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The Army's Optionally Manned Fighting Vehicle (OMFV) Program: Background and Issues for Congress

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SUMMARY

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The Army's Optionally Manned Fighting Vehicle (OMFV) Program: Background and Issues for Congress

In June 2018, in part due to congressional concerns, the Army announced a new modernization strategy and designated the Next Generation Combat Vehicle (NGCV) as the program to replace the M-2 Bradley. In October 2018, Army leadership decided to redesignate the NGCV as the Optionally Manned Fighting Vehicle (OMFV) and to add additional vehicle programs to what would be called the NGCV Program.

The M-2 Bradley, which has been in service since 1981, is an Infantry Fighting Vehicle (IFV) used to transport infantry on the battlefield and provide fire support to dismounted troops and suppress or destroy enemy fighting vehicles. Updated numerous times since its introduction, the M-2 Bradley is widely considered to have reached the technological limits of its capacity to accommodate new electronics, armor, and defense systems. Two past efforts to replace the M-2 Bradley—the Future Combat System (FCS) Program and the Ground Combat Vehicle (GCV) Program—were cancelled for programmatic and cost-associated reasons.

In late 2018, the Army established Army Futures Command (AFC), intended to establish unity of command and effort while consolidating the Army's modernization process under one roof. AFC is intended to play a significant role in OMFV development and acquisition.

On March 29, 2019, the Army issued a Request for Proposal (RFP) to industry for the OMFV. The Army characterized its requirements as "aggressive" and noted industry might not be able to meet all requirements.

On January 16, 2020, the Army canceled the current OMFV program, intending to restart the program following an analysis and revision of program requirements. According to Army officials, "a combination of requirements and schedule overwhelmed industry's ability to respond within the Army's timeline."

On February 7, 2020, the Army reopened the OMFV competition by releasing a new market survey with a minimally prescriptive wish list and an acquisition strategy that shifted most of the initial cost burden to the Army.

On April 9, 2020, the Army provided new OMFV program guidance to industry featuring a five-phased approach to acquisition as well as a pledge to "reduce foreign barriers to competition," and "identify a pathway to integrate relevant but immature technologies" into the program.

Reportedly, the three companies that participated in the first iteration of the OMFV competition—BAE Systems, General Dynamics Land Systems, and American Rheinmetall—have announced they plan to bid for the new OMFV program. In addition, Oshkosh Defense and Hanwha Defense, a Korean defense company, plan to team up on a bid and Mettle Ops, a small defense firm with no experience building vehicles, also plans to submit a bid. On July 23, 2021, the Army reportedly selected five companies to participate in the OMFV Concept Design Phase—American Rheinmetall, BAE Systems, General Dynamics Land Systems, Oshkosh Defense, and Point Blank Enterprises.

The Army's FY2022 OMFV Research, Development, Test, and Evaluation (RDT&E) budget request is $225.106 million.

Potential issues for Congress include oversight of the Army's OMFV acquisition strategy and OMFV program decisionmaking authority.

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Why Is This Issue Important to Congress?

The Army's Optionally Manned Fighting Vehicle (OMFV) is the Army's third attempt to replace the M-2 Bradley Infantry Fighting Vehicle (IFV) which has been in service since the early 1980s. Despite numerous upgrades since its introduction, the Army contends the M-2 is near the end of its useful life and can no longer accommodate the types of upgrades needed for it to be effective on the modern battlefield.

Because the OMFV would be an important weapon system in the Army's Armored Brigade Combat Teams (ABCTs), Congress may be concerned with how the OMFV would impact the effectiveness of ground forces over the full spectrum of military operations. Moreover, Congress might also be concerned with how much more capable the OMFV is projected to be over the M-2 Bradley to ensure that it is not just a costly marginal improvement over the current system. A number of past unsuccessful Army acquisition programs have served to heighten congressional oversight of Army programs, and the OMFV may be subject to a high degree of congressional interest.

The Next Generation Combat Vehicle (NGCV) Becomes the Optionally Manned Fighting Vehicle (OMFV)

In June 2018, the Army established the Next Generation Combat Vehicle (NGCV) program to replace the M-2 Bradley Infantry Fighting Vehicle (IFV), which has been in service since the early 1980s. In October 2018, Army leadership reportedly decided to redesignate the NGCV as the Optionally Manned Fighting Vehicle (OMFV) and add additional vehicle programs to what would be called the NGCV Program.[1] Under the new NGCV Program, the following systems are planned for development:

- The **Optionally Manned Fighting Vehicle (OMFV):** the M-2 Bradley IFV replacement.
- The **Armored Multi-Purpose Vehicle (AMPV):**[2] the M-113 vehicle replacement.
- **Mobile Protected Firepower (MPF):**[3] a light tank for Infantry Brigade Combat Teams (IBCTs).
- **Robotic Combat Vehicles (RCVs):** three versions, Light, Medium, and Heavy.
- **The Decisive Lethality Platform (DLP):** the M-1 Abrams tank replacement.

Report Focus on OMFV

Because AMPV and MPF are discussed in earlier CRS reports and the OMFV is in the early stages of development, the remainder of this report focuses on the OMFV. Because the DLP is

[1] Ashley Tressel, "MPF, AMPV Now Part of NGCV Family of Vehicles," *InsideDefense.com*, October 12, 2018.

[2] For additional information on the AMPV, see CRS Report R43240, *The Army's Armored Multi-Purpose Vehicle (AMPV): Background and Issues for Congress*, by Andrew Feickert.

[3] For additional information on MPF, see CRS Report R44968, *Infantry Brigade Combat Team (IBCT) Mobility, Reconnaissance, and Firepower Programs*, by Andrew Feickert.

intended to replace the Army's second major ground combat system—the M-1 Abrams Tank—it will be addressed in a separate CRS report in the future.

Preliminary OMFV Requirements[4]

The Army's preliminary basic operational requirements for the OMFV included the following:

- **Optionally manned.** It must have the ability to conduct remotely controlled operations while the crew is off-platform.[5]
- **Capacity.** It should eventually operate with no more than two crewmen and possess sufficient volume under armor to carry at least six soldiers.
- **Transportability.** Two OMFVs should be transportable by one C-17 and be ready for combat within 15 minutes.
- **Dense urban terrain operations and mobility.** Platforms should include the ability to super elevate weapons and simultaneously engage threats using main gun and an independent weapons system.
- **Protection.** It must possess requisite protection to survive on the contemporary and future battlefield.
- **Growth.** It should possess sufficient size, weight, architecture, power, and cooling for automotive and electrical purposes to meet all platform needs and allow for preplanned product improvements.
- **Lethality.** It should apply immediate, precise, and decisively lethal extended range medium-caliber, directed energy, and missile fires in day/night/all-weather conditions, while moving and/or stationary against moving and/or stationary targets. The platform should allow for mounted, dismounted, and unmanned system target handover.
- **Embedded platform training.** It should have embedded training systems that have interoperability with the Synthetic Training Environment.
- **Sustainability.** Industry should demonstrate innovations that achieve breakthroughs in power generation and management to obtain increased operational range and fuel efficiency, increased silent watch, part and component reliability, and significantly reduced sustainment burden.

Additional requirements included the capacity to accommodate[6]

- reactive armor,
- an Active Protection System (APS),

[4] Bob Purtiman, "Preparing for Future Battlefield: The Next Generation Combat Vehicle," *Army News,* September 17, 2018.

[5] For additional information on autonomous systems, see CRS Report R45392, *U.S. Ground Forces Robotics and Autonomous Systems (RAS) and Artificial Intelligence (AI): Considerations for Congress*, coordinated by Andrew Feickert.

[6] Project Manager NGCV, NGCV OMFV Industry Day Briefing, August 6, 2018, and David Vergun, "Next Generation Combat Vehicle Must be Effective in Mega Cities, FORSCOM Commander Says," *Army News,* November 30, 2017.

- artificial intelligence,[7] and
- directed-energy weapons[8] and advanced target sensors.

Background

The Army's Current Infantry Fighting Vehicle (IFV)

The M-2 Bradley is an Infantry Fighting Vehicle (IFV) used to transport infantry on the battlefield and provide fire support to dismounted troops and suppress or destroy enemy fighting vehicles. The M-2 has a crew of three—commander, gunner, and driver—and carries seven fully equipped infantry soldiers. M-2 Bradley IFVs are primarily found in the Army's Armored Brigade Combat Teams (ABCT). The first M-2 prototypes were delivered to the Army in December 1978, and the first delivery of M-2s to units started in May 1981. The M-2 Bradley has been upgraded often since 1981.[9]

M-2 Limitations and the Need for a Replacement

Despite numerous upgrades over its lifetime, the M-2 Bradley has what some consider a notable limitation. Although the M-2 Bradley can accommodate seven fully equipped infantry soldiers, infantry squads consist of nine soldiers. As a result, "each mechanized [ABCT] infantry platoon has to divide three squads between four Bradleys, meaning that all the members of a squad are not able to ride in the same vehicle."[10] This limitation raises both command and control and employment challenges for Bradley-mounted infantry squads and platoons.

The M-2 Bradley first saw combat in 1991 in Operation Desert Storm, where its crews were generally satisfied with its performance.[11] The M-2's service in 2003's Operation Iraqi Freedom (OIF) was also considered satisfactory. However, reports of vehicle and crew losses attributed to mines, improvised explosive devices (IEDs), and anti-tank rockets—despite the addition of reactive armor[12] to the M-2—raised concerns about the survivability of the Bradley.[13]

Furthermore, the M-2 Bradley is reportedly reaching the technological limits of its capacity to accommodate new electronics, armor, and defense systems.[14] By some accounts, M-2 Bradleys

[7] For additional information on Army artificial intelligence efforts, see CRS Report R45392, *U.S. Ground Forces Robotics and Autonomous Systems (RAS) and Artificial Intelligence (AI): Considerations for Congress*, coordinated by Andrew Feickert.

[8] For information on Army directed energy efforts, see CRS Report R45098, *U.S. Army Weapons-Related Directed Energy (DE) Programs: Background and Potential Issues for Congress*, by Andrew Feickert.

[9] Sebastien Roblin, "The Army's Plan for a Super Bradley Fighting Vehicle are Dead," *The National Interest*, February 10, 2019.

[10] Ibid.

[11] United States Government Accountability Office (GAO), "Operation Desert Storm: Early Performance Assessment of Bradley and Abrams," GAO/NSIAD-92-94, January 1992.

[12] Reactive armor typically consists of a layer of high explosive between two metallic armor plates. When a penetrating weapon strikes the armor, the explosive detonates, thereby damaging the penetrator or disrupting the resulting plasma jet generated by the penetrator.

[13] Sebastien Roblin, "The Army's M-2 Bradley Fighting Vehicle is Old. What Replaces it Could be Revolutionary," *The National Interest*, October 27, 2018.

[14] Sydney J. Freedberg Jr., "Army Pushes Bradley Replacement; Cautious on Armed Robots," *Breaking Defense*, June 27, 2018.

during OIF routinely had to turn off certain electronic systems to gain enough power for anti-roadside-bomb jammers. Moreover, current efforts to mount Active Protection Systems (APS)[15] on M-2 Bradleys to destroy incoming anti-tank rockets and missiles are proving difficult.[16] Given its almost four decades of service, operational limitations, demonstrated combat vulnerabilities, and difficulties in upgrading current models, many argue the M-2 Bradley is a candidate for replacement.

Past Attempts to Replace the M-2 Bradley IFV

The Army has twice attempted to replace the M-2 Bradley IFV—first as part of the Future Combat System (FCS) Program,[17] which was cancelled by the Secretary of Defense in 2009, and second with the Ground Combat Vehicle (GCV) Program,[18] cancelled by the Secretary of Defense in 2014. These cancellations, along with a series of high-profile studies, such as the 2011 Decker-Wagner Army Acquisition Review, have led many to call into question the Army's ability to develop and field ground combat systems.

Why the FCS and GCV Programs Were Cancelled

FCS

Introduced in 1999 by Army Chief of Staff General Eric Shinseki, FCS was envisioned as a family of networked manned and unmanned vehicles and aircraft for the future battlefield. The Army believed that advanced sensor technology would result in total battlefield awareness, permitting the development of lesser-armored combat vehicles and the ability to engage and destroy targets beyond the line-of-sight. However, a variety of factors led to the program's cancellation, including a complicated, industry-led management approach; the failure of a number of critical technologies to perform as envisioned; and frequently changing requirements from Army leadership—all of which resulted in program costs increasing by 25%.[19] After $21.4 billion already spent[20] and the program only in the preproduction phase, then Secretary Gates restructured the program in 2009, effectively cancelling it.[21]

GCV[22]

Recognizing the need to replace the M-2 Bradley, as part of the FCS "restructuring," the Army was directed by the Secretary of Defense in 2009 to develop a ground combat vehicle (GCV) that

[15] For additional information on active protection systems, see CRS Report R44598, *Army and Marine Corps Active Protection System (APS) Efforts*, by Andrew Feickert.

[16] Ibid.

[17] For additional historical information on the Future Combat System, see CRS Report RL32888, *Army Future Combat System (FCS) "Spin-Outs" and Ground Combat Vehicle (GCV): Background and Issues for Congress*, by Andrew Feickert and Nathan J. Lucas.

[18] For additional historical information on the Ground Combat Vehicle, see CRS Report R41597, *The Army's Ground Combat Vehicle (GCV) Program: Background and Issues for Congress*, by Andrew Feickert.

[19] Stephen Rodriguez, "Top Ten Failed Defense Programs of the RMA Era," *War on the Rocks*, December 2, 2014.

[20] United States Government Accountability Office (GAO), Army Modernization: Steps Needed to Ensure Army Futures Command Fully Applies Leading Practices, GAO-19-132, January 2019, p. 3.

[21] Stephen Rodriguez, "Top Ten Failed Defense Programs of the RMA Era," *War on the Rocks*, December 2, 2014.

[22] Information in this section is taken directly from CRS Report R41597, *The Army's Ground Combat Vehicle (GCV) Program: Background and Issues for Congress*, by Andrew Feickert.

would be relevant across the entire spectrum of Army operations, incorporating combat lessons learned in Iraq and Afghanistan. In 2010, the Army, in conjunction with the Pentagon's acquisition office, conducted a review of the GCV program to "review GCV core elements including acquisition strategy, vehicle capabilities, operational needs, program schedule, cost performance, and technological specifications." This review found that the GCV relied on too many immature technologies, had too many performance requirements, and was required by Army leadership to have too many capabilities to make it affordable. In February 2014, the Army recommended terminating the GCV program and redirecting the funds toward developing a next-generation platform.[23] The cost of GCV cancellation was estimated at $1.5 billion.[24]

After the Ground Combat Vehicle (GCV): The Next Generation Combat Vehicle (NGCV) Program

In the aftermath of the GCV program, the Army embarked on a Future Fighting Vehicle (FFV) effort in 2015. Army officials—described as "cautious" and "in no hurry to initiate an infantry fighting vehicle program"—instead initiated industry studies to "understand the trade space before leaping into a new program."[25] In general, Army combat vehicle modernization efforts post-FCS were characterized as upgrading existing platforms as opposed to developing new systems. This was due in part to reluctance of senior Army leadership, but also to significant budgetary restrictions imposed on the Army during this period. Some in Congress, however, were not pleased with the pace of Army modernization, reportedly noting the Army was "woefully behind on modernization" and was "essentially organized and equipped as it was in the 1980s."[26] In June 2018, in part due to congressional concerns, the Army announced a new modernization strategy and designated the NGCV as the second of its six modernization priorities.[27] Originally, the NGCV was considered the program to replace the M-2 Bradley. Development of the NGCV would be managed by the Program Executive Officer (PEO) Ground Combat Systems, under the Assistant Secretary of the Army (ASA), Acquisition, Logistics, and Technology (ALT).

Army Futures Command (AFC) and Cross-Functional Teams (CFTs)

Army Futures Command[28]

In November 2017, the Army established a Modernization Task Force to examine the options for establishing an Army Futures Command (AFC) that would establish unity of command and effort as the Army consolidated its modernization process under one roof. Formerly, Army

[23] Remarks by then-Secretary of Defense Chuck Hagel FY2015 Budget Preview, Pentagon Press Briefing Room, Monday, February 24, 2014.

[24] United States Government Accountability Office (GAO), Army Modernization: Steps Needed to Ensure Army Futures Command Fully Applies Leading Practices, GAO-19-132, January 2019, p. 3.

[25] Sebastian Sprenger, "Army Bides its Time in Next Steps Toward Infantry Fighting Vehicle," *InsideDefense.com*, June 10, 2015.

[26] Association of the U.S. Army, "Milley: Readiness, with Needed Modernization, is a Top Priority," March 1, 2016.

[27] U.S. Army Modernization Strategy, June 6, 2018, https://www.army.mil/standto/2018-06-06.

[28] Information in this section is taken directly from CRS Insight IN10889, *Army Futures Command (AFC)*, by Andrew Feickert.

modernization activities were primarily spread among Forces Command (FORSCOM), Training and Doctrine Command (TRADOC), Army Materiel Command (AMC), Army Test and Evaluation Command (ATEC), and the Army Deputy Chief of Staff G-8.[29] Intended to be a 4-star headquarters largely drawn from existing Army commands, AFC was planned to be established in an urban environment with ready access to academic, technological, and industrial expertise. On July 13, 2018, the Army announced that AFC would be headquartered in Austin, TX, and that it had achieved initial operating capability on July 1, 2018. AFC reached full operational capability on July 31, 2019.[30] Sub-organizations, many of which resided within FORSCOM, TRADOC, and AMC, were transitioned to AFC.

Cross-Functional Teams (CFTs)

Army Futures Command uses what it calls Cross-Functional Teams (CFT) as part of its mission, which includes the development of NGCV. As a means to "increase the efficiency of its requirements and technology development efforts, the Army established cross-functional team pilots for modernization" in October 2017.[31] These CFTs are intended to

- leverage expertise from industry and academia;
- identify ways to use experimentation, prototyping, and demonstrations; and
- identify opportunities to improve the efficiency of requirements development and the overall defense systems acquisition process.[32]

The eight CFTs are

- Long Range Precision Fires at Fort Sill, OK;
- Next Generation Combat Vehicle at Detroit Arsenal, MI;
- Future Vertical Lift at Redstone Arsenal, AL;
- Network Command, Control, Communication, and Intelligence at Aberdeen Proving Ground, MD;
- Assured Positioning, Navigation and Timing at Redstone Arsenal, AL;
- Air and Missile Defense at Fort Sill, OK;
- Soldier Lethality at Fort Benning, GA; and
- Synthetic Training Environment in Orlando, FL.[33]

CFTs are part of AFC. Regarding the NGCV, program acquisition authority is derived from Assistant Secretary of the Army (ASA) for Acquisition, Logistics, and Technology (ALT), who is also the senior Army Acquisition Executive (AAE), to whom the Program Executive Officers (PEOs) report. AFC is to be responsible for requirements and to support PEOs. The NGCV

[29] The Army G-8 is the Army's lead for matching available resources to the defense strategy and the Army plan. They accomplish this through participation in Office of the Secretary of Defense–led defense reviews and assessments, the programming of resources, material integration, analytical and modeling capabilities, and the management of the Department of the Army studies and analysis. http://www.g8.army.mil/, accessed February 21, 2019.

[30] Sean Kimmons, "In First Year, Futures Command Grows from 12 to 24,000 Personnel," *Army News Service*, July 19, 2019.

[31] United States Government Accountability Office (GAO), Army Modernization: Steps Needed to Ensure Army Futures Command Fully Applies Leading Practices, GAO-19-132, January 2019, p. 7.

[32] Ibid., p. 8.

[33] Ibid.

Program Manager (PM), who is subordinate to PEO Ground Combat Systems, remains under the control of ASA (ALT) but are teamed with CFTs under control of the AFC.[34] The Government Accountability Office (GAO) notes, however

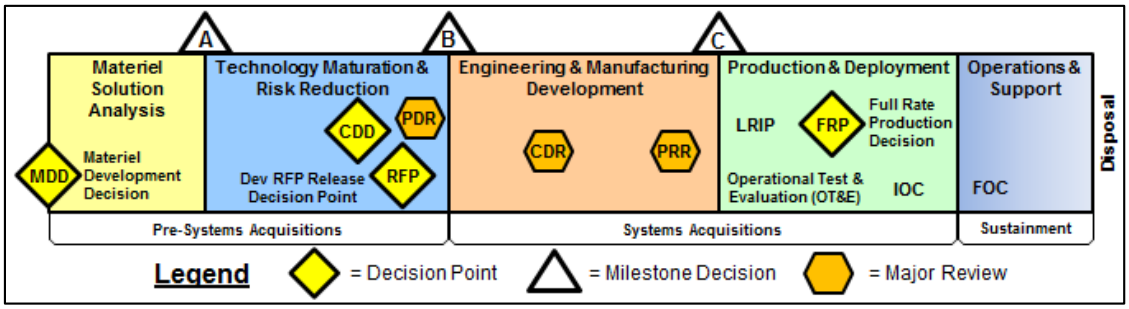
> Army Futures Command has not yet established policies and procedures detailing how it will execute its assigned mission, roles, and responsibilities. For example, we found that it is not yet clear how Army Futures Command will coordinate its responsibilities with existing acquisition organizations within the Army that do not directly report to it. One such organization is the Office of the Assistant Secretary of the Army for Acquisition, Logistics and Technology [ASA (ALT)]—the civilian authority responsible for the overall supervision of acquisition matters for the Army—and the acquisition offices it oversees.[35]

The Army's explanation of how the NGCV program is to be administered and managed, along with GAO's findings regarding AFC not yet having established policies and procedures, suggests a degree of uncertainty as to how the NGCV program was to be managed.

Army's Original OMFV Acquisition Approach[36]

Figure 1 depicts the Department of Defense (DOD) Systems Acquisition Framework, which illustrates the various phases of systems development and acquisitions and is applicable to the procurement of Army ground combat systems.

Figure 1. DOD Systems Acquisition Framework



Source: http://acqnotes.com/acqnote/acquisitions/acquisition-process-overview, accessed February 13, 2019.

Notes: Each phase of the acquisition process has specific DOD regulations and federal statutes that must be met. At the end of each phase, there is a Milestone Review (A, B, C) to determine if the acquisition program has met these required regulations and statues to continue on into the next phase.

Critical Development Document (CDD): The CDD specifies the operational requirements for the system that will deliver the capability that meets operational performance criteria specified in the Initial Capabilities Document (ICD).

Preliminary Design Review (PDR): The PDR is a technical assessment that establishes the Allocated Baseline of a system to ensure a system is operationally effective.

Request for Proposal (RFP): A RFP is a document that solicits proposal, often made through a bidding process, by an agency or company interested in procurement of a commodity, service, or valuable asset, to potential suppliers to submit business proposals.

[34] U.S. Army Stand-To, Army Futures Command, March 28, 2018.

[35] United States Government Accountability Office (GAO), Army Modernization: Steps Needed to Ensure Army Futures Command Fully Applies Leading Practices, GAO-19-132, January 2019, p. 14.

[36] For additional information on defense acquisition, see CRS Report R44010, *Defense Acquisitions: How and Where DOD Spends Its Contracting Dollars*, by Moshe Schwartz, John F. Sargent Jr., and Christopher T. Mann.

Critical Design Review (CDR): A CDR is a multi-disciplined technical review to ensure that a system can proceed into fabrication, demonstration, and test and can meet stated performance requirements within cost, schedule, and risk.

Production Readiness Review (PRR): The PRR assesses a program to determine if the design is ready for production.

Original OMFV Acquisition Plan

Reportedly, the original OMFV plan called for five years of Technology Development, starting in FY2019, and leading up to a FY2024 Milestone B decision to move the program into the Engineering and Manufacturing Development phase.[37] If the Engineering and Manufacturing Development phase proved successful, the Army planned for a Milestone C decision to move the program into the Production and Deployment phase in FY2028, with the intent of equipping the first unit by FY2032.[38]

Secretary of the Army Accelerates the Program

In April 2018, then-Secretary of the Army Mark Esper, noting that industry could deliver OMFV prototypes by FY2021, reportedly stated he wanted to accelerate the OMFV timeline.[39] After examining a number of possible courses of action, the Army reportedly settled on a timeline that would result in an FY2026 fielding of the OMFV.[40] This being the case, the Army reportedly would pursue a "heavily modified off-the-shelf model meaning a mature chassis and turret integrated with new sensors."[41] Reportedly, some Army officials suggested they would have liked to see a 50 mm cannon on industry-proposed vehicles.[42] Under this new acquisition approach, the Army planned to

- award up to two vendors three-year Engineering and Manufacturing Development (EMD) contracts in the first quarter of FY2020;
- if EMD is successful, make a Milestone C decision to move the program into the Production and Development phase in the third quarter of FY2023; and
- equip first units in the first quarter of FY2026.[43]

[37] Ashley Tressel, "How the Army Secretary Accelerated Service's New Combat Vehicle Program," *InsideDefense.com*, November 20, 2018.

[38] Ibid.

[39] Ibid.

[40] Ibid.

[41] Ibid.

[42] Ibid.

[43] Project Manager NGCV, NGCV OMFV Industry Day Briefing, August 6, 2018, p. 9.

Army Issues OMFV Request for Proposal (RFP)[44]

On March 29, 2019, the Army issued a Request for Proposal (RFP)[45] to industry for the OMFV. The Army characterized its requirements as "aggressive" and noted industry might not be able to meet all requirements. Major requirements included the ability to transport two OMFVs in a C-17 aircraft which will likely require the vehicle to have the ability to accommodate add-on armor; a threshold (minimum) requirement for a 30 mm cannon and a second generation forward-looking infra-red radar (FLIR); and objective (desired) requirements for a 50 mm cannon and a third generation FLIR. By October 1, 2019, industry was required to submit prototype vehicles to the Army for consideration and in the second quarter of FY2020, the Army planned to select two vendors to build 14 prototypes for further evaluation.

Potential OMFV Candidates

Reportedly, the Army originally planned to award a production contract for up to 3,590 OMFVs to a single vendor.[46] Although the Army reportedly expected five to seven vendors to compete for the OMFV EMD contract, three vendors showcased prospective platforms in the fall of 2018.[47]

BAE Systems

BAE Systems had proposed its fifth-generation CV-90. The CV-90 was first fielded in Europe in the 1990s. The latest version mounted a 35 mm cannon provided by Northrop Grumman that can accommodate 50 mm munitions. The CV-90 featured the Israeli IMI Systems Iron Fist Active Protection System (APS). The CV-90 could accommodate a three-person crew and five infantry soldiers.

[44] Information in this section is taken from Devon L. Suits, "Army Looking for Optionally-Manned Fighting Vehicle," *Army News Service,* March 28, 2019; Connie Lee, "Breaking: Army to Release Optionally Manned Fighting Vehicle RFP," *National Defense,* March 27, 2019; Jen Judson, "Army Drops Request for Proposals to Build Next-Gen Combat Vehicle Prototypes," *Defense News.com,* March 26, 2019: and Ashley Roque, "U.S. Army Releases OMFV RFP, Focusing on What is Deemed Realistically Obtainable," *Jane's Defence Weekly,* April 10, 2019, p. 11.

[45] A Request for Proposal (RFP) is a solicitation used in negotiated acquisition to communicate government requirements to prospective contractor and to solicit proposals. At a minimum, solicitations shall describe the Government's requirement, anticipated terms and conditions that will apply to the contract, information required in the offeror's proposal, and (for competitive acquisitions) the criteria that will be used to evaluate the proposal and their relative importance. See DOD Acquisition Notes: http://acqnotes.com/acqnote/tasks/request-for-proposalproposal-development, accessed June 13, 2019.

[46] Jason Sherman, "Army Tweaking NGCV Requirements, Requests for Proposals Following Recent Industry Parlay," *InsideDefense.com*, October 5, 2018.

[47] Information in this section is taken from Ashley Tressel, "Contractors Debut Possible Bradley Replacement Vehicles," *InsideDefense.com*, October 19, 2018.

Figure 2. BAE Prototype CV-90

Source: https://www.baesystems.com/en-us/product/cv90, accessed January 31, 2019.

BAE Decides Not to Compete for the OMFV Contract[48]

On June 10, 2019, BAE reportedly announced it would not compete for the OMFV contract suggesting the requirements and acquisition schedule "did not align with our current focus or developmental priorities."[49]

General Dynamics Land Systems (GDLS)

GDLS proposed its Griffin III technology demonstrator, which used the British Ajax scout vehicle chassis. The Griffin III mounted a 50 mm cannon and could accommodate an APS and host unmanned aerial vehicles (UAVs). The Griffin II could accommodate a two-person crew and six infantry soldiers.

[48] Ashley Tressel, "BAE Ducks Out of OMFV Competition," *InsideDefense.com*, June 10, 2019.

[49] Ibid.

Figure 3. GDLS Griffin III Prototype

Source: Sydney J. Freedberg, "General Dynamics Land Systems Griffin III for U.S. Army's Next Generation Combat Vehicle (NGCV)," October 8, 2018.

Raytheon/Rheinmetall

Raytheon/Rheinmetall proposed its Lynx vehicle. It could mount a 50 mm cannon and thermal sights, and could accommodate both APS and UAVs. Raytheon states that the Lynx can accommodate a nine-soldier infantry squad.[50]

Army Disqualifies Raytheon/Rheinmetall Lynx Prototype[51]

Reportedly, the Army disqualified the Raytheon/Rheinmetall bid because it failed to deliver a single OMFV prototype by October 1, 2019, as stipulated in the RFP, meaning only a single vendor—General Dynamics Land Systems (GDLS)—was left to compete for the EMD contract. Supposedly, Rheinmetall was unable to ship its Lynx prototype from Germany (although Rheinmetall shipped it to the United States in 2018) and asked the Army for a four-week extension so it could ship the vehicle to Aberdeen Proving Grounds in Maryland or, if that was not acceptable, arrange for the Army to take possession of the vehicle in Germany instead. Both requests by Rheinmetall were reportedly denied by the Army. Reportedly, the Army Acquisition Authority—the ASA (ALT)—was willing to grant a four-week extension, but Army Futures Command (AFC) insisted the Army adhere to the October 1, 2019, deadline.[52]

[50] https://www.raytheon.com/capabilities/products/lynx-infantry-fighting-vehicle, accessed January 31, 2019.

[51] Information in this section is taken from Jen Judson, "Lynx 41 Disqualified from Bradley Replacement Competition," *DefenseNews.com*, October 4, 2019, and Sydney J. Freedberg, Jr., "Bradley Replacement: Army Risks Third Failure in a Row," *Breaking Defense*, October 7, 2019.

[52] Judson, "Lynx 41 Disqualified from Bradley Replacement Competition."

Reportedly, a number of companies were interested in competing and submitting bids for the OMFV EMD contract but expressed concerns to the Army that meeting its requirements and timelines would not be possible and asked for extensions so they could submit bids. Some in industry reportedly had expressed their concerns to Army leadership that it would be difficult to meet approximately 100 mandatory vehicle requirements with a nondevelopmental vehicle prototype in the 15 months allotted.[53]

Figure 4. Raytheon/Rheinmetall Lynx Prototype

Source: https://www.rheinmetall-defence.com/en/rheinmetall_defence/systems_and_products/vehicle_systems/armoured_tracked_vehicles/lynx/index.php, accessed January 31, 2019.

Program Activities

Army Cancels OMFV Program[54]

Reportedly, on January 16, 2020, the Army canceled the current OMFV program, with the intent to restart the program following an analysis and revision of program requirements. According to Army officials, "a combination of requirements and schedule overwhelmed industry's ability to respond within the Army's timeline."[55] Others suggest that after the Army released its final RFP, several companies raised concerns with the Army about the requirement for vendors to produce a nondevelopmental prototype within 15 months, as previously noted, as well as the requirement to fit two OMFVs inside a C-17 aircraft.[56] At the time of the cancellation, Army officials reportedly

[53] Ibid.

[54] Unless otherwise noted, information in this section is taken from Ashley Tressel, "Army Scraps OMFV Program to Start Competition Over," *InsideDefense.com*, January 16, 2020.

[55] Ibid.

[56] Ashley Roque and Robin Hughes, "No Contest: Briefing: The U.S. Army's OMFV Competition," Jane's Defence

would not commit to a timeline for a revised program or if it would affect the original fielding date of FY2026. Army officials characterized the program cancellation as positive, noting it would save $9 billion by cancelling the program early and that the decision to cancel demonstrated the value of AFC.[57]

Army Restarts OMFV Program[58]

Reportedly, on February 7, 2020, the Army reopened the OMFV competition by releasing a new market survey with a minimally prescriptive wish list and an acquisition strategy that shifted most of the initial cost burden to the Army, in what was described as "a bid to regain industry's trust after a faulty start."[59] As part of the new acquisition strategy, the Army asked potential vendors to first submit a "rough digital prototype" and stated that the Army would not initially seek a target fielding date of FY2026. Also, the Army suggested the requirement to fit two OMFVs on a C-17 aircraft was not part of this new "wish list." Reportedly, it is hoped this new acquisition approach will bring companies who initially bowed out of the previous competition back into the new competition.

New OMFV Program Guidance[60]

On April 9, 2020, the Army released new OMFV program guidance to industry. Of note, the Army stated it now plans to "reduce foreign barriers to competition," and "identify a pathway to integrate relevant but immature technologies" for the OMFV program. The Army currently plans for a five-phased approach to OMFV acquisition:

- development and refinement OMFV acquisition and contracting strategies;
- preliminary design;
- detailed design;
- prototype building and testing; and
- production and fielding.

The Army now plans to award the first contract in the fourth quarter of FY2021, with a second award planned for the second quarter of FY2023 and down-select to a single vendor in the second quarter of FY2027. The new program guidance also calls for a full-rate production decision in the third quarter of FY2029. The Army now plans for the first unit to be equipped in the fourth quarter of FY2028.

Weekly, November 13, 2019, p. 27.

[57] Ashley Tressel, "Army Scraps OMFV Program to Start Competition Over," *InsideDefense.com*, January 16, 2020.

[58] Information in this section, unless otherwise noted, is taken from Ashley Tressel, "Army Reopens Competition for Bradley Replacement," *InsideDefense.com*, February 7, 2020.

[59] Ibid.

[60] Information in this section is taken from U.S. Army Document "Industry Day Narrative for Optionally Manned Fighting Vehicle (OMFV)," dated April 9, 2020, and Ashley Tressel, "Army Releases New Details on OMFV Competition," *InsideDefense.com*, April 10, 2020.

Army Issues Draft Request for Proposal (RFP) for the Preliminary Design Phase[61]

On July 17, 2020, the Army issued a draft RFP for the OMFV's Preliminary Design Phase. The draft RFP was to be open for 40 days to collect feedback from industry to inform the final RFP, which was planned to result in the award of up to five contracts in June of 2021.

Participants in the OMFV Preliminary Design Phase

Reportedly, the three companies that participated in the first iteration of the Optionally Manned Fighting Vehicle competition—BAE Systems, General Dynamics Land Systems, and American Rheinmetall—announced they planned to bid for the Preliminary Design Phase.[62] Reportedly, BAE Systems planned to team with Elbit Systems of America on its OMFV bid. BAE Systems manufactures the Bradley Fighting Vehicle.[63] General Dynamics Land Systems reportedly planned to partner with Applied Intuition, AeroVironment, and General Dynamics Mission Systems on its OMFV design.[64] American Rheinmetall planned to partner with L3Harris Technologies, and the team planned to pair Rheinmetall's Lynx armored fighting vehicle with L3Harris' modular systems technology.[65] Reportedly Raytheon, who partnered with Rheinmetall on the previous OMFV competition, will also be part of the new team.[66] Reportedly Oshkosh Defense and Hanwha Defense, a Korean defense company, planned to submit a joint bid for the OMFV concept design phase and Mettle Ops, a small defense firm that reportedly has never built a vehicle, has also bid for the OMFV concept design phase.[67]

Army Selects Five Companies for OMFV Concept Design Phase

On July 23, 2021, the Army reportedly selected five companies to participate in the OMFV Concept Design Phase:

- American Rheinmetall;
- BAE Systems;
- General Dynamics Land Systems;
- Oshkosh Defense; and
- Point Blank Enterprises.[68]

The five contracts are worth a combined $299.4 million to begin concept design work on the OMFV. During the Concept Design Phase, the Army reportedly will have the companies share

[61] OMFV Draft RFP W56HZV-20-R-0142, issued July 17, 2020, and Ashley Tressel, "Army Releases Draft RFP for OMFV Preliminary Design Phase," *InsideDefense.com*, July 17, 2020.

[62] Ethan Sterenfeld, "BAE, General Dynamics, Rheinmetall Bid for OMFV," *InsideDefense.com*, April 16, 2021.

[63] Ibid.

[64] Ibid.

[65] Ibid.

[66] Ibid.

[67] Ethan Sterenfeld, "Oshkosh, Hanwha Team Up for OMFV Bid," *InsideDefense.com*, April 19, 2021, and "Small Michigan Firm Bids for OMFV," *InsideDefense.com*, April 21, 2021.

[68] Ethan Sterenfeld, "Army Selects Five Companies for OMFV Concept Design," *InsideDefense.com*, July 23, 2021.

their OMFV design concepts with the Army, which will give feedback and adjust vehicle requirements.[69] The intent is for

> The government to refine requirements and specifications, feed that back out to industry so they can update their concepts, and repeat that cycle. Plans call for at least two cycles of requirements and specifications updates back and forth with industry before the conclusion of the concept design phase, at which point the Army expects the vendors to have highly defined concepts.[70]

Reportedly, the Army plans to publish the first formal OMFV requirements document in the first quarter of FY2022.[71] Plans call for another open competition in the second quarter of FY2023 for the next two phases of the OMFV competition, in which up to three companies are to create detailed designs and OMFV prototypes.[72] The Army plans to choose a single vendor to produce the OMFV in FY2027.[73]

FY2022 OMFV Budgetary Summary

The Army's FY2022 OMFV Research, Development, Test, and Evaluation (RDT&E) budget request is $225.106 million.[74] These funds are intended to cover among other things

> Initial OMFV development costs for up to 5 vendors to mature design. The efforts include, but not limited to; hardware and software development, producibility engineering and planning, development tooling, system engineering and program management, initial logistics data and product development, and data and support equipment.[75]

Potential Issues for Congress

Oversight of the Army's OMFV Acquisition Strategy

While there is not a great deal of public detail regarding the Army's OMFV acquisition strategy, in a 2020 interview the former ASA (ALT) Dr. Bruce Jette outlined the Army's plans:[76]

- The Army's current plan is to choose up to five vendors for the original equipment manufacturer position, while also choosing up to five separate contractors interested in developing subcomponents.
- Three of the five vendors would then move on to produce a "Detailed Digital Design" similar to a Critical Design Review (CDR), "where we prove out [that] all of the technologies that are being offered can be accomplished, that they can

[69] Ibid.

[70] Ibid.

[71] Ibid.

[72] Ibid.

[73] Ibid.

[74] Department of Defense Fiscal Year (FY) 2022 Budget Estimates, May 2021, Army Justification Book of Research, Development, Test & Evaluation, Army RDT&E—Volume II, Budget Activity 5C, p. 453.

[75] Ibid., p. 456.

[76] Ashley Tressel, "Army Reopens Competition for Bradley Replacement," *InsideDefense.com*, February 7, 2020.

be fitted together, that they have open architectures, that there's flexibility in the design."[77]

- Two of the vendors will then be funded to build physical prototypes, and "we'll do all the standard things you do with physical prototypes—we will validate and verify what we learned in the modeling and simulation, and in the soldier touchpoint, we'll confirm that the things we found were feasible were in fact feasible."[78]
- After that, the Army will choose a single prime contractor and move the "characteristics" into a requirements document.
- The Army would then, at that point, decide whether to move the program from a Middle-Tier Acquisition Authority[79] to a Federal Acquisition Regulation-based contract and solidify a timeline.

While this description is useful, it can be argued that for a potentially $45 billion program,[80] a more detailed plan is necessary for oversight. While the Army's April 9, 2020, revised program guidance to industry does provide some additional context and tentative dates, the guidance's new proposed five program phases arguably lack the level detail needed for program oversight.

Reportedly, the Army's current OMFV acquisition strategy takes a unique approach to system development, particularly in terms of system specifications and requirements:

> Over the course of the next 15 months, the teams will take their initial concepts, share those with the government and "begin a back and forth dialogue between what we see as value in their concepts.... Some of that will include putting their concepts through modeling and simulation to demonstrate some of the operational value of some of those ideas. We, the government, will refine the requirements and specifications, feed that back out to the industry so they can update their concepts and repeat that cycle. There will be at least two cycles of requirements and specification updates back and forth with industry before the conclusion of the concept design phase at which point we expect the vendors to have highly refined concepts and be ready for actual design."
>
> Following the concept design phase, the Army will move into a detailed design phase, through another full and open competition, that will be executed over the course of FY2023 and FY2024. Awards for up to three contracts are expected in the second quarter of FY2023. The prototyping phase will begin in FY2025 and vehicle testing will begin in FY2026 and wrap up the following year with a production decision planned for the fourth quarter of FY2027. Full-rate production is expected to begin in the second quarter of FY2030.[81]

[77] Ibid.

[78] Ibid.

[79] Middle Tier Acquisition (MTA) is a rapid acquisition interim approach that focuses on delivering capability in a period of two to five years. The interim approach was granted by Congress in the FY2016 National Defense Authorization Act (NDAA) Section 804 and is not be subject to the Joint Capabilities Integration Development System (JCIDS) and DOD Directive 5000.01 "Defense Acquisition System." The approach consists of utilizing two acquisition pathways: (1) Rapid Prototyping and (2) Rapid Fielding. It does this by streamlining the testing and deployment of prototypes or upgrading existing systems with already proven technology. See AcqNotes, http://acqnotes.com/acqnote/acquisitions/middle-tier-acquisitions, accessed February 14, 2020.

[80] Jason Sherman, "Army Estimates $45 Billion Total Price Tag—or $11 Million per Vehicle—for OMFV," *InsideDefense.com*, October 11, 2019.

[81] Jen Judson, "US Army Chooses Competitors to Design Infantry Fighting Vehicle Replacement," *Defense News*, July 24, 2021.

The Army's plan calls for 15 months to develop systems requirements and specifications with its five potential vendors before moving on to the actual OMFV design. Decisions made by the Army during this phase in terms of OMFV specifications and requirements will essentially determine the outcome of the OMFV program. In this regard, the Army could either opt for a technologically feasible and affordable solution or accept design risk and opt for a more expensive and technologically advanced version, potentially relying on immature or aspirational technology much as was the case for the FCS. Because of the ramifications of these decisions on the future of the OMFV program, Congress might decide to explore its oversight options during this phase of OMFV specifications and requirements development with Army and DOD leadership.

OMFV Program Decisionmaking Authority

As part of the Army's new OMFV acquisition strategy, given previously discussed concerns over AFC's programmatic role and decisionmaking authorities, it could be useful if the Army designates who—the ASA (ALT) or Commander, AFC—will make programmatic decisions by acquisition phase or activity. Given the alleged disagreement between the ASA (ALT) and Commander, AFC, over disqualifying Raytheon/Rheinmetall in the previous OMFV program, a clear delineation of program decisionmaking authority by acquisition phase or activity could assist policymakers in their oversight of the program. In addition, it might also be beneficial to designate who will make the final decision over modifying, adding, or eliminating OMFV specifications and operational requirements during the design phases of development. Given the Army's current plans to explore OMFV specifications and requirements with industry over the next 15 months, understanding who in Army leadership will make these program-defining decisions could be beneficial to oversight activities.

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