

The Army's Armored Multi-Purpose Vehicle (AMPV): Background and Issues for Congress

Andrew Feickert

Specialist in Military Ground Forces

March 9, 2018

Congressional Research Service

7-5700

www.crs.gov

R43240

Summary

The Armored Multi-Purpose Vehicle (AMPV) is the Army's proposed replacement for the Vietnam-era M-113 personnel carriers, which are still in service in a variety of support capacities in Armored Brigade Combat Teams (ABCTs). While M-113s no longer serve as infantry fighting vehicles, five variants of the M-113 are used as command and control vehicles, general purpose vehicles, mortar carriers, and medical treatment and evacuation vehicles.

The AMPV is intended to be a non-developmental program (candidate vehicles will be either existing vehicles or modified existing vehicles—not vehicles that are specially designed and not currently in service). Some suggest a non-developmental vehicle might make it easier for the Army to eventually field this system to the force, as most of the Army's past developmental programs, such as the Ground Combat Vehicle (GCV), the Future Combat System (FCS), the Crusader self-propelled artillery system, and the Comanche helicopter, were cancelled before they could be fully developed and fielded.

On November 26, 2013, the Army issued a Request for Proposal (RFP) for the AMPV. This RFP stipulated the Army planned to award a five-year Engineering and Manufacturing Development (EMD) contract in May 2014 worth \$458 million to a single contractor for 29 prototypes. While the March 2013 RFP established an Average Unit Manufacturing Cost Ceiling for each AMPV at \$1.8 million, this was rescinded to permit vendors greater flexibility. The EMD phase was scheduled to run between FY2015 and FY2019, followed by three years of low-rate initial production (LRIP) starting in 2020. As of 2017, the Army planned to procure 2,936 AMPVs to replace M-113s in ABCTs. The Army also has plans to replace 1,922 M-113s at Echelons Above Brigade (EAB), and Department of Defense (DOD) estimates if the M-113s are replaced by AMPVs at EAB, total program costs could be increased by an additional \$6.5 billion. While the Army would like a pure fleet of AMPVs, budgetary constraints could preclude this.

On December 23, 2014, the Army announced it had selected BAE Systems Land and Armaments L.P. as the winner of the EMD contract. The initial award was for 52 months, valued at about \$382 million. In addition, the award provides for an optional Low-Rate Initial Production (LRIP) phase. If this phase is awarded, BAE would produce an additional 289 vehicles for a total contract value of \$1.2 billion. This EMD contract does not include EAB AMPV variants. The AMPV reportedly successfully completed its Critical Design Review (CDR) on June 23, 2016. On December 15, 2016, BAE delivered the first general purpose AMPV to the Army for testing. In September 2017, the Army began AMPV reliability, availability, and maintainability (RAM) testing. Also in 2017, based on budgetary constraints, the Army decided that it would upgrade a number of EAB M-113s instead of replacing them with AMPVs.

Other program issues include DOD Inspector General (IG) concerns regarding performance and design concerns, as well as inaccurate procurement quantities, which could result in inaccurate program costs. Another issue addressed in the FY2018 National Defense Authorization Act is funding restrictions on M-113 upgrades until the Secretary of the Army provides the defense committees with a report on its strategy to upgrade EAB M-113s.

The FY2019 AMPV budget request is \$828.4 million for the production of 197 vehicles.

Potential issues for Congress include upgraded M-113s at EAB and DOD Inspector General (IG) concerns.

Contents

Background	1
The Armored Multi-Purpose Vehicle (AMPV)	1
The Army's AMPV Requirements	1
AMPVs at Echelons Above Brigade (EAB)	2
Program Overview	2
Department of Defense (DOD) Approves AMPV Program	3
Army Issues AMPV Draft Request for Proposal (RFP)	3
2017 ABCT AMPV Procurement Quantities	3
Selected Program Activities	3
Army Awards ABCT AMPV Contract to BAE	3
AMPV Completes Critical Design Review	4
Roll Out of First AMPV for Testing	4
AMPV Begins Developmental Testing	4
Army Plans to Limit EAB Upgraded M-113 Numbers	5
Other Program Issues	5
DOD Inspector General (IG) Concerns	5
FY2018 National Defense Authorization Act (NDAA) P.L. 115-91	5
Department of Defense FY2019 AMPV Budget Request	6
Potential Issues for Congress	7
Upgraded M-113s at Echelons Above Brigade (EAB)	7
DOD Inspector General (IG) Concerns	7

Tables

Table 1. M-113 Distribution in ABCTs, by Variant	2
Table 2. FY2019 AMPV Budget Request	6

Contacts

Author Contact Information	7
----------------------------------	---

Background

In 1956, the Army began the development of a family of air-transportable, armored multi-purpose vehicles intended to provide a lightweight, amphibious armored personnel carrier for armor and mechanized infantry units.¹ Known as the M-113, it entered production in 1960 and saw extensive wartime service in Vietnam. Considered a reliable and versatile vehicle, a number of different variations of the M-113 were produced to fulfill such roles as a command and control vehicle, mortar carrier, and armored ambulance, to name but a few. The Army began replacing the M-113 infantry carrier version in the early 1980s with the M-2 Bradley Infantry Fighting Vehicle, but many non-infantry carrier versions of the M-113 were retained in service.

The Armored Multi-Purpose Vehicle (AMPV)²

According to the Army:

The Armored Multi-Purpose Vehicle (AMPV) is the proposed United States Army program for replacement of the M-113 Family of Vehicles (FOV) to mitigate current and future capability gaps in force protection, mobility, reliability, and interoperability by mission role variant within the Heavy Brigade Combat Team (HBCT) [now known as the Armored Brigade Combat Team – ABCT]. The AMPV will have multiple variants tailored to specific mission roles within HBCT. Mission roles are as follows: General Purpose, Medical Evacuation, Medical Treatment, Mortar Carrier, and Mission Command. AMPV is a vehicle integration program.

The Army's AMPV Requirements³

Regarding the decision to replace remaining M-113s, the Army notes:

- The M-113 lacks the force protection and mobility needed to operate as part of combined arms teams within complex operational environments. For example, “commanders will not allow them to leave Forward Operating Bases (FOBs) or enter contested areas without extensive mission protection and route clearance.”⁴
- The use of other vehicles for M-113 mission sets (casualty evacuations, for example) reduces unit combat effectiveness.

The majority of the Army's M-113s are found in Armored Brigade Combat Teams (ABCTs), where they comprise 32% of the tracked armored vehicles organic to that organization. The 114 M-113 variants in the ABCT are distributed as follows:

¹ Information in this section is taken from Christopher F. Foss, *Jane's Armour and Artillery, 2011-2012*, 32nd Edition, pp. 470-478.

² From the Army's AMPV Program website, <https://contracting.tacom.army.mil/majorsys/ampv/ampv.htm>, accessed September 13, 2013.

³ Information in this section is taken from an Army briefing: “AMPV Industry Day,” April 23, 2013.

⁴ *Ibid.*, p. 13.

Table I. M-113 Distribution in ABCTs, by Variant

M-113 Variant Type	Number of M-113s
M-113A3 General Purpose (GP)	19
M-1068A3 Mission Command (MCmd)	41
M-1064 Mortar Carrier (MC)	15
M-113A3 Medical Evacuation (ME)	31
M-577 Medical Treatment (MT)	8

Source: Information in this table is taken from an Army briefing: “AMPV Industry Day,” April 23, 2013, p. 13.

AMPVs at Echelons Above Brigade (EAB)⁵

In addition to the AMPV requirement in the ABCTs, the Army also planned to procure an additional 1,922 AMPVs to replace M-113s in Echelons Above Brigade (EAB).⁶ The Army notes that these AMPVs might have different requirements than the ABCT AMPVs. DOD estimates if the M-113s are replaced by AMPVs at EAB, total program costs could be increased by an additional \$6.5 billion.⁷

Program Overview⁸

According to the Government Accountability Office (GAO), in March 2012, the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD, AT&L) approved a materiel development decision for AMPV and authorized the Army’s entry into the materiel solution analysis phase. The Army completed the AMPV analysis of alternatives (AoA) in July 2012 and proposed a non-developmental vehicle (the candidate vehicle will be either an existing vehicle or a modified existing vehicle—not a vehicle that is specially designed and not in current service). Because the AMPV is to be a non-developmental vehicle, DOD decided the program would start at Milestone B, Engineering and Manufacturing Development (EMD) Phase and skip the Milestone A, Technology Development Phase.

The Army planned for a full and open competition and aimed to award one industry bidder a 42-month EMD contract to develop all five AMPV variants. A draft Request for Proposal (RFP) released in March 2013 stated the EMD contract would be worth \$1.46 billion, including \$388 million for 29 EMD prototypes for testing between 2014 and 2017 and \$1.08 billion for 289 low-rate initial production (LRIP) models between 2018 and 2020. The Army had planned on releasing the formal RFP in June 2013 but instead slipped the date until mid-September 2013,

⁵ Information in this section is from PEO Ground Combat Systems, AMPV Program’s EMD Contract Awarded to BAE, December 24, 2014.

⁶ Echelon Above Brigade (EAB) refers to Army combat units larger than brigades—generally division and corps sized—as well as non-ABCT support brigades. Examples of EAB units that have M-113s that will be replaced with AMPVs include Armored Division and Corps headquarters and Combat Engineer Brigades.

⁷ Inspector General, U.S. Department of Defense, *Army is Effectively Managing the Armored Multi-Purpose Vehicle, but There Are Concerns That Could Impact Program Cost, Schedule, and Performance*, April 28, 2017, p. 17.

⁸ Information in this section is taken from the United States Government Accountability Office, *Defense Acquisitions: Assessments of Selected Weapon Programs*, GAO-13-294SP, March 2013, p. 133, and an Army briefing: “AMPV Industry Day,” April 23, 2013 and Tony Bertuca, “Optimism Emerges for AMPV Program Though Pre-RFP Work Remains,” *InsideDefense.com*, August 16, 2013.

citing a delayed Defense Acquisition Board review attributed in part to Department of Defense civilian furloughs.⁹ The EMD contract award was originally planned for late 2014. The Army planned for an average unit manufacturing cost (AUMC) of \$1.8 million per vehicle.

Department of Defense (DOD) Approves AMPV Program¹⁰

On November 26, 2013, DOD issued an Acquisition Decision Memorandum (ADM) officially approving the Army's entry into the Milestone B, Engineering and Manufacturing Development (EMD) Phase. The ADM directed the Army to impose an Average Procurement Unit Cost less than or equal to \$3.2 million at a production rate of not less than 180 vehicles per year. In addition, operations and sustainment costs were to be less than or equal to \$400,000 per vehicle per year. The Army was also directed to down select to a single prime contractor at the completion of Milestone B.

Army Issues AMPV Draft Request for Proposal (RFP)¹¹

Also on November 26, 2013, the Army issued a new draft Request for Proposal (RFP) for the AMPV. This RFP stipulated the Army planned to award a five-year EMD contract in May 2014 worth \$458 million to a single contractor for 29 prototypes. While the March 2013 RFP established an Average Unit Manufacturing Cost Ceiling for each AMPV at \$1.8 million, this was rescinded to permit vendors greater flexibility. The EMD phase was scheduled to run between FY2015 and FY2019, followed by three years of low-rate initial production (LRIP) starting in 2020.

2017 ABCT AMPV Procurement Quantities¹²

According to GAO's 2017 Assessments of Selected Weapon Programs, as of 2015, the Army planned to procure 2,936 AMPVs.

Selected Program Activities

Army Awards ABCT AMPV Contract to BAE¹³

On December 23, 2014, the Army announced it had selected BAE Systems Land and Armaments L.P. as the winner of the EMD contract. The initial award was for 52 months valued at about \$382 million. During this period of performance, BAE was to produce 29 vehicles, which would be put

⁹ Tony Bertuca, "Army's Armored Multi-Purpose Vehicle RFP Scheduled for Mid-September," *InsideDefense.com*, August 9, 2013.

¹⁰ Information in this section is taken from Department of Defense, "Armored Multi-Purpose Vehicle Pre-Engineering and Manufacturing Development Request for Proposals Acquisition Decision Memorandum," November 26, 2013 and Tony Bertuca, "DOD Officially OKs Army's Armored Multi-Purpose Vehicle Program; RFP Hits the Street," *InsideDefense.com*, November 26, 2013.

¹¹ Information in this section is taken from Solicitation, Offer, and Award: Armored Multi-Purpose Vehicle, Number: W56HZV-13-R-0022, November 26, 2013 and Tony Bertuca, "DOD Officially OKs Army's Armored Multi-Purpose Vehicle Program; RFP Hits the Street," *InsideDefense.com*, November 26, 2013.

¹² GAO-17-333SP Assessments of Selected Weapon Programs, March 2017, p. 67.

¹³ Information in this section is from PEO Ground Combat Systems, AMPV Program's EMD Contract Awarded to BAE, December 24, 2014.

through “rigorous developmental and operational testing.” In addition, the award provided for an optional Low-Rate Initial Production (LRIP) phase award in the future. If this phase is awarded, BAE would produce an additional 289 vehicles for a total contract value of \$1.2 billion. The Army, in its announcement, emphasized the BAE EMD contract did not pertain to the 1,922 EAB AMPVs.

AMPV Completes Critical Design Review

According to reports, the AMPV successfully completed its Critical Design Review (CDR)¹⁴ on June 23, 2016.¹⁵ Successful completion of a CDR demonstrates the AMPV’s design is stable, can be expected to meet established performance standards, and the program can be accomplished within its established budget.

Roll Out of First AMPV for Testing¹⁶

On December 15, 2016, BAE delivered the first general purpose AMPV to the Army for testing. The Army plans for six months of contractor tests, followed by one year of government testing and then Limited User Testing.

AMPV Begins Developmental Testing¹⁷

In September 2017, the Army reportedly started reliability, availability, and maintainability (RAM) testing for the AMPV. DOD defines RAM as follows:

- Reliability is the probability of an item to perform a required function under stated conditions for a specified period of time. Reliability is further divided into mission reliability and logistics reliability.
- Availability is a measure of the degree to which an item is in an operable state and can be committed at the start of a mission when the mission is called for at an unknown (random) point in time. Availability as measured by the user is a function of how often failures occur and corrective maintenance is required, how often preventive maintenance is performed, how quickly indicated failures can be isolated and repaired, how quickly preventive maintenance tasks can be performed, and how long logistics support delays contribute to down time.
- Maintainability is the ability of an item to be retained in, or restored to, a specified condition when maintenance is performed by personnel having specified skill levels, using prescribed procedures and resources, at each prescribed level of maintenance and repair.¹⁸

¹⁴According to AcqNotes: “A Critical Design Review (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.” <http://www.acqnotes.com/acqnote/acquisitions/critical-design-review>, accessed September 13, 2016.

¹⁵ Jason Sherman, “Armored Multi-Purpose Vehicle Program Clears Key EMD Milestone,” *InsideDefense.com*, July 1, 2016.

¹⁶ Connie Lee, “BAE Rolls Out First Armored Multi-Purpose Vehicle for Testing,” *InsideDefense.com*, December 19, 2016.

¹⁷ Jason Sherman, “Following July Launch of AMPV Developmental Testing, Army to Begin RAM Testing,” *InsideDefense.com*, September 15, 2017.

¹⁸ DOD Guide for Achieving Reliability, Availability, and Maintainability, August 3, 2005, p. 1-1.

Army Plans to Limit EAB Upgraded M-113 Numbers¹⁹

Due to budgetary constraints, the Army reportedly plans to provide upgraded EAB M-113s to a small number of units outside the continental United States and in South Korea and Europe. In August 2017, Army officials reportedly noted “that the amount of time and resources it would take to achieve a pure fleet solution for both ABCTs and EAB units would likely push fielding into FY 2040 and beyond, which is not a suitable course of action.”²⁰ Officials also suggested that upgrading M-113s for EAB use was “an interim solution until we can get to the optimal solution.”²¹

The Army reportedly plans to issue a request for proposal (RFP) in the near future for upgraded M-113s. A number of vendors, including General Dynamics Land Systems (GDLS), BAE Systems, and Science Applications International Corporation (SAIC) reportedly plan to respond to the RFP.²²

Other Program Issues

DOD Inspector General (IG) Concerns²³

An April 28, 2017, DOD IG report noted the Army has effectively managed the AMPV program, in particular keeping it within cost requirements and scheduled timeframes, but also expressed the following concerns:

- The program might not meet entry requirements for initial production and testing (Milestone C) because the Army has not fully resolved vehicle performance and design demonstration concerns.
- As a result of the aforementioned performance and design concerns, the AMPV could experience increased costs and schedule delays as a result of addressing the IG's concerns.
- Because the U.S. Army Deputy Chief of Staff, Programming (G-8) had not revised the procurement quantities to reflect changes to the Army's equipment and force structure requirements, the program's estimated total cost and Average Procurement Unit Cost is not accurate.²⁴

FY2018 National Defense Authorization Act (NDAA) P.L. 115-91

The FY2018 NDAA contained a provision on funding M-113 upgrades:

SEC. 113. LIMITATION ON AVAILABILITY OF FUNDS FOR UPGRADE OF M113 VEHICLES.

¹⁹ Connie Lee, “Army Plans Limited Effort to Upgrade M113s in EAB,” *InsideDefense.com*, October 11, 2017.

²⁰ Courtney McBride, “Army Eyes Rodeo for Upgrades to M113s in EAB,” *InsideDefense.com*, August 21, 2017.

²¹ Ibid.

²² Ibid.

²³ Inspector General, U.S. Department of Defense, *Army is Effectively Managing the Armored Multi-Purpose Vehicle, but There Are Concerns That Could Impact Program Cost, Schedule, and Performance*, April 28, 2017.

²⁴ Ibid., p. i.

(a) **LIMITATION.**—Of the funds authorized to be appropriated by this Act or otherwise made available for fiscal year 2018 for the upgrade of M113 vehicles of the Army, not more than 50 percent may be obligated or expended until the date on which Secretary of the Army submits to the congressional defense committees the report described in subsection (b).

(b) **REPORT.**—The report described in this subsection is a report setting forth the strategy of the Army for the upgrade of M113 vehicles that includes the following:

(1) A detailed strategy for upgrading and fielding M113 vehicles.

(2) An analysis of the manner in which the Army plans to address M113 vehicle survivability and maneuverability concerns.

(3) An analysis of the historical costs associated with upgrading M113 vehicles, and a validation of current cost estimates for upgrading such vehicles.

(4) A comparison of—

(A) the total procurement and life cycle costs of adding an echelon above brigade requirement to the Army Multi-Purpose Vehicle; and

(B) the total procurement and life cycle costs of upgrading legacy M113 vehicles.

(5) An analysis of the possibility of further accelerating Army Multi-Purpose Vehicle production or modifying the fielding strategy for the Army Multi-Purpose Vehicle to meet near term echelon above brigade requirements.²⁵

Department of Defense FY2019 AMPV Budget Request²⁶

The FY2019 budget request includes Research Development, Testing and Evaluation (RDT&E) and Procurement funding requests for the AMPV in both the Base and Overseas Contingency Operations (OCO) budgets, as well as FY2019 requested quantities.

Table 2. FY2019 AMPV Budget Request

Funding Category	Base Budget	Base Budget	OCO Budget	OCO Budget	Total Request	Total Request
	\$M	Qty	\$M	Qty	\$M	Qty
RDT&E	118.2	—	—	—	118.2	—
Procurement	479.8	131	230.4	66	710.2	197
TOTAL	598.0	131	230.4	66	828.4	197

Source: Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, Program Acquisition Cost by Weapon System: United States Department of Defense Fiscal Year 2019 Budget Request, February 2018, p. 3-4.

Notes: **\$M** = U.S. Dollars in Millions; **Qty** = FY2019 Procurement Quantities

²⁵ Report 115-404, National Defense Authorization Act for Fiscal Year 2018, Conference Report to Accompany H.R. 2810, November 9, 2017, p. 28.

²⁶ Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, Program Acquisition Cost by Weapon System: United States Department of Defense Fiscal Year 2019 Budget Request, February 2018, p. 3-4.

Potential Issues for Congress

Upgraded M-113s at Echelons Above Brigade (EAB)

As previously noted, the Army's optimal solution would be to replace EAB M-113s with AMPVs, but as of summer 2017, the Army felt that given current and projected budgetary constraints, only selected EAB units outside the continental United States and in South Korea and Europe would receive AMPVs while the remainder would receive upgraded M-113s as an interim solution.²⁷ Congress, in Section 113 of FY2018 National Defense Authorization Act (NDAA), P.L. 115-91, limits AMPV funding until the Army provides the defense committees with a strategy for upgrading M-113s as well as an analysis of the feasibility of further accelerating the AMPV fielding strategy in near term to meet EAB requirements.

The Bipartisan Budget Act of 2018 (P.L. 115-123) provides for topline budget increases for DOD in FY2018 and FY2019, but the Army's share of that funding growth reportedly has not yet been finalized; a working assumption is the Army could see an increase of approximately \$6.5 billion in FY2018.²⁸ Given this potential budget growth over the next two fiscal years, it is possible that funding might be made available to accelerate EAB AMPV funding with a corresponding decrease in the need for funds to upgrade M-113s for EAB use.

DOD Inspector General (IG) Concerns

DOD's April 2017 IG report, while acknowledging effective management of the AMPV program, also raises fundamental concerns about performance and design, as well as inaccurate procurement quantities, which could adversely impact program costs. With the Army examining the feasibility of accelerating AMPV procurement at all echelons and the possibility of additional funds being available in FY2018 and FY2019, it could be prudent for the Army to detail to Congress how it plans to address the DOD IG's concerns so that the AMPV program remains on budget and on time. As part of the Army's examination, identifying additional costs related to corrective actions, as well as how these actions might affect the AMPV's overall programmatic timeline, could also be of interest to Congress.

Author Contact Information

Andrew Feickert
Specialist in Military Ground Forces
afeickert@crs.loc.gov, 7-7673

²⁷ Connie Lee, "Army Plans Limited Effort to Upgrade M113s in EAB," *InsideDefense.com*, October 11, 2017, and Courtney McBride, "Army Eyes Rodeo for Upgrades to M113s in EAB," *InsideDefense.com*, August 21, 2017.

²⁸ Critical Intelligence, *InsideDefense.com*, February 28, 2018, <https://insidedefense.com/inside-pentagon/critical-intelligence-1123>.