



# The Marines' Expeditionary Fighting Vehicle (EFV): Background and Issues for Congress

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## Summary

The Expeditionary Fighting Vehicle (EFV) is an armored amphibious vehicle program that originated two decades ago to replace the 1970s-era Amphibious Assault Vehicle (AAV). Like current AAVs, the EFV is designed to roll off a Navy amphibious assault ship, move under its own power to the beach, and cross the beach and operate inland. The EFV has experienced a variety of developmental difficulties, resulting in significant program delays and cost growth. The EFV is currently in its second systems design and development (SDD) phase attempting to improve the EFV's overall poor reliability and performance that it demonstrated during its 2006 operational assessment. On January 6, 2011, Secretary of Defense Robert Gates announced, based on the recommendation of the Secretary of the Navy and Commandant of the Marine Corps, that he would recommend the cancellation of the EFV. Secretary Gates also reaffirmed the Marines' amphibious assault mission and pledged to fund future efforts to acquire a more affordable and sustainable replacement and also to upgrade existing amphibious assault vehicles.

The Marines originally planned to procure 1,025 EFVs at a total cost of \$8.5 billion, but increasing costs compelled the Marines to reduce their procurement to 573 EFVs. Each EFV was expected to cost about \$24 million apiece, and there were concerns that the high cost of the EFV could consume up to 90% of the Marines' ground equipment budget. There has been congressional opposition to Secretary Gates's decision to cancel the EFV. Despite the Marines' agreement to cancel the program, some Members reportedly believe that the EFV is central to the Marines' ability to launch an amphibious assault far enough off shore to protect the fleet. Other Members have also suggested that the EFV cancellation would lead to eliminating hundreds of high-skilled manufacturing jobs, as well as hurting local economies in states and districts associated with the EFV program.

The Marines, a little more than a month after Secretary Gates's EFV cancellation announcement, initiated a new competition to upgrade existing AAVs and develop a successor to the EFV (previously called the New Amphibious Assault Vehicle [NAV] but now called the Amphibious Combat Vehicle [ACV]). The Commandant of the Marine Corps, General James Amos, has committed the Marine Corps to fielding the ACV within four years. General Dynamics, the EFV's developer, suggests that it would be more affordable to "finish what's already been started," and build 200 EFVs and save the amount of money that it will take to terminate the program.

The Marines did not submit a budget request for FY2012 funding for the EFV. Instead, FY2011 and FY2010 funds will be used to cover termination costs as well as complete ongoing testing and developmental work, to include delivery of EFV-related software.

Potential issues for Congress include the possible evaluation of General Dynamics' proposal to build only 200 EFVs, which it contends would save \$6 billion. Another issue is a possible examination of EFV technologies that the Marines plan to incorporate into the ACV to help to ensure that there is "value added" by these technologies and that they meet "cost-benefit" criteria. Another possible issue is the Marines' plan to field the ACV in four years, which could be considered by some as overly ambitious. Navy and Pentagon officials stated that the soonest that the ACV would be ready was 2024, while the Commandant of the Marine Corps has committed the Marines to field the ACV in four years. This report will be updated.

## **Contents**

Background .....	1
The EFV Program.....	1
What Is the EFV?.....	1
Program Structure .....	1
Program History.....	2
Problems During the SDD Phase.....	2
2006 Operational Assessment.....	3
EFV Redesign.....	4
Critical Design Review and Additional Prototypes .....	4
Current EFV Testing .....	5
Program Cost and Funding .....	5
Solutions for EFV IED Vulnerability .....	6
DOD Questions the Need for the EFV.....	6
Recent EFV-Related Studies.....	6
Decision to Terminate the EFV.....	7
Opposition to EFV Cancellation.....	8
General Dynamics' Proposal to Continue the Program.....	9
The Marines' Plan for EFV Funds .....	9
The Amphibious Combat Vehicle (ACV).....	9
FY2012 EFV Budget Request .....	10
Potential Issues for Congress.....	10
General Dynamics' Proposal .....	10
Use of EFV Technologies .....	10
Is a Four Year ACV Development Cycle Overly Ambitious? .....	11

## **Contacts**

Author Contact Information .....	11
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## Background

The Marine Corps is responsible for the conduct of amphibious operations in support of the full spectrum of U.S. national security objectives. If the Marines need armored fighting vehicles in the early stages of an amphibious landing, these vehicles must either be transported by landing craft with limited protection against enemy fire, or the armored vehicle must come ashore under its own power.<sup>1</sup> Like current AAVs, the EFV is designed to roll off a Navy amphibious assault ship, move under its own power to the beach, and cross the beach and operate inland. The EFV is designed to be launched 25 miles off shore (the AAV can be launched only 2 miles from shore) permitting the fleet to operate “over the horizon,” where it theoretically would be less vulnerable to enemy fire. There are concerns that the 25-mile over the horizon operating capability may no longer provide the protection to the fleet that it once did. One example of such lack of protection is the 2006 Hezbollah C-802 cruise missile attack against an Israeli ship where two missiles were fired, with one hitting the Israeli warship, which was about 10 miles from shore, and the second missile striking an Egyptian ship 36 miles from shore.<sup>2</sup> Concerns also have been raised that, when ashore, the flat-bottomed EFV may be excessively vulnerable to improvised explosive devices (IEDs).

## The EFV Program

### What Is the EFV?<sup>3</sup>

The EFV would be an armored, fully tracked infantry combat vehicle operated by a three-person crew that can carry 17 combat-equipped Marines. It is to be a self-deploying, high-speed amphibious vehicle capable of transporting Marines from ships to objectives inland and aims to have the speed, maneuvering capabilities, fire power, and protection to operate with main battle tanks on land. It is intended to have a 20-knot speed in the water and a 345-mile range ashore with a 45-kilometer-per-hour speed on hard-surfaced roads. The EFV is to be designed to have modular armor and expanded mine blast protection and mount a 30mm high-velocity cannon in a stabilized turret. The EFV is also supposed to be able to communicate in joint networks and operate as part of a joint land force. There are to be two EFV variants. The EFV-P1 would carry a Marine rifle squad and its equipment and provide direct fire support during combat operations. The EFV-C1 variant would provide command and control capabilities for commanders and their staffs.

### Program Structure

The EFV is described as the Marines' number one priority ground weapon system acquisition program and is the only Acquisition Category (ACAT) 1D program managed by the Marine

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<sup>1</sup> Unless otherwise noted, information in this section is taken from Sydney J. Freedberg, “Future Corps,” *National Journal*, May 10, 2008.

<sup>2</sup> David Eshel, “INS Hanit Suffers Iranian Missile Attack,” *Defense Update*, July 17, 2006.

<sup>3</sup> Information in this section is from the 2008 United States Marine Corps Concepts & Programs Handbook, pp. 112-113; General Dynamics Land Systems Briefing: EFV Program, February 2008; and Marine Corps Tactical Systems Support Activity EFV Fact Sheet.

Corps.<sup>4</sup> The Marine Corps EFV Program Office is collocated with the EFV's prime contractor—General Dynamics—in Woodbridge, VA, and the Marines claim that collocation—the first of its kind for a major weapon system—has greatly reduced government contractor design costs and streamlined the program decision-making process.

## **Program History<sup>5</sup>**

In 1988, Acquisition and Program Decision Memorandums were signed by defense officials to initiate the Concept Exploration/Definition Phase (CE/D)<sup>6</sup> of what was then known as the Advanced Amphibious Assault Vehicle (AAAV) program. In 1995, the program entered into the Program Definition and Risk Reduction (PDRR) phase,<sup>7</sup> where it was considered by many to be a “model defense acquisition program,” winning two DOD awards for successful cost and technology management. In June 1996, a contract was awarded to General Dynamics Land Systems to begin full-scale engineering development of their design. Based on the aforementioned early success of the program, the Marine Corps awarded a cost-plus contract to General Dynamics in July 2001 for the Systems Development and Demonstration (SDD) phase of the program. General Dynamics and the Marines envisioned that the SDD phase would be completed by October 2003, a schedule that some say “proved too ambitious.”<sup>8</sup> In 2003, the Marines renamed the program the Expeditionary Fighting Vehicle (EFV) program.

## **Problems During the SDD Phase**

In 2006, the Government Accountability Office (GAO) reported that:

The program did not allow enough time to demonstrate maturity of the EFV design during SDD. The original SDD schedule of about three years proved too short to conduct all necessary planning and to incorporate the results of tests into design changes. Specifically,

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<sup>4</sup> Marine Corps Tactical Systems Support Activity EFV Fact Sheet. The 12<sup>th</sup> Edition of the *Defense Acquisition University Glossary*, July 2005, defines an ACAT 1D program as a Major Defense Acquisition Program (MDAP), which is estimated by the Under Secretary of Defense (Acquisition, Technology, and Logistics) (USD[AT&L]) to require the eventual expenditure for Research, Development, Test, and Evaluation (RDT&E) of more than \$365 million (FY2000 constant dollars) or a procurement of more than \$2.19 billion (FY2000 constant dollars).

<sup>5</sup> United States House of Representatives, Committee on Oversight and Government Reform, Majority Staff, “The Expeditionary Fighting Vehicle: Over Budget, Behind Schedule, and Unreliable,” April 29, 2008; “Military Vehicle Forecast: Expeditionary Fighting Vehicle,” Z Forecast International, June 2007, pp. 4-5; United States Government Accountability Office (GAO) Report to Congressional Committees, “Defense Acquisitions; The Expeditionary Fighting Vehicle Encountered Difficulties in Design Demonstration and Faces Future Risks,” GAO-06-349, May 2006, pp. 6-7.

<sup>6</sup> The Concept Exploration/Definition (CE/D) Phase of the Defense Systems Acquisition Process (now called the Concept Refinement [CR] Phase) is governed by Department of Defense (DOD) Directive 5000.1, “The Defense Acquisition System.” Activities during the CE/D phase, which normally lasts one to two years, include exploring material alternatives to satisfy mission needs; identification of high-risk areas; identifying most promising system concepts; developing a proposed acquisition strategy; and developing initial cost, schedule, and performance objectives.

<sup>7</sup> The Program Definition and Risk Reduction (PDRR) Phase normally lasts two to four years. Activities during this phase include defining key design characteristics and expected capabilities and demonstrating that technologies can be incorporated into systems designs. Prototype systems are developed during this phase.

<sup>8</sup> United States House of Representatives, Committee on Oversight and Government Reform, Majority Staff, “The Expeditionary Fighting Vehicle: Over Budget, Behind Schedule, and Unreliable,” April 29, 2008, p. 2.

the original schedule did not allow adequate time for testing, evaluating the results, fixing the problems, and retesting to make certain that problems are fixed before moving forward.<sup>9</sup>

Because of these and other difficulties, the EFV program was “rebaselined”<sup>10</sup> in November 2002, adding an additional year to the program schedule, and then rebaselined again in March 2003, also adding another year to the program schedule.<sup>11</sup> In December 2004, EFV prototypes experienced major failures of the hull electronics unit (HEU), the vehicle’s main computer system.<sup>12</sup> These failures caused the water-mode vehicle steering to freeze, making the vehicle non-responsive. The EFV also experienced significant problems in September and October 2004 with the bow flap—a folding panel extended forward to generate additional hydrodynamic lift as the EFV moves through the water.<sup>13</sup> The EFV experienced a myriad of hydraulics system failures, leaks, and pressure problems during testing that contributed to low reliability ratings. Because of reliability problems, the originally required 70-hour mean time between operational mission failure (MTBOMF) rate for the EFV was reduced by the Marines to 43.5 hours. Because of these demonstrated failures and related concerns about a lack of program management and oversight, the program was rebaselined for a third time in March 2005, this time adding an additional two years to the extra two years added during the previous rebaselining.

## **2006 Operational Assessment<sup>14</sup>**

In 2006, the EFV was subject to an Operational Assessment—a series of tests to demonstrate that it could meet performance requirements—that, if successfully completed, would permit the program to move into the production phase. During this assessment, the EFV experienced numerous critical failures and, because of repeated breakdowns, the EFV failed to meet reliability requirements and failed the assessment. For example, during the test, the vehicles were able to operate for only 4.5 hours between breakdowns and required about 3.4 hours of corrective maintenance for every 1 hour of operation—a maintenance burden that evaluators said would “wear out a unit under realistic combat operations.” Poor reliability also resulted in 117 Operational Mission Failures and 645 Unscheduled Maintenance Actions during testing. The EFV’s low reliability resulted in the EFV completing 2 out of 11 attempted amphibious tests, 1 out of 10 gunnery tests, and none of the 3 scheduled land mobility tests. The EFV prototypes tested were approximately 1,900 pounds too heavy to achieve the desired high water speed and,

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<sup>9</sup> United States Government Accountability Office (GAO) Report to Congressional Committees, “Defense Acquisitions; The Expeditionary Fighting Vehicle Encountered Difficulties in Design Demonstration and Faces Future Risks,” GAO-06-349, May 2006, p. 13.

<sup>10</sup> Rebaselining means that a program’s milestones, timelines, and costs are modified; in most cases increasing the length and cost of the program.

<sup>11</sup> *Ibid.*, pp. 8-9. DOD has been known to rebaseline programs—change the program’s estimated cost and schedule so they are a more accurate reflection of how the program is progressing—in instances where a troubled program shows potential for improvement.

<sup>12</sup> United States House of Representatives, Committee on Oversight and Government Reform, Majority Staff, “The Expeditionary Fighting Vehicle: Over Budget, Behind Schedule, and Unreliable,” April 29, 2008, p. 4.

<sup>13</sup> Information in this section is from United States Government Accountability Office (GAO) Report to Congressional Committees, “Defense Acquisitions; The Expeditionary Fighting Vehicle Encountered Difficulties in Design Demonstration and Faces Future Risks,” GAO-06-349, May 2006, pp. 16-18.

<sup>14</sup> Information in this section is from United States House of Representatives, Committee on Oversight and Government Reform, Majority Staff, “The Expeditionary Fighting Vehicle: Over Budget, Behind Schedule, and Unreliable,” April 29, 2008, pp. 7-10.

in some circumstances, could not accommodate equipment needed by Marines for special climatic conditions. Evaluators also noted significant problems in terms of limited visibility, excessive noise, and difficulty in reloading the EFV's main gun.

## **EFV Redesign**

In the aftermath of 2006 Operational Assessment, the Marines "went back to the drawing board."<sup>15</sup> In February 2007, the EFV program office issued a "sources sought" notice, requesting information from industry leaders on "tracked combat vehicles that can provide an alternative design concept of the EFV"—a perceived vote of no confidence in General Dynamics by the Marines. Also that month, the Navy formally advised Congress that the EFV program would incur a cost breach, requiring program recertification under the Nunn-McCurdy Act (10 U.S.C. 2433).<sup>16</sup> Finally, in late February 2007, the Navy announced that it would have to relax EFV performance and reliability requirements in order for the program to continue. In March 2007, the Marines modified the original SDD contract and awarded General Dynamics an additional \$143.5 million to redesign the EFV.<sup>17</sup> In what has been termed "the largest program setback," the Marines decided in June 2007 to repeat the entire SDD phase, meaning that instead of the original completion date of 2003, the SDD phase—if successful—would now be completed in 2011, eight years behind the original schedule.<sup>18</sup> In August 2008, the Marines and General Dynamics signed an SDD II contract, and work on seven new EFV prototypes was projected to begin in January 2009.<sup>19</sup> These new prototypes were to include, *inter alia*, rewired electronics to better protect against sea water, a rebuilt and strengthened gun turret to improve ammunition feed to the main gun, and the addition of trim tabs to make the EFV more stable in the water. The EFV was scheduled to be built at the U.S. military's joint tank production facility at Lima, OH.

## **Critical Design Review and Additional Prototypes<sup>20</sup>**

The Government Accountability Office (GAO) noted that the EFV passed its December 2008 Critical Design Review (CDR) and, with 94% of the system's design models releasable, that EFV's critical technologies were mature and its design is stable. Because the EFV's design has been stabilized, a number of critical manufacturing processes can be established. Because the EFV passed the CDR, the go-ahead was given for the production of the seven new prototypes. These new prototypes are expected to include almost 400 engineering design improvements to

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<sup>15</sup> Information in this section is from "Military Vehicle Forecast: Expeditionary Fighting Vehicle," Z Forecast International, June 2007, p. 5.

<sup>16</sup> The Nunn-McCurdy Act (10 U.S.C. 2433) requires that Congress be notified when a major defense acquisition program incurs a cost increase of at least 15%. If the increase is 25% or greater, the Secretary of Defense must certify that the program is essential to national security and that new cost estimates are reasonable, that the program is properly managed, and that there are no feasible alternatives to the system in question.

<sup>17</sup> United States House of Representatives, Committee on Oversight and Government Reform, Majority Staff, "The Expeditionary Fighting Vehicle: Over Budget, Behind Schedule, and Unreliable," April 29, 2008, p. 10.

<sup>18</sup> *Ibid.*

<sup>19</sup> Information in this section is from Kris Osborn, "USMC to Build 7 New EFV Prototypes," *Defense News*, October 9, 2008.

<sup>20</sup> Information in this section is taken from Daniel Wasserbly, "USMC Receives EFV Prototype Boost," *Jane's Defence Weekly*, March 4, 2009, p. 10; Bettina H. Chavanne, "EFV Redesign Makes Tracks," *Aviation Week*, March 6, 2009; and United States Government Accountability Office (GAO), *Defense Acquisitions: Assessments of Selected Weapons Programs*, GAO-09-326SP March 2009, pp. 77-78.

improve vehicle reliability.<sup>21</sup> It is likely that many of these engineering design improvements will add weight to the EFV. One potential change that could have helped reduce EFV weight was incorporating a lighter-weight linked track that the Army was researching, which could reduce EFV weight by 800 pounds.<sup>22</sup>

## **Current EFV Testing<sup>23</sup>**

The Marines have reportedly received four personnel carrier EFV prototypes and one command and control variant and are taking them through developmental testing at the Amphibious Assault Test Branch at Camp Pendleton, CA. EFV testing is scheduled to run through late January 2011. Each vehicle is slated to receive about 500 hours of reliability testing. Marine officials report that so far, “we’ve had no real significant surprises, either good or bad, about the performance of the vehicle.”<sup>24</sup>

## **Program Cost and Funding<sup>25</sup>**

The Marines originally planned to procure 1,025 EFVs at a total cost of \$8.5 billion. According to GAO, as of March 2010, the EFV program will require \$866.7 million in research and development and \$10.226 billion in procurement funding, for a total of \$11.163 billion to complete the program and field 573 EFVs.<sup>26</sup> Each EFV was expected to cost about \$24 million apiece.<sup>27</sup> There were concerns that the high cost of the EFV could consume up to 90% of the Marines’ ground equipment budget.<sup>28</sup> The former Commandant of the Marine Corps, General James Conway, reportedly was concerned that with potential future cuts to the defense budget, 573 EFVs might not be affordable.<sup>29</sup> The Marines have stated that it will cost approximately \$185 million to terminate the EFV program.<sup>30</sup>

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<sup>21</sup> Dan Lamothe, “U.S. Marine Corps Struggles to Redesign EFV,” *Defense News*, March 16, 2009.

<sup>22</sup> Chavanne.

<sup>23</sup> Information in this section is taken from Emelie Rutherford, “EFV Program to Start Reliability Tests, Focus on Costs,” *Defense Daily*, August 12, 2010.

<sup>24</sup> *Ibid.*

<sup>25</sup> United States House of Representatives, Committee on Oversight and Government Reform, Majority Staff, “The Expeditionary Fighting Vehicle: Over Budget, Behind Schedule, and Unreliable,” April 29, 2008, p. 11.

<sup>26</sup> United States Government Accountability Office (GAO), *Defense Acquisitions: Assessments of Selected Weapons Programs*, GAO-10-388SP, March 2010, p 61.

<sup>27</sup> *Ibid.*

<sup>28</sup> Zachary M. Peterson, “Navy Department to Examine EFV Business Case Prior to Procurement,” *InsideDefense.com*, July 12, 2010.

<sup>29</sup> Emelie Rutherford, “Conway: Marines May Not Have Money for 573 Expeditionary Fighting Vehicles,” *Defense Daily*, August 25, 2010.

<sup>30</sup> Information provided to CRS by the Marine Corps on January 12, 2011.



## **Solutions for EFV IED Vulnerability**

As previously noted, there is a great deal of concern that the flat-bottomed EFV would be overly vulnerable to IEDs detonated under the vehicle. The lack of a V-shaped hull, which can mitigate underbelly IED explosions, is a long-standing concern of some in Congress. The Marines contend that the EFV would have to be totally redesigned at great cost to incorporate a V-shaped hull.<sup>31</sup> The Marines suggest that installing an add-on underbelly armor appliqué after the EFV comes ashore will provide necessary protection. Marine officials also suggest that IEDs would not be a big concern during the initial stages of an operation and the EFV's mobility would provide protection from IEDs.<sup>32</sup> It might be argued, however, that the Marines are assuming away the EFV's vulnerabilities by suggesting that the enemy would not employ IEDs against Marine forces coming ashore and that the EFV could "out run" IEDs—something that has eluded smaller and faster combat vehicles in Iraq and Afghanistan.

## **DOD Questions the Need for the EFV**

During an April 17, 2009, address at the Naval War College, Secretary of Defense Gates noted that:

I have also directed the QDR [Quadrennial Defense Review] team to be realistic about the scenarios where direct U.S. military actions would be needed – so we can better gauge our requirements. One of those that will be examined closely is the need for a new capability to get large numbers of troops from ship to shore – in other words, the capability provided by the Marine Expeditionary Fighting Vehicle.... But we have to take a hard look at where it would be necessary or sensible to launch another major amphibious action again. In the 21<sup>st</sup> century, how much amphibious capability do we need?<sup>33</sup>

While there had been speculation that the EFV might be eliminated by the 2010 Quadrennial Defense Review (QDR), the report contained no recommendations that the EFV be cancelled or that major amphibious operations capabilities were no longer needed.<sup>34</sup>

## **Recent EFV-Related Studies**

In response to a request by some members of Congress, the Sustainable Defense Task Force<sup>35</sup> published a report in June 2010, *Debt, Deficits, & Defense: A Way Forward*, that recommends, inter alia, cancelling the EFV program.<sup>36</sup> The task force recommends that cancelling the program would save \$8 billion to \$9 billion between 2011 and 2020 and that the requirement can be met

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<sup>31</sup> Emelie Rutherford, "Murtha, Taylor Concerned About Expeditionary Fighting Vehicle Design," *Defense Daily* March 16, 2009.

<sup>32</sup> Bettina H. Chavanne, "EFV Redesign Makes Tracks," *Aviation Week*, March 6, 2009 and Emelie Rutherford, "Murtha, Taylor Concerned About Expeditionary Fighting Vehicle Design," *Defense Daily*, March 16, 2009.

<sup>33</sup> Transcript, Secretary of Defense Gates Address to the Naval War College at Newport, RI delivered April 17, 2009.

<sup>34</sup> Department of Defense, Quadrennial Defense Review Report, February 2010.

<sup>35</sup> The Sustainable Defense Task Force was formed in response to a request from Rep. Barney Frank (D-MA), working in cooperation with Rep. Walter B. Jones (R-NC), Rep. Ron Paul (R-TX), and Sen. Ron Wyden (D-OR), to explore possible defense budget contributions to deficit reduction efforts that would not compromise the essential security of the United States.

<sup>36</sup> Report of the Sustainable Defense Task Force, "Debit, Deficits, and Defense: A Way Forward," June 11, 2010.

by refurbishing AAV7A1s, the Corps' current amphibious assault vehicle, and an unspecified newly built, updated version of this vehicle.<sup>37</sup>

In response to recommendations from a June 2010 GAO Report,<sup>38</sup> the Navy, in conjunction with DOD, is to conduct a review of the business case for the EFV.<sup>39</sup> The results of this business case review, in conjunction with the results of reliability testing, would be used by senior defense officials assessing the overall program. It is not known when this review will be completed.

The Marines are also conducting a force structure review to determine what the Corps will look like post-Afghanistan to include size and types of equipment needed.<sup>40</sup> This review will likely emphasize the Marines returning to their amphibious roots and promises to take a hard look at vehicle requirements. While there was no date indicated for study completion, Marine officials maintain that the results of this study will be part of the FY2013 Program Objective Memorandum (POM).

On August 12, 2010, it was reported that Secretary of Defense Gates had ordered a review of the future role of the Marine Corps, given the "anxiety" that service in Iraq and Afghanistan had turned the Corps into "a second land army."<sup>41</sup> This review is intended to define a 21<sup>st</sup>-century mission for the Marines distinct from the Army. This review will likely directly address the issue that critics of the EFV frequently cite: that large amphibious assaults on fortified coastlines have become obsolete because of the changing nature of warfare and long-range, precision weapons. During an October 2010 Expeditionary Warfare Conference, Marine leaders reportedly stated that if the EFV failed to show adequate improvement during reliability testing, they would cancel the program and "start over."<sup>42</sup>

## **Decision to Terminate the EFV<sup>43</sup>**

On January 6, 2011, Secretary of Defense Robert Gates announced that, based on recommendations from the Secretary of the Navy and the Commandant of the Marine Corps, he had decided to recommend termination of the EFV. His rationale is explained below:

The EFV's aggressive requirements list has resulted in an 80,000- pound armored vehicle that skims the surface of the ocean for long distances at high speeds before transitioning to combat operations on land. Meeting these demands has, over the years, led to significant technology problems, development delays and cost increases. The EFV, originally conceived during the Reagan administration, has already consumed more than \$3 billion to develop,

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<sup>37</sup> Ibid., p. 23.

<sup>38</sup> GAO-10-758R Defense Acquisitions: Expeditionary Fighting Vehicle (EFV) Program Faces Cost, Schedule, and Performance Risks, June 2010.

<sup>39</sup> Information in this section is from Zachary M. Peterson, "'Navy Department to Examine EFV Business Case Prior to Procurement,'" *InsideDefense.com*, July 12, 2010.

<sup>40</sup> Geoff Fein, "Study Will Examine Future Make-Up of Marine Corps Post-Afghanistan," *Defense Daily*, August 4, 2010.

<sup>41</sup> Information in this section is taken from David S. Cloud, "Gates Orders a Review of Marines' Role," *Los Angeles Times*, August 13, 2010.

<sup>42</sup> Cid Standifer, "If EFV Fails, Back to the Drawing Board; Conway: New Stand-Off Doctrine Could Change EFV Requirements," *InsideDefense.com*, October 11, 2010.

<sup>43</sup> Information in this section is taken from U.S. Department of Defense News Transcript, "DOD News Briefing with Secretary Gates and Adm. Mullen from the Pentagon," January 6, 2011.

and will cost another \$12 billion to build, all for a fleet with the capacity to put 4,000 troops abroad—ashore. To fully execute the EFV, which costs far more to operate and maintain than its predecessor, would essentially swallow the entire Marine vehicle budget, and most of its total procurement budget for the foreseeable future.

To be sure, the EFV would, if pursued to completion without regard to time or cost, be an enormously capable vehicle. However, recent analysis by the Navy and Marine Corps suggest that the most plausible scenarios requiring power projection from the sea could be handled through a mix of existing air and sea systems employed in new ways, along with new vehicles, scenarios that do not require the exquisite features of the EFV. As with several other high-end programs cancelled in recent years, the mounting costs of acquiring this specialized capability must be judged against other priorities and needs.<sup>44</sup>

Secretary Gates stated that his decision “does not call into question the Marines’ amphibious assault mission.”<sup>45</sup> He also committed the Department of Defense to budget the funds to develop a more affordable and sustainable amphibious assault vehicle and funds to upgrade the existing AAV fleet with new engines, electronics, and armaments until a new AAV could be fielded. The Commandant of the Marine Corps stated that the Marine Corps would “shortly issue a special notice to industry requesting information relative to supporting our required amphibious capabilities.”<sup>46</sup> Reports suggest that the Marines will release three distinct requests for information to develop interim and long-term solutions for what the Marines were calling the “New Amphibious Assault Vehicle” (NAV) as well accelerating the development of the Marine Personnel Carrier (MPC).<sup>47</sup>

## **Opposition to EFV Cancellation<sup>48</sup>**

Reports suggest that Secretary Gates’s decision to cancel the EFV could face congressional opposition. Despite the Marines’ agreement to cancel the program, some Members reportedly believe that the EFV is central to the Marines’ ability to launch an amphibious assault far enough off shore to protect the fleet. Other Members have also suggested that the EFV cancellation would lead to eliminating hundreds of high-skilled manufacturing jobs as well as hurting local economies in states and districts associated with the EFV program. Reportedly, a number of letters have been sent by Members to the President and Secretary of Defense Gates opposing the recommendation to cancel the program. Even if the EFV program can not be saved, some Members suggest that ongoing EFV testing and associated activities should be fully funded and continued so that “technology can be harvested from the EFV program” and applied to any future amphibious vehicle development.<sup>49</sup> Toward that end, there is support in the House to allow \$145 million in the FY2011 Defense Appropriations Bill that was slated for termination costs or to

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<sup>44</sup> Ibid.

<sup>45</sup> Ibid.

<sup>46</sup> U.S. Department of Defense Office of the Assistant Secretary of Defense (Public Affairs), “Statement by the Commandant of the Marines Corps Gen. James Amos on Efficiencies,” January 6, 2011.

<sup>47</sup> Christopher J. Castelli, “In Wake of EFV Kill, Marine Corps to Issue Three RFIs for Vehicles,” *InsideDefense.com*, January 11, 2011.

<sup>48</sup> Information in this section is taken from Jen DiMascio, “Will Congress Save the Marines’ EFV,” *Politico.com*, January 6, 2011 and Nathan Hodge, “Backers of Marine Tank Try to Save It,” *Wall Street Journal*, January 8, 2011.

<sup>49</sup> Emelie Rutherford, “Support Seen for Continuing Some Near-Term Work on Expeditionary Fighting Vehicle,” *Defense Daily*, February 18, 2011.

continue SDD to be used to continue SDD work that can be used to support the development of the EFV's successor.<sup>50</sup>

## **General Dynamics' Proposal to Continue the Program**

General Dynamics, the EFV's developer, suggests that it would be more affordable to "finish what's already been started," and build 200 EFVs and save the amount of money that it will take to terminate the program.<sup>51</sup> General Dynamics contends that 184 EFVs, divided between the East and West Coast could provide amphibious lift for four battalions and that 16 EFVs could be used for training purposes.<sup>52</sup> General Dynamics says that this would save \$6 billion, which it believes would be the costs to terminate the EFV, upgrade current AAVs, and to develop and procure a new amphibious vehicle.<sup>53</sup> In order to implement its plan, General Dynamics estimates that it would need approval of the FY2011 \$243 million budget request and \$129 million in FY2012.

## **The Marines' Plan for EFV Funds<sup>54</sup>**

One report suggests that if Secretary of Defense Gates can overcome congressional opposition to terminate the EFV program, the Marines could have \$2.588 billion over the next five years that could be directed at other programs. If successful, some of those funds could be used to develop the New Amphibious Vehicle (NAV) and to upgrade the current AAV. The Marines reportedly would dedicate \$500 million over five years of the redirected EFV monies to the NAV and \$1 billion to AAV upgrades. In addition, the Marines are said to be considering using \$200 million of the EFV savings to recapitalize its High Mobility, Multi-Wheeled Vehicle (HMMWV) fleet over the next five years as well as allocating \$400 million to develop the Marine Personnel Carrier (MPC), which has been delayed due to lack of funding. Also, \$488 million would go to the Marine Corps general procurement needs to make up for war-related shortages.

## **The Amphibious Combat Vehicle (ACV)<sup>55</sup>**

The Marines, a little more than a month after Secretary Gates's EFV cancellation announcement, initiated a new competition to upgrade existing AAVs and develop a successor to the EFV (previously called the New Amphibious Assault Vehicle [NAV] but now called the Amphibious Combat Vehicle [ACV]). On February 21, 2011, the Marines issued three request for information (RFIs) to industry. In terms of the ACV, the Marines are looking for a vehicle that will carry a squad-sized force from a 12-mile minimum distance from shore and be able to maneuver with Marine mechanized units while maintaining a counter-IED capability. The Commandant of the

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<sup>50</sup> Ibid.

<sup>51</sup> Jen DiMascio, "Will Congress Save the Marines' EFV," *Politico.com*, January 6, 2011 and Nathan Hodge, "Backers of Marine Tank Try to Save It," *Wall Street Journal*, January 8, 2001.

<sup>52</sup> Information is from a briefing provided by General Dynamics to CRS on January 28, 2011.

<sup>53</sup> Ibid.

<sup>54</sup> Information in this section is taken from Emelie Rutherford, "Marine Corps Humvees, MPCs Would Benefit from EFV Cancellation," *Defense Daily*, January 12, 2011.

<sup>55</sup> Information in this section is taken from Carlo Munoz, "Marine Corps Kicks Off Competition for New Amphibious Vehicle System of Systems," *Defense Daily*, February 23, 2011 and "Amos: Marine Corps Will Have New ACV Within Four Years," *Defense Daily*, March 2, 2011.

Marine Corps, General James Amos, has committed the Marine Corps to fielding the ACV within four years.

## **FY2012 EFV Budget Request<sup>56</sup>**

The Marines did not submit a budget request for FY2012 funding for the EFV. Instead, FY2011 and FY2010 funds will be used to cover termination costs as well as complete ongoing testing and developmental work, to include delivery of EFV-related software.

## **Potential Issues for Congress**

### **General Dynamics' Proposal**

Congress might decide to evaluate General Dynamics' proposal to build 200 EFVs instead of 573. One evaluation criteria could be the EFV's overall performance in operational testing, which is in its final stages. While General Dynamics claims that current testing is reportedly "exceeding requirements by 90 percent,"<sup>57</sup> the Marines have not yet issued their final test results. Another issue for consideration is if the technologically advanced EFV now fits in with the Marines' planned restructuring to what it describes as a "middle weight force" with less equipment that it currently possesses.<sup>58</sup> While General Dynamics is promoting a 200 EFV procurement, it is likely that if this course of action is chosen, that they would then advocate for the acquisition of additional EFVs over time, perhaps approaching the 500 plus or even 1,000 vehicle requirements of the past.

### **Use of EFV Technologies**

If the EFV program is terminated as Secretary Gates intends, there could likely be two decades-worth of knowledge and associated technologies, which could be a major benefit—as well as potential cost savings—for the AAV upgrade and ACV programs. While it is reasonable to assume that the Marines would make good use of work previously done on the EFV, Congress might consider examining what EFV technologies the Marines plan to migrate to the ACV. This examination could help to ensure that there is "value added" by these technologies and that they meet "cost-benefit" criteria—in other words, these technologies meet ACV key performance parameters (KPPs) and are not expensive "nice to have" features that could potentially drive up the ACV per unit cost.

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<sup>56</sup> Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Navy, PE 0603611M: Marine Corps Assault Vehicles, February 2011.

<sup>57</sup> Gretel C. Kovach, "New Marine Assault Vehicle Meets Performance Test," *San Diego Union-Tribune*, January 26, 2011.

<sup>58</sup> Mark Walker, "Changes Loom for the Marine Corps," *North County (CA) Times*, February 5, 2011 and Cid Standifer, "Marine Corps Force Structure Review Calls for Smaller Equipment List," *InsideDefense.com*, February 24, 2011.

## **Is a Four Year ACV Development Cycle Overly Ambitious?**

Congress might wish to review whether the Marines' plan to field the ACV in four years is overly ambitious. During the Navy's presentation of its FY2012 Budget Request, it was reported that Navy and Pentagon officials stated that the "soonest that the ACV would be ready was 2024."<sup>59</sup> Originally, General Amos had reportedly wanted the GCV to be fielded using an acquisition track similar to the Mine-Resistant Ambush-Protected (MRAP) vehicle, which was fielded in a matter of months as opposed to years. As previously noted, the Commandant of the Marine Corps, General James Amos, has committed the Marine Corps to fielding the ACV within four years. It is not known if this four-year requirement is based on a specific operational need or if it is driven by other factors. Because of the wide disparity in expectations for the delivery date of the ACV, it might be beneficial to take a comprehensive look at the requirements and expected resources available to the Marines to ensure that a four-year development cycle is not both overly optimistic and ambitious. While the Marines certainly cannot afford another two-decades long developmental effort, some believe that they cannot afford to rush ACV development and testing in order to meet an arbitrary timeline.

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<sup>59</sup> Carlo Munoz, "Amos: Marine Corps Will Have New ACV Within Four Years," *Defense Daily*, March 2, 2011.

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