



CRS Report for Congress

The Army's M-4 Carbine: Background and Issues for Congress

Andrew Feickert
Specialist in Military Ground Forces
Foreign Affairs, Defense, and Trade Division

Summary

The M-4 carbine is the Army's primary individual combat weapon for infantry units. The M-4 uses a direct gas impingement system that blows carbon from the fired cartridge back into the weapon's receiver, which can lead to weapon malfunctions. The U.S. Special Operations Command (USSOCOM) is replacing its M-4s with the Special Operations Combat Assault Rifle (SCAR). It is a modular weapon with a short-stroke piston system which eliminates carbon blow back that theoretically improves reliability. Some have questioned why the Army has not adopted the SCAR or another similarly designed weapon. A series of studies and tests of the M-4 and potential competitors have added to this debate. This report will be updated as events warrant.

Background

In the mid-1990s, the Army began fielding the M-4 carbine, a lighter, more compact version of the Vietnam-era M-16 rifle. Both M-16 and M-4 carbines are 5.56 mm caliber weapons and are primarily manufactured by Colt Defense LLC, Hartford, CT. Army officials are said to be satisfied with the M-16 family of weapons, suggesting that the M-16 is "simply too expensive to replace with anything less than a significant leap in technology."¹ The Army's "leap ahead" program to replace the M-16 family of weapons — the Objective Individual Combat Weapon (OICW) program — began in 1994, and one weapon evaluated in that program, Heckler & Koch's XM-8 assault rifle, was considered by some as the M-16's/M-4's replacement. As late as 2005, the XM-8 was reportedly close to being officially approved as the Army's new assault rifle, but alleged acquisition and bureaucratic conflicts compelled the Army to cancel the XM-8 in October 2005. The Army plans to continue its procurement of M-16s and M-4s for "years to come," while

¹ Matthew Cox, "Better Than M4, But You Can't Have One," *Army Times*, March 1, 2007, and "Competition Sought for New Army Rifle," *Army Times*, April 27, 2007.

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE 30 MAY 2008	2. REPORT TYPE	3. DATES COVERED 00-00-2008 to 00-00-2008	
4. TITLE AND SUBTITLE The Army's M-4 Carbine: Background and Issues for Congress		5a. CONTRACT NUMBER	
		5b. GRANT NUMBER	
		5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)		5d. PROJECT NUMBER	
		5e. TASK NUMBER	
		5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Congressional Research Service, The Library of Congress, 101 Independence Ave, SE, Washington, DC, 20540-7500		8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)	
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited			
13. SUPPLEMENTARY NOTES			
14. ABSTRACT			
15. SUBJECT TERMS			
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified	Same as Report (SAR)
			18. NUMBER OF PAGES 6
			19a. NAME OF RESPONSIBLE PERSON

some in Congress have called for an “open competition” to choose a successor to the M-16 and M-4 assault rifles.²

Concerns with M-4 Reliability and Lethality

Reports suggest that soldiers have expressed concerns regarding the reliability and lethality of the M-4.³ Reliability can be described as “the probability that an item can perform its intended function for a specified interval under stated conditions” and lethality as “the killing or stopping power of a bullet when fired from a weapon.”⁴

Center for Naval Analyses (CNA) Study on Small Arms in Combat.⁵ In December 2006, the Center for Naval Analyses (CNA) published a survey and study at the request of the Army’s Project Manager-Soldier Weapons of 2,600 soldiers who had returned from Iraq and Afghanistan and who had engaged in a firefight using a variety of small arms. Some of the M-4-specific observations were as follows:

- Over 50% of soldiers using the M-4 and M-16 reported that they never experienced a stoppage [malfunction] while in theater, to include during training firing of the weapons (p. 2).
- Frequency of disassembled cleaning had no effect on the occurrences of stoppages. Variations in lubrication practices, such as the type of lubrication used and the amount of lubrication applied, also had little effect on stoppages. Using a dry lubricant decreased reports for stoppages only for M-4 users (p. 3).
- Of soldiers surveyed who used the M-4, 89% reported being satisfied with their weapon (p. 11).
- Of M-4 users, 20% recommended a larger bullet for the M-4 to increase lethality (p. 30).
- Regarding M-16s and M-4s, many soldiers and experts in theater commented on the limited ability to effectively stop targets, saying that those personnel targets who were shot multiple times were still able to continue fighting (p. 29).

Although M-4 critics cite this report as evidence of unsuitability of the M-4, it might also be interpreted as a favorable report on the M-4’s overall reliability and acceptance by soldiers. The “larger bullet” recommendation for lethality purposes may, in fact, be a valid recommendation based on observations from Iraq and Afghanistan, but the “bigger bullet debate” has been a source of contention for many small arms experts ever since the Army adopted the 5.56 mm M-16 during Vietnam in lieu of the 7.62 mm M-14 rifle.

² Ibid.

³ Ibid.

⁴ Shawn T. Jenkins and Douglas S. Lowrey, “A Comparative Small Analysis of Current and Planned Small Arms Weapon Systems,” MBA Professional Report, Naval Postgraduate School, Monterey, CA, December 2004, pp. 29-31.

⁵ Information in this section is taken from Center for Naval Analyses (CNA) Study: “Soldier Perspectives on Small Arms in Combat,” December 2006. CNA is a federally-funded research and development center (FFRDC) for the Department of the Navy.

Special Forces⁶ Opts to Replace the M-4

In 2001, the U.S. Special Operations Command (USSOCOM) was said to have documented M-4 reliability problems in an official report, noting that the M-4 suffered from an “obsolete operating system” and recommending the redesign of the current gas system.⁷ The USSOCOM report allegedly described the M-4’s shortened barrel and gas tube as a “fundamentally flawed” design, which contributed to failures extracting and ejecting spent cartridges during firing. In recognition of these deficiencies, the 1st Special Forces Operational Detachment-Delta, also referred to as “Delta Force,” reportedly began working with German arms manufacturer Heckler & Koch to replace the M-4’s gas system with a piston operating system to improve reliability and increase parts life. In 2004, Delta reportedly replaced their M-4s with the HK-416 — a weapon that combines the operating characteristics of the M-4 with the piston operating system.⁸

In early 2003, USSOCOM officials initiated efforts to identify potential new combat rifle capabilities.⁹ From May through August 2004, USSOCOM evaluated 12 weapons from nine different manufacturers.¹⁰ In November 2004, USSOCOM awarded a contract to FNH USA¹¹ to develop the Special Operations Combat Assault Rifle (SCAR).¹² The SCAR will come in two variants — the heavy 7.62 mm SCAR-H and the light 5.56 mm SCAR-L.¹³ Each variant will accommodate three different barrels — a standard 35.7 cm barrel, a 25.5 cm close-combat barrel, and a sniper variant barrel. All barrels reportedly will take less than five minutes to switch. The SCAR-L is intended to replace USSOCOM M4-A1 carbines and features the same type of gas piston operating system that the HK 416 employs. The SCAR is currently undergoing the final phases of initial operational test and evaluation, with a full-rate production decision projected for 2008, and with initial delivery quantities of around 2,800 weapons to be allocated throughout USSOCOM units.¹⁴

⁶ For additional information on U.S. Special Forces, see CRS Report RS21048, *U.S. Special Operations Forces (SOF): Background and Issues for Congress*.

⁷ Information in this section is from Matthew Cox, “Better Than M4, But You Can’t have One,” *Army Times*, March 1, 2007.

⁸ Matthew Cox and Kris Osborn, “M4, In Their Sights,” *Defense News*, February 25, 2008.

⁹ Scott R. Gourley, “Soldier Armed: Special Operations Forces Combat Assault Rifles,” *Association of the U.S. Army (AUSA) Army Magazine*, May 1, 2006.

¹⁰ “US SOCOM Awards Contract for SCAR Development,” *Jane’s International Defense Review*, January 2008, p. 26.

¹¹ FNH USA is the U.S.-based sales and marketing entity for the Belgium-based FN Herstal S.A.

¹² Scott R. Gourley, “SCAR Evaluation Nears Conclusion,” *Jane’s Defence Weekly*, March 19, 2009, p. 12.

¹³ Information in this section is from Joshua Kucera, “SOCOM Selects New Assault Rifle,” *Jane’s Defence Weekly*, February 5, 2005, p. 8.

¹⁴ Scott R. Gourley, “SCAR Evaluation Nears Conclusion,” *Jane’s Defence Weekly*, March 19, 2009, p. 12.

Army's Asymmetric Warfare Group and the H&K-416

The Army describes the recently established Asymmetric Warfare Group (AWG), based in Ft. Meade, MD, as an Army special missions unit consisting of carefully selected military, Department of the Army Civilians, and contractors who “observe and collect information about the evolving asymmetric operating environment by providing advisors to deployed and deploying forces in support in the Global War on Terrorism.”¹⁵ The Army reportedly initially approved AWG acquisition and use of HK-416s in lieu of M-4s, but then reversed this decision stating, “The AWG also advises units on training, tactics, and procedures. In this capacity, the use of the standard issue M-4 is required. In support of this mission set, the decision was made to transition to the M-4 and the AWG is now turning in its H&K rifles.”¹⁶ A report maintains that AWG “fought to keep its several hundred 416s, arguing that they outperform the Army’s M-4 and require far less maintenance.” Because the HK-416 operates in a similar fashion to the M-4 and has comparable performance characteristics, it is unlikely that training, tactics, and procedures vary greatly between the two weapons, thereby causing some to question the motives behind the Army’s decision to recall the AWG’s HK-416s.

M-4 Reliability Testing

A 2002 Marine Corps Systems Command test was said to have concluded that the M-4 malfunctioned three times more often than the M-16A4, as the M-4 failed 186 times for a variety of reasons over the course of 69,000 rounds fired, while the M-16A4 failed 61 times.¹⁷ In a test conducted by the Army between October 2005 and April 2006, 10 new M-16s and 10 new M-4s were fired in a 35,000-round test under laboratory conditions, with both weapons firing approximately 5,000 rounds between stoppages.

Congressionally Requested M-4 Test. In April 2007, Senator Tom Coburn (R-Oklahoma) sent a letter to then Acting Secretary of the Army Peter Geren questioning why the Army planned to spend \$375 million on M-4 carbines through FY2009 “without considering newer and possibly better weapons available on the commercial market.”¹⁸ Senator Coburn’s letter also cited M-4 reliability and lethality concerns and called for a competition to evaluate alternatives to the M-4, citing a need to conduct a “free and open competition.” The Army initially agreed to begin the tests in August 2007 at the Army Test and Evaluation Center at Aberdeen Proving Ground, MD, but then postponed the test until December 2007.¹⁹ The test evaluated the M-4 against the HK-416, the HK -XM8, and the FNH SCAR, with each weapon firing 6,000 rounds under sandstorm conditions.

¹⁵ See 2008 U.S. Army Posture Statement Information Paper — Asymmetric Warfare Group [http://www.army.mil/aps/08/information_papers/prepare/Army_Asymmetric_Warfare_Group.html], accessed May 20, 2009.

¹⁶ Information in this section is from Matthew Cox, “Army Takes HK416s From Special Unit,” *Army Times*, March 11, 2008.

¹⁷ Matthew Cox, “Better Than M4, But You Can’t Have One,” *Army Times*, March 1, 2007.

¹⁸ Information in this section is from Matthew Cox, “Competition Sought for New Army Rifle,” *Army Times*, April 27, 2007.

¹⁹ Matthew Cox, “Army Tests of Rival Carbines Postponed,” *Army Times*, September 20, 2007.

Officials reportedly evaluated 10 each of the four weapons, firing a total of 60,000 rounds per model resulting in the following: XM-8, 127 stoppages; FNH SCAR, 226 stoppages; HK-416, 233 stoppages; and the M-4, 882 stoppages.²⁰ On December 17, 2007, when the Army briefed Congress and the press, the Army reportedly claimed that the M-4 suffered only 296 stoppages during the test, explaining that the stoppage discrepancy from the original 882 M-4 stoppages reported could have been due to the application of the Army Test and Evaluation Center's post-test Reliability, Availability, and Maintainability (RAM) Scoring Conference.²¹ This process attributes failures to such factors as operator error or part failure and, as an example, if evaluators linked 10 stoppages to a broken part on a weapon, they could eliminate nine of the stoppages and count only one failure for reporting purposes. It is not known whether the Army also applied the RAM process to the other three weapons in the test, but it might be assumed that if the other three weapons were given equal treatment, those weapon's stoppages would also likely be decreased in a manner similar to the M-4.

Recent Congressional Action

The Administration requested \$151.1 million in FY2009 for the procurement of 88,964 M-4 carbines to be produced by Colt of Hartford, CT, at \$1,200 per weapon (not including combat optics and other accessories).²² There is also a request for an additional \$79.5 million for 47,185 M-4s in the pending FY2008 Global War on Terror Supplemental Request that has not yet been acted on in Congress.²³

The House and Senate have approved the Administration's FY2009 M-4 Budget Request (see H.R. 5658 and S. 3001, FY2009 National Defense Authorization Act). Accompanying H.Rept. 110-652, May 16, 2008, calls for the services to work together to develop and resource a joint, long-term competitive strategy for small arms, including a "next-generation carbine." S.Rept. 11-335, May 12, 2008, recommends "that Secretary of Defense submit a report on the feasibility and advisability of conducting a full and open competition for carbine-type weapons." (Sec.112, S.Rept. 11-335.)

Potential Issues for Congress

Additional Reliability and Lethality Testing. Although many feel that recent tests, studies, and surveys call into question the Army's decision to continue to procure and employ the M-4 carbine, it can also be argued that the M-4 is generally well-regarded by the soldiers who use it in combat and its lethality may be more a function of the round used as opposed to the actual weapon itself. One potential option for gaining greater insight into this issue might be to outfit selected Army infantry companies (about 120 soldiers) in both Iraq and Afghanistan with XM-8s, HK-416s, and FNH SCARs for a year-long comparative study with an infantry company equipped with M-4s. Such a

²⁰ Matthew Cox, "New Carbines Outperform M-4 in Dust Test," *Army Times*, December 17, 2007.

²¹ Information in this section is from Matthew Cox, "Giving M-4 Failures an Alibi," *Army Times*, December 29, 2007.

²² DOD Budget Item Justification Sheet, M-4 Carbine, February 2008, pp. 197-200.

²³ Department of the Army, FY2008 GWoT Exhibit P-1G, February 2008, p. A-9.

study, conducted in combat as opposed to in laboratories and on firing ranges, might provide what could be described as “the ultimate test” of these weapons. Such testing is not unprecedented, as the Army has recently tested its Land Warrior integrated modular combat system in Iraq with an infantry battalion in actual combat.

USSOCOM Implications of Replacing M-4s. It can be argued that USSOCOM’s decision to adopt the FNH SCAR has implications for the Army. In one sense, the SCAR is the first modular small arms system adopted by the military. The SCAR-L and SCAR-H will replace the following weapons: M-4A1, MK-18 close quarter carbine, MK-11 sniper security rifle, MK-12 special purpose rifle, and the M-14 rifle.²⁴ There is also a 90% parts commonality between the SCAR-L and SCAR-H, including a common upper receiver and stock and trigger housing and an enhanced grenade launcher can be attached to either model.²⁵ While the SCAR might not meet all of the conventional Army’s requirements, its adaptability in terms of missions (close quarters combat to long-range sniper operations), being able to rapidly convert from a 5.56 mm to a 7.62 mm weapon, and the ability to accommodate a variety of modifications such as grenade launchers and special optics, might be factors worth considering as the “modular Army” plans future small arms programs.

Open Competition for an M-4 Replacement. Some small arms analysts have detected “a growing frustration among arms makers that the Army is wedded to a single company.”²⁶ Congress has also asked the Army and DOD to study and report on the feasibility and advisability of conducting an open competition for carbine-type weapons and to develop a long-term, competitive strategy for small arms. If such an effort is undertaken by the Army and the other Services, some might argue that lessons learned from past Army small arms initiatives such as the Objective Individual Combat Weapon (OICW) program and, more recently, USSOCOM’s Special Operations Combat Assault Rifle (SCAR) program, would facilitate such a competition and procurement. The SCAR program involved a 10-month “full and open competition” resulting in nine manufacturers submitting 12 weapons for consideration.²⁷ The program was described as “operator-envisioned, operator-tested, and operator chosen,” with Navy, Army, and Marine special operators being extensively involved in design and testing.²⁸ Supporters of a competition maintain that a number of existing carbine manufacturers are available and that a precedent for joint development and testing is already established. From their perspective, a new Army initiative would benefit both in terms of reduced procurement time and developmental costs.

crsphgw

²⁴ Scott R. Gourley, “Soldier Armed: Special Operations Forces Combat Assault Rifles,” *Association of the U.S. Army (AUSA) Army Magazine*, May 1, 2006.

²⁵ Nathan Hodge, “Stopping Power,” *Jane’s Defence Weekly*, July 25, 2007.

²⁶ Matthew Cox and Kris Osborn, “M4, In Their Sights,” *Defense News*, February 25, 2008.

²⁷ Scott R. Gourley, “Soldier Armed: Special Operations Forces Combat Assault Rifles,” *Association of the U.S. Army (AUSA) Army Magazine*, May 1, 2006 and “US SOCOM Awards Contract for SCAR Development,” *Jane’s International Defense Review*, January 2008, p. 26.

²⁸ *Ibid.*