



Evolution of the Army Rifle and Squad Automatic Weapon

Form *Follows* Function

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ABSTRACT: The Army's selection of a standard caliber bullet has always determined the choice of its rifle and squad automatic weapon. Weight, rate of fire, lethality and bullet standardization are constant factors that guide the Army adoption of new weapons systems.

Since the beginning of modern warfare, the development of a cartridge that provided required maximum effective range and accuracy, penetration, and lethality, have dictated rifle and automatic weapons design. Form (rifle) follows function (cartridge desired). The development of a modern cartridge that was mutually compatible for a Squad Automatic Weapon (SAW), became the backbone of modern Infantry doctrine.¹ A dependable SAW with a high rate of accurate long-range fire suppressed enemy concentrations and enabled the remainder of the rifle squad to maneuver. Ammunition compatibility with all infantry squad weapons was desired from a logistics standpoint because it meant one cartridge fits all. Ammunition redistribution during and after a firefight was simpler and more efficient.

The Army adopted its first modern infantry rifle in 1903, the M1903 Springfield, chambered in .30-06. The Army adopted the .30-06 Springfield cartridge to accommodate advances in ballistics and aerodynamics made by European militaries.² At the time the .30-06 was adopted, ammunition weight was not a major factor because long range accuracy and lethality were the most important factors. The Springfield proved to be a reliable, accurate, and hard-hitting weapon in First World War trench warfare. However, as World War II loomed on the horizon, a bolt-action rifle with an internal five-bullet magazine was not sufficient to support infantry squad maneuver tactics based on the support capabilities of the M1918 Browning Automatic Weapon (BAR), the standard infantry squad automatic weapon.

Developed in 1917 and chambered in .30-06, the BAR proved devastating in the trench fighting of World War I. It was the Army standard during World War II, the Korean War, and was used by indigenous forces in Vietnam. An exceptionally rugged and dependable weapon, the major shortcoming of the BAR was its weight (nearly 20 lbs) and heavy twenty-cartridge magazine. The squad had to carry extra .30-06 ammunition for the BAR gunner, which reduced the individual rifleman's basic load.

To increase firepower in the infantry squad, the Army adopted the M1 Garand rifle in 1936. Chambered in .30-06, it shared the same ammunition as the BAR. Considered one of the best rifles of WWII, it was unusual because it was semi-automatic with an internal eight-cartridge magazine.³ It gave an American

infantry squad greater firepower than the Germans, Italians, or Japanese, who, through 1944, were primarily armed with bolt action rifles. Because of advances in firearms technology after the Korean War, the Army wanted a lighter standard service rifle with selective-fire.

As America moved deeper into the Cold War, it needed to adopt a new standardized cartridge. A full-sized .30-06 cartridge would put too much strain on a lighter weapon. In 1954 the Army adopted the smaller and lighter 7.62x51mm NATO cartridge. The bullet, with ballistic characteristics similar to the .30-06, was adopted as standard by the North Atlantic Treaty Organization (NATO). As opposed to the .30-06 of WWII, this new NATO cartridge allowed interoperability with allied forces.

To use the 7.62x51mm NATO cartridge, the Army first modified the M1 chamber and barrel to fire the 7.62x51mm NATO cartridge and then designed the M14 rifle/automatic rifle with a selector switch in 1957 around that new standard cartridge. The M14 replaced the M1 as the standard service rifle and the BAR as the squad automatic weapon.⁴ While a reliable weapon, in practice the M14 could not replace both. The M14 was a pound lighter and had a greater cartridge capacity (20) than the M-1, allowing soldiers to carry more cartridges and have greater firepower. The drawbacks were that its wood stock and length was not suited to the jungle environment of Vietnam, in which the U.S. Army became embroiled after adopting the weapon. Although only used as the Army's standard service rifle for a short time (1957-1967) before it was replaced by the M16 family of rifles, the accurate M14 remains in limited service for snipers.

The Army continued to use the 7.62x51mm NATO cartridge in the M60 machine gun, conceived to assume the role of the M1919A6 light machine gun.⁵ However, while it also displaced the BAR, the M60 proved inadequate as a squad automatic weapon. It was so heavy that soldiers affectionately referred to it as 'the pig' during the Vietnam War.⁶ It also

Main Battle Rifles



M1

In service: 1936–59
 Weight: 9.5 lb
 Caliber: .30-06
 Capacity: 8 rounds
 Range: 420 m

M14

S: 1959–limited use
 W: 8.56 lb
 C: 7.62 mm
 C: 20 rounds
 R: 460 m

M16

S: 1964–present
 W: 8.5 lb
 C: 5.56 mm
 C: 30 rounds
 R: 550 m

M4A1

S: 1994–present
 W: 7.5 lb
 C: 5.56 mm
 C: 30 rounds
 R: 500 m

WEAPON WEIGHT & CAPACITY

Squad Automatic Weapon



M1918

S: 1918–Vietnam
 W: 19.4 lb
 C: .30-06
 R: 20 rounds

M60

S: 1960–limited use
 W: 23 lb
 C: 7.62 mm
 R: Belt fed

M249

S: 1984–present
 W: 17 lb
 C: 5.56mm
 R: Belt fed

fired different ammunition (7.62x51mm NATO) than the M16 (5.56x45mm NATO), the rifle that replaced the M14. Squad members had to carry boxes of heavy, non-compatible belt ammunition to ‘feed’ the M60.

The AR-15 rifle, later adopted in modified form as the M16, fully replaced the M14 by 1969. The lighter selective-fire rifle initially fired a .223 Remington cartridge. The .223 evolved into the 5.56x45mm NATO cartridge in the 1980s. The cartridge was much lighter than the 7.62x51mm NATO cartridge, allowing each soldier to carry more ammunition. In addition, the recoil was less, reducing user fatigue and increasing the probability of second and third hits. The M16, unlike the M14, could also be fired controllably and accurately on automatic, an important consideration as the majority of the adversaries were armed with the selective-fire Soviet/Warsaw Pact/Chinese AK-47s.⁷ The M16, including its current variant, the M4A1, has been the main U.S. Army service rifle for fifty years.

The move to the 5.56x45mm NATO cartridge also influenced the reintroduction of a purpose-built ammunition-compatible SAW in 1984 to replace the M60. In an effort to increase rifle firepower, improve ammunition compatibility Army-wide, and provide a lighter automatic weapon for the squad, the Army adopted the M249. Although its high rate of fire and lighter weight have served well, it needed to be modernized based on the maintenance required to keep the aging weapon functional. Furthermore, the M249’s size is not well-suited to room clearing in urban combat environments.⁸

Concerns about the lethality of the 5.56x45mm NATO cartridge against combat troops wearing body armor were voiced. According to Major Thomas P. Ehrhart, “the U.S. infantry weapon has devolved from the World War I rifle capable of conducting lethal fire out to 1,200 yards, to the current weapon that can hit a target out to 300 meters, but probably will not kill it [because of more effective modern body armor] . . . the current U.S. infantrymen [is] less equipped to kill his

TAKEAWAYS

1. The bullet has always determined weapons design.
2. The Army has consistently adopted more accurate, longer range, and lighter weapons. Yet, to deal with improved body armor, a new generation rifle will be heavier than the M16 M4A1 while the M249 replacement will be lighter.
3. Historically, the Army has benefitted with squad level weapons that used the same ammunition.

enemy than his World War I predecessor.”⁹ Because of changes on the battlefield, the Army began research to replace the 5.56x45mm NATO cartridge with one of greater lethality.¹⁰

To speed up the standard procurement process, U.S. Special Operations Command (USSOCOM) in 2016 investigated the commercial 6.5mm Creedmore cartridge as the basis for a more precise weapons system.¹¹ While heavier than the 5.56, it had more lethality and accuracy than the 7.62x51mm NATO cartridge, today’s standard for sniper rifles. The 2017 operational tests showed that with rifles modified to fire 6.5mm Creedmore, soldiers “were twice as likely to hit their targets” compared to weapons with the 7.62x51mm NATO cartridge.¹²

Despite USSOCOM’s effort, the Army moved to replace the M4A1 and M249 with two new weapons and a government designed 6.8mm cartridge that “falls in the sweet spot . . . with all the good characteristics of the heavier 7.62mm but with more lethality and accuracy,” and weighing less.¹³ The new weapon ‘contenders’



ACTUAL SIZE

must improve the rifle squad capabilities against emerging threats, according to Lieutenant Colonel Jason D. Bohannon, the Project Manager for the new weapons system. The internally developed 6.8mm cartridge, and the weapons built to fire it, will incorporate the latest technology, reduce bullet aerodynamic drag, and be more lethal. The improvements “should last for the next thirty years.”¹⁴ Because the firing mechanism will need to be more robust, the new rifle will be heavier than the current M4A1, but because of incorporation of new construction materials, the SAW will be lighter than the M249. 🇺🇸

Endnotes

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