

# “This is My Rifle”

## From the Hill Fights in Vietnam to Today: The History of the M16

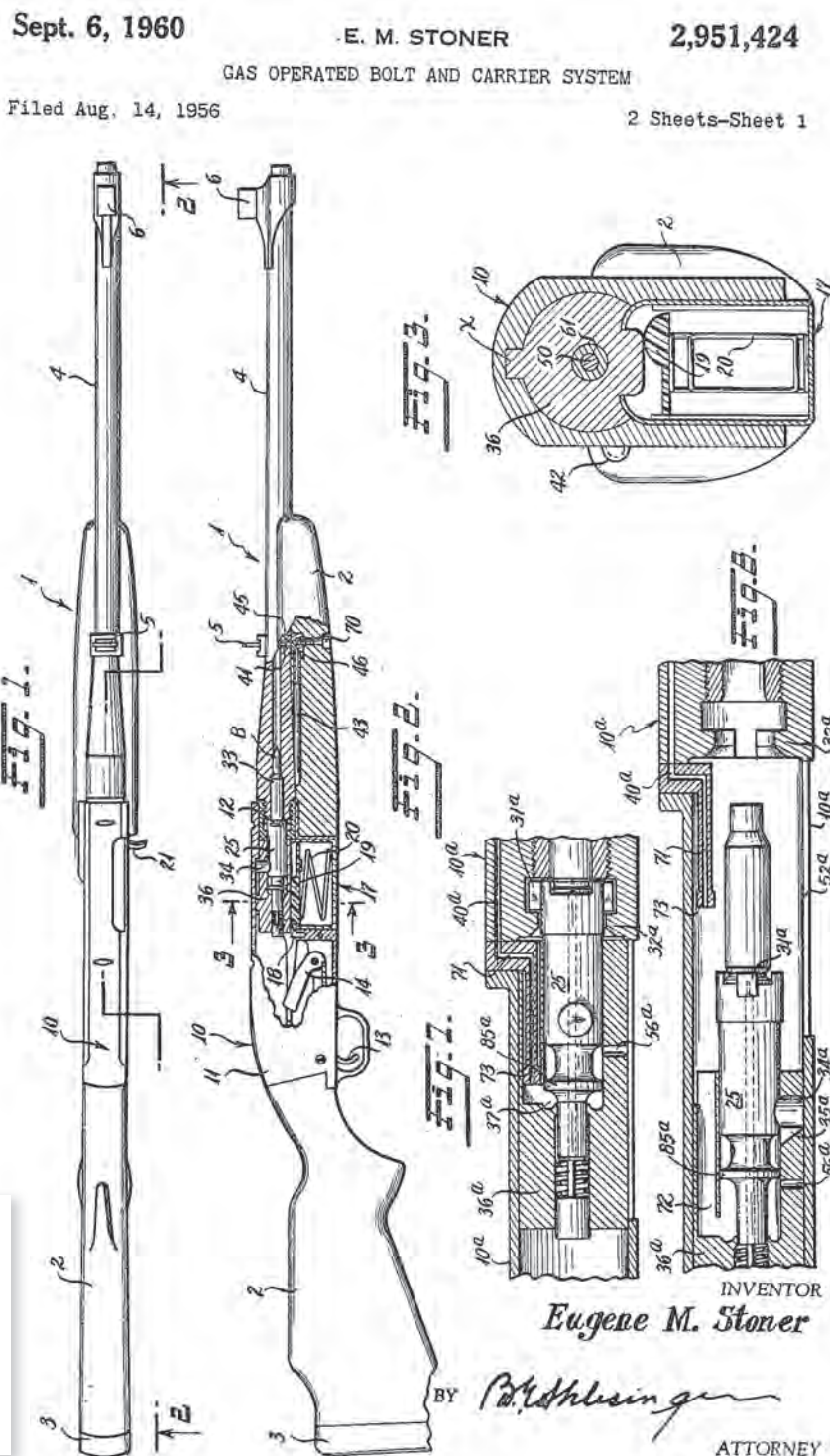
By Sam Lichtman

**T**he date, April 30, 1967. The place, a few miles northwest of Khe Sanh. The 2nd and 3rd Battalions of the 3rd Marine Division are preparing to assault Hill 881 and dislodge the North Vietnamese Army (NVA) forces emplaced in fortified bunkers on the hill. With 105 mm artillery at their backs and the new M16 rifles in hand, it seems like nothing can stand in their way as they attempt to take the hill.

Within just a few short hours, however, nothing is going according to plan. Because the defenders on the hill are more numerous and far better dug in than anticipated, the air strikes and artillery bombardment preceding the assault have had little practical effect. To make matters worse, Marines have been experiencing serious problems with their high-tech M16 rifles—critical malfunctions are causing them to seize up in the heat of combat. It seems nearly inconceivable that the U.S. military would issue fatally flawed equipment, but the Battle of Hill 881 and several other conflicts during the Vietnam War serve as grim reminders that it did indeed happen.

So, why were soldiers and Marines using rifles that often malfunctioned in battle? To understand how and why this happened, we need to travel more than a decade back in time and thousands of miles away to a small office complex in Hollywood, Calif.

**Drawings from Eugene Stoner's original patent for the hybrid gas system used in the AR-10, AR-15, and other weapons. Often referred to as “direct impingement,” this arrangement is also known as an “internal piston,” as the bolt and bolt carrier together perform the functions of a true gas piston found in more conventional designs.**



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**The new .223 ammunition was much lighter and produced less recoil than 7.62 NATO.**

Fairchild Airplane and Engine Company created its ArmaLite division in 1954 to design and produce firearms. As a subsidiary of a major aerospace contractor in the 1950s, ArmaLite's designs were unconventional and highly innovative. Where a rifle was traditionally constructed out of a milled or pressed sheet steel receiver mated to a steel barrel in a wood or metal stock, ArmaLite's AR-1, AR-5, and AR-7 rifles made heavy use of space-age materials like aluminum and fiberglass.

In the mid-1950s, ArmaLite engineer Eugene Stoner designed a revolutionary new military rifle he hoped would replace the venerable M1 Garand. Stoner's rifle, designated "AR-10," was a radical departure from conventional designs. Its barrel, operating components, and stock were all arranged in a straight line, transferring recoil directly back into the shooter's shoulder and minimizing muzzle rise on full-auto. With its aluminum receiver, fiberglass furniture, and composite barrel, the AR-10 was a full pound or more lighter than any of its more mainstream competitors. Unfortunately, military trials showed that the AR-10 was perhaps too far ahead of its time, and without years of refinement behind it, the rifle suffered a number of teething troubles which couldn't be corrected quickly enough to prevent its disqualification from the trials. The U.S. Army would ultimately go on to adopt the T44E4 prototype, essentially just an improved M1, as the M14 rifle.

But all was not lost for Eugene Stoner and ArmaLite. The Department of Defense was investigating a small-caliber, high-velocity rifle cartridge concept based on research and testing from the Aberdeen Proving Grounds in the early 1950s, and they wanted ArmaLite to help develop the new ammunition and a lightweight rifle to fire it. While Stoner worked on the design for the projectile itself, ArmaLite engineers L. James "Jim" Sullivan and Robert Fremont worked with Remington on the design for the case. What they came up with was a more powerful version of the .222 Remington capable of propelling a 55-grain full-metal jacket projectile at an astounding 3,250 feet per second from a 20-inch barrel.



**Eugene Stoner**



CPL R.J. DEL VECCHIO, USMC

**PFC Tommy Gribble displays his M16 rifle, which was hit by a round from an enemy AK-47 on Sept. 6, 1968. The round pierced Gribble's forearm, passing between both bones, then smashed through the Marine's rifle stock. Gribble, assigned to Co I, 3rd Bn, 5th Marines, was walking point during a patrol in Vietnam when the round hit.**

To go with this new so-called ".222 Remington Special" or ".223 Remington" ammunition, Sullivan and Fremont created a new rifle based on the AR-10. It used the same operating principle and retained many of the same desirable features as its predecessor, but testing showed that the new prototype was capable of superior accuracy and reliability. They called it the AR-15.

The first AR-15 was an impressive weapon for its time. It was demonstrated to have better reliability and accuracy than

the M14 while being nearly two pounds lighter. The new .223 ammunition was much lighter and produced less recoil than 7.62 NATO, allowing infantrymen to carry twice as many rounds and fire accurately in both semi-automatic and fully automatic modes. A 1959 test by the Army showed that a squad of five to seven men armed with AR-15s was just as effective as an 11-man squad armed with M14s.

Despite its lighter weight and lower recoil, the new high-velocity ammunition





**A Marine armed with an M16A1 checks in with his command post via field radio during Operation Urgent Fury in Grenada, Oct. 25, 1983.**

produced devastating wounds in soft targets. Whereas conventional rifle bullets had the potential to pass through their targets and leave behind small wound tracks, high-velocity projectiles had a tendency to fragment shortly after impact. Jim Sullivan would later recount an informal test at a shooting range between a conventional 7.62 NATO rifle and an .223-caliber AR-15 wherein the ArmaLite employees shot at jerrycans filled with water. The full-power rifle punched a hole straight through a can—the bullet went in one side and out the other, leaving nothing behind but a pair of holes. The AR-15, firing ammunition nominally half

as powerful, caused a can to explode from the sudden shock. Battlefield reports later confirmed the lethality of this effect on enemy combatants.

The AR-15 showed great promise as a combat rifle, but it couldn't have come at a worse time. The Army and Marine Corps had just adopted the M14 after 12 years of development and amid a great deal of controversy; they weren't about to go out and order hundreds of thousands of AR-15s. Furthermore, top generals were extremely conservative about small arms designs, and the AR-15 was easily the most innovative and unconventional rifle of its time. By this time, ArmaLite was on

the verge of bankruptcy. Years of work on the AR-10 project without a major contract to show for it had left the company in deep financial trouble, and the Army passing on the AR-15 was the final nail in the coffin. ArmaLite was finally forced to sell the rights to the AR-15 to a larger and more established arms manufacturer. Colt quickly snapped up the new design and began shopping it around to militaries around the world, as well as creating its own version lacking the fully automatic functionality for the civilian market.

The initiating event that led to the AR-15's popularity in military service for the past half-century and counting was not an elaborate multi-year military R&D program, but a backyard barbecue party.

July 1960. Richard Boutelle, former president of Fairchild (ArmaLite's parent company) is hosting an Independence Day party in his backyard. Among the high-powered friends on the guest list are Colt representative Robert Macdonald and legendary Air Force General Curtis LeMay. Eager to show off the capabilities of the AR-15, they offer to let Gen LeMay test the new rifle on some watermelons. A few magazines and a lot of pulp later, LeMay is so impressed by the rifle that he immediately places an order for 80,000. At that time, Air Force security personnel were still using the M2 Carbine. A variant of the M1 carbine, it was popular with troops when it was adopted during the Second World War, but by the early 1960s the design was beginning to show its age. The airmen still using it appreciated its light weight, but the carbine lost much of its lethality and accuracy beyond about 100 yards.

Congress delayed LeMay's order, but other top officials soon came to realize why he was so enamored with the new rifle. After another brief round of trials, the AR-15 entered service with the United States Air Force and United States Army special forces. It would see its first combat use by American advisors in a bush war that was just beginning to heat up in the small, relatively unknown country of Vietnam.

The United States Army and the Marine Corps went into the Vietnam War using the M14. According to conventional American military doctrine of the time, infantry combat would take place at long range, therefore accuracy was king. The M14 worked well with this theory, firing

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**Marines during Operation Desert Storm deployed with M16A2 rifles and M60E3 machine guns.**

the powerful 7.62×51 mm NATO round with an effective range farther than most people can identify a man-sized target. However, the jungles of Vietnam were suited to a very different kind of combat, a kind of combat with which the NVA and Viet Cong insurgents were intimately familiar. The thick brush and rugged terrain reduced visibility and obscured targets from view even at relatively close range, forcing combatants much closer together and making conventional long-range marksmanship all but impossible at times.

In an effort to simplify logistics, U.S. military officials had intended the M14 to replace most of the small arms in the inventory. However, the rifle was too light and too powerful for fully automatic fire to be useful, yet too long and heavy for effective use in close-quarters combat. NVA soldiers, by contrast, were using Soviet-designed rifles supplied by communist China, namely the AKM—an improved variant of the AK-47. Lighter and much more compact than the M14, it fired the 7.62×39 mm Soviet cartridge. Sacrificing effective range to achieve lower recoil, the AKM could be fired in bursts with reasonable accuracy. These traits suited the AKM perfectly for



LEATHERNECK FILE PHOTO

**1950-1953** Maj Melvin M. Johnson, USMCR tests small caliber, high-velocity rifle concepts

**1957** AR-10 participates in U.S. Army trials

**1958** First AR-15 prototype is completed by ArmaLite

**1959** ArmaLite sells rights to AR-15 to Colt

**1962** U.S. Air Force orders 8,500 AR-15s

**1963** Special Operations units begin using AR-15s in Vietnam

**1965** U.S. Army begins issuing XM16E1 to units in Vietnam

**1967** M16A1 enters service

**1969** M16A1 officially replaces M14

**1983** U.S. Marine Corps adopts M16A2, becoming the first service to do so

**1997** U.S. Marine Corps adopts M16A4

**2014** U.S. Marine Corps begins replacing M16A4 with M4 as standard issue

**2017** U.S. Marine Corps announces formal plans to completely replace M16 with M27 IAR



IMAGE COURTESY OF THE NATIONAL MUSEUM OF THE MARINE CORPS

## Key Dates in Development Of the M16 Rifle



**PFC Ricardo King, 3rd Bn, 1st Marines, cleans his early-pattern M16 aboard the helicopter assault ship USS Valley Forge (LPH-8) along the coast of Vietnam, Dec. 19, 1967. Early M16s required careful maintenance to withstand the humid jungle environment of Vietnam.**

poorly trained soldiers fighting in the jungle, allowing them to overwhelm even seasoned American combat veterans through sheer volume of fire. Furthermore, the M14 suffered from an unexpected problem of its own—in humid conditions, its wooden stock would swell and place uneven pressure on the barrel, causing the rifle's point of impact to shift dramatically.

The AR-15 could not have come at a better time for the United States military. Initial testing suggested that it surpassed the M14 in accuracy, reliability, and projected combat effectiveness, so the only thing left to do was bring it into service with the Army and Marine Corps. Yet another round of military trials resulted in the AR-15's official adoption as the M16 rifle in 1964. Contracts were signed, hands were shaken, and Colt began converting its civilian tooling for the military variant. Within a few years, the first M16s began to show up in the hands of U.S. military advisors and special forces operatives in theater.

Initial combat reports were positive. Its light weight and high volume of fire suited it well to the dense jungle environment of Vietnam, and the enemy quickly learned to fear the so-called "black rifle." According to co-

CPL M.J. COATES, USMC



**Marines of C/1/3 move out on an early morning patrol in Vietnam, 1969. (Photo by Cpl Philip R. Boehme, USMC)**



**But the question remained: what had happened to the rifles? What went wrong? This revolutionary new piece of technology that had promised to give American fighting men a decisive advantage now appeared to have cost many men their lives.**



LCPL MIGUEL A. CARRASCO JR., USMC

designer Jim Sullivan, enemy combatants wounded in the arm or leg by the new M16 would often die from blood loss due to the fragmentation effect of the projectile. One of the M16's first trials by fire was at the Battle of Ia Drang in November 1965. Elements of the U.S. Army 5th and 7th Cavalry, numbering approximately 1,000 men total, were able to repel nearly three times their number in hardened veterans from the NVA.

When Marines were first issued the M16, its lethal reputation preceded it. But what they didn't know was that it would soon develop a reputation for a very different kind of lethality.

All of this brings us back to the Battle of Hill 881. Some combat reliability problems with the M16 had begun to show, but the Marines of 3rdMarDiv didn't know about any of this. They found out as soon as their rifles began jamming in combat. The rifles ran extremely dirty, causing the delicate mechanics inside to seize up at the most inopportune times. Furthermore, spent casings would often get stuck in the chamber with no way to knock them out except by disassembling the rifle *while*

*under fire* or by shoving a cleaning rod down the barrel. And the rifles weren't issued with cleaning kits.

The so-called Hill Fights ended in a strategic American victory. The North Vietnamese were pushed out and the U.S. Marines were able to secure the area around Khe Sanh. But the question remained: what had happened to the rifles? What went wrong? This revolutionary new piece of technology that had promised to give American fighting men a decisive advantage now appeared to have cost many men their lives. The answer lies in a place almost no-one would immediately think to look—the military acquisitions system.

Recall that the M16 had been designed around the 5.56×45 mm M193 cartridge designed by ArmaLite and Remington. It was loaded with thin sticks of so-called "Improved Military Rifle" gunpowder, specifically IMR 4475, supplied by Du Pont Chemical. In Army testing, the ammunition yielded an average muzzle velocity around 3,150 feet per second—blisteringly fast, but about 100 feet per second lower than the specified velocity.

**Riflemen of Co K, 3rd Bn, 5th Marines are armed with M16A2s for a house-clearing mission in Fallujah, Iraq, in November 2004. The corpsman, second from the left, is carrying a Benelli M1014 semi-automatic shotgun.**

In order to remedy this perceived problem, the Army had Remington switch to a different type of gunpowder, known as WC846, supplied by Olin Mathieson. The pressures and velocities looked just fine on paper, but like with many things, the devil is in the details. The new powder came in the form of small grains, coated in a special chemical blend to improve shelf life. The only problem was that the Army, thinking the powders to be interchangeable, *didn't test the rifles with the new ammunition*. The new powder placed additional strain on the M16's gas operating mechanism, and the protective coating left chalky deposits inside the rifle's delicate internals. A seemingly simple change to the ammunition was able to multiply the rifle's failure rate by six without anyone noticing.

The Marines of the 2/3 and 3/3 didn't



**Hardliners continued to deride the futuristic-looking rifle with its small-caliber ammunition and plastic furniture contract-made by Mattel. But most of all, what the M16 showed the world was that the assault rifle paradigm was the way of the future.**



SGT ZACHARY A. BATHON, USMC

**Carrying the M16A2, Marines from Combat Engineer Plt, Battalion Landing Team, 2nd Bn, 2nd Marines, 24th Marine Expeditionary Unit (Special Operation Capable) place explosives on a Ba'ath Party Regime Symbol outside the Qalatsukar secret police station, Iraq, Nov. 19, 2011.**

know any of this. What they did know was that their fancy new rifles, which had been billed as “self-cleaning,” ran so dirty that they often stopped working—sometimes after only a few rounds. Without training on how to clean the rifles and no cleaning kits to do so anyway, the chalky residue clogging up the rifles became a deadly problem.

As if that wasn’t bad enough, the humid jungle environment of Vietnam created

microscopic deposits of rust inside the barrels and chambers of the M16 rifles. Once the invisible rust pitting in the chamber of a rifle was severe enough, cases would begin sticking inside without any way to remove them.

When the M16’s numerous problems began to surface, Congress had a field day. A committee, led by Congressman Robert Ichord of Missouri, set out to identify the causes and solve the problems

to get American soldiers and Marines a weapon that wouldn’t get them killed. The corrosion problem was the easiest to fix. All barrels and bolt carrier groups rolling off the production line at Colt would be coated in a thin layer of chromium metal, preventing the underlying steel from rusting. The fouling issue, however, was a little bit more difficult. Du Pont had long since stopped manufacturing IMR 4475, and the military desperately needed large supplies of ammunition as soon as possible. Contrary to the Ichord committee’s recommendation to immediately switch back to the old powder, the new powder was reformulated slightly and the rifle’s recoil buffer system redesigned to accommodate it. The most controversial change of all was the addition of the forward assist. This button on the side of the receiver was designed to engage with scalloped cuts on the side of the bolt carrier to allow it to be forced into battery. Eugene Stoner and the other ArmaLite engineers who had designed the system were vehemently opposed to this change—testing showed that failures to feed were only worsened by forcing the action closed. Nevertheless, these changes were incorporated by Colt onto the next pattern of M16 rifle, the M16A1.

The reliability problems all but disappeared when the M16A1 entered service, but the damage to the rifle’s reputation was done. Hardliners continued to deride the futuristic-looking rifle with its small-caliber ammunition and plastic furniture contract-made by Mattel. But most of all, what the M16 showed the world was that the assault rifle paradigm was the way of the future. When the Warsaw Pact began issuing select-fire intermediate-caliber rifles like the AKM, military strategists in the West had derided it as a “peasant’s weapon,” designed to maximize the combat effectiveness of a poorly trained conscript army. What the M16 proved was that even the best-trained fighting forces in the world could take advantage of the lighter weight and higher volume of fire provided by this revolutionary new weapon.

In the 1970s, NATO member countries began developing their own 5.56 mm rifles and tinkering with the ammunition to optimize it. The Belgian SS109 cartridge, based on the earlier American M193 but with improved penetration on hard targets,



was adopted by most of NATO as standard. When the Marine Corps requested an improved version of their rifle in response, Colt modified the M16A1 slightly to create the M16A2, which entered service in the early 1980s.

With the A2 variant, the M16 had finally fully matured. It used a different barrel for better accuracy and compatibility with a wider variety of ammunition types. The sights were made more adjustable, improving the individual rifleman's ability to hit targets at long range. Even though most infantry combat thus far during the 20th century had taken place at 300 meters or less, a rifleman armed with an M16A2 could reliably hit man-sized targets out to at least twice that.

The M16's final evolution in Marine Corps service was the M16A4. Taking a cue from the civilian aftermarket, the M16A4 is essentially just an M16A2 with enhanced modularity. The rear sight and carry handle assembly was made removable so an optical sighting system could be mounted, dramatically increasing the rifle's combat effectiveness. The currently issued Trijicon TA31 RCO can mount to this rail with two thumb screws, a far cry from the intricate machining required to mount optics on previous service rifles.

The round plastic handguards were

**Recruit Jared C. Seeland, Plt 3229, "Kilo" Co, 3rd Recruit Training Bn reloads his M16A4 Service Rifle in the standing position at Edson Range, Weapons and Field Training Bn, Marine Corps Base Camp Pendleton, Calif., Nov. 24, 2014. (Photo by Cpl Jericho Crutcher, USMC)**



replaced by long segments of MIL-STD-1913 rail, where Marines could attach a variety of accessories to fit almost any kind of mission. Even after the Army switched to the shorter M4A1 carbine, the Marine Corps continued using the M16A4 until a few years ago. With its longer barrel, the M16 is able to reliably hit targets, well past the effective range of the M4. While the M27 IAR has already replaced the M16A4 in frontline infantry units, hundreds of thousands of M16 rifles are still in Marine Corps inventory and will continue to see use for many years to come.

*Editor's note: This article is the first in a series of features detailing the small arms U.S. Marines have used since 1775. What were your experiences like with your issue weapons? Do you have a favorite one you would like to see featured next? Let us know at [leatherneck@mca-marines.org](mailto:leatherneck@mca-marines.org).*

*Author's bio: Sam Lichtman is a college student and licensed pilot. He works part-time as a salesman and armorer at a gun store in Stafford, Va., and occasionally contributes content to Leatherneck. He also has a weekly segment on Gun Owners Radio. 🦋*



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