



M24 SWS Engineering Change Proposal

History of the M24 SWS

The **M24 Sniper Weapon System**, fielded in 1988, represents a return to bolt action sniper rifles by the US Army. As in the US Marine M40A1, the M24 uses the Remington 700 receiver group, although the receiver has been made for adaptation to take the .300 Winchester Magnum round as required under the original M24 contract DAAA21-87-C-0086 Clause C3 for possible future conversion. The M-24 sniper weapon system is a 7.62 mm, bolt-action, six-shot repeating rifle (one round in the chamber and five rounds in the magazine). It is used with either the M3A telescope (day optic sight, usually called the M3A scope, a 10X fixed Leupold M3 Ultra telescope) or the metallic iron sight. The rifle weighs about 15 pounds with the scope, and about 12 pounds without it. It's about 43 inches long, with a 24-inch barrel with one twist and five lands and grooves. Manufacturers agree it's accurate to about 800 meters, but it will hit a target up to about 1,200 meters away. The stock is made of an Aramid fiber, graphite and fiberglass composite bound together with epoxy resins, and features an aluminum bedding block and adjustable butt plate. A bipod can be attached to the stock's fore end.

The M24 has been used by US forces in every conflict and/or hot spot since its inception. As such the M24 has performed superbly and is considered as one of the most popular weapons in use today. Its effectiveness has been instrumental in the war against terrorism delivering effective reliable precision fire far in excess of its design. An M24 holds the record for the longest confirmed 7.62 kill throughout the war hitting and killing an insurgent at a range of 1250 meters. Originally the M24 was delivered with a warranty of 5000 round barrel life, however the US Army has documented that the rifles as delivered actually produce over 10,000 rounds of usable life effectively doubling the weapon system's service life.

The US Army recently selected another 7.62 (308) system which was slated as a direct "one-for-one" replacement of the M24. This system is a semi automatic rifle which will provide the sniper team with the ability of engaging multiple targets in a rapid fashion. Given the nature of this system there remains a need for a precision bolt action weapon that can fill the void left between the 7.62 and .50 caliber systems in order to engage and defeat threat targets at nominal ranges. Since the M24 is already US Army property and has been trained to by 3 generations + of US Army snipers it stands to reason that the M24 is a prime candidate for an end of life cycle enhancement program such as is being offered here. Additionally it should be noted that since the beginning of the Global War On Terrorism (GWOT) the US Army has undertaken a huge restructuring and realigning which in turn has resulted in a large deficit in the amount of available sniper systems. And it makes fiscal sense to retain the system which has served so honorably but to do so in an enhanced form giving the commanders on the ground more versatility than currently exists.

Current Threat to our soldiers

US forces throughout the world face a variety of risks, situations and environments. Most notable to this discussion is the daily threat of IED and small insurgent attacks. In order to counter these situations US commanders rely very heavily on sniper teams to provide real time intelligence, conduct area denial and interdict insurgent forces precisely and selectively in order to destroy moral and the will to fight. These sniper teams are routinely emplaced at either last /first light or occupy an established perimeter firing position which has not gone unnoticed by the enemy. In

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order to remain effective US sniper/surveillance teams have had to develop innovative measures to confuse the enemy, establish obstacles to eliminate or reduce direct fire or to attempt to engage the enemy at a range that he is unable to respond to. Given the length of the conflict and the infusion of foreign fighters many of these countermeasures have been defeated or minimized.

The United States Marine Corps has recently undertaken a similar approach to obtain a long range sniping platform to support its efforts overseas. Below are excerpts from their official signed (CG III MEF) Universal Urgent Needs Statement (UUNS).

This is an Urgent Universal Needs Statement addressing capability shortfalls for the Global War on Terrorism.

Based on MCCLL lessons learned derived from multiple deployment After Action Reports including Operation Iraqi Freedom, Operation Enduring Freedom and Operation Iraqi Freedom 05-07 as part of the Sniper / Counter Sniper Employment Data Collection, and in reference to the Sniper Suite Universal Need Statement received 15 February 2004/ POM 2008, a deficiency exists in sniper capabilities beyond the 1000 yard range, semi-automatic near range (0-600 yards), and Sniper Ancillary equipment utilized to execute the Sniper Mission. USMC Sniper operations in and around Al Anbar Province, Al Fullujah, and Ar Ramadi, rural and urban settings, have demonstrated a significant degradation effect and deterrent of Anti-coalition Force (AIF) activities.

Currently snipers lack the capability to transition between various missions from the mountains to the desert floor to the urban environment carrying all mission essential gear on his back. In order to exercise the full range of employment capabilities required of the sniper, he must have a sniper suite of size and weight conducive of foot-mobile operations. The sniper suite would provide the Commanders the opportunity to employ sniper teams in multiple roles determined by the terrain found in current operational environments. The desired end-state: the sniper needs the flexibility to transition the various types of terrain; the sniper suite will provide this capability.

Operational summaries and intelligence exploitation indicate in the previously mentioned areas, individual AIF activities were positively identified beyond 1000 meters, (the limitation of current USMC Sniper weapon systems). The positively identified insurgent activities were allowed to continue due to the restrictions of the current sniper platforms, collateral damage considerations, and the inability of Coalition Forces to maneuver and actively engage insurgent targets. A long range precision fire weapon system that will greatly outperform the current capabilities of the M40A3 sniper rifle is required in order to increase USMC sniper capabilities and greatly reduce the overall effectiveness of (AIF) activities. The common effects of high winds and great distances encountered in the Iraq and Afghanistan areas of operation require a long range, a heavier grain projectile with a higher muzzle velocity, a greater sectional density with increased ballistic coefficient over the current 7.62X51mm sniper ammunition. A long range sniper platform with improved ammunition will greatly increase the probability of 1st round impacts at ranges less than 1000 meters and greatly increases positive effects on individual targets past 1000 meters. At this time long range sniper rifle systems are available commercial off the shelf (COTS). They have been developed specifically to penetrate military-grade body armor with a National Institute of Justice (NIJ) rating of III+ at up to 1500 meters. Presently 54 countries in the world, including the United Kingdom and Canada, have a long range sniper

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capability and an overall greater sniper capability than the United States. The long range capability that other nations possess provides their snipers with a rifle that has twice the effective range of the M40A3, weighs the same or less and has superior ammunition producing greater penetration of barriers, personnel, and equipment over that of the current issue 7.62mm ammunition. Presently the United States Marine Corps long range sniper capability does not exist, in order to gain sniper supremacy on the battlefield, the United States Marine Corps must catch up with the long range capabilities already provided to the snipers of 54 other nations in the world. Multiple After Action Reports (ARR) from Afghanistan and Iraq clearly state that sniper teams with suppressed rifles could have killed a countless number of insurgents without compromising the sniper team's position, but due to the lacking equipment did not. Presently, a limited amount of USMC snipers in Iraq are using suppressed 7.62mm rifles. The bolt action and semi-automatic variants are frequently effective up to 600 meters with great success engaging and killing multiple targets without compromising any of the team's positions, proving the necessity for suppressed sniper rifles. USMC combat snipers find that a rifle with the overall stock design, short barrel and suppressor, combine for a far more successful sniper rifle than the heavy, bench-rest designed, unsuppressed M40A3. The M40A3 is not designed for rapid combat sniping which is required in the rural environments. The M40A3 bench rest design and weight is conducive to competition style prone shooting, not combat sniping. A combat effective bolt action sniper rifle requires a suppressed capability and must allow the sniper to rapidly acquire multiple targets in various supported shooting positions other than prone. Bolt action 7.62mm caliber rifles in general, serve as valuable training tool when teaching entry level snipers the basic skills required of the prone shooting position, conducive to multiple shooting positions. The rifle should be suppressed and has an overall combat design that must emulate the future long-range effective training tools and should directly imitate the primary weapon system design found in long range sniper rifles. These future long-range sniper rifles should have a caliber greater than 7.62X51mm and should not imitate the unsuppressed bench-rest style M40A3. Operational requirements have identified a huge gap in the snipers ability to successfully conduct combat sniper operations in an urban environment with the current issued M40A3 sniper rifle. The MK-11 Mod 1 semi-automatic 7.62mm rifle has proven to be plagued with a variety of problems, and fails to satisfy the requirement for a semi-automatic 7.62mm sniper rifle. The MK11 Mod 1 has demonstrated catastrophic failures in reliability and accuracy, leading to a potential safety hazard for snipers employing them in combat zones. Current technology also offers the Unit Commander the ability to quickly move weapons through the repair cycle at the unit level by utilizing non-bedded technologies, and interchangeable barrels. Modifications by Ordinance Test Facility (OTF) intended to improve the M40A3 and DMR have proven to be slow, ineffective, and lack considerations provided in combat After Action Reports. Recent modifications attempted by OTF have served as impractical band-aids and have not significantly improved the overall sniper capability. For example, by attempting to add a suppressor to the M40A3, OTF failed to address the barrel length, twist rate, accuracy, and the overall ineffective stock design. Also, by adding a 5 round box magazine to the M40A3 (which already has a 5 round internal magazine), OTF has not validated the need for an external 5 round magazine modification. Snipers must possess the requisite tools (weapons, optics, and ancillary equipment) to become a significant force multiplier, and effectively accomplish all tasks assigned by the Unit Commanders.

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Operational Limitations of the existing M24 Platform

The M24 SWS was originally designed and built incorporating what was thought at the time as the "state-of-the-art" components and construction methods. This was done at a time when the use of snipers and the environments/situations that they were to be applied against were established by doctrine and the order of battle revolving around the Soviet threat. 9-11 has dramatically changed the face of warfare and more specifically how snipers are used. For all intents and purposes 7.62 has been relegated to near and mid range engagements (200 – 500 meters) leaving longer range fire to heavy systems such as the .50 BMG or crew served/vehicle mounted systems. This situation has resulted in a number of constraints and restrictions to be imposed upon operational snipers leaving them at times unable to accomplish their mission due to range, environments, etc. Specific to the current conflicts is the requirement for snipers to be able to precisely engage humans, obstacles and suspected items such as IEDs. While 7.62 can generally do these things at nearer ranges the intensity at which the insurgents are constructing IEDs warrants as much stand off as possible. Additionally this stand off allows the sniper to confuse the enemy as to how close he can get to friendly forces before being engaged.

While the M24 was the "state-of-the-art" in its day, modern warfare has illuminated a number of limitations that directly impact on the operator's capabilities and effectiveness. Modern warfare requires modern weaponry; specifically snipers need the ability to engage targets during times of limited visibility out to the maximum effective range of the weapon. The M24 SWS was never intended to afford this ability and subsequently a number of "work arounds" occurred to include the acquisition of the AN/PVS-10 and various mounting solutions. The main problem with these solutions is that they have never been universally applied throughout the Army resulting in many snipers without the ability to effectively operate at night. The most prolific improvement in precision rifle night vision is that of clip on inline systems such as the AN/PVS-22 which can be applied to any weapon with a rail system. In concert with the application of any night vision system is the ability to adjust the weapon to the shooter. The M24 SWS did take this somewhat into account but only offers the ability to make the weapon longer and does not offer the ability to move the shooter's face up or down which is required when the optics are changed to accommodate night vision.

As stated the M24 SWS was designed specifically as a precision weapon and at the time it was believed by the sniper community that a sniper would never need more than 5 rounds to accomplish his mission. The changing nature of warfare has shown that even a bolt action rifle needs to have the ability to quickly reload the system or change ammunition types (match to tracer). Subsequently almost every modern sniper rifle now offers at least a 5 round detachable magazine which offers this capability in addition to facilitating an easier method of carry and handling ammunition.

The M24 was designed after rifles and systems used in WWI in terms of ergonomics and stock configuration. The current war on terrorism has demanded many unforeseen requirements on conventional snipers and designated marksman not the least of which is operating in and around vehicles. This requirement places unique restrictions on the snipers who have to determine the best method of manipulating their weapons and gear inside of the various vehicles being used ranging from commercial pickups to Stryker vehicles. This situation coupled with the desire to

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conceal their sniper system while in movement demands an alternate stock system that will shorten the overall length of the weapon.

The Future of the M24, Engineering Changes Proposed

Remington Arms proposes an Engineering Change Proposal (ECP) for the M24 SWS that will support current operational requirements in addition to offering a level of versatility now currently enjoyed.

The M24 SWS was originally designed around a long action in order to facilitate the possible change of caliber such as 300 Winchester Magnum. Given this situation the M24 SWS is uniquely positioned to receive a factory upgrade to this caliber using the existing systems already owned by the US Army. Caliber conversion along with a host of enhancement such as an adjustable folding stock, detachable box magazine, top and side rail systems, upgraded variable power optics and sound suppressor makes the enhanced M24 SWS a force multiplier that compliments other battle field systems such as the M4, M249, M240 and MK19.

Remington Arms has established the M24E program to support the sniper on the ground using the existing US Army owned M24 SWS as a base that when delivered to the user will greatly change the way US snipers employ. This program allows the Army to return an original M24 SWS to Remington which in turn completely rebuilds the system adding a variety of enhancements to transform the M24 into a modern battlefield instrument. The specific enhancements are;

- Adding an enhanced folding stock that allows for adjustment of the length of pull and cheek height. This will allow the user to transport the sniper weapon system concealed when necessary, better negotiate the use of vehicles and allow the user to configure his weapon to his personal physical requirements.
- A detachable 5 round box magazine which will allow the sniper to quickly reload the weapon, change ammunition types and carry his ammunition load in an easily integrated configuration.
- A new 20" M24 .300 Winchester Magnum barrel that when combined with the folding stock presents a small transportable package while retaining long range accuracy.
- A sound suppressor that reduces sound signature by 45db and visible flash by 80%. This item will provide the sniper with location deniability and the ability to fire from a single position longer without detection. Additionally this device allows the sniper team to communicate more effectively between members as well as through radio communications.

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- An enhanced variable power optic that features increased magnification of 4.5-14X with a 50mm objective lens that will allow the sniper to better identify targets at extended ranges in addition to identify small suspect objects at nearer ranges. The larger objective lens provides better light gathering ability which in turn translates to better clarity throughout the day, to include dusk and dawn, which other smaller objectives are limited. The finer adjustments of this optic allow the sniper to more precisely engage targets at all ranges in all environments and provides vastly more control over his firing solutions.
- A rail system that allows for the use of a clip on inline night vision system such as the AN/PVS-22 that will allow the sniper to effectively engage targets during periods of limited visibility without an effect on the weapon's day sight zero. This rail also incorporates side rails to allow the use of ancillary systems such as an IR Illuminator/pointer such as the PEQ-4A. Use of these devices is crucial on the battlefield allowing the sniper to designate targets or areas for other forces that are equipped with night vision devices.

The proposed ECP provides significant overall advantages to the US sniper on the ground. Most notably is that of survivability of the sniper team and those forces they are supporting. These enhancements will allow the sniper to adjust the weapon to his personal needs which in turn will make him more accurate and effective. Additionally the enhancements will allow the sniper to operate more effectively by being able to remain in position longer, move without detection and engage targets without compromise. As an added benefit this ECP supports the current doctrine, training requirements, uses readily available ammunition (A191 190Gr .300WM), parts logistics train and maintenance procedures/equipment currently enjoyed by the US Army.

Pricing

Cost per weapons system upgrade is approximated at \$4,500. Note: There is a five year parts contract which will absorb some of the cost associated with the proposed change.

Benefits

This ECP provides a variety of advantages to the US Government; first is that it incorporates already owned and maintained equipment for which there is an established part logistics train and maintenance contract. Next is that the ECP eliminates the time line necessary for the development, testing, down selecting and acquiring a new system. Lastly, it saves the US government considerable funds in that over half of the cost of the system has already been purchased in the M24 SWS. On the average an open solicitation consumes over a year of time and close to a million dollars in resources. This does not include the price of first article testing or actual system acquisition which depending on the system could entail much more. In short an ECP for the M24 provides a huge time and financial savings to the US Government and as mentioned the existing infrastructure established by for the current M24. Unlike some of the other systems being considered by various military organizations/branches, this program takes full advantage of existing resources such as the ammunition, which has been in the inventory, and used for a considerable number of years. Currently the 75th Ranger Regiment, US Army Special Forces and the US Navy SEALs are using a similar weapon system with great success in

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both theaters. It should be noted that the M24 SWS was created for just this eventuality and is currently offered by Remington as a 300 WM platform. Additionally the Joint Operational Stocks (JOS) has offered a 300WM sniper system for loan for over 10 years which speaks to the desire and need for this configuration.

Given the varied programs being offered, the US Army can select that system which more closely meets its current engagement strategy and operational environments. As an additional aspect, this program can be reversed or changed in the future as requirements or policies change further saving the US Government time and funds by extending this system into yet another generation. This ECP is the best overall savings to the Government and US Army in addition to providing a significantly reduced response time for the soldier on the ground. Returned systems can be upgraded in as little as 90 days from the time they arrive at the plant and returned directly to the end user in the field providing him and his command with a virtually instant enhanced capability to support his mission.

Remington Arms has been supporting this nation's military since 1841 and is committed to providing the best possible products for our country's military forces. No other company in the US is as uniquely positioned or experienced with regards to this issue. It should be noted that virtually every commercial sniper weapon system in the US is based on a Remington action to include those built by the USMC and Crane NSW. This is a testament to the superior design and durability of the product and no other entity or company can produce the repeated quality and quantity as Remington Arms can.

Possible issues connected with this proposal.

- Safety Certification – Every component of this program has undergone testing and is currently being used by the US Military on one project or another. Most of the components are organic to the M24 SWS and have been in use since 1988.
- Training – This program requires no additional training over existing requirements.

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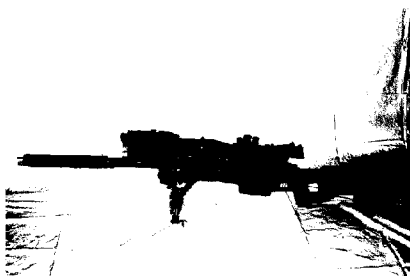
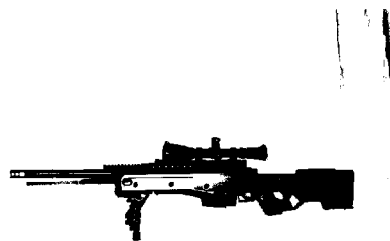


M24 - M24E SWS CHARACTERISTICS		
Characteristic	M24	M24E
Length-Base rifle	N/A	838.20mm (33")
Length-Base rifle	1092.2mm (43")	1066.80mm (42")
Length-Surefire equipped	N/A	1206.50mm (47.5")
Barrel	416R Stainless Steel	416R Stainless Steel
Barrel Twist	1/285.75mm (1/11.25") Rifling 5 radial land grooves	1/254mm (1/10") Rifling 5 radial land grooves
Barrel length	660.4mm (24")	508mm (20")
Barrel Finish	Black Powder Coat	Black Powder Coat
Trigger	Adjustable External 1.58 Kg - 3.6kg (3.5 – 7.9 lb)	Adjustable External 1.58 Kg - 3.6kg (3.5 – 7.9 lb)
Trigger Pull	1.58Kg (3.5lbs) to 2.26Kg (5lbs)	1.58Kg (3.5lbs) to 2.26Kg (5lbs)
Butt plate adjustment	50.8mm (2")	50.8mm (2")
Cheek piece adjustment	N/A	50.8mm (2")
Stock	Synthetic Aramid Fiber	AICS 2.0
Stock Color	Black	Dark Earth
Weight with Sling and Scope-Unloaded	6.3Kg (13.85lbs)	7.48Kg (16.5lbs)
Weight with Sling and Scope-Loaded	6.5Kg (14.25lbs)	7.60Kg (16.75lbs)
Weight with Sling, Scope, Suppressor-Unloaded	N/A	8.05Kg (17.75lbs)
Weight with Sling, Scope, Suppressor-Loaded	N/A	8.16Kg (18lbs)
Caliber	7.62 Nato	.300 Win Mag
Operation	Bolt Action	Bolt Action
Muzzle Brake	N/A	Surefire MB762SSAL/RE
Suppressor	N/A	Surefire FA 762SS
Suppressor length	N/A	254mm (10")
Suppressor weight	N/A	0.57Kg (1.25lbs)
Suppressor shift in point of impact	N/A	No greater than 1 MOA
Magazine Capacity	5rd, Internal	5rd Detachable box magazine
Magazines provided	N/A	2ea
Effective Range - Day Scope	800 Meters	1200 Meters
Effective Range - Night Scope (Weather & Night Vision dependant)	300+ Meters	500+ Meters
Tactical Sight Characteristics M24E		
Scope	Leupold Mark 4 M1 LR/T, 4.5-14X50mm Power variable	
Adjustments	Tactile	
Elevation	12.7mm (1/2min) per click	
Windage	12.7mm (1/2min) per click	
Reticle	Illuminated TMR (Tactical Milling Reticle)	
Remove/Install Max Error	12.7mm (1/2moa)	
Weight	624 Grams (22.0 OZ)	
Focus ring	Tactical Knob	
Optics Mount	Badger ordnance 20MOA	
Scope Rings	Badger Ordnance 30mm Medium Rings	
Scope Base screw hole size	8-40tpi	
Night Vision Mount	Badger Ordnance IMUNS (Integrated Mount Universal Night Sight)	
Tactical Sight Characteristics M24		
Type	Leupold, Ultra M3, 10 Power	
Adjustments	Tactile	
Elevation	25.4mm (1 min.) per click	
Windage	12.7mm (1/2 min.) per click	
Reticle	Range finding mil dot	
Remove/Install max error	12.7 (1/2 min.)	
Focus ring	Tactical knob	
Dust covers	Included	
2 piece Leupold Base/Rings	Included	

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Photos of proposed system



Note:

The Electro Optical equipment shown in these photos is used to demonstrate the weapon platform capabilities, and is not included in the weapon system upgrade.

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