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**M14SE “CRAZY HORSE”[®] SQUAD DESIGNATED MARKSMAN
(M14SE SDM) AND MK14 SEI RIFLE**



Fig. 1 Smith Enterprise, Inc. US Army (2ID) issue M-14SE with standard Leupold Mark 4 3.5-10X40 LR/T M3 Telescopic Sight.

Our strategic intent with this project has been to offer current M-14 users a thoroughly reliable, proven and cost-effective modernization program as a compelling, cost-effective and fast track course of action for a modern 7.62mm NATO caliber Squad Designated Marksman (SDM). Our customers have proven in combat that the M14SE will fulfill this same tactical mission as a new production 7.62mm NATO SDM would be required to accomplish at *one-third to one-half the price*.

Precision rifle enthusiasts and official-end users have long been aware of Smith Enterprise's established expertise in the area of the M-14 rifle. Since our incorporation in the early 1980s, we have successfully addressed all the documented shortcomings of the original M-14, M-21 and M-25 designs. To that end we have established a very successful business incorporating these product-improvements in customer-supplied M-14 rifles to exceed standards far beyond the original M-14 and M-21 designs parameters, in all areas of functionality, accuracy and reliability.

During that time we have rebuilt numerous M-14s for various USG users, to include all branches of the US Armed Forces, the Department of the Interior and various law enforcement agencies. With the renaissance that the M-14 is now enjoying in the Armed Forces, it is no wonder that American military units now involved in the Global War or Terrorism have adopted many of our combat-proven M14 components. Additionally, we have also produced weapons based on our own billet bar stock M-14 standard, single-lugged and double-lugged match-grade receivers, which to this day have remained the industry standard. Collectively, our modernization effort is known as the M-14SE “Crazy Horse”® Semiautomatic Sniper System.

M-14SE “Crazy Horse®” Program Highlights (standard configuration)

- Medium Heavy Barrel, 22.0” (P/N 9345-M14SE) or optional 18.0” (P/N 9345-MK14) length, Chrome Moly 4140, 1:10 ROT, Four lands and grooves, right hand twist, chambered for M118LR Special Ball ammunition.
- SEI Gas Cylinder Modification Program, unitizing gas system, Meloniting (AMS 2753) gas system to include gas plug, lock and front band with new 440 SS hard chrome piston.
- SEI M-14 Scope Mount and Ring Package. Scope Mount, NSN 5855-01-506-5750, (P/N 2006), melonited heat-treated to AMS 2753, 4140 Chrome Moly and our 4140 Chrome Moly CNC machined 30mm Heavy Duty (HD) Tactical Tall M1913 Picatinny ring set, P/N 7018.
- SEI Strap-On Check Pad in either black or desert camouflage, Cordura with PVC inserts (P/N 2020).
- SEI Direct Connect Vortex® Sound Suppressor-capable Flash Eliminator, 8620 steel heat treated for High Wear (P/N 2000V).
- Gas Lock Front Sight - Hooded (GLFS-H), or GLFS-Dovetail (GLFS-D).
- SEI Extended Bolt Stop (EBS) (P/N 2010)
- SEI standard, 4.5 pound tuned trigger assembly with oversized SEI S-7 tool steel triggers and hammer pins.
- Redesigned SEI hammer and trigger springs for extreme long life.
- Redesigned tool steel connector link pin for positive sustained and secure magazine changes.
- Weapon finished in black phosphate, per appropriate MIL SPEC. Other finishes upon request.
- Weapon is normally supplied with excellent-to-new condition SEI-modified USGI synthetic stock. Other stock configurations at extra cost and upon request.
- M-1907 sniper/target sling in either leather or synthetic material.
- Deep thermal cycling.

Options for the M-14SE “Crazy Horse” SDM include the following:

- 18.0” medium heavy “Crazy Horse” barrel, chrome moly, 1:10 ROT, Four lands and grooves, chambered for M118LR Special ball ammunition (P/N 9345-MK14) (no extra charge for 18” bbl).
- SEI Extended (7.0”) MIL STD 1913 Scope Mount (P/N 2008), NSN 1005-01-533-8160.
- Quick disconnecting SEI M-14 DC Sound Suppressor (only available to USG and FMS customers) (P/N 0001AK).
- Full range of Leupold Mark 4 optics.
- Installation of MIL STD 1913 tri-rail system for QD bipod and/or other accessories.
- SEI QD all-steel bipod, (P/N 2003)
- Sage Int’l modular collapsing stock (Mark 14 SEI configuration) (P/N M14ALCS).
- Angle Cosine Indicator (ACI) and mount.
- M14DC Suppressor and Tool Carrier (P/N 3005).
- SEI Cylinder Wrench, Gas Lock Front Sight, (P/N 3017)
- Tritium Dovetail Front Sight (TDFS) (P/N TBD).
- Numerous tactical fixed stock configurations.



Fig. 3 SEI M-14SE “Crazy Horse®” SDM as originally issued to 2ID and other US Army units, fitted with Leupold VX-III 1.5-5X20 Illuminated Circle Dot Scope.

Detailed Discussion of SEI M14SE “Crazy Horse” Improvements

With the realization that the M-14 has remained an extremely sound design as both a Main Battle Rifle and especially as a Squad Designated Marksman (SDM), the previous problems with accurized M14 designs have all been successfully addressed by Smith Enterprise. In tackling these well documented problems, Smith Enterprise kept its developmental focus on four imperatives: (1) Consistent build quality; (2) Keep the solutions simple, and (3) Employ all available modern technological developments that could address cited problems. Lastly, there was a fourth imperative: this is principally a *military weapon* – not a target rifle. All of the below cited processes and products are currently included on new manufacture M-14SE sniper systems, or available to the customer-supplied in our M-14SE SDM conversion program.

A. No requirement for glass bedding or steel inserts. It is imperative to understand that the M14SE program does not require bedding of the action, nor does it require steel inserts and the associated altering of the front end of the stock. An action, which properly locks up into a serviceable USGI fiberglass stock will *readily accomplish the sniper/designated marksman rifle task*. Naturally, should a customer require a custom fiberglass stock, such as a McMillan M2A or other stock, that stock must be then inletted and bedded for optimal fit. We caution against this approach as the cost of bedding is in addition to the cost of already very expensive aftermarket fiberglass stock. In practical terms, a bedded action frankly has no place on a *battlefield* weapon. A final note on the USGI fiberglass stock is in order. At SEI we modify the USGI synthetic stock to accommodate our unitized gas system. We also offer at extra cost, a reinforcing modification to the forearm that includes the installation of a steel MIL STD 1913 Picatinny rail for the attachment of a QD bipod or IR laser pointer. The stock can also be ordered from SEI with front and rear sling side swivels.

B. Gas Cylinder Modification Program. Previous approaches to “unitizing” the front end of the M-14 and silver soldering of the gas cylinder are no longer required. We have completely redesigned this component with key proprietary approaches, to include modification of the gas plug.

C. Barrel Installation. Improper barrel installation is another major shortfall in the original M-21 design that has been overcome with our proprietary approaches, which are unlike anything else offered in the industry. With these new technologies, the previous technique of employing a pull through reamer is no longer required.

D. Thermally cycled components. Cryogenics were obviously not available in the late 1960’s. We firmly believe that deep cryogenic, thermally cycled components, which greatly reduces stress on the barrel and other critical components, represent a wise investment and thus sound insurance for extended service life, reduced life-cycle costs, ease of maintenance and enhanced system accuracy. In creating the M-14SE we not only cryogenically treat the barrel, we also treat the bolt, receiver and most other components to this most essential process. Prior to the cryogenic treatment, SEI dry hones the barrel, bolt and receiver assemblies. In addition to removing any surface imperfections resulting from manufacturing or service use, dry honing also affords a certain measure of stress relief to these components.

E. Wire EDM Scope Mount and Rings. Currently, Smith Enterprise is the only US Manufacturer of wire EDM optical interface components. Our M-14 wire EDM mount, NSN 5855-01-506-5750, incorporates the very latest MIL STD 1913 specifications and has been recently procured in large quantities by several US Army and US Navy units. The use of our newly developed Heavy Duty (HD) Tactical 30mm 4140 chrome moly ring set with 0.50” rise will allow the sniper to use the back-up iron sights via the see-through sight channel on the M-14 scope mount.

For special applications where more than one optical device needs mounting or when an especially long or large optical device is employed, we have just recently developed our M14 Extended (7.0”) MIL STD 1913 Scope Mount, P/N 2008, NSN 1005-01-533-8160. This new product retains the ability to use iron sights as found on our M14 NSN mount. However, when using the M14 Extended Scope Mount on a current production Sage stocked weapon the chassis stock and the hand guard need to be slightly relieved at our factory or by a qualified gunsmith. When using the M14 NSN mount on a Sage-stocked weapon, only the hand guards require modification.



Fig. 4 Smith Enterprise wire EDM M-14 Mount, NSN 5855-01-506-5750. Shown with associated Smith Heavy Duty 4140 Chrome Moly Tactical 30mm rings.

F. Extended Bolt Stop. For operations in cold or wet weather or where speed of operation is critical, we have recently developed this extended bolt stop, which is manufactured from 8620 heat treated steel to the same specifications as the M14 receiver and bolt. This extremely useful product has recently been procured in quantity by various US Army, Air Force and Navy units, as well as law enforcement organizations.

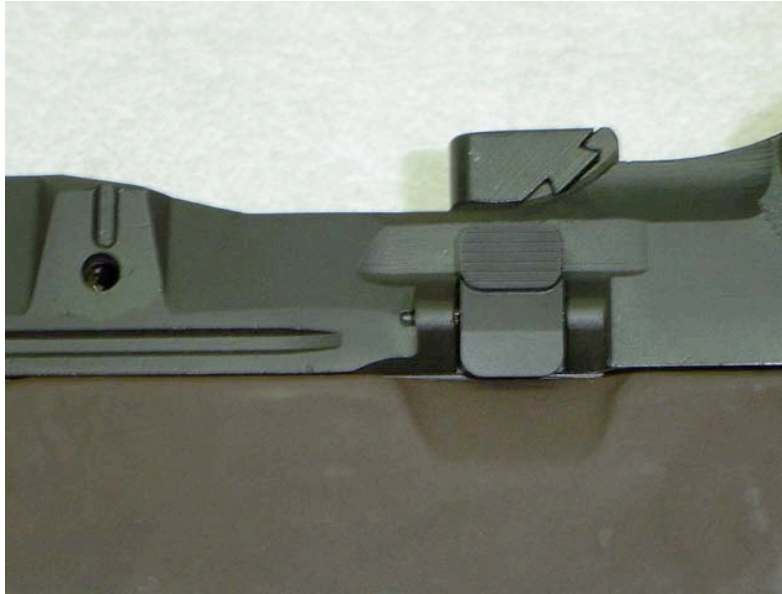


Fig. 5 Smith Enterprise M-14 Extended Bolt Stop (EBS) installed.

G. Consistent lapping. Smith Enterprise has developed a process of lapping bolts, lugs and receivers in such a way that facilitates large scale, and thereby consistent production values.

H. Redesigned Hammer and Recoil Spring. These items have been successfully redesigned, satisfying a long-sought requirement of precision shooters.

I. New Patent-Pending Adjustable Trigger Assembly. Our firm has developed the worlds first and to date, only reliable and completely safe 2.5 to five pound adjustable trigger assembly for the M-14 rifle. This patent-pending design overcomes the significant problem associated with previous attempts to develop a light trigger for the M-14, wherein once the light trigger pull has been established, the trigger could easily fall off safe and discharge when dropped or jarred. With our new design, such an accidental discharge (AD) is impossible. Amongst other features, our adjustable trigger pack, as well as our standard 4.5 lbs. sniper pack both feature our newly developed hammer and trigger axis pins. These new axis pins, made slightly oversize for optimal fit, are made from carefully heat-treated S-7 tool steel for extremely long life and consistent wear. This new trigger assembly, which is remanufactured from existing M-14 (also M1A and Garand M-1) trigger assemblies, is now going into series production and will be commercially available in late 2005.

J. New Patent-Pending Gas Lock Front Sight (GLFS) and Vortex® Direct Connect (DC) Flash Eliminator.

These two items work together to provide the shooter with a number of advantages over existing components. Developed initially for the Crane Naval Surface Warfare Center (NSWC) Mark 14 Mod 0 rifle, and recently adopted in quantity for that purpose, the GLFS and the Vortex DC do away with the old castle nut and front sight housing. This in turn offers a number of inherent advantages. First, the host weapon now has a reliable and sturdy method for attaching a flash hider and sound suppressor. The Vortex DC flash hider is now mounted directly to the barrel threads, as opposed to the old and questionable method of mounting the flash hider to an extension of the front sight housing. The patented and combat-proven Vortex flash eliminator also serves as a very secure interface for attachment of a sound suppressor. The M-14 DC suppressor is detailed below. Secondly, with the castle nut being eliminated, barrel stress is greatly reduced. The gas cylinder lock is not only a front sight housing, but aids in overall tightening up the gas cylinder assembly, much in the same manner as match gas cylinder assemblies. Lastly, it is important to remember that with the development of the GLFS and the Vortex DC, the host weapon can employ virtually *any barrel* length appropriate for the chambering. For example, the weapon depicted below which is being built to meet specific US Navy and US Air Force requirements, features an 18” barrel (Fig 6). However, in order to meet the new US Army SDM requirement for a semiautomatic weapon capable of delivering accurate fire against human targets to a maximum range of 1000 yards, a longer (i.e. 20.0-22.5”) barrel can easily be accommodated by this unique design. A second GLFS design is now entering production, which features a special tritium insert in the front sight post. This tritium-equipped gas lock front sight is known as the model GLFS-T.



Fig 6. Mark 14 SEI Rifle, with Leupold Mark 4 3.5-10X40 LR/T M3 scope and M14DC Sound Suppressor. (Bipod included only for illustrative purposes – not recommended for precision engagements)

K. SEI M-14 DC Sound Suppressor. The M-14 design has long been challenged by the need to effectively mount a sound and flash suppressor. This problem has been hitherto entirely attributable to the design limitations of the original front sight housing. The aforementioned attendant problems have been entirely eliminated with the development of the SEI M-14 DC (Direct Connect) sound suppressor, which connects the DC Vortex flash hider's directly onto the host weapon barrel. As opposed to the original M-14 flash hider design, which mounted onto the *front sight housing*, the Vortex DC and associated GLFS/GLFS-T/GLFS-D allow the suppressor to mount directly onto the Vortex DC, resulting in a far more rigid platform. Further, our M-14 DC is the only modern sound suppressor in US military use, which is completely rebuildable in the field. Thus, when and if the baffle array ever needs replacing, it can be quickly swapped out by the assigned sniper and thus, completely avoiding system down time. This M-14 DC suppressor is now being delivered to the US Army as an integral component of their new M-14SE SDM system. The nature of the Vortex DC flash eliminator interface design allows the 7.62mm M14DC sound suppressor to be effectively employed on 5.56mm and 6.8mm SPC weapons when fitted with the Vortex G6A2 flash eliminator (5.56mm p/n 1001V, 6.8mm SPC p/n 1003V).



Fig. 7 Smith Enterprise M14 DC Sound and Flash Suppressor with SEI Suppressor & Tool Pouch

L. New Barrel Technologies.

(1) M14SE M118LR Crazy Horse Barrels. High quality barrels are available to a degree that was simply not the case in the late 1960s when the M21 was developed. In close collaboration with world-renown US barrel manufacturer, we have developed 22.0" and 18.0" barrels for the M-14SE in an outstanding 1:10 ROT four-groove configuration for the M118LR round. We are also exploring the possibility of employing another completely different type of barrel technology that potentially offers a quantum improvement over traditional designs in terms of terminal performance, maintainability and service life. To that end, we have also developed a special chamber reamer that optimize use of the M118LR and *all other service 7.62mm NATO rounds*. For EOD applications where heavier projectiles are often preferred, our special M118LR chambering with its faster rate of twist is ideal for the EOD mission. The threading of the 10-pitch, 29 degree, stub Acme modified thread will be also held to a much tighter tolerance, and thread form will be monitored to uniform installation from receiver to receiver. Additionally, with total control over barrel manufacturing, Smith Enterprise now has op rod guides that are sized for optimal fit so as to preclude the notorious barrel knurling phenomenon experienced during the M21 program.

(2) 18.0" M14 Standard Profile Chrome Lined M118LR Barrel (p/n 2027). In a very recent development, SEI has just begun producing a chrome-lined 18.0" standard profile 1:10 ROT M14 barrel for use in extremely harsh environments (p/n 2027). What makes this unique barrel truly significant is the fact that although it is chrome-lined, the new 18.0" barrel is chambered for M118LR ammunition, thus making a weapon using this barrel capable of employing any known 7.62mm NATO ammunition type with remarkable accuracy. The barrel differs in other critical areas from competing commercially-available chrome-line USGI type barrels. Specifically, the SEI chrome-lined M14 barrel has a one degree crush angle and thread timing per US military specifications.

Frankly, we believe NSWC-Crane should have initially specified for their MK14 Mod O weapons, had it been available at the time the weapon was being designed. Unfortunately, the new NSWC-Crane weapons have neither chrome-linings nor are they capable of delivering precision fires (not to mention not being chambered for M118LR). The MK14 SEI on the other hand, has the unique barrel as a standard item. Simply put, the SEI chrome-lined standard profile 18.0" M14 barrel is the perfect all-purpose replacement barrel for any military M14.

For these reasons, this new 18.0" barrel configuration in either the Sage or USGI fiberglass stock is ideal for maritime, surf zone or high humidity applications. Lastly, unit commanders should remember that with the standard profile barrel (as opposed to the medium heavy Crazy Horse configuration), the host weapon will be much easier to bring to bear on a target and during transitioning to subsequent targets, especially by smaller personnel. Likewise, the 18.0" standard profile barrel configuration will be much more suitable for CQB applications. The accuracy delta in using our precision chrome-lined barrel as opposed to our Crazy Horse sniper-grade barrels becomes moot in real world battlefield conditions, except at extremely long ranges where absolute sniper-level accuracy and *skills* are required.

M. Heat treatment. Modern technology enables Smith Enterprise to examine older receivers for heat treatment integrity. If a receiver falls short of Smith Enterprise requirements for surface hardness, we can then very easily readjust the receiver surface for proper hardness.

FINISH AND MATERIALS. All new construction or refurbished Smith Enterprise rifles are given a Melonite MIL STD AMS 2753B treatment where applicable. Manganese phosphate is applied to all barrel assemblies, op rods, trigger assemblies and other small parts. All Smith Enterprise rifles and related components are made from the highest quality 8620, or 4140 chrome moly steel materials.

OPERATOR-LEVEL MAINTENANCE AND REPAIR KIT. Spare parts required at the individual operator level, together with a cleaning kit can be custom-tailored by SEI to meet individual customer requirements.

DETACHABLE BOX MAGAZINE. A principal advantage of the M-14/M-21 design is the simple fact that a vast number of serviceable magazines in government storage for this weapon. This fact represents a tremendous cost-savings to the resource managers. Additionally, the USGI specification 20 round magazine is now in full scale production and is available from numerous vendors.

EASE OF OPERATION AND POSITIVE SAFETY. No change over existing M-14 manual of arms.

CANNOT BE IMPROPERLY ASSEMBLED. The basic design of the M-14 has the inherent advantage of precluding improper assembly. This feature does not change with Smith Enterprise's modernized M-14 design.



Fig. 8 SEI M14SE Disassembled into major components.

M1907 TARGET/SNIPER SLING. An M1907-type leather or synthetic Target/Sniper sling is provided and highly recommended for the M-14SE. For the MK14 SEI variant we endorse the use of a three-point assault sling, as shown above in Fig. 7.

OPTICAL SIGHTING SYSTEM. Smith Enterprise, Inc. does not manufacture optical systems. However, our firm collaborates closely with Leupold & Stevens Optical Company and is the sole commercial distributor for USG sales for that firm. We are confident that Leupold can easily meet any anticipated requirements for the M14SE. Four Leupold tactical "Mark 4" scopes in particular are ideal for the M14SE: the Mark 4 1.5-5X20 MR/T M2 with SPR reticle; the 3-9X36mm MRT; the 3.5-10X50mm L/RT and the Mark 4 4.5-14X50 L/RT models. Mark 4 scopes in the First Focal Plan (FFP) version will be available in quantity by the end of 2005.

COMPONENT CARRYING CASES. Currently Smith Enterprise, Inc. has begun production of component-carrying cases. At present we manufacture a suppressor /tool pouch carrier, a magazine pouch and a cover for the Leupold tactical spotting scope. These covers are normally supplied in coyote brown. Other colors upon request, when ordered in quantity.

CONCLUSION. We firmly believe that after examining how the M-14 battle rifle can be transformed into a modern, modular, extremely reliable and highly accurate sniper system, that you will clearly share our enthusiasm for our innovative technical approaches, quality control measures. Equally important, we also believe that our fiscally responsible approach is in the best interest of the taxpayer, while offering peerless performance for *many years* to come.

PRICING: USG and FMS pricing for the Smith Enterprise M14SE "Crazy Horse" Squad Designated Marksman and the MK14 SEI rifle, as well as the related options, are available upon submission of an official request and will be based upon number of systems required, Required Delivery Date (RDD), condition of USG/FMS M-14 rifles at time of conversion and optional equipment selected. *Standard pricing does not include replacement or return of failed OEM parts as required.*

Note: The terms "Crazy Horse" and "Vortex" are registered trademark protected by Smith Enterprise, Inc. (Information Current: 03 August 2005, rev. 12 June 2008)