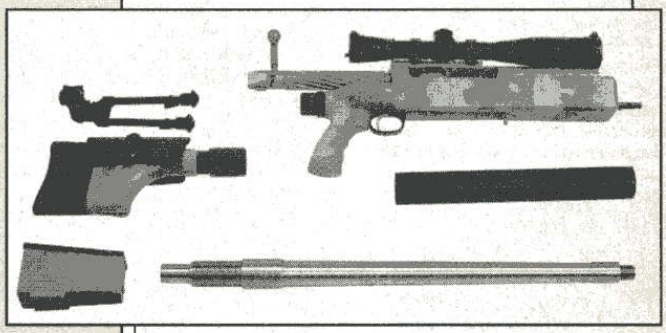
Left-side view of Arms Tech TTR-50 sniper rifle with MD-50B sound suppressor.



(Right) Arms Tech Tactical Takedown .50 BMG rifle field stripped for transport, including Arms Tech MD-50B sound suppressor and Leupold Mark 4, M3-10x scope with mildot reticle used in this study.

The MD-50B sound and flash suppressor from Arms Tech is designed to eliminate sonic and visual clues that would enable enemy forces to locate and direct counterfire against a sniper using the TTR-50 rifle.

threaten the national security of many countries. Furthermore, private companies with their own SpecOps-like security forces will play critical roles in the reconstruction of Afghanistan and Iraq, as well as in future confrontations.

For all of these missions related to Fourth Generation Warfare, the .50 BMG rifle is becoming increasingly valuable as a support weapon for taking out vehicles, fortified crew-served weapon emplacements, and high-value individuals at long range. Regrettably, .50 BMG rifles tend to be heavy and long. Some have other eccentricities that make them difficult to transport or clean or maintain in the field. Several have accuracy problems after a surprisingly limited number of rounds. Some have a short barrel life. Some are simply too expensive for many end-users.

Arms Tech Ltd. of Phoenix, Arizona, developed their new Tactical Takedown Rifle in .50 BMG caliber (TTR-50) to address all of these issues. They even developed a revolutionary, ultra-light sound suppressor that mitigates noise, flash, recoil, and environmental disturbance. What follows is a hands-on evaluation of this system.

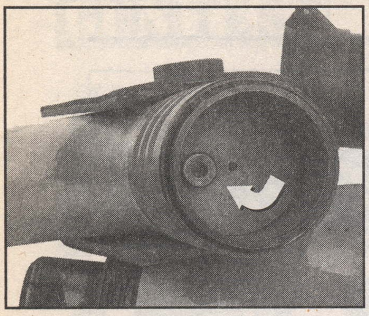
Most .50 BMG sniper rifles in Uncle's inventory were purchased for EOD (Explosive Ordnance Disposal). They were subsequently used by special operators in Gulf War I for destroying radar dishes as well as for engaging unarmored and lightly armored vehicles. Attempts were made at antipersonnel sniping at very long range, but limitations in ammunition design and other factors yielded sporadic success. Nevertheless, to paraphrase Julius Caesar when he crossed the Rubicon, "The die was cast."

The U.S. military began the quest to develop a projectile and find a rifle that would permit excellent long-range, anti-personnel sniping capability. Portability is also an issue. A central problem with heavy sniper rifles (HSRs) is that their weight and bulk limit their tactical utility. Historically, these weapons are generally transported in light-wheeled vehicles and then are only carried on foot for a short distance to firing positions. Better portability is essential for 4GW missions.

That's where Arms Tech, Ltd. comes into the story, bringing to the table a vision of a truly man-portable .50 rifle that can be readily carried by a sniper traveling by boot and sweat. General specifications of the TTR-50 are listed in Table 1, but some specifics merit discussion.

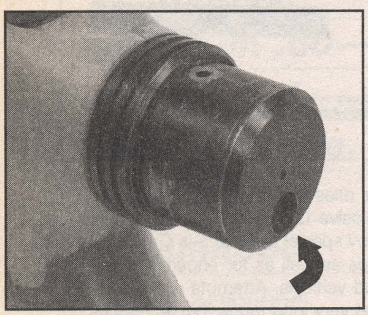
Gun Details

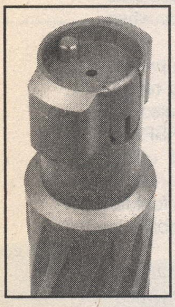
Arms Tech uses the military variant of the McMillan Brothers action that has served benchrest shooters so well. While the Benchrest model features a solid bottom, single-shot action, the Tactical version features a well-designed and executed five-round detachable box magazine. It is the .50 CAL TACTICAL action that served the Canadian Army so well in Afghanistan. The action is



(Above) Arms Tech's TTR-50 uses a take-down stock that McMillan Fiberglass Stocks developed for the U.S. Navy.

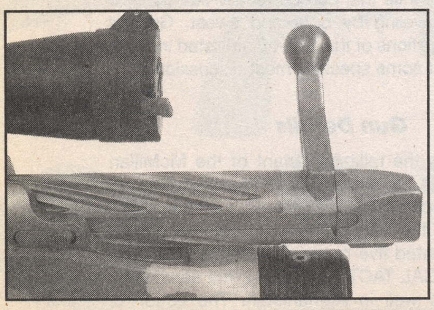
(Below) The peg visible inside the base of the butt stock's locking mechanism in an accompanying photo mates with a hole—shown here in the stock's steel fitting—to prevent rotation when assembled.





(Left) The full-diameter bolt has two massive, horizontally arrayed locking lugs, which permit the incorporation of a superb Sako-type extractor system.

(Below) Bolt and bolt release. Note light surface rust on "in the white" parts, caused by repeated handling and demos. I'd recommend the optional milspec black oxide finish to both sport shooters and armed professionals.



made from 4340 chrome-moly steel, which is carefully heat-treated after all machining operations, to a Rockwell C hardness of 45-48. The bolt features strong spiral flutes designed to both lighten the bolt and deal with fouling. The bolt is fabricated from 9310 steel, which takes well to case hardening. The full-diameter bolt has two massive, horizontally arrayed locking lugs, which permit the incorporation of a superb Sako-type extractor system. The top of the receiver features an integral Picatinny Rail (M1913) interface. Arms Tech adds a Remington-type trigger that's set at 3.5 pounds. A Jewell trigger is optional.

All military weapons are finished in black oxide. Civilians have the option of the black oxide finish or a coating that gives the appearance of buffed stainless steel.

The body of the box magazine is fabricated from 4130 chrome-moly steel that has been annealed and heliarc welded. The follower and floorplate are 30 percent glass-filled nylon.

Arms Tech's TTR-50 uses a takedown stock from McMillan developed for the U.S. Navy. It features an adjustable cheek rest, pistol grip, and spacer system for adjustable length of pull. The rock-solid takedown mechanism requires no tools for disassembly. Located behind the pistol grip, the takedown assembly is fabricated from 4340 chrome-moly steel. The knurled security ring screws forward to lock in place the pin-positioned, push/pull takedown mechanism. The security ring screws backward to enable disassembly. The arrangement is robust and foolproof. The weapon can be disassembled and placed in the Arms Tech backpack for transport. The backpack carries the TTR-50 with the butt stock, barrel, and sound suppressor removed. Extra compartments provide space for ammunition, hydration bladder, rations, and other supplies sufficient for three days. The operator can also carry a compact M16 such as an M4 or Arms Tech's Compak 16.

It is the quick detach (QD) barrel and its mounting system that really set Arms Tech's TTR-50 apart from other .50 BMG heavy sniper rifles built around McMillan .50 BMG actions. This one innovation enables the creation of a truly man-portable system.

Arms Tech modifies the action with a beefy receiver extension based upon the technology the company developed for their ground-breaking TTR-700 takedown .308 sniper rifle. This system was subsequently employed on the .300 Winchester Short

Table 1: Specifications Arms Tech TTR-50 & MD-50B.

Item: TTR-50 Rifle Specification
Cartridge: 12.7x99mm (.50 Browning Machine Gun)
Method of operation: Bolt-action
Effective range: 1,800 meters, depending upon optics and ammunition
Magazine type: Detachable, double-row, double-position feed
Magazine capacity: 5
Stock length, extended, without barrel: 30.38 inches
Stock length, buttstock removed, without barrel: 19.5 inches
Length overall (LOA), stock extended, with barrel, without suppressor: 55.75 inches
Length, overall (LOA), stock extended, with barrel and suppressor: 68.88 inches
Width, without bolt handle: 2.38 inches
Width, with bolt handle: 3.75 inches
Height, magazine inserted, with M-1913 rail but w/o optics or Arms Tech scope mounts: 8.0 inches
Receiver: Modified McMillan .50 CAL TACTICAL
Barrel: Schneider, threaded for MD-50B suppressor, includes a thread protector for storage and transport
Barrel material: 416R stainless steel
Barrel length: 27.0 inches without muzzle device, or customer-specified length
Barrel weight, 27 inch: 10.0 pounds
Barrel twist rate: 1:15 inches RH
Muzzle device: Arms Tech Ltd. MD-50B sound & flash suppressor
Weight, empty, w/o barrel, w/o sound suppressor, w/o optics, w/o bipod, w/o buttstock, but with magazine: 12.44 pounds
Weight, buttstock: 3.75 pounds
Weight, Leupold Mark 4, M3-10x scope: 1.31 pounds
Weight, Arms Tech scope rings: 0.6 pound
Bipod: Various available
Bipod weight: 14.5 ounces
Weight, complete rifle with suppressor: 28.8 pounds
Metal Finish on Gun: Black oxide or coating like buffed stainless
Transport case: Arms Tech TTR-50 Backpack
Availability: In production.

Item MD-50B Suppressor Specification

Length, Arms Tech sound suppressor: 14.0 inches
Diameter, Arms Tech sound suppressor: 2.0 inches
Weight, Arms Tech sound suppressor: 34 ounces
Availability: In production

Magnum Tactical Takedown Rifles (TTR-300 rifles). Using an unusual threading technology and five-point seating mechanism, the barrel interfaces to the receiver precisely. Zero is effectively maintained no matter how many times the barrel is removed and reattached to the receiver. The amount of threaded surface area tying the barrel to the receiver is double of what one would expect from traditional thread designs.

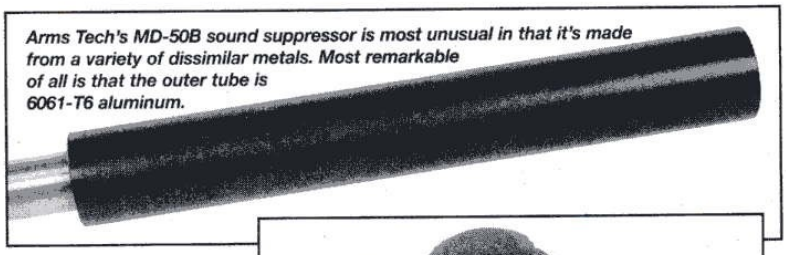
Barrels are built by Gary Schneider using the new 416R stainless steelalloy. The chamber and bore can be optimized for any user-specified .50 BMG cartridge.

The QD system offers some interesting advantages besides the obvious. Different barrel lengths with matched and zeroed scopes can be interchanged at will by the operator as mission requirements change and require a longer or shorter barrel. When a barrel eventually becomes unserviceable, the operator can replace the barrel without tools in the amount of time it would take to tie his boot laces. Confirm zero with the new barrel and he's good to go. Down time is virtually nil.

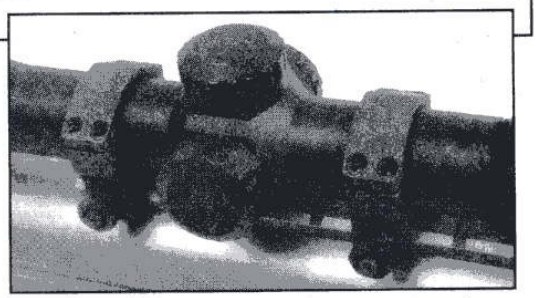
MD-50B Sound/Flash Suppressor

The MD-50B sound and flash suppressor from Arms Tech is designed to eliminate sonic and visual clues that would enable enemy forces to locate and direct counterfire against a sniper using the TTR-50 rifle. Typically, .50 BMG rifles are tasked with taking out critical, high-value targets at extended range such as battlefield and airspace surveillance systems, targeting radars, key leaders, or weapons of mass destruction (WMD) and related equipment. Such targets are usually protected by a quick-reaction "force protection" unit. Engaging such targets with an unsuppressed .50 caliber weapon—even at optimum .50 caliber range—will generate a strong response from a target's force protection unit. This makes taking a follow-up shot both difficult and extremely risky. British special operators encountered serious problems when attacking SCUD missile sites in the wide-open Iraqi desert during Operation Desert Storm (Gulf War I). The massive noise, flash, and dust or other environmental signatures generated by a .50 caliber rifle or by a follow-up shot placed the operator at extreme risk to direct or indirect counterfire.

Enter Arms Tech with their MD-50B sound and flash suppressor. It is evolutionary in that it is based upon the patented work of Don Walsh, who was arguably decades ahead of his time when designing and manufacturing sup-



Arms Tech's MD-50B sound suppressor is most unusual in that it's made from a variety of dissimilar metals. Most remarkable of all is that the outer tube is 6061-T6 aluminum.



(Right) Arms Tech does not recommend any particular scope at this time, since each end-user will have unique requirements. The TTR-50 comes standard with modified McMillan Bros. receiver and Arms Tech 30mm scope rings.

pressors under the Larand and Interrand brand names in the 1980s.

The MD-50B suppressor is revolutionary because it uses an aluminum tube to contain the huge volume and formidable pressure generated when circa 220 grains of powder are burned to push a roughly 750-grain bullet at perhaps 2,700 fps. History is filled with catastrophic failures of .50 caliber suppressors that died despite the fact that they were fabricated from tough carbon steel, stainless steel, and even titanium. Designing a sound suppressor for the .50 BMG is an unforgiving art.

When I first hefted the Arms Tech suppressor, I noticed two things immediately. It was impossibly light for its size. And the tube was made from aluminum. Aluminum? I can safely say I was shocked. Either the folks at Arms Tech were utterly demented. Or they had raised the bar considerably in suppressor design. Aluminum had long since been pretty much relegated to rimfire suppressors and pistol suppressors of centerfire caliber. Arms Tech was not only using aluminum in a rifle suppressor, but with the Mother of All Rifle Calibers. Whew.

This particular innovation must be more that skin deep to be successful. While the suppressor design is based in part on a Don Walsh patent, Arms Tech has gone on to pioneer the use of components of multiple, very different alloys in suppressors. This practice is normally avoided because different metals have different coefficients of expansion as they are heated—as well as other dynamic interactions—that can cause problems rather than solutions. This can produce warpage of the silencer, which can cause accuracy and even safety problems.

Most manufacturers would never use such divergent alloys so aggressively. Arms Tech views these divergent properties as assets rather than as liabilities. They use the different coefficients of expansion and different suites of properties in different portions of the suppressor to optimize suppressor performance in terms of heat extraction from combustion gases, transfer of heat from the core to the suppressor's outer periphery, and then transfer of heat from the suppressor to the environment. This practice also enables the use of optimum alloys such as titanium at optimal places to solve other problems when using suppressors for particular applications. This requires sound materials science, obsessive quality control, as well as thinking well outside of the box. These are three qualities I've come to associate with Arms Tech.

This suppressor has been adopted in quantity by USSOCOM for the Barrett M82A1 rifle. This robust design is standard equipment on the TTR-50 in lieu of a muzzle brake, since it does so much more than a muzzle brake at a comparable weight. Detailed specifications are listed in Table 1.

Shooting Impressions

The TTR-50 handles as well as any other precision rifle based upon the McMillan .50 caliber action and takedown stock—which is to say, "outstanding." The silencer weighs little more than a high-efficiency muzzle brake, so balance was outstanding. The weapon offers the added advantage of a takedown barrel that allows backpacking and airborne operations with the system. The barrel, action, and quick-mount barrel system are all proven to deliver 1/2 MOA. The components return to zero after setup, which is nearly as quick as putting on your boots and tying the laces. Chamber specs are set to end-user requirements. The test specimen featured a chamber specifically designed for a new military sniper round that was not available for testing. The chamber was too tight for reloads unless they were resized by new dies for the full length of the case. I used factory HSM match ammo for the study. Specify what ammunition you'll be using, and the chamber will be cut to match perfectly.

The Arms Tech MD-50B sound suppressor delivered a compelling mix of per-

Table 2: Performance Arms Tech TTR-50/AI AW50

Sound signatures and projectile velocities delivered by Arms Tech TTR-50 and Accuracy International AW50 sniper rifles with and without Arms Tech TTR-50B sound suppressor. Note the difference the presence or absence of a muzzle brake makes on the overall net sound reduction.

Parameter	Arms Tech TTR-50 rifle	AI AW50
SPL, unsuppressed at 1 meter, no muzzle brake:	175 dB	—
SPL, unsuppressed at 1 meter, AI muzzle brake:	—	180 dB
SPL, suppressed, Arms Tech MD-50B suppressor:	157 dB	157 dB
Net sound reduction:	18 dB	23 dB
First-round pop:	+6 dB	+6 dB
Muzzle velocity unsuppressed:	2,738 fps	n/a
Muzzle velocity suppressed:	2,787 fps	n/a
Freebore boost:	+49	n/a

Net sound reduction on TTR-50 rifle is misleadingly low because it is the only .50 BMG rifle that does not come from factory with a muzzle brake. Its unsuppressed SPL is, therefore, 5 dB less than comparable rifles, while the actual suppressed noise level is the same. That's why the net sound reductions are different.

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formance characteristics (see Table 2). It reduced recoil as well as a good muzzle brake, reduced flash as well as a good flash hider, reduced blast overpressure to that of a 9mm MP5 sub-machine gun—and it did so at half the weight of most premium .50 BMG sound suppressors. Wait, there's more. After five rapid-fire shots, the suppressor actually remained cooler than the barrel. That's a first. What's more, the heat was quite evenly distributed throughout the length of the suppressor; silencer cognoscenti take note. Finally, the suppressor—while hot—was cool enough to put my hand on for several seconds. A boonie hat gives enough protection to dismount the can if the shooter must take down the weapon and beat feet after emptying a magazine. This is all noteworthy performance.

Sniper marksmanship and field craft are highly perishable skills. Extensive training with a rifle chambered for the .50 BMG subjects the operator to long-term bilateral hearing loss, risk of shoulder separation, and risk of detached retinal fragments commonly known as "floaters." While the better muzzle brakes do mitigate recoil, they significantly increase blast overpressure both at the shooter's ear and even more so for the spotter. This places shooter and spotter hearing at even greater risk of permanent damage. Furthermore, the bi-directional whiplash generated by muzzle brakes is very hard on day and night optics. Using the Arms Tech MD-50B sound and flash suppressor is not only a superior choice over a muzzle brake for training, it vastly improves mission capability and operator safety during combat operations.

Arms Tech's TTR-50 Takedown Rifle and MD-50B together represent tours de force in the arts of rifle and sound suppressor design. To say I was wowed is to understate the case. This is an outstanding, truly man-portable system for long-range problem-solving in the real world of Fourth Generation Warfare and overseas corporate security in the 21st century.

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