

SMALL ARMS

DEFENSE

JOURNAL

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ORDNANCE ODDITIES
FROM THE LATE
VIETNAM WAR

AMMO ADVANCES:
AN IN-DEPTH REVIEW



TUMBLE UPON IMPACT
MAXIM DEFENSE'S OPTIMIZED SBR DEFENSIVE AMMO

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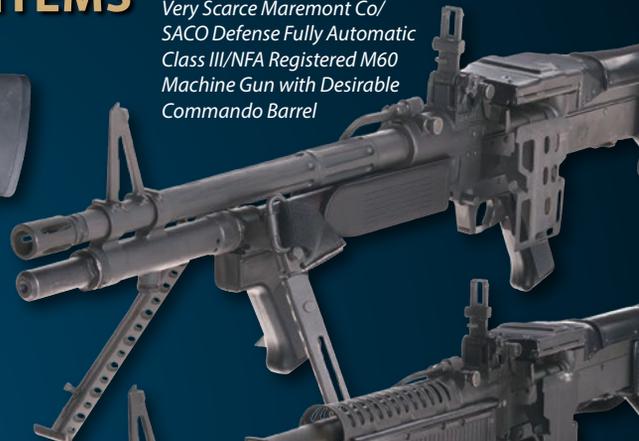
Featuring the Collections of Robert M. Lee, Mac McCroskie, Dr. Gerald Klaz, Gabe Lawson, Mark Larson, Robert Young, Roger Muckerheide, the Gateway Collection, the Paulson Brothers Collection of Civil War Cannons, Larry Vickers, the Putnam Green/Sycamore Collection, the Murdoch Trust Collection, a selection of fine arms from the Larry Jones Collection, and a selection of fine and historic sporting arms from the esteemed Collection of Malcolm King

OVER 100 CLASS III ITEMS



Exceptional Colt M16A1 Fully Automatic Class III/NFA Registered and Transferable Assault Rifle with Original Shipping Box

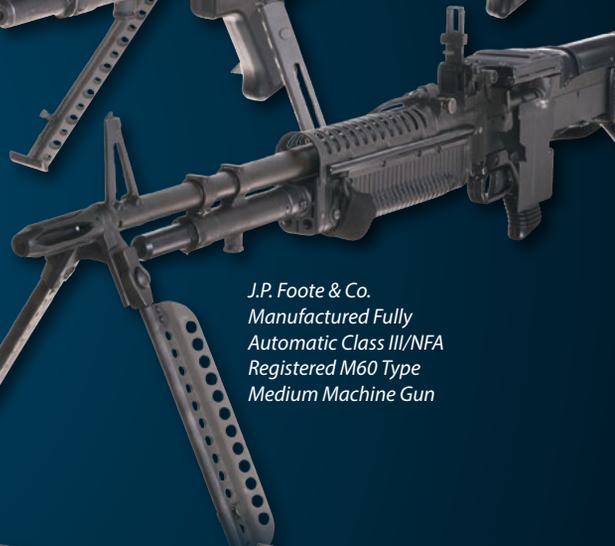
Very Scarce Maremont Co/ SACO Defense Fully Automatic Class III/NFA Registered M60 Machine Gun with Desirable Commando Barrel



Rare Cadillac-Gage Stoner Model 63A Light Machine Gun, Class III/NFA "Sales Sample" Machine Gun, with Ammo Box and Links



Desirable World War II German MG-42 (bnz code) Fully Automatic Class III/NFA C&R Medium Machine Gun with NATO Conversion Unit and Other Accessories



J.P. Foote & Co. Manufactured Fully Automatic Class III/NFA Registered M60 Type Medium Machine Gun



Excellent Ohio Police Department Shipped Colt Model 1921 Thompson Sub-Machine Gun with Drum Magazine, Class III/NFA C&R Fully Transferrable Machine Gun



John Stemple/High Standard M2 Browning Heavy Machine Gun with Tripod and Accessories, Class III/NFA Fully Transferrable Machine Gun

Scarce World War II German Fully Automatic Class III/NFA C&R MG42 (code cra) MAGET Machine Gun with Anti-Aircraft Mount, Spare Barrel, Tripod and Drum Magazines



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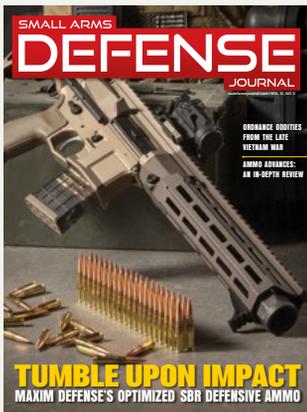
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ON THE COVER

Designed for Maxim Defense's PDX and MDX SBRs, Tumble Upon Impact™ (TUI) defensive ammunition has patented Next Generation technology. The TUI solid copper projectiles have a solid tip without any flutes/grooves/slots or other special effects that might impede successful feeding, firing and cycling out of the weapon.

PHOTO: MAXIM

See story on page 48.

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CORRECTION & CLARIFICATION

In *SADJ*, Vol. 12, No. 1, "Saddam's Sharpshooter: Al-Kadesiah Sniper Rifle," by Miles Vining, للتدريب was reversed due to a software error. The Arab script had been reversed from the Arab right to left order of characters to the European left to right configuration. We regret this error.



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NEW PRODUCTS



PDX/MDX:505



MDX:508



MDX:510

MAXIM DEFENSE

MDX and MD:15 Series

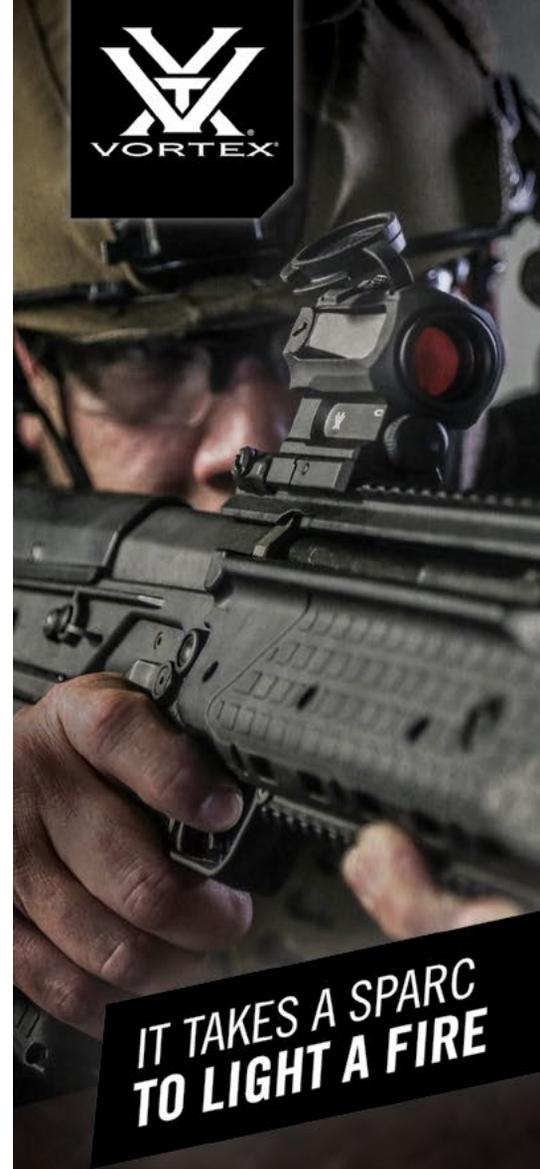
Maxim Defense unveiled its **MDX and MD:15 line** of firearms along with Maxim Defense Ammunition SBA (short barrel ammunition) at SHOT Show 2020. The MDX Weapon System was developed to fulfill the broad spectrum of needs by today's military and law enforcement operations. The family consists of the PDX/MDX:505 (5.5-inch barrel), the MDX:508 (8.5-inch barrel) and the MDX:510 (10.3-inch barrel).

maximdefense.com

TASMANIAN TIGER

TT First Responder Move On MKII Pack

The customizable **TT First Responder Move On MKII** consists of a large main backpack that has a removable front smaller backpack zipped to the front of it that can also be used on its own. You get two packs in one. It has a Padded Back Carrying System with laser cut MOLLE on the front and sides. Inside, there is MOLLE hook-and-loop on the interior walls for customizing the configuration, and there are internal fixation points for medical equipment. It includes three removable transparent pouches, detachable panels with elastic loops and a rain cover. Made with CORDURA 700d fabric and YKK zippers, it is designed to be durable, versatile and reliable. All of Tasmania Tiger's products are made to endure the toughest environments. tasmaniantigerusa.com



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TO LIGHT A FIRE

SPARC AR
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NEW PRODUCTS



MISSION FIRST TACTICAL

Extreme Duty Window Magazine

Mission First Tactical, LLC (MFT™) is proud to introduce the latest addition to the MFT magazine line, the **Extreme Duty Window Magazine**, designed for the AR-15/M4 but allowing use with a wide range of non-AR-15/M4 platforms. Utilizing new material technology and manufacturing processes for enhanced strength, durability and reliability, the Extreme Duty Window Magazine has durable dual-side, anti-glare transparent windows, numerical markers and high-visibility indicator coil on the spring allowing for quick visual identification of the approximate number of rounds remaining. Additionally, the Extreme Duty Window Magazines offer increased durability through a more efficient energy transfer between the polymer and the longer fiber filaments during an impact. The long-life USGI-Spec stainless steel spring is corrosion-resistant. The four-way, anti-tilt, self-lubricating follower keeps the rounds aligned and makes mag feeding consistent and reliable, while virtually eliminating jams. An oversized bolt-catch provides enhanced reliability of the bolt catch operation. The flared floor plate allows for an easier grip in handling, extraction and one-hand reloads.

missionfirsttactical.com

STEINEL AMMUNITION

6.5x52mm Carcano

The **6.5x52mm Carcano cartridge** has been around since 1891 and was only phased out of military service in the 1970s. Carcano rifles were strong actions, and most used gain-twist rifling to extend barrel life and improve accuracy. Heavy for the caliber projectiles, it retained useful energy levels despite the round nose form. The original lead core bullets had poor terminal performance, so later designs filled the bullet nose with less dense aluminum to promote tumbling on impact. Fortunately, an excellent target load is now available from Steinel Ammunition. The new cartridges use soft point expanding bullets that provide excellent terminal effect and accuracy while promoting reliable feeding. Loaded to 1,770 fps (from 17.5-inch barrels), this load offers a significantly lighter recoil than the original, while retaining good terminal performance at distances reasonable with iron sights. This ammunition is non-corrosive and made to much higher quality and more consistent specifications than either military surplus or other commercial loadings.

steinelammo.com





OTIS

Reality-Based Training Cleaning Kit

Otis announced the launch of a **Reality-Based Training Kit**, specifically for the law enforcement and military markets. This kit includes all the necessary tools to keep your training in session and is available in 9mm and .223 caliber/5.56mm variations. These kits are for firearms that are converted to use paint marker training ammunition. Training in real-life simulated scenarios is incredibly important and so is maintaining training guns. A portion of sales proceeds will be donated to the National Law Enforcement Officers Memorial Fund. otistec.com

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NEW PRODUCTS



MID-EVIL INDUSTRIES

360° VFG QD Tripod

The **360° VFG QD Tripod** is the next evolution in quick-detach accessories. This quick-detach mini tripod (can also be used as a bipod) is compatible with and exclusive to the 2nd Generation 360-degree VFG (Vertical Fore Grip). The adjustment possibilities are almost infinite. The smooth 360-degree rotation and full-tilt function allow you to acquire targets quickly for an accurate shot every time.

The Quick Detach Tripod has a single hand-operated lock and unlock mechanism. There's no button, no twisting—just a simple slide down to release and slide up to lock. It can be set to three different angles (20°, 50° and 78°). Just push, click and lock. It is constructed of aluminum, has extreme temperature resistance, and is sturdy, long-lasting and lightweight with a high quality finish. Patent pending.

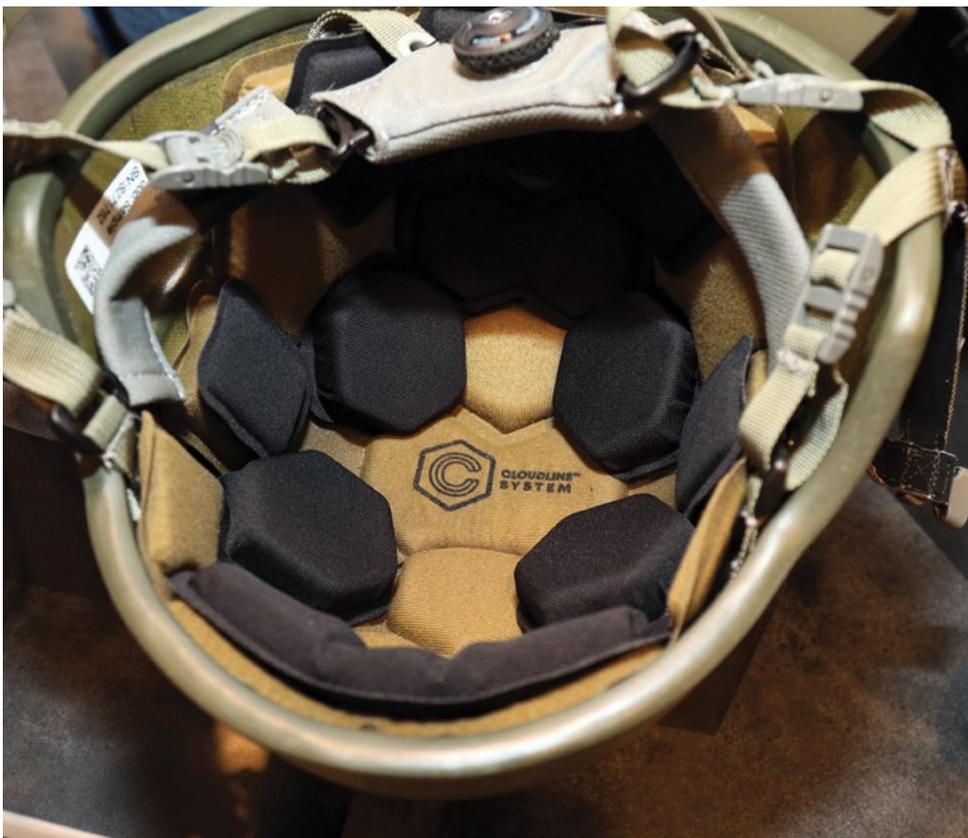
mid-evil.com

TEAM WENDY

CloudLine™ System

Team Wendy® announced the immediate availability of the **CloudLine™ System**, a new drop-in helmet liner designed for exceptional comfort while upholding the safety standards operators have come to expect from the brand. The liner, named CloudLine™ for its unique comfort grade, features the softest Team Wendy-patented Zorbium® foam to date, used in strategically placed hexagon-shaped comfort pads designed to prevent hot spots while maintaining protection. CloudLine is designed to fit a broader range of helmets, including those used throughout Special Operations communities. CloudLine exceeds ACH blunt-impact requirements (AR/PD 10-02) and is compatible with nearly all standard ground-combat helmets, though some models may also require a CAM FIT™ Retention System retrofit in order for the CloudLine System to fit properly.

TeamWendy.com



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EDITORIAL SPECIAL: AMMUNITION ADVANCES



TRUE VELOCITY

True Velocity's composite-cased ammo is far less expensive to manufacture, significantly lighter to carry and can replace brass-cased ammunition in every application. Linked 7.62 NATO shown above.

An In-Depth Review

By Paul Evancoe

Computer-aided design, advanced metallurgy, polymer composites, material forming technology and propellant formulation enable today's ammunition advances, and that subsequently drives weapon design, not the reverse. That said, it

is important to remember that claims associated with ammunition performance are almost always subjective or exaggerated.

Manufacturers are zealous to recover their research, development and manufacturing investments. Firearms manufactur-

ing and retailer sales are all about profit, while government program managers who make the big number buys are eager to score a win for their particular program as a matter of job security. In the end, it comes down to a hit or miss for the consumer and even



PAUL EVANCOE

Textron's newest cased-telescoped 6.8mm ammunition linked for their CTSAS machine gun. This ammo is approximately 40% lighter and takes up only 12% of the volume of conventional bottleneck metallic cartridges.

that depends upon how technically savvy the individual consumer may be. How then is one supposed to decide?

Ammunition performance testing takes many forms as does its data analysis. Formal operational testing (OT), based on a formal operational test plan (search OPTEVFOR), is an objective means by which operational testing performance can be achieved. Its resulting data can be validated and analyzed without subjective bias. OT requires that a formal operational test plan is strictly followed, and that presents both a problematic and expensive process for ammunition and firearms developers. The default is to provide a selected military or law enforcement unit(s) the opportunity to "shoot" a particular new weapon and/or ammunition. Based upon their subjective feedback of that particular experience, the product is deemed "tested." Thus, glowing product praise is routinely assigned, no matter how objectively unqualified it might be, and everyone in the consumer community largely accepts the product as tried, tested and proven.

But history offers more insight. The Cold War led to small arms procurement primar-

ily focused on NATO interoperability, and the 5.56 NATO-firing AR platform became the assault rifle mainstay. As a result of our wars in Southeast Asia and the Middle East spanning the past 60 years, attention has been given to the war-fighting adequacy of the U.S. military's current in-service arsenal of small arms and ammunition.

Much of today's ammunition hype revolves around "new" rounds like the 6.5mm Creedmoor and the 6.8mm Remington SPC (Special Purpose Cartridge). In reality, there is nothing new about either except for the substitution of caliber designation with a millimeter designation and a slightly altered cartridge case and load. For example, the 6.5mm uses the same bullet as the .264 Winchester Magnum (.264 WinMag), and the 6.8mm uses the same bullet as the .270 Winchester. Both the .264 WinMag and the .270 Winchester have been available off-the-shelf for half a century.

What is the difference between the comparable legacy calibers and the "new" rounds? The answer is not a whole lot that matters. Felt recoil between the same caliber and corresponding millimeter cartridges

is comparable and so is the projectile's delivered energy on target using comparable loads. Accuracy claims are always an amalgamation consisting of a number of factors contributing to operational performance, but there are two fundamental elements that can be used to interpolate a round's effectiveness—projectile weight (mass) and velocity. Projectile shape is also a contributing factor to ballistic flight characteristics. For example, each bullet diameter (caliber) has an individual "ideal" length to diameter, to shape, to weight ratio that provides its best ballistic trajectory (stable flight and range) at a given velocity (faster is not necessarily more accurate). That "ideal" formula is well understood and generally followed by ammunition manufacturers; although there is some really ridiculous ammunition available that has absolutely zero operational purpose other than it's "cool looking."

Another accuracy factor is barrel quality (material construction and machining accuracy) and barrel life expectancy. For the purpose of comparative example, a rifle or machine gun chambered in 7.62 NATO has an average barrel life of between 5,000 and 8,000 rounds. The same rifle or machine gun chambered in 6.5 Creedmoor has an average barrel life of only 1,200 to 1,500 rounds. The Creedmoor's significantly reduced lifespan is the result of its higher velocity's wear and tear on the gun's bore. And the answer is "YES" to the question you're probably thinking: Can't the gun barrel be manufactured from a stronger alloy that resists wear? The problem is the cost of using exotic materials.

Comparatively, the combat-proven 7.62 NATO round (.308 Winchester) generally performs better all around than either the .264 or the .270, with recognition that the counterargument to this falls into niche categories outside general use. Additionally, the 7.62 NATO cartridge is available in a wider range of bullet weights, shapes and off-the-shelf loads. Therefore, replacing the 7.62 NATO round with either the 6.5mm or 6.8mm round for general service use has questionable operational advantage or a clear return on investment (ROI).

In a weight reduction effort, the feasibility of caseless ammunition, polymer-cased ammunition and a hybrid metal-based with polymer-cased upper cartridge was explored as a weight and cost reduction solution several decades ago. None of these were proven to be operationally suitable, combat reliable or cost-effective, and, therefore, none were adopted.

Caseless ammunition made its way into the

EDITORIAL SPECIAL: AMMUNITION ADVANCES



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Caseless ammunition components included a solid propellant charge, primed at the base, with the bullet encased inside a cavity in the propellant. A protective plastic cap was placed on its front end to both help secure the bullet inside the propellant cavity and protect the nose of the round from chipping during feeding. The round has inherent reliability flaws and was discontinued.

U.S. Army's Advanced Combat Rifle Program, but caseless ammunition was little more than a flash in the ammunition pan when the Army cancelled the program because of reliability issues and the ammo's lack of interoperability with all other conventional rifles and pistols. However, it did help pave the way to Textron's development of Cased-Telescoped Ammunition (CTA) for use in uniquely designed small arms that fire it.

With that as the segue, we will briefly examine new ammunition offerings available today and on the horizon. Some make sense, and some are plainly pushing the envelope of sound operational logic, not to mention return on investment—you be the judge.

Cased-Telescoped Ammunition (CTA)

In partnership with Heckler and Koch (HK) and Winchester, Textron has developed the next generation of CTA (with a focus on the 6.8mm projectile). Winchester-Olin is manufacturing the CTA while HK has designed the special magazine and belt-fed, gas-operated CTA weapons suite and will produce these specialized guns in conjunction with Textron. This has become known as the Cased-Telescoped Small Arms Systems (CTSAS) program.

What exactly is CTA? It's a very curious-looking ammunition design that doesn't track with any conventional ammunition shape. The CTA cartridge looks like a polymer

tube about 1 ½ inches long and ½ inch in diameter. On the breech end it has a conventional primer in its center. On the muzzle end it has what looks like a second smaller tube inserted inside the larger outer tube. The smaller tube carries a 6.8mm bullet inside (by the way, this cartridge is fully scalable to larger calibers).

Here's how it works. The gun's firing pin strikes the primer, igniting the compacted smokeless powder propellant contained in the main tube body. As the gas pressure increases, the inside tube, holding the conventional 6.8mm round, extends forward, telescoping into the gun's chamber, creating the necessary gas check (seal). As combustion pressure rapidly develops inside the cartridge case, the round (6.8mm bullet) releases from its telescoped tube (similar to the bullet leaving a conventional metallic cartridge case's neck) and begins its transit down the gun's rifled bore spinning into stable ballistic flight, just like any other conventionally fired bullet. The important point here is that a comparable conventional load with comparable bullet will perform the same throughout its ballistic flight downrange.

There are some advantages to cased-telescoped ammunition. Round for round, CTA is about 40% lighter than metallic cased ammunition. In addition, the CTA rounds use compacted propellant, which has better burn characteristics so it requires less case volume compared to conventional, loosely filled cartridge case propellant. This means CTA is approximately 12% the volume of similar cal-

iber metallic cased ammunition, so it's lighter and takes less overall space.

CTA ballistics, as mentioned previously, are comparable to conventional ammunition of the same caliber and bullet weight. CTA advertises improved accuracy, but that is scientifically questionable. Accuracy is the sum total of multiple variables such as the gun barrel quality, twist, caliber, bullet weight, balance and aerodynamic shape, velocity, gun sights being used, environmental conditions, shooter's ability and so on, not the ammunition and/or gun alone.

CTSAS guns are about 20% lighter overall. For example, the 6.8mm CTA-firing machine gun variant weighs in at 14.5 pounds, compared to the Army's current **21.8-pound** M240L lightweight (7.62 NATO) machine gun. Additionally, because CTA ammunition telescopes, the CTSAS machine gun's chamber is separated from the barrel; therefore lowering the risk of "cook off" during periods of sustained automatic fire. This claim may be true, but there is questionable thermodynamics involved for heat dissipation.

Conventional metallic ammunition extracts about 60% of the combustion-generated heat with each spent cartridge. The remaining 40% sinks into the gun barrel and receiver. That's why guns get hot when they're fired rapidly. Polymer (CTA) ammunition doesn't carry (sink) heat; so how is the heat from propellant combustion managed and dissipated from the gun? Unquestionably, there is heat generated by propellant combustion, and that



SIG SAUER's new hybrid ammunition is made with a brass upper and an alloy lower body and base. This provides greater strength for increased cartridge case pressures and also achieves a 20% reduction in cartridge weight. From left to right: 6.8 Hybrid, 6.5 Creedmoor Hybrid, 7.62x51 Hybrid.

PAUL EVANCOE

heat must go somewhere. Textron claims less heat is generated by its compacted propellant, but currently provides no clear explanation within the known Law of Thermodynamics that accounts for the dissipation of heat from sustained automatic fire.

There are additional legal and treaty issues needing resolution by Textron and (mostly) Program Executive Office (PEO) Soldier, before CTSAS can be adopted into general service use by U.S. forces. CTA requires a special family of cased-telescoped weapons to fire it. Conventional weapons cannot be converted to fire CTA and vice versa. That means neither the ammunition nor the CTSAS weapons are NATO-interoperable and therefore fall outside the NATO STANAG requiring ammunition interoperability.

Further, U.S. law dictates U.S. forces interoperability with our NATO allies. This leaves cased-telescoped weapons and ammunition in the "special use" category, and that in itself is a legal show stopper for its replacement as DoD's main battle rifle and light

machine gun dedicated to CTA. Nonetheless, cased-telescoped ammunition and the special weapons that fire it are a step forward in the world of firearms technology, and Textron is leading that charge. For more information see textronsystems.com.

SIG SAUER's Hybrid Bi-Metal Cartridge

On September 3, 2019, SIG SAUER, Inc., Newington, NH, announced the official award of a U.S. Army contract for the Next Generation Squad Weapons (NGSW). The primary objectives set forth by the U.S. Army for the NGSW-AR was a weapon with the firepower and range of a machine gun, coupled with the precision and ergonomics of a rifle. The award encompassed the complete SIG SAUER system consisting of SIG's hybrid ammunition, a lightweight machine gun and rifle that includes suppressors. Utilized in both weapons, SIG's 6.8mm (.27 caliber) hybrid ammuni-

tion is an interesting advance in ammunition, design, manufacturing and material metallurgy, not because of the 6.8mm round it fires, but rather the bi-metal cartridge.

SIG's newly developed, high-pressure, 6.8x51mm hybrid ammunition is designed for increased penetration at greater range. SIG's hybrid ammunition also achieves an important 20% reduction in cartridge weight by attaching a brass cartridge case (body) to a proprietary metallic alloy base. That's right—a bi-metal cartridge case using dissimilar ferrous and non-ferrous metals that somewhat resembles an off-the-shelf 7.62x51mm NATO bottleneck rimless metallic cartridge.

In order to prevent metal seam separation between the alloy cartridge base and brass case upper, a lock washer (of sorts) is used between the two metals as a means to prevent case and base separation from dissimilar expansion coefficients when fired. The method SIG is using to manufacture their hybrid ammunition is otherwise proprietary, and their engineering department is not

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DSG Technology's CAV-X bi-metal dual core super cavitation bullets fly a straight path in air or water and through the transition from one to the other (dsgtec.com).



PAUL EVANCOE

returning calls.

As outlined in the recent award, SIG SAUER will deliver a complete SIG SAUER system inclusive of the SIG SAUER 6.8x51mm hybrid ammunition, lightweight machine gun, rifle and accompanying suppressors. SIG has historically manufactured quality firearms, and no doubt their superb track record will continue. Visit sigsauer.com.

Polymer Composite Cartridge Case

It's being manufactured and it's available now. True Velocity, headquartered in Garland, TX, currently offers 5.56 NATO, 7.62 NATO, .338 NORMA, .50 BMG and 12.7x108 ammunition in its proprietary polymer composite case design. True Velocity's composite case manufacturing utilizes scalable technology from 5.56 NATO through 14.5mm. This production technology allows rapid design modifications. True Velocity can also meet your packaging needs, including linked belts and individ-

ual rounds. Because they're using composite munitions, they can offer the casing in multiple colors to match the operating environment, thereby lowering the battle signature. They can further color-code the composite casing to match a projectile type and load, making it distinctive and readily distinguishable from other ammunition. Remarkably, True Velocity loads all projectiles and powders with match-grade accuracy.

Unlike metallic-cased ammunition, the composite casing does not carry heat. True Velocity claims the weapon remains cooler, and the spent casing is cool to the touch. They also claim their ammunition provides substantial flash reduction because the gases exiting the bore are not superheated and therefore are below the flash point. These claims are made without the benefit of formal OT (as previously discussed).

True Velocity's composite case ammo is easier to carry because it's 30% lighter than brass casing ammunition of the same quantity and caliber. With casings that are 100% recyclable,

the reduction in heavy metal byproducts also translates to reduced environmental impact. True Velocity's "Lean is Our Culture" slogan is indeed a fact. True Velocity's agile production technology reduces the required manufacturing footprint by 80% when compared to a traditional brass casing manufacturing facility. See tvammo.com.

Tracer Ammunition

Traditional tracer rounds have a bullet base filled with a magnesium-based pyrotechnic incendiary compound that's ignited when the round is fired, leaving a bright glowing trail (usually red or orange in color) behind the bullet as it streaks downrange. This allows the shooter to visually track (trace) the rounds' actual flight path. Tracer ammo is most often linked into machine-gun-belted ammunition to provide the gunner immediate visual feedback of his bullet string's trajectory and target hit proximity. This is especially useful when using fully automatic fire against moving tar-

gets and suppressing enemy fire.

However, this bright in-flight glowing tracer tail comes at a price. It marks the bullet's entire flight path from beginning to end, making the firing source location easily identifiable from both the sending and receiving ends. Additionally, because tracer rounds are incendiary and burn until their pyrotechnic is fully consumed, they will usually set fire to anything flammable where they come to rest downrange. For this reason, tracers are prohibited at nearly every indoor and outdoor range in the U.S. with the exception of specially designated military ranges. Another shortcoming of tracer rounds is that they are traditionally only available in NATO calibers, e.g., 5.56, 7.62 and .50 caliber, and this misses a huge consumer market of sportsmen shooters who shoot a variety of rifle and pistol calibers.

Can tracer ammunition be made non-incendiary, safe for indoor and outdoor range use, cost-effective and available across multiple popular calibers? Headquartered in Scottsdale, AZ, with its manufacturing facility in Payson, AZ, AMMO, Inc. (ammo-inc.com) has developed a cool non-incendiary tracer solution they named "Streak Ammunition."

Streak Ammunition is a non-incendiary "cool tracer." They achieve this by replacing the incendiary magnesium-based pyrotechnic with a non-flammable eco-friendly strontium aluminate (glow-in-the-dark) powder mixed with clear enamel. These new phosphorescent tracer rounds achieve a similar visual nighttime effect by using the same glow-in-the-dark ingredient used in many watch faces, gauge faces and kids' glow-in-the-dark toys. When exposed (charged) to a light source, strontium aluminate compound glows brightly for a limited time after that light source exposure is removed. Streak Ammunition uses the flash from firing the gunpowder propellant as the light source to activate (charge) the strontium aluminate compound coating the rear cavity of the tracer bullet.

At night, the visual effect is nearly identical to a conventional tracer round as it streaks downrange. Another very important advantage is that Streak Ammunition tracers offer a restricted 30-degree rear-viewing angle. This means these tracers can only be viewed from the shooter's end, not the receiving end, thus keeping the shooter's position unmarked. Streak Ammunition's disadvantage is that it simply does not glow bright enough to see in bright daylight. This ammunition is now in full production and will soon be available off-the-shelf in several colors for most popular calibers.



What exactly is Cased-Telescoped Ammunition?

It's a very curious-looking ammunition design that doesn't track with any conventional ammunition shape.



Saboted Light Armor Penetrator (SLAP)

SLAP ammunition is uniquely designed to penetrate lightly armored vehicles and aircraft and barrier armor more efficiently than conventional steel-core, or tungsten-core, armor-piercing ammunition. Designed for use in small arms, SLAP rounds can be safely fired through a conventional gun's rifled bore without damage or any special gun modification.

Think of a shotgun shell as an analogy. In the same manner a shotgun shell uses a plastic shot cup (wad) to carry the shot down the bore, SLAP design incorporates a polymer sabot (*sabot* is a French word meaning *wooden shoe*) that carries a lesser diameter tungsten penetrator projectile down the gun's bore. So—the sabot's outside diameter matches the bore diameter and carries within it a smaller diameter, lightweight, high-density, sub-caliber projectile down the gun's bore. As the sabot leaves the gun barrel, the sabot "undergoes" immediate and profound aerodynamic lift that instantaneously strips it away from the sub-caliber projectile it's carrying. In this manner, the sabot comes to an almost immediate halt, and it "slingshots" the SLAP projectile (it's carrying) to extreme velocity. By design, the spin-stabilized, sub-caliber SLAP projectile has greatly increased sectional density (mass), especially if it employs a heavy

metal tungsten or depleted uranium core.

SLAP ammunition has been in production since 1985 by the Winchester Cartridge Company and Olin Corporation (olin.com). The sabot that contains the sub-caliber SLAP round is manufactured by Cytec Industries. SLAP ammunition is produced in two NATO calibers, 7.62×51mm NATO (.308 Winchester) and 12.7×99mm NATO (.50 BMG). The 7.62×51mm round is designated as the M948 (standard) and M959 (tracer). The 12.7×99mm (.50 BMG) round is designated as the M903 (standard) and M962 (tracer). SLAP, by nature of its design, cannot be efficiently scaled down below 7.62mm. However, it is easily scaled-up to larger bore guns and renamed "APDS" (armor-piercing discarding sabot).

Armor-piercing discarding sabot (APDS)

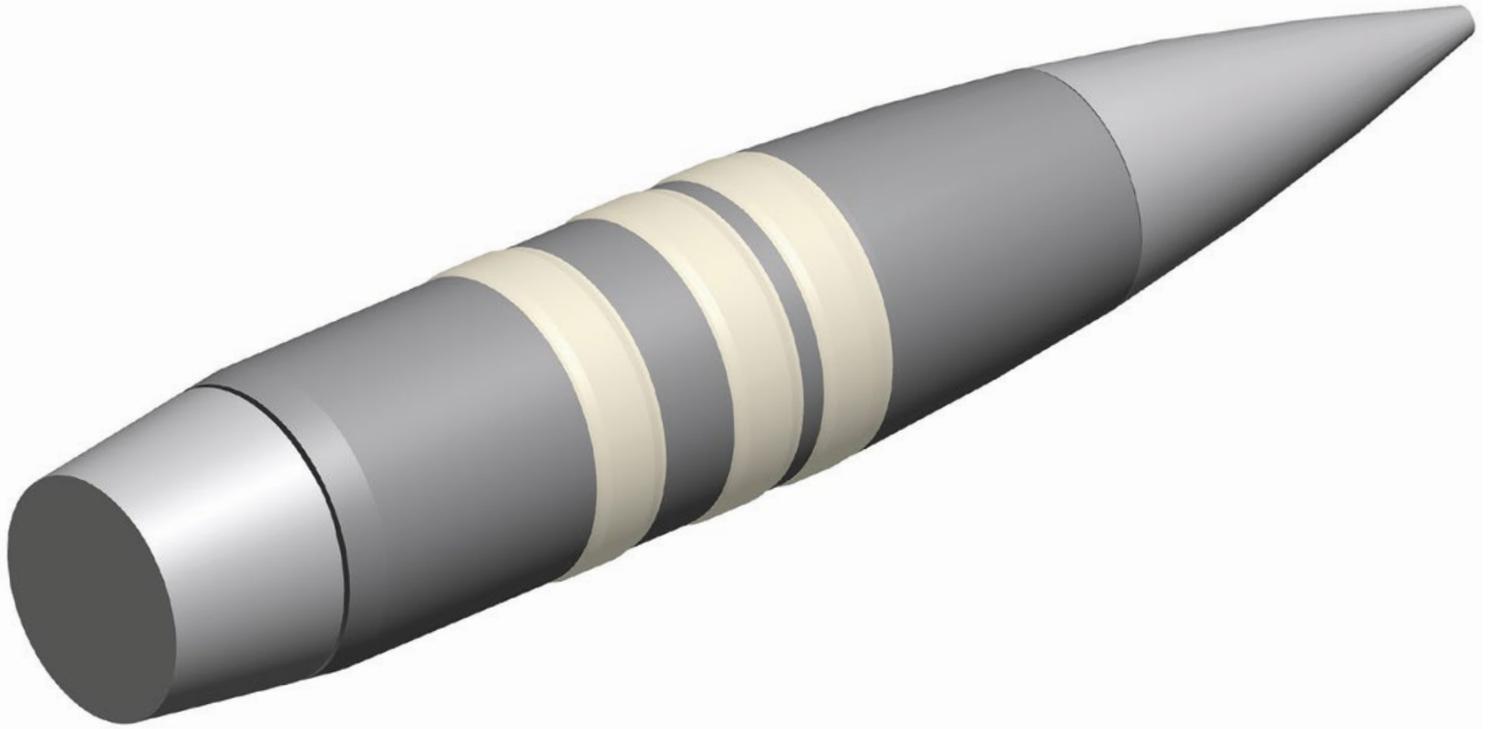
APDS is a form of kinetic energy projectile fired from a rifled-barrel gun to attack armored targets. APDS rounds are sabot rounds, firing a spin-stabilized armor-penetrating sub-projectile. Like SLAP ammunition, its small arms equivalent, APDS ammunition can nearly double the armor penetration of a small caliber gun, compared to armor-piercing (AP), armor-piercing-capped (APC), or armor-piercing, capped, ballistic-capped (APCBC) projectiles.

APDS technology is not new, and it actually preceded SLAP ammunition. In fact, its development began in France prior to the 1940 Franco-German Armistice. Resulting from the project engineers fleeing France to escape the Nazi's occupation, APDS projectile technology was honed in the United Kingdom from 1941 to 1944. In mid-1944, the UK was first to operationally field the APDS projectile for use in their QF 6-pounder anti-tank gun.

However, these early APDSs had low sectional density and high aerodynamic drag, resulting in poor "carrying power" (meaning the round rapidly lost velocity and penetration over distance). As a means to eliminate these negative factors, the engineers designed a flowerpot-shaped outer sheath (sabot) that was immediately discarded upon leaving the bore.

Today, the front end of the pot (sabot) has 3 to 4 petals, depending on the bore diameter, that are covered with a bore-centering band (usually made from a sacrificial nylon derivative material). This design provides the high-density APDS core / projectile with unencumbered bore acceleration, high muzzle velocity and downrange carrying power while eliminating the consequences of high drag in flight.

EDITORIAL SPECIAL: AMMUNITION ADVANCES



EXACTO—.50-caliber command guided projectile can make course corrections in mid-flight. As part of a DARPA-funded project, Teledyne and Orbital ATK's Armament Systems Division developed this round and its guidance system.

DARPA

Newer medium-caliber APDS cores are constructed from a frangible high-density alloy. These projectiles are called Frangible Armor Piercing Discarding Sabot, or FAPDS, when employed as APDS types. When they're used as full-caliber projectiles they're called FRAP rounds (Frangible Armor Piercing) because during target penetration, the projectile's frangible core fragments into numerous high-velocity pieces. On a lightly armored target, the effect is akin to a high explosive incendiary round, but with the addition of a lethal cloud of dense high-velocity fragments penetrating deep into the target's interior—it's not survivable for those inside. When striking heavy armor, the FAPDS's effect is more akin to a standard APDS, only with higher fragmentation of the core and subsequently, higher lethality if the armor is penetrated.

material design composition to get an explosive-like physical effect upon impact with a hard armored surface. PELE's effectiveness derives from its design and material construction using the combination of two dissimilar density materials.

The projectile's outer body is constructed from high-density steel or tungsten material. The inner core consists of a low-density aluminum or plastic material. When the PELE projectile impacts a target, the high-density outer component penetrates the target material. However, the low-density inner component, which has a much lower penetration performance, is dramatically slowed upon target impact. This inertia-to-mass mismatch causes a tremendous instantaneous pressure build-up inside the projectile that easily reaches values in the region of gigabars and mimics the effects of a high-explosive-shaped charge against the target.

The result is the projectile disintegrates (explodes) into a large number of highly lethal, high-velocity fragments that will punch through nearly most material like light armor, block walls, frame, body armor, etc. Better, the number and size of the fragments is adjustable as a function of the projectile's physical dimensions and material construction. Even better,

the PELE effect is scalable to larger calibers and can be achieved by using non-exotic standard ammunition construction materials.

Reduced Range Cartridge

Nammo, headquartered in Raufoss, Norway, has developed and qualified a new .50-caliber, Reduced Range (RR) cartridge for training on smaller ranges where the normal 5-mile downrange danger area must be radically reduced. While not designed as a training round, it absolutely provides affordable training options never before available. The downrange safety template of the cartridge is the same as standard 7.62mm NATO rounds, so warfighters and law enforcement snipers can train with .50-caliber weapons at ranges previously approved for 7.62mm and below, or by carving up an existing .50-caliber range into several smaller sites. Some users are also interested in the RR cartridge for combat in urban operations where line-of-sight is limited, and there is high concern about collateral damage. The Nammo round has the same ballistics as NATO standard .50-caliber ammo to about 800m (875 yards), and accuracy has been demonstrated to be better than standard .50-caliber Ball/AP ammo within

Penetrator with Enhanced Lateral Effect (PELE)

In case you're not sufficiently mind-boggled by now, the FAPDS is also known as a Penetrator with Enhanced Lateral Effect (PELE). But PELE has some very subtle design modifications. It is fuzeless ammunition without any explosives that leverages its



PAUL EVANCOE

The 12-gauge shotgun offers the widest variety of conventional and exotic loads than any other firearm in existence. This picture depicts a sampling of a few.

this range. The Nammo .50-caliber Reduced Range ammunition is qualified in accordance with NATO specifications and already fielded by several countries for use in both machine guns and rifles. Visit nammo.com.

EXACTO—Command-Guided Ammunition

EXACTO (Extreme Accuracy Tasked Ordnance) is the research and development (R&D) program headed by DARPA (Defense Advanced Research Projects Agency) for round guidance technology, involving a combination of “fire and forget” technologies currently applied to guided .50-caliber rounds. EXACTO .50-caliber rounds can make course corrections in mid-flight. As part of a DARPA-funded project, Teledyne and Orbital ATK’s Armament Systems Division developed this round and its guidance system. While the program officially ended in 2017, the EXACTO program developed

new approaches and advanced capabilities to improve the range and accuracy of sniper systems beyond the current state of the art.

DARPA’s program manager, Jerome Dunn, described it like this: “EXACTO’s specially designed ammunition [employs] a real-time optical guidance system to track and direct the [.50-caliber] projectiles to their targets by compensating for weather, wind, target movement and other factors that can otherwise impede successful hits. True to DARPA’s mission, EXACTO demonstrated what was once thought impossible: the continuous guidance of a small-caliber bullet to target. Live-fire demonstration from a standard rifle showed that EXACTO is able to hit moving and evading targets with extreme accuracy at sniper ranges unachievable with traditional rounds. Fitting EXACTO’s guidance capabilities into a small .50-caliber size [round] is a major breakthrough and opens the door to what could be possible in future guided projectiles across all calibers.”

Exactly how they’ve achieved this quantum advancement in bullet guidance can only be imagined. It is believed they use a spin-stabilized projectile with internal and/or external aero-actuation control methods equipped with projectile guidance technologies, tamper proofing and macro-power supplies. The round’s guidance system consisting of advanced sighting, optical resolution and clarity technology components remains classified, as does the bullet’s guidance technology. It is likely that this program has been moved into DARPA’s “black” program side. Perhaps one day guided bullet technology will emerge and become available, but as of today that is only wishful thinking. For more information see darpa.gov.

12-Ga. Shotgun Special Purpose Ammo

The 12-gauge shotgun is perhaps the most versatile, most widely used gun for sporting purposes, home defense and law enforcement.

EDITORIAL SPECIAL: AMMUNITION ADVANCES

As such, 12-gauge shotgun ammunition offers the widest selection of loads available for any off-the-shelf gauge or caliber gun. Shot-filled shells are most commonly used for across-the-broad applications, but there are other far more exotic loads available designed for special purpose use. While most of these shells aren't cheap (\$5 dollars or more per round), they generally perform as advertised. Here are some examples.

Triple Threat Round. This home defense specialty shotgun round is available in a variety of different names. It's loaded in three layers consisting of a half-length slug, No. 8 birdshot and No.4 buckshot. Its effectiveness is limited by the range / distance / proximity to the target. The advantage a slug + birdshot + buckshot combo offers in a single shot is debatable, but the marketing concept sounds lethal.

Flechette Round. *Flechette* is a French word that means *little arrow*. Flechettes resemble miniature steel arrows. Like arrows, they have arrow-style points and stabilizing fins on the trailing end. The 1-inch long, 12-gauge versions are bundled inside the 12-gauge shot cup (wad) which acts as a sabot to carry the flechette bundle down the shotgun's bore, releasing them into ballistic flight as the shot cup strips off from aerodynamic drag. The flechettes continue downrange and pierce through (like a straw in an apple) nearly anything they encounter with the exception of hard armor, stone, steel, thick wood and bone. They can penetrate soft body armor with little effort, and they will completely pass through soft body tissue, leaving little visible surface damage. The maximum effective range is about 30 to 40 yards. U.S. Navy SEALs first used 12-gauge flechette rounds during the Vietnam War, but found later in the war that 00 buckshot had far more immediate stopping power.

Metal Piercing Discarding Sabot (MPDS). Much like a rifled slug used for hunting, this round uses a sabot-carried, 500-grain, heat-treated proprietary-alloy, heavy metal slug designed for metal penetration. The slug rides in a sabot and makes no direct contact with the bore. Leaving the muzzle-end at a velocity of around 1,700 ft/sec, the sabot is discarded as it is subjected to aerodynamic lift. The slug has a bottom heavy hourglass shape that helps stabilize its in-flight ballistic trajectory. This projectile will easily break an engine block or penetrate through both sides of a car and continue on. These 12-gauge rounds perform as advertised and should not be taken trivially.

.50-cal. BMG Shotgun. This 12-gauge round actually contains a .50 BMG / M17 Tracer round that is carried by two sabot sleeves to

maintain straight alignment throughout its travel down the bore. The incendiary tracer lights when the round is fired and burns about 3 to 4 seconds, offering about a 400m tracer burnout. It is inherently inaccurate because the .50-caliber round is not spin- or fin-stabilized. For example, at 400m a typical elevation hold of about 30 feet above the target is necessary. This round has little practical value other than its "nasty" unfired look.

Bolo Round. Like a hand-thrown bolo that whirls during flight to entangle its target, this 12-gauge shotgun round is constructed by using a short length of flexible steel wire to connect two lead slugs together. Coiled into a shot cup to carry it down the bore, the miniature bolo is released as the shot cup strips away as it leaves the muzzle. The bolo round then swirls its way downrange to mash and entwine a live target at ranges of 30 to 40 yards. The effectiveness of this round against dog-size animals and/or large goose-size birds is marginal. The round sounds interesting, but it's no substitute for a shot-carrying shell or a rifled slug that possesses unarguable effectiveness and reliability against a given target.

Dragon's Breath (Incendiary Round). Dragon's Breath is a unique type of 12-gauge incendiary round loaded with magnesium shards. When the round is fired, it resembles a huge torch of white-hot sparks and scorching flames that reaches out to about 100 feet. This searing hot flame only lasts a few seconds, but it will ignite anything flammable in its path—a human's clothing—or cause serious burns otherwise. While prohibited on all civilian ranges except for specifically designated government ranges, it must only be used outdoors with extreme caution and target discretion.

Flashbang Round. These rounds don't fire a projectile. Rather, they produce an intensely bright muzzle flash accompanied by an instantaneous 182dB report that will disorient anyone without ear protection. The gun must be pointed down and away from a human target to prevent severe injury. If fired in rapid volley from a semiauto-loading shotgun they can immobilize a hostile within close proximity. While it's hard to say whether they're actually effective in a tactical situation, these rounds do exactly what they're advertised to do; they cause an obnoxiously loud bang.

Rubber Bullet Rounds. These rounds are often used by law enforcement for riot control. They are used much like regular shotgun ammo except they must never be aimed at a person's face or chest. They're loaded with nothing more than rubber 00 buckshot as replacement for lead or steel shot. They are still lethal at close range and can easily knock

out an eye at 40 yards.

Beanbag Rounds. Used by law enforcement as a less-than-lethal solution, this round is many times loaded with small teabag-size cloth bags filled with bismuth powder. Bismuth is close to lead in mass (weight), but unlike lead it is non-toxic and eco-friendly. There are some beanbag rounds available that are loaded with lighter materials for specific less-than-lethal use at very close range. Stick with the heavy bags and aim for the legs and lower body.

What the Future Holds

Soldier-carried Directed Energy (Laser) Weapons are well within current technical grasp. Prototypes have been built and fielded for nearly 2 decades. Miniaturizing high-power-directed energy technology has not been the limiting factor for the adoption of such weapons for battlefield use. The limiting factors really only involve two issues: one technical and one political.

Lasers of sufficient power to damage material objects like vehicles and aircraft or burn holes in other soldiers consume large amounts of power. That requires a large portable power source that can be sustained. Reducing power-source size so it can easily be soldier-carried also reduces its capacity to recharge the laser(s) it powers. So power sustainability is a major showstopper when it comes to soldier-carried offensive laser systems.

A second show stopper are the Geneva Conventions and their follow-on addendums that dictate what can and can't be used to kill one's enemy. While it's acceptable to shoot holes in one's enemy, lasers are only acceptable when used for target designation but not to blind or burn holes into the enemy. As ridiculous as this might sound, it is a recognized measure in the Rules of War. This playbook will likely change as robotic warfighting systems (drones of all types) technically mature and are fielded against similar adversary systems, both terrestrially and celestially. They will surely rely upon some form of directed energy because killing robots with robots using directed energy isn't covered by any Convention.

Achieving an army of robotic combatants is still a decade or more in the future, but it is coming. Until then, and perhaps well into the next several decades, kinetic weapons consisting of bullet firing guns will remain the cost-effective mainstay for warfare, law enforcement and sporting purposes. As a result, ammunition will continue to evolve and so will the weapons that fire it. SADJ

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The Model 52 (also known as Vz. 52) self-loading rifle, calibre 7.62x45mm, is perceived by contemporary collectors and shooters as a successful counterpart of the Soviet SKS model with an original design.

THE TROUBLE

MORPHY AUCTIONS



A Complicated Story of the Czecho

By David Pazdera

Shortly before the end of WWII, Czechoslovakia pledged in the so-called “Košice Government Programme” to unify its armament with that of the Soviet Union. However, these plans went up in smoke soon after, due to the reluctance of the Soviets to provide information on their latest projects regarding infantry armaments.

When all options had been evaluated, a decision was made in Czechoslovakia at the end of 1946 to pursue its own path regarding ammunition for rifles and machine guns. Originally, two directions were considered: one of them was a variation on the Soviet 7.62x54R cartridge, but with the cartridge case having a groove replace the complicated rim of the case bottom, and the other

involved new ammunition “with lower ballistic performance.”

The other type of ammunition was designed by Ing. Alois Farlík (1900–1985) from Zbrojovka Brno, and it originally bore the designation of 7.62mm. Nevertheless, since there were several “7.62s” on the scene, the cartridge was renamed in 1947 to “7.5mm ostrý náboj” or “7.5mm

Nevertheless, at the time of its origin, the M52 rifle was a genuine nightmare for designers, production factories and Czechoslovak soldiers for several years.

EMAKER



Model 52 self-loading rifle from Uherský Brod, serial no. C38273. Such well-preserved pieces are of high value to collectors.

slovak Model 52 Self-Loading Rifle

live cartridge" (7.5x45mm, Z-47, Z-49). This cartridge, which could pride itself on its decent ballistic performance, became the basis for development of new self-loading rifles in 1947.

Potemkin Unification

Two state-owned companies took part in the rifle development: Česká zbrojovka in

Strakonice and Zbrojovka Brno. In Strakonice, the attention soon shifted to a model with the transfer of gas energy using a piston mechanism designed by Jan Kratochvíl (1912–2002), in cooperation with his younger brother Jaroslav (1915–1972).

The development was not hurried. In this respect it can be said that everything was going as usual till the Spring of 1950;

designing, testing and improving resulted in the following three most promising prototypes: the ZK 472 and ZJ 481 from Zbrojovka Brno and the ČZ 493 from Strakonice. Although none of them had shown optimum performance yet, all seemed to be slowly nearing a successful end. However, in the Spring of 1950, Alexej Čepička, the son-in-law of the Communist Party leader



CENTRAL MILITARY ARCHIVE PRAHA

The ceremonial handover of an M52 self-loading rifle to a new conscript in the Czechoslovak People's Army. These firearms were available in quantities enabling their use in propaganda materials in 1955.

Klement Gottwald, assumed the office of the Minister of National Defence and immediately launched a radical Sovietization of the Czechoslovak Army. The pledge for unification of armaments with the Soviet Army suddenly became something like a law.

Already in May 1950, all programs involving non-unified ammunition were halted with an immediate effect. Then, the Czechoslovak Ministry of National Defence (MND) attempted to acquire licences from the USSR for the manufacture of a bolt-action rifle, a self-loading rifle and a light machine gun calibre 7.62mm "of the latest type." Even though, in most other cases, the Soviets had been willing to accommodate such applications, in this case they strictly refused. The reason evidently was not just their lasting

secretive mania but also the huge troubles the Soviet arms industry was encountering during the production launch of a new generation of infantry weapons, especially the automatic AK rifle in calibre 7.62x39mm.

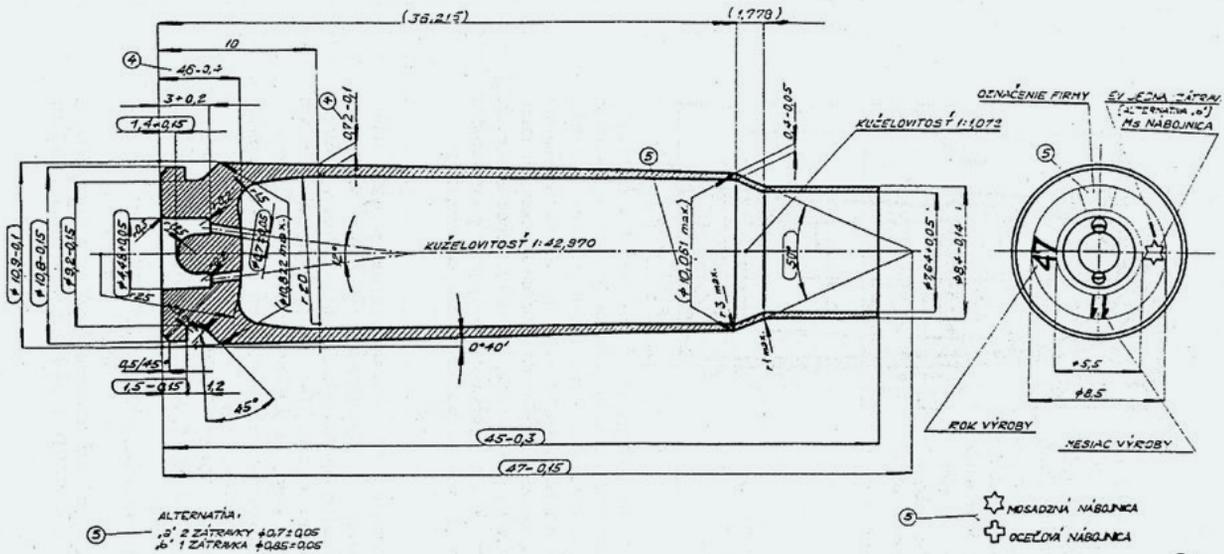
The new upper echelons of the Czechoslovak Army had clearly been expecting such development, because a reconstruction program of the 7.5mm cartridge and the corresponding firearms was parallelly released already in August 1950. The paradoxes of that time showed, in that the issues were being solved by means of minor changes. A document on the topic of the new Z-50, or the 7.62x45mm cartridge of the period, states: "When the decision to change to cal. 7.62mm had been adopted, the already solved 7.5mm cartridge was generally left without any

changes, just the diameter of the bullet and the cartridge case was [sic] modified."

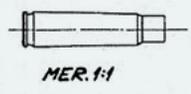
Into Armament with Overweight

In the autumn of 1950, the Army chose to further develop only the ČZ 493 model by Česká zbrojovka (CZ). The decision came as a surprise, given that the rifle's performance had so far been considerably fluctuating. Its biggest problems were in accuracy. On the other hand, the latest specimens of calibre 7.5mm had shown satisfactory reliability during testing.

The 7.62x45mm calibre prototypes were designated ČZ 502 and, to the significant disappointment of Česká zbrojovka and the Army, their parameters deteriorated considerably, especially the increase in weight.



ALTERNATÍVA:
 5' 2 ZÁTRAVKY $\pm 0.07 \pm 0.05$
 6' 1 ZÁTRAVKA $\pm 0.85 \pm 0.05$



ZMENA	4	5
PREDŤIHY	4.8-0.14	0.05-0.1
TERAZ	4.6-0.14	0.22-0.1
UPL. PODPIS	15.11.45.	12.4.47.

PREBERÁ SA CELKOVÝ TVAR A MIERY V RÁMEČKÁCH VÁHA NÁBOJNICE (7.5-0.2)

NÁBOJNICA		M52	
Opisovacia	Číslo výskvu	Súčiniteľ	Príloha
Model	5-1, 11	Druhový výskvu	Názov skúky
Konštrukcia	<i>[Signature]</i>	Technický výskvu	7.5 mm OSTRÝ NÁBOJ
Príloha	<i>[Signature]</i>	CV 3708	Príloha VTU I-2A1-3-41
Pracovná	<i>[Signature]</i>	CV 3718	Názov výskvu
Datum	14. 7. 47.	Harčovný výskvu	NÁBOJNICA
Považské strojárne, národný podnik, Pov. Bystrica.			CV 3752 - 5

Drawing of the cartridge case of the "7.5mm live cartridge," dated July 14, 1947.

It was due to the hectic pace of the calibre modification and to the necessity to implement additional requirements. (It was the Soviet advisers who recommended using a non-removable folding bayonet, as opposed to the previously used simple bayonet that could be inserted into the forearm.)

What troubled the designers most was the weight. According to the original assignment, the weight of the firearm with an empty magazine was expected to be 3kg, but in reality it was considerably higher. In the end, it was necessary to change the requirements, and, on March 20, 1952, the "7.62mm samonabíjací puška vz. 52," weighing 3.95kg without a magazine, was introduced. The same directive applied to the introduction of the "7.62mm krátký náboj vz. 52" with a bullet weight of 8.5g.

Two Manufacturers' Challenges

Two code marks can be found on M52 self-loading rifles: "aym" and "she." The first mark was reserved for Považské strojárne in Považská Bystrica in Slovakia, while the other code mark is still used on products for armed forces made by Česká zbrojovka, a.s., Uherský Brod, at that time Závody přesného strojírenství (ZPS).

According to the original plans, production of the M52 rifles was to take place

in Považská Bystrica only. The local factory was an ammunitions plant in the first place, but it prided itself with its half-forgotten tradition of producing Model 24 and K98k bolt-action rifles—and with its position far from the western border of Czechoslovakia. The MND and the Ministry of Interior Security requested a total of 372,000 M52 self-loading rifles, the delivery of which spanned from 1952 to 1955, and 40,000 firearms were to be supplied in the first year.

Coordination of production of infantry weapons was the task for the Ministry of General Engineering, which, to its disillusion, found that during the first half of 1952, the bet on Považské strojárne had been an unfortunate step. The Slovak factory lacked qualified and experienced personnel and struggled with long-term fatal lack of tools and measuring instruments. In July 1952, the Ministry decided to solve this situation by assigning a part of the M52 self-loading rifle's production to Závody přesného strojírenství in Uherský Brod (ZPS). To be able to accommodate the assignment, ZPS had to stop its preparations for production of the DŠKM (DShK M) anti-aircraft machine guns immediately.

During the first months of production preparation, ZPS experienced typical prob-

lems, such as procuring the material and forgings. Therefore, it was only during 1953 that ZPS gradually came to realize that the M52 self-loading rifle in its existing form was not ready for serial production. For these reasons, ZPS was able to supply the Army with only 360 rifles by the end of 1953, and instead of production they embarked on removing the identified design and technological flaws.

Hundreds of modifications were made in production drawings from 1953 to 1955. The shape of one of the smaller parts was changed completely. New operations appeared in the manufacturing process, the most obscure of which was welding the pressed-in and pinned locking insert into the receiver, otherwise it would be shifting rearwards during proofing. The incidental folding of the extended bayonet was corrected by means of a new bayonet key. At one time, the situation turned even more dramatic due to random occurrence of M52 cartridges with higher pressures, which destroyed the gun during firing and because of which isothermal hardening of the cartridge chamber had to be implemented. And, on top of it all, the planned performance started to be jeopardized by catastrophic shortage of high-quality walnut wood for stocks.



A factory cut-away of the M52 rifle from the collection of Wehrkundliche Sammlung Schloss Ebelsberg (Austria).

Birch wood, imported from USSR since 1955, was used instead of walnut wood. But the problem with the birch wood stocks was that they tended to swell in humid conditions, so much that it was not possible to remove the buttplate covering the openings with stored accessories. And so, another manufacturing modification was done—a so-called double-buttplate, consisting of a removable buttplate attached to another buttplate permanently mounted on the stock.

In the situation when this program represented up to 80% of production volume of ZPS, in 1954 the Army was only willing to accept 11,314 self-loading rifles, and this quantity had come from so-called selective assembling. There was a shortage of finances for the payment of salaries, not to mention bonuses, and the company was not able to pay sub-suppliers for their material and services. All of this had a harmful influence on the spirit of rank-and-file as well as management employees of ZPS, who started to long for the time when they would have finally completed the M52 rifle production.

Their wishes started to come true in 1955, when the Army accepted 48,435 self-loading rifles. However, the firearm was never rid of all its deficiencies. Its production was continuously accompanied by additional modifications, repairs, minor technological and design changes, not to mention the fact that the hit mark of the first shot showed a significant deviation from the mean point of impact.

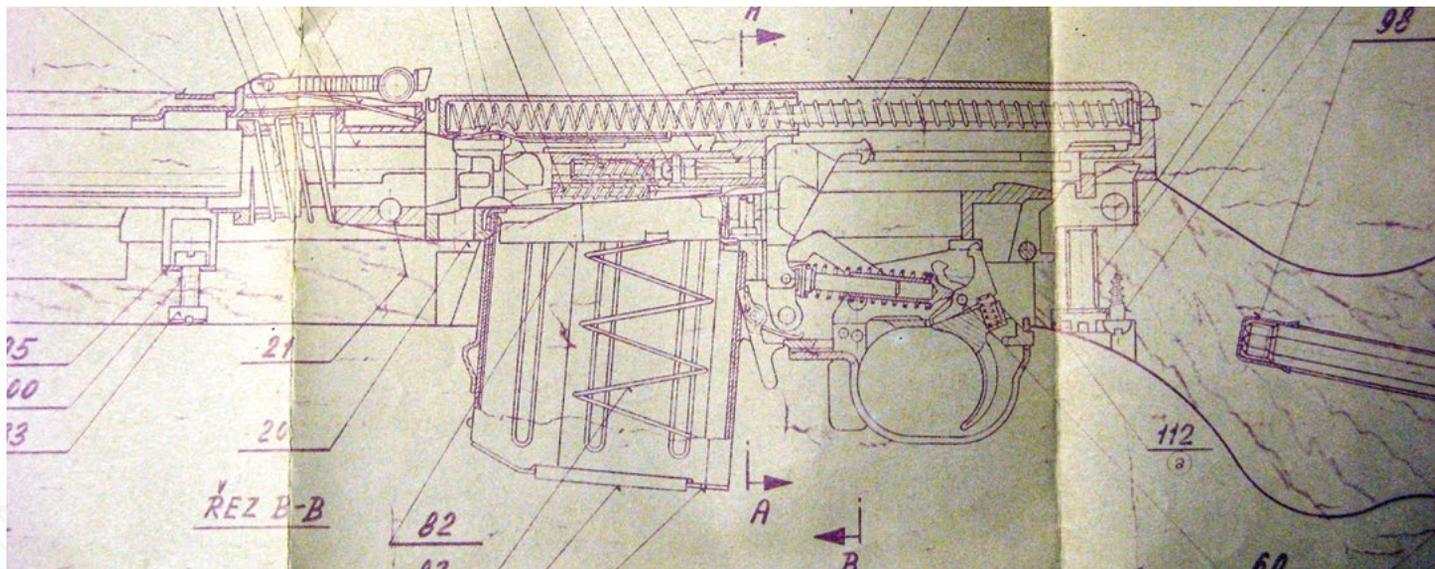
In 1956, the Army accepted a total of 58,318 pieces. With respect to ensur-



A detail of the rear sight and the marking of a piece from 1956. The M52 rifles can be easily dated, but sophisticated alphanumeric numbering was introduced for them, which prevented any estimates of production volumes. At the beginning of production, the arms factory in Uherský Brod (the "she" code) was assigned the initial letters of F, M, V, J, S, K, T, G, E and R, and after these letters had been used up, new letters were assigned. The numbering following the letter changed after each 10,000 unit in two rows: 30,001–40,000 and 60,001–70,000.

ing employment for the company, it was planned that this production program would be extended to 1958, when it would be replaced with the planned licence production of SKS carbines. This, however, was no longer true in the Spring of 1957,

when a decision had been reached on the introduction of the M52/57 self-loading rifle using a Model 43 (7.62x39mm) cartridge. Production of the M52 self-loading rifle at ZPS definitely ended in September 1957, and only symbolic quantities



A part of the assembly of the M52 self-loading rifle in a drawing from 1951. The firearm had the breech locked by means of a tilting breech block with two locking lugs in the front section, engaging with the insert in the receiver. Its automatics were controlled by pressure gases drawn from a bore in the circle ring of the ring piston; the impulse was transferred on the spring-loaded carrier of the breech by means of a pressed, metal plate piston rod.

were completed in the following three months. In 1957, 35,058 M52 self-loading rifles were manufactured in total.

The factory records show that 153,485 M52 rifles were manufactured in total in Uherský Brod from 1953 to 1957.

As far as production in Považská Bystrica is concerned, we are not yet able to map it in detail. It is assumed that it, too, continued till 1957 and that the quantities produced were considerably lower than those at ZPS. The information on the total number of 236,952 M52 rifles provided by the MND in 1958 can serve for the assumption that a little more than 80,000 of these firearms were manufactured in Slovakia.

Hard Lesson

If today's collectors and shooters consider M52 rifles to be robust, user-friendly and sufficiently accurate (with the exception of the inaccurate first shot), it is, above all, an appraisal addressing the countless workers in both manufacturing plants, but especially the one which is Česká zbrojovka today, the shoulders of which carried most of the burden. When looking back, it is obvious that the M52 self-loading rifle has brought the arms factory in Uherský Brod to the most critical situation in its entire history, without representing any significant stimulus for its technological development. On the other hand, the company has learned a valuable lesson on the unconditional necessity of the perfect design and technological preparedness of new products, which it soon made use of during the demanding production of a new generation of automatic firearms. SADJ



CENTRAL MILITARY ARCHIVE PRAHA

The M52 self-loading rifles were given ceremonial public presentation during the grandiose military parade at Letná, Praha, on May 9, 1955. Nevertheless, images of soldiers with the new firearms were not released for publishing, probably due to their still low numbers at military units.

SPECIFICATIONS

Calibre:	7.62x45mm (M52 cartridge or Z-50)
Overall length with folded bayonet:	1,005mm
Overall length with extended bayonet:	1,205mm
Barrel length:	525mm
Weight of unloaded firearm with empty magazine:	4.15kg
Double-column magazine capacity:	10 rounds

SHOW REPORT: MILIPOL PARIS 2019

Story & Photography by Jean Huon



The AlmaDK company comes from Kazakhstan and makes ammunition and tear gas grenades. AlmaDK offers a few non-lethal cartridges:

- 9x18 and 9x19, with 1 gram plastic or rubber bullet
- 5.45x39, 7.62x39 and 7.62x54R, with 1 gram plastic bullet or 2 grams rubber bullet

The Latest Innovations in Homeland Security

Milipol, the 21st Worldwide Exhibition on Internal Security, was held in Paris from November 19 to 22, 2019, at the Paris-Nord Villepinte Exhibition Centre

with more than 1,000 exhibitors coming from all over the world. Here are some of the highlights from the exhibition.



The Heckler & Koch (HK) tactical buttstock is a compact model for discreet target acquisition in riot-control situations which require a helmet with a protective screen.

It can be fitted on an HK UMP submachine gun, HK G36 rifle or HK169 grenade launcher.



Stoeger Industries, now in the Benelli/Beretta family, moved to Turkey. The **Stoeger STR-9** is a striker-fired pistol. It has a polymer frame with a square trigger guard and Picatinny rail. The aggressive slide serrations ensure a firm grip with or without gloves. The magazine holds 15 shots, and the magazine release is reversible. The grip can receive three interchangeable backstraps.



The **Taurus G2C Semiauto Pistol Series** is a small, lightweight pistol (22 ounces) with a polymer frame, thin profile and a ramped 3.2-inch barrel. The G2C 9 shoots the 9mm Luger cartridge and has a 12-round magazine. The G2C 40 shoots the .40 S&W cartridge and has a 10-round magazine.



Nobel Sport is a French company which manufactures various anti-riot grenade or loads:

- **Spartan LE 40 Shock** with rubber bullet (used by French police)
- **Spartan ALR PADMA** with a reduced energy round (used by the French Army)

No information was available about the initial velocity or the weight of its missile.

SHOW REPORT: MILIPOL PARIS 2019



ATA Arms is a Turkish company. It manufactures several sniper and riot guns, particularly the ATA1955 which is a magazine-fed shotgun organized like an assault rifle. The barrel is 47cm (18.5 inches) long, 12-gauge, with box magazines holding five or 10 rounds.

The Brazilian **Condor Non-Lethal Technologies** has a new non-lethal ammunition launcher equipped with a folding stock. Available in 37mm or 40mm calibre.





The Beretta ARX200 is the new combat rifle in 7.62mm NATO. It has fully ambidextrous controls (bolt catch lever, magazine release button, and fire selector) and is equipped with an interface for the Beretta GLX160 grenade launcher.

It can be used as a sniper rifle with a scope fitted on the Picatinny rail and is also designed for the Soldato Futuro program.



The FN SCAR is now available as a carbine with a short barrel, telescopic or folding stock. It can use 5.56x45mm or .300 AAC Blackout cartridges.

SHOW REPORT: MILIPOL PARIS 2019

FN PERMAX® EPR 5.56mm is an armour piercing bullet made of lathe-turned brass with a hardened steel core.

FN PROPASS® AP 5.56mm is an armour piercing bullet with tungsten carbide core with a lead filler and a steel jacket.

FN ARIA® .50 RR is a reduced range load organised like the old Pored French cartridge with a sharp shoulder on the bullet. Also available as a tracer.



FN PERMAX® EPR
5.56mm



FN PROPASS® AP
5.56mm



FN ARIA®
.50 RR



GLOCK 43X



GLOCK 48

GLOCK 43X and **GLOCK 48** are compact pistols with a square trigger guard and a front rail. The slide has rear and forward serrations, a slender profile and a new sight.



IWI ARAD, is an Israeli multicalibre assault rifle or carbine based on the M16 but with some important improvements. It is equipped with a Picatinny rail to allow the use of a variety of optics or other attachments. The rail is an integral part of the upper receiver. The telescopic buttstock is individually adjustable in length for particular purposes. Available in 5.56x45mm with an 11.5-inch or 14.5-inch barrel or in .300 AAC Blackout with a 9.5-inch barrel.



True Velocity located in Texas produces lightweight ammunition with cases made of plastic with a metal casehead. Various loads are available, from 5.56mm to 14.5mm. The cartridge is 30% lighter than those made with brass cases and is 100%

recyclable. On an A/MH-6 "Little Bird" helicopter, an ammunition payload of 6,000 of these 7.62mm rounds saves 124 pounds. Converted into additional fuel, it would increase the flight time by 39 minutes.



New training loads made by MEN in Germany with leadless bullet, which allow indoor shooting. Available in 5.56x45mm, 7.62x51mm and .300 AAC Blackout, it can be identified by the blue bullet tip.

The SIG SAUER MG 338 machine gun can be used on any NATO mount. It works with gas-operated action and weighs 40% less than the M240. The recoil is similar to the one of an M4 carbine. It is fitted with a folding stock and a carrying handle. It can be easily converted from 7.62mm NATO to .338 Norma Magnum. Range is 2,000m (2,200 yards).



SHOW REPORT: MILIPOL PARIS 2019



MILIPOL PARIS 2021: Show Master Info

Location

Paris-Nord Villepinte Exhibition Centre, Paris, France

Website

en.milipol.com

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Next Show

Milipol Paris 2021, October 19-22

Focus

Milipol Paris is the leading event dedicated to homeland security and safety. The event is organized under the auspices of the French Ministry of Interior in partnership with several governmental bodies. The show focuses on homeland security topics such as data protection-information and communication systems, economic and industrial intelligence, systems integration, risk analysis and management, CBRN, civil defence, law enforcement and forensic science services just to name a few.

Statistics

In 2019, the 4-day event welcomed 1,089 exhibitors, 31,185 visitors from 156 countries and 167 official delegations participated in Milipol Paris. 68% of exhibitors and 48% of visitors come from abroad.

Dress

Business "informal," meaning jacket and tie, or business casual depending on how you desire to present your company.

Hotel Hints

There are many hotels around the exhibition center. Consult travel

websites such as expedia.com and tripadvisor.com for suggestions.

Power & Plug Types

230v 50Hz cycle, 3-prong plugs; may use 220V-240V

Country Warnings

France is currently at Level 2: Exercise increased caution demonstrations in Paris and other major cities continue in France and are expected to continue in the coming weeks. Property damage, including looting and arson, in populated tourist areas has occurred with reckless disregard for public safety. There are currently travel restrictions due to the coronavirus, COVID-19. Consult the CDC before booking travel.

Cultural Hints

In French culture, it is very important to greet people properly. It's polite to say "bonjour" or "bonsoir" (good morning/good evening) when encountering someone, even if it's a stranger. People are generally expected to behave discreetly, although public displays of affection aren't uncommon. You're also expected to speak in quiet tones, particularly in restaurants.

Tipping

Tipping is unnecessary unless you feel you received excellent service; in this case, 10% is appropriate. Be aware that a 15% service charge is added automatically to your bill. Overtipping a server is considered to be somewhat vulgar and showy.

Getting Around

The best way to get around Paris is on foot and by metro. Paris is very large, so you should take the efficient metro to travel long distances. The Régie Autonome des Transports Parisiens or RATP system, which runs the metro, also offers several bus routes around the city. Those traveling to Paris by plane can arrive at Charles de Gaulle Airport (CDG), about 22 miles northeast of the city center, or Paris Orly Airport (ORY), about 11 miles south of the city.

Military Museums

The Musée de l'Armée (Army Museum) is a national military museum located at Les Invalides in the 7th arrondissement of Paris. The Musée de l'Armée was established in 1905 by merging the Artillery Museum and the Historical Army Museum. It contains 500,000 objects, including weapons, armour, artillery, uniforms, emblems and paintings. It houses Napoleon's tomb.

Tourism

There is no shortage of landmarks to visit in Paris. The Eiffel Tower, the Louvre Museum and the Arc de Triomphe along with the numerous cafes and restaurants should keep one busy.

NOTE: All information subject to change. Go to en.milipol.com for up-to-date information.

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Innovation



The MCR can feed from belts, drums and box magazines.

and Style

FightLite Industries' New Carbines

Story & Photography
by Oleg Volk





The MCR

When ARES Defense Systems first came up with the Shrike belt-fed AR-15 upper, the so-called Assault Weapons Ban was still in effect. Shrike took years to develop, but it filled big shoes: capable of box and belt feed, possessed of a quick-change barrel and compatible with registered select-fire lowers. It was the closest that most of Americans could come to a Squad Automatic Weapon (SAW) in private hands. Six generations later, the ARES Shrike upper is now the FightLite MCR. Unlike the long-delayed original, the MCR is available anytime you want one. Positioned as a SAW substitute, much like the Ultimax 100, the MCR has found military

adopters in Africa and Asia, in addition to being quite popular with U.S. shooters.

MCR is a closed-bolt design available with a wide variety of quick-change barrels, in 5.56mm and .300 Blackout in lengths from 12.5 inches to 20 inches. A barrel swap can be done in three seconds without an asbestos glove, thanks to insulated handles. The MCR feeds from M27 disintegrating link belts, same as an M249, but it also works reliably from STANAG box magazines. An adapter to hold soft- or hard-sized belt carriers fits into the mag well, permitting the use of 100 or 200 round belts on the move. A short-stroke gas piston with an adjustable regula-

tor allows both suppressed use without over-gassing and emergency hard use for high-volume firing in dirty environments.

Although the MCR is capable of considerable mechanical precision, it's not a match rifle due to the optic and iron sights placement on top of the feed tray cover. For shooters who want better than 2 MOA and don't require quite the volume of fire, FightLite now offers conventional AR uppers in 5.56mm and .300 Blackout. With the same high-grade barrel and excellent trigger, those carbines shoot MOA or better out of the box. In general, the high quality of manufacturing and well thought-out industrial design are the calling cards of FightLite.



The SCR

With so many states on the banning binge, FightLite also offers a "featureless" SCR carbine. Also available with a wide variety of barrel lengths and profiles, as well as with wooden, polymer and railed forends, the direct impingement SCR looks like a conventionally stocked hunting rifle. It uses all standard AR magazines. Unlike an AR, SCR car-

bines use an angled recoil spring guide outwardly reminiscent of Benelli action. Accurate and soft-recoiling, the SCR also went through several generations of refinements, ending up with an excellent trigger and stellar ergonomics. Far from merely being a legal AR-15 substitute for restrictive jurisdictions, the SCR has certain advantages: With the grip being in

line with the bore line, it points more naturally than the pistol grip designs. The SCR is also available as a handgun, putting a 7.25-inch barrel into the form of an 18th century dragoon pistol—it looks odd but balances well and makes for very natural pointing. FightLite offers low-profile iron sights just for the 5.56mm/.300 pistol configuration.



A conventional AR upper on an MCR lower.



The SCR looks classic and shares much in common with an AR-15.



The MXR

With surplus rifle ammunition drying up, and more and more people dependent on indoor ranges with pistol-rated backstops, the pistol-caliber carbines have gained popularity. The FightLite MXR system can be configured as a pistol, as a carbine

or as a submachine gun. Using a modular barrel retention system, the MXR allows changing barrel lengths and calibers without tools. Going from 9mm to .45ACP to 10mm to 5.7x28mm takes only a few minutes. Blowback operation with varying weight buffers and some

bolt overtravel makes for low recoil and smooth action. The MXR has right-handed ejection only, but the reciprocating charging handle is easily reversed. The fire control group is AR-15 style, and magazines, other than 5.7x28mm, are GLOCK-compatible.



The MXR barrel, one of many lengths and calibers available.

Sound Design

All this wide variety of guns comes from the mind of Geoffrey Herring. I've asked many technical questions, always getting detailed and logical explanations for why certain features have been added or omitted, or why specific approaches to engineering were employed. The design work and much

of the manufacturing are done in-house at the Melbourne, Florida, plant. Given Geoffrey's background in aviation, a field where small errors can have drastic consequences, it's no surprise that the QC and testing practices are impressively thorough. Those, along with the sound conceptual basics, explain

why the FightLite firearms I've used at high-volume range events have all worked consistently and reliably, with excellent accuracy. Incremental development and close attention to detail have really set FightLite apart from the manufacturers of old public domain AR design. **SADJ**



Scoped MXR carbine with 16-inch barrel maximizes the pistol cartridge reach.

An MCR feed tray cover with the attached Trijicon ACOG 3.5x35 scope.



SCR bolt, carrier and recoil system extension.

SHOW REPORT: SHRIVENHAM 2019

Story & Photography by Richard D. Jones



Rheinmetall Canada demonstrated its Mission Master Unmanned Ground Vehicle to an interested audience at the Range Day.

Close Combat Symposium

The 2019 Close Combat Symposium (CCS) was held at the Defence Academy of the United Kingdom (UK) over July 9 to 11, 2019. Historically, it has its origins in the Small Arms and Cannon Symposium held for many years at the same venue.

The themes of the symposium this year were to “consider trends and developments in small arms, dismounted weapon systems, ammunition, sensors, optics and protective clothing and equipment. The revised theme of 21st Century Infantry also seeks to examine additional opportunities for capability enhancements in the near-term, some of which will require new development.”

The 3-day symposia has an established format and opened for on-site registration at 0900 hours on the first day, followed by a full day of pre-

sentations. On the second day, delegates were able to attend a manufacturers’ outdoor range day, where the opportunity to fire a number of different small arms types and view associated supporting equipment was provided. The final day’s presentations at the Defence Academy location concluded in late afternoon.

The lecture program consisted of short presentations on various aspects of mounted and dismounted close combat together with infantry weapons and ammunition, which provided wide-ranging coverage of a diverse subject matter area to cater to the varied interests of those attending. Over the 3 days, the program offered 19 formal presentations which included panel discussions after each segment and covered the following areas.



Day One

The first day's presentations included:

- **Keynote: The (UK) Close Combat Plan**—British Army HQ
- **The Future Threat**—Defence Intelligence—MoD
- **Land Littoral Manoeuvre and Future Commando Force**—UK Navy HQ
- **Transformation Fund—21st Century Infantry**—British Army HQ (Unmanned Aerial Systems, Platoon Robotic Vehicles, Less-than-Lethal)
- **Engaging with Defence Equipment & Support (DE&S)**—UK MoD (Soldier Systems, Innovation & Experimentation)
- **ForceDevelopment—Experimentation Opportunities**—British Army
- **Unmanned Ground Vehicles: A Strong Ally for Dismounted Soldiers**—Rheinmetall Canada
- **Development in Small Arms**—Dan Shea, Phoenix Defence and Editor-in-Chief *Small Arms Defense Journal*



Ultimate Training Munitions (UTM) booth in the Exhibition Hall; attendees were also able to fire a variety of small arms using the UTM product on the outdoor Range Day.

Day Two

Systems Engineering & Assessment Ltd

The Range Day was again held at the Cranfield Ordnance Test and Evaluation Centre (COTEC), West Lavington, on the northwestern edge of the UK MoD, Salisbury Plain artillery and field-firing range. The Range Day this year, which provided attendees the opportunity to view and fire selected infantry small arms, also included a demonstration by Rheinmetall Defence of their Mission Master Unmanned Ground Vehicle (UMV).

Demonstrations of equipment and opportunities to live-fire weapons were provided by:

- **Beechwood Equipment Ltd**
- **FN Herstal (UK)** (Range Day Sponsor)
- **Brolis Photonics Solutions Ltd**
- **Instro Precision Ltd**
- **Qioptiq**
- **NHMD Ltd.**
- **Viking Arms** (Defence)
- **Infantry Trials and Development Unit (ITDU) & Amvision-FCS13**
- **Rheinmetall Defence**
- **Ultimate Training Munitions (UTM)**

Breakfast on arrival and a BBQ lunch were provided for all attending. The Range Day was followed that evening by the now traditional formal dinner held at the Swindon STEAM Museum of the Great Western Railway. Pre-dinner drinks provided the opportunity for informal networking, the dinner itself being held within the precincts of the museum with musical entertainment during dinner being provided by a local brass ensemble.

SHOW REPORT: SHRIVENHAM 2019



FN Herstal (UK), Range Day sponsor's firing point on the COTEC range.



Breech Tool displayed its product range of specialist small arms cleaning accessories for the first time.



The Exhibition Hall during coffee break, provided excellent opportunities for attendees to network.



The unblinking stare of Isambard Kingdom Brunel again awaited attendees arriving at the STEAM Museum for the formal evening dinner.

Day Three

The presentations covered on the third day included:

- **Precision Versus Rate**—Cranfield Defence and Security
- **Enhancing Dismounted Combatants Lethality Through Fire Control and Training Systems**—FN Herstal (UK)
- **Fighting in the Street—CR2 Streetfighter**—Ultra Electronics/Royal Tank Regiment
- **How to Ensure and Maintain Fightability on Close Combat Operations with an Increasingly Technology-Driven Soldier System**—Systems Engineering & Assessment (SEA) Ltd
- **Reducing the Error Budget**—Infantry Trials and Development Unit (ITDU)/Riflcrafft
- **National Armed Policing Group**—Civil Nuclear Constabulary
- **When Computers Do the Wrong Thing**—Captain W. Shepherd (Ret'd)—USN
- **How to Overcome the Problems of Delivering Safe and Reliable Training in Close Quarter Combat (CQB)**—Ultimate Training Munitions (UTM)
- **Soldier System Integration**—Tommy Works—British Army
- **Connecting the Dismounted Soldier**—Glenair
- **UAV Enhanced Digital Networked Mortar Fire Control Systems**—KWESST North America (Canada) SADJ

SHRIVENHAM 2020: Show Master Info

Location

Shrivenham, Oxfordshire, United Kingdom
The Defence Academy of the United Kingdom, Cranfield University, Shrivenham, UK is situated to the west of London off the M4 motorway and easily accessible from the main London airports. The nearest large town to Shrivenham for reference purposes is Swindon. Note: In recent years, the immediate area of and access to the Defence Academy has been via the "Watchfield" entrance off the A420 main road.

Website

symposiaatshrivenham.com

Contact

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For symposium details and administration:
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Next Show

Close Combat Symposium, October 20-22, 2020, Shrivenham, UK

Focus of Show

This year's Symposium focused on current UK Infantry-mounted and -dismounted close combat developments and future capabilities and intentions, with opening presentations being delivered by leading members of the UK close combat community. Other presentations focused on infantry weapons, training and support to the UK civil community, supporting the Symposium's historical Small Arms and Cannon theme.

A concurrent trade show is also held in the adjacent indoor hall that is comfortable for attendees to mix with the vendors. Numerous vendor booths covering broad subject matters related to the themes of the Symposium were available for attendees to meet and talk with industry during coffee and lunch breaks.

Statistics

Overall, more than 140 delegates from the UK and the international community took part in the symposia over the 3 days, making this Symposium, again it is believed, the largest of its type in Western Europe.

Dress

Business "informal," meaning jacket and tie, or business casual depending on how you desire to present your company. Military are in duty attire. For the formal dinner, now traditionally held within the confines of the STEAM Museum of the Great Western Railway, dress base line for men is a dark suit with tie, ladies' comfortable evening wear (no jeans or tee-shirts in either case). Symposium staff is on hand to help with your concerns on this.

Hotel Hints

Local hotels are listed with the Symposium information package. Most vendors choose hotels in Swindon or out on the M4 motorway area. There is UK military billeting for those who are eligible.

Power & Plug Types

220v 50 cycle, British 3-prong plugs

Country Warnings

The Swindon/Shrivenham areas are largely rural with the historic city of Oxford located to the north. The only warnings would be in certain parts of London or other major cities. The Symposium is in a rural area that is very safe. There are currently travel restrictions due to the coronavirus, COVID-19. Consult the CDC before booking travel.

Cultural Hints

The British are generally very polite, with the exceptions perhaps of rush-hour travel in London and other major cities.

Tipping

10% is generally fine in restaurants, less to a taxi. Taxis are either meter fare or pre-booked at an agreed price.

Getting Around

Rental cars will have UK-style right-hand steering, and driving is on the left side of the road. Unless you know how to drive with a left-hand shift, order an automatic. We advise finding the first parking lot in sight after getting your rental car and learning the reverse geometry if you are a European or U.S. driver. Road roundabouts are common and do not pose a problem; always give way to the right, unless the road markings (rarely) advise otherwise. Trains are reliable; however, ticket purchases made on the day of travel can be extortionately expensive, pre-booking is strongly advised. A good guide for the latter is at nationalrail.co.uk. Bus travel is both simple and inexpensive. If driving, the show is within reasonable distance of Heathrow International Airport; travel due west on the M4 motorway to the Swindon exit and look for local directions to Shrivenham. For rail travel from Heathrow or Gatwick International Airports take a direct train service to Swindon.

Military Museums to See

The Defence Academy Small Arms teaching collection may be visited by qualified visitors. Inquire with the promoters. In London, the Imperial War Museum in Lambeth and the National Army Museum in Chelsea are worth a visit. To the south of Swindon on the south coast is the Royal Armouries, Fort Nelson Artillery Museum situated in an old Victorian fort (built during the Napoleonic Invasion fears in the 19th century) and overlooking the historic Portsmouth Naval Base. Also within the Portsmouth Naval Base area are the Explosion Museum of Naval Firepower and the Royal Navy Submarine Museum. Further afield is the National Firearms Centre (the former MOD Pattern Room collection of small arms and light infantry weapons) at the Royal Armouries main site located in the northwest of England at Leeds. Admittance to the former is strictly by prior appointment only; although the museum itself is open to the general public.

Tourism

Shrivenham is located within reasonable driving distances of the university town of Oxford, the Neolithic monument at Stonehenge and Shakespeare's home town of Stratford-upon-Avon. Try the following websites if planning a pre- or post-Symposium cultural visit: visitbritain.com or visitolondon.com.

NOTE: All information subject to change. Go to www.symposiaatshrivenham.com for up-to-date information.



Maxim Defense's PDX Pistol in .300 BLK.



TUMBLE UPON IMPACT

By Jay Bell

Maxim Defense's Optimized SBR Defensive Ammo

The term "Next Generation" can mean a lot of things. I recently wrote an article on U.S. Army Next Generation 40mm Day/Night Thermal training ammunition technology. The results are still "to be determined." I took a hard look at some Next Generation weapons and ammunition in this article. What happens when Next Generation

weapons and ammo collide?

Maxim Defense continues to impress with its Next Generation focus and out-of-the-box thinking. Maxim Defense's short-barreled rifle (SBR) designs are impressive and enthralling enough to be selected by SOCOM for further evaluations. Its success with the U.S. government has carried over to the commercial market with personal defense weapons (PDWs). Commercially, the weapons also have gained a following in the personal defensive arena and in the concealed weapon subcategory of untold possibilities.

I first got my hands on one of these weapons at the 2019 Special Operations Forces Industry Conference (SOFIC). Ammunition and guns are in surprisingly short supply at SOFIC, as the focus is much more on electronics. I was drawn like a moth to the flame.

The weapons are as visually impressive as they are physically stout and well-engineered. The construction is remarkable; some AR platform weapons feel flimsy. The Maxim rifles remind me of HK weapons. The 18.75-inch weapon overall length is impressive, and the punch packed by these weapons blows pistols out of the water. The 5.5-inch barrel length is also amazing. If you add in the massive increase in accuracy over a pistol and the potential magazine capacity, I imagine that many private security forces are in line to grab these SBRs and re-arm their teams.

What About the Ammo?

Defensive pistol ammunition is numerous and widespread. Defensive rifle ammunition, not so much. All the major ammunition producers have versions of defensive pistol ammunition, and the number of niche producers is also a mile long. Many designs go beyond the typical hollow-point designs. There have been more niche designs going back over the last 40-plus years than I can remember. Who remembers the big left-wing hysteria concerning the Black Talon bullets back in the early 1990s? More recently, G2 Research Ammunitions' fragmenting solid bullets were a big item and huge YouTube sensation. Maxim Defense knew that the weapons needed special rifle ammunition to pair with these very special rifles. The company could have gone with one of the usual suspect bullets in rifle calibers. Instead, Maxim went a whole new direction. In retrospect, it seems only logical that a Next Generation defensive rifle

would have its personalized Next Generation defensive ammunition.

Maxim has a truly innovative rifle ammunition product that works superbly in these SBRs. Specialized weapons need specialized ammunition to fully capitalize on the performance limitations of lower velocities with short barrels. The Maxim Defense team saw that if customers did not use the proper ammunition, the effectiveness of the weapons would be massively

diminished. To complete Maxim's total weapon system, the ammunition needed to be the Next Generation to maximize the performance needs exactly specified and to be available to the customers. There are some potential solutions in the marketplace; however, consistent access to the customer is always difficult with niche products. Just as high-performance engines will barely work on low-octane gas, these SBRs need high octane ammo, and Maxim took



charge of the situation.

TUI® Projectiles

Fort Scott Munitions™ (FSM®) and Maxim Defense worked together on a 6.5CM project for the U.S. government. Upon starting this relationship, Maxim Defense approached FSM to build and optimize a full-ammo solution for the SBR in critically short-barrel lengths for the PDX and MDX Weapon Lines. Six separate ammo variants were designed and opti-

mized; FSM is Maxim Defense's Original Equipment Manufacturer (OEM).

It was not enough to just take one of the top defensive rifle bullets and load it. Maxim Defense knew that the FSM had developed something special with their Tumble Upon Impact™ (TUI®) projectiles. The TUI projectiles are patented Next Generation technology, just like the Maxim rifles. These TUI projectiles increase the effectiveness of Maxim's weapon system

and accomplish impressive terminal ballistic cavities without substantial fragmentation all the way down to minimal velocities and/or until they become unstable.

The impressive part of the TUI projectiles is that they have a solid tip without any flutes/grooves/slots or other special effects that might impede the successful feeding, firing and cycling out of the weapon. These will hold up and function in extreme environments. They surpass the criteria of both expanding and fragmenting projectiles in ballistic gel. These designs and features are only more critical in rifle calibers. Maxim has successfully achieved a winning combination of weapon and ammunition.

These solid copper projectiles appear to maintain extremely high percentages of their initial weight in the pistol ammunition. Many tests indicate 100% retention through ballistic gels. This ensures greater energy transfer, consistency in performance and devastating wound channels. Monolithic solids are great for not having a jacket to separate from the core, which is also very important in close-combat situations where the fragments can be a hazard to the shooter. The projectile stays together in one piece, causes significant damage and gives more knockdown power. The testing for the rifle ammunition appears to have very similar results to the pistol ammunition.

The short barrel ammunition comes in three calibers and six total varieties:

Caliber	Projectile Weight (gr)
5.56 NATO	55
5.56 NATO	62
5.56 NATO	70
7.62x39	117
.300 Blackout Supersonic	115
.300 Blackout Subsonic	190

The projectiles being made out of 100% copper also add a nice element of being lead-free. This is ideal for the close-combat training scenarios in which this product will be used. This also opens up use in lead-restricted ranges and states around the country. All the ammo is Match Grade.

After some R&D, FSM recalled the old 5.56mm M855 round that sometimes accidentally tumbled or keyholed. This failure was a huge problem for the M855. How-

TUI® in 5.56 NATO.



ever, a tumbling defensive bullet could offer some impressive performance if done right. What if they could make this happen on purpose and with 100% consistency? This would make for some very effective defensive ammunition. They started working on the concept and came up with two patents.

Considerations

Some elements must be considered: First, it is not a traditional FMJ, and it only tumbles on water-based solutions (i.e., water jugs, ballistic gelatin). If it is fired into a wood 2x4, metal, drywall or vehicle windshield, it will not tumble—period. However, for their key customer and the defen-

sive ammo market, these were acceptable parameters.

The energy released because of the tumble is impressive. This is because of multiple elements. First, the bullets have 100% weight retention. With no loss of mass from fragments shedding, the energy is retained. Second, in ballistic gelatin, the projectile will tumble and then briefly stabilize and stay on its trajectory. Then, it will start to tumble for a bit and then track straight again. FSM noted, “Typically, the projectile will get two to three ‘tumble then brief stabilization’ cycles in a 6x6x16-inch-long ballistic gelatin block.” Impressive.

TUI comes in two different materials. The first is solid brass, and the second is cop-

per. The brass version is called “solid brass spun” or SBS. The copper version is similarly “solid copper spun” or SCS. FSM also has a full line of brass projectiles in pistol calibers (.45, 9mm, .40 S&W, 10mm, .380, .357 SIG) that are only LE/military.

The product is well-designed and versatile. It is not a one-trick pony. Ultimate versatility is an objective FSM strived to achieve with the TUI ammunition. They believe the TUI ammo is a great military or law enforcement round. It checks all the boxes: it goes through the barrier, has great accuracy and has an excellent performance in ballistic gel. However, with the same ammunition, you can also go hunting for coyote and even buffalo. Better yet, it has great long-range



utility. An FSM employee recently used his 6.5 Creedmoor, 123-grain, TUI factory-boxed ammunition to take a deer at 100 yards (and dropped him cold), and the same round is capable of a distance of 1.39 miles (2,446.4 yards) to hit a 30-inch target twice on a string of 10 with a factory Ruger Precision Rifle (see **YouTube** video at [youtube.com/watch?v=7x-18QKxQpRM](https://www.youtube.com/watch?v=7x-18QKxQpRM)). Yes, the TUI projectile is still stable out at that distance, despite tumbling in ballistic gelatin. TUI is the complete package—self-defense, hunting and long-range performance.

A key aspect of the ammunition is that there is no mechanical feature to rely on, nothing to fail. So many of the other high-performance bullets are counting on

the consistency of the tooling and keeping a close eye on tooling wear and performance. Of course, this means that the bullets made on fresh tooling are going to perform slightly differently than the last rounds before a tool change. I am aware that some of these performance bullets could require tool change in as little as 5,000 to 10,000 rounds manufactured. This all happens on a multi-station transfer press that is running at 60 parts per minute—no small task.

I queried on what feature of the bullet and the bullet design is critical. The answer is not just one thing. It is everything—the tip, the ogive and the boat tail. It can take strenuous testing and a lot of time to develop a single round. It took 1 year to develop the

.300 Blackout 190 subsonic. It is one of the few truly subsonic rounds at +/- 950 to 960 fps. It will also function without a suppressor on the Maxim Defense SBR weapons.

Superior Weapon System

Maxim Defense produces high-quality firearms that enhance their ammo and make it perform well. The quality of FSM's ammo and the weapons mesh so well, they result in an overall superior weapon system. I suspect that both Maxim Defense and Fort Scott Munitions are going to be long-term players in the market.

So, what happens when Next Generation weapons and ammo collide? Nothing short of awesome. **SADJ**

Maxim Defense's PDX and MDX Weapon Lines and FSM's TUI® ammo.



SHOW REPORT: MILITALIA 2019

Story & Photography by Lawrence E. Heiskell, M.D.



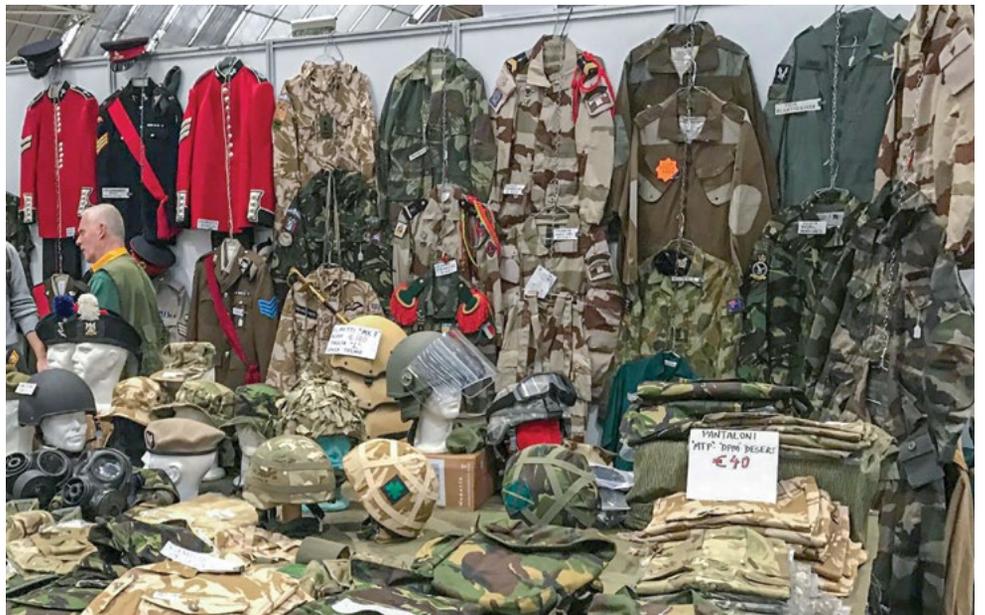
Decima Flotilla MAS display with Beretta WWII submachine guns.

Italy's Show of Shows

Located in Milan, Italy, and held twice a year in May and November is the terrific Militalia show. The event is held at the Novegro Exhibition Park near the Milan International Airport.

Militalia first opened in 1986, as part of the Exhibition Hobby Model Expo. Since that time, Militalia has evolved into a fabulous 2-day show with events, demonstrations, association meetings and a very large array of military collectibles for all enthusiasts of military collecting.

Of special interest to me personally at the show was the Association of the Decima Flotiglia MAS (10th Assault Vehicle Flotilla). This WWII Italian Commando Frogman Unit was formed in 1939 and were the world's first Frogmen. Their tactics and methods were later copied by the British Royal Navy and the United States Navy. Their WWII exploits and daring missions are legendary. The show has a large meeting area with lots of reading material and association members and historians who



Huge selection of European military uniforms.

speak English, happy to answer questions and provide historical information.

In addition, there are many historical groups dressed in period costumes and uniforms with static displays of vintage military vehicles and representatives from historical and military museums in Italy and Europe.

One can find a diverse selection of military medals, swords, bayonets, ceremonial daggers, postcards, badges, books, headgear, uniforms and weapons accoutrements. There was a large selection of German, American and British field gear. I found interesting WWII photographs and especially WWII Italian uniforms, helmets and field gear that are rarely seen or found at shows here in the United States.

The U.S. collecting market as you well know is now flooded with reproductions, as many field gear items and uniforms have simply dried up and disappeared into collections; however, the Militalia show had an abundance of original WWII field gear, helmets and uniforms.

There were many deactivated weapons for sale including WWII rifles and pistols as well as German MP40s, Italian Beretta PM38s, PM42s, Russian PPsh-41s, British STEN Guns, German MG34s and MG42s and many others. Several dealers had a huge selection of deactivated ordnance, grenades, rockets and mines. I am not sure how you could bring these back to the United States with TSA rifling through your luggage at the airport. **(EDITOR'S NOTE: Get an approved Form 6 to import!)**

As a WWII collector I found an abundance of interesting rare items not often found at shows in the U.S. as well as hard-to-find firearms magazines, bayonets, slings and accoutrements at very reasonable prices. I even found some rare 1921 Colt Thompson magazines and a scarce original rigger-modified WWII paratrooper 1910 entrenching tool in nice condition.

I often wondered why the WWII D-Day paratrooper 1910 entrenching tool was so difficult to find in the United States; if you find one, it is more often than not a "fake," having been modified in recent years and passed on to unknowing collectors as an original.

The reason I found one was simple after speaking with several experienced advanced collectors at the show. They were rigger-modified in England prior to the Invasion of Normandy, and almost all of them were used by paratroopers of the 101st and 82nd Divisions on D-Day. So if you want an original, your best bet is to continue your search in Europe, not in the United States.

In the outdoor area there are opportunities



A table with a nice selection of magazines and edged weapons.



Vendor with WWII American helmets and uniforms.

SHOW REPORT: MILITALIA 2019



Show attendees in costume.



Vendor with medals and badges.



Stall with medals, badges and small items.



Show case with headgear, edged weapons and interesting items.

for the public to see and experience historical representations of military scenarios of various eras. What continues to make Militalia a unique opportunity is a tradition for those who like to identify themselves in a direct and emotionally engaging way with some of the most important events in history.

The show is increasingly taking on the character of a testimony of Italian national history. Speaking with some Italian attendees at the show, they told me that the political position of those who attended the show in the past

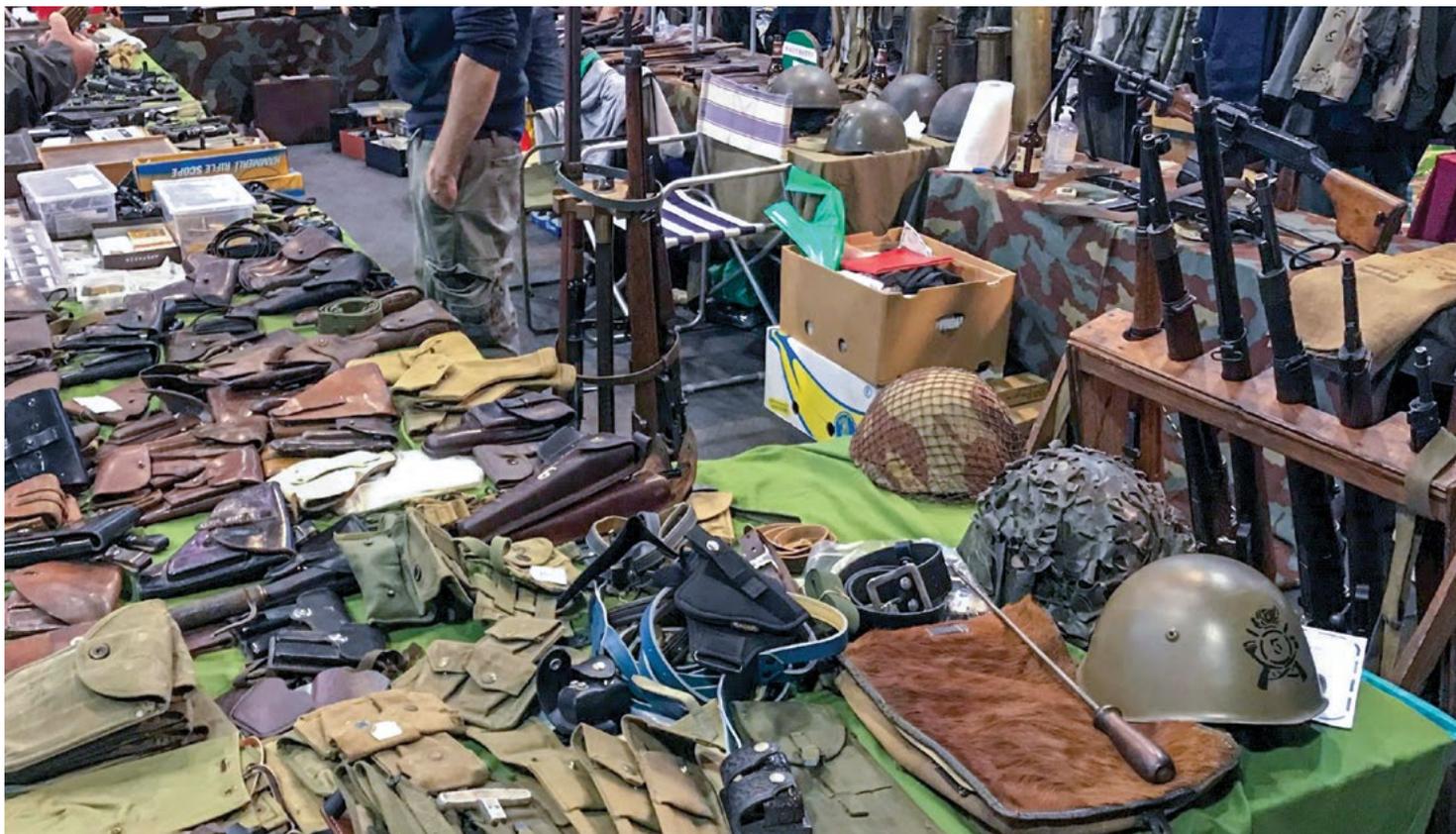
was to some degree with embarrassment and concern over the risk of being accused of being "militarists" or worse yet "rehabilitators" of the fascist period of government.

However, the attitude has changed in Italy, and as the WWII generation is about to pass, many want to honor the surviving fighters and the memories of their often dramatic experiences. This does not exclude but rather extends the involvement of historical artifacts and memories of an entire generation in a way that the "militarism" of today constitutes a set

of values, regardless of their identification in the becoming of peoples and nations.

I attended the show with Italian friends from years ago while teaching courses in Italy. The food and wine were outstanding; however, the reunion of old friends was the best!

This was my first attendance at Militalia, and although not quite the size of the well-known "Show of Shows" in Louisville, Kentucky, it is certainly a contender. The next show is tentatively scheduled for May 9-10, 2020. **SADJ**



MILITALIA 2020: Show Master Info

Location

Parco Esposizioni Novegro
20090 Segrate MI
Milan, Italy

Website

militalianovegro.com

Contact

+39 02 7020 0022

Tentative Next Shows

May 9-10, 2020
November 2-3, 2020

Focus

Exhibitors come from sectors related to Armed Forces and state bodies, museums and historical military, weapon and veterans' associations, industry associations and archaeological, historical groups in costume, static models and war games, armories and survival, specialized publications and shows and concerts with a focus on security and defense.

Dress

For civilian attendees, formal business dress is recommended. Military personnel should be in duty uniform.

Hotels

Visit hotel websites for recommendations.

Country Warnings

Due to the Coronavirus, COVID-19, travel restrictions are currently in place. Check the show website to keep up-to-date.

Cultural Hints

Appearance is very important in Italian social etiquette and you should be aware that you will most likely be judged first and foremost on this. When meeting and leaving, Italians (whether friends or strangers) wish each other "good day" or "good evening." Where there is an existing relationship, Italians greet each other with a kiss on both cheeks (left cheek first). Punctuality is expected in Italy, and it's customary to shake hands when meeting someone for the first time. It's advisable that smart business suits are worn by both men and women.

Tipping

Tipping is not required in Italy unless you feel you received exceptional service. A VAT is already included in prices.

Currency Type

The Euro is the currency. The currency code for dollars is EUR, and the currency symbol is €. For current exchange rates, please visit: xe.com.

Getting Around

The bus lines are very efficient. The metro train system offers four color-coded main lines for 2 euros, and tram and bus connections fill in where they leave off. You may also bike or walk through the city. Many streets have restricted access, and parking is difficult to find, so it is best to avoid renting a car.

Things to See

There are many places and things to see in Milan. Visit the Duomo, vineyards, museums, hop-on hop-off bus tours, Sforza Castle, the Scala Theater, Piazza dei Mercanti and even view "The Last Supper," Leonardo da Vinci's masterpiece.

Tourism

Visit italia.it/en/home.html.

NOTE: All information subject to change. Go to militalianovegro.com for up-to-date information.

Ordnance Oddities

Late Vietnam War

By Robert Bruce

In the course of decades of research in various military and museum archives, Robert Bruce has acquired a treasure trove of photos of what might be considered “odd and unusual weapons.” Here is another follow-on to earlier oddities that have appeared in previous **SADJ** issues.

In this edition, we’ll take a look at some interesting developments as the massive might of the combined U.S. Armed Forces was brought to bear in Southeast Asia, not only against elusive Viet Cong guerrillas, but increasingly in pitched battles against well-trained and -equipped regulars of the North Vietnamese Army and their Communists Chinese and Russian “advisers.”

Now, with apologies for some of these rough-looking images—presented as they were found—let’s look at some very unusual weaponry from America’s quickly escalating involvement in South Vietnam’s fight against Communist guerrillas, backed by North Vietnam and China.



People Sniffer

January 31, 1967, An Khe, RVN (Republic of Vietnam). Sp4 Gilbert Hurte of Company B, 5th Battalion, 1st Cavalry Division with the XM-2 “Manpack Personnel Detector—Chemical” on simulated patrol. One would be hard pressed to come up with anything more absurd than the “People Sniffer,” a backpacked, automated chemistry set with rifle-mounted, vacuum-cleaner-type scent collector. Apparently desperate to try anything that research and development money could buy to help keep infantry troops from being ambushed, the Army’s Chemical Corps fielded this monstrosity. It “worked” by sucking in air laced with the ammonia-based sweat smell of nearby humans, analyzing it on the move and warning the operator/point man. Oh, and there was a bigger version for recon helicopters. You can’t make this stuff up. U.S. ARMY/



NATIONAL ARCHIVES

That Special Smell

Probably in a pine forest on Fort Bragg, North Carolina, a U.S. Army Special Forces “Green Beret” Sergeant demonstrates how the XM-2 “Manpack Personnel Detector—Chemical” will be used on patrol in Southeast Asia to detect the presence of enemy soldiers hiding behind thick jungle growth, sounding a headband-mounted warning buzzer. Upon positive identification, of course, the smelly VC or NVA would then be dispatched immediately with bursts from his 5.56mm M16 rifle. Note that this is a very early model AR-15/M16, characterized by slab-sided receiver, lack of a forward assist, “waffle” magazine and 3-prong flash suppressor.

Escalation in Vietnam

While it was initially believed that the Viet Cong insurgency in the Republic of Vietnam would soon collapse when confronted by strong South Vietnamese forces being trained, armed and equipped by America, this proved sadly optimistic. Despite horrendous casualties, Communist VC guerrillas didn’t seem to falter and were increasingly well-armed and reinforced by PAVN (People’s Army of Vietnam) regulars from the north.

America’s political leadership was unwilling to cut and run (that would eventually change when Democrats took control of the money), so escalation was inevitable. By the high water mark in 1968, more than

536,000 U.S. Soldiers, Seamen, Airmen and Marines were in the fight, alongside Allied counterparts, notably 800,000 South Vietnamese and 50,000 South Koreans.

Desperate for some sort of victory that would put an end to the hemorrhage of American lives and treasure, the Army as an institution and its essential Ordnance Corps radically ramped up RDT&E (Research, Development, Test & Evaluation). This came in support of the ever-expanding war in Vietnam that was already spilling over to other countries in Southeast Asia. Results, as it’s said, were mixed, and it wasn’t rare for combat troops in the field to make their own modifications and innovations.

Mini Mortar

November 1970, RVN. Mortarmen with the 9th ARVN Division using “Kentucky windage” to aim and trigger fire their 60mm M19 mortar, a lighter, purpose-built version of the venerable M2. It was unhampered by an awkward and heavy bipod and was fitted with a 4-pound mini baseplate, so these South Vietnamese soldiers could quickly move into position to engage enemy troops with a somewhat accurate mini barrage. The rag-wrapped tube protects the soldier’s aiming hand against burns after firing multiple rounds. Noting the absence of customary helmets and gear, this appears to be a training session.



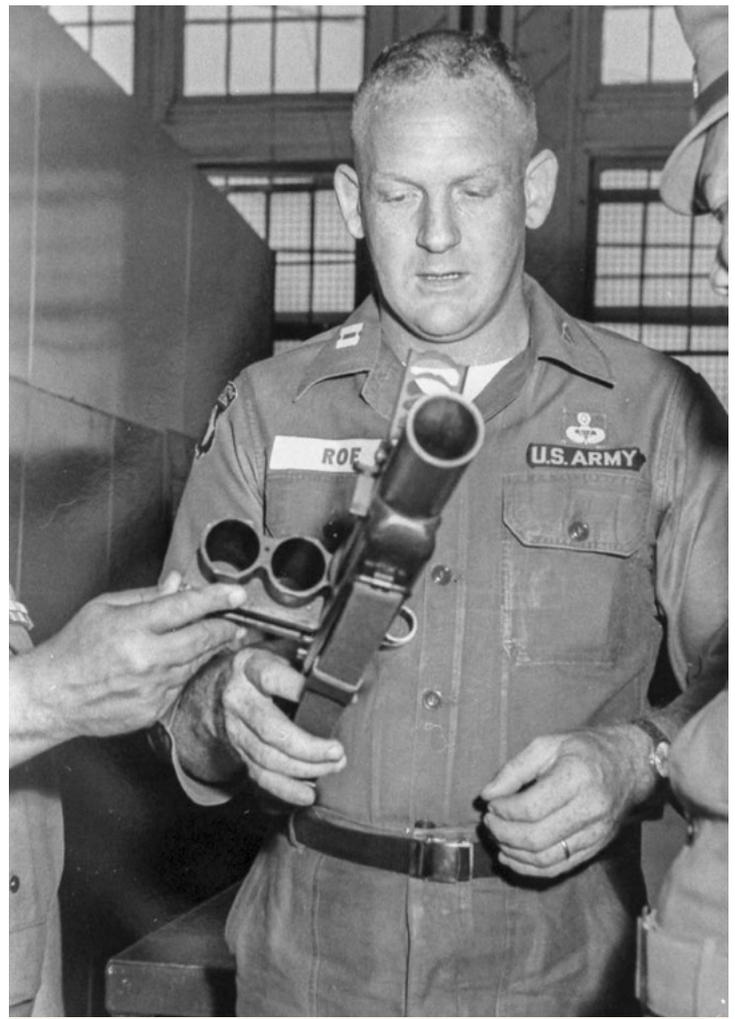
U.S. ARMY/NATIONAL ARCHIVES



U.S. ARMY/NATIONAL ARCHIVES

Mini-Blooper

October 30, 1970, RVN. Seen with a group of Pathfinders of 2nd ARVN Rangers, is this radically chopped M79 grenade launcher. Firing a selection of low-recoil but highly effective 40mm rounds, in some situations it's a much handier solution to close engagement with an area fire weapon. While this homemade modification wasn't officially approved, it was not uncommon among U.S. and Allied special warfare units in the war and even up to recent times with Navy SEALs. Meanwhile, Ordnance fielded the M203, a single-shot blooper hung under M16s.



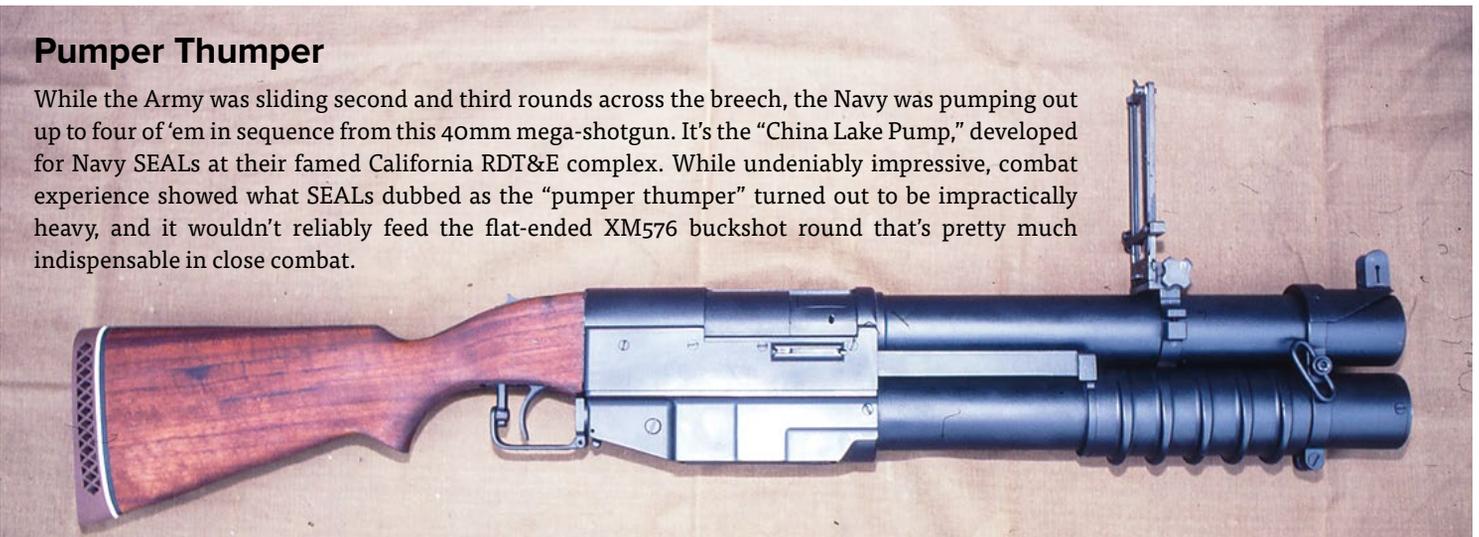
U.S. ARMY/NATIONAL ARCHIVES

Multi-blooper

Earlier, back in the states, U.S. Army Captain Roe was showing off Springfield Armory's T148E1, a clever experimental 3-shot version of the well-regarded 40mm M79 "Bloop Tube." Judging the shotgun-style, single-shot, break action necessary for reloading the standard 79 to be too slow, the spring-advanced "harmonica" chamber allows quick follow-up shots, presumably aided by a double-action trigger mechanism. It's said that some 300 were made for troop testing, and some even found their way to 'Nam before the plug was pulled due to unreliability.

Pumper Thumper

While the Army was sliding second and third rounds across the breech, the Navy was pumping out up to four of 'em in sequence from this 40mm mega-shotgun. It's the "China Lake Pump," developed for Navy SEALs at their famed California RDT&E complex. While undeniably impressive, combat experience showed what SEALs dubbed as the "pumper thumper" turned out to be impractically heavy, and it wouldn't reliably feed the flat-ended XM576 buckshot round that's pretty much indispensable in close combat.



ROBERT BRUCE



USMC/NATIONAL ARCHIVES

Four-Shot Flamethrower

April 1970, RVN. Marine Staff Sergeant Davenport (gunner) and Sergeant G.A. Sorensen prepare to fire the XM191/M202 Multi-shot Portable Flame Weapon. Responding to a 1966 requirement from the Marine Corps to blast/burn out enemy bunkers at 100m or more, Army Ordnance and Chemical Corps teamed to field a rocket pack that eventually became the M202. *"The MPFW system consists of the lightweight, shoulder-fired, four tube, semiautomatic, 66mm, XM202 rocket launcher and the factory-loaded, four-round XM74 rocket clip. The rocket, which is propelled by the M54 LAW motor, has a warhead containing 1.3 pounds of thickened triethylaluminum. ..."*



U.S. ARMY/MILITARY HISTORY INSTITUTE

Zippo Reb

June 18, 1967, Cau Dat, RVN. In Operation Cedar Falls, troopers of 1st Battalion, 4th Cavalry Regiment light up the surrounding jungle with hose bursts of flaming napalm from "Zippo Reb," their M132 Armored Flamethrower. These vehicles had been quickly crafted by Ordnance and Chemical Corps engineers by stuffing the spacious interior of a standard M113 Armored Personnel Carrier (APC) with four 50-gallon fuel tanks and a high-pressure pumper unit feeding an armored cupola mounted M10-8 flame gun. Side by side with the flame nozzle is the problematic 7.62mm M73 machine gun that—when it wasn't jammed—could be used for suppressive fire. In addition to that pintle-mounted 7.62mm M60 for much needed backup, their APC is well-accessorized with concertina wire, crates of extra ammo and chow and a handy stretcher for sleeping or just in case.

Queen's Cobra Spits Fire

A useful side-on view of the M132's cupola-mounted M10-8 flame gun in action, capable of sending multiple bursts of liquid fire out to 200m. Solidarity with our allies in the Vietnam War apparently extended to this crew from the Royal Thai Army's Queen's Cobra Regiment on operation near Phuc Tho, RVN, on November 19, 1967.



U.S. ARMY/MILITARY HISTORY INSTITUTE



USMC PHOTO/NATIONAL ARCHIVES

The Thing

On May 28, 1966, on Operation Mobile in RVN, this U.S. MC-tracked and -armored six-shooter and its three-man crew are ready for action. Semi officially known as *Ontos*, from the Greek word for “thing,” the rifle, multiple 106mm, self-propelled, M50 was the Army’s somewhat bizarre attempt to field a compact, light, airmobile antitank weapons platform. The marines latched on to it and used its six powerful 105/106mm recoilless rifles (there’s a confusing/amusing story there) to excellent effect in the epic battle for Hue City in 1968.



U.S. ARMY/NATIONAL ARCHIVES

Morning Mine Clearing

August 6, 1970, RVN. A 1st Squadron 10th Cavalry, 4th Infantry Division M48 series tank with E202 Tank-Mounted Expendable Mine Roller system is ready for a day’s work on Highway 19. The enemy’s profligate use of pressure-detonated mines and powerful IEDs proved formidable weapons against supply convoys moving essential fuel, ammo and rations, so brave tankers “Butch” and his TC (track commander) rolled out every morning for the nasty, dangerous and TBI-inducing job of clearing the way.



U.S. ARMY/MILITARY HISTORY INSTITUTE

War Wagon

On March 22, 1968, Can Tho, RVN, we find the 3rd Combat Aviation Battalion’s mobile security team. Standing up in the back, manning the crank-operated 40mm MK18 grenade machine gun, is Warrant Officer Bernard Buono, creator of this heavily armed, sandbag-protected, rapid-response M151 Mutt, named the “War Wagon.” Its mission is to rush to defend the unit’s perimeter to counter increasingly frequent and effective enemy assaults. The formidable array of onboard weaponry includes the driver’s 5.56mm XM177E1 submachine gun, the passenger’s 7.62mm M134 Minigun—probably a spare from the unit’s armed helicopters—and a 40mm M79 single-shot grenade launcher resting on the back fender as Buono’s MK18 backup.



U.S. NAVY PHOTO/NATIONAL ARCHIVES

Low-Level Flying

May 11, 1966, Cat Lo Beach near Vung Tau, RVN. A U.S. Navy PACV (Patrol Air Cushion Vehicle) effortlessly glides from river to shore, powerlifted by an aircraft turbine engine and pushed by a giant, aft-mounted propeller. Only six of these million-dollar-a-piece hovercraft monstrosities were completed and then divvied up to the Navy and Army for use on rivers and swamps in Vietnam. Although seemingly a great idea for roaring at high speed over water and right up onto land to chase and kill the enemy, PACVs experienced some limited success but ultimately proved to be too loud, complicated, expensive to operate and maintain and vulnerable to enemy fire.



U.S. ARMY TRANSPORTATION MUSEUM

Gun Trucks

June 1, 1971, RVN. Built up from a beefy M54 5-ton 6x6 cargo truck and mounting four .50-caliber M2 Brownings, famed armed and armored gun truck “Eve of Destruction” makes a photo run on one of her final convoy escort missions. Beginning around 1967 in a desperate response to increasing ambush attacks on daily supply convoys through the Central Highlands, truckers of the 8th Transportation Corps began welding and bolting scrounged sheets of armor to their cargo trucks and piling on as much armament as available or possible. Eve and dozens of other home-built rolling fortresses—everyone a unique design—provided daily route security in the Central Highlands and along the coast. Eve was singled out as the only one of her kind for a return to America and now—completely refurbished and repainted—she resides comfortably inside the U.S. Army Transportation Museum’s climate-controlled main gallery.



U.S. NAVY PHOTO BY PH1 L.R. ROBINSON/NAVY HISTORICAL CENTER

SEAL Stoner

March 26, 1968, Mekong Delta, Tan Dinh Island, Operation Bold Dragon III. The M16 wasn’t the only weapon in ‘Nam designed by Eugene Stoner. Here, a Navy SEAL armed with a 5.56mm Stoner 63, set up as a squad auto weapon for belt feeding from a drum magazine attached underneath, covers members of his squad as they prepare demo charges in an enemy bunker. The versatile Stoner modular system could also be quickly configured as an assault rifle or carbine, fed from detachable box magazines on the top or underneath.



ROBERT BRUCE

Constant Force Magazine

Handicapped by standard 20 rounders for their “Sixteens” and Stoners, SEALs in furious firefights in ‘Nam desperately needed high-capacity magazines, so Childers sprang into action in 1970 with characteristic avoidance of unworkable conventional solutions. Seen here is his “Constant Force 50-round Magazine,” Model 2 version, with a smooth body curve, nylon follower and all-important twin-coiled lift springs, reportedly inspired by those used in common roll-up window shades. This solution, he explained, lifts all the rounds with ease and the same follower pressure from first to last as the mag is emptied, eliminating that common source of feed stoppages. Inexplicably, the Navy abandoned it when Vietnam fell, and we’re unaware of any subsequent military or commercial attempts to exploit this clever concept. Any takers out there?



U.S. ARMY/NATIONAL ARCHIVES

Starlight Scope

October 23, 1967, Bearcat Base, RVN. Taking a picture-perfect squatting position, SP4 Michael Longo, 9th Infantry Division, poses for a daytime photo with his 5.56mm M16A1 topped with the game-changing AN/PVS-1, the first “starlight” scope fielded for combat use in SE Asia. While previous night scopes were heavy, bulky, of limited range and used

inefficient infrared light, this Generation 1 device’s S-20 photo cathode gathered and amplified ambient light nearly 1,000 times. Under a bit of moonlight, the gunner could detect and fire on enemies at 400 yards or more. The more durable and capable AN/PVS-2 soon followed, and today, far more sophisticated night vision devices are in widespread use.

One Unsung Hero

There are many good men behind developments in weapons, ammunition and sighting systems in the Vietnam War, including well-known ones like ArmaLite’s Gene Stoner and Colt’s Rob Roy. Lesser known but on a similar level is MajGen Carroll D. Childers, seen here in September 2000 at his home in Stafford, Virginia. A prominent member of what was formally known as the Vietnam Laboratory Assistance Team while stationed at the Naval Surface Warfare Center,

Dahlgren, Virginia, in the late 1960s and early 1970s, Childers was a key figure behind some important weapons and related equipment used by the U.S. Marine Corps and Navy Special Operations. A fascinating interview with Childers discussing his radically innovative RHINO/MIWS/SOW selective fire shotgun, and a detachable box magazine for the Remington 870 shotgun, can be found in **Small Arms Review**, Vol. 5, No. 8 (May 2002).



ROBERT BRUCE

What’s Ahead

In the next installment of “Ordnance Oddities,” we’ll turn a jaundiced eye on some “Silliness in the ‘70s and ‘80s.” Like the funny 5.56mm Folded Ammunition/Weapon System from Frankford Arsenal and maybe even the remarkable Colt SCAMP. SADJ

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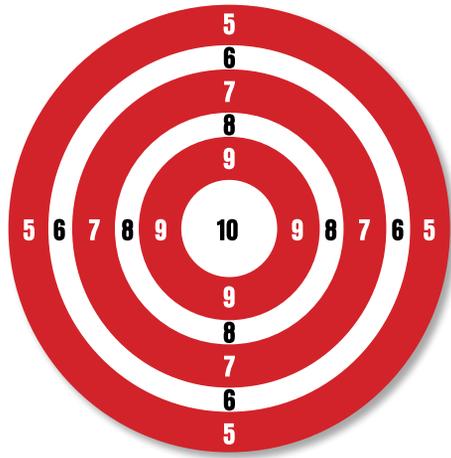


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TRAINING ALONE

Keep It Short, Sweet
and to the Point!

Story & Photography by Linda M. Gilbertson

Sometimes it is best to train in shooting alone. It allows you to focus on what needs to be practiced and assures that your practice time will be short, sweet and to the point. When training with others there is a tendency to spend time on war stories, goofing-off with others' firearms and the shooting of a lot more ammo than is necessary. Let's

look at how to focus, be prepared and accomplish your goal.

Keep It Short— Focus

When preparing to go shooting, keep in the mind all that you need to bring with you. Perhaps you need to make a list to assure that

you have everything before you leave home. If you live a great distance from a range or a shooting area, finding out you left something behind is a big frustration. A wasted trip is not what you want. Not if your visit is controlled by time constraints.

The equipment will depend upon what you hope to accomplish. Will you be training in



"Where's the rifle?"



Bull's-eye table.

competition bull's-eye, personal protection, long-range rifle or black powder? Are you trying out a new cartridge load or just practicing the fundamentals of shooting? Are you going on a hunt? Do you need to bring a timer, shooting mat, knee and elbow pads, chronograph or spotting scope? Don't forget your IWB (inside the waistband) or OWB (outside the waistband) holster. Will you be shooting just practice ammo, or do you need to bring some personal protection ammo as well? What color of lenses on your shooting glasses should you use for the weather conditions? Don't forget your hearing protection. Does your range provide a shooting table, bench, a target base and backer? If you're not shooting at a range, do you have a portable table, bench, target base and backer? What targets are you going to use? Don't forget your brass bag if you want your cases back. Many times, people have shown up at the range with everything except a gun. What are the weather conditions? Shooting black powder on a windy day is counterintuitive.

Keep it Sweet— Be Prepared

When you shoot at the range and you're concentrating on personal protection, select



Bull's-eye practice.



Bull's-eye box.

one type of concealed carry method at a time. Perhaps you're carrying an OWB Fobus SP-11 Paddle Holster for your Springfield XD and you need to work on the proficiency of quickly drawing it from under clothing. In dressing for practice, choose clothing to simulate what needs to be practiced. Bring a jacket or shirt to wear over the holster so you can practice sweeping it aside to reach the pistol in the holster. You don't need to worry about a belt as this holster does not require it. Have your pistol, ammo, magazines, magazine loader, brass bag and holster in your range bag. If you have multiple magazines, have them pre-loaded so that you're ready to start shooting immediately. If you're concerned about the speed at which you draw and present the pistol, then of course consider including a timer. If you have grip issues, bring a handy racker to help you manipulate the slide in the event of a malfunction. Perhaps a cleaning rod should be available in the event you have a squib load. Don't shoot a lot of ammo, because after a certain time, you're wasting it. If your objective is to reset your mind to the fundamentals of pistol shooting and increase your speed in presenting the pistol and hitting your target, this can be accomplished with 50 rounds of practice ammo and 10 rounds of personal protection ammo. Warm up with a plain piece of 8 1/2 x 11 paper, switch to a situational target



Muzzleloader practice.

for mental concentration and hit placement. Vary the distance from 3 yards to 7 yards. This should take you no more than 1 hour.

Bull's-eye is a great training opportunity to perfect sight alignment/trigger control and breath control. Just remember, that shooting is done one-handed. Choose something like a Browning Buck Mark Bull's-eye pistol, .22 ammo and a couple magazines. A carpet mat is useful to protect the pistol and/or the table you're using. Consider bringing binoculars (bull's-eye is shot at 25 yards and 50 yards) and bull's-eye targets. Have a pencil and paper in order to document your score to see if you're progressing. Since bull's-eye requires intense concentration on sight alignment, consider bringing a set of reading glasses to enhance the front sight. Also, bringing a timer will help count the 10 minutes, 20 seconds and 10 seconds used in competition. The standard bull's-eye target is used. If you're not at a range, bring a portable table, target stand and backer. Generally, you'll find you've had enough in 1 to 2 hours.

In rifle shooting, slightly different equipment is required. For this you need to remember to bring a shooting mat, rifle rests, spot-



Personal protection equipment.



Personal protection practice.

ting scope and ear protection acceptable in rifle shooting (earplugs). If shooting in different positions, you'd best bring knee pads and elbow pads. Have your rifle already pre-set to your length of pull (LOP), the stock's comb height and stock angle. If they aren't, then you'll be taking extra time to properly fit the rifle to your body. A .223 M4 has an adjustable stock which is easy to set to your LOP. An EOtech scope already mounted makes finding your mark quick and easy. Remember to bring new batteries for the EOtech. Once more, pre-loaded magazines will have you ready to shoot when set-up is complete. Consider wearing a rifle shooting shirt with padding on your shooting shoulder to help cushion the recoil. If bench rest is one of the positions you need to practice, then bring a portable table, bench, target stand and backer if you're not at a shooting range that provides these. The longest period will be spent moving target backers and stands from 100 yards and beyond. Shooting time will vary, but you'll probably be done in 2 to 3 hours.

Black powder is a sport where training by yourself is a good idea. There are steps which you must take to reach the point of firing your pistol or rifle without any interruption causing you to wonder, "Where was I?" in the step



Rifle equipment.

process. I believe this has happened on more than one occasion where you may have to remove the powder you just inserted, because you forgot if you did it or not. This is also the occasion where the shooter may insert another ball, unaware that he or she had already performed that step. When shooting black

powder, place your equipment in a pattern on the shooting table whereby you can tag where you're at in the event you're interrupted. Make sure you have your powder flask already pre-filled, so you're not wasting powder if the wind should pick up. Most times, your wads and .50 balls can be prepared in a hold-



Rifle practice.

er which makes it easy to tap into the mouth of the barrel. Like powder, cloth wads have a tendency to drift off the table if not contained. After you're done with your range rod, place it somewhere whereby it signifies to you that you're loaded and ready to shoot. Black powder shooting is a lot of fun, and you can spend multiple hours enjoying sending a lot of lead balls down range. Generally, 2 to 3 hours will accomplish what you've intended.

Keep It to the Point— Accomplish Your Goal

The purpose of shooting alone is to concentrate on what needs to be accomplished and to complete it with little interruption. Considering time constraints, it's understandable that some shooters choose to shoot alone and not with a group. Some people practicing for national or international competitions need intense concentration and therefore choose a specific day and time of the week to practice when no one else is around. Others may be getting ready for a hunt and have limited time to sight in their scopes. They need to be able to move their targets from 100 to 300 feet when necessary and not when everybody else is ready. You can't suddenly call the line safe whenever you want and expect everyone on the line to agree.

This is indeed an expensive hobby if you



WIKIMEDIA COMMONS

2004 Olympic shooting medalists.

permit yourself the distraction by others. I'm not discounting the enjoyment of training with others, but I'm concerned with the potential lack of direction. We're all busy people, and free time is minimal to many. Keep it

short, sweet and to the point, and you'll find the time satisfying, successful and within your budget.

For more on training, see ladiesdayllc.com. SADJ



This Australian Army reservist is wielding a standard EF88 assault rifle during Exercise Talisman Sabre. The 5.56mm weapon has a short-stroke gas piston. Its nominal rate of fire is 740 rounds per minute, and it operates in both semiautomatic and fully automatic modes.

Enhancing the Austeyr

Australia Defence Force's EF88/F90 Rifle

Story & Photography by Gordon Arthur

The Australian Defence Force (ADF) had depended upon its F88 5.56mm rifle—a Thales Australian-built variant of the Austeyr or Steyr AUG A1—since 1988. Australian “diggers” relied upon it in operations in Afghanistan and Iraq, but there was a persistent demand for a better weapon. Although some favored the M4, it was instead decided to pursue a fresh new weapon that retained a bullpup configuration, since this

was familiar to serving soldiers.

Thales Australia gained useful experience in upgrading service rifles to the F88SA2 model, and it was later contracted in December 2011 to design a new 5.56mm assault rifle for the ADF. This project came under the auspices of Land 125 Phase 3C, and Thales had to meet demanding user requirements. Essentially, it was competing against itself to produce a rifle that met strict speci-

fications and was cost-effective. Among the requirements were weight reduction, the ability to install more accessories and the possession of better balance by moving the center of gravity rearwards.

The Human Factors Team of the then Defense Science and Technology Organisation (DSTO) first trialed the new EF88 with a group of 10 soldiers in December 2012, and this resulted in minor adjustments to the design.



This is what the standard EF88 bullpup rifle looks like when delivered in its black finish. This lineup of weapons possesses the 20-inch (508mm) barrel. Fitted is Elcan's SpecterDR dual-day sight with 1-4x magnification, which soldiers are very enthusiastic about, and Grip Pod Systems GPS.02-CL foregrip/bipod.

The new weapon was to become known as the "EF88," with the E denoting "Enhanced." For the export market, Thales Australia refers to it as the "F90."

After extensive development work and close collaboration with the ADF and other defense agencies, the company concluded a critical AUD 100 million (U.S.D 73.6 million in 2015) deal with the ADF in July 2015, this covering the production of 30,000 EF88 rifles and 2,500 SL40 40mm under-barrel grenade launchers.

At the time of the award, Kevin Wall, Thales Australia's armaments vice president, said, "Our soldiers deserve the best possible equipment, and the F90 delivers on all counts. Enhancing the Austeyr is the most cost-effective way to deliver a capability upgrade, and we've worked closely with defense and Army units to design, test and manufacture this world-class weapon. We're now looking forward to getting it into troops' hands as quickly as possible."

The EF88 is very much a product of psychology, too. Although the F88 was improved throughout its lifecycle, each iteration looked the same, and that meant its reputation and the perception of its flaws lingered. By making the EF88 look distinctly different, there would be no mistaking its new lineage.

The EF88 is manufactured at Thales Australia's facility in Lithgow, New South Wales. Production levels peaked at around 40 rifles per day, and it requires a total of 5.9 hours to



This corporal belonging to an elite unit of the Australian Army also has a pretty standard EF88 rifle that has been camouflage-painted. The EF88 benefits from upgraded ergonomics, greater durability and better balance. There are numerous options for mounting ancillary devices such as sights and laser aiming devices.

build a single rifle. This compares very favorably with the 11 hours once needed to make an F88 rifle. The company reported to *Small Arms Defense Journal* that, by February 2020, just 4,000 rifles of the original 30,000 on order remained to be delivered.

Ins and Outs of the EF88/F90

Initially, there were teething problems such

as breakages relating to the polymer material used on the weapon and ejection port covers coming off. The EF88 had a supposedly improved gas plug but, according to sources spoken to by the author, there is considerable criticism from soldiers about the signature coming off this gas plug.

One expensive problem to rectify, not relat-



Watching over a beach during an amphibious landing in Exercise Talisman Sabre 2019, this rifle has a carefully concocted camouflage pattern. Note also the InForce WMLx flashlight. New F1A1 ammunition was developed specifically for the EF88, and it is manufactured at Thales Australia's Benalla plant. Propellant is made at the company's Mulwala plant.

ing at all to the performance of the EF88, was that the new rifle did not fit existing mounting brackets in ADF vehicles. It cost AUD 5 million alone to modify these brackets.

The first unit to receive the new rifles were members of the 1st Battalion, Royal Australian Regiment (1 RAR) based in Townsville, these were handed over in June 2015. Thales Australia had commenced low-rate initial production in September 2014 to reduce risk and smooth the transition from existing F88

manufacturing. Broader rollout to the Australian Army commenced in 2016, with successive recipients being soldiers of the Townsville-based 3rd Brigade, then the 7th Brigade in Brisbane and finally the 1st Brigade split between Darwin and Adelaide.

Thales says the EF88, which weighs 3.25kg and is therefore around 500g lighter than the F88, is more accurate, reliable and robust than its predecessor. New materials that are half the weight but twice as strong as aluminum

have been introduced. Certainly, it is more modular and ergonomic, and it is one of the lightest assault rifles available.

The change in center of gravity towards the rear is a key one, since it improves the speed of engagement for users. This resultantly increases the first-round probability of a hit.

Illustrating its modularity, the EF88 has several Picatinny rails fully integrated to reduce weight. The top rail was extended compared to the F88SA2, so a day sight, in-line sight, thermal imager or even a grenade launcher sight can be attached. The right-hand rail can mount a laser so that it does not snag on the sling. Another rail is under the barrel to which a grenade launcher, grip or bipod can be affixed. One o'clock offset rails can also be fitted.

Initially, it was conceived that only regular infantry units would be equipped with the weapon, but such was the success of the design that it was rolled out to every soldier regardless of their specialty. The EF88 is issued to Australian troops in two versions: a standard bullpup rifle with a 20-inch (508mm) barrel and a carbine with a 16-inch (407mm) barrel.

The Australian Army divides its soldiers into Tier 1 combatants who perform niche tasks (e.g., tank crews), Tier 2 dismounted troops who conduct dismounted close combat, Tier 2 mounted soldiers who crew armored fighting vehicles and Tier 3 combatants who provide general support to combined-arms teams.

The ADF introduced the EF88 according to the above tiers, with the difference being barrel lengths and accessories such as sights and bipods. As already indicated, as part of Project Land 125 Phase 3C a range of accessories were procured. These were all carefully tested to ensure the EF88 represented an integral system, a process in which Thales was thoroughly involved.

The standard sight for all soldier tiers is Elcan's SpecterDR, an enhanced dual-range

ADF



This official photo is notable as it shows the Qioptiq KITE IN-LINE night vision device mounted in front of the Elcan SpecterDR day sight. The double-stack magazine made from polymer has a standard 30-round capacity. The two-position, sliding trigger has a select-fire function. The EF88's length of pull is 385mm.



This is the Elbit Systems XACT *th65* clip-on thermal imager, though it has been flipped to the side for daytime use. Lithgow's Bullet Trap Blank Firing Attachment (BTBFA) is evident on the end of the gun barrel to capture any bullets inadvertently fired during training. The BTBFA's lifecycle exceeds 25,000 rounds.

day sight with 1-4x magnification. One clear positive aspect of this sight is that users can see and hit targets at far greater ranges than before, even at 600m.

Weapons can be fitted with a Grip Pod Systems GPS.02-CL forward grip with bipod or a Harris N325-BRM bipod. The standard image intensifier sight is Qioptiq's KITE IN-LINE, an in-line system for which the ADF specified white phosphorous tubes.

There are four slightly different weapon

variants for Tier 2 dismounted troops (i.e., regular infantry): commander, marksman, rifleman and grenadier (the latter has a 40mm under-barrel grenade launcher). Their weapons can be fitted with an InForce WMLx visual illumination device on a Daniel Defense 1 o'clock offset rail. Meanwhile, the standard laser on the right-hand rail is L3 Insight EOTech's AN/PEQ-16.

As one would expect, Tier 2 mounted troops who usually crew vehicles use the

shorter-barreled 407mm carbine with a Knight's Armament basic forward grip. Tier 3 soldiers have two rifle variants available: the standard 508mm-barreled rifle and the grenadier type with 40mm grenade launcher. Selected Tier 2 dismounted troops received an Elbit Systems XACT *th65* clip-on thermal imager system, these devices being assigned to dedicated marksmen.

The aforementioned Steyr Mannlicher SL40 (or F91) that weighs 1,025g is a fully integrated 40mm grenade launcher attachment. This combines with a Thales F1 quadrant sight that can be used at night and is compatible with night vision goggles. The launcher can be fitted to the rifle in just 15 seconds. The double-action grenade launcher is side opening, which allows more types of rounds to be fired. It can be fitted and removed by individual soldiers without resorting to the services of an armorer.

The EF88's six-fluted 5.56mm barrel is lighter than the F88's, and the mount was fixed to enhance accuracy after the requirement for a quick-change barrel was dropped. As on the M4, the bolt release catch was relocated to permit faster magazine changes and allow the shooter to keep his eyes on target. The folding cocking handle is less likely to break too, and the cocking action is now silent. Furthermore, the hammer pack is more reliable. Also altered was the butt group to reduce the length of pull and therefore more comfortably accommodate body armor being worn by the shooter.

Color, Suppressors and Sovereignty

Earlier on in its development, the EF88 was finished in two colors as was the F88SA2, with a tan-colored upper and khaki green-colored bottom. Why then did the new rifle end up black? According to a 2019 report titled, "Sticking to Our Guns: A Troubled Past Produces a Superb Weapon," written by Chris Masters and published by the Australian Strategic Policy Institute (ASPI), it was Australia's then Chief of Army and a couple of senior generals who unilaterally decided black was the best color for the new weapon.

Their decision took many by surprise, because few elements in the natural environment are black, so this color offers less camouflage in combat. Furthermore, the dark-colored rifle had no harmony with the ADF's new Australian Multicam Camouflage Uniform (AMCU) that was being introduced at much the same time.

Masters in his report related that something seemingly as innocuous as a color change necessitated months of extra work. This was because testing had to be redone to prove that changes in the polymer's color did not affect the hardness of the material throughout its lifecycle.

The reason for adopting black was never explained by the ADF. However, the ASPI report commented: "Black is severe, but also



Yet another Australian grenadier, this one belonging to 1 RAR, with the same SL40 40mm under-barrel, side-loading grenade launcher installed. The easily accessible trigger extension for the SL40 is clearly visible. The 5.56mm rifle barrel has six grooves with a 1:7 twist.

sexy. Special Forces counterterrorism operatives, bedecked in black, carry black weapons ... Soldiers, particularly the younger ones, are as much creatures of fashion as anyone, so to give them a weapon with a cool, industrial design and sex appeal was following a useful rationale—even if the result was a victory of style over substance.”

The ADF originally forbade soldiers from camouflaging their black rifles, but this order was soon rescinded when soldiers discovered how starkly they stood out in the field, and individuals started implementing their own personal camouflage schemes on their personal weapons.

Combat experience in Afghanistan had taught that the typical hostile engagement occurred at ranges of 30m to 200m. There was

thus an effort to instill close-quarters battle skills (the type that Special Forces are highly proficient in) among regular Australian infantrymen to increase their shooting speed and accuracy.

Of course, such a training focus requires offhanded shooting, something not possible with the F88 and not a requirement when the EF88’s specifications were drawn up. The Australian Army sought to resolve this issue of ambidextrous shooting—to prevent spent cases hitting the face—with a new case deflector. After being commissioned to come up with a solution, Thales tested a first deflector prototype in 2017. Though that one did not meet requirements, an appropriate deflector eventually became available; this one sending cases forward rather than backwards.

Special Forces also recognize the value of a suppressor to reduce sound and flash and, thus, conceal their position. Therefore a suppressor was chosen for the EF88 too, and an initial total of 1,000 suppressors were acquired from Oceania Defence in New Zealand. These titanium suppressors are made by 3D printing, but fitting a suppressor meant the removal of a barrel lug and the possibility of attaching a bayonet. However, Thales has so far not been able to get the sound pressure level of any suppressor below 140dB owing to the design of the EF88’s operating system.

Thales Australia has also developed adaptors for Simunition® training ammunition, plus it has created a stand-alone stock for the SL40 40mm grenade launcher. That means the launcher no longer has to be attached to the weapon to be fired.

One final factor worthy of mention is that the EF88 represents a sovereign design capability and greater self-reliance for Australia. Indigenous production also provides local employment, which is something politicians like to trumpet.

For the export market, Thales Australia is offering the F90MBR (Modular Bullpup Rifle), currently available with three barrel lengths: 360mm, 407mm and 508mm. The F90MBR is mechanically the same as the EF88, but it has a modified stock. It also possesses a NATO-standard magazine and ambidextrous features, including a magazine release catch forward of the pistol grip. The shortest barrel length of 360mm turns the weapon almost into the category of a submachine gun.

As the original manufacturer, Thales Australia is actively exploring export opportunities for the F90. Certainly, the greatest opportunities are in India. Thales had originally announced a tie-up with Indian firm MKU in early 2018, but more recently it transferred allegiance to Bharat Forge to market the F90 to the Indian Army.

Thales had already offered a shorter, customized 13.5-inch barrel for an Indian competition for 94,000 close-quarters battle carbines. Although this tender closed nearly 2 years ago and a different contender was selected, no contract was ever awarded. Thales therefore expects to compete in a potential rerun of this competition. A second phase of the project would see 350,000 rifles made within India. At the time of writing, Thales Australia was about to execute a license transfer with Bharat Forge to meet this local production requirement.

A Thales spokesman told **SADJ** that his company was hopeful of its first F90 exports either this year or in 2021, with “lots of interest” being expressed internationally from potential clients. **SADJ**

Acknowledgements

The author would like to thank Thales Australia plus various soldiers of the Australian Army for their assistance in preparing this article.



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IMI Systems Provides Tank Ammo to Finnish Army

In January 2020, Elbit Systems announced that its subsidiary, IMI Systems was selected by the Finnish Ministry of Defence (Finnish MOD), following a competitive testing by the Finnish Defence Forces (FDF), to provide the Finnish Army with the M339, a NATO-compliant, 120mm High Explosive Multipurpose ammunition and Data Setting Units for its Leopard 2 Main Battle Tanks (MBTs).

Suitable for all NATO 120mm smooth bore gun MBTs, the M339 is a high-accuracy, multipurpose 120mm tank ammunition that complies with NATO STANAG requirements. The FDF selected the M339 to improve the fire power and ability of the battle tanks to engage different types of targets.

imisystems.com

Elbit Systems Awarded Initial \$31M Contract for Protection Systems

Elbit Systems announced on January 7, 2020, that it was awarded an initial contract from the Production and Procurement Directorate of the Israeli Ministry of Defense (IMOD) valued at approximately \$31 million to provide Iron Fist Active Protection Systems (APS) for the Eitan Armored Fighting Vehicles (AFVs) of the Israeli Defense Forces (IDF). The contract

will be performed over a 5-year period.

Under the contract, Elbit Systems will equip the IDF's new wheeled AFVs with the Iron Fist Light Decoupled (IFLD) Systems. The Iron Fist System uses optical sensors, tracking radar, launchers and countermeasure munitions to defeat threats at a safe distance. The Iron Fist System provides 360-degree protection cov-

erage for close-range scenarios in both open terrain and urban environment. The systems' high-performance, versatility and negligible residual penetration, as well as its low size and weight and ease of integration, position the Iron Fist as an optimal APS for any fighting vehicle.

elbitsystems.com

Turkish Armed Forces Adds Armed Drone System

SONGAR™, the first national armed drone system to be developed by **ASISGUARD™**, has been delivered to the Turkish Armed Forces (TAF) after the successful completion of acceptance tests. Equipped with advanced features, SONGAR will undertake critical tasks in operations conducted by both TAF and the security forces.

Equipped with an automatic machine gun, SONGAR can carry out operations within a 3km radius. The system can transfer images in real time and carry 200 rounds of 5.56x45mm NATO ammunition. The drone features a specially designed, flexible ammunition feed chute (ammunition belt) and an automatic firing mechanism and can operate at altitudes of 2,800m.

Ayhan Sunar, General Manager at **ASISGUARD**, underlined that the SONGAR system is currently unique, saying: “As one of the most prominent drone systems in our product family, SONGAR can undertake many critical tasks, including locating the target area, eliminating the threat, transferring real-time images and carrying out post-operation damage assessment. It stands out as one of the leading national capabilities in asymmetric warfare as a result of its firing accuracy.”

SONGAR has achieved further success in field tests after the integration of a grenade launcher in place of the machine gun, and its firing precision has been significantly improved with the



inclusion of an “Electronic Sight and Ballistic Calculation Module,” specially designed by **ASISGUARD**. National and international patent applications have been made for SONGAR’s unique stabilisation system.

ASISGUARD develops systems, subsys-

tems, hardware and software in for military land vehicle electronics; autonomous micro-, mini- and medium-class UAVs; electro-optics; border security; artificial intelligence; and big data.

asisguard.com

Quantico Tactical Announces TLS Contract Award

On March 9, 2020, Quantico Tactical announced the award of TLS (Tailored Logistics Support) contract SPE8EJ-19-D-0015. This is an indefinite delivery / indefinite quantity with a firm fixed price of \$4,000,000,000 for use through March 6, 2021. This contract allows for special operation equipment to be purchased and delivered to our nation’s military and federal agencies.

Quantico Tactical is a leading supplier of special operations equipment to the U.S. government, DoD and federal law enforcement

agencies. This contract expedites the purchase and fielding of necessary equipment for our warfighters. Quantico Tactical has partnered with over a thousand of manufacturers to fulfill this need.

“We have been consistently ranked as the best customer service and highest on-time deliveries of all contractors within the TLS contract. In fact, we are the only current DLA TLS contract awardee to hold DLA’s highest award for operational excellence,” said David Hensley, president of Quantico Tactical. “We

will continue to provide the best products, with world class service to our warfighters and federal agents.”

As the nation’s combat logistics support agency, the Defense Logistics Agency (DLA) manages the global supply chain, from raw materials to end user to disposition, for the Army, Marine Corps, Navy, Air Force, Space Force, Coast Guard, 11 combatant commands, other federal agencies and partner and allied nations.

quanticotactical.com

Export Reform, Finally!

New Regulations Should Increase Export Sales

By Jason M. Wong

Faithful readers of this column are well aware of the on-going efforts to modernize and streamline the current procedures for the export of small arms from the United States. Recent media reports attribute the recent proposed changes to the Trump presidency, but in reality, export control reform has been underway since 2009, at the request of President Obama. Undertaken with the goal of strengthening national security and increasing the competitiveness of U.S. manufacturing, the reform effort has focused on current threats while adapting to changing economic and technological landscapes. The reform effort has taken two noteworthy avenues: ITAR category revisions and EAR/ITAR definition harmonization. Back in 2016, this column predicted that “[t]rue export reform will not occur for most readers until USML Categories I, II and III are completed; however, at this juncture it seems unlikely that massive changes will be made to these categories.” This author could not have been more wrong. In 2018, export reform of USML Categories I, II and III seemed imminent.

Finally, on January 23, 2020, the most recent effort to reform the U.S. Munitions List was published in the *Federal Register*, with an effective date of March 9, 2020. On the day of publication, 21 states filed a lawsuit in U.S. federal court to delay or prohibit the new regulations from taking place over concerns that 3D-printed firearms would not be subject to sufficient export controls.

On Friday, March 6, 2020, a federal judge in Seattle, WA, agreed with the Trump Administration to allow most of the regulations to take effect on March 9, 2020. The court issued a very narrow injunction against the section of the regulation governing the export of technical data related to 3D-printed firearms.

Transfer of Jurisdiction

Prior to March 9, 2020, the U.S. State Department held jurisdiction over most small arms

and ammunition, with the exception of shotguns and shotgun ammunition, which were governed by the U.S. Commerce Department. Under the new regulations, nearly all common sporting firearms, to include single-shot, bolt-action and semiautomatic firearms will transfer from State Department jurisdiction to Commerce Department jurisdiction.

At this juncture, it's probably easier to state what remains in U.S. Munitions List Category I (under State Department jurisdiction):

- a. Firearms using caseless ammunition.
- b. Fully automatic firearms to .50 caliber (12.7mm) inclusive.
- c. Firearms specially designed to integrate fire control, automatic tracking or automatic firing (e.g., precision guided firearms). *Note 1 to paragraph (c):* Integration does not include only attaching to the firearm or rail.
- d. Fully automatic shotguns regardless of gauge.
- e. Silencers, mufflers and sound suppressors.
- f. [Reserved.]
- g. Barrels, receivers (frames), bolts, bolt carriers, slides or sears specially designed for the articles in paragraphs (a), (b) and (d) of this category.
- h. Parts, components, accessories and attachments, as follows:
 1. Drum and other magazines for firearms to .50 caliber (12.7mm) inclusive with a capacity greater than 50 rounds, regardless of jurisdiction of the firearm, and specially designed parts and components therefor;
 2. Parts and components specially designed for conversion of a semiautomatic firearm to a fully automatic firearm.
 3. Parts and components specially designed for defense articles described in paragraphs (c) and (e) of this category; or
 4. Accessories or attachments specially designed to automatically stabilize

- aim (other than gun rests) or for automatic targeting and specially designed parts and components therefor.
- i. Technical data (see §120.10 of this subchapter) and defense services (see §120.9 of this subchapter) directly related to the defense articles described in this category and classified technical data directly related to items controlled in ECCNs (Export Control Classification Numbers) 0A501, 0B501, 0D501 and 0E501 and defense services using the classified technical data. (See §125.4 of this subchapter for exemptions.)

New ECCNs

Most small arms that were once in USML Category I will be moved to 13 new Commerce ECCN categories in the 0X5zz range. In addition, four new “600” series ECCN classifications will be created. The 17 new ECCNs created are:

0A501 – Firearms and Related Commodities:

This ECCN governs most firearms (non-automatic, non-semiautomatic and semiautomatic, up to and including .50 caliber), magazines (with a capacity greater than 16 rounds, but less than 50 rounds), receivers, barrels, cylinders and trunnions.

0A502 – Shotguns and Related Commodities:

This ECCN governs all non-automatic shotguns, to include those with barrels shorter than 18 inches in length and shotguns with barrels exceeding 18 inches. It also includes controls on parts and components previously listed in ECCN 0A984, the ECCN that previously controlled shotguns and their parts.

0A503 – Discharge Type Arms:

This ECCN governs less lethal projectiles and grenades. It is a direct replacement of ECCN 0A985. The new regulation makes clear that such projectiles are classified in that ECCN 0A503 and not classified under ECCN 0A602 or on the USML.

0A504 – Optical Sighting Devices:

Previously

Undertaken with the goal of strengthening national security and increasing the competitiveness of U.S. manufacturing, the reform effort has focused on current threats while adapting to changing economic and technological landscapes.

regulated under ECCN 0A987, the new ECCN no longer differentiates between ITAR-controlled optics previously controlled under USML Category I(f). Export restrictions on most optics are eased or lifted, with limited controls in place for those “specially designed” for use in firearms that are “subject to the ITAR.”

0A505 – Ammunition: This new ECCN governs most ammunition for small arms (up to .50 caliber), blank ammunition, shotgun ammunition up to 10-gauge and the related parts and components. Caseless ammunition, tracer ammunition, ammunition utilizing depleted uranium and ammunition of any caliber preassembled into links or belts (and thus, presumably for use within an automatic weapon) remain controlled by the ITAR under USML Category III.

0A602 – Guns and Armament: This ECCN controls guns and armament (and their parts) manufactured between 1890 and 1919, as well as military flame throwers with an effective range less than 20m. Export restrictions on these commodities are eased, as they do not provide significant military advantage. Modern artillery remains subject to the ITAR under USML Category II. Black powder guns and armament manufactured in and prior to 1890 (and their replicas) have been designated as EAR99.

0B501 – Test, Inspection and Production Equipment for Firearms

0B505 – Test, Inspection and Production Equipment for Ammunition

0B602 – Test, Inspection and Production Equipment for Guns and Armament: These three 0Byyy ECCNs cover “test, inspection and production” equipment for the development or production of firearms, ammunition and (antique) guns. It also extends controls over jigs, fixtures and other metal working implements and accessories

designed to be used in the manufacture of firearms, ammunition, ordnance or guns.

0D501 – Software for Firearms

0D505 – Software for Ammunition

0D602 – Software for Guns and Armaments:

These three 0Dyyy ECCNs govern software specially designed for the development, operation or maintenance of their respective subject matter categories.

0E501 – Technology for Firearms

0E502 – Technology for Shotguns

0E504 – Technology for Sighting Devices

0E505 – Technology for Ammunition

0E602 – Technology for Guns and Armament:

These five 0Eyyy ECCNs govern the export of technical data for their respective subject matter categories. Given the current state of litigation over 0E501 and the issuance of an injunction by the courts, it is possible that the language within 0E501 will change or be modified within coming months.

Removed ECCNs

The following nine ECCNs will be removed, as they have been incorporated into the newly created 0X5yy ECCN categories:

0A918 and 0E984 – Removes the controls over technology for the development, production and/or use of bayonets.

0A984 and 0E984 – Controls over shotguns have been modified and are now controlled under 0A502 or 0A505.

0A985 – Controls over electro-shock weapons have been modified and incorporated into ECCN 0A503.

0A986 and 0E986 – Controls over shotguns shells, equipment to load ammunition and related technology have been modified and incorporated into ECCNs 0A505, 0E502 and/or 0E505.

0A987 and 0E987 – Controls over firearm optics and related technology have been mod-

ified and incorporated into ECCN 0A504.

While the new regulatory scheme seems overly burdensome, the reality is that the new regulations should assist in making the export of U.S. arms and equipment easier. Admittedly, the new scheme will require new training throughout the industry to include Commerce Department licensing officers, U.S. Customs officials, foreign end users, manufacturers and exporters. As the barriers to arms export fall, one should anticipate a wave of new “international arms dealers,” who believe that they can effectively export arms with little or no industry experience and who believe that they can export with minimal regulatory interference. In reality, strong controls on the export of arms remain in place under the new regulatory scheme, with the same (or greater) penalties in place for conducting an improper export. As general advice, manufacturers and foreign end users should continue working with existing partners who are well-versed in the export of arms and equipment to avoid civil and criminal penalties for export violations. In return (and with the benefit of time), the industry should see increased export sales under the new regulatory scheme. **SADJ**

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Mr. Wong is a Washington licensed attorney. He regularly provides legal counsel to the firearm and defense industry via his law firm, The Firearms Law Group. Mr. Wong also manages Hurricane Butterfly, an import/export company that assists firearm manufacturers, resellers and collectors from around the world wade through the regulatory quagmire of U.S. import/export regulations. The preceding article is not intended as legal advice and should not be taken as legal advice. If the reader has specific legal questions, seek competent legal counsel.



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