

SMALL ARMS

DEFENSE

JOURNAL

sadefensejournal.com | VOL 12, NO 6



BLACK RAIN ORDNANCE

CLINT CAPERTON TALKS AR CUSTOMIZATION

2020 NDIA AWARDS

MEET THIS YEAR'S CHINN, HATHCOCK & AMBROSE RECIPIENTS

KWESST MICRO SYSTEMS INC.

TRANSFORMING TACTICAL TECH

THE **ULTIMATE** MOBILE ARMORY



12-Pack Deployable
Rifle Locker

Waterproof, MIL-STD, and virtually indestructible, this Rifle Locker is designed to secure and protect (12) M4 or M16 rifles, with six rifles secured in each half by a single padlockable security bar enabling rapid deployment. Built-in tow handles and wheels provide ease of transport in all types of environments.

Custom configurations available. Contact us for more information.



**MILITARY
APPROVED**

skbcases.com/military
800.783.0087

©2019 SKB Corporation

NEXT-GENERATION TECHNOLOGY

IT'S IN OUR DNA

Textron Systems' Next-Generation Squad Weapons (NGSW), the CT 6.8 mm Rifle and 6.8 mm Automatic Rifle + Ammunition, are redefining the future of small arms.

We never settle.

JOIN US ONLINE AT
AUSA NOW



Cased Telescoped 6.8 mm Rifle



Cased Telescoped 6.8 mm Automatic Rifle



TextronSystems.com



© 2020 Textron Systems Corporation.

TEXTRON Systems

HK
HECKLER & KOCH

WINCHESTER 

Hosted by



REPUBLIC OF TURKEY
MINISTRY OF NATIONAL DEFENCE



Under the auspices of the
PRESIDENCY OF THE
REPUBLIC OF TURKEY

Under the Management and
Responsibility of



TURKISH ARMED FORCES
FOUNDATION

Eurasian Meeting

IDEF'21

15th International Defence Industry Fair

MAY 25 - 28, 2021

BÜYÜKÇEKMECE - İSTANBUL - TURKEY

www.idef.com.tr

TÜYAP

www.tuyap.com.tr

SUPPORTED BY



REPUBLIC OF TURKEY
MINISTRY OF FOREIGN AFFAIRS



REPUBLIC OF TURKEY
MINISTRY OF TREASURY AND FINANCE



REPUBLIC OF TURKEY
MINISTRY OF INTERIOR



REPUBLIC OF TURKEY
MINISTRY OF CULTURE AND TOURISM



REPUBLIC OF TURKEY
MINISTRY OF HEALTH



REPUBLIC OF TURKEY
MINISTRY OF INDUSTRY
AND TECHNOLOGY



REPUBLIC OF TURKEY
MINISTRY OF AGRICULTURE
AND FORESTRY



REPUBLIC OF TURKEY
MINISTRY OF TRADE



REPUBLIC OF TURKEY
MINISTRY OF TRANSPORT
AND INFRASTRUCTURE



TÜYAP İSTANBUL



TÜYAP FAIR CONVENTION AND CONGRESS CENTER
Büyükkçekmece, İstanbul / Turkey

THIS FAIR IS ORGANIZED WITH THE AUDIT OF TOBB (THE UNION OF CHAMBERS AND COMMODITY EXCHANGES OF TURKEY) IN ACCORDANCE WITH THE LAW NO.5174.

PHOENIX DEFENCE



- FOREIGN WEAPONS & MUNITIONS
- DEFENSE CONTRACTING
- MK-19/M2HB REBUILD PROGRAMS
- IMPORT/EXPORT
- ARMORER/OPERATOR TRAINING
- CONSULTING
- BROKERING

702.208.9735

INFO@PHOENIXDEFENCE.COM

WWW.PHOENIXDEFENCE.COM



CONTENTS

NOV/DEC 2020 | VOLUME 12 | NUMBER 6



50



32



ON THE COVER

A participant at the Oklahoma Full-auto Shoot and Trade Show (OFASTS) tests a **Black Rain Ordnance** (BRO) custom-built AR, with a laser-engraved American flag made specifically for the shoot. BRO is able to customize any AR, using U.S. products and providing a lifetime warranty.

PHOTO: BLACK RAIN ORDNANCE

See story on page 12

FEATURES

- 12** **BLACK RAIN ORDNANCE UNLOADS AT OFASTS—AN INTERVIEW WITH SALES DIRECTOR CLINT CAPERTON**
MILES VINING
- 18** **CENTER-T—RUSSIAN TRAINING IN THE LAS VEGAS DESERT**
LYNNDON SCHOOLER
- 20** **ADVANCED WEAPON TECHNOLOGIES—.308 LEO SNIPER RIFLE PACKAGE**
JOHN BIBBY
- 26** **NDIA SMALL ARMS GROUP AWARDS 2020**
DAN SHEA
- 32** **THE ZID A-545 ASSAULT RIFLE—IS THIS THE RUSSIANS' SCAR?**
MAXIM POPENKER
- 40** **EDITORIAL SPECIAL: LONG-RANGE OPTICS**
- 50** **HIT PROBABILITY—THE PRACTICAL APPLICATION OF PRECISION FIRE**
CHRISTOPHER ROBERTS
- 54** **THE HUNGARIAN FÉG KGP-9 SMG—HUNGARIAN SERVICES SEARCH FOR COMPACT FIREPOWER**
KRISTÓF NAGY
- 58** **ORDNANCE ODDITIES—ODDS & ENDS**
ROBERT BRUCE
- 66** **THE FUTURE THREAT—ESTABLISHING A “DIVISIVE” ADVANTAGE**
PAUL EVANCOE
- 74** **SMART SOLUTIONS TO SOLDIER SYSTEMS—AN INTERVIEW WITH KWESST MICRO SYSTEMS INC.’S DAVID LUXTON AND JEFFREY MACLEOD**
MILES VINING
- 77** **DISPATCHES**
—MODIFIED NSV SOLD AS ANTI-MATERIEL RIFLE IN YEMEN
JONATHAN FERGUSON
—SOUTH AFRICAN POLICE SEIZE CHINESE CS/LS5 SUBMACHINE GUN
JONATHAN FERGUSON

COLUMNS

- 8** **NEW PRODUCTS**
- 80** **INDUSTRY NEWS**

CORRECTION & CLARIFICATION

On the cover of **SADJ** Vol. 12, No. 5, we listed “Advanced Weapon Technologies, .308 LEO Sniper Rifle Package.” Regrettably, this story does not appear in this issue of the magazine. We apologize for any inconvenience this may have caused.



www.sadefensejournal.com

PUBLISHER

Chipotle Publishing, LLC

GENERAL MANAGER

Deborah Shea

OWNER/PUBLISHER

Megan M. Vukodinovich

EDITOR-IN-CHIEF

TECHNICAL EDITOR

Dan Shea

EDITOR

Lisa Weder

ART DIRECTOR

Adam Bucci

PRODUCTION COORDINATOR

Rachel Hoefing

TECHNICAL CONSULTANT

Frank Iannamico

DISTRIBUTION

Sara Lund

ADVERTISING

Megan Vukodinovich

Jayne Wynes

+1.702.565.0746

adv@sadefensejournal.com

CONTRIBUTING WRITERS

Robert Bruce

Todd Burgreen

Alton P. Chiu

Dr. Philip H. Dater

Leszek Erenfeicht

Paul Evancoe

Michael Heidler

Heebum Hong

Jean Huon

Frank Iannamico

N.R. Jenzen-Jones

Richard D. Jones

George Kontis, P.E.

Julio A. Montes

Tom Murphy

Ronaldo Olive

W. Hays Parks

Christopher M. Rance

Robert G. Segel

Dan Shea

Michael Smallwood

Miles Vining

Oleg Volk

Tony Williams

Jason M. Wong, JD

CHIPOTLE PUBLISHING, LLC

631 N. Stephanie St. #282

Henderson, NV 89014

T: 702.565.0746 | F: 702.567.2425

office@sadefensejournal.com

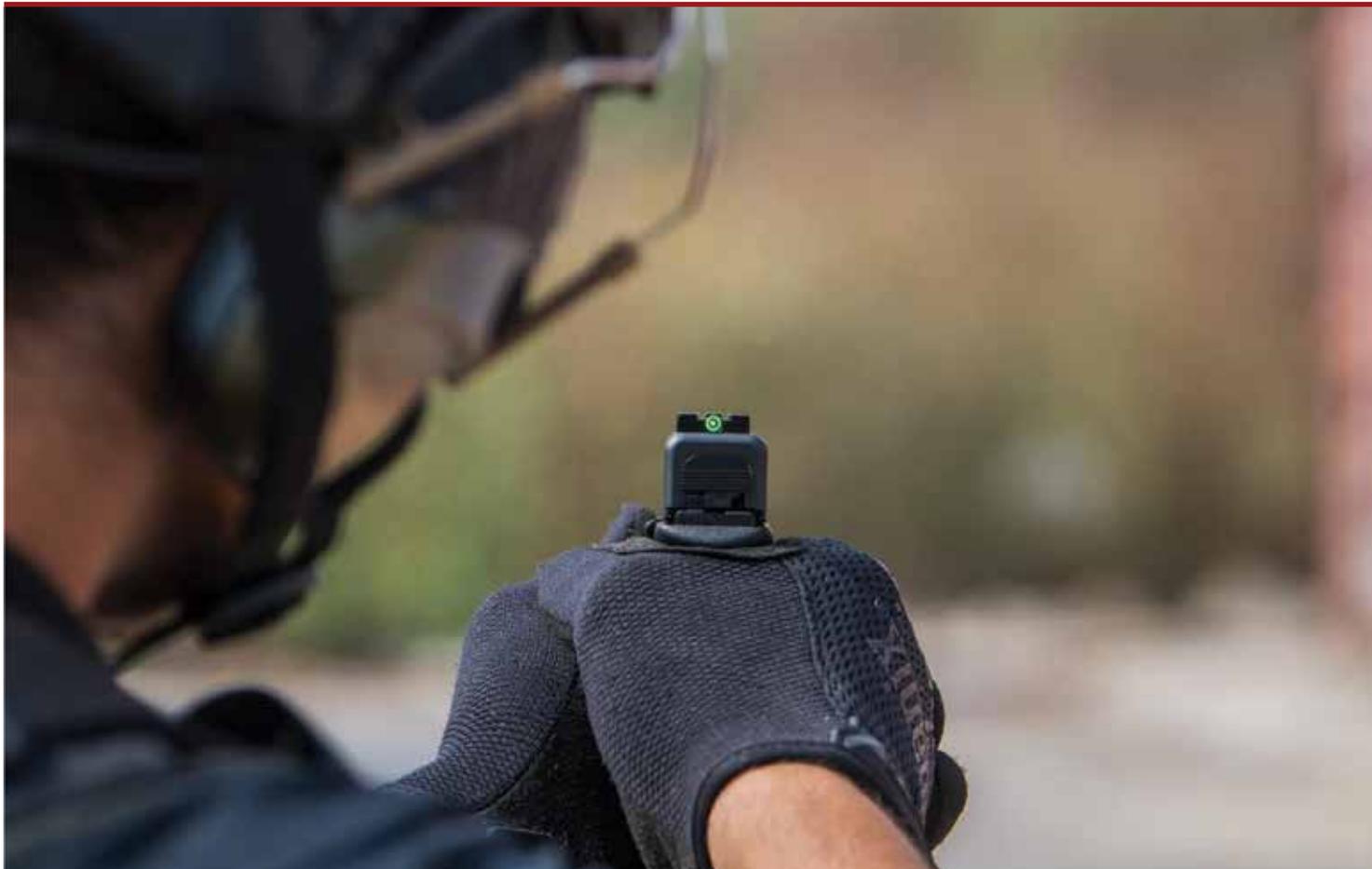
www.chipotlepublishing.com

For *Small Arms Defense Journal* article submissions, please contact Rachel Hoefing at: rachel@chipotlepublishing.com. For *Small Arms Defense Journal* New Products submissions, please send to: newproducts@chipotlepublishing.com.

Small Arms Defense Journal is published by Chipotle Publishing, LLC, 631 N Stephanie St. #282, Henderson, NV 89014 USA. Telephone: +1.702.565.0746 Fax: +1.702.567.2425. Email: office@sadefensejournal.com. Copyright ©2020. All material contained in *Small Arms Defense Journal* is copyrighted, and no portion may be reproduced in any way without the written permission of the publisher. US subscriptions are USD \$39.95 for 1 year (6 issues). 1 year international first class is USD \$69.95. Subscription prices are subject to change without notice.

Small Arms Defense Journal is not responsible for the misuse of any information contained in this publication. We do not endorse any item or practice offered in any ad or article in this publication. The opinions expressed are those of the individual writers. For advertising information, writer's guidelines or to subscribe, call +1.702.565.0746. Publisher assumes all North American Rights upon acceptance and payment of all manuscripts. Printed in the USA.

NEW PRODUCTS



MEPROLIGHT™

MEPRO FT Bullseye Pistol Sight

Originally developed for the civilian market, Meprolight has introduced the **Mepro FT Bullseye optical pistol sight** to law-enforcement and HLS forces. Based on a compact optical illumination patent, the sight's fiber-optic tritium combination creates a low-profile, single rear sight. This enables instant and accurate shooting in all light-

ing conditions with no batteries needed. It is easily installed on an existing pistol dovetail and is activated from the moment the sight is installed on the pistol. The sight's compatibility to a variety of pistol models/holsters adds versatility, simplicity and cost-effectiveness to the various forces' existing arsenal. meprolight.com



ACCURACY INTERNATIONAL





SAFARILAND

Integrated Light / Handle for PRO-TECH® X Series Ballistic Shields

The Safariland Group (Safariland) introduced its next generation **Safariland® PROTECH X Series ballistic shields** featuring the **FoxFury® Taker B70 integrated shield light and handle**. The X Series lightweight shield with its integrated lens cap combined with the feature-laden light / handle design provides a clean look and further reduces the overall weight. Two handle options are offered: the standard horizontal handle or a 3-position handle design co-developed by Safariland in partnership with FoxFury®. The exclusive 3-position handle is ambidextrous and features ergonomically designed pressure switches which are easily activated by the thumb.

The X Series models with the FoxFury Taker B70 Integrated light and handle feature a top-of-the line LED light with the functionality merged into the handle design. The cord-free light is bolted to the shield through the handle and is powered by six CR123 batteries which are incorporated into the handle.

safariland.com / foxfury.com



ACCURACY INTERNATIONAL LTD

AX50 ELR Anti-materiel Rifle

The **AX 50 ELR long-range anti-materiel rifle** is a multicaliber rifle system. The rifle has been produced in line with NATO standards based on operational experience and requirements. The rifle as supplied is configured in .50 BMG and can be converted to .408 CheyTac® or .375 CheyTac. Features include an Arca-Swiss-style tripod mounting rail under the forend grip, barricade supports, Accuracy International's (AI) patented QuickLoc barrel system and 10-round double stack magazines. Devised as an upgrade, it is the latest iteration of the AW50 rifle and is built to withstand sustained, heavy usage.

accuracyinternational.com



IT TAKES A SPARC TO LIGHT A FIRE

SPARC® AR
RED DOT



NEW PRODUCTS



PROOF® RESEARCH

Conviction Ti LR Precision Tactical Rifle

PROOF Research has announced a new lightweight, tactical long-range rifle that combines a titanium receiver with PROOF Research's match-grade, carbon-fiber barrel and laid carbon-fiber stock. With a starting weight of just 6 pounds, 6 ounces, the **Conviction Ti** is backed by PROOF Research's SUB ½ MOA guarantee. The ergonomic design features an adjustable cheekpiece, a near-vertical grip, low-profile flush cups, integral rail and a wider forearm to accommodate an EFR mount. Also, the Conviction Ti is available with a right- or left-handed titanium action, a TriggerTech trigger and a Pachmayr® recoil pad. Even fully kitted with a scope, suppressor and bipod, the Conviction Ti rifle weighs less than 13 pounds, half the weight of traditional tactical rifles.

proofresearch.com



DIAMOND AGE

Advanced NeoSteel™ Tactical Helmet

Texas-based, materials science and ballistics specialists, Diamond Age, have unveiled their latest addition to the tactical helmet market with the introduction of the new **NeoSteel™ Helmet**, a modular designed tactical-style helmet comprised of the most technologically advanced metal alloys. Revolutionary in design, function and material capability, the NeoSteel Helmet is an evolution in personal protection. Designed to meet the ever-changing needs of police and military personnel, including reserves and auxiliaries, the NeoSteel Helmet is the result of years of scientific research and development to ensure a high level of ballistic performance (VPAM-3 + Special Threats) at the lightest possible weight with all-day comfort and balance characteristics.

diamondage.org

QUANTICO TACTICAL

ATAK-Enabled Gear from Safran Optics 1

Quantico Tactical® and Safran Optics 1 have teamed up to offer the latest in Android Tactical Assault Kits or **ATAK-enabled devices** for the dismounted soldier. ATAK is an app-based technology that identifies and views teammates, targets and route points. Operators can also see terrain, topographical elements and even weather.

The **Optics 1 Enhanced Clip-On Thermal Imager** (ECOTI) provides unmatched detection capability and situational awareness by adding a long-wave infrared thermal overlay on the user's night vision device (NVD). The ECOTI is a low power consuming thermal sensor that mounts to existing NVDs. The ECOTI has a heads-up display that provides real-time, geo-referenced navigation information.

The **Optics 1 Enhanced Clip-On SWIR Imager** (ECOSI) bears the same physical design as the ECOTI, yet provides short-wave infrared (SWIR) overlay on to the user's NVD. It helps see out-of-band short-wave infrared items like strobes, markers, beacons and other



Optics 1 Enhanced Clip-On Thermal Imager

devices. The ECOSI also integrates augmented reality through the use of ATAK.

The **Pocket Laser Rangefinder, PLRF25C**, is a reconnaissance, surveillance and targeting device, also by Optics 1. The PLRF25C is a small, lightweight and ruggedized laser rangefinder that connects via Bluetooth® to wirelessly transmit distance, azimuth, inclination, horizontal distance and vertical distance to a target. The ATAK unit will automatically populate the target



Optics 1 Enhanced Clip-On SWIR Imager



Pocket Laser Rangefinder, PLRF25C

location information on the ATAK map. [quanticotactical.com / optics1.com](http://quanticotactical.com/optics1.com)

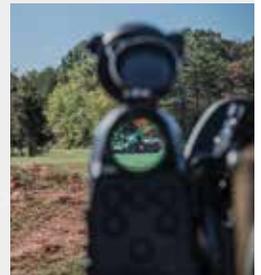


FCS13RE™

SELECTED
BY THE
U.S. MILITARY

A direct view optic for crew-served weapons that greatly increases first round hit probability on both static & moving targets.

- Day / night use optic
- Onboard ballistic computer
- Integrated laser range finder
- Ballistically compensated 2 MOA red dot
- Programmed for use on: M3E1 MAAWS, M2 .50 BMG, MK 19 & MK 47 Grenade Launchers, H&K GMG, AT4, M240D/H, & M134D Minigun
- Communicates with programming units for 40mm HV airburst munitions
- Available accessories: 3XL Magnifier & TH60 clip-on thermal imager



THANK YOU TO THOSE WHO SERVE.
Discount for First Responders and U.S. Military at www.aimpoint.us

Aimpoint®



Black Rain Ordnance



Tripod-mounted AR-15 set up for a shooter on the line. Caperton mentioned that this was great for children as they didn't have to use their limited strength to muscle the rifles on full-auto.

Unloads at OFASTS

An Interview with Sales Director Clint Caperton

By Miles Vining



"We the People" engraved receiver with an American flag Cerakote behind it.

Small Arms Defense Journal recently caught up with Clint Caperton, the Military/LE sales director from Black Rain Ordnance. The company had just gotten done with the Oklahoma Full-auto Shoot and Trade Show (OFASTS) when we were able to get in touch and ask about its participation there.

What makes Black Rain Ordnance really stand out in the AR-15 world today?

Clint Caperton: Well, a lot of what we do is custom stuff. And especially right now in today's climate with the firearms market going absolutely crazy, we're pushing out a lot of custom rifles. Even our distributors, our box stores, places like that are getting a lot of custom and one-off rifles or pistols. We're trying to be completely different from your standard AR-15 that everyone's seen for the last decade or better, when the AR-15 market has become so popular.

What kind of company culture allows that to happen?

Caperton: We take pride in the fact that from day one, all of our founders, our company management, all of our team, are blue col-

lar people. We've all come from the working class. We're not a big corporate suit and tie executive kind of outfit. Our president and founder comes from a first responder background, fire services for 14 years, grew up in the gun world; his family had gun stores and pawn shops and things of that nature, so it was kind of in his blood. Our vice president had a career in juvenile detention. He was a juvenile officer in the state of Missouri for his career. And then, the other individuals involved, most of our core leadership team have military, law enforcement, first responder-type backgrounds. That's kind of how we pushed into the market over 11 years ago with our billet receivers. There were only a handful of manufacturers that did those high-end, billet-type ARs. And that's where we built our brand and started into the mar-

ket was high-end custom ARs, primarily in our billet design and our drop-in triggers, stainless barrels, all of that. And of course, our lifetime warranty. We work hard to build a great product, and we work very hard to stand behind it. We take pride in our customer service as well.

What does every Black Rain rifle have that customers are going to get on top of their custom package?

Caperton: Everything that we make, whether it's our most plain-Jane, entry-level patrol rifle on a forged platform or our high-end billet hunting line, it doesn't matter; everything we build we take pride in the fact that we use U.S. products. Lifetime warranty on everything we do. And customer service, if someone has an issue,



The 9x19mm Ion 9 submachine gun with custom engravings, an example what Black Rain is capable of. From one of the engravers himself: "One of our guys came up with waves, and we kind of just ran with it. From ... the conception of the idea all the way up to the execution of laser work, and also with all of the custom Cerakote that went into it, it's all of our team and all done in-house at Black Rain. The Japanese quote is translated as, 'The weak are the meat that the strong eat.'"

which is rare, but if there is an issue we absolutely stand behind our product. We use 7075 billet receivers, but not everything is billet as we also have forged receivers.

And then who makes your barrels? Where do your barrels come from?

Caperton: We have a variety; it just depends on the build. We try to start with barrel blanks and then go from there. Anything that is not done in our facility, we try to source to local machinists and then anything outside of that is still done to our specifications, to our standards and it is our product.

I know you said everything's custom, but what are you guys really working on and fine tuning this year?

Caperton: We don't really have anything as far as a new build or a new product line, nothing crazy this year. Last year we rolled out the 9mm platform—that was a big one. And then, last Shot Show we rolled out the 16-inch 9mm carbine—that gave those PCC [pistol-caliber carbine] shooters something to work with. We offer that in our Ion 9 series, which has the side charging handle, and then we also have it in our FalloutCQB



Some classic machine guns at a stand next to Black Rain Ordnance at OFASTS.

with the rear charging handle. And we are working right now on a shorter barrel. We had one at Shot Show, and we're hoping to be able to go to full production with that shorter barrel. We've got the prototypes, we've got the testing and stuff, we've just not been able to go to full production because the demand is so high right now in the market.

Awesome, so tell us about OFASTS. Heard you guys had some fun!

Caperton: OFASTS is a great event held every year. Basically, the entire firing line is full of collectors, dealers, manufacturers that have just about every machine gun you could imagine ... And then, all the people who come out to the event can hang out and watch, or they can buy magazines or belts and actually fire those machine guns. So, it's a pretty neat opportunity for people to get that once-in-a-lifetime experience to actually shoot a machine gun. And out on the range, they've got around 300 yards, and they've got everything you can imagine: cars, TVs, refrigerators, binary explosive targets, they set off full explosive charges, moving vehicles. They've got all kinds of stuff ... on the range for people to shoot at, so it's a pretty great event. It gives us a chance to kind of go and just hang out and get some range time with our customers and let them see the other side of products that you can't go and buy at Bass Pro Shops® or Cabela's®.

What full-autos did you bring out?

Caperton: We had a wide variety of AR builds out there. One was a custom, American flag-engraved rifle. That was a full-on custom machine gun that we did specifically for that shoot just to ... showcase our custom shop and some of the stuff we can do. And then, we had the Ion 9mm full-auto with all of the detailed laser work; that was blue and silver. Those were just very much full-on custom shop stuff to kind of showcase what our custom shop team can do with the lasers, the engraving and the Cerakote. We had several precision rifles out there—our .308 Predator platform that was suppressed. We had our 6.5 Creedmoor Predator rifles out as well. It's funny, because a lot of people came out there and shot machine guns, and we ended up with more people wanting to get on the precision rifles because a lot of people never had an opportunity to get on a rifle that's set up like that. We always have a couple out there at that event that are set up with high-end optics, silencers and stuff like that, so that essentially no matter what the range is, if you aim at it you can hit it.



Shooting the Patriot with an EOTECH holographic sight mounted.

Can you talk about your pedestal-mounted AR that was at the shoot?

Caperton: That's a fun one, especially for people who maybe aren't real excited about shooting a full-on machine gun just from the shoulder. That gives us the opportunity to let some of the other shooters who don't have a lot of experience be able to get on that. Kids love that one. It's mounted on a tripod; it's got the butterfly handles, kind of like what your old 50-caliber would have. It's just a really cool, solid, stable machine gun that basically anyone can shoot.

How much ammunition did you guys go through?

Caperton: I would guess we probably went through 12,000 or 15,000 rounds that weekend if I was guessing. That's not counting the other 50 lanes that were out there for other machine gun guys, manufacturers and dealers and stuff like that.

Are you guys going to be at the 2021 shoot as well?

Caperton: Oh, yes! **SADJ**



The nighttime shoot at OFASTS.



A shooter tries out a .308 Predator precision setup while on the range.

CENTER-T

Russian Training in the Las Vegas Desert

By Lynnndon Schooler

Naturally, it was the hottest day of the summer out in the high desert near Las Vegas. At 8 a.m., 10 pilgrims from different countries and walks of life convened at the Pro Gun Vegas shooting center to punish themselves in the 115-degree bare sun and at the mythic hands of Russia's Center-T guest instructor Dmitry Yermak (center-t.com). Yermak was in town to teach his AK Operator's Course No. 1, a real treat as he usually works out of his headquarters in Bryansk, Russia. As of late, he has taken up occasional travel using his years of experience as a former Spetsnaz operator to pass along the knowledge of all things AK to anyone willing to learn the way the Russians do. Anyone who has attended the Combloc-focused Red Oktober Kalashnikov shooting event will be familiar with the range upon which we stood. "Moon rocks" scatter the landscape in the annoyingly perfect size to come underfoot and knock you off-balance. Some blood has been shed on the range, mostly from the knees and hands of rushed, panicking and often clumsy students and competitors. The stones reflected the heat back up like a microwave. You could sense that Yermak enjoyed the uncomfortable nature of the course of fire.

Yermak's English was eclectic. It was obvi-

ous that his foreign language ability had come from general life experience rather than formal linguistic training. He would stand and explain shooting positions and movements through gesticulations and some light color commentary. We would do our best to follow directions, but at times there were still some miscommunications. This was part of the charm and created a "Russian foreign legion" experience. After all, even dogs can follow commands in Russian. Back in Russia, Yermak employs an international team of instructors from varying countries and military experiences. Each team member contributes different skill sets. Some teach tactical driving, others teach basic and advanced battlefield trauma response and first aid. The center offers PMC (Private Military Company) training, specializing in the AK as well as law enforcement use of force and Close-Quarter Battle (CQB) skills. Luckily for us, two students at the Las Vegas course spoke fluent Russian and English. As Russian Jews, they had immigrated to Israel and served in the IDF before moving to Canada. Canada's weapons restrictions over the AK precluded their training, so they travelled down to the lower 48 to learn and act as impromptu translators from time to time.

Yermak decided to begin shooting drills

from "patrol position"—guns slung up and the low ready. Our sweat-soaked hands slid on the pistol grips of our rifles as we waited for Yermak's accented call of "contact." We would bring our rifles to eye level and fixate upon the 10 paper silhouettes hung at about 50 yards away from us. The range was enclosed by three large berms, framing the shooting space and allowing movement of fire in all directions but backward. The silhouettes had small circles, about 5 inches across and 5 inches apart. We began to squeeze off some rounds. "If you miss the circle, you kill babushka," Yermak said with a twinkle in his eye. "Kill babushka means 25 push-ups." Yermak wanted to clearly reinforce that he expected students to hit what they shot at. We were not there to throw lead down range, but to refine skills and reinforce instincts on movement, gun mount and immediate action reloads and malfunction clearing. From his past career, Yermak explained that innocent bystanders are often near targets. Missing is unacceptable, and we certainly did not want to disappoint. Nonetheless, many push-ups were performed.

We moved on from basic shooting drills to malfunction clearing. Like a cranky school master, Yermak would walk beside students

R-T

while holding a long stick. While they fired, he would place the stick behind the AK's charging handle, causing a short stroke and inducing a malfunction. Everyone was interrupted sufficiently to clear his weapon with robotic, mechanical reliability; however, it was abundantly clear when a malfunction was about to happen to you. There was no surprise, and surprise can be useful in this kind of training. This developed into disassembly drills under stress. Students practiced fieldstripping their AKs while lying prone or on their back. Images of Russian children speedily stripping AKs from 1,000 YouTube videos came to mind. Why do they do this? Why is this important? Yermak explained that disassembly of the AK in a combat zone required not only speed but focused management of where the components are set aside. It was best practice, he explained, to place them on your chest while lying down, as hot parts quickly fall through melting snow and can be lost. As a long-time shooter in Alaska, I know how this can happen and can only imagine the stress of disassembly while mortar shells rain about in the fields and trench ways of Eastern Ukraine. I thought to myself how such a drill would reveal that my firing pin was broken or some other catastrophic failure that would not be a

quick fix, no matter how fast I tore down my rifle while lying on my back.

Overall, his teaching style was simple and soldier proof. The heat, push-ups and scrambling across rocks for nearly 8 hours was exhausting. If you plan to take a course with Center-T, remember that hydration is key. Just before we commenced the most physically intense section of the course, bounding from cover to cover like mountain goats across a rocky gorge, we ran out of time. Over the 8 hours, the heat had slowed us down, and the entire crew was ready to call it a day. No one had anything left, and we drained more than just our magazines and wallets.

Center-T

Center-T as a business, remains moderately busy, targeting just under one class per week throughout the year. Their small staff size allows for a high level of flexibility, offering classes at ranges literally around the world and may accommodate beginners to the most seasoned trigger pullers. Yermak explained to me that they prefer class sizes from six to 20 students for civilian and private contractors, but they're known to teach larger groups as part of government or security specialist training and may tai-

lor their proprietary training programs to their clients' needs, including seminars and special drill courses. Center-T's unique training programs have attracted the attention of private security firms and civilians interested in defense.

In a prior life, I had the pleasure to witness the closing drills of Yermak's Level 3 AK Operator's Course being conducted in Russia. The students there moved with the grace, fluidity and aggression of professionals. It was obvious that many had more serious training with the AK outside of the three-level course. Still, it was beyond doubt that any level student would have honed his or her skills to surpass 90% of AK owners.

Our 2-day course got us pretty far and truly made us a cut above from manipulations and movement. By the end, we were moving as teams, performing short barrier drills and tightening our groups while shooting and moving. Above all, Yermak instilled a strict code of safety. Each of our movements had a purpose, either for efficiency, accuracy of fire or safe handling. This made evident Center-T's dedication to proficiency in every regard, despite some unorthodox methods from an American perspective. I look forward to more instruction from Yermak. **SADJ**

Advanced Weapon Technologies

.308 LEO Snipe





r Rifle Package

An AWT .308 LEO sniper rifle.



Close-up detail of AWT's .308.

Story & Photography by John Bibby

Several months back, I took a 1,000-yard long-range precision class taught by Don Fraley of Advanced Weapon Technologies (AWT). As part of that class, we delved into a bit of the history of long-distance shooting, and as you may imagine, military and police sniper work came up. The military has mostly gone away from the .308 as it just doesn't have long enough legs to engage out past 600 to 900 yards, conditions dependent. What I was truly shocked to learn is the law enforcement community's average sniper shot from 2008 to 2018 was right at 70 yards. Each year it varied a bit, but rarely is a police

SWAT officer given the green light past 100 yards. There are many reasons for this, not the least of which is concern about where a potential miss might end up. It makes sense; it just shocked me.

Thinking about the normal distances such a platform is used made some in the class think the accuracy of the platform would not be as much of a consideration. It was explained that the distance limitation is often due to lawyers being attached to all bullets fired. This makes the accuracy of the rifle (and shooter) paramount. After mulling the idea over, it certainly made sense. Having a rifle that shoots 2.00 MOA at 100 yards is

not a big deal when the backstop behind your deer is 500 yards of hilly woods. In an urban environment, that same rifle with a backstop consisting of a diner full of hostages makes it a bit less useful.

Each evening after our time on the range, we retired to a local restaurant to share our lessons and successes of the day. One of those days, I decided to get into greater depth with Don regarding Law Enforcement Officer (LEO) Sniper / SWAT training and equipment. That led to my taking possession of one of his .308 sniper rifles for a test and evaluation. Before I could even do much more than make sure the barrel was sighted in properly,



Federal Gold Medal Match ammo.

a local agency found out I was in possession of the rifle and asked to test it. As a favor to both Don and the department, I ran it over and gave them the run of the gun. I am pretty sure they are ordering three rifles based on some very hands on testing.

Don Fraley machines his own Remington 700 variant (AWT Tomahawk) action. They are blueprinted, quite a bit beefier and precise compared to the factory offerings. It also comes with a receiver-mounted bolt release and an M-16-style extractor. The action is mated to a Wilson Barrel's select match barrel. These barrels have a 0.001 inch or less out of deviation from being perfectly straight. This precision is beyond the ability of current machining tools to accomplish. Wilson sorts barrels by air gauging. These are separated from their 0.002-inch tolerance match barrels. The author's rifle uses a blind magazine stock with aluminum pillar bedding, but many agencies opt for a chassis stock that allows the use of AICS mags. A large percentage of agencies utilize the Federal® Gold Medal® Match .308 rounds as their go-to round. With this in mind, AWT specifically tailors the chamber for that round.

AT A GLANCE

MANUFACTURER: Advanced Weapon Technologies

ACTION: AWT Tomahawk Bolt Action

CALIBER: .308 Winchester

CAPACITY: 4+1 with blind mag (5 or 10 with detachable box magazine)

BARREL LENGTH: 22-inch threaded barrel with seamless thread protector

TRIGGER: Timney 510 Elite single-stage, set at 2.5#

BIPOD: Harris

OVERALL LENGTH: Nominal 41.5 inches

FINISH: Olive Drab Cerakote as pictured, but customer has the choice

SIGHTS: 20 MOA rail, Nikon .308 Tactical, but several choices are available

STOCK: H-S Precision® stock (optional adjustable comb or full chassis stock)

PRICE: \$2,495 without optic (discount with LEO paperwork)

If I were an agency purchasing one of these rifles, I would choose the chassis system. It provides for a bit more rigid platform, as well as the flexibility of quick magazine changes. I realize LEO snipers are not sending dozens of rounds down range in an engagement. The goal is zero to one round. The magazines allow for a quick change from very thin-skinned rounds, reducing the risk of over-penetration of the target, to rounds more suited to penetrating windshields or other obstacles. With the detachable magazine

option, the shooter can quickly adapt as conditions change.

Performance

The real question is, "How does the rifle package perform?"

We will start out by saying this author is a pretty good rifle shooter. At that 1,000-yard class, I was able to shoot one 8-inch group at 1,000 yards and another two groups that measured just a hair over 10 inches. There is a difference between me and guys who shoot well for a living. I

can shoot tight groups fairly regularly when under no real pressure or time constraint. They do it almost every time, on command and under real pressure.

I put 80 rounds down range of the preferred LEO ammo, the Federal Gold Medal with the 168-grain Sierra MatchKing bullet. At 100 yards, my best group was 0.287 inch. I know, you say everyone can get lucky if they shoot enough rounds, and that is certainly true. It may even be true of that group. However, my worst group was 0.743 inch, and that likely had a user-induced flyer. My average group diameter (excluding two user error shots) was just under 0.450 inch.

If we do the math, that makes for even more impressive groups at 70 yards as well as some pretty interesting possibilities at 300 and 500 yards. Realize wind and other things will open the groups up as the distance grows; but from a math perspective here are the numbers:

	100yds	70yds	300yds	500yds
Smallest	.287in	.200in	.861in	1.435in
Average	.450in	.315in	1.350in	2.250in
Largest	.743in	.520in	2.229in	3.715in

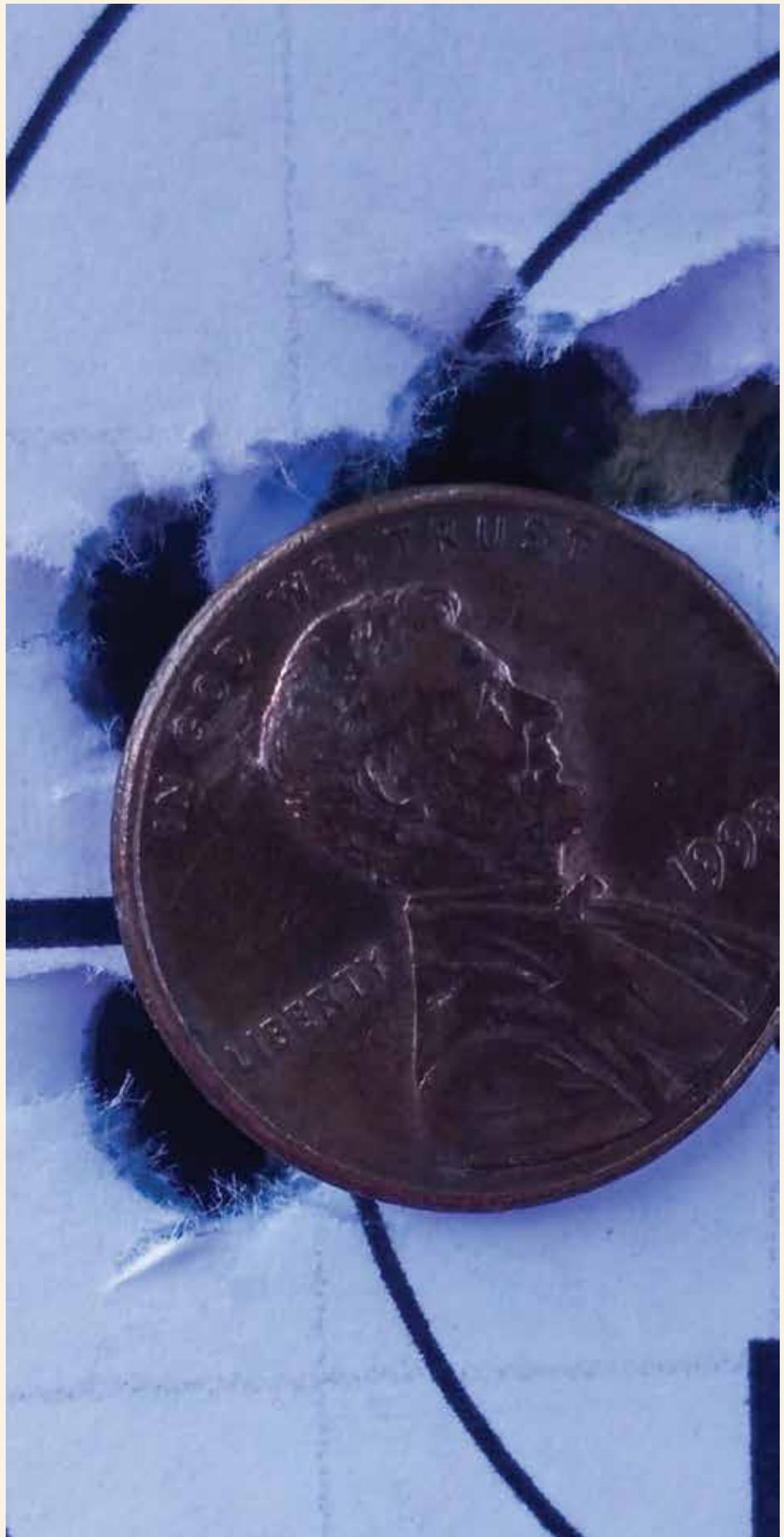
As I mentioned earlier, a single tight group is not a very good indication of precision. The extrapolated largest group is also not a true picture of real-world shots at 500 yards; they do show potential.

For some perspective, the bullet holes of the largest group at 100 yards would all make contact with a single penny (0.750 inch). The same group scaled up to the 300-yard size fits easily within the diameter of a baseball (2.94 inches). Couple that with the fact that this author doesn't know of any agency policy permitting shots past 300 yards, and one has a precise choice.

In further testing with alternative ammunition choices, two other brands shot pretty close to the Federal Gold Medal Match. Those groups were shot from 100 yards.

	Best	Average	Largest
Black Hills	.396in	.507in	.698in
168-gr Barnes TSX			
SIG SAUER	.398in	.648in	.797in
Elite 168-gr			

Perhaps even more amazing, of the nine match grade ammunition choices, the worst average group size for the 168- to 180-grain projectiles was 1.131 inches. Again, the perspective here is that of the nine tested choices, none of the average groups would exceed 3.50 inches at 300 yards. I am pretty sure with those kinds of results, this rifle package passes muster for just about any agency. **SADJ**



Penny overlay of a 0.750 group.

THE VICKERS MACHINE GUN

Pride of the Emma Gees



DOLF L. GOLDSMITH

Formerly The Grand Old Lady of No Man's Land: The Vickers Machinegun

Coming Soon!

\$129.95
PLUS S&H
RETAIL EDITION

Call our offices at 702-565-0746
to pre-order your copy today.

 **CHIPOTLE**
PUBLISHING, LLC

NDIA

SMALL ARMS GROUP AWARDS 2020

By Dan Shea

SADJ usually publishes the NDIA Small Arms Awards at the same time as the NDIA Armaments meeting. Obviously, in this crazy year, the events have been canceled—twice. In fairness to the 2020 award recipients, we wanted to publish this year, and during the 2021 JARCE meeting we will physically present the awards to the 2020 recipients, along with the 2021 awardees.

2020 Lt. Colonel George M. Chinn Award

Presented by

Mark McFadden, Joint Service Small Arms Program Office —JSSARI Chairman—NATO Dismounted Soldier Systems, Weapons and Sensors SubGroup U.S. Head of Delegation U.S. Army Futures Command, Combat Capabilities Development Command Armaments Center (CCDC-AC) ESIC/JSSAP

Augustine Funcasta Chief-Joint Service Small Arms Program Office U.S. Army Futures Command, Developmental Command (DEVCOM), CCDC-Armaments Center, ESIC/JSSAP

Mr. Ralph Mazeski

Mr. Ralph Mazeski spent over 40 years working on a wide variety of programs involving design, development, test, evaluation and production of various small arms ammunition (including grenades and flechettes) throughout his career. During his career as a U.S. government employee, he has been involved in numerous impactful programs and served in several key positions, which have allowed him to develop a tremendously broad and thorough knowledge of many aspects of small- and medium-caliber ammunition design, development, evaluation and production.

Mr. Mazeski graduated from the City College of New York (CCNY) in 1979 with a Bachelor of Science in Mechanical Engineering. He began his federal service at Picatinny Arsenal on 20 February 1979 as a Mechanical Engineering intern in the Small Caliber Ammunition Branch at the former Armament Research and Development Center (ARDC). He began his career at Picatinny/ARDC and quickly rose through the engineering ranks working on a variety of ammunition programs. As an engineering intern, Mr. Mazeski was assigned to the M249 Squad Automatic Weapon (SAW) ammunition development team (Project Office) where he participated in the design, development, test, evaluation and materiel



release of CONUS-produced M855/M856 ammunition (including the M27 link) for not only the M249 but the M16A2 rifle as well. During this time period, he also served as a member of the NATO 5.56mm Standardization Team (intimately involved in the famous "Trial of the 1980s") which ultimately resulted in the NATO selection of the 5.56mm caliber and the 62-grain heavy bullet and establishment of a NATO 5.56mm STANAG. Ralph was involved in the transition of the Belgian SS109 to the M855 (and the L110 Belgian Tracer to the M856), which required his dedication to various test facilities acquiring interior, exterior and terminal ballistics for these cartridges and furthering the SAW ammunition development.

He served on the Sergeant York project, assessing ammunition needs for the Self-Propelled Anti-Aircraft System (2x 40mm weapon systems). Mr. Mazeski also was the integrated product team (IPT) lead on the Advanced Rifle Grenade Munitions project, evaluating the possible utility of numerous rifle-launched grenades such as the bullet-through FN rifle grenade. Mr. Mazeski also served on a NATO Team of Experts assessing possibilities of standardizing rifle grenades.

Ralph Mazeski became a member of the JSSAP Advanced Combat Rifle (ACR) team where he provided engineering support and oversight to various contractors' efforts to include Colt and Hughes Helicopter. Four final designs were evaluated, and the U.S. military decided to stay the course with the M16 rifle. With the completion of the ACR program, Mr. Mazeski became a member of the JSSAP Air Bursting Munitions team where exploratory development was conducted leading to the establishment of the Objective Individual Combat Weapon

(OICW) system program and the Objective Crew Served Weapon (OCSW) program. He served as the ammunition IPT leader for both of these programs up through transition of these programs from the JSSAP office to PM Soldier Weapons. Other JSSAP programs that Mr. Mazeski has participated in during his 40-year career includes: the Objective Sniper Weapon (OSW) program; Light Fighter Lethality (LFL); Lightweight Family of Weapons and Ammo (LWFWA); Lightweight Small Arms Technologies (LSAT); the Next Generation Squad Weapons (NGSW); the Next Generation Family of Ammo (NGFA); Reduced Range Training Ammo (RRTA); and Lightweight Small Caliber Ammunition (LSCA).

During his career, Mr. Mazeski has also supported many other programs for PM Soldier Weapons, PM Maneuver Ammunition Systems and SOCOM, to include: Advanced Rifle Grenade Munitions (ARGM); the XM109 25mm Anti-Materiel Payload Rifle (AMPR); the XM307 Advanced Crew Served Weapon (ACSW) program; the XM25 Individual Semi-Automatic Airburst System (ISAAS); the DARPA EXACTO Guided Bullet program; Enhanced Sniper Technologies (EST)/Advanced Sniper Rifle (ASR) programs; Counter Unmanned Airborne Systems (CUAS); and the M17 Modular Handgun System (MHS) program. Ralph served as MHS SSEB team lead for the ammunition and ammunition GPR sections, leading to the selection of the new military pistol.

Mr. Mazeski also supported fielding of the 9mm M9 Pistol, 5.56mm M16A2 Rifle, 5.56mm M249 Squad Automatic Weapon (SAW), 7.62mm M24 Sniper Rifle and 7.62mm M240B Machine Gun and worked extensively on all next Generation systems up until his retirement.

Two things critically important for the Chinn Award: First, he authored over 50

technical publications/reports on a variety of technical topics including M856 trace profile improvement, Gas Tube Fouling (tracer ammunition) in the M16A2 and .50-cal enhanced flash suppression evaluation, to name a few. Second, he has mentored many in the small arms community. When he served as branch chief for the Small Caliber Munitions Technology Team since 2001 in the Munitions Engineering and Technology Center, at CCDC-Armaments Center, a primary objective was mentoring young engineers for the future.

Ralph Mazeski was involved in virtually every significant small arms effort (R&D/Fielding) for infantry systems over the last 40 years and had a critically positive influence on all of them. His vast knowledge and judgment helped progress the infantry weapon systems to new levels and ensured the U.S. military achieved the capability it needs to meet its overmatch requirements.

During his entire career, Mr. Mazeski was also active with the NDIA Armaments Forum over the last 30+ years and briefed and chaired various sessions. Mr. Mazeski also stayed in contact with corporate ballistic knowledge such as William Davis, Lou Behling, Troy Lawton, Col Frank Hackley, George Niewenhaus and many others in order to ensure engineering ideas were being vetted properly.

A polling of past recipients of the Chinn Award we could locate resulted in unanimous votes of confidence for Ralph Mazeski to become the 2020 LtCol George M. Chinn Awardee. Combined with letters of recommendation from numerous industry icons and military personnel, it was the Committee's pleasure to select Ralph Mazeski as the 2020 Chinn Awardee.

About the Chinn Award

The **George M. Chinn Award** is presented annually to honor a government or industry individual who, in the opinion of the Small Arms Division Executive Board, has made significant contributions to the field of small arms and/or infantry weapons systems. A significant contribution is considered to be a creative invention, new design or innovative concept in small arms weapons, ammunition or ancillary equipment that provides an advancement in the state-of-the-art or capability enhancement that clearly benefits the warfighting or general military capability of the United States. The Chinn Award may also be conferred as recognition to an individual who

has performed sustained, superior service in a career field of science, engineering, test & evaluation, manufacturing, program management, academic study & research, publishing or maintenance relating to military small arms or infantry weapons.

The Chinn Award is named in honor of Lt. Colonel George M. Chinn, a career Marine Corps officer who dedicated his life to the study, development and refinement of machine gun mechanisms. Lt. Colonel Chinn is remembered for his work as a gun designer and for having compiled a five-volume reference work titled, *The Machine Gun*.

Past Recipients of the Chinn Award

2019	Thomas B. Nelson	2011	Chuck Buxton	2003	Phil Baker & Georges Chauveheid	1995	Joseph Unterkofler
2018	Richard D. Jones	2010	Frank Puzycki	2002	Ernst Mauch	1994	Richard E. Brown
2017	E. Daniel Shea	2009	Joel M. Goldman	2001	L. James Sullivan	1993	Edward C. Ezell
2016	Philip H. Dater	2008	Troy Smith	2000	Salvatore A. Fanelli	1992	Not awarded
2015	Jim Schatz	2007	Bill Dittrich	1999	Vernon E. Shisler	1991	Roderic A. Spies
2014	George Niewenhaus	2006	Richard Swan	1998	George E. Kontis	1990	John S. Wood, Jr.
2013	Rudy Nedelka	2005	Rich Audette	1997	Robert A. Trifiletti	1989	James Ackley
2012	Dan Haywood	2004	Ronnie Barrett	1996	C. Reed Knight, Jr.	1988	Thomas E. Cosgrove

2020 GySgt Carlos Hathcock Award

Presented by

Sal Fanelli, SME—Small Arms & Ammunition

Pete Gould (SGM—Army SF Retired—Offensive Systems Development & Training, CTTSO AIM Coordinator, Small Arms and Ammunition, Tactical Operations Support (SETA Support), TSWG/CTTSO

MSgt Kevin Owens

The GySgt Carlos Hathcock Award is awarded annually to “an individual, who ... has made significant contributions in operational employment and tactics of small arms weapons systems which have impacted the readiness and capabilities of the United States military or law enforcement. A ‘significant contribution’ is considered to be superior performance of duties in an operational environment or the development of tactics or training.”

In the words of SGM Gould: I have been training military snipers for the last 17 years, and there have been many men [who] I have had the great pleasure to know and friend, [who] have been exceptional at their job and had, as one might say, superior performance. But this award is meant for someone [who] has changed the community due to [his] “significant contribution” not just doing [his] job well.

In wanting to stay with above definition, especially the “significant contribution” part, this is why we would like to nominate Kevin Owens. I have known Kevin since 2006, and he has always been the same since day one. Focused on doing the best that he can at any job the military gave him. Throughout his career, he has been deployed to four different continents and conducted numerous combat tours.

But again, this is just doing your job as a soldier, and even if it was [at] an exceptional level, this is not why we are nominating Kevin.

I met Kevin while he was a Team Sergeant on a Special Forces ODA in B Company 2nd Battalion, 3rd Special Forces Group (Airborne) and spent many hours with him doing training for his unit snipers. Kevin was always focused and always stayed late to learn as much as possible. Kevin also developed a passion for long-range shooting and competing and was successful at and won many competitions, including the International Sniper Competition. This, among other things, established him as a true SME in the world of long-range shooting. Kevin is constantly sought out by



his peers, superiors, foreign partners and industry on all things related to sniper systems development and training.

Although this is exceptional and hard to achieve, this is not the reason he is nominated nor should it be. Doing your job or hobby at an exceptional level is not what I think the Hathcock Award is for.

I see the Hathcock Award for someone that has changed the community in a “significant” way.

Kevin was selected to be the Non-Commissioned Officer in Charge (NCOIC) of the Special Forces Sniper Course (SFSC). Kevin spearheaded the change to bring SFSC into the 21st

century encompassing all the new and relevant changes in the community and lessons learned in combat. He saw that the program of instruction (POI) was decades behind, but because the way the instructors roll in and out of the schoolhouse, most do not put much effort into the exhausting process of trying to change the POI to be relevant to today’s modern sniper needs. I am not saying Kevin did it all by himself, as in most of major things that we are involved in, it takes a group effort. But Kevin was the spearhead and the one in the position to try to make the change. He was fortunate that his higher command was open and saw that Kevin wasn’t doing this as a feather in his hat or as a legacy program that “he” would be known for or in an effort to get a job on the outside. His superiors saw that Kevin was trying to fix something that was broken and was willing to work hard and work long hours doing it because he felt he owed it to his students. He was the first to start the new POI in a Level 1 school and was open in sharing his efforts with all schools when asked. It was normal for a sniper school to have an excessively high attrition rate. He showed you could teach more, make it harder and still pass 98%, setting the standard for all schools to get away from the “keeper of the badge” mind set.

He was also pushing for new and better technology for all Special Forces. He pushed the use of ballistic computers and gridded reticles, getting away from the norm of old school logbooks and limiting Mil dots of the past. This has now become the standard for all military groups worldwide.

His current assignment is NCOIC of the G8 (force modernization) for 1st Special Forces Command; he oversees how the command develops, accesses and selects next-generation capabilities for Special Forces soldiers. The Precision Sniper Rifle contract failed after two attempts to find a new sniper system for SF. Kevin reenergized the process, starting the Advanced Sniper Rifle (ASR) program. Kevin saw that this was really a blow to the soldier,



and bad contracts can keep equipment out of needy hands for years if not decades. So in his job of handling the ASR, he made sure the requirements were written based on reality, set a standard way of testing and made sure the contract would continue, and the soldier would not be left empty-handed if in the case that a company failed to produce, another award winner of the contract would be awarded the contract and deliverables would be as seamless as possible.

Kevin was sought out by U.S. Army, USMC [and] other DOD and DHS units specifically to assist in their modernization and capability selection processes which resulted in several units upgrading combat capabilities quickly. Kevin also works close with Canada, United Kingdom, Australia Special Operation Forces in advising on these processes. All of these organizations have programs underway to improve their senior capabilities both in

training and equipment.

Kevin also did the same for our ammo for these new weapon systems. Seeing that ammo is the biggest limiting factor, he set new standards for these contracts and has made sure the soldier in the field will get the equipment one needs to do his job.

Kevin has also been instrumental in the acquisition of new day and night visual augmentation systems for snipers, laser range-finders, handheld ballistic tools, etc.

As of today, Kevin continues to set all the standards as the NCOIC at the G8 ensuring Special Forces soldiers receive newly acquired sniper systems as fast as possible as well as looking to the future for the next-generation needs and solving capability gaps that arise across the commands.

Kevin Owens was nominated for the Hathcock Award in recognition of the huge changes for the whole community from what he has

done, and what is now taught in the military school. Not just teaching the new stuff. There are tons of instructors out there teaching and doing a great job, but Kevin made it a reality for the military by getting the POI changed.

His spearheading the progression of tools for the sniper such as ballistic engines and reticles in a world where few like something new, he was willing to show the benefits through knowledge. There are a lot of guys teaching this new stuff now, but Kevin was the one in the job [who] made it happen.

As well as the exceptional job he is doing at G8, he opened up information so qualified military units all over would not have to start from scratch and copy his efforts, but he would allow them to come be a part of the test and share results and how the new requirements would be written and how testing and evaluation and contract award would take place. This may sound like him just doing his job, but that would then indicate that no one before him ever did their job. I am not saying that.

I am saying Kevin has [made] a “Significant Contribution” to the sniper community and exceeds the requirements to be awarded the Carlos Hathcock Award.

In the words of Sal Fanelli: To quote Pete Gould, 2015 Carlos Hathcock Award recipient, who whole heartedly supports this nomination: “Master Sergeant Kevin Owens has immeasurably impacted the sniper community, across all agencies in the United States as well as our foreign special operations partners. I do not know any other individual in the U.S. DOD/DOS at this time [who] has a had a bigger impact across the spectrum of sniper training, equipping and making industry work hard to meet the new capability needs of snipers in combat.”

For the above reasons, Kevin Owens has been chosen by the Small Arms Committee as the 2020 recipient of the GySgt Carlos Hathcock Award.

About the Hathcock Award

The Gunnery Sgt Carlos N. Hathcock Award is presented to recognize an individual who, in the opinion of the Small Arms Division Executive Board, has made significant contributions in operational employment and tactics of small arms weapons systems which have impacted the readiness and capabilities of the U.S. military or law enforcement. A significant contribution is considered to be a superior performance of duties in an operational environment or the development of tactics or training. The Hathcock Award is named in honor of Gunnery Sergeant Carlos N. Hathcock, II, USMC, a career Marine who

dedicated his life to the service of this country in both the military and law enforcement communities. He was honest, tactful, considerate, courageous, quietly proud and determined in all things and all places from the range to the battlefield. “The Gunny” not only distinguished himself in combat as a scout sniper but also as a competitive marksman and trainer. In his capacity as a trainer, he not only significantly impacted the current United States Marine Corps Scout Sniper Program but also influenced the sniper programs of the other military services and similar law enforcement programs nationwide.

Past Recipients of the Hathcock Award

2019	Bryan Litz	2012	MSgt Craig R. LaMudge, USAF (Ret.)	2005	Pat Mitternight
2018	Stephen Toboz, Jr.	2011	SGM Jason Beighley	2004	Steve Holland
2017	Todd Hodnett	2010	Jeff Hoffman	2003	Larry Vickers
2016	W. Hays Parks	2009	Lt. Commander Robert J. Thomas	2002	Jim Owens
2015	SGM Pete Gould, USA (Ret.)	2008	J. Buford Boone	2001	Bart Bartholomew
2014	Not awarded	2007	American Snipers.org	2000	Charles B. Mawhinney
2013	MSG Jim Smith	2006	Allen Boothby	1999	Carlos Hathcock

2020 James R. Ambrose Award

Presented by

Steve Faintich, Sr. Director, Sales and Marketing, General Dynamics-OTS

Vista Outdoor Inc.

The James Ambrose Award is presented periodically to recognize, in the opinion of the Small Arms Division Executive Board, an Industrial Firm that has made outstanding contributions to the field of small arms systems. Vista Outdoor Inc. was chosen for the 2020 Ambrose Award.

While most people think of Vista Outdoor Inc. as a sporting company, they have a long history of supporting the U.S. military. Since the 1990s, they have manufactured millions of .300 Win Mag ammunition (MK 248 MOD 0) for the U.S. military and SOCOM. Their engineers have worked with the U.S. military over the last 5 years to develop an improved round and a new longer range version (MK 248 MOD 1).

Vista also developed and manufactured over 200 million rounds over the last 12-plus years of 5.56mm Frangible for U.S. military training. Currently, they have been awarded the new 5-year contract (MK311) for this ammunition with a new and improved non-lead primer.

After ammunition performance issues in Iraq and Afghanistan in the early 2000s, Vista developed and manufactured millions of improved performing 5.56mm and 7.62mm rounds (MK318 and MK319) for U.S. SOCOM



and the USMC. Versions have been developed in both lead (MOD 0) and non-lead (MOD 1). Vista also developed and manufactured millions of rounds of a more accurate, flash-suppressed and overall improved 7.62mm Long Range cartridge (MK316) for the U.S. military and SOCOM. Vista also participated on two contracts for the U.S. Army NGSAR program on developing next-generation ammunition for the future Squad Automatic Weapon.

Vista's scope also included pistol and shotshell ammunition. Vista developed and manufactured millions of hollow point, full-metal jacket and frangible pistol rounds for the U.S. Coast Guard. They have proudly manufactured various rounds for the Army Marksmanship Unit over the last 15 years (i.e., .45 ACP, .22 LR, etc.). Vista also supplied various shotshell ammunition to the U.S. military over the last 15 years (i.e., tactical buckshot, frangible door breaching, etc.) and developed

a new 9mm round (EBR) with improved barrier performance for the U.S. military.

Vista has proudly supplied numerous federal law enforcement agencies. Over the last 10-plus years, they have held the majority of ICE / DHS' duty contracts for both pistol (Gold Dot and HST) and rifle (Tactical Bonded and Gold Dot), supplying hundreds of millions of rounds. During last 15-plus years, Vista has held multiple contracts with the FBI for various pistol (duty, training, frangible) and rifle (duty, training, sniper, frangible) ammunition. They have developed various products to meet the FBI's unique requirements and supplied hundreds of millions of rounds. Over the last 10-plus years, they have provided the U.S. Secret Service with its main pistol duty round and various other pistol, rifle and shotshell duty and training rounds. They also supply various other Federal LE agencies, such as FLETC, VA, DEA, U.S. State Department and U.S. Department of Justice.

In summary, Vista Outdoor Inc. has continually demonstrated its focus on emerging technologies, development of products and systems, establishment of enhanced production capabilities and integration of innovative weapons systems.

About the Ambrose Award

The James R. Ambrose Award is established and presented periodically to recognize an Industrial Firm which, in the opinion of the Small Arms Committee Executive Board, has made outstanding contributions to the field of small arms systems. An outstanding contribution is characterized by exemplary commitment and contribution to the Armed Forces by delivering superior materiel that meets required operational capabilities and supports a high level of force readiness in the conduct of warfighting activities or homeland defense. Such contributions may be shown through a record of continual demonstration of emerging technologies, development of products and systems, establishment of enhanced production

capabilities and integration of innovative weapons systems and supporting products and services required by the DoD and Allied countries.

The Ambrose Industry Award is named in honor of former Under Secretary of the Army, James R. Ambrose because of his recognition of the value and contribution of industry in meeting the needs of our National Defense. This was made unmistakably clear during his tenure from 1981-1988 as Under Secretary of the Army during the presidency of Ronald Reagan. He was a major force in the post-Vietnam modernization of all small arms weaponry where new and improved versions of the M16, M249 and M9 were purchased in large quantities as a result of industry competitions. **SADJ**

Past Recipients of the Ambrose Award

- 2019 Arrow Tech
- 2018 Wilcox Industries Corporation
- 2017 Oehler Research, Inc.
- 2013 SureFire
- 2012 Winchester Ammunition
- 2009 Otis Technologies
- 2008 St. Marks Powder

“THE BIGGEST GUN SHOW WEST OF THE ROCKIES!”

SMALL ARMS
REVIEW

IN CONJUNCTION WITH CROSSROADS OF THE WEST

PRESENTS

**SAR
WEST
2021**

VENDORS!
TO GET EARLY BIRD
PRICING-BOOK &
PAY BY 9/30

DECEMBER 3-5

Fri. 11am-5pm | Sat. 9am-5pm | Sun. 9am-4pm

ARIZONA STATE FAIRGROUNDS | 1826 W. MCDOWELL ROAD, PHOENIX, AZ

FOR SAR WEST TABLE RESERVATIONS

CALL 702-565-0746 OR EMAIL OFFICE@SMALLARMSREVIEW.COM

SARWESTSHOWS.COM

FOR CROSSROADS OF THE WEST TABLE RESERVATIONS CALL 801-544-9125 OR EMAIL GUNSHOWS@CROSSROADSGUNSHOWS.COM



An A-762 rifle being test-fired.

ZiD



V. KUZMIN

Early version of the A-545 rifle with red dot sight.

The ZiD A-545 Assault Rifle

Is This the Russians' SCAR?

By Maxim Popenker

About 2 years ago, in 2018, the Russian Ministry of Defense (MoD) officially announced results of the “Ratnik” trials in regard to new assault rifles. It recommended for adoption not one, but four rifles, in two calibers. Those included 5.45x39mm AK-12 and 7.62x39mm AK-15 rifles from the Kalashnikov group and 5.45x39mm A-545 and 7.62x39mm A-762 rifles from the Degtyarov plant, also known as ZiD.

The two Kalashnikov rifles represent the latest iteration of the classic design, originally adopted by the Soviet Army some 70 years ago. These rifles were recommended as potential replacements for an existing bunch of AK-type rifles in general service with the Russian military, including 5.45mm AK-74M and older 7.62mm AKM rifles. As of early 2019, the Kalashnikov group confirmed governmental

orders for at least 150,000 of the new 5.45mm AK-12 and 7.62mm AK-15 rifles, plus an unspecified number of export orders, and by the end of 2020, the Russian Army is expected to receive as many as 40,000 of the AK-12 rifles.

Rifles from the Degtyarov plant were recommended for adoption by Russian Special Forces, but until March 2020 there was no information whatsoever about upcoming orders for the A-545 and A-762 rifles. Many thought that those orders would never materialize at all because of the high cost of these weapons, which are noticeably more complicated than a typical assault rifle (either the AK or M16, or any other standard-issue gun of today). However, in late March 2020 a newspaper called, “Degyarevets,” published by ZiD, leaked news about preparations for production of the “new 5.45mm assault rifle for the Russian Army.”

Independent sources confirmed that this rifle indeed is the A-545, and in June 2020 the Russian MoD officially announced on its website that Airborne Forces are about to receive an unspecified number of 5.45mm 6P67 (A-545) rifles by the end of 2020.

Since the Russian Army is firmly set to rearm its main troops (Infantry, Airborne, etc.) with the next generation of Kalashnikovs, the A-545 is obviously intended for the SSO—the Russian Special Operation Forces, an independent structure within Russia’s Armed Forces, similar to the tasks and general concept of USSOCOM—and for a number of other specialized units. As such, it seems that the new A-545 rifle would serve in the same role as the U.S. Mk16 SCAR—a U.S. Special Forces assault rifle. It also must be noted that there is no information about the 7.62x39mm A-762, the



V. KUZMIN

An earlier version of the A-545 rifle with retractable stock.

bigger caliber brother of the A-545, which successfully passed the Ratnik trials.

A Closer Look

Since the A-545 rifle is rather unique, it warrants a more detailed look.

The most unusual and interesting aspect of the A-545 rifle is its so-called “balanced ac-

tion.” Originally devised in the mid-1960s by Soviet Small Arms Engineer Petr Tkachev, this system adds an additional gas piston and operating rod to an otherwise more or less traditional gas-operated action. It is a common fact that the unrivalled reliability of AK-type rifles comes, among other things, from a heavy bolt group reciprocating inside the re-

ceiver with significant velocity. Under normal circumstances, the AK-74 bolt group, which weighs around 500g, slams against the rear trunnion inside the receiver with terminal velocity of 3 to 4 meters per second. This creates a significant additional recoil impulse that disrupts aiming and increases muzzle rise during full-automatic or rapid semiauto fire.



SERGEY S.

A very early AEK-971 rifle from the Project Abakan trials.



V. KUZMIN

The left-side controls of an early version of the A-545 rifle.

An additional impulse is created when the same bolt group slams the front trunnion after chambering the next round. The simplest way to reduce shocks and vibration from these impulses is to adopt a “constant” or “soft” recoil system,” similar to that used in an Ultimax machine gun, where the bolt group does not hit the receiver upon its travel back. The Ultimax bolt group travels on very long recoil springs. However, this simple system results in a longer and heavier receiver and decreased reliability under harsh conditions.

Tkachev’s idea was to counter and neutralize these impulses with addition of the counter-mass, moving inside the gun in a direction opposite to the movement of the bolt group, while having the same velocity and, if possible, mass. That way shooters won’t experience additional recoil shocks from movement of the bolt group, and full-auto or rapid semiautomatic fire dispersion would be noticeably decreased without sacrificing the power necessary to overcome dirt, powder residue or frozen grease during extensive combat.



V. KUZMIN

Early version of the A-545 rifle; close-up view of firing controls.



V. KUZMIN

An earlier A-545 rifle, muzzle end and forward gas cylinder for balancing piece.

Starting in the late 1960s, balanced action assault rifles were designed in parallel at two leading small arms development centers, in Izhevsk (IZHMASH) and in Kovrov (KMZ or Kovrov Mechanical Plant). IZHMASH produced a line of rifles, designed by Mikhail Alexandrov, which started with the AL-5 and culminated in the unsuccessful AK-107. Early work by Kovrov/KMZ resulted in the complicated, expensive 5.45mm Konstantinov SA-006 assault rifle, which competed against the Kalashnikov AK-74 and eventually lost trials in 1972-1973; the SA-006 offered only limited improvements over the conventional 5.45mm AK, and that was only when firing short bursts.

Despite this setback, designers from KMZ continued their work on balanced-action rifles, which resulted in the AEK-971, a 5.45mm balanced-action weapon that was extensively tested during the Project Abakan trials of the 1980s and early 1990s, and lost it again, this time to the Nikonov AN-94, another unusual

rifle that featured an entirely different system. Undeterred, KMZ continued developing the AEK-971 until around 2006, when it passed all small arms development to another factory located in the same city, the aforementioned Degtyarov plant, or ZiD in short. During late the 1990s and early 2000s KMZ produced small batches of AEK-971 rifles for use by Russian police SWAT-type units, but the military remained generally uninterested in this gun, mostly due to the lack of funds. However, as early as 2003, some Russian Army officials stated that the next assault rifle for the Russian Army should have a balanced action, and, apparently, this concept was incorporated into official requirements for the Ratnik program.

In 2012, the Russian Army initiated the massive R&D program which, besides other things such as new combat uniforms and communication equipment, sought new and improved assault rifles that would be more effective and have improved ergonomics and modern sight

interfaces. For the Ratnik trials (Ratnik in medieval Russian means “warrior”), ZiD submitted severely modified balanced-action rifles, heavily based on the former AEK-971 but with a redesigned receiver and stock. As noted, those rifles eventually were recommended for adoption by Russian SF, and the final goal of our article is to describe these interesting rifles for western readers. In the course of tests, the A-545 rifle received an official GRAU index of 6P67, and A-762 was designated as 6P68.

It must be noted that while all descriptions below refer primarily to the current A-545 rifle, they are also applicable to the A-762 as well, which differs only by caliber and type of ammunition used. Differences from earlier AEK-971 rifles also are mentioned in the text, where applicable.

The Details

The A-545 assault rifle has a gas-operated, balanced action with rotating bolt locking. The bolt is of traditional “Russian school” de-



V. KUZMIN

Earlier version of the A-545 rifle with red dot sight.

sign, with dual frontal locking lugs. *Balancing* means that the gas system has two co-axial gas pistons. The primary gas piston has an annular shape and is linked via the tubular operating rod to the bolt carrier and operates as usual. The second gas piston is linked to a balancing steel weight at the front and moves in the opposite direction to the main gas piston, partly inside its hollow tubular body. As a result of this setup, the gas tube is a "T" shape and is open at both ends (front and rear), with the gas port located in the middle. Both pistons are synchronized through a simple gear (in early models) or two gears (in current production models). Gears are assembled into a small assembly which remains stationary inside the action when the gun is fired, as it forms an integral front part of the return spring guide rod. The synchronous and opposite movement of the balancing weight eliminates all major impulses except one generated by the projectile and burning powder, so the rifle becomes more stable during full-auto fire and vibrates less.

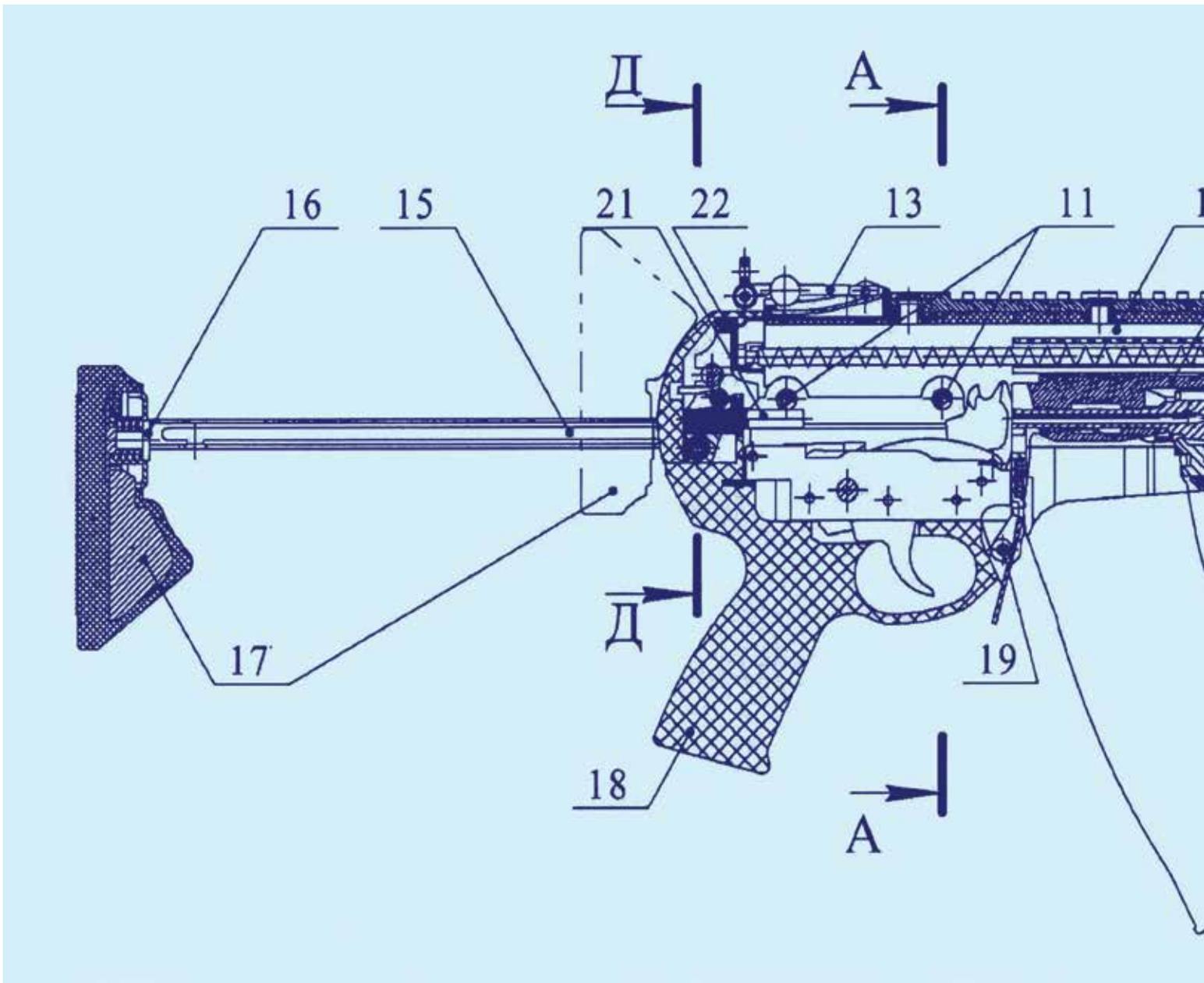
Production AEK-971 rifles had a side-folding plastic buttstock, plastic forearms and fire control grips and used standard AK/AKM

or AK-74 30-round magazines (depending on the chambering). They also featured safety switch/fire mode selectors of various designs, depending on the year of manufacture and factory. The fire selector normally permitted three modes of fire: single shots, three-round bursts and full-auto. Inner workings of the gun were accessible through a detachable top cover made from stamped steel.

A-545 rifle features numerous internal and external improvements over the earlier AEK-971. These include, among other things, a redesigned receiver with an integrated Picatinny rail on the top and hinged pistol grip / trigger unit at the bottom. Its receiver is made from steel, with plastic "wrapping," and the pistol grip unit is made from polymer. The rifle is now disassembled by removing the rear end-cap from the receiver, swinging the pistol grip down and then pulling out the bolt group with the recoil spring and synchronizing the gear cart as a single unit. Other features include ambidextrous fire mode selector / safety levers (with positions for safe, single shots, two-round bursts and full-auto) and an aperture rear sight. It interesting to note that early A-545

and A-762 rifles featured an HK-style drum rear sight, while later models replaced it with more a common type of tangent rear sight. The retractable shoulder stock is of somewhat unusual design. Its buttplate rides on two struts and can be adjusted between fully collapsed and fully extended conditions. To collapse the stock completely, the operator has to rotate the buttplate for half of the turn to either side, so its bottom end does not interfere with the user's hold on the pistol grip if the rifle is to be fired. However, in this position, the buttplate, which is held upside down, covers the line of sight for integrated iron sights. To alleviate this problem, the buttplate has a hole allowing one to aim the rifle through it, using iron sights.

As mentioned above, the A-545 features a diopter-type rear sight, adjustable between 100m and 800m. However, iron sights are mostly seen now as back-ups for red dot or electronic night sights, which can be installed using an integrated Picatinny rail that runs at the top of the receiver. The A-545 barrel features a quick-removable muzzle brake / compensator which can be replaced with a tactical sound suppressor, optimized for use with



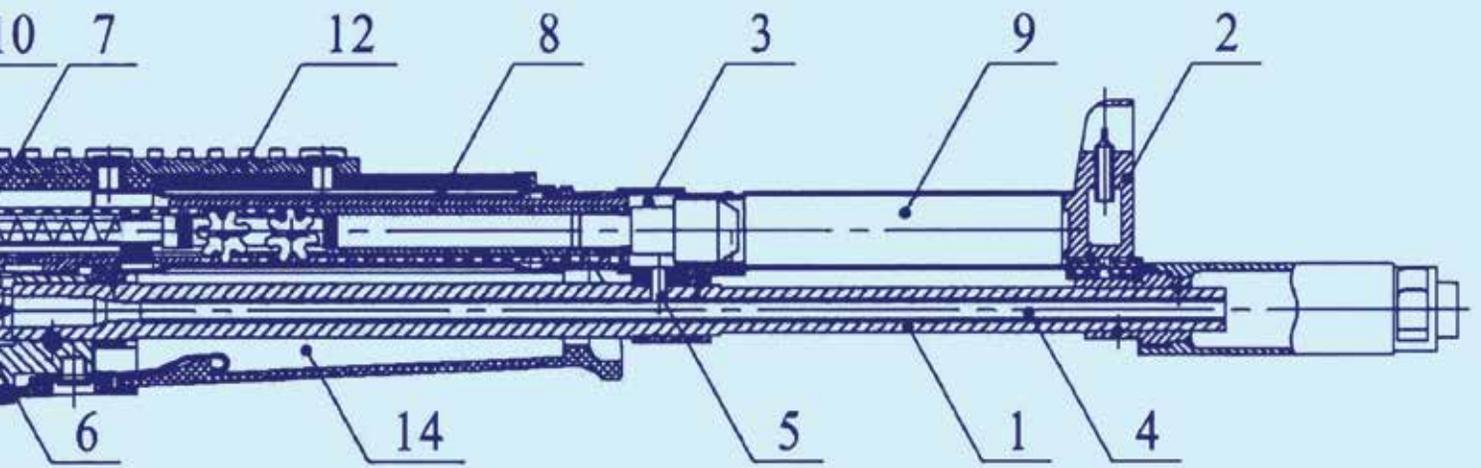
A patent diagram of the A-545.

standard-issue, supersonic ammunition.

According to published information, the A-545 indeed offers less dispersion when firing a two-round burst, compared to an AK-74M or an AK-12. In single shots, however, conventional Kalashnikov-type rifles proved to be more accurate during the Ratnik trials, although there's no explanation why. Overall, the Russian press quoted that the A-545 offered 10% more combat effectiveness compared to an AK-12 when used at ranges under 300m. At extended ranges, the AK-12 has a slight edge over the A-545, which is also close to 10%. When seen from an outside perspective, the A-545 appears to be more "modern," with its plastic lower receiver / grip unit, solid

top with integral Picatinny rail and ambidextrous controls; however, some of its features raise questions when the gun is actually handled. Its "HK-style" retractable stock with relatively small buttpad, which has to be rotated 180 degrees between the extended (combat) and fully collapsed (storage) position, is less than ideal and does not offer a good cheek-weld. Its balanced action requires more force to manually cycle the bolt, is noticeably more complicated and requires more meticulous and time-consuming maintenance when compared to AK-type rifles. Other less obvious but inherent set-backs of the balanced system are increased cyclic rate of fire, about 900-1,000 rounds per minute, and a slight loss of the

muzzle velocity due to more powder gases used up to cycle dual pistons. Unlike conventional designs, it is almost impossible to produce short-barreled PDW- or CQB-style rifles with balanced action without significant redesign. The final and probably most important problem with the A-545 is its cost. It is believed that the initial unit price, quoted by the factory to the Russian MoD, is several times higher than unit price of the new AK-12 in the same caliber. Considering that the A-545 offers only a stated 10% increase of combat effectiveness over a 200% to 300% increase in price, it is not hard to see why the A-545 and A-762 were recommended only for relatively small Russian Special Forces. **SADJ**



SPECIFICATIONS

CALIBER: 5.45x39 (A-545) or 7.62x39 (A-762)

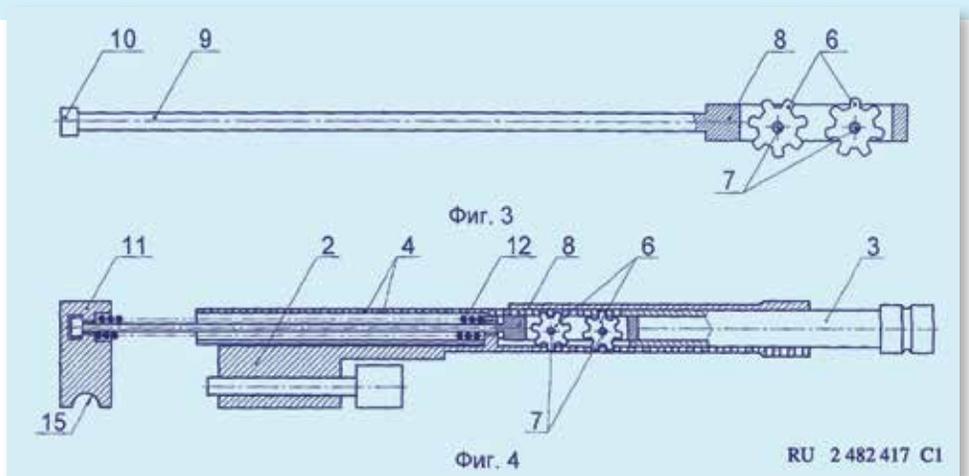
OVERALL LENGTH: 960mm

LENGTH WITH THE STOCK COLLAPSED:
720mm

BARREL LENGTH: 420mm

WEIGHT, WITH EMPTY MAGAZINE: 3.5kg

MAGAZINE CAPACITY: 30 rounds



A patent diagram for balanced action, as used in the A-545 rifle.

EDITORIAL SPECIAL: LONG-RANGE OPTICS



ARMAMENT TECHNOLOGY, INC.

Tangent Theta 5-25x56mm TT525P

The **Tangent Theta 5-25x56mm TT525P** is an extreme-range precision sighting instrument for professional marksmen. Designed for extreme conditions, the development team has used their extensive experience to optimize and refine it for unfailing ruggedness, precision

and image quality. Elevation and windage mechanisms have a tactile response and feature our TOOL-LESS RE-ZERO® feature.
armament.com

OPTICAL MAGNIFICATION: 5-25x

FOCAL PLANE (1ST OR 2ND): N/A

EYE RELIEF: 90mm

EXIT PUPIL: at 5x11mm

FIELD OF VIEW (AT 100M): at 5x, 4.3°–7.6m / at 25x, 9°–1.6m

ADJUSTMENT RANGE:

ELEVATION: 30 MRAD (103 MOA)

WINDAGE: +/- 10 MRAD (+/- 34 MOA)

RETICLE COLOR: Black

SOLUTION CALCULATION TIME: N/A

MENU: N/A

POWER SUPPLY: N/A

RANGING LASER: N/A

VISIBLE LASER: N/A

APERTURE: 56mm

RANGE: N/A

MINIMUM RANGE: N/A

RANGE ACCURACY: N/A

DIMENSIONS: 425x103x86mm

WEIGHT: 2.53lb / 1,150g

MSRP (USD): \$4,733

ATN

ThOR 4 640 4-40x

The **ThOR 4's** Thermal Sensor and Dual Core Processor technology delivers an impressive image, user-friendly features and capabilities that sight your scope in one shot and puts you on target quickly with its internal bullet drop compensator (BDC) and Wi-Fi dual stream video that now lets you record and stream at the same time!

atncorp.com



OPTICAL MAGNIFICATION: 4x

FOCAL PLANE (1ST OR 2ND): 2nd

EYE RELIEF: 90mm

EXIT PUPIL: N/A

FIELD OF VIEW (AT 100M): 8.3x6.2

ADJUSTMENT RANGE: ¼ MOA at 100yds

RETICLE COLOR: Multiple patterns & color

options

SOLUTION CALCULATION TIME: 1 sec

MENU: Graphical user interface

POWER SUPPLY: Internal Lithium-ion battery (16+ hrs)

RANGING LASER: N/A

VISIBLE LASER: N/A

APERTURE: N/A

DETECTION RANGE: N/A

MINIMUM RANGE: N/A

RANGE ACCURACY: N/A

DIMENSIONS: 14.8x3x3in / 375x76x76mm

WEIGHT: 2.35lb / 1.06kg

MSRP (USD): \$4,799

ATN

X-Sight 4K Pro 5-20x

The **X-Sight 4K Pro** is ATN's flagship, smart digital day and night vision rifle scope, packed with advanced features and technology. ATN brings the X-Sight series to new heights by incorporating a dual-core processor together with an ultra-sensitive HD sensor for crisp, vivid images day or night.

atncorp.com

OPTICAL MAGNIFICATION: 5x
FOCAL PLANE (1ST OR 2ND): 2nd
EYE RELIEF: 90mm
EXIT PUPIL: N/A
FIELD OF VIEW (AT 100M): 240ft (5°)
ADJUSTMENT RANGE: ¼ MOA at 100yds
RETICLE COLOR: Multiple patterns & color

options
SOLUTION CALCULATION TIME: 1 sec
MENU: Graphical user interface
POWER SUPPLY: Internal Lithium-ion battery (18+ hrs)
RANGING LASER: N/A
VISIBLE LASER: N/A

APERTURE: N/A
RANGE: N/A
MINIMUM RANGE: N/A
RANGE ACCURACY: N/A
DIMENSIONS: 14.9x3x3in / 379x76x76mm
WEIGHT: 2.2lb / 1.01kg
MSRP (USD): \$799



BURRIS OPTICS

XTR III 5.5-30x56mm

The Burrís **XTR III Premium 5.5-30x56mm** features glass and optical improvements, including a smaller eyepiece signature and larger eye box, and provides best-in-class field-of-view, deeper depth of focus and

OPTICAL MAGNIFICATION: 5.5-30x
FOCAL PLANE (1ST OR 2ND): 1st
EYE RELIEF: 3.5in
EXIT PUPIL: 1.86-11.2mm
FIELD OF VIEW (AT 100M): 23ft at 5.5x, 4.2ft at 30x
ADJUSTMENT RANGE: ¼ MOA
RETICLE COLOR: Black

SOLUTION CALCULATION TIME: N/A
MENU: N/A
POWER SUPPLY: N/A
RANGING LASER: N/A
VISIBLE LASER: N/A
APERTURE: N/A
RANGE: N/A

outstanding light transmission. Four front focal plane reticle designs and matching reticle and knob units allow shooters a variety of options.
burrisoptics.com

MINIMUM RANGE: N/A
RANGE ACCURACY: N/A
DIMENSIONS: Overall length 15.4in
WEIGHT: 32oz
MSRP (USD): \$2,159

EDITORIAL SPECIAL: LONG-RANGE OPTICS

BUSHNELL

Elite Tactical DMR II Pro

The **Elite Tactical DMR II Pro** riflescope combines the exceptional performance of the venerable DMR II but adds ED Prime Glass to increase resolution and virtually eliminate chromatic aberrations to make target acquisition faster and easier. Its 34mm main tube houses a locking windage turret, and on top is a dial-halting RevLimiter™ zero stop under the elevation knob.

bushnell.com

OPTICAL MAGNIFICATION: 3.5-21x50mm

FOCAL PLANE (1ST OR 2ND): 1st

EYE RELIEF: 4.0in / 101.6mm

FIELD OF VIEW (AT 100M): 25ft at 3.5x–5ft at 21x

ADJUSTMENT RANGE:

ELEVATION: 30.0 MIL

WINDAGE: 20.0 MIL

RETICLE COLOR: Black

SOLUTION CALCULATION TIME: N/A

MENU: N/A

POWER SUPPLY: N/A

RANGING LASER: N/A

VISIBLE LASER: N/A

APERTURE: N/A

RANGE: N/A

MINIMUM RANGE: N/A

RANGE ACCURACY: N/A

DIMENSIONS: Length 13.2in / 335.3mm

WEIGHT: 37oz / 1,048g

MSRP (USD): \$1,599.99



BUSHNELL

Elite Tactical™ XRS II

Used by top precision shooters around the world, the **Elite Tactical XRS II** riflescope features ED Prime Glass for enhanced color representation, contrast and resolution. Topping it all off is Bushnell's exclusive EXO Barrier to protect the user's view from stage-robbing elements. The scope's exacting turrets are machined to extreme clearances for repeatability.

bushnell.com

OPTICAL MAGNIFICATION: 4.5-30x50mm

FOCAL PLANE (1ST OR 2ND): 1st

EYE RELIEF: 4.0in / 101.6mm

FIELD OF VIEW (AT 100M): 24ft at 4.5x–4ft at 30x

ADJUSTMENT RANGE:

ELEVATION: 30.0 MIL

WINDAGE: 20.0 MIL

RETICLE COLOR: Black, FDE, Gray; G3, G3 Illuminated, H59, Tremor3

SOLUTION CALCULATION TIME: N/A

MENU: N/A

POWER SUPPLY: N/A

RANGING LASER: N/A

VISIBLE LASER: N/A

APERTURE: N/A

RANGE: N/A

MINIMUM RANGE: N/A

RANGE ACCURACY: N/A

DIMENSIONS: Length 14.5in / 368.3mm

WEIGHT: 37oz / 1,048g

MSRP: \$1,699.99–\$1,949.99



PRIMARY ARMS OPTICS

GLx 6-24x50FFP

The Primary Arms **GLx® 6-24x50mm FFP rifle scope** with Athena® BPR MIL reticle brings premium quality technology and materials with an unprecedented price point.

With steel-on-steel turret adjustments and the patented AutoLive™ illumination technology, this scope readily competes with some of the finest precision optics on the market.

primaryarms.com



OPTICAL MAGNIFICATION: 6-24x
FOCAL PLANE (1ST OR 2ND): 1st
EYE RELIEF: Low: 3.60in / High: 3.50in
EXIT PUPIL: Low: 8.10mm / High: 2.20mm
FIELD OF VIEW (AT 100M): Low: 15.20ft / High: 4.20ft
ADJUSTMENT RANGE:
ELEVATION: 17.5 MIL

WINDAGE: 11.6 MIL
RETICLE COLOR: Red illuminated / Black unilluminated
SOLUTION CALCULATION TIME: N/A
MENU: N/A
POWER SUPPLY: CR2032 3V Lithium coin
RANGING LASER: N/A
VISIBLE LASER: N/A

APERTURE: N/A
RANGE: N/A
MINIMUM RANGE: N/A
RANGE ACCURACY: N/A
DIMENSIONS: 15.3in
WEIGHT: 24.5oz
MSRP (USD): \$799.99

PRIMARY ARMS OPTICS

PLx 6-30x56mm

The Primary Arms **PLx® 6-30x56mm FFP rifle scope** with Athena® BPR MIL reticle is Primary Arms' ultimate long-range precision rifle scope. Built in Japan with the finest materials available, this rifle scope delivers superior clarity and light transmission when taking targets at a kilometer and beyond.

primaryarms.com



OPTICAL MAGNIFICATION: 6-30x
FOCAL PLANE (1ST OR 2ND): 1st
EYE RELIEF:
LOW: 4in
HIGH: 3.30in
EXIT PUPIL:
LOW: 8.20mm
HIGH: 1.90mm
FIELD OF VIEW (AT 100M):
LOW: 16.60ft
HIGH: 3.30ft

ADJUSTMENT RANGE:
ELEVATION: 27.6 MIL
WINDAGE: 13.1 MIL
RETICLE COLOR: Red illuminated / Black unilluminated
SOLUTION CALCULATION TIME: N/A
MENU: N/A
POWER SUPPLY: CR2032 3V Lithium coin
RANGING LASER: N/A
VISIBLE LASER: N/A
APERTURE: N/A

RANGE: 6-30x
MINIMUM RANGE: N/A
RANGE ACCURACY: N/A
DIMENSIONS: Length 14.3in
WEIGHT: 38.2oz
MSRP (USD): \$1,499.99

EDITORIAL SPECIAL: LONG-RANGE OPTICS



RITON OPTICS

X7 Conquer 3-24x56

The **X7 Conquer 3-24x56** features Riton HD/ED glass with a First Focal Plane, illuminated reticle allowing for maximum clarity and accurate ranging at all magnification levels. With an integrated throw lever,

34mm tube, R7 Zero Stop turrets, the X7 Conquer 3-24x56 is a high-performance optic sure to help you conquer the distance. ritonoptics.com

OPTICAL MAGNIFICATION: 3-24x

EYE RELIEF: 90mm/3.5in

EXIT PUPIL:

LOW: 6.6mm

HIGH: 2.23mm

FIELD OF VIEW (AT 100M): 4.6ft–35ft

ADJUSTMENT RANGE: 37.5 MRAD

RETICLE COLOR: Red

SOLUTION CALCULATION TIME: N/A

MENU: N/A

POWER SUPPLY: CR2032 battery

RANGING LASER: N/A

VISIBLE LASER: N/A

APERTURE: N/A

RANGE: N/A

MINIMUM RANGE: 25yds

RANGE ACCURACY: Determined upon shooter ability and ammunition being used

DIMENSIONS: 6.87in / 174mm

WEIGHT: 35oz / 992g

MSRP (USD): \$2,499.99

ROCHESTER PRECISION OPTICS (RPO)

CNOD

The first high-definition digital imaging system fielded by USSOCOM, the **CNOD** (CMOS Day/Night Observation Device) functions as a dedicated weapon sight or clip-on and allows for a disturbed reticle, compatible with laser range-finder (LRF) and ballistic fire control solutions. With an operating range of 500–1080nm, the CNOD can view the 1064nm laser in bright sunlight and enables HD video-out.

rpooptics.com

OPTICAL MAGNIFICATION: 1x to 12x

EYE RELIEF: 25mm–914mm (with long eye relief extender (LERA))

EXIT PUPIL: 35mm

FIELD OF VIEW (AT 100M): Up to 22.2° diagonal

ADJUSTMENT RANGE: 1x to 6x e-zoom / 2x optical magnification via extender

RETICLE COLOR: Greyscale

SOLUTION CALCULATION TIME: 2-3 seconds or less based upon LRF return (compatible with LRF and ballistic solutions for on-demand disturbed reticle)

MENU: On board, user-selectable menu with D-Pad user interface

POWER SUPPLY: 2x CR123

RANGING LASER: N/A

VISIBLE LASER: N/A

APERTURE: F#/1.2

RANGE: 1,000m man-size target (day); 750m man-size target (night)

MINIMUM RANGE: CQB

RANGE ACCURACY: 1.5 MOA

DIMENSIONS: 5.5x3.2x2.5in

WEIGHT: 19oz

MSRP (USD): Price upon request





SCHMIDT & BENDER

3-27x56 PM II High Power

The **3-27x56 PM II High Power** was developed as part of a USSOCOM request for proposal for shooting at extremely distant targets. This unique 9x zoom rifle scope provides at 27x magnification an excellent

resolution for even the smallest, distant target. The lower 3x magnification is perfect for observation.

schmidtbender.de

OPTICAL MAGNIFICATION: 3-27x
 EYE RELIEF: 90mm
 EXIT PUPIL: 8.7mm–2.07mm
 FIELD OF VIEW (AT 100M): 13.0m–1.4m
 ADJUSTMENT RANGE:
 ELEVATION: 39.5 MIL
 RETICLE COLOR: Red illuminated cross

SOLUTION CALCULATION TIME: N/A
 MENU: N/A
 POWER SUPPLY: CR2032 battery
 RANGING LASER: N/A
 VISIBLE LASER: N/A
 APERTURE: N/A
 RANGE: N/A

MINIMUM RANGE: N/A
 RANGE ACCURACY: N/A
 DIMENSIONS: Length 394mm
 WEIGHT: 1,128g
 MSRP (USD): \$4,995



SCHMIDT & BENDER

5-45x56 PM II High Power

The **5-45x56 PM II High Power** is the latest addition to the High Power line. Apart from the unusual magnification range, the optic design has been improved allowing a wider field of view on 5x magnification. This

is our giant among long-range riflescopes.

schmidtbender.de

OPTICAL MAGNIFICATION: 5-45x
 EYE RELIEF: 90mm
 EXIT PUPIL: 8.8mm–1.2mm
 FIELD OF VIEW (AT 100M): 7.8m–0.9m
 ADJUSTMENT RANGE:
 ELEVATION: 29.5 MIL
 RETICLE COLOR: Red illuminated cross

SOLUTION CALCULATION TIME: N/A
 MENU: N/A
 POWER SUPPLY: CR2032 battery
 RANGING LASER: N/A
 VISIBLE LASER: N/A
 APERTURE: N/A
 RANGE: N/A

MINIMUM RANGE: N/A
 RANGE ACCURACY: N/A
 DIMENSIONS: Length 434mm
 WEIGHT: 1,106g
 MSRP (USD): \$4,995

EDITORIAL SPECIAL: LONG-RANGE OPTICS

SIG SAUER

KILO2400BDX 7x25mm

The SIG SAUER **KILO2400BDX** is the world's most advanced laser rangefinder featuring SIG SAUER's BDX technology. The KILO2400BDX features a 7x25mm monocular with SpectraCoat™ anti-reflection coatings for superior light transmission and optical clarity.

sigsauer.com

OPTICAL MAGNIFICATION: 7x
 EYE RELIEF: 15mm
 EXIT PUPIL: N/A
 FIELD OF VIEW (AT 100M): 6.78ft
 ADJUSTMENT RANGE: N/A
 RETICLE COLOR: Red
 SOLUTION CALCULATION TIME: 4 times per second
 MENU: OLED
 POWER SUPPLY: CR2 battery

RANGING LASER: Yes
 VISIBLE LASER: N/A
 APERTURE: N/A
 RANGE: Up to 3,400yds
 MINIMUM RANGE: 1yd
 RANGE ACCURACY: +/- 1yd
 DIMENSIONS: 4.0x3.0x1.3in
 WEIGHT: 7.5oz
 MSRP (USD): \$879.99



SIG SAUER

TANGO6 5-30x56mm

The **TANGO6** with LevelPlex and T120 Turrets offers shooters the ideal high-precision shooting solution. LevelPlex allows shooters to remove unwanted cant from the shooting system +/- .5 degrees of accuracy, and the turrets help the user quickly dial in their shooting solution when time matters.

sigsauer.com

OPTICAL MAGNIFICATION: 5-30x
 FOCAL PLANE: 1st
 EYE RELIEF: 3.5in
 EXIT PUPIL:
 LOW: 8.9mm
 HIGH: 1.9mm
 FIELD OF VIEW (AT 100M): Low: 18.9ft at 100yds / High: 3.3ft at 100yds
 ADJUSTMENT RANGE: 0.1 MRAD
 RETICLE COLOR: Black etched, Red illuminated

SOLUTION CALCULATION TIME: N/A
 MENU: N/A
 POWER SUPPLY: CR2032 battery
 RANGING LASER: N/A
 VISIBLE LASER: N/A
 APERTURE: N/A
 RANGE: N/A
 MINIMUM RANGE: N/A
 RANGE ACCURACY: N/A
 WEIGHT: 42oz
 MSRP (USD): \$2,469.99

STEINER OPTICS USA

M7Xi IFS

The **M7Xi Intelligent Firing Solution (IFS)** is an integrated customizable display that provides the operator all important info in real time. The built-in ballistic calculator and sensor suite determine POI in real time (temperature, air pressure, inclination, wind drift). Simply turn the turrets to match the data in the field of view (FOV) and boom.

steiner-optics.com

OPTICAL MAGNIFICATION: 4-28x
FOCAL PLANE (1ST OR 2ND): 1st
EYE RELIEF: 3.54in / 90mm
EXIT PUPIL: 14-2mm
FIELD OF VIEW (AT 100M): 9-1.42m
ADJUSTMENT RANGE: N/A
RETICLE COLOR: Black
SOLUTION CALCULATION TIME: N/A
MENU: In FOV
POWER SUPPLY: AA battery
RANGING LASER: N/A

VISIBLE LASER: N/A
APERTURE: N/A
RANGE: N/A
MINIMUM RANGE: N/A

RANGE ACCURACY: N/A
DIMENSIONS: 15.4in
WEIGHT: 40.6oz
MSRP (USD): \$5,750.99



STEINER OPTICS USA

T5Xi

The **T5Xi** is Steiner's most affordable long-range scope. It brings unmatched clarity, accuracy and self-assurance to any situation, from combat to competition. Precise German engineering, rugged U.S. construction, slick Never-Lost™ turrets and the new SCR™ reticle gives you the victor's edge in long-range shooting.

steiner-optics.com

OPTICAL MAGNIFICATION: 5-25x
FOCAL PLANE (1ST OR 2ND): 1st
EYE RELIEF: 3.5in-4.3in
EXIT PUPIL: 11.2mm-2.3mm
FIELD OF VIEW (AT 100M): 21.5m-4.3m
ADJUSTMENT RANGE: N/A
RETICLE COLOR: Black unilluminated / Red illuminated

SOLUTION CALCULATION TIME: N/A
MENU: N/A
POWER SUPPLY: CR2450 battery
RANGING LASER: N/A
VISIBLE LASER: N/A
APERTURE: N/A

RANGE: N/A
MINIMUM RANGE: N/A
RANGE ACCURACY: N/A
DIMENSIONS: Length 16.6in
WEIGHT: 33oz
MSRP (USD): \$2,610.99



EDITORIAL SPECIAL: LONG-RANGE OPTICS



TRIJICON

Trijicon Tenmile® 4.5-30x56

The **Tenmile® 4.5-30x56** is available with first or second focal plane, dual red/green illuminated reticles in either MOA or MRAD. Extra-low dispersion glass delivers true-to-life color and fully multicoated, broadband anti-reflective lenses virtually eliminate glare and loss of light. Return-to-zero adjusters offer precise tracking with 100 MOA of elevation and 50 MOA of windage.

trijicon.com

OPTICAL MAGNIFICATION: 4-5-30x

FOCAL PLANE (1ST OR 2ND): 1st

EYE RELIEF: 3.2in–3.8in / 81.28mm–96.52mm

EXIT PUPIL: 0.35in–0.07in / 8.89mm–1.78mm

FIELD OF VIEW (AT 100M): 24.7ft–3.7ft at 100 yds / 8.23m–1.23m at 100m

ADJUSTMENT RANGE:

ELEVATION: 100 MOA

WINDAGE: 50 MOA

RETICLE COLOR: Red / Green

SOLUTION CALCULATION TIME: N/A

MENU: N/A

POWER SUPPLY: CR2032 battery

RANGING LASER: N/A

VISIBLE LASER: N/A

APERTURE: N/A

RANGE: N/A

MINIMUM RANGE: N/A

RANGE ACCURACY: N/A

DIMENSIONS: 14.33x3.63x2.9in

WEIGHT: 36oz

MSRP (USD): \$2,675



TRIJICON

Trijicon Tenmile® 5-50x56

The **Tenmile® 5-50x56 SFP riflescope** features dual red/green illuminated reticles in either MOA or MRAD. Extra-low dispersion glass delivers true-to-life color and fully multicoated, broadband, anti-reflective lenses virtually eliminate glare and loss of light. Return-to-zero adjusters offer precise tracking with 100 MOA of elevation and 50 MOA of windage.

trijicon.com

OPTICAL MAGNIFICATION: 5-50x56

FOCAL PLANE (1ST OR 2ND): 2nd

EYE RELIEF: 3.5in–3.9in / 88.9mm–99.06mm

EXIT PUPIL: 0.28in–0.04in / 7.11mm–1.02mm

FIELD OF VIEW (AT 100M): 21.2ft–2.1ft at

100yds / 7.07m–0.7m at 100m

ADJUSTMENT RANGE:

ELEVATION: 100 MOA

WINDAGE: 50 MOA

RETICLE COLOR: Red / Green

SOLUTION CALCULATION TIME: N/A

MENU: N/A

POWER SUPPLY: CR2032 battery

RANGING LASER: N/A

VISIBLE LASER: N/A

APERTURE: N/A

RANGE: N/A

MINIMUM RANGE: N/A

RANGE ACCURACY: N/A

DIMENSIONS: 16x3.6x2.9in

WEIGHT: 38.4oz

MSRP (USD): \$2,700

THE U.S. M14 RIFLE

THE LAST STEEL WARRIOR
SECOND EDITION



CHIPOTLE
PUBLISHING, LLC



\$69⁹⁵

Frank Iannamico

Now Available!

In hardback format, the second edition of this classic work has been expanded to 430 pages and includes new information from recently discovered government documents and numerous color photographs.

What's Included: Prototypes and production M14 rifles and their commercial semiautomatic counterparts, contractors, subcontractors, experimental models, match and sniper rifles, modern M14 rifles, training, magazines, parts and accessories, ammunition, maintenance and more!

Order your copy of *The U.S. M14 Rifle: The Last Steel Warrior (Second Edition)* today!

<https://www.smallarmsreview.com/M14> | 702-565-0746



A U.S. Army Sniper engages targets with the M110 Semi-Automatic Sniper System (M110 SASS). He has increased the capability of his platform by incorporating an updated scope and STORM Laser Rangefinder.

Hit Probability

The Practical Application of Precision Fire

By Christopher Roberts

Snipers and what they do have long been shadowed in mystery and folklore. We all heard stories of Gunnery Sergeant Carlos Hathcock taking 1-mile shots on a Vietnamese general, or of Canadian snipers shooting Taliban insurgents at nearly 2,000 meters (m) in Afghanistan. Not so far from where I live in Georgia resides a retired soldier who held the longest engagement, 1200m, with an M24 Sniper Weapon System (SWS), chambered in .308 Winchester. We hear all kinds of stories of mythical shots that lead people

to believe that snipers have this innate ability to deliver precision fires to inconceivable distances. While a lot of these stories are rooted in truth, there are a lot of questions brought to light when we really start to think about what it would take to make those shots.

We often hear about maximum effective ranges, and there is the assumption that those ranges are the distance the average sniper should engage the enemy. When we consider “shooter in the loop,” which describes the stressors on the sniper, environmental factors and hit probability (P(H)), we find that practical engage-

ment distances are a lot shorter than what our weapon system may be capable of reaching.

I have spent the better part of 3 years behind a spotting scope watching students fire countless rounds at targets up to and sometimes beyond 1,200m. During that time, it began to dawn on me that maybe the target distances that these students were engaging were beyond the realm of reasonable engagements. Specifically, when it came to the M2010 Enhanced Sniper Rifle (ESR), 1,200m was a range that was seldom hit. What is interesting is that 1,200m was thought to be within

M2010 with A191 Ammunition 190 Grain Boat Tail Hollow Point at 2,985 fps

Wind est. error	+/-1mph				+/-5mph				Energy ft-lb
	+/-5 meters		+/-50 meters		+/-5 meters		+/-50 meters		
	E-type	10 inch	E-type	10 inch	E-type	10 inch	E-type	10 inch	
Range est. error									
Target	E-type	10 inch	E-type	10 inch	E-type	10 inch	E-type	10 inch	
200m	100%	100%	100%	73%	100%	100%	100%	69%	2,833
300m	100%	100%	94%	43%	99%	80%	93%	31%	2,445
400m	100%	98%	79%	26%	88%	51%	67%	14%	2,100
500m	100%	88%	62%	15%	66%	31%	40%	7%	1,794
600m	99%	69%	47%	9%	48%	19%	23%	3%	1,525
700m	96%	49%	34%	6%	35%	12%	12%	14%	1,290
800m	88%	33%	24%	4%	26%	7%	8%	1%	1,087
900m	77%	22%	16%	2%	20%	5%	5%	1%	915
1,000m	63%	15%	11%	2%	15%	3%	3%	0%	772
1,100m	50%	10%	8%	1%	11%	2%	2%	0%	657
1,200m	38%	6%	6%	1%	8%	1%	1%	0%	567
1,300m	28%	4%	4%	1%	6%	1%	1%	0%	500
1,400m	21%	3%	3%	0%	4%	1%	1%	0%	450
1,500m	16%	2%	2%	0%	3%	0%	0%	0%	411
	Best Case				Worst Case				

This chart allows the leadership to establish a baseline of weapon effectiveness based on the parameters of the M2010 and the sniper's ability to range a target and make a wing call. At 100m, the performance was consistent at 100%.

the maximum effective range of that weapon system. I started to question what effective fire meant and what level of P(H) was really acceptable for a sniper to engage a target.

When I came up through Sniper School we were shooting the M24 SWS, which is a Remington 700 bolt action with a heavy taper barrel, 5-round rifling and is chambered in .308 Winchester. That weapon system had always been taught as an 800m gun with a 1,000m capability based off the shooter's ability. What that meant was that we trained and tested to 800m, but acknowledged that if the right person were behind the rifle, that person would be potentially capable of making shots at 1,000m. The reason for this is the bullet still had an acceptable terminal effect, or what we thought was acceptable terminal effect at 1,000m, but the probability of hit dropped off greatly when shooters extended to ranges past 800m. It would take a highly trained or skilled sniper to increase the P(H) to acceptable levels, beyond 800m.

As a community, we need to think about what are our engagement criteria, what are acceptable levels of success, and do we risk mission failure because we are trying to shoot to the limits of ourselves or the weapon system? When you are shooting in a competition and you miss a target, you have a time penalty or lose some points. The worst thing that happens is you lose a match. You can afford to take a risk, because the cost will seldom out-



Target Array as seen during the 2017 International Sniper Competition. Competitors were expected to run 2 miles, climb into the attic of a building and engage the hostile target (green steel IPSC), ensuring to not hit the hostage target (dummy). The Target, (inset), was 344m away from the firing position. The P(H) was less than 50%.



Utilizing tripod systems like this CruXord setup can help maximize stability when firing from alternate positions.

weigh the reward. On a mission, if you shoot and miss, you risk compromise, putting your team in danger, hitting an innocent or even killing a friendly soldier. As a sniper you cannot just completely avoid risk, but it needs to be calculated, and you have to consider mission success. The simple answer is, if you're not certain you can make the shot, do not take it; however, I do feel that oversimplifies the thought process and minimizes the effects needing to be taken into account in our decision-making process.

Grading the Sniper

As leaders or even Senior Snipers we should test our subordinates on crosswind estimation, range estimation, grouping ability and ammunition velocity consistency (Standard Deviation). Based on this assessment, leaders can "grade" the snipers to one of three confidence zones, explained in *Training Circular (TC) 3-22.10 (SNIPER)* as: High, Medium and Low.

An example of grading the sniper who can read wind and range estimates with medium confidence is: He can maintain a high confidence for grouping (.5 minute of angle [MOA] when zeroing), and by using a chronograph to evaluate his ammunition, he annotates his ammunition has a standard deviation (SD) in the low zone. This sniper would be assigned a MEDIUM CONFIDENCE LEVEL.

A sniper with a higher rating should be expected to deliver a more accurate result than a sniper with a low confidence rating. Commanders and Sniper Employment Officers can assess a sniper's probability of successfully hitting the intended target by using

VARIABLE UNCERTAINTY LEVELS	CONFIDENCE		
	High	Medium	Low
Crosswind estimation	+/-1mph	+/-2.5mph	+/-4mph
Range estimation	+/-1 meters	+/-10 meters	+/-50 meters
Rifle estimation	.5 minute of angle	1 minute of angle	1.5 minute of angle
Velocity consistency	10fps standard deviation	15fps standard deviation	20fps standard deviation

The Confidence Zone Chart as referenced on *TC 3-22.10*.

the zone confidence table and the weapon performance chart to establish a baseline performance metric.

Additionally, we need to do the same analysis of the weapon system and ammunition that will be utilized on a mission. The modeling demonstrated in *TC 3-22.10* for the following table has the following constants:

1. Range uncertainty is modeled at +/- 5m and +/- 50m to represent instrumented (LRF) and no instrumented (mil reading) ranging.
2. Wind uncertainty is modeled at +/- 1 mile per hour and 5+/- miles per hour to represent easy and difficult wind conditions.
3. E-type body (width of target at 19.5 inches by height of 29.5 inches, from end of neck line to bottom) and 10-inch target sizes are modeled to represent hit percentages against full body versus head- or chest-sized vital zones.
4. Environment modeled in is: Wind from 9 o'clock at 5.0/10 miles per hour. Temperature is 59 degrees, pressure at 29.92 inches

hectograms and humidity is 50%.

5. Azimuth is 90 degrees and inclination is 0 degree.

Danger Space

So what does this all tell us? It tells us there is no easy answer. Probability of hit will depend on the target size and type, the accuracy of your weapon, its cartridge and ballistics factors. It will depend on the weather. And lastly, it will depend on you. You're the biggest variable. Many hunters limit themselves on what they consider an ethical kill. I've heard many hunters limit themselves to 300m or 400m. Nearly any modern hunting cartridge has a danger space creating enough of an error budget at 400m to guarantee a lethal shot at those distances. What do you as a sniper consider your danger space to be? At what distance can you ensure the kill and guarantee mission success? **SADJ**

NEW DATES

**7.8.9.10
APRIL 2021**

**JIEXPO KEMAYORAN
JAKARTA-INDONESIA**



Ministry of Defence
of The Republic of Indonesia

INDO DEFENCE 2021 EXPO & FORUM

INCORPORATING WITH

**INDO
AEROSPACE**
2021 EXPO & FORUM

INDO MARINE
2021 EXPO & FORUM

THE 9th INDONESIA'S OFFICIAL TRI-SERVICE DEFENCE, AEROSPACE, MARITIME, AND SECURITY EVENT

“Building Peace, Stability, and Prosperity Through Defence
Industry Cooperation”



www.indodefence.com

Indo Defence Expo & Forum

@IndoDefence

@Indo_Defence

For further information, please contact

Ms .Erike B. Malonda

Senior Project Manager
Mobile : +62 815-9254-215
E-mail : erike@napindo.com

Ms. Agnes Nilam

Senior Project Executive
Mobile : +62 823-1093-9951
E-mail : agnes.napindo@gmail.com

Official And Exclusive
Show Daily



Organised by

Showing The Way!



PT Napindo Media Ashatama

Telp. : +6221 8644756/85 8650962
Fax : +6221 8650963
Email : info@napindo.com

Supporting Publications





Right-hand side profile of the Hungarian FÉG KGP-9 submachine gun.

The Hungarian FÉG

Hungarian Services Search for Compact Firepower

By Kristóf Nagy

Development History

The history of this little-known firearm can be traced back to the summer of 1986, when János Egerszegi, the head of the Hungarian Institute for Military Technology (MN HTI), drafted specifications for a modern 9x19mm submachine gun over the space of a few weeks. While the Hungarian military was, at that time, still deeply embedded within the Warsaw Pact system with its standardised 9x18mm pistol calibre, the newly established counter-terror units of the Hungarian police (*Komondor*) disliked the weak round—and all

of the available weapons that fired it. It seems highly likely that this new project was driven by the police.

The specifications, as written, left room for options; Egerszegi specifically stated that both recoil- and gas-operated designs would be accepted for testing. In total, three proposals reached the committee responsible for evaluating potential participants in the program; the design submitted by Fegyverés Gázkészülékgyár (FÉG) was selected as the most promising. Shortly after this decision, a project was established, and work began on

the first prototypes. The project was named “ZUV,” standing for three names: Zala, Ungvár and Végh. Interestingly, none of these people made any direct contribution to the design; it was developed by one of FÉG’s production engineers, Zoltán Horváth.

The program that eventually became the KGP-9 (*kis géppisztoly-9* or “small submachine gun-9”) proceeded according to plan—at least initially—and the first pre-production models were ready for limited trials in 1988. These concluded in late 1988 with very promising results. The personnel involved in testing



KRISTÓF NAGY/ARES

G KGP-9 SMG

especially liked the robust and very durable operating system, which promised to offer a very long service life, and the reliable performance and precision of the weapon even in harsh climatic conditions. All momentum on the project was lost during the socio-economic upheaval of 1989, which shifted focus and limited funds to other issues. It was not until 1993 that the project was revived and reassessed. Besides the growing demand within the police force, the Hungarian military was now free of the regulatory requirements of the Warsaw Pact and was interested in acquiring firearms in NATO calibres.

Field trials in 1993 gave less favourable results than those of a couple of years earlier. Reliability issues, stemming from fail-

ures to feed, plagued the gun. It seems very likely that the guns which were tested were of the same early trials production batch that were tested in the late '80s, and so it is somewhat surprising to read reports of reliability issues which were not noted in the first evaluation. The explanation offered by the manager of the KGP-9 project is that the poor tolerances of the 9x19mm ammunition supplied by Hungarian manufacturer MFS (now owned by RUAG) were the primary cause of the issues. This point of view is strongly contested by police officers who took part in the testing. They claim that ammunition from the same lot that failed in the KGP-9 was reliably and precisely shot from UZI submachine guns and the Jericho®

941 service pistol. In addition to feeding issues, testing personnel strongly criticised the folding stock and the safety's design.

Interestingly, these criticisms had a very limited impact on the further development of the firearm. The program continued, albeit slowly, and prototypes—allegedly ready for fielding—were presented in 1996. These pre-production models failed miserably. The gravest problem was the tendency to fire automatic bursts while the selector was in the semi-automatic position. A subsequent technical evaluation painstakingly reviewed every potential source of failure and identified it within the production processes of FÉG. The formerly state-owned arms manufacturer—by now known as FÉGARMY Fegyvergyártó Kft.



KRISTÓF NAGY/ARES

The Hungarian FÉG KGP-9 submachine gun fieldstripped.

(FÉGARMY Arms Factory Ltd.)—had recently been fully privatised and had lost a substantial number of its superbly trained workforce. The evaluation of the production processes revealed that FÉG was unable to provide required quality control, adherence to tolerances and project management to implement a new service weapon design into production at that time. Correcting these substantial problems delayed the final acceptance of the KGP-9 for a further year.

In 1997, the submachine gun was once again tested by members of the military’s Special Forces and the Law Enforcement Agencies Training Centre (*Rendészeti Szervek Kiképző Központja*, or RSZKK). While the Hungarian military accepted the weapon as presented, the police rejected it as unsuitable for service. The IMI UZI and Micro UZI had already filled their requirements, and the Heckler & Koch MP5 had just recently passed a successful evaluation and would soon be fielded.

Despite the reluctance of the police to adopt the weapon, another branch of the Hungarian Ministry of Interior became interested in the design. The Hungarian prison service adopted the KGP-9 shortly after the police. The exact number of KGP-9 submachine guns manufactured in total is unknown. Approximately 1,000 examples were delivered to the military; some were taken on missions abroad in the 2000s and served in operations in Kosovo, Afghanistan and Iraq. Their military use is scarce nowadays and seems to be limited to the military police, who more recently fielded the CZ Scorpion EVO 3. Not officially declared



KRISTÓF NAGY/ARES

Detail of the internal trigger mechanism components and magazine well of the Hungarian FÉG KGP-9 submachine gun.

obsolete, it is likely that the KGP-9 has *de facto* fallen out of service.

Technical Description

The FÉG KGP-9 is a classic blowback-operated submachine gun. What makes it stand apart from innumerable other weapons using this system of operation is the fact that it is hammer-fired and therefore fires from a closed bolt. The overall external impression of the gun is that of a scaled-down AK, with a front and rear trunnion, a magazine well riveted to the lower receiver and a fire control group held in place by retaining pins. Similarly, both the method of top cover retention—held in place by the recoil spring via a guide rod—and the position of the magazine release catch are as per any other AK derivative.

The charging handle is located on the left-hand side, and the KGP-9 has no bolt catch. After the last round is fired, the magazine follower will block the bolt in its forward movement. This has no practical benefit without a bolt catch, and the

recoil spring provides so much pressure against the follower that the magazines will not drop free and must be purposefully removed from the gun. The setup of the push-button safety is also far from ideal, as it’s located inside the trigger guard, forward of the trigger. In the central position the weapon is on safe; the button is pushed to the left for semi-automatic fire and to the right for automatic fire.

Internally, the KGP-9 exhibits some direct influence from the UZI design. The telescopic bolt wraps around the chamber and part of the barrel, reducing the overall length and providing the weapon with very good balance and remarkable stability during automatic fire. These features, in addition to the weapon firing from a closed bolt, mean the KGP-9 is a surprisingly accurate weapon in both firing modes. To provide the firearm with the ability to swap the standard barrel for a longer one, another design feature was



KRISTÓF NAGY/ARES

An alternate view of the Hungarian FÉG KGP-9 submachine gun fieldstripped.



HUNGARIAN DEFENCE FORCES

A Hungarian Army soldier holding a KGP-9 submachine gun.

TECHNICAL SPECIFICATIONS

OVERALL LENGTH: 642mm (stock unfolded) / 381mm (folded)

HEIGHT (WITH MAGAZINE): 217mm

WIDTH: 68mm (stock unfolded) / 84mm (folded)

WEIGHT (EMPTY): 2.87kg

SIGHT RADIUS: 198mm

RATE OF FIRE: 1,100 rounds per minute

MAGAZINE CAPACITY: 25 rounds

V0: 390 m/s (124gr Hungarian service ammunition made by MFS)

E0: 608 J (124gr Hungarian service ammunition made by MFS)

borrowed from the UZI, with a simple barrel nut holding it in place. The longer barrel is mentioned in multiple sources, but unfortunately the author was not able to locate one, and it is not mentioned in the manual. Therefore, it is likely that it was never adopted after the trials were completed.

Disassembly

Disassembly of the KGP-9 is along the lines of an AK rifle, beginning by pushing in the end of the recoil spring guide rod that protrudes out of the rear of the top cover and removing the latter. The recoil spring rod is held in place by a guiding piece that also

locks the dust cover. With the recoil spring compressed toward the muzzle, this can be removed from the firearm by pulling it out of the bolt. Next, the bolt can be moved rearwards, and the barrel nut can be unscrewed to remove the barrel. Reassembly is performed in reverse order. The rear end of the barrel is keyed so that it can only be assembled in the correct manner, with the thread of the barrel nut holding it in place. After mounting the top cover, the user encounters the next design flaw. The rear sight is mounted directly to the top cover, and therefore the gun must be zeroed each time it is reassembled. The simple sights are set up as two U-notch fold-up blades at the rear for 50m and 150m respectively, with an adjustment for windage. The front sight is more or less a direct copy of the FÉG AK-63 / AMM rifle front post, which can be adjusted for elevation by screwing it in or out of the mounting block. At least two stock designs are known.

Conclusion

The FÉG KGP-9, with its combination of flaws and interesting design features, was a victim of the time of its development and production. Struggling with fluctuating political and economic backing and beset by significant quality problems in the early stages, the whole design was set up for failure from the beginning. Other tried and tested designs became available to the Hungarian services looking for compact firepower, and the chances of export were slim from the beginning. With no further development, and despite a surprisingly long service life of nearly 20 years, the KGP-9 remains a side note in the history of the submachine gun. **SADJ**

•••

This article is reproduced courtesy of Armament Research Services (ARES). See www.armamentresearch.com for further original content.

Ordnance Oddities

Odds & Ends

By Robert Bruce

*In the course of decades of researching various sources including military and museum archives, Robert Bruce has acquired a treasure trove of photos of what might be considered “odd and unusual weapons.” This has fueled a seven-part series in **Small Arms Defense Journal** featuring various oddities, presented in more or less chronological order. But this time—with apologies for some of these rough-looking images—he’s going back through the stacks to showcase some eminently worthy candidates that got left behind due to space limitations.*

World War Weaponry

Opening this latest can of Oddities in the heat of WWI, we find all kinds of inventors working feverishly to come up with new and improved ways to kill. Leaving to others the formidable task of recounting how newfangled airplanes, sub-

marines, tanks, flamethrowers, poison gas and other nightmarish innovations manifested themselves, we’re looking past dozens of efficiently deadly “automatic” machine guns of the time to pick out just one oddity.



WIKIPEDIA.ORG

“Frankengun” from World War I

This particularly obscure oddity, the “Maschinengewehr des Stand-schutzen Hellriegel,” is a pistol-caliber prototype auto weapon from 1915 that quickly disappeared until a set of intriguing photos in the Austrian National Library were stumbled upon, scanned and posted on Wikimedia. There, the gun must have caught the fancy of the designers of the video game “Battlefield 1,” springing to modest fame when it was added to the arsenal of selections for shooters. While few real facts are known about

this frightening firearm, it appears to be an amalgamation of contemporary concepts including the Italian Villar Perosa pipsqueak, the awesome Austrian “Schwarzlose” and the German Luger pistol’s novel snail drum magazine. A YouTube video from Ian McCollum at *Forgotten Weapons* (forgottenweapons.com) one of our faves, offers well-informed speculation on credited inventor Hellriegel and his noble but doomed experiment on the rocky road toward what would eventually be called “submachine guns.”



WIKIMEDIA

Hellriegel Himself?

It's entirely possible that this stalwart shooter is none other than Austro-Hungarian Army Standschutzen (reservist) Hellriegel himself, ready to squeeze off a burst of what's likely to be 9mm Steyr cartridges, pushed up from that drum through a flexible feed chute into a simple blowback mechanism. Note the leather-wrapped water cooling jacket, serpentine

tubular foregrip and leather carrying sling. At *Historical Firearms* (historicalfirearms.info), another of our favorite blogs, Matthew Moss offers some very good conjecture on the weapon's characteristics and circumstances. It's linked in the References to Wikipedia's Standschutze Hellriegel M1915 entry.

Fast forwarding 2 decades after "The War to End All Wars," no surprise that we find Europe aflame yet again. Justifiably alarmed, the U.S. Army Ordnance Corps is scrambling to get ready for the inevitable necessity to go back "Over There" and rescue the Damsel of Democracy from the evil

Hun's clutches. Among bigger and probably more important initiatives, an urgent call went out for a "Light Rifle" to fill the perceived gap between .45-caliber M1911 handguns and .30-caliber M1 rifles.

U.S. ARMY ORDNANCE MUSEUM



Submachine Gun or Light Rifle?

In August 1941, alongside entries from big name gun makers, civilian gun tinkerer Russell Turner offered this selective-fire carbine with its metal skeleton and not a sliver of hardwood. The simple trigger was described as "on the order of an old-fashioned door lock" along with a three-position gas port and operating rod. Although weighing a mere 4.32 pounds with a five-round box magazine, traditionalists on the Army's evaluation team turned up their hairy nostrils at the mere sight of this naked gun. Then, poor performance in live-fire trials doomed the prototype, but Turner wouldn't give up. He returned a couple weeks later with a wooden-stocked rework that had some of the identified problems ironed out. In the end it was no match for its rivals, and Winchester's entry (in semiauto only) became the WWII GI's iconic M1 Carbine.

49135 8-18-41 ABERDEEN PROVING GROUND ORDNANCE DEPT.
Turner Light Rifle, Cal. .30, right view, with bolt closed.

Meanwhile

Over in Germany, Hitler's Wehrmacht (Armed Forces) had been steamrolling British, Polish and Russian armies since the Blitzkrieg (lightning war) invasion of Poland in September 1939. Equipped with excellent infantry weapons including the "Maschinenpistole" 38, Maschinengewehr 34 and "Gewehr" 98k rifle, combat experience showed a bit of a firepower gap.

While there was a light mortar, several kinds of hand grenades and the 98k could fire a selection of signal, explosive and rifle grenades, they just weren't handy enough in certain situations. The quick fix came in adapting an ordinary flare pistol.



ROCK ISLAND AUCTION COMPANY

"Kampfpistole" / "Sturmpistole"

Got to hand it to those Germans for both armaments inventiveness and inspiring names. A customizing kit consisting of a slip-in, rifled barrel liner, detachable folding buttstock and clamp-on sheet metal sight system, teamed with a selection of adapted and purpose-built munitions, were somewhat optimistically intended to turn the lowly "Leuchtpistole" (flare pistol) into a bunker-blasting, armor-punching, soldier-shredding super mini-weapon. The chronology of its German designations is confusing, but in the definitive 1945 U.S. War Department's *Handbook on German Military Forces*, the first modifications became the Kampfpistole (combat pistol), then further refined as the Sturmpistole (storm pistol). This excellent example of a WWII German Leuchtpistole fitted with the whole ultra-rare Sturmpistole/Kampfpistole assembly, sold at auction by Rock Island Auction Company in September 2018 for \$6,325 (rockislandauction.com).



BUNDESARCHIV VIA WIKIMEDIA

Grenade Launching Pistol

"Leutnant bei Vorführung neuer Waffen (Kampf Pistole mit Aufsatz) vor Soldaten und Offizieren" translates as "Lieutenant demonstrating new weapons (combat pistol with attachment) in front of soldiers and officers." This German propaganda photo from Russia in June 1943 shows a Kampfpistole firing demonstration. Note the buttstock but absence of the barrel-clamped sight. Extensive research has not identified the grenade, but it appears to be the head of a stick grenade screwed on to the "Wurfkorper Leuchtpistole's" adapter base containing a blank-type launching cartridge.



Tank Killer Pistol

Russia, 1943, A German Lieutenant of the "Grossdeutschland" Division with what's identified in the official caption as a Kampfpistole. Since it's fully tricked out with buttstock and clamp-on sights, it's probably a newer Sturmpistole, all the more fearsome with that big warhead poking out of the muzzle. A mid-War edition of U.S. Army Intelligence Bulletins noted, "A new type hollow charge projectile similar to the hollow charge rifle grenades was also developed for this weapon." Probably the "Gross Panzergranate" 61, weighing a hefty 20 ounces with 8.7 ounces of high explosive filling, capable of punching through 3.54 inches of armor plate. Second only to the "Birdman Arms Nuke 50 Atomic Pistol" (a YouTube spoof), is this actually the world's most powerful pistol round?

BUNDESARCHIV VIA WIKIMEDIA

Clandestine Devices

With Hitler's Wehrmacht "jackbooting" all over the European continent and elsewhere, America and Great Britain were hard at work on both conventional and unusual weaponry. Yank spies and saboteurs of

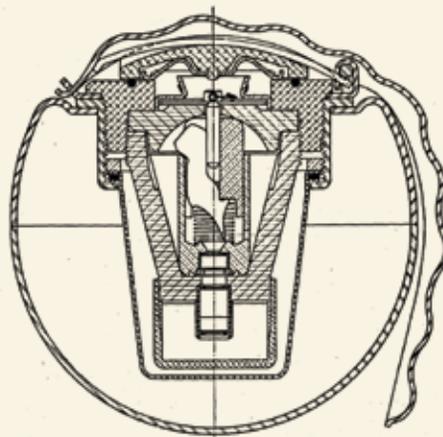
the top secret Office of Strategic Services (OSS) were particularly well-equipped with a variety of oddities for clandestine warfare behind German and Japanese lines.



JOHN F. KENNEDY SPECIAL WARFARE MUSEUM / ROBERT BRUCE

"Beano"

An original WWII OSS T-13 "Beano" Grenade with first type T5 impact fuze in the collection of the John F. Kennedy Special Warfare Museum. Conventional hand grenades explode after a short delay, making them less than ideal for some critical situations. The OSS had Eastman Kodak (yes, the camera and film company) make these baseball-sized fragmentation grenades with an impact-detonating fuze that caused it to explode upon hitting the intended target (or any other hard surface). Hence the nickname, derived from the illegal "bean ball" pitch in baseball. Unfortunately, it was prone to premature detonation for a variety of reasons and improved versions were only marginally safer. The War ended before it could be put into production, and the project was terminated.



U.S. ARMY ORDNANCE MUSEUM

Inside Story

The mechanism inside what looks to be a later-model, "improved" Beano with a safety lever. On the early models when the safety pin is pulled and the grenade is thrown, the textured metal arming cap flies off, heavy enough to pull out a nylon string attached to the impact fuze arming pin. Anthony Dee's comprehensive article on the Beano can be found in *Small Arms Review*, Vol. 7, No. 1 (October 2003).

Deadly Dart

This WWII OSS "Little Joe" pedal crossbow is said to be the only surviving example, preserved in the collection of the John F. Kennedy Special Warfare Museum. Multiple elastic bands quietly propel the nasty 10-inch-long aluminum darts at 170 feet per second for discreetly taking out enemy sentries or perhaps for stealthy assassinations. No evidence that there was also a holster for the thing..



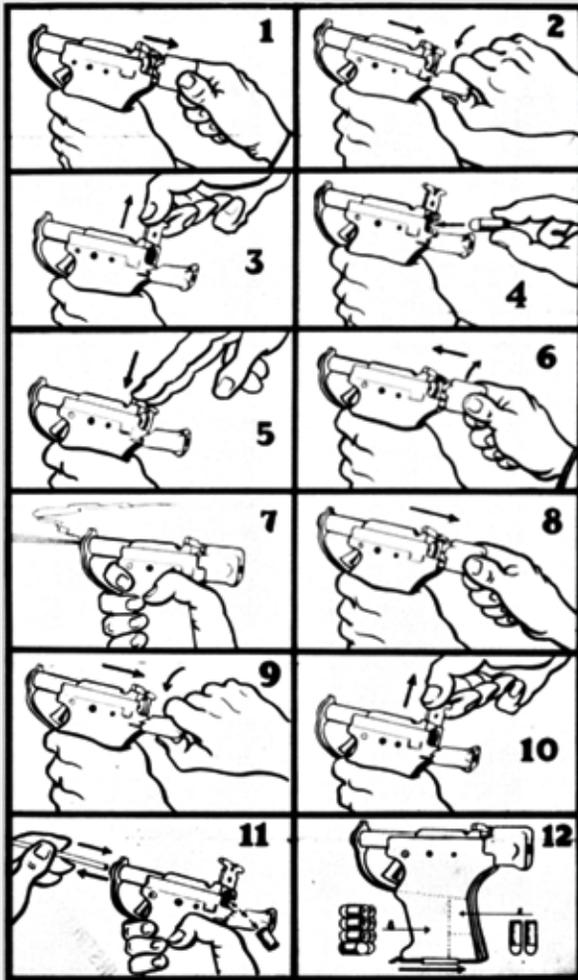
JOHN F. KENNEDY SPECIAL WARFARE MUSEUM / ROBERT BRUCE

Sheet Metal Shooter

The crude, stamped-steel, WWII single-shot "Liberator" pistol was designed for dirt cheap production in vast quantities for airdropping to resistance forces in Europe and Asia. For operational security, its formal name was "Flare Projector, Caliber .45 (Model FP-45)." Ten rounds of powerful .45 ACP ammo were stowed inside the stubby grip. Over a million were manufactured, but distribution was a disaster. Over 400,000 ended up in the Office of Strategic Services' (OSS) custody. They're quite rare today as most were destroyed after the War. The Liberator's original waxed cardboard boxes are even rarer.



JOHN F. KENNEDY SPECIAL WARFARE MUSEUM / ROBERT BRUCE



JOHN F. KENNEDY SPECIAL WARFARE MUSEUM / ROBERT BRUCE



JOHN F. KENNEDY SPECIAL WARFARE MUSEUM / ROBERT BRUCE

Oh Deer!

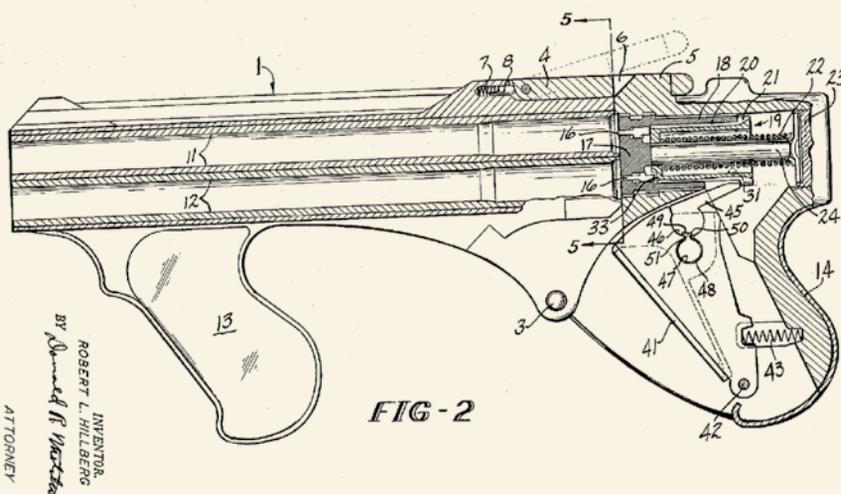
This 9mm single-shot pistol, commonly known as the “CIA Deer Gun,” was fielded during the Vietnam War for use in Central Intelligence Agency operations including SOG, the extra spooky Studies and Observation Group. Reportedly designed by Russell J. Moure, chief engineer with American Machine and Foundry (AMF), it’s essentially an updated, further simplified version of the .45-caliber Liberator from WWII. Loaded by inserting a cartridge in the smooth bore steel barrel that’s then screwed back into the cast aluminum body, the prominent knob at the back was pulled rearward to cock. But careful, there’s no trigger guard!

Liberator Cartoon-Style

The sheet of pictorial instructions packed with each Liberator makes operation clear and simple to anyone, anywhere; requiring no reading skills or translation.

Continuing this thread of minimalist weapons for minimally trained militiamen, CIA opposition to the alarming spread of Communism

in Third World countries inspired Robert Hillberg, a 4-decade veteran gun guru, to design an ultra-cheap and simple scattergun.

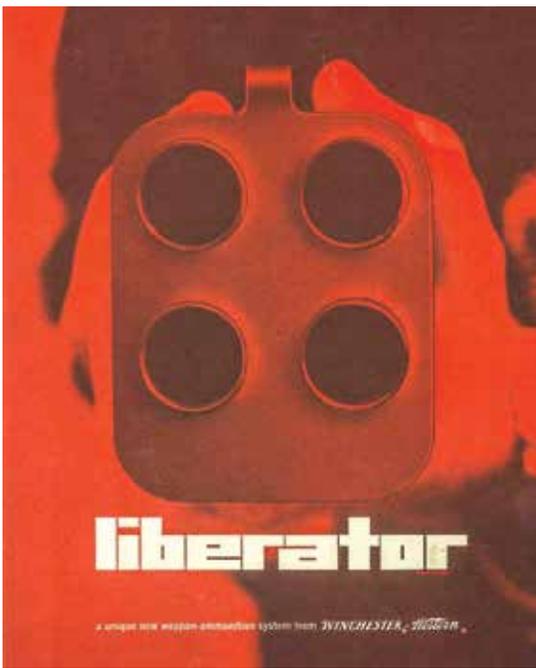


July 12, 1966
 MULTI-BARREL FIREARM WITH ROTATABLE AND RECIPROCATABLE HAMMER
 Filed Dec. 23, 1964
 R. L. HILLBERG
 3,260,009
 3 Sheets-Sheet 2

Shotgun Derringer

Reportedly while at High Standard Manufacturing Co. in 1960, Robert Hillberg’s soon-to-be patented concept was a break-open mega Derringer with four fixed barrels being striker-fired in sequence by a “rotatable and reciprocable hammer.” Ingeniously contrived for mass production with a minimum of steel parts in simple pot metal castings with plastic furniture, it was believed that this 20-gauge shotgun shorty could be made for about 20 bucks. Well, things got going when DARPA (Defense Advanced Research Projects Agency) became interested with an eye toward to various military applications.

WIKIMEDIA



CHIPOTLE PUBLISHING / SMALL ARMS REVIEW DIGITAL ARCHIVES

Winchester's Wonder Gun

A couple of prototypes followed, and engineers with mainline manufacturer Winchester took over around 1963, further refining the gun. Meanwhile, the marketing department wasted no time in putting out an eye-catching sales brochure for what became the LIBERATOR, supporting energetic efforts to attract military and law enforcement buyers. A powerful (and necessarily heavier) 12-gauge version, it was capable of firing "Super Buckshot," slugs, tear gas and more, allowing "any person to deliver devastating firepower without formal training." Well, in the end, almost nobody delivered because sales were nil.



U.S. ARMY ORDNANCE MUSEUM

Mystery Minigun

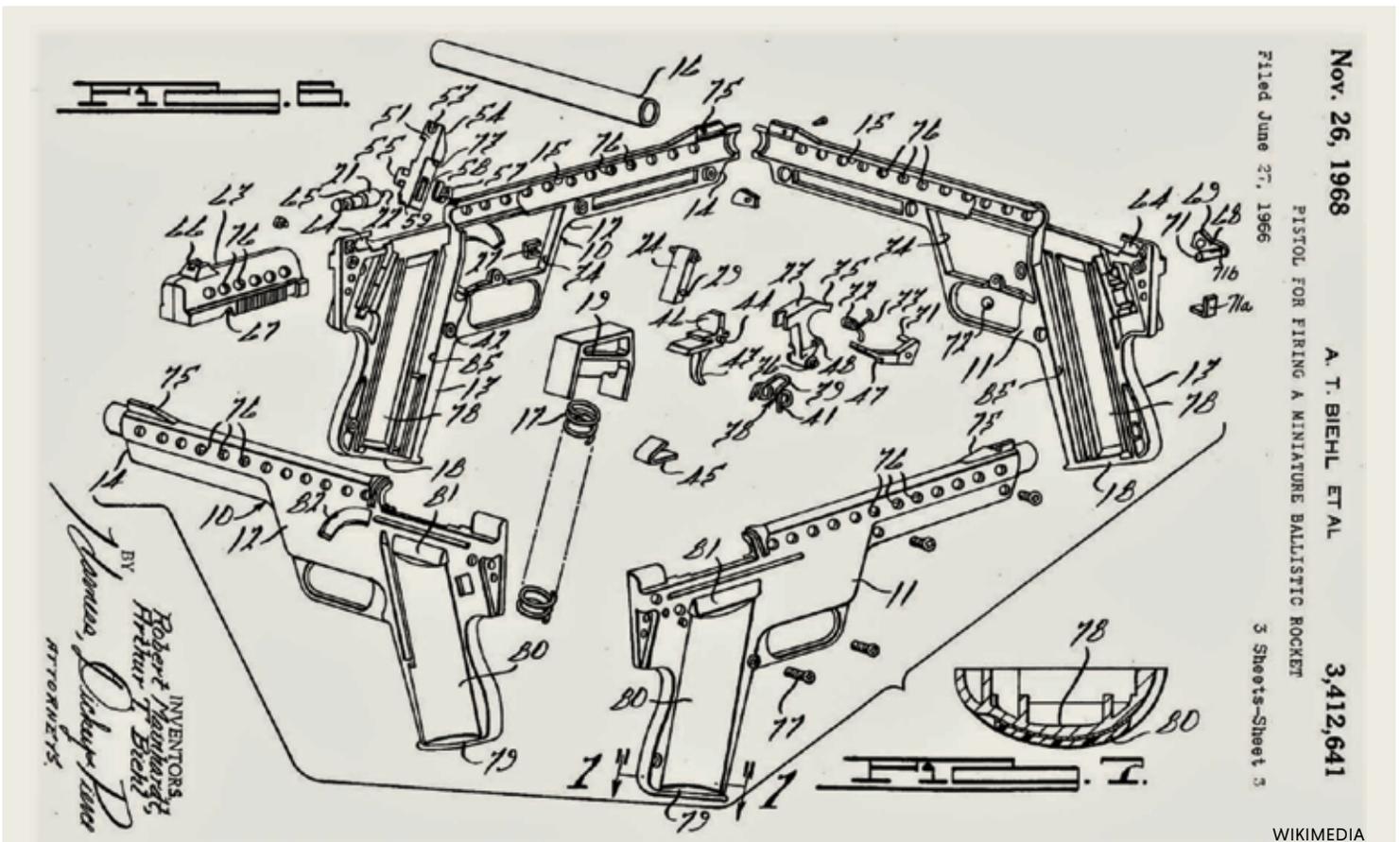
Who is this guy and what's the story on that apparently .22-caliber, belt-fed subgun with its polished cylindrical receiver and finely machined cooling fins? Rummaging through boxes of photos at the U.S. Army Ordnance Museum, we stumbled across several pix of what looks like a live-fire demonstration from back in the 1960s or 1970s being filmed (see the "shotgun" microphone) for possibly a product promo or TV news segment. Maddeningly, no information was on the photos or anywhere else in the box, and some follow-up research in dusty tomes from the period hit a dead end. If some RKI will step in and help with identification and details on the gun, please email it to editorial@chipotlepublishing.com because "inquiring minds want to know."



RICHARD HOFFMAN VIA JOHN PLASTER

Rocket Pistol

Looking like a 1950's sci-fi movie prop, MBA's Gyrojet rocket-launching weapons are a favorite of any number of writers and YouTube producers delving into obscure guns and ammo, and why not since they were real and right there for most any firearm fantasy fan? Seen here in a snapshot from the war in Vietnam, Franklin Miller, an elite operator with the super spooky Studies and Observations Group (SOG), shows off a 13mm/.51-caliber Mark 1 Pistol. In Major John Plaster's authoritative book, *SOG: Photo History of the Secret Wars*, Plaster says it was being evaluated as a possible low-noise/high-effects weapon. "But propelled by a solid fuel that burned out in just 100 milliseconds, the rocket emitted such a bizarre 'whoosh!' that it could hardly be called silent."



WIKIMEDIA

Inside the Gyrojet

In a drawing from the Gyrojet Pistol's 1966 patent application, the rocket launcher's ultra-simplicity is revealed as thin pot metal halves clamped together with machine screws to hold a smooth bore, 5-inch steel tube barrel and minimal moving parts that strike and set off the novel cartridges. Its internal box magazine delivers six spin-stabi-

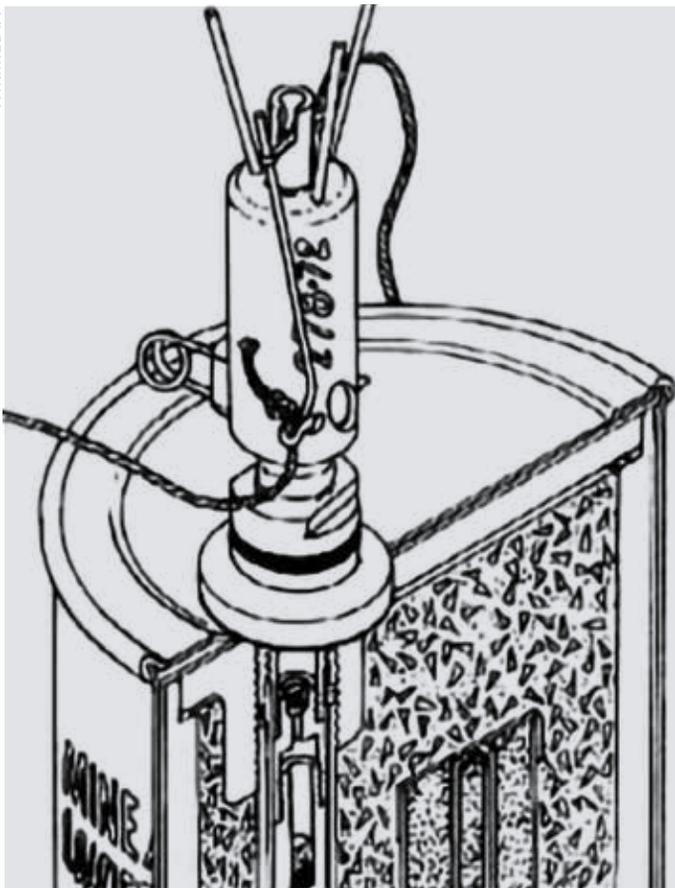
lized, mini-rockets that blast off with nearly zero recoil and almost instantly attaining +1200 fps. No need for extraction and ejection because the ammo is fully self-contained as it ignites and whooshes out of the barrel. Alas, multiple problems doomed this innovative combo to novelty status.



U.S. ARMY ORDNANCE MUSEUM

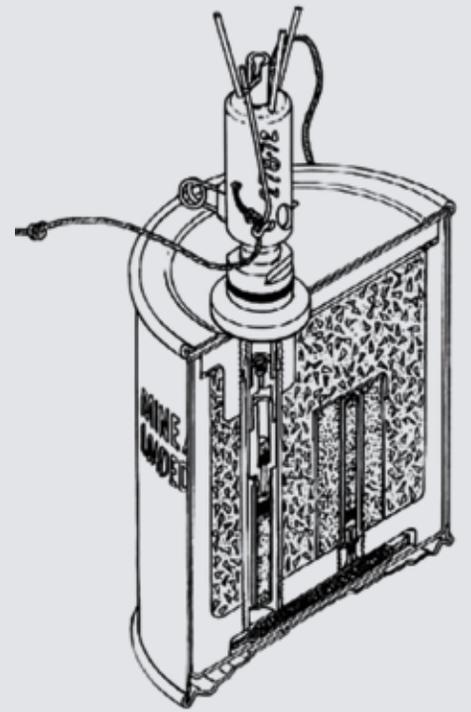
Pop-Up Mine

This lurid drawing from the early Cold War period is official U.S. Army artwork showing the concept of an antipersonnel mine that would somehow leap up from underground right when needed, blasting lethal fragments in a spherical 360-degree pattern at chest level, devastating a squad of Soviet-Warsaw Pact enemy infantrymen. The WWII German S-mine nicknamed "Bouncing Betty" by American GIs did this simply and with murderous efficiency from trip wire or pressure activation. So what—short of some kind of magic—would make this concept a "new and improved" reality?



Drafting Betty

Well, the U.S. M16 and M16A1 “bouncing” anti-personnel mines are what were actually fielded, beginning around 1957. No surprise, they are “product-improved” versions of Germany’s fearsome “Fraulein Betty” with a light booster charge to kick up a fragmentation-sleeved, 1-pound can of TNT that explodes about 2 to 4 feet in the air. Maybe not the magic “pop up” that the artist envisioned, but cheap, reliable and deadly. Millions were made and used for highly effective defensive purposes by the U.S. and Allies until President Obama’s minions banned their use.



U.S. ARMY PHOTO BY SPECIALIST MIKE TAYLOR

Today’s Enhanced Battle Rifle, the M14 EBR

2005, Mianashin, Afghanistan. Peering through the Leupold 3.5-10 power day scope, Specialist Ronald Turner, from the 82nd Airborne Division’s 325th Airborne Infantry Regiment, provides security for fellow soldiers on an operation against insurgents. Not so much an oddity as the U.S. Army’s venerable 7.62mm NATO-caliber M14 enhanced battle rifle from 1957 was being given new life half a century later for the war in Afghanistan. There, the 5.56mm M16 and M4 had proved sadly lacking for long-range target engagements where enemy weapons had the advantage. Mounting the M14’s standard barrel and action in a special Sage International chassis stock originally designed by David Armstrong, its accuracy with M118 Match ammo was reportedly 2 MOA.

Bye for Now

While this concludes the Ordnance Oddities series, there’s a possibility of it being revived from time to time as the author combs through his enormous collection of archived images and other sources in research for feature assign-

ments. Because things like the amusing Locust Airborne Tank deserve some degree of recognition ... **SADJ**



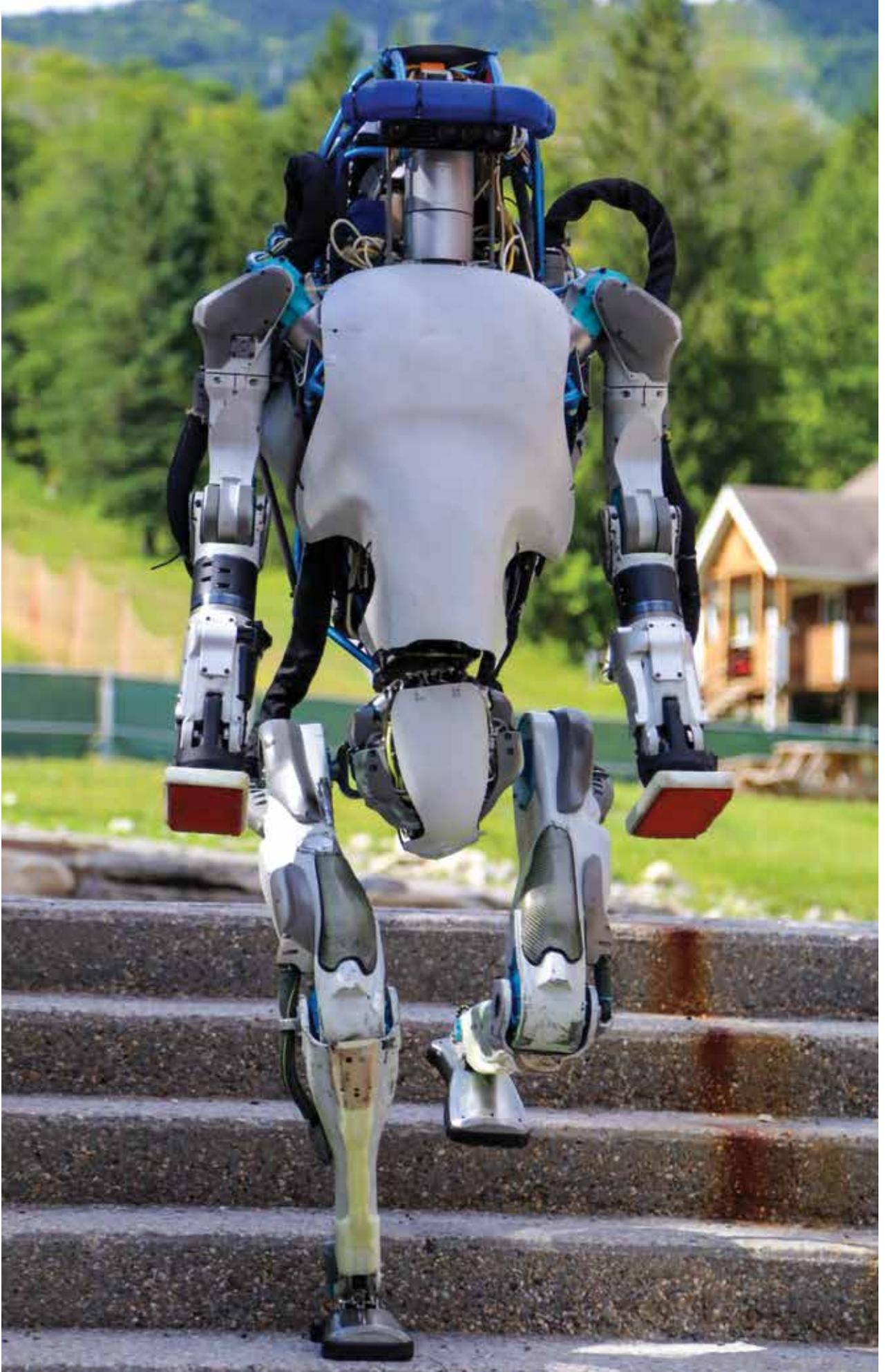
The Future Threat

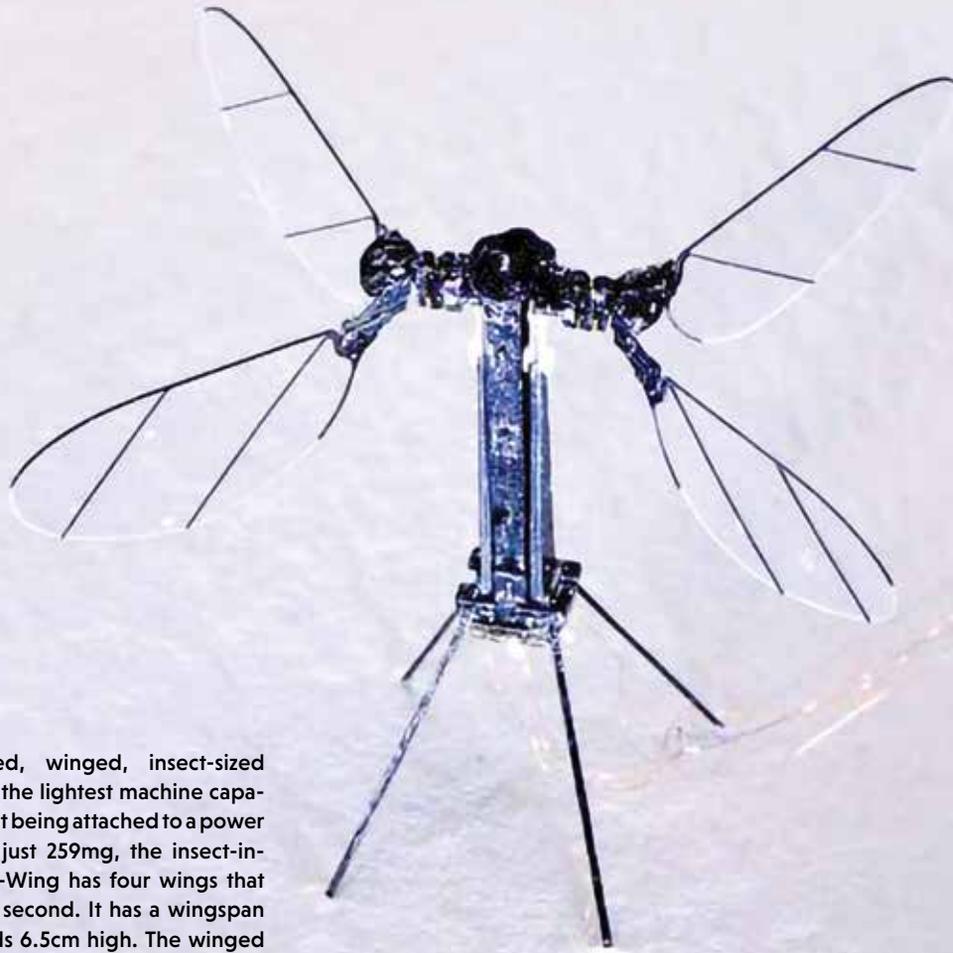


By Paul Evancoe



Standing 6-feet tall and human-like in movement, Boston Dynamics' Atlas® exemplifies an autonomously controlled, advanced bipedal, humanoid robot. Its autonomous whole-body mobile manipulation system coordinates human-like motions of the arms, torso and legs. Atlas employs multiple body and leg sensors to balance, and LIDAR and stereovision sensors in its head to avoid obstacles and map terrain for navigation. The advantage of bipedal locomotion (walking upright) is its compact footprint. Atlas is to humanoid robots as the Model T was to automobiles.





This solar-powered, winged, insect-sized robot has become the lightest machine capable of flying without being attached to a power source. Weighing just 259mg, the insect-inspired RoboBee X-Wing has four wings that flap 170 times per second. It has a wingspan of 3.5cm and stands 6.5cm high. The winged robot was developed by Noah Jafferis and his colleagues at Harvard University.

Establishing a “Divisive” Advantage

The term *future threat* is frequently used in military and intelligence community circles, but it means many things to many people. How far into the future does it go? What factors does it include? How might we peer into the crystal ball today with any clarity of understanding and attempt to ascertain the future threat?

The future threat is ascertained through a disciplined and thoughtful process involving in-depth analysis of today’s emerging technology and its evolutionary (directional) trends. This is done in conjunction with understanding our competitors’ geopolitical and political-military strategic goals, while declaratively defining and following our own. Technological and physical dominance and/or area denial in specific geographical theaters (regions), countries, sea lines of communication and space are examples of these goals. Attainment of technological dominance in these particular domains must be strategically advanced to the point it

denies peer competitors from achieving the same level of technology.

There are countless “think tanks” composed of very smart people focused on forecasting how warfare across the potential world theaters of conflict will likely evolve. They are concerned with what technological advancements will be necessary to maintain U.S. superiority to secure deterrence and realize combat supremacy should armed conflict become necessary. But think tanks don’t provide us the necessary information to understand how the emergence of, and access to, “big” technology affects the future of warfare, or how and where future conflicts might be fought. We simply do not possess a common understanding of the technological fusion necessary between the many critical elements in play in determining the future threat, e.g., artificial intelligence, autonomous systems, machine learning, space operations, biotechnologies, weapons and special warfare.

One point that most can agree on is that the requirement for and use of kinetic weapons will not diminish with the development of future high technology weapons. If anything, employment interoperability of kinetic weapons may prove to be the tiebreaker in future high technology conflict.

It is no secret that the U.S. has renewed its strategic emphasis on near-peer military competitors like China and Russia. China is investing significant resources in developing its military’s expeditionary capability as an essential component of its geopolitical goals to harvest the recourses necessary to fuel the continuance of China’s explosive growth in industrial manufacturing and critical technology development.

Russia, on the other hand, still remains a “first world” competitor of sorts. While Russia’s military now pales to what it once was during the Cold War, Russia is still technologically competitive with the U.S. Russia



BOEING

The Echo Voyager technology demonstrator (shown) preceded Orca. Boeing was recently awarded a \$43 million contract to build four Extra-Large Unmanned Underwater Vehicles (XLUUVs) for the U.S. Navy. These giant drone subs, nicknamed "Orcas," will undertake long-range autonomous missions that include intelligence collection, electronic warfare, mine laying, countermining, torpedoing surface ships and submarines and clandestine support of Special Operations missions. Measuring in at 51x8.5x8.5 feet, with a 50-ton displacement, this unmanned, autonomous, diesel-electric submarine can be launched and recovered from a pier. Of course, an amphibious ship's well deck would likely work too, as might a submarine's top deck carry (attached behind the sail) similar to the SEAL's Dry Deck Shelter (DDS). If Orca possesses the capabilities of its prototype predecessor, the Echo Voyager, it will dive to 11,000 feet with a range of 6,500 nautical miles and run stealthily at a submerged speed of 8 knots.

therefore cannot be ruled out of any equation involving near-peer competitor conflict; neither can bad actors like Iran, North Korea and some of the miscreant wild-card nations in the Middle East be ruled out. Extrapolating a future threat from that jumbled mess is no easy matter. That said, there are several predominant technological areas of shared significance that bubble to the crystal ball's surface and warrant discussion.

Artificial Intelligence

AI relies on computer-made decisions, and it is only as good as the power, speed and programming of the computer(s) that compose it. In view of the rapid and continuing evolution of computing technology we will see a continuing fusion of AI into fully autonomous mechanical systems. Today, we generally insist upon having a "person in the loop" who makes the critical decisions necessary in combat operations for precarious engagement. However, AI is at the threshold of possessing enough power to take the "person out of the loop" for fully autonomous operations of most

everything conceivable. There is currently a military and commercial weaponized AI arms race underway between the U.S., China and Russia. There are also several other countries of lesser consequence involved, which include the UK, Israel, Japan, India and Iran, to one degree or another.

The U.S. Department of Defense (DoD) reportedly has over 22,000 various robotic systems in use today with many more advanced systems on the way. The DoD's and private sector's collective annual spending on AI research and development has recently exceeded \$100 billion, reflecting its significance. The critical goal during the first half of this decade is the advancement of AI to a fully autonomous decision capability, superior to humans allowing military operations never before imagined. Replacing human decision-makers in the loop, AI will analyze opponents' moves at the speed of light and make better tactical and operational choices in combat. AI will bring the right weapon(s) and/or level of force to bear against the right target(s) at exactly the right time. AI will streamline

complex logistics and supply chains and integrate into the very fabric of warfare, becoming a high-priority cyber target itself.

Cyber-humans will be created within this decade. AI will soon be integrated directly into the human brain. There is credible research in this area today that reflects favorable results and a plausible future. Within the next 10 years the human brain will be fully integrated into the AI complex. Imagine having people with the history of everything at a thought's recall while possessing AI problem solving abilities.

Autonomous Systems

When we think of AI-controlled systems we usually think of autonomously controlled platforms, e.g., airborne drones, cars and land vehicles, small sea surface vessels and submarines, even exploratory spacecraft. But the next decade holds an entirely different level of AI-controlled, fully autonomous robotic systems that will range from bipedal human-like robots to specialized micro-bots. Imagine insect-sized sensing and killing bots that can

“swarm” in an attack or combine their individual capabilities transforming them into a made-to-order weapon system; that forms a variety of tailor-made, completely adaptable, yet different capabilities. The options are limitless. For example, dozens, hundreds or even thousands of sensors or weapons of all sizes and shapes could be autonomously integrated at the exact moment they’re needed to most efficiently counter a particular threat, or threats, and then be immediately redirected for other applications.

AI-autonomous systems will certainly be modular in design so repair and upgrade modifications can be robotically accomplished. Bipedal robot soldiers will unquestionably be designed to be interoperable with man-operated weapons employed by human soldiers, thereby offering the greatest degree of battlefield adaptability and interoperability. Among their numerous attributes, soldier-bots will possess great strength, agility and survivability, as well as the ability to repair and maintain each other. They will necessarily operate on a cloud-based system and be capable of creating a dedicated, secure portable cloud in order to do so.

Cyber

A secure dedicated military or government version of the World Wide Web is necessary to provide AI and autonomous systems secure access to data, data storage and data exchange. That has somewhat been accomplished to a limited degree, but in the future, as a result of technology-linked reliance to it, the cloud will become woefully overcrowded while offering vulnerability to exploitation. General internet use will also become increasingly competitive because its available space is already overpopulated by an estimated 20 billion devices today. That number currently translates to about three devices for each human on earth, and estimates predict over 50 billion devices by **2025**. 5G may offer a partial solution but not a permanent fix.

The convenience provided by all the mobile phones, computers, remotes and apps linking into today’s internet make our lives easier. However, these electronic devices present a mammoth vulnerability (known as a “threat surface”) that can be maliciously exploited by state actors, cyber-criminals and “fifth domain” black hats. Protecting government and military operations is paramount, but we cannot forget the privately held industrial, banking and general business complex, along with the critical infrastructure that relies upon internet connectivity.

Encryption strategies are evolving, but they always seem to fall short of fully protecting both data in motion and data at rest. It’s akin to the age-old game Cops and Robbers play except in the cyber world the players are AI. Firewalls don’t work against sophisticated AI attacks. The “castle” mentality of building a high wall around a city to protect its citizens



PAUL EVANCOE

Employing weaponized robotic platforms in high-threat operations is the undeniable future of warfare. Qinetiq’s TITAN modular UGV is not limited by any particular selection of armament. Pictured here, it’s equipped with a .50-caliber machine gun and Javelin missile launcher.

lost its viability around the 14th century with the invention of gunpowder and its tactical incorporation into siege warfare. Encryption is no different; especially when defending against an attacking AI cyber army where an overpowering siege may only last a matter of seconds or less.

Cyber-warfare requires both robust cyber attack capabilities as well as defenses. While today we have the U.S. Army Cyber Institute and Army Cyber Command, at some point, the creation of a stand-alone Cyber Force (modeled along the same lines of the Space Force) that is dedicated to cyber warfare will become necessary. Hopefully, Cyber Force will be created before we suffer a devastating 9/11-style cyber attack or worse.

The Space Domain

Space is slowly becoming a warfighting domain of its own, but its sheer enormity makes controlling it, without suffering political and military entanglement, a challenge of equal magnitude. Today, there are more than 2,600 earth-orbiting satellites, and the number continues to grow on a near weekly basis. These satellites have a variety of purposes that range from scientific, communications, navigation, mapping, agriculture, weather fore-

casting and mineral prospecting to military intelligence, targeting and surveillance, etc.

There is another highly classified satellite group that involves counter-space operations and commercial disruption (that includes offensive operations against other satellites, space ships, space stations and even counter-moon exploitation operations), and this category brings us to a whole other area of space operations ripe for exploitation. These areas include Cislunar space, Trans-lunar space and Lagrange points.

Cislunar space is defined as the spatial volume within the moon’s orbit, or the sphere formed by rotating within that orbit. *Cis* is a Latin word meaning “close to.” Practically, *Cislunar space* is defined as “the space volume between geostationary orbit and the moon’s orbit.” It is a spatially large area that has few occupiers and no permanent suitors that will rapidly gain strategic importance as we head toward permanent, forward-operating bases on the moon, including moon, comet and asteroid mineral exploitation and eventual Mars colonization.

Trans-lunar space is another area possessing strategic value with its own unique vulnerabilities. *Trans-lunar space* is the area that

extends beyond the moon or the moon's orbit around the earth. It is, for example, the vast area that spacecraft must transit on the way to Mars or any other Heavenly body beyond our moon's orbital Cislunar space.

There is a third area in space, known as the Lagrange points. These points were named after an 18th-century mathematician, Joseph-Louis Lagrange, who discovered and mathematically plotted their locations in a 1772 paper concerning what he called the "three-body problem." *Lagrange points* are specific locations in space where the combined gravitational forces of two large bodies (masses), like the earth and the sun, or earth and the moon, equal the centrifugal force felt by a much smaller third body (in our case, a spacecraft). The interaction of these forces creates a point of equilibrium where a spacecraft may be strategically "parked" for later use.

There are five (5) Lagrange points around all major bodies such as a planet or a star: they are not unique to our planetary system. Three Lagrange points lie along the gravitational tangent line connecting the two large bodies. In the Earth-Sun system, for example, the first point, L1, lies between the earth and the sun at about 1 million miles from Earth. L1 gets an uninterrupted view of the sun, and in our case, is currently occupied by the satellites Solar and Heliospheric Observatory (SOHO) and the Deep Space Climate Observatory (DSCOVR).

L2 also lies a million miles from Earth, but in the opposite direction of the sun. At this point, with the earth, moon and sun behind it, a spacecraft can get a clear view of deep space. NASA's Wilkinson Microwave Anisotropy Probe (WMAP) was located here from 2001 to 2010 and measured the cosmic background radiation left over from the Big Bang. The James Webb Space Telescope also operates within this region.

The third Lagrange point, L3, lies behind the sun, opposite Earth's orbit. For now, neither science nor the military has found a use for this parking spot because it remains hidden behind the sun at all times and it is vastly distant to Earth. Of course, that doesn't mean it should be discounted or that it won't someday gain strategic value.

There is an Achilles heel to L1, L2 and L3 because of their geospatial location; they all have precarious equilibrium that makes them unstable. This is to say, if a spacecraft parked at L2 drifted toward or away from Earth, it would irreversibly fall toward the sun or the earth. Therefore, parking a spacecraft at one of these points requires constant position adjustment to maintain equilibrium, and that means using fuel to power its thrusters or engines to hold its position.

In contrast, Lagrange points L4 and L5 are stable because these points lie along Earth's orbit at 60 degrees ahead of and behind Earth. This forms the apex of two equilateral triangles that have the large masses (the earth

Using automatus guidance and terrain navigation, Boston Dynamics' Spot® and Atlas® can autonomously follow a human foot soldier leader or travel on their own to a designated location using onboard terrain sensing, obstacle avoidance and GPS. They respond to basic voice commands like "sit," "stay" and "follow." Both are now commercially available and can be built to accommodate specific tasks.



and the sun, for example) as their vertices. Spacecraft parked at these two points must only make slight adjustments to maintain their orbits consistent with these points. This makes L4 and L5 very stable parking locations and strategically valuable for future occupation as well as denial.

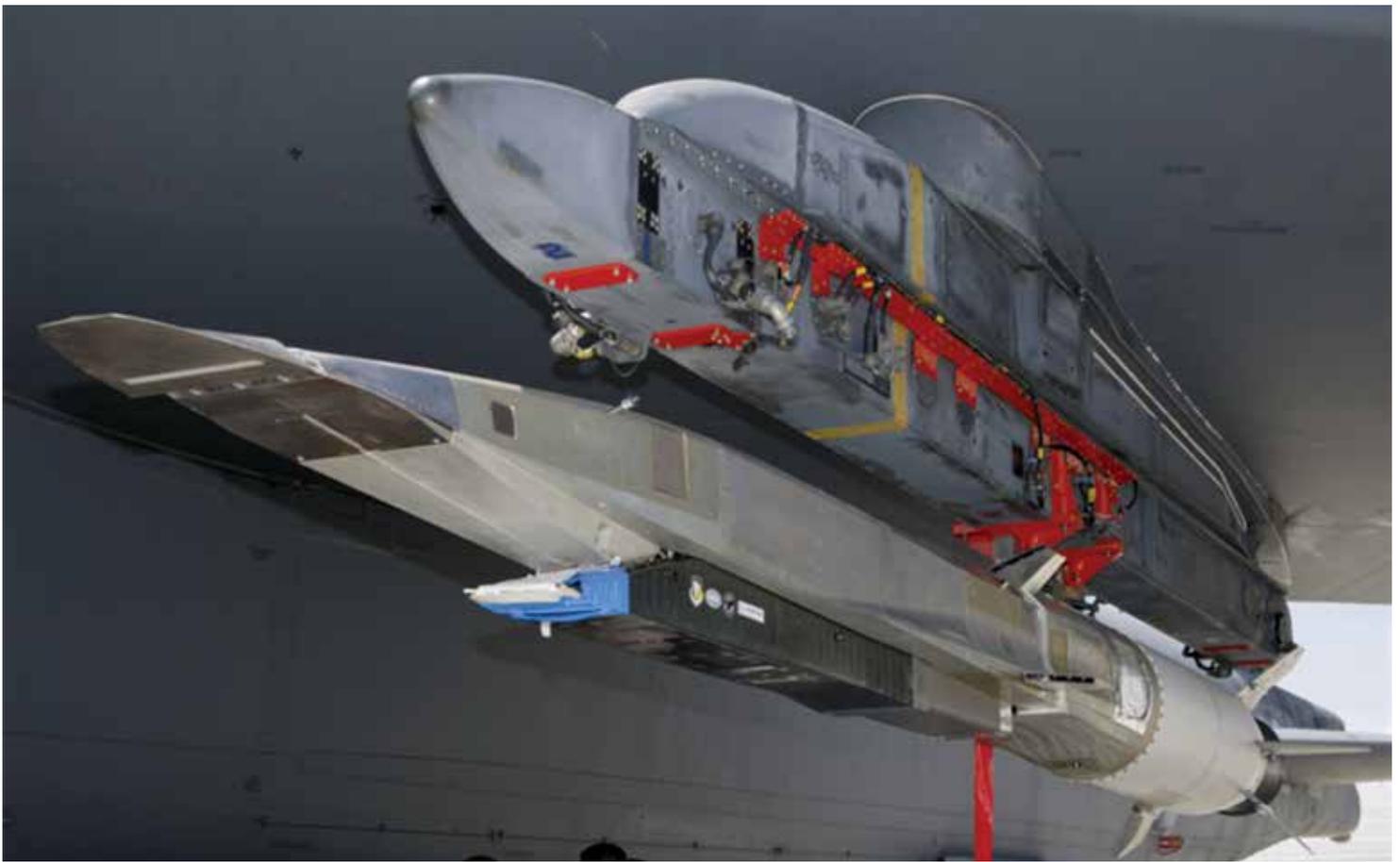
We don't know what form a conflict in space might take, because the means and capabilities required for space battle supremacy are largely unwritten. It is doubtful that we'll ever see manned spacecraft in dogfights as depicted in the "Star Wars" movies. Using space-based weapons against Earth targets is also unlikely for a variety of reasons ranging from being cost prohibitive to being a tactically bad option. However, it is likely we'll see AI, fully autonomous, space-employed, kinetic and directed energy weapons used against orbital satellites, or high-value spacecraft operating in Cislunar or Trans-lunar space. Caching space weapons or other systems, or the necessary components for later robotic assembly in space, at a Lagrange point will become an advantageous means of skirting treaties limiting the proliferation of space weapons.

The Space Force has been created because the space domain has already evolved beyond just putting satellites in Earth's orbit. Much like Earth's global sea lines of communication (SLOCs) for which the Navy

has responsibility, space lines of communication (celestial SLOCs) will become an issue for free movement to, from and through space for commerce, mineral exploitation and colonization. Space entrepreneurs like Elon Musk and Jeff Bezos are monetizing the space domain with plans to establish space tourism and permanent space colonies on the moon and on Mars. Within the next 20 years space commercialization will transpire and critical importance will be given to securing the space lines of communication (SLOCs). In turn, Space Force policies and operations will become a lot more like our Navy's projection of sea power.

Biotechnology

Smaller, less wealthy and less technically competitive nations have always considered bioweapons as equalizers. Bioweapon development can be accomplished in laboratories that don't require great investment, or sophistication, and otherwise does not have a detectable weapon development footprint. It can be accomplished, for example, in university laboratories. Delivering and dispersing bioweapons on target is technically more difficult, but the level of that difficulty is commensurate to one's respect for the protection of one's own personnel and the willingness to accept human collateral damage. If suicide bombers



BOEING

Launched from a B-52's wing pylon, the U.S. Air Force's experimental X-51A Waverider is an unmanned, autonomous, ramjet-powered hypersonic (5 times the speed of sound, or faster) technology demonstrator. Its nearly wingless 25-foot-long body and shark nose are aerodynamically designed to ride its own shockwave. The X-51A is envisioned to carry a payload array of capabilities to include reconnaissance and surveillance, electronic warfare and cyber countermeasures and even the capability to launch orbital devices like cube satellites.

abound, weapon delivery is made far easier.

The Coronavirus is exemplary of how easily a communicable virus (biology) can change our lives on a national or even a worldwide basis. It has demonstrated how complex and fragile our industry, agriculture and economy is and the degree of dependence we all have on a healthy country. Despite international conventions that curtail the development and use of bioweapons, rogue nations without the budget to compete with First World Nation technology development will find bioweapons appealing. Treaties banning bioweapon research and development are unquestionably important, but inclusion of rogue states and other disenfranchised bad actors into the international security regime, with any degree of confidence, is doubtful. Bioweapons will be used in future conflict, and they may range from bioengineered viruses or bugs that only attack a specific race's DNA, to those engineered to attack specific agricultural crops or animals. It's scary stuff.

Special Warfare

Special warfare is conducted by Special Operations Forces (SOF), e.g., Navy SEALs, Army Rangers, Marine Raiders, etc., and covers a wide swath of target types (both hard and soft), mission areas, operating environments

and human risk thresholds. With the advent of the U.S. Special Operations Command (SOCOM for short) in the mid-1980s, SOCOM set a new course into the future with its own research and development program, along with its own unique rapid procurement authorization that seeks to keep its force on the cutting edge of high technology. The purpose is to equip SOF warriors with the most technologically advanced equipment available to support their commando operations.

SOCOM has succeeded in some of the most advanced rapid development programs within the U.S. Department of Defense. These range from dedicated communications satellites (CUBESATS) that can be quickly launched into low orbit above a particular SOF area of operations, to advanced man-portable, directed energy and kinetic weapons, to undersea SOF delivery vehicles that provide occupants' life support. More importantly, SOCOM views space as the ultimate "high ground" as future conflict will likely include celestial battlespace.

It is not far fetched to imagine special mission-tailored commando teams composed of human SOF commandoes working side-by-side with AI-controlled fully autonomous robots of all types. Missions that are extremely high-risk, where the odds of death or capture

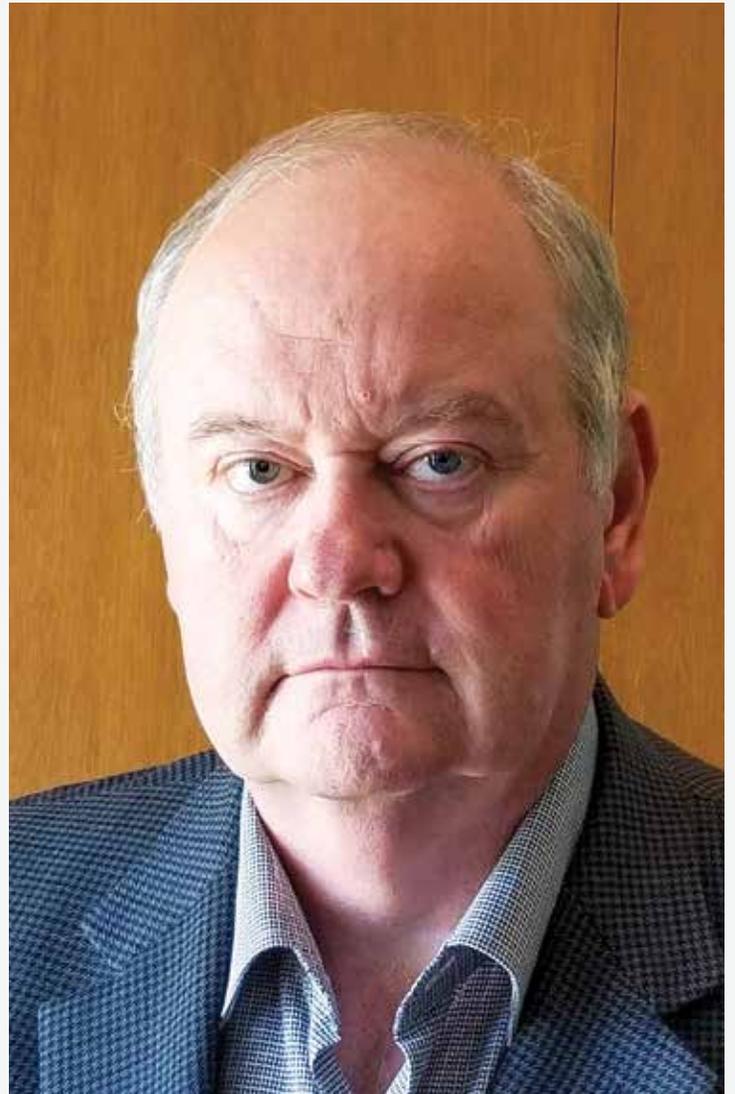
are unacceptable or where the battle environment denies human existence, like space, may well be wholly conducted robotically. It will essentially be the SOF future version of using autonomous drones and cruise missiles we see today. This "hybrid warfare" will become the norm as Earth-bound massed armies, along with their vulnerability to easy detection and targeting by advanced warfighting systems, become an expensive liability.

Divide to Conquer

During this decade we will witness fervent emphasis on budding technologies that rely upon quantum computing, manipulating subatomic particle movement, nanotechnology, cybernetics, hypersonics and the advanced propulsion and metallurgy necessary to achieve the rest. Thus, our "threat-casting" goal must be founded upon the development of advanced technology packages that provide a "divisive" advantage. This is to say that phrases like "cutting-edge technology, game changer" and "decisive advantage" don't look ahead far enough. We must strive to identify and perfect technologies so advanced that they clearly divide us from our competition, and that must be based upon accurately assessing the future threat. **SADJ**



David Luxton



Jeffrey MacLeod

Smart Solutions to Soldier Systems

**An Interview with KWESST Micro Systems Inc.'s David
Luxton and Jeffrey MacLeod**

By Miles Vining

Small Arms Defense Journal writer Miles Vining was able to recently talk to the head shed of KWESST Micro Systems Inc., a pioneering defense company in the area of providing smart solutions to legacy weapon systems through digital sighting and target acquisition systems. David Luxton is the executive chairman of KWESST, and Jeffrey MacLeod is the founder and president of the company.

Tell us a little bit about the current Augmented Weapon Sight (AWS) and Integrated Fires Module (IFM) project, the team involved and how you got here today.

MacLeod: I think it's important to know that this is not something that happened overnight. This has been 3 years in development to get us to this point we're at now, and about a year and a half to 2 years of that was strictly internally funded research and development to get the technology to a point where we were happy with it, to be able to demonstrate effectively to customers at various trade shows and international events and different venues that you'd be familiar with. Part of that involves having a team that has tremendous experience in sensors, soldier systems, weapons and just basically the whole package to deal with everything that the soldier wears, uses, touches and interfaces with.

Luxton: It's a cross-disciplinary team, and it's able to do ultra miniaturization of sensors and software, ballistic algorithms and micro-optical systems. It's able to achieve the kind of miniaturized network capability that we believe the market's been looking for. Certainly, the Future Soldier systems, which go by different names of different NATO countries, all have in common that they use a soldier as a node on a network, ... the soldier needs to be able to receive situational awareness, and this is a task system [that] has taken that further and has been able to put that kind of information and targeting capability right onto soldiers' weapon systems ... [T]hat really is the game changer and the overmatch capability that NATO customers are looking for.

MacLeod: So, these types of technologies are something I identified in a white paper to the Canadian defense and research people about 15 years ago now ... saying, "These are areas where you should be looking at as we go forward." And this was just reading through some of the Future Soldier systems; the different papers just told where people thought things might go. Being in the position with Colt Canada at the time, I had a pretty good idea of where small arms [were] going and the way things could be worked with them, but there was so much more that could be done ... that I thought it was time that Canada

is sure looking at it, and eventually they did. When we formed KWESST, what we wanted to do is take the ball in our hands and really start digging into the Future Soldier requirements that people thought really couldn't be done, but the technology has improved in the last, say, 5 years to the point where computer systems that used to take up the size of a breadbox or a small microwave now fit on a chip that's smaller than the tip of your finger sort of thing. That miniaturization capability allows us to have a whole lot of flexibility with what we can do with systems and build in capabilities that people just still aren't [sic] having a hard time understanding that we can actually do that with the technology that's out there.

Can you explain these systems?

MacLeod: Well, there's a couple of different aspects to the systems. First and foremost, for a mortar system we have the Integrated Fires Module (IFM). Essentially what you're doing is you're taking the optical aiming sight off, and using the same mount, you're putting on the electronic sensor package. One side of your electronic sensor package is aligned to the gun tube, then it knows precisely where the tube is pointed at all times. There isn't a need for the traditional aiming stakes or re-bubbling as with the current traditional mortar systems. That's just a sample of one of the things that our system does that you don't have to do anymore, because our device is fully aligned with the tube so that it doesn't matter if it's at a slant or an angle, or whatever; it's still going to calculate the actual impact point.

MacLeod: So, it is not an optic, it is an electronic sensor. We do have an optical camera in the system, but it is for providing the overall pointing accuracy of the system.

What does this look like to the gun crew behind the mortar?

MacLeod: Once the alignment is done, all they really have to interface with is an end user device. In our case, we're using the Samsung family of cell phones, and we'll be moving shortly to the Samsung S20 Tactical Edition. So, that's what they see. ... Depending on the user, we will interface the TASCs [Tactical and Situational Control System] ...

into [a] battlefield management application such as ATAK [Android Tactical Assault Kit]. So, it's not a new application for them; they're using their current battlefield management application already. So, on the screen for the mortar, if they're just in an observation or a standby mode, they'll basically have a map of the general area they're in, which will show their location and give them situational awareness of where other TASCs systems are, and that means ... everybody who's equipped with the TASCs system knows where everybody else is. They also know where the guns are pointed. And when they actually engage the ballistic mode in the system, everybody will also be able to see the projected impact point for everybody else's weapons.

If I'm a squad leader calling for 60mm mortars, and I have one of these battlefield management ATAK systems on my plate carrier, I can adjust off of it and actually communicate with it on a touchscreen and say, "I want mortars to land at this spot where I'm touching the screen?"

MacLeod: Yes, that's actually one of the ways of designating a target. If you are in a situation where you have that capability, you can just flip down your screen, tap the map you have on board at the location where you want to engage, and you can assign that target to any of your tubes; or if your tubes are not in range, you can send it to somebody else who might be in range. They'll get that instantaneously. They'll get a little tone on their phone or a vibration to say, "You've got a new message," and when they open the device, it'll give them a target. If it's not within the viewing zone of the map they're currently on, or in the viewfinder, it will tell them to elevate and rotate, and as the target becomes visible, it'll be marked with the standard NATO symbols on the map, and the reticle pattern will be overlaid on top of it, and basically you just adjust your weapon system until the reticle pattern is on top of the target, and you're good to go.

Luxton: We have heard customers repeatedly described this as transforming their dumb weapons into smart weapons without any modification to the weapon or the munitions, which is one of the features they find very attractive.

MacLeod: TASCs is basically the software portion of it. The Integrated Fires Module (IFM), the sensor package, is built and designed to work on any crew-served weapon. We've used it on Mark 19s; we've used it on M203s, 81mm mortars, and we've been asked to move it up to higher caliber weapon systems as well, but basically, it's for use with any crew-served weapon or any indirect-fire-type weapon. With our system, if you know where the target is on the map, and you input that into the map, then the computer takes over and gives you an aim point, and you just, as I say, elevate and rotate until you're on the target, and you will hit the target.

Why are you concentrating on mortars?

MacLeod: The bigger guns (105s, 155s) technically have their computer systems with them. I mean, to be brutally honest, a lot of mortars, particularly the 60s and the 81s, are still using whizz wheels. Their technology for calculating the aiming of the mortar has not changed in like 75 years, and even the lucky guys, you do have some kind of ballistic computer, they're actually fairly clunky and not terribly user friendly. When we first started demonstrating this we were demonstrating with underslung M203 launchers because the concept is the same. But as soon as the user started seeing it, first of all, the guys using the 60mm mortars and the handheld motors were going, "Wow, I could put this on, and I wouldn't actually have to do the sighting over the top of the barrel and expos[e] myself to enemy fire at the same time. As long as I know where he is on the map, I could be behind cover and engaging." Then we go, "Yes, that's pretty much what we're saying." So they said, "If we could get better first-round hit probabilities and use fewer rounds to neutralize the target, that could really pay some dividends for us."

Explain the Augmented Weapon Sight (AWS).

MacLeod: The AWS is the augmented weapon site portion of this. If they [soldiers] happen to be working in a situation where they do have observation on the target from a UAS or a UAV system, the gunner or the fire coordination center can see what the drone is seeing; they can pass that target information down to the gun system and basically re-overlay the gun reticle directly on the video feed from the drone. So, it's an instantaneous battlefield damage assessment, instantaneous corrections, particularly if the target is moving, and it's really quite interesting. The other thing we can do is, we can control the payload, i.e., the camera of the drone, if we're given permission to do so, switching from day camera to night camera, the black hot, white hot, zoom in, zoom out—

"When we formed KWESST, what we wanted to do is take the ball in our hands and really start digging into the Future Soldier requirements that people thought really couldn't be done, but the technology has improved in the last, say, 5 years to the point where computer systems that used to take up the size of a breadbox or a small microwave now fit on a chip that's smaller than the tip of your finger sort of thing."

Jeffrey MacLeod

that kind of thing from the gun tube.

How complicated can I get with this in terms of variety of ammunition choice? With an aerial burst, will it show where I can place my aerial burst? If I'm that squad leader, can I request different rounds of ammunition? Does that squad leader know how many rounds of ammunition that 60mm crew has?

MacLeod: Currently, we're really only dealing with the impact fusing. There's no reason why we can't deal with the other fusing, because we're dealing with three-dimensional maps. So, if you're calling for an airburst, which is fused to burst at a certain level above ground, one of the things we can do is, the system will be able to calculate the height difference between where you are and where the target is and tell you what you should set your fuse at, but that's not something that's implemented at this time, but it's certainly not out of the question to do that. For some of the grenade machine guns which use the airburst munitions as well, once again, in trials, we found that the actual range data we get using the physical map interface, as opposed to relying on a laser rangefinder to determine range, gives you a significantly better range estimate than the laser does,

because of some of the built-in problems with using laser rangefinders. So, we can program the munition or provide the information to the programmer to program that munition, so that we should be able to achieve better accuracy with those types of systems as well.

Understood. So where are you on your trials and production timeline? AWS and IFM?

MacLeod: With our Integrated Fires Module, we're building what we would basically call our pre-production units now. They'll be ready to roll later this fall [2020]. We'll do some internal testing, and we hope to provide them to our customer for an extended user evaluation, which will last from 12 to 18 months, early next year. And, during that period we anticipate, as the system gets better known throughout the U.S. military, that we will start to get additional orders for evaluation samples, that kind of thing. The good news about the system is that different operators will want different features, and, as I said, most of the features ... are already in the system or adapting the user interface device to display the information in the way that the customer wants it. So, basically, what we're looking at is probably by mid-next year to have a system which is well proven by that time, integrated with ATASCs and ready for serial production.

So, you're looking at the 12 to 18 months of user evaluation starting early next year?

MacLeod: Early next year, yes. Significant orders would probably be [later] 2021 to 2022 from the U.S. military. However, I do have some other irons in the fire with other NATO countries as well. So, that could come to fruition a little before that.

This has been quite the discussion. What other products are in the works at KWESST?

Luxton: Well, there is the electronic decoys capability as well, and there's market excitement about that, because there are more and more emerging requirements to be able to have a micro system of electronic decoys that will emulate friendly-force electromagnetic signatures to spoof the enemy. It's a thing that are small enough that they can be peppered in an operational area and drive the enemy to false locations, either reconnaissance or attack, and it provides time for operations to be completed. We have a couple other products that are around the KWESST website, including the shot counter system, which certainly is a small arms technology that is extremely interesting. In short, there's a lot going on. It's a very compelling portfolio of technologies that are now making their way into the market. **SADJ**

DISPATCHES

Small Arms News from the World's Hot Spots



YEMENI SOCIAL MEDIA VIA ARES CONMAT DATABASE

A modification of an NSV-type heavy machine gun.

Modified NSV Sold as Anti-Materiel Rifle in Yemen

By Jonathan Ferguson

A **mystery 12.7x108mm** anti-materiel rifle documented for sale in Yemen recently—described as “craft-produced” by some observers—has been identified by ARES. It is not, in fact, craft-produced but rather an ingenious yet relatively straightforward modification of an NSV-type heavy machine gun (HMG). The gun's barreled action has simply been flipped upside down and re-equipped for firing from the shoulder. As well as the obviously locally made and rather blocky buttstock, numerous other additions have been made. A pistol grip, trigger guard and unusually shaped trigger (not the standard NSV assembly as normally found separately on the HMG mount) have been fitted to the rear cover plate in place of the rear sight assembly.

A rock-in style magazine well has been

improvised to accept a factory-made 12.7mm magazine. Fins have also been machined into the barrel in an attempt to cool the gun and/or (given the reported 26kg weight of the weapon) to lighten it somewhat. A Czech UK vz. 59 machine gun bipod (fixed pattern) has been fitted and the NSV cone-shaped flash-suppressor replaced by an unidentified (possibly craft-produced) bird-cage type. Sighting arrangements have also been changed. The weapon's standard rear sight has been removed and re-sighted on top of the rifle and the front sight reinstalled upside-down. Finally, an optical sight with brow-pad has been mounted. The NSV selector (safe and fire only) remains intact, and this indicates it is likely that the weapon remains automatic-only in operation, save for judicious trigger

control or the more laborious option of loading a single round into the magazine. Despite this, one source claims the rifle is capable of semi-automatic fire.

TECHNICAL SPECIFICATIONS

Overall length: 1,400mm

Barrel length: 600mm

Weight: 26kg

Calibre: 12.7x108mm

Feed device: 10-round detachable box magazine

...

Special thanks to ArmoryBazaar.

This article is reproduced courtesy of Armament Research Services (ARES). See armamentresearch.com for further original content.



SOUTH AFRICAN SOCIAL MEDIA VIA ARES CONMAT DATABASE

A Chinese CS/LS5 or SMG9 submachine gun recovered by South African police.

South African Police Seize Chinese CS/LS5 Submachine Gun

By Jonathan Ferguson

Amongst a handful of small arms seized on September 6, 2019, by police in Johannesburg, South Africa, was an unusual Chinese submachine gun or pistol-calibre carbine. Superficially similar to the German Heckler & Koch (HK) MP5 and UMP—two better-known 9x19mm submachine guns—this original design is available in both military/law enforcement and sporting forms as the CS/LS5, manufactured by Chongqing Jianshe Industry Co., Ltd (on behalf of Norinco), and the SMG9, produced by Sino Defense Manufacturing, respectively.

Three suspects were arrested by the South African Police Service on suspicion of planning an armed robbery. Along with the CS/LS5, two 7.62x39mm self-loading rifles were also recovered: a Czech vz. 58 and an AKM-pattern rifle, both missing their stocks.

The CS/LS5 first appeared in prototype form at the 3rd China International Police Equipment Exhibition in 2009, with the introduction of the production-ready gun following in 2012. Due to variations in observed build standards and a lack of

close-up images for the captured example, it is not clear whether the recovered weapon is a CS/LS5 or the semiautomatic-only commercial SMG9. In any case, the two variants appear to differ only in the trigger mechanism (and presumably in their markings), sharing a machined aluminum upper receiver with integral rear sight protectors and optical sight rail, as well as a polymer lower with side-folding buttstock (seen folded underneath the captured example).

The upper and lower receivers are retained by the familiar push-pin arrangement. The rear iron sight is a vertically mounted wheel with multiple apertures, and the front post is shrouded in a machined sight-protector/gas-block assembly with a removable gas plug at the front. The cocking handle is mounted on the left-hand side in a tube above the barrel, aping the popular HK MP5/UMP arrangement. The front handguard is polymer with insets for bolt-on strips of accessory rail (not present on the South African example). Like some contemporary western submachine guns, both variants are gas-operated and fire

from the closed bolt, with an AK-inspired bolt carrier group. Designed for the 9x19mm cartridge, the SMG9 is additionally available for the Italian commercial market in a 9x21mm chambering.

Unlike the CS/LS06 9x19mm submachine gun, it is unclear if the CS/LS5 has entered Chinese service or gained any foreign military or police contracts. Although self-loading rifles are legal in RSA and Chinese firearms are imported, ARES has yet to come across any examples of the CS/LS5 or SMG9, and it is possible that the weapon was illicitly imported.

TECHNICAL SPECIFICATIONS

Calibre: 9x19mm

Overall length: 690mm

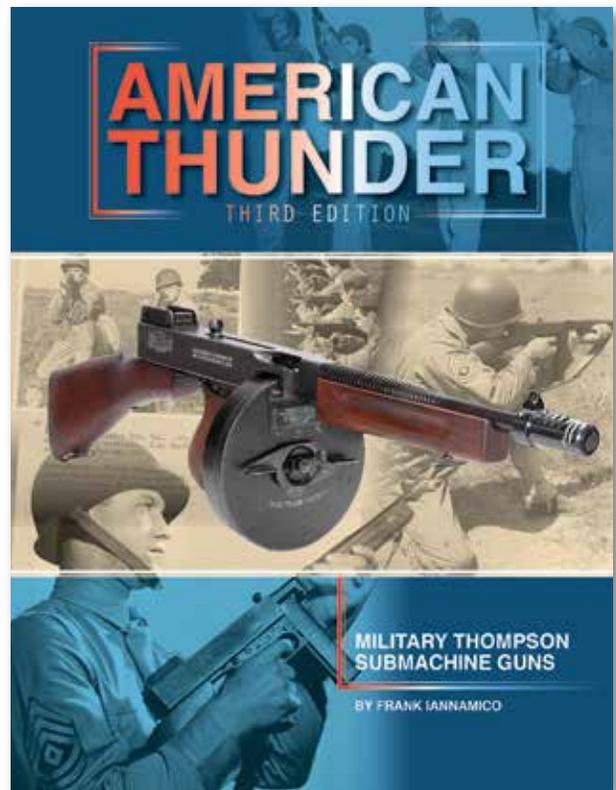
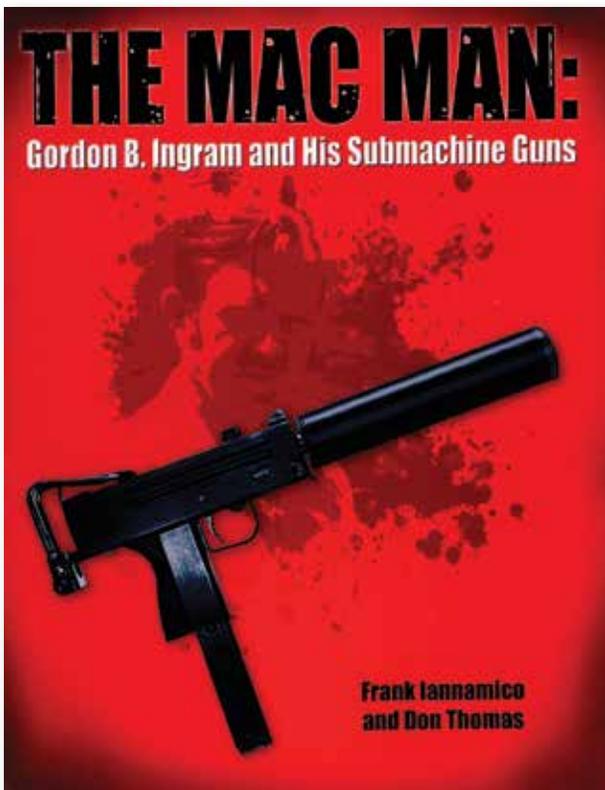
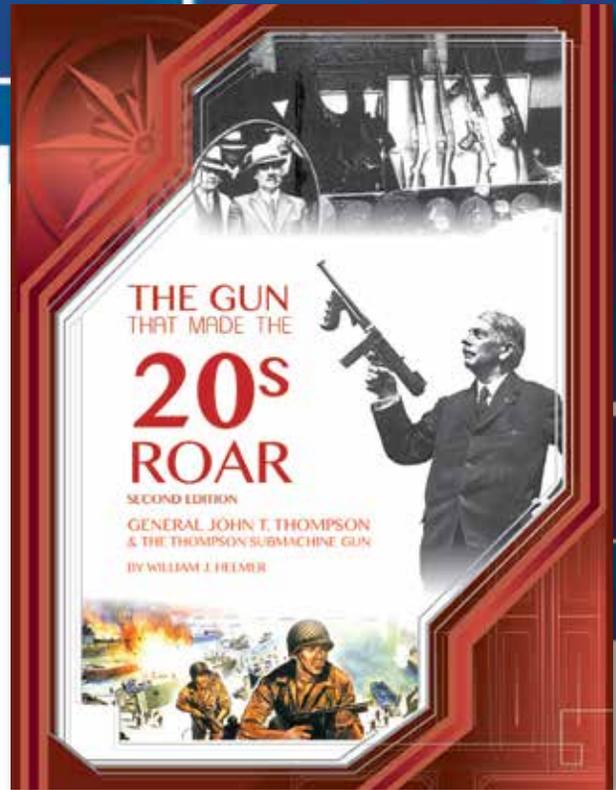
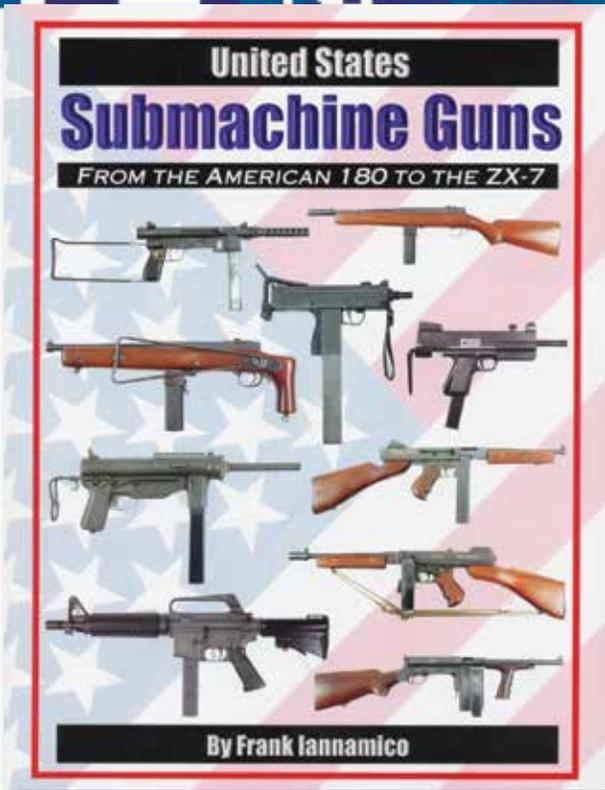
Barrel length: 216mm

Weight: 2.5kg (w/empty magazine)

Feed device: 30-round detachable box magazine

...

This article is reproduced courtesy of Armament Research Services (ARES). See armamentresearch.com for further original content.

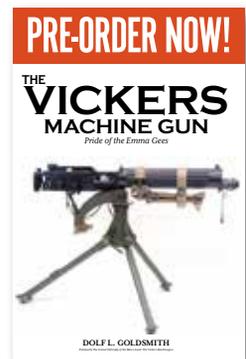


THESE TITLES AND MORE AVAILABLE ON OUR WEBSITE!

SMALLARMSREVIEW.COM



CHIPOTLE
PUBLISHING, LLC
702.565.0746





Aimpoint® Awarded Second Contract for FCS

Aimpoint has been awarded a second contract for supply of the Aimpoint® FCS13RE™ Fire Control Systems to the U.S. military. The system is currently being deployed as the primary fire control on the M3E1 MAAWS lightweight 84mm Carl-Gustaf produced by SAAB Dynamics for use by the U.S. Army, U.S. Marine Corps and U.S. Special Operations Command. The FCS13RE is a direct view, Dynamic Universal Reflex Sight (DURS) which uses an integrated laser rangefinder and ballistic computer to give the gunner an aiming point corrected for range, type of munition, terrain angle and environmental conditions. In addition to the 84mm Carl-Gustaf, the system can also be utilized on other weapons including the AT4, 40mm high-velocity grenade launchers (Mk19), .50-caliber heavy machine guns (M2) and the M134D Minigun. The FCS13RE provides an extremely high probability of first-round hits on both stationary and moving targets during day and night. The system can be enhanced with a magnifier, a thermal imager and is compatible with all generations of military night vision.

aimpoint.com

True Velocity™ Unveils Ammo Production Cells

On September 22, 2020, Texas-based **True Velocity** introduced new tech and proprietary solutions to help Armed Forces streamline ammo production and logistics from anywhere in the world. The company's manufacturing capabilities can power customizable and highly portable "cells," allowing for decentralized and automated ammo production.

True Velocity manufacturing is aimed at reducing inefficiencies in the ammunition supply chain, improving manufacturing safety and has capacity to produce as many as 600 million rounds per year from its operations. The cell production technology from True Velocity includes everything from casing manufacturing to loading of ammunition in a physical footprint that requires only 2,500 square feet.

During testimony in front of the House Armed Services Committee, Assistant Secretary of the Army for Acquisition, Logistics, and Technology Dr. Bruce Jette mentioned the shortfalls of current ammunition manufacturing logistics in the U.S. and provided a blueprint for modernization: "We have been reticent to bring our production facilities into the 21st century. But we are at an inflection point, knowing that technology offers true modernization pathways that can significantly improve both safety and transform the production capability." When asked about opportunities to modernize operations, Dr. Jette referenced using polymer casing manufacturers.

True Velocity can ship manufacturing infrastructure anywhere in the world and can create operational manufacturing cells within months. Traditional ammunition manufacturing lines take as long as 2 years to accomplish similar outputs. More than 1 million rounds of True Velocity composite-cased cartridges will be delivered throughout 2020-2021 to the U.S. Army as ammunition solutions are tested by the U.S. Army's NGSW program.

tvammo.com



Remington Auctioned Off

Once the oldest and largest gunmaker in North America, **Remington Outdoor Co.** is now out of business. The company was auctioned off in bankruptcy court to seven bidders after the company was divvied up in several portions, according to a filing in the northern district of Alabama. In 2007, Alabama-based Cerberus Capital Management acquired Remington for \$370M, but years later Remington accumulated nearly \$1 billion in debt due to low sales, debt incurred by its acquisition and lawsuits.

The seven companies and the Remington lines of business purchased include:

- Franklin® Armory Holdings Inc.—Bushmaster rifle brand and some related assets
- JJE Capital Holdings LLC (parent company of Palmetto State Armory)—DPMS, H&R, StormLake, AAC and Parker brands

The Remington logo is written in a green, cursive, serif font with a registered trademark symbol (®) at the end.

- Roundhill Group, LLC—Remington Firearms, including all long guns, shotguns, pistols, firearms manufacturing facilities, museum and gift shop (all non-Marlin)
- Sierra® Bullets LLC—Barnes Bullets
- Sportsman's Warehouse Inc.—Tapco brands
- Sturm, Ruger, & Co.—Marlin firearms business
- Vista™ Outdoor Inc.—Lonoke ammunitions business and certain IP assets

FN Herstal Ground Mobility Agreement with Nexter

FN Herstal, a Belgian subsidiary of the Herstal Group, and the French group Nexter have recently signed a strategic contract in the framework of the CaMo (Capacité Motorisée or Motorized Capability) program for the modernization of the Belgian Army's ground mobility capability. This contract covers the production and delivery by FN Herstal of latest

generation deFNder® remote weapon stations to be fitted to Griffon multi-role armored vehicles (VBMR) that will be supplied by France to the Belgian Army between 2025 and 2030.

The contract between FN Herstal and Nexter, prime contractor in the French consortium in charge of the program, results from the November 2018 intergovernmental

agreement between France and Belgium that confirmed their decision to form a long-term strategic partnership in the field of ground mobility.

The contract includes the supply to the French Army of the same type of weapon stations for its Leclerc tank modernization program.

fnherstal.com

KWESST Completes 1st Phase of Contract with TASCSTM

Canadian-based **KWESST Micro Systems Inc.** announced the successful completion of the first phase of three deliverables under a contract to support a U.S. military customer featuring the company's signature Tactical Awareness and Situational Control System (TASCSTM), an app and snap-on weapon adaptor that streams situational awareness and targeting information from any source directly to soldiers' smart devices and their weapons systems for a leap ahead in safer and more effective engagement of adversaries.

This first deliverable under a

\$500,000 (CAD) contract demonstrated the TASCSTM Integrated Fires Module (IFM) on mortars and the Augmented Weapon Sight (AWS), a system developed by AeroVironment™, Inc. and KWESST to provide real-time situational awareness and targeting information. The AWS streams full-motion video from an overhead Unmanned Aerial Vehicle (UAV or drone) manufactured by AeroVironment into the TASCSTM architecture for the purpose of target identification, accurate first-shot hits and real-time Battle Damage Assessment (BDA).

kwesst.com

U.S. Army Awards FN America M249 SAW Contract

On September 24, 2020, **FN America, LLC**, announced that the company has been awarded a firm-fixed-price contract to supply the U.S. Army with M249 Squad Automatic Weapons, also known as the M249 SAW. The contract is expected to be completed by 2025.

The FN M249 SAW has been a mainstay throughout the U.S. military since 1986 and is currently in service in more than 30 countries globally. FN has been the sole source manufacturer of the 5.56-chambered, belt-fed lightweight machine gun. Designed for front line applications delivering crucial support at the infantry squad/fire team level, the FN M249 SAW provides accurate fire from a highly maneuverable light machine gun. The ergonomic polymer buttstock contains a hydraulic buffer that allows SAW gunners to maintain a high rate of fire with accuracy and effect.

fnamerica.com



Ministry of Defence
Thailand



Power of Partnership

Tri-Service Asian Defense & Security Exhibition, Conference and Networking Event



1 - 4 November 2021

IMPACT Exhibition and Convention Center,
Muang Thong Thani, Thailand

10th
EDITION



Organised by:



For more information please contact:

Ms. Yaowalak Chuvichien, Project Manager

+66 (0) 2036 0500 ext. 212

Yaowalak@asiandefense.com

Officially Support by:



28-31 MARCH 2022
MITEC HALLA, LUMPUR

Strategic Partner:

Official Publication
and Official Show
Daily Publisher:



Official Online
Show daily:



Official Bilingual
Show daily:



Official News Online
and Web TV:



Supporting Publication:



+66 (0) 2036 0500

info@asiandefense.com

@DefenseThailand

Defense Security Thailand

#DefenseThailand

SHORT BARREL DOMINATION

ADVANCED FIREARMS +
TERMINAL AMMUNITION

We changed the game in compact firepower. Leading with the groundbreaking PDX, measuring a mere 18.75" in total length, the MDX family is now complete with the addition of the 508 and 510. Thanks to advancements such as our HATEBRAKE™ and SCW stocks & braces, the MDX series delivers reliability, durability, and accuracy never before seen in short barreled firearms.

SBR and Pistol variants
available in Black and Anod.

Calibers:

— .300 BLK
— 7.62x39
— 5.56 NATO



PDX



MDX 508



MDX 510

SHORT BARREL AMMUNITION



To maximize effectiveness of our PDX series, we've partnered with Fort Scott Munitions to design cartridges specifically formulated for high-performance from short barreled firearms. The Maxim Defense Ammunition wound cavities exceed the standards of both expanding and fragmenting projectiles found on the market today. The TUI® design of the projectiles tumble all the way down to 500 fps.



Calibers:

— .300 BLK 115gr & 190gr
— 7.62x39 117gr
— 5.56 NATO 55gr, 62gr & 70gr



MAXIM
DEFENSE®
www.MAXIMDEFENSE.com

A MILE IN THEIR SHOES



The M107A1 is more than a simple evolution of its predecessor. Critical components were re-engineered and built to be lighter, stronger, and more accurate. The result? A high-performance rifle that has successfully engaged targets at distances exceeding 1760 yards by Special Operations Forces. **Available to the civilian market.**