

SMALL ARMS

# DEFENSE

JOURNAL

VOL 14, NO 3 | MAY/JUNE 2022

## NO COMPROMISE

THE NEW EXCELITAS DRAGON THERMAL SIGHT

**PETIT BUT POTENT**

**SIG SAUER'S M400 SWITCHBLADE  
AR PISTOL**

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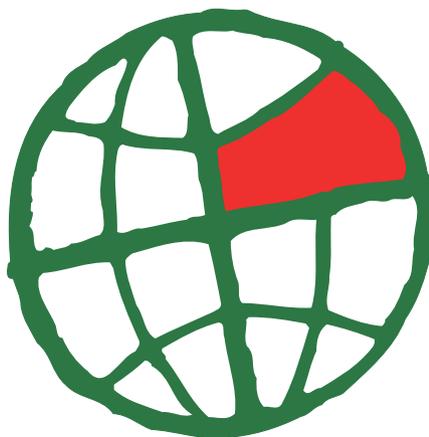
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## ON THE COVER

Read more about the **Excelitas DRAGON-C12** clip-on thermal weapon sight.

PHOTO: Excelitas

See Story on page 12



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# NEW PRODUCTS



## FN HERSTAL

### ***FN Elity***

FN Herstal's new weapon-mounted, ITAR-free rangefinder and ballistic calculator, the **FN Elity**, is designed for squad or sniper team weapons of any caliber and spotting scopes. The weapon mounted ballistic calculator maximizes first hit probability at long range, night and day.

The laser rangefinder can measure a human-size target at distances of up to 1,913 yards and the AFS bal-

listic solver by ApexO provides ballistic corrections, wind speed, and direction through its unique wind clock. All this information is displayed on a state-of-the-art OLED display screen.

Alongside its rangefinding and ballistic solver capability, the unit also provides target designation and illumination capability thanks to its integrated IR and visible laser

pointers, and IR illuminator. Environmental sensors for humidity, temperature, pressure, cant, elevation, complete the feature set of the FN Elity. The FN Elity is a collaboration between FN Herstal and Canadian ApexO, which specializes in ballistic engineering and computer-oriented solutions.

**MSRP: \$TBD**  
**[fnherstal.com](http://fnherstal.com)**

## ADEPT ARMOR

# Colossus

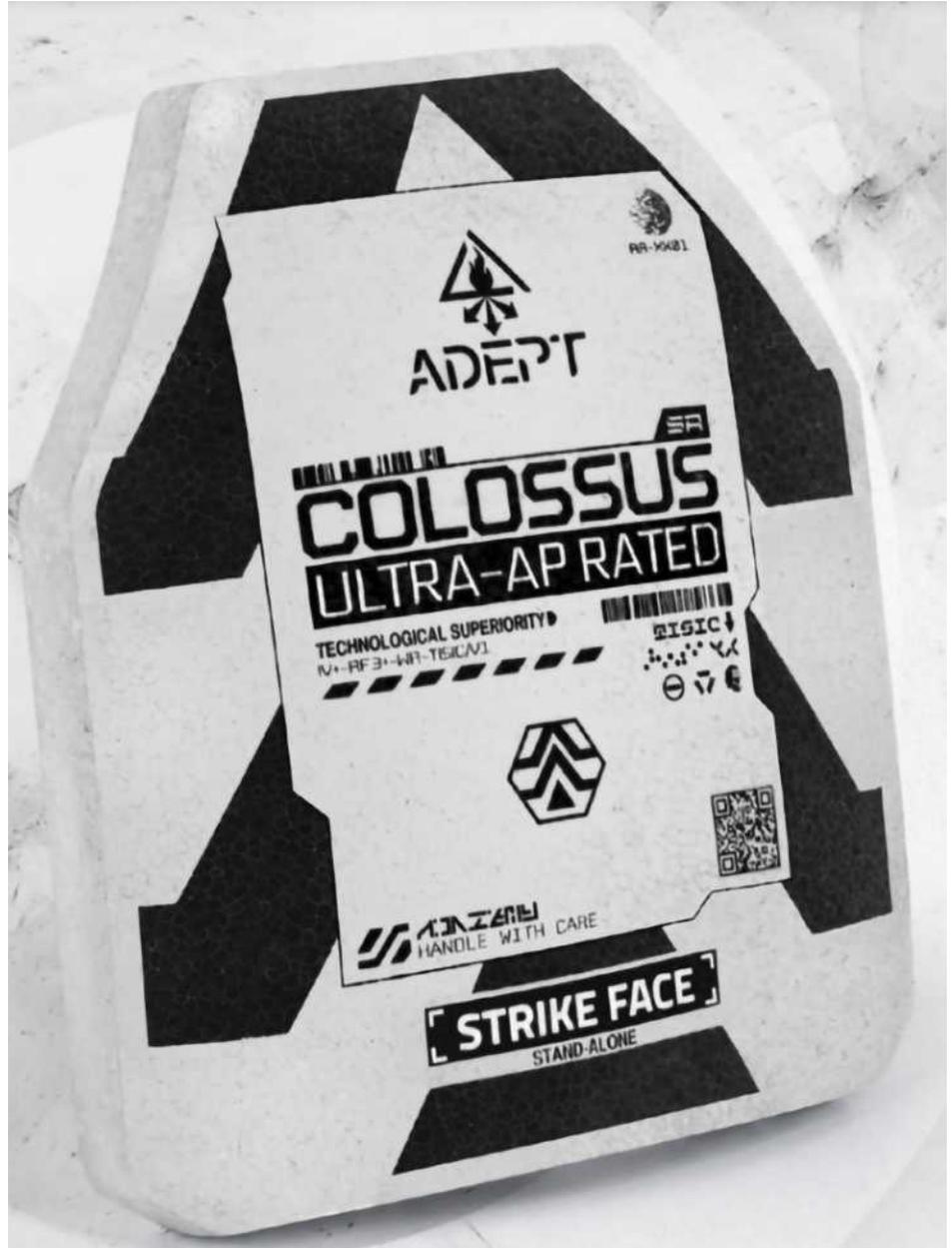
Adept Armor's new ceramic armor with the **Colossus Armor Plate** offers protective capabilities beyond Level IV or RF3 plates. The Colossus was designed from the ground up using the most advanced materials available to produce the strongest plate in its category, yet weighing significantly less than the average Level IV or RF3 plate at just over six pounds.

The Colossus was built and tested to VPAM 12 with a ballistic rating for 7.62x51mm Swiss P AP (tungsten core) at 2657 fps. VPAM is the European standard for testing and measurement of ballistic materials and products. Additionally, the Colossus is also rated for:

- VPAM 11 – 7.62x51mm M993 (tungsten core) at 3,084fps
- Level IV (RF3) - .30-06 AP M2 at 2,887fps
- 7.62x54mmR Bf32 API at 2,821fps
- 5.56x45mm M995 at 3,280fps
- 5.45x39mm AP at 2,887fps

The multi-curve Colossus is made from advanced SiC-TiB2 ceramic, Vectran, a liquid crystal polymer fiber known for its high-strength, high heat resistance, and low stretch capabilities, and UHMWPE composite in a thermoplastic wrap. The premium-grade thermoplastic foam on the strike-face offers drop protection, and on the body-side, it serves as an integrated trauma pad. Weighing just 6.5 lbs. in the Shooter's Cut, the Colossus is 1.13-inch thick.

MSRP: From \$640  
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# NEW PRODUCTS



**FOXFURY**

## ***Taker B52***

The **Taker B52** ballistic shield light retains the same field-tested design as the popular Taker B50 but is 2,000 lumens brighter. The front-mounted Taker B52 shield light gives tactical officers more panoramic lighting, making situational assessment faster. The light also incorporates a Turbo-Strobe mode that disorients suspects for a tac-

tical advantage. The light is powered by a pair of 18650 batteries and features a remote pressure switch with three tactical settings: momentary, "turbo-strobe", and continuous on.

**MSRP: \$500**

**foxfury.com**



FOXFURY

## **EXOLANDER Landing System for the DJI Mavic 2 Pro**

The new **EXOLANDER** Drone System enables the DJI Mavic to mount anti-collision lights and searchlights, and provides a more stable landing platform with leg extensions and landing skids. The system includes the saddle mount that connects the EXOLANDER frame to the DJI Mavic 2 Pro. It can be used to hold five FoxFury D10 or D3060 lights (available separately.) These lights serve as anti-collision lights for night flight regulation compliance.

This apparatus securely supports D3060 and D10 drone lights for maintaining proper center of gravity on the DJI Mavic Pro 2. The frame has 10 hard points for mounting various accessories and may be attached/removed from the DJI Mavic 2 Pro aircraft without tools. The landing skids allow the DJI Mavic Pro 2 to land on snow, mud, and uneven surfaces, protects the camera from impact, and stabilizes the aircraft when landing.

MSRP: \$180  
[foxfury.com](http://foxfury.com)

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# No Compromise with the New Excelitas DRAGON Thermal Sight

## A True Multi-Mission Uncooled Thermal Capability

**Steve Rickard**

**B**ased on operator feedback and using the latest low power architectures, Excelitas has evolved the next generation of compact, lightweight, and rugged uncooled thermal imaging weapon sights. With a pedigree of over 40 years of experience in the design, development and delivery of night vision, thermal and fused vision systems that are trusted by law enforcement and military customers world-

wide, the Excelitas DRAGON-C12 is the system of choice for a tactical range multi-role thermal imaging sight.

DRAGON-C12 is the latest addition to the Excelitas DRAGON family of uncooled thermal weapon sights. It uses a low power 640x512 12um thermal core and an intelligent, low power System on Chip (SoC) electronic architecture to provide capability that operators demand. The performance is provided without compromise for

accuracy, ruggedness, or reliability.

DRAGON-C12 is a true multi-mission thermal imaging sight. It can be used as an in-line weapon sight with a range of fixed or variable day scopes up to 10x magnification, or as a stand-alone weapon sight with a range of reticles that can be selected by the operator. The device can also be used as a handheld sight for observation. It includes a zoom feature for up to 4X magnification, which can be zeroed to

the day scope, guaranteeing boresight retention and effective engagement at all zoom settings, in all scenarios.

Excelitas' designers understand that every ounce matters, which is why they have reduced the weight significantly while recognizing that the sight needs to be rugged and reliable to withstand the operational environments of military, law enforcement, and professional shooters. The unit weighs just 13 ounces and gives the operator the ability to recognize and engage human targets out to ranges of more than 600 yards.

Excelitas also recognizes that every bullet counts, which is why their optical design and lens mounting methods ensure that boresight stability is retained throughout the mission, which means that you hit exactly what you aim at, in all climates and conditions.

With the user and usability in mind, DRAGON-C12 has a simplified, tactile control panel with silent operation controls that allows the operator to optimise the image quickly even



DRAGON-C12 is a true multi-mission thermal system, from a high-quality U.S. manufacturer with over 40 years of experience in delivering proven, battle-winning weapon sight products to operators worldwide.

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DRAGON-C12 XR

while wearing gloves, along with the option of a remote control that can be mounted on the weapon. The set-up menu is simple and intuitive with a range of features and options that can be selected to tailor the unit to the mission profile.

Weapon attachment is simple and straight forward via a quick release bracket or an optional flip-to-mount to provide maximum tactical flexibility.

The device features an on-board shutter. The intelligent shutter will only calibrate (NUC) the system when needed, or on operator demand, if preferred. In both cases, there is no need to cover the objective lens to optimise the target scene, and risk losing eyes on the target. The shutter can also be disabled when tactical stealth is a must.

The target scene is controlled with intelligent algorithms and advanced image processing to ensure the target remains optimized under all scene conditions, including the optional use of color to highlight and outline potential

threats trying to remain concealed

Recognizing that the connectivity is the future, DRAGON-C12 includes a Bluetooth Low Energy interface which provides the option for remote setup and control, along with image download via a smartphone app. Connectivity with battlespace management systems (i.e. ATAK) is also supported through the Bluetooth Interface. The onboard GPS and 9-axis MEMS motion sensor, provide location, heading and orientation information to enhance the operators localization and situational awareness.

DRAGON-C12 is powered from just two AA lithium batteries, which provide over six hours of runtime, even at low temperatures, where other battery types tend to suffer.

DRAGON-C12 is just one example of the new range of tactical thermal imagers for military, law enforcement and professional operators being developed by Excelitas, with several variants available and planned to support different weapons and mission needs. A common approach to the controls, fea-

tures and functionality ensures that the training burden is reduced, along with providing efficiencies and cost saving opportunities for through life support on spares and repairs.

DRAGON-C12 XR is an extended range variant, well suited for sharpshooters or squad machine guns. Sharing all the core features and benefits of the C12, XR has a longer focal length objective lens fitted to allow longer range engagements, while maintaining a compact form required to mount on squad machine guns and other support weapons. An optional flip mount can be fitted if required for weapon and day scope integration.

DRAGON-A12 is a tactical range target acquisition system that also shares the common architecture of the DRAGON family, with the addition of a laser pointer and rangefinder, DRAGON-A12 supports intelligence, surveillance and target acquisition activities through its ability to gather and share target location data across the wider battlespace. **SADJ**



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The SIG M400 Switchblade is an excellent example of what to look for in terms of an effective weapon.

# *Petit Bu*



# *t Potent*



A SIG Romeo4T enclosed red dot sight was mounted on the Switchblade's upper receiver's picatinny rail. A SIG Juliet4 magnifier was mounted behind the Romeo4T.

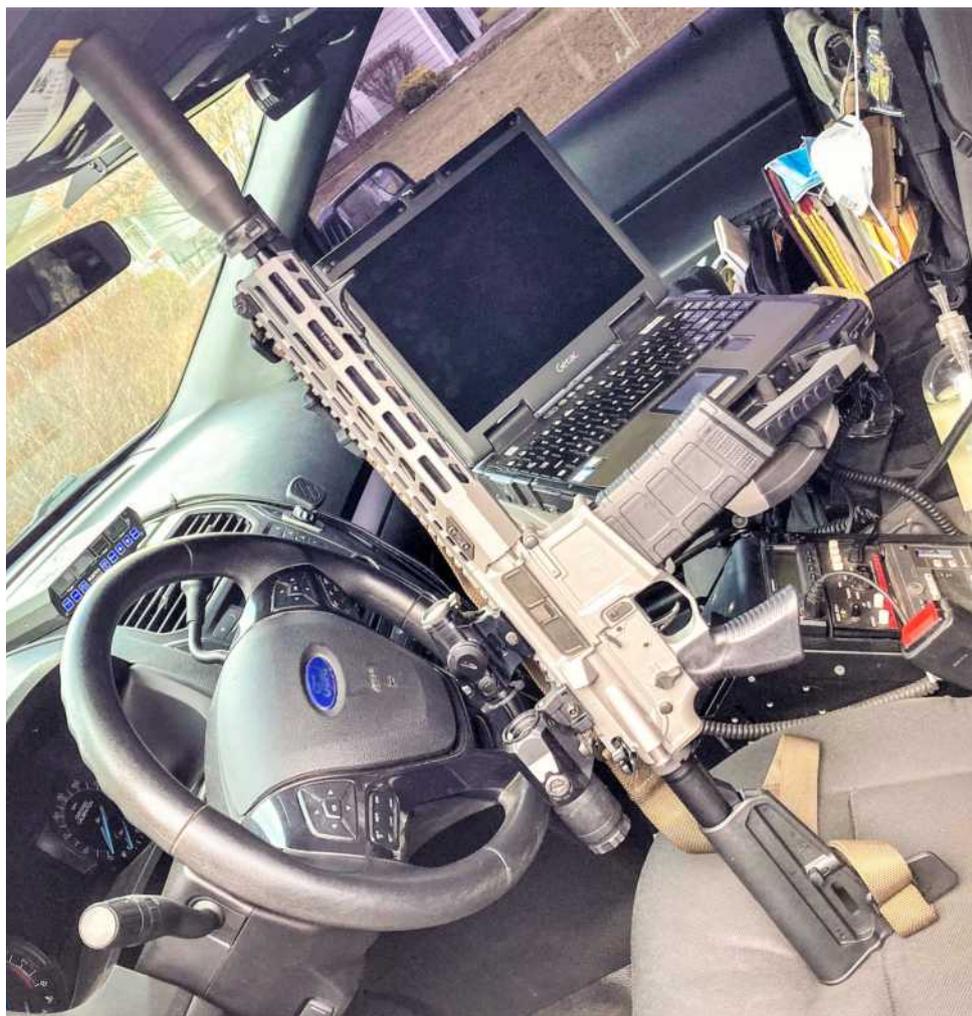
## SIG Sauer's M400 Switchblade AR Pistol

Story & Photography by Todd Burgreen

**S**IG Sauer exploded onto the AR scene in a big way back in 2010 with its piston driven 516 Patrol rifle. Typical of the SIG leadership team, this initial offering has morphed into several new product offerings over the years. SIG might not be

the first to the AR party; but they certainly helped redefine the AR market sector — civilian, law enforcement, and military. For example, SIG piston driven AR-type rifles were soon joined by SIG direct impingement offerings. This was expanded even further with

the advent of SIG's braced AR pistol, a product category SIG nearly lead the way on. Can anyone even comprehend current model offerings if braced pistols didn't happen? An excellent example of how far braced AR pistols and SIG has come is the recently intro-



M400 Switchblade equipped with SIG SRD556 suppressor and SIG Romeo4T red dot is the epitome of compact firepower.

duced M400 Switchblade braced pistol chambered in 5.56 NATO.

One can't ignore the growing number of people are contemplating "the end of the world as we know it" scenarios involving economic meltdown, pandemics and natural or man-made disasters. What advice applies if someone asks about getting a weapon for insurance if these predictions take shape? Certain characteristics are essential, such as reliability,

portability, ruggedness, and, lastly, effective firepower. Braced AR pistols dominate this market. The SIG M400 Switchblade is a prime candidate to explore this genre.

For those who have no legal access or desire for an NFA SBR, the SIG M400 Switchblade AR pistol may well be the closest one can get to achieving such firepower in such a compact package. A weapon like the M400 Switchblade has its own advantages in terms of portability and discrete carry that is hard to resist when compared to a full sized rifle. While many will have a wry smile cross their face when discussing AR pistols, they comply with BATF regulations. Along these same lines, the expansion of states issuing concealed carry permits while honoring other states' permits is another reason why AR pistols are currently so popular.

I challenge potential users to view the Switchblade not as cool novelty, but rather a serious contender for home and personal protection. It's

an ideal candidate with its firepower, while still allowing for a modicum of discrete carry, all combined with accuracy, flight, and terminal ballistics far superior to any handgun, or handgun-caliber offering. Without a doubt the Switchblade will change users' thoughts on how AR pistols are best utilized.

The Switchblade arrives with a cold hammer forged 11.5-inch (1:7 twist) barrel. The 30-inch 5-pound, 5-ounce Switchblade features a free float M-Lok compatible handguard. The handguard attachment method with the Switchblade is one SIG pioneered with their professional shooting customers. It is extremely rigid, with clamps securing the handguard to barrel nut. This translates into mounting accessories and sights without worrying about impacting accuracy or skewing established zeros. The brace used with the Switchblade is the recently introduced Magpul BSL "blade" type. A Cerakote Titanium finish is placed on the receiver and



A SIG SAUER Juliet4 magnifier was mounted behind the Romeo4T. The Juliet 4x magnifier is on a tilt mount allowing for it to be swung out of the way until situation calls for its use.

forend. A 2-stage Matchlite Duo trigger is installed. Trigger pull measures 4 pounds.

The Switchblade is fully ambidextrous, featuring ambi selector switch, charging handle, bolt, and magazine release. A unique Switchblade feature is the lever found on the right side of the receiver above the magazine release. This acts as a supplemental bolt catch if users find it more feasible to use on this side of the receiver. The Switchblade was designed from the ground up to be as flexible to use as possible.

A SIG Romeo4T closed red dot sight was mounted on the Switchblade's upper receiver's picatinny rail. A SIG Juliet4 magnifier was mounted behind the Romeo4T. The JULIET 4x magnifier is on a tilting mount; it swings out of the way until a situation calls for its use. The Romeo4T sight and Juliet magnifier combina-



The Switchblade is fully ambidextrous. A unique Switchblade feature is the lever found on the right side of the receiver above the magazine release. This acts as a supplemental bolt catch and release if users find it more feasible to use on this side of the receiver.



The M400 Switchblade is fully ambidextrous featuring ambi selector switch, ambi charging handle, ambi bolt and an ambi magazine release.



A SIG SRD556-QD was mated to the M400 Switchblade. SIG's Taper-Lok system is used with the SRD suppressor lineup. It is not only an ingenious mounting system for the suppressor, but also an effective flash hider or muzzle device in its own right.

tion is worthy of consideration for any role, as it enhances performance by offering the flexibility of a red dot or a magnified optic with the flip of the wrist. The fully enclosed nature of the Romeo4T creates a dependable design that will not be affected by weather or severe environmental conditions. Rain, snow, or debris, cannot interfere with the red dot projection on the lens, as can be the case with open-emitter red dots, enabling accurate shooting in any condition. The Romeo4T features an IPX8 waterproofing rating, meaning continuous submersion in 13 feet of water, as well as SIG's MOTAC motion sensing technology. MOTAC immediately powers up the sight when it senses motion and powers down when it does not, in order to extend battery life. An AR-pistol like the Switchblade is a perfect fit for a red dot like the Romeo4T since it's not dependent on



Premium loads typified by SIG's Elite 77-grain Match and Hornady Frontier Match punched rounds into sub 1-inch groups. Remember, the M400 Switchblade is not a match target rifle making this performance even more impressive.

a fixed eye relief distance. From a chin weld to an isosceles stance, red dots work when magnified optics don't.

SIG's choice of a 11.5-inch barrel may cause some confusion. Why not go shorter for even more compactness? There could be a few reasons. The 11.5-inch barrel conserves direct impingement reliability as well as maintaining the semblance of rifle-like ballistics. The Switchblade's 11.5-inch barrel length also alleviates many complications associated with suppressor use impacting functioning. Ultra-short barrels (sub-10-inch) can be problematic with suppressor use due to the resulting increase in back pressure and bolt group velocity. The Switchblade's 11.5-inch barrel begs for a suppressor.

SIG has become a true "one stop shop" for military, law enforcement and civilians; weapons, ammunition, optics, training, etc. SIG's suppres-

sors were introduced in 2014. Like SIG firearms, SIG suppressor design constantly evolves based on customer feedback and technology advancements. We mated a SRD556-QD suppressor to the Switchblade. While the SRD556 has been supplanted in the SIG catalogue by their SLH and SLX suppressors, it's still relevant. The SRD556-QD weighs 14 ounces, measures 6.5 inches long, and has a width of 1.625 inches, offering a sound rating of 134db. The SIG SAUER Taper-Lok system is used with the SRD suppressor lineup. It is not only an ingenious mounting system for the suppressor, but it's also an effective flash hider or muzzle device in its own right.

If considering a Switchblade pistol for anything beyond recreational use, it would be best to view the AR pistol through the lens of a PDW (personal defense weapon) versus a rifle. The AR pistol is just as compact as an SBR,

and with training, it can be operated as a very effective PDW. The 11.5-inch barrel produces approximately 2300-2680 fps velocities. CQB/direct action and personal security detail operations are the realm of PDWs, a near perfect analogy to the civilian personal defense realm.

Accuracy was beyond reproach with the gun typically printing 1.25-inch groups at 100 yards. Remember, this is with a red dot mounted. A large part of the accuracy equation is thanks to using the SIG magnifier. Ammunition tested with the Switchblade was a combination of multiple 5.56 NATO/.223 Rem loads from SIG, Black Hills, and Hornady. No load produced greater than 1.5-inch groups. Premium loads typified by SIG's Elite 77-grain match punched rounds into sub 1-inch groups. Remember, the Switchblade is not a target rifle, making this perfor-



The SIG M400 Switchblade prepped for firing from the bench for accuracy testing.

mance even more impressive.

Drills quickly moved past stand and deliver to more dynamic drills involving movement, magazine reloads, and firing from cover. We concentrated on using the Switchblade in training scenarios involving team tactics and patrolling to contact through Echo Valley Training Center's (EVTC) 360, MOUT Village and Jungle Walk ranges. We used a Magpul PMAG D-60 drum magazine during portions of the T&E. The thought being the fastest reload is no reload. This allowed the Switchblade to shine in terms of potent firepower. Firing from unorthodox positions while working around vehicles showed why the lightweight Switchblade equipped with a red dot is such an upgrade over your standard handgun.

The Switchblade lived up to the task of being a lightweight, fast-handling weapon. Drills moving around barriers

## SPECIFICATIONS

**CALIBER:** 5.56 NATO  
**BARREL:** 11.5in 1:7RH twist  
**OA LENGTH:** 30in  
**WEIGHT:** 5lb 5oz, empty  
**ACTION:** Semi-automatic, direct impingement  
**CAPACITY:** 30-rounds  
**MSRP:** \$1,549

and training evolutions involving firing and evacuating from vehicles clearly bore this out. Over 500 rounds were fired for this T&E. This was not the goal, considering ongoing ammunition availability issues. However, the Switchblade proved too enticing to put down. It always felt like there was one more drill that needed to be run. The direct impingement Switch-

blade proved utterly reliable.

SIG SAUER's thought process with the Switchblade was to create a lightweight, simple-to-operate AR rifle similar to Eugene Stoner's original concept. All Switchblade features are intended for maximizing effectiveness during a fight or during realistic training. The key component in a fighting rifle is reliability. No matter how accurate the barrel or powerful the chambering of a rifle, if it does not work 100-percent of the time, it's a liability. Selection of a fighting rifle is as personal as it gets. The M400 Switchblade is intended for serious practitioners who plan on using it for patrolling, training, or defense. A return to AR basics such as lightweight, great handling firearm with potent firepower is often the answer for most defensive situations. SIG Sauer offers such a platform with the M400 Switchblade. **SADJ**



ATN's ThOR 4 represents the next generation thermal sensor with a dual core processor. Without lag or loss of performance, the ThOR 4 has an in-scope video recording feature that provides the opportunity to capture your experiences on video either live streaming via wifi to a mobile device or by recording to an SD card without any additional USB cables.

# Own the Night

## Night Vision and Thermal Imaging Sights

By Paul Evancoe

**N**ight vision image-enhancement technology and thermal imaging are commonly confused because both are used to see in the dark. When most people talk about night vision devices (NVDs) they're generally referring to image-enhancement technology which is often confused with infrared thermal imaging systems – a distinctly different technology. The major difference between the two technologies is this. NVD systems require the existence of visible light, no matter how slight. NVDs will not work in total darkness, e.g., cave, mine shaft, etc. Whereas thermal imaging systems work in the total absence of visible light.

The firearms market offers a variety of night vision and thermal imaging devices. These range in cost and quality from hundreds to thousands of dollars with little or no explanation of their operational quality, life expectancy, maintainability, or reliability. Moreover, most firearms owners don't understand either NVD or thermal imaging technology well enough

to make a sound selection of what will work best for their needs. So, let's look at the two technologies.

### Night Vision Devices

NVDs employ conventional glass lenses much like a conventional rifle scope. The front objective lens captures ambient light (starlight/moonlight) and some near-infrared light. Near-infrared means the wavelength is closest to the red band (but just beyond it on the invisible side) of the visible light spectrum. Unlike a conventional rifle scope, the NVD objective lens-gathered light is focused into an image-intensifier tube that contains a photocathode. The photocathode converts the photons of light energy into electrons. As the electrons pass through the tube, additional electrons are released from atoms provided by a microchannel plate (MCP) in the tube. An MCP is a tiny glass disc that has millions of microscopic holes (microchannels), made using fiber-optic technology. This multiplies the original number of electrons by a factor of

thousands and ensures the electrons maintain their position in relation to the channel they passed through.

At the output end of the image-intensifier tube, the electrons hit a screen coated with phosphors. Since the electrons remain in the same alignment as the original photons, this paints a perfect image. The energy of the electrons impacting the phosphors causes the phosphors to reach an excited state and release photons. In turn, these phosphors create the green image on the viewing screen that has come to characterize night vision.

The green phosphor image (there is now white phosphor available) is viewed through another lens called the ocular lens (the lens closest to the eye), which provides magnification and image focus. With the addition of a small camera, the NVD may also be connected to an electronic display such as a monitor, or the image may be viewed by the naked eye directly through the ocular lens.



ATN

ATN's PS28 clip-on night vision scopes mount on the Picatinny rail directly in front of a daytime scope to provide night vision operation without the need to change eye relief or re-zero your scope. A rubber boot is rolled backward from the PS-28 over the scope's front end to create a light-tight seal joining the two devices. ATN uses the latest generation image intensifier tube technology for superb resolution and performance.

### Thermal Imaging

Visible light spectrum wavelengths extend well beyond what can be seen by the human eye. It is this invisible radiation, past visible red, that resides within the infrared region of the electromagnetic spectrum, (called infrared, or IR for short) which is captured by thermal imaging devices and made visible to the human eye.

Literally everything with physical mass, whether alive or inert, emits infrared radiation to one degree or another. This is called emissivity, and unless you can achieve a temperature of absolute zero (-273 degrees Celsius), emissivity cannot be eliminated. Emissivity is a term that is often misunderstood and misused. It represents a material's capacity to emit thermal radiation and is an optical property of all matter. Since everything on planet earth emits IR radiation (heat) to varying degrees, thermal imaging devices "see" that heat radiation and provide the user an image based upon the contrasting differences in emis-

sivity of the field (objects and background) being observed.

Thermal imaging devices are very sophisticated photoelectric devices that use lenses made from rare and unique materials like germanium and zinc selenide. Before 1960, we didn't possess the exotic materials and manufacturing processes necessary to perfect them. The transistor and the light emitting diode came of age in the 1960s, which led to the optoelectronic circuitry that makes it possible for us to manipulate the IR wavelength data and create a viewable picture from it.

Secondly, unlike the millions of today's digital photography cameras found on every smart phone, computer and even the cheapest of SLR cameras, the demand for thermal imaging cameras and IR sighting scopes doesn't even come close. Demand drives development – not the reverse, so thermal imaging has advanced along its own developmental path largely based upon military and other special purpose applications.

Here's how it works. Thermal imaging uses a special optical lens that focuses the infrared wavelengths (energy) emitted by all the objects within the field of view. Compared to the selection of conventional optics you see for the visible world; infrared optics are very limited. Glass is opaque to thermal radiation, so thermal imaging optics are made from exotic materials such as germanium, zinc selenide, or sapphire. This makes IR optics expensive and limited in selection. IR optics are not readily interchangeable, even between similar models of thermal imaging devices. IR optics are all uniquely designed to achieve specific capabilities, and that means they're expensive.

As previously mentioned, infrared is a part of the electromagnetic spectrum with wavelengths that are longer than visible light. Infrared is typically divided into near, mid, long and extreme, and is measured in units known as microns or nanometers. Thermal technology detects infra-



BURRIS

The Burris BTS 50 3.3-13.2x50mm IR imaging scope features seven color palettes, Stadiametric ranging, ten reticle options, manual and auto NUC, adjustable contrast and brightness, and is ergonomically designed for one-hand operation.

red energy in the mid-wave infrared (MWIR) spectrum at 3-5 microns or long-wave infrared (LWIR) at 8-12 microns. That seems categorically simple enough, but technically, how does it work?

Day or night in any environment, every person, object and structure emit infrared (heat) energy. The IR device's lens serves to focus infrared energy that is collected and scanned by a phased array of infrared-detector elements. The detector elements create a very detailed temperature pattern called a thermogram. It only takes about one-thirtieth of a second for the detector array to attain all the necessary temperature data to construct the thermogram. This information is obtained from several thousand points within the field of view of the detector array and it all happens extraordinarily fast.

The thermogram created by the detector elements is instantaneously translated into electric impulses (expressed in Hertz). The

*The advantage of a cooled system is the incredible resolution and sensitivity that result from super cooling the sensing elements.*

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impulses are sent to a signal-processing unit; a circuit board with a dedicated and highly sophisticated microchip that translates the thermogram impulse information into data for the visual display. A signal-processing unit sends the information to the display, where it appears as various colors depending on the intensity of the infrared emission. More simply, the combination of all the impulses from all of the detector elements creates the image.

Most thermal-imaging devices

scan at a rate of 30 times per second. They can sense temperatures ranging from -4 degrees Fahrenheit (-20 degrees Celsius) to 3,600 F (2,000 C) and can normally detect temperature differences of about 0.4 F (0.2 C). There are some special, purpose-built systems that are far more sensitive, but they are also far more expensive. Nonetheless, there are two types of thermal-imaging systems, cooled and un-cooled. Most all man-portable thermal systems used for gun sights and field observation are un-cooled systems.

### **Cooled Thermal**

The cooled systems are cryogenically cooled, with most using either open-system or closed-system Dewar flasks containing liquid nitrogen (LN2). Dewars are specially constructed thermos bottle-like insulated cryogenic liquid containers. The open-system Dewars require hourly/daily monitoring and replenishment to maintain sufficient LN2 levels resulting from "boil



KNIGHT'S ARMAMENTS

Knight's Armament's UNS LR LP clip-on weapon sight (DoD type classified as the AN/PVS-30 Universal Night Sight Long-Range) provides state-of-the-art high performance gen3 light intensification night vision to most rifle-mounted day scopes. This NVD is perfect for front-line, long-range sporting and sniper rifles. Within the Knight Vision product line, this NVD model is in current production for DoD use with the Knight's Armament Company Semi-Automatic Sniper System (SASS), and other long range sniper rifles. Most importantly, it's made in the USA at Knight's Florida-based facility.

off." The closed systems have sealed Dewars so cryogenic replenishment is unnecessary. These systems have the IR elements sealed inside a container that cools them to below zero Centigrade. As you might imagine, cryogenically cooled systems are expensive to manufacture and maintain as well as more susceptible to damage from rugged use. These systems are usually platform-mounted systems, e.g., aircraft, land vehicle, ship, permanent observation post, etc.

The advantage of a cooled system is the incredible resolution and sensitivity that result from super cooling the sensing elements. Even the low-end cryogenically cooled systems can "see" a temperature difference as small as 0.2 F (0.1 C) from more than 1,000 ft. (300 m) away. This translates to enough detail to determine if a person is holding a handgun or a wallet. The high-end

units provide even more clarity.

### Un-Cooled Thermal

Un-cooled systems are the most common type of thermal-imaging device. The infrared-detector elements are contained in a unit that operates at room temperature. This type of system is completely quiet. It activates without needing system spool up time and its battery powered. Comparatively, the un-cooled system's resolution is far less than the cooled system's, but it is sufficient for man-portable military applications like weapon sighting scopes, small UAV drones, etc.

In summary, the two types of thermal imaging technology each offer their own advantages and both are built with exotic materials, making them expensive. Some recently developed uncooled systems are built with a vanadium oxide (VOx) detector that

allow for a very small camera size, low weight, minimal power requirements and high image resolution. Cooled systems often employ mercury cadmium telluride (MCT) technology that utilizes a highly efficient cryogenic cooler, enabling the detector to discriminate smaller differences in infrared emissions.

Like many other high-end technologies, there are teams of very bright people working to improve thermal imaging products with new materials and better optoelectronics. But since there are highly exotic materials and sophisticated manufacturing processes involved and the lens itself is uniquely designed for each individual camera system; it may be many years for a divisive breakthrough that will drive the cost of thermal imaging down to that of today's smart phone.

That said, there are some discrim-

inators you may want to consider when choosing a particular thermal imaging device. First and foremost, you can't judge the contents by its cover. The wavelength envelope the device sees is certainly very important as is its operating speed, but so is its ability to focus. Both athermalized lenses and manual focus lenses are offered by several manufacturers.

### **Athermalized Focus**

An athermalized focus (AF) lens is one that will automatically maintain focus over a wide temperature range. The lens is either immune to focus shift over temperature, or there are fixtures in the lens that maintain focus over a wide temperature range. With a manual focus (MF) lens, you will see slight focus shifts as the field of view (FOV) temperature changes. This will be apparent at temperature changes of approximately 20 C or more requiring you to manually adjust the lens to remedy this focus shift (where the athermalized lens does this automatically). Athermalized lenses are generally larger-heavier lenses that are used for a fixed FOV.

Quality thermal imaging rifle sights often have a high price range (U.S. \$3,000-\$6,000, or more) due to the expense of the imaging technology and the bells and whistles it offers. Features like Bluetooth to your smart phone, GPS, recoil activated record capability, built-in IR illuminator and IR target spotting laser, run time extender auxiliary battery packs, inline rail mounting for in-line compatibility with conventional rifle scope, built in zoom magnification - all add cost.

### **Camera Accuracy**

Camera (device) accuracy is another discriminator. In lower end thermal imaging devices, accurate images can be easily hindered by differing emissivity and reflections from target-adjacent surfaces. Images can also be difficult to interpret accurately when based upon certain objects, specifically objects with erratic temperatures; although this problem is reduced in active thermal imaging where an object is illuminated by an IR light. Most of the better thermal imaging devices have at least a  $\pm 2\%$  accuracy threshold - look for a similar accuracy threshold number when shopping.

### **Future Thermal Applications**

Where will thermal imaging likely go

*Since everything on planet earth emits IR radiation (heat) to varying degrees, thermal imaging devices "see" that heat radiation and provide the user an image based upon the contrasting differences in emissivity of the field (objects and background) being observed.*

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in the future? Since a thermal imager is an optoelectronic device, the attainment of fully autonomous artificial intelligence (AI) will play dominantly into thermal imaging sophistication, especially in industrial, medical and humanoid robotic applications. The laws of physics will forever restrict some of the applications we can and can't achieve with thermal imaging, but coupling thermal imaging with AI as a sensor for AI to use to explore its environment, will give it super abilities. It will see in all environmental conditions. It will be able to map and navigate its path in total darkness. It will be able to conduct diagnostic analysis on nearly everything based upon unique heat signatures. It will measure precise speed and distance of the environment around it.

For instance, it will see us as a series of nano-second thermogram frames and through AI's use of spectroscopy, instantaneously discriminate us from everything else in the surrounding environment identifying us individually as humans. It will be able to see and identify the forest from the trees and anything else walking, crawling or flying within it, with near perfect discrimination. It will possess the ability to instantaneously identify everything it sees using cloud-based computer image identification technology coupled with AI driven spectroscopy. This advanced capability provided by the marriage between thermal imaging and AI will be used in navigation systems, sighting and aiming systems, robotics of all kinds, security systems, medicine, aviation, and interplanetary exploration - to name a few.

### **Fusion Devices**

There are also (currently fielded) purpose-built advanced military systems that combine NVD and IR imaging into a composite vision field that is achieved by means of computer-enabled image amalgamation. Some of these systems even provide true colorized imaging that significantly facilitates target identification (think sniper and aircraft surgical targeting). Once these super-sophisticated composite night imaging systems proliferate and are designed for general purpose applications, they may become available - but that is perhaps a decade or more away. Until then, they're simply out of reach for sporting purposes.

Lastly, which technology is better, NVD or IR? That depends upon the purpose which you intend for its use and how fat your wallet is. While both technologies require upkeep, IR systems generally require the most maintenance and that, like the system's purchase price, is expensive. Moreover, beyond lens cleaning and battery changing, both NVD and IR repair can only be done in a "clean room" by expertly trained persons - not on your garage workbench. Most NVD and IR systems go by generation number just like smartphones. This is to say that a NVD gen4 is more advanced than a gen2 version. It also means (in most cases) that parts are not interchangeable with other generations. Another meaningful discriminator is the origin of manufacture. An imported Russian-made NVD or IR device, for example, will be a nightmare to repair compared to one made in the USA. Buy American and you'll eliminate a vast majority of your future repair issues. IR sighting systems do have distinct clarity and target discrimination advantages over NVD systems, but you'll pay dearly to put it on your rifle.

So, what should you buy? If you intend to hunt wild boar in the dark under normal atmospheric conditions and all you need is a green screen target image with a crosshair, an NVD scope is probably sufficient. If your required operational capability and projected operational environment (ROC & POE) is more complex, you'll want to look at IR sighting devices. There's no magic formula. Clarify and distill your ROCs & POEs. See which system best satisfies them. Choose wisely and own the night. **SADJ**



Elements of the Portuguese Police Special Operations Intervention Group train building clearing.

# Portuguese Police Special Operations Intervention Group

*Grupo de Intervenção de Operações Especiais – GIOE*

By Bryan Ferreira

**T**hrough the shadows of a morning's first light, you can distinguish a group of heavily armed personnel approaching the door of a mansion located in a quiet Por-

tuguese neighborhood. Spearheading the stack of these men with very modern equipment, we can see one holding a ballistic shield. Even though shields are almost as old as warfare

itself, due to modern weapon firepower, they have made a comeback in what relates to high intensity counter terrorist operations. Just behind him comes a teammate with a high-



A stack of Portuguese GIOE prepares to enter a building. All personnel have silencers on their guns in order to mitigate noise inside the building and allow better communications.

tech explosive breaching charge. All this coordinated action led to a fiery breach of the entrance to the house. Inside we can hear some small explosions from flashbangs thrown, followed by shots fired from their suppressed assault rifles. After just a few minutes, the special operations team emerges from the building escorting the hostage that was held inside.

This could be a true story, but is just a small demonstration of some of the capabilities of the Portuguese *Grupo de Intervenção de Operações Especiais – GIOE* (Special Operations Intervention Group). This unit is the prime counter terrorism (CT) unit in the country and belongs to the National Republican Guard (*GNR - Guarda Nacional Republicana*), which is a militarized police unit equivalent to other European *Gendarmerie* units.

### Organizational Framework

The Portuguese GNR occupies a special position within the forces and the security services of the country. The paramilitary structure fulfils a double function among the forces; on one hand, the police and on the other hand, the military. As a result, there is a dou-

ble dependency on both respective ministries. Usually, they execute typical police tasks and it is in this function that they serve under the command of the Ministry of the Interior. However, the National Guard can, and is used for military missions within the context of

national defense. In such operations the National Guard is under the command of the Ministry of Defense.

Since 2007 the GNR has in its ranks the Intervention Unit (*Unidade de Intervenção - UI*) and responds to crimes and riots which endanger



Three elements of the GIOE in a tight formation inside their shoot house.



A GLOCK 19X in use by the Portuguese Police Special Operations Intervention Group.

national security. The *GIOE* is a sub-unit of *UI*, which specialises on fighting terrorism and violent crime. Furthermore, the unit supports normal GNR units during exceptionally dangerous incidents or missions if these units are overstretched. The range of operations of *GIOE* includes:

- Counter terrorism actions
- Tactical response to serious criminal offences
- Employing marksmen to provide security in public events
- Security and protection for persons, and critical infrastructure
- Support in the execution of arrest warrants
- Supporting other GNR units at in-shore maritime traffic VBSS (visit, board, search, and seizure)
- Support in dealing with very violent/serious gang-related crime or mobile offenders
- Direction and coordination of negotiations during hostage situations, etc.

- Participation in international missions.

Due to the military character of *GIOE*, the respective military skills are trained which can guarantee deployment in-country as well as abroad. Counter terrorism operations abroad can therefore be completed at the request of the Portuguese Government, or of international organizations (NATO, European Union, United Nations, etc.).

### Structure

*GIOE* is under the command of a senior commander of the *GNR* who, in turn – depending on the type of mission – has to report to the Ministry of the Interior or to the Ministry of Defence. Its tasks have been divided into three main components:

1. Special Operations
2. Investigations
3. Negotiations

The Special Operations component constitutes the main part of *GIOE*. The activities here include tactical inter-

vention, protection of persons and objects at high risk, and the instruction of special courses.

The department of investigations in criminal law cases is responsible for criminal investigations and analysis of information in relation to crimes which endanger the country.

The department of negotiations takes over the coordination and direction of all forms of negotiations during hostage situations, abductions, or cases of blackmail.

With regard to the changing threat scenario and the ever more complex forms of crime, a number of advantages and synergies can be achieved with these three components: *GIOE* can collect and analyze relevant information, conduct interventions and perform practical investigations on a national level.

*GIOE* has its central headquarters near Lisbon. This centralised structure allows not only for the concentration of all important functions and infrastructure of *GIOE*. Since this site



Police officers from the Portuguese Police Special Operations Intervention Group train multiple points of entry into buildings.

is equidistant from the northern and the southern end of the country there is no need for regional sub-units.

### History

In Portugal, the decision to create a GNR unit capable of guaranteeing a specialized response to situations of concerted violence was taken on October 24, 1978.

It resulted from a process of reflection that followed the events that took place in Munich, but which had greater progress on September 19, 1977, when, in the prison establishment of *Custódias*, about 10 inmates mutinied and dominated about two dozen officials, including the prison director, trying to escape and using the hostages as shields. The GNR regular forces sent to the site did not intervene, but it was found that they were not prepared for that scenario of violence and danger. The operation report stated that "in such circumstances only highly prepared and specialized personnel endowed with appropriate means could carry out any action with acceptable



A police officer from the Portuguese GIOE trains sentry elimination while rappelling from a rooftop.

probability of success."

Based on these events, the GNR general commander gave orders to instruct a group of soldiers prepared to intervene in specific cases of criminal activities of "high violence", such as kidnappings, hostage taking, terrorist actions or other similar situations, in that it became necessary to resort to special-

ized and trained personnel in order to ensure the fulfillment of the mission.

The initial period of intensive instruction was divided into three phases: basic preparation, advanced preparation, and specialized preparation. Its main objective was to train its operatives and make them physically resourceful and psychologi-

Police officers from Portuguese Special Operations Intervention Group train vehicle interdiction with high value target takedown and arrest.



cally prepared, with highly controlled aggressiveness, with exceptional decision-making capacity, an highly skilled in the use of weapons and other equipment, and able to develop combat actions with special characteristics. It involved subjects such as individual combat technique, team combat technique, physical preparation and sports, military swimming, rescue, diving, martial arts, military application gymnastics, shooting, CQB, breaching, handling of explosive devices, topography, transmissions, care under fire, and first aid and military subjects.

In order to obtain adequate operation capabilities, the GNR command also developed efforts for the acquisition of new weapons, equipment, and special uniforms. On the training side, they sent a delegation to the counterpart unit of the French *Gendarmerie Nationale (GIGN)* in order to obtain knowledge that would enable the group's capabilities to be improved, and also began training at the Special Operations Instruction Center (CIOE) of the Portuguese Army.

The Portuguese Army Special Operations provided the GNR unit with some special Mindset training that can only be obtained with the Army interoperability training. The spirit of sacrifice, energy and tenacity, strong



Police officers from Portuguese Special Operations Intervention Group approach an enemy position using their Glock 19Xs and H&K 416s.

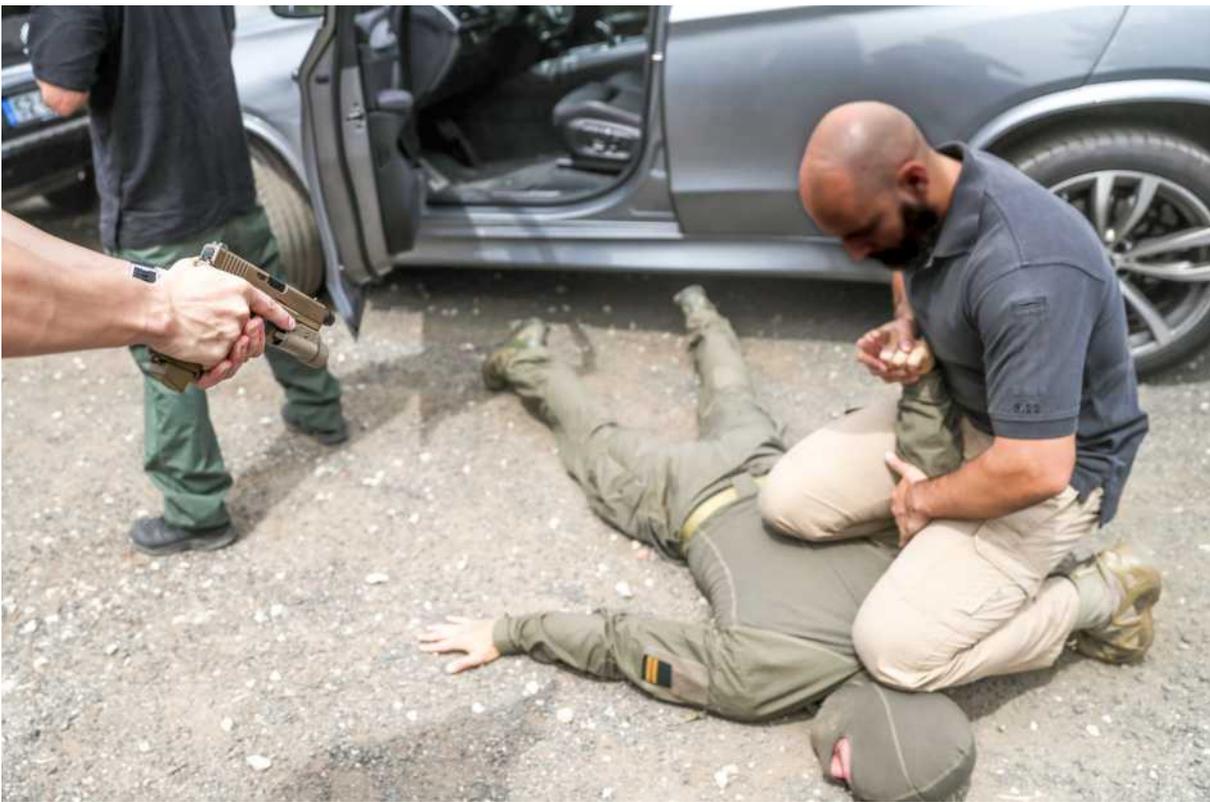
and constant will, rusticity and physical resistance and sobriety and discretion, which only the CIOE in Portugal could transmit, guided by high standards of conduct, camaraderie, cohesion, esprit de corps and a sense of mutual support.

Currently, the GIOE is an elite force especially dedicated to combating terrorism and intervening in situa-

tions that, due to their nature, high risk, and complexity, require specialized technical and tactical knowledge and require the commitment of specially trained and equipped men, exceeding the operational capabilities of the other National Guard units.

#### **Equipment and Weapons**

GIOE has the mindset, techniques, technology, weapons and gear nec-



Working in civilian clothes, these police officers from the GIOE train vehicle interdiction with high value target takedown and arrest.

essary to carry out special operations missions and to investigate complex crimes. Personal protection is a permanent concern, bearing in mind that these soldiers are permanently subject to risk, whether in training, in most of which they use live ammunition, or during operational activity.

It is extremely important that military personnel involved in highly dangerous and risky missions feel safe, especially in terms of ballistic protection, as the correct use of this equipment can make the difference between life and death.

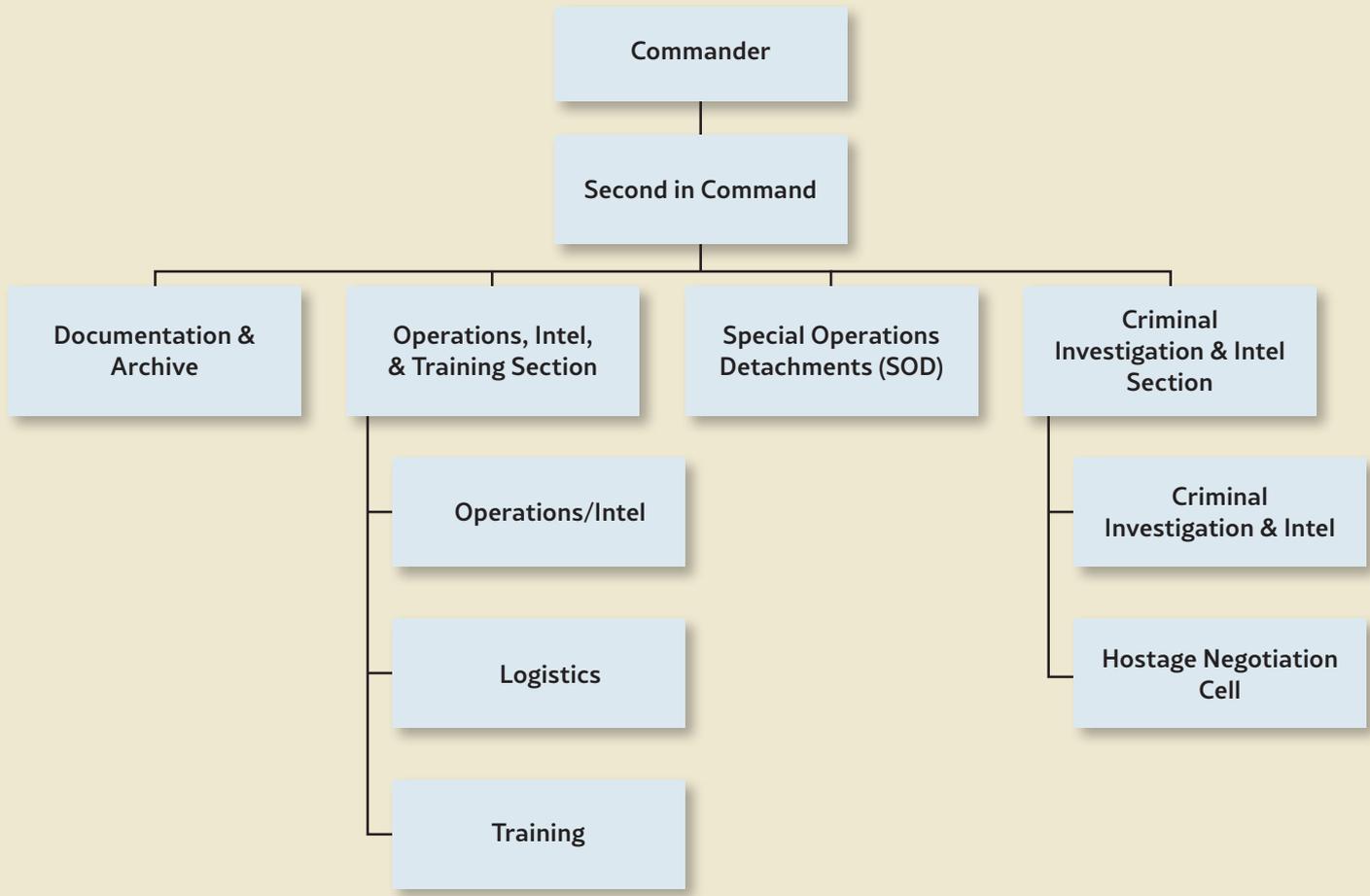
There is also a set of special technical means, depending on the sub-specialties and the tasks they develop, for example: the breacher uses mechanical, hydraulic, ballistic, thermal, explosive or combined means, in order to guarantee instant access of the intervention force, giving it a surprise effect and reducing the opponent's responsiveness; the snipers, specialists in long-range precision shooting, have sniper rifles fitted to each sniper and use the appropriate weapon, optics (night vision and thermal included), ammunition, equipment and uniform for the mission.

The GIOE also has vehicles for the most diverse missions assigned to it, including a mobile command post, vehicles for transporting personnel and equipment, uncharacterized vehi-

## Weapons used by the GIOE

Weapon	Country	Caliber	Type
Accuracy Int'l AW50	UK	.50 BMG	Precision rifle
Benelli M4	Italy	12 Gauge	Semi-automatic shotgun
Browning M2 HB	Belgium	.50 BMG	Heavy machine gun
Brügger & Thomet Advanced Precision Rifle (APR) mod. 308 Win.	Switzerland	7.62 NATO	Precision rifle
Fabarm SDASS	Italy	12 Gauge	Pump action shotgun
FN Herstal FN MAG	Belgium	7.62 NATO	General purpose machine gun
Glock 19X	Austria	9mm Luger	Semi-automatic pistol
Glock 26	Austria	9mm Luger	Semi-automatic pistol
Heckler & Koch 416 A2	Germany	5.56 NATO	Assault rifle
Heckler & Koch 417	Germany	7.62 NATO	Battle rifle
Heckler & Koch G28	Germany	7.62 NATO	Precision rifle
Heckler & Koch GMG	Germany	40x53mm	Grenade machine gun
Heckler & Koch MG4	Germany	5.56 NATO	Light machine gun
Heckler & Koch MP5 N	Germany	9mm Luger	Submachine gun
Heckler & Koch MP5 KA1	Germany	9mm Luger	Submachine gun
Heckler & Koch MP5 SD6	Germany	9mm Luger	Submachine gun

# Organization of the GIOE



cles for rapid displacement and follow-up, surveillance, among others; or maritime means, and respective equipment to respond to incidents in the aquatic environment in the fulfillment of GNR's mission in the territorial sea, which is part of its responsibility.

In terms of uniforms and personal equipment, the GIOE military use a uniform and personal protective equipment in stone gray olive color (RAL7013) for most missions performed in the national territory, and may wear another type of uniform or clothing in specific situations, such as security and personal protection missions, which may require the use of formal attire. For international or covert missions, they can wear a camouflage uniform appropriate for the environment in which they are operating.

## Operations

The technical and tactical preparation have allowed high levels of performance in the theaters of operations where GIOE troops have participated: Afghanistan, Iraq and Timor-Leste are examples. With several high-risk missions where they were employed,

among which we can highlight the protection and rescue of the President of the Democratic Republic of Timor-Leste, Dr. Ramos Horta, after an assassination attempt, or the rescue of Italian soldiers in Nasiriyah, Iraq, who were ambushed and cornered under heavy fire from armed terrorist groups.

In a national context, since the creation of the current structure, the GIOE has resolved an annual average of 7 to 11 complex tactical-police incidents and developed about 100 other actions, which include operations in support of the GNR's territorial units in detention of dangerous individuals, reconnaissance and surveillance operations, and personal security actions.

## International Cooperation and Military Assistance

The GIOE currently integrates several structures of international cooperation in the area of special operations and maintains close links with similar units, namely with the UEI of the Guardia Civil in Spain and the GIGN of the Gendarmerie Natio-

nale in France, at European level. And with the Fuerzas Especiales of the Gendarmeria Nacional Argentina, the GOPE of the Carabineros of Chile or the BOPE of the Military Police of Brazil, at the international level.

The unit has collaborated in the training of staff of the national police of Afghanistan, through the SWAT course (NTM-A – 2012 to 2014), as well as the police forces of Timor-Leste (PNTL), being responsible for building counterterrorism capabilities, as well as for security and protection of senior entities in the latter (UNTAET – 2000 to 2003; UNMIT – 2006 to 2013).

GIOE has also participated as a training entity in the area of counterterrorism in the GARS-SAHEL training project since 2018, in an effort to prevent threats to internal security through external actions. The project aims to empower Sahel African countries with human and material resources capable of combating the threat of terrorism and violent crime in that region, namely through the preparation of specialized units in the various countries that are capable of interoperating with each other. **SADJ**



# Close Combat 2022

## Defence Academy, Shrivenham - 5th - 7th July

The aim is to bring together the military, academia, and industry to discuss current and future developments in close combat technologies, procedures and the equipment programmes.

**D Futures Mil Cap Plans** (formerly Cap GM) in Army HQ have expressed an interest in the following subject areas on which presentations would be particularly welcome:

- Future equipment and technologies deliverable in the 5-10 year timeframe
- 24 hour digital lethality' that provides an all day and weather capability
- Developing a roadmap to the 24/7 future force

### Format

**Day 1** is at the Defence Academy of the UK in Shrivenham and provides insight from Army HQ and other customers on their intent for the future. This is supplemented by presentations from academia and industry.

**Day 2** takes place at Cranfield Defence and Security's Cranfield Ordnance Test and Evaluation Centre (**COTEC**) range facility on Salisbury Plain. This has involved live-firing demonstrations from industry as well as an opportunity to fire small arms from different manufacturers and with different optics and technologies including automatus vehicles.

**Day 3** is back at Shrivenham and provides more technology briefs from industry and academia.

### Sponsorship

There are unique opportunities for sponsoring at various levels during this event: individual activities such as the barbeque on the range, or collectively for the whole event with generous concessions

In Association with:

**BATTLESPACE**

### Who should attend

The event is for all those involved with weapons systems, equipment and technologies for the ground manoeuvre community of the military and the security sector more broadly: military, police, security, industry and academia. It provides a valuable opportunity to network, inform, educate, debate and challenge the status quo.

### Range Day Sponsor

Thank you to **FNH UK** for their continuing support



**FNH UK**

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### Further details

For more detail on the event, including Registration, booking display space, booking range space and sponsorship, please check our **website** [www.symposiaatshrivenham.com/cc](http://www.symposiaatshrivenham.com/cc) or contact [Leanne@symposiaatshrivenham.com](mailto:Leanne@symposiaatshrivenham.com)



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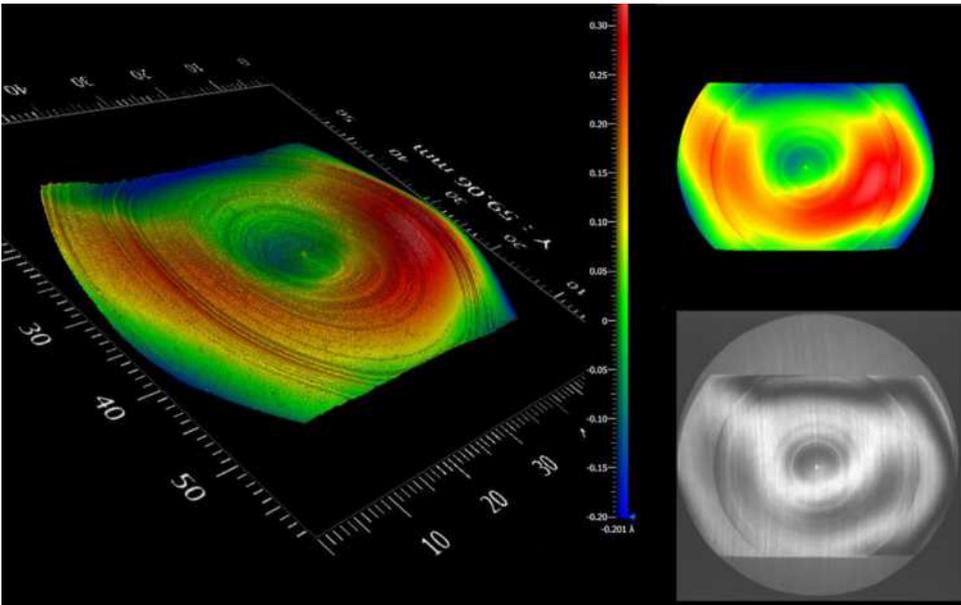
By Adam Gingras

**T**he advantages of selecting the proper fire control system to improve the overall capability of your weapon system can't be understated. Electro optics, like other weapon-based technologies, continue to improve to keep up with the ever-changing tactical challenges facing today's operators. When selecting the proper accessories for your weapon

system, you must select accessories that offer the most effective options available and enhance your ability to adapt to unknown and rapidly changing circumstances.

As an end user, your situational awareness is all too often limited to your ability to rapidly adapt to the environment at hand. Your weapon system is your key to engagement

tempo and resulting lethality. To enhance that capability, visualize a next generation fire control system equipped with an "always dependable" hard fixed metal sight, a fully integrated red dot reflex sight, visible and near-IR IR aiming and flood lasers, as well as the ability to connect to a tactical white light. A fire control system with the ability to keep zero



Wilcox has invested in equipment and modern techniques for the manufacturing process and measuring of the optical tolerances.

when switching from supersonic to subsonic ammunition, even when the rifle is suppressed. An advanced system with the ability to connect you to a rapidly formed network confederation of operators, sensors, information services and weapons platforms.

The Wilcox BOSS Xe (Ballistically Optimized Sighting System - Enhanced) is that vision. From the design inception focused on size,

weight, power and cost (SWaP-C) to maximize both tactical and overall unit value, it features a small lightweight reflex sight, red visible laser, infra-red (IR) laser and fixed IR illuminator. The BOSS Xe is unique, allowing the operator to shoot two preset ballistic trajectories with the flip of a switch without having to re-zero the weapon. This is achieved by co-aligning the reflex sight to the lasers and

illuminator which all reside on Wilcox's patented trajectory switch design. Powered by one CR123A battery, this lightweight "power miser" system delivers repeatable accuracy.

The BOSS Xe comes equipped with Bluetooth installed and brings the power of networked operations into your hands. The tie-in allows the fire control system to sync to a dedicated BlueForce app (Blueforce Tactical or 'BTAC') enabling networked connectivity able to provide information services and targeting data in real-time, providing actionable information for fire control system operation, engagement data, weapon system maintenance status and overall weapon system status. These advances in the Wilcox BOSS Xe fire control system are directly proportional to significant increases in user effectiveness and lethality.

Optics in general are expected to properly function in an array of harsh conditions and hence must be robust enough to withstand severe environments and operate consistently over huge temperature ranges consistent with global operational requirements. Wilcox's approach to manufacturing allows them to rapidly innovate, design and prototype new advances in optics from concept to production.



Rapid routing of real time actionable information with BTAC.

Wilcox's vertically integrated engineering model means it can make decisions that impact manufacturability early in the development cycle and its modular approach allows them to vet emerging optical technology at a very rapid rate.

The Wilcox BOSS Xe integrates the company's advanced design and manufacturing capabilities. Utilizing Vertical Cavity Surface Emitting Laser or "VCSEL" Lasers, enabled Wilcox to create an advanced fire control system, designed to provide customers with many advantages:

- Superior laser beam quality.
- No beam 'speckles' associated with dated laser technology.
- Beam uniformity with no 'dead' spots while in the NIR IR modes.
- Enhanced beam clarity and distance allowing for the positive identification and engagement of potential targets during nighttime operations.
- The ability to adjust laser intensity on the move.
- Shot or recoil counter built into sight to aid in maintenance and Mean Time Between Failure [MTBF] data points for both the weapon

## Sensor to Shooter Advantage

- Decentralized fusion and sharing of data from diverse sensors, processed with advanced third-party artificial intelligence.
- Share target data on a need-to-know basis over tactical networks to other elements involved in an operation.
- Orthogonal sensor cueing allows the BOSS Xe Plugin for BTAC to communicate with other BTAC plugins allowing image capture enabled sights to pass images to BTAC Cognitive Services Plugin for identification and real-time sharing.
- Hyper-Local alerting capabilities can inform operators of relevant tactical information based on their location, competencies, and available resources.
- Connects shooters to sensors and artificial intelligence to assist operators in complex targeting scenarios that span acquisition and surveillance, identification, engagement, and hand-off.

and the sight. This preventative maintenance feature allows for pre-mission checks to prevent active mission failures.

- Reduced weight and overall sight profile.
- Combination of all available sighting options in one weapon mounted fire control system maximizes SWaP-C, reduces snag hazards, reduces batteries required and increases rail space.

The BOSS Xe fire control system delivers the ability to identify and successfully engage targets at greater distances with higher confidence, increases your operator tempo, decreases vulnerability from enemy forces, provides reduced risk of friendly fire incidents and provides for a highly accurate first shot capability under the stressful and demanding conditions at the tactical edge. **SADJ**

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Visit [wilcoxind.com/BOSS-Xe](http://wilcoxind.com/BOSS-Xe) for more details and to download BOSS Xe resources. Visit [wilcoxind.com/BOSS-XeLP](http://wilcoxind.com/BOSS-XeLP) to learn more about the recently announced low power commercial version of the BOSS Xe.

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# Colombia's Brown

## A Historical Look at Columbia's Littoral Capability

By Julio A. Montes

**A**s we attended the latest edition of Expodefensa in Colombia, an exhibit caught our attention; a new type of riverine patrol boat developed for the local Marine forces. It was an example of the new low-draft riverine combat launch, officially named Riverine Reconnaissance Boat 230, or BRF230 (for its Spanish acronym). The hull is made of aluminum alloy providing NIJ-III-type ballistic protection and measuring 28.2 feet in length, 8.5 feet in width, and displacing 12 tons. It is equipped with a Furuno-1623 radar and a Ritchie Supersport SS-1002 compass. It has a load capacity of up to 882 pounds, and can be armed with two Browning M-2HB QCB .50 caliber machine guns, one on the bow and another one at the stern, allowing to transport up to seven Marines. The BRF230 has been designed to fill a gap for which the traditional Boston Whaler Outrage (nicknamed Piranhas) is not suitable. The BRF230 is to operate in secondary and tertiary rivers. The Armada (or ARC - Colombian Navy) is acquiring the BRF230 as part of a pilot plan, which includes the development of a new doctrine for their use.

They are designed to carry out river assault, border control, and river search and rescue missions. The vessels can carry up to 500 gallons of fuel and 2094 pounds of ammunition. They were derived from PRF boats (Fast River Patrol boats), and the Colombian Marine Corps (INFAMAR) currently has 14 of them. The boat is

propelled by waterjets and its propellers are driven through a cardan-type shaft by two Caterpillar 510 diesel engines, developing 517 hp at 2500 RPM that allows speeds over 34 knots. It has an autonomy of five days, cruising up to 370 miles at 25 knots.

The BRF-230 is built by the Corporation of Science and Technology for the Development of the Colombian Naval and Maritime Industry (COTECMAR), with some twenty-four BRF-230 ordered so far for deployment by the Fluvial Battalions of the Naval



# Water Forces



Colombian riverine operations, 1999. The U.S. government supported Colombian state-building efforts through Plan Colombia.

U.S. SOUTHERN COMMAND

Infantry. The boat appears to be propelled in a similar fashion to the LPR40, a combat river patrol boat also developed by COTECMAR. The LPR40 accommodates a crew of sox, with its interior providing space for beds a kitchenette and a refrigerator giv-

ing it an autonomy of up to five days. The basic model has been developed for several purposes, such as ambulance duty, and can transport up to 10 Marines as a combat transport. The first boat was delivered in 2009 to the ARC, and soon after it entered

into combat with FARC-guerrillas operating in the Orinoco River. Its hull is made of a new ballistic protection alloy. The LPR40 appears to be an evolution of the LPR93 boats, built by the U.S.-based Bender Shipbuilding & Repair Company and delivered in 1993.



COLOMBIAN ARC

PAF-IV class mothership NF-615 ARC TECIM Edic Cristian Reyes Holguín.

The LPR93 revealed deficiencies and weaknesses in their stated role as a command-and-control boat (BCC) for the Riverine Combat Elements (ECF). The ECF is a formation consisting of a command boat and three tactical boats. Therefore, in 2006, Navy Captain Jorge Enrique Carreño Moreno offered a new design to be built in Colombia, and the concept was made a reality by COTECMAR in 2009.

The backbone of the Colombian brown water navy is the River Combat Group (GCF), each made up of two river combat elements, a mothership boat (river support patrol boat) and a river assault group.

### Nodrizas

In 1938, the Navy established a presence in Cartagena by taking over and overhauling an old maintenance and repair shipyard at Puerto Berrio, owned previously by the Ministry of Transportation. In July 1948, the renewed installation launched its first naval patrol boat, the ARC Captain Binney; this was followed in July 1950 by the ARC Spartan. In 1952 the shipyard produced 25 aluminum-hulled river patrol boats, each measuring 105 feet long, 19.6 feet



J. MONTES

Eduardoño Patrullero-260 at Expodefensa.

wide, and had a draft of 3.3 feet, having a 70-ton displacement. They could carry 48 personnel.

In 1953, the U.S. delivered the ARC Avenger and ARC Diligent, two riverine assault boats built by Dauntless Shipyard. In 1954, the shipyard at the Naval Base ARC Leguizamo built the

tugboats ARC Teniente Luis Alejandro Bernal Baquero and ARC Teniente Miguel Silva. In 1956, the Unión Industrial y Astilleros Company from Barranquilla (UNIAL) built three Arauca-class gunboats, and were named ARC Leticia, ARC Arauca, and ARC Riohacha. As a note, in 2011 there was



MARINHA OF BRASIL

In 2013 Cotecmar delivered the first of four river patrol boats (LPR-40) for the Brazilian Navy.

an accidental explosion onboard ARC Riohacha. In 1968, a national shipyard was created between the Navy and the Institute of Industrial Development, establishing the Shipyard and Naval Services Company of Colombia (EDANSCO). Four years later, this company would become the Compañía Colombiana de Astilleros (CONASTIL); however, this enterprise was again liquidated in 1993 due to economic difficulties.

In 1996, the Navy began the reactivation of the Naval Industry at the ARC Bolívar Naval Base at the former CONASTIL yard and incorporated the Mamonal yard. This gave initiative to the design and construction of several projects, to include a beacon vessel for the DIMAR (General Maritime Directorate), a Bahia-class tug for the Navy, a pumping station for ECOPETROL (Colombia's Petroleum company), and a mothership for the Marine River Brigade.

Navy officer Ricardo Pulido Osuna (later rear admiral) presented an official letter (No. 000477 /CBN1-404) on May 8, 1997, proposing to Admi-



J. MONTES

Riverine Reconnaissance Boat 230 at Expodefensa.

ral Edgar Romero the recovery of the shipyard, and the creation of the Technical Department to develop the mothership design to support the River Combat Elements. The effort

culminated with the establishment of COTECMAR, a partnership between the Ministry of Defense/Colombian National Navy, the National University of Colombia, the Technological



ARC

Patrullero de Apoyo Fluvial PAF-II A.R.C. TNCIM Mario Alonso Villegas.

University of Bolívar, and later, the Colombian School of Engineering "Julio Garavito." Naval Captain Guillermo Sarmiento González was placed as team leader to develop the mothership (riverine support vessel) concept, resulting in the ARC Guillermo Londoño, which was followed by the ARC Sénen Araujo.

The launching of the mothership marked another historical milestone, restoring the national maritime capacity to recover, design and build vessels in-country. On March 30, 2000, only three months after the first generation of motherships entered service, the ARC Guillermo Londoño maneuvered to reinforce troops along Vigía del Fuerte on the Atrato River that were under attack by guerrillas of the 34th and 57th FARC fronts. The ship resisted a rain of bullets and rockets for six hours but received only minor damage.

Eventually, the PAF, or Riverine Support Patrol ship, evolved in three subsequent generations of patrol boats called PAF II, III and IV. The mission of the PAF is to monitor and patrol the



COLOMBIAN ARC

ARC Bell-412 approaching PAF-III ARC TEFIM Juan Ricardo Oyola Vera NF-613.



J. MONTES

Eduardoño Patrullero-260 at Expodefensa. A pair of Vektor SS-77 light machine guns are placed on the boats. The Vektor is the standard LMG of the Colombian Marines.

nearly 10,500 miles of navigable rivers in the country, as well as to fulfill logistical support missions, fire support in assault operations, support for river combat elements (ECF), and support for river assault groups (GAF), in addition to a number of other tasks. COTECMAR built two PAF-I crafts which were basically mobile platforms for logistical and combat support. They were equipped with a .50 caliber machine gun at bow, and two other firing stations equipped with either M60 machine guns or MK-19 grenade launchers. These ships could transport 100 Marines with a full complement of equipment. PAF-II ARC TNCIM Mario Alonso Villegas was developed from the experiences of PAF-I and built at Mamonal Shipyard, with a modified hull, and sporting a remotely operated machine gun turret with the locally developed Jeyur (a deadly regional scorpion in the Wayunaiki language) Integrated Combat System with an optronic laser designator system with HRTV and FLIR system. The hull also had four firing stations for light machine guns, new communication equipment (VHF-FM radio, VHF command network, HF contact channel ARC, and satellite telephone), new power plant and new rooms for the 30-person crew.

In June 2008, the ARC incorporated the ARC TECIM Tony Pastrana Contreras, the first of two PAF-III boats. These two had greater autonomy and range. It had also better armor,

improved navigation systems, GPS, a heliport, and three fire stations for heavy machine guns or MK-19 grenade launchers. They have eight port and starboard mounts for light machine guns, and it was propelled by pump jets. Its interior could accommodate 40 Marines. The PAF-IV was even larger, and four ships have been completed. The evolution of these ships has made it possible to significantly expand their autonomy, from 15 days in the PAF I, to 60 days in PAF IV. The range has also increased from 2000 miles to 3100 miles and displacement increased from 260 to 370 tons.

The COTECMAR catalog also lists the BCFBC, or Low Draft River Combat Boat. It is a model with an aluminum hull providing NIJ-III protection for operations in secondary and tertiary rivers, with transport capacity of five passengers and loads up to 880 pounds. It has a length of 28 feet, and a beam of 8 feet. It can travel at 24 knots, having a range of 186 miles. The BRF230 appears to be based on this design.

### Private shipyards

At Expodefensa, we examined the Eduardoño Patrullero-380 Maritime patrol and Interdiction craft, which is capable or working in shallow waters such as rivers and estuaries and also in high seas operations. It has an efficient hull developed on a modified 'V' platform that allows the boat to face large waves without losing sta-

bility and speed. It has a length of 37.8 feet, and a beam of 8.6 feet. It has a crew of five, and a maximum cargo capacity of 8820 pounds. From this design, Eduardoño has developed the Interceptor-380 powered by three outboards developing 350-hp.

The Eduardoño Patrullero-260 River boat, on the other hand, has been conceived to work in interior waters and bays. It is built on a modified 'V' hull, which provides low draft and excellent performance. It can carry 20 armed personnel with their gear. It can also be configured as a heavy river combat boat with four M60-type guns, two per side, and two .50 caliber guns, one forward and one aft. It measures 26 feet in length and a 8.46 foot beam. The smaller Patrullero-195 is light river combat boat developed on a trihedral hull that provides excellent maneuverability. This low draft craft is equipped with two M60-type gun mounts to port and stern, and a dual .50 and MK-19 gun mount in the bow. It can sustain speeds over 30 knots under full load. It has a length 19.48 feet and a beam of a 7.41 feet. The largest vessel developed by Eduardoño is the Patrullero-450, a craft designed to operate in estuaries, rivers, bays, coastal areas, and the open seas. It has a length of 45 feet and a beam of 10 feet. Power is provided by three 250-hp outboard engines.

Also related to the latest edition of Expodefensa 2021, the government



COLOMBIAN ARC

PAF-II ARC NF-610 TNCIM. Mario Alonso Villegas.

announced the acquisition of several BAF (Riverine Support Boats) to equip the No. 4 Riverine Marine battalion, part of the Pacific Naval Force. The BAF is one of the products offered by MAR-10, a group of companies from Cali aligned to provide local nautical solutions.

Shipyards JOL S.A. is another player. The company was founded in 1996, and has acquired considerable experience working on vessels that navigate on the Guainía, Inírida, and Atabapo rivers. Since 2002 it has worked on floating hangars for the Navy, resulting in the construction of 15 E.M.A.F (estación móvil de apoyo fluvial, mobile fluvial support station), basically floating barracks for Colombian Marines, and modernization of the light River Support Patrol Vessel ARC Inirida.

### Combat element

In 1956 Ensign Rafael Grau Araujo and Marine Captain Aurelio Castrillón devised a River Control System, basically a new formation consisting of



USMC CPL. CHRISTOPHER J. MOORE

Colombian Marines at the firing range. These Marines wear the contemporary digital jungle pattern BDU, introduced in 2004 and which is in the process to be exchanged since 2018 with the new Arco pattern BDU. The Galil is their standard rifle.



U.S. Army soldiers and Colombian Marines during a combined training.

RICHARD BUMGARDNER/U.S. ARMY

four rustic aluminum-hulled boats equipped with machine guns and bazookas, which became known as the Wasp Flotilla. Its first organization and procedures manual (a TOE) was published the following year, and the first Wasp formations were established at Puerto Leguízamo. On July 3, 1958, the first eight Marine second lieutenants graduated from the Naval Cadet School, and the Directorate of the Marine Infantry was created in 1964, followed by the Marine Infantry Command in 1967.

In 1971 Lt. Major Alejandro Pimiento Hernandez reorganized the Wasp Flotilla into Jungle Commandos, comprising four boats with five Marines per boat to operate along the Putumayo River. Marine detachments were created in Puerto Carreño and Puerto Galán. The Jungle Commandos were reorganized in the 1980s, transforming in the present ECFs, each equipped with four 13-foot boats and one 17-foot administrative boat.

On August 30, 1989, under MoD Resolution No.6469, the Riverine Naval Force was established in Bogotá. As a consequence, the Eastern River flotillas were reorganized under command posts at Puerto Carreño and Barrancabermeja (Magdalena). The U.S. contributed with the delivery of the firsts

36 Boston Whaler Outrage ("Piranha") boats and 9 MK-IV PBR ("Eel") boats, allowing the modernization of 15 River Combat Elements.

At the end of 1993, the Marine Corps managed to authorize the creation of the Marine Fluvial Units Command (CUFIM), in order to assume command of all the River Combat Elements and the Advanced River Outposts. As of July 1994, to improve security in operations, the River Combat Elements began to be supplemented with a command-and-control boat. In 1996 the Colombian Marines acquired 32 "Caribbean" boats from Eduardoño. These boats were received with Yamaha outboards, which were later replaced with Johnson Evinrude models in order to standardize them with those used on the piranha and eel boats. In 1997, another 60 Caribbean-boats were acquired and used to reequip and modernize three other ECFs as well as activating 12 new ECFs, thus reaching a total of 30 of such formations. These new assets also allowed for the creation of the Marine Fluvial Battalion No. 51 in 1997, replacing the Fluvial Units Command and grouping the advanced river outposts and the ECFs under one command.

A reorganization took place

between 1998 and 2002 as part of the Plan Colombia. The new organization allowed greater efficiency and effectiveness in the control and support of the Fluvial Posts and ECFs, increased training, the level of operational readiness and the operational results of the River Combat Elements were improved. This year, 60 Caribbean-type boats were acquired, which allowed the creation of 12 new river combat elements, reaching a total of 30 ECF at the end of the 90s. Thus begins the implementation of the River Combat Group (GCF), made up of a mother boat and a river assault group; empowering them to regain control in regions that the narco-terrorists had taken under their control.

The Mobile River Support Stations (EMAF) were implemented in 2002 in order to improve the Marines' welfare. These floating barracks not only provided accommodation for staff but also were used to carry out maintenance on the boats. The Colombian riverine forces have been equipped with more than 250 riverine combat boats, with 75-percent of those being supplied by the U.S., and have become one of the most sophisticated and efficient riverine forces in the region, and in the world. **SADJ**



# EUROSATORY: Innovation and New Concepts

*One of the world's leading land and airland defense and security exhibitions will be held in June at the Parc des Expositions of Paris-Nord Villepinte - France.*

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In 2022, in addition to business advice, Eurosatory offers several networking services to facilitate meetings between individuals and between companies and buyers through pre-scheduled business meetings. Optimising your time by identifying the right people and planning your meetings in advance is the key to a successful exhibition.

## **Presentation of equipment**

As in every edition, in 2022 plenty of equipment and materials will be displayed on the stands. For more visibil-

ity, new technological clusters have been created for this edition: Cyber, Engineering and Manufacturing, Medical/Health, Civil Security and Fire Fighting.

The latest developments and main trends in defence and security technologies will also be presented during outdoor dynamic demonstrations, a special feature of the exhibition. Throughout the exhibition week, manufacturers and institutions will alternate dynamic demonstrations on a dedicated field.

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Eurosatory is a unique opportunity to showcase new products, no less than 500 new products and systems are usually unveiled for the first time to participants. 2022 should be no exception.

In addition to companies and SMEs, nearly 80 start-ups will be gathered at the Eurosatory LAB and on the GICAT stand as part of the "Generate" cluster.

70 conferences and exhibitor pitches will be organised throughout the 5 days of the exhibition with the participation of over 150 speakers. High-level experts, senior military, government and industry representatives will debate a wide range of strategic issues.

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Find out more about EUROSATORY: [eurosatory.com](http://eurosatory.com).  
SADJ

2022

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(representing 760 delegates)

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journalists  
from 44 countries

**75** Conferences  
**2,100** Business meetings made



2018 key figures



# The Evolution of TEAM CR



Taking its name from the ancient scientific vessel used for refining metal under intense heat, the Crucible tactical training facility has been the go-to site over almost three decades for military, law enforcement and corporate clients on the East Coast and beyond. Seen left to right are Ben Klinefelter - instructor, Ernie Gillespie - Co-Owner, Jack Davis - Director, Candy Eubanks - Adjunct Tactical Instructor/Competitive Shooter, Curt Sebastian - Adjunct Tactical Instructor/LEO/Fire Rescue/Gun Procurement Specialist, John Buchanan - Instructor.

By Robert Bruce

Crucible's necessarily secluded location in rural Stafford County Virginia has long proven attractive to certain clients, particularly among the many throughout the greater Washington D.C. area. By leveraging Crucible's wide array of training capabilities, clients can ensure their personnel are fully trained and/or formally qualified with little travel time or costs.



CRUCIBLE

## Tactical Training and More...

*Crucible, formed in 1993, is a specialized, high-risk environment (HRE) training company, providing instruction to the United States Government, Department of Defense, other Government agencies (OGAs), and multi-national corporations. Located just 60 miles from our Nation's capital, Crucible's training facilities provide classrooms, firearms ranges, high speed 2.1 mile track, unimproved roadways, off road trails, matted combatives training area and scenario sites that replicate real world environments for*

*people operating in austere locations worldwide. We have earned our credentials as global providers of operational services and training with over 25 years of continuous, successful business in more than 50 countries. Our formally trained and internationally experienced instructors bring a deep knowledge base to Crucible's training and security management system. We bring our clients training from the operational field and services with silent confidence. (Team-Crucible.com)*



SCOTT PRESLEY FOR CRUCIBLE

John Buchanan, USMC combat veteran and longtime instructor at Crucible, conducting dry runs for students in the live fire shoothouse.

## Crucible, Radio Recon and now there's Tier Craft

Nearly 30 years since its modest beginning that was quickly followed by rapid growth in discreetly serving a specialized range of clients, Team Crucible is further expanding operations.

Radio Reconnaissance Technologies, Crucible's parent company, has formed Tier Craft Inc. as a holding company, providing a streamlined structure as both companies look towards significant growth in 2022 and beyond.

Nick Hoben, President of RRT and leader of Tier Craft, says the new organization "will guide the growth and teaming power of the two long established companies. Formerly organized as parent – RRT, and subsidiary – Crucible, the two companies will operate completely independent of each other while maintaining the ability to support each other operationally."

Official contracting channels will stay at Crucible and RRT, but Tier Craft will step in to assist in growing client base and services.

## "Four legs to the table" Lean but not Mean

Crucible's primary staff is remarkable in many ways, not the least of which because it has long been just four full timers; "four legs to the table." It works, we're told, because they all pitch right in to do everything necessary, from cleaning toilets to training elite members of the mili-

tary. Efficiency and effectiveness come from drawing on a roster of dozens of highly skilled and specialized part time adjunct tactical instructors whenever needed to prepare and serve up all items on the company's extensive menu.

Our main interviews were with two key individuals: John Garman, who has been with Crucible almost from the very beginning; and Jack Davis, the most recent addition, who will be taking the company forward with new capabilities and offerings.

Also, quietly observing the interviews, were Principal Instructors and all-around problem solvers John Buchanan and Ben Klinefelter. Both men are seasoned USMC combat veterans with years of rough, real wartime experience and highly specialized training courses in the Corps. Various defense and security postings followed including overseas-deployed contract operators. Coming to Team Crucible first as adjunct tactical instructors, then selected for coveted full-time positions, they've brought an astonishing array of critical skills to enhance and round out the curriculum.

## Garman and Davis

John Garman, a lean, steel spring wiry and deceptively young looking 50-year-old, describes himself as Crucible's only non-military principal staffer. "I'm not DoD," he said, "I'm OJT," starting in 1994 as a combat-ives instructor, training personal security teams. While literally "hands on" at the time, this internationally recognized martial arts master's keen intellect combined with organizational and administrative skills led him thru



CRUCIBLE

Seen during a previous deployment to Africa, Crucible's John Garman confers with a local commander in planning the primary route for a VIP convoy through potentially hostile urban areas.

serial changes in company ownership to become president of the company in 2015. Along the way, he deployed in various capacities to Afghanistan, Iraq, Uganda, Burundi, Bosnia, Brazil, Russia, Indonesia, and more. In January 2022, Garman made a lateral move to Tier Craft, the new holding company, concentrating on business development and corporate growth.

Jack Davis, a red bearded, 36-year-old, smiling grizzly bear of a man is now Crucible's director. He enlisted in the Marines in 2004 and following combat tours as an infantryman, was selected for the Corps' Martial Arts Center of Excellence where he earned a fourth degree black belt instructor trainer title. In 2009 he joined the elite Raider brotherhood of Marine Corps Special Operations Command. But after ten intense years of combat deployments as a MARSOC operator, "I was bruised, battered and beat up," he said, "it was time for me to stop being operational and enhance the next generation of war fighter. Still having a heavy desire and feeling the obligation to ensure safety and



CRUCIBLE

Pausing for a moment on one of the facility's ranges, Jack Davis, director of Crucible, strives to maintain weapons proficiency that was honed to a razor edge from years as a MARSOC operator. Davis explained his mission at Crucible is to "develop and improve our curriculum based on the ever-changing global threats, and provide training necessary to increase the survivability of those going into harm's way."

well-being of all my brothers and sisters in arms, I joined the Crucible team in 2019."

## Quiet Professionals

**Garman:** We are open to provide our services to everybody. I had a member from the DEA say, 'We didn't know the DEA was allowed here, we thought it was only the snake eaters.' People need to know The Crucible is here to provide our services to everybody who needs it.

A lot of people don't realize that because we don't use Facebook much and because we don't advertise that it means 'stay away.' That only means when you come here nobody has to know. That's really the difference. We could put up all the cool images of everybody we've trained – 'Great class today with Acme Corp.' But we don't do selfies. The 'quiet professional' is in our DNA.

## The Crucible Method

Our first order of business was to go over the company's well-established mission set that has distinguished it over many years. The four main disciplines being combatives,



CRUCIBLE

Instructor John Buchanan closely monitors students in a tactical weapons training exercise utilizing proper carry and employment techniques for carbine and pistol while static and moving to engage multiple targets at various distances. Courses can be tailored to cover basic to advanced techniques and tactics depending on mission requirements, student proficiency levels, and training objectives.



CRUCIBLE

A training scenario to realistically simulate battlefield wounds and critical triage in the tactical field care stage of a live fire scenario. Having fought off the enemy, there is now sufficient time and cover for a thorough patient assessment and care.

small arms weapons and tactics, tactical combat casualty care, and driving.

**SADJ:** Explain Crucible’s focus on this training for domestic law enforcement as well as for U.S. military, corporate personnel and contractors who will be traveling overseas.

**Garman:** While we teach weapons and tactics, where we shine is in the way we teach students to incorporate each



CRUCIBLE

The Vehicle Tactics course involves shooting into, around, through, and out of a vehicle utilizing good tactics and use of cover while understanding ballistic and defensive properties of metal and glass. The highly realistic targets are from TAT-3D. This shooter is dressed in plain clothes, running the course in a carrying concealed which mimics an EDC citizen here in the U.S. or a special operations team member working overseas.

of the skills, combining medical and weapons, driving and shooting, driving and medical, fighting in vehicles, etc. That is the most salient thing in the Crucible method. You don’t just get to be in a silo and teach people to shoot well. People don’t get to go downrange to be a good marksman, they go downrange to come home to their families.

Combative handgun is a product we offer here, recog-

Thorough preparation for live fire and other training takes place in Crucible's well-lit and comfortable classrooms. In this case, adjunct instructors get a refresher before assisting with concealed handgun courses.



CRUCIBLE



CRUCIBLE

A representation of some of the organizations and nations that have long used the wide range of services offered by the Crucible and Radio Reconnaissance Technologies partnership.

nizing our students have to perform several different tactics from what they learned here when they're overseas. So when they go overseas and have to drive a rental car and somebody jumps into it with 'em. At that point they had to have been a good driver to get to where they are, now they've got to be a good combatant.

**SADJ:** So shooters and drivers learn medical too?

**Garman:** Absolutely. In a course coming up in January we're driving on day one and two, medical day three, weapons day four and five. On the range, the students will have an attack cue with live weapons, move in depth, use barricades, we'll tap one of the students down. The rest of the team has to fire and maneuver and remember care under fire. Sometimes good tactics is bad medicine.

**SADJ:** Tell us about those very realistic humanoid target dummies out there by the Combatives mats.



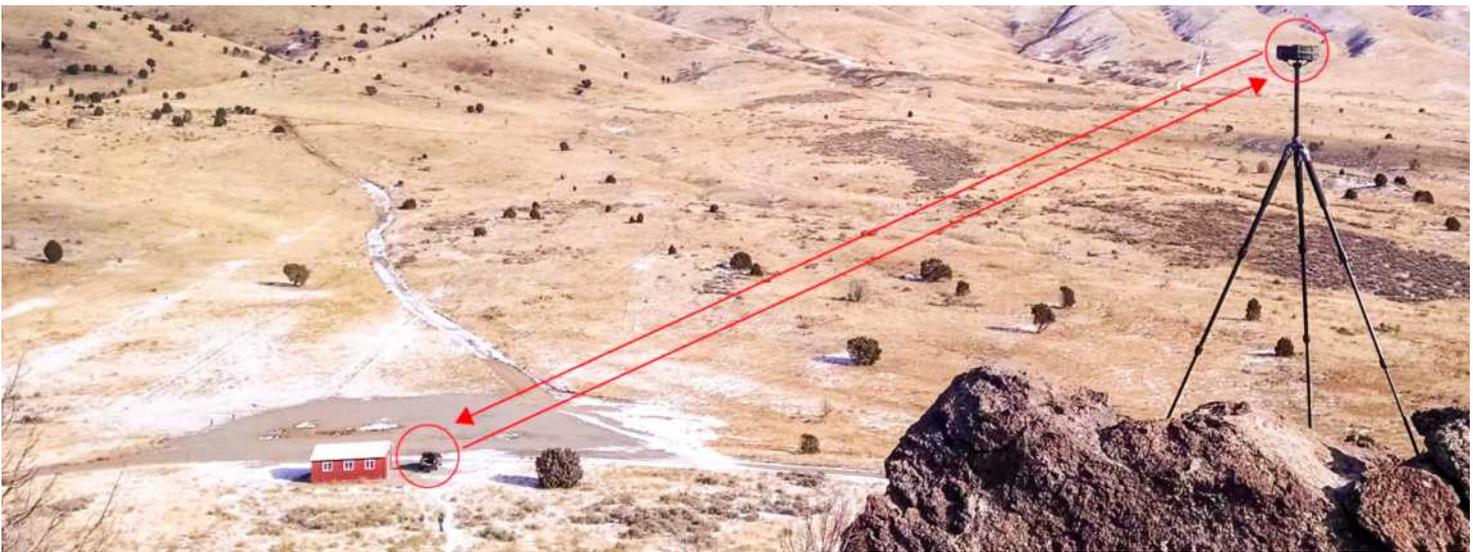
ROBBY THAYER, TSSI

Unmanned aircraft systems (UAS) are of particular interest to DoD's Rapid Reaction Technologies Office. This is the new military-grade VESPER Next Generation Elite Small Drone Vantage Robots, a participant in the 2021 NCRE at Crucible.

**Garman:** Three dimensional targets are important to our close confrontational shooting course. We can all shoot a silhouette in front of us but the way we approach is the reality of the life the student has. We've got 3D targets with arms that can extend with threat cues in their hand or their hands hidden behind them. 3D targets you can grab onto, pull in and shoot a live pistol or with Simunition weapons and SecuriBlank weapons and ammunition. The Simunition weapons cycle and eject with no unburnt propellant or ejected particles.

**SADJ:** Some students won't be able to do it right. How do you deal with this?

**Garman:** We're asked to improve the clients who show up – not be a source of attrition, but a source of improvement. You're going to get eight hours of training. If we can



RADIO RECONNAISSANCE TECHNOLOGIES

ThiEF, from Radio Reconnaissance Technologies, is a miniature, man-portable, fully integrated signal intercept and directional line of a bearing system designed to prosecute VHF and UHF analog, single-channel, push-to-talk radio transmitters. The system utilizes proven direction-finding techniques incorporated into modern technology to reduce size, weight, and power while increasing performance parameters.



CRUCIBLE

An aerial drone captured this overhead view of one of Crucible's ranges set up for a recent USPSA (United States Practical Shooting Assn.) competition. Expanding into open enrolment programs, the company has begun teaching techniques for improving performance in this demanding, fast paced shooting sport.



ROBERT BRUCE

The extensive SimIS product lineup which includes military-grade training robots, de-escalation robotics, and autonomous water vessels. On the left is their eerie, screen-faced Autonomous De-Escalation Robotic Trainer posed next to the self-propelled, programmable Human Type Target.

help a student realize deficiencies and develop capacities you can then take that knowledge to your mission and apply it as you see fit. You show up at level X and you leave at level X plus. That's our goal.

**SADJ: Report cards?**

**Garman:** It depends on what the client asks for. Sometimes we can provide simple feedback like go/no go. Sometimes we build an evaluation metric for the client: 1 – does not meet the standard; through 5 – good as an instructor.

**SADJ: What are some of the biggest challenges in your job? Biggest rewards ?**

**Garman:** Every day is a challenge. We are a problem-solving company. We look for the hard things to do. The company has been so successful because, typically, people come to

us when they're getting into something they're unaware of. Like a Tier 1 operator with new METL [mission essential task list] or enabler that doesn't normally go to high-risk environments. Everybody showing up has a problem that needs to get solved and that's why we're here.

We've heard from hundreds and hundreds of people who said 'I got into a sticky situation, and I immediately remembered being in classroom 2 where I learned what helped me survive the situation. Easily the most rewarding.

**Davis:** Challenges – Understanding the dynamics of each organization. One day you're teaching members of military who have plenty of experience handling firearms and the next day you're with someone who has never held a firearm. Rewards – To see some of these men and women return from hostile foreign country to say,



ROBBY THAYER, TSSI

Crucible's versatile facilities proved a perfect fit for TSSI's National Capitol Region Expo in 2021. While the numerous outdoor exhibits and live fire ranges saw constant action, crowds of attendees circulated among the dozens of exhibit tables in cavernous Building 5. The Expo returns to Crucible on June 16, 2022.

'you saved my life.' This is a motivator to continue our growth to ensure we stay sharp on TTP's [tactics, techniques, procedures].

## Clients

**SADJ:** Note some organizations hosted and what recent training or other activities.

**Garman:** SAM.gov [System for Award Management] is an official website of the U.S. Government procurement opportunities. It shows Crucible's training for Army, Navy, Marine Corps, work for Tier 1 SPECOPS (top level Special Operations) units and for their enabling units. We also do work for some large corporations with government contracts supporting war effort across the world.

More often than not they're hiring former military and government folks to go overseas to do jobs similar to when they were in. They'll come here to get weapons qual so they can go downrange and carry guns and do TCCC (tactical combat casualty care). Others may come for a 'rebluing' [refresher] of a 5-day pre-deployment training package getting two days driving, two days weapons, and a day of medical so the team now has learned and can codify some of their TTPs before going downrange.

The other thing we're really focusing on is being a range resource for different entities. Like we discussed about the Department of Defense coming, we're trying to get more



CRUCIBLE

Performing live fire runs in Crucible's shoot house, a tactical team of CQB students has moved through multiple rooms, finding and engaging a series of highly realistic friend-or-foe 3D targets.

of the regional Department of Justice [entities] to come here. To let them know we're available for their kind of organic in-house range resource. So, their instructors come down, with their guns and everything else, to just use our ranges to accomplish their mission.

**SADJ:** Any agencies like CIA training here?

**Garman:** No agency likes us to talk about specifics but of

course we do work with many different government agencies.

## Research, Development, Test & Evaluation Support

### **SADJ: Crucible does more than live range operations?**

**Garman:** We're problem solvers – able to team with government and industry to avail this great facility to their emerging technologies and connect them with potential users. Whether it's an autonomous vehicle that's a IED disruptor, a UAS drone, or other, they can come here T&E in a short iteration time.

We have done a good bit of work in the research field with ONR [Office of Naval Research] and ARL [Applied Research Lab] and also in the sales industry – working with leaders in the manufacturing industry to research and develop products.

ARL connects emerging technologies for the DoD's Rapid Reaction Technologies Office. They came to us in 2020 to host a demonstration event revolving around the CBRNE [chemical, biological, radiological, nuclear, explosive] world. We were able to work with their professionals and figure out how to hold the event. They returned in fall 2021 for an Unmanned Aircraft Systems demonstration.

Our partner company, Radio Reconnaissance Technologies, is working to place their ThiEF product, a signal intercept and directional line of bearing system, as a program of record with the DoD. We want to have these types of industry reps come in and demonstrate technologies for the government.

**Davis:** These efforts are what we are calling Crucible's 'Training Center of Excellence'. We can be a resource for emerging technology or product development. This location being close to the beltway and having great latitude and creativity of the staff provides a great environment for developing the next great advancement in training and solutions for the warfighter.

### **SADJ: With Aberdeen Proving Ground, Quantico, AP Hill, and other big bases, why would the military and government contractors come to Crucible?**

**Garman:** Our professionalism and response capability is extremely sought after by folks that have access to all of those facilities. I've heard 'Hey John, I've scheduled my third exercise with U.S. installation X and I got bumped again. I've had engineers fly in, there's stuff in storage, all these things planned out and I still haven't accomplished my mission.' I'll say, 'How about Tuesday?'

### **SADJ: But then the contracting people have to get involved. Put it out for bids?**

**Garman:** We are registered in the System for Award Management that enables us to propose and write prime contracts with the government but it's not always necessary. Some agencies are able to use their IMPAC purchase card and make it happen. So, your three-million-dollar research project got stalled for six months due to government range availability? With your IMPAC card your bottleneck just got opened up here at the Crucible.

Another example is a DoD organization that says, 'we have a pipeline of folks who have to qualify and go downrange.' They write a contract with Crucible for 30 days a year, then they know all it takes is a phone call to shoot and deploy.

## Openings for Individual Students

**Davis:** The Crucible has decided to expand our training to



CRUCIBLE

An adjunct instructor demonstrates through inspection of potential wounds by cutting away a role-playing patient's clothing. After initial assessment and stopping any major bleeding, the patient is assessed again for any additional wounds that are not immediately obvious. These critical skills will be an important part of a follow-on live fire tactical team exercise.



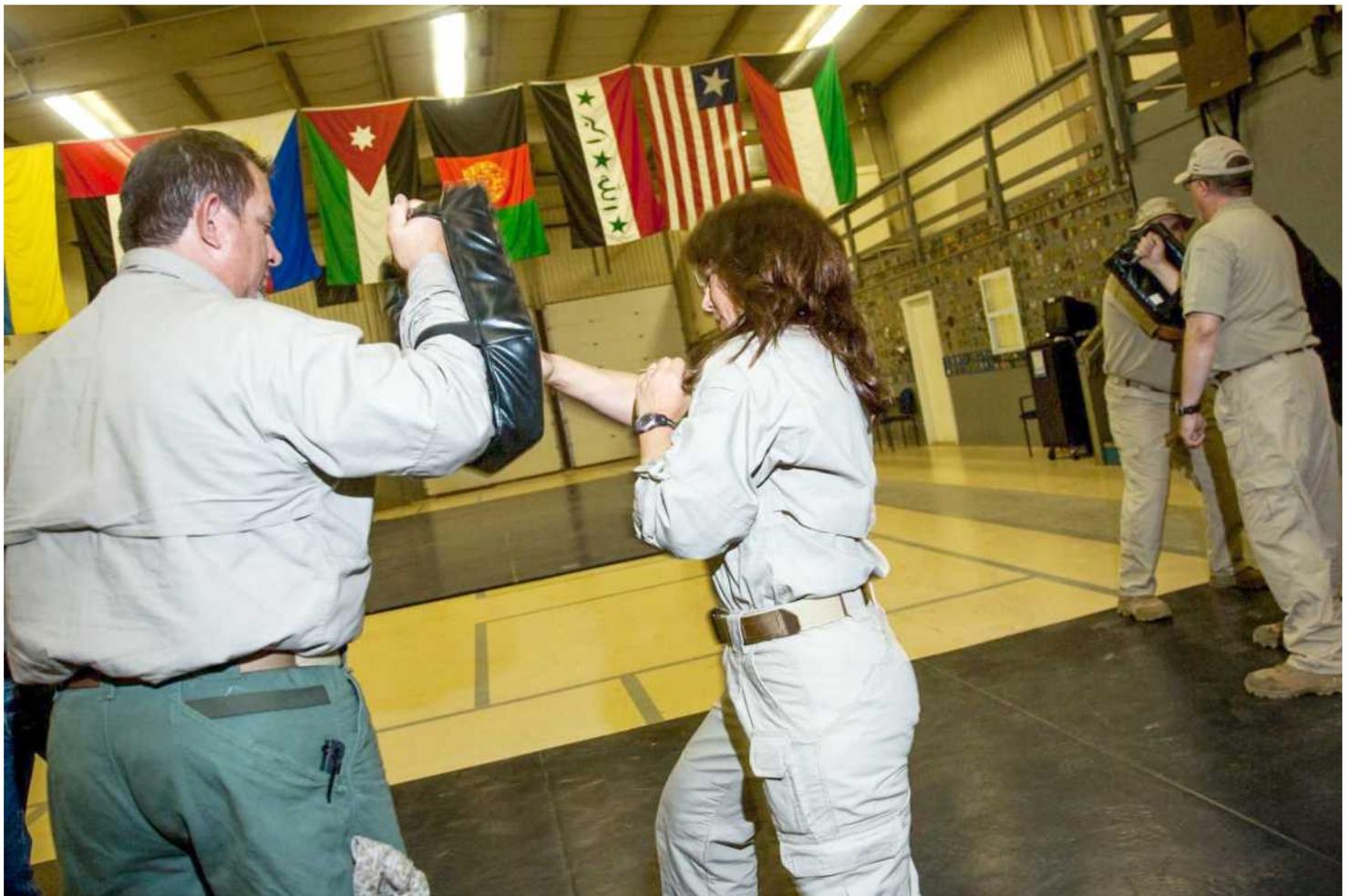
CRUCIBLE

This view through the windshield on Dominion Raceway's high-speed track is overlaid with images from the Track Addict Pro smartphone app, used to help teach students when driving at emergency speeds. Measuring time, when and how hard each pedal is used, G-forces through the turn, speeds in each section or corner, it gives real-time information to improve the student's performance.



CRUCIBLE

Pyrotechnics along with role-playing adversaries characterize Crucible's realistic anti-terrorist driving training off-site at Dominion Raceway. The ongoing arrangement with this versatile motorsports venue allows a full range of challenges including high speed driving, attack mitigation, convoy operations, and close defensive driving. Other offerings back at Crucible's main site include driving on gravel and dirt, as well as technical off roading.



CRUCIBLE

Thick hitting pads absorb impact shock as combatives students give it their best in the big open bay of Crucible's Building 5 learning center. Training options include edged weapons, club and expandable baton, multiple assailants, confined space, vehicle combatives, and abduction escape.



CRUCIBLE

Crucible is the first private corporation to have its instructors certified by the U.S. Department of State, Diplomatic Security Training Center, as protective security operations instructors. A key element of Crucible's Worldwide Personal Protection Services course for the Department of the State is this practical exercise in loading and unloading of personal protection details and some of the formations used to protect the motorcade and the protectee.

civilians. The safest and most efficient manner we believe was to have one range dedicated to weapons handling and marksmanship, while the other has stages of fire using USPSA [United States Practical Shooting Association] rules and regulations.



CRUCIBLE

In what has become known as low visibility training, Crucible teaches clients how to blend in with their environment, present less value to a would-be attacker, avoid confrontation, and in the event of an attack, how to swiftly mitigate the attack and move off of the attack site.



CRUCIBLE

Crucible instructors traveled to Mississippi to conduct foreign weapons training for an Army National Guard unit preparing for overseas deployment. Hands-on weapons instruction included AK-47, RPD, RPK, and PKM.



U.S. ARMY SPC. RYAN GREEN

Pulling security watch in 2013 at the U.S. Consulate in Herat province, Afghanistan. Crucible's Security Management services prepare personnel and facilities for a full spectrum of challenges.



SCOTT PRESLEY FOR CRUCIBLE

Gear and weapons in Crucible's armory await the right men and women who can qualify as adjunct (part time) instructors, a necessary entry level to the team. Hiring takes place year-round as current personnel deploy and the demand for a wide range of highly specialized trainers intensifies.

## Joining The Crucible Team

*Since our inception, Crucible has employed only the most competent, operationally experienced military, law enforcement, and security professional veterans to instruct, consult, and manage operations globally. We continually update our pool of available professionals and their individual specialties. Crucible is recruiting for Adjunct Tactical Instructors for "as needed" instructor positions at our Fredericksburg, VA facility. Specific experience is required in teaching one or all of the four foundational disciplines (small arms tactics, tactical medicine, driving, and individual protective measures). Cruciblejobs@team-crucible.com*

**Davis:** As our operations tempo increases in 2022 we will lean heavily on individual contractors to assist and would like to continue grow that pool of highly trained special operators.

**Garman:** Our people are the company's biggest asset. We hire folks that come from a high threat operational background that also have formal instructional experience. While we primarily look for folks from the Special Operations community, we also have some that were not in SPECOPS but excel as instructors and problem solvers. Regardless of where our staff comes from, they all have an exceptional ability to get the most out of our clients to prepare them to prevail in the harshest of climates.

The best way into the company is to be used as an adjunct on a daily or intermittent basis, then as you learn of the company and the company learns about you – strengths and weaknesses – we move forward and then as jobs present, overseas job or higher-level effort here in the building, we pull from that pool of people because they're known entities.



CRUCIBLE

Personal security detail (PSD) training includes all aspects of providing close protection in high threat environments. Instructors relate formal training with operational experiences that prepare the PSD team member for success in the most severe situations.

**SADJ: Is this something individuals can sign up for?**

**Garman:** On Facebook look up 'Crucible Crucible.' Jack Davis is running point on that.

**SADJ: Any other classes that individuals can take?**

**Garman:** We're moving into that space now.

**SADJ: What additions, upgrades/improvements are planned for the near future?**

**Garman:** Our most immediate upgrades are what we're doing in medical training, to provide a combination of domestic stateside first aid with tactical combat casualty care.

TCCC is for that non-medical provider to treat life threatening wounds and get you back to higher echelon care. It doesn't really deal with non-kinetic issues like cardiovascular incidents, heat exhaustion, diabetes. We're meshing that training so the tactical professional will get the full spectrum of professional responder training.

**SADJ: Upgrading targeting capability on the ranges? Moving robots?**

**Garman:** Absolutely. We've been working with SimIS for almost a year with their moving, pre-programmable or randomized, three-dimensional targets that get knocked back and measure the hits. A perfect example of how the Crucible can help bring these good products to the industry.

Another big one we've been working very close for about two years – see this on our 'Crucible Crucible' Facebook



U.S ARMY SPC. RYAN GREEN

Bullet holes, blown out windows and RPG damage to the U.S. Consulate Herat in the aftermath of a surprise attack in 2013 by insurgent forces in Afghanistan. A comprehensive security survey by Crucible's analysts is key to prevent this from happening to your overseas operation.

page – is Scoring Technologies and PracticeScore for USPSA and IPSC. We're helping to provide data for their acoustic and non-acoustic shot timers that include artificial intelligence. Measure your shot times and go up to the target, take a picture and the computer is able to score your target.

The owners of Crucible know how to grow a company, that investment is required, but they are smart about how they spend their money. We're a commercial enterprise, a positive profit and loss is obviously one of the goals. Our mission statement is 'Provide Best of industry training to exceed client demands and company goals.' We can outfit a range with the highest tech you need but we have to manage that cart before the horse.

**What's Next ?**

The "wiring diagram" for Radio Reconnaissance Technologies, and The Crucible shows the two aligned straight across with Tier Craft sitting above as an umbrella organization. As previously noted, Nick Hoben, heading up the Tier Craft holding company, says RRT and Crucible "will operate completely independent of each other while maintaining the ability to support each other operationally."

While investment advertising often cautions; "past performance does not necessarily predict future results," the unbroken track record of success for Crucible and RRT bodes well for the future in their new structure. **SADJ**

**Contacts**

While RRT and Crucible will maintain their current office locations and capabilities, Tier Craft will support a management team that will aggressively promote the

two companies as they position themselves for new partnerships and teaming arrangements with an eye towards growth for both entities.

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SIMON DUNSTAN

Soldiers of the IDF 202nd paratroops armed with an 9×19mm UZI submachine gun, a 7.62×51mm Romat FAL, and what appears to be a Mauser-pattern bolt-action rifle, likely in a sniper configuration, riding in an M3A1 Mk A half-track.

# Six Day War Tactics and Equipment

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## Sinai Front

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By Matthew Fishback



IMPERIAL WAR MUSEUM

## Israeli FAL

**I**srael's infantry tactics had changed drastically since the 1955 Suez Crisis, in which Army Chief of Staff Moshe Dayan focused almost entirely on traditional infantry and airpower, neglecting armor and logistics. The British and French had significant success with armored assaults on Egyptian forces during the Crisis. This proved to Dayan that a strong mechanized infantry and

armor corps would be the key to success for Israel in the inevitable future warfare over Sinai. Finkel and other commentators refer to this as the "cult of armored warfare", which neglected defense for offensive capability entirely. By the time the Six-Day War began, in 1967, Israel's forces were better equipped but no more well trained than the army had previously been. This would prove

to be a major issue.

At the start of the Six-Day War, almost all Israeli Defense Forces soldiers were part of the mechanized infantry (interchangeably called armored infantry) and assigned to a tank company. This meant they would ride in US M3A1 half-tracks alongside tanks into combat. Typically, a full squad of seven or eight men would be in a single half-track,



VITTORIANO RASTELLI/CORBIS

A group of Israeli soldiers holding Romat FALs.



SIMON DUNSTAN

An IDF reservist in Gaza using an unmodified K98 Mauser.

with support from 81mm mortars, Browning M1919A4 .30-06, and M2 .50 caliber machine guns mounted on M3A1 Mk B models. According to a veteran interview conducted by *Silah Report*, a squad was doctrinally supposed to be composed of eight men but in reality, men would drop out for various reasons leaving squads consistently undermanned. There were also reconnaissance detachments with the armored infantry, consisting of jeeps, more half-tracks, and AMX-13 light tanks. The hierarchy of IDF field command started at the top with an 'Ugadah' [sic.] composed of two or more brigades. A brigade was the "backbone of strategic planning" and contained two regular and one reservist battalion. A battalion was broken into sub-units of companies, platoons, and squads of around eight men as the smallest unit. Since the IDF focused on decentralized field control and fluidity, the exact numbers of any unit or sub-unit are imprecise.

In the same theme of flexible field



BETTMANN/CORBIS

IDF forces holding UZI submachine guns with distinctive wooden buttstocks.



UDI STEINWELL

Men of Company A, 28th Battalion, 55th Brigade, circa 1967-70, armed with folding stock-variant Uzis.

control, along with a low budget – all conscript army, IDF units were equipped with a wide variety of small arms and equipment. There were, however, some mainstay small arms on the Egyptian front. Almost every soldier could expect to be equipped with a 7.62×51mm FN FAL (known as a Romat), a heavy-barreled FAL otherwise known as a Makleon, 9×19mm UZI submachine gun, the 7.62×51mm FN MAG general-purpose machine gun, or a 7.92×57mm Mauser-patterned bolt action rifle as their main weapon – alongside grenades. Anti-tank weapons were also issued, but in much smaller numbers than were required for field needs.

In her journal, Yael Dayan notes that one colonel was “assigned a pistol but no ammo, and all Uzis were assigned out,” showing the makeshift nature of the army at the time. She goes on to mention that the IDF had not issued gas masks

*The FAL and Heavy FAL were too long, at around 110cm or 42.5 inches overall, to be wielded effectively in the trenches, but infantry successfully used them to suppress Egyptian lines as paratroopers advanced.*

even though Egyptian forces did, prompting fears of gas attacks in the Sinai. At this point in time, to her knowledge, all of the Uzis had the original configuration wooden stocks, as metal folding stock variants had not yet been issued. In *Silah Report's* interview with an infantry veteran, he states that he

saw some metal folding stocks in the field, which period pictures confirm, but they were still limited to regular paratroopers and tankers.

If a platoon was set up to meet the exact specifications of doctrine it would be comprised as follows: an infantry squad would be mounted in an M3 half-track with eight men, a leader with an UZI, two heavy FAL's, a rifle grenadier, and four with standard pattern FALs. The command squad would have an officer, radio-man, medic, mortarman, and mortar ammo carrier all with Uzis. Many K98/Mauser-pattern rifles had been turned into sniper platforms with a 12-power scope and were given to men who were the best shots. In reality, though, this was not always the case, and many men would swap the FAL for an UZI or even a 7.62×39mm SKS or AKM in the field. Paratroopers, being elite forces, were given Uzis with metal folding stocks first, followed by tank crews,



AMMUNITION HILL MUSEUM

**Israeli paratroopers flush out Jordanian soldiers from trenches during the Battle of Ammunition Hill.**

commandos, junior infantry leaders, and vehicle crews. FALs were then issued to everyone else when UZIs were unavailable.

Reservists were often the worst equipped, as they were the lowest priority, except for one category – anti-tank weapons. Reservist paratroopers were given the FAL with 22mm BT/AT 52 rifle grenades, while infantry reservists were often armed with WWII surplus 7.92×57mm

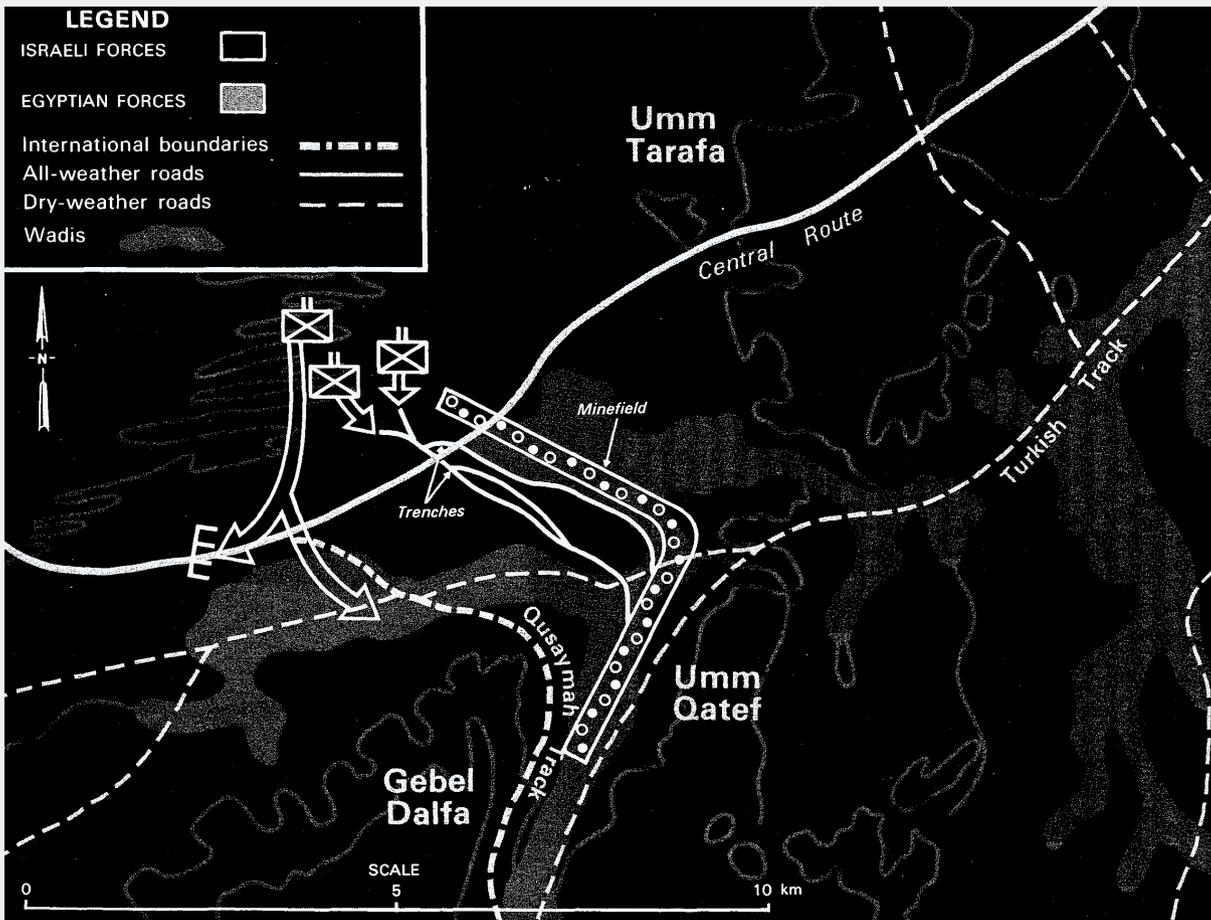
Mauser K98k/other Mauser-pattern rifles in their original condition without a scope. One lucky reserve division was equipped with U.S. M20 rocket launchers, anti-tank mines and grenades, and 106mm recoilless rifles (which made up an Ugdá's entire anti-tank capability.) The 7.62×51mm FN MAG general-purpose machine gun was supposed to be reserved for defensive positions along the border but was quickly

brought into frontline service since the 20-round magazines of the heavy-barreled FALs, which were essentially used as light machine guns, were found to be too small for sustained fire.

During the course of the Six-Day War, the combat loadout of a soldier armed with an UZI sub-machine gun was five 25-round magazines in pouches (the 32 rounders were believed to be unreliable), two clipped together in the gun, and some grenades. Those equipped with a FAL had four to six pouches holding two 20-round magazines each, while the Makleon FAL was carried with eight regular pouches, plus a large pouch holding ten 20-round magazines. When the IDF prepared for a night assault on the fortified El-Arish and Um-Katef complexes they took their equipment capabilities into serious consideration.

On the Egyptian side, though, General Mohamed Fawzi readily admitted after the war that "some units had not trained on weapons of any kind since the 1956 Suez Crisis" and that "reserve units... had severe shortages of weapons, equipment, and radios." On top of this, Egyptian forces that were better trained were "able to conduct one type of operation – [defense]." The El-Arish attack serves as a textbook example of an IDF assault on a fortified position that would take place numerous times across the Sinai desert.

During the night-time El-Arish assault, paratroopers dropped behind Egypt's Um-Katef defenses from helicopters while artillery marked out the northernmost part of a trench line for infantry to storm. Moshe Dayan specifically trained all infantry for trench assaults in the lead-up to the war, so troops were well prepared for these operations. Each of the three battalions storming the trenches carried 50 flashlights of one color, red, green, or blue, to mark their battalion's progress in the trench. This helped prevent friendly fire, as the paratroopers were coming in from behind the lines. Targets were identified at night by throwing a lit "goznik" – a goose-neck lamp, which was a can of kerosene-soaked sand. As paratroopers landed they "jumped right



An IDF battle plan for the Um-Katef offensive.

"KEY TO THE SINAI: THE BATTLES FOR ABU AGEILA IN THE 1956 AND 1967 ARAB-ISRAELI WARS." BY WALTER GAWRYCH

at the beginning of the trench and started running inside throwing hand grenades before us, then running ten to twenty yards and squeezing the trigger of our UZI submachine gun from the bends and corners of the communication trenches."

The FAL and Heavy FAL were too long, at around 110cm or 42.5 inches overall, to be wielded effectively in the trenches, but infantry successfully used them to suppress Egyptian lines as paratroopers advanced. IDF paratroopers relied on knives, shovels, grenades, and Uzis alike to clear Egyptian trenches. Their tactic was to fan out and rush trench networks with one platoon per gun emplacement, relying heavily on brutal hand to hand combat. The rapid and brutal night attack disoriented the Egyptian forces, which were defeated in a few hours, unable to effectively use artillery or direct fire in the dark. This assault on the Um-Katef lines broke the Egyptian forces and all but won the war for Israel in the Sinai. **SADJ**

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*This article originally appeared at Silah Report, a project of Armament Research Services (ARES) monitoring arms and munitions developments in the Middle East, North Africa, and Central Asia. More original material is available at [silahreport.com](http://silahreport.com).*



An original, relatively unmolested MkIII Bren chambered in 7.92x57mm in Darra.

# Bren Light Machine Guns of the Afghan-Pakistan Region

By Khyber Abdullah

**T**he Bren Light Machine Gun is most notable for its use during WWII with British and Commonwealth forces. It's an iconic piece of small arms history. Its rugged and reliable design meant that it stayed in use for many years and in various calibers from the late 1930s well up to the 1990s with the British military. It did see some limited use by other groups and militaries up until the mid-2000s, as well. From our field work it now appears that there are still a number of British Bren and Czech ZB vz. 26-pattern guns in the Darra region.



KHYBER ABDULLAH

An original, unmolested MkIII Bren chambered in 7.92x57mm in Darra.

A place we can still see these Bren LMG's still for sale in shopfronts is with the firearm dealers of Darra

Adam Khel. They still have a small number of original .303-chambered Brens in their inventories, and an even



KHYBER ABDULLAH



Handmade hand-guards are a feature of this heavily modified vz. 26.

KHYBER ABDULLAH



KHYBER ABDULLAH

A heavily modified Czech ZB vz. 26 chambered in 7.92x57mm in Darra, with some significant changes made to the length of the barrel and gas system. The gun appears to have a new matching butt and forend furniture .



KHYBER ABDULLAH

A heavily modified Czech ZB vz. 26. Note that the gun appears to have had a Bren ladder rear sight added and the left side of the receiver machined flat as there is no sign of the original drum sight.

larger number of guns which have been rechambered to the more easily acquirable and reliable 7.92x57mm cartridge. No, these are not the only 7.92mm Mauser-chambered Bren LMGs that have been made or converted, the Canadians also produced them for the Chinese during WWII. Note that gunsmiths from the region did not happen upon one of these factory-built 7.92mm Mauser-chambered Bren Guns, they have, however, seen a number of original Czech ZB vz. 26/ vz. 30 LMGs, from which the Bren was

developed, and it is most likely that the idea for converting them came from these guns.

Gunsmiths in Darra also recondition Brens. One reconditioned and refurbished variation of a MkI Bren was seen along with another interesting variation which seemed to be rebuilt/reworked and had some additions and lightening cuts added. Seeing such a pristine item led me to believe it was some sort of copy, however, after speaking with colleagues in the manufacturing industry there, they

confirmed they do not make copies of the Bren but instead recondition them. The magazines used are locally made copies based on the original ZB 26/30-pattern magazines, which fits with them taking cues for the ZB 26/30 in regard to caliber conversions.

Now that the Bren is long out-of-production, it seems that some of the only people left on the planet still keeping the legendary light machine gun on their shelves and in operation, in one form or another, are the gun bazaar dealers of Darra Adam Khel.



DARRA DEALER

A reconditioned Bren Mk1 type LMG with ZB 26/30 barrel.

*This article originally appeared at [Silah Report](http://SilahReport.com), a project of Armament Research Services (ARES) monitoring arms and munitions developments in the Middle East, North Africa, and Central Asia. More original material is available at [silahreport.com](http://silahreport.com). SADJ*



DARRA DEALER

A reconditioned Bren Mk1 type LMG in a Darra dealers shop with what appears to be a shortened ZB barrel.



## Elbit Systems Awarded a \$27 Million Contract to Provide Sweden with NATO Compliant Tank Ammunition

**Elbit Systems** was recently awarded a contract in the amount of approximately \$27 million by the Swedish Defense Material Administration to provide the Swedish Armed Forces with M339 120mm rounds, and Data Setting Units for its Leopard tanks. The contract will be performed over a period of ten months.

Suitable for all NATO 120mm smooth-bore gun-equipped main battle tanks, the M339 is a high-accuracy, multi-purpose 120mm tank

round that complies with U.S. military and NATO standards. The Swedish Armed Forces selected the M339 to improve the firepower and the ability of the battle tanks to engage different types of targets.

Yehuda (Udi) Vered, General Manager of Elbit Systems Land, commented: "I believe that this selection by Sweden underscores the growing recognition by Western armies of the unique quality of our portfolio of products."

In the beginning of 2020 Elbit Systems reported the decision of the Finnish Army to select the M339 rounds for its Leopard 2 tanks. The company announced the establishment of Elbit Systems Sweden AB in Gothenburg in July 2021, and a contract awarded in January 2022 to this Swedish subsidiary to supply Combat Management Systems for Spårö class mine countermeasures vessels of the Royal Swedish Navy.



# Safariland Announces Distribution Agreement with Busch PROtective

**Safariland Armor**, a brand of The Safariland Group, a global provider of safety products designed for the public safety, military, professional and outdoor markets and one of Cadre Holdings, Inc.'s (NYSE: CDRE) key brands, announced today a national distribution agreement with Busch PROtective.

Busch PROtective's ballistic helmets meet the widely referenced National Institute of Justice (NIJ Standard 0106.01) Level IIIA test standard. In addition, the Busch PROtective AMP-1TP helmet system is designed for the demanding needs of federal and local law enforcement agencies and public safety missions and meets the new DEA-FBI Ballistic Helmet Protocol V1.0-2019 as well as the European VPAM-3 standard. Introduced to U.S. law enforcement in 2019, the DEA-FBI protocol has become the defining real-world ballistic performance evaluation that tests against projectile penetration specifically limiting energy transfer during ballistic events to help reduce

possible TBI, ballistic resistance in both hot and cold temperature extremes, edge protection, hardware testing & reduced blunt trauma.

Through the new agreement with Busch PROtective, Safariland will handle domestic U.S. sales and distribution of Busch PROtective helmets & accessories.

"This strategic relationship will expand the availability of Busch PROtective's state-of-the-art ballistic helmets designed for the specific needs of local, state, and federal law enforcement such as the DEA, FBI, U.S. Marshals Service, and ATF," says James Duncan, VP/GM of Armor for Safariland.

"Our helmet systems, which range from premier Ballistic protection, SAR/Training, to Riot Control, offer world-class performance in lightweight designs that are as comfortable as they are robust." Scott Wyatt, president of Busch PROtective, "We're excited to join forces with Safariland and to do our part to further Safariland's mission: 'Together, we save lives'."



## Elbit Systems Displays Hybrid Propulsion Small Tactical UAS

Already under contracts, Skylark 3 Hybrid offers triple endurance in a small tactical UAS package

**Elbit Systems** will present the Skylark 3 Hybrid Small Tactical Unmanned Aerial Systems (STUAS) for the first time at the Singapore Airshow 2022. The Skylark 3 Hybrid is equipped with a hybrid propulsion system, both an electric and an internal combustion engine, tripling endurance and offering up to 18 hours of operations, with no change to size or weight, significantly increasing mission effectiveness and cost efficiency.

The Skylark 3 Hybrid uses its combustion engine to fly rapidly to the area of interest (AOI) and switches to the electrical engine

while operating above the AOI. The twin engine architecture of the new Skylark enables one to back up the other, providing greater reliability and safety. The significantly increased endurance of the Skylark 3 Hybrid provides forces with greater capacity to hover above areas of interest and requires fewer platforms to execute the same mission.

Skylark 3 Hybrid is based on the Skylark family of STUAS that have been ordered by 27 countries, to date. Skylark 3 Hybrid has a 15.4-foot wingspan, a maximum take-off weight of 110 pounds, service

ceiling of 12,000 feet and a range of 75 miles. It features dual payload capacity with a plug-and-play interface for a quick replacement of sensors in the field. The unit is capable of integrating a range of payloads including high-resolution electro-optical gimballed payload, ELINT, COMINT, laser designators and others. It is deployed and operated by a crew of two, launched with a pneumatic launcher and can be mounted on a vehicle or vessel. Two Skylark 3 Hybrid STUAS can be assigned to the same mission simultaneously managed by a shared ground control station.

# Otis Technology Partners with Daniel Defense

Otis Technology is proud to announce it has partnered with Daniel Defense to provide custom cleaning gear for their firearms.

Interest in working together was kindled when Daniel Defense began using the Otis B.O.N.E Tool in their armorer courses. The mutual interest in using the best firearm maintenance practices quickly brought the two together for this endeavor. The first task was to develop a catered M4 cleaning kit, which Daniel Defense and Otis tackled together. This specialized kit, the DDM4 Cleaning Kit, is now available to all Daniel Defense customers.

"Daniel Defense is dedicated to providing the best products and service to our customers. At times, our military and law enforcement team is requested to provide turnkey solutions. This can be as simple as adding an optic or sling, but, at times, we are asked to provide a complete rifle package that includes everything an end-user would need – and that includes weapons care," said Joe Marler, Law Enforcement Sales Manager for Daniel Defense.

Otis Technology's law enforcement sales manager, Mollie Martin, offered: "Daniel Defense is a powerhouse in the industry and we're honored to include our gear with their rifles. Their core values of delivering quality, USA made products to our mutual customers line up nicely with our own values and partnering with them came naturally."



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# INDUSTRY NEWS

## Special Forces from a European Country Adopt the FN FCU Mk3 Fire Control Unit to Equip 40mm Multi-Shot Grenade Launchers

**FN Herstal** has recently been selected by a Special Forces unit in Europe to enhance their 40mm Multi-Shot Grenade Launchers with FN FCU Mk3 Fire Control Units.

Under extreme stress or severe combat conditions, first round hit probability with a 40mm LV/MV system is low, even for an experienced shooter. The FN FCU Mk3 Fire Control Unit uses new technologies and advanced electronics to calculate the trajectory of grenades and give an adjusted point of aim, ensuring first round hits in all conditions, night and day.

Lightweight, compact, and user-friendly, the FN FCU Mk3 can be fitted onto any rifles featuring a rail-mounted grenade launcher, onto stand-alone grenade launchers or onto multi-shot grenade launchers regardless of the manufacturer. It was recently selected by a Europe-based Special Forces unit to equip 40mm Multi-Shot Grenade Launchers (MGLs).



## Mission First Tactical & Precision Technic Defence A/S Awarded Contract from the Danish Defence Acquisition and Logistics Organization (DALO)

**Mission First Tactical, LLC**, maker of USA-made rifle/carbine accessories and holsters, was awarded a contract from the Danish Defence Acquisition and Logistics Organization (DALO) to supply it with MFT's Battlelink Minimalist Stock. DALO is responsible for procurement, supply, maintenance, development, and decommission of material capabilities, IT, and services for the armed Danish forces. The contract award is specifically for weapon-mounted accessories NAR for the next seven years. The contract items will be supplied through Precision Technic Defence Group.

Danish defense forces operate in various environments across the globe, which means that the organization uses a variety of different small arms and light weapon systems during combat and training.

The Battlelink Minimalist Stock is a slide-on replacement for a collapsible buttstock. The angled, non-slip, rubberized removable buttpad allows for faster presentation, even when wearing body armor. The stock adapts and changes to the environment or operational needs by utilizing custom accessory mounts and accepts a new, optimized sling



configuration. All of the functional requirements are met while keeping the weight of the stock under six ounces, making it the lightest stock of its kind.



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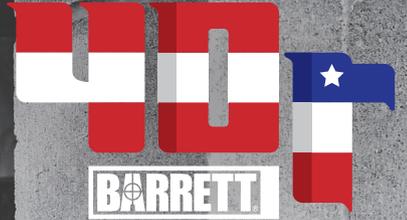
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