



Paradigm Tactical Systems

Overwatch and PTX Bullpup Pneumatic Weapons



Paradigm Tactical Systems

Overwatch and PTX Bullpup Pneumatic Weapons

Technical Notes

PTX BullPup



Paradigm Overwatch



Overview

The Overwatch and PTX Bullpup pneumatic air rifle platforms are extremely precise low-energy weapons (20-25 Joules) designed to neutralize targeted individuals at distances between 15 feet and 100 yards. Both weapons are designed to be non-lethal and to avoid inflicting significant injury, thereby providing an effective way for Law Enforcement Agencies to stop any individual causing harm to people or property without harming those near the individual.

Both semi-automatic platforms neutralize threats by propelling 0.68" caliber (17.3 mm) munition rounds. The pneumatic energy level inflicted by these rounds cause primarily minor injuries; below Level 1 on the Abbreviated Injury Scale (AIS). Both platforms can shoot a variety of munition projectiles, including glass break rounds (used to break a glass separator such as a window or door, thus allowing the target to be acquired via a following projectile), PAVA rounds (which shatter upon impact, simultaneously inflicting pain and delivering incapacitating irritation to the respiratory system due to the inhalation of PAVA (capsaicin) powder), other chemical-filled rounds, or inert (paint-filled) rounds.

Concept Objective

Paradigm's objective is to provide LEAs with less lethal weaponry by combining five fundamental points:

- The ability to effectively access and neutralize threats without causing significant harm to the target AND without endangering uninvolved people or property near the target.
- The ability to consistently shoot with precision at distances up to 100 yds.
- The ability to utilize the weapon and its accessories in a practical and autonomous manner under a variety of field conditions, and with relative comfort/ease of use.
- The ability to have an intuitive stadiametric sighting device that automatically corrects for trajectory without manual adjustment.
- The ability to switch to night vision when needed.

Design

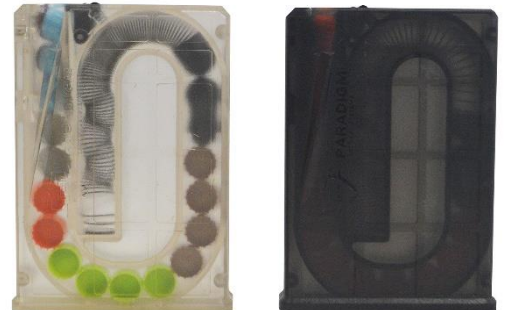
- The pressurized air tank launches high-velocity 0.68 caliber projectiles. The tank capacity allows for more than 100 shots prior to reloading.
- The structure of each weapon is made of aerospace-type aluminum, and the casing is made of synthetic material to ensure a lightweight and robust product.
- Barrels are available for both weapons in lengths of 9", 11", 13", 15", 17", and 23". This length assumes the standard usage of a 3" sound tip; the actual barrel length is 3" shorter than indicated.
- The semi-automatic design allows for firing in bursts of up to five (5) shots per second.
- Each platform features a shoulder strap, attachments for carrying the weapon over the shoulder, and a removable bipod handle for shooting in a stabilized position. The mounting rails are NATO-type.
- The accuracy level can guarantee an on-target grouping of shots within a circle of 10", even at a distance of 100 yards.
- The weapon is preset to obtain an energy output of 20 Joules. The initial velocity of the projectiles at the barrel exit is approximately 350 fps (106 m/s).



Magazines

Paradigm constant-feed magazines hold 18 precision-finned projectiles; however, we recommend loading only 16 projectiles in each magazine, as projectile brands vary slightly in sizing. **Hopper feed** easy to attach.

The standard projectiles used have a low mass (3.4 g) and a skirt fitted with fins, which promotes the gyroscopic effect to obtain the precision and stability necessary for long-range firing. The projectiles can contain powders and other dispersants (PAVA-type or other) which neutralize targets due to PAVA and other chemical irritant effects.



Magazine to Hopper
feed easy to attach...



Air Tanks

Each air tank has a capacity of 0.5 Liters, and the maximum inflation pressure is 200 bar, enabling more than **100** shots per tank. The air tanks are made of aluminum, steel, or carbon.

A pressure gauge lets the user know of the air tank's remaining capacity. An empty air tank can be replaced quickly and without removing the tank by using the quick-coupling device and a scuba tank.



Maintenance

The weapons are designed to be serviced easily, as the main parts can be disassembled without tools. Quick interventions include rapid replacement of the barrel, which is simply locked on the bolt, and disassembly of the bolt, which is fixed on the body by three (3) quick-locking pins.



Safety Design Criteria

The criteria for defining the energy of the projectiles, and therefore their speed, have been established by integrating the following concepts:

- An energy density (ED) value leading to a 50% probability of penetration of the projectile into the skin is 24 J/cm^2 , i.e., a maximum energy for a 0.68 caliber of 54 Joules. The retained value is less than half of this value.
- A threshold value of intense pain of 3.62 J/cm^2 . For a caliber of 0.68 and a value close to 9 Joules, which would prevent the victim from carrying out his activities, whatever they may be.

Optics

The Overwatch and PTX Bullpup offer sophisticated optical elements, allowing precision without the need for manual intervention of adjustment.

The basic sighting element is the patented scope sight with variable zoom of 1 to 6. It includes a stadiametric device to evaluate the shooting distance and an optical means to automatically compensate the deflection of the projectile trajectory according to the distance, without manual action.



Standard Scope



Safe and accurate engagement from short to extreme range, up to 100 yards/m with grouping around 8 inch even in light crosswind



Up to 100 yards even in light crosswind

Public Safety is considerably enhanced as our unique sighting system gives officers almost immediate range compensated point of aim ensuring that projectiles impact within the most effective zone for the type of Less Lethal engagement necessary. The effectiveness of both impact and PAVA projectiles is increased as fewer shots are required to achieve effect and compliance.

Bering Optics Night Probe Mini Scope

For night and low-light deployment an optional “clip-on” scope, the Bering Optics Night Probe, allows sighting and shooting. This module has been qualified and tested with the scope for the best quality, performance, accuracy and price.



About

Night Probe Mini is one of the most compact and lightweight clip-on NV attachments available on the market. The attachment is 5.2" (132mm) long and weighing 15.5 oz (440g). Night Probe Mini mounts directly in-front of the daytime optics using a clip-on mounting system. The advantage of the NV attachment is quick and easy conversion of the daytime optics for night time operation. Night Probe Mini may be used with spotting scopes, video camcorders, photo cameras and binoculars to enhance the night time viewing experience. Night Probe is optimal with 2.0x to 5.0x magnification daytime optics.

Night Probe Mini is offered with high performance Gen 2+ or Gen 3 image intensifier tubes. The tubes are specially selected for optimal performance and resolution. The Night Probe Mini kit comes with a flip-up protective cap, a clip-on adaptor, featuring quick release levers and a set of fitting rings, all packed in soft protective case. Both, Gen 2+ and Gen 3 modification, are offered in a kit, where a clip-on adaptor or a tactical mount is included.

BE26141/BE36141 includes a clip-on adaptor to fit with 24mm-40mm objective lenses

BE26142/BE36142 includes a clip-on adaptor to fit with 30mm-56mm objective lenses

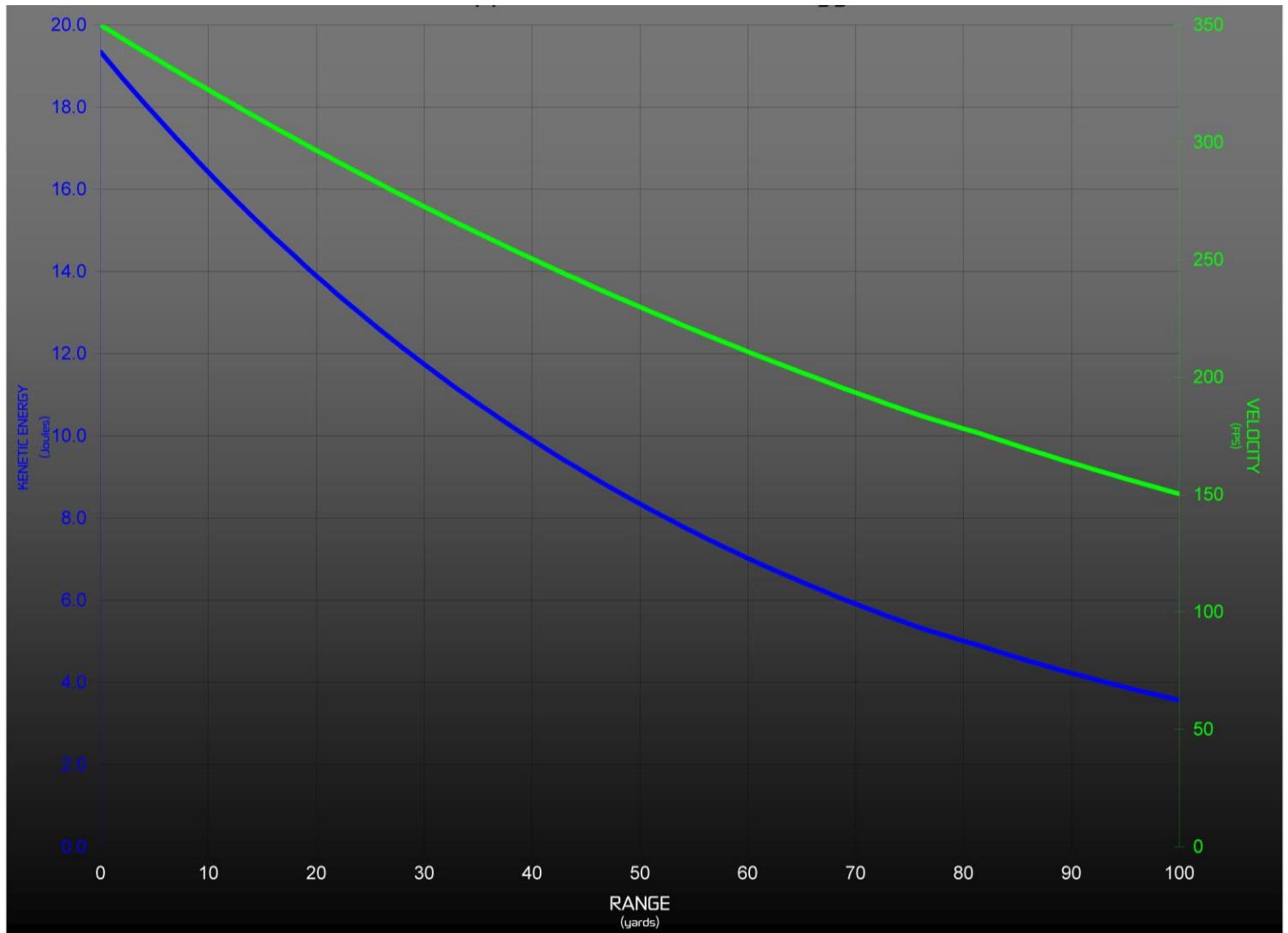
BE26143/BE36143 a kit with a tactical mount to mount onto the tripod in-line with daytime monocular

Specifications

Product Modification	Night Probe Mini Gen 2+	Night Probe Mini Gen 3+	Night Probe Mini B&W Gen 3+
Model	BE26141/BE26142	BE36141/BE36142	BE36142W
Magnification, x	1.0		
Objective lens diameter, mm	30		
Image intensifier tube classification	Gen 2+ 50-72 lp/mm	Unfilmed Gen 3+ 64-72 lp/mm	B&W Unfilmed Gen 3+ 64-72 lp/mm
Field of view, degree	16°		
Focus range, <u>yard</u> /m	8/7 to infinity		
Exit pupil, mm	40		
Optimal daytime scope magnification	2.0x - 5.0x		
Detection range, <u>yard</u> /m	up to <u>275</u> / 250	up to <u>375</u> / 340	
Overall dimensions, <u>in</u> / mm	<u>5.2"x2.44"x3.1"</u> / 132x62x78		
Weight, <u>oz</u> /g	<u>15.5</u> / 440		
Power supply	3V (one CR123)		
Estimated battery life, hour	up to 60		
Operating temperature, ° <u>F</u> /° <u>C</u>	<u>-22 to +122</u> / -30 to +50		
Water intrusion	Meets IPX4 rating		
Humidity, %	up to 98%		

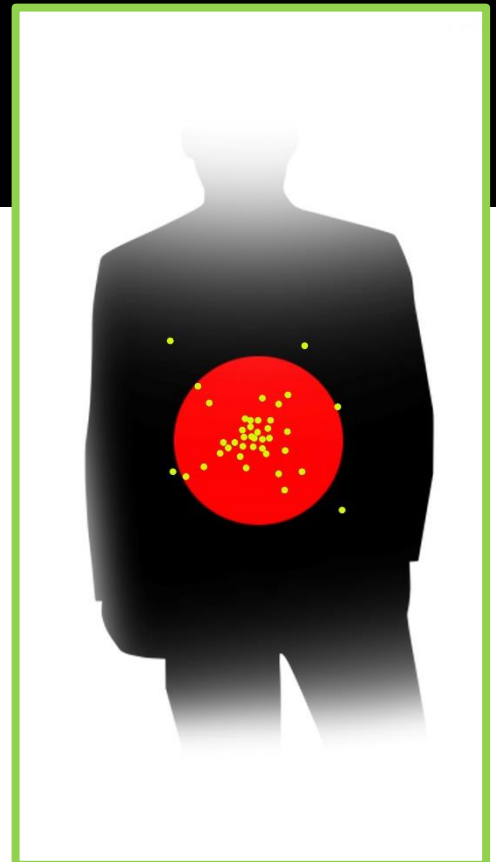
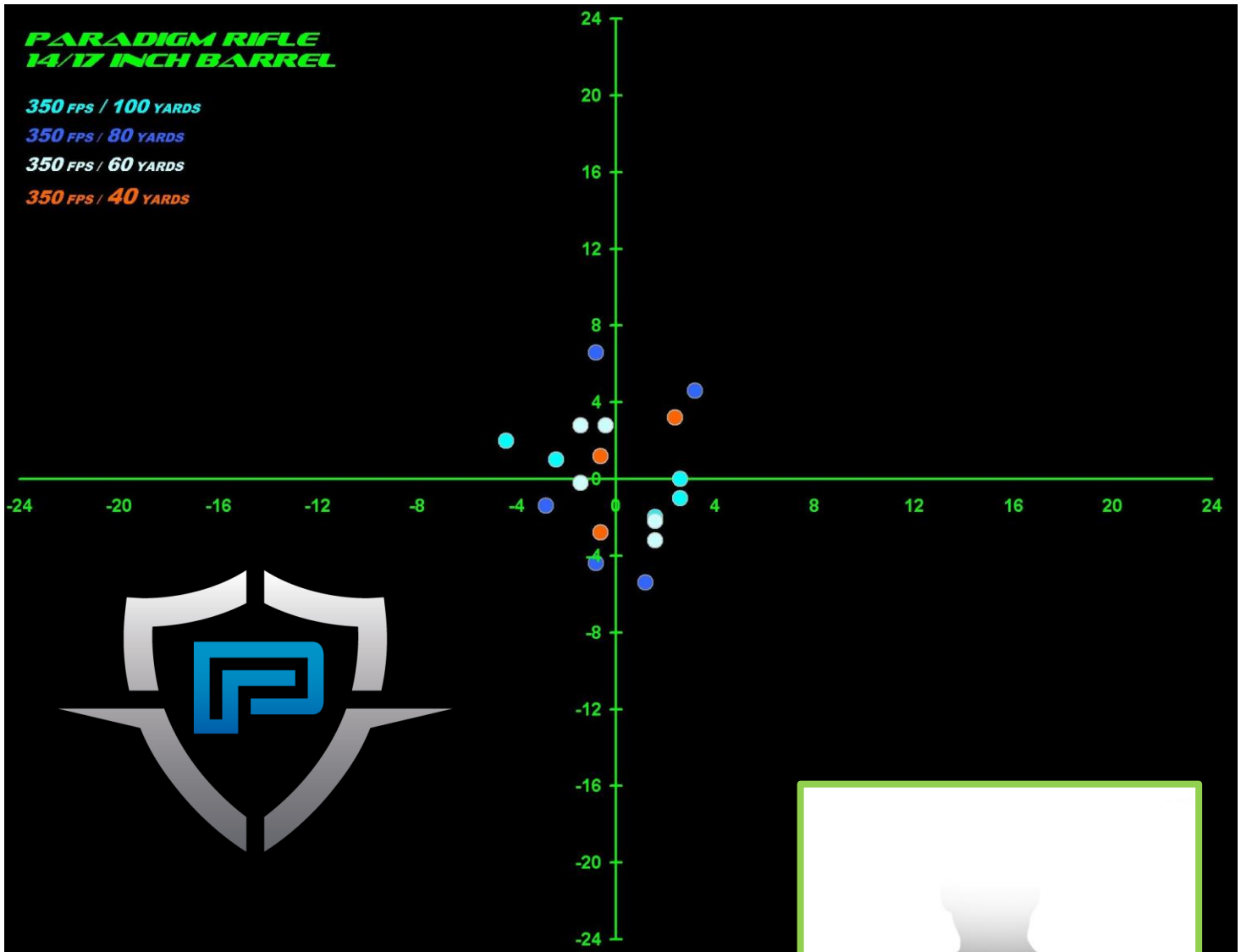
Graph A Energy in Joules and Speeds in FPS as a Function of Distance (yards)

Unit Conversions: 1 fps = 0.304 m/s
1 yard = 0.914 m



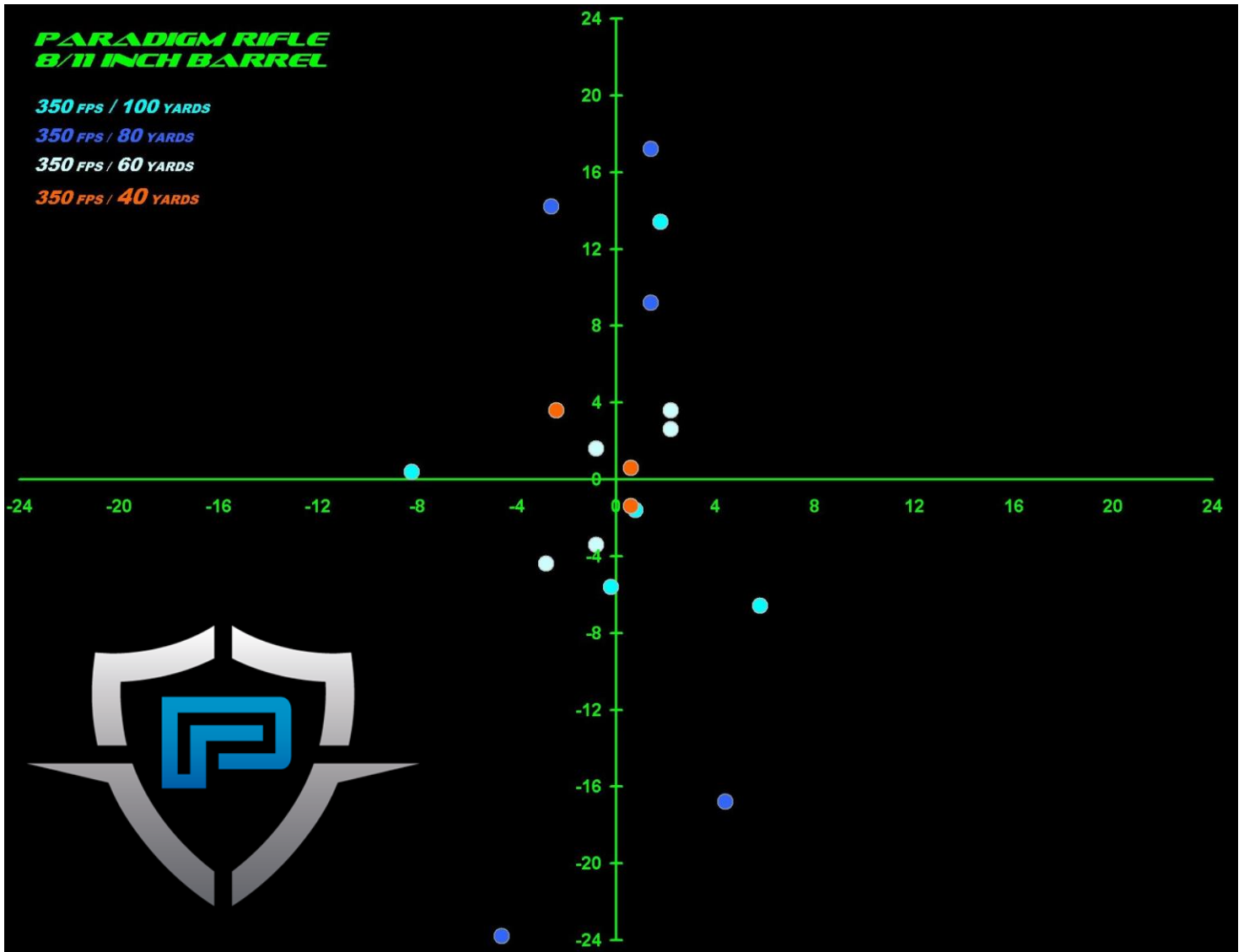
Graph B Shows shots made using 14"/17" barrel (35 cm/43 cm barrel) at 40, 60, 80, and 100 yards.

Unit Conversions: 1 inch = 2.54 cm; 8/12/16/20 inches = 20/30.5/40.5/51 cm
1 yard = 0.914 m; 40/60/80/100 yards = 36/55/73/91 m



Graph C Shows shots made using 8”/11” barrel (20 cm/28 cm) at 40, 60, 80, and 100 yards.

Unit Conversions: 1 inch = 2.54 cm; 8/12/16/20 inches = 20/30.5/40.5/51 cm
 1 yard = 0.914 m; 40/60/80/100 yards = 36/55/73/91 m



Accuracy over long-range engagements

Improved Public Safety

Improved Less Lethal performance



Analyzing numerous crowd and riot videos the closer crowds get to police lines police lose the ability to swiftly react to rapidly changing crowd dynamics. Ideally the distance between crowd-line and police formations must be at least 20 yards/20m as that is beyond thrown object range.

A hostile crowd can advance within seconds if charging at police lines, therefore current Less Lethal paintball style weapons with limited 50m range police only have seconds to engage. Also, to effectively engage an advancing and hostile crowd, cross-arcs and multiple Less Lethal weapons have to be tactically deployed.

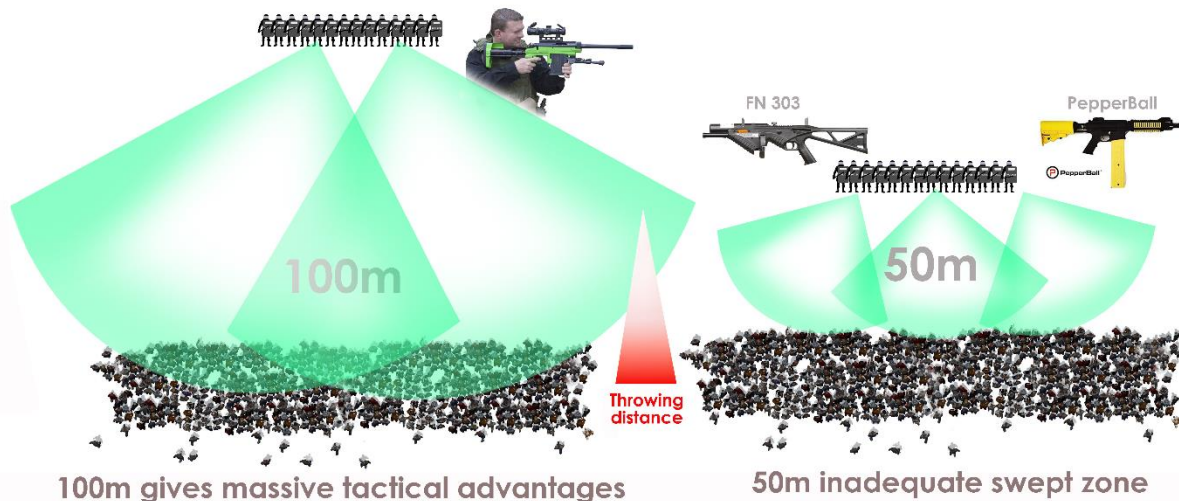
Even at 50 yards/50m current weapons such as FN303 and PepperBall are inaccurate at maximum their range, with ideal accuracy achieved around 30 yards/30m. In stressful situations police Less Lethal shooters cannot guarantee well-placed shots therefore under duress there is increased crowd injury potential combined with less effective use of the many advantages .68 calibre pepper and solids offer.

By increasing the distance between crowd and police to 100 yards/100m and using cross-arcs as shown below, police Less Lethal officers have time and distance to aim carefully at specific subjects to deter and command the inter-space. At 50 yards/50m there simply isn't enough time to make best use of pepper ball and solids.



100 yards is the **ideal** range

Creating maximum distance between officers and crowd enables improved and safer tactical options



Contact us



CIVIL DEFENSE SUPPLY INC

6655 Dobbin Road, Suite 3
Columbia
Maryland 21045
United States of America

CEO - Mr Uriel Binyamin
Email: uri@cds-usainc.com

Office: +1 410.988.2274
Website: <https://cds-usainc.com>



COMPETITIVE COMPARISONS

Less Lethal Weapons for Law Enforcement: A Performance-Based Analysis

See - <https://www.ojp.gov/ncjrs/virtual-library/abstracts/less-lethal-weapons-law-enforcement-performance-based-analysis>

Authors

Charlie Mesloh PhD, Division of Justice Studies, Florida Gulf Coast University
Ross Wolf, EdD, MPA, Department of Criminal Justice and Legal Studies, University of Central Florida
Mark Henych, PhD, Senior Researcher, Weapons and Equipment Research Institute
Frank L. Thompson, MBA, Researcher, Weapons and Equipment Research Institute

FN303 Less Lethal Launcher

The FN303 is built by FNH USA and utilizes fin-stabilized plastic projectiles to deliver paint-marking rounds and OC rounds on target. Since FNH USA also manufactures the M16 family of weapons for the U.S. military, many of the components on the weapon should be familiar to anyone who has handled an M16 or AR15. The pistol grip is identical to the M16, and the iron sights are from the M16A2. I

In addition, the launcher has a picatinny rail for mounting optics, and the upper receiver of the launcher can be mounted beneath the M16 in place of the M203 grenade launcher. Independent tests by Bertomen (2005) found the FN303 to be accurate to over 50 yards, shooting four-inch steel plates; however, the weapon's sights are set at 30 yards. The primary drawback is the launcher's 15-round magazine capacity.



The ammunition for the FN303 is a proprietary fin-stabilized .68 caliber round that has a muzzle velocity of 280 to 300 feet per second. The weapon should not be used at distances closer than three feet; at distances up to 12 feet an operator should only target the thighs as strikes to the center mass may cause serious injury or death (FN Herstal, 2002). Beyond 12 feet, the torso is the POA.

The manufacturer's literature states that the air reservoir will allow 110 firings before the air tank must be refilled; however, FN303 representatives place the number of shots at approximately 79 before a refill is necessary.

FN303 Testing

A research design was created to measure the accuracy of the FN303 less lethal launcher. Ten projectiles were fired at each distance, which were in ten-yard increments (n = 60). Accuracy was measured as the difference between POA and POI. At distances of 30 yards and closer, the difference between POA and POI is less than four inches, indicating that there is very little drop, and the weapon can be consistently and accurately fired on target. Beyond 30 yards, a substantial deteriorating effect is noted. However, while the projectiles were falling below the POA, they remained in a relatively tight pattern.

A linear regression was conducted to measure the strength of the relationship between distance from the target and the drop of the projectile from the POA. As shown below, an almost perfect relationship exists. However, when the data was plotted, it became clear that at distances closer than 30 yards there was a very small amount of drop, which impacted the perceived strength of the model (r = 0.909).

While the correlation between distance and spread from POA is 0.901 for the entire dataset, there is obviously more activity beyond 30 yards. Consequently, a second regression model was used to examine these greater distances, excluding distances closer than 30 yards. The strength of the model increases as shown in the r = 0.96. Past 30 yards, an actual relationship between distance and projectile drop emerges compared to the extreme flat shooting at distances under 30 yards (Mesloh & Thompson, 2006a).

Table 3. FN303
Mean Scores by Distance

Distance to Target	Mean	N	SD
10 yards	1.9500	10	1.03950
20 yards	3.0250	10	1.03950
30 yards	3.9500	10	2.72285
40 yards	16.7000	10	3.35162
50 yards	27.5250	10	3.56380
60 yards	46.0750	10	7.20922

The overall goal of this project was to create a predictive model that would allow an FN303 user to determine where the projectile would strike given a known distance. The unstandardized coefficient of the regression model indicates that at distances of 40 yards and greater, the drop of the projectile will be 13.72 inches for every ten yards of distance beyond 40 yards. Testers were able to effectively correct their fire based on observations of projectile impact and were capable of achieving tight groupings at distances well over 60 yards during additional test sessions.



PepperBall

The PepperBall family of launchers is designed around Tippmann paintball markers and operates in the same fashion. The stated muzzle velocity for the **PepperBall TAC-SA** launcher is 300 to 380 feet per second, and the projectiles have 8- to 12-foot pounds of kinetic energy. The standard air system for the PepperBall utilizes a 13 cubic inch bottle, and when charged to 3,000 psi, it can launch 130 projectiles. A larger 47 cubic-inch bottle exists that can launch 450 projectiles. A 68 cubic-inch bottle exists and is capable of launching 850 projectiles. The hopper on the PepperBall launcher can hold 180 projectiles.

PepperBall TAC SA



According to the PepperBall system instructor-training manual, “PepperBall operators must understand that **thirty feet is the farthest distance to target individual suspects**. The lightness of the projectiles makes the ballistic accuracy fall off dramatically past thirty feet” (Bedard & Cole, 2003, p.24); however, the manufacturer claims that it is safe to engage a target at point blank range with the PepperBall system.

The PepperBall launchers fire a .68 projectile modeled off of a traditional paintball round; the primary payloads are PAVA, glass shattering rounds, paint marking rounds, inert training rounds, and an anti-freeze round for use in colder climates. PAVA is the abbreviation for pelargonyl vanillylamide, and is a synthetic form of OC.

The PepperBall manual (Bedard & Cole, 2003) states that subject compliance is brought on by a combination of the three factors of shock (associated with being struck with an object), pain (resulting from impact), and the chemical irritant in the payload. The PepperBall launcher’s best attribute is in the incapacitation effect of their PAVA (a synthetic OC) rounds. Mesloh and Thompson (2006b) found the effects of PAVA to be “immediate and incapacitating” and that they created a burning sensation to any exposed skin surface.

PepperBall TAC-SA Testing

A research design was created to test the accuracy of the PepperBall launcher. Utilizing the same methodology used in the 12-gauge beanbag and the FN303 studies, 15 projectiles were fired from each position (n = 90). Beginning at five feet and increasing in 5-foot increments, the study continued to 30 feet, which was the maximum recommended distance for a direct fire target.

Up to 20 feet, deviation from POA to POI is approximately five inches or less.

The relationship between dispersion (difference in POA to POI) is moderately correlated. A linear regression indicates that dispersion increases 1.5 inches for every five feet of distance. **However, at greater distances, the projectiles seem much less accurate and tend to “float” with little discernible pattern,** unlike the traditional “drop” seen in other weapons’ projectiles.

As the dispersion results indicate that the projectiles travel in no consistent, discernible pattern, a second test was conducted to determine the spread of the projectiles—that is, the distance between the two

projectiles furthest away from each other in each string. First, the projectile spreads for each shooter were plotted in a table correlated to the shooter's distance from the target. As shown in Table 3, at the furthest distance of 30 feet, the average spread was less than 15 inches. The relationship between PepperBall projectile spread and distance is highly correlated ($r = 0.94$). A simple linear regression indicates that projectile spread increases an average of 2.68 inches for every five feet of distance between target and shooter ($t = 11.07$, $df = 17$).

Table 4.
PepperBall TAC-SA Distance

Dispersion Table	Distance Mean	N
5 feet	0.8833	15
10 feet	2.2833	15
15 feet	4.3333	15
20 feet	5.0833	15
25 feet	6.2833	15
30 feet	9.0500	15
	Total 4.6528	90

While the PepperBall system is capable of producing a high rate of fire and delivering an extremely effective chemical agent payload, its accuracy and reliability hinder the effectiveness of the weapon. Unlike other compressed air weapons where the projectiles travel in a predictable pattern and POA can be corrected to achieve proper aim, this does not seem possible with the PepperBall S200 launcher.

While 21 feet is considered a critical distance to law enforcement, and the PepperBall can strike a target at that range, it is frequently necessary to engage targets at much longer distances.

At any distance beyond ten yards, the PepperBall launcher is unable to accurately strike a point target and can only be used for area saturation with PAVA. Therefore, successful PepperBall deployments will most likely occur within enclosed areas or in tandem with an additional less lethal launcher capable of long-range engagements.

The new PepperBall VKS

Range and accuracy of the new PepperBall VKS is presently unknown as no formal testing has published results however expert assessments have indicated the VKS is a slight improvement on the original Tippmann-based weapon and as the projectiles are identical it is believed similar limited distance characteristic exist with the new PepperBall VKS.



PepperBall VKS

COMPARISONS

	PARADIGM PTR	FN HERSTAL FN 303	PepperBall VKS
Calibre	0.68	0.68	0.68

Projectile Options

Capable to fire, Maximum Velocity & Maximum Energy (Joules)

Round Capsaicin (3.4g)	Yes 350 fps/107 m/s 19.4 Joules	Yes 350 fps/107 m/s 19.4 Joules	Yes 350 fps 19.4 Joules
FN 303 (8.4g)	Yes 225 fps/69 m/s 19.4 Joules	Yes 280 fps/85 m/s 30.6 Joules	Yes 225 fps/69 m/s 19.4 Joules
PepperBall VXR (3.4g)	Yes 350 fps/107 m/s 19.4 Joules	Yes 350 fps/107 m/s 19.4 Joules	Yes 350 fps/107 m/s 19.4 Joules
Paradigm Ballistic Chemical Munition BCM (3.5g)	Yes 350 fps/107 m/s 19.4 Joules	No	No
Paradigm Ballistic Kinetic Energy Munition BKM (3.4g)	Yes 350 fps/107 m/s 19.4 Joules	No	No

Operating System

Power Supply	Compressed Nitrogen	Compressed Nitrogen	Compressed Nitrogen
Tank Pressure	3000 or 4500 psi	3000 psi	3000 psi
Internally Regulated	Yes	Yes	Yes
Bolt Closing Force	15 lbs	118 lbs	79 lbs
Mechanical Operating System	Proprietary Paradigm anti-chop Spool Valve	Open Bolt Blow Forward Dump Valve	Open Bolt Blow Forward Dump Valve
Shot to Shot fps Variation	Plus – Minus 3 fps	Plus – Minus 10 fps	Plus – Minus 10 fps
Main Advantage	Low Impact on Projectiles which reduces chances of breaks in the breach leading to fail to fire and PAVA contaminating officers	None	None
Secondary Advantage	Consistent Velocity	None	None
Magazine Feed	Yes	Yes	Yes
Hopper Feed	Yes	No	Yes

Barrel System

Barrel System	Proprietary USA Patented rifling system designed exclusively for optimized delivery of Paradigm Plastic Projectiles	Smooth bore barrel As used in civilian paintball market since 1980's	Rifled Barrel Limited capacity to properly induce required Ballistic RPM to induce longer range stability.
RPM Induced @ 350 fps	14,000	0	Varies from shot-to-shot 2500 to 5200 maximum.

Optics Package

Optics	Paradigm designed, Ballistic Drop Compensated Range Estimating First Focal Plane 1-6 x Optic Intellectual Property Rights reserved	Simple flip-up iron sights	Simple flip-up iron sights
--------	--	----------------------------	----------------------------

Fewer Less Lethal trained officers are needed to cover far larger areas at 100 yard/100m range crossed-arcs

