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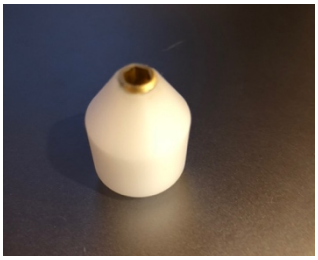
# Close Quarters Systems

## History of Invention

In March of 2011 I responded to the report of one of my officers having been shot by a sniper. Police riflemen were directing suppressive fire toward a concrete wall directly below the sniper's window. They did not know where the sniper was positioned within the structure. After the scene settled, I surveyed the evidence of the gun battle. I could see the divots in the concreate near the window of the sniper's hide. The officers did not fire into the wooden structure because they feared that their bullets would pass through the duplex into the neighboring living quarters. They needed a bullet that could kill the sniper if they got a shot, but during covering fire would cause the interior of the structure to crash in on the sniper without passing through and hitting an unintended target.

## Summary of Capability

A projectile that will instantly incapacitate a person in body armor while significantly reducing the risk of passing through residential walls. A projectile that can be adapted in the field by adding an Interchangeable Component™, modifying the projectile to mission requirements.



The interchangeable component can be selected from a range of materials from soft light aluminum to carbon steel. The Modular Adaptable Projectile™ (MAP) is designed to enable the adaptation of the projectile to a range of mission profiles:

- Covering fire (no interchangeable component IC)
- High penetration lethality (Brass IC)
- Breaching (TBD)
- Mass violence urban scenarios (no IC)
- IED Disruptor (Both with and without IC)
- Assault on structures

Seen in these pictures high velocity pressure wave carries debris, but the actual projectile does not pass through the cardboard box. This simulated exterior wall shows what a room might look like during covering fire or assault.

## Picture 1

## Picture 2

**Picture 1** is an example of a purpose-built system for breaching, lethal applications, and covering fire shotgun: Rifled 22” barrel zeroed at 25 yards, enables aimed fire from behind armor or other cover. An 18 inch barrel on a pump or semiauto would be effective for breaching, assault, lethal, and covering fire. We build these in semi-automatic and pump action.

**Picture 2** is a 12-gauge bolt gun with heavy barrel and chamber. Enables superior accuracy with a fully rifled 22-inch barrel. Our goal is to enable breaching and IED disruption from an armored vehicle or other cover. Inside 25 yards for best results.

We are developing a program to introduce and AR format 12 gauge with a rifled barrel. Ten round magazine and extremely durable accepting ammunition that might damage a platform of lesser quality.

## Level IIIA Body Armor Test

Fired one 3957 FPS, 110 grain, .73 caliber projectile at type 3A armor protecting a human spine analog. The Kevlar® was attached to a one-gallon jug of ballistic gel. The bottle of gel contained a poplar dowel approximately 1 inch in diameter and 12 inches long. According to materials catalog it takes 10,000 PSI to rupture the 1x12 dowel. The following things happened:


The projectile struck the Kevlar® causing an entry hole approximately ¾ of an inch in diameter. The Kevlar® threads are frayed but not melted or ultrasonically fused.

The projectile produced an exit hole in the Kevlar 1.5 inches in diameter while melting the Kevlar®. Kevlar® melts at 900 degrees farenheight. It is undetermined at this time if the Kevlar® fibers melted or were ultrasonically fused. Either phenomenon is unusual, but the fibers appear to be charred.

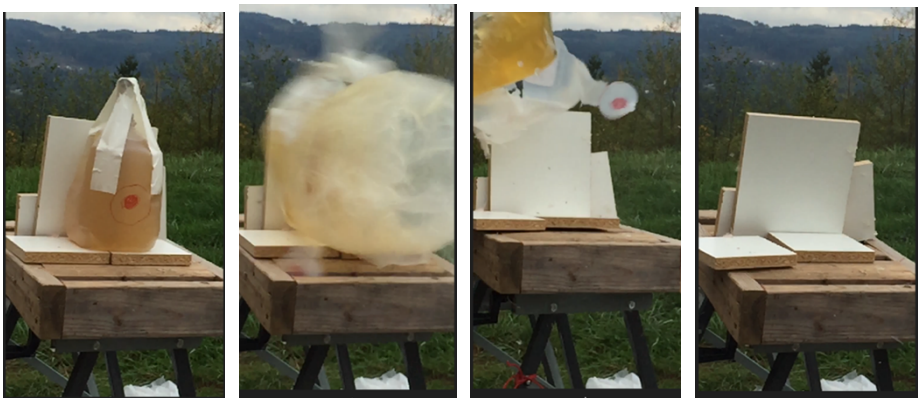
Note the crescent shaped flash of light on the upper right quadrant of the Kevlar® panel.

There is a spherical pattern formed within the gel as the pressure wave propagates outward from the point of impact

Dowel

A pressure wave of at least 10,000 PSI reached the bone analog inside several inches of 20% gelatin human analog causing the dowel to rupture. The poplar dowel is commonly used as a human analog for a large bones. Close examination confirmed that the projectile did not strike the dowel. The rupture was caused by a pressure wave passing through the ballistic gel. In the picture of the spherical pressure wave inside the gel the dowl can be seen (red arrow) bending around the pressure wave.

A single .73 caliber, 3000 FPS projectile into 20% ballistic gel, human tissue analog. Demonstrating effectiveness for mass violence munition and non-reflexive impacts. The pressure wave destroys the target but does not penetrate the backstop. We have used this technology to shoot a cow head and in hunting small game. We learned that the projectile passes through the skull easily releasing the energy upon hitting tissue.



A single 3000+ FPS .73 caliber projectile into 20% ballistic gel. The camera captured the sonic boom of the wide profile projectile a microsecond before impact. Theoretically the sonic boom will affect a target like an IED, notice that a moment before the slug impacts the gel, the sonic boom is already displacing material. Then you can see the pressure build up causing the pressure wave to exit the cavity causing tail splash to return along the path of the bullet. Pieces of the tail splash were located 55 feet in front of the gel target.

Stationary

Sonic Boom

Sonic Boom Impact

Tail Splash 30 feet

Cavity

Note the cavity and stretching of the material. We believe this will create predictable remote wounding and reliable non-reflexive impact of a targeted subject. Studies have proven that remote wounding is detectible in the brain with 1027 psi. The slug in this test was calculated at nearly 8 times the minimum required pressure.

We used what we have learned to create a close quarters (40 feet or less) buck shot. With high-speed video our staff physicist was able to confirm that upon impact the target material with a density of 1 SG displaces at 2900 FPS upon impact at 15 feet. Intended for indoor close quarters combat where over penetration is a concern. We have video shot at 40,000 Frames Per Second that documents velocity of displacement and flashes of light. Our staff physicist and some of his collogues were split on the cause. After researching causes we believe the most likely explanation is atomic excitation.

Using our wide profile design, we created a 73 caliber, 230 grain, 2399 fps metallic slug. This was created for an allied business with a strong AR platform. We tested the slug on a hunt in eastern Oregon. It was used to take down a cow elk at approximately 100 yards from a 22-inch rifled barrel. This slug also appears stable out of a smooth bore. It is intended for missions where penetration and hard hitting is desired. It is more traditional but combines velocity, mass, and rapid propagation of energy. Although ballistic models show this round effective to 200 yards, we have not tried using it beyond 100 yards.

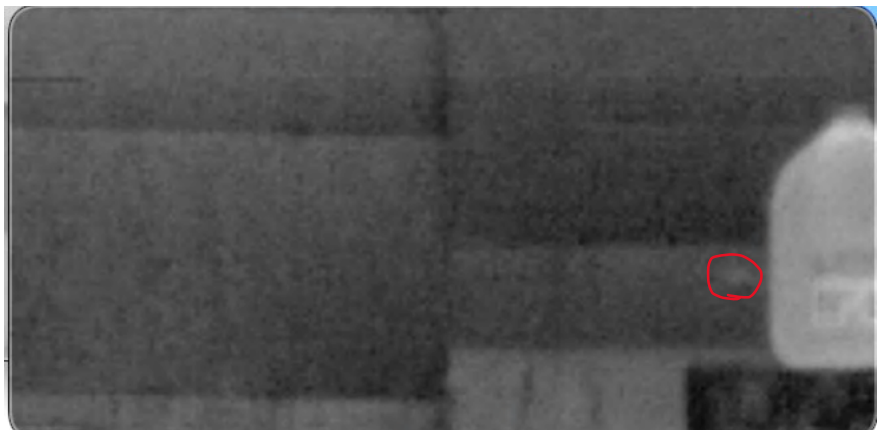
A farmer took this chicken stealing raccoon out of a tree at about 30 yards and 30 feet up. The animal died instantly, and the slug did not exit the body we recovered 90% of 110 grain slug. It is hard to tell but this was a shot into the crown of the animal's skull. The hydraulic pressure was so intense the animals tongue split down both sides. We have improved on the tech that took this animal. The slug used was a 3000 FPS 110 CPM with a 1/8 hollow point from an 18-inch rifled barrel. It is the same slug used to defeat the level 3A ballistic panel shown in this document.

These rounds are particularly good for use in congested areas like where this animal was taken. The risks of shooting up at an elevated target is mitigated by the fact the projectile will not exit a water-based target and the wide profile projectile sheds its energy faster than other projectiles so there is less risk of an errant shot flying for a half mile and blowing through a house.

Energy Pulse

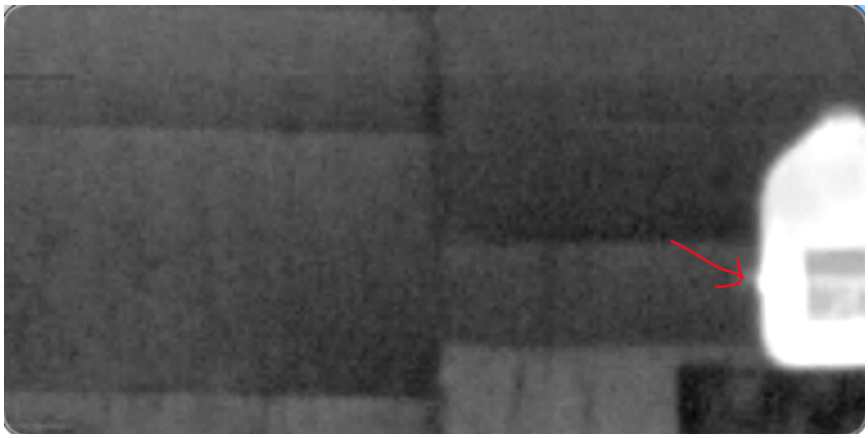
Using high speed video, we documented an energy burst within the water upon impact. When reviewed by physicists one possible explanation offered is atomic excitation. Atomic excitation is when electrons in a molecule receive enough energy to transition from their ground state to a higher state. When an electron moves from one state to another, it puts off a photon. To be visible there needs to be a lot of photons being put off by electrons. According to this evaluation of our test, if this is atomic excitation, it would require a lot of energy to cause what we witnessed and recorded. We resist making conclusive claims, but this supports what we have learned in other tests, there is a huge amount of energy made more powerful by the efficiency of the energy propagation. A similar test was done using liver and the results support what we theorize through a mechanical process of energy against a witness material.

Picture 1



Picture 1 the one-gallon jug of water is at rest prior to the impact of the slug (circled in red). This slug is traveling in excess of 3000 FPS. We use water for these tests because it enables us to accurately determine the velocity of energy propagation.

Picture 2



Picture 2 the gallon jug of water looks like a light bulb as the massive energy pulse passes into the water. Note the light on the face of the jug (red arrow) that is the slug impact. This is believed to be an atomic excitation, causing electrons to put off photons.

Additionally, using the water allows us to view the development and shape of the pressure wave. In the case of this munition the pressure wave presents as spherical. This is similar to how an explosive presents in water. It comes down to the speed of the energy propagation. Viewing the spherical pressure wave develop on high-speed video further supports what we learned from our liver test and our test wherein we believe Atomic Excitation produced visible light. This all means there is a lot of energy. The red arrows point to the outer edge of the spherical wave as it develops. Also, water can be calibrated for breaching as demonstrated in this document.

Note: Source videos are available for review

**Multi mediums for multiple mission profiles:**

Sugar water can be adjusted to emulate numerous fluid models enabling adaptation for various mission profiles including breaching, IED disruption, and energized circuit disruption.

Water is 1.0 SG

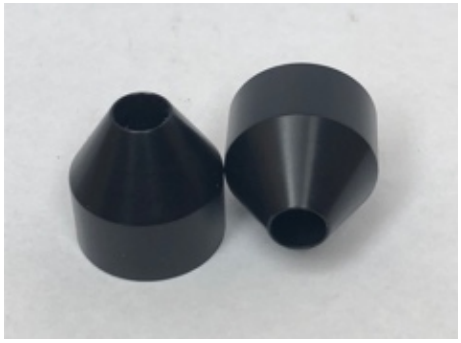
- Sugar Water SG:
  - 1 pound of sugar in water SG is 1.046
  - 2 pounds of sugar in water SG is 1.09
  - 3 pounds of sugar in water SG is 1.10

Blood is 1.05 at moderate temps but ranges 1.04 to 1.06 (outside body)
Liver is 1.05 +/- .009
Honeydew 1.0 to 1.02
Watermelon is .876

- SG of Common door and wall materials:
  - Oak .71
  - Maple and ash .63 to .66
  - Aluminum 2.57
  - Plywood .57 to .7
  - Dry wall, stucco, and plaster 2.5 to 2.7

We used a fresh cow liver, it provides characteristics particularly useful in our technology. The energy from the slug turned the bag of liver into a shape charge. The combination of our 3000-fps slug and the blood in the liver blew a hole in the plywood the size of the liver. The wood witness material seems to have a whole created by a spherical pressure wave. Other documented tests support this observation.

We tried this technique on a make-shift plank door using a melon and it ripped the door off the hinges and split the wood. We constructed it out of a ¾ inch laminated pressed shelving material and wood planks glued to the pressed board to increase strength. It was attached to a 2x4 wood frame with hinges and latches.



Updated projectile profiles. Both can be used for breaching, assaults, covering fire, and mass violence munitions. Theoretically the flat nose would be best for breaching.

These projectiles are used in our latest munition. The flat nose projectile is 72 grains and the projectile with the conical nose is 78 grains.

In our Archangel project we have 4 configurations with velocities ranging from 3936 FPS to 4138 FPS. The variations are created for optimal performance in different temperatures.

- $0^{o}$ to $50^{o\ F}$
- $40^{o}$ to $70^{o\ F}$
- $60^{o}$ to $90^{o\ F}$
- $80^{o}$ to $110^{o\ F}$