

CHEYTAC[®]
INTERVENTION[™]
CHEYTAC LONG RANGE RIFLE SYSTEM
INTERVENTION[™] TACTICAL SYSTEM



INFORMATION PAPERS
CHEYTAC[®] INTERVENTION[™] System

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CheyTac® Long Range Rifle System

The basis of the CHEYTAC® Long Range Rifle System is the CheyTac® INTERVENTION™ rifle and the CheyTac® Cartridge, a proprietary cartridge developed by the company. In testing, the system has proven to be capable of soft target interdiction to ranges of 2500 yards. While conceived as simply a rifle – the CheyTac® INTERVENTION™ has developed into a total system package. CheyTac® system consists of the following sub-components:

1. CheyTac® INTERVENTION™: The Rifle

The CheyTac® INTERVENTION™ is a 7 shot repeating, takedown rifle system. The barrel is removable and replaceable by the operator. In fact, the entire rifle is maintainable at the operator level – including complete tear down. Spare barrels can be maintained at the unit level and replacement can be made in the field, allowing for special barrel design and shorter barrels. *The takedown capabilities provides the only safe rifle which supports all methods of infiltration; including military free-fall, static line, small boat, dive lockout as well as all other forms of infiltration.*

2. .408 CheyTac® Cartridge: The Ammunition



50 BMG 408 C 338L

The CheyTac® Cartridge was developed to fill the gap between the 338 Lapua and the .50 BMG, yet the downrange characteristics outperform the best .50 BMG projectiles. The projectiles are manufactured by Lost River Ballistic Technologies™ and are designed using PRODAS software. The projectiles are CNC, lathe turned, projectiles of a copper/nickel alloy. *The 419grain projectile has a supersonic range of 2200 yards+ at standard air conditions.* A second projectile is available - the 305grain projectile is designed for a high velocity near range application. **The average ballistic co-efficient of the 419 projectile is .945 over 3500 meters.**





3. CheyTac® Advanced Ballistic Computer: The Computer

Early in testing, it became apparent that the CheyTac® INTERVENTION™ is capable of field accuracy levels far beyond currently accepted levels. The INTERVENTION™ has delivered SUB Minute of Angle groups at ranges up to 2500 yards. As a result, a tactical computer was developed to integrate radar

data¹ with a handheld computer. The computer calculates and provides the operator with elevation and windage settings. The current platform is a Casio IT-70 using input from a Kestrel 4000 and a Vector Laser Rangefinder; other options include the Mil Spec, Talla-Tech R-PDA as a primary platform for the ABC.

The following variables are programmed into the computer:

- Slant angle from rifle to the target.
- Correction for air temperature.
- Correction for air pressure.
- Correction for ammunition temperature, powder burn rate, and muzzle velocity.
- Correction for rifle barrel twist rate.
- Correction for the spin of the earth (Coriolis). Operator inputs the latitude on the globe and direction of fire from true north.
- The operator can input corrections based on his differences from the computer fire solution to the solution that strikes the target²
- The operator can also input variables to compensate for gunlock times and operator reaction times for engaging moving targets.
- **The computer is also programmed with all current US Sniping Cartridges from 5.56mm to .50 Caliber along with numerous other long**



¹ Testing at Yuma Proving Grounds, Yuma Arizona, 2001 & 2002. Downrange data was collected using the Weibler Radar. POC: Director Brian Grimes, YPG, Arizona.

² This is usually caused when one shooter holds the rifle different from another shooter. At times, different holds induce a “gun jump” that can add elevation and / or windage to a suggested sight setting. This input allows different members of a sniper team to use the same computer.

range rounds. This makes it usable for sniper teams at all organizations and weapons systems.

The tactical computer provides the following solutions:

- Elevation and windage settings in MOA and MIL adjustments.
- Elevation and windage settings in ¼ MOA clicks.
- MIL leads for use with moving targets.
- Windage solutions. The winds are input for 3 positions on the range, at the rifle, at maximum ordinate and at the target. Values are automatically input to weigh each of the three settings.
- Moving target solutions are input for speed in MPH and direction from any position on the clock.
- Danger space solutions based on the operator-input size of the critical kill zone (30 inches on a personnel target for example). The danger space dimension is a figure that tells the shooter the degree of accuracy required for the range determination.
- Maximum ordinate figures.
- Downrange velocities. This is used to determine if the target is within the supersonic range of the projectile.

4. CheyTac® Day and Night Optical Sight Systems: The Sights

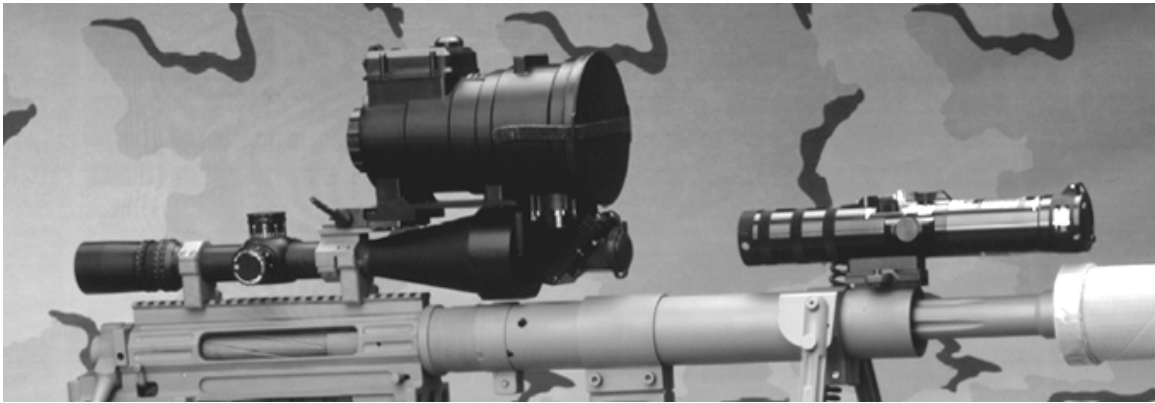
There are two different day optical sights available. The primary sight is the Nightforce NXS 5.5 – 22X variable with a 56mm Objective. The night vision system of choice is the SIM RAD from Spa SimRad USA. The customer may specify mounting systems for a variety of additional night vision equipment.



Nightforce NXS 5.5 – 22X. In extensive testing, the NXS has excellent repeatability characteristics while changing power settings and while indexing elevation settings on the entire elevation travel on the system.

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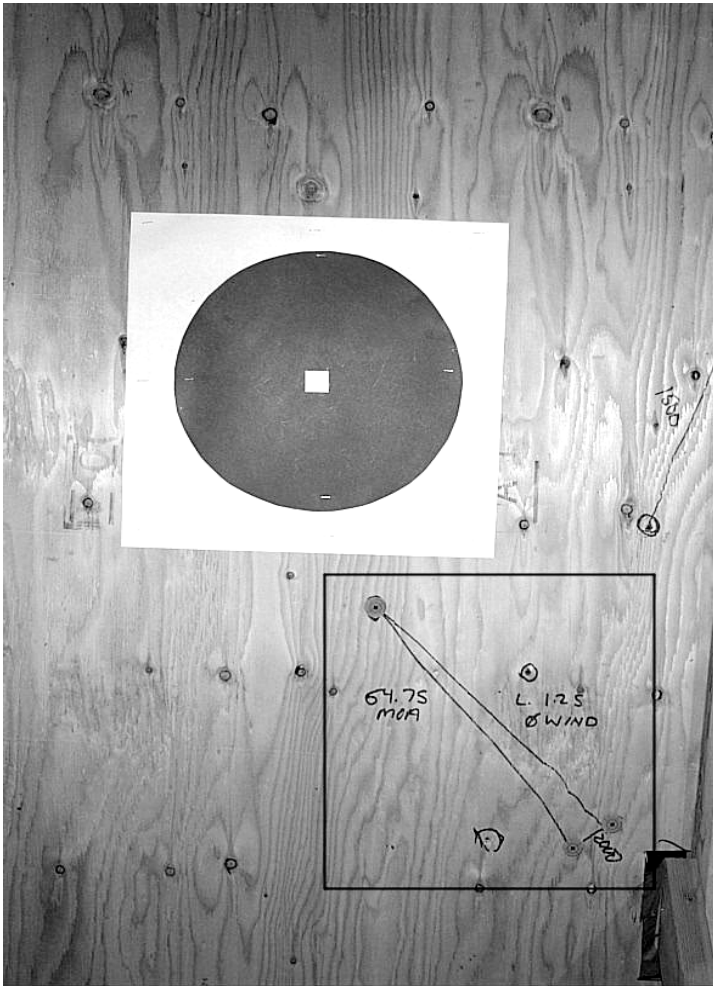
5. CheyTac® LRRS: The Support Devices



- **IR Laser from B.E. Myers** is used for system support with the night vision sight under conditions where there is insufficient ambient light or the IR Laser is needed for further target illumination. The device is attached to an M-1913 rail system offset on the barrel shroud/bipod support. (currently 1 watt)
- **KESTREL 4000** sensor package is used to measure the wind, air temperature, and air pressure. It also collects relative humidity, wind chill, and dew point. All of these points of data will be fed directly into the IT-70 tactical computer so that no manual input is necessary.
- **Leica Vector IV** Laser Rangefinder; provides the optimum long-range data on the target. Additional features allow computation of speed and direction of target as well.
- **SUUNTO X6** Wrist computer provides environmental data as well as altitude, barometer, temperature and slant angle inputs for the ABC.

The CheyTac® LRRS as a Soft Target Interdiction System

The CheyTac® LRRS is a solid anti-personnel system to 2000 yards. The primary intent of the .408 is as an extreme range anti-personnel system. Groups of 7” - 9” at 1000 yards, 10” at 1500 yards and 15” at 2000 yards have been consistently obtained. Groups of 19” at 2100 yards and 29 “ at 2400 yards have also been obtained. All groups that are up to 3000 yards are less than 1 minute of angle for vertical dispersion.



The extreme range capability of the .408 allows the shooter to standoff at a distance that is unparalleled by any other system, including the .50 SASR. In testing at the Idaho test range, an observer at the target could not see the sniper (with no additional camouflage) in the open on the desert floor when shooting at 2000 yards. With the suppressor in place, the sniper (with no additional camouflage such as a ghillie suit) could not be seen under direct observation with binoculars.

2000 yd. Group Size 15". Black aiming point is 12" Dia.

Testing of the Night Vision System has indicated that targets can be observed at

ranges to 1500 yards (at 5300' ASL, bright stars, no moon).

The CNC turned projectiles are made from a hard copper/nickel alloy that has very good penetration properties. It can penetrate Level IIIA armor at 2000 yards or more. The projectile can also penetrate a cinder block wall at 500 yards and greater. It will penetrate 1" cold rolled steel at 200 yds, and .5" cold rolled at 850 yds.

The INTERVENTION™ repeats its different zeros extremely well. The system has been repeatedly disassembled and reassembled with no change in zero. This includes removal of the barrel and reinstallation, removing and reinstalling the optics, and removing and reinstalling the suppressor. For parachute infiltrations, the receiver group fits easily into a military rucksack and the barrel can be attached to the main left

web in a 1950 weapons case, or exposed with little difficulty or safety issues. The barrel is essentially a pipe and is also the longest piece of hardware when the rifle is taken down.

As an anti-personnel system, the .408 is only limited by any flight time that transits on the flight of the projectile to the target. The nature of the target at that point becomes the limiting factor on the systems maximum effective range. Yuma Proving Grounds test results prove that engagements can be made at sub-sonic ranges due to the high stability of the projectile through transition into sub-sonic flight.



1032 Yd. Composite Group of Shots. Suppressor repeatability test. The suppressor was taken off at 2034 yards and reinstalled. The rifle was moved to 1032 yds for a group of shots. The shots in the photo are a total of 9 rounds from 1032 yds. At three different times of the day and after removing and reinstalling the suppressor.

Finally, the rifle is very comfortable to shoot. In a demonstration in Canada, over 65 snipers shot the prototype rifle. There were no complaints about recoil management or fatigue. The muzzle brake is highly efficient and there is little overpressure felt by the shooter or observer.

The CheyTac® LRRS as an Anti-Material Rifle³

The high remaining kinetic energy characteristics of the 419grain projectile make it a very effective anti-material rifle. The .50 BMG has a higher initial muzzle energy of 11,200 ft. lbs. vs. the 408s energy of 7,700 lbs. At 700 yards however, the remaining energy of the 408 is higher than that of the .50 caliber rifle. Ranges past 700 yards are the realistic engagement-range for anti-material rifles.

The .408s 419grain projectile will defeat any material that the .50 BMG can defeat except those targets that require an explosive projectile. While the round of choice is the Raufoss for anti-material operations, there is a strong argument for use of solid projectiles for many of the material targets. Material targets such as surface to surface missiles can be easily engaged and defeated by the use of solid projectiles.

³ See document “50 BMG M33 Ball vs. 408 CheyTac®”.

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Sniper teams that engage targets that have a secondary explosive capability (fuel systems, etc.). Using solid projectiles give the team the opportunity to depart the objective area without being compromised by secondary explosions (document author study of hard targets while stationed at the 1st Special Forces Group SOTIC detachment, 1996).

Summary

The CheyTac® Long Range Rifle System provides an outstanding value proposition. Loaded cartridges are priced at the 338 Lapua level. Additionally, loaded cartridges are much lighter than the .50 BMG cartridges. Four 50 BMG cartridges weigh 1 lb. while 7 .408 cartridges weigh 1 lb. The operator level maintenance of the entire system, including barrel replacement, provides logistical efficiency. Barrel replacement is as simple as calling CheyTac® Associates, LLC and ordering replacement .408 barrels.

For the invested dollar, the CheyTac® LRRS provides a state of the art, well-supported and easily maintained sniper weapon system.



The Ultimate in Very Long Distance Military Shooting The .408 CheyTac® Cartridge and Firing Platforms

A White Paper

Abstract:

This paper proposes a system where US snipers can engage targets at very long distances – distances so long, that enemy return fire cannot reach them.

The Problem:

A major battlefield strategy is “engage the enemy at distances greater than which the enemy can engage you.” US snipers use the 7.62mm NATO cartridge – a .30-caliber cartridge available in numerous sniper rifles manufactured around the world.

The US military has moved to a .50-caliber sniper rifle system. The .50-caliber projectile (projectile) goes farther and delivers more kinetic energy (knock down power) than the .30-caliber projectile. The .50 BMG cartridge was designed in 1918 as an anti-tank round – minor changes have been made since that date. Systematic testing has not been conducted to determine whether the .50 BMG is the ideal cartridge for very long-range shooting.

The US military is in the final stages of awarding a 3000-rifle contract for .50 BMG semiautomatic sniper rifle. This White Paper proposes that this is not the best system available.

Long Distance Military Shooting:

A number of years ago, Professor John D. Taylor saw the need to improve the over eighty year old .50 BMG cartridge design and as a result, spearheaded a group of extremely talented individuals to form a company called CheyTac® Associates. Their purpose was to create the ideal very long-range sniper cartridge. The concept of “*Balanced Flight*” was invented (US Patent 6-629-669sub B2). Using PRODAS software that allows engineers to test all known physical parameters that a projectile encounters in flight, the theory of *Balanced Flight* was proven. The .408 CheyTac® cartridge embodies *Balanced Flight* and as a result greatly outperforms the .50 BMG cartridge in speed, range, accuracy, and even power.

Note: While *Balanced Flight* can improve the ballistic characteristics of the .50 BMG projectile; when compared, the .408 CheyTac® is overall superior.

the Coriolis Effect (earth rotation while the projectile is in flight).

Utilization of *Balanced Flight* to Build a Very Long Range Sniper Rifle System:

Advantages of the .408 CheyTac® cartridge over the .50 BMG cartridge include:

- More compact
- 33% less weight
- Greater kinetic energy (beyond 400 yards)
- Shorter time to the target
- Greater velocity to the target
- Superior accuracy
- Engages targets at greater distances
- Remains supersonic longer for greater accuracy
- Less primary recoil due to lighter projectile
- Greater raw materials savings in manufacturing.

In the hands of a trained shooter, the CheyTac® cartridge can hit a man-size target at 1.5 miles and beyond. Because the CheyTac® cartridge is designed to shoot great distances, a hand-held advanced ballistic computer (patent pending) was designed to provide ultimate solutions within seconds for accurate elevations and windage settings. The CheyTac® ^{Advanced} Ballistic Computer compensates for all known physical conditions that will affect projectile trajectory including ammunition temperature (burn rate) and



Comparison of the .408 CheyTac® cartridge with other cartridges. From left to right: .50 BMG, .408 CheyTac®, .338 Lapua Magnum, .300 Winchester Magnum, 7.62mm NATO and 5.56mm NATO.

The .408 CheyTac® is approximately one-third smaller and one-half the weight of the .50 BMG.

To take advantage of the ballistic characteristics of the .408 CheyTac® cartridge, CheyTac® Associates designed and builds multiple firing platforms using a newly invented barrel rifling (US Patent) with a suppressor (silencer). Both turn-bolt receiver designs and a new semi-automatic receiver design were chosen to insure maximum accuracy. One design (Model 200) has a collapsible stock and a removable barrel – ideal for high altitude parachute jumps. The other design M-310 can be fitted in the same stock (McMillan A5) currently used by military 7.62mm NATO sniper rifles – making initial training easier. The new M-400, in testing provides a previously unknown level of long range accuracy in a Semi-Automatic platform.

Advantages to the US Army of the CheyTac® rifles over the .50 BMG rifle include:

- Greater choice in rifle designs to fit combat missions
- Suppressed noise for silent shooting
- Requires less training than the bullpup design
- Ergonomically easier to shoot, thus improved accuracy
- Two turn-bolt receiver designs gives superior accuracy compared to a semi-automatic receiver design
- Greater reduction of secondary recoil (Advanced muzzle brake design)
- Does not expel gases into shooters' eyes (Advanced muzzle brake design)

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CONCLUSION

The .408 CheyTac® is a superior cartridge to the .50 BMG in all of the critical ballistic characteristics as well as in numerous factors important to successful military field tactics. It, as well as its firing platforms, could be tested immediately and compared to the .50 BMG platform currently under consideration. Such testing should demonstrate the numerous advantages of the .408 CheyTac® over the .50 BMG and as a result, the system should be a priority consideration for adoption by the US Army.

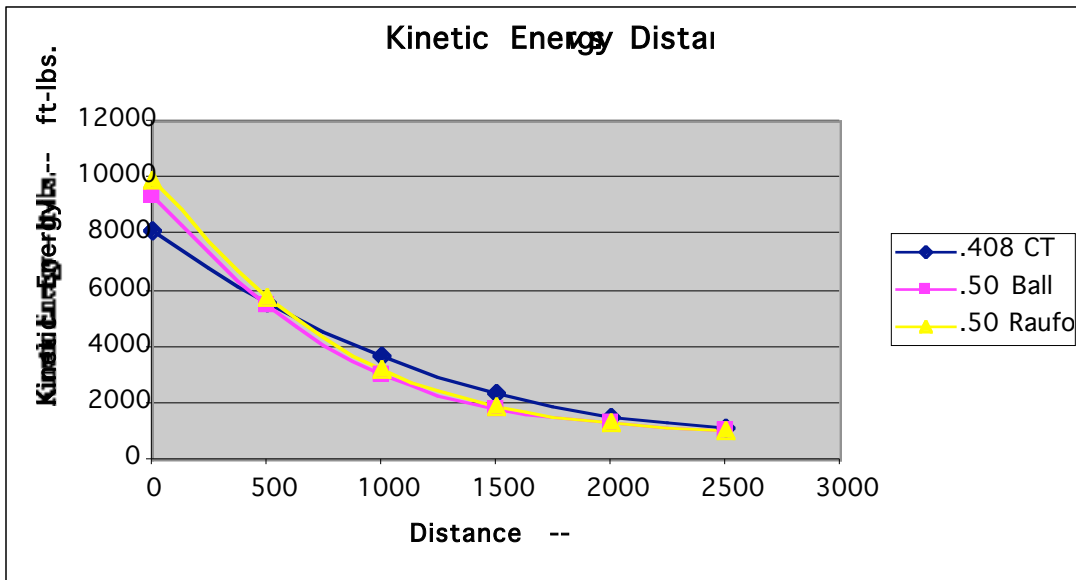


Model 310



Model 400

Appendix I

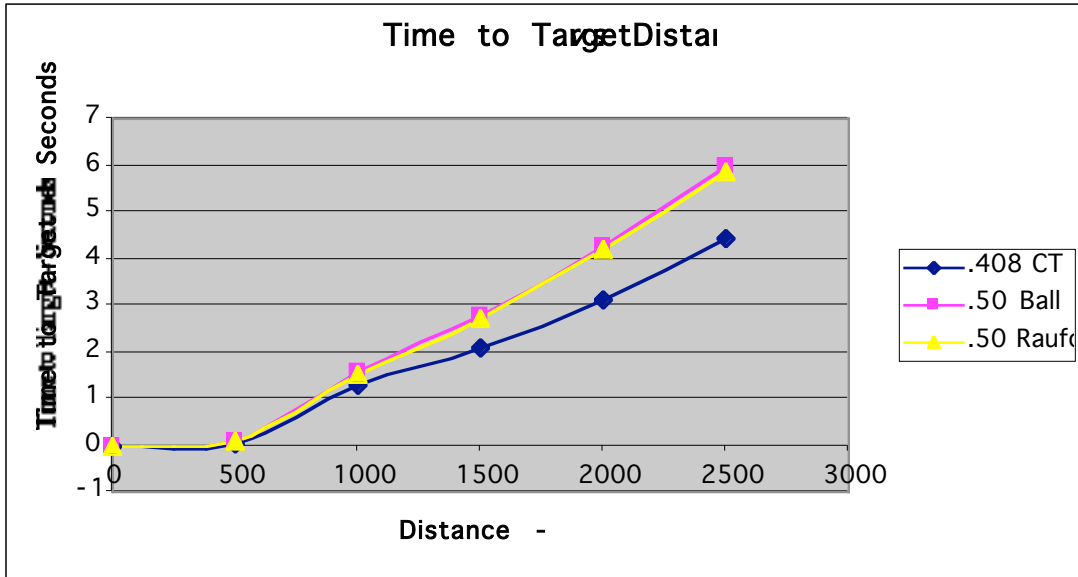


Note: The .50 Raufoss cartridge was designed as an improvement over the .50 Ball cartridge. Data indicates that kinetic energy profiles are very similar.

The .408 CheyTac® kinetic energy surpasses the .50 Ball and the .50 Raufoss at approximately 400 yards and maintains the lead beyond 2500 yards (1.42 miles).

In supervised tests, the .408 CheyTac® projectile penetrated armor and laminated glass that was resistant to the .50 BMG projectiles (*US Armed Forces Journal*, August 2003)

All data is based on flight data obtained by Doppler radar during testing at US Army Yuma Proving Grounds, 18 June 2001.

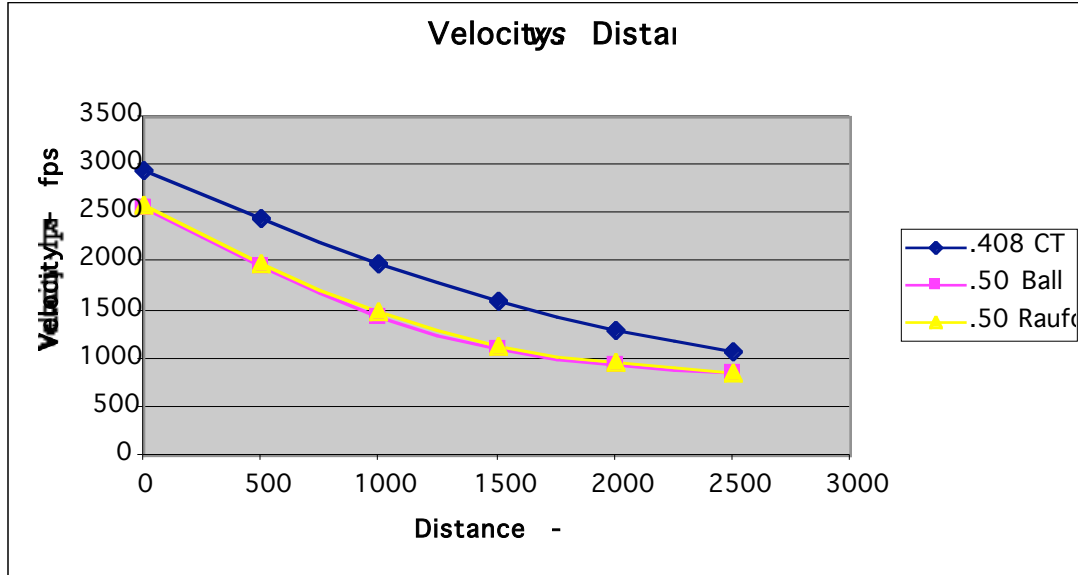


Note: The .50 Raufoss cartridge was designed as an improvement over the .50 Ball cartridge. Data indicates that kinetic energy profiles are very similar.

At 1000 yards the .408 CheyTac® projectile exceeds the .50 BMG projectile by approximately 1 second and at 2500 yards (1.42 miles) by approximately 1.5 seconds.

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All data is based on flight data obtained by Doppler radar during testing at US Army Yuma Proving Grounds, 18 June 2001.



Note: The .50 Raufoss cartridge was designed as an improvement over the .50 Ball cartridge. Data indicates that kinetic energy profiles are very similar.

The .408 CheyTac® projectile was designed to penetrate the atmosphere with the least amount of resistance. It remains supersonic to 2400 yards, while the .50 Ball and the .50 Raufoss projectiles remain sonic to only 1700 yards.

The .408 CheyTac® projectile remains stable as it passes through the transonic zone and remains on its original trajectory path (Patented Balanced Flight Process). However, the .50 Ball and .50 Raufoss projectiles undergo extensive vibrations through the transonic zone, resulting in their departure from their original trajectory paths.

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All data is based on flight data obtained by Doppler radar during testing at US Army Yuma Proving Grounds, 18 June 2001.

Appendix II

Types of CheyTac® Projectiles. There are currently three projectile types:

419gr. Heavy Ball (HB). The standard ball round is a 419grain solid-copper nickel alloy projectile. These projectiles are turned on a CNC lathe-machining center and display a .945 ballistic coefficient over a 3500-meter range average. This is the standard load for long-range precision applications.

305gr. Battlefield Domination Round (BDR). The 305grain BDR round is used for rapid defense engagements from the rifle out to 1000. The maximum ordinate of this projectile over the 1000 yards range is 48 inches. The operator places an rifle sights elevation setting of 1000 yards and then aims at the mid thigh point of any target from 0 to 1000 yards away. The high velocity (3500 fps) and low maximum ordinate makes the flight time extremely short (1 second to 1000 yards), which makes the gun able to engage targets to 1000 yards about every 3 seconds. It is much less time for a semi-automatic gun. The normal data needed, such as range, winds, and environmental conditions are not needed at such high velocities.

Additional Rounds under Development. These types of projectiles are under development.

418gr. High Performance Armor Penetration (HPAP). CheyTac® is testing a steel and carbide tipped, high performance armor-piercing round for the .408 CheyTac®.

Tracer. A conventional, visible tracer round will be available for inter-linking and use in semi-auto and bolt action systems.

Infrared Tracers. An infrared tracer will be developed for use at night and in day operations. The advantage of an IR tracer in the daytime is that the operator can observe his shot trace through filtered night vision sights. One of the greatest problems in extreme range shooting is that it is often impossible to see the shot “trace” or impacts of the rounds. This makes corrections for a second shot impossible. By observing an IR trace of the shot, an observer is able to make second shot corrections, or “walk in” shots in the MG or mini-gun role.

Balance Flight – Projectile Stabilization for Increased Distance and Accuracy

A projectile begins its trajectory once it emerges from the bore and from the accompanying expanding gases. The signature of the projectile's trajectory in flight is influenced by a number of factors – some associated with the projectile itself, some associated with the atmosphere in which the projectile translocates and some associated with the earth's gravitational forces.

To present a complete picture of a projectile's trajectory in flight, one should integrate all three factors. In this particular case, we shall focus on the projectile itself with only passing reference to the atmosphere and to the earth's gravitational forces.

A projectile's mass, diameter, shape as well as axial spin rate are characteristics that influence its trajectory signature in flight. These characteristics are only important when viewed in relation to a defined speed of the projectile in flight.

If the projectile travels far enough without first hitting a target, it will experience three speed zones: supersonic, transonic and subsonic. Conditions in the atmosphere affect speed. It is considered to be a fluid with varying characteristics including its density, temperature, viscosity and wind directory. Speed in flight is measured as a value called Mach (M).

$$M = \frac{\text{Projectile speed}}{\text{Sound ambient speed}}$$

Projectiles with a Mach speed less than 0.8 are considered to be subsonic, while those greater than 1.2 are considered to be supersonic. The range between the two values is known as transonic.

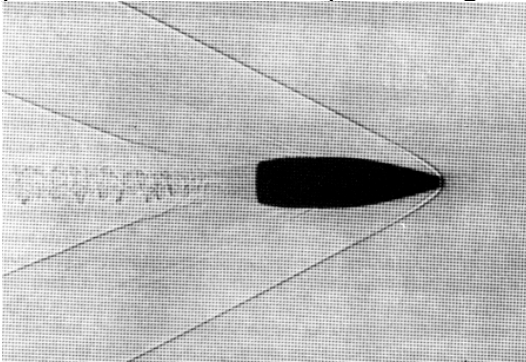
In a vacuum, gravity is the only force acting on the projectile in flight. However, in the atmosphere the projectile encounters resistance called drag or drag force. Drag depends on the forward speed of the projectile – at high speeds it is the dominant force influencing the projectile. Drag has a major influence in modifying the trajectory signature during the early part of the trajectory arc and minor influence occurring during the latter part of the trajectory arc.

There are five factors that separately contribute to drag force.

- Skin friction
- Pressure drag
- Base drag
- Wave drag
- Yaw-dependent drag

Skin friction results from the viscosity of the fluid. Viscosity is defined as the resistance of the shearing motion of the fluid. When a projectile moves through the atmosphere, molecules immediately adjacent to the surface cling firmly to the surface while those adjacent to the surface flow parallel to it. So there is an area where shearing occurs; *i.e.*, boundary layer. This contributes to pressure drag.

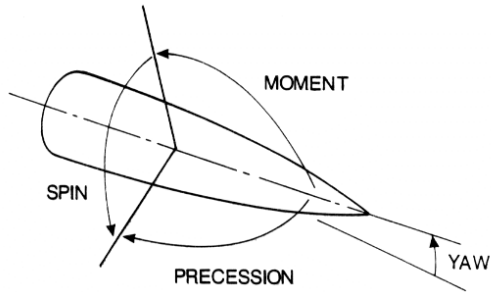
Generally, the average static pressure at the front of a projectile is greater than that found at the end of the projectile. This is called pressure drag. Pressure drag can be reduced if the front of the projectile is pointed and the base is tapered. Even so, a base drag can develop as a result of the fluid moving around it to form a wake. These characteristics are pronounced at subsonic speeds and greatly reduced at supersonic speeds.



Note Pressure & tail wakes

Another drag appears at supersonic speeds; *i.e.*, wave drag. This is due to the shock waves generated by the projectile traveling through stationary air at a speed greater than the speed of sound. If the shape of the projectile changes dramatically from its forward tip, an additional shock wave will be produced resulting in an additional drag.

Generally a projectile will not travel with its axis aligned to the direction of flight. A measurement called the angle of repose (yaw) is the angle between the projectile axis and the direction of the flight. Causes are numerous, but this results in a force impinging upon the side of the projectile, which contributes to drag. The level of drag is related to the angle of repose.



The total drag is the sum of all drags. Taking into effect the air density and forward speed of the projectile, a value without units can be determined. This is drag coefficient. Drag coefficient is used as a measurement of projectile efficiency during flight depending upon the speed of the projectile.

On the other hand, the rate at which projectile velocity decays against a standard is called ballistic coefficient. The ballistic coefficient is expressed as a measure of mass per unit frontal area of a projectile times a drag efficiency factor. The projectile deceleration is inversely proportional to it. The larger the ballistic coefficient means the smaller the deceleration.

The stability of a projectile in flight is related to its ability to overcome disturbances. For example, a projectile subjected to yaw disturbances will define its stability. The projectile might have a tendency to tumble when the center of pressure is forward to the center of gravity. The projectile cannot return to a stable state. Other examples of instability exist.

There is an important correlation in the distance between the center of pressure and the center of gravity and its relation to the stability of the projectile. This is called static stability of the projectile.

As a general rule, most projectiles are aerodynamically unstable in flight. This can be overcome however, by the incorporation of axial spin. For example, if a projectile is experiencing a nose upward motion resulting in an increased yaw angle, a projectile spin – assuming it is fast enough – will cause the nose to move to a stable position or back to its original yaw.

There is a second motion present – one in which superimposes the first. This is gyroscopic motion known as nutation. This motion of a projectile in flight is determined by the dynamic stability of the projectile.

Upper and lower limits exist for the rate of spin. Too much spin results in a projectile flying at a larger yaw angle, which results in lost of the distance traveled and accuracy.

Spin rates with projectiles with small diameters are high. In addition, a longer projectile requires a faster spin for stability *versus* a shorter projectile. Finally, projectiles entering tissues will become directionally unstable and will tumble. This assumes that they retain their original shape.

Balanced Flight

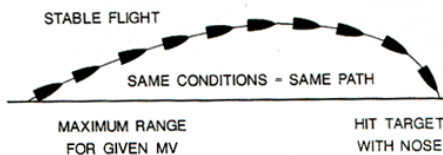
It is clear that a projectile being able to retain stability throughout its flight will go farther and will be more accurate.

Warren Jensen, partner and designer at Lost River Ballistic Technologies® identified the conditions that could be translated into projectile design, which would exhibit very long distance accuracy. The concept is called Balance Flight and is patented (6,629,669).

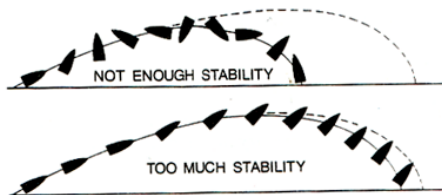
Working with PRODAS software, Jensen designed projectiles in multiple calibers, where the linear drag on a projectile is matched to its rotational drag. In other words, forward rate of deceleration and an axial rate of deceleration are balanced. The gyroscopic stability remains constant resulting in the projectile remaining on its original trajectory path.

Non-balance flight occurs when a projectile's spin is too great, thus leading to an "over spin" of the projectile. Over spin leads to increasing angles of repose, which result in increased drag and can result in instability at the transonic threshold.

WHAT IS REQUIRED :



WHAT IS NOT REQUIRED :



An important component of Balanced Flight is the design of the barrel lands and grooves. A ratio of a total surface of the projectile to a total surface area of the physical feature must be in the range of 3.00:1 to 4.00:1.

As a result of projectile and barrel land / groove design, the drag coefficient is reduced to a range of 0.100 to 0.250. In addition, the bearing surface of the projectile has a depth equal to 1% of the caliber of the projectile and a ratio of a total surface area of projectile to the total surface of the physical feature in the range of to 3.00:1 to 4.00:1. The purpose is to impart an ideal axial surface friction upon launching, which during flight produces a trajectory characterized by a continuously decreasing rate of axial deceleration.

Balanced Flight is best associated with the .408 CheyTac® caliber.

However, Jensen first designed projectiles in 30 caliber, which resulted in major improvements over existing projectiles in this caliber.

Balanced Flight's improvements of projectiles in the 40 caliber went far beyond expectations. Could a Balanced Flight improve the 50 caliber projectiles? The answer is yes, but it would require specific changes to standard 50 BMG land, groove, and twist configurations.

Combined with the CheyTac[®] cartridge case, the .408 projectile has found an ideal launching platform. This platform represents the best long-distance cartridge to date – in all ballistic-characteristic, including kinetic energy.

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November, 2006

