2021 TXMoMe
Mid-Range Rifle Clinic
October 22, 2021

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Introduction

Welcome to the 2020 TXMoMe Mid-Range Rifle Clinic, an *introduction* to the basics of mid-range rifle shooting. We have several different levels of experience represented today so please be considerate of those attending for whom this information may be new. The material we will cover cannot be mastered quickly and must to be *practiced* in order to develop and maintain proficiency. The idea is for you to have a good time and to hopefully take a few new ideas home with you. Please do not hesitate to ask questions! You will find many of the methods discussed today represent one of several ways of doing something, however, the methods shown herein have been found to be effective by this writer.

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Mark Holland
October 2021

Range Safety Rules

1. All weapons remain cased until called to the firing line.
2. *Wearing* side arms on the firing line is prohibited.
3. Keep weapons on the line pointed downrange at all times.
4. Keep weapons on the line unloaded with magazine removed and an ECI inserted until the line is called hot.
5. If a problem or malfunction requires removing a weapon from the firing line while shooting is in progress, please coordinate that movement with an RSO.
6. If you see an unsafe condition on the line or elsewhere on the range, call a cease fire.
7. Shoot ONLY at the targets set up for the purpose of this exercise, and nothing else.
8. If you hear the command to cease fire, stop shooting and make your weapon safe.
9. Don't be stupid.

Please remember to police all brass from the firing line at the end of the day.

Ammunition, Gear and Setup

Modern stock rifles are capable of remarkable accuracy, and high-end equipment really only begins to make a difference for a shooter at the very top end of the performance curve. Usually, the single greatest limiting factor in mid to long range precision shooting is inconsistent ammunition, closely followed by general marksmanship skills, with fancy gear coming in a distant third.

Ammunition

For the competitor, or in applications where extreme accuracy and precision are required, a significant amount of time is spent loading match ammo. That includes case preparation (trimming, cleaning, annealing and sizing), sorting match grade bullets by ogive measurement, trickling powder to a precise weight by the fraction of a grain, or literally by the speck, and then finally seating the bullet. Absolute consistency in match ammunition, both in sourcing and preparing components, and assembly of the finished product, is essential. It is also extremely time consuming and expensive to produce.

Most people do not have a need for this level of precision and consistency, and shooters generally find commercially produced ammunition will represent the most sensible solution. For example, Federal Gold Medal Match ammunition is acceptably consistent for training and practice purposes. I do not have the same confidence in many other brands, especially bulk, discounted or surplus ammunition. A fairly high degree of consistency is valuable during training to eliminate variables leading to an errant shot. If the bullet doesn't go where expected, it's helpful to know what might be causing the problem. Experienced shooters will begin to see the limits of commercial ammunition consistency and accuracy in as little as 100 yards, and must decide what represents an acceptable standard for consistency for a particular application.

Equipment and Setting up Your Gear

Keep it Simple. Take exactly everything you need to the firing line, and little else. Pack your range bag exactly the same way every time, and set up your gear on the firing point in exactly the same way, every single time. Know where everything is by touch without getting up from the rifle or spotting scope to look for it. Don't allow anything to disturb your position behind the rifle once you are settled in if at all possible.

Some items of gear, e.g. a hat, glasses, hearing protection, bug spray, water and shooting mat are for shooter safety and comfort. These items contribute to the success of the shooter who will generally perform better when they come prepared with at least the basics.

Other items of gear, such as the front and rear bags or bi-pod are used to establish a solid shooting base and fine tune elevation. Consistency is vital in your setup and cannot be over-emphasized. Emphasis on ***solid***!

Natural Point of Aim (NPOA)

Natural point of aim is not a difficult concept, but many overlook or disregard it altogether. ***You should be relaxed and comfortable, not scrunching yourself up or straining your neck to get the proper eye relief behind the scope.*** Adjust your gear to YOU, not the other way around, finding the point where you are naturally aligned with the target. Without looking down range, close your eyes and settle into your natural shooting position, then open your eyes. Repeat the process until you are naturally and comfortably aligned with the target. Do not strain to adapt to an awkward position or use large muscles. With practice and repetition you will condition your brain and body to assume something pretty close to natural point of aim as you assume your shooting position.

Rifle Zero

So what is zeroing a rifle? Simply put, it's adjusting the sights or optical reticle ***so it aligns exactly with the bullet impact on target at a specific distance with zero wind and elevation***. For the purpose of this discussion I will refer from here on out to optics although the concepts are mostly the same with iron sights.

Every single rifle has to be zeroed if you want to stand much of a chance of hitting a target beyond about 100 yards or so. With changes in velocity and bullet weight, it's very easy for the ballistics to vary to such a degree that a non-zeroed rifle will miss even inside that distance.

Every single time you change ammunition, you must re-zero your rifle. You may get lucky and be somewhere on target close in, but the results will only get uglier the farther out you go. A shooter with a non-zeroed rifle stands little chance of hitting a target beyond a couple of hundred yards. It is absolutely essential the scope reticle is pointing to the *exact same place as the bullet is going,* or you might as well be shooting without sights at all, and you're probably just wasting your ammunition. What is the point of carefully selecting a target through the scope when your rifle barrel is pointing somewhere else?

This is why I spend so much time harping on consistency in ammunition. Inconsistent ammunition, with respect to either velocity or bullet weight, is the same as changing to different ammunition every time you chamber a round. If you know the weight of the bullet and its velocity leaving the barrel you can compute a ballistic trajectory. Alter either variable, and the bullet goes somewhere else. No exceptions. Once again, changing ammo ***will change*** the zero. Atmospherics also begin to influence the equation at greater distances, but for now let's stick with the basics.

The good news is that zeroing a rifle is no big deal and is not hard to do. I zero my rifles at 100 yards because I mostly shoot at fixed distances and that keeps the math simple, but it's not uncommon for hunters to zero their rifles at 200 yards or some other distance if that better suits their purpose. Again, all you are doing in the zeroing process is moving the reticle inside the scope so at zero elevation and zero windage indicated, it matches the point of bullet impact at a fixed distance, in this case, 100 yards.

So what is required? A sturdy bench, some sandbags or other shooting rest, a spotting scope and a sighting target. I use pre-printed targets with one-inch grid squares, but that isn't even completely necessary. A blank sheet of paper with an aiming dot will work fine. You can even zero a gun without a bench or sandbags, but you need an absolutely stable platform to work from so small movements in your gear and set up do not affect the point of aim.

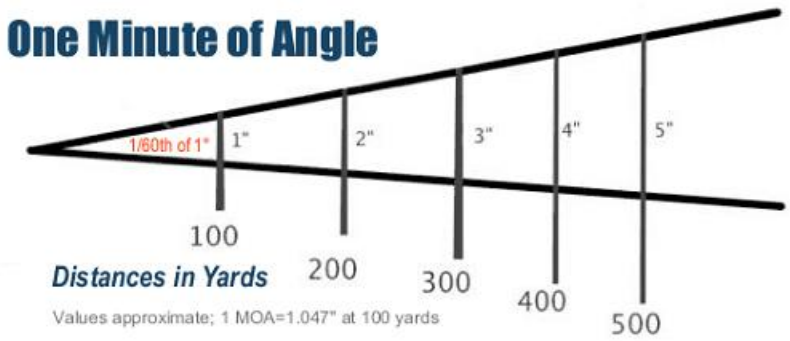
The process is simple. With an already fouled barrel, choose a calm day, set up your stuff, and as carefully as possible take a shot at the target. An assistant is helpful to spot impacts landing off the target. Let's say you're lucky and hit the target but the bullet impacts right 3 inches and high 2 inches from the aim point. I like to take a second shot at this point to validate the first. All things being equal, the difference in the two impacts should be small, ideally in the same hole, but at least making some sort of group. For argument's sake, say they're pretty close; almost touching, which tells you your setup and ammo consistency is good. All you need to do now is dial down 2 inches and left 3 inches and you should be in the center. My rifle scopes all use the minute-of-angle (MOA) convention, so at 100 yards it would be down 2 MOA and left 3 MOA. Take a third shot and observe the results. Hopefully you're in the center, but if the impact is wandering around, you need to begin investigating possible causes like goofy ammo or stability and marksmanship problems. Once the bullets are going to where the reticle is pointing, loosen the screws on the scope turrets, turn the caps to read ***zero*** for both elevation and windage, tighten them back up and you're done.

Rifle Scopes and Angular Conventions

MOA - Minute(s) of Angle
MOA, or Minute of Angle, is simply an angular unit of measure describing the arc of a circle. A circle can be divided into 360 degrees, and one degree can be divided into 60 minutes. One MOA is equal to 1/60th of one degree of arc.

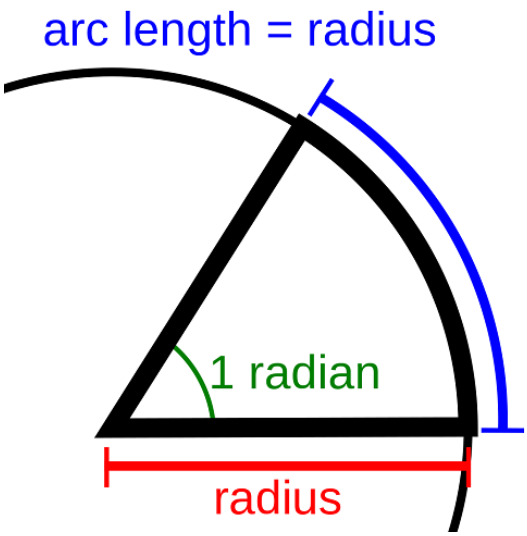
On a flat rifle range, the target point straight in front of you is zero degrees elevation, and an imaginary point directly overhead is 90 degrees elevation, which really is just one quarter of a giant circle. One MOA is a tiny little wedge of that big angle.

The nice thing about circles is the relationship between the **radius** and the **arc** remain constant. As the length of the radius increases, so does the arc. If we substitute the radius for range or distance to target, and the arc of the circle for elevation (or windage) we can compute a firing solution.

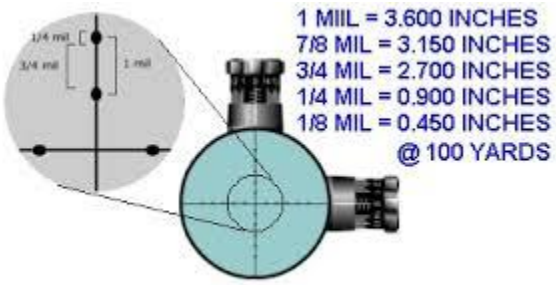


One Minute of Angle or MOA equals 1.047 inches at 100 yards. One MOA equals 2.094" at 200 yards (1.047x2), and 10.47" at 1000yds (1.047"x10), and so forth. The fractional amount of .047" or 47 hundredths per hundred yards is generally disregarded inside about 600 yards or so.

Mils or Milliradians
Mil stands for **mil**liradian which is also an angular unit of measure describing the arc of a circle. A ***radian*** is the angle defined when the length of arc is equal to the radius of a circle. A milliradian is simply 1/1000th of one radian, and there are approximately 6.28 radians (rounded) in a full circle (2 x π). Again, a very small wedge of a much larger angle.



One Mil is equal to 3.6 inches at 100 yards. One mil equals 7.2" (3.6"x2) at 200 yards, and 36" (3.6"x10) at 1000 yards, and so on.



Fractional Mil adjustments at 100 yds

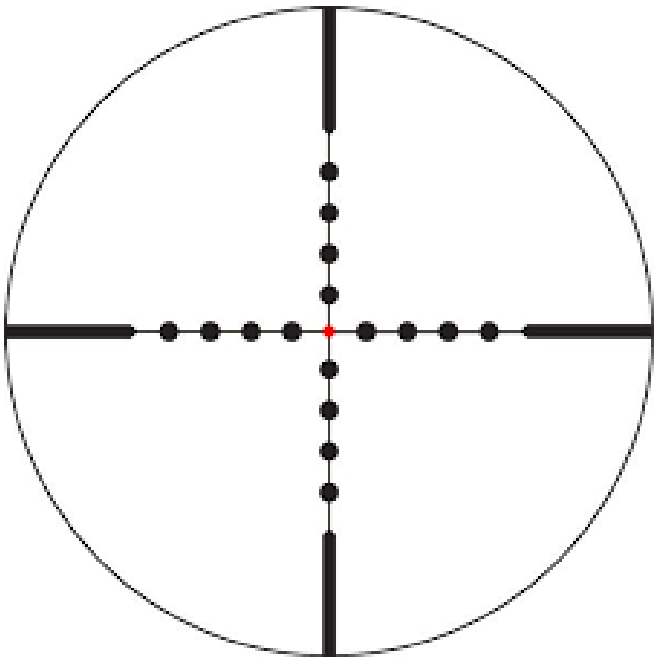
One Mil is therefore equal to ***approximately*** 3.5 MOA (3.6/1.047 = 3.44). To convert from MOA to mil, you divide by 3.5 and to convert from mil to MOA you multiply by 3.5. Although the actual conversion factor is 3.44, most normal people simply round to the value 3.5 to keep the math easier.

A good article exploring the MOA / Mil math in more detail can be found at:
https://www.longrangeshooting.org/articles/moa-and-mils-explained

So how is all this useful?
Both conventions, the MOA and Milliradian are used to measure the angle, or elevation, of a rifle barrel above the horizontal, and the same concepts apply for left and right adjustments for wind. When you dial on elevation or wind, you are simply moving the scope reticle up, down and right or left inside the scope body.

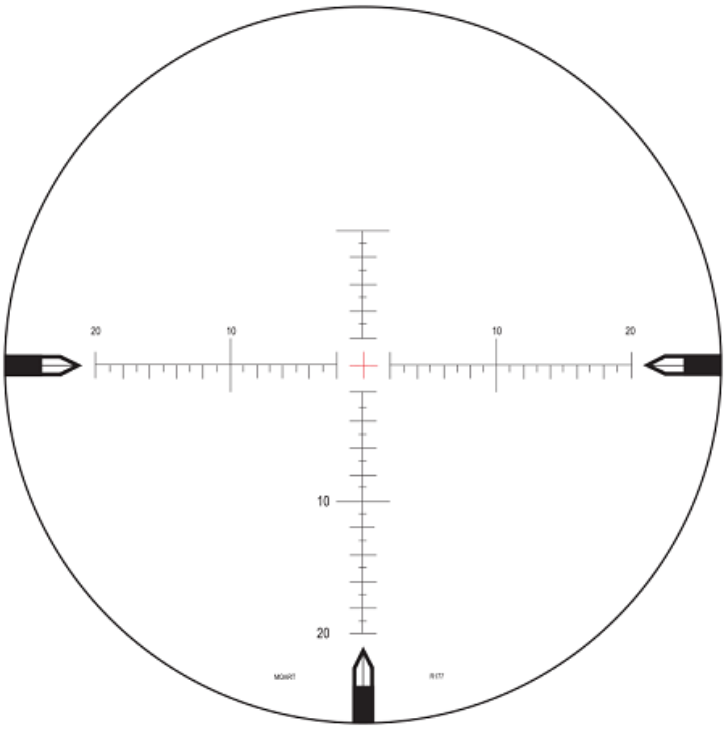
Which is Better?

In my opinion, neither is clearly superior to the other. They both do the same thing and have very slight advantages and disadvantages depending on the intended use. You will see more scopes with Mil reticles on military rifles with targets ranged in meters and more MOA scopes on civilian competition rifles with targets ranged in yards. While there are slight differences, for example one MOA is a finer adjustment than one Mil, in the end I'd recommend using whichever system you like and are comfortable with. The usefulness also depends a lot on matching the reticle to the *intended use.* If you're undecided, try both, and ask others who do the same type of shooting you do which they use, and why.



Mil ***DOT*** Reticle

Note in the reticle shown above, the distance between the 'dots' is one MIL, or 3.6 inches at 100 yards. Would you choose this scope/reticle combination if your intended use regularly included target shooting at 600 yards? Conversely, would it be a good choice for shooting larger targets at shorter distances where absolute precision was not a priority, but fast target acquisition was important?



Nightforce MOA MOAR-T Reticle

The reticle shown above is subtended in the much finer increments of one MOA, and would be a good choice where precision adjustments or longer engagements are required.

Other Scope Considerations

Parallax

Parallax is the apparent movement in the relative position of a ***target and the reticle***, and is detected when the eye is moved from the optical axis of the scope. Parallax is a simple concept once you get it, but it's also just complicated enough to have achieved some sort of mythical status among shooters.

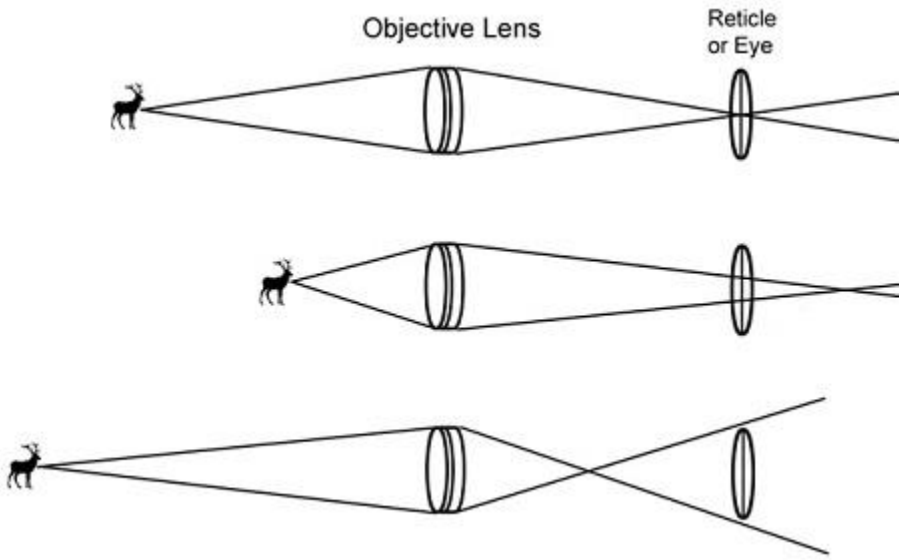


Image courtesy US Optics

The illustration above is one many of are familiar with in discussions of parallax. The short explanation is ***parallax occurs when the target is on a different focal plane than the reticle***. What does that mean? Well, it's really not as complicated as it sounds. Try the following experiment:

Choose a "target" about an arm's length away, and hold your thumb up as the scope reticle about a foot from your nose. Now move your head up and down and right and left. See how the "reticle" moves in relation to the target based on your eye position? Now extend your arm to full length and repeat the process. See how your thumb remains over the target despite changes in your eye position?

This is parallax. In the first example, your thumb and the target are on different focal planes. In the second example, the reticle has been moved onto the same focal plane as the target. That's it. Why is it bad? Well, unless you have a perfectly consistent cheek weld and eye position behind the scope, every time you take a shot the apparent position of the reticle, and thereby

the bore axis of the barrel, has changed. In other words, you are no longer pointed at the target. That's why it's bad.

Many rifle scopes have what a lot of shooters think is a focus knob. Sometimes it's on the scope body near the elevation and windage dials, and sometimes it's on the objective lens, and will have reference marks for different distances. These aren't focus knobs, but rather are for parallax adjustments. The distance markings on the scope are simply there for reference. In order to eliminate parallax, each time the distance to the target changes, ***you must check for parallax***. Adjust the dial until head and eye movement behind the scope do not cause changes in the reticle position in relation to the target. Don't just rely on the indicated range marks, but rather confirm visually that parallax has been eliminated.

Scope Mechanical Zero

The scope mechanical zero is the midpoint in the mechanical range of a scope elevation or windage adjustment and is different from your ballistic zero or the point in your scope adjustment where the point of impact matches point of aim. Know your zero point for both elevation and windage if you do not have a zero stop scope. It is especially easy to become lost when making large windage corrections.

Scope Zeroing and Angled Bases

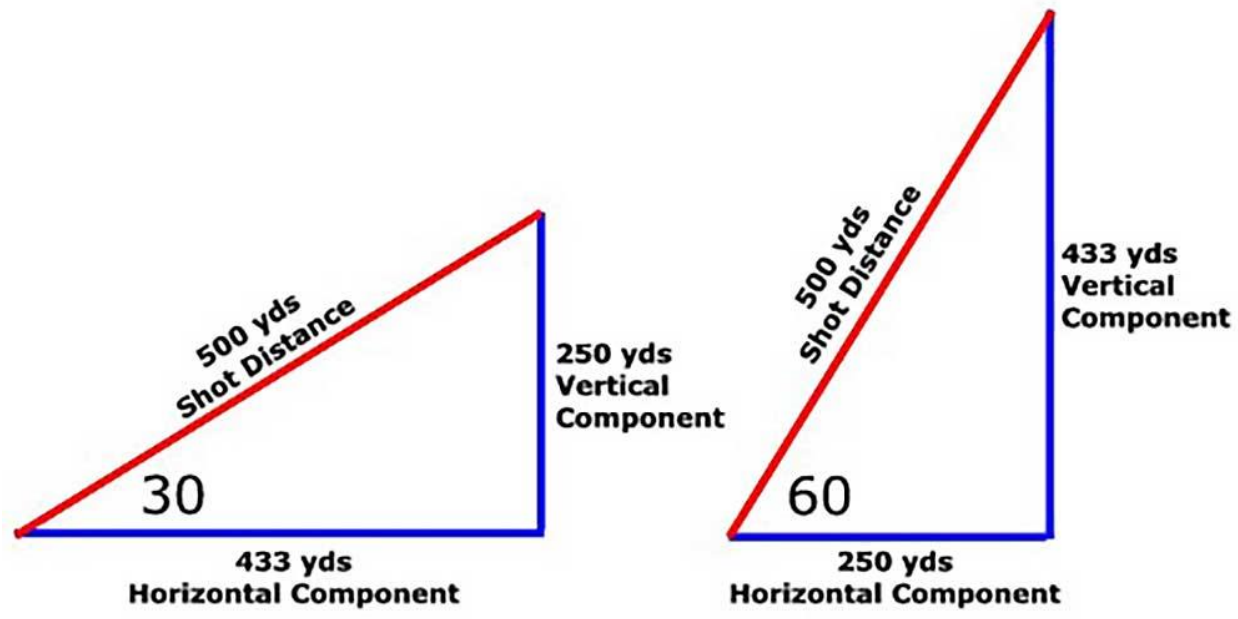
Ballistic zero is the point in your scope adjustment where the point of impact matches point of aim. An angled scope base, sloping down from back to front, converts the generally useless reticle travel adjustment ***below*** the mechanical zero point, to potential elevation adjustment. An example; how do you correct for a 35 MOA firing solution when your mechanically zeroed scope has internal travel limit of 60 MOA?

Considerations for High-Angle Shooting

Depending on the distance, when shooting at an angle greater than about 10 - 15 degrees, you must correct your firing solution for the difference between the ***straight line range to target*** and the ***gravity distance to target***. Uncorrected, high angle shots will always impact ***high.***

Using an Angle/Cosine Indicator or ACI

Mounted next to the riflescope, the ACI indicates the angle and cosine of the angle by means of a level and index marks. In descending order of accuracy, a few options exist for correcting the firing solution; input the observed angle into a ballistic computer (or chart) with other data for a firing solution, multiply the cosine by your straight line distance to target for an adjusted ‘gravity distance’, or multiply the cosine by your computed straight line elevation adjustment in MOA or Mils.



A detailed article can be found at: https://ustacticalsupply.com/anglecosignindicator.aspx

Ballistics and Atmospheric Conditions Affecting Bullet Flight

If you know the weight of the projectile and its velocity leaving the barrel, and certain atmospheric conditions affecting air density then you can compute a firing solution. Most generic range cards use a "standard" atmosphere, from which there are several to choose. I use the ICAO atmospheric model, which is; air temp 59 F, air pressure 29.92 Hg, 78% RH and an elevation of 0' or sea level. But what if you're not shooting in precisely these conditions? What if you take a trip from your home range near the beach and go hunting in the Colorado mountains?

Since it's cumbersome to record and use all of that data, it can be combined into the single reference value ***Density Altitude (or DA)*** which is simply expressed as a variation in altitude to the standard column of air at sea level. If you have been faithfully recording data in a little notebook every time you shoot, you should have been including the DA, range to target, and the necessary elevation in MOA or mils for future reference.

Density Altitude is published for local airports, and many online calculation tools exist, but you need data in real time as the DA changes throughout the day. If you're interested in this level of precision, I strongly recommend investing in a Kestrel Meter a compact weather instrument with an anemometer and which calculates DA based on your current conditions at the range.

If you have been recording your data, all you need to do is look in your data book and find the last time you shot at the same distance with the same rifle and ammo, and dial the same elevation based on DA. It doesn't matter where on the planet you observed the data, if accurately measured, it will still be valid. If you are diligent, over time you will record enough data to cover most shooting situations.

Performance and a Cold Bore

The first few shots of a clean, cold barrel do not behave the same once they leave the rifle as the next 80 or so will. I know that my long range match gun shoots a cold bore shot high/right about 1 MOA, and I expect it. It pays to know this if you cannot take fouling shots and a first round hit is important. Most matches allow a blow-off period at the start of the day to allow shooters to foul barrels. Some law enforcement and military shooters will foul their rifles after cleaning them and before putting them away.

Ballistic Coefficient and Aerodynamic Models

Generally speaking the Ballistic Coefficient, or BC, of a bullet is a measurement of its ability to overcome deflection and air resistance. There are many ballistic models, and the two widely used are the G1 and G7 profiles. For reasons involving actual rocket science, the G1 is best suited for shorter rounded bullets and the G7 is better suited for today's longer boat-tail bullets.

Figure 1. The G1 standard projectile.

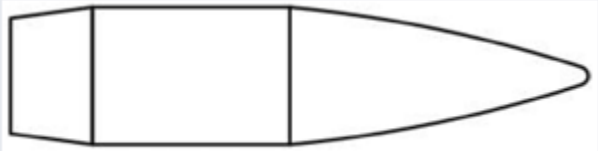


Figure 2. The G7 standard projectile.

If you’re using any sort of ballistic computer, it is helpful to know the ballistic coefficient of the bullet you’re using and apply the correct profile in your calculations, using the appropriate (G1 or G7) ballistic profile.

Adjusting for Elevation and Wind

Depending on the riflescope, rifles are commonly 'zeroed' at 100yds (MOA) or sometimes 100 meters (mil). It's a matter of preference, and some people zero their rifles at longer distances, but many of shooters generally use a 100 yd/m zero. What is zeroing a rifle? Simply put it's adjusting the scope so the bullet point of impact occurs exactly at the point of aim, in this case 100 yards or 100 meters with **zero** elevation or windage indicated on the scope.

Here's where the MOA and Mil business begins to matter. Say you're shooting a .308 with an MOA scope at 800 yds. Your data shows 27.3 MOA in elevation is required at this distance. You dial that in (27.25 MOA and hold the rest), take the shot and are high and right about 4 inches. Well at 800 yds, 1 MOA is 8.4" (1.047" x 8 = 8.4" rounded) so I'd take off 1/2 MOA in elevation and wind then hold very slightly low and left, and take another shot. If your rifle scope has .25 MOA adjustment, that's two hash marks or 'clicks' of the elevation and windage knobs. Some scopes have finer .125" or eighth MOA adjustments per click and in that case you would want to dial down four hash marks to equal 1/2 MOA. Mil based scopes usually have 1/10th Mil adjustments. ***Note:*** I reference the term ‘click’ here referring to the movement of the scope windage and elevation knobs. It’s also a holdover from the old days of iron sights, where elevation at a given distance was referred to as a number of ‘clicks’ above zero or “come ups” from a previous setting.

If you’re recreating a WWII battle that's fine, but get used to referring to angular measurement in MOA or Mils based on actual measurements of the measurement convention you are using.

What's important is the windage and elevation knobs are tools for making adjustments by moving the crosshairs inside the scope. They can also create a disaster if you get all excited and start turning them in the ***wrong direction***. I try to set them at the start of a match and leave them alone during each string, holding for wind and elevation, unless the conditions really change.

A Very Brief Tutorial on Ranging

Rifle scopes can be used to determine range to target - Second Focal Plane (SFP) scopes only range accurately at one specific magnification, while First Focal Plane (FFP) scopes range accurately across the entire range of magnification. Again, this is only important when using a scope to determine the ***range to target***. The scope zero and other functions are the same for both types.

To use your riflescope in determining range to target you must know (or estimate) the **size** of the target in the following formulas:

MOA Scope:

target size (inches) x 95.5 / size (MOA) = range (yards)

Metric users, estimate target size in centimeters and substitute the constant 34.4 in the formula to determine range in meters.

Mil Scope:

target size (inches) x 27.8 / size (mils) = range (yards)

Metric users, estimate the target size in centimeters and substitute the constant 10 in the formula to determine the range in meters.

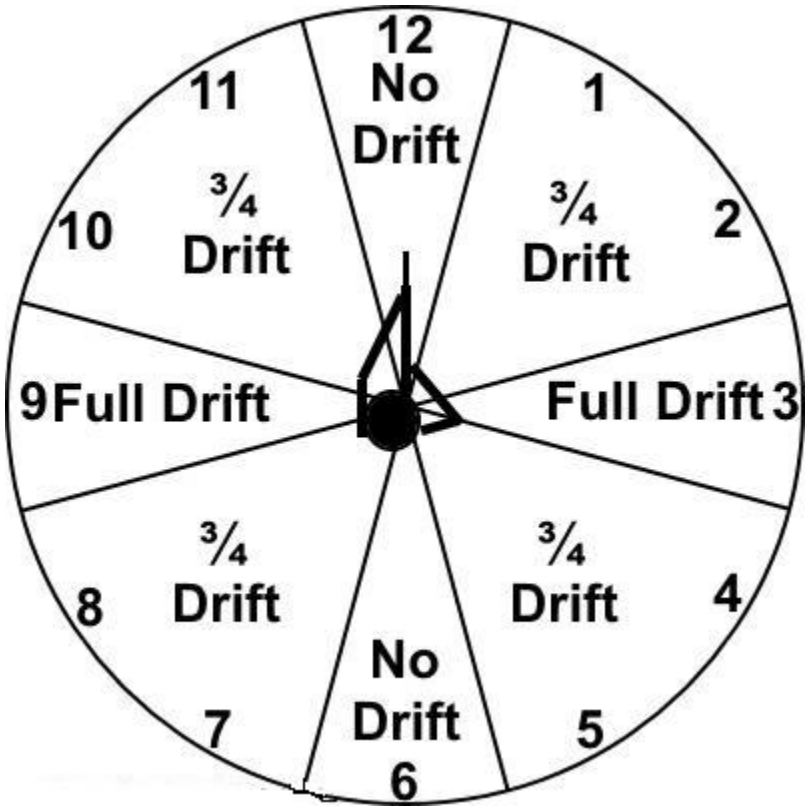
Wind Estimation and Correction

Accurately estimating wind speed and direction can be one of the most challenging aspects of shooting.

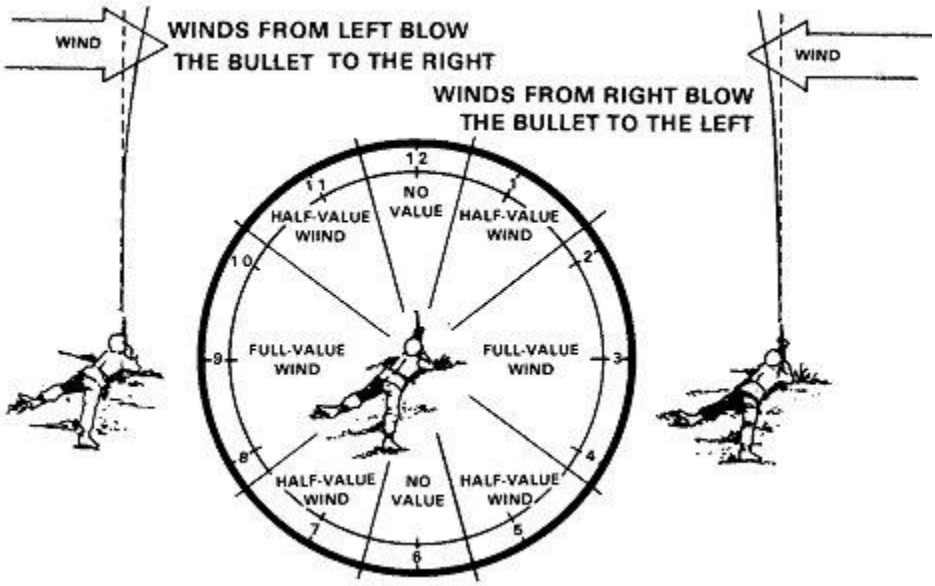
All wind is not equal. A 3 mph wind blowing from 9 o'clock or directly perpendicular to the bullet's line of flight has a greater effect, or a "full value", than a 3 mph wind blowing from an angle which is between 50% and 75% of full value. Buy an anemometer and practice estimating wind values and detecting changes in wind direction.

Wind Drift and Direction

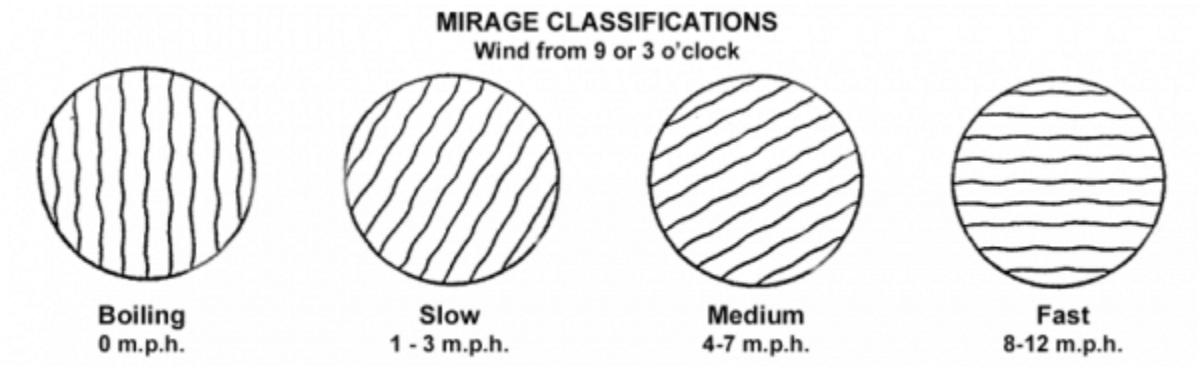
The illustration below represents the effect of wind on a bullet depending on its relation to the direction of the bullet flight.



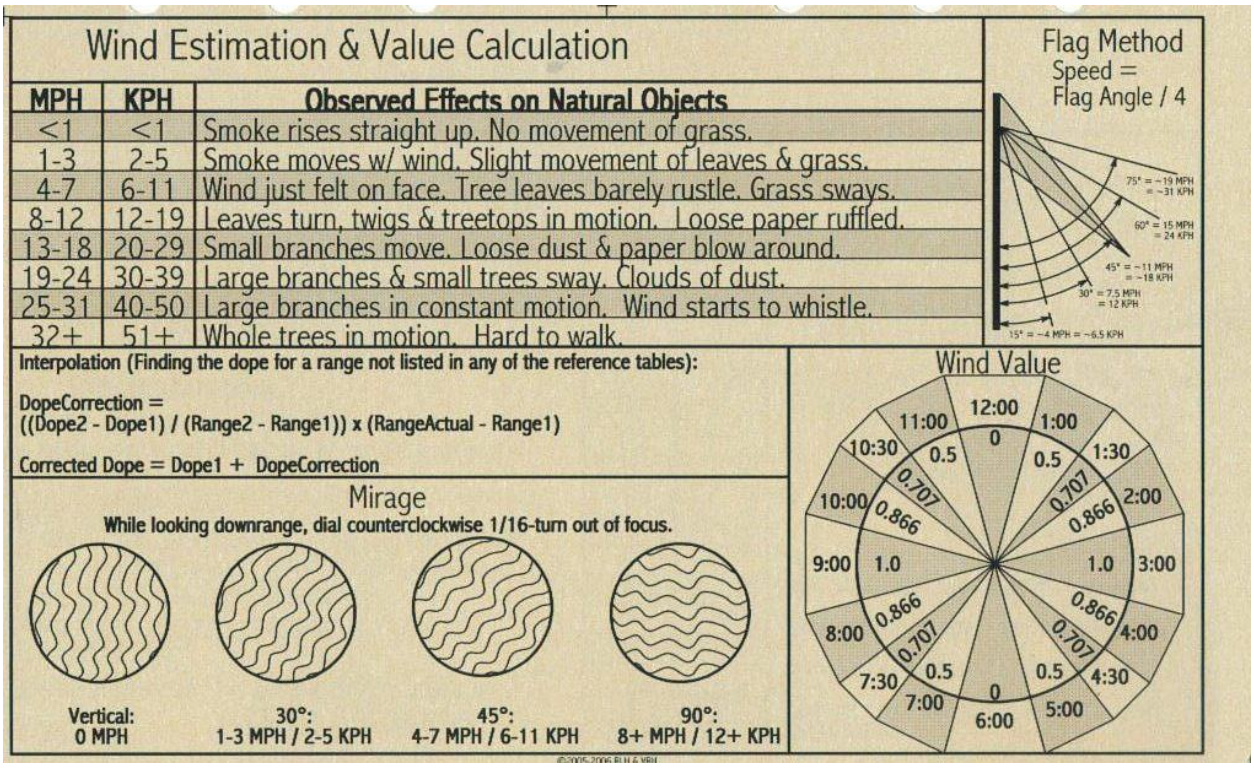
Headwind and tailwind: These are the worst kind of wind, and very difficult to read accurately. It can also affect elevation; headwind slightly low, tailwind slightly high. Be vigilant for changes that introduce a lateral wind value. See also: http://www.exteriorballistics.com/ebexplained/4th/531.cfm



Different bullets at different velocities respond to wind, *differently*. You should know the ballistic coefficient for the bullet you're using, and plug it into a ballistic calculator to determine the 1 mph full value wind effect for your particular setup. Ballistic AE is the iOS app I use.



Learn to read and use different wind indicators; mirage, flags, dust from bullet impact in the berm, leaves, grass, etc. Continually try and determine which of these indicators is reflecting the conditions your bullet is encountering. When you are not looking through the riflescope you should be looking through your spotting scope if one is available.



Look at the entire range for indicators of changes with wind. Preference should be given to indicators on the UPWIND side of the range whenever possible. Do not become fixated on only one indicator. Do not become so focused on wind **speed** that you fail to pick up changes in wind **direction**.

There is often more than one wind vector on a rifle range. Look at the entire range and be prepared to net the effects together. Be aware of gaps in a tree line or other natural terrain features which might affect the wind along the course. When you are confident of the wind speed and direction, and the deflection it will have on your bullet, take the shot.

Spin Drift

A bullet in flight is stabilized by spinning, and for very complicated reasons, this spinning causes the bullet to drift in the direction of rotation. This is 'spin drift' and with a .308 will add between 3/4 and 1 MOA of (usually right) drift at 1000 yards, and proportionally less at closer range with the effect generally disregarded inside about 500 yards.

A Firing Solution

Putting it Together – An Example (Using MOA)

You are setup at 1000 yards, and have your elevation dialed in based on your rifle data and current DA. You have been watching the wind all morning which is light and slightly variable. You estimate wind speed at about 4 mph and wind direction from around the 10 o'clock position. You multiply 4 mph times 70% and get an effective wind value of 2.8 mph. You know at this distance the influence on a bullet for each 1 mph wind effect is .48 MOA. You multiply 2.8 x .48 and get 1.34 MOA, or 3 x .5 and just use 1.5 MOA rounded. Either dial the 1.5 MOA left wind or hold off from the target center. Don't forget you have to add the effect of the 1.5 MOA of wind blowing the bullet right with the 1.0 MOA of spin drift to the right. The correct firing solution for that condition is 2.5 MOA left hold.

- You can either add 1 MOA (or whatever) of left spin correction to your rifle zero, for a 1000 yd zero, or just include it in your corrections. Either way, you have to remember it's there.
- Learn to hold off (aiming right or left of center) for wind. You can easily get lost in making scope adjustments and really screw things up. Badly.
- It's OK to use a little "Kentucky Windage" as long as the conditions are generally consistent. If there are large directional or velocity changes you may need to stop shooting and start doing the math again. If you get lost in wind changes, just relax, reset everything to zero, and re-compute the solution.
- If things really start going to shit, **stop shooting** and figure out what is going on. If there is a significant change, *don't be afraid to wait it out until a preferred condition returns*.
- Keep reading wind and making adjustments to the point of aim until the very last second when you take the shot. Never stop reading wind.

If you're having trouble arriving at a firing solution, raise your hand and we'll work through the problem together.

Ballistic Table

	308 Win 168gr 2650fps		308 Win 175gr 2600 fps		.223/5.56 69gr 2950 fps	
Range (yds)	Elev (MOA)	1 mph CORR	Elev (MOA)	1 mph CORR	Elev (MOA)	1 mph CORR
100	0	0.04	0	0.04	0	0.05
200	1.8	0.08	1.9	0.07	1.4	0.10
300	4.3	0.12	4.5	0.11	3.5	0.15
400	7.0	0.16	7.2	0.15	2.5	0.21
500	10.0	0.21	10.2	0.19	8.4	0.27
1,000	28.3	0.48	28.2	0.42	26.0	0.63

Working with a Spotter or Coach

When a shooter and spotter are working together there is a division of responsibilities. The shooter is responsible for any vertical or elevation dispersion on target and the spotter is responsible for any lateral or windage errors. Everyone is doing their job when the bullet arrives exactly on target at precisely the right time. Below are some tips for helping make that happen. Try and keep chatter to a minimum. Ideally, there should be very little discussion when you are preparing to take a shot. Keep the necessary communication succinct and to the point.

A good example would be:
SPOTTER: "Shooter ready?"
SHOOTER: "Shooter Ready"
SPOTTER: "Left Center Hold - Send It"

Everything that needs to be communicated has been, and nothing else. How do you get to that point? Here are some tips:

- The shooter should prepare for the shot quickly and efficiently. That means all of their gear is where it's needed, and they are comfortable and settled into their shooting position with the target acquired. Don't tell the spotter you are ready when you aren't and then fumble around for another 2 minutes setting up. 'Shooter ready' means you are ready to accept the wind call and pull the trigger. *No more than about 2 or 3 seconds should elapse between the call and the trigger pull.* If the shot is not taken in that time, re-compute the wind call.
- The spotter's job is to make the wind call, so their focus should be downrange while maintaining a general idea what their partner is doing and where they are in their setup. Don't start feeding wind calls to the shooter while they are still setting up. It is, however, OK to give the shooter the ***expected setup*** as they appear to be in the final stages of getting settled in. I like to say something like 'Expect a (whatever left/right) hold" as they appear close to being ready.
- Do not rush unless you have to. If you are having trouble deciding on a wind call or are waiting for a condition to improve, tell your shooter what is going on and let them relax if there is time to do so. Maintaining a ready-to-shoot condition is tiring and it's easy to wear the shooter out.
- It's OK to work together on a call and discuss conditions if necessary – just be mindful of the time needed for the shooter to get back in "ready" mode.
- Agree on aiming conventions before you start shooting. For this exercise I'd suggest: Center, Right/Left Center and Right/Left Edge holds on target.

Notes: