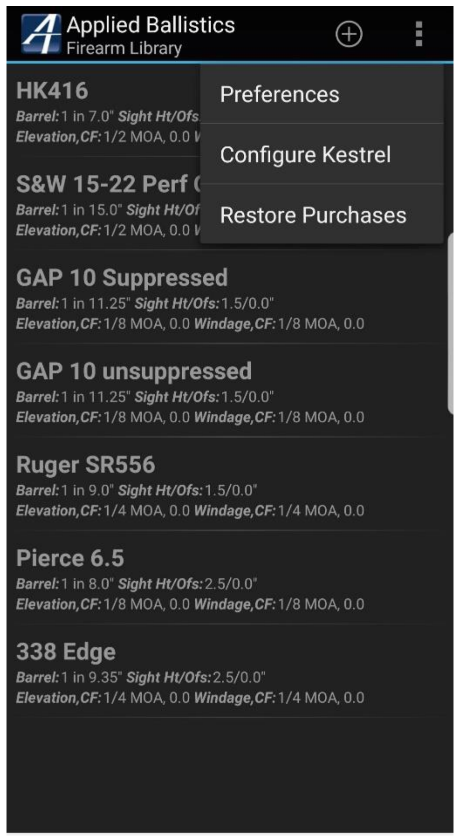
APPLIED BALLISTICS
THE SCIENCE OF ACCURACY

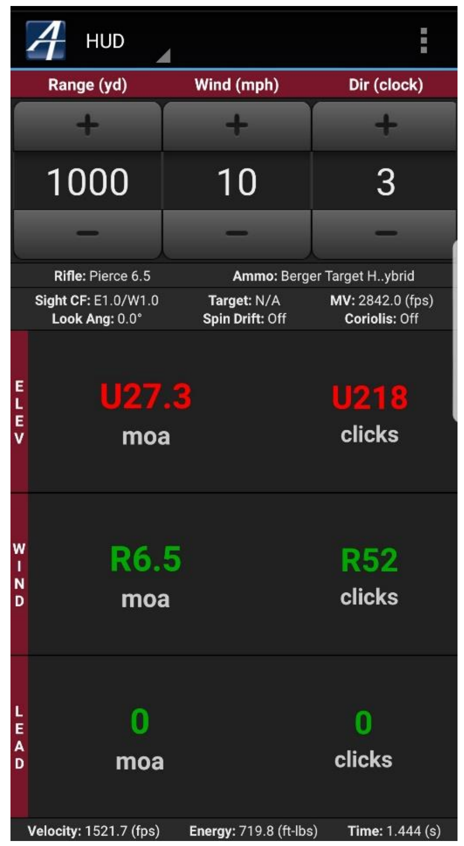
Applied Ballistics Mobile Application V2.1

For Android and iPhone

The Applied Ballistics Mobile Application is the most versatile, accurate and user friendly ballistics program available. This page is dedicated to presenting operational requirements, along with the many features and their proper use. Kestrel Connection to iPhone is not available at this time. All screens are relatively the same between Android and iPhone all functions are the same where appropriate.



Initialization screen and Menu



Some firearm inputs

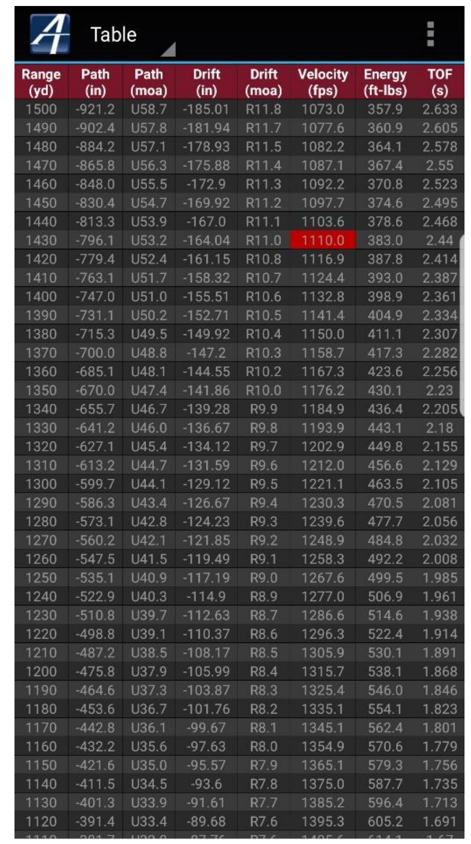


Table output view

Reticle output view

Features

The following table lists the features of the Applied Ballistics Mobile app and gives a brief explanation of what they are/do. Greater detail along with directions for how to properly use all the features is given below in the instructional sections of this page.

Highly Accurate Ballistics Engine	The Applied Ballistics Mobile App runs a Point Mass ballistic solver. The program integrates the equations of ballistic motion numerically, using a 4th order Runge-Kutta routine at 1000 Hz. This is a standard way of solving dynamic equations of motion in aircraft and missile simulations. This particular solver was written by former missile design engineer and current ballistician Bryan Litz.
AB Connect™	The Applied Ballistics Mobile App comes with AB Connect™. Unlike traditional apps which require the entire app to be updated in order for the library to be up to date, the AB Mobile app has direct communication with the ballistics laboratory server and database. This means the app is able to check the library in real time, and prompt the user of any bullet changes/additions that are available. Regardless of when the last app update occurred, the library is never out of date.
Custom Drag Curves	Applied Ballistics Mobile App features custom drag curves to model a specific bullet, rather than referencing drag to a standard. Using custom drag curves enables more accurate trajectory predictions for projectiles that slow to and below transonic speed which happens when shooting at Extended Long Range (ELR).
Firearm/Ammo Profiles	Build and store custom profiles that characterize your specific rifles, sights, and ammo for easy recall.
Restore Purchases	If you purchased an Applied Ballistics Custom Drag Curve, and had to re-sync your profiles from the web, or you had to re-install the program. You can Restore Purchases from the Firearm Library Menu, and it will restore previously purchased drag curves.
Bullet Library	The Applied Ballistics Mobile App currently has a built-in library including Bryan Litz' measured ballistic coefficients for over 780 popular bullets. This allows you to easily select your bullet and have its data loaded into your ammo profile automatically. The bullet library will continue to expand in future updates.
Distance Calculator	Use the built-in distance calculator to estimate target range using your scope's reticle (supports MOA, IPHY and Mils).
Angle Detection	Use your device's accelerometer to determine look angle (up/downhill shot). Simply turn on the angle detector and point device at target.
Automatic Atmosphere	Automatically populate Altitude, Temperature, Pressure, Humidity and Wind Speed by pulling data from the nearest weather station based off GPS location (Density Altitude may also be used instead of altitude/pressure/humidity input).
Zero Atmosphere	You can specify atmospheric conditions during the time you sighted in your rifle into each ammo profile and the ballistic solution will automatically correct for it. This is particularly useful for those who use longer zero ranges (>100 yards/meters) and shoot in an atmosphere that's vastly different from what they zeroed in.
Atmosphere from Kestrel	If you have a Bluetooth-enabled Kestrel device, you can load the atmosphere straight from your Kestrel into the program. *Note:* Android version only.
Atmosphere f/ WeatherFlow Meter	If you have a Bluetooth-enabled WeatherFlow Meter, you can load the atmosphere straight from your WeatherFlow into the program. *Note:* Only available on Android at this time.
Aerodynamic Jump	This app calculates and adjusts for the vertical component a crosswind can induce on the bullet as it leaves the muzzle.
Coriolis Effect & Spin Drift	You can figure in Coriolis acceleration and/or gyroscopic drift (spin drift) into your solution. You can use your device to acquire your latitude and the target's Azimuth (for Coriolis). *Note:* Spin Drift is only available if you enter both barrel twist and bullet length in the rifle and ammo profile. Both Coriolis effects and spin drift are optional features, easily disabled by un-checking a box.
Powder Temperature	You can specify your load's powder temperature at time you chronographed along with the variation of muzzle velocity (fps/mps) per degree (F/C) and the app will automatically adjust the muzzle velocity based on current powder temperature.
Powder Temp Custom Input	Input a powder temperature separate from the ambient air temperature for MV adjustments.
Graphs	Compare trajectory and windage for up to 6 loads at once in a full color graph (see screenshots below).
Interactive HUD Output View	Elevation, windage and lead solutions are presented in large and easy to see font for your desired correction unit (MOA, IPHY or Mils). You can easily tap-in changes to distance, wind, wind direction, lead and lead direction or invoke the distance calculator, angle detector or azimuth detector and the solutions will be auto-recomputed upon any changes to input.
Share Trajectory Table via Email	Send the trajectory table output to any email address so that you can print it out for future use.

Ballistic Calibration	Sometimes it's not possible to accurately determine all the variables required to calculate an exact ballistic solution. As a result, the Point Of Impact (POI) predicted by the program can be a little different from where the actual bullet hits in the real world. One of the more powerful features of the Applied Ballistics Mobile App is the 3 modes of *Ballistic Calibration.* A user can calibrate the program based on real world observed drop data at range by inputting pairs of observed range/drop data, and the program will calibrate itself to your data point by modifying either: muzzle velocity, drag, or simply by scaling the computed drop. As one of the most powerful features only available in the advanced version of the application, the proper use of Ballistic Calibration requires a user to learn the details of how to use it correctly. Full instructions on all 3 modes are given below in the instructions.
Reticle Output Views	The effectiveness of a ballistics application goes beyond simply providing raw elevation and windage adjustments. To fully leverage the accurate fire solutions, the AB Mobile app provides reticle output views which graphically shows where to hold in the context of a given reticle for a particular shot.
Dark Theme	There is a dark-colored theme available to those who prefer that.
Metric Support	Data inputs/output can be configured to use Metric units.

* Features listed above in ***Bold Red*** are advanced features that are not available in most ballistics programs.

Operational Overview

The general flow of the program is in-line with the natural flow of information for a typical shooting engagement. Libraries of rifles and ammo are pre-built so when you're in the field, you simply choose a rifle, ammo, and progress to the environment inputs where you enter all the specific details of your current environment. Finally you choose the solution view that best suits your shooting objective. The following sections cover the details of operation.

Inputs

This section covers the various inputs required to build; rifle profiles, ammo profiles, and describe the target and environment to the ballistic solver. It's important to note that the more accurate the inputs are, the more accurate the output will be. If you rush thru the inputs and only use approximate numbers, the output will be correspondingly *approximate.* However if truly accurate inputs are gathered and input, this program is capable of highly accurate predictive fire solutions.

Rifle Library

When first opened, the application shows the rifle library which will be blank the first time you run the program. Touch the 'Add Firearm' button to open the screen where you'll enter all inputs related to the rifle and sight/scope. **Once created, you can edit or delete firearms by touching and holding the name of the firearm in the library listing for Android or By swiping the name of the firearm to the left in iOS.** Below is a detailed list and explanation of all the variables required on this page.

Profile	
Name	This is a descriptive title you give to the rifle/scope system that will appear in the library listing.
Firearm Data	
Barrel Twist	How many "inches per turn" is your rate of rifling twist. This number is used along with other inputs to determine the stability and related trajectory metrics. Typical value for this input is between 1:7" and 1:13".
Twist Direction	[Left or Right] Right refers to a clockwise direction of rotation from the shooters point of view. Most barrels are right twist.
Sight Height	How high the scope centerline is above the bore centerline. This is typically between 1.5" and 3.5".
Sight Offset	the scope centerline is not directly above the bore centerline, this input defines how much and in what direction. Unless your scope is not mounted right over the barrel, this input will be 0.
Sight Data	
Reticle	Here is where you select the reticle you would like to see in the reticle output view. Some default reticles are available with the app.

Reticle True Magnification	Second focal plane scopes have a specific power at which the reticle scale is accurate, or 'True'. Refer to the literature for your particular optic to find out what power the scope has to be on for the reticle to be scaled properly. Note, first focal plane scopes are 'true' at any power. If this particular rifle has iron sights (no scope) then these inputs don't matter.
Reticle Low Magnif.	This is the lower limit of the scopes power range, used for scaling reticle output view. (Minimum Value should never be below 1, never input 0).
Reticle High Magnif.	This is the upper limit of the scopes power range, used for scaling reticle output view.
Elevation Unit	What units does your scope adjust in: Minutes Of Angle (MOA), Miliradians (MILS) or Inches Per Hundred Yards (IPHY)? Most scopes are either MOA or MIL.
Elevation Turret Grad	What is the value of each 'click' on the elevation turret? Usually MOA scopes are 1/4, some are 1/8. MIL scopes are usually 0.1 with some being 0.05.
Windage Unit	Same as elevation only for the windage knob of the scope.
Windage Turret Grad	Same as elevation only for the windage knob of the scope.
Lead Unit	This is the units that the calculated Lead will be displayed for moving targets. Typically you want this to correspond to a reticle feature (MIL dots for example).
Elevation Correction Factor **Windage Correction Factor**	These are actually very important inputs that describes how much your reticle *actually* moves in response to a given adjustment. For example, if you dial 40 MOA on your scope and it only really shifts the point of aim by 38.5 MOA, you need to apply a *correction factor* (CF) to account for this, otherwise your scope adjustments will not result in the proper aim. Use the Tall Target Test which has the calibration factor calculator to figure out how to determine the proper CF for your scope. If you currently don't know your scopes CF you can enter 1.0 (which will apply no correction). However, keep in mind that many perceived errors in ballistic predictions are actually errors in scope calibration. This is an important input that you should determine at your next trip to the 100 yard range.

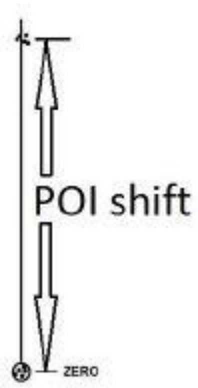
“Tall Target Test” - Determining Elevation Correction Factor

The intent of this section is to assist in calculating a scope correction factor (CF) based on shooting the tall target test at 100 yards. The point is to see if your scope is really giving you what you’re dialing for adjustment. If not, the correction factor is applied to raw ballistic calculations to make up for the error in scope adjustment.

Procedure:

1) Set up a tall target at 100 yards with a vertical line (confirmed with plumb bob or level). 5
2) Place an aim point near the bottom of the vertical line and shoot a group to confirm zero.
3) Dial up (or hold) at least 30 MOA (or 10 MILS) of elevation and shoot another group.
4) Measure the distance between shot groups with a tape measure.
5) Use the formula below to calculate your scopes Correction Factor (CF).
6) Apply the Correction Factor to any raw ballistic solution to account for scope tracking error.

Calculate Correction Factor Based on Range and POI Shift According to the following formula:



First step is to select a constant based on measurement units:

Range Unts:	Adjustment Units:	Constant
Yards	MOA	0.01047
Yards	MILS	0.03599
Meters	MOA	0.01145
Meters	MILS	0.03936

Expected POI Shift = Dialed x Range x Constant

Correction Factor (CF) = Expected POI Shift ÷ Actual POI Shift

Example:

Suppose the range to target is 102 yards. You dial 30 MOA and get a POI shift of 29.8 inches. The formula will apply as follows:

1) Since you’re dealing with yards and MOA, select the Constant of 0.01047.
2) Next, calculate Expected POI Shift: Expected POI Shift = Dialed x Range x Constant
   Expected POI Shift = 30 MOA x 102 yards x 0.01047 = 32.04 inches.
3) Finally, calculate Correction Factor:
   CF = Expected POI Shift ÷ Actual POI Shift
   CF = 32.04 Inches ÷ 29.8 Inches
   CF = 1.075
4) Apply this correction factor to any raw ballistic prediction. So if the ballistics program calls for 30 MOA elevation for some shot, you should dial:
   30 MOA x 1.075 = 32.25 MOA to actually get 30 MOA

The procedure is the same for any combination of units and range, just plug in your numbers and apply the proper Constant, calculate Expected POI Shift, and finally the Correction Factor.

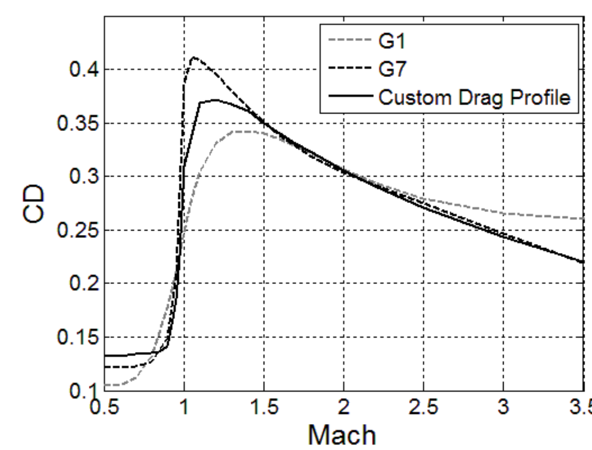
After you've entered all the inputs on the rifle page, click 'update' and this rifle will be stored in the rifle library under the name you entered.

After you've created one or several firearms, it's time to move on and add ammunition.

Ammo Library

In the ammo library, you have the option to Add Ammo or view the Bullet Library. If you select Bullet Library, it will guide you thru a process of selecting a bullet from the programs extensive data base.

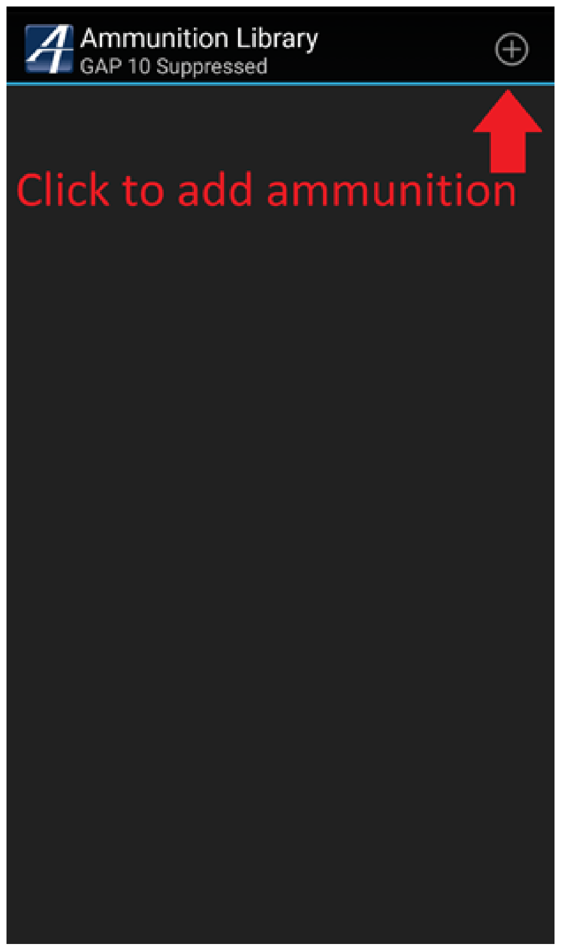
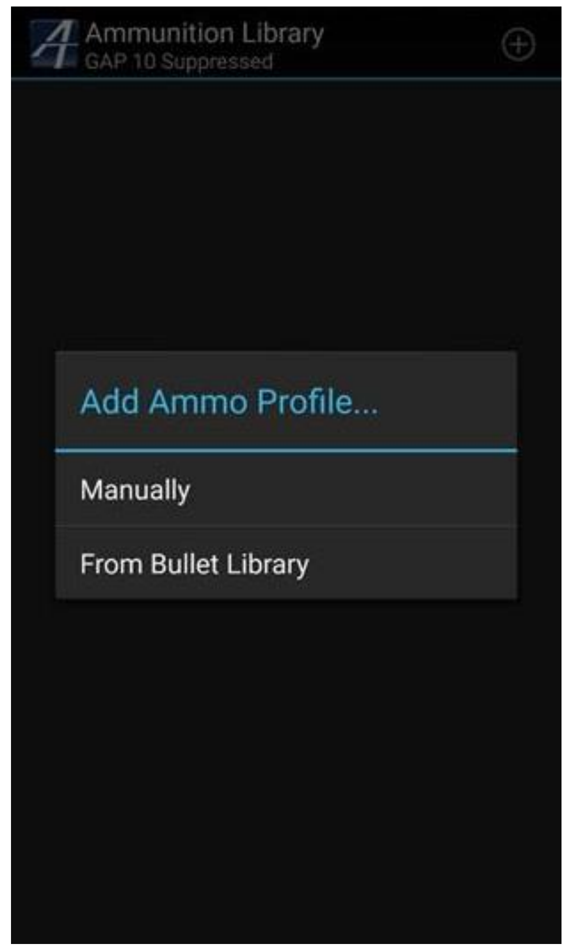
If you select 'Add Ammo', you can enter your ammo including all bullet parameters from scratch. **Once created, you can edit, delete, duplicate or duplicate to another firearm by pressing and holding the ammo title in the library list for Android devices, or by swiping to the left on iOS devices.** The following explains all of the inputs required to add an ammo type.

Profile	
Name	Descriptive title that identifies this ammunition in your library.
Ammunition Data	
Bullet Diameter	**[Inches]** This is the bullet caliber. For example, .284, .308, .338, etc.
Bullet Weight	**[Grains]** Self-explanatory.
Bullet Length	**[Inches or Centimeters]** This is used for stability and related trajectory calculations including spin drift.
Muzzle Velocity	**[feet per second (fps) or meters per second (mps)]** How fast the bullet leaves the rifle as measured by a chronograph. For very accurate results, remember to account for the velocity lost in the 10-15 feet between the muzzle and the chronograph. As a rule of thumb, a bullet looses 5-15 fps in this short distance.
MV Variation	**[fps/ºF or mps/ºC]** This variable describes the temperature sensitivity of your ammunition in terms of fps/degree. For example, if your MV is 3000 fps at 80 degrees, and 2980 fps at 40 degrees, the variation is 20 fps in 40 degrees, so you would input 0.5 fps/degree.
Powder Temperature	**[ºF or ºC]** This is the temperature of the powder that corresponds with the Muzzle Velocity that was input.
Atmosphere Standard	**[ASM or ICAO]** This is the atmosphere model that you want to use. ASM (Army Standard Metro) is the old model, ICAO (International Civilian Aviation Organization) is a newer model. ICAO is the correct choice in most cases. The importance of this choice is that it should match the atmosphere model that your BC is corrected for. Only choose ASM if you're using a BC advertised by Barnes, Hornady or Sierra. All other sources of BC's including Bryan Litz's measured BC's and custom drag curves are matched to the more modern ICAO standard.
Drag Model*	**[G1 BC, G7 BC, or Custom]** This is the projectile drag model that will be applied for your bullet. Most long range bullets are better matches to the G7 standard, and using G7 BC's (Ballistic Coefficient) will provide sufficiently accurate trajectory predictions out to a range where the bullet slows to transonic speeds (~1340 fps which is in the neighborhood of 1000 yards for many cartridges). Be sure that if you select the G7 drag model that you enter a G7 BC (not a G1 BC).  For Extended Long Range Shooting, the accuracy of the ballistic solution can be improved by using a ***custom drag curve*** instead of a BC. When using custom drag curves, the ballistics engine is solving the equations of motion using the exact drag curve for a specific bullet, not referencing a standard (G1 or G7) curve. The added accuracy in trajectory predictions that is possible with custom drag curves is especially valuable when shooting at targets at or beyond transonic range, because that's the speed region where drag curves tend to diverge most (see Mach vs CD plot to the right). If you're only shooting to ranges at which the bullet never slows below 1340 fps, little to no improvement can be expected for trajectory predictions compared to using G7 BC's. For further reading on this subject, refer to Chapter 11: *Extended Long Range Shooting* of Applied Ballistics for Long Range Shooting. Custom drag curves are available for many bullets as in-app purchases.
Zero Data	
Zero range	**[Yards or Meters]** This is the range at which your rifles Point Of Aim (POI) equals the Point Of Impact (POI). A Zero range of 100 yards or meters is encouraged for several reasons, including insensitivity to atmospheric conditions, and accounting for inclined fire effects.
Zero Height	**[Inches or Centimeters]** If your POA does not exactly equal your POI at the zero range, you can enter how much the group is off center. In other words if you have 1/4 MOA clicks on a scope and the zero is 0.1" high, you can enter this here to account for the error that's less than 1 click.
Zero Offset	**[Inches or Centimeters]** Same as above for the horizontal direction; use a negative value to indicate left.
Enable Zero Atmosphere	**[Checkbox]** If you use a longer range zero for your rifle, 600 yards for example, that zero will be subject to changes in atmospherics. This feature allows you to compensate for that those effects by entering the atmospherics that apply to your zero conditions.. If you use a 100 yard/meter zero, the impact shift will be too little to worry about in different environments, so you can ignore this feature (leave unchecked) if you have a 100 yard/meter zero.

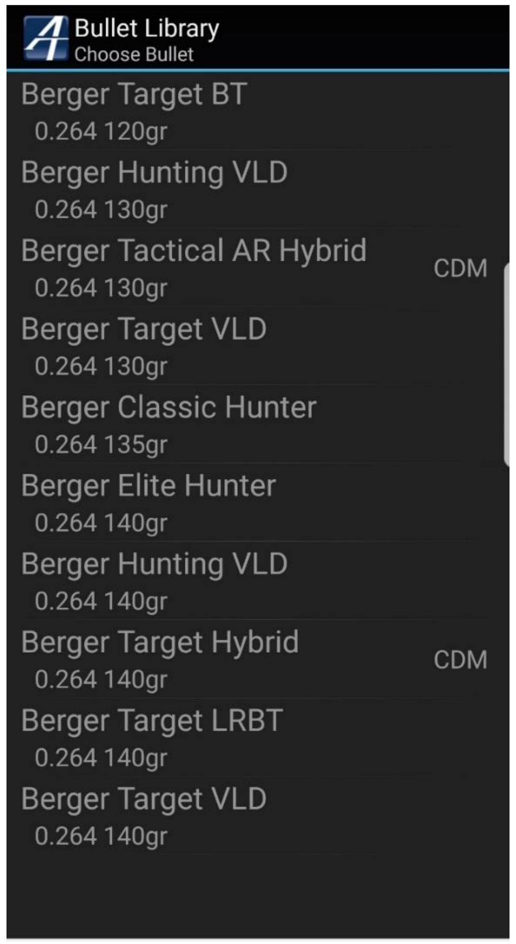
Altitude, Barometric Pressure, Pressure is absolute, Temperature and Humidity	Inputs are all treated the same as the environmental inputs which are described below.

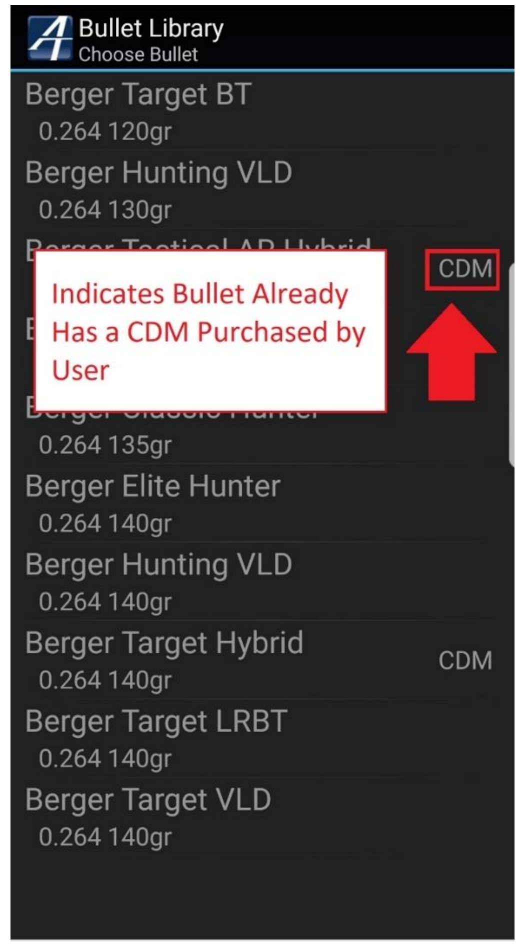
Custom Drag Curves

How to purchase custom drag cures, and use the library. This system functions visually the same on both Android and iOS.

	Custom Drag Curve Purchase
Add Ammunition Screen	First you must select the Firearm, then you will be brought to the Ammunition Library Screen.
Create the Ammo Profile	  Next you must create the bullet, do this by selecting the + symbol in the upper right, then choosing From Bullet Library.

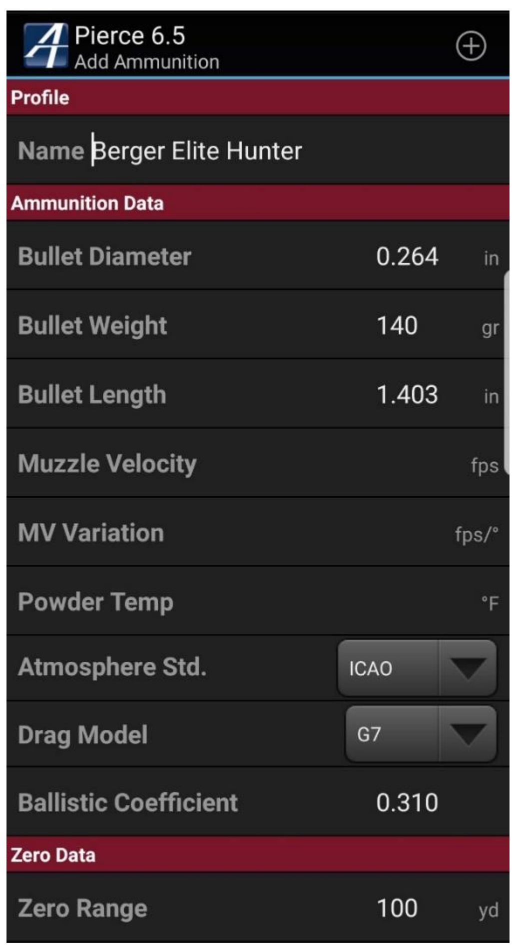
Select The Bullet

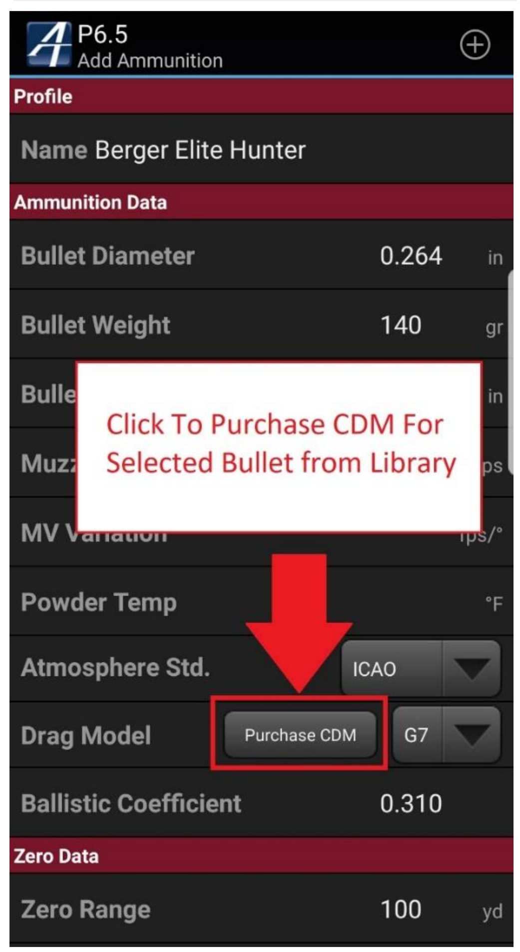




Next select the Caliber, Manufacturer, Bullet, then Form Factor (G1 or G7). If you have already purchased a CDM for a bullet, it will be indicated with "CDM" next to that bullet, and you will have a 3rd option for custom.

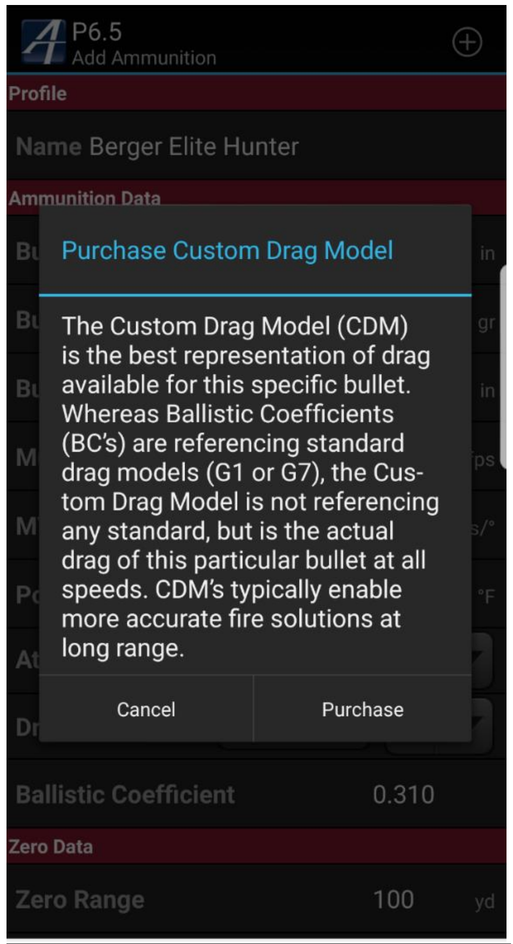
Bullet Main Screen and Drag Model Selection





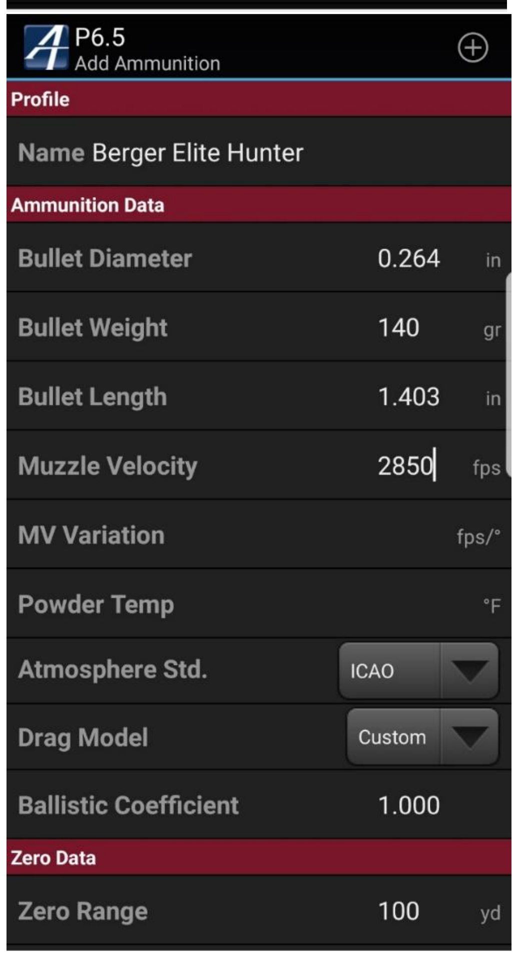
Click on the "Purchase CDM"

Applied Ballistics: Installed Drag Curves Screen, Purchase Library, and Payment.



You will need to complete the purchase by following the payment process.

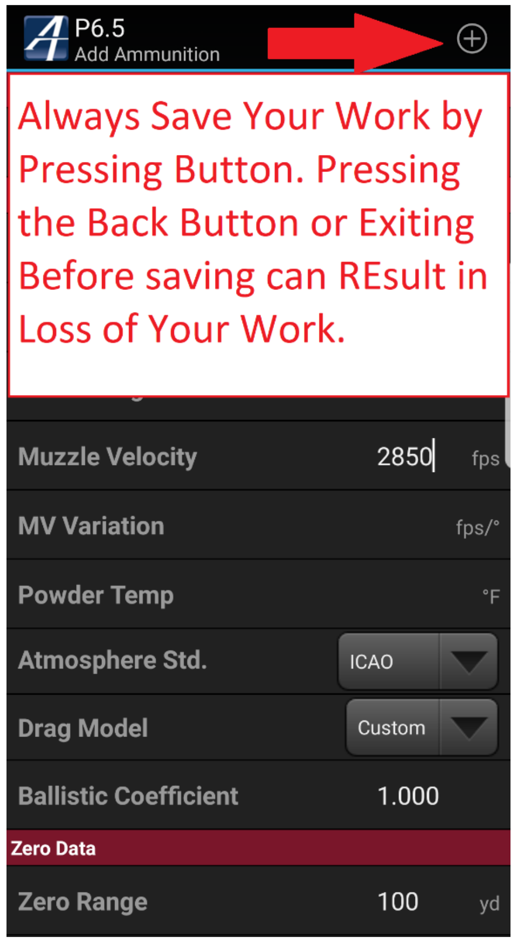
Complete the profile once payment is complete



Once payment is complete, the CDM will automatically be selected as the Drag Model.

NOTE: Muzzle Velocity, MV Variation, and Powder Temp will not automatically populate. Also note the BC portion of the Ammunition Library is replaced by Model/Name. So you cannot alter its BC unless you do a Ballistic Calibration. Note screenshot 1 shows **Model** and screenshot 2 shows **BC**. When using a CDM this portion is locked out. You can change back nd forth by switching the Drag Model to G1/G7/Custom.

Save Profiles



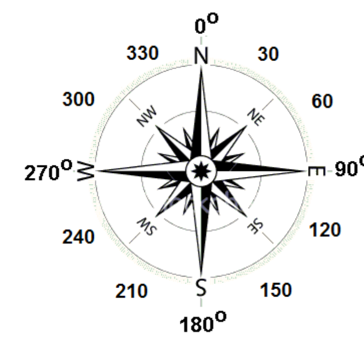
Do not forget to save weapons or ammunition profiles after creating them. The same + symbol you used to create the profile should be clicked in order to save it.

Environment

Having built the Rifle and Ammo libraries ahead of time, the environment screen is where you will spend most of the time when using this program in the field. This is where you enter variables related to the target, atmosphere, and optional effects like spin drift and Coriolis.

Target

Distance	**[Yards or Meters]** This is the range to the target in yards or meters, and is probably the most critical input of the entire program. Estimated distances result in predictions that are no more accurate than the estimation. Entering accurate range values becomes increasingly important at longer ranges where the trajectory is falling off the fastest. Use a laser rangefinder to determine range whenever possible.
Look Angle	**[Degrees]** Also known as inclination angle, this is the uphill or downhill angle to your target and is measured with an inclinometer (angle indicator). Many mobile devices have inclinometers built in, and you can use it to populate the look angle field by going to menu and selecting *get look angle.* The value will be positive for look-up angles, and negative for look-down angles. Small look angles, like less than 5 degrees can typically be ignored with little consequence even for long range shooting. If the angle exceeds 10 degrees it becomes increasingly important to account for.
Move Speed	**[mph or mps]** If the target is moving, this input is the speed of the target.
Move Angle	**[Degrees or Clock direction]** The direction of travel for a moving target either degrees or clock direction. A direction is named from where the target is coming *from.* The angle in degrees is defined as follows. The direction of a target moving: • toward you is 0 degrees or 12 O'clock. • right to left is 90 degrees, or 3 O'clock. • away from you is 180 degrees, or 6 O'clock. • left to right is 270 degrees, or 9 O'clock. See picture to the right for clarification on the directions.



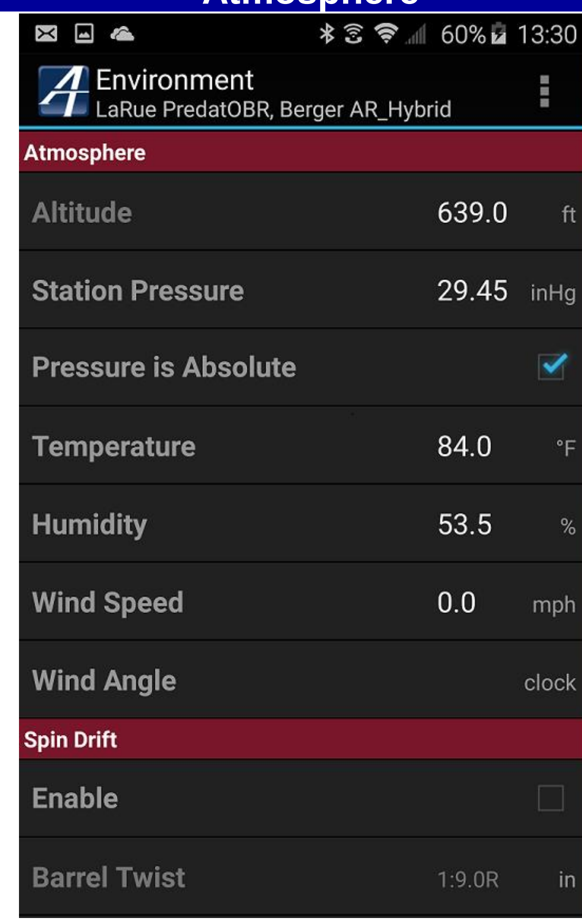
Atmosphere

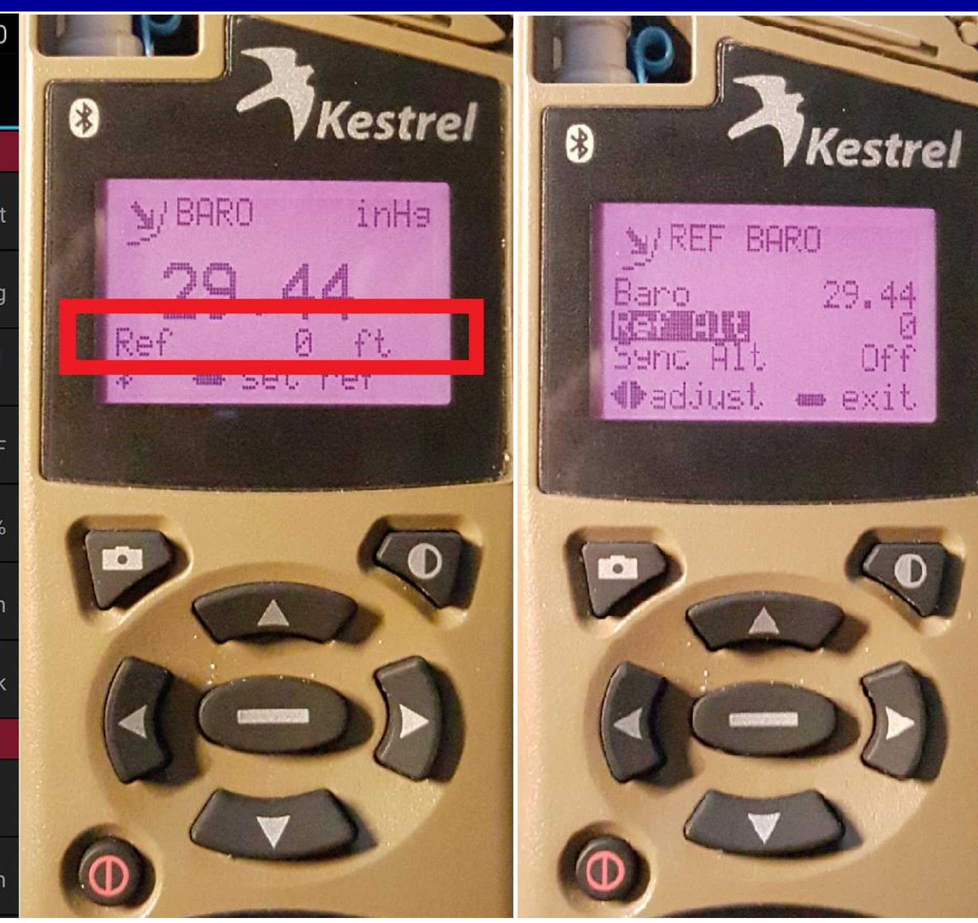
Atmospheric inputs have historically been the least understood and caused the most trouble for shooters running ballistics programs, in particular the pressure inputs. The following discussion elaborates on the correct way to manage these variables. Basically there are two options for describing pressure to a ballistics program; 1) Enter the barometric (aka *corrected*) pressure and altitude, or 2) Enter the Station pressure where you are. Some definitions are in order regarding barometric and station pressure.

Barometric pressure is also known as sea level corrected pressure, and is what the weather station and airports report because it's useful for pilots and making weather assessments. Barometric pressure is not the actual air pressure where you are, rather it's a number that's corrected to sea level. In order to determine the actual air pressure where you are (which is what the ballistics program cares about), you have to account for the effects of altitude. However if you have a handheld weather meter like a Kestrel, you can measure *Station Pressure* directly which is the actual air pressure where you are. This is the preferred method of inputting pressure data because it's one less input and relies on only one measurement instead of two.

A common error is to mistake station pressure for barometric or vice versa. The consequence of this error is that the wrong air density gets applied which degrades the accuracy of trajectory predictions. This error is increasingly more severe the higher up you are above sea level.

Refer to the image on the right for proper set-up of the atmospheric pressure inputs **(ONLY APPLIES TO <u>Kestrel 4000 Series</u>, Modification I<u>s Not Needed for 5000 Series</u> Users).** Note the reference altitude is set to 0 ft in the Kestrel which indicates it's displaying uncorrected station pressure, and the *Pressure is Absolute* box is checked in the program indicating it's using station pressure.





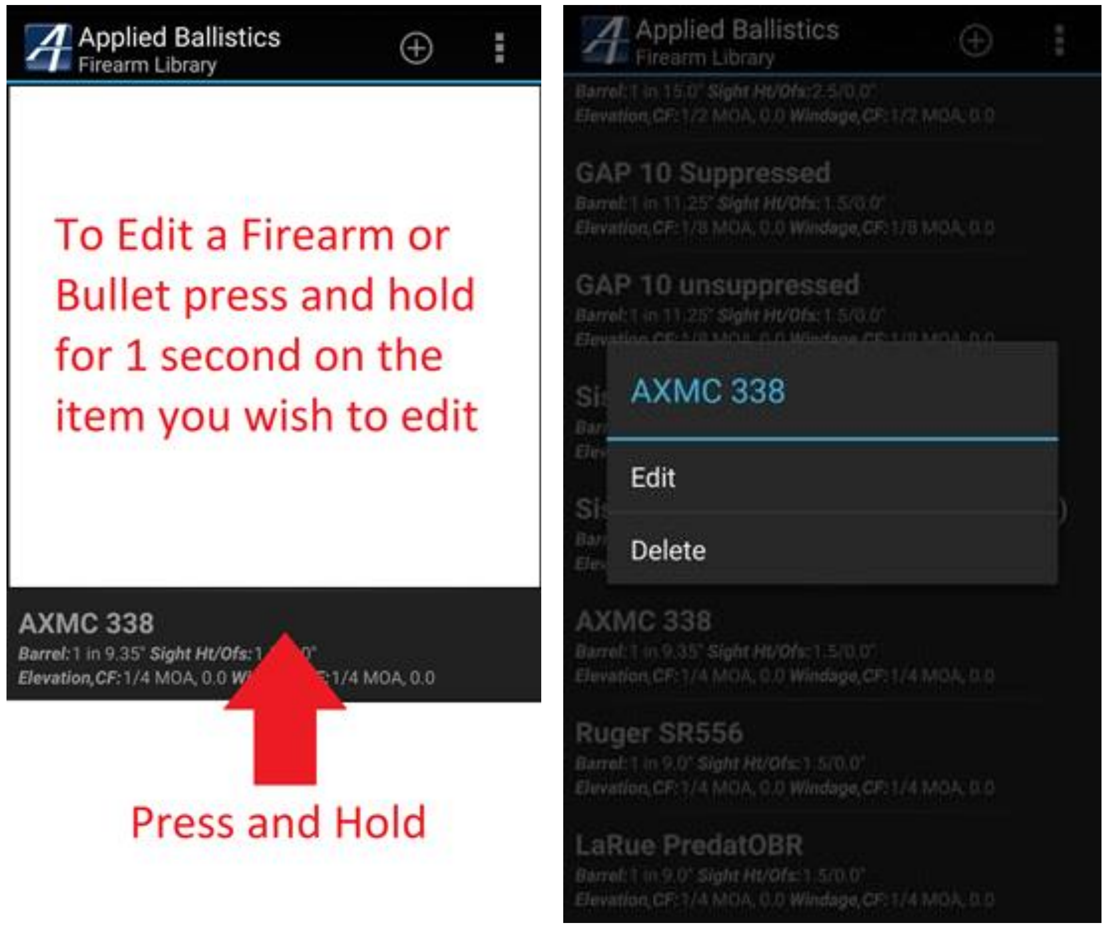
To further clarify the output from the Kestrel, here is an excerpt from the Kestrel user's manual:

"Some final notes - If you wish to know the actual or station pressure for your location (such as for engine tuning), simply set the reference altitude on the BARO screen to "0". In this case, the Kestrel Meter will not make any adjustment and will display the measured value. (Engine tuning and ballistics software sometimes refer to atmospheric or station pressure as "absolute pressure." These applications are concerned with the actual air density, as opposed to pressure gradients relating to weather, so barometric pressure is less useful."

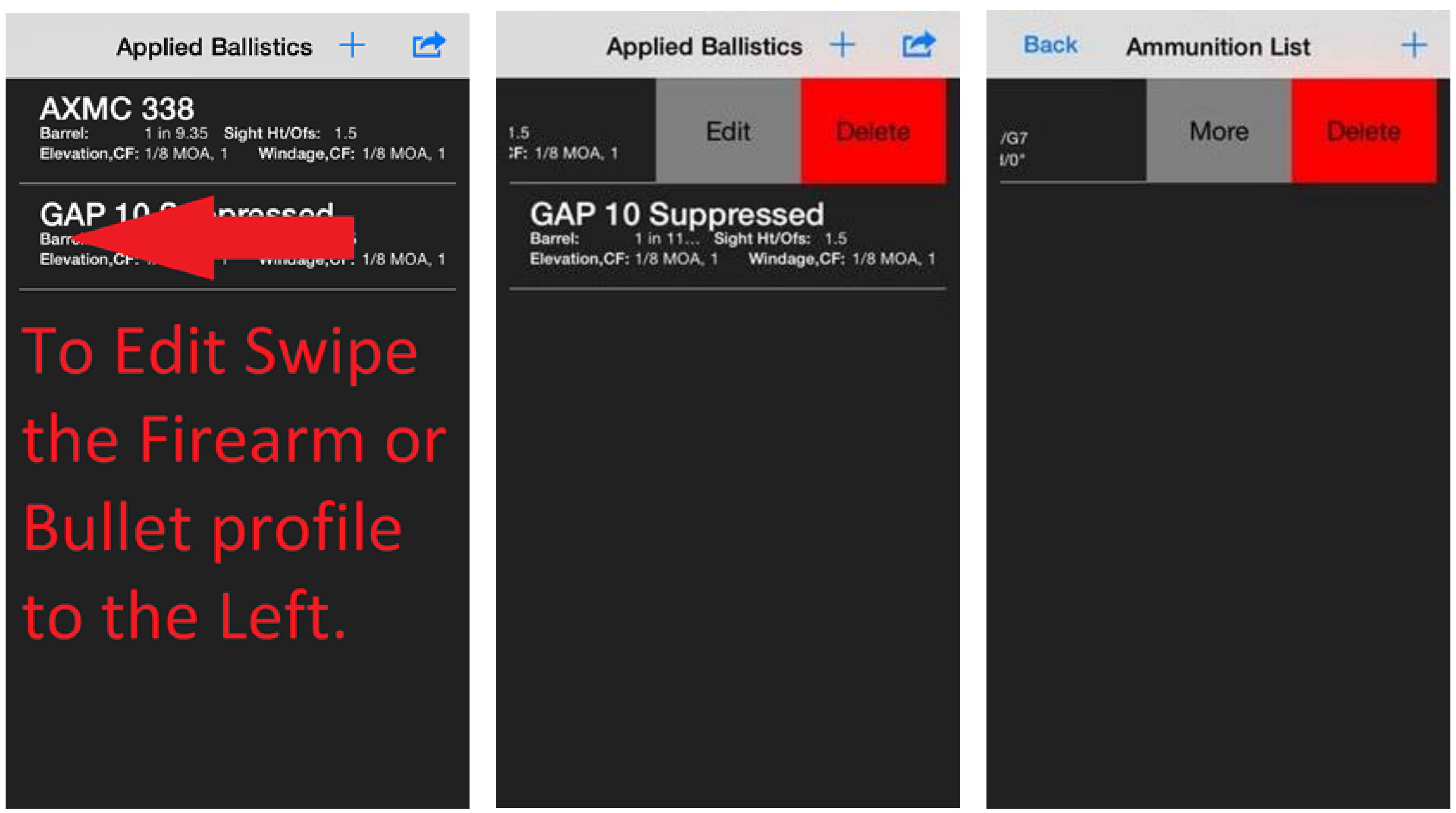
Altitude	This is your altitude above sea level and is only used if you're working with barometric pressure.
Barometric Pressure (or Station Pressure)	If using altitude, input Barometric pressure. If not using altitude, enter measured station pressure at your location (see above discussion under Atmosphere).
Pressure is Absolute	[Checkbox] If checked, it means you're entering station pressure as measured by a Kestrel (or similar device). If unchecked, then you're working with altitude and barometric pressure.
Temperature	This is the air temperature thru which the bullet flies.
Humidity	Relative Humidity in %. This is not a highly important variable, if unknown enter 50%.
Wind Speed	Enter the speed of the wind.
Wind Angle	The angle/direction of a wind is named for where the wind comes from, and you can enter this in either degrees or clock direction. For example, a wind blowing from right to left is a 3 O'clock, or 90 degree wind. A tail wind is a 6 O'clock or 180 degree wind, etc.
Spin Drift	
Enable	[Checkbox] Spin drift, aka gyroscopic drift is a minor effect that can be considered optional in a ballistic solution. If you've given the program accurate inputs related to the bullets stability, it will compute spin drift accurately, but it usually amounts to less than 10" at 1000 yards. The effect is aerodynamic, and arises from the fact that the bullet is spinning. Direction of spin drift is the same as barrel twist, and is in the horizontal plane only.
Coriolis	
Enable	[Checkbox] Coriolis Effect refers to the very small drift of a trajectory that arises from the spin of the earth. There is both a vertical and horizontal component of Coriolis. The vertical component depends on latitude and azimuth of fire. Firing east will cause the bullet to strike high, and firing west will cause you to hit low. Firing north or south will not result in any deflection. The horizontal component depends entirely on latitude, with the deflection always being to the right in the northern hemisphere and to the left in the southern hemisphere. Both components are more severe the further you are away from the equator.
Latitude	How far you are from the equator (south of the equator is noted with -). Tip, most of the lower 48 states of the US lay between 30 and 45 degrees North Latitude.
Azimuth	Direction of fire in degrees, clockwise from north. For example, firing due east is 90 degrees, south is 180 degrees, west is 270 degrees, and north is 0 or 360 degrees. You can access the *get target azimuth* function via the mobile devices built in compass via the menu.

Editing Profiles

Android – To edit Press and hold on the Firearm or Bullet and a menu will pop up.



iOS (Apple) – To edit Swipe the Firearm or Bullet to the left and options will appear.



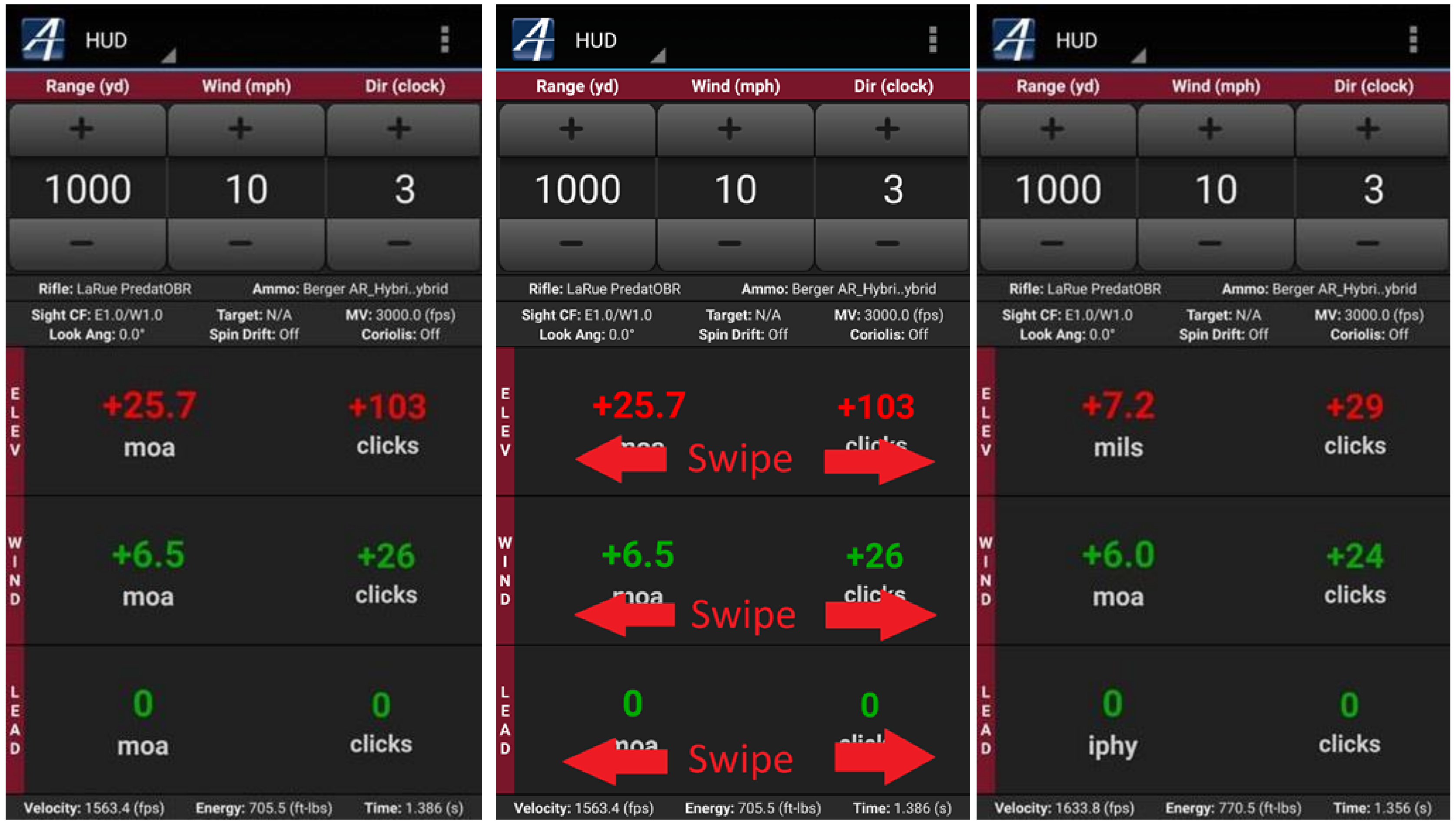
APPLIED BALLISTICS
THE SCIENCE OF ACCURACY

Output

The usefulness of a ballistics app is not limited to putting out an accurate, numeric windage and elevation correction. A truly user friendly ballistics app will display outputs in a convenient form that a user can apply quickly and easily while minimizing the chance of mistakes. The following sections will review the various forms of output available from the Applied Ballistics Mobile App.

Single Shot HUD View

The Single Shot HUD View is the simplest form of output. This display mode simply shows the windage, elevation, and lead as a numeric adjustment in either MOA or MILS. Simply swipe left or right in the elevation, windage, or lead boxes to change units from Mils to MOA to IPHY. In order to change MOA to Mils or IPHY (Shooters MOA) you can simply swipe left and right on Elevation/Wind/Lead. This can allow you to mix/match outputs, or change them where necessary for holdovers if using MOA Turrets on a Mil reticle.



Single Shot Reticle View

The reticle view is available for those shooters who prefer to hold their correction in a scope reticle rather than dial the correction on the scope turrets. The reticle view accounts for scope magnification effects. So you can see where to hold in the reticle no matter what the scope power setting is in both first and second focal plane optics. The reticle view also allows for 'dialing on' elevation in the event you need to hold more than the reticle allows. For example, if you need 40 MOA of total elevation, but you can only hold 30 MOA in the retical, you can 'dial on' 30 MOA and hold 10 MOA. The reticle view is very useful for augmenting the effectiveness of ballistic reticles which are based on certain environmental conditions, MV and BC's. Using the AB Mobile app reticle view, you can use a get a perfect hold for any ballistic reticle, even when you're off condition.

Single Shot Reticle View with MIL-Dot Reticle

Reticle View with +20 MOA "Dialed In"

Trajectory Table

The trajectory table output view simply shows tabulated output that is user format-able via the preferences. You can see your elevation, windage, time of flight, etc in 1 to 100 yard increments. The range at which the bullet goes subsonic is indicated with a red cell.

Table

Range (yd)	Path (in)	Path (moa)	Drift (in)	Drift (moa)	Velocity (fps)	Energy (ft-lbs)	TOF (s)
2000	-2061.3	+98.4	-316.3	+15.1	950.3	260.7	3.952
1900	-1744.3	+87.7	-281.86	+14.2	975.4	274.6	3.64
1800	-1463.6	+77.7	-248.75	+13.2	1002.2	289.9	3.335
1700	-1217.7	+68.4	-217.01	+12.2	1031.1	306.9	3.039
1600	-1005.0	+60.0	-186.78	+11.1	1065.6	327.7	2.753
1500	-822.5	+52.4	-158.21	+10.1	1113.6	358.0	2.476
1400	-668.3	+45.6	-132.27	+9.0	1199.1	415.0	2.216
1300	-538.1	+39.5	-109.51	+8.0	1299.7	487.6	1.976
1200	-428.6	+34.1	-89.75	+7.1	1405.8	570.4	1.754
1100	-336.8	+29.2	-72.65	+6.3	1516.3	663.7	1.548
1000	-259.9	+24.8	-57.93	+5.5	1630.9	767.7	1.357
900	-196.4	+20.8	-45.36	+4.8	1748.8	882.8	1.18
800	-144.1	+17.2	-34.68	+4.1	1870.6	1010.0	1.014
700	-101.9	+13.9	-25.75	+3.5	1996.0	1150.0	0.859
600	-68.3	+10.9	-18.36	+2.9	2125.4	1303.9	0.713
500	-42.4	+8.1	-12.37	+2.4	2259.6	1473.8	0.576
400	-23.4	+5.6	-7.69	+1.8	2398.5	1660.5	0.447
300	-10.4	+3.3	-4.21	+1.3	2541.9	1865.0	0.326
200	-2.8	+1.3	-1.82	+0.9	2689.8	2088.3	0.211
100	0.0	0	-0.45	+0.4	2842.6	2332.3	0.103
0	-1.5	0.0	0.0	0.0	3000.0	2597.8	0.0

Table output view with 100 yard increments

Table

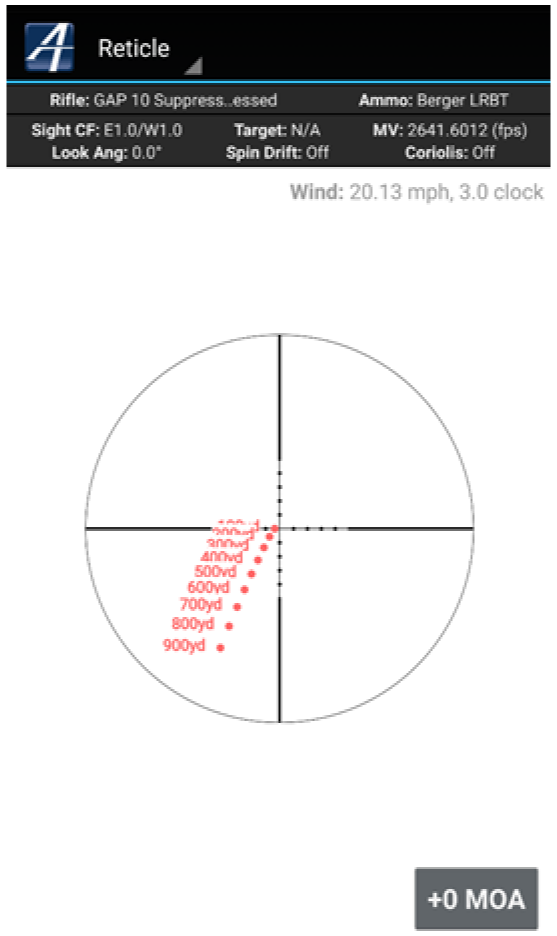
Range (yd)	Path (in)	Path (moa)	Drift (in)	Drift (moa)	Velocity (fps)	Energy (ft-lbs)	TOF (s)
2000	-2066.7	+98.7	-317.11	+15.1	949.3	260.1	3.957
1975	-1983.6	+95.9	-308.36	+14.9	955.4	263.5	3.878
1950	-1903.0	+93.2	-299.7	+14.7	961.6	266.9	3.8
1925	-1824.6	+90.5	-291.11	+14.4	967.9	270.4	3.722
1900	-1748.6	+87.9	-282.61	+14.2	974.3	274.0	3.644
1875	-1674.9	+85.3	-274.18	+14.0	980.9	277.7	3.567
1850	-1603.4	+82.8	-265.85	+13.7	987.5	281.5	3.491
1825	-1534.1	+80.3	-257.59	+13.5	994.3	285.4	3.415
1800	-1467.4	+77.9	-249.47	+13.2	1001.2	289.3	3.339
1775	-1402.5	+75.5	-241.38	+13.0	1008.2	293.4	3.265
1750	-1340.1	+73.1	-233.43	+12.7	1015.3	297.5	3.191
1725	-1279.3	+70.8	-225.5	+12.5	1022.6	301.8	3.117
1700	-1221.0	+68.6	-217.72	+12.2	1030.0	306.2	3.044
1675	-1164.4	+66.4	-209.96	+12.0	1037.8	310.9	2.971
1650	-1110.1	+64.3	-202.34	+11.7	1046.0	315.8	2.899
1625	-1057.7	+62.2	-194.81	+11.5	1054.8	321.2	2.827
1600	-1007.2	+60.1	-187.36	+11.2	1064.3	326.9	2.756
1575	-958.8	+58.1	-180.06	+10.9	1074.3	333.1	2.686
1550	-912.2	+56.2	-172.85	+10.7	1085.0	339.8	2.617
1525	-867.3	+54.3	-165.73	+10.4	1097.1	347.4	2.548
1500	-824.3	+52.5	-158.77	+10.1	1111.5	356.6	2.48
1475	-783.1	+50.7	-151.96	+9.8	1129.0	367.9	2.413
1450	-743.6	+49.0	-145.33	+9.6	1150.0	381.7	2.347
1425	-705.8	+47.3	-138.92	+9.3	1172.6	396.9	2.282
1400	-669.5	+45.7	-132.69	+9.1	1196.3	413.1	2.218
1375	-634.8	+44.1	-126.69	+8.8	1220.8	430.2	2.157
1350	-601.4	+42.5	-120.87	+8.6	1245.8	448.0	2.096
1325	-569.5	+41.1	-115.27	+8.3	1271.2	466.4	2.036
1300	-539.0	+39.6	-109.85	+8.1	1297.0	485.5	1.978
1275	-509.8	+38.2	-104.65	+7.8	1322.9	505.1	1.921
1250	-481.7	+36.8	-99.57	+7.6	1349.4	525.6	1.864
1225	-454.9	+35.5	-94.7	+7.4	1376.1	546.6	1.809
1200	-429.2	+34.2	-90.01	+7.2	1403.1	568.3	1.755
1175	-404.6	+32.9	-85.47	+6.9	1430.4	590.6	1.702
1150	-381.1	+31.6	-81.11	+6.7	1458.0	613.6	1.65
1125	-358.8	+30.5	-76.94	+6.5	1485.5	637.0	1.6

Table output view with 25 yard increments

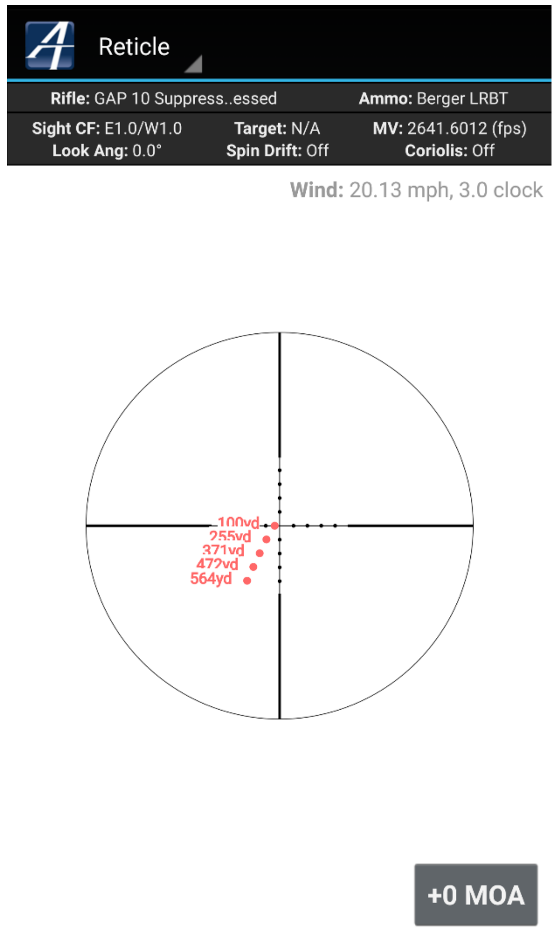
Trajectory Reticle

The trajectory reticle view has two basic options, selectable in the main preferences page. You can either see a hold every 100 yards/meters, or see what range corresponds to each reticle sub tension. You can 'dial on' elevation and the reticle view will dynamically respond.

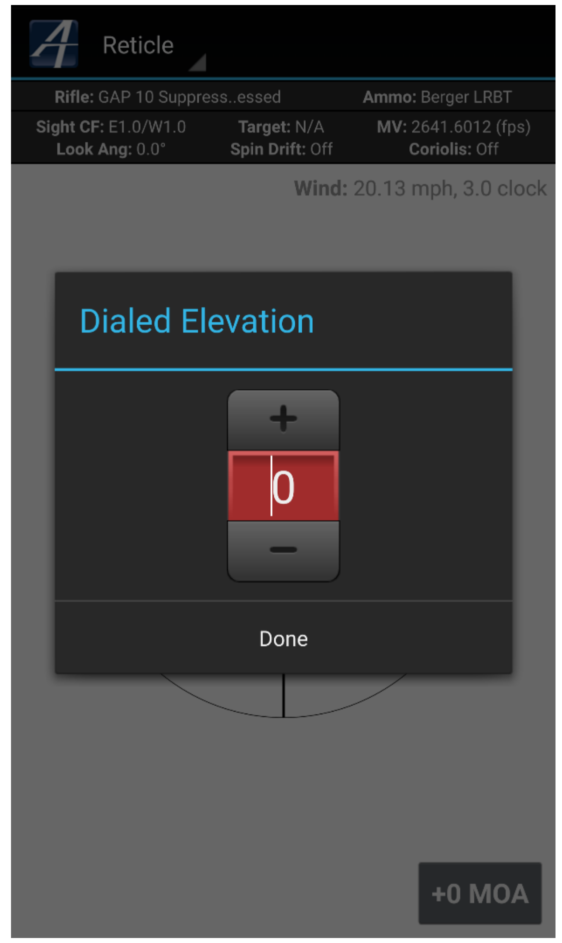
Indicate hold every 100 yards



Indicate range at each sub tension

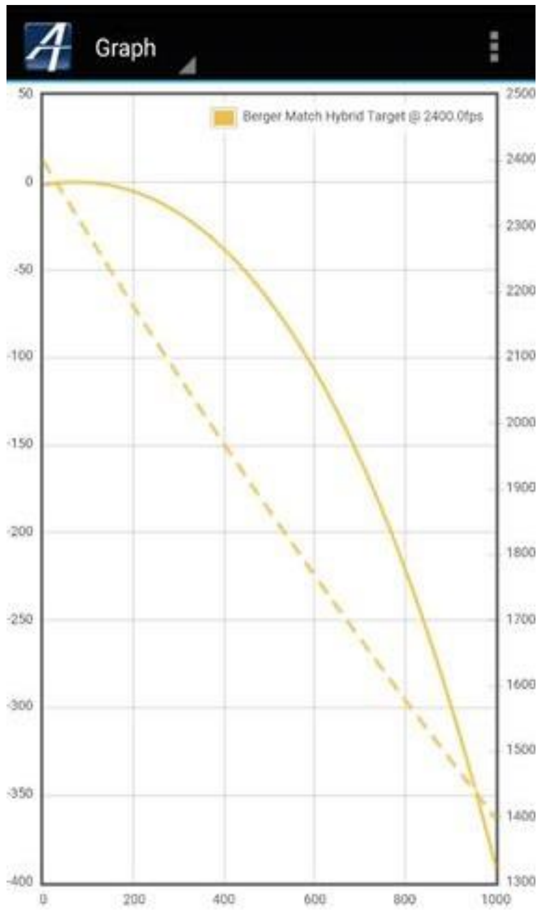


Dial In Elevation

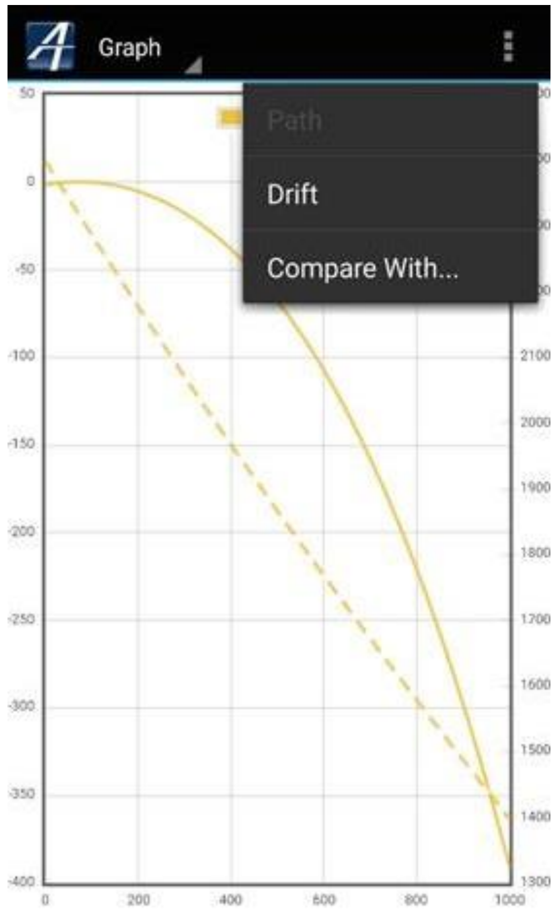


Trajectory Graph

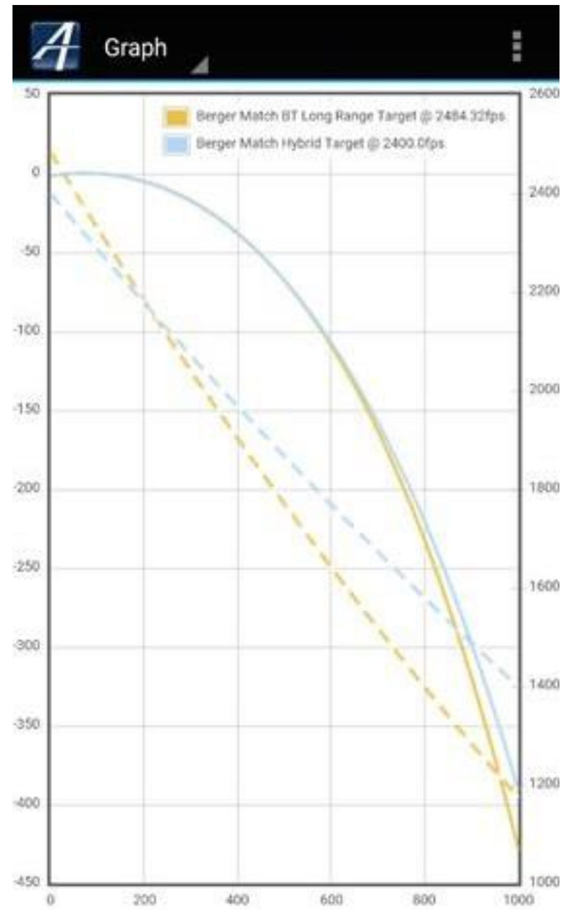
The trajectory graph view shows the ballistic curve, along with velocity. This can also be used to compare multiple bullets, or shifted to show Drift (4th image) instead of Drop. The dotted line shows velocity, and is to be compared with the numbers on the right hand side of the graph. The solid line shows drop and is to be compared with the numbers on the left side of the graph. The numbers across the bottom are your distance marks.



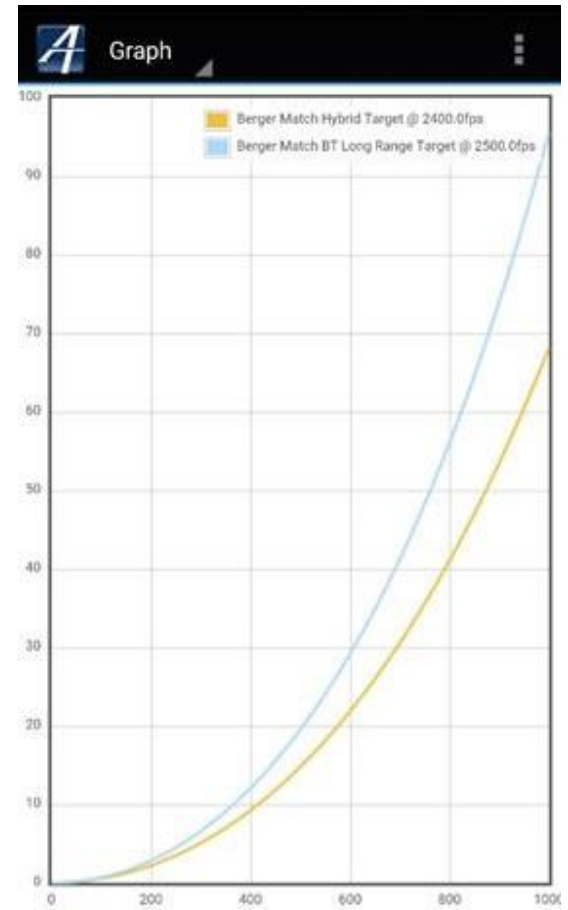
Trajectory Graph output view



Trajectory Graph Menu Options

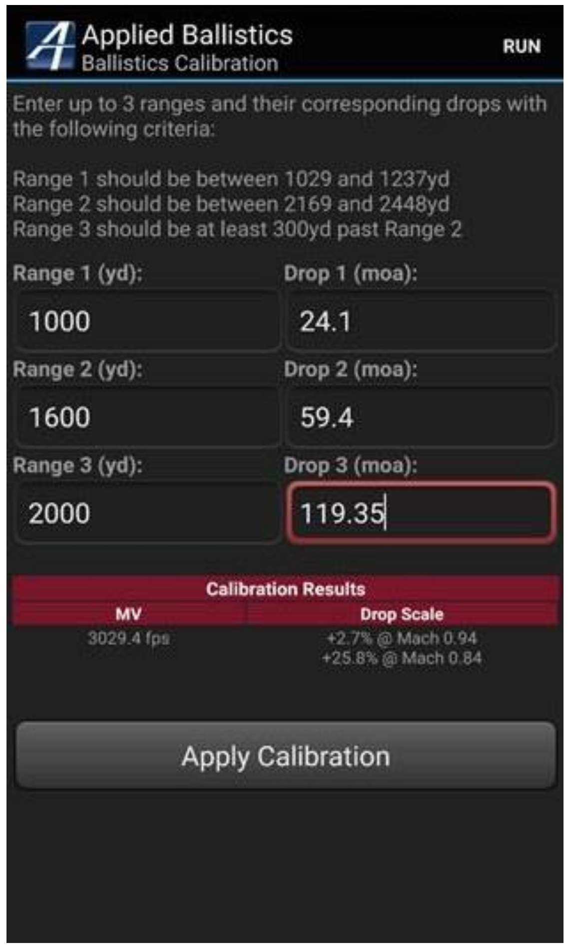


Trajectory Graph with Bullets being compared



Trajectory Graph in Drift View

Ballistic Calibration



The ballistic calibration feature allows a user to calibrate the ballistic solution based on observed bullet drop at range. There are 3 parameters that can be calibrated; muzzle velocity, [bullet] drag, and by directly scaling the amount of drop. The Ballistic Calibration tool is accessed via the main menu from any solution screen.

Due to light sensitivities and uncertainties involved with modern chronographs, velocity measurements are not always as accurate as we would hope. Therefore the first variable a shooter should attempt to calibrate is muzzle velocity. The muzzle velocity calibration should be done at a great enough distance that the amount of drop is great, meaning at least 20 MOA or 7 MILS. If you have multiple 'observed' data points, use the farthest high confidence data point available for muzzle velocity calibration. The interface will state the optimal range in which to calibrate muzzle velocity based on the bullets remaining velocity. After you've entered the observed range/drop pair, hit calibrate and the program will calculate and display the actual MV that results in your observed drop. Click 'Apply Calibration' and the calculated MV will be saved in the ammo library and future ballistic calculations will be based on this value.

The drag calibration feature can be used to adjust the drag model used for a particular bullet, weather you're using a BC or custom drag table. The drag calibration feature is applied after the muzzle velocity calibration, thru the transonic range of the bullet flight. Note that if the observed points require more than 50% adjustment in the original drag of the bullet, the program will not allow it due to the extreme (non-physical) nature of the physics. In other words, if you're trying to scale drag by more than 50% to match your observed drop point, it's likely that the points are not accurate, or were influenced by wind or something else. The primary intent of the drag calibration is for shooting into the transonic zone where various levels of dynamic instabilities can occur, and affect the drag of the bullet differently over various range segments.

The drop calibration feature is intended to compensate for errors in scope tracking. This mode is different from muzzle velocity and drag scaling in that the calibration is only applied to the drop number. The calculated remaining velocity, time of flight, wind, lead, etc all remain based off the original BC and velocity inputs. In other words, the physical solution is not affected in this mode, only the drop. The drop calibration is applied in the region of bullet flight beyond transonic, which is typically at ranges far beyond where most shooters will be able to shoot.

Weather Meter Pairing

Image 1

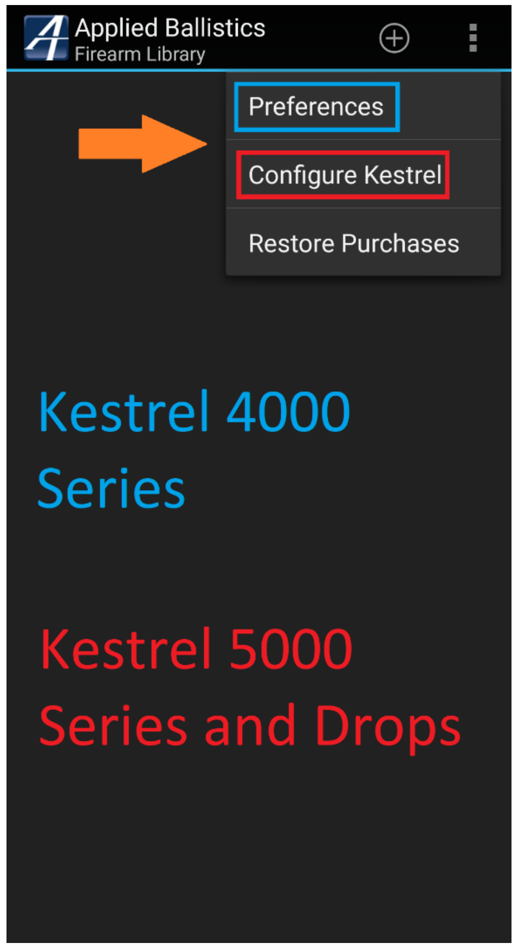


Image 2 (Kestrel 5000 & Drop)

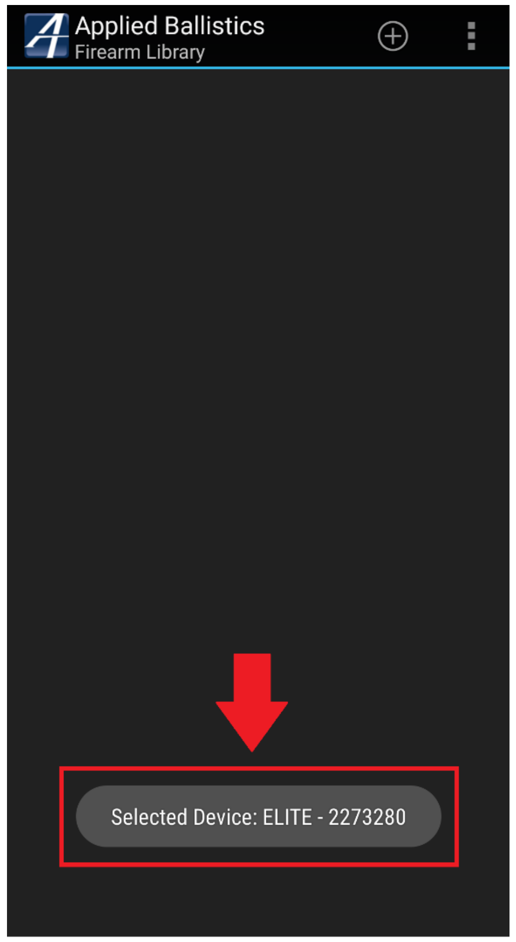


Image 3 (Kestrel 4000)

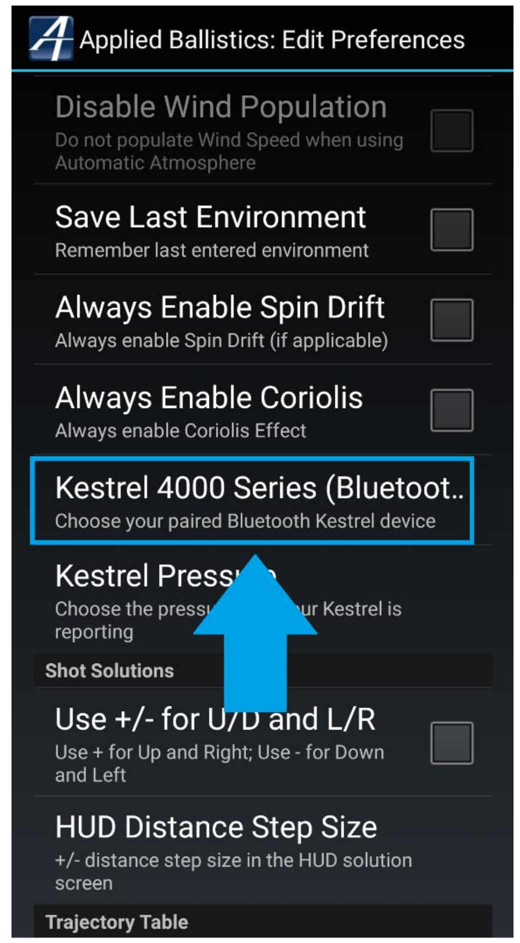
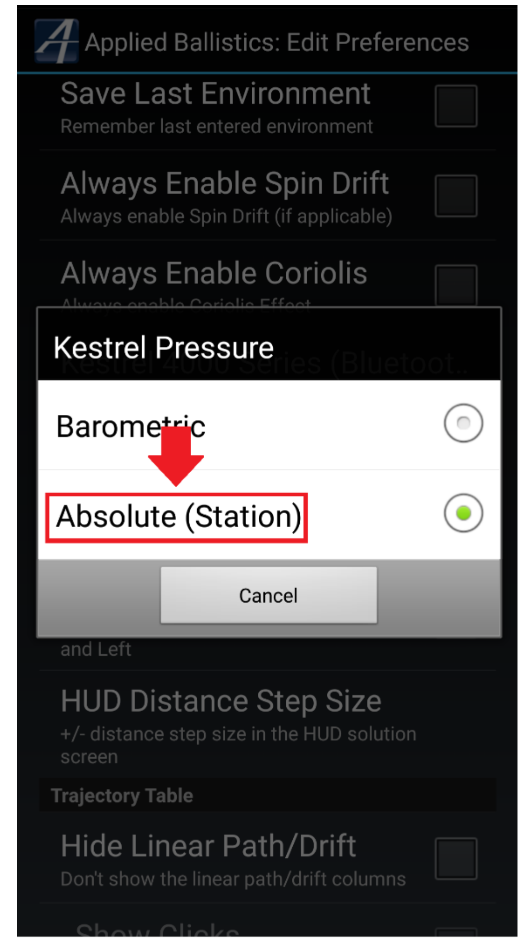


Image 4 (All Units)



To pair your Weather Meter please use the following steps depending on which device you have (**Android Version Only**).

Kestrel Elite (5700) & 5000 Series. (This also works for the Kestrel Drop 3)
From the main screen select "Configure Kestrel" (**Image 1 Red**). **NOTE: Kestrel 5700 SHOULD NOT be paired to the device through the Bluetooth phone menu.** Make sure your Kestrel Elite is turned on, and Bluetooth is on. After you press "Configure Kestrel" a new screen will pop up with device selection. Tap your device to select it, it will return to the main screen and at the bottom prompt you that your device has been selected (**Image 2**). To finish review the final step below.

Kestrel 4500 AB/Sportsman & 4000 Series.
From the main screen select "Preferences" (**Image 1 Blue**). **NOTE: Kestrel 4500 SHOULD already be paired with the device through the phones Bluetooth Menu.** Scroll down until you find "Kestrel 4000 Series Bluetooth" and select this option (**Image 3**). When the menu screen pops up select your Kestrel 4000 series device. If your Kestrel does not appear in this menu, then you need to pair it in the Devices Bluetooth Menu, and restart the Device. To finish review the final step below.

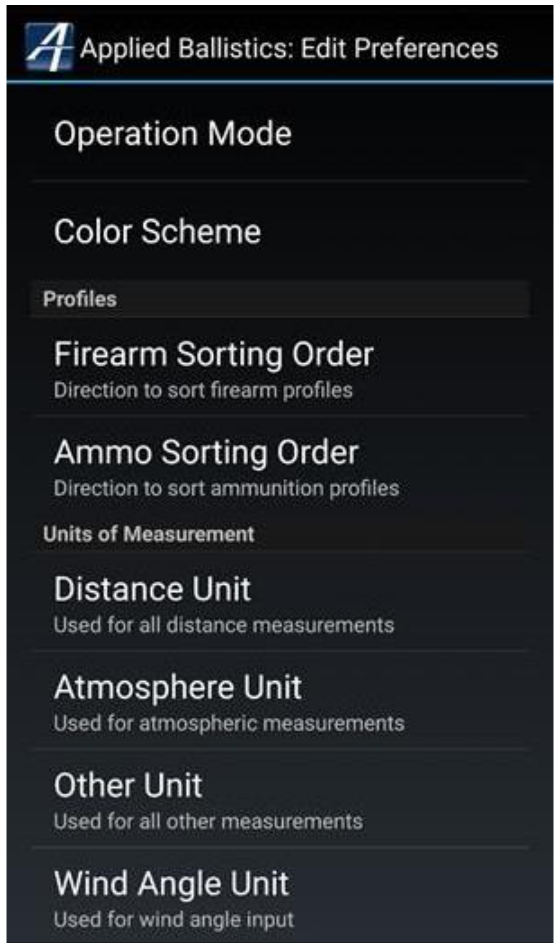
WeatherFlow Bluetooth Meter.
For this device simply pair the device in the phones Bluetooth menu. No app settings are required. **NOTE: WeatherFLOW SHOULD already be paired with the device through the phones Bluetooth Menu.** To finish review the final step below.

Final Step.
The last thing you should do is change the preferences option "Kestrel Pressure" to Absolute (Station) setting. Go to "Preferences" from the main screen. Scroll down to "Kestrel Pressure". Choose "Absolute (Station)" (**Image 4**).

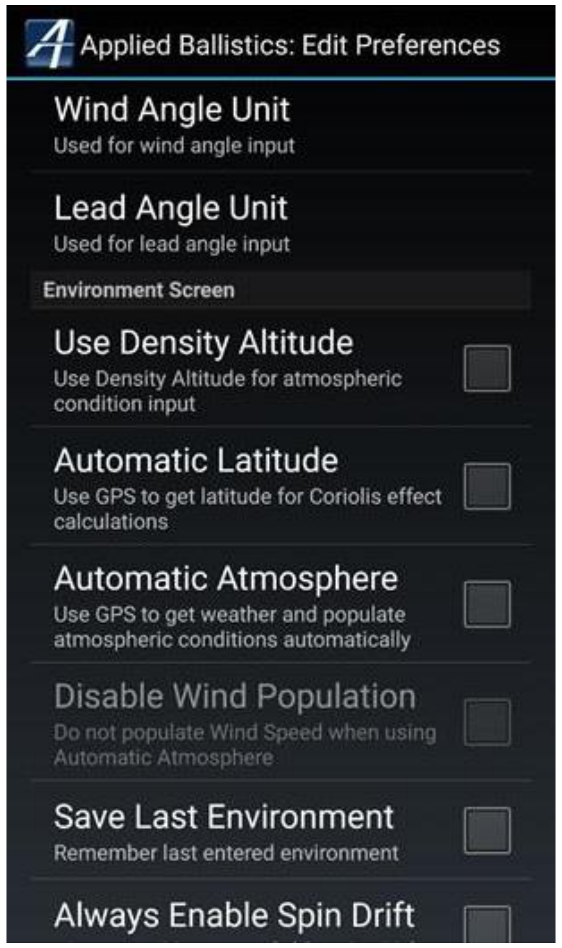
Preferences

The preferences are accessed from the main (first) entry screen to the AB app. This is where you set all the options and settings for the program. Below are screenshots showing all the preferences you have access to.

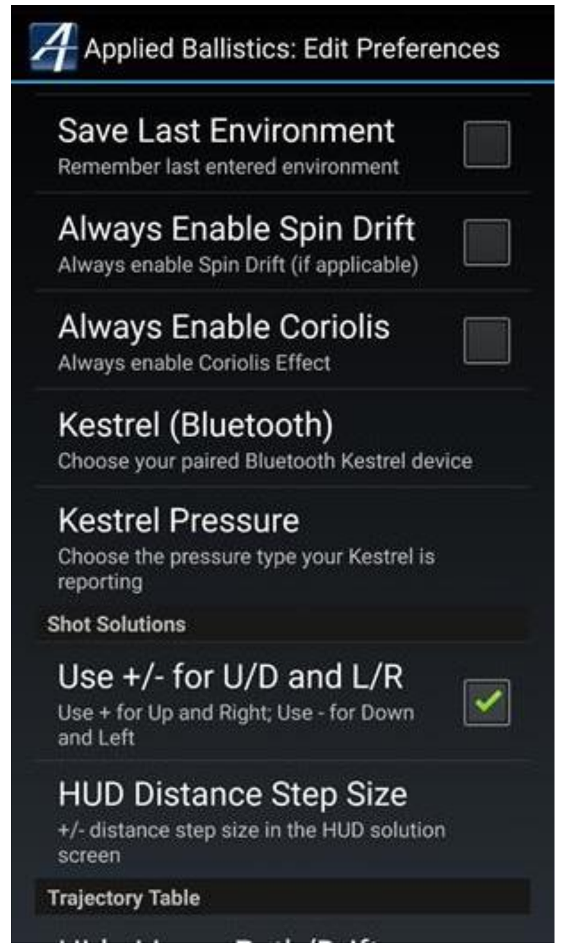
Preferences page 1



Preferences page 2



Preferences page 3



Preferences page 4

Requirements:

- Android v5.0 or higher (iOS 7.0 or higher for iPhone)
- GPS is required for “Automatic Latitude” and “Auto Atmosphere”, explained in detail in features.
- Internet is required for “AB Connect™”, “Auto Atmosphere”, “Restore Purchases”, and to purchase Custom Drag Curves.
- Bluetooth support is required for Kestrel Integration (Bluetooth connection not possible with iPhone).
- An accelerometer is required to use the Look Angle acquisition tool.
- Region and Carrier Limitations: This app is not approved for all regions and/or carriers at this time. Some carriers may choose to block this app due to the nature of its content.

Not Required:

- You do not need GPS, Internet, Bluetooth, or Cell Service to run calculations.

Web Sync (Future Addition)

Currently Under Development – Not Completed For Public Release at This Time. The Backup Portion is Up and Running, WEB Login still in BETA.