

Ballistica V.1.1 Manual

Ballistica is a quick, accurate and streamlined tool for calculating ballistic trajectories. It can either be used to calculate a single firing solution (Quick Shot page) or a trajectory table (Chart page). This application has been optimized for small screens and touch gestures. Values can either be entered with the keypad or by using various tools that support finger swipes, taps and holds (e.g. wind, target or line-of-sight angles).

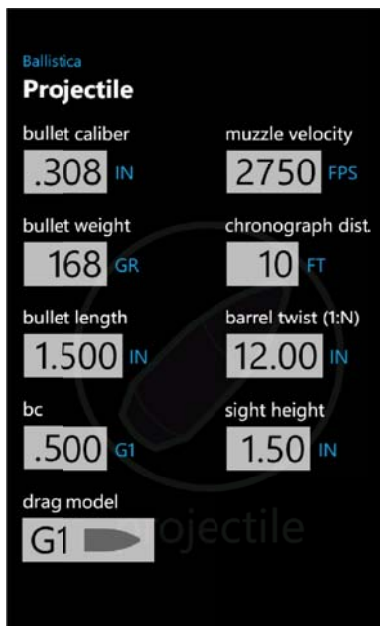
This application uses the Metro guidelines for navigation. Each section of the application is just a backbutton-press away from the main page. Tools within a section may be canceled by using the backbutton. If you quit Ballistica, you can press and hold the backbutton to use Windows Phone's fast-app switching feature (which will show you your last five applications and immediately resume on whatever page you were using). Alternatively, you can restart Ballistica by tapping on its tile. You will be taken to the main page but your last settings within all the pages will be retained.

Ballistica has three sections for entering data related to calculating a firing solution or chart for a given load – Projectile, Conditions and Target. As mentioned, Quick Shot and the Chart page provide output. At the bottom of the main page are three buttons representing Saved Profiles, Settings and an About page.

Calculating Trajectories – Providing Input

To create an accurate firing solution for the load you are shooting, it is important to enter the right information – garbage in, garbage out. While it isn't always possible to have all you need, try to be as close as possible.

The Projectile Page



The screenshot shows the 'Projectile' page in the Ballistica application. It features a dark background with white text and input fields. The fields are arranged in two columns. The left column contains: 'bullet caliber' with a value of '.308 IN', 'bullet weight' with '168 GR', 'bullet length' with '1.500 IN', 'bc' with '.500 G1', and 'drag model' with 'G1'. The right column contains: 'muzzle velocity' with '2750 FPS', 'chronograph dist.' with '10 FT', 'barrel twist (1:N)' with '12.00 IN', and 'sight height' with '1.50 IN'. A faint 'Projectile' watermark is visible in the background.

Most of the information on this page is straightforward and easy to acquire, such as caliber and bullet weight. Other data, such as muzzle velocity are often provided by manufacturers for commercial ammo. However, be aware that even among barrels of the same length velocities will differ. A good chronograph is very useful for measuring the true performance of your load. It is almost essential for handloaders, although it's not impossible to tweak one variable until it matches real world results.

The BC (ballistics coefficient) is essential. It may be provided for the commercial ammo you are using. For most bullets used by handloaders, the manufacturer will supply a G1 BC. Some, such as Berger, will supply G7 BCs. While this is not an endorsement of any particular manufacturer, in this author's experience, those are accurate numbers, something which can't be said of all bullet makers. If you want accurate numbers for a popular assortment of bullets, it is recommended that you purchase a copy of Bryan Litz' Applied Ballistics for

Long Range Shooting.



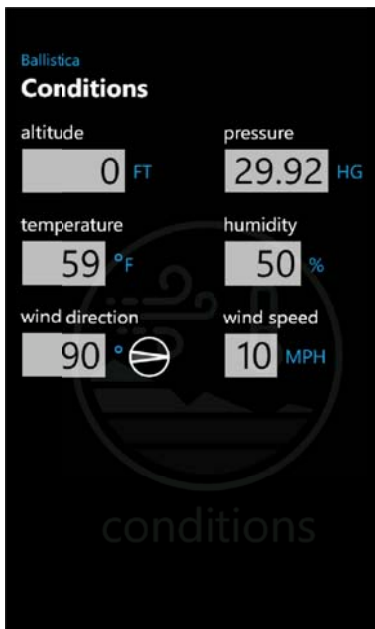
While it is my preference to use the G7 drag model with boat tail bullets, the G1 drag model will provide similar results, typically out to ranges of 800 yards or more (for a .308 Win or similar). **Just be sure that you are using the drag model that matches the BC number.** Otherwise your results will be disappointing.

Bullet length and barrel twist are only used in the calculation of spin drift so don't worry if you don't have numbers for those. (See the Settings page section for an explanation of spin drift).

Sight height is of moderate importance. A good way to measure it is to:

- 1) Measure the diameter of the objective on your scope, e.g. 2.1"
- 2) Measure the diameter of the barrel directly below the objective, e.g. .9"
- 3) Add those numbers together and divide by two, e.g. $3 / 2 = 1.5$
- 4) Measure the distance between the objective and the barrel, e.g. .25"
- 5) Add it to the previous result, e.g. a sight height of 1.75"

The Conditions Page



It is important to understand the relationship between atmospheric pressure and altitude, as well as temperature. Together they will apply air density to the ballistics calculations. As you can imagine, the density of the air around the bullet has a highly significant effect on its trajectory.

Atmospheric pressure is commonly reported as “corrected pressure” - meaning that a pressure reading has been taken at a particular altitude and has then been adjusted to relate to sea level. There are other resources that discuss why this is done, but that is beyond the scope of this manual. It is mentioned here because you need to be aware of it.

If you are using a corrected pressure (likely if you got this info from a weather report or the nearest airport) it is essential to enter your shooting altitude. If possible, carry either a weather meter or a GPS unit that contains a barometric pressure sensor (many do) and use the uncorrected station pressure. This way, you can always leave altitude set to zero...one less thing to worry about, especially when you're in a hurry to set up a shot! (<http://www.snipershide.com/forum/ubbthreads.php?ubb=showflat&Number=1696382> is a post I made on using a Garmin 60Sx to get what they call “Ambient Pressure”. I use a DeLorme PN-60 to get my pressure data...and to avoid getting lost...most of the time).

You can set wind direction either by entering a value between 0° and 360° or by tapping on the wind angle icon, which will bring up a control that allows you to drag your finger around a dial:

Note: If you press and hold on the wind angle icon, it will reset to zero.



Dragging your finger around in a circular direction will cause the needle to turn. Both an angular and traditional “clock” readouts are supplied. For example, if the wind is blowing directly from right to left across your shooting position, then you want to set the indicator to point left, which is 270°, or 3 o’ clock.

Wind speed is typically entered for what it is at the shooter’s location up range. I won’t pretend to have all the answers on this subject. Someone else, based on experience or circumstance will have their own method for obtaining this value.

Note: Wind will often vary across terrain. While it is often impossible to measure wind downrange, take some comfort in the fact that most of the wind’s effects on the bullet begin uprange. In other words, enter the wind value from your location. Sometimes, however, you’ll be in a sheltered area, such as the lee of a ridge that extends a couple hundred yards, shooting out into an open area blowing 40 mph. On a 400-yard shot, you might split the difference, roughly speaking and enter 20mph.

The Target Page

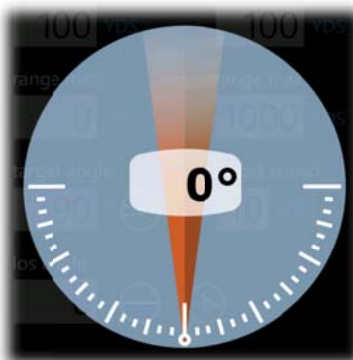


The Target page allows you to enter range increment, your zero range, the minimum and maximum ranges (to show in the Chart page). You can also set the target’s angle of travel and speed. If you are shooting up or downhill, set the LOS (line of sight) angle.

While you can set any range increment you like, the minimum value is 10 (yard or meters). This keeps computation time down. The maximum range is currently 2000 (yard or meters).

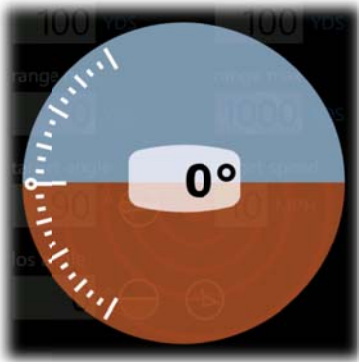
Hint: To speed calculation time, limit your min and max ranges to the smallest range possible, e.g. if shooting between 300-700 yards in increments of 25 yards, don’t leave range max set to 1000.

The target angle is between -90° (moving right-to-left) and 90° (left-to-right). It may be entered with either the keypad or by tapping on the target angle icon (press and hold the icon to reset it to the default value of 90°):



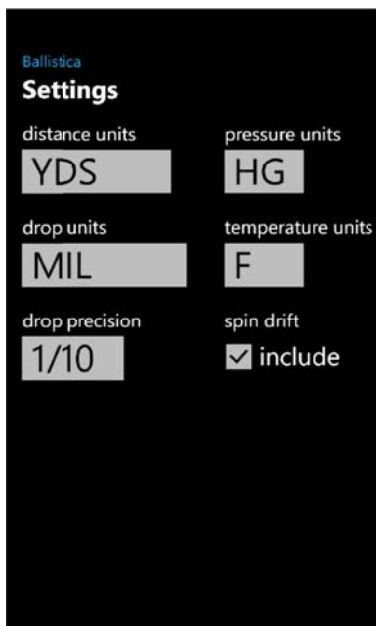
Drag your finger on the screen in a circular motion to set the angle.

The LOS angle is set in a similar fashion:



However, just to the right of it is another icon (represented by an eye). This is the auto-angle function that allows you to look down the length of your phone and set the angle by aiming it at the target. To do so, tap on the auto-angle icon. You will feel a vibration, signaling that it has been activated. Hold the phone so you can sight across the screen at the target. A second vibration signals that it is done and sets the angle value. (Press and hold the los-angle icon to reset the angle to zero).

The Settings Page



While this is not one of the primary pages, it would be good to discuss it next because it also has an effect on output, as well as input, e.g. switching from yards to meters.

If you switch to meters, various input and output values will be expressed in metric, e.g. wind speed in KPH. Where this occurs, labels change to reflect this.

Pressures on the Conditions page can be entered in either inches of mercury (HG) or millibars (MB). There is, however, no auto-conversion on the screen so switching from one to the other here requires changing the value on the Conditions page, e.g. going from MB to HG, if the pressure was 1013 you need to go back and enter the Hg equivalent, 29.92.

Temperatures can be entered either in Fahrenheit or Celsius, independent of the distance units. In other words, if you switch to meters, you won't be switched to Celsius temperatures automatically.

A variety of drop units are available:



You can chose from among these and then select the drop precision to determine how many numbers are displayed after the decimal. For example, if you chose MIL, you would probably want to stick with an output precision of 1/10 so that drops are shown with enough detail to make an accurate adjustment, e.g. 4.3 mils. Likewise with MOA or IPHY. However, when using 1/10 MIL or ¼ MOA it would make for less clutter to use a precision of 1. (The 1/100 precision is basically just there for really anal shooters who want to compare output to other programs).

Spindrift has a minor effect on bullet travel, but can be noticeable out at distances around 1000 yards (around 8-9 inches). A technical explanation can be found here:

http://www.appliedballisticsllc.com/index_files/SpinandCoriolisDrift.htm

Checking this box will add it to the windage value for each row of the output. (It is assumed in this version that the rifle has a right twist).

Calculating Trajectories – Viewing Output

There are two pages in the application that provide output – the Chart page and the Quick Shot page. The Quick Shot page also allows some in-page manipulation of variables to change the output.

The Chart Page

range	drop	wind	lead	tof	vel	energy
YDS	MIL	MIL	MIL	SEC	FPS	FT-LBS
300	-1.3	0.6	5.9	0.363	2233	1860
325	-1.5	0.7	6.0	0.397	2192	1792
350	-1.7	0.8	6.0	0.431	2152	1727
375	-1.9	0.8	6.1	0.467	2111	1663
400	-2.1	0.9	6.1	0.502	2072	1601
425	-2.3	0.9	6.2	0.539	2033	1541
450	-2.6	1.0	6.3	0.576	1994	1483
475	-2.8	1.1	6.3	0.614	1956	1427
500	-3.1	1.1	6.4	0.653	1918	1372
525	-3.3	1.2	6.4	0.692	1880	1319
550	-3.6	1.3	6.5	0.733	1844	1268
575	-3.9	1.3	6.6	0.774	1807	1218
600	-4.2	1.4	6.6	0.816	1771	1171
625	-4.4	1.5	6.7	0.859	1736	1124
650	-4.7	1.6	6.8	0.902	1701	1080
675	-5.0	1.6	6.9	0.947	1667	1037
700	-5.4	1.7	6.9	0.992	1633	995

landscape

range	drop	wind	lead	tof	vel	energy	drop	wind	lead
YDS	MIL	MIL	MIL	SEC	FPS	FT-LBS	IN	IN	IN
300	-1.3	0.6	5.9	0.363	2233	1860	-13.6	6.9	63.9
325	-1.5	0.7	6.0	0.397	2192	1792	-17.1	8.1	69.8
350	-1.7	0.8	6.0	0.431	2152	1727	-21.0	9.5	75.9
375	-1.9	0.8	6.1	0.467	2111	1663	-25.4	11.0	82.1
400	-2.1	0.9	6.1	0.502	2072	1601	-30.4	12.6	88.4
425	-2.3	0.9	6.2	0.539	2033	1541	-35.8	14.3	94.9
450	-2.6	1.0	6.3	0.576	1994	1483	-41.7	16.2	101.4
475	-2.8	1.1	6.3	0.614	1956	1427	-48.2	18.2	108.1
500	-3.1	1.1	6.4	0.653	1918	1372	-55.3	20.4	114.9

In the chart page range distances are shown first, followed by the drop, wind and target lead. This is done so that the shooter can apply the data immediately.

Rotating the screen into landscape mode will show all of the columns at once.

You can tap on a row to hilite it, which makes it easier to track:

475	-2.8	1.1	6.3	0.614	1956	1427	-48.2	18.2	108.1
500	-3.1	1.1	6.4	0.653	1918	1372	-55.3	20.4	114.9
525	-3.3	1.2	6.4	0.692	1880	1319	-62.9	22.7	121.9

The Quick Shot Page



This page is designed to provide a fast firing solution at one range (distance). It will also, if ranging with mils, allow you to see the relationship between target size, mils and distance to the target. Changing target size or subtensions will change range. Changing range will change subtensions (while target size remains constant). Any changes are reflected, of course, in the elevation, windage and lead values.

Wind direction and speed are changed here just as they are in the conditions page. (They will change there too, affected output in the Chart page).

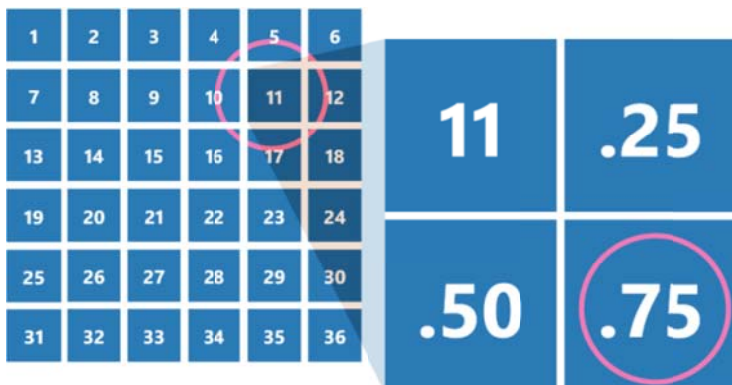
The directional arrows next to each of the outputs indicate the direction in which the shooter needs to correct. So, for example – as shown here, you would read this as:

- 1) Hold over or dial up 3.9 mils
- 2) Hold or dial left 1.4 mils
- 3) Hold or dial right 1.3 mils

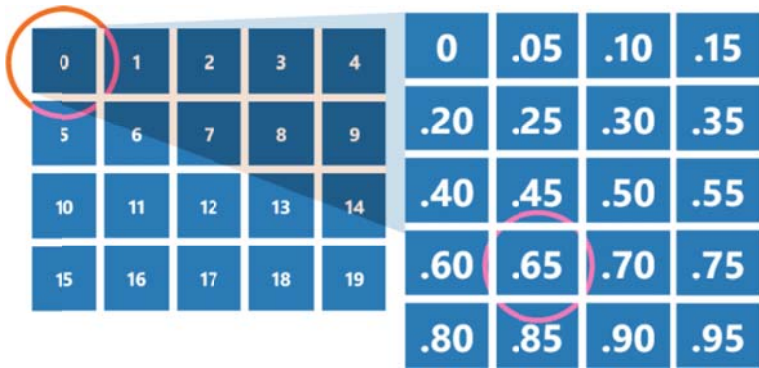
Do you have to subtract the windage from the lead to get to a proper hold right or left? In practical terms, shooters often dial in the wind, e.g. left 1.4, and hold for lead.

You can obviously change the range by typing in the text box. However, if the distance to the target needs to be changed by a few yards, you can use the arrow buttons to the right to either increase or decrease it in increments of 10. Holding a button down longer will keep increasing/decreasing the distance until you let up on it.

Next to the target size text box is a ruler icon. Click on this and it will bring up a control with either 36 squares (inches) or 100 (centimeters). You can choose one of these more quickly than by typing by tapping on one. If you need a finer value, e.g. 11.25, hold instead of tap and a second control will pop up, allowing you to tap on one of those values:



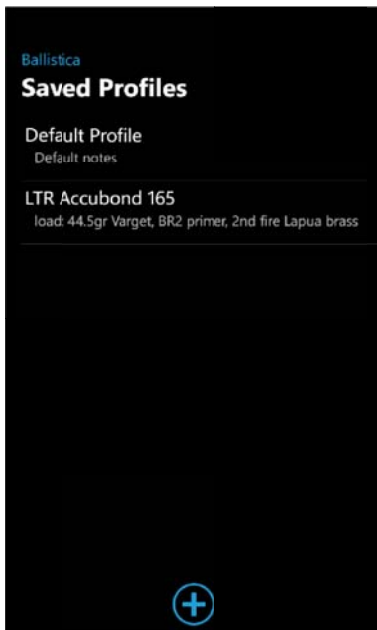
Likewise, with the ruler icon next to the subtensions text box, which allows selecting values between 0.1 and 19.95 mils:



For example, if you wanted to selected .65 mils you would tap on the ruler icon, hold on square 0, then tap on .65.

Note: For other values, as long as they are within the limits of the application, you can always use the text boxes.

The Saved Profiles Page



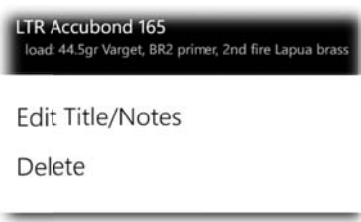
On this page you can save the active settings to a new profile so it can be instantly loaded for later use by tapping on it. You can also edit the title or notes related to a profile (but not the profile itself) or delete it.

Tapping on a profile loads it instantaneously and returns you to the main page so that you can make use of it right away. All settings will be set to whatever was in effect when the profile was created. If you make changes to settings and want to save them, return to this page and tap on the + icon to add a new version.

Add a new profile by tapping on the + icon, enter a title and (optionally) notes, then hit the Save button:



To edit or delete a profile, hold on it and a context menu will appear:



Tapping on Edit will allow you

The About Page



If you would like to contact us about this application or for any other reason, you can click on the mail button on this page or email appsupport@stonetip.com. Feedback is welcome since it will help improve this app or lead to new ones. Reviews are also welcome.

If you are reading this manual, then you have probably already visited <http://apps.stonetip.com>. Feel free to check it out for info on updates to the application or related information.

11	.25				
.50	.75				
1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

0	.05	.10	.15	
.20	.25	.30	.35	
.40	.45	.50	.55	
.60	.65	.70	.75	
.80	.85	.90	.95	
0	1	2	3	4
5	6	7	8	9
10	11	12	13	14
15	16	17	18	19

Quick Shot

target view: 18 IN

subtensions: 0.75 MIL

range: 667 YDS

wind direction: 90°

wind speed: 10 MPH

elevation: -4.9 MIL

windage: 1.6 MIL

lead: 6.8 MIL

Conditions

altitude: 0 FT

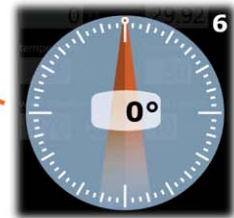
pressure: 29.92 HG

temperature: 59°F

humidity: 50%

wind direction: 90°

wind speed: 10 MPH



Projectile

bullet caliber: .308 IN

muzzle velocity: 2750 FPS

bullet weight: 168 GR

chronograph dist: 10 FT

bullet length: 1.500 IN

barrel twist (1/N): 12.00 IN

bc: .500 G1

sight height: 1.50 IN

drag model: G1

Default Profile

projectile

conditions

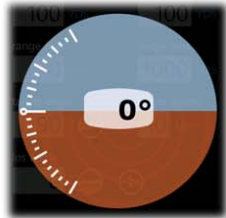
quick shot

target

chart

Chart

range	drop	wind	lead	tof	vel	energy
YDS	MIL	MIL	MIL	SEC	FT/LBS	FT/LBS
300	-13	0.6	5.9	0.363	2233	1860
325	-15	0.7	6.0	0.397	2192	1792
350	-17	0.8	6.0	0.431	2152	1727
375	-19	0.8	6.1	0.467	2111	1663
400	-21	0.9	6.1	0.502	2072	1601
425	-23					
450	-26					
475	-28					
500	-31					
525	-33					
550	-36					
575	-39					
600	-42					
625	-44					
650	-47					
675	-50					
700	-54					



Target

range increment: 100 YDS

zero range: 100 YDS

range min: 0 YDS

range max: 1000 YDS

target angle: 90°

target speed: 10 MPH

los angle: 0°

hold to trigger auto angle

Settings

distance units: YDS

pressure units: HG

drop units: MIL

temperature units: F

drop precision: 1/10

spin drift: include

drop units: MIL, 1/10 MIL, MOA, 1/4 MOA, IPHY

drop precision: 1, 1/10, 1/100

LTR Accubond 165

load: 44.5gr Varget, BR2 primer, 2nd fire Lapua brass

Edit Title/Notes

Delete

Saved Profiles

Default Profile

LTR Accubond 165

load: 44.5gr Varget, BR2 primer, 2nd fire Lapua brass

+

title: 700 SS Berger OTM 175s

notes: 2690 fps, 45gr

Save

range	drop	wind	lead	tof	vel	energy
YDS	MIL	MIL	MIL	SEC	FT/LBS	FT/LBS
475	-28	1.1	6.3	0.614	1956	1427
500	-31	1.1	6.4	0.653	1918	1372
525	-33	1.2	6.4	0.692	1880	1319
550	-36					
575	-39					
600	-42					
625	-44					
650	-47					
675	-50					
700	-54					

tap to hilite a row

STONETIP

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For technical support, suggestions or comments, please contact us: appsupport@stonetip.com

Your review would be highly appreciated

Review

For more information and a complete user manual <http://apps.stonetip.com>

