



Sierra Infinity 7

Ballistics Calculation System User Guide

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Date: 3/14/2015

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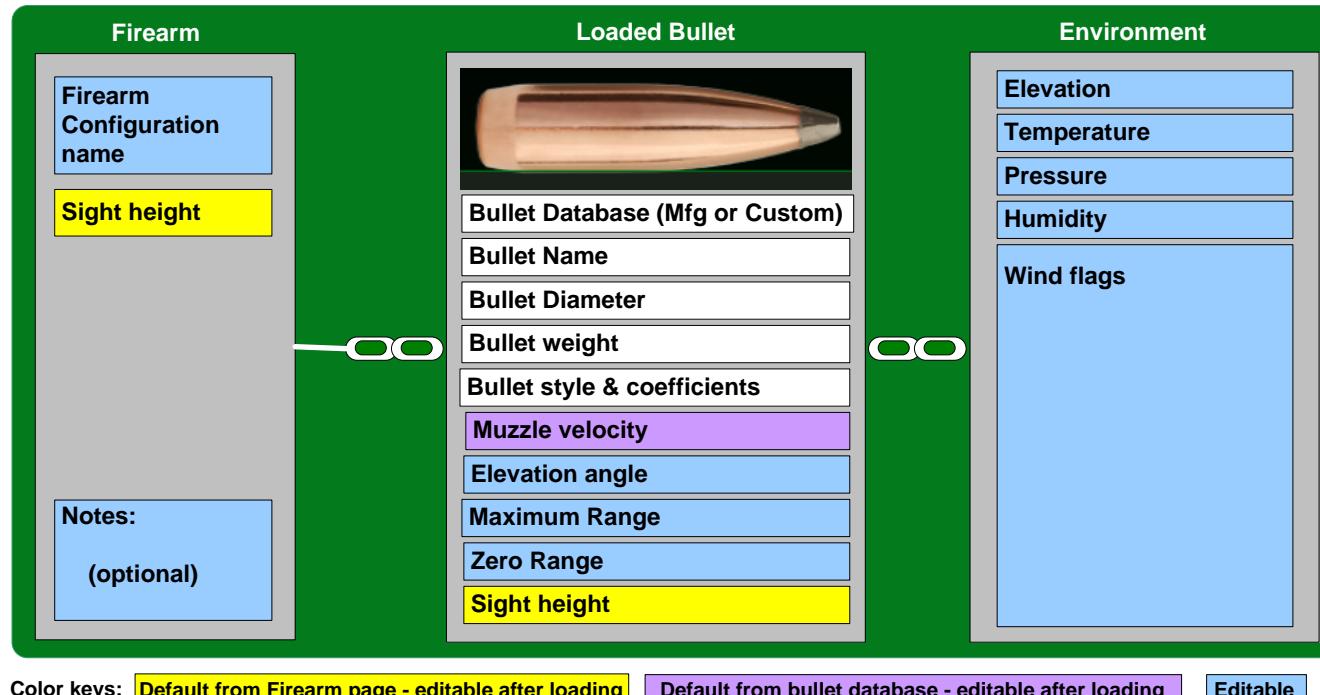
Overview

Sierra looked at the problems associated with archiving (storing) and more importantly, finding and recalling, previously loaded bullets. What better and more logical way than starting with a firearm linked to one or more bullets. Each loaded bullet links to its own set of environmental data. How does a firearm help you locate bullet information 5 years from now? First, you get to create any Firearm Configuration name you want. Second, there is a generous amount of space for saving notes about each Firearm Configuration.

Firearms, Bullets and the Environment

Each Firearm Configuration name is a container that holds all selected (aka loaded) bullets and corresponding Environmental data. The number of firearm configurations is limited only by the practicality of scrolling a large list window. The same is true of the number of loaded bullets although each additional bullet increases the processing time of the application as it calculates the ballistics for all loaded bullets. The following diagram shows the automatic linkage created between the active Firearm Configuration and any selected bullet as well as the automatic linkage to the corresponding Environment page.

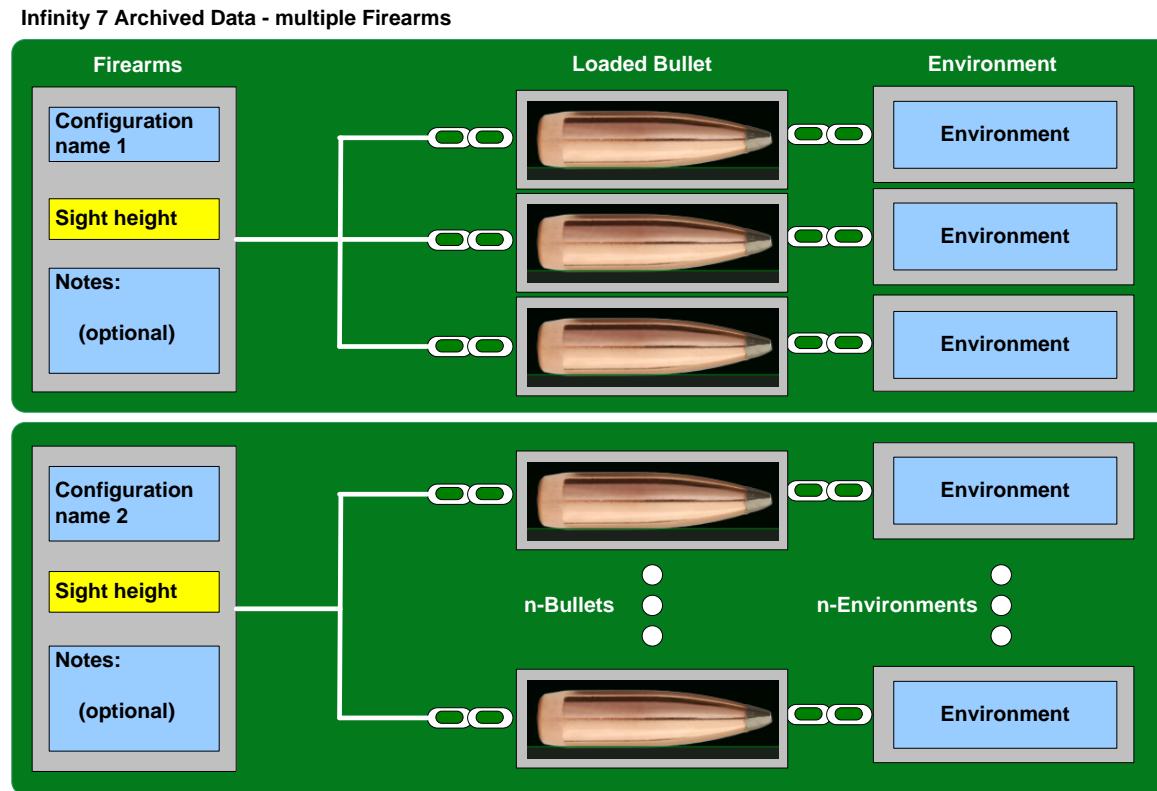
Infinity 7 Archived Data





Using Multiple Firearms

The following figure shows Infinity 7 with two Firearm Configuration containers. Firearm Configuration “name 1” is loaded with 3 bullets. Firearm Configuration “name 2” is loaded with “n-Bullets” where n is any number. When a Firearm Configuration is first created, it has no bullets. Bullets can be selected from Infinity 7’s bullet database that contains all major bullet and cartridge manufacturers as well as custom bullets. Selecting a bullet from the bullet database creates a copy of the bullet in the active Firearm Configuration container. An Environment object is automatically created and linked to the bullet. Once loaded from the bullet database, a copy of the bullet resides in the Configuration named container and parameters may be edited any time. The same holds true of the Environment data.



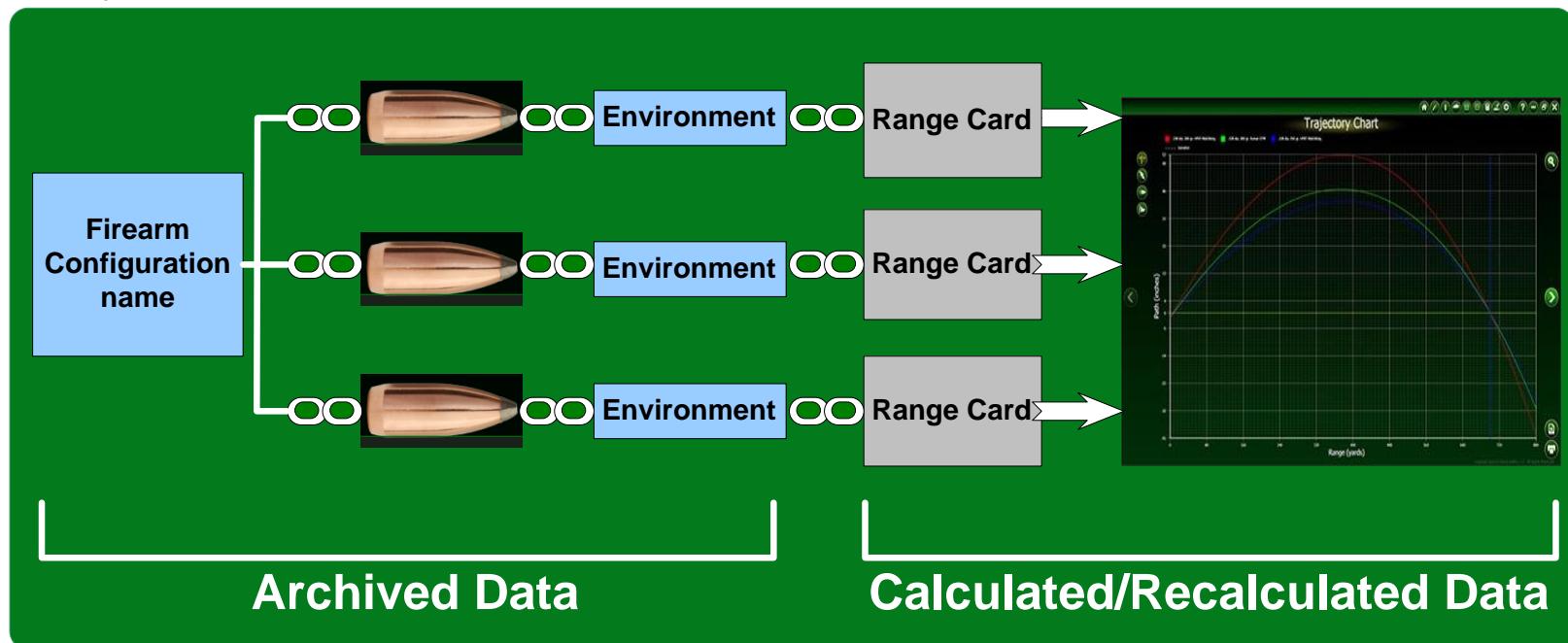
A key point to note about Infinity 7 is that bullets can only be compared with each other if loaded into the same Firearm Configuration name (container). See the section below on Firearm Configuration names to see how this may be used to your advantage.



Archived Data Verses Calculated Data

The following diagram shows entities that are archived: Firearm Configuration name, copies from the database of loaded bullets, and corresponding Environment data. Range Cards and Trajectory Charts are updated as bullet and/or environment changes are made and are not archived since they can be recreated. An “Include on Chart” checkbox corresponding to each loaded bullet determines whether that bullet is graphed.

Infinity 7 Archived Data and Calculated/Recalculated Data





General Rules

English and Metric Modes



The “units” on the settings page determines the input mode for most data entry boxes in Infinity 7. It also determines how Infinity 7 calculates the trajectory. Infinity 7 calculates the trajectory in yards in English mode, and meters in metric mode. The range card allows you to display the rest of the data in both English and metric units. One exception to this is the Silhouette mode which always use metric mode for the trajectory calculations.

Entering Values and Names in Infinity 7 Database Fields

Number Entry – In database fields that hold numbers, only numbers and the decimal point are valid. For example, on the Firearms page, the legend for the Sight Height field says “Sight Height (Inches)” or “Sight Height (Centimeters)”. 1.62 is valid. 1.62” is not. Use the Application Settings page to put Infinity 7 in metric display mode.

Text Entry – The following punctuation may not be used in the names of firearms, custom bullet categories or bullet names:

/ \ “ * | : ? < >

If an invalid number or character is entered in any field, the field’s boundary box turns red. Backspace over the offending symbols until the red goes away. You cannot change pages while any boundary box is red.

Page Navigation

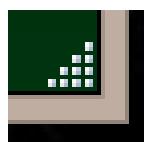


Click the arrows at either side of the page to go to the previous or next page.



Click the icons in the header to go directly to a page.

Click and drag in a blank section of the header to move Infinity.



Click and drag the corner resizing handle to resize Infinity 7 to make better use of screen space.



Key Concepts Recap

- Each Firearm Configuration name is a container holding all loaded bullets and environmental data linked to that name.
- On the Firearms page, only the Firearm Configuration name and Sight height are required. Other data is optional.
- The sight height value on the Firearms page for each firearm is the default sight height used when bullets are loaded.
- For each firearm listed on the Firearms page, a Notes section provides space to describe why the firearm was created.
- When selecting bullets for the active firearm, the bullet is copied from the Infinity 7 bullet database into the active firearm's container where muzzle Velocity, Elevation Angle, Maximum Range, Zero Range and Sight Height can be edited.
- Multiple bullets can be compared and charted only if those bullets are loaded in the same Firearm Configuration.
- Firearms, Bullets and corresponding Environment are recalled each time a different firearm is selected.
- Range Cards and Trajectory Charts are calculated or recalculated whenever the Bullet or the Environment data changes.
- Don't add symbols, except a decimal point, or text to numeric database entry fields. Avoid the special symbols when entering text.

Firearm Configurations – The Power of Infinity 7

A key concept that provides additional power in Infinity 7 is the Firearm Configuration which is a container that holds bullet and environment information for multiple bullets. The details of each bullet may be the same or different in caliber, sight height, velocities, angles, zero ranges and environmental values. Take control of that power by selecting meaningful Firearm Configuration names. Putting a little effort into coming up with your own standard naming convention will pay off, making it easier to find the desired data in the future.

While the primary function of Infinity 7's Firearms page is to include information about actual firearms, the same physical firearm may have multiple Firearm Configuration Names. You may create names that are "virtual" firearms.

Infinity 7 is frequently used for bullet caliber comparisons, velocity comparisons, sight height comparisons, zero range and bullet drop comparisons, wind effect comparisons, and data analysis. If you got tired of reading the word "comparisons", that's a clue. With the awesome archiving capabilities of Infinity 7, as your list of firearm names grows, it may become difficult to find a previously computed comparison.

One possible name standardization method is dividing Firearm Configuration names into two groups; "real" firearms and "virtual" firearms. Real firearms are characterized by entering make, model, accurate sight height, caliber, barrel length, twist, and serial number on the firearms page. Those values are optional but, if entered, the firearm name should be easy to locate in Firearms list by its name.

Virtual firearms are characterized by something that might make no sense in a real firearm or that a real firearm can't do ... like feeding a .50 BMG into a .22LR chamber. Use virtual firearms for all those comparisons of different calibers and sight heights.



When preparing to go to the range, for example, comparison data done between two calibers doesn't hold the importance of the data representing the "real" firearm you will be firing. Consider limiting loaded bullets for a real firearm to those that you will shoot and/or chronograph. That simplifies range or field time because every bullet in the selection list actually fits that firearm, has (or will have) accurate velocity information and sight height. If you have been performing caliber comparisons, sight height comparisons and velocity comparisons for a real firearm, it is just too easy to make a mistake and not notice values that don't match your real firearm.

For each firearm owned, create a Firearm Configuration name that is a combination of the Make, Model and Caliber, e.g. Winchester Model 70 30'06. These real firearms are easily recognized in the Firearms list box. You will know exactly which firearm to pick to look for measured data about that firearm, e.g. barrel twist and even serial number.

Consider adding a one letter prefix to the Firearm Configuration name when creating virtual firearms. You might use the letter "V" for virtual or the letter "C" for comparisons.

When adding any firearm to the list, take advantage of the Notes field to describe the firearm. The Notes section might be equally important for both real and virtual firearms. For example, record scope models, serial numbers or special powder requirements for real firearms. For virtual or comparison firearms, you might wish to provide a detailed description of the comparisons being performed. Think of yourself as a librarian. You get to redefine the Dewey Decimal System, or is it Library of Congress numbers? Have fun!



Firearms

The Firearms page is the starting point for Infinity 7 where you may create firearms, real or imaginary. The only values required to start using Infinity 7 are the Configuration name and Sight height. All other data is optional and not used by the application to calculate the ballistics.

The screenshot shows the 'Firearms' configuration screen. At the top, there's a navigation bar with various icons: Home, Edit, New, Delete, Import, Export, Print, Help, Minimize, Maximize, and Close. Below the navigation bar is the title 'Firearms'. On the left, there's a list of firearms configurations with 'Sako Finnbear' selected. On the right, detailed information for 'Sako Finnbear' is displayed, including its configuration name, sight height, barrel length, twist, manufacturer, model, serial number, type, caliber, date acquired, cost, purchase location, and notes. The notes section mentions it's quite collectible and based on a Redfield Accurange scope. At the bottom, there are buttons for View, Add, Edit, or Delete, and a copyright notice for Sierra Bullets, LLC.

| Configuration name | Sako Finnbear |
|-------------------------------|---|
| Sight height (Centimeters) | 3.861 |
| Barrel length | 24.5 |
| Barrel twist | 9.4 |
| Manufacturer/Importer | Sako |
| Model | L61R Finnbear |
| Serial number | 68689 |
| Type | Bolt action rifle |
| Caliber/Gauge | 7 mm Remington Magnum |
| Date acquired | |
| Cost | 0 |
| Purchase Location | |
| Sold/Transferred to (Name) | |
| Sold/Transferred to (Address) | |
| Transfer date. | |
| Notes | Quite collectible! Sight height based on Redfield Accurange scope (headstone range finder) |

View, Add, Edit, or Delete firearm configurations

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Firearms

- V1
- V2
- V3
- Colt's AR-15
- AR-15 Lower, Rock River Upper
- Winchester Model 70
- Sako Finnbear
- M1A
- M1 Garand
- Lee Enfield Mk III
- Mosin-Nagant
- Browning 1886
- Savage Mk II BSEV
- Kimber Govmt Mod 82
- Remington 550 I
- Romanian Training Rifle
- Tommy Gun
- Winchester Super-X Model 1
- Mauser M48
- S&W Mod 38 Blue
- S&W Mod 38 Nickel
- S&W Mod 10
- S&W Mod 686
- S&W Mod 52
- S&W Mod 41 Main
- S&W Mod 41 Backup
- S&W Mod 41 Long Barrel
- S&W Mod 622
- Norinco TT Olympia
- Browning Hi-Power

Firearms List

The Firearms list box shows firearm (configurations) and highlights the selected firearm. Click on a different firearm to select that firearm.

Note that firearm names as displayed in the list come from the edit field "Configuration name".

Each listed firearm can be linked to one or more selected (loaded) bullets. Each loaded bullet has its own linked Environment.

Click **(+)** to add a new firearm.

Click the **pencil** to edit the selected firearm.

Click **(X)** to delete the selected firearm.

Caution: Deleting a firearm deletes all linked bullets and associated environmental data.



| | |
|-------------------------------|---|
| Configuration name | Sako Finnbear |
| Sight height (Inches) | 1.52 |
| Barrel length | 24.5 |
| Barrel twist | 9.4 |
| Manufacturer/Importer | Sako |
| Model | L61R Finnbear |
| Serial number | 68689 |
| Type | Bolt action rifle |
| Caliber/Gauge | 7 mm Remington Magnum |
| Date acquired | |
| Cost | 0 |
| Purchase Location | |
| Sold/Transferred to (Name) | |
| Sold/Transferred to (Address) | |
| Transfer date. | |
| Notes | Quite collectible! Sight height based on Redfield Accurange scope (headstone range finder) |

The edit window allows entry of data in fields, starting with the Configuration name and followed by Sight height.

Those are the only two mandatory values and the only values used to calculate ballistic data in Infinity 7. The rest of the values are used only to print the P3312.8 Personal Firearms Record which may be useful in the event that a firearm is stolen.

The Configuration name can contain any character or symbol except:

/ \ " * | : ? < >

The name can be the name of a real firearm or can be a virtual firearm name or something to remind you of the purpose and/or comparisons being performed.

It is highly recommended that the Notes section be filled in with additional information to help you remember why the firearm was created.



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Bullet Selection

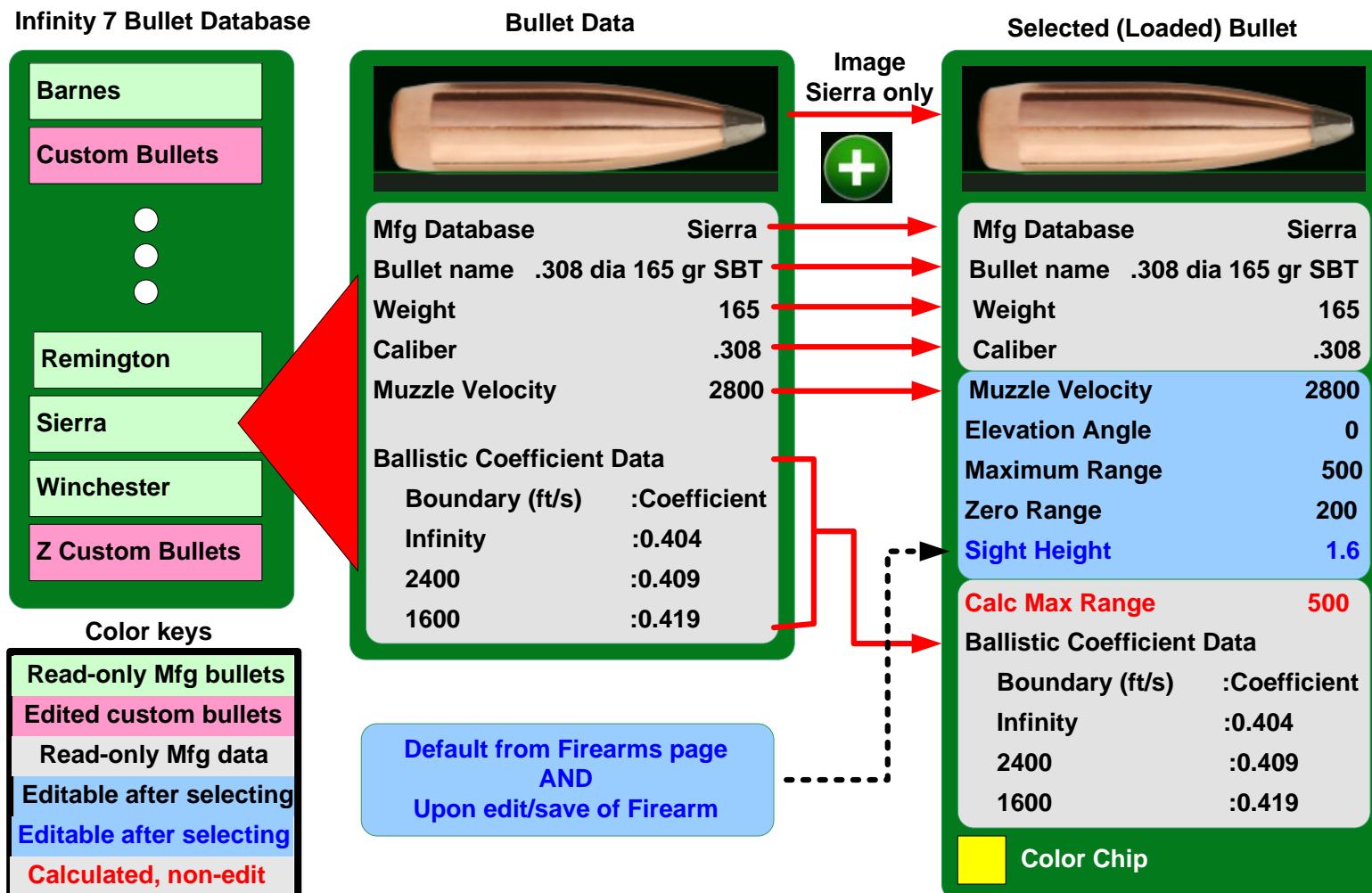
Bullets are selected (aka “loaded”) using the Bullet Selection page. To load a bullet, select the manufacturer followed by bullet caliber (diameter) then select the bullet weight and style. Click on (+) to load the bullet. Loaded bullets are listed in the Selected Bullets window.

The screenshot shows the Bullet Selection interface. At the top, there's a toolbar with various icons: Home, Search, Bullet, File, Print, Calc, Tools, Help, Minimize, Maximize, and Close. Below the toolbar is the title "Bullet Selection". On the left, there's a "Manufacturer" dropdown set to "SIERRA", a "Caliber" dropdown set to ".308", and a "Bullet" dropdown showing "175 gr. Tipped MatchKing (TMK)" which is highlighted in blue. In the center, under "Bullet Details", it shows "SIERRA" again, "Bullet Name: .308 dia. 175 gr. Tipped MatchKing (TMK)", and an image of a bullet. To the right of the bullet image are two input fields: "Weight" (175) and "Caliber" (.308). Further down are fields for "Muzzle Velocity" (ft/s) with values 2,900 and 2,900, "Elevation Angle" (0 and 0), "Maximum Range" (Yards) with values 500 and 500, "Zero Range" (Yards) with values 200 and 200, "Sight Height" (1.6), and "Calc Max Range" (Yards) with a value of 500. At the bottom, there's a section for "Ballistic Coefficient Data" with five circular icons. A note at the bottom left says "Select the bullet then click the Add (+) button." The bottom right contains the copyright information: "Copyright ©2015 Sierra Bullets, LLC All Rights Reserved."



Bullet Selection from the Infinity Database

All bullets that can be selected using the Bullet Selection Page come from the Infinity 7 Bullet Database shown on the left below. Bullets are first identified by the manufacturer's name, followed by bullet caliber (diameter) and finally bullet style. The Bullet Data box below shows the data for a single bullet from Mfg. (Sierra), caliber (.308) and name (".308 dia. 165 gr SBT"). Pressing the "Add selected bullet to configuration" (+) button causes bullet data to be copied to the Firearm Configuration name container. The arrows represent the copied data. A "Color keys" box below describes meaning of each color combination.





Bullet Data Details

The “**Muzzle Velocity**” value may be changed as desired after the bullet is loaded. See Variation under Other Button, Controls & Edit Boxes below.

The values for “**Elevation Angle**”, “**Maximum Range**” and “**Zero Range**” default to the values shown when the first bullet is added to a firearm. After the first bullet is loaded and edited, the values come from the values of the last edited bullets. These values can be changed as desired for the selected bullet. See Variation under Other Button, Controls & Edit Boxes below.

The “**Sight Height**” value comes from the value with the same name entered on the Firearms page when a bullet is first loaded. You might remember that Sight Height is one of two values on the Firearms page that are mandatory. After loading a bullet, the sight height for the selected bullet can be changed as desired.

Word of caution when performing sight height comparisons or knowingly setting different sight heights for a firearm configuration editing the sight height on the Firearm Configuration page will result in that new height being copied to all loaded bullets linked to that configuration.

The “**Calc Max Range**” value is calculated by Infinity 7. If the combination of values in the “Elevation Angle” and “Maximum Range” boxes causes the bullet to be dropping near-vertical before reaching the specified Maximum Range, the Calc Max Range value shows the distance where Infinity 7 stopped calculating.

Other Buttons, Controls and Edit Boxes

The **Variation** Muzzle Velocity, Elevation Angle and Zero Range edit boxes provide the ability to perform comparisons using a single bullet without loading additional bullets. Variation data is displayed on Trajectory Charts with dashed lines. The values contained in the Variation edit boxes must be the same as the values in the normal boxes to avoid dashed lines.

The “**Include on chart**” checkbox determines whether the selected bullet will be display on the Trajectory Chart. Bullets may be individually selected and the checkbox for each put in the desired state. Clicking on a box that is already checked will uncheck that box.



The **color** associated with each bullet is initially set to a value when the bullet is loaded. The color chip next to the bullet in the “Selected bullets” list window is the line color that will be displayed (or printed) on the Trajectory Chart. **Hint:** Since the Trajectory Chart has a dark background but paper has a white background, consider changing any light colors e.g. whites and yellows to something that will show against white paper. The color of the bullet’s color chip also carries over to the Environment page and Range Card page.

The color for the selected bullet can be changed using the color chip drop-down box. Select the bullet you wish to change from the “Selected bullets” list and then click on the color chip drop-down box located in the Bullet Details window. Click the desired color from the palette or select “Advanced”. The Advanced screen allows selection of Red-Green-Blue and Transparency (Alpha-channel) to create any color you wish. Click anywhere outside the “Advanced color selection” box or click on “Standard” to return to the standard color values. The color chip drop-down box remains in the last-used state, “Advanced” or “Standard”, until the state is changed by picking either the “Standard” or “Advanced” buttons.



Reloads default bullet velocity from Bullet Database.



Copies bullet to Custom Bullet Editor page. See Custom Bullets Editor Help.



Copies all editable data from this bullet to all bullets displayed in List of Bullets.



Copies elevation angle of this bullet to all bullets displayed in List of Bullets.



Copies Max and Zero Range data of this bullet to all bullets displayed in List of Bullets.



Caliber / Diameter Confusion:

For those new to reloading, there is a great deal of confusion between the words “caliber” and “diameter”. The confusion comes from the firearms industry itself. How many times do you see “.223 caliber” or “.30 ’06 caliber” in advertising? Both are actually cartridge names, not calibers. **Since Sierra designs bullets, they choose to use the word caliber in its strictest sense – meaning the diameter of a bullet.** Therefore, bullets suitable for a .223 Remington cartridge have a diameter of 0.224. The 30 ’06 cartridge use a bullet diameter of 0.308. However, a lot of other cartridges use the same 0.308 diameter bullet including but not limit to: 30 Carbine, 30-30 Winchester, 300 Savage, 30-40 Krag, 300 Winchester Short Mag, 30 Winchester Mag, .308 Winchester, 7.62x25 Tokarev, 7.62 x 39, 7.62 x 51 NATO and 7.62 x 54R. Furthermore, all are commonly called “30 caliber”. Just because they all use the same 0.308” diameter bullet doesn’t mean those bullets can all be loaded in a .30 Carbine cartridge. Further confusing the issue is that some cartridge designations equal the bullet diameter: .243 Winchester and .308 Winchester come to mind.

If you purchased Sierra Suite with its built-in *Handgun & Rifle Reloading Data* book, it is simple to find a bullet diameter because you first search for the cartridge name, not bullet diameter. The book then offers bullets of the correct diameter for the cartridge. For those without Sierra Suite, Winchester and Remington databases within Infinity 7 tell which cartridges use the selected bullet diameter.

Don’t stress over caliber/diameter. Just know that when trying to select a bullet to load in Infinity 7, you must know or find correct bullet diameter.



Sierra Infinity Version 7.2.1 — Bullet Selection



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Environment

Each bullet links to a corresponding Environment page. Enter environmental data: Elevation (altitude), Temperature, Pressure, Humidity and Wind Direction and Velocity in fields on this page. Sighted values and Variation values allow comparison and prediction of two shooting locations.

A screenshot of the Sierra Infinity software interface, specifically the Environment page. At the top, there's a navigation bar with various icons. A red arrow points to the 'Environment' icon in the top right corner of the bar. Below the bar, the title 'Environment' is displayed in large letters. To the left of the title, it says '.308 dia. 175 gr. Tipped MatchKing (TMK)' and 'Sighted'. To the right, it says 'Variation'. Both sections have 'Set Standard' buttons. Under 'Sighted', the values are: Elevation 500, Pressure 29, Temperature 57.217, and Humidity 78. Under 'Variation', the values are: Elevation 7000, Pressure 22.78, Temperature 34.038, and Humidity 78. Below these sections are two graphs titled 'Profiled Winds' and 'Field Winds'. Each graph has a vertical axis from 0 to 200 and a horizontal axis. The 'Profiled Winds' graph shows a red dot at approximately (100, 100) and a yellow dot at approximately (103, 95). The 'Field Winds' graph shows a red dot at approximately (102, 100) and a yellow dot at approximately (102, 95). Both graphs have up, down, left, and right arrows for adjustment, and search/magnifying glass icons. At the bottom of the screen, it says 'Set the environmental conditions.' and 'Copyright ©2015 Sierra Bullets, LLC All Rights Reserved.'

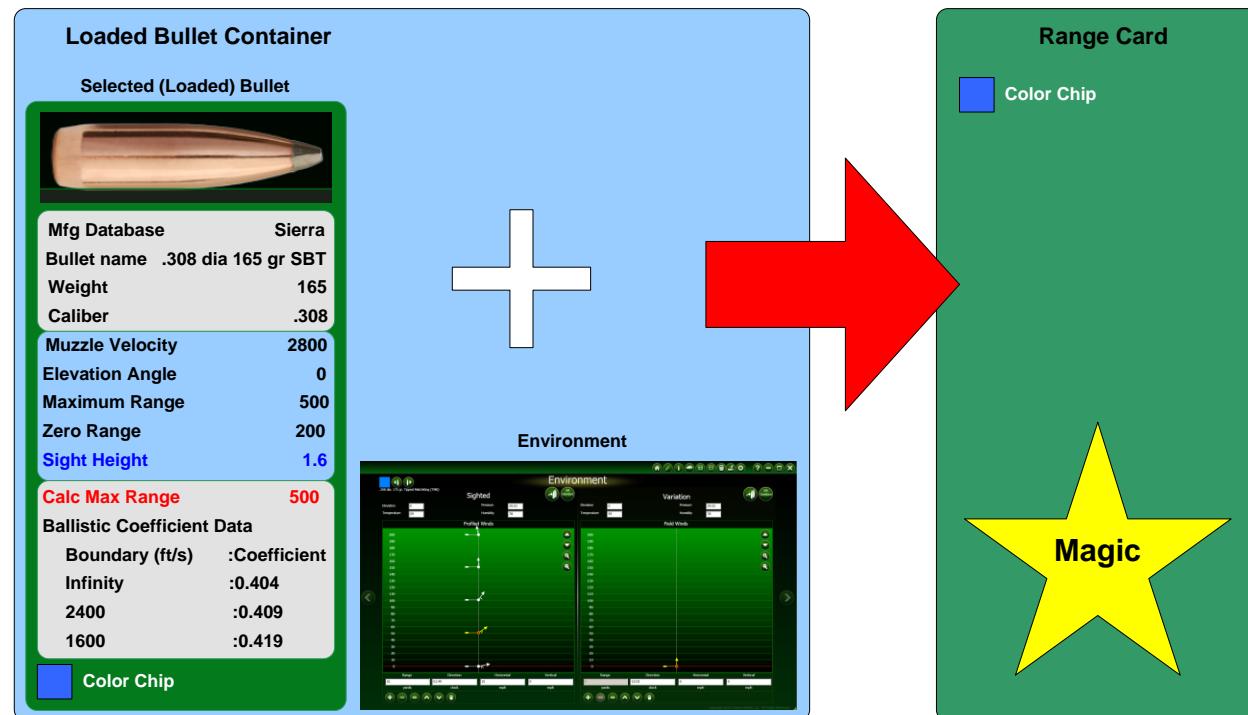


Sighted Verses Variation

The Environment page has two identical sides, one for “Sighted”, the other for “Variation” data. Like values on the Bullet Selection page, Variation data provides a means to compare bullet reaction to a different environment without the need to load another bullet. Again, Variation data is graphed with dashed lines. Only the Sighted side will be described in this section.

The Environment Page, as the title implies, allows entry of all environmental variables that impact bullet flight: Elevation, Temperature, Humidity, Barometric Pressure, Wind Direction, Wind Velocity, Rain Drops, Snowflakes and Hailstones. Just joking about the last three, but hope I got your attention. Before getting into screen details, let’s discuss how the Environment data reacts with the Loaded Bullet data and the Range Card. Simply visualize the loaded bullet as it leaves the barrel. Once leaving the barrel, only the environment and gravity acts upon the bullet. See Appendix A for an example of the effects of the environment on the bullet path.

Data that is common between the Loaded Bullet and Environment such as color chip, bullet Mfg. and bullet name are shared between the two pages and shared with the Range Card.





Bullet Selection



The Bullet selection control group located in the upper left of the Environment page (and Range Card page) displays bullet color chip and bullet name. The arrows allow changing to a different bullet without returning to the Bullet Selection pages. Bullet selection from this page is linked to the Bullet Selection page as well as the Range Card page. Change one page and all three pages change.

Data Input Fields

| | |
|-------------|------------------------------------|
| Sighted | |
| Elevation | <input type="text" value="0"/> |
| Temperature | <input type="text" value="59"/> |
| Pressure | <input type="text" value="29.53"/> |
| Humidity | <input type="text" value="78"/> |

Elevation, Temperature, Pressure and Humidity all affect the external trajectory. Enter the values most closely matching your shooting location. If in English Unit display mode, enter Elevation (altitude) in feet above or below mean sea level (MSL), Temperature in degrees F, barometric Pressure in inches of mercury (inHg) and Humidity in %. If Metric Unit display mode is enabled, enter Temperature in Celsius, Elevation in meters, and Pressure in millimeters of mercury (mmHg). Note that humidity has extreme local variations. Since most people don't carry psychrometers in their pocket, a best guess is adequate based on your location.

Standard Temperature and Pressure



A standard formula exists for determining barometric pressure at altitudes above mean sea level (MSL). If you know your elevation is 6000 feet, enter 6000 in the Elevation field then press the **Set Standard** button. Barometric pressure and air temperature change to the standard values for that elevation. If the indicated Temperature is well away from actual temperature, the barometric pressure is likely off.

There is one button to set the sighted environment and another to set the variation environment to "Standard".

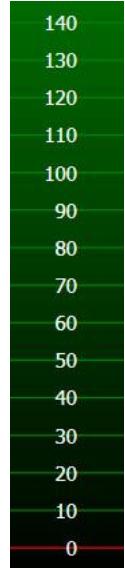
Copy All Data to Other Bullets



Select this button to quickly copy environmental data, including wind data, to all bullets contained in this Firearm Configuration. One button copies sighted environment. The other button copies variation environment.



Wind Fields



The distance scales on the fields indicates distance in yards or meters. Zero is the firing point position. See “[Scrolling and Zooming the Wind Flag Range](#)” on page 23 below.

The wind flag control group allows you to add or delete flags from the range as well as select flags. The values in the edit boxes determine both how far downrange a flag is placed and the Direction of the Wind, Horizontal Velocity, and the Vertical Velocity. Before delving into the buttons, a discussion of the wind flag is in order.

| Range | Direction | Horizontal | Vertical | | |
|----------------------------------|----------------------------------|------------------------------------|-----------------------------------|-------------------------------------|--------------------------------------|
| 51 yards | 01:49 clock | 15 mph | 0 mph | | |
| <input type="button" value="+"/> | <input type="button" value="-"/> | <input type="button" value="eye"/> | <input type="button" value="up"/> | <input type="button" value="down"/> | <input type="button" value="trash"/> |



Wind Flags



Wind Flags are rather complex. A lot of information is conveyed by this symbol. The red dot indicates this is the selected wind flag. The data shown in the wind flag control group applies to this and only this flag. All other flags are shown in white with white dot indicating they are not selected.

First and foremost, the direction in which the arrow is pointing is the direction from which the wind is coming, in this case about 1:30. You can think of the arrow and your nose pointing into the wind, or the arrow of a weather vane. The small bars hanging on the shaft of the arrow indicate approximate wind speed with each major tick being 10 mph. The length of the short tick is about half the length of the 10 mph ticks. Therefore, the horizontal wind value shown here is about 35 mph. The shorter tick gets shorter or longer depending on the range between 10 mph increments.

With the exception of the 0 yard wind flag, the red dot on the active flag is a handle allowing the flag to be moved up or down the range by clicking and dragging the dot. The value in the Range box increases or decreases accordingly.

The arrowhead of the selected flag is also a handle. Pick on the arrowhead and drag in a circle around the red dot to point the arrowhead into the wind. The Direction edit box updates accordingly with the angular data indicated by 12-hours of a clock. When precision of values is necessary, enter the values directly in the edit boxes.

The small rectangle hanging off the selected wind flag represents the vertical wind speed. If directly even with the red dot, the vertical wind speed is zero. You guessed it! The rectangle is also a handle that be clicked and dragged up or down the page to increase or decrease the velocity of vertical wind. Note that if moved downward below the zero line, control with the handle isn't possible. Manually enter zero in Vertical wind to bring the handle back on the range. Vertical winds in excess of -100 mph or +100 mph cause the Vertical edit box outline to turn red indicating illegal value. Enter a legal value or zero just to start over.

This little wind flag does everything except enter a horizontal wind velocity. The term "Horizontal" doesn't mean side-to-side as used here. It means the velocity of the wind on the axis in the direction of the wind.



Adding, Deleting, Hiding, Un-hiding, Selecting and Clearing the Range of All Wind Flags



Press (+) to add a new wind flag to the range. New flags are automatically added farther downrange than the last flag. Therefore, you may need to scroll to see the new flag.

Press (-) to remove the selected flag from the range.



Hides the selected flag. The dot for the flag remains on-screen so that it can later be found and re-displayed. All wind flags are used in Wind Drift calculations whether or not they are hidden.

Select a hidden flag and pick this button to re-display the flag.



These buttons provide a means of selecting wind flags other than picking with a cursor. Using these buttons will automatically scroll the Wind Flag into view if it is not visible.



The trash can clears all wind flags on the range.



Scrolling and Zooming the Wind Flag Range



Use the scroll up/down buttons to position the desired yard markers in the window.

To examine flags on the range more closely, use magnifier (-) or (+). The range is magnified in the following steps:

- 0 to 150 yards
- 0 to 250 yards
- 0 to 450 yards
- 0 to 850 yards
- 0 to 1650 yards
- 0 to 3250 yards
- 0 to 6650 yards
- 0 to 10,050 yards



Page intentionally left blank



Range Card

The Range Card displays data, one loaded bullet at a time, for analysis in as little as 1 yard or 1 meter increments as the bullet travels down range through the environment. Values displayed in the header as well as column headings are configurable from a large collection.

Bullet Selection Group

The screenshot shows the Range Card interface with various UI elements labeled:

- Bullet Selection Group**: A red box highlights the top-left area where a bullet icon and its specifications are displayed.
- Header**: A red box highlights the top section of the table, which includes the bullet type (.308 dia. 165 gr. 58T) and environmental conditions (Elevation: 0 Feet; Temperature: 59°; Humidity: 78%; Pressure: 29.53 mmHg).
- Column Headings**: A red box highlights the first row of the table, which contains the column headers: Range (Yards), Velocity (ft/s), Energy (ft/lbs), Path (Inches), Path Variation (Inches), Path (1 MOA), Wind Drift (Inches), Wind Drift (1 MOA), and Time (Seconds).
- Config Header**: A red arrow points to the 'Config' icon in the top right corner of the table header.
- Config Column Headings**: A red arrow points to the 'Config' icon in the top right corner of the table body.
- Copy to clipboard**: A red arrow points to the 'Copy' icon in the bottom right corner of the table.
- Print**: A red arrow points to the 'Print' icon in the bottom right corner of the table.
- Page Mode**: A red arrow points to the 'Page' icon in the bottom right corner of the table.
- Scroll Mode**: A red arrow points to the 'Scroll' icon in the bottom right corner of the table.
- Zoom**: A red arrow points to the 'Zoom' icon in the bottom right corner of the table.

| Range Yards | Velocity ft/s | Energy ft/lbs | Path Inches | Path Variation Inches | Path 1 MOA | Wind Drift Inches | Wind Drift 1 MOA | Time Seconds |
|----------------|------------------|------------------|----------------|--------------------------|---------------|----------------------|---------------------|-----------------|
| 0 | 2800.00 | 2671.88 | -1.60 | -1.60 | 0.00 | 0.00 | 0.00 | 0.0000 |
| 10 | 2777.06 | 2625.03 | -1.05 | -1.05 | 0.98 | 0.00 | 0.00 | 0.0108 |
| 20 | 2754.25 | 2778.80 | -0.54 | -0.54 | 2.56 | 0.00 | 0.00 | 0.0216 |
| 30 | 2731.55 | 2733.19 | -0.07 | -0.07 | 0.23 | 0.00 | 0.00 | 0.0325 |
| 40 | 2708.98 | 2688.20 | 0.35 | 0.35 | 0.82 | 0.00 | 0.00 | 0.0436 |
| 50 | 2686.52 | 2643.80 | 0.72 | 0.72 | 1.37 | 0.00 | 0.00 | 0.0547 |
| 60 | 2664.17 | 2600.00 | 1.04 | 1.04 | 1.65 | 0.00 | 0.00 | 0.0659 |
| 70 | 2641.93 | 2556.79 | 1.31 | 1.31 | 1.79 | 0.00 | 0.00 | 0.0772 |
| 80 | 2619.83 | 2518.14 | 1.53 | 1.53 | 1.83 | 0.00 | 0.00 | 0.0886 |
| 90 | 2599.79 | 2492.06 | 1.71 | 1.71 | 1.81 | 0.00 | 0.00 | 0.1001 |
| 100 | 2575.89 | 2430.56 | 1.83 | 1.83 | 1.74 | 0.00 | 0.00 | 0.1117 |
| 110 | 2554.11 | 2389.63 | 1.89 | 1.89 | 1.64 | 0.00 | 0.00 | 0.1234 |
| 120 | 2532.43 | 2349.23 | 1.91 | 1.91 | 1.52 | 0.00 | 0.00 | 0.1352 |
| 130 | 2510.84 | 2309.34 | 1.87 | 1.87 | 1.37 | 0.00 | 0.00 | 0.1471 |
| 140 | 2489.34 | 2269.96 | 1.78 | 1.78 | 1.21 | 0.00 | 0.00 | 0.1591 |
| 150 | 2467.93 | 2231.09 | 1.63 | 1.63 | 1.04 | 0.00 | 0.00 | 0.1712 |
| 160 | 2446.63 | 2192.75 | 1.42 | 1.42 | 0.85 | 0.00 | 0.00 | 0.1834 |
| 170 | 2425.44 | 2154.92 | 1.15 | 1.15 | 0.65 | 0.00 | 0.00 | 0.1957 |
| 180 | 2404.35 | 2117.60 | 0.83 | 0.83 | 0.44 | 0.00 | 0.00 | 0.2082 |
| 190 | 2383.54 | 2081.12 | 0.45 | 0.45 | 0.22 | 0.00 | 0.00 | 0.2207 |
| 200 | 2362.82 | 2045.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.2333 |
| 210 | 2342.40 | 2009.89 | -0.51 | -0.51 | -0.23 | 0.00 | 0.00 | 0.2461 |
| 220 | 2321.98 | 1975.00 | -1.06 | -1.06 | -0.47 | 0.00 | 0.00 | 0.2589 |
| 230 | 2301.66 | 1940.58 | -1.71 | -1.71 | -0.71 | 0.00 | 0.00 | 0.2719 |
| 240 | 2281.43 | 1906.63 | -2.42 | -2.42 | -0.96 | 0.00 | 0.00 | 0.2850 |
| 250 | 2261.30 | 1873.13 | -3.18 | -3.18 | -1.22 | 0.00 | 0.00 | 0.2982 |
| 260 | 2241.27 | 1840.09 | -4.02 | -4.02 | -1.48 | 0.00 | 0.00 | 0.3115 |
| 270 | 2221.34 | 1807.50 | -4.92 | -4.92 | -1.74 | 0.00 | 0.00 | 0.3250 |
| 280 | 2201.50 | 1775.36 | -5.90 | -5.90 | -2.01 | 0.00 | 0.00 | 0.3386 |
| 290 | 2181.75 | 1743.66 | -6.95 | -6.95 | -2.29 | 0.00 | 0.00 | 0.3522 |
| 300 | 2162.11 | 1712.40 | -8.07 | -8.07 | -2.57 | 0.00 | 0.00 | 0.3661 |



Calculations and Interval Steps

Sierra Infinity 7 external ballistic calculations work behind the scenes to generate the data displayed on the Range Card. The Range Card displays calculations at user-specified Range Steps. Note that the number of Range Steps displayed does not impact the accuracy of Trajectory Charts. Infinity 7 calculates trajectories at 1 yard or 1 meter intervals to the limits of Maximum Range. Only those that correspond to Range Steps are displayed on the Range Card.

Range Card Sections

The upper portion of the Range Cards has a header area that can display several calculated values plus a bullet image if the bullet is built by Sierra. Immediately below the header is a single row of column headings which are also configurable. Below the column headings, one row of data is displayed for each distance (Range Step) down range. For shooters preferring the graphical Trajectory Charts rather than looking at Range Card data, keep the Step Range large, 25, 50 or 100 yards for long range rifle. While the data calculations at 1 yard/meter intervals are calculated very quickly, the Range Card screen redraws are slower. Keeping the number of displayed rows to a minimum reduces re-draw time.

NOTE: The Range Step value can be set using the Configure Column Headings page.

Bullet Selection



Data for one bullet at a time is displayed on the Range Card. Click on the right or left arrow to sequentially display data for each loaded bullet. Note that all loaded bullets can be displayed regardless of whether the “Include on chart” checkbox is checked on the Bullet Selection page. Changing bullets using these controls also changes the selected bullet on the Environment page and Bullet Selection page.

Page Display Controls and Page Zoom



Infinity 7 provides two display modes: page mode and scroll mode. Select the left-most button (highlighted) in this group to display data in page mode. Move between pages using the arrows on either side of the page number.

Select the page icon on the right to display data in scroll mode. A scroll bar appears in the right side of the data window.

Use the Zoom control to increase or decrease text size for easier reading. Excessive zoom may cause text or data wrapping within each cell.

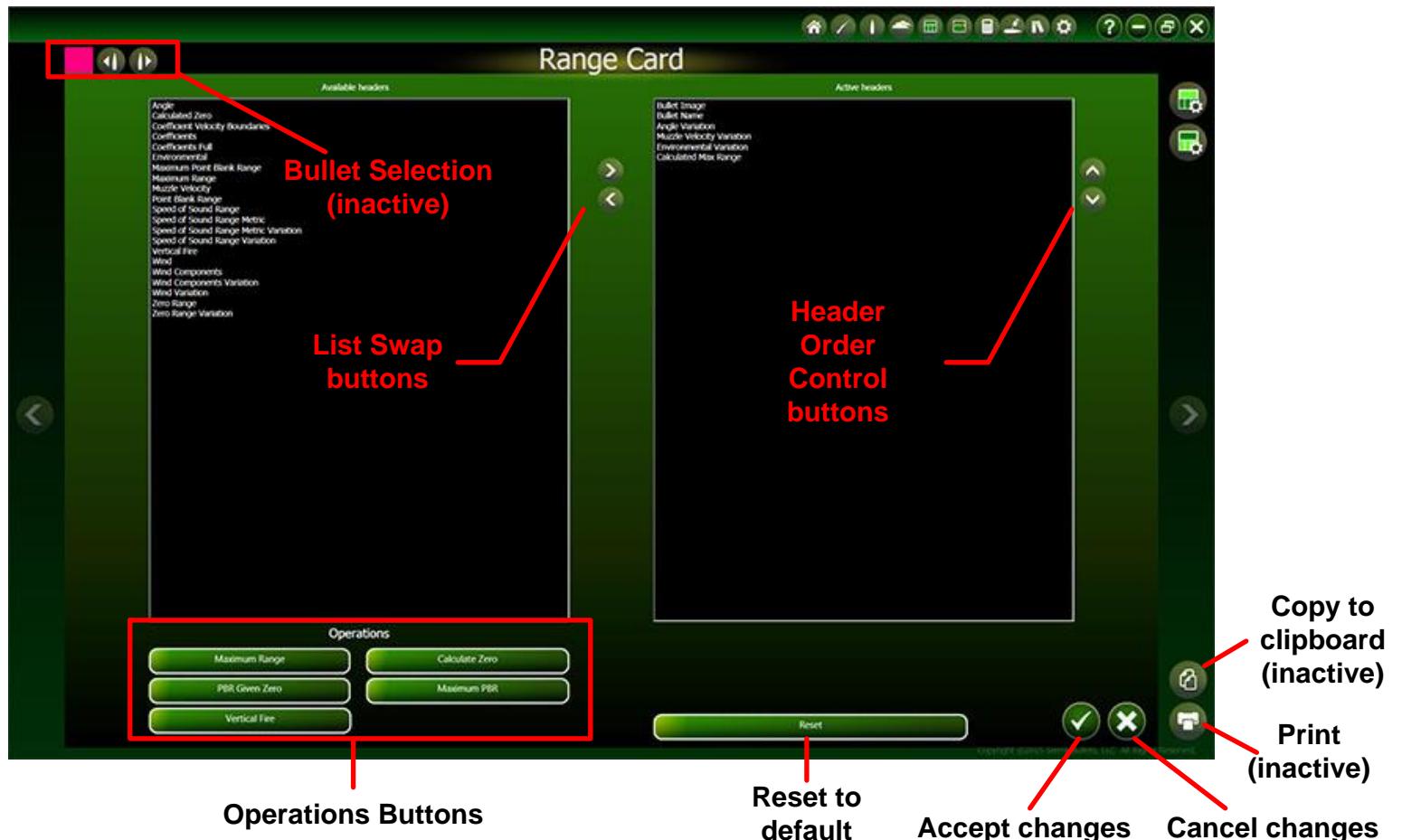


Configuring the Range Card Header



Select the Configure Range Card Header button while viewing the Range Card to access the Header Configuration page.

Note that Range Card Headers are applied to the Range Card for all bullets and all firearms until changed.





Header Configuration Panels and Buttons

The left panel lists available Headers. The right panel lists active headers. Use the List Swap buttons to move headers between panels. Headers in the left panel are automatically placed in alphabetical order.

Headers in the right panel will be displayed in the order listed on the Range Card. To change the Header order, select a Header name and use the Header Order Control buttons to move that Header up or down in the list.

Select the Reset to Default button to load default Headers

When done editing, select the Accept changes or Cancel changes buttons to return to the Range Card.

Operations

Operation buttons, when selected and accepted, cause Infinity 7 to calculate special values. Calculated values do not affect the Trajectory but simply cause the resulting calculations to be included in the Range Card Header. In addition to calculating the values, the Operation Buttons preset the Active Headers pane with those values needed to display the results in the Range Card Header.

Some Operation buttons require entry of one or more additional values to make the calculations. For example, Maximum Point Blank Range must know the size of the Vital Zone. If additional information is required to complete a special calculation, that information must be entered in the field/s below the Active Headers pane.

Hint: You may wish to add bullet Manufacturer and Muzzle Velocity to the Active Headers list if the Range Card is going to be printed for archival purposes.



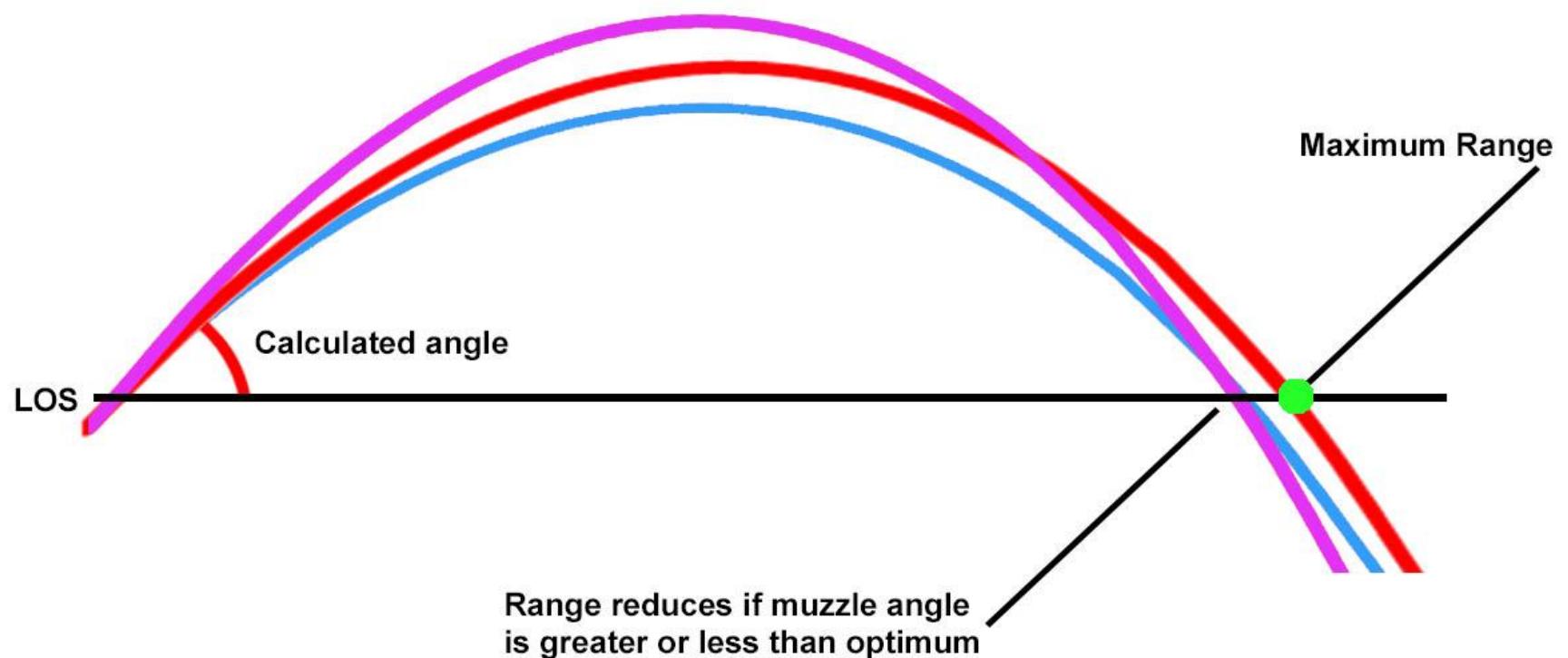
Maximum Range

Maximum Range

The Maximum Range Operation calculates the angle causing the bullet to travel the greatest distance. As shown below, the red trace causes the bullet to travel the greatest distance. Either a larger or smaller barrel angle causes the bullet to travel less distance.

Note that the Calculated Angle and Maximum Range is based on the Variation Muzzle Velocity. Additionally, if Variation Elevation Angle data other than 0 is entered, the range slopes up or down at that angle resulting in shorter or longer Maximum Range, respectively.

Variation Temperature, Humidity, Elevation and Barometric Pressure from the Environment page are also included in the calculation. Wind values are not part of the calculation.





PBR Given Zero

PBR Vital Zone Inches

3

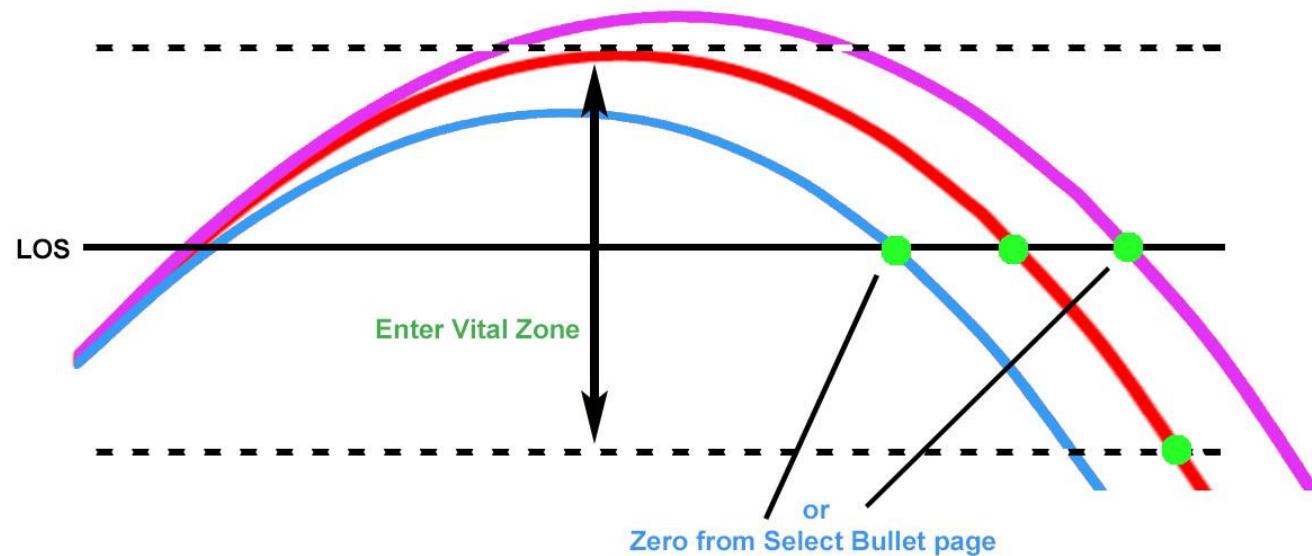
Point Blank Range Given Zero

The Point Blank Range (PBR) Given Zero Operation is a two-step analysis. The first step, based on the PBR Vital Zone, determines the optimal zero range for that Vital Zone. The red line in the following figure represents the Maximum PBR trajectory. The green dots on the red line are optimal Zero point and Maximum PBR at the lower Vital Zone limit. See Maximum PBR Operation topic below.

The second step compares Zero distance from the Bullet Selection page with the previously calculated PBR Zero. This comparison results in one of two messages that are displayed in the Range Card Header:

- (**Cyan line**) If the Bullet Selection page Zero value is less than calculated PBR Zero, “The Zero Range is less than the Zero for Maximum Point Blank Range” is displayed in the Range Card Header.
- (**Magenta line**) If the Bullet Selection page Zero value is greater than calculate PBR Zero, “The Zero Range is greater than or equal to the Maximum Point Blank Zero for the Vital Zone” is displayed in the Range Card Header.

In addition to either of the messages above, the header also shows the Maximum PBR and Zero to achieve Maximum PBR.



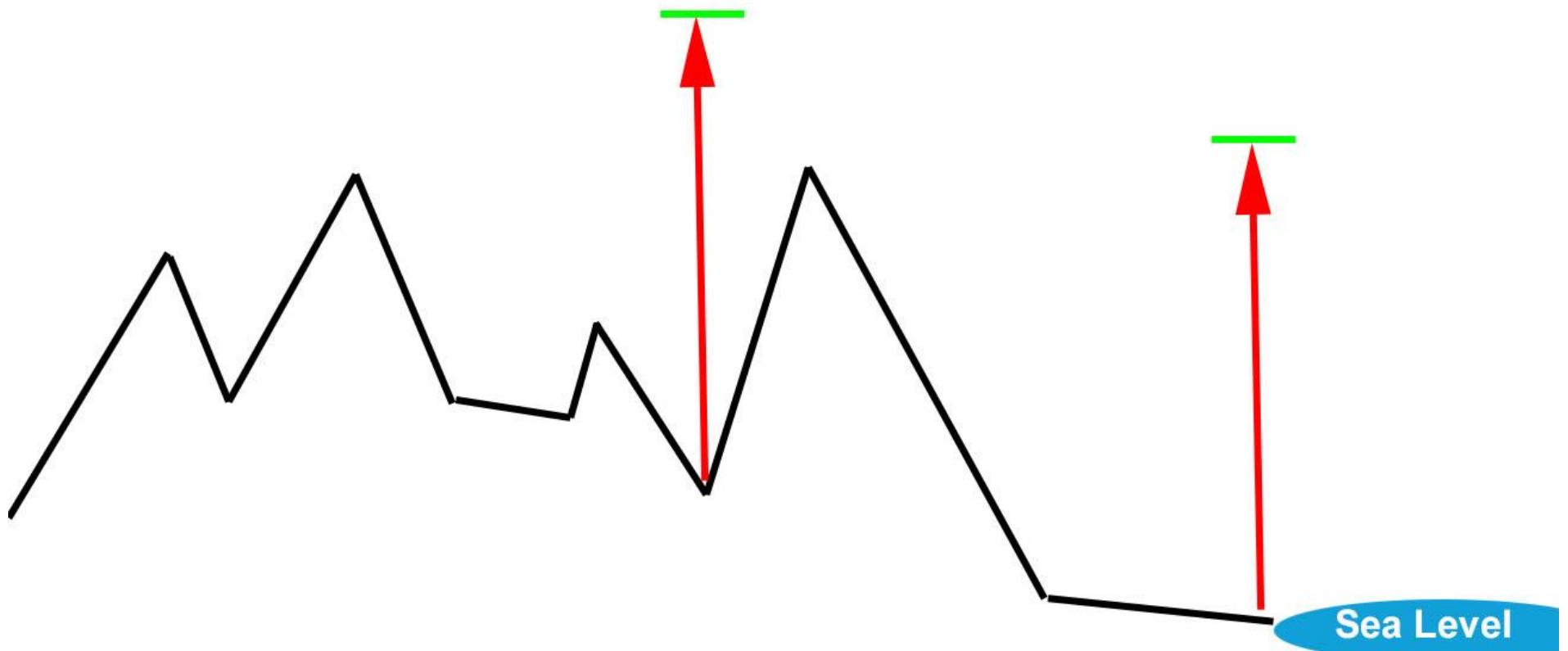


Vertical Fire

Vertical Fire

The Vertical Fire Operation button calculates the height the selected bullet reaches if the barrel were turned vertical. Three resulting values are displayed in the header: Maximum Elevation (distance above sea level), Maximum Elevation (distance above firing point) and Time of Flight in seconds. The time of flight is the time until the bullet reaches maximum height.

The data providing inputs to this operation come from main data fields, not Variation fields. Winds are not included in the calculation nor does this header affect the Trajectory Chart.





Calculate Zero

Measured Range Yards

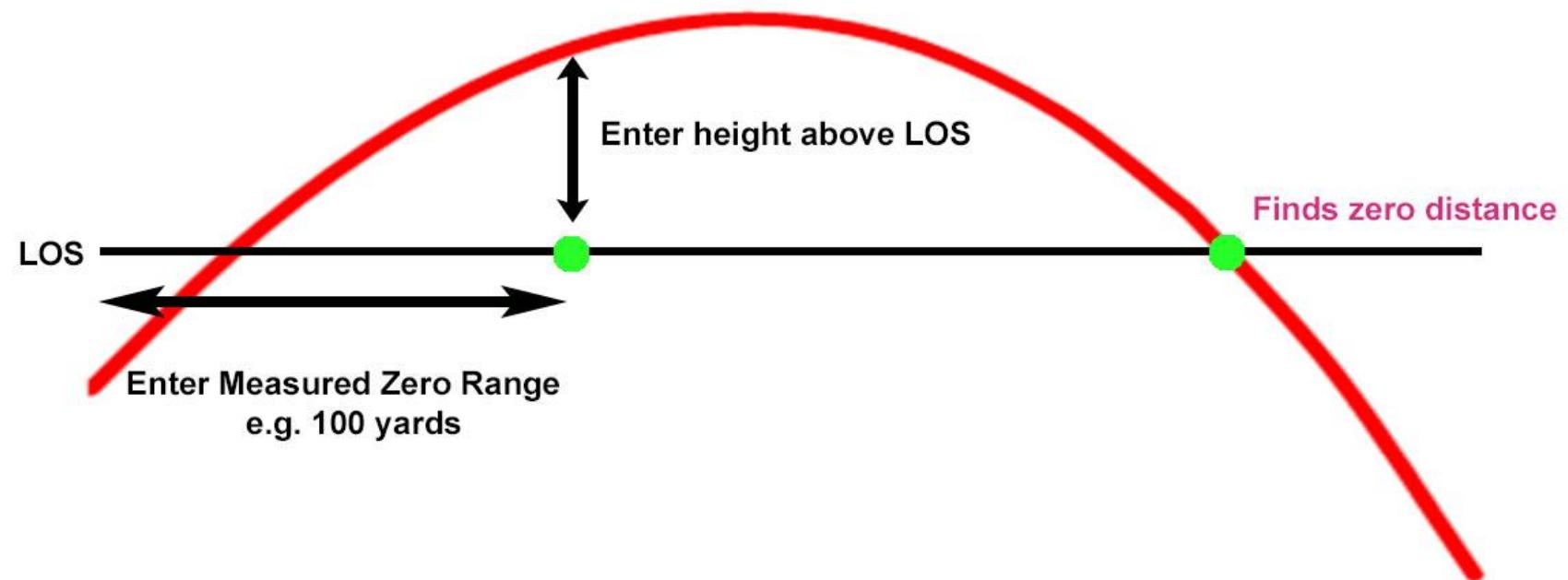
100

Inches above LOS

1

Calculate Zero

The Calculate Zero Operation button calculates the zero distance if you know the height above the Line of Sight (LOS) at a given distance. For example, if your bullet is 2-inches high at 100 yards, you can determine the zero distance (where the bullet passes through the LOS travelling downward).





Maximum PBR

PBR Vital Zone Inches

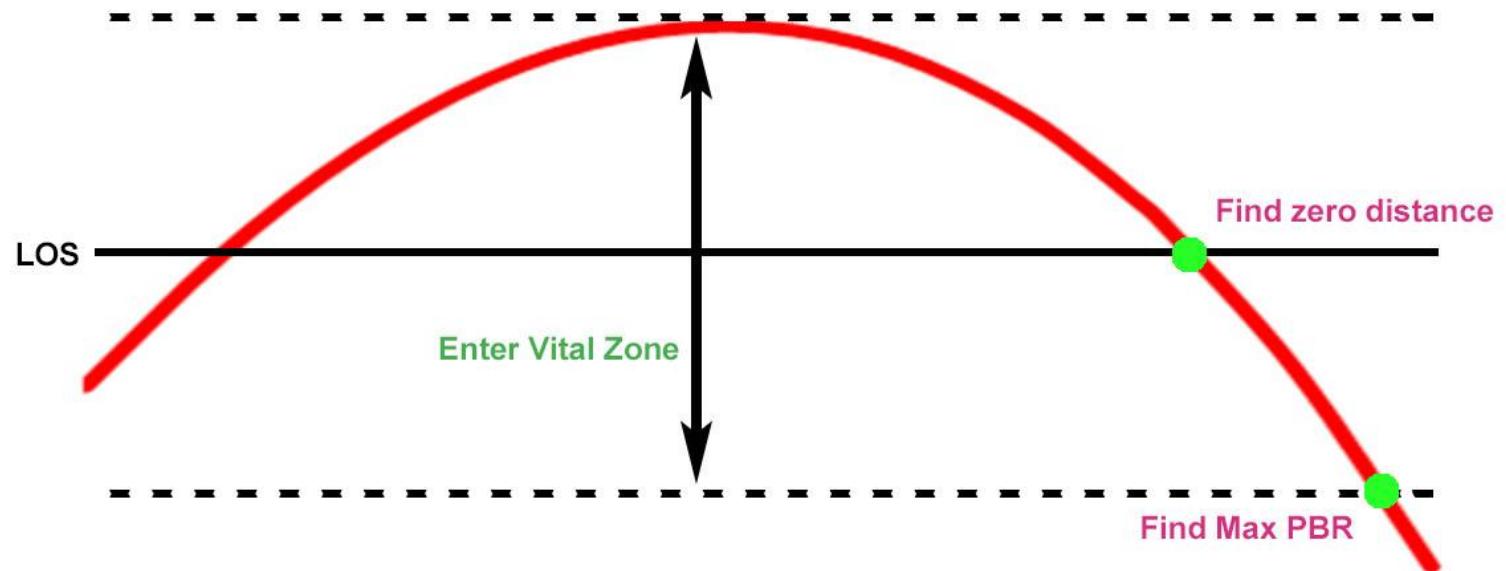
3

Maximum Point Blank Range

The Maximum PBR Operation Button requests a value for the Vital Zone. Enter the Vital Zone and click Accept. The Range Card Header lists Selected bullet, and MPBR data including the Vital Zone you entered, the Maximum Zero distance and Maximum Point Blank Range.

Note that the PBR Vital Zone Inches is total height. Therefore, if the number 3 is entered, it means 1.5 inches high to 1.5 inches low.

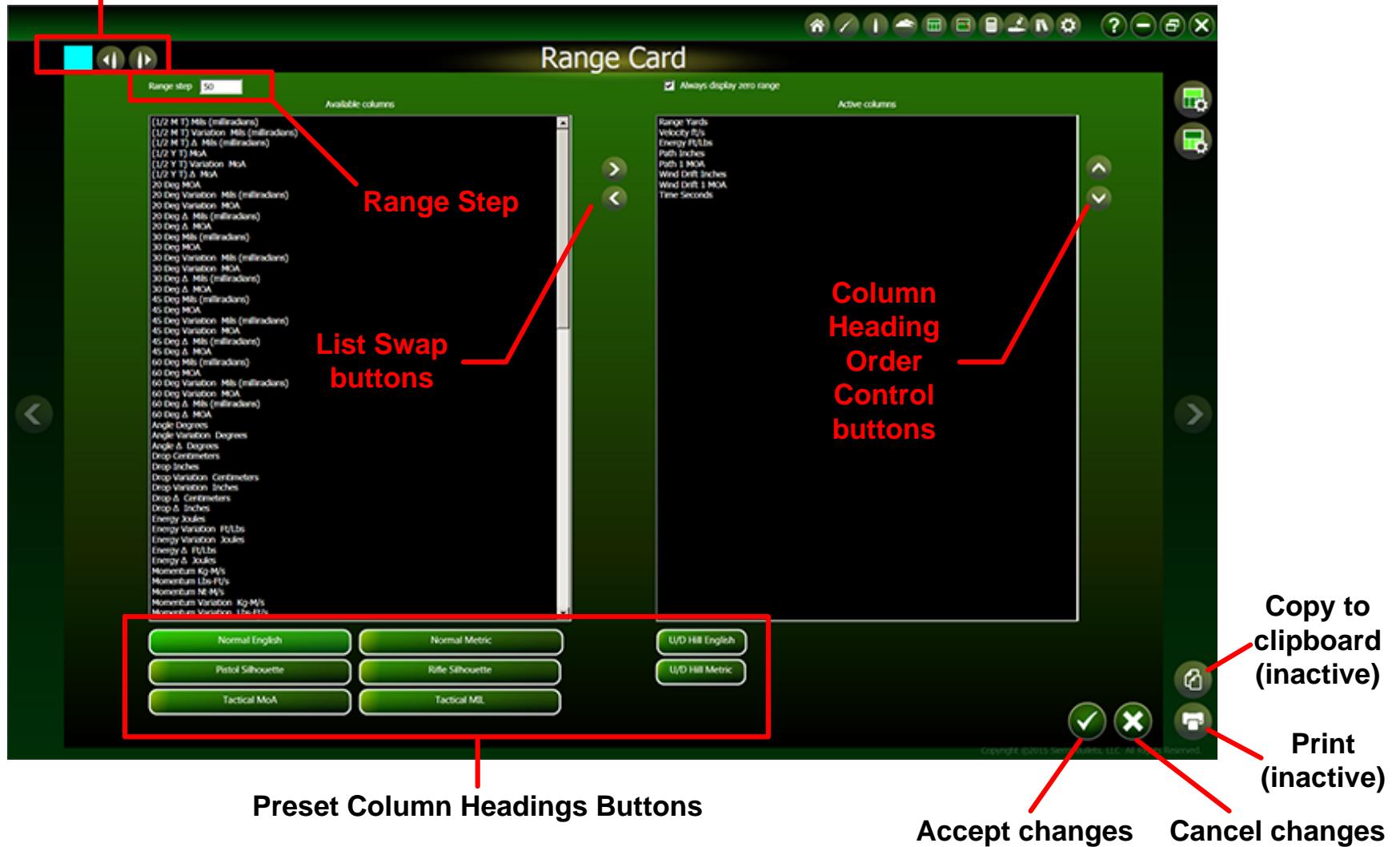
Although sighted elevation, temperature, humidity and barometric pressure are included in the calculations, wind values are not. Therefore, wind drift must be accounted for independently of Max PBR.





Configuring the Range Card Data Columns

Bullet Selection (inactive)





Select the Range Card Data Columns button while viewing the Range Card to access the Column Configuration page.

Note that Range Card Columns are applied to the Range Card for all bullets and all firearms until changed.

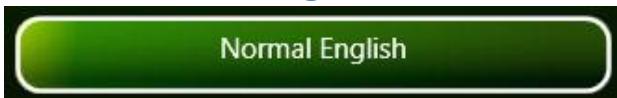
Infinity 7 provides total flexibility in selecting and displaying only those columns you wish to see. Like Range Card Header Configuration, highlight headings from the Available Columns and move to the Active Columns pane or vice-versa. In the Active Columns pane, select a Column name and move it up or down in the list.

Range Card Step

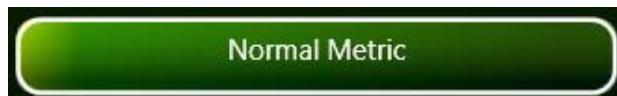


The Range Step Control allows you to set the magnitude of steps on the Range Card. Keep in mind calculations occur every 1 yard (or meter if Units = metric on the Setup page). The Range Card refresh/upgrade rate is affected by the total number of steps listed. If you are not using data from the Range Card but examining the Trajectory Charts, set this to a high value to avoid delays.

Preset Column Headings Buttons



Select Normal English to load a standard set of column headings in English units. Select Normal Metric to display column headings in Metric units. The selected units apply only to column headings on the Range Card.



To set English or Metric for all pages, refer to the Settings page for “Units”. That value selected on the Settings page determines if calculations are performed at 1 yard or 1 meter increments.

The Range Card column heading for “Range” is displayed in yards or meters depending on the selected mode of the setting specified in the applications settings units.

Silhouette Modes



Select either of these buttons to load a standard set of column headings designed for Silhouette shooters. When either of these modes is selected, the Range Card’s Range column heading is always in meters regardless of selection of the Units on the Settings page.



In addition, the word “Silhouette” shows just under the title of the Range Card to ensure the shooter realizes the range is in meters.



Tactical Modes

Tactical MoA

Select either of these buttons to load a standard set of column headings for Tactical MoA or Tactical MIL sights.

Tactical MIL

Up Hill / Down Hill Calculations

U/D Hill English

Select either of these buttons to load a standard set of column headings for Uphill or Downhill shooting in English or Metric. Again, if the Units set on the Options page are in English, the Range values will be in yards regardless of which of these buttons is selected. The opposite is true if in metric on the Options page.

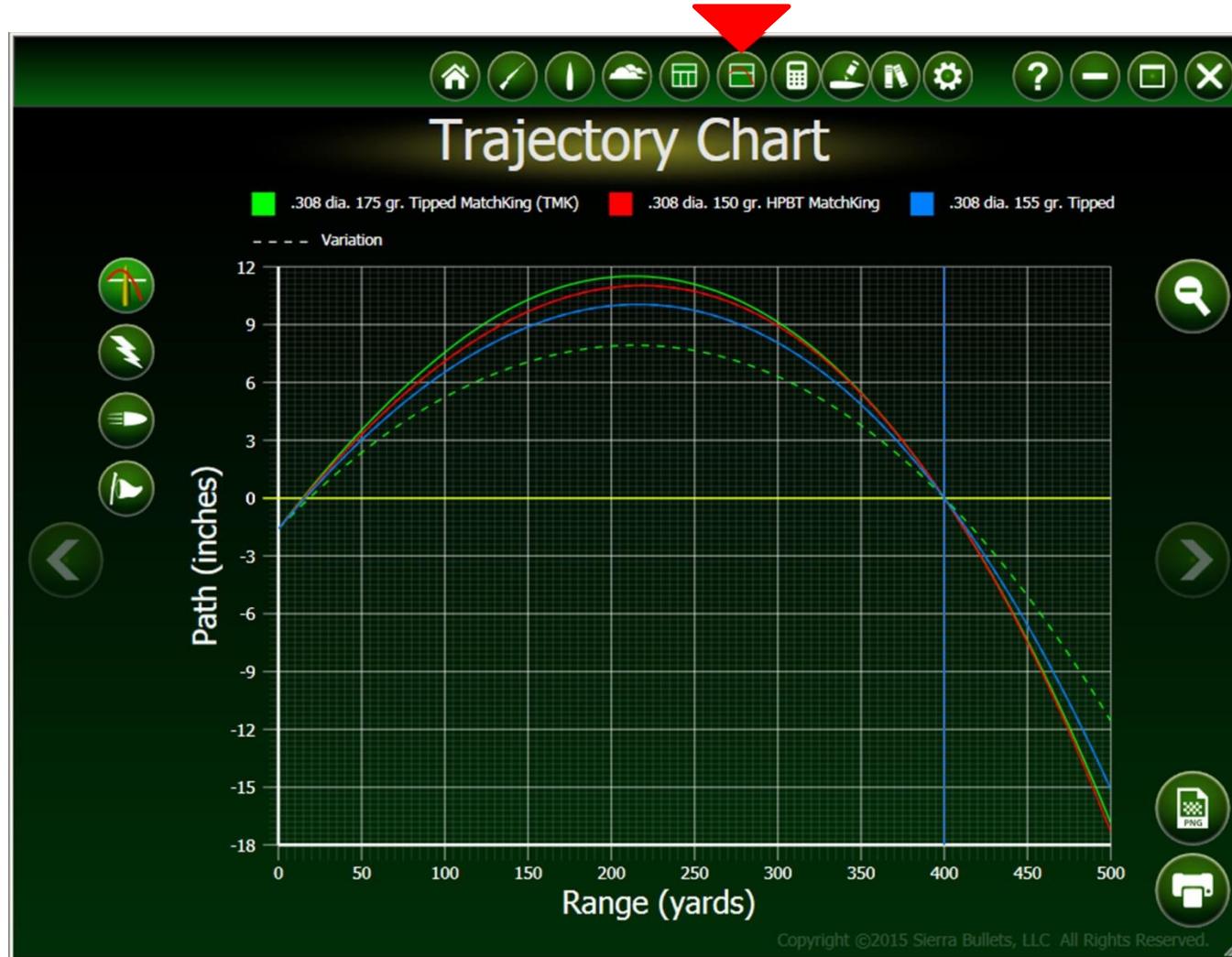
U/D Hill Metric

Infinity 7 uses Elevation Angle from the Bullet Selection Page as sighted data and Variation Elevation Angle as the uphill/downhill data. The preselected Range Card columns include both the Up/Down path and the delta (difference) between the sighted and Variation Angle.



Trajectory Chart

The Trajectory Charts page displays calculated in an easy to visualize form. Line colors match bullet colors with the “Include on Chart” checkbox enabled on the Bullet Selection page. Displayed lines have 1 yard or meter granularity regardless of Range Card settings.





Trajectory Chart Buttons



Bullet Path

Select the “Display bullet path chart” button to display the bullet or multiple bullet paths. The vertical axis is listed in inches or centimeters depending on the Units mode selected on the Settings page. The horizontal axis is in yards or meters.

The solid horizontal yellow line is the Line of Sight (LOS). A vertical solid line represents the Zero Range entered on the Bullet Selection page. If Variation Zero Range differs from sighted Zero Range, a dashed vertical line is displayed for the Variation Zero Range.

Variation bullet path data is shown in dashed lines. Dashed lines are caused by differing values of Muzzle Velocity, for sighted and variation or by differing values for sighted and variation Temperature, Humidity, Elevation or Barometric pressure.

The x-axis limit of all charts is determined by the maximum value of the values for “**Calc Max Range**” on the Bullet Selection page for all bullets included on the chart. That value is normally the same as specified in the Maximum Range box you entered on the same page. However, that range may be shortened if calculations determine the bullet is no longer moving toward the target, e.g. very close to straight down.



Bullet Energy

Select the “Display Energy Chart” button to display the bullet energy in foot-pounds or joules if in the Metric Units mode.

Variation energy data is shown in dashed lines. Dashed lines are caused by differing values of Muzzle Velocity, for sighted and variation, or by differing values for sighted and variation Temperature, Humidity, Elevation or Barometric pressure.



Bullet Velocity

Select the “Display Velocity Chart” button to display the bullet velocity in feet per second or meters per second if in the Metric Units mode.

Variation velocity data is shown in dashed lines. Dashed lines are caused by differing values of Muzzle Velocity, for sighted and variation, or by differing values for sighted and variation Temperature, Humidity, Elevation or Barometric pressure.



Wind Drift

Select the “Display Wind Drift Chart” button to display the bullet wind drift in inches or centimeters per second if in the Metric Units mode. Values shown are calculated from data supplied on the Environment page. Bullets curving upward are moving to the left of the range viewed from the shooting position. Bullets curving downward are curving to the right.

Variation wind drift data is shown in dashed lines. Dashed lines are caused by differing values of wind velocity and direction between sighted and variation from the Environment page.



Zoom Chart

The “Zoom to full view” button returns any of the four charts to full view if zoom was previously applied. To zoom in (+) on any portion of a chart, click-and-drag the cursor diagonally over the desired section. When done viewing in zoomed mode, select the Zoom to full view button or double click anywhere on the chart.

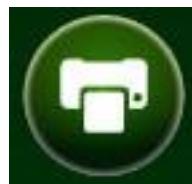
Zoomed images may be printed or exported to a “.png”. See below.



Export Chart

Select the “Export to a file” button to export the chart in a “.png” file format.

Note that bullet names and colors are not included in the .png image file.



Print Chart

Select the “Print” button to send the displayed chart to a printer. When printing, bullet colors and names are printed in a font color matching the lines.

Hint: When printing on white paper, light colored lines can disappear. Change bullet color chips to slightly darker colors before printing. Printing a bullet with white or light yellow color chip on white paper is probably not useful. The only indication a line exists is the absence of black grid lines that were overwritten by white or light yellow.



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Calculators

The Calculator page provides two calculators: Twist Rate Calculator and Recoil Calculator. These calculators function totally independent of values for loaded bullets. The Twist Rate Calculator and Recoil Calculator both use manually entered data of the same or different caliber bullets.

A screenshot of the Sierra Infinity software interface showing the 'Calculators' screen. At the top, there is a toolbar with various icons: Home, Pen, Bullet, Weather, Tools, Settings, Help, Minimize, Maximize, and Close. A red arrow points to the 'Calculators' icon in the toolbar. Below the toolbar, the title 'Calculators' is displayed in large white letters. The interface is divided into two main sections: 'Twist Rate Calculator' on the left and 'Recoil Calculator' on the right. Both sections contain input fields for various parameters and output fields for calculated results. The 'Twist Rate Calculator' section includes fields for Bullet Weight (grains), Bullet Diameter (inches), Bullet Length (inches), Stability Factor, and Muzzle Velocity (ft/s), with a resulting Twist Rate (inches per turn) of 10.45. The 'Recoil Calculator' section includes fields for Bullet Weight (grains), Powder Weight (grains), Muzzle Velocity (ft/s), and Firearm Weight (lbs), with resulting values for Free Recoil Velocity (15.75 ft/s), Recoil Momentum (3.72 lb-mass ft/s), and Recoil Energy (29.3 ft-lb weight). Navigation arrows are located at the bottom left and right of the calculator sections. At the bottom of the screen, the copyright notice 'Copyright ©2015 Sierra Bullets, LLC All Rights Reserved.' is visible.

| Twist Rate Calculator | |
|------------------------------|--------|
| Bullet Weight (grains) | 69 |
| Bullet Diameter (inches) | 0.224 |
| Bullet Length (inches) | 0.8885 |
| Stability Factor | 1.15 |
| Muzzle Velocity (ft/s) | 3000 |
| Twist Rate (inches per turn) | 10.45 |

| Recoil Calculator | |
|------------------------|-------------------|
| Bullet Weight (grains) | 175 |
| Powder Weight (grains) | 62.3 |
| Muzzle Velocity (ft/s) | 2950 |
| Firearm Weight (lbs) | 7.6 |
| Free Recoil Velocity | 15.75 ft/s |
| Recoil Momentum | 3.72 lb-mass ft/s |
| Recoil Energy | 29.3 ft-lb weight |



Twist Rate Calculator

Twist Rate Calculator

| | |
|------------------------------|------|
| Bullet Weight (grains) | 50 |
| Bullet Diameter (inches) | .224 |
| Bullet Length (inches) | 1 |
| Stability Factor | 1.25 |
| Muzzle Velocity (ft/s) | 2700 |
| Twist Rate (inches per turn) | 6.2 |

The Twist Rate Calculator uses supplied data to determine a recommended rifling twist rate to stabilize a bullet. A stabilized bullet noses over with the arc, remaining tangent to the arc. An under-stabilized bullet is likely to tumble in flight. An over-stabilized bullet doesn't nose over during flight presenting the side of the bullet rather than the tip to drag.

The Stability Factor is a theoretical number with no units. A value less than 1.0 indicates an under-stabilized bullet that is likely to tumble. A Stability Factor of 1.0 is considered perfect EXCEPT perfectly stabilized bullets may still tumble if acted upon by wind. Even a bullet with 1.1 or 1.2 may tumble. Therefore, experimentation with the Twist Rate Calculator before loading those 1,000 bullets is advised.

This Twist Rate Calculator provides the means to explore the effects of changing the input stability factor on twist rate. For example, begin with a Stability Factor of 1.0, then go to 1.05, 1.10, 1.15, and 1.20 to gain a feeling of stability factor to twist rate. The practical analytical model for rifling twist rate, attributed to William F. Davis in Infinity 6, is based on practical assumptions and then verified by practical experience in the field.



Recoil Calculator

Recoil Calculator

| | |
|------------------------|--------------------|
| Bullet Weight (grains) | 165 |
| Powder Weight (grains) | 55 |
| Muzzle Velocity (ft/s) | 3080 |
| Firearm Weight (lbs) | 11 |
| Free Recoil Velocity | 10.45 ft/s |
| Recoil Momentum | 3.57 lb-mass ft/s |
| Recoil Energy | 18.67 ft-lb weight |

The Recoil Calculator computes the recoil generated when the firearm shoots. The physical units chosen for the calculated parameters are customary for English Units. These units do not change even if the Settings page is set to metric.

The difference between pounds-mass (slugs) and pounds-weight is that gravity acts on mass to produce weight. Thus, one pound-mass on earth produces about 32.2 pounds-weight. The analytical model for the recoil computations is attributed to Julian S. Hatcher (see Hatcher's Notebook).



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Custom Bullets Editor

The Custom Bullets Editor allows creation of custom bullets. Custom bullets are created by starting with a bullet having the same general characteristics as the bullet you wish to create. The more similar the starting (or “boilerplate”) bullet is, the less work needed. Starting with any bullet, from any Manufacturer, including other custom bullets then modify as desired

The screenshot shows the 'Custom Bullets Editor' window. At the top, there's a toolbar with various icons: Home, Edit, Undo, Redo, Save, Load, Print, Delete, Help, Minimize, and Close. Below the toolbar is the title 'Custom Bullets Editor'. On the left, there's a sidebar with a 'Category' dropdown set to 'Custom Bullets' and a 'List of bullets' section containing a single item: '45 ACP 200 gr SWC OTBC 150 gr. FMJBT IMR-4064 48.5 gr Garand'. The main area contains several input fields: 'Bullet name' (.308 dia. 150 gr. FMJBT IMR-4064 48.5 gr Garand), 'Bullet Description' (Custom .308 dia. 150 gr. FMJBT), 'Caliber' (0.308), 'Weight in grains' (150), and 'Muzzle velocity' (2800). Below these are tables for 'Boundary (ft/s)' and 'Coefficient'. The 'Boundary' table lists values for Infinity (.408), 2.800 (.397), and 1.800 (.387). The 'Coefficient' table has a row for 'Infinity' with a value of 0.408. At the bottom, there are buttons for adding (+), deleting (-), and editing (pencil) a bullet, along with a checkmark and X button. A note at the bottom says 'Add a bullet by clicking on the large + button'.



Category Creation and Selection

Category

The name of a Category is the name of a Manufacturer in the Infinity 7 Bullet Database. You get to name your Manufacturer anything you want before adding a new custom bullet. The default Manufacturer name for Infinity 7 is “Custom Bullets”. That name cannot be deleted nor changed. You can create your custom bullets using a Company name (preferably your company name) or take advantage of the ability to categorize your loads, e.g. My 30 '06.

Hint: Create a new Category name before editing a bullet if you want to add the new bullet to a new Category. Category names cannot be added while editing a bullet.

Create a new Category name by selecting (+) then typing the new Category name in the combo box where you see “Type new name here”. The (+) button changes to a checkmark. When the name is entered as desired, select the checkmark to save the name or (X) to cancel. After saving a new Category name, it becomes available in the drop-down list.

Categories can be deleted by selecting (X).

CAUTION: Deleting a Category deletes all custom bullets saved in the database that are contained in that Category. Read the warning carefully to avoid disappointment and lost time.

Each time a new Category name is selected using the drop-down list, all bullets saved with that Category name are displayed in List of bullets window. After creating a new Category, the list of bullets window is blank.

[Copy a bullet Hint:](#)

Now that a Category name is available in which to store a custom bullet, return to the Bullet Selection page to select your boilerplate bullet from any manufacturer, including bullets listed in “Custom Bullets” or any other Category name you have created. Select your boilerplate caliber and bullet style then select the wrench icon on the Bullet Selection page. The selected bullet’s data is copied directly to the Custom Bullet Editor and placed in edit mode ready to modify the bullet name.

(Found on Bullet Selection page)





Create and Edit Custom Bullets



If the bullet you want to add OR edit is in one of the Custom Bullet Categories, select the Category and the bullet within that category.

Click the **(+)** button located below the List of bullets window to add a new bullet based on the selected name. A copy of that bullet's data is copied to the edit window. See below.

Click the pencil icon to edit an existing bullet. That bullet's data is overwritten after saving changes from the editor.

Delete a bullet from the List of bullets by selecting **(X)**. Only the highlighted bullet is deleted from the list.

Editing Custom Bullets

| | |
|--------------------|---|
| Bullet name | .308 dia. 150 gr. FMJBT IMR-4064 48.5 gr Garand |
| Bullet Description | Custom .308 dia. 150 gr. FMJBT |
| Caliber | 0.308 |
| Weight in grains | 150 |
| Muzzle velocity | 2800 |

The bullet editing fields are shown to the left.

Bullet name: This name is displayed in the Bullet Selection page list after selecting the caliber. It is also shown on Environment, Range Card and Trajectory pages and associated with the color chip. The name should be descriptive but not too long. In the example, it was important to add powder type and charge to the name to prevent firearm damage.

Bullet Description: Used and displayed only on this page while editing this custom bullet.

Caliber: Enter the bullet caliber. This value is displayed after selecting a manufacturer on the Bullet Selection page. For consistency with all other database bullets, enter a leading zero followed by period and 3 or 4 digits, e.g. 0.038 or 0.4515. Do not add symbols or alphabetic characters, for example (“”) for inches.

Weight in grains: Enter the bullet weight in grains. Whole numbers are normally used but this field does accept more resolution, e.g. 53.5. The decimal point is the only allowable punctuation.

Muzzle velocity: Enter the default muzzle velocity when loading a bullet on the bullet selection page.



If you selected a boilerplate bullet that matches bullet coefficients of your custom bullet, you are done! Select the check mark at the lower right of the page to save edited (or new) custom bullet. Select (X) to cancel edits.

Editing Boundaries and Coefficients

| Boundary (ft/s) | : Coefficient |
|-----------------|---------------|
| Infinity | : .408 |
| 2,800 | : .397 |
| 1,800 | : .387 |

Below the table are three buttons: a pencil icon, a plus sign (+), and a minus sign (-).

In order to edit bullet coefficients, a custom bullet must be opened for edit mode, either using the wrench tool from the Bullet Selection page or by selecting a bullet from the List of (custom) bullets and selecting (+) or the List of Bullets pencil to edit. Edit mode is characterized by white backgrounds in data fields.

To edit a Boundary and its Coefficient, select the Boundary. The background will turn blue (light blue or dark blue depending on Windows Personalization settings). The values in the two lower edit boxes can now be changed.

To overwrite the values for the Boundary you selected (edit), select the pencil and the values for that list entry will change.

To add a new Coefficient after editing, select the (+) button.

To delete a Coefficient, press the (X).

Changes to the Boundaries and Coefficients are not saved until the edited bullet is saved using the check mark in the lower-right corner of the page.

Every bullet must have at least one Coefficient with the velocity boundary set to “Infinity”. Therefore the boundary value “Infinity” may not be changed. Additional coefficients take effect at the given velocity boundary. The example shown here uses a coefficient of .408 for all velocities above 2800 feet per second. Between 1800 feet per second and 2800 feet per second, the coefficient .397 is used and finally for velocities below 1800 feet per second, .387 is used.

Most manufacturers only supply a single coefficient for their bullets. Sierra measures and provides up to four coefficients per bullet. Infinity 7 allows additional ballistic coefficients to be provided when adding custom bullets for maximum flexibility.



Reloading Manual

The Sierra Reloading Manual is only available with Infinity 7 Suite, not the standard version. For those who reload many calibers, the Suite version saves precious time. Selecting the Reloading Manual icon or transition to the manual from pages on either side treats the Reloading Manual page as any other page. The difference is you are viewing the entire library of Sierra bullets.

Reloading Manual

Rifle • 30-06 Springfield

Test Specification

| | |
|----------------|-------------|
| Firearm Used | Savage 116 |
| Barrel Length | 26" |
| Twist | 1 x 10" |
| Components | |
| Case | Federal |
| Trim-to Length | 2.485" |
| Primer | Federal 210 |

Remarks:

The 30-06 Springfield is one of our all-time classic cartridges. Adopted as the standard U.S. military cartridge in 1906, the 30-06 served through both world wars, Korea, and several smaller conflicts around the globe. In addition to its military duties, the 30-06 was also an instant success in the hunting fields. As a big game cartridge, the 30-06 has probably been used to take every major species in the world. It is the most popular cartridge for big game here in the United States, and is likely to remain so for the foreseeable future. And for good reason. With standard bullet weights ranging from 110 to 220 grains, the 30-06 is capable of taking on anything from the smallest varmints to the largest North American species. The 30-06 can be tailored to almost any hunting situation with proper bullet selection.

Originally, this cartridge was adopted in 1903 along with the Model 1903 Springfield rifle. Designated as the 30-03, military specifications called for a 220 grain bullet at 2200 fps. Severe bore erosion with the nitroglycerin-based powder that was used at the time forced a reduction in velocity to approximately 2000 fps. This effectively duplicated the performance of the 30/40 Krag, which it was intended to replace. With Germany's introduction of the revolutionary high-velocity Spitzer loading around 1905, U.S. Ordnance modified the cartridge to keep pace. Reducing the case length slightly, the loading was changed to a 150 grain bullet at 2700 fps. Redesignated as the 30-06, it is still the case used today.

For handloading, the 30-06 Springfield is a versatile cartridge. Powder selection, however, is slightly complicated by the wide range of bullet weights. As a general rule, powders having a "medium" burning rate will normally perform best with the mid-range bullet weights of 150 to 168 grains. Heavier bullets from 180 to 220 grains are best served by the slower-burning powders, such as 3100, IMR-4831 or M5P. Faster powders, such as IMR-3031, 2230 and 748, are the best choice for lightweight 110 or 125 grain bullets. There is one notable exception to this pattern — the M1 Garand rifle. Powders in the medium-burning range must be used when loading for a Garand. Due to its system of operation, the Garand can be damaged by improper powder selection, even if the loads themselves are perfectly safe. We have had our best results in Garands when using IMR-4895, IMR-4064, XMR-2495 and 2520. Military brass for the 30-06 is still frequently encountered. Loads for GL cases should be reduced by one to one and a half grains to compensate for their heavier construction.

◀ ▶

◀ 1 of 13 ▶

The values in red indicate MAXIMUM LOADS. USE EXTREME CAUTION when using.



The reloading manual is divided into two sections, Rifles and Handguns. Click on the Firearm Type button and selected the type from the dropdown list to change between the two sections.

Next, click on the Cartridge Name button. For example, in the figure above, click on the title 30-06 Springfield to select a new cartridge. The list of available cartridges will open. Select the desired cartridge name.

In the example above, the .30-06 Springfield is open and displaying the first page of the Sierra Reloading Manual for the 30-06.

Page Display Controls and Page Zoom



Infinity 7 provides two display modes: page mode and scroll mode. Select the left-most button (highlighted) in this group to display data in page mode. Move between pages using the arrows on either side of the page number.



Select the page icon on the right to display data in scroll mode. A scroll bar appears in the right side of the data window.

Use the Zoom control to increase or decrease text size for easier reading. Excessive zoom may cause text or data wrapping within each cell.



After selecting the desired cartridge, select the Print button to print the entire data sheet with all bullets for that cartridge.

If you would like to print only part of the page you can place the mouse cursor at the top of the desired data, then click and drag the selection to include the desired data, then press the Ctrl + C to copy the data to the clipboard. Then open Microsoft Excel and press the Ctrl + V to paste the data into a spread sheet.



Bullet Selection

Select pages or scroll through pages to see available bullets in that caliber. Bullets are grouped by weight. Locate the desired weight then select the desired bullet style by selecting the radio button on the same row as the bullet, outlined in red below. The bullet weight for each style is listed.

The screenshot shows the software interface for the Sierra Infinity Reloading Manual. The main window title is "Reloading Manual". A dropdown menu shows "Rifle" and "30-06 Springfield". The main table lists bullet information:

| Bullet | Caliber | Weight | Type | C.O.A.L. | Select |
|--------|---------|--------|----------------------|----------|----------------------------------|
| #2135 | .308" | 150gr. | RN | 3.000" | <input checked="" type="radio"/> |
| #2125 | .308" | 150gr. | SBT | 3.225" | <input checked="" type="radio"/> |
| #2130 | .308" | 150gr. | SPT | 3.225" | <input checked="" type="radio"/> |
| #2115 | .308" | 150gr. | FMJBT | 3.250" | <input checked="" type="radio"/> |
| #2190 | .308" | 150gr. | HPBT MatchKing | 3.250" | <input checked="" type="radio"/> |
| #2155 | .308" | 155gr. | HPBT Palma MatchKing | 3.250" | <input checked="" type="radio"/> |

A red box highlights the "Select" column for the last three rows (bullet #2155). Below the table is a "Powder I / Velocity" section:

| Powder I / Velocity → | 2600 | 2700 | 2800 | 2900 | 3000 |
|-----------------------|------|------|------|------|------|
| IMR-3031 | 42.9 | 44.8 | 46.7 | 48.6 | - |
| AA-2230 | 41.2 | 43.4 | 45.6 | 47.8 | - |
| 748 | 44.0 | 46.0 | 48.0 | 50.0 | 52.0 |
| BL-C(2) | 43.9 | 46.1 | 48.3 | 50.5 | - |
| AA-2460 | 42.4 | 44.4 | 46.4 | 48.4 | - |
| TAC | - | 43.4 | 45.5 | 47.6 | - |
| XMR-2495 | 43.2 | 45.6 | 48.0 | 50.4 | - |
| IMR-4895 | 44.5 | 46.3 | 48.1 | 49.9 | 51.7 |
| Varget | 44.6 | 46.9 | 49.2 | 51.5 | - |
| IMR-4064 | 44.9 | 46.7 | 48.5 | 50.3 | 52.1 |
| IMR-4320 | 46.6 | 48.6 | 50.6 | 52.6 | - |
| BigGame | - | 49.2 | 51.3 | 53.4 | 55.5 |
| RE-15 | - | 45.3 | 47.8 | 50.3 | - |
| H380 | 46.3 | 49.3 | 52.3 | - | - |
| 760 | - | 50.8 | 53.6 | - | - |
| Vht N150 | 44.5 | 46.9 | 49.3 | - | - |
| IMR-4350 | 51.8 | 53.6 | 55.4 | 57.2 | 59.0 |
| H4350 EXT | 52.2 | 53.8 | 55.4 | 57.0 | - |

A red box highlights the "Select" column for the last three rows (bullet #2155). The bottom of the screen includes a search icon and copyright information: "The values in red indicate MAXIMUM LOADS. USE EXTREME CAUTION when using." and "Copyright ©2015 Sierra Bullets, LLC. All Rights Reserved."



Selecting a Powder and Velocity - Intersection

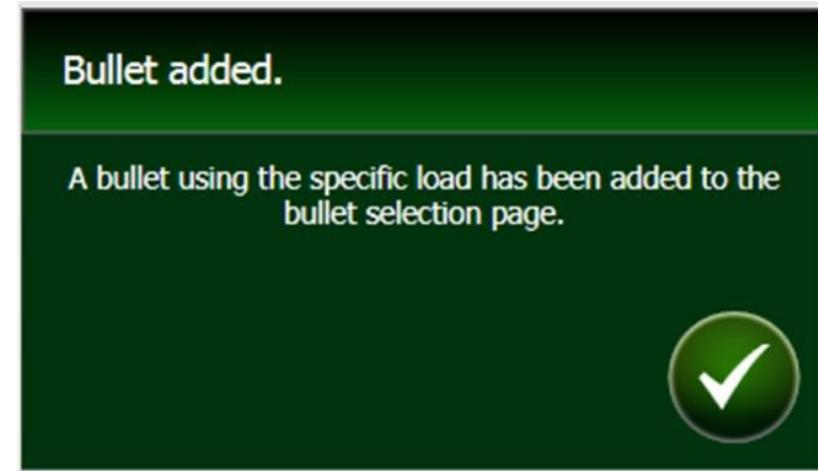
| Powder ↓ / Velocity → | |
|-----------------------|------|
| | 2900 |
| IMR-3031 | 48.6 |
| AA-2230 | 47.8 |
| 748 | 50.0 |
| BL-C(2) | 50.5 |
| AA-2460 | 48.4 |
| TAC | 47.6 |
| XMR-2495 | 50.4 |
| IMR-4895 | 49.9 |
| Varget | 51.5 |
| IMR-4064 | 50.3 |
| IMR-4320 | 52.6 |
| BigGame | 53.4 |
| RE-15 | 50.3 |
| H380 | - |
| 760 | - |
| Viht N150 | - |
| IMR-4350 | 57.2 |
| H4350 EXT | 57.0 |

The table below the bullets includes a list of suitable powders and a series of velocities, normally in 100 foot per second increments. Examine the table and find a powder and velocity combination you would like to load.

WARNING: Never load a cartridge with less than the minimum powder charge nor more than the maximum for the power used. Bullets listed in red are maximum charges. Never exceed those charge levels and increase charges slowly looking for signs of excess pressure.

To copy data from the selected bullet (weight, velocity, coefficients) into the Bullet Selection page of Sierra, simply select the intersection of the velocity and powder. For example, clicking on the 49.9 grains of IMR-4895 will copy bullet data at 2900 feet per second into the Bullet Selection page.

You will be greeted with the following message. Click the check mark to return to the Bullet Selection page.



Selecting bullets doesn't get much easier!



Appendix A

Example, Using Variation Environment Data

Did you ever wonder which of the four environment variables causes the greatest effect on trajectory? Here's a fun experiment using a light, high velocity bullet. Note that this experiment is not purely valid because as one variable changes in the atmosphere, other variables also change.

Constants:

| | |
|----------------|----------------------------|
| Bullet | Sierra .224 dia. 55 gr SBT |
| Velocity: | 3200 feet per second |
| Maximum Range: | 600 yards |
| Zero Range: | 600 yards |
| Sight Height: | 1.6 inches |

Environment defaults while making measurements follow. Only the variable of interest is changed from these defaults.

- Hints:** 1) Set Elevation to 5000 in the both the Sighted and Variation section then press Set Standard buttons to return to default.
2) Add "Path Variation Inches" to the columns displayed on the Range Card (see Range Card Help for more information).

| | |
|--------------|-------|
| Elevation: | 5000 |
| Temperature: | 41.17 |
| Pressure: | 24.57 |
| Humidity: | 78 |

Variables:

Variables, Elevation, Temperature, Pressure and Humidity were compared toward both ends of extremes that might be encountered and the difference in apex measured in inches.

| Variable | Low Value | High Value | Low/High inches at apex | Low - High |
|--------------------|-------------|---------------|-------------------------|--------------|
| Elevation | 0 feet | 10000 feet | 32.97 vs 32.94 | 0.03 inches |
| Temperature | 0 degrees F | 100 degrees F | 34.96 vs. 30.30 | 4.66 inches |
| Pressure | 23 mmHg | 31 mmHg | 30.96 vs. 34.63 | -3.67 inches |
| Humidity | 10% | 99% | 32.96 vs. 32.95 | 0.01 inches |

If you are asking the question, "why did the bullet fly higher with high pressure?", then you are starting to understand the magic performed by the Range Card.

Just for fun, use Profiled Winds and Variation Winds to see the effects two different wind patterns have on the same bullet. Remember to view Wind drift on the Trajectory Chart page lest you be surprised.