## Using the Vortex Long Range Ballistics Calculator

The Vortex Long Range Ballistics Calculator (LRBC) is an invaluable tool for the serious shooter! Use this calculator to generate ballistic drop charts and compare various loads and environmental conditions such as temperature and incline (slope). A particularly nice feature is that users can quickly set up a personal account in the program and store both favorite rifle/loads as well as multiple range or hunting conditions. Using the LRBC is also the first step in building a customized TMT turret cap.

Maximum accuracy from the LRBC will be achieved by using the unique **Trajectory Validation** feature which uses data collected on a range day. On that day, a shooter will observe and note how a bullet's actual impact point varies from a predicted impact point at longer distances. Using this variance, the LRBC adjusts the initial estimated muzzle velocity to a customized **True Velocity**. This will effectively correct for inherent inaccuracies in both a measured muzzle velocity and a manufacturer's listed ballistic coefficient which can be affected by environmental conditions and equipment calibration. Once a custom True Velocity has been calculated, users can generate and print true custom drop charts as well as build custom TMT elevation caps.

### Getting around in the LRBC

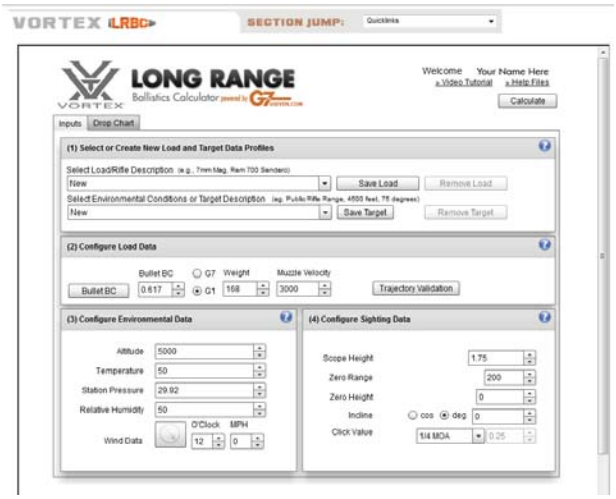
- Click on the ? for information related to a specific section of the LRBC.
- ***Help Files*** link provides instructional information on individual topics.
- ***Video Tutorial*** button walks you through the range day procedure.

### Using the Inputs Screen

Use the LRBC and fill in all required fields on the Inputs screen.

- In Section 1, create a new load or choose a pre-established load. If desired, you can save a particular load and range condition in your own personal file
- In Section 2, use the **Bullet BC** button, or consult the bullet manufacturer's website, to find the ballistic coefficient of the bullet being used. This will populate the **Bullet BC**, **G7/G1**, and **Weight** fields. Enter the **Muzzle Velocity**. This can be measured with a chronograph or obtained from ammunition manufacturer websites. If you will be using the **Trajectory Validation** feature, it is okay to estimate muzzle velocity at this time. For the moment, disregard the **Trajectory Validation** button.
- In Section 3, estimate range conditions you will encounter. In the **Environmental Data** section, enter estimated **Altitude**, **Temperature**, **Pressure**, **Relative Humidity**, and **Wind Data**. Be sure to refer to the ? Help button for additional useful information concerning altitude and pressure.
- In Section 4, complete **Sighting Data**.
  - · Fill in the **Scope Height** from bore and range incline.
  - · Choose and enter the **Zero Range** you will use on the range day. 100-200 yards, 200 yards recommended.
  - · If desired, enter a **Zero Height**. Use the ? Help button for more information.
  - · If range is sloped, enter **Incline** data.
  - · Enter the **Click Value** of the riflescope in MOAs or mrads. This can be found on the original turret cap.

Click the **Calculate** button at the upper right area of the **Inputs** screen to generate and print an intitial drop chart you can take to the range for trajectory validation.




*The Inputs interface page of the Vortex Long Range Ballistics Calculator (LRBC) is used to generate an initial* ***Drop Chart****.*

### Range Day — Trajectory Validation

Take your initial drop chart and make a trip to a shooting range that will allow you to shoot at 70–100% of the furthest distance you with to shoot. For example, if you wish to shoot out to 800 yards, try to find a range which will allow you to shoot at least 550 yards. Shorter distances can be used, but maximum accuracy will be obtained with a longer range.

1. Begin by zeroing the rifle at the sight-in distance selected in the initial drop chart.

2. After shooting the sight-in zero, shoot and re-zero at the far range distance (70–100% of the furthest distance you with to shoot). The initial drop chart you generated in Step 1 will list the scope adjustment necessary to get "on paper" at the far distance you have chosen. Adjust your scope's elevation turret ***up*** the listed amount.

3. Shoot and adjust through several groups until you are satisfied with a repeatable long range zero, being particularly picky about the elevation setting. You will probably find that you'll have to make some additional adjustments from the beginning one.

4. On the drop chart, write down the ***Far Range*** distance and the final **Drop Adjust** from the original sight-in zero that was required to re-zero at the far distance. Drop adjust may be noted in clicks, MOAs or mils. For example, you began with the recommended 200-yard sight-in zero and then had to dial in a final drop correction of +10 MOAs ***up*** to get a 550-yard long range zero.

5. Note as many of the environmental conditions present during the range day as possible, including altitude, temperature, and humidity. If you have the proper equipment, you may record velocity and pressure. These conditions will be entered in LRBC data fields.

6. Once the long range zero has been completed, return the scope's elevation adjustment ***down*** to the starting sight-in distance. In the example used above, you would dial 10 MOAs ***down***.

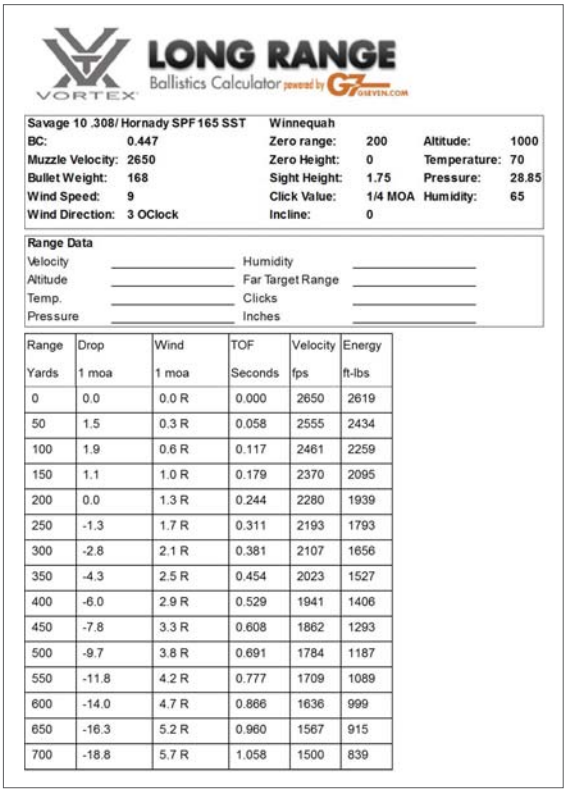
7. Go to the **Trajectory Validation** screen of the LRBC and fill in all fields. **Load Data** and **Sighting Data** carry over from initial inputs.

- In the ***E*nvironmental Data** section, enter the data gathered while at the range in Step 5.

- In the **Down Range Drop Data** section, fill in the **Far Range** and **Drop Adjust** information gathered while at the range. Using the previous example, the **Far Range** would be 550 yards and the **Drop Adjust** would be +10 MOA

- In the **Validated Parameters** section, hit the **Calculate** button on page bottom to calculate a customized **True Velocity**. A true customized drop chart can then be generated and printed by using the **Add Value to Program** button.

***Note:*** You may also use the **True Velocity** along with manufacturer's listed ballistic coefficient to order custom TMT elevation caps for various Vortex riflescopes.



LONG RANGE Ballistics Calculator powered by G7 6SEVEN.COM

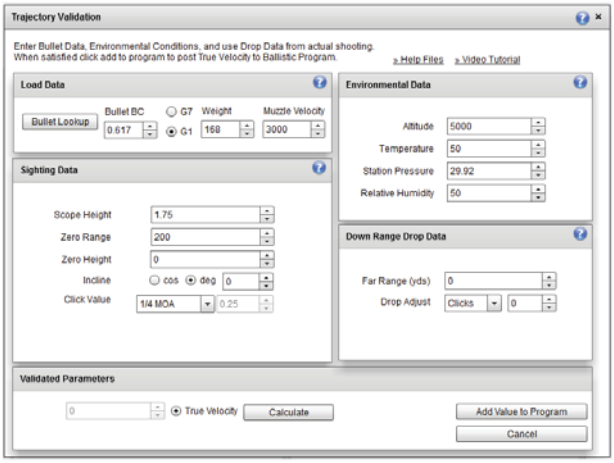
| | | | | | |
|---|---|---|---|---|---|
| Savage 10 .308/ Hornady SPF 165 SST | | Winnequah | | | |
| BC: | 0.447 | Zero range: | 200 | Altitude: | 1000 |
| Muzzle Velocity: | 2650 | Zero Height: | 0 | Temperature: | 70 |
| Bullet Weight: | 168 | Sight Height: | 1.75 | Pressure: | 28.85 |
| Wind Speed: | 9 | Click Value: | 1/4 MOA | Humidity: | 65 |
| Wind Direction: | 3 OClock | Incline: | 0 | | |

Range Data

| | | | |
|---|---|---|---|
| Velocity | _____ | Humidity | _____ |
| Altitude | _____ | Far Target Range | _____ |
| Temp. | _____ | Clicks | _____ |
| Pressure | _____ | Inches | _____ |

| Range Yards | Drop 1 moa | Wind 1 moa | TOF Seconds | Velocity fps | Energy ft-lbs |
|---|---|---|---|---|---|
| 0 | 0.0 | 0.0 R | 0.000 | 2650 | 2619 |
| 50 | 1.5 | 0.3 R | 0.058 | 2555 | 2434 |
| 100 | 1.9 | 0.6 R | 0.117 | 2461 | 2259 |
| 150 | 1.1 | 1.0 R | 0.179 | 2370 | 2095 |
| 200 | 0.0 | 1.3 R | 0.244 | 2280 | 1939 |
| 250 | -1.3 | 1.7 R | 0.311 | 2193 | 1793 |
| 300 | -2.8 | 2.1 R | 0.381 | 2107 | 1656 |
| 350 | -4.3 | 2.5 R | 0.454 | 2023 | 1527 |
| 400 | -6.0 | 2.9 R | 0.529 | 1941 | 1406 |
| 450 | -7.8 | 3.3 R | 0.608 | 1862 | 1293 |
| 500 | -9.7 | 3.8 R | 0.691 | 1784 | 1187 |
| 550 | -11.8 | 4.2 R | 0.777 | 1709 | 1089 |
| 600 | -14.0 | 4.7 R | 0.866 | 1636 | 999 |
| 650 | -16.3 | 5.2 R | 0.960 | 1567 | 915 |
| 700 | -18.8 | 5.7 R | 1.058 | 1500 | 839 |

*Print off the customized* **Drop Chart** *you generate and take it to the shooting range.*




*Use the* **Trajectory Validation** *interface to calculate the* **True Velocity** *for your load and environmental conditions.*