

MERO - 2024 (V2.4.*)

A brief help file ...

The MERO interface can be viewed as four separate elements:

- 1.0 **A menu system**
- 2.0 **A data-entry interface**
- 3.0 **Table and image areas**
- 4.0 **"helper" applets to accomplish specific tasks**

1.1 **Menu System**

The menu system has drop-down menus:

1.1.1 File menu (not MacOS), with items:

¹ Preferences

MERO preferences applet

¹ Quit

Exit the MERO application

1.1.2 Setup menu, with items:

New/Clone Setup ...

Make a new setup file by copying the current setup

Open Existing Setup ...

Open an existing datafile

Save Current Setup

Save the current datafile

Save Current Setup As ...

Save the existing datafile with a new name

Rename Current setup ...

Give the current setup a different name

Reset Default Setups ...

Non-destructively replaces deleted Default Setups

1.1.3 Reticle menu, with submenus:

Mil-dot Reticles

Standard Half Mil-dot

Extended Half Mil-dot

Hawke AMX Half Mil-dot

Optisan Half Mil-dot

Discovery Half Mil-dot

SCB Type 1

SCB Type 2

MoA Reticles ²

- Sightron MoA-2
- Sightron MoA-3
- Vector Tourex
- March FML-1
- Aztec DYND-1
- Diamondback EBR-2

BDC Reticles ²

- Hawke SR6
- Hawke SR12
- Hawke MAP6
- Hawke MAP8
- Viper BDC
- Nikon BDC

Generic Reticles

- Generic Mil-dot
- Generic MoA
- Generic 30/30

Custom Reticles

- A list of 1 to 25 installed Custom Reticles

Custom Reticle Management

- Opens an applet that allows new Custom Reticles to be Added, existing reticles (default or custom) to be Cloned, existing Custom Reticles to be Deleted or selected for use in the main application.

1.1.4 Projectiles

- A database of projectiles (and their details) is provided and split into convenient groups:

- 0.177 (0.100" to 0.19") diameter
- 0.20 (0.191" to 0.21") diameter
- 0.22 (0.211" to 0.24") diameter
- 0.25 (0.241" to 0.26") diameter
- Bigger (0.261" to 1.0") diameter

Current Projectile:

- Selects the record of the current projectile

All Projectiles:

- Displays all of the projectile groups

Database management:

- A sub-menu having items:

Merge Database Update:

- Merges an accessory database with the current database

Backup Current Database:

- Saves the current database as a backup

Restore Database from Backup:

- Restores the backup database as the current database

Reset Projectile Database:

Resets the Projectile Database to the "as received" state in case of corruption, etc. after a confirmation request. Note that any changes that have been made will be overwritten and lost.

When any of the above are selected, the Projectile applet is displayed so that any individual record can be edited and/or selected for use as the current projectile.

1.1.5 Displays

A menu of available display options

1.1.6 Tools, with items:

Gives instant access to various useful functions and helper applets:

Use All Imperial Units

Changes all of textbox units to those of the Imperial system

Use All Metric Units

Changes all of textbox units to those of the Metric system

Environmental ...

Opens the Environmental applet.

BC Calculator ...

Opens the Ballistic Coefficient Calculator applet

Custom Table Content ...

Opens the Custom Table Content applet

Current Projectile ...

Opens the Projectile selection applet at the current projectile

All Projectiles ...

Opens the Projectile selection applet displaying all projectiles

1.1.6 Help menu, with items:

Help Topics

Displays this helpfile

HowTo

A HowTo walk-through

Key Bindings

Show a list of universal and platform-specific key bindings

Check for Updates

Check for the availability of later app versions

¹ [About](#)

Displays an About panel.

¹ Quit, Preferences and About menu items appear on the MacOS system menu.

² The Calibration Magnification of these reticles varies from model to model so be sure to check the manufacturer's literature.

2.1 Data-entry interface

Data-entry elements are arranged in clusters with a header label, text-box and, in most cases, a drop-down combo-box for selecting input units. Some of the clusters also have a popup menu attached to the right-hand side.

Muzzle Velocity

Acceptable range: 200 Ft/s to 4000 Ft/s

Selectable Units: Ft/s, m/s or Mach (at the currently set temperature)

Changing the Muzzle Velocity value will cause the Kinetic Energy to be re-calculated (i.e., the projectile Weight is held constant)

BC (Ballistic Coefficient)

Acceptable range: 0.004 to 1.200

Selectable Drag Laws:

- G1 - Standard model, Flat-base with 2-calibre (blunt) nose ogive
 - GA - The Chairgun normalised contender for round-nosed diabolo airgun pellets
 - GA2 - Ballisticboy's normalised contender for round-nosed diabolo airgun pellets
 - GS - Round Ball
 - RA4 - 0.22 Long Rifle
 - G7 - Very Low Drag with long 7 Degree 30° boat-tail and 10 cal. nose ogive
 - SLG0 - Ballisticboy's experimental blunt airgun slug profile
 - SLG1 - Ballisticboy's experimental blunt boat-tailed airgun slug profile
 - WC0 - A generalised wad-cutter profile
- Note: when a different Drag Law is selected, the BC appropriate to the new Drag Law is re-computed such that the trajectory is correct at the muzzle, far-zero and the current reticle range.

Zero Range

Acceptable range: 3 - 500 Yard depending on maximum calculated range.

Selectable Units: Foot, Yard or Metre

Click label to toggle between near and far zero ranges

Zero Range menu:

- a) Set to Single Zero (that where FarZero = NearZero)
- b) Set Zero on the Target Range

Sight Height

Acceptable range: 0.0 to 12.0 Inch

Selectable Units: Inch, cm or mm

Sight Height menu:

- a) low (1.25 inch)
- b) low/medium (1.5 inch)
- c) medium (1.75 inch)
- d) medium/high (2.0 inch)
- e) high (2.25 inch)

The selection changes the value of the "Sight Height" textbox and re-calculates the trajectory.

The "Sight Height" referring to the distance between the line-of-sight (LOS) and the bore axis at the **muzzle**.

Target Range

Acceptable range: 5 Yard to the maximum calculated Range.

Selectable Units: Foot, Yard or Metre

Kinetic Energy

Acceptable range: 0.4 to 44956 Ft.Lb

Selectable Units: Ft.Lb or Joule.

Changing the Kinetic Energy value will cause the Muzzle Velocity to be re-calculated. i.e., keeping the projectile weight constant.

Scope Type

Choose from:

- a) FFP - First Focal Plane
- b) SFP - Second Focal Plane
- c) Fixed - Fixed Magnification

Dots @ Target (Mil-dot Reticles)

Acceptable range: 0.1 - 10.0 dots below the centre

Selectable Units: n/a

MoA @ Target (MoA Reticles)

Acceptable range: 1.0 - 100.0 MoA dots below the centre

Selectable Units: n/a

Intercepts (BDC Reticles)

Acceptable range: First to Last subtensions below the centre selectable from a drop-down menu.

In the above 3 cases:

if a SFP mode is specified then changing the value will recalculate the Magnification (keeping the calibration magnification constant).

If a Fixed or FFP mode is specified then, since the magnification cannot be changed, the far zero range - *provided that the physics permit* - will be adjusted to suit.

Cal.Mag. (Calibration Magnification)

Acceptable range: 1.0x to 60x

Selectable Units: n/a

Set Mag. (Set/Computed Magnification)

Acceptable range: 1.0x to 60x

Selectable Units: n/a

Weight

Acceptable range: 4.0 to 1000.0 Grain.

Selectable Units: Grain or Gram.

Changing the Weight value will cause the Kinetic Energy to be re-calculated. i.e., the Muzzle Velocity is held constant

Calibre

Acceptable range: 0.1 to 1.0 Inch

Selectable Units: Inch, cm or mm

Click Size

Acceptable range: 1.0000 to 32.0000 clicks/MoA

Selectable Units: clicks/MoA or MoA/click

Click size menu:

- a) 1 inch/click @ 100 Yards
- b) 1/2 inch/click @ 100 Yards
- c) 1/4 inch/click @ 100 Yards
- d) 1/8 inch/click @ 100 Yards

- d) 1 MoA/click
- e) 1/2 MoA/click
- f) 1/4 MoA/click
- g) 1/8 MoA/click

- h) 1/10th. mil
- i) 1/20th. mil

The selection changes the value of the "Click Size" textbox.

C-C Impact Zone

Acceptable range: 0 to 6 Inch

Selectable Units: Inch, cm or mm

The input Impact Zone value is used to calculate the corresponding zero ranges and far/near PoInt Blank Ranges.

Wind Speed

Acceptable range: 0.0 to 60 MPH

Selectable Units: MPH, Ft/s, km/h, m/s, Knots

Wind speed menu

Standard perceived wind speeds from "calm" to "Whole Gale"

The selection changes the value of the "Wind Speed" textbox and re-calculates the wind drift.

Wind Angle

Acceptable range: 0 - 359 degrees

Selectable Units: n/a

Wind angle menu (Right-click)

Options from 12 o'clock to 11 o'clock

Left-clicking on the menu advances the wind (or Cant) angle by 15° per click.

Sight Base / Barrel Length (Left-click to toggle)

Acceptable range: 2 to 36 Inch

Selectable Units: Inch, cm or mm

"Sight Base" is used to calculate and to correct PoI values at close ranges.

"Barrel Length" is used to calculate the interior ballistics in the Summary.

3.1 **Panels: Tables, Plots, Reticle, Vertical Drift, Scope Label Images, Scope Tape, Rangefinder, Range Card, Visualisation, and Summary**

Each panel can be selected from the main "Displays" menu.

All of these areas have access to a right-click popup-menu as described below.

3.1.1 Tables:

PoI table

Show table of PoI values:

Range (Foot/Yard/Metre) v. Inch/cm against:
(Mil-dot Reticles)

MoA, mil, dot and click

(MoA and BDC Reticles)

MoA, mil and click

Windage Drift table:

Show table of Windage values:

Range (Foot/Yard/Metre) v. Inch/cm against:
(Mil-dot Reticles)

MoA, mil, dot and click

(MoA and BDC Reticles)

MoA, mil and click

Ballistics table

Show table of Ballistics values:

"Practical" values

Range (Foot/Yard/Metre) v. velocity, kinetic
energy, PoI(Unit), MoA, Drift(unit) and Drift(MoA)

"Esoteric" values

Range (Foot/Yard/Metre) v. velocity, Drop(Unit),
Cd.proj, Cd.ref, Time, Dwell Time and Vacuum
Time

Maximum Range table

Inclination Angle (degree) v. Maximum Range (Foot/Yard/Metre), Maximum Height (Foot/Metre), Range for Maximum Height (Foot/Yard/Metre) and Elapsed Time

Inclined Shooting sub_menu:

Show table of Δ PoI for 0, 15, 30, 45, 60 and 75 degree together with the Δ PoI of a user-entered angle in: (Mil-dot Reticles) Units: PoI, MoA, Mil or Mil-Dots or (MoA and BDC Reticles) Units: PoI, MoA, Mil.

PBR table

Impact Zone (Inch/cm/mm) v. Range (Foot/Yard/Metre) for the set of PBR curves - Near PBR, Near Zero Range, Far Zero Range and Far PBR.

Cant table

Vertical and horizontal difference (Inch/cm/mm) v. Range (Foot/Yard/Metre) for the current Cant Angle

Reference Cd table

Cd v. Velocity (Ft/s, m/s or Mach) reference for the available drag laws

Vertical Stringing table

PoI difference (Inch/cm/mm) v. Range (Foot/Yard/Metre) for the trajectories having the set Muzzle Velocity $\pm$ a velocity variation.

Custom table

Range (Foot/Yard/Metre) v. a set of one to ten user-specified columns. Use the "Custom Table Content" applet to select the columns to be displayed.

Table Extent sub-menu:

Select Table Extent:

- a) near Zero Range
- b) far Zero Range
- c) Reticle Range
- d) Target Range
- e) maximum calculated Range (or 2000 Yard whichever is shorter)

Table step sub-menu:

Select Table Step:

1, 2, 5, 10, 25, 50 or 100 Foot/Yard/Metre

Hide/Show Table Gaps:

Hides or Shows a gap between every 5 entries

Units Sub-menus:

Range Unit:

The desired range units.

Other Units:

...in the context of the table displayed.

Print table

Print the current table.

Save Table as .CSV

Save the current table as a .CSV file

3.1.2 Plots:

PoInt of Impact

Shows the current PoI trajectory profile

MoA

Shows the current MoA profile

Mil

Shows the current milliradian profile

Mil-Dot (Mil-dot Reticles only)

Show the current Mil-dots profile

Click

Shows the current Clicks profile

Velocity

Shows the current Velocity profile

Kinetic Energy

Shows the current Kinetic Energy profile

PoInt Blank Range

Shows near/far Zero and rear/far PoInt Blank ranges for various Impact Zones

Inclined PoI

Shows the 0° trajectory together with that for a user-defined angle.

Wind Drift (Continuous)

Shows the Windage profile with the current speed and angle

Wind Drift (Custom)

Shows the Windage profile with the current speed and angle but with defined start and end PoInts

Wind Drift (Optimum)

Shows the Wind Drift profile at an entered range; the plot showing the relationship between Muzzle Velocity and Ballistic Coefficient (at the defined Drag Law)

Vertical Stringing

Shows the Vertical PoI deviation for the current Target Range given a Muzzle Velocity variation

Esoteric Plots

- a) Cant
- b) Time functions
- c) Drop from LoD (Line of Departure)
- d) Linear Momentum
- e) Drag Force
- f) Penetration
- g) Retained Velocity/Momentum/Power Factor
- h) Retained Kinetic Energy
- i) Power Factor
- j) Horizontal Velocity
- k) Horizontal Acceleration
- l) Vertical Velocity
- m) Vertical Acceleration
- n) Maximum Range
- o) Impact Angle
- p) Drag Law
- q) All/selected Drag Laws

Display Embellishments menu (PoI Plots only):

Intersects:

whole dots or whole + half dots (Mil-dot reticles)

10 MoA or 10 + 5 MoA (MoA reticles)

Whole intercepts only (BDC reticles)

Hide/show Intersects

Show/Hide Auxiliary Table

Shows or hides the Auxiliary table.

Show/Hide Impact Zone (PoI plot only)

Hides or displays the Impact zone.

Show/Hide LoD (PoI plot only)

Hides or displays the Line-of-Departure

Display Intersects (PoI and Wind Drift plots only)

Select the granularity to display:

Hide/show Intersects:

Clears all Intersects from the plot

Mil-dot Reticles:

Whole Dots only

Display only whole dots and markers (red)

Half Dots

Display whole and half dots with markers
(blue)

MoA Reticles:

10 MoA only

Display 10 MoA markers (red)

10 MoA + 5 MoA

Display 10 (red) and 5 MoA markers (blue)

Plot Extent

Select Plot Extent:

- a) near Zero Range
- b) far Zero Range
- c) Reticle Range
- d) Target Range
- e) maximum calculated Range (or 1760 Yard whichever is shorter)

Hide/show Impact Zone

Hide or show the Impact Zone on PoI plot (only)

Print Image

Print the current image

Save Image

Save the current plot as a .png image

Additionally:

Auxiliary Table

Can be displayed when a plot has been selected in the main panel. The Auxiliary table's function is to display more exact values than could easily be interpolated "by eye" from the graphical representation without switching to a full table.

A right-click menu is available, the options of which are specific to the particular plot currently displayed.

Plot/Table links

Some Plots and Tables have links in the context menu to easily swap between the appropriate counterpart Plot/Table.

Units Sub-menus:

Horizontal Unit:

The desired units of the horizontal (X) axis.

Vertical Unit:

The desired units of the vertical (Y) axis.

3.1.3 Reticle View:

Show Ranges for:

Mil-dot Reticles:

Whole Dots only

Display only whole dots and markers (red)

Half Dots

Display whole and half dots with markers (blue)

MoA Reticles:

10 MoA only

Display 10 MoA markers (red).

10 MoA + 5 MoA

Display 10 (red) and 5 MoA markers (blue)

Reticle LHS: (Left Hand Side)

Near Ranges:

Display near ranges.

Far Ranges

Display far ranges (duplicating RHS)

PoI mode:

A popup menu to display (or hide) PoI values associated with the various notable ranges. Options are:

a) None

Hide the additional data

b) PoI

Display the PoI at each PoInt using the current Sight-height units

c) MoA

Display the PoI at each PoInt in MoA

d) Mil

Display the PoI at each PoInt in Mil

e) Clicks

Display the PoI at each PoInt in Clicks

f) Energy

Display the kinetic energy at each intercept

g) Momentum

Display the momentum at each intercept

Units Sub-menus:

Range Unit:

The desired range units.

Other Units:

...in the context of the table displayed.

Print Image

Print the current image.

Save Image

Save the current image as a .png file

3.1.4 Vertical Drift:

Indicates the horizontal and vertical deflection at range as determined by the barrel's twist rate (pitch), the Cg (Gyroscopic Coefficient) and the slope angle of the impacts on target.

Textboxes:

Gyro Coefficient:

Values: -1.5 to 1.5

α Slope:

Slope angle (in degree): -80° to 80°

The measured slope angle at the Target Range.

Pitch:

Values: 5 Inch to 72 Inch

Popup Menu:

Ignore Velocity Loss at range:

A projectile loses velocity with range. If selected, this option forces the algorithm to keep the velocity constant (at the muzzle velocity)

Ignore Head/tail wind vector:

A non-perpendicular wind vector has an influence on the projectile velocities all along the trajectory.

Selecting this option forces the algorithm to ignore the influence by setting the headwind to zero.

Show Slope Plot / Show Deflection Plot

Toggles between Slope and Deflection display

Units Sub-menus:

Range Unit:

The desired range units.

Other Units:

...in the context of the table displayed.

Print Image

Print the current image

Save Image

Save the current image as a .png file

3.1.5 Scope-label:

Show Ranges for:

Mil-dot Reticles:

Whole Dots only

Display only whole dots and markers (red)

Half Dots

Display whole and half dots with markers (blue)

MoA Reticles:

10 MoA only

Display 10 MoA markers (red)

- 10 MoA + 5 MoA
 - Display 10 (red) and 5 MoA markers (blue)
- Reticle LHS: (Left Hand Side)
 - Near Ranges
 - Display near ranges
 - Far Ranges
 - Display far ranges (duplicating RHS)
 - Wind Drift
 - Displays wind drift trajectories at various wind speeds
 - Blank Image:
 - The bare reticle with no decoration.
 - Coloured/Monochrome Image:
 - Toggles between the monochrome and coloured images.
 - Useful for elderly monochrome laser printers.
 - Hide/Show PBR Detail:
 - Hide or show PBR items including:
 - Peak range and subtension
 - Impact Zone (IZ)
 - PBR: near and far PBR ranges and PBR representation on reticle
 - Print Options
 - Print single image
 - Prints the current scope cap at the diameter requested
 - Page of Populated Images
 - Prints a page of the current image.
 - Units Sub-menus:
 - Range Unit:
 - The desired range units.
 - Other Units:
 - ...in the context of the table displayed.
 - Print Calibration Target
 - Prints a calibration target of the current reticle. Coloured or monochrome as required
 - Save Image
 - Save the current coloured/monochrome image as a .png file
- The Scope-label pane also includes:
 - A "Print Diameter" group for setting the diameter of the printed resulting label diameter (0.75 to 6 Inch)
 - A menu is provided to set the label's background colour. Left-click to choose from a list.

3.1.6 Scope Tape:

Prepares a simple Scope Tape based on the current trajectory and click-size. The facilities are limited at this time (suitable for airgun use) although this may improve to cover rim-fire and centre-fire applications and trajectories at a later date.

A separate area in the display section has three textboxes, three drop-down menus and seven checkboxes:

3.1.7.1 Scope Turret Diameter with limits: 0.75 to 2.0 Inches

3.1.7.2 Scope Turret Height with limits: 0.25 to 1.0 Inches

Available Units: Inch, cm or mm for the above.

3.1.7.3 Scope Turret Clicks per revolution: 16 to 120

3.1.7.4 Ranges to display: 5, 10, 20 or 25

Available Units: Yard or Metre.

3.1.7.5 Check Boxes:

- a) "Reverse": Reverses the tape if checked,
- b) "2 Turns": 2 turns if checked, 1 turn if not,
- c) "Bold": Bold text if checked,
- d) "Lines": Show Click-Lines if checked,
- e) "Zeros": Indicate the current zero(s) if checked,
- f) "Mono": Plain black-on-white if checked, and
- g) "Tint": System Tinted background if checked.

A popup menu is available by right-clicking on the tape image having options to print the tape or save it as an image.

3.1.7 Rangefinder:

Show Ranges for:

Mil-dot Reticles:

Whole Dots only

Display only whole dots and markers (red)

Half Dots

Display whole and half dots with markers
(blue)

MoA Reticles:

10 MoA only

Display 10 MoA markers (red)

10 MoA + 5 MoA

Display 10 (red) and 5 MoA markers (blue)

Indicators:

Cycles between Plain, circles or lines as background
indicators.

Units Sub-menu:

Range Unit:

The desired range units..

Print Image

Print the current image

Save Image

Save the current image as a .png file

3.1.8 Range Card:

A pane displaying an adaptable Range Card for use in the field or notebook. Optionally, the range card can be single or double sided.

The right-click context menu has options:

Reverse Panel Properties: available if the Reverse or both Panels are displayed.

Displays an applet to allow the user to:

Select the variables to be displayed,

Set the Start Range,

Set the Range Step value:

Choice: 1, 2, 5, 10, 25, 50 or 100 unit steps

and Indicate the PBR and IZ

Show Ranges for:

Mil-dot Reticles:

Whole Dots only

Display only whole dots and markers (red)

Half Dots

Display whole and half dots with markers (blue)

MoA Reticles:

10 MoA only

Display 10 MoA markers (red)

10 MoA + 5 MoA

Display 10 (red) and 5 MoA markers (blue)

Range Card LHS:

Near Ranges, Far Ranges or windage.

Show Blank Image/Show Detailed Image:

Toggles between Detailed and Blank images.

Show/Hide PBR Detail:

Adds or subtracts the Impact Zone and PBR data from the image.

Intercept Variables sub-menu:

None:

Don't display Intercept Variables

PoI:

Displays the trajectory PoI data for the current reticle and it's reticle range

MoA:

Displays the trajectory MoA data for the current reticle and it's reticle range

Mil:

Displays the trajectory Mil data for the current reticle and it's reticle range

Click:

Displays the trajectory Click data for the current reticle and it's reticle range

Velocity:

Displays the trajectory Velocity data for the current reticle and it's reticle range

Momentum:

Displays the trajectory Momentum data for the current reticle and it's reticle range

Energy:

Displays the trajectory Kinetic Energy data for the current reticle and it's reticle range

Units Sub-menus:

Range Unit:

The desired range units.

Other Units:

...in the context of the table displayed.

A frame at the bottom of the display proper has controls to:

Select the appropriate panel from ...

Front Panel, Reverse Panel, or Both Panels

A Card Print Width textbox to enter the required print size (in Inch, cm or mm):

3.1.9 Visualisation:

Displays the Line-of-Sight ranges associated with the current reticle when inclined. The PoA for the Target Range (LoS as always) is indicated on the reticle image.

One text box is supplied:

Inclination angle:

An entry ($\pm 75^\circ$) is used to display the appropriate Line-of-Sight ranges associated with the Inclination angle.

... and a Target Selection combo box have targets:

None (no target shown)

Brown Rat

Squirrel

Rabbit

FT Rat

FT Squirrel

FT Rabbit

FT Rook

FT Magpie

3.1.10 Summary:

Concise Format

Displays a concise summary of (mostly) practical data

... or ...

Verbose Format

Displays a more verbose format suited to advanced users

Units Sub-menus:

Range Unit:

The desired range units.

Other Units:

...in the context of the table displayed.

Copy to File

Saves the summary to a text (.txt) file

Print Summary

Prints the current summary

4.1 **Helper applets**

4.1.1 Preferences

The Preferences applet displays controls:

- a) A flag to allow the application to automatically check if a new version is available. (Optional, Default:ON)
- b) A flag to automatically save data on exit - saving any changes. (Optional, Default:OFF)
- c) A flag to display the MERO icon when the application starts and stops. (Optional, Default:ON)
- d) A flag to indicate if tooltips are to displayed or hidden. (Optional, Default:ON)
- e) A flag to indicate if the Target Range is to be indicated on plots. (Optional, Default:ON)
- f) A flag to enable/disable the Projectile DB auto-update function. if set then, should the BC value, Drag Law, projectile weight or calibre be changed then the projectile database will be updated with the new details - creating a new record (if the calibre is changed) as necessary. (Optional, Default:OFF)
- g) A text box to set the minimum print size (2.0" to 8.0") with an attached drop-down units menu (Inch, cm and mm). (Default: 4.0")
- h) A drop-down menu to select the data block position. Choice: Top, Middle or Bottom. (Default: Middle)
- i) A flat to select the data block position. (Optional, Default: "To the Left")
- j) A drop-down menu to select the target marker size Choice: Small, Medium, Large and Huge. (Default: Medium)
- k) A drop-down menu to select the plot dot size size Choice: Thin, Medium, and Thick. (Default: Medium)
- l) A drop-down menu to select the Plot Line thickness. Choice: Small, Medium, Large and Huge (Default: Medium)
- m) A drop-down menu to select the applications's plot Tint colour. (Default: Ivory)
- n) A checkbox to give the background a gradient (or not)
- o) A drop-down menu to select the applications's plot line colour. (Default: Red)
- p) A Cancel button. Reverses any changes made and closes the applet
- q) A Default button. Sets everything to the defaults above
- r) An Accept button. Implements and saves any changes and closes the apple.

4.1.2 Environment Applet

MERO requires the Ambient Pressure, Temperature and relative humidity to calculate Ambient Air Mass Density. The Ambient Air Pressure may be available at the shooting site via a stand-alone barometer or, increasingly, via a smartphone app.

If none of these are available then the Ambient Air Pressure can be estimated from the Mean Sea Level Pressure (MSLP) - perhaps gleaned from local weather forecasts, etc. together with the shooting site's elevation.

The MSLP has units of: InHg, mmHg or mBar (as appropriate) and the elevation can be defined in Foot or Metre units as required.

It makes very little difference at airgun ranges but the Ambient Relative Humidity can be set (0-100%) if required. A drop-down menu gives access to a short list of "Standard Environments" - ISO5011, ICAO, STP and US Metro - and the facility to use a previously saved environment ("Current = Default") or to save the current environment as the default for later use (Default = Current)

Enter the appropriate data and click "Accept" to transfer the calculated Ambient Air Density value into to the main app or click the "Reject" button to reject any changes.

4.1.3 BC Calculator

An applet to calculate the Ballistic Coefficient of the currently selected projectile. Three methods are available, all of which use the current Muzzle Velocity and Target Range as assumed parameters:

ΔPoI method:

Requires only one chronograph at the muzzle and uses the current Far Zero Range and Sight Height. Enter the measured difference between the PoInt-of-Aim and PoInt-of-Impact at the Target Range into the "PoI" textbox. Since there are so many variables - all of which need to be measured accurately - this method should be regarded as one of last resort and will only be available if the Target Range is set equal or greater (preferably much greater) than 1.25 times the Far Zero Range. Enter the PoI to PoA measurement into the textbox, hit the Return key and the BC value will be displayed (or a message box if the calculation results in an out-of-range BC value)

ΔV method:

Requires two chronographs; one at the muzzle and another at the Target Range. Enter the **velocity** at the Target Range into the textbox, hit the Return key and the BC value will be

displayed (or a message box if the calculation results in an out-of-range BC value).

ΔD method:

Requires one chronograph and a bore-sighter. Set the scope's crosshair on the bore-sighter's projection at the Target Range. Make an aiming point on the target, remove the bore-sighter (!) and, aiming at the aiming point, shoot a group. Measure the distance between the aiming point and the centre of the group and enter said **distance** into the textbox, hit the Return key and the BC value will be displayed (or a message box if the calculation results in an out-of-range BC value).

ΔT method:

Requires one chronograph and the means of accurately measuring the elapsed time for the projectile to reach the Target Range. Enter the elapsed **time** at the Target Range into the textbox, hit the Return key and the BC value will be displayed (or a message box if the calculation results in an out-of-range BC value).

A click on the Cancel button will disregard any changes while the "Accept" button (or double-left-clicking on the BC value label) will enter the computed BC value into the main application and re-compute the trajectory. Note that if the "Projectile DB auto-update function" option has been checked, the projectile database will be updated appropriately.

Clicking on the ">" button will toggle the confidence panel on/off while clicking on the "▲" button will reset the values to their starting state.

4.1.4 Custom Table Content

Allow the selection of the columns to be displayed on the Custom Table. The first (left-hand) column is fixed as the range but up to ten further columns can be specified. The content of each column can be blank or any of:

PoI(unit), PoI(MoA), PoI(mil), PoI(dot), PoI(click),
Drift(unit), Drift(MoA), Drift(mil), Drift(dot), Drift(click),
Velocity, Energy, Momentum, Drop from LoD, Elapsed Time,
Dwell Time, Vacuum Time, Horizontal Velocity,
Vertical Velocity, Horizontal Acceleration, Vertical
Acceleration, Reference Cd, Projectile Cd, Drag Force,
BC @ Constant Cd (0.204), Penetration and
Line-of-departure.

Select a column from the left-hand side of the applet by clicking on the button or its label. Choose the required content from the panel and double-left-click on it to select.

The "Default" button sets the columns to a default state, the clear button sets all columns blank and the "Accept" button saves the selection for use in a Custom Table.

4.1.5 Projectiles

The interface consists of a list of projectiles - with the current projectile selected if the appropriate grouping had been chosen from the main menu - together with four textboxes, a Drag Law popup menu and six buttons.

The highlighted item can be changed with a single left-click on the required record or by using the up/down keyboard arrow keys, shift+up-arrow for the first record, shift+down arrow for the last record; the content of the textboxes changing appropriately to reflect the highlighted record.

The calibre, name, weight, BC and Drag Law of the highlighted item can be edited all within the prescribed limits as per the tooltips.

The buttons are:

Reject:

Reject any new selection and close the applet.

Clone:

Insert a copy of the current list selection. This new copy will be identical to the selected item (but with a single dot after the name) and can be edited using the textboxes.

Delete:

Deletes the currently highlighted record.

(Confirmation is required prior to actual deletion)

Print:

Prints the current list.

Save CSV:

Saves the current list as a CSV file.

Accept:

Accepts the currently highlighted record into the application, re-calculates the trajectory (if necessary) and closes the applet.

4.1.6 Hot Keys (Key bindings)

Hot Keys are always available when the application has focus.

ESC: Save current state and quit.

F1: Display the MERO Help file in a pdf viewer/browser.

F2: Display the MERO Howto file in a pdf viewer/browser.

F3: Display the MERO web page.

F4: Check for version updates.

F5: Toggle display between Last and Current Display Panels

Shift+F5: Index forward through Display Panels

Ctrl+F5: Index backwards through Display Panels

F6: Toggle extra precision on/off. (+1 decimal place)

(Extra precision is always **off** on startup.)

F7: Toggle mini-Icon on/off.

Please toggle the mini-icon **on** if the various MERO images are used for publication.

Shift+F7: Toggle +/- BC value buttons on/off.

F8: Toggle white table background in dark mode.

F9: Clear currently selected textbox border (for cleaner printing).