How To prepare and use a PBS zip

Version: 1.28

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Create a new Directory somewhere safe

Ex:

mkdir /Users/figueras/Desktop/Private/tmp/PBSv128

Go to the source directory

cd /Users/figueras/Desktop/Private/Python-Source/PBS

copy all the files and directories to the destination directory

./MakeVersion.bsh /Users/figueras/Desktop/Private/tmp/PBSv128

Go to the destination Directory

cd /Users/figueras/Desktop/Private/tmp

Check that the correct number of files are presents.

find ./PBSv128 -type f -not -name ".DS\_Store" | wc -l

23

If the number is NOT correct, check the detailed list of files

find ./PBSv128 -type f -not -name ".DS\_Store"

./PBSv128/PBS How to generate pdf Abacus.docx

./PBSv128/pdf-merge.py

./PBSv128/PBS How to generate pdf Abacus-v126.pdf

./PBSv128/PBS\_Abacus\_htmlToPDF.bash

./PBSv128/CSV/lunette.csv

./PBSv128/CSV/Backup-Files.bsh

./PBSv128/CSV/Template/lunette.csv

./PBSv128/CSV/Template/bullet\_BC.csv

./PBSv128/CSV/Template/env.csv

./PBSv128/CSV/Template/zero.csv

./PBSv128/CSV/Template/amo.csv

./PBSv128/CSV/Template/rifle.csv

./PBSv128/CSV/Template/montage.csv

./PBSv128/CSV/Template/bullet.csv

./PBSv128/CSV/bullet\_BC.csv

./PBSv128/CSV/env.csv

./PBSv128/CSV/zero.csv

./PBSv128/CSV/amo.csv

./PBSv128/CSV/rifle.csv

./PBSv128/CSV/montage.csv

./PBSv128/CSV/bullet.csv

./PBSv128/PBS-v128.py

./PBSv128/PBS\_Abacus\_Script\_Creation.bash

Create the zip file with new version

find ./PBSv128 -type f -not -name ".DS\_Store" | zip PBSv128 -@

adding: PBSv128/PBS How to generate pdf Abacus.docx (deflated 3%)

adding: PBSv128/pdf-merge.py (deflated 48%)

adding: PBSv128/PBS How to generate pdf Abacus-v126.pdf (deflated 1%)

adding: PBSv128/PBS\_Abacus\_htmlToPDF.bash (deflated 54%)

adding: PBSv128/CSV/lunette.csv (stored 0%)

adding: PBSv128/CSV/Backup-Files.bsh (deflated 64%)

adding: PBSv128/CSV/Template/lunette.csv (stored 0%)

adding: PBSv128/CSV/Template/bullet\_BC.csv (deflated 39%)

adding: PBSv128/CSV/Template/env.csv (deflated 18%)

adding: PBSv128/CSV/Template/zero.csv (deflated 11%)

adding: PBSv128/CSV/Template/amo.csv (deflated 6%)

adding: PBSv128/CSV/Template/rifle.csv (deflated 8%)

adding: PBSv128/CSV/Template/montage.csv (deflated 3%)

adding: PBSv128/CSV/Template/bullet.csv (deflated 17%)

adding: PBSv128/CSV/bullet\_BC.csv (deflated 35%)

adding: PBSv128/CSV/env.csv (deflated 18%)

adding: PBSv128/CSV/zero.csv (deflated 11%)

adding: PBSv128/CSV/amo.csv (deflated 7%)

adding: PBSv128/CSV/rifle.csv (deflated 8%)

adding: PBSv128/CSV/montage.csv (deflated 3%)

adding: PBSv128/CSV/bullet.csv (deflated 20%)

adding: PBSv128/PBS\_Abacus\_Script\_Creation.bash (deflated 51%)

adding: PBSv128/PBS-v128.py (deflated 82%)

check that the file was created

ls -lh PBSv128.zip

-rw-r--r-- 1 figueras staff 4.0M Jul 14 10:54 PBSv128.zip

Check the content of the zip file

unzip -l PBSv128.zip

Archive: PBSv128.zip

Length Date Time Name

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1264806 07-14-2025 10:53 PBSv128/PBS How to generate pdf Abacus.docx

672 07-14-2025 10:53 PBSv128/pdf-merge.py

2934583 07-14-2025 10:53 PBSv128/PBS How to generate pdf Abacus-v126.pdf

663 07-14-2025 10:53 PBSv128/PBS\_Abacus\_htmlToPDF.bash

20 07-14-2025 10:53 PBSv128/CSV/lunette.csv

322 07-14-2025 10:53 PBSv128/CSV/Backup-Files.bsh

20 07-14-2025 10:53 PBSv128/CSV/Template/lunette.csv

103 07-14-2025 10:53 PBSv128/CSV/Template/bullet\_BC.csv

211 07-14-2025 10:53 PBSv128/CSV/Template/env.csv

158 07-14-2025 10:53 PBSv128/CSV/Template/zero.csv

71 07-14-2025 10:53 PBSv128/CSV/Template/amo.csv

92 07-14-2025 10:53 PBSv128/CSV/Template/rifle.csv

39 07-14-2025 10:53 PBSv128/CSV/Template/montage.csv

157 07-14-2025 10:53 PBSv128/CSV/Template/bullet.csv

106 07-14-2025 10:53 PBSv128/CSV/bullet\_BC.csv

211 07-14-2025 10:53 PBSv128/CSV/env.csv

158 07-14-2025 10:53 PBSv128/CSV/zero.csv

90 07-14-2025 10:53 PBSv128/CSV/amo.csv

91 07-14-2025 10:53 PBSv128/CSV/rifle.csv

36 07-14-2025 10:53 PBSv128/CSV/montage.csv

172 07-14-2025 10:53 PBSv128/CSV/bullet.csv

503 07-14-2025 10:53 PBSv128/PBS\_Abacus\_Script\_Creation.bash

91479 07-14-2025 10:53 PBSv128/PBS-v128.py

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4294763 23 files

Try to use it

create à temporary the directory

mkdir ./PBSInstallDir

move the zip file in some temporary Directory

Ex :

mv ./PBSv128.zip ./PBSInstallDir/PBSv128.zip

Move to this directory

cd ./PBSInstallDir

unzip the package

unzip ./PBSv128.zip

Archive: ./PBSv128.zip

inflating: PBSv128/PBS How to generate pdf Abacus.docx

inflating: PBSv128/pdf-merge.py

inflating: PBSv128/PBS How to generate pdf Abacus-v126.pdf

inflating: PBSv128/PBS\_Abacus\_htmlToPDF.bash

extracting: PBSv128/CSV/lunette.csv

inflating: PBSv128/CSV/Backup-Files.bsh

extracting: PBSv128/CSV/Template/lunette.csv

inflating: PBSv128/CSV/Template/bullet\_BC.csv

inflating: PBSv128/CSV/Template/env.csv

inflating: PBSv128/CSV/Template/zero.csv

inflating: PBSv128/CSV/Template/amo.csv

inflating: PBSv128/CSV/Template/rifle.csv

inflating: PBSv128/CSV/Template/montage.csv

inflating: PBSv128/CSV/Template/bullet.csv

inflating: PBSv128/CSV/bullet\_BC.csv

inflating: PBSv128/CSV/env.csv

inflating: PBSv128/CSV/zero.csv

inflating: PBSv128/CSV/amo.csv

inflating: PBSv128/CSV/rifle.csv

inflating: PBSv128/CSV/montage.csv

inflating: PBSv128/CSV/bullet.csv

inflating: PBSv128/PBS\_Abacus\_Script\_Creation.bash

inflating: PBSv128/PBS-v128.py

And run a test

cd PBSv128

python3 ./PBS-v128.py 0.308 190 772 1000 180 Y 6 2 Y 0.0001 N 15 Y G1 1 N

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PBS stands for Python Ballistic Solver

PBS is an Open Source Balistic Software

Written in Object Oriented Python3 by Fabien FIGUERAS (he/him)

v1.00 was released in 2024

Current Version is v 1.28 2025

Call example Python3 ./PBS-vxyz.py to get this message

Next 3 Parameters will be overwritten by Files values

Where param1 is the caliber [inch]

Where param2 is the bullet mass [gr]

Where param3 is the Muzzle Speed [m/s]

Where param4 is the Shooting distance [m]

Where param5 is the Azimut (shooting angle relative to the North) [deg]

Where param6 is the Coriolis Option [Y/N]

Where param7 is the Average Wind Speed [m/s]

Where param8 is the Wind Speed direction related to shooting direction [hour]

Where param9 is the Spind Drift Option [Y/N]

Where param10 is the time increment for numerical solution [s]

Where param11 is Zeroing the sight ? [Y/N]

Where param12 is the Shooting Angle (relative to the Horizontal plan) required for Coriolis option [deg]

Where param13 is Aerodynamic Jump Option ? [Y/N]

Where param14 is BC\_Gx type ? [G1/G7]

Next Option could force BC\_Gx to be overwritten by Files values

Where param15 is BC\_Gx value ? [0 constant, 1 Speed related]

Where param16 is the option to allow calculation of Card or Abacus or Nothing [C/Y/N]

Sources available in GitHub : https://github.com/fabienfigueras/TLD

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Gathering and printing Data from Files

File parameters overcome some Command line parameters

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Rifle and Scope related parameters

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Rifle Brand : PGM Rifle Model : Mini Hecat 2 Rifle Caliber (inch) : 0.338 Barrel Twist (inch) 1: 9 Barrel Twist (R/L) : Right Barrel Twist in Caliber 26.62721893491124

SightHeight (mm): 70.0 Fixed Angle (mRAD): 0.0

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Bullet related parameters

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Bullet Brand : SWISS\_P Bullet Model : "SWISS\_P Target HPBT" Bullet Diameter (inch) : 0.338 Bullet Mass (gr) : 300.0 Bullet Length (cm) : 4.35 Muzzle Speed (m/s) : 835.0 BC\_G1 : 0.83 BC\_G7 : 0.43

bullet length (inch) : 1.713

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Earth Localization

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Latitude 46.0 ° 17.0 min 43.0 s

Latitude degree 46.295

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ICAO Standard Atmosphere

Hard coded values

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Altitude (m) 0.0 Absolute Pressure (Pa) 101325.0

Air Temperature (°C) 15.0 Air Temperature (°K) 288.15

Air Relative Humidity (%) 0.0

Wet Air Volumic Mass (kg/m3) 1.225

Saturated Vapor Pressure (Pa) : 17.05228

Vapor Pressure (Pa) : 0.0

Virtual Temperature (K) : 288.15

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Zeroing Atmosphere

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Zero Distance (m) 100.0 Error tolerance (m) 0.001

Zero Atmosphere Data

Altitude (m) 0.0 Absolute Pressure (Pa) 101325.0

Air Temperature (°C) 15.0 Air Temperature (°K) 288.15

Air Relative Humidity (%) 0.0

Wet Air Volumic Mass (kg/m3) 1.225

Saturated Vapor Pressure (Pa) : 17.05228

Vapor Pressure (Pa) : 0.0

Virtual Temperature (K) : 288.15

Zero Angle (deg) 0.08726521 Windage (cm) - =Left + =Right 0.23207896

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Shooting Atmosphere

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Altitude (m) 0.0 Absolute Pressure (Pa) 101325.0

Air Temperature (°C) 15.0 Air Temperature (°K) 288.15

Air Relative Humidity (%) 0.0

Wet Air Volumic Mass (kg/m3) 1.225

Saturated Vapor Pressure (Pa) : 17.05228

Vapor Pressure (Pa) : 0.0

Virtual Temperature (K) : 288.15

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Shot related parameters

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Shooting Distance : 1000

Time increment (s) : 0.0001

Shooting Angle relative to Horizontal plan (deg) : 15.0 (RAD) : 0.261799

Shooting Angle relative to North (Azimut °) : 180.0 (RAD) : 3.141593

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Coriolis Data

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Earth Angular Speed - Omega (rad/s) : 7.292115900231274e-05

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ICAO Drag Coefficient (Cd) Determination

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Speed of sound ICAO (m/s) : 340.72

Bullet Stability Factor ICAO 2.45

ICAO Stable Bullet

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Wind Speed and Direction

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wind speed (m/s) : 6.0

wind Angle relative to shooting direction (hour) : 2

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Options choice

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Spin Drift : Y

Aerodynamic Jump : Y

Corriolis : Y

Zeroing : N

Calculate Abacus : N

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No Zeroing requested

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Alpha(0) used (deg) : 0.08726521 Windage correction used (cm) 0.23207896

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Ballistic differential equations being solved numerically using Ruge-Kutta Method...

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Doing a Simulation without Coriollis

PRS\_Solver : shoot with Horizontal Angle (deg) : 15.0

PRS\_Solver : Solving Balistic for corrected distance (m) : 965.93

Impact point Data

X coordinate (distance from shooting point) (m) 1000.0169

Y coordinate (Lateral drift from shooting point) (m) -13.2272

Z coordinate (Vertical Drop from shooting point) (m) 0.0

Y coordinate (Lateral drift from shooting point) (cm) -1322.7

Z coordinate (Vertical Drop from shooting point) (cm) 0.0

Speed coordinate on X axis (m/s) 398.65284

Speed coordinate on Y axis (m/s) -16.03788

Speed coordinate on Z axis (m/s) 0.0

Speed Module (m/s) 398.97532

Speed Module on XY plan (m/s) 0.0

Elevation Angle (RAD) -0.04021

Windage Angle (RAD) 0.0

Simulation with Coriollis due to chosen option

PRS\_Solver : shoot with Horizontal Angle (deg) : 15.0

PRS\_Solver : Solving Balistic for corrected distance (m) : 965.93

Coriolis Results

Impact point Data

X coordinate (distance from shooting point) (m) 1000.0169

Y coordinate (Lateral drift from shooting point) (m) -13.2272

Z coordinate (Vertical Drop from shooting point) (m) 0.1042

Y coordinate (Lateral drift from shooting point) (cm) -1322.7

Z coordinate (Vertical Drop from shooting point) (cm) 10.4

Speed coordinate on X axis (m/s) 398.65284

Speed coordinate on Y axis (m/s) -16.03789

Speed coordinate on Z axis (m/s) 0.10417

Speed Module (m/s) 398.97532

Speed Module on XY plan (m/s) 0.0

Elevation Angle (RAD) -0.04021

Windage Angle (RAD) 0.00026

Delta No Co - Co

Impact point Data

X coordinate (distance from shooting point) (m) 0.0

Y coordinate (Lateral drift from shooting point) (m) 0.0

Z coordinate (Vertical Drop from shooting point) (m) 0.0

Y coordinate (Lateral drift from shooting point) (cm) 0.0

Z coordinate (Vertical Drop from shooting point) (cm) 0.0

Speed coordinate on X axis (m/s) 0.0

Speed coordinate on Y axis (m/s) 0.0

Speed coordinate on Z axis (m/s) 0.0

Speed Module (m/s) 0.0

Speed Module on XY plan (m/s) 0.0

Elevation Angle (RAD) 0.0

Windage Angle (RAD) 0.0

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Printing All Results

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Shot Parameters

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Lattitude (° N/S) : 46.3 North

Shooting Direction (Azimut Angle) related to North (deg) : 180.0 RAD 3.14159

Shooting Direction (Horizontal Angle) related to vertical (deg) : 15.0

Goal Distance (m) : 1000.0

wind speed (m/s) : 6.0

wind Angle relative to shooting direction (hour) : 2.0

Time increment (s) : 0.0001 (ms) : 0.1

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Calculated values not linked to any options

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Average Wind intensity (m/s) 6.0 Heading from (hour) 2.0 related to shooting direction

Heading Angle in RAD : 1.0472

Resulting Wind Speed on X axis (m/s) -3.0

Resulting Wind Speed on Y axis (m/s) -0.0

Resulting Wind Speed on Z axis (m/s) -5.2

Resulting Deviation on X direction (m) 0.0

Resulting Deviation on Y direction (m) -0.0

Resulting Deviation on Z direction (m) -3.003

Wind Drift Along X (m) : 0.0 (cm) : 0.0

Wind Drift Along Y (m) : -0.0 (cm) : -0.0

Wind Drift Along Z (m) : -3.0034 (cm) : -300.34

Calculated Z shift due to Wind Drift (m) : -3.0 (cm) : -300.34

Calculated Z Angle due to Wind Drift (mRAD) : -3.0

Time of Flight (s) : 1.776

Bullet Stability Factor Sg = 2.45

Sg >1.5 Bullet is Stable

Calculated bullet Impact parameters (With only Drag and Gravity influences without Coriolis for NON horizontal shooting Ha>0 )

Target Distance corrected for Horizontal Angle (deg) : 15.0 (m) : 966.0

Calculated Impact Speed Module |V| (m/s) (With only Drag and Gravity influences) : 409.057

Calculated impact Y position corrected for Non Horizontal Angle No Coriolis (m) : -11.908 (cm) : -1190.792

Calculated impact Y position corrected for Non Horizontal Angle With Coriolis (m) : -11.908 (cm) : -1190.793

Calculated Z impact position Coriolis Ha ? (m) : 0.0

Calculated Z impact position Ha and Coriolis (m) : 0.096

Calculated Y impact Angle No Ha and No Coriolis (mRAD) : 0.0

Calculated Y impact Angle No Ha and Coriolis (mRAD) : 0.0

Calculated Y impact Angle Ha and No Coriolis (mRAD) : -12.327

Calculated Y impact Angle Ha and Coriolis (mRAD) : -12.327

Elevation to be applied due to gravity drag, No Ha and No Coriolis (clicks) : -0.0

Elevation to be applied due to gravity drag No Ha and Coriolis (clicks) : -0.0

Elevation to be applied due to gravity drag Ha and No Coriolis (clicks) : 123.3

Elevation to be applied due to gravity drag Ha and Coriolis (clicks) : 123.3

Spin Drift including zero correction (m) : 0.308 (cm): 30.82

Windage correction due to Spin Drift (clicks) : -3.1

Aerodynamic Jump (m) : 0.15 (cm) 14.99

Elevation correction due to Aerodynamic Jump (clicks) : -1.5

=========== CORRECTIONS TO BE APPLIED WITHOUT OPTION =================

Elevation (gravity, drag No Ha and No Coriolis) to be applied (clicks) +=>Up -=>Down: -0.0

Windage (Spin Drift only including zero correction) to be applied (clicks) +=>Rigt -=>Left: -3.1

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Calculated values depending on choosen options

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Elevation to be applied due to Target Distance (gravity, drag), Range Wind, Horizontal Angle and Coriolis (clicks) : 123.3

Calculated shift along Y axis due to Aerodynamic Jump (m) : 0.15 (cm) : 14.99

Calculated Angle along Y axis due to Aerodynamic Jump (mRAD) : 0.15

Calculated Correction due to Aerodynamic Jump (click) : -1.5

Elevation to be applied due to due to Target Distance (gravity, drag), Range Wind, Horizontal Angle, Coriolis and Aerodynamic Jump (clicks) : 121.8

Calculated Z shift due to Coriolis (m) : 0.10423 (cm) : 10.42

Windage to be applied due to due to Coriolis (clicks) : -1.0

Calculated Z shift due to Spin Drift including zero correction (m) : 0.30819 (cm) : 30.82

Windage to be applied due to due to Spin Drift (clicks) : -3.1

Calculated Z shift due to Cross Wind (m) : -3.00335 (cm) : -300.34

Calculated Z Angle due to Cross Wind (mRAD) : -3.0

Windage to be applied due to due to Cross Wind (clicks) : 30.0

Windage to be applied due to due to Spin Drift and Cross Wind (clicks) : 25.9

Impedance multiplicator 1.0

At Muzzle Speed

Ballistic Coefficient G1 ICAO 0.429 Ballistic Coefficient G1 Current Atm 0.429

Ballistic Coefficient G7 ICAO 0.215 Ballistic Coefficient G7 Current Atm 0.215

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Calculation of the maximum value for Y along the trajectory

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PRS\_Solver : shoot with Horizontal Angle (deg) : 15.0

PRS\_Solver : Solving Balistic for corrected distance (m) : 965.93

Max Z (m): 6.5712 for distance (m) : 730.61 at time (s) : 1.163

=========== CORRECTIONS TO BE APPLIED =================

Elevation to be applied (clicks) +=>Up -=>Down: 121.8

Windage to be applied (clicks) +=>Rigt -=>Left: 25.9

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Do some cleaning

cd /Users/figueras/Desktop/Private/tmp

rm -rf /Users/figueras/Desktop/Private/tmp/PBSInstallDir

rm -rf /Users/figueras/Desktop/Private/tmp/PBSv128