

How To prepare and use a PBS zip

Version: 1.26

Author : Fabien FIGUERAS

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Create a new Directory somewhere safe

Ex:

```
mkdir /Users/figueras/Desktop/Private/tmp/PBSv126
```

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/PBSv126
```

Go to the destination Directory

```
cd /Users/figueras/Desktop/Private/tmp
```

Check that the correct number of files are presents.

```
find ./PBSv126 -type f -not -name ".DS_Store" | wc -l
```

23

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

```
find ./PBSv126 -type f -not -name ".DS_Store"
```

```
./PBSv126/PBS How to generate pdf Abacus.docx
```

```
./PBSv126/pdf-merge.py
```

```
./PBSv126/PBS How to generate pdf Abacus-v126.pdf
```

```
./PBSv126/PBS_Abacus_htmlToPDF.bash
```

```
./PBSv126/CSV/lunette.csv
```

```
./PBSv126/CSV/Backup-Files.bsh
```

```
./PBSv126/CSV/Template/lunette.csv
```

```
./PBSv126/CSV/Template/bullet_BC.csv
```

```
./PBSv126/CSV/Template/env.csv
```

```
./PBSv126/CSV/Template/zero.csv
```

```
./PBSv126/CSV/Template/amo.csv
```

```
./PBSv126/CSV/Template/rifle.csv
```

```
./PBSv126/CSV/Template/montage.csv
```

```
./PBSv126/CSV/Template/bullet.csv
```

```
./PBSv126/CSV/bullet_BC.csv
```

```
./PBSv126/CSV/env.csv
./PBSv126/CSV/zero.csv
./PBSv126/CSV/amo.csv
./PBSv126/CSV/rifle.csv
./PBSv126/CSV/montage.csv
./PBSv126/CSV/bullet.csv
./PBSv126/PBS-v126.py
./PBSv126/PBS_Abacus_Script_Creation.bash
```

Create the zip file with new version

```
find ./PBSv126 -type f -not -name ".DS_Store" | zip PBSv126 -@
  adding: PBSv126/PBS How to generate pdf Abacus.docx (deflated 3%)
  adding: PBSv126/pdf-merge.py (deflated 48%)
  adding: PBSv126/PBS How to generate pdf Abacus-v126.pdf (deflated 1%)
  adding: PBSv126/PBS_Abacus_htmlToPDF.bash (deflated 54%)
  adding: PBSv126/CSV/lunette.csv (stored 0%)
  adding: PBSv126/CSV/Backup-Files.bsh (deflated 64%)
  adding: PBSv126/CSV/Template/lunette.csv (stored 0%)
  adding: PBSv126/CSV/Template/bullet_BC.csv (deflated 34%)
  adding: PBSv126/CSV/Template/env.csv (deflated 18%)
  adding: PBSv126/CSV/Template/zero.csv (deflated 10%)
  adding: PBSv126/CSV/Template/amo.csv (deflated 6%)
  adding: PBSv126/CSV/Template/rifle.csv (deflated 8%)
  adding: PBSv126/CSV/Template/montage.csv (deflated 3%)
  adding: PBSv126/CSV/Template/bullet.csv (deflated 18%)
  adding: PBSv126/CSV/bullet_BC.csv (deflated 39%)
  adding: PBSv126/CSV/env.csv (deflated 18%)
  adding: PBSv126/CSV/zero.csv (deflated 11%)
  adding: PBSv126/CSV/amo.csv (deflated 6%)
  adding: PBSv126/CSV/rifle.csv (deflated 8%)
  adding: PBSv126/CSV/montage.csv (deflated 3%)
  adding: PBSv126/CSV/bullet.csv (deflated 17%)
  adding: PBSv126/PBS-v126.py (deflated 82%)
  adding: PBSv126/PBS_Abacus_Script_Creation.bash (deflated 51%)
```

check that the file was created

```
ls -lh PBSv126.zip
-rw-r--r--  1 figuras  staff   4.0M Oct 20 14:25 PBSv126.zip
```

Check the content of the zip file

```
unzip -l PBSv126.zip
```

Archive: PBSv126.zip

Length	Date	Time	Name
1264806	10-20-2024	13:44	PBSv126/PBS How to generate pdf Abacus.docx
672	10-02-2024	11:51	PBSv126/pdf-merge.py
2934583	10-20-2024	13:45	PBSv126/PBS How to generate pdf Abacus-v126.pdf
663	10-02-2024	11:49	PBSv126/PBS_Abacus_htmlToPDF.bash
20	10-08-2024	12:46	PBSv126/CSV/lunette.csv
322	08-29-2024	17:48	PBSv126/CSV/Backup-Files.bsh
20	09-11-2024	22:10	PBSv126/CSV/Template/lunette.csv
109	09-11-2024	22:10	PBSv126/CSV/Template/bullet_BC.csv
209	09-11-2024	22:10	PBSv126/CSV/Template/env.csv
135	09-11-2024	22:10	PBSv126/CSV/Template/zero.csv
54	09-11-2024	22:10	PBSv126/CSV/Template/amo.csv
92	09-11-2024	22:10	PBSv126/CSV/Template/rifle.csv
39	09-11-2024	22:10	PBSv126/CSV/Template/montage.csv
160	09-11-2024	22:10	PBSv126/CSV/Template/bullet.csv
103	10-08-2024	12:46	PBSv126/CSV/bullet_BC.csv
211	10-20-2024	12:57	PBSv126/CSV/env.csv
158	10-20-2024	12:47	PBSv126/CSV/zero.csv
71	10-08-2024	12:46	PBSv126/CSV/amo.csv
92	10-08-2024	12:46	PBSv126/CSV/rifle.csv
39	10-20-2024	12:45	PBSv126/CSV/montage.csv
157	10-08-2024	12:46	PBSv126/CSV/bullet.csv
91459	10-20-2024	13:44	PBSv126/PBS-v126.py
503	10-20-2024	13:42	PBSv126/PBS_Abacus_Script_Creation.bash

Try to use it

move the zip file in some temporary Directory

Ex :

```
mv ./PBSv126.zip ./PBSInstallDir/PBSv126.zip
```

Move to this directory

```
cd ./PBSInstallDir
```

unzip the package

```
unzip ./PBSv126.zip
```

```
Archive:  ./PBSv126.zip
```

```
  inflating: PBSv126/PBS How to generate pdf Abacus.docx
```

```
  inflating: PBSv126/pdf-merge.py
```

```
  inflating: PBSv126/PBS How to generate pdf Abacus-v126.pdf
```

```
  inflating: PBSv126/PBS_Abacus_htmlToPDF.bash
```

```
extracting: PBSv126/CSV/lunette.csv
```

```
  inflating: PBSv126/CSV/Backup-Files.bsh
```

```
extracting: PBSv126/CSV/Template/lunette.csv
```

```
  inflating: PBSv126/CSV/Template/bullet_BC.csv
```

```
  inflating: PBSv126/CSV/Template/env.csv
```

```
  inflating: PBSv126/CSV/Template/zero.csv
```

```
  inflating: PBSv126/CSV/Template/amo.csv
```

```
  inflating: PBSv126/CSV/Template/rifle.csv
```

```
  inflating: PBSv126/CSV/Template/montage.csv
```

```
  inflating: PBSv126/CSV/Template/bullet.csv
```

```
  inflating: PBSv126/CSV/bullet_BC.csv
```

```
  inflating: PBSv126/CSV/env.csv
```

```
  inflating: PBSv126/CSV/zero.csv
```

```
  inflating: PBSv126/CSV/amo.csv
```

```
  inflating: PBSv126/CSV/rifle.csv
```

```
  inflating: PBSv126/CSV/montage.csv
```

```
  inflating: PBSv126/CSV/bullet.csv
```

```
  inflating: PBSv126/PBS-v126.py
```

```
  inflating: PBSv126/PBS_Abacus_Script_Creation.bash
```

And run a test

```
cd PBSv126
```

```
python3 ./PBS-v126.py 0.308 190 772 1000 180 Y 6 2 Y 0.0001 N 15 Y G1 1 N
```

```
=====
```

```
PBS stands for Python Ballistic Solver
```

```
PBS is an Open Source Ballistic Software
```

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

```
v1.00 was released in 2024
```

```
Current Version is v 1.26 2024
```

```
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 : TIKKA Rifle Model : T3X TAC A1 Rifle Caliber (inch) : 0.308 Barrel Twist (inch)
1: 11 Barrel Twist (R/L) : Right Barrel Twist in Caliber 35.714285714285715

SightHeight (mm): 60.0 Fixed Angle (mRAD): 11.6

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Bullet related parameters

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Bullet Brand : SIERRA Bullet Model : HPBT Matchking Bullet Diameter (inch) : 0.308 Bullet
Mass (gr) : 190.0 Bullet Length (cm) : 3.437 Muzzle Speed (m/s) : 772.0 BC_G1 : 0.0 BC_G7 :
0.0

bullet length (inch) : 1.353

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Earth Localization

=====

Latitude 46.0 ° 22.0 min 25.0 s

Latitude degree 46.374

=====

ICAO Standard Atmosphere

Hard coded values

=====

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

=====

Zeroing Atmosphere

=====

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) 0.08190247 Windage (cm) - =Left + =Right 0.23951312

=====

Shooting Atmosphere

=====

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

=====

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

=====

Coriolis Data

=====

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 1.77

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

=====

Options choice

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Spin Drift : Y

Aerodynamic Jump : Y

Corriolis : Y

Zeroing : N

Calculate Abacus : N

=====

No Zeroing requested

=====

Alpha(0) used (deg) : 0.08190247 Windage correction used (cm) 0.23951312

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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) 1000.0031

Y coordinate (Lateral drift from shooting point) (m) -16.9153

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

Y coordinate (Lateral drift from shooting point) (cm) -1691.5

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

Speed coordinate on X axis (m/s) 341.78718

Speed coordinate on Y axis (m/s) -18.08467

Speed coordinate on Z axis (m/s) 0.0

Speed Module (m/s) 342.26529

Speed Module on XY plan (m/s) 0.0

Elevation Angle (RAD) -0.05286

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) 1000.0031

Y coordinate (Lateral drift from shooting point) (m) -16.9153

Z coordinate (Vertical Drop from shooting point) (m) 0.1172

Y coordinate (Lateral drift from shooting point) (cm) -1691.5

Z coordinate (Vertical Drop from shooting point) (cm) 11.7

Speed coordinate on X axis (m/s) 341.78717

Speed coordinate on Y axis (m/s) -18.08468

Speed coordinate on Z axis (m/s) 0.104

Speed Module (m/s) 342.2653

Speed Module on XY plan (m/s) 0.0

Elevation Angle (RAD) -0.05286

Windage Angle (RAD) 0.0003

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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Latitude (° N/S) : 46.37 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

=====

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) -3.529
 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) : -3.529 (cm) : -352.9
 Calculated Z shift due to Wind Drift (m) : -3.53 (cm) : -352.9
 Calculated Z Angle due to Wind Drift (mRAD) : -3.53
 Time of Flight (s) : 1.974
 Bullet Stability Factor $S_g = 1.77$
 $S_g > 1.5$ Bullet is Stable

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

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) : 352.463
 Calculated impact Y position corrected for Non Horizontal Angle No Coriolis (m) : -15.185 (cm) : -1518.549
 Calculated impact Y position corrected for Non Horizontal Angle With Coriolis (m) : -15.185 (cm) : -1518.549
 Calculated Z impact position Coriolis H_a ? (m) : 0.0
 Calculated Z impact position H_a and Coriolis (m) : 0.107
 Calculated Y impact Angle No H_a and No Coriolis (mRAD) : 0.0
 Calculated Y impact Angle No H_a and Coriolis (mRAD) : 0.0
 Calculated Y impact Angle H_a and No Coriolis (mRAD) : -15.72
 Calculated Y impact Angle H_a and Coriolis (mRAD) : -15.72
 Elevation to be applied due to gravity drag, No H_a and No Coriolis (clicks) : -0.0
 Elevation to be applied due to gravity drag No H_a and Coriolis (clicks) : -0.0
 Elevation to be applied due to gravity drag H_a and No Coriolis (clicks) : 157.2
 Elevation to be applied due to gravity drag H_a and Coriolis (clicks) : 157.2
 Spin Drift including zero correction (m) : 0.304 (cm): 30.39
 Windage correction due to Spin Drift (clicks) : -3.0
 Aerodynamic Jump (m) : 0.132 (cm) 13.25
 Elevation correction due to Aerodynamic Jump (clicks) : -1.32

===== 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) +=>Right ==>Left: -3.0

=====

=====

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) : 157.2

Calculated shift along Y axis due to Aerodynamic Jump (m) : 0.132 (cm) : 13.25

Calculated Angle along Y axis due to Aerodynamic Jump (mRAD) : 0.13

Calculated Correction due to Aerodynamic Jump (click) : -1.3

Elevation to be applied due to due to Target Distance (gravity, drag), Range Wind, Horizontal Angle, Coriolis and Aerodynamic Jump (clicks) : 155.9

Calculated Z shift due to Coriolis (m) : 0.11724 (cm) : 11.72

Windage to be applied due to due to Coriolis (clicks) : -1.2

Calculated Z shift due to Spin Drift including zero correction (m) : 0.30387 (cm) : 30.39

Windage to be applied due to due to Spin Drift (clicks) : -3.0

Calculated Z shift due to Cross Wind (m) : -3.52904 (cm) : -352.9

Calculated Z Angle due to Cross Wind (mRAD) : -3.53

Windage to be applied due to due to Cross Wind (clicks) : 35.3

Windage to be applied due to due to Spin Drift and Cross Wind (clicks) : 31.1

Impedance multiplicator 1.0

At Muzzle Speed

Ballistic Coefficient G1 ICA0 0.533 Ballistic Coefficient G1 Current Atm 0.533

Ballistic Coefficient G7 ICA0 0.268 Ballistic Coefficient G7 Current Atm 0.268

=====

Calculation of the maximum value for Y along the trajectory

=====

PRS_Solver : shoot with Horizontal Angle (deg) : 15.0

PRS_Solver : Solving Balistic for corrected distance (m) : 965.93

Max Z (m): 8.6826 for distance (m) : 756.941 at time (s) : 1.334

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

Elevation to be applied (clicks) +=>Up ==>Down: 155.9

Windage to be applied (clicks) +=>Right ==>Left: 31.1

=====

Do some cleaning

```
cd /Users/figueras/Desktop/Private/tmp
```

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

```
rm -rf /Users/figueras/Desktop/Private/tmp/PBSv126
```