



Topography and Geodesy Module

Calculation of Total Stations Observations

The surveying module allows the importing of files from total stations and the most usual data collectors on the market and also manual data entry. Based on this information, the program provides all the tools required for the processing, calculation and drawing of stations and topographic points. Stations calculation can be carried out by radiation procedures, inverse bisection, resection, direct intersection and levelling.

The program compensates the mean distances and slopes in the calculation of points and stations. Optionally, corrections may be considered by refraction and sphericity, reduction to ellipsoid and combined scale factor.

It also includes the automatic correction of disorientations of mutual observations and instrument angular errors in directinverse circle observations. Finally, for these calculations to be more precise, a table is included with the precisions and characteristics of the most usual instruments.



Traverses and Networks

MDT includes the compensation of networks and traverses (closed, open and tied to one or more fixed points) by Least Squares, proportional to the distances, coordinates' increases, Crandall rule or rotation and dilation.

The program allows the configuration of admissible errors and for calculation methods which use Least Squares, the tests can be activated which assess the reliability of the observations and of the adjustment made.

| Traverse Compensation | \times |
|--|----------|
| | |
| Method of Calculation Fit Options Closure | |
| Least Squares O Planimetric L: 418.694 | |
| eD: 0.310* | |
| O Proportional Distance eH: 1/1351* | |
| Proportional Increments OProportional Increments | |
| eX: -0.162 | |
| Rotation and Homothety Fix compensated stations Fix 0.022* | |
| Crandall Angular Error Share-Out eA: -0.1600 | |
| | |
| Compensate Print Restore | |
| Station HC X Coord. Y Coord. Z Coord. Vx Vy Vz | |
| 1 0.0000 1000.000 1000.000 | |
| 8 142.7063 962.782 1056.835 97.740 -0.022 -0.018 -0.007 | |
| 11 136.3686 896.368 1099.487 94.348 -0.041 -0.060 0.000 12 230.9729 909.651 1124.627 96.158 -0.048 -0.073 0.001 | |
| 13 230.5649 927.373 1158.692 97.743 -0.045 -0.103 0.018 | |
| 6 207.8095 1011.829 1095.461 102.279 -0.154 -0.251 0.001 | |
| Tart (hi): Passad | |
| Stations | |
| Fixed Mobile Error Ellipse | |
| Observations | |
| Distances Azimuths Angles Verticals Obs | |
| Original OAdjusted | |
| | |
| OK Cancel Help | |

O Geodesy

MDT 9's coordinate system transformation engine uses the powerful PROJ library, which transforms geospatial coordinates from one CRS to another. In practice, this allows the use of more than 8,000 reference systems used throughout the planet, including the most recent ones.

| CRS | - | - 0 | × |
|----------------------|--|-----|---|
| | EPSG ~ | | |
| Туре | Projected ~ | | |
| Search By | Area V >> | | |
| | Latitude Longitude | | |
| Name | 25830 : ETRS89 / UTM zone 30N | | ~ |
| Area Vertical CRS | 2553011 E TRS89 / UTM zone 30N 25831 : ETRS89 / UTM zone 31N 25832 : ETRS89 / UTM zone 32N 25833 : ETRS89 / UTM zone 33N 25834 : ETRS89 / UTM zone 34N 25835 : ETRS89 / UTM zone 35N 25836 : ETRS89 / UTM zone 37N 25837 : ETRS89 / UTM zone 37N 25834 : ETRS89 / TM Baltic93 25932 : Malongo 1987 / UTM zone 32S 26191 : Merchich / Nord Maroc 26192 : Merchich / Sahara Nord 26193 : Merchich / Sahara Nord 26195 : Merchich / Sahara Sud 26237 : Massawa / UTM zone 31N 26331 : Minna / UTM zone 31N 26332 : Minna / UTM zone 31N 26332 : Minna / Nigeria West Belt 26392 : Minna / Nigeria East Belt 26393 : Minna / Nigeria East Belt 26692 : M'poraloko / UTM zone 32N 26692 : M'poraloko / UTM zone 32N 26692 : M'poraloko / UTM zone 32N 26701 : NAD27 / UTM zone 1N 26702 : NAD27 / UTM zone 3N 26704 : NAD27 / UTM zone 3N 26705 : NAD27 / UTM zone 5N 26706 : NAD27 / UTM zone 6N 26707 : NAD27 / UTM zone 7N | | I |

These can be projected, geographic 2D, geographic 3D and geocentric. In addition to the EPSG, other authorities such as ESRI and France's IGN have been included. The installation also contains multiple grids and geoids from different countries.

Also, if there are multiple conversion alternatives, the most accurate option is automatically chosen, without the need to manually select the transformation.

The selection of the origin or destination CRS can be made by name, region, code or latitude and longitude.

| RS | | × |
|--------------|--------------------------------|---|
| | EPSG ~ | |
| Туре | Projected ~ | |
| Search By | Area ~ Sweden >> | |
| | Latitude Longitude | |
| Name | 3006 : SWEREF99 TM ~ | - |
| | 40 | |
| Area | Sweden - onshore and offshore. | |
| Vertical CRS | EPSG:9389 - EVRF2019 height ~ | |
| | | |
| | OK Cancel Help | |

Furthermore, this module includes options for converting projected coordinates' files into generic format X, Y, Z and geographic coordinates into KML formats from Google Earth, GPS exchange Format (GPX) and TcpGPS among others.

Finally, another command allows the projection of drawings opened in CAD, applying the transformations to the complete drawing, a list of layers or a selection of objects and being able to decide whether the elevations will be included in the calculations.

The selected transformation applies to all drawing entities (vertices of lines, arcs and polylines, text insertion points and blocks etc.).

It is also endowed with specific options for transforming a flat and projected coordinates' drawing and vice versa.

| Convert Drawing | × |
|--|-----------------|
| Source CRS | |
| ED50 / UTM zone 30N | ·) |
| Target CRS | |
| ETRS89 / UTM zone 30N + EVRF2007 h | eight |
| Element to convert | |
| O All Drawing | |
| O Select Layers | |
| O Select Entities | |
| Ignore elevations | |
| Change layer of non-converted entities | |
| Prefix | _NOT CONVERTED_ |
| ОК | Cancel |

| Projected CRSs Management | - 🗆 X |
|--|---|
| Data Source Sea EPSG ~ Are | rch By ea v Poland > |
| EPSG Projected CRSs (24) - 2176 : ETRS89 / Poland - 2177 : ETRS89 / Poland - 2178 : ETRS89 / Poland - 2178 : ETRS89 / Poland - 2180 : ETRS89 / Poland - 3034 : ETRS89 / Poland - 3034 : ETRS89 - extended - 3329 : Pulkovo 1942(58) / - 3330 : Pulkovo 1942(58) / - 3331 : Pulkovo 1942(58) / - 3332 : Pulkovo 1942(58) / - 3332 : Pulkovo 1942(58) / - 3333 : Pulkovo 1942(58) / - 3333 : Pulkovo 1942(58) / - 3333 : Pulkovo 1942(58) / - 3334 : Pulkovo 1942(58) / - 3335 : Pulkovo 1942(58) / - 335 : P | CS2000 zone 5 CS2000 zone 6 CS2000 zone 7 CS2000 zone 7 CS2000 zone 8 CS92 /LCC Europe 3-degree Gauss-Kruger zone 5 3-degree Gauss-Kruger zone 6 3-degree Gauss-Kruger zone 7 3-degree Gauss-Kruger zone 8 GUGiK-80 Gauss-Kruger zone 3 Gauss-Kruger zone 3 Gauss-Kruger zone 4 Gauss-Kruger zone 4 Gauss-Kruger zone 5 |
| Edit New | Delete Details |
| OK | Cancel Help |

| RS | | CRS |
|--------------------|----|---|
| D50 | | ETRS89 / UTM zone 30N + EVRF2007 height |
| EPSG:4230) | | (EPSG:25830+EPSG:5621) |
| 1 stilled | | Factor |
| 40 * 24 ' 30 " ON | | 479714 615 C Draw |
| Longitude | | Northing |
| 3 14 16 CE | <- | 4472975.998 |
| Ellipsoidal Height | | Orthometric Height |
| 100 | | 100.000 |
| | | Scale Factor 0.999605065 |
| | | Convergence -0° 9' 17.8935" |
| | | |

Local Coordinate Systems

This module also has options for local coordinate systems application and management with the following methods being available:

- 2D: XY Translations, Helmert 4 parameters, Similar and Projective.
- 3D: XY Translations and Helmert 7 parameters.
- 2D+1D: Helmert 4 parameters + Z Displacement and Helmert 4 parameters + Z Displacement and Slopes at XY.

To create a local coordinate system there are various possibilities: enter the value of the transformation parameters directly (rotations, translations etc.), establish the pairs of source and target points involved or by importing a predefined file. The program generates a detailed report in which the parameters calculated, various statistics and the coordinates of the checkpoints involved are provided.

Once the local system has been created, recording can be carried out to subsequently carry out transformations of drawings and files of coordinates and it may also be used in the TcpGPS application for mobile devices.

| | _ | | | | | | | | | | - |
|-----------------|--|--------------------------------------|----------------------|-----------------------------|-------------|----------------------------------|-------------------|----------------------------------|-------------------|-----------|-----------|
| | | New. | | Ope | Open | | Save As | | Print HTML Report | | |
| Control Po | Used | Control | XSource | YSource | Z Source | X Target | Y Target | Z Target | XResidual | YResidual | ZResidual |
| 1 | Yes | 3D | 1094.883 | 820.085 | 109.821 | 10037.810 | 5262.090 | 772.040 | 0.048 | 0.025 | -0.001 |
| 2 | Yes | 3D | 503.891 | 1598.698 | 117.685 | 10956.680 | 5128.170 | 783.000 | 0.008 | -0.056 | 0.011 |
| 3 | Yes | 3D | 2349.343 | 207.658 | 151.387 | 8780.080 | 4840.290 | 782.620 | -0.014 | -0.054 | 0.009 |
| 4 | Yes | 3D | 1395.320 | 1348.853 | 215.261 | 10185.800 | 4700.210 | 851.320 | -0.042 | 0.085 | -0.019 |
| | | | Points | | | Delete | Import Point | Files | Toract | | |
| MSE 3D 0.068 | MSE H 0.067 | MSE \ 0.012 | / Max X F 0.048 (| Residual Control Point 1 | Max 0.08 | Y Residual 5 Control Point 4 | Ma 4 0.0 | ax Z Residual 119 Control Poi | int 4 | | |
| | | Para | meters | | | | | | | | |
| | TX 10233.826 ± 0.067 | | | | RY | (*'') | -0"33'2.97298' | ± 0'0'8.74588'' | | | |
| | TY 6549.968 ± 0.068 TZ 720.879 ± 0.229 | | 0.068 | RZ (* ' '') | | -135°27'46.44379" ± 0°0'7.77431" | | | | | |
| | | | 229 | Sc | Scale 0 | | 0.94996 ± 0.00004 | | | | |
| | | RX (' ' '') 2'17'2.74309'' ± 0'0'30. | | 9" ± 0°0'30.333 | 23'' - | | | | | | |
| | | | | | | - | | | | | |
| | | | | | | | | | | | |

Requirements (1)

| CAD | AutoCAD [®] versions 2007 to 2024 and compatible versions | | | | |
|------------------|--|--|--|--|--|
| | BricsCAD [®] Pro/Platinum versions 16 to 23 | | | | |
| | GstarCAD* Professional versions 2021 to 2023 | | | | |
| | ZWCAD* Professional/Enterprise versions 2012+ to 2024 | | | | |
| Operating System | Windows 8 / 10 / 11 in x64 architecture (2) | | | | |
| Peripherals | Mouse or pointing device | | | | |
| Graphic Card | CD-ROM Reader | | | | |
| | 1280x720 pixels, compatible with OpenGL 3.3 or better | | | | |
| | Nvidia or ATI chipset recommended | | | | |
| Drive | 10 Gb free space | | | | |
| Memory | Minimum 4 Gb | | | | |

(1) Consult the website for further details

(2) Operation via a remote desktop and similar services are not guaranteed, nor on virtualization platforms. Write to soporte@aplitop.com to ask about these special cases. AutoCAD* is a registered trademark of Autodesk, Inc.

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