



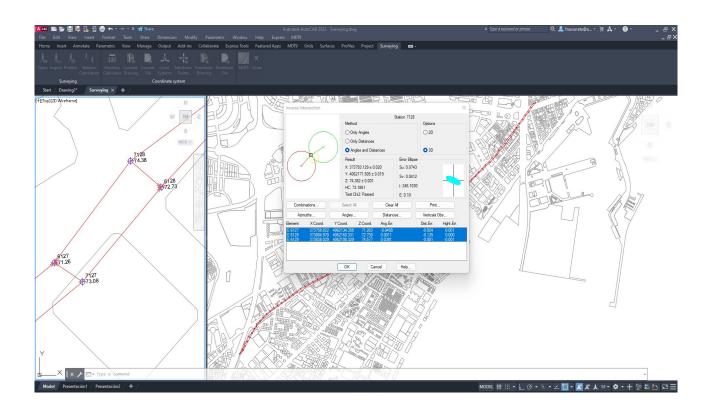
Topography and Geodesy Module

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*						
eH: 1/1351 *						
O Proportional Increments						
eX: -0.162 eY: -0.264						
Rotation and Homothety Fix compensated stations eY: -0.264 eZ: 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						
Test Chi2: Passed						
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.

RS			×
	EPSG ~		
Туре	Projected ~		
Search By	Area V >>		
	Latitude Longitude		
Name	25830 : ETRS89 / UTM zone 30N		~
Area Vertical CRS	25830 : ETRS89 / UTM zone 30N 25831 : ETRS89 / UTM zone 31N 25832 : ETRS89 / UTM zone 33N 25833 : ETRS89 / UTM zone 34N 25835 : ETRS89 / UTM zone 34N 25835 : ETRS89 / UTM zone 34N 25836 : ETRS89 / UTM zone 36N 25837 : ETRS89 / UTM zone 37N 25884 : ETRS89 / UTM zone 37N 25884 : ETRS89 / UTM zone 37N 25884 : ETRS89 / UTM zone 32S 26191 : Merchich / Nord Maroc 26192 : Merchich / Sahara Nord 26193 : 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 Mid Belt 26393 : Minna / Nigeria East Belt 26393 : Minna / Nigeria East Belt 26692 : M'poraloko / UTM zone 32N 26692 : M'poraloko / UTM zone 32N 26701 : NAD27 / UTM zone 1N 26702 : NAD27 / UTM zone 4N 26703 : NAD27 / UTM zone 4N 26705 : NAD27 / UTM zone 5N 26706 : NAD27 / UTM zone 6N 26707 : NAD27 / UTM zone 7N		-

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	- 0	×
	EPSG ~	
Туре	Projected	
Search By	Area V 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 + EVRF20	07 height	
Element to convert		
O All Drawing		
O Select Layers		
O Select Entities		
Ignore elevations		
Change layer of non-converted er	tities	
Prefix		_NOT CONVERTED_
ОК	Cancel]

Projected CRSs Management	- 🗆 X
Data Source Sea EPSG ~ Are	rch By ea v Poland >
- 5672 : Pulkovo 1942(58) / - 3330 : Pulkovo 1942(58) / - 3331 : Pulkovo 1942(58) / - 3332 : Pulkovo 1942(58) / - 3328 : Pulkovo 1942(58) / - 3333 : Pulkovo 1942(58) /	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 7 3-degree Gauss-Kruger zone 8 GUGiK-80 Gauss-Kruger zone 3 Gauss-Kruger zone 3 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)
1.0.6			5.6
Latitude 40 * 24 ' 30 " ON		\rightarrow	Easting 479714.615 < Draw
Longitude			Northing
3 14 16 OE		<	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.

Helmert (7-para	meter sin	nilarity tran	nsformation) (3	D) - D:\3DHelme	ert.ntr						
		New.		Oper	Open		Save As		Print HTML Report		
Control Po	Used	Control	X Source	Y Source	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
	MSE H 0.067	MSE \		Edi	Max	Delete Y Residual Control Point 4			Target		
			ameters								
		TV		10000 000	0.007		· (° ' '')	-012212 07209	' ± 0'0'8.74588''		
	TX 10233.826 ± 0.067 RY		()								
	TY 6549.968 ± 0.068		RZ	(" ' ")	-135°27'46.44379'' ± 0°0'7.77431''		31"				
		ΤZ	0	720.879 ± 0.	229	Sc	Scale		0.94996 ± 0.00004		
		RX	((°'')	2°17'2.74309	9" ± 0°0'30.3332						
		<u></u>			ОК	Cancel		Help			

Requirements (1)

CAD	AutoCAD [*] versions 2007 to 2025 and compatible versions					
	BricsCAD [®] BIM/Pro/Ultimate versions 16 to 24					
	GstarCAD® Professional versions 2021 to 2024					
	ZWCAD* Professional versions 2012+ to 2025					
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.

 $\textit{BricsCAD}^{\circ}$ is a registered trademark of Bricsys NV.

 $\textit{GStarCAD}^{*} \textit{ is a registered trademark of Gstarsoft Co., Ltd.}$

ZWCAD^{*} is a registered trademark of ZWSOFT CO., Ltd.

APLITOP S.L.

Sumatra,9 – Urb. El Atabal E-29190 Málaga (España) Tlf: +34 95 2439771 e-mail: info@aplitop.com Web: www.aplitop.com

aplitop