Topocad portfolio

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What is Topocad?

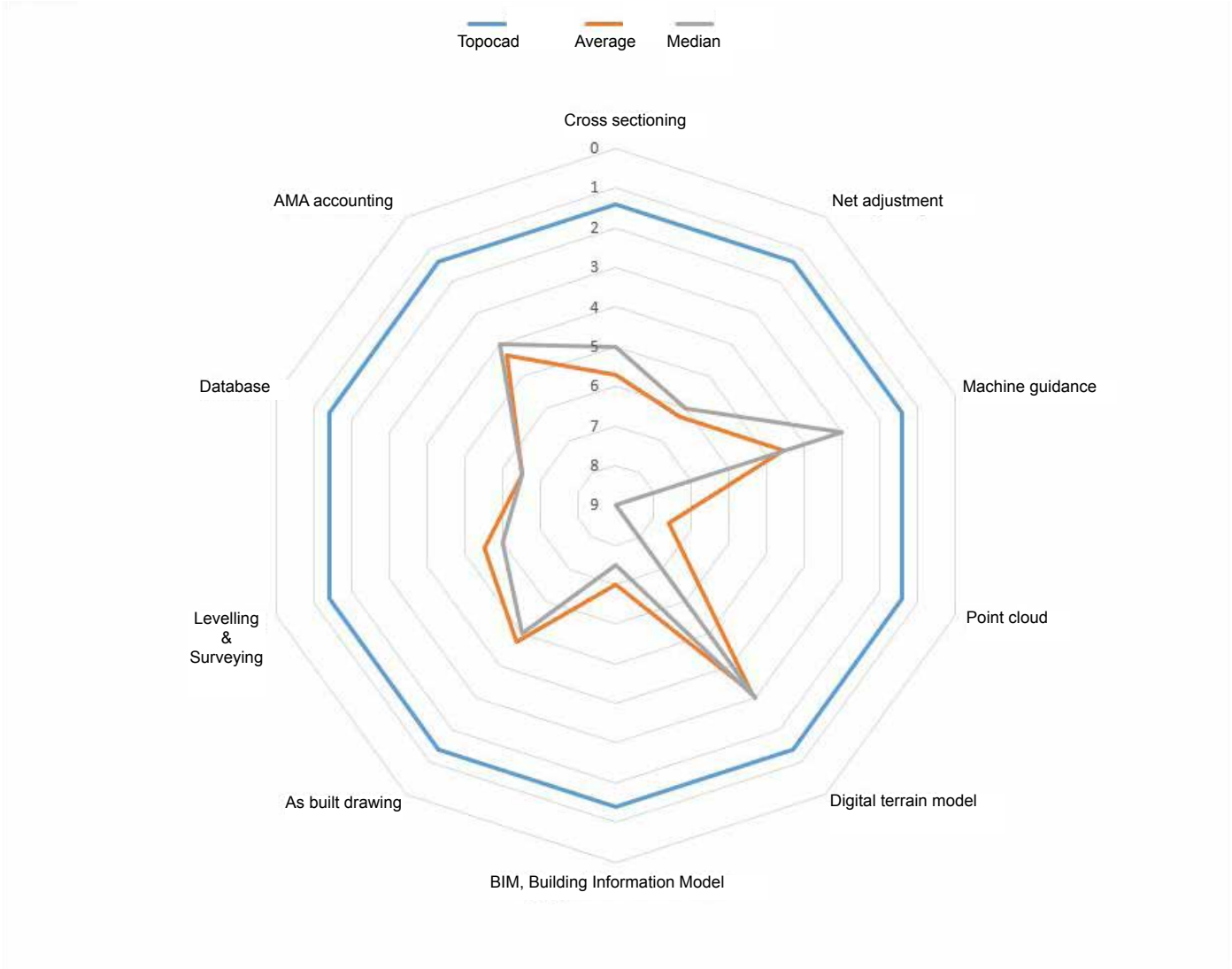
Topocad is easy to use and provides a powerful CAD system for all requirements when it comes to technical survey calculations integrated with data import, CAD, net adjustment , civil planning, engineering, point cloud and machine control data.

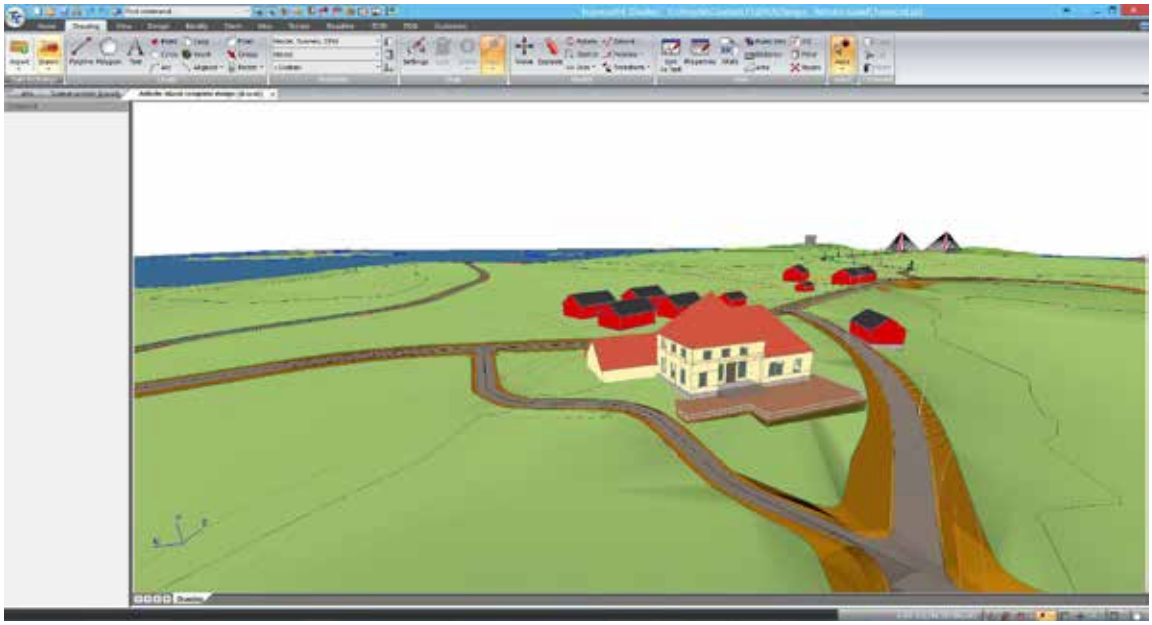
A modern product which, since its inception in 1994, has reached more than 23 000 users around the world, it is installed in over 100 countries and translated into 17 languages.

All working areas are important

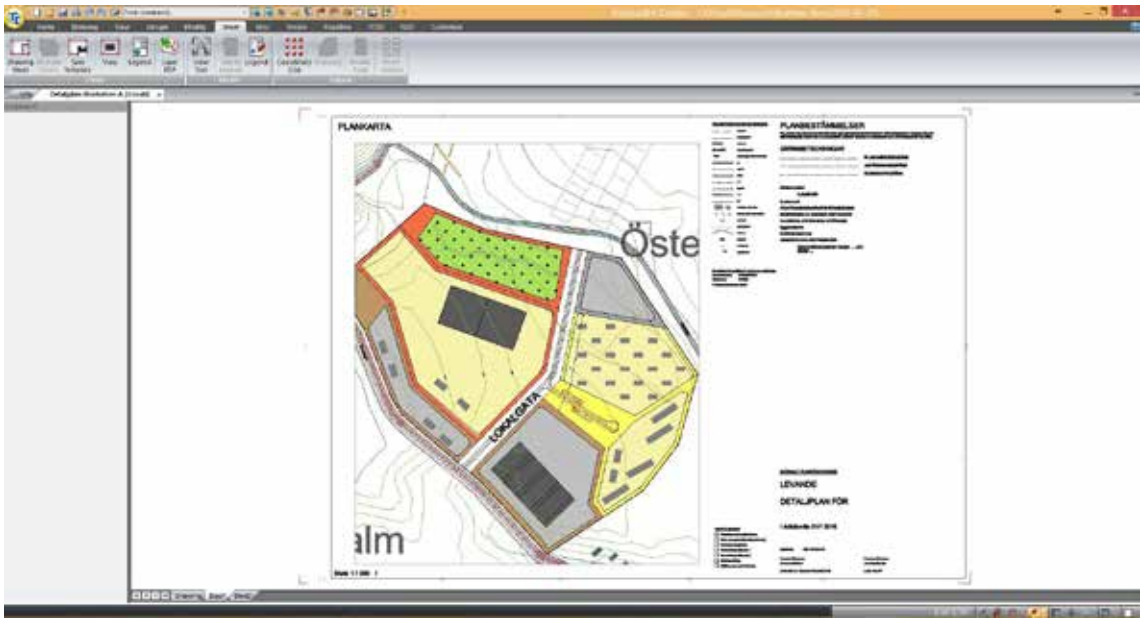
In a survey we asked engineers about their most important words and areas - and we had many interesting answers. The peaks were digital terrain models, machine guidance and accounting, but also sectioning and as built drawings were common.

Topocad is available in all these areas. **In this portfolio, we describe how.**

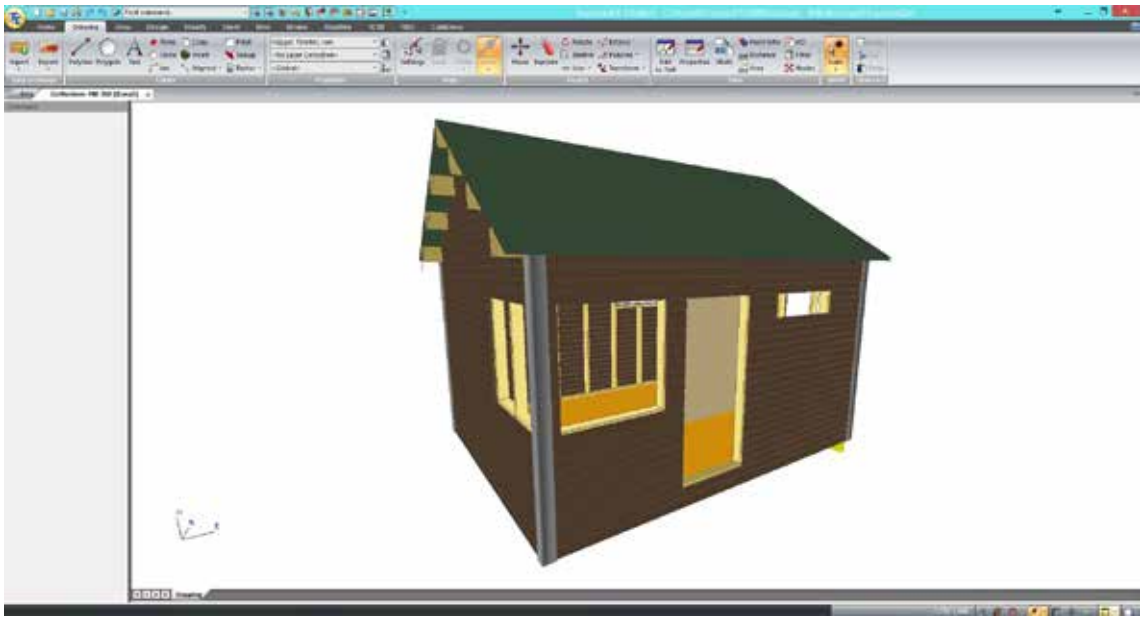




Digital terrain model in Topocad Base module. The drawing file contains a lot of different kind of data. Among them, DTM.

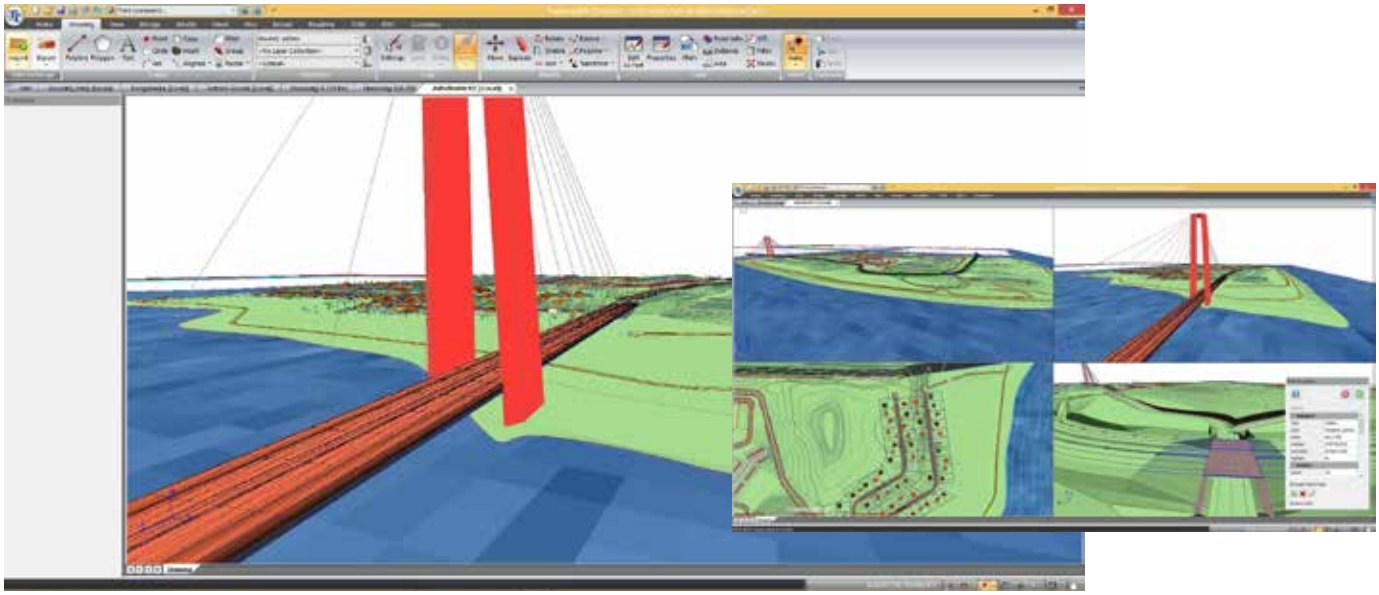


Print & Plot in Topocad Base module. With help of templates it is easy to create your own drawing sheets.



3D CAD in Topocad Base module. Full support of 3D in Topocad.

Base module - 3D CAD



Topocad is easy to use and provides a powerful CAD system for all requirements when it comes to technical survey calculations integrated with data import, CAD, net adjustment , civil planning, engineering, point cloud and machine control data . A modern product which, since its inception in 1994, has reached more than 23 000 users around the world, it is installed in over 100 countries and translated into 17 languages.

Survey data, levelling and GNSS

Topocad is a powerful 64 bit system with a drawing file format (TOPX) that blends all types of data: vectors, rasters, TIN's, point clouds and also BIM objects.

Topocad reads data from total stations, GNSS instruments, levelling instruments and calculates its data into the drawing. With code table functions, the result can be sorted into layers with colours and the objects get line types and symbols.

With the use of control codes, different geometries can be created directly from the field, with no editing in the drawing necessary. Attributes are handled from the field via the drawing to the database. Default values of attributes and codes can easily be specified in the field or edited directly in the survey data or drawing. The attributes value can also control the appearance of objects in the drawing.

3D CAD

Topocad's three dimensional editing is extremely powerful. All data is held as three dimensional points or lines. There are many CAD commands to create data: draw polylines, points, arcs, circles, polygons, write text, dividing surfaces, create slope hatching, copy, mirror, group objects, split into lines and calculate mean points, just to mention a few.

Special commands are available for creating pile protocol and pile bottom. There is also a very powerful dimension function. The software can work with raster images; add and geo-reference them within a drawing. Topocad also reads JPEG, TIFF, ECW, CALS , MrSID, PNG and bitmap formats. A large number of commands are used to edit objects: move, trim, explode, rotate, edit polyline, edit properties, stretch, join, extend. In addition, three different types of transformation are built-in.

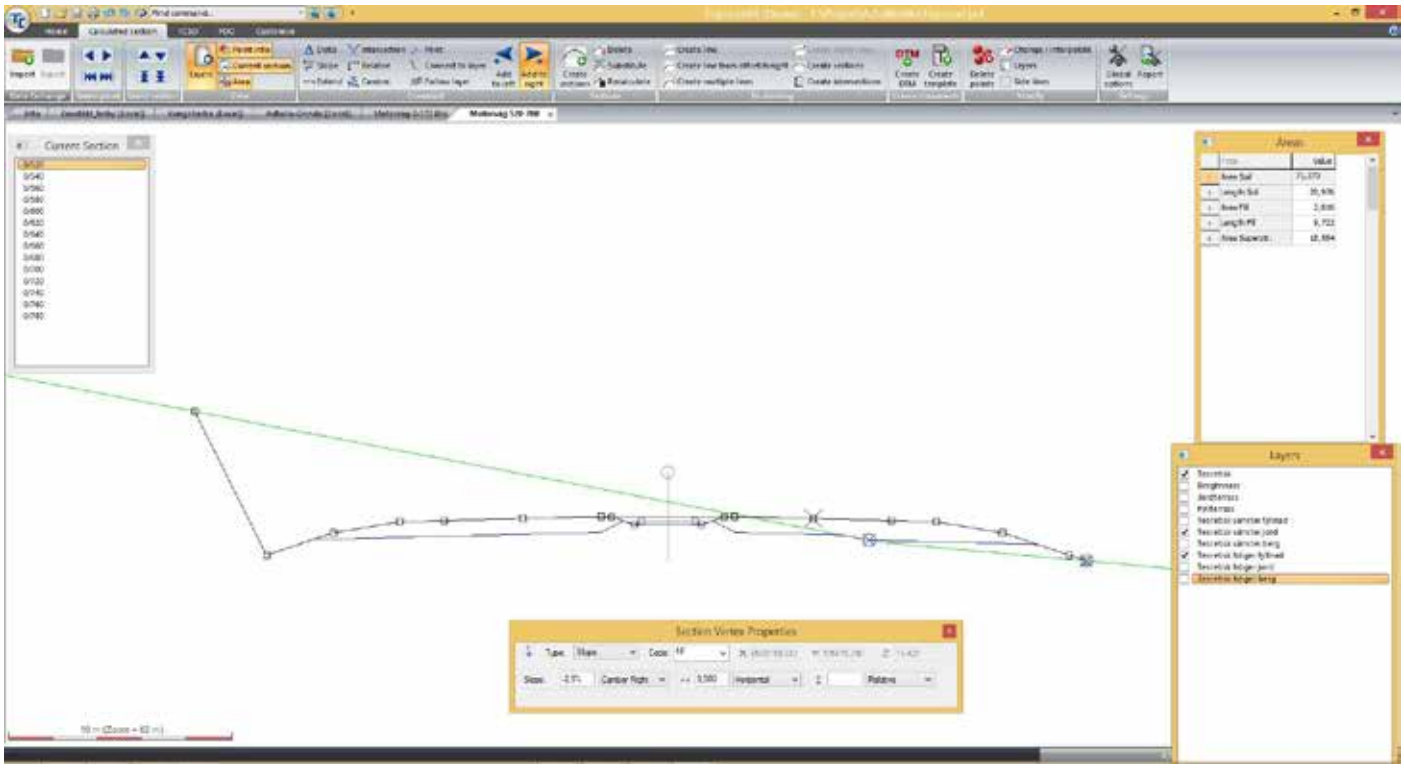
Drawing management

Topocad drawing management is effective. Drawing templates and their views are placed on the area/areas you want to print. Built-in functions are included to create legend, coordinate cross and north arrows.
The Bas module includes a macro module where it is possible to create custom commands and to automatically draw objects in predefined layers, colors, symbols, lines. In the Base module there is also a point database connection and ability to use drawing sheets.
A built-in DTM creates a digital terrain model and draws level curves quickly. Stake out is done directly from Topocad to the instrument.

Import and export formats are numerous; DWG, DXF, PXY, LandXML, coordinate files, DGN, Shape and many more. All file types can be imported can also be used as external references. These can both have a moving, scaling, or even a transformation calculation online.
Topocad is a geodetic calculation systems with a powerful built-in CAD system that is easy to use. It is modular and the base unit can be supplemented with a large number of additional modules for volume calculations, Section rings, nätutjämningsberäkning and databasadapters.

- 3D CAD
- Communication to instruments and field computers
- Calculation of survey data
- Management of code tables, symbols, line types and attributes
- Transformation
- Digital Terrain Modeling
- Creation of level curves
- Reads and writes drawing formats DXF, DWG and DGN
- Reads and writes GIS formats Shape and Mif
- Complete print management
- Macro Commands

Road Design



Design your roads, sewer, pipes and other excavations work in Topocad Road design modules. Topocad Road design uses three different modules with the help of a fourth, the Point cloud.

Topocad Volume model

Calculate your excavation volumes fast and smooth using Topocad Volume model. Topocad Volume module has three types of calculations:

Automatic slopes

This calculation reports the volumes from one or two terrain models and the excavation ground in the shape of one or more closed polylines. Create a terrain model for soil and/or rock. Submit the excavation grounds that shall be used for the calculation. The procedure is very simple and results in a report containing all the surface areas and volumes for soil excavation, rock excavation and fill.

Two models

The two models calculation will result in a volume from two terrain models, no matter how they look. It is also possible to calculate the volume from one terrain model and a pre-set level. The command is quick and besides a detailed report you can also view the result as different level curves or as thermal colored level curves and areas.

Sections

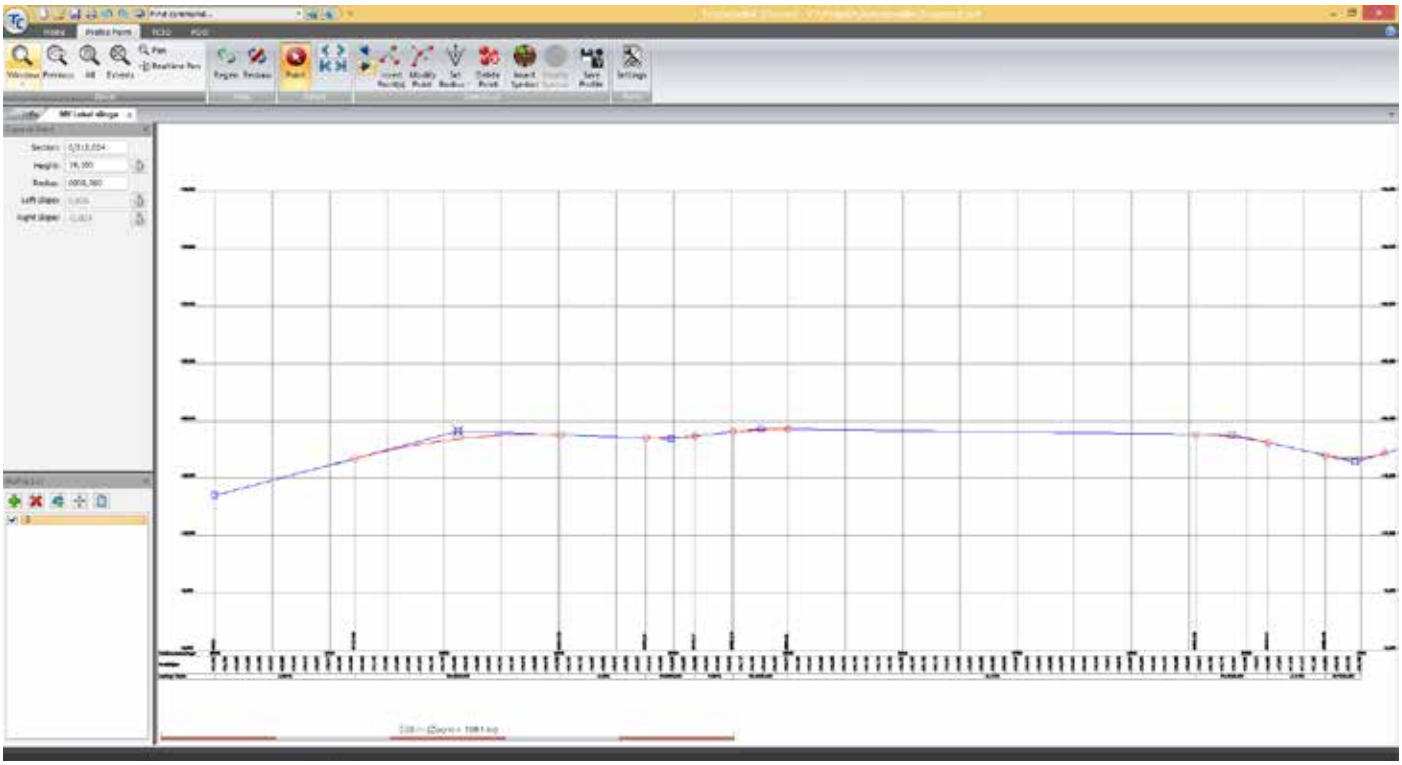
If you have two terrain models this calculation will result in calculated sections from the two terrain models and also the calculated volume between the two. The result is reported as sections.
If you have the Point cloud module, you can use it for calculating sections as well as for calculating the volume difference between two terrain models.

Topocad Volume sections

Topocad Volume section combines section templates with terrain models, point clouds, road lines, profiles and camber diagrams in order to create several different calculated sections and volumes.

The Topocad section template is intelligent and can create any section template from road to railroad or sewer. The section templates are created with different vectors, fixed dimensions, slopes, fillet, intersections, relative dimensions and connections to models and layers. Dynamic cross section templates are created to follow different sidelines or profiles and different offset measurements.

The cross section templates can apply an unrestricted amount of input layers. Both when it comes to internal layers such as top soil layers, carrying layers, amplification layers but also when it comes to numerous terrain models. It is possible to calculate cross sections using ground, mud, amplifications, rock or for example existing roads. Editing one or many sections can be done simultaneously, with or without interpolation, and volumes are calculated instantly. It is also possible to calculate sections using point clouds. You can easily change the input components, for example when switching or updating a terrain model, road line, profile or section you immediately get an updated section.



The sections can be exported to LandXML for machine control in Novatron, Topcon, Trimble or to MBS for machine control in Georog. They can also be exported to terrain models or as sections and polylines in a drawing. You can import calculated sections from LandXML format furthermore you can create a section template from that imported calculated section.

Both the calculated sections and terrain models created from sections can be used as reference in a 3D drawing in Topocad for instant preview of how the calculated sections will turn out. Topocad Volume Section is a simple and smooth tool for creating calculated sections and volumes for roads, railroads and sewers. In Topocad you have all you need to configure the calculation and update the volumes. Topocad also support both numerous machine control formats and import designs from other software and systems. Cross sections and terrain models can easily be used directly in The Guider machine system.

Topocad Geometry

The geometry format of Topocad is a compilation format for the different types of longitudinal geometries in Topocad. Road line (horizontal line), road profile (vertical line), camber, cant and length table represent the longitudinal geometry for a roadway or an elevated railroad. Import is possible from several formats such as LandXML, Geo-files LIN and PRF, Geosecma roadline (281) and cant (286), Novapoints format TIT and NYL together with general import from ASCIIfiles, for example Excel.

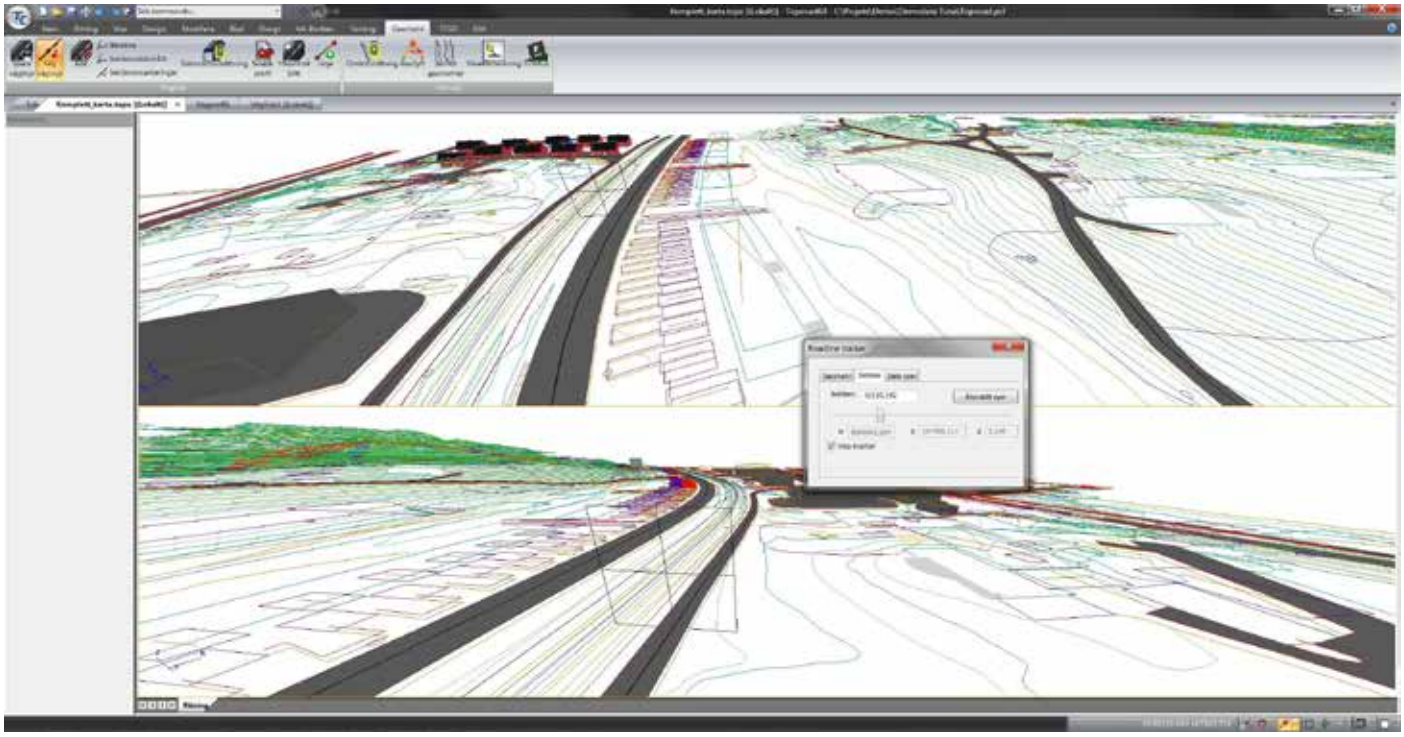
The Topocad profile form is also included in the module, where you can create profiles and illustrate different types of data. In the profile form you can create and illustrate profile lines, section markers, terrain profiles, profile heights, terrain profile heights, differences between different profiles, both distance and graphical display. You can also create camber information and profile key points.

In the Topocad Geometry module there are several different functions for calculations using horizontal and vertical geometries. The calculation of a section and an offset - or from a section and offset to coordinates or a surface control function - all use the geometry format or independent road and profile lines.

With Topocad Road design modules you can do any design, mass calculation and geometry calculations that is. Now also with the tunnel module implemented!

- Topocad Road Design modules: Volume model, Volume sections, Geometry and Point cloud.
- Calculate all kind of earthworks
- Use point cloud to create contours, calculate volumes, create profiles and cross sections
- Now also tunnel design
- Export to LandXML for machine control in Novatron, Topcon, Trimble or to MBS for machine control in Georog
- Use it for Topocad machine guidance together with The Guider system

Geometries



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The geometry format, TGF, contains a three dimensional preview where desired width is specified to reflect the design of the road or the line. The TGF-file can also be referred to a drawing in Topocad.

The Topocad profile form is also included in the module, where you can create profiles and illustrate different types of data. In the profile form you can create and illustrate profile lines, section markers, terrain profiles, profile heights, terrain profile heights, differences between different profiles, both distance and graphical display. You can also create camber information and profile key points.

The components can be used any number of times which makes it possible to view information from several profiles in the same form. Both lines and profiles can be adjusted according to different methods and there is a built-in transformation calculation (Gtrans) with associated control and adjustment of the road line. A road line can also be created and adjusted graphically in Topocads road line editor.

In the Topocad Geometry module there are several different functions for calculations using a horizontal and a vertical geometry. The calculation of a section and an offset - or from a section and offset to coordinates or a surface control function - all use the geometry format or independent road and profile lines.

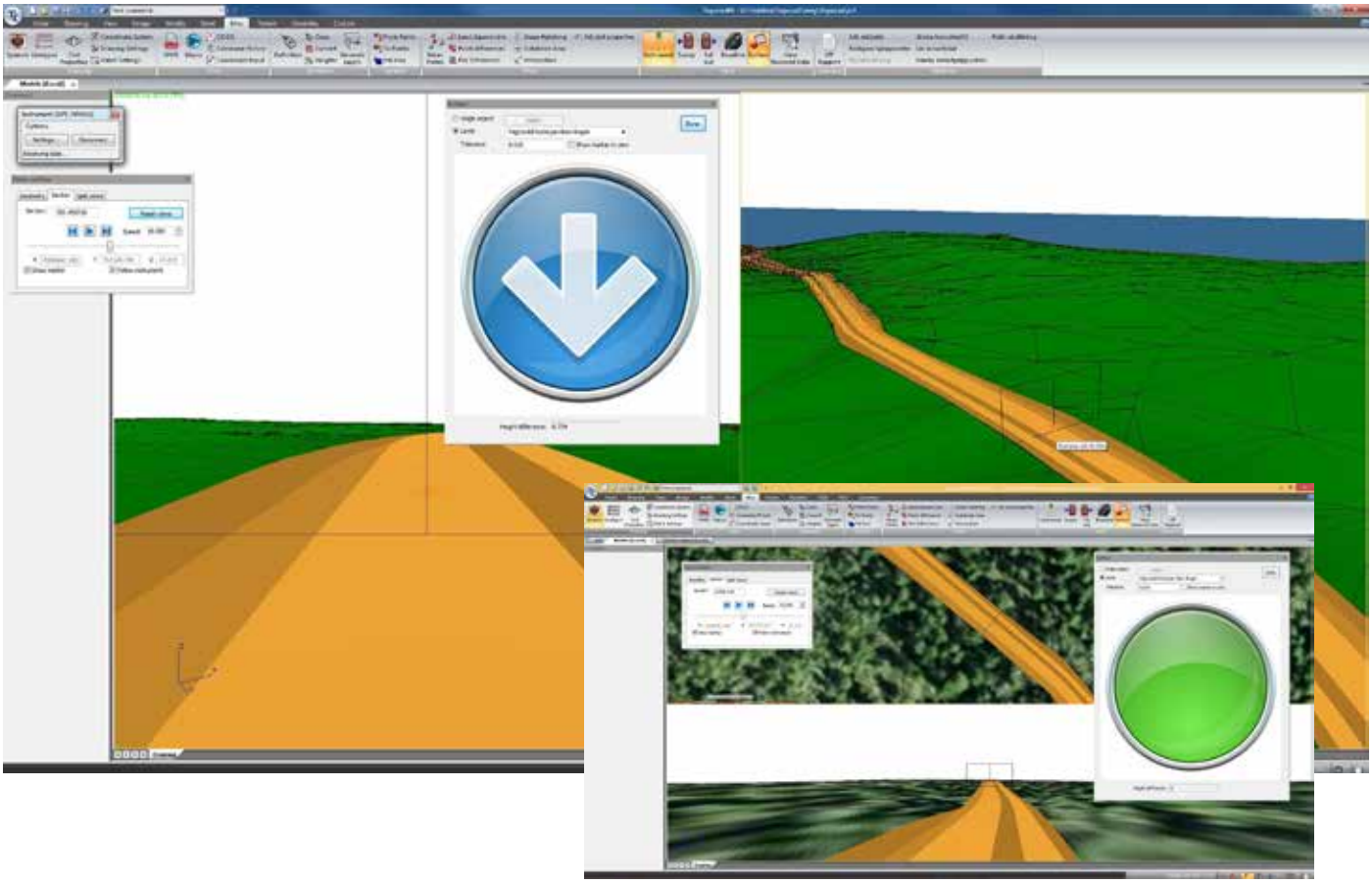
The module also contains a function for creating a quick terrain profile and a function for generating a three dimensional polyline from a geometry line in the drawing.

The Topocad Geometry module contains rail road specifics such as cant, length table and the special calculation functions that exist for rail roads. For example overlap measurements, slew and lift protocols from data in the drawing as well as directly from survey data with export to the slew and lift format ALC. There is an implemented calculation for space from the rail. It is also possible to extract kilometers from a geometry with a length table for easier stake out.

Topocad Geometry module help you with all longitudinal geometries such as roads, profiles, camber, length tables and rail road.

- Road lines
- Profiles
- Skews
- Cambers
- Offset calculations
- Length tables
- Profile forms
- Road line editing
- Road line geometry
- Areas between selected profiles and terrain profiles
- Corridor from the road line in plan
- Corridor from the road profile in height

Field & Machine Guidance



Adtollo supports machine guidance through the Topocad Field module, which is included in the Topocad Base package. With Topocad guidance, we read the position of the instruments, GPS or calculated positions for the bucket and display the bucket position along with your terrain model or calculated sections.

There are functions to show the bucket, backhoe mode, in 2D and 3D, and it is possible to get the view along the road or along with the machine. A dialog shows the distance from the estimated terrain model and scoop. The dialog is made to appear more evident for the excavator operator.

The advantage of using Topocad as machine guidance system is that you can use the same software all the way from the survey, to the project planning, and to the machine guidance.

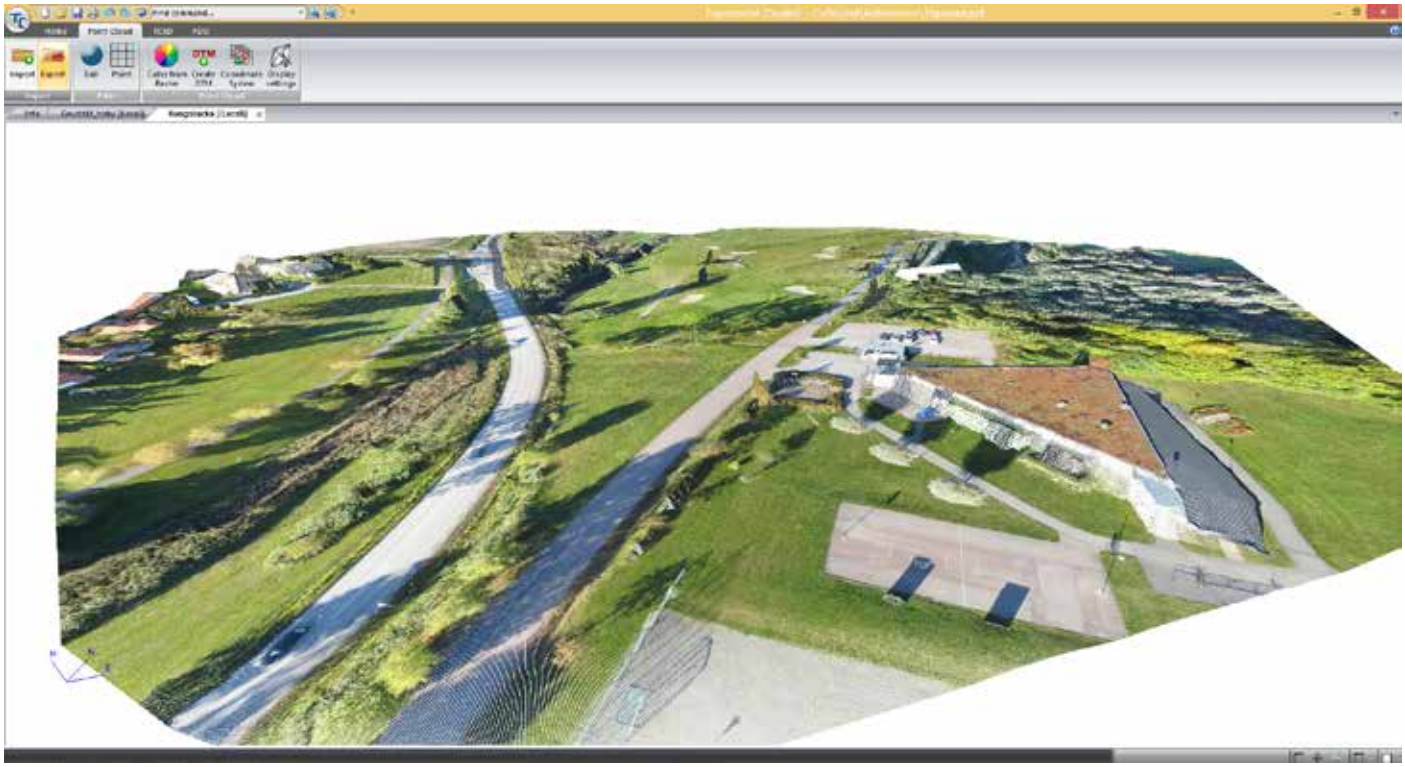
This system is made for the machine guidance system from The Guider.

Machine Guidance and other systems

Topocad handles a large amount of formats and can deliver data to any other machine guidance systems. By producing a terrain model or calculated sections in Topocad, you can then export it to either LandXML handled by most brands as Trimble, Topcon, Novatron, DigPilot or Georog system where we can deliver finished MBS's, terrain models (TRM) and geometries in the form of LIN and PRF.

- Machine guidance is included in Topocad Base package
- Funtions to show the scoop, backhole mode, in 2D and 3D
- Use the same software all the way, from survey, to project planning, to machine guidance
- Deliver data to Topcon, Trimble, GeoROG / Scanlaser, DigPilot and Novatron

Point Cloud Processing



In Topocad Point cloud, the editing is easy; use the filter function or delete parts manually. Set colour to the point cloud from an orthophoto or drape it with a raster image. Use colour for elevation at different height scales and colour points to alter the angle to see where the slope is steeper or flatter.

A number of file formats, including LAS, NH (ESRI ASCII grid) and generic ASCII files can be imported into the Topocad TPC format. If there is RGBA information, like colour and intensity, you can also read and import this.

There are two ways to filter point clouds in the module. The first way is to “roll the ball” on the bottom (or top) of the point cloud. The points that touch the ball remain. By varying the radius of the ball, more or fewer points can be deleted. The second is to use a grid where the bottom, top or middle point is saved.

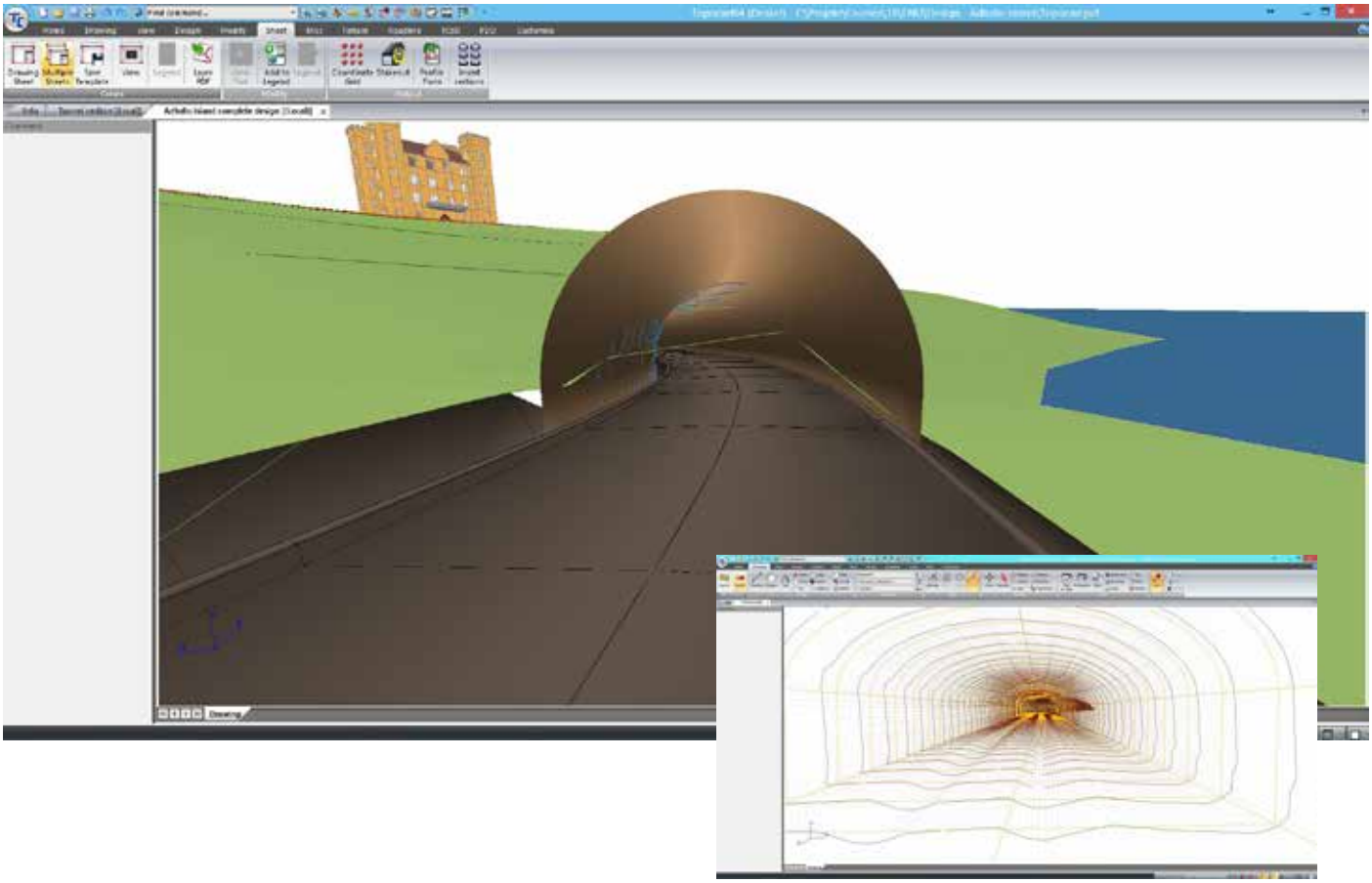
TPC can then be used for a variety of functions. For example, it is possible to create a terrain model from a point cloud, and then use the editing functions in the terrain model. The Point cloud file can also be used directly in all commands that use terrain modelling:

» Creating contours: in the command to create level curves, you can choose a point cloud file.
» Volume calculation between two point clouds.
» Volume calculation between a terrain model and a point cloud.
» Volume calculation between point clouds and a flat surface.
» Obtain elevations from point clouds for objects, coordinate files, the difference between objects and point clouds (Set height to a map).
» Terrain section calculation from point clouds (also in combination with terrain models).
» Volume calculation in sections with one or more point clouds and/or terrain models.
» Create terrain profiles from point clouds.

Point clouds can be referenced and imported to a drawing. Data - vectors, raster, point clouds and DTM’s - can be blended within the same drawing.

- For volume calculations, cross sections, contours and profiles
- Two filter functions to avoid noise in point clouds
- Colour with raster or orthophoto

Tunnel Work



The tunnel features in Topocad include volume calculation, 3D design, work with point clouds and specific calculations for tunnelling.

The Tunnel Works uses the Topocad design modules such as Geometry, Volume by section and Point clouds. Using an alignment with road line, road profile and eventual camber it is easy to calculate tunnel and volumes thru terrain models and point clouds in tunnels.

The tunnel section uses straight lines, radius and/or ellipses to describe the tunnel and it is possible to use any kind of theoretic tunnel, also with widening of tunnel or increasing of tunnel roof height. Point clouds from all kinds of scanners are possible to use and compare towards your tunnel and even the designed tunnel can be displayed in 3D.

All data is naturally 3D and there are many different ways to display the tunnel and comparisons between design and surveyed tunnel.

Cross sections

Cross sections uses section templates, road lines (horizontal alignment), road profiles (vertical alignment) and one or many point clouds or even terrain models. It is fully possible to use different point clouds for different scans and it possible to calculate both the tunnel/mine with or without the road section at the same time.

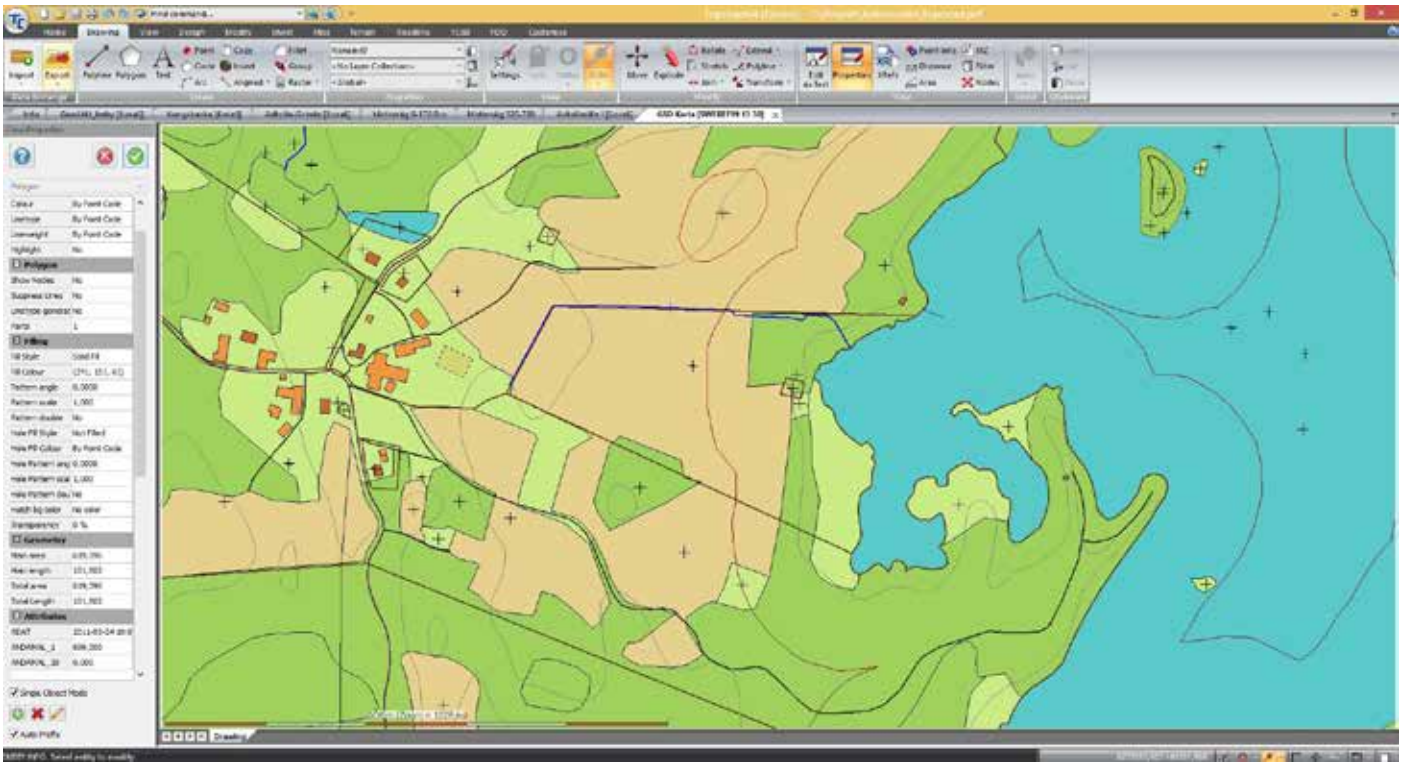
Tunnel sections can use straight lines, arcs and ellipses and it can connect to side lines such as ramps for automatic widening or lift of the tunnel. The tunnel section can also tilt sideways depending on the skew or cross slope of the tunnel section.

Volume calculations can be made in many ways. By creating a line or area in the theoretic section it is possible to calculate areas and volumes in any direction from this line towards any other surface in the tunnel. With the Area setup command it is possible to decide any type of area that you want to calculate the volume of.

There are also commands for creating lines from horizontal and vertical offsets from road line and road profile and there is a calculation for geological profile. The intersections between the design and measured point cloud can be printed out. All data can be imported to a TOP drawing for 3D view together with any type of data such as map, road, railway, etc.

- Tunnel volume calculation
- 3D design
- Point clouds
- Tilted tunnels
- Reports

Mapping - database adapters in Topocad



Communicate with instruments, calculate survey data, edit and update the map, do your large calculations and designing in Topocad, create new construction plans, stake-outs or documentation for building permits. Topocad is a complete CAD-system for surveying, calculation, mapping and design.

Database adapters in Topocad

Select between three database adapters in Topocad: FDO, ArcGIS or ISM. FDO is an Open Source database adapter and Topocad uses this to read and write data to a database. In this case there are plenty of different databases to choose from and several of them are freeware. It gives you a possibility to use a spatial database for storage of huge amount of data – and to have a good control of them. FDO is an Open Source code and many applications are using FDO to read and write data to databases. The connection to the database is easy; the connection is a few rows and for each layer (table in the database) you add colors, symbols, line types and from this you can compose your own maps. Everything is saved in XML files, easy to distribute or point out in a network.

For communication with instruments and calculating survey data

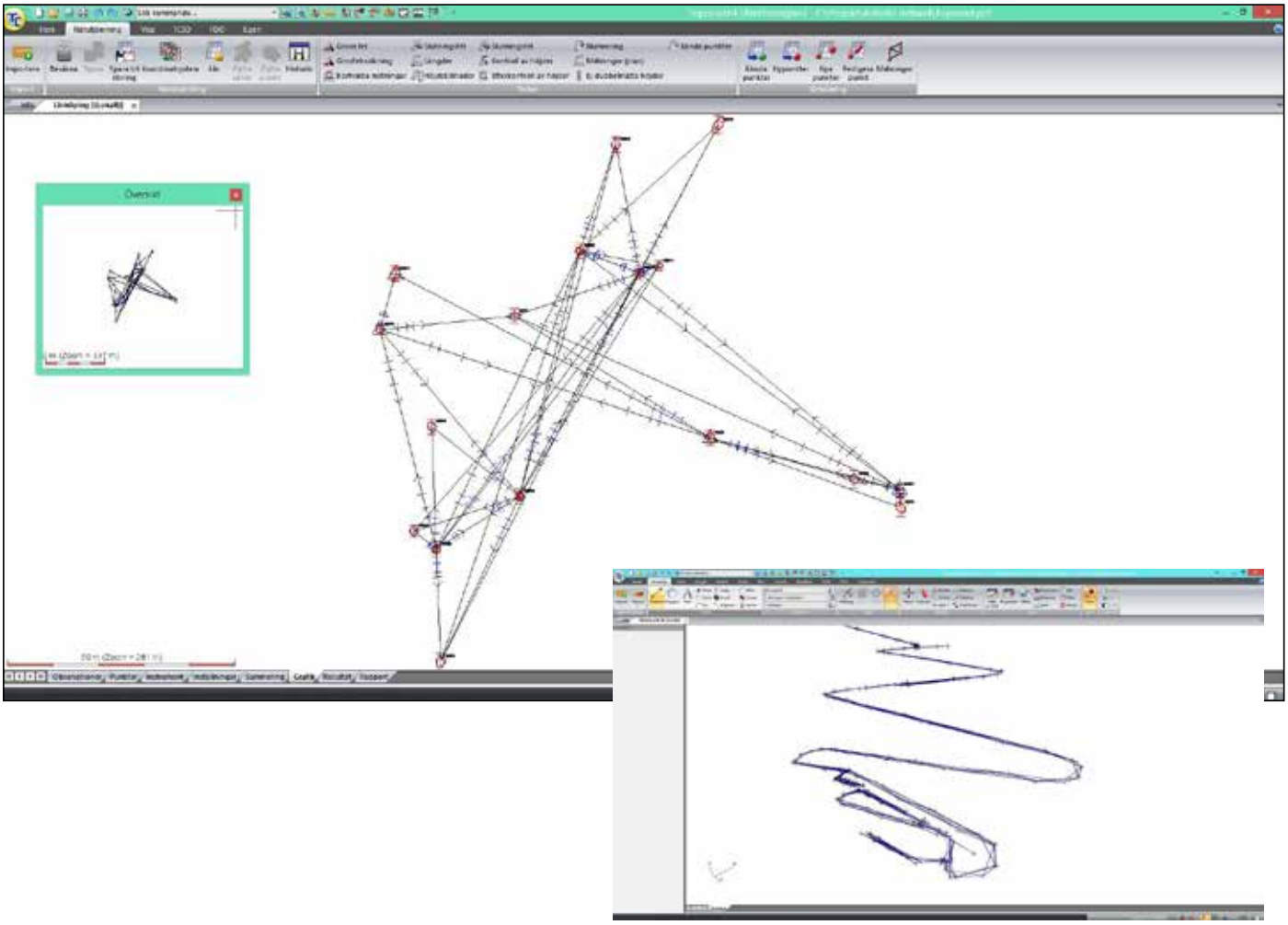
Topocad communicates with most brands of total stations and GPS equipment. Access data from the instrument and process it to the map. All variations of calculations are available for diametrical stations, free stations, and traverses, least square methods, network adjustments. Mix data as you wish and calculate them together. Thanks to the smart functionality of the code tables, the map set-up in FDO and a system for control codes, you can control your measurements to get the correct geometry regardless of dots, lines, surfaces with straight sides, radii, circles or splines and add on the correct layer with the correct colour, symbol and type of line with exactly the right properties for that database it ends up in.

Naturally you can export data from the database out to mobile fields with the same, good functionality, or you can export and access data from a large number of different types of file-formats such as coordinate files DXF, DWG, DGN, Shape, MapInfo, LandXML and many other formats. Thanks to Topocad's rich drawing format, you will not lose any data during transfers. Topocad manages coordinates as survey engineers want them, we handle all drawings in all the necessary manners and handle attributes just as well as GIS-applications do. You do not lose any data in Topocad.

For editing and updating of the map

Large databases require management. Things happen, new objects are added, others are removed, paths change, and properties are created and logged together. GIS- applications are extremely good at handling the map and its information, but when it comes to the small details and we need to use the fine instruments to edit the map, then the CAD-platform is even better. Topocad is a CAD made

Net adjustment



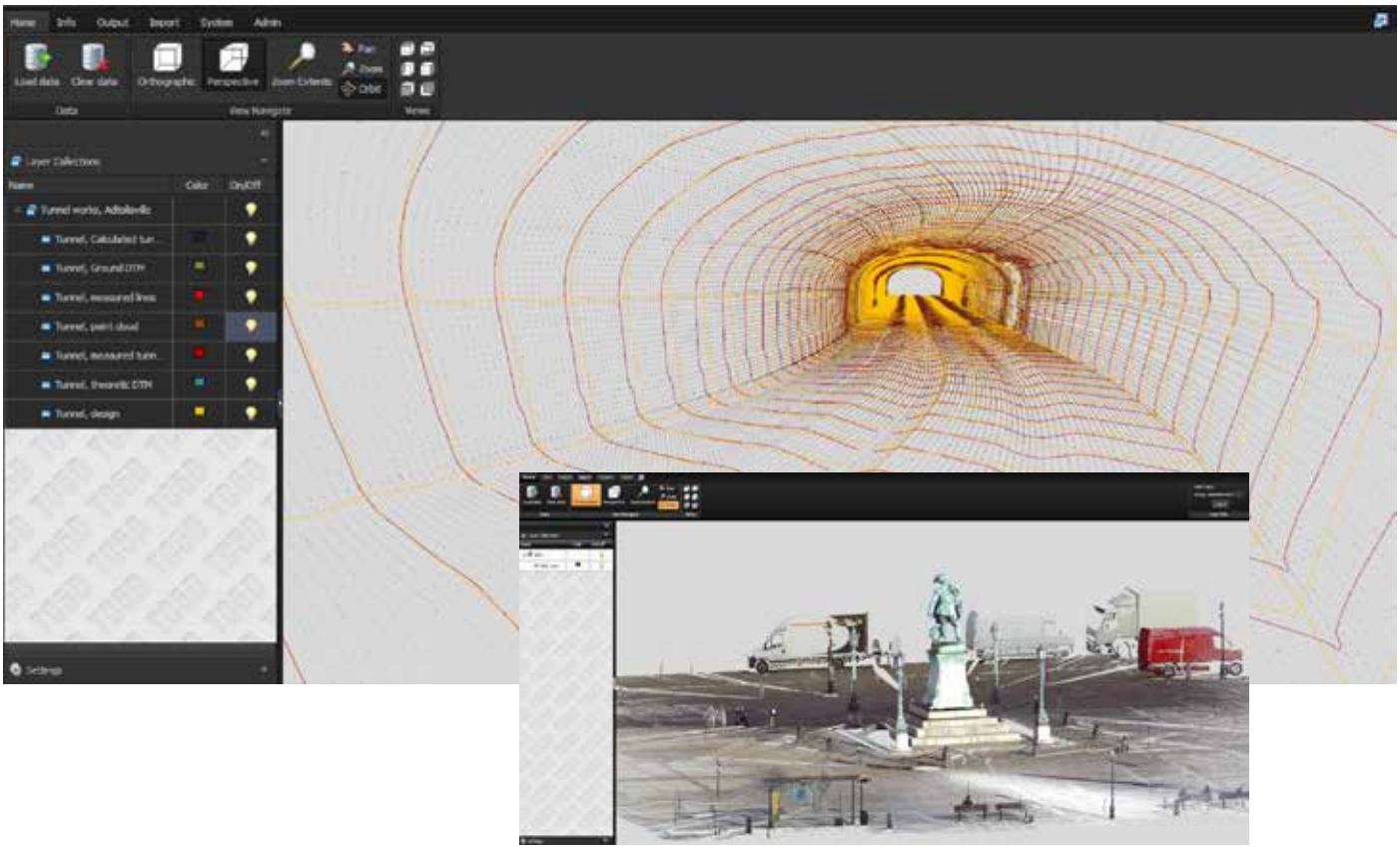
Topocad Net adjustment is a unique calculation module, as it does not make any difference on an advanced net adjustment or a simple resection. All setups are calculated just as good.

Topocad Net adjustment can use of all types of observations in the same calculation.
The idea is that it should be so easy to use this module, that even ordinary calculations, that are not made for network adjustment, can be calculated via the module, to ensure the accuracy of the station establishment.

The more advanced net adjustment calculators can also fill their needs, as it is easy to add different instruments, atmospheric corrections, weightings and a priori error of different observations.
The result ends up directly in Topocad graphics with zooming on the observation that caused the greatest impact on the network. It is then possible to include , exclude or modify this observation interactively.
In Topocad, net adjustment are a large number of tests and reports for different types of misidentification.
There's also a built-in simulation of the network where it is easy to add new points and measurements between them.
Net Adjustment is 100% integrated with Topocad

- An add-on module for Topocad
- It can be used for basically an unlimited amount of points and observations
- A basic function for finding serious errors
- Adjustable for 2D, 3D or a mix of 2D/3D
- Simulation
- Several possibilities for troubleshooting
- A number of reports for plane and contour nets

TC5D: Web Map Publishing



TC5D is a web publisher with full 3D functionality in your web browser. TC5D is your tool for publishing data direct from Topocad on the web in3D direct from Topocad. With very few click you can upload data on the web for a certain public, or everyone, to have a look on your work in three dimensions.

TC5D, which stands for Topocad Collaborator 5 Dimensions, is a 5-dimensional web publishing system. Built with the latest technology, with much support from open source, we have created a publishing and distribution engine for the web that shows positioned data in three dimensions. With support for two dimensions, time and relation.

Area of application

Use TC5D for publication of your map data on the web, or for distribution of position data to clients or users. Using an API, we build your building permit's handler for you, or a system to create new construction maps to the user. As a project server, TC5D is certainly useful; add your objects and let the recipient select exactly the right object at the right moment. It is the objects that are versioned in TC5D, not the drawing!

TC5D and Topocad

If you are using Topocad, there are direct links between the two software systems in which you can publish selected data directly in TC5D. You can also retrieve the data directly from TC5D for editing in Topocad. If you do not have Topocad or want to supplement with other type of data that does not go through Topocad, there will not be a problem. As an administrator or moderator of TC5D you can import data from a large number of files, drawings, databases and publish them via TC5D.

3D on the Web

TC5D is working with WebGL and dynamic HTML on your browser. No plug-in is needed, you have 3D right in your client. Connected to a database, and as a standard we use a PostgreSQL database with PostGIS extensions where we have made our own additions. The database loads the data from, for example, Topocad who has a direct link to TC5D's database. Topocad also reads data directly from the database.

You can import a variety of file formats for uploading to the database and for the Web. Likewise, you can export selected data in the map image to any format and download from the server.

- 3D map in your web browser
- Supports a variety of file formats
- Directly linked to Topocad

Topocad
a list of all modules

Topocad Reader - Freeware
Topocad Engineer
Topocad Base

Net adjustment
Point cloud
Geometry
Volume Model
Volume Section
Earthworks

Database adapter FDO
Database adapter ISM
Database adapter ArcGIS

Connection to Espa
Civil plan module (Swe)
Delivery module (Swe)

Adtollo - developers of Topocad

Are you in need of software that will simplify your work with surveying, mapping and design? Welcome to Adtollo! We are experienced software suppliers for those who build society. We can help you in areas such as data coordination, drawing and document management, CAD, GIS, mapping and surveying or pure calculation assignments. Our software helps you to bring order to your chaos. Since 1993 we develop our own systems and the company is divided into two business areas: Surveying & Mapping and Document management. Surveying & Mapping includes the products Topocad, TC5D, TopoSurv and Topocad FDO for AutoCAD. When it comes to Document management we offer Chaos desktop. More info at adtollo.se/en

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