



Ground Plan



3D view of a ground plan in ADT

## ELCOVISION 10 ELTHEO – The Total Station Device Driver for CAD Software

ELCOVISION 10 EITheo is a total station "device driver" for CAD software. It enables various total stations with a serial or Bluetooth interface to communicate directly with a CAD system. The total station turns into a 3D-digitizer for the CAD software. All drawing functions of the CAD software became measuring functions. You draw online a 3D-model of the object.

The integration of the measuring instrument into the CAD environment offers further the advantage that construction and measurement are one single process. But not only the 3D-measurements from the total stations are directly turned into drawing entities, also distances which were measured with a ruler or with the Leica DISTO can be directly used for drawing purposes.

### The Stationing of the Total Station



Besides from stationing on known points it is possible to define a local system of coordinates. This system of coordinates can be defined at will in any direction. It can also be defined by two measurements defining the x

axis, e.g. setting the axis parallel to a façade.

### The Free Stationing

If there is already a CAD drawing or a file of known points then free stationing is available too. You simply select the

visible points in the CAD drawing and measure them with the tachymeter. The free stationing module supports 2D and 3D-orientation.

### The Measurement Methods of EITheo

EITheo offers 3 different measuring methods. The normal polar measurement, the plane intersection measurement and the multi beam intersection measurement.

All measured points are logged in 3D, and can be projected additionally to any plane. For example if you need to survey a ground plan you define a plane for the floor first and then the measurements are automatically projected into this plane but logged are the 3D-original coordinates.

Sometimes you get very big coordinates for the measurements. Then you can add an offset to these measurements in order to get easy to handle coordinates for the drawing.

### The Balanced Spatial Planes for Projection and Intersections

A spatial plane can be defined with at least 3 or as many as desired 3D points. Additional planes can be defined as parallel planes or perpendicular planes to existing planes. You can name any plane for reference purposes. These planes can be used for projections, intersections or defining a user coordinate system in the CAD or other things.

### The Stake Out Module

The stake out module of ELCOVISION 10 EITheo is particularly used to check existing plans or also for showing points on the location. Motorized total stations are directly controlled by EITheo. The operation of this module is very simple: You just click on the points in the control point list or to any entity in the CAD drawing and the laser beam of the total station directly shows you the point at the object.

### The Additional Functions

In the projection measurement mode a maximum threshold distance can be set. If the measured point is too far away from the projection plane the user is notified.

All measurements are logged automatically by EITheo. These points can be transferred at any time into the CAD drawing. During the transfer you can also project them into a plane. The transferred points can be labelled with their point number, coordinates etc. Free configurable stamp functions are simplifying additionally the drawing of standard plans.



The era of the pure 2D of plans and line evaluations is going to an end. More and more clients want to have a 3D model of the object.

We recognized this need and can offer you this ELCOVISION ELTheo add-on. This 3D add-on is directly integrated into the AutoCAD Architectural Desktop. All the intelligent object orientated planning functions of AutoCAD Architectural Desktop become measurement functions. Thus all objects of the Architectural Desktops such as walls, window, doors, columns, cross girders etc. can be measured and drawn directly with a total station.

### Example: Measurement of Walls

A wall is determined with two measurements in its direction and automatically trimmed then with the adjacent walls. If a wall is measured on the other side then the wall thickness is adapted automatically. Walls can be trimmed at will. You can measure and draw also niches and projections with the total station.

### Example: Measurement of Windows, Doors and Other Openings

Windows, doors and other wall openings can be measured completely in 3D with only one measurement with the

tachymeter into the reveal. Widths and heights can be measured directly with the tachymeter or entered by hand.

### Other Measurement Functions

Generally speaking nearly all of the planning objects of AutoCAD ADT can be measured and drawn directly with the total station. However for special objects like columns special measuring procedures are available. For example a cylindrical column could be drawn by measuring 3 arbitrary points on the surface for calculating the diameter and measuring one single point at the top and one at the bottom.

## ELCOVISION 10 ELTheo Technical Data and Function Overview

### Supported Total Stations and Protocols

Leica: GSI 16/32, GeoCOM

Trimble: "For M5" Protocol

Topcon

### Total Station Stationing and Orientation

Local system of coordinates by direction measurement of the total station or measuring 2 points at the object

Balanced free stationing with 2 or more points or directly by picking points in a CAD drawing

### Total Station Measuring Methods

Polar measurement with or without reflector

Polar measurement with plane intersection

Intersection with multiple beams from 2 or more point of views

Stake out of points or CAD drawing entities with direct control of motorized total stations

3D-logging of all measurements

Direct measuring of intersections and projections with all measuring methods mentioned above

### Definition of 3D Planes

Balanced spatial plane by 3 or more 3D-points

Definition of parallel planes by points or with arbitrary distance to other planes

Definition of perpendicular planes to arbitrary other spatial planes

### CAD Integration

Seamless integrated into the following CAD Systems, all drawing functions of the CAD become measurement functions

AutoCAD: 2009–2016 (32/64 Bit)

BricsCAD V12-V15 (32/64 Bit)

### Additional CAD Functions

Superimposition of the CAD drawing into the digital images

Draw perpendiculars with one single measurement

Measuring and drawing of single segmented lines

Simultaneous measuring and drawing of 3D-trimmed lines

Simultaneous measuring and drawing of 3D-balanced lines

Simultaneous measuring and drawing of UCS aligned lines

Circle intersection construction function

Drawing of 3D-circles and circular arcs with three 3D-measurements with plausibility check

Drawing 3D-rectangles with three 3D-measurements with plausibility check

2D-projection of a drawing into any plane

Optimized merging of single lines into 2D-polylines and 3D-polylines

Integrated 3D-surface modeller generating waterproof surfaces from 3D-clouds of points and 3D-line drawings

Built-in generating of contour maps from surface models

Special measuring functions for inserting blocks with automatic block adjustment

Special measuring functions for measuring cylinders and right parallelepipeds

### Supported Operating Systems

Windows XP/Vista/7/8/10