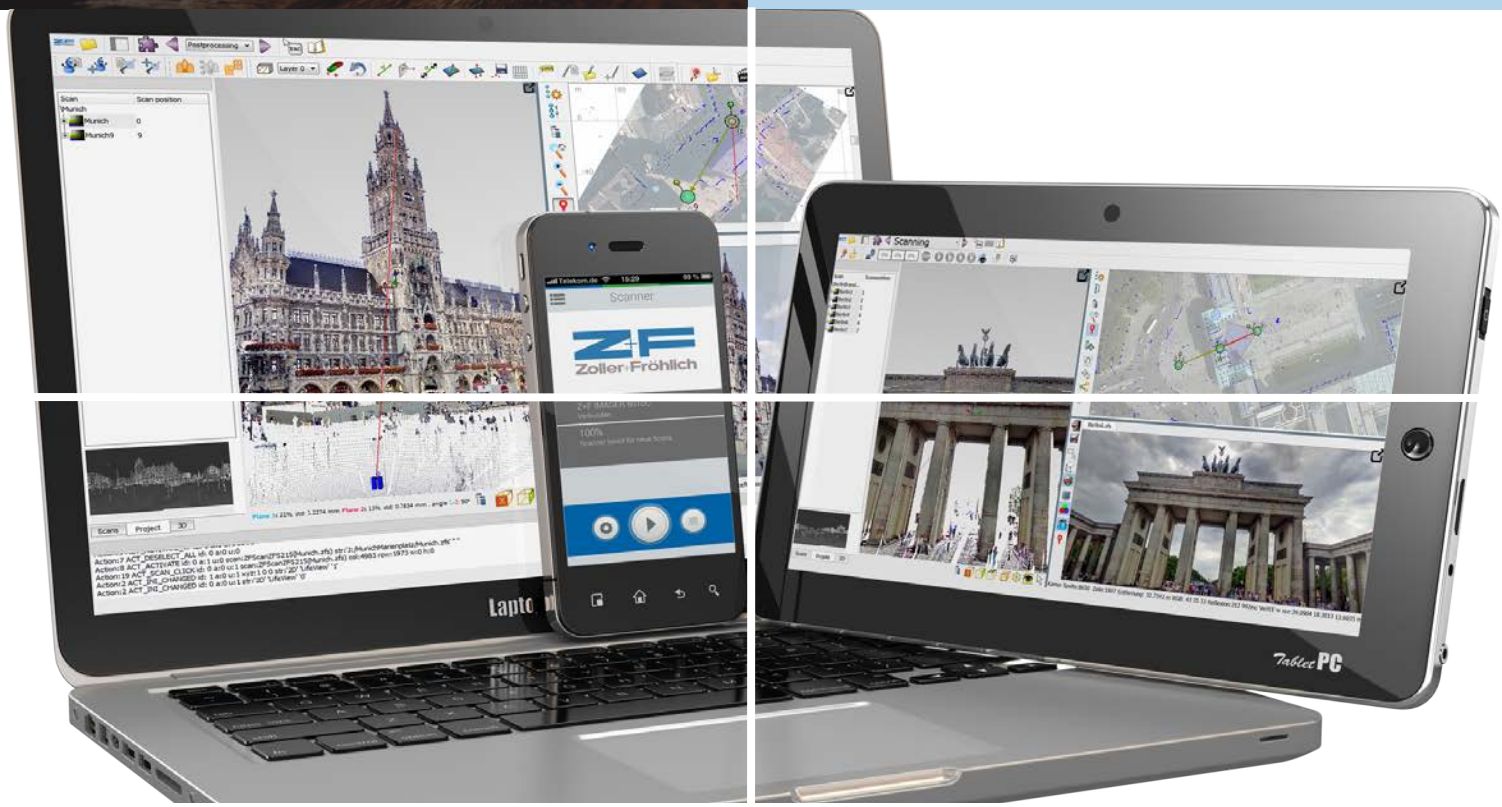
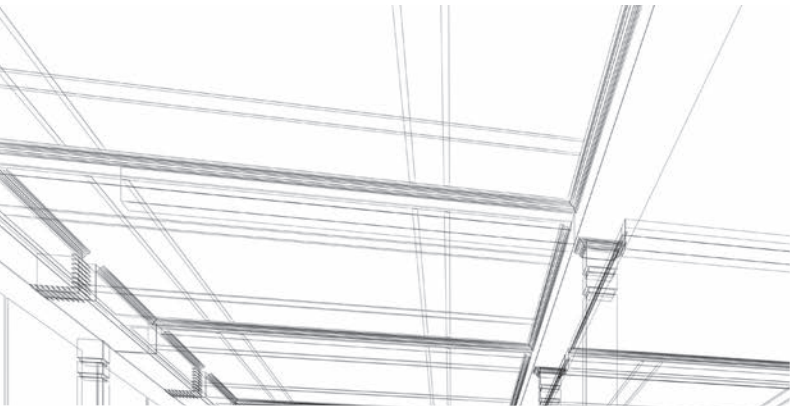
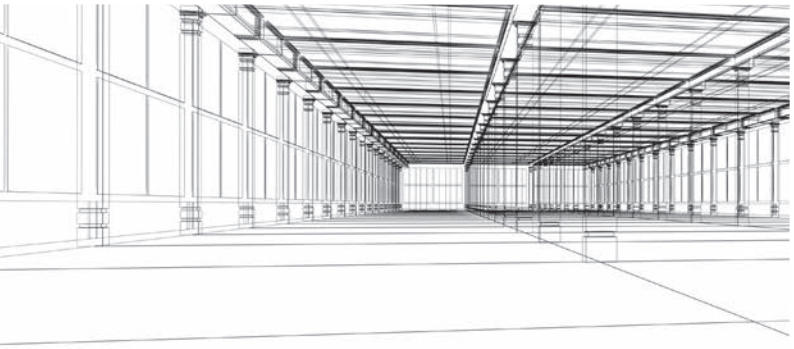
How we build reality



Z+F LaserControl®





Company Overview

Z+F is one of the world's leading manufacturers of non-contact laser measurement technology. After years of research, development and numerous engineering projects, Z+F is an industry leader. Z+F offers its customers a wealth of innovation, experience and success.

When it comes to implementing future developments Z+F has always encouraged innovative thinking and open-minds. Our loyal and long-standing customers appreciate our continual innovations, support and the services we provide.

LaserControl®
Software Package

Packages

Z+F LaserControl® provides all necessary tools to manage your scan jobs efficiently. It is a unique software solution with a complete workflow from data capturing to delivery. Multiple software packages are available for getting the ideal solution according to your needs.

Elements

- Viewer
- Scanner Control
- System Check
- Target Definition
- Measurement Functions
  - Point-to-Point Measurement
  - Auto Snapping
  - Perpendicular Measurements

Page 4

Professional

- Viewer
- Scanner Control
- System Check
- Target Definition
- Extended Measurement Functions
  - Point-to-Point Measurement
  - Auto Snapping
  - Perpendicular Measurements
  - Polygon Tool
  - Ground Measure Tool
  - Save Points
- Target Registration with bundle adjustment
- Filter Functions
- Import / Export
- Slice Function
- Kinematic
- Color Module
- Plane Tool
- 3D PDF
- Project To-Go

Page 6

*WITHOUT bundle adjustment available as **Professional Light**

Professional PLUS

- Viewer
- Scanner Control
- System Check
- Target Definition
- Extended Measurement Functions
  - Point-to-Point Measurement
  - Auto Snapping
  - Perpendicular Measurements
  - Polygon Tool
  - Ground Measure Tool
  - Save Points
- Target Registration with bundle adjustment
- Filter Functions
- Import / Export
- Slice Function
- Kinematic
- Color Module
- Plane Tool
- 3D PDF
- Project To-Go
- Auto-Paper-Target Registration
- Orthophotos
- Video-Plugin
- Mirror Filter
- Cloud-to-Cloud Registration
- Traverse Registration
- Linktool

Page 10

Optional modules for the Professional PLUS package

- Plane-to-Plane Registration with Bundle Adjustment

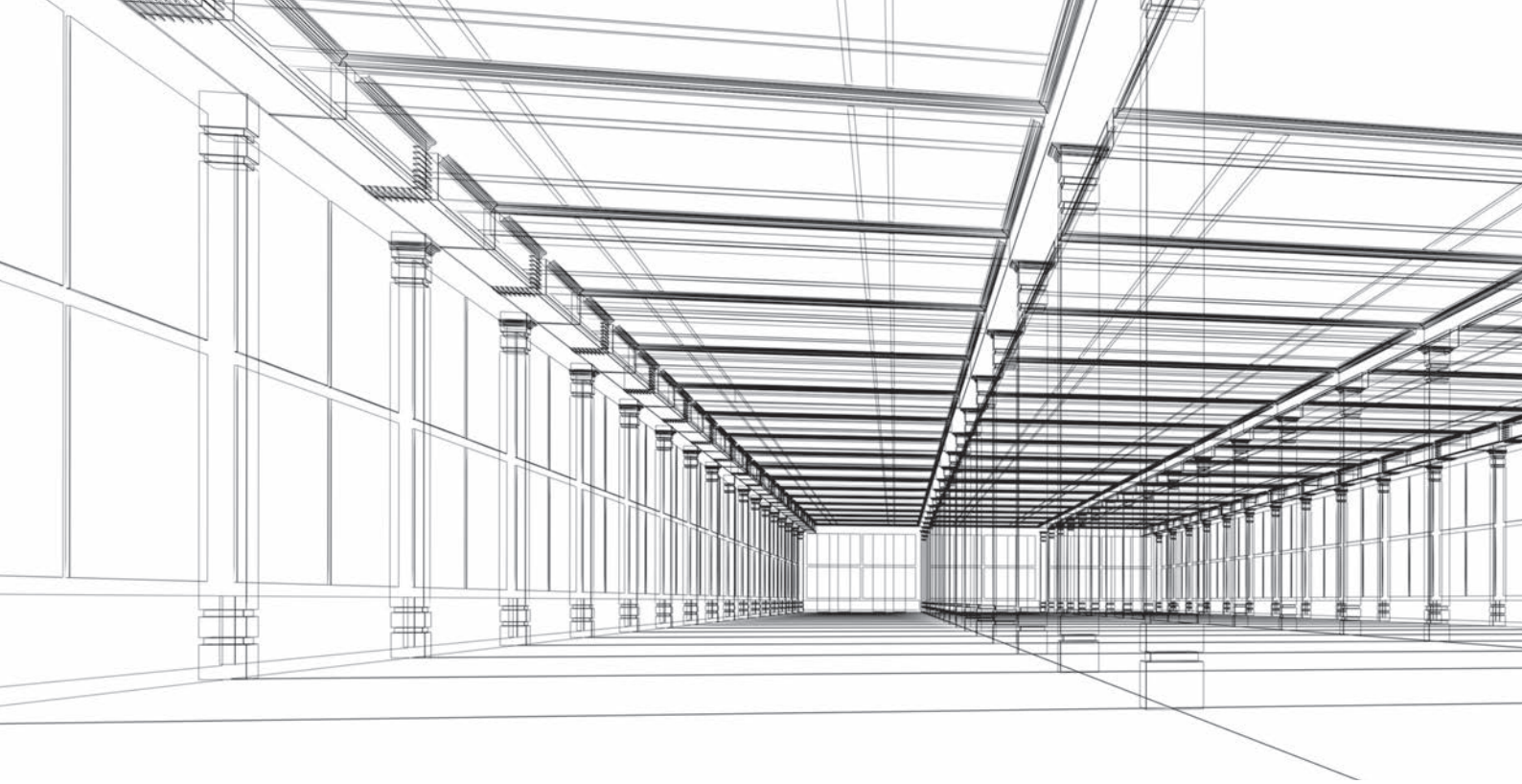
Page 12

Forensics (Plug-in)**

- View-from-Eye
- Shot Trajectory
- 3D Movie / Fly Through

Page 13

The Forensics plug-in is available for **Professional or **Professional PLUS**



Elements

Z+F LaserControl® Elements is the freedom to view and browse your point cloud data without any cost. Beside checking the accuracy status of the device calibration, basic measurement functions are implemented. It is also the key to access and operate all Z+F products of the entire Z+F IMAGER® and Z+F PROFILER® series.

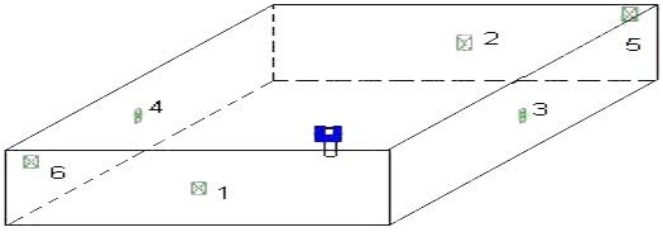
Direct Scanner Control

Z+F LaserControl® supports the entire control of the scanner hardware (Z+F IMAGER® and Z+F PROFILER® series). The direct TCP/IP communication with the scanner device allows fast and downloading from the scanners hard drive via FTP connection to your computer, which grants highest flexibility.

Direct Scanner Control

System Check

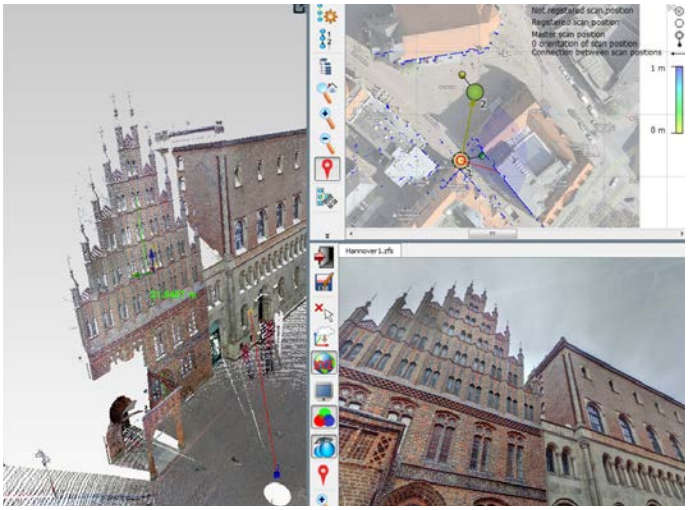
The System Check is a quick check for your Z+F laser scanner. It tells you if the laser scanner is in good condition, or if you should send it to Z+F for recalibration.



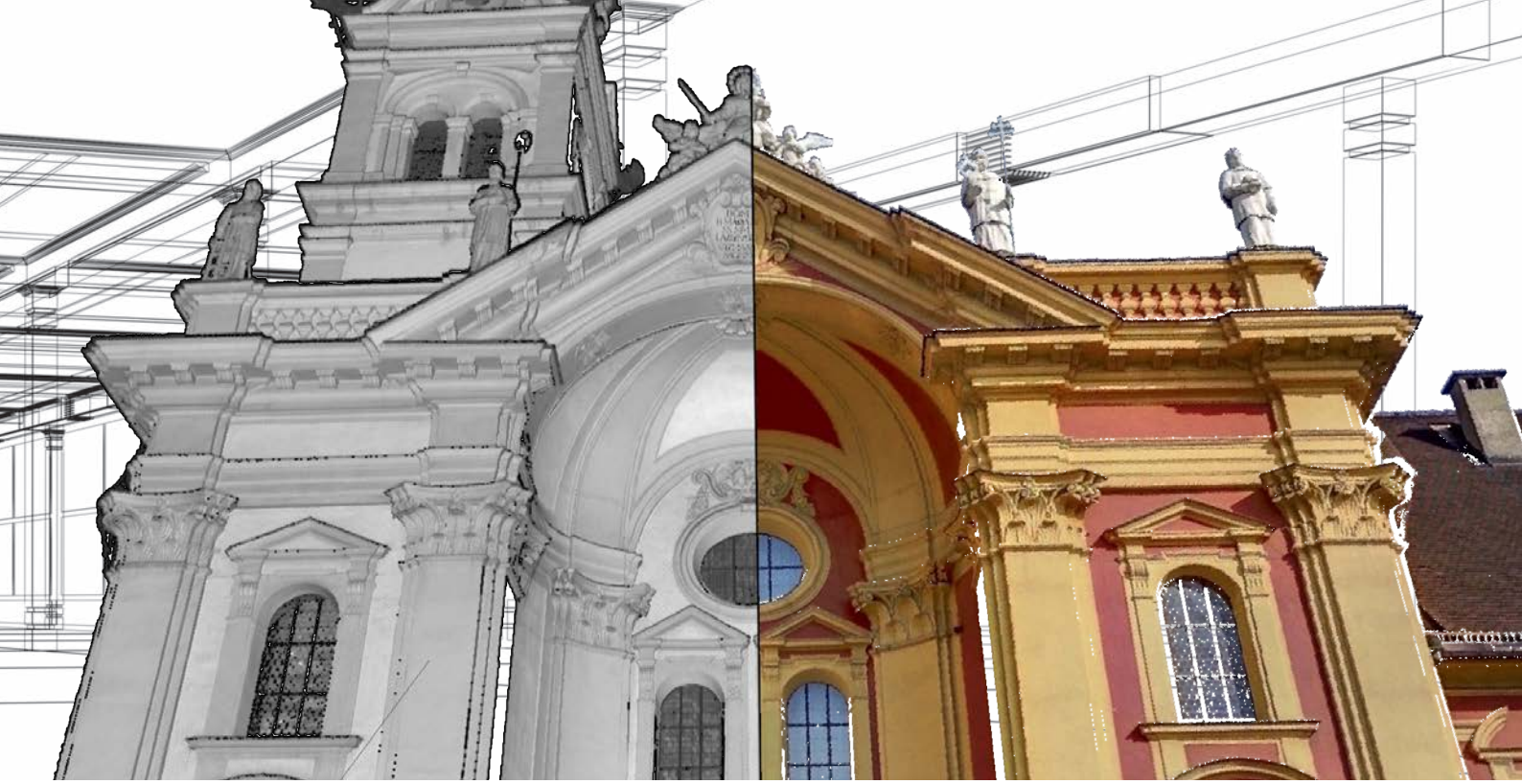
System Check

Viewer

The multi window viewer allows you to analyse your data concurrently in 2D and 3D at the same time. Z+F LaserControl® updates each view in real-time which allows easy examination of data. The user can easily select points in 2D, while the hovered point will simultaneously be shown in 3D.

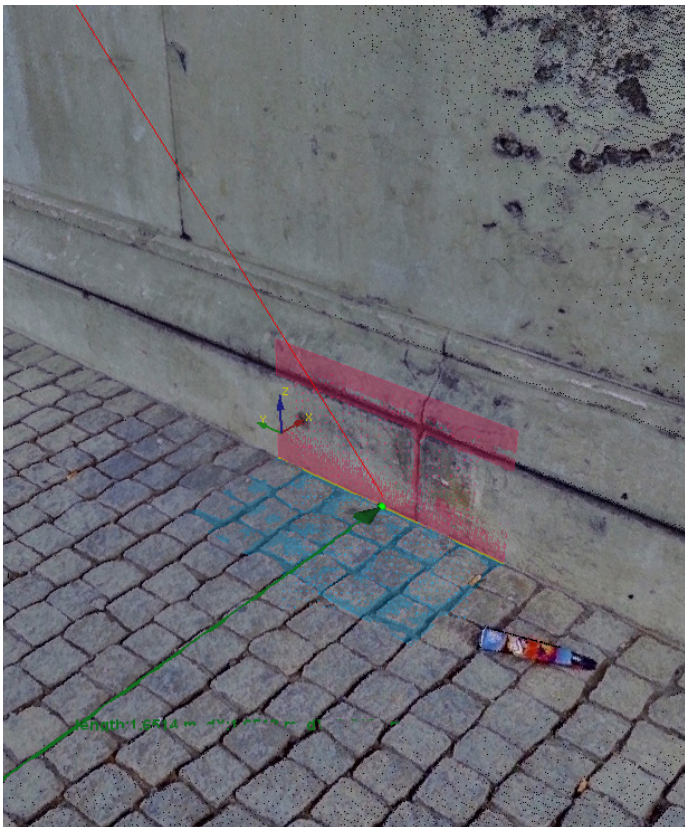


Multi Window View



Measurement Functions

There are basic measurement functions integrated in Z+F LaserControl® Elements, for taking distances in 2D and 3D very quickly, for instance the height of a room. All measurements are stored in layers and can be displayed at any time.



Auto Snapping

Perpendicular Measurements

Auto Snapping on corners and edges

The new auto-snap feature to corners and edges enhances your measuring workflow immensely. It allows you to pick corner points or points on edges quickly and easily in 2D, eliminating the time needed for positioning and zooming in 3D. This enables you to perform quick outlining of features with polylines, e.g. for elevations, sections and ground plans.

Perpendicular Measurements

The perpendicular measurement tool allows you to quickly measure the distance from a point to a plane. This is extremely useful, e.g. if you need to measure the width, length and height of rooms.

Professional

Z+F LaserControl® Professional is the standard solution for common use with every laser scanner of the Z+F IMAGER® and Z+F PROFILER® series. A suite of filters allow differentiated preprocessing of scan data and are the key to a highly accurate registration. By adding colour information with the included colour module the scan data is ready for post-processing through a wide range of export formats. Naturally all Z+F LaserControl® Element features are included. In addition the Kinematic function gives extended usability for profiling applications.

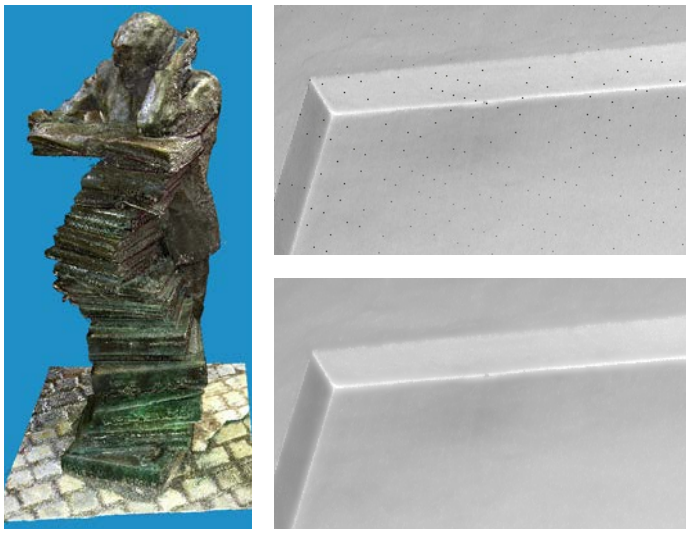
Target Registration

Z+F LaserControl® Professional is equipped with all common registration functions. The workflow includes the definition and naming of identical points, the calculation process and the generation of a registration report. Automatic registration with Z+F AutoTargets cuts down the registration time drastically. In a final step, all found transformation parameters are enhanced through a global bundle adjustment process.

Z+F AutoTarget

Filter

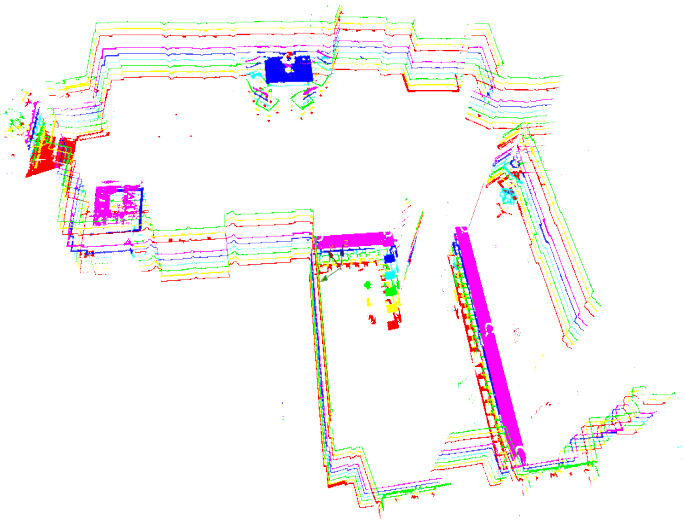
The filter functions optimises the point cloud quality. Z+F LaserControl® generates a mask for each filter, which just marks the filtered points in a certain colour. The filters will not delete any point. The filter tool box allows individual filter settings.



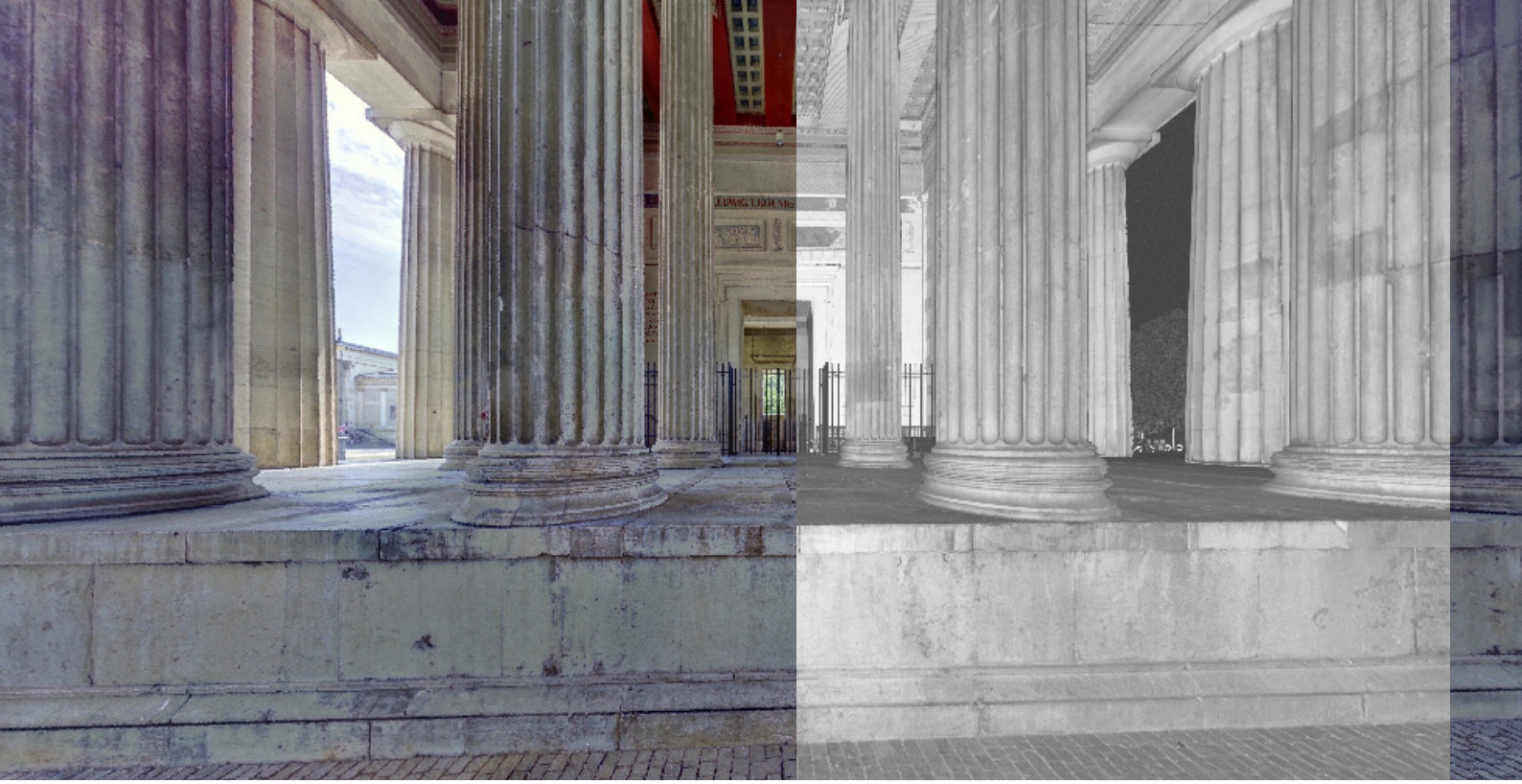
Filter

Slice

Z+F LaserControl® calculates predefined slices from a point cloud. These can also be displayed in the 3D View or exported in dxf- or txt-format. Free slice orientation allows optimum placement to the object geometries.



Slice example



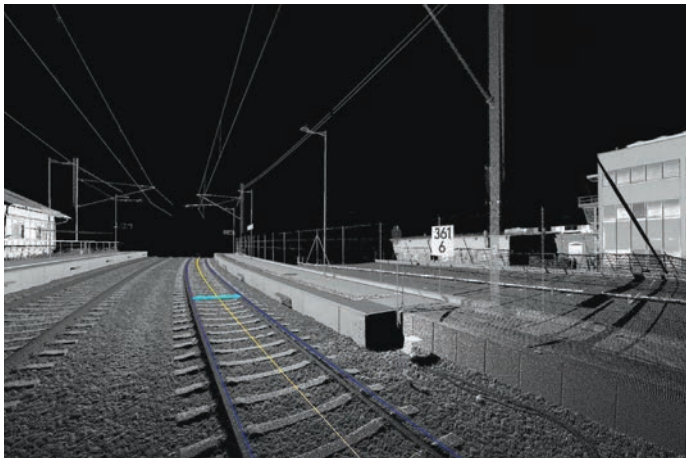
Plane Measure Tool

The measured points can be projected onto a plane at a user-defined height. The tool can also be used to quickly outline the floor plan of a room. Z+F LaserControl® Professional allows you to save all data in your project.

Plane Measure Tool

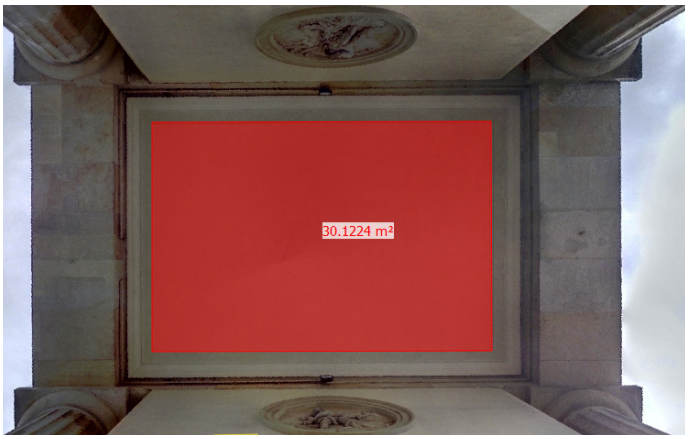
Kinematics

From simple measurements to complex clearance functions the kinematic module offers tools to manage and analyse 2D scans from mobile mapping applications.



Polygon Tool

Z+F LaserControl® Professional includes the polygon tool. This tool allows you to precisely determine areas and perimeters of objects.



Polygon Tool

Mobile mapping application

Colour Module

An ideal base for object visualisation is obtained by combining 3D data with digital photography. Recognition and analysis is much easier through visual illustration rather than geometric characteristics. In addition, colour information includes a documental value, which is interesting for many applications. The colour module offers supporting tools to combin scans with images, no matter if they were taken with any external camera or the integrated i-Cam with Z+F HDR Technology.

High Dynamic Range

HDR offers a solution to display homogenous colour information in highly contrasted lighting conditions.

1a) standard picture in a high-contrast scene

1b) underexposed areas in pink

1c) overexposed areas in red

3D scan without HDR colour

3D scan with HDR colour

HDR picture

Auto Mapping of Temperature Informations

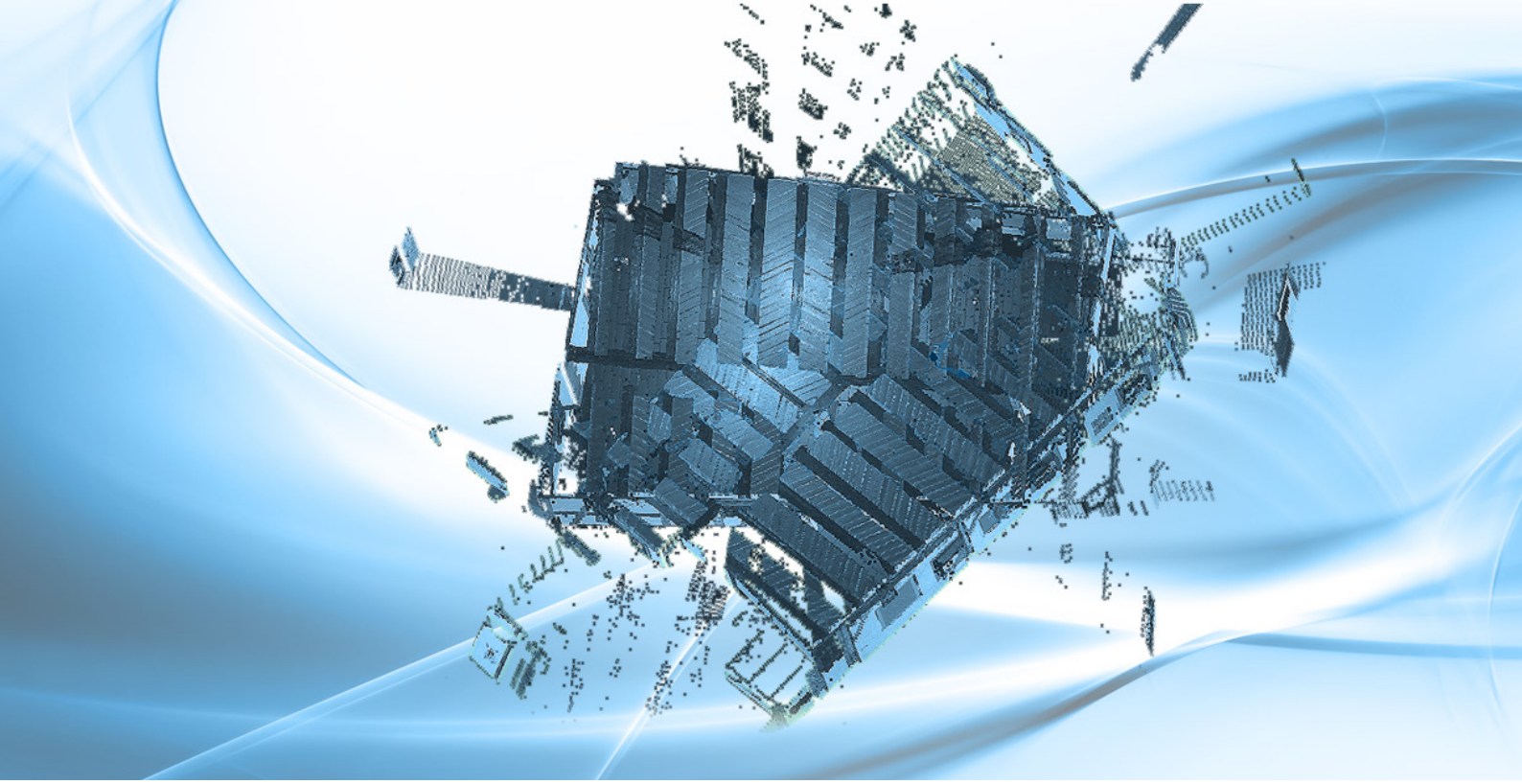
With Z+F LaserControl® you can easily map the recorded temperature information of the Z+F T-Cam to your 3D point cloud. Just like the mapping of panoramic photos, the mapping works fully automatic. Also Z+F LaserControl® allows you to process the temperature information. Temperature ranges can be defined and measurements can be adjusted for different materials to get accurate temperature results.

Auto Mapping of Panorama Pictures

Panoramas taken with an external camera together with a nodal point adapter from the same position, Z+F LaserControl® allows to automatically align and map the panorama onto the point cloud. There is no further need for manual alignment work, which previously required selecting homologous points on the panorama and the scan (64-bit version only).

Point Cloud combined with thermal data

HDR Point Cloud



Professional PLUS

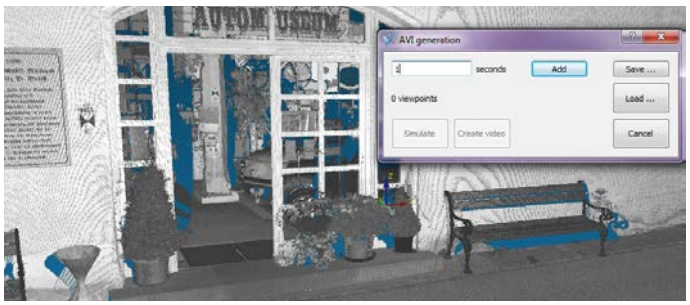
Z+F LaserControl® Professional PLUS gives extended functions for registration, additional data visualisation and project management tools. The Cloud-to-Cloud registration decreases the need of targets, saving time in the field and in the office, which are the striking benefits of this future orientated registration tool. Furthermore fly throughs can be simulated, generated and saved. The relocation of misplaced data with the mirror filter is the right tool to bring your point clouds to perfection. Finally, the linktool offers you best usability for project management.

Link Tool

With the link tool it is possible to link external files such as pictures, documents etc. to any position of the scan. These files will also be added to the project structure. All information of a scan project can be digitally added to the scan forming one unit. In addition it is possible to add notes into the scan.

Video Plug-in

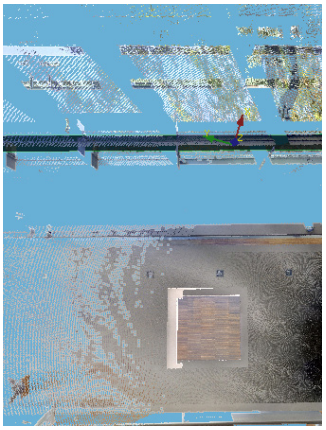
This plug-in allows to fly through a point cloud in 3D. The selected trajectory can be stored and reloaded even after changing of the current data set.



Video Plugin

Mirror Filter

In some cases, scans may contain misplaced data due to the presence of highly reflecting surfaces, e.g. insulated windows, glass or mirrors. This tool allows the relocation of these points onto the mirror plane.

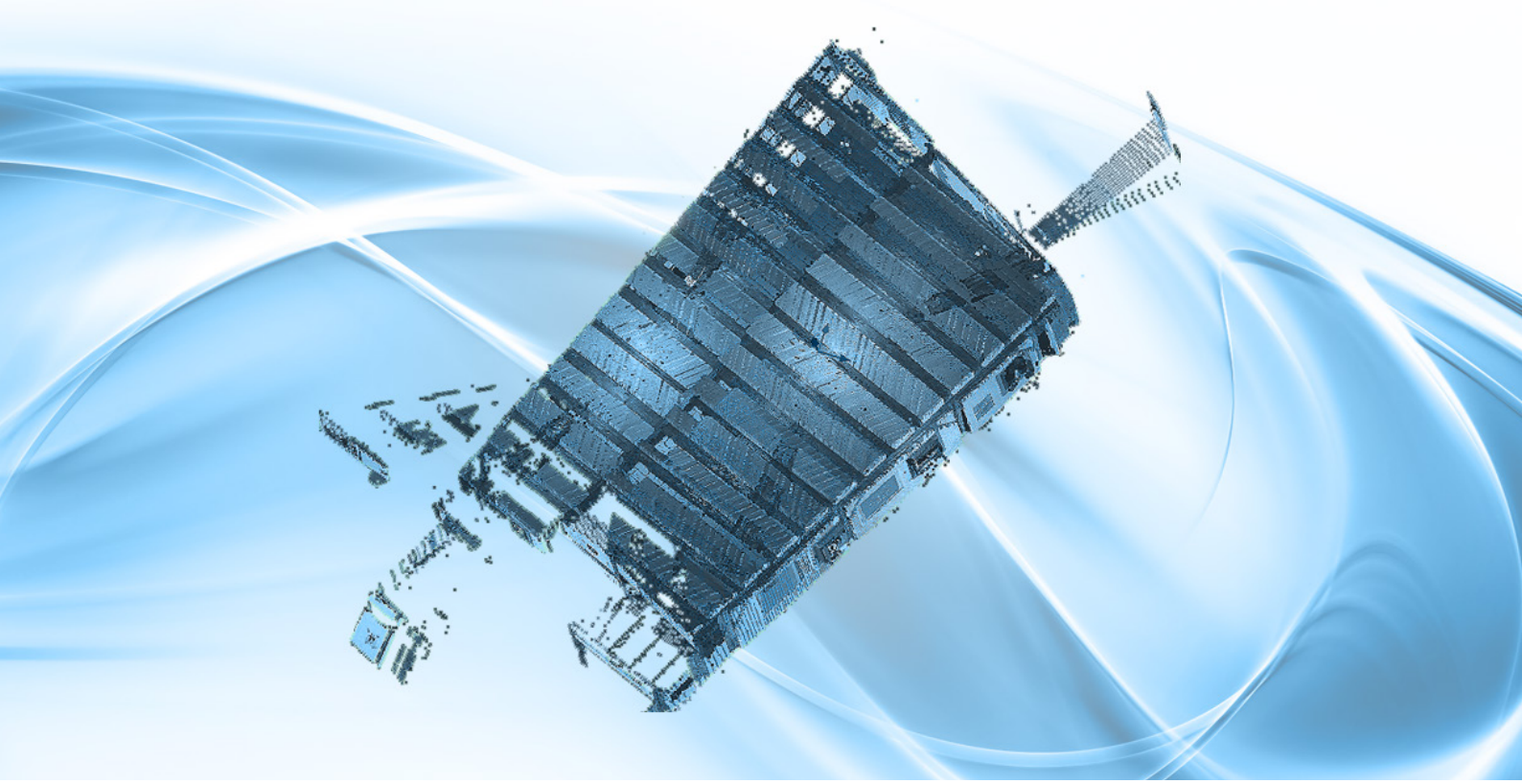


Mirror Filter

Auto-Paper-Target Registration

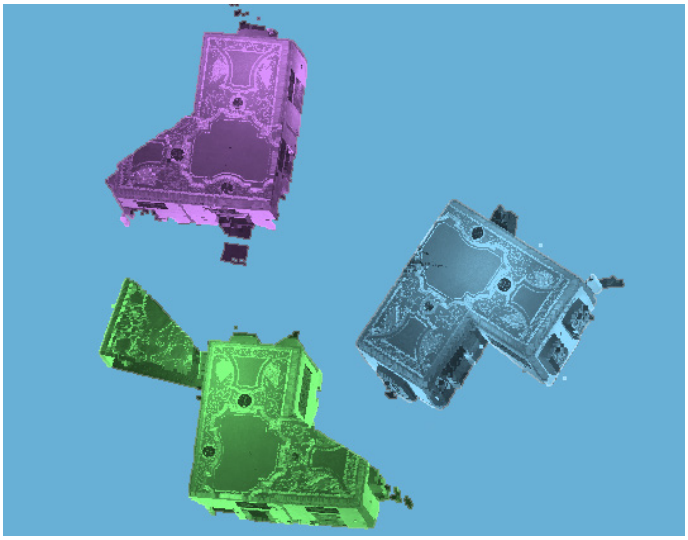
Targets can detected and labeled automatically. This includes paper targets as well. Z+F LaserControl® is able to use the naming convention of survey control points, if available.

Paper-Target Registration

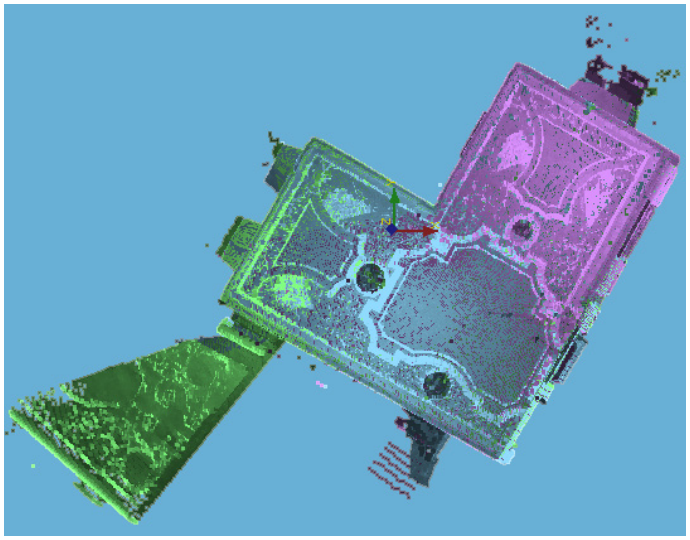


Cloud-to-Cloud Registration

This module automatically registers all scans based on point clouds as opposed to plans. This makes it the allround tool to register arbitrary objects without the presence of planar surfaces. The user provides an approximate alignment during the preregistration stage, but usually this is not necessary.



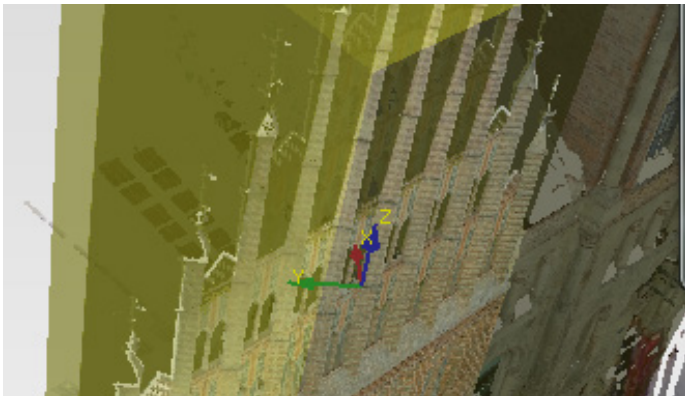
Unregistered cloud



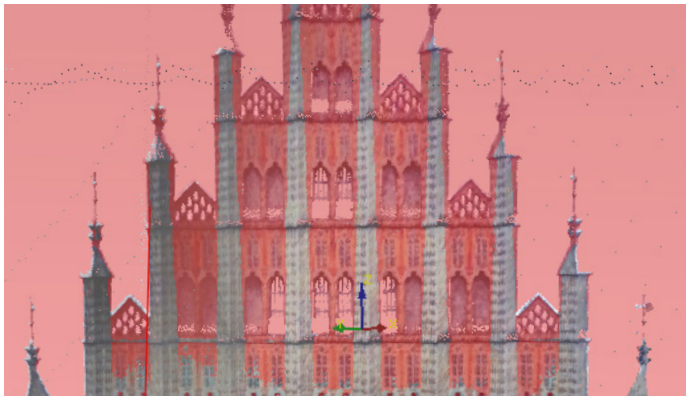
Registered could

Orthophotos

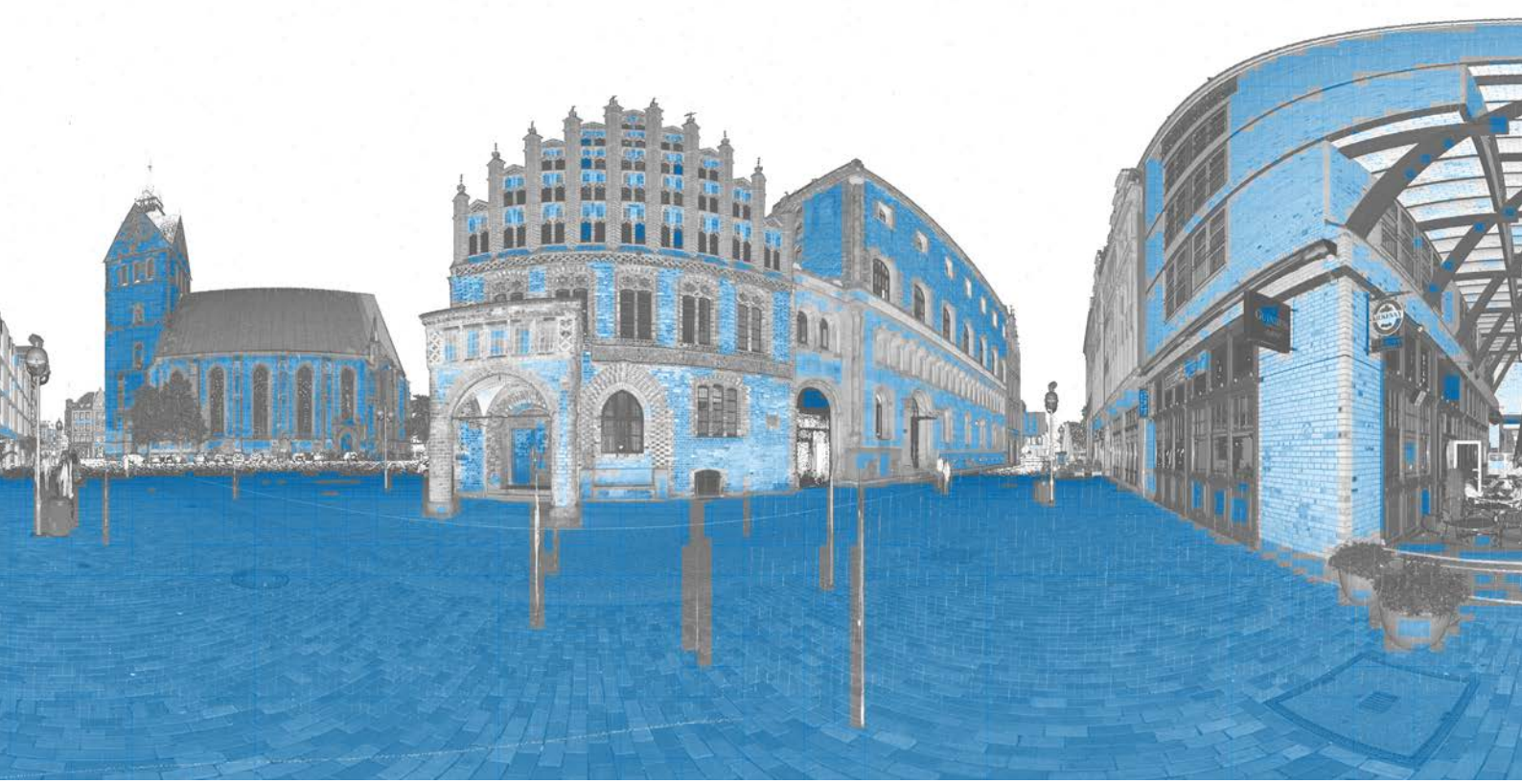
Orthophotos can be created with this feature in no time. Selected points are projected onto a user defined plane, to easily create scaled elevations sections and floor plans. The graphic results can be exported into various file formats.



Projection Box Orthophoto

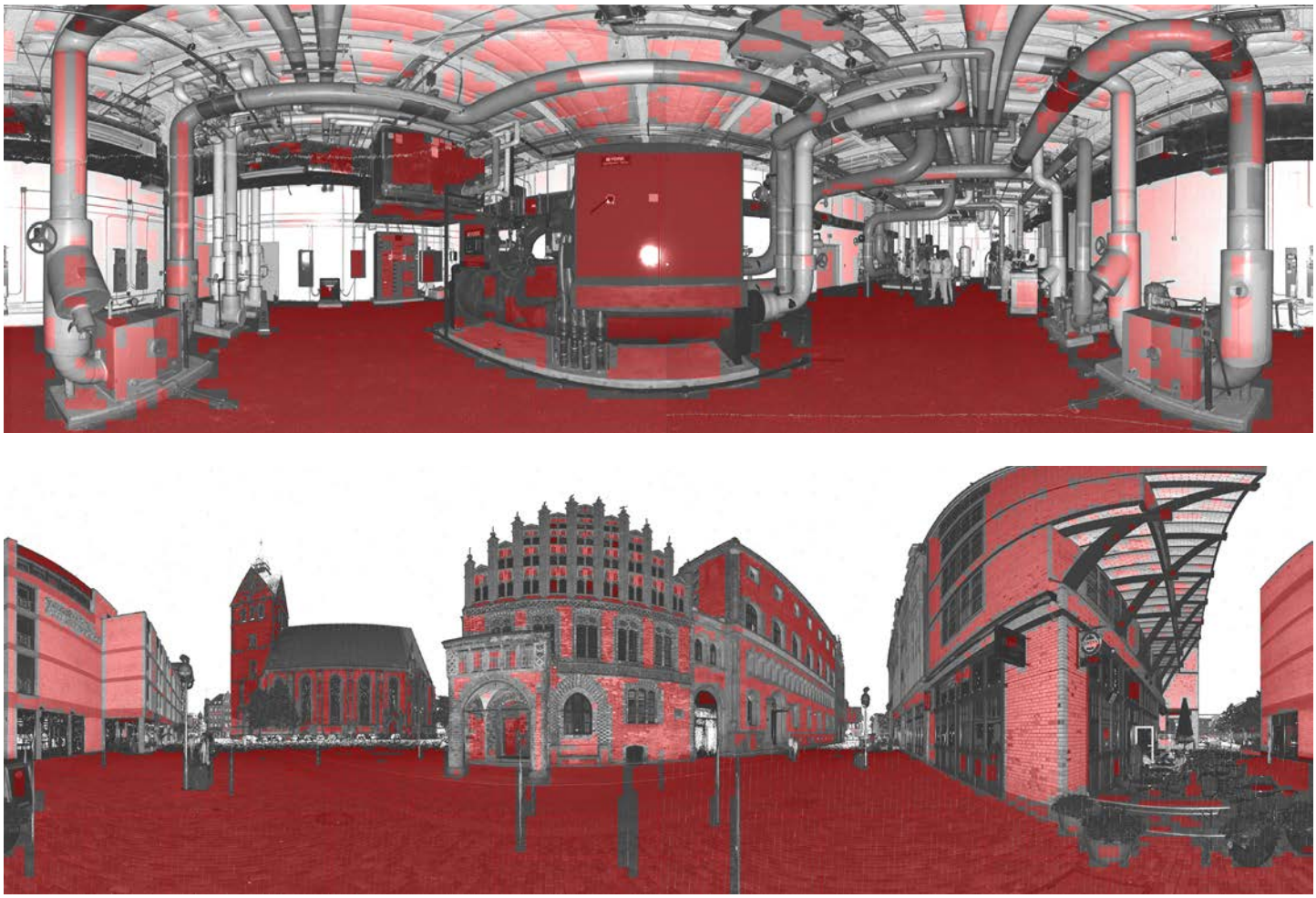


Plane Orthophoto



Plane-to-Plane Registration

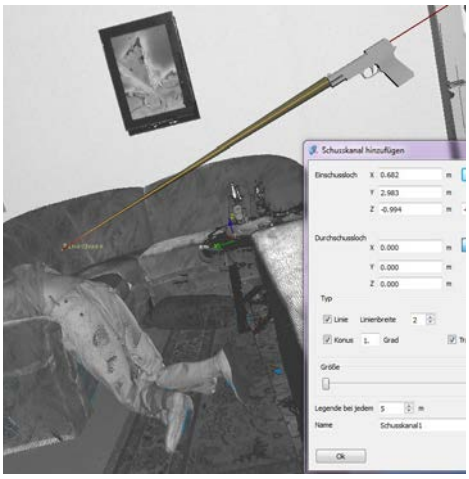
The Plane-to-Plane registration eliminates the need of targets. The algorithm uses identical planes, in the overlapping range of two adjacent scans. The achievable registration accuracy can be a matter of submillimeters. Automatic plane detection is done separately for each scan - a matching algorithm finds plane identities between scan. The following registration is divided into pairwise transformations and a concluding block adjustment for perfect results.



Plane-to-Plane Registration

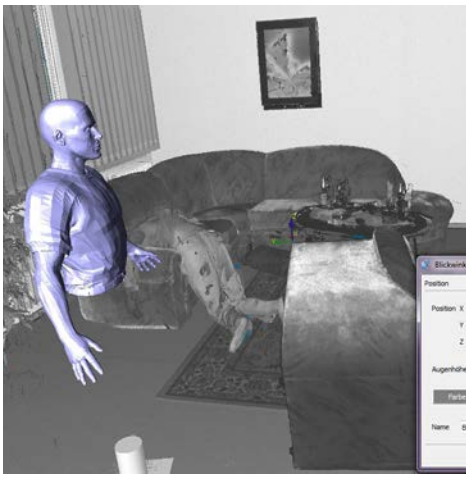
Forensics

The Forensics module is a customised feature that matches the high standards as of the police. Using 3D data enables forensics experts to visualise and simulate a sequence of events at crime scenes. Besides existing functions for the 2D and 3D vis-ualisation, the module offers additional features to analyse the crime scene e.g. shot trajectory or view-from-eye. Even after years a reconst-ruction of the scenery can reveal new evidence.



Shot Trajectory

A tool to calculate a possible area within the 3D point cloud where the shot was fired from.

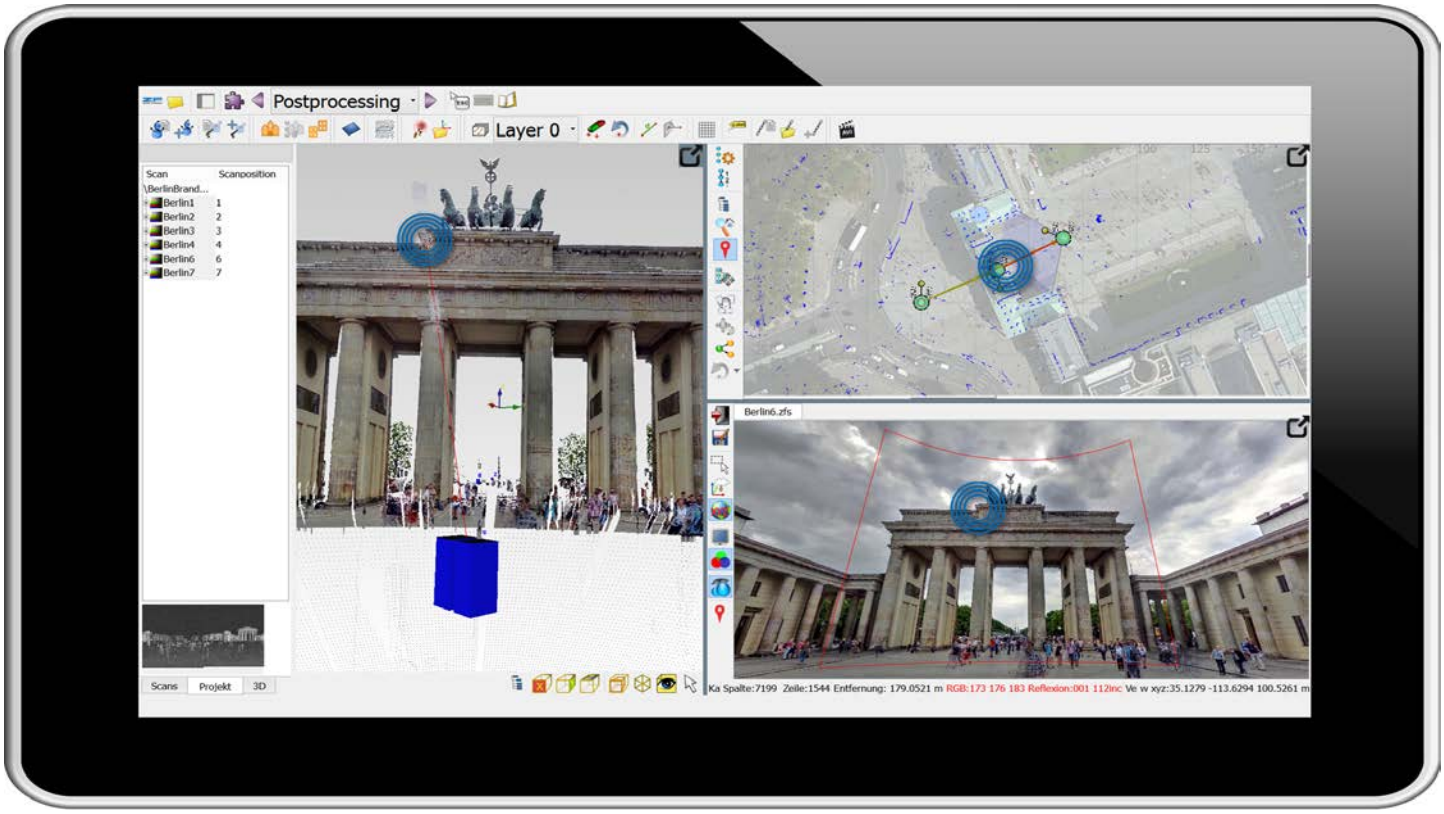


View-from-Eye

Any position within the point cloud can be used to simulate a persons field of view. It is a very powerful tool to verify what witnesses or suspects could or could not have seen from their position.

3D Movie / Fly Through

Take the crime or accident scene into the court room instead of taking the judge, the lawyers and the jury out to the crime scene. A flight through the point cloud can be created which gives a realistic 3D impression of the scene.

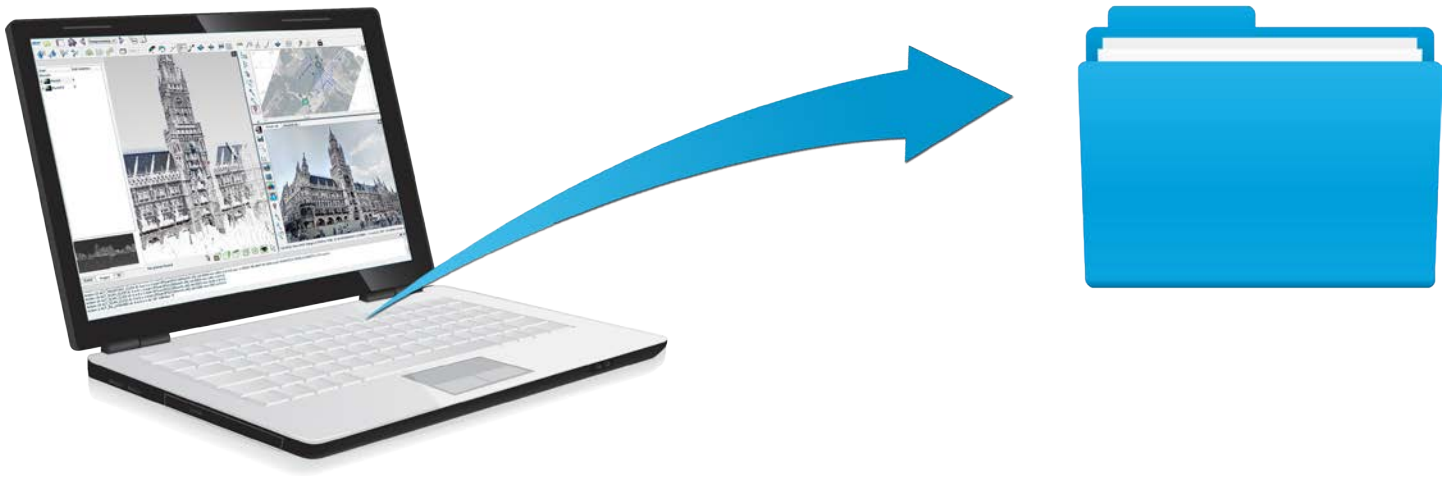


Multi Touch

Z+F LaserControl® provides support for multi touch enabled devices, such as Windows tablets. The tablet version includes all functions of Z+F LaserControl® and is designed to be used in the field.

Project To-Go

Take your project and viewer software with you on a regular flash drive. This function copies your entire project to any drive together with a portable version of Z+F LaserControl®. Thus, no software installation is required for viewing the project. Project to-go offers enormous advantages for the project review process and the communication with customers and especially with corporate networks.



Export / Import

Data Format	Description	Import	Export
.zfs,.zfprj, *.zfi	Z+F Scan, Z+F Projects, Z+F Imagery	x	x
(*.zfc, *.sat)	Aveva Point Cloud, Aveva LFM Project	x	
*.ptx	Leica Point Cloud	x	x
*.asc, *.txt, *.pt, *.pts	ASCII	x	x
*.xyz.asc	XYZ as ASCII Point Cloud		x
*.pdf	3D - PDF incl. Point Cloud		x
*.ptg	Leica binary	x	x
*.e57	ASTM E57	x	x
*.iv	Open Inventor	x	x
*.vrml, *.wrl	VRML	x	x
*.jpg, *.png, *.bmp	Image	x	x
*.jpw	JPEG WoldFile		x
*.gif	Image	x	
*.tiff	Image		x
*.k, *.idx	Total Station	x	
*.dxf	Autodesk		x
*.rcs, *.rcp	Autodesk Point Cloud		x
*.las	ASPRS	x	x
*.osf	Open Source Binary	x	x
*.mpc	Mantis Vision Point Cloud	x	

Minimum System Requirements	Recommended System Requirements (for HDR imagery)
Windows 32bit	Windows 7 64bit
Dual Core Prozessor	Quad Core processor or better
8 GB RAM	16 GB RAM or more
OpenGL-Graphics support	OpenGL-Graphics support

Hauptsitz – Deutschland
Head office – Germany

Zoller + Fröhlich GmbH
Simoniusstrasse 22
88239 Wangen im Allgäu
Germany

Phone: +49 7522 9308-0
Fax: +49 7522 9308-252

www.zofre.de | info@zofre.de

Niederlassung – UK
Subsidiary – UK

ZF UK Laser Limited
9 Avocado Court
Commerce Way
Trafford Park
Manchester M17 1HW
United Kingdom

Phone: +44 161 8717 050
Fax: +44 161 3125 063

www.zf-uk.com | info@zf-uk.com

Niederlassung – USA
Subsidiary – USA

Z+F USA, Inc.
700 Old Pond Road
Suite 606
Bridgeville, PA 15017
USA

Phone: +1 412 257 8575
Fax: +1 412 257 8576

www.zf-usa.com | info@zf-usa.com