

TerraPhoto

for MicroStation SE/J and V8
Windows NT/2000/XP

TrueOrthos through Airborne Laser Scanning

TerraPhoto produces orthorectified images from airborne images. It is specifically developed to process images, which are taken during a laser-scanning mission. TerraPhoto uses TIN of ground laser points for an accurate projection model. Some known points on the ground are used only for quality control. A seamless compatibility with the other Terrasolid's applications for laser mapping and the complete orthorectification simultaneously with laser point processing does not let you pass TerraPhoto.



Lidar data points with high-resolution images are the most sophisticated data to create a 3D-city model. You can process this by using Terrasolid's packages for Lidar mapping.

Let You Adjust Trajectories and Camera Calibration

TerraPhoto's approach to orthorectification is simpler and more accurate than in most competing packages. The rectification routine has the following advantages:

- Single pass method creates directly a mosaic of an orthorectified grid.
- Triangulated laser surface model follows accurately all terrain features. The system computes an elevation value for each pixel in the orthophoto.
- Automatic smoothing of colour transitions between the images.

Due to the inaccuracy of the GPS/ IMU system the information of trajectories may be insufficient. Sometimes the camera may shake during the survey too. Therefore the calibration of camera defined in laboratory may not be valid any more.

By searching tie points by TerraPhoto let you to adjust both trajectories and camera calibration before orthorectification. This adjustment is important especially if your target is to reach the best possible accuracy for the location of the orthoimages.

Processing time depends on the desired quality level of the final product. After searching tie points TerraPhoto creates an orthophoto mosaic automatic.

 **Terrasolid**

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Camera Parameters

The camera model in TerraPhoto includes the following parameters:

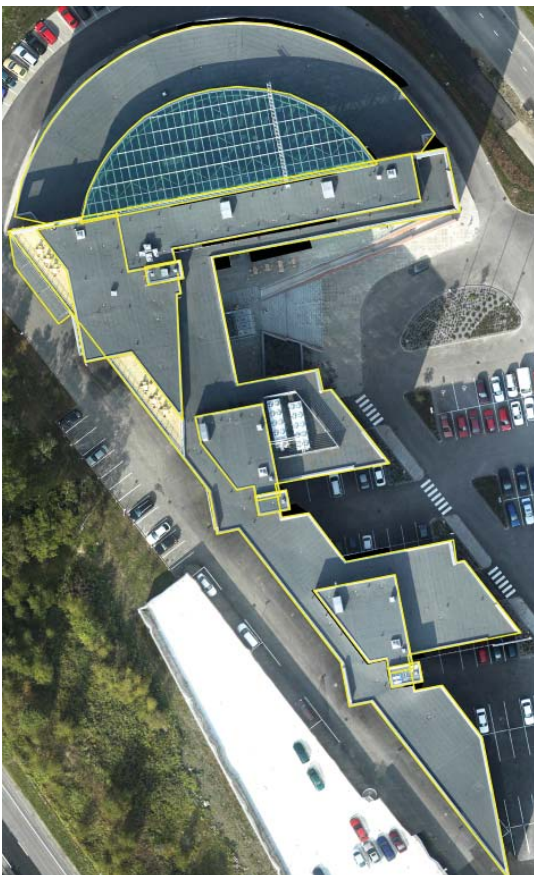
- Focal point x, y and z relative to image plate.
- Heading, roll and pitch misalignment between camera and IMU.
- Radial distortion parameters for the lens.
- Tangential distortion parameters for the lens.

TerraPhoto does not only rely on the radial and the tangential lens distortion parameters provided by the system manufacturer. TerraPhoto offers also an interactive method to define the full camera calibration information by using the tie points.

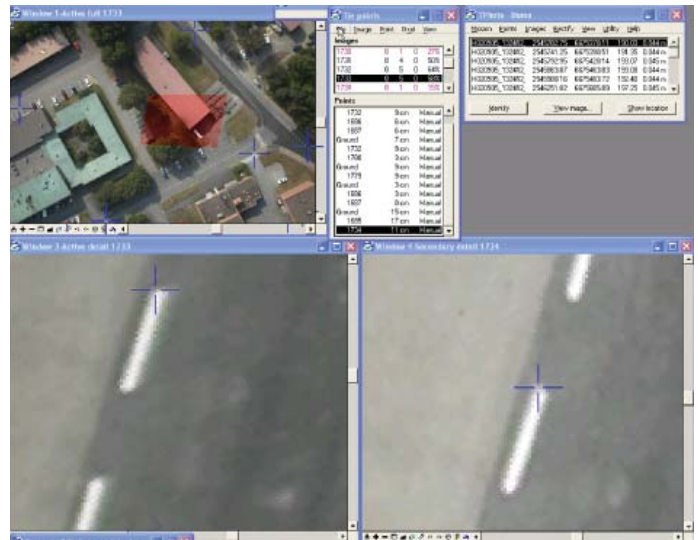
Powerful Tools to Search Tie Points

Tie points can be used to improve the positional accuracy of the images and to produce perfectly positioned orthophotos.

TerraPhoto supports four different types of tie points: known xyz, known xy, common point on ground elevation and common point at unknown elevation. Typically the majority of tie points in a project are common points seen in multiple images for which one does not know the coordinates before hand.



True Orthophotos can be produced from airborne laser points and high-resolution images by using TerraScan and TerraPhoto. Yellow lines show the edges of building roofs.



Tie points search takes place in three view windows. Top window is for navigating and two windows below are for showing the location of tie points. The user shows first some points and then TerraPhoto searches points automatic. 'Tie point' form shows the values of each point and let you remove worst hits.

With TerraPhoto you can apply manual, semi-automatic or fully automatic methods for searching the tie points. The selection of an appropriate method one must decide case by case depending on the quality of the raw images, the type of the survey area and the xy-accuracy aimed.

Aerial Triangulation

Tie points can be used in an aerial triangulation process, which improves the positions and/or the orientations of individual raw images. This will completely remove positional mismatches between raw images.

Perspective Views

Raw, aerial photos can be used without turning them into orthorectified images. TerraPhoto can display a 'bird-eye view' from the location of the camera. This view is useful not only to see the camera location for each frame itself but you can use it when you work with e.g. the laser points and the vectorized design elements. It let you to compare 3D-vectors with an aerial photos without needing to orthorectify the photos first.

Viewing Orthophotos

TerraPhoto displays orthorectified images as reference of MicroStation. The supported file formats include among other ECW, GeoTIFF, TIFF, BMP and JPG 2000.

TerraPhoto Viewer is a light version of the full version. It is available for users, who want to view orthophotos as references as well as render RPC cells and large volumes of raster images draped over a TIN.