

Workflow of Laser and Image Processing / *time for basic training*

1. Import raw laser data / *TerraScan; ½ day*

- Coordinate settings and the transformations (from WGS84 to local co-ordinate system)
- Import trajectories
- Draw trajectories
- Read-in every (10th) point to see the coverage and find the largest building. If the echo is last of many returns or only echo, the point belongs to class default; otherwise it belongs to low vegetation class
- Measure point density and estimate block size, 2 GB RAM if 5 million points per block - 4 GB RAM 10 if million points per block
- Place project blocks
- Cut or split turnarounds from trajectories, trajectory can not passes itself in TerraScan
- Create a project and save it immediately
 - Import points into project
- Possible geoid adjustment for laserpoints and trajectories
- Deduce line numbers for laser points

2. Data calibration / *TerraMatch + TerraScan ; ½ day*

- Classify ground points per flight line + low points and points below surface
- Create a project for matching purposes, select blocks where slopes on different direction or hilly areas
- Measure match
- Find match for heading, roll, pitch and mirror scale corrections. Solve these for whole data set
- Save corrections and report
- Apply corrections for entire project
- Measure match again for match project
- Find match for z correction. Solve this for individual flight lines and use entire project
- Save corrections and report
- Apply corrections if big DZ differences
- Find fluctuations for entire project, apply corrections
- Measure match for entire project
- Cut overlapping points to produce a more uniform data density and point pattern. By quality for crossing flights first. By offset (reserves points, which are most vertical from their flight line)

3. Point classification / *TerraScan + TerraModeler + TerraPhoto; 1 day*

- Use TerraSlave to continue interactive work in MicroStation
- Use TerraSlave with several computers to get maximim RAM and CPU capacity for process
- Evaluate always a new macro by one active block before final macro execution!
- Classify ground points to default class by macro
- Classify final ground by macro
- Classify vegetation by macro
- Classify buildings by macro
- Classify isolated points
- Classify preliminary Model-Key-Points for 'quick orthos', We need them for interactive ground classification
- Classify manually utilities as lamp posts, traffic signs, radio towers...

- Control and complement classification manually. For this
 - Create 'preview-orthos'
 - Display shaded surface
 - Use section views and reclassify ground where automated classification not perfect
- Output Model-Key-Points by macro
 - Smoothen ground
 - Classify Model-Key-Points
 - Output results to separate location without saving results

4. Processing airborne images /TerraPhoto; 1 day

- Import trajectories for images, do not thin positions (done, if 'quick orthos' done)
- Possible geoid adjustment for trajectories
- Create mission (done, if 'quick orthos' done)
- Compute image list (done, if 'quick orthos' done)
- If large raw images, tile images, should be tiled if larger than 100 MB
- Generate thumbnails for raw images
- Define colour corrections to balance large colour differences. Use Define colour corrections for viewing and applying corrections
- Search tie points to get best positioning for image list and save list in camera view and define DXY transformations to shifting images fit to ground control points
- Display laser points by intensity and use camera view for finding XY differences
- Define DXY transformation and shift laser points
- Output control report to verify the overall elevation accuracy of TIN of ground points with a good number of known points inside the project area
- Define DZ transformation and shift elevations
- Compare details to known points
- Adjust image positions and save adjusted image list as different name
- Vectorize buildings + bridges if aiming for true ortho
- Colour corrections interactively in real-time
 - Search automatically color points
 - View orthomosaic and edit color points where needed
 - Search best seamlines automatically
 - Edit seamlines where needed
 - Place smearing polygons
- Place tiles for ortho mosaic
- Run rectification, make sure that available free space on hard disc is 10 GB for temporary files

5. Producing delivery products /TerraModeler + TerraPhoto + TerraSurvey; ½... day

- Digitize break lines by displaying orthos, contours, shaded surface model and laser points in section views
- Produce contours
- Model buildings -> true orthos
- Detect trees
- Process and vectorize power lines
- etc.