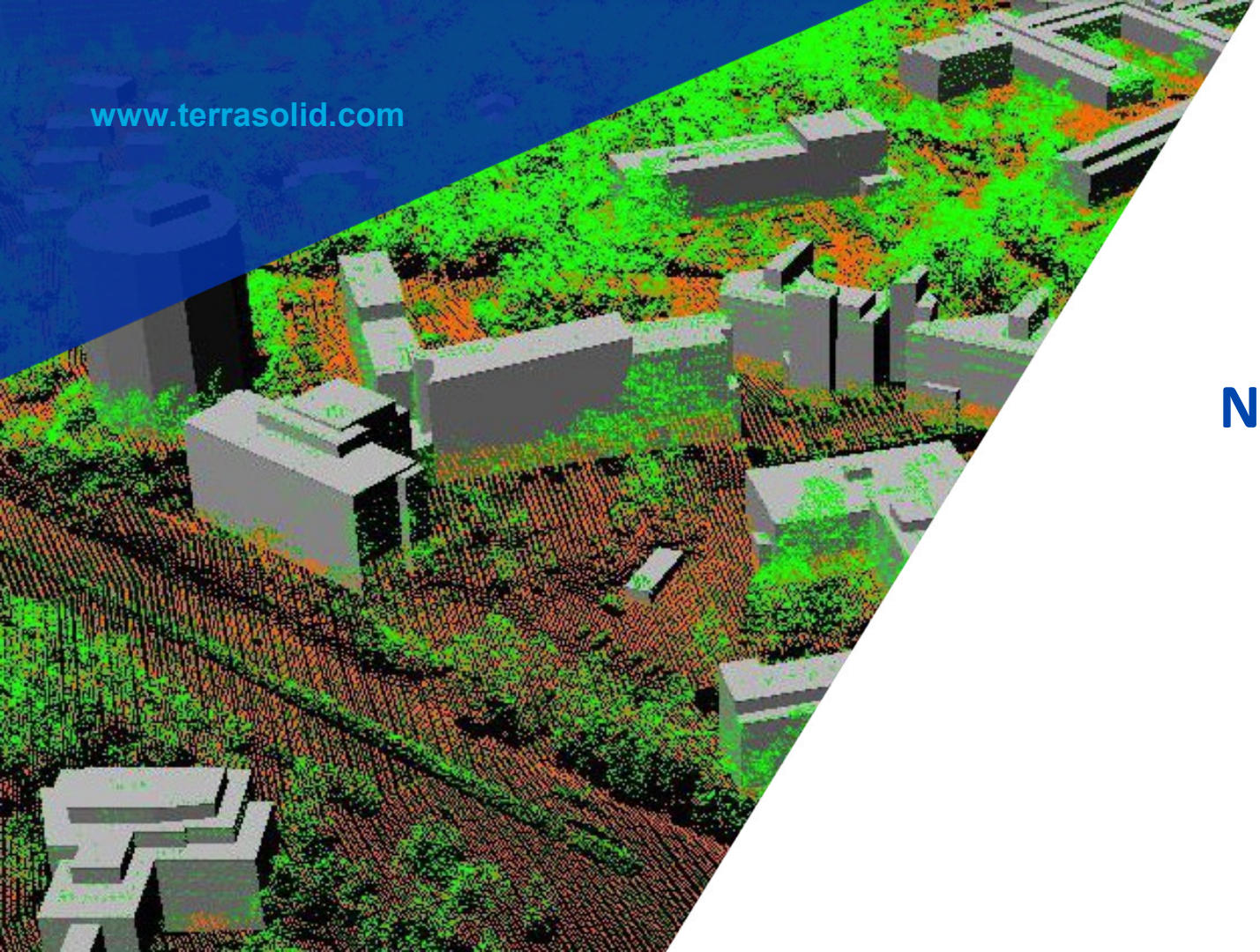


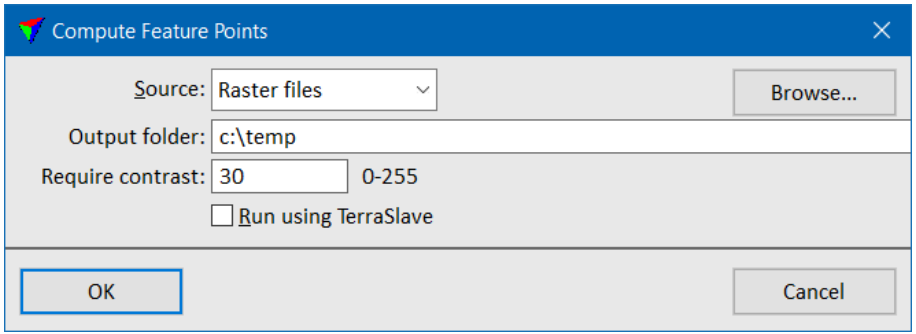
TerraPhoto
New Features

Arttu Soininen 22.01.2019

Terra solid
POINT CLOUD INTELLIGENCE

Windows Dialogs

- Bulk of development effort during last year has been on writing a Windows user interface library
- Many TerraPhoto dialogs have been converted to Windows dialogs
- These have Terrasolid icon in upper left corner



- No immediate benefit to customers

- Makes source code less dependent on MicroStation
- Possible to use same user interface code for standalone products

Various Improvements

- Support for PNG as raw image file format

Old vs New Tie Point Search

Old Tie Point Search

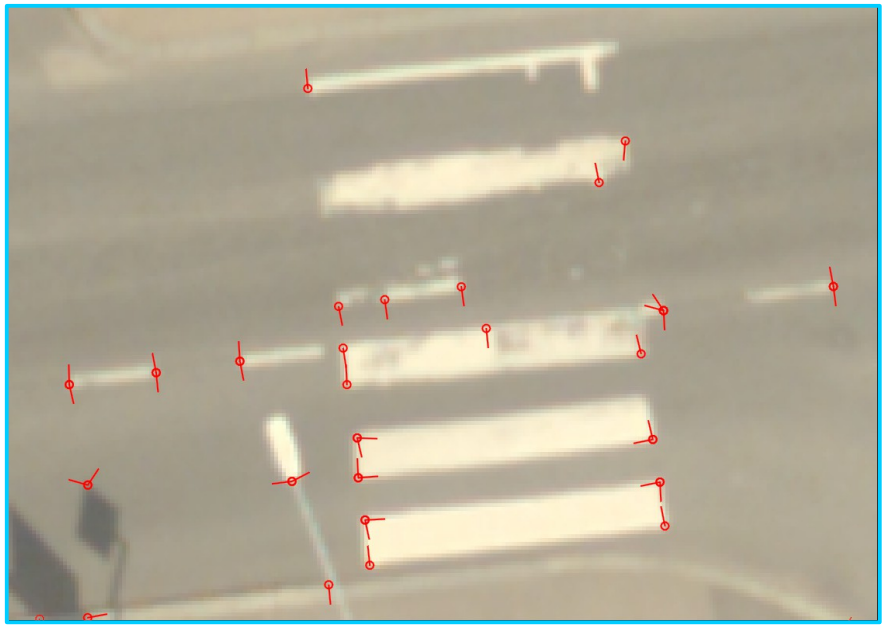
- Requires ground classification
- Requires shadow maps
- Finds points on ground only
- May take a long time if does not find many points

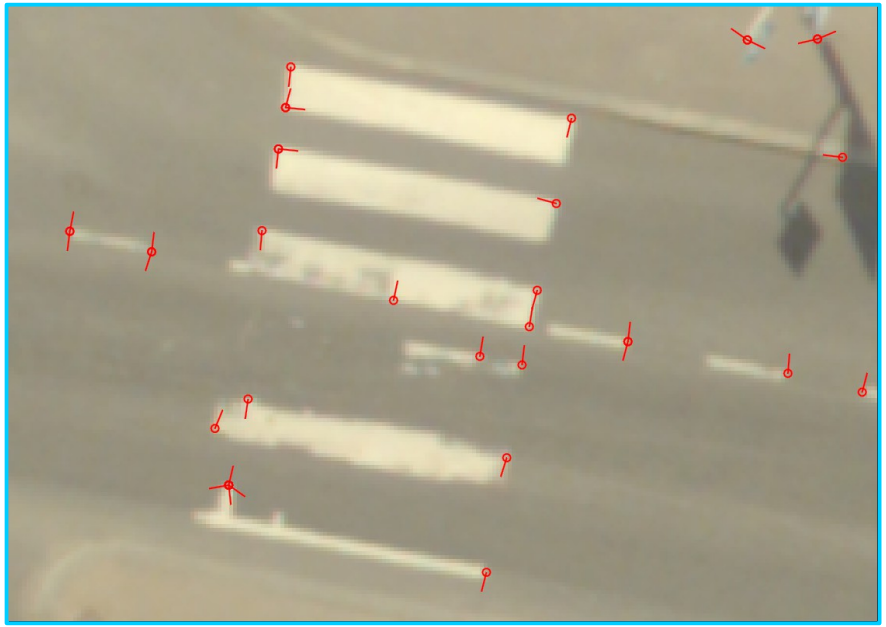
New Tie Point Search

- Ground makes user work easier
- Benefits from depth maps
- \+ Finds points on building roofs and in vegetation as well
- \+ Systematic execution time

Feature Point

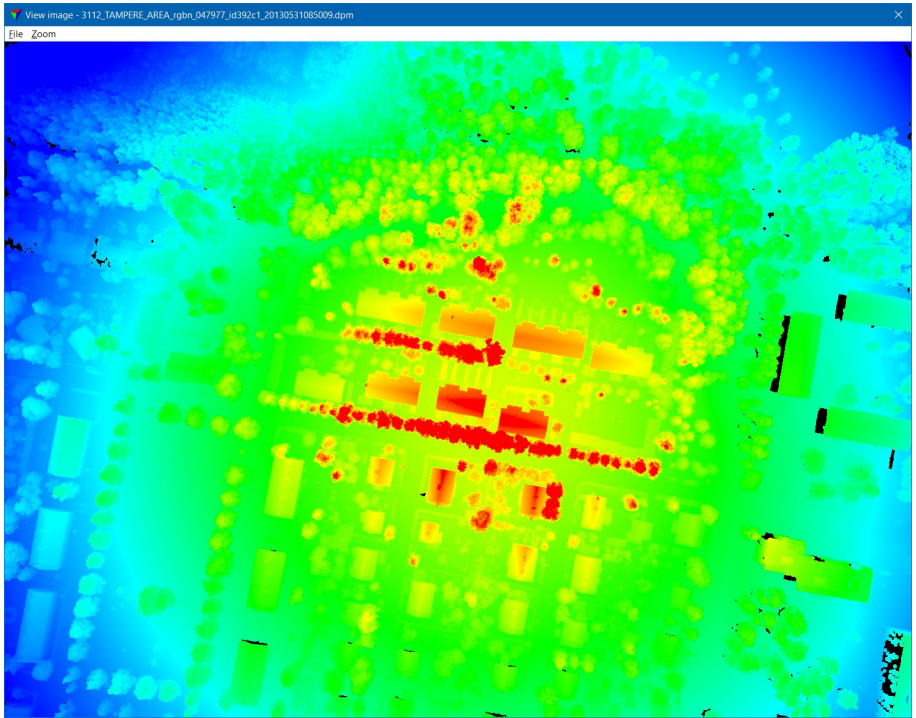
- Interesting pixel location in an image defined by:
  - Pixel in image (x, y as decimal value)
  - Direction angle (strongest brightness change direction)
  - Descriptor (table of numbers describing brightness changes relative to direction angle)
  - Scale (resolution version from which derived)





Depth Map

- Contains depth information for each image pixel
- Computed from laser point cloud



TerraPhoto Implementation

- Designed for image sets with GPS+IMU derived raw positioning
- Workflow benefits from laser data
- All computation done with CPU (no graphics card computation)
- Emphasis on making tie points easy for user to verify:
  - Managable number of tie points per image (user choice)
  - Tie point locations similar to what human would choose

Workflow

1. Run **Compute feature points** tool
   - Can run as soon as you have raw images – no mission setup needed
   - Can run in TerraSlave
   - Writes .fpt files (into mission temporary folder)
2. Collect some tie points and solve/check misalignment angles
3. (Optional) Run **Compute depth maps**
   - Writes .dpm files into mission temporary folder
4. Import feature points to build tie points from those
5. Check and validate tie points

Denmark Oblique Import

- Denmark has published laser data and vertical+oblique images of whole country

- **Mission / Import Denmark oblique** menu command:
  - Reads camera calibration file *.cam
  - Creates five TerraPhoto camera calibration files
  - Creates mission definition with five cameras

- **Images / Load list** menu command can read exterior orientation from *.dbf files