www.terrasolid.com

WORKING WITH OPEN DATA
Basic level webinar

Antti Järvenpää Wednesday 17/3/2021

2021 Virtual Training Event

Terra solid
POINT CLOUD INTELLIGENCE

Agenda

- Setting up project
  - Obtaining data (points, images, vectors)
- Improving point cloud usability
  - Extracting color to points from images
  - Filling holes in point cloud
  - Classifying points by grouping
- Producing content
  - Feature digitization
  - Rendering views
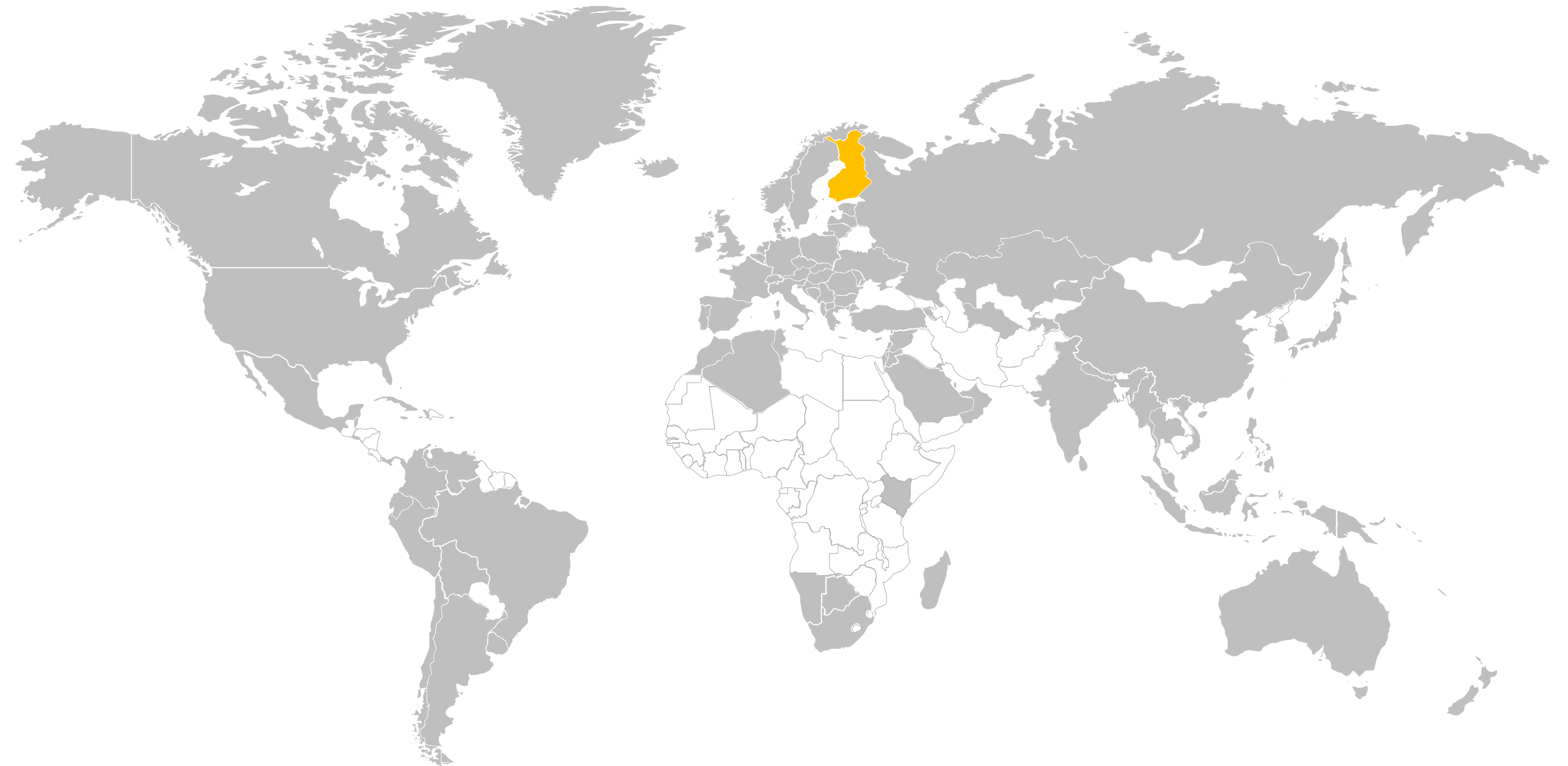 - Extracting sample of points inside area of interest

Note

The presentation will include demonstation of several small tasks, and the target group is beginners/basic level users.
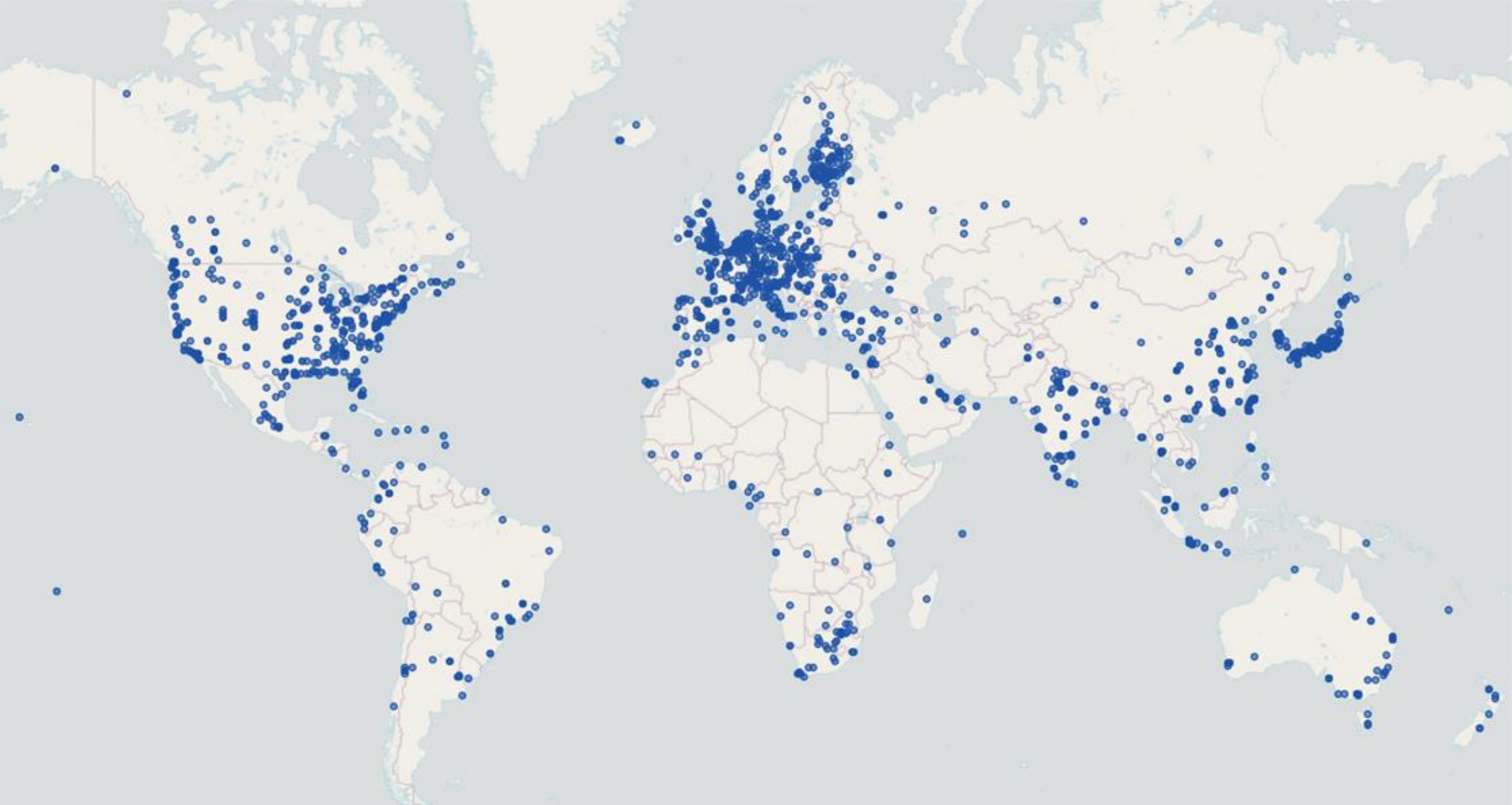
The workflow to be presented does not aim to any specific result but shows some common tasks useful in general processing.
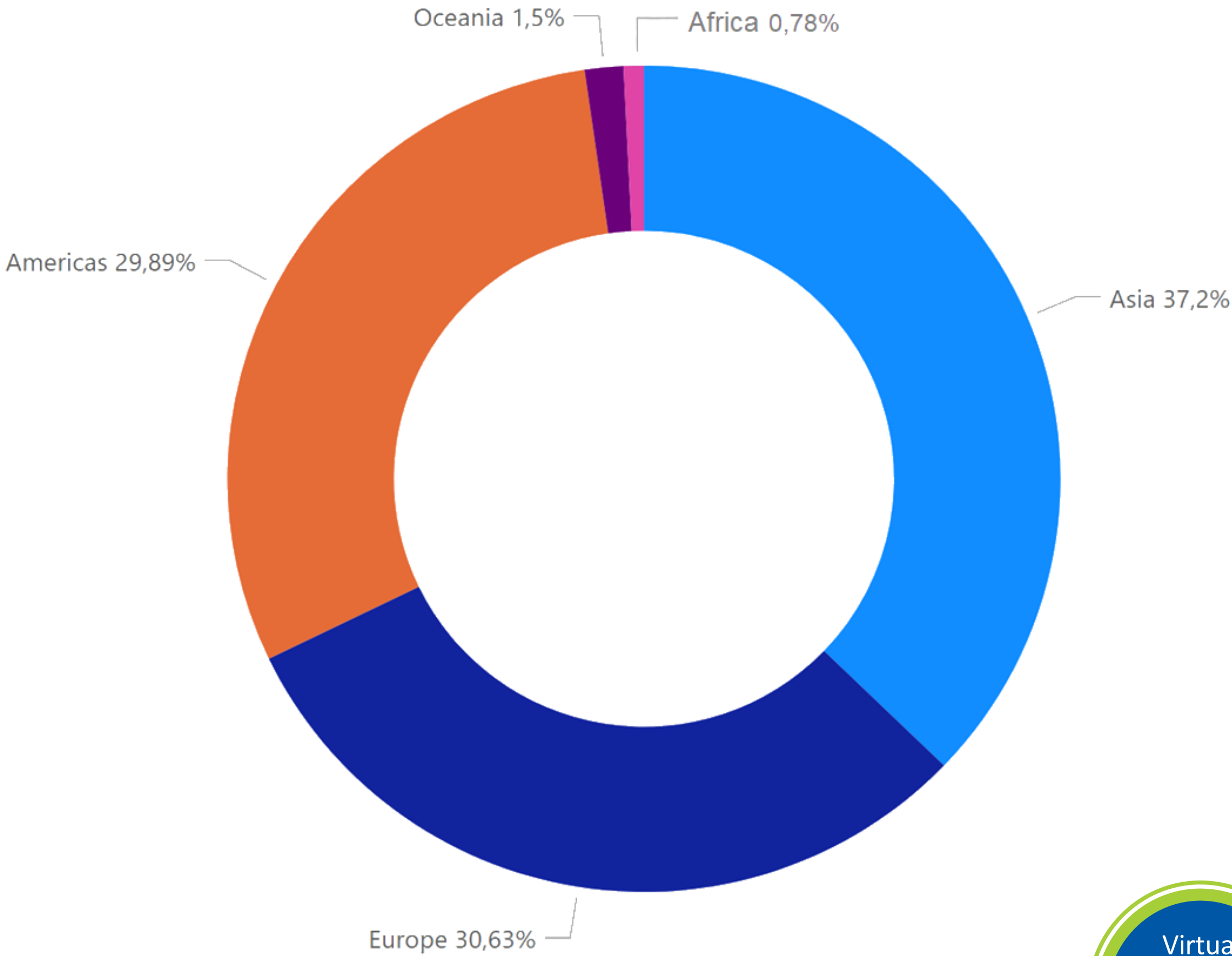
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ABOUT Terrasolid

- Founded in 1989, privately held
- Based in Finland
- 30 years of software development
- 20 years of point cloud software development
- Revenue 2019 14,8 M€
- Over 4500 TerraScan licenses sold to more than 2700 customers
- Global presence - customers in over 90 countries
- Global market leader in airborne and mobile laser point cloud processing with an estimated 85% market share

Terrasolid

CUSTOMER LOCATIONS 2021

REVENUE BY REGION 2020

Oceania 1,5%

Africa 0,78%

Americas 29,89%

Asia 37,2%

Europe 30,63%

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DATA SOURCES

APPLICATION FIELDS

SOFTWARE TOOLS

Airborne

Mobile

UAV

Handheld

Backpack

LiDAR

Photogrammetric point clouds

3D City models

Building vectorization

Orthophotos /Wall textures

Integration of DTM, vector models, point clouds and imagery

Tree mapping

Mapping and Observation

Roads, Railways, Power lines

**Open mines, Forests**

Topographic mapping

...

Calibration and adjustment

Point cloud classification

Image data processing

Vector data production

Data analysis

Visualization

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Project set-up

Obtain data

- [Finnish National Land Survey laser data samples](#)
  - [L4144A1.zip](#) 520,2MB
- Finnish National Land Survey Ortho & Topographic vectors
  - Ortho L4144A JPEG2000 102MB
  - Vectors ESRI Shapefile 4,5MB
- [OpenStreetMap vectors](#)
  - Bounding Box:
  - 2MB OSM-file

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24.8060		24.8857
	60.4263	

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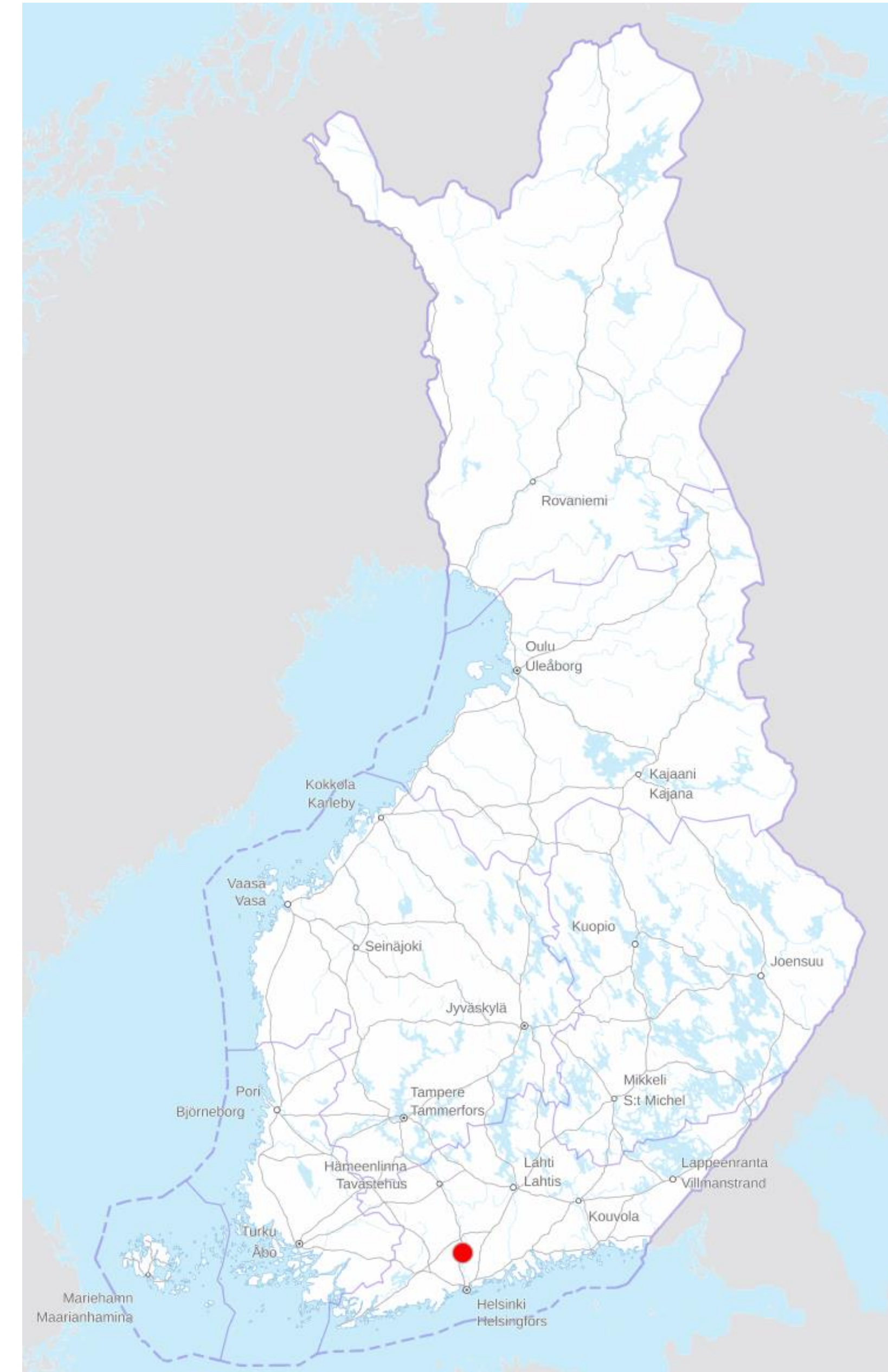
Project set-up

- Create CAD design file

- Define point class file

- Define project with TerraScan

- Read points into project

  - Software has several optional ways to set up blocks depending on data format

  - Blocks can be defined using files, as data is pre-processed

  - Convert point storage format for faster processing
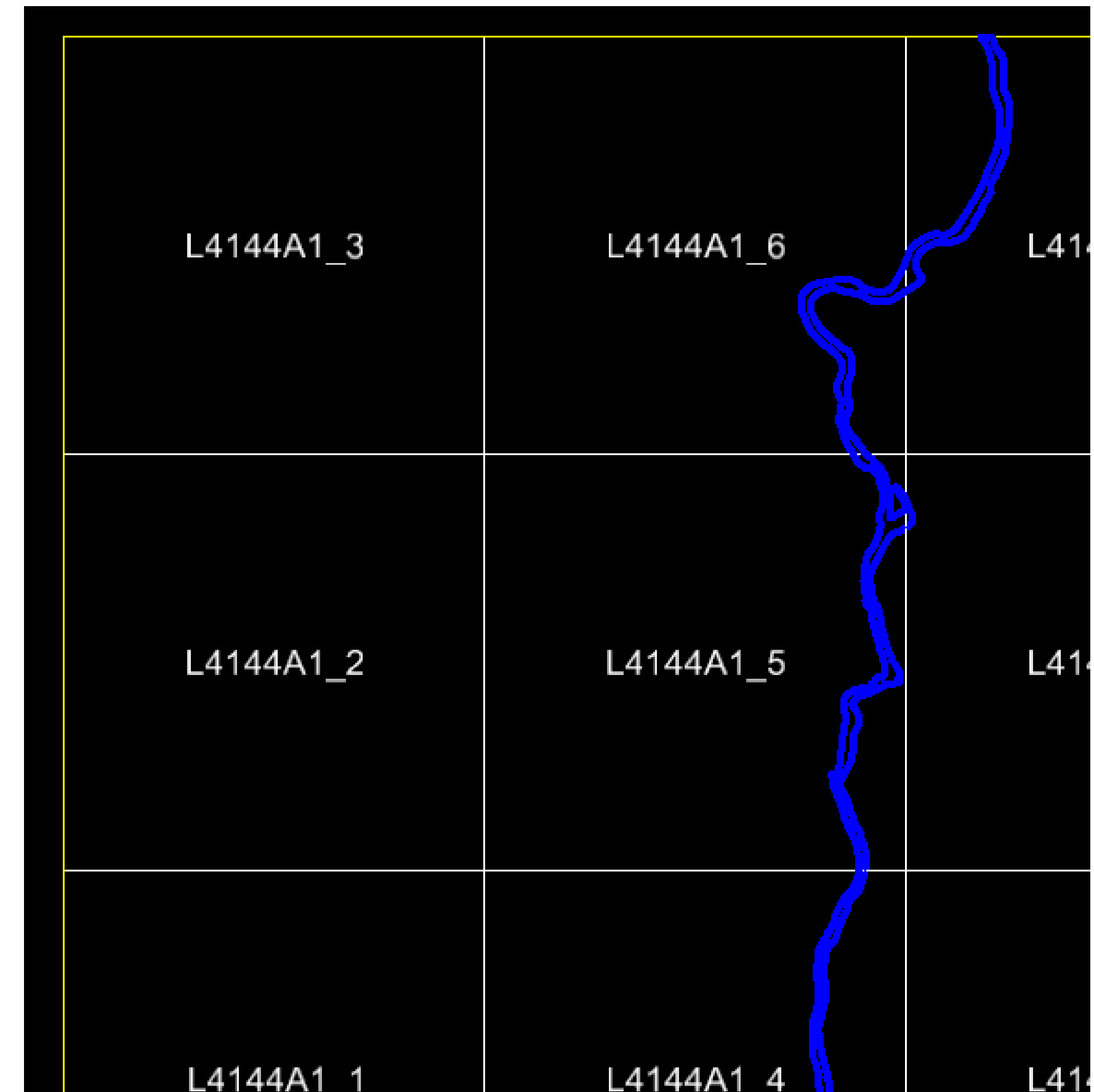
# Improving point cloud usability

Extracting color from images

- Color improves visual readability of the data
- However, using ortho images has weaknesses, e.g.
  - Vertical surfaces, like walls are not visible
  - LiDAR might capture points below canopies, those are not visible to ortho
 - Date of image and point capture may not match

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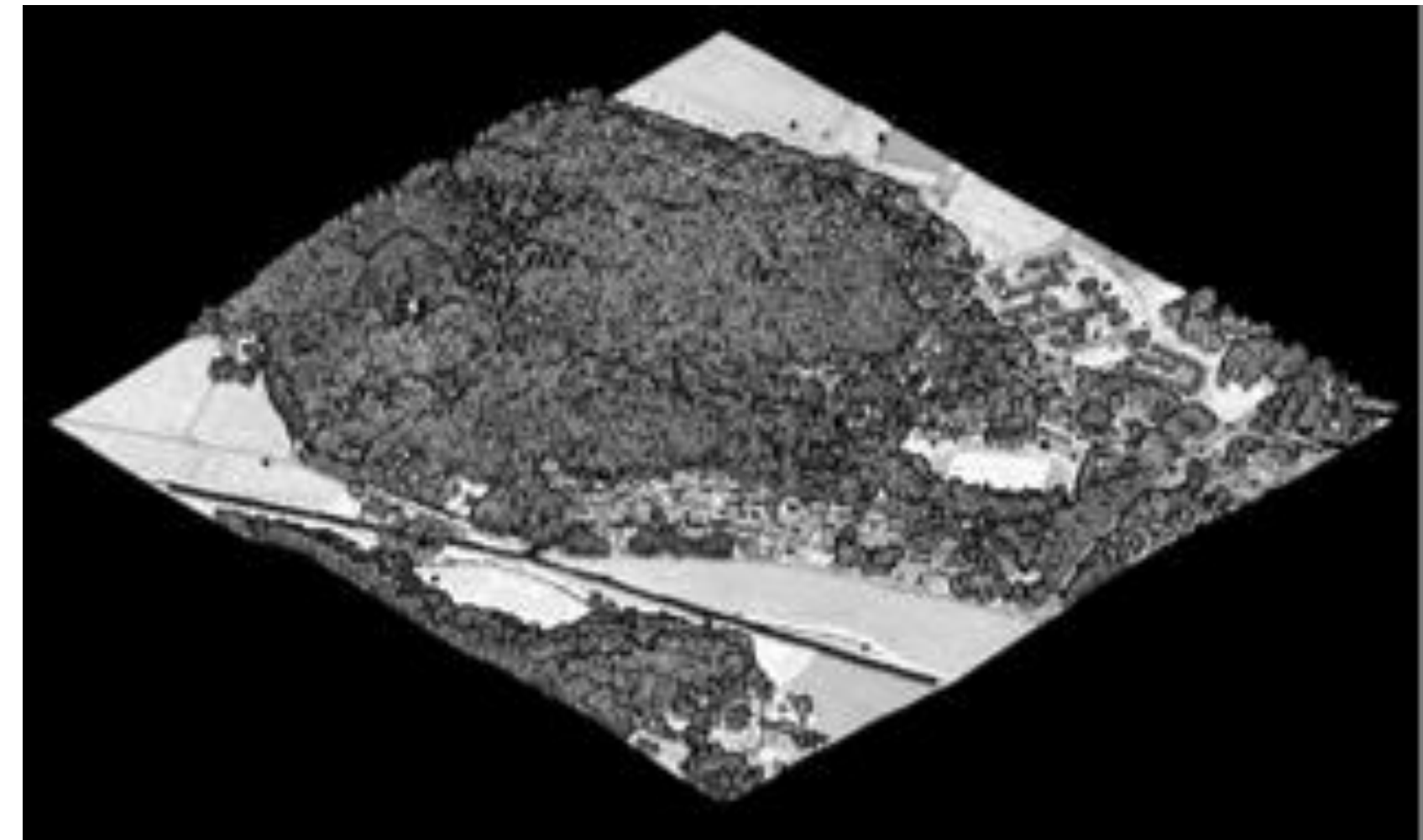
Improving point cloud usability

Filling holes with synthetic points

- Fill empty areas with "Add synthetic point" -tool
  - Data collection with LiDAR may leave some empty areas to the data (e.g., water bodies and under bridges). If point cloud is used for visualization, it might be necessary to fill these holes in the material
- Points can be placed by hand or using vector elements
- Point elevations can be adjusted to existing points

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Improving point cloud usability

Grouping point cloud
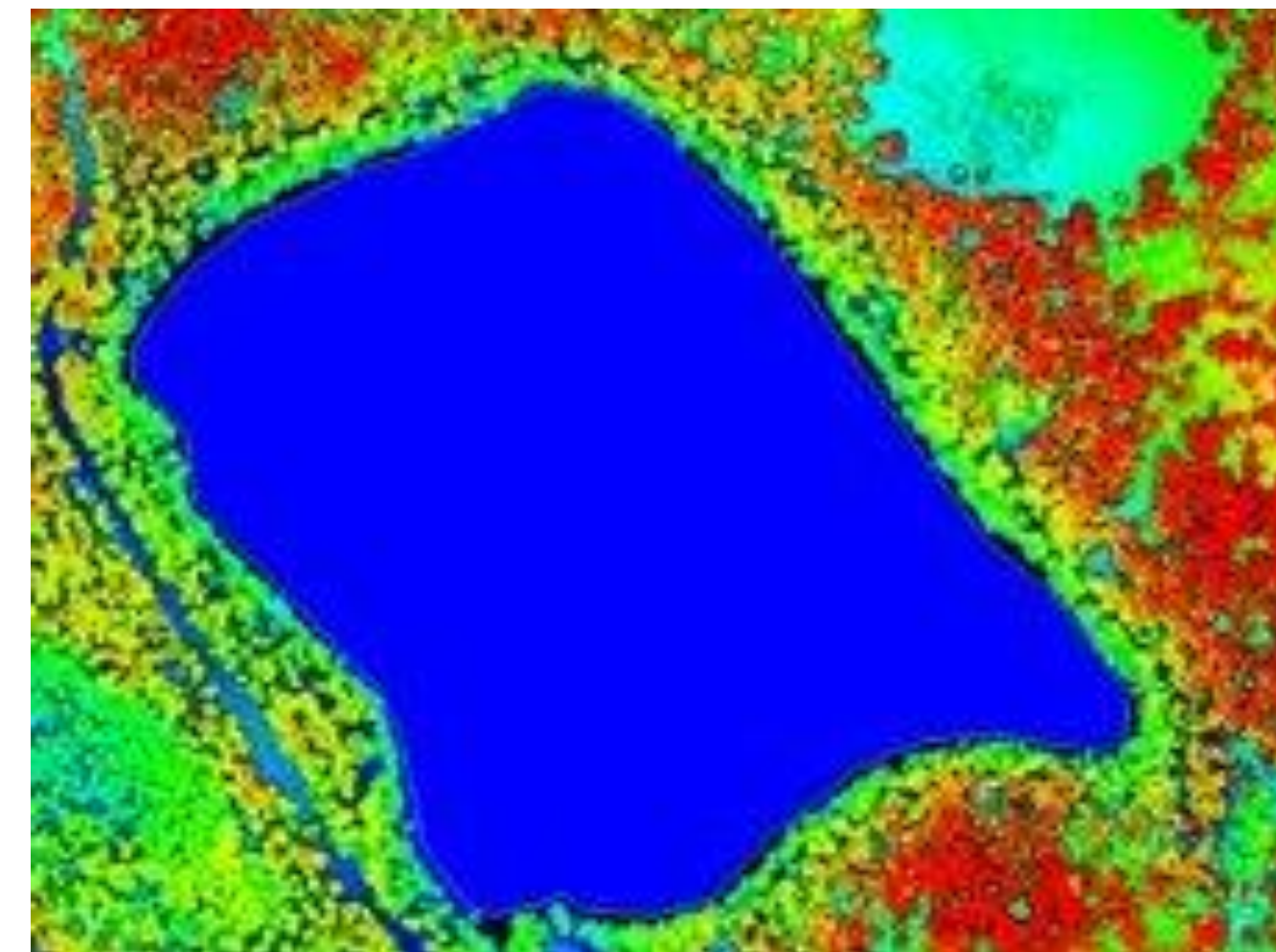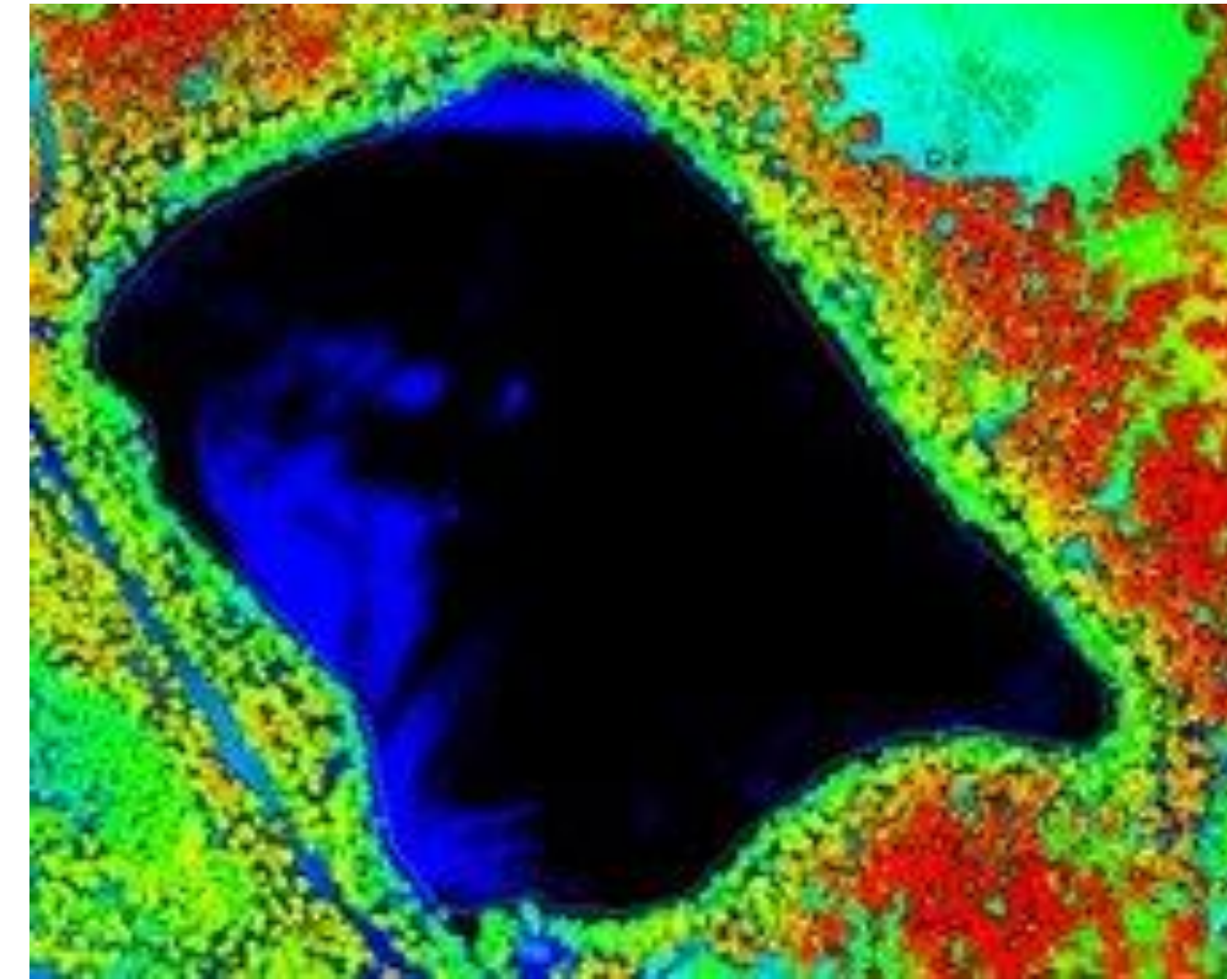
- Points itself lack **topology**. Grouping is a step towards automatic separation of real objects
- TerraScan implements several grouping algorithms and has tool for easy classification of most common objects **by-best-match**
- Grouping may (depending on the method) require additional parameters (distance to ground, normal vectors etc.)
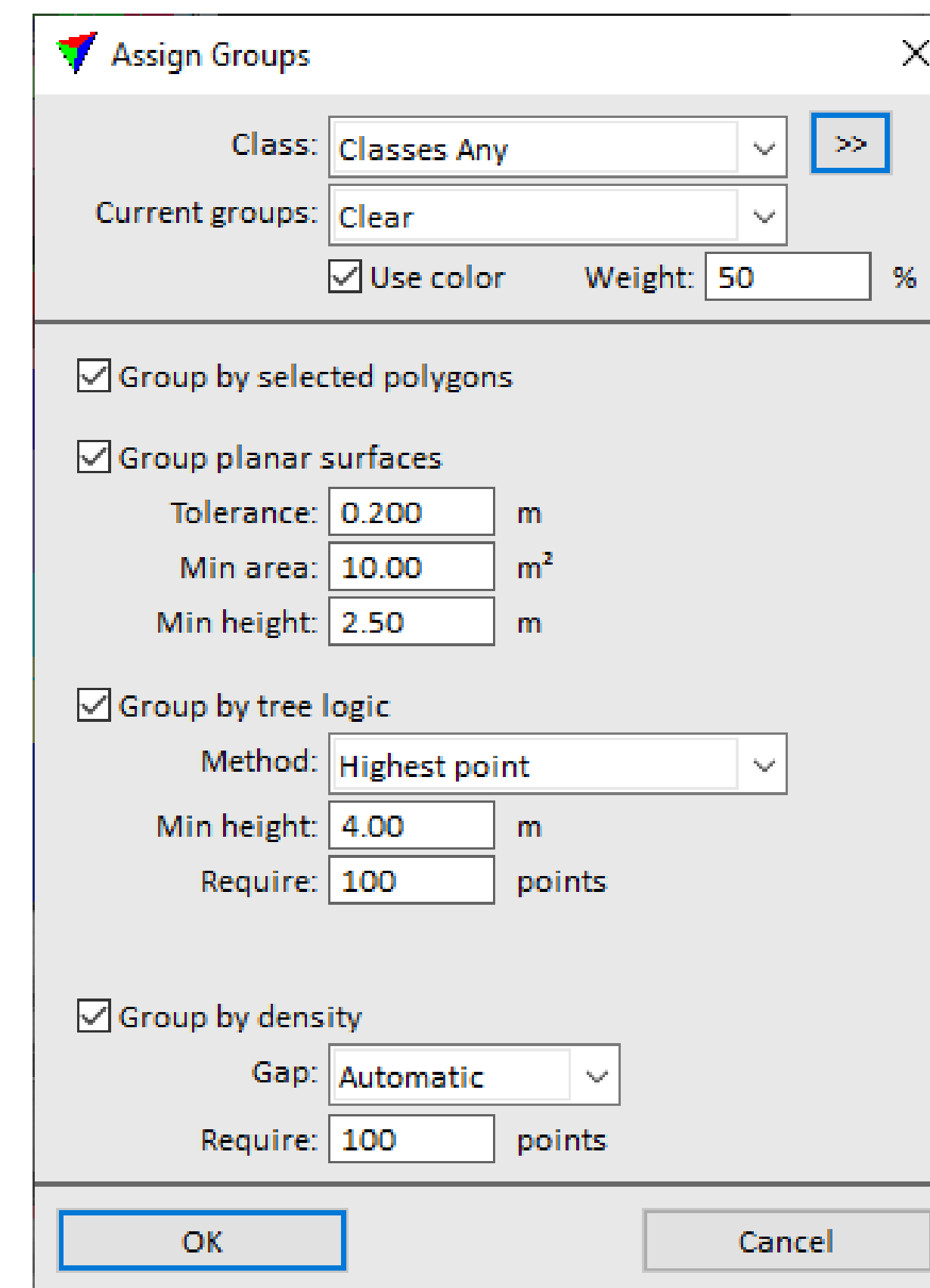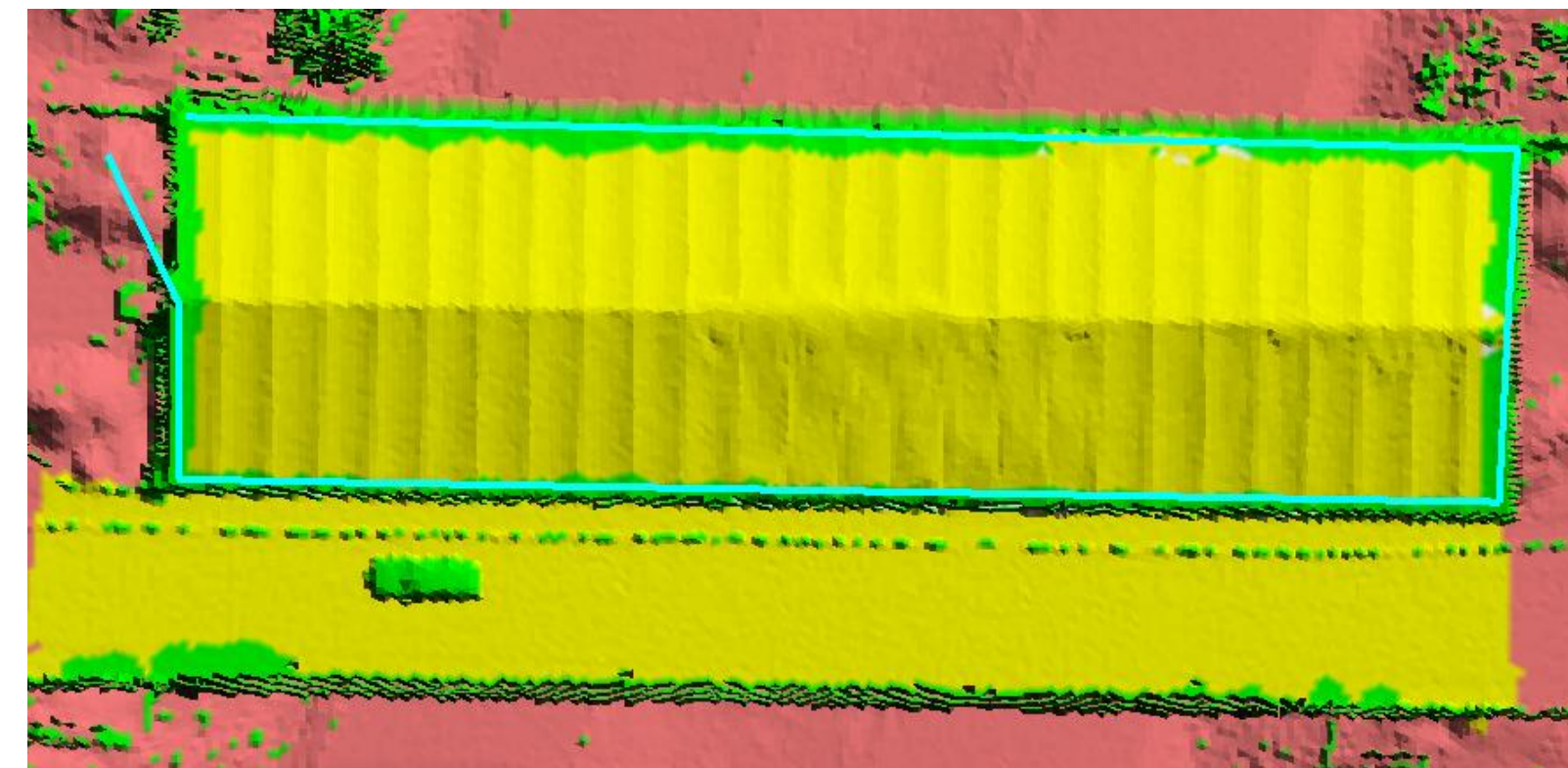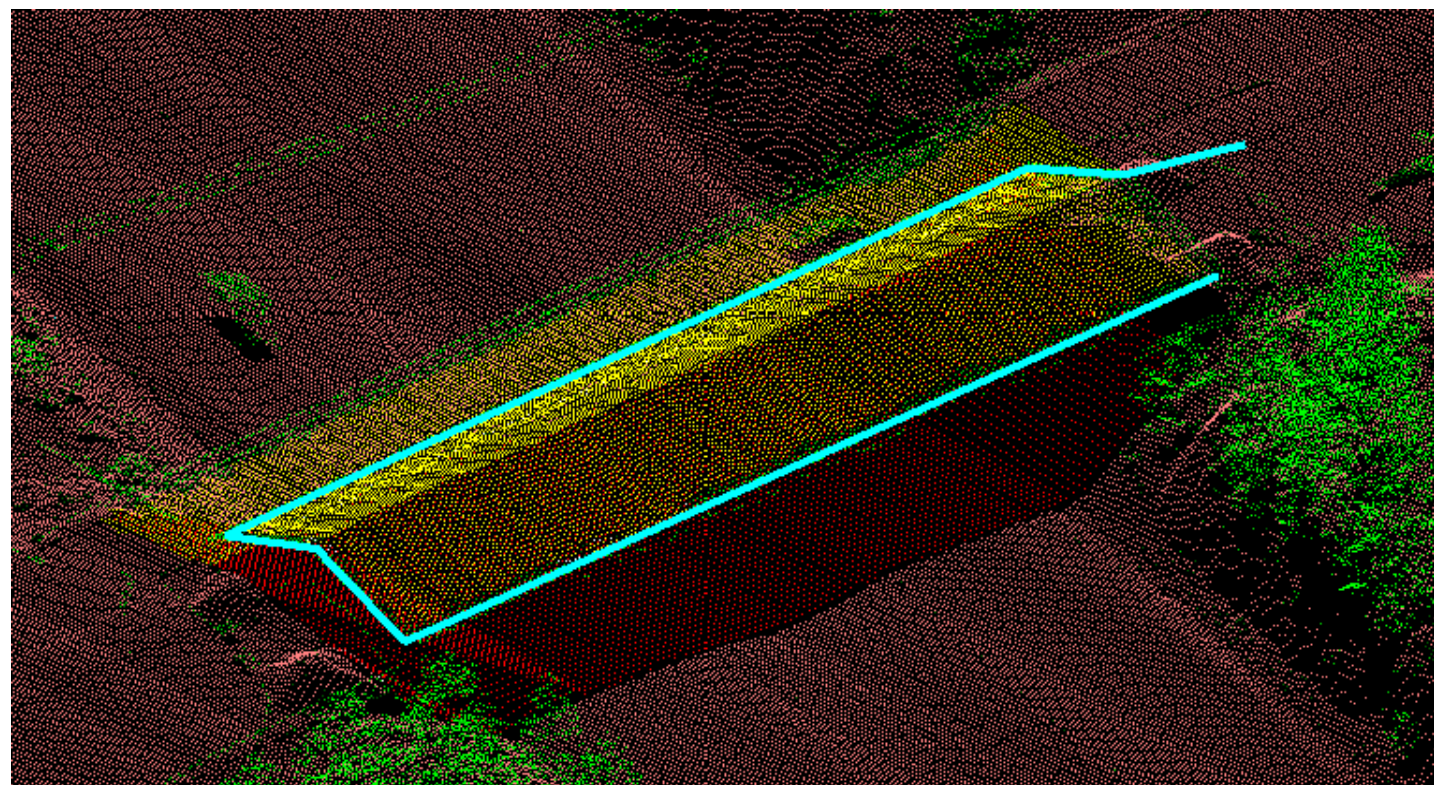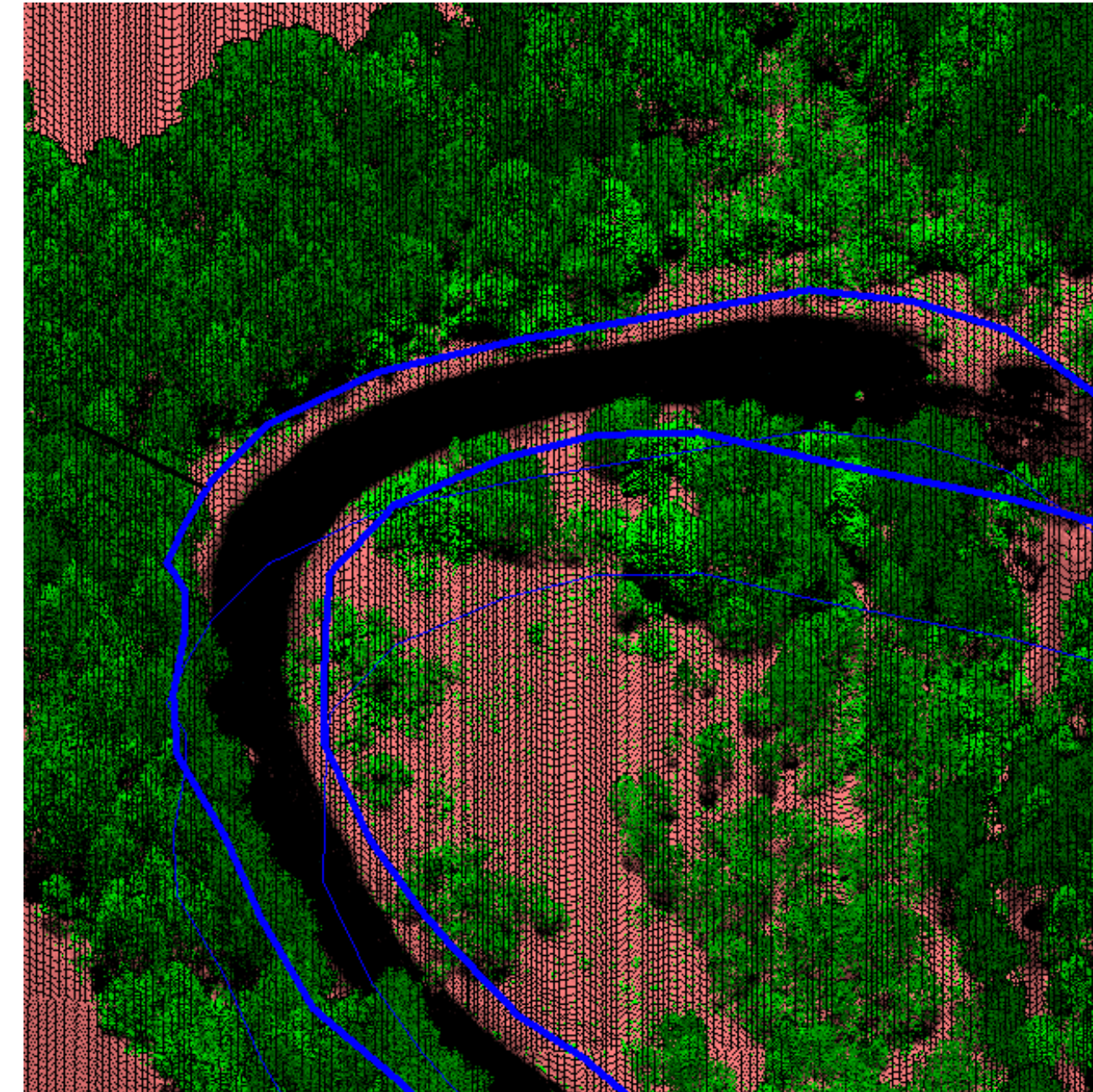
Producing content

Digitizing elements

- Use "Mouse point adjustment" to snap the cursor to point cloud when drawing

Draping elements

- Adjust vector elements to correct elevation with the help of point cloud/elevation model
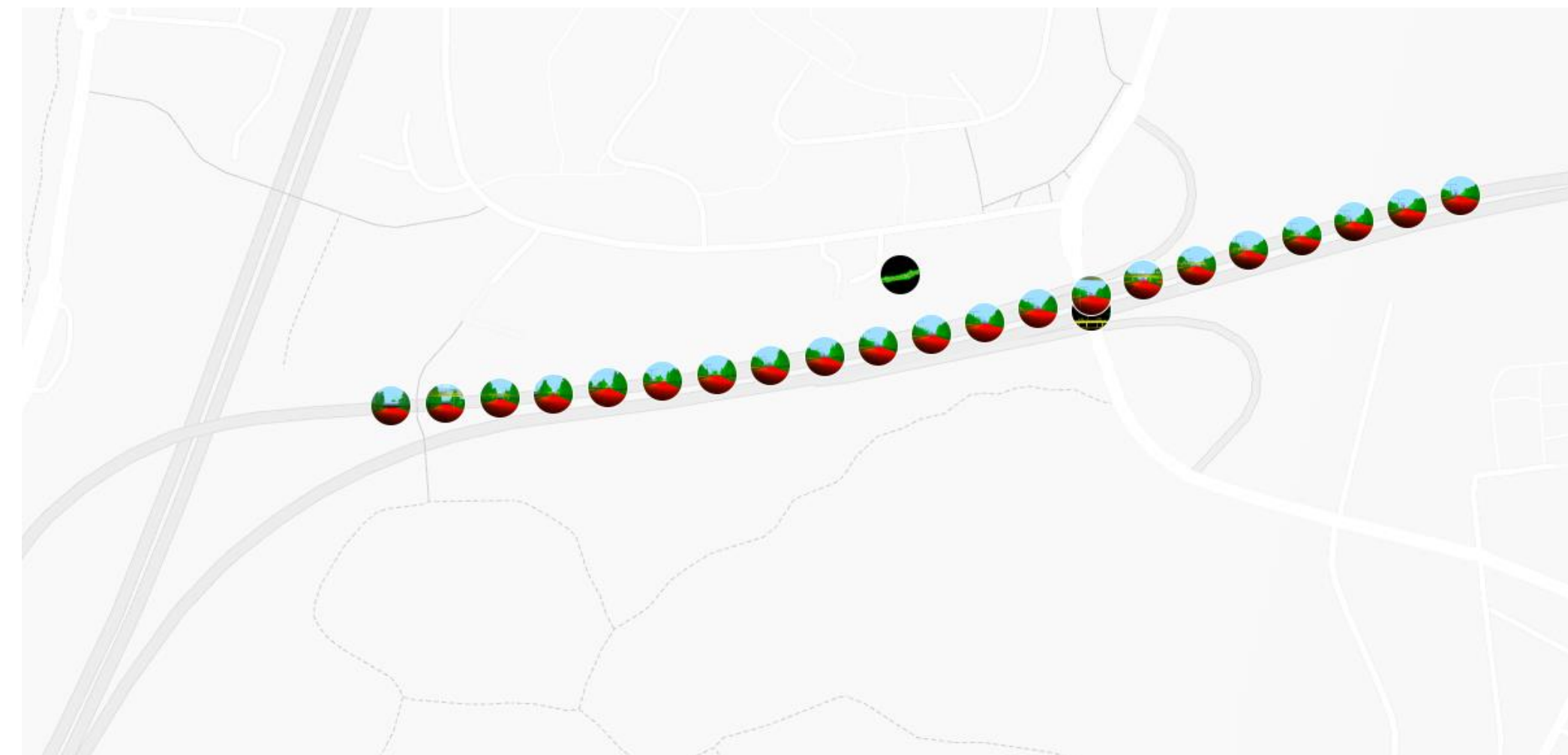
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Producing content

Render views with TerraPhoto

- Tools help to deliver controlled results
- Rendering may include both points and CAD-elements
- Software can write geolocation directly to produced image files to help sharing
  - Geolocated images could e.g., be added on a map easily

Wrap-up

What did we learn?

- Project workflow structure typical for public data
- Common processing steps in practice
- Glimpse of some simple end results

What's next?

- Other webinars of the event
- Material on our website (manuals, videos, future trainings, FAQ)
- Material on our Youtube-channel (Demonstrations and tutorials)

Questions?

- Ask now!
- Email me: antti.jarvenpaa@terrasolid.com

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THANK YOU!

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