

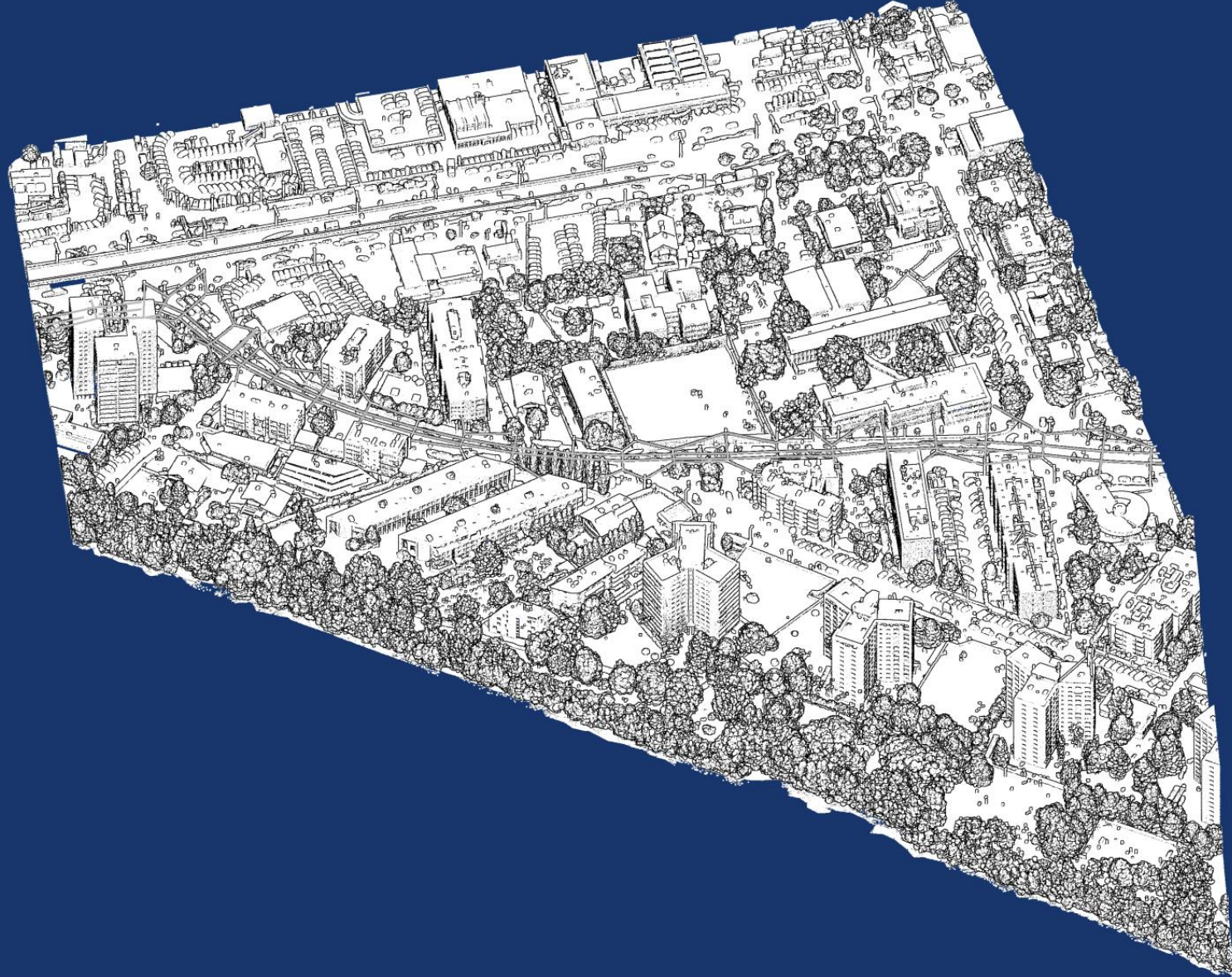


**Terra
solid**

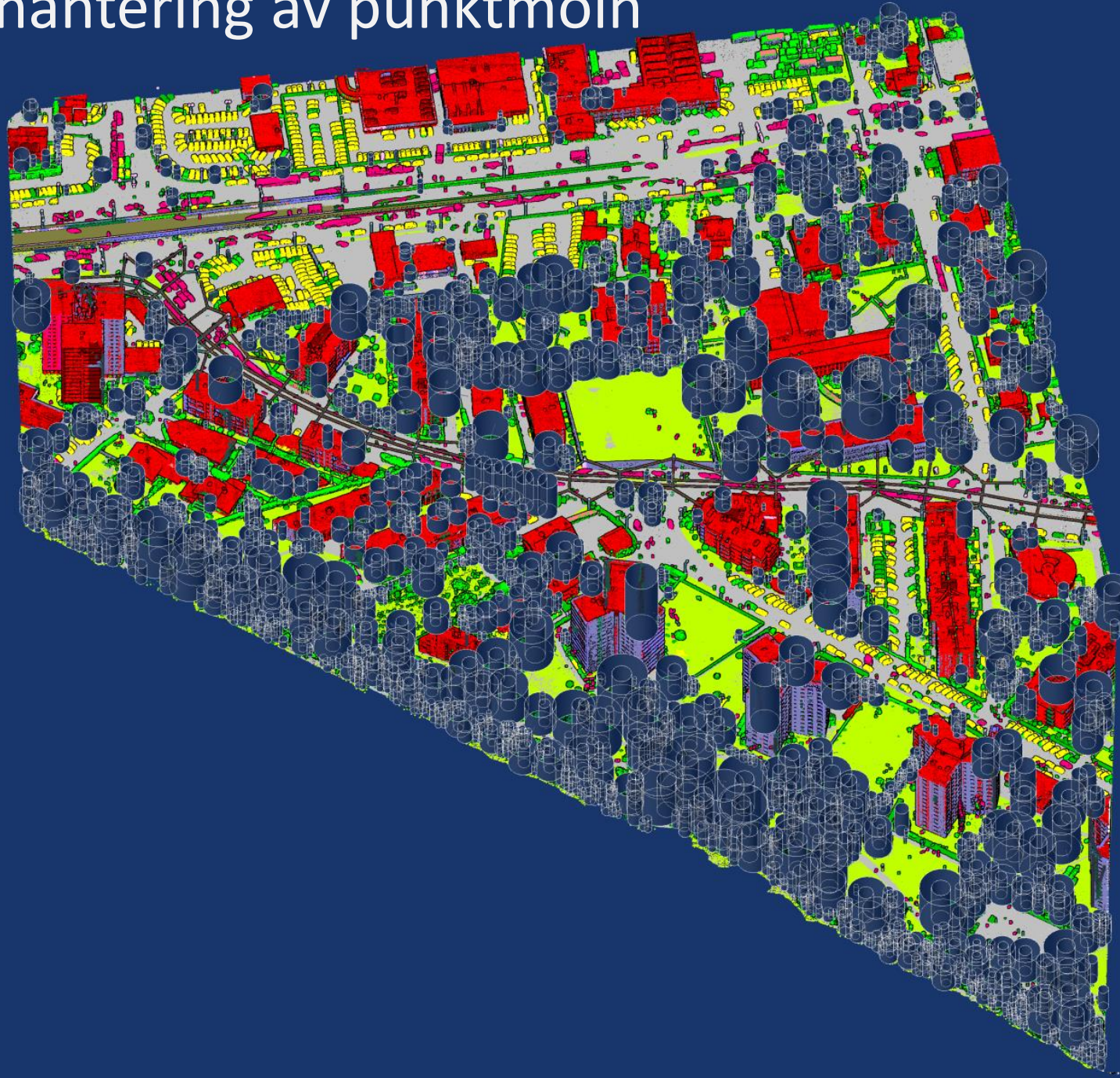
POINT CLOUD INTELLIGENCE

Helén Rost

Programvara för hantering av punktmoln



Programvara för hantering av punktmoln

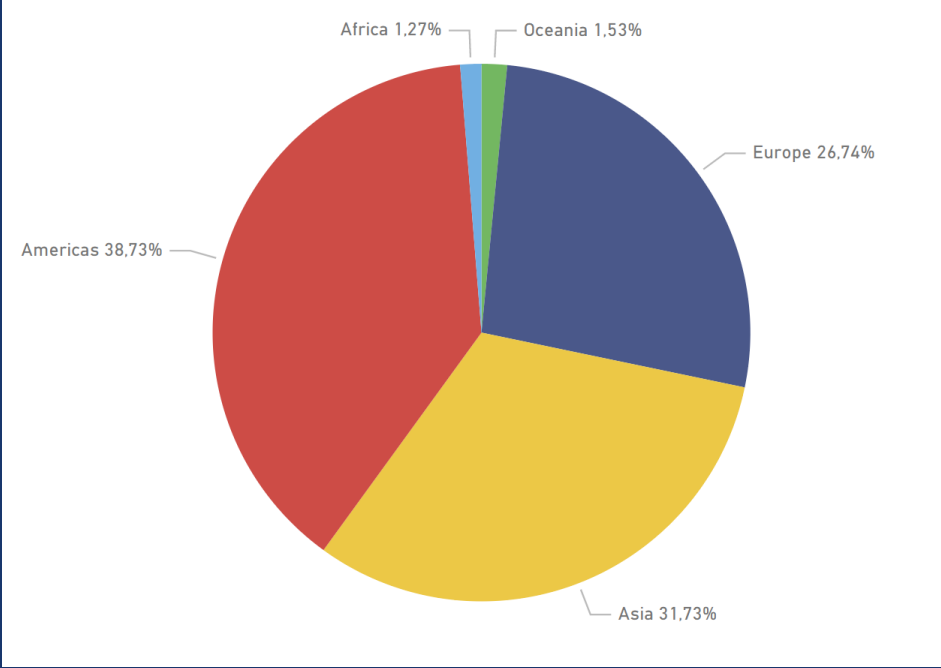
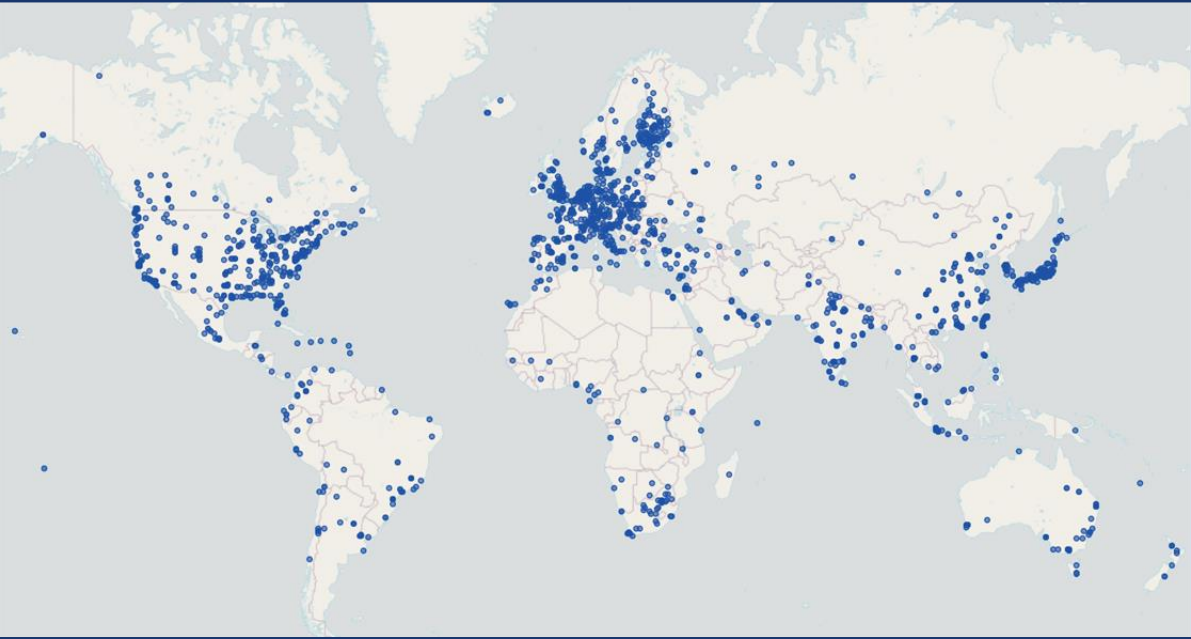


Terrasolid

- Startades 1989, privat företag
- Baserat i Finland
- 30+ år av mjukvaruutveckling
- 25 år av mjukvara för punktmoln
- Ca 6 000 TerraScan-licenser
- Globalt – kunder i mer än 100 länder



Terrasolid



Lösningar



Stor verktygslåda för punktmoln

Buildings

- Tool Reference
- Vectorize Wires
- Vectorize Towers
- Displayset toolbox
- Draw toolbox

Building Patches

- TerraModeler Settings
- 2D Contour
- Create Surface
- Display Line
- Display Single Contour
- Display Surface toolbox
- Domains toolbox
- Draw using Surface toolbox
- Paint Markings
- View Powerline
- Wizard pulldown menu
- Manage Trajectories
- Commands

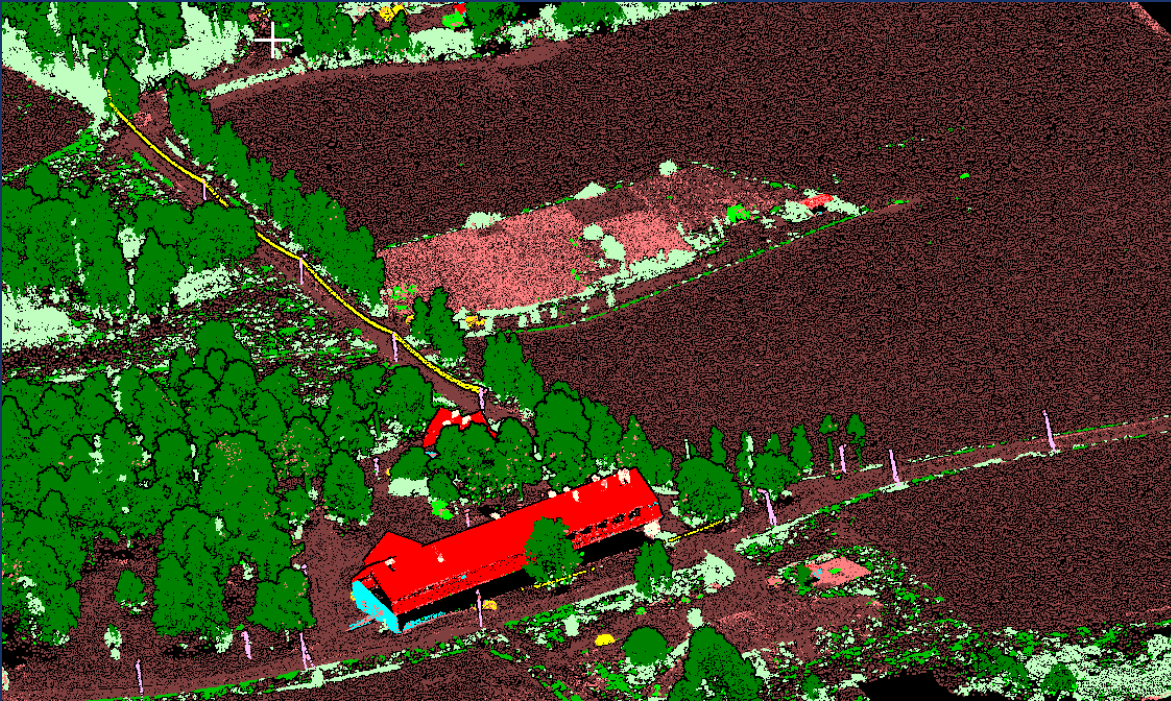
Building Edges

- TerraScan Window
- Classify pulldown menu
- Group pulldown menu
- File pulldown menu
- Line pulldown menu
- Measurement pulldown menu
- Output pulldown menu
- Point pulldown menu
- Walls
- Lattice Database
- Key-in commands/Spaccels

Other Toolbars and Panels

- Points pulldown menu
- TerraMatch Settings
- Met
- ALS Calibration
- Railroad
- Combine rotation angles
- Key-in commands/Spaccels
- Matching with Tie Lines

Wizard



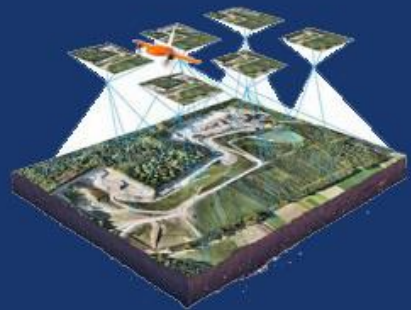
Process Drone Data

- Split trajectory [Settings...](#)
- Match passes [Settings...](#)
- Cut overlap [Settings...](#)
- Smoothen and remove noise [Settings...](#)
- Thin points to inactive [Settings...](#)
- Classify ground [Settings...](#)
- Check ground
- Classify height from ground [Settings...](#)
- Classify above ground features [Settings...](#)
- Copy result to inactive points [Settings...](#)
- Copy result to noise points [Settings...](#)

[OK](#) [Cancel](#)

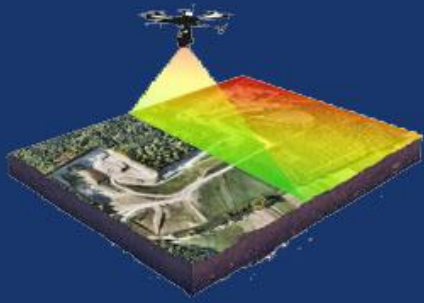
Hanterar olika typer av punktmoln

Från flera olika datakällor
Från flera olika system och plattformar
Små som stora datamängder



PHOTOGRAMMETRY

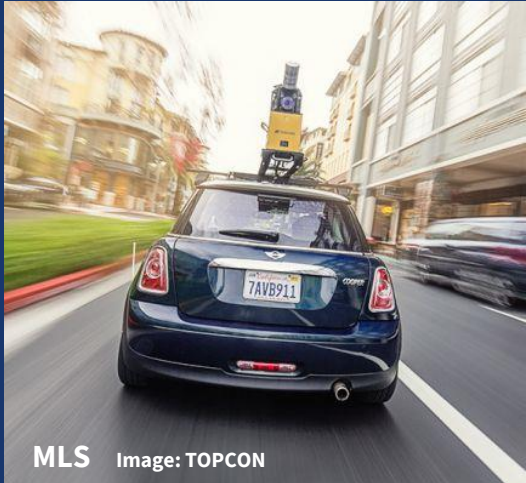
Image: Wingtra



LASER SCANNING



ALS Image: HELINET



MLS Image: TOPCON



UAV Image: Phoenix LiDAR



HANDHELD Image: GEO-SLAM

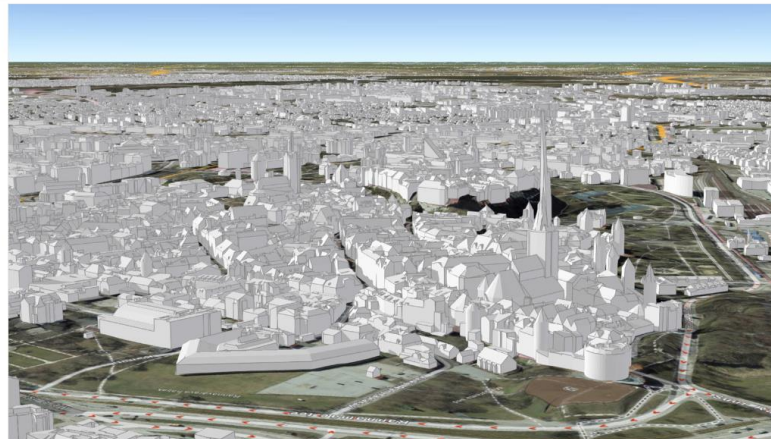
Tillämpningar - exempel

3D-stadsmodell



Point cloud as 3D City Model

Colorized and georeferenced point cloud, with or without already collected vector data, provides a sound platform for several municipal applications. This example is from the wooden city centre of the town of Rauma, Finland which is listed as a UNESCO World Heritage Site. TerraStereo is a stand-alone application for visualizing very large point clouds fast and in high quality.



The first national 3D building model created using Terrasolid's TerraScan released

The Estonian Land Board produced the countrywide 3D building dataset by combining laser scanning point cloud with 2D buildings data from Estonian Topographic Database (ETD). 3D representations of buildings, including roof structures (LOD 2) were created with TerraScan and later processed with tools provided by ArcGIS and FME. Attribute data was added to 3D building models by spatial joins to building footprints (ETD) and land parcels, resulting in rich set of semantic data (address, links to different national registries, etc.), as well as appropriate metadata. A perfect example of first steps in Digital Twin creation.

The 3D data can be viewed in application, hosted in ArcGIS Online <https://3d.maaamet.ee/kaart/>. The data is also available for download from Land Board's [Geoportal](#).



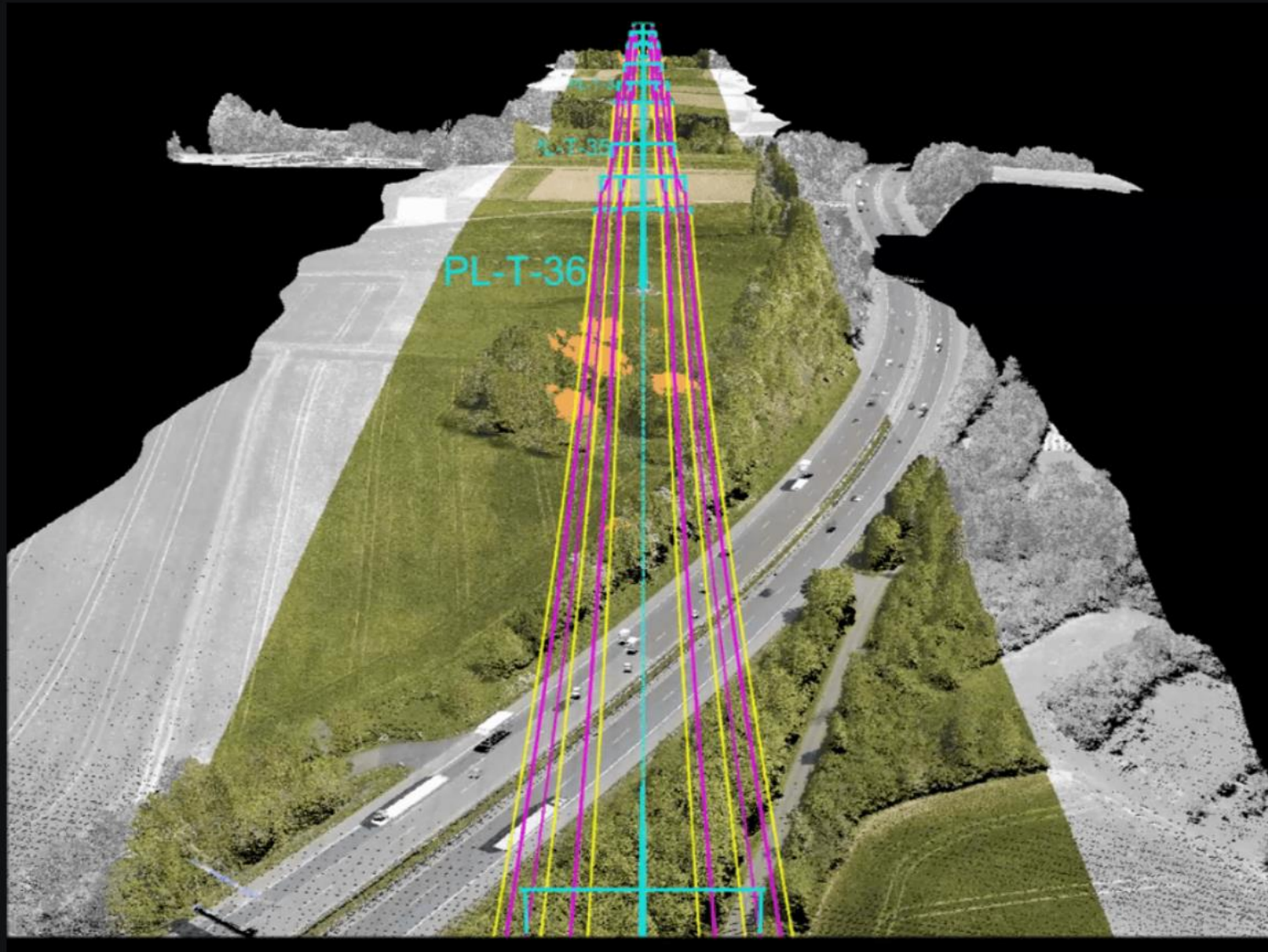
3D City Vector Model Downtown City of Hyvinkää

3D city model video rendering. Vector model created fully automatically from TerraScan classified point cloud. Textures for the roofs and walls are created from oblique images using TerraPhoto. True orthophoto created with TerraPhoto is draped on triangulated ground using TerraModeler.

<https://3d.maaamet.ee/kaart/>



Utility mapping – Powerline processing software



A 3D point cloud visualization of a powerline inspection project. The terrain is rendered in light blue, vegetation in green, and buildings in red. Yellow lines represent powerlines, and blue structures represent powerline towers. The scene is set against a black background.

POWERLINE INSPECTION

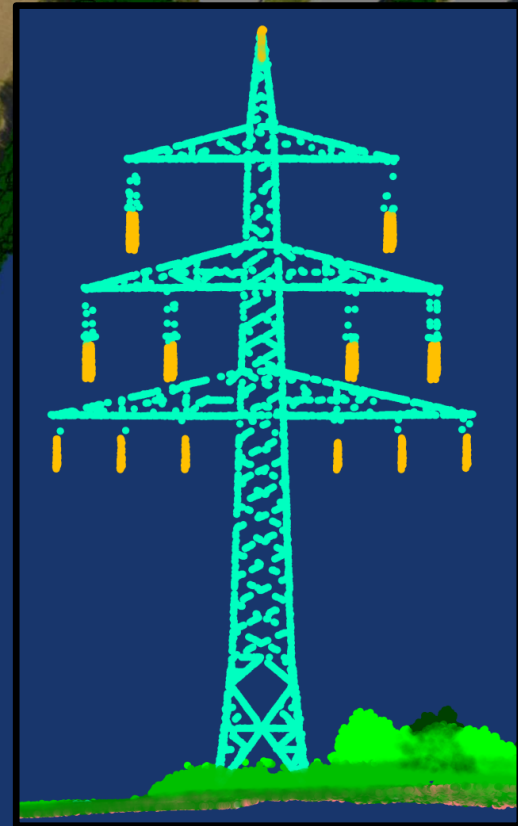
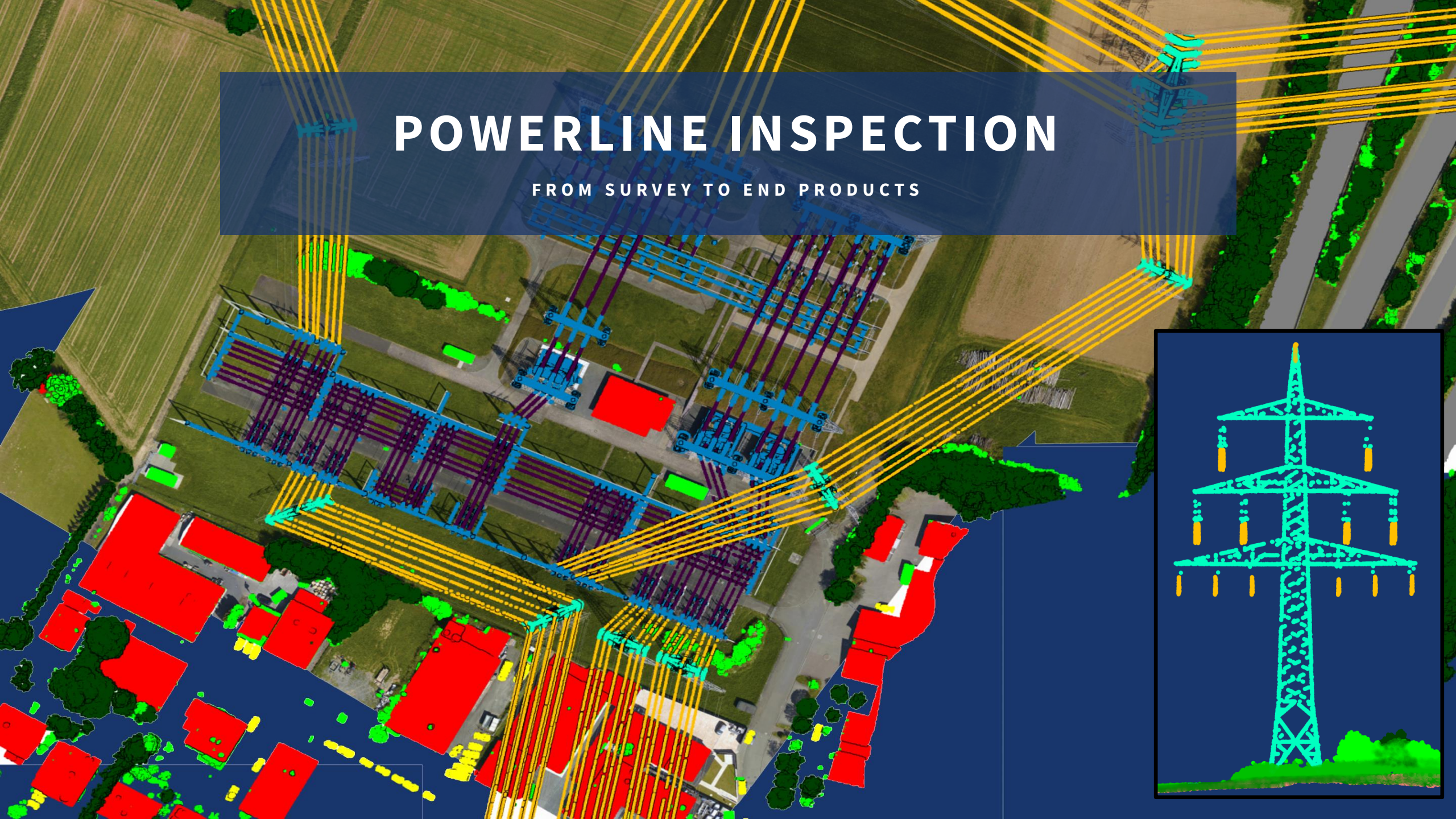
FROM SURVEY TO END PRODUCTS

Digitalization

Object
Encroachment

POWERLINE INSPECTION

FROM SURVEY TO END PRODUCTS



Vägar och gator



Results of TerraScan tools used to analyze and design road surface improvements

Terrasolid offers new tools to analyse the road surface and design a resurfacing model to for example optimize the milling and



Drive through point cloud

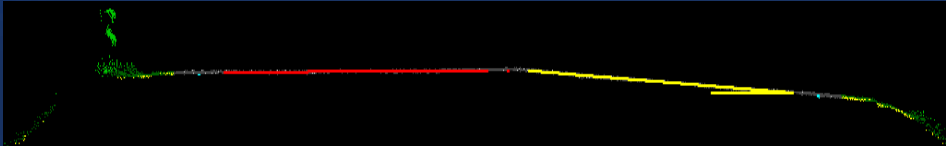
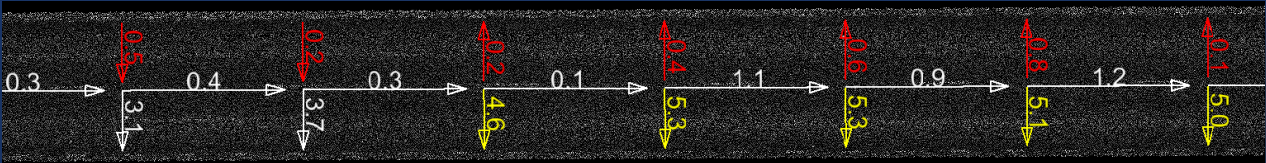
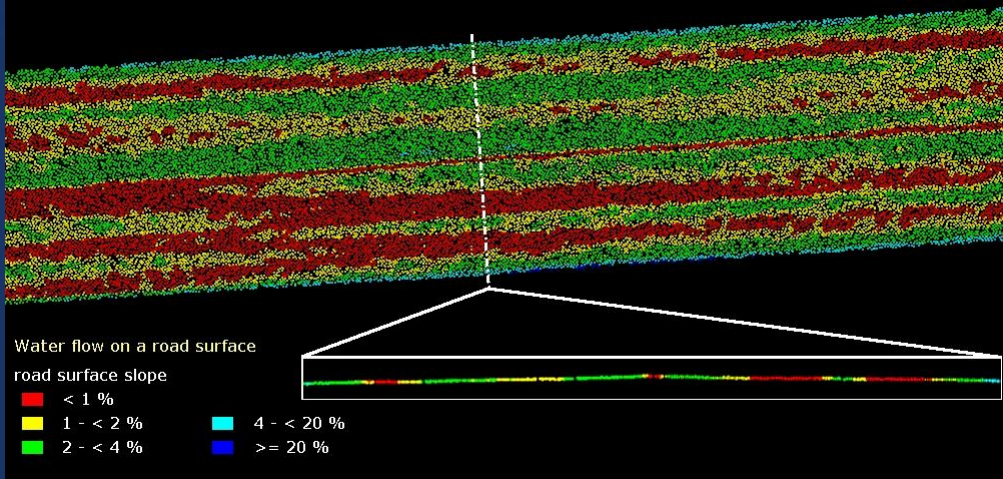
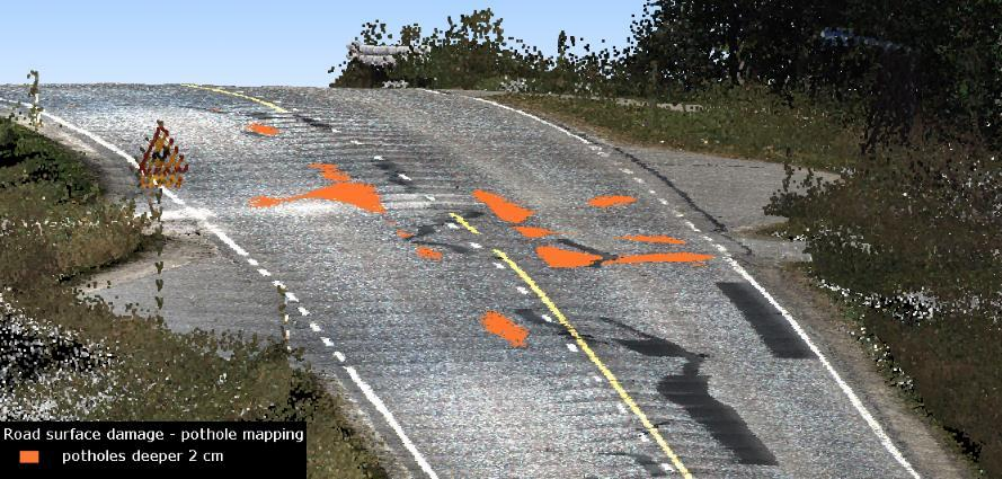
Drive through video of MLS captured point cloud rendered with TerraPhoto



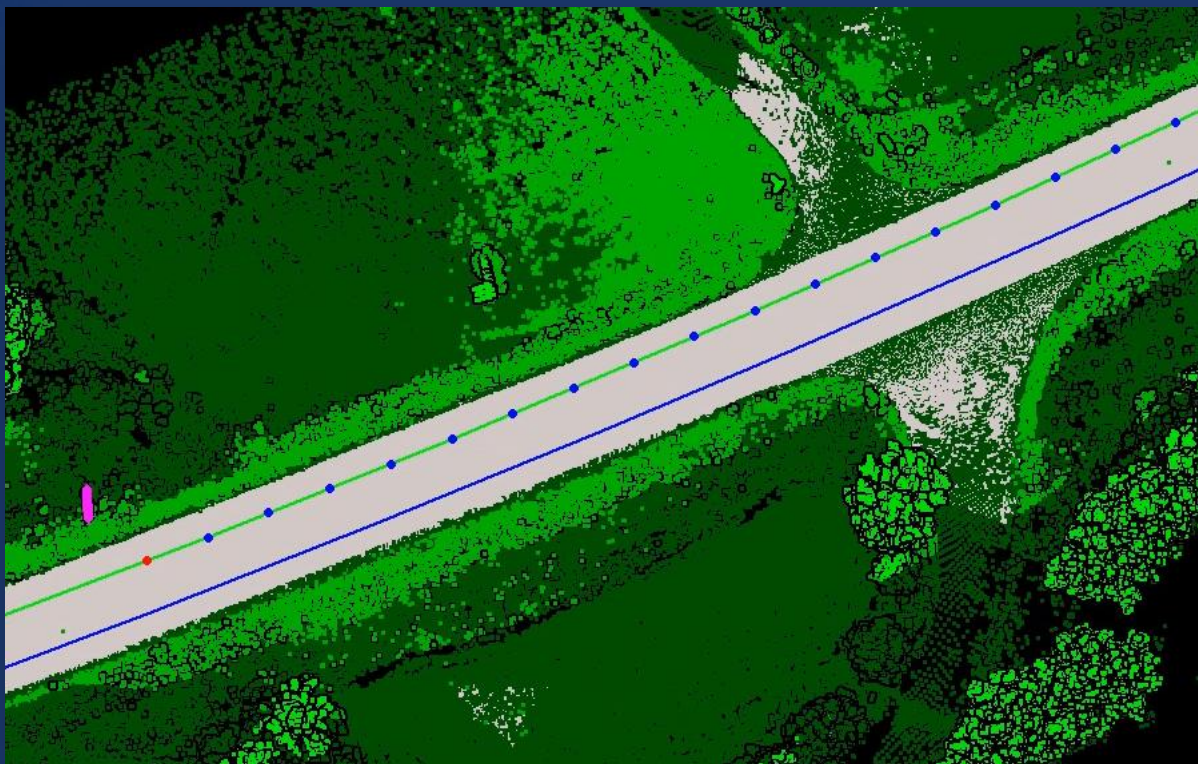
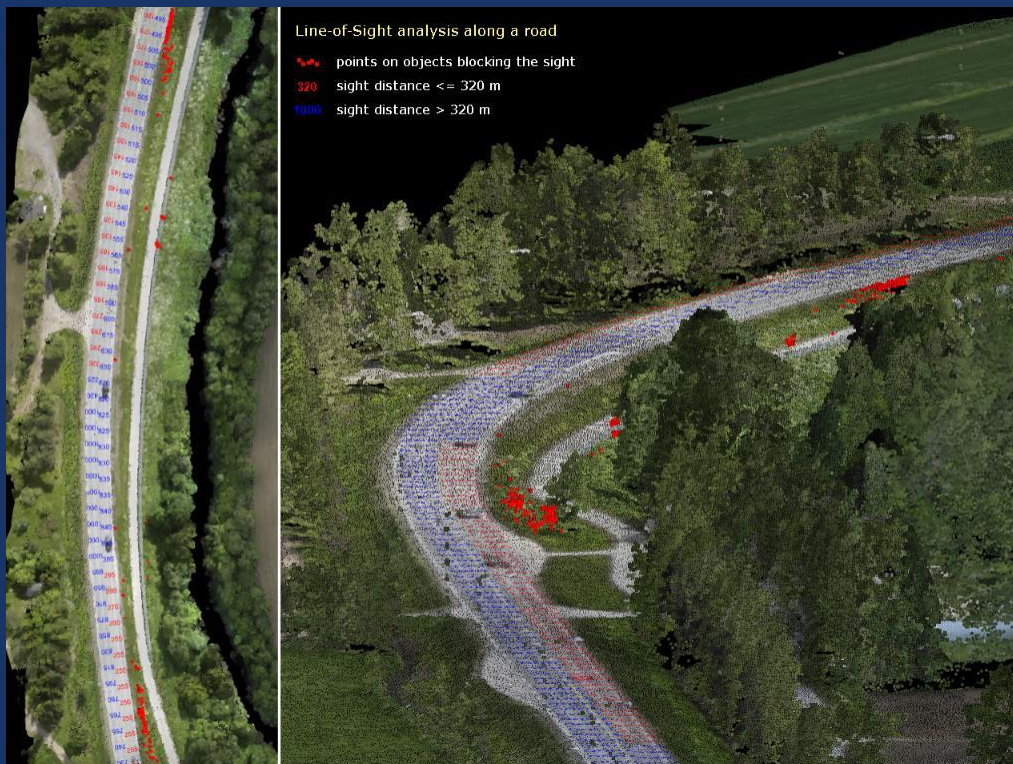
Moving object removal from MLS data

Remove moving objects using TerraScan

Vägar underhåll



Vägar underhåll – Siktanalys

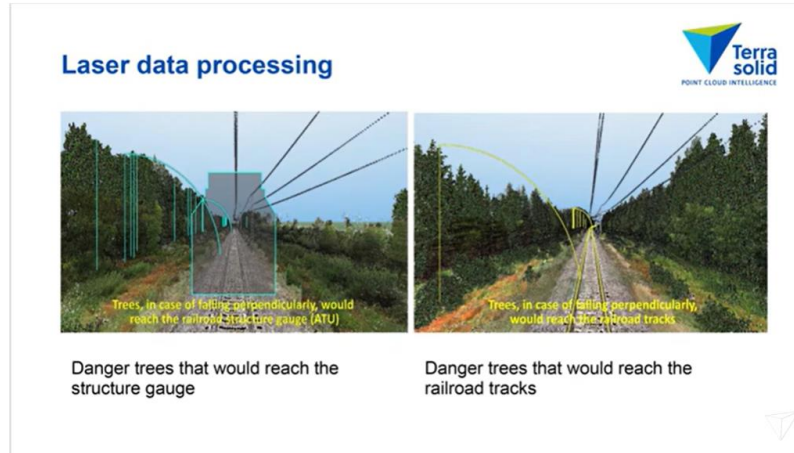


Järnväg



LIDAR in railroad maintenance and safety analysis - results of TerraScan project

LIDAR in railroad maintenance and safety analysis - results of TerraScan project



Danger trees that would reach the structure gauge

Danger trees that would reach the railroad tracks

LIDAR improves railroad maintenance and safety

Pilot project presentation describing how with the right processing, design and visualization tools mobile mapping will improve both the maintenance and safety of railroads. Project results can be seen in video "LIDAR in railroad maintenance and safety analysis - results of TerraScan project"



Helsinki Tram Network

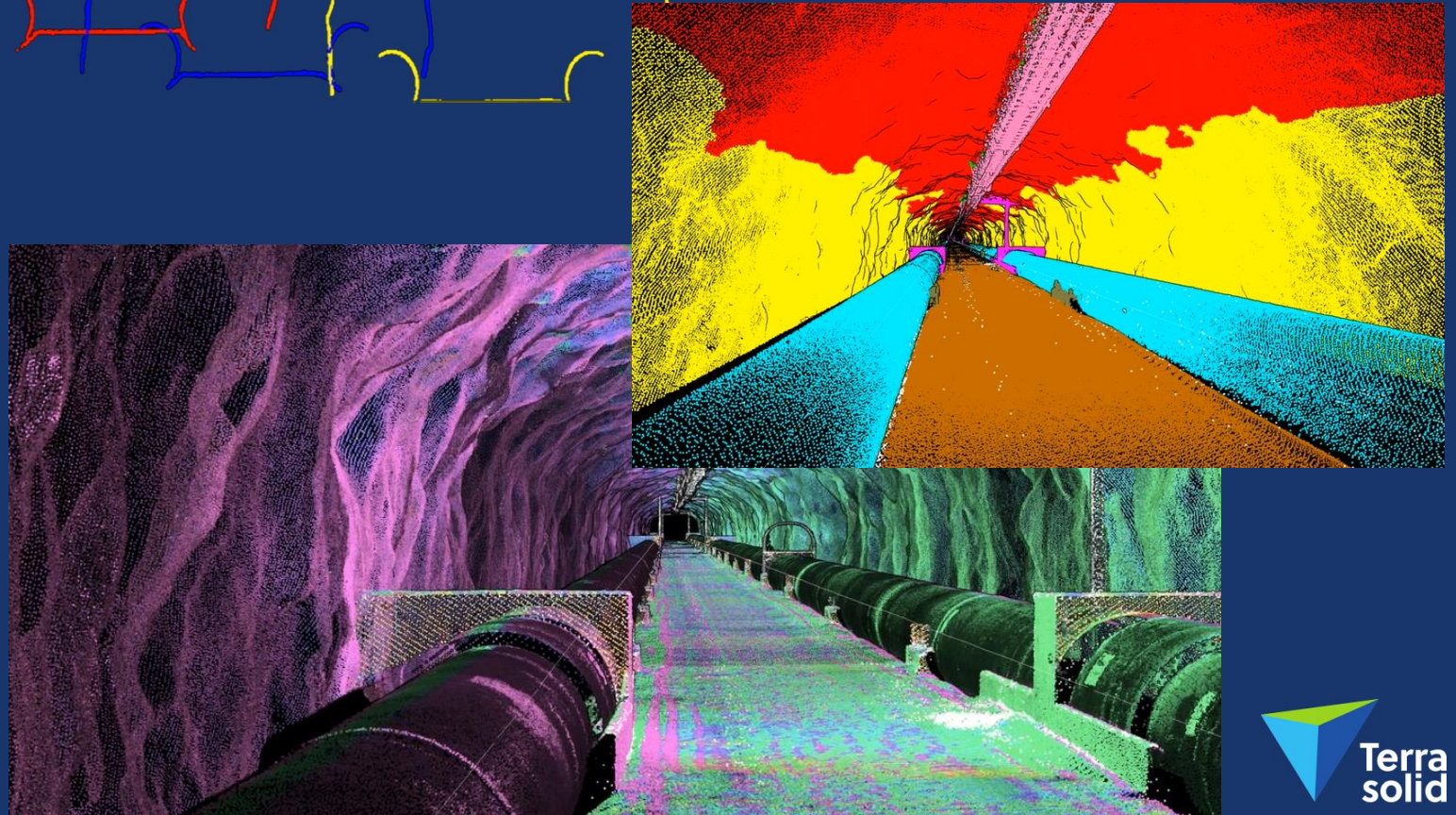
Terrasolid conducted a R&D project including scanning and data processing of the complete tram network of City of Helsinki. LIDAR data and images were acquired using the StreetMapper System mounted on top of a maintenance tram.

Tunnlar och pipelines

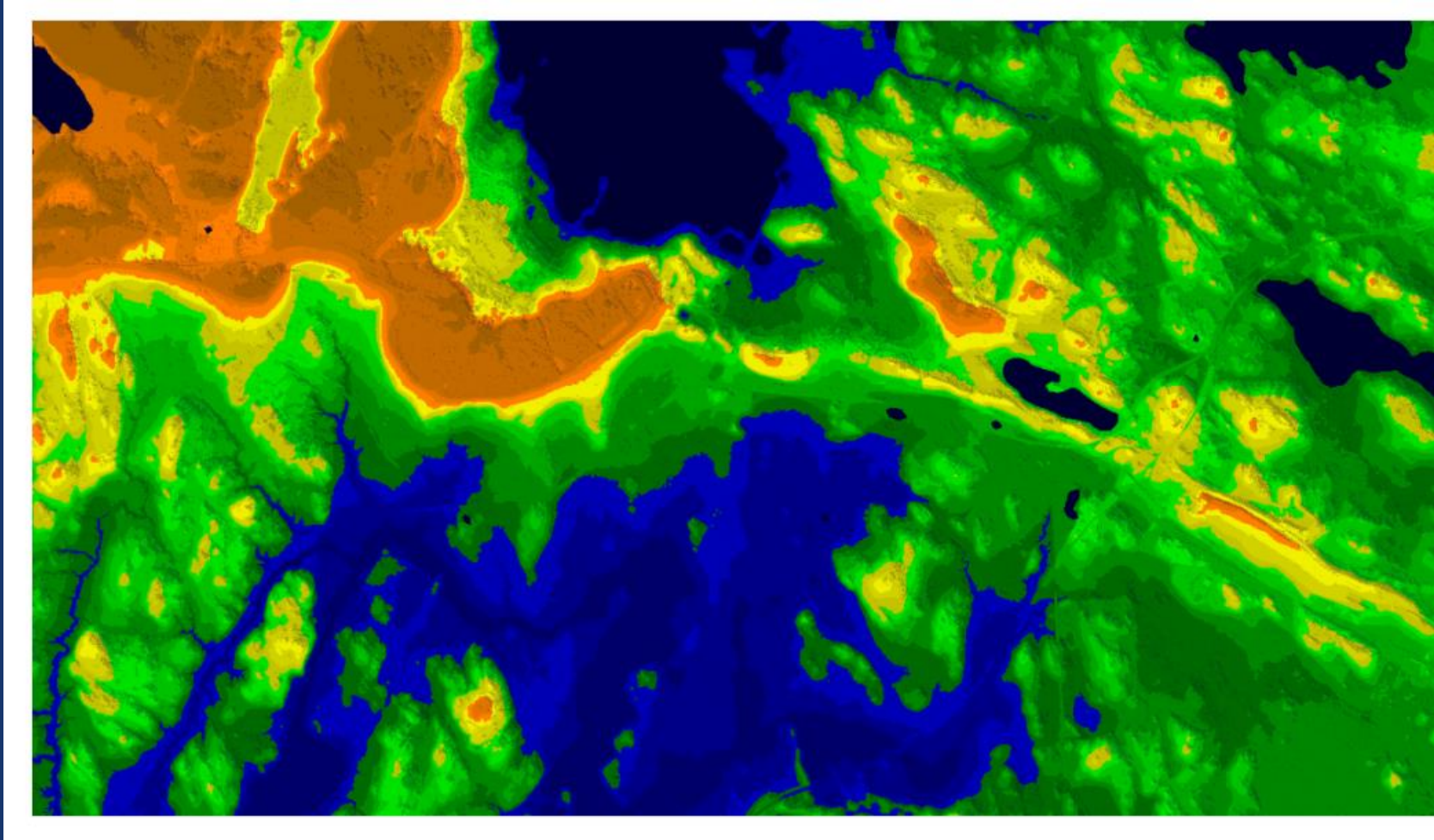
Geometrisk
korrigerig

Klassning

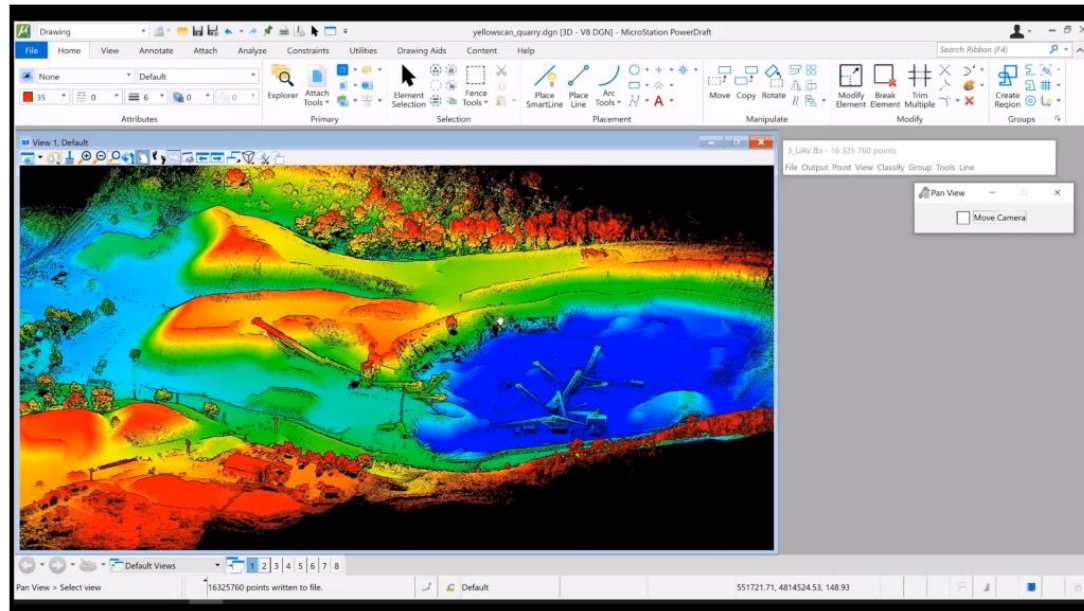
Design / volym



Vatten – avrinning, översvämning, erosion, ras

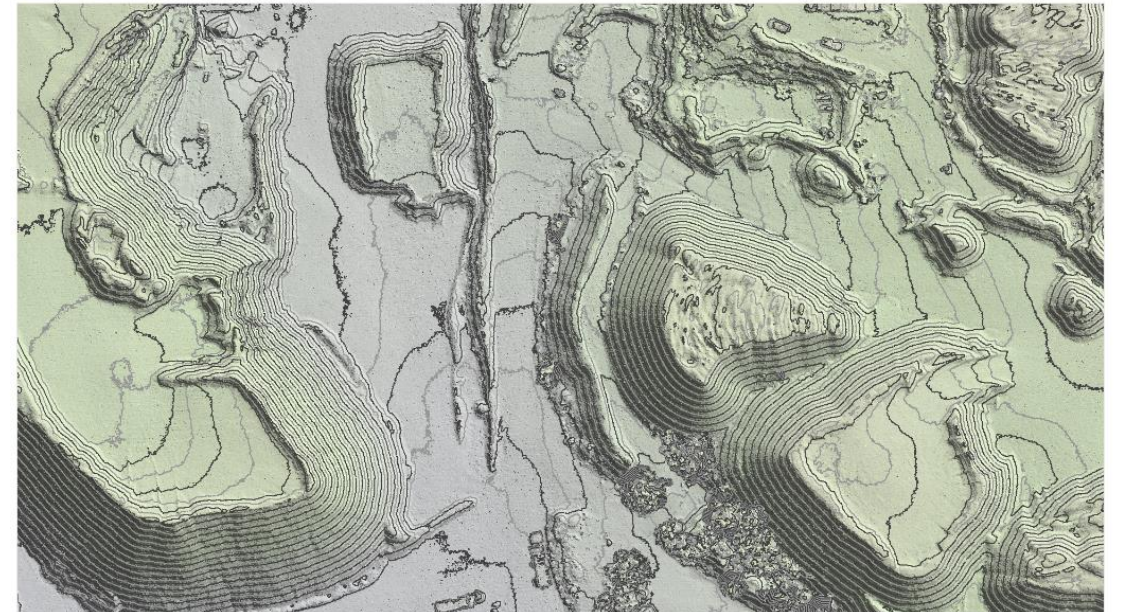


Gruvor och deponier



TerraModeler in mining

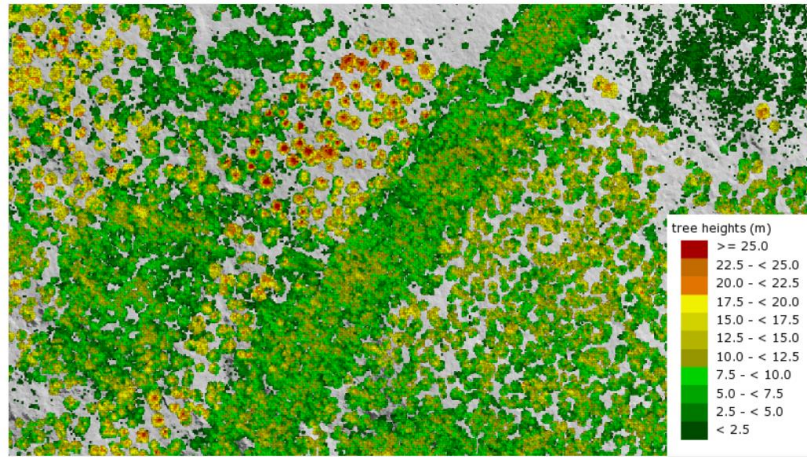
TerraModeler has tools for quantity computation. Those can be utilized to calculate and report the volume between two surfaces and/or based on tunnel or trench sections. Demo shows the volume calculation of stockpiles. [watch the demo](#)



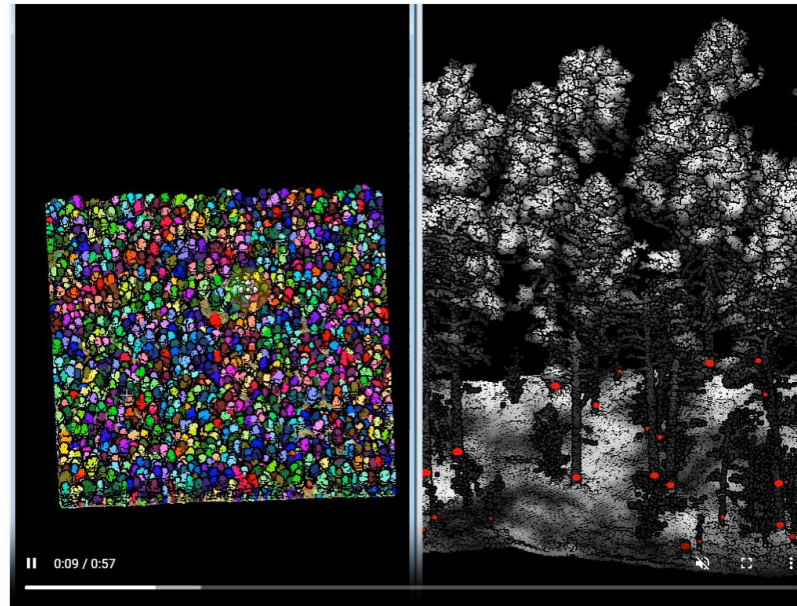
Contours produced using TerraModeler

Contours produced using TerraModeler

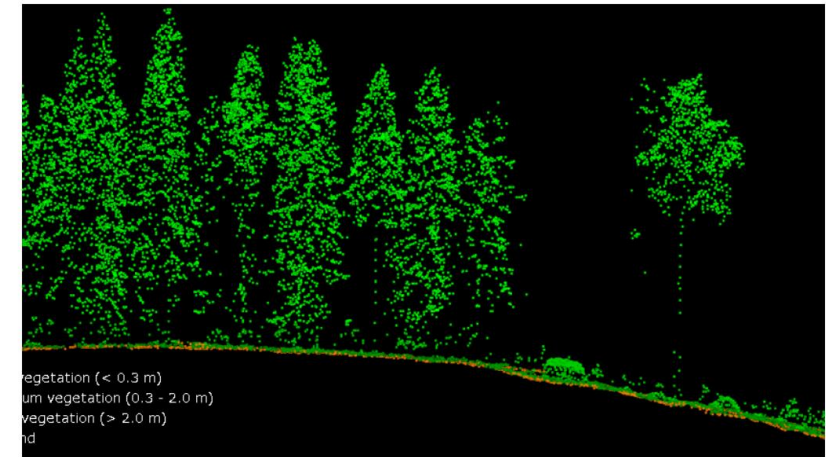
Vegetation och träd



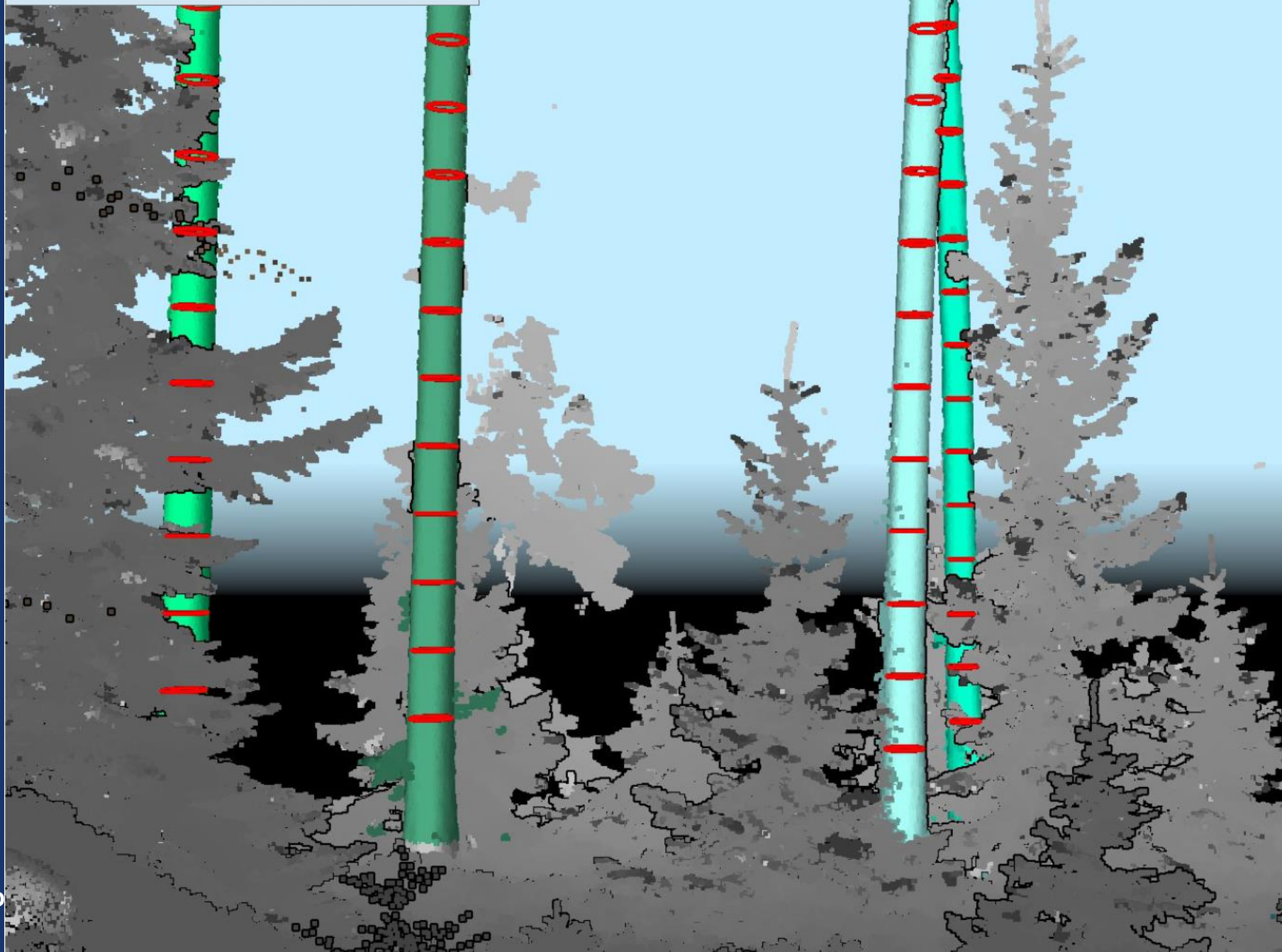
Tree heights



Tree detection



Vegetation levels



OPEN-PIT STOCKPILE COMPUTATION

FROM SURVEY TO END PRODUCTS

Stockpile Volume Report
Top Surface: Point cloud

Stockpile	Volume	Area	Max height
Region 1	4 730.1	1 482.0	8.05
Region 2	7 250.7	1 839.0	8.23
Region 3	4 617.4	1 208.8	10.55
Region 4	3 442.7	1 089.5	10.15
Region 5	2 031.7	948.5	5.54
Region 6	3 546.0	1 380.8	9.66
Total	25 618.6	7 948.5	10.55



OPEN-PIT STOCKPILE COMPUTATION

FROM SURVEY TO END PRODUCTS




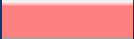

RGB Coloring



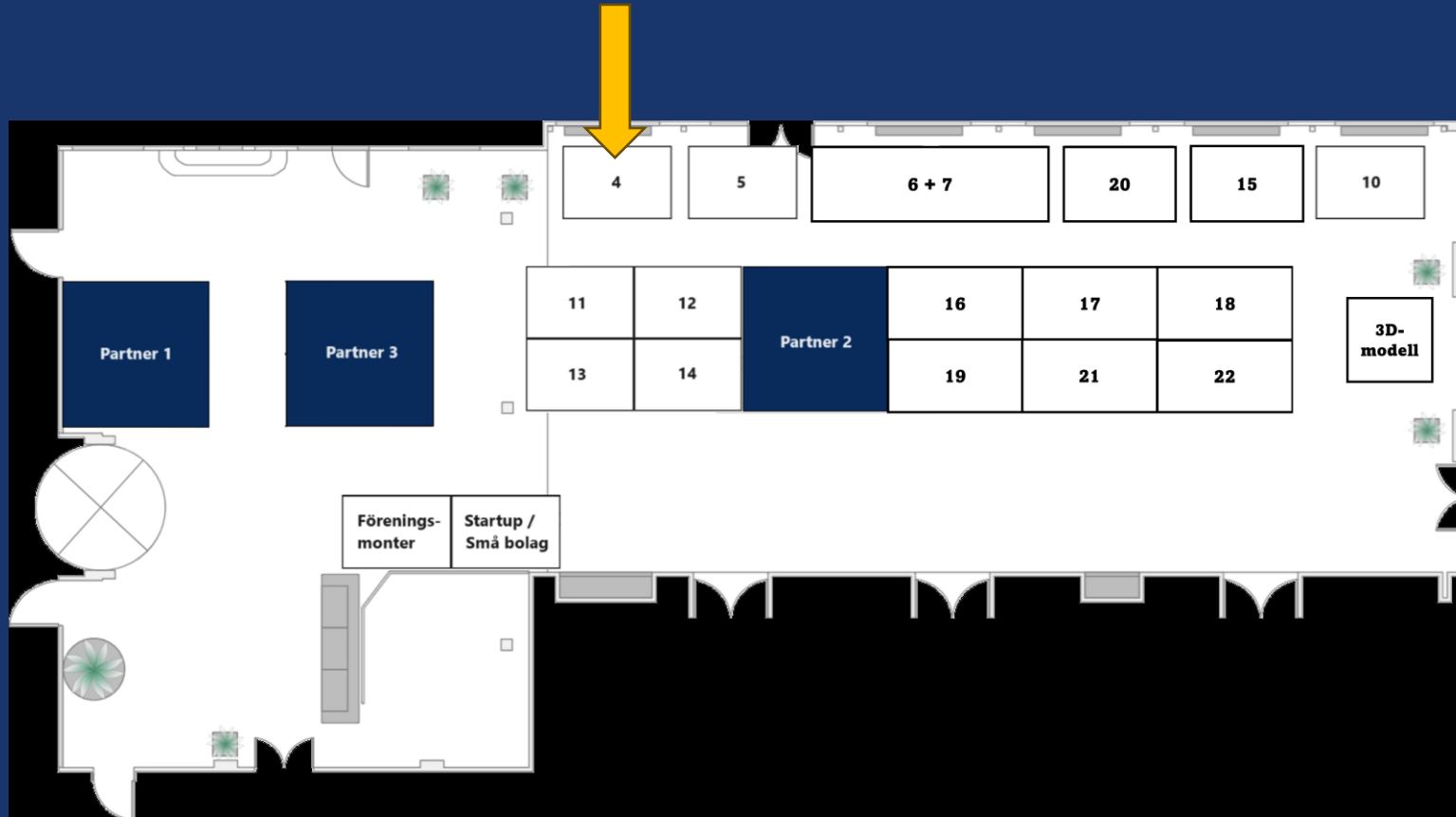
HI-RES

BATHYMETRY

FROM SURVEY TO END PRODUCTS

Zone 3 
Zone 2 
Zone 1 

Välkomna till monter!





POINT CLOUD INTELLIGENCE

Kartdagarna 2024

Tack för uppmärksamheten!
Thank you!

Helén Rost



info@terrasolid.com



<https://www.youtube.com/terrasolid>



<https://www.linkedin.com/company/terrasolid>