#GWF2020

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GEOSPATIAL WORLD FORUM

TRANSFORMING ECONOMIES IN 5G ERA

The Geospatial Way!

7-9 April 2020 /// Amsterdam

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Airborne urban mapping made easy
Leica CityMapper and Real City

Ratan Awasthi

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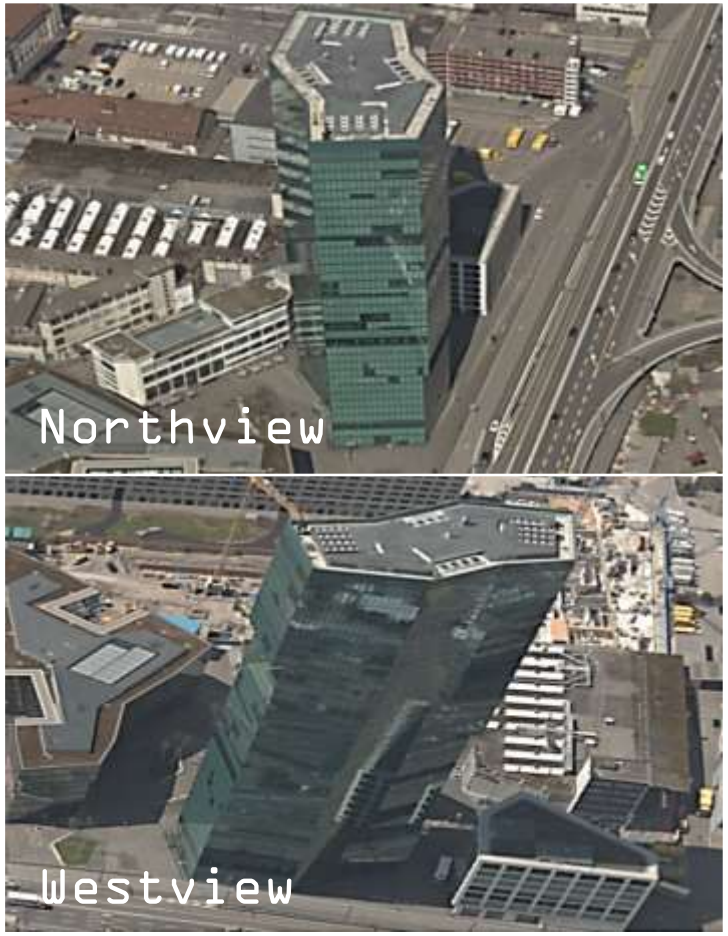
State-of-the-art oblique views



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Point cloud from stereo & oblique images

- Pointclouds generated from imaging, even if flown in very dense overlaps (dense matching) still show problem areas, where efficient point extraction is not good enough.

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Leica CityMapper

CityMapper imaging sensors

- Nadir camera
  - Leica RCD30 CH82 multispectral camera
  - 80 MP, 5.2 µm pixels
  - Mechanical bi directional motion compensation
- Oblique cameras, 4 pcs
  - Leica RCD30 CH81 mini RGB camera
  - 80 MP, 5.2 µm pixels
  - 45 degrees viewing angle (other optional available)
  - Mechanical in flight directional motion compensation

CityMapper LiDAR sensor

- Pulse repetition frequency up to 700 KHz
- Laser divergence 0.25 mrad
- Up to 2.500 m altitude range
- Oblique scanner, with various scan patterns
- Up to 40 degrees field of view
- Real time LIDAR waveform analysis
  - Including waveform attribute capture
- Typical 8 p/m2 at City Mapping

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CityMapper system peripherals

- PAV 100 Mount
  - Stabilises the sensor for flight path deviations in roll, pitch and yaw
  - Minimises image blur and improves LiDAR data spatial distribution
- Leica POD Lifter
  - High oblique viewing angles, without interference with aircraft fuse-lodge
  - Lifts the sensor during take off and landing to protect it
- CC33 Camera & LiDAR Controller
  - Controls camera heads and LiDAR unit
  - Stores the image and LiDAR data on 2.4 TB solid state drives
  - Includes deeply coupled GNSS/IMU solution
- Leica OC60 Operator Console
  - 12.1” screen hosting the Sensor Operator interface
  - Leica PD60 Pilot Display
  - 6.3” screen hosting the Pilot interface

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CityMapper operational

- Weight and Size
  - CityMapper sensor: Height 75 cm, ø 41 cm, Weight 54 Kg
  - PAV: 67x53x17 cm, Weight 38 Kg
  - POD lifter: Weight 20 Kg
  - CC33: Weight 6 kg
- IMU / GNSS
  - SPAN CNUS5-H, Non export controlled
- Operational
  - Operating -10 to 40 deg C
  - Avg. Power: 600 w / 28 VDC
  - Peak power: 1000 W / 28 VDC
  - Fuse: 1x 50 A

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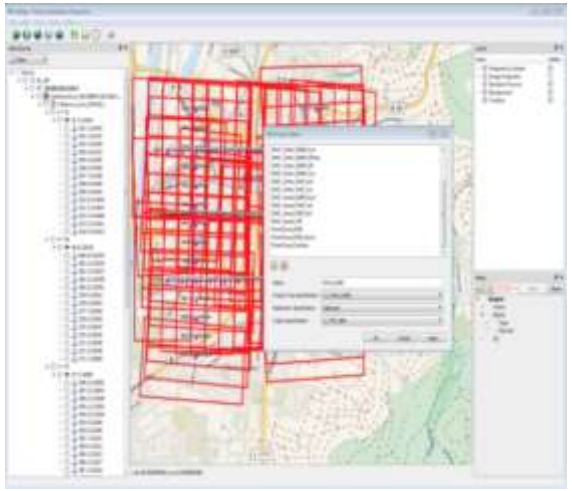
Leica RealCity
Airborne reality capture for smart cities

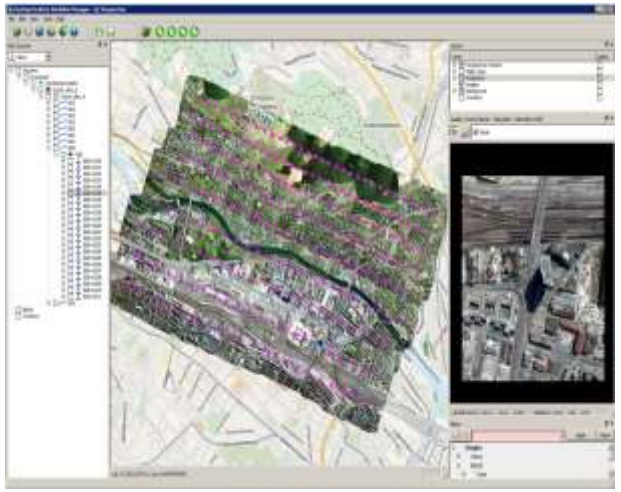
Leica HxMap 2D & 3D production workflow

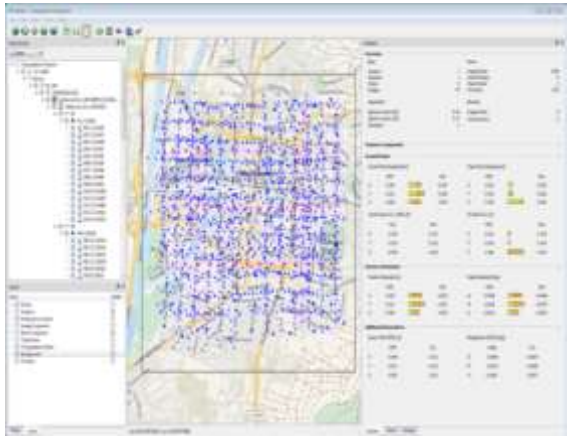
HxMap modules for Leica RealCity

Enabler Enabler, Workflow Manager	●
Provider Ingest, Raw QC	●
Core APM, AT, Infocloud, Ortho Generator, Ortho Mosaic	●
3D Modeller Basic City Modeller, Texture Mapper, 3D Editor	●
3D Modeller Advanced Building Finder, 3D Mesh	○
SDK Developer's Kit	○

● = Standard ○ = Optional







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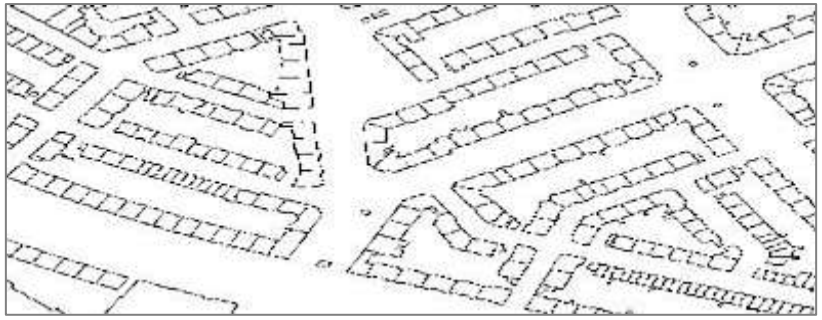
HxMap CityModeller / BuildingFinder

Stereo imagery

automatic

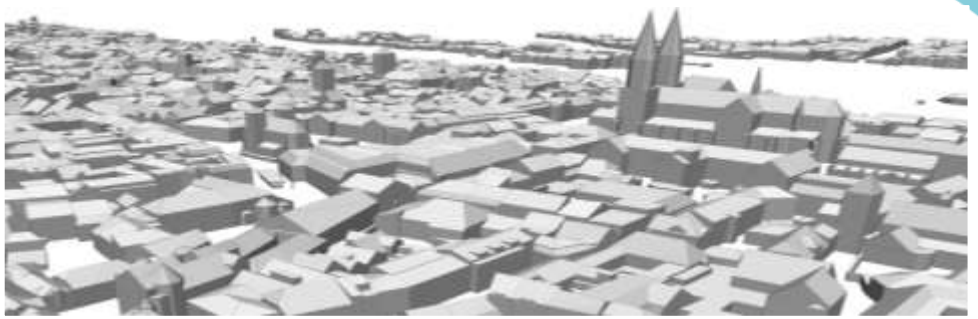
(Semi global matching algorithm)

3D-point cloud/DSM
(if available also from LiDAR)



Building footprints

automatic



3D city model in LOD 2

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SmartBase

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Imagery

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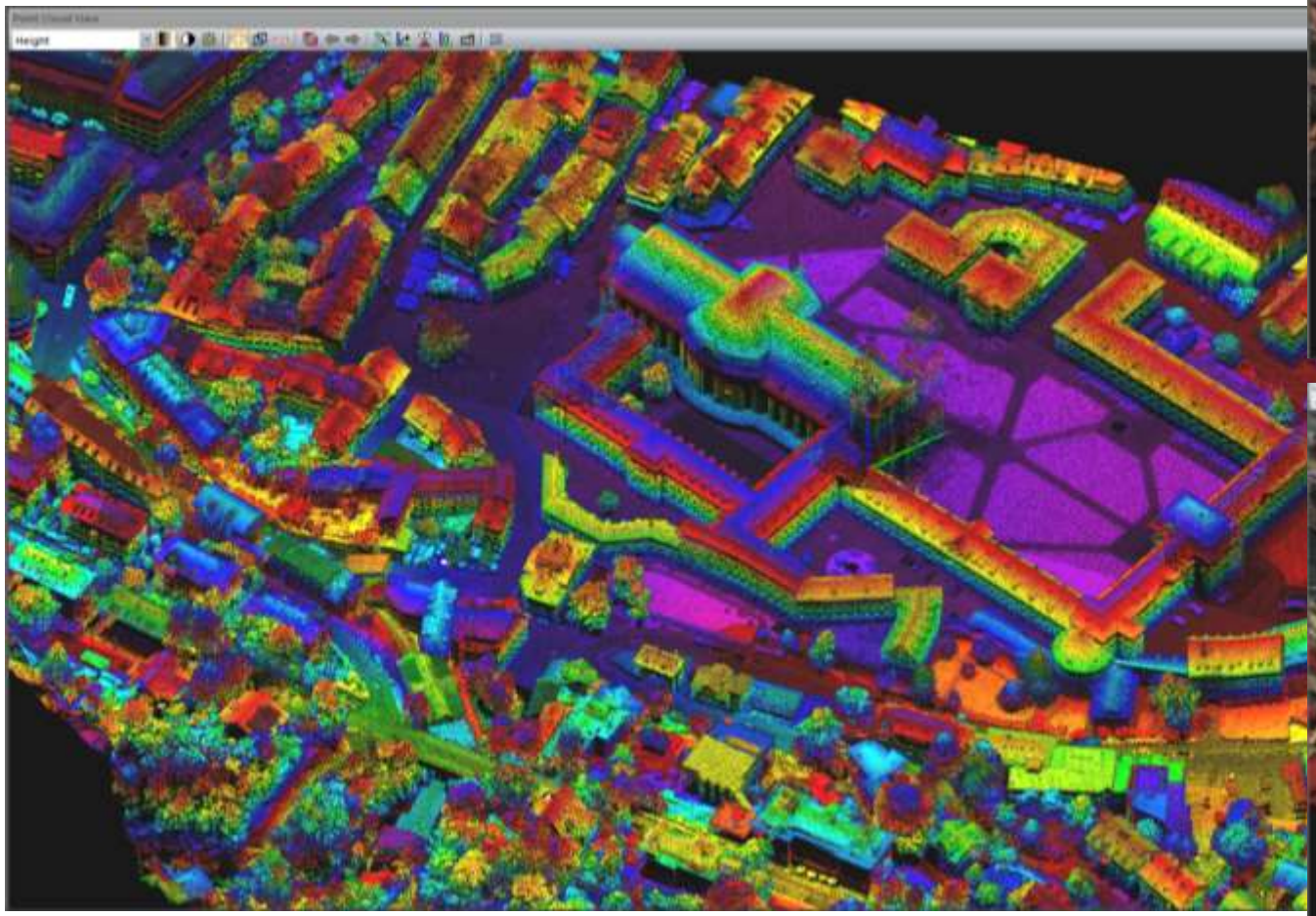
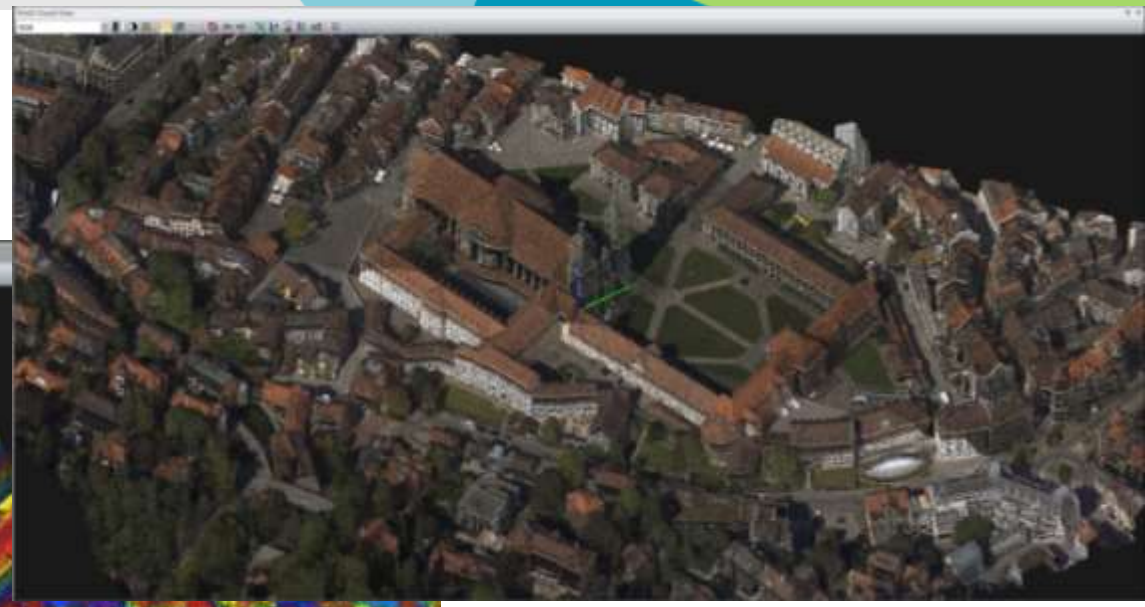
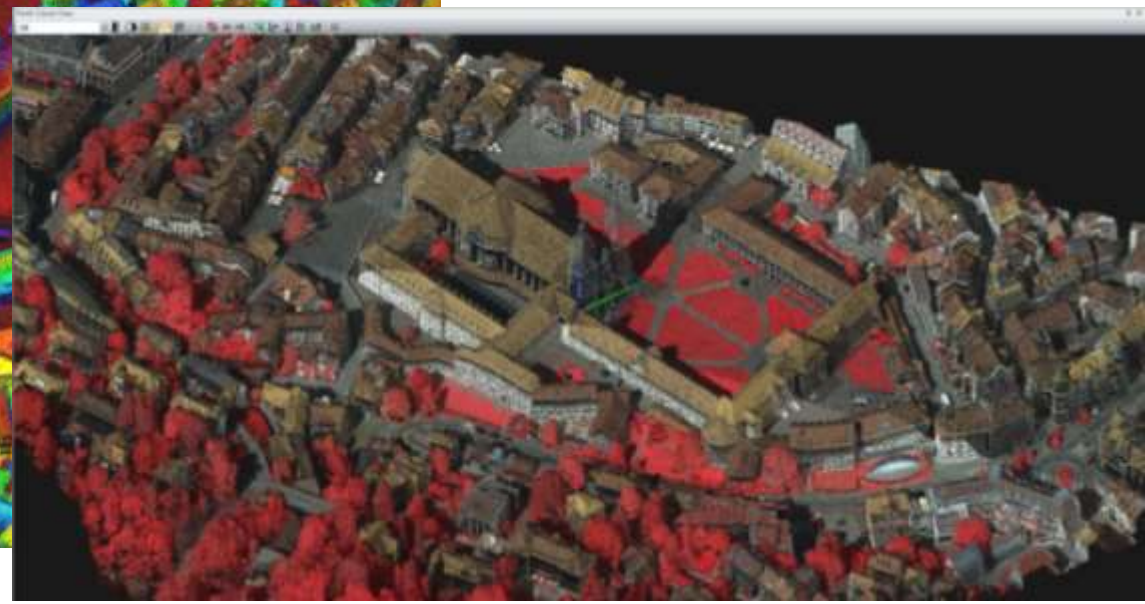
HxMap LiDAR point cloud processing







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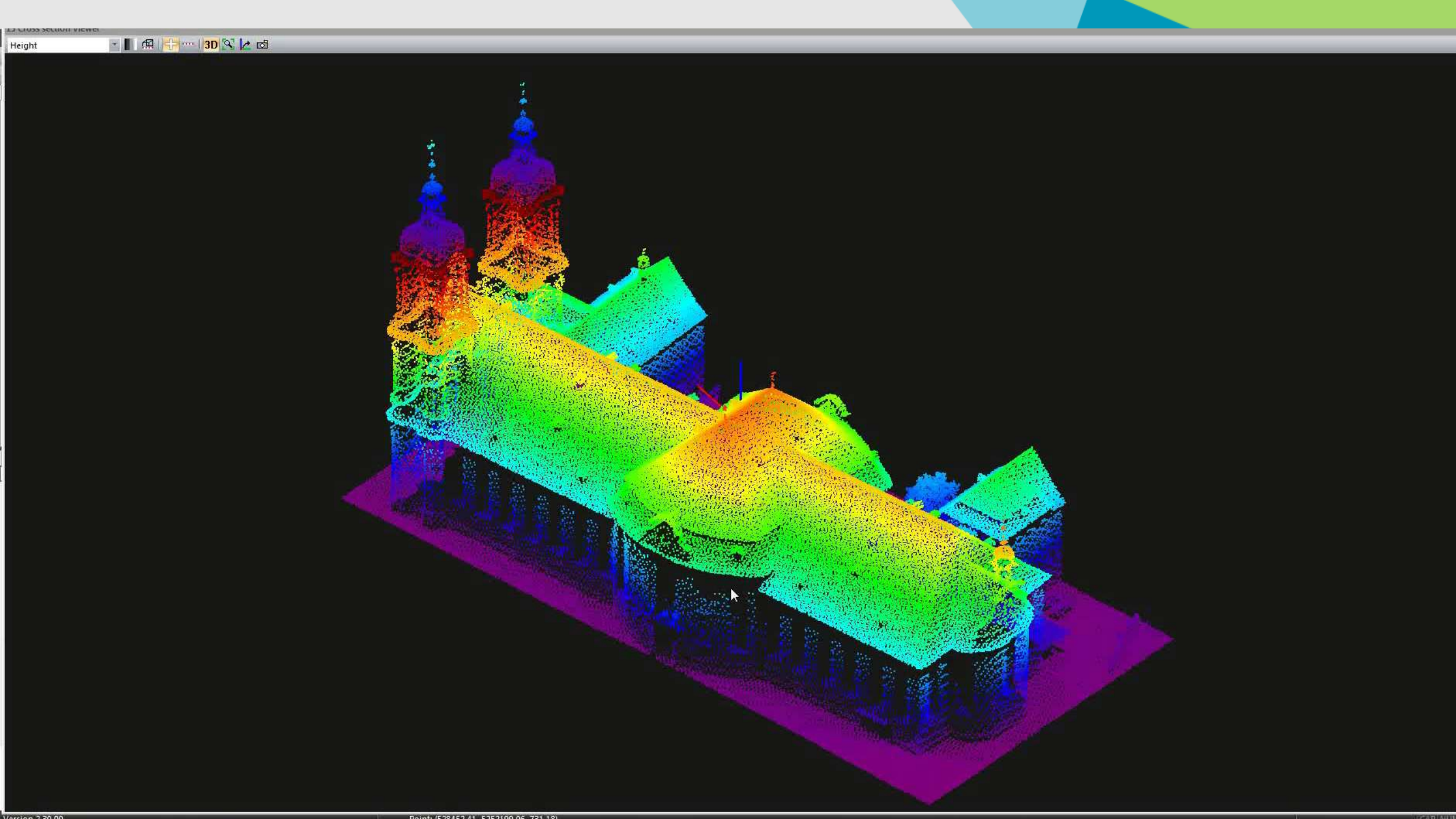
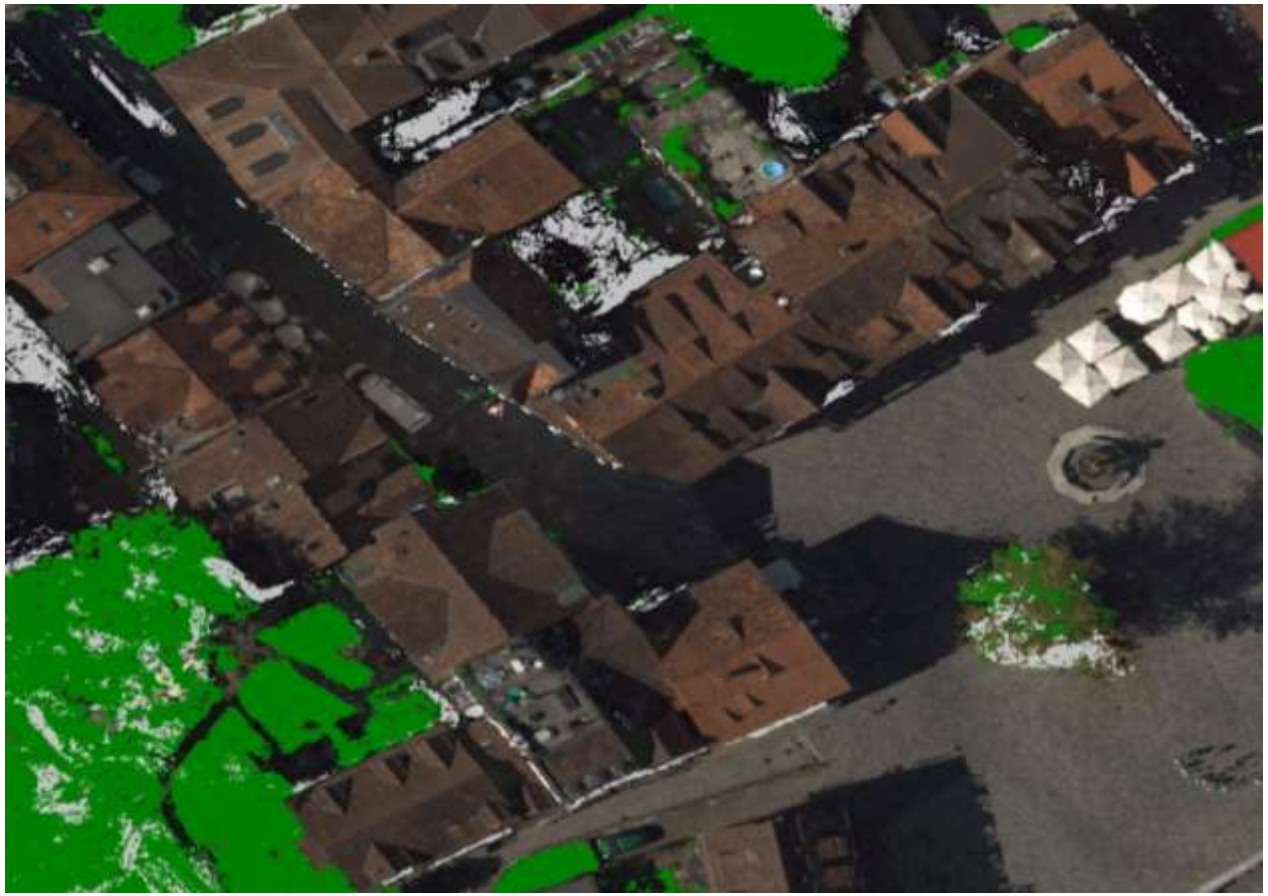

Height
3D

Image PC vs Lidar PC
Noise & Vegetation



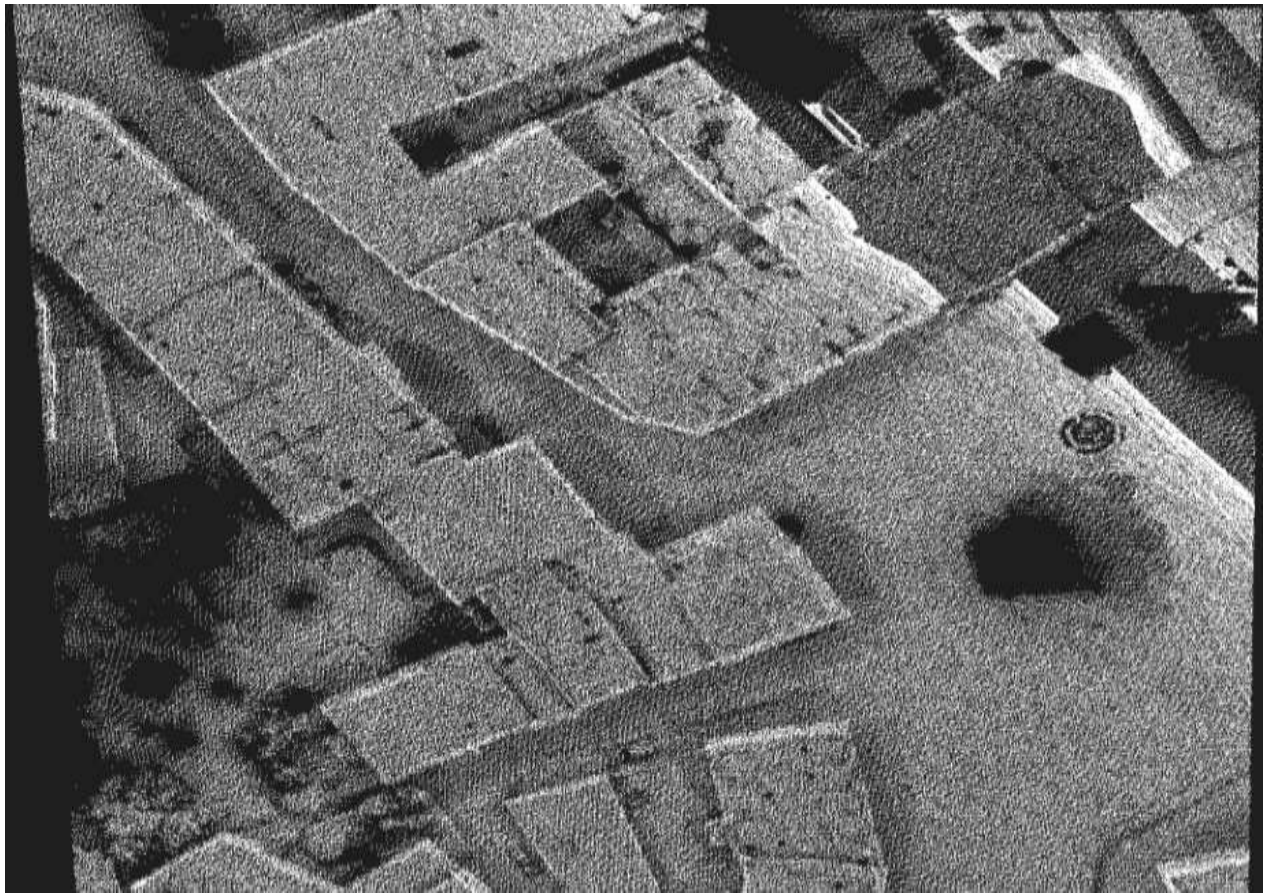


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Image PC vs Lidar PC
Noise & Vegetation

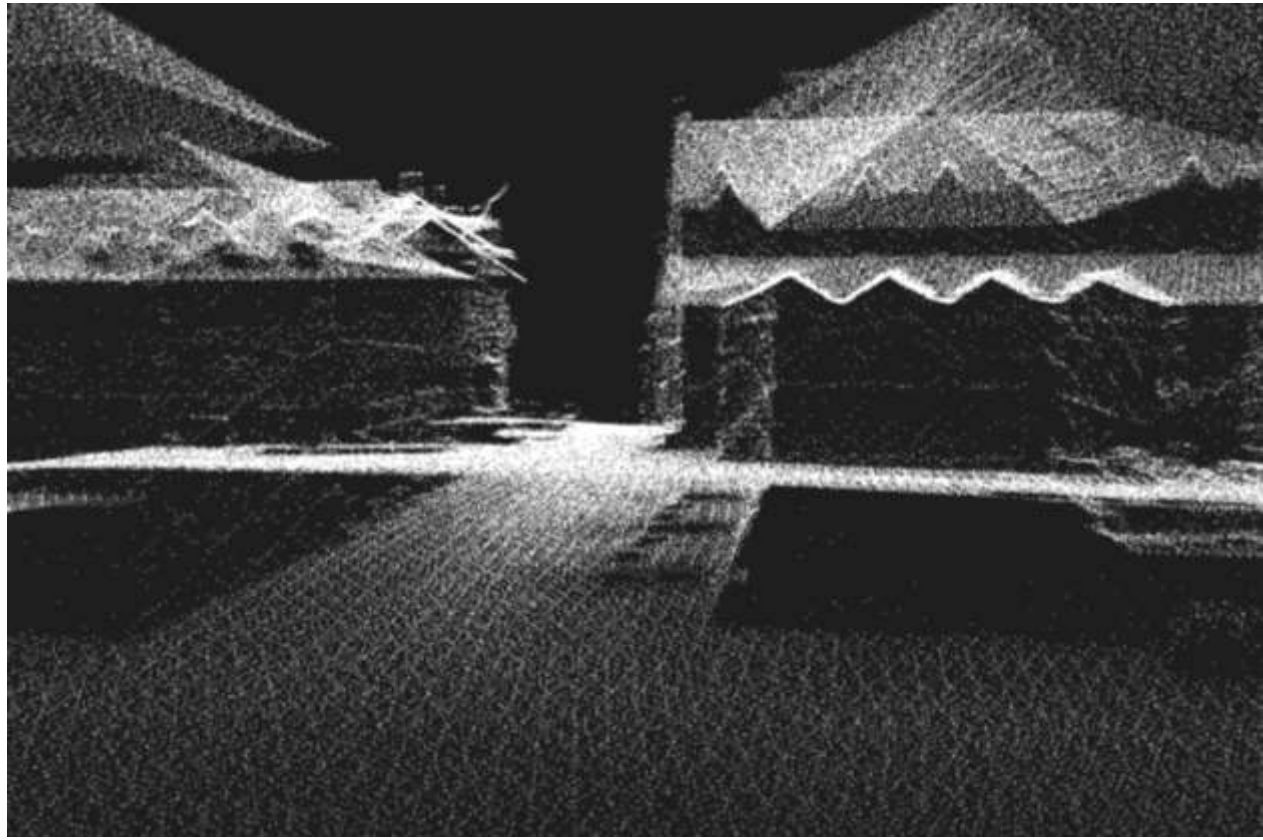

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Image PC vs Lidar PC
Building Edges

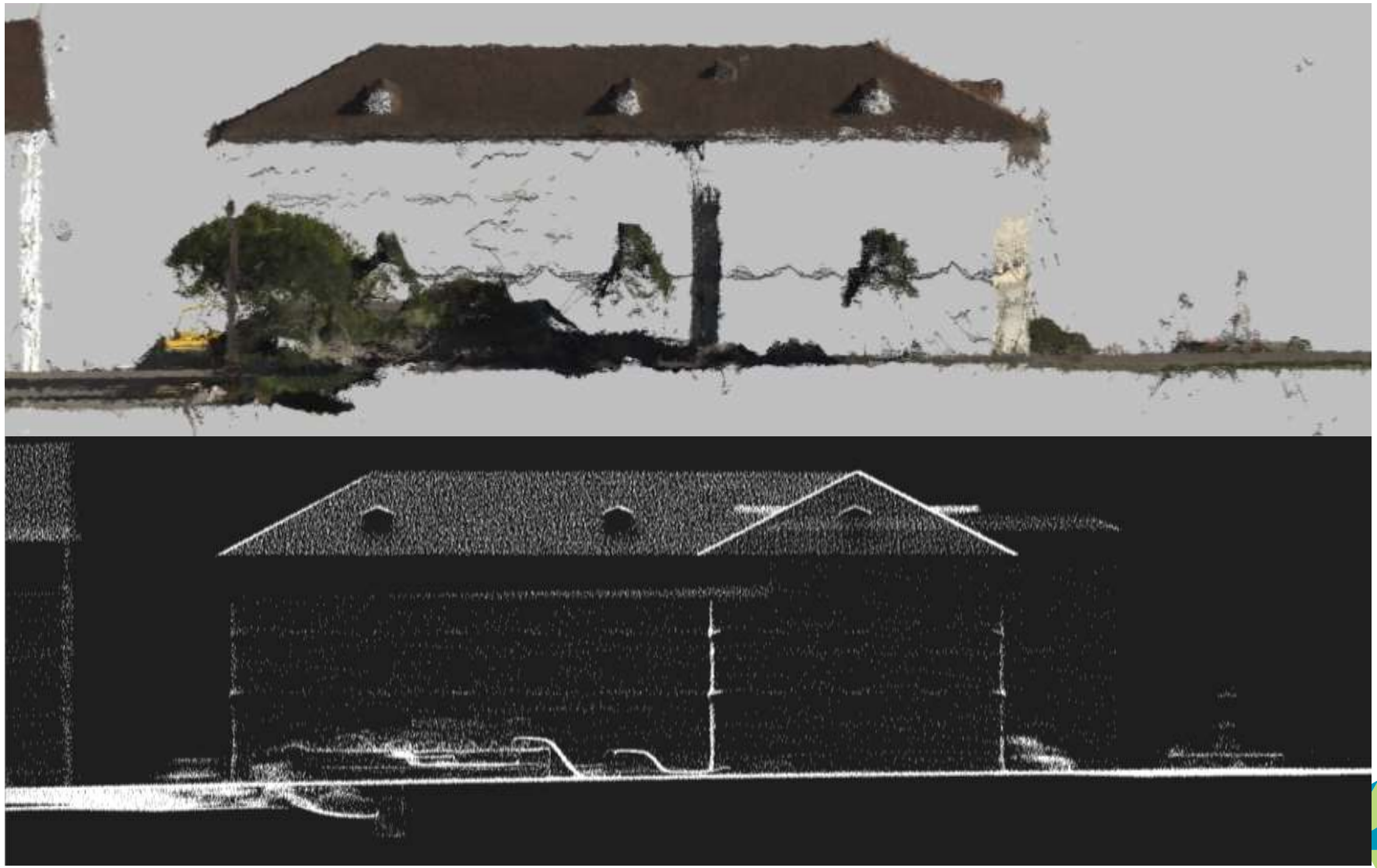

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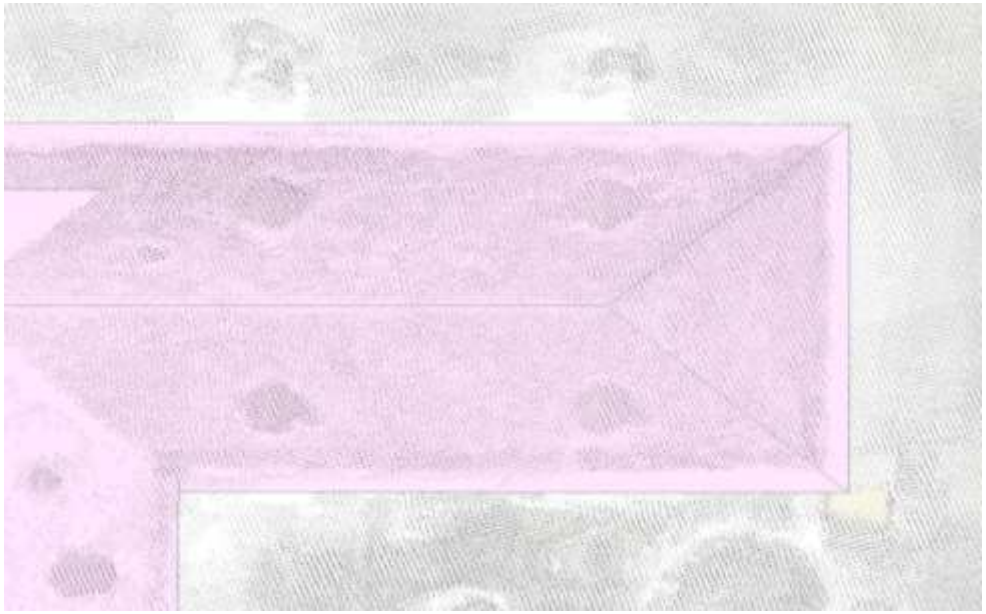
Image PC vs Lidar PC
Building Extraction



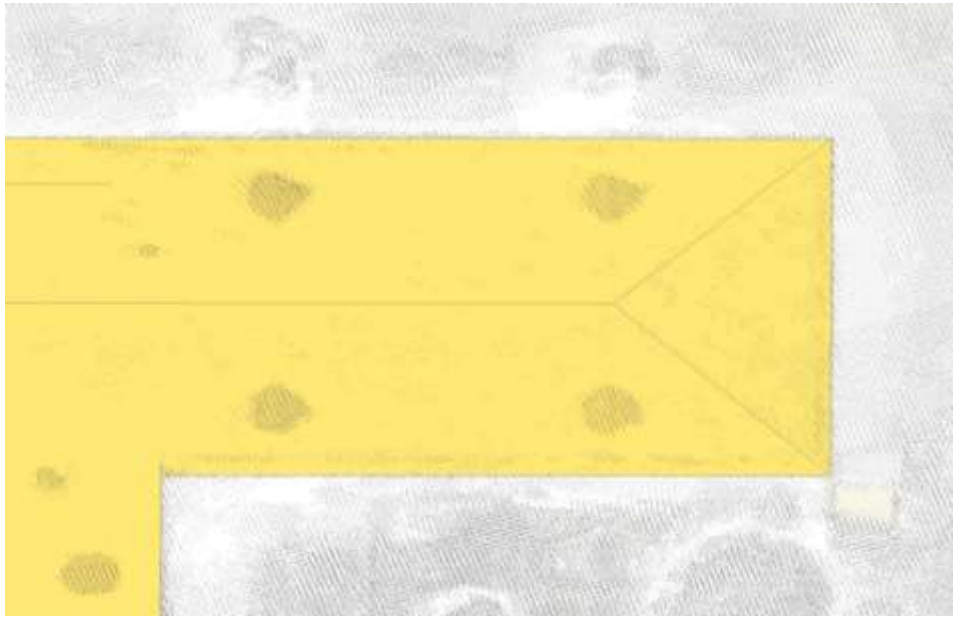


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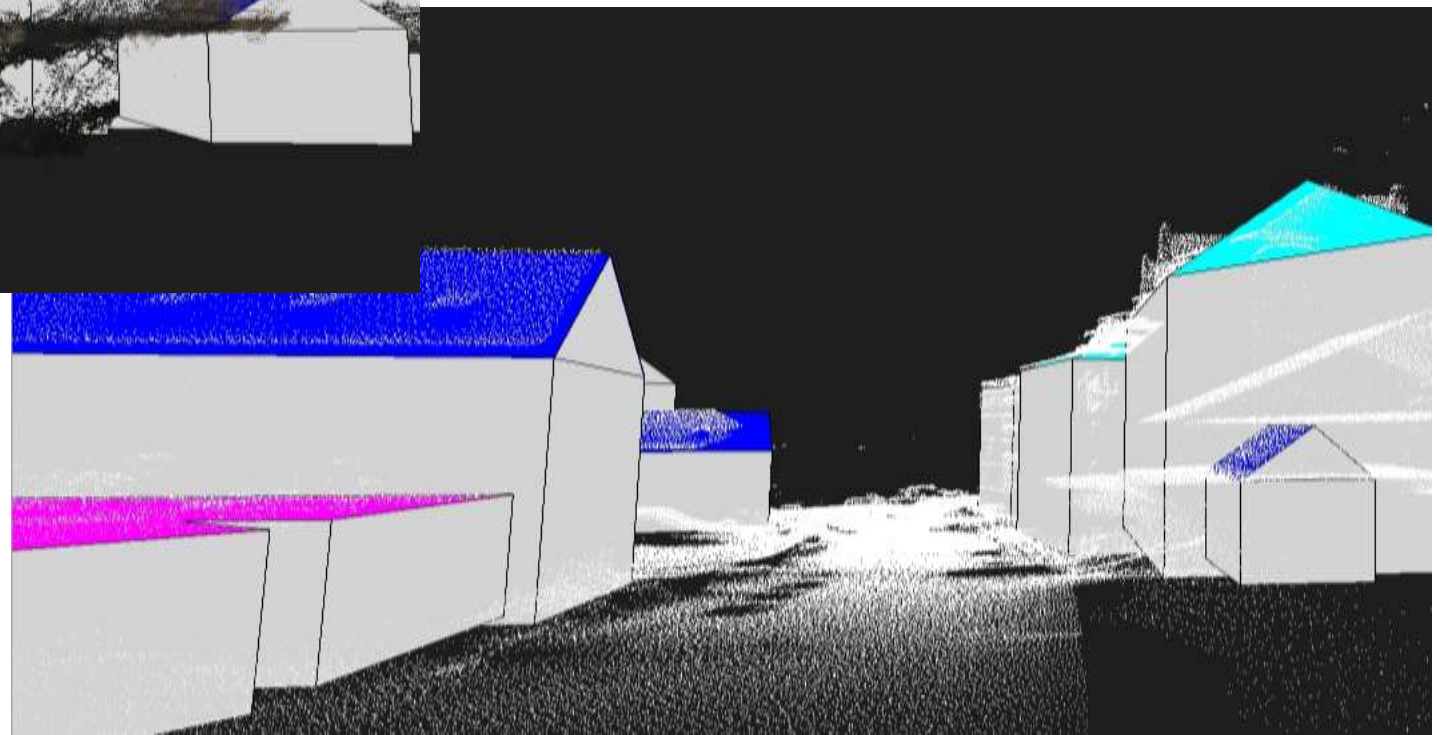
Image PC vs Lidar PC Building Extraction



3D Mesh

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Economic advantage

- Two datasets collected in one flight ➔ **Half the collection costs**
- End user does not need to select between imaging and LIDAR ➔ **Gets both**
- Fused data improves automatic modelling ➔ **Reduced manual edits**
- Improved accuracy of end product ➔ **Increased customer satisfaction**
- Fused workflow ➔ **Less software tools, less training, less labor works**
- **But primary: The RealCity and CityMapper offers a complete solution for the fast growing need of accurate 3D urban modelling**.

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Thanks

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