
nFrames
EMPOWERING PHOTOGRAMMETRY

Munich

DMC II
nadir 80/80


dgipfel) (3044m)
Eiger (3970m)
3D
RealityMaps
nFrames


SURE
aerial
SURE
aerial
SURE

nFrames
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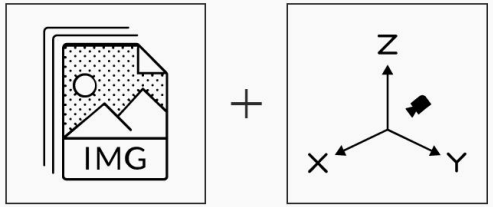
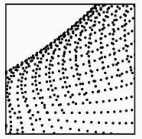


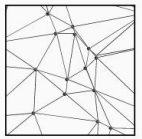
Image Files

+

Orientation Files*



Dense Point Clouds



Textured Triangle Meshes

True Orthophoto & Digital Surface Models

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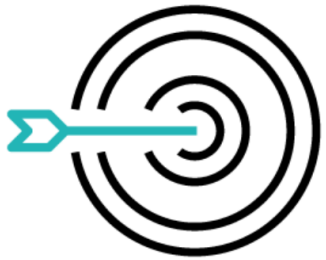
Values



PRECISION

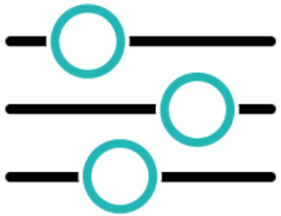
ACCURATE AND SHARP.

Presice surfaces featuring sharp edges and fine details at low noise levels. Precision and reliability measures enable quality control.

PERFORMANCE

GET YOUR RESULTS FASTER.

Optimized algorithms enable fast data processing on a common desktop computer with about 1 Megapixel per second.



USABILITY

AS EASY AS YOU NEED.

No parameterization required and deep configuration possible. First results within minutes and full control for experts.

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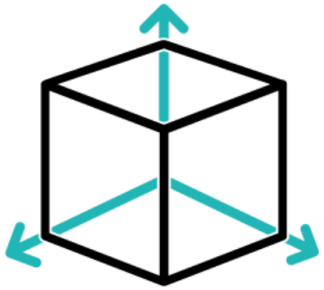
Values



SCALABILITY

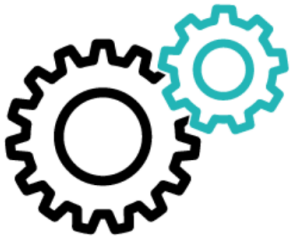
NO LIMITS IN DATA SIZE.

Scalable solution supporting production of projects comprising thousands of images at any resolution common hardware.

INTEGRATION

FITS INTO YOUR VALUE CHAIN.

Stand alone executables as well as intuitive library APIs designed for simple integration into custom workflows.



MODULARITY

ACCESS THE LEVEL YOU NEED.

Complete workflow solutions can be configured individually, enabling the flexibility to select particular functionalities.

About us

» **Company history**

- Initiated 12/2012 as spin-off from the Institute for Photogrammetry, University of Stuttgart
- Since 10/2014 independent company *nFrames GmbH*
- Currently team of 14 people
- Financed exclusively by revenues
- Close connection to Universities and cutting edge research

» **Products & Services**

- Core product “SURE” + SDKs
- Consulting services

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Selected Customers & Partners

DLR
COWI
BLOM
IMAGING THE WORLD
ASIA AIR SURVEY
AVT
AEROWEST
Geodata On Demand
GeoFly
focus the world
geoplana
3D RealityMaps
DIGITAL WORLD
MV punktgenau
Amt für Geoinformation, Vermessungs- und Katasterwesen
Bezirksregierung Köln
LGLN
Bayerische Vermessungsverwaltung
IGI
www.igi-systems.com
Danish Geodata Agency
kadaster
LANTMÄTERIET

(...)

DSM

True Orthophoto

Projection on the DSM

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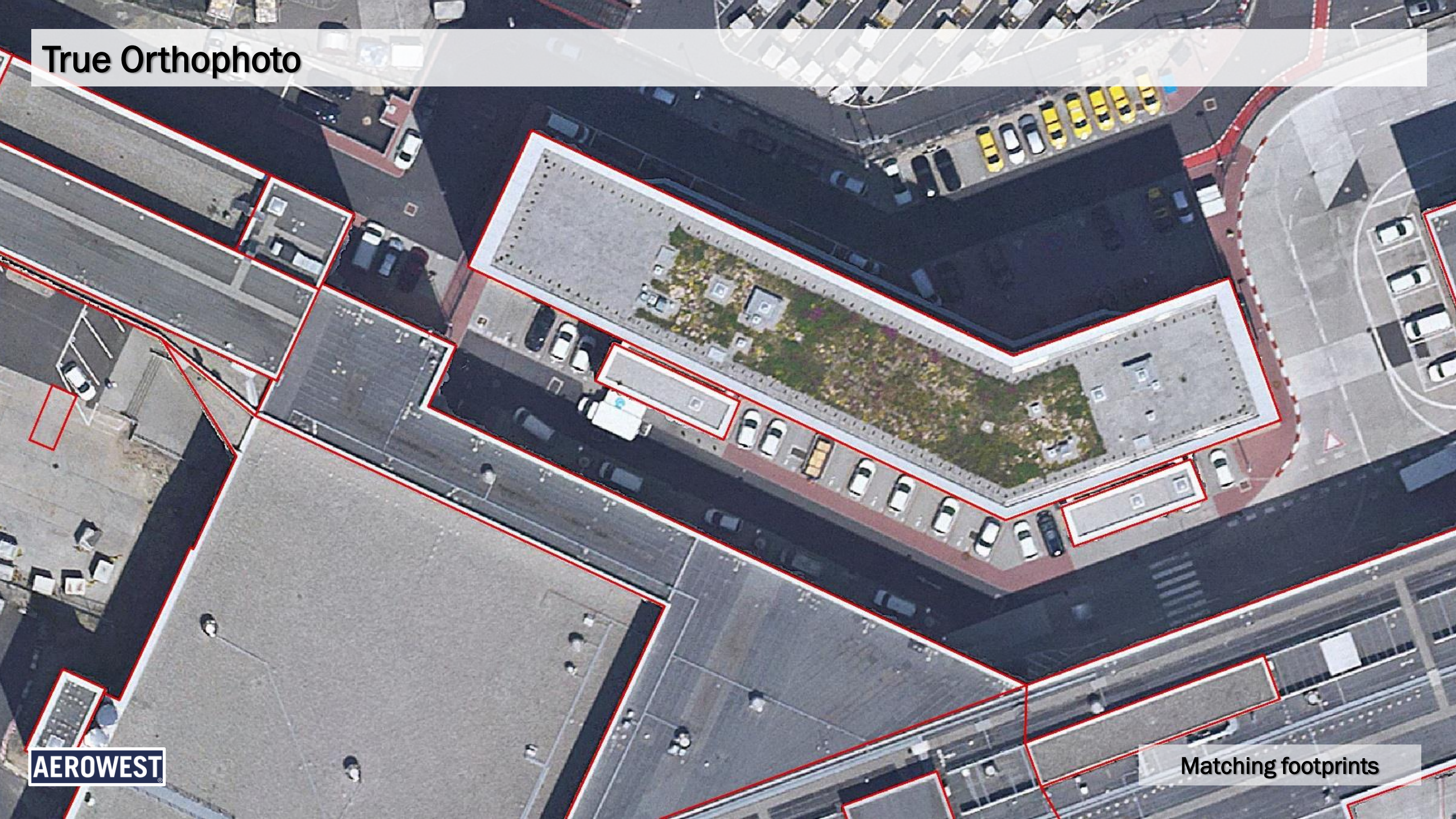
Traditional Orthophoto

SURE True Orthophoto

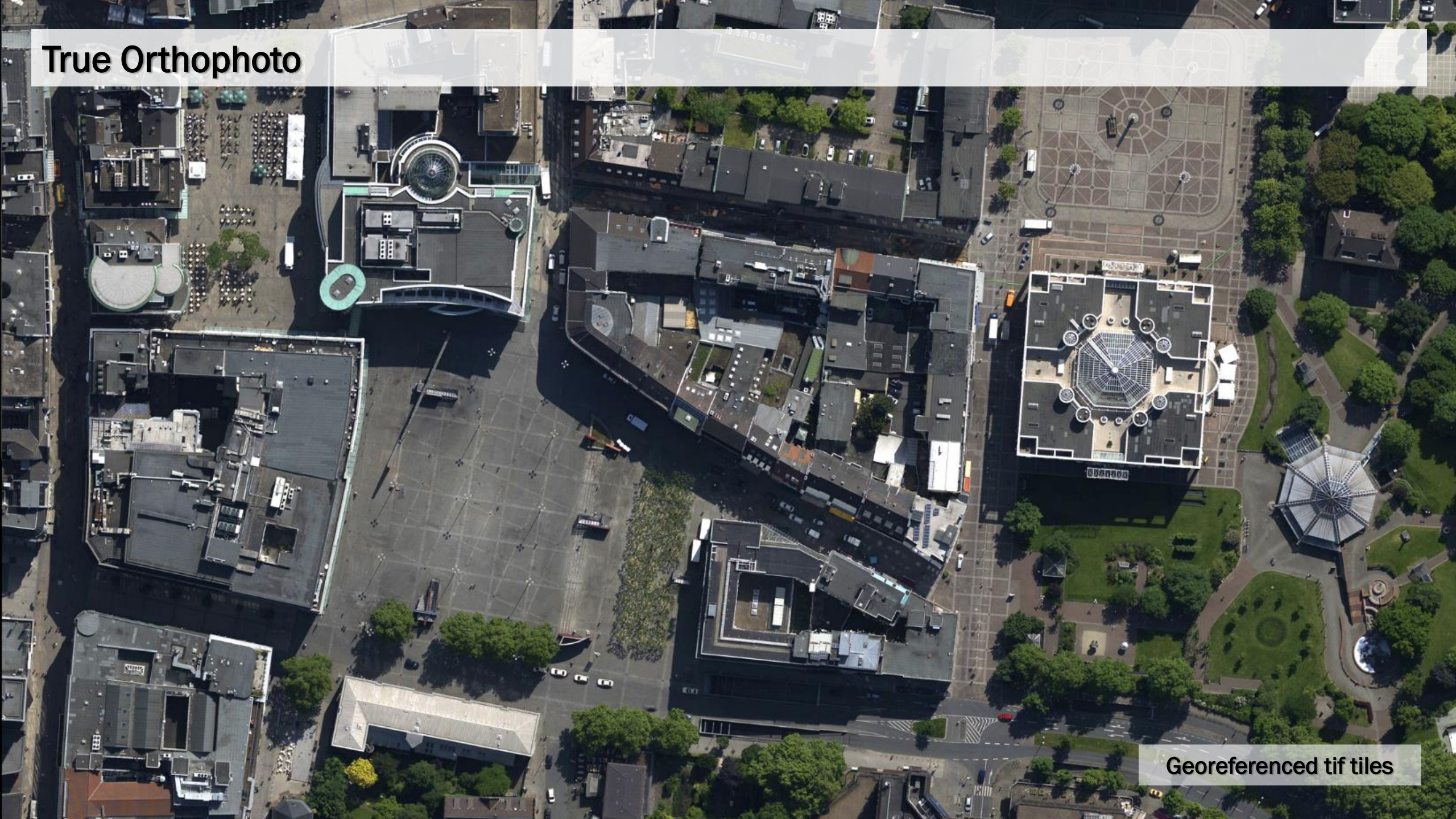
True Orthophoto



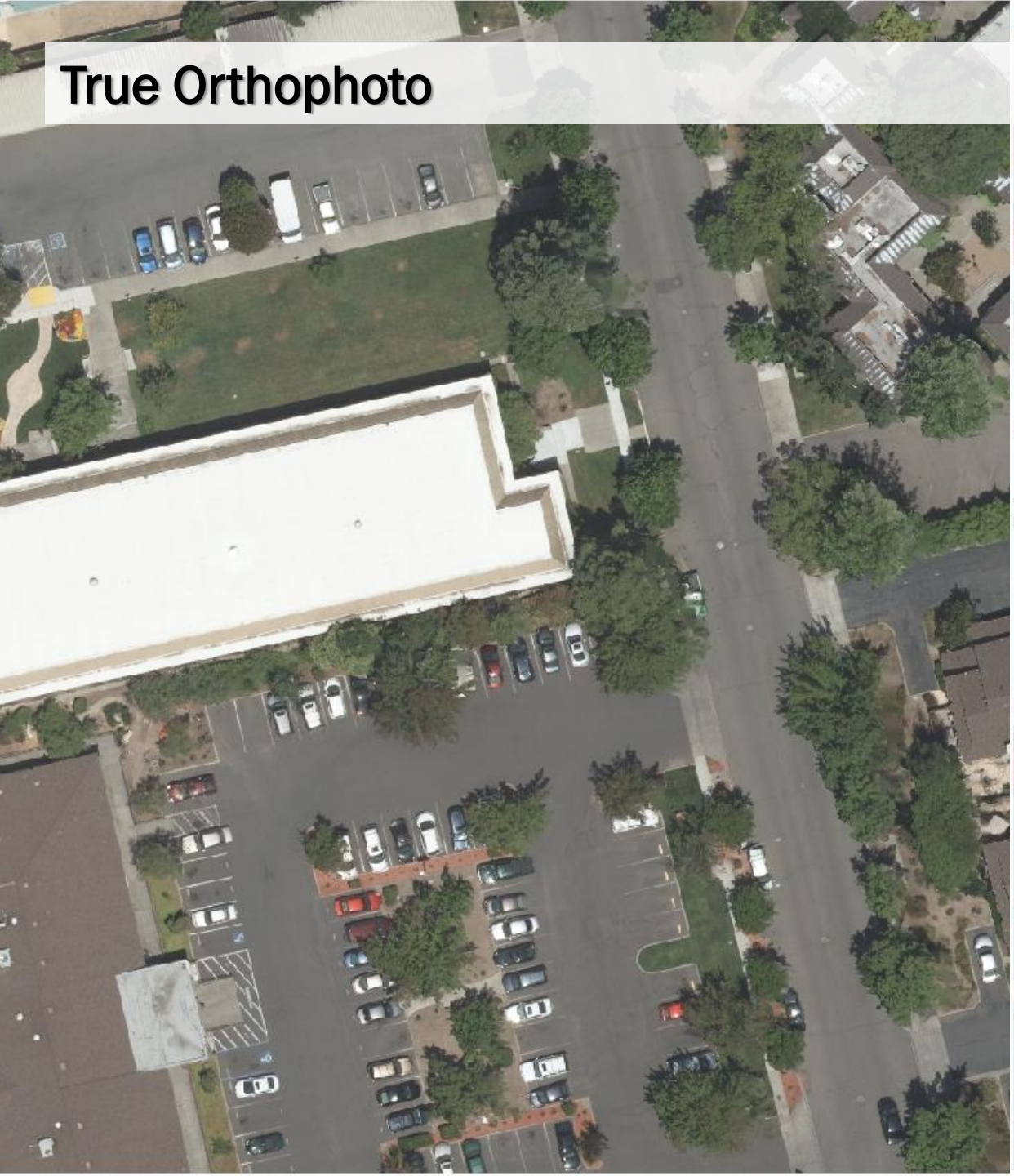
AEROWEST

Matching footprints

True Orthophoto

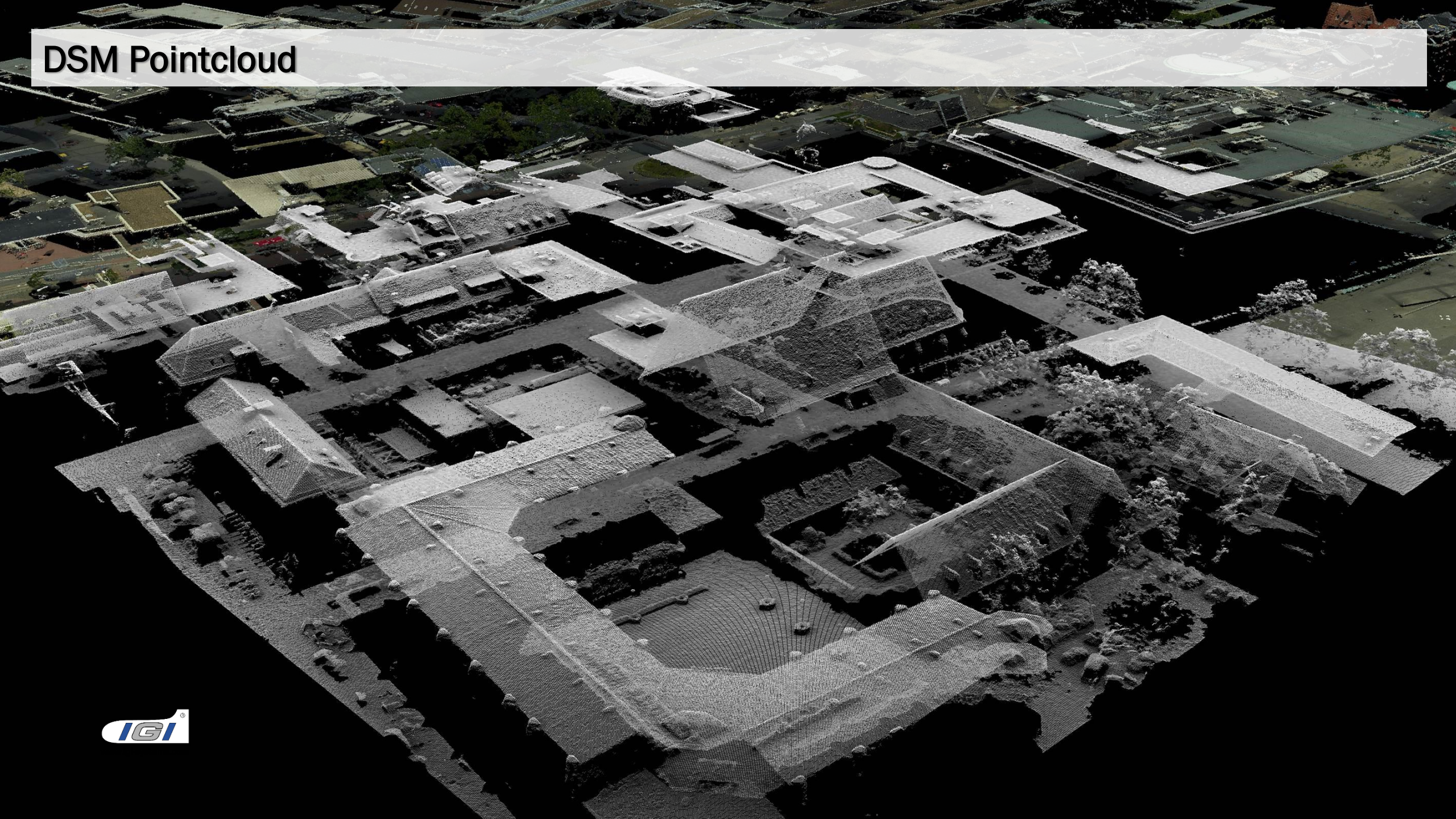


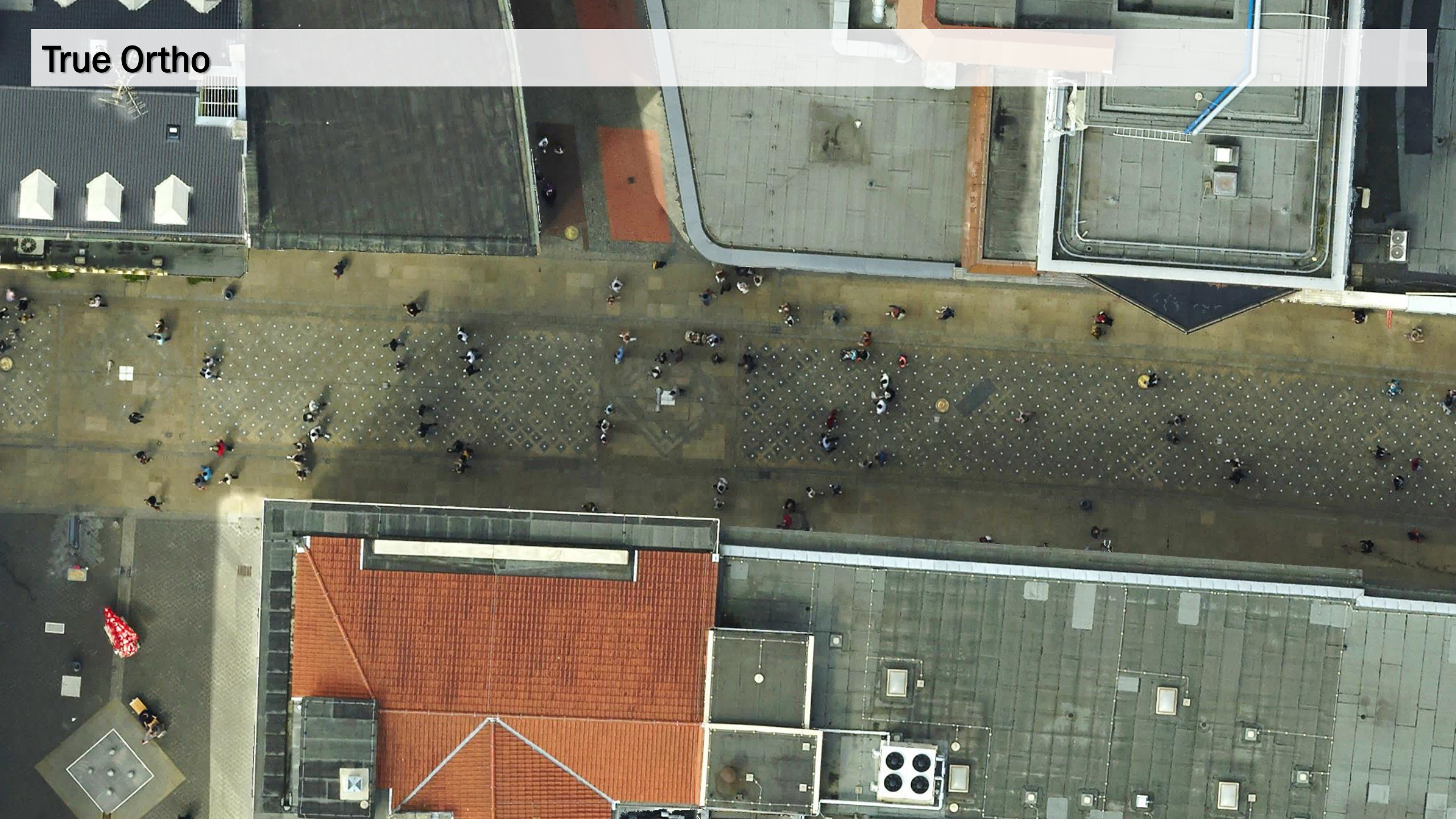
Georeferenced tif tiles


True Orthophoto

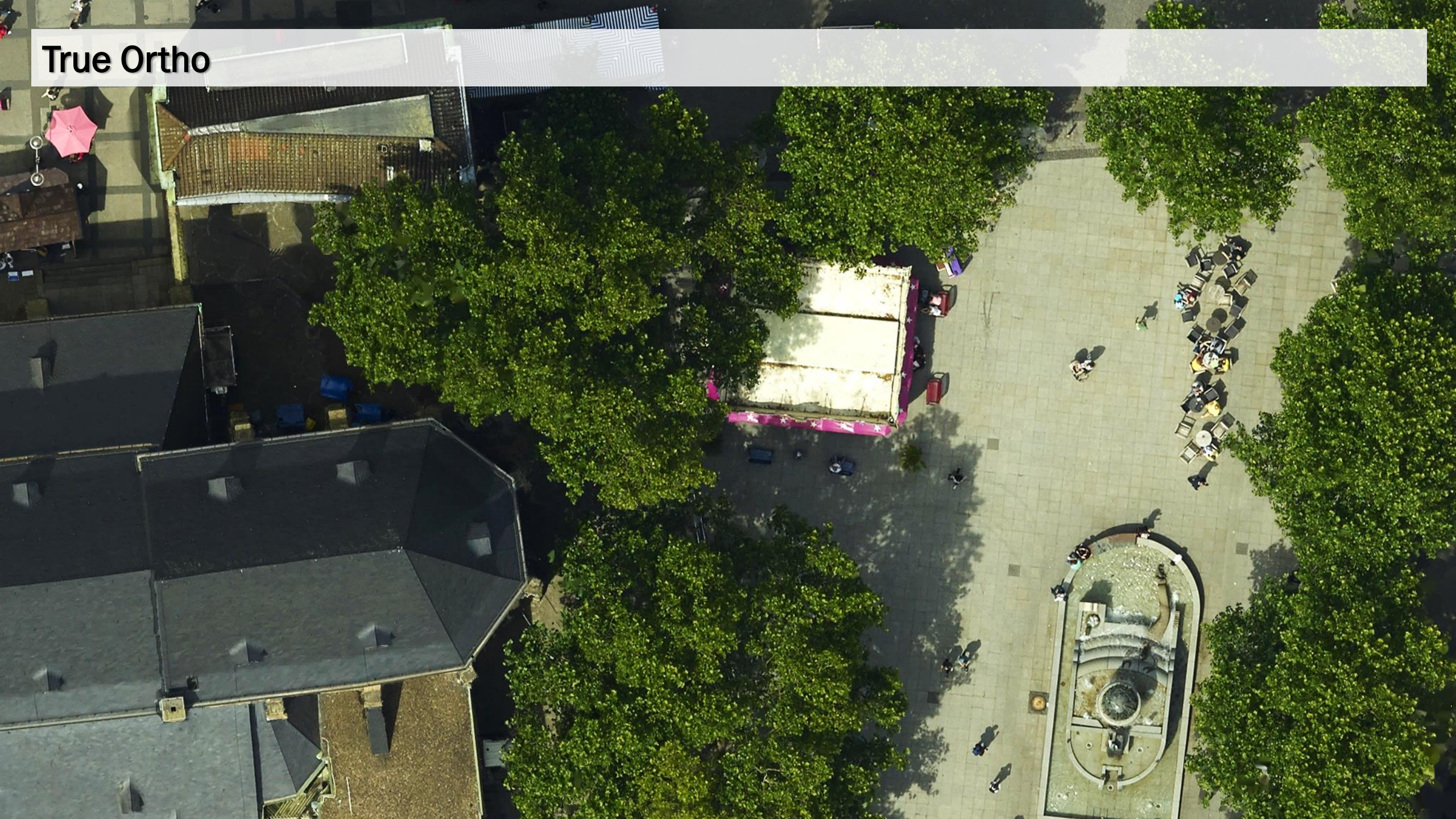

16 Bit Multispectral

DSM Pointcloud



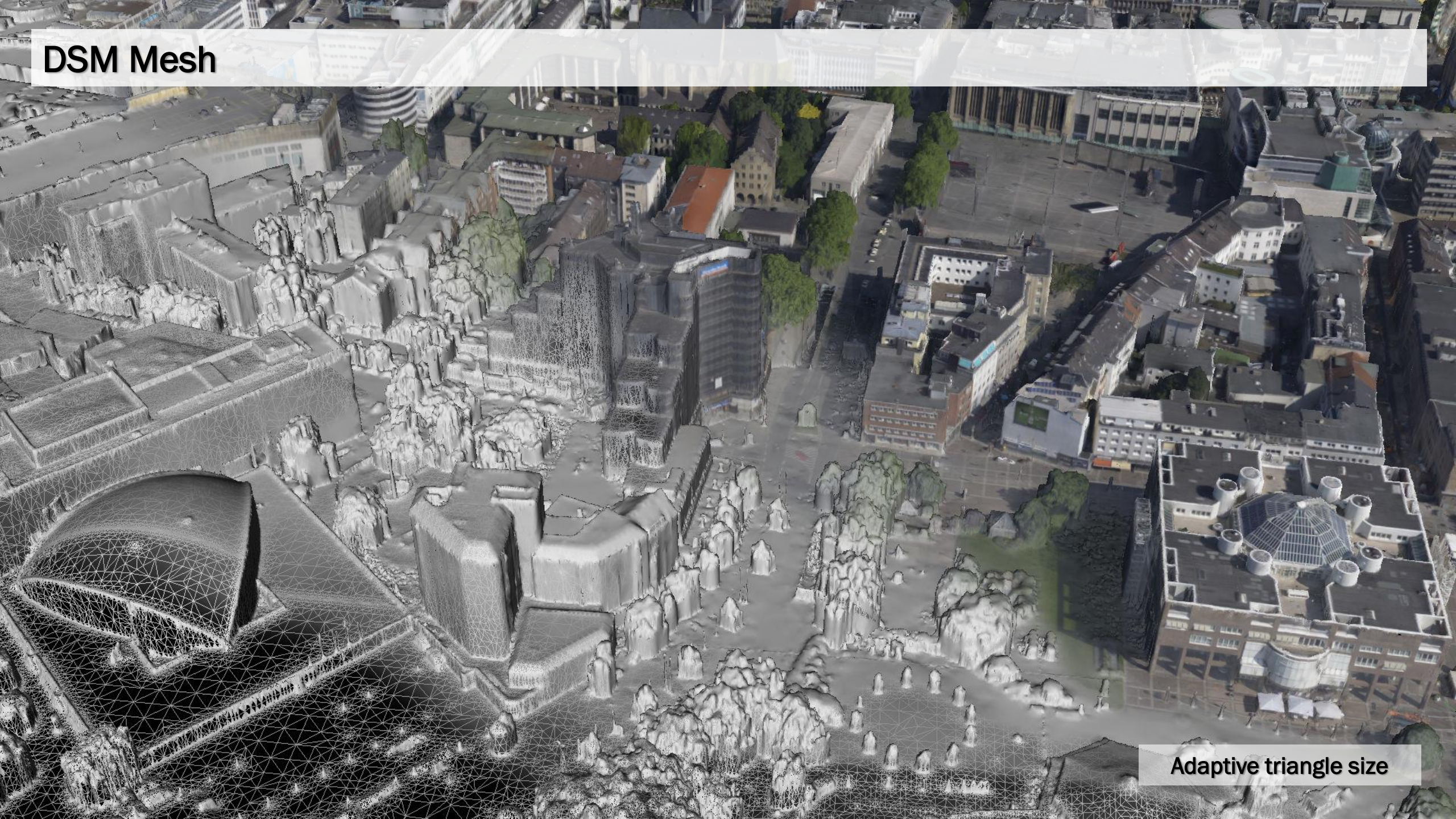

True Ortho

True Ortho



True Ortho

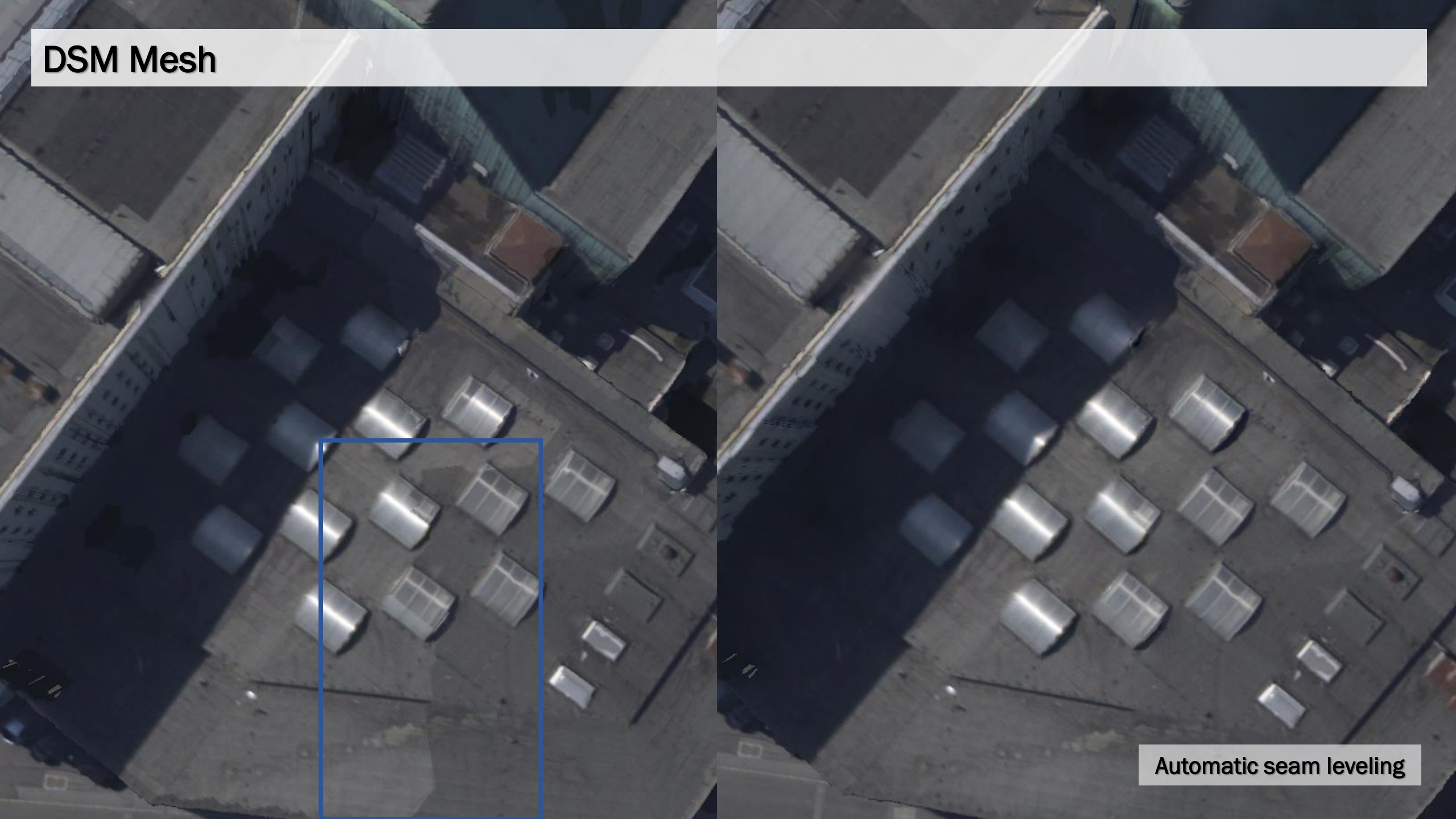
DSM Mesh



Adaptive triangle size

DSM Mesh

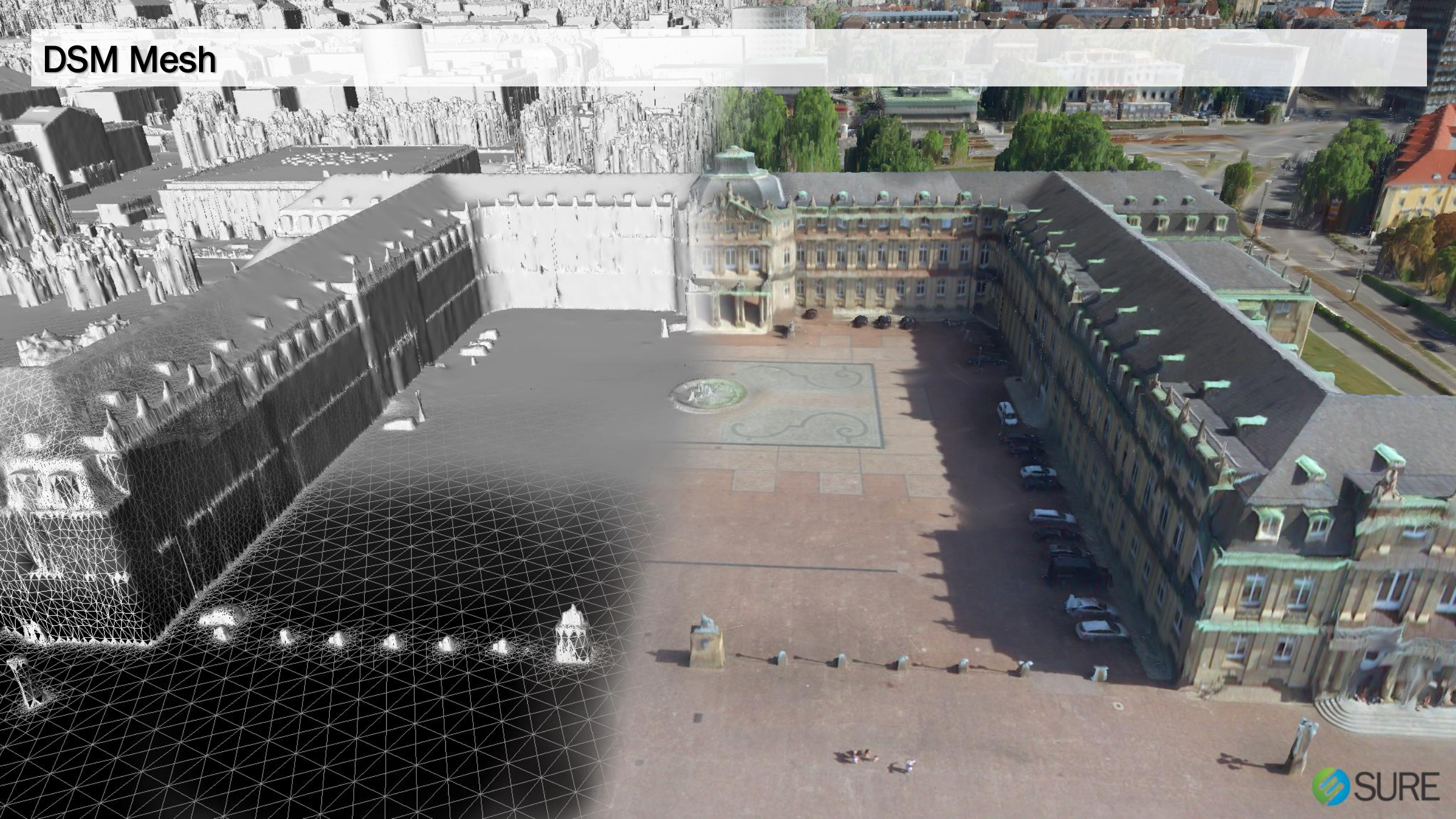
DSM Mesh



Automatic seam leveling

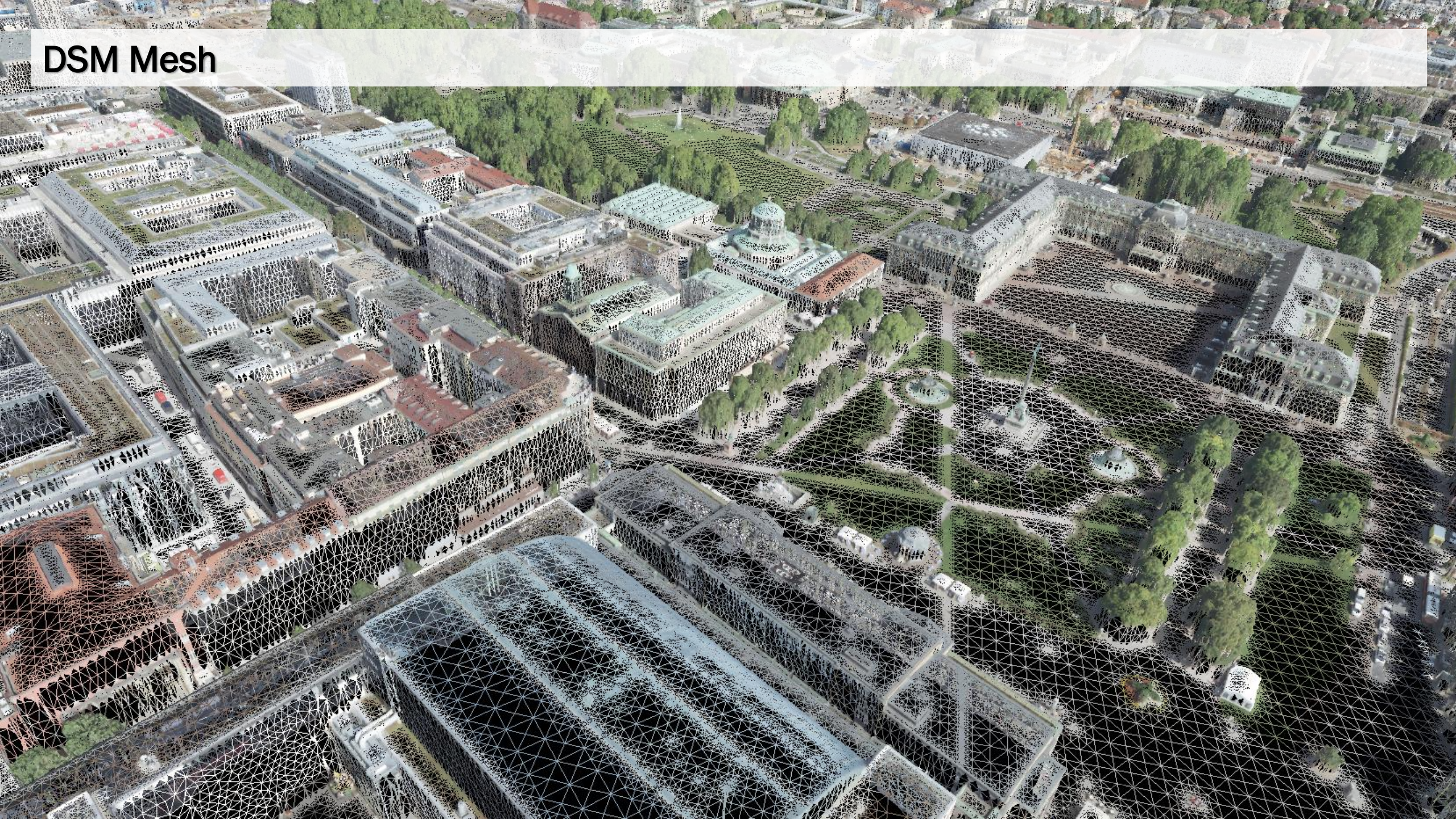
Texturing – Consistency Check

DSM Mesh



DSM Mesh

DSM Mesh



DSM Mesh

3D Mesh


AEROWEST


AEROWEST


AEROWEST


Dataset courtesy of FBK

Texture Sharpening

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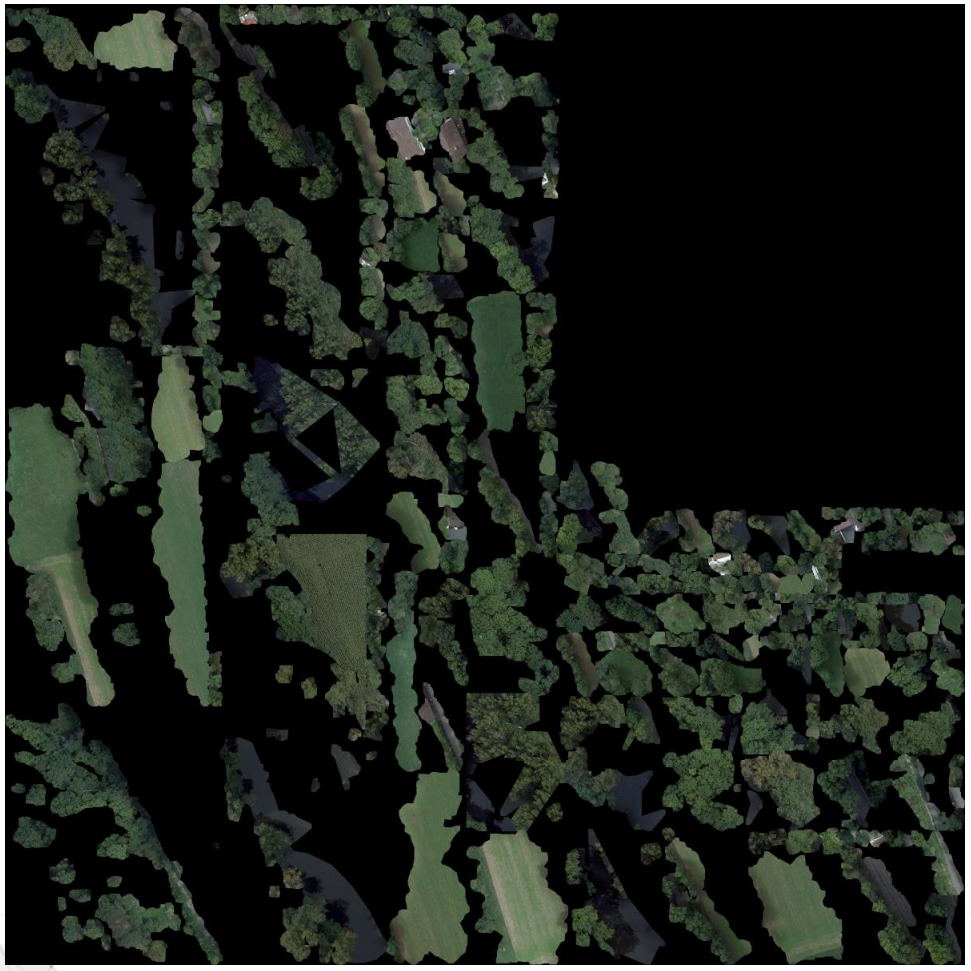
Texture Compression



- New texture image (atlas) packing
- New texture compression

➔ Up to 6 times less storage

Improved Texturing

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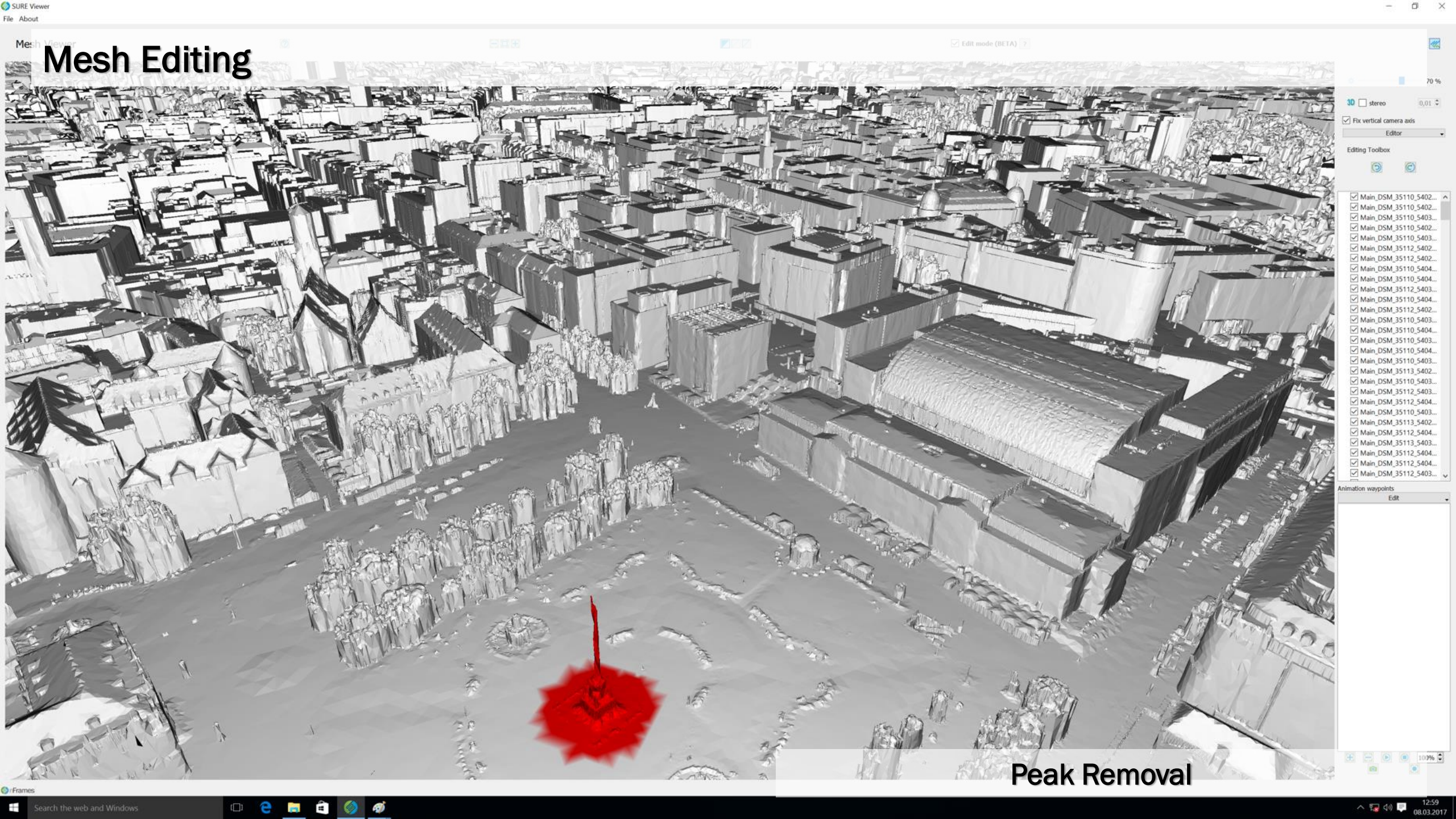
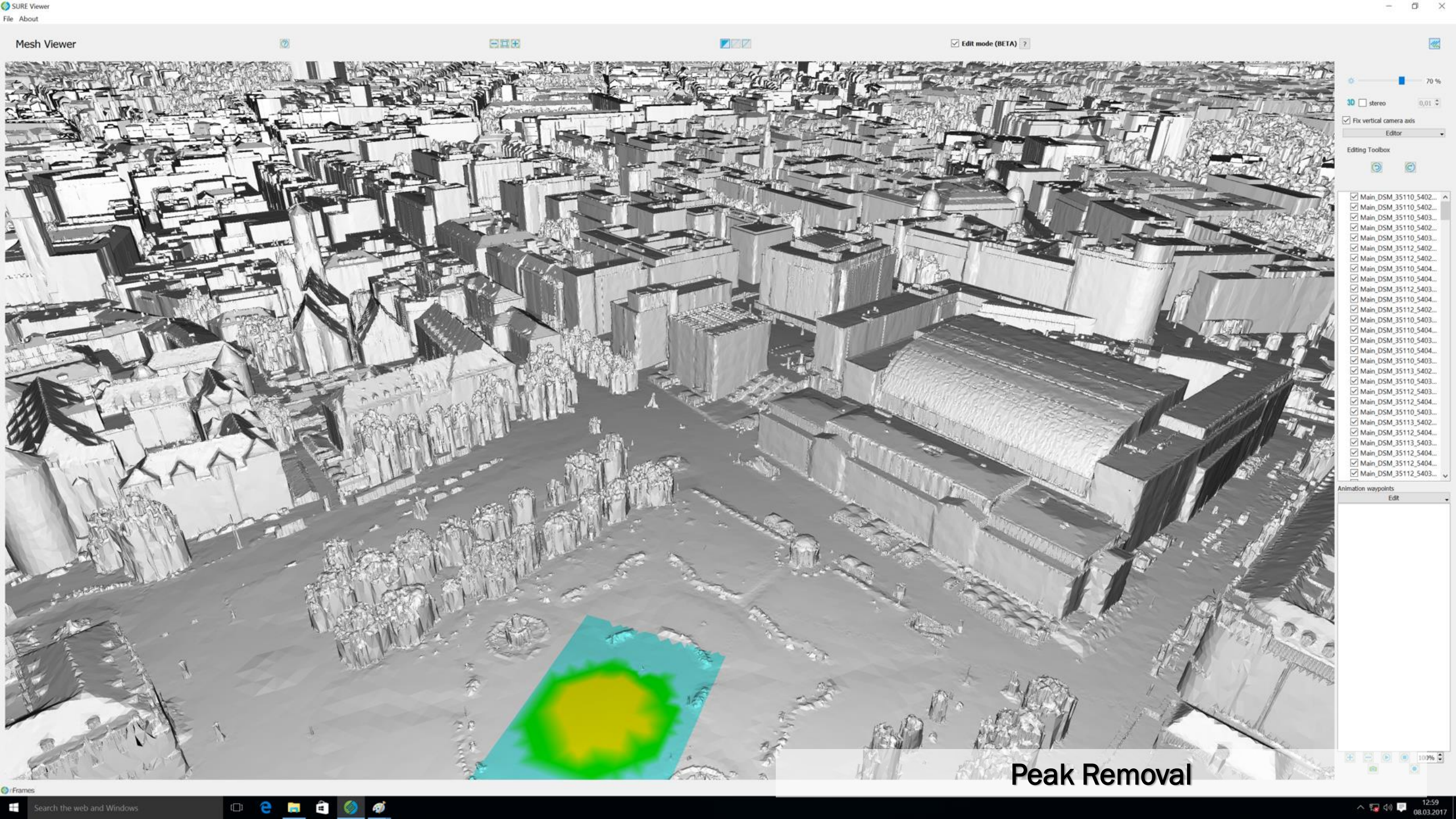
Native Cesium tileset support

Mesh Editing



Peak Removal


SURE Viewer
File About
Mesh Viewer
Edit mode (BETA)
70 %
3D stereo
0,01
Fix vertical camera axis
Editor
Editing Toolbox
Main_DSM_35110_5402...
Main_DSM_35110_5402...
Main_DSM_35110_5403...
Main_DSM_35110_5402...
Main_DSM_35110_5403...
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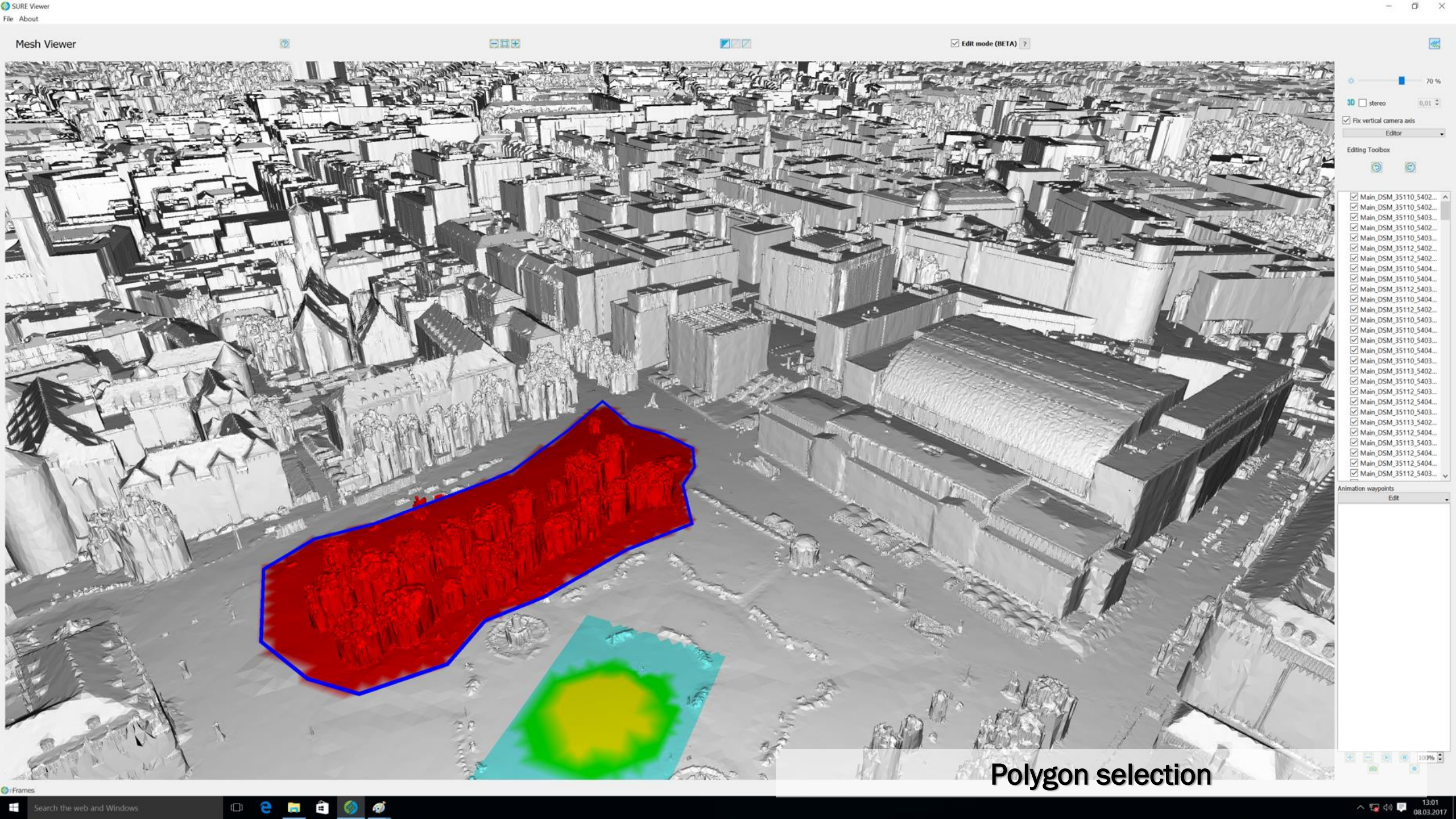
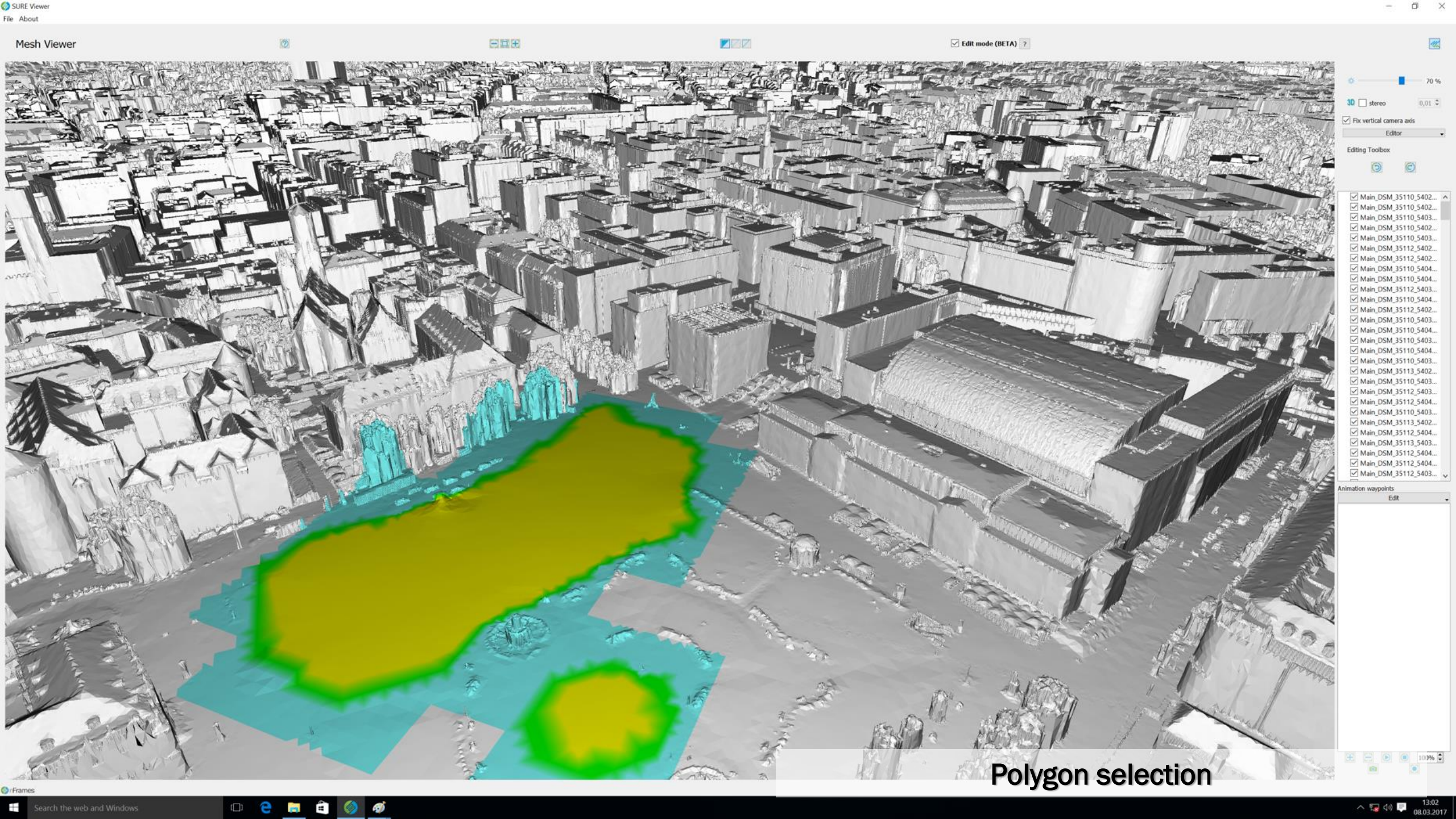
Main_DSM_35113_5403...
Main_DSM_35112_5404...
Main_DSM_35112_5404...
Main_DSM_35112_5403...
Animation waypoints
Edit
Peak Removal
Search the web and Windows
12:59
08.03.2017


SURE Viewer
File About
Mesh Viewer
Edit mode (BETA)
70 %
3D stereo
Fix vertical camera axis
Editor
Editing Toolbox
Animation waypoints
Edit
Polygon selection


SURE Viewer
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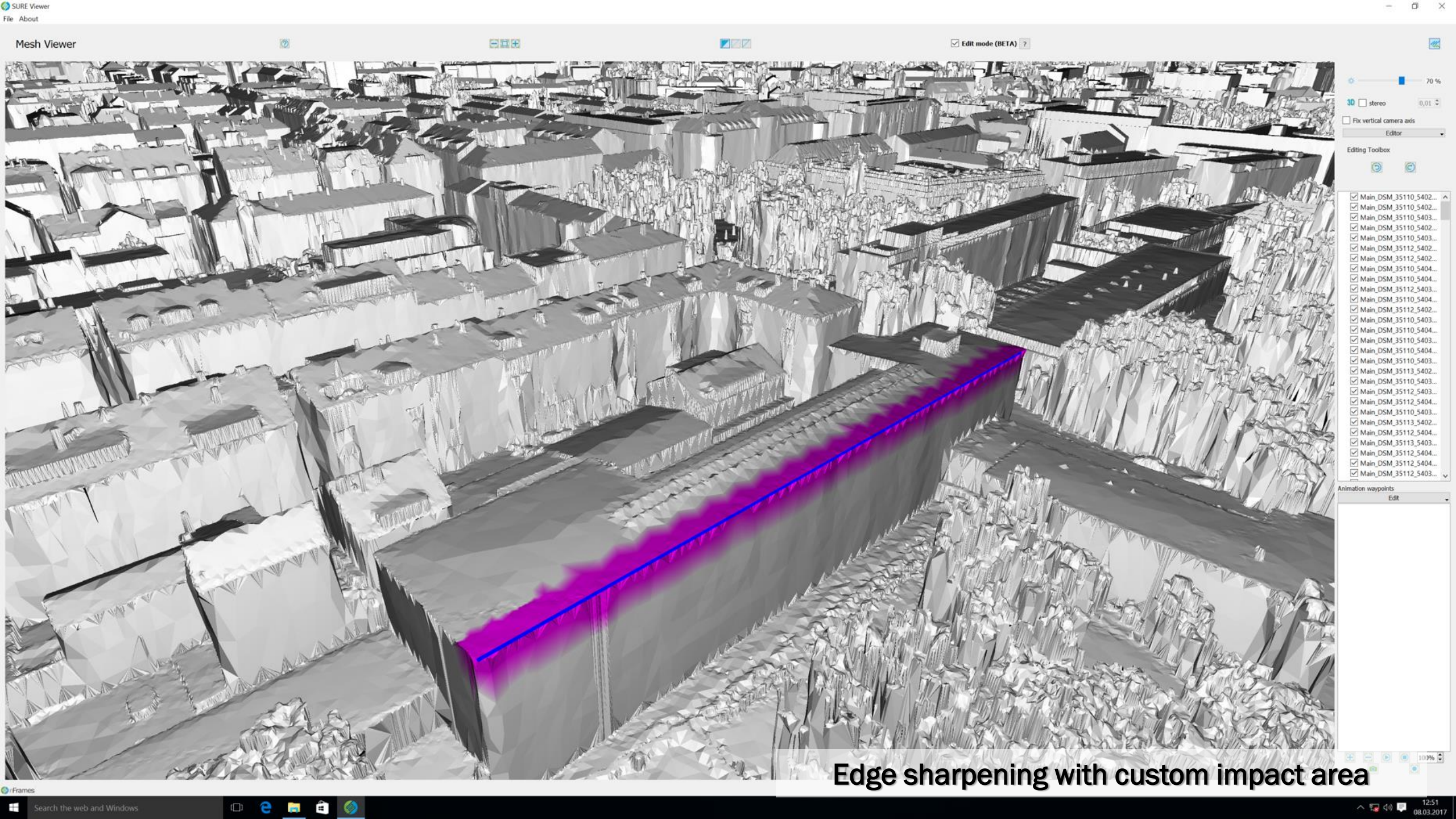
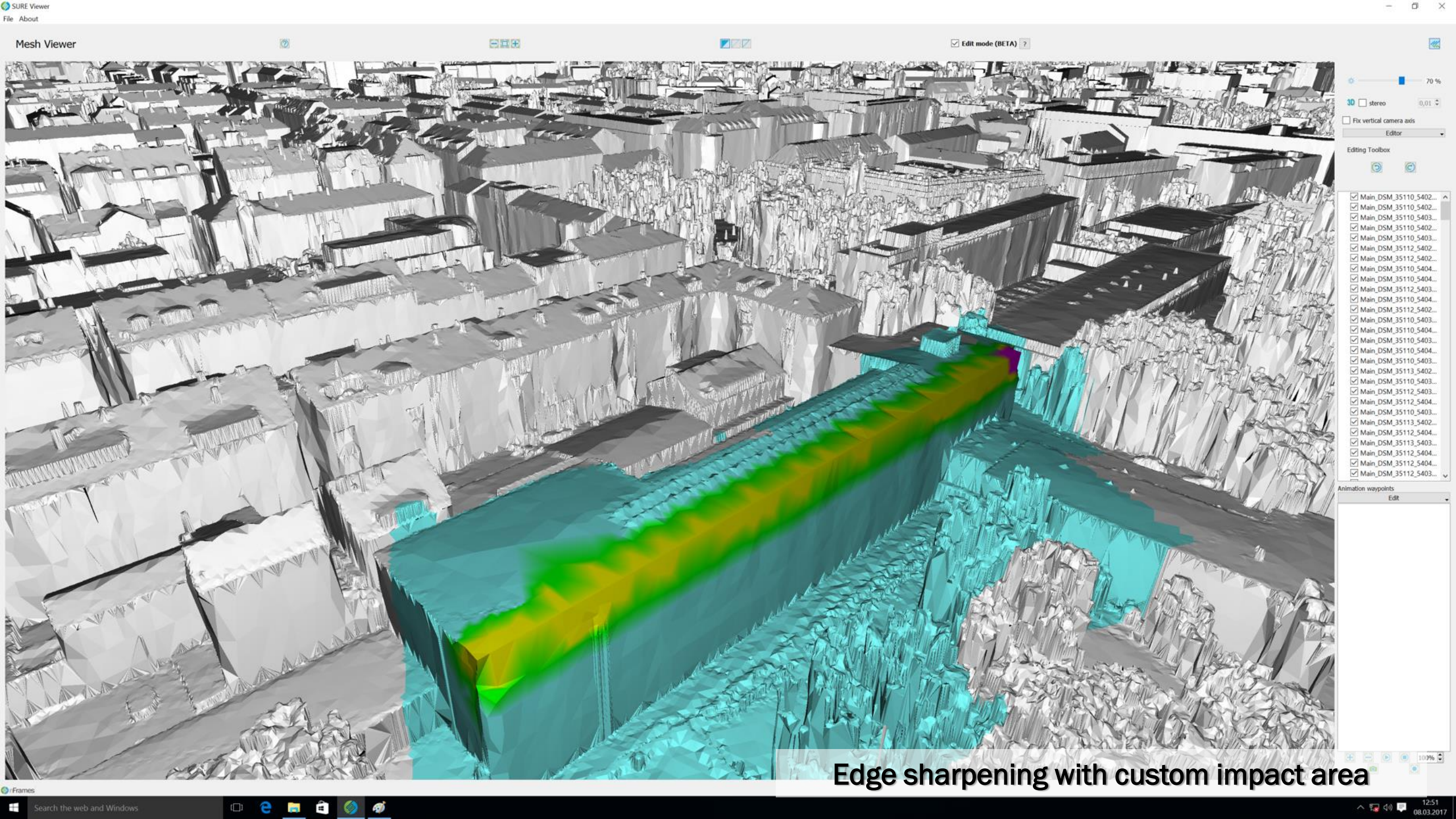
Animation waypoints
Edit
Polygon selection
Search the web and Windows
13:02
08.03.2017


SURE Viewer
File About
Mesh Viewer
Edit mode (BETA)
70 %
3D stereo
Fix vertical camera axis
Editor
Editing Toolbox
Animation waypoints
Edit
Edge sharpening with custom impact area


SURE Viewer
File About
Mesh Viewer
Edit mode (BETA)
70 %
3D stereo
Fix vertical camera axis
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Edit
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Custom Workflows

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Geoinformation Vermessung
Freie und Hansestadt Hamburg

Geometry correction for better True Orthos by using the 2.5D Tool for any point cloud

here: automatic replacement of water points

Integration of further point cloud sources

Integrate & Combine

» Edited point clouds

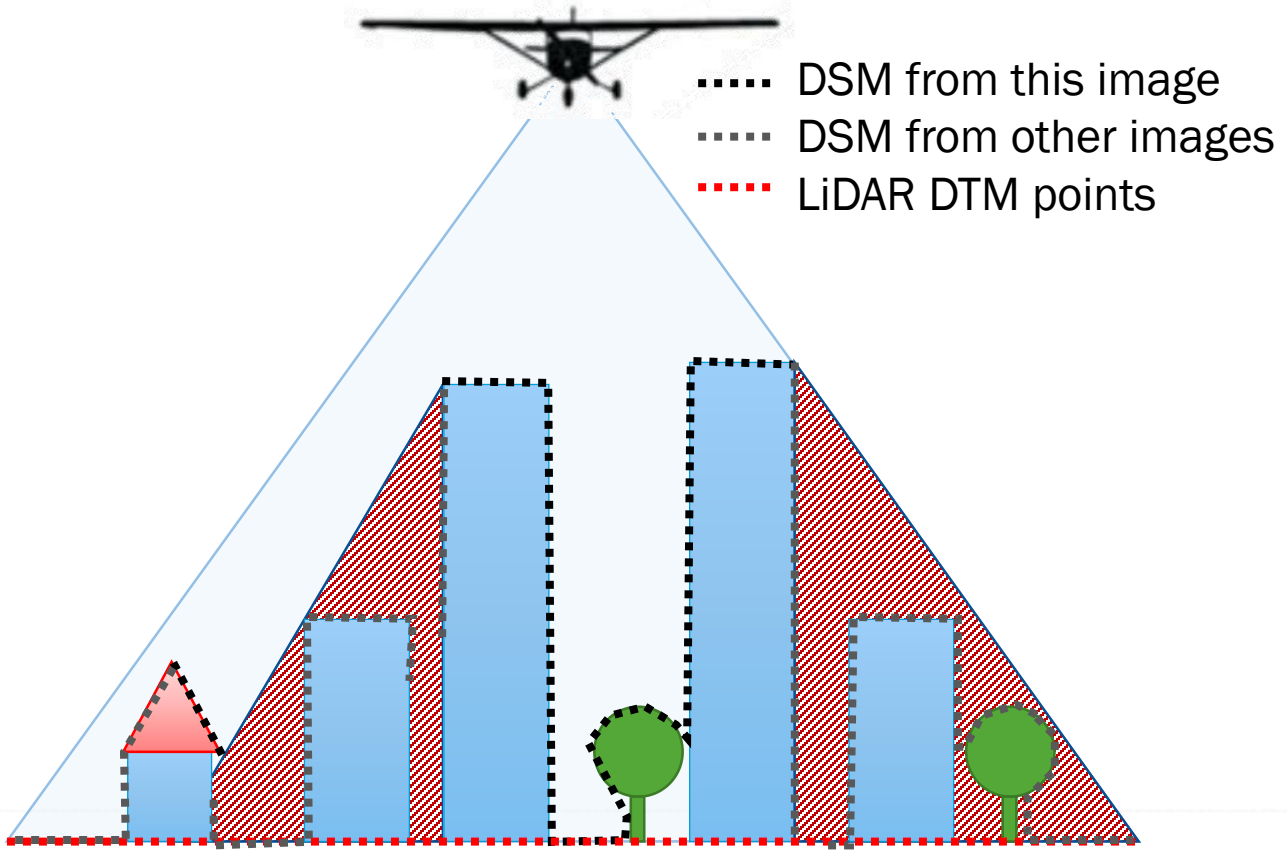
» Point clouds from other sensors
  - E.g. LiDAR

➔Improved completeness

➔Compensation of occlusions

➔Compensation of texture issues

Gottfried Mandlburger, Konrad Wenzel, Andrea Spitzer, Norbert Haala, Philipp Glira and Norbert Pfeifer (2017): IMPROVED TOPOGRAPHIC MODELS VIA CONCURRENT AIRBORNE LIDAR AND DENSE IMAGE MATCHING, PhotoGA 2017

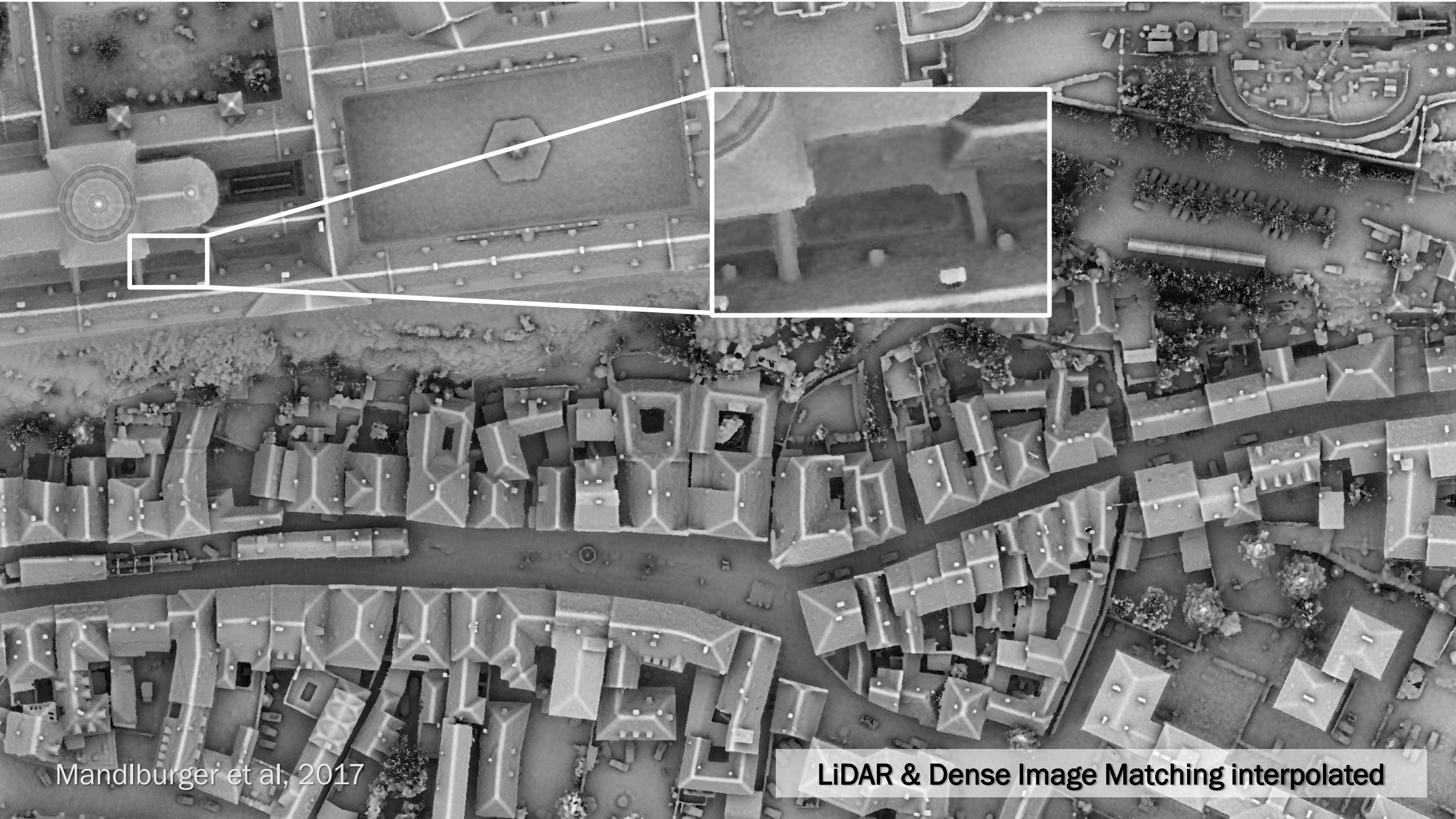


Mandlburger et al, 2017

LiDAR DSM

Mandlburger et al, 2017

LiDAR & Dense Image Matching



Mandlburger et al, 2017

LiDAR & Dense Image Matching interpolated

Mandlburger et al. 2017

LiDAR and Dense Image Matching DSM Mesh

Mandlburger et al, 2017

LiDAR and Dense Image Matching DSM Mesh


Mandlburger et al., 2017
True Ortho - Dense Image Matching only

Mandlburger et al. 2017

True Ortho - LiDAR and Dense Image Matching

Flight planning - Objectives

Quality

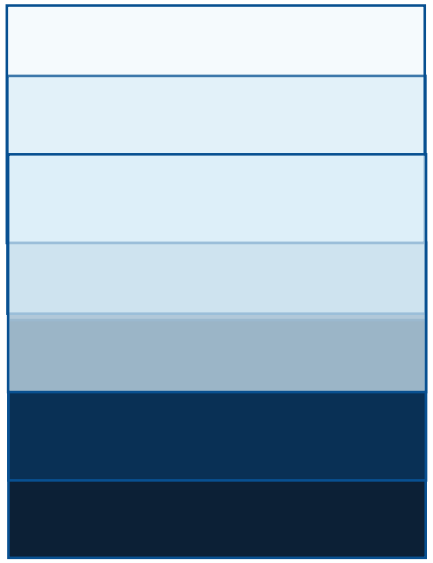
- Precise results
  - Sharp geometry and texture

Productivity

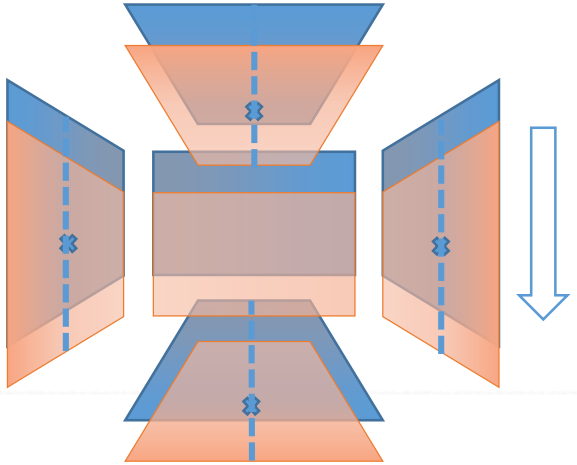
- Efficient acquisition
  - Minimal amount of flight lines
- Efficient processing
  - As less manual editing as possible

City capturing

» Nadir
  - 80% Forward overlap
  - Higher sideward overlap recommended
    - 60% common buildings, 80% skyscrapers

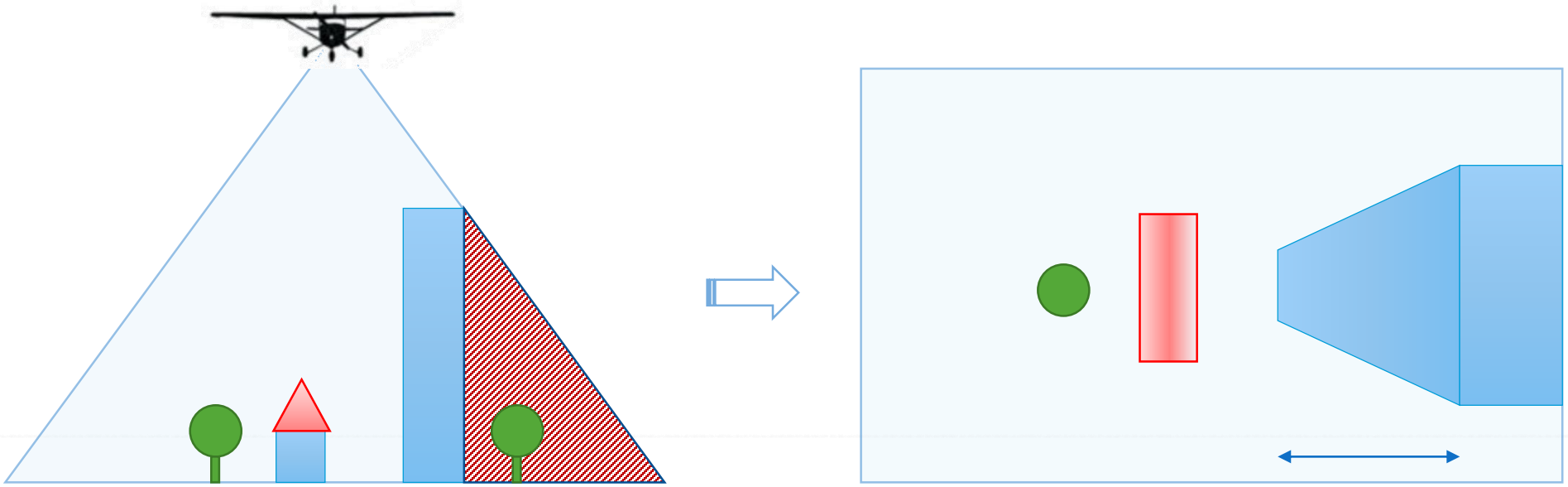


» Oblique
  - Maintain Nadir overlap
    - Resolve street occlusions + enable True Ortho
    - Additional oblique views for façade observation



Challenges from terrain displacement

» Pixel shifts untreated in the traditional flight planning
  - Occlusions
  - Perspective distortions
  - Insufficient overlap

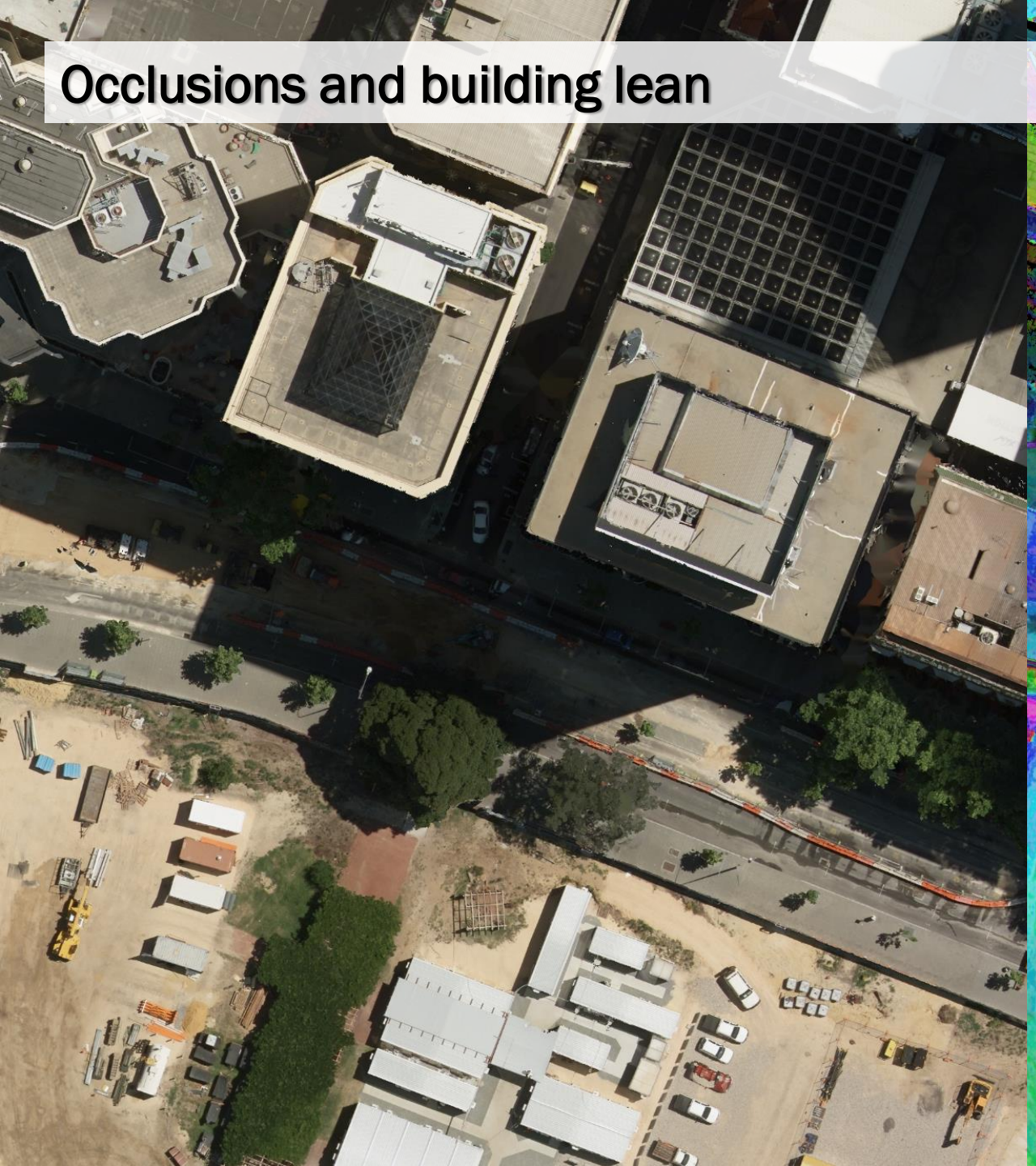


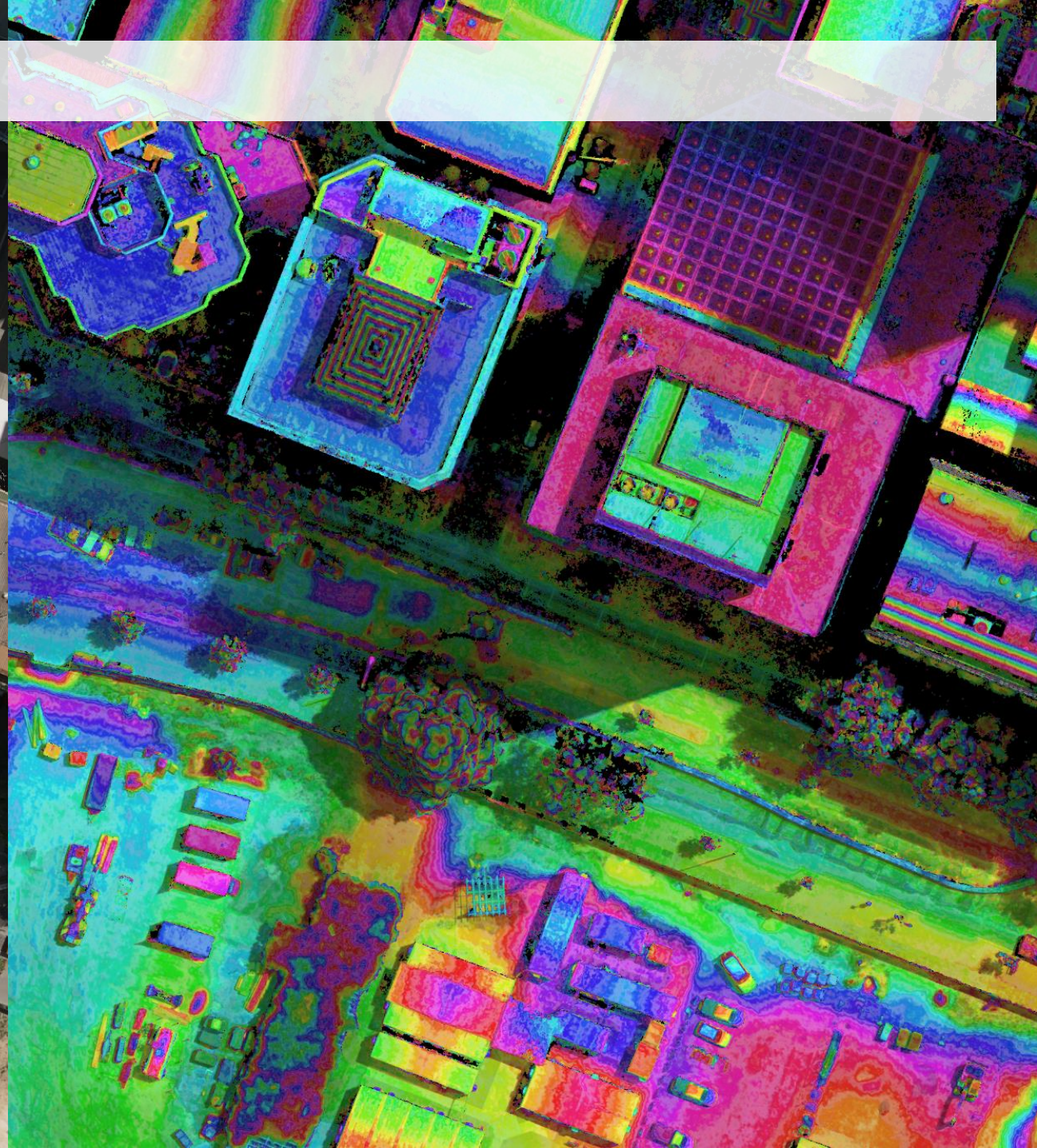
Occlusions and building lean

Brookfield place building - 234m

Occlusions and building lean

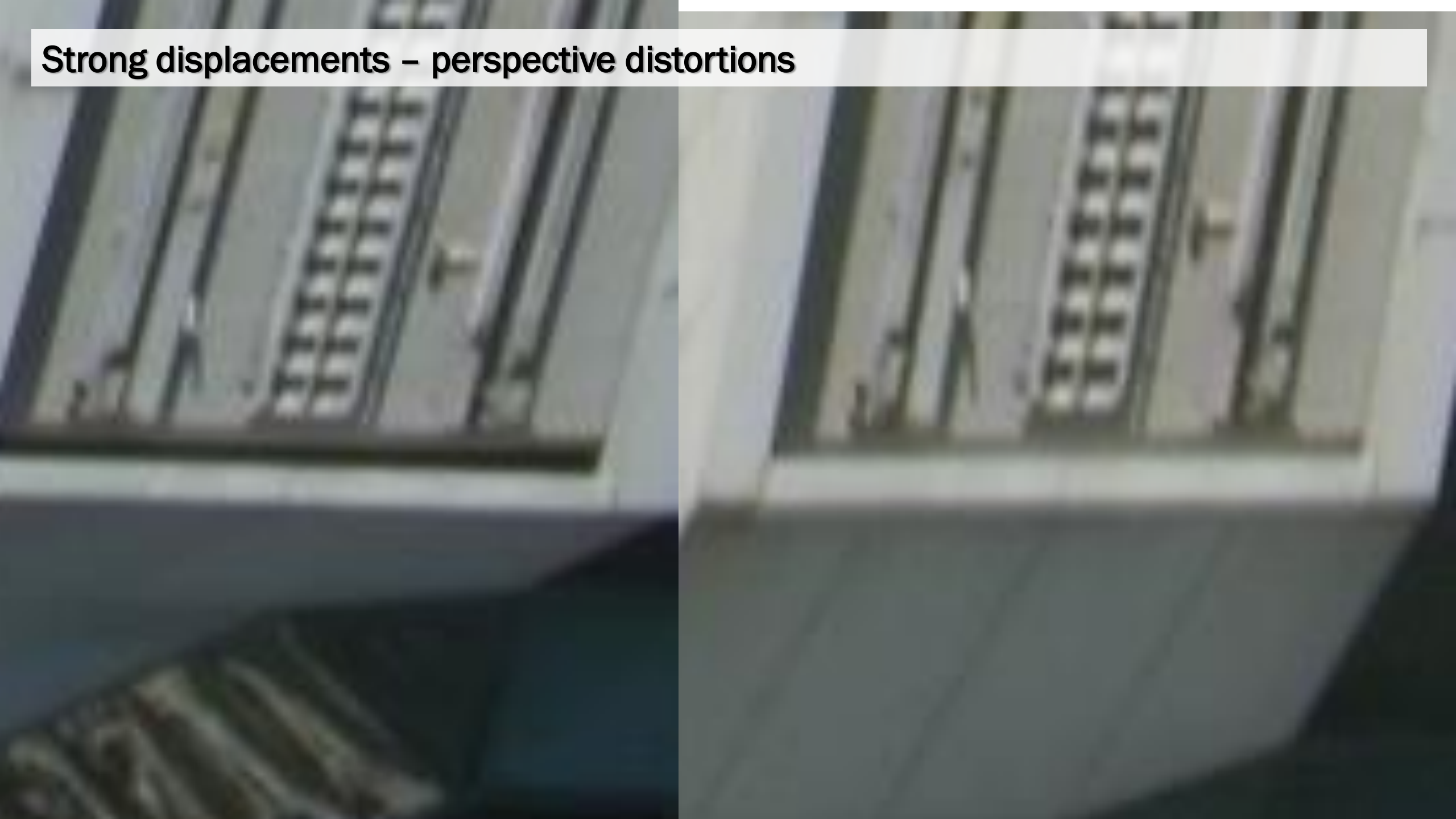
Occlusions and building lean





Occlusions and building lean

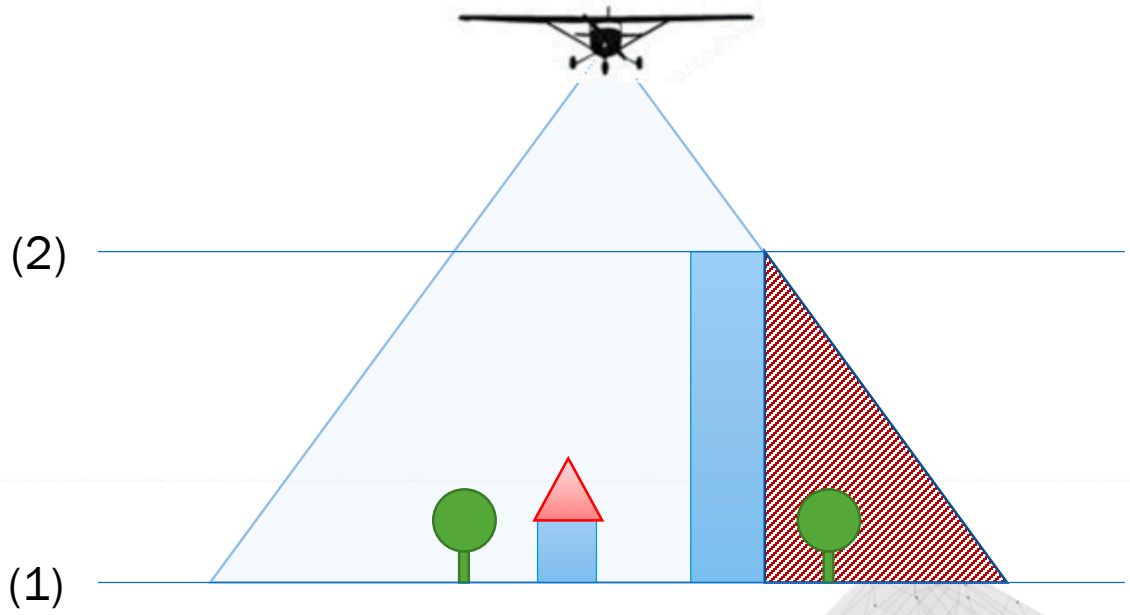
Strong displacements – perspective distortions



Flight planning - Solutions

1) Carry out flight planning at two levels
   - Minimum (1) and maximum (2) ground level
   - Overlap !>= 75%

2) Consider building lean
   - As angle **and** effective pixels
   - Use *Central Image Contribution*



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