



Increasing productivity for the digitisation of urban areas

Introducing Leica CityMapper-2

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Seoul, 28 October 2019



An aerial photograph of a city, likely New York City, with a dense grid of buildings. A semi-transparent 3D point cloud is overlaid on the image, representing the city's geometry. The point cloud is rendered in various shades of green and blue, with taller buildings appearing in lighter green and shorter buildings in darker blue. The text 'WHAT'S NEW?' is superimposed on a blue banner across the middle of the image.

WHAT'S NEW?

A NEW GENERATION AIRBORNE CAMERA

Made specifically
for photogrammetry



MFC150 RGB & MFC150 NIR

The best image chipset available

Custom-designed lenses of highest quality

Mechanical forward-motion-compensation

Stable camera system that maintains calibration under difficult aerial conditions

Several focal lengths for flexible flying heights



GOALS FOR NEW DEVELOPMENT

Best image quality possible for mapping in low sun angle and low light condition to ensure optimum productivity

A system able to fly high resolution from high altitude and with high speed

Compact design for flexible system integration



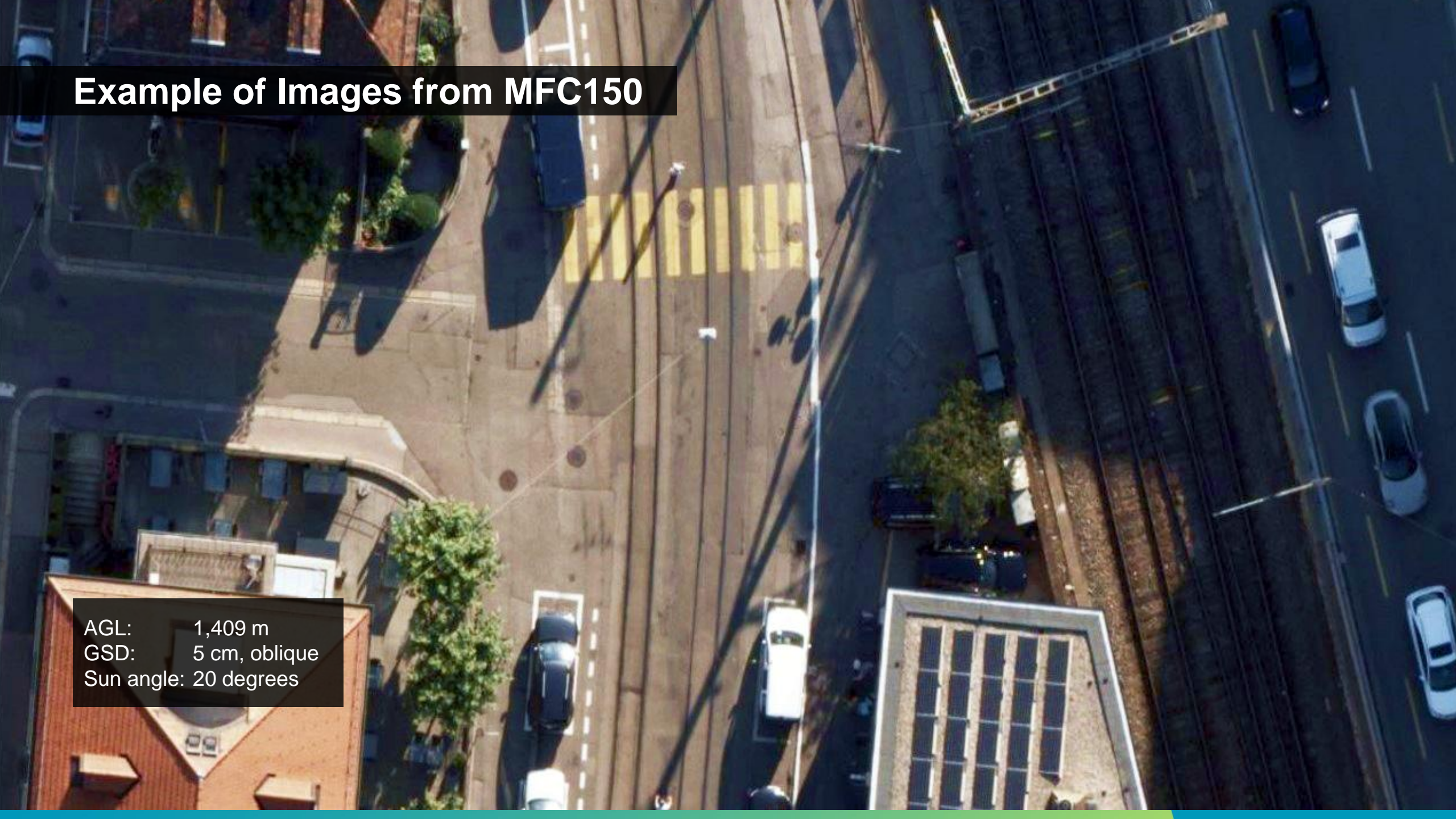
Example of Images from MFC150

AGL: 717 m
GSD: 2.5 cm, nadir
Sun angle: 47.8 degrees



Example of Images from MFC150

AGL: 1,409 m
GSD: 5 cm, oblique
Sun angle: 20 degrees

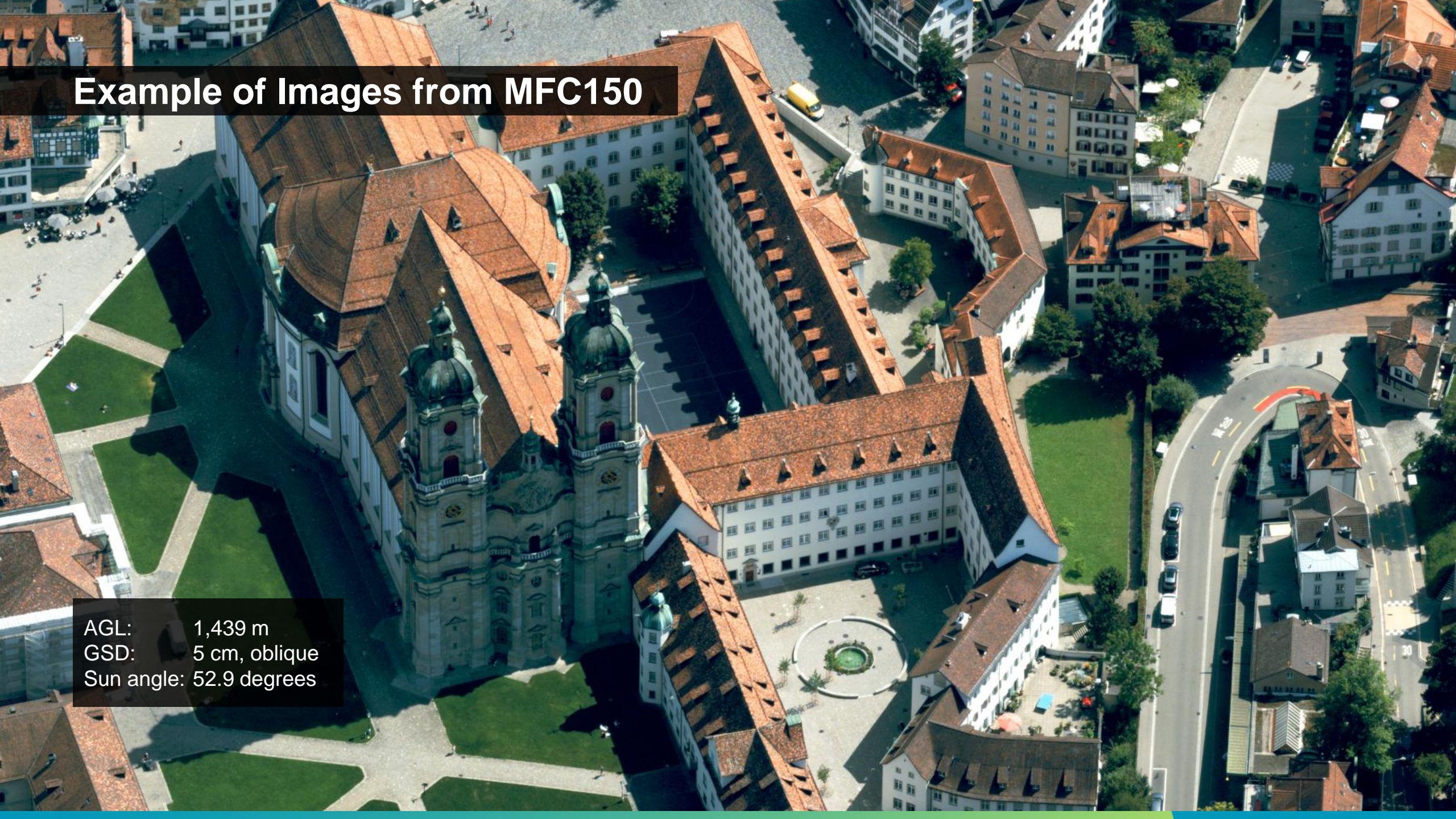


Example of Images from MFC150

AGL: 1,400
GSD: 5 cm, oblique
Sun angle: 53 degrees



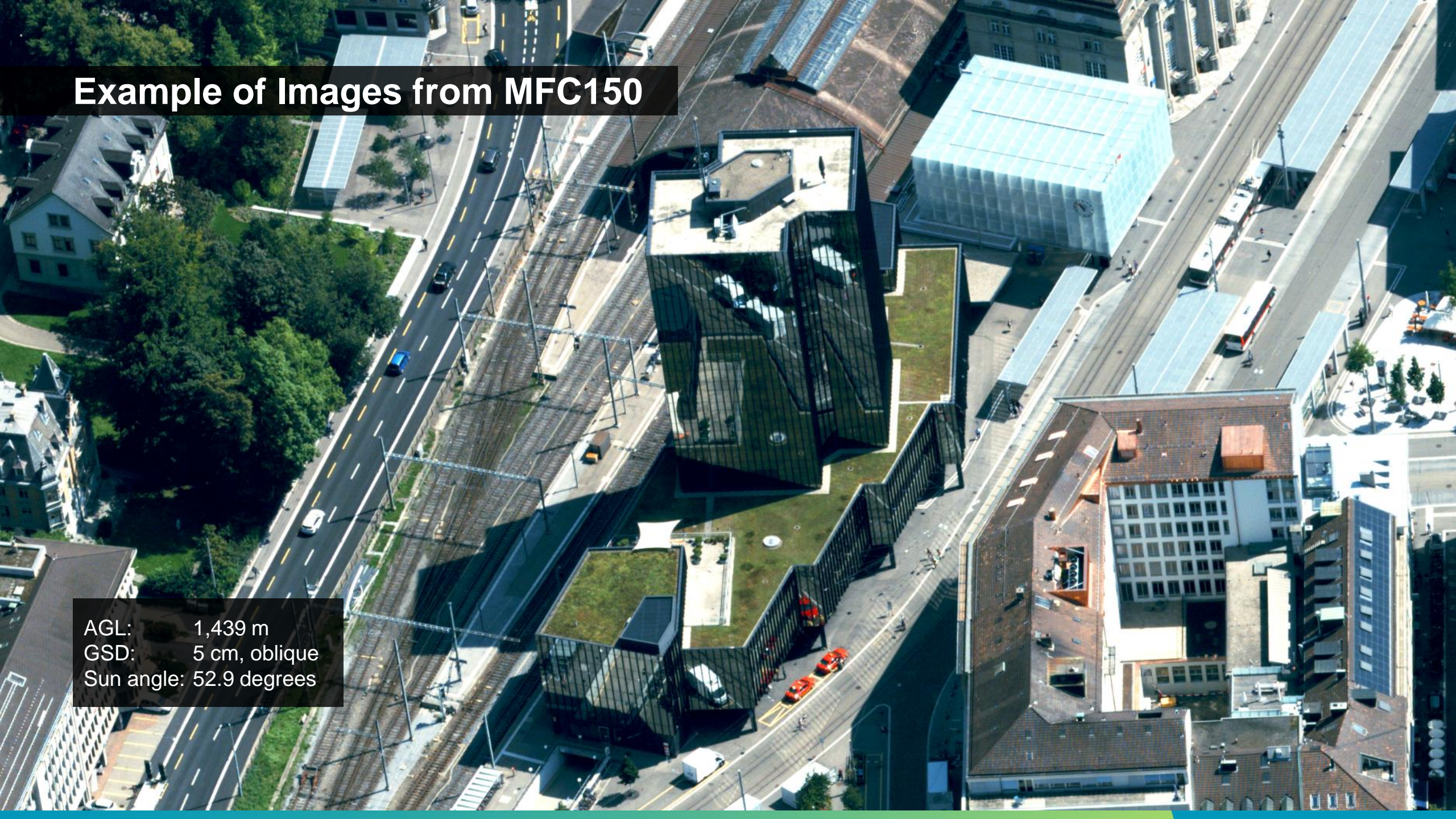
Example of Images from MFC150



AGL: 1,439 m
GSD: 5 cm, oblique
Sun angle: 52.9 degrees

Example of Images from MFC150

AGL: 1,439 m
GSD: 5 cm, oblique
Sun angle: 52.9 degrees





Major Performance Improvement

CityMapper (First Gen)

- Introduced in 2016 as the world's first airborne sensor to combine aerial survey of oblique imagery and LiDAR
- Built to meet demanding and significant need for digital twins of urban areas
- Today the most efficient system for urban mapping applications
- Still no competitor.....

CityMapper-2

- 40% more productivity with new high-performance cameras and LiDAR
- Focus on simplifying the mapping of urban areas
- More compact and easy to use with outstanding workflow
- Built for 2.5 cm / 1" resolution data



Building on the Common Sensor Platform

PAV100 Mount

- Stabilises the sensor for flight path deviations in roll, pitch and yaw
- Minimises image blur and improves LiDAR data distribution

Pod Lifter

- Makes operation easy in low aircrafts

LiDAR & Camera Controller

- Built in, see next slide

OC60 Operator Console

- 12.1" screen hosting the Sensor Operator interface

PD60 Pilot Display

- 6.3" screen hosting the Pilot Interface



GSD versus Ground Speed at 80% Forward Overlap



Flying Height for 5 cm Nadir GSD

CityMapper-2H

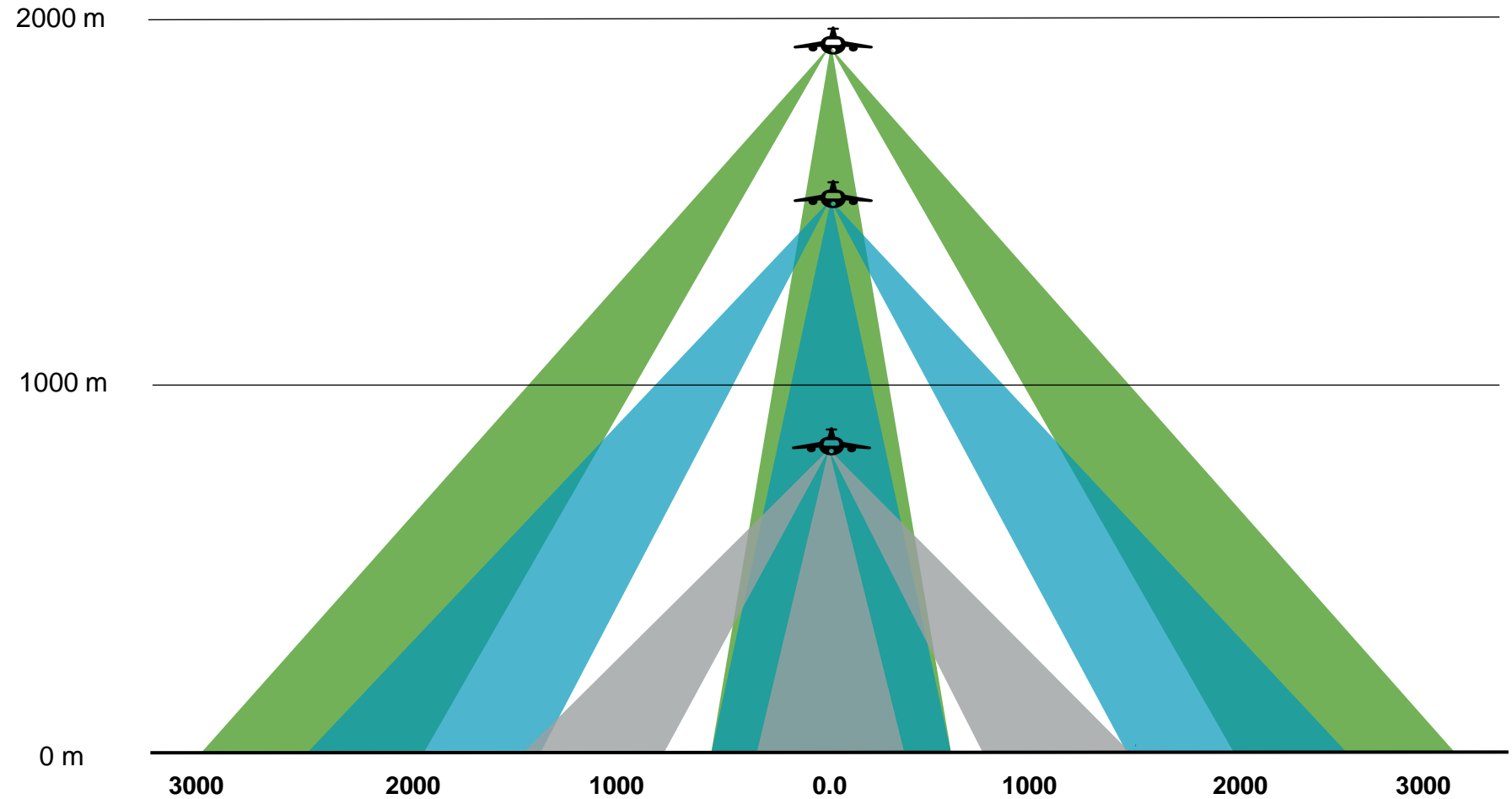
146 mm lens nadir and 189 mm oblique

CityMapper-2S

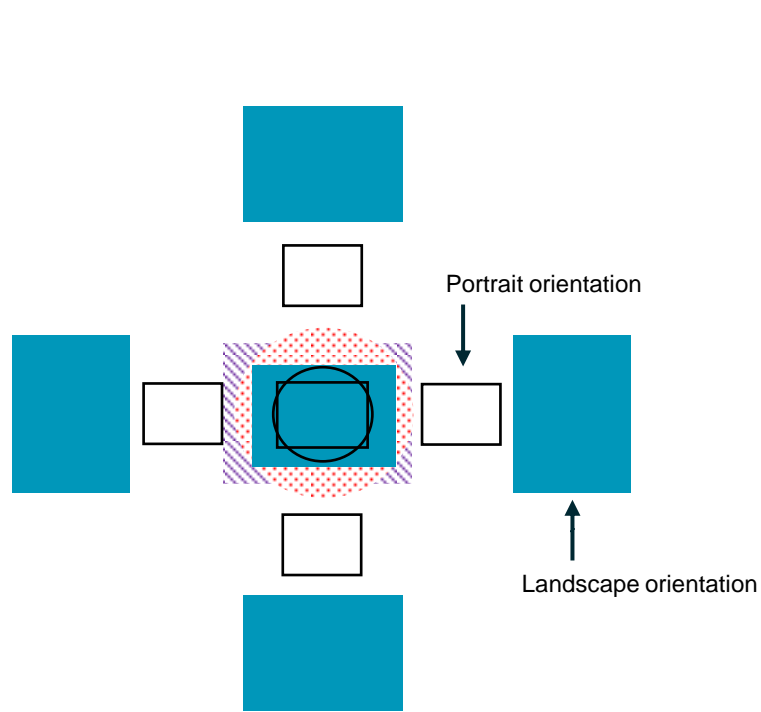
112 mm lens nadir and 146 mm oblique

CityMapper

83 mm lens nadir and 156 mm oblique

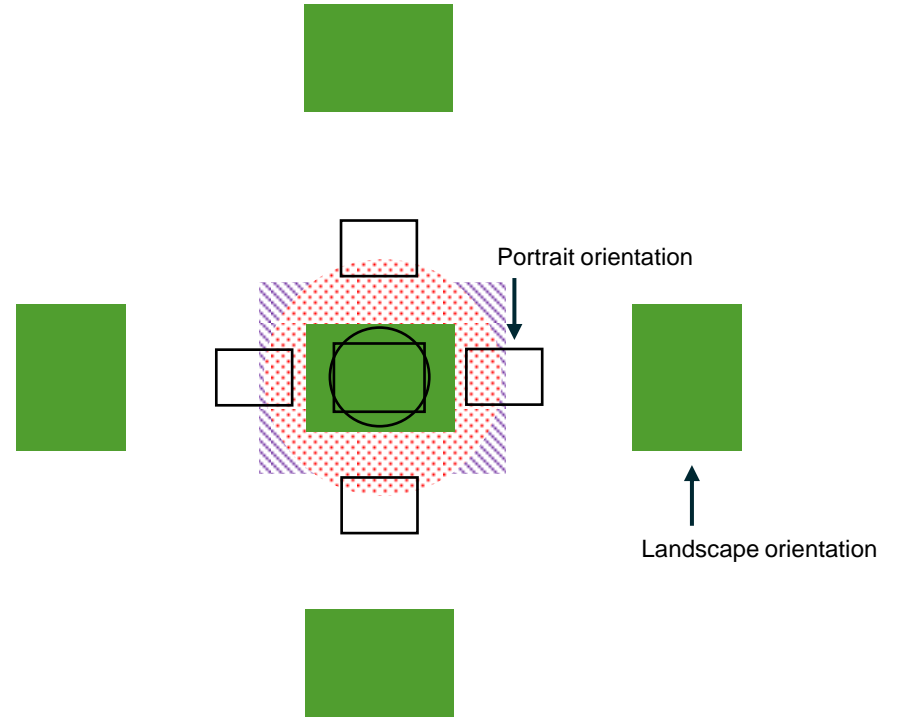


Sensor Orientation



CityMapper-2S

Flight Direction ↑



CityMapper-2H

Real-time quality control of images

In-the-Aircraft QA of images when flying

- RGB images from oblique cameras
- RGB and NIR images from nadir cameras
- Single or multi-frame view
- Mark frames for re-flight
- Directly queue execution of re-flight
 - Full line or affected parts of line

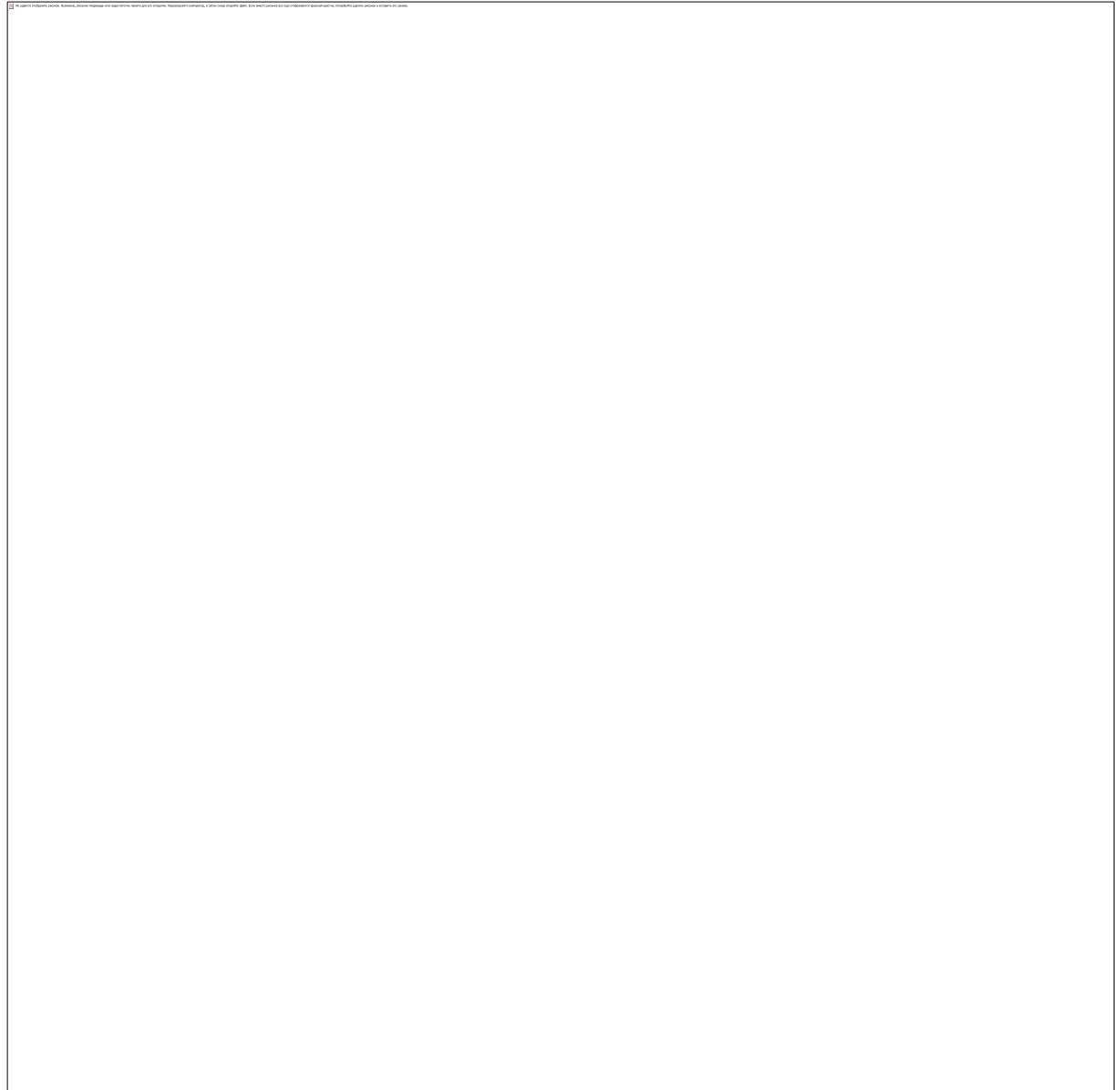
Off-line QA of images

- Thumbnails can be stored on USB during flight
 - Resolution 3,536 x 2,656 px
- Fast QA of images with third-party software
- Hand-over of QC information to MissionPro/HxMap



New Control Panel & Integrated Storage

- New design with major improvements
- Internal storage reduces cabling
- Storage improved to 15,360 Tb
- New control panel, key and stop system
- New bar handles reduces size and gives possibility for placement on handles for any lens and camera service



CityMapper-2 includes a full version of TerrainMapper

High collection efficiency

- Up to 2 MHz pulse repetition frequency
- Flying altitude from 300 m to > 5,000 m AGL

All terrain

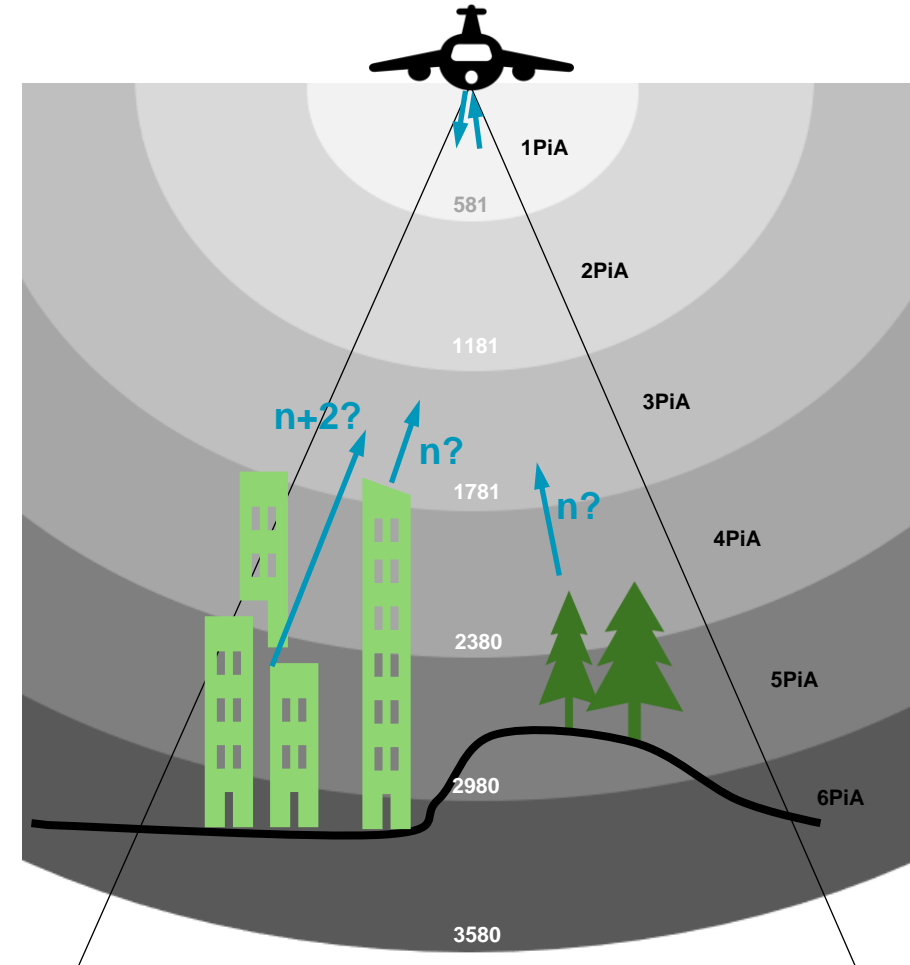
- Handles complex terrain, from urban mapping to mountainous area due to gateless MPiA zones
- Handles up to 35 LiDAR pulses in the air (MPiA zones) simultaneously

Even point density

- Circular scan pattern for oblique coverage
- Even point density mode provides same point density at the center and at the FOV edges

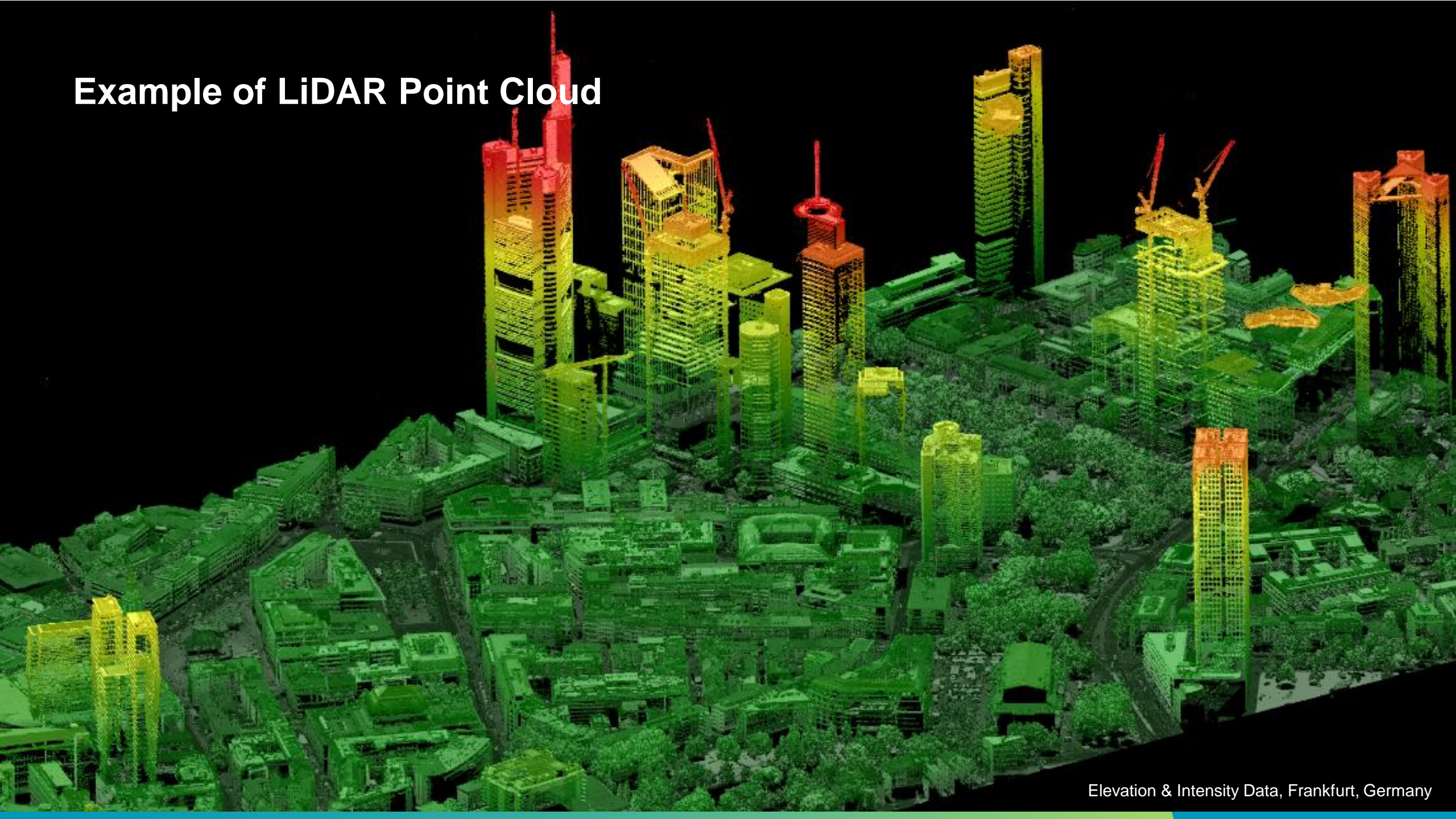
Full waveform LiDAR

- Full waveform LiDAR system with on-board real-time waveform-to-range processing



Function of gateless MPiA zone technology

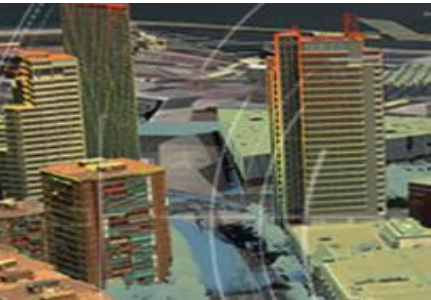


Example of LiDAR Point Cloud



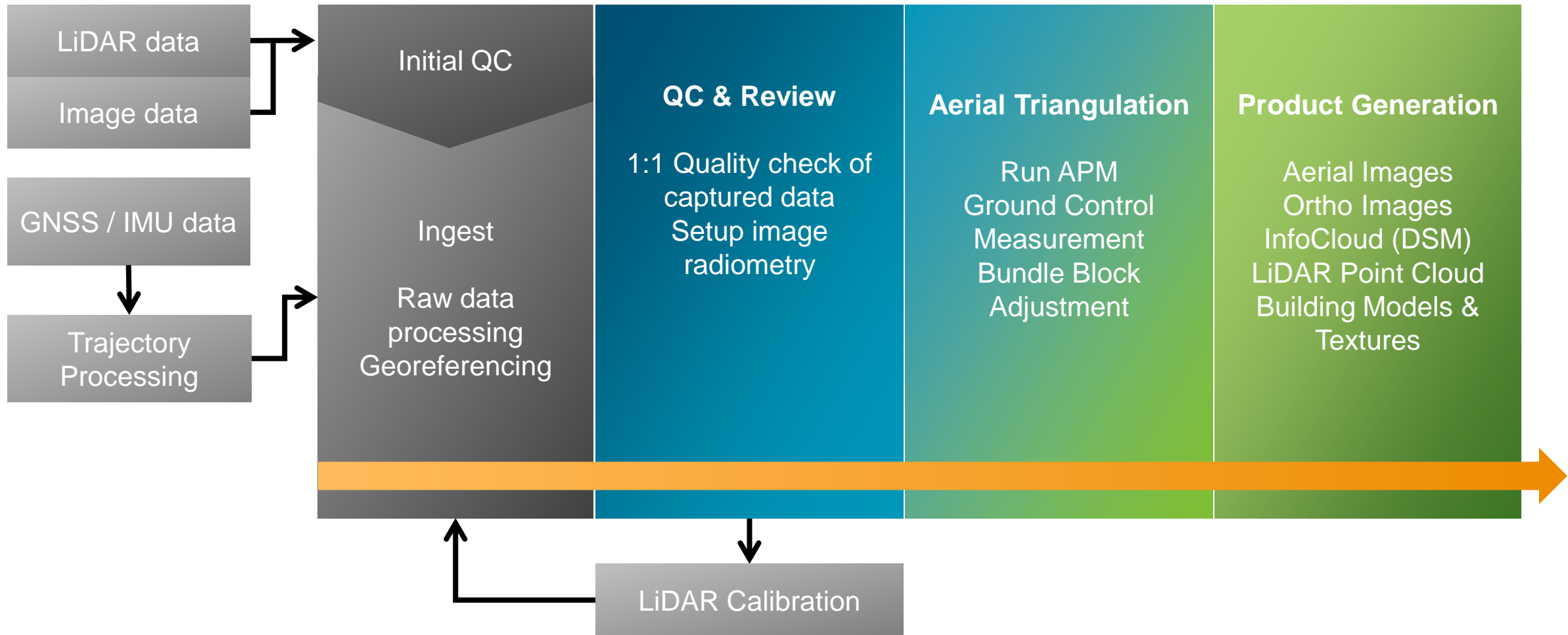
HxMap Supported Sensors

 <p>RealCity</p>	 <p>CityMapper-2</p>	 <p>CityMapper</p>	 <p>RCD30 Oblique</p>
 <p>RealWorld</p>	 <p>DMC IIe / III</p>	 <p>RCD30</p>	
 <p>RealTerrain</p>	 <p>SPL</p>	 <p>TerrainMapper</p>	 <p>ALS80</p>



Aerial Hybrid Oblique Sensors	
Aerial Imagery Sensors	
Aerial LiDAR Sensors	

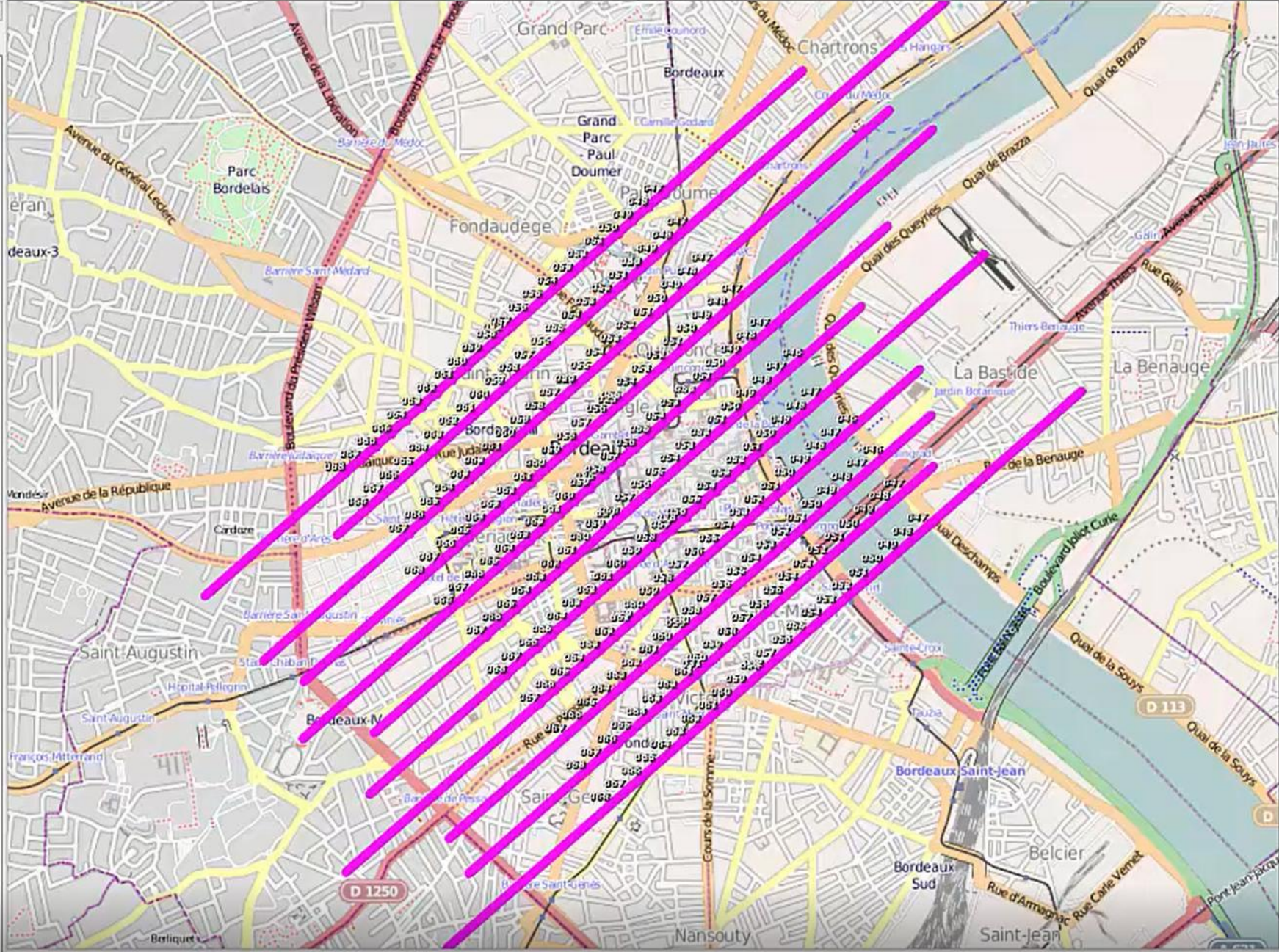
Processing Workflow





Data Sources

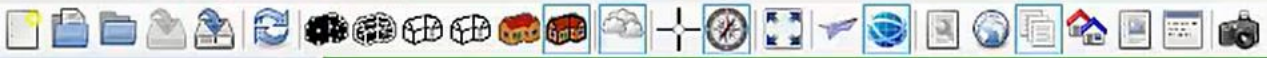
- Strips
- Blocks
 - Bordeaux_Demo
 - Bordeaux_Demo
 - CM_Bordeaux_V7==21.02.2017 09:15:40_5
 - CM_Bordeaux_V7_5
 - 032
 - 022
 - 022
 - 028
 - 028
 - 023
 - 023
 - 024
 - 025
 - 025
 - 026
 - 027
 - 027
 - 029
 - 030
 - 030
 - 031
- Overlays
 - Bordeaux_footprints_area1_2



Lat: 44.8511517760, Lon: -0.6162689665

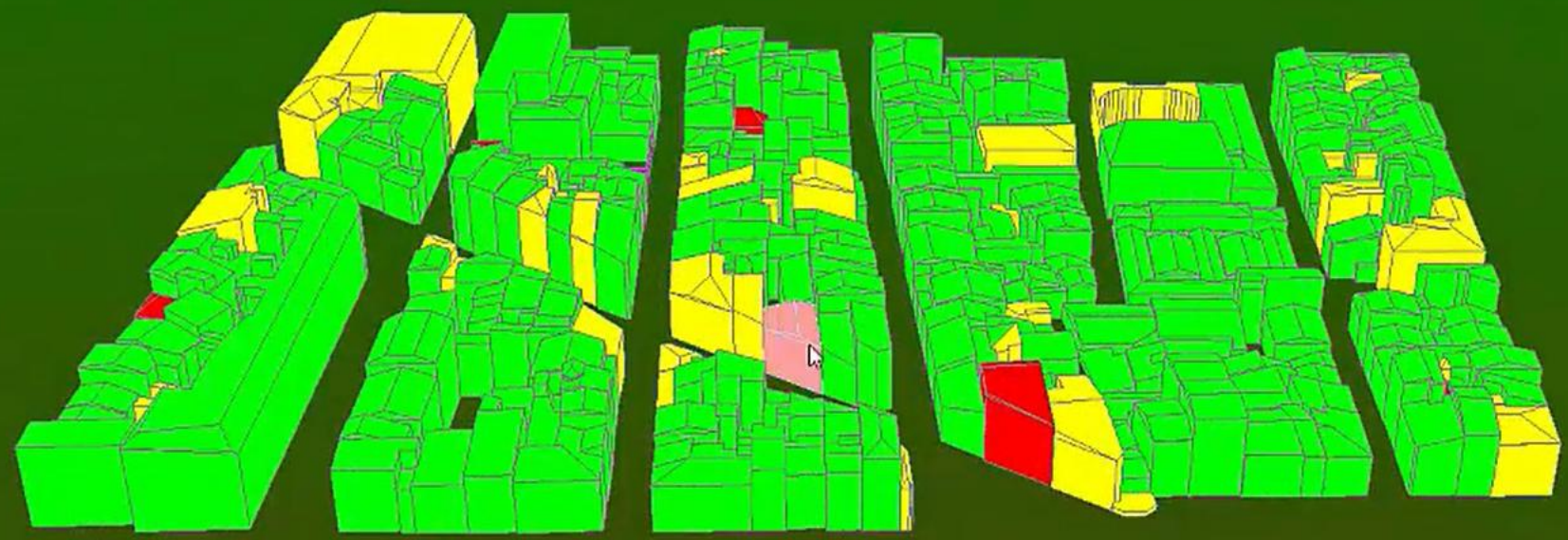
- Layers
- | Layer | Labels |
|---|-------------------------------------|
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| <input checked="" type="checkbox"/> Bordeaux_Demo_LiDAR | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Footprints | <input type="checkbox"/> |
| <input type="checkbox"/> Elevation Sources | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> Background | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> Overlays | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> Bordeaux_footprints_area... | <input checked="" type="checkbox"/> |

- Filters
- Apply Reset
- Images
 - Views
 - Bands
 - Type
 - Channel
 - Capture
 - Contains
 - Data Type
 - QC
 - Date Time

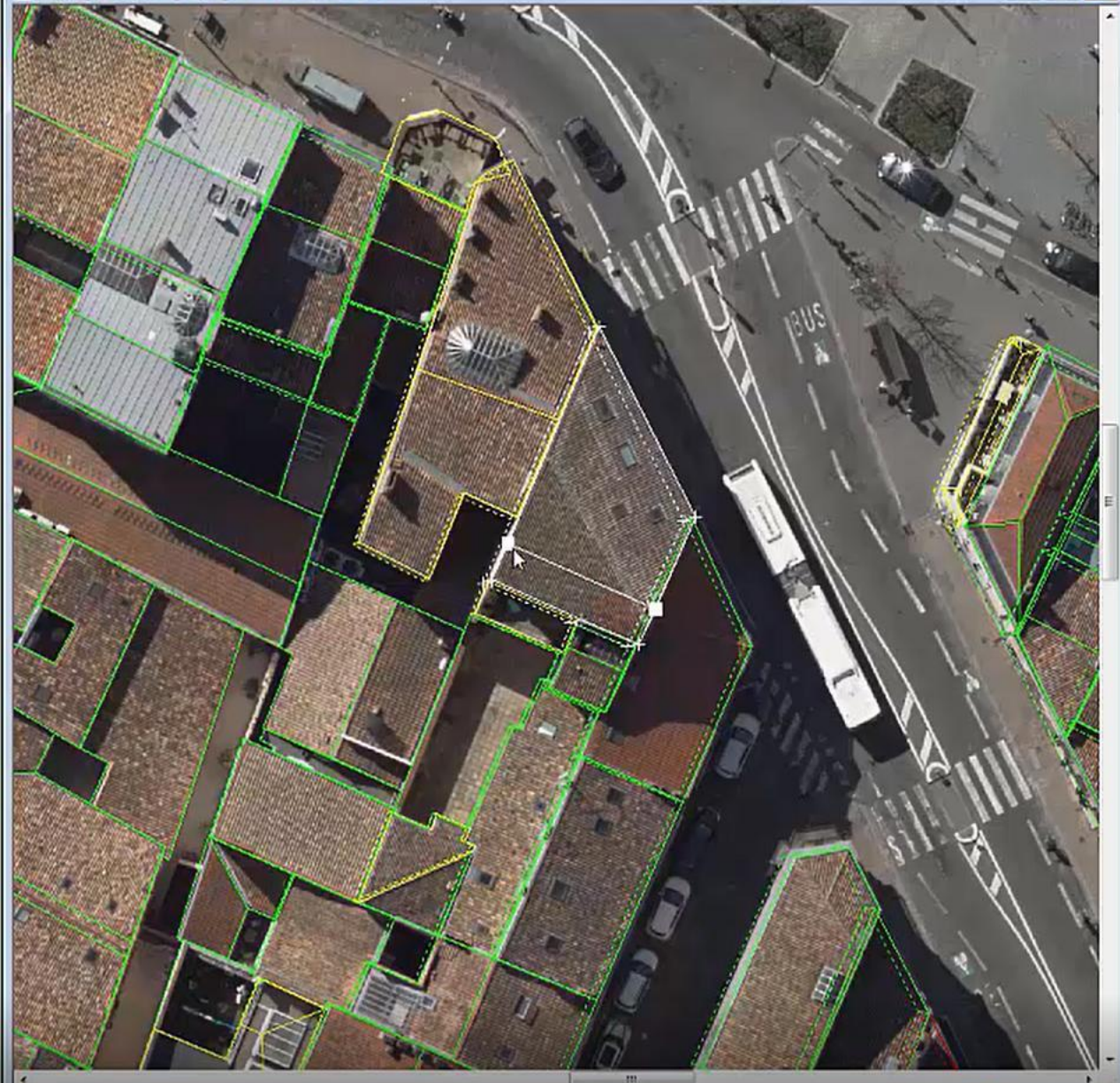


Layers

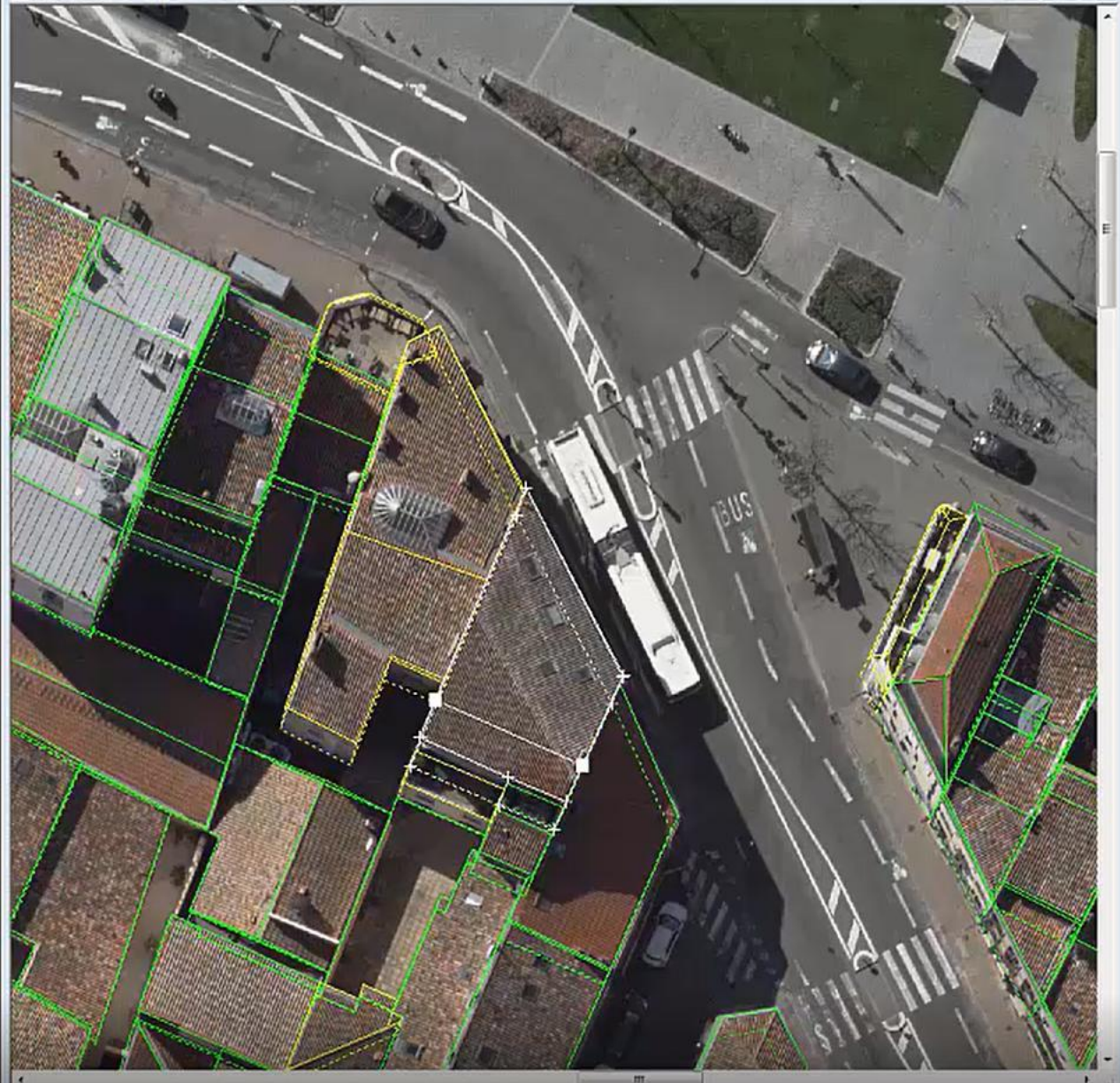
Bordeaux_Demo



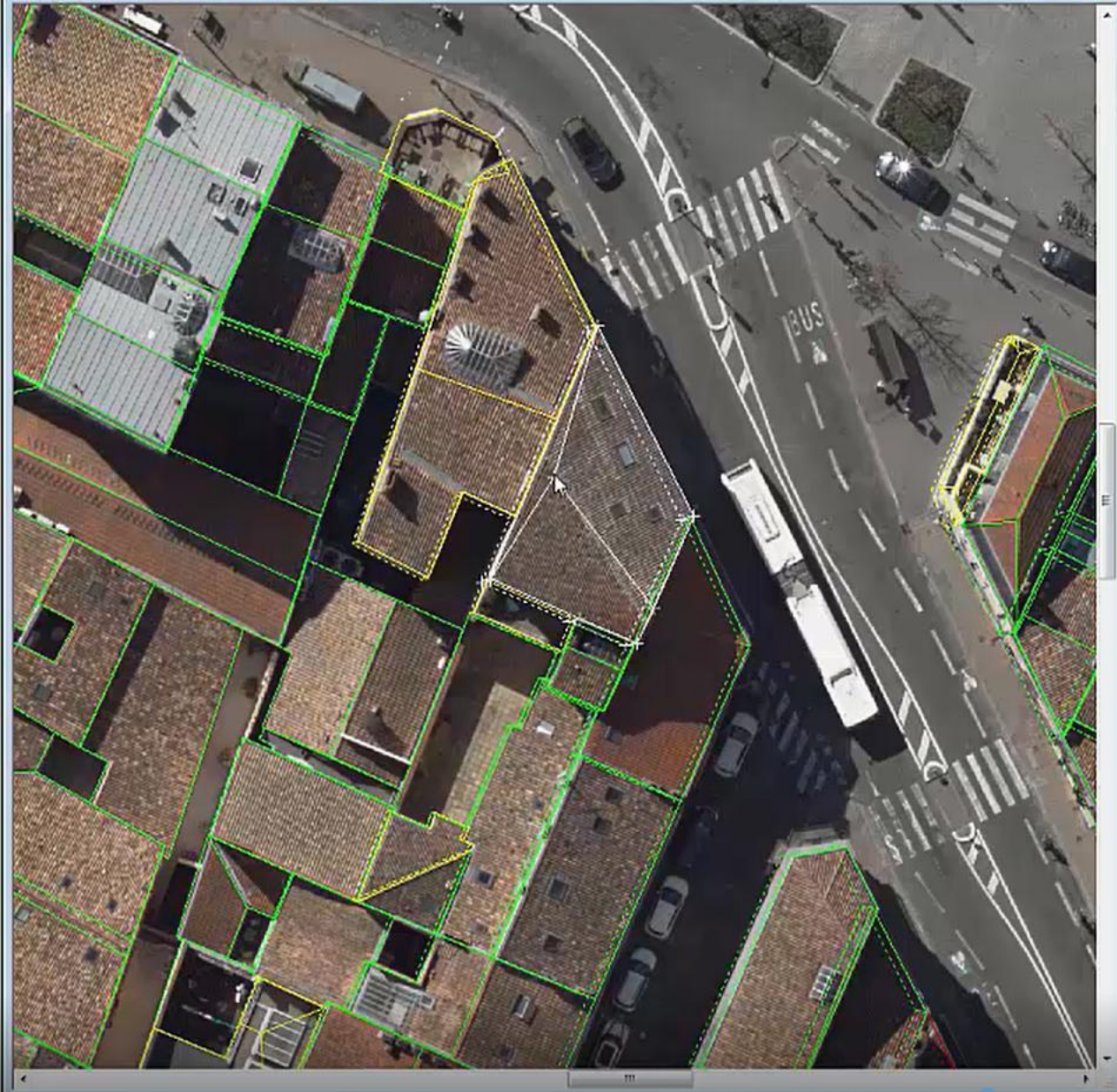
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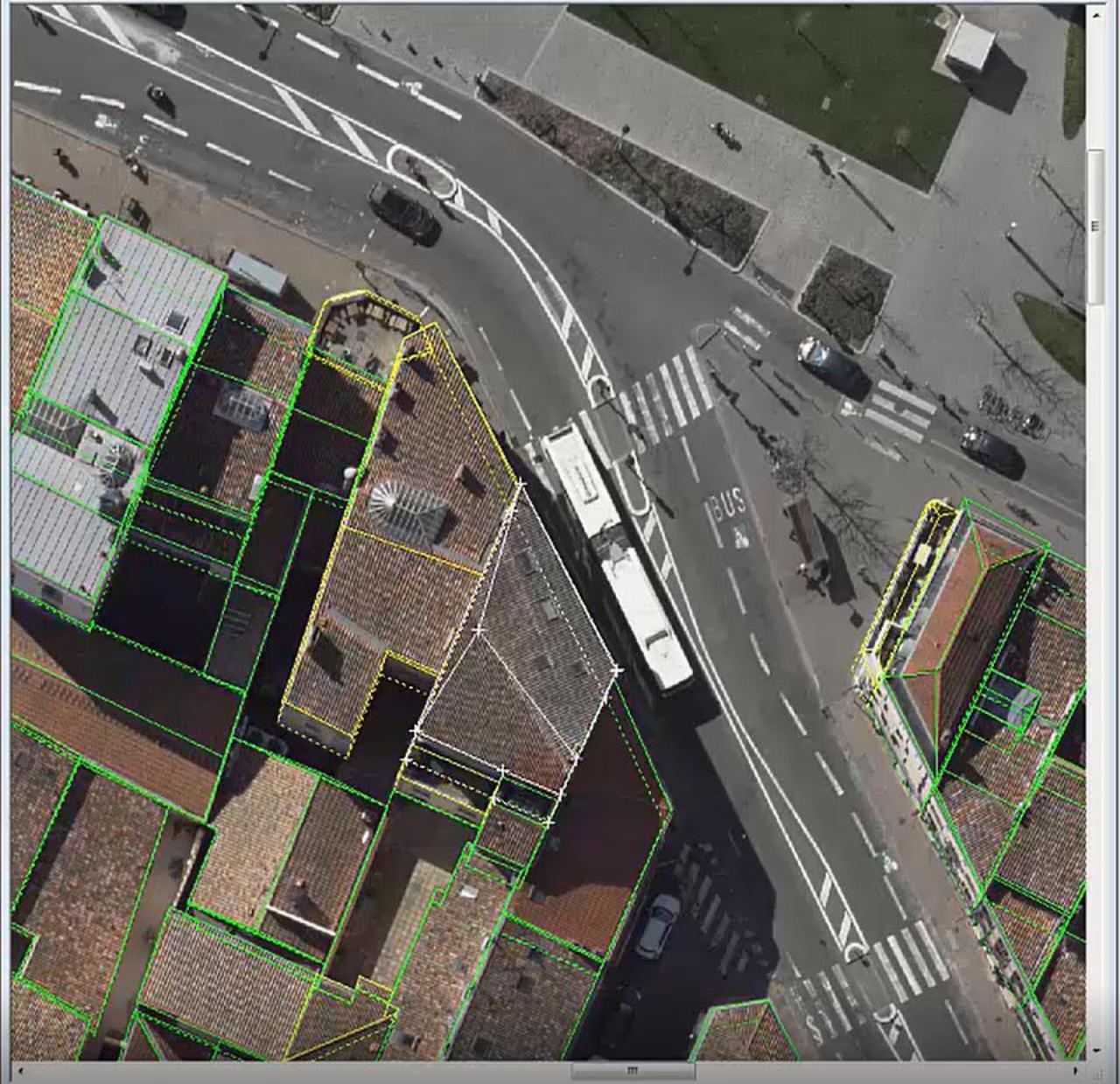
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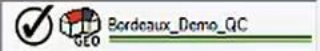


026_060_id2933c82579_123246_Nadir.tif - [XY] - [1:1.38]



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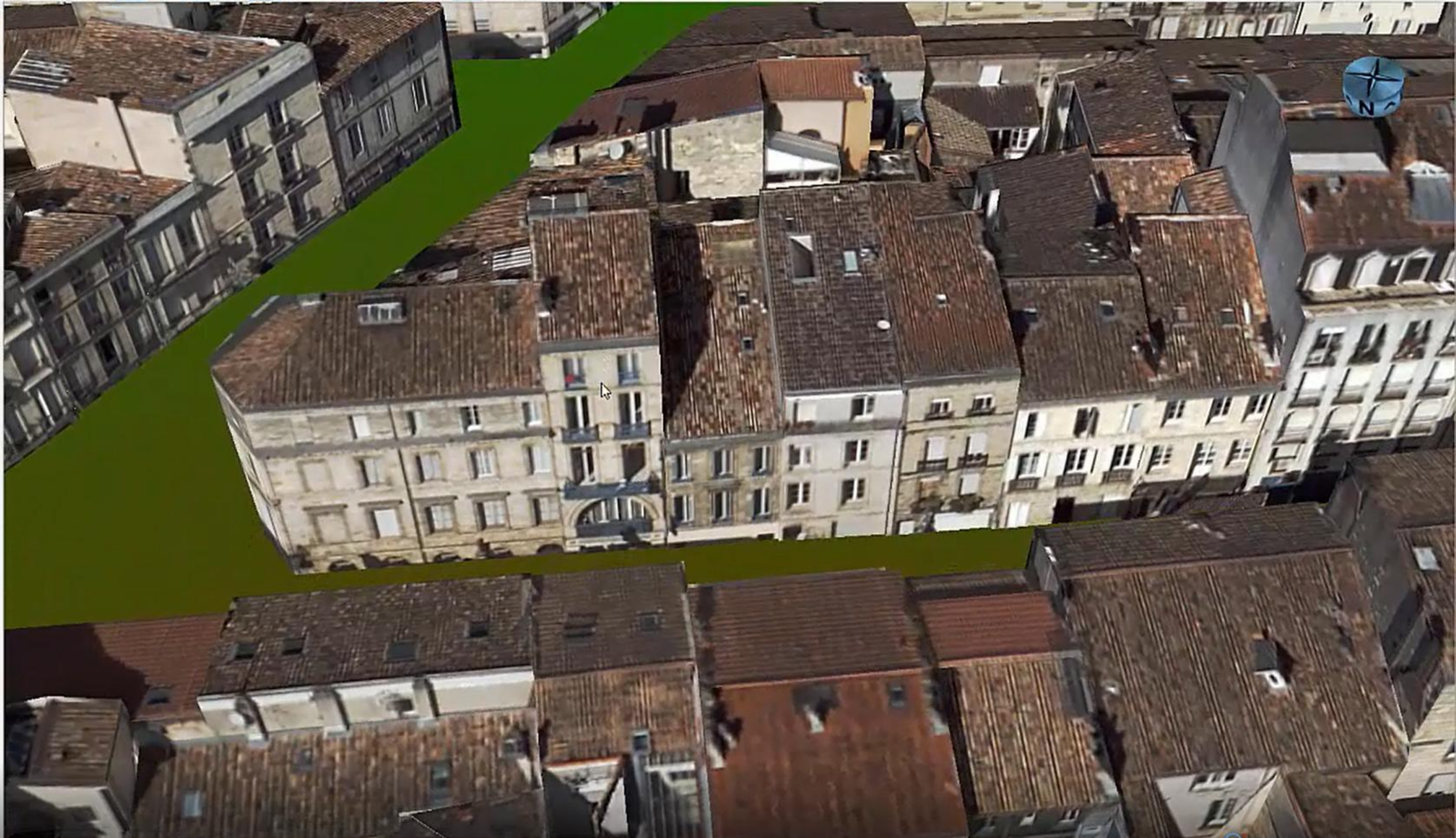


No joystick selected

Layers

Bordeaux_Demo_QC

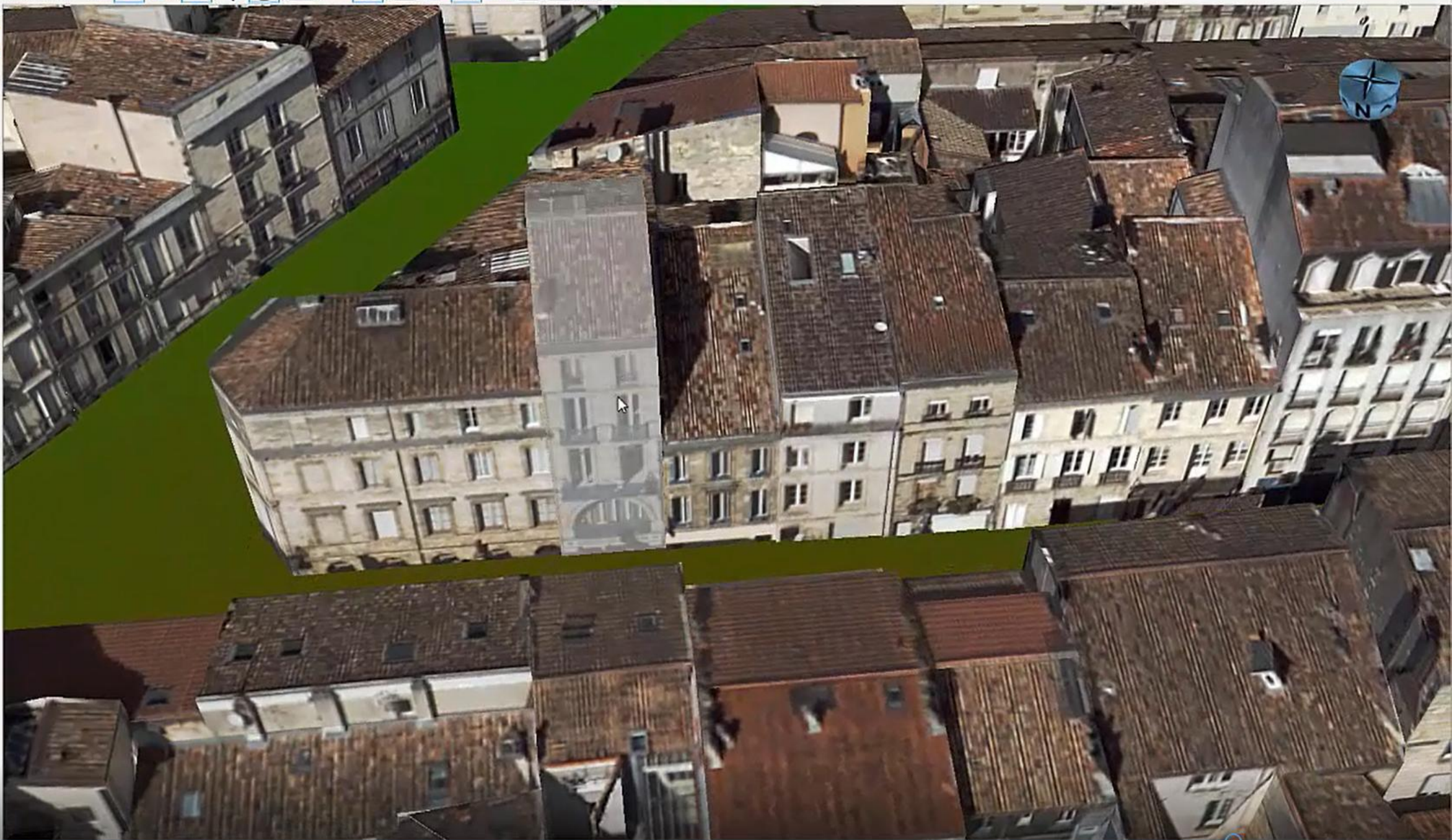


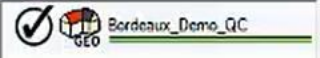




Layers

 Bordeaux_Demo_QC







For more information:
leica-geosystems.com/citymapper-2