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Update on UltraCam and UltraMap Technology

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JACIE NASA NOAA USDA USGS science for a changing world
Joint Agency Commercial Imagery Evaluation

Fort Worth, Texas USA April 11 - 15, 2016

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Update on UltraCam and UltraMap Technology

New Ownership Information:

Vexcel Holdings GmbH, Graz, acquires Microsoft's UltraCam Business Unit in March 2016.

JACIE NASA NOAA USDA USGS science for a changing world
Joint Agency Commercial Imagery Evaluation

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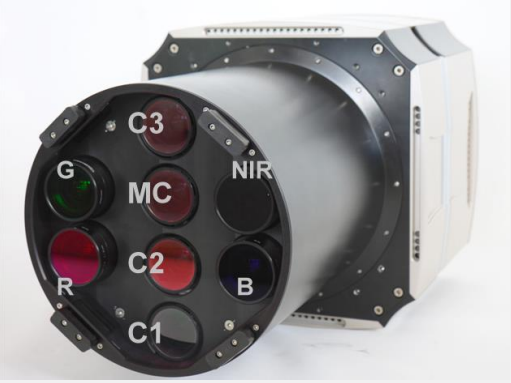
UltraCam Eagle Prime



23,010 x 14,790 pixel

Fast frame rate, more storage

Less weight, less power

Four exchangeable lens systems

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UltraCam Eagle Prime

PAN pixel across	**23,010**	**PAN focal length**	**80, 100, 120, 210 mm**
PAN pixel along	**14,790**	**b/h (f80, f100, f120, f210)**	**0.34; 0.27; 0.23; 0.13**
Max. frame rate	**1.65 s**	**AGL for 5cm GSD (f80, f100, f120, f210)**	**870 m; 1,090 m; 1,304 m; 2,283 m**
Pan-sharpening ratio	**1:3**	**Max. speed for 5cm/10cm GSD @ 80% frontlap**	**159kts / 318kts**
FMC	**Non mechanical, TDI**	**Max. speed for 5cm/10cm GSD @ 60% frontlap**	**318kts / 637kts**
Lens system	**Exchangeable w/o calibration**	**Max. frontlap for 5cm/10cm GSD @ 140 kts**	**82% / 91%**

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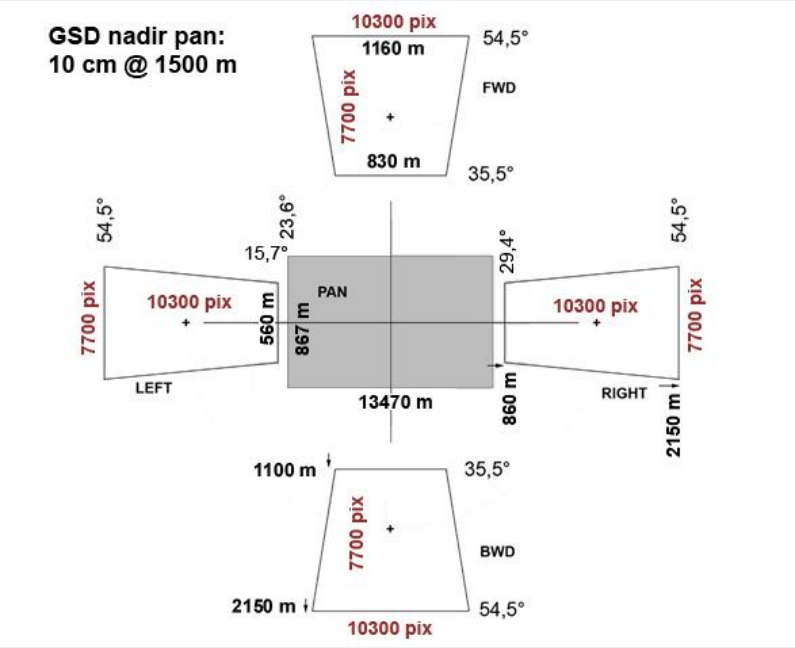
UltraCam Osprey Prime II

Mapping grade nadir (pan, 120 Mpix)

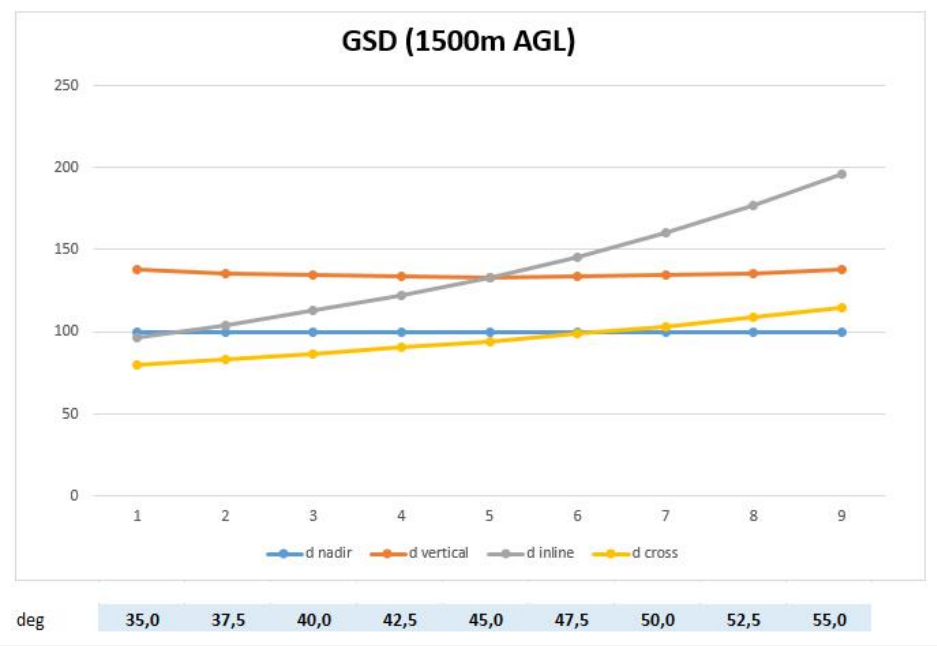
80 Mpix oblique (4 directions)

80mm / 120 mm lens system

UltraCam Osprey Prime II



Footprint



GSD

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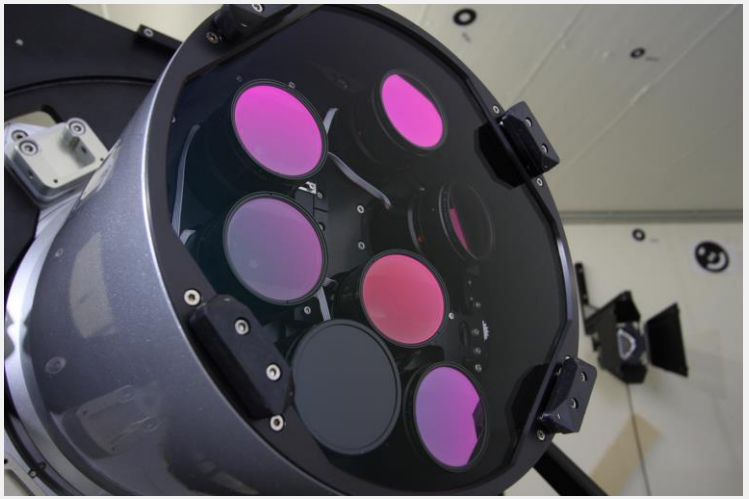
Oblique View Salzburg, @ 750 m
GSD 5 cm to 8 cm

UltraCam Condor (preview)



37800 Pixel * 5200 Pixel RGB

Mapping grade Pan (120 Mpix)

NIR at lower resolution

100mm / 40 / 23 mm lens system

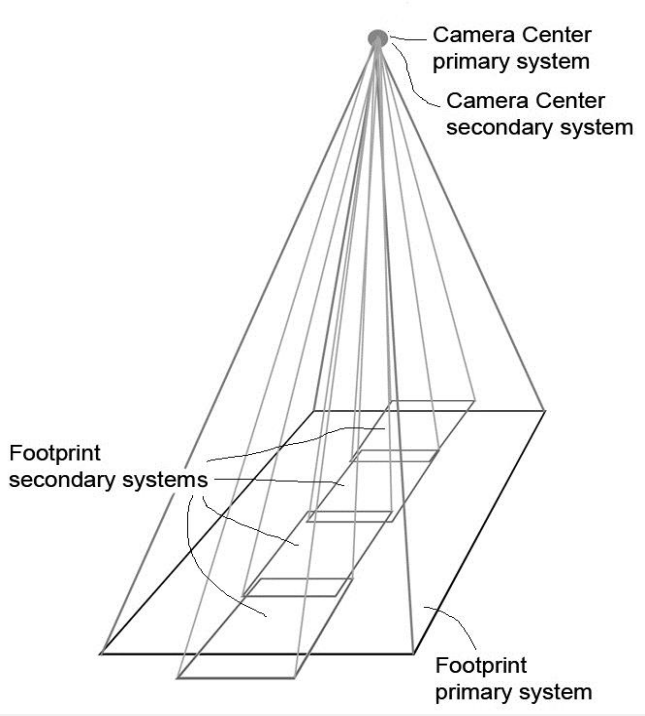
UltraCam Condor Specs

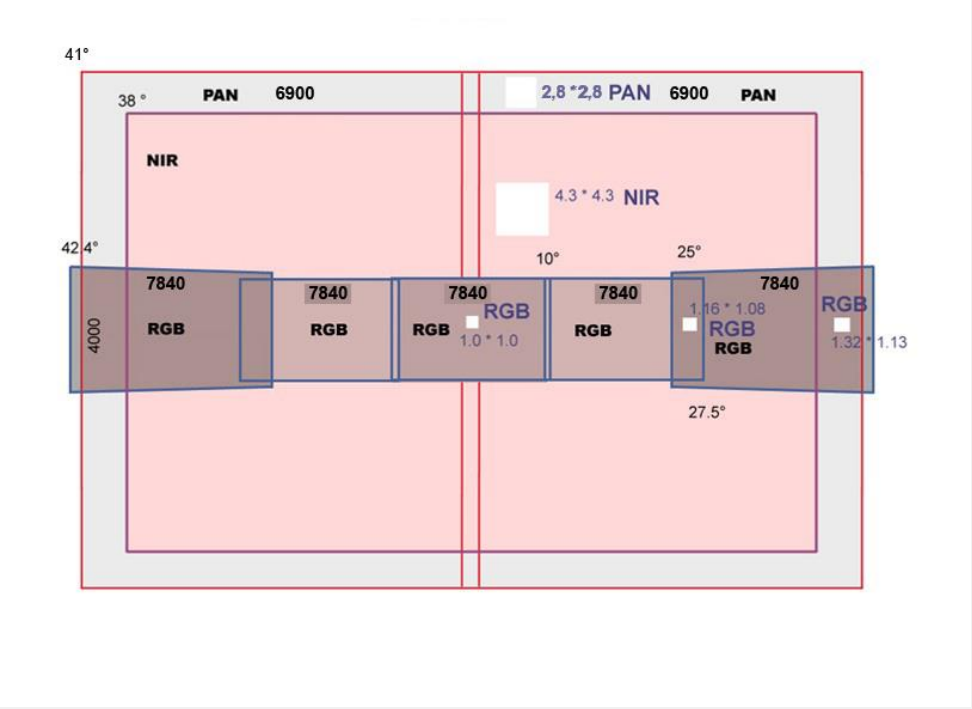
Image Format (RGB)	37800 px by 5200 px	
Focal Length	100.5 mm	
Pixel Size	4.6 µm	
Preferred Altitude	5400 m AGL	2170 m AGL
GSD	25 cm	10 cm
Flight Line Distance @ (20 % SOL)	7500 m	3000 m
PAN 13,4k * 9,2k GSD	70 cm	28 cm
Focal Length	40mm	
NIR 7,8k * 5,2k GSD	108 cm	43 cm
Focal Length	23mm	

Design Criteria

- Designed to map large regions extremely efficient with UltraCam quality
  - High resolution, highly efficient RGB image collection for ortho image generation
  - PAN of lower resolution supporting automated DTM and DSM generation for automated DSMOrtho and DTMOrtho image generation
  - NIR of lower resolution supporting basic classification and DSM/DTM generation
- Typicall RGB GSD: 10cm … 25cm
- Typicall flight altitude: 2,000m … 5,500m AGL
- Characteristics
  - Frame sensor for stable geometry and better independency from GPS/INS accuracy
  - Uncompressed RAW data collection for color correction without artifacts
  - 14bit image collection and 16bit workflow for leading image dynamic
  - FMC by TDI for fast flight speeds and high sensor reliability
  - Sophisticated UltraMap processing corrects color shift effects of high altitude flights automated and without artifacts
- Aicrafts: turboprop and jets

UltraCam Condor Design





UltraCam Condor Design

PAN RGB NIR

Compare:

Image taken with UltraCam G

Rome, Italy

Compare:

Image taken with UltraCam G

Rome, Italy

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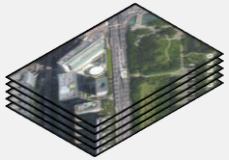
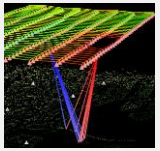
UltraMap

Digital Photogrammetric Workflow for Nadir and Oblique

Image Acquisition



Radiometrically aligned Images



Aerial Triangulation

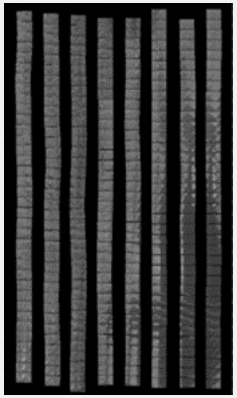
3D Point Cloud

Digital Surface Model (DSM) And Editing

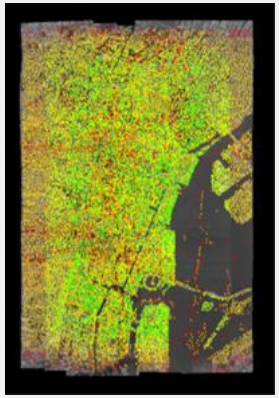
True (DSM) Ortho

Traditional (DTM) Ortho

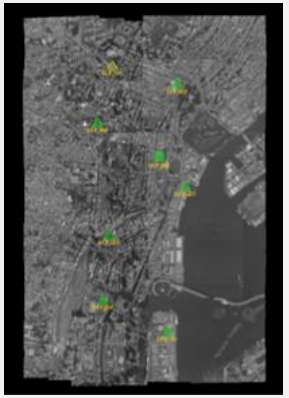
UltraMap – Aerial Triangulation



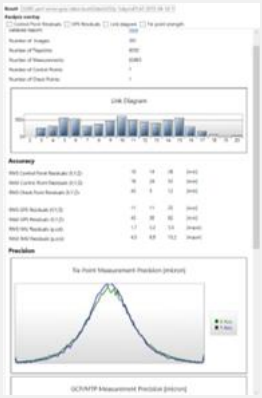
Input Preparation



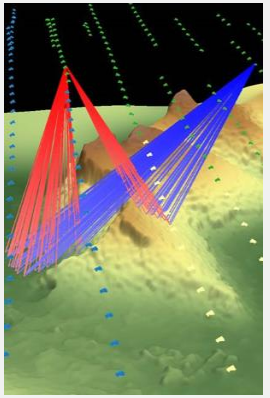
Automated Tie Point Collection



[Grond Control Measurement]



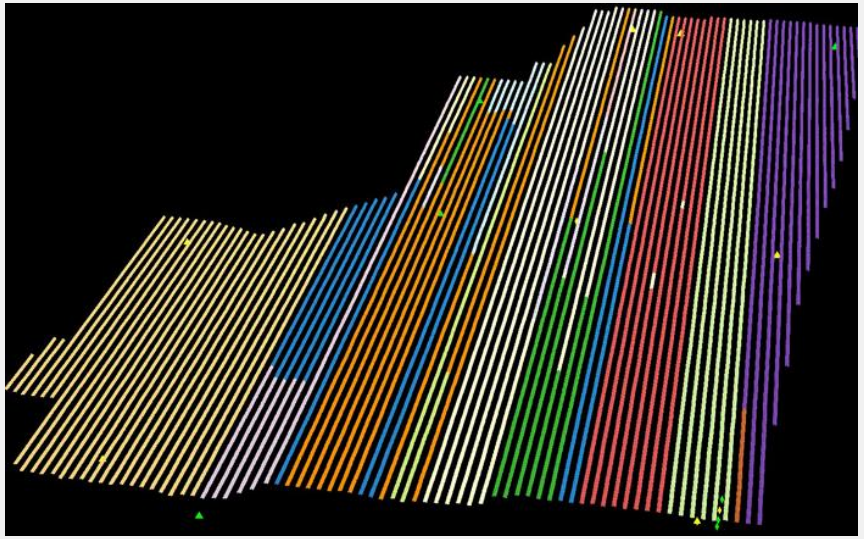
Bundle Adjustment (Bingo 6.6)

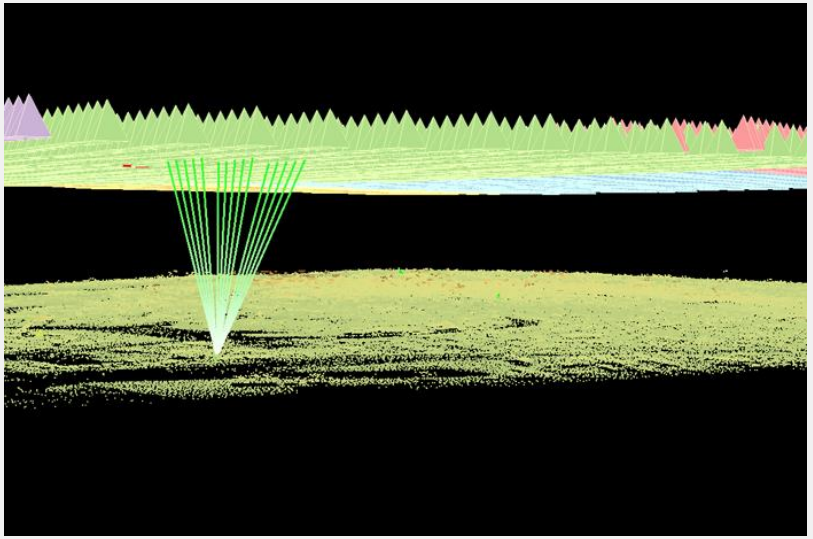


Oblique AT

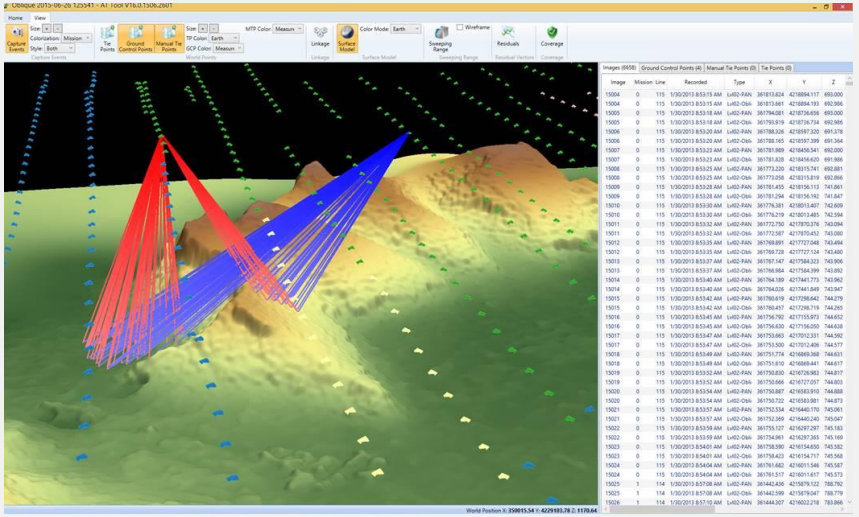
NEW Visual Analytics NEW

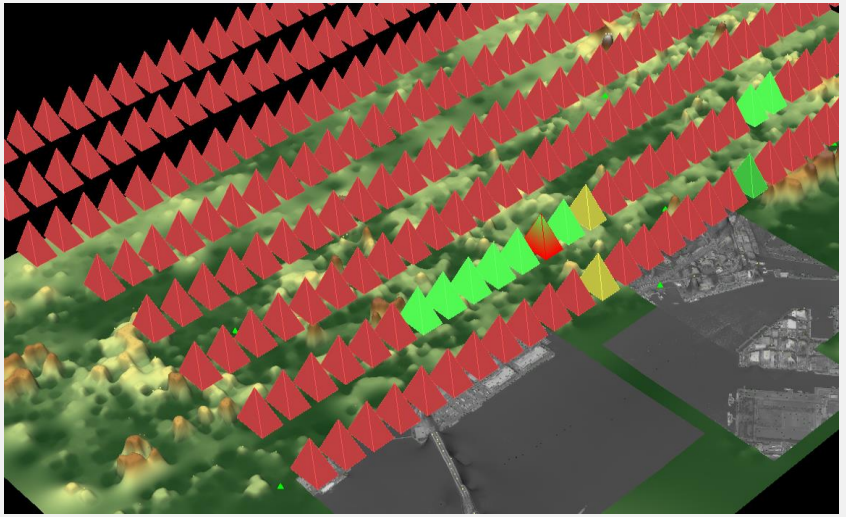
Visual Analytics – Large Block Visualization



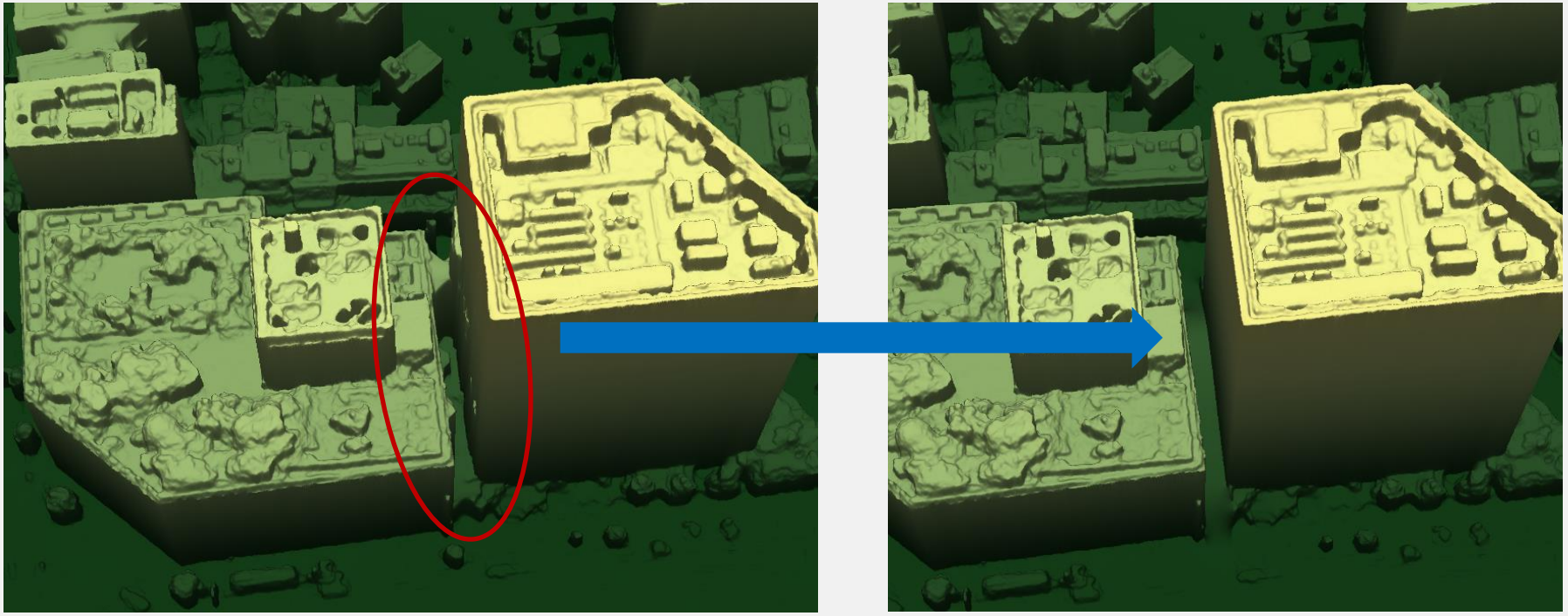


Visual Analytics – Built-in Terrain and Image Visualization

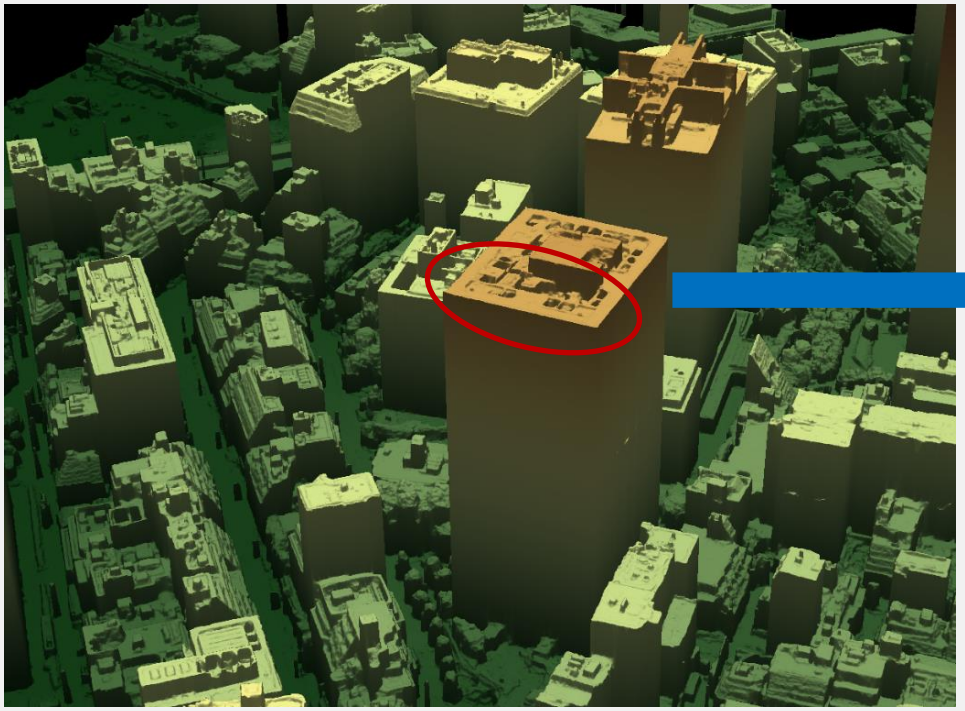


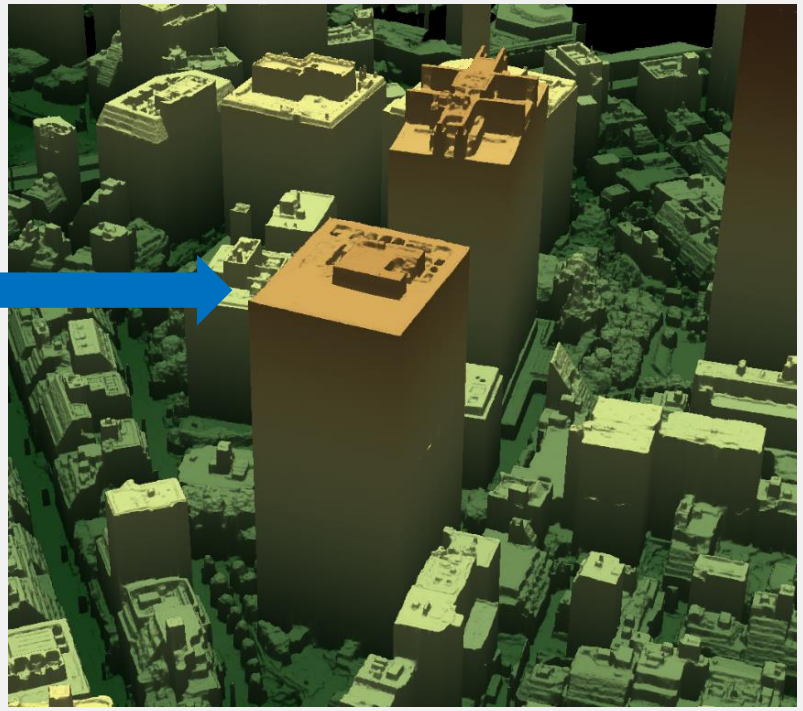


Innovtive 3D Editor

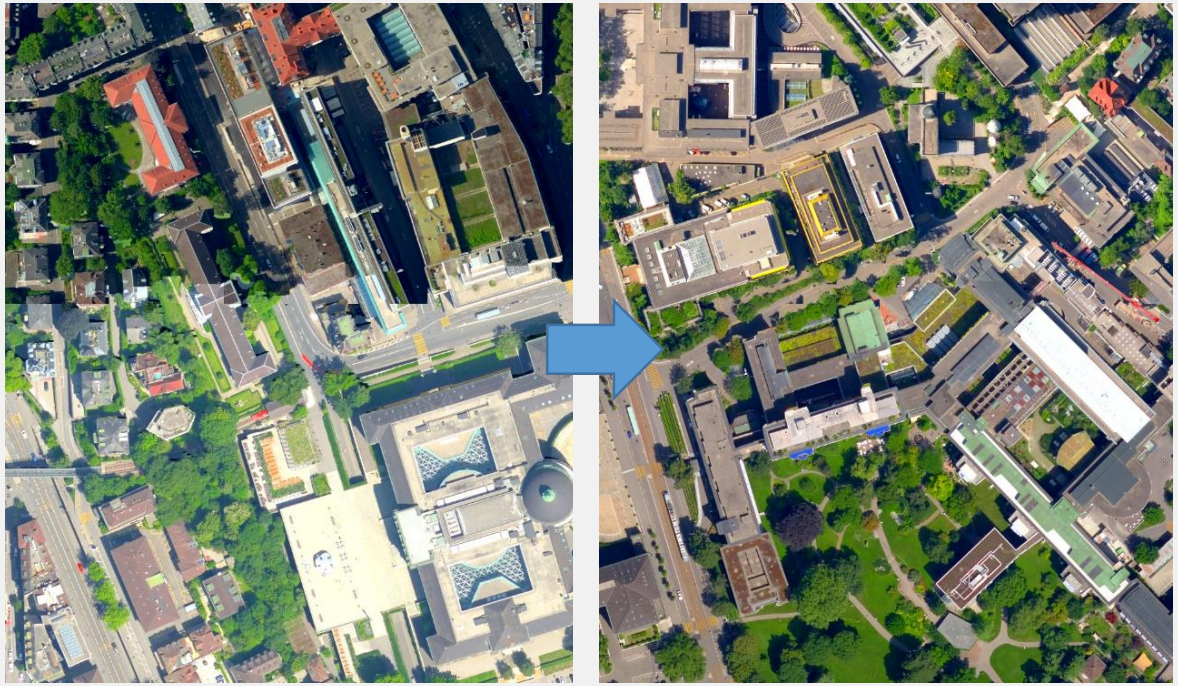


Innovtive 3D Editor





Simultaneous Oblique and Nadir Color Balancing



Powerful De-Hazing of Oblique Images

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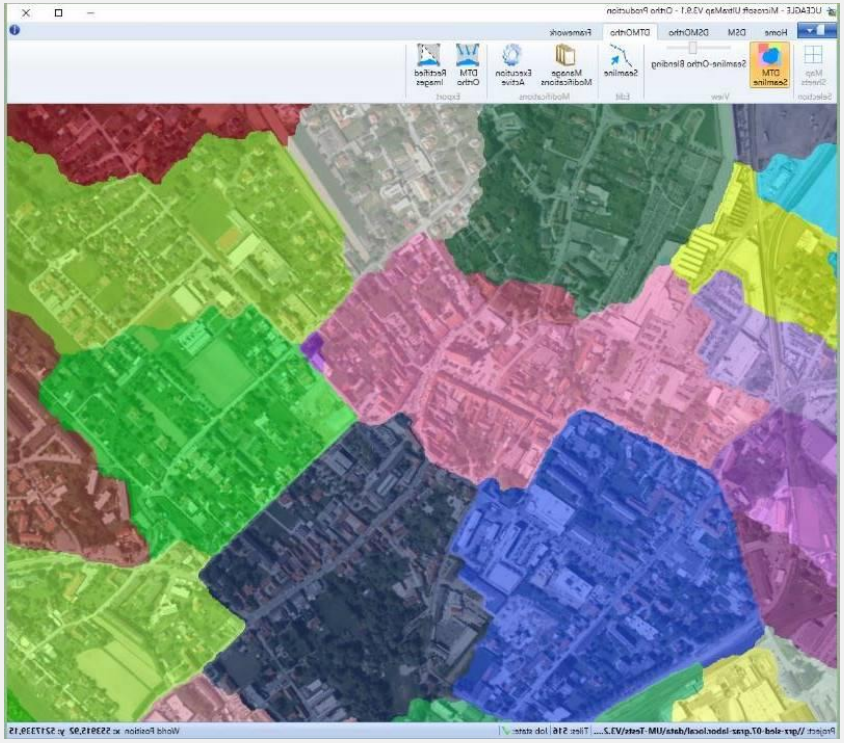
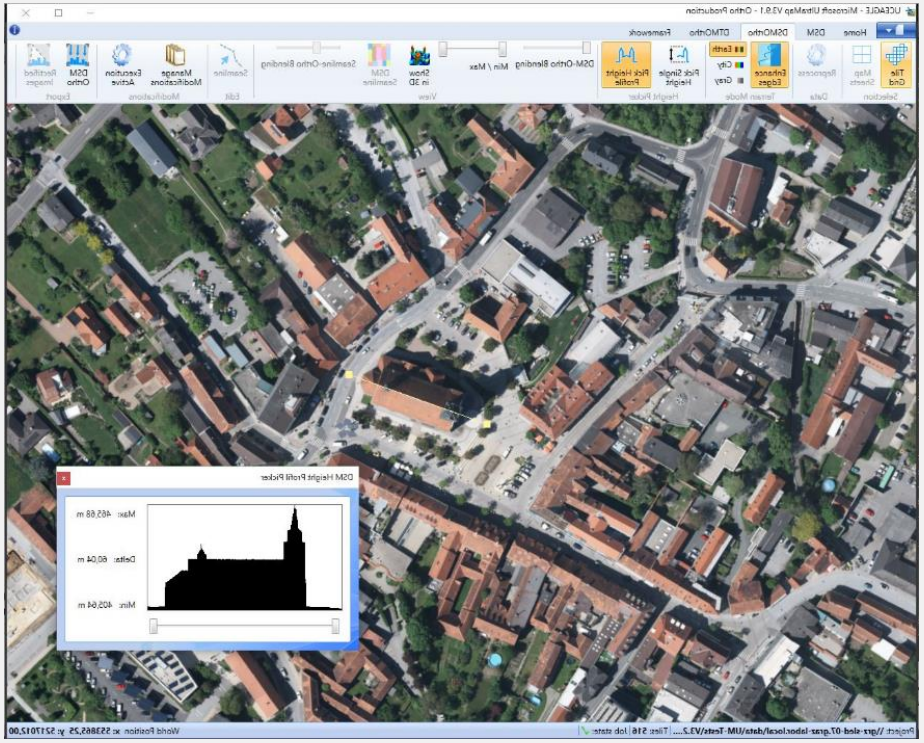
Interactive Seamline Editing and Data Inspection





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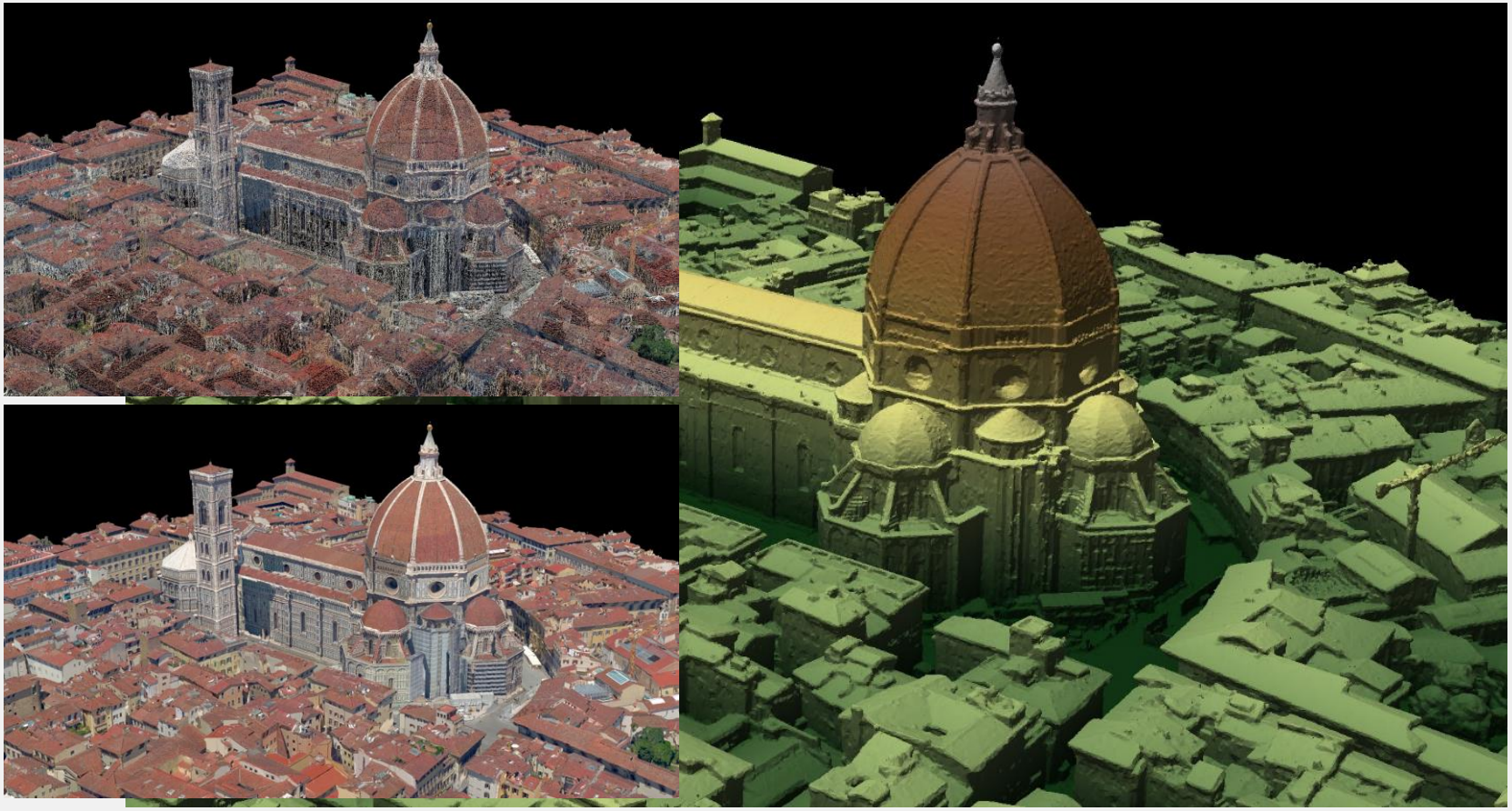
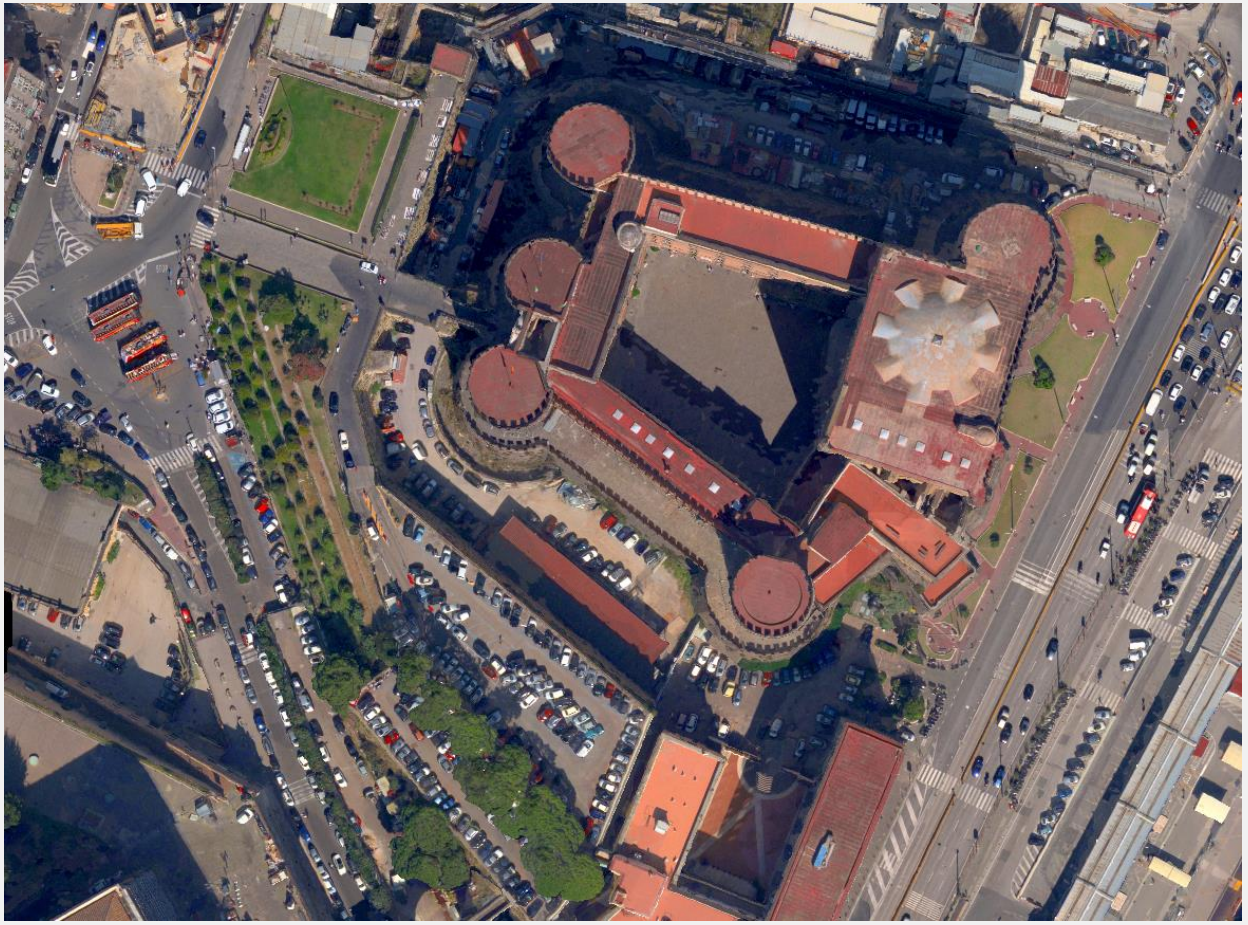
UltraMap technology preview
3 D object reconstruction

Automatic 3D textured TIN





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