

Urban Monitor Update

including recent high resolution vegetation masks and relative elevation maps

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CSIRO MATHEMATICS, INFORMATICS AND STATISTICS
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- Recent Accomplishments
 - Vegetation/non-vegetation classification
 - Vegetation Heights
 - More Products
 - Processed both 2007 and 2009
 - AND we delivered them to DEC
- Can Land Monitor Benefit?

Urban Monitor History

Inception

- Urban environments are highly dynamic and need *monitoring*
- Satellite resolutions are insufficient for complex urban/peri-urban scenes
- High resolution aerial photography is already collected at least annually for large cities, and fairly regularly in most other areas
(adding a monitoring process is an economical opportunity wherever photography is regularly gathered)

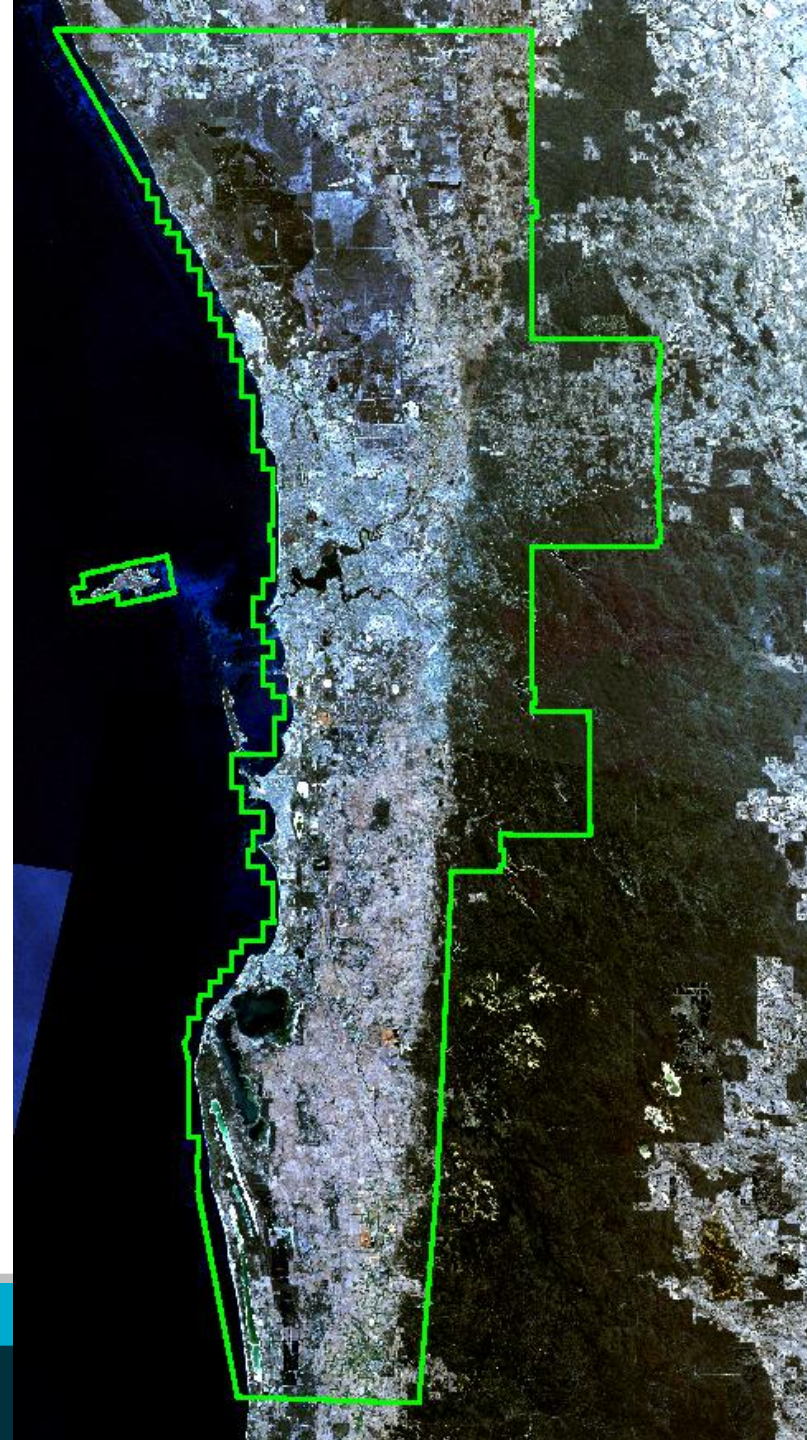
Because we want a *quantitative monitoring* system (more than humans viewing images):

- New methods for the higher resolutions
- New methods for dealing with the variations in aerial photography

Urban Monitor History

The Raw Data

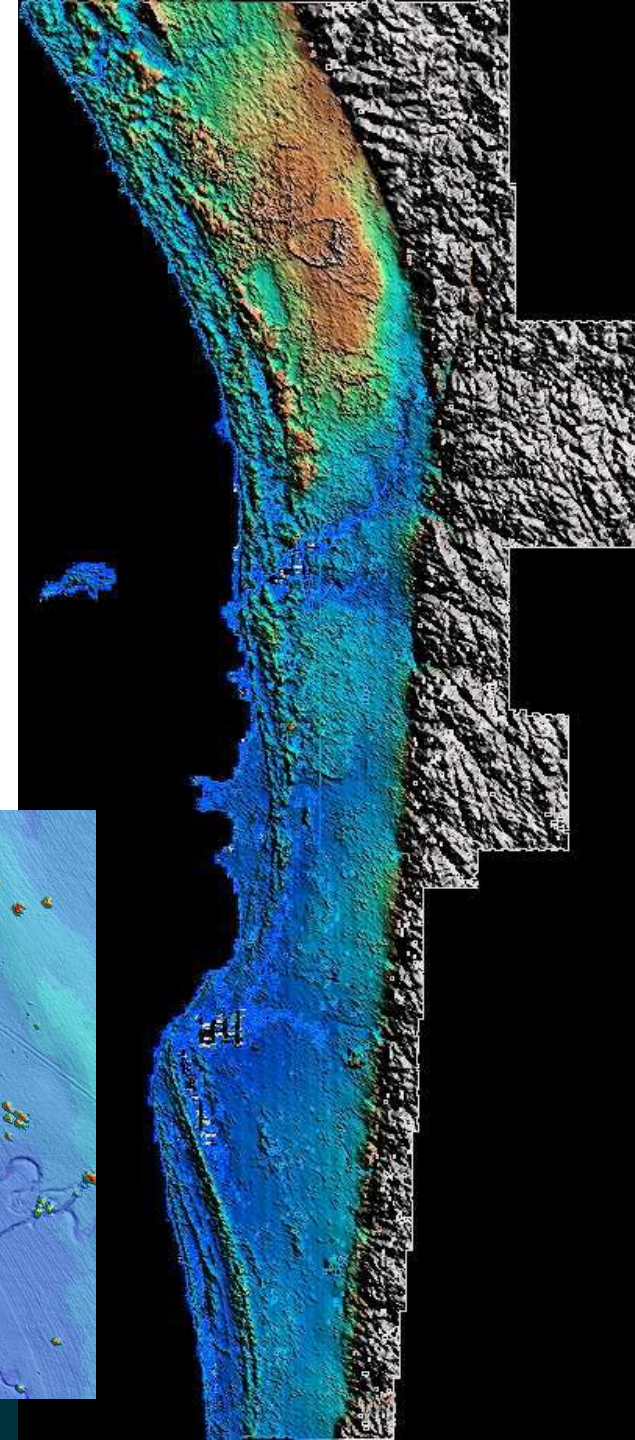
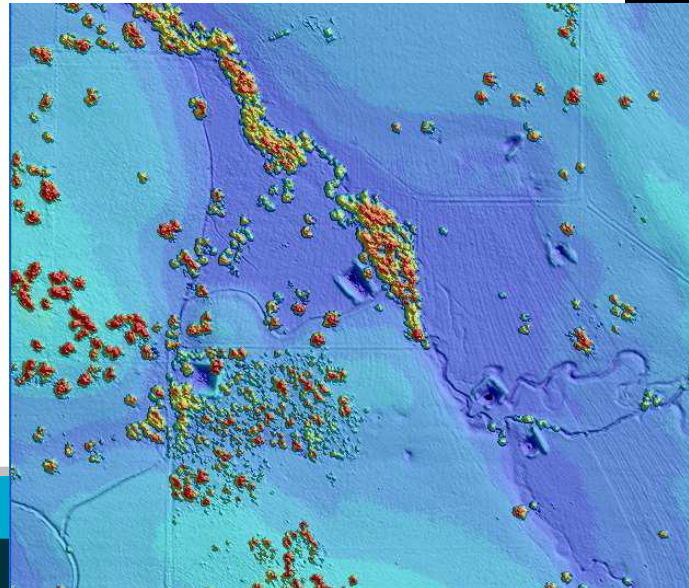
- Acquired every summer since 2007
- 9600km²
- Raw:
13TB to 40TB per annum
- Less than 0.3m GSD
- 4 bands: Near-infrared, Red, Green and Blue



Urban Monitor History

Digital Surface Models

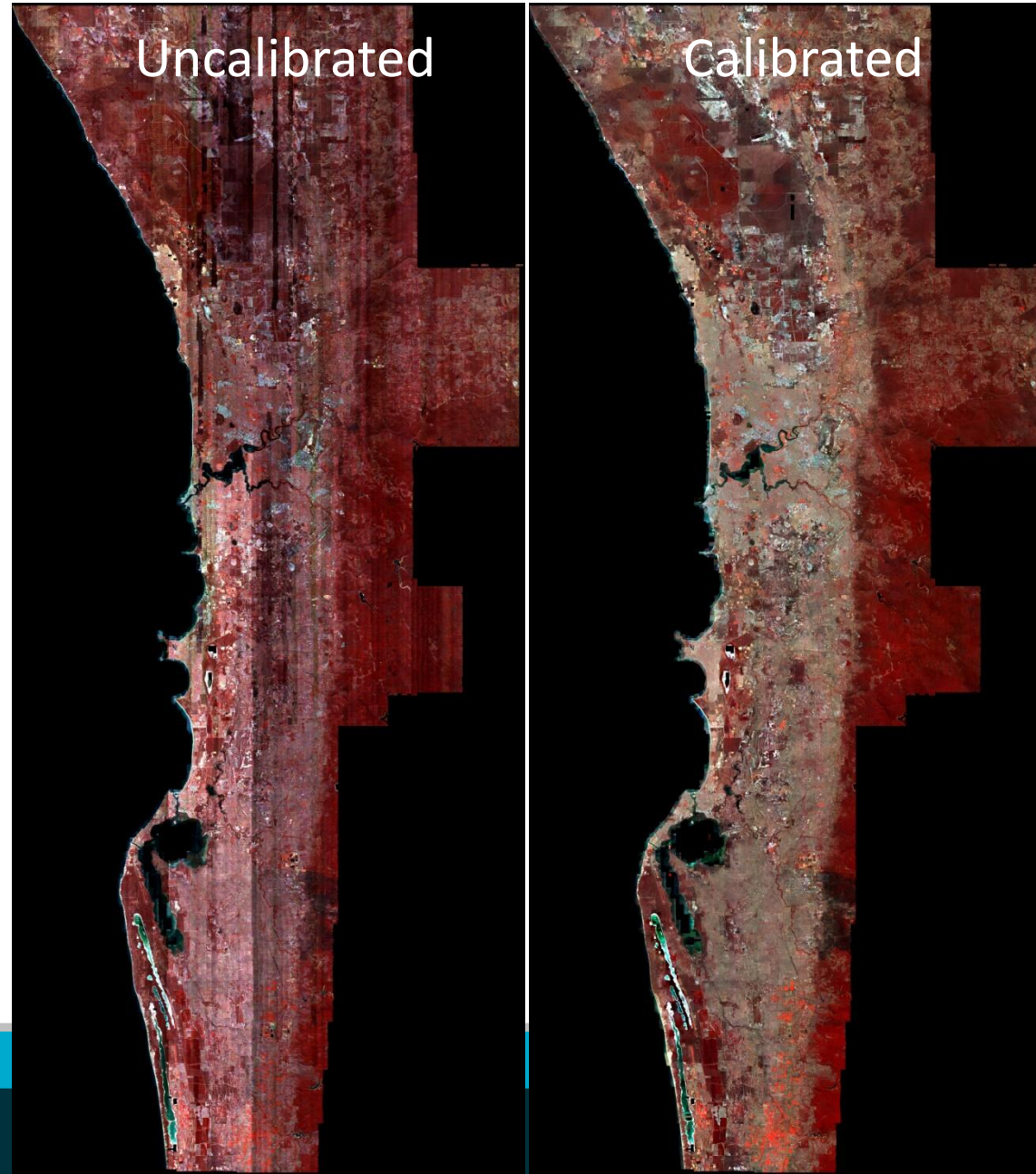
- 2.5 dimensional
- Used to orthorectify spectral data
- 0.2m GSD
- Storage:
1.3TB per annum



Urban Monitor History

Calibrated Orthophotos

- Calibrated to ground reflectance
- Consistent spectral values
- -> Classifications using spectral values



Urban Monitor History

Qualitative Change Comparisons

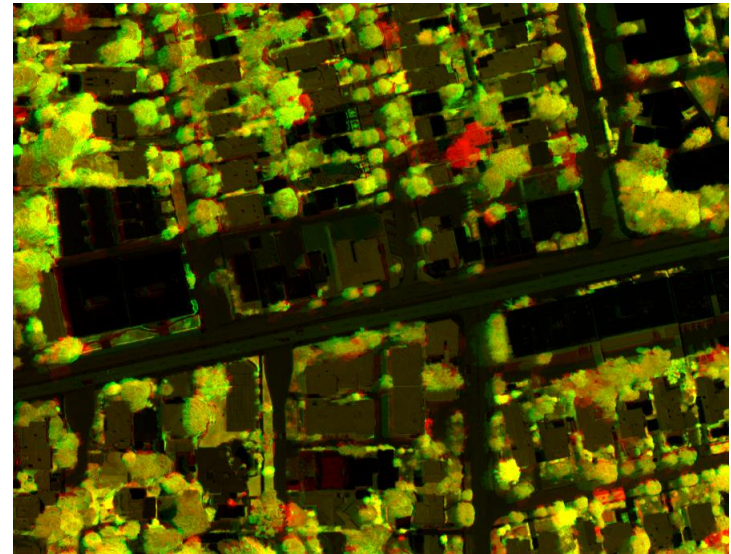


2009

2007 vigour index in red
2009 vigour index in green

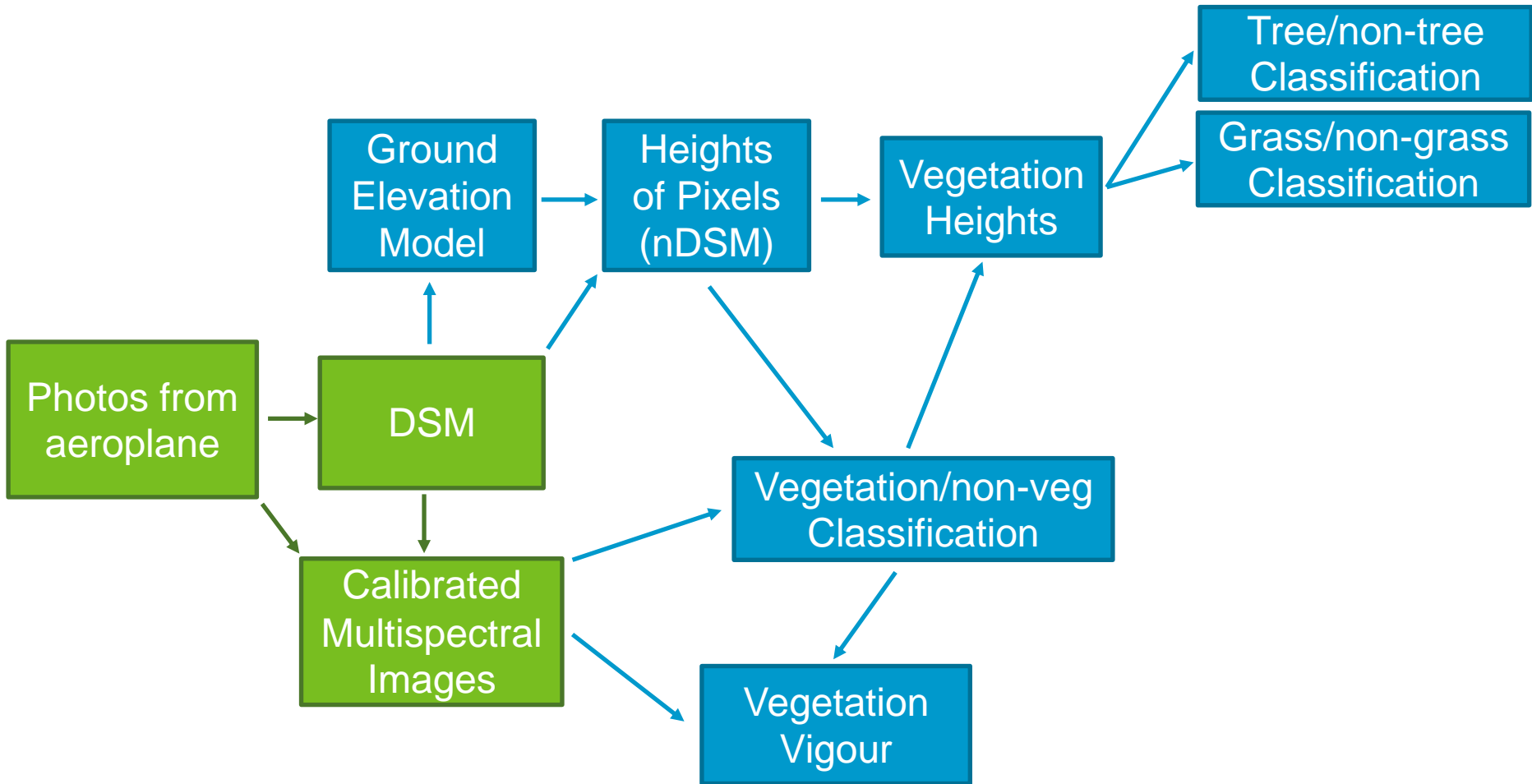


2007



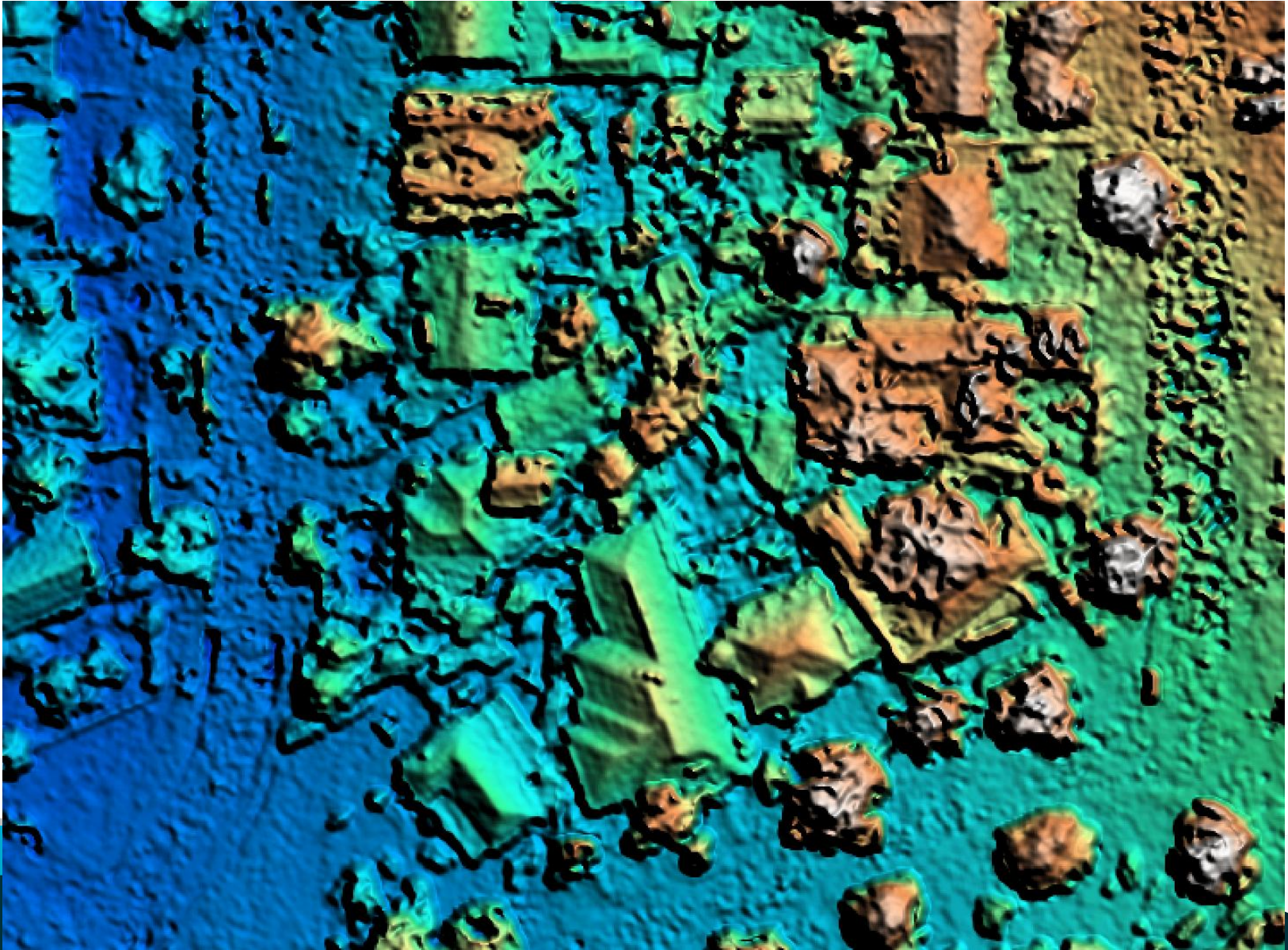
Recent Accomplishments

Recent Accomplishments



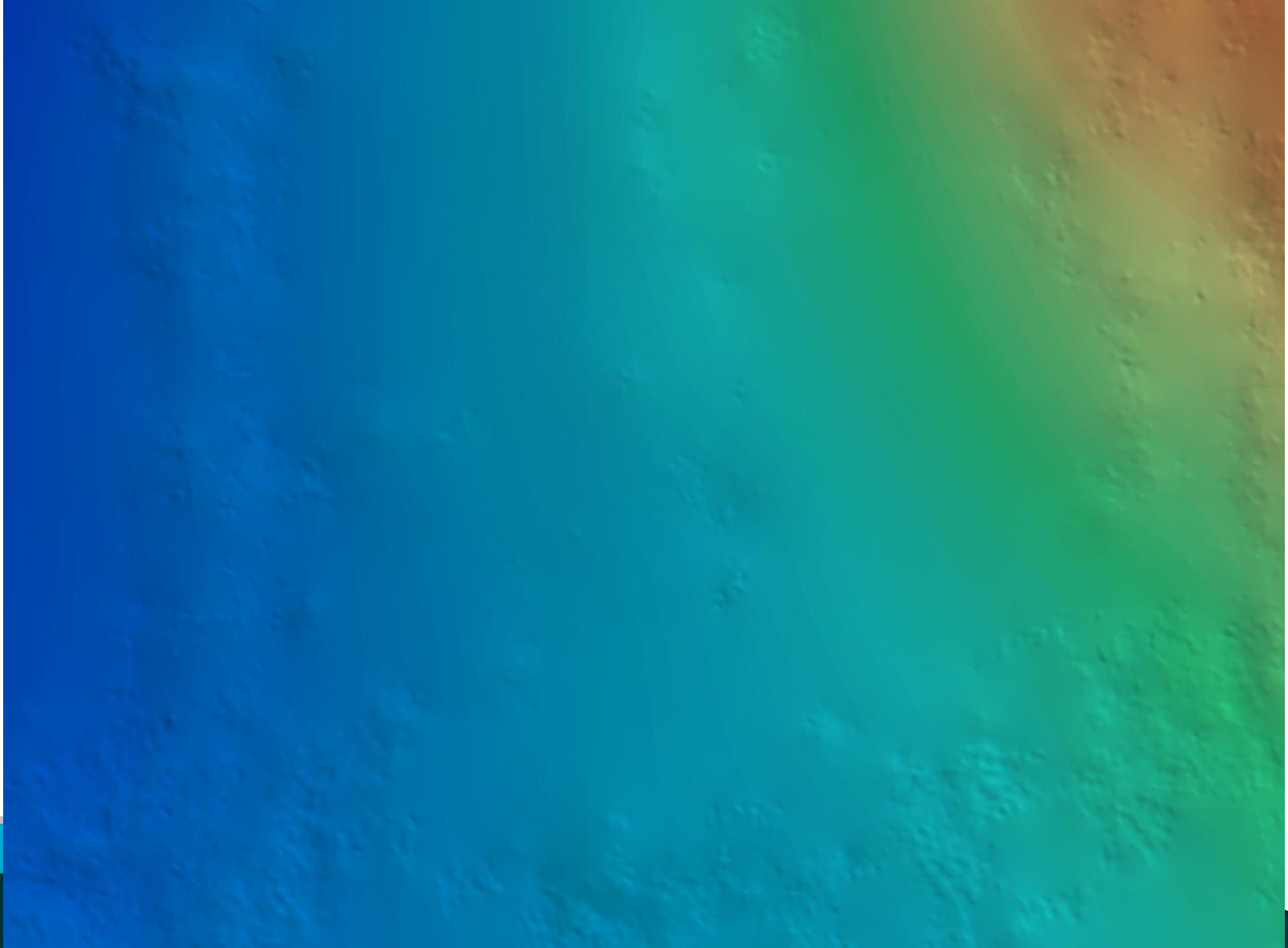
Recent Accomplishments

Digital Surface Model



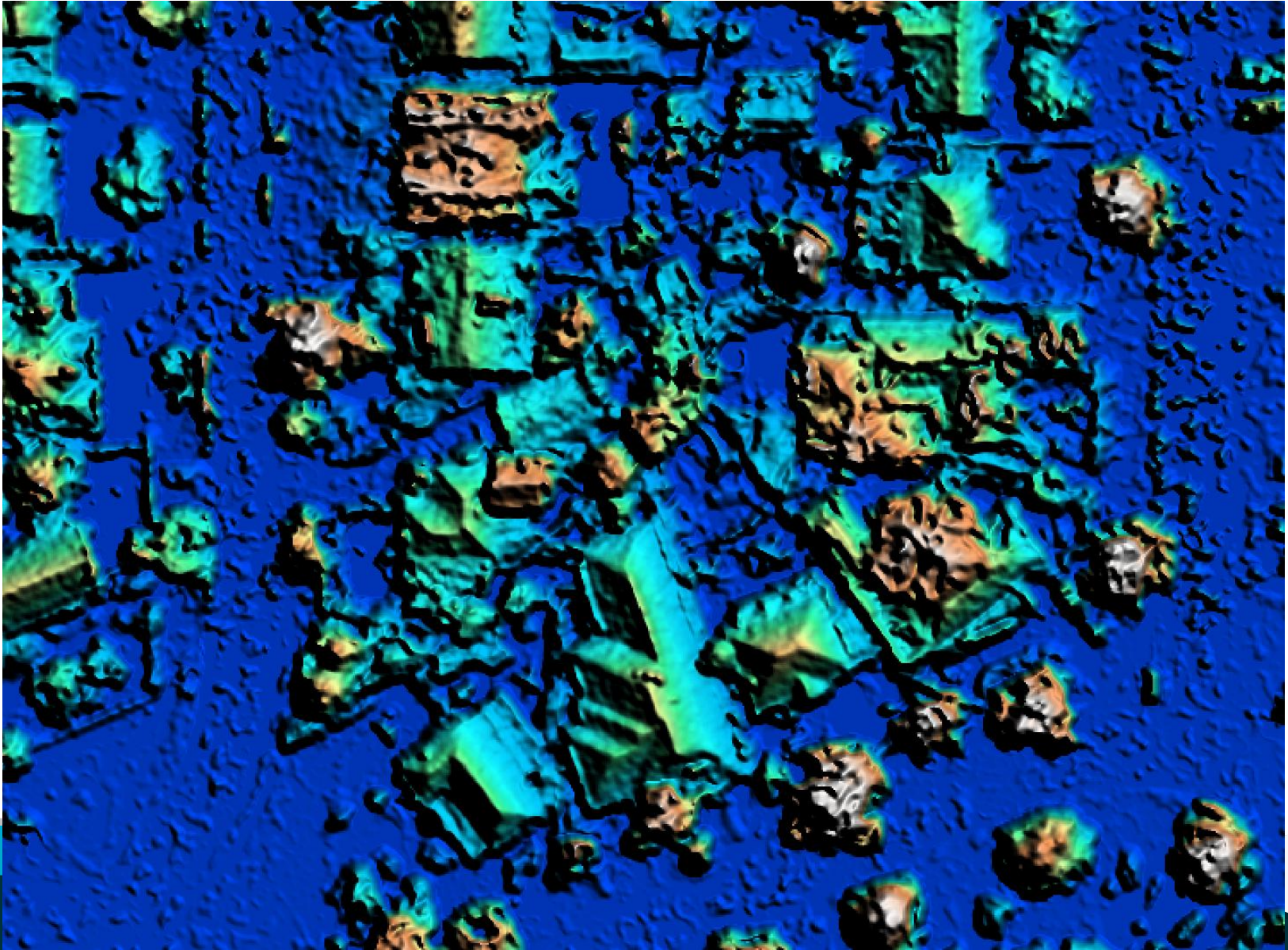
Recent Accomplishments

Ground Elevation Model



Recent Accomplishments

Heights above ground (nDSM)



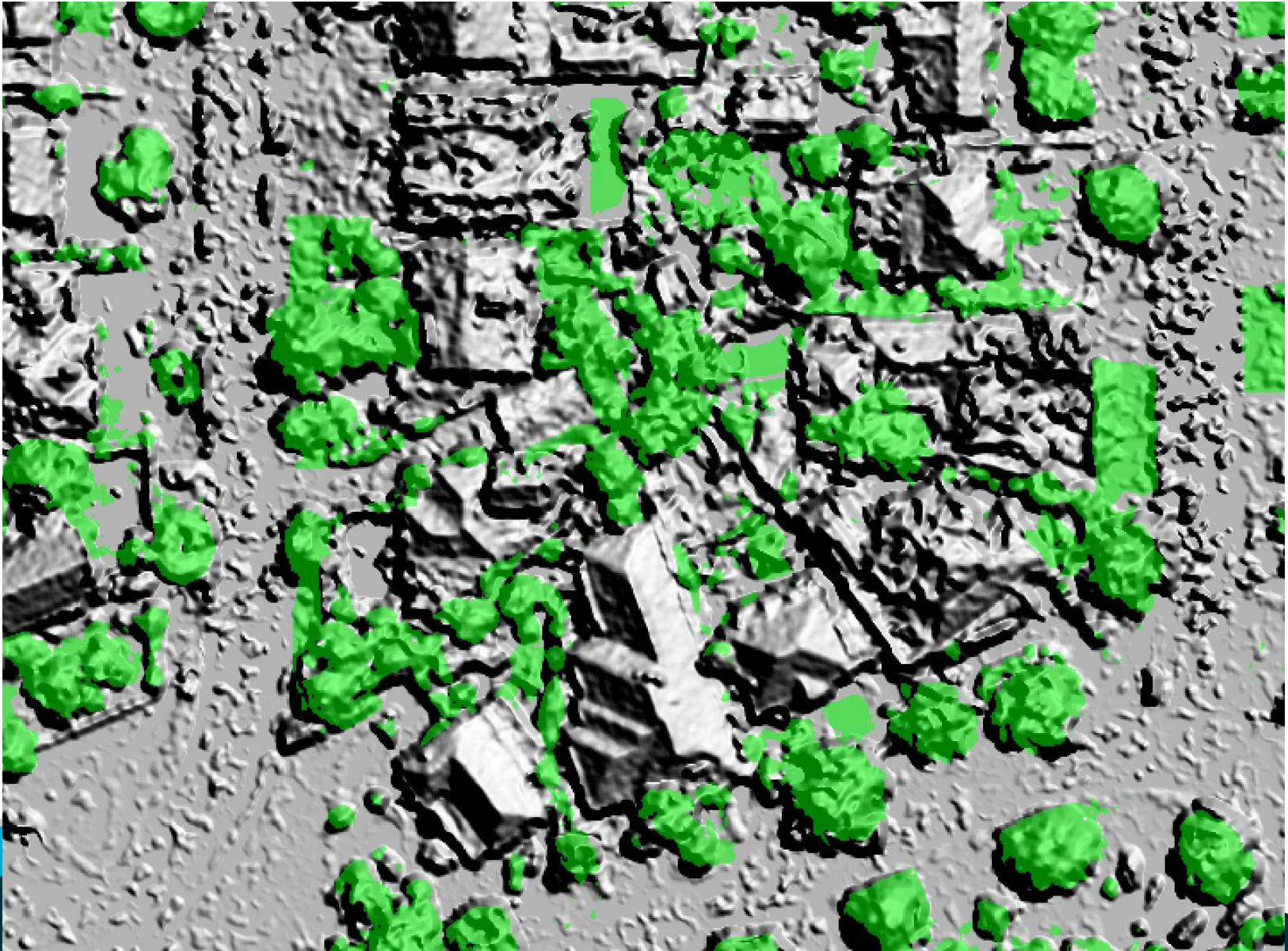
Recent Accomplishments

Calibrated Orthophoto



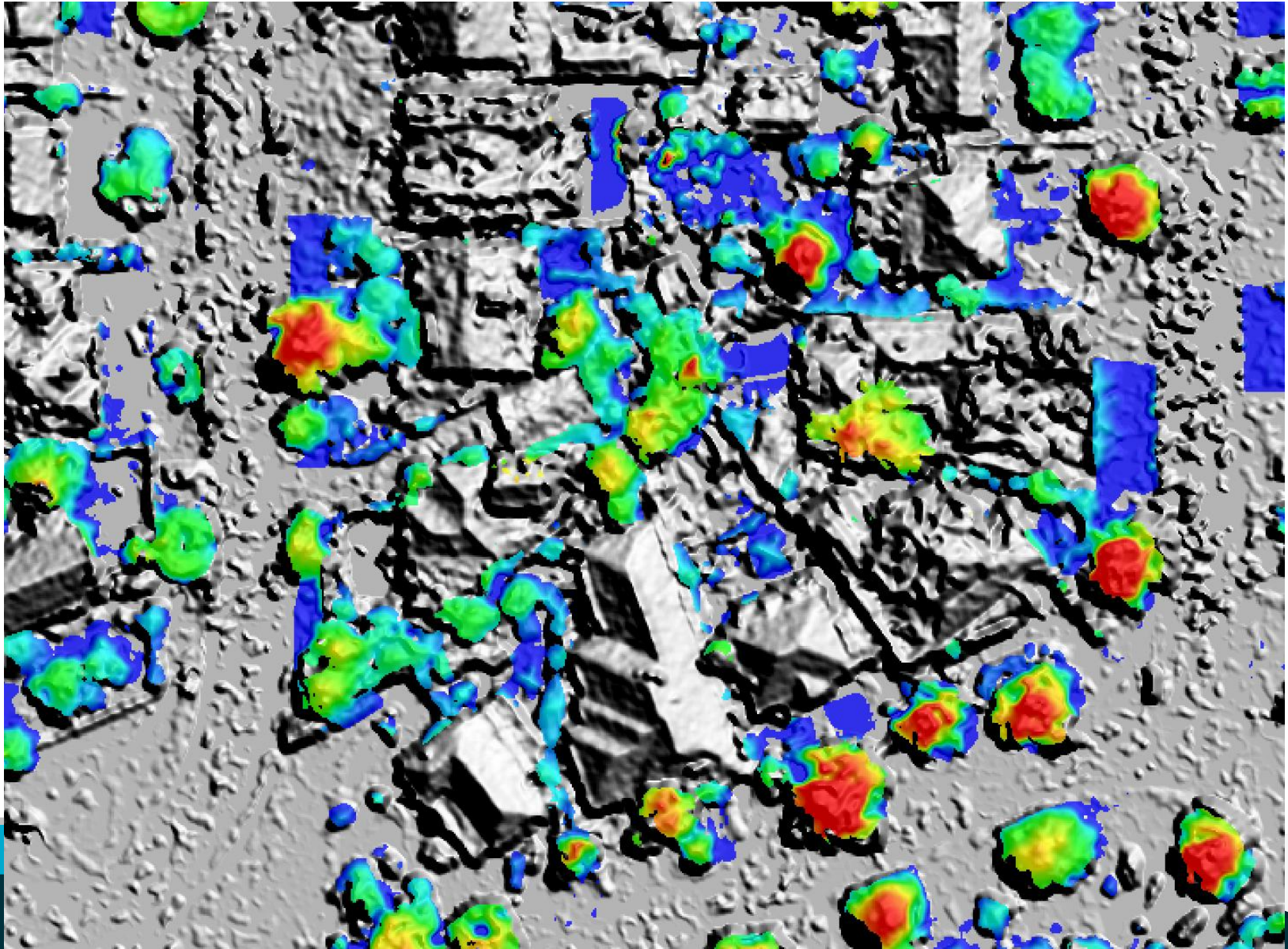
Recent Accomplishments

Vegetation/non-vegetation classification (nDSM displayed behind)



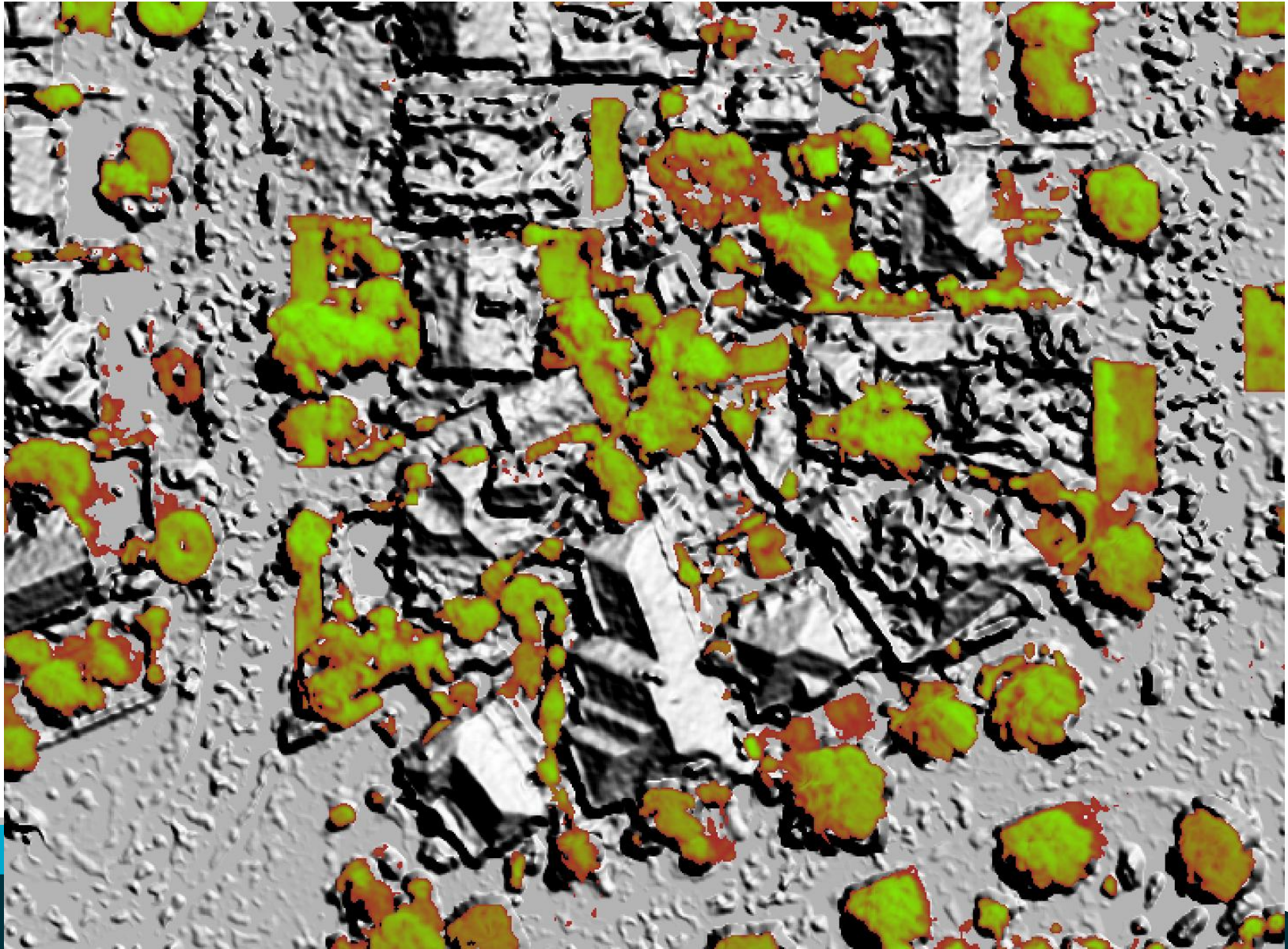
Recent Accomplishments

Vegetation height (nDSM displayed behind)



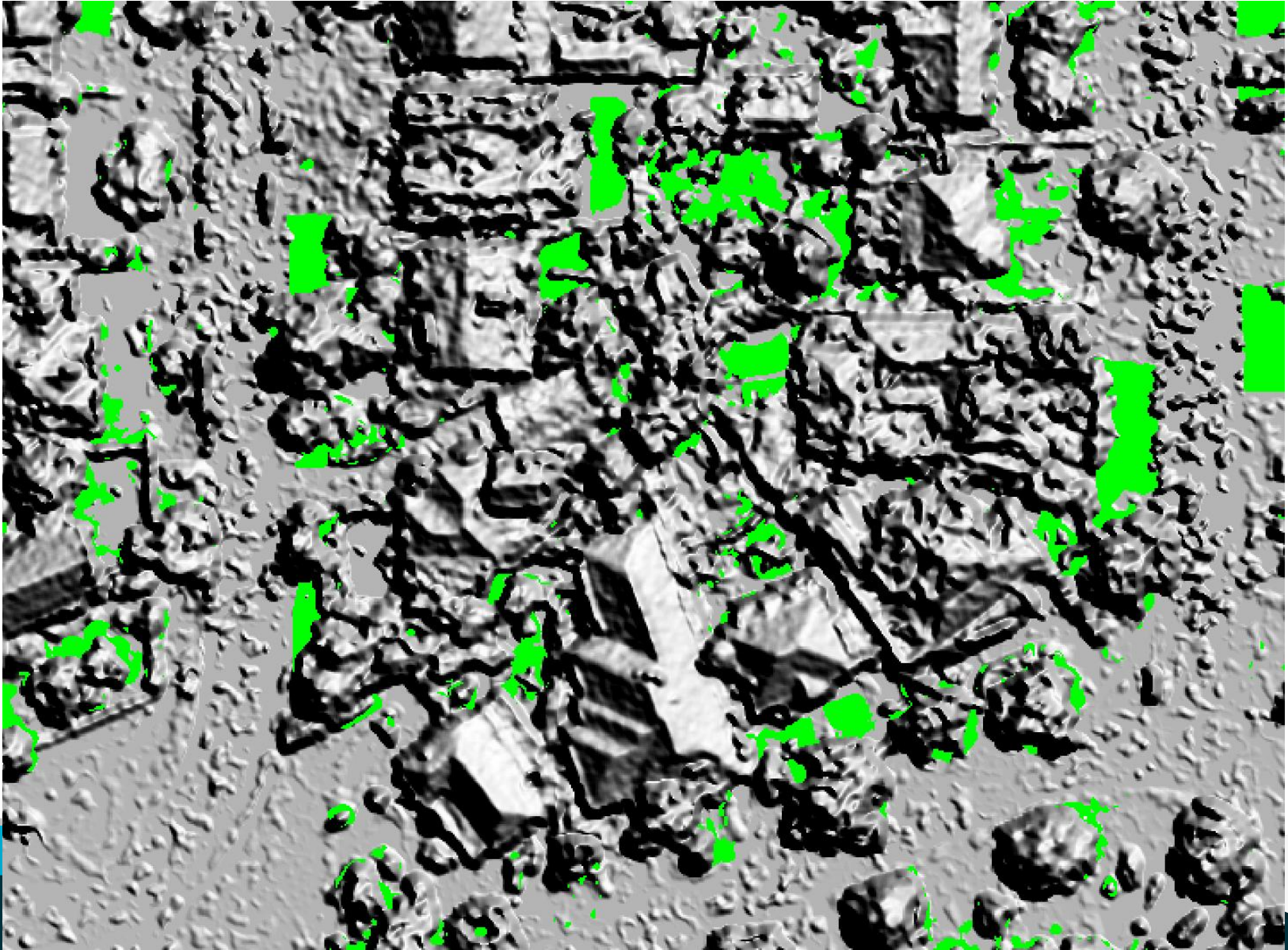
Recent Accomplishments

Vegetation vigour (nDSM displayed behind)



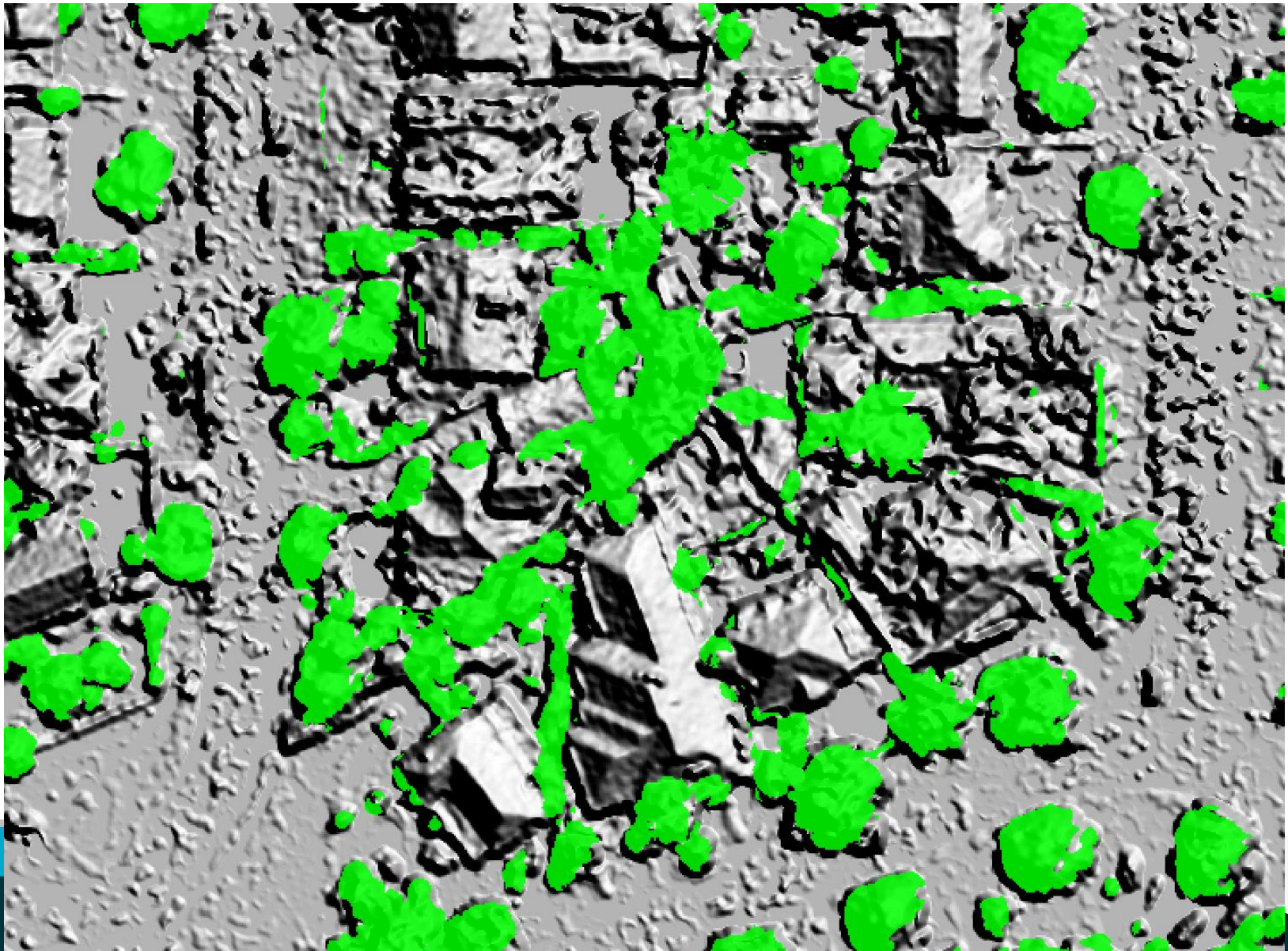
Recent Accomplishments

Irrigated Grass Mask (nDSM displayed behind)



Recent Accomplishments

Tree Mask (nDSM displayed behind)



Whats Next

- Accuracy analysis
- Change maps
- Statistical summaries
- Multiclass classifications
- Shadow mask
- Water mask

How Land Monitor Can Benefit

- High resolution aerial photography is being acquired by the state.
- Quick, computer generated vegetation extents and vegetation heights.
- Urban Monitor methods will easily transfer to 50cm resolution
- Much higher resolution ground elevations and vegetation masks
- At 50 cm GSD:
1 tile \approx 1:25 000 map sheet

Thank you

CMIS

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