OGUG UAS WORKSHOP

August 23, 2016 Eola, Oregon

Chase Fly

UAS Team Coordinator

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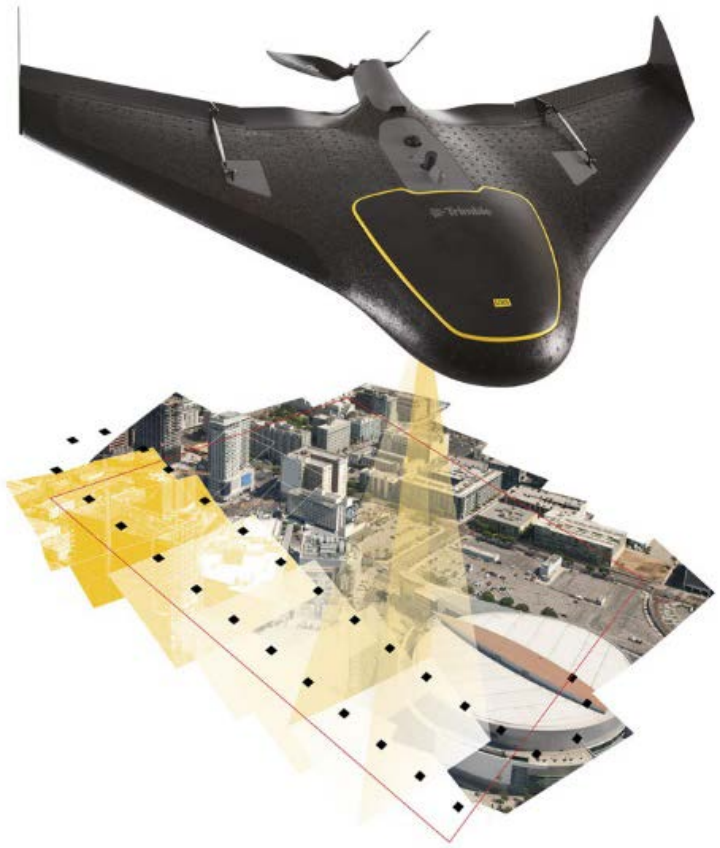
REGULATORY

- Part 107
- http://www.faa.gov/uas/
- https://registermyuas.faa.gov/
- https://app.airmap.io/
- http://vfrmap.com/

AIRFRAMES

PHOTOGRAMMETRY AND AERIAL SURVEY



WHICH DO YOU NEED?

Fixed Wing

- www.uas.trimble.com
- www.precisinhawk.com
- www.sensefly.com
- http://www.honeycombcorp.com/

Multirotor

- http://www.dji.com/
- https://www.aeryon.com/aeryon-scout
- https://www.aibotix.com/en/


HERO4


SONY
E 3.5-5.6/PZ 16-50 OSS
0.25m/0.82ft-0.30m/0.98ft
APS-C


Canon
PowerShot SD450


Velodyne


esri


DATA
MAPPER

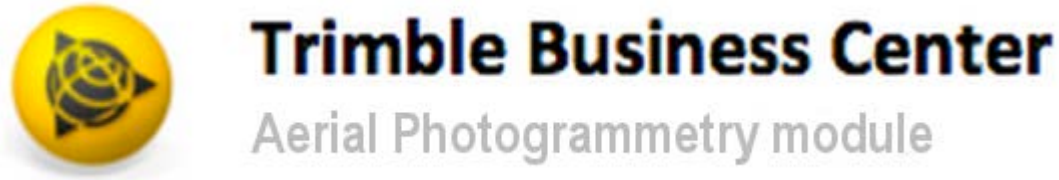

Agisoft
3D Modeling and Mapping


PIX4D
simply powerful


simactive
Cutting-Edge Photogrammetry Software


inpho UASMaster


DroneDeploy


Trimble Business Center
Aerial Photogrammetry module

WHAT REALLY MATTERS?

Sensors

- http://www.phoenix-aerial.com/
- http://www.flir.com/suas/content/?id=68335
- http://www.parrot.com/usa/companies/sequoia/

Software

- https://www.datamapper.com/
- https://www.datamapper.com/algorithms
- https://www.dronedeploy.com/
- https://pix4d.com/
- http://www.esri.com/products/drone2map

BOTTOM LINE

Lots of available systems

Sensors are getting smaller and better

Drones are getting cheaper

But there's more to it than just the UAS

It's all about the data!

CHALLENGES FOR UAS

Large scale projects

Urban areas

Near airports

Over crowds

Large sensors

Beyond visual line of sight

Privacy concerns

Twin Oaks - Trimble Business Center

File | Home | View | Data | Survey | CAD | Edit | Surfaces | Corridor | Drafting | Photogrammetry | Point Clouds | Machine Control | Support

Zoom: Zoom Extents, Zoom In, Zoom Out, Zoom, Pan, Pan Precise, Center

Panes: Manager, Project Explorer, Flags Pane, Command Pane

Graphic Views: Points, Plan View, 3D View, Activate Limit Box, Station View, 3D View Settings, Process View, Surface Slicer View, Google Earth

Alignment Views: 3D Drive View, Cross-Section View, Profile View, Superelevation Diagram

Toggle: Toggle Gridlines, Toggle Line Marking, Coordinate Scroll

Windows: New Horizontal Tab Group, New Vertical Tab Group, Move to Next Tab Group, Move to Previous Tab Group, Float View

View Filter Manager

My Filter

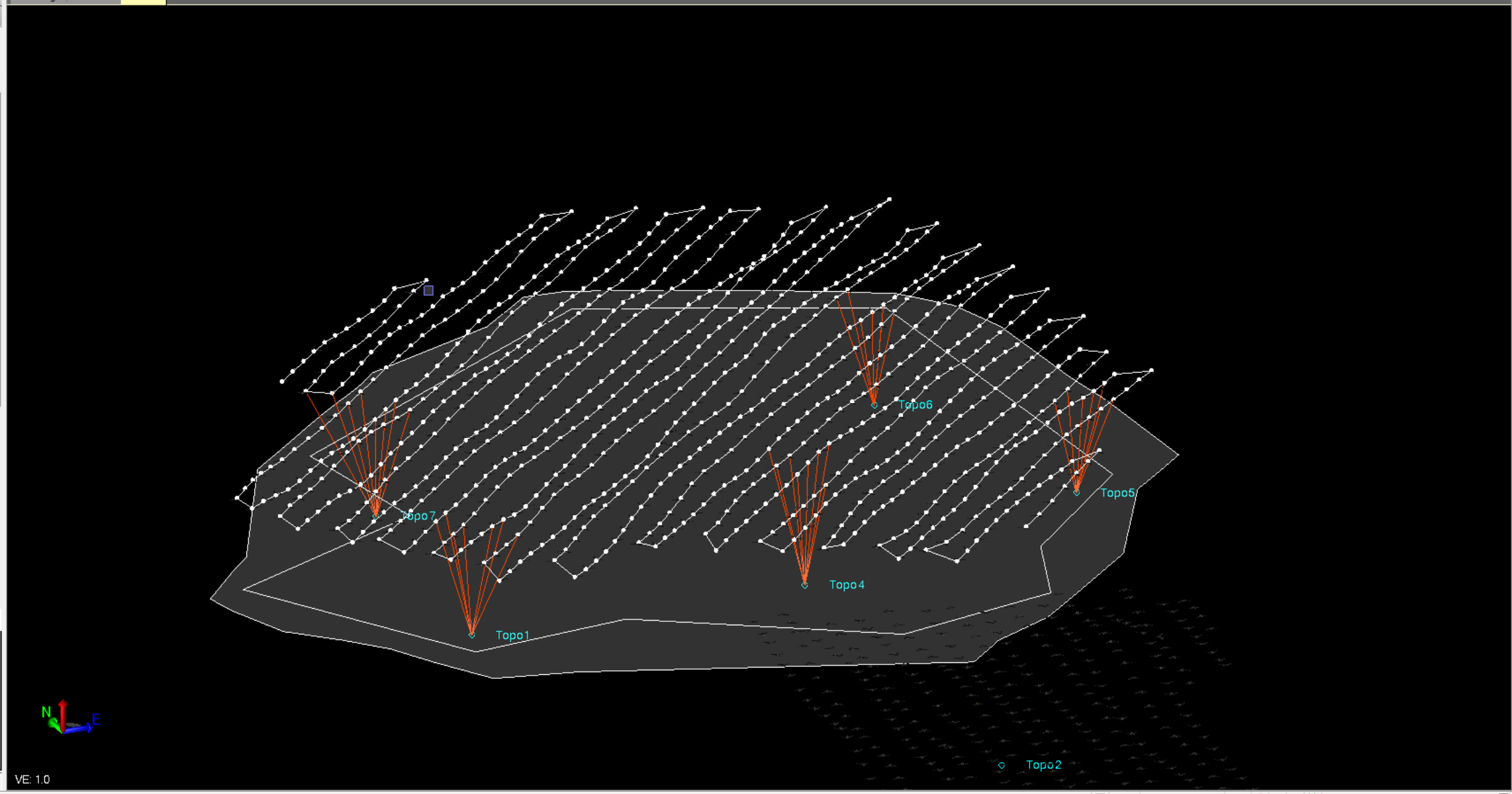
<Everything>

- Raw Data
  - Baseline
  - PP Continuous
  - PP Stop and Go Vector
  - PP Vector
  - PP Vector Imported
  - RTK Vector
  - As-Staked Point
  - Azimuth
  - Offset
  - Point
  - Averaged Point Relations
  - Georeferenced Image
  - Laser Rangefinder
  - Leveling
  - Media Folder
  - Total Station
  - Traverse
- Photogrammetry
  - Photo Station
  - Referenced Image (Statio
  - Referenced Image (Plan
  - Image Frame
  - Observation
  - Flight Mission
  - Flight Block
  - Flight Block Plan
- Flag
  - Error Ellipse

Point | Observations | GNSS Da

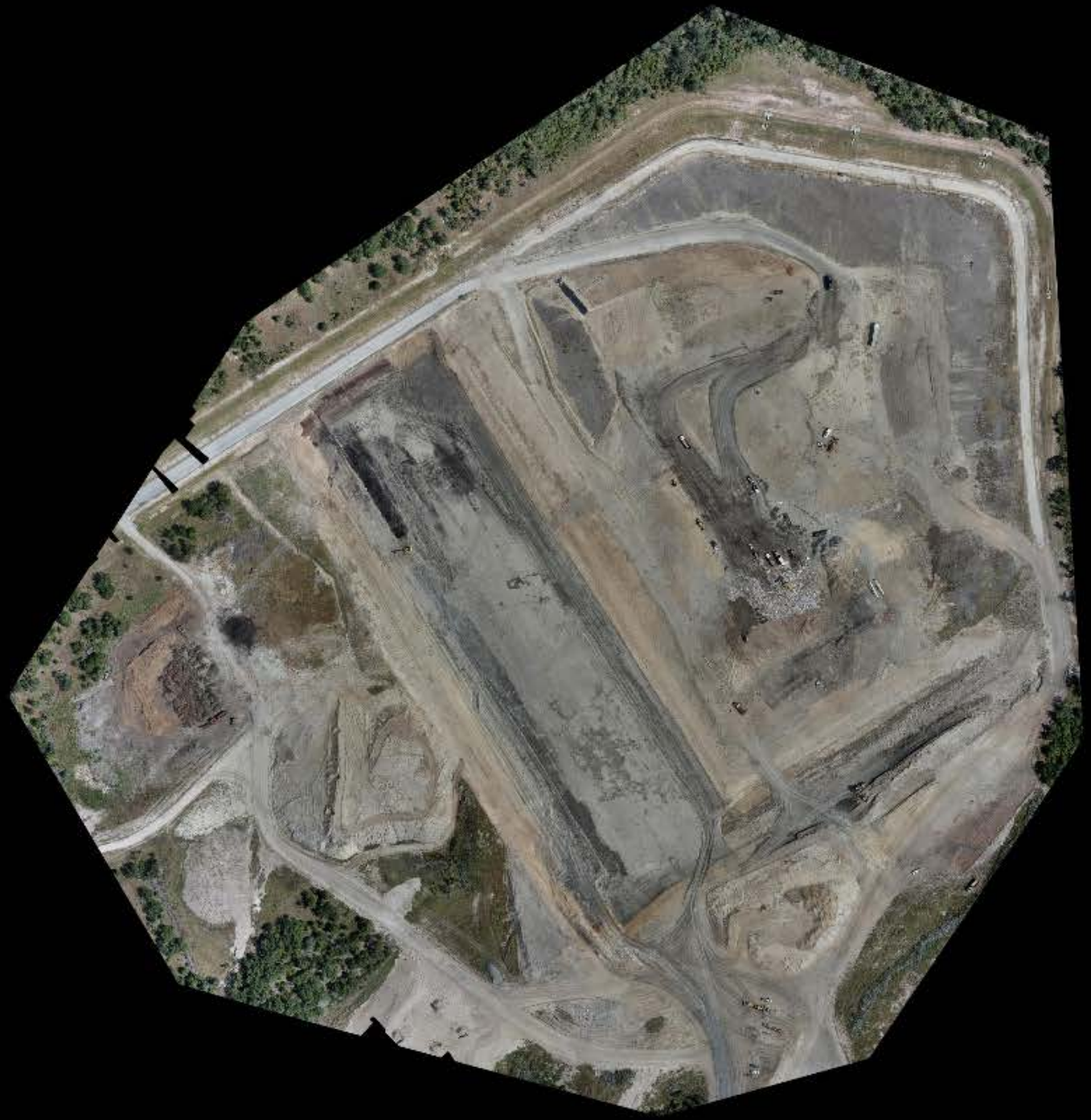
- Show point labels
- Show feature code
- Show elevation
- Show disconnected points
- Show feature symbol only

Start Page | Plan View | 3D View

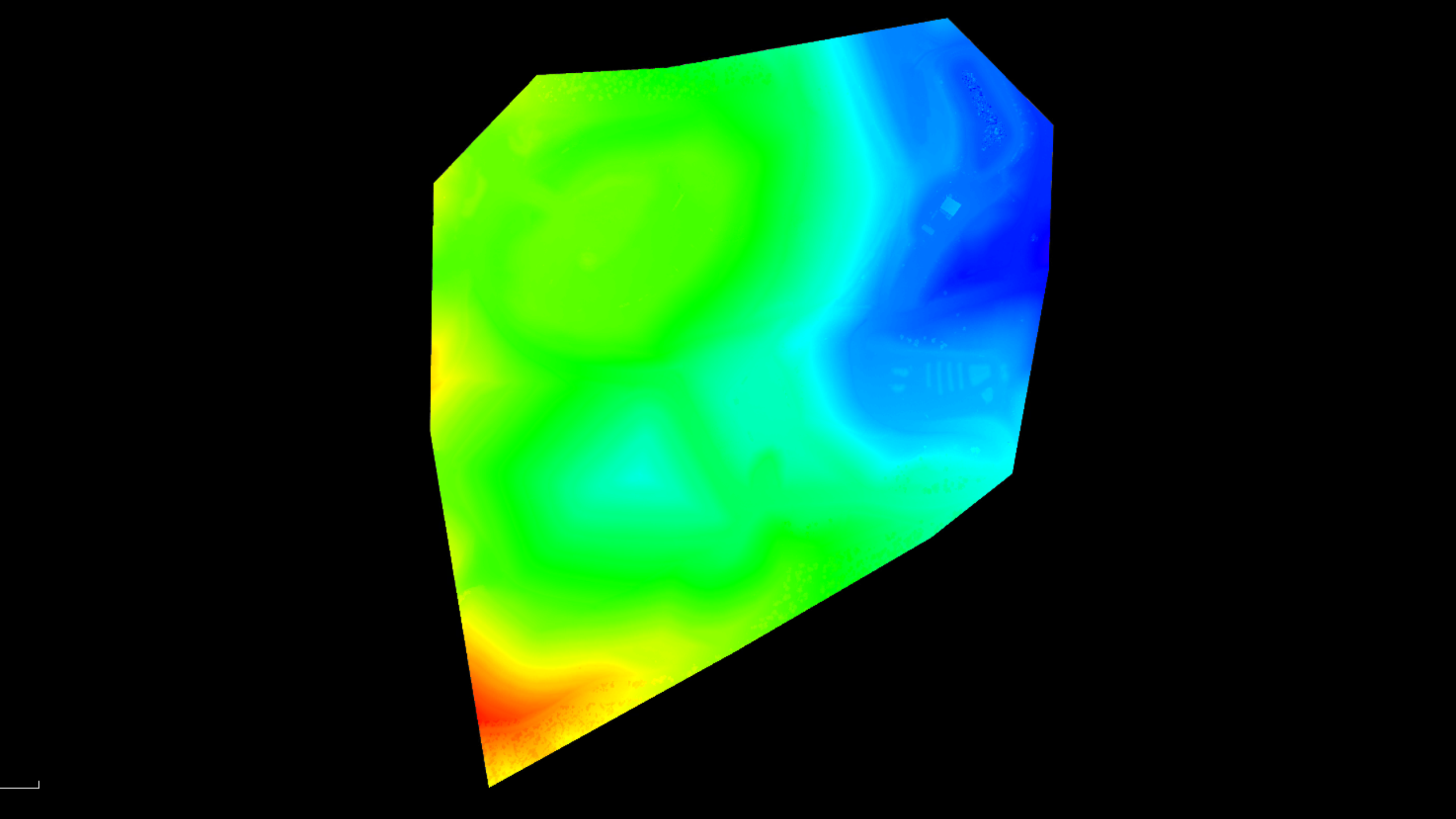


Project Explor... | View Filter Ma...

Snap | International Foot | Grid | 0




Georeferenced Image : Twin Oaks Block A.Ortho_3.tif [0]

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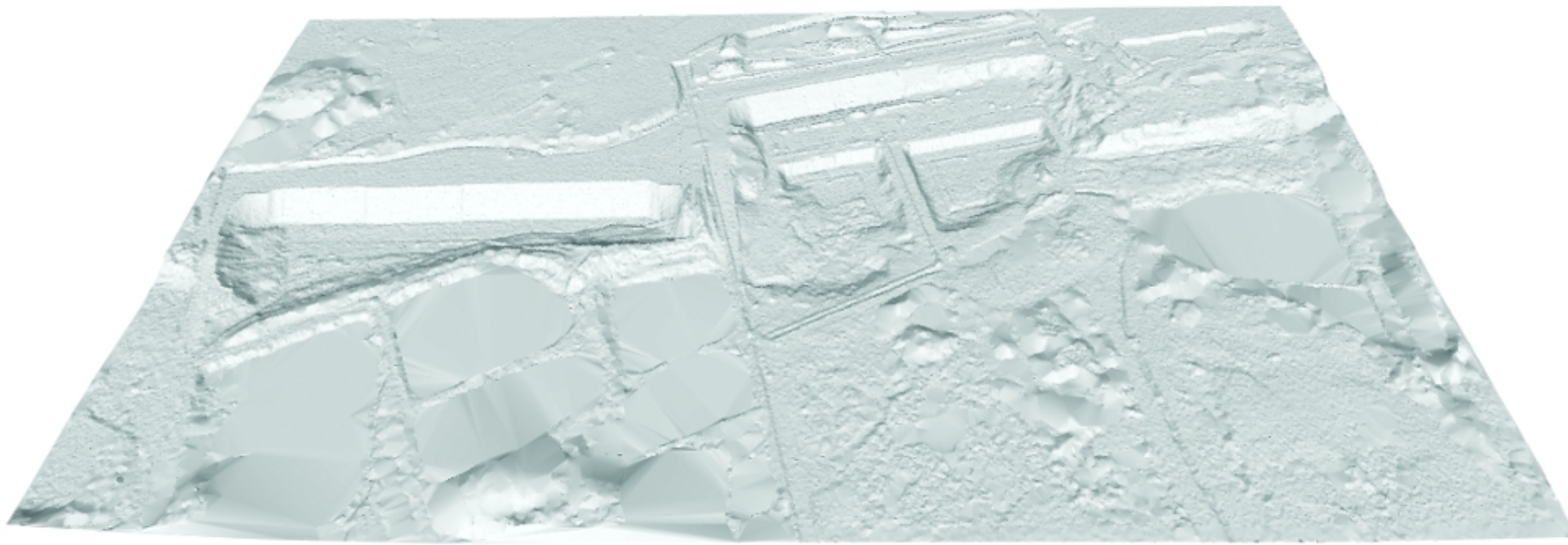
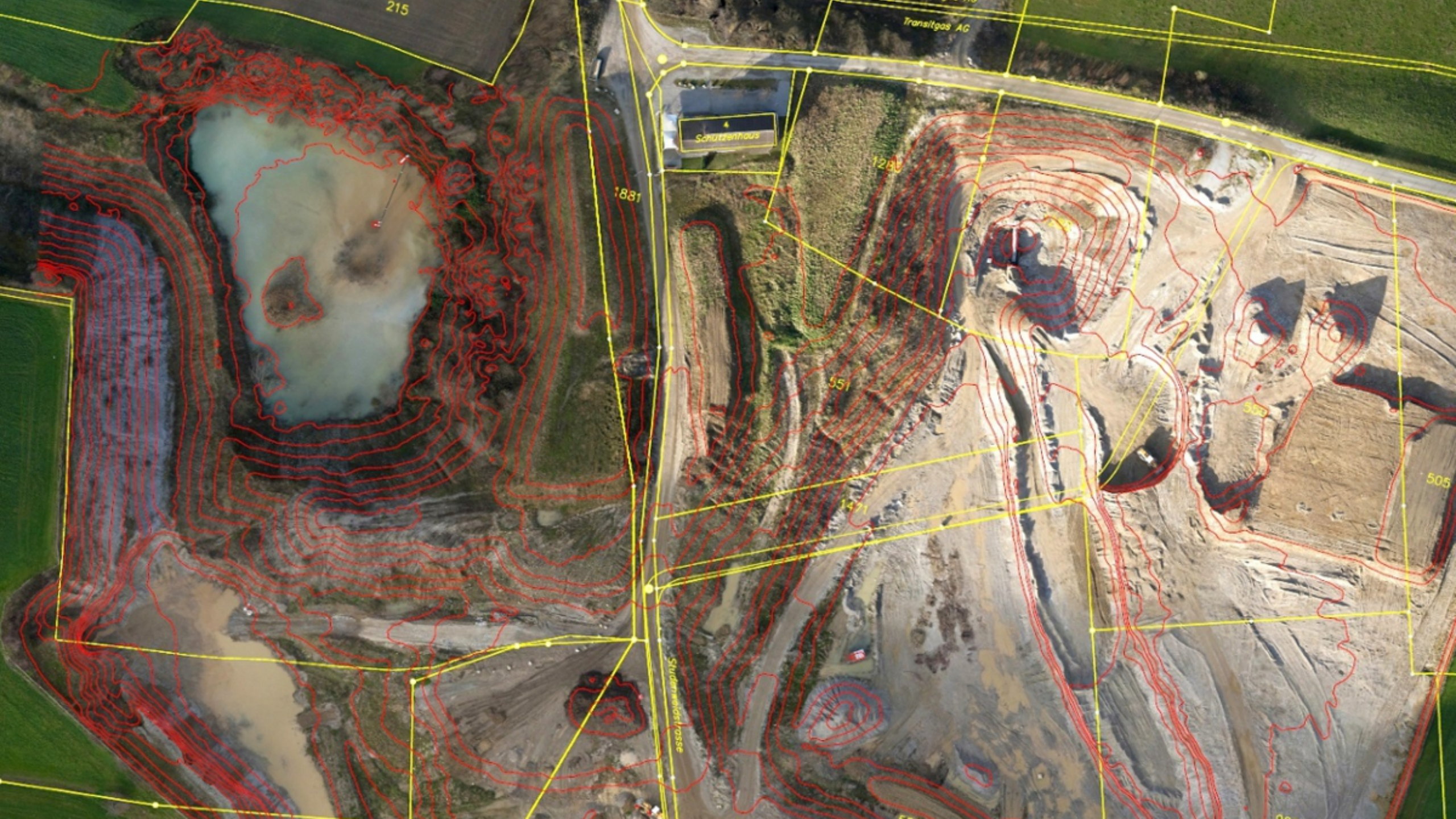


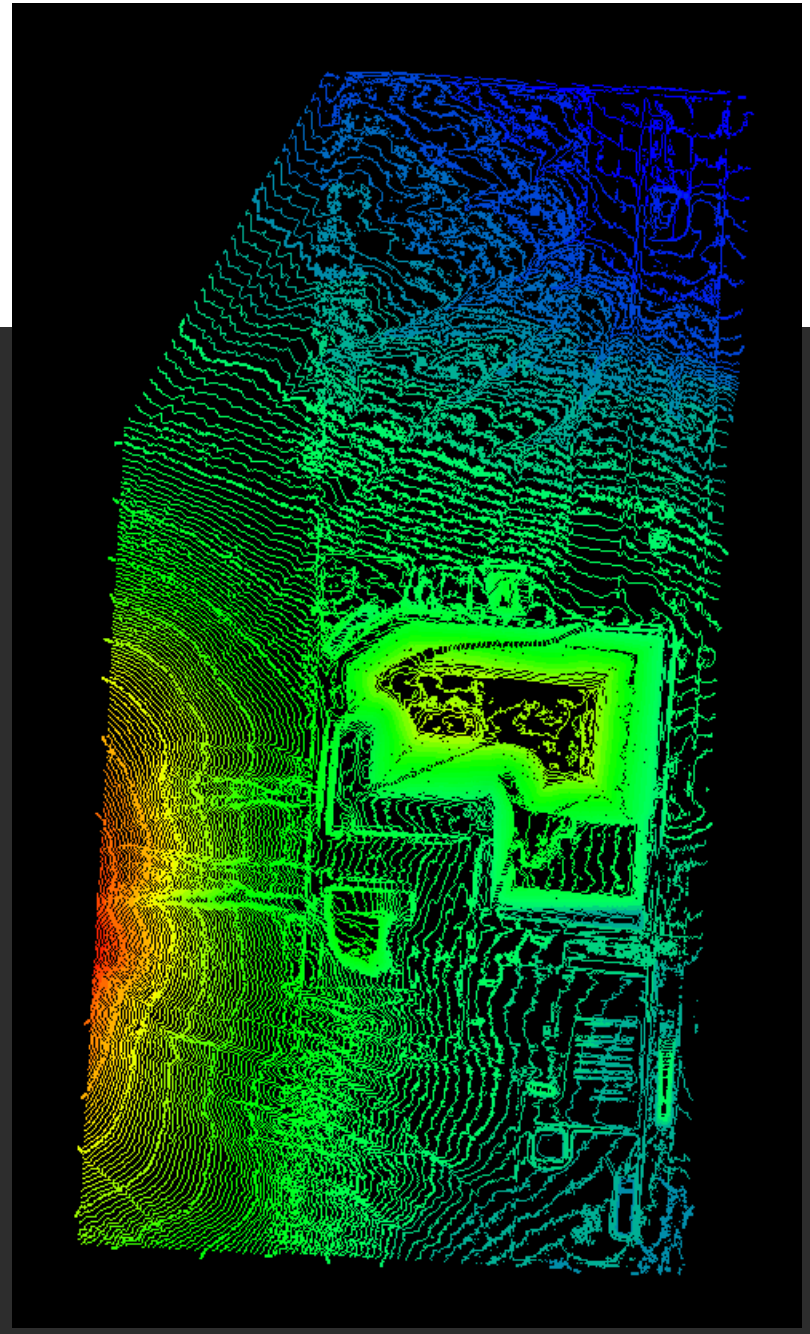

215
Transitgas AG
Schützenhaus
1281
1881
551
1471
505
Strudenwaldstrasse

HAVE REALISTIC EXPECTATIONS

Don’t spec your deliverables off a data sheet!

LANDFILL PROJECT

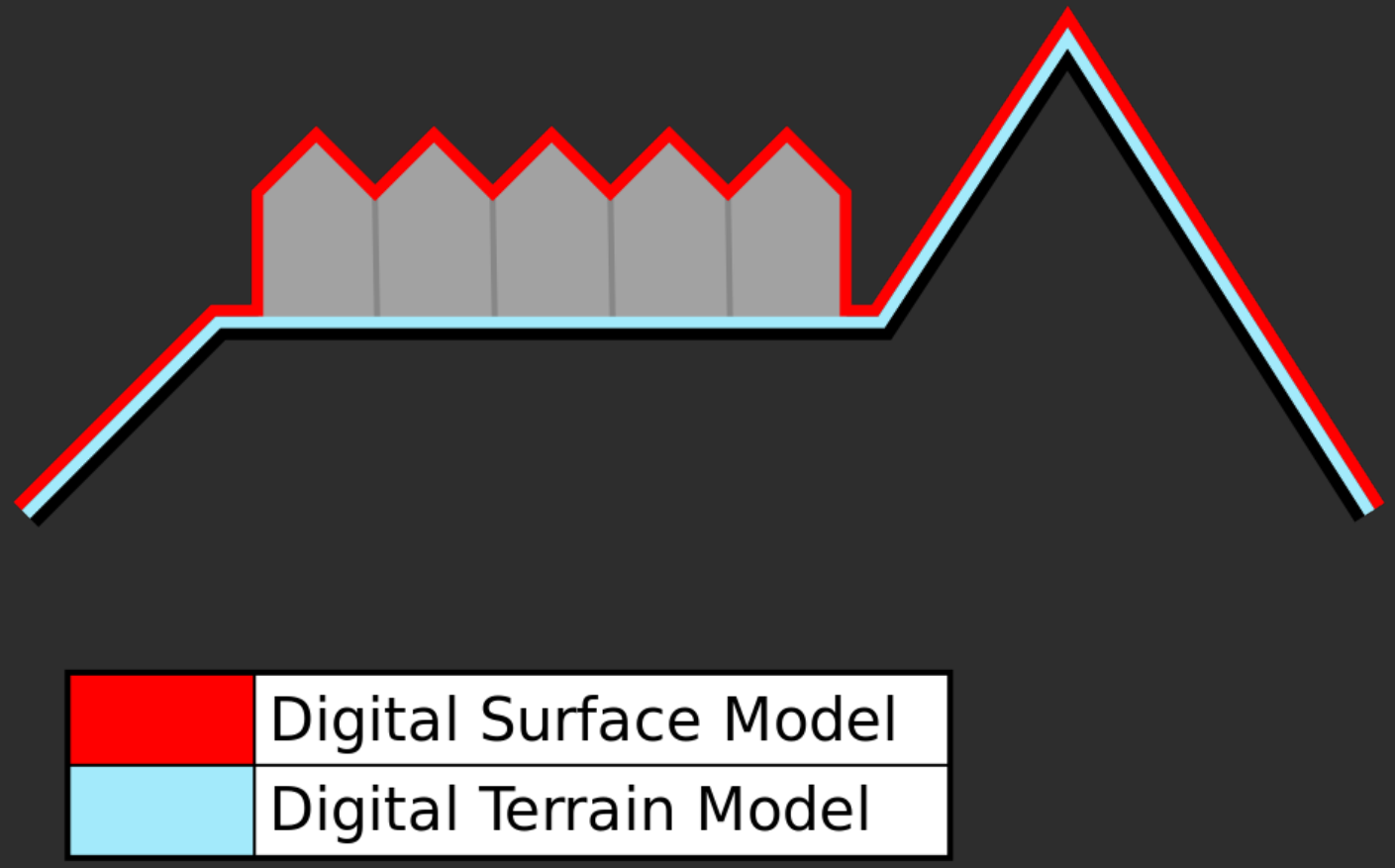
- Trimble UX5 and Sony a5100 24 MP
- Average 250’ AGL
- 680 acres
- 6 flights, average 35 minutes each
- 3 TO/L locations
- 5,700 photos, ~100 discarded
- 19 GCPs, 7 CPs
- 2cm GSD
- Trimble Business Center Advanced Photogrammetry software
- Days of processing time, split into 5 subsets



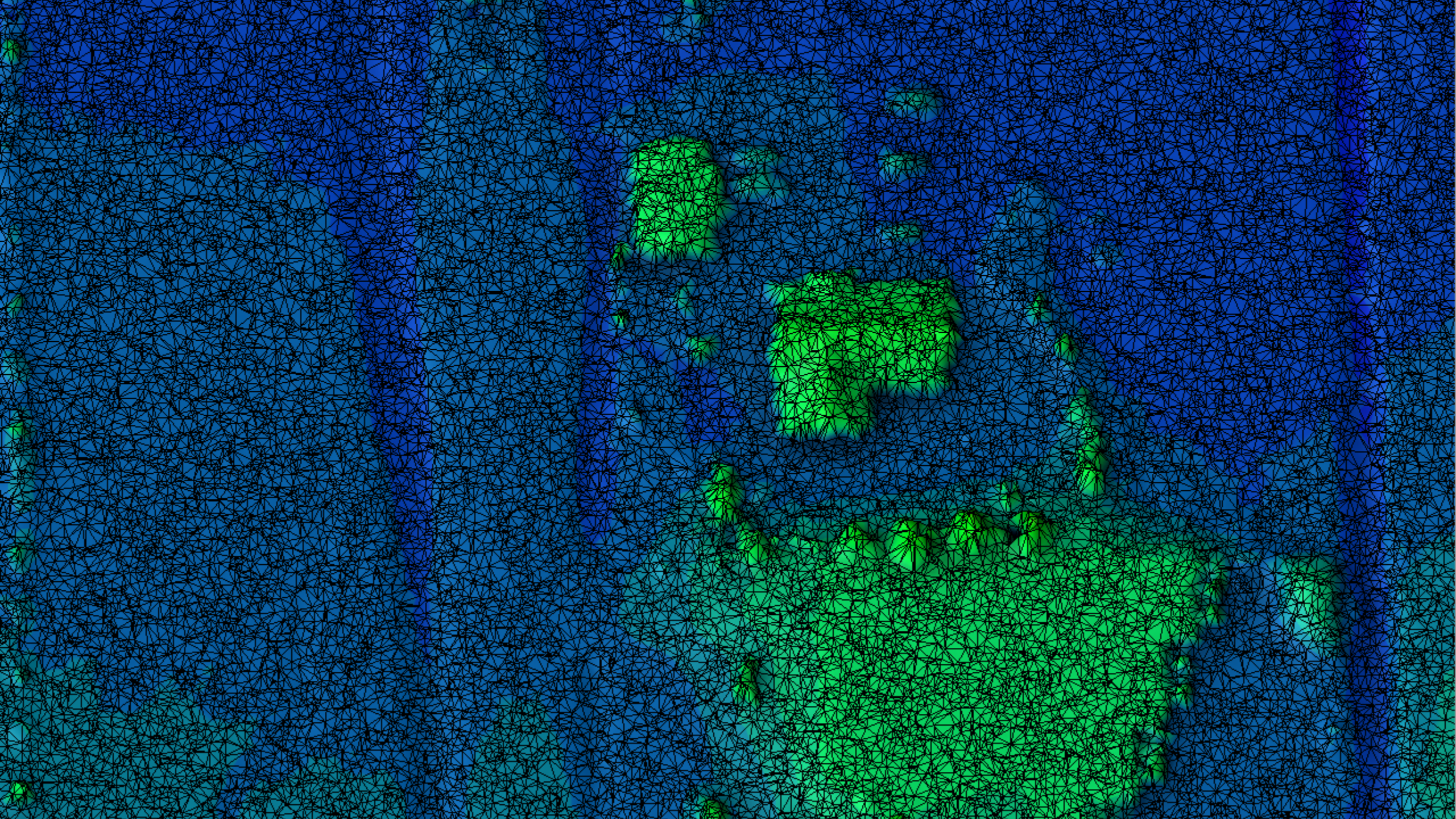

GCP07
GCP08
GCP09
GCP10
GCP11
GCP12
GCP15
GCP02
GCP01
GCP17
GCP06
GCP18
GCP04
GCP03
GCP05
GCP20
GCP13
GCP14

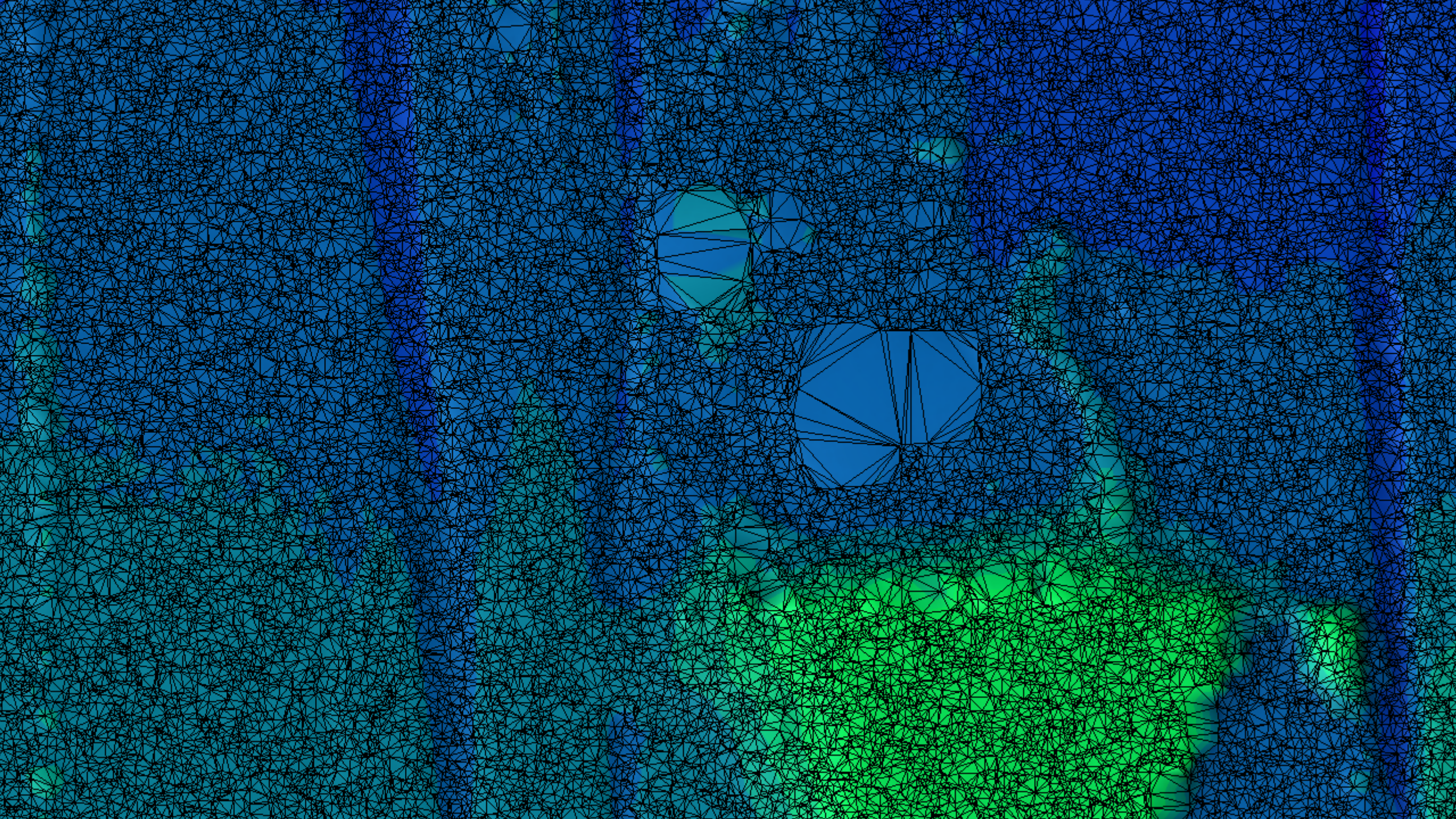
DO YOU WANT A SURFACE MODEL OR A TERRAIN MODEL?

They may call it an apple, but they actually want an orange!

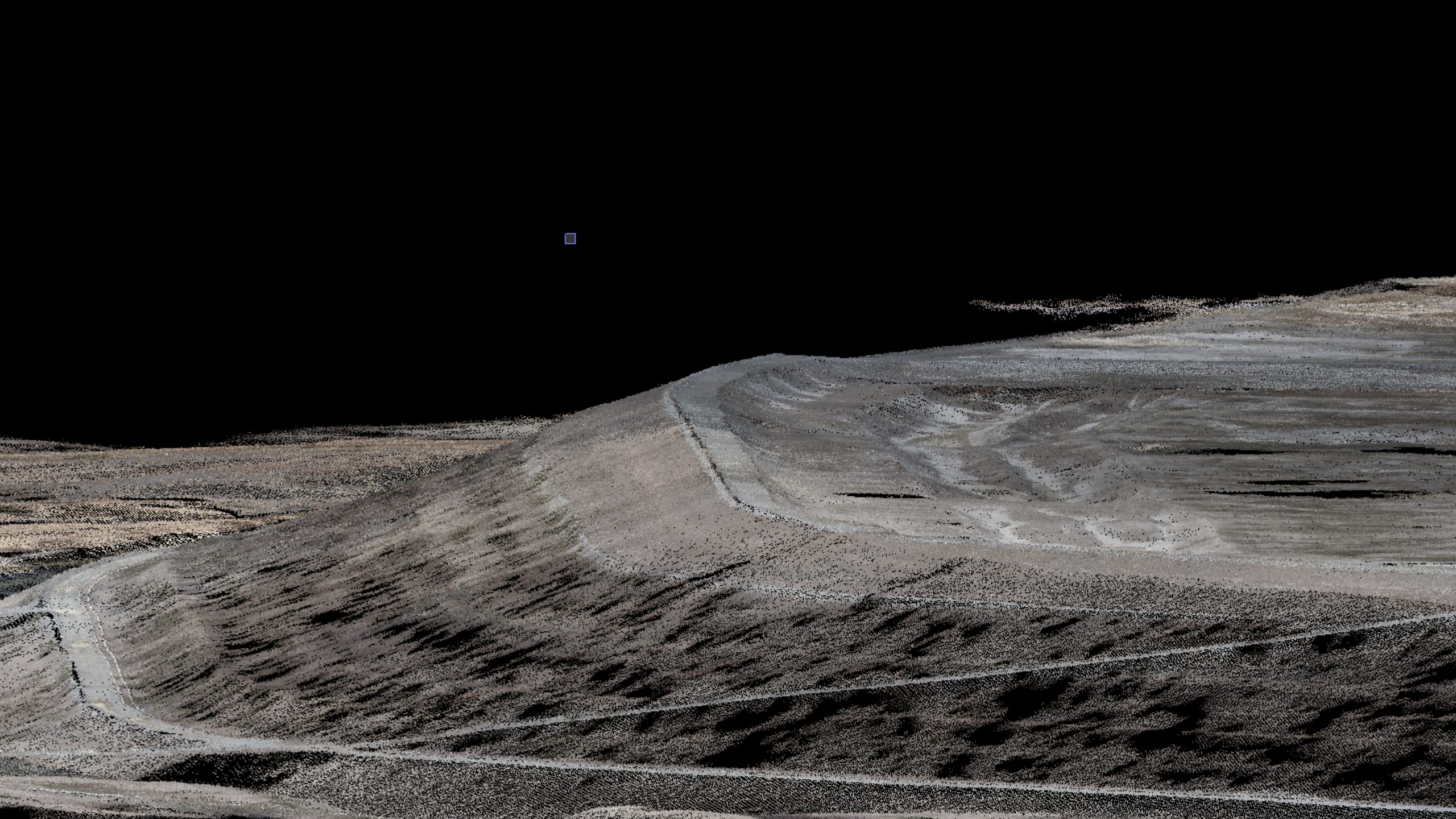


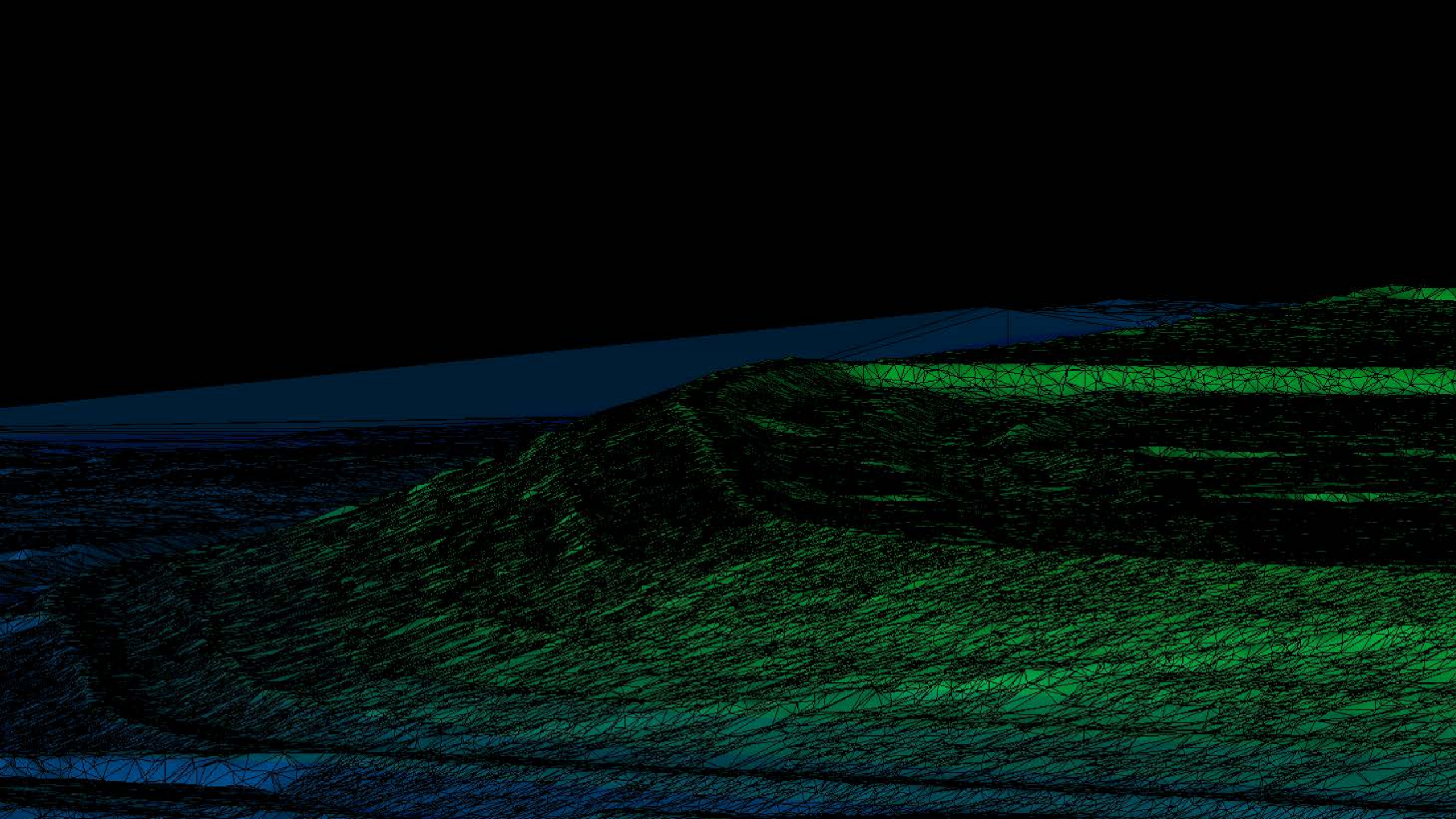
www.Wikipedia.com

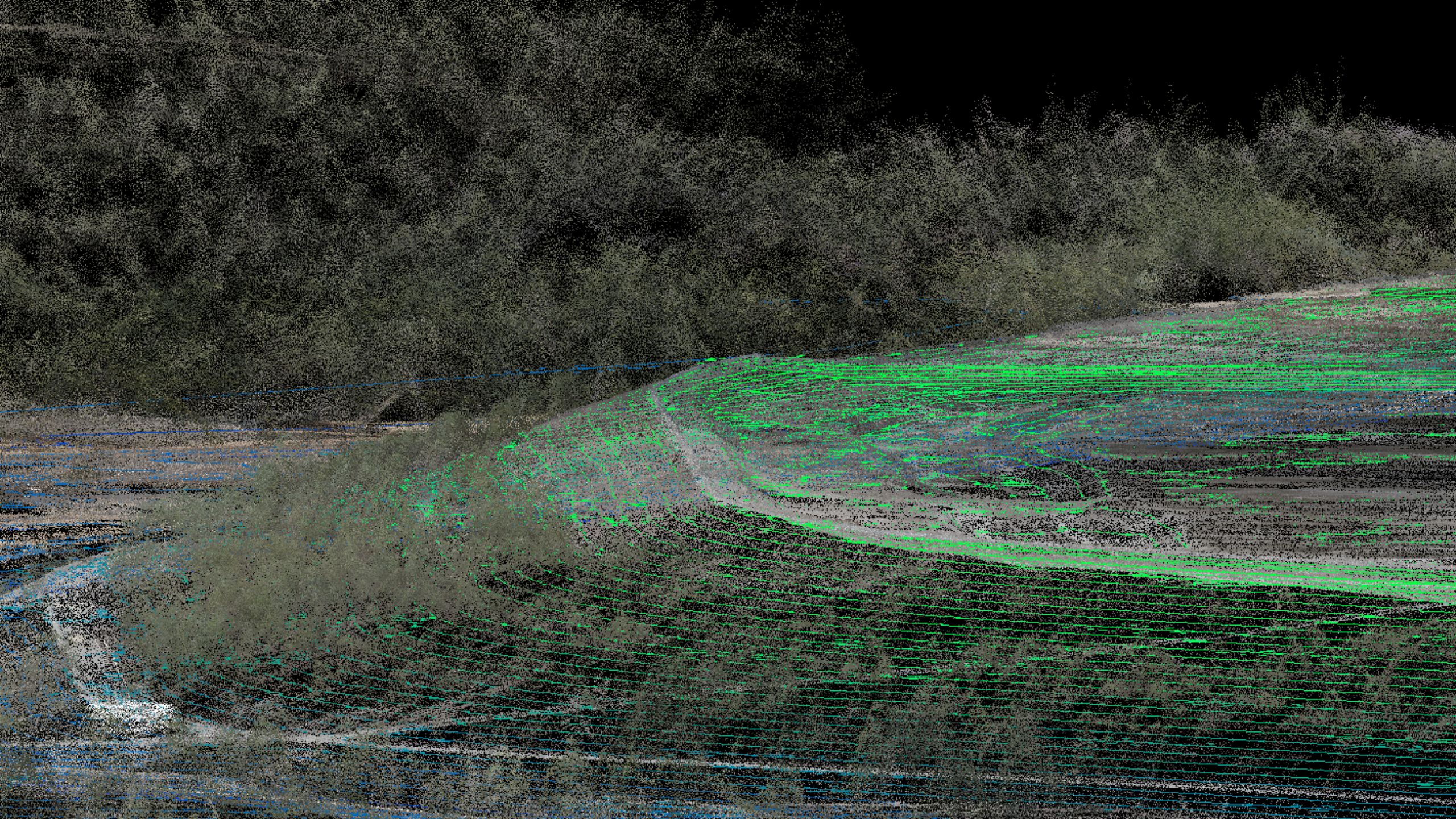


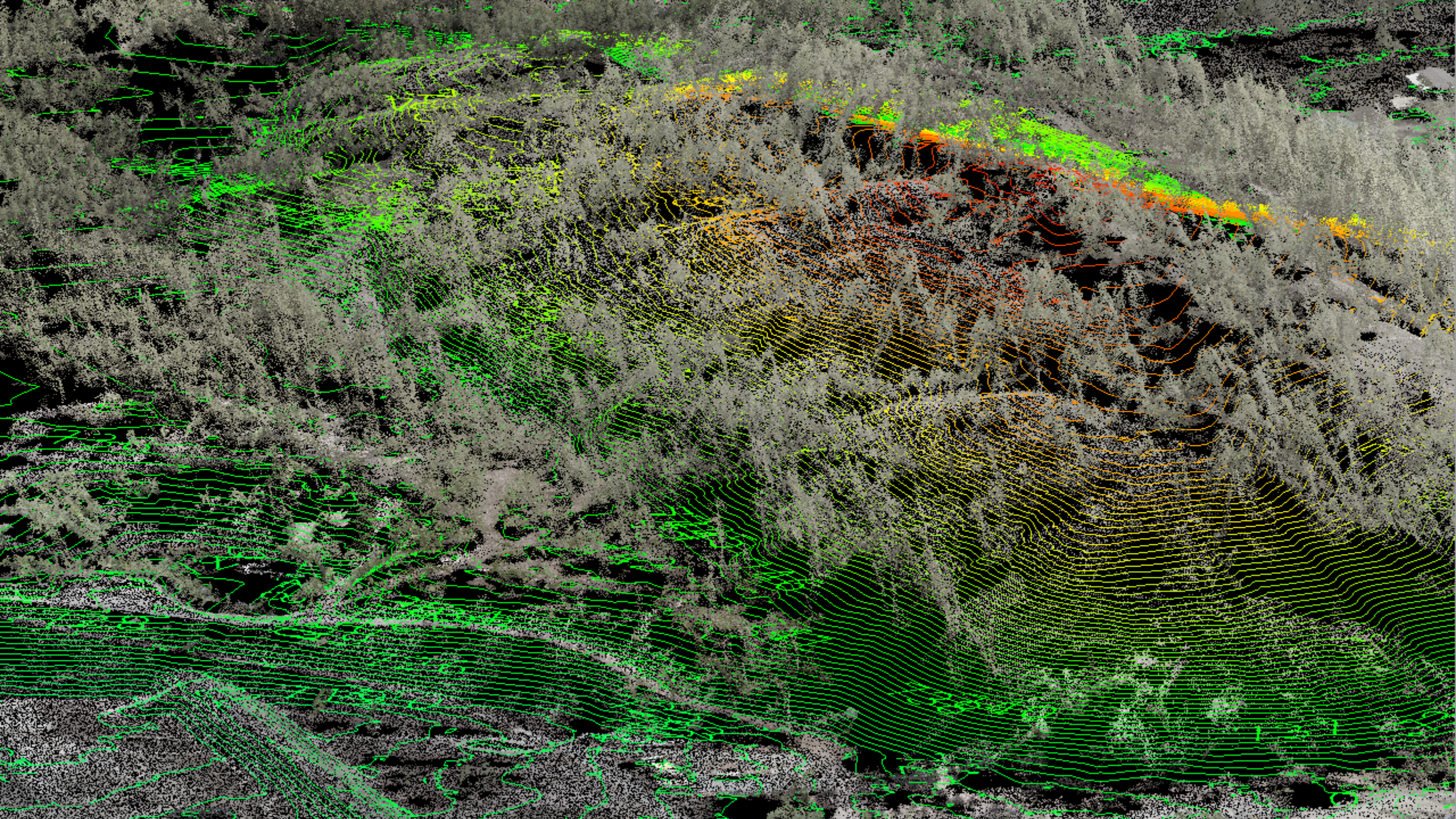


VEGETATION IS A CHALLENGE









DATA PROCESSING—MAN HOURS VS. COMPUTER HOURS

RECOMMENDED COMPUTER SPECS

For non-server, non-supercomputers running UAS photogrammetry programs (e.g. Trimble Business Center, UASMaster, Pix4D, PhotoScan, etc.)

- Solid State Drive
  - 500 GB or bigger
  - 120 GB+ free space for processing
  - ~10 MB/image
- Intel Core i7 or Xeon Processor
  - At least 4 cores, more are better
- 32 GB RAM or more
  - Depends on how many photos
- 4 GB NVIDIA graphics card or better

STEP 1: RELATIVE ADJUSTMENT
150 ACRES, 820 PHOTOS, 24 MP, ~2CM GSD

Standard Issue Laptop

8 GB RAM

500 GB spinning HD

Intel Core i5 processor

Basic graphics card

6-8 hours

Mobile Workstation

16 GB RAM

500 GB SSD

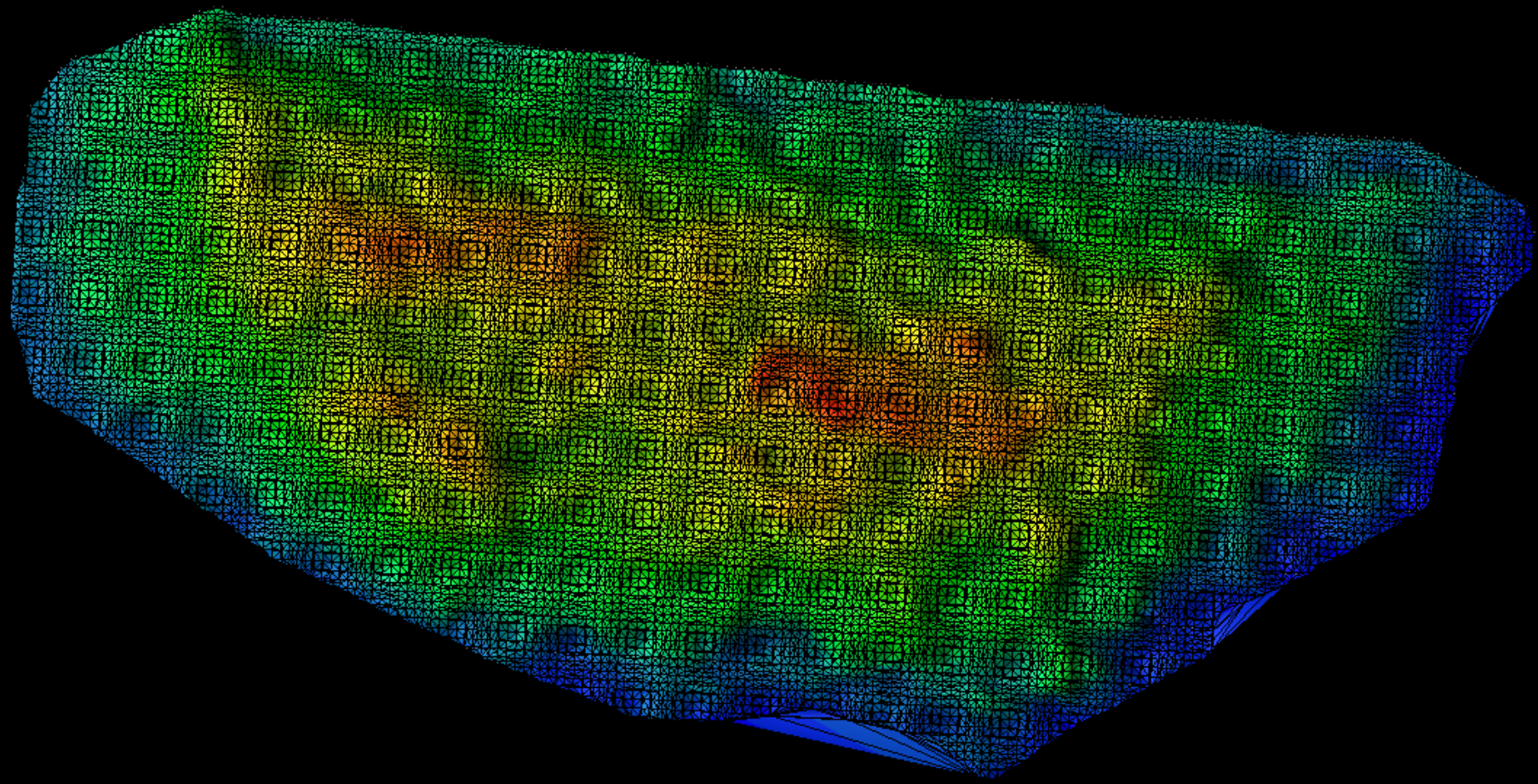
Intel Core i7

4GB NVIDIA graphics card

2 hours

WHAT KIND OF DATA DOES THE END USER REALLY WANT?

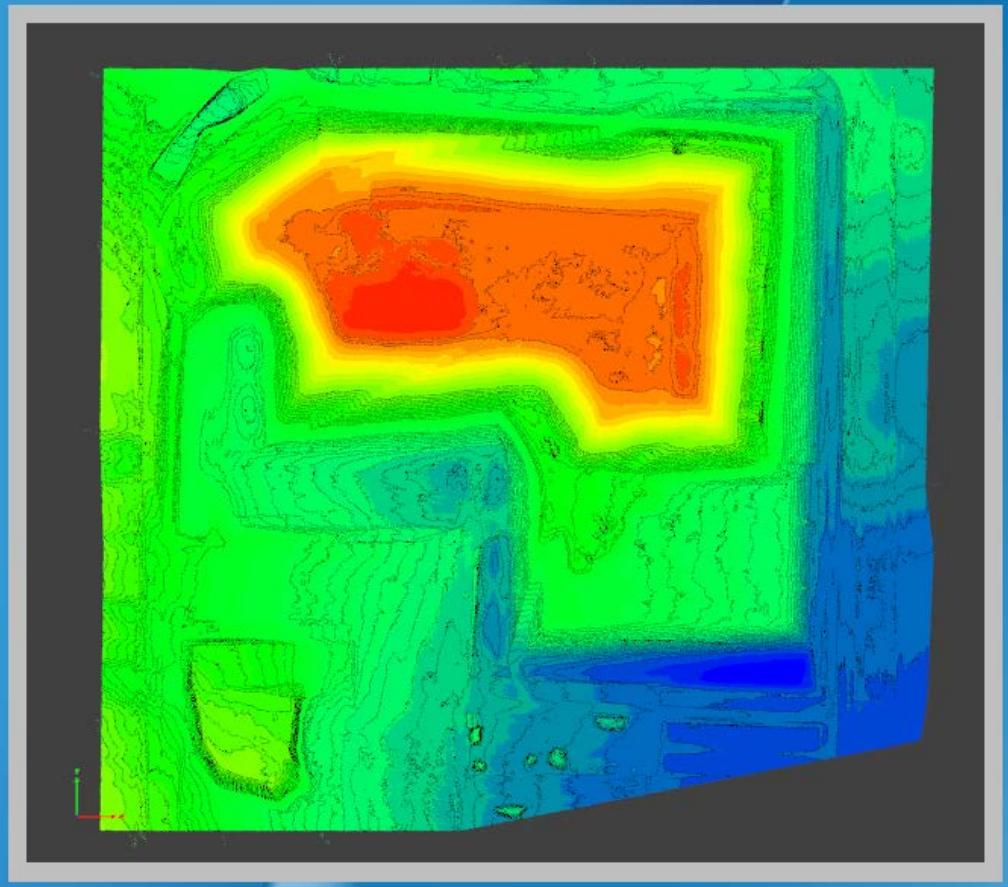
And what can they actually work with?



Volume of tire pile = 930 cu. yds.

Electronic Data Solutions

MilnerButte2.vce



Surface model and 2' contours of active portion of Milner Butte Landfill. Derived from imagery collected by Electroinc Data Solutions via UAS (Trimble UX5) in February and March, 2016.

Front View | Side View | Top View | Iso View

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THE UAV IS THE CHEAP PART

Operations and overhead will get you

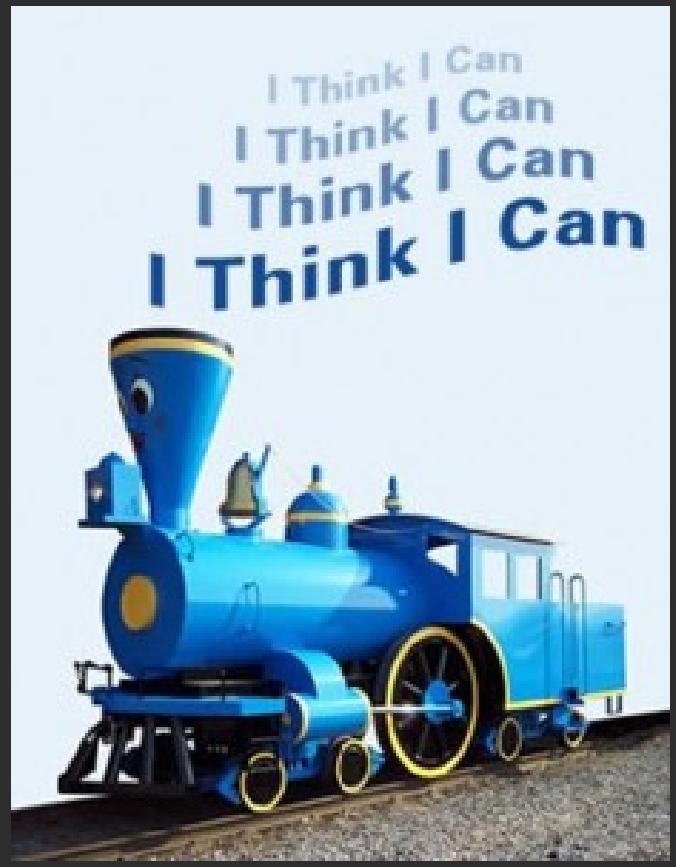
DRONES DON'T DO EVERYTHING!

Know and accept your limitations

WHEN TO SAY NO

If you “think you can”, there’s a good chance you can’t…yet

- Too big
- Too far
- Too little money
- Wrong equipment
- Don’t know how



COLLABORATE WITH PARTNERS

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