Geospatial Science as a first stop for addressing engineering challenges

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- Lidar
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Background

- Eskom power utility has a mandate to generate and supply electricity to its citizens and neighbouring countries. It has a total network 377287 km (line length).
- In order to meet its mandate…. The following needs to be addressed.
- Line inspection – foot patrol and detailed helicopter patrol (every two years)
- Corona discharge /Thermal anomalies on its infrastructure
- Monitoring of Vegetation management

Line inspection- Helicopter inspection

Line inspection - RPAS

RPAS – Aerial Kopter LiDAR

Yellow Scan surveyor + RGB camera
Processes

- **Upload flight plan**
- **Autonomy test**
- **Take off and landing testing**
- **Camera set up**

RPAS - Multirotor Multispectral

Multispectral camera Processes

- **Upload flight plan**
- **Autonomy test**
- **Take off and landing testing**
- **Set up flying Height**
- **Camera set up**

Thermal anomalies monitoring on infrastructure

- Corona monitoring
- Insulator monitoring
- Surface instability and deformation

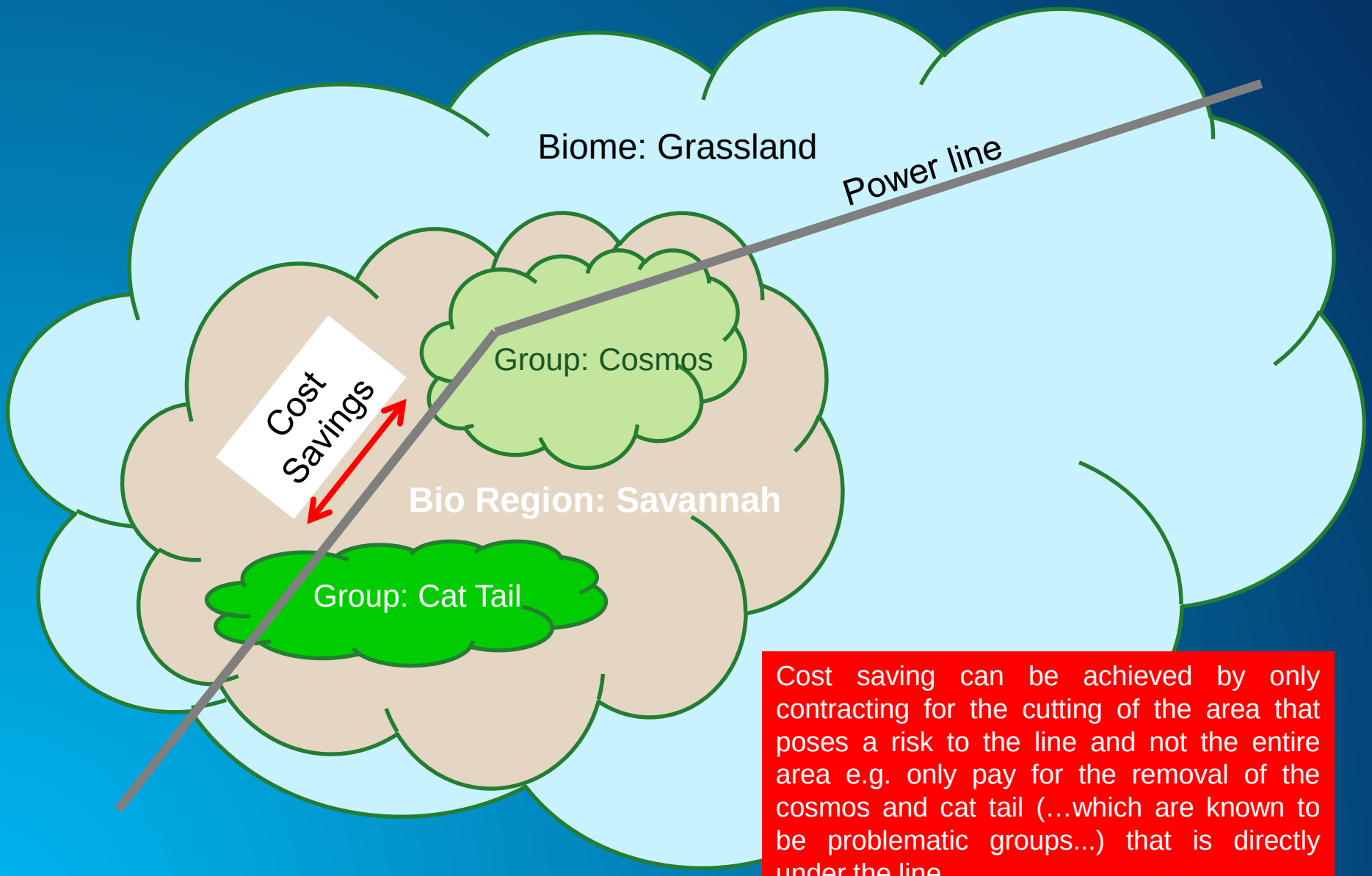
Vegetation monitoring

- **How do we make better use of Power line, vacant servitude, Servitude Inspection & Assessment tools for more effective and efficient management of Servitudes :**
  - Many different tools are being used by the different divisions,
  - Different data sets are obtained from each of these tools,
  - Different people make use of the data in different ways,
  - Different course of action required after interpretation of the data,
  - Information may be useful to more than 1 recipient,
  - Delays (latency) in getting data to the appropriate people.
- **Challenge: How to make the appropriate information and data available to the right people at the right time.**

Vegetation monitoring.. Continued…

- **This programme is focusing on the Vegetation related issues.**
- **Some issues noted with existing processes with regards to vegetation:**
  - Time delay between inspection and getting data back to decision makers.
  - Collusion between Eskom staff and Contractors.
  - Lack of staff to manage contractors and verify work done.
  - End users interfaces – getting the correct data to the correct person at the correct time.
  - Management of the information used for vegetation initiatives.
  - Lack of current ground vegetation status.

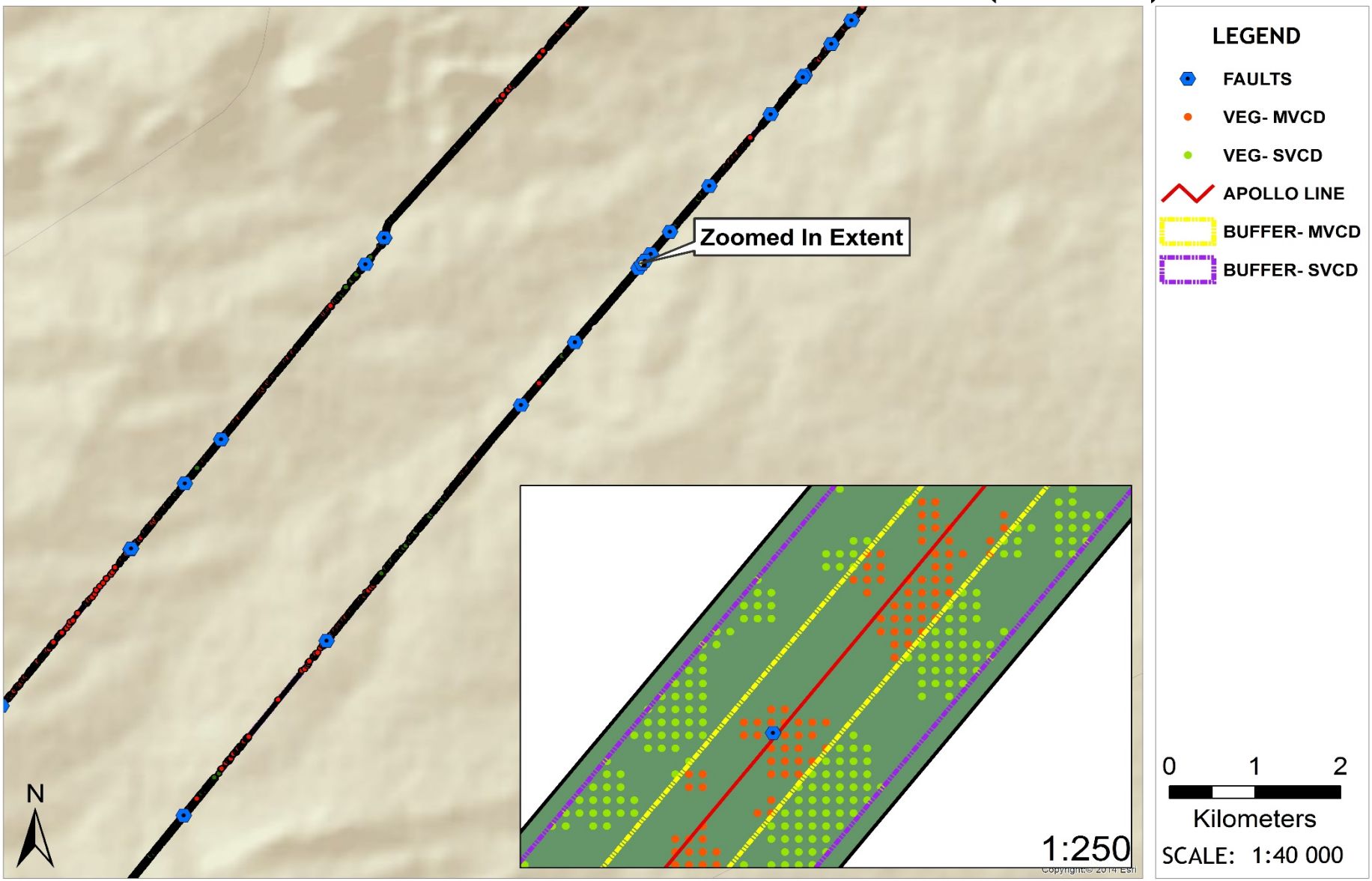
Potential cost saving



Cost saving can be achieved by only contracting for the cutting of the area that poses a risk to the line and not the entire area e.g. only pay for the removal of the cosmos and cat tail (…which are known to be problematic groups...) that is directly under the line

Proximity analysis

PROXIMITY ANALYSIS - STUDY AREA 2 (MIDDLE)

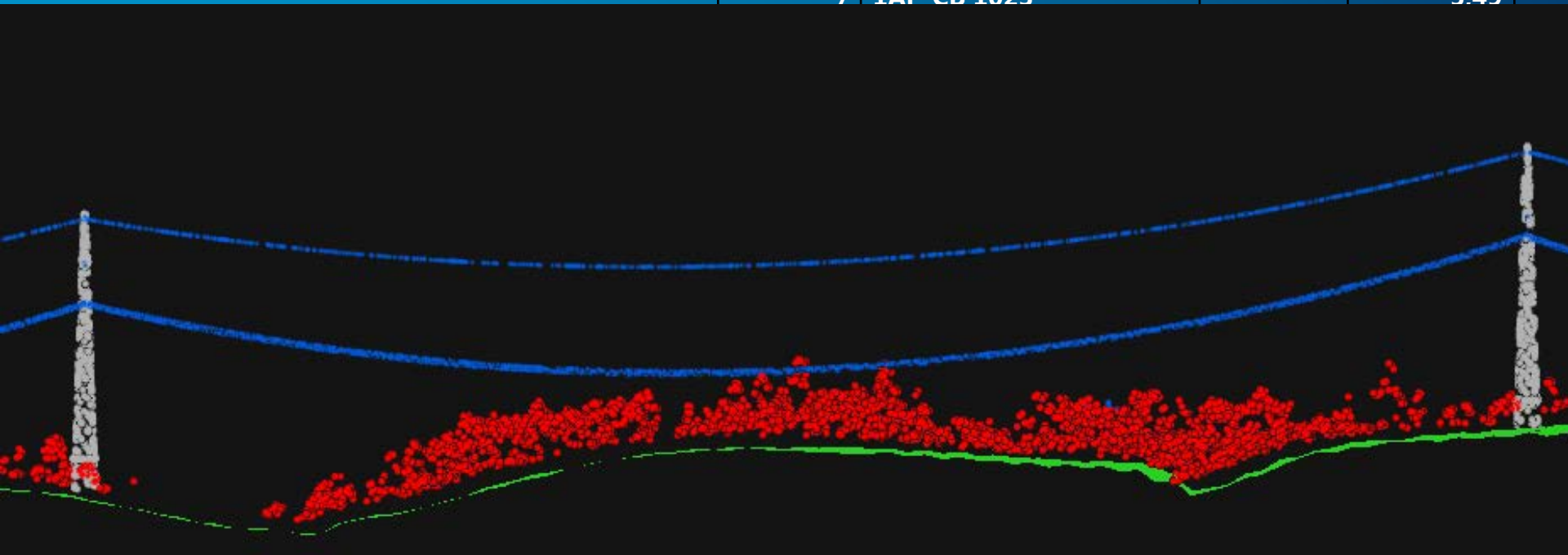


Volume analysis

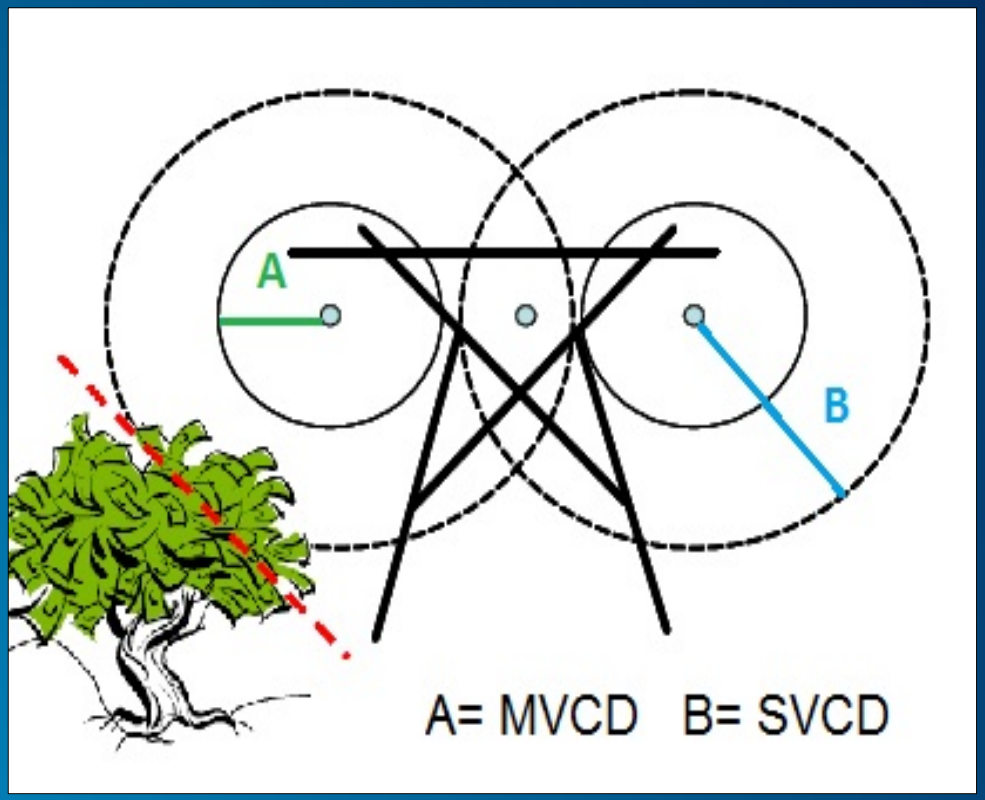
- Calculated by number of Lidar returns between each pylon.

- **Results:**
  - Study Area 1: **2054,22m³**
  - Study Area 2: **2110.16m³**
  - Study Area 3: **3430.12m³**

Pylon ID	Poles /Pylons	Volume m³	Percentage
13	Between 1AP-CB 1028-1AP-CB 1029	39,5	0,13
11	Between 1AP-CB 1026-1AP-CB 1027	566,3	1,84
14	Between 1AP-CB 1029-1AP-CB 1030	897,6	2,91
15	Between 1AP-CB 1030-1AP-CB 1031	998,7	3,24
9	Between 1AP-CB 1024-1AP-CB 1025	1059,8	3,44
10	Between 1AP-CB 1025-1AP-CB 1026	1566	5,08
7	Between 1AP-CB 1022-1AP-CB 1023	1692,7	5,49



Height Analysis



Published Regulations:

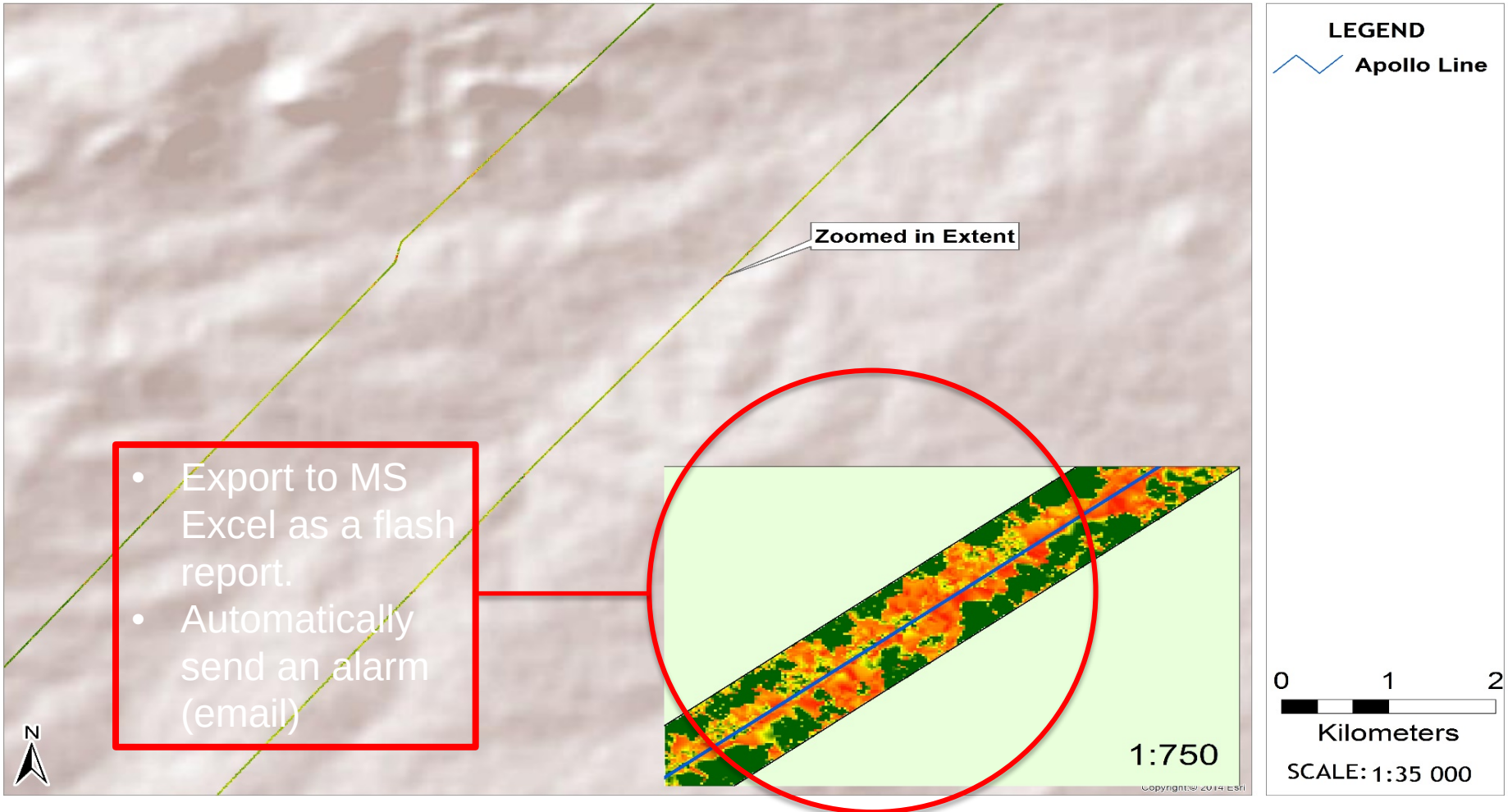
- MVCD – 3,7m radius
- SVCD – 6,1m radius

ELC Land Task Team, 2010: Procedure- Vegetation Management, Eskom

Height Results

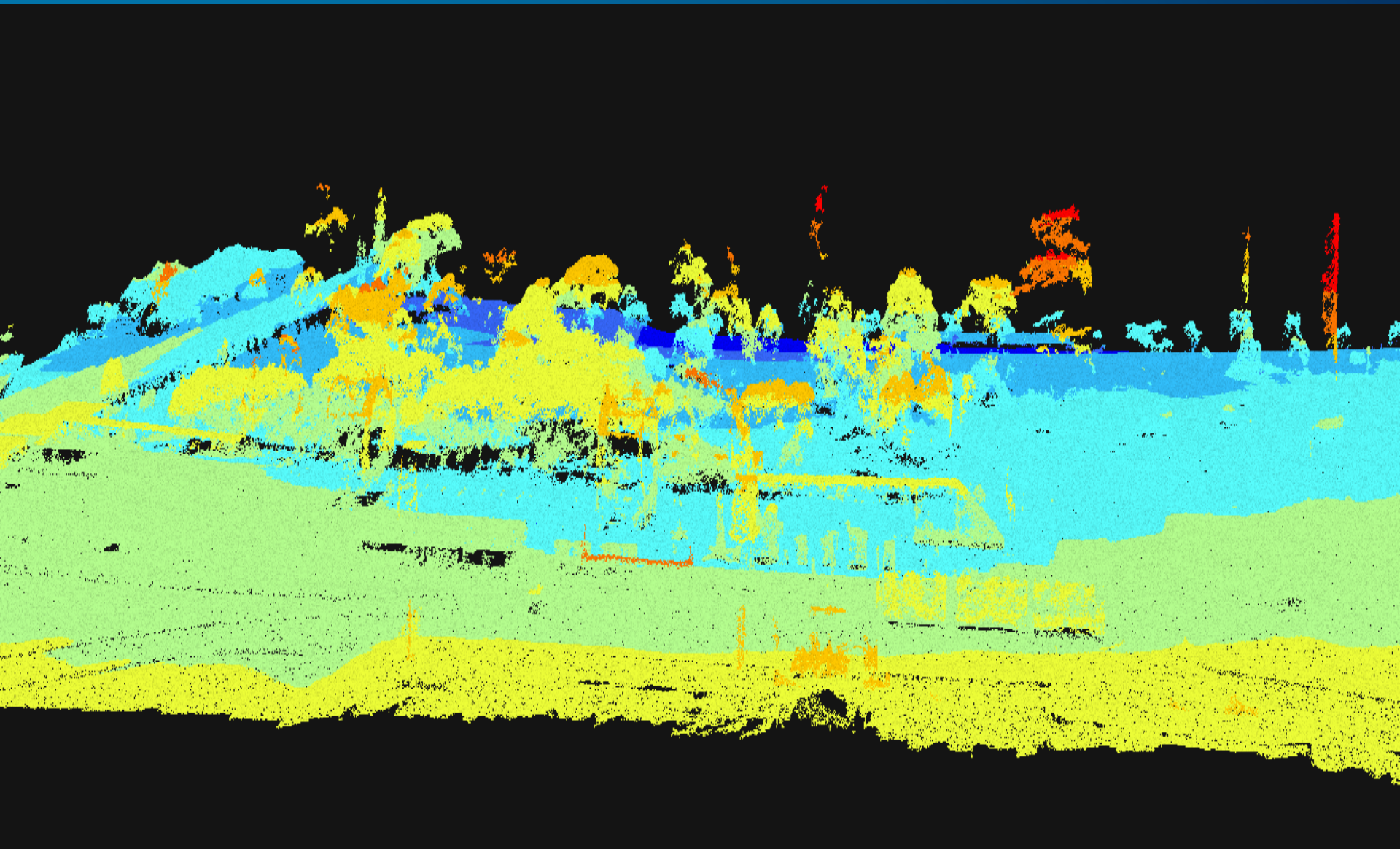
- **Results 6,1m radius:**
  - Study Area 1: **4,326km²** of 60km² (7,21%)
  - Study Area 2: **56,4km²** of 400km² (14,10%)
  - Study Area 3: **39,98km²** of 140km² (28,56%)

STUDY AREA 2: CANOPY HEIGHT ANALYSIS



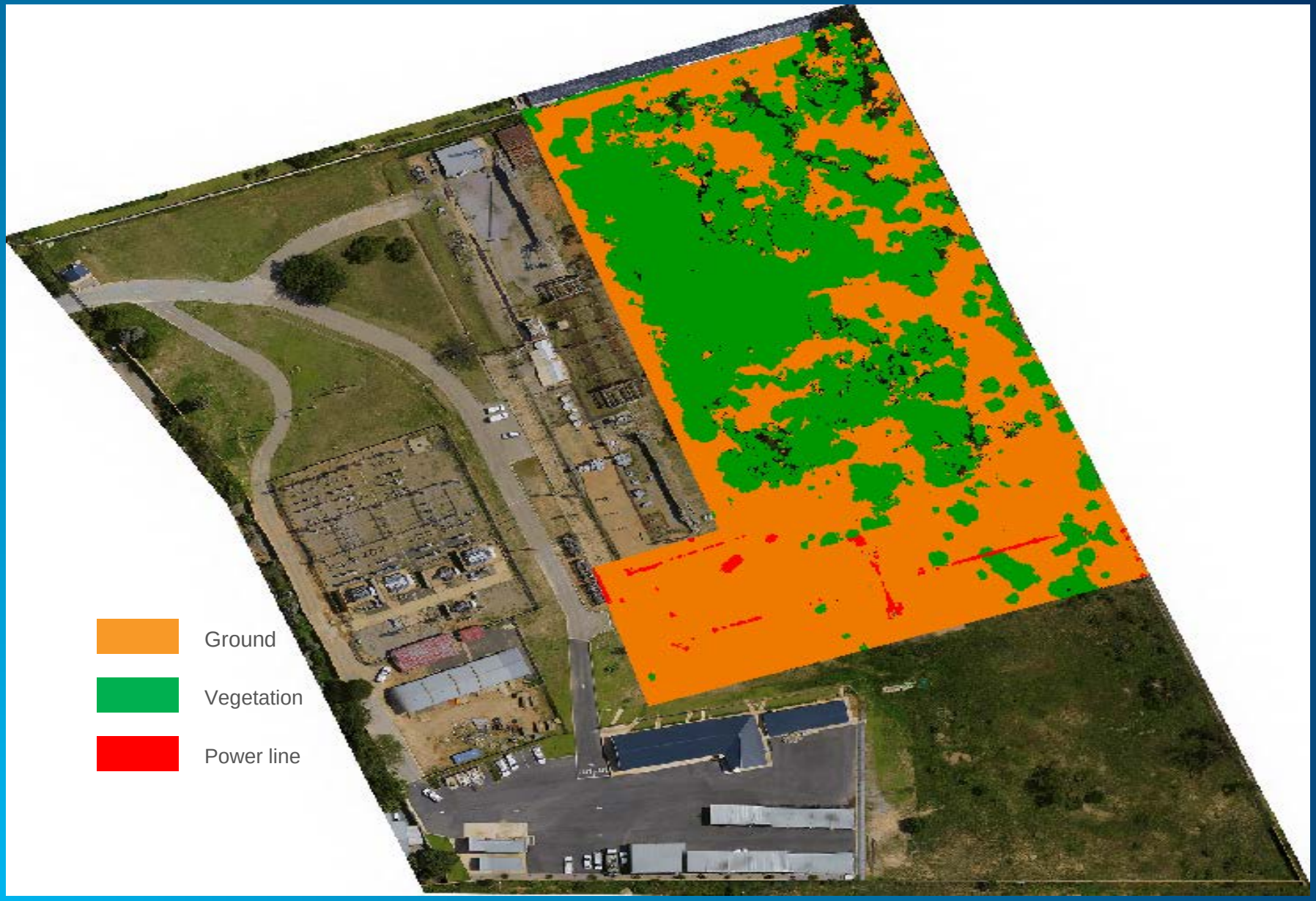
- Export to MS Excel as a flash report.
- Automatically send an alarm (email)

Vegetation

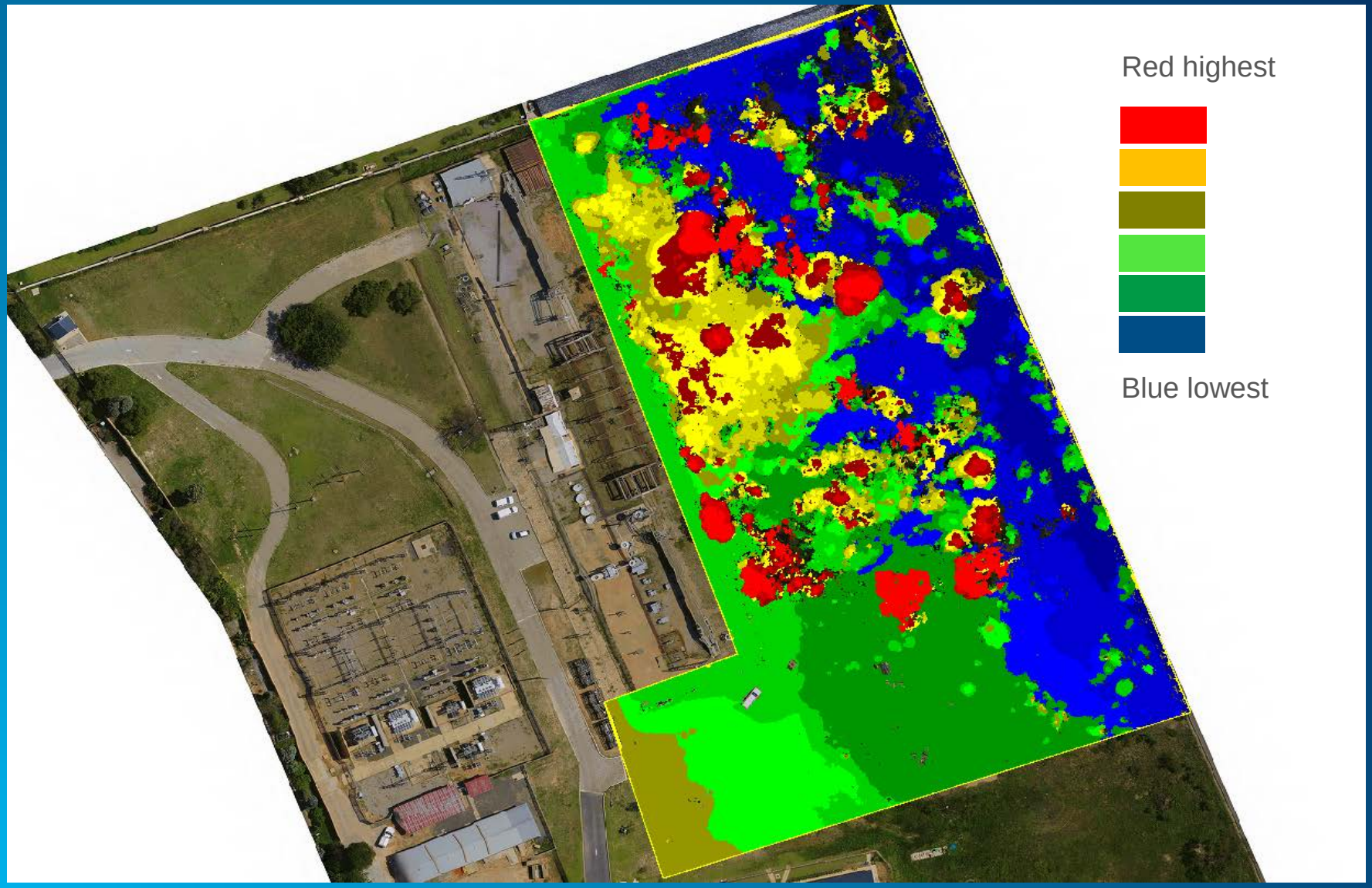


Orthophoto

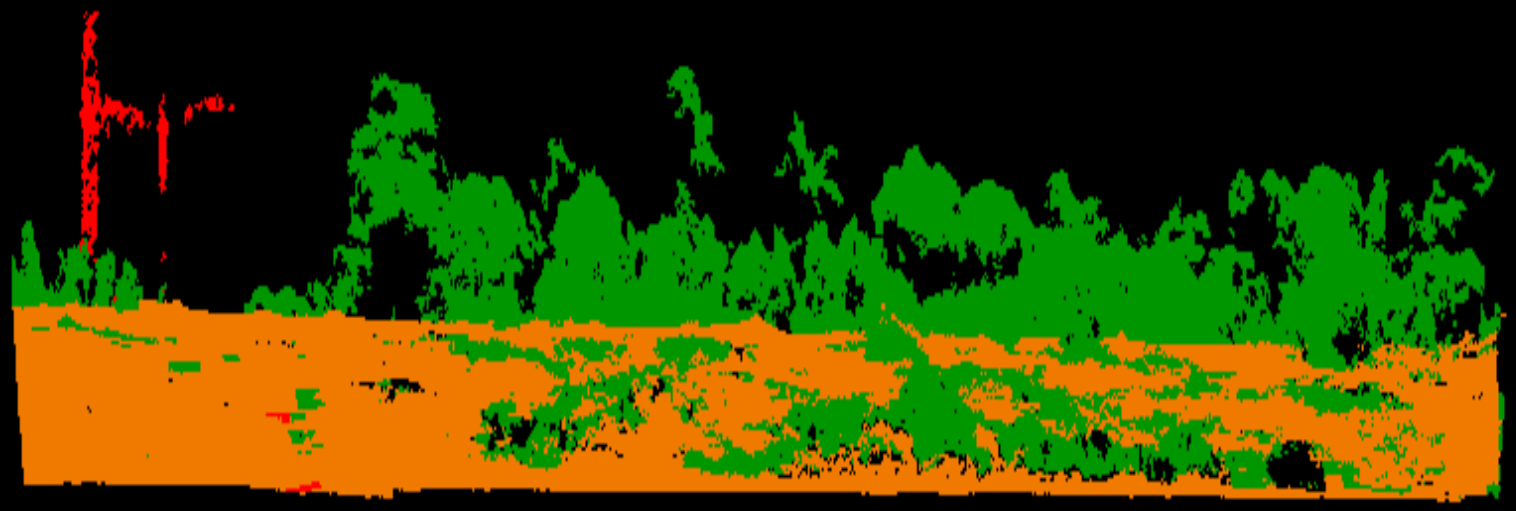
Classification



Relative matrix height



3-D visualization

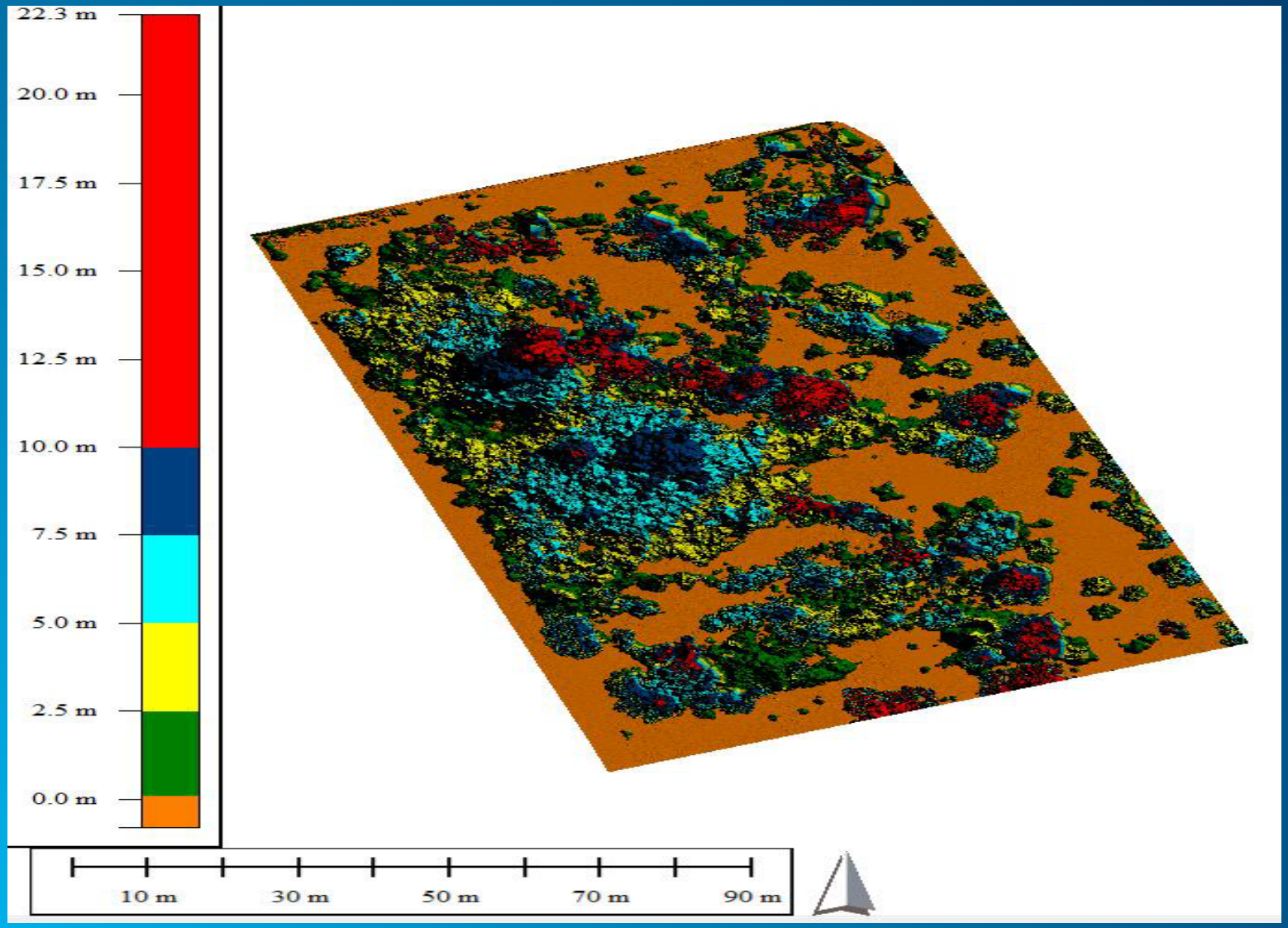


Ground

Vegetation

Power line

Vegetation Height Classification



Thank you

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