



AERIAL INSPECTION OF ENERGY INFRASTRUCTURE

Effective way to manage Power Lines
with improved speed, efficiency,
safety and systems for data
management

based on a UAVOS' real project

GOAL OF THE **PROJECT:**

■ **Transmission Wires & Tower Check**

Drones are being used in areas that are difficult to access for ground patrols

■ **Substation Maintenance & Inspection**

One of the most valuable things of drone-based inspections is the ability to inspect infrastructure without having to shut it down

■ **Storm Restoration**

Thanks to the drone-based capability to collect high resolution images, photogrammetric point clouds, thermal data, and LiDAR allowing to quickly and efficiently plan recovery measures

■ **Unauthorized objects and Vegetation**

Drones are able to make vegetation assessments in populated areas by avoiding traversing across private property or having to access right-of-way areas



UVH 170

a robust gasoline engine VTOL platform for beyond visual line-of-sight

MTOW: **45 kg**

Max payload: **15 kg**

Flight time: **5 hours (with 4 kg payload)**

Maximum speed: **120 m/sec**

Practical ceiling: **5,000 m**

Operational range: **350 km**

Temperature range: **-35°C...+40°C**



GSG 201

Gyro-stabilized 2-axis gimbal with a Day & Thermal camera and Laser Rangefinder

Day camera: **Global shutter 1920x1080**

IR camera: **LWIR 1024x768**

Laser Rangefinder: **0.1 m Resolution**

Weight: **3.5 kg**

Direct drive



- Insulator Overheating
- Wire Overheating
- Wire break
- Detection of unauthorized objects

Watch the [UVH-170](#) in action

UVH EL25

fully automatic drone with an electric motor

MTOW: **25 kg**

Max payload: **5 kg**

Flight time: **1.5 hours**

Maximum speed: **100 km/h**

Practical ceiling: **3,500 m**

Temperature range: **-20°C...+40°C**



Lidar

provides very high point densities, therefore generating a detailed image of the stand and crown structure as well as the ground surface structure

- can enable a recording density of at least 4 points/m²
- a georeferenced point cloud can be classified into surface points, vegetation points and building points



- Wire profiles
- Distance calculations
- Vegetation analysis
- Dangerous trees

Watch the [UVH-25EL](#) in action

Borey

the unique mobility of the system allows quick transportation and deployment in minutes

MTOW: **26 kg**

Max payload: **4 kg**

Flight time: **5 hours**

Maximum speed: **30 m/sec**

Practical ceiling: **3,500 m**

Operational range: **400 km**

Temperature range: **-20°C...+40°C**



Digital Camera

Max resolution: **8,000 x 6,000**

Effective pixels: **42 megapixels**

Sensor size: **Full frame (35.8 x 23.8 mm)**

Focal length (equiv.): **35 mm**



- Wire break
- Corridor inspection, detection of unauthorized objects
- Vegetation close to power lines
- Chipped or loose insulators
- Towers defects

Watch the [Borey](#) in action

AI-BASED DATA PROCESSING

High-end technologies have been employed to automate data analysis of power lines enabled to digitalize the whole grid infrastructure on a large scale

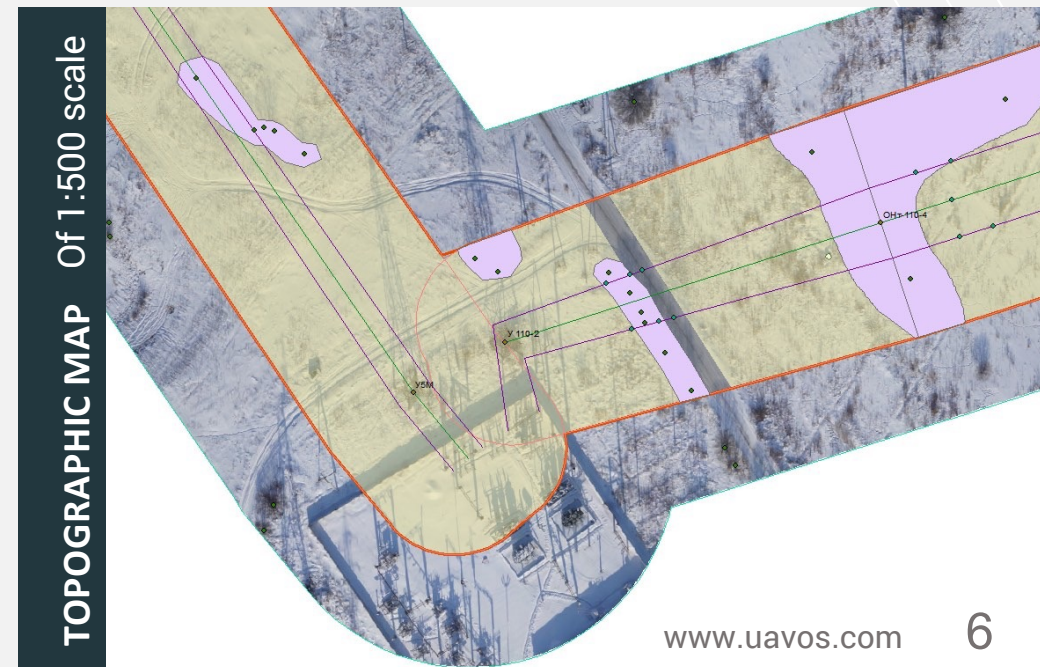
Proprietary Software speeds up the analysis process and reduces the analysis costs

Digitalization of the whole grid infrastructure on a large scale includes:

- Digital Twin for Maintenance
- Big data platform processing
- Digital Twin for Maintenance
- Artificial neural networks (ANNs): classification, object detection, and image segmentation

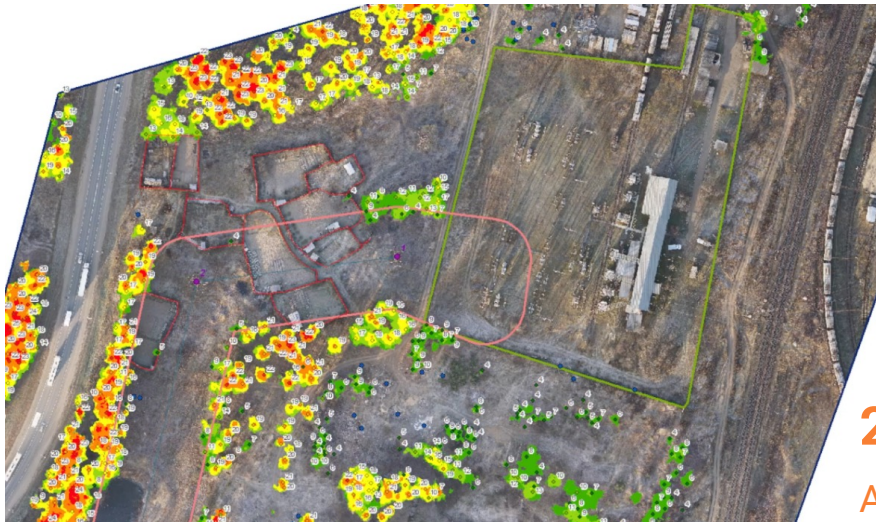
Topographic Maps

Images and LiDAR data at a high level of precision and in great detail allow creating accurate 3D site maps, including contours and terrain at a fraction of the time and cost of traditional survey methods



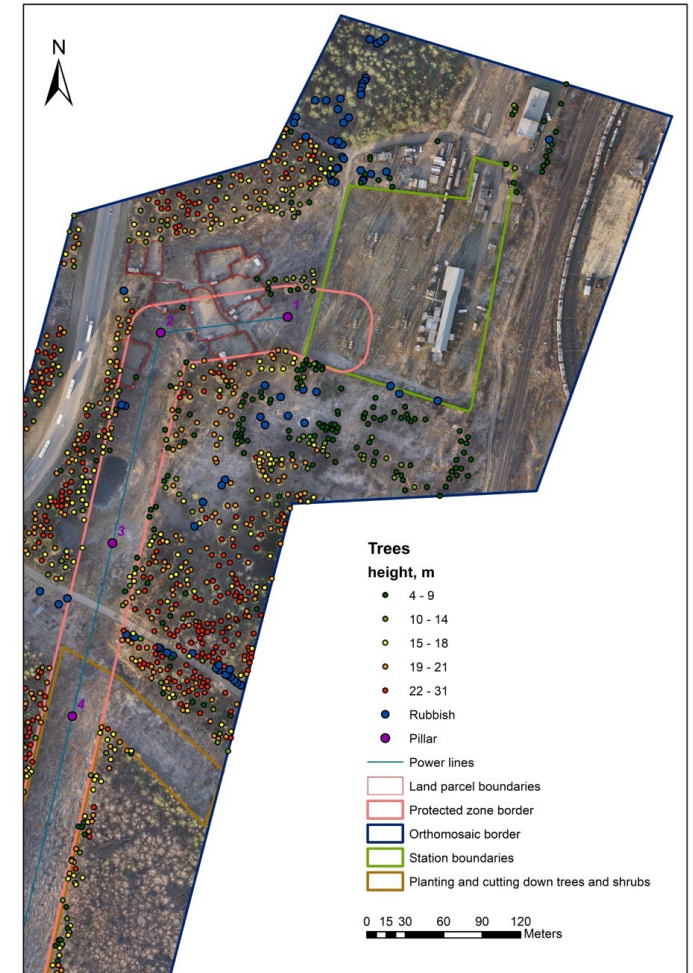
ORTHOMOSAIC IMAGES

provides accurate measurements such as horizontal distances and surfaces



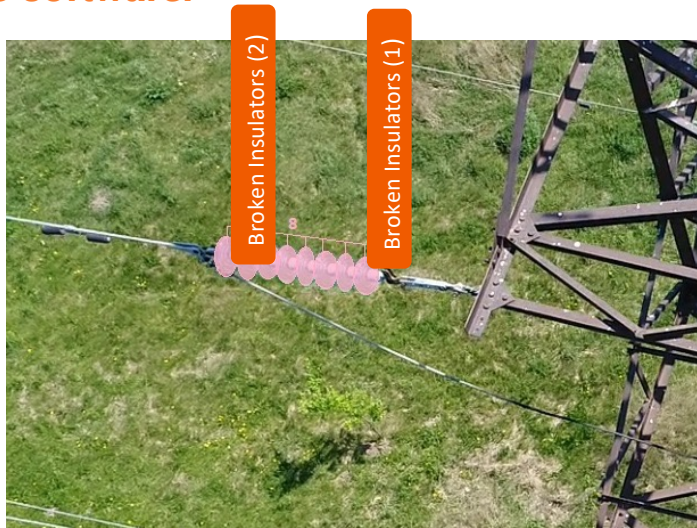
2 cm/pixel
Accuracy up to 5 cm

- High-definition images
- Data visualization through a Geographic Information System (GIS)
- Drone images are corrected for image distortion and stitched together during post-processing to create a highly-accurate orthomosaic



GIS data records and digital terrain models for use in Energy video

Following drone inspection, our client will be provided with a detailed report and GEO tagged images for use in GIS software:



- High-definition RGB images and video
- GEO tagged images for use in GIS software
- Orthomosaic images for large areas for import into GIS
- Digital surface model (DSM), digital terrain model (DTM) or DEM files
- Highly-accurate 3D spatial data
- Digital Twin

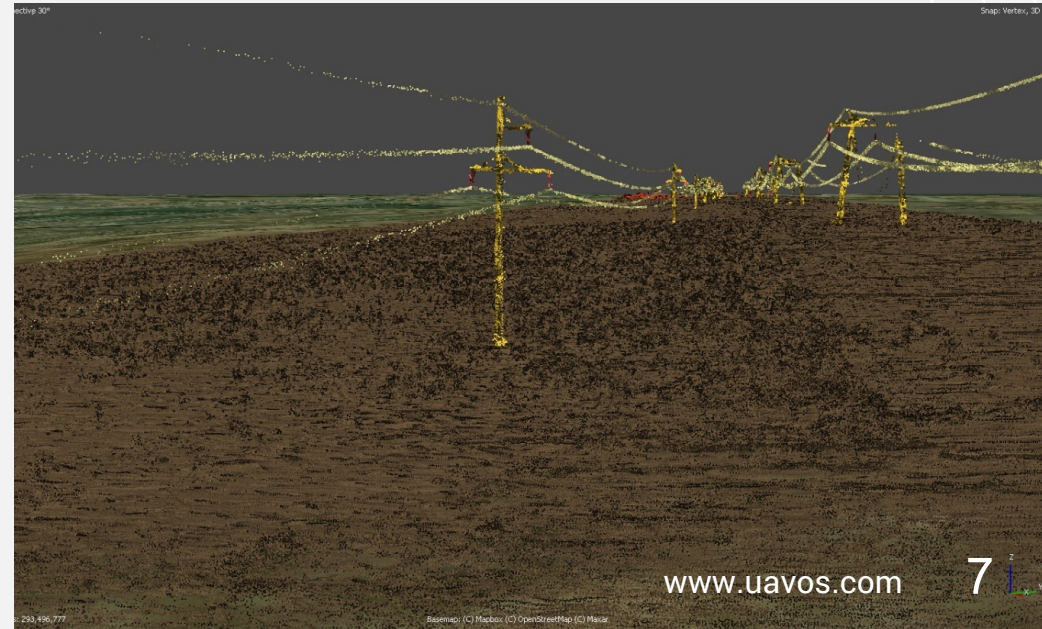
DATA PROCESSING

3D LIDAR Point Cloud

provides a very accurate model for distance (slant and horizontal), area and volume measurements

A densified point cloud is generated from drone images. Each point contains geospatial and color information

Point density up to **400+pts/m**



RESULTS FOR THE ENERGY COMPANY:

Over 2300 km flights of BVLOS have been carried out

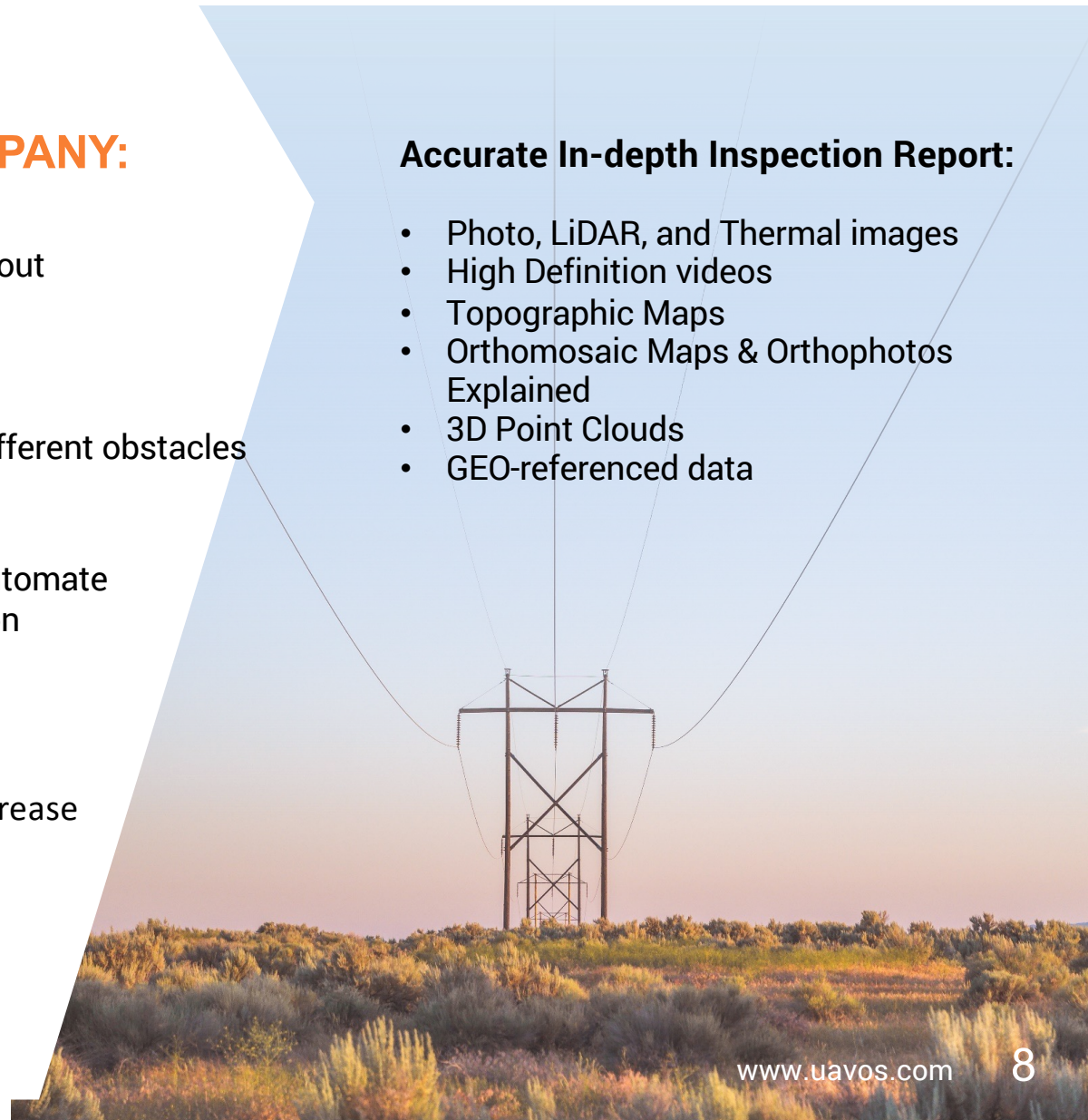
The project was done in a hard-to-reach area, where the landscape often changes and offers different obstacles

High-end technologies have been employed to automate data analysis of power lines enabling digitalization of the whole grid infrastructure

Automation of data processing is supposed to increase analysis of the data collected from 30% to 90%

Accurate In-depth Inspection Report:

- Photo, LiDAR, and Thermal images
- High Definition videos
- Topographic Maps
- Orthomosaic Maps & Orthophotos Explained
- 3D Point Clouds
- GEO-referenced data



WHY CHOOSE UAVOS ?

UAVOS team of pilots, mapping professionals, and GIS experts provide the highest quality service maximizing clients' benefits:

- Highly experienced in government projects support
- Drone pilots are UAS BVLOS certified
- Both hardware and software are developed and manufactured in-house
- Financially solid with investment backing



THANK YOU

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