



YellowScan



Construction and engineering

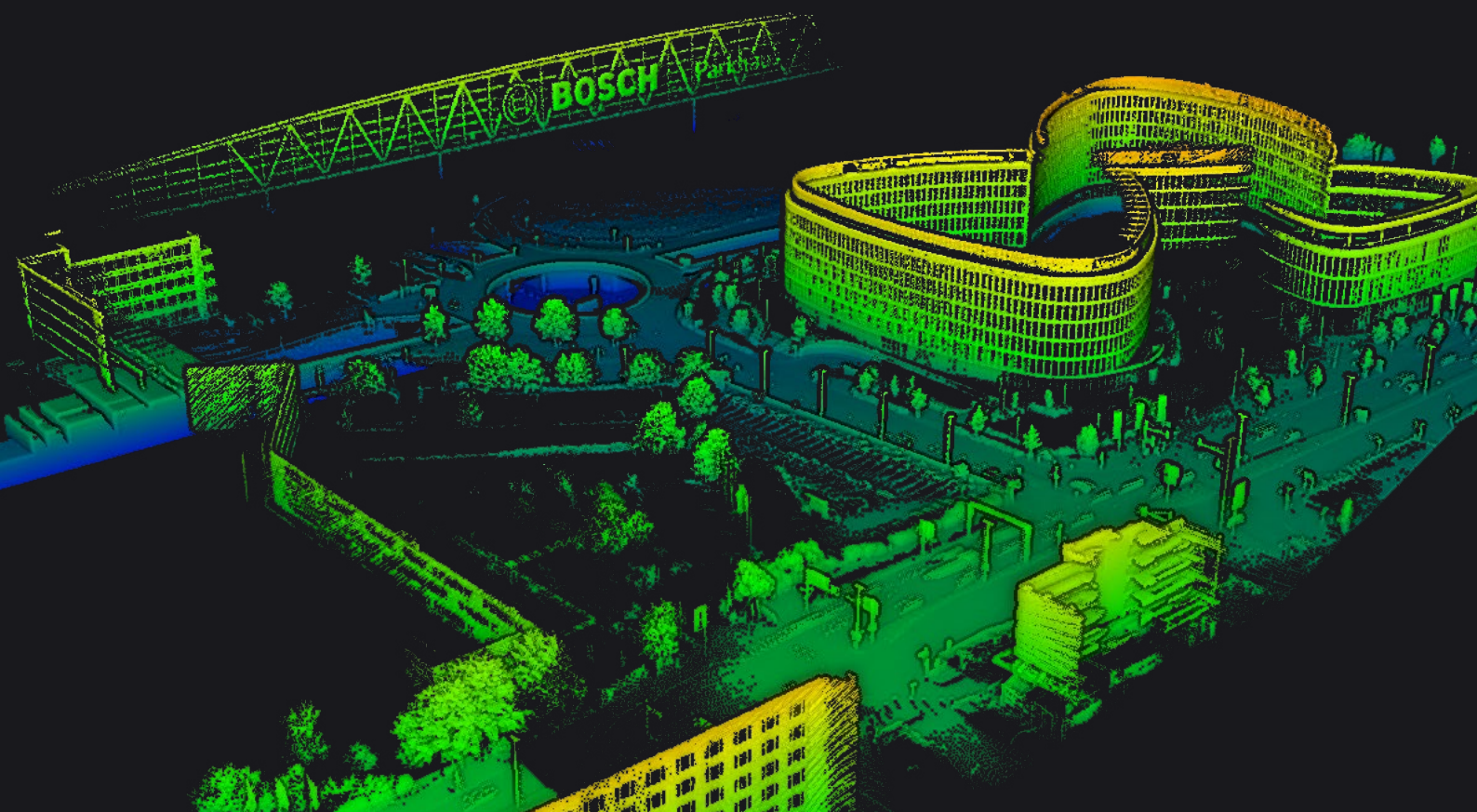
# Success Stories Catalog.

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Welcome to our LiDAR Success Stories Catalog for construction and engineering, where we showcase real-world examples of how LiDAR technology has been applied to solve a wide range of challenges in the construction and engineering industry. Through these success stories, we aim to show the versatility and effectiveness of LiDAR solutions in addressing complex problems faced by managers and stakeholders.

Each success story in this catalog provides a detailed analysis of a specific project, outlining the challenges faced, the methodology used, and the results achieved. Our aim is to highlight the potential of LiDAR technology as a powerful tool for data collection, analysis, and decision-making in management and operations.

We invite you to explore our catalog and discover the power of LiDAR technology.



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**YellowScan**

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## SUCCESS STORY

# Acquiring ground topography data efficiently with LiDAR & heavy-lift UAS

CONSTRUCTION & ENGINEERING

In recent years, advancements in unmanned aerial vehicle (UAV) technology have enabled the collection of accurate and rapid data for various applications.

One such application is ground topography determination, crucial for a range of fields such as agriculture, urban planning, and environmental monitoring. This case study presents the utilization of the YellowScan Vx20-300 sensor on the IF1200A UAV to obtain ground topography data over a specific area.

## Challenge.

Accurate ground topography data is essential for understanding terrain variations, water flow patterns, and landscape characteristics. Traditional ground survey methods can be time-consuming and may not cover large or inaccessible areas effectively.

The challenge was to acquire high-resolution ground topography data swiftly and accurately, enabling efficient decision-making for various applications.



INTEGRATION  
IF1200A



SOLUTION  
Vx20-300



*The YellowScan CloudStation software they provided was also very intuitive to use and made post-processing the data a breeze to get maximum value out of the point cloud models.*

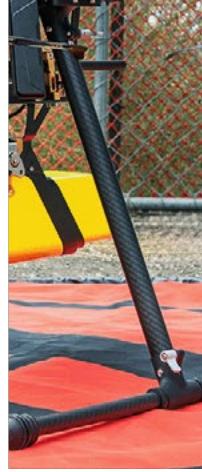
Casey Viera  
Operations Fleet Manager  
Inspired Flight

 INSPIRED FLIGHT

Company: Inspired Flight

Website: [www.inspiredflight.com](http://www.inspiredflight.com)

Country: United-States



## SUCCESS STORY

# Solution

Want to learn more about the YellowScan Vx20 LiDAR solution?

Scan this QR CODE



The Vx20-300 LiDAR solution was mounted on the IF1200A UAV for data acquisition. The UAV was programmed to fly at a velocity of 5 m/s and a height of 85 m, covering a designated area of 45,000 m<sup>2</sup>.

The sensor's capabilities allowed for efficient data collection while minimizing flight time, which was essential to cover a substantial area within the 10-minute flight time.



*YellowScan Vx20-300 mounted on the IF1200A*

## Results.

The mission yielded highly successful results:

- **Swift Data Collection:** The entire process, from trajectory refinement to ground classification, was completed in less than 30 minutes, thanks to the efficiency of the UAV and LiDAR system.
- **Accurate Ground Topography:** The Vx20-300 sensor demonstrated excellent vegetation penetration capabilities, providing clear data on ground topography. This allowed for the creation of accurate DTMs, DSMs, and DHMs.
- **Quick Data Processing:** The collected data was processed efficiently due to the use of rapid ground classification techniques. This enabled the generation of relevant models for analysis.

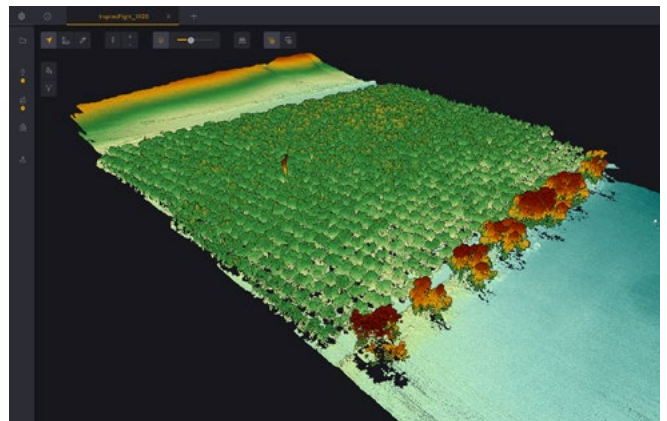
- **Real-world Applicability:** The obtained ground topography data proved valuable for various applications, including urban planning, hydrological modeling, and landscape assessment.

In conclusion, the deployment of the YellowScan Vx20-300 LiDAR solution on the IF1200A UAV showcased the effectiveness of modern UAV technology in obtaining accurate and rapid ground topography data.

The combination of quick data acquisition, sensor capabilities, and processing techniques highlights the potential for UAVs to revolutionize traditional survey methods in various industries.

## Mission Parameters.

- **Flight Velocity:** 5 m/s
- **Flight Height:** 85 m
- **Flight Time:** 10 minutes
- **Survey Area:** 45,000 m<sup>2</sup>
- **Data Collection Process:** Trajectory refinement, point cloud generation, strip adjustment, ground classification



*LiDAR point cloud of vegetation*



**YellowScan**

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SUCCESS STORY

# Risk assessment of rockfall hazards on road networks

ENVIRONMENTAL RESEARCH

CONSTRUCTION & ENGINEERING

## Business challenge.

L'Avion Jaune and Ginger CEBTP, a geotechnical study office, were mandated by the Departmental Council to conduct a risk assessment study of rockfall hazards on their road networks. The end goal was to implement the most suitable prevention measures to protect road users.

The natural degradation of limestone cliffs generates landslides and block falls that can mobilize large volumes of material and impact the road networks below.

The management of this risk was mainly based on trajectographic analysis, which consisted in simulating the fall of rock masses from the peaks to the bottom of the valley. The aim was to evaluate the level of risk incurred and to optimize the dimensioning and implementation of rockfall barriers.

To conduct this risk mitigation, a 3D model study of the cliffs overhanging a frequented road was essential. The site was 200 m (655 ft) high, 300 m (980 ft) wide and 2.5 km (1.5 mi) long.



INTEGRATION  
**DJI M600**



SOLUTION  
**Vx20-300**

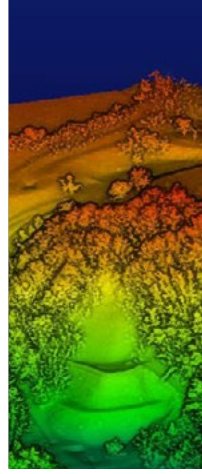
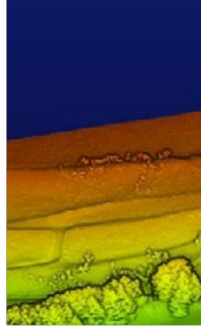


*To survey this type of environment, LiDAR for drone is the best tool: the time-saving and increased safety are considerable. Given the 5 echoes' capabilities of the Vx20-300, it can easily penetrate the vegetation to recover the ground and generate an accurate DTM, thus giving the geologists a new set of 3D maps for risk management and decision support.*

**Benjamin Pradel**  
Aerial Survey Project Manager  
L'Avion Jaune



**Company:** L'Avion Jaune  
**Website:** [www.lavionjaune.com](http://www.lavionjaune.com)  
**Country:** France



## SUCCESS STORY

# Solution

Want to learn more about the YellowScan Vx20 LiDAR solution?

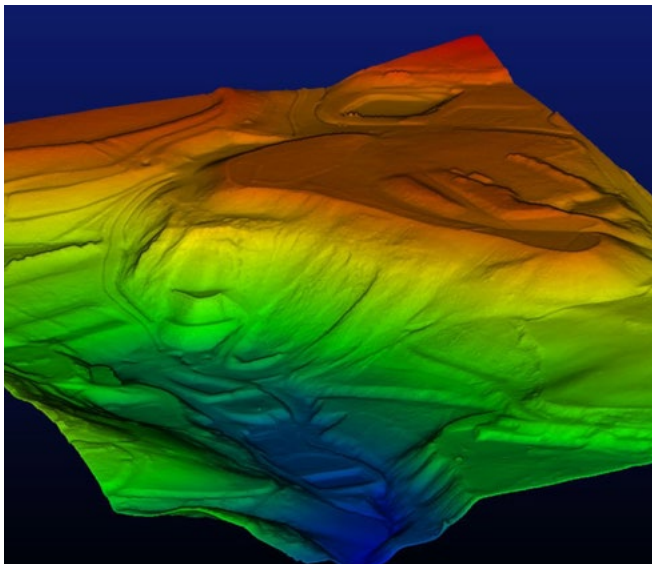
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### Acquisition.

The configuration and the dangerousness of the terrain did not allow for soil mapping under dense vegetation with traditional methods.

Therefore, L'Avion Jaune used their YellowScan Vx20-300 to survey the cliffs and extract a Digital Terrain Model (DTM), after classification and filtering of the laser data.



*Digital Terrain Model of the area*

### Results.

The flexibility of the means used by L'Avion Jaune enabled the acquisition of a dense point cloud and the creation of an accurate and exhaustive DTM in less than 3 days.

- Point density: 100 pts/m<sup>2</sup> (10 pts/sqft)
- Precision X, Y, Z: 5cm (2 in)
- Benefits: Access to dangerous areas, mapping of the ground, under the vegetation, fast deployment

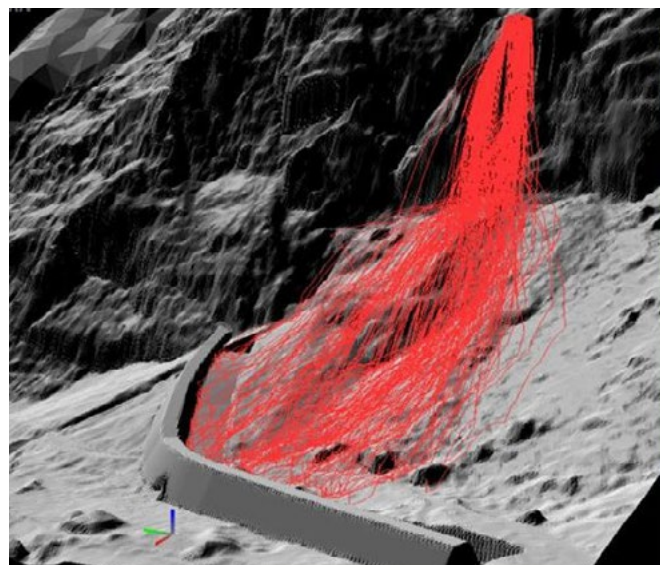
### Mission parameters.

Four flights of fifteen minutes each were necessary to map the whole site.

This operation was carried out at sunrise when the roads were less frequented. Near the road, they surveyed control points with a differential GPS (DGPS).

The data processing took about two days (correction of the trajectory, matching of the flight lines, classification of the point cloud).

- Number of flights: 4
- Surface area: 75 hectares (185 acres)
- Total duration of the operation: 6 hours (flights, quality control, DGPS point taking)
- Flight speed: 5 m/s (11 mph)
- Flight height: 60m (200 ft)
- Equipment used: YellowScan Vx20-300



*Landslides and block falls trajectory*





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SUCCESS STORY

# Building the digital twin of the Chain Bridge in Budapest

CONSTRUCTION & ENGINEERING



INTEGRATION  
DJI M600



SOLUTION  
Surveyor

Discontinued first generation.  
New generation now available!

## Business need.

How did data captured by drones help create a digital twin of the Széchenyi Chain Bridge?

This project, led by our customer Ventus-Tech in Hungary, aimed to establish a baseline and record the status of the bridge before its restoration started. The scan of the present state of the bridge will serve as a baseline to compare its status after the restoration is done, where a final scan will be performed.

Ventus-Tech's main goal was to showcase the capabilities of state-of-the-art sensors and post-processing solutions, to help the workflow of construction companies, and to raise awareness related of BIM-solutions.

They wanted to meet the requirements of the modern age and create a solution that could be integrated into BIM systems, by taking up this opportunity to work on the Chain Bridge, which is a national symbol of innovation in Hungary.

“

*The value of a digital twin cannot be connected to a single stage of construction, it can be utilized at pricing, design, construction and even at operation stages. Thanks to the YellowScan Surveyor, we were able to successfully complete this project!*

Balint Vanek  
Chief Technology Officer  
Ventus-Tech

**VENTUS**  **TECH**

Company: Ventus-Tech Ltd.  
Website: [www.ventustech.hu](http://www.ventustech.hu)  
Country: Hungary



## SUCCESS STORY

# Solution

Want to learn more about the new generation Surveyor Ultra LiDAR solution?

Scan this QR CODE



## Challenge.

In order to survey all parts of the bridge, various sensors and unmanned vehicles were needed. A rotary wing drone with an RGB camera was used to take top and side views using RTK GPS, and a LiDAR sensor, the YellowScan Surveyor, was mounted on a drone to map the bridge. A static ground laser scanner and a robotic boat were also used to take RGB camera images of the bridge's underside, as well as a multibeam sonar to scan the riverbed to remove bombs and debris.

Flying legally in the heart of the city center was no easy task. Ventus-Tech had to get special permission from the aviation authorities. The decision stated that the Carmelite Monastery (Prime Minister's Office) and the Sandor Palace (President's Office) had to be kept at a safe distance of 150m. They were also not allowed to fly over the Ministry of Interior. With this information in mind, they planned their flight route and complied with the city's request.

## Solution.

The use of a LiDAR system was essential to carry out this task, Ventus-Tech therefore chose the YellowScan Surveyor. This system was ideal for this project due to its versatility, ease of use, and 360 degrees laser scanner. It is also ideally suited for urban surveys subject to strict flying regulations requiring extra-lightweight payloads.



*YellowScan Surveyor mounted on a DJI M600*

## Mission parameters.

- **Survey size:** 60m x 420m
- **Duration:** 30 days flight permit, 2 days for the flights (LiDAR, photogrammetry), 1 day for the boat, 1 day for the sonar, 16 days vectorization and post-processing
- **Number of flights:** 3 (1 LiDAR / 2 Photogrammetry)
- **Flight speed & altitude:** 4 m/s, 40m above the road surface, 55m above the water
- **Equipment:** DJI M600 Pro, YS Surveyor, RGB Sony a6400 camera with Zeiss Ventum 21mm lenses and a static laser scanner
- **Main target:** the bridge itself (60m high by 40m long)



*LiDAR pointcloud of the Chain Bridge*

## Results.

The point density was 100points/m<sup>2</sup> and the accuracy was under 5cm, which gave Ventus-Tech a complete pointcloud with a high level of detail. Some parts of the structure, where aerial scans were not possible, were augmented with TLS scans, and the photogrammetry pointcloud was adjusted based on the ALS results.

Ventus-Tech indicated that the data quality obtained was excellent and that they have now developed a workflow to seamlessly combine data from different sources.



**YellowScan**

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## SUCCESS STORY

# Using LiDAR technology to produce precise topographic data of an amusement park

CONSTRUCTION & ENGINEERING

MEDIA & ENTERTAINMENT

Drone Expertise Centre's client, the Parc Asterix\*, in France, had an objective to produce very precise and complete topographic data on the whole of the amusement park and its surroundings.

This mission was done as part of an impact study for a future project where it was essential to have highly resolution and accurate data without having to enter the area.

## Business challenge.

The Parc Asterix is bordered by forest classified as a Natura 2000 zone and is forbidden to pedestrians, therefore using an aerial LiDAR solution was essential.

In addition, the unexpected presence of a construction crane forced them to review their flight plans and to increase the flight height. The objective was to create a DWG plan with contour lines every 25cm.

\* The Parc Astérix is a theme park in France based on the comic book series. It is France's second largest theme park.



INTEGRATION  
DJI M300



SOLUTION  
Mapper



*We are very satisfied with the YellowScan Mapper solution. Long skeptical, we were convinced during a Demo Day in January 2021 held in Montpellier by YellowScan. Our customers are also satisfied with the deliverables we produce from our data processing. Transforming a complete data acquisition (produced by the Mapper) into a high added value deliverable has now become our strength.*

Paul Vandemeulebrouck  
Director  
Drone Expertise Centre



Company: Drone Expertise Centre  
Website: [drone-expertise-centre.com](https://drone-expertise-centre.com)  
Country: France



## SUCCESS STORY

# Solution

Want to learn more about the YellowScan Mapper LiDAR solution?

Scan this QR CODE



## Acquisition.

YellowScan Mapper was the only possible solution to get topographic data of the area as it is a purely aerial LiDAR solution that is ideally flown at 70m above ground level. It uses Livox's Horizon laser scanner and is designed to fit most professional drones and comes with an integrated camera module.



*YellowScan Mapper mounted on a DJI M300 RTK*

The YellowScan Mapper is ideal for general topography projects and is particularly suited for archaeology, forestry and post-disaster missions.

The Mapper seamlessly integrates with YellowScan's portfolio of software solutions, CloudStation and LiveStation, making it easy to remotely check data while the system is flying, and comprehensively post-process, visualize and export survey data.

## Mission parameters.

- **Survey size:** 160 ha
- **Number of flights:** 8 (2 days of flight)
- **Flight altitude:** 50m AGL (using DJI M300 RTK)
- **Acquisition:** 2 days for planning, 1.5 day for LiDAR acquisition and orthophoto, 5 days for processing

## Results.

The Mapper solution provided excellent point density with 60 Gb of data collected allowing to achieve the 25cm-interval for the contour lines. To verify their results, Drone Expertise Centre used their own GCPs (9) and the client's GCPs (38) which were done in 2018 and checked in 2020 by a land surveyor.

Drone Expertise Centre wanted to do fairly extensive quality control and took advantage of the client's GCPs that were already positioned on the park's grounds. However, the area needing to be surveyed by went a little further North and South, which is why Drone Expertise Centre decided to add another 9 GCPs.

These 47 GCPs were only used for controlling the validity of the final point cloud and not as tie points for strip adjustment processing.

### Results obtained with GCPs:

- 86% (33/38) have an accuracy better than 5cm
- 60% (28/47) have an accuracy better than 3cm
- and 31% even have an accuracy better than 1cm



*Colorized LiDAR pointcloud of the Parc Asterix*



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## SUCCESS STORY

# Overcoming geotechnical engineering challenges with LiDAR for road monitoring

ROAD & RAILWAY

CONSTRUCTION & ENGINEERING

## Business need.

Diospatial's client is responsible for managing geotechnical risks along a 170km long rural road which travels through remote and rugged terrain and is prone to landslides and rock fall. The client conducts routine inspections and geotechnical risk assessments as part of their geotechnical management plan.

However, the rugged nature of the area - dense vegetation and large sandstone escarpments - limits the ability to use conventional inspection methods. Only the slope areas immediately adjacent to the roadway were assessed, leaving the majority of the slope largely unassessed and the risk profile uncertain.

## Solution.

The YellowScan Surveyor was utilised to survey the slopes on both sides of the valley from creek to crest. In four days, an area of 400ha of mountainous terrain was covered, exceeding 250m of vertical relief in some places.



INTEGRATION  
DJI M600



SOLUTION  
Surveyor

Discontinued first generation.  
New generation now available!

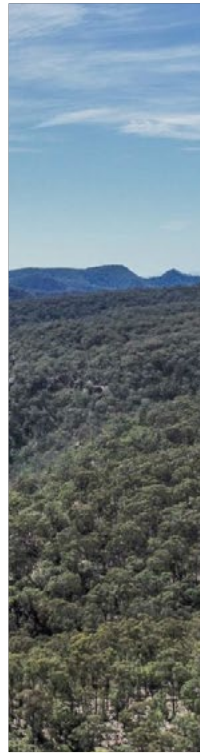
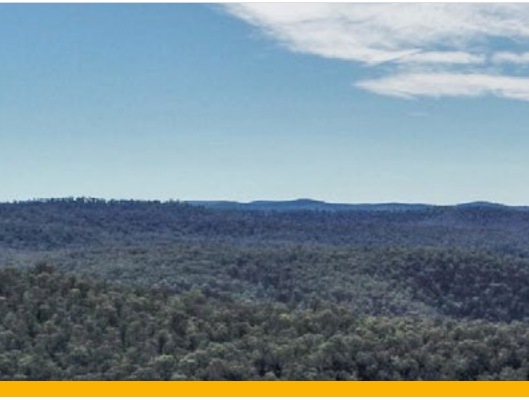


*Flying low and slow with the surveyor and processing with high scan angles achieved more than 400 points/m<sup>2</sup> – providing incredible detail of surface topography including cliff faces, inside caves and beneath overhangs.*

**Zack Wasson**  
CEO and Founder  
Diospatial



Company: Diospatial  
Website: [www.diospatial.com](http://www.diospatial.com)  
Country: Australia

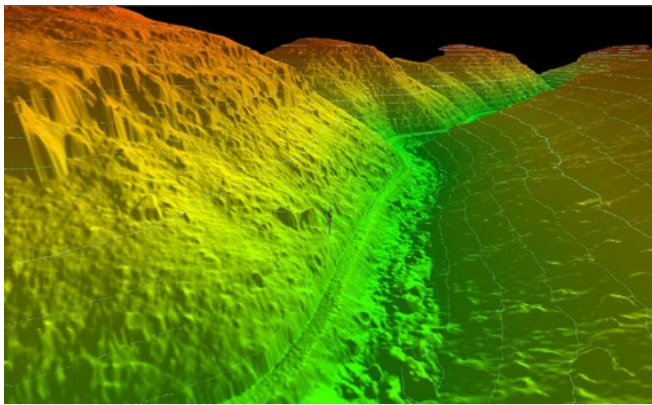


## SUCCESS STORY

# Solution

## Acquisition.

4 days operating along 5km of road length and capturing an 800m corridor width with up to 250m of vertical relief. Pre-programmed flights were optimised to increase point density and data capture along cliff faces and within caves.



*Digital Terrain Model of the area (DTM)*

## Mission parameters.

- Number of flights: 27
- Survey size: 400ha
- Flight speed: 4m/s
- Flight altitude: 50m AGL

## Results.

The high-resolution LiDAR point cloud was then classified for ground points with extensive manual refinement to ensure that boulders, erosion gullies and other geological features were retained in the ground classification and evident in the resulting digital terrain model (DTM).

The resulting deliverables provided geotechnical engineers with a high-fidelity DTM for use in rockfall modelling as well as identifying the location and extent of boulders, landslide debris, erosion gullies and overhanging rock formations - essentially providing a heatmap of potential rockfall sources throughout the assessment area.

The data reduced uncertainty and improved the geotechnical engineer's confidence in the risk profile enabling and optimised decision making.

## Benefits.

- High density data
- Detailed DTM beneath dense vegetation
- 50mm RMSE
- Variable scan angle to optimise point density in caves and steep terrain

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## SUCCESS STORY

# LiDAR remaps Diamond Vista Wind Farm in Tornado Alley : Saves \$1M

CONSTRUCTION & ENGINEERING

ENERGY & UTILITIES

## Business need.

Juniper's client was an Engineering Procurement Construction (EPC) contractor with a subcontract to create the Diamond Vista Wind Farm at an estimated cost of U.S. \$400 million. The EPC expected to set up 92 wind turbine pad sites across 345 km of access roads over a 62 km area.

However, initial land surveys proved inaccurate, construction could not continue using existing DTM data. Traditional surveys would have incurred extremely expensive delays with heavy machinery sitting idle and possible late delivery penalties.

## Solution.

The Surveyor was able to remap over 8,800 hectares in just three days of collection, as opposed to traditional surveying methods that would have cost delays of up to six weeks. Because of the quality of the resulting digital terrain surface captured by the YellowScan Surveyor, the client saved an estimated one million dollars in additional earth-moving costs.



INTEGRATION  
DJI M600



SOLUTION  
Surveyor

Discontinued first generation.  
New generation now available!



*With a traditional survey you might get a data point every 50 feet. With our YellowScan Surveyor we were able to deliver between 40 to 45 points per square meter—incredibly accurate data for our client.*

**Brian Soliday**  
Chief Revenue Officer  
Juniper



Company: Juniper Unmanned  
Website: [juniperunmanned.com](http://juniperunmanned.com)  
Country: Texas, USA

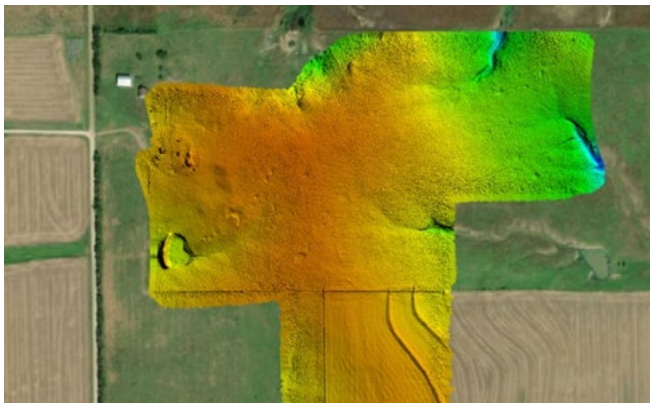


## SUCCESS STORY

# Results

3 days of data processing delivered all survey data and value-added products:

Digital Terrain Models (DTMs) in .XML format, 1 foot Contours, Cut-and-Fill Reports for each pad/road and GPS Machine Control Files.



*Bare earth Digital Terrain Model (DTM)*

## Mission parameters.

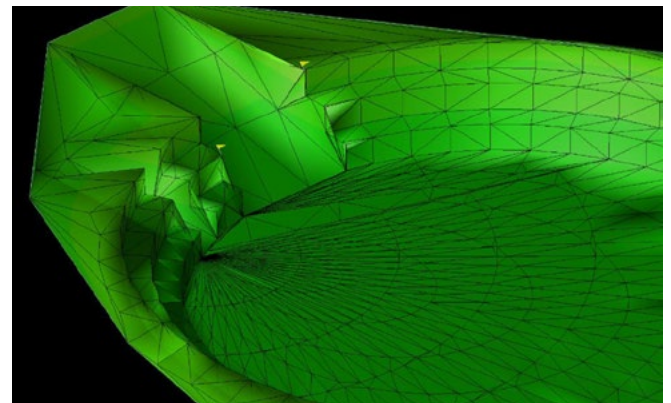
- **Number of flights:** Confidential
- **Survey size:** 8800 hectares
- **Swath:** 76 m
- **Flight altitude:** 50 m

## Acquisition.

3 days operating on-site across a 62 sq km geographic area with pre-programmed drone missions capturing a 76 meter swath of LiDAR. Accurate data acquired in winds under 32 kph, overcoming challenging site access logistics.

## Benefits.

- High density data
- Fast data turnaround
- Access to difficult areas
- 40-45 points per m<sup>2</sup>
- Rapid deployment
- Maximum efficiency



*Machine Control Model*

Want to learn more about the new generation Surveyor Ultra LiDAR solution?  
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## SUCCESS STORY

# Highway Infrastructure LiDAR mapping survey

ROAD & RAILWAY

CONSTRUCTION & ENGINEERING



INTEGRATION  
DJI M600



SOLUTION  
Surveyor

Discontinued first generation.  
New generation now available!

## Business need.

We needed to capture raw data for complete geographical surveys of linear infrastructure in a safe and efficient way. The goal is to capture the present geographical state of a 47 km long highway segment with its supporting infrastructure (one of the busiest roads in Central Europe) to start designing the extension of the road from 2+2 lanes to 3+3 lanes.

The road should not be closed during the survey. The survey had to be done in the shortest time and document the present state in the highest detail, in case something has to be measured in the future. The engineering design of the road will be based on the data.

Finish the survey with the least interruption to traffic, in a shortest amount of time and document the present state in the highest detail, in case something has to be measured in the future.

## Acquisition.

Our lightweight UAV Lidar, YellowScan Surveyor, enabled quick and easy collection of detailed data about topography of the surveyed area.



*Customer support of YellowScan was incredibly good, they provided extremely valuable support to set up such a complex and large project.*

**Balint Vanek**  
Chief Technology Officer  
Ventus-Tech

**VENTUS**  **TECH**

Company: Ventus-Tech Ltd.  
Website: [www.ventus-tech.hu](http://www.ventus-tech.hu)  
Country: Hungary



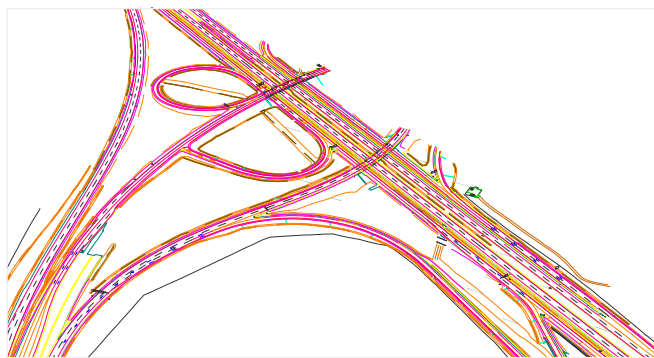
## SUCCESS STORY

# Solution

« We aimed for 100 points/m<sup>2</sup> (10 pts/ft<sup>2</sup>), ideally >10 point/m<sup>2</sup> from the ground, ditches on the sides of the road are very important for drainage, where significant vegetation is present. We had to prove < 5cm (2") absolute accuracy due to volume of Earthworks. Vectorization of present state is done using the combination of LIDAR and photogrammetric survey. The technology is developed by MindiGIS, partner in the project. »

## Benefits.

The Yellowscan Surveyor is truly a turnkey solution for such an advanced application. In case manual survey has to be done, the surveyors have to work during partial road closure, which is dangerous and costly. Due to the great amount of detail we can add items to the survey list in the office without going back to the field.



Road with surrounding infrastructure and terrain: geodesy for road reconstruction and extension

Want to learn more about the new generation Surveyor Ultra LiDAR solution?  
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YellowScan Surveyor, LiveStation and RGB camera on a M600 from DJI

## Mission parameters.

- Number of flights: 88
- Survey Size: 47 km length (155 000 ft)
- Flight speed: 5 m/s
- Flight altitude: 40 m
- Software: UGCS, Pix4D, Yellowscan QGIS module, TopoDOT
- Duration: 1 month
- Add-on: Leica GNSS base station



Designed to innovate.

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