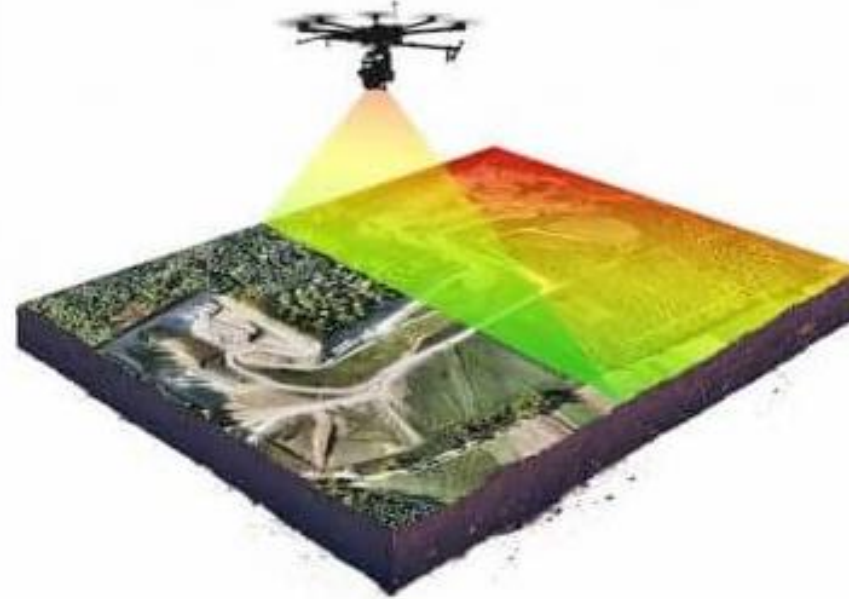




INVITE

Drones For Industrial Use

Commercial drones are being used to help companies save money, improve safety, and enhance the efficiency of their operations.



Overview

Discover innovative ways drones are being employed for industrial purposes generating large-scale surveys with unmatched data quality at a fraction of the time and cost.

Leverage drone's full potential

As the drone industry developed rapidly over the last several years, the commercial use of drones has grown exponentially in various industries, and the cameras that come with them have continued to improve as well.

Types of data collected by drones

Drones act as an important tool for gathering data remotely. In inspection situations, employing a drone to get data instead of a person can make a big impact on safety as it decreases the exposure of staff to potentially dangerous scenarios, such as climbing a cell tower or walking along scaffolding inside a large tank to get visual data.



Visual data

By flying over an area or object of interest, a drone can be employed to get visuals of things that might not be otherwise visible and generate a record of what is seen.



Thermal data

Aerial thermal data can support firefighters discover where to focus their efforts during an active fire or assist inspectors in distinguishing possible problem areas in a solar array.



LiDAR data

A LiDAR sensor illuminates a target with laser light and then measures the reflection to create data points that can be used to map the area create 3D maps of an area, which can be used for project planning or progress tracking.



Multispectral data

Aerial multispectral data can be used in agriculture and conservation to monitor plant and tree health, and it's also being used by law enforcement to help find human remains.



Hyperspectral data

Aerial hyperspectral data can be used in agriculture for monitoring the health of crops, or in defense or security for detecting the presence of those who shouldn't be in each area.

Use Of Drones In Agriculture

Agricultural drones render growers, service providers, and ag researchers a fast and efficient way to scout their crops, identify stress, create treatment plans, track plant growth, and much more.



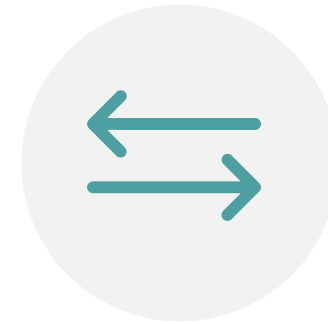
Scout your fields faster

Drones provide an instant snap of a field in no-time compared to on foot scouting. Cover hundreds of hectares with one flight, gaining data that helps distinguish variability and areas of crop stress.



Obtain precise data

Drones' data can direct you to the right places to sample, then use data to generate prescription maps and plans, adjusting treatments more efficiently and reducing costs.



Efficiently track changes

Track how crops are progressing from emergence through harvest. Accurately monitor fields for phenotyping and other research applications. Periodic capture of calibrated data from professional multispectral sensors.

Drones – Agriculture Use Cases



Crop scouting

A quality drone and multispectral camera system can detect disease and stress early (sometimes before it is visible from the ground or with standard color cameras). Use this information, coupled with proven agronomic methods, to focus your treatment plans.



Prescription maps and treatment plans

Multispectral data is a key tool that, when combined with other established agronomic methods, enables prescription maps for treatments (fertilizer, herbicide), reducing costs and improving efficiency.



Irrigation monitoring and planning

Use drone maps, digital surface models, and terrain models for irrigation and drainage management. Multispectral data can also help identify leaky irrigation pipes or areas that need more water.



Drones – Agriculture Use Cases

Precision phenotyping



Quickly and effectively measure and track performance in small test plots. Calibrated data that accounts for changing lighting conditions allows you to track trends over time.

Crop damage assessment and documentation



Drone data provides critical information for measuring and documenting damage to crops caused by floods, fire, pests, weather events, etc. These reports can complement and reinforce insurance claims.

Plant counting and crop emergence



High-resolution cameras on drones and plant-counting algorithms can accurately and efficiently provide inventory information, track crop emergence, drive replanting decisions and help predict yield.



Commercial Drone Deliverables

The truth is that simply sharing a folder that contains a huge amount of data will not be very helpful for most people. What they need is for that raw data to be converted into actual deliverables, which can then be used for a variety of purposes.



Photos and videos

These might be for professional photography/videography purposes (such as weddings or family photo shoots), aerial shots of real estate to help market it, or even high-end cinematography for work in filmmaking.



3D Maps

Across various industries 3D maps are becoming a common deliverable for drone data, helping people to better visualize the spaces in which they're working.



Orthomosaics

Orthomosaics are used in construction to visualize building sites, in public safety to record the details of places where large groups of people commonly gather, or in civil engineering to track the progress of a large project, such as restoring part of a beach.



Actionable reports

In some industries a deliverable produced from drone data could include a report generated by industry-specific software like Pix4Dfields, which allows users to produce agricultural indices to better understand plant stress as well as aggregating vegetation index maps into zones.

Commercial Drones – Data Outputs

Here are some of the most common data outputs generated by drones:



RGB color orthomosaic

Color orthomosaic provides context for interpretation of multispectral data. A color orthomosaic map is often the first step in scouting. Interpretation is intuitive and can be used to easily detect gaps in the crop and find areas of visible stress while visualizing maturity and growth stages.



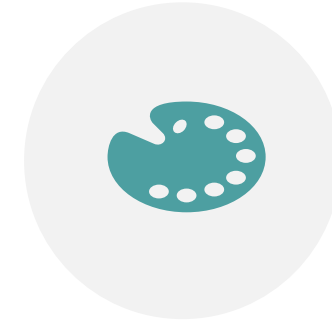
Vegetation index maps

Multispectral data outputs in the form of vegetation index maps can help identify problems in a field. Vegetation indices such as normalized difference vegetation index, normalized difference red edge, chlorophyll-based indices, and other indices can be used to detect and quantify variability in the field.



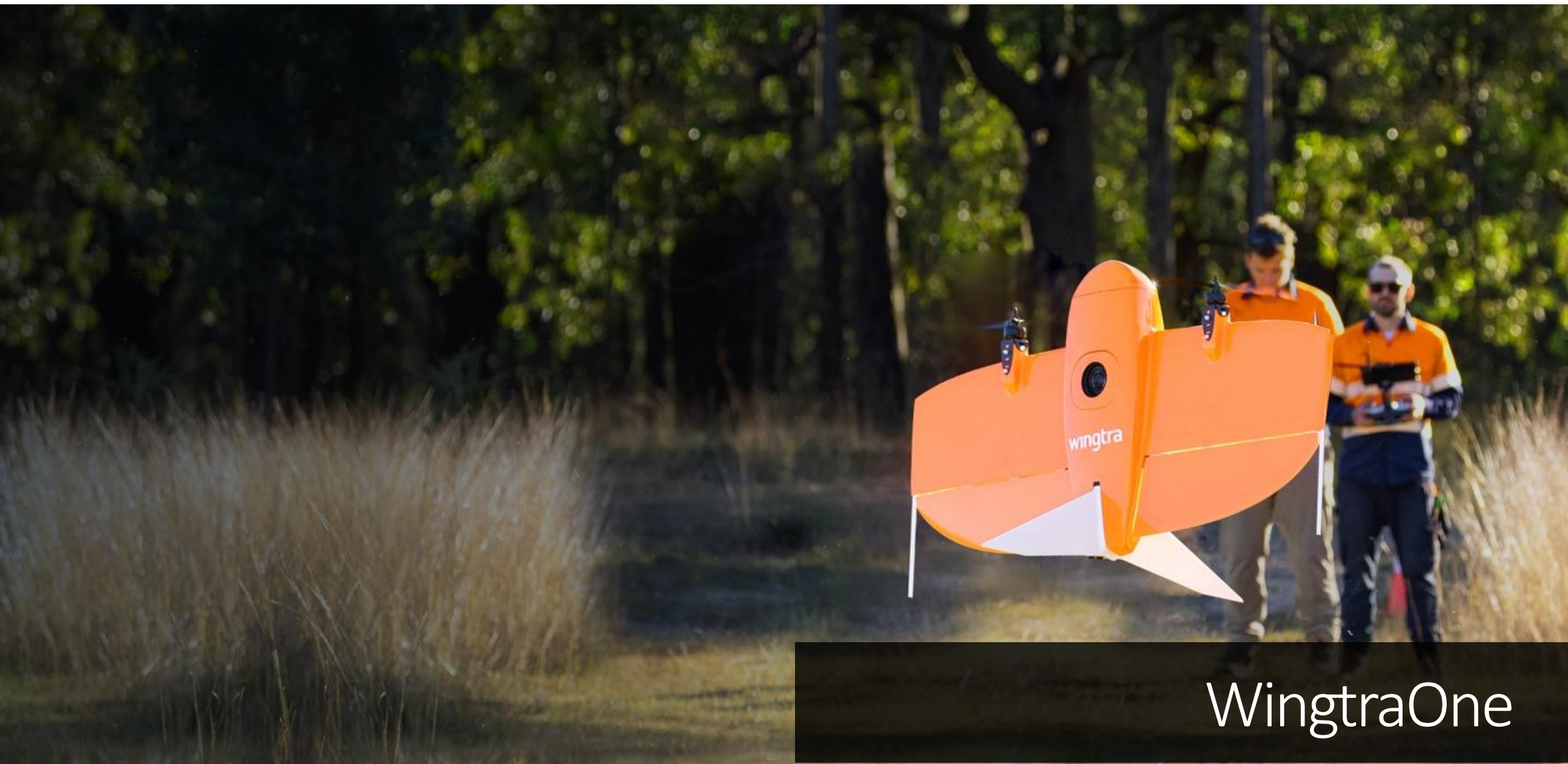
Digital surface model

Terrain models show changes in elevation across a field to aid in water management and planning. Digital surface models are digital representations of the elevation of the field and crop. They can be used for irrigation planning, water flow analysis, and crop optimization based on slope direction.



False-color band combination

Multispectral data can also be visualized as combinations of three bands, assigning a band to the red, green, and blue colors. This visualization maintains texture and context and reveals hidden patterns, such as the presence of weeds or waterlogged soil.



WingtraOne

THE BEST DRONE FOR AGRICULTURE

How does WingtraOne benefit agricultural applications

Large fields, difficult or steep terrain, or lack of smooth surfaces required for take-off and landing: the WingtraOne mapping drone can overcome all these challenges when assessing mid- and large-scale projects while carrying (and protecting) high-quality cameras.

- **Vertical take-off and landing (VTOL)**
 - VTOL capability combined with forward flight means larger coverage area than a multicopter in areas that are not well suited for flying a regular fixed-wing drone.
- **One drone, many applications**
 - WingtraOne is able to carry high-resolution RGB cameras (42MP) or professional 5-band multispectral cameras and protect these sensors (and your data) during take-off and landing, while still providing broad coverage per flight.
- **High-resolution data**
 - To capture plant variability at a per-plant level or empower plant counting at earlier stages of growth, WingtraOne enables results with resolutions down to 6.7 cm (2.6 in) per pixel for its multispectral payload and down to an impressive 0.7 cm (0.3 in) per pixel for its flagship RGB camera.



WingtraOne Tech Specifications



Efficient fixed-wing flight

Fly at 16 m/s (36 mph) for up to 59 minutes per flight for large coverage.

42 MP camera

WingtraOne can fly higher than drones limited to 20 MP cameras, so you capture more ground and more detail with every picture and a larger area per flight.

No more GCPs, checkpoints only

With an onboard high-precision PPK GNSS receiver you no longer need to lay out ground control points (GCPs). Use as few as three checkpoints to verify your map quality.

Lower image overlaps

High quality optics means you can reconstruct your map reliably even with lower overlaps. This means more new ground covered per flight line and maximum coverage per flight.



WingtraOne RX1R II

42 MP camera

110 ha (272 ac)

93 m (305 ft) altitude



Other fixed-wing drones

20 MP camera

70 ha (173 ac)

57 m (187 ft) altitude



Multicopter drones

20 MP camera

8 ha (20 ac)

44 m (144 ft) altitude



Maximum coverage with one flight

at 12 cm/px (0.5 in/px) GSD



DJI Matrice 600 Pro

A CONFIGURATION TO WORK WITH
PRECISION IN AGRICULTURE

DJI Matrice 600 Pro - Simply Professional Performance

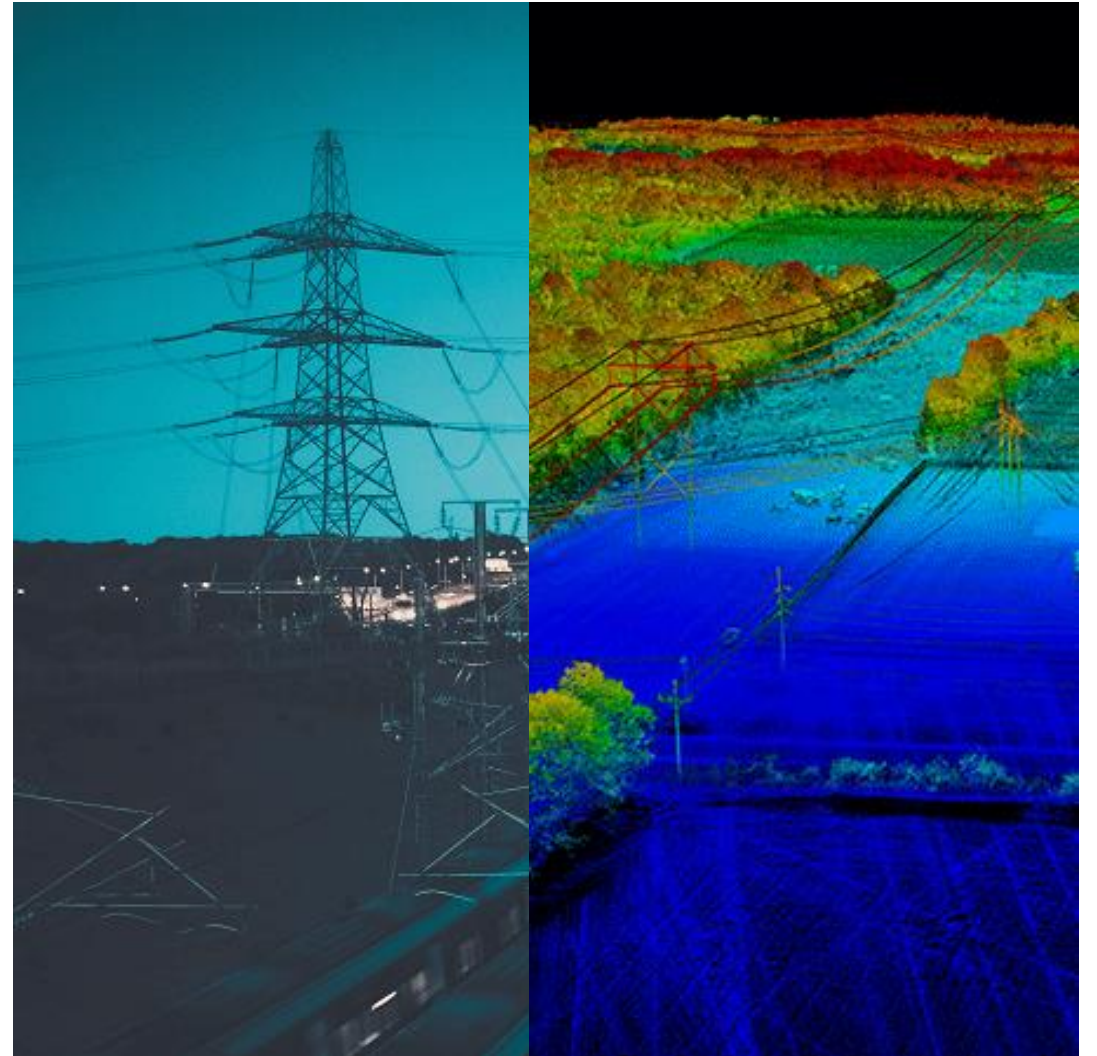
DJI Matrice 600 Pro not only empowers agriculture professionals with powerful equipment but also provides intelligent solutions that save time and increase workflow, benefiting a wide range of customers from farmers and growers to agricultural cooperation and service agencies.

- **Grain Crops**

- DJI Matrice 600 Pro solutions provide digital, informative, intelligent, and precise field management for grain crops such as rice, wheat, and corn. This empowers agricultural operators with more convenient and efficient options, reduces operation costs, improves crop quality, and increases yield rate. One drone, many applications

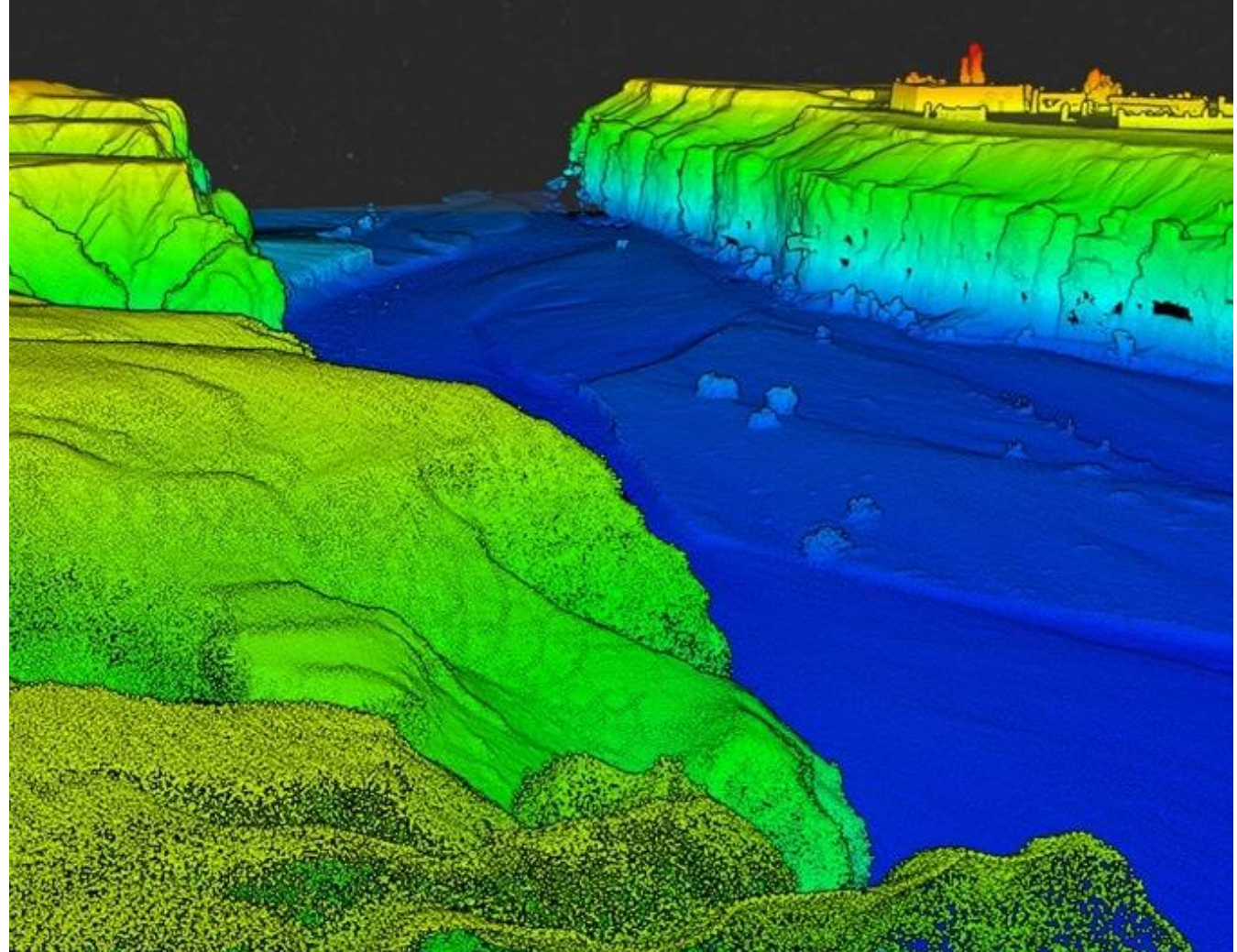
- **Commercial Crops**

- DJI Matrice 600 Pro also provide digital, informative, intelligent, and precise management solutions for commercial crops such as cotton, citrus trees, apple trees, and tea plants. As with grain crops, operators will find these options more convenient, inexpensive, and beneficial to crop quality and yield rate.



What you can expect from your DJI Matrice 600 Pro

- Absolutely beautiful flight performance: a system that you can rely on, with high-performance flight characteristics, impeccable GPS position hold and unparalleled reliability.
- A highly modular system: the DJI Matrice 600 Pro has a range of upgrades available from DJI, and Rise Above has customized a range of payloads, for numerous applications, suited to the DJI Matrice 600 Pro platform.
- Flight times of up to 40 minutes using 6 x TB48S high-capacity batteries, and the X5 camera system, on slow & steady flying for aerial photography.
- Heavy Lift Capability - the M600 Pro is designed to lift a max of 6kg payload in flight and has a max takeoff weight of 15.5kg.
- Quick and easy setup and pack up - the M600 Pro includes a basic carry case, so you can transport your system safely, & unpack & be ready to fly in minutes!



DJI Matrice Pro Tech Specifications

SIMPLY PROFESSIONAL PERFORMANCE

The Matrice 600 Pro (M600 Pro) inherits everything from the M600 with improved flight performance and better loading capacity. Pre-installed arms and antennas reduce time required for setup, and the system's modular design makes it easy to mount additional modules. The airframe is equipped with the latest DJI technologies, including the A3 Pro flight controller, Lightbridge 2 HD transmission system, Intelligent Batteries and Battery Management system. Several Zenmuse cameras and gimbals are natively compatible and full integration with third party software and hardware make the M600 Pro ideal for professional aerial photography and industrial applications.

EXTENDED FLIGHT TIME AND TRANSMISSION RANGE

The M600 Pro has an extended flight time and a 5km* long-range transmission. A comprehensive battery management system means that if any of its six Intelligent Batteries are turned on or off, the rest will follow suit. The battery management system monitors every battery during flight, ensuring safe landing in the event of single battery failure. Compared to traditional non-intelligent batteries, the M600 Pro's battery management system simplifies maintenance while enhancing security.





INDUSTRIES USING DRONES

Drones have been around for more than two decades, but the last few years have been significant in terms of drone adoption, usage expansion across industries, and global awareness.



Conservation

One of the main ways drones are helping conservation efforts is by providing detailed vegetation maps to help track forestry work and water mapping to better understand how water moves through an area.

Drones have also been invented that shoot out seeds from the air, which could help reforestation efforts in places that have been clear cut.



Construction

Mapping and surveying construction sites can be quite slow when done by walking a site.

Drones help speed up these efforts, allowing construction companies to provide real-time maps of progress and surveys that can help them both plan for projects and improve projects that are underway, leading to significant savings.



Drones are being used in the chemicals industry to improve indoor inspections by taking the place of inspectors in collecting visual data inside large assets used in chemical processes.



Delivery

Consumer drone delivery has yet to be rolled out at a large scale anywhere in the world, but it does present a major contribution for commercial drones.

Medical drone delivery is currently taking place throughout the world in countries as far-reaching as Rwanda, the U.S., and Switzerland





Mining

Mining companies are turning to tough indoor drones to help them create maps of their mines. These maps lead to improved safety and can also help companies locate ore that might otherwise be lost.

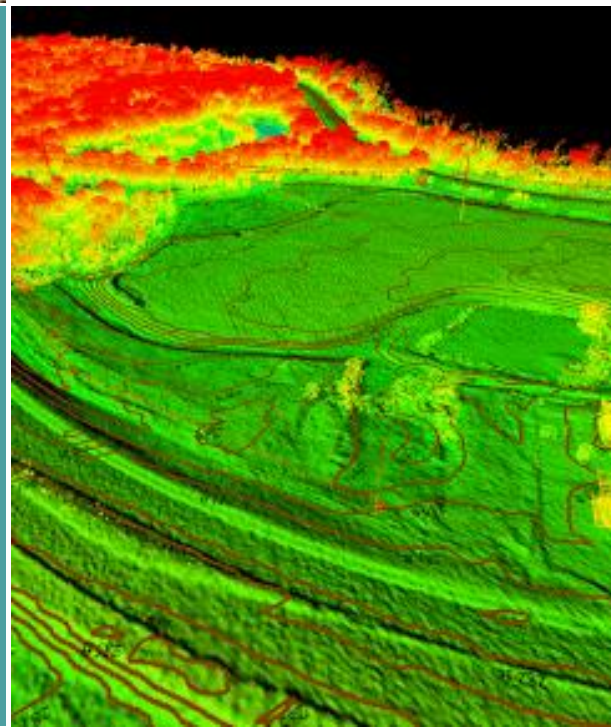


Oil & Gas

Indoor drones are making a big impact in Oil & Gas by providing inspectors with a tool for collecting high-quality visual data inside assets crucial to the oil refining process, such as tanks and FCC units and risers.

Filmmaking

For years now, high-end drones have been used to capture aerial shots for movies instead of helicopters, which are more expensive and cumbersome to work with.



Insurance

Insurance companies are always processing claims, especially after large storms. Drones are helping insurance companies process claims on roof damage much more quickly by allowing adjusters to collect visual data from the sky instead of by climbing up ladders.

Insurance companies are also using drones for accident reconstruction, helping them to piece together how an auto collision took place so that they can verify the validity of auto-related insurance claims.





Public Safety

Law enforcement, fire departments, and search and rescue have all adopted drones over the last several years.

Police use drones to help them get better situational awareness and to map densely populated areas, firefighters use drones to collect thermal data that can pinpoint where they should focus their efforts, and search and rescue personnel are using both thermal and visual sensors on drones to help find people missing in the wilderness.



Power Generation

In power generation, indoor drones are also helping inspectors to access areas that would otherwise be difficult to reach.

Drones can also help keep inspectors from the harm presented by radiation at nuclear power plants by taking the place of inspectors in collecting visual data of key assets like boilers.



Sewer Maintenance

Indoor drones have been helping inspectors enter city sewer systems to collect visual data that can be used to identify the source of a problem or to evaluate the condition of the infrastructure as part of the regular maintenance process.



Summary

As drone technology develops, people continue to find new ways to use drones to save money, improve safety, and increase efficiency in their operations.

- As the technology continues to evolve and grow, drones will become safer and more dependable, suited to meet various business goals.
- Smart drones with built-in safeguards and compliance tech, smart top accurate sensors, and self-monitoring are the next big revolution in drone technology that would provide new opportunities in transport, military, logistics, and commercial sectors.



Thank You

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