

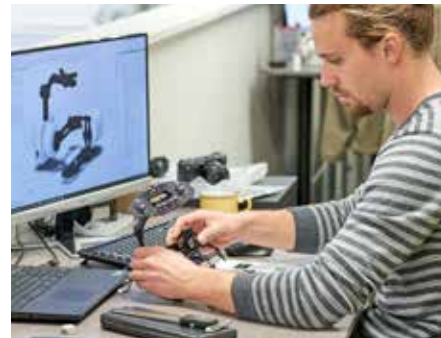


mdSOLUTIONS

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**WORK SMARTER.**





# INDUSTRY-LEADING COMMERCIAL UAV SYSTEMS

An idea born in a small town in Germany. Used everywhere on earth.

For more than a decade, Microdrones® has been building and perfecting unmanned aerial vehicles. We developed the world's first commercial quadcopter and our innovation continues to drive the industry.

Our team has created the highest-quality aircraft and integrated the most advanced sensors, software, workflow, training, and support. Our solutions are being used to revolutionize the way work is performed.

Microdrones customers use our integrated drones for all sorts of applications. Some start with just the aircraft and we help them customize it to perfectly suit the industrial or research solution they are creating.

Others purchase our aircraft as part of a complete packaged system that includes everything they need to perform applications like land surveying and mapping, corridor mapping, construction, academic research, infrastructure inspection, mining, volumetrics, and precision agriculture.



# MORE THAN 1000 PROFESSIONAL USERS WORLDWIDE TRUST MICRODRONES®

## RAIN AND HEAT RESISTANT



The Microdrones molding process keeps electronics and wiring protected from the elements. Our system is resistant to rain, sand and salt, so you can fly in harsh conditions.

## ROBUST HOUSING AND COMPONENTS



Robust carbon fiber construction makes easy work of an occasional rough landing. Carbon fiber also insulates interior components so you can fly at more extreme temperature and humidity levels.

## mdOS FOR EFFICIENT CODE CUSTOMIZATION



Microdrones created a lean, proprietary operating system and used that as the foundation for a flexible autopilot, so you can customize it to meet the specific needs of your mapping project.



Businesses and institutions all over the globe rely on Microdrones aircraft to cut operating costs and make their work more efficient, safe, and accurate. Here are just a few reasons commercial users trust Microdrones aircraft:

- **German engineering** – Microdrones UAVs are rugged, reliable, and built to withstand rough weather and the rigors of daily use.
- **Industry-leading flight times** – Microdrones UAVs deliver the longest flight times on the market, so you can fly longer and improve your efficiency on the job.
- **Proven performance** – Professionals need to fly with confidence. Our brushless, low-RPM motors work smart, not hard, allowing for exceptional longevity.



## GNSS RECEIVER

A GNSS chip combines the power of all existing satellite-based positioning systems around the globe (GPS, GLONASS, Galileo, and Beidou), dramatically improving accuracy. This provides superior positioning and increased efficiency, while reducing risks of breakdown and missed data.



## A PLUS FOR EFFICIENCY

Our plus sign (+) shaped configuration is more practical. With a motor on the front, the rear and each side, the airframe remains more stable in level flight and during turns. With less energy being consumed for stability, the extra power goes to carrying heavier payloads.



## FAILSAFE MOTORS FOR MINIMUM DOWNTIME

Brushless, low RPM motors and large props work seamlessly for the life of your airframe. Our motors don't need to work as hard, which translates to longevity.



## STABLE FLIGHT FOR PRECISE RESULTS

Our smart auto pilot system instantly responds to changing winds to maintain the proper flight attitude. For mapping, stable flight delivers more accurate and precise data.



## READY FOR THE FUTURE

The Microdrones platform is ready to be upgraded when new developments in hardware and firmware are implemented.

- **Simplicity** – It is easy to get started with Microdrones UAVs. They are easy to use and can be operated with very little training.
- **Application-specific options** – We work to understand your needs and we've developed an arsenal of solutions to meet them. Direct georeferencing, multi-spectral imaging, inspection accessories with brushless gimbals and video return, LiDAR, high-speed industrial cameras – our customers enjoy the best solutions for their specific applications.





## PROFESSIONAL DRONE PACKAGES

Your UAV plus everything you need.  
All in one convenient package.

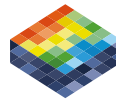
At Microdrones, our goal is to empower you to deliver the best possible work while cutting costs, saving time, and completing projects more easily. mdSolutions were developed with the realities of your job in mind.

Our mdLiDAR, mdMapper and mdTector packages combine industry-leading UAVs with payloads that were specifically designed for industrial applications like surveying, mapping, inspection, construction, mining, volumetrics, and precision agriculture. These packages provide complete solutions that include aircraft, sensors, accessories, custom mounts, and even an Android tablet app that makes it easy to plan, monitor, adjust, and analyze your missions anywhere.

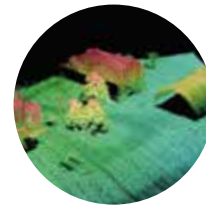


We've taken the guesswork out of the process, with fully integrated software, workflow, training and support so you are ensured a perfectly integrated aerial solution that performs flawlessly from start to finish.





mdLiDAR



## SOLUTIONS FOR ANY PROJECT OR DELIVERABLE.

LiDAR + Microdrones Aircraft + easy to use software = Extreme Geomatics Productivity.

mdLiDAR3000 and mdLiDAR1000 are fully integrated systems for producing 3D point clouds optimized for land surveying, construction, oil & gas, and mining applications.

Microdrones has developed end-to-end LiDAR solutions combining drones, LiDAR payloads, a fully integrated software workflow, and world class support to consistently provide quality deliverables.



mdMAPPER



## Conquer large surveying or mapping projects in a fraction of the time.

mdMapper1000DG is the flagship mdMapper system. With this aerial surveying solution, you'll achieve the highest level of data accuracy currently possible, cover more ground in one flight, use less people and equipment on jobs – all without using ground control points.

In addition to this system, Microdrones offers a full range of mapping systems that meet your application, at your budget. From PPK technology down to basic GCP-intensive photogrammetry, we have a solution that will meet your project needs and budget.

Significantly reduce your time spent on projects. Deliver unparalleled data quality. Become invaluable to your clients' success.



mdTECTOR



## See and detect. Get over your gas detection problems.

mdTector1000 CH4 consists of a Pergam gas sensor, mounted and integrated perfectly with a Microdrones md4-1000 UAV. It has an onboard HD video link. That means that you can see in real time what you are detecting with the laser sensor.

Whether your gas infrastructure is in a hard to reach riverbed or near a steep cliff... the tough, carbon-fiber built drone will easily navigate terrain that would be difficult, dirty or dangerous by traditional foot crews. Microdrones is known for its field-proven aircraft platform. It's sturdy, stable, resistant to wind and weather, as well as dust and dampness.



## mdCOCKPIT APP: FUNCTION AND FLEXIBILITY AT YOUR FINGERTIPS.

## PLAN, MONITOR, ADJUST, AND ANALYZE YOUR MISSIONS RIGHT FROM YOUR TABLET.

Professionals who use Microdrones UAVs for surveying, mapping, volumetrics, inspection, construction, mining, precision agriculture, and many other commercial applications will appreciate the mdCockpit Android tablet app.

This app was designed for professional drone users and makes it easy to plan, monitor, change, and analyze your flights right from your tablet.

When you're out in the field flying missions, you should always expect the unexpected. The mdCockpit app was developed to provide you with the flexibility you need to tackle projects and overcome changes and challenges as they arise.





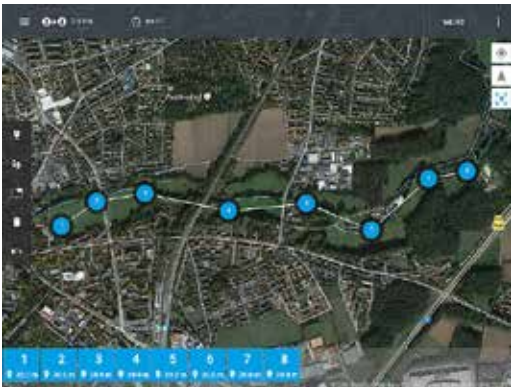
## HOW TO DOWNLOAD THE mdCOCKPIT APP

Downloading the mdCockpit app onto your Android tablet is easy. Just visit our page in the Google Play store.

### Technical Requirements:

Before downloading, be sure you have firmware mdOS 4.32 or higher. To complete this update, visit the Clients Only section of the Microdrones website and complete the simple steps.

Your tablet must be Android 6.0.0 Marshmallow or higher.





mdLiDAR  
3000



## HEAVY PROJECTS? MAKE *LIGHT WORK* OF THEM ALL.

### The Complete Package to add unmanned aerial LiDAR to your geomatics services

The mdLiDAR3000 uses the lifting power, resilience and efficiency of the Microdrones aircraft platform to carry a perfectly integrated Riegl miniVUX-1UAV (or an optional miniVUX-1DL) and a Sony RX1R II camera. The result? You can quickly acquire high density and accurate LiDAR data in the field and efficiently turn it into a 3D colorized pointcloud back at the office or on your laptop.

mdLiDAR3000 is an end-to-end LiDAR solution combining a drone, a LiDAR payload, a fully integrated software workflow, and world class support to consistently provide quality deliverables.



Riegl miniVUX-1UAV



Riegl miniVUX-1DL

Choose a perfectly integrated Riegl miniVUX-1UAV or miniVUX-1DL paired with a 42.4 megapixel camera mounted with a custom, lightweight, vibration-free, quick release mount to capture the data you need.



## The mdLiDAR3000 package includes:



**md4-3000**  
Robust, powerful, stable and dependable. Build your business on this versatile platform.



**Sony RX1R II & Mount**  
42.4 megapixel camera paired with a custom, lightweight, vibration-free, nadir mount to capture the images you need for point colorization.



**Fully Integrated LiDAR**  
Select a perfectly integrated Riegl miniVUX-1UAV or miniVUX-1DL.



**mdLiDAR Processing Software**  
Complete point cloud processing and data export, via one integrated software suite and workflow, specially designed for Microdrones mdLiDAR family of systems.



**Applanix APX-20 UAV**  
Compact single-board module with survey-grade GNSS receiver and dual precisely calibrated IMUs for mapping.



**POSPac UAV**  
Direct georeferencing post processing software – used to achieve maximum accuracy and efficiency from data collected by APX-20 UAV.



**mdCockpit Tablet Software**  
Simple swipes of the finger help you plan your survey area and monitor progress in flight on your Android tablet.



**Rugged Carrying Case**  
Bring your Microdrones UAV to tackle missions in the toughest corners of the Earth.



**mdAcademy**  
Become an expert at flying and maintaining your platform, to ensure many years of successful use.



**mdRC**  
Proven, professional controls and telemetry keep you in control when you need it most.



## Easy end-to-end workflow:

### PLAN

- Simple mission planning using mdCockpit
- User inputs the point density or flying height and drone speed

### FLY

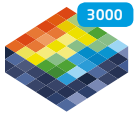
- Fully automated mission execution and real-time mission monitoring using mdCockpit

### PROCESS

- Thorough georeferencing data processing using the dual-IMU Applanix APX-20 and POSPac UAV
- Automated final point cloud processing using mdLiDAR processing software

### VISUALIZE

- Final point cloud in standard ASPRS LAS format usable in any GIS or CAD software environment
- Quick and Accurate point cloud colorization using accurate system-produced orthomosaics and a user-friendly, seamless workflow



## mdLiDAR3000 (equipped with Riegl miniVUX-1UAV) technical specs:

### Product Components:

- Airframe: Microdrones md4-3000 Drone
- LiDAR Sensor: Riegl miniVUX-1UAV
- Camera: Sony RX1R II
- Georeferencing Sensor: Trimble APX-20
- Planning Software: mdCockpit Tablet
- Processing Software Packages:
  - POSPac UAV
  - mdLiDAR Processing Software

### Technical Specifications:

- Weight: 14kg
- System Operation Temperature: -10°C (14°F) up to 50°C (122°F)
- Number of Laser Returns: 5
- Field of View: 56° (Optional 80°)
- Maximum Flight Altitude: 80m
- Recommended Speed: Up to 6m/s (to Accommodate Photogrammetry Workflow)

### Accuracy Specifications:

- LiDAR Pointcloud:
  - Horizontal: 1-3 cm
  - Vertical: 1-5 cm
- Photogrammetry:
  - Horizontal: 1-2 pixels
  - Vertical: 3-4 pixels



## miniVUX1

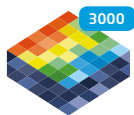
Flight Altitude AGL (m/ft)*	40/130	60/195	80/260
Speed (m/s)	Point Density (pts/m <sup>2</sup> )**		
3	130	90	65
4	100	65	50
5	80	55	40
6	65	45	35
Swath Width (m/ft) at 56° FOV	45/148	65/213	85/279
Swath Width (m/ft) at 80° FOV	70/230	100/328	135/443
Number of Laser Returns	5		
Example of a 20-Minute Flight (minutes)***			
Area Coverage at 20% Overlap (hectare/acres)****	18/44.5	26/64	34/84
Area Coverage at 50% Overlap (hectare/acres)****	11/27	17/42	21/52

\*Flight Altitude Above Ground Level (AGL)

\*\*Average Point density. Note that calculation does not factor target remission (reflectivity %)

\*\*\*An example of a 20-minute Flight under standard flight conditions

\*\*\*\*Area coverage is computed for an example of a 20-minute survey (3 minutes for take-off and landing) at a drone speed of 5 m/s at 56° Field of View (FOV)



## mdLiDAR3000 (equipped with Riegl miniVUX-1DL) technical specs:

### Product Components:

- Airframe: Microdrones md4-3000 Drone
- LiDAR Sensor: Riegl miniVUX-1DL
- Camera: Sony RX1R II
- Georeferencing Sensor: Trimble APX-20
- Planning Software: mdCockpit Tablet
- Processing Software Packages:
  - POSPac UAV
  - mdLiDAR Processing Software

### Technical Specifications:

- Weight: 14.8kg
- System Operation Temperature: -10°C (14°F) up to 50°C (122°F)
- Number of Laser Returns: 5
- Field of View: 46°
- Maximum Flight Altitude: 80m
- Recommended Speed: Up to 6m/s (to Accommodate Photogrammetry Workflow)

### Accuracy Specifications:

- LiDAR Pointcloud:
  - Horizontal: 1-3 cm
  - Vertical: 2-4 cm
- Photogrammetry:
  - Horizontal: 1-2 pixels
  - Vertical: 3-4 pixels



## miniVUX1-DL

Flight Altitude AGL (m/ft)*	40/130		60/195		80/260	
Point Density**	Swath Center	Edge	Swath Center	Edge	Swath Center	Edge
Speed (m/s)						
3	308	2,637	206	2,144	154	1,853
4	227	1,977	152	1,607	114	1,391
5	188	1,581	126	1,289	94	1,113
6	156	1,317	106	1,072	80	928
Swath Width (m/ft) at 46° FOV	34/112		50/164		68/223	
Number of Laser Returns	5					
Example of a 20-Minute Flight (minutes)***						
Area Coverage at 20% (overlap hectare/acres)****	13.5/33		20/49		27.5/68	
Area Coverage at 50% (overlap hectare/acres)****	8.5/21		13/32		17/42	

\*Flight Altitude Above Ground Level (AGL)

\*\*Average Point density. Note that calculation does not factor target remission (reflectivity %)

\*\*\*An Example of a 20-minute flight under standard flight conditions

\*\*\*\*Area coverage is computed for an example of a 20-minute survey (3 minutes for take-off and landing) at a drone speed of 5 m/s



mdLiDAR  
1000



## YOU HAVE IMPORTANT POINTS TO MAKE.

LiDAR + Microdrones aircraft  
+ easy to use software = geomatics  
productivity

mdLiDAR1000 is a fully integrated system for producing 3D point clouds optimized for land surveying, construction, oil & gas, and mining applications.

mdLiDAR1000 consistently provides an accuracy of 6 cm (0.2 ft) when flown at 40 m (130 ft) at a speed of 3 m/s.



A lightweight, downward oriented LiDAR solution that efficiently scans at an 85 degree field of vision with a custom, lightweight, vibration-free, quick release mount to capture the data you need.



## The mdLiDAR1000 package includes:



**md4-1000**  
Robust, powerful, stable and dependable. Build your business on this versatile platform.



**Fully Intergrated LiDAR**  
A lightweight, downward oriented LiDAR solution that efficiently scans at a 85 degree field of vision.



**mdLiDAR Processing Software**  
Complete point cloud processing and data export, via one integrated software suite and workflow, specially designed to optimize data from the mdLiDAR1000 system.



**Applanix APX-15 UAV**  
Compact single-board module with survey-grade GNSS receiver and a precisely calibrated IMU for mapping.



**POSPac UAV**  
Direct georeferencing post processing software – used to achieve maximum accuracy and efficiency from data collected by APX-15 UAV.



**mdCockpit Tablet Software**  
Simple swipes of the finger help you plan your survey area and monitor progress in flight on your Android tablet.



**Rugged Carrying Case**  
Bring your Microdrones UAV to tackle missions in the toughest corners of the Earth.



**mdAcademy**  
Become an expert at flying and maintaining your platform, to ensure many years of successful use.



**mdRC**  
Proven, professional controls and telemetry keep you in control when you need it most.



## Easy end-to-end workflow:

### PLAN

- Simple mission planning using mdCockpit
- User inputs the point density or flying height and drone speed

### FLY

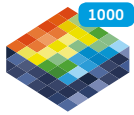
- Fully automated mission execution and real-time mission monitoring using mdCockpit

### PROCESS

- Thorough georeferencing data processing using POSPac UAV
- Automated final point cloud processing using mdLiDAR processing software

### VISUALIZE

- Final point cloud in standard ASPRS LAS format usable in any GIS or CAD software environment



## mdLiDAR1000 technical specs:

- UAV: md4-1000
- Laser Scanner: SICK
- Georeferencing sensor: Trimble APX-15
- Laser Point Rate: 19,500 points/sec
- Flight range: Up to 10 km (total flight distance under standard flight conditions)
- Maximum Laser Range: 100 m (under standard operating conditions - up to 60 m is recommended for reasonable laser point density)
- Weight: 6 Kg
- Speed: Up to 6 m/s (for a reasonable point density)
- Endurance: 25 min
- System Operation Temperature: -10°C (14°F) up to 50°C (122°F)
- Wavelength: Near infrared (no laser returns from any water body)
- Class 1 laser (100% eye safe)
- Field of view: 85°
- Number of Returns: 3 (Typically treetop and bare earth)

### Point Density Estimation

Flight Altitude AGL* (m/ft)	30/100	40/130	50/165
Speed (m/s)	Point Density (pts/m <sup>2</sup> )**		
2	160	120	95
3	105	80	65
4	80	60	50
5	65	50	40
Swath Width (m)	55	75	95
Flight Time (minutes)***	25	25	25
Number of Laser Returns	3	3	3

\*Flight Altitude Above Ground Level (AGL)

\*\*Average Point density... Note that calculation does not factor target remission (reflectivity) %

\*\*\*Flight time is calculated under standard flight conditions (using new Microdrones batteries)





mdMAPPER  
1000DG



NO GROUND  
CONTROL POINTS,  
LESS SIDELAP,  
MORE PRODUCTIVITY.

Master your geospatial data by putting direct georeferencing to work for you. With mdMapper1000DG, you'll achieve the highest level of data accuracy currently possible using fewer ground control points – or no ground control points at all.

Conquer large projects in a fraction of the time. Meet the most precise data requirements and cover more ground in one flight. mdMapper1000DG will help you deliver unparalleled data quality in less time.



A 42.4 megapixel camera paired with a custom, lightweight, vibration-free, nadir mount to capture the images you need. And because we integrate popular camera selections, when it's time to upgrade, you only have to change the camera, not the whole system!



Imagine saving 10 hours per project.

## Why does direct georeferencing matter in UAV mapping?

Calling this solution a game-changer is no exaggeration. The reduced/eliminated need to install ground control points, low sidelap, and industry-leading flight times add up to significant time and cost savings.

To the right is an example comparison of a surveying project completed using two different mdMapper packages: mdMapper1000, which uses aerial triangulation, and mdMapper1000DG, which uses direct georeferencing.



As you can see in the image on the right, the direct georeferencing solution's lower front and side lap resulted in the UAV's ability to cover more ground more quickly when compared with the aerial triangulation solution on the left. The chart below shows the actual amount of time spent and number of images taken.

Workflow Task	mdMapper1000	1000DG	Difference
Plan Project	1 hr	1hr	-
GCP Layout	2 hrs	-	2 hrs
Flight	35 mins	15 mins	20 mins
Data Processing	12 hrs	4 hrs	8 hrs
<b>Total</b>	<b>15.35 hrs</b>	<b>5.15 hrs</b>	<b>10.20 hrs</b>

The results of this sample project may vary depending upon conditions.

Result: mdMapper1000DG completed its mission in less than half the time it took mdMapper1000.





# RAISE YOUR EXPECTATIONS

## mdMapper1000DG as a corridor mapping tool

When a Chilean mine company invited Microdrones to perform a demonstration at one of their sites, the team was eager to show off their newly released mdMapper1000DG solution – and the cost savings, accuracy, efficiency, and safety this direct georeferencing (DG) system achieves. The client challenged the team and the system with a corridor mapping assignment, and both rose to the occasion.

### MAIN POINTS

- A corridor mapping project in Chile.
- 5 km road.
- High altitude, 2500 meters.
- Rough winds, frigid conditions.
- Were unexpectedly asked to corridor map.

The Microdrones mdMapper1000DG performed on an unanticipated request to map an existing wall. With a non-DG solution, this project would have taken much more time and effort, and would have required GCPs (ground control points.)

### As seen in xyHt

Read the full story in the xyHt "Heights" supplement from March 2017:

[www.microdrones.com/links/xyht-corridor-mapping](http://www.microdrones.com/links/xyht-corridor-mapping)

Case Study **Microdrones**
HEIGHTS 2017

## Microdrones® Succeeds at Unexpected Corridor Mapping Request

**WHEN A CHILEAN MINE COMPANY INVITED MICRODRONES** to perform a demonstration at one of their sites, the team was eager to show off their newly released mdMapper1000DG solution – and the cost savings, accuracy, efficiency, and safety this direct georeferencing (DG) system achieves. The client challenged the team and the system with a corridor mapping assignment, and both rose to the occasion.

**CHALLENGE** The client invited Microdrones to perform a demonstration at one of their sites, the team was eager to show off their newly released mdMapper1000DG solution – and the cost savings, accuracy, efficiency, and safety this direct georeferencing (DG) system achieves. The client challenged the team and the system with a corridor mapping assignment, and both rose to the occasion.

**THE RESULT** The client invited Microdrones to perform a demonstration at one of their sites, the team was eager to show off their newly released mdMapper1000DG solution – and the cost savings, accuracy, efficiency, and safety this direct georeferencing (DG) system achieves. The client challenged the team and the system with a corridor mapping assignment, and both rose to the occasion.

**COMPANY PROFILE**

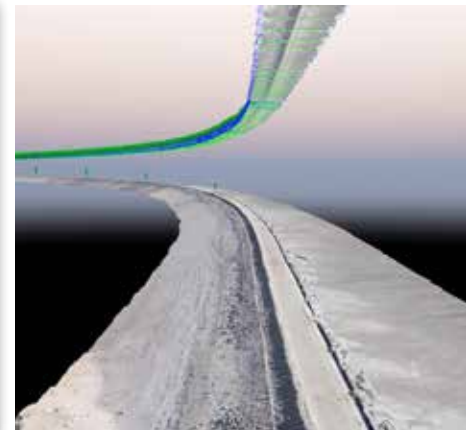
**CHILEAN MINE COMPANY** is a leading mining and mineral processing company in Chile. The company is currently expanding its operations and is looking for innovative solutions to improve its efficiency and safety. Microdrones was selected to provide a demonstration of its mdMapper1000DG solution to the company's management.

**CHALLENGE**

The client invited Microdrones to perform a demonstration at one of their sites, the team was eager to show off their newly released mdMapper1000DG solution – and the cost savings, accuracy, efficiency, and safety this direct georeferencing (DG) system achieves. The client challenged the team and the system with a corridor mapping assignment, and both rose to the occasion.

**THE RESULT**

The client invited Microdrones to perform a demonstration at one of their sites, the team was eager to show off their newly released mdMapper1000DG solution – and the cost savings, accuracy, efficiency, and safety this direct georeferencing (DG) system achieves. The client challenged the team and the system with a corridor mapping assignment, and both rose to the occasion.





## mdMapper1000DG: Collect the data and images you need, all in one site visit.

Dramatically reduce your time spent on projects with mdMapper1000DG. Direct georeferencing technology allows you to achieve the highest possible level of accuracy without using ground control points (GCPs).

- Reduce or eliminate your need to install GCPs.
- Drastically reduce time spent on post-processing and data collection, thanks to an impressively decreased side lap.
- Access hard-to-reach or dangerous sites without risking human injury.
- Improve your efficiency with industry-leading flight times and resilience to harsh environmental conditions.
- Realistically perform corridor mapping without the need for many control points.

The client had plans to heighten a 10-kilometer retaining wall so that it could contain their reservoir and reduce water waste for the mining operation. They wanted us to show that we could efficiently map that wall with our system. We did it.



## The mdMapper1000DG package includes:



**md4-1000**  
Robust, powerful, stable and dependable. Build your business on this versatile platform.



**Sony RX1R II & Mount**  
42.4 megapixel camera paired with a custom, lightweight, vibration-free, nadir mount to capture the images you need.



**Applanix APX-15-L UAV**  
Compact single-board module with survey-grade GNSS receiver and a precisely calibrated IMU for mapping.



**Charger & Flight Battery**  
One md4-1000 flight battery and charger for maximum flight endurance.



**mdWaypoint**  
A flight planning module to prepare and carry out automated flights with your aircraft.



**mdLandingAssistant**  
Execute automatic final approach landing. Conduct waypoint missions and land with minimal operator intervention.



**Digital Data Link**  
Conveniently connect your Microdrones UAV to your digital devices.



**mdRC**  
Proven, professional controls and telemetry keep you in control when you need it most.



**POSPac UAV**  
Direct georeferencing post processing software – used to achieve maximum accuracy and efficiency from data collected by APX-15 L-UAV.



**mdAcademy**  
Become an expert at flying and maintaining your platform, to ensure many years of successful use.



## mdMAPPER1000DG technical specs:

Thanks to direct georeferencing, surveying and mapping professionals who choose mdMapper1000DG will achieve significant cost savings, the highest possible level of accuracy, and dramatic time savings – with no ground control points.

- Payload: up to 2.7 pounds (1.2 kilograms)
- Flight time: up to 45 minutes depending on conditions
- Area covered in one battery charge: up to 198 acres (80 hectares)
- Sensor: Sony RX1R II (42.4-megapixel camera)
- GNSS/IMU: Applanix APX-15-L UAV
- Georeferencing method: Direct georeferencing technology with Nadir mount
- Enables corridor mapping

### mdMapper1000DG

Flight Parameters	Area Covered (@120m)*	80 ha (198 ac.)
	Camera Model**	Sony RX1R II
	Imagery Format	RAW + JPEG
	G.S.D. cm/pixel (@120m)	1.6 cm
	G.C.P.	No
	Overlaps (front/side)	80% / 40%
Post-Processing	Method	Optimized Aerial Triangulation / GNSS-Inertial Solution
	Orientation	High Precision Sensor (INS)
	Position	High Precision Sensor (GNSS)
	Accuracy	2-3 GSD (X,Y) and 3-5 GSD (Z)
Advantages		<ul style="list-style-type: none"> <li>• No GCP Needed</li> <li>• Efficient Flight Planning – Cover Greater Areas</li> <li>• Efficient Post-processing (EO apriori and less images)</li> <li>• Enables Corridor Mapping</li> </ul>

\* Typical project benchmark comparisons based on missions completed in Canada in 2016.

\*\* The current camera models are listed. These may be replaced by equivalent or better cameras depending on availability from the manufacturer.







mdMAPPER  
1000PPK



DG READY

# POWERFUL ACCURACY WITH JUST 1-3 GROUND CONTROL POINTS.

It grows with you.

Microdrones customers asked for a system that could deliver excellent results with a handful of ground control points. We listened.

mdMapper1000PPK fills an important niche for customers who may not be ready for DG, and are willing to set up 1-3 ground control points for their projects.

And when your business, projects or services expand to require DG, this system is easily and affordably upgradeable via a DG READY firmware update.



A 42.4 megapixel camera paired with a custom, lightweight, vibration-free, nadir mount to capture the images you need. And because we integrate popular camera selections, when it's time to upgrade, you only have to change the camera, not the whole system!



## Do more – even in intermittent conditions.

This package is all about resilience, convenience, and all-around performance. The md4-1000 UAV can stand up to intense environmental challenges, from strong winds and magnetic fields to high temperatures and voltage. It also boasts the longest flight times on the market.

- Improve your efficiency by staying in the air longer. mdMapper1000 delivers an average flight time of 30 – 45 minutes, depending upon conditions.
- Fly in harsh weather and stay on schedule – even on days with rough wind.
- Compatible with accessory kits for precision agriculture, inspection, Lidar, and Direct Georeferencing.

## The mdMapper1000PPK package includes:



**md4-1000**  
Robust, powerful, stable and dependable. Build your business on this versatile platform.



**Sony RX1R II & Mount**  
42.4 megapixel camera paired with a custom, lightweight, vibration-free, nadir mount to capture the images you need.



**Applanix APX-15-L UAV**  
Compact single-board module with survey-grade GNSS receiver. IMU is present, ready for DG when you are ready to upgrade.



**Charger & Flight Battery**  
One md4-1000 flight battery and charger for maximum flight endurance.



**mdWaypoint**  
A flight planning module to prepare and carry out automated flights with your aircraft.



**mdLandingAssistant**  
Execute automatic final approach landing. Conduct waypoint missions and land with minimal operator intervention.



**Digital Data Link**  
Conveniently connect your Microdrones UAV to your digital devices.



**mdRC**  
Proven, professional controls and telemetry keep you in control when you need it most.



**POSPac UAV**  
Direct georeferencing post processing software – used to achieve maximum accuracy and efficiency from data collected by APX-15 L-UAV.



**mdAcademy**  
Become an expert at flying and maintaining your platform, to ensure many years of successful use.



**DG READY**  
When you are ready to expand, this system will expand with you. mdMapper1000PPK is easily upgradeable via firmware to direct georeferencing.



## mdMAPPER1000PPK technical specs:

Professionals who choose mdMapper1000PPK will achieve excellent data collection with just 1-3 ground control points.

- Payload: up to 2.7 pounds (1.2 kilograms)
- Flight time: up to 45 minutes depending on conditions
- Area covered in one battery charge: up to 198 acres (80 hectares)
- Sensor: Sony RX1R II (42.4-megapixel camera)
- GNSS/IMU: Applanix APX-15-L UAV

### mdMapper1000PPK

Flight Parameters	Area Covered (@120m)*	80 ha (198 ac.)
	Camera Model**	Sony RX1R II
	Imagery Format	RAW + JPEG
	G.S.D. cm/pixel (@120m)	1.6 cm
	G.C.P.	Yes: 1-3 GCPs, Depending on Application.
	Overlaps (front/side)	80% / 40%
Post-Processing	Method	Aerial Triangulation with High Precision Positioning
	Orientation	High Precision Sensor (INS)
	Accuracy	2-3 GSD (X,Y) and 3-5 GSD (Z)
Advantages	Efficient Flight Planning – Cover Greater Areas	

\* Typical project benchmark comparisons based on missions completed in Canada in 2016.

\*\* The current camera models are listed. These may be replaced by equivalent or better cameras depending on availability from the manufacturer.







mdMAPPER  
1000+



PPK READY

DG READY

## READY TO GROW WITH YOUR BUSINESS

It will grow at your pace.

Many users needed basic GCP intensive aerial surveying, but wanted to keep the option to upgrade open. The Microdrones mdMapper1000+ builds on the classic mdMapper1000, but it's PPK Ready or DG Ready when you are!

Via an easy, affordable firmware update, you'll enjoy a full PPK or DG system without any physical or hardware upgrades!



A 42.4 megapixel camera paired with a custom, lightweight, vibration-free, nadir mount to capture the images you need. And because we integrate popular camera selections, when it's time to upgrade, you only have to change the camera, not the whole system!



## The mdMapper1000+ package includes:



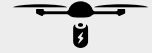
**md4-1000**  
Robust, powerful, stable and dependable. Build your business on this versatile platform.



**Sony RX1R II & Mount**  
42.4 megapixel camera paired with a custom, lightweight, vibration-free, nadir mount to capture the images you need.



**Applanix APX-15-L UAV**  
Compact single-board module with survey-grade GNSS receiver. IMU is present, ready for DG when you are ready to upgrade.



**Charger & Flight Battery**  
One md4-1000 flight battery and charger for maximum flight endurance.



**mdWaypoint**  
A flight planning module to prepare and carry out automated flights with your aircraft.



**mdLandingAssistant**  
Execute automatic final approach landing. Conduct waypoint missions and land with minimal operator intervention.



**Digital Data Link**  
Conveniently connect your Microdrones UAV to your digital devices.



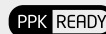
**mdRC**  
Proven, professional controls and telemetry keep you in control when you need it most.



**POSPac UAV**  
Direct georeferencing post processing software – used to achieve maximum accuracy and efficiency from data collected by APX-15 L-UAV.



**mdAcademy**  
Become an expert at flying and maintaining your platform, to ensure many years of successful use.



**PPK READY**  
When you are ready to expand, this system will expand with you. mdMapper1000+ is easily upgradeable via firmware to PPK.



**DG READY**  
When you are ready to expand, this system will expand with you. mdMapper1000+ is easily upgradeable via firmware to direct georeferencing.



## Do more – even in intermittent conditions.

This package is all about resilience, convenience, and all-around performance. The md4-1000 UAV can stand up to intense environmental challenges, from strong winds and magnetic fields to high temperatures and voltage. It also boasts the longest flight times on the market.

- Improve your efficiency by staying in the air longer. mdMapper1000 delivers an average flight time of 30 – 45 minutes, depending upon conditions.
- Fly in harsh weather and stay on schedule – even on days with rough wind.
- Compatible with accessory kits for precision agriculture, inspection, Lidar, and Direct Georeferencing.



## mdMAPPER1000+ technical specs:

mdMapper1000+ gives professionals all the power of aerial surveying with GCPs, just like our classic mdMapper1000. But it's ready to upgrade to PPK or DG with a simple, affordable firmware update.

- Payload: up to 2.7 pounds (1.2 kilograms)
- Flight time: up to 45 minutes depending on conditions

mdMapper1000+		
Flight Parameters	Area Covered (@120m)*	60 ha. (148 ac.)
	Camera Model**	Sony RX1R II
	Imagery Format	RAW + JPEG
	G.S.D. cm/pixel (@120m)	2.4 cm
	G.C.P.	Yes
	Overlaps (front/side)	80% / 60%
Post-Processing	Method	Aerial Triangulation
	Orientation	Calculated During the A.T.
	Position	From UAV GNSS Receiver
	Accuracy	Depends on Ground Control Point (GCP) Accuracy and Distribution
Advantages	Large Area Mapping	

\* Typical project benchmark comparisons based on missions completed in Canada in 2016.

\*\* The current camera models are listed. These may be replaced by equivalent or better cameras depending on availability from the manufacturer.







mdMAPPING  
1000



## IT NEVER COMPLAINS ABOUT THE WEATHER

### Get your business off the ground.

Expand your capabilities and flight time with mdMapper1000. Featuring our best-selling md4-1000 UAV, users enjoy the critical advantages of a larger aircraft.

The longest flying time on the market. Impressive stability for the most accurate data collection. Resistance to rough winds, harsh weather, hot temperatures, high voltage, and strong magnetic fields. With mdMapper1000, you'll rise to your clients' toughest mapping challenges every time.



### Now offering two camera choices!



A 24 megapixel Sony a6300 camera paired with a custom, lightweight, vibration-free, nadir mount to capture the images you need. And because we integrate popular camera selections, when it's time to upgrade, you only have to change the camera, not the whole system!



A 42.4 megapixel Sony RX1R II camera paired with a custom, lightweight, vibration-free, nadir mount to capture the images you need.



## mdMapper1000: Do more – even in intermittent conditions.

This package is all about resilience, convenience, and all-around performance. The md4-1000 UAV can stand up to intense environmental challenges, from strong winds and magnetic fields to high temperatures and voltage. It also boasts the longest flight times on the market.

- Improve your efficiency by staying in the air longer. mdMapper1000 delivers an average flight time of 30 – 45 minutes, depending upon conditions.
- Fly in harsh weather and stay on schedule – even on days with rough wind.
- Compatible with accessory kits for precision agriculture, inspection, Lidar, and Direct Georeferencing.

## The mdMapper1000 package includes:



**md4-1000**  
Robust, powerful, stable and dependable. Build your business on this versatile platform.



**Sony a6300 & Mount**  
24 megapixel camera paired with a custom, lightweight, vibration-free, nadir mount to capture the images you need.

OR



**Sony RX1R II & Mount**  
42.4 megapixel camera paired with a custom, lightweight, vibration-free, nadir mount to capture the images you need.



**Charger & Flight Battery**  
One md4-1000 flight battery and charger for maximum flight endurance.



**mdWaypoint**  
A flight planning module to prepare and carry out automated flights with your aircraft.



**mdLandingAssistant**  
Execute automatic final approach landing. Conduct waypoint missions and land with minimal operator intervention.



**Digital Data Link**  
Conveniently connect your Microdrones UAV to your digital devices.



**mdRC**  
Proven, professional controls and telemetry keep you in control when you need it most.



**mdCockpit Tablet Software**  
Simple swipes of the finger help you plan your survey area and monitor progress in flight on your Android tablet.



**Rugged Carrying Case**  
Bring your Microdrones UAV to tackle missions in the toughest corners of the Earth.



**mdAcademy**  
Become an expert at flying and maintaining your platform, to ensure many years of successful use.



## mdMAPPER1000 technical specs:

### mdMAPPER1000

Featuring our hard-working md4-1000 UAV to cover more area per flight, users enjoy the longest flight time on the market, superb stability, and resistance to rough winds, harsh weather, hot temperatures, high voltage, and strong magnetic fields.

- Payload: up to 2.7 pounds (1.2 kilograms)
- Flight time: up to 45 minutes depending on conditions
- Area covered in one battery charge: up to 148 acres (60 hectares)
- Sensor: Sony a6300 (24-megapixel camera) and nadir mount
- Georeferencing method: Aerial triangulation with GCP

#### mdMapper1000

Flight Parameters	Area Covered (@120m)*	60 ha. (148 ac.)
	Camera Model**	Sony a6300
	Imagery Format	RAW + JPEG
	G.S.D. cm/pixel (@120m)	2.4 cm
	G.C.P.	Yes
	Overlaps (front/side)	80% / 60%
Post-Processing	Method	Aerial Triangulation
	Orientation	Calculated During the A.T.
	Position	From UAV GNSS Receiver
	Accuracy	Depends on Ground Control Point (GCP) Accuracy and Distribution
Advantages	Large Area Mapping	

\* Typical project benchmark comparisons based on missions completed in Canada in 2016.

\*\* The current camera models are listed. These may be replaced by equivalent or better cameras depending on availability from the manufacturer.







mdMAPPER  
200



## ADDING OVERHEAD IS NOW AN EASY DECISION.

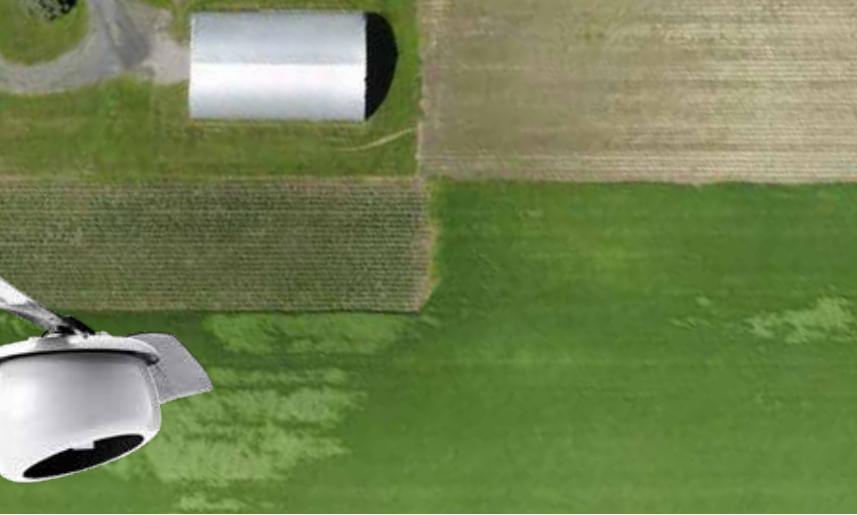
It's never been easier to make aerial mapping a part of your business.

Take your business to a higher level with a professional mapping solution from Microdrones. This basic package has everything you need to complete mapping projects more quickly and accurately, while gaining a competitive edge.

Compact but robust, the md4-200 aircraft at the heart of this solution is lightweight and easy to transport – yet tough enough to stand up to rough weather and daily use. mdMapper200 is a reliable, professional solution that will allow you to stay in the air longer and map up to 30 hectares (74 acres).



A minimum 18.2 megapixel camera paired with a custom, lightweight, vibration-free, nadir mount to capture the images you need. And because we integrate popular camera selections, when it's time to upgrade, you only have to change the camera, not the whole system!



## mdMapper200: Your gateway aerial mapping solution.

Get ready to elevate your business. This competitively priced, highly capable package makes it easy to start using drones on the job – or add a smaller, more lightweight UAV to your geospatial arsenal.

The compact md4-200 UAV is easy to take on any mapping job, yet achieves long flight times and reliability in less-than-perfect weather.

- Improve your efficiency with a high-quality German-engineered system.
- Achieve the same accuracy as traditional ground surveying in less time.
- Enjoy simplified transport of your UAV, thanks to its compact design.
- Fly 20 – 25 minutes, even in less-than-ideal conditions.
- Compatible with accessory kits for precision agriculture.

## The mdMapper200 package includes:



**md4-200**  
Robust, powerful, stable and dependable. Build your business on this versatile platform.



**Lightweight Camera & Mount**  
A minimum 18.2 megapixel camera paired with a custom, lightweight, vibration-free, nadir mount to capture the images you need.



**Charger & Flight Battery**  
One md4-200 flight battery and charger for maximum flight endurance.



**mdWaypoint**  
A flight planning module to prepare and carry out automated flights with your aircraft.



**Digital Data Link**  
Conveniently connect your Microdrones UAV to your digital devices.



**mdRC**  
Proven, professional controls and telemetry keep you in control when you need it most.



**mdCockpit Tablet Software**  
Simple swipes of the finger help you plan your survey area and monitor progress in flight on your Android tablet.



**Rugged Carrying Case**  
Bring your Microdrones UAV to tackle missions in the toughest corners of the Earth.



**mdAcademy**  
Become an expert at flying and maintaining your platform, to ensure many years of successful use.



## mdMAPPER200 technical specs:

### mdMAPPER200

Compact but robust, the md4-200 aircraft at the heart of this solution is lightweight and easy to transport – yet tough enough to stand up to rough weather and daily use.

- Payload: up to .6 pounds (250 grams)
- Flight time: up to 25 minutes depending on conditions
- Area covered in one battery charge: up to 74 acres (30 hectares)
- Sensor: Minimum 18.2 megapixel camera with custom nadir mount
- Georeferencing method: Aerial triangulation with GCP

#### mdMapper200

Flight Parameters	Area Covered (@120m)*	30 ha. (74 ac.)
	Camera Model**	Sony DSC-QX10
	Imagery Format	JPEG
	G.S.D. cm/pixel (@120m)	3.2 cm
	G.C.P.	Yes
	Overlaps (front/side)	80% / 60%
Post-Processing	Method	Aerial Triangulation
	Orientation	Calculated During the A.T.
	Position	GPS UAV
	Accuracy	Depends on Ground Control Point (GCP) Accuracy and Distribution
Advantages	Small Area Mapping	

\* Typical project benchmark comparisons based on missions completed in Canada in 2016.

\*\* The current camera models are listed. These may be replaced by equivalent or better cameras depending on availability from the manufacturer.







mdTECTOR  
1000 CH4



## GET OVER YOUR GAS DETECTION PROBLEMS.

mdTector, from Microdrones, is a lineup of professional aerial inspection solutions.

mdTector1000CH4, is a fully integrated aerial methane inspection package. It's purpose-built for professionals who are responsible for inspecting methane gas infrastructure.

mdTector1000CH4 consists of a Pergam gas sensor, mounted and integrated perfectly with a Microdrones md4-1000 UAV. It has an onboard HD video link. That means that you can see in real time what you are detecting with the laser sensor.



A perfectly integrated Pergam Lm Gen 2 for Methane (CH4) and methane-containing gases, 1 – 50,000 ppm x m.



## It goes where people shouldn't.

Whether your gas infrastructure is in a hard to reach riverbed or near a steep cliff... the tough, carbon-fiber built drone will easily navigate terrain that would be difficult, dirty or dangerous by traditional foot crews. Microdrones is known for its field-proven aircraft platform. It's sturdy, stable, resistant to wind and weather, as well as dust and dampness.

The mdTector1000CH4 is versatile and can be used for:

- Natural Gas Line Surveys
- Tank Inspections
- Gas Well Testing
- Landfill Emission Monitoring
- Plant Safety

## The mdTector1000CH4 package includes:



### md4-1000

Robust, powerful, stable and dependable. Build your business on this versatile platform.



### Methane Gas Sensor

Pergam LMM Gen 2 for Methane (CH<sub>4</sub>) and methane-containing gases, 1 – 50,000 ppm × m



### mdWaypoint

A flight planning module to prepare and carry out automated flights with your aircraft.



### Digital Data Link

Conveniently connect your Microdrones UAV to your digital devices.



### mdRC

Proven, professional controls and telemetry keep you in control when you need it most.



### mdCockpit Tablet Software

Simple swipes of the finger help you plan your survey area and monitor progress in flight on your Android tablet.



### Rugged Carrying Case

Bring your Microdrones UAV to tackle missions in the toughest corners of the Earth.



### mdAcademy

Become an expert at flying and maintaining your platform, to ensure many years of successful use.



### mdTector Viewer App

Visualize methane detection levels, post flight on a map, via an intuitive, easy to use Microdrones Android app.



### Live ppm × m value visualization

NEW: visualize methane leaks during flight with the mdCockpit Tablet Software.



## mdTECTOR1000 CH4 technical specs:

### Benefits

- Low cost compared to the expense and risk of traditional gas detection methods
- Broad range of detection, from 1 – 50,000 ppm × m
- Lightweight and easy to transport
- Easy to deploy and operate

### Outputs

The mdCockpit Android App provides a live data view of potential gas leaks in real time during flight.

- Methane Column Density in ppm × m
- Sensor Status
- Plot the LMm readings

The mdTector Android App allows you to graphically visualize and present all exported post-flight data on one convenient map.

- Data includes LMM reading and GNSS position
- Import TFD from md4-1000
- Quickly export data to .csv for exploitation in GIS software
- Data is displayed by color
- Toggle between Google Imagery and Google Maps

Target Gas	Methane (CH <sub>4</sub> ) and Methane-Containing Gases (Natural Gas and Similar)
Detection Limits	1 – 50,000 ppm × m
Detection Speed	0.1 seconds <sup>(1)</sup>
Distance	1.5 ft. – 100 ft. / 0.5 – 30 m <sup>(2)</sup>
Operating Temperature Range	1°F – 122°F / -17°C – +50°C
Laser Safety Class	Guide Light (Green Laser Light): Class 3R, Measurement Light (Infrared Laser Light): Class 1
Dimensions	70 (W) × 179 (D) × 42 (H) m
Weight	Sensor: 335 g

<sup>(1)</sup> The mdTector1000CH4 solution averages 10 data in order to record 1 value each second.

<sup>(2)</sup> Please take note that the lower distance values might represent safety issues for the UAV in terms of altitude above ground level.





## KEEP YOUR OPTIONS OPEN



mdSOLUTIONS



### See Things From a New Angle with +i

Turn your mdMapper1000 series into a powerful aerial inspection tool with the +i add-on. This system makes it easy to collect data to create accurate three-dimensional models. With +i, you can:

- Take images of structures from various angles, thanks to brushless gimbals
- View what the camera sees in real-time on a 7-inch monitor with tripod
- Frame images
- Capture outstanding imagery with a Sony a6300 with controlled zoom lens (16–50mm)

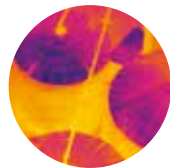


Whether you're completing infrastructure inspections, planning engineering work, or surveying construction sites, +i will add flexibility.



## Detect Heat Issues Early with +t

Add value to your services offering with +t, our thermal mapping add-on. Whether you're providing a solution for farms with persistent irrigation issues or including one more preventive measure into aerial assessments, +t will help ensure thermal issues are identified weeks before they can be detected visually – and long before they cause permanent damage. Help your clients be as efficient as they can be with +t.



- The +t add-on features a FLIR Vue Pro R thermal mapping sensor that allows you to:
- Identify irrigation issues before crops suffer irreparable yield loss
  - Inspect and detect problems with solar panels
  - Identify building heat loss via the roof, etc.



## Shed New Light on Crop Health with +m

Agronomists, researchers, and other precision agriculture professionals can gain valuable insight into the vitality of crops with +m. Featuring the acclaimed Micasense Rededge sensor, the multi-spectral power of the +m add-on allows you to:



- Monitor nutrients, moisture levels, and overall vigor
- Identify and measure crop issues like disease, pest problems, weeds, and water-stress
- Estimate yields
- Characterize soil and vegetative cover
- Use data for predictive analysis



As your UAV flies over a field, +m captures five spectral bands and data is processed into indices tailored for specific agricultural applications.



microdrones®

[www.microdrones.com](http://www.microdrones.com)

10/2018