ATMOS

Marlyn Cobalt

Specifications

MARLYN COBALT SPECIFICATIONS V2.3 OCTOBER 2023
SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

Atmos is a leader in geospatial drone technologies. With a deep awareness of our future challenges in resources, population growth, and climate change, our team of dedicated problem solvers are working hard to help you plan with efficiency, accuracy, and precision.

We specialise in high quality surveying and mapping VTOL drones, capable of operating in the roughest weather conditions.

Our flagship product Marlyn Cobalt is proudly designed, engineered, tested, and manufactured from our headquarters in Leiden, The Netherlands.

Contents

03 MARLYN SPECIFICATIONS

05 DUAL SMART BATTERY SYSTEM

06 BATTERY SPECIFICATIONS

07 BACKPACK SPECIFICATIONS

08 PPK: ACCURACY AND EFFICIENCY

10 PAYLOADS OVERVIEW

11 ATMOS LIDAR

12 SONY A7RIV SPECIFICATIONS

13 SONY A6100 SPECIFICATIONS

14 MICASENSE REDEDGE-P SPECIFICATIONS

15 MICASENSE ALTUM PT SPECIFICATIONS

Marlyn Specifications

OPERATION

Take-off & landing area	2 x 2 m [7 x 7 ft] required	
Set-up time	5 minutes	
Automatic Flight	Fully automatic flight execution of preprogrammed mission; Automatic flight with position control by user.	
Take-off & landing	Automatic takeoff, Assisted landing	Weather dependent
Cruise speed	65 km/h [40 mph]	Indicated Airspeed
Wind resistance	Take off: 45 km/h [28 mph] / Cruise: 55 km/h [34 mph] / Landing: 45 km/h [28 mph]	
Max flight time	50 mins	Dependent on environmental conditions
Pre-flight checklist	Yes (integrated in Navigator)	
Temperature range	-10°C to +40°C [14°F to 104°F]	Above 35°C operating restrictions apply
GCPs	Not required with optional PPK module	
Max. operating altitude	5000m [16,000 ft] above mean sea level (high altitude propellers required above 1800m)	

SAFETY

Safety Lights	Lights indicate Marlyn's status. When they are off Marlyn is safe to approach	
Return to home	Single tap function returns Marlyn to home	
Low Battery	Automatic return to home (configurable)	Emergency Controls Possible
Lost Link	Automatic return to home (configurable)	
Geofence	Both horizontal and vertical (configurable)	
System Diagnostics	Built-in comprehensive pre-flight and in-flight checks ensure a safe flight	
Avoidance Maneuvres	Pause, abort mission, perform an upward, sideward, or downward maneuvre. Resume if clear	
Manual flight override	Intuitively fly Marlyn to safety in both airplane and helicopter mode	
Emergency Landing	Immediately land Marlyn in helicopter mode in case of approaching aircraft	

SOFTWARE

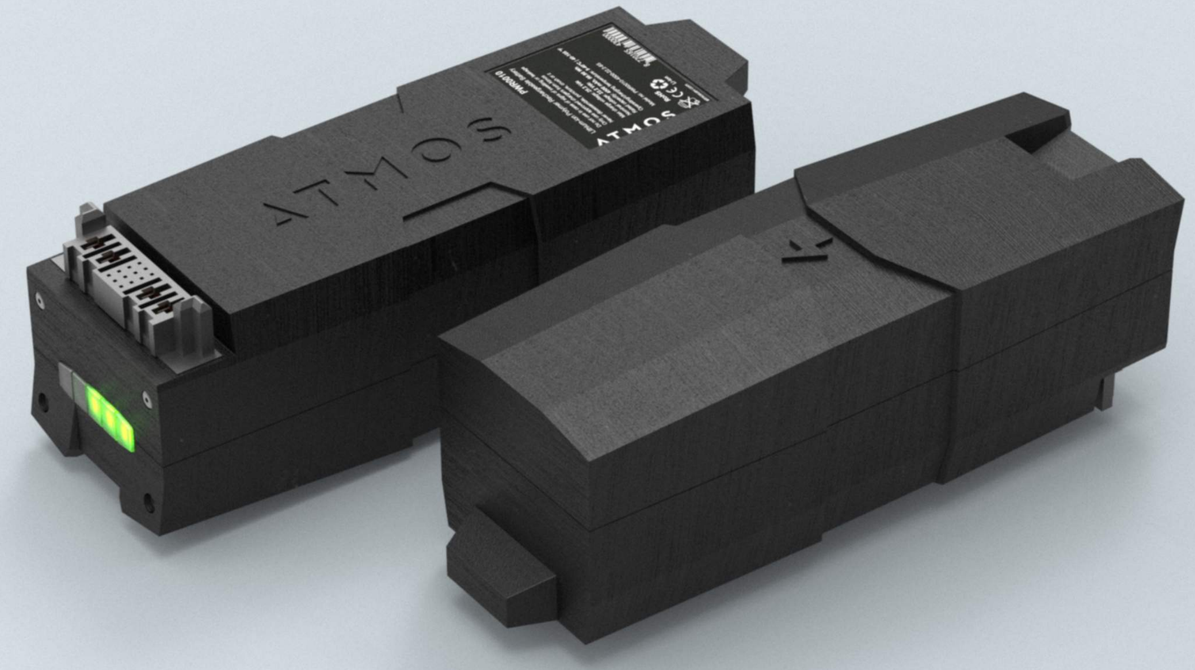
Flight planning + Processing	Navigator, Geotagger (In-house developed)	Included
System Requirements	Windows. CPU: Quad core 1.20GHz (i5-7Y57 Kaby Lake) or equivalent; RAM: 8 GB; Graphics: Intel HD Graphics 615 or equivalent; HDD: 100 MB + space for caching maps.	
Flight Operation	Automatic	Emergency Controls Possible
Input files	.KML, .KMZ, .GeoTIFF, .MBTiles, .WMTS	
Mapping Options	Polygon, Linear Corridor (Time based triggering, position based triggering)	

Marlyn Specifications

HARDWARE

Drone type	Hybrid — VTOL (Vertical Take-Off and Landing) & fixed-wing	
Max takeoff weight	6.4 kg [14.1 lbs] (Including batteries)	Standard Configuration
Wingspan	1.6 m [5.2 ft] (With detachable wings for easy transportation in Marlyn's backpack)	
Built in safety lights	2 Navigation lights, 2 Anti-collision lights — Over 1km [0.6 miles] of visibility	
Motors	4 brushless electric motors	
Telemetry link range	Default 7 km [4.3 miles]	Alternative configurations possible
RC link range	Default 1 km [0.6 miles] (Alternative configurations possible)	
Included accessories	Backpack, 4 batteries, battery charger, remote control, Navigator modem, in-field maintenance kit, battery case, Wind anemometer, cables, spare parts	
Materials	Carbon fiber frame surrounded with durable structural EPP	
RC Battery	3.7V 5000mAh Lithium-polymer battery. 8hrs Battery Life, 2.5hrs charge time. USB-C Charging. May be charged while in use.	

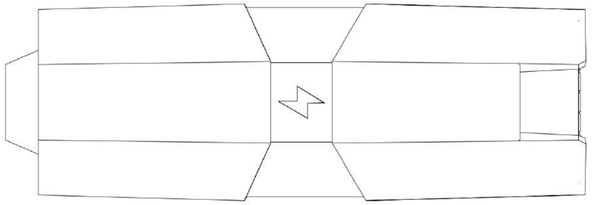
Dual Smart Battery System

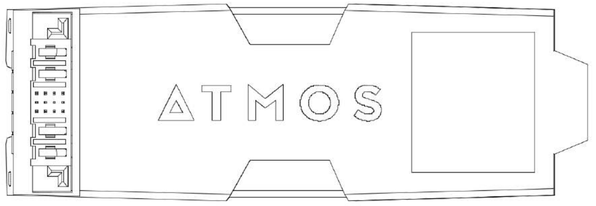


THE BATTERY SYSTEM IS A CRITICAL COMPONENT FOR SAFE OPERATION OF SURVEYING DRONES.

It also has a direct influence on the flight performance. To further increase the operational efficiency and reliability of Marlyn, Atmos' engineering team designed a dual smart battery system that results in redundancy, peace-of-mind, and durability.

Safer Smarter Batteries





REDUNDANCY

Each battery acts as a failsafe to the other to maximize reliability ensuring safe operation without any disruptions. The two batteries are used in parallel to create one integrated power system. Marlyn's smart power board can recognize any unexpected inconsistencies and initiate its predefined safety routine to land automatically.

SPECIFICATIONS

Type of battery	Lithium-polymer battery	1 set (2 batteries) required to fly
Battery capacity	4500 mAh (99.9 Wh)	9000 mAh per battery set
Weight	670 g [24 oz] per battery	
Status lights	Transparent button with 5 imbedded LED status lights	
Size (LxHxW)	170 x 58 x 58 mm [6.7 x 2.3 x 2.3 in]	
Charging Time	30 - 60 min (60 min per battery set, when completely discharged)	
Air Travel Compliance	Meets standard conditions for air travel in carry-on luggage below 100Wh	

PEACE OF MIND

Battery Management System (BMS for optimal flight performance. Both batteries are closely monitored in terms of remaining energy capacity, voltage, and temperature. Complying with airline carryon luggage regulations making it easy to transport from one job to another

DURABILITY

After 300 charges, you still have 80- 90% capacity remaining. The strengthened shell with rugged connectors eliminates potential failure points for increased safety and ease of use.

Marlyn's Backpack

SPECIFICATIONS

Size	75cm x 45cm x 85cm
Weight	Backpack 11 kg + Marlyn +/- 17 kg + accessories +/- 19 kg
Material	Nylon exterior, protective foam interior
Capacity	Marlyn, 4 sets of batteries, laptop, pole/total station, extra payload module, telemetry module, RC module, and small accessories
Travel	Handled as standard luggage by airlines
Water protection	Water proof vinyl Base
Straps	Padded shoulder straps with waist belt

Why PPK?

Capturing high-resolution images with ultra-precise geotagging is crucial when converting aerial imagery into accurate point clouds.

When looking at the different options to increase the accuracy, Ground Control Points (GCPs) is the least effective method as it requires a lot of time in the field and more complex post-processing which results in higher costs in the end.

By choosing PPK, the accuracy of your image geotags is drastically improved. Data recorded by the PPK module is augmented by satellite corrections resulting in ultra-precise geotags. This ensures high precision datasets without the use of GCP’s.

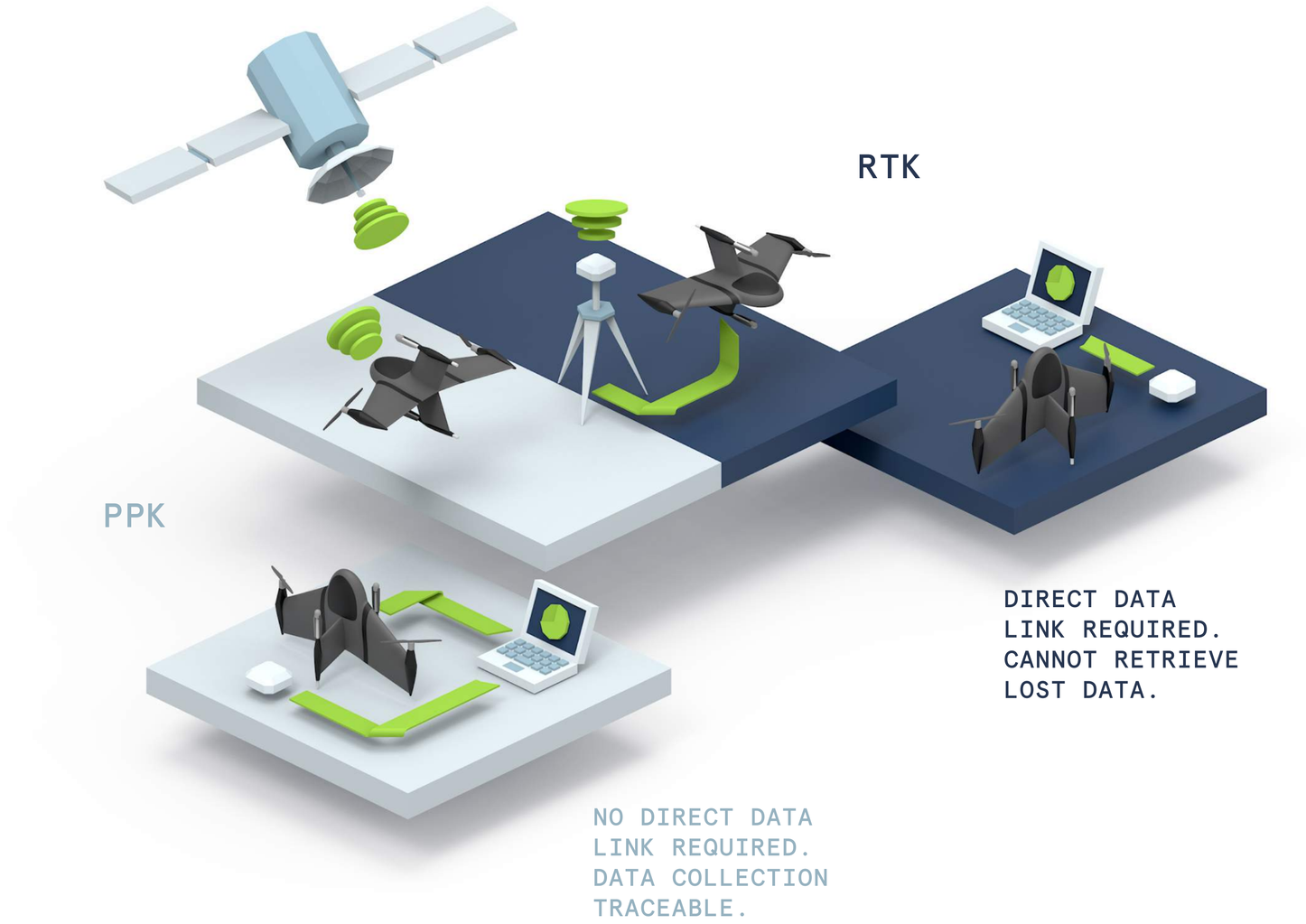
These accuracies can be achieved with any PPK enabled Marlyn with a properly located base station or CORS network.

Accuracy and Efficiency

REDUCE TIME AND COSTS WITH A PPK- ENABLED MARLYN

- Absolute accuracy down to cm-level, with no realtime datalink required.
- High data quality and consistency over your complete project without laying out GCPs.
- High end Topcon PPK featuring multi-constellation, multi frequency all-in-view satellite tracking.

PPK Benefits



PPK VS. RTK

The two most common methods of GPS correction technology are Real Time Kinematic (RTK) and Post Processing Kinematic (PPK).

RTK (Real Time Kinematic) relies on continuous link between a fixed GNNS base station (above a known point) and a GNSS rover on the UAV. During an RTK mission, the RTK module must stay connected to the base station while it's gathering data in order for the two-way communication to inform positioning.

Due to the long distances and obstructions between the drone and the base station, signals can be disrupted resulting in loss of correction data and a lower percentage of accurate camera positions in the flight.

PPK, on the other hand, processes the positioning information after the flight, not during. Data is logged in the aircraft and combined with data from the base station when the flight is completed. As a result, there is no risk of data or initialisation loss due to radio link disruptions. PPK drones therefore offer more flexibility in terms of how and where the drone is deployed.

Regarding the processing of the captured data, both technologies are similar, however PPK is more thorough as it traces back and forth through the data multiple times to give more comprehensive results.

Payloads

UPGRADEABLE & MODULAR

Marlyn's payloads are upgradable and swappable in minutes, no tools required! A variety of RGB and specialty camera modules are available to suit your project needs.

LIDAR

	Atmos LiDAR
Point Rate	640,000 pts/s
Precision	2-3 cm [0.8-1.2 in]
Horizontal FoV	Up to 100 deg
Range	150 m [490 ft]

RGB

	Sony A7R IV	Sony A6100
Sensor Format	Full Frame	APS-C
Spectral bands	RGB	RGB
Pixel count	61 MP	24 MP
Lowest GSD	1.4 cm/px [0.6 in/px]	1.96 cm/px [0.8 in/px]

MULTISPECTRAL

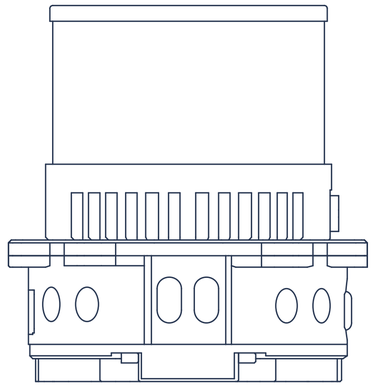
	RedEdge-P	Altum PT **Multispectral EO Bands**	Altum PT **Thermal Band**
Sensor Layout	5 individual sensors +1 panchromatic sensor	5 individual sensors +1 panchromatic sensor	FLIR LWIR
Spectral bands	RGB, Red Edge, Near-IR	RGB, Red Edge, Near-IR	8-14 µm
Pixel count	Spectral 1.6 MP + Panchromatic 5.1 MP	Spectral 3.2 MP + Panchromatic 12 MP +	160 x 120 Pixels
Lowest GSD	2.6 cm/px [1 in/px]	1.69 cm/px [0.7 in/px]	21.3 cm/px [8.4 in/px]

LiDAR

NEW

REACH YOUR FULL POTENTIAL

Operating in vegetated areas or working on projects where you need a straight-to-point-cloud workflow? Then look no further! The Atmos Lidar is a custom-assembled spinning laser, with the most accurate LiDAR and IMU that is currently equipped on a VTOL drone.



SPECIFICATIONS

Scanner	Hesai XT32M2X
IMU	Inertial Labs INS-D-OEM
GNSS	NovAtel OEM7720
Point rate	640,000 pts/s
Number of Returns	up to 3 returns
Field of View (Vertical)	43 deg
Field of View (Horizontal)	Up to 100 deg (user setting)

Ranging Accuracy	+/- 1cm
Precision	0.5 cm (typical, 1σ)
Point Density at 100m	up to 110 pts/m2
Max Altitude	150m (500ft)
Pitch, Roll Accuracy	<0.01 deg
Yaw Accuracy	0.05 deg
Wavelength	905nm

RESULTS DEPEND ON ENVIRONMENTAL CONDITIONS.
*ALL-ROUND MAPPING AT 20% SIDELAP.
FOR HIGH VEGETATION DENSITY OR HIGHER DETAIL, WE RECOMMEND 50% SIDELAP OR A CROSS-PATTERN FLIGHT PLAN.

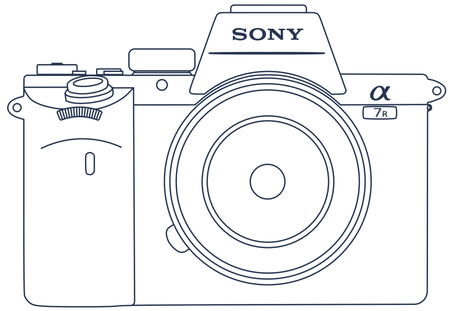
RESULTS

Altitude	Coverage*
60 m [200 ft]	290 ha [710 ac]
80 m [260 ft]	400 ha [990 ac]
100 m [330 ft]	480 ha [1190 ac]
120 m [400 ft]	580 ha [1430 ac]
150 m [500 ft]	790 ha [1960 ac]

SONY A7R IV

CAPTURE THE LARGEST AREAS

Sony's 61 Megapixel Full-Frame sensor meets Zeiss' renowned 21mm lens, offering cm-level imagery and a whopping 350Ha coverage per flight. The A7RIV makes even the biggest areas part of your everyday offering.



RESULTS DEPEND ON ENVIRONMENTAL CONDITIONS.
*ALL-ROUND MAPPING AT 60% SIDELAP.
FOR OBLIQUE, 3D STRUCTURE MAPPING, WE
RECOMMEND 80% SIDELAP OR A CROSS-PATTERN.
**ACHIEVED ON HARD SURFACES, WITH PPK-
ENABLED UNITS IN OPTIMAL CONDITIONS

SPECIFICATIONS

Sensor Format	Full Frame
Pixel count	61 MP
Focal length	21 mm
Shutter type	Focal Plane Shutter
Trigger Frequency	0.8 Hz (at full resolution)
Vertical Accuracy	3 cm [1.2 in] **
Horizontal Accuracy	1 cm [0.4 in]**

Spectral bands	RGB
Sensor size	35.7 x 23.8 mm
Pixels array	9504 x 6336 px
Pixel pitch	3.76 µm
Integration	Powered and controlled by Marlyn
Vertical field of view	59° (-10.5°, +48.5°)
Horizontal field of view	81°

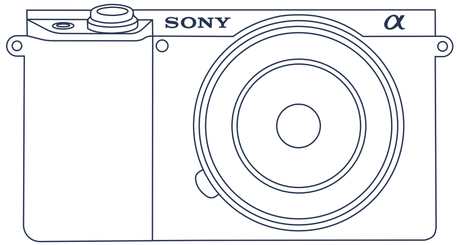
RESULTS

GSD	Altitude	Coverage*	Frontal Overlap* No wind condition
1.4 cm [0.6 in]	80 m [260 ft]	200 ha [500 ac]	76%
1.8 cm [0.7 in]	100 m [330 ft]	250 ha [600 ac]	81%
2.2 cm [0.9 in]	120 m [400 ft]	320 ha [790 ac]	84%
3.6 cm [1.4 in]	200 m [650 ft]	500 ha [1200 ac]	90%
5.4 cm [2.1 in]	300 m [990 ft]	700 ha [1700 ac]	94%

SONY A6100

AFFORDABLE AND ACCURATE

A great camera for an even greater price! The Sony A6100 is a 24 MP sensor which provides GSD results as low as 1.96 cm. Fitted with a Meike 12mm wide-angle lens, it also provides fantastic coverage and is great for capturing oblique features for 3D mapping of urban sites.



RESULTS DEPEND ON ENVIRONMENTAL CONDITIONS.
*ALL-ROUND MAPPING AT 60% SIDELAP.
FOR OBLIQUE, 3D STRUCTURE MAPPING, WE
RECOMMEND 80% SIDELAP OR A CROSS-PATTERN.
**ACHIEVED ON HARD SURFACES, WITH PPK-
ENABLED UNITS IN OPTIMAL CONDITIONS

SPECIFICATIONS

Sensor Format	APS-C
Pixel count	24 MP
Focal length	12 mm
Shutter type	Focal Plane Shutter
Trigger Frequency	1 Hz (at full resolution)
Vertical Accuracy	4 cm [1.6 in]**
Horizontal Accuracy	2 cm [0.8 in]**

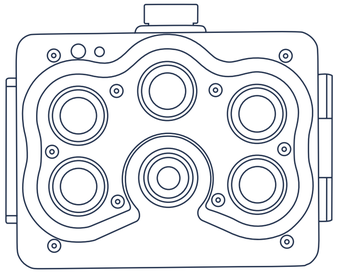
Spectral bands	RGB
Sensor size	23.5 x 15.6 mm
Pixels array	4000 x 6000 px
Pixel pitch	3.85 µm
Integration	Powered and controlled by Marlyn
Vertical field of view	67.4° (-7.7°, +49.7°)
Horizontal field of view	90°

RESULTS

GSD	Altitude	Coverage*	Frontal Overlap* No wind condition
2.6 cm [1 in]	80 m [260 ft]	250 ha [620 ac]	83%
3.3 cm [1.3 in]	100 m [330 ft]	300 ha [740 ac]	86%
3.9 cm [1.5 in]	120 m [400 ft]	350 ha [870 ac]	89%
6.5 cm [2.6 in]	200 m [650 ft]	650 ha [1600 ac]	93%
9.8 cm [3.9 in]	300 m [990 ft]	850 ha [2100 ac]	95%

MicaSense RedEdge-P

The RedEdge-P is the newest industry-standard Multispectral camera, built-to-last with 5 spectral bands and a high-res panchromatic sensor. The RedEdge-P has the ability to generate accurate & repeatable plant health indices and high-accuracy RGB images in one flight.



	MULTISPECTRAL	PANCHROMATIC
Spectral bands	RGB, Red Edge, Near-IR	171.5 - 1097.5 nm
Pixel count	1.6 MP	5.1 MP
Sensor size	4.73 x 4.2 mm	8.33 x 7.4 mm
Focal length	5.5 mm	10.3 mm
Pixel size	3.45 µm	3.45 µm
Output bit depth	12-bit	12-bit
Field of view	49.6° HFOV x 38.3° VFOV	44.5° HFOV x 37.7° VFOV

RESULTS DEPEND UPON ENVIRONMENTAL CONDITIONS.
*SIDE OVERLAP OF 60% IS USED FOR CALCULATING RESULTS
** BEST ACHIEVABLE IN NO WIND CONDITION

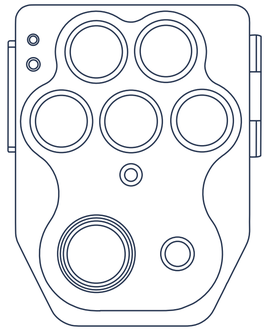
RESULTS

PANCHROMATIC

GSD	Altitude	Coverage*	Frontal Overlap**
2.6 cm [1 in]	80 m [260 ft]	100 ha [250 ac]	83%
3.3 cm [1.3 in]	100 m [330 ft]	120 ha [300 ac]	87%
3.9 cm [1.5 in]	120 m [400 ft]	140 ha [350 ac]	89%
6.6 cm [2.6 in]	200 m [650 ft]	240 ha [600 ac]	93%
9.8 cm [3.9 in]	300 m [990 ft]	360 ha [900 ac]	96%

MicaSense Altum PT

The Altum-PT is the most advanced Agricultural sensor system on the market today, capturing synchronized multispectral, thermal, and panchromatic data for plant health indices and RGB outputs at leaf-level resolutions.



	MULTISPECTRAL	THERMAL	PANCHROMATIC
Spectral bands	RGB, Red Edge, Near-IR	7.5 -13.5 µm	171.5 - 1097.5 nm
Pixel count	3.2 MP	320 x 256 Pixels	4112 x 3008 Pixels
Sensor size	7.12 x 5.33 mm	3.84 x 3.07 mm	14.18 x 10.37 mm
Focal Length	8 mm	4.5 mm	16.3 mm
Pixel size	3.45 µm	12 µm	3.45 µm
Output bit depth	12-bit	16-bit	12-bit
Field of view	48° HFOV x 36.8° VFOV	48° HFOV x 39° VFOV	46° HFOV x 35° VFOV

RESULTS DEPEND UPON ENVIRONMENTAL CONDITIONS.
*SIDE OVERLAP OF 60% IS USED FOR CALCULATING RESULTS
** BEST ACHIEVABLE IN NO WIND CONDITION

RESULTS

PANCHROMATIC

GSD	Altitude	Coverage*	Frontal Overlap**
1.7 cm [0.7 in]	80 m [260 ft]	100 ha [250 ac]	82%
2.1 cm [0.8 in]	100 m [330 ft]	120 ha [300 ac]	86%
2.5 cm [1 in]	120 m [400 ft]	160 ha [400 ac]	88%
4.2 cm [1.7 in]	200 m [650 ft]	260 ha [640 ac]	93%
6.4 cm [2.5 in]	300 m [990 ft]	360 ha [900 ac]	95%

sales@atmosuav.com
www.atmousuav.com
+31 (0) 88 028 6670

Hangaargebied
Marinevliegkamp 356
2236ZZ Valkenburg (ZH)
The Netherlands

ATMOS

CARE FOR THE ENVIRONMENT
BY KEEPING THIS DOCUMENT DIGITAL.