Mena 3D
TOP MEASURE

Marlyn

The go-anywhere mapping solution, made by surveyors for surveyors

ATMOS UAV

Vertical take-off and landing (VTOL)

All you need is a 2×2 m space

Efficient and faster mapping

50 minutes per flight

Smart dual battery system

Redundancy and peace of mind

In-house developed autopilot

Enjoy fully autonomous flights

Post Processed Kinematics (PPK)

No need for ground control points (GCPs)

High wind resistance up to 12.5 m/s

No more lost days due to wind conditions

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Marlyn Specification Sheet

Hardware

Drone type	Hybrid (VTOL & fixed-wing)	
Weight without payload	5.7 kg (incl. batteries)	
Max payload weight	Up to 1 kg	
Wingspan	1.6 m (detachable wings)	
Motors	4 electric motors	
Radio link range	Up to 3km line of sight	frequency customizable
Camera options	RGB (Sony RX1RII, UMC R10C), Multispectral (MicaSense-MX), Thermal (FLIR Duo Pro R)	check our camera specsheet for details
Included accessories	Backpack, battery charger, remote control, MarLynk modem & maintenance kit	
Materials	Carbon fiber frame surrounded with durable structural EPP	

Software

Flight planning software	MarLynk (in-house developed)	included
Operating system	Windows	
Image processing software	Compatible with Pix4D, Agisoft, SimActive and more	optional
Input files	.KML, .KMZ, .GeoTIFF, .MBTiles, .WMTS	
Updates	Free	

Operation

Take-off & landing area	2 x 2 m required	
Set-up time	7 minutes	
Autonomous flight	Yes	
Take-off & landing	Automatic	
Emergency procedures	Automatic (configurable)	
Cruise speed	12.5 - 26.4 m/s	
Wind resistance	12.5 m/s (for take-off, cruise and landing)	tested
Max flight time *	50 mins	
Pre-flight checklist	Yes (integrated in MarLynk)	
Temperature range	-10°C - 40°C	tested
GCPs	Not required with optional PPK module	

RGB Camera Specification Sheet

The best sensors for every mapping application

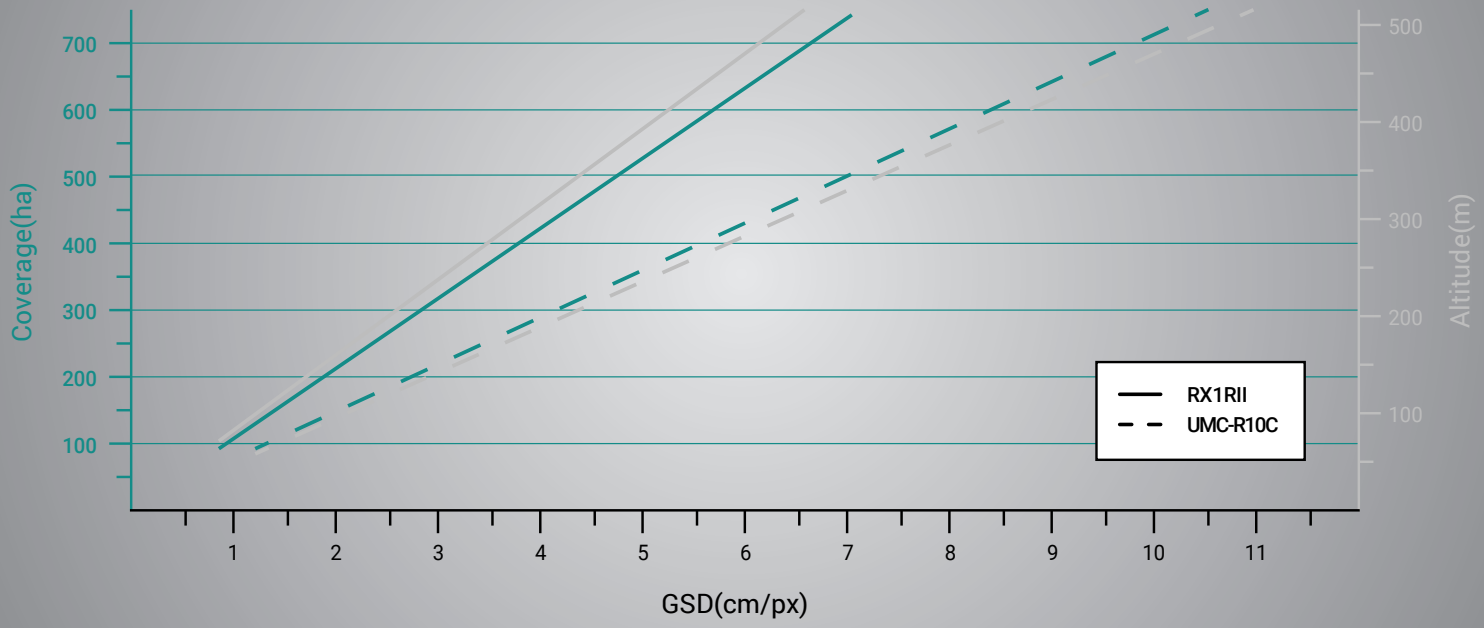
Metric

	SONY RX1RII	SONY UMC-R10C
		
	Take advantage of the ultra-high resolution of the 42.4 MP full-frame sensor to achieve GSD and accuracy down to 1 cm! Map 1 km2 in 30 minutes with a GSD of 1.6 cm.	The industry workhorse and proven payload for many professional users. Map 1 km2 in 30 minutes with a GSD of 3 cm.
		
Details		
Sensor layout	Full Frame	APS-C
Spectral bands	RGB	RGB
Sensor size	35.9 x 24 mm	23.2 x 15.4 mm
Pixel pitch	4.51 µm	4.25 µm
Pixel count	42.4 MP	20.1MP
Shutter type	Leaf shutter	Focal plane
Pixels array	7952 x 5304 px	5456 x 3632 px
Weight	505 g (incl. battery & SD card)	285 g (incl. battery & SD card)
Focal length of lens	35 mm	20 mm
Trigger frequency	1.2 Hz at full resolution	1.0 Hz at full resolution

Results

Lowest achievable GSD	0.85 cm/px	1.2 cm/px
Flight altitude	66 m	57 m
Frontal overlap	70 %	67 %
Max coverage	89 ha	87 ha
GSD at 1.5 cm/px	**1.5 cm/px**	**1.5 cm/px**
Flight altitude	117 m	71 m
Frontal overlap	83 %	75 %
Max coverage	157 ha	108 ha
GSD at 2 cm/px	**2 cm/px**	**2 cm/px**
Flight altitude	156 m	95 m
Frontal overlap	87 %	81 %
Max coverage	210 ha	144 ha
GSD at 2.5 cm/px	**2.5 cm/px**	**2.5 cm/px**
Flight altitude	194 m	118 m
Frontal overlap	90 %	85 %
Max coverage	262 ha	180 ha
Flight altitude at 100 m	**100 m**	**100 m**
GSD	1.3 cm/px	2.1 cm/px
Frontal overlap	80 %	82 %
Max coverage	135 ha	153 ha
Flight altitude at 120 m	**120 m**	**120 m**
GSD	1.5 cm/px	2.6 cm/px
Frontal overlap	80 %	85 %
Max coverage	162 ha	184 ha

Flight altitude at 500 m	500 m	500 m
GSD	6.4 cm/px	10.6 cm/px
Frontal overlap	96 %	96 %
Max coverage	675 ha	764 ha



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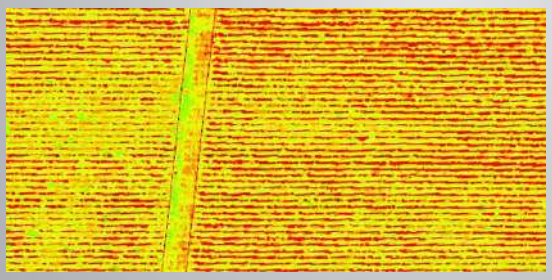
Multispectral Camera Specification Sheet

The best sensors for every agricultural application

Metric

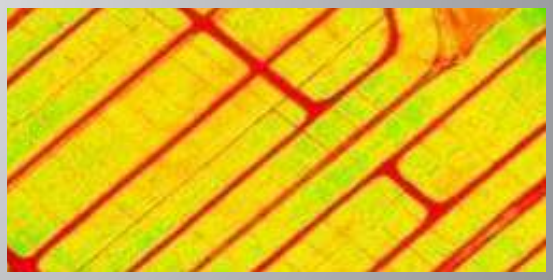
RedEdge-MX

A great solution for multispectral imagery. Generate plant health indices and RGB images in a single flight!



Altum

The revolutionary 3 in 1 camera empowers professional users to capture advanced thermal, multispectral and RGB imagery at the same time.



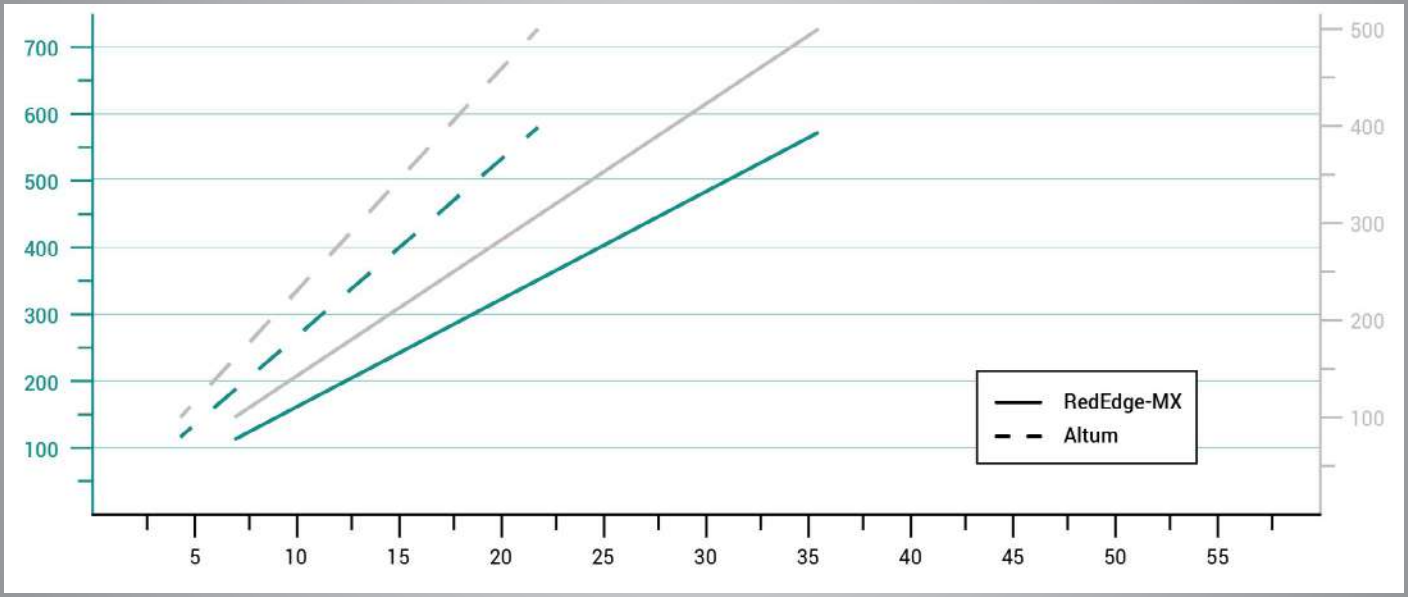
Details

	RedEdge-MX	Altum	
		Multispectral	Thermal
Sensor layout	5 individual sensors	5 individual sensors	FLIR LWIR
Spectral bands	RGB, Red Edge, Near-IR	RGB, Red Edge, Near-IR	8-14 µm
Sensor size	4.8 x 3.6 mm	7.16 x 5.35 mm	1.9 x 1.43 mm
Pixel pitch	3.75 µm	4.25 µm	
Pixel count	5 x 1.2 MP	5 x 3.2 MP	
Pixels array	1280 x 960 px	2064 x 1544 px	160 x 120 px
Shutter type	Global shutter	Global shutter	
Weight	232 g (incl. SD card)	406.5 g (incl. SD card)	
Focal length of lens	5.4 mm	8 mm	1.77 mm
Trigger frequency at full resolution	1 Hz	1 Hz	1 Hz

Results

Lowest achievable GSD	**6 cm/px**	**3.7 cm/px**	**57.3 cm/px**
Flight altitude	86 m	85 m	
Frontal overlap	70%	70%	
Max coverage	102 ha	101 ha	
GSD at 7 cm/px	**7 cm/px**	**7 cm/px**	**109 cm/px**
Flight altitude	101 m	162 m	
Frontal overlap	75%	84%	
Max coverage	118 ha	191 ha	
GSD at 8 cm/px	**8 cm/px**	**8 cm/px**	**124 cm/px**
Flight altitude	115 m	185 m	
Frontal overlap	78%	86%	
Max coverage	135 ha	218 ha	
GSD at 9 cm/px	**9 cm/px**	**9 cm/px**	**140 cm/px**
Flight altitude	130 m	208 m	
Frontal overlap	80%	88%	
Max coverage	152 ha	245 ha	
Flight altitude at 100 m	**100 m**	**100 m**	
GSD	7 cm/px	4.3 cm/px	67 cm/px
Frontal overlap	75%	75%	
Max coverage	118 ha	118 ha	
Flight altitude at 120 m	**120 m**	**120 m**	
GSD	8.3 cm/px	5.2 cm/px	81 cm/px
Frontal overlap	79%	79%	
Max coverage	141 ha	142 ha	

Flight altitude at 500 m	500 m		500 m	
GSD	34.7 cm/px		21.7 cm/px	337 cm/px
Frontal overlap	95%		95%	
Max coverage	585 ha		589 ha	



GSD(cm/px)

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PPK Accuracy

Reduce time and costs with a PPK-enabled Marlyn!

Metric

Why PPK

Flight Planning | **Fewer to no GCPs needed** | Capture Data | Process & Analyse

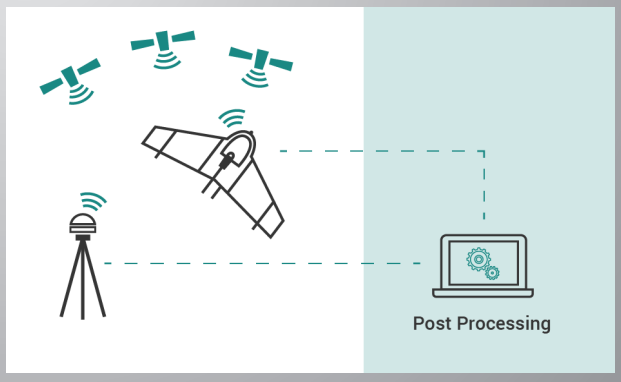
Capturing high-resolution images with ultra- precise geotagging is crucial when converting aerial imagery into accurate point clouds.

When looking at the different options to increase the geotagging 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. Using GPS correctional technology, the data is improved drastically by achieving ultra-precise geotagging as the aircraft's satellite positioning is fully augmented with supportive base station/VRS information.

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

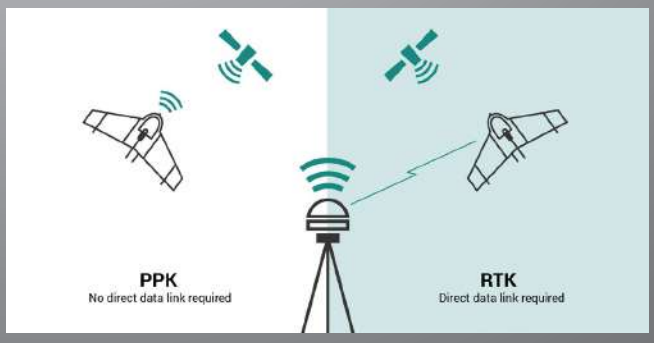
How does it work?

A Global Navigation Satellite System (GNSS) is a constellation of satellites providing signals from space that transmit positioning and timing data to the GNSS receiver (PPK module). Each satellite constantly sends its position and the time to the reciever. The receiver then uses this data, correlated from multiple satellites, to precisely determine its location.



PPK vs RTK

RTK (Real Time Kinematic) relies on GNSS positioning and a stable radio link between a base station on the ground and a GPS antenna on board the drone. Due to these requirements, RTK positioning can have its downsides, with radio link outages and GNSS signal blocks. Due to the long distances between the drone and the base station, signals can be obstructed 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 initialization 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.

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Performance

AsteRx-m2a UAS

- Multi-constellation, multi-frequency all-in-view satellite tracking
- Centimeter-level (RTK) position accuracy with or without a real-time datalink
- Heading output for orientation or INS integrations
- AIM+ anti-jamming and monitoring system
- Camera shutter synchronisation

Position Accuracy	Horizontal	Vertical
Standalone	1.2 m	1.9 m
SBAS	0.6 m	0.8 m
DGNSS	0.4 m	0.7 m

RTK Accuracy	
Horizontal accuracy	0.6 cm + 0.5 ppm
Vertical accuracy	1 cm + 1 ppm
Initialisation	7s

GNSS Attitude Accuracy	Heading	Pitch/ Roll
Antenna separation 1m	0.15°	0.25°
Antenna separation 5m	0.03°	0.05°

Velocity Accuracy	0.03 m/s

Maximum update rate	
Position	100 Hz
Position and attitude	50 Hz
Measurements only	100 Hz

Latency	<10 ms

Time precicion	
xPPS Out	5 ns
Event accuracy	<20 ns

Time to first fix	
Cold start	< 45 s
Warm start	< 20 s
Re-acquisition	avg 1 s

Tracking performance	
Tracking	20 dB-Hz
Acquisition	33 dB-Hz

MarLynk Flight Control System

Maximize your surveying capacity & conquer every project

About

We want to give professionals across all industries access to data gathered from the skies, by making the data gathering process as easy as possible.

With this vision in mind, we made Marlyn's flight fully automated and are providing an accompanying software suite, MarLynk, that makes flight planning and monitoring easy and straightforward.

Key Features

Easy & Intuitive

- **User-friendly interface**
  Offers a smart and intuitive user experience and simplifies your planning process.
- **Pre-flight checklist**
  Enables you to get Marlyn ready to fly in just a few minutes.
- **Windows compability**
  Helps smooth your workflow, no matter whether you are in the office or out in the field.

Hands-off experience

- **One-slide take-off**
  With one simple slide, Marlyn will take-off automatically to gather all the data that you need without any human intervention.
- **Flight overview & Emergency procedures**
  During flight, MarLynk offers you a full overview of all the important flight parameters, as well as custom safety procedures.

Advanced features

- **Battery swapping feature**
  MarLynk enables you to change batteries in the middle of a mission and makes mapping multiple/ large areas possible.
- **Custom backgrounds**
  You can easily upload custom background maps using a WMTS server or a MbTiles file.
- **KML/ KMZ import**
  Create a seamless workflow with the ability to import KML/ KMZ files.

System Requirements

	Minimum	Recommended
CPU	Quad core 1.20 GHz (i5-7Y57 Kaby Lake)	Intel core i3-8300T
RAM	8GB	8GB
Graphics	Intel HD Graphics 615	Intel UHD Graphics 630
HDD	100 MB	100 MB

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Dual Smart Battery System

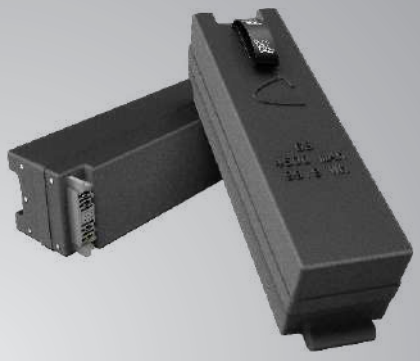
A system you can trust

Metric

The necessity of a smart system

The battery system is the surveying drones' most common source of failure.

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.



Benefits

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.

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 carry-on luggage regulations making it easy to transport from one job to another

Durability

- After 300 charges, you still have 80-90% capacity remaining.
- Ruggedized connectors and pulling straps to eliminate potential failure points in order to increase safety and ease of use.

Details

Type of battery	Lithium-polymer battery	1 set (2 batteries) needed for flight
Battery capacity	4500 mAh (99.9 Wh)	9000 mAh per battery set
Weight	670 g per battery	
Size (LxHxW)	220 x 55 x 57 mm	
Charging Time	30 - 60 min	60 min per battery set, when completely discharged