senseFly
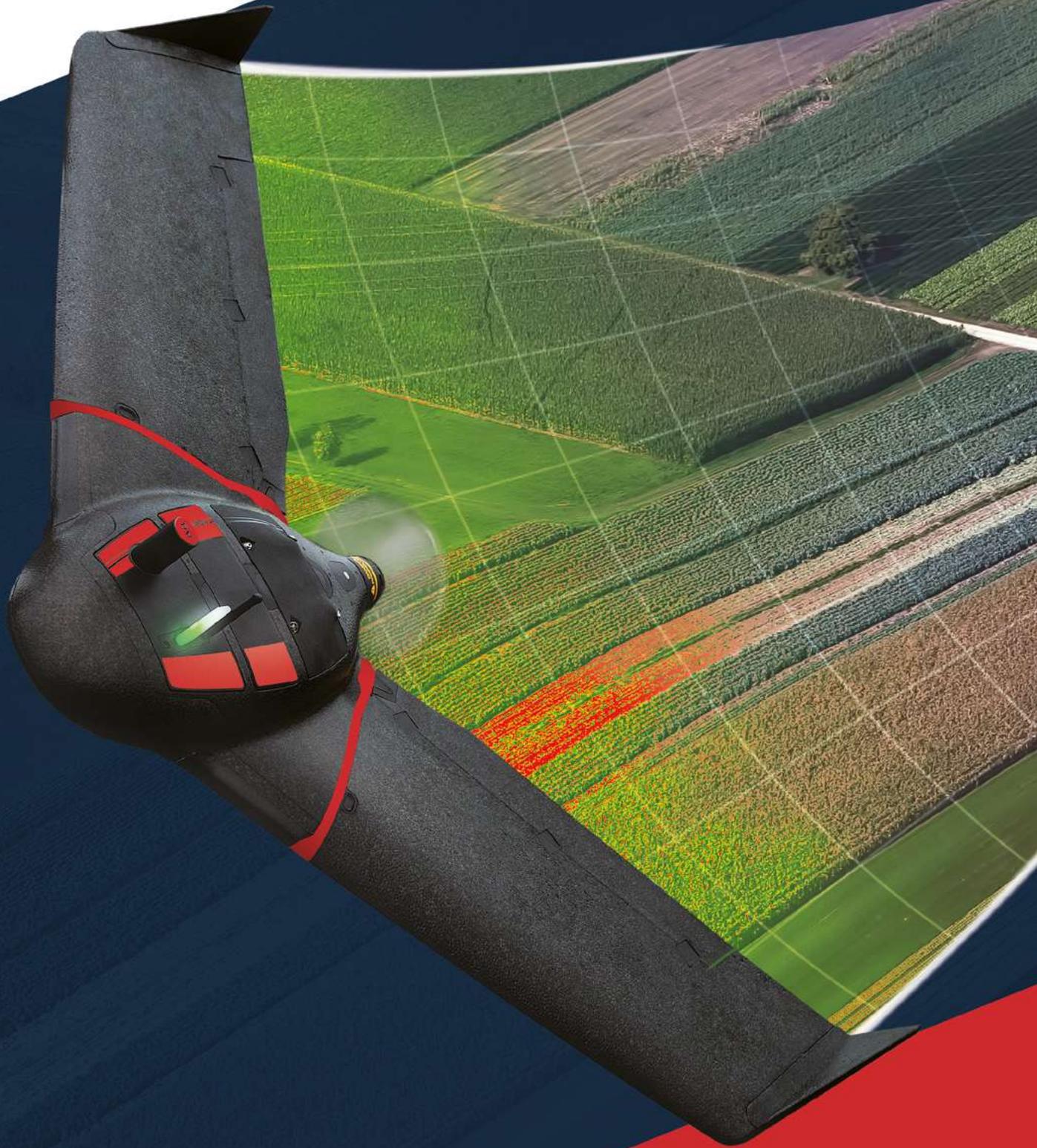

eBee Ag

eBee Ag

Efficiency is in the field.

The eBee Ag is a reliable, affordable fixed-wing drone that helps farmers, agronomists and service providers map and monitor crops quickly and easily. With its fixed Duet M multispectral/RGB camera, automated flight and vast coverage, eBee Ag delivers accurate and timely plant health insights for making better decisions to improve crop yields, save on inputs, allocate resources and achieve greater profit potential.

"Thanks to the eBee Ag multispectral maps we have managed to reduce our operational and logistical costs by 30%, through being able to define different sugarcane harvest zones based on the crop's quality in different regions. That work resulted in an increase of 15% in the value of the product we sold to our customers."

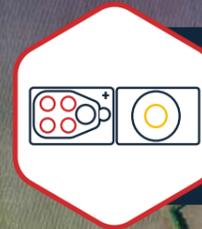Jorge Gomez Andrade, CEO, Agronos Soluciones Agropecuarias

Up to 55 minutes flight time*
45 minutes with standard battery and up to 55 minutes with available endurance battery

Down to 2.5 cm absolute accuracy with RGB
Available RTK allows you to achieve the high precision accuracy your project requires, without GCPs.

Optimized multispectral outputs
Comes with senseFly Duet M Camera a dual sensor of senseFly S.O.D.A. & Parrot Sequoia+.

Lightweight and durable
Designed to operate in the harshest conditions, thanks to its optimized airframe and ultra-tough under-body skin.

Safe and easy to use
Simply plan your mission. Launch the drone and collect critical project data in minutes.

*Results can vary depending on the flight conditions

senseFly

Duet M

The advanced dual-purpose agricultural camera

The senseFly Duet M is an innovative dual-purpose RGB and 4-band multispectral mapping camera. By combining multispectral and RGB, users can quickly spot troublesome areas from above in high-resolution RGB and gain critical NDVI data invisible to the naked eye—all in one flight. Use it to create geo-accurate multispectral maps and digital surface models (DSMs) quickly and easily.
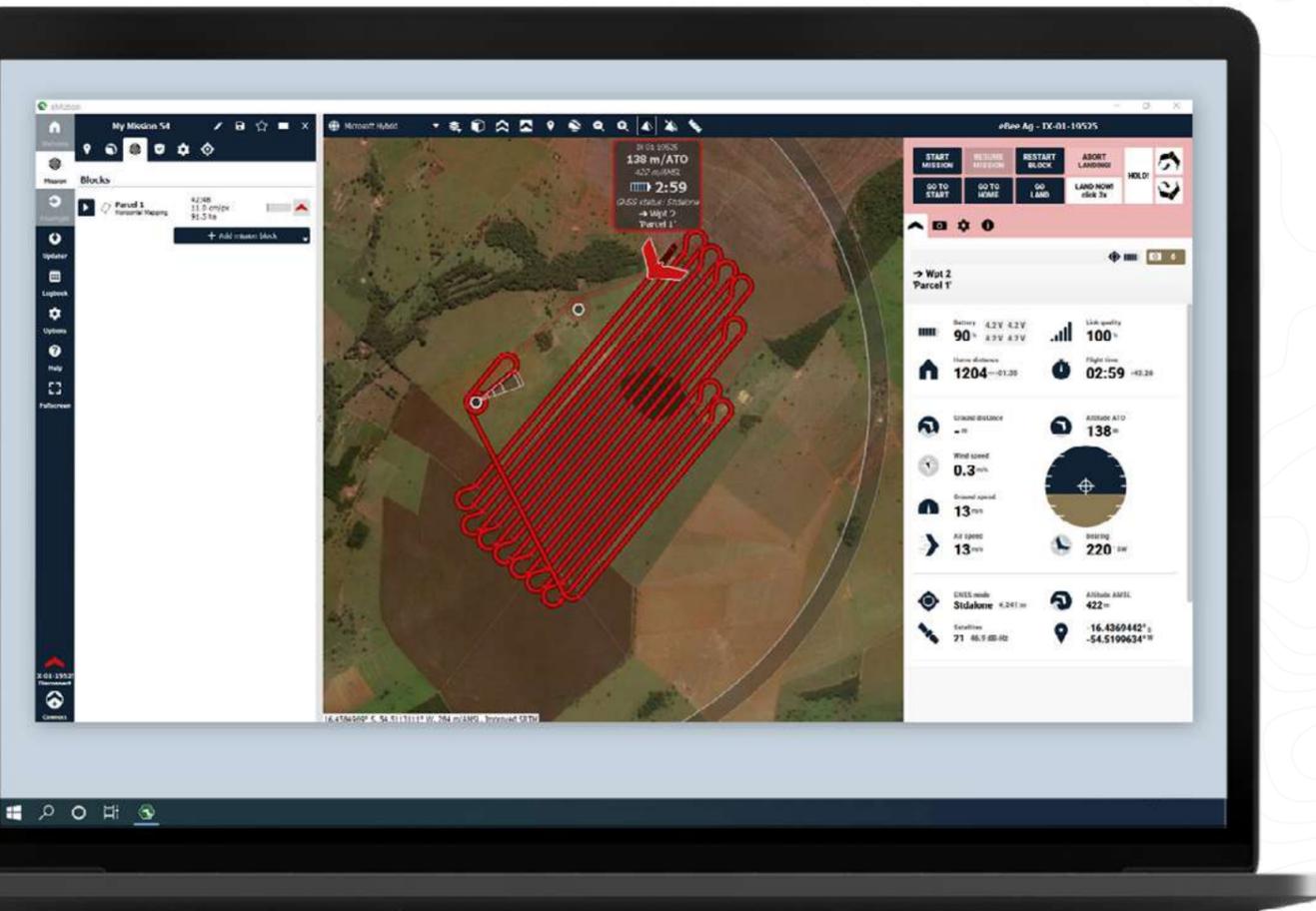
Vegetation indices (CCCI, GNDVI, LCI, MCARI, NDRE, NDVI, SIPI2)

Use cases :

- Crop Planning
- Planting *(stand & population counts)*
- Plant health monitoring
- Crop scouting
- Water and soil management

- Pest, diseases and weed tracking
- Prescription maps
- Fertilizer and input efficacy
- Yield monitoring & forecasting
- Crop insurance assessments
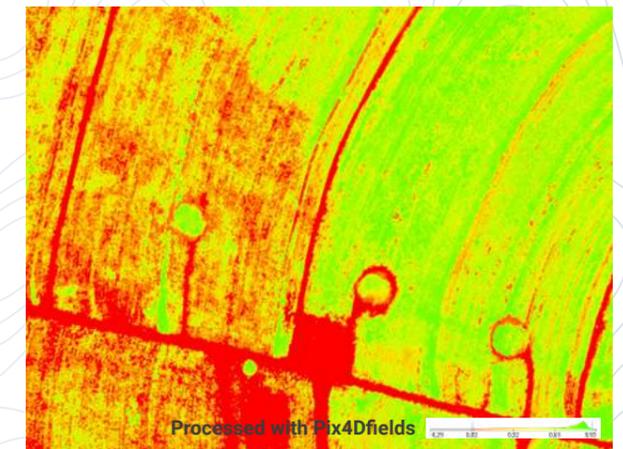
eMotion

How it works

With eMotion, flights are built using mission blocks. Just choose your block, highlight the region you want to map, define key settings, and eMotion auto-generates your drone's flight plan. Multi-flight missions are supported and you can activate/import elevation data for even safer, terrain-accurate flights.

Beginner-friendly, yet packed with advanced features to tackle the toughest jobs, our eMotion flight planning software optimizes every step, helping to get your eBee Ag in the air quickly and with ease, so you can focus on what's important - collecting and analyzing plant heath and operations data critical to your fields.

"A drone's flight management software defines your experience—if this is complicated or confusing, operations can quickly become a chore. eMotion is different: it's advanced, scalable drone software that anyone can use."

Scott Hiebert, CEO Green Aero Tech

Processed with Pix4Dfields

Upload your flight plan wirelessly to your drone. After a simple hand launch, your eBee Ag drone will then fly, capture images and land by itself.

eMotion's built-in Flight Data Manager automatically handles the georeferencing & preparation of images required for post-processing in software such as Pix4Dmapper or Pix4Dfields.

Compatible Farm Management Software (FMS) and precision agriculture equipment

Pix4Dmapper & Pix4Dfields, Agisoft PhotoScan, Esri Drone2Map, DroneDeploy, Trimble Ag Software, FarmLogs, AgWorld, Granular, Climate FieldView, My John Deere Operations Center, AGCO Fuse, Apex, SMS, Farm Works Software, Xarvio and more.

Farm-ready and easy to maintain

The eBee Ag is designed for maximum uptime and offers incredible reliability in the field. Its robust underbody protects it from damage, while its modular design lets you easily swap out parts as needed.

Upper Body

senseFly Duet M Camera

Lower Body

Pitot Tube

Autopilot Stack

Clipped Wings
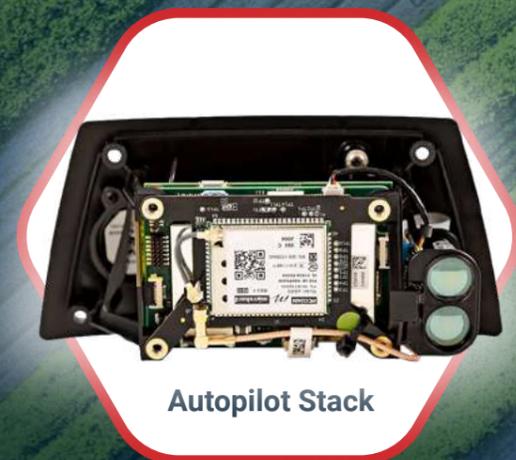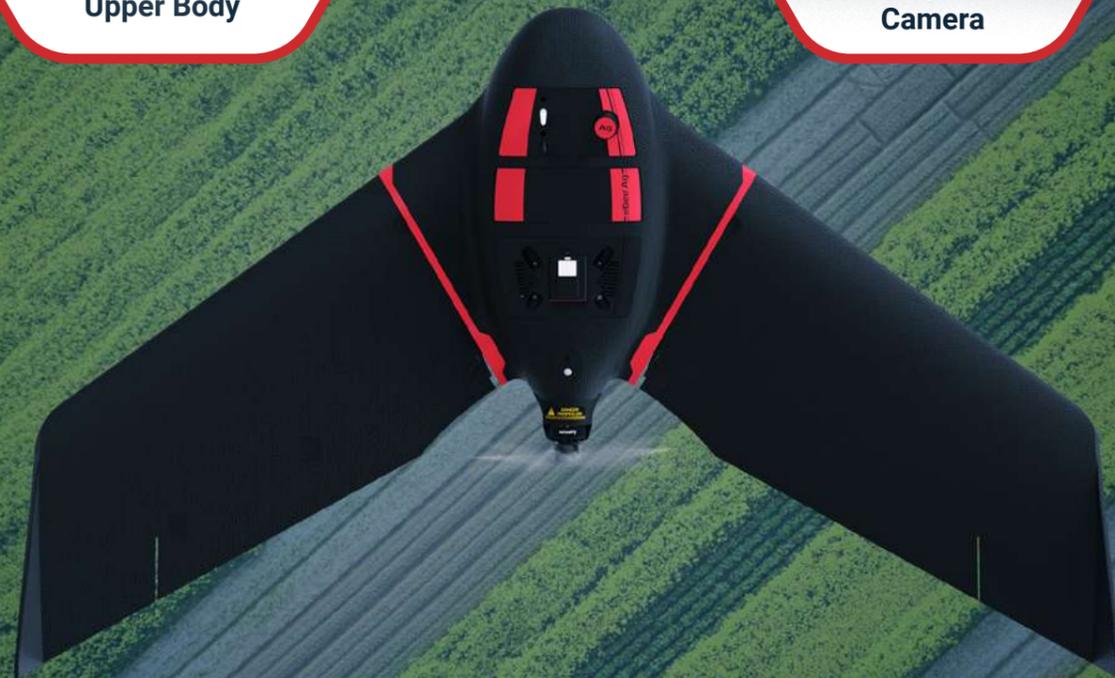
Global network = local support
senseFly's renowned Technical Support is never far. Get your senseFly drone repaired locally, thanks to our global network of authorized repair centers.

All you need to survey with your eBee Ag.
On your back.

The eBee X series backpack is a smart and durable way to carry everything you need to transport your new senseFly drone into and out of the field.

All your gear in one spot
Safely store and transport everything you need to operate your eBee Ag.

Lightweight and resistant
Comes with a rain cover to ensure your drone stays protected from the elements.

Laptop pocket
The eBee X series backpack features a helpful 45cm x 45cm (17.7 in) laptop pocket

Comfort and security
Ergonomic and adjustable straps help keep you comfortable while transporting your drone.

The senseFly eBee Ag comes with...

1x **eBee Ag Drone**

1x **Backpack**

2x **Spare Propellers**
10x Spare Propeller attachment rubber bands

2x **Lithium-Polymer Standard Batteries**

1x **Lithium-Polymer Battery Charger**

1x **Spare Pitot Kit**

1x **USB Ground Modem**

1x **USB Cable**
To connect your computer to the drone and some cameras

1x **senseFly Duet M Camera**

Go further, fly longer with senseFly extensions

Remote Control
Operate your eBee Ag drone manually with the available remote control

Geobase
Enable high-accuracy workflows with this plug-and-play GNSS instrument

USB Ping
View live air traffic data directly within eMotion

Spare Pitot Pro Kit
Contains 3 pitot kit. The Pitot Tube is used by the eBee Ag to measure wind speed and direction for course correction as well as landing optimization.

Radio Tracker
This accessory is a useful final safeguard against unexpected aircraft loss

RTK Activation
Achieve absolute accuracy of down to 2.5 cm (1 in) with available RTK

Endurance Battery
Available Endurance Batteries allow for flight times of up to 55 minutes.

Hard case
For safe transport in a harsh environment

Extended Warranty
1 year warranty extension

Certified Operator Program
www.senseflyacademy.com

Put accurate data to work.

Get the most out of eBee Ag with active RTK

eBee Ag is available with RTK functionality to provide your operations with even greater precision and accuracy. With on-board RTK enabled, you can collect aerial imagery with an absolute accuracy down to 2.5 cm (1 in) with RGB. The position data can then integrate seamlessly into your existing GPS-enabled machinery and/or FMS.

While laying ground control points (GCPs) has been a necessary step in drone surveying workflows from the beginning, advancements in GNSS technology have led to the evolution of real-time kinematic (RTK) and post-processing kinematic (PPK) methods. Thanks to the improved vertical and horizontal accuracy, RTK is ideally suited for surveying stockpiles, land change mapping and more. The following is a quick look at the use of Ground Control Points and the added benefit of a drone with active RTK.

Ground Control Points (GCPs)

A Ground Control Point is a location or object on the ground that has precisely known coordinates. **GCPs are used to accurately geo-reference and align projects from absolute accuracy —one to two meters—to absolute accuracy—two to five centimeters.**

This method has been used for years and trusted to consistently produce a high level of precision and overall accuracy. Also, GCPs used as checkpoints allow the production of a defensible quality report to prove the validity of technology and are used for consistent ground-truthing of a project's accuracy. There are some downsides however, as GCPs can take much longer to set up in comparison to RTK and large worksites may require an entire crew to set points. This can be a dangerous endeavor in certain environments and may require additional equipment including a GPS rover, base, VRS network license in addition to spray paint and targets. Also, there is a possibility of targets moving between the setup and data collection, impacting the accuracy of the results. And GCPs may require operator input during the processing phase to click on the target.

GCPs have been a proven method of accuracy for years, but with safer and faster methods available, it should be used only when RTK and PPK are not possible.

Real-Time Kinematic (RTK)

Real-time kinematic is a technique used to enhance the precision of position data derived from satellite-based positioning systems, which relies on a single reference station or interpolated virtual station to correct geotagged locations while in flight. In other words, RTK is a correction method that enhances GNSS precision. RTK is advantageous for many surveying professionals because it increases safety.

The technique eliminates the need for teams to maneuver through dangerous terrain to set GCPs while also efficiently saving time and productivity. RTK provides corrections to the drone onsite and is ideal for geo-tagging in absolute accuracy throughout flights in real-time. GNSS post-processing can be avoided as the eBee Geo can directly geo-tag the images in real-time during flight. Following, the images can be used for processing from the payload SD card. This technique does require a base station and a consistent connection to process data in real-time. While this extra piece of equipment provides the benefit of increased accuracy, it also has a moderate possibility of malfunctioning.

The RTK methods work well in flat terrain where trees or mountains won't get in the way of the communication signal. RTK is restricted by the power of ground and air communication with the drone. If there are more than three kilometers between the drone and the ground station, or if there are obstructions such as trees or mountains, there's a chance it will lose signal.

As an operational best practice, it's ideal to use RTK on flights in open terrain and within two or three kilometers of the ground station to maintain the communications link. These flights can deliver highly accurate results without the need for using GCPs. This is an extremely helpful advantage for land surveyors working in dense vegetation, crops and other hard to distinguish terrain.

Without Correction	**With GCPs**	**With RTK**
1-2 meters Absolute accuracy	**Few centimeters** Absolute accuracy	**Few centimeters** Absolute accuracy

When considering factors such as ease of use, time and expense, the advantages of an RTK drone become more apparent. Difficult terrain, unreachable spots and safety concerns can be deterrents for using GCPs, not to mention the amount of time it could take to plan and measure each. By contrast, post-processing imagery collected via drone normally takes 10 to 20 minutes. And lastly, the measurement of GCPs is an expense you'll need to factor into every project unlike the one-time activation of RTK on a drone, which ultimately is a better investment long term.

Hardware Datasheet

eBee Ag

Wingspan	116 cm (45.7 in)
Material	Expanded Polypropylene (EPP)
Underbody skin	Curv® Polypropylene thermoplastic composite
Weight (Empty)	0.8 kg
Max Take-off weight	1.6 kg
Backpack dimensions	75 x 50 x 29 cm (29.5 x 19.7 x 11.4 in)
Motor	Low-noise, brushless, electric
Detachable wings	Yes
Empty backpack weight	4.6 kg

Coverage & accuracy

Max. nominal coverage at 122 m (400 ft)	160 ha (395 ac) with Standard battery
	200 ha (494 ac) with Endurance battery
Ground sampling distance at 122 m (400 ft)	2.8 cm/px (1.1 in/px) RGB
	11.5 cm/px (4.5 in/px) Multispectral
Lowest ground sampling distance (42m)	1.1 cm/px (0.4 in/px) RGB
	4 cm (1.6 in) Multispectral

High Precision

Upgradable on demand	Yes
RTK	Virtual Base Station, Base Station Unknown point, Base Station Known point
GNSS	GPS+GLONASS

Flight performance

Cruise speed	40-110 km/h (11-30 m/s or 25-68 mph)
Max wind resistance	Up to 46 km/h (12.8 m/s or 28.6 mph)
Landing type	Automatic linear landing (5 m/16.4 ft accuracy in 20° angle cone)
Service temperature	-15° to 40°C *
Humidity	Light rain resistance
Ground avoidance	Yes - LiDAR (range 120m)

*Working above 35°C/ 95°F requires to protect the drone from the sun while on the ground
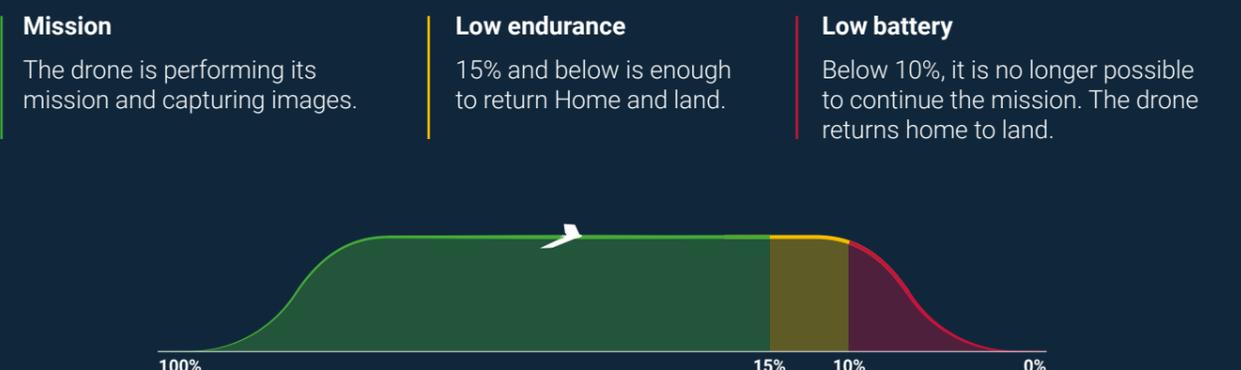
Maintenance and service

Spare Parts Available	Pitot Tubes, Wings, Propellers and vertical surfaces
Modular Repair	Auto Pilot Stack, Upper Body and Lower Body
Service	Every 100 flight hours

Battery

Battery	Standard	Endurance
Power	3700 mAh	4900 mAh
Voltage	15.2V	15.2V
Number of cells	4 Cell	4 Cell
Type	LiHV	LiHV
Energy	56.24Wh	74.48Wh
Weight	330g	420g

Radio Link

Certification	CE or FCC
Range	3 km nominal (up to 8 km) / 1.9 mi (up to 5 mi)
Frequency	2.400 - 2.4835 GHz
Encryption AES 254	Available
EIRP	CE/JP 20.0 dBm max
	FCC 22.5 dBm max

How long can you fly with your eBee Ag?

senseFly Duet M
Standard Battery
Endurance Battery

Flight time in minutes

0   10′   20′   30′   40′   50′   60′   70′   80′   90′

Automatic safe return when the battery is low

Mission
The drone is performing its mission and capturing images.

Low endurance
15% and below is enough to return Home and land.

Low battery
Below 10%, it is no longer possible to continue the mission. The drone returns home to land.

100%   15% 10%   0%

The above figures represent optimal flight conditions. It is not representative of all flight times and will vary depending on flight conditions. Also note that the condition of the pitot tube can influence flight time.

Efficiency is in the field.

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At senseFly, we believe in using technology to make work safer and more efficient. Our proven drone solutions simplify the collection and analysis of geospatial data, allowing professionals in surveying, agriculture, engineering and humanitarian aid to make better decisions, faster. The company is a commercial drone subsidiary of Parrot Group.

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