eBee

senseFly

The
professional
mapping
drone

4 reasons to choose the eBee

Map more, more accurately

The eBee can cover up to 12 km² (4.6 mi²) in a single automated flight, while flights over smaller areas, flown at lower altitudes, can acquire images with a ground sampling distance (GSD) of down to 1.5 cm (0.6 in) per pixel.

No flying skills required

The eBee is the easiest to use professional drone on the market, used by thousands of customers around the world. To launch it, just throw the eBee into the air! It then flies, captures images and lands itself. However you can always alter its flight plan or land manually if required.

Because safety matters

Thanks to its ultra-light construction the eBee weighs just 700 g (1.5 lb), vastly minimising its impact energy. It also features a safety-conscious rear-facing propeller and senseFly's cutting-edge autopilot, which manages a wide range of intelligent failsafe behaviours.

Your complete solution

The eBee package contains all you need to start mapping: a high-res RGB camera, batteries, radio modem and eMotion, our highly acclaimed flight planning and control software. It even comes with a sturdy, carry-on sized case. Then just process and analyse the eBee's images using professional image processing software, such as Pix4Dmapper.

Plan your flight

The eBee sets the standard for easy flight planning and management thanks to its acclaimed eMotion software.

Just choose or create your preferred background map. Then use this to define the region you want to map. Next, simply specify your desired ground resolution (down to 1.5 cm / 0.6 inches per pixel) and set your required image overlap.

The rest is automatic: eMotion automatically generates a full flight plan, based on GPS waypoints, calculates the eBee's required altitude and displays its projected trajectory.

To ensure your mission's success, eMotion even offers a confidence-building simulation mode. This virtual flight simulates wind strength and direction, allowing you to make any flight plan enhancements needed before launch.
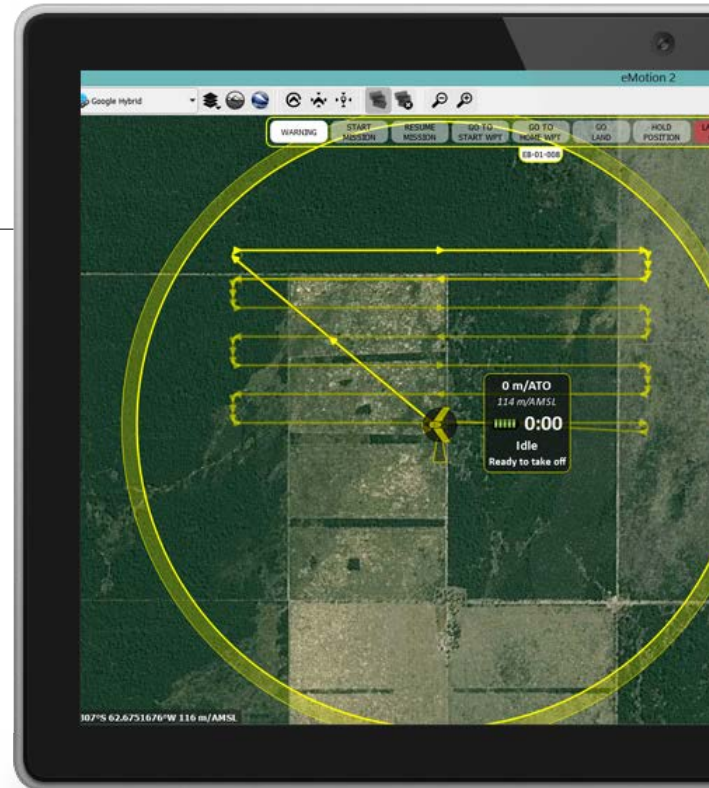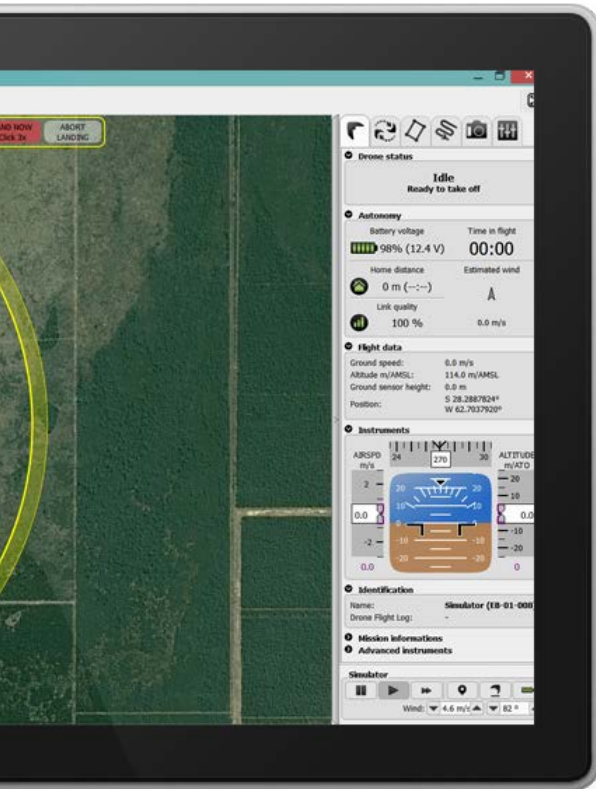
SAFETY FIRST

The eBee is built with safety firmly in mind, from its ultra-light, shock-absorbent construction to its numerous embedded safety features. eMotion also includes a 3D flight planning feature. This uses real-world elevation data when setting the altitude of a flight's waypoints (shown above), for the most consistent ground resolution possible and the highest level of aircraft safety.

> 66 *With a fully integrated workflow the eBee allows us to focus on making use of the data as opposed to worrying about flight operations and data processing. We have flown the eBee in all types of weather conditions and have been extraordinarily impressed with its reliability.* 99

Jarlath O'Neil-Dunne, Director, University of Vermont Spatial
Analysis Laboratory, U.S.A.

Fly

Nothing is easier to operate than the eBee. Just shake the drone three times to start its motor, then throw it into the air—no catapult or additional accessories required!

The eBee's eMotion software displays the aircraft's key flight parameters, its battery level and its image acquisition progress, in real time, while the artificial intelligence inside the eBee Ag's autopilot continuously analyses onboard IMU and GPS data to control and optimise every aspect of the drone's flight. This proprietary autopilot also manages a wide range of intelligent failsafe behaviours, improving safety and security still further.

Need to make an adjustment? Reprogram the drone's flight plan and landing zone mid-flight. Or in the case of any issue, tell it to immediately hold its position, return home or land.
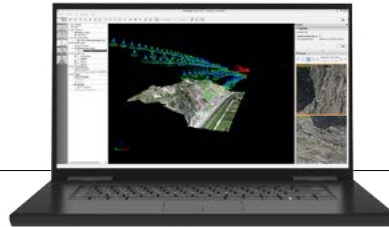
+220,000 — FLIGHTS TO DATE

+65,000 — FLIGHT HOURS

+2,700,000 — KM FLIGHT DISTANCE

Create

Process

Use eMotion's Flight Data Manager to pre-process, geotag and organise your flight's images. Then import these into your professional image processing software of choice, such as Pix4Dmapper Pro, to create a range of valuable outputs.

Orthomosaics

In just a few clicks, you can transform the eBee's high-resolution aerial images into a georeferenced orthomosaic raster (also known as an orthophoto).

Format(s):	geoTIFF, KML tiles (png/kml)
Example usage:	Background maps, 2D measurements, cadastre, urban/infrastructure/transport planning, forestry, marketing

> " We use an eBee for many different projects: mapping, road and railway projects, power lines, dam and construction projects, renewable energy and more. For us, it is the most effective drone on the market—the perfect blend of user-friendliness, quality, price, support, and software. "

Diner Yılmaz, General Director Artu Harita, Turkey

Digital Surface Models (DSMs)

The DSM is an essential component of the orthomosaicing process. It displays a continuous surface, featuring the tops of objects and structures such as trees and buildings (inc. bare earth when nothing is obscuring it). Ground-based objects can also be removed to produce a digital terrain model (DTM).

Format(s):	geoTIFF (tiff)
Example usage:	Flood plain analysis, sunlight/ signal coverage assessment, GIS applications, spatial analysis

Point clouds

These comprise millions of individual points, each featuring X, Y, Z coordinates and an RGB value. Can also be classified for more specific analysis using classes such as ground, buildings and vegetation. A LiDAR-like output, except in the presence of ground-obscuring vegetation, point clouds are most often used for geometric and CAD-based work.

Format(s):	las, laz, ply, ascii
Example usage:	3D line & surface area measurement, volumetric calculation (i.e. stockpiles)

Drone vs LiDAR point clouds: http://goo.gl/T1DA5b

Other common outputs:

INDEX MAP
geoTIFF (tiff), shp

3D MESH WITH TEXTURE
Wavefront (obj)

CONTOUR LINES
dxf, shp

GOOGLE MAPS
KML tiles (png/kml)

Outputs compatible with:

ESRI ArcGIS	GlobalMapper
QGIS	Autodesk
Inpho	StereoCAD
Erdas Imagine	Google Maps
RealWorks	MicroStation
Maptek	Quick Terrain
3DReshaper	Agisoft
Surpac	ccViewer
Mapbox	& many more

Fully automatic
• Create your flight plan
• Hand-launch (no catapult required)
• Flies, acquires images & lands itself

Optimal range
• Up to 50 min flight time
• Maximum flight coverage
  of 12 km^2 (4.6 mi^2)*

Green technology
• Low-noise brushless electric motor
• Rechargeable lithium-polymer battery
• Safe rear-facing propeller

66 *The eBee is the heart of my operation, allowing me to offer clients an affordable and reliable service that wasn't previously available in this part of the world. My drone has already logged 182 problem-free flights and has proved durable enough to handle the toughest African operating conditions.* 99

Theo Wolmarans, Director ICARUS AT Pty Ltd, S. Africa

2.4 GHz radio link
- Communicates with eMotion via USB ground modem
- Approx. 3 km (1.86 mile) range

18.2 MP RGB camera
- Fully controlled by eBee's autopilot
- Automatic image acquisition & geotagging
- Multiple additional camera options available (inc. thermal)

Lightest in its class
- Ultra-light EPP foam body & wings
- 0.69 kg (1.52 lb) take-off weight
- Less kinetic energy than a kicked football

Onboard artificial intelligence
- Analyses data from inertial measurement unit & onboard GPS
- Optimises every aspect of eBee's flight

Accessories

WX RGB

Like all eBee cameras, this 18.2 MP model has been adapted so that it can be controlled by the drone's autopilot. It acquires regular image data in the visible spectrum and its exposure parameters are set automatically.

Technical features

Resolution	18.2 MP
Ground resolution at 100 m (328 ft)	2.75 cm (1 in) / pixel
Sensor size	6.16 x 4.63 mm
Pixel pitch	1.26 µm
Image format	JPEG

S110 RGB

The 12 MP S110 RGB acquires regular image data in the visible spectrum. However unlike the slightly higher resolution WX, its exposure parameters can be set manually and it can also output RAW format image files.

Technical features

Resolution	12 MP
Ground resolution at 100 m (328 ft)	3.5 cm (1.4 in) / pixel
Sensor size	7.44 x 5.58 mm
Pixel pitch	1.86 µm
Image format	JPEG and/or RAW

thermoMAP

thermoMAP is a thermal infrared camera, featuring an integrated shutter for in-flight radiometric calibration. It can capture thermal video and still images, allowing you to create thermal maps of a site (for example, to assess a mine's water distribution or to check the functionality of photovoltaic panels).

Technical features

Resolution	640 x 512 pixels
Ground resolution at 75 m (246 ft)	14 cm (5.5 in) / pixel
Scene temperature	-40 ℃ to 160 ℃ (-40 °F to 320 °F)
Temperature resolution	0.1 ℃ (0.2 °F)
Temperature calibration	Automatic, in-flight
Output formats	TIFF images + MP4 video
Weight	Approx. 134 g (4.7 oz)
Operating altitude	75 - 150 m (246 - 492 ft)

Sequoia

Sequoia by Parrot is the smallest, lightest multispectral sensor ever released. It captures images across four defined, visible and non-visible spectral bands, plus RGB imagery, in just one flight. Sequoia is immediately compatible with the eBee courtesy of senseFly's proprietary eBee Integration Kit.

Main body
- Four 1.2 MP spectral cameras
- Up to 1 fps
- One 16 MP RGB camera with rolling shutter
- 64 GB built-in storage
- 5 W (~12 W peak)
- 72 g (2.5 oz)

Sunshine sensor
- 4 spectral sensors with same filters as body
- GPS
- IMU & magnetometer
- SD card
- 1 W
- 35 g (1.2 oz)

Radio tracker

If you are planning to fly your eBee in extreme situations, such as those with high winds, in mountainous areas, out of line of sight, or over very large areas, this accessory is a useful final safeguard against unexpected aircraft loss. It comprises a small transmitter that fits snugly next to the eBee's battery bay, plus a portable handheld receiver.

Technical features

Battery life	Up to 7 days
Operating temperature	-15 ℃ to 51 ℃ (5 °F to 122 °F)
Range	Up to 20 km (12.4 mi)
Frequency range	UE / AUS / NZ (433.050-434.750 MHz) Model 410

About senseFly

At senseFly we develop and produce aerial imaging drones for professional applications.

Safe, ultra-light and easy to use, these highly-automated data collection tools are employed by customers around the world in fields such as agriculture, surveying, GIS, industrial inspection, mining and humanitarian aid.

senseFly was founded in 2009 by a team of robotics researchers and quickly became the industry leader in mapping drones. Today we continue to lead the way in developing situationally aware systems that help professionals make better decisions.

eBee RTK
The survey-grade mapping drone

eBee Ag
The precision agriculture drone

albris
The intelligent mapping & inspection drone

For more information, visit www.sensefly.com. senseFly is a Parrot company and a member of the Small UAV Coalition.

Where can you buy your eBee?
Visit www.sensefly.com/about/where-to-buy to locate your nearest distributor.

senseFly SA
Route de Genève 38
1033 Cheseaux-Lausanne
Switzerland

HARDWARE

Wingspan	96 cm (37.8 in)
Weight (inc. supplied camera & battery)	Approx. 0.69 kg (1.52 lb)
Motor	Low-noise, brushless, electric
Radio link range	Up to 3 km (1.86 miles)
Detachable wings	Yes
Camera (supplied)	WX RGB (18.2 MP)
Cameras (optional)	S110 NIR/RE/RGB, Sequoia, thermoMAP

SOFTWARE

Flight planning & control software (supplied)	eMotion
Image processing software (optional)	Pix4Dmapper Pro

OPERATION

Automatic 3D flight planning	Yes
Cruise speed	40-90 km/h (11-25 m/s or 25-56 mph)
Wind resistance	Up to 45 km/h (12 m/s or 28 mph)
Maximum flight time	50 minutes
Maximum coverage (single flight)	12 km^2 (4.6 mi^2)*
Automatic landing	Linear landing with ~ 5 m (16.4 ft) accuracy
Multi-drone operation	Yes
Ground control points (GCPs)	Optional
Oblique imagery	0 to -50°

RESULTS

Ground sampling distance (GSD)	Down to 1.5 cm (0.6 in) / pixel**
Absolute horizontal/vertical accuracy (w/GCPs)	Down to 3 cm (1.2 in) / 5 cm (2 in)
Absolute horizontal/vertical accuracy (no GCPs)	1-5 m (3.3-16.4 ft)

Based on the following test conditions: target ground resolution of 30 cm (11.8 in) / pixel, no wind, moderate weather temp. (18 ℃/64.4 ℉), new fully charged battery, flight altitude of 1,000 m (3,280 ft) above ground level, take off at approx. sea level, take-off point in centre of desired coverage area.

*** Depends upon environmental conditions (light, wind, surface type).*

Package contents:

- eBee body (inc. all electronics & built-in autopilot)
- Pair of detachable wings
- WX still camera (inc. SD card, battery, USB cable & charger)
- 2.4 GHz USB radio modem for data link (inc. USB cable)
- Two lithium-polymer battery packs & charger
- Spare propeller
- Carry case with foam protection
- Remote control & accessories (for safety pilots)
- User manual
- eMotion software download key (accessible via my.senseFly at no extra cost)

senseFly
a Parrot company