



DRONES: CLIMBING TO THE NEXT LEVEL

SCARCELY A WEEK GOES BY WITHOUT DRONES MAKING THE HEADLINES. GEOCONEXION CAUGHT UP WITH FRANCOIS GERVAIX, SURVEYING PRODUCT MANAGER AT SENSEFLY, TO GET A SENSE OF WHAT THE COMPANY IS DOING AND WHERE THE INDUSTRY IS HEADED

GEOconnexion (GEO): The ubiquitous fixed-wing eBee has evolved into a number of variants to suit specific tasks. Can you bring us up-to-date on these?

Francois Gervais (FG): The eBee Plus is senseFly's most advanced geospatial platform. It suits a wide range of applications — from cadastral land surveying to quarry and mine mapping, land management, environmental and humanitarian development projects.

This large-coverage photogrammetric mapping system can fly for 59 minutes, enabling it to map up to 220 ha (540 ac) in a single 122 m (400 ft) flight, and it includes built-in RTK/PPK upgradeability for survey-grade accuracy whenever the user requires it. The eBee Plus is supplied with senseFly's proprietary new senseFly S.O.D.A. RGB sensor, which was designed from the ground up for photogrammetry. The eBee Plus is also fully modular, meaning an operator can alternatively slot in any other senseFly fixed-wing camera — multispectral, thermal etc. — as their work requires. The eBee Plus also features eMotion 3, the latest generation of senseFly's acclaimed flight and data management software.

Meanwhile, the eBee SQ is purely designed for agricultural use. Built around Parrot's Sequoia multispectral camera, this 55-minute fixed-wing solution captures actionable crop data across four multispectral bands, plus RGB imagery, and is able to chart hundreds of acres in a single flight. It is supplied with eMotion Ag, which is compatible with all modern farming

workflows and farm management information systems.

senseFly's original eBee is also still very much available. This globally popular solution suits geospatial operators who require a cost-effective professional mapping drone that is capable of achieving much greater coverage than most of the multirotor solutions on the market. As with the eBee Plus, the eBee is a highly flexible, multi-payload system and is supplied with both an RGB sensor and eMotion 3.

Alongside senseFly's eBee solutions, the albris is the company's inspection and close mapping drone. This sensor-packed quadcopter is carefully optimised for work such as asset inspection and vertical 3D modelling. It features TripleView imaging (HD video, 38MP still and thermal), advanced situational awareness and a choice of flight modes.

GEO: Will we see the albris quadcopter evolve in the same way?

FG: Unlike the majority of senseFly's eBee systems, the albris is not a modular camera solution. It includes video, still imaging and thermal right there, out of the box, inside its TripleView camera head. However, as with all senseFly solutions, our product management team is continuing to listen carefully to the market in order to ensure that this platform continues to meet our customers' needs moving forwards.

GEO: What new features are being incorporated in the latest version of the eMotion flight and data management software suite?



Francois Gervais. Photo : senseFly

FG: The latest version of this software is eMotion 3. This has been available for the eBee Plus since its launch in October last year, and recently also became available for senseFly's existing eBee and eBee RTK operators.

eMotion 3 features easy mission block-based flight planning, multi-flight projects and a built-in Flight Data Manager. For the first time, it also offers users a full 3D environment, which helps users to more accurately plan, simulate and control their drone's trajectory, for safer flights, more consistent performance and improved data quality. It also supports all senseFly's camera payloads and eMotion 3 is also an ever-evolving workflow hub: it connects wirelessly to the drone, to industry cloud solutions, to survey-grade base stations and to Air Navigation's pilot app to improve mid-air safety. It even includes live weather updates and, now, DroneLogbook connection.

GEO: Which territories are on the rise in terms of sales, and is there are marked shift in demand?

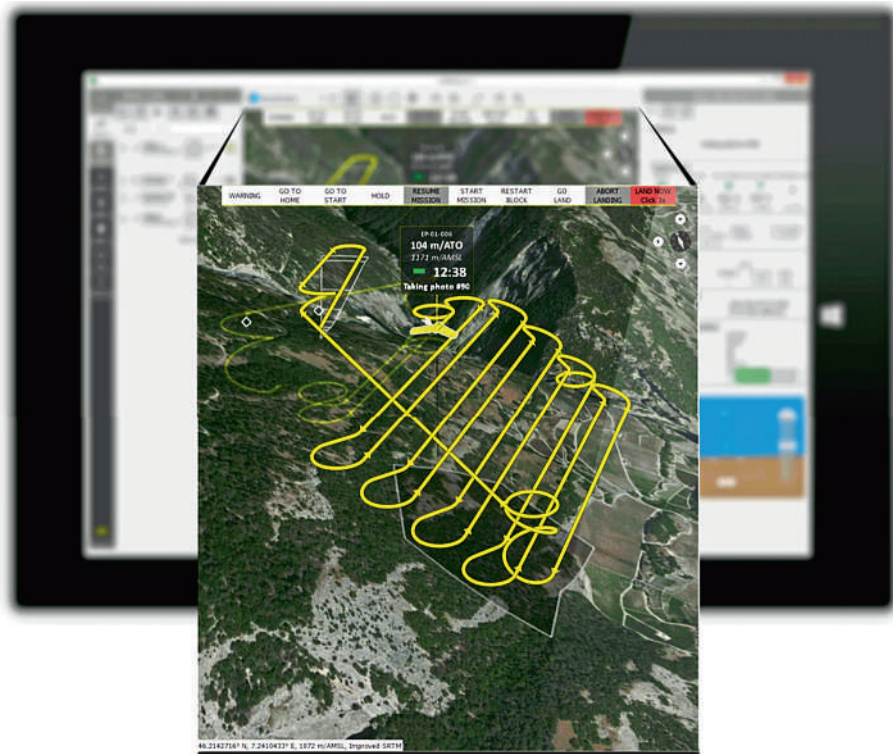
FG: In one sense, demand is tied to the regulatory environment of each country. Obviously, where commercial drone operations are regulated fairly and pragmatically, this will typically lead to a growth of that market. Since Part 107 took effect in the United States for example, this has started to further drive that market's growth.

Generally speaking however, geographically, we see the benefits of aerial data collection being appreciated right around the world from Europe and the Americas right across Asia and Australasia. The applications might be more or less important in each region — mining being a stronger application in some, surveying or agriculture in others — but we do not see one particular territory surging ahead of the rest. The growth is global.

GEO: What applications are coming to the fore? And are these displacing traditional uses such as videography and open cast mine surveys?

FG: The core applications we see driving the commercial market are largely survey-based, referring to land management, quarries and aggregates, open pit mining, construction monitoring and so on. However, agriculture is also a strong market and growing quickly in some territories, such as South America.

More than applications though, one interesting other move we see is adoption becoming more mainstream. Within surveying and engineering companies for example, the professionals purchasing solutions are not just small tech-savvy service providers or drone start-ups, but more established players looking to build out UAV divisions and fleet-type operations. It is these types of buyers who we see turning to our eBee platforms due



In addition to eMotion's highly efficient 2D flight planning approach, eMotion 3 goes a step further by including a full 3D environment for flight planning, simulation and management. Image: senseFly

to their automated ease of use — meaning a range of staff can easily operate them — and the reliability and consistency of their data.

GEO: senseFly's success has been built on producing lightweight fixed and rotary wing drones. Presumably this implies small payloads. As users demand more comprehensive, multi-spectral capabilities and increased flight times, can sensors, power sources and control systems be miniaturised yet further to avoid the need for bigger, heavier airframes?

FG: They already are being and will continue to be. Take the Parrot Sequoia camera inside the eBee SQ. This collects calibrated multispectral imagery but weighs just 70 grams!

There will always be a place for both: larger, heavier systems designed for certain payloads and flight times, and lighter, more adaptable and regulation-friendly platforms like today's senseFly solutions.

GEO: Last year, the European Aviation Safety Agency published a 'Prototype' Commission Regulation on Unmanned Aircraft Operations'. Does senseFly have any observations on the proposed measures and/or the need for an EU-wide regulatory/licensing framework?

FG: We are heavily involved in the rule-making process of future European regulations via the Drone Manufacturers Alliance Europe¹. We advocate for regulations that are pragmatic, harmonised across member states, proportionate to the safety risks



The eBee Plus suits a wide range of applications — from cadastral land surveying to quarry and mine mapping, land management, environmental and humanitarian projects. Image: senseFly



and based on state-of-the-art standards. In our view, registration and identification of aircraft are necessary and efficient measures that can be taken rapidly. Safety is also of paramount importance, and at senseFly we put a huge amount of effort



into designing light, safe systems.

That said, it is also important to provide accurate and clear information to the user, who remains ultimately responsible for his or her operations. This will avoid over-regulation and reduce regulation complexity, supporting economic growth. Training and licensing may be necessary for some operations but these should be put in place in a pragmatic way, through online tools as much as possible.

We are also very active member participants of the Global UTM Association², supporting the global standardisation effort.

GEO: How is senseFly responding to the call for more on-board intelligence to enhance drone safety and security?

FG: In terms of how drones integrate into the national airspace safely, we are doing a great deal of work, both in terms of working with aviation authorities around the world and at a software level. For example, we are integrating airspace intelligence into our eMotion ground station software, through our Airmap development partnership³, and pushing drone operation details out to aviation pilots, as through our Air Navigation partnership⁴. However, safety, by design, is the first and most efficient measure. This is why at senseFly we develop low density, lightweight drones. Our eMotion ground control software's intuitive functions reduce the risk of flight planning and flight monitoring errors. The feedback provided to the pilot by eMotion also helps in maintaining situational awareness during the flight; at any time the pilot can update the drone's course or even take-over the controls manually. The senseFly autopilot then offers a raft of additional on-board fail-safe mechanisms to protect the drone's flight envelope, should any failure occur, and to to guarantee the safety of other airspace users and people on the ground.

GEO: The company has published a variety of educational material on its website and on YouTube. How important is this to the future of the industry and is senseFly increasing its presence in this area?

FG: Education is always important. There has been, of course, a lot of hype about commercial drones in recent years, so we see part of our role as needing to push through this hype and be real with our prospects and customers. We try to explain, clearly and honestly, what the potential benefits

(and challenges) can be of integrating drone solutions into an organisation, and how the data that these tools capture can fit their existing workflows and be put to use. In many cases, this means enabling our customers around the world to tell their stories more widely, for example, via social media and over on our Waypoint blog⁵. After all, they are the true experts who are flying commercially every day and boosting their businesses (and those of their clients) with the help of our technology.

GEO: Your partnerships with academic bodies such as the University of Zurich and Lausanne Polytechnic have proved fruitful in the past. Is this a continuing source of innovation?

FG: Very much. It's our history. senseFly was born out of research that took place at the Laboratory of Intelligent Systems here at the École Polytechnique Fédérale de Lausanne (EPFL). But it's also a key component of our future success. We retain strong links with EPFL in terms of our being up-to-speed on the innovatory research taking place there and recruiting the best talent to move our R&D team forwards.

One Commission for Technology and Innovation, or CTI, project we are currently involved with at the EPFL is called PEACE for UAV — PEACE standing for Planning & Estimating Accuracy in a Cluttered Environment. This project combines the knowledge and experience of senseFly, the EPFL's Geodetic Engineering Laboratory⁶ and an industrial end user, the aim being to enable the precise mapping of elongated structures in inaccessible natural environments using small drones. Its implementation would represent considerable savings when monitoring and managing man-made infrastructure in complex

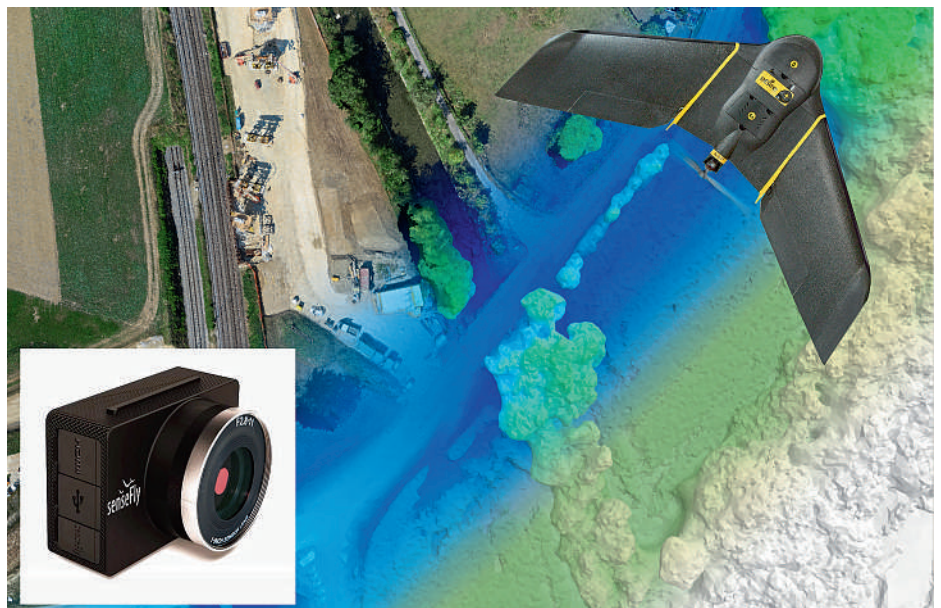
surroundings. Also, outside of senseFly, at an industry development level, research institutions have an important role to play.

Take agriculture for example. This industry has been subject to perhaps the greatest degree of drone hype in the last few years. But companies saying that drones will solve all of a farmer's or agronomist's problems is one thing, while proving this and discussing the real on-the-ground benefits — as far as data accuracy and reliability are concerned — is quite another. That's why senseFly partnerships with organisations such as UAS Jena⁷ are so valuable to us. It's this group for example, led by Dr. Perner in Germany, that is objectively and credibly validating the benefits that UAVs like the eBee can offer to those conducting field trials⁸.

GEO: Can we expect any surprises from senseFly at the upcoming INTERGEO Expo in Berlin?

FG: Possibly, but if you expected it, it wouldn't be a surprise!

1. <http://dronemanufacturersalliance.eu/>
2. <http://www.utm.aero/>
3. <https://www.sensefly.com/nc/news-single/article/airmap-and-sensefly-partner-to-advance-safety-for-commercial-drones.html>
4. <https://safertogogether.aero/>
5. <http://waypoint.sensefly.com/>
6. <http://topo.epfl.ch/>
7. <http://www.uas-jena.de/en/home.html>
8. <https://www.slideshare.net/senseFlyDrones/minidrohnen-uav-als-boniturwerkzeuge-im-landwirtschaftlichen-versuchswesen-erfahrungen-und-perspekiven>



The company's proprietary S.O.D.A (senseFly Optimised for Drone Applications) RGB sensor (lower left) has been designed from the ground-up for photogrammetry. Image: senseFly