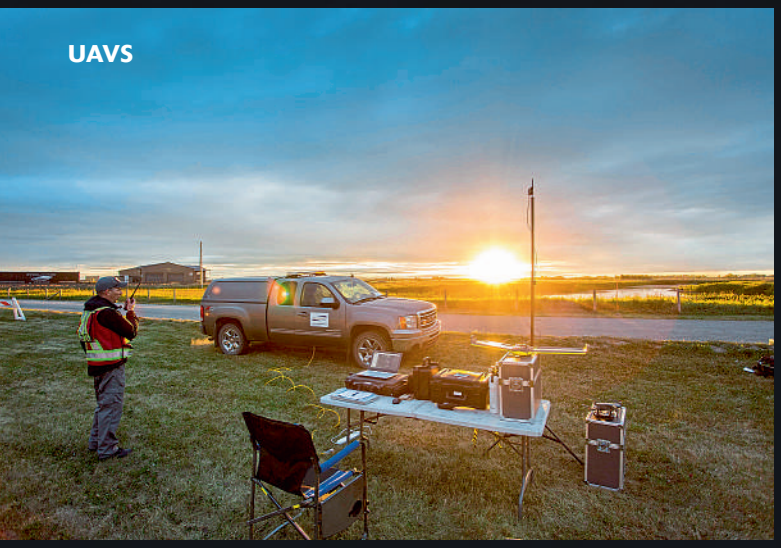
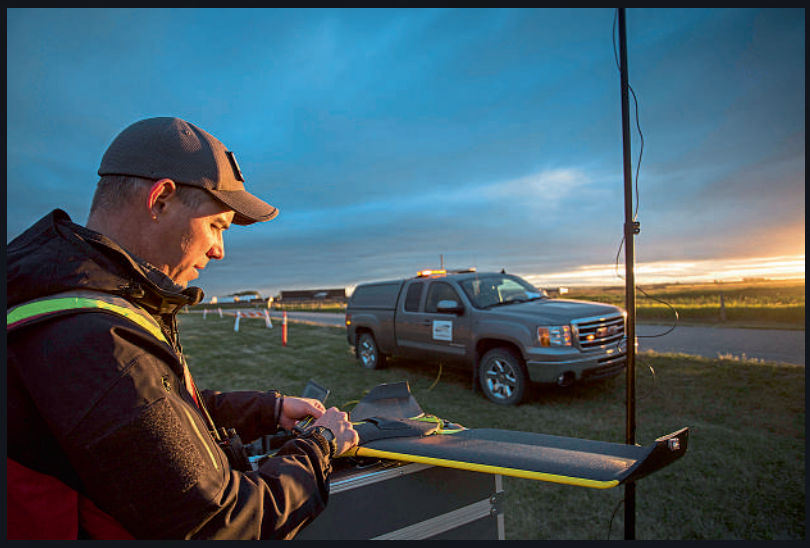
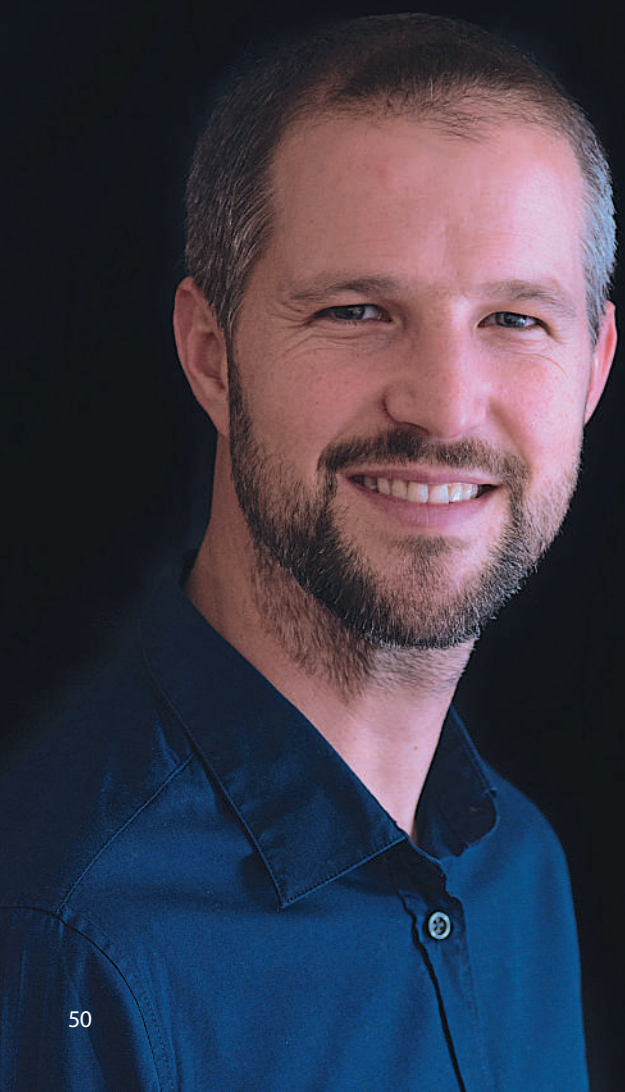


Data gathered during the Canadian BVLOS trial will be used to help define risk models © Droto – Marcel Vajdik



IN-FLIGHT Data's BVLOS UAS Operations trial uses a senseFly eBee and eBee Plus to conduct flights across Canada © Droto – Marcel Vajdik

SIGHT **BEYOND** SIGHT



BEYOND VISUAL-LINE-OF-SIGHT (BVLOS) IS SET TO BECOME INCREASINGLY IMPORTANT IN SHAPING THE FUTURE DIRECTION OF COMMERCIAL UAV OPERATIONS. GEOCONNEXION INTERNATIONAL TALKED TO SENSEFLY REGULATION PROJECT MANAGER SAMUEL DÉPRAZ TO DISCUSS THE KEY CHALLENGES AND OPPORTUNITIES FOR THE INDUSTRY AS IT SETS ABOUT ESTABLISHING SAFETY-FOCUSED, FIT-FOR-PURPOSE BVLOS REGULATIONS

What is the regulatory climate for commercial UAV operators that want to fly beyond visual-line-of-sight (BVLOS)?

BVLOS is a high priority for the global UAV market. Almost all operations worldwide are currently restricted to visual-line-of-sight, accelerating the need to redress the balance and expand opportunities for professionals working in diverse sectors.

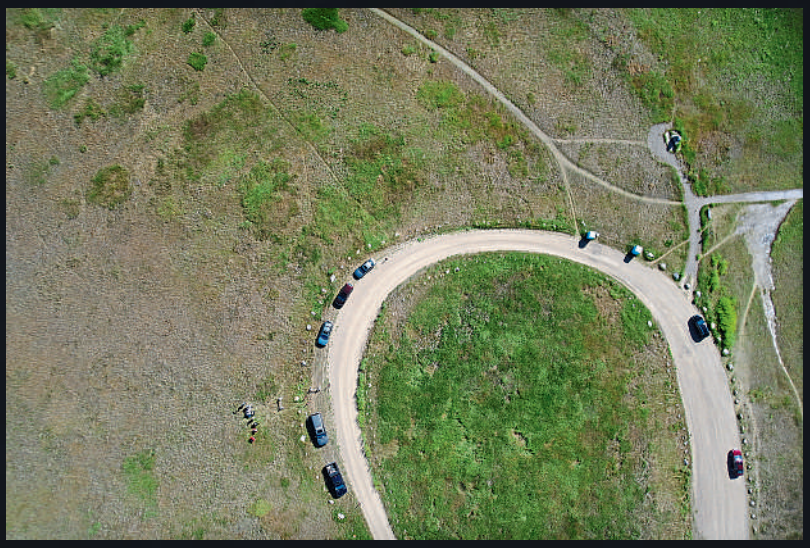
While several manufacturers and operators have been able to secure temporary or permanent BVLOS operations, such projects are still restricted and complex to scale up. We anticipate that regulations are going to evolve significantly in the coming years, supported by trials, demos and data collection in a number of regions.

Countries are accelerating their involvement in this area, from the UAS integration pilot program (IPP) and Canadian BVLOS trials in North America, to diverse initiatives in Europe, such as the UK Pathfinder programme, BVLOS standard scenarios in Switzerland and the S2 and S4 Scenarios in France. That's not to mention regular operations in Rwanda, Israel, Australia and New Zealand.

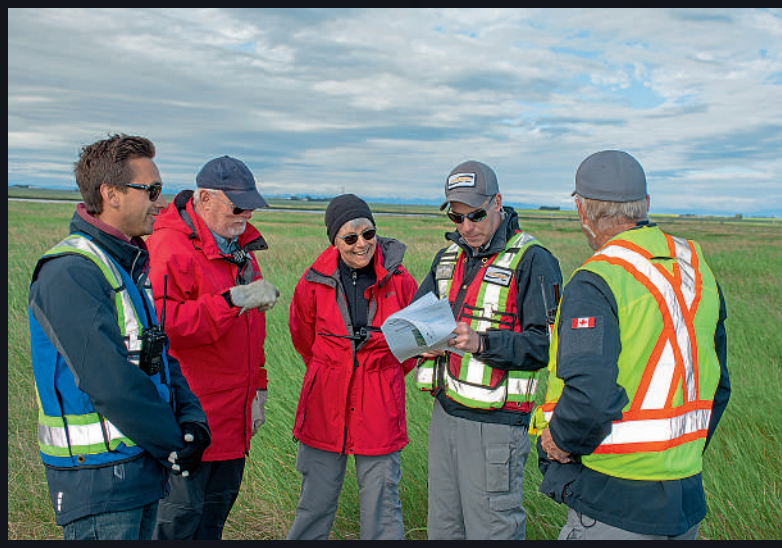
What is the ideal scenario for BVLOS regulations?

It's all about finding an acceptable safety level. We want to be in a position where we can build convincing safety arguments for the national aviation authorities (NAAs) to allow UAV operators to fly BVLOS. This would require us to define a target safety level – usually in terms of fatalities per operational hours – and demonstrate that we have a way to measure this.

Unlike in the airline or general aviation industries, where certification is a keyword and all licensed pilots are required to log



The JARUS SORA methodology aims to establish what the risks are in the air and on the ground as a result of UAS operations © IN-FLIGHT Data



Increasingly, humans will take on a management, rather than a piloting, role © Tanner McEwan

their hours, the challenge in our industry is that we currently have very little data from UAVs. As such, we need new metrics and proxies, and the support of key industry organisations and professional UAV users, to estimate current safety levels – most likely partly anonymously, but also through partnerships and industry-led research, supported by governments.

While I'm confident that as an industry we are already well within acceptable safety levels, if we want public acceptance and scalability, we must continue to develop the system. Ultimately, when you consider the responsibility we have for the safety both of other airspace users and third parties on the ground, it is crucial to have robust global standards and guidelines to be able to fly BVLOS.

How will we establish these standards and which countries have played a key role in their development?

The Joint Authorities for Rulemaking on Unmanned Systems' (JARUS) specific operations risk assessment (SORA) will be a key methodology. Essentially, the JARUS SORA looks at the whole operation holistically and defines what is required for each type of operation, to reduce the risk to an acceptable level, in the air and on the ground. The consultation on version 2.0 ended in August and it will eventually be integrated around the world by NAAs.

So far, Switzerland's Federal Office of Civil Aviation (FOCA) has been very active in shaping BVLOS regulations, taking a leading role in the JARUS SORA and collaborating with leading experts and partners from around the world. This is pioneering work. There will be challenges and we won't get everything right from the beginning.

What are the technical advancements that need to be made?

While major technical advancements are required to enable BVLOS to be safely adopted on a wide scale, there already exists a broad spectrum of technical solutions to support such operations, especially for unmanned traffic management (UTM) and on the data side. This has already been shown in our live UAV demonstrations in Geneva last year and more recently this year in Zurich, which, in collaboration with the Swiss NAA (FOCA), brought together our team with partners AirMap, skyguide, SITA and swisscom, to show how UTM software can be used safely to enable successful commercial UAV operations.

From air traffic and airspace data to terrain models and population density maps, if we aggregate all these technical solutions and combine them with the SORA methodology, it's very easy to quickly establish whether an operation can be conducted or not. While hardware and systems are readily available, advancements in this domain need to be made to improve overall performance and support long range operations. Focus areas will include 'detect and avoid', which will allow detection of cooperative and non-cooperative aircraft and management of energy and communication issues, such as frequency allocations and coverage at low altitudes. Over time, the level of autonomy will increase and humans will take on a management, rather than a piloting, role.

SOLUTIONS WILL BE END-TO-END AND WORK ACROSS USERS' DIFFERENT SOFTWARE PLATFORMS

How are commercial operators such as senseFly supporting the development of fit-for-purpose BVLOS regulations?

senseFly is committed to working with aviation authorities, organisations and other partners to develop BVLOS regulations and operations over people (OOP) that are fit-for-purpose and ensure safety for everyone. We continue to partner with operators across different regions and countries to explore potential BVLOS applications and gather data to help define risk models.

For instance, in collaboration with IN-FLIGHT Data, we're currently embarking upon Canada's largest BVLOS trial to date, with an aim to collect data and learnings and ultimately, change aviation culture globally. The project, which began in June, will fully engage a senseFly eBee and eBee Plus and generate a total of approximately 2,000km of flights over a four-month period. In addition, the IN-FLIGHT Data team has offered to share this flight safety data with other organisations to help establish safety-focused BVLOS regulations in the region.

What does this all mean to the end-user?

Put simply, successful and routine BVLOS operations for the end-user will involve an integrated approach. Covering everything from adhering and defined, fit-for-purpose operating rules to using UAVs that are designed in a robust way with the appropriate safety mechanisms and exceptional navigation performance, solutions will be end-to-end and work across users' different software platforms. Communication with other airspace users will also be crucial to help streamline BVLOS operations, with innovations such as AirMap's flight plan tools automatically alerting UAV operators to airspace requirements and advisories in a custom flight area, to enable adjustments prior to take-off.

UAVs are going to dramatically change the way that aviation works as an industry, as well as how data is used and collected. My message to authorities and operators would be to continue moving forward together, learn from our mistakes and successes, and help shape a regulatory environment that promotes safe and efficient use of airspace by UAVs and manned aircraft alike.