DRONE ALLIANCE EUROPE

Interview with **Aurélie Joy Pascual-Werner,**

FOR DRONE ALLIANCE EUROPE

by Joanna Wieczorek,

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Joanna Wieczorek: You started your adventure with the aviation sector as an air traffic controller. Why did you shift to drones?

Aurelie: I did start in manned aviation indeed, and I loved it! My first experience was at Skyguide, the Swiss ANSP, as an air traffic controller trainee, and it made me discover so much about this world. My fellow trainees were all very passionate about aviation and they got me hooked as well. We used to go to Zurich Airport during the weekend to watch aircraft take off and land, I really have great memories with them. We spent countless hours there, identifying different types of aircraft based on their unique design features. When at the airport, time would just rush by as we sat on the side of the runway, and before I even fully realized what was happening, I was loving it just as much as they were. After Skyguide, my career in aviation continued with an internship at Swiss International Airlines in their Operations Research & ATM department. There I was tasked with developing tools that would support flight dispatchers and pilots in optimizing operational processes. Through a data-driven approach, our team would analyze various factors that impacted operations. Our goal was to make things better, faster and more efficient; and what I really like was that these projects were not only theoretical but had a real-world impact.

Aurélie Joy Pascual-Werner holding Matternet's M2 drone during flight training in Lugano, Switzerland (2021).

Later, I remained in the company and worked in the Operation Center at the airport, right next to the runway. This office location was amazing as I wanted to be in the tick of the action, in this constant buzz of activity. Working as a flight dispatcher brought me a lot of knowledge and experience, as much as it taught me resilience and adaptability. It is a constant challenge to remain agile and resourceful to find ways to ensure that every flight reaches optimal efficiency under all kinds of circumstances.

When the Covid19 pandemic hit, airport and airline operations were halted and we, as employees, were stranded at home. As I am the kind of person who proactively seeks out opportunities, this passive wait wasn't an option. I started looking for a new position, and through my search I discovered the drone industry. As it combines aviation and technology, it was an immediate match. I was hired as a flight director at Matternet, as US-based company conducting beyond visual line of sight (BVLOS) drone operations in Switzerland to deliver medical samples between hospitals and laboratories. There I could combine my knowledge of risk assessment and operational skills from manned aviation and use my skills to oversee Matternet's drones. It was a very invaluable experience, especially because I was also trained on drone components, repair, and troubleshooting. I contributed to product design and development and had the opportunity to fly drones on a daily basis, both remotely and VLOS at a test airfield. Overall, this first contact with the drone industry allowed me to see many different aspects, and I was impressed by its enormous potential. It was clear to me at this point that I would continue contributing to building and shaping it all, while looking forward to seeing it turn to life in the present and future. Drones are simply limitless!

Joanna: You just joined Meteomatics as a regulatory and policy expert. What are you trying to achieve for your company in regulations as a chief policymaker?

Aurelie: My main goals are to provide our company access to anything that will facilitate operations, and to ensure the safest and most perfectly achieved integration of our Meteodrones into the existing airspace structure. Currently, and like many others in the field, we are working towards getting our Light UAS operator Certificate (LUC). This will be a major achievement that will give us privileges defined by the NAA based on our company's maturity. We aim to demonstrate that we are capable of evaluating the risk of our operation ourselves,

and that we could reasonably self- authorize it. Being able to start operations in the specific category without needing an operational authorization from the NAA could save us a significant amount of time and effort. Having this process sped up would give us more flexibility and increased efficiency, and it would benefit our customers as well by giving them more ease in the operation of the drones. At the same time, we want to achieve to nicely integrate our drones so that they could fly anywhere anytime along other airspace participants, enabling flexible and easy data collection. The path towards a safe and complete integration of our drones is marked by a few milestones like the EASA Design Verification Report (DVR) on which we are currently working too.

Aurélie Joy Pascual-Werner
at the Forbes DA Women's Summit 2023 in Zurich, Switzerland.

Ultimately, the goal of this report is to confirm that the design of our drone complies with the applicable operational safety objectives (OSO) and is therefore suitable for the intended use. Another important step on this journey will be our Type Certification (TC). We want to make sure that the use of our drones does not interfere with other airspace users, but that all operations can be conducted together in a safe and considerate manner. Overall, this is a long process filled with interesting exchanges, various challenges and many learning experiences. On the long run, I would like to see our drones allowed to operate on multiple locations around Europe and reach even higher altitudes. As of today, our drones climb up to 6km – but as we say, the sky is the limit!

Joanna: Can you explain the importance of weather data in manned aviation, for drones, and also for other industries. Please describe your experience in airline operations and the importance of weather information in this context. Try to think about people with no aviation background while answering.

Aurelie: Weather is a key parameter in aviation since it directly influences the environment in which aircraft fly. Changes in weather can totally change the operations planned on a certain day. In manned aviation, weather is also widely linked with accidents. Having access to a higher quality of weather data allows aircraft operators to better anticipate challenging situations and consequently mitigate their impact, reducing delays and costs while increasing safety and efficiency. During my time as a flight dispatcher, I could see up close how much weather impacts airlines. Examples can easily give you an understanding of the importance of such data: the route for each flight is chosen based on many parameters including weather. And once a flight planned, weather is also the parameter you repeatedly check until departure and onwards. Winds have a significant influence on the flight time and fuel consumption. Thunderstorms cause technical and safety issues. Often, during thunderstorm episodes, airplanes must hold.

Fog limits the visibility and therefore the usability of airports for take-off and landing, as well as for diversion in case of emergency. During the cold season, the removal of snow on runways requires a considerable effort. De-icing adds an extra step in the logistics of aircraft rotation. In summer, high temperatures mean lower maximum take-off weight (MTOW) and therefore less cargo carriable. Most of these conditions can't be avoided, but with precise weather data available many can be anticipated.

With an extra margin during the planning stage, the whole aviation system can be safer, smoother, and more effective. When we talk about drones, the situation is basically the same at a different scale. The logistics are not as complex as those of an airport, but local weather can have an even greater impact since aircrafts are usually smaller, lighter, and therefore more vulnerable to turbulences. By consequence, weather is an even more limiting factor for drone operations compared to aviation, and it is the #1 cause responsible for downtime. Designing a perfect product and having the best team to operate it is not enough to succeed if the weather is not on your side. This central aspect of operations is often underestimated, especially by companies with a background in tech instead of aviation. By integrating precise hyperlocal weather data into their systems, drone companies can stand out and have significantly more reliable operations.

If we take a step back and consider other industries, it becomes obvious that this logic applies to many more. A large chunk of the world's economy is affected by weather; from agriculture, to energy, to supply chains, precise data is critical for forecasting and decision making. Each and every industry is impacted by weather to a greater or lesser extent, and in the current context of climate change, this becomes even more important. Severe weather is increasingly mentioned in the news and can't be ignored anymore. Amongst those that can

Meteomatics' Meteodrone MM-670
flying up to 6km AGL through cloud layers.

benefit from high quality weather data, the most obvious is probably the insurance sector where it is crucial to calculate with the appropriate margin to ensure coverage. Other major beneficiaries are the agriculture sector, the automotive sector, the logistics sector, and the renewable energy production sector.

Joanna: Why do you believe drones can make a huge difference when it comes to getting data?

Aurelie: First of all, drones are an incredibly versatile, customizable and powerful tool. When we consider the collection of weather data, drones give access to a space otherwise hard to reach: the mid and lower atmosphere. They allow a higher frequency of measurement than any other method available until now, and this makes a huge difference for local weather including thunderstorms. Their flight performance enables to counter wind drift effects and fly a perfectly vertical profile, resulting in a higher precision. Since drones come back to ground after their mission, they can be fitted with high quality sensors – much better than if they were going to fly away and never come back, like in the case of weather balloons! This enables a customization of the drone with the required sensors for a specific purpose. Drones are also more sustainable than other comparable data collection methods: they run on batteries, and they don't need helium to climb. Helium being a scarce resource, it makes balloons far from an ideal solution for that matter.

Of course, many other kinds of data can be gathered using drones. Survey data collection for example can be greatly optimized by using automatic drones that fly over an area following a pre-programmed path. Solutions like this can drastically reduce the number of working hours needed and the costs, and by avoiding having a person in the field carrying out the survey, they also reduce the risk of accident.

Joanna: What are the most promising drone use cases for the future — how do you think drones can be more useful? What use cases do you see in your country and with which companies Meteomatics has signed partnerships?

Aurelie: In my view, the most promising drone use cases are those that really bring added value by making a big difference compared to other methods available for the same purpose. By that I mean how much faster, how much farther, how much higher, how much cheaper, how much better (etc.) these activities

can be performed when introducing a drone in the equation. There must be at least one, hopefully more, aspect (s) that make the switch to drones worth it because people are generally not willing to change if they don't see a meaningful result. If you want them to change their habits, tools and routines, you must give them a good reason to leave their comfort zone. Additionally, a key aspect is also the relevance of the service delivered. For me, use cases that will succeed are those that fulfill a specific need or respond to a concrete demand — the more important the need for drones, the higher the chances of success. To give concrete examples, there is no doubt that drones for Search & Rescue are promising because they contribute to providing a service that is essential and usually dangerous and time-consuming for humans. When looking at examples on the commercial side, industrial inspection immediately comes to my mind. I've seen solutions where drones can automatically conduct inspection of very large infrastructures in a simple, quick and precise manner, or even drones that can not only inspect but even directly repair infrastructure without the need for a person on site. I also see a huge potential in

Yves Morier, Aurélie Joy Pascual-Werner and Joanna Wieczorek at the European Drone Forum 2023 in Cologne, Germany.

survey drones that automatically overfly an area and bring back ready-to-use data. When they are simple to use and have a high-quality output, it makes no doubt that they are promising.

Talking about Switzerland and Meteomatics, our drones surely make a difference and I obviously think they are a promising use-case. As I described, they are a game-changer in the world of weather forecasting. To mention a few partnerships, we collaborated with the ETH (Zurich Institute of Technology) for cloud seeding research. This project involved adding flares on our Meteodones, which is quite an impressive feature to have! The aim of these cloud seeding experiments in wintertime stratus clouds was to study ice crystal formation and growth leading to precipitation with a multi-dimensional set of observations and numerical modeling. We also collaborated with EMPA (Swiss Federal Laboratories for Materials Science and Technology) to develop a noise model for drones, more precisely a calculation tool for a low-noise operation of multicopters. Ultimately, Meteomatics also collaborates with swiss airports and the aviation sector, for example to develop drone enhanced terminal aerodrome forecast (DETAF).

Joanna: What do you think about SORA and is it the best way to assess the risk? Do you know other methods? (here you can share your own thoughts)

Aurelie: SORA is not perfect, obviously, and that's the reason why it is still being worked on. Nevertheless, every release is a better version of it and as of today, it is the method that is applied and recognized in many countries. There are a wide range of available methods when it comes to assess risk but some fit better than others depending on the type of activity considered. UAS operations are a tough subject for risk assessment because many different factors must be taken into account, and also because the airspace structure was designed before they existed. Such operations require consideration of ground risk and air risk, and the SORA methodology allows the combination of both. In my opinion, the most useful part of the SORA is that it tells you what you need to do for your risk to be mitigated down to an acceptable level. The list of operational safety objectives (OSO) describes in detail the requirements for each aspect of the operation, and this is a great help for operators. Other risk assessment methods provide means to evaluate the level of risk, but unlike the SORA, they don't bring up guidelines on how to improve the outcome.

Joanna: Please explain to the Drone Alliance Europe members how Meteomatics as a company can make their life and operations easier?

Aurelie: Meteomatics can help your members in their life and operations in many ways! For example, they can highly benefit from our high precision local weather forecast to improve their operations. Weather conditions strongly impact the operation of aircraft and therefore, by integrating our data into their system, these companies could significantly reduce their downtime, better plan their operations, and optimize logistics. Our Weather API is easy to access and can be implemented in any of their processes and systems, for any type of activity.

Aurélie Joy Pascual-Werner during a helicopter flight over glaciers in the Jungfrau Region, Switzerland

To get a grasp of the functionalities and the potential of our API, free packages are available. They are exclusively for non-commercial use, but they are useful to get a first impression of the API and see what is offered. Another interesting service to mention is weather.swiss, where we provide drone weather and glider weather for free for any location in the world, it is a great opportunity to discover our work and its applications. Generally speaking, Meteomatics can help anyone operate at a higher level of performance and efficiency, and can support in reducing all kinds of operational struggles related with weather such as re-routings, diversions, delays, holding, downtime, and many more.