We Robotics

Expanding Drone Expertise Across DPPI Member States

WeRobotics Report for DPPI

Understanding the *Five Ws* of how DPPI members are using drones: *Who? What? When? Where? and Why?*

Introduction

Since 2010, small consumer drones, or uncrewed aerial vehicles, have become increasingly widely available and globally popular amongst disaster responders and aid workers, who value their inexpensive price and their ability to swiftly collect information about areas impacted by crisis. In recent years, disaster specialists from member states of the Disaster Preparedness and Prevention Initiative for South-Eastern Europe (DPPI SEE) have begun to experiment with using small drones in their own response efforts.

Purpose of Project

WeRobotics's research efforts were focused on better understanding the so-called Five Ws of how DPPI members are using drones: *who?, what?, when?, where?, and why?* In addition to collecting this overview information, researchers attempted to identify cross-cutting themes and patterns related to drone use across member countries

Researchers carried out semi-structured interviews with disaster responders working with DPPI in the following countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Romania, Serbia, Slovenia and Turkey. The remaining DPPI countries were unable to participate in these interviews, and are not included in the research findings.

Researchers then analyzed notes and transcripts from these interviews to identify initial cross-cutting themes and patterns, as well as challenges and impediments to further drone use that the interviewees identified.

Objectives

This research paper will summarize WeRobotics findings on DPPI drone use, and identify key themes. It will briefly discuss some of the overlapping challenges and issues that DPPI members have encountered while working with drones in disaster response and public safety.

Cross-Cutting Findings Across Countries

Financial

"For us, the biggest obstacle is definitely financial… Finances come from the central government, and there's no private budget to buy drones."

While drones are often less expensive than data collection via crewed aircraft, the costs of starting up a drone program (including purchasing drones), and the ongoing costs of running a drone program still represent a **significant expense**. Multiple interviewees cited **budget issues** as an impediment to the further development of their drone programs.

Drones are still a relatively new technology, and some felt their organizational leadership did not yet **see the value of drones**, or felt that the technology ought to be made a priority. Across all the organizations interviewed, none reported a situation where their drone program had fully dedicated staff.

As a result, a number of interviewees reported **issues with convincing their leaders to allocate funds** towards buying drones. Others struggled with funding structures that did not allocate cash that could be used for buying drone software and hardware. Allocating funds specifically for maintenance from ministry budgets was named as another issue.

Some interviewees reported buying their drones with grant money, or via other funding mechanisms, such as a NATO project - permitting them to bypass the challenge of convincing management to allocate funding specifically for drones.

At all organizations, **drone pilots also held other roles and responsibilities**, and only worked with drones on a part-time basis, or as a "secondary job." While some found this arrangement to be acceptable, others reported considerable challenges with **being able to dedicate adequate time** to drone flight training, flight practice, and other essential tasks.

The majority of organizations reported using **inexpensive and widely available consumer drones**: of these, the most popular choice were drones made by DJI, a globally-dominant Chinese drone producer. A smaller number of interviewees reported using custom-built or "DIY" drones from companies produced by companies based in Europe.

Regulatory

Drone regulations **vary widely from country to country among DPPI member states**, but there are some common themes. Almost all of the drone users in this study reported having to pass an exam to obtain a license to operate a drone. Some countries, like Turkey, have licenses that encompass 4 degrees, using weight to divide up who can fly what.

Most global drone regulatory regimes **place restrictions** on drone flights over people, moving vehicles, at night, and over certain sensitive locations (such as airports, military bases, and nuclear power plants). Most drone regulatory regimes also have restrictions on altitude.

Some countries only have rudimentary drone laws in place, or laws that are not clear: some respondents expressed **concern over inadequate legislation or clarity in the law around drone use.** One interviewee noted that the drone rules are different for themselves, for the police and for the military, creating a relatively complex web of regulation.

The Covid-19 pandemic paused the development of more complex drone rules in some countries, including in Turkey, where a planned government initiative was put on hold.

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Drone users during disasters need to have a **good relationship with aviation regulators.** Regulators help secure airspace during crisis, deconflict drones operating in that airspace with other aircraft, and can pave the way for securing permission for drone pilots to operate in certain areas.

Some interviewees have **standing relationships with the government as disaster responders that enable them to fly with minimal advance permission from regulators** (although some areas may be more restrictive than others). One interviewee reported that during a disaster, they are able to fly for up to 15 minutes without informing air traffic control in advance: for training and other events, they inform their operational center, who then informs ATC.

However, **some interviewees reported that their countries do not currently have any special rules around drone use during emergencies.** Local authorities sometimes **are not aware of current drone regulations**, and may enforce them unevenly or incorrectly. An interviewee from Bosnia and Herzegovina reported an incident where police challenged him over flying his drone in the vicinity of a prison, although he was flying in full compliance with the law.

Deconfliction with other drones or aircraft largely did not appear to be a major concern for interviewees. One interviewee noted that they do inform the press of their presence and ask them not to fly drones in the area at the same time.

Another noted that a project in their country is working on developing a national system that might facilitate this kind of deconfliction, along the lines of the digitally-based LAANC system currently operational in the US. In Croatia, drone pilots reported attending an educational workshop on safe drone flight provided by national aviation regulators: Croatia's national regulator also operates an app that facilitates safe drone flights in airspace used by manned aircraft.

DJI Concerns

The majority of interviewees reported **using widely-available consumer drones made by DJI,** a Chinese company that sells products around the world. While these drones are very popular, many governments around the world have clashed with DJI over concerns (albeit with limited concrete proof) about the company's possible linkage to Chinese security and intelligence interests.

Some interviewees reported **concern that their national governments might ban or severely restrict the use of DJI products**, which would force them to find other drone manufacturers to work with.

A number of drone programs are currently exploring **alternatives to DJI products,** although this can be a challenge, as DJI products are relatively inexpensive, easy to repair due to wide part availability, and relatively easy to use, as compared to products made by most non-Chinese competitors at this time. Many consumer drone companies outside of China are actively working to fill this market gap.

Technical

"The drone really helps us with seeing the whole picture from above, which gives us perspective and a better view of the situation, so we can make better decisions. That's a huge part of our job."

Data Management

Drones are, in essence, data collecting machines: data is a key reason why disaster responders around the globe have begun to use drones. Drone data typically includes live video, still photographs, processed orthomosaics, and 3D models (among other outputs), and may be collected with a range of sensors attached to the drone itself, including standard digital cameras, multispectral cameras, and thermal cameras. Data and issues surrounding its collection and use proved to be a key theme in this research.

Data Processing and Analysis

Interviewees largely collect and share drone photographs and video at this time. In one typical workflow, a respondent reported collecting fire data which they used both during the fires themselves: their team then reviewed the data a few days later to analyze it and to log lessons learned.

Croatia's program reported using DJI Flight Hub to centralize live drone video feeds during the Covid-19 lockdowns in 2020. Bosnia and Herzegovina's program reported streaming drone data via both YouTube and via Lincoln Lab's (MIT) Next-Generation Incident Command System, or NICS. No other programs reported using streaming services with their drone data.

Interviewees largely are not using additional data processing software tools to create derived data products from this so-called "raw" drone data. One exception is Croatia's drone program, which first used photogrammetry tools to create orthophotos of earthquake damage in Zagreb in 2020, and is currently working with Pix4D's cloud photogrammetry software.

While a few respondents expressed great interest in **starting to work with photogrammetry software and other more complex drone data processing tools,** and had begun to test these tools themselves, none other than Croatia reported being able to use these tools on a regular basis in the field. Some respondents reported challenges with f**inding information about which software tools might work** with the drones they had on hand.

Internet speeds and the l**arge size of drone data files** were a few of the reported issues that interviewees experienced related to sharing, processing, and analyzing their drone data in a more comprehensive way (including via web-based drone data processing tools).

Very few respondents reported **working directly with GIS analysts or specialists** at this time, either within their own team, or elsewhere in government. Bosnia and Herzegovina's drone team reported that they have a colleague who uses ArcGIS software, but they have not had much "real opportunity to use it for more complicated tasks." A number of interviewees expressed interest in working more closely with GIS analysts within government agencies in the future.

Data Storage

All interviewees reported **storing data on either physical portable drives or on office-based servers.** Only one interviewee reported using a cloud based system who noted that it was **challenging to use due to slow speeds: t**hey preferred to use local data storage as a result. Often, this choice of locally-based storage solutions is due to security and privacy-related rules, and not due to individual choice in the matter.

Drone data is typically very large: one interviewee reported having 100 GB of drone video to contend with, a "very big total" for their personal computer, while others reported having to wait for long periods of time for multiple terabytes of drone data to upload to web-based processing tools.

No interviewees said that they had developed **their own data protection or storage plan**. None appeared to have **defined rules for how long data can legally be retained**, or rules around how data might be **legally redacted or edited**. Data retention appears to be largely left up to the discretion of the drone team themselves.

Data Sharing

As essentially all interviewees reported storing data on non-networked systems, data sharing is **restricted to a very small group of people.** Data is typically shared with authorized parties either by **physically handing off a SD card or a flash drive,** or **via closed, internal system** access.

No interviewees currently appear to be using a centralized cloud-based portal system which multiple users can access. One interviewee noted that many volunteers in their country have their own drone, and can arrive at the scene of disaster more quickly than national-level responders can . Therefore, they believe **a web-portal system, where authorized volunteers can upload their data for others to review,** would be particularly useful.

While one responder reported sharing limited amounts of data on social media for promotional and educational purposes, most do not post any data publicly. Some respondents also reported **sharing data with law enforcement or other authorities on a limited basis,** in response to reports of criminal activity.

Drone data collected by DPPI members is therefore only viewed by a very small subset of people within a given agency or organization.

Data Privacy

Interviewees **did not report formally informing locals of drone operations in advance,** often citing the emergency nature of the situations they responded to as justification.

Most interviewees **reported awareness of both ethical standards and legal regulations pertaining to capturing potentially sensitive information (or PII).** Some reported that their organizations had specific codes of conduct around capturing footage of individuals: these standards tend to vary widely from organization to organization, and from country to country.

Operational

Drone Hardware

The majority of respondents are using **multirotor drones, and of those drones, most are using DJI product**s. DJI models included the DJI Phantom 4, the DJI Mavic 2 Enterprise, the Matrice 300, and the DJI Inspire 2. One respondent reported that their DJI Matrice 300 was equipped with DJI's XT2 FLIR (thermal) and Z30 optical zoom sensor. As noted above, a number of respondents expressed concern about potential regulatory issues with using DJI products in the future.

A smaller number of interviewees reported using **custom-made drones or drones from smaller companies: these included VTOL and fixed wing models.** Respondents reported that the benefits of using drones produced by smaller companies included the ability to have them built to specification, and the manufacturers proximity to the DPPI region. Additionally, DJI does not produce a fixed-wing drone model at this time, and programs that wish to benefit from the considerably longer flight times of fixed-wing drones must work with other manufacturers.

Reported downsides of using these custom drones included **ease of use:** often, they are not as easy to use as DJI products, may not be as well-engineered, and require more of a learning curve to use. Of those using custom-built drones, one person mentioned that they had experienced **considerable issues with being able to obtain spare parts and repairs** for their drone from the manufacturer (ultimately, they ended up waiting for six months).

Another reported downside of custom-built drone platforms: one interviewee reported that **while their DJI systems have a log function that prints the drone's location to the RC controller's SD card, their custom drone does not**. In one case, they were able to find a downed DJI drone kilometers away by reading these coordinates, which they would not have been able to do with the custom drone.

The majority of respondents **did not report other major issues with maintenance,** although one noted that their batteries are degrading as it has been difficult for them to use them enough.

Respondents from Romania and Albania are not currently using drones, but are in the process of exploring which systems might best suit their needs.

Drone Use Cases

The majority of the respondents **are already using drones to at least some extent**. Some have been using drones for quite some time: as early as 2014 and 2015 in the case of Serbia, after their program received EU financing. Bosnia and Herzegovina's drone program also was launched in 2015.

The actual volume at which respondents used drones differed considerably, varying from just a few times a year to on a very regular basis - as often as once a day since late August 2022 in the case of Bulgaria's drone program, which works with border patrol authorities to search for immigrant crossings.

Almost all respondents primarily used drones to respond to immediate, emergent disasters.

Search and rescue was the most commonly-reported use case. Drones were particularly useful in mountainous areas that human searchers find hard to navigate. Interviewees from Turkey reported **using drones to search for people in the water**. Some reported working directly with police to search for missing persons.

Fire response was the second most common use-case. Some interviewees had access to drones equipped with thermal cameras, which can be used to see "through" choking smoke to better identify fire locations. Serbia's drone team is contemplating **using drones to identify illegal fires:** authorities will then educate the people who started the fires (usually farmers) on safety risks.

Landslides, earthquakes, and floods represent three other natural disasters that interviewees reported using drones to evaluate, or that they hoped to use drones to evaluate in the future.

Interviewees from Croatia reported **using drones to create orthophotos of buildings impacted by the Zagreb earthquake in 2020,** data which officials used to assist with rebuilding efforts.In Bosnia and Herzegovina, a powerful earthquake in April 2022 caused one death and considerable damage to buildings. Civil safety drone pilots **flew over the scene and collected data on the damage: this imagery was then shared with other institutions, who analyzed it** to search for ways to prevent similar structural damage in the future.

Interviewees from Slovenia reported an interest in using drones and Pix4Dmapper photogrammetry software to **monitor flood areas before, during, and after** an actual flooding event.

Some interviewees reported using drones to **monitor public movement during Covid-19 pandemic lockdown periods in 2020 and 2021.** One reported c**ollaborating with police to photograph areas with potential criminal activities**. Another expressed interest in using drones to detect illegal border crossings, in collaboration with authorities.

Serbia reported using drones to **monitor ice on the Danube river** during a period of extreme cold, helping to facilitate boat traffic. Slovenia **used a drone to shoot video during the removal of an unexploded WWII bomb.**

Turkey hopes to use drones in the future for **chemical, biological, radiological and nuclear** (CBRN) operations, and is exploring which sensors might make this possible. Bosnia and Herzegovina have used drones to assist with **ongoing landmine clearance efforts**, speeding up the pace of operations.

Finally, a few interviewees reported using drones for **education and for public events.** A few interviewees have posted public videos of their drones in action on YouTube, Facebook, and other social media outlets for public consumption.

No interviewees reported using drones for delivering objects, or for other physical forms of assistance.

Command Structure

Drone pilots within DPPI appear to be both fu**ll-time employees (who fly drones in addition to their other tasks) and volunteers (who are compensated for their time in some countries**). No one we spoke to reported **working with drones as their only job.** As mentioned above, a number of respondents reported struggling with securing adequate time to fly drones and to practice with drones away from their other duties: **indeed, time-allotment issues were the most universally reported problem** across all DPPI members who we spoke with.

Organizations working with drones within DPPI often **appear to be fairly spread out.** A number of interviewees reported that they were aware other people working in public safety at their organization were using drones (both employees and volunteers), but they were not certain who they were or how many drone pilots there were.

Flight Planning

Within the drone planning process, **responsibility for creating a flight plan may fall upon the head of operations, or it may fall to the pilot themselves**.

Most DPPI members fly their drones manually. A number of interviewees reported that they **rarely (or never) construct flight plans in advance of flying**, due to the time-sensitive nature of disaster. One interviewee reported regularly using Google Earth, Esri's ArcGIS, DJI Flight Hub 2, and DJI Terra software for flight planning purposes.

No interviewees reported using a distributed system to share flight plans with multiple people at this time. However, interviewees from Croatia reported that they are experimenting with a DJI software solution (although they are unsure if the software will fit their needs at this time). Ideally, they would like to see software that might allow someone in the Operations Center to create a flight plan which would then be automatically sent to the pilots, removing the need to call or email them to exchange information.

Training

Just as with crewed aircraft, training is an essential element of running a successful drone program. Training approaches were widely varied across the interviewees. A majority said that their **pilots had received initial flight training from the vendor** from whom they purchased the drone.

While these initial vendor training programs are useful, drone programs should be expected to develop their own training programs and procedures (which can be done in collaboration with other government agencies and authorities).

A **minority of respondents reported regular training sessions**: Croatia, for example, reported that training sessions for pilots take place on a weekly basis, using a curriculum developed by the Civil Protection Agency. Croatian pilots also hold annual drone training sessions and inter-unit drone competitions to ensure that their skills remain sharp. Pilots in Bulgaria reported very regular training sessions with their colleagues in border control.

Some countries reported that their **pilots did not undergo any kind of standardized, regular practice or training sessions after completing an initial training course**. Some reported that this lack was linked to their **struggle to secure the time needed t**o conduct drone activities. One interviewee noted that their **equipment is degrading because they have not been able to secure enough flight hours** to ensure that their batteries are maintained.

Flight and Pilot Hours Tracking

In the consumer drone industry, just as in crewed aviation, tracking a pilot's hours and experience is widely considered to be essential. Many organizations use software tools, known as Flight Management Systems (FMS) to accomplish this. They require pilots to regularly log their hours for expert review. In these systems, pilots who do not log an adequate number of flights or hours over a certain period (such as 3 takeoffs and landings in a 90 day period) may be required to undergo additional refresher training.

However, **only two of the responders in the DPPI interviews stated that they were currently tracking pilot hours** in an organized way at this time. One interviewee reported using Airdata UAV, a specialized FMS software for this purpose, while another interviewee reported using a Google spreadsheet.

Many drone programs also use FMS software to track key information about their activities, including where they have flown, what aircraft they used for those flights, which pilot flew the aircraft, and more. This information can also be used to maintain maintenance schedules for aircraft, and to log issues with hardware and software for review. **Only one responder reported using a specialized FMS service for flight tracking purposes (Airdata UAV),** , although some stated that they were exploring ways to begin doing this soon.

WeRobotics has direct professional experience and expertise in flight logging, which is included in the hands-on training provided by WeRobotics.

Accidents and Incidents

The interviewees overall reported **few crashes or major incidents with their drones**. One interviewee reported two incidents in which the drone suffered either loss of signal or a battery issue, but was able to safely land itself. Another interviewee reported an incident **where a drone was lost due to bad weather,** but was able to be recovered by using the coordinates reported on the remote control. Yet another interviewee reported one crash attributed to "human error," and a second crash due to sensors malfunctioning after a software error.

WeRobotics has direct professional experience and expertise in incident reporting, which is included in the hands-on training provided by WeRobotics.

Public Relations

> *"In some situations, people who are living in the area where we use drones aren't happy about what we're doing. They say 'you're filming us, taking photos of us, searching for things in our area.' But we're only doing our jobs. It's not a problem for us, because we are big government."*

Interviewees reported almost entirely positive or neutral interactions with the communities in which they operated drones. They largely appeared unconcerned about potential anger or pushback from community members. As mentioned above, interviewees largely do not inform local residents of drone operations in advance.

A small number of interviewees reported participating in public events or demonstrations, intended to help the community better understand the public safety tools that might be used in their area.

WeRobotics has direct professional experience and expertise in community engagement, which is included in the hands-on training provided by WeRobotics.

Cross Cutting Recommendations

Training and Practice is Essential

"At the beginning of this project we were not taken seriously by our colleagues, like we were taking time off from our regular duties by playing with drones. But in time, they realized the usefulness of the drones."

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Crucially, **drone pilots must be given an adequate amount of time away from their other duties** to participate in training and practice activities. Programs should be encouraged to develop **standardized flight manuals and reference**s in written form, which drone pilots can use as reference materials These programs and materials can then be used to train new pilots and ensure that existing pilots' knowledge remains current. Training sessions that follow a predetermined curriculum should be conducted on a very regular basis: at least once a month, if not more.

Organizations should ensure that **all new pilots follow a standardized learning plan**: ideally, all new pilots should be required to pass an initial competency test (above and beyond national licensing standards) before they are permitted to fly in real world scenarios. Ensuring that every pilot in a drone program has been trained to the same standard and holds the same knowledge will prove highly valuable as disaster response drone programs grow.

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WeRobotics has been providing **professional hands-on training to disaster managers** and other stakeholders in dozens of countries since 2015. As such, WeRobotics is prepared to provide relevant DPPI Members with fully customized and in-person training sessions as required.

Conduct Live Disaster Simulations

We strongly recommend holding **live disaster simulations** as part of the training process, which WeRobotics has designed and run in half-a-dozen countries for multiple UN agencies and other disaster management stakeholders since 2015. Disaster responders train the way they respond, and they respond the way they train. Integrating drones into disaster simulations is thus essential to expanding the value-add that these technologies can offer in disaster situations.

Flight Hours (And Other Information) Must Be Tracked

Crewed aircraft pilots carefully track their cumulative flight hours to ensure that their skills are up-to-date - protecting the safety of themselves, their passengers, and people on the ground. Drone pilots should follow the same standard, and indeed, most professional drone-using organizations globally **mandate flight hours tracking** as a key component of their training and safety organizations.

All organizations within DPPI should ensure that **each individual pilot's flight hours are tracked,** alongside information on which aircraft they used, where they used it, what the mission was, and any issues they ran across (including maintenance issues, weather challenges, and other unexpected pitfalls).

In its most low-tech form, flight tracking can be done in a digital shared spreadsheet - which is preferable to tracking hours in a hand-written notebook. A number of software companies now offer FMS or drone flight management software solutions that assist drone organizations with tracking pilot flight hours and missions as well.

Encourage Flight Planning

While it's inherently very challenging to flight plan around emergent disaster, drone programs should still investigate ways to make sure that their operations are as well-organized as possible. Flight planning programs today are often relatively easy to use, and pre-planning a flight - even with a notebook and Google Earth satellite data - need not take more than a few minutes of time.

Flight planning software often operates hand-in-hand with flight management software, and can help organize both planned flights for the future, and logs of flights that have already taken place. Flight planning software can also be used to share flight plans with others via the Internet, allowing multiple people to both review and share input on flight plans in advance of physically arriving on the scene.

Flight planning software that can steer the drone along a pre-programmed or automated route (such as Litchi and DroneDeploy) are **also essential for drone programs that want to begin creating orthomosaics and 3D models with drone data**, as manual flight usually cannot capture adequately precise data.

Further Explore the Potential of Drone Data

Interviewees largely are **using drone data in an immediate fashion**: IE, they are shooting video and taking photographs upon request at the site of a disaster, data which is then shared with others in the moment for situational awareness.

While this type of drone data workflow is a key part of drone disaster response operations, more can be done, and a number of our interviewees expressed interest in expanding their data skills and expertise. They should consider which areas in their region might be served by **pre-disaster mapping or data collection:** collecting data in potentially at-risk areas before a crisis actually arrives makes it much easier to compare and contrast old drone data with new post-disaster results, helping disaster responders make better decisions.

They should also consider the possibilities of **post-disaster mapping**, in the time period after the acute phase of the disaster is over - as Croatia demonstrated by creating orthomosaics of earthquake damage in Zagreb in 2020. Drone data can be used to evaluate forest recovery after fires, assist with re-building impacted areas after flooding, examine in detail (and safely) the results of rock slides, and much more. Analyzing drone data with specialized GIS software, such as ArcGIS Pro or QGIS, can help unlock new findings and new insights from aerial data. Drone data can also be combined with data collected by satellites and by manned aircraft for an even more comprehensive understanding of the situation.

WeRobotics has direct expertise and experience in data management, processing and analysis, and these skills are included in the professional hands-on training offered by WeRobotics.

Get Drone Users Talking to Each Other

DPPI's drone-using members all have valuable expertise, observations, and advice to share with one another. Local organizations should pursue **holding regular drone-focused meetings, conferences, and flight practice sessions** that are open to people both from their own country and from other countries in the DPPI region.

The parent DPPI organization should also pursue holding annual (or, ideally, more frequent) drone-focused **meetings that bring together drone users across all member countries.** Some of these meetings can easily be held virtually for information sharing - although holding in-person trainings and workshops would also be immensely valuable.

DPPI members may also want to consider **agreeing to set common standards** around practices like training curriculums, flight hour tracking, best practices in different types of disasters, and more. Standardizing how drone pilots across DPPI operate in a disaster will make it considerably easier for DPPI members to come to one another's aid in the future, as everyone will be on the same page.

DPPI members can **also assist one another with questions related to buying drones and drone-related software.** The market offers a wide array of options, and navigating them can be particularly intimidating for newer drone users. Members should compare notes about the hardware and software tools that they use: they might also wish to explore the possibility of collaborating on specifications for custom-built hardware and software tools.

DPPI drone-using members can hopefully use this initial WeRobotics-facilitated workshop and training to get to know each other, forming connections that they can rely upon for information sharing in the future.

Collaborate with GIS and Data Teams

Drone pilots and GIS and data teams make a great team, and bring highly complementary skills to the table. DPPI drone teams should make identifying collaborators with GIS and data experience a top priority. They should also consider identifying ways for members of their own teams to gain more experience with GIS and remote sensing analytics skills, or possible means by which their teams might be able to hire people with these skills to work with them.

Work With Regulators on Disaster Drone Rules

DPPI member states have widely differing drone laws, and while some countries have specific rules pertaining to public safety drone use during disaster, others do not. Many countries are still in the midst of creating final or fully-developed drone regulatory regimes.

DPPI drone users should work to develop relationships with their national airspace regulators: this will allow them to advocate for their interests as emergency responders as new drone rules and regulations are rolled out. They should also work with regulators to draft SOPs for drone operations that reflect both current laws, and the specific needs of drone pilots in public safety.

Share Drone Data to Show Its Value - Safely

While storing drone data locally and restricting access to a very small cohort of people is a highly secure practice, it comes with a downside: f**ew people will be aware that the drone program exists, or what it does**. If drone programs are to gain broader financial and public support, both DPPI member's organizations and the broader public **need to be aware of what drones do and what drone data is used for**. Public events can also help local law enforcement agencies better understand drone technology and its legal uses, reducing the risk of conflict between public safety drone pilots and police in the future.

Drone users need to **demonstrate that their data is valuable,** and keeping all drone data restricted to a small audience makes this challenging. DPPI drone users should consider **exploring ways to balance legitimate privacy and safety risks against the benefits** of sharing drone data more widely.

Conclusion

DPPI Members have been using drones to support disaster response work since 2014, and have made great strides in figuring out how to best integrate this new technology into existing systems and methods. Still, Member States differ markedly in their experience with drones, the degree of support that they receive (both financial and organizational) from the agencies that they work within, and the regulatory systems in which they must operate. DPPI members have the expertise and the ability to support one another in growing their drone programs.

As WeRobotics, we believe we are well positioned to support DPPI Members in their efforts to further streamline drone operations into their important work. We strongly recommend that one of the essential next steps is to design and organize a live disaster simulation exercise with drones to accelerate hands-on learning by all.