A SPECIAL REPORT FROM
Commercial Drone Professional

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COMMERCIAL DRONE PROFESSIONAL
Drone use is becoming more and more common across many market verticals around the world with some looking to adopt the tech sooner than others. The market in which the advantages of drones have been clear from the outset has been for emergency services. As part of this month’s special report, we speak to industry leaders about just how drones are helping their daily operation.
ON THE PANEL

Sergeant Kevin Taylor:
Chief Pilot, Lincolnshire Police
Drone Unit

Gemma Alcock:
Founder, Owner, CEO, Skybound
Rescuer and Director of Air
Operations for Lowland Rescue

Sergeant James Rees:
Alliance Drone Team Manager,
Devon and Cornwall Police

When were you first made aware of how drone technology could be advantageous for you?

KT: In early 2017 The Chief Constable Bill Skelly asked for a feasibility study to be carried out in order to look at the capability, technology, benefits and cost of drones for Lincolnshire Police. Inspector Ed Delderfield was tasked with the initial project discovery phase and following a comprehensive market study the project was signed off and £30,000 allocated to get drone capability up and running for the force.

The study at the time identified the most suitable technology to be the DJI inspire 1v2 aircraft with the Z3 and XT payloads, along with 10 batteries, dual controllers and dual tablets for each airframe. PICO training took place for 10 Remote Pilots and following submission to the CAA the force was granted their Standard Permissions and became operational in September 2017.

GA: My journey into the drone world was very much research-lead. For my dissertation project at Bournemouth University in 2014 I had to choose an industry or organisation to research to find areas in which they struggle; to subsequently define that problem then solve it with a product design together with a business case for the solution. As a proud and passionate RNLI beach lifeguard myself, I decided to work with the RNLI and solve a problem they faced. I found that the RNLI really struggle to find people in darkness, it takes them 3 to 4 times longer to find someone in darkness than it does in daylight if all other conditions were the same. This could be the difference between life or death, and as such the UK Coastguard has to task 3 to 4 times the amount of assets to cover the search area to ensure that the probability of detection is similar to a daylight search. Furthermore, between 25-40% of the RNLI’s annual searches were conducted in darkness - that’s 1000s of searches every year. This became the problem that I set out to address.
After interviewing a large number of lifeboat crewmen/women and lifeboat crew trainers, it became overwhelming clear that the asset that helped them the most during these nighttime searches was the Her Majesty’s Coastguard (HMCG) helicopter services, because of the higher height of eye advantage that the helicopters could offer and the specialist payload sensors that the helicopters carry. However, at the point in time of this research, the average time from being requested to being airborne for taskings during the night is 40 minutes – and that is before they have transited to the search area to commence a search pattern. Within search and rescue (SAR) there is a concept called the “golden hour” – that is 1 hour to find the casualty and deliver them to definitive care for the best chances of survival. The HMCG helicopter service were missing this window of opportunity during nighttime searches. I wanted to give the benefits of the helicopters (i.e. higher height of eye advantage and specialist sensors) to the lifeboat crews but instantly, ergo the project became drone focused.

JR: I didn’t join the team until mid-2018, but Devon & Cornwall Police and Dorset Police started exploring the use of drones back in 2015. Some of our officers who had an interest in the technology, began to see the benefits drones could bring to emergency services scenarios and so advocated their use to senior officers. As part of a trial programme they were given some limited funding to explore the concept and it proved very successful. Thanks to their tenacity and hard work, the drone programme began, and the technology is now used daily within our organisations.

How long have you been using drones and just how do they benefit your work?

KT: The first operational drone deployment was in September 2017. The initial discovery phase identified a list of anticipated uses for the drone at the time, however as time has progressed the drone has proven invaluable and the list of uses has grown way beyond initial expectations.

Drones have proven just how beneficial they are in helping to protect the community of Lincolnshire. There are so many benefits to single one out is difficult however; one common use is searching of large rural areas for High Risk missing persons. The ability to search large open spaces especially in areas of high crops, allows the force to redeploy officers to search other areas such as woodland. Furthermore this can be done much more efficiently than with officers on foot and without damage to crops or the risk of injury to officers.

GA: As mentioned in my previous answer, I began researching into drones for public safety 6 years ago. I continued the research after graduating for a further 2 years, broadening the focus to all forms of drone deployments for Emergency Services in the UK and abroad, before then founding my company – SkyBound Rescuer. Thus, I have been running SkyBound Rescuer for 3 years now.
Furthermore, I am also the Director of Air Operations for Lowland Rescue – a charity that searches for missing people on behalf of Police forces all across the UK. I have been managing their air operations – which is mainly focused on how to train, use, and manage drones for SAR, I have fulfilled this role for 1 year now. Prior to becoming Director, I fulfilled the role of ‘Technical Development Lead’ within Lowland Rescue’s Air Operations department, which I fulfilled for 18 months before being promoted to Director.

With regards to the benefits, whilst most drones cannot physically conduct a rescue or casualty extrication like a manned SAR helicopter can (unless specifically designed to do so), the truism that there can be no rescue without first locating the casualty emphasises how critical drone capabilities are towards saving a life. Ultimately, the main functions of a SAR team are contained in the acronym LAST:

- **LOCATE** – define the specific location of point last seen or identify casualty location
- **ACCESS** – establish rescue teams’ access to the casualty by appropriate methods wade/boat/helicopter. And ASSESS equipment requirements.
- **STABALISE** – medical and physical stability to secure casualty
- **TRANSPORT** – transportation of casualty and rescuers to safety

Drone technology offers a plethora of capabilities that can greatly assist the LOCATE and ACCESS functions of the SAR operation.

As well as offering effective and efficient response, drone technology can afford protection to the Emergency Services on site too. In emergency situations, one of the first requirements is to gain up-to-date situational awareness information at the highest quality available and as quickly as possible, to mitigate the risks and hazards that rescue personnel are subjected to.

Moreover, the use of a drone can negate having to put ground teams or helicopter crews into potentially dangerous situations. Drones are frequently employed in search areas which are inaccessible to ground teams or in weather conditions that are too hazardous for manned aircraft (e.g. fog).

To summarise, drones allow us to save lives quicker and safer.

**JR:** In early 2017, following the success of the initial trial, a full-time operational team of 3 officers was established and this was the first of its kind within the UK police service. Since then, in addition to the full-time officers, we have grown our part-time pilot base so that we now have approximately 45 pilots who work across the Alliance.

We utilise drones in a variety of policing activities including looking for missing people, providing real time video feeds of ongoing incidents to our commanders, and capturing images of RTC’s and crime scenes. Apart from the obvious benefits associated with having an ‘eye in the sky’, any technology that can find vulnerable people more quickly, or that we can use to avoid unnecessarily sending officers into dangerous situations is hugely advantageous.

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Generally, our use of drones can be summarised into three policing categories:

1. Searches – whether that be looking for missing people or suspects that are trying to evade police.
2. Information/Intelligence – providing information to officers and commanders to help them plan or manage incidents more effectively. For example, at firearms incidents or at large public events like music festivals.
3. Evidence gathering – gathering digital material that will help support investigations and prosecutions. Examples include: 3d modelling crime scenes or recording the scene of road traffic collisions.

On average, we support nearly 360 individual police incidents or operations each year; this year alone our pilots have flown for over 10000 minutes at live incidents and in training.

What were/are the biggest challenges you faced when getting drones rolled out as part of your operations?

KT: Fortunately, the project ran relatively smoothly although it is imperative you get the right candidates for the role. Remote Pilots are selected based on their enthusiasm and dedication to the team and that determination really is crucial in getting results. Officer availability for training can be a challenge so the training had to be scheduled over a period of several months, however that fortunately didn’t have an impact on delivery of the project. The role of a Remote Pilot isn’t a glamorous one, you are often working under a lot of pressure for long periods of time and often at night when it’s cold.

We are extremely focused on safety and very mindful Lincolnshire is an Area of Intense Aerial Activity. Our deployments often mean we need to operate in airspace used by the Royal Air Force Red Arrows and low flying military fast jets. Fortunately, our Chief Pilot fly’s aircraft and helicopters as a PPL so we have a thorough understanding of what is needed to ensure we operate safely, and we have invested a lot of time in building a valuable working relationship with the RAF and local flying clubs.

GA: I was not responsible for introducing drones into Lowland Rescue, but not every Lowland Rescue Member Team are using drones yet so I do often help with integrating drones into SAR teams, and these are the top 3 challenges that our teams face – some we have overcome and some are ongoing challenges to overcome:

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SPECIAL REPORT: DRONES AND THE EMERGENCY SERVICES

1. Perception of drones – both of the public and of SAR team members / Emergency Services
2. The cost of training, equipment, etc. – we are a charity, fundraising is a constant challenge
3. Teams that are not sure how to get started because they do not have a team member with relevant experience to start a drone team – these teams rely a lot more on me and my team, we are creating information packages to overcome this.

JR: Where do I start? Whilst we are very proud of being the first team, it unfortunately meant that there was no existing guidance to help us decide how to best implement the technology. Effectively we had to start from scratch and work out how; not only how to legally utilise and manage the equipment as individuals, but also how to utilise it in an emergency services context where there are so many additional policies, legal issues and regulations.

Part of this process involved identifying our preferred deployment model. Due to the geography of our force we opted to train a large number of pilots to ensure the best cover across our force area. This has proven to be a lot more challenging than having all your equipment and pilots in one place and a significant amount of work is invested every day in keeping the equipment operational, the pilots trained, and managing the other governance tasks that are required. We are very fortunate that our senior officers recognise the importance of this work and so we have been able to invest in a dedicated flight management system to manage our operations, much like a commercial airline would utilise to manage theirs.

Encouragingly, the network of emergency service pilots in the UK has grown significantly since the early days and hopefully our early work has prevented others from making some of the same mistakes. There is still a way to go, but together we have been able to work collaboratively to define best practice and we have made great leaps in the professionalisation of our operations and our training standards. This will undoubtedly be an evolving process as the technology advances and the legislation adapts, so there is still much to do.

Tell us more about the process behind getting drones off the ground for your organisation.

KT: Although Lincolnshire Police were one of the early adopters of drones thankfully we were able to talk to other forces with drone capability and learn from them, allowing us to understand both the benefits but more importantly the challenges we would need to overcome. We visited several forces and that sharing of experience and best practice was invaluable.

Devon & Cornwall stood out as a force that were really making the best of the technology available having experienced and overcome the challenges, so
we remain extremely grateful to them for the help they gave us at the start of the project. That relationship continues to be beneficial and we are in touch with them and many other forces on a regular basis, sharing best practices.

**GA:** I was not responsible for introducing drones into Lowland Rescue. Rather, I am responsible for expanding and refining Lowland Rescue’s use of drones. The key points to my development plan (some completed, some ongoing) have been provided in the bullet points below:

1. Surveys sent to teams collecting data / opinions on the key areas for shared learning
2. Created a National SAR Operations Manual template – had to be a template rather than a set manual, because each SAR team often has slightly different requirements, a template allows teams to adopt however appropriate
3. Recruitment – expanding the Air Operations Department to manage an increasing workload as more teams adopt drone technology
4. Drone training courses – improve the Lowland Rescue drone training course content and materials; and move towards online courses to increase accessibility of drone-related training for our volunteers. We have courses for Remote Pilots, Observers, and Air Awareness (i.e. for non-drone SAR personnel to know how to safely interact with a drone team)
5. Remote Pilot competency management – as team numbers increase and deployment frequency increases, managing competency becomes a key priority to address and optimise, thus measures are being put in place to ensure knowledge is retained and continued learning is taking place.

**JR:** When I joined the team in 2018, my predecessor (along with two other officers, including my current Senior Pilot), had done a fantastic job of establishing the programme. They began by running a pilot project which involved the purchase of a DJI Inspire drone, they wrote an Operations Manual and applied to the CAA for the relevant permissions. It meant them having to deploy to incidents on their days off or whenever they could get released from their day jobs. They did a significant amount of internal and external engagement work to gain support, to educate and to allay fears of “expensive toys” or “privacy intrusion”. Ultimately, they were able to demonstrate the value of the technology to senior officers and the Police and Crime Commissioners for each respective force, and so the decision was made to establish the Drone Team.

Since then, due to their hard work, we have been able to move forward and focus our efforts on expansion as well as identifying areas for improvement. Our main aim was to provide better geographic cover and so as I previously mentioned, we quickly trained more pilots and invested in new equipment. Relatively recently we had close to 60 pilots and at the time we were trying to manage that and a fleet of 30 drones on multiple Excel spreadsheets. We quickly realised this wasn’t sustainable and this led us to invest in a cloud-based solution called CENTRIK to manage our records, including
pilot logs, taskings and risk assessments. Now our operators do everything electronically on tablets and so we don’t have the burden of paper records. We have also rationalised our pilot numbers, removing those who were struggling to keep up with their CPD and so we now stand at just 45 pilots.

Other issues that have slowed progress are fairly common in any commercial or public organisation setting; we have had to compete and wait our turn for resources such as staff, ICT support and the provision of vehicles, so it hasn’t all been smooth sailing. It has been a very steep learning curve, but one which we have thoroughly enjoyed. We are all passionate about the benefits drones can bring, and fortunately for us, the end product we produce does much of the talking for us. However, still to this day there is a lack of understanding from some about the complexities and legal aspects of operating drones and so it’s vitally important to invest time to engage with key stakeholders and get them on board. This applies to external parties as well, so we regularly interact with councillors, MP’s and community groups to share the good work drones are doing and address any of their concerns.

We have also developed a public education course called Safer Drones, which provides an opportunity for people who own a drone, or who are maybe thinking about buying one, to come and find out about the legislation, how to use a drone safely, and how we are using the equipment to protect our communities. This has proved to be extremely popular and we are very close to rolling this out nationally so that other parts of the country can benefit as well.

Give us one example/case study which reflects how beneficial drones have been.

**JR:** With all the benefits and opportunities drones have brought within policing it is difficult to identify one example so here’s two:

The most obvious and undeniably important use is in searching for missing or vulnerable people. Time is a critical factor in these situations, and our drones can be credited with finding 2 high risk missing people in the last 12 months that may not have been found in time without the technology. One was found near the edge of a cliff top after leaving a goodbye note to family members. The other was an elderly male with dementia who was found confused and distressed walking through muddy fields.

The drones carried by some of our armed response and force support group officers are quickly deployable and fitted with a high-resolution camera, so they are extremely useful for quick time searches when people are initially reported as missing and are hopefully still close by. These drones also feature speakers and spotlights, to help aid in the search. Should more specialist equipment be required, we also have larger drones with a thermal camera and high zoom visual camera to help search more thoroughly. Our officers are also able to utilise one of two dedicated drone vans equipped with AV equipment and charging facilities, to allow them to deploy for longer periods and to review footage effectively out in the field.
Another beneficial but less publicised way we have utilised the technology is for court presentation purposes. We work closely with our major investigation teams and mapping unit to create presentations to convey to the court and jury the facts of the case. By combining aerial images and video with other sources of information such as CCTV evidence, we can help members of the court visualise the events. These products can be so effective that it can negate the need for jurors to be transported for physical site visits and they are now regularly requested by the prosecution team.

For more information about working with CDP, including the unique brand and marketing opportunities available, please contact:

**JOSH WADDELL**
Group Commercial Manager  
+44 (0)20 3176 4233  
josh.waddell@itppromedia.com

Additionally, if you would like to join the other thousands of professionals within and using the drone industry in receiving our daily e-newsletter which contains five new stories every 24 hours, please contact:

**ALEX DOUGLAS**
Editor  
+44 (0)20 3176 4237  
alex.douglas@itppromedia.com