University of Reading

ARPAS-UK The UK Drone Association

Industry toolkit

Professional, responsible and considerate commercial drone use

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Industry toolkit: Professional, responsible and considerate commercial drone use

Overview

- Drone use continues to grow across UK skies.
- Drones enable the capture of aerial imagery and data and the carrying and transport of items and goods, and are used commercially across a growing range of applications and sectors
- Drones can enable data gathering, safety, access, connection, environmental, economic and cost-saving benefits.
- From privacy and safety concerns, to noise and wildlife disruption, drones can negatively impact local communities and environments.
- This toolkit is designed for members of the commercial drone industry and seeks to encourage reflection on and the sharing of best practice.
- Members of the UK drone industry identified key aspects of commercial best practice as including: understanding regulation, thorough risk assessment and flight planning, engaging local communities, and thinking like an aviator.

1. Introduction

Drone use continues to grow across UK skies. In January 2023 the UK's aviation regulator, the Civil Aviation Authority (CAA), stated that it has 500,000 drone 'operators and flyers' registered under its Drone and Model Aircraft scheme, processes 7,000 operational authorisation applications per year, and that the total number of drone pilots and aircraft are already '80% larger than the General Aviation and commercial air sector added up'.[1] Drones enable the capture of aerial imagery and data, as well as the carrying and transport of items or goods. The UK's drone sector is growing, with drone's used for inspection, monitoring, surveillance, and carrying and transport roles across diverse sectors, from agriculture and oil and gas, to construction and emergency service.[2]

Commercial drones are praised as enabling the carrying out of 'tasks faster, safer, cheaper and with less impact on the environment than traditional methods'. [3] A 2022 Department for Business, Energy & Industrial Strategy and the Department for Transport report outlines a vision 'that by 2030 commercial drones will be commonplace in the UK in a way that safely benefits the economy and wider society'.[4] While echoing forecasting around the 'potential for drones to positively impact the UK economy', such forecasting also identifies 'challenges' – from public perception and regulation, to technology and implementation – to be addressed in order to 'realise' the benefits associated with commercial drones.[5]

This toolkit draws on engagement with members of the UK drone industry to explore professional, responsible and considerate drone use. It was produced by Dr Anna Jackman as part of the Economic and Social Research Council funded 'Diversifying Drone Stories' research project (ES/W001977/1) and was developed in partnership with The Association of Remotely Piloted Aircraft Systems UK (ARPAS-UK), the not-for-profit trade association for the UK drone industry.[6] Drawing on online focus groups with 21 members of the UK drone industry, the toolkit explores:

- Potential positive impacts of commercial drone use and operations
- Potential negative impacts of commercial drone use and operations
- Tips for professional, responsible and considerate commercial drone best practice.

It is also accompanied by a longer form report exploring the UK commercial drone industry.[7]

2. Positive impacts of commercial drone use and operations

Commercial drone use spans a range of sectors and is associated with two primary applications

- Aerial imagery, video and sensor data capture (e.g. Inspection, survey and mapping, surveillance, monitoring)
- Transport and carriage of goods (e.g. Delivery, dispersal/ spraying)

Drone use is associated with a range of potential positive impacts, including:

- Data capture affording situational awareness and enabling information provision (e.g. image, video, sensor data) to inform decision-making (e.g. asset management)
- Increasing speed of data capture, when compared to other methods of remote sensing
- Enabling repeat data collection (e.g. progress or change over time)
- Increasing operational safety (e.g. reducing workers at height, reducing entry to dangerous sites or increasing understanding of site before entry) and supporting emergency response
- Cost-saving, through enabling pre-emptive surveys (e.g. of buildings, structures, assets), and when compared to other methods of aerial imaging or remote sensing
- Improving or increasing access, connection and/or convenience in remote or congested areas (e.g. postal or medical delivery)
- Drones can offer environmental benefits (e.g. reduction of carbon emissions, reduction of scaffolding, potential reduction of traditional vehicles and emissions).
- Contributing to the UK economy and job creation.

3. Potential negative impacts of commercial drone use and operations

Participants recognised that drone use can negatively impact local communities and environments. Discussions focused upon: public perception, wildlife, the environment, and other airspace users.

Public perception

- *Privacy and safety*: Participants described members of the public expressing concerns about privacy and safety. In discussion of perceptions of 'drones violating privacy', participants described encounters where they were challenged by members of the public who were concerned about what they could see and what they were 'taking pictures of'. Research into the UK general public's perception of drones echoes this, with surveys highlighting concerns around the 'privacy implications' and potential 'intrusion' of drones in relation to accessing 'and potentially recording' personal data and data in 'personal spaces' such as 'private property'.[8]
- *Noise and visual*: Participants recognised that the presence of drones (sound and visual) can impact members of the public. Participants expressed different views on the significance of drone noise. Some participants viewed it as a 'problem that won't go away' but that can be 'mitigated as much as possible' (e.g. choice of drone, route and altitude), some understood it as a 'challenge' for 'engineers' who have demonstrated the ability to 'make aircraft much quieter', while others cautioned that to a certain extent 'we're guessing what the public will think because' drones have not been flown 'in volume' with enough frequency to determine their effects. Participants suggested that the geographical context of the flight (urban, rural) may also inform the drone's impact, as the drone's presence may be more noticeable in rural locations and/or risk 'disturbing people' or disrupting 'tranquillity', though this may be where the positive impacts are most acutely felt. While participants felt that flights in urban areas may more easily 'become part of the background noise', research indicates concerns from members of the public that existing 'visual and aural disruption' at 'ground level' could be 'duplicated in the air above the home' by drones and wider urban air mobility craft. [9]

- *Engaging with local communities and stakeholders*: As is returned to in discussion best practice, participants repeatedly stressed the importance of prioritising drone use cases with clear 'societal benefits' as a 'first step piece' to 'prove our benefit'. They also underscored the importance of 'bringing people along with us' because they are impacted, drones 'need to fly from somewhere, land somewhere', and 'negative' responses may 'kill' a 'fledging industry'.

Disruption to wildlife

- Drones can disturb wildlife. Research demonstrates that drone impacts on animals vary by type of animal (e.g. birds are more likely impacted, as are animals with 'high hearing capabilities'), response (e.g. from curiosity, vigilance and alert, to alarm, fleeing and aggression), and drone attributes and flight characteristics (e.g. platform size, noise, flight pattern).[10]
- Participants described encounters with wildlife, with birds (seagulls, oyster catchers, and pigeons) responding to and even attacking and downing drones. Participants described different strategies in response, including avoiding particular times (e.g. 'nesting'), considering platform and flight pattern (e.g. using smaller drone, adjusting flight pattern and altitude), and experimenting with flying an additional drone to try and 'distract' the birds 'from the actual job'. One participant described a confrontation with 'members of the horse riding community' who were concerned over how their horses would respond to 'drone noise'. The participant added context around injuries resulting from low flying military aircraft causing horses to bolt and throw riders, reminding the group that 'risk and impact were dependent on point of view'.

Environmental impacts

- Participants highlighted that many are 'electric', are associated with reduced 'carbon emissions' and can be understood as 'better for the environment'. The UK Government has promoted drones as 'alleviating pressure on ground level networks, reducing congestion, helping towards net zero targets' and causing 'less impact on the environment than traditional methods'.[11] However, research on delivery drones has also 'cautioned' that while drones 'could reduce' emissions, further analysis is needed to the 'broader systemic effects along the logistics chain', such as 'emissions relating to extra warehousing', the 'life cycle of batteries' and the 'potential environmental risks' of any 'debris resulting from collisions and dropped cargo'.[12]
- A participant urged further consideration of 'where that electricity is coming from' (adding that this is 'not just a drone related problem', rather impacts electric vehicles more widely) and 'the sourcing' and disposal of 'lithium batteries', when considering 'wider environmental impacts'.
- Others recognised environmental impacts throughout drone operations. In discussion of geospatial surveys and the requirement for 'ground control points', one participant said 'temporary spray' variants can last months and may be 'visual deterrent for the locals' when sprayed 'across pavement in front of their house'. Describing pegging ground control points into a field, another participant recalled a farmer expressing concerns that their cows 'were eating' the ground control points and suffering 'digestive issues'. The team set out the ground control points every day and 're-registered' them. The participant noted that this issue highlighted that there are 'specific' environmental 'impacts' and concerns 'for a specific location'.

Other airspace users

- Participants stressed the importance of impacting and being impacted by other airspace users, from manned aviation to emergency service air support.
- In discussion of a drone operation 'taking off and landing from an operational airport', a participant noted that while on their initial 'approach to the airport' they were 'kept at arm's length', following good communication they secured 'a temporary operating instruction' from the airport. Another participant described the importance of considering military aircraft, noting that

while they had ‘a temporary danger area confirmed’ and ‘NOTAMs raised’, they experienced ‘multiple air incursions with Chinooks’. While this enabled them to practice ‘emergency protocols’, they asserted that it underscored the importance of communal ‘airmanship’.

- Participants recognised the importance of awareness of the presence or onset of emergency service air support, as the presence of external drones can impede emergency responses. [13] CAA guidance states that ‘you must keep out of the way and not fly in any way that could hamper the emergency services when they’re responding to an emergency incident’, unless you ‘have permission to do so from the responsible emergency response personnel’.[14]

4. Professional, responsible and considerate commercial drone best practice

- A central aim of the focus groups with members of the UK drone industry was to share reflections on professional, responsible and considerate commercial drone best practice.
- Participants described the drone sector as a ‘learning industry’, stressing the value of sharing expertise and building a good ‘reputation’ through professional practice.
- Participants identified the following as key aspects of best practice: Understanding regulation; Thorough risk assessment and flight planning; Considering and engaging with local communities; Careful equipment maintenance; Tailored and/or ongoing training; Visibility and transparency; and Thinking like an aviator.
- This toolkit can be used by members of the industry to reflect upon and inform best practice.

Understanding regulation

- Participants stressed the importance of awareness, understanding and ‘acting in accordance’ with relevant UK airspace regulations.
- The UK’s aviation regulator, the Civil Aviation Authority (CAA), details relevant regulation applying to drone flight in the UK. Rules are ‘based on the risk of the flight – where you fly, the proximity to other people, and the size and weight of your drone’.[15] There are three categories of operation - the open category, specific category, and certified category. The Open category is ‘intended for low-risk drone flights’, the Specific Category is for ‘higher risk flights’ and requires ‘an operating approval’, and the Certified Category ‘is for large drones which have to meet specific safety certifications along the lines of aircraft’.[16]
- There is ‘no distinction between flying commercially and flying for pleasure or recreation’, i.e. this means that an ‘approval just to operate commercially is not required’, though ‘all commercial drone flights require valid insurance cover’. [17]
- Participants stated that ‘just because it’s legal doesn’t mean you should do it’. Describing witnessing ‘people buzzing around’ 249g drones, participants highlighted Articles 240 and 241 of the Air Navigation Order, stipulating that you must not ‘recklessly or negligently act in a manner likely to engender an aircraft’ or ‘cause or permit an aircraft to endanger any person or property’.[18]

Thorough risk assessment and flight planning

- Participants underscored the importance of completing comprehensive risk assessment and flight plans ‘for every single job without fail’.
- Participants encouraged proactive planning, including: having risk assessment and flight planning documentation ready ‘to present as needed’, having the contact information for and/or contacting local airports/ airfields and police as necessary, ‘filing a flight plan’ using an app to increase operation visibility, and checking weather and sun radar to anticipate any operational and ‘visual line of sight’ impacts.

- Participants described value of sharing risk assessments and planning documents with their clients. Clients can be 'wary of drones', with concerns about whether drones may 'endanger anyone' on their site or land. One participant remarked that going through a 'thorough flight plan shows [the client] you have considered everything' from airspace, to the public or uninvolved persons, to 'what might go wrong and how you can mitigate it'. Alongside 'best practice', this can also help 'build legitimacy' around drone use more widely.
- Where subcontractors are brought it (e.g. due to the 'scale of work'), participants suggested additional considerations including 'briefing them on how to undertake a particular exercise' to ensure 'competence' for the specific task and the capture of consistent data. CAP722 includes further guidance on 'contracted remote pilots'.

Considering and engaging with local communities

- Participants underscored the importance of considering and engaging with local communities and stakeholders in the area of and impacted by the flight. Participants urged this to take place early and 'strictly as part of planning processes'.
- Approaches included: 'ensuring residential advisories are in place', circulating flyers and/or letters to local areas and residents, and dedicating 'extra time' to provide information and answer questions.
- Participants described communication as a key, and at times 'lengthy', 'part of workflow'. Participants advised that providing information on where you're flying, what you're flying, and why you're flying is an important part of building awareness and 'confidence that the pilot [or team] has considered the flight and is following the regulation'. Such communications may also aid 'public acceptance' more widely.
- Participants also described challenges, with participants sharing incidents of not supplying letters or notices and encountering concerned and/or angry residents, which acted as an 'important reminder' that 'there's a reason why' such measures are important and that best practice means doing them 'every time'.
- Participants also returned to the potential impacts of drones (e.g. privacy, safety, and noise concerns/ disturbance) and urged a consideration of the size and type of the drone, based on the job in hand and the location or context of flight.

Careful equipment maintenance

- A participant specifically raised the 'maintenance of equipment' as an issue they felt was not adequately discussed across the 'drone industry'. They described the 'manuals' accompanying particular equipment as 'very woolly', and as such they had implemented both a 'test before first use' document for each system they brought in, and 'three-monthly and twelve-monthly prompts for maintenance'. They underlined the importance of documenting such maintenance, both as evidencing that 'you are professional and have maintained everything', and in case of an inquiry or incident.

Tailored and/or ongoing training

- Participants suggested that tailored and ongoing training can be very valuable. The CAA details different pilot competency requirements depending on the nature of the drone flight. For information on flights in the Open category see the Drone and Model Aircraft Code and CAP2012. [19] For flights in the Specific category, 'competency requirements will vary…dependent on the type of operation', but pilots must 'as a minimum' complete the General VLOS Certificate (GVC).[20]
- While participants expressed differing views on the scope of existing qualifications,[21] some participants described the value of implementing 'additional type training' and the need 'to pass different assessments' before undertaking drone work. They described the value of developing in pilots a deeper understanding of 'not just the

types of equipment, but the types of jobs' at the specific location, and as a way to both act safely and do 'everything over and above' the regulatory requirements. Another participant 'advocated' for the creation of additional training opportunities for 'continued professional development', drawing attention to the potential value of training for 'specific use cases', given the 'nature of the industry' and the variety of contexts and operations pilots may encounter.

Visibility and transparency

- In discussion of visibility, participants described digital measures such as 'going over and above' what is required in the regulations through 'inputting flight data' into UTM services (e.g. Drone Assist) in order to increase 'awareness of operations'.
- Participants also highlighted the importance of making both the pilot (and wider team) physically visible (e.g. through wearing high vis jackets and using cones and/or signs to demarcate take-off and landing area, and/or to set up a perimeter around the pilot). While noting the importance of 'cordons' and 'spotters, so people don't go up to the pilot' or distract them, one participant recalled experiences of people 'walking right in front' of where the drone is landing 'with their phone up filming'. They added that it is very important for the pilot and team to be aware of their surroundings.
- Participants also stressed the importance of being 'open and transparent' about both the operation and relevant airspace rules when 'approached' with questions. Participants understood this as an important part of the operation and as a form of public engagement 'educating stakeholders' about what drones can do and the 'societal benefits they can provide' more widely.
- A participant stated that in the event someone 'does have any concerns' or appears 'suspicious', they remind them that they are welcome to call the police.

Thinking like an aviator

- Participants stressed the value of 'thinking like an aviator' and developing airmanship.
- Participants described developing 'an appropriate and responsible level approach to safety'. Concerns were expressed that 'understandings of what is safe and what isn't' and how to go 'about risk assessment and management' can in some cases be 'quite thin', with only 'lip service' paid to 'the idea of safety'. Participants noted that it can be 'easy to become too reliant on the kit' and for that 'wider awareness to be lost', 'particularly when the pilot gets tired on long jobs'. Participants underscored the need to fully consider what it means to 'fly a drone' (e.g. 'what happens if something goes wrong?'), and understand how to effectively respond in an emergency.
- From the way we conceive of safety to the reporting of incidents, participants suggested that lessons can be learned from manned aviation. Understanding the drone sector as a 'fledgling industry', participants described it as in a 'privileged position' to 'try to instil these behaviours early on'.

Summary: Professional, responsible and considerate commercial drone best practice

Members of the UK drone industry shared their recommendations for professional, responsible and considerate commercial drone best practice. Drone operators and/or flyers should:

- Understand and adhere to relevant and applicable regulation
- Take a proactive approach to planning, including a comprehensive risk assessment and flight plan for each flight
- Consider and proactively engage with local communities and stakeholders early on and as an important part of flight planning
- Consider and choose the right sized drone for the job and recognise that drones can be perceived to be noisy and visually disturbing
- Consult relevant regulatory guidance and undertake additional measures when subcontracted pilots are employed, to ensure best practice is followed and
- Ensure all equipment is carefully maintained
- Explore opportunities for further training and ongoing professional development
- Use digital and physical measures to ensure aircraft, pilots and operations are clearly visible
- Be open and transparent about the scope and purpose of drone operations and applicable airspace regulation when approached by members of the public
- Think like an aviator! Lessons can be learned from manned aviation, especially on safety.

Recommended resources

- Jackman A (2023) UK Commercial Drone Industry: Professional, responsible and considerate drone use [link]
- CAP722 (2022) CAP 722: Unmanned Aircraft System Operations in UK Airspace [link]
- CAP2569 (2023) Call for input: Review of UK UAS regulations [link]
- Department for Business, Energy & Industrial Strategy, Department for Transport (2022) Advancing airborne autonomy: use of commercial drones in the UK [link]
- NATS (2023) South of the clouds: A roadmap to the next generation of uncrewed aviation [link]
- Future Flight Challenge (2022) Future Flight Challenge – Mini Public Dialogue [link]

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