

SO, YOU WANT TO FLY A DRONE OVER **OUR COMMUNITY**?



A simple guide for European local
authorities considering planning
drone flights over people

PART ONE

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This is a two-part guide. Part one, published in February 2020, focuses on supporting local authorities in managing the immediate challenges of authorising visual-line-of-sight drone operations above people in their communities.

Part two, to be published in July 2020, will focus on the roles that local authorities will play in supporting more complex UAS operations, such as beyond-visual-line-of-sight first-responder and commercial delivery operations along with urban air taxi services and implementing UAS traffic management systems within an integrated ground/air autonomous transport network. Part two will also contain a list of certified expert contacts and use-case examples for more detailed reference points.



INTRODUCTION TO URBAN AIR MOBILITY AND FLYING DRONES

You are a local authority who wants to use a drone to undertake roof inspections of the apartment blocks for which you are responsible. Your drone officers have worked closely with local inhabitants to inform them about upcoming flights and have been received with curiosity and understanding.

In which case you are well prepared and fortunate.

But for many local authorities the prospect of introducing drone operations into the nearby environment represents more of a threat than an opportunity. Local residents will object to the noise and intrusion. What happens if a drone falls out of the sky and causes an accident or injury – who will be liable? Where does the responsibility for ensuring safe drone operations start and end? What are the different rules for flying drones in rural areas and flying drones above people (not allowed in most European Union countries). Isn't this more a job for the national aviation regulator?



The world is divided about drones, especially the use of drones flying above people, busy roads and buildings. Around the world drones have saved hundreds of lives by helping first responders locate lost and vulnerable individuals or delivering medical supplies to remote areas. But they have also raised new concerns about safety, the protection of individual privacy and environmental nuisance.

Every community is different – with different concerns and expectations.

There are now more than 100 cities, towns and villages in the world actively engaged in looking at the space above our heads as a key, clean, efficient transport resource, part of a multi-modal transport network to transfer goods and emergency responder equipment efficiently and safely between different points in the urban landscape in an environmentally responsible way. Your pizza in Reykjavik can be delivered by drone. If there is smoke coming from a house in your neighbourhood in San Diego, the first responder could well be a drone. If blood needs to be transferred between hospitals in Switzerland it could be flown by a drone.

INTRODUCTION TO URBAN AIR MOBILITY AND FLYING DRONES 2

Local authorities around the world have started to recruit specialist drone officers – not just to oversee the launch of new drone services but to liaise with the police and community representatives to manage irresponsible drone use by the clueless, the careless and the criminal. While national aviation regulators generally forbid the flying of drones above people urban airspace is unregulated. When it will be regulated and controlled, we don't know. Some communities believe they should develop their own local traffic regulations for drones in the same ways as they have for cars but this has not been decided in any systematic way.

Some city councils have embraced not just commercial opportunities that they bring but the fun aspect, too. Brisbane in Australia, for example has built permanent launch pads in city parks¹ so drone hobbyists can race and fly their drones. More than 700 people provided feedback to the Council following an initial trial and 80% of those support the Council in providing spaces in parks for the launch and landing of drones.

This guide has been written to provide a simple blueprint for any local authority officer tasked with introducing drone operations into the community – from a roofer who wants to use a drone to inspect the tiles on a village house to a metropolis developing networks of drones for first responders mapping, insurance, broadcast and passenger taxi services.



Part one of the guide gives some guidance on managing current drone operations. Part two looks at building an entire drone eco system for the city and lists links to organisations who can provide help and advice along with case studies. As new rules and new drone businesses develop this guide will develop, too. For the latest updates please visit www.urbanairmobiltynews.com.

¹ (<https://www.couriermail.com.au/news/queensland/brisbane-to-get-10-drone-launch-pads/news-story/b0574a2e601598769a55f66327c7f6de>) and UAS Vision (<https://www.uasvision.com/2018/08/10/brisbane-to-get-10-drone-launch-pads/>)



DRONES

Drones come in all different shapes and sizes but broadly there are two different types of designs – multirotor drones with two or more rotors and fixed-wing drones built for longer flights and not for the moment really suitable for urban operations, though they will fly over people on long distance flights. Around 70% of all drones in use today are made by one company: DJI (www.dji.com). For more information on other types of drones please refer to part two of this guide.

Multirotor drones are by far the most popular type and come in three different classes:



Micro, nano and indoor drones used recreationally



Larger multirotor drones used for both recreational and commercial operators to take pictures, for example



Large multirole drones used for commercial or first responder operations



DRONE OPERATIONS

Today, most operations are confined to visual-line-of-sight (VLOS) or extended-visual-line-of-sight (EVLOS) operations – this means that the drone operator must be able to see the drone he/she controls at all times or be in direct contact with an observer who can also see the drone flying (EVLOS).

If operators want to fly beyond-visual-line-of-sight (BVLOS) this operation will need to be certified by the national aviation authority. Each country has its own regulations but from July 1 2020 all European Union countries will put in place common drone laws developed by the European Aviation Safety Agency (www.easa.europa.eu/easa-and-you/civil-drones-rpas).

The operator controls the drone via a radio link, either with a handheld controller or a smart phone. The hand-held transmitter sends signals to the receiver in the drone. The radio link will have four separate channels for each direction the drone will fly – up, down, left and right – and once the transmission command is received the on-board flight controller moves the control surfaces in the appropriate manner. Most drones are also fitted with air-ground video link, using a digital transmission system which relies on WIFI or a 4G/LTE mobile telecommunication device broadcast directly to a nearby cell tower.



Commercial drone services are broadly split into three categories – collecting data (traffic flows, energy loss, mapping); transporting things and simple services.

Commercial/professional operators can use drones for several different tasks:

- First responders and public safety officials use drones to track lost people and provide an initial assessment of emergency situations such as fires or accidents
- Tower operators use drones to check-out mobile phone and wind turbine structures
- Mapping agencies looking to survey or map an area for environmental reasons
- Construction companies use drones to monitor construction progress and site safety and security
- Film and broadcast companies use drones to take images
- Light displays – are becoming increasingly fashionable as an alternative to a firework display, for example

DRONE OPERATIONS 2

The rules for all drone operations are clearly defined. In the European Union, drones are classified as aircraft – which means shooting them down or interfering with their signal is a criminal offence – and the rules for operating them are set out by national civil aviation administrations, which work to high-level regulations set out by the European Commission and EASA.

The Commission has defined three type of drone categories *(for a full definition please see appendix one)*

- ‘open’ category – small, usually recreational drone flights, which do not need to be regulated.
- ‘specific’ category – operations involving drones of more than 25 kg and/ or operated beyond-visual-line-of-sight.
- ‘certified’ category – high risk, highly regulated operations.

Drones fitted with cameras are not allowed to be flown less than 150ft (50m) of other people or properties. They must also stay away from crowds and built up areas by at least 500ft (150m). A request to fly a drone in a VLOS operation by a first responder, roofer, commercial operator, broadcaster etc can be dealt with relatively simply and easily by agreeing the flight envelope in which the operator will fly the drone and ensuring the operator and operation is certified by the national aviation authority and follows the proposed flight plan.





SO WHO IS RESPONSIBLE FOR WHAT?

Local authority areas of competence in respect of drones:

- Deciding whether and when to develop city-wide drone regulations (in parallel and in addition to national aviation authority rules) and no-fly zones beyond those identified by the national aviation authority (public buildings, crowds, power stations, airports, prisons etc).
- Agreeing with the national aviation authority the geographic and operational areas of each other's competencies. Each local authority will eventually have to develop its own drone map including no-go areas and the flight envelope limits in which drones can operate. These will need to be transmitted to the national authority – normally the civil aviation administration – and drone operators via U-Space management companies (see below).
- Liaising with emergency services and police to determine respective roles and responsibilities for dealing with clueless, careless and criminal operators and developing a hotline/website to report public concerns and then publicising this.
- All drone operations must abide by local noise and environmental laws, including wildlife preservation areas. These can be automatically transmitted to drone operators via the U-Space management company. Local authorities can develop their own noise limit rules; the route dependent on horizontal risk and noise concerns and vertical risk and noise concerns if the routes fly close to high-rise areas.
- Engaging stakeholders and communities in drone awareness campaigns.
- Ensuring commercial operators are properly certified and insured for the operations they are planning. Before any flight over people the drone operator will have to have undertaken a risk assessment according to the Specific Operations Risk Assessment process developed by the Joint Authorities for Rulemaking on Unmanned Systems (JARUS), which need to be validated by the national aviation authority.
- Licensing of take-off and landing sites for commercial operators in consultation with national aviation authority and local communities.



SO WHO IS RESPONSIBLE FOR WHAT? 2



National aviation authority areas of competence in respect of drones:

- Training and licensing of pilots, operators and commercial drone operations
- Approval of drone types and suspension of approval
- Setting out contingency procedures
- Licensing of take-off/landing sites for operators in consultation with the local authority
- Publication of temporary obstacles to allow line of sight operations
- Marking and lighting of obstacles within visual site and for on-board sensors
- Building a Terrain/Obstacle/Vegetation database for fixed and mobile obstruction collision avoidance
- Certifying risk assessments according to the Specific Operations Risk Assessment process developed by the Joint Authorities for Rulemaking on Unmanned Systems (JARUS)
- Protection of search and rescue as well as other civil emergency flights
- Approval links to other parties – such as ATC service providers
- Licensing of UAS traffic management operators to, if appropriate, manage the airspace for multiple drone operations

SO WHO IS RESPONSIBLE FOR WHAT? 3

U-Space companies

- These companies – responsible for requesting authorisation for flights and managing the safety of flights once authorisation has been given – will input into their software the flight envelopes developed by local authorities. Drone operators use these to plan and operate their flights.
- Many national aviation authorities have already specified their U-Space service provider partners (see part two of this guide). U-Space service providers focus on managing more complex drone operations than those operations covered in this guide.

Commercial drone operators' areas of competence:

- Ensuring their pilots, drones and operations are certified and legal
- Ensuring their operations are covered by comprehensive insurance policies
- Ensuring they abide by GDPR rules
- Ensuring their operations meet all local as well as national environmental and safety laws
- Taking responsibility for avoiding collisions and accidents
- Ensuring a documented risk assessment has been made for each flight.



Private drone operators' responsibilities:

- Ensuring their drone flights abide by national privacy laws
- Ensuring their drone flights are safe and that their drones and drone operating systems meet the minimum national certification requirements (no home built drones or home-written software management systems which could cause an accident)
- Report accidents and incidents to the relevant first responder organisation



POSSIBLE SCENARIOS

Flying a drone in the garden

...will only be a concern for the local authority if there is a report of an invasion of privacy, an accident, a noise nuisance, or if the operator is flying the drone in a careless way or flying about 120 metres. Flying a drone over someone's garden is not allowed unless the owner has given her/his permission. The local authority might consider setting up a drone 'hot-line' or email account where concerned members of the public can contact.



Flying a drone in the park

...drones fitted with cameras are not allowed to be flown less than 150ft (50m) of other people or properties. They must also stay away from crowds and built up areas by at least 500ft (150m). This means most public parks are no-fly zones unless specifically designated by the local authority.

POSSIBLE SCENARIOS 2



Flying a drone to survey a structure or for use by first responders – the police, ambulance, fire services

...will require the local authority to develop a check list:

- Is this a VLOS or BVLOS flight? (If BVLOS, the application should be referred to the national authority)
- Are you flying over or near people? (In which case the operation needs to be SORA certified)
- Are you performing these operations with the EASA “open”, “specific” or “certified” categories?
- If “specific” have you obtained the authority of the national civil aviation administration or other relevant competent authority for the operation plus done the certified risk assessment (SORA)?
- Does your company comply with GDPR regulations?
- Is your organisation and operation fully insured?
- Will any of your operations involve flights above people who are not aware of what you are doing or visible to drivers?
- How high are you flying? (should not be above 400ft)?
- What routes will the drone be flying and how will it be tracked and identified?
- What contingency plans are in place for loss of control, radio interference and micro weather events?
- Are you aware of the noise limits within the vicinity of your flight?

Further, it may require a local authority officer to be present during the operation to ensure the flight is carried out as planned.



APPENDIX ONE: EASA CLASSIFICATION OF DRONE OPERATIONS

EASA has classified drones into three categories: open, specific and certified²

Category of operations	Open <i>low risk</i>	Specific <i>medium risk</i>	Certified <i>high risk</i>
Authorisation needed	None	Authorisation from NAA based on operational risk assessment or specific scenario	Authorisation from NAA/EASA
UAS	Compliant with Commission Delegated Regulation on UAS	Compliant with requirements included in the authorisation	Certified UAS
Operations allowed	Restricted to: <ul style="list-style-type: none"> • VLOS • Altitude < 120 m • Other limitations defined by: <ul style="list-style-type: none"> - Commission Regulation on UAS operations - National airspace zones 	Restricted to: <ul style="list-style-type: none"> • Operations specified in the authorisation • Limitations defined by national airspace zones 	Controlled airspace U-Space
Regulations	Commission Regulation on UAS operations in open and specific		Revision of existing aviation regulation
	Commission Delegated Regulation on UAS	No regulatory requirement (UAS requirements included in the authorisation)	

Open Category

Operations in the “open” category do not require prior authorisations or pilot license. However, they are limited to operations: in visual-line-of-sight (VLOS), below 120 metres altitude and performed with a privately built drone or a drone compliant with the technical requirements defined in the regulation. To demonstrate this compliance drones that can be operated in the “open” category will bear a class identification label. Additional operational restrictions apply to each class of drone, in particular with regard to the distance that must be maintained between the drone and non-involved persons.

² Source: <https://dronerules.eu/assets/covers/Table-1.png>

APPENDIX ONE: EASA CLASSIFICATION OF DRONE OPERATIONS 2

The following table provides a summary of the operations authorised in the “open” category for each class of drones as defined currently by EASA opinion 01/2018 (still subject to changes during the adoption process).

UAS		Operation			Operator/pilot	
Class	MTOM	Subcategory	Operational restrictions	Distance from people	Operator Registration Required	Remote pilot competence
Privately built C0	< 250 g	A1	<ul style="list-style-type: none"> Operate in visual line of sight below 120 m altitude Fly away from airports Respect specific rules defined by the zone in which you operate 	You can fly over uninvolved people (not over crowds)	No	Read owner manual
C1	< 900 g					<ul style="list-style-type: none"> Read owner manual Perform online training Pass online test
C2	< 4 kg	A2		You can fly at a safe distance from uninvolved people	Yes	<ul style="list-style-type: none"> Read owner manual Perform online training Pass online test Pass a theoretical test in a centre recognised by the aviation authority (only if you intend to fly close to non involved people)
C3	< 25 kg	A3		You should: <ul style="list-style-type: none"> Fly in an area where it is reasonably expected that no uninvolved people will be endangered Keep a safety distance from urban areas 		<ul style="list-style-type: none"> Read owner manual Perform online training Pass online test
C4 (model aircraft)						
Privately built						

Specific Category

When the intended operation exceeds the restrictions of the “open” category, the operator should consider operating under the “specific” category (medium risk). Only high-risk operations require compliance to classical aviation rules under the “certified” category (like operating in controlled airspace). Operations involving drones of more than 25 kg and/or operated beyond-visual-line-of-sight will typically fall under the “specific” category. Before starting an operation in the “specific” category, operators must either perform a risk assessment (using a standardised method – the SORA – that will be provided by EASA) and define mitigation measures or verify that they comply with a specific scenario defined by EASA (or the national aviation authority). On that basis they will be able to obtain an authorisation from the national aviation authority (in some cases a simple declaration may be enough). The authorisation or the specific scenario will define the authorised operation and the applicable mitigation measures (drone technical requirements, pilot competence, etc.).

APPENDIX ONE: EASA CLASSIFICATION OF DRONE OPERATIONS 3

Certified Category

The “certified” category (high risk) includes operations involving large drones in controlled airspaces. Rules applicable to the “certified” category will be the same as for manned aviation: drones must be certified for their airworthiness, pilots shall be licensed, and safety oversight will be performed by the relevant national aviation authorities and EASA. EASA is currently working on the necessary amendments of existing regulations in order to accommodate drones.

Particular elements of the high-risk UA operations are:

- the approval of design, production and maintenance organisations;
- air operator certificates;
- operations of UA; and
- licences of personnel.



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