Regulatory implications of local authority drone use for traffic signal infrastructure management

The benefits of using drones, the regulatory challenges and how to deal with them

Delivered by Coventry City Council in partnership with Midlands Aerospace Alliance as part of the Drone Ready Cities project. Funded by DSIT's Regulators' Pioneer Fund.

Introduction

In the management of traffic signal infrastructure, drones present the opportunity to

1. Increase safety by reducing the need for individuals to work at height
2. Increase efficiency and reduce costs by reducing the need to deploy access equipment
3. Reduce CO2 emissions generated by the use of ground transport
4. Reduce ground transport congestion by using drone data to capture traffic data and get eyes on a problem quickly
5. Create new business & job opportunities

Across the Public and Defence, Health and Education sector, PWC predicts potential costs savings of £4.6bn by 2030 resulting from the use of drones.[1]

Despite the obvious benefits, when Coventry City Council (CCC) took part in an urban airport demonstration near the Coventry rail station in 2022, roads had to be closed when drones flew. With constraints like this, the full benefit of drones will not be delivered.

In November 2022, the UK Government awarded Coventry City Council, partnered with the Midlands Aerospace Alliance a grant of £268,175 via the Regulators' Pioneer Fund to deliver Drone Ready Cities, which started in September 2023. The RPF is a grant-based fund to enable UK regulators and local authorities to help create a UK regulatory environment that encourages business innovation and investment. The current £12m round is being delivered by the Department of Science, Innovation & Technology.

The project has produced a regulatory framework for use by other local authorities so that the whole UK can unlock the value of urban drone use.

Background

Traditionally, most drone operations have been performed within Visual Line of Sight (VLOS). That is an operation in which the drone pilot can maintain continuous unaided visual contact with the drone. The key to unlocking many more applications is routine flight of drones Beyond Visual Line of Sight (BVLOS).

Current aviation regulation permits BVLOS operations by exception only and largely in segregated airspace. However, development of the means and regulation to permit qualifying operations using BVLOS routinely in unsegregated airspace is underway. The Civil Aviation Authority (CAA) is taking a phased approach to allowing for repeatable, scaled BVLOS. Over the period 2024 to 2027, operational constraints imposed on BVLOS operations will ease.

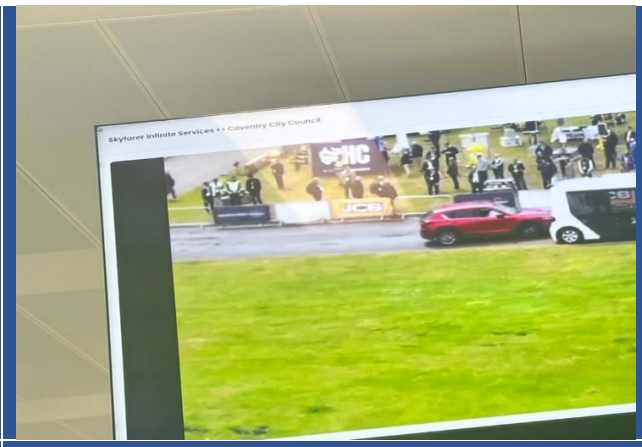
As the routine nature of BVLOS operations increases, so will the feasibility and the benefit of the use cases. The social and economic benefit case for many will improve meaning that the services being offered and taken up by end-users will increase. For local authorities this will mean in increasing number of drone operations and operators in their areas.

[1] PWC, 2022, "Skies Without Limits V2.0" PWC, July 2022

Although the regulation of UK airspace lies with the CAA, the operation of drones within the local authority area has regulatory and policy implications that relate to local airspace, ground infrastructure, supporting services, security, privacy, protecting the environment and maintaining social equity. These and the relevant regulations are identified in the regulatory framework.

Use Case Examples

University Hospital Coventry & Warwickshire Traffic Monitoring Overview of congestion pressure at Coventry Hospital. Visual data captured and processed to provide quick analysis on current environment leading to solution identification.	
CBS Arena - Car Park Orthomosaic Scan of CBS arena car park C provided as an orthomosaic and 3D model.	
Coventry City ring road inspection Ring road inspection consisting of orthomosaic, 3D model and footbridge inspection.	

Incident Monitoring and Traffic Modelling CCC teamed up with Skyfarer, Midlands Aerospace Alliance, VESOS and HAAS Alert to demonstrate how a drone can deliver 'first eyes' on a vehicle collision. A live feed from the drone was streamed to the Council's control room.	
Planned for 2024	Coventry Very Light Rail scan Event Traffic Monitoring

Regulatory Challenges

DRC research revealed a significant collection of activities that will involve local authorities as commercial drone operations increase in the authority's area[2] whether the operations are conducted by or for the authority or not. These are listed in Table 1 along with the regulatory areas anticipated to be applicable.

[2] LEWIS, C., 2024, "Benchmarking Non-Aviation Regulation Relating to Urban Drone Use Issue 2", Coventry City Council/Midlands Aerospace Alliance, 29th February 2024

Table 1 Local Government activities and regulatory implications

			Regulation Area Having Implications (S - Significant, P - Possible Implications) - generic, not intended to indicate specific legislation or standards										Strategy & Policy (S - Significant, P - Possible Implications) - generic, not intended to indicate specific policies		
	Local Government Activity	Specifics	Planning	Building Regs	Environmental	Privacy	Electronic Communications	Electrical Safety & Inspection	Carriage of Dangerous Goods	Health & Safety	Fire	Aviation	Strategic Plan	Integrated Transport Plan	Decarbonisation Plan
In collaboration with Civil Aviation Authority	Location of Air Corridors	Considering critical infrastructure, secure facilities, hazards from specific land uses, social equity, noise sensitive areas e.g. hospitals, wildlife, etc			S	S	P					S	S	S	P
	Provision of Aeronautical Data	Static - on location of buildings, antennas, trees, migratory routes, critical infrastructure Dynamic - Movements of people, high-altitude platforms (such as cranes), blowing debris, construction staging, etc.	S									S			
	Defining no-fly zones	Considering critical infrastructure, secure facilities, hazards from specific land uses, noise sensitive areas e.g. hospitals, wildlife, etc			S	S						S			
	Developing Byelaws	Ensuring byelaws relating to drone operations are consistent with civil aviation regulations										S			
	Determining Vertiport/Take-off and Landing Areas	Location - Critical infrastructure, Fire station locality, Transport interconnection, Local land use, Maturing vegetation, Hazards from specific land uses e.g. birds at landfills, ash from burning, Property under approach and departure paths, Noise sensitive area, Nearby animals (zoo, domestic), Protected wildlife habitats, Future property values, Impact of traffic, Privacy, Distraction to other activities e.g. drivers	S	S	S	S						S	S	S	
		Integration with other transport modes	S										S	S	S
		Design	S	S	S					S		P			
	Providing Supporting Services	Ensuring appropriate fire services									S	S	S		
		Police enforecement in the Case of Improper Drone Use										S	S		
		Utilities - Electricity, data, water, waste water, gas	S	S	S					P	P		S		S
	Accomodating Drone Infrastructure	Battery Storage & Charging/Refuelling	S	S	S			S		S	S		S		
		Ground-Based Transceivers	S	S			S								
	Ensuring Security	Reporting suspicious activity or usage that presents a threat										S			
		Risk assessments and mitigation of nefarious drone use and on critical entities										S			
	The carriage of goods					P			S			S			
	Protecting the Environment	Sustainability – life-cycle impact	S		S										S
		Wildlife protection	S		S										
		Noise pollution	S		S										
		Visual impact	S		S										
	Non-regulatory Activities	Community/stakeholder consultation/engagement													
		Equity – evaluate impacts to enable positive outcomes											S		
		Data - Support standards development and processes to facilitate sharing of AAM data					P								

S = Significant implications

P = Possible implications

As a solution to the challenges, the DRC Regulatory Framework identifies the relevant regulation in each regulatory area for a council to use to explore and ensure compliance. The framework is available to download here.

Conclusions

The benefits of drone use to councils, their economies and societies are enormous. Many are available now. As aviation regulation develops to permit routine qualifying BVLOS operations, the potential benefits will accelerate.

Realising these benefits will involve local authorities in many ways that they can prepare for. One way is to become familiar with the applicable regulatory framework and incorporate into their policy.