Delivered by
Innovate UK and ESRC

Future Flight Challenge

Drone and Advanced Air Mobility Regional Use Case Study

For the Future Flight Community Integration Group

Contents

1. Executive Summary

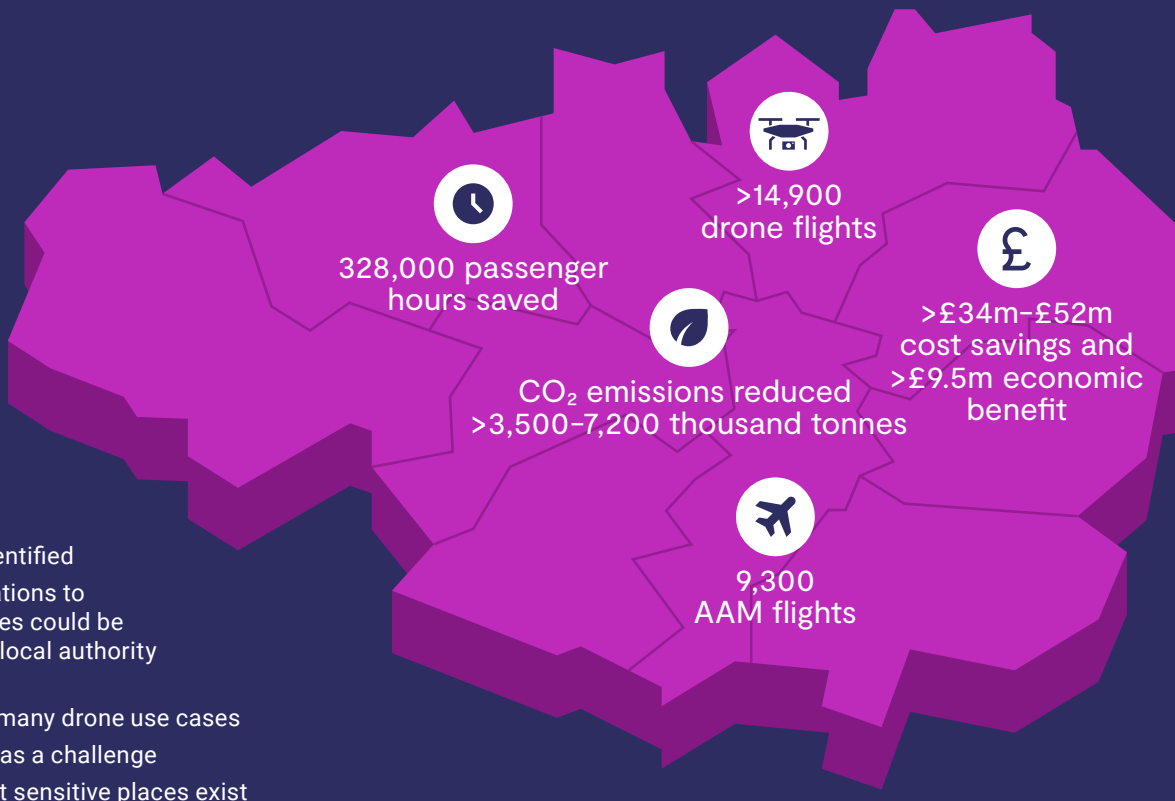
Midlands Aerospace Alliance has partnered with Achieving the Difference to conduct a case study into the future use of drones and Advanced Air Mobility (AAM) within the UK.

This report was commissioned by the Future Flight Community Integration Group (CIG) and funded by the UKRI's Future Flight Challenge, delivered by Innovate UK and the Economic and Social Research Council (ESRC). It looks specifically at the practicalities of integrating and operating drones and AAM.

Greater Manchester was selected as the sample area for this study, following consultation with several other potential regions.

Please note, this study is not a technical Concept of Operations (CONOPs) report. It is designed to help stakeholders better understand how Future Flight services can look and feel once implemented across a region in the UK.

Impact and takeaways



- Significant benefits identified
- A network of drone stations to serve multiple use cases could be kickstarted with novel local authority funding approach
- Routine BVLOS key to many drone use cases
- Accessibility not seen as a challenge
- Mechanisms to protect sensitive places exist but guidance for local government is needed

What is the UKRI Future Flight Challenge?

The UKRI Future Flight Challenge is a £300 million programme co-funded by the UK government, and delivered by Innovate UK and the Economic and Social Research Council. It aims to build the ecosystem needed to accelerate the introduction of AAM, drones and zero-emission regional aircraft.

Working with industry leaders, academia, the government, regulators and other stakeholders, the Future Flight Challenge is transforming how we sustainably connect people, transport goods and deliver services, generating socio-economic benefits across the UK.

What benefits would drones and AAM provide?

By 2030, we could see an additional 14,945 drone movements and, by 2040, at least 9,322 AAM flights each year. Annually, this could:

Generate **£9.5 million** in economic benefit

Save **328,380** passenger hours

Cut up to **£52 million** in costs

Reduce CO2 emissions by up to **7,203 thousand tonnes**

How will drones be operated and managed?

A network of 30 hubs could serve a range of use cases for drones across the region. Local councils could purchase these hubs and licence them to third-party commercial businesses. Revenue would then be divided between the two, with local councils acting as 'customers'.

Routine Beyond Visual Line of Sight (BVLOS) operations will also need to be implemented in order to enable large-scale drone use.

What challenges will arise from widespread drone and AAM use?

Introducing more drones and AAM operations to the UK's public spaces will present several key challenges that must be addressed before implementation, namely:

1. Clear flight boundaries and restrictions must be introduced

Locally determined geographical restrictions will establish 'no go' areas of flight. These will need to be added alongside those governed by the Civil Aviation Authority (CAA).

National guidelines should be distributed to local governments, detailing how decisions will be made on additional flight restrictions. This will encourage a consistent approach across the UK.

2. Wildlife will need to be protected

With additional drones entering UK airspace, wildlife will need to be considered. This is a good opportunity to improve current CAA guidance for drone operators by incorporating Important Bird Areas (IBAs) and nature reserves into future guidance.

Similar advice should be incorporated into guidance for:

- Operators of electric Vertical Take Off and Landing (eVTOL) aircraft
- National Nature Reserves
- Sites of Special Scientific Interest (SSSIs)
- The Royal Society for the Protection of Birds (RSPB) reserves
- Details of the relevant bodies for further advice

3. The AAM and drone sectors must work closely with local authorities

Implementing drones and AAM across the UK provides an opportunity to work closely with local authorities. This would allow them to better understand the socio-economic benefits, level of technical maturity and the pace of aviation regulation changes currently underway.

Local authorities will require support to be able to fully realise the potential of drones and AAM. This includes education, training and local demonstrations. Some councils are further along in their adoption and could serve as 'beacons' for others.

2. Acknowledgements

We'd like to thank the following organisations for contributing various resources in aid of this report, including sharing data, providing expertise, attending stakeholder workshops and contributing their time.

Please note, their participation does not imply endorsement of this report or its recommendations.

- 3Mile
- Airvis
- Arup
- Baringa
- Barton Aerodrome
- Dronedesk
- EAMaven
- Greater Manchester Combined Authority
- Greater Manchester Ecology Unit
- Greater Manchester Police Drone Unit
- Herotech8
- Hollis Global
- Logistics UK
- Manchester Airports Group (MAG)
- MediaCity Immersive Technologies Innovation Hub
- Neuron
- NHS Greater Manchester
- Optimal Cities
- PilotAware
- Skyfarer
- PWC
- Sky Sports
- Transport for Greater Manchester (TfGM)
- uAvionix
- West Midlands Police

Thank you to the following members of the steering group that offered encouragement, wisdom and additional connections:

- Corrine Matthews, Somerset Council
- Suzanne Graham, NHS Golden Jubilee
- Nigel Rees, Welsh Ambulance Service NHS Trust

3. Findings

During a workshop with stakeholders, concerns about drone and AAM use were discussed, with Greater Manchester as a specific consideration.

Broad concerns of drone use

- Visual impact
- Unintended consequences
- Protecting areas from overflight such as data centres
- Infrastructure requirements such as bandwidth, landing sites and communications
- 2040 Local Transport Plan synergy
- Flight impact, including bird strikes and other airspace users
- Safety
- Product accreditation
- Overall reputation issues
- The levers that local authorities have for control
- Overall responsibility
- Security considerations
- Risk of ban by exception

Regional priorities for drone and AAM use in Greater Manchester

- Blue light service driven
- Devolution and resilience
- Developing a greener, fairer and more prosperous Greater Manchester Combined Authority (GMCA) strategy
- Improving Greater Manchester (GM) public services
- Use of this case study to support Greater Manchester as a 'region of firsts', including building infrastructure to enable drone use and supporting attraction of commerce and new businesses

> **"Introducing more drones and AAM operations to the UK's public spaces will present several key challenges that must be addressed before implementation."**

Types of drone and AAM use in Greater Manchester

Through a survey and a workshop, stakeholders were asked to categorise different types of drone use within Greater Manchester and their expected delivery date. The following were identified:

	By 2027	By 2030	By 2040
Medical Cargo: Between hospitals, defibrillators, to first responders	✓	✓	✓
Medical Last Mile Delivery: Prescriptions to remote locations	✓	✓	✓
Last Mile Logistics: Fast food, online orders	✗	✓	✓
Middle Mile Logistics: Port/airport to urban	✗	✗	✗
Reconnaissance & Surveillance: Site security, remote area incident response	✓	✓	✓
Data Gathering: Traffic surveys	✓	✓	✓
Inspection: Assets & infrastructure	✓	✓	✓
Media & Entertainment	✓	✓	✓
Airport Passenger Shuttle	✗	✗	✗
Commuter Shuttle	✗	✗	✗
Passenger Remote Community Connection	✗	✗	✗
Intra Urban Passenger Transport	✗	✗	✗
Regional Passenger Transport	✗	✗	✓
First Responder Transport	✗	✗	✗
Air Ambulance	✗	✓	✓
'Expert' to site: 'Last mile' from airport to critical infrastructure	✗	✗	✓

It is recognised that this could evolve with greater understanding of the advancement of technology and regulation.

Benefits, challenges and solutions

Many benefits, challenges and solutions identified are included in the table below. Understandably, stakeholders addressed areas they were most familiar with first. This means some use cases still require further information, which will come with time.

	Benefits	Challenges	Solutions
Medical Cargo: Between hospitals, defibrillators, to first responders	• Better patient outcomes • Speed • Reliability • Gateway to other drone use cases	• Any route at any moment – makes corridor approach difficult • Rules around administering care	Hierarchy of needs requires: • body to manage it • National licensing • Cost of access as mechanism to prioritise public good use
Medical Last Mile Delivery: Prescriptions to remote locations	Patient not needing to travel regularly	Patients with mobility issues collecting package from drone	More information required to complete
Last Mile Logistics: Fast food, online orders	• Reduced cost • Convenience	• Differences in delivery locations • Public perception • Theft/vandalism • Start point for food • Low social benefit • Loss of jobs	Delivery from food production hub
Middle Mile Logistics: Port/airport to urban	More information required to complete	• Economic viability over road/rail • Sufficient drone payload • Insufficient justification of time criticality	More information required to complete
Reconnaissance & Surveillance: Site security, remote area incident response	• Cover blind spots • Cost • Safety of staff • Proactive prevention • Incident management	• Privacy • Public perception	Privacy not an issue on private facilities
Data Gathering: Traffic surveys	• Fast payback • Economic benefits of keeping people moving • Other uses – e.g. incident response, surveys	• Is it a one-time use? • How does it compete with existing aircraft/ satellite survey? • Public perception	Communication of benefits
Inspection: Assets & infrastructure	• Cost • Time • Safety • Use case already proven • Proactive problem identification	• Privacy • Public perception • Could create bow wave of repairs from new data	• Launch public good use cases first e.g. council, NHS • Communication of benefits • Prioritisation of repairs to avoid bow wave

Table continued next page

	Benefits	Challenges	Solutions
Media & Entertainment	• Lower cost • Quick to deploy vs other approaches • Opportunity for more use in sport • Reduced emissions • New entertainment sector	• Finding new uses – it's already being done • Airport statutory consultation • Interaction with other drone actors	• Treat as firework Local Authority planning requirement • Entertainment license • Planning permission requirements
Airport Passenger Shuttle	More information required to complete		
Commuter Shuttle	More information required to complete	Not thought viable before 2050	More information required to complete
Passenger Remote Community Connection	More information required to complete		
Intra Urban Passenger Transport	More information required to complete		
Regional Passenger Transport	For people that can afford it	• Not mass transit • Cost of infrastructure • Maturity of the industry • Too niche • Energy requirement • Sustainable fuel availability	More information required to complete
First Responder Transport	More information required to complete		
Air Ambulance	• Reduced energy consumption • Sustainable fuel opportunity	• Sufficient payload	More information required to complete
'Expert' to site: 'Last mile' from airport to critical infrastructure	• Speed • Reduced downtime • Airport as the Expert Hub for the region	• What is the business model? • Risk of tech interaction with critical infrastructure	More information required to complete

4. Data and analysis

The following list is a detailed breakdown of use cases, with information on how each would be implemented and adopted within Greater Manchester. Stakeholder responses to drone and AAM use are also included where relevant.

Medical cargo and last mile delivery

A survey was sent to 11 NHS GM staff across several trusts, each representing different areas of healthcare. These included ambulance services, air ambulance services and cancer care.

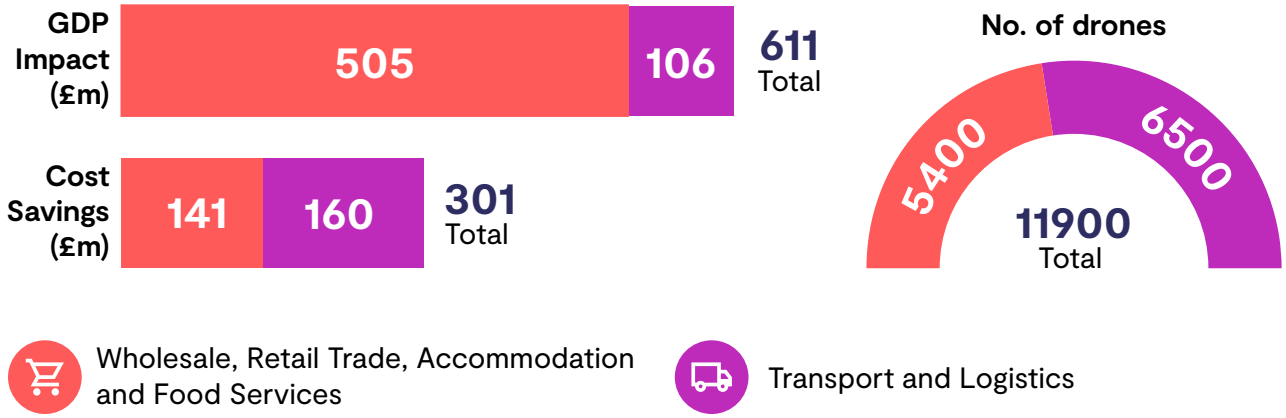
A very low number of responses was received, with most presenting conflicting and dismissive responses to the use of drones and AAM. In discussion with TfGM and members of the NHS GM Net Zero/Sustainability team, it was concluded that the main reason for such a low response rate was a lack of awareness on the current advancements in technology and regulations.

Stakeholders also highlighted that NHS GM tends to be risk averse and cautious toward solutions it perceives as unproven. Furthermore, it was noted that a complex set of stakeholders are involved in such decisions.

Logistics and key adoption challenges

Drone deliveries could cut costs and provide logistical benefits for Greater Manchester.

Below is a projection for the GDP impact and cost savings by 2030 for Greater Manchester, generated by using GDP to factor figures produced by PWC in 2022 as part of its Skies Without Limits 2.0 report.



Last mile delivery drones case study

One of the most pressing challenges raised during the workshop was the potential loss of delivery jobs, with the risk of little social benefit gained for the extra perceived nuisance that drones may create.

For Greater Manchester, these jobs represent an important gateway to employment. It is estimated that 5,283 people are employed in Greater Manchester in last mile delivery. The gig economy is overrepresented by ethnic minorities, people with disabilities and males (CIPD 2023), who might be disproportionately impacted by a loss of jobs.

From TfGM's own experience with logistics and delivery partners, there are strong cost pressures on businesses. These expenses make it more challenging to justify funding a new innovative delivery solution that would require significant investment in new supply chain infrastructure. Further, the complexity of urban infrastructure could make the last metre of drone delivery challenging.

In conclusion, this last mile delivery use case was widely regarded as not viable for Greater Manchester with the current knowledge provided by this set of stakeholders.

However, given that the viability of this use case can vary depending on geographical factors and existing transport links, other regions across the UK may have a more positive outlook. A large GDP and cost impact have been suggested by the PWC study.

Site security

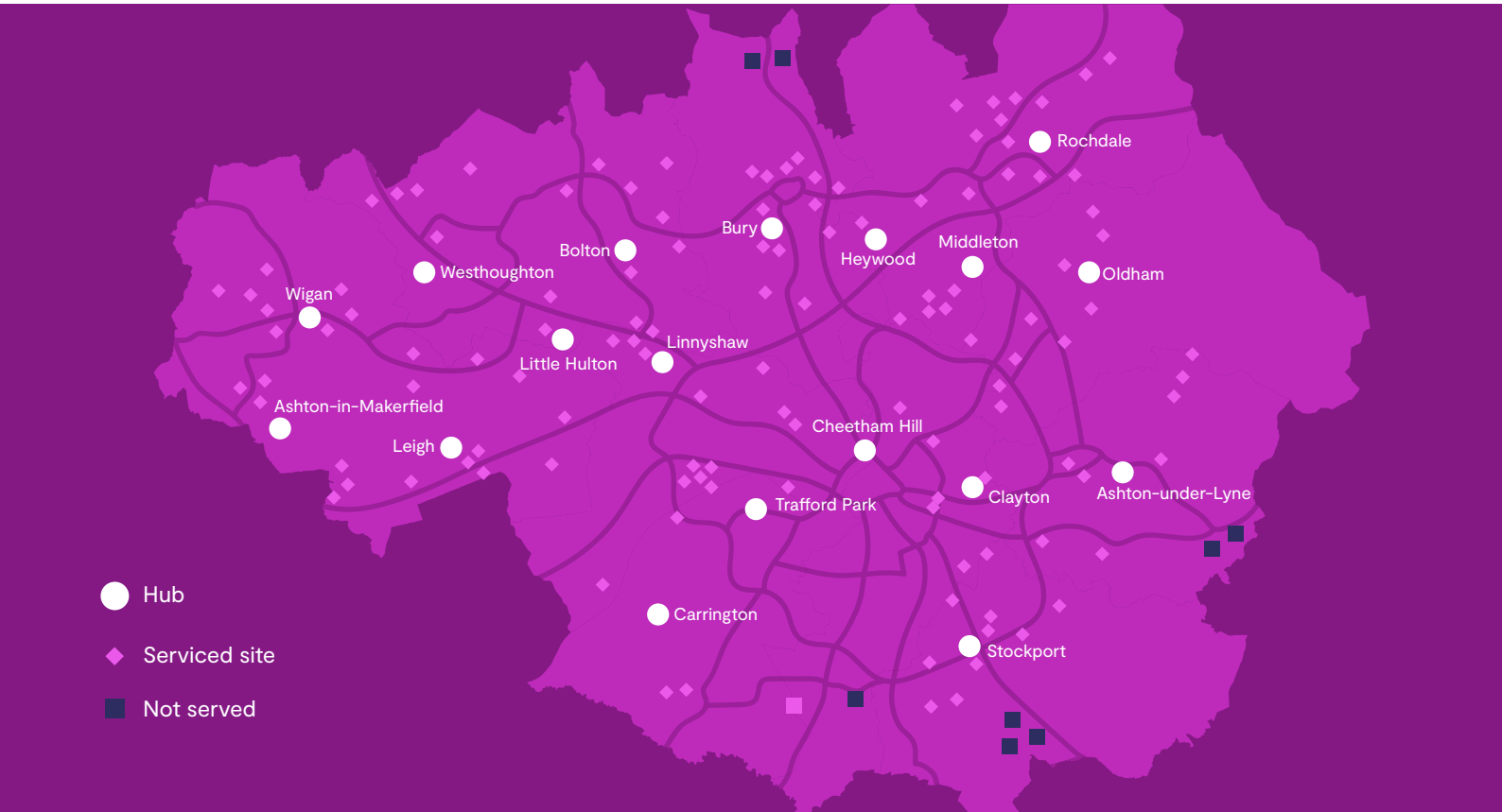
Business and industrial areas are protected by various different services. The table below shows how drones could offer additional benefits.

	Reduced cost	Coverage of blind spots	Reduced risk
On site security guards	✓	✗	✓
Closed Circuit Television (CCTV)	✗	✓	✓
Visiting mobile patrols	✓	✗	✓
Alarm response patrols	✓	✗	✓

As part of this report, 163 business and industrial areas were identified as potential sites for drone security patrols in Greater Manchester. 18 of these could act as drone-in-a-box 'hub' locations, assuming that BVLOS in populated areas becomes routine.

This is a conservative estimate, as it's highly likely that not all potential sites were identified.

Assuming that there would be one overflight per site, per night, a total of 18 drones would each cover up to nine locations across the region, including its 'hub' site.
A potential network is illustrated below.



To keep up with current site security solutions, a drone flight for one site would need to cost in the region of £30, or a monthly drone station provision would need to be between £1k–£1.5k per month. For this to be possible, multiple use cases would need to be served by the same network of drone stations.

Traffic surveys

Greater Manchester has set out an ambitious target to be Net Zero by 2038. Transport still contributes to 30% of its carbon emission across the region. To help achieve this objective, it needs to improve the sustainable transport offering and the flow of traffic on its network. (GMCA n.d.)

TfGM is currently planning to use drones to reduce congestion during roadworks or traffic collisions (RTCs). This will allow live re-sequencing of traffic signals and satellite navigation applications to manage and reduce congestion.

In 2023, the control room recorded 4,910 highway incidents. TfGM estimates that 5%–10% of congestion is caused by these incidents and that in at least 95% of them it could have used drones to assess and intervene. This would alleviate congestion by around 40%.

Based on these estimates, £28–£46 million and 2%–4% of emissions could be saved, based on 4,700 drone flights per year, or 13 per day. Using public data, this equates to approximately 2,750–5,500 tonnes of CO2 per year. (BEEDHAM 2022, TfGM/GMCA 2016).

Additional traffic uses:

- Drones will be used to survey scheduled roadworks and plan congestion mitigations.
- TfGM is implementing bus franchising, giving Greater Manchester control of its local bus network and enabling the creation of the Bee Network, an integrated transport system. Drones could give the organisation better understanding and data of traffic movement on its network to improve its reliability. (TfGM, n.d.)
- Drones could be used to survey much larger areas than traditional, fixed camera installations, which cost roughly £60,000.
- A network of drones could be used for both site security and traffic surveys, allowing for a spread of overheads across more operations. A combined network would use approximately 30 locations. Many of these could utilise TfGM owned sites.

> **“Multiple use cases would need to be served by the same network of drone stations.”**

Inspection of assets and infrastructure

Drones could be used to inspect bridges and commercial and public buildings, as well as other structures without working at height or access equipment.

Examples include:

- Preparing to sell a building
- Surveying for the installation of equipment such as solar panels
- Maintenance inspections

A key challenge identified by interviewees was expense. They suggested the provision of building surveys is highly cost competitive and that providers are in a 'race to the bottom'. Nevertheless, local authorities have shown interest in drone use for inspections of their own assets, and significant cost savings have proven to be possible. (LABM 2022)

With price being the key challenge, this is regarded as a good use case for a network of drone stations.

Drones as a first responder

The use cases listed earlier included both 'remote area incident response' and 'first responder transport'. The latter was discounted as not a priority by the workshop attendees.

However, drones as first responders are an emerging use case for the Police and Fire Rescue Service. Greater Manchester Police (GMP) identified two types of drone use within its division:

Preplanned requests

- These are sent via email across the force and are not time critical.
- They include looking at building addresses prior to taking action, identifying cannabis farms, and monitoring live events such as festivals, concerts and protests.
- Live streams can be sent back to the GMP control centre.

Spontaneous

- This is a blended use across the force, in cooperation with the National Police Air Service (NPAS) helicopter services.
- They include missing person searches, traffic interceptions, making off from addresses, recording of crime scenes that are large or hard to capture from the ground, and indoor capabilities for tactical solutions such as clearing a building in a firearms incident.

Using population to scale data from West Midlands Police (WMP), there could be around 2,250 police drone operations in Greater Manchester. Excluding vehicle pursuits, it is estimated that 1,425 NPAS helicopter flights could be replaced.

Assuming the cost of operating a helicopter is £1,500 per hour, versus £100 for a drone, it is estimated that £1.3 million could be saved. CO2 emissions are also projected to be reduced for air ambulances by 322 tonnes. (NPAS 2023, PWC 2022, Achieving the Difference analysis)

Combining estimates for current drone usage and the potential for drones to replace helicopters, there will be an estimated 3,675 flights per year, or 10 per day on average.

Live video streaming

Video live streaming is required for some use cases. A drone service provider confirmed that Cellular-LTE/3G/4G was able to handle streaming, with 5G offering further improvements. However, there is still room to analyse optimal data connectivity for drone use in the future.

Regional passenger transport

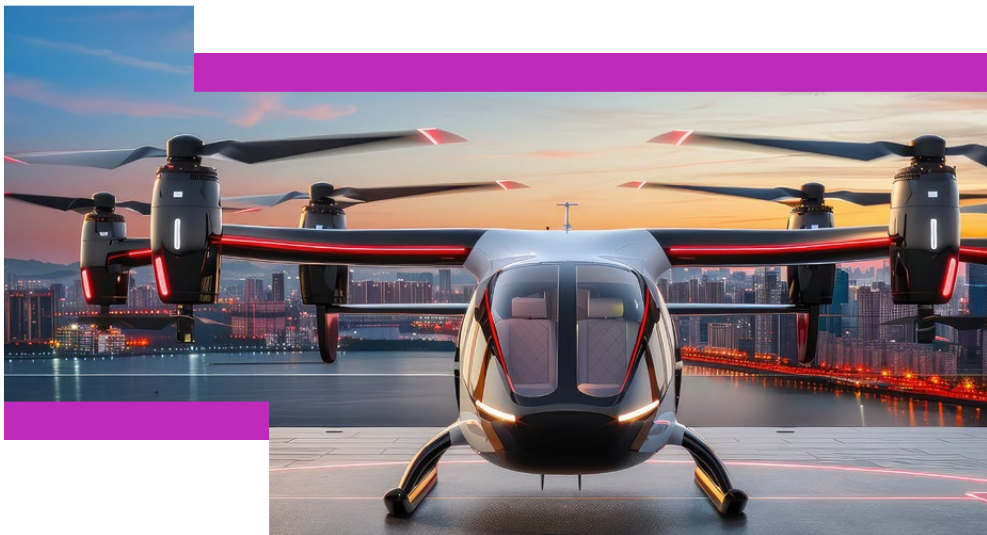
Based on their current understanding, the stakeholder workshop participants could not see Regional Air Mobility (RAM) as a significant use case for Greater Manchester, deeming it unsuitable for mass transit.

Considering the lack of operational data currently available for this use case, stakeholders prioritised other sectors. Attitudes are likely to evolve as more information and solutions become more widely available and regional demonstrations are showcased across the UK.

Concerns raised that will need to be addressed include:

- Cost of infrastructure
- Low maturity of the industry
- Too niche and only for the wealthy
- High energy consumption
- Low availability of sustainable aviation fuel (SAF) for turbine or hybrid powered aircraft

Scaling PWC 2023 data by GDP suggests that AAM could contribute around £80 million in socioeconomic benefit, bring £11 million in fare value and reduce CO2 emissions by 8.4 tonnes in Greater Manchester.



EAMaven predicts a UK Total Addressable Market (TAM) of 242.2 million travellers per year, and that 81.5% of them would have normally opted for cars. It sees the Target Market as 93% of the TAM, with 226.8 million passengers and 14.9 million hours saved, and an economic stimulation of £429.7 million. (SWANSON AND ZYCH, n.d.)

When scaled by GDP for Greater Manchester, this suggests a total market of 8.6 million travellers and economic stimulation of £16.3 million.

Among 20 routes selected for analysis in UKRI 2022, one served the Manchester/Liverpool area. Only one end of the route was disclosed. The study selected 'appropriate potential locations for AAM activity'. The data for this early route can be found in the table below.

Annual demand	134,972 trips
Carbon emissions savings	702,342 kg
Annual revenue	£35 million
Number of aircraft	6
Aircraft type	eSTOL
Flights per day (calculated from data provided)	20
Annual total time saving	328,380 passenger hours
Economic boost (lost travel time value)	£9.5m

Air Ambulance

PWC 2023 found that AAM could reduce operating costs by 36% in 2025, rising to 42% in 2035. CO2 emissions could be reduced by 226.3kg per journey.

The North West Ambulance (NWAA) charity states that 1,763 missions were conducted this year by August. This suggests annual CO2 emissions could be reduced by 684 tonnes.

NWAA also reports that the cost of operating the air ambulance is £12,724,920, which is reduced to £12,001,220 when estimated operational staff costs are subtracted. This suggests that operating costs could be reduced by around £4.8 million.

Expert to site

This use case occurs when critical infrastructure has failed or is close to failing, and urgent intervention is required. An expert could be flown in via AAM aircraft, reducing the likelihood and impact of failure.

Net zero generation facilities are a likely early use case, though more information is needed from operators of such assets. As no data could be collected and this is considered a marginal case, no data is included in the summary of use case conclusions.

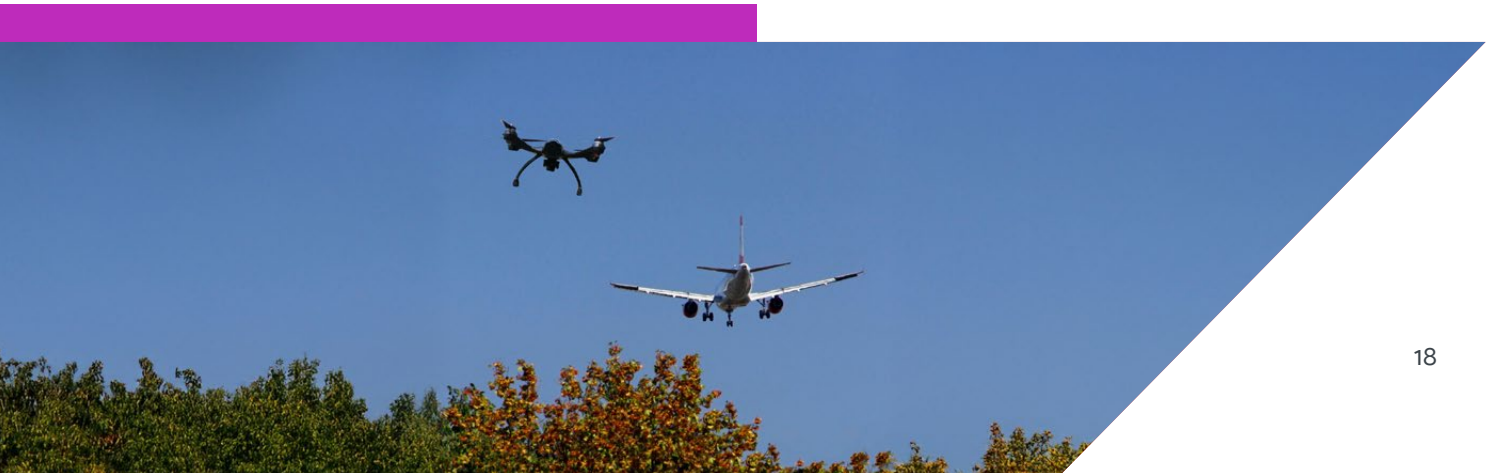
Understanding flight restriction zones

The UK has numerous mandatory restricted-flying zones that would apply to drones and AAM. These include:

- Danger areas
- High Intensity Radio Transmission Areas (HIRTAs)
- Prohibited areas
- Flight Restriction Zones
- Airfields and Aerodromes

Locations for these different restricted areas are readily available online and in several drone and helicopter flight management applications, such as NATS 2023 and No Fly Drones.

Many existing drone restrictions apply to national parks, while others are complete bans over very wide areas. These appear to address the very small number of rogue private operators who fly drones without proper regard for safety and privacy.



Authorities and landowner restrictions

Some authorities demand a fee for licence applications and issue operation licences, despite it being the CAA that decides whether the operator's risk assessment is adequate.

Many landowners prohibit the use of drones over their land without permission, some with the power of byelaws. The potential for legal enforcement of these prohibitions has been challenged but has yet to reach the courts. The CAA also requires that pilots with permits must 'have control' over the area where they intend to use a camera-drone. Landowners rely on both these approaches to restriction.

A review of the places where drones are forbidden and requested not to fly via No Fly Drones is summarised in the table below. It is largely targeted at leisure drone users.

	Generic and specific examples	Found in Greater Mcr. area
Prohibited areas	• Dounreay Nuclear site • Coulport/Faslane Royal Naval Armaments Depot/Naval Base	None
Aerodromes and airports	• Commercial and military airports, aerodromes and airfields	• Manchester Barton Flight Restriction Zone (FRZ) • Manchester Airport FRZ
Danger Areas & High Intensity Radio Transmission Areas (HIRTAs)	• Military test/training/firing ranges	• Warrington Gas Venting Station to South West of GM • Winter Hill radio transmitter to North West of GM

Restricted areas	• Prisons
	• Nuclear sites including:
	  • fuel manufacturing sites e.g. Westinghouse, Springfields, Lancashire
	  • Nuclear Power Stations e.g. Heysham, Lancashire
		• His Majesty's Prison (HMP) Manchester
		• HMP Forest Bank
		• HMP Buckley Hall
		• HMP Hindley
		• HMP Risley to South West of GM
		• HMP Styal to South of GM

Private land by byelaws and User Requested Zones	• Can include aerodromes and gliding clubs e.g. Warton • Historic buildings, e.g. Chatsworth House • National Parks and moors • Public venues • All National Trust land (by-law)	• AO Arena • Hopwood Hall College • Bridgwater Hall • National Trust - Castlefield Viaduct • National Trust – Dunham Massey

Restrictions for Greater Manchester

Greater Manchester stakeholders may wish to prevent drone and AAM operations over places that are not already included in mandatory restrictions.

This could be for security reasons, data protection, nuisance prevention, wildlife preservation or social equity.

To ensure the protection of some areas, a balance will need to be struck between clear

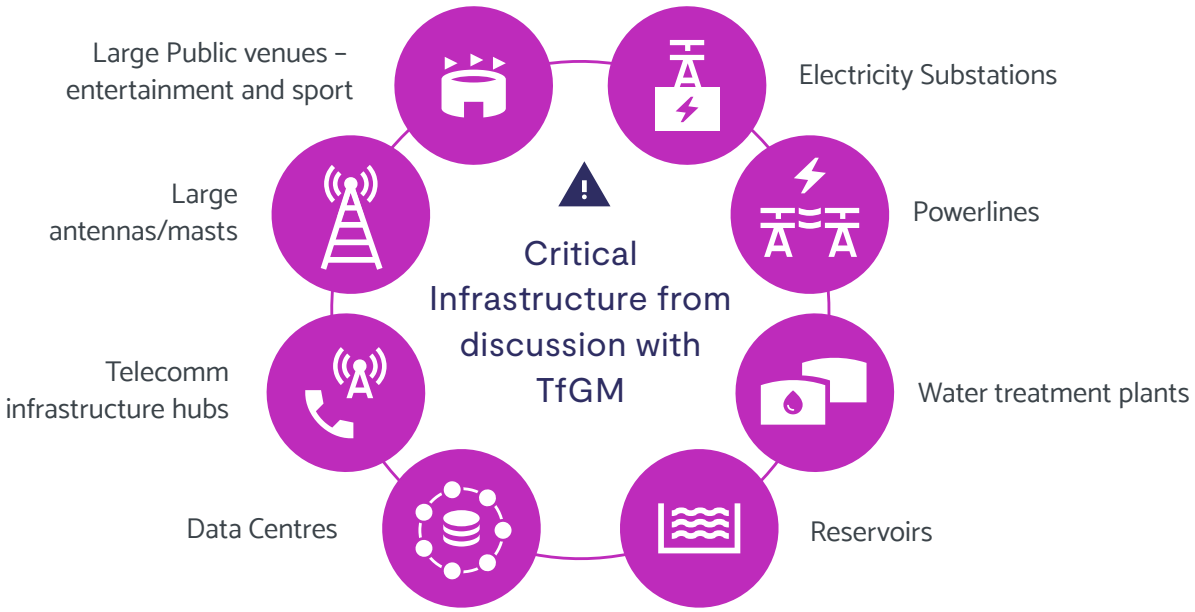
overflight restrictions and publicly sharing any details on a specific location. Public consultation would be required to support this.

Such places may include (but are not limited to):

- Hospitals
- Schools
- Historic buildings
- Critical infrastructure, like water plants, power generation facilities and data centres

A list of critical infrastructure that might be considered for overflight restriction has been developed with TfGM.

According to Greater Manchester Wildlife, specific areas and animals would need to be



protected, such as birds and insects. To minimise the risk of bird strikes, drones should not be allowed to fly low over roosting areas. Areas where animals live, as well as migration routes, will vary throughout the year.

Understanding the CAA's regulations

The CAA provides limited guidance to drone operators with regards to safeguarding wildlife.

The European Union Aviation Safety Agency (EASA) is in the process of creating new operational air rules and is revising existing ones to accommodate eVTOL.

There is an opportunity to include guidance that incorporates National Nature Reserves, SSSIs, IBAs and RSPB reserves, plus other relevant bodies for further advice.

5. Conclusions and recommendations

Based on the information provided in this study, various actions that could be taken to support regional drone and AAM adoption have been outlined. These include:

Raising awareness of drone use within healthcare

At present, GM healthcare professionals are not fully aware of the potential benefits that emerging drone and AAM technologies could provide. Educating this sector would enable greater readiness to sponsor possible use cases in the future.

Developing a network of drone hubs

As BVLOS operation of drones becomes routine, it will significantly increase the potential for economically viable drone operations at scale.

Successful coverage of high-demand areas across a number of use cases and sectors could be achieved with a network of approximately 30 hubs. Drones could be operated remotely and eventually autonomously from these hubs.

To serve all use cases, drones based at each hub will need to be equipped with a range of different sensors.

Financing of drone operations

Innovative forms of local or combined authority kickstart financing would help to build momentum toward wide-scale drone and AAM adoption.

Routine BVLOS across the UK by 2027

Routine BVLOS will be key to unlocking commercial viability at scale. Supporting this as outlined in the UK Department for Transport's Future of Flight Action Plan is essential.

Accessibility considerations

For AAM, accessibility is expected to be achieved by designing products that follow UK regulations. Challenges for the vulnerable or disabled will need to be considered when adopting drones and AAM across all case uses.

Establishing flight restrictions and issuing national guidance

Once adopted, there is potential for a large volume of drone and AAM operations to occur within close proximity of one another. Restrictions to overflight for specific areas, in addition to those generated by the CAA, will need to be enforced.

Guidance for local governments will also need to be introduced at a national level. This will detail how and by whom the decisions on additional restrictions are enacted, encouraging a reasonable and consistent approach across the UK.

Protection of wildlife

There is an opportunity to improve current CAA guidance for drone operators. This can be done by incorporating IBAs, nature reserves and details of the relevant bodies for further advice. A similar approach should also be taken when developing guidance for eVTOL air operators.

Communication with local authorities

Keeping local authorities updated and encouraging information sharing about the progress of technological and regulatory advancements will help smooth out the adoption process.

Support local authority demonstrations

Encourage internal local authority demonstrations so that they identify cost savings and alleviate change anxiety to kickstart routine drone operations.

6. Abbreviations

AAM - Advanced Air Mobility

BVLOS - Beyond Visual Line of Sight

CONOPS - Concept of Operations

CAA - Civil Aviation Authority

CCTV - Closed Circuit Television

CIPD - Chartered Institute of Personnel and Development

CIG - Community Integration Group

DfT - Department for Transport

EASA - European Union Aviation Safety Agency

eSTOL - electric Short Take Off and Landing [aircraft]

eVTOL - Electric Vertical Take Off and Landing [aircraft]

GDP - Gross Domestic Product

GIS - Geographic Information System

GM - Greater Manchester

GMCA - Greater Manchester Combined Authority

GMFRS - Greater Manchester Fire and Rescue Service

GMP - Greater Manchester Police

HMP - His Majesty's Prison

IBA - Important Bird Areas

kg - Kilogram(s)

km - Kilometre(s)

NHS - National Health Service

NPAS - National Police Air Service

NWAA - North West Air Ambulance

ONS - Office of National Statistics

RAM - Regional Air Mobility

RSPB - Royal Society for the Protection of Birds

RTC - Road Traffic Collision

SME - Small or Medium Enterprise

SSSI - Site of Special Scientific Interest

TAM - Total Addressable Market

TfGM - Transport for Greater Manchester

TM - Target Market

UK - United Kingdom

VLOS - Visual Line of Sight

WMP - West Midlands Police

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