

# Drones

## Integration – not segregation

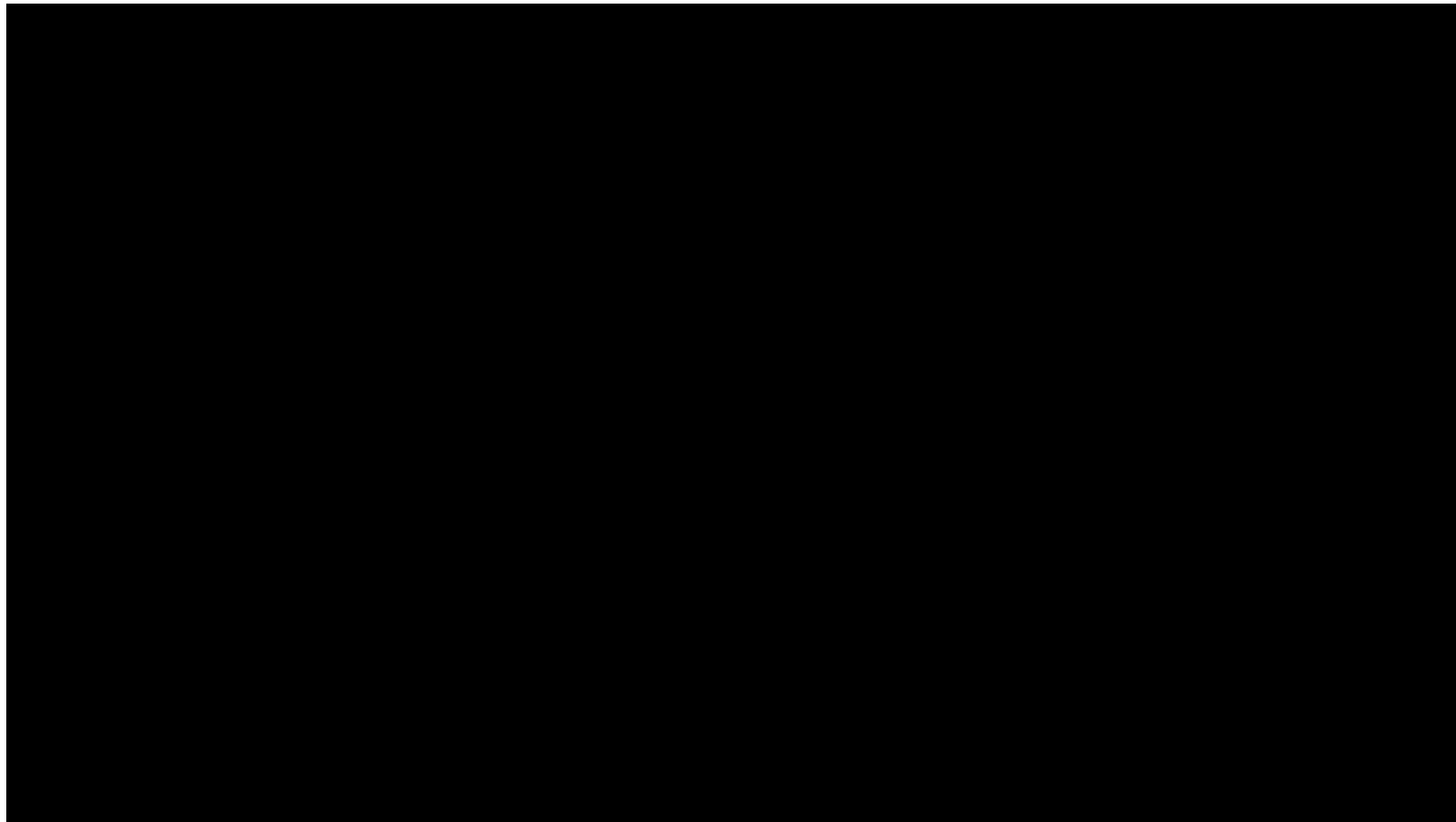
Andrew Sage, Head of Unmanned Traffic Management (UTM), NATS

Keynote presentation, INC 2019

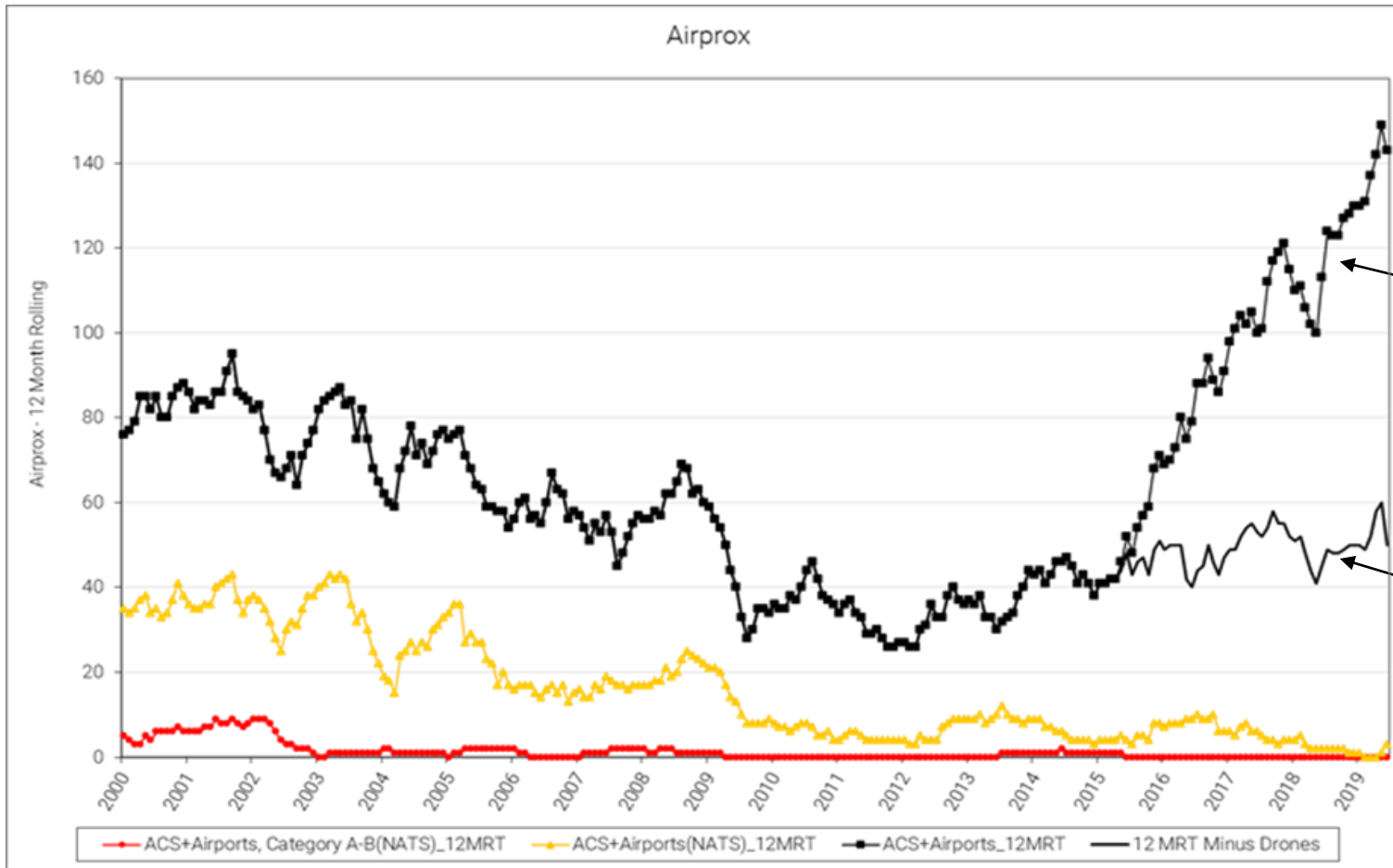
Edinburgh, November 2019

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# The reality of today's skies



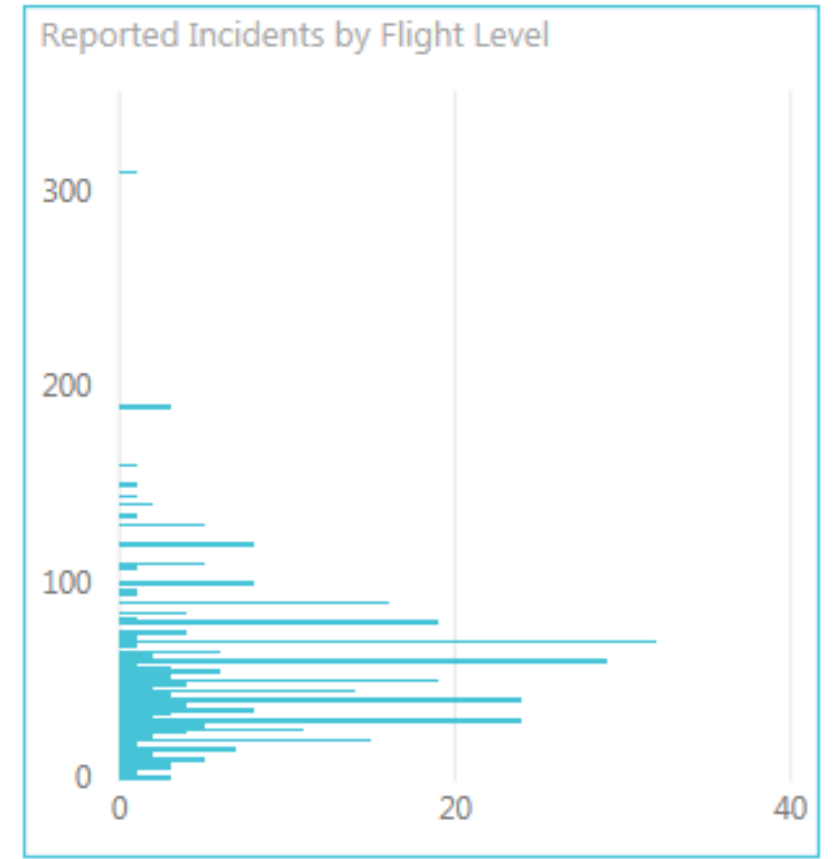
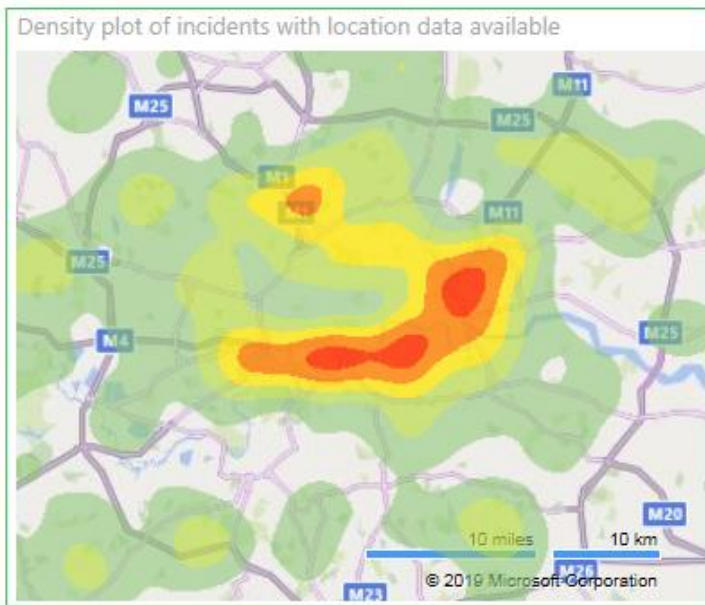
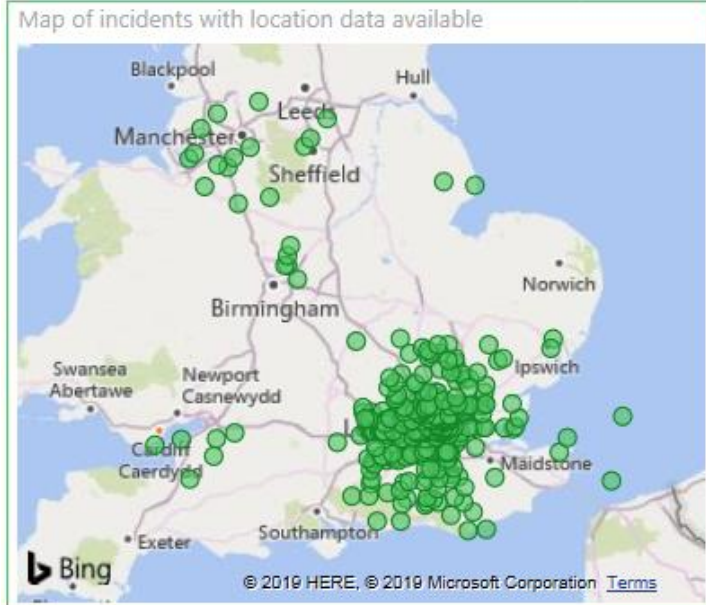
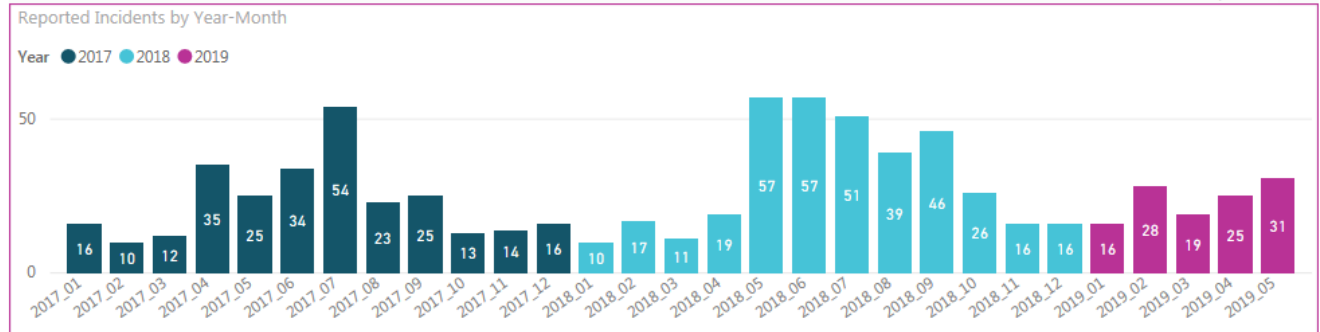
# Drones have consistently accounted for over 50% of Airprox reports since summer 2017



How much of these incidents are really drones and what does it mean in terms of safety risk?

Excluding AIRPROX reports classified as Drones related

# NATS Drone Safety Dashboard



# A few facts and myths....



Approximately 300,000 drone users in the UK

Over 200 manufacturers of drone passenger vehicles in the world

Commercial applications of drones have yet to emerge

- Incorrect, Around 6,000 organisations have permission to operate in the UK

You can't fly a drone within 5km of an airport

- Incorrect. You can fly but you need approval first

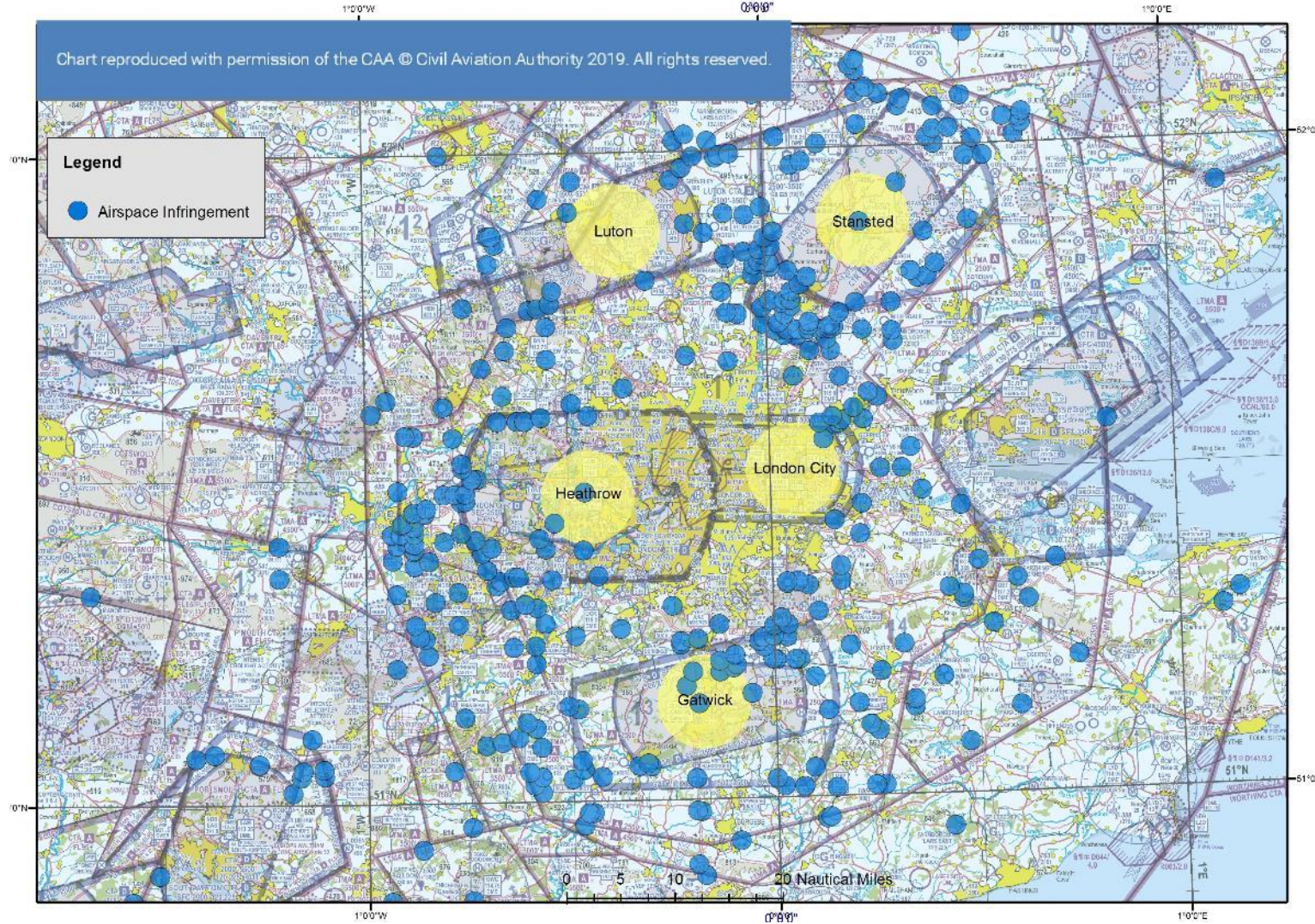
A drone is safe provided it's under 250g in weight

- We don't know for sure but that is the basis of most regulation

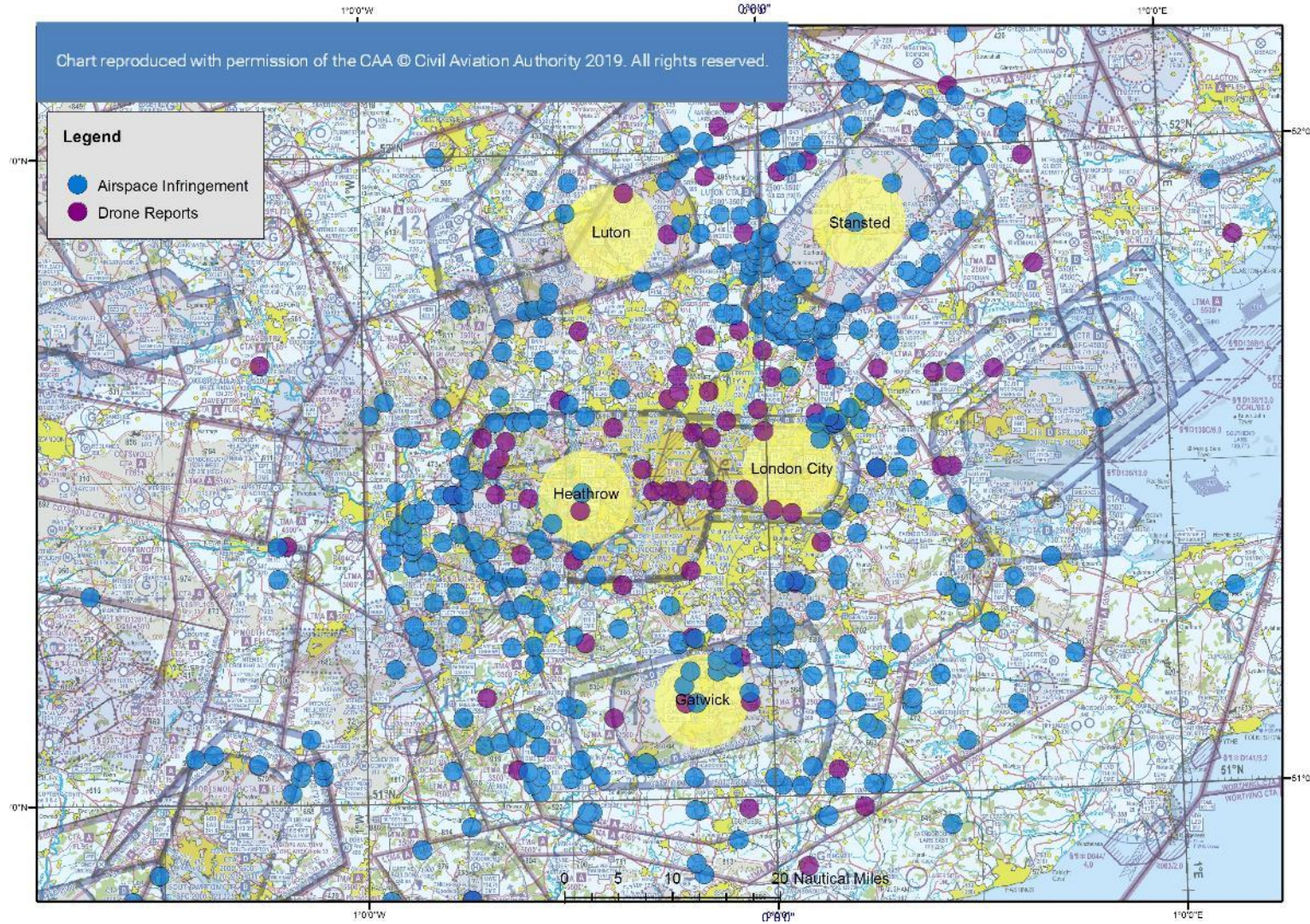
Drones are the biggest safety risk to air traffic management

- Incorrect. They are one of the causes of a growing number of infringements

# Manned aviation airspace infringements



# Infringements & Drone Reports



# Drones – A new pressure on airspace



Over the next two years, we will see the emergence of more valuable commercial applications operating routinely Beyond Visual Line of Sight (BVLOS)

- Remote tracking, telemetry and mission data
- Automated flight path management and monitoring
- Situational awareness on vehicle/ground
- Reversionary procedures

The most commercially valuable operations are often near cities – this means they will typically be close to major airports, airfields and controlled airspace

Flight plans do not follow predictable paths – requires free route principles

Demand is immediate and requires automated and strategic de-confliction

Solutions that work for one-off trials such as temporary danger areas are not sustainable in the long term for repeatable operations

# Integration – not segregation

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# Building the safety case for BVLOS

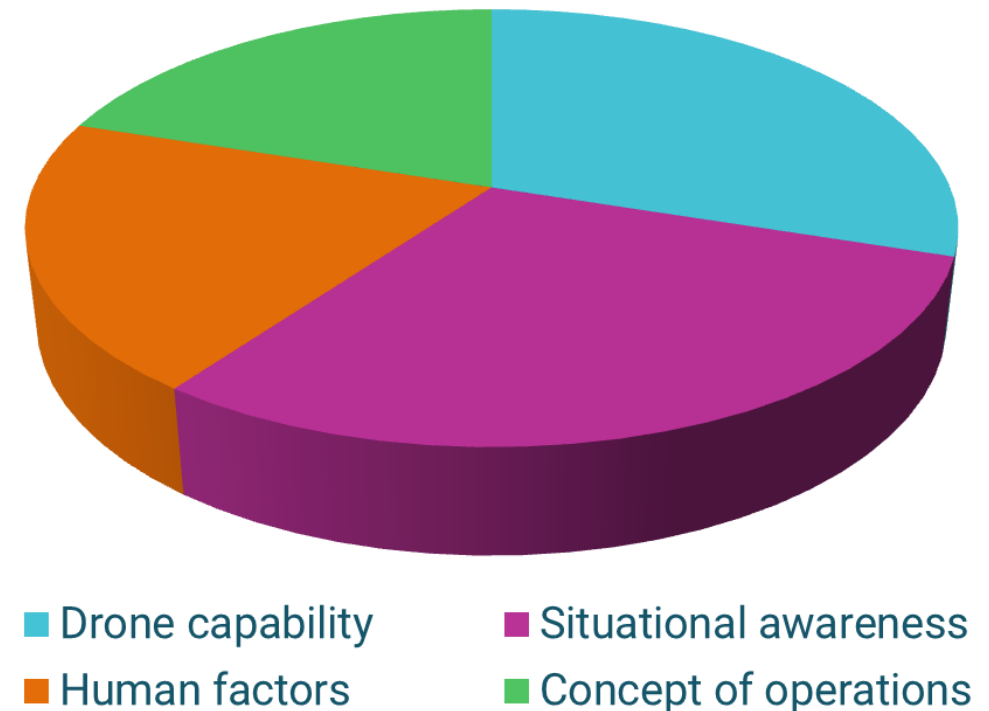
BVLOS depends upon increased electronic conspicuity of all users

Any increase in situational awareness reduces minimum required capability of airborne vehicle

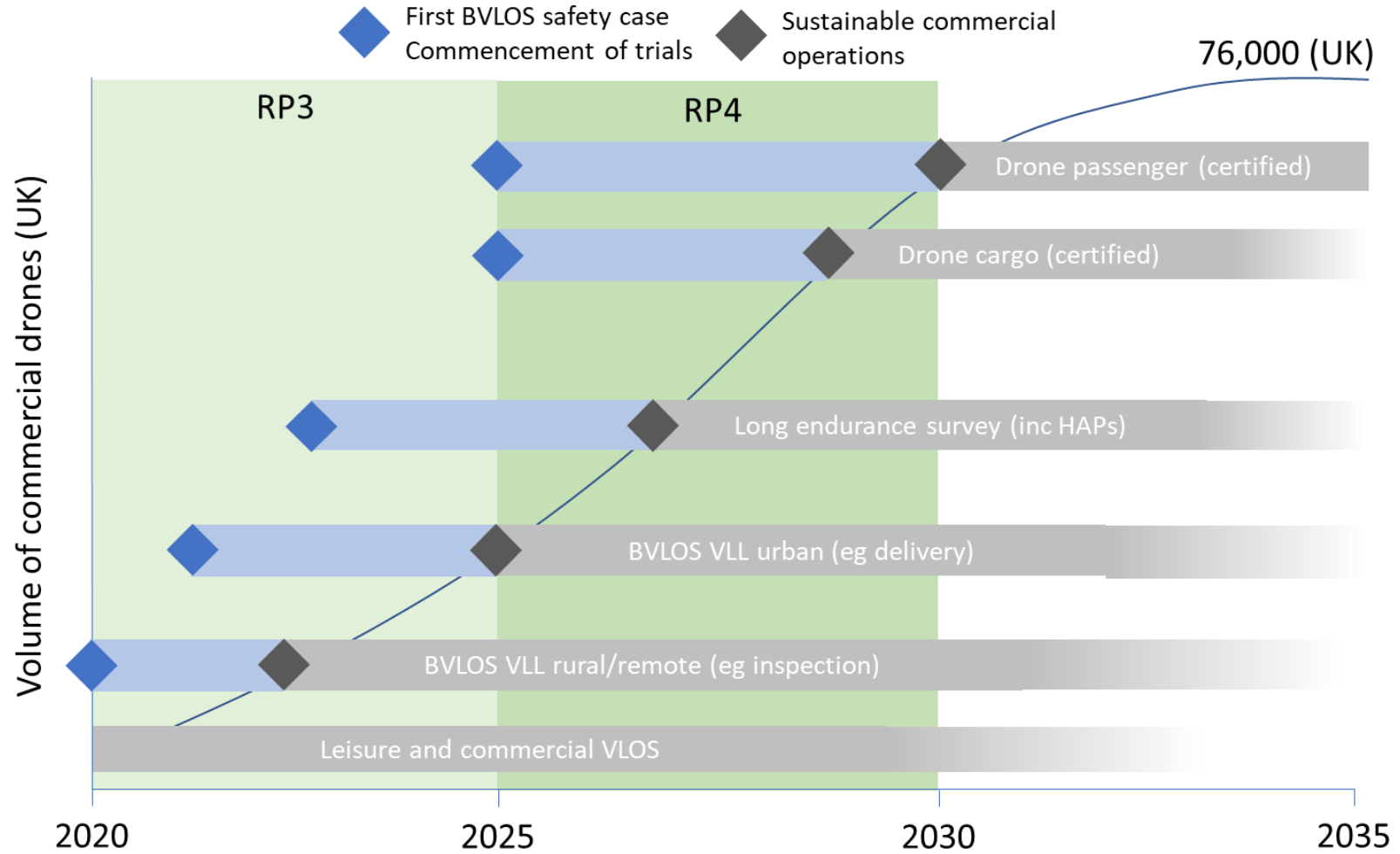
Safety cases are likely to require increased automation and flight conformance monitoring

The way in which we supervise the airspace will require new flight rules and operational practises

**Necessary safety measures**



# Beyond Visual Line of Sight – how soon?



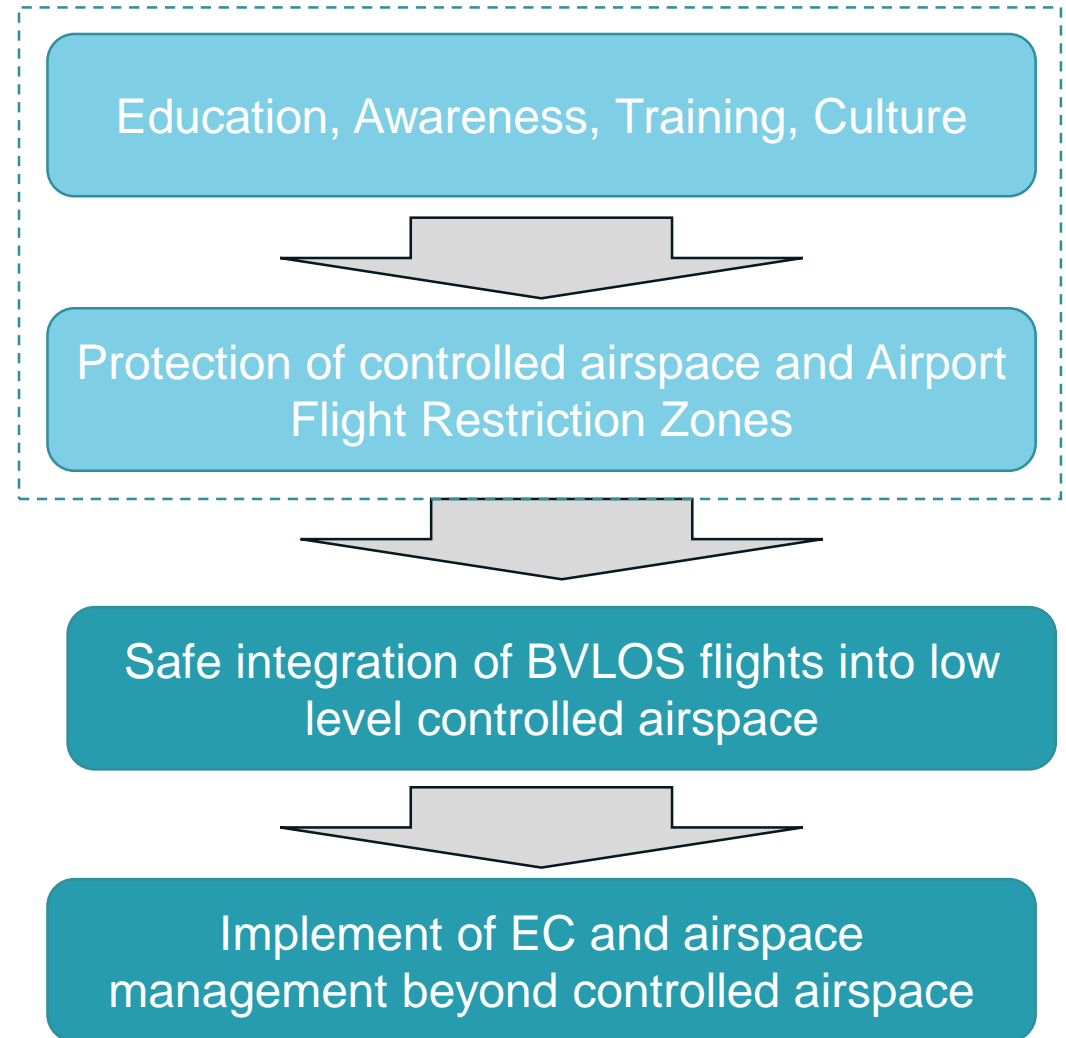
# Unified Traffic Management (UTM)

Phase 1: Foundation services to build safety culture and public awareness. Drone Assist App now has 130,000 voluntary users

Phase 2: Implementation of basic UTM services. Protection of controlled airspace and automation of airspace access requests by GA and drones

Phase 3: The integration of more complex BVLOS drone operations at Very Low Level (VLL) within controlled airspace in a known traffic environment

Phase 4: The expansion of BVLOS operations outside controlled airspace which will require increased situational awareness and electronic surveillance of all aircraft



## Sharing the Air #1 – Project Zenith

A world's first in manned/unmanned user integration

Demonstrating cooperative and uncooperative manned and unmanned aircraft in a variety of scenarios near a busy international airport

Drone position information to other users, improving situational awareness

UTM/ATM interoperability using ATM infrastructure and ATC procedures.

Demonstrate the information flow to and from a UTM system

Including a safeguarding solution for an airport

### OPERATION ZENITH

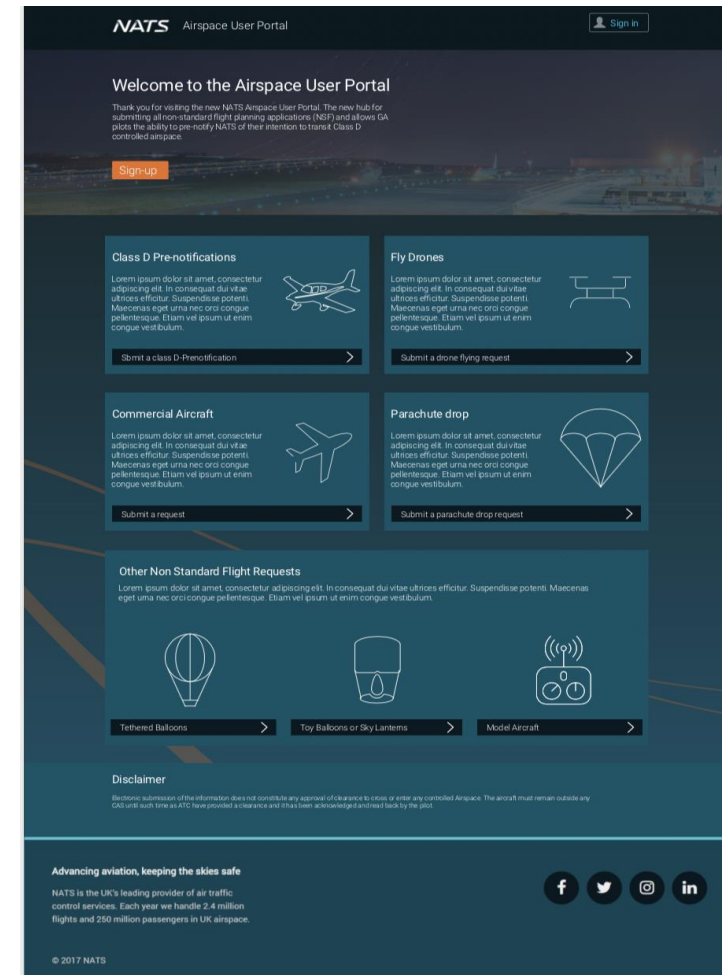




# Sharing the Air #2 – Airspace User Portal



- Currently evaluating Airspace User Portal to automate and route airspace requests
- A single means of gaining access to controlled airspace for ALL users
- Building a single picture of traffic intent
- Providing airspace alerts and situational awareness
- Gives airports access to approved flights and enables informed risk assessments
- Supports enforcement agencies
- We have processed over 2,000 flight requests since April



# Sharing the Air #3 - North Sea

## Mission & business benefit:

Exploit UAS rather than helicopters to inspect offshore platforms. Benefits of quicker deployment and improved safety. 200+ platforms, -100+ unmanned

## Airspace management:

Low level airspace; heli route structure and movements are procedural

Pre-flight de-confliction of UAS with known offshore traffic

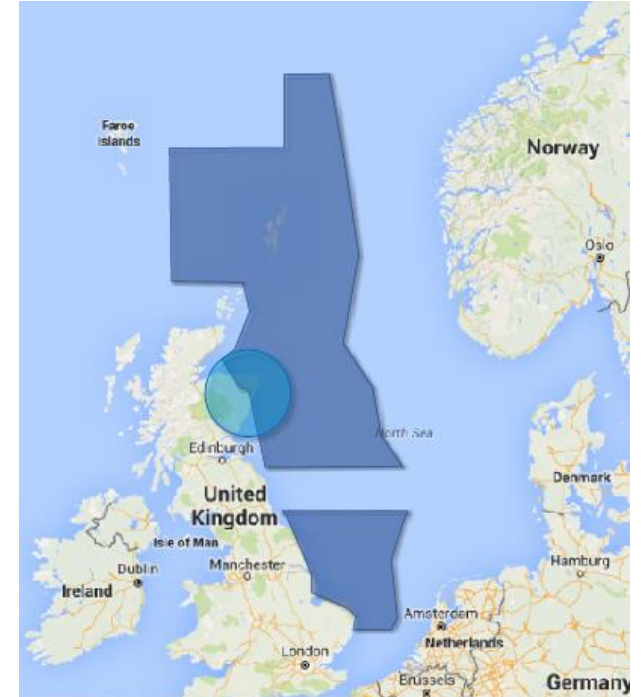
Flight monitoring and de-confliction with unexpected traffic during flight

## Key safety risks:

Exploits low density offshore airspace to minimise risk to other airspace users

Implement temporary restricted airspace for initial trial

Evolving towards dynamic airspace allocation requiring new equipage rules to be seen and to be contactable



# Does all this make navigation harder or easier?



## Challenges

Varied altitude, inc urban

Globally standardised

Cost effective hardware

Flexible to environment

Non-certified platforms

Auditable

Scalable to many varied users

## Opportunities

Signals of opportunity

Visual detection via the ground

Flexible mission requirements

Option to cease flight

Are we returning to a more cognitive means of air navigation in order to reach a safe level of automation?

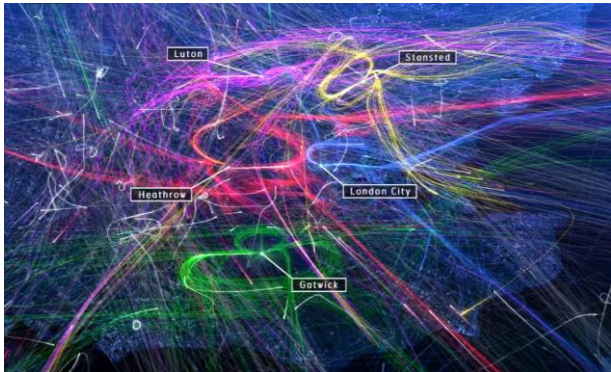
# Keynote takeaways

Airspace capacity is already an issue and airspace infringements are on the rise

Integration through procedures is the key to safety, not simple prohibition

BVLOS applications will not be 'piloted' – they are likely to be fully automated

Changes in airspace management and navigation will impact all airspace users



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