

Emergency Services Applications

<Redacted> Home Office

Trials to date - UK

- Police
 - Strathclyde
 - Merseyside
 - Staffordshire
- Fire
 - West Midlands
- EMS exercises



Results

- Systems tried were '1st generation' offering relatively low capability
- Unrealistic expectations of performance
- Trials not targeted on specific roles
- Set of technical requirements generated



Tasks

- Search
 - Open areas (moors, beaches, parks)
 - Difficult access areas (roofs, cranes, steep terrain)
 - Limited access (along river banks, islets, the far side of railways / roads / rivers)
- Situational overview

Mapping



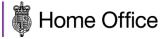
Tasks

- Incident / Scene recording reduced impact on environment compared to foot access
- Collision scene (potentially a distributed area)
- Extended crime scene provide overview or mapping for referencing evidence locations
- Visualisation for investigation/presentation
- Perimeter checking (UKAEA, MoD Police, utilities)



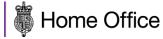
Benefits

- Coverage of 'hard to search' areas
 - Rough or steep terrain
 - Large open areas
 - Difficult of access
- Hazardous environments
 - Chemical, fire, flood…
- Hazardous situation
 - Public order, firearms...



Equipment

- Mostly imagery
 - Colour, thermal, near IR
 - Hyperspectral
 - Stabilised camera mount or orthographic mapping
 - SAR
 - LIDAR
- Other sensors
 - CBRN
 - Chemical 'Cannasniffer'



Technologies

- Interchangeable payloads
 - common across platforms?
 - Payload POV adaption
- Chemical sensors etc could be used on rotor, fixed wing, land and marine vehicles
- Automatic route planning
 - Adapts to weather
 - Terrain mapping
 - Use collision avoidance to update routing



Technologies

- Search patterns
 - Orbit / follow tracked object
 - Raster scan for mapping
- Georeferenced data

EPIRB receiver



Autonomy...

...or automation?

- Minimal operator intervention
 - Collision avoidance, route planning, weather adaption, take off and landing must be automated
 - De-skilling flight operation would enable wider usage
- Decision of what to do remains with a person how to do it lies with the UAS

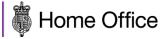


Targeted uses

- Reactive tasking
- Not for pervasive surveillance
 - Not police policy no 'fishing expeditions'
 - Not enough time to look at the information!

Controls on use

- BBC Newsnight "should be signed out"
- Police systems likely to be operated under same structure as manned aircraft
- Deployed by specialist team who know operating rules
 - Licensing requirements?
- Audit trail of flights
- RIPA rules applied to UAS



Media feeding public perception

- Still try to link civil uses to military weaponry
 - Imagery used is Predator/Reaper/Global Hawk
 - Continued use of the term 'drone'
- Stated concerns
 - Big brother surveillance tool
 - Controls on security agency use
 - Safe to fly?
 - Privacy invasion
- Intrusive media being highlighted by some
 - Criminal use also mentioned



Definitions

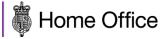
- Small systems
 - Most regulation covers the airframe segment of a system
 - 'Small aircraft' is up to 150kg MTOW
- NOT Aerial Work
 - i.e. flights form part of work duties rather than for hire or reward, affects permissions, regulation and licensing
- UAV the flying element
- UAS includes ground station and operators



SAFE TO FLY

FLOWN SAFELY

USED APPROPRIATELY



SAFE TO FLY

- Competent design
- Competently made
- Inspection
- Maintenance
- Registration
- Flight checks
- Software
- Safety systems

Under 20kg No airworthiness requirements

20 – 150kg Yes

Over 150kg EASA Permit to Fly

Demonstration of construction quality and consistency.

EuroUSC design and airworthiness

assessment.



SAFE TO FLY

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- Inspection
- Maintenance
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- Flight checks
- Software
- Safety systems

Small aircraft over 20kg are required to be registered



FLOWN SAFELY

- Distance
- Operator training
- Risk assessment
- Separation distances
- Deconfliction AIR
- Deconfliction RF

Visual Line of Sight – direct and unaided. Considered as up to 400 feet AGL and 500m range.

Small airframes will be non-visible at closer range so values are maxima.

Extended VLOS – visual contact may be by other methods

Beyond VLOS – need sense and avoid, flown as IFR



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Under 7kg None, BNUC-S

7 - 20kg BNUC-S

20 – 150kg BNUC

Over 150kg BNUC/CPL/ATPL

Larger aircraft, longer range or non-segregated airspace may increase requirements.



FLOWN SAFELY

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Airspace type, other aircraft, meteorological conditions, by-laws, surroundings, permissions of landowner

FLOWN SAFELY

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- Deconfliction RF

Air Navigation Order – explicit permission required to operate within 50m of persons, vehicles, buildings or structures, over or within 150m of congested areas (includes built-up, industrial, or crowds >10000)

FLOWN SAFELY

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Pilot plus additional observers if needed

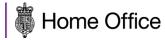


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Control, telemetry, video downlink Imported systems often noncompliant.

WRC12 allocated 5-5.15GHz



APPROPRIATE USE

- High mobility CCTV
 - In flight or perch and stare
- Safety survey
 - extent of fires, floods, incidents ?...might this include officer safety in public order situations??
- Mapping
 - access, egress, assessing scale of events or incidents
- Search
 - · 'golden hour' for mispers, reduced delays due to low staffing

APPROPRIATE USE

- Location and Tracking
 - CVIT, SAR
- Surveillance
 - RIPA

INAPPROPRIATE USES

- Deploy taggants
- Weaponised
- Autonomous



Questions?