



Home Office

# Emergency Services Applications

<Redacted>  
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# Trials to date - UK

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



# Results

- Systems tried were '1<sup>st</sup> 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



# Requirements for Acceptability

- SAFE TO FLY
- FLOWN SAFELY
- USED APPROPRIATELY



# Requirements for Acceptability

- **SAFE TO FLY**

- Competent design

Under 20kg  
20 – 150kg  
Over 150kg

No airworthiness requirements  
Yes  
EASA Permit to Fly

- Competently made

Demonstration of construction quality and consistency.  
EuroUSC design and airworthiness assessment.

- Inspection

- Maintenance

- Registration

- Flight checks

- Software

- Safety systems





# Requirements for Acceptability

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

Small aircraft over 20kg are required to be registered



# Requirements for Acceptability

- **FLOWN SAFELY**

- Distance 

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

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

Extended VLOS – visual contact may be by other methods
- Separation distances 

Beyond VLOS – need sense and avoid, flown as IFR
- Deconfliction – AIR
- Deconfliction – RF



# Requirements for Acceptability

- FLOWN SAFELY

- Distance

- Operator training

- Risk assessment

- Separation  
distances

- Deconfliction – AIR

- Deconfliction – RF

Under 7kg

7 - 20kg

20 – 150kg

Over 150kg

None, BNUC-S

BNUC-S

BNUC

BNUC/CPL/ATPL

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



# Requirements for Acceptability

- **FLOWN SAFELY**

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

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



# Requirements for Acceptability

- **FLOWN SAFELY**

- Distance
- Operator training
- Risk assessment
- Separation distances
- Deconfliction – AIR
- 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)



# Requirements for Acceptability

- **FLOWN SAFELY**

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

Pilot plus additional observers if needed



# Requirements for Acceptability

- FLOWN SAFELY

- Distance
- Operator training
- Risk assessment
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- Deconfliction – AIR
- Deconfliction – RF

Control, telemetry, video downlink  
Imported systems often non-compliant.

WRC12 allocated 5-5.15GHz



# Requirements for Acceptability

- **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





# Requirements for Acceptability

- **APPROPRIATE USE**
  - Location and Tracking
    - CVIT , SAR
  - Surveillance
    - RIPA
  
- **INAPPROPRIATE USES**
  - Deploy taggants
  - Weaponised
  - Autonomous



# Questions ?