AIRSPACE INTEGRATION OF UAS AND UAM

A virtual primer for European Rotors
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iConspicuity and U-space Airspace

Airspace Integration of UAS and UAM

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Safety data 2009 - 2019

FATAL AIRBORNE COLLISIONS / AIRBORNE COLLISION FATALITIES IN EASA STATES

- 60 FATAL COLLISIONS
  ~ 6 PER YEAR
- 137 FATALITIES
  ~ 13 PER YEAR

ALL UNCONTROLLED TRAFFIC

ALL SMALL AIRCRAFT*

*MANY ROTORCRAFT
Problems and Solution Areas

- Ineffective sharing of traffic information
- Congestion of uncontrolled traffic
- Drones operations
- Airspace inefficiencies
- Airspace design & use

And constant interface with U-space developments

iConspicuity - KEY SOLUTION
U-space
A set of ‘new services’ and ‘specific procedures’ designed to support safe, efficient and secure access to airspace for large numbers of drones **without airspace segregation** for the sole use of drones

iConspicuity
‘in-flight capability’ to transmit position and/or to receive, process and display information about other aircraft, airspace or weather in a real time with the objective to enhance pilots’ situational awareness
High Level Roadmap

Step 1
Propose a solution for U-space airspace

AMC/GM to SERA.6005(c):
Manned aircraft operating in airspace designated by the competent authority as a U-space airspace, and not provided with an air traffic control service by the ANSP, shall continuously make themselves electronically conspicuous to the U-space service providers

Step 2
Build on the U-space solution

Expand the functionalities and address the GA conspicuity issue generally, including the possibility to use the information broadcasted by the GA traffic for Flight Information Service
Certified ADS-B out

For certified aircraft (especially rotorcraft) to make themselves conspicuous using the existing certified technology already installed on board.

SRD 860 Band

For 50,000+ airspace users using new ADS-L specification voluntarily adopted by OEMs of the existing non-certified solutions (FLARM, OGN, FANET, PilotAware...) to make their customers conspicuous.

Mobile telephony

For other airspace users to make themselves conspicuous using existing mobile telephony technology in compliance with new ADS-L specification.
ADS-L (Light) – Objective

→ Absolute minimum position information standard for making manned aircraft operating in U-space as uncontrolled traffic conspicuous to USSPs

→ Subset of information derived from ADS-B out standard

→ ADS-B out system provides in principle the information that meets the technical specification detailed in ADS-L (Light)
ADS-B Light – Scope
Summary - Step 1

1090 MHz (ADS-B out)
- ICAO standard
- Already installed
- All elements in place

SRD 860 Band
- Utilises past investments
- User’s choice
- Affordable infrastructure

Mobile Telephony
- Existing infrastructure
- Affordable to new users
- Needs further actions
Thank you
Phil Binks
Head of ATM
Altitude Angel
Airspace integration of UAS and UAM
Our Company
Values: Trust, Integrity & Shared Achievement

7 YEARS OLD
Company founded in 2014

40+ EMPLOYEES
Growing to 50+ in 2022

150k FLIGHTS A MONTH
Drones flying safely worldwide

152 COUNTRIES
Global airspace information

4 ANSPs
Utilising our UTM Operating System

1 MISSION
To unify airspace
Who are Altitude Angel?
Values: Trust, Integrity & Shared Achievement

- Our mission is to unlock and unify the airspace, enabling more people and organisations to access the potential in UAS and UAM.

- We're passionate about airspace safety, and we serve millions of drone pilots with accurate, rich and reliable safety information without charge in over 40 countries via our apps and website, dronesafetymap.com, using our innovative data management technologies.
UTM tomorrow...
Inform, Assist, Connect & Integrate

Example UTM services

<table>
<thead>
<tr>
<th>Geofencing</th>
<th>Deconfliction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity Management</td>
<td>Flight Route Planning</td>
</tr>
<tr>
<td>Airspace protection</td>
<td>Identify Uncooporative Drones</td>
</tr>
</tbody>
</table>

Other airspace users

Drone Pilots

Automated Flights, UAM services

Air Traffic Managers

THE INTERNET OF FLYING THINGS™

ALTITUDE ANGEL | 4
Unified Traffic Management

www.altitudeangel.com
Chris Kucera
Head of Strategic Partnerships
Onesky
Harmonizing Our Sky

October 29, 2021
Our airspace is getting more crowded & complex

- 16.4 million flights annually
- 5,499 aircraft flying at peak times
- 1.7 million drones registered in US
- 494,000 commercial drones in use today
ATM Must Adapt & Change

Traffic Management
ATM is unable to effectively monitor & track UAS aircraft

Volume
ATM may not be able scale to the volume of UAS operations

Lower Altitudes
ATM does not scale down to the lower altitudes

Funding
UTM funding will help pave the way towards ATM advancements
What is UTM?

**UTM is...**

- A digital system that can integrate drones safely and efficiently into air traffic that is already flying in low-altitude airspace.
- A system of systems – not a single product or service.
- Will expand to incorporate all airspace users and operations.
- A collaborative effort – regulators, OEMs, SPs and consumers must work together.
- Must be built with tomorrow’s needs in mind.
Our Evolution

• 7,000,000 lines of code
• 31 years supporting aero and defense
• 700 aero and defense companies

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Track Record

35 projects+ implemented | Expansive UTM IP developed | Adherence with global UTM standards

United States of America UTM/UAM projects
- NASA TCL4 – UAS Service Supplier
- FAA UPP2 – UAS Service Supplier
- NASA AAM National Campaign DT & NC-1 – Airspace Service Provider
- NASA SIO UAS in NAS – Operations center situational awareness app
- AFWERX STTR – UAM Noise modeling
- FAA NextGen BVLOS - Examining gaps in CNS to meet BVLOS needs
- NASA SBIR – U-AIM for Advanced Routing and Scheduling
- FAA CRADA - Advanced methods to enable BVLOS

International UTM/UAM projects
- CAAS Singapore – UTM prototype for BVLOS in an Urban Environment
- Airservices Australia – UTM AIM scoping project
- Swiss FOCA – SUSI network remote identification service provider
- CED Qualia Test Site – Tracking and surveillance system w/ UTM
- Other POC – MNO integration, Korea UAM, Japan Quantum Computing, Maritime Test Sites

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Solutions for every step of the way

**Design & Validate**
- **Understand your airspace**: CNS challenges, terrain, simulate routes

**Test & Certify**
- **Test your operations**: aircraft design, system constraints, post-flight reports, ensure compliance

**Operate**
- **Scale your business**: live situational awareness, fleet management, scheduling
Technology Solutions for Your UAM/AAM Journey

Modeling & Simulation Analytics
- CONOPs development
- Flight profile modeling
- Terminal operations
- Multi-modal simulation
- Vehicle Certification
- Community Adoption

Real-time Operations & Airspace Integration
- Real-time situational awareness
- Dynamic airspace visualization
- BVLOS risk analysis
- Operation & constraint monitoring
- Surveillance integration

Digital Traffic Management Services
- UTM/UAM service supplier
- Flight management services
- Airspace management services
- Strategic deconfliction
- Conformance monitoring
- Contingency management

Common Analytical Services Across OneSky Products

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