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SCAN ME

In cooperation with:

Alliance for New Mobility Europe

ASD

DRONE ALLIANCE EUROPE

Global UTM Association

JEDA Joint European Drone Associations

EASA Innovative Air Mobility Implementation Forum

Enabling VLL operations far from airports

Moderator
STÉPHANE VAUBOURG
U-space project manager, EASA

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Airworthiness Certification Manager, Thales

JAN ERIC PUTZE
CEO, Droniq GmbH

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Policy coordinator Strategy and Innovation unit, FOCA

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Goal:

→ To remind the technical difficulties and associated. challenges to safely enable VLL operations far from airports.

→ To present solutions applied to support the operations in different environments.

→ To identify and propose generalisation of good practices and working operational framework.

THALES
Building a future we can all trust

Air Risk Methodology for BVLOS operations

www.thalesgroup.com

BVLOS Operations in VLL : Incremental Roadmap

2020-2021 — PHASE 1

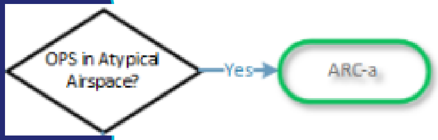
2022-2024 — PHASE 2

Full DVR SAIL III

2025 — PHASE 3

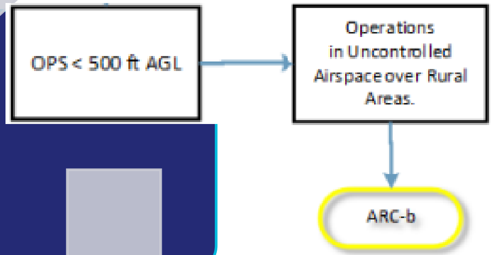
PHASE 1

- BVLOS Operations **in Temporary Restricted Area in Rural areas** (experimental flights).



PHASE 2

- BVLOS Operations **in Uncontrolled Airspace over Rural Areas.** Exposure time: 10h/month



PHASE 3

- Same than Phase 2, « routine » operations.

Manage Air Risk : Process Scheme

> 4 steps

- **Strategic analysis** — **Months before**
  - During Flight Plan elaboration
  - List of protocols to do

> Information post-strategic — Months before

- Warning to other users of crossed airspace

> Pre-tactical analysis — Day(s) before – D-day

- Last time / real time information (radio, phone calls, …)

> Tactical management — During flight

- During flight procedures

And tomorrow…

> Enhanced tools and method to foster operations in uncontrolled airspace

> Input from another ASD and Eurocae Member.

Enabling VLL Operations

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EUROCAE WG105 activities on DAA for VLL

- To facilitate UAS operation in VLL, a performance based air risk mitigation is required
- Within EUROCAE WG105 Industries and research organization (NRCC) are working together to define a DAA MOPS for UAS in VLL

Performance based approach

- Surveillance performance requirement flown down from Risk Ratio (ARC B, ARC C) thanks to Monte-carlo simulation.
- Industry feedback on feasibility
- Statistical models: UAV trajectories, UAV parameters, Sensor models, Encounter model
- The proposal is to provide to the industry
  - Validated functional and performance requirements
  - Methodology for specific future application
- ED-330 Document to be published in 2025

US and Canadian data used for validation

- EU data on VLL traffic and encounter model welcome

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Thank you

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Today possible?

DRONIQ
FOR
FLIGHT

EASA
Innovative Air Mobility Implementation Forum

DRONIQ

Drones are „invisible“

Limitation of full drone potential

Drones are **invisible** to manned aviation, air traffic control and other operators, especially in uncontrolled airspace.

LIMITATION OF COMMERCIAL DRONE POTENTIAL AND USE

BVLOS within CTR

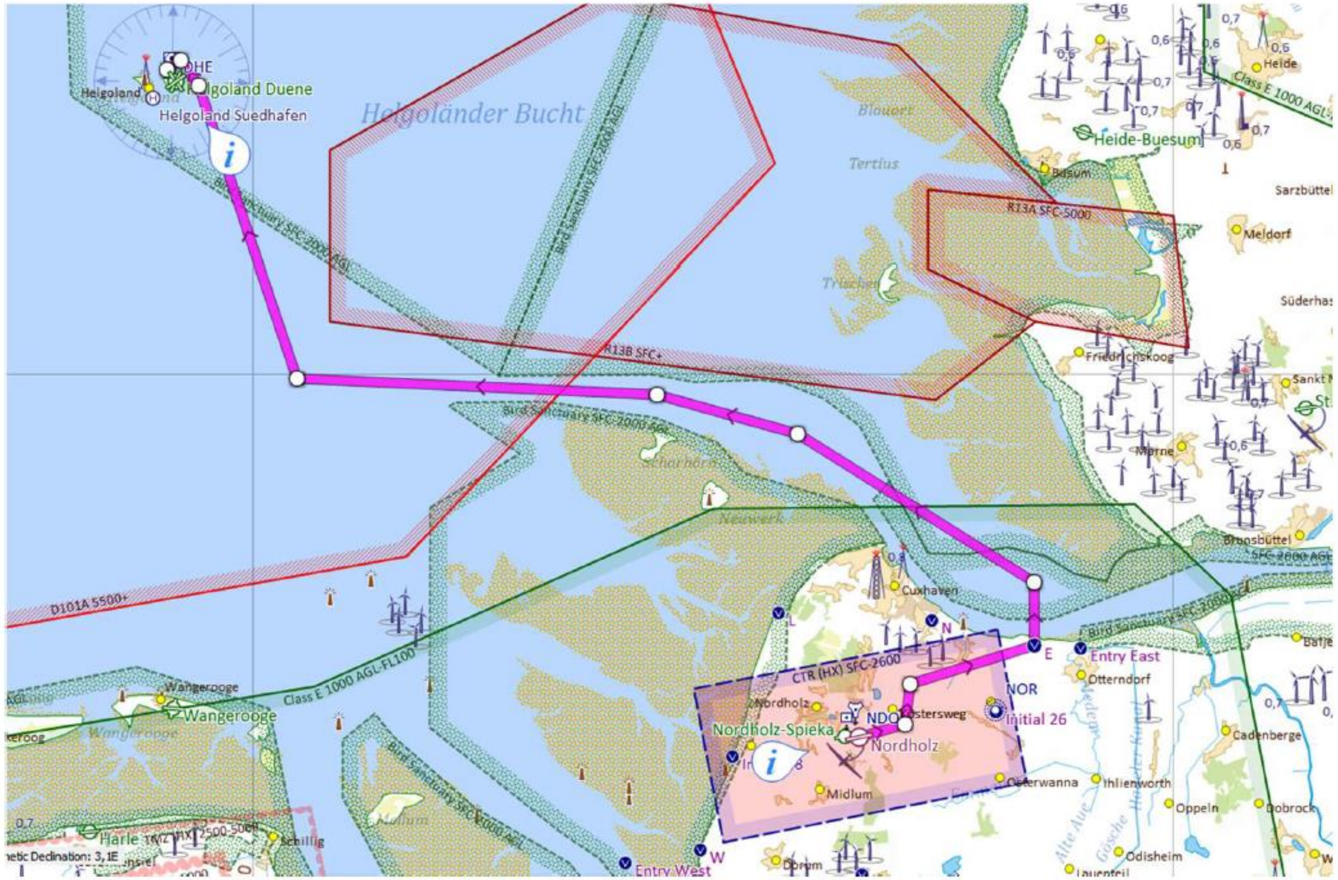
- ANSP will separate manned and unmanned air traffic
- Certified Mode-S transponders can interfere with the communication of the drone with the linked ground station due to their power
- Low power (non-certified) Mode-S transponders should be accepted for the VLL-airspace
- The height at which the airspace for manned aviation begins in principle must be redefined and must be accepted by each competent authority in this way
- Guidelines for UAS operations in the open and specific category – Ref to Regulation (EU) 2019/947

BVLOS outside controlled airspace

At least 50% of the surrounding air traffic must be detected - How?

- iConspicuity is the solution for detect and avoid
- In addition to the u-Space with its services, there should be UAS-geographic zones or airspace elements for manned aircraft with high traffic density in which the use of an iConspicuity-capable transceiver is mandatory for all aircraft, manned or unmanned.

... but possible!

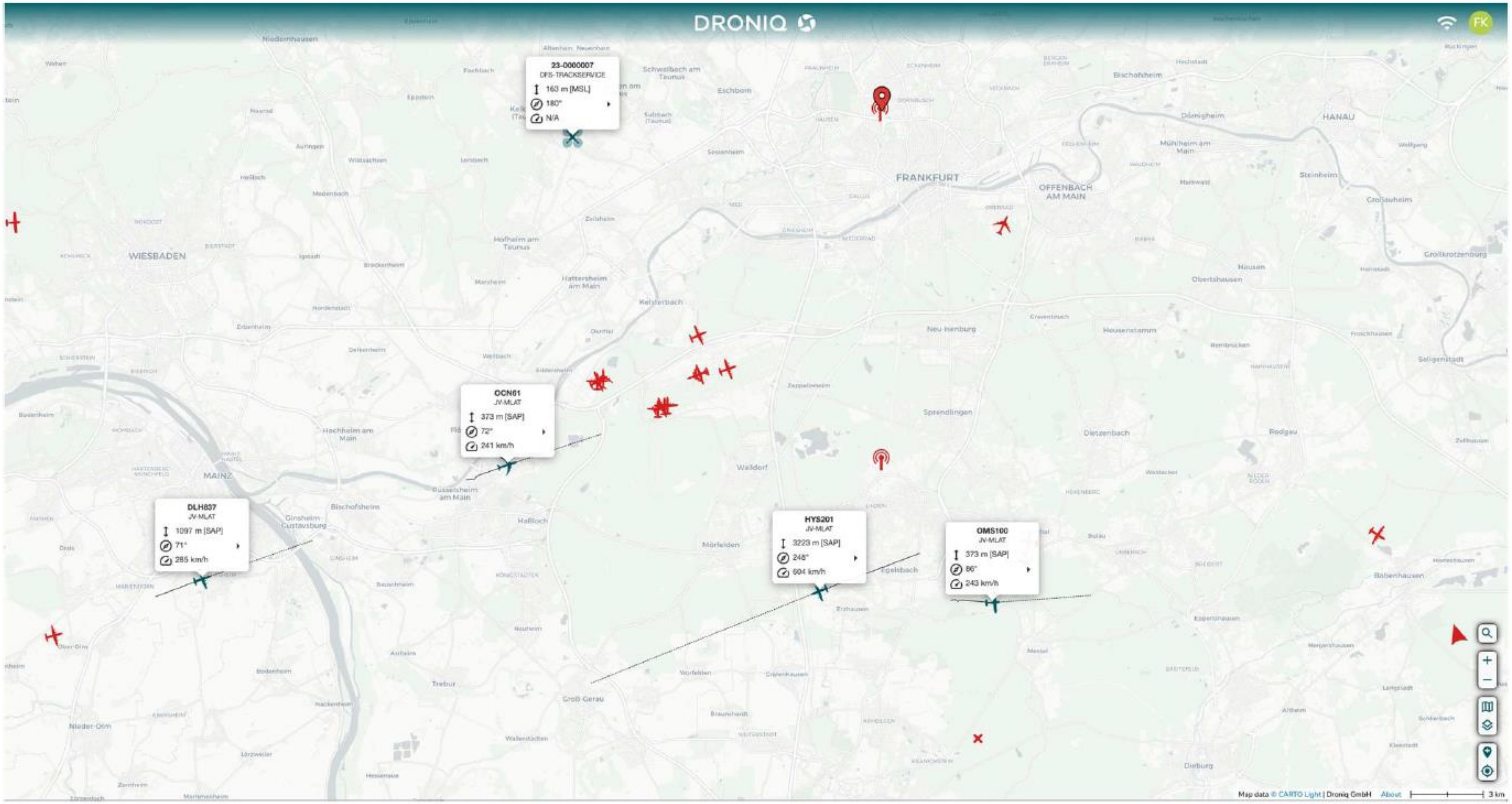


- Alt max. 600ft AGL bzw. AMSL
- Approach and landing in Nordholz via published VFR Routes
- Approach and landing in Helgoland via published traffic patterns
- Use of air-to-air communication and use of mode-S transponder
- Compliance with minimum meteorological conditions for flight visibility, ground visibility and cloud clearance in accordance with SERA.5001 for airspace G and D (CTR)

Hanseatic S360Mk.II – equippment list

Spannweite	3600 mm
Max. Startgewicht	< 25kg (3,5l Tank) < 30 kg (8l Tank)
Betriebsfrequenz	2.4 GHz 1616 - 1626.5 MHz 868 MHz
Max. Steig- / Sinkgeschwindigkeit	5 m/s bzw. 1000 ft/m 2,5 m/s bzw. 500 ft/m
Höchstgeschwindigkeit	150 km/h bzw. 80 kn
Reisegeschwindigkeit	100 km/h bzw. 55 kn
Max. Flugzeit	3.5 Liter Tank: 3 h 8 Liter Tank: 7 h
Flugfunk	Trig TY91 D-PDQO (zugeteilt)
Mode-S Transponder	ping200X 24-bit Adresse (zugeteilt)
Beleuchtung	2 Navigationslichter 1 Antikollisionsblitzlicht
Anti Kollision	FLARM in / out ADS-B in

Best date solution – combined air traffic view



Contact

Jan-Eric
Putze

CEO

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Enabling VLL Operations

Kevin Houston

President Drone Alliance Europe

& Head of Regulation MANNA Drone Delivery

Who is MANNA?

- Founded 2019 - Bobby Healy (Serial Entrepreneur)
- Relies on Private investment
- 120 employees in 6 countries (mainly Ireland)
- Designs its own automatic Drones (55 Engineers)
- Manufacturers its own Drones
- Operates its own Drones
- LUC from IAA in April 2021

MANNA
DRONE DELIVERY

Solution – UAS Geographic Zone

- MANNA Drone Delivery is the nominated controller
- ANSP (Air Nav Ireland) & NAA (IAA) developed in parallel
- Has worked without problem since March 24
- Operators have no restrictions

MANNA
DRONE DELIVERY

Blanchardstown – 10Km from Airport

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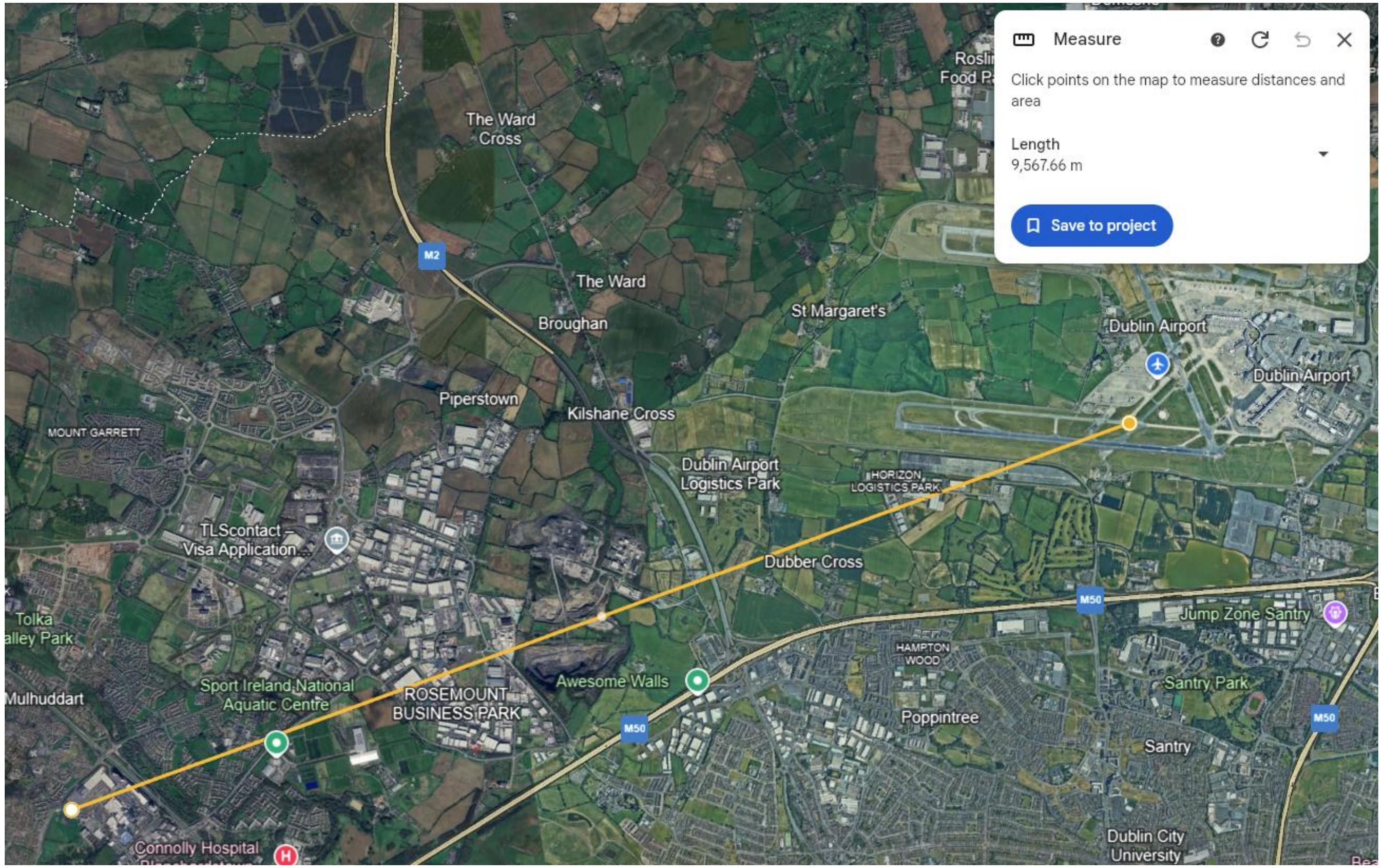

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DRONE DELIVERY

Main Base

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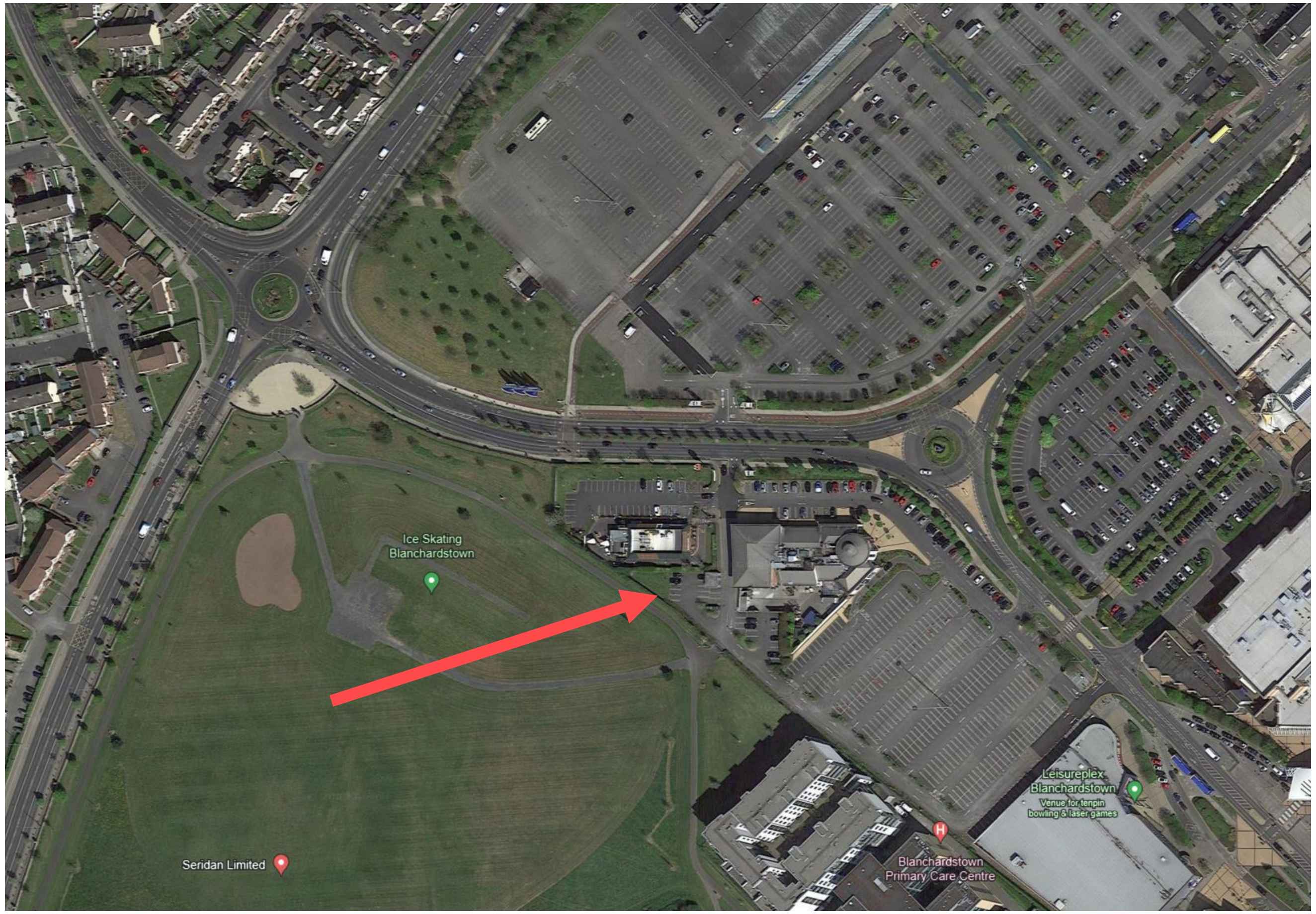

MANNA
DRONE DELIVERY

Flight Geography

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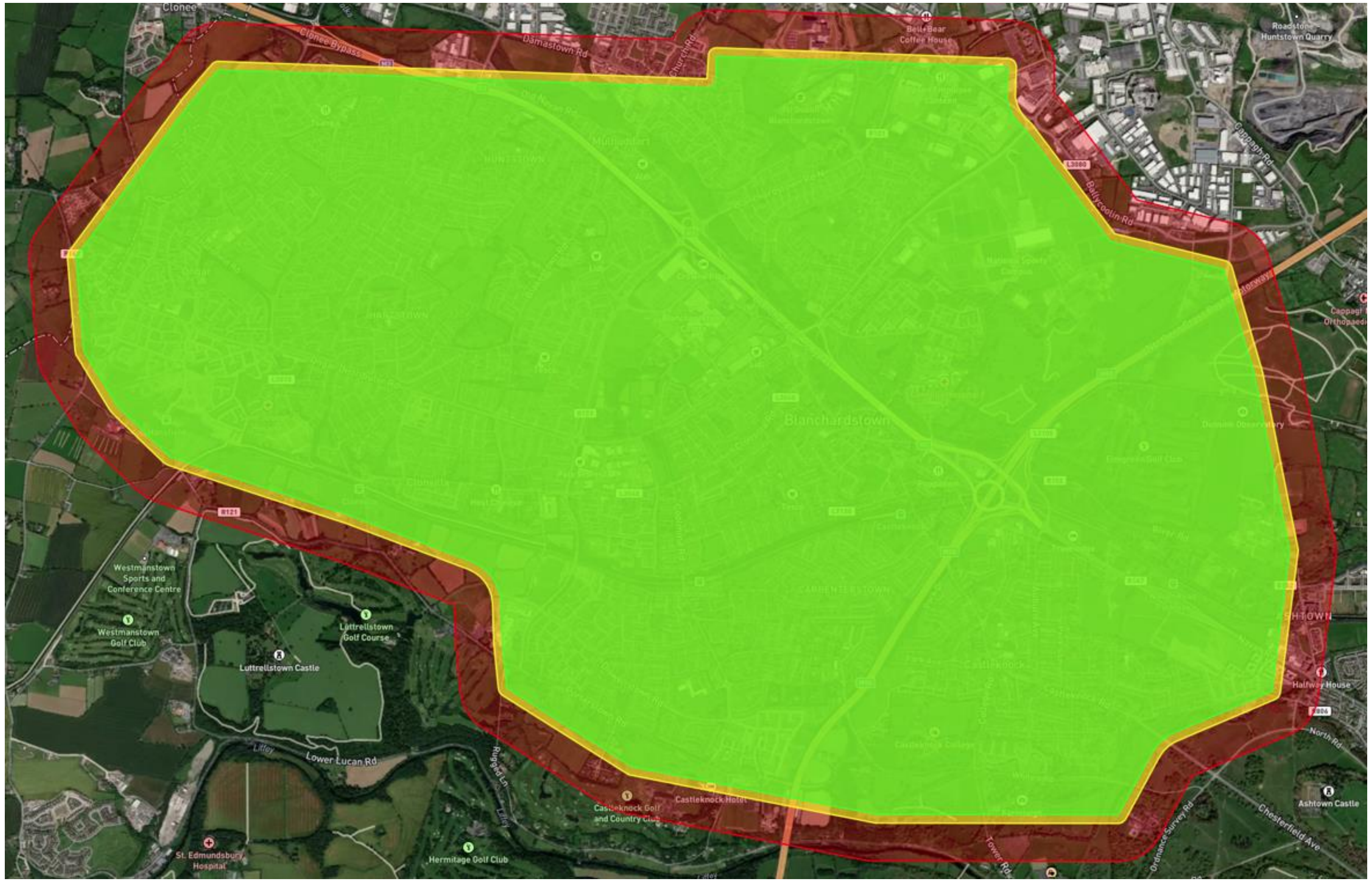

MANNA

DRONE DELIVERY

Altitude

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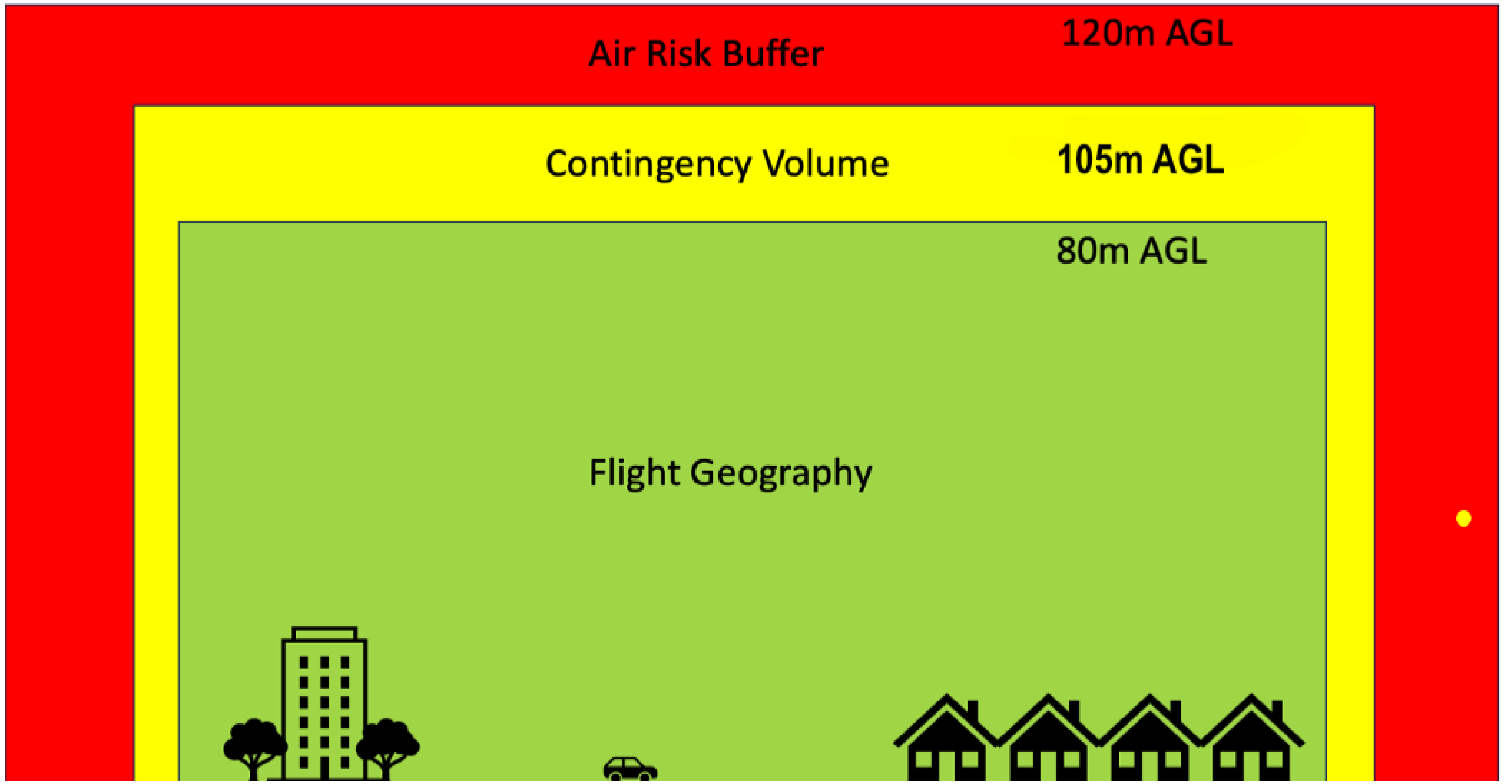

Memorandum of Understanding

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APPENDIX F –

MOU & Vol Coordinates

Agreement Between

MANNA AERO and AIRNAV Ireland

For

UAS Operations in a Geo Zone

Blanchardstown

Geo Zone Volume & Coordinating Procedures

There the area to be operated as a result of the formal written assessment by ASAP dated 16 Mar 2024.

Signed

Cathal Mac Criostail, Manager Airspace & Navigation

AIRNAV Ireland

Signed

ROBERT HEALY

ACCOUNTABLE MANAGER

MANNA

DRONE DELIVERY

Coordinating Procedures

EASA Innovative Air Mobility Implementation Forum

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Coordinating Procedures

P-004 SOP – Ops Manager – Management of Airspace & Third-Party Operators

Step 1
- Geo Zone signed into force and published by IAA
- MANNA with contact details for two persons published
- UF101s will be submitted as per published procedures on www.iaa.ie (in this case, it will be suaairspace@airnav.ie)

Step 2
- ATC Dublin will have access to MANNA cell numbers during operational hrs - 0800-2100hrs daily (Local Time)
- ATC may issue instructions to cease operations for emergency reasons e.g. HEMS
- MANNA requires up to 15 minutes to clear the airspace

Step 3
- The primary telephone contact for Dublin ATC is 01 8144601
- When MANNA instructed to clear airspace they will phone when complete (Max 15mins)
- MANNA will have emergency actions also

Step 4
- ATC will forward all UF101s for flights within the MANNA area of operation to confirm they can be accomodated
- ATC will issue ATC approval after MANNA has confirmed authorisation. ATC will include an instruction to the applicant to contact MANNA before flights can commence

Step 5
- MANNA will cooridinate with the operators in the same way as ATC does elsewhere using the approval number given by ATC
- Operator will communicate prior to take of and after landing with MANNA Ops Cell

Step 6
- MANNA will close down airspace for emergencies for any operator who is live when instruction is received by MANNA from ATC or when an emergency arises

Step 7
- Primary Contact: 0858550164
- Secondary Contact: 015252365

MANNA

DRONE DELIVERY

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Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Bundesamt für Zivilluftfahrt BAZL
Office fédéral de l'aviation civile OFAC
Ufficio federale dell'aviazione civile UFAC
Federal Office of Civil Aviation FOCA

Enabling VLL operations far from airports

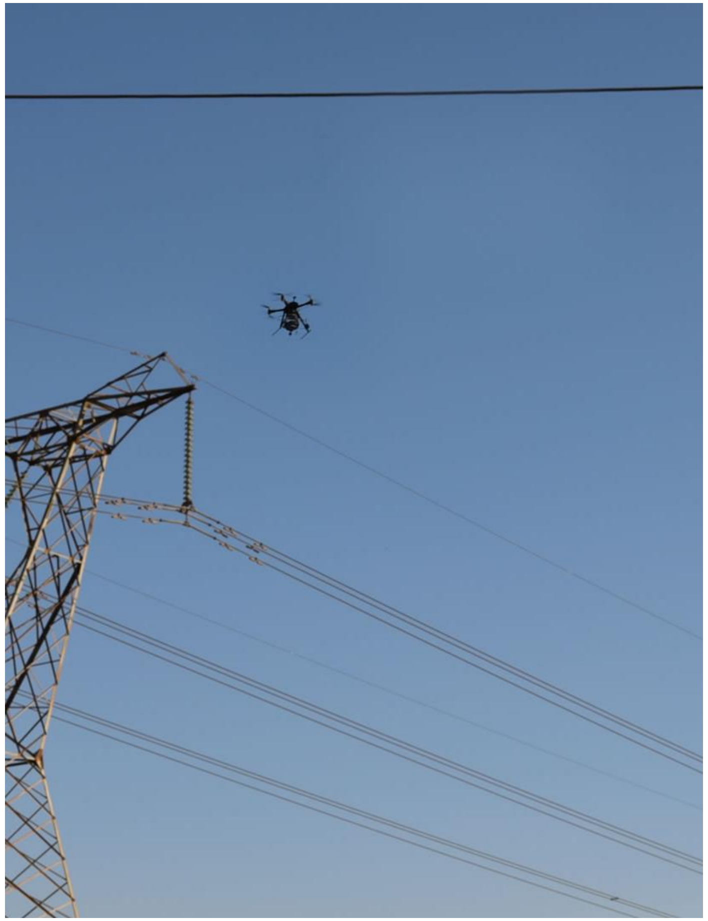
Larissa Haas

23/10/2024 IAM Implementation Forum

VLL OPERATIONS ARE A CHALLENGE

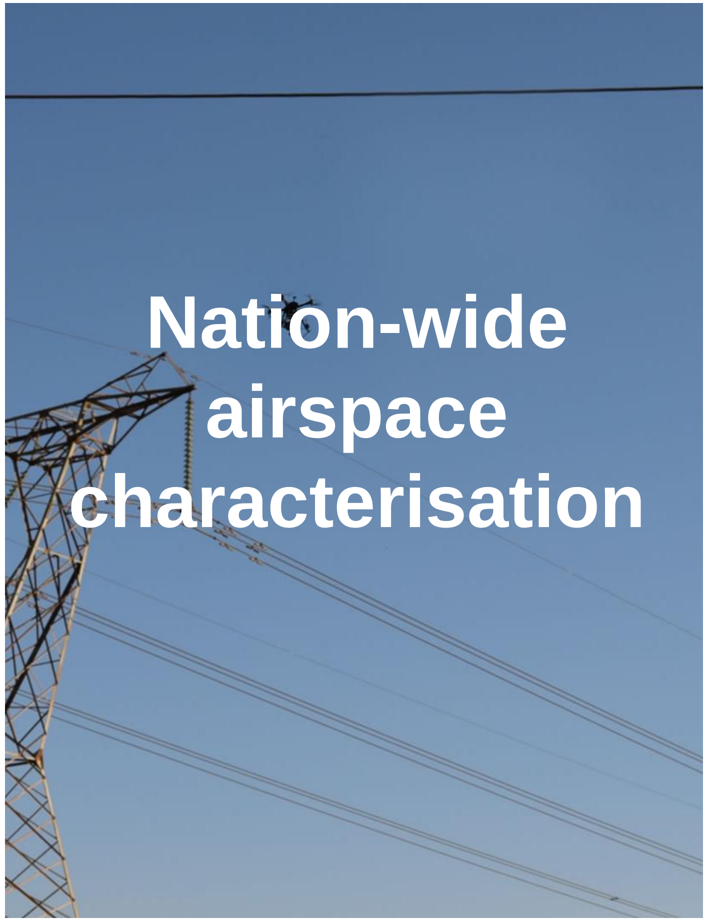
Aerial objects by group			Hazard Identification			Risk Characterization	
Cat	Group	Description	Considered as Hazard [yes / no]	Equippage Conspicuity	**Traffic Characteristics** *Rationale to not consider it as Hazard* Hazard characterization within airspace and details on conspicuity requirements	**Strategic Mitigations (included in SORA)** **Soft factors (excluded from the SORA scope)*	**Tactical Mitigations (included in SORA)** **Soft factors (excluded from the SORA scope*
1	F	Fauna. Large Birds	*No*	*None*	*(e.g.) Impact on Ground Risk only*		
	K	Kites and tethered balloons.					
	B	Hot air balloons.	No	MODE-S (a)	• Balloons tend to operate in known weather and areas. • Traffic exposure at low level is limited in airport environment and controlled airspace • For gas and hot air balloons within airspace C and D, an authorisation is required from the appropriate air traffic control units. • Minimum VFR height (ie 500ft/AGL) from VRV-L/SERA are applicable to balloons (except for training) and main balloons sites are visible on the ICAO chart for flight planning. • (a) Transponder MODE-S only required for flights during aeronautical night and dense fog (VRV-L, art. 29)	• Flight planning, identification of the flight time and areas for B Ops • Monitoring of radio communication Soft factors Balloons are identifiable on on-board camera / ground-based webcams due to their size	• Transponder MODE-S detection through MLAT Soft factors Balloons are identifiable on on-board camera due to their size
	P	Parachutists					
	A	Unpowered air sports: hang gliders, paragliders, etc.					
2	R	Radio controlled model aircraft					
	G	Gliders.					
	S	Powered air sports: very light aircraft, ultralights, motor gliders, motor paragliders, etc					
3	D	Dirigible airships					
4	H-State	Helicopters (VIP, Police, Customs, Civil Protection, Military)					
	H-SAR	Helicopters (emergency and medical services SAR/HEMS)					
	H-CAT	Commercial rotorcraft (CAT) incl. SPO (Aerial Work)					
	H-GAR	General aviation rotorcraft (GAR)					
	L	Light aircraft (i.e. non-pressurised general aviation).					

Current challenges



1. UAS operators often **lack access** to crucial **information**
2. **Coordinating** with (local) airspace stakeholders requires significant **resources**
3. **Hazard identification** and **mitigation** is not universally applicable

Solution: large-scale e-conspicuity



1. UAS operators often **lack access** to crucial **information**

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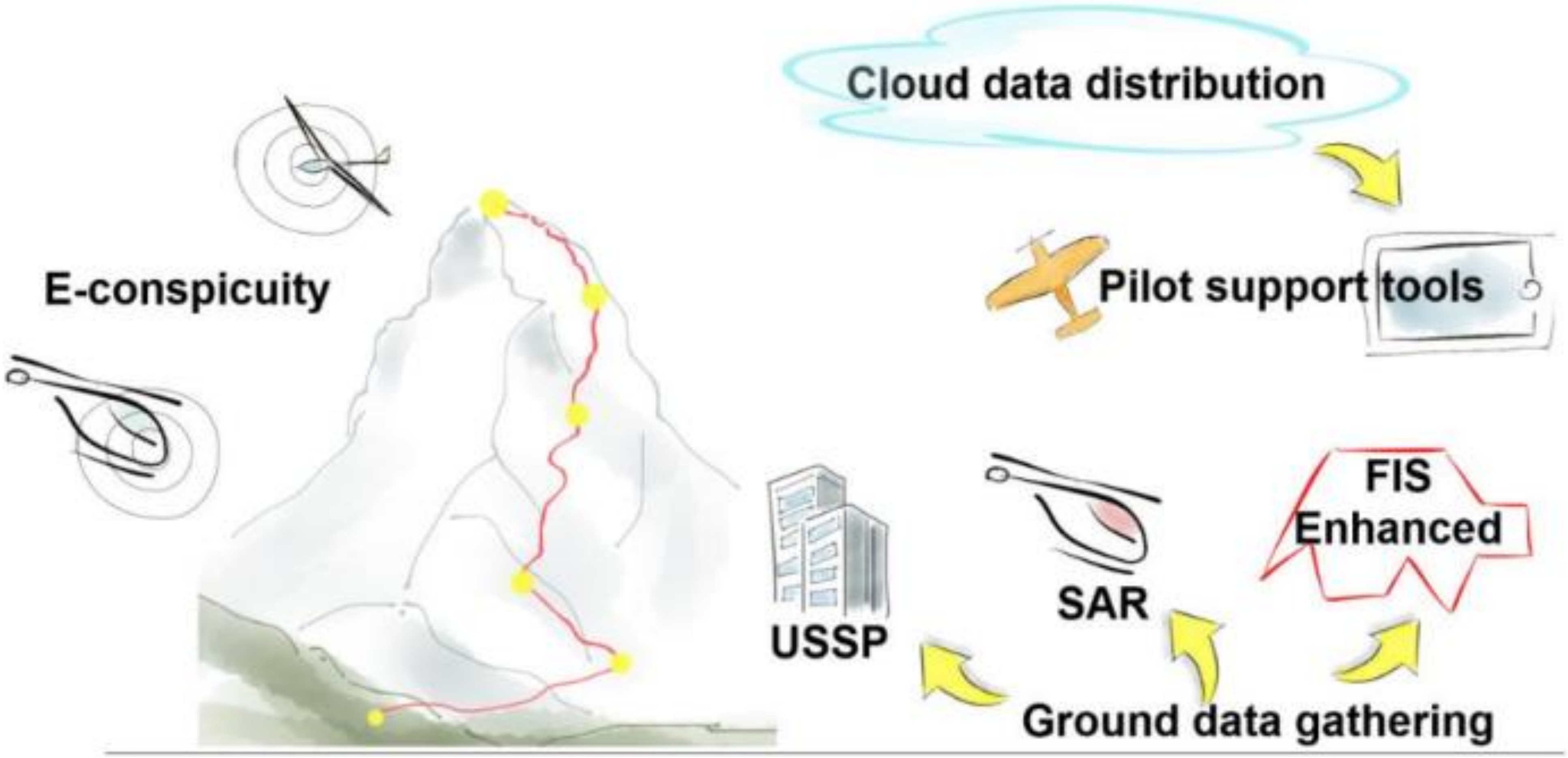
Goal: full e-conspicuity by 2030



In a nutshell

- Growing **recognition** of for enhanced visibility in lower airspace.
- Stakeholder survey (Q3 2024): The Swiss aviation community are early adopters of e-conspicuity devices, **fragmentation and technical differences** among systems remain.
- Switzerland's topography **limits the current CNS infrastructure**, leaving parts without full coverage.
- Switzerland has a strong **industry** developing e-conspicuity solutions and supporting services.
- **Cost-efficiency** is possible by creating a **framework** for the use of **low-cost, non-certified** technologies.
- Challenge: **Building trust** in these technologies.
- Solution: Fostering **test** and **demonstrations** to achieve proof of concept.
- European-wide **collaboration** and **coordination**.