

*i*Conspicuity in U-space ... and beyond

Joint CNS Stakeholder Platform

4 May 2022

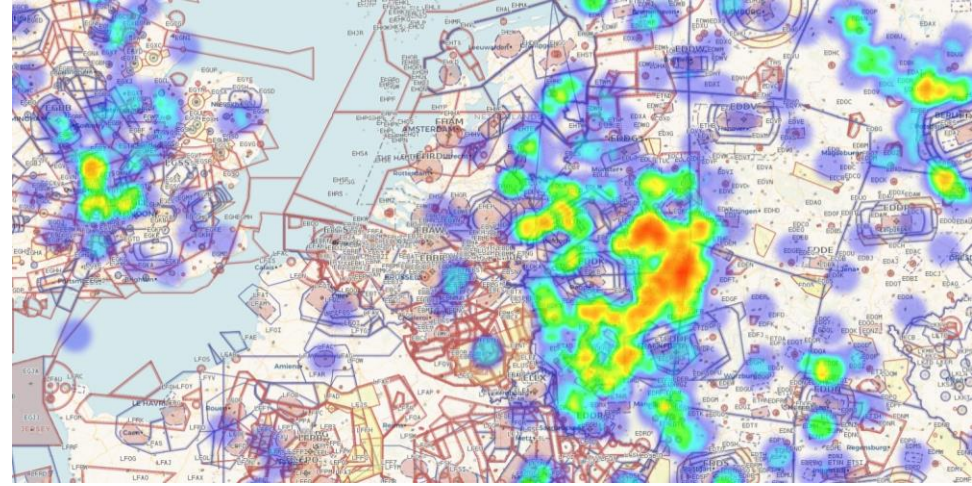
Vladimír Foltín

Project Certification Manager / ATM Expert



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*

Step 1

Propose a solution for U-space airspace

AMC/GM 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 and Rotorcraft conspicuity issue generally, including the possibility to use the information broadcasted for Flight Information Service**

Constraints & Boundaries

Development of AMC/GM to SERA.6005(c) by Q4 2021

Aircraft (manned)

- **Affordability** (to end users)
- Technology **available now** (aviation & other)
- **Single device policy**
- Simple installations
- Enable airborne collision risk mitigation for manned aircraft

USSP

- Minimum necessary position information (incl. from 3rd parties)
- **Affordable infrastructure** (ideally compatible with UAS needs)
- Minimum performance meeting U-space objectives

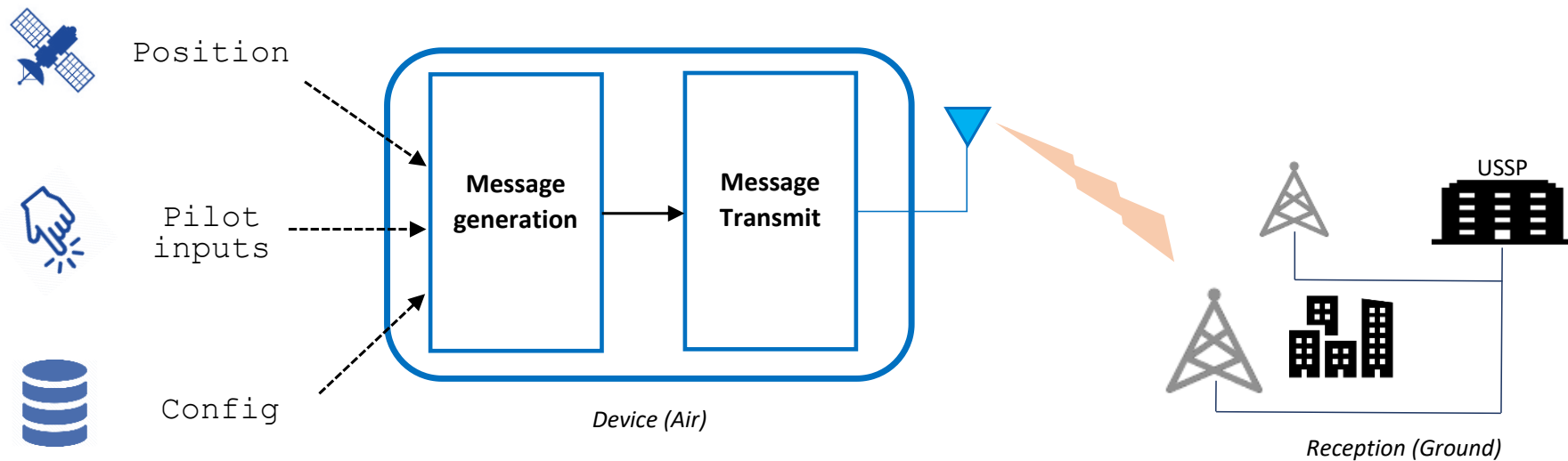
Resources

- Existing international standards (aviation & other)
- **Pan-European applicability**
- ITU regulated spectrum
- **Machine readable**
- Open standards (non-proprietary or free of royalties)

Introducing ADS-L

- **Minimum standard** for making manned aircraft in U-space conspicuous to USSPs
- **Principle: “-L” is for “Light”**
 - Compatible with **low-cost devices** and **mobile telephones**
 - **GNSS-based** parameters
 - Derived from **ADS-B** and **simplified**
- Should support possible **future applications** (traffic awareness)

ADS-L Concept



Means of Transmission

ADS-B Out (1090 MHz)



For certified aircraft, using the **existing certified technology** already installed on board

ADS-L (SRD-860)



Non-certified devices transmitting at low power on the licence-free band SRD-860, in compliance with ADS-L specifications

ADS-L (Mobile telephony)



Mobile telephony application transmitting in compliance with ADS-L specifications



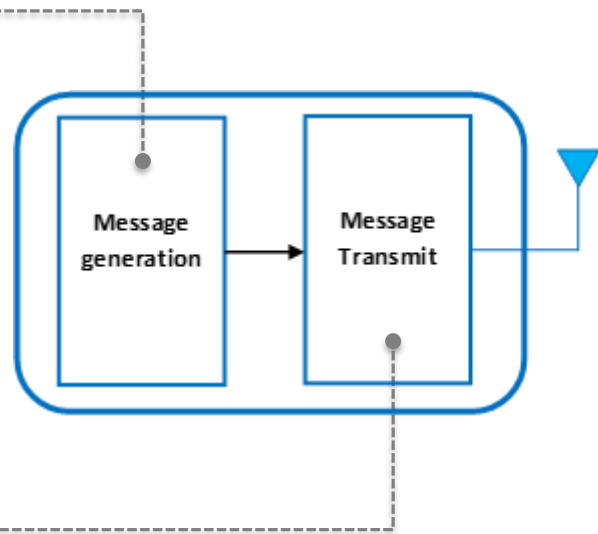
ADS-L – Standardisation

→ Appendix 1 to AMC1 SERA.6005(c) ✓

- Specification of the message generation function
 - List of parameters
 - Characteristics

→ EASA Technical Specification for SRD-860 → SOON

- Easy implementation in existing devices
- Current open standards as a starting point
- Content
 - Specification of transmission function
 - Example of transmitter code
 - Example of receiver code



Why Mobile Telephony?

- Mobile telephony offers many benefits for iConspicuity:
 - Affordable
 - Widely available
 - No specific infrastructure required
 - Few, if any, installation requirements
- ... but raises some questions, too:
 - Coverage?
 - Integrity & Latency?
 - Safety of Life?
 - Legal?

Mobile Telephony Feasibility Study

Yes, BUT...

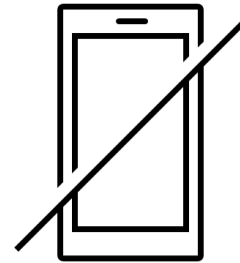
Can existing mobile telephony technology make aircraft electronically conspicuous to USSPs today?



Legal certainty
for aerial use



Standardization
(frequencies, services, roaming ...)



Smartphones /
Dedicated devices

Mobile Telephony

→ Conclusion:

- The use of mobile telephony is technically feasible, but roaming agreements and country-specific restrictions on the aerial use of the spectrum allocated to mobile telephony (in some Member States) impede the introduction of this technology for *iConspicuity* in all EASA Member States
- The AMC to SERA 6005(c) includes provisions to allow the use of mobile telephony when these constraints have been cleared

→ Next steps:

- Discuss removing legal constraints with the Commission (DG-CNECT & DG-MOVE) and with Electronic Communications Committee (ECC) or the Conference of European Postal and Telecommunications administrations (CEPT)

Installed Equipment

Certified ADS-B out

- ✓ CS-ACNS
- ✓ CS-STAN
- ✓ AMC 20-24

SRD 860 Band & Mobile Telephony

- ✓ EASA design approval (typically minor change)
- ✓ EASA CS-STAN Issue 4 (new CS-SC057a)
- ✓ National design approval



Non Installed Equipment

Should **comply with** applicable **air operations requirements**

(e.g. CAT.GEN.MPA.140, NCC.GEN.130, NCO.GEN.125, SPO.GEN.130 or equivalent national AIR OPS requirements)



Signal Obscuration

Equipment should be set up on board the aircraft **to limit its obscuration** by the airframe, human body, or other structures and at the same time **maximize ground visibility of the transmitting antennas**.



USSPs

Article 18(h) of Regulation (EU) 2021/664 to **inform** about **any known irregularities** in continuous transmissions



Manned Aircraft

Regulation (EU) No 376/2014 for **reporting** of **any known irregularities** in continuous transmissions



Authorities

In case of an **urgent safety problem**, determine a corrective action, **including directives or recommendations**, to safeguard safety

Summary

Certified ADS-B out

- ✓ ICAO standard
- ✓ Already installed
- ✓ All elements in place

SRD 860 Band

- ✓ Utilises past investments
- ✓ Affordable infrastructure
- soon Standardization

Mobile Telephony

- ✓ Existing infrastructure
- ✓ Affordable to new users
- soon Needs further actions

