

iConspicuity & ADS-L

EASA – CASIA meeting

9 May 2023

Vladimir Foltin

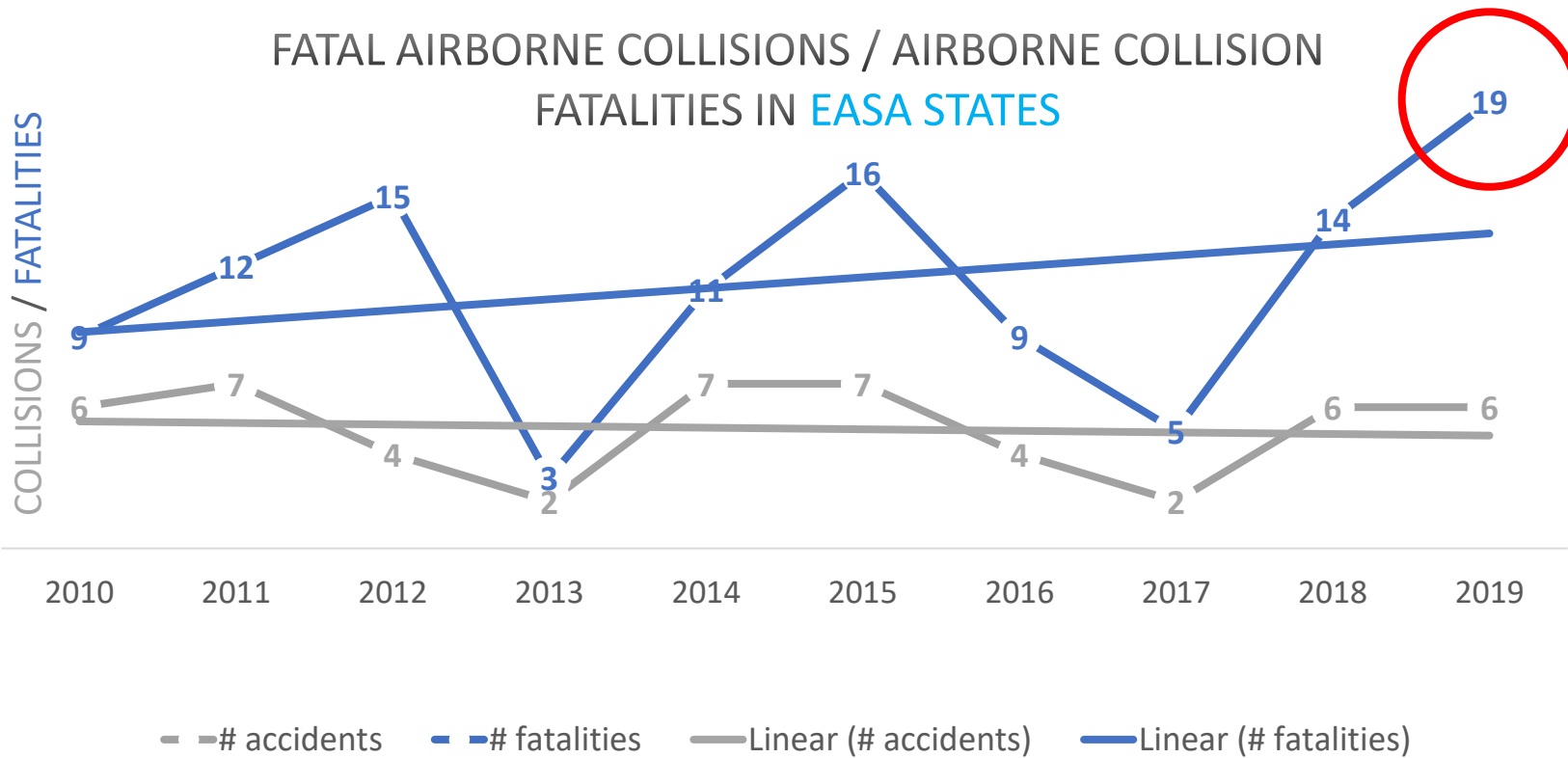
Project Certification Manager – General Aviation (GA)

GA Flightpath 2030+ Project Manager

ATM Expert



Safety data 2009 - 2019



60 FATAL COLLISIONS
~
6 PER YEAR

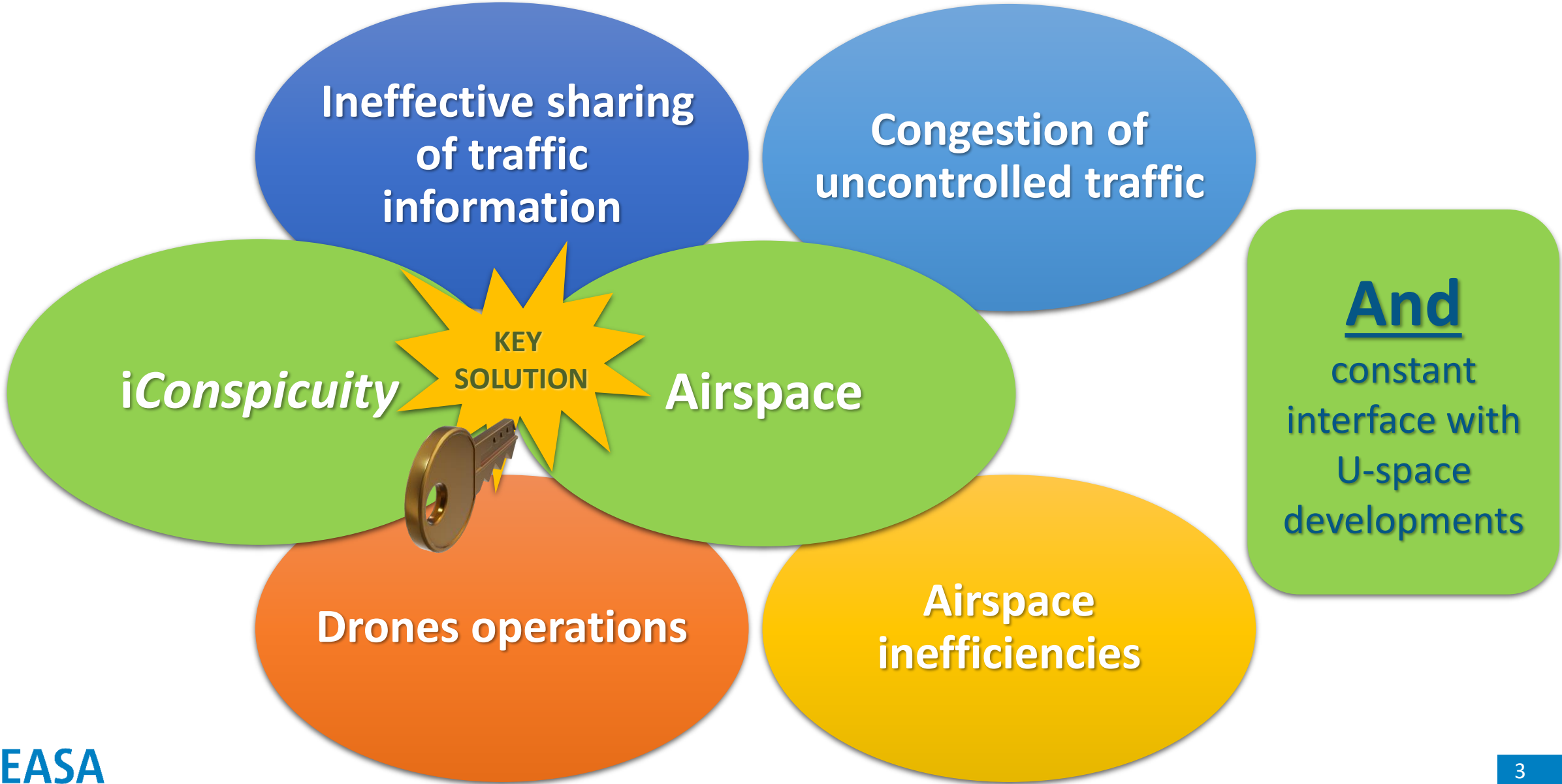
137 FATALITIES
~
13 PER YEAR

ALL UNCONTROLLED TRAFFIC

ALL SMALL AIRCRAFT*

*MANY ROTORCRAFT

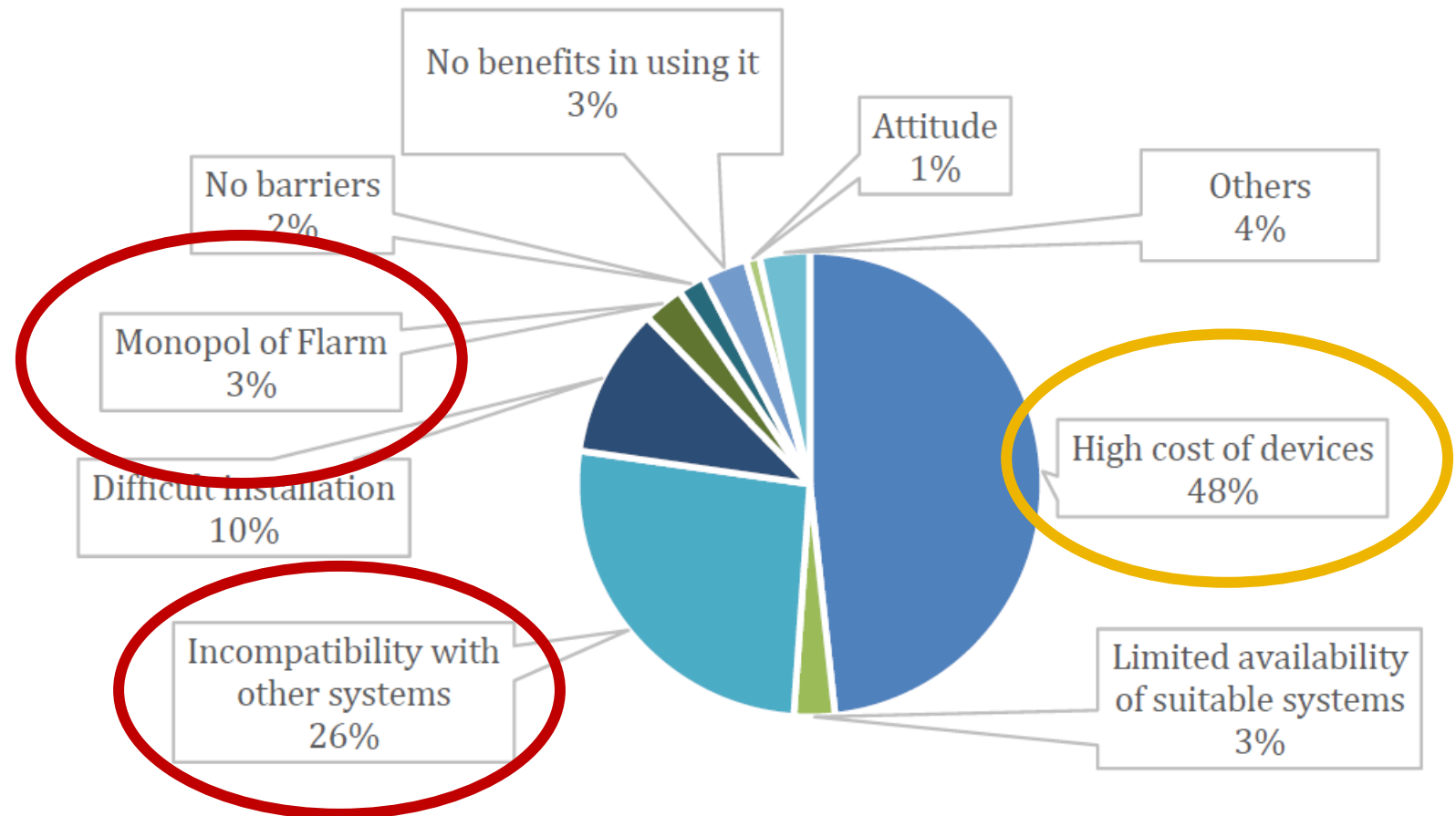
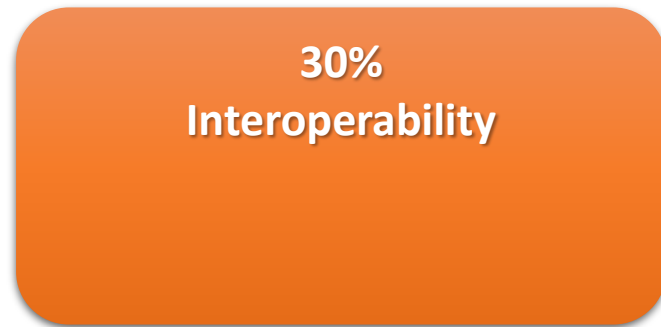
Problems and Solution Areas



Validation through EASA Pilots' Survey

→ iConspicuity

What are the main barriers in bigger uptake of traffic awareness/Anti-collision system for GA pilots?

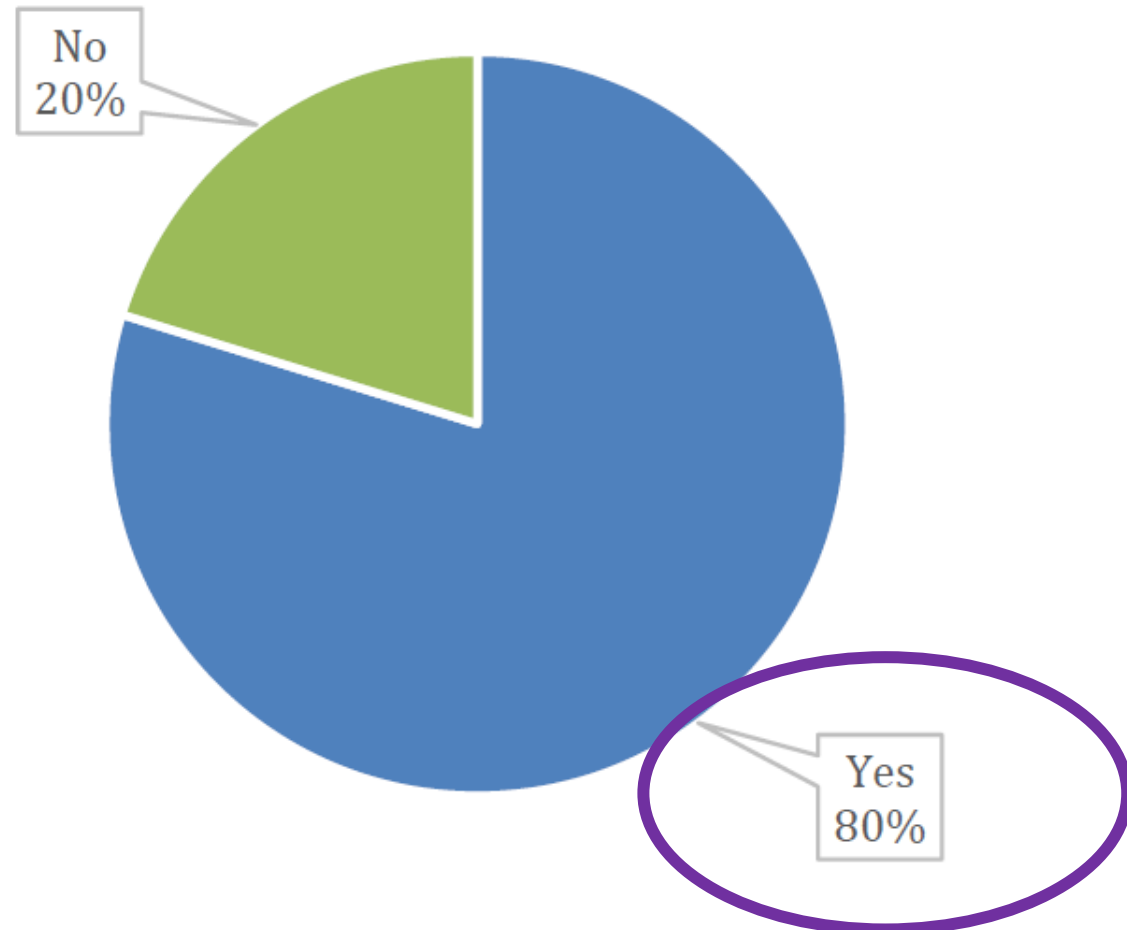


Validation through EASA Pilots' Survey

→ Airspace

Do you consider that airspace complexity increased during last 10 years?

80%
Increased Complexity



New EPAS Actions – *iConspicuity* & Airspace

| Type | Title | 2020 | 2021 | 2022 | 2023 | 2024 |
|----------|-------------------------------------|--------------|-------------|-------------|-------------|-------------|
| RES 0031 | Solutions for Interoperability | | Light Green | Dark Green | | |
| RES 0032 | Support Flight Information Service | | | Light Green | Dark Green | |
| SPT 0119 | Promote Compatibility Installations | Light Orange | Dark Orange | Dark Orange | Dark Orange | Dark Orange |
| RMT * | Use | Dark Purple | Dark Purple | Dark Purple | Dark Purple | Dark Purple |
| SPT 0120 | Promote Innovative Airspace Design | Light Orange | Dark Orange | Dark Orange | Dark Orange | |
| MST 0038 | Improve Airspace Design | | Light Blue | Dark Blue | Dark Blue | Light Blue |

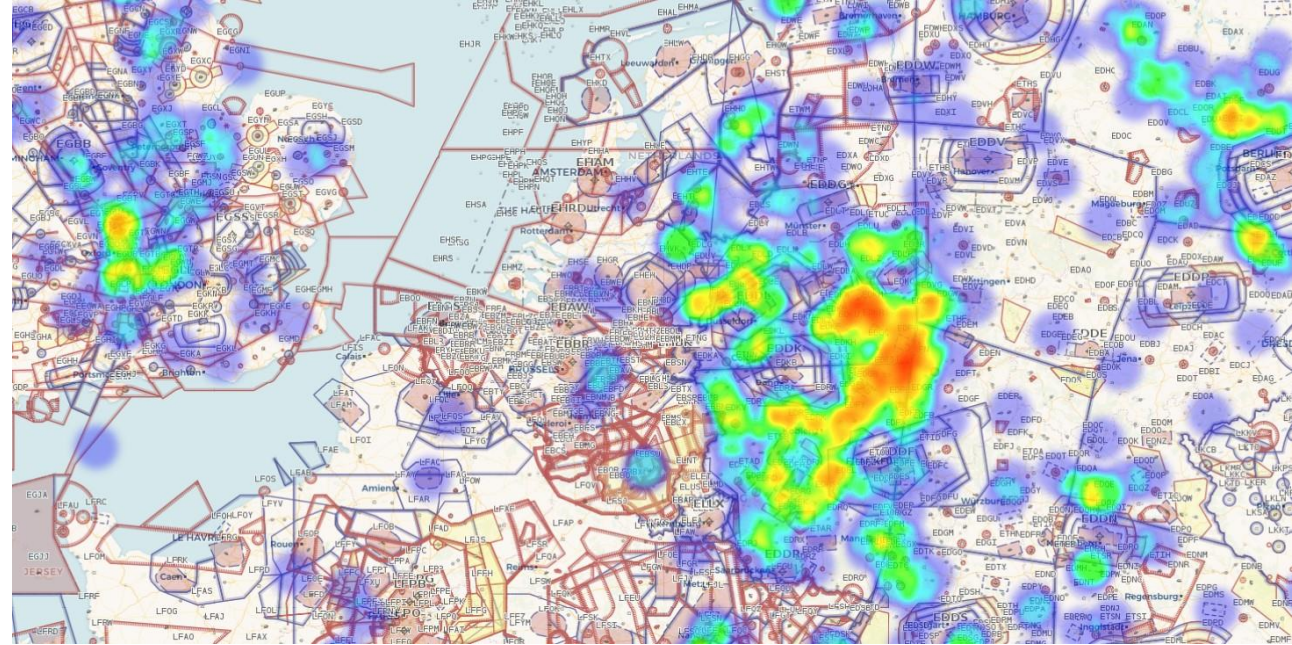
iConspicuity

Airspace

*RMT.0690 (CS-STAN), RMT.0230 (U-space), RMT.0519 (CS-ACNS)

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, weather or support to navigation in a real time with the objective *to enhance pilots' situational awareness*

High Level Roadmap

iConspicuity for Rotorcraft and General Aviation



Step 1

Propose an E-Conspicuity 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 e-Conspicuity for 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)

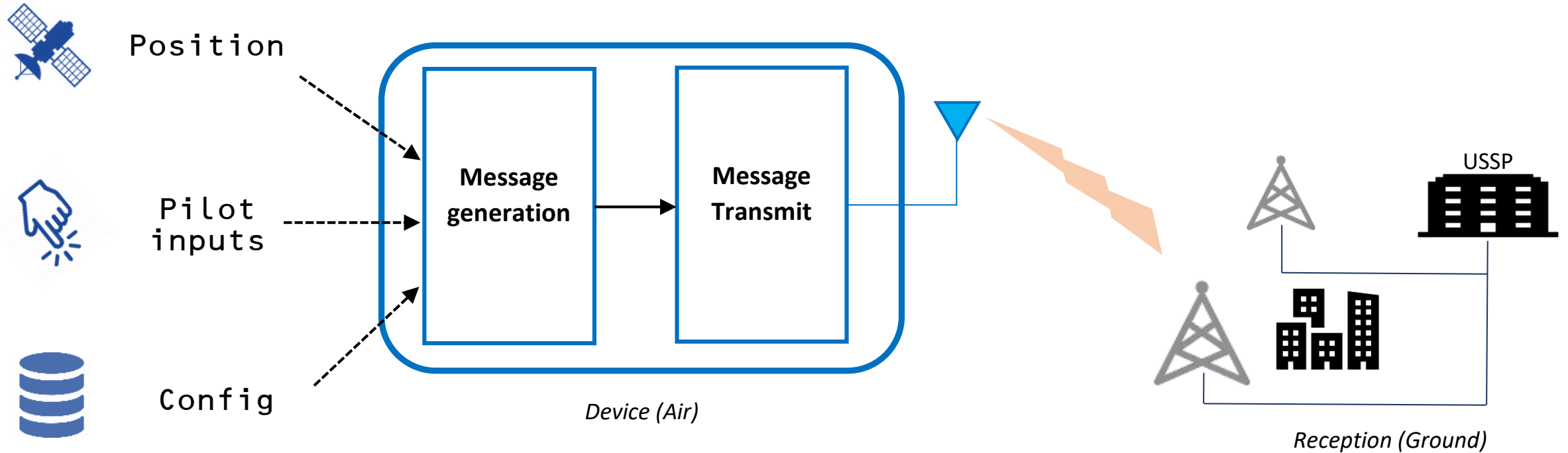
Contributors



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

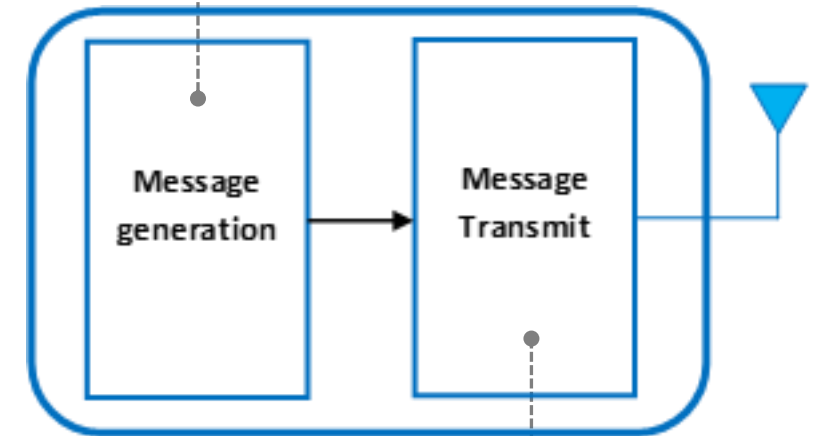
→ Appendix 1 to AMC1 SERA.6005(c)

→ Specification of the message generation function

- List of parameters
- Characteristics

→ ADS-L 4 SRD-860 specification

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



Mobile Telephony Feasibility Study

Can existing
aircraft

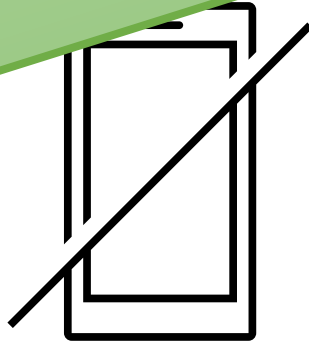
Aerial Mobile Telephony is legal in Europe !

on harmonised technical conditions for the usage of aerial UE for communications based on LTE and 5G NR in the bands 703-733 MHz, 832-862 MHz, 880-915 MHz, 1710-1785 MHz, 1920-1980 MHz, 2500-2570 MHz and 2570-2620 MHz harmonised for MFCN
CEPT/ECC Decision (22)07 of 18 November 2022

...
for aerial use

Standardization
(frequencies, services, roaming ...)

**Smartphones /
Dedicated devices**



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.**

Military And State Aircraft Operations

SERA.6005(c) does not apply => Right not to be conspicuous to the USSPs

National level coordination to assess the risk of non-conspicuous aircraft and specify communication means

U-space airspace designation with regard such operations and the ability or otherwise to be conspicuous





USSPs and

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 – Step 1

Certified ADS-B out

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

SRD860

- ✓ Utilises past investments
- ✓ Affordable infrastructure
- ✓ **ADS-L 4 SRD-860**



Mobile Telephony

- ✓ Existing infrastructure
- ⊘ **Need for implementation**
- 👉 **ADS-L 4 Mobile***

*expected in 2023



High Level Roadmap

iConspicuity for Rotorcraft and General Aviation

Step 1

Propose a solution for U-space airspace

*CFR 605(c):
Manned aircraft operating in airspace designated by the competent authority as a **U-space airspace** shall be provided with an air traffic control service by the provider. Such aircraft 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**

EASA Research – *iConspicuity interoperability*

Objectives

- **Review** the existing deployments, solutions, standards
- **Identify and analyze** the set of requirements enabling interoperability (incl. ATM and U-space)
- **Develop** a series of case studies, **identify** the suitable deployment scenarios and the coordination actions
- **Assess** the additional benefits for airspace users
(SAR, Big Data, Accidents investigation ...)

Comprehensive roadmap for the development of technical standards addressing the interoperability

Survey on the use of
electronic collision
warning and
conspicuity systems



**2000+
pilots
joined
already !**

EASA Research – *iConspicuity* interoperability Timeline



Questions?