EASA
European Union Aviation Safety Agency

iConspicuity - Interoperability of Electronic Conspicuity Systems for General Aviation

Contractor

Horvath

Consortium Members

DRONIQ

Contract period

04/10/2022 - 30/06/2024

Budget

430 000€

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Main objectives:

EASA's Annual Safety Review and the European Plan for Aviation Safety (EPAS) identified collisions involving small aircraft as one of the main safety concerns.

Analysis of these accidents revealed that the main concern was the pilots' lack of situational awareness of the surrounding traffic. Many of these collisions could have been avoided if the aircraft involved had been equipped with interoperable traffic situational awareness systems.

Many systems exist to improve pilots' situational awareness, and tens of thousands of these devices are currently in use. However, they are not always interoperable. In addition, the high-end systems require formal airworthiness certification are not affordable for all users. The lack of interoperability and affordability are the main barriers to wider adoption of this technology by pilots.

In the U-space airspace, all manned aircraft that are not subject to air traffic control shall be electronically conspicuous to the U-space service providers at all times (e-conspicuity). This provided an opportunity to try to improve the interoperability and affordability of the systems that are currently used by pilots to improve their situational awareness.

The main goals of this project are:

- Assess GA initiatives for digital traffic awareness in European uncontrolled airspace / uncontrolled traffic.
- Examine standards ensuring interoperability, including Communication, Navigation, and Surveillance (CNS/ATM) systems.
- Analyze requirements for interoperability in main technologies for pilot traffic data.
- Explore data formats, transfer protocols, and wireless communication options.
- Assess interoperability levels, challenges, and constraints.
- Conduct case studies to evaluate interoperability feasibility, constraints, and costs.
- Identify deployment scenarios and coordination actions for electronic conspicuity.

Impacts & benefits

The project's primary result is a thorough roadmap, guiding the development of technical standards to enhance the interoperability of electronic conspicuity systems in General Aviation.

This will be a major contribution to the reduction of the risk of collision including with unmanned aircraft.

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Further reading

The EASA safety database reports 61 fatal accidents and 144 fatalities from airborne collisions in EASA Member States from 2009-2019. The stats reveal a stable trend in airborne collisions but a rise in related fatalities. The risk of collisions involving non-commercial small aeroplanes is a key concern in the EASA Annual Safety Review and the European Plan for Aviation Safety (EPAS). Safety recommendations propose mandatory Aircraft Collision Avoidance System (ACAS) for certain aircraft. The foundation for preventing collisions in uncontrolled airspace is 'see and avoid.' Despite the introduction of electronic devices by the General Aviation community to enhance situational awareness, the lack of harmonized technical standards for these electronic conspicuity devices poses a challenge to their widespread use in Europe. The devices' diversity results in a lack of interoperability, hindering electronic visibility between aircraft. Some aerodromes in Europe have locally enabled traffic data exchanges between GA actors and Air Navigation Service Providers (ANSP). Additionally, electronic conspicuity requirements for manned aircraft in U-space operations was enforced in 2023, influencing choices for GA pilots installing such devices. The text underscores the safety implications, regulatory challenges, and technological diversity impacting the deployment and interoperability of electronic conspicuity solutions in European airspace.

Expected outcomes:

- Evaluate GA-initiated digital solutions in Europe for pilots' traffic situational awareness in uncontrolled airspace. Assess existing standards, measures, and interoperability with CNS and ATM systems.
- Analyze requirements for interoperability among technologies, considering data formats, protocols, wireless solutions, and levels, addressing challenges and constraints.
- Create case studies (minimum two) to evaluate the feasibility, constraints, and costs of proposed interoperability requirements, considering existing electronic conspicuity solutions in General Aviation and U-space operations. Identify suitable deployment scenarios and necessary coordination actions among stakeholders.

- Evaluate benefits for airspace users with harmonized data exchanges, focusing on search and rescue, safety investigations, and training.
- Conduct workshops involving GA associations, solution developers, NAAs, ANSPs, and USSPs for feedback on proposed interoperability requirements and deployment scenarios
- Consolidate the approach, action plans, and coordination for realizing interoperability requirements. This includes preparing relevant technical standards, deploying solutions, and monitoring achievements, unresolved issues, and implementation risks.

The project scope spans various solutions for General Aviation, including those adhering to aeronautical standards and radio bands (e.g., ADS-B on 1090MHz). It encompasses diverse approaches, including open-source and proprietary solutions (e.g., data transmissions over ISM bands). Additionally, the project addresses the integration with CNS/ATM systems, such as surveillance services operated by ANSP for traffic data exchange (excluding air traffic control purposes). The interfacing with U-space service providers is also a focal point during the development of interoperability levels and requirements.

This project is part of the portfolio of EASA managed research projects funded under the European Research Programmes. Projects under this portfolio address research needs of civil aviation authorities and are geared to generate mid-term benefits after the successful completion of the project to enhance safety, security and sustainability.