



EUROPEAN AVIATION SAFETY AGENCY  
AGENCE EUROPÉENNE DE LA SÉCURITÉ AÉRIENNE  
EUROPÄISCHE AGENTUR FÜR FLUGSICHERHEIT

# Scoping improvements to 'See and avoid' principle for General Aviation

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# Background

- 'See-and-avoid' (S&A): combination of seeing conflicting air traffic in time, and avoiding the traffic in an appropriate manner (ICAO Annex 2)
- 2 main contributing factors reducing the effectiveness of 'see-and-avoid':
  - 1) Conflicting aircraft not always visible from the cockpit, and
  - 2) Workload in the cockpit and traffic density may cause a failure of the pilot to see visible conflicting aircraft.

# Powerful Human Vision?





- In 2006-2011 there were 82 mid-air collisions in Europe involving GA aircraft, causing 83 fatalities and 16 serious injuries
- Key safety issues: conflicting aircraft not visible, aircraft not in airspace portion that is scanned by pilot, pilot is not scanning airspace, pilot does not use RF to increase situational awareness
- Causal factors: high traffic density (hence during day-light in excellent weather conditions), flight near aerodromes, manoeuvring



# How to deal with the limitations of S&A ?

- Training: "Pilots can be taught how to search for aircraft"
- Education: "A safety leaflet from time to time is enough to keep pilots aware"
- Rules and procedures: "Rules on how to scan airspace should be drafted"
- Equipment: "S&A by the pilot is not enough, the pilot should be aided by systems"



# The needs for augmented traffic situational awareness

- Performance: range, field of regard, scan rate, refresh rate, reliability, interoperability, IMC...
- Size, weight, power, costs, RF frequency
- Execution: integrated, stand-alone, display, sounds...
- What are the requirements: e.g. what can it cost? what performance is needed? must it be integrated in existing systems?
- What are the most important requirements?
- Is overconfidence a hazard when using these systems?



# Objectives EASA-NLR project

1. To survey/analyze options for provision of an augmented traffic situational and collision-risk awareness for VFR Pilots in light of limitations of the 'see-and-avoid' principle
2. To survey on-going initiatives undertaken to deploy/operate augmented enhancement means of pilots' visual observation
3. To identify required actions to foster harmonization considering viewpoints of different stakeholders involved
4. To identify a set recommendations for stakeholder actions considering different GA stakeholder roles/responsibilities



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