

Unmanned Aircraft Systems Sense and Avoid Multi-Sensor Data Fusion Strategies

Purpose

- The research on Unmanned Aircraft Systems (UAS) Sense and Avoid (SAA) Multi-Sensor Data Fusion Strategies will support the FAA and RTCA to determine the minimum operational performance standards (MOPS) for SAA system architecture for UAS, allowing UAS to detect and avoid other aircraft, which may or may not have location transponders

Background

- UAS require SAA systems to comply with Code of Federal Regulations that apply to operating and flight rules, 14 CFR 91, without a pilot on board the aircraft. Multiple sensors will ensure all aircraft are detected and tracked to remain well clear, and safely separated in compliance with 14 CFR 91
- The use of multiple sensors requires strategies to combine or fuse the position information obtained over time from each sensor
- These strategies are required to accurately detect and/or track threats, and provide SAA systems with accurate information

Projected Benefit of Research

- Documented consensus on minimum requirements on SAA system surveillance sensor fusion strategies and performance parameter sensitivities
- SAA system performance certification and approval guidance
- Documented guidance on minimum performance for tracker algorithms to improve the safety and interoperability of SAA systems approved for operations in the National Airspace System

Research Approach

- Conduct simulations to test several sensor fusion strategies
- Develop architecture to include several sensors ranging from Traffic Alert and Collision Avoidance System (TCAS), Automatic Dependent Surveillance-Broadcast (ADS-B) and Radar
- Develop sample tracker to test the sensor performance requirements to ensure it meets the minimum safety standard for SAA performance

Research Partners

- National Aeronautics and Space Administration (NASA)
- ARCON Corporation

Status

- Fast time simulation architecture including five scenarios completed
- Several sensor fusion strategies integrated with specific tracker functions completed
- Radar and ADS-B model integration completed
- Sample tracker developed and released to RTCA partners
- RTCA DAA Phase I MOPS released
- Developing ground-based radar modeling to align with Phase II direction
- Currently working within RTCA Phase II MOPS to align scoping of research efforts
- Expected to be continue supporting RTCA standards development

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