Airspace Risk Mitigation System

The University of North Dakota is actively seeking industry partners to license and commercialize its technology consisting of an airspace risk mitigation system for use in unmanned aircraft flight applications. The technology provides unmanned aircraft operators, air traffic control operators, and ground observers with concise information about the weather and the airspace monitored, as well as an assessment of the risk associated with operating an unmanned aircraft in the current airspace. The system allows an unmanned aircraft operator to perform aircraft deconfliction and severe weather avoidance beyond line-of-sight.

Suggested Uses
- To provide unmanned aircraft operators, air traffic control operators, and ground observers with a concise view of the airspace, the weather and the risk associated with operating an unmanned aircraft in airspace containing manned aircraft, other unmanned aircraft, or storms.
- To allow an unmanned aircraft operator to perform aircraft deconfliction and severe weather avoidance beyond line-of-sight.
- To calculate the risk associated with aircraft operation within a given airspace.
- To broadcast an unmanned aircraft’s position to other ADS-B equipped aircraft without the need to equip the unmanned aircraft with an ADS-B transceiver.

Advantages
- This technology meets the need for a risk mitigation system in the quickly growing unmanned aircraft industry.
- The system is entirely ground-based; thus, it does not require any of its equipment to be carried onboard the unmanned aircraft.
- The system is capable of tracking both cooperative and non-cooperative aircraft, and integrates the use of weather information to assess the risk of operating the unmanned aircraft.
- The system adjusts radar scanning strategies to optimize target tracking needs.

Technology
The system gathers information about cooperative aircraft, non-cooperative aircraft, and severe weather by fusing Ganged Phased Array Radar (GPAR), Automatic Dependent Surveillance-Broadcast (ADS-B), and weather station information. Based on that information, the system takes into account flight dynamics limitations and uses computationally optimized Monte Carlo simulations to assess the risk associated with operating in the current airspace. Based on elevated risks within a region of the monitored airspace and on a potential degradation of radar performance, the system is capable of adjusting the scanning strategies of the ground-based radars to ensure optimum coverage and revisit time of tracked targets.

contact
Tara Kopplin
(701) 777-3267
tara.kopplin@research.und.edu
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und.edu/ipcommercialization