Unmanned Aircraft System Airspace Integration: Intelligent Analyzer

When an Unmanned Aircraft System (UAS) loses the command and control link connecting the aircraft to the Ground Control Station (GCS), it will typically fly a pre-programmed route autonomously. Because air traffic controllers may need to clear traffic along the unmanned aircraft’s route, a mechanism is needed to communicate the intended route in real time to the air traffic controller and pilots of the surrounding aircraft.

The goal of this research is to investigate methods for maintaining situational awareness and communicating the intended route of flight to air traffic controllers and pilots leveraging the existing air traffic management infrastructure. This synthesized voice transmission of the intended route provides the needed situational awareness to air traffic controllers and pilots of surrounding aircraft to allow for safe response to the situation. The Intelligent Analyzer is also capable of receiving and understanding a set of voice inquiries regarding the specific data values of the flight intent and returns a voice message with the requested information.

Safety concerns surrounding the lost link scenario are currently a significant impediment to regular operations of UAS in the non-segregated civil airspace. This research identifies one potential mechanism for maintaining situational awareness of an unmanned aircraft’s intended route of flight during a lost link event.

The MITRE Corporation’s Center for Advanced Aviation System Development (MITRE/CAASD) has developed an onboard Intelligent Analyzer research prototype that monitors the state of the UAS and detects a lost command and control link situation. The Intelligent Analyzer then interprets and converts the UAS flight plan to a standardized position report message and transmits it as a synthesized voice on Very High Frequency (VHF) radio link. This voice transmission occurs on emergency channels 121.5 Megahertz (MHz) or 243.0 MHz, the internationally recognized aircraft emergency frequencies monitored by air traffic control, pilots, and flight service stations.