

This application is for testing the Resolute Eagle for up to 80nm to gather data, test Detect and Avoid (DAA) technology and proceed to get type certification, working with the FAA and NASA, on the SIO program and beyond.

The Resolute Eagle (RE) Unmanned Aircraft System (UAS) assets were acquired by American Aerospace ISR (AAISR) on December 19, 2019 from PAE-ISR. These assets are being converted from a military use UAS system to a civil use system. American Aerospace Technologies Inc. (AATI) was co-investigator with PAE-ISR on the NASA SIO program. Therefore, AATI was able to work with NASA to novate the SIO contract so AATI is now part of the NASA SIO program. This novation occurred at the end of March 2020/.

For NASA SIO program, the RE, 220 pound category 3, fixed wing UAS is being designed to use for linear infrastructure with pipeline inspection as the first use case. As part of the SIO program, the RE is working on an FAA type certification for up to 5,000 ft agl and Beyond Visual Line of Site (BVLOS) with an implemented DAA system. Moving the system towards civil aviation procedures, process and components that either have or are working on FAA TSO and FCC licensing approval.

AATI has implemented a spiral development model to get to a fully functional type certified system which requires extensive flight testing. The final configuration is the aircraft going for D&R type certification.

The communications path to type certification uses initially L, S and C Band and moves to an LTE and C- Band configuration. AATI has been working with Verizon, T-Mobile and Nokia since 2016 to test, analyze and configure LTE to be a reliable link. The LTE system is currently using Band 13 of their approved frequencies.

The Resolute Eagle(RE) is a highly automated UAS that uses the Piccolo II flight control system for flight control and user configurable radios to set the frequencies and set power to the minimum needed for the mission. The RE always has a primary and secondary communications and control (C2) links. Prior to a flight campaign frequency analysis is completed and coordination with the flight range is done to insure that the communications configuration does not interfere with other users on the range or in the surrounding area.

During flight planning and pre-flight a flight plan is entered into the autopilot along with communications timeouts, return to home and lost comms procedures. During a communications failure the auto pilot reverts to the secondary link while continuing on the programmed flight plan while trying to reestablish the primary link. If both links fail, lost link, occurs and the RE performs a comms timeout procedure. The autopilot continues flying the comms timeout procedure. It is important to note that the lost communications procedure identifies a complete flight plan and not a single waypoint. When the timeout elapses autopilot analyzes this plan and makes an intelligent lost comm waypoint choice. It tracks the first waypoint segment on the lost comm plan with a waypoint closer to the termination point of the

flight plan than the current aircraft location (highest numbered waypoint) . This allows the pilot in command to create intelligent lost comm flight plans that avoid no-fly areas.

The Pilot In Command (PIC) can also use the orbit and autoland capabilities in the lost comm flight plan. The PIC will create a flight plan that would avoid no fly areas, return to a safe location, and orbit for an allotted time. This would allow for reestablishment of communications. If communications cannot be established, the aircraft would then perform an autoland at a safe designated area.

Communications Equipment being used and frequency see AATI Equipment Definition and Use and AATI PUR Frequency Request / Definition Table attached.