TASK # (AN009). Ultra Lightweight VORILS Receiver

PROJECT AT-A-GLANCE

- UNIVERSITY: University of Oklahoma
- PRINCIPAL INVESTIGATOR(S): Yan (Rockee) Zhang
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- INDUSTRY PARTNER(S): Garmin International

RELEVANCE TO TECHNICAL TRAINING AND HUMAN PERFORMANCE

- The research will enable a novel type of flight inspection operation, which is based on unmanned aerial system (UAS), which will reduce cost and workload for flight inspection and training process.

STATEMENT OF WORK

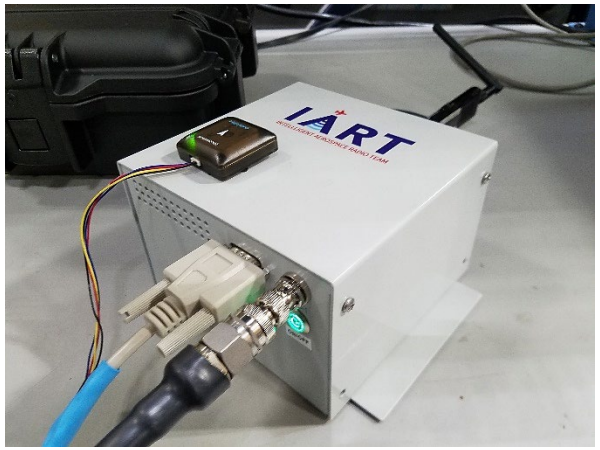
TASK 1: Requirement analysis of navigational aide signal FI instrumentation requirements: Working with the FAA team, we propose to first perform a careful review of ICAO, FAA and industry standards and generate a list of expected measurement goals, verification procedures and realistic ranges of parameters from this task.

TASK 2: SDR receiver hardware design and development: We'll design hardware based on the selected SDR IC and achieve the C-SWaP requirements through a careful engineering design. We will fabricate a prototype receiver hardware in Radar Innovations Lab and include the system components according to the technical approach in the proposals.

TASK 3: SDR receiver software design and development: Develop customized software package for the SDR receiver prototype as discussed in the proposals. Perform basic functional tests of software and hardware to prepare for the payload system integration.

TASK 4: Integration, Tests and Validations: Integrating antenna, battery, SDR and software into one payload package, and ensures the basic airworthiness for UAS-based flights. Perform tests as described in the proposals and deliver the data reports to the FAA team.

Lab Testing of the initial ultra-lightweight receiver prototype



STATUS

- We have fabricated, tested the first receiver prototype through both lab test and initial flight test
- Developed algorithms and initial implementations for generating flight inspection data products.
- Tuning and testing the performance of real-time ILS/VOR processing.

FUTURE WORK

- Test and verification that the receiver product data quality meet the ICAO FI standards and requirements
- Optimization of the SDR configuration and processing for field operation missions.

Publications, Presentations & Awards

- Publications: 1. Yan (Rockee) Zhang, James West, Brad Snelling, Gary Ambrose, “UAS Ultra-Lightweight VOR/ILS Receiver Integration and Flight Test”, IFIS 2020: International Flight Inspection Symposium (accepted abstract).

- Presentations: NA

- Awards: NA