NASA SBIR/STTR Technologies

Multifunction Laser Radar for Kinetic Air Hazard Detection and Air Data Measurement

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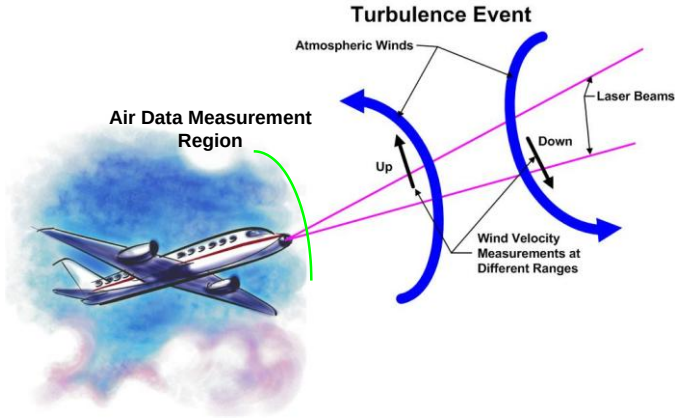
Identification and Significance of Innovation

- A single sensor that has dual use functionality – air data measurement and air hazard detection in a single, lightweight, low cost laser radar (lidar)
- Provide more robust air data measurements to commercial aircraft addressing current vulnerabilities of Pitot-tube (i.e. Air France accident)
- Enhance transportation safety and efficiency
- Increase safety with detection of kinetic air hazards prior to flight encounter
- Increase efficiency with early alert of potential weather delays and air hazard information
- Automatic sensor reports could augment the NASA Aviation Weather Information Network

Estimated TRL: TRL 5 at contract completion



Technical Objectives

- Design, assemble and test a multifunction lidar capable of providing atmospheric measurement of temperature, pressure and velocity.
- Complete Proof-of-Capability testing to demonstrate lidar air data measurement capabilities in a controlled environment.
- Perform Proof-of-Functionality testing of a multifunction lidar from a flight test platform.

Work Plan

- Task 1: Finalize the Phase II prototype multifunction lidar design.
- Task 2: Assemble, laboratory test and calibrate the prototype lidar.
- Task 3: Proof –of-capability lab testing.
- Task 4: Algorithm development for velocity retrievals.
- Task 5: Phase II prototype flight packaging.
- Task 6: TRL 5 multifunction lidar prototype flight demonstration.
- Task 7: Final report and data analysis.

NASA and Non-NASA Applications

NASA Applications:

- Enabling technology for increased aviation safety – more robust air data system and detection of kinetic air hazards
- Ability to integrate lidar sensor onto commercial aircraft – reasonable size, weight and power consumption
- Enabling sensor for airspace transformation to NextGen
- Complement to TPAWS system
- Enhance NASA AWINS system

Non-NASA Applications:

- Validation of multifunction lidar for commercial aircraft use as air hazard detection and as a redundant air data system
- Validation of optical air data system for use by Air Force and regional aircraft manufacturers for new vehicle calibration

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