



Project Number
BED32-977-02

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Counting Airport Operations Using Aircraft Transponder Signals and/or Aircraft Automatic Dependent Surveillance-Broadcast (ADS-B) Data

March 2025

Current Situation

Airports without air traffic control towers often struggle to get precise data on the number of daily and annual operations, which is important for airport planning, funding, and safety measures. Many non-towered airports in Florida currently lack effective and reliable counting methods, leading to the undercounting or overcounting of operations, which can negatively affect decision-making for future infrastructure investments. This project focuses on improving the accuracy of counting aircraft operations at airports without air traffic control towers.



Sensors like this one may capture non-cooperative targets like take-off and landing operations using position and speed measurements.

Research Objectives

The primary goal of this research is to evaluate new technologies for counting aircraft operations at non-towered airports. Specifically, the project aims to explore the effectiveness of Aircraft Automatic Dependent Surveillance-Broadcast (ADS-B) technology combined with other systems such as RADAR and cameras, to improve the accuracy of operation counts. Additionally, the project seeks to update the 2018 Florida Department of Transportation (FDOT) report, Operations Counting at Non-Towered Airports Assessment, on non-towered airport operations, using newer technology and methods that have emerged since then.

Project Activities

The Embry-Riddle research team conducted a thorough review of available aircraft operation counting technologies. They focused on three categories of systems: cooperative systems, which rely on signals from aircraft (such as ADS-B and transponder data), non-cooperative systems (such as RADAR or cameras), and hybrid systems that combine both approaches. After evaluating different systems based on accuracy, installation and maintenance costs, and other criteria, several technologies were selected for field testing at two Florida airports—DeLand Municipal Airport (KDED) and Ormond Beach Municipal Airport (KOMN).

Field tests involved installing ADS-B receivers and RADAR systems at the airports to capture data on takeoffs, landings, and other operations. Human spotters were also used to validate the technology's accuracy. The study analyzed and compared the performance of different systems, focusing on their ability to detect and accurately count aircraft operations.

Project Conclusions and Benefits

The study concluded that ADS-B technology is effective for counting operations at non-towered airports, but it is not entirely reliable on its own, because it may miss non-cooperative aircraft (those not equipped with ADS-B). Systems that combine ADS-B with RADAR or cameras perform better by capturing both cooperative and non-cooperative targets, resulting in more accurate counts. The research provides valuable insights for FDOT and airport authorities, recommending that hybrid systems be implemented for more reliable data collection. This improved accuracy in counting aircraft operations will lead to better airport planning, more accurate funding allocation, and enhanced safety at non-towered airports.

For more information, please see fdot.gov/research.