

<b>UTC Project Information</b>	
Project Title	MPC-639 – Automated Image-Based Aircraft Tracking and Record-Keeping for Utah Airports
University	University of Utah
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Funding Source(s) and Amounts Provided (by each agency or organization)	<p>USDOT, Office of the Assistant Secretary for Research and Technology \$28,000</p> <p>Utah Department of Transportation \$35,001</p>
Total Project Cost	\$63,001
Agency ID or Contract Number	69A3551747108
Start and End Dates	October 30, 2020 to July 31, 2022
Brief Description of Research Project	<p>Except for a small number of airports that are equipped with traffic control towers, airports in the State of Utah are controlled in a traditional fashion. The current method relies on forms filled out by the pilots. In some cases, a rough number of the passed airplanes are counted using radio calls for landing permissions. However, these systems are highly prone to error and are not reliable. Also, there is no documented evidence after counting the airplanes using radio transmission data.</p> <p>This project is an attempt to address the above-mentioned issue by proposing an automated traffic control system in small-sized airports. An image-based traffic control system is one promising solution that is already in use for highway traffic control systems. In this system, we can monitor, count, and recognize airplanes flying from or landing in an airport. This can be achieved by using the video data collected from cameras mounted on strategic points in the airport. Using the collected</p>

	<p>video data and relevant computer vision techniques, we intend to build an air-traffic control system able to count the traffic load and to recognize the aircraft models flying from or landing on the airport's runway. Results of the project will improve safety and automation aspects within small to medium size airports within the state of Utah.</p>
<p>Describe Implementation of Research Outcomes (or why not implemented)</p> <p>Place Any Photos Here</p>	<p>The evaluation of the implemented system has shown that a vision-based system can provide accurate airport operational data. The research outcomes are specifically proved effective when tested at five general aviation airports within the state of Utah. Two camera layouts are tested to record video footage from the airport. Camera layout one records the two ends of the runways, which is beneficial for cases where there is a cost limitation and the counts are essential. Camera layout two uses cameras placed adjacent to the entrance taxiways and have a closer range of view, thereby resulting in higher tail number recognition accuracy.</p>
<p>Impacts/Benefits of Implementation (actual, not anticipated)</p>	<p>The accurate fleet mix information is critical for fair allocation of the national funds throughout the airports across the country. The general aviation airports provide vital services such as aerial firefighting, aeromedical flights, and law enforcement, besides corporate flights. The proposed method can accurately count both departures and arrivals, while the current in-practice system (acoustical counter) only can count departures. The practitioners double the departure counts obtained by the acoustical counter to find the total number of operations. Nonetheless, this research has shown that the correlation between departures and arrivals varies from airport to airport and during different seasons.</p>
<p>Web Links</p> <ul style="list-style-type: none"> <li>• Reports</li> <li>• Project Website</li> </ul>	<ul style="list-style-type: none"> <li>• MPC Research Report – <a href="#">Automated Image-Based Aircraft Tracking and Record-Keeping for Utah Airports</a></li> <li>• Journal Paper – <a href="#">Automated Video-Based Air Traffic Surveillance System for Counting General Aviation Aircraft Operations at Non-Towered Airports</a></li> <li>• Journal Paper – <a href="#">General Aviation Aircraft Identification at Non-Towered Airports Using a Two-Step Computer Vision-Based Approach</a></li> <li>• Conference Paper – <a href="#">Implementing Haar Cascade Classifiers for Automated Rapid Detection of Light Aircraft at Local Airports</a></li> </ul>