



Catching “Counter-Flow” Intruders in Airports with Video Anomaly Sensing Technology

An advanced video analytics technology may soon enable airports across the nation to avoid costly shutdowns and delays by detecting gate skippers before they enter secure areas. A testbed for this technology installed at Cleveland Hopkins International Airport (CLE) is detecting potential violations at a rate of 99 percent with an average of only five false alarms per week. The system enables airport security to use video analysis to detect “counter-flow” (e.g., someone moving against the flow of foot traffic to skip screening lanes to reach boarding gates through the exit lanes).

Working with airport officials, researchers from the Department of Homeland Security (DHS) Science and Technology (S&T) Center of Excellence for Awareness and Localization of Explosives-Related Threats (ALERT) installed the testbed to provide real-time warning of counter-flow in controlled access areas of the airport.

Automating the Identification and Tracking of Individuals Who Pose Threats to Airport Security

Security officials must spot individuals who are wrongly attempting to enter secure areas amid a crush of passengers. Situations like this can result in an airport lockdown, potentially costing millions of dollars in shutdown-related response efforts and flight disruptions.



ALERT’s “tag-and-track” software is used by the VAST team to track an individual travelling through multiple surveillance cameras.

The **Video Analytic Surveillance Transition (VAST)** project uses advanced video analytics to solve key technical challenges in detecting and tracking potential risks in vulnerable venues. This project is focusing on identifying counter-flow within a defined area (in-the-exit)

and tagging and tracking a person-of-interest moving through a defined space across multiple cameras (tag-and-track). The system must identify an individual within a single camera’s view as well as reidentify that same individual in each sequential camera’s view.

Providing the Tools to Solve Customer Problems

The VAST effort is addressing the needs of the Transportation Security Administration (TSA) to monitor and intercept threats by individuals to airport security. CLE is collaborating with ALERT researchers, Siemens Corporate Research and TSA practitioners to develop and deploy “in-the-exit” and “tag-and-track” solutions.



Real-time application of the VAST “in-the-exit” testbed currently deployed and used by TSA at CLE.

Potential Security and Safety Applications

- Airport and Rail Platform Surveillance
- Secure Area Monitoring
- Detection of Abandoned or Suspicious Packages
- Tracking or Locating a Person-of-Interest or a Missing Person

Next Steps

ALERT’s partnership with Siemens has enabled the VAST team to deliver a real-time, commercial-grade “in-the-exit” system to airport Transportation Security Officers. ALERT is currently partnering with the Greater Cleveland Rapid Transit Authority, Massport and Boston’s Logan International Airport to both leverage data sets for further refining of the VAST system and to develop software-based security solutions.