

DHS Science and Technology Directorate

Imaging System for Immersive Surveillance

Seeing the big picture from all angles

A perfect security camera system would be able to see everything all the time, identify anomalous activity of interest within the camera's field of view and automatically and immediately alert users. Public safety officials told the Department of Homeland Security Science and Technology (S&T) Directorate of their need for such a system, resulting in the launch of the Wide Area Surveillance project and developed the Imaging System for Immersive Surveillance.



The Imaging System for Immersive Surveillance 360° field of view camera head

Zooming in on the details

Imaging System for Immersive Surveillance captures high resolution imagery of an entire scene with a complex system of cameras. While most cameras must balance the trade-offs between high resolution over a small field of view versus a wide field of view with low resolution. Imaging System for Immersive Surveillance combines the best of both worlds. It integrates individual views from multiple high definition cameras and then "stitches" them together to create a single image. Coupled with detection and video processing algorithms, Imaging System for Immersive Surveillance provides the wide-area surveillance technology agencies need.

Creating the next generation of surveillance

S&T and the Massachusetts Port Authority (Massport) installed a prototype of Imaging System for Immersive Surveillance at Boston's Logan International Airport for a successful demonstration of its capabilities. A mobile Imaging System for Immersive Surveillance unit has also been deployed by the Boston Police Department. Key attributes of Imaging System for Immersive Surveillance include:

- Continuous capture of 360° field-of-view while simultaneously allowing multiple operators to scan and zoom different regions of the scene digital analytics optimized for high resolution video, including the ability to track individuals and objects forward and backward in

time

- Digital pan, tilt and zoom to provide greater detail in a selected scene; this creates high resolution images with no moving parts
- Designation of exclusion areas and automated alerts for unauthorized activity in selected areas
- Forensic video memory and playback capabilities, including options to quickly review critical events
- Scalable storage solutions that allow storage and retrieval of full resolution video for up to 30 days
- Smart image compression solution that enables efficient bandwidth usage

Imaging System for Immersive Surveillance offers greater levels of surveillance

A typical security observation room is filled with multiple operators struggling to scan the whole scene on a dozen or more live video feeds. Imaging System for Immersive Surveillance addresses this problem by enabling improved video surveillance of a larger area using fewer security watchstanders.



An example of the 360° full field of view Imaging System for Immersive Surveillance provides (L); Boston Police Department control room during a demonstration (R). (Photos courtesy of MIT/LL)

Partnerships brought Imaging System for Immersive Surveillance to fruition

S&T is developing Imaging System for Immersive Surveillance in partnership with the Massachusetts Institute of Technology Lincoln Laboratory and the Pacific Northwest National Laboratory, with input from prospective users with roles in law enforcement and critical infrastructure protection. Key stakeholders include Massport, the Boston Police Department, and the Transportation Security Administration. S&T is working with a potential commercialization partner to transfer the technology and select demonstration sites for short-term installations to help publicize Imaging System for Immersive Surveillance.



Homeland Security

Science and Technology

To learn more about the Imaging System for Immersive Surveillance project, contact sandt.rsd@hq.dhs.gov.