# 2D-3D Registration of Optical and Ladar Imagery for Real-Time Tracking

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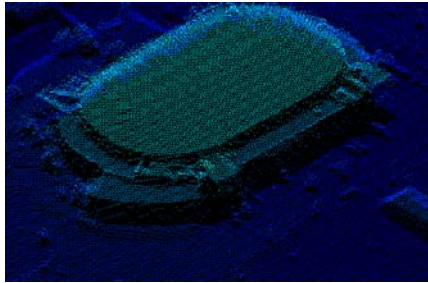**mastin@csail.mit.edu   kepner@ll.mit.edu   fisher@csail.mit.edu**

**High Performance Embedded Computing (HPEC) Workshop**
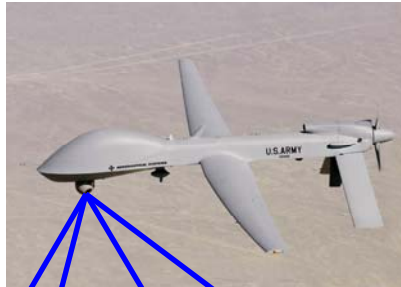
**23-25 September 2008**
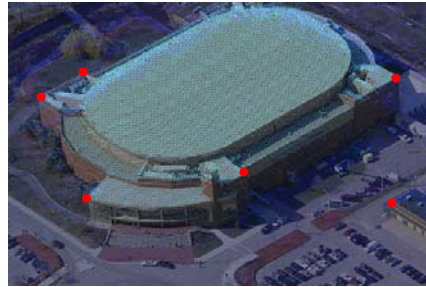
**MIT Lincoln Laboratory**

# Overview



**UAV with on-board 3D ladar imagery**



**Video reconnaissance**

**Initial ladar-optical registration with feature detection and statistical registration**
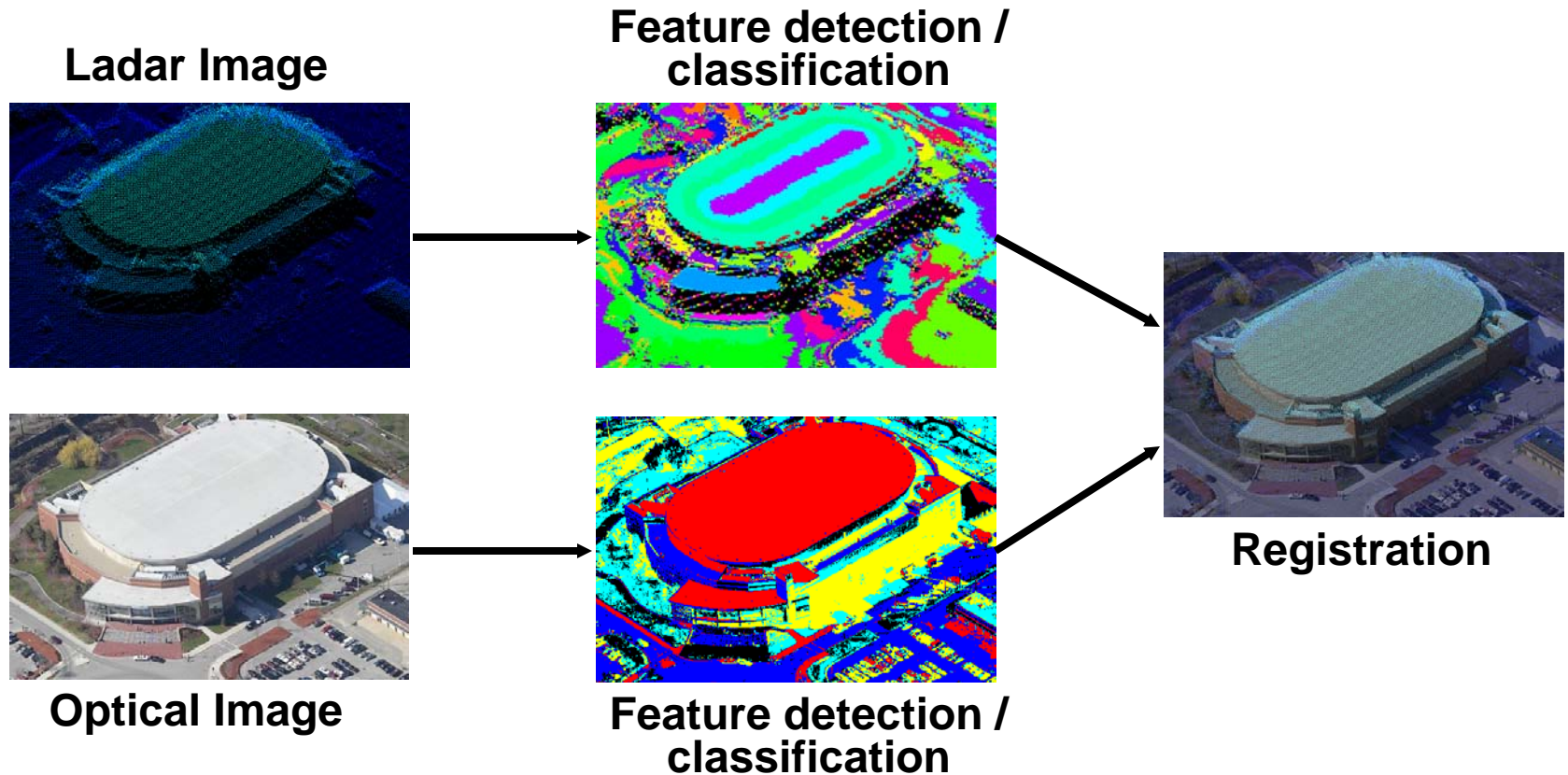
**Registration updated by tracking feature points in video**

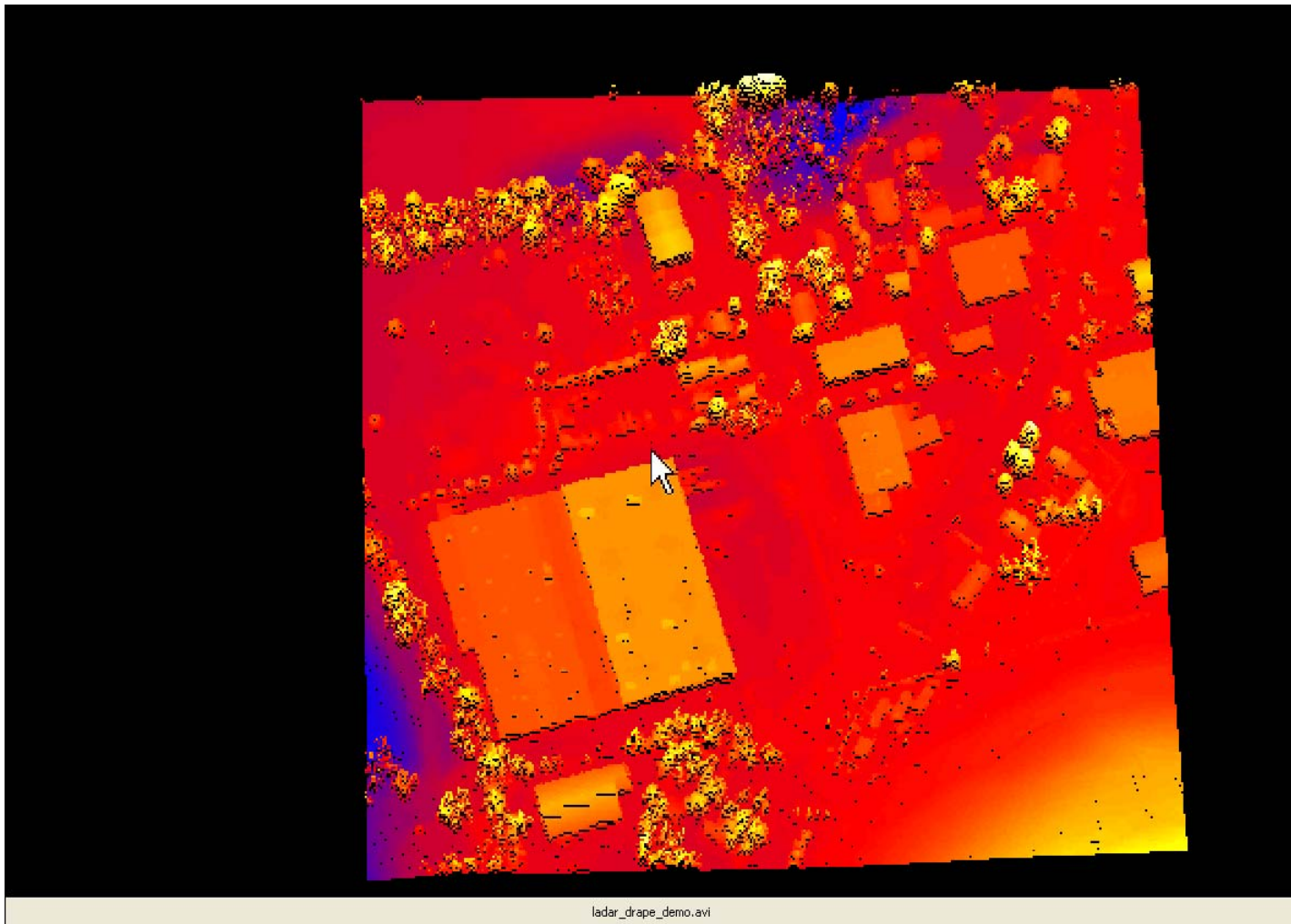**Real-time tracking with occlusion reasoning from ladar imagery**

# Statistical Registration Methods

- **Commonly used for registration of multi-modal medical imagery**
- **Information theoretic similarity measure with optimization**
- **Machine learning approach**

**Ladar Image**

**Feature detection / classification**

**Optical Image**

**Feature detection / classification**

**Registration**

# Fusion of Optical and Ladar Imagery



ladar_drape_demo.avi

**ladar_drape_demo.avi**