

CASE STUDY _

Evidence-Based Drone Testing to Strengthen Public Safety and Counter Threats

MISSION OPERATIONS & LOGISTICS

Key Highlights

- A DHS S&T federal laboratory needed reliable, evidence-based assessments of UAS and counter-UAS technologies to support DHS and first responder missions.
- LMI partnered with the lab to design test methodologies, conduct field evaluations, automate data analysis, and deliver results that reflect the operational environments faced by first responders and homeland security operators.
- Our testing and data-driven reporting provided federal, state, and local agencies with actionable data to inform technology investment and deployment decisions, enhancing public safety and national resilience.

Advancing drone technologies for public safety missions

The U.S. Department of Homeland Security (DHS) Science and Technology Directorate (S&T) advances research, development, testing, and evaluation of technologies that help agencies protect the public and respond to evolving threats. One of DHS S&T's federal laboratories, the National Urban Security Technology Laboratory (NUSTL), plays a critical role in ensuring those technologies work as intended in the hands of first responders and homeland security operators.

Unmanned aircraft systems (UAS) have become vital tools for public safety use cases, including search and rescue, disaster response, and situational awareness. However, their increasing prevalence has also led to a rise in nefarious drone activity, underscoring the need for

NUSTL to test and evaluate emerging technologies to ensure their effectiveness and reliability in support of homeland security missions.

NUSTL faced growing demands from DHS and first responder agencies for credible, real-world testing of both UAS and counter-UAS (C-UAS) technologies. These evaluations required:

- Standardized, repeatable test methodologies to ensure performance results were objective and comparable across systems.
- Efficient data collection and analysis processes to handle massive volumes of flight and sensor data from live testing.
- Actionable reporting that could translate complex performance metrics into insights decision-makers could trust.

To meet this mission-critical need, NUSTL partnered with LMI to evaluate UAS and C-UAS technologies, establishing rigorous, data-driven methods that turn technical findings into meaningful operational value.

Data-driven insights for mission-critical technology procurements

To meet NUSTL's need for standardized, scalable, and operationally relevant test results, LMI helped transform how UAS and counter-UAS technologies are evaluated.

Operational Testing and Evaluation

Over the past five years, LMI has contributed to more than 25 UAS and C-UAS test events, supporting the end-to-end process to assess the



Validating technology, informing investments

This partnership empowered DHS S&T and NUSTL to transform how drone technologies are tested, validated, and deployed, accelerating innovation that directly strengthens public safety and homeland security operations.

Results:

- Executed 25+ large-scale test events, evaluating the performance of 100+ UAS and C-UAS systems across diverse environments and operational scenarios.
- Accelerated decision-making by automating analysis and standardizing test methodologies, reducing reporting timelines and ensuring consistent, data-driven results.
- Delivered comparable system performance data and market research that guide procurement and deployment decisions for federal, state, and local agencies.
- Enhanced operational readiness by identifying reliable UAS for life-saving missions and validating C-UAS solutions that protect communities from malicious drone activity.
- Completed line-of-sight analysis on 10+ sensor sites for more effective C-UAS placement to protect critical infrastructure.

performance of 100+ systems in environments ranging from open rural test sites to New York City's dense urban landscape. Recent assessments compared UAS from the DoD's Blue Cleared List, deemed cybersecure and NDAA-compliant, against other widely used systems to determine if they meet the real-world demands of first responders.

Data-Driven Analysis

To manage the massive volume of data generated during testing, LMI enhanced NUSTL's Test, Evaluation, and Analysis (TEA) Tool, a Python-based application that automates the ingestion, synchronization, and analysis of UAS and C-UAS performance data. LMI's enhancements introduced faster processing speeds, expanded key performance metrics, optimized data formats, and improved data visualization capabilities.

By converting raw GPS and sensor data, flight logs, and environmental readings into standardized performance metrics—such as tracking accuracy, detection probability, and the sensor's detection range—LMI streamlined reporting and greatly reduced manual analysis time from hours to minutes. The result: verified insights delivered to DHS and first responders faster than ever before.

Collaborative Field Testing

LMI engineers worked side by side with DHS teams at 30+ field sites across the U.S., from border regions and maritime zones to high-profile public events. Our experts handled on-site data collection, ground-truth validation, and real-time performance assessments, ensuring every evaluation reflected the complex, dynamic conditions operators face in the field.

Our testing and data-driven reporting provided federal, state, and local agencies with actionable data to inform technology investment and deployment decisions, enhancing public safety and national resilience.

LMI's deep technical expertise and operational experience enabled comprehensive evaluations of UAS and C-UAS technologies designed to perform when lives are on the line. This support helps DHS and its partners stay ahead of evolving threats and ensures first responders are equipped with reliable, mission-ready capabilities to safeguard the nation.

For more information

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