

Research at a Glance

Technical Brief

Principal Investigator

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NJDOT Unmanned Aircraft Systems

The New Jersey Department of Transportation (NJDOT) engaged Cambridge Systematics (CS) to review existing unmanned aircraft systems (UAS) practices within NJDOT and State Departments of Transportation (DOTs) to identify how UAS programs engage consultants, certify staff and consultants to conduct UAS missions, assess and manage risk associated with UAS missions, and manage and store data to comply with state and federal regulations.

Research Problem Statement

Unmanned Aircraft Systems (UAS), also known as “drones” were first developed and utilized to assist with military operations including surveillance and decoy applications via aerial imagery. Over the past five years, there has been rapid deployment of UAS technology by various federal, state, and local agencies including state Departments of Transportation (DOTs), to enhance every-day operations. The New Jersey Department of Transportation (NJDOT) has established a safe and well-recognized UAS program and has been recognized as a national leader in UAS usage and deployment. With the program’s increasing popularity, it has created a high demand for UAS services. NJDOT wants to scale their UAS program by increasing their ability to use both consultants and in-house staff to conduct mission using safe and standard practices across all mission types and activities.

Research Objectives

The goal of this research was to provide recommendations to enhance NJDOT’s UAS program through conducting research into UAS best practices and procedures at state DOTs, reviewing current practices at NJDOT, and provide recommendations for NJDOT to develop, refine, or update its procedures related to:

- Prequalifying criteria and procedures for UAS consultants working on behalf of NJDOT;
- Procedures for UAS missions and five special use cases; and
 - High Mast Light Pole Inspections
 - Construction Project Management
 - Emergency Management
 - Operations at Public Use Airports
 - Field Observations and Demonstrations
- UAS data security and storage requirements and procedures.

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Methodology

An extensive literature review comprised of materials from all 50 states (including New Jersey), as well as federal agencies and research organizations was undertaken to understand both the current state of UAS operations at the state level and evolution of the practice. State resources reviewed were sourced from state DOT UAS programs, the NJDOT Bureau of Aeronautics, and New Jersey Codes and Statutes. Federal and national resources reviewed include relevant portions of the U.S. Code of Federal Regulation, and research material from the Federal Aviation Administration (FAA), the Federal Highway Administration (FHWA), U.S. Department of Homeland Security (DHS), the American Association of State Highway and Transportation Officials (AASHTO), National Academy of Sciences (NAS), and the National Conference of State Legislatures. Interviews were also conducted with UAS program managers at nine state DOTs, as well as with relevant experts within NJDOT.

Results

The findings of the research activities, state DOT interviews, and NJDOT interviews produced a set of 60 recommendations and considerations across the three key areas:

- UAS Prequalifying Criteria for Consultants and Sub-consultants
 - Remote Pilot in Command and Visual Observer Qualifications
 - Consultant and Equipment Management
 - Insurance Considerations
- UAS Standard Operating Procedures for Transportation Missions
 - Documentation, Updates, and Use of the Flight Operations Manual
 - Updates to Risk Assessment and Management Procedures
 - Updates to Flight Checklists
 - Special Mission Use Cases
 - High Mast Light Pole Inspections
 - Construction Project Management
 - Emergency Management
 - Operations at Public Use Airports
 - Field Observations and Demonstrations
- UAS Data Security and Storage
 - Development of a NJDOT UAS Data Management Lifecycle
 - UAS Data Acquisition, Collection, Processing, Classification, and Transfer
 - UAS Data Storage, Sharing, and Usage