
**Transfer of Unmanned Aircraft Systems Technology to SCDOT for
Enhanced Bridge Inspections**

Technology Transfer Activities

by

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Technology Transfer Activities

1 Outputs

The project aimed to enhance the bridge inspection processes of the South Carolina Department of Transportation (SCDOT) through the integration of Unmanned Aircraft Systems (UAS) technology. This section details the primary outputs generated from the project, which include the development and implementation of a flight proficiency assessment tool, a comprehensive training program, and the provision of commercial-grade UAS equipment to SCDOT bridge inspection teams. Each output represents a significant step forward in advancing the capabilities and efficiency of SCDOT's inspection processes.

1.1 Output #1: Creation of UAS Flight Proficiency Assessment Tool

A robust flight proficiency assessment tool was developed to complement the FAA's Part 107 knowledge test. This tool ensures a comprehensive evaluation of UAS pilots' capabilities by including scenario-based questions and aircraft control exercises tailored to meet ASTM F3266 standards.

1.2 Output #2: Development and Implementation of Training Programs

A comprehensive training program was developed, combining online coursework and in-person bootcamps. The online training focused on preparing participants for the FAA Part 107 exam and familiarizing them with basic drone operations using simulators. In-person bootcamps provided hands-on experience and practical training crucial for mastering UAS technology.

1.3 Output #3: Provision of Commercial-Grade UAS Equipment

Commercial-grade UAS equipment was distributed to SCDOT bridge inspection teams across all seven districts, enabling immediate operational deployment. The equipment included advanced features and capabilities essential for detailed and accurate bridge inspections.

2 Outcomes

The successful execution of the project resulted in several key outcomes that have positively impacted the SCDOT's bridge inspection operations. These outcomes include the enhancement of technical skills and operational efficiency among SCDOT personnel, improved safety and proficiency in UAS operations, and the immediate application of advanced UAS technology in bridge inspections. This section outlines the specific outcomes associated with each project output, highlighting the improvements in technologies and processes that address critical transportation issues.

2.1 Outcome #1

The creation of the UAS flight proficiency assessment tool ensured that UAS pilots are comprehensively evaluated on both theoretical knowledge and practical skills. This increased the reliability and safety of drone operations by assessing pilots' real-world flight capabilities. The tool provided a standardized method for evaluating pilot proficiency, facilitating consistent and objective assessments. As a result, the overall quality of UAS operations was enhanced by identifying and addressing skill gaps among pilots.

2.2 Outcome #2

The development and implementation of training programs significantly improved the technical skills and operational efficiency of SCDOT bridge inspection teams. By combining online coursework and in-person bootcamps, the program enhanced the safety and proficiency of UAS operations. It enabled SCDOT personnel to pass the FAA Part 107 exam and gain practical experience, resulting in higher confidence and competency in drone operations. This initiative fostered a culture of continuous learning and adaptation to new technologies among SCDOT staff.

2 Outcome #3

The provision of commercial-grade UAS equipment enabled SCDOT to perform detailed and accurate bridge inspections with advanced UAS technology. This led to reduced inspection time and costs by leveraging high-resolution imagery and efficient data collection methods. The safety of bridge inspectors was improved by minimizing the need for manual inspections in hazardous locations. Additionally, this initiative facilitated the immediate integration of UAS technology into SCDOT's inspection processes, leading to better maintenance and management of transportation infrastructure.

3 Impacts

The overall impact of the project is significant and brought advancements to the SCDOT's bridge inspection capabilities. By leveraging UAS technology, the project has reduced inspection times and costs, increased safety for inspectors, and provided high-resolution data that improves the maintenance and management of transportation infrastructure. This section discusses the broader implications of the project, demonstrating how these advancements contribute to more efficient, effective, and safer transportation infrastructure management.

3.1 Impact #1

This assessment tool helps ensure that pilots are not only knowledgeable but also proficient in practical flight operations, enhancing the overall safety and effectiveness of UAS deployments.

3.2 Impact #2

This training program was highly effective, with 20 out of 21 participants passing the FAA Part 107 exam and earning additional certifications, enhancing their operational capabilities.

3.2 Impact #3:

The availability of this equipment facilitated the immediate application of UAS technology in bridge inspections, significantly improving data collection efficiency and safety while reducing inspection costs.