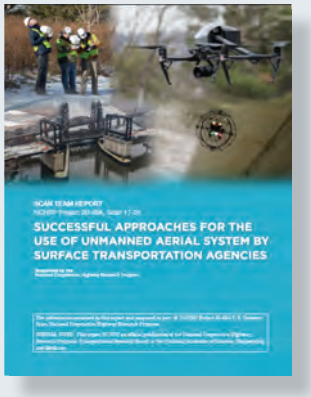
Implementing a Pilot Training Program on UAS Operations



The scan team report for NCHRP Project 20-68A, Domestic Scan 17-01: "Successful Approaches for the Use of Unmanned Aerial Systems by Surface Transportation Agencies" was published in 2018. The final project report and other deliverables for NCHRP Project 20-44(17): "Implementing the Results of NCHRP Project 20-68A, Domestic Scan 17-01: Successful Approaches for the Use of Unmanned Aerial Systems by Surface Transportation Agencies" will be published in 2022.

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A slow exposure of a UAS flight at night shows the flight pattern the operator had to execute for the UAS test lane.

Unoccupied aircraft systems (UAS) have the potential to revolutionize DOT operations but as with any new technology, integrating UAS into operations poses challenges related to human resources, policies, procedures, and information technology. NCHRP Project 20-44(17): "Implementing the Results of NCHRP Project 20-68A, Domestic Scan 17-01: Successful Approaches for the Use of Unmanned Aerial Systems by Surface Transportation Agencies" aimed to provide tailored UAS training in the areas of safety, risk management, flight operations near structures, night operations, and thermal sensing, for DOT staff from the states of Vermont, Maine, Massachusetts, and New Hampshire, and staff from the Vermont Department of Public Safety.

Led by project teams from the University of Vermont (UVM) and ARE Corp (ARE), a series of 10 online sessions were hosted between October 2020 and June 2021. This series included training on organizational considerations, geospatial integration, UAS photography, UAS sensor and platform selection, flight data management, risk assessment, regulations, operating near structures, night operations, and thermal imagery collection and analysis.

A 5-day in-person workshop was hosted on the UVM campus in August 2021. It was attended by 17 participants who received instruction on risk management, flight planning, barriers to implementing a UAS program, flight operations, and data analytics. Attendees honed their UAS flight skills on the National Institute of Standards and Technology (NIST) Standard Test Methods for Small Unmanned Aircraft Systems test lane, in addition to collecting of UAS imagery for mapping, flying UAS near structures for inspections, and collecting and analyzing thermal imagery. An evening session provided participants with hands-on night operation experience, including search and rescue techniques, thermal imaging, regulatory considerations, and risk assessment for the hazards posed by flying UAS at night. Participants also received an introduction to remote sensing and geospatial analysis and worked through several modules to rapidly process UAS imagery, analyze the resulting geospatial data products, and disseminate the outputs. Through this, they gained a foundational knowledge of a variety of UAS software packages along with end-to-end data collection, processing, and analysis workflows for tasks such as 2D mapping, 3D modeling, volume estimations, and utilizing multispectral imagery.

The results of this project will aid these agencies in reducing UAS operational liability, maximize UAS potential uses, enable DOT staff to perform UAS operations at a higher level more resourcefully, and shorten the response time for UAS-developed deliverables. Though challenging, the move to virtual training enabled additional training materials to be created to support the goal of integrating the results from this project into AASHTO's online training platform. Final products for this project include recordings and documentation of the virtual and in-person lectures as well as access to the self-paced UAS workflow modules.