

Unmanned Aerial Systems (UAS)

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_5/uas.cfm

State of Practice Report Form (for EDC-5)

1) Reporting Period: Progress Report #2 – December 2019

2) Accomplishments or Changes to Report? If there has been NO CHANGE on this innovation during this reporting period and the previous report is still accurate, select "No Change from Previous Report" without completing Questions 3-6.

<input type="checkbox"/>	Changes indicated in Progress Report Below
<input checked="" type="checkbox"/>	No change from Previous Report

3) Current Implementation Stage: What is the State's current stage of innovation implementation?
Review the State of Practice Guidance Questions on the next page.

<input type="checkbox"/>	Not Implementing: The Unmanned Aerial Systems innovation has not been used anywhere in the state* (for surface transportation projects) and the state* is not interested in pursuing UAS.
<input checked="" type="checkbox"/>	Development Stage: The state* is developing an implementation process, collecting guidance and best practices, and building support.
<input checked="" type="checkbox"/>	Demonstration Stage: The state* is testing and piloting the innovation. UAS has been used on at least one project or operational situation.
<input type="checkbox"/>	Assessment Stage: The state* is assessing the performance of the innovation and adjusting any processes for full deployment.
<input type="checkbox"/>	Institutionalized: The state* has adopted the innovation as a standard practice and uses it regularly on projects.

4) Accomplishments and Benefits. Describe the State's accomplishments for this reporting period (both State DOT and local agency accomplishments). Please provide highlights with good results or stories that can be shared with the deployment teams and other states.

An analysis based on strengths, opportunities and challenges was carried out by NMDOT Survey & Lands Engineering (SLE) Division looking at the different areas of interest utilizing UAV's for NMDOT and establishing a Drone program. Based on literature review, survey responses and analysis, the use of UAV's for NMDOT operations improved safety, efficiency and has reduced costs. Out of the suggested areas considered for implementing UAV's, the recommended UAV applications where NMDOT could realize benefits in safety, efficiency and possible cost savings are:

- bridge inspections
- construction monitoring
- location field surveys
- road mapping
- stockpile measurements
- drainage studies
- Aerial photography

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With the attached “NMDOT Unmanned Aircraft System (UAS) Mapping Procedures and Checklist” developed by SLE, NMDOT has currently performed work with UAV’s in support of drainage studies, aerial photography, locations surveys, and existing right-of way-conditions imposed on areal imagery to support litigation. Mission planning is essential to successful flights and operations. SLE staff establish the most efficient flight paths which will ensure the best coverage area for the aerial mission. If required, project control is established and given to field crews so that the proper panels are set prior to the flight. NMODT has realized the benefits of safety, efficiency, and cost savings in these applications. All UAV’s currently managed under SLE are operated by SLE staff that are certified FAA Part 107 licensees.

These operators have obtained understanding of aeronautical terms and meteorology. The FAA Part 107 license requires the pilot to ensure that the drone is safe before flying by performing preflight visual and operational checks of the UAV to ensure that safety-pertinent systems are functioning properly. This includes checking the communication link between the control station and the UAV.

UAV’s will not replace many of the current activities that NMDOT SLE performs, but it will complement and enhance them in regards to safety, schedule, and value.

The most important element in Drone Program is to establish the procedures and guidelines to operate by. NMDOT SLE has made significant progress and is demonstrating this per the aforementioned attachment. SLE is committed to continuing its progress in establishing a defined Drone Program.

5) Assistance Needed: Describe any additional assistance needed by your state.

No comment at this time

6) Lessons Learned: Describe any implementation obstacles or lessons learned. Also indicate if and how your state can provide assistance to others in their implementation.

No comment at this time

The information below is to determine the appropriate Innovation Implementation Stage in your State:

Innovation Implementation Stage Definitions	Guidance Questions
Not Implementing: The Unmanned Aerial Systems innovation has not been used anywhere in the state* (for surface	Prompt questions to help assess your current state of practice and help tell your story. <i>NOTE: Not all questions have to be affirmatively answered to meet any given stage; judgment is required; call the UAS Deployment Team w/ questions.</i> Is the State not implementing UAS to support their surface transportation program because: <ul style="list-style-type: none">• It has evaluated the innovation and determined that it is not appropriate for the jurisdictional or technical restrictions within the State?

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Innovation Implementation Stage Definitions	Guidance Questions
<p>*State is all-inclusive (e.g., state agency, local municipalities, contractors, consultants)</p>	<p>Prompt questions to help assess your current state of practice and help tell your story.</p> <p><i>NOTE: Not all questions have to be affirmatively answered to meet any given stage; judgment is required; call the UAS Deployment Team w/ questions.</i></p>
<p>transportation projects) and the state* is not interested in pursuing UAS.</p>	<ul style="list-style-type: none"> • It does not have the resources (human, financial, or technological) to implement the innovation? • It chooses not to engage in any research or operational considerations for UAS at this time but may pursue innovation at a later date?
<p>Development Stage:</p> <p>The state* is developing an implementation process, collecting guidance and best practices, and building support.</p>	<ul style="list-style-type: none"> • Has the State researched UAS use and/or begun considering how it might support surface transportation programs? (eg pavement, bridge, Geotech, 3-D modeling, traffic operations) • Has the State attended a training or peer exchange about UAS to learn more?
<p>Demonstration Stage:</p> <p>The state* is testing and piloting the innovation. UAS has been used on at least one project or operational situation.</p>	<ul style="list-style-type: none"> • Has the State tested the applicability of UAS operations on a limited number of uses to evaluate its effectiveness? • Does the state own a drone and/or software to process the data obtained by the UAS?
<p>Assessment Stage:</p> <p>The state* is assessing the performance of the innovation and adjusting any processes for full deployment.</p>	<ul style="list-style-type: none"> • Has the State operationalized UAS use to support at least one agency mission? • Does the State have draft guidance, policies, and/or procedures that allow for the operations of UAS to support their agency mission? • Has there been cross coordination established between planning/design/construction/operations or a working group established to advance UAS as a whole?
<p>Institutionalized:</p> <p>The state* has adopted the innovation as a standard practice and uses it regularly on projects.</p>	<ul style="list-style-type: none"> • Does the State routinely utilize UAS to advance their surface transportation programs? Does the State have a documented UAS Program? • Has the State developed final guidance, policies, and/or procedures that allow for the operations of UAS for at least one program use?

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Innovation Implementation Stage Definitions *State is all-inclusive (e.g., state agency, local municipalities, contractors, consultants)	Guidance Questions Prompt questions to help assess your current state of practice and help tell your story. <i>NOTE: Not all questions have to be affirmatively answered to meet any given stage; judgment is required; call the UAS Deployment Team w/ questions.</i>
	<ul style="list-style-type: none">• Has the State added the Final guidance and specifications to the agencies standard operating procedures for consistent use of UAS statewide?

UAS Champions – FHWA Deployment Team Contacts

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Date	Unit #	Flight Speed
Project	Client	Altitude
	FAA #	

NMDOT Unmanned Aircraft System (UAS) Mapping Procedures and Checklist

Ensure all requirements for the FAA (Federal Aviation Administration) Part 107 (Small unmanned aircraft regulations) are met for a safe and legal flight operation, including maintaining flight logs and maintenance logs of all aircrafts and its accessories.

Before departing: Visually inspect aircraft for airworthiness			
Check battery status:	Check firmware for updates:	Check airspace: (Sky Vector)	Weather conditions:
<input type="checkbox"/> Controller _____ %	<input type="checkbox"/> Last updated _____	<input type="checkbox"/> Type _____	<input type="checkbox"/> FAA waver or authorization?
<input type="checkbox"/> A/C Free of damage & charged	<input type="checkbox"/> Set flight path / AOI limits	<input type="checkbox"/> Airports nearby?	<input type="checkbox"/> Notified?

Ensure all Part 107 required documentation for operation are current, present and available

Preflight checklist			
Controllers:	Aircraft:	Flight operating system:	Camera:
<input type="checkbox"/> Attach Antenna, Sun shield, Strap	<input type="checkbox"/> Propellers: damage free & secure	<input type="checkbox"/> Power on aircraft	<input type="checkbox"/> Set photo type (single, multi-shot, video)
<input type="checkbox"/> Power controller & Adjust screen display	<input type="checkbox"/> Batteries: Charged and free of damage	<input type="checkbox"/> Calibrate compass & Accelerometer	<input type="checkbox"/> Set img size/format & ISO/shutter speed
<input type="checkbox"/> Download Mission	<input type="checkbox"/> Ensure SD card is installed with no errors	<input type="checkbox"/> Check GPS satellite connections	<input type="checkbox"/> Set video size / format (if applicable)
<input type="checkbox"/> Close all applications excpt. piloting app	<input type="checkbox"/>	<input type="checkbox"/> Set Altitude: maximum and return	<input type="checkbox"/> Set Desired image overlap

Take off Checklist:	<input type="checkbox"/> Start flight log	<input type="checkbox"/> Clear take-off area/ propellers	<input type="checkbox"/> Start video recording (if applicable)	<input type="checkbox"/> Start rotors	<input type="checkbox"/> Hover 20 sec: look/listen for problems
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Carryout planned flight operation and keep constant visual contact with the UAS throughout the duration of the flight, using multiple visual observers

Start	End	Total Time	Notes

Proper landing:	<input type="checkbox"/> Clear landing area	<input type="checkbox"/> Power down all equipment	<input type="checkbox"/> Finish flight log
Post flight:	<input type="checkbox"/> Check all equipment for any damage or malfunctions	<input type="checkbox"/> Set all batteries to charge and log their time in use	<input type="checkbox"/> Maintenance / order any parts or accessories that may need repairs or replacement

I hereby certify that all above criteria has been met and that the flight has been completed and meet all FAA Part 107 requirements and guidelines.

_____ Pilot Name	_____ Date	_____ Crew
_____ Pilot Signature	_____ Certificate #	_____