

**NORTH CAROLINA**  
Department of Transportation



# **FHWA's Role in NC-TIC**

George Hoops, PE

Planning and Program Development Manager

Federal Highway Administration – North Carolina Division

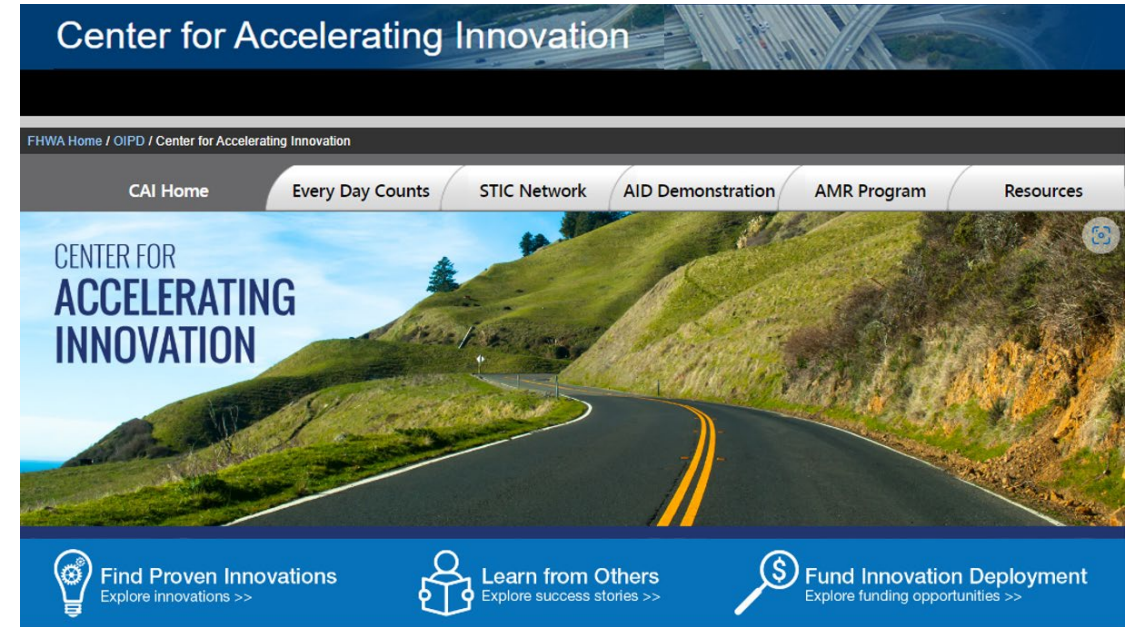
Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina

## FHWA's Innovation Role

- Technology deployment and transfer have been core values of FHWA throughout its history
- FHWA supports various initiatives through its Center for Accelerating Innovation
- The Every Day Counts (EDC) program strategically deploys innovation



*A State-based model that identifies and deploys proven, yet underutilized innovations — saving time, money and resources that can be used to deliver more projects.*



## FHWA's Innovation Role

### Every Day Counts (EDC) - Vision

- Rapid changes facing the highway community at all levels in the 21st century
- Adapting to those changes must be a central focus of the FHWA.
- Every Day Counts captures what I believe to be the sense of urgency with which we must pursue innovation.
- Every Day Counts will seek to identify and deploy innovation as its highly focused mission.
- It is my goal to reach out and engage FHWA employees as well as external stakeholders to deliver innovation that will enable us to become faster, better and smarter.



Victor Mendez, FHWA Fall Business Meeting 2009

## FHWA's Innovation Role

### What is EDC?

- State-based model
- Identifies and rapidly deploys **proven**, yet underutilized innovations that:
  - Shorten the project delivery process
  - Enhance roadway safety
  - Reduce traffic congestion
  - Preserve the environment
  - Integrate automation



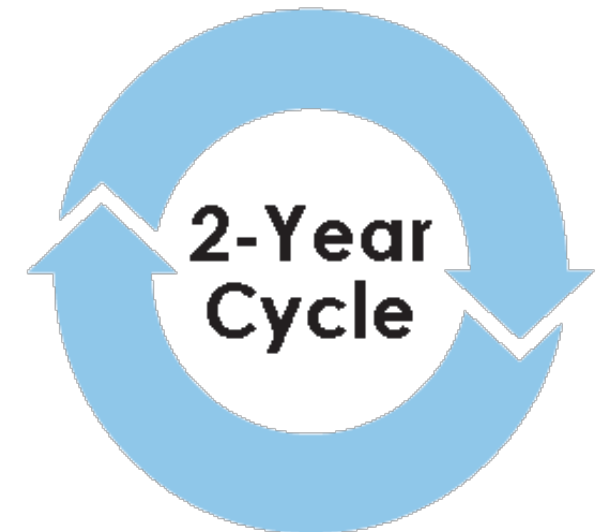
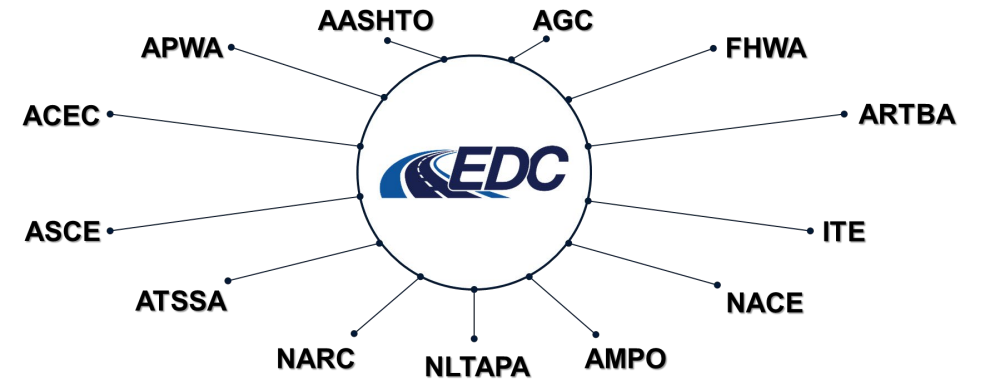


## FHWA's Innovation Role

### How EDC works?

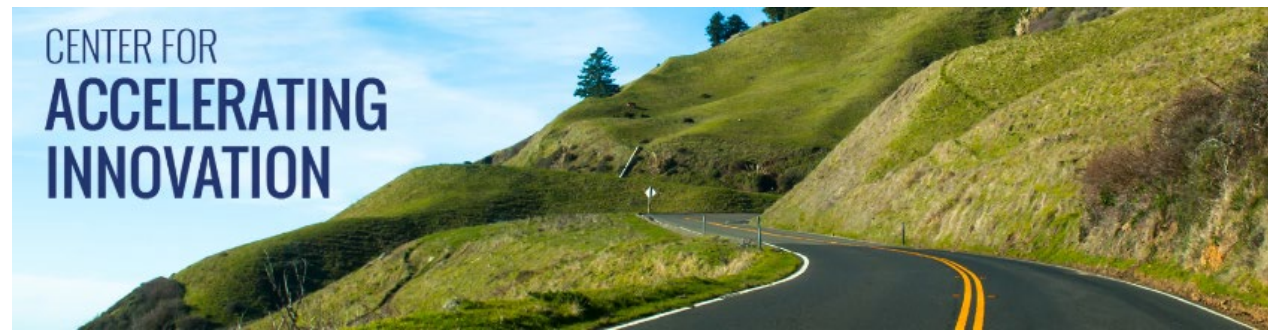
- Stakeholder collaboration to identify and select innovations
- Multidisciplinary deployment teams to provide technical assistance to deploy innovations
  - Share case studies
  - Provide Training
  - Hold Webinars and workshops
  - Demonstrations and peer exchanges
  - Create Guidance and specifications

### Stakeholder Engagement



ncdot.gov

## FHWA's Innovation Role



### How EDC works?

Every State advanced 26 or more of the 57 innovations promoted in the first six EDC rounds, and some states adopted 45 or more innovations.



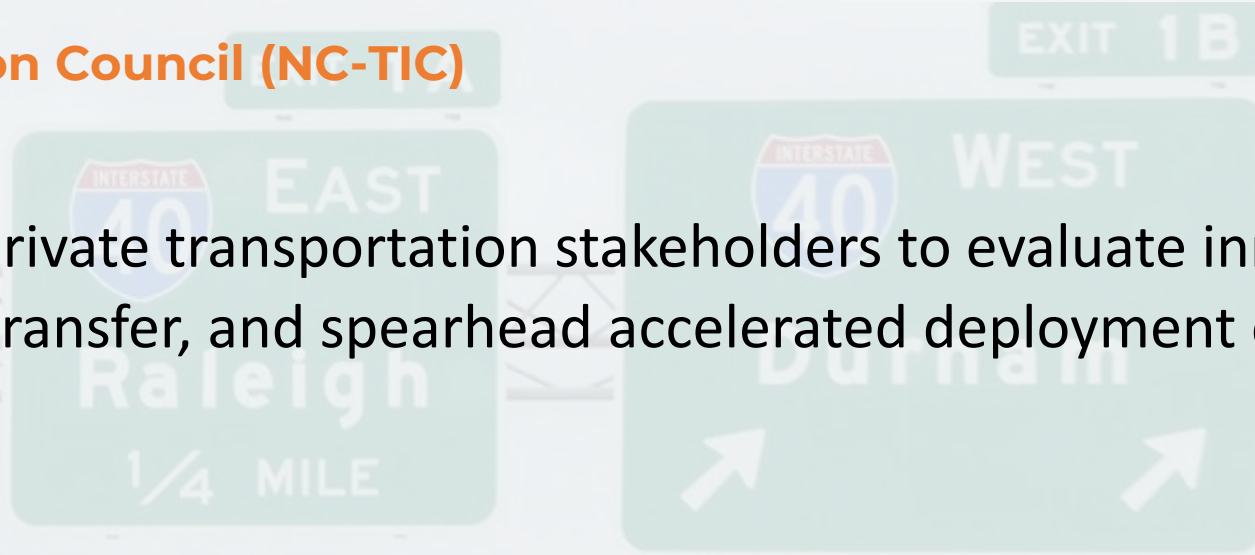
Center for Accelerating Innovation Website:  
<https://www.fhwa.dot.gov/innovation/everydaycounts/>

## STIC Program Overview



### NC-Transportation Innovation Council (NC-TIC)

Bring together public and private transportation stakeholders to evaluate innovations, kickstart rapid technology transfer, and spearhead accelerated deployment of innovative ideas.



[ncdot.gov](http://ncdot.gov)

## STIC Incentive Funding Program

### Eligibility Overview

Requirements for eligibility of a project are as follows:

- ✓ Must have a statewide impact in fostering a culture of innovation
- ✓ Must align with STIC goals
- ✓ Must be eligible for federal-aid assistance
- ✓ Funding must be expended within 2 years.
- ✓ State must have a STIC

**Funding Available: \$125,000/ fiscal year**

**A 20% Non-federal match is required**

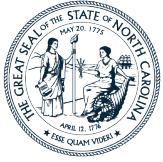




## Accelerated Innovation Deployment (AID) Program

- Provides a maximum of \$1,000,000
- Eligible projects
  - Infrastructure
  - Non-infrastructure strategies
  - Other activities which incorporate proven innovative practices or technologies
- Past NCDOT AID projects:
  - Geosynthetic Reinforced Soil-Integrated Bridge System (2015)
  - Harker's Island Carbon Fiber Reinforcing Polymer (2019)





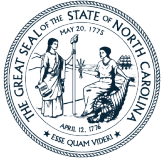
**NORTH CAROLINA**  
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# VMO's Role in NCTIC

Alyson Tamer, PE, CPM

Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina



**NORTH CAROLINA**  
Department of Transportation



# Value Management Office's Role in NCTIC

Alyson Tamer, PE, CPM

# Who is VMO?

**Alyson Tamer, PE**

State Value Management Engineer  
NC-TIC

**Janaki Patel, PE**

CLEAR Program  
(Lunch and Learns, PCAs, TAGs, etc.)

**Andrew Folz, PE**

Value Engineering and  
Risk Management

**Zach McLaughlin**

Constructability Reviews and  
Value Engineering Proposals



VMO-Value  
Management Office

NC-TIC- NC Innovation Council





**Value Management builds value into the department's processes, programs, projects, and services by providing opportunities for cross collaboration to generate innovative solutions one interaction at a time.**



# Office of Strategic Initiatives and Program Support

## Purpose and Core Functions –

- NCDOT strategic planning, goal setting, and performance management.
- Research, trend analysis and forecasting.
- Cross-departmental initiatives, programs and projects.
- Clean Transportation Plan implementation.
- Management of CMAQ, Carbon Reduction, and NEVI programs.
- Discretionary grant strategy and pursuits.
- Corridor Development Engineers.
- Value Management Office and innovation
- Data strategy, integration, and governance.
- Emerging technology exploration and strategy (e.g., CAVs).

*\*New in  
2024*

*\*Coming  
Soon*



# VMO's Role

- Innovation Hub
- Coordinates Funding and Innovations
- Engagement and Outreach
- Knowledge Management



NC-TIC Website  
<https://connect.ncdot.gov/groups/NCSTIC/Pages/default.aspx>





# NC- TIC Technical Coordinating Committee

## Organizations Represented

- ACEC of North Carolina
- Carolina Asphalt Pavement Association (CAPA)
- Carolinas Associated General Contractors (AGC)
- Carolinas Concrete Paving Association
- FHWA
- NC Association of Metropolitan Planning Organizations
- NC Association of Rural Planning Organizations
- NC Local Technical Assistance Program (LTAP)
- NCDOT





# EDC-7 Innovations

<u>Innovations</u>	<u>Where we are now</u>	<u>In two years</u>	<u>POC</u>
Nighttime Visibility for Safety	Development Stage	Assessment Stage	Shawn Troy Greg Hall
Next Generation TIM: Technology for Saving Lives	Development Stage	Assessment Stage	Dominic Ciaramitaro
Integrating Green House Gas Assessment and Reduction Targets in Transportation Planning	Demonstration Stage	Assessment Stage	Heather Hildebrand
Rethinking DBE for Design-Build	Development Stage	Development Stage	Tonya Marriott Michelle Gaddy Lisa Wilson
Strategic Workforce Development	Development Stage	Institutionalized Stage	Ebony Pittman Ayanna Wallace

\* Enhancing Performance with Internally Cured Concrete (EPIC2)

\* Environmental Product Declaration for Sustainable Project Delivery



# STIC Incentive Program



**\$125,000 of Federal Funding available per Federal Fiscal Year**

## Eligible Activities

Internal Assessments	Build Capacity
Develop Guidance, Standards and Specs	Implement System Process Changes
Organize Peer Exchanges	Offset Implementation Costs
Conduct other activities the STIC identifies to address goals and to foster a culture of innovation	

<https://www.fhwa.dot.gov/innovation/stic/guidance.cfm>



# STIC Program Overview

## Project Eligibility



- **Funding Available: \$125,000/ fiscal year**
- **A 20% Non-federal match is required**
  
- **If you have questions, contact [NCTIC@ncdot.gov](mailto:NCTIC@ncdot.gov)**

**Guidance available:**

**<https://www.fhwa.dot.gov/innovation/stic/guidance.cfm>**



# Past/Current STIC Incentive Projects



Project	Funding
Knowledge Transfer Tools	\$40K (2021)
Automating Waze Road Closures	\$60K (2021)
Implement Emergency Alerting Service	\$50K (2022)
Create Ladders of Opportunity Plan	\$50K (2022)
Debris Removal Evaluation	\$65,680 (2023)
Development of Data Governance for Rail	\$34,320 (2023)
Insert your project here!	





# Applying for STIC Incentive Funding

- Application is open NOW until **April 15, 2024**
- If you have any questions email [NCTIC@ncdot.gov](mailto:NCTIC@ncdot.gov)



## STIC INCENTIVE FUNDS Application FY 2024

This is the STIC Incentive Funding application for FY24. This application is open until April 15, 2024. Once the window closes, the applications will be evaluated by the NCTIC. If your application moves to the next round, you will be asked to present to the NCTIC in May. Nominees should be told the award amount by June with funding made available in October 2024.

Please note: STIC requires a commitment of 20% from another funding source. You will be asked about this funding source in the application.

You must complete this application once you start it. To see what is needed for the application, return to the NCTIC site and look for the PDF version of the application (for information only). Only applications submitted through this form will be evaluated.

<https://forms.office.com/g/0TahYwPryL>



**NORTH CAROLINA**  
Department of Transportation

# STIC and Traffic Systems Operations

Dominic Ciaramitaro, PE

State Traffic Systems Operations Engineer

March 20, 2024

Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina

## Outline

- Every Day Counts (EDC) and STIC
- Traffic Operations 6 x NC-TIC Projects
- Performance Metrics
- Challenges and Successes



# Every-Day-Counts (EDC) Initiatives over the years

## EDC-4 Innovations (2017-2018)

- ▶ Automated Traffic Signal Performance Measures (ATSPMs)
- ▶ Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE)
- ▶ Community Connections
- ▶ Data-Driven Safety Analysis (DDSA)
- ▶ e-Construction and Partnering: A Vision for the Future
- ▶ Integrating NEPA and Permitting
- ▶ Pavement Preservation (When, Where, and How)
- ▶ Road Weather Management – Weather-Savvy Roads
- ▶ Safe Transportation for Every Pedestrian (STEP)
- ▶ Ultra-High Performance Concrete (UHPC) Connections for Prefabricated Bridge Elements
- ▶ Using Data to Improve Traffic Incident Management

## EDC-5 Innovations (2019-2020)

- ▶ Advanced Geotechnical Methods in Exploration (A-GaME)
- ▶ Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE)
- ▶ Project Bundling
- ▶ Reducing Rural Roadway Departures (FoRRRwD)
- ▶ Safe Transportation for Every Pedestrian (STEP)
- ▶ Unmanned Aerial Systems (UAS)
- ▶ Crowdsourcing for Operations
- ▶ Value Capture: Capitalizing on the Value Created by Transportation
- ▶ Virtual Public Involvement
- ▶ Weather-Responsive Management Strategies

## EDC-6 Innovations (2021-2022)

### Crowdsourcing for Advancing Operations

Crowdsourced data can be obtained whenever and wherever people travel, allowing agencies to capture in real time what happens between sensors, in rural regions, along arterials, and beyond jurisdictional boundaries. Agencies at all levels can use crowdsourced data integrated from multiple streams to optimize roadway use for reduced congestion and increased safety and reliability.

### e-Ticketing and Digital As-Builts

Converting paper-based materials ticketing systems and as-built plans into electronic (e-Ticketing) workflows and digital as-builts enhances the accessibility of highway project data. e-Ticketing improves the tracking, exchange, and archiving of materials tickets. Digital information, such as 3D design models and other metadata, enhances the future usability of as-built plans for operations, maintenance, and asset management.

### Next-Generation TIM: Integrating Technology, Data, and Training

Traffic Incident Management (TIM) programs aim to shorten the duration and impact of roadway incidents and improve the safety of motorists, crash victims, and responders. New tools, data, and training mechanisms are available that can benefit both new and existing TIM programs, including local agency and off-interstate applications.

### Strategic Workforce Development

The demand for highway construction, maintenance, and operations workers is growing, while at the same time, emerging technologies require these workers to have new skills. The Highway Construction Workforce Partnership has developed new resources and innovative strategies for identifying, training, and placing individuals in the Contractors' workforce filling the construction jobs that support the Nation's highway system.

### Targeted Overlay Pavement Solutions (TOPS)

Pavement overlays represent a significant portion of highway infrastructure dollars. State and local highway agencies can maximize this investment and help ensure safer, longer-lasting roadways by employing innovative overlay procedures that will improve pavement performance, lessen traffic impacts, and reduce the cost of pavement ownership.

### UHPC for Bridge Preservation and Repair

Ultra-high performance concrete (UHPC) is a new material for bridge construction that has become popular for field-cast connections between prefabricated bridge elements. Bridge preservation and repair is an emerging and promising application for UHPC. UHPC-based repair solutions are robust, and offer superior strength, durability, and improved life-cycle cost over traditional methods. State and local agencies can deploy UHPC for bridge preservation and repair to maintain or improve bridge conditions.

### Virtual Public Involvement (VPI)

Public engagement during transportation project planning and development helps agencies identify issues and concerns early in the process, which can ultimately accelerate delivery. Virtual public involvement strategies supplement traditional face-to-face information sharing with technology platforms that increase the number and variety of methods agencies use to inform the public, receive feedback, and collect and consider comments.

## EDC-7 Innovations (2023-2024)

### Nighttime Visibility for Safety

The nighttime crash fatality rate is three times the daytime rate. Enhancing visibility along corridors, intersections, and pedestrian crossings can help reduce fatalities. This initiative promotes traffic control devices and properly designed lighting to improve safety for all users.

### Next Generation TIM: Technology for Saving Lives

Over six million crashes a year in the U.S. put responders and other vulnerable road users at risk. Next-Generation Traffic Incident Management programs promote emerging technologies such as emergency vehicle lighting and queue warning solutions. These and other tools can advance safety and operations to mitigate incident impacts.

### Integrating GHG Assessment and Reduction Targets in Transportation Planning

Transportation is the largest emitter of greenhouse gases in the U.S. This initiative provides resources to help agencies quantify greenhouse gases and set goals to decrease motor vehicle, construction, and life-cycle emissions through planning and project development.

### Enhancing Performance with Internally Cured Concrete (EPIC<sup>2</sup>)

Cracking in concrete is a limiting factor in achieving long-term concrete performance. Internal curing mitigates shrinkage cracking and has the potential to substantially extend the service life of concrete bridge decks and enhance the performance of pavements and repairs.

### EPDs for Sustainable Project Delivery

Construction materials such as concrete and asphalt have environmental impacts during their life cycle. Environmental product declarations, or EPDs, document those impacts. This tool helps States support procurement decisions and quantify embodied carbon reductions using life cycle assessments for sustainable pavements.

### Rethinking DBE for Design-Build

Many disadvantaged business enterprise program procedures do not adequately address design-build contracting. New practices are available to support the effective integration of program requirements to help small, disadvantaged businesses compete for design-build contracts.

### Strategic Workforce Development

The demand for highway workers is growing, and emerging technologies require new skills. This innovation helps stakeholders improve their ability to identify, train, and place highway construction workers. The focus will expand to rural and Tribal communities to increase career opportunities.



# EDC Baseline and Progress

## EDC-7 Innovations (2023-2024)

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**EDC** Next-Generation Traffic Incident Management (NextGen TIM): Technology for Saving Lives  
EDC-7 State of the Practice/Implementation Plan Form

The below table is meant to provide a means to define the implementation stages that will be used throughout the 2 years of EDC-7 deployment. These definitions are for use when capturing your baseline, progress, and final reports for each of the innovations and were developed to provide consistency between states in measuring the deployment progress of an innovation.

The six NextGen TIM Technology categories covered in EDC-7 include:

- Unmanned Aircraft Systems (UAS) for TIM
- Queue Removal Systems
- Emergency Vehicle Lighting
- Advance Warning Technologies
- Emergency Vehicle Preemption (EVP)
- Technology for Emergency Medical Services (EMS) to Support Post-Crash Care

States can choose to select one or more NextGen TIM Technology categories to focus on during EDC-7. However, to assist tracking, it is recommended that the State use the NextGen TIM Technology category that will be the top priority, or most likely to advance, to select their Baseline and Goal implementation stages.

Innovation Implementation Stage Definitions	Guidance Questions
<b>Not Implemented:</b> The State is not implementing any of the NextGen TIM Technology categories.	<ul style="list-style-type: none"> <li>Implementation of the NextGen TIM Technology has been evaluated and it is determined that they are not appropriate for the State?</li> <li>Resource (monetary, financial, or technological) are not available to assist with implementation of any of the NextGen TIM Technologies?</li> <li>The State is not interested in creating an implementation plan or funding at this time.</li> </ul>
<b>Development Stage:</b> The State has identified one or more NextGen TIM Technology categories to advance and is gathering facts and building support for implementation.	<ul style="list-style-type: none"> <li>Has an implementation lead/champion been identified?</li> <li>Have efforts to gather information (i.e., participation in webinars, workshops, identification of best practices, etc.) been initiated?</li> <li>Are efforts underway to build support with involved stakeholders?</li> <li>Has development of an approach or supporting processes for technology deployment been initiated?</li> </ul>
<b>Demonstration Stage:</b> The State is testing or has initiated a pilot for one or more of the NextGen TIM Technology categories.	<ul style="list-style-type: none"> <li>Has the State's "secured management support to the field testing or a pilot program of the technology?"</li> <li>Has the State "agreed to or received grant funding (e.g., State Transportation Innovation Council (STIC) or accelerated Innovation Deployment (AD) Demonstration funding), or secured State" funding to pilot the technology?"</li> </ul>

Page 1 of 6

**EDC** Next-Generation Traffic Incident Management (NextGen TIM): Technology for Saving Lives  
EDC-7 State of the Practice/Implementation Plan Form

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Page 2 of 6

**EDC** Next-Generation Traffic Incident Management (NextGen TIM): Technology for Saving Lives  
EDC-7 State of the Practice/Implementation Plan Form

The discussion and use of the information in the table below is meant to provide your state with an initial framework to help meet your Innovation Goals. This information is helpful to provide to the Department Teams for them to better understand any activities they could assist with as your implementation efforts that are required to be supplied with the baseline report.

Innovation Implementation Team Members		
State DOT:	Jennifer Portanova	Dom Caranatan
FWHA:		

**State Innovation Goal (Baseline Goal):** In other words, after 2 years, what would success look like for your state? If an innovation will take 3 years, money, or both, please include an initial baseline goal and the baseline goal you wish to track to ensure the activities of milestones involved in the statement of innovation user EDC. What are the measurable targets to assess your progress?

To be published, the state's goals will be in line with federal goals for EDC-7.

**Objectives:** What is proposed as ongoing the State in meeting the implementation goal?

Timeline sources to support the plan alignment of testing the technology to identify the feasibility of incorporating the technology into the standard practice. Also, any software-based technology will need to overcome state DOT procurement rules which typically can be lengthy process.

Implementation Plan Activities		
Activity No.	Description of Activity	Target Completion Date
1	Complete needed research of potential technology	First Quarter 2024
2	Identify options for procuring technology for pilot project	Second Quarter 2024
3	Procure technology for pilot project	Third Quarter 2024
4	Implement pilot project	Fourth Quarter 2024
5	Analyze technology and submit findings in a report	Second Quarter 2025
6	Provide findings per peer exchanges	Fourth Quarter 2025

**Action items to follow up with after discussion:**

Page 6 of 6

## Definition and Guidance

## Implementation Plan

**EDC** Next-Generation Traffic Incident Management (NextGen TIM): Technology for Saving Lives  
EDC-7 State of the Practice/Implementation Plan Form

This is the information that will be collected in the EDC-7 Baseline Report for each innovation. The deployment teams will use this information to better understand your state's baseline technical assistance efforts over the next two years of EDC-7 deployment.

If your state does not want to advance this innovation over the next two years, we ask you to please indicate your current level of implementation and indicate your goal on the same level of implementation with "NO Assistance Available from EDC" (development) selected (optional).

Baseline Questions (Due April 21, 2023):	Answers - Select From Category
1) April 2023 Baseline: What stage of implementation is the State currently at? Select the NextGen TIM Technology category the State has identified as the top priority and will be used to define the implementation stage. Review the Implementation Stage Definitions and select the appropriate stage for your state.	<input type="checkbox"/> Not Implemented <input type="checkbox"/> Development Stage <input type="checkbox"/> Assessment Stage <input type="checkbox"/> Institutionalized
2) Current Status: Provide the current state of practice to support the above selection. Please note: State DOT, local agency, and transportation partners status.	<input type="checkbox"/> UAS for TIM <input type="checkbox"/> Queue Removal Systems <input type="checkbox"/> Emergency Vehicle Lighting <input type="checkbox"/> Advance Warning Technologies <input type="checkbox"/> Emergency Vehicle Preemption <input type="checkbox"/> Technology for EMS
3) Goal: What is the State goal in two years? Review the Implementation Stage Definitions on pages 1-2 and select from appropriate stage.	<input type="checkbox"/> Not Implemented <input type="checkbox"/> Development Stage <input type="checkbox"/> Assessment Stage <input type="checkbox"/> Institutionalized
4) Implementation Plan Activities: Provide the proposed activities the State and their partners intend to perform to attain their goal.	<input type="checkbox"/> Training (e.g., self course or self-directed modules) <input type="checkbox"/> Technical Report on specific implementation <input type="checkbox"/> Customized Documents (develop specific needs report) <input type="checkbox"/> Webinars on specific topics (develop specific topics list)

Page 3 of 6

**EDC** Next-Generation Traffic Incident Management (NextGen TIM): Technology for Saving Lives  
EDC-7 State of the Practice/Implementation Plan Form

This is provided to show what information will be captured in future progress reports during the 2 years of EDC-7 deployment. The progress report information has changed from previous EDC reports. The first EDC progress report was dropped to allow more time to make progress on the innovation deployment. Progress Report #1 will be 2 years after the Baseline Report. Progress Report #2 will be 6 months later, with a final Progress Report 2 years after the initial baseline.

Progress Report Questions:	Answers
1) If there has been NO CHANGE on the innovation during this reporting period and the previous report is satisfactory, select "No Change from last Progress Report" and you do not need to complete Question 2-5.	<input type="checkbox"/> No Change from last Progress Report <input type="checkbox"/> Change indicated in Progress Report below
2) What is the State's current stage of innovation implementation?	<input type="checkbox"/> Not Implemented <input type="checkbox"/> Development Stage <input type="checkbox"/> Assessment Stage <input type="checkbox"/> Institutionalized
3) Describe the State's accomplishments for the reporting period (State DOT, local agency, and transportation partners' accomplishments).	<input type="checkbox"/> Not Implemented <input type="checkbox"/> Development Stage <input type="checkbox"/> Assessment Stage <input type="checkbox"/> Institutionalized
4) Describe any implementation challenges or lessons learned. Also indicate if any of your state and transportation partners can reach others as their implementation of the innovation.	(open discussion)
5) Describe any additional assistance needed by your state or partners.	(open discussion)

Page 6 of 6

## Baseline Questions

## Periodic Progress Reports



# Next Generation TIM Technology

## EDC-7 Innovations (2023-2024)

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Transportation is the largest emitter of greenhouse gases in the U.S. This initiative provides resources to help agencies quantify greenhouse gases and set goals to decrease motor vehicle, construction, and life-cycle emissions through planning and project development.

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### EPDs for Sustainable Project Delivery

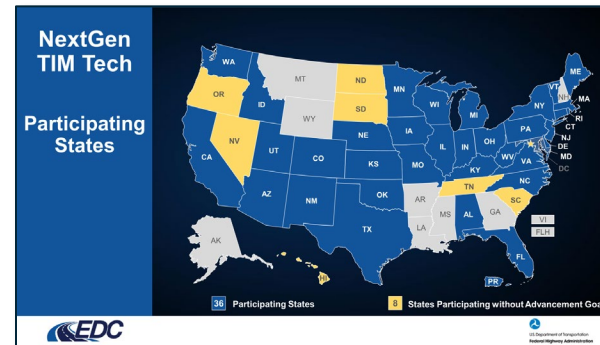
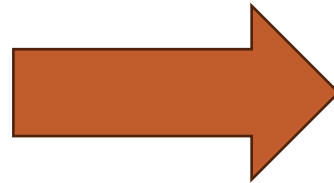
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### Strategic Workforce Development

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### EDC-7 Next-Generation Traffic Incident Management: Technology for Saving Lives (NextGen TIM Tech) Kickoff Meeting

U.S. Department of Transportation Federal Highway Administration

Every Day Counts innovation for a Nation on the Move



### Kick-Off Meeting Goals

1. Provide an overview of NextGen TIM Tech
2. Confirm which technologies your State/agency is interested in focusing on
3. Define at a minimum:
  - Measuring success
  - Support activities
  - Funding opportunities

## TIM Technologies for Saving Lives

**Debris Removal**

**Smart Emergency Vehicle Lighting**

**UAS for TIM**

**Advance Warning**

**Emergency Vehicle Preemption**

**EMS Post-Crash Care**

Source: Florida Department of Transportation | Source: Sarasota, FL Fire Department

All images from Enforcement Engineering, unless otherwise noted.

## NextGen TIM Tech: Measuring Success

Progressing **at least one technology one stage** by the end of the 2-year EDC-7 cycle (April 2025).

- States can choose to select more than one NextGen TIM Tech category to focus on during EDC-7.
- However, to simplify tracking, it is recommended that the category that will be the top priority, or most likely to advance, be used to select Baseline and Goal implementation stages.

Not Implemented

Development

Demonstration

Assessment

Institutionalized

# 2018 Project

## EDC-4 Innovations (2017-2018)

- ▶ Automated Traffic Signal Performance Measures (ATSPMs)
- ▶ Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE)
- ▶ Community Connections
- ▶ Data-Driven Safety Analysis (DDSA)
- ▶ e-Construction and Partnering: A Vision for the Future
- ▶ Integrating NEPA and Permitting
- ▶ Pavement Preservation (When, Where, and How)
- ▶ Road Weather Management – Weather-Savvy Roads
- ▶ Safe Transportation for Every Pedestrian (STEP)
- ▶ Ultra-High Performance Concrete (UHPC) Connections for Prefabricated Bridge Elements
- ▶ Using Data to Improve Traffic Incident Management

**ITRE** Institute for Transportation Research and Education  
**KITTELSON & ASSOCIATES**

**I-40 BUSINESS TOWING CONTRACT EVALUATION**  
Final Report

FREQUENT SUDDEN STOPS

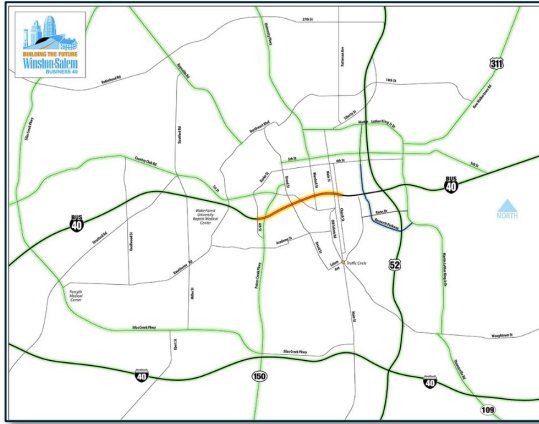
August 2020

South Carolina

2018 Business 40 Tow Contract \$60K

Need: conduct a before/after study to show the value of NCDOT administered tow contracts

# 2018 Project – Business 40 Towing Contract Evaluation

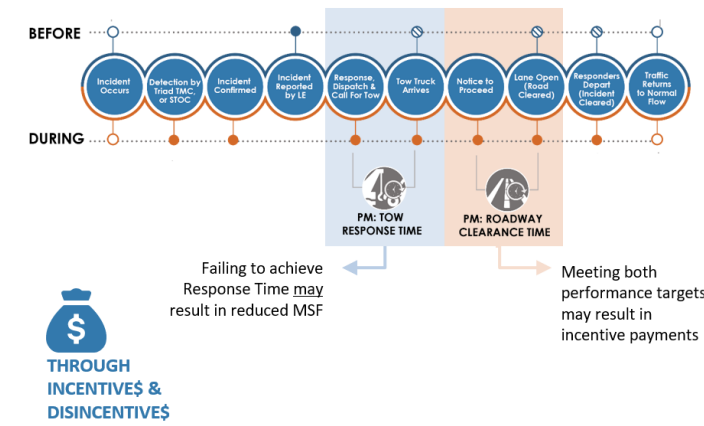


## Traffic Management Tools

- Expanded Safety Service Patrol
- Incident Response Plans
- No-Parking Zone / Quick Clearance
- **Towing Contract\***

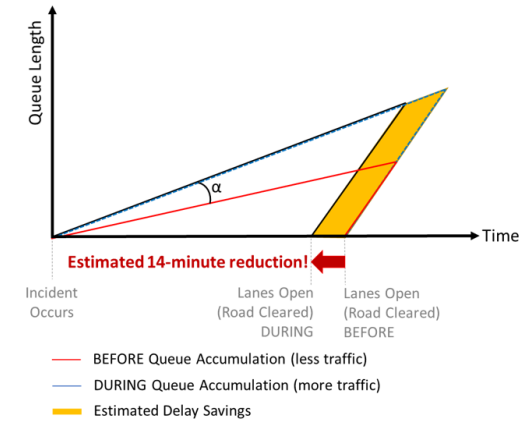


## Tower Incentives



- Reconstruction of 1.2 mile section of US 421 (Bus. 40)
- Closed Nov 2018 – Feb 2020

## Estimating Delay Impacts Amongst Increased Traffic

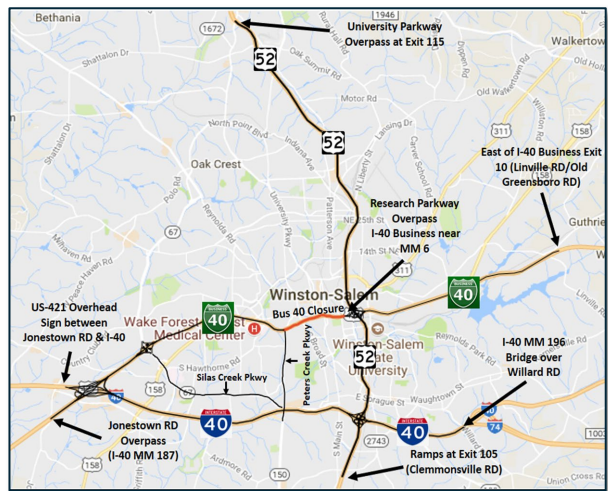


### Now:

- I-95 Widening
- I-40 Widening (Orange County)
- I-26 Widening

### Planning:

- I-85 Widening (Gaston County)
- I-26 Connector





# 2019 Project

2019 Rekor/Waycare\* Triangle Pilot \$62,500

REKOR INTELLIGENCE DRIVEN INNOVATION

- EDC-5 Innovations (2019-2020)
- ▶ Advanced Geotechnical Methods in Exploration (A-GaME)
  - ▶ Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE)
  - ▶ Project Bundling
  - ▶ Reducing Rural Roadway Departures (FoRRRwD)
  - ▶ Safe Transportation for Every Pedestrian (STEP)
  - ▶ Unmanned Aerial Systems (UAS)
  - ▶ Crowdsourcing for Operations
  - ▶ Value Capture: Capitalizing on the Value Created by Transportation
  - ▶ Virtual Public Involvement
  - ▶ Weather-Responsive Management Strategies

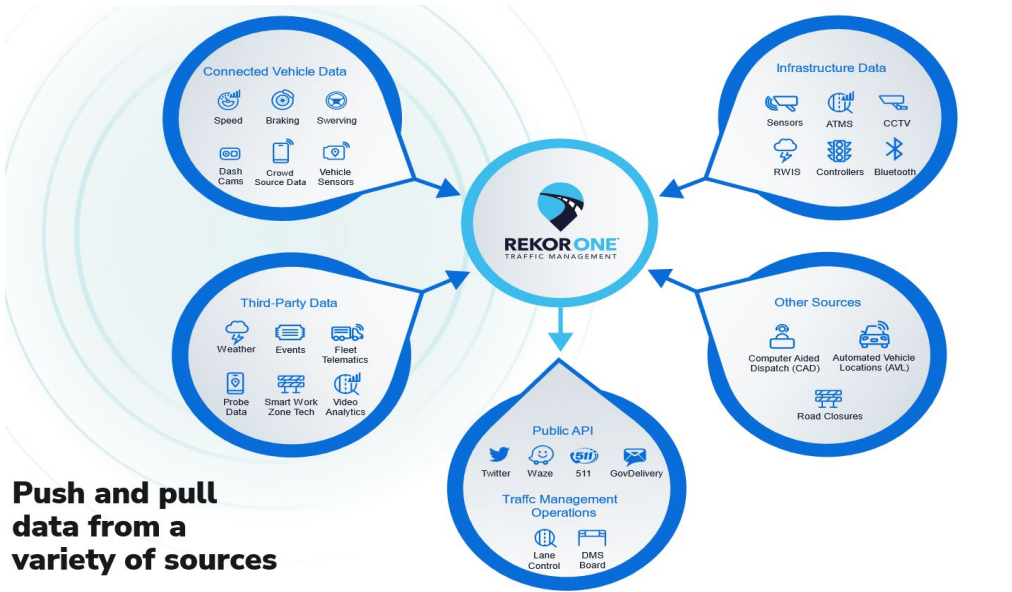
REKOR ONE Incidents

Showing 1 - 50 out of 6662 results

Rekor ID	Status	Address	Type	Start Time	End Time	Completion reason	Completion note	Duration
#4053643	Completed	1-480-48-1842	Crash	23:21, 14 Mar 2022	09:44, 15 Mar 2022	Unknown		1:24 Hr
#4053609	Completed	2304, 14 Mar 2022	Crash	23:04, 14 Mar 2022	04:11, 15 Mar 2022	Unknown		5:08 Hr
#4053342	Completed	1-480-48-1842	Crash	21:40, 14 Mar 2022	23:09, 14 Mar 2022	Unknown		1:29 Hr
#4052955	Completed	148, 750 East 40 Street, Raleigh, NC 27601	Type unknown	20:20, 14 Mar 2022	20:38, 14 Mar 2022	Could not be verified		0:19 Hr
#4051887	Completed	1-480-48-1842	Crash	18:00, 14 Mar 2022	18:39, 14 Mar 2022	Unknown		0:40 Hr
#4051868	Completed	1-480-48-1842	Crash	18:00, 14 Mar 2022	18:39, 14 Mar 2022	Unknown		0:40 Hr
#4051513	Completed	1-480-48-1842	Crash	17:47, 14 Mar 2022	19:27, 14 Mar 2022	Unknown		1:41 Hr
#4051314	Completed	1-172-48-1842	Crash	17:28, 14 Mar 2022	18:25, 14 Mar 2022	Unknown		0:58 Hr
#4051426	Completed	1-480-48-1842	Crash	17:25, 14 Mar 2022	19:09, 14 Mar 2022	Incident resolved		1:44 Hr
#4051229	Completed	1-480-48-1842	Crash	17:25, 14 Mar 2022	18:09, 14 Mar 2022	Unknown		0:45 Hr
#4051305	Completed	1-480-48-1842	Crash	17:10, 14 Mar 2022	17:48, 14 Mar 2022	Unknown		0:39 Hr
#4050871	Completed	1-480-48-1842	Crash	16:55, 14 Mar 2022	18:41, 14 Mar 2022	Unknown		1:46 Hr
#4050826	Completed	1-480-48-1842	Crash	16:50, 14 Mar 2022	17:50, 14 Mar 2022	Unknown		1:00 Hr
#4050783	Completed	1-480-48-1842	Crash	16:47, 14 Mar 2022	17:45, 14 Mar 2022	Unknown		0:58 Hr

Need: more proactively detect incidents to dispatch IMAP and provide additional situational awareness  
*\* First attempt for a software based STIC Project*

# 2019 Project: Advanced Collaboration Technology, Rekor / Waycare Pilot

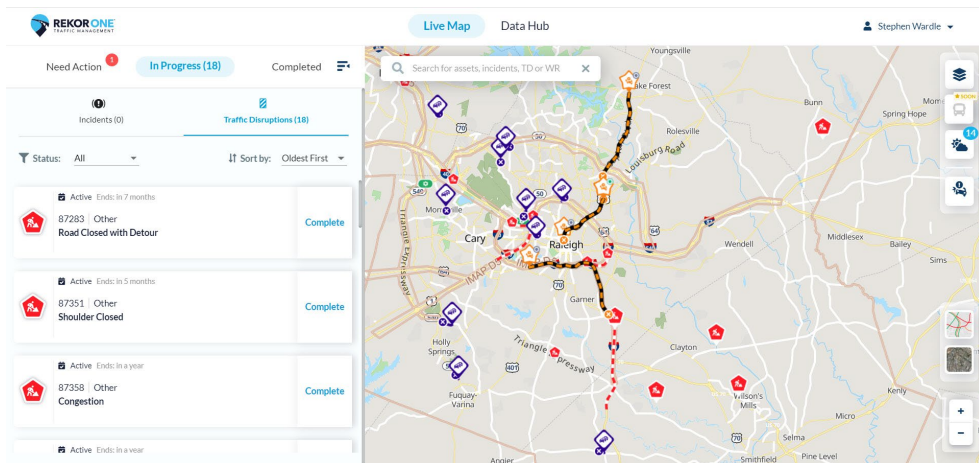


**Push and pull data from a variety of sources**

## Key Findings:

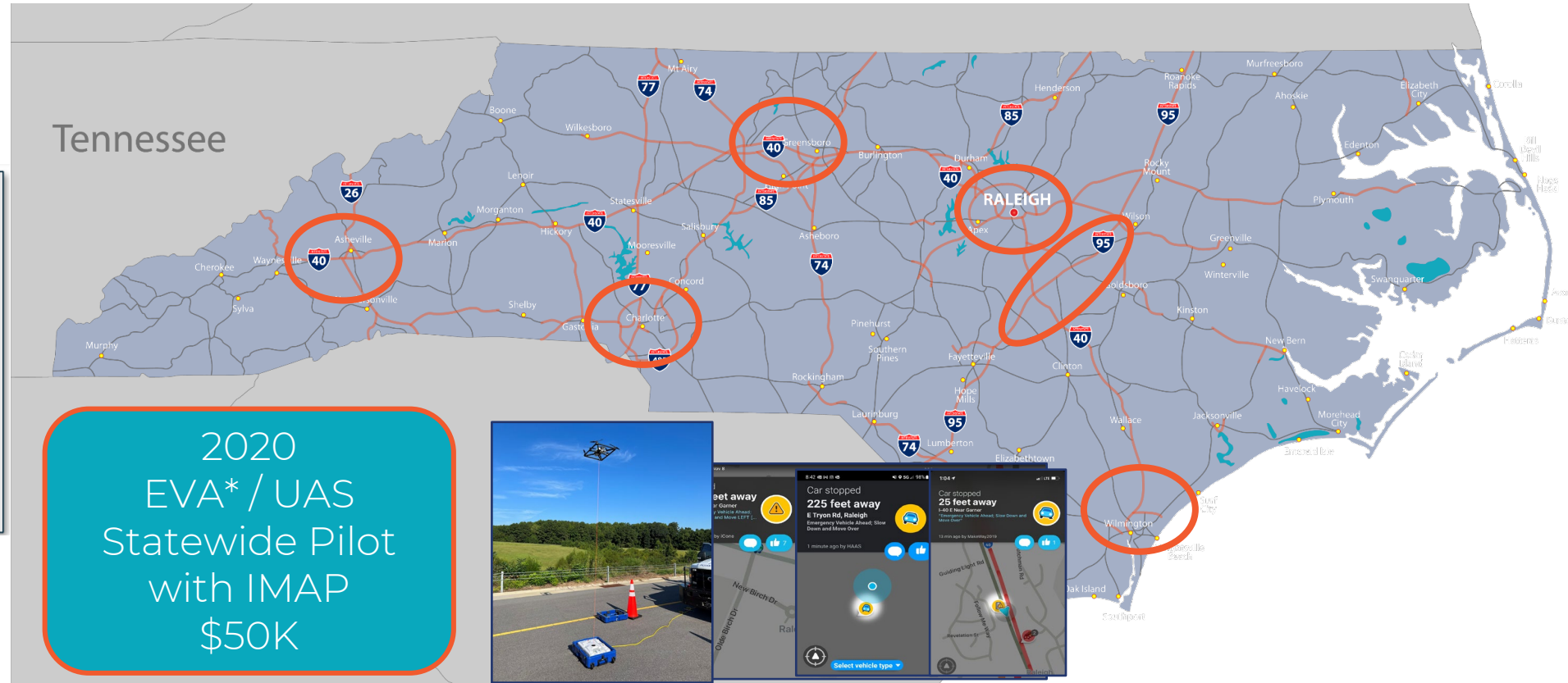
- Increased incident awareness by 17%
- 7% of Rekor detected crashes used; other 93% already detected
- Rekor detected incidents 50% faster than SHP CAD
- On average, Rekor incidents found 12 minutes earlier

Crash Metric	Monthly Average
Total number of crash only incidents identified in Rekor	2,485
Total number of confirmed crashes in Rekor (traffic impacting only)	195
Percentage Confirmed Crashes (over all Crashes Reviewed)	4%
Percent of crashes rejected	93%
Percent of crashes expired	3%
Top 3 Completion Reasons for Rejected Incidents (non-expired)	Could not be verified, Duplicate, False
Total number of crash only incidents identified in TIMS	1,397
Total number of crash only incidents identified in TIMS sourced from Rekor	242
Total percent of crash only incidents identified in TIMS sourced from Rekor	17%

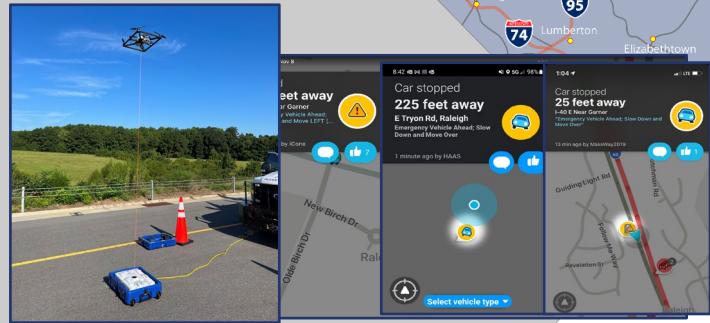




# 2020 Project



2020  
EVA\* / UAS  
Statewide Pilot  
with IMAP  
\$50K



- EDC-5 Innovations (2019-2020)
- ▶ Advanced Geotechnical Methods in Exploration (A-GaME)
  - ▶ Collaborative Hydraulics: Advancing to the Next Generation of Engineering (CHANGE)
  - ▶ Project Bundling
  - ▶ Reducing Rural Roadway Departures (FoRRRwD)
  - ▶ Safe Transportation for Every Pedestrian (STEP)
  - ▶ Unmanned Aerial Systems (UAS)
  - ▶ Crowdsourcing for Operations
  - ▶ Value Capture: Capitalizing on the Value Created by Transportation
  - ▶ Virtual Public Involvement
  - ▶ Weather-Responsive Management Strategies

- Needs:
- Improve situational awareness, especially in areas without camera coverage
  - Improve mobility, to provide better traveler information to motorists
  - Improve the safety of motorists and responders

\*EVA = Emergency Vehicle Alerting Device

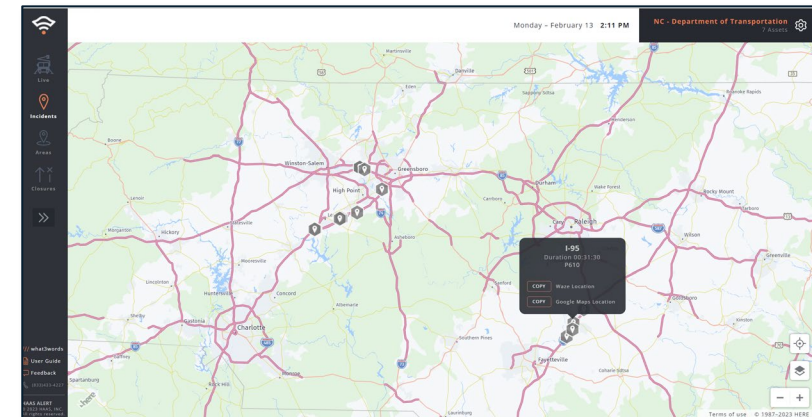
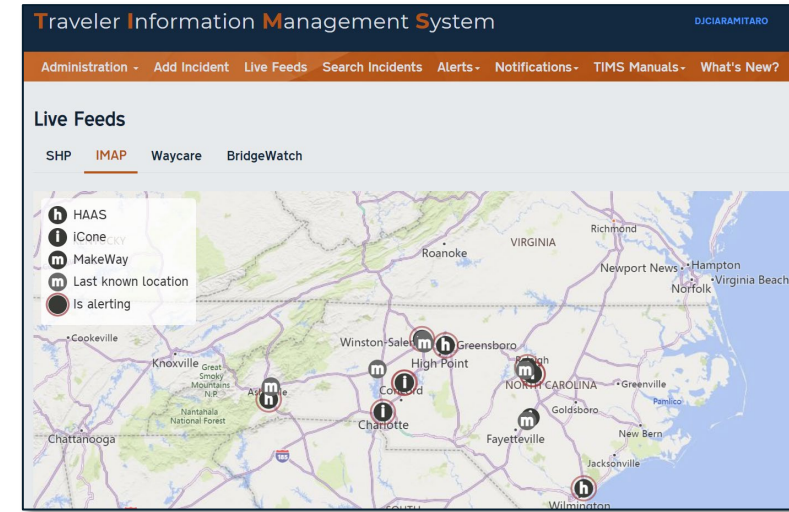
# Emergency Vehicle Alerting (EVA) Devices

## What's the need?

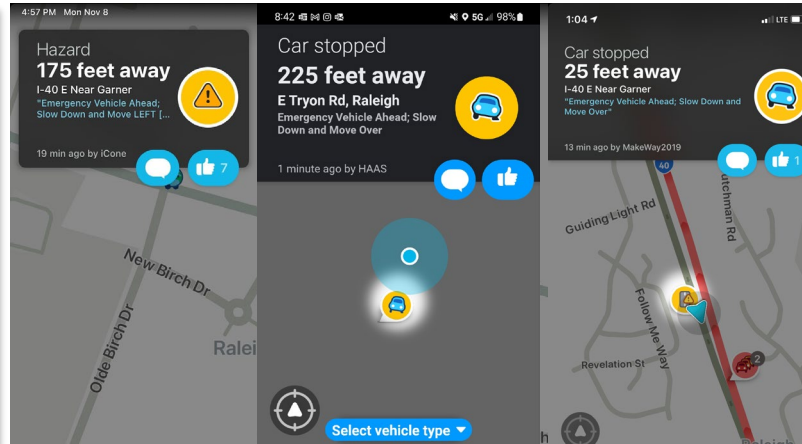
- Notification to approaching traffic with limited sight distance
- Move over law compliance
- Additional safety to responders

## What to do?

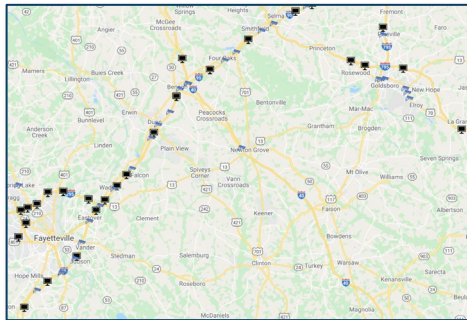
- Pilot for ~28 IMAP trucks
- Install of EVA Devices
  - iCone Work Truck Kit
  - iCone Arrow Board Kit
  - HAAS Alert
  - MakeWay Safety
- Dashboards for analytics



HAAS, HA-5 Transponder



# How we got to Tethered Drones/UAS



Need situational awareness



\$25K for 5 x drones w/ SHP  
No control during incidents



CCTV on IMAF  
Poles over max GVWR  
Low pole height



Regular drones need  
FAA certification



Source: Fotokite.com

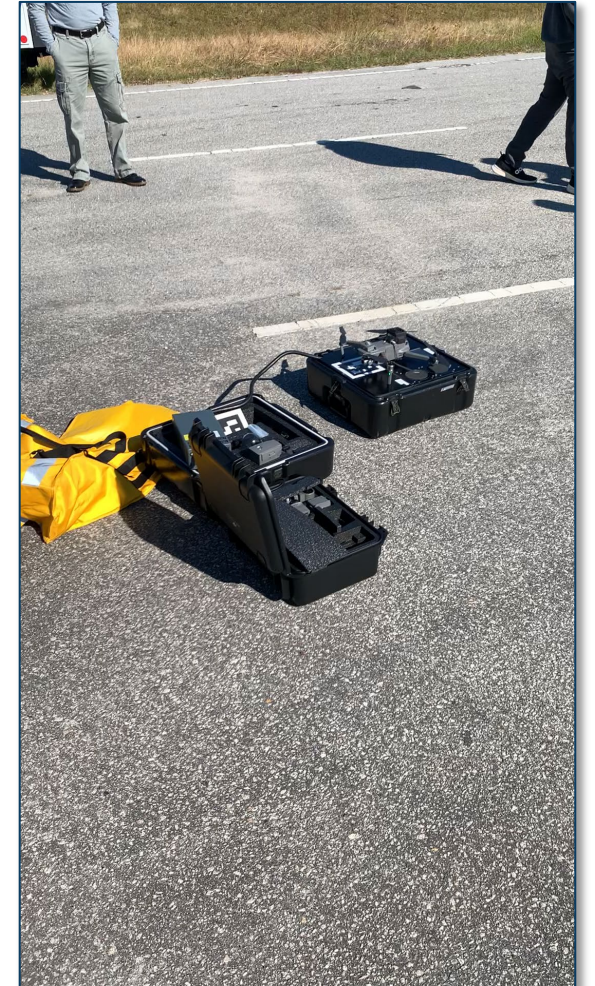


## Tethered UAS Pilot

- Close collaboration with Div of Aviation
  - Training with Checklists
  - Purchasing support
- Procurement Strategies
  - Fotokite – ITRE (Research)
  - Mavik 2 – Div of Aviation (Low Bid)



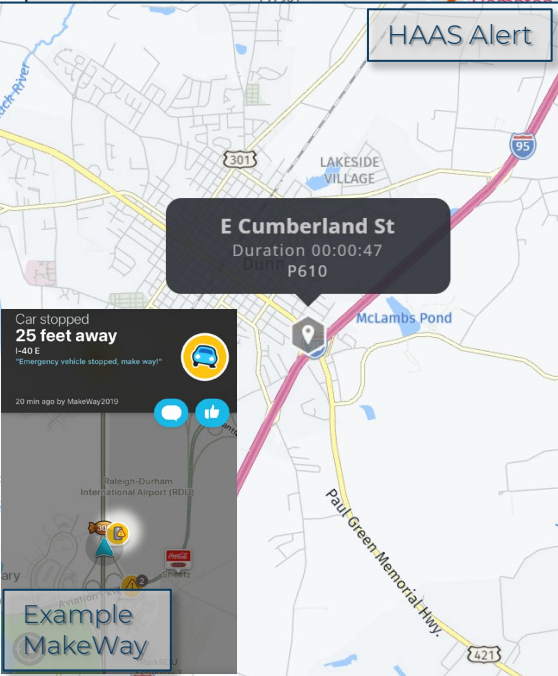
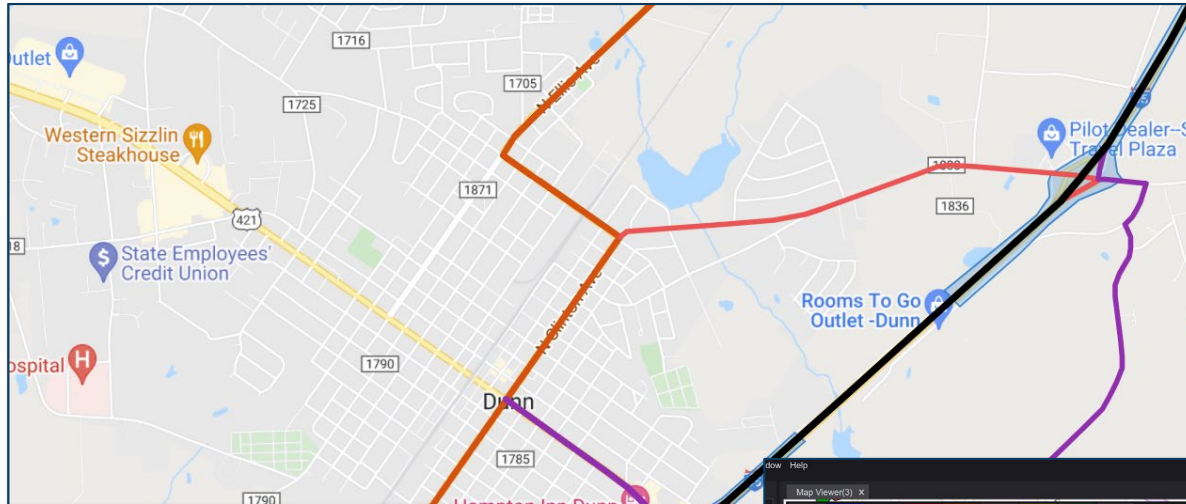
Fotokite



Mavik 2 w/ V-line Tether



Incident: I-95 South/US 421- Dunn, 3/4/22



A screenshot of a traffic management software interface. The top part shows a map with a red circle around a location on I-95. Below the map is a table with columns for Mode/Pattern, Coordination, Time, Preempt, and Alarms. The table contains data for various phases and cycles. At the bottom, there is a 'Manual Commands' section with a list of actions and targets.

Mode / Pattern	Coordination	Time	Preempt	Alarms
Disturb	Actual	Prog		
NONWON	Cycle 52	110		
STBYS	Offset 53	53		

Manual Commands X

Action	Targets	Start	End
Flash >5 minutes (D1)			
Flash >5 minutes (D1)			
Flash >5 minutes (D1)			
Flash (TMSD Testing)			
Flash >5 minutes (D1)			





# 2020 Project – IMAP Connected Technology Evaluations (Surveys)

Table 6. EVA Evaluation Area

Evaluation Area	Description
Ease of Installation	How easy was the device to install on the IMAP vehicles
Latency Information (Dashboard/Waze)	How quickly was the information resonating between the vehicle, the dashboard, and onto Waze for the public motorist to view
Quality of the Data	How accurate was the information
Durability	How well is the device holding up in its location
Device Support	How well did the vendor respond to questions or issues
Applicability	How applicable are the capabilities with respect to traffic incident management (TIM)
Integration with Other Systems	How well is the data able to integrate with TIMS and Waze
Pricing	Is the price reasonable for the solution

Table 9: EVA Matrix Summary

Summary Table	Devices			
	iCone Arrow (Panel)	Haas	iCone Truck (Beacon)	Makeway
<b>Metrics</b>				
EASE OF INSTALLATION	8.0	8.0	8.0	8.0
DEVICE SUPPORT	4.0	2.5	4.0	2.0
LATENCY TO DASHBOARD	7.5	8.0	8.0	8.0
QUALITY OF DATA	7.2	9.0	8.0	8.0
DURABILITY	6.8	7.6	7.5	6.0
APPLICABILITY TO THE USE CASES	10.4	6.0	9.0	7.0
<b>Weighted Average</b>	<b>43.9</b>	<b>41.1</b>	<b>44.5</b>	<b>39</b>

Table 4. UAV Evaluation and Description Used

Evaluation Area	Description
Capability	Was the set-up simple and efficient?
Reliability	Was network access to the UAVs dependable?
Durability	Did weather, wear and tear, or other external factors impact the device's performance?
Video Quality/ Data Requirements	Was the video stream viewable in the application used?
Ease of Use	Was UAV easy to use or did it require more skills to operate it?
Device Support	Was technical support available when needed throughout the project?
Value Added	Did the tethered UAV enhance the capabilities of the Department during incident response?

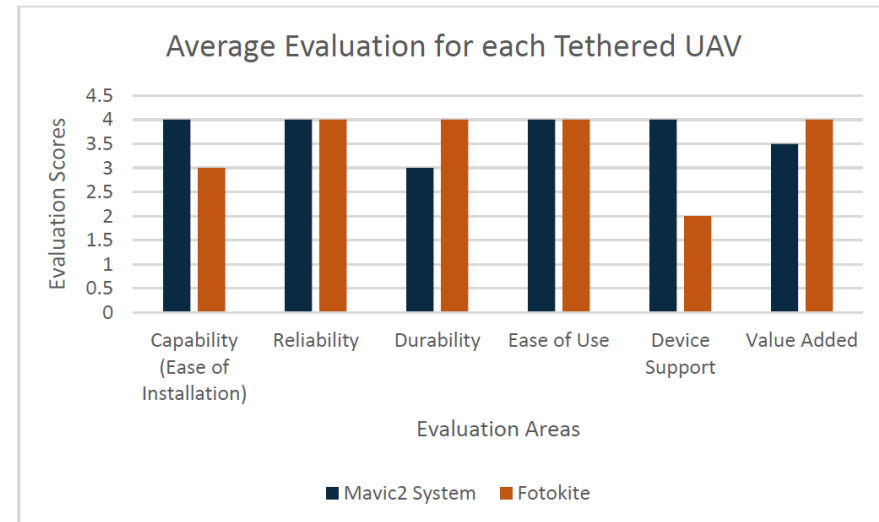


Figure 6. Average Tethered UAV Evaluations Graph

# 2021 Project

## EDC-6 Innovations (2021-2022)

### Crowdsourcing for Advancing Operations

Crowdsourced data can be obtained whenever and wherever people travel, allowing agencies to capture in real time what happens between sensors, in rural regions, along arterials, and beyond jurisdictional boundaries. Agencies at all levels can use crowdsourced data integrated from multiple streams to optimize roadway use for reduced congestion and increased safety and reliability.

### e-Ticketing and Digital AS-BUILTS

Converting paper-based materials ticketing systems and as-built plans into electronic (e-Ticketing) workflows and digital as-builts enhances the accessibility of highway project data. e-Ticketing improves the tracking, exchange, and archiving of materials tickets. Digital information, such as 3D design models and other metadata, enhances the future usability of as-built plans for operations, maintenance, and asset management.

### Next-Generation TIM: Integrating Technology, Data, and Training

Traffic Incident Management (TIM) programs aim to shorten the duration and impact of roadway incidents and improve the safety of motorists, crash victims, and responders. New tools, data, and training mechanisms are available that can benefit both new and existing TIM programs, including local agency and off-interstate applications.

### Strategic Workforce Development

The demand for highway construction, maintenance, and operations workers is growing, while at the same time, emerging technologies require these workers to have new skills. The Highway Construction Workforce Partnership has developed new resources and innovative strategies for identifying, training, and placing individuals in the Contractors' workforce filling the construction jobs that support the Nation's highway system.

### Targeted Overlay Pavement Solutions (TOPS)

Pavement overlays represent a significant portion of highway infrastructure dollars. State and local highway agencies can maximize this investment and help ensure safer, longer-lasting roadways by employing innovative overlay procedures that will improve pavement performance, lessen traffic impacts, and reduce the cost of pavement ownership.

### UHPC for Bridge Preservation and Repair

Ultra-high performance concrete (UHPC) is a new material for bridge construction that has become popular for field-cast connections between prefabricated bridge elements. Bridge preservation and repair is an emerging and promising application for UHPC. UHPC-based repair solutions are robust, and offer superior strength, durability, and improved life-cycle cost over traditional methods. State and local agencies can deploy UHPC for bridge preservation and repair to maintain or improve bridge conditions.

### Virtual Public Involvement (VPI)

Public engagement during transportation project planning and development helps agencies identify issues and concerns early in the process, which can ultimately accelerate delivery. Virtual public involvement strategies supplement traditional face-to-face information sharing with technology platforms that increase the number and variety of methods agencies use to inform the public, receive feedback, and collect and consider comments.

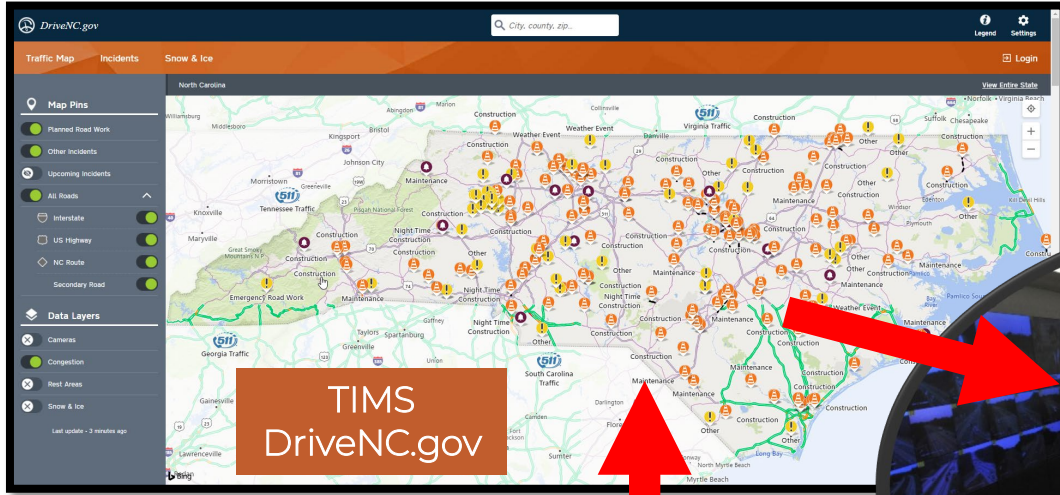


2021 Automated Waze Closures \$50K

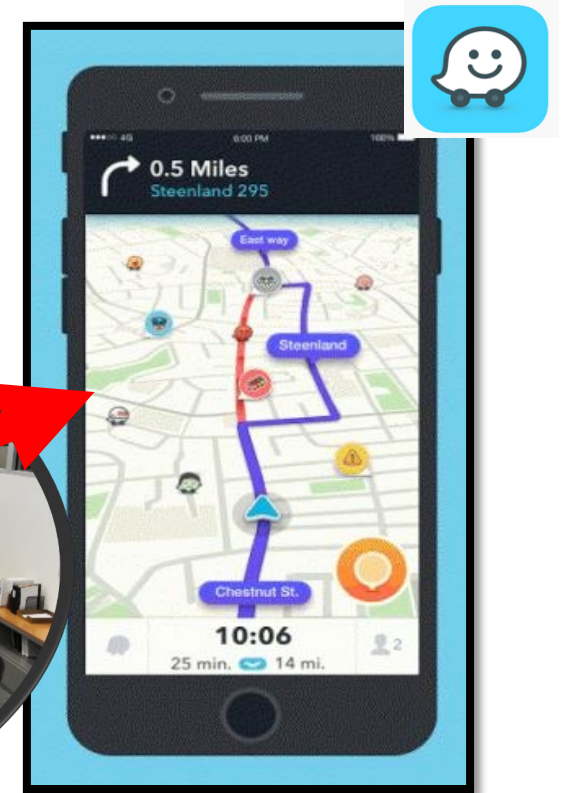
Need: increase safety by automating full road closures within Waze



# The Need:



2500 Road Closures!



September 2018



# Full Closure Order of Magnitude

- Emergencies
  - 2500 for Hurricane Florence (2018)
  - 1500 for Hurricane Matthew (2016)
- Day to Day
  - crashes, work zones, downed power lines, etc.
  - Friday, 9/23 @ 1 pm: 121 roads closed in NC



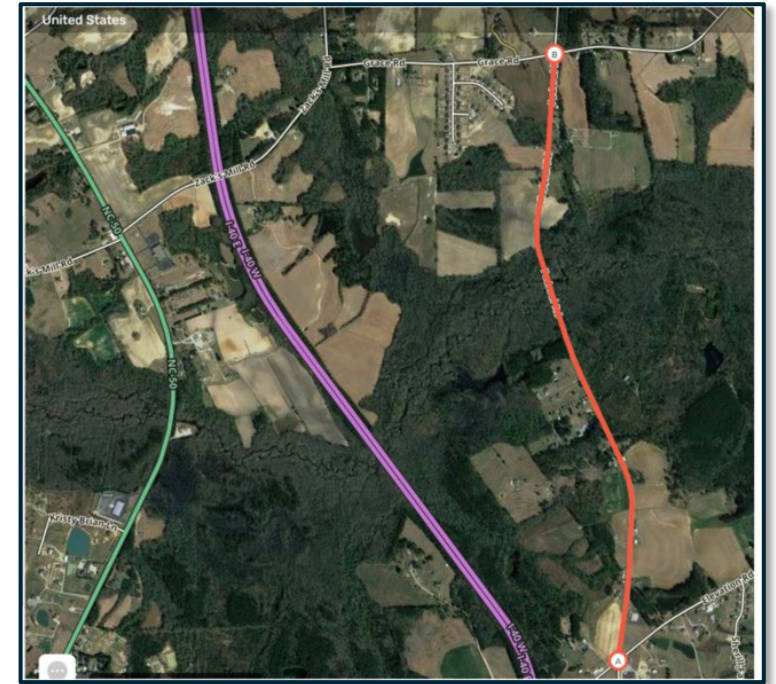
Rain from Tropical Storm Ophelia left Church Street in Winterville, in Pitt County, North Carolina, flooded on Saturday afternoon. (Courtesy/Shawn Hendrix)

	A	B	C	D	F	G	H	L	M	N	O	P	Q	R	S	T	
1	Incident ID	StartTime	EndTime	RoadName	Direction	Cross St	Cross Street Common Name	County	City	Div	Latitude	Longitude	Impact	Condition	CommonName	Incident Type	Reason
2	487333	18:00.0	49:00.0	SR-1215	Both	US-13	US-13	Wayne	Goldsboro	4	35.29732	-78.1309	Medium	Road Closed	Weaver Rd	Weather Event	Hurricane Matthew flooding, road
3	490178	45:00.0	05:07.2	NC-133	Both	NULL		Brunswick	Boiling Spring Lakes	3	34.09776	-77.9677	High	Road Closed	River Road	Weather Event	The road is closed near Funston Ro
4	492450	51:00.0	23:45.2	NC-41	Both	SR-1514	SR-1514	Bladen	White Lake	6	34.65502	-78.4669	Medium	Road Closed	NC 41	Weather Event	NC 41 flooded at Colly Creek west
5	492452	55:00.0	54:11.3	SR-1150	Both	SR-1206	Happy Valley Rd	Bladen	Elizabethtown	6	34.60764	-78.6484	Medium	Road Closed	Peanut Plant Rd	Weather Event	Road closed at Blue Herron Drive n
6	492455	34:00.0	09:27.7	US-701	Both	SR-1005	Peacock Rd	Columbus	Whiteville	6	34.43169	-78.7315	High	Road Closed with	James B White High	Weather Event	US 701 North (James B White High
7	492460	27:00.0	59:06.1	I-95	Both	SR-1811	SR-1811	Harnett	Dunn	6	35.25061	-78.6284	High	Road Impassable		Weather Event	The road is now open.
8	492462	46:00.0	09:17.6	SR-1336	Both	NC-87	NC-87	Bladen	Elizabethtown	6	34.65216	-78.6723	Medium	Road Closed	Owen Hill Rd	Weather Event	The road is closed near NC-87, 1.1
9	492465	58:00.0	22:00.4	SR-1257	Both	SR-1260	SR-1260	Bertie	Windsor	1	36.04055	-77.0115	Low	Lane Closed	School Rd	Weather Event	Hurricane Matthew caused roadwa
10	492466	59:00.0	18:34.9	SR-1790	Both	SR-1780	SR-1780	Harnett	Dunn	6	35.28938	-78.6319	Medium	Road Closed	Chicken Farm Rd	Weather Event	SR 1790 (Chicken Farm Road) is clo
11	492471	15:00.0	35:11.7	NC-87	Both	NC-20	NC-20	Bladen	Tar Heel	6	34.76719	-78.8102	High	Road Closed	NC Highway 87	Weather Event	NC 87 is closed between NC 20 and
12	492473	32:00.0	39:46.9	NC-242	Both	SR-1325	SR-1325	Bladen	Elizabethtown	6	34.76036	-78.6047	Medium	Road Closed	NC 242	Weather Event	The road is closed near Gum Spring
13	492474	42:00.0	53:03.0	SR-1105	Both	NC-131	NC-131	Bladen	Dublin	6	34.64523	-78.751	Medium	Road Closed	Paul Brinson Rd	Weather Event	Road closed due to washout cause
14	492476	54:00.0	54:34.2	SR-1002	Both	SR-1793	SR-1793	Harnett	Dunn	6	35.26183	-78.6031	Medium	Road Closed	Long Branch Rd	Weather Event	SR 1002 (Long Branch Road) is clos
15	492478	00:00.0	56:22.1	SR-1708	Both	SR-1700	Mercer Mill Brown	Bladen	Elizabethtown	6	34.55537	-78.578	Medium	Road Closed	Old Rosindale	Weather Event	Road washed out between Coley R
16	492479	03:00.0	55:34.3	SR-1009	Both	SR-1332	SR-1332	Lee	Sanford	8	35.48095	-79.2201	High	Road Impassable	Carbonton Rd	Weather Event	
17	492482	17:00.0	01:26.5	US-1	Both	SR-1406	SR-1406	Lee	Sanford	8	35.50124	-79.1797	High	Road Impassable	Hawkins Ave	Weather Event	Tree down across road with power
18	492483	00:00.0	19:43.1	SR-1902	Both	NC-42	NC-42	Johnston	NULL	4	35.63723	-78.419	Low	Road Closed	Rocky Branch Rd	Weather Event	Road closed due to high water .



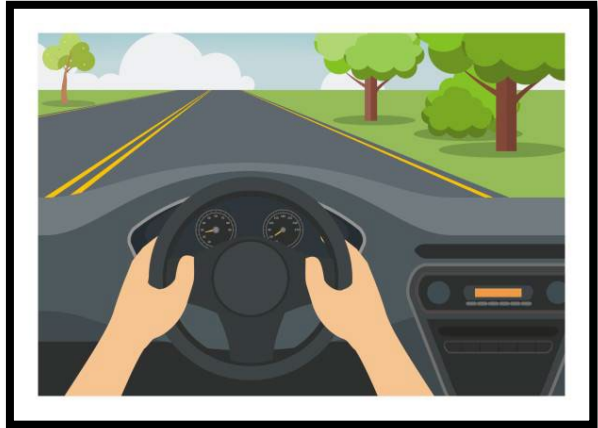
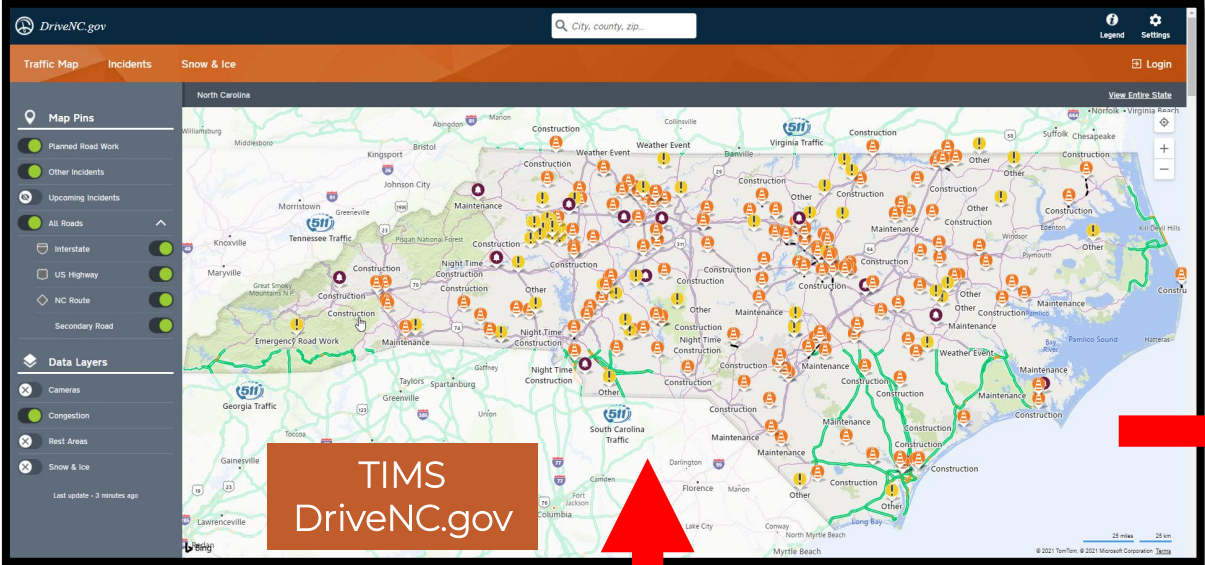
## Waze Full Closures

- In-house by NCDIT-T GIS & Web Team
- Approach
  - Use manually-entered polylines for TIMS closure incidents
  - Use Waze Reverse Geocoding API to determine road name
  - TIMS road and direction fields to determine closure directionality
  - Host feed
  - Submit feed to Waze



```
<incident>
  <id>22678699</id>
  <type>ROAD_CLOSED</type>
  <subtype>ROAD_CLOSED_CONSTRUCTION</subtype>
  <reference>one.network</reference>
  <starttime>2022-06-20T08:00:00+01:00</starttime>
  <endtime>2022-06-20T17:59:00+01:00</endtime>
  <description>Closed until 18:00 for roadworks. Ref #22678699</description>
  <location>
    <street>Pouchen End Ln</street>
    <location_description>Pouchen End Lane</location_description>
    <polyline>51.766060 -0.513720 51.765560 -0.513241
              51.765230 -0.512990 51.764570 -0.512540
              51.764210 -0.512330 51.763690 -0.512141
              51.763420 -0.512060 51.762680 -0.511971
              51.761740 -0.511960 51.761540 -0.511960
    </polyline>
    <direction>BOTH DIRECTIONS</direction>
  </location>
</incident>
```

# STIC and Traffic Systems Operations



Over *9,000* NC road closures have automatically appeared in Waze and rerouted traffic!



# 2022 Project

## EDC-6 Innovations (2021-2022)

### Crowdsourcing for Advancing Operations

Crowdsourced data can be obtained whenever and wherever people travel, allowing agencies to capture in real time what happens between sensors, in rural regions, along arterials, and beyond jurisdictional boundaries. Agencies at all levels can use crowdsourced data integrated from multiple streams to optimize roadway use for reduced congestion and increased safety and reliability.

### e-ticketing and Digital AS-builts

Converting paper-based materials ticketing systems and as-built plans into electronic (e-Ticketing) workflows and digital as-builts enhances the accessibility of highway project data. e-Ticketing improves the tracking, exchange, and archiving of materials tickets. Digital information, such as 3D design models and other metadata, enhances the future usability of as-built plans for operations, maintenance, and asset management.

### Next-Generation TIM: Integrating Technology, Data, and Training

Traffic Incident Management (TIM) programs aim to shorten the duration and impact of roadway incidents and improve the safety of motorists, crash victims, and responders. New tools, data, and training mechanisms are available that can benefit both new and existing TIM programs, including local agency and off-interstate applications.

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The demand for highway construction, maintenance, and operations workers is growing, while at the same time, emerging technologies require these workers to have new skills. The Highway Construction Workforce Partnership has developed new resources and innovative strategies for identifying, training, and placing individuals in the Contractors' workforce filling the construction jobs that support the Nation's highway system.

### Targeted Overlay Pavement Solutions (TOPS)

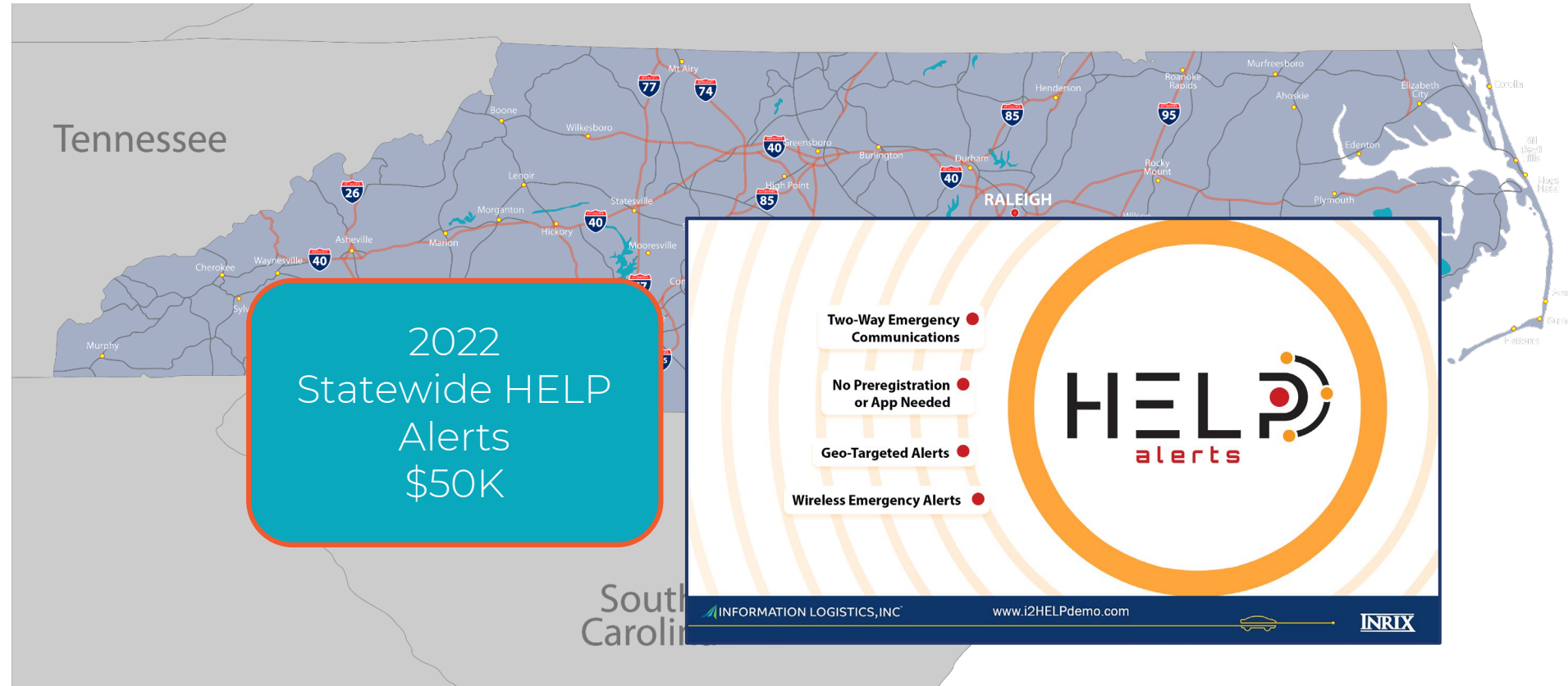
Pavement overlays represent a significant portion of highway infrastructure dollars. State and local highway agencies can maximize this investment and help ensure safer, longer-lasting roadways by employing innovative overlay procedures that will improve pavement performance, lessen traffic impacts, and reduce the cost of pavement ownership.

### UHPC for Bridge Preservation and Repair

Ultra-high performance concrete (UHPC) is a new material for bridge construction that has become popular for field-cast connections between prefabricated bridge elements. Bridge preservation and repair is an emerging and promising application for UHPC. UHPC-based repair solutions are robust, and offer superior strength, durability, and improved life-cycle cost over traditional methods. State and local agencies can deploy UHPC for bridge preservation and repair to maintain or improve bridge conditions.

### Virtual Public Involvement (VPI)

Public engagement during transportation project planning and development helps agencies identify issues and concerns early in the process, which can ultimately accelerate delivery. Virtual public involvement strategies supplement traditional face-to-face information sharing with technology platforms that increase the number and variety of methods agencies use to inform the public, receive feedback, and collect and consider comments.



Need: better communication with motorists of upstream significant incidents or those stuck in queues

## Traffic Wireless Emergency Alerts (WEAs)

- Infrequent, but impactful
- Current system
  - STOC fills out a form and works with State Emergency Management to enter in software
  - Takes over an hour to issue WEA
  - Requires County EM approval then State EM approval
- Emergency Management software
  - Dated
  - Not uniform across state





## 2022 Project – HELP Alerts

- \$50K to support startup costs (~\$200K initial)
- Expedited templates and approvals
- HELP sends WEAs to motorists (initial alert)
  - Directs to a website with info about the incident
  - Capable of two-way communication
- Continuing to evaluate

The HELP alerts logo is a large orange circle containing the text 'HELP alerts' in black and red. To the left of the logo is a list of features, each with a red dot:

- Two-Way Emergency Communications
- No Preregistration or App Needed
- Geo-Targeted Alerts
- Wireless Emergency Alerts

At the bottom of the slide, there is a dark blue footer with the following text: 'INFORMATION LOGISTICS, INC' on the left, 'www.i2HELPdemo.com' in the center, and the INRIX logo on the right.



**CMAM/WEA Text:** NCDOT: I-40 WEST closed between exits 287 and 283B. Go to <https://ncdot.511connect.com>

Highway Emergency Linked Platform = HELP  
Wireless Emergency Alerts = WEA

# 2023 Project

## EDC-7 Innovations (2023-2024)

### Nighttime Visibility for Safety

The nighttime crash fatality rate is three times the daytime rate. Enhancing visibility along corridors, intersections, and pedestrian crossings can help reduce fatalities. This initiative promotes traffic control devices and properly designed lighting to improve safety for all users.

### Next Generation TIM: Technology for Saving Lives

Over six million crashes a year in the U.S. put responders and other vulnerable road users at risk. Next-Generation Traffic Incident Management programs promote emerging technologies such as emergency vehicle lighting and queue warning solutions. These and other tools can advance safety and operations to mitigate incident impacts.

### Integrating GHG Assessment and Reduction targets in Transportation Planning

Transportation is the largest emitter of greenhouse gases in the U.S. This initiative provides resources to help agencies quantify greenhouse gases and set goals to decrease motor vehicle, construction, and life-cycle emissions through planning and project development.

### Enhancing Performance with Internally Cured Concrete (EPIC<sup>2</sup>)

Cracking in concrete is a limiting factor in achieving long-term concrete performance. Internal curing mitigates shrinkage cracking and has the potential to substantially extend the service life of concrete bridge decks and enhance the performance of pavements and repairs.

### EPDs for Sustainable Project Delivery

Construction materials such as concrete and asphalt have environmental impacts during their life cycle. Environmental product declarations, or EPDs, document those impacts. This tool helps States support procurement decisions and quantify embodied carbon reductions using life cycle assessments for sustainable pavements.

### Rethinking DBE for Design-Build

Many disadvantaged business enterprise program procedures do not adequately address design-build contracting. New practices are available to support the effective integration of program requirements to help small, disadvantaged businesses compete for design-build contracts.

### Strategic Workforce Development

The demand for highway workers is growing, and emerging technologies require new skills. This innovation helps stakeholders improve their ability to identify, train, and place highway construction workers. The focus will expand to rural and Tribal communities to increase career opportunities.



Need: Better protect motorists and IMAP responders when removing debris from the travel lanes

# Typical schedule for STIC projects (Example Debris Removal Tools)



## DOCUMENT

potential benefits and metrics to evaluate the technology



## PROCURE

equipment and confirm pilot vehicles; collaborate with SW Fleet Management  
- **Debris Clear** in procurement  
- **MoDOT tools**: Scoping with vendors



## INSTALL

the Debris Removal System on IMAP vehicles  
- **Lane Blane** Installed



## CONDUCT

pilot use of the debris removal system



## DOCUMENT

findings and provide recommendations

# Performance Metrics

- No set way to do evaluations, try to develop prior to deploying
- Successes and Failures
- Vary with project
- Technology may not be ready, now, but maybe later
- Sharing feedback
  - Vendor
  - FHWA
  - Other States

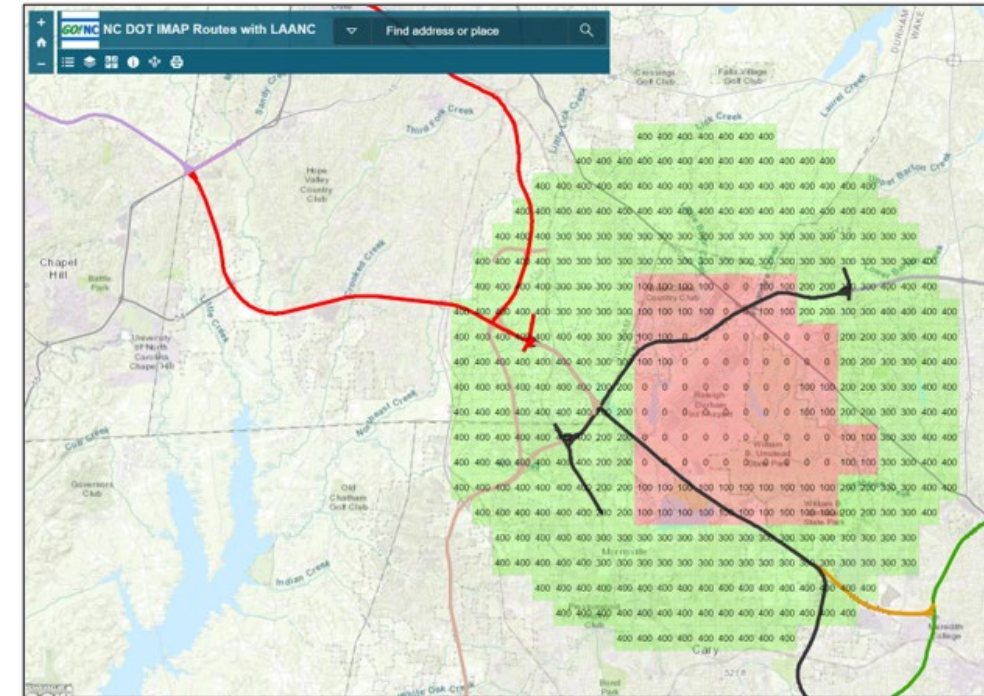
PILOT EVALUATION REPORT	
Table of Contents	
Contents	
Table of Contents	2
Executive Summary	3
Introduction and Purpose	3
Evaluation Overview	4
Methodology	4
STIC Grant Criteria	4
Planning Phase	4
Implementation Phase	5
Utilization Phase	5
Operational Criteria	8
Predictive Traffic Capabilities	8
Number of Incidents Detected	8
Incident Detection Time	9
Key Findings	10
Overall Budget	10
Lessons Learned	11
Conclusion	12

NCDOT STIC Grant Final Report: Safety Service Patrol Technology Pilot	
Table of Contents	
Executive Summary	3
Introduction	4
Project Description	4
Unmanned Aerial Vehicles (UAV)	6
UAV Evaluation Method	6
UAV Types (What)	6
UAV Test Locations (Where)	7
UAV Testers (How)	7
UAV Distribution (When)	8
UAV Procedures (How)	10
UAV Findings	11
UAV Assessment	14
UAV Conclusion	15
Emergency Vehicle Alert (EVA) Devices	17
EVA Evaluation Method	17
EVA Types (What)	17
EVA Test Locations (Where)	18
EVA Testers (How)	18
EVA Distribution (When)	19
EVA Procedures (How)	19
EVA Findings	20
EVA Assessments	21
EVA Conclusion	23
Summary	25
Recommendations	26
Appendix A – Checklists and Instruction Reference	27
Appendix B – Evaluation Forms	35
Appendix C – Project Budget	37



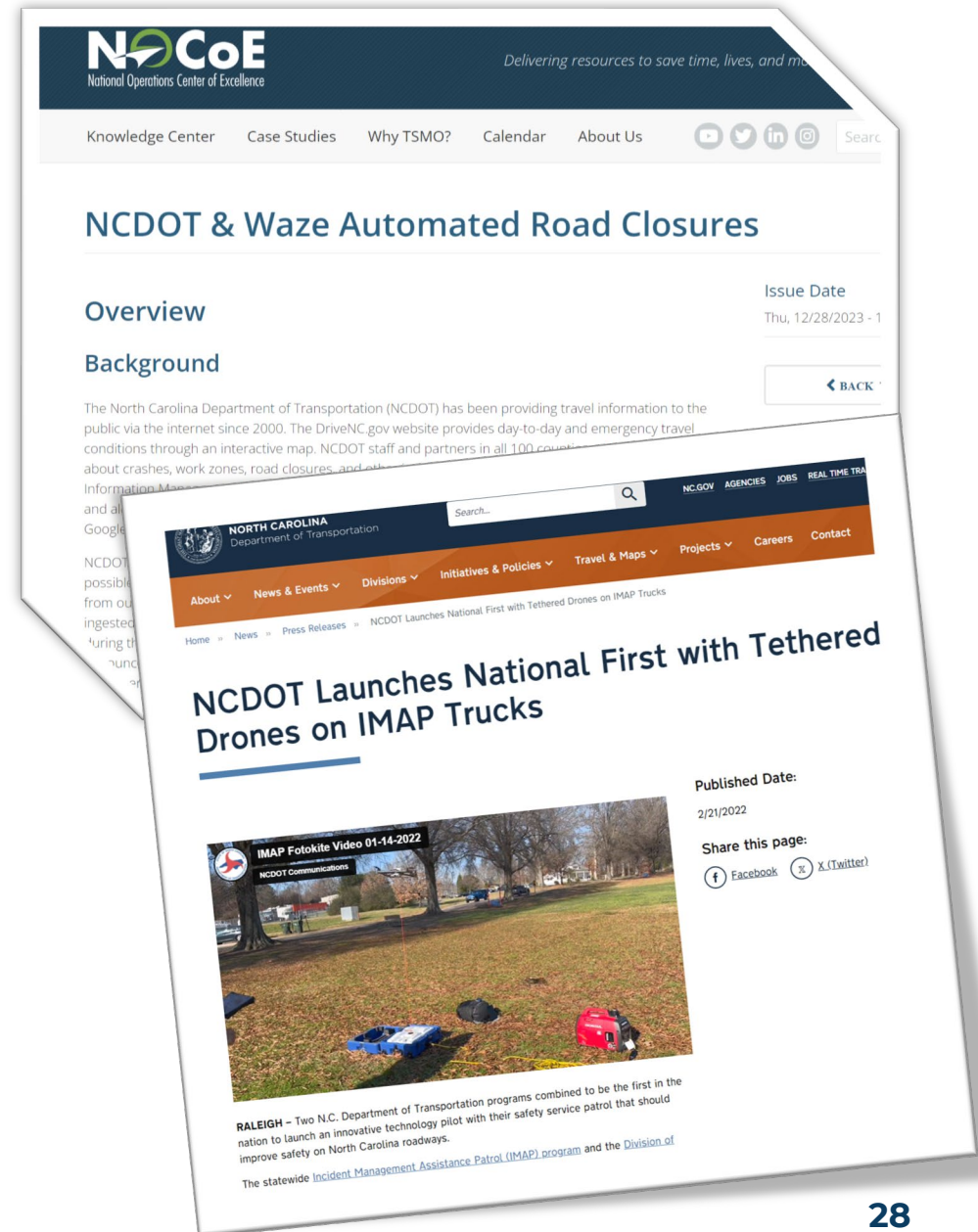
## Challenges with STIC

- Lengthy software procurements
  - Pilot projects have some leeway, but not much
- Overcoming existing laws and regulations
  - FAA and use of drones in restricted airspace
  - Software
- Estimating costs and time
- Sole source purchasing; if not on statewide contract, may have to go out to bid
- Change management – Statewide good-ideas implemented at lowest level



## Success with STIC

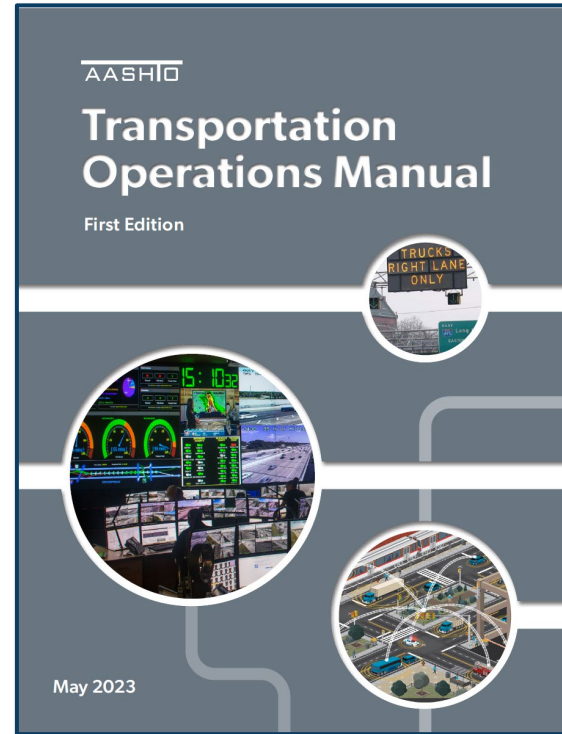
- Allows you to “try” something out without a long-term commitment
- Potential to drive future long-term change through the evaluation report
- Vendors willing to work with you to stay within funding constraints; future benefits
- High payoff for success and failure is low risk – helps to refine both vendor and NCDOT use of technology
- Partner with other groups (DIT, SW Maintenance, Div of Aviation, ITRE, etc.)
- Creative purchasing solutions
- Good news stories for NCDOT





## Takeaways

- FHWA Every Day Counts and STIC
- Meet a need, not just a cool toy
- Persistence with process
- Change management
- Opportunity to work with others
- Tell your story





# Contact Us

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**Thank you!**

