NORTH CAROLINA
Department of Transportation

# FHWA's Role in NC-TIC

George Hoops, PE

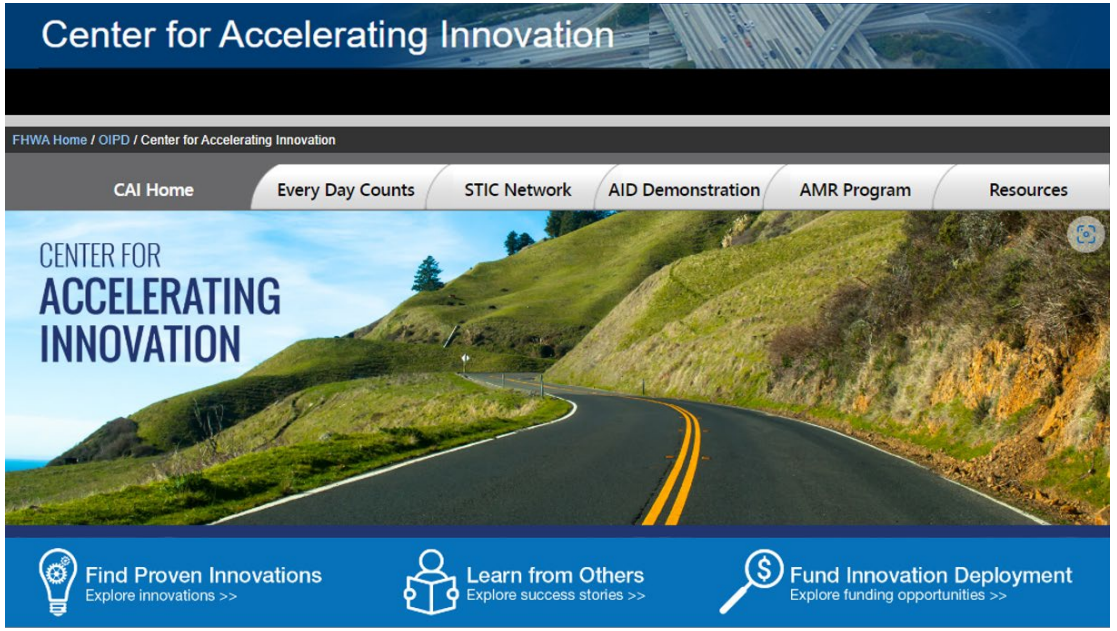
Planning and Program Development Manager

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



**Every Day Counts**
Innovation for a Nation on the Move

*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.

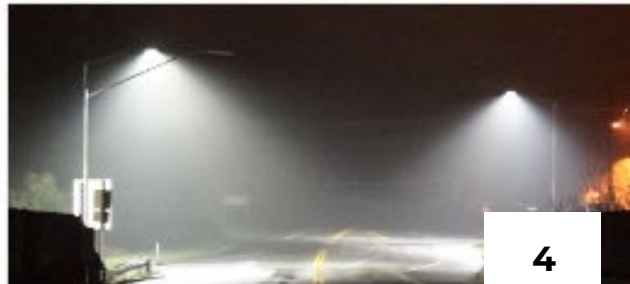
Victor Mendez, FHWA Fall  Business Meeting 2009

# 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

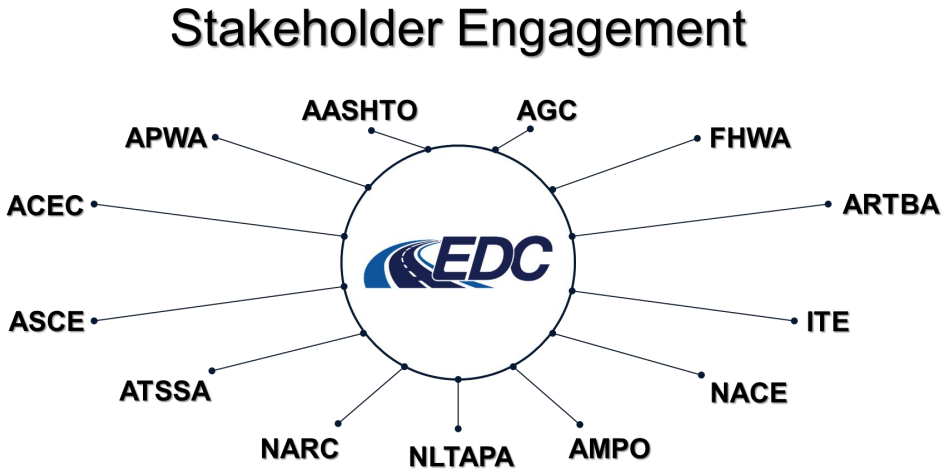
Every Day Counts
Innovation for a Nation on the Move

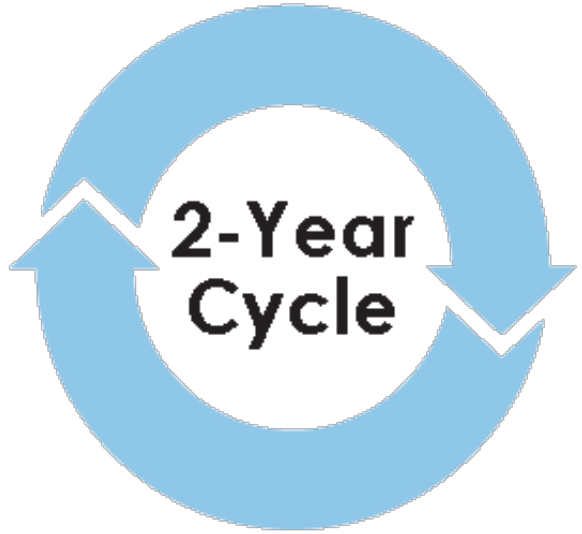


# FHWA's Innovation Role

## 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



# 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.

| Round 1 | Round 2 | Round 3 | Round 4 | Round 5 | Round 6 | Round 7 |
|---|---|---|---|---|---|---|
| (2011-2012) | (2013-2014) | (2015-2016) | (2017-2018) | (2019-2020) | (2021-2022) | (2023-2024) |
| 14 Innovations | 13 Innovations | 12 Innovations | 11 Innovations | 10 Innovations | 7 Innovations | 7 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.

Every Day Counts
Innovation for a Nation on the Move

AID Demo
Accelerated Innovation Deployment

# 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
Department of Transportation

NCDOT
VMO
VALUE MANAGEMENT

# 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

NCDOT
VMO
VALUE MANAGEMENT

# 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.
SOUTH
220

# 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.

*New in 2024

- Clean Transportation Plan implementation.
- Management of CMAQ, Carbon Reduction, and NEVI programs.
- Discretionary grant strategy and pursuits.
- Corridor Development Engineers.

*Coming Soon

- Value Management Office and innovation
- Data strategy, integration, and governance.
- Emerging technology exploration and strategy (e.g., CAVs).

# 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

| Innovations | Where we are now | In two years | POC |
|---|---|---|---|
| Nighttime Visibility for Safety | Development Stage | Assessment Stage | Shawn Troy<br>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<br>Michelle Gaddy<br>Lisa Wilson |
| Strategic Workforce Development | Development Stage | Institutionalized Stage | Ebony Pittman<br>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

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

## 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 ($EPIC^2$)

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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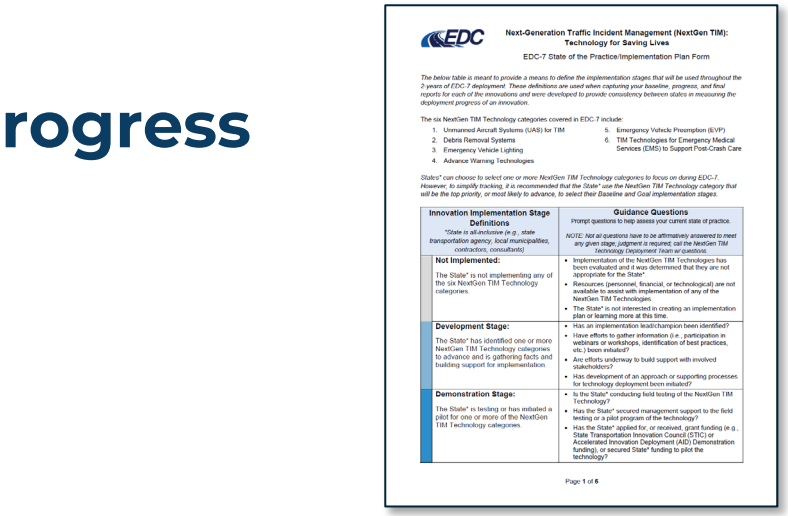
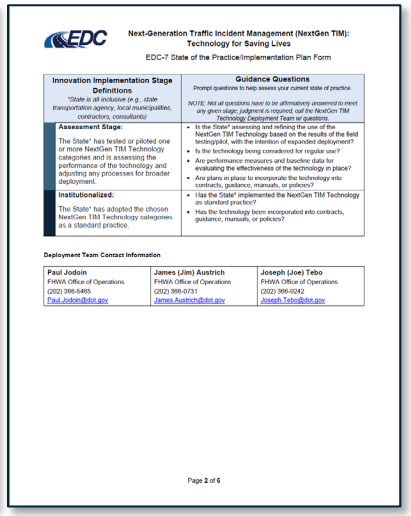
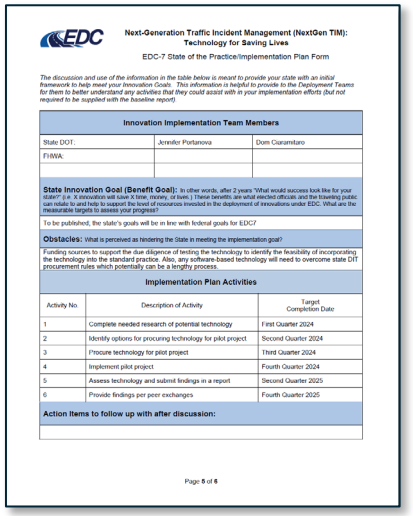
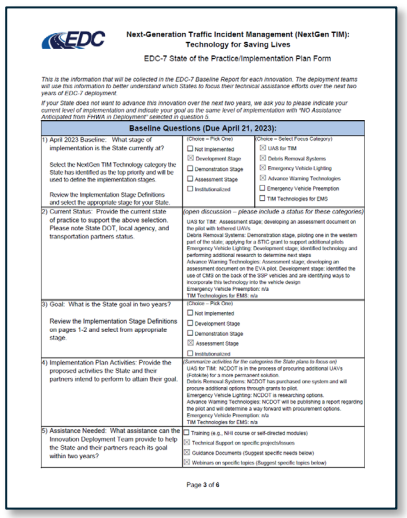


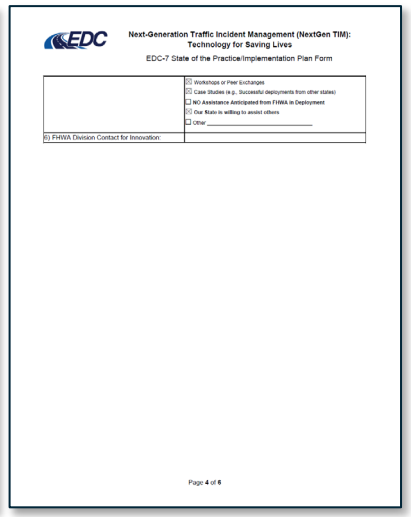




Definition and Guidance

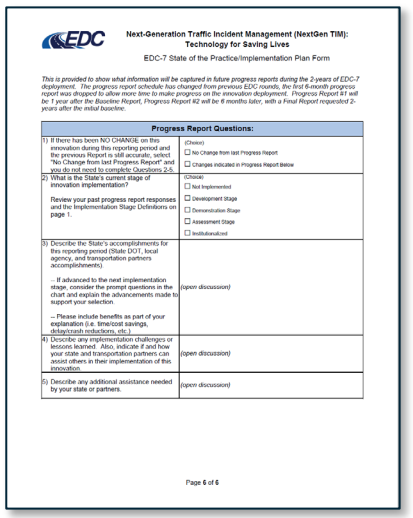



Implementation Plan




Baseline Questions




Periodic Progress Reports

# Next Generation TIM Technology

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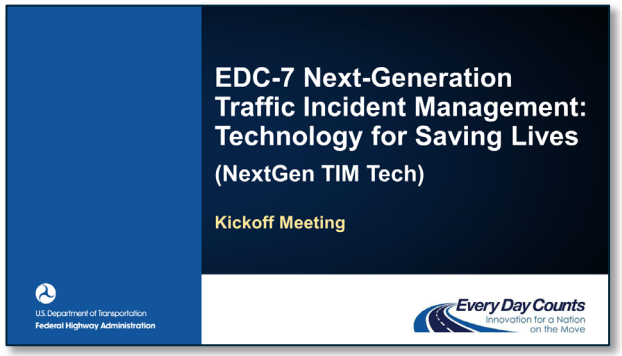
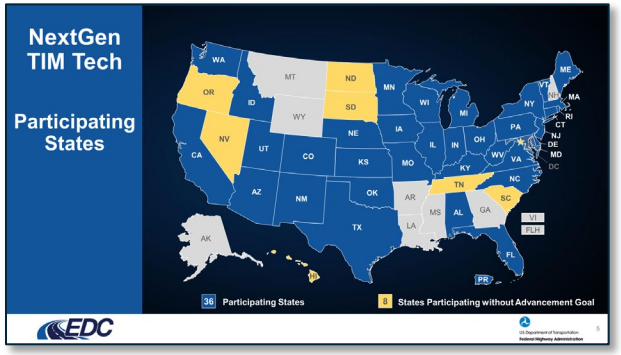



STIC
State Transportation Innovation Councils



# 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
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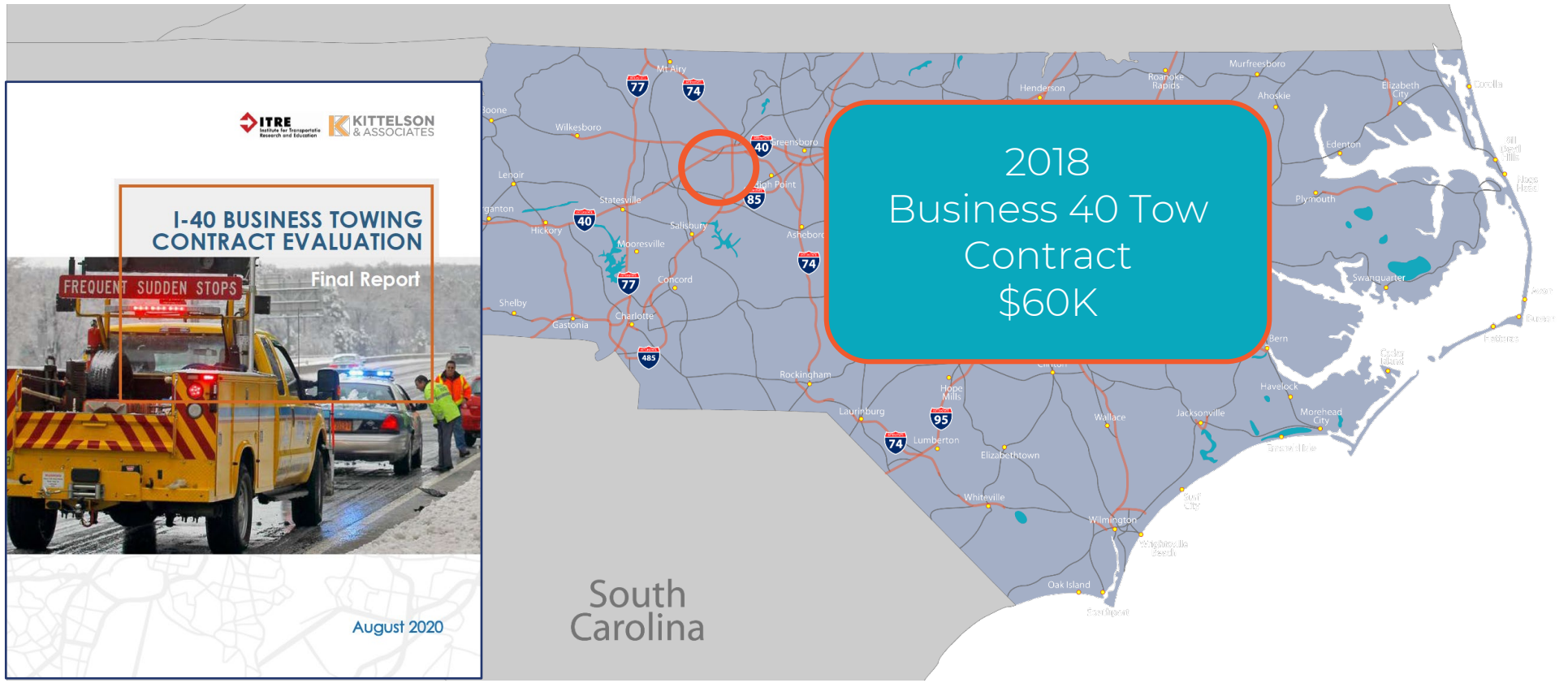
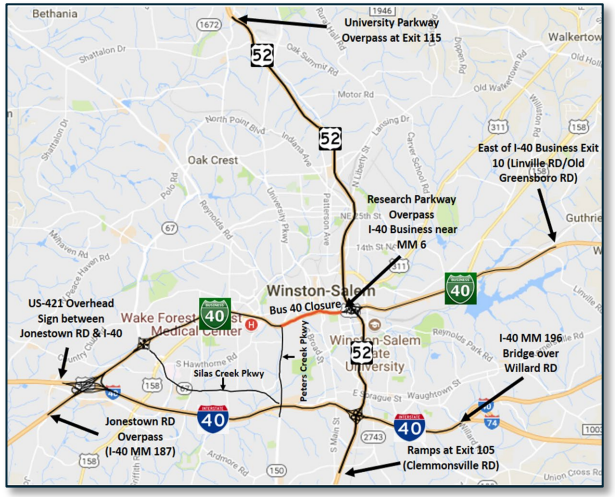



Need: conduct a before/after study to show the value of NCDOT administered tow contracts

# 2018 Project – Business 40 Towing Contract Evaluation

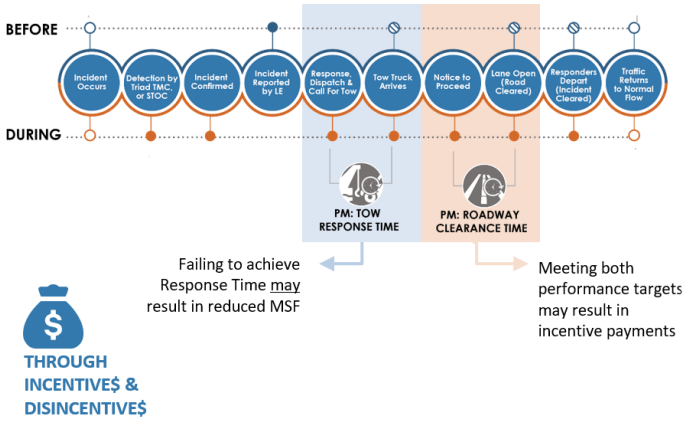
- Reconstruction of 1.2 mile section of US 421 (Bus. 40)
- Closed Nov 2018 – Feb 2020



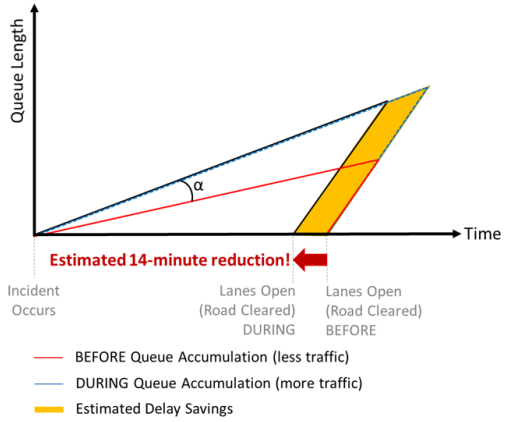

## Traffic Management Tools

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

## Tower Incentives




## 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

## 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)
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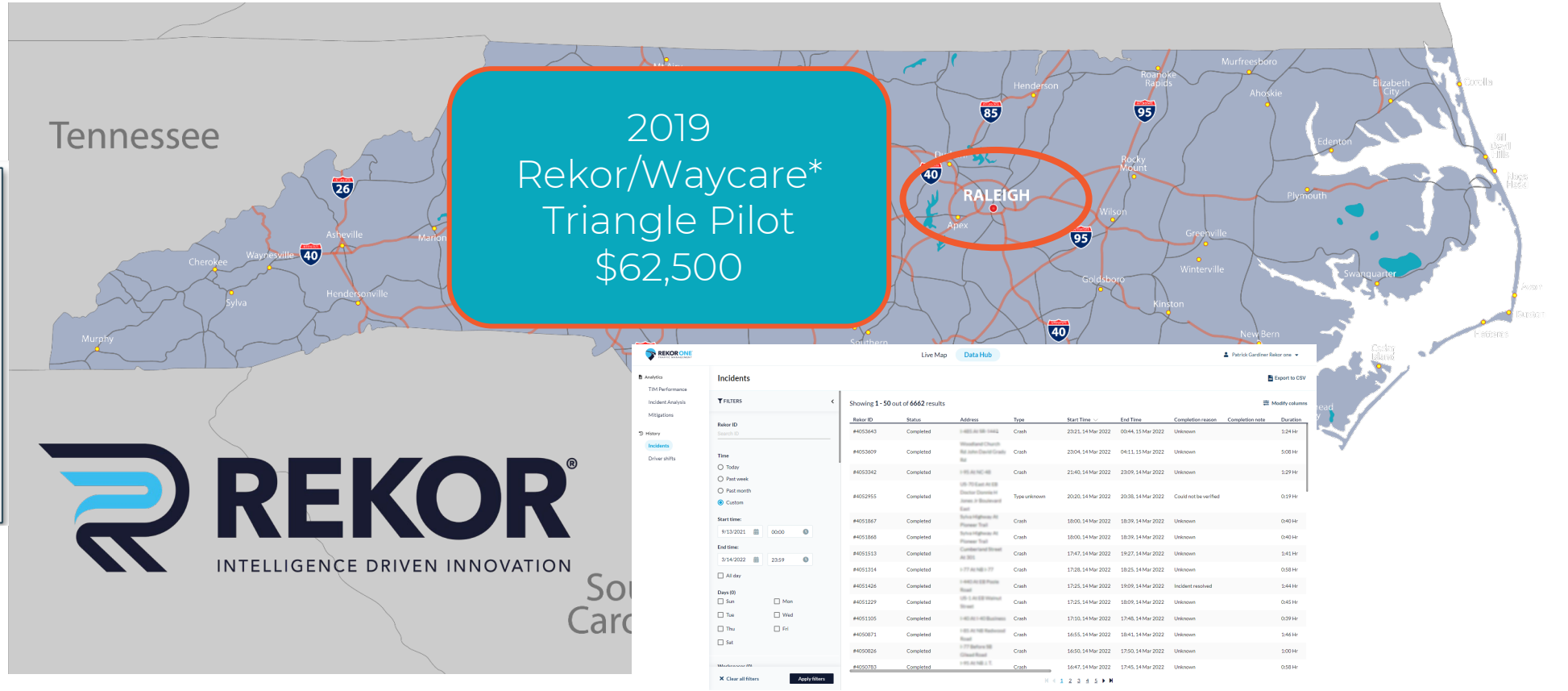
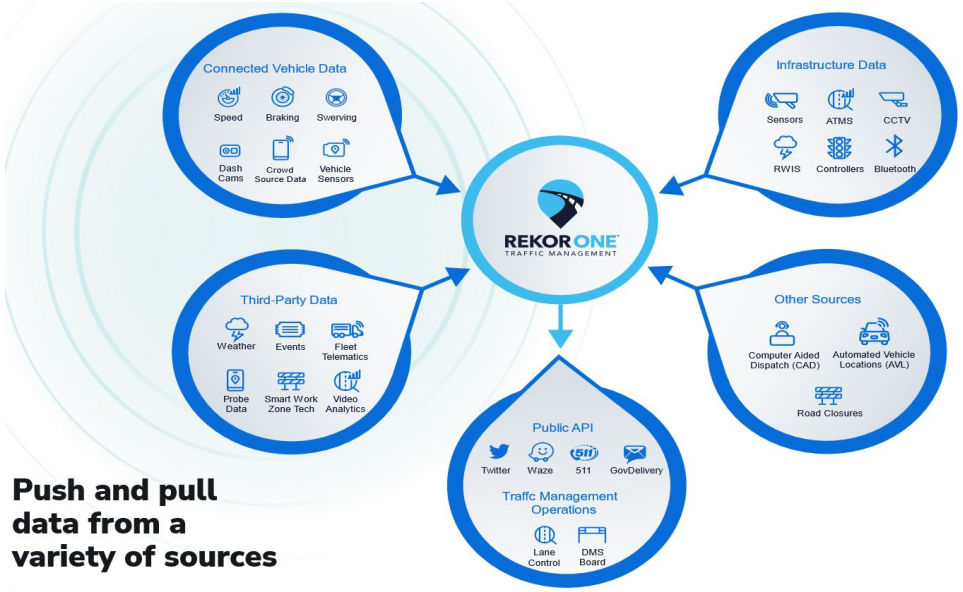


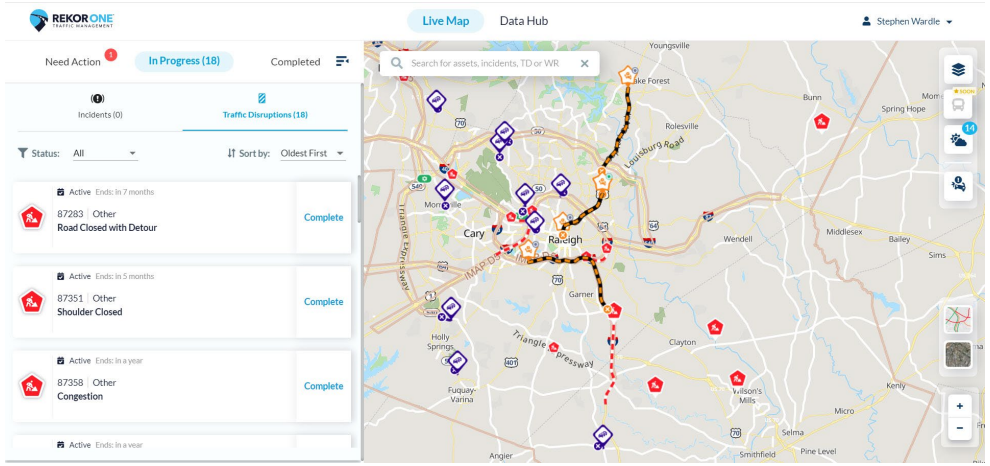

Need: more proactively detect incidents to dispatch IMAP and provide additional situational awareness

** 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:

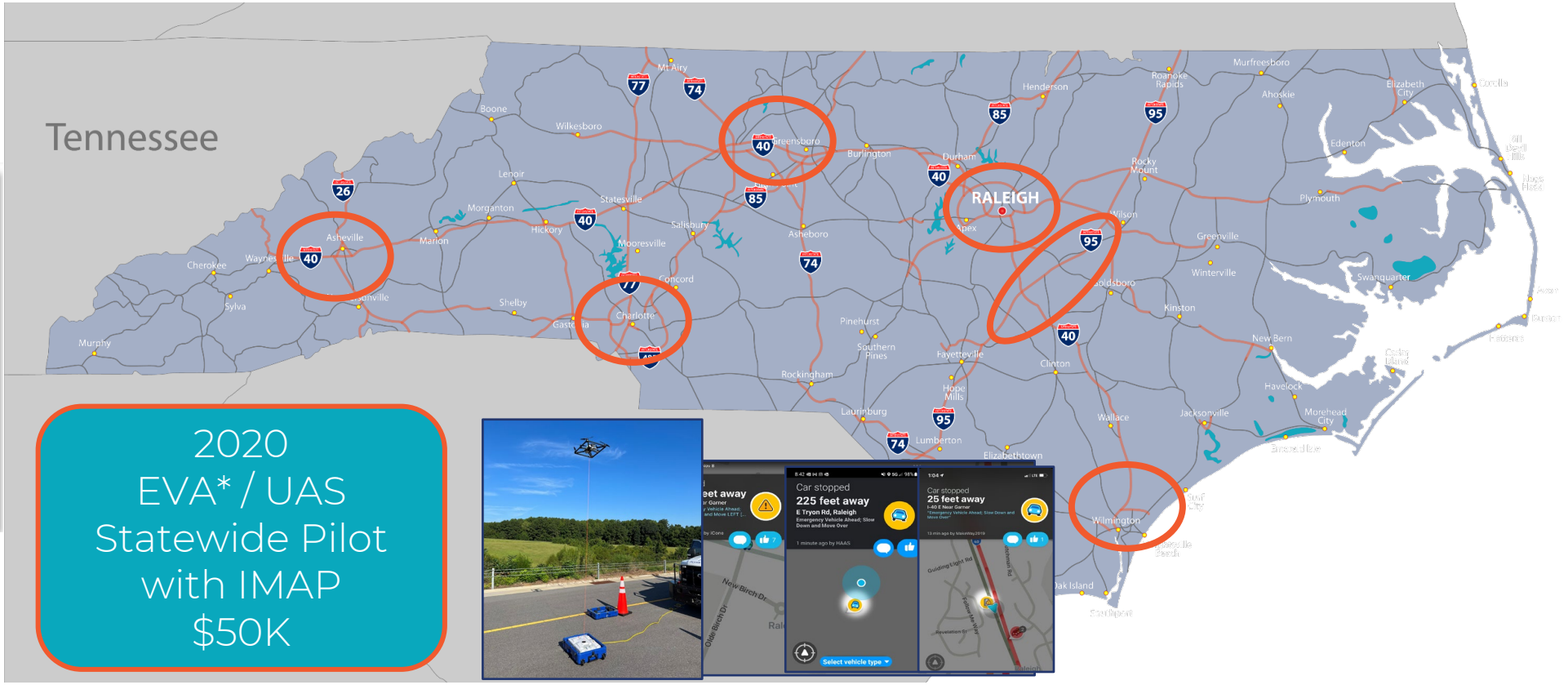
- Increased incident awareness by 17%
- 7% of Rekor detected crashes used; other 93% already detected
- Rekor detected incidents 50% faster than SHP CAD
- On average, Rekor incidents found 12 minutes earlier

| 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

## 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

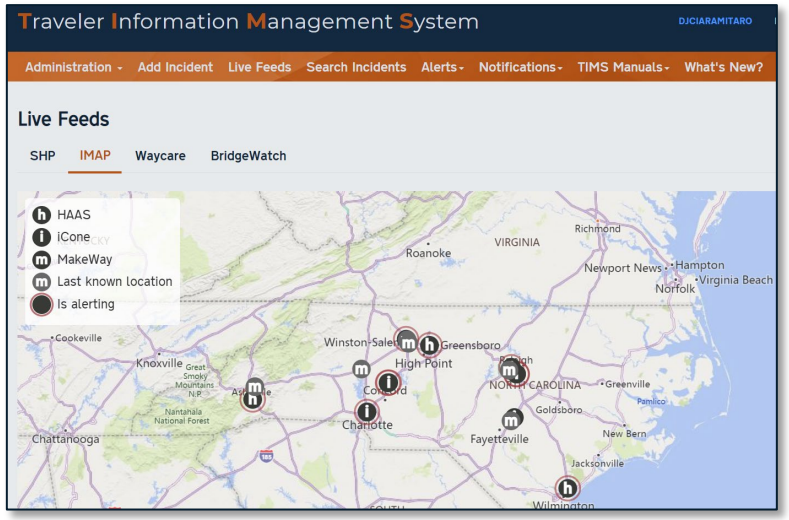
# Emergency Vehicle Alerting (EVA) Devices

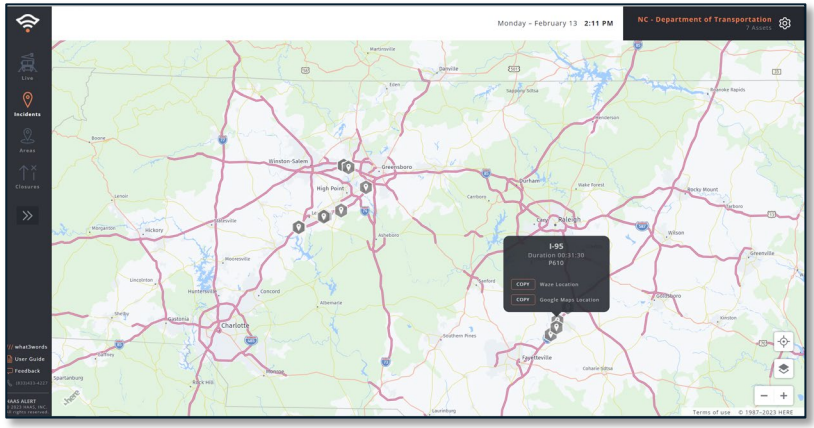
## What's the need?

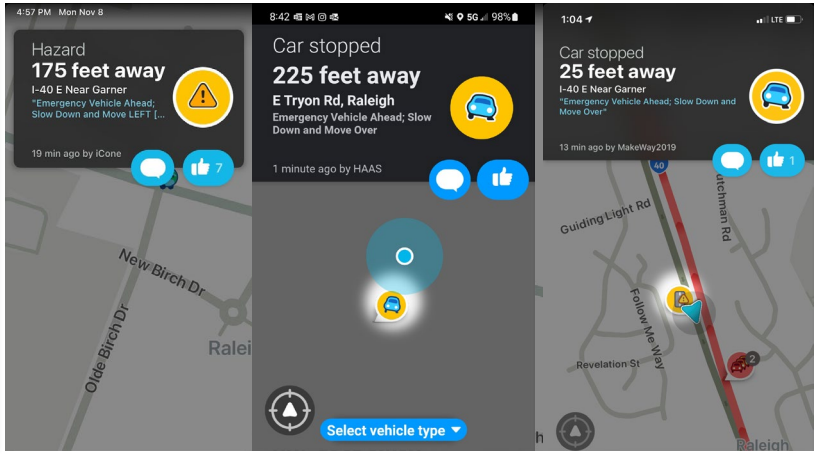
- Notification to approaching traffic with limited sight distance
- Move over law compliance
- Additional safety to responders

## 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

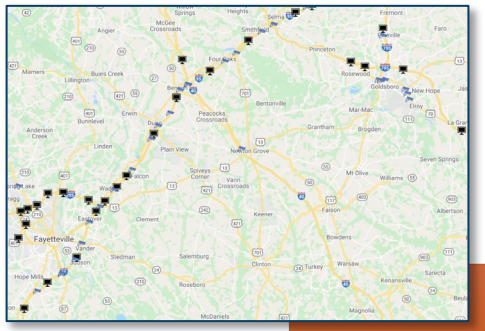




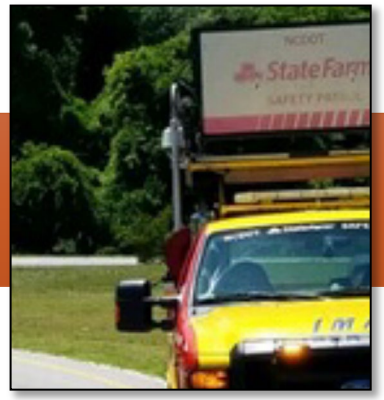
HAAS, HA-5 Transponder

# How we got to Tethered Drones/UAS



Need situational awareness

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




CCTV on IMAP
Poles over max GVWR
Low pole height

Regular drones need
FAA certification

Source: Fotokite.com

# Tethered UAS Pilot

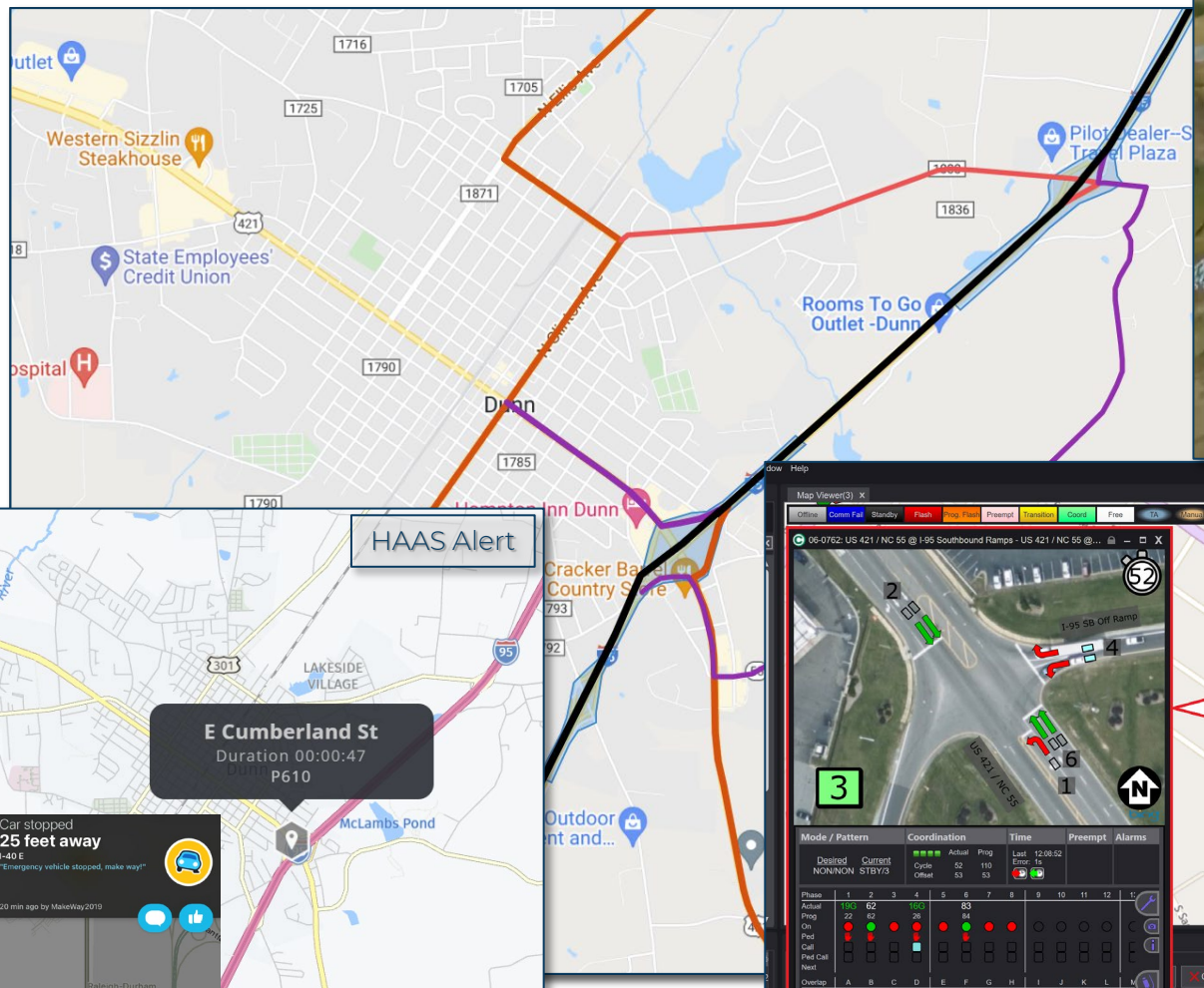
- Close collaboration with Div of Aviation
  - Training with Checklists
  - Purchasing support
- Procurement Strategies
  - Fotokite – ITRE (Research)
  - Mavik 2 – Div of Aviation (Low Bid)

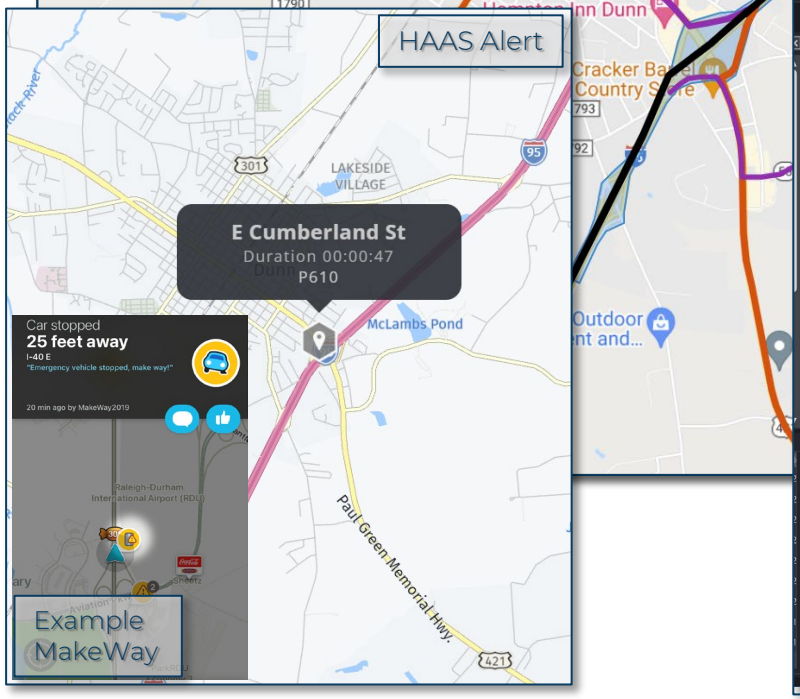
Fotokite

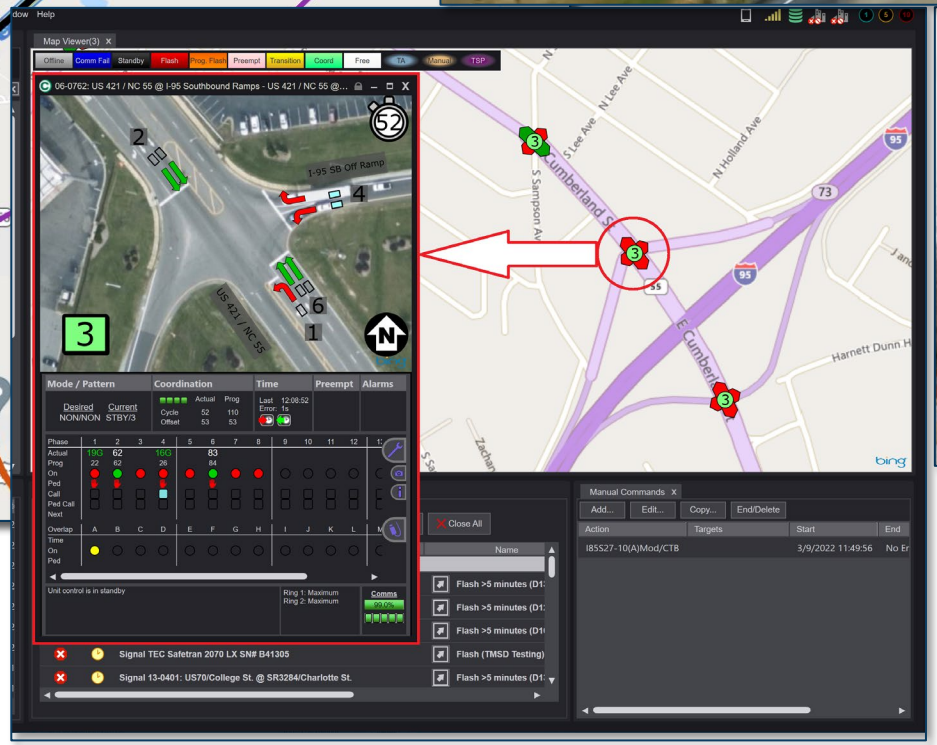
Mavik 2 w/ V-line Tether

**ncdot.gov**

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



# 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 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?* |

*Table 9: EVA Matrix Summary*

| Summary Table | Devices | | | |
|---|---|---|---|---|
| Metrics | iCone Arrow (Panel) | Haas | iCone Truck (Beacon) | Makeway |
| 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 |
| **Weighted Average** | **43.9** | **41.1** | **44.5** | **39** |

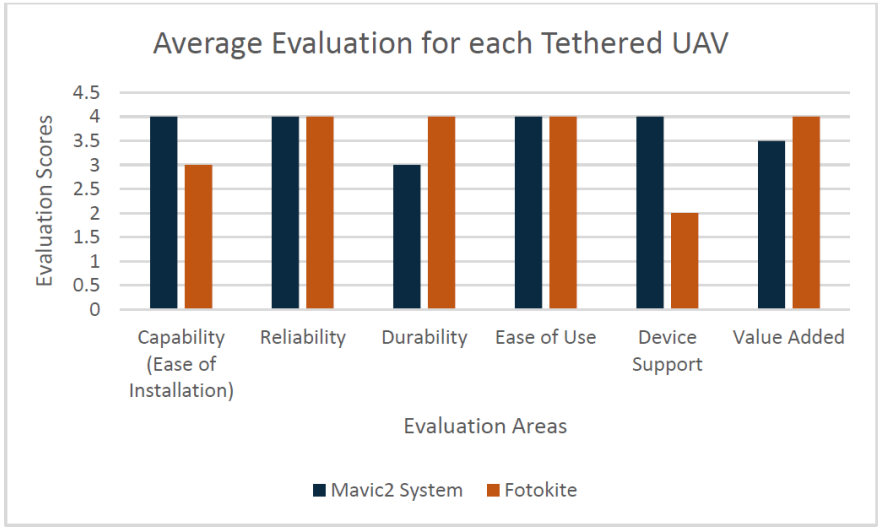



*Figure 6. Average Tethered UAV Evaluations Graph*

# 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)

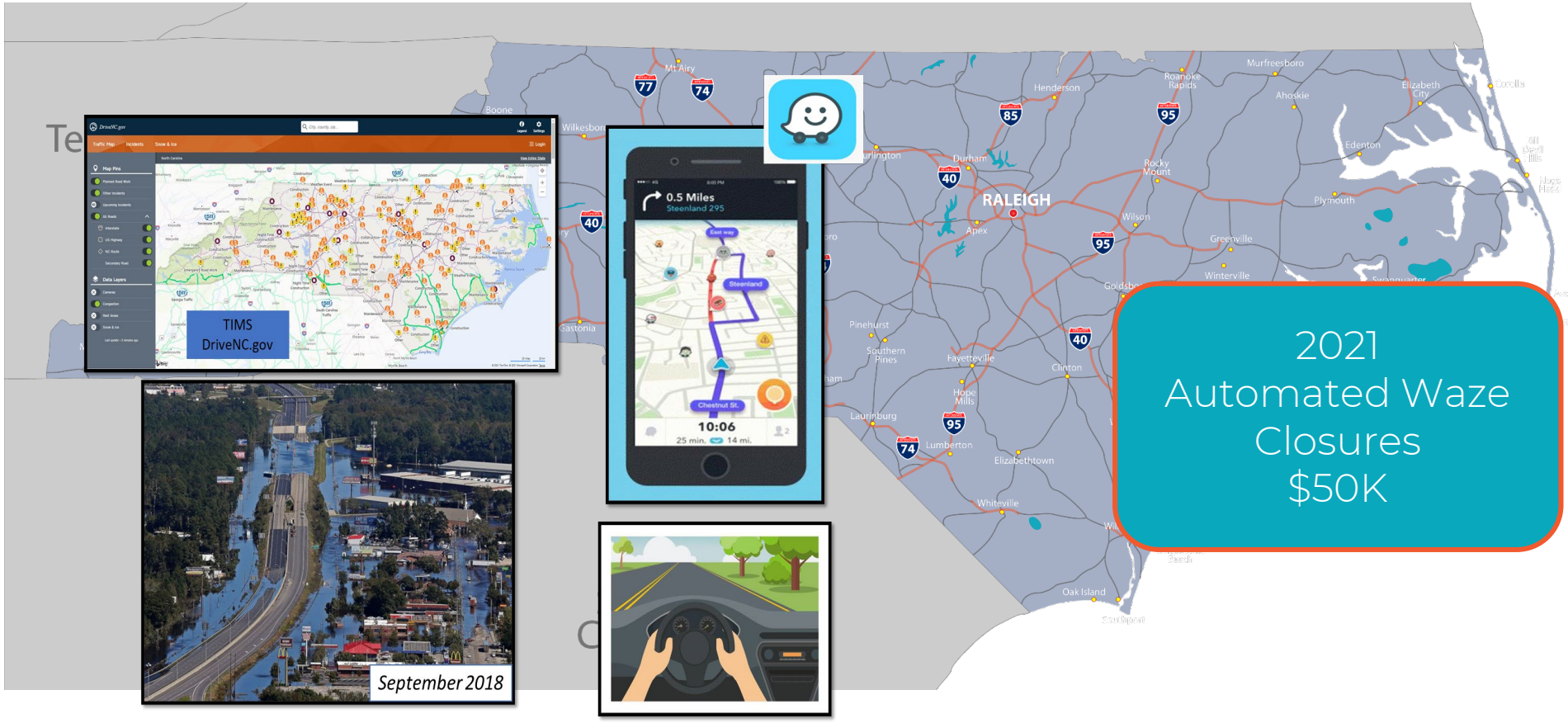
Pavement overlays represent a significant portion of highway infrastructure dollars. State and local highway agencies can maximize this investment and help ensure safer, longer-lasting roadways by employing innovative overlay procedures that will improve pavement performance, lessen traffic impacts,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

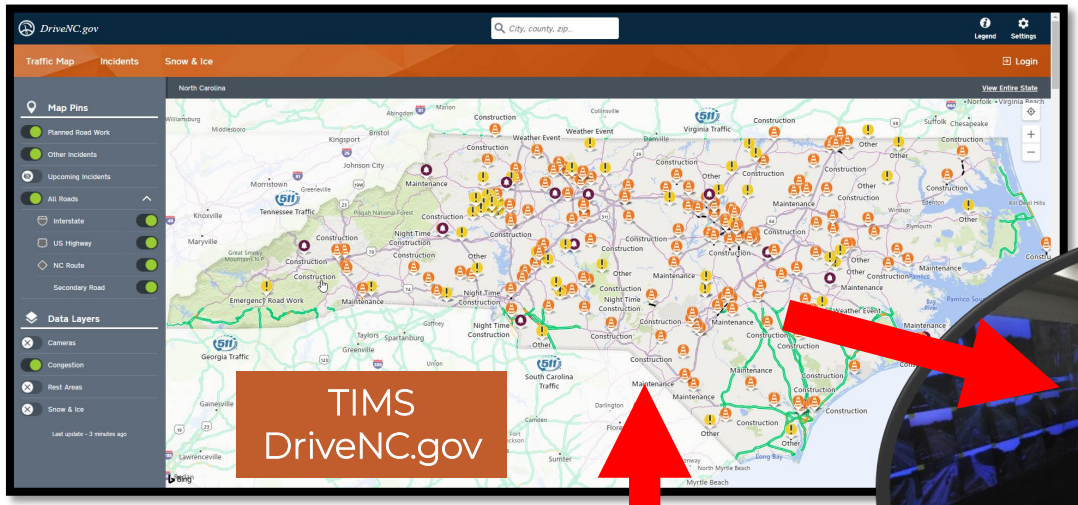
### Virtual Public Involvement (VPI)

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.

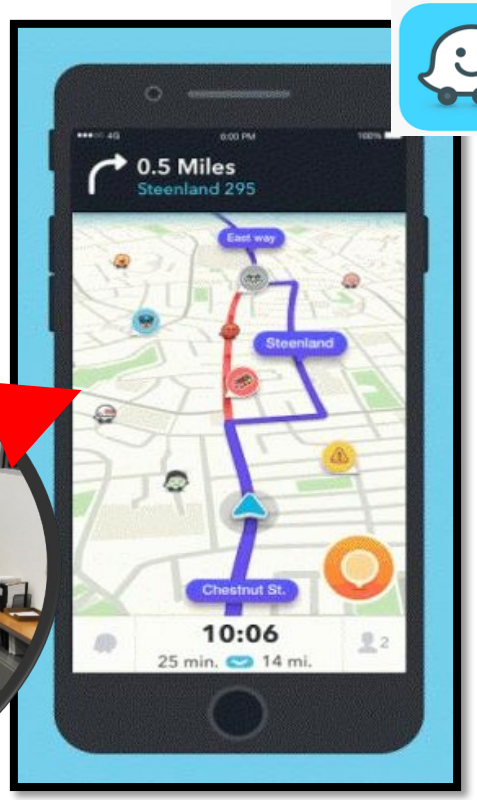



Need: increase safety by automating full road closures within Waze

# The Need:




2500 Road Closures!



September 2018

# Full Closure Order of Magnitude

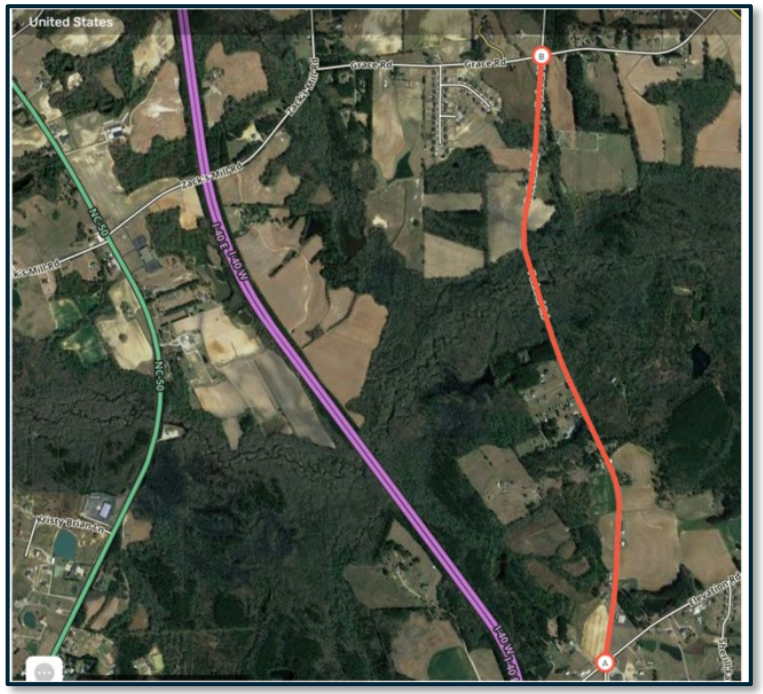
- Emergencies
  - 2500 for Hurricane Florence (2018)
  - 1500 for Hurricane Matthew (2016)
- Day to Day
  - crashes, work zones, downed power lines, etc.
  - Friday, 9/23 @ 1 pm:  121 roads closed in NC

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

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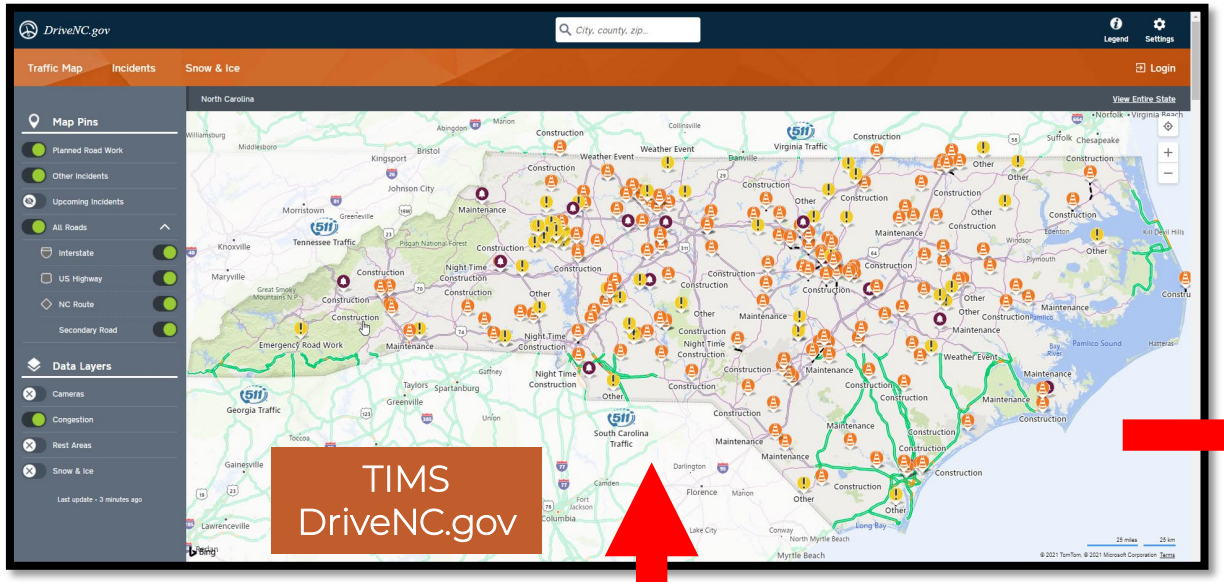
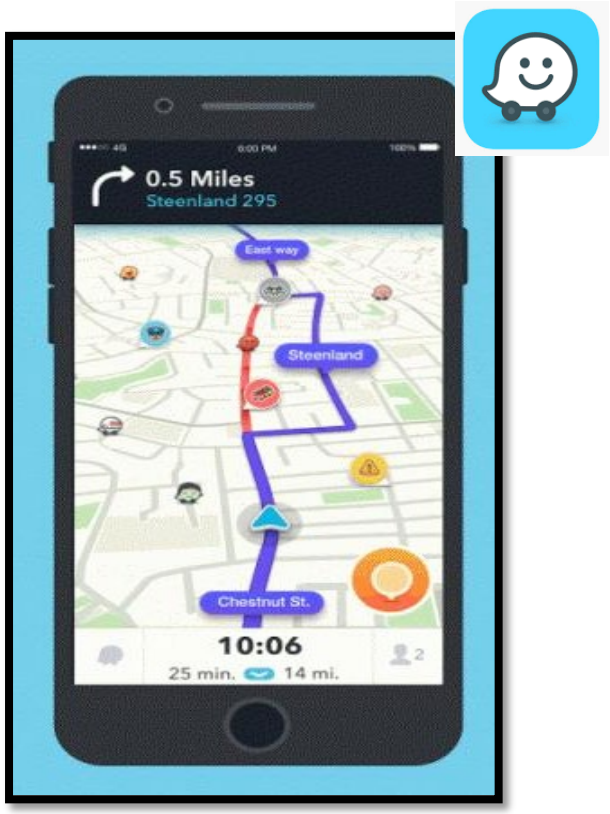
# STIC and Traffic Systems Operations



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

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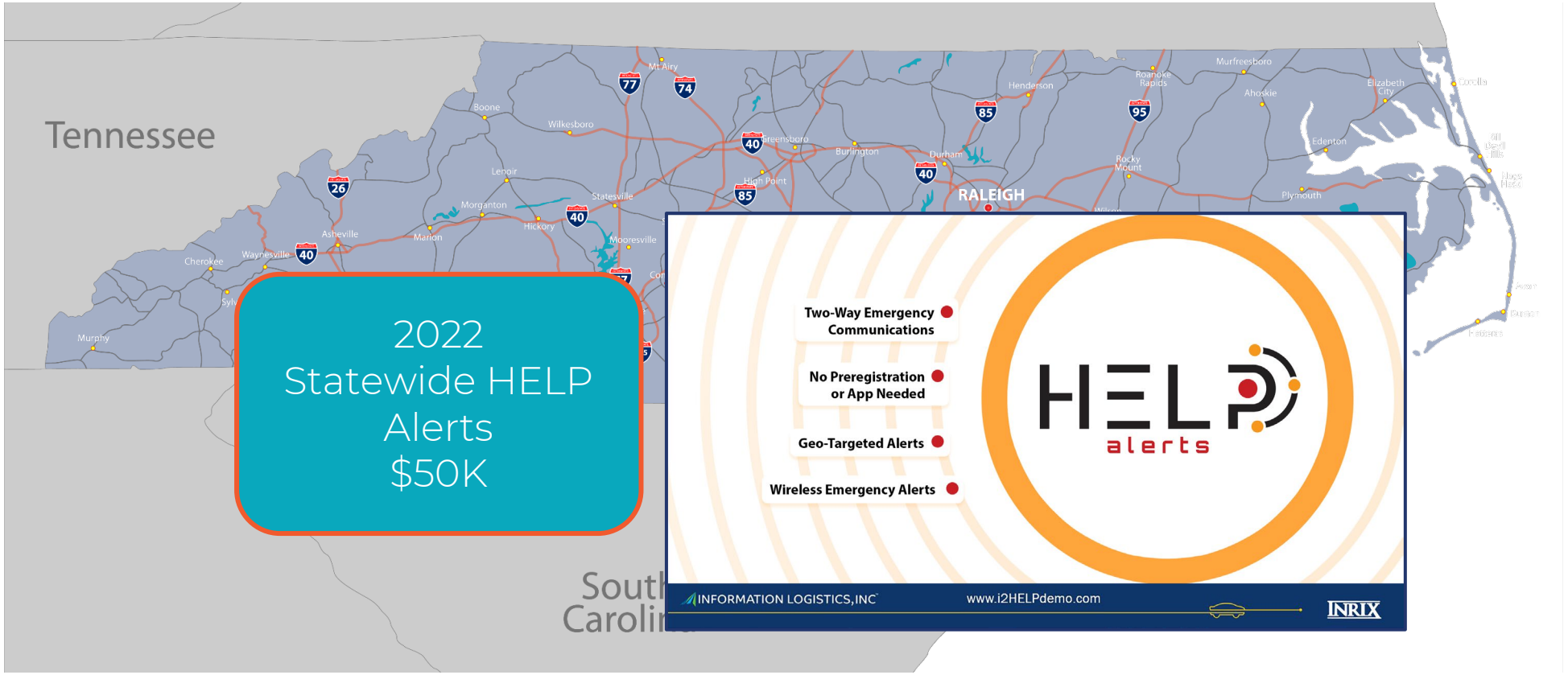



Need: better communication with motorists of upstream significant incidents or those stuck in queues

# 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

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$^2$)

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

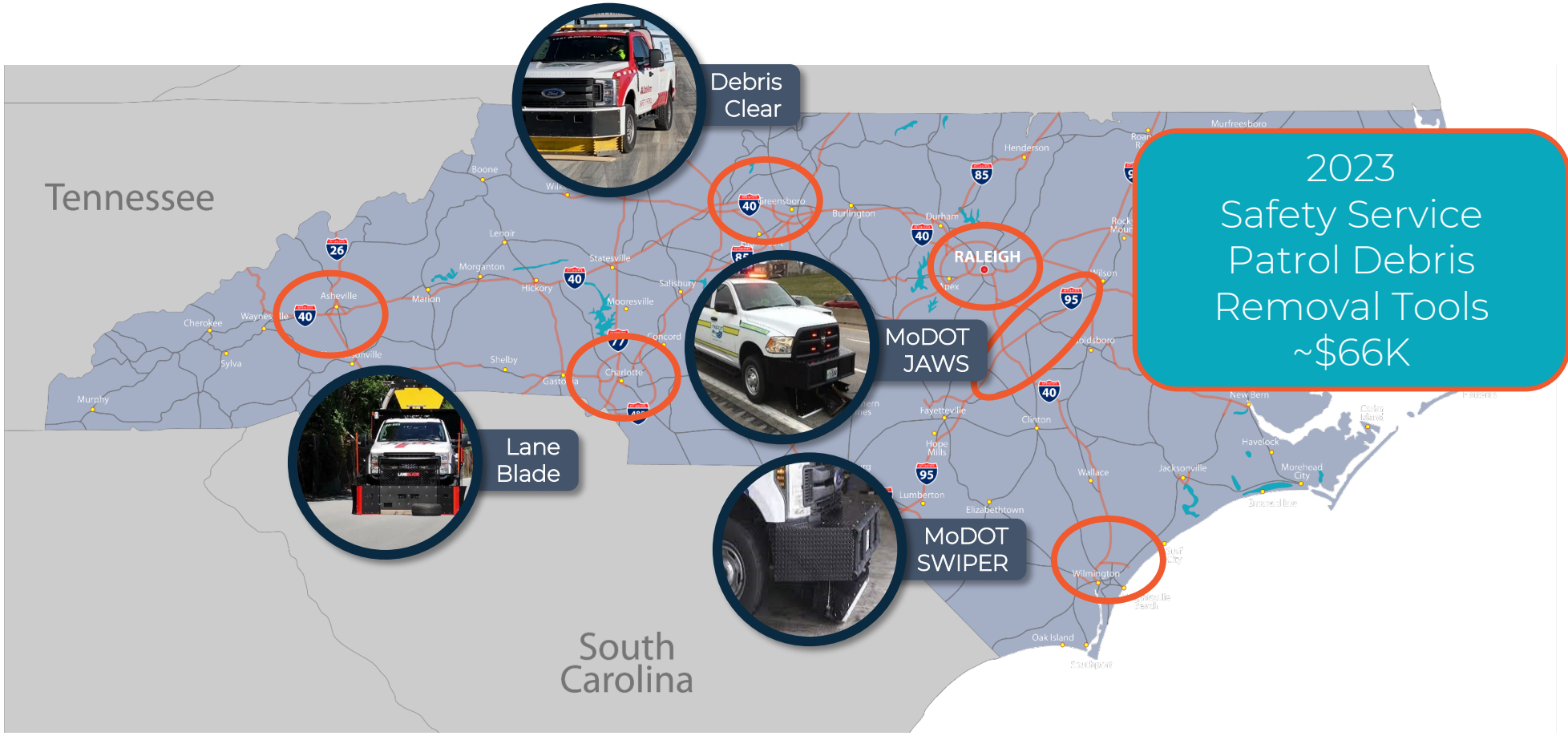
Construction materials such as concrete and asphalt have environmental impacts during their life cycle. Environmental product declarations, or EPDs, document those impacts. This tool helps States support procurement decisions and quantify embodied carbon reductions using life cycle assessments for sustainable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




2023
Safety Service Patrol Debris Removal Tools
~$66K

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

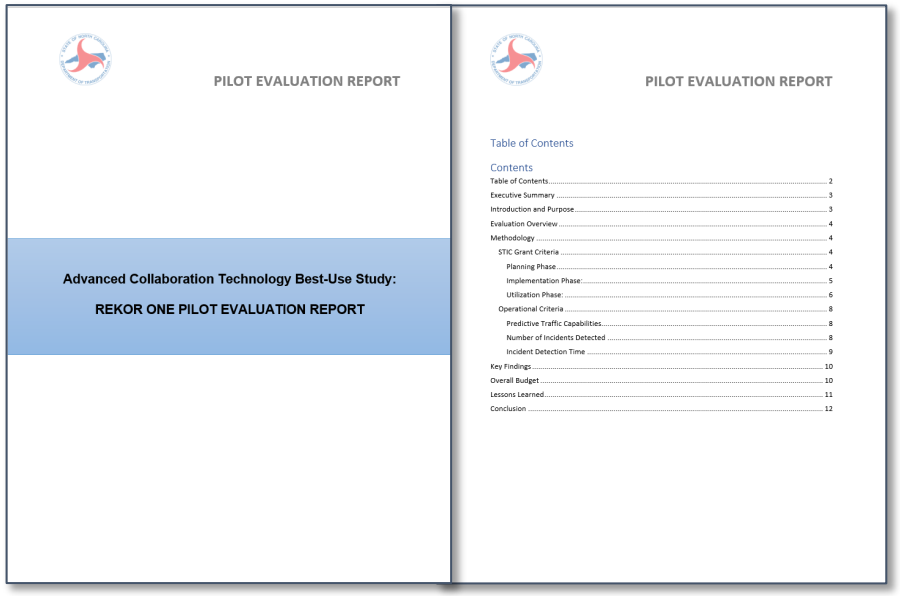
pilot use of the debris removal system

## 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

Advanced Collaboration Technology Best-Use Study:

REKOR ONE PILOT EVALUATION REPORT

PILOT EVALUATION REPORT

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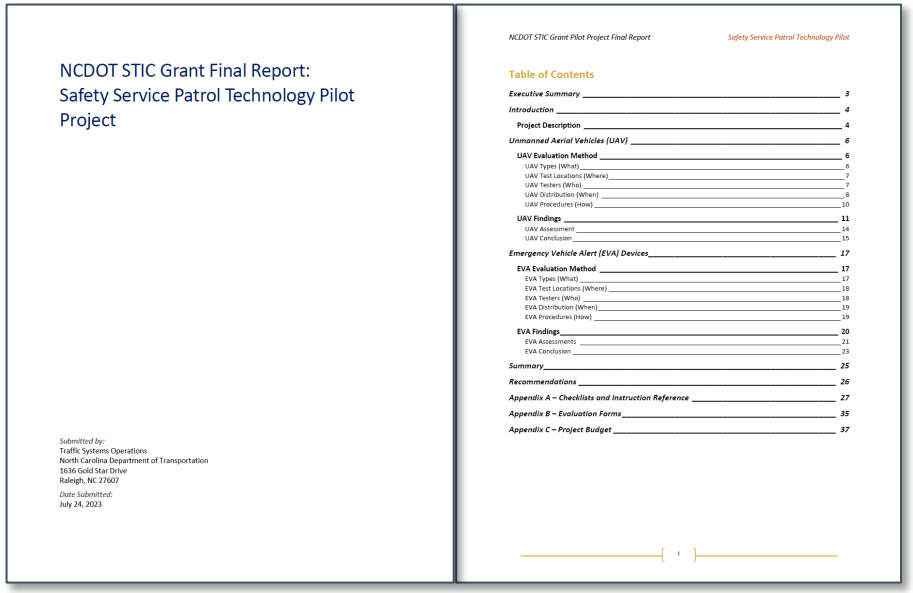

NCDOT STIC Grant Final Report:
Safety Service Patrol Technology Pilot Project

Submitted by:
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Date Submitted:
July 24, 2023

NCDOT STIC Grant Pilot Project Final Report — Safety Service Patrol Technology Pilot

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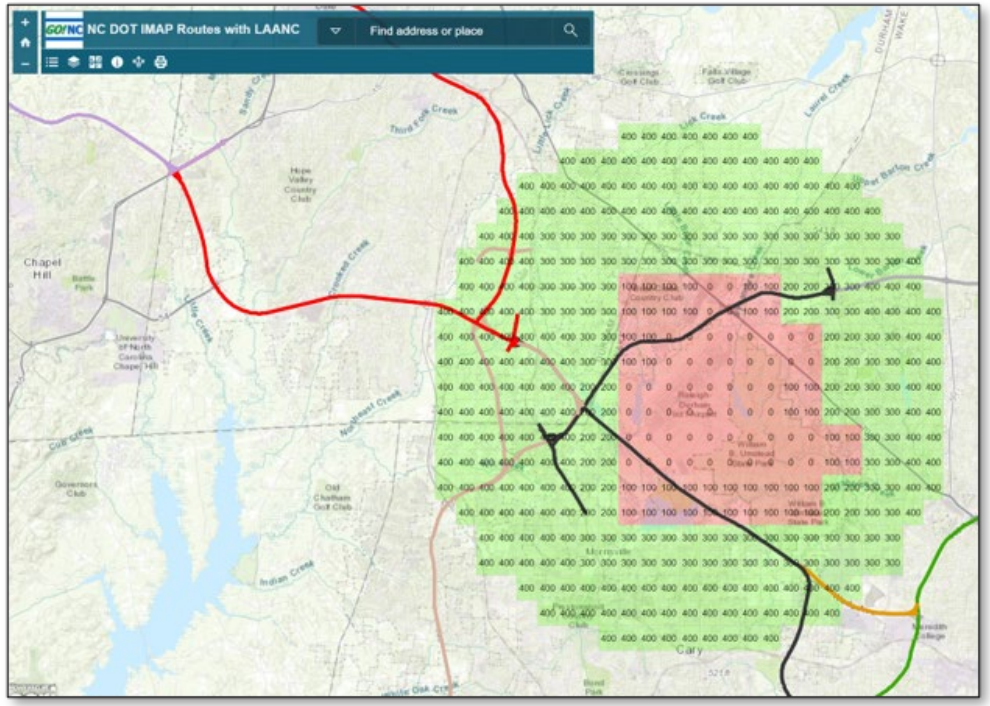
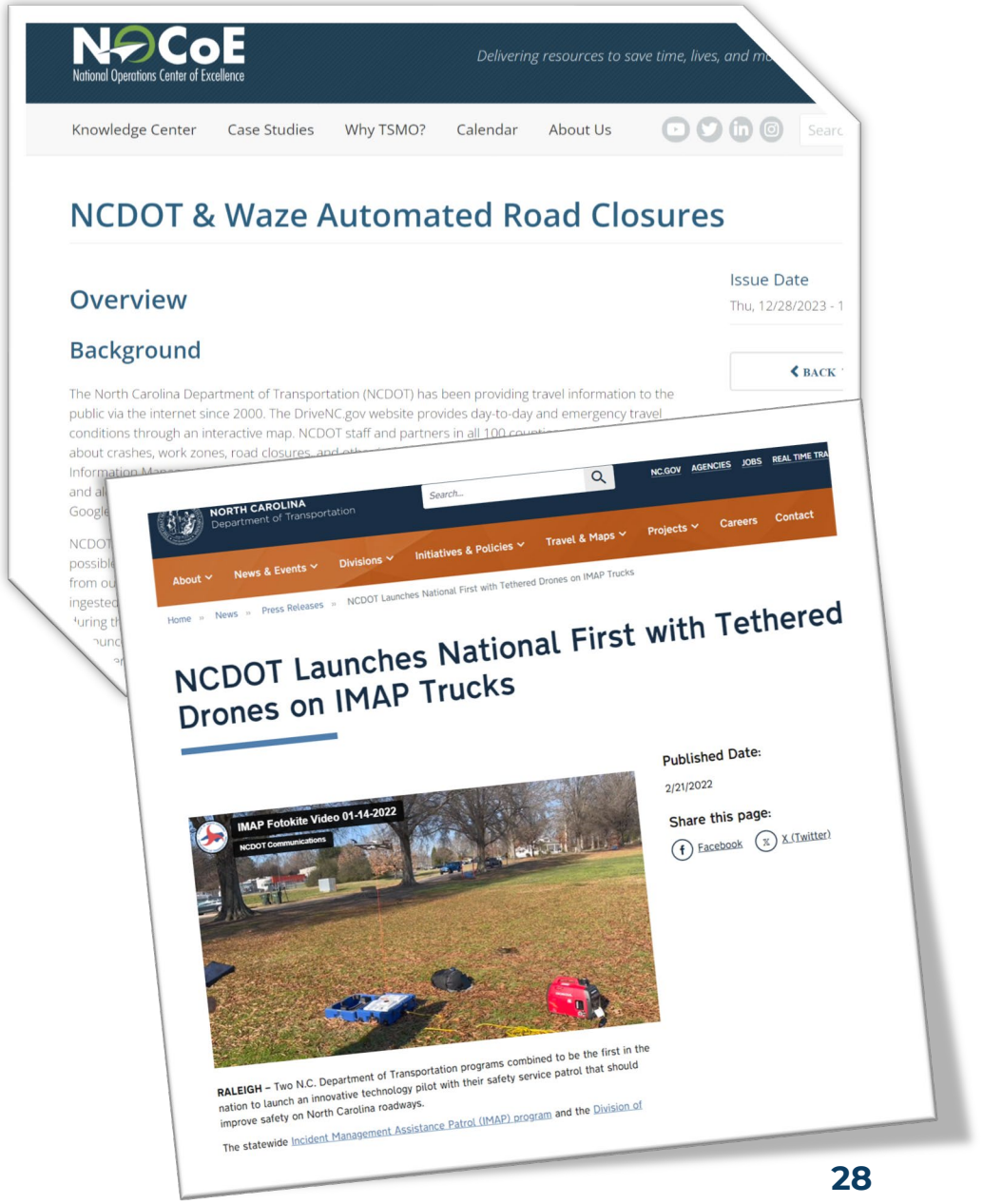
# Challenges with STIC

- 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



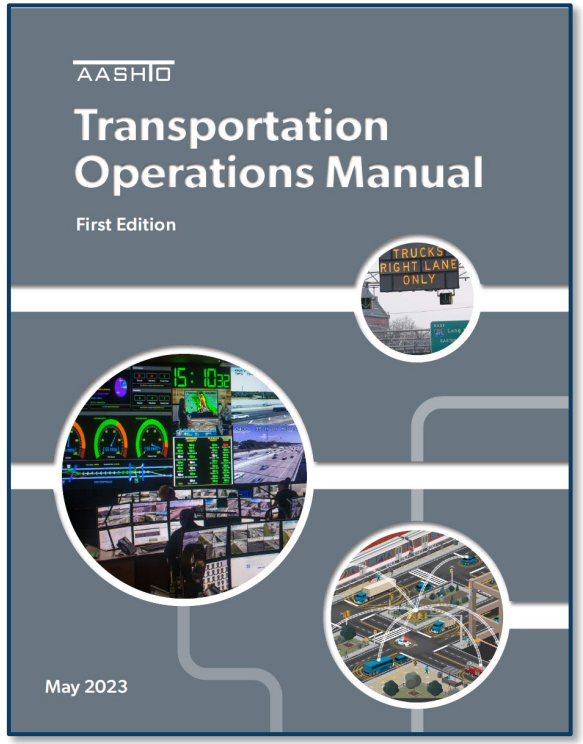
# Success with STIC

- 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



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# Thank you!