NORTH CAROLINA
Department of Transportation









Wrong Way Driver Detection and Notification

North Carolina Turnpike Authority

May 12, 2017

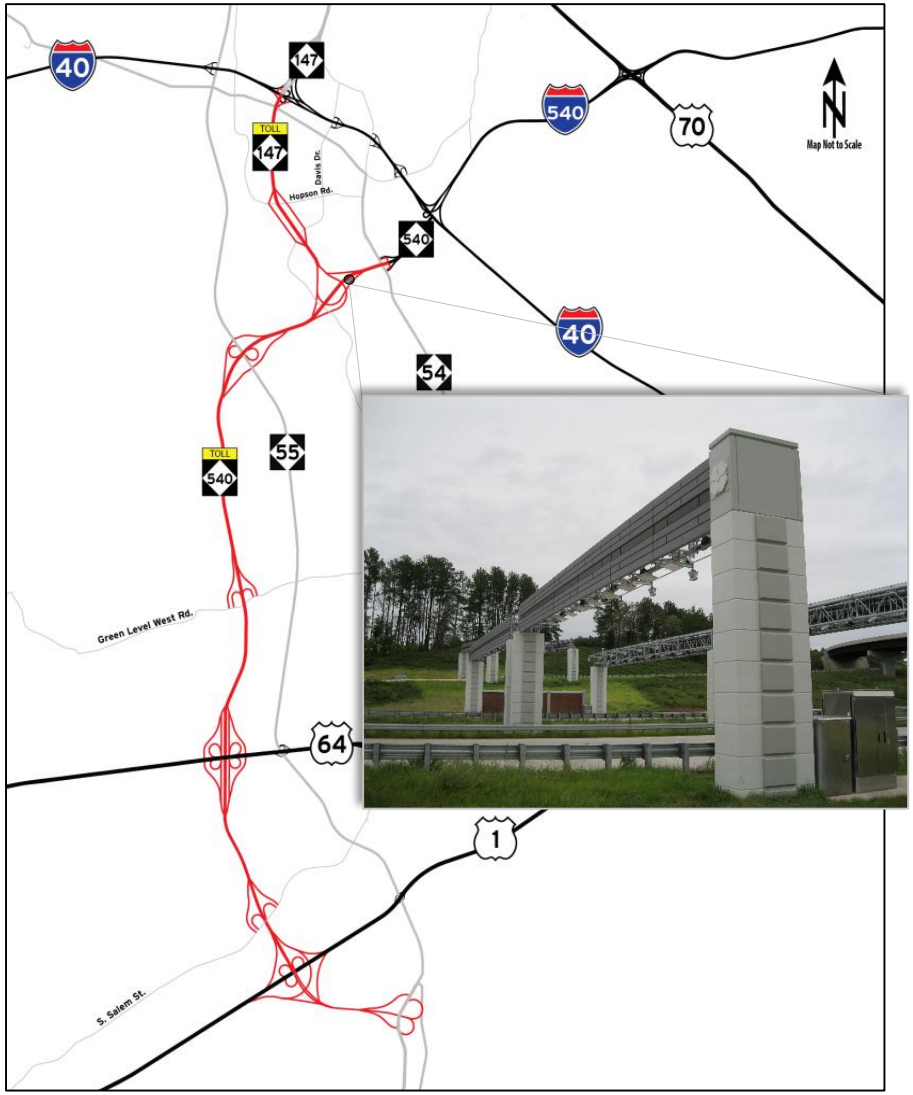
Wrong Way Driver Detection and Notification

Beau Memory

Executive Director

Triangle Expressway

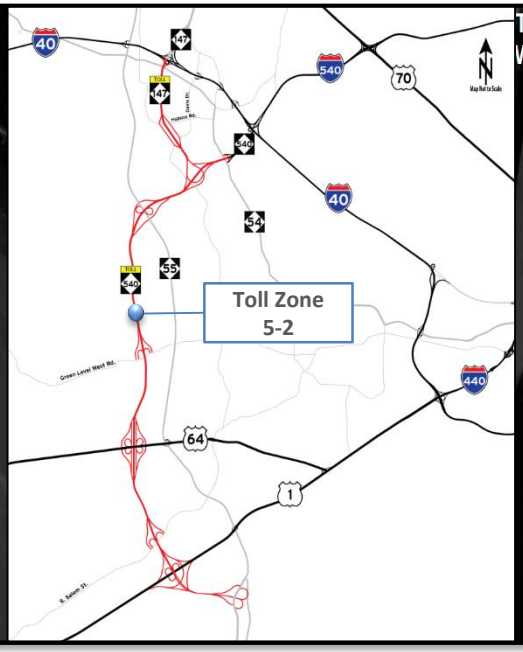
- All-electronic tolling facility
- 18.8 miles long
- Average Weekday Traffic = 49,800 (AWT) at busiest section
- 18 toll zones
  - Equipped to detect wrong way drivers
- Average of 3 wrong way drivers detected monthly
- No wrong way driving crash since opening



Wrong Way Driver Recorded on Triangle Expressway

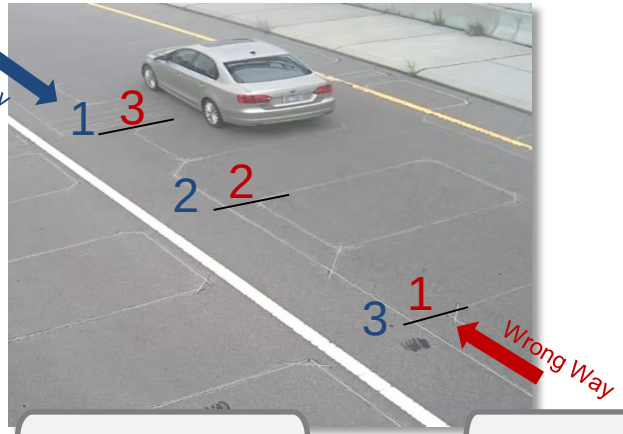
- Detected at toll zone 5-2
  - Toll NC-540 Southbound
  - North of Green Level West Interchange
- Point of origin Green Level West Interchange

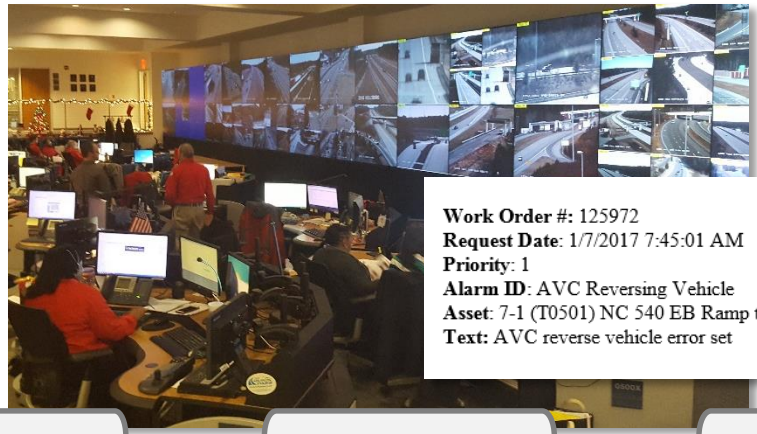
Right Way



Wrong Way

Triangle Expressway Wrong Way Driver Detection and Notification





Work Order #: 125972
Request Date: 1/7/2017 7:45:01 AM
Priority: 1
Alarm ID: AVC Reversing Vehicle
Asset: 7-1 (T0501) NC 540 EB Ramp to NB Triangle Parkway Lane 1
Text: AVC reverse vehicle error set

Wrong Way Driver Detected	Control Room Notification	Operators Verify Notification	NCSHP Notified
• Loop detectors • Toll system	• E-mail notification sent to operators	• Roadside Overview Cameras • Closed Circuit TV cameras	• Phone call to NCSHP dispatcher

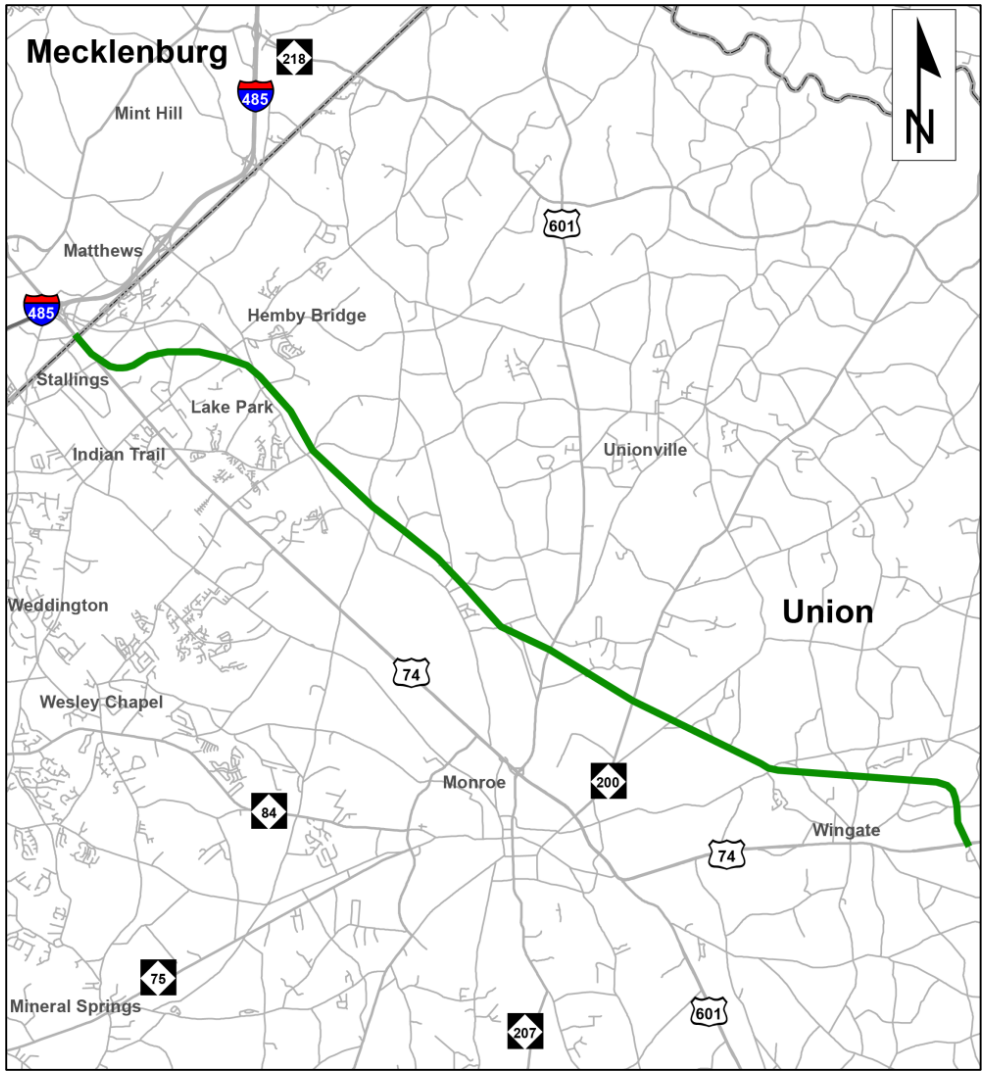
Lessons Learned from Triangle Expressway

Longer response time than desired

- Notification time
  - 90+ seconds for control room notification to arrive
- Notification sources
  - Tolling and ITS networks are not integrated
  - Notification source is limited to e-mail only
- Manual verification required
  - No visual data in initial notification

Monroe Expressway

- Similar greenfield project to Triangle Expressway
- All-electronic tolling facility
- 19.8 miles long
- 14 mainline toll zones
  - Equipped to detect wrong way drivers



Monroe Expressway Wrong Way Driver Detection and Notification System

Wrong Way Driver Detected

- Loop detectors
- Mainline toll zones

Wrong Way Alert to Driver

- Wrong-Way sign lit up to alert wrong way driver

Control Room Notification

- E-mail and video wall notification sent to operators

Operators Review Notification

- Review video to confirm location and vehicle type

NCSHP Notified

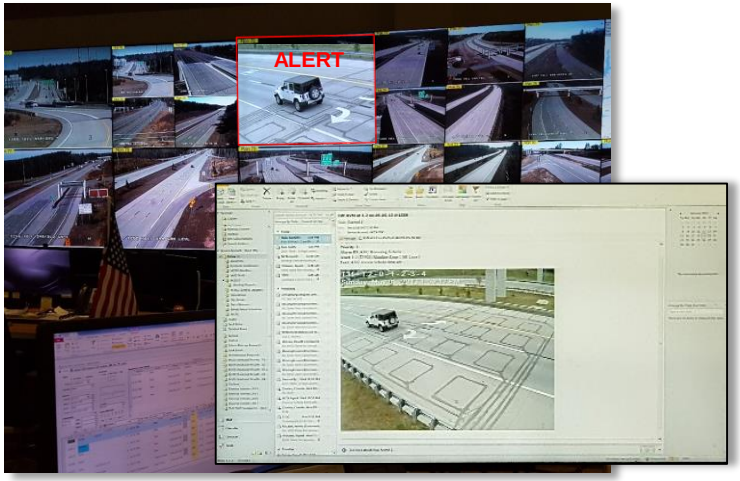
- Phone call to NCSHP dispatcher

*Monroe Expressway conceptual detection and notification system flowchart

Monroe Expressway Wrong Way Driver Notification System Improvements

Lesson Learned from Triangle Expressway

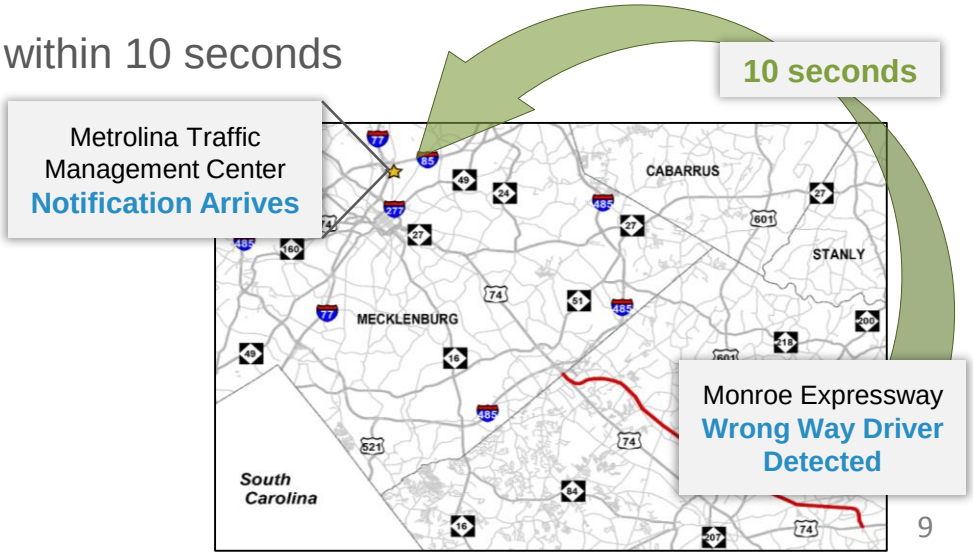
- Longer response time than desired
  - Longer notification time
  - Limited notification sources
  - Longer Manual verification process



*Concept rendering of wrong way driver control room alert for Monroe Expressway

Solution for Monroe Expressway

- Control room notification must arrive within 10 seconds
- 5-second looping video
  - Displayed on video wall
  - Attached to email
- Reduce manual verification time



Wrong Way Driver Detection Methods Used by Other Agencies

Central Florida Expressway Authority

- Radar detectors on ramps

Miami-Dade Expressway Authority (MDX)

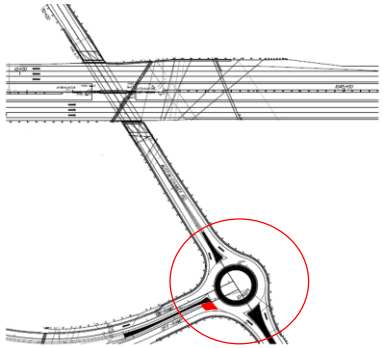
- Microwave radar detectors on ramps
- Inductive loop detectors on ramps

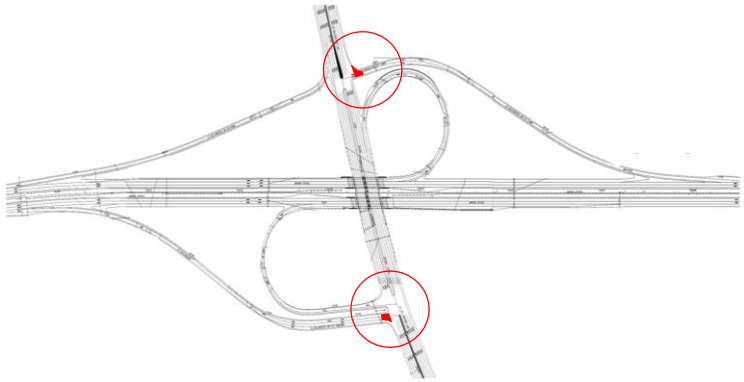
Florida's Turnpike Enterprise

- Dual radar detectors and high quality cameras on ramps
- High definition radar detectors on mainline
- IDRIS smart loops on reversible lanes

Wrong Way Detection and Notification (WWDN) Other Current Initiatives

- Research the State of Current Practices for Wrong Way Driving Detection and Notification
- Propose approach that provides standardized solutions that can be scalable to any location
- Apply to other situations: ramp terminals, express lane direct connects, express lane gate control systems





- For each situation:
  - Evaluate geometry
  - Analyze potential access points
  - Determine risks
  - Develop mitigation strategies
- Develop Concept of Operations

Thank You