

Wrong-Way Vehicle Detection

Andy Lelewski, P.E.

February 12, 2018

NC Statistics* (2000 - 2016)

46%
DUI

236
Crashes

21%
60 yrs +



.2%
Of Crashes

42%
12a.m -
5a.m.

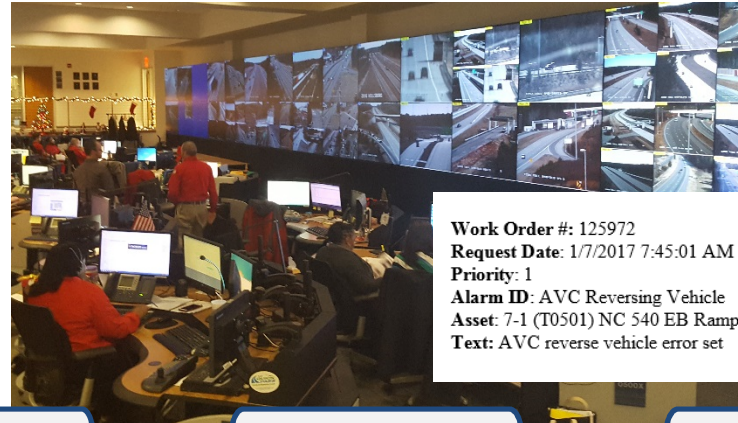
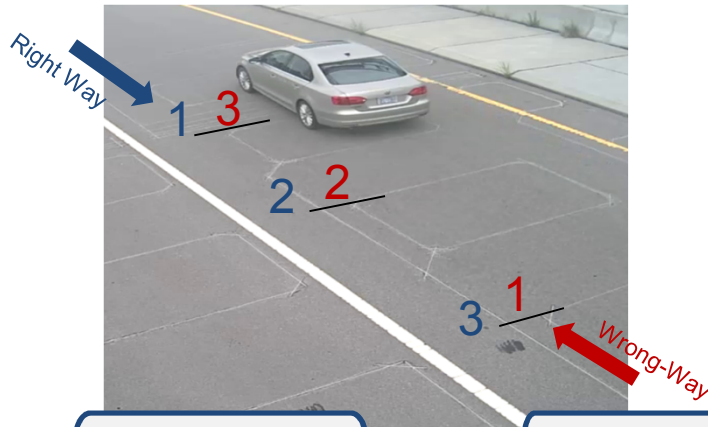
* Source: NCDOT Traffic Safety Unit

Triangle Expressway

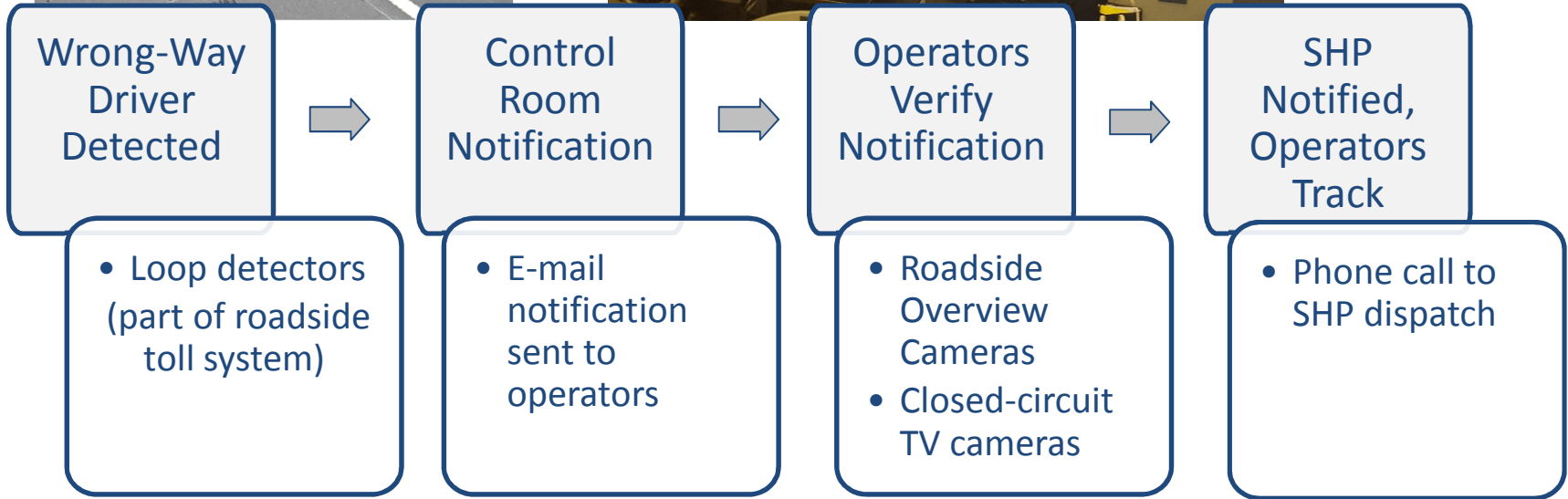
- All-Electronic Tolling
- 20 Toll Zones
 - 8 Mainline
 - 12 Ramps
- Average Weekday Traffic: up to 50,000
- 3 Wrong-Way Vehicle Detections per Month



Current Detection Program



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

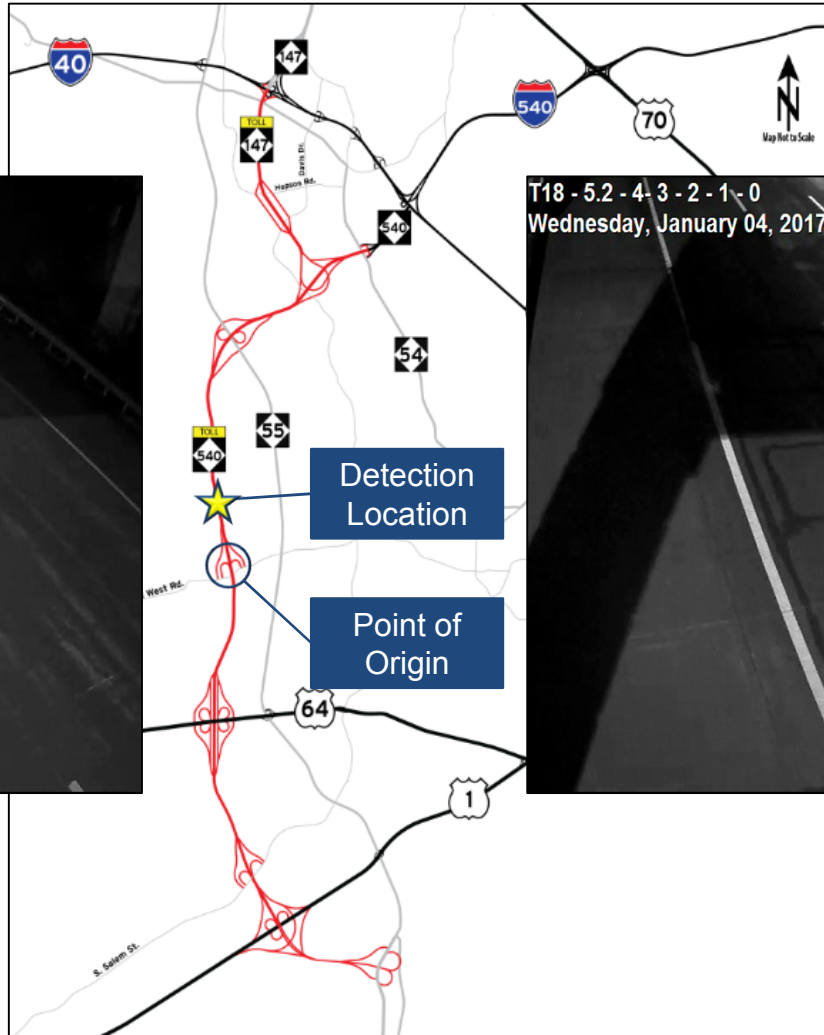


Wrong-Way Vehicle Occurrence

T18 - 5.2 - 4 - 3 - 2 - 1 - 0
Wednesday, January 04, 2017 05:33:07



T18 - 5.2 - 4 - 3 - 2 - 1 - 0
Wednesday, January 04, 2017 05:35:11



NCTA Pilot Program

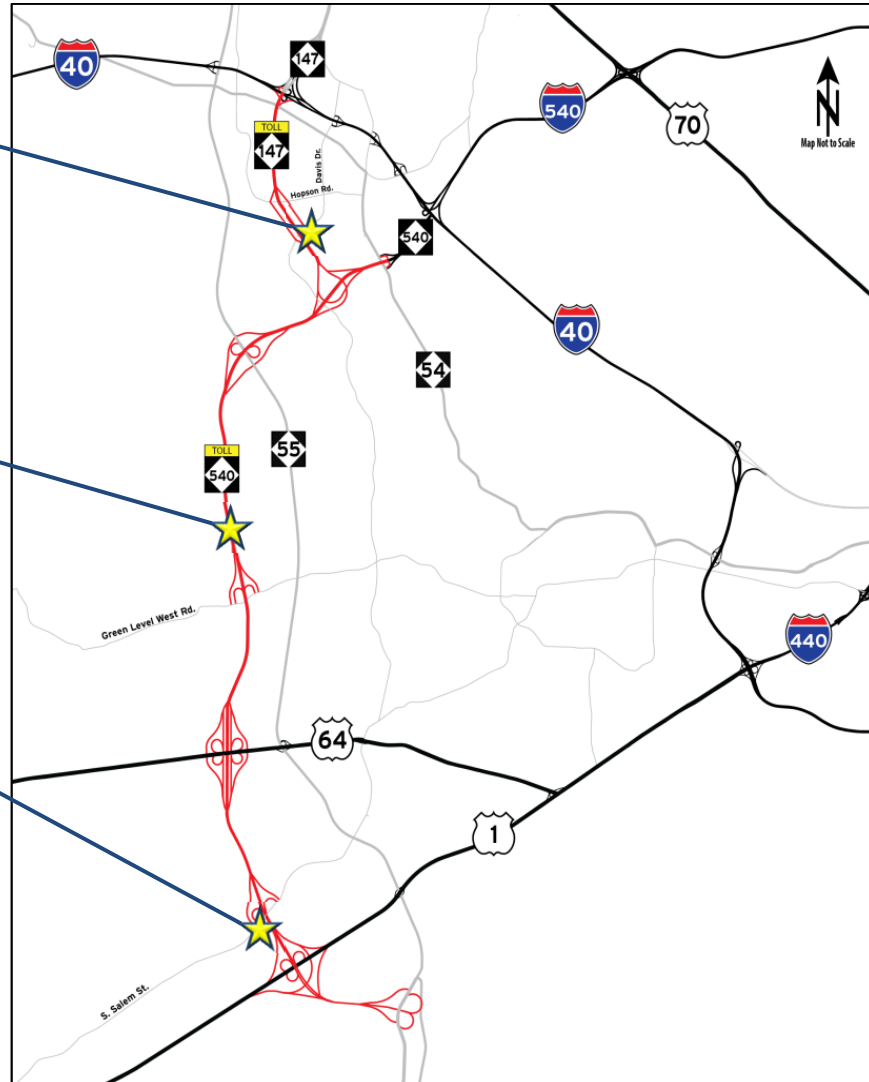
- Initiated: 2017
- Partnerships in Planning
- Goals:
 - Research industry trends
 - Establish proof of concept (small scale)
 - Evaluate multiple technologies
 - Prepare for large-scale deployments

Pilot Program Locations

Davis Drive
Off-Ramp

Mainline Toll Zone

South Salem Street
Off-Ramp



Mainline Toll Zone

ROADSIDE TECHNOLOGY

Wrong-Way Electronic Signs

Once a wrong-way vehicle is detected by radar, red flashing lights are activated to alert the driver.



Street View of Northbound Lanes



Street View of Southbound Lanes

Davis Drive

TRAFFIC SIGNAL, PAVEMENT MARKINGS & SIGNING

1 Enhanced Traffic Signal Heads
 Traffic signal heads now display green directional arrows to indicate "no turns".



Old Traffic Signal Heads



New Traffic Signal Heads

2 Enhanced Pavement Markings
 Wider pavement markings increase the ramp intersection visibility and reinforce the prohibited traffic movement.



3 New Enhanced Signs
 Oversized static signs reinforce prohibited traffic moves.



ROADSIDE TECHNOLOGY

4 Radar Detection
 Detects vehicles driving in the wrong direction on the off-ramp.



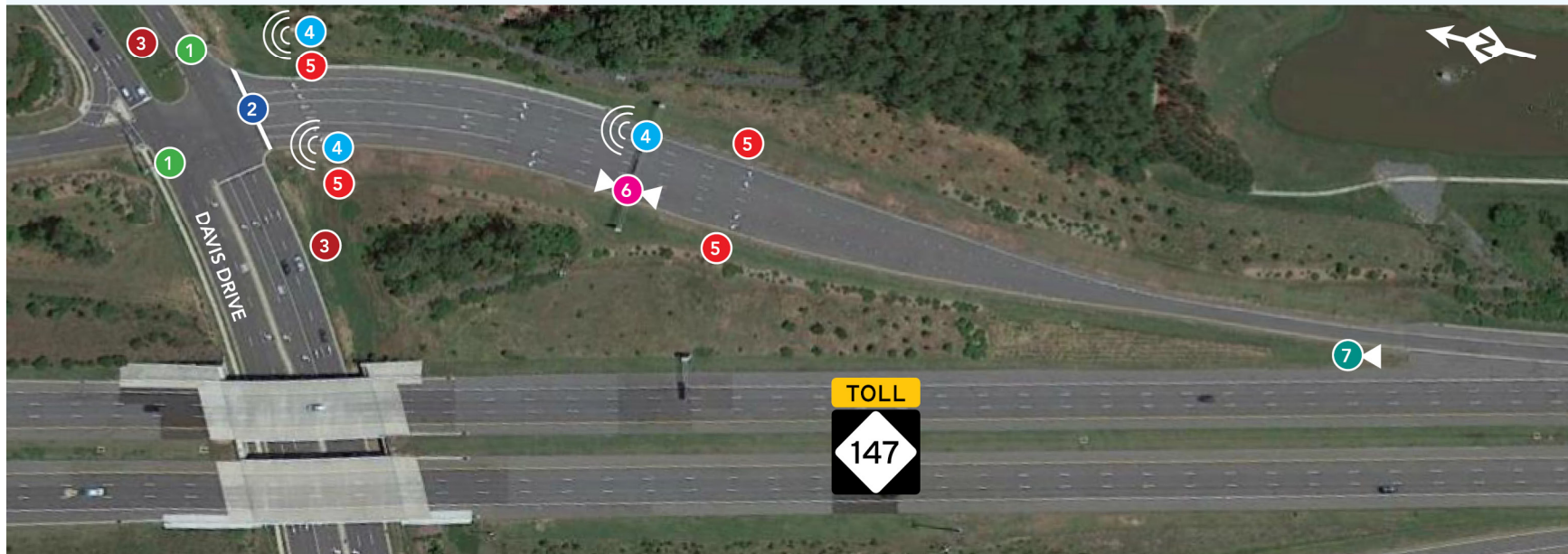
5 Wrong-Way Electronic Signs
 Once a wrong-way vehicle is detected by radar, red flashing lights are activated to alert the driver.



6 Incoming/Outgoing Cameras
 Two-directional cameras provide real-time wrong-way driving verification information to Turnpike Authority Traffic Management Center operators.



7 Verification/Confirmation Camera
 If the driver does not correct their direction of travel on the ramp, this camera provides verification of continued wrong-way driving on the Expressway.



South Salem Street

TRAFFIC SIGNAL, PAVEMENT MARKINGS & SIGNING

1 Enhanced Pavement Markings

Wider pavement markings increase the ramp intersection visibility and reinforce the prohibited traffic movement.



ROADSIDE TECHNOLOGY

2 Radar Detection

Detects vehicles driving in the wrong direction on the off-ramp.



3 Wrong-Way Electronic Signs

Once a wrong-way vehicle is detected by radar, red flashing lights are activated to alert the driver.



4 Incoming/Outgoing Cameras

Two-directional cameras provide real-time, wrong-way driving verification information to Turnpike Authority Traffic Management Center operators.



5 Verification/Confirmation Camera

If the driver does not correct their direction of travel on the ramp, this camera provides verification of continued wrong-way driving on the Expressway.



Sophisticated Software

BlinkLink | Systems | Schedules | Alerts! 83 | Reports | Admin | Help | Account

System Details | Manage System | More System Info

SR 528 EB Exit 31 at 520

Wrong Way BlinkerSign System
Customer: Central Florida Expressway Authority

12:14
1:25pm, 12/13/2017 CST

System Alerts

Active Alerts | Notify Me | Notify Users

Currently in the clear!
No alerts requiring your attention

View Resolved Alerts

System Settings

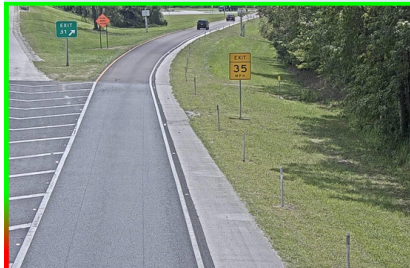
Activation Logging: Logging is On [Edit]

Mode: Active [Edit]

System Location Info

Map | 1 | 2 | 3

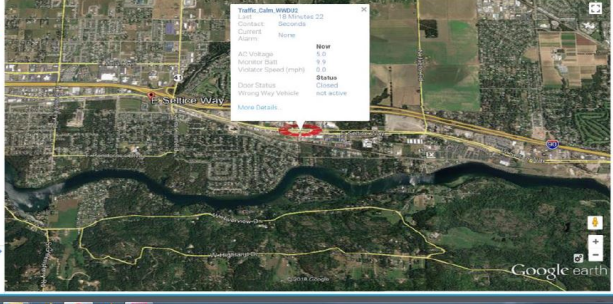
Overview Camera



glance

Chris Bealy - MOR Manufacturing | powered by Applied Information

Name	Status
Traffic_Cam_WW001	Online
Traffic_Cam_WW002	Comms Fail
Traffic_Cam_WW003	Comms Fail




Alarm	Ack	Unack	Beep
Critical	1	0	0
High	0	0	0
Low	0	0	0

glance

Chris Bealy - MOR Manufacturing | powered by Applied Information

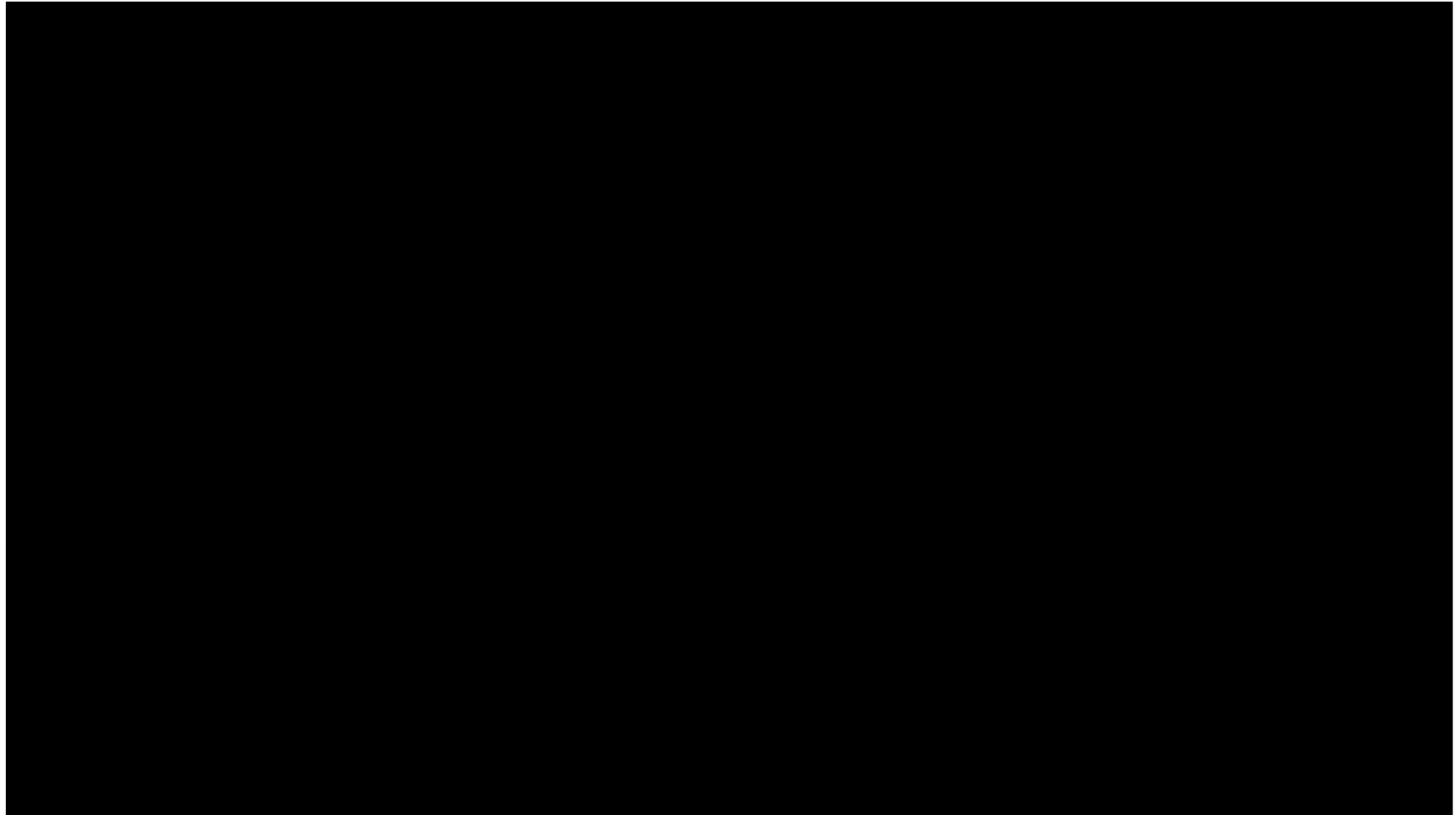
Name	Status
Traffic_Cam_WW001	Comms Fail
Traffic_Cam_WW002	Online



Status	
Door Status	Closed
Wrong Way Vehicle	not active
Inputs	

[More Details]

Implementation & Testing



Implementation & Testing



Next Steps



~~Concept of Operations (2017)~~



Deploy Pilot Sites on Triangle Expressway (Early 2018)



Evaluate Pilot Program (2018)



Plan Large-Scale Deployment – Multiple Projects

- Monroe Expressway (2018)
- Triangle Expressway (2019)



National Committee Involvement (Ongoing: TRB / IBTTA)



NCDOT Research Program (2018)

Questions

