

TDOT's Journey to Integrated Corridor Management **TSITE Summer Meeting**

July 28, 2021







TDOT's Journey to Integrated Corridor Management

Presentation Outline

- I-24 SC
 - Intro: Purpose and Need, Mission and Vision
 - Our Solution: I-24 Smart Corridor
 - Project Phases 1-3
 - Project Schedule and Status
 - Initial ICM Operation and Maintenance Needs
 - ICM Coordinator Role
 - Local Agency Operations Support
 - ICM Maintenance Expectations
 - Public Outreach for Project
 - Next Steps
- SWCS Upgrades
 - ATMS upgrade and background
 - ATCMTD Grant Project for ICM DSS
 - ICM Decision Support System
 - SWCS Expansion Next Steps











I-24 SMART Corridor Update



WWW.TN.GOV/TDOT/PROJECTS/REGION-3/I-24-SMART-CORRIDOR

https://www.youtube.com/watch?v=c5HOIYXyszs











I-24 Smart Corridor Mission & Goals

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I-24 Smart Corridor Goals:

Goal 1: Increase Travel Time Reliability

Goal 2: Increase Mobility of all

Goal 3: Reduce the Concentration of

Goal 4: Develop Agency Coordination

I-24 Congestion Contributors



Traffic Incidents 27%

Incidents Breakdown 2015 (Total Crashes:1,661)









I-24 Smart Corridor Purpose and Need

Safety

I-24	Fatal Crashes	Major Injury Crashes	Minor Injury Crashes	Prop Damage Crashes	Total	Total*	ak Hill
2018	5	26	184	567	776	457	ntwot
2019	3	10	200	663	876	470	5
2020*	1	17	82	306		406	252

*Data as of mid-August 2020

SR-1	Fatal Crashes	Major Injury Crashes	Minor Injury Crashes	Prop Damage Crashes	Total	Total*
2018	2	14	223	764	1003	564
2019	4	23	261	802	1090	671
2020*	3	10	126	372		521

*Data as of mid-August 2020







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Historical Travel Time Data - 2017

TN

Department of

ransportation

Weekday AM Peak Period Travel Time I-24 From I-840 to Briley Pkwy 70 60 50 Travel Time (min) 40 30 20 10 -1an 2017 Atar 2017 May 3017 ^{541,201}, Feb. 3013 Jun 2015 AUS 2017 ADI-2017 Septions Octaons Stantec **ARCADIS** TDOT



Historical Travel Time Data - 2018

TN

Weekday AM Peak Period Travel Time I-24 From I-840 to Briley Pkwy



Historical Travel Time Data - 2019

TN

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Weekday AM Peak Period Travel Time I-24 From I-840 to Briley Pkwy





I-24 Smart Corridor - Phases 1 & 2



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Length: 94.10 Total Miles (29.5 Miles along I-24) Termini:

- I-24 from I-440 to SR-231
- SR-1 from I-24 to SR-231
- Various connector routes

Phase 1

- Scope of Work:
- ITS and signal improvements on all project roadways
- Connected Vehicle Infrastructure
- Interchange ramp improvements along I-24
- Emergency pull-offs along I-24
- Let to Contract: October 2018
- **Contractor:** Stansell Electric
- Award Price: \$18.7 Million
- Estimated Completion: December 2021

40 to SR-231 24 to SR-231 ector routes

Phase 2

- Scope of Work:
- Install 67 overhead dynamic message signs on I-24 between I-440 and SR-102
- Traffic Signal upgrades: radar and video detection
- Implement Active Traffic Management (Arterial & Freeway)
- Let to Contract: October 2019
- **Contractor:** Stansell Electric
- Award Price: \$45.8 Million
- Estimated Completion: December 2022

I-24 Smart Corridor - Phase 3



ansportation

- Phase 3
- Length: 94.10 Miles
- Termini:
 - I-24 from I-440 to SR-231
 - SR-1 from I-24 to SR-231
 - Various connector routes
- Scope of Work:
 - Ramp Meters

 - Arterial DMS Trailblazers
 - Arterial CCTV Cameras
- Earliest Letting: CY 2022

 Arterial Fiber Optic expansion Intersection Operations Improvements (ADA, Pedestrian Signals, etc) **Estimated Construction Cost:** \$45M

I-24 Smart Corridor – Operations & Maintenance Program Schedule









Initial ICM O&M Needs

- Local Agency Operations Support
 - Assists and trains Local Agencies on active arterial operation.
 - Assists local agencies in planning and execution of ICM strategies.
 - Assists and trains staff in maintenance of ICM components within their jurisdictions.
 - Provide supplemental TOC support.

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I-24 Smart Corridor – O&M Support and training for Local Agencies

- Provide Agency Specific training:
 - BlueTOAD units / BlueARGUS Dashboard
 - DSRC / CAV Training
 - Traffic Responsive Operation
 - Miovision Cameras (Intersection Stopbar) Detection)
 - Wavetronix (Advanced Detection)
 - Centracs (Signal Controller central management software)
 - RITIS Training











BlueTOAD

I-24 Smart Corridor - Initial ICM Operation and Maintenance Needs

- ICM Coordinator Roles
 - Defines and coordinate training needs
 - Support the TMC on active freeway and arterial management strategies
 - Support DSS Development based on lessons learned and TDOT SOPs
 - Define rules for implementation of diversion scenario plans
 - Coordinates with Local Agencies on the implementation of an incident management signal timing plans.
 - Corridor Specific TIM Coordination



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I-24 Smart Corridor - Initial ICM Operation and Maintenance Needs

- ICM Maintenance Expectations
 - Set maintenance goals and expectations for the local agencies
 - Identify critical field assets
 - Define KPIs such as percent uptime
 - Establish expected repair times
 - Establish maintenance budgets
 - TDOT's role if local agency cannot repair critical asset within accepted duration
 - Paradigm Shift for Traffic Signal O&M in TN
 - TSM&M









I-24 Smart Corridor - Public Outreach for Project

- Providing relevant and timely information to the public is critical to this project's success
 - Media campaigns in advance of project milestones
 - Update of the project website as well as Social Media Outlets.









Challenges for Initial ICM Deployment in Tennessee

- Multiple TSMO / ICM Strategies deployed for the first time in Tennessee
 - AAM, LCS, VSL, Ramp Metering
 - Local Agency Coordination, Collaboration, Communication
 - Motorist Education
- TDOT's Role
 - I-24 ICM policies
 - Active Arterial Management during peak hours
 - Preventive / Routine Maintenance
 - Timely Detector, Communication, and Surveillance Repair
- Local Agency Role
 - Funding (Staffing + Capital improvements)
 - Training
 - Operational Priorities
- Maintenance requirements
- Measures of Effectiveness (MOE)
- Inter-agency MOUs
 - Communication protocols
 - Control of equipment
- Dedicated funding for:
 - Staffing
 - Infrastructure maintenance and improvements











I-24 Smart Corridor - Next Steps

- LCS and VSL Operations lacksquare
 - Develop Scenarios, Algorithms, SOGs
- **Continue Interagency Coordination**
 - Monthly TAC meeting with the Local Agencies and First Responders ۲
 - Ongoing individual meetings to work on specific ICM stragegies •











- Gather ICM operations best practices
 - Peer Exchanges with FHWA: WsDOT (Seattle) and FDOT (Orlando)
 - Peer Agency Reviews with Arcadis: TxDOT (Dallas), and Caltrans (San ۲ Diego) with Arcadis









- I-24 Smart Corridor Phase 3 Design
 - Ramp meter design study by RK&K is complete
 - Con Ops Update to align with Phase 3 Design
 - Preliminary Plans Development is underway



TDOT's Journey to Integrated Corridor Management









TDOT Network Upgrade

- Cisco Networking Equipment
- Replacement of all Layer
 2 and Layer 3 Switches
- Addition of 829 Routers
- Updated security and IP-Scheming









Why was SWCS needed?

- Efficient incident/HELP Truck ${\color{black}\bullet}$ management
- **Recurring congestion management**
- Establish a unified software platform ${}^{\bullet}$
- Integrated Corridor Management (ICM) support
- Data exchange between different ${ \bullet }$ TMCs/TOCs



Tennessee roads experience **410** vehicle crashes everyday on average!







SPEED LIMIT 55

Where did we start?

Multiple software for Incident Management:

- MIST
- IM/LOCATE \bullet
- Cameleon \bullet
- **SWIFT**
- Vero
- Platinum



MIST Operator Interface

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- 🗆 X MIST Map Status Database Signal Control Flows Strategies Maintenance Pager View Window Help _ 🗆 × LAKE NEWPORT RI NT **Display Modes** Go To Object Show Overview Show Full Extent Show Legend Layer Control SUNSET BILL RI Click Mode Hide Toolbar SWIFT (**

Where are we now?

- All modules in one package
- Unified map interface
- Statewide consistency
- Single databus to facilitate automation
- Center to Center Communications











SWCS Capabilities

Event/Incident Management

Help Trucks Management

Traffic Congestion Management

Device Management







Reporting

Event/Incident Management

- Incident Location
- Lane Maps
- Event Type
- Involved Vehicles
- HELP Dispatch



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Event Workflow



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Event Workflow









Response Plans

Plan Actions Plan Items	Suggestions			
Device Details	Response Plan Message Details		Currently Active Message Detail	ils
Email	Email Groups: TDOT Region 4 Notification Subject: Active Level 2 Title: Location: SHELBY 10040 WB Before Exit 1 Body: Location: SHELBY 10040 WB Before Exit 1D Incident: Overturned Vehicle Impact: Left Lane (of 2 Lanes) Blocked, Left Expected Duration: 0 minutes TDOT Incident Commander on Scene: TM Notes: Traffic is being allowed to pass in	ons ID MM 1B.2 D MM 1B.2 Ift Shoulder Blocked IC Operator lane two and on the right shou	ılder.	
511 ATIS	Incident in SHELBY county, going Westbo MARKER 1B.2 with Left lane blocked Last	ound on Interstate 40 before M t updated 4/30/2021 8:49:12 Af	IILE M	
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(1) 0 ✓ 1 X 0 ✓ Suggested response plan received.







Automated Vehicle Location (AVL)

- Cisco IE 829 routers connect HELP trucks to operator's map
- Application developed using Cisco Kinetic
- Facilitate capabilities for operators to enter incidents
- Additional future benefits











Reporting

- A wide variety of report templates that can export reports
- These templates are initially grouped by similar type or functionality but are configurable

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SWCS Performance Metrics

- Developed in **Crystal Reports**
- Quarterly Performance Measures Report
- Performance Measures for HELP **Truck Operations**





Percentage of event types for all events in current quarter













Percentage of Activity Types for HELP Truck Activities in Current Quarter

ICM DSS - Goal: Maximize the Performance of the I-24 ICM System

The ICM DSS:

ransportation

- aggregates all relevant data generated about the corridor, ____
- fuses the data into its most meaningful and valuable representations, and
- provides actionable intelligence to the TMC Operators when appropriate and/or requested





SmartWay Expansion: Paving the Way for the Future!









Over-height Detection

Wrong Way Driver Detection

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Contact Info:
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Thank You!

