

Integrated TSM&O Governance and Regional ITS Systems Engineering



By Florida DOT

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Overview

The Florida Department of Transportation (FDOT), District 4 operates a regionally integrated Transportation Systems Management and Operations (TSM&O) program that combines governance, performance measurement, and systems engineering to deliver interoperable operations across local Transportation Management Centers (TMCs), field devices, and partner agencies. The program emphasizes real-time data sharing, standardized processes, and corridor level coordination to improve safety, reliability, and transparency for both operators and the traveling public. In 2025, District 4 advanced this model through unified traveler information systems, expanded Intelligent Transportation Systems (ITS) device monitoring, cybersecurity and information technology modernization, and coordinated operational alignment tied directly to performance outcomes. These efforts demonstrate how governance and regional ITS architecture can be aligned to support consistent, data driven decision making across a multi county transportation network.

In this case study you will learn:

1. How to govern a regional ITS architecture that enables interoperable operations across the Regional Transportation Management Center (RTMC), field devices, and partner agencies
2. The uses of real-time data and performance dashboards to guide corridor level decision making
3. How to integrate traveler information systems, Dynamic Message Signs (DMS), and third-party navigation platforms for consistent public communication
4. How to strengthen system resilience through cybersecurity, network modernization, and device monitoring
5. How to align emergency coordination and operational governance with performance and safety outcomes

BACKGROUND

FDOT District 4 oversees a high demand, multi county transportation network that includes freeways, arterials, and managed lanes. The scale and complexity of this network require a governance and systems engineering approach that connects policy, operations, and technology into a single, coordinated framework. To address this need, District 4 established standardized procedures and a regional Intelligent Transportation Systems architecture that enables shared situational awareness among the Florida Department of Transportation, local TMCs, emergency responders, and transportation operations partners. This framework supports real-time data sharing, consistent operational practices, and coordinated, data-driven decision making across jurisdictions.

TSMO PLANNING, STRATEGIES, AND DEPLOYMENT

District 4's regional ITS architecture is designed to support continuous monitoring, interoperability, and performance-based management. As part of this deployment, the Queue Warning System (QWS) used Vehicle Detection System (MVDS) data to automatically display advance warnings for congestion and provide drivers with real time distance to queue information, improving traveler awareness and decision making. Two phased DMS travel time messaging further enhanced comparative travel time reporting across corridors. To strengthen system resilience and governance, District 4 modernized its information technology and network infrastructure. More than 7,255 service desk tickets were resolved, and 15,331 security vulnerabilities were remediated. Redundant servers were consolidated, and end of life platforms were upgraded to improve reliability and cybersecurity compliance. ITS field devices were integrated into the SolarWinds monitoring platform, enabling real time performance tracking and rapid incident detection across the network. From a systems engineering perspective, District 4 expanded connected vehicle infrastructure through

the deployment of additional RSUs to support CAV applications. The Supervisory Control and Data Acquisition (SCADA) system at the Henry E. Kinney Tunnel was fully activated to enable real time monitoring and dual communication with legacy and newly deployed ITS generators, improving emergency response and operational resilience.



COMMUNICATIONS PLANNING AND EXECUTION

District 4 applies a standardized, step-based operational workflow to manage events across freeway, arterial, and managed lane corridors. Real-time data from field devices and partner agencies is received at the RTMC, where it is validated, prioritized, and translated into coordinated operational actions. The workflow formalizes how responsibilities are assigned across FDOT operations, local TMCs, Road Rangers, and law enforcement, ensuring consistent escalation, field deployment, and performance tracking throughout the lifecycle of an incident or operational event. Operational readiness is reinforced through regular multi-agency exercises and technical coordination sessions that test communication protocols, data-sharing pathways, and continuity of operations during severe weather and regional disruptions.

OUTCOMES, BENEFITS, AND LEARNINGS

District 4's integrated governance and systems engineering approach has delivered measurable improvements in performance, resilience, and transparency. In 2025, the RTMC Information

Technology (IT) network achieved 99.84 percent uptime, reflecting high system availability and operational continuity. The traveler information program delivered tens of thousands of real-time DMS messages across incident, construction, and safety categories, ensuring consistent communication to motorists throughout the region. Real-time monitoring of ITS field devices, unified traveler information platforms, and centralized cybersecurity governance strengthened the district's ability to respond quickly to incidents, congestion, and infrastructure issues while maintaining operational integrity across a multi-county network. The program's emphasis on interoperability and shared data has improved coordination across districts, local agencies, and emergency partners, ensuring consistent messaging and aligned operational strategies. Key learning includes the value of centralizing device monitoring, integrating cybersecurity into operational governance, and linking public outreach directly to performance metrics and system changes.

WHY THIS PROGRAM STAND OUT

District 4's TSM&O program distinguishes itself through the integration of governance and systems engineering at a regional scale. Rather than managing technology, communications, and operations as separate functions, the district operates a unified architecture that connects ITS deployments, information technology resilience, traveler information, and operational coordination into a single, performance-driven framework. By combining real-time data sharing, standardized procedures, cybersecurity modernization, and multi-agency coordination, District 4 demonstrates a mature, transferable model for regional TSM&O governance that supports reliable mobility, transparent communication, and continuous operational improvement across a complex, multi-county transportation network.



Average Device Uptime

Devices active between 1/1/2025 12:00:00 AM and 12/31/2025 11:59:59 PM

