

Expanding TSMO Capabilities through Software and Technology Innovation



By Florida Department of Transportation

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Benefits Statement

FDOT's TSMO program improves traffic management through technology, real-time data, and stakeholder collaboration. Tools like the SunGuide Alert Viewer and Vehicle-to-Everything Data Exchange Platform enhance safety by reducing accidents and improving emergency response. Dashboards and dynamic tolling optimize traffic flow, saving time for commuters and freight operators. Cost-saving measures, such as the Truck Parking Availability System and strategic partnerships like Waze, cut fuel waste and infrastructure expenses. These innovations create a safer, faster, and more cost-efficient transportation system across Florida.

In this case study you will learn:

1. How FDOT utilizes innovations like the SunGuide Alert Viewer and V2X-DEP, FDOT to improve real-time incident response and vehicle communication, reducing crashes and improving mobility.
2. How FDOT's use of advanced software and dashboards optimize freeway and arterial management, reduce congestion, and support emergency evacuations.
3. How FDOT leverages tools like the Truck Parking Availability System (TPAS) to streamline operations, minimizing infrastructure and fuel costs.

BACKGROUND

FDOT's Traffic Engineering and Operations Office (TEOO) conducted a series of self-assessments to create a TSMO Capability Maturity Model (CMM) as part of its TSMO Strategic Plan. There were ten dimensions for the CMM, including:

- Freeway & Arterial Management
- Freight & Transit Management
- Stakeholder Coordination
- TSMO Operations and Maintenance (O&M)
- Connected Vehicles (CV)
- TSMO Policy Development
- Incident Management
- Stakeholder Coordination

Since then, FDOT's TEOO has improved each of its ten CMM dimensions, not only by developing business processes and implementing follow-on action plans, but by embracing technology, software innovation, and data-based decision making.

At the time of initial CMM development, FDOT's Freeway Management dimension was beyond Level 3 (Defined). Its processes were documented and standardized throughout the organization. The Freeway Management has now moved into Level 5 (Optimizing), focused on continuous improvement through incremental and innovative advancements. One such innovation is the SunGuide Alert Viewer (SAV), which was developed by FDOT to alert Florida Highway Patrol and other stakeholders of wrong way driving (WWD) incidents in real-time as they are presented at FDOT's Regional Transportation Management Centers (RTMCs).

When the original CMM assessment was conducted, FDOT had a robust O&M Program – complete with reversible lanes, performance-based maintenance contracts, dynamic tolling, and RTMCs operating throughout the state. The CMM's O&M dimension was nearing

Level 3, however TSMO software enhancements to FDOT's Advanced Traffic Management System software, SunGuide® Software, have propelled that dimension to Level 5. The thousands of roadside devices that communicate with SunGuide have allowed the O&M dimension to be fully integrated throughout the organization (Level 3), quantitatively managed, measured, and controlled (Level 4) to the point where TEOO's focus on O&M has shifted towards continuous process improvement (Level 5). Additional TSMO improvements in the O&M dimension include the development of the Next Generation Statewide Express Lanes Software (NG SELS), FDOT's RTMC Standard Operating Guidelines, the statewide RTMC Operations Working Group, and the expansion of managed lanes.

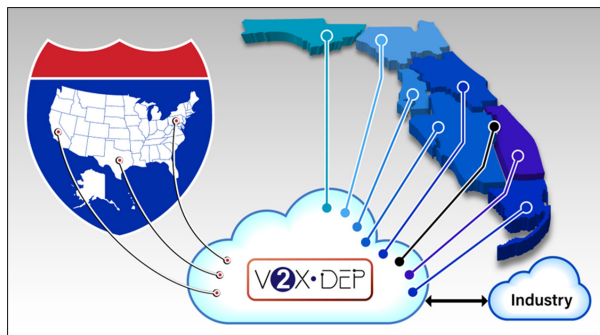
TSMO PLANNING, STRATEGIES AND DEPLOYMENT

The Stakeholder Coordination dimension of FDOT's CMM was between Level 2 (Managed) and Level 3. There were basic management processes in place, but they were not fully integrated throughout the organization. Expanding TSMO capabilities with the establishment of business practices, such as real-time dashboarding, have matured FDOT's Stakeholder Coordination dimension to above Level 3 and near Level 4 (Quantitatively Managed). TSMO Dashboards, such as the Emergency Shoulder Use (ESU) and Lane Closure Notification (LCN) dashboards, have become standard processes for FDOT.

- The ESU dashboard is a decision support tool that monitors real-time speeds on the six ESU-approved corridors by ingesting information from hundreds of roadside devices. It is used when deciding whether or not to implement Emergency Shoulder Use as an evacuation counter measure.
- In 2022, FDOT established a new Lane Clo-

sure Notification System (LCNS) – the first of its kind in North America – to further increase safety on construction projects. The TSMO Software Team collaborated with the State Construction Office to build a dashboard that pulls lane closure data and feeds it into a custom LCN dashboard, tailored for traffic operations.

FDOT’s Connected Vehicle (CV) dimension was at Level 1 (Initial). The Department could conduct ad-hoc CV pilots, however, success was dependent on individual efforts and not established processes. Since then, the Department’s CV dimension has flourished well into Level 3. CV has been fully integrated into standard processes throughout the organization. Currently, FDOT is building the foundation to quantitatively manage the CMM’s CV dimension by introducing innovative tools such as its pioneering Vehicle-to-Everything Data Exchange Platform (V2X-DEP).



- The V2X-DEP serves as the TSMO clearing house to collect, store, and share CV data and other TSMO data, allowing researchers to discover, analyze, and extract previously unavailable insights to improve safety and mobility. The V2X-DEP will ultimately fulfill the agency’s safety, mobility, environmental, and economic development goals by reducing crashes and congestion through the gathering, consolidating, analyzing, and disseminating of data to and from motorists and stakeholders in ways that existing systems cannot.

TEOO’s TSMO Policy Development dimension was also at Level 1 when the CMM self-assessment was conducted. Today, TSMO software is not just a part of the policy making process, but in some instances, it is integral to it. For example, the Statewide Express Lanes Software is the centerpiece of the Department’s Express Lane Policy. The TSMO Policy Development dimension has matured past Level 2 and is nearing Level 3.

COMMUNICATIONS PLANNING AND EXECUTION

In addition to deploying the aforementioned TSMO software technologies, FDOT was able to expand and mature its TSMO capabilities by engaging in communication and planning activities that were frequent, productive, and inclusive. TEOO took steps to engage its end-users and stakeholders so they could partake in strategic planning. This was done by creating the SunGuide Software Users Group, Florida Users of Express Lanes Software, SELS Change Management Team, and SunGuide Change Management Board. Members of these groups range from TMC Operators to TSMO Engineers, and come from all FDOT districts, external agencies, and partners. This multilayered approach allows a wide array of initiatives to be brought forward, discussed, voted on, and prioritized by the various stakeholders before they are deployed as future TSMO software enhancements. This planning has led to a transparent Department process which engages stakeholders and ensures everyone’s voice is heard.

OUTCOME, BENEFITS AND LEARNINGS

The outcome of the FDOT TSMO Software Team’s focus on expanding TSMO capabilities through the implementation of business processes, stakeholder engagement, following improvement plans, and leveraging TSMO Software is a more mature and capable system

for all. Additional expanded TSMO capabilities include:

- **Truck Parking Availability System (TPAS):** FDOT developed TPAS to address the need for parking information management. The system works by incorporating vehicle sensors and cameras to determine parking space availability in truck parking areas. That information is then verified by the RTMC before being posted to the traveling public. This and other system enhancements have helped increase the CMM’s Freight and Transit Management dimensions.
- **Strategic Partnerships:** FDOT has made strategic partnerships with companies such as Waze to get pertinent traffic information to the traveling public. Partnerships like this have expanded TSMO capabilities by enhancing Florida’s Advanced Traveler Information System, FL511, and helping to mature the Freeway, Arterial, and Incident Management dimensions of the CMM.
- **SunGuide Remote Command Application (RCA):** Another SunGuide enhancement, RCA, allows districts to remotely control other districts’ ITS devices. This TSMO capability enhances TSMO resiliency during hurricanes and other situations where parts of the state are being evacuated while ITS infrastructure is unavailable. Expanding this TSMO capability has helped increase the Incident Management and Road Weather Information Systems dimensions.
- **Smart Phone Application for Road Rangers (SPARR):** SPARR allows for more efficient coordination and communication between Road Rangers and RTMCs. SPARR was enhanced to allow Road Rangers to enter a more accurate location of an incident, pinpointing the exact location where safety countermeasures may be needed. Expanding this TSMO capability has helped increase the Incident and Freeway Management dimensions of the CMM.

FDOT Connected Mobility and Technology Program Architecture

