Planning and Deploying Integrated Corridor Management (ICM) Projects

Caltrans Connected Corridors Program and Corridor System Management/Pilot Projects

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Transportation System Management and Operations (TSMO)

Definition of TSMO

Integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system…

Section 101(a) of title 23, United States Code, as amended by MAP-21

The Promise of TSMO

"We promise **travelers and shippers** that we will **manage** traffic and incidents as well as provide timely and accurate travel information so that they can make informed decisions to **minimize their unexpected delay and improve the safety** of their travel."

SHRP2 L17 Technical Report

TSMO Focus on Integration

Institutional Integration

Coordination to collaboration between various agencies and jurisdictions that transcends institutional boundaries.

Technical Integration

Sharing and distribution of information, and system operations and control functions to support the immediate analysis and response.

Operational Integration

Multi-agency and cross-network operational strategies to manage the total capacity and demand of the corridor.

Implementing TSMO is Complicated

Institutional Integration + **Technical Integration** + **Operational Integration**

$$\mathcal{L}_{GWS} = \sum_f (\bar{\Psi}_f (i\gamma^\mu \partial\mu - m_f)\Psi_f - eQ_f \bar{\Psi}_f \gamma^\mu \Psi_f A_\mu) +$$

$$+\frac{g}{\sqrt{2}} \sum_i (\bar{a}_L^i \gamma^\mu b_L^i W_\mu^+ + \bar{b}_L^i \gamma^\mu a_L^i W_\mu^-) + \frac{g}{2c_w} \sum_f \bar{\Psi}_f \gamma^\mu (I_f^3 - 2s_w^2 Q_f - I_f^3 \gamma_5) \Psi_f Z_\mu +$$

$$-\frac{1}{4}|\partial_\mu A_\nu - \partial_\nu A_\mu - ie(W_\mu^- W_\nu^+ - W_\mu^+ W_\nu^-)|^2 - \frac{1}{2}|\partial_\mu W_\nu^+ - \partial_\nu W_\mu^+ +$$

$$-ie(W_\mu^+ A_\nu - W_\nu^+ A_\mu) + ig' c_w (W_\mu^+ Z_\nu - W_\nu^+ Z_\mu|^2 +$$

$$-\frac{1}{4}|\partial_\mu Z_\nu - \partial_\nu Z_\mu + ig' c_w (W_\mu^- W_\nu^+ - W_\mu^+ W_\nu^-)|^2 +$$

$$-\frac{1}{2} M_\eta^2 \eta^2 - \frac{g M_\eta^2}{8 M_W} \eta^3 - \frac{g'^2 M_\eta^2}{32 M_W} \eta^4 + |M_W W_\mu^+ + \frac{g}{2} \eta W_\mu^+|^2 +$$

$$+\frac{1}{2}|\partial_\mu \eta + i M_Z Z_\mu + \frac{ig}{2c_w} \eta Z_\mu|^2 - \sum_f \frac{g}{2} \frac{m_f}{M_W} \bar{\Psi}_f \Psi_f \eta$$

This is a description of the Langrangian of the Standard Model. In essence, it's a description of the underlying physics of the universe.

Caltrans

Implementing TSMO is Complicated

Institutional Integration

People

+

Technical Integration

All Electronic Stuff Works Together

+

Operational Integration

People and Electronic Stuff Make Things Happen

Implementing TSMO at Caltrans

Institutional Integration

- ✓ 2015-2020 Caltrans Strategic Management Plan – e.g., Stewardship and System Performance Goals
- ✓ Draft TSMO Director's Policy -08 & Draft ITS Deputy Directive -70
- ✓ 25 Top Priority Corridors
- ✓ Caltrans TSMO Steering Committee
- ✓ Regional Operations Forums/Capability Maturity Model Self Assessments
- ✓ Planning for Operations Effort

Implementing TSMO at Caltrans

Institutional Integration

Organizing for Corridor Management - Making TSMO a central part of an agency's mission and institutional structure.

- Current Organizational Structure
- Future Organizational Structure
- Existing Knowledge, Skills, and Abilities (KSAs)
- Future KSA Needs
- Gaps
- Necessary Training
  - At Caltrans
  - External to Caltrans
  - Not Existing, but needed

Implementing TSMO at Caltrans

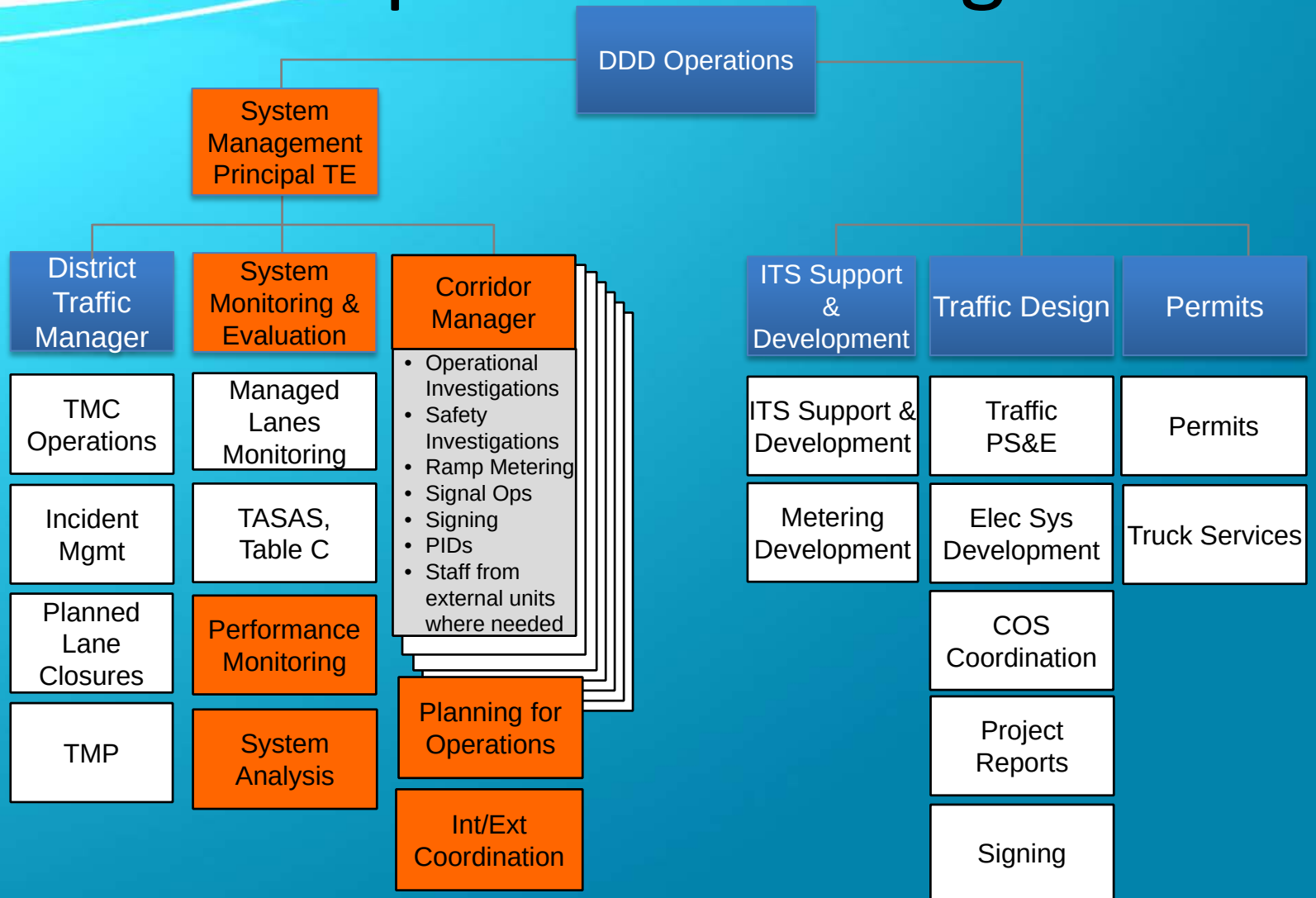
Institutional Integration

- Organizing for Corridor Management Statewide Workshops
  - All but D1 and D2
- Sub-regional, Corridor-Level Operations Forums
  - Only 3 left CTs D5, D1, & D2

* all scheduled for later this year.

District 7 Traffic Operations Reorganization

Institutional Integration



Implementing TSMO at Caltrans

Technical Integration

- ✓ **Connected Corridors I-210 Pilot and I-80 Smart Corridor Project**
- ✓ **Decision Support System**
- ✓ **Standardized Data Formats**
- ✓ **Upgrades to Caltrans PeMS to support Performance Measurement/Analysis**

Implementing TSMO at Caltrans

Operational Integration

- ✓ **Corridor Management - I-80 Smart Corridor Project and Connected Corridors I-210 Pilot**
- ✓ **Connected Corridors / ICM - Caltrans, UC Berkeley PATH, LA Metro, LA County, Cities of Pasadena, Arcadia, Monrovia, Duarte**
- ✓ **Caltrans and local agency personnel working together with UC personnel and researchers and private sector consultants to deliver Corridor Management**

Last Year - 2017

Catching a Wave

This Year 2019!

Smooth Sailing

(AP Photo/Gregory Bull)

Thank you !

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