



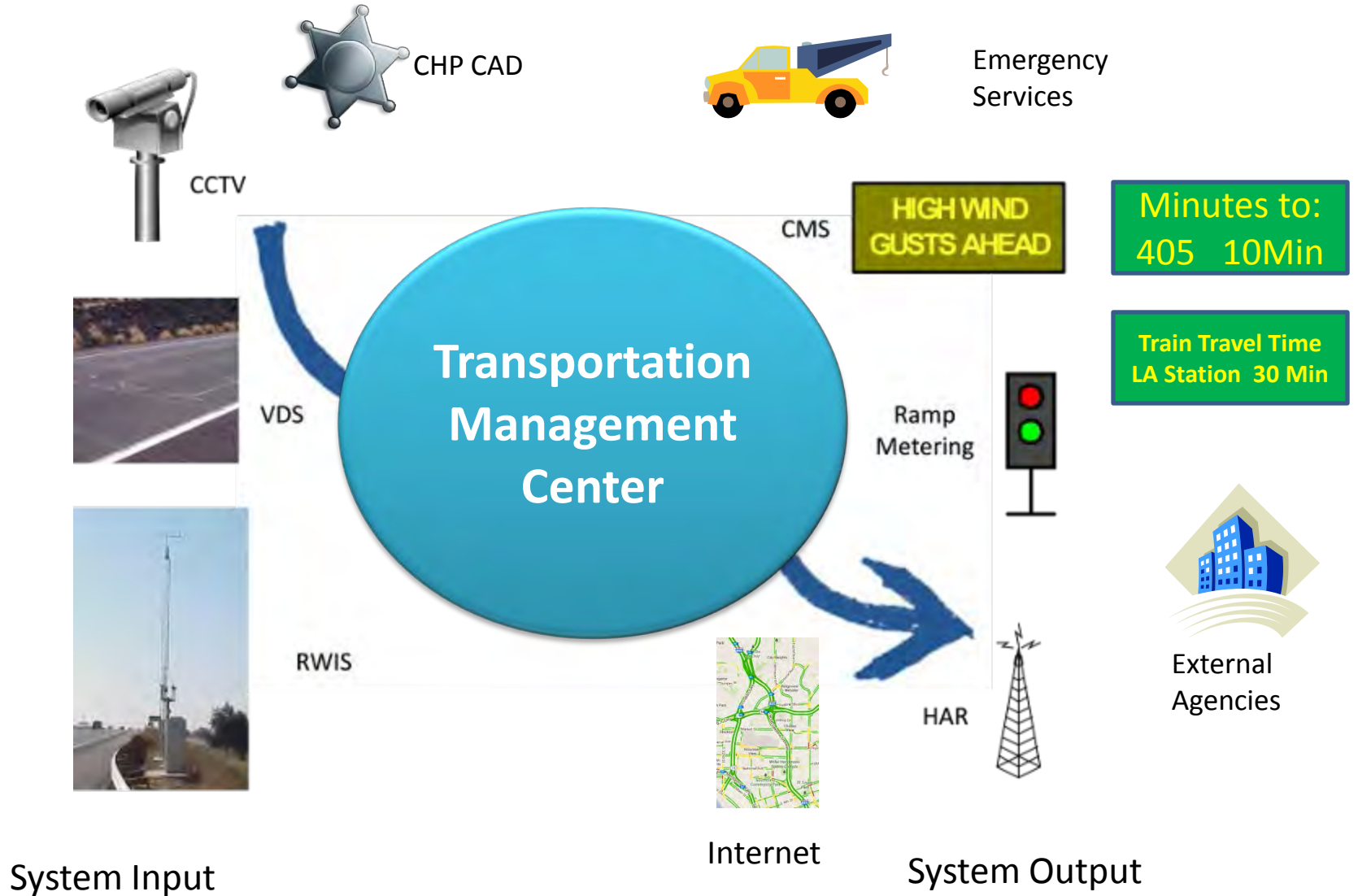
Key Challenges in Transportation and Why SE Can Help

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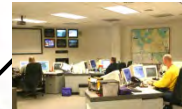
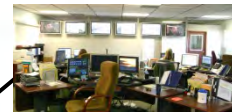
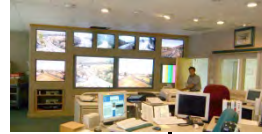


Typical Caltrans ATMS System





Caltrans Districts and Transportation Management Centers

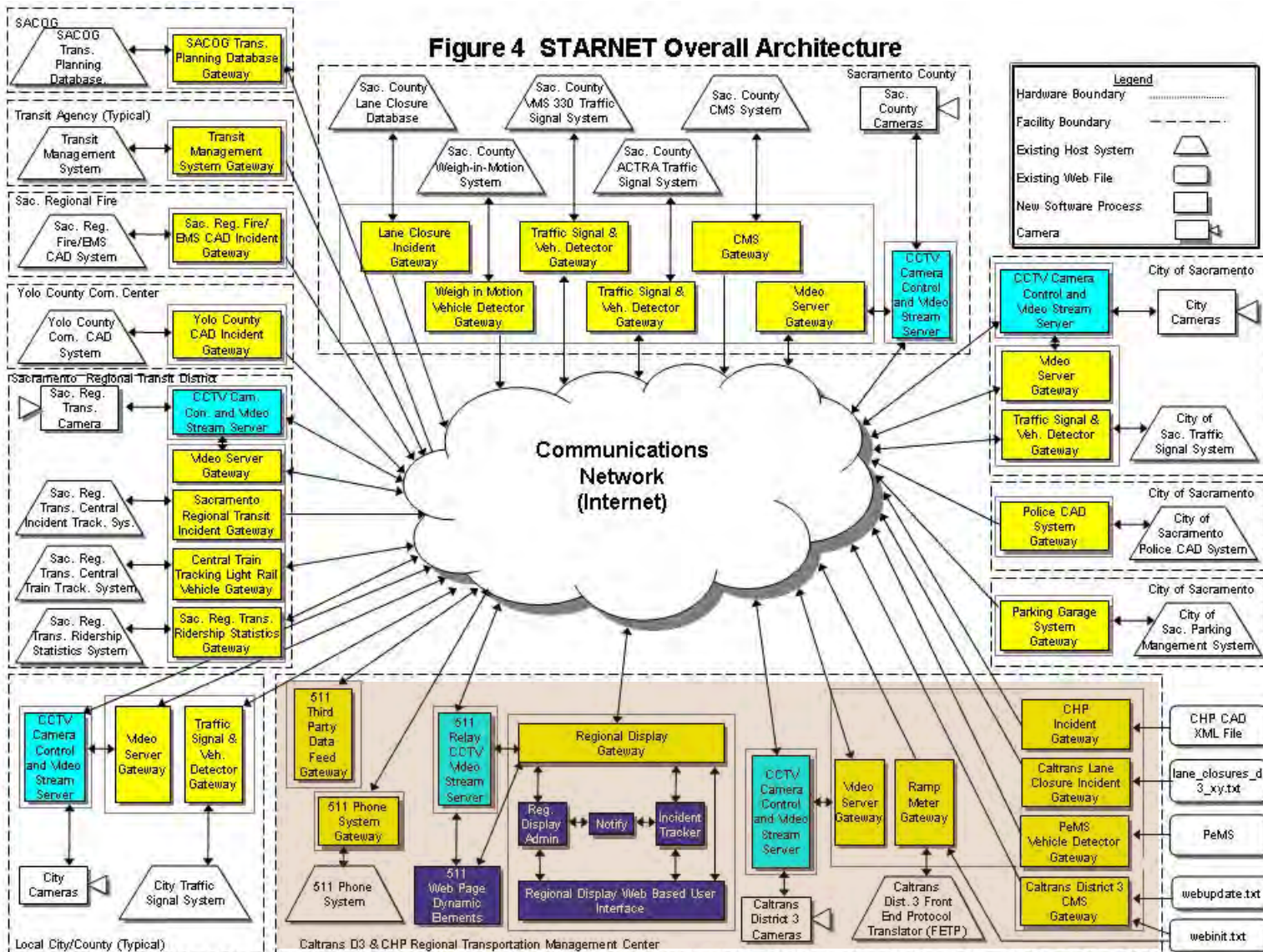


* ATMS



Integration with Regional Systems

Example District 3 STARNET





History of Systems Engineering in Caltrans

1990s

- *Initial ITS National Architecture (FHWA/FTA)*
- Initial ATMS deployed
- Initial Systems Engineering Training

2000-2009

- *FHWA Systems Engineering Rule (FHWA/FTA)*
- Initial Systems Engineering Process
- SE Guidebook For ITS
- Statewide Systems Engineering Training

2010-Now

- Evolved the SE Process
- Initial Standardization of SE
- Initial Single Model for ATMS

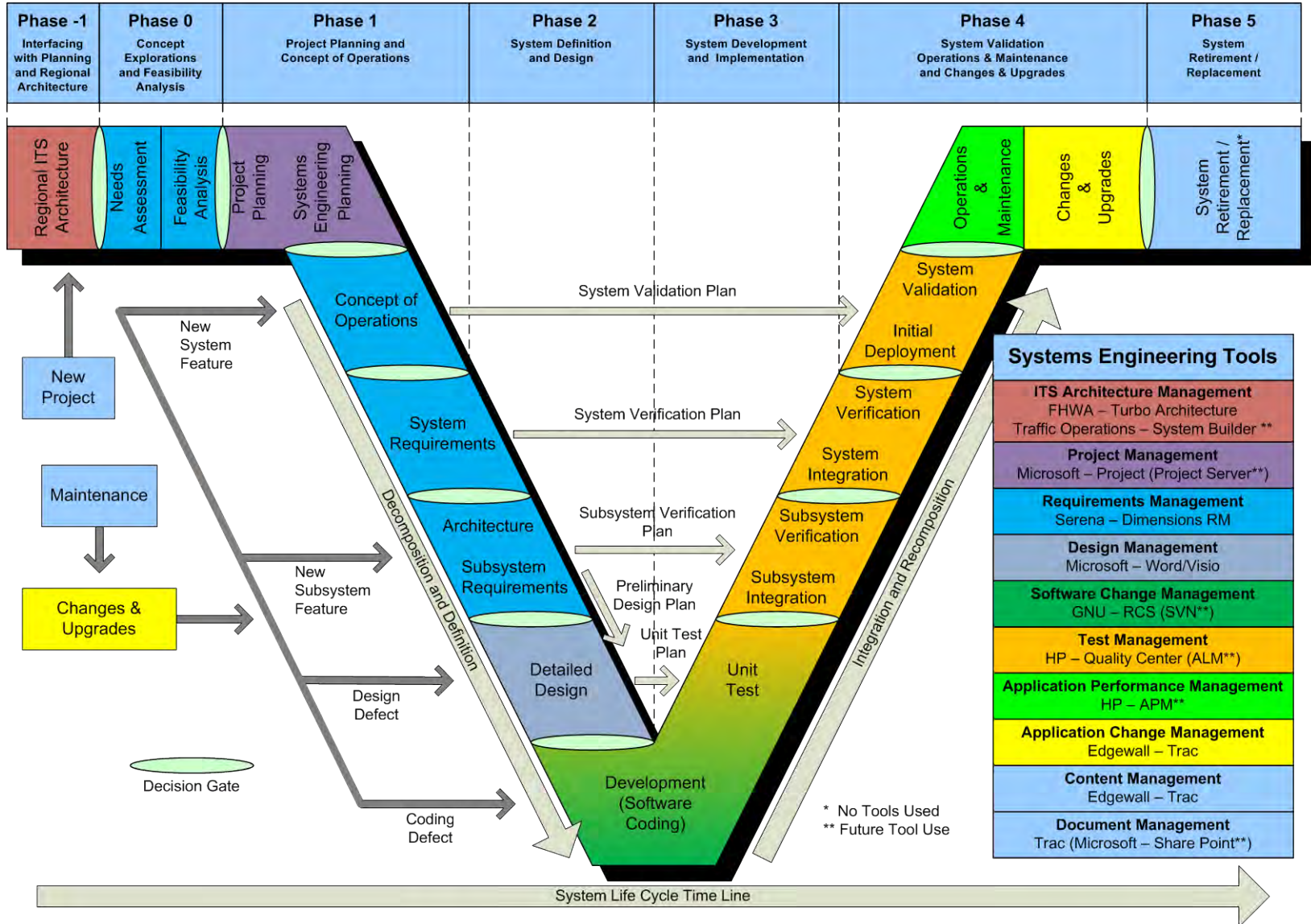


Key Challenge - Single Model for ATMS Statewide

- Integrate 6 ATMS Applications into 1 ATMS Application
- 5 Year Project Plan
- Moving Toward a Single Model for the ATMS Allowing Tailoring for Each District
- Integration of New Technologies into Legacy Systems – Google Maps, Decision Support System, AVMS
- Standard SE Process
 - Integration of Tools to Support the SE Process



Automation Support for SE





Key Challenge - Internal Caltrans Integration Capabilities

- Because of challenges with previous projects, Caltrans is moving system integration in-house
 - Transparency
 - SE Process Control
- SE Training to Improve Capabilities
- Using the Guidebook as a Bases for Processes
- Performing a Repeatable SE Process
- Using Document Templates that are Tailorable



Key Challenge - Using SE on all Caltrans ITS Projects

- Align the Divisions to Use a Standard SE Process
- Developing Internal Champions for SE
- Promoting SE within the Divisions
- Teaching How SE Aligns with Existing Division Practices
- Maintaining Management Support for the SE Process



Key Challenge - Streamline the SE Process

- Making the SE Process Leaner and More Effective
- Uniform SE Process (Tailorable Templates)
- Project Level Tailoring Guidance of SE Process
- Maximize the Automation of Requirements, Development, Verification, and Validation



ICM – Integrated Corridor Management

The key to ICM is integrating existing systems and management efforts with new concepts and relationships to develop a coherent multi-modal, multi-jurisdiction, corridor-wide transportation management system.

Institutional Integration

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

Operational Integration

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

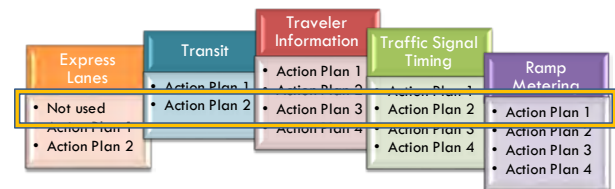
Technical Integration

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



Connected Corridor Elements

- Enhanced traffic monitoring systems
- Enhanced communication
- Freeway operations
- Arterial operations
- Arterial operations
- Enhanced traveler information
- Decision support system





Connected Corridors Map

I-210

Area 1

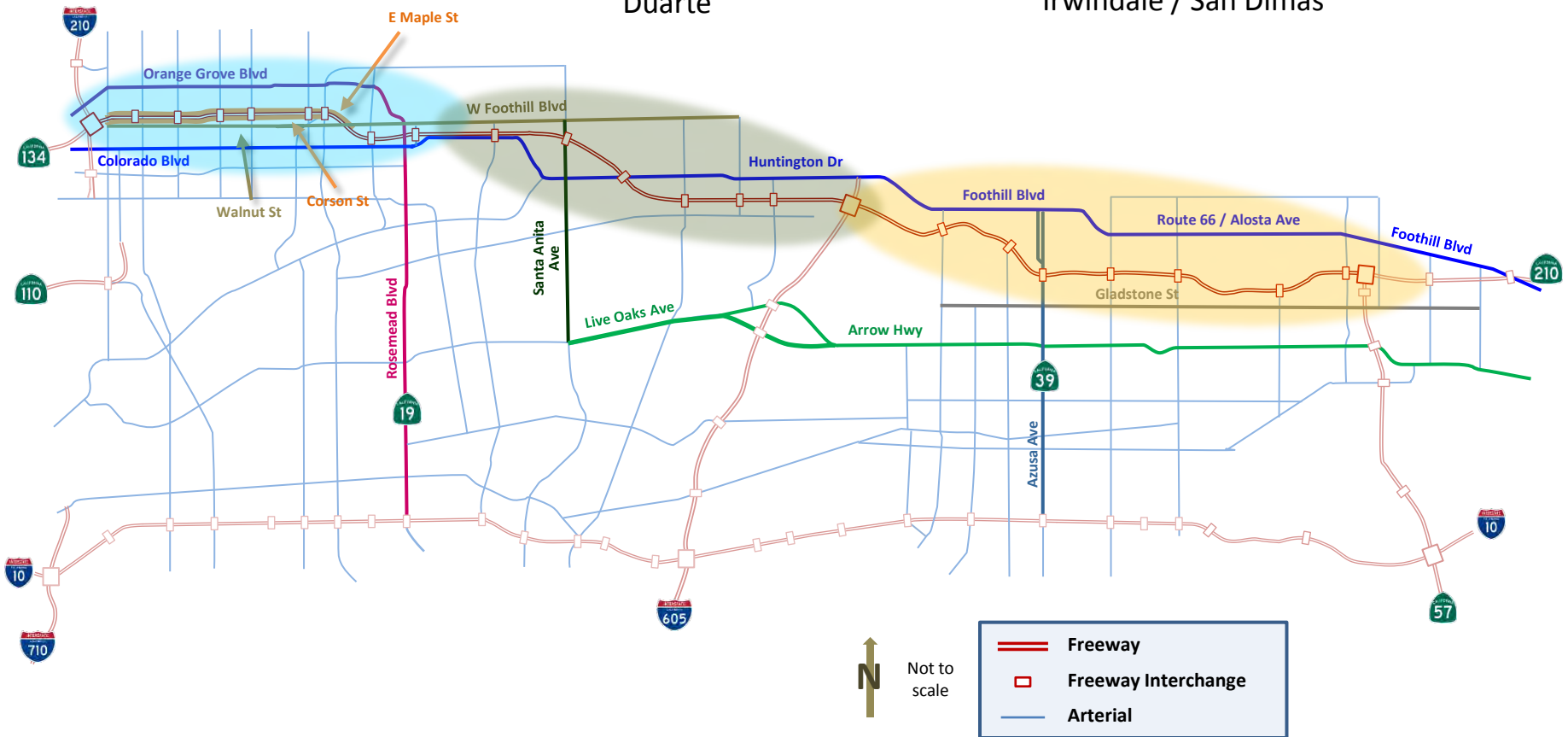
Pasadena

Area 2

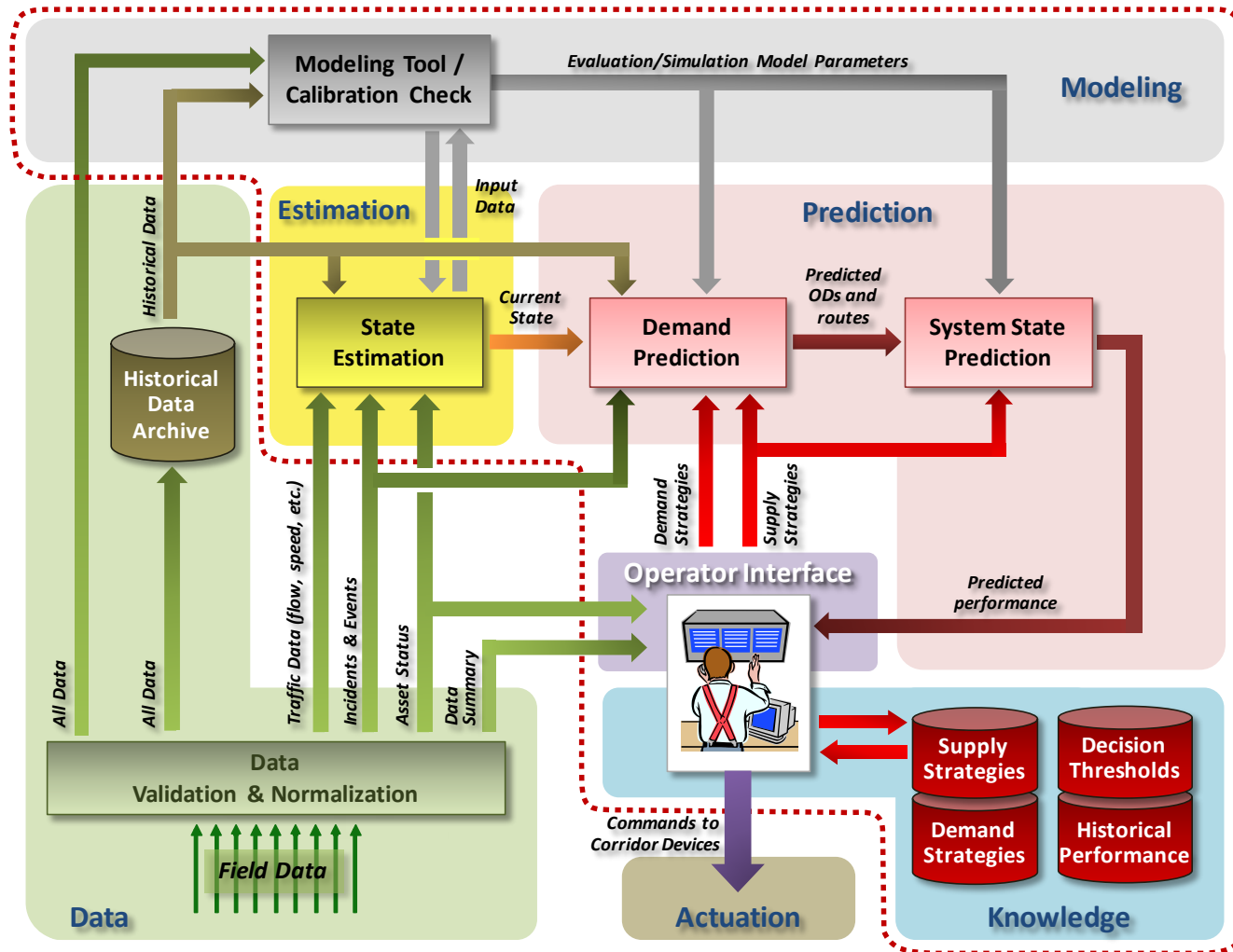
Arcadia / Monrovia
Duarte

Area 3

Azusa / Glendora / Citrus
Irwindale / San Dimas



Decision Support System





Key Challenge - Connected Corridors

- Challenges with Multiple Agencies
 - How to Get Buy-in on a Multi Jurisdictional Project
 - Stakeholder's Involvement
- The Goal is a Single Model for Use in All Corridors
 - Creating Standards, but Allowing Tailoring to Jurisdictional Needs