Partnering to Improve Corridor Safety and Operational Performance

2012 Washington Tribal-State Transportation Conference

Airway Heights, Washington

U.S. Department of Transportation

FHWA Office of Operations

FHWA Office of Planning

Introductions

U.S. Department of Transportation
Federal Highway Administration
Federal Transit Administration

- Washington State Department of Transportation
- Federal Highway Administration
- Workshop Facilitators
  - Dr. Mike C. Smith, SAIC
  - Ms. Jocelyn Bauer, SAIC

Workshop Outcomes for Participants

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- Understand and demonstrate a collaborative tool for strategic corridor planning for improved safety and mobility
- Identify collaborative approaches to transportation operations and the tangible benefits for participating agencies/governments

Workshop Overview

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- Welcome and Introductions
- Overview of Management and Operations (M&O) Strategies
- Collaboration and Coordination for Improved Safety and Operational Performance
- Collaborative Tool for Advancing M&O Strategies
- Activity: Developing a Collaborative Approach to Enhancing Corridor Mobility and Safety Based on a Scenario
- Integrating Operations into the Planning Process: An Overview
- FHWA Resources

What do our travelers want?

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- Safe, seamless, and reliable travel across modes and jurisdictions
- Information about current travel conditions
- Timely information to make mode & route choices
- Efficient and reliable goods movement

Consistency across modes & jurisdictional boundaries

Expanding our roads and rails takes time and significant funding.

How can we make a difference in the way people and goods move in the region now?

Maximize current investments in roads, bridges, rails, and transit systems with transportation <u>management and operations (M&O) strategies</u>.

What is Management & Operations?

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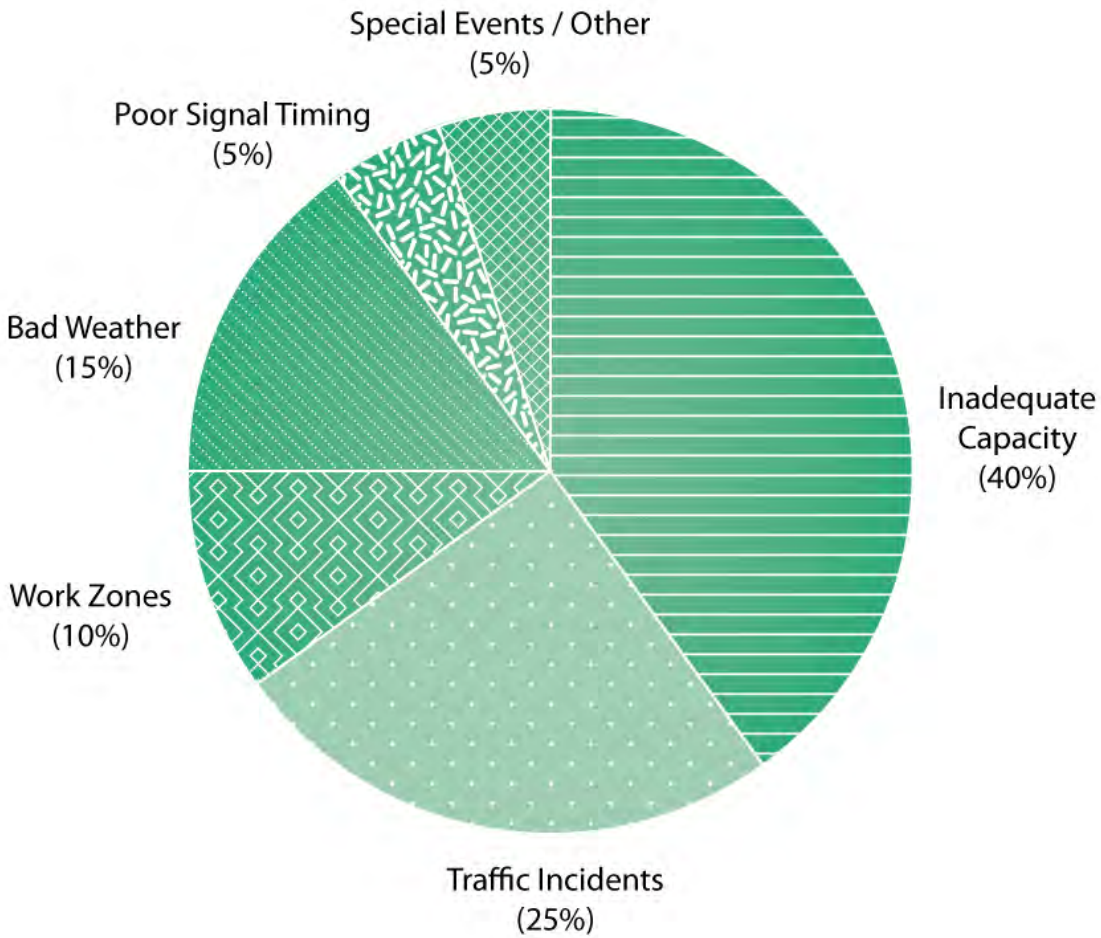
M&O is: "integrated strategies to **optimize the performance of existing infrastructure**

- Through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects …

- Includes coordination of the implementation of regional transportation system management and operations investments …requiring agreements, integration, and interoperability to achieve targeted system performance reliability, safety, and customer service levels."

Moving Ahead for Progress in the 21st Century (MAP-21)



M&O strategies address multiple sources of congestion not just capacity.

Management & Operations Strategies Include…

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- Traffic incident management
- Traffic signal coordination
- Transit signal priority
- Freight management
- Work zone management
- Special event management
- Road weather management
- Congestion pricing
- Managed lanes
- Ridesharing programs
- Parking management
- Electronic toll collection
- Traveler information
- Coordination of highway, rail, transit, bicycle, and pedestrian operations

Which M&O strategies are used in your area?

Using M&O Strategies

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- Applied at regional, corridor, project levels
- Address multiple modes and better coordinate across jurisdictions
- Integrated into capacity, preservation, and maintenance projects
- Focus on optimizing multimodal system performance and traveler experience

Management & Operations Strategies Deliver…

- Safer travel
  - Freeway ramp metering reduces crashes by 15-50%
- More free time
  - Traffic signal retiming decreases delay on roads by 13-94%
  - Transit signal priority reduces transit delay by 30-40%
- Less wasted fuel
  - Georgia's traffic incident management program reduced annual fuel consumption by 6.83 million gallons per year
- Cleaner air
  - Electronic toll collection reduced harmful emissions at Baltimore, Maryland toll plazas by 16-63%

Cost-Effective Solutions

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- Typical benefit-cost ratios:
  - For traffic signal retiming/optimization, 17:1 to 62:1
  - For work zone management systems, 2:1 to 42:1
  - For bus rapid transit, 2:1 to 10:1
- State of Georgia study found almost a 200-to-1 return on investment for each dollar invested in travel demand management

Real Programs Achieving Results

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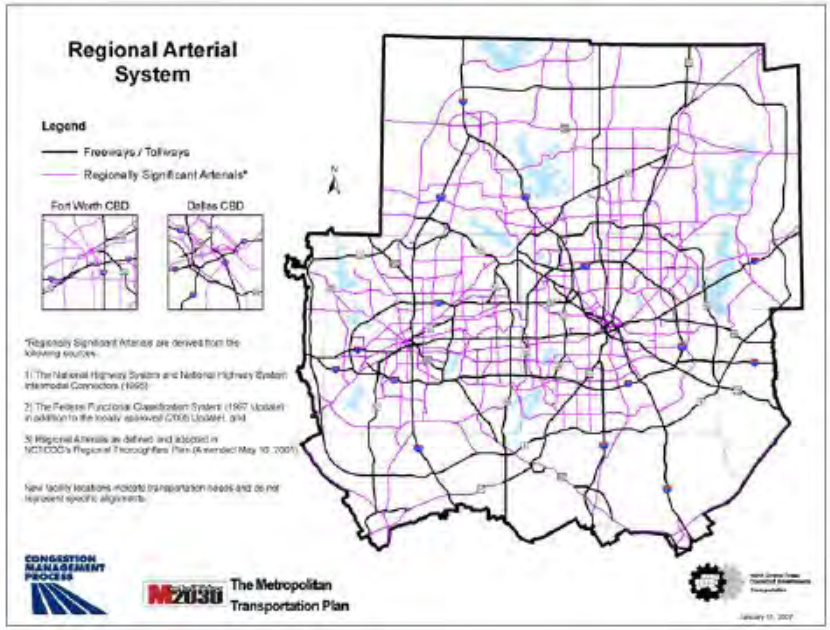
Dallas, TX region: Thoroughfare Assessment Program

- Traffic signal retiming program Phase 2 retimed 18 corridors (431 intersections)
- Prioritized corridors based on traffic volumes, signal spacing, and delay



Results

Signal delay	Fuel consumption	Emissions
↓ 20.7%	↓ 19.1%	↓ 12.9%

Real Programs Achieving Results

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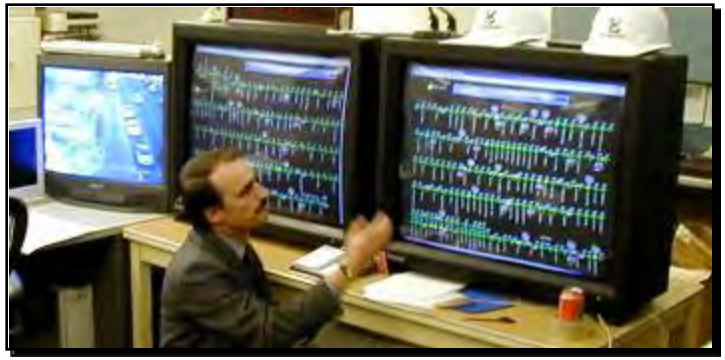
Los Angeles region: MetroRapid BRT Demonstration

- Bus priority at traffic signals, fewer stops and more frequent service, “interval-based” operation, NextBus info at each stop, and level boarding on low-floor buses



Results

Transit travel time

↓23 - 28%

(no impact on vehicle traffic)

Ridership

↑ 38 - 42%

(1/3 new riders)

Ensuring effective use of M&O strategies in a corridor requires a shift…

- Away from project-focused responses
- Toward a collaborative, performance-based approach to planning for operations

What is Planning for Operations?

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- A joint effort between planners & operators to improve regional/corridor transportation system performance
- Focuses on integrating management & operations strategies in the transportation planning process
- Driven by objectives & performance measures
- Enhances regional decisionmaking process so that operations investments are on par with investments in construction & system preservation.

A New Approach to Planning for Operations

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- Focus on specific outcomes and regional/corridor objectives
- Planning and investment decisions based on performance measures and data
- High levels of multi-modal collaboration between agencies, governments, and jurisdictions

Planning for Operations: *U.S. DOT Program Goal*

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- Improve performance of regional transportation systems through
  - An objectives-driven, performance-based approach to planning for operations
  - Enhanced collaboration & coordination between planners and operators
  - Effective integration of the congestion management process (CMP) and management & operations (M&O) strategies in the metropolitan transportation planning process

The Result:
Increased Performance of Our Existing Transportation System

Collaboration and Coordination for Improved Safety and Operational Performance

Discussion Questions

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Why is Collaboration between Governments, Agencies, Jurisdictions, or Modes Important to Your Organization?

How Can Your Organization Benefit?

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Sample of Real Benefits to Collaborating Organizations

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- Increase access to funding and expertise
- Purchase discounted ITS equipment and services
- Respond to incidents and evacuate areas more efficiently
- Provide seamless traveler information
- Use partners' communications assets
- Save staff time and improve staff safety
- Exchange information/assistance with partners in the field
- Undertake larger, more complex operations projects than they could alone

Areas of Benefits from Collaboration

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- Areas of benefit to agencies/governments
  - Inputs/resources
    - Funding, staff, equipment, etc.
  - Operations Activities for Mobility and Safety
    - Expanded 511 coverage, improved incident response
  - Outcomes/Results
    - Increased reliability, safety, customer satisfaction

Discussion Question

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How can your agency/government work with others to reach those benefits?

10 Collaborative Strategies

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1) **Follow the Money**: collaborative pursuit of funding
2) **Get Smart**: sharing expertise and joint learning
3) **With One Voice**: coordinating communications and giving a consistent message
4) **On the Same Page**: developing common procedures, protocols, and plans
5) **Measuring Up**: jointly measuring performance

10 Collaborative Strategies (cont'd)

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6) You Ought to Know: sharing transportation information

7) Can You Hear Me Now?: developing tools for efficient communications

8) Sharing the Wealth: sharing resources

9) Building Economies of Scale: consolidating services

10) All Together Now: performing joint tasks

Benefits of *"Get Smart"*

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- Agencies share knowledge to avoid "re-inventing the wheel" – saving staff time and money
- NITTEC Incident Management Subcommittee members pool expertise to develop training program
- AZTech agencies use partners for advice on developing TMCs and purchasing wireless technology

Sharing the Wealth

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- By sharing assets, agencies save money and boost their operations capabilities.
  - Vancouver VAST agencies share excess fiber assets as part of an inter-local agreement

Benefits of *"Building Economies of Scale"*

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- Agencies benefit by consolidating services through reduced operating costs and enhanced services.

- **NITTEC provides member agencies with 24/7 traffic operations center**

- **AZTech REACT emergency response team**

Source: Maricopa County Department of Transportation

Follow the Money

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- Agencies that collaborate on funding applications enjoy increased access to outside funding.
- Example- Denver's Traffic Signal System Improvement Program (TSSIP) – participants share $3.9M

"By forming together, we were able to carve out a pool of funding to be spent on traffic signal activities that wouldn't otherwise compete well against construction projects such as intersection improvements."

—Local traffic engineer participating in Denver TSSIP

Multidisciplinary Coordination

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- Virginia DOT - Strategically Targeted Affordable Roadway Solutions (STARS)
  - Identifies critical safety & congestion locations in each systems operations region
    - Road Safety Audits
    - Traffic Volume Estimates
  - Each Operations Region develops an improvement plan for selected locations
  - Team Members: District Planner, PDC Representative, Regional Operations Director, VDOT Traffic Engineering Rep, VDOT Transportation Mobility Planning Division Rep

Closing Question

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Are there operations and safety needs that your organization could better address using one of the collaborative strategies?

A Collaborative Tool for Advancing M&O Strategies

What is a Regional Concept for Transportation Operations (RCTO)?

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- A management tool to assist in planning and implementing management and operations strategies in a collaborative and sustained manner
- Guides agencies in thinking through **what** they would like to achieve within 3 to 5 years and **how** they want to get there

Purpose of an RCTO

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- Promotes effective and efficient action towards improving transportation system performance by getting everyone “on the same page”
- Facilitates coordinating priorities, leveraging resources, and alleviating duplicative efforts
- Provides opportunity to link transportation planning and operations

Motivation for an RCTO

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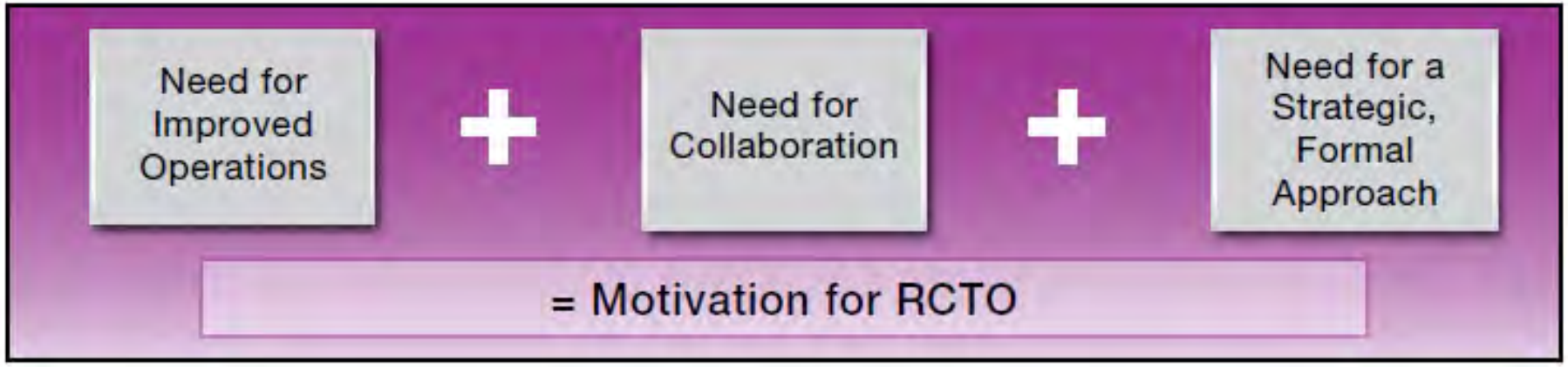
When does it make sense to use an RCTO?

When the region or corridor has these three needs…



Foundations in Systems Engineering

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- Consistent with well established ***systems engineering principles***
- Elevates the focus from agencies' individual responsibilities to a ***global view*** of the region's transportation system
- Enables partners develop ***higher level operations objectives*** that address ***systemic issues*** that cut across multiple agencies and jurisdictions
- A ***living guide*** that partners update and amend as circumstances and priorities evolve
- More than a "project" because it effects lasting changes in ***how partners work together*** to improve system performance

A Systemic and Sustainable Approach to Improving Regional Transportation System Performance

RCTO Scope

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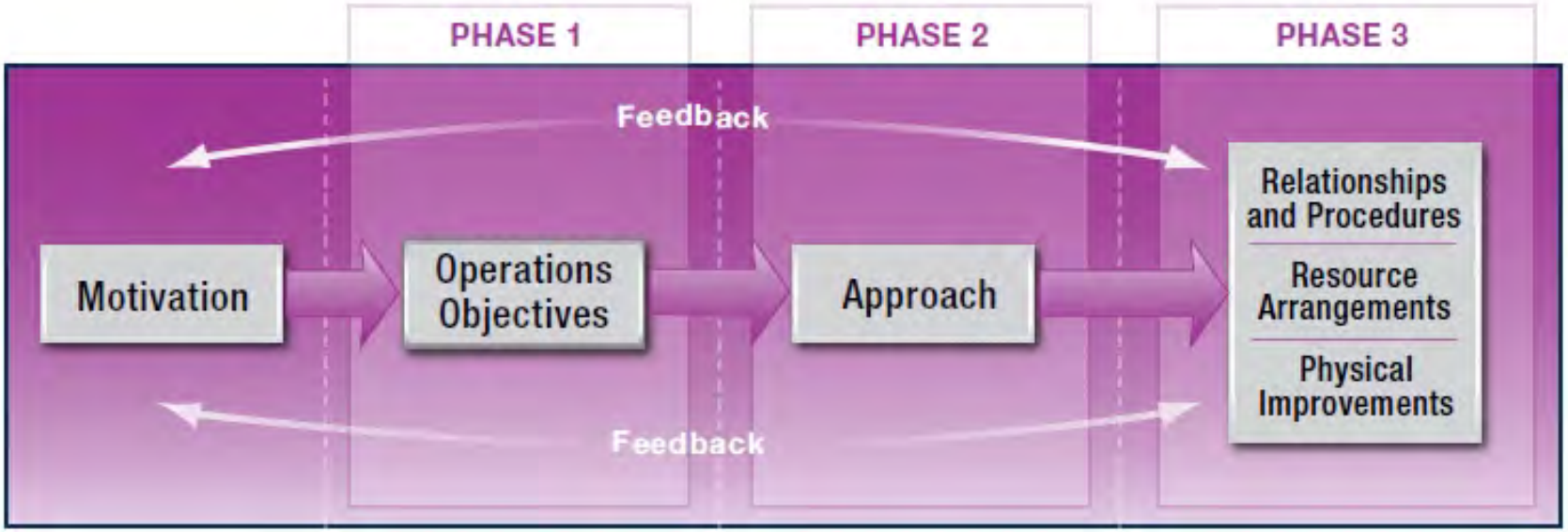
- Possible focus areas:
  - Single service (e.g., traveler information)
  - Collection of related services (e.g., congestion management)
  - Capability that supports several services (e.g., wireless communications network)
- Shaped by collaborative activity

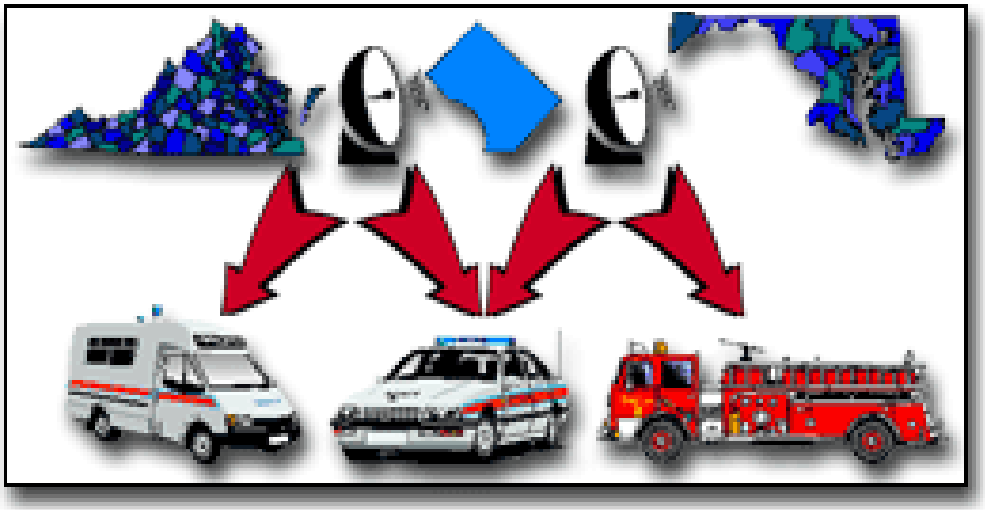
RCTO Process



Operations Objective

- Defines the desired state of operations at end of timeframe.
- Mutually agreed-upon by all participants.
- Derived from collaborative activity.
- Sets the direction for future collaboration.

Courtesy of CapWIN



Example: ***Within the next three years, reduce the average clearance time of traffic incidents on freeways and major arterials in the region to no more than X minutes from the time they are detected.***

Approach

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- Overall strategy for achieving the operations
- Cohesive design containing elements that support each other to bring about a common outcome

Example: *Public safety and transportation partners will work together on quick clearance through education and knowledge sharing, policy and procedure development, and expanded service. Includes cross-agency training…*

Physical Improvements

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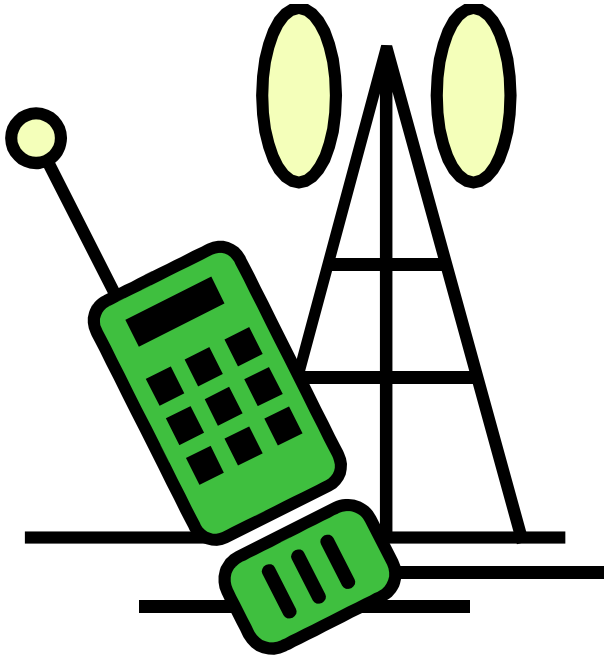
Facilities, equipment, and systems needed to achieve operations objective.



Examples:

- *Communication systems to connect police, fire, emergency medical, transit, traffic.*
- *Roadside technologies for traveler information.*

Relationships and Procedures

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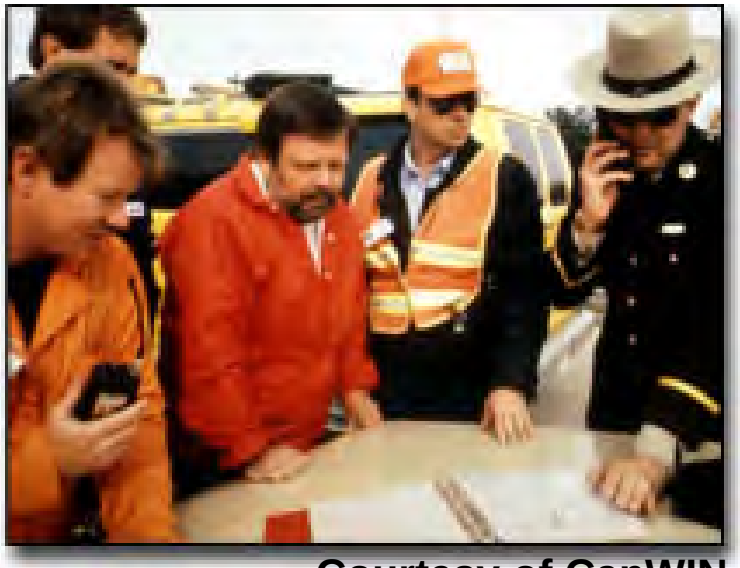
Define how participating stakeholders will work together to achieve objectives

Examples:

- ***Protocols for data sharing and communicating***
- ***Common performance measures that cross jurisdictional boundaries***
- ***Memoranda of understanding for interagency and multijurisdictional policy and procedures***



Courtesy of CapWIN

Resource Arrangements

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- Time, money, staff, and equipment needed to actualize and sustain operations objective
- Ways in which these resources are obtained/applied

Examples:

- *Joint purchasing agreements for traffic signal synchronization software*
- *Staff dedicated to jointly operate TMC*
- *Shared service and equipment agreements*

RCTO Demonstration Initiative

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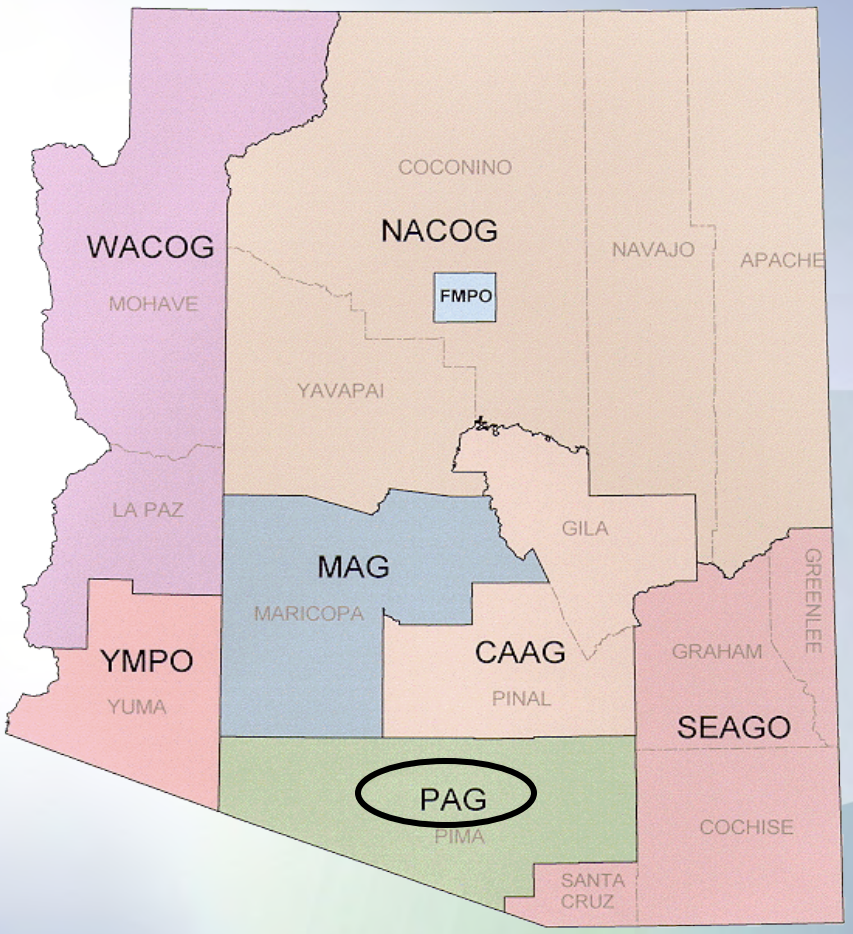
Pima Association of Governments Regional Context

- Pima Association of Governments (PAG) is MPO for Tucson, Arizona
- 9 member agencies:
  - 2 cities, 3 towns, 1 county, state, 2 Indian tribes
- Tucson metropolitan area consists of approximately 1,000,000 people



RCTO Development Process

Identified Multiple Operations Areas

- Vision Statement
- Conducted Inventory
- Established Goals and Performance Measures

Selected Focus Operations Areas

- Developed list of needed policies, practices, or procedures for focus areas
  1) Arterial management
  2) Work zone management
  3) Traveler information

Prioritized Needed Action Plans

- Develop high-priority action plans
- Identify resources and institutional relationships
- Identify roles and responsibilities

Example Action Plan Template

Introduction:
• Establish a regional traffic signal operations program
Need:
• Enhance ability to proactively manage the region's traffic signal system
Institutional Arrangements:
• Guided by PAG Subcommittee • Consultant contracts managed by PAG • Project-level working groups established on a project-by-project basis
Roles and Responsibilities:
• Agencies retain control, but have certain participation obligations to the region
Resources Required and Estimated Costs:
• Agency staff time commitment • On-call consultant program • Identify funding mechanism
Status:

Achievements and Implementation

- Traveler information
  - Achieved agreement on regional traveler information framework/integration with existing statewide 511 system
  - Expand integrated CAD real time traffic incident info
  - Implement real-time bus info into traveler information system
  - Incorporate bicycle and pedestrian information
  - Incorporate rideshare and travel reduction information
- Regional program for gathering, producing, distributing traveler information
  - Building block for regional archived data center
  - Funded through MPO work program

Achievements and Implementation

Work Zone Coordination

- Improvements to active construction information through traveler information system “TransView.org”
- True objectives of this RCTO focus area have proven difficult
  achieve
  - Multiple data formats
  - Multiple procedural formats for bringing projects forward
  - Limited support for full-scale effort
  - Cost prohibitive – need for dedicated staff identified

Achievements and Implementation

Regional Traffic Signal Program

- Uniform approach to signal equipment operations
- Planning and funding
- Proactive approach to signal timing
  - *Contracted services*
  - *Provided over 600 new signal time plans*
- Regional traffic signal model for all but 13 signals

RCTO Insights and Observations

- Utilize existing committee structures
- RCTO is an evolving document - scaleable and can be expanded upon over time
- Initial operational objectives should be attainable
    - “low-hanging fruit”
- Most successful meetings are in smaller settings, rather than larger, more formal settings
    - “role up the sleeves”
- Operators natural tendency is to focus on the ‘equipment’
- Don’t bite off more than you can chew
    - “action plan”
- Fight for operations in TIP and long range plan
    - “carry the load together”
      look to local agencies to help get you there

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www.TransView.org

Hampton Roads, Virginia RCTO for Traffic Incident Management

U.S. Department of Transportation
Federal Highway Administration
Federal Transit Administration

- Covers 10 cities and 6 counties
- Population over 1.6 million
- 2008 RCTO led jointly by MPO and Virginia DOT
- Significant participation by local public safety and DOTs
- Motivated by elected officials who demanded improvements in TIM after major bridge incident

Contact: James Stanek, Virginia DOT Eastern Region Incident Management Coordinator
James.stanek@vdot.virginia.gov
757-424-9903

Hampton Roads RCTO Objectives & Performance Measures

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Operations Objectives	Performance Measures
Increase responder safety by eliminating struck-by incidents and fatalities.	• Ratio of crashes per 100,000 miles driven for VSP. • Incidents involving vehicle fires.
Decrease incident clearance time.	• Incident duration. • Average number of incidents lasting longer than 30, 60, and 90 minutes.
Decrease secondary incident occurrences.	• Number of secondary accidents.
Improve inter-agency communication during incidents.	• Input (e.g., what improvements have been most beneficial, where deficiencies remain, what improvements they would like to see) from survey of stakeholder agencies.
Identify existing regional incident management resources and establish plans for inter-agency utilization and acquisition.	• Identification of resource arrangements, mutual training agreements, and information sharing.
Establish a regional incident management pro-active and post-incident review consortium.	• Scheduling all post-incident review meetings. • Posting meeting minutes to RCTO web site in a timely fashion. • Creating and updating the Hampton Roads Incident Responders Contact, Jurisdiction, and Resource Guide.

Outcomes

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- Began practice of collecting and reporting TIM performance measurement data
- Held regular post-incident review meetings
- Planned joint outreach for “Slow Down, Move Over” law
- RCTO approved by MPO board
- Obtained funding for 3 total stations for more efficient incident investigations
- RCTO participants continue to meet quarterly

RCTO Template

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Operations Objective
Approach
Physical Improvements
Relationships and Procedures
Resource Arrangements