Florida Transportation Systems Management and Operations

Strategic Plan

Final: Version 2

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Table of Contents

List of Tables

List of Figures

List of Acronyms and Abbreviations

ATM ..... Active Traffic Management

ATMS ..... Advanced Traffic Management System

FARS ..... Fatality Analysis Reporting System

FDOT ..... Florida Department of Transportation

FHWA ..... Federal Highway Administration

ICM ..... Integrated Corridor Management

ITS ..... Intelligent Transportation Systems

MAP-21 ..... Moving Ahead for Progress in the 21st Century

MPO ..... Metropolitan Planning Organization

NHS ..... National Highway System

NHTSA ..... National Highway Traffic Safety Administration

PD&E ..... Project Development and Environment

RITA ..... Research and Innovative Technology Administration

SIS ..... Strategic Intermodal System

TSM&O ..... Transportation Systems Management & Operations

U.S. DOT ..... United States Department of Transportation

VMT ..... Vehicle-Miles Traveled

1 Executive Summary

Transportation Systems Management and Operations (TSM&O) is a program within the Florida Department of Transportation (FDOT) that is based upon:

- Performance measurement,
- Active management of the multi-modal transportation network, and
- Positive safety and mobility outcome delivery to Florida's traveling public.

Initially envisioned in 2008, formally endorsed as a program in 2010, and actively being implemented across the state, TSM&O offers ways to optimize the use of limited transportation funding to maximize transportation system safety, efficiency, and effectiveness.

The *TSM&O Functional Plan*, described in Appendix A, defines the following TSM&O vision and mission statements:

> **Vision:** To operate our transportation system at the highest level of cost effective performance.
>
> **Mission:** To deploy a customer-driven TSM&O program focused on mobility outcomes through real-time and effective management of the existing transportation system toward its maximum efficiency.

The expanded vision for arterial and freeway operations is:

> To operate our transportation system at the highest level of cost effective performance, resulting in reduced excess delay on arterials AND freeways, real-time management and traveler information for all modes, and seamless coordination with ALL operating agencies.

Additionally, the TSM&O formal definition is shown below:

> **Formal Definition:** TSM&O is an integrated program to optimize the performance of existing multimodal infrastructure through implementation of systems, services, and projects to preserve capacity and improve the security, safety, and reliability of our transportation system.

This *TSM&O Strategic Plan* presents the high-level structure for establishing and maintaining FDOT's TSM&O Program. Through all of the recommended activities listed in the *TSM&O Functional Plan* (Appendix A), this *Strategic Plan* ensures that implementation will occur concurrently through FDOT Operations and Planning, high-level Policy recommendations, and the Project Development Cycle.

2 Document Structure

The following describes the sections of the *TSM&O Strategic Plan*.

Section 1: Executive Summary – provides a high-level overview of the *TSM&O Strategic Plan*.

Section 2: Document Structure – provides the document organization for the various sections of the *TSM&O Strategic Plan*.

Section 3: Introduction – describes the impetus for evolving to a TSM&O Program approach. This section describes the current status of TSM&O at the Central and District Office levels.

Section 4: Implementing TSM&O – describes the activities needed to expand TSM&O, including those affecting operations, planning, project development, construction, and maintenance within the FDOT. These activities are discussed in terms of people (i.e., District and Central Office champions, and task teams), processes (i.e., performance measures, network identification, and pilot programs), and tools (i.e., travel time data collection/analysis/archive/ reporting, travel demand, and simulation models).

Section 5: Resources – outlines resources required to implement actions in the *TSM&O Strategic Plan* and *TSM&O Functional Plan*.

Section 6: References – lists sources of information referenced throughout this document.

Appendix A

Table 5 – provides the current *TSM&O Functional Plan* as of the publication of the *TSM&O Strategic Plan.* The *Functional Plan* will be updated as a separate document.

3 Introduction

This *Strategic Plan* is a high-level document describing the need for TSM&O, program definition, and a plan for deployment. It lays the groundwork for establishing and maintaining such a program at FDOT. It recommends actions which must be taken within FDOT in the next five years to successfully implement the TSM&O Program at the Central and District Office levels.

This *Strategic Plan* is consistent with the *2010 Intelligent Transportation Systems (ITS) Strategic Plan Update (DRAFT)*, Florida's Transportation Vision for the 21st Century, FDOT's mission statement, *Florida's Strategic Intermodal System (SIS) Plan (2010)*, and the *2060 Florida Transportation Plan* and its short-range component.

3.1 Florida's Challenges

Florida's population was estimated to be 19,074,400 in April 2012,[1] suggesting an increase of 0.9 percent (The 2010-2011 increase was 1.5 percent).

Vehicle-miles traveled (VMT) decreased by nearly 2 percent from 2010 to 2011. The *Florida Transportation Trends and Conditions Report* (2012) suggests this trend may be attributable to depressed economic conditions, reduced freight travel, and high fuel prices.

Research shows that over 50 percent of all congestion in urban areas is caused by incidents, work zones, weather, and special events. The most efficient way for an operating agency to address congestion is to target and manage congestion caused by these sources. One such way to do so is to provide real-time information to assist travelers in meeting their travel goals.[2]

Florida has a robust statewide 511 traveler information system that provides this real-time travel information to the traveling public. This information allows travelers to make more informed travel decisions such as whether to select a different route or delay their travel start time. FDOT is currently studying the future functionality of 511 and what form it will take as it continues to educate the traveling public on real time traffic information.

Safer travel is also a concern. In 2011, Florida experienced 2,398 traffic fatalities. While this number decreased from the previous year, Florida's fatality rate per VMT (100 million VMT) is 1.25, which is higher than the national average of 1.10.[3]

With nearly one-fifth of Florida's population over the age of 65, safety for older drivers and for all drivers remains a top priority. Although fatal crash involvement rates have declined substantially for older drivers in recent years, older drivers are more likely to be seriously injured or killed from their injuries[4].

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[1] FDOT Official Population Estimates, April 1, 2012

[2] *2009 Urban Congestion Trends*, FHWA-HOP-10-032, FHWA Office of Operations

[3] FARS Data Resource web site, National Highway Traffic Safety Administration (NHTSA)

[4] *Research Report: Declines in fatal crashes of older drivers: changes in crash risk and survivability*, Ivan Cheung and Anne T. McCartt, June 2010, Insurance Institute for Highway Safety

There are clear economic benefits to TSM&O as well. ITS and operations investments create technology sector jobs for engineers, electronics technicians, software developers, and system integrators. On average, about 50 percent of ITS project spending is for direct labor, as compared with 20 percent for new highway construction.[5]

Additionally, agencies that have deployed ITS technologies, such as synchronized traffic and adaptive signals, have found that every dollar invested returns close to $40 to the public in time and fuel savings and up to 22 percent reductions in carbon dioxide emissions. A 2009 Government Accountability Office report found the benefit-cost ratio of deploying a nationwide real-time traffic information system to be 25 to 1. Overall, the benefit-cost ratio of ITS-enabled operational improvements is estimated to be 9 to 1, a significant return on investment when compared to the addition of conventional highway capacity, which has a benefit-cost ratio of 2.7 to 1.

Transportation funding remains limited and must be carefully allocated to meet agency objectives regarding safety, mobility, commerce, and environmental preservation. Projects compete for limited funds, and FDOT is facing a need to manage and operate its entire multimodal transportation system both efficiently and effectively.

3.2 TSM&O Program

FDOT has recognized this need to move toward mobility, defined networks, and development of an integrated operations and management program that focuses on providing multimodal mobility and safety outcomes for Florida's traveling public. In 2008, FDOT's Executive Board recommended the establishment of a TSM&O Task Team. On May 20, 2010, FDOT's Executive Board endorsed the creation of the TSM&O Program. TSM&O is defined as:

> **An integrated *program* to optimize the *performance* of existing *multimodal* infrastructure through implementation of systems, services, and projects to preserve capacity and improve the *security, safety and reliability* of Florida's transportation system.**

The FDOT Secretary called for the creation of a TSM&O Leadership Team comprised of FDOT executives from the Central and District Offices. These members provide leadership and direction to the TSM&O Task Team, which carries out regular program activities. TSM&O workshops were held in every District in 2012, and each District has varying levels of implementation as shown further in Section 4. Recently, the Executive Committee (previously the "Executive Board") approved the concept of a TSM&O Policy Statement to encompass a variety of transportation management strategies.

[5] U.S. DOT Research and Innovative Technology Administration, Jan 2009.

Florida's TSM&O Program encompasses a wide variety of functions and operations solutions available within FDOT, spanning planning and development, construction, system operations, and maintenance. Figure 1 graphically depicts this relationship.

Figure 1: TSM&O Components

TSM&O will require:

- Organizational change/evolution to operations and management of all surface transportation systems/networks in real time; and
- Performance driven approach for solving congestion problems using tools, such as ITS, signal system control, and other management and operational strategies, to identify and respond to the causes of congestion in real-time.

TSM&O will result in:

- Improved safety;
- Improved travel time reliability;
- Capacity management on limited-access facilities and arterials;
- Cost savings;
- Real-time traveler information for all modes;

- Rapid incident response;
- Better traffic flow through work zones; and
- Synergies through improved interagency coordination.

Through:

- Integration of planning and operations;
- High level of communication and coordination with local transit, freight, and traffic entities;
- Maximized efficiency of existing infrastructure; and
- Maximized effectiveness of tools and data for mobility and safety outcomes.

Using technology solutions instead of traditional capacity enhancements, such as roadway widening, results in lower capital and maintenance costs. Technologies, operating practices, programs, and strategies provide methods to realize the most efficiency out of the road or transit capacity that is built, typically for relatively modest costs and low environmental effects. In some cases, operational improvements are some of the few strategies that can be approved, funded, and implemented. The improvements may be built within the existing right-of-way, and they provide the opportunity to recapture roadway capacity that is lost to congestion and incidents.

3.3 Consistency with State and National Programs

Florida's transportation vision for the 21st century, as announced by FDOT's Secretary includes creative financing alternatives, offers transportation choices, places strong emphasis on port development, reduces bureaucracy and streamlines decision making, plans and develops future corridors, and provides faster project delivery to keep Florida moving and get its citizens back to work. The vision states that, "To provide a world class experience for commuters and to increase the efficiency of traffic movement, the Department will be developing a system of managed lanes in Florida." Managed lanes are a key TSM&O strategy, and guidance related to managed lanes will be included in the TSM&O Policy Statement. The vision also emphasizes freight/ports, faster project delivery, future corridors, and consistent/predictable/repeatable functioning within FDOT.

The national transportation bill, Moving Ahead for Progress in the 21st Century Act (MAP-21), establishes national performance goals for federal highway programs:

- **Safety**—To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- **Infrastructure condition**—To maintain the highway infrastructure asset system in a state of good repair.
- **Congestion reduction**—To achieve a significant reduction in congestion on the National Highway System (NHS).
- **System reliability**—To improve the efficiency of the surface transportation system.

- **Freight movement and economic vitality**—To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- **Environmental sustainability**—To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- **Reduced project delivery delays**—To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

MAP-21 contains strong language supporting TSM&O. Both state departments of transportation and metropolitan planning organizations (MPO) must consider projects and strategies as part of a planning process that promotes efficient system management and operations.

Federal initiatives, such as Integrated Corridor Management (ICM), focus attention on operations and management of the transportation system. ICM enables DOTs to optimize the use of available infrastructure by directing travelers to underutilized capacity in a transportation corridor. ICM is a synthesis of TSM&O strategies, including motorists shifting their trip departure times, routes, or modal choices; or transportation agencies dynamically adjusting capacity by changing metering rates at entrance ramps or adjusting traffic signal timings to accommodate demand fluctuations. Multijurisdictional partner agencies manage ICM corridors as collaborative, multimodal systems. At the federal level, three United States Department of Transportation (U.S. DOT) agencies – Research and Innovative Technology Administration (RITA), Federal Highway Administration (FHWA), and Federal Transit Administration– are partnering in a multiyear initiative to develop, deploy, and evaluate ICM concepts for eight of the nation's busiest corridors. Active traffic management (ATM) utilizes ITS to dynamically manage traffic flow and disseminate information to system users.

Florida is moving forward with several of these initiatives, including connected vehicle, ATM, and ICM. Florida is also moving forward with implementation and operation of managed lanes.

These initiatives are consistent with focused attention on operations and management of the transportation system. Research projects related to TSM&O as well as travel time reliability are active at this time.

4 Implementing TSM&O

This section describes activities needed to deploy TSM&O. They are not intended to be all-inclusive; additional activities may be identified in the future. They affect FDOT operations and planning, project development, and construction and maintenance. Further details are expected to be developed as guidance documents for these focus areas and will be inserted as addenda to this *Strategic Plan*.

Table 1 lists actions and strategies that are either underway within various Districts or are potential actions and strategies (in **BOLD** and **UPPERCASE**) that are applicable to TSM&O. They will be prioritized and considered for development of Guidance documents.

Table 1: TSM&O Actions and Strategies

Focus Area	Benefit	Status
Ramp Signals	Regulates flow of traffic entering freeway	Implemented District 6 Guidance under development
Advanced Traffic Management System (ATMS)	Enhances signal coordination	Implemented statewide
Severe Incident Response Vehicles	Central point of contact at major incidents	Implemented Districts 4 and 6
Managed Lanes	Road managed in response to changing conditions, creating a more effective and efficient freeway	Implemented District 6 Guidance under development
Incident Management	Improves safety for motorists and responders, reduces congestion, improves safety	Implemented statewide
Rapid Incident Scene Clearance	Heavy wrecker performance-based contract for major incidents	Statewide program available for implementation in Districts
Traveler Information	Improved traveler decision-making in response to changing conditions	Implemented statewide
Arterial Management	More effectively manage traffic on arterial roadways	Implemented Districts 1, 2, 4, and 6 *Statewide Needs Plan* in development [focus on intersection operations]
Work Zone Traffic Management	Improved safety and enhanced traffic management in work zones	Under development statewide
Weather Information	Advanced information for significant weather events and changing conditions	Under development statewide
Variable Speed Limits	Uniform Traffic Flows	Implemented District 5
HARD SHOULDER RUNNING	**CORRIDOR MANAGEMENT**	**GUIDANCE UNDER DEVELOPMENT**

4.1 FDOT Operations and Planning

FDOT operations and planning encompasses the organization and establishment of roles, responsibilities, and assignments to sustain the TSM&O Program.

The following operations and planning actions (Table 2) must be accomplished over the next three years. These actions are discussed in terms of people (i.e., Central Office and District champions and task teams), processes (i.e., performance measures, network identification, and

pilot programs), and tools (i.e., travel time data collection/analysis/archiving/reporting, travel demand, and simulation models). Each of these items supports the *Functional Plan* with its associated performance measures and targets. Development of technical memoranda for initiatives, such as connected vehicle, new data sources, benefit-cost analyses for projects, adoption of funding flexibility, and work zone sketch planning, will also support the *Functional Plan*.

Table 2: FDOT Operations and Planning Recommendations

Organization Aspect	Recommended Action	Near Term (2013-2015)	Long Term (2016-2018)
People	Maintain a Leadership Team - Meet on a regular basis, review *Functional Plan* and *Strategic Plan*	X	X
	Maintain a TSM&O Task Team to support the Leadership Team. Ensure representation from all relevant offices	X	X
	Establish TSM&O office structure		X
	Inform and engage FDOT leadership on freeway and arterial TSM&O	X	X
Processes	Conduct a TSM&O self-assessment at Central Office level and develop a maturity model to plan and implement TSM&O	X	
	Develop a TSM&O Needs Plan and a Cost Feasible Plan (arterial, freeways, freight, and work zones)	X	
	Build on existing performance measures efforts within FDOT to establish a TSM&O dashboard	X	
	Develop a benefit-cost process and adopt it for all projects	X	X
	Develop and implement an Outreach Plan	X	X
	Develop a TSM&O Regional Concept of Operations	X	
	Identify funding sources for TSM&O (capacity and preservation [operations & maintenance])	X	X
	Develop Guidance Documents for each focus area identified in Table 1	X	
Tools	Develop and implement a Training Plan	X	X
	Establish data archive	X	X

4.2 FDOT Policies and Procedures

The following near- and long-term high-level policy actions (Table 3) are recommended in order to institutionalize TSM&O. These actions support the *Functional Plan* with performance measures and targets.

Table 3: FDOT High-Level Policy Recommendations

FDOT Level	Recommended Action	Near Term (2013-2015)	Long Term (2016-2018)
Central Office	Develop a formal TSM&O program within FDOT	X	
	Develop TSM&O Policy	X	
	Develop Guidance Documents	X	
	Update/maintain *TSM&O Strategic Plan* and *Functional* Plan	X	X
	Develop accountability mechanisms (dashboard)	X	
	TSM&O formally considered in FDOT, MPO, Planning, and Project Development processes	X	X
	TSM&O reflected in key FDOT policies/procedures	X	
	Define interagency TSM&O policies, procedures, protocols		X
Districts	Implement and expand focus areas	X	X
	Engage a champion in each District	X	
	Define/refine networks (freeways, arterials, other) for performance-based management through TSM&O	X	X
	Develop/update *Functional* Plan for TSM&O	X	X
	Identify and implement pilot projects	X	X

4.3 FDOT Project Development Cycle

There are many opportunities to incorporate TSM&O within the entire project development cycle. Table 4 represents FDOT's desired vision.

Table 4: FDOT Project Development Cycle - TSM&O Outcomes

FDOT Project Development Cycle	TSM&O Outcomes
Planning	Projects undergo a benefit/cost or net present value assessment.
	Operations and management strategies are incorporated into every project.
	Projects are selected based on the ability to maximize operations and capacity.
	Operations are incorporated into long range plans (MPO and Corridor Master Plans).
	Data, tools, and performance measures are used to assess operations projects.
	Tools and modeling take into account the impact of both operations and capacity projects.
	Networks for operations are planned and taken into account in MPO plans.
	Formal memoranda of understanding or interagency agreements are in place for operating defined transit, arterial, and freeway systems.
Project Development and Environment (PD&E)	All projects consider TSM&O alternatives through an evaluation process.
Design	Operations and management strategies are incorporated into every project.
Operations	Networks are identified, and freeways and arterials are managed in real-time.
	Statewide program is defined for ATMS operations and support.
	Performance measures are used.
Construction	Real-time traffic management is used during all construction maintenance of traffic phases.
Maintenance	Real-time management of traffic is used during maintenance activities.
	Sensors are deployed and used to monitor infrastructure condition.

5 Resources

FDOT's TSM&O Program needs commitment from executive and staff level teams in order to move forward and successfully realize goals and objectives. This is particularly true because TSM&O spans multiple offices and functions within FDOT.

Time and team member commitment are needed to strategically implement TSM&O actions and measure the program's performance. This new program to actively manage the multimodal transportation network may take several years to achieve widespread results. However, as TSM&O actions and practices are put into place, FDOT will achieve important and measurable improvements to safety and mobility.

6 References

2009 Urban Congestion Trends, FHWA-HOP-10-032, FHWA Office of Operations

2010 Intelligent Transportation Systems (ITS) Strategic Plan Update (DRAFT), FDOT Traffic Engineering and Operations, ITS Program

2060 Florida Transportation Plan, FDOT

Fatality Analysis Reporting System (FARS) Data Resource web site, NHTSA

FDOT Official Population Estimates, April 1, 2012, FDOT Office of Policy Planning

Florida's Strategic Intermodal System (SIS) Plan (2010), FDOT Systems Planning Office

Florida Transportation Trends and Conditions Report (2012), FDOT Systems Planning Office

Research Report: Declines in fatal crashes of older drivers: changes in crash risk and survivability, Ivan Cheung and Anne T. McCartt, June 2010, Insurance Institute for Highway Safety

Appendix A

Table 5: TSM&O Functional Plan

	Function: Transportation System Management and Operations (TSM&O)				
MISSION	To deploy a customer-driven TSM&O program focused on mobility outcomes through real-time and effective management of the existing transportation system toward its maximum efficiency				
VISION	To operate our transportation system at the highest level of cost effective performance				
VALUES	Performance measurement, active management of the multi-modal transportation network, and positive safety and mobility outcome delivery to Florida's traveling public				
	OBJECTIVES	**ACTIVITIES**	**PERFORMANCE INDICATORS**	**TARGETS**	**PERSON(S) RESPONSIBLE**	**Status**
DEVELOP & MAINTAIN	Continue to Develop and Maintain the TSM&O Program	1. Develop TSM&O policy and procedures 2. Prioritize and develop guidance documents for each focus area 3. Establish TSM&O outreach and education program through periodic presentations to FDOT at all levels 4. Measure and report key performance measures to FDOT, Florida Transportation Commission, and others 5. Maintain and update the *Functional Plan* and *Strategic Plan* 6. Benchmark where FDOT is with respect to TSM&O (Conduct a self-assessment and develop a maturity model) 7. Define a network of arterials/freeways to monitor 8. Create training program / training opportunities 9. Update FDOT Policies and Procedures to incorporate TSM&O strategies in all functional areas, including Central Office and District projects in PD&E, Construction, Maintenance, Production 10. Assign a champion in each District 11. Formalize a TSM&O Program structure	1. Policies and Procedures developed and updated 2. Guidance documents complete a) Finalize ramp metering and hard shoulder running guidance documents 3. a) District workshops conducted every other year b) Presentations to FDOT Executive Committee twice yearly 4. Key performance measures reported 5. *Strategic Plan* finalized with updates to Functional Plan every two months 6. Self-assessment complete and implementation plan developed 7. Networks defined 8. a) Training opportunities created at District and Central Office level through computer-based training and webinars b) Career development opportunities created 9. Existing policies and procedures updated 10. Champion identified 11. TSM&O Program structure in place	1. Jul 2014 2. Dec 2013 3. On-going 4. Annually 5. Dec 2014 6. Apr 2014 7. On-going 8. Dec 2014 9. On-going 10. On-going 11. Dec 2013	1. All, CO lead 2. All, CO lead 3. CO 4. CO 5. CO 6. CO 7. Districts 8. All 9. CO 10. Districts 11. All	

Function: Transportation System Management and Operations (TSM&O)

MISSION	To deploy a customer-driven TSM&O program focused on mobility outcomes through real-time and effective management of the existing transportation system toward its maximum efficiency
VISION	To operate our transportation system at the highest level of cost effective performance
VALUES	Performance measurement, active management of the multi-modal transportation network, and positive safety and mobility outcome delivery to Florida's traveling public

	OBJECTIVES	ACTIVITIES	PERFORMANCE INDICATORS	TARGETS	PERSON(S) RESPONSIBLE	Status
MAXIMIZE	Maximize Use of Transportation Infrastructure	1. TSM&O strategies are designed, delivered, and operational 2. Develop and report performance measures in dashboard on both a program and network level: a) Delay b) Incident clearance c) Travel time reliability d) Work zone 3. Develop plan for data collection on designated networks (most from ITS performance measure process) 4. Establish data archive	1. Strategies in place 2. Process in place, collection occurring, reporting occurring in regular cycles (quarterly and annually) 3. Data plan in place 4. Archive in place	1. On-going 2. On-going 3. On-going 4. Apr 2014	1. All 2. All 3. Districts 4. CO	
FUND	Fund the TSM&O Program	1. Develop a TSM&O Needs Plan and Cost Feasible Plan (arterials, freight, work zone) 2. Demonstrate on a macro level, cost savings/efficiency if TSM&O is deployed instead of major capacity improvements – impact of shaving a percentage of the Work Program to dedicate to TSM&O alternatives (on both arterials and NHS/SIS) 3. In cooperation/coordination with MPOs and planning offices, identify plan to address gaps and incorporate plans into Work Program development process 4. Develop an approach for conducting TSM&O studies in planning to prioritize needs for TSM&O funding source 5. Conduct pilot projects in all Districts 6. Establish TSM&O projects as a viable alternative in PD&E studies 7. Develop a benefit/cost process and adopt on all projects	1. Plans identified and incorporated into Work Program 2. Macro strategy completed 3. Plan in place 4. Plan in place;TSM&O considered 5. Pilot projects demonstrate value of TSM&O 6. PD&E process adjusted 7. Benefit/cost process underway	1. Jul 2015 2. Jan 2015 3. Jun 2015 4. Jan 2015 5. On-going 6. Jan 2015 7. Jan 2015	1. CO lead, Districts participate 2. CO lead 3. CO lead, Districts participate 4. CO 5. Districts 6. CO 7. CO	