APPENDIX A

Business Case

CAMBRIDGE SYSTEMATICS

MetroPlan Orlando ITS Master Plan Business Case Report

technical report

prepared for

MetroPlan Orlando

prepared by

Cambridge Systematics, Inc.

with

Gannett Fleming

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www.camsys.com

Table of Contents

Executive Summary **1**
Analysis Approach 1
Findings 1
Conclusions 4

1.0 Introduction **5**
1.1 Background 5
1.2 What Makes a Business Case 5
1.3 Target Audiences 6
1.4 Context in the Master Plan 7
1.5 Organization of this document 8

2.0 Benefit-Cost Analysis Methodology **9**
2.1 Geographic Scope of Analysis 10
2.2 Benefit Analysis 11
2.2.1 Transit-Specific Benefit Analysis 12
2.3 Cost Analysis 12
2.3.1 Distributed Costs and Geographic Scope 14
2.4 Off-Network Benefits and Costs 15

3.0 Analysis Results **17**
3.1 Benefits 17
3.2 Costs 18
3.3 Benefit-Cost Ratios 19

4.0 Sensitivity Analysis **25**
4.1 Interpretation of Results 26

5.0 Conclusions and Next Steps **28**
5.1 Near-Term ITS Opportunities 28

Appendix A. Inventory Data and Other Analysis Inputs **30**
A.1 Roadway Configuration Data 30
A.2 Traffic Characteristics 31
A.3 Equipment Inventory Data 56
A.4 Emergency Responder Data 57
A.5 Transit Data 58
A.6 Data for Supplementary Analysis of Off-Network Routes 60

Appendix B. Benefit Analysis Methodology and Details 61
B.1 Background 61
B.2 TOPS-BC Specifications, Functionality, and Limitations 62
B.3 ITS Coverage by Analysis Segment 63
B.3.1 Assumptions 63
B.3.2 Calculation Procedure 64
B.3.3 Coverage Results 65
B.4 TOPS-BC Impact Parameters by Segment 67
B.4.1 Baseline Benefit Impact Parameters 67
B.4.2 Procedure for Calculating Impact Parameters by Corridor 68
B.4.3 Benefit Impact Parameters by Analysis Corridor 68
B.5 Transit Strategy Benefit Analysis Methodology 70
B.5.1 Methodology for Transit Benefit Estimation 70
B.5.2 Transit Benefit Analysis Assumptions 71
B.6 Benefit Monetization Parameters 71
B.7 Benefit Analysis Methodology for Supplementary Off-Network Routes 72

Appendix C. Cost Analysis Methodology and Details 73
C.1 Background 73
C.2 High-Level Assumptions 74
C.3 Reference Cost Tables by ITS Strategy 74
C.4 Calculating Overall Annualized Direct and Indirect Costs 81
C.4.1 Procedure 81
C.4.2 Example 81
C.4.3 Results 82
C.5 Allocating Costs by Jurisdiction 83
C.5.1 Procedures 83
C.5.2 Examples 84
C.6 Cost Analysis Methodology for Supplementary Off-Network Routes 84

Appendix D. Detailed Benefit-Cost Results 86
D.1 Cost Results by Jurisdiction 86
D.2 Results for Supplementary Off-Network Routes 87
D.3 Sensitivity Analysis Scenario Results 88

List of Tables

Table ES.1 Benefits for All Counties by Improvement Type 1
Table ES.2 Annualized Costs for All Counties by ITS Strategy Category....2
Table 1.1 Business Case Materials in this Report *by intended use* 7
Table 2.1 Mapping of ITS Project Types to TOPS-BC Improvement Categories 11
Table 2.2 Component Summary by ITS System 13
Table 2.3 Projects included in each Cost Category....14
Table 3.1 Annualized Benefits Summary by Category and Jurisdiction....17
Table 3.2 Annualized Cost Summary by Category and Jurisdiction 18
Table 3.3 Benefits and Costs by Roadway Type and Jurisdiction 20
Table 4.1 Scenarios Examined as Part of the Sensitivity Analysis 25
Table 4.2 Summary of Annualized Costs and Benefits for each Sensitivity Analysis Scenario....25
Table A.1 Roadway Characteristics by Corridor and Jurisdiction....30
Table A.2 Roadway and Traffic Characteristics for Corridor A Northbound (Segments 1-16) 32
Table A.3 Roadway and Traffic Characteristics for Corridor A Northbound (Segments 17-29) 33
Table A.4 Roadway and Traffic Characteristics for Corridor B Eastbound (Segments 1-16)....34
Table A.5 Roadway and Traffic Characteristics for Corridor B Eastbound (Segments 17-28)....35
Table A.6 Roadway and Traffic Characteristics for Corridor C Eastbound (Segments 1-13) 36
Table A.7 Roadway and Traffic Characteristics for Corridor D Northbound (Segments 1-16)....37
Table A.8 Roadway and Traffic Characteristics for Corridor E Northbound (Segments 1-17) 38
Table A.9 Roadway and traffic characteristics for Corridor F Eastbound (Segments 1-8)....39
Table A.10 Roadway and Traffic Characteristics for Corridor G Eastbound (Segments 1-16) 40
Table A.11 Roadway and Traffic Characteristics for Corridor G Eastbound (Segments 17-23) 41
Table A.12 Roadway and Traffic Characteristics for Corridor H Eastbound (Segments 1-16)....42
Table A.13 Roadway and Traffic Characteristics for Corridor H Eastbound (Segments 17-29) 43
Table A.14 Roadway and Traffic Characteristics for Corridor A Southbound (Segments 1-16) 44
Table A.15 Roadway and Traffic Characteristics for Corridor A Southbound (Segments 17-29) 45
Table A.16 Roadway and Traffic Characteristics for Corridor B Westbound (Segments 1-16)....46
Table A.17 Roadway and Traffic Characteristics for Corridor B Westbound (Segments 17-28)....47
Table A.18 Roadway and Traffic Characteristics for Corridor C Westbound (Segments 1-13)....48
Table A.19 Roadway and Traffic Characteristics for Corridor D Southbound (Segments 1-16) 49
Table A.20 Roadway and Traffic Characteristics for Corridor E Southbound (Segments 1-17) 50
Table A.21 Roadway and Traffic Characteristics for Corridor F Westbound (Segments 1-8) 51
Table A.22 Roadway and Traffic Characteristics for Corridor G Westbound (Segments 1-16) 52
Table A.23 Roadway and Traffic Characteristics for Corridor G Westbound (Segments 17-23) 53
Table A.24 Roadway and Traffic Characteristics for Corridor H Westbound (Segments 1-16)....54

Table A.25 Roadway and Traffic Characteristics for Corridor H Westbound (Segments 17-29) 55
Table A.26 Field Equipment Quantities 56
Table A.27 Calculated Quantities for Transit Ridership on LYNX 58
Table A.28 Calculated Quantities for Transit Ridership on LYNX 60
Table A.29 Investment Extents by Type and Jurisdiction 60
Table B.1 Methodology for Calculating Percent Coverage of each ITS Type on a Given Corridor 64
Table B.2 Extent of Corridor Coverage for each ITS Strategy Type 65
Table B.3 Extent of Corridor Coverage by TOPS-BC Improvement Category 66
Table B.4 Arterial Parameter Values by ITS Strategy Category 67
Table B.5 Freeway Parameter Values by ITS Strategy 68
Table B.6 Calculated Overall Benefit Impact Factors by Corridor 69
Table B.7 Calculated Quantities for Transit Benefits on LYNX 71
Table B.8 Economic Benefit Parameters 72
Table B.9 Average Annual Benefits per Mile, by Strategy 72
Table C.1 Cost Parameters by Component – CCTV 76
Table C.2 Cost Parameters by Component – Ramp Meters 76
Table C.3 Cost Parameters by Component – DMS Traveler Information 77
Table C.4 Cost Parameters by Component – 511 Traveler Information 77
Table C.5 Cost Parameters by Component – Road Rangers Service Patrol 78
Table C.6 Cost Parameters by Component – TMC 78
Table C.7 Cost Parameters by Component – Fiber Communication 78
Table C.8 Cost Parameters by Component – Central Traffic Signal Control and Coordination 79
Table C.9 Cost Parameters by Component – Signal Retiming Studies 79
Table C.10 Cost Parameters by Component – Emergency Vehicle Preemption 80
Table C.11 Cost Parameters by Component – Transit Signal Priority 80
Table C.12 Cost Parameters by Component – Transit AVL 81
Table C.13 Cost Summary by ITS System 82
Table C.14 Distributed Costs and Associated Methods for Disaggregating 84
Table C.15 Annualized Costs by Category, for the Core Analysis Corridors Only 85
Table D.1 Total Annualized Costs by Project Type, for each Jurisdiction 87
Table D.2 Annualized Costs and Benefits for Supplemental Off-Network Routes 88
Table D.3 Disaggregated Annualized Benefits for the Baseline Analysis Scenario 89
Table D.4 Disaggregated Annualized Benefits for the Signalization Improvements Sensitivity Analysis 91
Table D.5 Disaggregated Annualized Benefits for the Incident Management Sensitivity Analysis 93
Table D.6 Disaggregated Annualized Benefits for the Travel Time System Breadth Sensitivity Analysis 95

Table D.7 Disaggregated Annualized Benefits for the Travel Time System Effectiveness Sensitivity Analysis 97
Table D.8 Disaggregated Annualized Benefits for the Value-of-Time Sensitivity Analysis 99
Table D.9 Disaggregated Annualized Benefits for the Fuel Costs Sensitivity Analysis 101

List of Figures

Figure ES.1.1 Summary of Benefit-Cost Analysis Results across All Corridors 3
Figure 2.1 OPS-BC Input Sheet Example 9
Figure 2.2 Map of Analysis Corridors and Traffic Data Location 10
Figure 2.3 Summary of Benefit Estimation Process for TOPS-BC 12
Figure 2.4 Summary of cost estimation process for TOPS-BC 14
Figure 2.5. Off-Network Routes with Known ITS Investments 15
Figure 3.1 Summary of Benefit-Cost Analysis results for All Counties 21
Figure 3.2 Summary of Benefit-Cost Analysis Results for Orange County 22
Figure 3.3 Summary of Benefit-Cost Analysis Results for Seminole County 23
Figure 3.4 Summary of Benefit-Cost Analysis Results for Osceola County 24

Executive Summary

Freeway and arterial ITS systems provide a high degree of benefit, particularly in the area of travel reliability, despite their relatively small portion of overall transportation budgets. For example, by keeping users apprised of incidents and other delays after they have started their trips, and facilitating quick removal of incidents, ITS provides a crucial service that cannot be replaced by capital investments alone. Users of the system benefit from this increased consistency of their daily commutes, though they may not appreciate the ITS investments that contribute significantly to these outcomes.

Many agencies have conducted benefit/cost analyses to evaluate the economic merits of new or continued investments in ITS technology. Characterizing and documenting the ITS benefits, including cost-benefit ratio and magnitude of annual cost savings provided by the system, can prove crucial to establishing an effective and persuasive business case for sustained, continued, dedicated system funding.

Analysis Approach

In recognition of these objectives, this business case report presents the approach, results, and conclusions of a carefully conducted benefit/cost analysis of the ITS investments and TSMO strategies in the Orlando Urban Area. The approach taken for this analysis is to utilize the Tool for Operations Benefit/Cost (TOPS-BC),[1] which is a tool developed by FHWA that offers reasonable estimates of the economic impacts and generalized outcomes associated with various ITS. The analysis is performed in the context of existing conditions in the tri-county area. A sensitivity analysis is also included to explore the impacts of alternative analysis assumptions on the overall benefit/cost outcomes.

Findings

The overall annual monetized benefit associated with Intelligent Transportation Systems (ITS) in the Orlando Urban Area (Orange, Osceola, and Seminole Counties) is $70.3 million, or $421k per mile. Of this, approximately $21.8 million (or 31% of the total) is a result of delay savings, $33.0 million (47%) is a result of crash-related savings (damage and injury costs), $11.3 million (16%) is a result of annual fuel savings, and $4.2 million (6%) is captured by bus passengers through the transit strategies. Table ES.1 provides a summary of these benefits per mile, separately by outcome type.

Table ES.1 Benefits for All Counties by Improvement Type

Benefit Category	Total Benefit	Per-Mile Benefit
Delay Savings Associated with Recurrent Congestion	$787,086	$4,991
Incident Management: Delay Savings	$20,964,220	$132,937
Incident Management: Crash Reduction Benefits	$33,007,268	$209,304
All Strategies: Fuel Savings	$11,304,050	$71,681
Transit Delay Savings	$4,239,291	$2,033
Total Benefits	$70,301,914	$420,947

[1] Available from FHWA: http://www.ops.fhwa.dot.gov/plan4ops/topsbctool/index.htm (accessed 10-19-2016).

The overall annual cost associated with ITS investments in the Orlando Urban Area is $13.8 million, or $72k per mile. Of these costs, approximately $7.1 million (or 52% of the total) is associated with signalization improvements, $2.8 million (20%) is related to incident management, $1.3 million (10%) is attributed to travel time information systems, and $2.5 million (18%) is invested in transit improvements. Table ES.2 provides a summary of these costs separately by ITS strategy category.

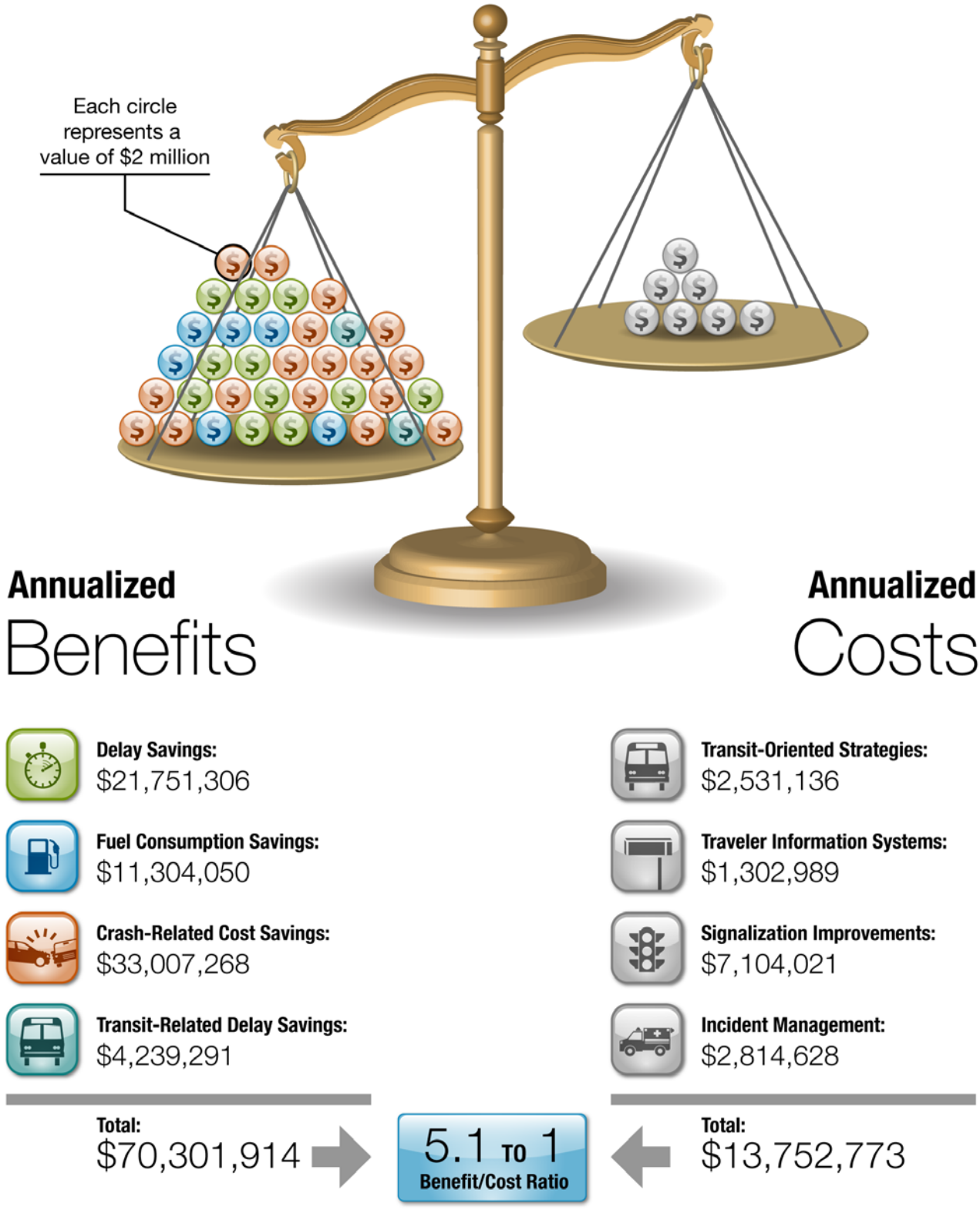
Table ES.2 Annualized Costs for All Counties by ITS Strategy Category

Cost Category	Total Annual Cost	Per-Mile Annual Cost
Signal Improvements	$7,104,021	$45,048
Incident Management	$2,814,628	$17,848
Travel Time System	$1,302,989	$8,262
Transit Strategies	$2,531,136	$1,214
Total Annualized Cost	$13,752,773	$72,372

Given these annual benefits and costs, the combined ITS strategies have an overall benefit-cost ratio of 5.11 to 1 as shown in Figure ES.1.1 Put another way, every $1.00 invested in ITS in the Orlando Urban Area generates more than $5.11 in benefits for users of those facilities. Alternatively, a decision not to fund these strategies could be expected to result in a net loss to the public of $56.5 million annually.

The benefits were well distributed across the region, with all three counties shown to benefit substantially from their respective ITS investments across these categories. Specifically, Orange County benefits the most from ITS strategies in terms of absolute dollar amounts, with a countywide benefit of $34.3 million annually compared to $26.3 million for Seminole County and $9.8 million for Osceola County. Normalizing these benefits by mileage, Seminole County exhibits the highest dollar value of annual benefits per mile at $678k, compared to $337k per mile in Orange County and $349k per mile in Osceola County. From a cost perspective, Osceola was the most efficient with an estimated per-mile rate of $50k for all ITS strategies combined, compared to $71k per mile in Orange County and $93k per mile in Seminole County. Bringing together the benefit and cost results by county, the benefit-cost ratio is found to be highest for Seminole County at 7.3 to 1, compared to 7.0 to 1 for Osceola County and 4.8 to 1 for Orange County.

Figure ES.1.1 Summary of Benefit-Cost Analysis Results across All Corridors



Conclusions

This business case analysis used a nationally recognized benefit/cost estimation tool from FHWA, informed by years of research projects and empirical data from leading studies across the country, and applied it to detailed ITS inventory/deployment data and traffic/roadway configuration data from the Orlando Urban Area to obtain reliable estimates of overall ITS-related benefits and costs throughout the region and by county. Impact parameters were tailored to each of the 326 analysis segments according to their specific characteristics, and benefits for each segment were estimated using high-fidelity hourly volume data to achieve the highest level of analysis precision possible.

Across all counties and all analysis scenarios, the ITS strategies deployed in the Orlando Urban Area consistently demonstrated a significant value across several categories, including fuel savings, time/delay savings, crash injury/damage cost savings, and improved transit performance/efficiency. The analysis revealed a regionwide annual benefit of $70.3 million against a cost of $13.8 million, for a benefit-cost ratio of 5.1 to 1.

These findings were found to be resilient even when subjected to double-digit levels of uncertainty regarding the input parameters used to produce these results, as demonstrated by the outcomes of the sensitivity analysis scenarios. Across a set of six scenarios designed to examine the effects of reasonable ranges of uncertainty associated with several key analysis parameters, the net benefit was always above $49 million per year, resulting in benefit-cost ratios well in excess of 4:1 in all cases.

1.0 Introduction

1.1 Background

Since its establishment in 1977, MetroPlan Orlando has been responsible for ensuring that the region's transportation infrastructure is operated and managed efficiently and safely, and has taken a leading regional role in facilitating interagency coordination and cooperation in pursuit of an effective and diverse regional transportation system. Several of the region's strategic overall objectives include:

- Improving safety and mobility,
- Reducing congestion,
- Providing information to motorists, and
- Sharing information with stakeholders.

Intelligent Transportation Systems (ITS) have had a central role in accomplishing these objectives among all major member agencies of MetroPlan Orlando, enabling the region to efficiently operate the region's freeways and major state route arterial roadways by utilizing some of the most advanced traffic management technologies available. It is a robust system that includes (among many strategies) the following key components:

- Transit-oriented strategies (e.g., Transit Signal Priority, Automated Vehicle Location Services);
- Traveler information dissemination (e.g., dynamic message signs, Florida 511);
- Incident management strategies (e.g., emergency vehicle pre-emption, CCTV, Road Rangers service patrol); and
- Signalization improvements (e.g., signal retiming studies, coordinated control).

This business case analysis quantitatively evaluates the current performance of these ITS strategies, to provide a sense of the value associated with past and ongoing investment in these systems.

1.2 What Makes a Business Case

The primary purpose of any business case is to provide agencies with the resources, data, and materials they need to present a compelling investment justification to decision-makers and agency leadership. This includes coverage of such integral topics as:

- Demonstrating how ITS investment and its associated outcomes aligns with agency goals.
- Identifying the needs that are met or addressed through different types of ITS investment.
- Quantifying the economic outcomes of the investment in terms of costs and benefits, both to the agency and to the broader public.

- Presentation of transparent calculations, assumptions, inputs, and outputs, to instill trust in the business case analysis.
- Conducting a sensitivity evaluation and risk analysis associated with realistically plausible outcomes, rather than just a single point estimate of benefits and costs.
- Demonstrating the comparative value of TSMO against other alternatives for investment, including "do nothing."

Altogether, these topics are intended to provide actionable information, accompanying motivation, and data-driven justification for continued investment in and support of MetroPlan's ITS program among key stakeholders including executive leadership, partner agencies, and the traveling public.

1.3 Target Audiences

Identifying the intended audiences of a business case is paramount to developing materials that most effectively resonate with them and their needs, priorities, and goals. A business case is not a strategy for communicating how ITS has solved MetroPlan's problems, but rather a vehicle for showing how it has addressed the interests and concerns of the target audiences. These include:

- Executive leadership;
- Decision-makers and politicians;
- Member agencies and their staffs at various levels;
- Regional partners and major stakeholders; and
- The traveling public.

Obtaining an understanding of the target audiences' contexts enables the selection communications strategies that are suitable and relevant to them according to the anticipated engagement opportunities that may be expected. This includes consideration of format, length, and content. Examples of several different communication strategies, formats, and priority topics for business case materials are available separately in SHRP2's report, Business Case Primer: C*ommunicating the Value of Transportation Systems Management and Operations.*

The different business case materials and content available within this business case report are summarized in Table X below by the intended audience type and/or desired level of detail.

Table 1.1 Business Case Materials in this Report
by intended use

Business Case Materials	Intended purpose, audience, and/or level of detail
Summary Graphics (see Figure ES.1.1)	A concise summary of the key benefit/cost results only. Ideal for starting the conversation about the benefits and value of the ITS in the Orlando Urban Area. Suitable for non-technical audiences that do not have a detailed working knowledge of ITS or transportation engineering/planning.
Executive Summary	A summary of the benefit/cost results with additional interpretive notes, contextual information, and discussion regarding the significance of these findings for more informed policy and decision support. Suitable for audiences with a basic understanding of ITS.
Main Report Body (Chapters 2-5)	A description of the basic analysis approach, assumptions, inputs, procedures, and references used to obtain the results shown in the executive summary. Also includes a more detailed presentation of findings associated with the benefit/cost analysis, and a more thorough treatment of the assumptions and the sensitivity of the results to those assumptions. Suitable for technical audiences familiar with ITS that want a more thoughtful understanding of how the results were obtained, and what they show more precisely.
Full Report with Appendices	A full explanation of all data, parameter values, assumptions, calculations, and procedures used in this analysis, suitable for critical analysis and sufficient to allow the reader to reproduce the results shown. Suitable for technical audiences with a basic understanding of the principles of economic analysis and standard practice associated with transportation planning/engineering benefit/cost evaluations.

As summarized in Table 1.1, this complete business case report provides detailed quantitative results for a number of ITS technologies and scenarios, presented with transparent calculations and a clearly-defined methodology that are ideal for analytical and technical audiences including project evaluators and reviewers. Several summary figures are also provided in the results section that convey the key findings and outcomes in a concise, graphical format that is both visually engaging and powerfully intuitive—qualities that make these figures ideal for short publicity engagements and public outreach opportunities. Finally, an Executive Summary chapter is provided at the front of this document that provides more background and contextual information than the standalone graphics while still maintaining a higher-level perspective and concise writing style suitable for executive leaders, decision-makers, and other audiences that need to quickly understand the key elements and conclusions of this ITS business case in a carefully prepared summary that is highly time-efficient.

1.4 Context in the Master Plan

This business case is only one element of the overall MetroPlan Orlando ITS Master Plan, and while this document is written to function as a standalone work product, its full relevance is realized only when it is considered within the context of the other tasks on this project. This business case analysis builds upon the findings and products of other project tasks, including the following contributing components:

- Goals and objectives that have been articulated in other parts of the MetroPlan Orlando ITS Master Plan, which provides a basis for identifying benefit categories and performance measures.
- Inventory data, which is essential to the development of costs and the expected geographic extent and magnitude of benefits associated with these ITS strategies.
- Existing conditions data, which are required to evaluate performance measures with and without the ITS strategies.

The outcomes and results of this business case analysis also inform other components of the project, including the following:

- The Needs Analysis, which will be used to help identify future proposed deployments and to establish priorities.
- Planning work associated with future ITS activities, as informed by the benefit/cost evaluation and subsequent prioritization of various proposed strategies.

1.5 Organization of this document

The remaining chapters and appendices of this business case report cover all major topics and components of a proper business case as described above. The chapters of the report body are organized as follows.

- A high-level description of the analysis methodology used to evaluate the costs and benefits of the ITS infrastructure and strategies deployed in the Orlando Urban Area is provided in Chapter 2. Additional details are available in Appendices B and C.
- Analysis results are provided in Chapter 3, which include an evaluation of system benefits, system costs, and benefit/cost ratios. Results are separated by jurisdiction and by strategy type where available. Additional details are available in Appendix D.
- A sensitivity analysis is provided in Chapter 4, which explores the sensitivity of the findings of Chapter 3 with respect to six different alternative analysis assumptions and sets of parameter values. Additional details are available in Appendix D.
- A summary of conclusions and next steps is provided in Chapter 5.

The four report appendices provide additional details and data associated with the above core document chapters and topics. The organization of the appendix materials is as follows.

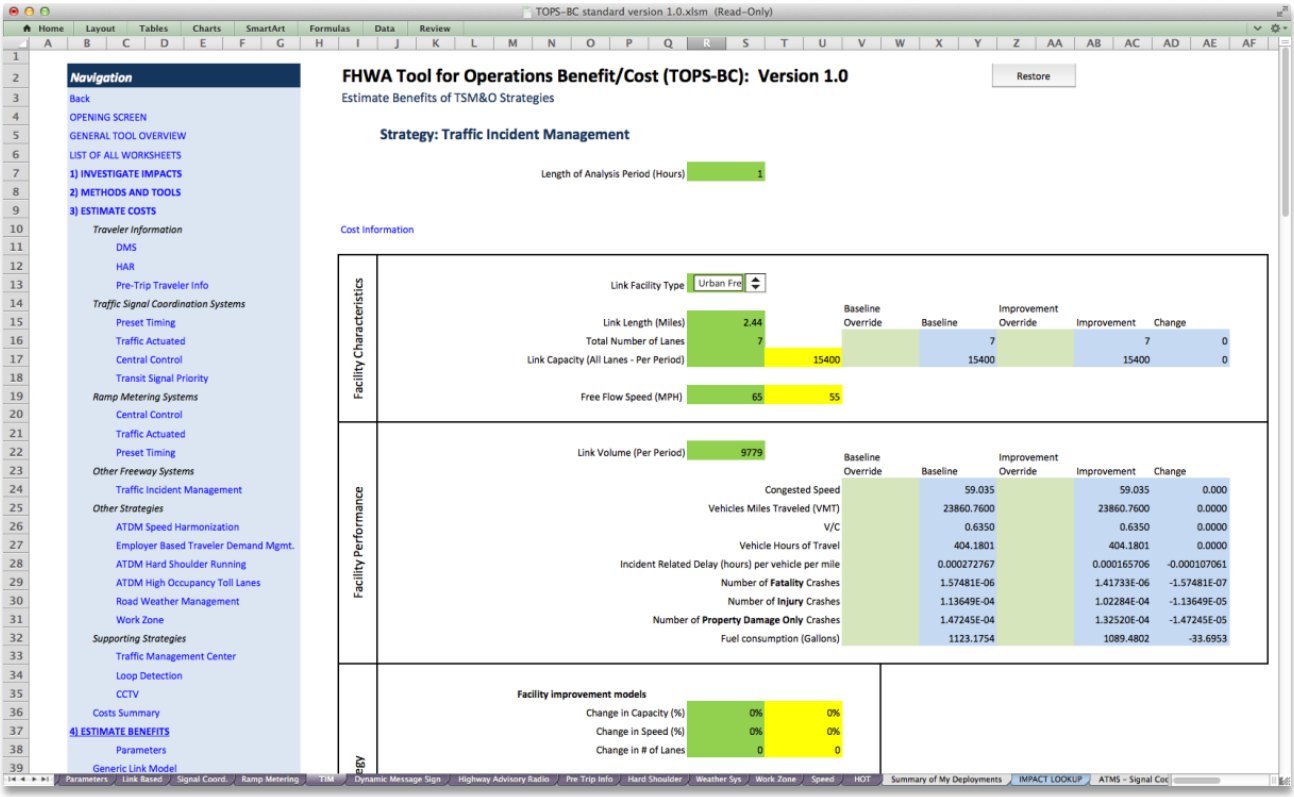
- An overview of all relevant equipment inventory data, source traffic data, roadway characteristics, population data, fleet data, and other referenced input data is provided in Appendix A.
- Building upon the content of Chapter 3, additional specifics, procedural details, parameter values, intermediate analysis results, and assumptions associated with the benefit analysis are provided in Appendix B.
- Expanding upon the content of Chapter 3, additional specifics, procedural details, parameter values, intermediate analysis results, and assumptions associated with the cost analysis are provided in Appendix C.
- To supplement the results presented in Chapters 4 and 5, more detailed numbers and disaggregated results associated with the baseline benefit/cost analysis and the six sensitivity analysis scenarios are provided in Appendix D.

2.0 Benefit-Cost Analysis Methodology

The approach taken for this analysis is to utilize the Tool for Operations Benefit/Cost (TOPS-BC),[2] which is a tool developed by FHWA that offers reasonable estimates of the economic impacts and generalized outcomes associated with various ITS.

TOPS-BC has the capacity to estimate benefits and costs associated with several types of common ITS strategies using several representative parameter values informed by literature; outcomes associated with other ITS strategies not explicitly covered in a module of TOPS-BC can be estimated as long as key benefit and cost parameters are available (or assumed by the analyst). A sample of the module used to estimate the ITS benefits for the MetroPlan ITS analysis is shown in Figure 2.1, where input parameters would be specified in green cells, default input parameters provided in yellow cells (superseded by green cells when provided), and calculated values in blue cells.

Figure 2.1 OPS-BC Input Sheet Example



For the analysis, TOPS-BC has been used in conjunction with detailed inventory and traffic data for each corridor, as shown in Appendix A. The analysis is performed in the context of existing conditions in the tri-county area. The following sections describe the methodology and assumptions associated with this analysis approach. Additional detail regarding the benefit and cost analysis procedures, assumptions, and inputs is provided in Appendix B and Appendix C.

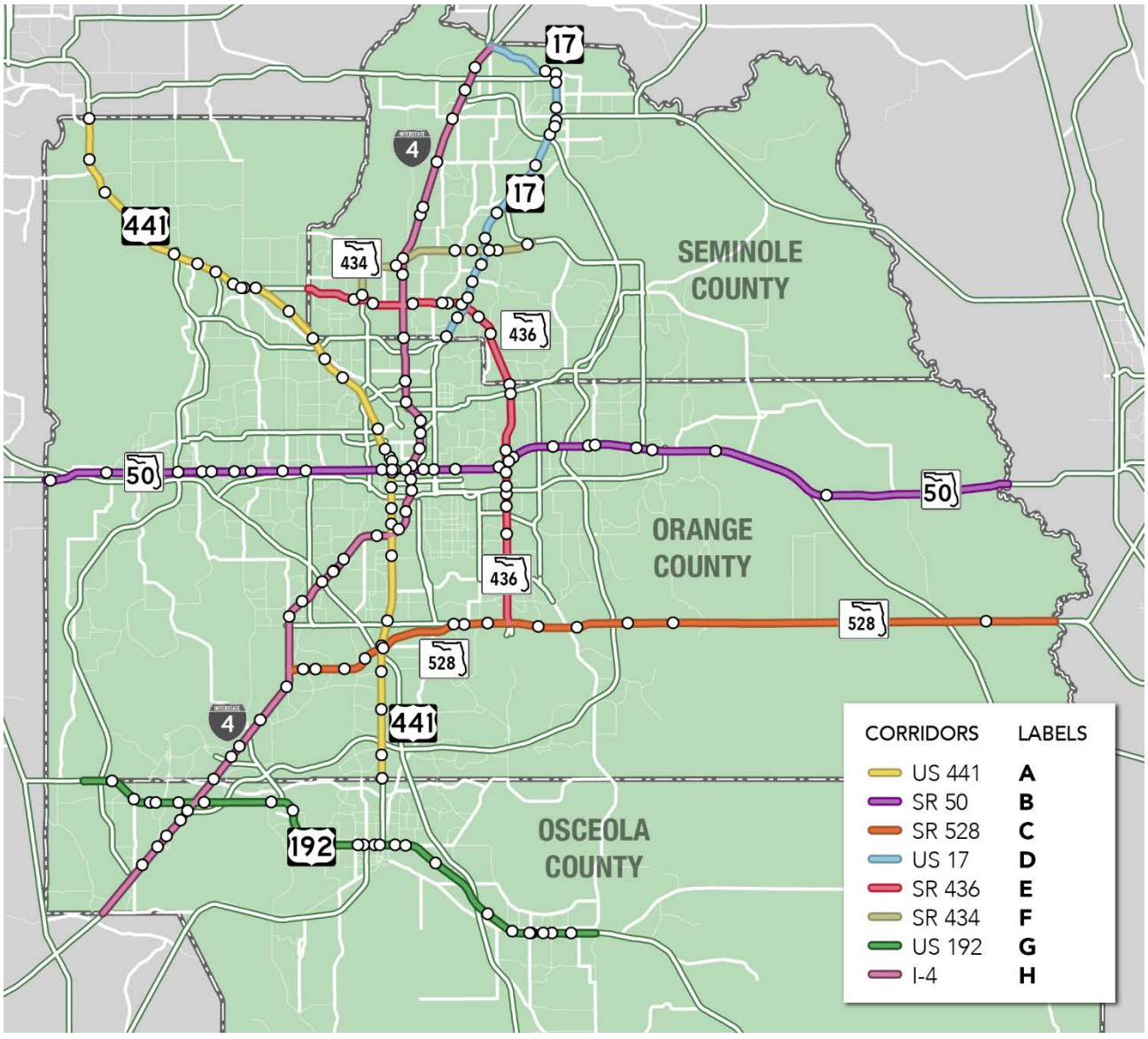
[2] Available from FHWA: http://www.ops.fhwa.dot.gov/plan4ops/topsbctool/index.htm (accessed 10-19-2016).

2.1 Geographic Scope of Analysis

Eight analysis corridors have been considered for this analysis, as shown in Figure 2.1. These corridors are furthermore subdivided into analysis segments based on the locations of available traffic data. Each data location corresponds to a separate analysis segment, defined by the midpoints between it and the nearest neighboring data locations upstream and downstream on the corridor. Altogether, there are 326 directional analysis segments across these eight corridors, with an average length of 1.5 miles each. Throughout this report, the eight analysis corridors will be referred to using the labels A-H as indicated in the figure.

Two important exceptions to this geographic scope of analysis are the transit component and the limited consideration of supplemental routes as described in Section 2.4. As a result of input data limitations, costs and benefits for AVL and TSP are evaluated across all LYNX routes, and are not limited to the eight corridors indicated in Figure 2.2.

Figure 2.2 Map of Analysis Corridors and Traffic Data Location



Traffic volume data locations are indicated by white circles on the map.

2.2 Benefit Analysis

Benefits are calculated using a set of safety, mobility, and environmental impact parameters associated with each of the broad improvement categories shown in Table 2.1. These impacts are then scaled down according to the extent to which ITS has been deployed on a given corridor, such that a segment with relatively little coverage is estimated to achieve a proportionally smaller level of benefit relative to comparable segment with much more ITS infrastructure.

Table 2.1 Mapping of ITS Project Types to TOPS-BC Improvement Categories

TOPS-BC Improvement Category	ITS Project Types Included
Signalization Improvements	• Signal Retiming Studies (arterials only) • Coordinated Signal Control Systems (arterials only)
Incident Management Strategies	• CCTV • Emergency Vehicle Pre-emption (arterials only) • Road Rangers Service Patrol (freeways only)
Travel Time System	• On-road Traveler Information System (using DMSs) • 511 Traveler Information System
Transit Strategies[3]	• Transit Signal Priority • Automatic Vehicle Location Service

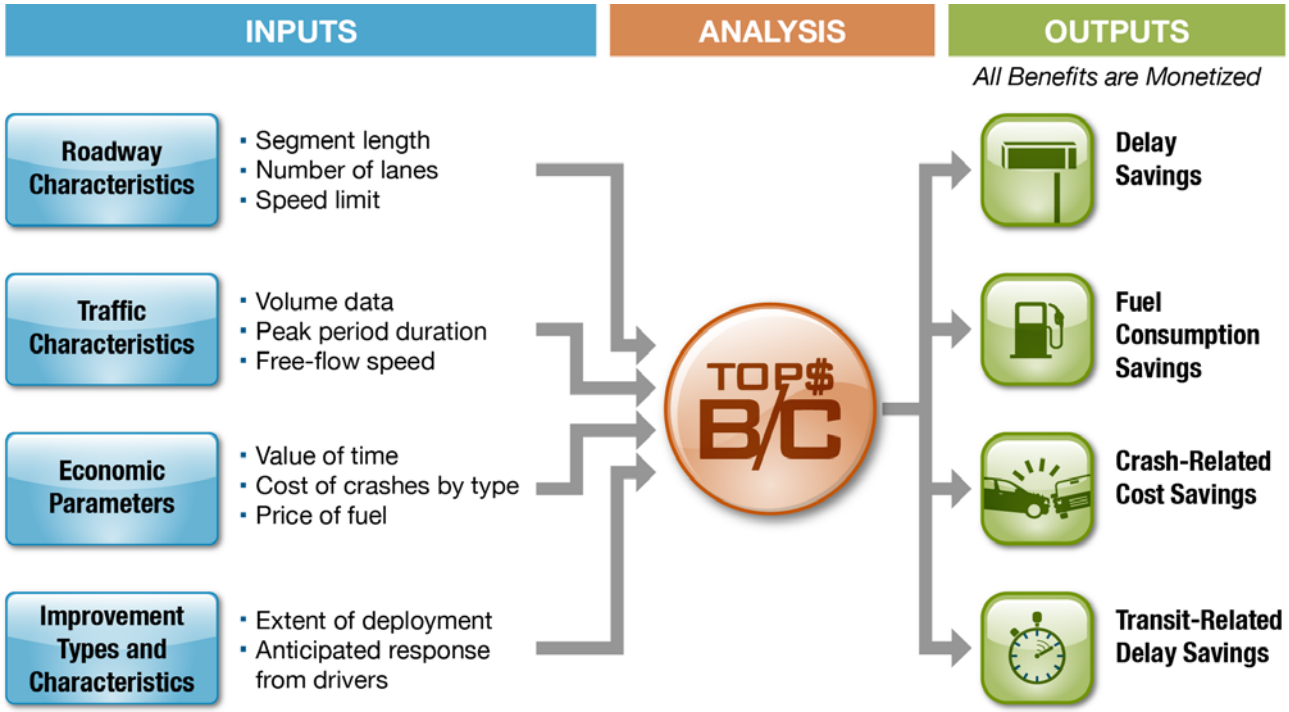
These impact parameters are combined with basic traffic and roadway configuration details to obtain benefit estimates from TOPS-BC in the following four categories:

- Monetized fuel savings across all strategies.
- Direct cost savings of incidents prevented (or reduced in severity).
- Monetized delay savings associated with incident management strategies.
- Monetized delay savings achieved through traveler information strategies associated with recurrent congestion.

Finally, these quantities are aggregated across all hours of the day to obtain daily estimated benefits by category for each segment, and scaled by a factor of 250 to obtain annual benefit estimates by segment and improvement category. The overall TOPS-BC benefit estimation process is summarized in Figure 2.3.

[3] Note that this is not a TOPS-BC improvement category—rather, these calculations will be performed following the procedure described in the subsequent transit benefits section.

Figure 2.3 Summary of Benefit Estimation Process for TOPS-BC



2.2.1 Transit-Specific Benefit Analysis

Because the benefits associated with transit-specific strategies cannot be directly evaluated using the current version of TOPS-BC, the procedure used to estimate these benefits was to assume a travel time savings of 10 seconds per transit passenger at each intersection equipped with TSP along a bus route, combined with an assumed savings of 1 minute per trip as a result of fleet-wide AVL data. This AVL-related savings per trip is based on an assumed overall savings of 4 minutes per trip when the system is used, and a further assumption that 25% of riders use the system.

This 10-second TSP-related savings and 1-minute AVL savings is then scaled appropriately based on statistics from LYNX, the Central Florida Transportation Authority, regarding ridership, passenger-miles traveled, directional miles of bus routes, and the number of signalized intersections per route.

2.3 Cost Analysis

Costs are calculated by considering the individual capital, operating, maintenance, integration, and labor expenses that are associated with each ITS strategy component, including both field equipment and supporting systems (hardware and software). Non-recurring costs are amortized according to estimated useful life of each component, and combined with annual estimates for other costs to obtain annualized estimates that are suitable for comparison to the estimated annual benefits described in the preceding section.

Table 2.2 indicates the different cost components taken into consideration for each ITS strategy. These costs are then consolidated into suitable improvement categories for more concise reporting as shown in Table 2.3. The overall TOPS-BC cost estimation process is summarized in Figure 2.4.

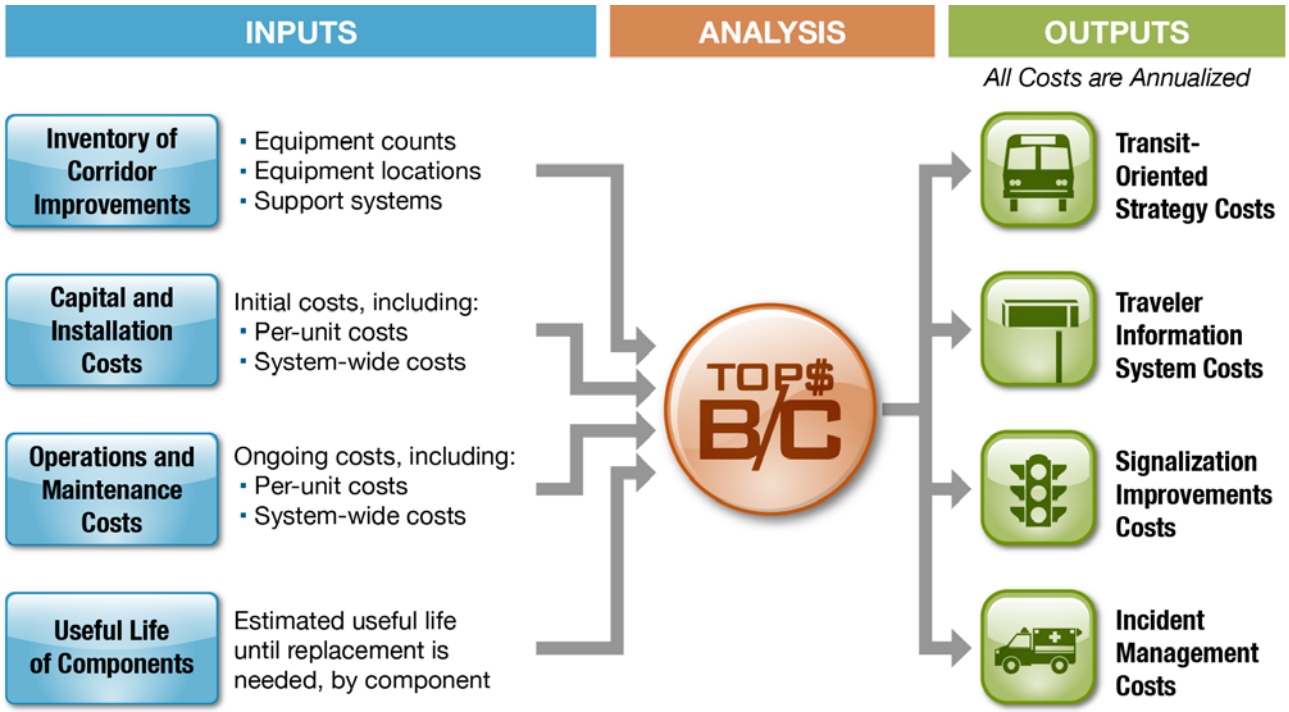
Table 2.2 Component Summary by ITS System

ITS System	Direct Cost Components (per Field Deployment)	Indirect Cost Components (e.g., Integration, Monitoring)
CCTV	• Video camera • Camera pole	• Hardware/software for central CCTV monitoring • System integration
Ramp Meters	• Ramp meter signal/controller • Loop detectors (two) • Communication line	• TMC hardware for freeway control • TMC software/integration • Labor
DMS Traveler Information	• Changeable message sign • Support structure • Communication line	• TMC hardware and software for information dissemination • TMC system integration
511 Traveler Information System	• None	• Information Dissemination Hardware, Software, Integration, Labor • Transit Center Hardware, Software, Integration, Labor • Communication Lines • Information Service Center Hardware, Software, Integration, Labor • Map Database Software
Fiber Optic	• Installation of physical cable • Capital cost of physical cable	• None
Centralized Traffic Signal Control	• Signal Controller • Communication Line • Loop Detectors (2)	• Linked Signal System LAN • TMC Hardware for Signal Control • TMC Software/System Integration • Labor
Road Rangers Service Patrol	• Incident response vehicle • Incident response labor (driver) • Communication line	• Video monitors/wall for incident detection • TMC incident response hardware/software • TMC system integration • TMC labor • Emergency management center hardware and software • Emergency response labor • Communication line
Emergency Vehicle Preemption	• Vehicle Hardware	• Intersection Hardware
Transit Signal Priority	• Signal Preemption Processor • Cell Based Communications Equipment	• Signal Preemption Receiver • Signal Controller Upgrade • Telecommunications (low usage)
Automatic Vehicle Location System	• Onboard equipment	• Central system
TMC General Functions	• TMC facility operations • TMC facility capital cost • Labor (supervisors, operators, general staff)	• Not Applicable

Table 2.3 Projects included in each Cost Category

Cost Category	Included Project Types
Signalization Improvements	Fiber Interconnects/Communications, Signal Timing Studies, Coordinated Signal Control, Ramp Meters
Incident Management	Emergency Vehicle Preemption, CCTV Cameras, Road Rangers
Travel Time System	Dynamic Message Signs, 511 Automated Traveler Information Service
Transit Improvements	Transit Signal Priority, Automatic Vehicle Location system

Figure 2.4 Summary of cost estimation process for TOPS-BC



2.3.1 Distributed Costs and Geographic Scope

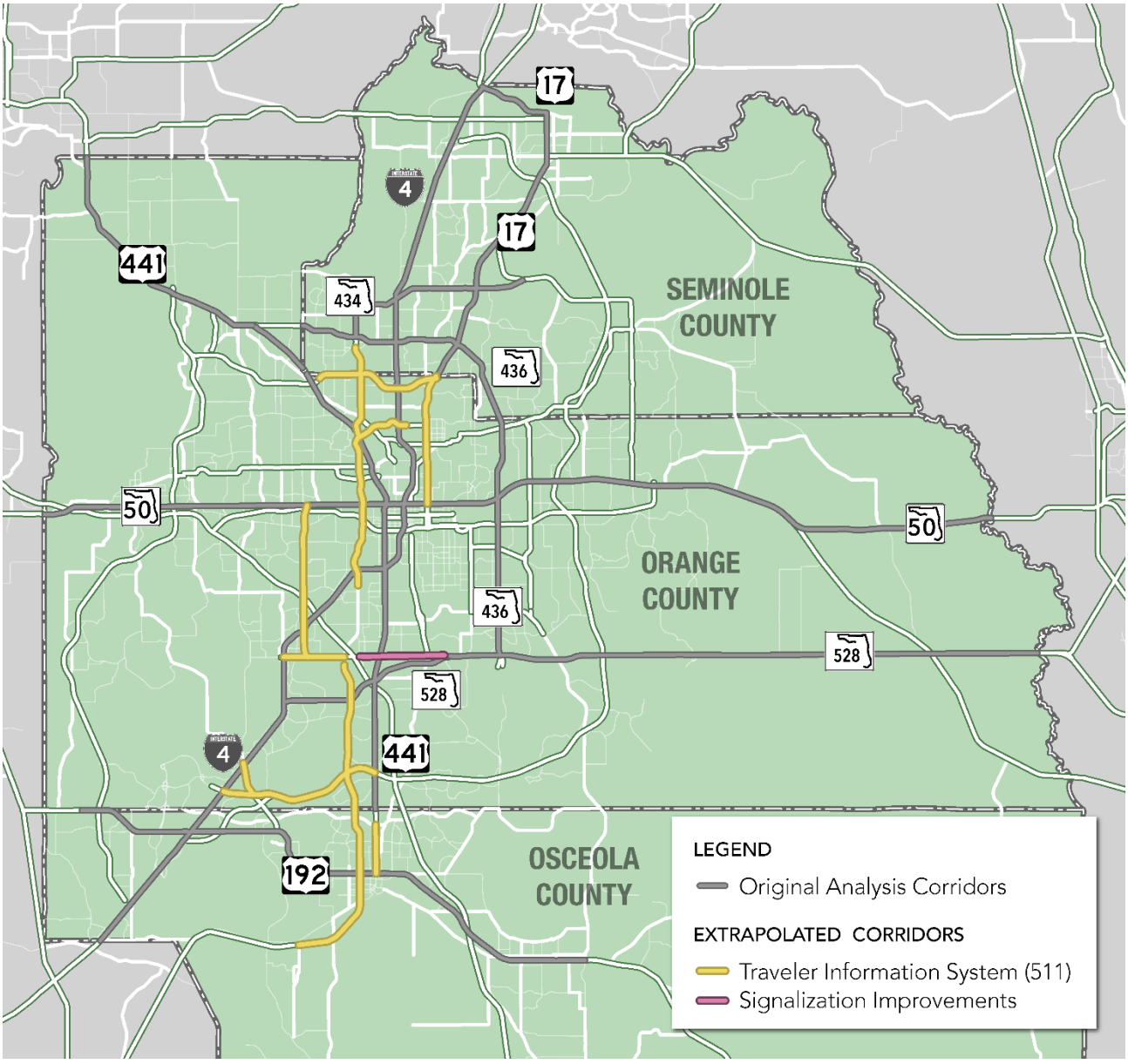
In pursuit of a balanced comparison of costs and benefits across the same cross-section of the ITS deployed in the Orlando Urban Area, this cost analysis only considers the ITS investments and strategies deployed on the eight corridors for which traffic data were available (see Figure 2.2). For costs that are widely distributed across the region, such as those for TMCs or centralized monitoring systems, the associated costs for those systems and items are scaled to reflect the fact that these eight corridors comprise only a fraction of the full coverage areas. Two notable exceptions to this approach for distributed system costs are noted below.

- **Transit Strategies:** Because transit strategy benefits are evaluated across the full LYNX route network, the costs for AVL and TSP are calculated all vehicles and routes rather than just the subset that use the eight corridors shown in Figure 2.2.
- **Emergency Vehicle Preemption:** As a result of input data limitations, the cost of equipping the vehicles of emergency responders will consider all responder vehicles in each county, rather than just the subset of those that routinely operate on the eight corridors being evaluated—a highly conservative assumption. This calculated total fleet size of responder vehicles will then be scaled according to the assumed deployment rate for EVP (refer to section B.3.1).

2.4 Off-Network Benefits and Costs

Additional benefits and costs associated with adaptive traffic control systems (ATCS) and traveler information systems are also known to be available on other routes in the Orlando Urban Area in addition to those shown in Figure 2.2. These additional routes are shown below in Figure 2.5.

Figure 2.5. Off-Network Routes with Known ITS Investments



However, due to a lack of available detailed contextual data for these other routes (e.g., detailed volume data, roadway data, ITS infrastructure/inventory data), they have not been included in the core analysis of benefits and costs. Instead, the supplemental benefits and costs associated with these extra routes are extrapolated from the core analysis results for the routes in Figure 2.2, based on average benefits per mile and average costs per mile for signalization improvements and traveler information systems. In the case of the extra corridors with Traveler Information System (511) investments shown in Figure 2.5, specific cost

data were available, and so they have been used in place of extrapolated costs from the core corridor analysis. These additional benefits and costs are then combined with the results of the core analysis to provide a more complete assessment of the value of ITS investment in the region.

3.0 Analysis Results

3.1 Benefits

The results of the benefit analysis are summarized in Table 3.1. To control for the fact that some jurisdictions are larger than others and/or have longer corridor extents, and would therefore be expected to have more substantial benefits than the shorter ones, Table 3.1 also reports the estimated benefits on a per-mile basis. A detailed breakdown of benefits by corridor is provided in Appendix D.

Table 3.1 Annualized Benefits Summary by Category and Jurisdiction

Benefit Category	Arterial Annual Benefit	Freeway Annual Benefit	Total Benefit	Per-Mile Benefit
All Counties				
Delay Savings Associated with Recurrent Congestion	$787,086	$0	$787,086	$4,991
Incident Management: Delay Savings	$11,532,532	$9,431,687	$20,964,220	$132,937
Incident Management: Crash Reduction Benefits	$22,846,663	$10,160,605	$33,007,268	$209,304
All Strategies: Fuel Savings	$7,107,765	$4,196,285	$11,304,050	$71,681
Transit Delay Savings	$4,239,291	$0	$4,239,291	$2,033
Total Benefits	$46,513,337	$23,788,577	$70,301,914	$420,947
Orange County				
Delay Savings Associated with Recurrent Congestion	$495,702	$0	$495,702	$5,324
Incident Management: Delay Savings	$4,456,866	$5,562,137	$10,019,004	$107,604
Incident Management: Crash Reduction Benefits	$8,371,950	$5,583,557	$13,955,507	$149,882
All Strategies: Fuel Savings	$4,462,755	$2,304,495	$6,767,250	$72,680
Transit Delay Savings	$3,013,982	$0	$3,013,982	$1,815
Total Benefits	$20,801,255	$13,450,189	$34,251,444	$337,304
Seminole County				
Delay Savings Associated with Recurrent Congestion	$189,381	$0	$189,381	$4,994
Incident Management: Delay Savings	$6,845,658	$3,412,247	$10,257,905	$270,514
Incident Management: Crash Reduction Benefits	$8,199,575	$3,706,585	$11,906,160	$313,981
All Strategies: Fuel Savings	$1,699,372	$1,531,418	$3,230,790	$85,200
Transit Delay Savings	$689,775	$0	$689,775	$4,058
Total Benefits	$17,623,761	$8,650,250	$26,274,011	$678,747

Benefit Category	Arterial Annual Benefit	Freeway Annual Benefit	Total Benefit	Per-Mile Benefit
Osceola County				
Delay Savings Associated with Recurrent Congestion	$102,003	$0	$102,003	$3,825
Incident Management: Delay Savings	$230,009	$457,303	$687,312	$25,771
Incident Management: Crash Reduction Benefits	$6,275,138	$870,463	$7,145,601	$267,927
All Strategies: Fuel Savings	$945,638	$360,372	$1,306,010	$48,969
Transit Delay Savings	$535,534	$0	$535,534	$2,108
Total Benefits	$8,088,322	$1,688,138	$9,776,460	$348,600

Based on the total benefits reported for each corridor in Table 3.1, the overall annual monetized benefit associated with ITS investments in the Orlando Urban Area is $70.3 million, or $421k per mile. Of this, approximately $21.8 million (or 31% of the total) is a result of delay savings, $33.0 million (47%) is a result of crash-related savings (damage and injury costs), $11.3 million (16%) is a result of annual fuel savings, and $4.2 million (6%) is captured by bus passengers through the transit strategies. The delay savings category includes the combined benefits for:

- Traveler information strategies associated with recurrent congestion, and
- Incident management strategies associated with non-recurrent congestion.

3.2 Costs

Annualized costs for each ITS category are summarized by jurisdiction in Table 3.1, with detailed results by corridor provided in the appendix. TMC costs have been split among the different cost categories according to the distribution of all other costs among these categories.

Table 3.2 Annualized Cost Summary by Category and Jurisdiction

Cost Category	Arterial Annual Cost	Freeway Annual Cost	Total Annual Cost	Per-Mile Annual Cost
All Counties				
Signal Improvements	$5,288,471	$1,815,550	$7,104,021	$45,048
Incident Management	$847,734	$1,966,894	$2,814,628	$17,848
Travel Time System	$904,596	$398,392	$1,302,989	$8,262
Transit Strategies	$2,531,136	$0	$2,531,136	$1,214
Total Annualized Cost	$9,571,937	$4,180,836	$13,752,773	$72,372

Cost Category	Arterial Annual Cost	Freeway Annual Cost	Total Annual Cost	Per-Mile Annual Cost
Orange County				
Signal Improvements	$2,949,153	$1,373,909	$4,323,061	$46,430
Incident Management	$349,200	$998,592	$1,347,793	$14,475
Travel Time System	$578,040	$212,805	$790,845	$8,494
Transit Strategies	$1,982,119	$0	$1,982,119	$1,193
Total Annualized Cost	$5,858,512	$2,585,306	$8,443,818	$70,592
Seminole County				
Signal Improvements	$1,606,324	$441,641	$2,047,966	$54,008
Incident Management	$335,987	$649,841	$985,828	$25,998
Travel Time System	$263,351	$161,412	$424,763	$11,202
Transit Strategies	$254,562	$0	$254,562	$1,497
Total Annualized Cost	$2,460,224	$1,252,894	$3,713,119	$92,704
Osceola County				
Signal Improvements	$732,994	$0	$732,994	$27,484
Incident Management	$162,547	$318,460	$481,007	$18,036
Travel Time System	$63,206	$24,175	$87,381	$3,276
Transit Strategies	$294,455	$0	$294,455	$1,159
Total Annualized Cost	$1,253,201	$342,635	$1,595,837	$49,955

Based on the total annual costs indicated for each corridor in Table 3.2, the overall annual cost associated with ITS investments in the Orlando Urban Area is $13.8 million, or $72k per mile. Of these costs, approximately $7.1 million (or 52% of the total) is associated with signalization improvements, $2.8 million (20%) is related to incident management, $1.3 million (10%) is attributed to travel time information systems, and $2.5 million (18%) is invested in transit improvements.

3.3 Benefit-Cost Ratios

Merging the cost and benefit analyses provides greater insight into the economic performance and value of the ITS investments in the Orlando Urban Area. Specifically, given an annual benefit of approximately $70.3 million to the traveling public across all corridors and jurisdictions, combined with a corresponding annual cost of $13.8 million specifically for the strategies analyzed, this indicates an overall benefit-cost ratio of 5.11 to 1. Put another way, every $1.00 invested in ITS in the Orlando Urban Area generates more than $5.11 in benefits for users of those facilities. Alternatively, a decision not to fund these strategies could be expected to result in a net loss to the public of $56.5 million annually.

Figure 3.1, Figure 3.2, Figure 3.3, and Figure 3.4 summarize the overall benefit/cost analysis results by improvement category/type. When interpreting these results, it is important to recognize that benefits are only fully achieved when all parts of the system are effectively engaged together, rather than operated in isolation. The results of the benefit/cost analysis show that the benefits obtained from the system are generally concentrated on the more congested segments, which is expected given that delay reductions and

other benefits cannot occur on a segment that has no performance issues to begin with. This also suggests that as congestion inevitably continues to grow in the future, the benefits of these ITS investments will increase as long as steady investment in the system continues.

Benefit-cost ratios are provided in Table 3.3 separately for arterials and freeways in each jurisdiction, where transit strategies are included in the arterial category.

Table 3.3 Benefits and Costs by Roadway Type and Jurisdiction

Benefit Category	Annual Benefit	Annual Cost	Benefit-Cost Ratio
All Counties			
Arterials	$46,513,337	$9,571,937	4.86 to 1
Freeways	$23,788,577	$4,180,836	5.69 to 1
Orange County			
Arterials	$20,801,255	$5,858,512	3.55 to 1
Freeways	$13,450,189	$2,585,306	5.2 to 1
Seminole County			
Arterials	$17,623,761	$2,460,224	7.16 to 1
Freeways	$8,650,250	$1,252,894	6.9 to 1
Osceola County			
Arterials	$8,088,322	$1,253,201	6.45 to 1
Freeways	$1,688,138	$342,635	4.93 to 1

Figure 3.1 Summary of Benefit-Cost Analysis results for All Counties

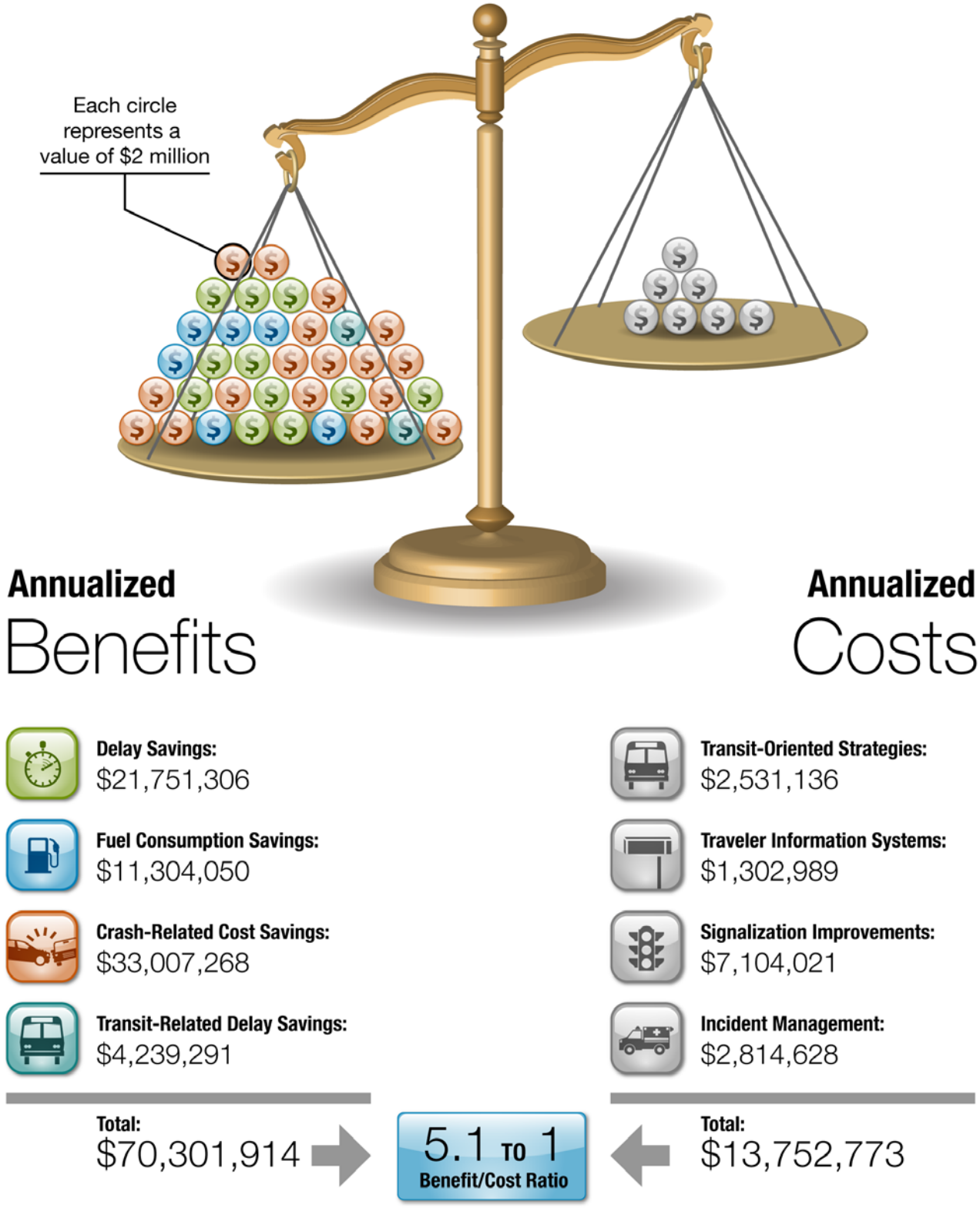
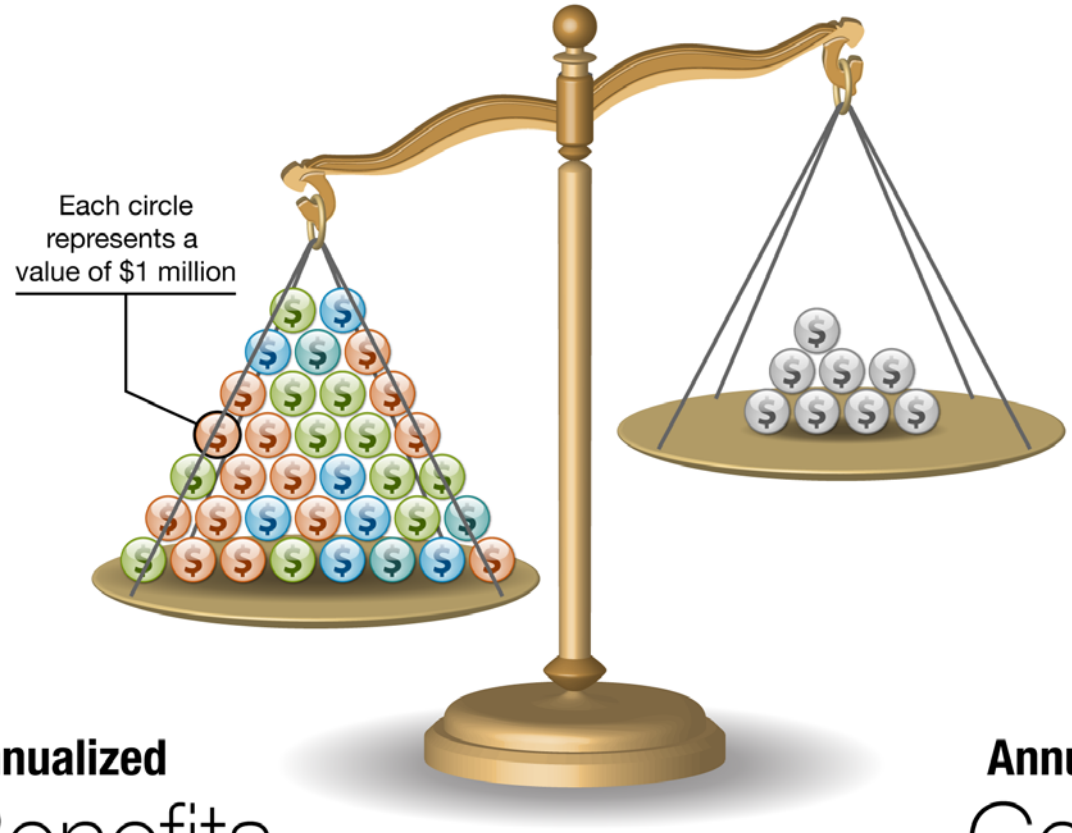


Figure 3.2 Summary of Benefit-Cost Analysis Results for Orange County



Annualized
Benefits

Delay Savings:
$10,514,705

Fuel Consumption Savings:
$6,767,250

Crash-Related Cost Savings:
$13,955,507

Transit-Related Delay Savings:
$3,013,982

Total:
$34,251,444

4.8 TO 1
Benefit/Cost Ratio

Annualized
Costs

Transit-Oriented Strategies:
$1,982,119

Traveler Information Systems:
$790,845

Signalization Improvements:
$4,323,061

Incident Management:
$1,347,793

Total:
$8,443,818

Figure 3.3 Summary of Benefit-Cost Analysis Results for Seminole County

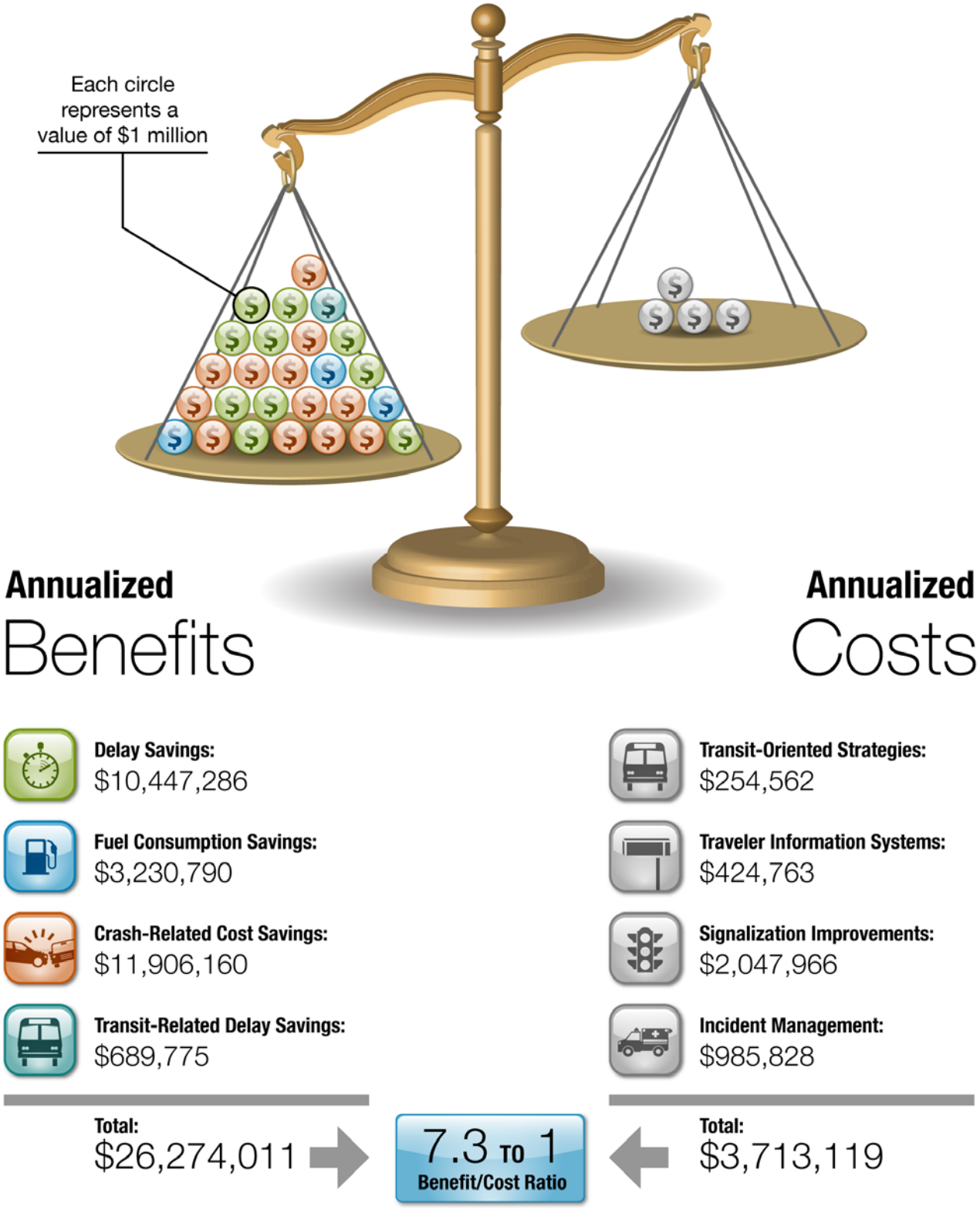
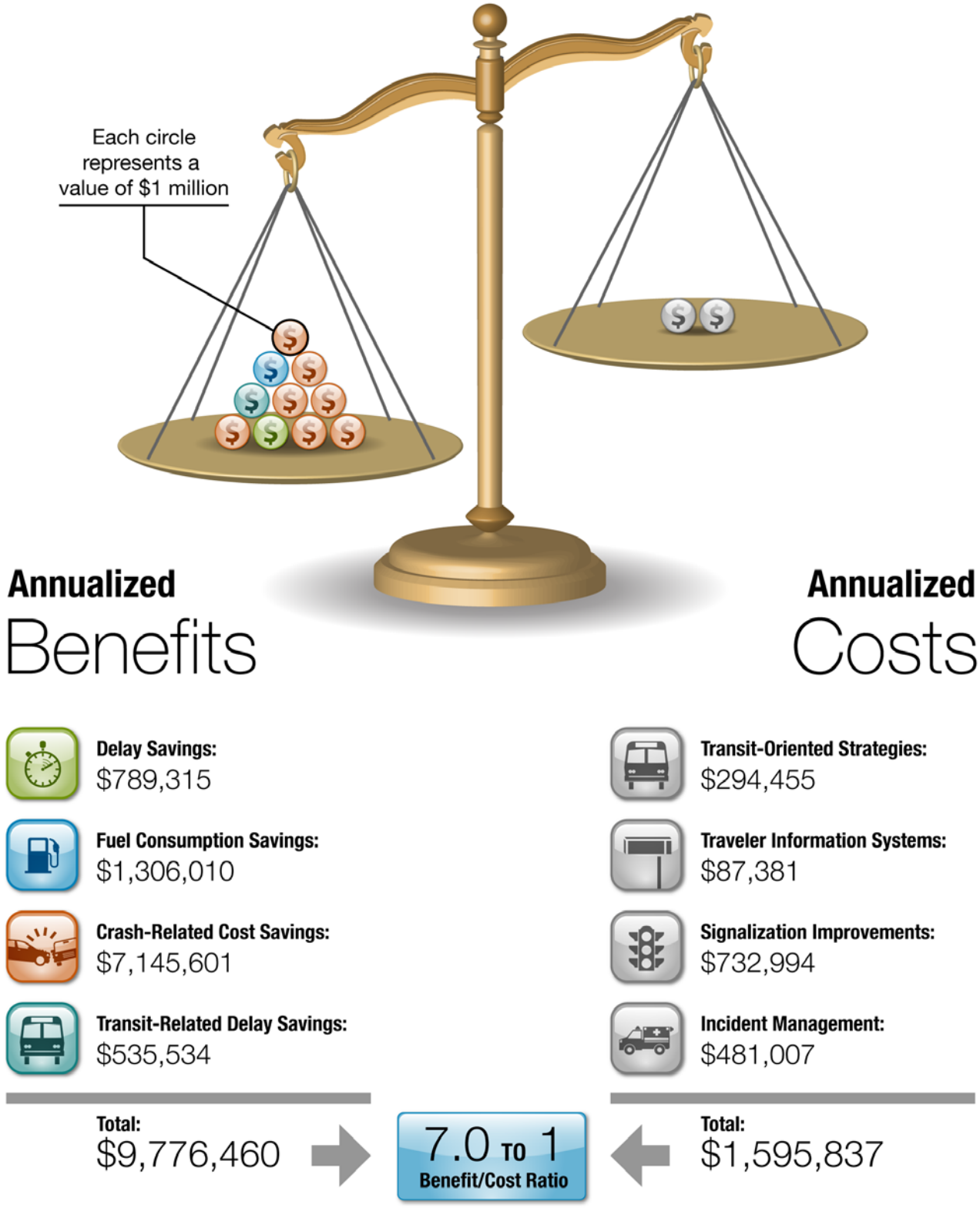


Figure 3.4 Summary of Benefit-Cost Analysis Results for Osceola County



4.0 Sensitivity Analysis

To examine the effects of uncertainty associated with key assumptions made as part of this benefit/cost analysis, the calculations of Chapter 3 have been repeated using several alternate sets of parameters, with the subsequent results for each of those alternatives presented here as part of a benefit-cost sensitivity analysis. Six analysis alternatives (plus the baseline scenario) were examined altogether, as summarized in Table 4.1.

Table 4.1 Scenarios Examined as Part of the Sensitivity Analysis

Sensitivity Analysis Scenario	Description
Baseline Analysis	Uses all analysis assumptions and parameter values as described previously.
Signalization Improvements	Capacity-related gains associated with signalization improvements reduced by 20% (i.e., 8% instead of 10%).
Incident Management	Crash rate benefits associated with incident management strategies reduced by 20% (i.e., 8% instead of 10%).
Travel Time System Breadth	Amount of time that useful information is disseminated by travel time systems is reduced by 20% (i.e., 16% instead of 20%).
Travel Time System Effectiveness	Travel time savings provided by travel time systems is reduced by 20% (i.e., 4 minutes instead of 5 minutes).
Value of Time	Value of time reduced by 20% across all vehicle classes.
Fuel Costs	Fuel costs reduced by 20% across all vehicle classes.

The results of the sensitivity analyses are summarized by jurisdiction in Table 4.2. It is important to note that the sensitivity analyses have been performed for the core analysis network only (i.e., the corridors in Figure 2.2), and do not also include the supplemental benefit and cost calculations associated with the extra routes (i.e., those shown in Figure 2.5). As the overall purpose of the sensitivity analysis scenarios is to evaluate the relative impacts of various changes to the input assumptions, and given that the supplemental benefit and cost calculations are largely extrapolations of the core analysis results, it is not necessary to include the supplemental benefit and cost estimates in these scenarios.

In each case, the first alternative represents the cost/benefit analysis with the standard assumptions described in Chapter 2, and therefore functions as the baseline against which all other scenarios are compared. The table also indicates the percentage drop in total benefits relative to the baseline scenario, and an updated benefit/cost ratio. A detailed breakdown of scenario results by corridor is provided in Appendix D.

Table 4.2 Summary of Annualized Costs and Benefits for each Sensitivity Analysis Scenario

Sensitivity Analysis	Total Annual Benefits*	Reduction in Annual Benefit	Total Annual Cost*	Benefit-Cost Ratio*
All Counties Combined				
Baseline Analysis	$68,890,967	N/A	$13,216,618	5.2 to 1

Sensitivity Analysis	Total Annual Benefits*	Reduction in Annual Benefit	Total Annual Cost*	Benefit-Cost Ratio*
Signalization Improvements	$68,727,604	0%	$13,216,618	5.2 to 1
Incident Management	$62,892,948	9%	$13,216,618	4.8 to 1
Travel Time System Breadth	$65,744,338	5%	$13,216,618	5 to 1
Travel Time System Effectiveness	$65,756,272	5%	$13,216,618	5 to 1
Value of Time	$63,895,898	7%	$13,216,618	4.8 to 1
Fuel Costs	$66,201,356	4%	$13,216,618	5 to 1
Orange County				
Baseline Analysis*	$33,041,085	N/A	$7,978,694	4.1 to 1
Signalization Improvements	$32,932,835	0%	$7,978,694	4.1 to 1
Incident Management	$30,653,702	7%	$7,978,694	3.8 to 1
Travel Time System Breadth	$31,611,874	4%	$7,978,694	4 to 1
Travel Time System Effectiveness	$31,611,874	4%	$7,978,694	4 to 1
Value of Time	$30,498,978	8%	$7,978,694	3.8 to 1
Fuel Costs	$31,261,890	5%	$7,978,694	3.9 to 1
Seminole County				
Baseline Analysis*	$26,251,913	N/A	$3,705,293	7.1 to 1
Signalization Improvements	$26,216,391	0%	$3,705,293	7.1 to 1
Incident Management	$23,959,577	9%	$3,705,293	6.5 to 1
Travel Time System Breadth	$24,602,993	6%	$3,705,293	6.6 to 1
Travel Time System Effectiveness	$24,614,165	6%	$3,705,293	6.6 to 1
Value of Time	$24,028,420	8%	$3,705,293	6.5 to 1
Fuel Costs	$25,603,825	2%	$3,705,293	6.9 to 1
Osceola County				
Baseline Analysis*	$9,597,969	N/A	$1,532,631	6.3 to 1
Signalization Improvements	$9,578,378	0%	$1,532,631	6.2 to 1
Incident Management	$8,279,670	14%	$1,532,631	5.4 to 1
Travel Time System Breadth	$9,529,471	1%	$1,532,631	6.2 to 1
Travel Time System Effectiveness	$9,530,233	1%	$1,532,631	6.2 to 1
Value of Time	$9,368,500	2%	$1,532,631	6.1 to 1
Fuel Costs	$9,335,642	3%	$1,532,631	6.1 to 1

*Excludes supplemental results associated with off-network extrapolated benefits and costs.

4.1 Interpretation of Results

With respect to the six sensitivity analyses performed and presented in this chapter, none of the scenarios resulted in a decrease in benefits of more than 10% on overall benefits for ITS strategies in the Orlando Urban Area, with most having an impact of 5% or less. Even in the Incident Management sensitivity analysis scenario, which had the largest impact on benefits overall, the net annual gain across all ITS strategies was

$49.7 million, yielding a benefit/cost ratio in excess of 4:1. This shows a resilience of the findings with respect to the benefits and value of ITS in the MetroPlan region, even when subjected to levels of uncertainty associated with the precise levels of benefit associated with any one given type of strategy.

Each scenario in this analysis is intended to be compared to the baseline results shown in the first row of Table 4.2. This is by design, as the primary objective of this sensitivity analysis was to provide insight into the extent to which the results of this benefit analysis depend on the specific input parameters that were selected. In all of the scenarios examined, a double-digit percent change in the input parameters resulted in only a single-digit percent change in the estimated level of overall benefit across the counties, showing that the results are relatively stable and not highly influenced by the parameter values that have been used.

Looking at the impacts between individual counties, Orange County exhibited a relatively high sensitivity to the adjustments of the Fuel Costs scenario compared to the other counties, while showing relatively low sensitivity to the adjustments of the Incident Management Scenario. This is as expected, given that fuel savings constitute a larger proportion of the overall benefits for Orange County than they do for either of the other two counties, while incident-related delay and crash savings constitute a relatively small portion compared to the other two counties (see Table D.3).

Similarly, Seminole County exhibited a relatively low sensitivity to the Fuel Costs scenario, which again reflects the fact that fuel costs comprise a relatively small proportion of the overall benefits to Seminole County, compared to Osceola and Orange Counties (see Table D.3). However, Seminole County also shows a relatively high sensitivity to the two travel time scenarios, which may be explained by the relatively high level of coverage for that strategy in Seminole County compared to the other two counties (see Table B.3).

Finally, Osceola County exhibits a relatively high sensitivity to the incident management scenario and a relatively low sensitivity to the travel time scenario. This high sensitivity to the incident management impact factors may be explained by the fact that Osceola County's crash-related benefit (which is the benefit category that is most directly connected to crash rate) constitutes 74% of its total benefits (see Table D.3), whereas this percentage is far lower for the other two counties (i.e., 42% and 45%). The low sensitivity to the travel time scenario in Osceola County may be explained by the low coverage rate of travel time information systems in Osceola County compared to the other two (see Table B.3), which corresponds to a relatively low contribution of that strategy type to the overall benefits in that county.

5.0 Conclusions and Next Steps

This business case analysis used a nationally recognized benefit/cost estimation tool from FHWA, informed by years of research projects and empirical data from leading studies across the country, and applied it to detailed ITS inventory/deployment data and traffic/roadway configuration data from the Orlando Urban Area to obtain reliable estimates of overall ITS-related benefits and costs throughout the region and by county. Impact parameters were tailored to each of the 326 analysis segments according to their specific characteristics, and benefits for each segment were estimated using high-fidelity hourly volume data to achieve the highest level of analysis precision possible.

Across all counties and all analysis scenarios, the ITS strategies deployed in the Orlando Urban Area consistently demonstrated a significant value across several categories, including fuel savings, time/delay savings, crash injury/damage cost savings, and improved transit performance/efficiency. The analysis revealed a regionwide annual benefit of $70.3 million against a cost of $13.8 million, for a benefit-cost ratio of 5.1 to 1.

The benefits were well distributed across the region, with all three counties shown to benefit substantially from their respective ITS investments across these categories. Specifically, Orange County benefits the most from ITS strategies in terms of absolute dollar amounts, with a countywide benefit of $34.3 million annually compared to $26.3 million for Seminole County and $9.8 million for Osceola County. Normalizing these benefits by mileage, Seminole County exhibits the highest dollar value of annual benefits per mile at $678k, compared to $337k per mile in Orange County and $349k per mile in Osceola County. From a cost perspective, Osceola was the most efficient with an estimated per-mile rate of $50k for all ITS strategies combined, compared to $71k per mile in Orange County and $93k per mile in Seminole County. Bringing together the benefit and cost results by county, the benefit-cost ratio is found to be highest for Seminole County at 7.3 to 1, compared to 7.0 to 1 for Osceola County and 4.8 to 1 for Orange County.

These findings were found to be resilient even when subjected to double-digit levels of uncertainty regarding the input parameters used to produce these results, as demonstrated by the outcomes of the sensitivity analysis scenarios. Across a set of six scenarios designed to examine the effects of reasonable ranges of uncertainty associated with several key analysis parameters, the net benefit was always at least $49 million per year, resulting in benefit-cost ratios well in excess of 4:1 in all cases.

5.1 Near-Term ITS Opportunities

Moving forward, there are a number of emerging ITS technology trends that MetroPlan can be expected to benefit from in the near term. These will impact TSMO functions and operations in a number of ways, and include:

- Performance-based planning and management
- Advanced traffic management
- Integrated corridor management
- Emerging vehicle technologies, including zero-emissions vehicles
- Changing roles of transportation data

- Changing roles of traveler information
- Finance and payment options
- Connected and automated vehicle opportunities

More information about each of these items is available in a separate technical memo, *Next Steps for the MetroPlan Orlando ITS Master Plan.*

Appendix A. Inventory Data and Other Analysis Inputs

This chapter contains the input data and reference information required to support the benefit and cost calculations of this analysis. These include:

- Roadway configuration data (i.e., number of lanes, free flow speed, analysis segment lengths)
- Traffic data (i.e., volume data)
- ITS equipment inventory data by corridor
- Emergency Vehicle fleet size estimates
- Transit network and fleet size data

A.1 Roadway Configuration Data

High-level roadway characteristics for the analysis segments are summarized in Table A.1. Detailed roadway characteristics and traffic characteristics by segment are provided in the next section.

Table A.1 Roadway Characteristics by Corridor and Jurisdiction

	Corridor							
Characteristic	A	B	C	D	E	F	G	H
All Counties								
Length (miles)	37.07	44.98	35.75	16.93	22.64	9.40	26.67	46.69
Analysis segment type (F = Freeway, A = Arterial)	A	A	F	A	A	A	A	F
Number of major junctions	9	6	4	7	6	3	6	14
Orange County								
Length (miles)	37.07	44.98	35.75	—	11.06	—	—	24.67
Analysis segment type (F = Freeway, A = Arterial)	A	A	F	—	A	—	—	F
Number of major junctions	9	6	4	—	3	—	—	7
Seminole County								
Length (miles)	—	—	—	16.93	11.59	9.40	—	14.14
Analysis segment type (F = Freeway, A = Arterial)	—	—	—	A	A	A	—	F
Number of major junctions	—	—	—	7	3	3	—	5
Osceola County								
Length (miles)	—	—	—	—	—	—	26.67	7.89
Analysis segment type (F = Freeway, A = Arterial)	—	—	—	—	—	—	A	F
Number of major junctions	—	—	—	—	—	—	6	2

A dash (—) indicates that a segment was not analyzed in that county due to various factors, including lack of available data.

A.2 Traffic Characteristics

Table A.2 through Table A.25 provide hourly estimates for traffic volumes at various mileposts along each of the eight analysis corridors, along with basic configuration data for each of the corresponding segments. The lane counts used for each analysis segment are based on the lane count measured at the segment midpoint, and are obtained from FDOT GIS files.[4] Free-flow speeds have been calculated analogously, using a different set of FDOT GIS files.[5]

Most data locations along the eight corridors had only daily volume estimates available. To separate these AADT data provided at most measurement locations into hourly counts, typical daily traffic distributions were estimated using hourly data from all available locations along each corridor that already had data disaggregated at this level. If no locations along a particular corridor had hourly data available, the nearest hourly data source on an adjacent parallel corridor was used instead (note that this is simply to establish the relative volume distribution throughout the day).

[4] FDOT Shapefile. *Number of Lanes.* October 15, 2016. ftp://ftp.dot.state.fl.us/fdot/co/planning/transtat/gis/TRANSTAT_metadata/number_of_lanes.shp.xml (accessed 10-18-16).

[5] FDOT Shapefile. *Maximum Roadway Speed.* October 15, 2016. ftp://ftp.dot.state.fl.us/fdot/co/planning/transtat/gis/TRANSTAT_metadata/maxspeed.shp.xml (accessed 10-18-16).

Table A.2 Roadway and Traffic Characteristics for Corridor A Northbound (Segments 1-16)

	Corridor A Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	0.57	2.15	4.05	5.51	6.68	8.76	10.98	12.05	12.89	13.72	14.34	14.70	15.02	15.74	17.69
End Milepost	0.57	2.15	4.05	5.51	6.68	8.76	10.98	12.05	12.89	13.72	14.34	14.70	15.02	15.74	17.69	19.75
Length (mi)	0.57	1.57	1.91	1.45	1.17	2.08	2.22	1.08	0.83	0.83	0.62	0.37	0.32	0.72	1.95	2.06
Number of Lanes	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2
Free Flow Speed (mph)	55	55	55	50	45	40	40	35	35	35	35	40	40	40	40	45
Hourly Volumes																
12-1 AM	360	456	624	552	720	654	642	273	299	362	266	282	280	286	269	196
1-2 AM	195	247	338	299	391	358	361	155	171	210	155	165	165	169	161	121
2-3 AM	123	156	214	189	247	230	240	105	117	145	109	117	117	120	116	91
3-4 AM	89	113	154	137	178	168	180	80	90	112	85	91	91	95	92	75
4-5 AM	115	146	199	176	230	215	227	100	112	139	104	112	112	116	112	89
5-6 AM	243	307	420	372	485	451	471	207	230	285	213	228	228	236	227	178
6-7 AM	496	628	859	760	992	923	965	424	472	584	437	469	469	485	467	368
7-8 AM	722	914	1251	1106	1443	1356	1452	645	722	901	679	731	732	759	737	594
8-9 AM	835	1058	1448	1281	1671	1566	1667	738	825	1028	773	832	832	862	836	670
9-10 AM	869	1101	1506	1332	1738	1616	1685	739	822	1018	761	816	816	843	812	637
10-11 AM	872	1105	1512	1338	1745	1623	1693	743	826	1023	765	820	820	847	816	641
11-Noon	866	1096	1500	1327	1731	1617	1708	753	841	1045	784	842	842	872	843	670
Noon-1 PM	855	1083	1481	1310	1709	1601	1704	754	843	1050	789	849	850	880	854	683
1-2 PM	849	1075	1472	1302	1698	1593	1700	754	844	1052	791	852	852	883	858	688
2-3 PM	863	1093	1495	1323	1725	1619	1731	768	860	1072	807	869	869	901	875	704
3-4 PM	898	1138	1557	1377	1796	1690	1816	808	905	1130	852	918	919	953	927	749
4-5 PM	934	1183	1619	1432	1868	1757	1888	840	941	1176	886	954	956	991	964	779
5-6 PM	956	1211	1658	1466	1913	1795	1916	850	951	1186	892	960	961	996	967	777
6-7 PM	845	1071	1466	1296	1691	1587	1697	753	843	1051	791	852	853	884	859	690
7-8 PM	726	920	1259	1114	1452	1358	1437	634	708	880	661	710	711	736	712	567
8-9 PM	632	800	1095	968	1263	1176	1233	542	604	748	560	601	601	621	599	473
9-10 PM	586	742	1015	898	1171	1087	1128	494	549	678	507	543	542	560	538	420
10-11 PM	556	704	963	852	1112	1022	1034	447	493	604	449	478	477	490	467	354
11-Midnight	515	653	893	790	1031	938	923	393	431	522	385	407	405	414	390	284

Table A.3 Roadway and Traffic Characteristics for Corridor A Northbound (Segments 17-29)

	Corridor A Analysis Segments															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Start Milepost	19.75	20.89	22.26	24.04	25.25	25.59	25.86	26.56	27.50	28.53	31.27	34.29	36.07	—	—	—
End Milepost	20.89	22.26	24.04	25.25	25.59	25.86	26.56	27.50	28.53	31.27	34.29	36.07	37.07	—	—	—
Length (mi)	1.14	1.37	1.78	1.22	0.33	0.27	0.70	0.94	1.03	2.74	3.01	1.79	0.99	—	—	—
Number of Lanes	2	2	2	2	2	2	2	2	2	2	2	2	2	—	—	—
Free Flow Speed (mph)	55	55	55	45	35	35	45	45	45	55	55	55	55	—	—	—
Hourly Volumes																
12-1 AM	213	229	216	306	264	229	236	229	194	160	208	208	201	—	—	—
1-2 AM	134	147	142	208	180	156	161	156	132	109	142	142	137	—	—	—
2-3 AM	103	114	114	172	149	129	133	129	109	90	117	117	113	—	—	—
3-4 AM	85	95	96	148	128	111	114	111	94	77	101	101	98	—	—	—
4-5 AM	101	113	113	171	148	129	132	129	109	90	117	117	113	—	—	—
5-6 AM	201	223	222	335	289	251	259	251	213	175	228	228	221	—	—	—
6-7 AM	415	461	459	693	599	520	536	520	441	362	473	473	457	—	—	—
7-8 AM	675	758	764	1171	1011	878	905	878	745	612	798	798	772	—	—	—
8-9 AM	760	851	856	1306	1128	980	1009	980	831	683	891	891	861	—	—	—
9-10 AM	718	797	793	1195	1032	896	923	896	760	625	815	815	787	—	—	—
10-11 AM	722	802	798	1202	1038	902	929	902	765	628	820	820	792	—	—	—
11-Noon	759	847	848	1289	1113	966	996	966	820	674	879	879	849	—	—	—
Noon-1 PM	775	868	872	1331	1150	998	1029	998	847	696	908	908	877	—	—	—
1-2 PM	782	876	882	1349	1165	1012	1043	1012	859	705	920	920	889	—	—	—
2-3 PM	800	896	903	1382	1194	1037	1068	1037	879	722	942	942	911	—	—	—
3-4 PM	853	958	967	1484	1282	1113	1147	1113	945	776	1012	1012	978	—	—	—
4-5 PM	887	996	1006	1543	1333	1158	1193	1158	982	807	1052	1052	1017	—	—	—
5-6 PM	883	989	996	1523	1315	1142	1177	1142	969	796	1039	1039	1004	—	—	—
6-7 PM	785	880	886	1357	1172	1017	1048	1017	863	709	925	925	894	—	—	—
7-8 PM	642	717	719	1094	944	820	845	820	696	572	746	746	721	—	—	—
8-9 PM	533	594	592	895	773	671	691	671	569	468	610	610	590	—	—	—
9-10 PM	472	524	519	780	674	585	603	585	496	408	532	532	514	—	—	—
10-11 PM	393	431	419	616	532	462	476	462	392	322	420	420	406	—	—	—
11-Midnight	310	334	317	450	388	337	348	337	286	235	307	307	296	—	—	—

Table A.4 Roadway and Traffic Characteristics for Corridor B Eastbound (Segments 1-16)

	Corridor B Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	1.54	3.31	4.94	6.68	7.44	8.19	9.09	10.19	11.45	13.72	15.69	15.99	16.30	16.95	17.59
End Milepost	1.54	3.31	4.94	6.68	7.44	8.19	9.09	10.19	11.45	13.72	15.69	15.99	16.30	16.95	17.59	18.32
Length (mi)	1.54	1.77	1.63	1.74	0.77	0.74	0.90	1.11	1.25	2.27	1.98	0.30	0.30	0.65	0.64	0.73
Number of Lanes	3	2	3	2	2	2	2	3	3	3	2	2	2	2	2	2
Free Flow Speed (mph)	50	50	50	45	45	45	45	45	45	45	40	30	40	40	40	40
Hourly Volumes																
12-1 AM	171	94	124	160	141	146	91	111	130	160	130	131	148	162	177	100
1-2 AM	116	64	83	107	94	97	61	74	86	106	86	86	97	106	116	65
2-3 AM	93	51	67	86	75	78	48	59	68	83	67	67	76	83	90	51
3-4 AM	109	60	78	98	85	87	54	65	74	90	70	70	80	86	93	52
4-5 AM	197	108	142	174	149	152	93	112	126	152	115	114	129	140	150	84
5-6 AM	511	281	368	450	385	393	240	288	324	389	292	291	328	354	379	212
6-7 AM	1155	636	833	1015	868	887	540	648	728	873	654	650	733	792	848	473
7-8 AM	1613	889	1163	1414	1208	1234	752	901	1010	1211	904	899	1013	1094	1170	653
8-9 AM	1631	899	1176	1430	1222	1248	760	911	1021	1223	913	908	1024	1105	1181	659
9-10 AM	1512	833	1090	1336	1145	1172	716	860	969	1166	881	878	990	1071	1149	642
10-11 AM	1467	808	1058	1305	1122	1149	704	848	959	1158	884	882	996	1079	1160	649
11-Noon	1544	851	1113	1376	1184	1214	744	897	1016	1228	941	940	1061	1150	1237	693
Noon-1 PM	1630	898	1175	1456	1254	1285	789	952	1079	1304	1002	1001	1130	1225	1319	739
1-2 PM	1601	882	1154	1434	1237	1269	780	941	1069	1295	1000	999	1128	1224	1319	740
2-3 PM	1584	873	1142	1426	1233	1266	780	943	1074	1303	1013	1013	1144	1243	1342	753
3-4 PM	1676	924	1209	1514	1310	1346	830	1005	1147	1394	1089	1090	1231	1338	1446	812
4-5 PM	1671	921	1204	1521	1322	1361	842	1022	1173	1430	1130	1133	1280	1394	1511	850
5-6 PM	1641	904	1183	1497	1302	1340	830	1008	1157	1412	1118	1121	1267	1379	1495	841
6-7 PM	1387	764	1000	1265	1100	1132	701	851	977	1193	944	947	1070	1165	1263	710
7-8 PM	1045	576	753	955	831	856	531	645	741	905	719	721	815	888	963	542
8-9 PM	796	439	574	731	638	658	409	497	574	702	561	563	637	694	755	425
9-10 PM	618	340	445	571	500	515	321	391	453	555	447	449	508	554	603	340
10-11 PM	451	249	325	419	367	378	236	288	334	410	331	333	376	411	448	252
11-Midnight	280	154	202	261	229	237	148	181	210	259	211	212	240	262	286	161

Table A.5 Roadway and Traffic Characteristics for Corridor B Eastbound (Segments 17-28)

	Corridor B Analysis Segments															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Start Milepost	18.32	19.83	21.09	21.49	22.60	24.38	25.35	26.46	27.78	29.59	33.22	36.01	—	—	—	—
End Milepost	19.83	21.09	21.49	22.60	24.38	25.35	26.46	27.78	29.59	33.22	36.01	44.98	—	—	—	—
Length (mi)	1.50	1.27	0.40	1.11	1.78	0.97	1.11	1.31	1.82	3.63	2.79	8.97	—	—	—	—
Number of Lanes	3	3	3	3	3	3	3	2	2	2	2	2	—	—	—	—
Free Flow Speed (mph)	40	50	50	50	50	50	45	45	45	55	55	60	—	—	—	—
Hourly Volumes																
12-1 AM	202	289	246	242	234	263	230	250	193	200	142	61	—	—	—	—
1-2 AM	133	189	160	158	152	171	149	162	125	129	91	39	—	—	—	—
2-3 AM	103	146	124	122	117	131	114	124	95	98	69	30	—	—	—	—
3-4 AM	105	147	124	122	115	127	111	118	91	91	62	27	—	—	—	—
4-5 AM	166	228	191	187	174	189	165	172	131	128	84	36	—	—	—	—
5-6 AM	420	573	481	471	436	471	410	427	324	314	203	88	—	—	—	—
6-7 AM	937	1276	1071	1048	968	1046	910	946	717	693	445	192	—	—	—	—
7-8 AM	1291	1755	1472	1440	1327	1431	1244	1291	978	941	601	259	—	—	—	—
8-9 AM	1303	1771	1485	1453	1339	1443	1255	1301	986	948	605	261	—	—	—	—
9-10 AM	1275	1747	1468	1438	1336	1451	1263	1322	1005	981	641	276	—	—	—	—
10-11 AM	1293	1784	1502	1472	1377	1504	1311	1381	1052	1039	690	298	—	—	—	—
11-Noon	1381	1909	1608	1577	1478	1617	1410	1489	1136	1125	751	324	—	—	—	—
Noon-1 PM	1475	2042	1720	1687	1584	1735	1513	1600	1221	1212	813	350	—	—	—	—
1-2 PM	1478	2051	1730	1697	1597	1754	1530	1622	1240	1235	833	359	—	—	—	—
2-3 PM	1508	2101	1774	1741	1645	1813	1582	1684	1289	1292	879	379	—	—	—	—
3-4 PM	1628	2275	1922	1887	1788	1974	1724	1839	1409	1417	970	418	—	—	—	—
4-5 PM	1708	2403	2033	1998	1905	2113	1847	1982	1522	1545	1070	461	—	—	—	—
5-6 PM	1693	2383	2017	1983	1892	2101	1837	1973	1515	1540	1069	461	—	—	—	—
6-7 PM	1429	2012	1703	1674	1597	1773	1550	1665	1278	1299	902	389	—	—	—	—
7-8 PM	1091	1538	1302	1281	1223	1360	1189	1279	983	1001	696	300	—	—	—	—
8-9 PM	857	1213	1028	1011	969	1080	945	1020	784	802	562	242	—	—	—	—
9-10 PM	687	976	828	815	784	876	767	830	639	656	463	200	—	—	—	—
10-11 PM	511	727	617	607	585	655	573	621	479	493	348	150	—	—	—	—
11-Midnight	327	466	396	390	377	423	370	402	310	321	228	98	—	—	—	—

Table A.6 Roadway and Traffic Characteristics for Corridor C Eastbound (Segments 1-13)

	Corridor C Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	0.92	1.88	3.12	4.18	6.44	8.44	9.22	10.47	12.52	15.04	23.17	31.37	—	—	—
End Milepost	0.92	1.88	3.12	4.18	6.44	8.44	9.22	10.47	12.52	15.04	23.17	31.37	35.75	—	—	—
Length (mi)	0.92	0.96	1.24	1.06	2.26	2.00	0.78	1.25	2.05	2.51	8.13	8.20	4.39	—	—	—
Number of Lanes	2	2	2	2	3	3	3	3	3	3	3	2	2	—	—	—
Free Flow Speed (mph)	55	55	55	55	55	55	55	55	55	70	70	70	70	—	—	—
Hourly Volumes																
12-1 AM	761	752	789	679	706	835	981	743	704	562	479	339	156	—	—	—
1-2 AM	444	439	460	396	412	487	573	434	411	330	282	205	94	—	—	—
2-3 AM	303	299	314	270	281	332	391	296	281	223	188	128	59	—	—	—
3-4 AM	250	247	259	223	232	274	322	244	231	183	155	104	48	—	—	—
4-5 AM	362	358	375	323	336	397	467	353	335	262	219	132	61	—	—	—
5-6 AM	627	620	650	559	582	688	809	612	581	470	405	311	143	—	—	—
6-7 AM	1132	1118	1173	1009	1050	1241	1459	1104	1047	868	764	666	307	—	—	—
7-8 AM	1528	1509	1583	1362	1417	1675	1970	1491	1414	1175	1037	917	423	—	—	—
8-9 AM	1661	1641	1721	1480	1541	1821	2141	1621	1537	1290	1150	1065	491	—	—	—
9-10 AM	1780	1758	1844	1587	1651	1951	2294	1737	1647	1410	1277	1281	591	—	—	—
10-11 AM	1936	1913	2006	1726	1796	2122	2496	1889	1791	1557	1426	1510	696	—	—	—
11-Noon	2044	2019	2118	1822	1896	2241	2635	1995	1892	1647	1512	1612	743	—	—	—
Noon-1 PM	2100	2075	2176	1872	1948	2302	2707	2049	1943	1658	1497	1482	683	—	—	—
1-2 PM	2212	2186	2292	1972	2052	2426	2852	2159	2047	1708	1513	1362	628	—	—	—
2-3 PM	2432	2403	2520	2168	2256	2666	3135	2373	2251	1849	1617	1352	623	—	—	—
3-4 PM	2960	2924	3067	2639	2746	3245	3816	2889	2739	2223	1923	1504	693	—	—	—
4-5 PM	3491	3448	3617	3112	3238	3827	4500	3406	3230	2610	2249	1716	791	—	—	—
5-6 PM	3964	3916	4107	3534	3677	4346	5110	3868	3668	2929	2496	1769	816	—	—	—
6-7 PM	3193	3154	3308	2847	2962	3501	4116	3116	2955	2374	2034	1499	691	—	—	—
7-8 PM	2258	2230	2339	2013	2094	2475	2910	2203	2089	1684	1447	1088	501	—	—	—
8-9 PM	1915	1892	1984	1707	1777	2100	2469	1869	1772	1418	1211	869	401	—	—	—
9-10 PM	1692	1672	1753	1509	1570	1855	2182	1652	1566	1253	1070	770	355	—	—	—
10-11 PM	1382	1366	1432	1233	1282	1516	1782	1349	1279	1024	874	627	289	—	—	—
11-Midnight	1074	1061	1112	957	996	1177	1384	1048	994	792	673	471	217	—	—	—

Table A.7 Roadway and Traffic Characteristics for Corridor D Northbound (Segments 1-16)

	Corridor D Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	0.62	1.64	2.54	3.37	4.43	5.70	7.75	9.57	10.34	10.91	11.26	11.69	12.56	13.34	13.81
End Milepost	0.62	1.64	2.54	3.37	4.43	5.70	7.75	9.57	10.34	10.91	11.26	11.69	12.56	13.34	13.81	16.93
Length (mi)	0.62	1.02	0.90	0.83	1.06	1.26	2.05	1.82	0.77	0.57	0.35	0.43	0.87	0.78	0.48	3.12
Number of Lanes	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2
Free Flow Speed (mph)	45	45	45	45	45	50	50	50	45	45	45	45	45	40	40	45
Hourly Volumes																
12-1 AM	164	179	213	222	217	174	145	174	183	126	130	90	140	130	56	72
1-2 AM	101	110	131	137	134	107	89	107	113	77	80	55	86	80	35	45
2-3 AM	75	82	97	102	99	80	66	80	84	57	60	41	64	60	26	33
3-4 AM	62	68	81	85	83	66	55	66	70	48	50	34	53	50	21	28
4-5 AM	62	68	81	84	83	66	55	66	70	48	50	34	53	50	21	28
5-6 AM	170	185	220	230	225	180	150	180	190	130	135	93	145	135	58	75
6-7 AM	394	429	510	533	521	417	348	417	440	301	313	216	336	313	134	174
7-8 AM	618	673	800	837	818	655	546	655	690	473	491	338	527	491	211	273
8-9 AM	744	810	963	1007	985	788	657	788	831	569	591	407	635	591	254	328
9-10 AM	837	911	1083	1132	1108	886	738	886	934	640	665	458	714	665	286	369
10-11 AM	952	1036	1232	1288	1260	1008	840	1008	1063	728	756	521	812	756	325	420
11-Noon	1079	1174	1397	1460	1428	1143	952	1143	1205	825	857	590	920	857	368	476
Noon-1 PM	1231	1340	1593	1666	1629	1304	1086	1304	1375	941	978	673	1050	978	420	543
1-2 PM	1233	1342	1596	1668	1632	1306	1088	1306	1377	943	979	675	1052	979	421	544
2-3 PM	1241	1351	1607	1680	1643	1314	1095	1314	1386	949	986	679	1059	986	424	548
3-4 PM	1284	1397	1661	1737	1699	1359	1133	1359	1433	982	1019	702	1095	1019	438	566
4-5 PM	1303	1417	1686	1762	1724	1379	1149	1379	1454	996	1034	713	1111	1034	444	575
5-6 PM	1383	1505	1790	1871	1830	1464	1220	1464	1544	1058	1098	757	1180	1098	472	610
6-7 PM	1175	1279	1521	1590	1555	1244	1037	1244	1312	899	933	643	1002	933	401	518
7-8 PM	912	993	1181	1234	1208	966	805	966	1019	698	725	499	778	725	311	403
8-9 PM	743	808	961	1005	983	786	655	786	829	568	590	406	633	590	253	328
9-10 PM	570	620	737	771	754	603	503	603	636	436	453	312	486	453	194	251
10-11 PM	404	440	523	546	535	428	356	428	451	309	321	221	344	321	138	178
11-Midnight	261	284	338	353	345	276	230	276	291	200	207	143	223	207	89	115

Table A.8 Roadway and Traffic Characteristics for Corridor E Northbound (Segments 1-17)

	Corridor E Analysis Segments																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Start Milepost	0.00	2.66	4.04	5.65	6.47	6.93	7.74	8.71	10.45	11.91	13.44	15.25	16.07	16.55	17.00	17.91	19.89
End Milepost	2.66	4.04	5.65	6.47	6.93	7.74	8.71	10.45	11.91	13.44	15.25	16.07	16.55	17.00	17.91	19.89	22.64
Length (mi)	2.66	1.38	1.61	0.82	0.46	0.81	0.98	1.74	1.46	1.52	1.81	0.82	0.48	0.45	0.91	1.98	2.75
Number of Lanes	3	4	4	3	3	3	3	4	3	3	3	3	3	3	3	3	3
Free Flow Speed (mph)	45	45	40	40	40	40	45	50	50	50	50	45	45	45	45	50	50
Hourly Volumes																	
12-1 AM	560	550	612	560	498	529	716	602	426	560	519	540	457	477	664	633	557
1-2 AM	332	326	363	332	296	314	425	357	252	332	308	320	271	283	394	376	331
2-3 AM	187	183	204	187	166	176	239	201	142	187	173	180	152	159	221	211	186
3-4 AM	171	168	187	171	152	162	219	184	130	171	158	165	139	146	203	193	170
4-5 AM	250	245	273	250	222	236	319	268	190	250	231	240	203	213	296	282	248
5-6 AM	447	438	488	447	397	422	571	480	339	447	414	430	364	380	529	505	444
6-7 AM	796	781	870	796	708	752	1017	855	605	796	737	767	649	678	944	899	792
7-8 AM	1165	1143	1273	1165	1035	1100	1488	1251	884	1165	1079	1122	949	992	1381	1316	1159
8-9 AM	1231	1208	1345	1231	1094	1162	1572	1322	934	1231	1139	1185	1003	1048	1458	1390	1224
9-10 AM	1166	1145	1274	1166	1037	1101	1490	1253	885	1166	1080	1123	950	993	1382	1317	1160
10-11 AM	1191	1169	1301	1191	1059	1125	1522	1279	904	1191	1103	1147	971	1015	1412	1345	1185
11-Noon	1345	1320	1470	1345	1196	1270	1719	1445	1021	1345	1246	1295	1096	1146	1594	1520	1338
Noon-1 PM	1587	1558	1734	1587	1411	1499	2028	1705	1205	1587	1470	1528	1293	1352	1881	1793	1579
1-2 PM	1646	1616	1799	1646	1463	1555	2104	1768	1250	1646	1524	1585	1341	1402	1951	1860	1637
2-3 PM	1664	1633	1818	1664	1479	1572	2126	1787	1264	1664	1541	1603	1356	1418	1972	1880	1655
3-4 PM	1742	1709	1903	1742	1548	1645	2225	1871	1322	1742	1613	1677	1419	1484	2064	1967	1732
4-5 PM	1852	1818	2023	1852	1646	1749	2366	1989	1406	1852	1715	1783	1509	1578	2195	2092	1842
5-6 PM	2018	1981	2205	2018	1794	1906	2579	2168	1532	2018	1869	1943	1644	1719	2392	2280	2007
6-7 PM	1768	1735	1932	1768	1572	1670	2259	1899	1342	1768	1637	1703	1441	1506	2096	1997	1759
7-8 PM	1452	1425	1586	1452	1290	1371	1855	1559	1102	1452	1344	1398	1183	1236	1720	1640	1444
8-9 PM	1332	1307	1456	1332	1184	1258	1702	1431	1011	1332	1233	1283	1085	1135	1579	1505	1325
9-10 PM	1215	1193	1328	1215	1080	1148	1553	1305	923	1215	1125	1170	990	1035	1440	1373	1209
10-11 PM	1056	1036	1153	1056	938	997	1349	1134	802	1056	978	1017	860	899	1251	1193	1050
11-Midnight	827	812	903	827	735	781	1057	888	628	827	766	796	674	704	980	934	822

Table A.9 Roadway and traffic characteristics for Corridor F Eastbound (Segments 1-8)

	Corridor F Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	1.57	3.84	5.28	6.20	6.98	7.57	8.47	—	—	—	—	—	—	—	—
End Milepost	1.57	3.84	5.28	6.20	6.98	7.57	8.47	9.40	—	—	—	—	—	—	—	—
Length (mi)	1.57	2.27	1.45	0.92	0.78	0.59	0.90	0.93	—	—	—	—	—	—	—	—
Number of Lanes	2	3	3	2	2	2	2	2	—	—	—	—	—	—	—	—
Free Flow Speed (mph)	45	45	45	45	45	45	45	45	—	—	—	—	—	—	—	—
Hourly Volumes																
12-1 AM	187	264	204	178	125	168	125	115	—	—	—	—	—	—	—	—
1-2 AM	118	166	128	112	79	106	79	73	—	—	—	—	—	—	—	—
2-3 AM	90	126	98	85	60	80	60	55	—	—	—	—	—	—	—	—
3-4 AM	73	104	80	70	49	66	49	45	—	—	—	—	—	—	—	—
4-5 AM	91	128	99	86	60	81	60	56	—	—	—	—	—	—	—	—
5-6 AM	220	310	239	209	147	197	147	135	—	—	—	—	—	—	—	—
6-7 AM	719	1013	783	682	479	645	479	442	—	—	—	—	—	—	—	—
7-8 AM	1033	1457	1125	980	689	927	689	636	—	—	—	—	—	—	—	—
8-9 AM	1177	1661	1283	1117	785	1057	785	725	—	—	—	—	—	—	—	—
9-10 AM	1121	1582	1222	1064	748	1006	748	690	—	—	—	—	—	—	—	—
10-11 AM	1130	1593	1231	1072	753	1014	753	695	—	—	—	—	—	—	—	—
11-Noon	1183	1668	1289	1122	789	1062	789	728	—	—	—	—	—	—	—	—
Noon-1 PM	1295	1826	1411	1229	863	1162	863	797	—	—	—	—	—	—	—	—
1-2 PM	1339	1889	1459	1271	893	1202	893	824	—	—	—	—	—	—	—	—
2-3 PM	1335	1883	1454	1266	890	1198	890	821	—	—	—	—	—	—	—	—
3-4 PM	1339	1888	1458	1270	892	1201	892	824	—	—	—	—	—	—	—	—
4-5 PM	1377	1942	1500	1307	918	1236	918	848	—	—	—	—	—	—	—	—
5-6 PM	1397	1970	1522	1325	931	1254	931	860	—	—	—	—	—	—	—	—
6-7 PM	1232	1737	1342	1169	821	1105	821	758	—	—	—	—	—	—	—	—
7-8 PM	959	1352	1044	909	639	860	639	590	—	—	—	—	—	—	—	—
8-9 PM	749	1056	816	710	499	672	499	461	—	—	—	—	—	—	—	—
9-10 PM	602	850	656	572	402	541	402	371	—	—	—	—	—	—	—	—
10-11 PM	440	621	480	418	294	395	294	271	—	—	—	—	—	—	—	—
11-Midnight	294	415	321	279	196	264	196	181	—	—	—	—	—	—	—	—

Table A.10 Roadway and Traffic Characteristics for Corridor G Eastbound (Segments 1-16)

	Corridor G Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	1.97	3.01	3.53	4.19	5.30	7.43	9.55	11.33	13.39	14.39	14.77	15.14	15.61	16.20	17.27
End Milepost	1.97	3.01	3.53	4.19	5.30	7.43	9.55	11.33	13.39	14.39	14.77	15.14	15.61	16.20	17.27	19.78
Length (mi)	1.97	1.05	0.52	0.66	1.11	2.13	2.12	1.78	2.06	1.00	0.38	0.37	0.47	0.59	1.06	2.51
Number of Lanes	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Free Flow Speed (mph)	50	45	50	50	50	50	45	45	45	40	40	40	40	45	50	50
Hourly Volumes																
12-1 AM	637	650	728	793	767	637	481	689	806	455	533	611	494	559	728	455
1-2 AM	352	359	402	438	424	352	266	381	445	251	294	338	273	309	402	251
2-3 AM	218	223	249	272	263	218	165	236	276	156	183	209	169	192	249	156
3-4 AM	139	141	158	172	167	139	105	150	175	99	116	133	107	122	158	99
4-5 AM	125	127	143	155	150	125	94	135	158	89	104	120	97	109	143	89
5-6 AM	242	247	277	301	292	242	183	262	307	173	203	232	188	213	277	173
6-7 AM	520	531	595	648	627	520	393	563	659	372	435	499	404	457	595	372
7-8 AM	960	979	1097	1195	1155	960	725	1038	1215	685	803	920	744	842	1097	685
8-9 AM	1043	1065	1193	1299	1256	1043	788	1129	1321	745	873	1001	809	916	1193	745
9-10 AM	1085	1107	1240	1350	1306	1085	819	1173	1373	775	908	1040	841	952	1240	775
10-11 AM	1242	1267	1419	1546	1495	1242	938	1343	1572	887	1039	1191	963	1090	1419	887
11-Noon	1389	1417	1587	1729	1672	1389	1049	1502	1758	992	1162	1332	1077	1219	1587	992
Noon-1 PM	1476	1506	1687	1838	1777	1476	1115	1597	1869	1054	1235	1416	1145	1295	1687	1054
1-2 PM	1577	1609	1803	1964	1899	1577	1191	1706	1997	1127	1320	1513	1223	1384	1803	1127
2-3 PM	1651	1685	1887	2056	1988	1651	1247	1786	2090	1179	1382	1584	1281	1449	1887	1179
3-4 PM	1754	1789	2004	2183	2111	1754	1324	1897	2220	1253	1467	1682	1360	1539	2004	1253
4-5 PM	1786	1822	2041	2223	2150	1786	1349	1932	2261	1276	1494	1713	1385	1567	2041	1276
5-6 PM	1791	1828	2047	2230	2157	1791	1352	1937	2267	1279	1499	1718	1389	1572	2047	1279
6-7 PM	1517	1548	1734	1889	1827	1517	1146	1641	1920	1084	1269	1455	1177	1331	1734	1084
7-8 PM	1219	1244	1393	1517	1467	1219	920	1318	1543	871	1020	1169	945	1070	1393	871
8-9 PM	1040	1062	1189	1295	1253	1040	786	1125	1317	743	870	998	807	913	1189	743
9-10 PM	942	961	1077	1173	1134	942	711	1019	1192	673	788	904	731	827	1077	673
10-11 PM	918	936	1049	1142	1105	918	693	993	1162	655	768	880	712	805	1049	655
11-Midnight	878	896	1003	1093	1057	878	663	949	1111	627	734	842	681	770	1003	627

Table A.11 Roadway and Traffic Characteristics for Corridor G Eastbound (Segments 17-23)

	Corridor G Analysis Segments															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Start Milepost	19.78	22.15	23.25	23.70	24.00	24.48	25.13	—	—	—	—	—	—	—	—	—
End Milepost	22.15	23.25	23.70	24.00	24.48	25.13	26.66	—	—	—	—	—	—	—	—	—
Length (mi)	2.38	1.10	0.44	0.31	0.48	0.64	1.53	—	—	—	—	—	—	—	—	—
Number of Lanes	2	2	3	3	3	3	2	—	—	—	—	—	—	—	—	—
Free Flow Speed (mph)	55	45	40	40	40	40	55	—	—	—	—	—	—	—	—	—
Hourly Volumes																
12-1 AM	468	585	546	533	481	429	364	—	—	—	—	—	—	—	—	—
1-2 AM	259	323	302	294	266	237	201	—	—	—	—	—	—	—	—	—
2-3 AM	160	200	187	183	165	147	125	—	—	—	—	—	—	—	—	—
3-4 AM	102	127	119	116	105	93	79	—	—	—	—	—	—	—	—	—
4-5 AM	92	115	107	104	94	84	71	—	—	—	—	—	—	—	—	—
5-6 AM	178	222	208	203	183	163	138	—	—	—	—	—	—	—	—	—
6-7 AM	382	478	446	435	393	350	297	—	—	—	—	—	—	—	—	—
7-8 AM	705	881	823	803	725	646	548	—	—	—	—	—	—	—	—	—
8-9 AM	767	958	894	873	788	703	596	—	—	—	—	—	—	—	—	—
9-10 AM	797	996	930	908	819	730	620	—	—	—	—	—	—	—	—	—
10-11 AM	912	1140	1064	1039	938	836	710	—	—	—	—	—	—	—	—	—
11-Noon	1020	1276	1190	1162	1049	935	794	—	—	—	—	—	—	—	—	—
Noon-1 PM	1085	1356	1265	1235	1115	994	844	—	—	—	—	—	—	—	—	—
1-2 PM	1159	1449	1352	1320	1191	1062	901	—	—	—	—	—	—	—	—	—
2-3 PM	1213	1516	1415	1382	1247	1112	944	—	—	—	—	—	—	—	—	—
3-4 PM	1288	1610	1503	1467	1324	1181	1002	—	—	—	—	—	—	—	—	—
4-5 PM	1312	1640	1531	1494	1349	1203	1020	—	—	—	—	—	—	—	—	—
5-6 PM	1316	1645	1535	1499	1352	1206	1023	—	—	—	—	—	—	—	—	—
6-7 PM	1115	1393	1300	1269	1146	1022	867	—	—	—	—	—	—	—	—	—
7-8 PM	895	1119	1045	1020	920	821	696	—	—	—	—	—	—	—	—	—
8-9 PM	764	955	892	870	786	701	594	—	—	—	—	—	—	—	—	—
9-10 PM	692	865	807	788	711	634	538	—	—	—	—	—	—	—	—	—
10-11 PM	674	843	787	768	693	618	524	—	—	—	—	—	—	—	—	—
11-Midnight	645	806	752	734	663	591	502	—	—	—	—	—	—	—	—	—

Table A.12 Roadway and Traffic Characteristics for Corridor H Eastbound (Segments 1-16)

	Corridor H Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	3.39	4.26	5.06	6.75	8.61	9.56	10.63	13.39	15.97	17.02	18.13	19.16	19.88	21.22	22.75
End Milepost	3.39	4.26	5.06	6.75	8.61	9.56	10.63	13.39	15.97	17.02	18.13	19.16	19.88	21.22	22.75	23.76
Length (mi)	3.39	0.87	0.80	1.69	1.86	0.95	1.07	2.76	2.58	1.05	1.12	1.03	0.72	1.34	1.54	1.01
Number of Lanes	3	3	3	3	3	3	4	4	4	4	3	4	4	4	3	4
Free Flow Speed (mph)	65	65	65	65	65	65	65	60	60	55	55	55	55	55	55	50
Hourly Volumes																
12-1 AM	1379	1056	1559	1116	1331	1559	1559	2471	2097	1701	1371	1841	1736	1755	1776	939
1-2 AM	749	573	846	605	723	846	846	1341	1138	930	755	1023	970	986	1014	541
2-3 AM	473	362	535	383	457	535	535	848	720	595	487	670	640	655	689	372
3-4 AM	341	261	386	276	330	386	386	612	519	434	358	497	478	492	525	286
4-5 AM	441	337	498	356	425	498	498	790	670	556	457	630	604	619	655	355
5-6 AM	930	711	1051	752	897	1051	1051	1665	1413	1169	957	1314	1256	1285	1350	728
6-7 AM	1901	1454	2148	1537	1834	2148	2148	3404	2889	2390	1958	2691	2572	2634	2770	1495
7-8 AM	2766	2117	3127	2237	2670	3127	3127	4955	4205	3507	2891	4009	3851	3962	4222	2296
8-9 AM	3203	2451	3620	2590	3091	3620	3620	5737	4869	4052	3335	4613	4426	4548	4830	2622
9-10 AM	3331	2549	3766	2694	3215	3766	3766	5967	5064	4186	3427	4705	4495	4600	4830	2606
10-11 AM	3344	2559	3781	2705	3228	3781	3781	5991	5084	4204	3441	4726	4515	4621	4853	2618
11-Noon	3318	2539	3751	2683	3203	3751	3751	5943	5044	4187	3438	4742	4542	4660	4927	2668
Noon-1 PM	3276	2507	3704	2649	3162	3704	3704	5869	4981	4144	3410	4716	4524	4648	4935	2679
1-2 PM	3255	2490	3679	2632	3141	3679	3679	5830	4948	4121	3394	4700	4512	4639	4934	2681
2-3 PM	3307	2530	3738	2674	3192	3738	3738	5923	5027	4189	3451	4782	4592	4722	5026	2732
3-4 PM	3443	2634	3892	2784	3323	3892	3892	6167	5234	4370	3605	5004	4811	4952	5287	2878
4-5 PM	3581	2740	4048	2896	3456	4048	4048	6414	5444	4545	3750	5205	5004	5151	5498	2993
5-6 PM	3666	2805	4144	2965	3539	4144	4144	6567	5573	4643	3824	5297	5085	5228	5562	3022
6-7 PM	3241	2480	3664	2621	3128	3664	3664	5806	4927	4107	3383	4688	4502	4630	4929	2679
7-8 PM	2784	2130	3147	2251	2687	3147	3147	4987	4232	3515	2888	3986	3819	3920	4149	2248
8-9 PM	2421	1852	2737	1958	2337	2737	2737	4336	3680	3047	2497	3434	3284	3364	3541	1913
9-10 PM	2245	1718	2538	1815	2167	2538	2538	4021	3413	2817	2303	3157	3012	3080	3225	1737
10-11 PM	2130	1630	2408	1723	2056	2408	2408	3816	3239	2652	2154	2925	2776	2825	2914	1557
11-Midnight	1976	1512	2233	1598	1907	2233	2233	3539	3003	2438	1966	2644	2494	2523	2559	1353

Table A.13 Roadway and Traffic Characteristics for Corridor H Eastbound (Segments 17-29)

	Corridor H Analysis Segments															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Start Milepost	23.76	24.74	25.50	26.07	27.16	28.23	29.06	30.09	31.55	35.12	40.31	43.64	44.92	—	—	—
End Milepost	24.74	25.50	26.07	27.16	28.23	29.06	30.09	31.55	35.12	40.31	43.64	44.92	46.69	—	—	—
Length (mi)	0.98	0.76	0.57	1.10	1.06	0.84	1.03	1.46	3.56	5.19	3.33	1.28	1.78	—	—	—
Number of Lanes	4	4	4	4	4	4	4	4	3	3	3	3	3	—	—	—
Free Flow Speed (mph)	50	50	50	50	50	50	50	55	55	65	65	65	65	—	—	—
Hourly Volumes																
12-1 AM	1349	1230	1553	1578	1601	1372	1482	1249	1306	990	986	625	861	—	—	—
1-2 AM	783	721	914	934	963	830	908	773	827	673	671	425	586	—	—	—
2-3 AM	545	507	647	666	700	607	673	580	637	557	555	352	485	—	—	—
3-4 AM	422	396	508	525	559	487	545	473	527	480	478	303	417	—	—	—
4-5 AM	521	486	622	641	677	588	654	566	625	555	553	350	483	—	—	—
5-6 AM	1066	992	1266	1304	1368	1187	1316	1134	1243	1085	1081	685	944	—	—	—
6-7 AM	2190	2040	2603	2681	2817	2443	2710	2337	2566	2247	2238	1418	1954	—	—	—
7-8 AM	3384	3173	4063	4202	4461	3884	4340	3765	4188	3792	3778	2394	3299	—	—	—
8-9 AM	3858	3612	4621	4774	5055	4398	4905	4249	4712	4232	4216	2672	3682	—	—	—
9-10 AM	3814	3549	4528	4660	4891	4241	4700	4049	4439	3871	3856	2444	3367	—	—	—
10-11 AM	3832	3567	4551	4684	4916	4263	4726	4071	4465	3895	3880	2459	3388	—	—	—
11-Noon	3918	3659	4678	4825	5092	4424	4923	4255	4699	4175	4158	2636	3631	—	—	—
Noon-1 PM	3940	3688	4719	4873	5159	4488	5005	4335	4805	4312	4296	2723	3751	—	—	—
1-2 PM	3947	3698	4733	4891	5185	4513	5038	4367	4849	4371	4354	2760	3802	—	—	—
2-3 PM	4024	3771	4828	4990	5294	4608	5146	4462	4958	4477	4460	2827	3895	—	—	—
3-4 PM	4245	3984	5104	5280	5613	4890	5469	4748	5290	4809	4791	3036	4183	—	—	—
4-5 PM	4414	4143	5308	5491	5837	5085	5687	4937	5501	5000	4981	3157	4349	—	—	—
5-6 PM	4450	4169	5337	5516	5849	5090	5683	4926	5472	4935	4916	3116	4293	—	—	—
6-7 PM	3946	3699	4736	4895	5193	4521	5048	4378	4865	4395	4378	2775	3823	—	—	—
7-8 PM	3303	3086	3946	4071	4300	3737	4161	3599	3978	3543	3529	2237	3082	—	—	—
8-9 PM	2804	2613	3336	3436	3613	3136	3480	3002	3301	2899	2888	1830	2522	—	—	—
9-10 PM	2539	2360	3009	3094	3240	2807	3106	2672	2921	2527	2517	1596	2198	—	—	—
10-11 PM	2259	2082	2644	2705	2796	2412	2643	2255	2423	1996	1988	1260	1736	—	—	—
11-Midnight	1947	1777	2245	2282	2321	1989	2153	1817	1904	1457	1451	920	1267	—	—	—

Table A.14 Roadway and Traffic Characteristics for Corridor A Southbound (Segments 1-16)

	Corridor A Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	0.57	2.15	4.05	5.51	6.68	8.76	10.98	12.05	12.89	13.72	14.34	14.70	15.02	15.74	17.69
End Milepost	0.57	2.15	4.05	5.51	6.68	8.76	10.98	12.05	12.89	13.72	14.34	14.70	15.02	15.74	17.69	19.75
Length (mi)	0.57	1.57	1.91	1.45	1.17	2.08	2.22	1.08	0.83	0.83	0.62	0.37	0.32	0.72	1.95	2.06
Number of Lanes	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2
Free Flow Speed (mph)	55	55	55	50	45	40	40	35	35	35	35	40	40	40	40	45
Hourly Volumes																
12-1 AM	286	345	420	378	571	461	474	204	216	248	194	206	213	211	199	180
1-2 AM	197	238	290	261	395	317	324	139	147	168	131	139	143	142	133	119
2-3 AM	181	218	266	239	361	289	291	124	130	148	115	122	125	123	115	101
3-4 AM	148	178	217	195	295	239	250	108	115	133	104	111	115	114	108	100
4-5 AM	204	246	301	271	409	334	355	156	166	193	153	163	169	168	161	152
5-6 AM	374	451	550	495	749	622	693	310	335	396	316	341	353	354	345	340
6-7 AM	684	825	1006	906	1369	1151	1322	600	652	776	623	675	701	706	693	699
7-8 AM	898	1083	1321	1189	1796	1484	1630	724	779	916	729	784	812	813	788	766
8-9 AM	915	1103	1346	1211	1830	1511	1656	735	791	929	739	795	823	823	798	775
9-10 AM	907	1093	1333	1200	1813	1500	1653	736	792	932	742	799	827	828	804	784
10-11 AM	898	1083	1320	1188	1796	1488	1647	735	792	933	744	801	830	831	808	792
11-Noon	888	1071	1306	1175	1776	1475	1641	734	792	934	746	804	832	835	813	800
Noon-1 PM	875	1055	1287	1158	1750	1455	1623	727	785	927	740	798	827	830	809	798
1-2 PM	916	1105	1348	1213	1833	1520	1686	753	812	957	763	823	852	854	830	815
2-3 PM	999	1205	1470	1323	1999	1651	1811	805	866	1017	809	870	901	902	874	849
3-4 PM	1039	1253	1528	1375	2078	1715	1878	833	896	1052	837	900	931	932	902	876
4-5 PM	1021	1231	1501	1351	2042	1693	1877	838	903	1065	849	915	947	950	923	906
5-6 PM	976	1177	1435	1292	1952	1630	1837	827	895	1060	849	917	950	955	933	929
6-7 PM	920	1109	1353	1218	1840	1528	1698	759	819	967	771	831	861	863	840	826
7-8 PM	859	1036	1263	1137	1718	1405	1503	659	705	822	650	696	719	717	689	653
8-9 PM	815	982	1198	1078	1629	1321	1381	599	636	736	578	616	635	631	601	554
9-10 PM	809	975	1189	1070	1618	1302	1336	574	607	697	545	578	595	589	557	501
10-11 PM	702	847	1033	930	1405	1125	1138	485	511	583	454	480	494	488	457	403
11-Midnight	489	590	719	647	978	784	795	339	358	409	319	337	347	342	322	284

Table A.15 Roadway and Traffic Characteristics for Corridor A Southbound (Segments 17-29)

	Corridor A Analysis Segments															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Start Milepost	19.75	20.89	22.26	24.04	25.25	25.59	25.86	26.56	27.50	28.53	31.27	34.29	36.07	—	—	—
End Milepost	20.89	22.26	24.04	25.25	25.59	25.86	26.56	27.50	28.53	31.27	34.29	36.07	37.07	—	—	—
Length (mi)	1.14	1.37	1.78	1.22	0.33	0.27	0.70	0.94	1.03	2.74	3.01	1.79	0.99	—	—	—
Number of Lanes	2	2	2	2	2	2	2	2	2	2	2	2	2	—	—	—
Free Flow Speed (mph)	55	55	55	45	35	35	45	45	45	55	55	55	55	—	—	—
Hourly Volumes																
12-1 AM	187	170	157	244	222	188	177	166	150	133	166	172	166	—	—	—
1-2 AM	123	112	102	157	143	121	114	107	96	86	107	111	107	—	—	—
2-3 AM	103	92	83	124	113	96	90	85	76	68	85	88	85	—	—	—
3-4 AM	105	96	90	141	128	109	103	96	87	77	96	99	96	—	—	—
4-5 AM	161	149	142	227	207	176	165	155	139	124	155	160	155	—	—	—
5-6 AM	367	345	337	556	506	430	405	379	341	303	379	392	379	—	—	—
6-7 AM	762	723	714	1194	1085	922	868	814	732	651	814	841	814	—	—	—
7-8 AM	824	771	747	1223	1112	945	890	834	751	667	834	862	834	—	—	—
8-9 AM	832	779	753	1233	1120	952	896	840	756	672	840	868	840	—	—	—
9-10 AM	844	791	767	1259	1145	973	916	859	773	687	859	887	859	—	—	—
10-11 AM	853	801	779	1281	1164	990	931	873	786	699	873	902	873	—	—	—
11-Noon	864	812	791	1305	1187	1009	949	890	801	712	890	920	890	—	—	—
Noon-1 PM	863	811	792	1308	1189	1011	951	892	803	714	892	922	892	—	—	—
1-2 PM	879	826	804	1324	1203	1023	963	902	812	722	902	933	902	—	—	—
2-3 PM	913	854	827	1353	1230	1046	984	923	830	738	923	953	923	—	—	—
3-4 PM	940	879	850	1390	1263	1074	1011	948	853	758	948	979	948	—	—	—
4-5 PM	977	917	892	1469	1335	1135	1068	1002	901	801	1002	1035	1002	—	—	—
5-6 PM	1007	950	932	1547	1406	1195	1125	1055	949	844	1055	1090	1055	—	—	—
6-7 PM	892	838	817	1347	1224	1041	979	918	826	735	918	949	918	—	—	—
7-8 PM	694	643	613	987	897	763	718	673	606	538	673	696	673	—	—	—
8-9 PM	582	534	500	788	717	609	573	538	484	430	538	555	538	—	—	—
9-10 PM	520	472	434	670	609	518	488	457	411	366	457	472	457	—	—	—
10-11 PM	414	372	337	509	463	393	370	347	312	278	347	359	347	—	—	—
11-Midnight	293	263	239	363	330	281	264	248	223	198	248	256	248	—	—	—

Table A.16 Roadway and Traffic Characteristics for Corridor B Westbound (Segments 1-16)

	Corridor B Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	1.54	3.31	4.94	6.68	7.44	8.19	9.09	10.19	11.45	13.72	15.69	15.99	16.30	16.95	17.59
End Milepost	1.54	3.31	4.94	6.68	7.44	8.19	9.09	10.19	11.45	13.72	15.69	15.99	16.30	16.95	17.59	18.32
Length (mi)	1.54	1.77	1.63	1.74	0.77	0.74	0.90	1.11	1.25	2.27	1.98	0.30	0.30	0.65	0.64	0.73
Number of Lanes	3	2	3	2	2	2	2	3	3	3	2	2	2	2	2	2
Free Flow Speed (mph)	50	50	50	45	45	45	45	45	45	45	40	30	40	40	40	40
Hourly Volumes																
12-1 AM	280	163	209	268	192	202	117	155	223	232	166	155	176	165	194	198
1-2 AM	170	99	127	165	119	126	73	97	141	148	108	102	115	108	128	131
2-3 AM	118	69	88	114	82	87	51	67	98	103	76	71	80	75	89	92
3-4 AM	98	57	73	96	69	74	43	57	84	88	66	62	70	66	78	80
4-5 AM	110	64	82	112	83	89	53	71	107	114	90	85	96	91	109	113
5-6 AM	209	122	156	230	175	189	115	158	245	267	224	213	242	232	282	294
6-7 AM	533	311	397	574	432	465	282	386	592	643	530	504	573	546	663	689
7-8 AM	903	527	673	915	672	716	424	571	852	907	705	665	755	715	858	885
8-9 AM	1071	624	798	1071	783	832	490	658	976	1033	792	745	845	799	955	984
9-10 AM	1051	613	784	1049	765	813	478	641	950	1004	767	721	818	773	923	950
10-11 AM	1135	662	846	1124	818	868	509	681	1004	1059	801	753	853	805	960	987
11-Noon	1324	772	986	1301	943	999	584	779	1144	1202	899	844	957	901	1071	1100
Noon-1 PM	1515	884	1129	1478	1067	1129	658	876	1279	1340	991	929	1052	990	1174	1204
1-2 PM	1605	936	1196	1558	1123	1187	690	918	1337	1397	1027	961	1089	1023	1211	1241
2-3 PM	1759	1026	1311	1700	1223	1291	749	994	1445	1506	1099	1027	1163	1092	1291	1321
3-4 PM	1843	1075	1374	1786	1286	1359	789	1048	1525	1592	1166	1091	1235	1160	1372	1405
4-5 PM	1933	1127	1440	1883	1359	1438	837	1114	1627	1702	1258	1178	1335	1255	1488	1525
5-6 PM	2064	1204	1538	2015	1456	1541	898	1196	1749	1832	1358	1272	1442	1356	1609	1650
6-7 PM	1772	1034	1321	1726	1246	1318	767	1021	1490	1559	1151	1078	1221	1148	1361	1395
7-8 PM	1363	795	1016	1316	946	1000	580	769	1117	1164	849	793	898	843	996	1019
8-9 PM	1146	669	854	1099	787	830	480	635	917	952	685	639	724	678	799	816
9-10 PM	904	527	673	865	619	653	377	499	720	747	536	500	566	530	624	637
10-11 PM	649	378	483	623	446	471	272	360	521	541	390	364	413	387	456	465
11-Midnight	448	261	334	429	307	324	187	247	357	371	266	248	281	263	310	316

Table A.17 Roadway and Traffic Characteristics for Corridor B Westbound (Segments 17-28)

	Corridor B Analysis Segments															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Start Milepost	18.32	19.83	21.09	21.49	22.60	24.38	25.35	26.46	27.78	29.59	33.22	36.01	—	—	—	—
End Milepost	19.83	21.09	21.49	22.60	24.38	25.35	26.46	27.78	29.59	33.22	36.01	44.98	—	—	—	—
Length (mi)	1.50	1.27	0.40	1.11	1.78	0.97	1.11	1.31	1.82	3.63	2.79	8.97	—	—	—	—
Number of Lanes	3	3	3	3	3	3	3	2	2	2	2	2	—	—	—	—
Free Flow Speed (mph)	40	50	50	50	50	50	45	45	45	55	55	60	—	—	—	—
Hourly Volumes																
12-1 AM	176	319	264	287	257	257	233	228	190	157	103	45	—	—	—	—
1-2 AM	117	216	179	195	177	179	163	162	135	115	78	34	—	—	—	—
2-3 AM	82	151	125	137	125	126	115	114	95	81	55	24	—	—	—	—
3-4 AM	72	134	111	122	111	114	103	103	87	75	52	22	—	—	—	—
4-5 AM	103	197	165	181	170	177	162	166	141	125	91	40	—	—	—	—
5-6 AM	271	534	450	495	477	506	463	485	414	379	286	124	—	—	—	—
6-7 AM	635	1240	1044	1148	1100	1162	1064	1108	945	859	644	280	—	—	—	—
7-8 AM	804	1530	1279	1401	1312	1361	1241	1268	1073	949	685	298	—	—	—	—
8-9 AM	890	1680	1402	1535	1427	1472	1341	1361	1150	1007	718	312	—	—	—	—
9-10 AM	859	1618	1349	1477	1370	1411	1286	1303	1100	961	683	296	—	—	—	—
10-11 AM	890	1668	1389	1520	1404	1440	1311	1322	1114	968	681	296	—	—	—	—
11-Noon	989	1843	1532	1675	1538	1570	1428	1433	1205	1037	721	313	—	—	—	—
Noon-1 PM	1079	1997	1657	1810	1652	1678	1525	1520	1275	1088	746	324	—	—	—	—
1-2 PM	1110	2046	1696	1852	1683	1704	1547	1536	1287	1091	741	322	—	—	—	—
2-3 PM	1179	2163	1792	1954	1768	1783	1618	1599	1337	1126	756	328	—	—	—	—
3-4 PM	1255	2309	1914	2088	1894	1914	1737	1721	1440	1217	822	357	—	—	—	—
4-5 PM	1366	2526	2096	2289	2086	2118	1924	1916	1607	1369	936	407	—	—	—	—
5-6 PM	1479	2741	2276	2486	2270	2308	2097	2093	1757	1501	1031	448	—	—	—	—
6-7 PM	1249	2309	1916	2092	1906	1934	1757	1749	1467	1249	854	371	—	—	—	—
7-8 PM	909	1668	1381	1506	1362	1373	1245	1230	1028	865	580	252	—	—	—	—
8-9 PM	725	1318	1089	1187	1064	1065	965	945	787	653	428	186	—	—	—	—
9-10 PM	566	1028	849	925	828	828	749	733	610	504	329	143	—	—	—	—
10-11 PM	414	754	623	679	610	611	554	543	453	376	248	108	—	—	—	—
11-Midnight	281	510	421	459	411	411	372	364	303	250	163	71	—	—	—	—

Table A.18 Roadway and Traffic Characteristics for Corridor C Westbound (Segments 1-13)

	Corridor C Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	0.92	1.88	3.12	4.18	6.44	8.44	9.22	10.47	12.52	15.04	23.17	31.37	—	—	—
End Milepost	0.92	1.88	3.12	4.18	6.44	8.44	9.22	10.47	12.52	15.04	23.17	31.37	35.75	—	—	—
Length (mi)	0.92	0.96	1.24	1.06	2.26	2.00	0.78	1.25	2.05	2.51	8.13	8.20	4.39	—	—	—
Number of Lanes	2	2	2	2	3	3	3	3	3	3	3	2	2	—	—	—
Free Flow Speed (mph)	55	55	55	55	55	55	55	55	55	70	70	70	70	—	—	—
Hourly Volumes																
12-1 AM	319	315	330	284	296	349	384	322	298	239	211	144	65	—	—	—
1-2 AM	209	206	216	186	194	229	251	211	195	162	147	120	54	—	—	—
2-3 AM	173	171	179	154	161	190	209	175	162	134	121	98	44	—	—	—
3-4 AM	279	276	289	249	259	306	336	283	261	211	188	135	61	—	—	—
4-5 AM	600	593	622	535	557	658	723	607	561	456	408	300	136	—	—	—
5-6 AM	1246	1231	1291	1110	1155	1366	1501	1261	1164	954	859	659	299	—	—	—
6-7 AM	2332	2304	2417	2079	2164	2557	2810	2360	2179	1771	1584	1163	528	—	—	—
7-8 AM	3489	3447	3615	3110	3236	3825	4203	3531	3259	2589	2266	1429	648	—	—	—
8-9 AM	3498	3456	3625	3119	3245	3835	4215	3540	3268	2617	2308	1540	699	—	—	—
9-10 AM	2815	2781	2917	2510	2612	3087	3392	2849	2630	2164	1955	1532	695	—	—	—
10-11 AM	2540	2510	2632	2265	2357	2785	3061	2571	2373	1966	1788	1455	660	—	—	—
11-Noon	2423	2394	2511	2160	2248	2657	2919	2452	2264	1873	1701	1376	624	—	—	—
Noon-1 PM	2332	2304	2417	2079	2164	2557	2810	2360	2179	1806	1643	1339	608	—	—	—
1-2 PM	2329	2301	2413	2076	2160	2553	2806	2357	2176	1807	1647	1357	616	—	—	—
2-3 PM	2360	2331	2445	2104	2189	2587	2843	2388	2205	1838	1680	1408	639	—	—	—
3-4 PM	2447	2417	2535	2181	2270	2682	2948	2476	2286	1921	1768	1539	698	—	—	—
4-5 PM	2568	2537	2660	2289	2382	2815	3094	2599	2399	2029	1878	1683	764	—	—	—
5-6 PM	2568	2537	2661	2290	2382	2816	3094	2599	2399	2032	1882	1696	769	—	—	—
6-7 PM	2132	2106	2209	1901	1978	2337	2568	2157	1992	1685	1560	1401	636	—	—	—
7-8 PM	1558	1539	1614	1389	1445	1708	1877	1577	1456	1218	1117	955	433	—	—	—
8-9 PM	1150	1136	1191	1025	1067	1261	1385	1164	1074	899	824	703	319	—	—	—
9-10 PM	920	909	953	820	854	1009	1109	931	860	709	642	511	232	—	—	—
10-11 PM	707	698	733	630	656	775	852	716	661	538	483	360	163	—	—	—
11-Midnight	507	501	525	452	470	556	611	513	474	382	339	237	108	—	—	—

Table A.19 Roadway and Traffic Characteristics for Corridor D Southbound (Segments 1-16)

	Corridor D Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	0.62	1.64	2.54	3.37	4.43	5.70	7.75	9.57	10.34	10.91	11.26	11.69	12.56	13.34	13.81
End Milepost	0.62	1.64	2.54	3.37	4.43	5.70	7.75	9.57	10.34	10.91	11.26	11.69	12.56	13.34	13.81	16.93
Length (mi)	0.62	1.02	0.90	0.83	1.06	1.26	2.05	1.82	0.77	0.57	0.35	0.43	0.87	0.78	0.48	3.12
Number of Lanes	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2
Free Flow Speed (mph)	45	45	45	45	45	50	50	50	45	45	45	45	45	40	40	45
Hourly Volumes																
12-1 AM	102	213	213	199	208	173	137	168	168	133	128	102	128	111	55	65
1-2 AM	67	140	140	131	137	114	90	111	111	87	85	67	85	73	36	43
2-3 AM	55	115	115	108	113	93	74	91	91	72	70	55	70	60	30	35
3-4 AM	41	86	86	81	84	70	56	68	68	54	52	41	52	45	22	26
4-5 AM	67	140	140	131	137	114	90	111	111	87	84	67	84	73	36	43
5-6 AM	177	368	368	345	361	299	238	292	291	230	223	177	223	192	95	112
6-7 AM	410	855	855	801	837	694	552	677	676	534	516	410	516	445	221	260
7-8 AM	662	1381	1381	1295	1352	1122	892	1093	1092	863	834	662	834	719	357	420
8-9 AM	683	1425	1425	1336	1396	1158	921	1128	1127	891	861	683	861	742	368	434
9-10 AM	674	1406	1406	1318	1376	1142	908	1113	1112	879	849	674	849	732	363	428
10-11 AM	694	1448	1448	1358	1418	1177	935	1146	1145	905	875	694	875	754	374	440
11-Noon	757	1580	1580	1481	1547	1284	1020	1251	1249	987	954	757	954	823	408	481
Noon-1 PM	832	1737	1737	1629	1701	1412	1122	1375	1374	1086	1050	832	1050	905	449	528
1-2 PM	809	1689	1689	1584	1654	1372	1091	1337	1336	1056	1020	809	1020	880	436	514
2-3 PM	787	1642	1642	1539	1608	1334	1060	1300	1299	1026	992	787	992	855	424	499
3-4 PM	775	1618	1618	1517	1584	1315	1045	1281	1280	1011	978	775	978	843	418	492
4-5 PM	785	1638	1638	1535	1604	1331	1058	1297	1295	1024	989	785	989	853	423	498
5-6 PM	796	1662	1662	1558	1628	1351	1074	1316	1314	1039	1004	796	1004	866	429	506
6-7 PM	657	1371	1371	1286	1343	1114	886	1086	1084	857	828	657	828	714	354	417
7-8 PM	525	1096	1096	1027	1073	890	708	867	866	685	662	525	662	571	283	333
8-9 PM	428	894	894	838	875	726	577	708	707	559	540	428	540	466	231	272
9-10 PM	333	694	694	651	680	564	448	550	549	434	419	333	419	362	179	211
10-11 PM	234	488	488	458	478	397	315	387	386	305	295	234	295	254	126	149
11-Midnight	150	314	314	294	307	255	203	248	248	196	190	150	190	163	81	95

Table A.20 Roadway and Traffic Characteristics for Corridor E Southbound (Segments 1-17)

	Corridor E Analysis Segments																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Start Milepost	0.00	2.66	4.04	5.65	6.47	6.93	7.74	8.71	10.45	11.91	13.44	15.25	16.07	16.55	17.00	17.91	19.89
End Milepost	2.66	4.04	5.65	6.47	6.93	7.74	8.71	10.45	11.91	13.44	15.25	16.07	16.55	17.00	17.91	19.89	22.64
Length (mi)	2.66	1.38	1.61	0.82	0.46	0.81	0.98	1.74	1.46	1.52	1.81	0.82	0.48	0.45	0.91	1.98	2.75
Number of Lanes	3	4	4	3	3	3	3	4	3	3	3	3	3	3	3	3	3
Free Flow Speed (mph)	45	45	40	40	40	40	45	50	50	50	50	45	45	45	45	50	50
Hourly Volumes																	
12-1 AM	320	280	348	303	258	269	387	314	269	325	280	359	241	320	359	275	309
1-2 AM	200	175	217	189	161	168	242	196	168	203	175	224	151	200	224	172	193
2-3 AM	204	179	221	193	164	171	246	200	171	207	179	228	154	204	228	175	197
3-4 AM	352	309	383	333	284	296	426	346	296	358	309	395	265	352	395	302	340
4-5 AM	559	490	608	529	451	470	676	549	470	568	490	627	421	559	627	480	540
5-6 AM	838	735	912	794	677	706	1015	824	706	853	735	941	632	838	941	721	811
6-7 AM	1328	1165	1445	1258	1072	1118	1608	1305	1118	1351	1165	1491	1002	1328	1491	1142	1284
7-8 AM	1667	1463	1814	1580	1346	1404	2019	1638	1404	1697	1463	1872	1258	1667	1872	1433	1612
8-9 AM	1660	1456	1805	1572	1339	1398	2009	1631	1398	1689	1456	1864	1252	1660	1864	1427	1605
9-10 AM	1396	1225	1519	1323	1127	1176	1690	1372	1176	1421	1225	1568	1053	1396	1568	1200	1350
10-11 AM	1362	1195	1482	1291	1099	1147	1649	1338	1147	1386	1195	1530	1028	1362	1530	1171	1317
11-Noon	1555	1364	1691	1473	1255	1309	1882	1527	1309	1582	1364	1746	1173	1555	1746	1337	1503
Noon-1 PM	1781	1562	1937	1687	1437	1500	2156	1750	1500	1812	1562	2000	1344	1781	2000	1531	1722
1-2 PM	1750	1535	1903	1658	1412	1474	2118	1719	1474	1781	1535	1965	1320	1750	1965	1504	1692
2-3 PM	1722	1510	1873	1631	1390	1450	2084	1692	1450	1752	1510	1933	1299	1722	1933	1480	1665
3-4 PM	1710	1500	1860	1620	1380	1440	2070	1680	1440	1740	1500	1920	1290	1710	1920	1470	1653
4-5 PM	1766	1549	1920	1673	1425	1487	2137	1735	1487	1797	1549	1982	1332	1766	1982	1518	1707
5-6 PM	1792	1572	1949	1698	1446	1509	2169	1760	1509	1823	1572	2012	1352	1792	2012	1540	1733
6-7 PM	1622	1423	1765	1537	1309	1366	1964	1594	1366	1651	1423	1822	1224	1622	1822	1395	1569
7-8 PM	1352	1186	1471	1281	1091	1139	1637	1328	1139	1376	1186	1518	1020	1352	1518	1162	1307
8-9 PM	1186	1041	1291	1124	957	999	1436	1166	999	1207	1041	1332	895	1186	1332	1020	1147
9-10 PM	1068	937	1162	1012	862	899	1293	1049	899	1087	937	1199	806	1068	1199	918	1033
10-11 PM	789	692	858	747	637	664	955	775	664	803	692	886	595	789	886	678	763
11-Midnight	522	458	568	495	421	440	632	513	440	531	458	586	394	522	586	449	505

Table A.21 Roadway and Traffic Characteristics for Corridor F Westbound (Segments 1-8)

	Corridor F Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	1.57	3.84	5.28	6.20	6.98	7.57	8.47	—	—	—	—	—	—	—	—
End Milepost	1.57	3.84	5.28	6.20	6.98	7.57	8.47	9.40	—	—	—	—	—	—	—	—
Length (mi)	1.57	2.27	1.45	0.92	0.78	0.59	0.90	0.93	—	—	—	—	—	—	—	—
Number of Lanes	2	3	3	2	2	2	2	2	—	—	—	—	—	—	—	—
Free Flow Speed (mph)	45	45	45	45	45	45	45	45	—	—	—	—	—	—	—	—
Hourly Volumes																
12-1 AM	162	213	158	146	114	130	107	91	—	—	—	—	—	—	—	—
1-2 AM	109	143	106	98	77	88	72	61	—	—	—	—	—	—	—	—
2-3 AM	88	115	86	79	62	71	58	49	—	—	—	—	—	—	—	—
3-4 AM	75	99	74	68	53	61	50	42	—	—	—	—	—	—	—	—
4-5 AM	108	142	105	97	76	87	71	60	—	—	—	—	—	—	—	—
5-6 AM	271	357	266	245	192	218	179	152	—	—	—	—	—	—	—	—
6-7 AM	643	848	630	581	455	518	424	361	—	—	—	—	—	—	—	—
7-8 AM	1153	1519	1129	1041	816	928	759	647	—	—	—	—	—	—	—	—
8-9 AM	1259	1658	1232	1136	890	1013	829	706	—	—	—	—	—	—	—	—
9-10 AM	1216	1602	1191	1098	860	979	801	682	—	—	—	—	—	—	—	—
10-11 AM	1222	1609	1196	1103	864	984	805	686	—	—	—	—	—	—	—	—
11-Noon	1296	1707	1269	1170	917	1043	854	727	—	—	—	—	—	—	—	—
Noon-1 PM	1413	1861	1383	1275	999	1137	930	793	—	—	—	—	—	—	—	—
1-2 PM	1394	1836	1365	1258	986	1122	918	782	—	—	—	—	—	—	—	—
2-3 PM	1384	1822	1354	1249	979	1114	911	776	—	—	—	—	—	—	—	—
3-4 PM	1406	1852	1376	1269	995	1132	926	789	—	—	—	—	—	—	—	—
4-5 PM	1469	1934	1438	1325	1039	1182	967	824	—	—	—	—	—	—	—	—
5-6 PM	1505	1982	1473	1358	1064	1211	991	844	—	—	—	—	—	—	—	—
6-7 PM	1257	1655	1230	1134	889	1011	827	705	—	—	—	—	—	—	—	—
7-8 PM	1012	1333	991	914	716	815	667	568	—	—	—	—	—	—	—	—
8-9 PM	783	1032	767	707	554	630	516	439	—	—	—	—	—	—	—	—
9-10 PM	593	781	581	535	420	478	391	333	—	—	—	—	—	—	—	—
10-11 PM	406	535	397	366	287	327	267	228	—	—	—	—	—	—	—	—
11-Midnight	277	364	271	250	196	223	182	155	—	—	—	—	—	—	—	—

Table A.22 Roadway and Traffic Characteristics for Corridor G Westbound (Segments 1-16)

	Corridor G Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	1.97	3.01	3.53	4.19	5.30	7.43	9.55	11.33	13.39	14.39	14.77	15.14	15.61	16.20	17.27
End Milepost	1.97	3.01	3.53	4.19	5.30	7.43	9.55	11.33	13.39	14.39	14.77	15.14	15.61	16.20	17.27	19.78
Length (mi)	1.97	1.05	0.52	0.66	1.11	2.13	2.12	1.78	2.06	1.00	0.38	0.37	0.47	0.59	1.06	2.51
Number of Lanes	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Free Flow Speed (mph)	50	45	50	50	50	50	45	45	45	40	40	40	40	45	50	50
Hourly Volumes																
12-1 AM	256	256	309	309	314	277	188	272	337	220	241	246	230	241	298	173
1-2 AM	175	175	211	211	215	190	129	186	230	150	164	168	157	164	204	118
2-3 AM	138	138	166	166	169	150	102	147	181	119	130	133	124	130	161	93
3-4 AM	183	183	220	220	224	198	134	194	240	157	172	175	164	172	213	123
4-5 AM	336	336	405	405	412	363	247	357	441	288	315	322	302	315	391	226
5-6 AM	611	611	735	735	748	660	449	648	801	523	573	586	548	573	710	411
6-7 AM	1133	1133	1365	1365	1388	1226	833	1203	1488	971	1064	1087	1018	1064	1318	763
7-8 AM	1439	1439	1733	1733	1763	1557	1058	1528	1889	1234	1351	1381	1293	1351	1674	969
8-9 AM	1283	1283	1545	1545	1571	1388	943	1362	1684	1100	1205	1231	1152	1205	1493	864
9-10 AM	1207	1207	1453	1453	1478	1306	887	1281	1584	1035	1133	1158	1084	1133	1404	813
10-11 AM	1246	1246	1500	1500	1525	1347	915	1322	1635	1068	1169	1195	1119	1169	1449	839
11-Noon	1377	1377	1659	1659	1687	1490	1012	1462	1808	1181	1293	1321	1237	1293	1602	928
Noon-1 PM	1498	1498	1804	1804	1834	1620	1101	1590	1966	1284	1406	1437	1345	1406	1743	1009
1-2 PM	1563	1563	1882	1882	1914	1690	1148	1659	2051	1340	1467	1499	1403	1467	1818	1053
2-3 PM	1637	1637	1971	1971	2005	1771	1203	1738	2149	1403	1537	1570	1470	1537	1905	1103
3-4 PM	1670	1670	2011	2011	2045	1806	1227	1772	2192	1432	1568	1602	1500	1568	1943	1125
4-5 PM	1611	1611	1940	1940	1973	1743	1184	1710	2115	1381	1513	1546	1447	1513	1874	1085
5-6 PM	1535	1535	1849	1849	1880	1661	1128	1629	2015	1316	1441	1473	1379	1441	1786	1034
6-7 PM	1349	1349	1625	1625	1652	1459	991	1432	1771	1157	1267	1294	1212	1267	1570	909
7-8 PM	1174	1174	1414	1414	1438	1270	863	1246	1541	1006	1102	1126	1054	1102	1366	791
8-9 PM	1010	1010	1216	1216	1237	1092	742	1072	1325	866	948	969	907	948	1175	680
9-10 PM	915	915	1102	1102	1121	990	672	971	1201	784	859	878	822	859	1064	616
10-11 PM	718	718	865	865	880	777	528	762	943	616	674	689	645	674	836	484
11-Midnight	433	433	521	521	530	468	318	459	568	371	406	415	388	406	503	291

Table A.23 Roadway and Traffic Characteristics for Corridor G Westbound (Segments 17-23)

	Corridor G Analysis Segments															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Start Milepost	19.78	22.15	23.25	23.70	24.00	24.48	25.13	—	—	—	—	—	—	—	—	—
End Milepost	22.15	23.25	23.70	24.00	24.48	25.13	26.66	—	—	—	—	—	—	—	—	—
Length (mi)	2.38	1.10	0.44	0.31	0.48	0.64	1.53	—	—	—	—	—	—	—	—	—
Number of Lanes	2	2	3	3	3	3	2	—	—	—	—	—	—	—	—	—
Free Flow Speed (mph)	55	45	40	40	40	40	55	—	—	—	—	—	—	—	—	—
Hourly Volumes																
12-1 AM	194	236	230	215	204	178	157	—	—	—	—	—	—	—	—	—
1-2 AM	132	161	157	147	139	122	107	—	—	—	—	—	—	—	—	—
2-3 AM	104	127	124	116	110	96	85	—	—	—	—	—	—	—	—	—
3-4 AM	138	168	164	153	146	127	112	—	—	—	—	—	—	—	—	—
4-5 AM	254	309	302	281	267	233	206	—	—	—	—	—	—	—	—	—
5-6 AM	461	561	548	511	486	424	374	—	—	—	—	—	—	—	—	—
6-7 AM	856	1041	1018	948	902	786	694	—	—	—	—	—	—	—	—	—
7-8 AM	1087	1322	1293	1204	1146	999	881	—	—	—	—	—	—	—	—	—
8-9 AM	969	1179	1152	1074	1021	890	786	—	—	—	—	—	—	—	—	—
9-10 AM	911	1108	1084	1010	961	838	739	—	—	—	—	—	—	—	—	—
10-11 AM	941	1144	1119	1042	991	864	763	—	—	—	—	—	—	—	—	—
11-Noon	1040	1265	1237	1153	1096	956	843	—	—	—	—	—	—	—	—	—
Noon-1 PM	1131	1376	1345	1254	1192	1040	917	—	—	—	—	—	—	—	—	—
1-2 PM	1180	1435	1403	1308	1244	1084	957	—	—	—	—	—	—	—	—	—
2-3 PM	1236	1504	1470	1370	1303	1136	1002	—	—	—	—	—	—	—	—	—
3-4 PM	1261	1534	1500	1397	1329	1159	1023	—	—	—	—	—	—	—	—	—
4-5 PM	1217	1480	1447	1348	1283	1118	987	—	—	—	—	—	—	—	—	—
5-6 PM	1159	1410	1379	1285	1222	1065	940	—	—	—	—	—	—	—	—	—
6-7 PM	1019	1239	1212	1129	1074	936	826	—	—	—	—	—	—	—	—	—
7-8 PM	887	1078	1054	982	934	815	719	—	—	—	—	—	—	—	—	—
8-9 PM	763	927	907	845	804	701	618	—	—	—	—	—	—	—	—	—
9-10 PM	691	840	822	766	728	635	560	—	—	—	—	—	—	—	—	—
10-11 PM	542	660	645	601	572	498	440	—	—	—	—	—	—	—	—	—
11-Midnight	327	397	388	362	344	300	265	—	—	—	—	—	—	—	—	—

Table A.24 Roadway and Traffic Characteristics for Corridor H Westbound (Segments 1-16)

	Corridor H Analysis Segments															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Milepost	0.00	3.39	4.26	5.06	6.75	8.61	9.56	10.63	13.39	15.97	17.02	18.13	19.16	19.88	21.22	22.75
End Milepost	3.39	4.26	5.06	6.75	8.61	9.56	10.63	13.39	15.97	17.02	18.13	19.16	19.88	21.22	22.75	23.76
Length (mi)	3.39	0.87	0.80	1.69	1.86	0.95	1.07	2.76	2.58	1.05	1.12	1.03	0.72	1.34	1.54	1.01
Number of Lanes	3	3	3	3	3	3	4	4	4	4	3	4	4	4	3	4
Free Flow Speed (mph)	65	65	65	65	65	65	65	60	60	55	55	55	55	55	55	50
Hourly Volumes																
12-1 AM	933	748	1067	782	1034	1076	1076	1748	1478	1420	1066	1370	1126	1315	1092	857
1-2 AM	644	517	737	540	714	743	743	1208	1021	978	733	940	771	899	742	581
2-3 AM	590	473	675	494	654	680	680	1105	935	892	665	849	694	807	660	514
3-4 AM	482	387	552	404	534	556	556	904	764	737	555	717	591	692	579	457
4-5 AM	667	535	764	559	739	770	770	1250	1058	1026	777	1012	837	985	834	663
5-6 AM	1222	980	1398	1024	1354	1409	1409	2290	1936	1908	1462	1936	1618	1920	1669	1344
6-7 AM	2234	1791	2556	1872	2476	2576	2576	4186	3540	3525	2723	3645	3064	3658	3229	2623
7-8 AM	2932	2351	3355	2457	3249	3381	3381	5494	4646	4556	3477	4580	3814	4515	3892	3121
8-9 AM	2987	2395	3418	2503	3310	3445	3445	5598	4734	4639	3539	4658	3878	4589	3951	3167
9-10 AM	2960	2374	3387	2480	3280	3414	3414	5547	4691	4605	3518	4638	3866	4578	3953	3174
10-11 AM	2931	2350	3354	2456	3248	3380	3380	5493	4645	4567	3493	4613	3848	4562	3949	3174
11-Noon	2898	2324	3316	2428	3212	3342	3342	5431	4593	4523	3464	4584	3829	4543	3944	3175
Noon-1 PM	2856	2290	3268	2393	3165	3294	3294	5352	4526	4462	3420	4531	3786	4495	3909	3149
1-2 PM	2992	2399	3423	2507	3315	3450	3450	5606	4741	4664	3569	4718	3937	4670	4047	3255
2-3 PM	3263	2616	3733	2734	3616	3763	3763	6114	5171	5068	3868	5092	4240	5018	4323	3466
3-4 PM	3392	2719	3880	2842	3758	3911	3911	6355	5375	5265	4015	5282	4397	5202	4476	3587
4-5 PM	3333	2673	3814	2793	3693	3844	3844	6246	5282	5195	3975	5253	4383	5198	4503	3621
5-6 PM	3186	2554	3645	2669	3530	3674	3674	5970	5049	4995	3839	5106	4276	5087	4448	3595
6-7 PM	3004	2408	3437	2517	3328	3464	3464	5628	4760	4686	3589	4747	3964	4703	4081	3285
7-8 PM	2804	2248	3208	2349	3107	3233	3233	5254	4443	4319	3274	4270	3537	4165	3537	2814
8-9 PM	2660	2133	3043	2229	2947	3067	3067	4984	4215	4067	3065	3963	3266	3828	3206	2531
9-10 PM	2640	2117	3021	2212	2926	3045	3045	4948	4184	4014	3011	3867	3174	3707	3070	2407
10-11 PM	2293	1838	2623	1921	2541	2644	2644	4296	3633	3471	2594	3315	2712	3158	2592	2022
11-Midnight	1596	1280	1827	1338	1769	1841	1841	2991	2530	2419	1809	2313	1894	2206	1814	1416

Table A.25 Roadway and Traffic Characteristics for Corridor H Westbound (Segments 17-29)

	Corridor H Analysis Segments															
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Start Milepost	23.76	24.74	25.50	26.07	27.16	28.23	29.06	30.09	31.55	35.12	40.31	43.64	44.92	—	—	—
End Milepost	24.74	25.50	26.07	27.16	28.23	29.06	30.09	31.55	35.12	40.31	43.64	44.92	46.69	—	—	—
Length (mi)	0.98	0.76	0.57	1.10	1.06	0.84	1.03	1.46	3.56	5.19	3.33	1.28	1.78	—	—	—
Number of Lanes	4	4	4	4	4	4	4	4	3	3	3	3	3	—	—	—
Free Flow Speed (mph)	50	50	50	50	50	50	50	55	55	65	65	65	65	—	—	—
Hourly Volumes																
12-1 AM	1090	1156	990	902	1189	1142	1118	1446	974	772	759	454	704	—	—	—
1-2 AM	738	780	667	606	795	763	744	959	641	497	488	292	453	—	—	—
2-3 AM	649	682	582	527	685	654	633	811	534	393	387	232	359	—	—	—
3-4 AM	584	622	534	488	648	625	615	800	545	447	439	263	407	—	—	—
4-5 AM	851	913	787	722	969	937	930	1218	842	720	708	424	656	—	—	—
5-6 AM	1748	1900	1647	1524	2087	2035	2048	2715	1925	1762	1732	1037	1605	—	—	—
6-7 AM	3435	3762	3273	3042	4212	4122	4181	5576	4005	3780	3717	2225	3445	—	—	—
7-8 AM	4045	4378	3788	3496	4759	4629	4641	6128	4314	3874	3809	2280	3531	—	—	—
8-9 AM	4102	4439	3839	3542	4818	4685	4694	6196	4358	3903	3838	2297	3557	—	—	—
9-10 AM	4116	4460	3860	3564	4859	4729	4745	6271	4422	3988	3921	2347	3635	—	—	—
10-11 AM	4122	4471	3873	3578	4887	4759	4782	6327	4472	4056	3987	2387	3696	—	—	—
11-Noon	4128	4485	3887	3594	4920	4794	4824	6391	4528	4134	4064	2433	3767	—	—	—
Noon-1 PM	4097	4455	3863	3574	4897	4774	4808	6373	4523	4143	4073	2438	3776	—	—	—
1-2 PM	4229	4590	3977	3676	5025	4895	4921	6514	4609	4192	4121	2467	3820	—	—	—
2-3 PM	4490	4860	4204	3879	5278	5133	5145	6792	4780	4286	4214	2522	3906	—	—	—
3-4 PM	4645	5024	4345	4007	5449	5297	5306	7002	4922	4402	4327	2590	4011	—	—	—
4-5 PM	4704	5105	4422	4087	5586	5441	5469	7238	5120	4652	4574	2738	4240	—	—	—
5-6 PM	4689	5112	4438	4113	5659	5525	5579	7413	5286	4899	4817	2883	4465	—	—	—
6-7 PM	4270	4638	4019	3716	5085	4955	4985	6602	4677	4265	4193	2510	3887	—	—	—
7-8 PM	3621	3890	3353	3079	4142	4012	3988	5228	3625	3126	3074	1840	2849	—	—	—
8-9 PM	3235	3449	2962	2707	3598	3469	3418	4446	3032	2497	2455	1469	2276	—	—	—
9-10 PM	3060	3241	2774	2525	3320	3189	3116	4025	2702	2123	2087	1249	1935	—	—	—
10-11 PM	2558	2695	2301	2087	2720	2603	2526	3242	2146	1612	1585	949	1469	—	—	—
11-Midnight	1793	1891	1615	1466	1914	1833	1781	2288	1519	1151	1131	677	1049	—	—	—

A.3 Equipment Inventory Data

For proper cost estimation and benefit impact evaluation, the number of deployed ITS elements in the field must be established. As described in the previous chapter, only equipment deployed along the eight analysis corridors are considered in this cost analysis, to ensure a proper benefit-cost comparison is performed (see Figure 2.2). The exception to this is the transit component of the benefit-cost analysis, which considers the full system deployment with respect to transit strategies (see Table 2.3).

Table A.26 summarizes the ITS field equipment deployed along the eight analysis corridors by county, as estimated using the inventory tables and maps presented at the first project workshop.[6] Signal inventory data were not available for Osceola County, and so have been estimated based on the average number of signalized intersections per mile across all other counties (2.2 intersections per mile).

Table A.26 Field Equipment Quantities

Corridor	CCTV Cameras	DMSs	Ramp Meters	Road Rangers	Signal Retiming	Fiber Line	Signalized Intersections
All Counties							
U.S. 441 & U.S. 17	6	1 North, 0 South	*	*	8.9 mi	20.47 mi	70
SR 50	11	1 East, 1 West	*	*	0 mi	25.08 mi	86
SR 528	2	0 East, 0 West	0	0	0 mi	35.75 mi	*
U.S. 17	22	3 North, 3 South	*	*	0 mi	13.63 mi	35
SR 436	33	3 North, 3 South	*	*	3.5 mi	16.65 mi	70
SR 434	15	2 East, 2 West	*	*	2.1 mi**	9.4 mi	28
U.S. 192	26	0 East, 0 West	*	*	5.2 mi	19.77 mi	59
I-4	15	2 East, 3 West	0	12	0 mi	21.71 mi	*
Orange County							
U.S. 441 & U.S. 17	6	1 North, 0 South	*	*	8.9 mi	20.47 mi	70
SR 50	11	1 East, 1 West	*	*	0 mi	25.08 mi	86
SR 528	2	0 East, 0 West	0	0	0 mi	35.75 mi	*
U.S. 17	—	—	—	—	—	—	—
SR 436	2	0 North, 0 South	*	*	0 mi	5.06 mi	27
SR 434	—	—	—	—	—	—	—
U.S. 192	—	—	—	—	—	—	—
I-4	0	0 East, 0 West	0	12***	0 mi	7.57 mi	*
Seminole County							
U.S. 441 & U.S. 17	—	—	—	—	—	—	—
SR 50	—	—	—	—	—	—	—

[6] MetroPlan Orlando ITS Master Plan Workshop #1 Presentation Slides, April 29, 2016.

Corridor	CCTV Cameras	DMSs	Ramp Meters	Road Rangers	Signal Retiming	Fiber Line	Signalized Intersections
SR 528	—	—	—	—	—	—	—
U.S. 17	22	3 North, 3 South	*	*	0 mi	13.63 mi	35
SR 436	31	3 North, 3 South	*	*	3.5 mi	11.59 mi	43
SR 434	15	2 East, 2 West	*	*	2.1 mi**	9.4 mi	28
U.S. 192	—	—	—	—	—	—	—
I-4	15	2 East, 3 West	0	12***	0 mi	14.14 mi	*
Osceola County							
U.S. 441 & U.S. 17	—	—	—	—	—	—	—
SR 50	—	—	—	—	—	—	—
SR 528	—	—	—	—	—	—	—
U.S. 17	—	—	—	—	—	—	—
SR 436	—	—	—	—	—	—	—
SR 434	—	—	—	—	—	—	—
U.S. 192	26	0 East, 0 West	*	*	5.2 mi	19.77 mi	59
I-4	—	0 East, 0 West	0	12***	0 mi	0 mi	*

A dash (—) indicates that a segment does not exist in the given jurisdiction.

* FSP does not apply to arterial corridors. Signals to not apply to freeway corridors.

** This represents only 48% of the full extent of this retiming project (and is therefore assumed to cost only 48% of the full retiming project cost). The remaining 52% occurred beyond the limits of this analysis corridor.

*** These Road Rangers are shared across all three counties.

For cost purposes, Fiber is assumed to be installed separately for each freeway direction over the lengths shown in Table A.26 (effectively doubling the Fiber mileage and cost for freeway corridors while leaving the coverage extents unaffected). Conversely, both directions of an arterial are assumed to be served by a single Fiber communications line.

A.4 Emergency Responder Data

For the estimation of costs associated with Emergency Vehicle Preemption, it is necessary to have an estimate of the number of responder vehicles that are equipped with the required technology. Using a combination of population statistics and typical per-capita rates of emergency responder vehicles and personnel, these estimates can be calculated.

The following typical rate ranges are obtained from available literature:

- **Fire Department.** There are 0.13-1.09 fire department engines per 10,000 residents based on data from agencies across the U.S..[7] As a conservative assumption, this analysis will assume 1 engine per 10,000 residents.

[7] Thomson, K. *U.S. Fire Department Staffing and Resource Allocation Survey.* UFOA. Spring 2011. http://www.ufoa.org/researchfiles/file00000009.pdf (accessed 10-21-2016)

- **Police Department.** The average number of police officers per 100,000 population is 201.2. Furthermore, approximately 66% of officers are assigned to patrol duties, and may be expected to have patrol vehicles available.[8]

- **Ambulances and EMS Personnel.** For midsize cities, there is an average of one ambulance per 51,223 people.[9]

To apply these rates, the following population data from the U.S. Census Bureau for Orange, Seminole, and Osceola Counties will be used. These data are from 2013, as this was the most recent year of data available from the Bureau.

- **Orange County:** Estimated population of 1.225 million.
- **Seminole County:** Estimated population of 436,041.
- **Osceola County:** Estimated population of 298,504.

The resulting estimates for the number of emergency responder vehicles in each county are provided in Table A.27.

Table A.27 Calculated Quantities for Transit Ridership on LYNX

Quantity	Orange County	Seminole County	Osceola County	All Counties
Annual Ridership[10]	4,534,088 (72%)	779,116 (12%)	1,001,988 (16%)	6,315,192
Passenger-miles Traveled Annually	95,711,617	16,446,627	21,151,308	133,309,552
Directional route-miles[11]	1,661	170	254	2,085
Number of known intersections by routes and direction[12]	4,893	781	501	6,175
Number of unique known intersections, merging across routes and directions[12]	1,292	241	175	1,708
Signals per mile along LYNX directional routes	2.95	4.59	1.97	
Signals traversed annually for each passenger	281,948,792	75,557,738	41,719,706	399,226,236

A.5 Transit Data

Inventory data related to the LYNX transit network and fleet are provided in Table A.28. These have been calculated according to the following reference data and assumptions.

[8] James McCabe. *An analysis of police department staffing: How many officers do you really need?* ICMA Center for Public Safety Management. http://icma.org/Documents/Document/Document/305747 (accessed 10-21-2016).

[9] Braun O, McCallion R, Fazackerley J. *Characteristics of midsized urban EMS systems.* Annals of Emergency Medicine, May 1990. https://www.ncbi.nlm.nih.gov/pubmed/2331099 (accessed 10-21-2016).

[10] LYNX Comprehensive Operational Analysis Final Report. January 2014. http://www.golynx.com/core/fileparse.php/144934/urlt/LYNX-2013-Comprehensive-Operational-Analysis-Report.pdf (accessed 10-12-16).

[11] LYNX Bus Routes GIS data file. http://www.golynx.com/lynxmap/DataDownload/index_files/Page300.htm (accessed 10-12-16).

[12] LYNX Bus Stops GIS data file. http://www.golynx.com/lynxmap/DataDownload/index_files/Page614.htm (accessed 0-12-16).

- The overall number of annual passenger-miles traveled is: 133,309,552.[13]
- The overall deployment of TSP in the Orlando Urban Area is 6 out of 16 agencies, or roughly 37.5% deployed. This is assumed to represent both the fraction of vehicles that are equipped with TSP transponders, and the fraction of intersections that are equipped with TSP receivers.
- The total fleet size is 300 vehicles.[14]

The procedures used to calculate the quantities of Table A.28 that were not directly referenced to available sources are:

- **Passenger-Miles Traveled Annually:** Using the LYNX ridership percentages by county, the total passenger-miles traveled on transit in each county are estimated by splitting the total passenger-miles traveled annually on LYNX according to these percentages.
- **Signals Per Mile along LYNX Directional Routes:** The average number of signalized intersections encountered per mile is calculated by dividing the total directional route mileage in a jurisdiction by the total number of signalized intersections by route/direction in that jurisdiction. Note that this count of signalized intersections considers the number along each directional route, such that an intersection traversed by multiple routes is counted multiple times. In 3% of all cases, the exact number of routes passing through that intersection was not available. For these intersections, a conservative value of 2 was assumed, based on the expectation that at least one route would pass through this intersection in both directions.
- **Signals Traversed Annually for Each Passenger:** The number of TSP-equipped signals traversed across all passengers is calculated as the product of the total passenger VMT and the average number of signals per mile.

[13] LYNX Transit Development Plan 2013-2022. http://www.golynx.com/core/fileparse.php/137733/urlt/LYNX-TDP-2013-2022-DRAFT.pdf (accessed 10-12-16).

[14] http://www.golynx.com/corporate-info/facts-glance.stml (accessed 10-21-2016).

Table A.28 Calculated Quantities for Transit Ridership on LYNX

Quantity	Orange County	Seminole County	Osceola County	All Counties
Annual Ridership[15]	4,534,088 (72%)	779,116 (12%)	1,001,988 (16%)	6,315,192
Passenger-miles Traveled Annually	95,711,617	16,446,627	21,151,308	133,309,552
Directional route-miles[16]	1,661	170	254	2,085
Number of known intersections by routes and direction[17]	4,893	781	501	6,175
Number of unique known intersections, merging across routes and directions[12]	1,292	241	175	1,708
Signals per mile along LYNX directional routes	2.95	4.59	1.97	
Signals traversed annually for each passenger	281,948,792	75,557,738	41,719,706	399,226,236

A.6 Data for Supplementary Analysis of Off-Network Routes

Basic roadway data for the supplemental analysis routes shown in Figure 2.5 are provided in Table A.29.

Table A.29 Investment Extents by Type and Jurisdiction

Investment Type	Orange County	Seminole County	Osceola County	All Counties
Arterial ATCS	3.8 miles	0 miles	0 miles	3.8 miles
Arterial Traveler Information	44.6 miles	1.3 miles	10.5 miles	56.4 miles
Freeway Traveler Information	4.9 miles	0 miles	0 miles	4.9 miles

15 LYNX Comprehensive Operational Analysis Final Report. January 2014. http://www.golynx.com/core/fileparse.php/144934/urlt/LYNX-2013-Comprehensive-Operational-Analysis-Report.pdf (accessed 10-12-16).

16 LYNX Bus Routes GIS data file. http://www.golynx.com/lynxmap/DataDownload/index_files/Page300.htm (accessed 0-12-16).

17 LYNX Bus Stops GIS data file. http://www.golynx.com/lynxmap/DataDownload/index_files/Page614.htm (accessed 0-12-16).

Appendix B. Benefit Analysis Methodology and Details

This appendix expands upon the methodology overview provided in Chapter 2.0 by describing the detailed procedures, assumptions, and inputs that have been used to generate the estimated benefits by jurisdiction and outcome category as presented in Chapter 3.0. The specific topics included in this appendix include:

- Background information on the different categories of estimated benefits and their mechanisms.
- TOPS-BC specifications and analysis assumptions.
- Procedures, assumptions, and calculation results regarding the extent of ITS strategy coverage for each analysis corridor.
- Procedures, assumptions, and calculation results regarding the TOPS-BC benefit impact factors associated with each analysis corridor.
- Transit-specific analysis procedures, assumptions, and calculation results regarding the time savings associated with transit signal priority and automated vehicle location information.
- Monetization parameters used to convert all estimated benefits into dollar equivalents, to facilitate comparisons across categories and corridors, and to enable comparisons of benefits and costs.

B.1 Background

Benefits resulting from ITS strategies generally fall into the following categories:

- **Mobility.** Detection and surveillance technologies allow faster identification of, response to, and clearance of incidents, leading to reduced traffic delays. In addition, traveler information services provide motorists with alerts regarding unanticipated congestion in advance, giving them time to take appropriate measures such as rerouting, switching modes, or deferring trips. Efficient operation of arterial signals and other traffic control devices help to improve both travel times and reliability, enabling motorists to reduce the extra “buffer” time they typically build into their trips to ensure on-time arrival. Benefits associated with improvements in travel time reliability are particularly significant in areas with highly variable congestion severity from one day to another, which is commonly associated with areas where congestion itself is a regular occurrence, as it is these segments that are most significantly impacted by even minor disturbances (e.g., traffic incidents).
- **Safety.** The principal contribution of ITS in traffic safety is targeted toward reducing secondary traffic collisions, which are incidents that occur as a result of other earlier precipitating (primary) incidents. Such secondary incidents become increasingly likely as the duration of the primary incident increases, so that improvements in incident clearance times accomplished through ITS have a positive effect on secondary crashes. Another common ITS method for addressing crashes is to provide advanced warnings to motorists of upcoming congestion.
- **Fuel Consumption and Air Quality.** Many ITS strategies improve fuel consumption and air quality by addressing traffic delays, stop-and-go driving, and extended vehicle idling: traveler information dissemination systems help divert traffic when more efficient routes or modes are available, and incident management strategies reduce the delays associated with traffic collisions.

By monetizing the estimated benefits (i.e., converting each of the benefit quantities into equivalent dollar amounts), the outcomes associated with each category can be aggregated and appropriately compared in a meaningful way. TOPS-BC provides quick, reliable methods for estimating the mobility, safety, and fuel consumption impacts of various transportation improvements, and includes integrated benefit monetization functionality as well.

B.2 TOPS-BC Specifications, Functionality, and Limitations

For this benefit analysis, the Traffic Incident Management module of TOPS-BC Version 1.2 was used, as it was the one with all necessary input parameter options for each strategy. For each arterial segment, the facility type specified in TOPS-BC was "Principal Arterial." For each freeway segment, the facility type specified in TOP-BC was "Urban Freeway." As the minimum allowable analysis duration in TOPS-BC is one hour, the benefit analysis was performed separately for each hour of the day to provide the maximum possible temporal resolution of the estimated benefits.

Although TOPS-BC provides for benefits estimates with respect to travel time savings, crash reductions, and fuel savings, the latest version currently has no air quality assessment capabilities, and so these benefits are not captured in the current analysis. However, while air quality is closely linked to public health impacts, existing literature has shown that the monetized benefits associated with improved air quality are comparable to those obtained from fuel consumption analyses. As TOPS-BC is a quantitative impact assessment tool, it does not report qualitative or intangible benefits associated with ITS, such as improved customer service or reduced driver stress. Although these outcomes are beyond the scope of the current analysis, they may be evaluated in future work using alternative tools, such as user surveys that employ self-reported categorical or qualitative responses (e.g., "high impact," "strongly agree," or "very important").

It should also be noted that there are additional indirect benefits that are often challenging to separate out from the impacts of any number of other confounding variables without detailed modeling/analysis methods, and are consequently out of scope for the current analysis as well.

- **Operational Savings.** ITS infrastructure can reduce operating costs for public agencies in several ways, including faster response times, automation of incident detection and data collection, and improved transit on-time performance. Remote monitoring of facilities also reduces staffing burden, and data archives allow for improved performance monitoring, more informed decision-making, and data-driven long term planning.

- **Economic Benefits.** While the direct impacts associated with ITS and accompanying delay savings are captured in the form of time savings, there are many other indirect economic benefits afforded by such improvements as well. For example, a more efficient transportation system reduces shipping costs, improves scheduling reliability, and enables businesses to reduce the buffer time they build into their production schedules.

To ensure a tractable analysis methodology, several conservative assumptions and simplifications have been made that may result in additional modesty in the reporting of benefits for the ITS in the Orlando Urban Area:

- Benefits are assumed to occur on 250 working days of the year only, meaning that the ITS benefits on Saturdays (which have been subject to increasing levels of congestion that are, in some cases,

comparable to weekday traffic patterns) are not being captured. In contrast, costs are calculated over the full year.

- Reductions in emissions and the associated health benefits are not being considered. As discussed earlier, this is a limitation of the current version of TOPS-BC, which does not provide estimates for emissions reductions.
- Other indirect and secondary benefits associated with the ITS system are largely unaccounted for by the TOPS-BC analysis. These include:
  - Operational savings as discussed earlier in this section.
  - Economic benefits as discussed earlier in this section.
  - Local agencies, private traffic information distributors, and web site visitors who use the CCTV real-time camera image feeds (if made available to partner agencies).
  - The utilization of changeable message signs for public safety and information announcements.

B.3 ITS Coverage by Analysis Segment

To more accurately calculate the anticipated level of benefit associated with the ITS strategies on each corridor, a corresponding "percent coverage" is calculated for each corridor to reflect the extent to which a particular project category is deployed/available on it. Transit-oriented strategies are discussed separately in a later section of this chapter.

B.3.1 Assumptions

The following global assumptions have been made for this MetroPlan ITS Benefit-cost analysis and are reflected in the table.

- A total of 12 Road Rangers Service Patrol trucks are deployed across the I-4 freeway corridor.[18]
- Emergency vehicle preemption is available at 43% of signals throughout the Orlando Urban Area and is supported by 43% of emergency vehicles in the region, based on a reported 7 equipped agencies out of 16.[19] This results in an overall assumed EVP availability of 18%, or the overall probability that an EVP-equipped vehicle (43%) encounters an EVP-equipped intersection (43%).
- Travel time data sources are available on all SunGuide routes only (i.e., all corridors except US 192), and provide useful travel time data for traveler information systems on all corridors.
- As no DMS and CCTV inventory data were available for the City of Orlando, the coverage rates for the remaining portions of Orange County were assumed to apply within the Orlando city limits as well.

[18] MetroPlan Orlando. *Tracking the Trends,* June 2016. p26.

[19] MetroPlan Orlando ITS Master Plan Workshop #1 Presentation Slides, April 29, 2016. Slide 41.

B.3.2 Calculation Procedure

Table B.1 describes the methodology for calculating the percent coverage for each ITS project type on a segment. To translate the project coverage by ITS strategy into a format that can be input into TOPS-BC, the coverage by ITS type (i.e., Table B.1) must be consolidated into four broader TOPS-BC improvement categories according to the mapping provided in Table 2.1.

Table B.1 Methodology for Calculating Percent Coverage of each ITS Type on a Given Corridor

ITS Project Type	Coverage Calculation Method
CCTV	The number of CCTV units along the corridor is counted. Each unit is assumed to have coverage of ½ mile in either direction, for a total coverage of 1 mile per camera. Each camera is furthermore assumed to have minimal coverage overlap with adjacent cameras. Therefore, the total number of cameras on the corridor is multiplied by one mile per camera, to obtain a total corridor coverage rating for CCTV. This is then converted into a percent coverage by dividing by the total mileage of the corridor. Coverage is capped at 100% in the event that a given corridor has a large quantity of CCTV units, resulting in a calculated value of over 100% coverage.
Signal Coordination	Percent of computer-controlled coordinated traffic signals in the jurisdiction.[20]
Signal Retiming	Length of corridor that was retimed, divided by the total length of the corridor.[21]
Road Rangers Service Patrol	Assumed to provide full coverage of I-4 freeway corridor only.
Emergency Vehicle Preemption (EVP)	Assumed to have an overall coverage of 18%, based on the assumption that 43% of all agencies have EVP-equipped vehicles, and 43% of all signals are EVP-capable. In this case, the overall coverage value of 18% is based on the probability of an EVP-equipped signal and an EVP-equipped vehicle occurring simultaneously, or the product of 43% and 43%.
On-road Traveler Information System	Number of junctions with State Roads (i.e., major decision points) along the corridor that have dynamic message signs in advance, divided by the total number of major junctions along the corridor. This coverage calculated separately by direction. DMS directions are assumed based on positioning relative to major junctions.
511 Traveler Information System	Assumed to be available on all SunGuide routes only (i.e., all corridors except US 192).
Freeway Ramp Metering	Not present on any routes.

When consolidating individual project types into a single TOPS-BC improvement category as shown in Table 2.1, the analysis was done using the average coverage value across all relevant categories used.

[20] MetroPlan Orlando. *Tracking the Trends,* June 2016. p23.

[21] MetroPlan Orlando. *Travel Time Studies and B/C Analysis,* 2014. p185.

Therefore, the benefit parameters associated with each of these four TOPS-BC categories (see next section) will reflect the expected impacts of full coverage by all of these strategies in each category.

B.3.3 Coverage Results

Table B.2 indicates the extent of coverage for each project category by corridor and jurisdiction, calculated according to the methodology presented in Table B.1. A value of 0% indicates that the strategy does not exist at all on the segment.

Table B.2 Extent of Corridor Coverage for each ITS Strategy Type

	Corridor							
Strategy Type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
All Counties								
CCTV	16%	24%	6%	100%	100%	100%	97%	32%
Signal Coordination	88%	88%	*	74%	80%	74%	43%	*
Signal Retiming	24%	0%	*	0%	15%	22%	19%	*
Road Ranger Service Patrol	0%	0%	0%	0%	0%	0%	0%	100%
Emergency Vehicle Preemption	18%	18%	0%	18%	18%	18%	18%	*
511 Traveler Information System	100%	100%	100%	100%	100%	100%	0%	100%
Traveler Information DMSs	11% North 0% South	17%	0%	43%	50%	67%	0%	14% East 21% West
Ramp Meters	0%	0%	0%	0%	0%	0%	0%	0%
Orange County								
CCTV	16%	24%	6%	—	18%	—	—	0%
Signal Coordination	88%	88%	*	—	88%	—	—	*
Signal Retiming	24%	0%	*	—	0%	—	—	*
Road Ranger Service Patrol	0%	0%	0%	—	0%	—	—	100%
Emergency Vehicle Preemption	18%	18%	0%	—	18%	—	—	*
511 Traveler Information System	100%	100%	100%	—	100%	—	—	100%
Traveler Information DMSs	11% North 0% South	17%	0%	—	0%	—	—	0%
Ramp Meters	0%	0%	0%	—	0%	—	—	0%
Seminole County								
CCTV	—	—	—	100%	100%	100%	—	100%
Signal Coordination	—	—	—	74%	74%	74%	—	*
Signal Retiming	—	—	—	0%	30%	22%	—	*
Road Ranger Service Patrol	—	—	—	0%	0%	0%	—	100%
Emergency Vehicle Preemption	—	—	—	18%	18%	18%	—	*
511 Traveler Information System	—	—	—	100%	100%	100%	—	100%
Traveler Information DMSs	—	—	—	43%	100%	67%	—	40% East 60% West
Ramp Meters	—	—	—	0%	0%	0%	—	0%
Osceola County								
CCTV	—	—	—	—	—	—	97%	0%

	Corridor							
Strategy Type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Signal Coordination	—	—	—	—	—	—	43%	*
Signal Retiming	—	—	—	—	—	—	19%	*
Road Ranger Service Patrol	—	—	—	—	—	—	0%	100%
Emergency Vehicle Preemption	—	—	—	—	—	—	18%	*
511 Traveler Information System	—	—	—	—	—	—	0%	100%
Traveler Information DMSs	—	—	—	—	—	—	0%	0%
Ramp Meters	—	—	—	—	—	—	0%	0%

A dash (—) indicates that a segment does not exist in the given jurisdiction.

* Signalization Improvement Strategies do not apply to freeway corridors.

Table B.3 shows the percent coverage for each TOPS-BC improvement category by corridor segment, according to the strategy mapping by category as indicated in Table 2.1.

Table B.3 Extent of Corridor Coverage by TOPS-BC Improvement Category

TOPS-BC Improvement Category	Corridor							
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**
All Counties								
Signalization Improvements	56%	44%	0%	37%	48%	48%	31%	0%
Incident Management Strategies	17%	21%	3%	59%	59%	59%	58%	66%
Travel Time System	56% North 50% South	58%	50%	72%	75%	83%	0%	57% East 61% West
Orange County								
Signalization Improvements	56%	44%	0%	—	44%	—	—	0%
Incident Management Strategies	17%	21%	3%	—	18%	—	—	50%
Travel Time System	56% North 50% South	58%	50%	—	50%	—	—	50%
Seminole County								
Signalization Improvements	—	—	—	37%	52%	48%	—	0%
Incident Management Strategies	—	—	—	59%	59%	59%	—	100%
Travel Time System	—	—	—	72%	100%	83%	—	70% East 80% West
Osceola County								
Signalization Improvements	—	—	—	—	—	—	31%	0%
Incident Management Strategies	—	—	—	—	—	—	58%	50%
Travel Time System	—	—	—	—	—	—	0%	50%

A dash (—) indicates that a segment does not exist in the given jurisdiction.

B.4 TOPS-BC Impact Parameters by Segment

Using a baseline set of benefit impact parameters associated with each of the major categories of ITS strategies (see Table 2.1), the specific impact parameters to use for each segment can be calculated by rescaling the baseline values according to the extent of coverage for each strategy on any given corridor. This section provides the procedural details associated with these calculations, as well as the resultant impact values.

B.4.1 Baseline Benefit Impact Parameters

Table B.4 shows the baseline impact parameters used in this analysis for strategies deployed on arterial segments, while Table B.5 provides analogous parameter values for freeway segments. These parameters are informed by previous studies, simulations, modeling efforts, and reports associated with local, regional, and national efforts. Additionally, the U.S. Department of Transportation maintains a benefits database with extensive documentation on ITS impacts and outcomes spanning a broad range of technologies and municipal settings.[22] The table shows only the parameter values in the TOPS-BC model that are primarily impacted by the ITS Strategy. There are several secondary benefits which do not have parameters. For example, any changes in speeds are captured more directly by the impact factors for capacity-related gains.

For each ITS strategy category, the benefit impact parameters reflect the expected impacts of full coverage by all of the strategies in each category. As mentioned previously, these impact parameters can then be tailored to specific corridors by rescaling them according to the extent of coverage for a given strategy category on the corridor.

For the information dissemination strategy category, the percent of time that the device is engaged in conveying useful information does not reflect the total amount of time that the system is active. Instead, it reflects the expected percent of time that the displayed information will contribute toward rerouting or other behavioral changes by drivers, which would not be expected during uncongested conditions (i.e., when conditions are exactly as drivers would have assumed even without the system to provide confirmation).

Table B.4 Arterial Parameter Values by ITS Strategy Category

Impact	Signalization Improvement	Incident Management	Information Dissemination
Change in Capacity	10%	—	—
Reduction in Non-Fatality Crash Rate	2%	10%	—
Reduction in Crash Duration	—	40%	—
Reduction in Fuel Use	5%	—	—
Percent of time device is disseminating useful information	—	—	20%
Percent drivers using information	—	—	10%
Minutes saved by drivers acting on the information	—	—	5

A dash (—) indicates that a given ITS strategy category is not expected to have that type of impact.

[22] http://www.itsbenefits.its.dot.gov/

Table B.5 Freeway Parameter Values by ITS Strategy

Impact	Signalization Improvement	Incident Management	Information Dissemination
Change in Capacity	1%	—	—
Reduction in Non-Fatality Crash Rate	1%	9%	—
Reduction in Fatality Crash Rate	—	1%	—
Reduction in Crash Duration	—	25%	—
Reduction in Fuel Use	1%	2%	—
Percent of time device is disseminating useful information	—	—	25%
Percent drivers using information	—	—	10%
Minutes saved by drivers acting on the information	—	—	3

A dash (—) indicates that a given ITS strategy category is not expected to have that type of impact.

B.4.2 Procedure for Calculating Impact Parameters by Corridor

Suitable benefit impact factors by corridor are calculated by scaling down the impact factors shown in Table B.4 and Table B.5 by the percent coverage for each TOPS-BC improvement category shown in Table B.3. The one exception to this general approach is associated with the Freeway/Arterial Travel Time System category. For that, only one factor will be scaled according to percent coverage on the segment: the number of minutes saved by drivers using the information. All other impact parameters in this category remained unchanged regardless of coverage extent, since they are only used in TOPS-BC as scale factors for the number of minutes saved by drivers using the information. Thus, if *all* of the impact parameters in this TOPS-BC improvement category had been rescaled according to coverage extent, the overall result would be a disproportionately large penalty being applied to the overall benefits on that corridor associated with the travel time system.

For each corridor, the rescaled parameters across the two (for freeway corridors) or three (for arterial corridors) different ITS strategy categories are then consolidated into a single set of impact parameters for that corridor by taking the sum across all categories. This is based on the observation that the different strategy categories generally use different mechanisms for achieving their results, and therefore may be expected to have minimal overlap with respect to impacts. As Table B.4 and Table B.5 indicate, this summation is only required for the impact factors related to reductions in non-fatality crash rates and for fuel savings on freeways, as these are the only impact factor classes that have contributions from multiple TOPS-BC benefit categories.

B.4.3 Benefit Impact Parameters by Analysis Corridor

The overall impact factors by corridor, as calculated according to the procedures above, are summarized in Table B.6.

Table B.6 Calculated Overall Benefit Impact Factors by Corridor

	Corridor							
Impact	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Orange County								
Change in Capacity	6%	4%	0%	—	4%	—	—	0%
Change in Speed	0%	0%	0%	—	0%	—	—	0%
Change in # of Lanes	0%	0%	0%	—	0%	—	—	0%
Reduction in Non-Fatality Crash Rate	3%	3%	0%	—	3%	—	—	5%
Reduction in Fatality Crash Rate	0%	0%	0%	—	0%	—	—	1%
Reduction in Crash Duration	7%	8%	1%	—	7%	—	—	13%
Reduction in Fuel Use	3%	2%	0%	—	2%	—	—	1%
% of time device conveys useful information	11% North 10% South	12%	13%	—	10%	—	—	13%
Percent drivers using information	6% North 5% South	6%	5%	—	5%	—	—	5%
Minutes saved by drivers using the information	2.8 North 2.5 South	2.9	1.5	—	2.5	—	—	1.5
Seminole County								
Change in Capacity	—	—	—	4%	5%	5%	—	0%
Change in Speed	—	—	—	0%	0%	0%	—	0%
Change in # of Lanes	—	—	—	0%	0%	0%	—	0%
Reduction in Non-Fatality Crash Rate	—	—	—	7%	7%	7%	—	9%
Reduction in Fatality Crash Rate	—	—	—	0%	0%	0%	—	1%
Reduction in Crash Duration	—	—	—	24%	24%	24%	—	25%
Reduction in Fuel Use	—	—	—	2%	3%	2%	—	2%
% of time device conveys useful information	—	—	—	14%	20%	17%	—	18% East 20% West
Percent drivers using information	—	—	—	7%	10%	8%	—	7% East 8% West
Minutes saved by drivers using the info	—	—	—	3.6	5.0	4.2	—	2.1 East 2.4 West
Osceola County								
Change in Capacity	—	—	—	—	—	—	3%	0%
Change in Speed	—	—	—	—	—	—	0%	0%
Change in # of Lanes	—	—	—	—	—	—	0%	0%
Reduction in Non-Fatality Crash Rate	—	—	—	—	—	—	6%	5%
Reduction in Fatality Crash Rate	—	—	—	—	—	—	0%	1%
Reduction in Crash Duration	—	—	—	—	—	—	23%	13%
Reduction in Fuel Use	—	—	—	—	—	—	2%	1%
% of time device conveys useful information	—	—	—	—	—	—	0%	13%

	Corridor							
Impact	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**
Percent drivers using information	—	—	—	—	—	—	0%	5%
Minutes saved by drivers using the info	—	—	—	—	—	—	0%	1.5

A dash (—) indicates that a segment does not exist in the given jurisdiction.

B.5 Transit Strategy Benefit Analysis Methodology

Because TOPS-BC Version 1.2 does not have native capabilities for estimating the benefits associated with transit strategies, an alternative benefit analysis method has been used to evaluate the value of two key transit-oriented strategies in the Orlando Urban Area: transit signal priority and automated vehicle location information.

B.5.1 Methodology for Transit Benefit Estimation

The specific methodology for estimating transit-related benefits from AVL and TSP is provided below. These procedures are used in conjunction with the calculated transit vehicle and signal inventory results shown in Table A.28.

1. Applying the assumed savings per intersection with TSP, while also assuming that only 37.5% of the vehicles and intersections Orlando Urban Area are properly equipped for TSP,[23] an overall estimate for the total time savings achieved by LYNX passengers through TSP is estimated by multiplying these quantities:
    a. the total number of intersections traversed
    b. the total time savings per intersection
    c. the percent of intersections that are estimated to be TSP-equipped
    d. the percent of vehicles that are estimated to be TSP-equipped
2. This result is combined with the AVL-related savings, which is calculated by multiplying the total number of passenger trips per year by the assumed time savings per trip.
3. Finally, the total time savings is monetized according to the standard TOPS-BC assumed value of time for “other” auto trips (see Table B.8).

The resultant estimates for time savings associated with AVL and TSP are reported in Table B.7. The dollar values corresponding to these calculated time savings are provided in Appendix D, Table D.3.

[23] MetroPlan Orlando ITS Master Plan Workshop #1 Presentation Slides, April 29, 2016. Slide 41.

Table B.7 Calculated Quantities for Transit Benefits on LYNX

Quantity	Orange County	Seminole County	Osceola County	All Counties
Time savings associated with TSP annually (hours)	110,136	29,515	16,297	155,948
Time savings associated with AVL annually (hours)	75,568	12,985	16,700	105,253
Time savings associated with transit strategies annually (hours)	185,704	42,500	32,997	261,201

B.5.2 Transit Benefit Analysis Assumptions

The assumed benefit of 10 seconds achieved when a TSP-enabled vehicle traverses a TSP-equipped intersection is based on the assumption of a standard 120-second cycle, which corresponds to a red interval of 60 seconds. The average delay for a bus arriving during the red phase is therefore 30 seconds (i.e., half of the entire red time), and the probability of a bus arriving randomly during the red phase is approximately 50%. Therefore, the expected value for bus delay at each intersection is 15 seconds. Making the additional assumption that TSP improves the probability that a given bus will arrive during the green phase by 50% (i.e., to an overall probability of 75% for an arrival during the green phase), this reduces the average delay across all buses by 50% (or 7.5 seconds per bus on average). When taking into consideration the additional time savings associated with avoided acceleration and deceleration time, a value of approximately 10 seconds per transit vehicle is obtained, which is then passed along to each passenger that is carried by a TSP-equipped transit vehicle through each TSP-equipped intersection.

The assumption of fleet-wide availability of AVL technology is based on a recent media article describing the deployment of AVL services across all LYNX rolling stock.[24]

B.6 Benefit Monetization Parameters

Once benefits have been quantified in TOPS-BC, they must be converted to equivalent dollar values suitable for aggregation and subsequent cost/benefit analysis. Table B.8 summarizes the economic parameters used for this monetization process. The parameter values are largely based on guidance from TOPS-BC documentation. These values are supplied directly to TOPS-BC as inputs, which the tool then uses to calculate the dollar values associated with the improvements on each corridor by benefit type.

[24] Mentor Graphics Corporation. *LYNX Fixed Route Improves On-Time Service with an ITS Solution from Mentor Engineering.* Embedded Computing Design. February 19, 2009. http://embedded-computing.com/news/lynx-its-solution-mentor-engineering/ (accessed 10-18-2016).

Table B.8 Economic Benefit Parameters

Benefit Parameter	Parameter Value
Number of travel days in a year	250
Dollar value of person hour, “on the clock” auto	$32.46
Dollar value of person hour, other auto	$16.23
Dollar value of vehicle hour, truck	$32.46
Average cost per gallon of fuel	$4.25
Dollar value of a fatality crash	$10,433,467
Dollar value of an injury crash	$77,671
Dollar value of a property damage-only crash	$2,666

B.7 Benefit Analysis Methodology for Supplementary Off-Network Routes

For adaptive traffic signal control (ATCS), average per-mile benefit rates have been calculated for the core analysis network (i.e., the routes in Figure 2.2) and the impact factors associated with Signalization Improvements in Table B.4. As ATCS applies only to arterials, no freeway routes from the core analysis network were included in this calculation of average benefit rates per mile. Based on this procedure, the average annual benefit associated with ATCS for arterials was evaluated as $86,278 per mile (see Table B.9 for breakdown by benefit category).

For traveler information data distributed through a 511 system, average per-mile benefit rates have been calculated for the core analysis network, separately for arterials and freeways. The impact factors used are those shown in Table B.4 and Table B.5 for information dissemination, reduced by a factor of two in consideration of the fact that traveler information from 511 systems is assumed to constitute only half of the benefit associated with the travel time system impacts, as indicated in Table 2.1. Based on this procedure, the average annual benefit associated with traveler information data distributed through a 511 system is $16,999 per mile for arterials, and $25,377 per mile for freeways (see Table B.9 for breakdown by benefit category).

Table B.9 Average Annual Benefits per Mile, by Strategy

Investment Type	Recurrent Travel Time Benefit	Incident Related Delay Benefit	Incident Related Crash Benefit	Fuel Savings
Arterial Traveler Information	$0	$16,999	$0	$0
Freeway Traveler Information	$0	$25,377	$0	$0
Arterial Signal Timing & Control Strategies	$5,021	$136	$31,825	$49,296

Appendix C. Cost Analysis Methodology and Details

This appendix expands upon the methodology overview provided in Chapter 2.0 by describing the detailed procedures, assumptions, and inputs that have been used to generate the estimated costs by jurisdiction and category as presented in Chapter 3.0. The specific topics included in this appendix include:

- Background and explanation of the cost terminology used in this analysis.
- List of the major assumptions applied to this analysis, to maintain a tractable procedure and to reflect the degree of cost data readily available.
- Detailed reference cost data by component for each ITS strategy being considered as part of this analysis.
- Procedures, sample calculations, and results associated with the conversion of component cost data into overall annualized direct and indirect costs by ITS strategy.
- Procedures and sample calculations associated with the allocation of regionwide costs to individual counties.

C.1 Background

In this analysis, costs are handled on a relatively detailed level; every major component is assessed separately in terms of its capital cost, useful life, and O&M cost. Each ITS system is additionally split into the **direct cost** of resources in the field (e.g., CCTV cameras, changeable message signs, ramp meters), and the **indirect cost** associated with their accompanying supporting systems (e.g., centralized software to coordinate and control each system, TMC operators monitoring each system, equipment integration costs/labor). The direct cost of resources in the field is marginal, being incurred on an incremental basis with each additional deployment. In contrast, the indirect costs associated with the supporting systems are generally incurred on an approximately fixed basis, occurring with the first deployment and remaining unchanged as additional components of the same type are added. Direct costs include capital and O&M costs for the field equipment itself, while indirect costs similarly include capital and O&M costs for the supporting systems.

For both direct and indirect costs, there are generally two distinct components:

- **Initial:** deployment costs (which include both the capital cost of the equipment/system and the cost of installation)
- **Ongoing:** operations and maintenance costs

Whereas O&M costs are incurred on an ongoing (yearly) basis, the deployment costs are incurred only once over the useful life of the equipment—specifically, when it is purchased, installed, and configured. Since benefit/cost analyses are generally conducted by comparing annual costs to annual benefits (to ensure a reasonable comparison), these deployment costs need to be amortized over the life of the project. Therefore, for the purposes of this analysis, the deployment costs are converted into equivalent annualized initial costs that are spread evenly across the expected useful life of the system and its components. Details regarding

the procedures and calculations used to convert deployment costs into annualized equivalent costs are provided in the following sections.

C.2 High-Level Assumptions

The following assumptions have been made as part of this cost analysis, to maintain the most straightforward interpretation of results and avoid potential problems associated with using an inaccurate or inappropriate discount/inflation rate:

- No discounting of costs is performed.
- No annual inflation is taken into consideration.

If desired, the information provided in this section is sufficient to conduct additional benefit/cost analyses with non-zero inflation or discount rates, though such an analysis has not been performed here.

For the purposes of this analysis, the total direct costs are assumed to scale proportionally with the number of deployments (i.e., the direct cost of deploying CCTV at three locations is three times the cost of deploying CCTV at one location), while the total indirect costs are assumed fixed, independent of the number of deployments (i.e., the cost of labor/software to control and monitor the cameras is the same whether the system is comprised of 150 cameras or 175).

Furthermore, while each county has been assumed to operate and maintain its own TMC, this analysis includes the overall cost of only one TMC, in acknowledgment of the fact that these eight corridors being analyzed are only a subset of the corridors being monitored, managed, and operated by each of the counties' TMCs. In addition, given the expected wide range of institutional, logistical, and planning functions performed by a dedicated TMC, this assessment ascribes only 25% of the costs of the TMC facility to supporting the strategies considered in this analysis.

C.3 Reference Cost Tables by ITS Strategy

Capital costs, O&M costs, and useful life estimates by component were informed by guidance from FHWA as provided in TOPS-BC, and have been subsequently reviewed and revised for reasonableness. The specific values used for each ITS strategy and component are provided in Table C.1 through Table C.12. Additionally, the following references and data have been used for specific strategies that were not addressed by TOPS-BC:

- **Automatic Vehicle Location Systems for Transit.** AVL useful life estimates are based on the combined useful life of all TSP components weighted by annualized cost, while AVL cost estimates are based on findings from the TCRP Synthesis 73.[25] For AVL systems, four FTEs are assumed to be required for system maintenance, operation, and IT functions, based on findings from the TCRP Synthesis 73.[26]

[25] *TCRP Synthesis 73: AVL Systems for Bus Transit Update.* Transportation Research Board, 2008. p4. http://www.tcrponline.org/PDFDocuments/tsyn73.pdf (accessed 10-21-2016).

[26] *TCRP Synthesis 73: AVL Systems for Bus Transit Update.* Transportation Research Board, 2008. Tables 17, 18, and 21. http://www.tcrponline.org/PDFDocuments/tsyn73.pdf (accessed 10-21-2016).

- **Transportation Management Centers.** These costs have been informed by similar center costs in California as owned and operated by Caltrans.[27]

- **Fiber Communication (Freeway).** These costs have been informed by similar Fiber communications costs in California as owned and maintained by Caltrans.[28]

- **Fiber Communication (Arterials).** These costs have been informed by similar Fiber communications costs in an urban arterial environment, as estimated for ITS in Chicago, IL.[29] Fiber is assumed to be installed underground.

- **DMS-Based Traveler Information (Freeway).** These costs have been informed by similar system costs in California as owned and maintained by Caltrans.[30]

- **DMS-Based Traveler Information (Arterial).** These costs have been informed by similar system costs in an urban arterial environment, as estimated for ITS in Chicago, IL.[31]

- **Signal Retiming Studies.** These costs have been obtained directly from MetroPlan Orlando for 2014, for projects that applied to the eight corridors in this cost analysis.[32] Similar costs are assumed to be incurred annually. Costs are estimated per intersection, rather than per mile, as the correlation between cost and intersection count (R^2 value of 0.86) was found to be stronger than the correlation between cost and corridor length (R^2 value of 0.68).

- **Emergency Vehicle Preemption.** These costs have been informed by similar EVP system costs in an urban arterial environment, as estimated for ITS in Chicago, IL.[33] Useful life estimates are obtained from TOPS-BC estimates for similar TSP components.

- **CCTV Cameras (Freeway).** These costs have been informed by similar freeway-based camera deployments in California as owned and maintained by Caltrans.[34]

- **CCTV Cameras (Arterials).** These costs have been informed by similar freeway-based camera deployments in an urban arterial environment, as estimated for ITS in Chicago, IL.[35]

Note that labor costs are considered for each strategy separately, such that no additional labor considerations are made in the TMC cost category. Rather, the TMC cost table is intended to capture the capital and maintenance cost of the facility itself, apart from the systems and staff associated with the various strategies listed in this section.

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27 Cambridge Systematics. *Caltrans District 12 ITS Master Plan Final Report.* March 2015. Page A-36.

28 Cambridge Systematics. Caltrans District 12 ITS Master Plan Final Report. March 2015. Page A-36.

29 Cambridge Systematics. *Cook DuPage Smart Corridors Plan and Design Report.* 2015. Page 4-3.

30 Cambridge Systematics. *Caltrans District 12 ITS Master Plan Final Report.* March 2015. Page A-35.

31 Cambridge Systematics. *Cook DuPage Smart Corridors Plan and Design Report.* 2015. Page 4-3.

32 GMB Engineers & Planners, Inc. *MetroPlan Orlando Travel Time Studies and B/C Analysis.* 2014. Appendix C.

33 Cambridge Systematics. *Cook DuPage Smart Corridors Plan and Design Report.* 2015. Page 4-3.

34 Cambridge Systematics. *Caltrans District 12 ITS Master Plan Final Report.* March 2015. Page A-34.

35 Cambridge Systematics. *Cook DuPage Smart Corridors Plan and Design Report.* 2015. Page 4-3.

Table C.1 Cost Parameters by Component – CCTV

Component	Useful Life	Capital Cost	O&M Costs (Annual)	Annualized Cost Total
Indirect Cost of Basic Supporting Infrastructure/Equipment (incurred once)				
Hardware/Software for Central CCTV Monitoring	20	$150,000	$7,500	$15,000
System Integration	20	$250,000	$12,500	$25,000
Total Infrastructure Cost	—	$400,000	$20,000	$40,000
Arterial Installation Direct Costs (incurred per location)				
Video Camera and Pole	10	$15,000	$750	$2,250
Total Incremental Cost (Arterial)	—	$15,000	$750	$2,250
Freeway Installation Direct Costs (incurred per location)				
Video Camera	10	$20,000	$2,000	$4,000
Camera Pole	20	$30,000	$475	$1,975
Total Incremental Cost (Freeway)	—	$50,000	$2,475	$5,975

Table C.2 Cost Parameters by Component – Ramp Meters

Component	Useful Life	Capital Cost*	O&M Costs (Annual)*	Annualized Cost Total
Indirect Cost of Basic Supporting Infrastructure/Equipment (incurred once)				
TMC Hardware for Freeway Control	5	$22,500	$2,000	$6,500
TMC Software/Integration	5	$200,000	—	$40,000
Labor	—	—	$250,000	$250,000
Total Indirect Cost	—	$222,500	$252,000	$296,500
Direct Costs (incurred per location)				
Ramp Meter (Signal, Controller)	25	$88,000	$2,000	$5,520
Loop Detectors (two)	25	$11,000	$500	$940
Communication Line	25	$750	$250	$280
Total Direct Cost	—	$99,750	$2,750	$6,740

*Costs are based on the assumption of a communications link to the TMC.

Table C.3 Cost Parameters by Component – DMS Traveler Information

Component	Useful Life	Capital Cost	O&M Costs (Annual)	Annualized Cost Total
Indirect Cost of Basic Supporting Infrastructure/Equipment (incurred once)				
TMC Hardware for Info Dissemination	5	$7,500	$375	$1,875
TMC Software for Info Dissemination	5	$20,000	$1,000	$5,000
TMC System Integration	20	$100,000	$5,000	$10,000
Total Infrastructure Cost	—	$127,500	$6,375	$16,875
Arterial Direct Costs (incurred per location)				
Dynamic Message Sign and Sensing	25	$87,500	$4,150	$7,650
Total Incremental Cost (Arterial)	—	$87,500	$4,150	$7,650
Freeway Direct Costs (incurred per location)				
Communication Line*	—	—	—	—
Dynamic Message Sign	15	$174,250	$6,000	$17,617
Dynamic Message Sign Structure	25	$125,000	$275	$5,275
Total Incremental Cost (Freeway)	—	$299,250	$6,275	$22,892

* Communications costs are assumed to be captured by the fiber communications costs.

Table C.4 Cost Parameters by Component – 511 Traveler Information

Component	Useful Life	Capital Cost	O&M Costs (Annual)	Annualized Cost Total
Indirect Cost of Basic Supporting Infrastructure/Equipment (incurred once)				
TMC Information Dissemination Hardware	5	$7,500	$375	$1,875
TMC Information Dissemination Software	5	$20,000	$1,000	$5,000
TMC System Integration	20	$100,000	$5,000	$10,000
Labor for Traffic Information Dissemination	—	—	$100,000	$100,000
DS3 Communication Line*	—	—	—	—
Transit Center Hardware	10	$22,500	—	$2,250
Transit Center Software, Integration	20	$815,000	$9,000	$49,750
Transit Center Labor	—	—	$150,000	$150,000
Communication Line*	20	—	—	—
Information Service Center Hardware	20	$45,000	$900	$3,150
Info Center System Integration	5	$100,000	—	$20,000
Information Service Center Software	20	$275,000	$20,625	$34,375
Map Database Software	2	$22,500	—	$11,250
Information Service Center Labor	—	—	$225,000	$225,000
Total Infrastructure Cost	—	$1,407,500	$511,900	$612,650

* Communications costs are assumed to be captured by the fiber communications costs.

Table C.5 Cost Parameters by Component – Road Rangers Service Patrol

Component	Useful Life	Capital Cost	O&M Costs (Annual)	Annualized Cost Total
Indirect Cost of Basic Supporting Infrastructure/Equipment (incurred once)				
Video Monitors/Wall for Incident Detection	5	$3,000	$150	$750
TMC Incident Response Hardware	5	$3,000	$150	$750
TMC System Integration	20	$200,000	—	$10,000
TMC Incident Response Software	2	$15,000	$750	$8,250
TMC Labor	—	—	$100,000	$100,000
Emergency Management Center Hardware	10	$22,500	$450	$2,700
Emergency Management Center Software	10	$110,000	$2,000	$13,000
Emergency Response Labor	—	—	$100,000	$100,000
Communication Line	20	$750	$900	$938
Total Infrastructure Cost		$354,250	$204,400	$236,388
Direct Costs (incurred per location)				
Incident Response Vehicle	7	$85,000	$15,000	$27,143
Incident Response Labor	—	—	$100,000	$100,000
Communication Line	25	$750	$250	$280
Total Incremental Cost		$85,750	$115,250	$127,423

Table C.6 Cost Parameters by Component – TMC

Labor/Staffing Costs	Useful Life	Capital Cost	O&M Costs (Annual)	Annualized Cost Total
Facility and Physical Infrastructure Costs				
TMC Facility	25	$30,000,000	$1,500,000	$2,700,000
Total Facility Cost		$30,000,000	$1,500,000	$2,700,000

Table C.7 Cost Parameters by Component – Fiber Communication

Component	Useful Life	Capital Cost	O&M Costs (Annual)	Annualized Cost Total
Indirect Cost of Basic Supporting Infrastructure/Equipment (incurred once)				
System integration cost	—	$0*	$0*	—
Arterial Direct Costs (incurred per mile)				
Installation/capital cost of physical cable	20	$375,000	$250	$19,000
Total Incremental Cost (Arterial)	—	$375,000	$250	$19,000

Component	Useful Life	Capital Cost	O&M Costs (Annual)	Annualized Cost Total
Freeway Direct Costs (incurred per mile)				
Installation/capital cost of physical cable	20	$300,000	$0*	$15,000
Total Incremental Cost (Freeway)	—	$300,000	$0	$15,000

Table C.8 Cost Parameters by Component – Central Traffic Signal Control and Coordination

Component	Useful Life	Capital Cost	O&M Costs (Annual)	Annualized Cost Total
Indirect Cost of Basic Supporting Infrastructure/Equipment (incurred once)				
Linked Signal System LAN	20	$55,000	$1,100	$3,850
TMC Hardware for Signal Control	5	$35,000	$2,000	$9,000
TMC Software/System Integration	5	$200,000	$0	$40,000
Labor	—	$0	$540,000	$540,000
Total Indirect Cost	—	$290,000	$543,100	$592,850
Direct Costs (incurred per intersection)				
Signal Controller	15	$6,250	$350	$767
Communication Line*	—	—	—	—
Loop Detectors (2)	5	$11,750	$4,500	$6,850
Total Direct Cost	—	$18,000	$4,850	$7,617

* Communications costs are assumed to be captured by the fiber communications costs.

Table C.9 Cost Parameters by Component – Signal Retiming Studies

Retiming Project	County	Mileage	Intersections	Cost
Total Costs per Retiming Project				
SR 436 from Line Drive to San Sebastian Prado*	Seminole	3.5	11	$74,434
SR 434 from SR 414 to Manor Ave*	Seminole	4.4**	12**	$78,865**
SR 426 from Old Howell Branch Rd to Dean Rd	Seminole	2.2	8	$53,024
Goldenrod Rd from Liverpool Bl to Bates Rd	Orange	0.51	2	$14,963
Goldenrod Rd from Charlin Pkwy to Pershing Av	Orange	0.73	3	$17,260
Goldenrod Rd from Lake Underhill Rd to Valencia College Ln	Orange	1	4	$21,287
U.S. 441 from Central Florida Pkwy to Hunters Creek Bl*	Orange	3.99	11	$49,403
U.S. 17-92 from Marks St to Greenwood Rd	Orange	5.62	21	$88,751
U.S. 441 from Clarcona Ocoee Rd to SR 50*	Orange	4.8	7	$33,473
Universal Blvd from Sand Lake Rd to Vineland Rd	Orange	2.36	11	$47,402

Retiming Project	County	Mileage	Intersections	Cost
Conroy Rd from Kirkman Oaks to Eastgate Dr	Orange	2.46	10	$45,050
SR 438 from Mercy Av to SR 423	Orange	0.93	3	$17,364
SR 435 from Carrier Dr to Vineland Rd	Orange	1.75	4	$21,977
Central Blvd from Summerlin Av to SR 15	Orange	0.32	3	$15,265
SR 416 from Dardanelle Dr to Rio Grande Av	Orange	2.23	6	$29,010
Multiple	Multiple	5.08	16	$105,178
U.S. 192 from Polynesian Isle Blvd to Bass Rd*	Osceola	3.66	7	$33,971
U.S. 192 from Celebration Pl to Seralago Blvd*	Osceola	1.35	6	$26,911
Overall Average Cost per Intersection				**$5,335**

* This project occurred on one of the corridors included in this benefit-cost analysis.

** Only 2.1 miles of this project overlapped with the corridors selected for this benefit-cost analysis, and therefore only 48% of the cost (based on 2.1 miles out of 4.4 total) will be considered in this analysis.

Table C.10 Cost Parameters by Component – Emergency Vehicle Preemption

Labor/Staffing Costs	Useful Life	Capital Cost	O&M Costs (Annual)	Annualized Cost Total
Direct Costs (incurred per intersection)				
Intersection hardware	5	$10,000	$600	$2,600
Total Cost per Intersection	—	$10,000	$600	$2,600
Direct Costs (incurred per vehicle)				
Vehicle hardware	10	$1,000	—	$100
Total Cost per Vehicle	—	$1,000	—	$100

Table C.11 Cost Parameters by Component – Transit Signal Priority

Component	Useful Life	Capital Cost	O&M Costs (Annual)	Annualized Cost Total
Direct Costs (incurred per intersection)				
Signal Preemption Receiver	5	$4,000	$125	$925
Signal Controller Upgrade	20	$3,500	—	$175
Telecommunications (low usage)	—	—	$190	$190
Total Cost per Intersection	—	$7,500	$315	$1,290
Direct Costs (incurred per vehicle)				
Signal Preemption Processor	10	$450	$10	$55
Cell Based Communications Equipment	10	$200	$10	$30
Total Cost per Vehicle	—	$650	$20	$85

Table C.12 Cost Parameters by Component – Transit AVL

Component	Useful Life	Capital Cost	O&M Costs (Annual)	Annualized Cost Total
Indirect Cost of Basic Supporting Infrastructure/Equipment (incurred once)				
Central System	7	$2,506,759	$448,000	$806,108
Total Infrastructure Cost	—	$2,506,759	$448,000	$806,108
Direct Costs (incurred per vehicle)				
Onboard Equipment	7	$17,577	*	$2,511
Total Incremental Cost	—	$17,577	*	$2,511

* These maintenance costs are captured by the O&M costs for the overall (central) system.

C.4 Calculating Overall Annualized Direct and Indirect Costs

This section describes the procedures used to convert the direct costs by component shown in Table C.1 through Table C.12 into (1) overall annualized direct costs per unit and (2) annualized indirect costs regionwide for supporting systems, for each ITS strategy type as deployed in the Orlando Urban Area.

C.4.1 Procedure

The direct costs associated with field equipment physically installed in each jurisdiction (i.e., ramp meters, dynamic message signs, CCTV, and fiber) are calculated in terms of their initial (i.e., capital) and recurring (i.e., maintenance) costs, and are allocated to their individual jurisdictions accordingly. The indirect costs associated with this field equipment, defined be the costs of supporting systems that accompany the equipment (e.g., centralized software to coordinate and control each system, Transportation Management Center operators monitoring each system, equipment integration costs/labor), are assumed to be independent of the number of devices deployed. These indirect costs are calculated and subsequently distributed across all jurisdictions to which they apply, weighted by the number of deployments on each corridor.

C.4.2 Example

For example, the component cost data for arterial CCTV cameras is provided in Table C.1. Using standard amortization procedures, the overall annualized direct and indirect costs associated with arterial CCTV deployments in the Orlando Urban Area are:

$$Direct\ (Incremental)\ Costs\ Per\ Camera = Annualized\ Capital\ Costs + O\&M\ Costs$$

$$Annualized\ Capital\ Costs = \left(\frac{\$15{,}000\ per\ camera\ \&\ pole}{10\ year\ useful\ life}\right) = \$1{,}500/year$$

$$O\&M\ Costs = (\$750/camera)$$

$$Direct\ (Incremental)\ Costs = \$1{,}500 + \$750 = \$2{,}250$$

$$Indirect\ (Infrastructure)\ Costs = Annualized\ Capital\ Costs + O\&M\ Costs$$

$$Annualized\ Capital\ Costs = \left(\frac{\$150{,}000\ for\ hardware\ \&\ software}{20\ year\ useful\ life}\right) + \left(\frac{\$250{,}000\ for\ system\ integration}{20\ year\ useful\ life}\right)$$

$$= \$20{,}000$$

$$O\&M\ Costs = (\$7{,}500\ for\ hardware\ \&\ software) + (\$12{,}500\ for\ system\ integration)$$

$$= \$20{,}000$$

$$Indirect\ (Infrastructure)\ Costs = \$20{,}000 + \$20{,}000 = \$40{,}000$$

These calculated values for direct and indirect costs associated with arterial CCTV deployments are reported in Table C.13 of the following section.

C.4.3 Results

Table C.13 provides a summary of the overall annualized direct and indirect costs associated with each ITS strategy, following the procedures described in the preceding section. Table 2.2 provides a summary of the components included in each cost category for each ITS system. Annualized costs are calculated with consideration of the useful life for each component separately.

Table C.13 Cost Summary by ITS System

	Direct Costs (per Field Deployment)			Indirect Costs (e.g., Integration, Monitoring)		
ITS System	Capital & Installation	O&M per Year	Annualized Equivalent	Capital & Integration	O&M per Year	Annualized Equivalent
CCTV on Arterials	$15,000 per camera	$750 per camera	$2,250 per camera	$400,000 in TMC costs	$20,000 in TMC costs	$40,000 in TMC costs
CCTV on Freeways	$50,000 per camera	$2,475 per camera	$5,975 per camera	—	Same as above	—
Ramp Meters	$99,750 per ramp	$2,750 per ramp	$6,740 per ramp	$222,500 in TMC costs	$252,000 in TMC costs	$296,500 in TMC costs
Arterial DMS Traveler Information	$87,500 per sign	$4,150 per sign	$7,650 per sign	$127,500 in TMC costs	$6,375 in TMC costs	$16,875 in TMC costs
Freeway DMS Traveler Information	$299,250 per sign	$6,275 per sign	$22,892 per sign	—	Same as above	—
511 Traveler Information System	—	N/A	—	$1,407,500 in TMC costs	$511,900 in TMC costs	$612,650 in TMC costs
Road Rangers Service Patrol	$85,750 per truck	$115,250 per truck	$127,423 per truck	$354,250 in TMC costs	$204,400 in TMC costs	$236,388 in TMC costs

	Direct Costs (per Field Deployment)			Indirect Costs (e.g., Integration, Monitoring)		
ITS System	Capital & Installation	O&M per Year	Annualized Equivalent	Capital & Integration	O&M per Year	Annualized Equivalent
TMC General Functions	—	N/A	—	$30,000,000 for facility	$1,500,000 for facility	$2,700,000 for facility
Fiber Optic on Arterials	$375,000 per mile	$250 per mile	$19,000 per mile	—	None	—
Fiber Optic on Freeways	$300,000 per mile	None	$15,000 per mile	—	None	—
Centralized Signal Control/Coordination	$18,000 per intersection	$4,850 per intersection	$7,617 per intersection	$290,000 in TMC costs	$543,100 in TMC costs	$592,850 in TMC costs
Emergency Vehicle Preemption*	$1,000 per vehicle	None	$100 per vehicle	$10,000 per intersection	$600 per intersection	$2,600 per intersection
Transit Signal Priority*	$650 per vehicle	$20 per vehicle	$85 per vehicle	$7,500 per intersection	$315 per intersection	$1,290 per intersection
Automatic Vehicle Location System	$17,577 per vehicle	None	$2,511 per vehicle	$2,506,759 in TMC costs	$448,000 in TMC costs	$806,108 in TMC costs

* Infrastructure costs are indicated in the Indirect Cost column, though these are incurred by infrastructure installation location (as is more common for direct costs).

C.5 Allocating Costs by Jurisdiction

This section describes the procedures used to suitably apportion the regionwide indirect costs associated with supporting systems across the three counties in the Orlando Urban Area.

C.5.1 Procedures

For support systems associated with field equipment deployed at various locations across the three counties (as indicated in Table A.26), indirect costs associated with the accompanying support systems and infrastructure are calculated and apportioned to the three counties according to the percent of all field devices that are deployed in each jurisdiction.

For systems that provide coverage to the entire network without physical equipment installations along particular routes, the cost calculation involves computing the total cost throughout the Orlando Urban Area and subsequently distributing it across each county according to the methods indicated in Table C.14.

Table C.14 Distributed Costs and Associated Methods for Disaggregating

Distributed Cost Type	Method for Disaggregating Across Counties
Road Rangers Service Patrol	Apportion by county according to the percent of I-4 mileage within the county, out of the full length of I-4 through all three counties.
General TMC Services	Apportion by county according to the total corridor mileage within the county, out of the total corridor mileage across all three counties.
511 Traveler Information System	Apportion by county according to the same method as General TMC services above.
Transit AVL and TSP Services (equipped vehicles only)	Apportion by county according to the percent of directional LYNX route mileage within the county, out of the total directional LYNX route mileage across all three counties.

C.5.2 Examples

CCTV is one ITS strategy with field deployments located throughout the three counties. Therefore, since 17% of arterial CCTV cameras across the eight analysis corridors are deployed in Orange County, 17% of the annualized indirect costs for arterial CCTV monitoring and support ($40,000 per year total) would also be attributed to Orange County.

Road Rangers Service Patrols are deployed across all segments of I-4, but do not have any field devices or site installations associated with this strategy. Instead, the costs of this strategy are computed at a regionwide level first using the annualized Direct and Indirect Cost values in Table C.13, and subsequently allocated to the three counties based on the relative amounts of I-4 mileage in each one. More precisely:

$$Overall\ Cost\ for\ Seminole\ County = (Overall\ Cost\ of\ Road\ Rangers)\left(\frac{14.14\ miles}{46.69\ miles}\right)$$

$$Overall\ Cost\ of\ Road\ Rangers = (Direct\ Costs)\ (12\ vehicles) + Indirect\ Costs$$

$$Overall\ Cost\ of\ Road\ Rangers = (\$127{,}423)\ (12\ vehicles) + \$236{,}388 = \$1{,}765{,}462$$

$$Overall\ Cost\ for\ Seminole\ County = (\$1{,}765{,}462)\left(\frac{14.14\ miles}{46.69\ miles}\right) = \$534{,}668$$

C.6 Cost Analysis Methodology for Supplementary Off-Network Routes

For the supplemental off-network traveler information system, the total project cost is $3,690,000.[36] This cost is assumed to include maintenance and jurisdiction over the useful life of the investment, which is furthermore assumed to be 10 years. Based on these assumptions, the annualized cost of this supplemental off-network traveler information system is $369,000. This cost is split across all counties according to mileage of supplemental routes within each jurisdiction.

[36] Email correspondence with Jim Stroz of Florida DOT on 2-28-2017.

For the supplemental off-network ATCS costs, the per-mile average annual cost of signalization improvements across all jurisdictions will be used to extrapolate the off-network costs based on mileage, where the per-mile rates will be obtained from the core analysis network. As shown in Table C.15, this per-mile cost is $43,988 annually.

Table C.15 Annualized Costs by Category, for the Core Analysis Corridors Only

Cost Category	Arterial Annual Cost	Freeway Annual Cost	Total Annual Cost	Per-Mile Annual Cost
All Counties				
Signal Improvements	$5,121,316	$1,815,550	$6,936,866	$43,988
Incident Management	$847,734	$1,966,894	$2,814,628	$17,848
Travel Time System	$565,092	$368,896	$933,989	$5,923
Transit Strategies	$2,531,136	$0	$2,531,136	$1,214
Total Annualized Cost	$9,065,278	$4,151,340	$13,216,618	$68,972
Orange County				
Signal Improvements	$2,781,998	$1,373,909	$4,155,907	$44,634
Incident Management	$349,200	$998,592	$1,347,793	$14,475
Travel Time System	$309,567	$183,309	$492,876	$5,293
Transit Strategies	$1,982,119	$0	$1,982,119	$1,193
Total Annualized Cost	$5,422,884	$2,555,810	$7,978,694	$65,596
Seminole County				
Signal Improvements	$1,606,324	$441,641	$2,047,966	$54,008
Incident Management	$335,987	$649,841	$985,828	$25,998
Travel Time System	$255,525	$161,412	$416,937	$10,995
Transit Strategies	$254,562	$0	$254,562	$1,497
Total Annualized Cost	$2,452,399	$1,252,894	$3,705,293	$92,498
Osceola County				
Signal Improvements	$732,994	$0	$732,994	$27,484
Incident Management	$162,547	$318,460	$481,007	$18,036
Travel Time System	$0	$24,175	$24,175	$906
Transit Strategies	$294,455	$0	$294,455	$1,159
Total Annualized Cost	$1,189,995	$342,635	$1,532,631	$47,585

Appendix D. Detailed Benefit-Cost Results

This section includes detailed cost and benefit results by jurisdiction and analysis corridor, providing a greater degree of fidelity than the summary result tables shown in Chapters 3 and 4. The specific results available in this appendix include:

- Detailed estimates of annualized costs associated with each ITS strategy type, disaggregated by jurisdiction (see Table D.1).
- Detailed results for the supplemental off-network analysis of benefits and costs.
- Detailed estimates of monetized annual benefits by category, corridor, and jurisdiction, for the baseline analysis scenario (see Table D.3) and the six alternative scenarios presented in Chapter 4 as part of the sensitivity analysis.

D.1 Cost Results by Jurisdiction

Note that transit strategy benefits are not calculated by corridor, as the scope of analysis for the transit strategies included the full LYNX network rather than just the eight corridors shown in Figure 2.2. Consequently, the transit results are reported by county but not by corridor.

Table D.1 Total Annualized Costs by Project Type, for each Jurisdiction

	Orange County	Seminole County	Osceola County	Total
CCTV on Arterials	$49,476	$177,071	$67,704	$294,250
CCTV on Freeways	$11,950	$89,625	$0	$101,575
Ramp Meters	$0	$0	$0	$0
Arterial DMS Traveler Information	$25,614	$136,611	$0	$162,225
Freeway DMS Traveler Information	$0	$114,458	$0	$114,458
511 Traveler Information System (arterials)*	$267,209	$108,824	$0	$376,033
511 Traveler Information System (freeways)*	$173,395	$40,579	$22,643	$236,617
Road Rangers Service Patrol*	$932,633	$534,553	$298,276	$1,765,462
TMC Facility (arterials)*	$261,708	$106,583	$74,963	$443,254
TMC Facility (freeways)*	$169,825	$39,744	$22,177	$231,746
Fiber Optic on Arterials	$961,590	$657,780	$375,630	$1,995,000
Fiber Optic on Freeways	$1,299,600	$424,200	$0	$1,723,800
Centralized Signal Control/Coordination	$1,587,066	$773,034	$250,024	$2,610,124
Emergency Vehicle Preemption (signals)	$204,594	$118,508	$65,962	$389,064
Emergency Vehicle Preemption (vehicles)	$76,244	$27,139	$18,579	$121,962
Transit Signal Priority (signals)	$625,005	$116,584	$84,656	$826,245
Transit Signal Priority (vehicles)	$7,618	$780	$1,165	$9,563
Automatic Vehicle Location System*	$1,242,291	$127,146	$189,971	$1,559,408
Signal Retiming (annually)	$82,876	$112,074	$60,882	$255,832
Total	**$7,978,694**	**$3,705,293**	**$1,532,631**	**$13,216,618**

A dash (—) indicates that a strategy did not have a significant documented deployment in the given jurisdiction.

* These costs were first calculated systemwide across all jurisdictions, and then distributed across each county according to the procedures in Appendix C.

D.2 Results for Supplementary Off-Network Routes

The extrapolated costs and benefits associated with each investment type on the off-network routes (see Figure 2.5) are summarized by jurisdiction in Table D.2.

Table D.2 Annualized Costs and Benefits for Supplemental Off-Network Routes

	Orange County	Seminole County	Osceola County	Total
Traveler Information System (Arterials)				
Mileage	44.6	1.3	10.5	56.4
Total Cost	$268,473	$7,825	$63,206	$339,504
Total Benefits	$758,155	$22,099	$178,490	$958,744
Recurrent Travel Time Benefit	$0	$0	$0	$0
Incident-Related Delay Benefit	$758,155	$22,099	$178,490	$958,744
Incident-Related Crash Benefit	$0	$0	$0	$0
Fuel Savings	$0	$0	$0	$0
Traveler Information System (Freeways)				
Mileage	4.9	0	0	4.9
Total Cost	$29,496	$0	$0	$29,496
Total Benefits	$124,347	$0	$0	$124,347
Recurrent Travel Time Benefit	$0	$0	$0	$0
Incident-Related Delay Benefit	$124,347	$0	$0	$124,347
Incident-Related Crash Benefit	$0	$0	$0	$0
Fuel Savings	$0	$0	$0	$0
Adaptive Traffic Control System (ATCS)				
Mileage	3.8	0	0	3.8
Total Cost	$167,154	$0	$0	$167,154
Total Benefits	$327,856	$0	$0	$327,856
Recurrent Travel Time Benefit	$19,080	$0	$0	$19,080
Incident-Related Delay Benefit	$517	$0	$0	$517
Incident-Related Crash Benefit	$120,935	$0	$0	$120,935
Fuel Savings	$187,325	$0	$0	$187,325

D.3 Sensitivity Analysis Scenario Results

Results are provided in Table D.3 through Table D.9.

Table D.3 Disaggregated Annualized Benefits for the Baseline Analysis Scenario

	Corridor								
	A	B	C	D	E	F	G	H	All
All Counties									
Delay Savings Associated with Recurrent Congestion	$182,359	$211,772	$0	$47,797	$164,016	$60,059	$102,003	$0	$768,006
Incident Management: Delay Savings	$1,279,725	$1,907,284	$804,507	$1,568,522	$4,352,234	$1,413,988	$51,519	$8,502,832	$19,880,612
Incident Management: Crash Reduction Benefits	$3,075,653	$3,754,148	$144,100	$2,841,307	$4,734,767	$2,044,715	$6,275,138	$10,016,505	$32,886,332
All Strategies: Fuel Savings	$1,869,825	$1,690,375	$59,550	$488,697	$1,482,923	$442,982	$945,638	$4,136,735	$11,116,725
Transit Delay Savings									$4,239,291
Orange County									
Delay Savings Associated with Recurrent Congestion	$182,359	$211,772	$0	—	$82,491	—	—	$0	$476,622
Incident Management: Delay Savings	$1,279,725	$1,907,284	$804,507	—	$511,184	—	—	$4,633,282	$9,135,984
Incident Management: Crash Reduction Benefits	$3,075,653	$3,754,148	$144,100	—	$1,421,215	—	—	$5,439,457	$13,834,573
All Strategies: Fuel Savings	$1,869,825	$1,690,375	$59,550	—	$715,230	—	—	$2,244,945	$6,579,925
Transit Delay Savings									$3,013,982
Seminole County									
Delay Savings Associated with Recurrent Congestion	—	—	—	$47,797	$81,525	$60,059	—	$0	$189,381
Incident Management: Delay Savings	—	—	—	$1,568,522	$3,841,050	$1,413,988	—	$3,412,247	$10,235,807
Incident Management: Crash Reduction Benefits	—	—	—	$2,841,307	$3,313,552	$2,044,715	—	$3,706,585	$11,906,160
All Strategies: Fuel Savings	—	—	—	$488,697	$767,692	$442,982	—	$1,531,418	$3,230,790
Transit Delay Savings									$689,775

	Corridor								
	A	B	C	D	E	F	G	H	All
Osceola County									
Delay Savings Associated with Recurrent Congestion	—	—	—	—	—	—	$102,003	$0	$102,003
Incident Management: Delay Savings	—	—	—	—	—	—	$51,519	$457,303	$508,821
Incident Management: Crash Reduction Benefits	—	—	—	—	—	—	$6,275,138	$870,463	$7,145,600
All Strategies: Fuel Savings	—	—	—	—	—	—	$945,638	$360,372	$1,306,010
Transit Delay Savings									$535,534

A dash (—) indicates that a segment does not exist in the given jurisdiction.

Table D.4 Disaggregated Annualized Benefits for the Signalization Improvements Sensitivity Analysis

	Corridor								
	A	B	C	D	E	F	G	H	All
All Counties									
Delay Savings Associated with Recurrent Congestion	$148,859	$168,847	$0	$38,741	$133,194	$48,734	$82,412	$0	$620,787
Incident Management: Delay Savings	$1,279,725	$1,891,141	$804,507	$1,568,522	$4,352,234	$1,413,988	$51,519	$8,502,832	$19,864,468
Incident Management: Crash Reduction Benefits	$3,075,653	$3,754,148	$144,100	$2,841,307	$4,734,767	$2,044,715	$6,275,138	$10,016,505	$32,886,332
All Strategies: Fuel Savings	$1,869,825	$1,690,375	$59,550	$488,697	$1,482,923	$442,982	$945,638	$4,136,735	$11,116,725
Transit Delay Savings									$4,239,291
Orange County									
Delay Savings Associated with Recurrent Congestion	$148,859	$168,847	$0	—	$66,809	—	—	$0	$384,516
Incident Management: Delay Savings	$1,279,725	$1,891,141	$804,507	—	$511,184	—	—	$4,633,282	$9,119,840
Incident Management: Crash Reduction Benefits	$3,075,653	$3,754,148	$144,100	—	$1,421,215	—	—	$5,439,457	$13,834,573
All Strategies: Fuel Savings	$1,869,825	$1,690,375	$59,550	—	$715,230	—	—	$2,244,945	$6,579,925
Transit Delay Savings									$3,013,982
Seminole County									
Delay Savings Associated with Recurrent Congestion	—	—	—	$38,741	$66,384	$48,734	—	$0	$153,859
Incident Management: Delay Savings	—	—	—	$1,568,522	$3,841,050	$1,413,988	—	$3,412,247	$10,235,807
Incident Management: Crash Reduction Benefits	—	—	—	$2,841,307	$3,313,552	$2,044,715	—	$3,706,585	$11,906,160
All Strategies: Fuel Savings	—	—	—	$488,697	$767,692	$442,982	—	$1,531,418	$3,230,790
Transit Delay Savings									$689,775

	Corridor								
	A	B	C	D	E	F	G	H	All
Osceola County									
Delay Savings Associated with Recurrent Congestion	—	—	—	—	—	—	$82,412	$0	$82,412
Incident Management: Delay Savings	—	—	—	—	—	—	$51,519	$457,303	$508,821
Incident Management: Crash Reduction Benefits	—	—	—	—	—	—	$6,275,138	$870,463	$7,145,600
All Strategies: Fuel Savings	—	—	—	—	—	—	$945,638	$360,372	$1,306,010
Transit Delay Savings									$535,534

A dash (—) indicates that a segment does not exist in the given jurisdiction.

Table D.5 Disaggregated Annualized Benefits for the Incident Management Sensitivity Analysis

	Corridor								
	A	B	C	D	E	F	G	H	All
All Counties									
Delay Savings Associated with Recurrent Congestion	$182,359	$208,519	$0	$47,797	$164,016	$60,059	$102,003	$0	$764,753
Incident Management: Delay Savings	$1,280,122	$1,889,703	$802,030	$1,569,409	$4,355,050	$1,414,619	$48,825	$8,209,670	$19,569,428
Incident Management: Crash Reduction Benefits	$2,701,928	$3,221,653	$115,293	$2,336,170	$3,979,320	$1,692,990	$5,142,203	$8,013,195	$27,202,750
All Strategies: Fuel Savings	$1,869,825	$1,690,375	$59,550	$488,697	$1,482,923	$442,982	$945,638	$4,136,735	$11,116,725
Transit Delay Savings									$4,239,291
Orange County									
Delay Savings Associated with Recurrent Congestion	$182,359	$208,519	$0	—	$82,491	—	—	$0	$473,369
Incident Management: Delay Savings	$1,280,122	$1,889,703	$802,030	—	$511,266	—	—	$4,483,495	$8,966,616
Incident Management: Crash Reduction Benefits	$2,701,928	$3,221,653	$115,293	—	$1,229,375	—	—	$4,351,562	$11,619,810
All Strategies: Fuel Savings	$1,869,825	$1,690,375	$59,550	—	$715,230	—	—	$2,244,945	$6,579,925
Transit Delay Savings									$3,013,982
Seminole County									
Delay Savings Associated with Recurrent Congestion	—	—	—	$47,797	$81,525	$60,059	—	$0	$189,381
Incident Management: Delay Savings	—	—	—	$1,569,409	$3,843,784	$1,414,619	—	$3,277,463	$10,105,275
Incident Management: Crash Reduction Benefits	—	—	—	$2,336,170	$2,749,945	$1,692,990	—	$2,965,250	$9,744,355
All Strategies: Fuel Savings	—	—	—	$488,697	$767,692	$442,982	—	$1,531,418	$3,230,790
Transit Delay Savings									$689,775

	Corridor								
	A	B	C	D	E	F	G	H	All
Osceola County									
Delay Savings Associated with Recurrent Congestion	—	—	—	—	—	—	$102,003	$0	$102,003
Incident Management: Delay Savings	—	—	—	—	—	—	$48,825	$448,713	$497,538
Incident Management: Crash Reduction Benefits	—	—	—	—	—	—	$5,142,203	$696,382	$5,838,585
All Strategies: Fuel Savings	—	—	—	—	—	—	$945,638	$360,372	$1,306,010
Transit Delay Savings									$535,534

A dash (—) indicates that a segment does not exist in the given jurisdiction.

Table D.6 Disaggregated Annualized Benefits for the Travel Time System Breadth Sensitivity Analysis

	Corridor								
	A	B	C	D	E	F	G	H	All
All Counties									
Delay Savings Associated with Recurrent Congestion	$182,359	$208,519	$0	$47,797	$164,016	$60,059	$102,003	$0	$764,753
Incident Management: Delay Savings	$1,023,459	$1,520,006	$649,632	$1,252,631	$3,471,028	$1,130,525	$51,519	$7,638,435	$16,737,236
Incident Management: Crash Reduction Benefits	$3,075,653	$3,754,148	$144,100	$2,841,307	$4,734,767	$2,044,715	$6,275,138	$10,016,505	$32,886,332
All Strategies: Fuel Savings	$1,869,825	$1,690,375	$59,550	$488,697	$1,482,923	$442,982	$945,638	$4,136,735	$11,116,725
Transit Delay Savings									$4,239,291
Orange County									
Delay Savings Associated with Recurrent Congestion	$182,359	$208,519	$0	—	$82,491	—	—	$0	$473,369
Incident Management: Delay Savings	$1,023,459	$1,520,006	$649,632	—	$408,925	—	—	$4,108,003	$7,710,026
Incident Management: Crash Reduction Benefits	$3,075,653	$3,754,148	$144,100	—	$1,421,215	—	—	$5,439,457	$13,834,573
All Strategies: Fuel Savings	$1,869,825	$1,690,375	$59,550	—	$715,230	—	—	$2,244,945	$6,579,925
Transit Delay Savings									$3,013,982
Seminole County									
Delay Savings Associated with Recurrent Congestion	—	—	—	$47,797	$81,525	$60,059	—	$0	$189,381
Incident Management: Delay Savings	—	—	—	$1,252,631	$3,062,103	$1,130,525	—	$3,141,627	$8,586,887
Incident Management: Crash Reduction Benefits	—	—	—	$2,841,307	$3,313,552	$2,044,715	—	$3,706,585	$11,906,160
All Strategies: Fuel Savings	—	—	—	$488,697	$767,692	$442,982	—	$1,531,418	$3,230,790
Transit Delay Savings									$689,775

	Corridor								
	A	B	C	D	E	F	G	H	All
Osceola County									
Delay Savings Associated with Recurrent Congestion	—	—	—	—	—	—	$102,003	$0	$102,003
Incident Management: Delay Savings	—	—	—	—	—	—	$51,519	$388,805	$440,324
Incident Management: Crash Reduction Benefits	—	—	—	—	—	—	$6,275,138	$870,463	$7,145,600
All Strategies: Fuel Savings	—	—	—	—	—	—	$945,638	$360,372	$1,306,010
Transit Delay Savings									$535,534

A dash (—) indicates that a segment does not exist in the given jurisdiction.

Table D.7 Disaggregated Annualized Benefits for the Travel Time System Effectiveness Sensitivity Analysis

	Corridor								
	A	B	C	D	E	F	G	H	All
All Counties									
Delay Savings Associated with Recurrent Congestion	$182,359	$208,519	$0	$47,797	$164,016	$60,209	$102,478	$0	$765,378
Incident Management: Delay Savings	$1,023,459	$1,520,006	$649,632	$1,252,631	$3,471,028	$1,141,547	$51,803	$7,638,437	$16,748,545
Incident Management: Crash Reduction Benefits	$3,075,653	$3,754,148	$144,100	$2,841,307	$4,734,767	$2,044,715	$6,275,138	$10,016,505	$32,886,332
All Strategies: Fuel Savings	$1,869,825	$1,690,375	$59,550	$488,697	$1,482,923	$442,982	$945,638	$4,136,735	$11,116,725
Transit Delay Savings									$4,239,291
Orange County									
Delay Savings Associated with Recurrent Congestion	$182,359	$208,519	$0	—	$82,491	—	—	$0	$473,369
Incident Management: Delay Savings	$1,023,459	$1,520,006	$649,632	—	$408,925	—	—	$4,108,003	$7,710,026
Incident Management: Crash Reduction Benefits	$3,075,653	$3,754,148	$144,100	—	$1,421,215	—	—	$5,439,457	$13,834,573
All Strategies: Fuel Savings	$1,869,825	$1,690,375	$59,550	—	$715,230	—	—	$2,244,945	$6,579,925
Transit Delay Savings									$3,013,982
Seminole County									
Delay Savings Associated with Recurrent Congestion	—	—	—	$47,797	$81,525	$60,209	—	$0	$189,531
Incident Management: Delay Savings	—	—	—	$1,252,631	$3,062,103	$1,141,547	—	$3,141,627	$8,597,909
Incident Management: Crash Reduction Benefits	—	—	—	$2,841,307	$3,313,552	$2,044,715	—	$3,706,585	$11,906,160
All Strategies: Fuel Savings	—	—	—	$488,697	$767,692	$442,982	—	$1,531,418	$3,230,790
Transit Delay Savings									$689,775

	Corridor								
	A	B	C	D	E	F	G	H	All
Osceola County									
Delay Savings Associated with Recurrent Congestion	—	—	—	—	—	—	$102,478	$0	$102,478
Incident Management: Delay Savings	—	—	—	—	—	—	$51,803	$388,807	$440,611
Incident Management: Crash Reduction Benefits	—	—	—	—	—	—	$6,275,138	$870,463	$7,145,600
All Strategies: Fuel Savings	—	—	—	—	—	—	$945,638	$360,372	$1,306,010
Transit Delay Savings									$535,534

A dash (—) indicates that a segment does not exist in the given jurisdiction.

Table D.8 Disaggregated Annualized Benefits for the Value-of-Time Sensitivity Analysis

	Corridor								
	A	B	C	D	E	F	G	H	All
All Counties									
Delay Savings Associated with Recurrent Congestion	$145,887	$166,815	$0	$38,237	$131,213	$48,048	$81,603	$0	$611,803
Incident Management: Delay Savings	$1,023,780	$1,512,912	$643,497	$1,254,818	$3,481,787	$1,131,190	$41,215	$6,801,450	$15,890,650
Incident Management: Crash Reduction Benefits	$3,075,653	$3,754,148	$144,100	$2,841,307	$4,734,767	$2,044,715	$6,275,138	$10,016,505	$32,886,332
All Strategies: Fuel Savings	$1,869,825	$1,690,375	$59,550	$488,697	$1,482,923	$442,982	$945,638	$4,136,735	$11,116,725
Transit Delay Savings									$3,390,388
Orange County									
Delay Savings Associated with Recurrent Congestion	$145,887	$166,815	$0	—	$65,992	—	—	$0	$378,695
Incident Management: Delay Savings	$1,023,780	$1,512,912	$643,497	—	$408,948	—	—	$3,706,205	$7,295,342
Incident Management: Crash Reduction Benefits	$3,075,653	$3,754,148	$144,100	—	$1,421,215	—	—	$5,439,457	$13,834,573
All Strategies: Fuel Savings	$1,869,825	$1,690,375	$59,550	—	$715,230	—	—	$2,244,945	$6,579,925
Transit Delay Savings									$2,410,443
Seminole County									
Delay Savings Associated with Recurrent Congestion	—	—	—	$38,237	$65,220	$48,048	—	$0	$151,505
Incident Management: Delay Savings	—	—	—	$1,254,818	$3,072,840	$1,131,190	—	$2,729,468	$8,188,315
Incident Management: Crash Reduction Benefits	—	—	—	$2,841,307	$3,313,552	$2,044,715	—	$3,706,585	$11,906,160
All Strategies: Fuel Savings	—	—	—	$488,697	$767,692	$442,982	—	$1,531,418	$3,230,790
Transit Delay Savings									$551,650

	Corridor								
	A	B	C	D	E	F	G	H	All
Osceola County									
Delay Savings Associated with Recurrent Congestion	—	—	—	—	—	—	$81,603	$0	$81,603
Incident Management: Delay Savings	—	—	—	—	—	—	$41,215	$365,777	$406,992
Incident Management: Crash Reduction Benefits	—	—	—	—	—	—	$6,275,138	$870,463	$7,145,600
All Strategies: Fuel Savings	—	—	—	—	—	—	$945,638	$360,372	$1,306,010
Transit Delay Savings									$428,295

A dash (—) indicates that a segment does not exist in the given jurisdiction.

Table D.9 Disaggregated Annualized Benefits for the Fuel Costs Sensitivity Analysis

	Corridor								
	A	B	C	D	E	F	G	H	All
All Counties									
Delay Savings Associated with Recurrent Congestion	$179,570	$208,510	$0	$47,818	$163,998	$60,088	$101,997	$0	$761,980
Incident Management: Delay Savings	$1,275,427	$1,891,323	$804,507	$1,568,645	$4,352,725	$1,414,152	$51,520	$8,502,832	$19,861,132
Incident Management: Crash Reduction Benefits	$2,644,218	$3,754,148	$144,100	$2,841,307	$4,734,767	$2,044,715	$6,275,138	$10,016,505	$32,454,897
All Strategies: Fuel Savings	$1,494,300	$1,350,888	$47,598	$390,570	$1,185,075	$354,025	$755,707	$3,305,893	$8,884,055
Transit Delay Savings									$4,239,291
Orange County									
Delay Savings Associated with Recurrent Congestion	$179,570	$208,510	$0	—	$82,485	—	—	$0	$470,565
Incident Management: Delay Savings	$1,275,427	$1,891,323	$804,507	—	$511,250	—	—	$4,633,282	$9,115,790
Incident Management: Crash Reduction Benefits	$2,644,218	$3,754,148	$144,100	—	$1,421,215	—	—	$5,439,457	$13,403,138
All Strategies: Fuel Savings	$1,494,300	$1,350,888	$47,598	—	$571,575	—	—	$1,794,055	$5,258,415
Transit Delay Savings									$3,013,982
Seminole County									
Delay Savings Associated with Recurrent Congestion	—	—	—	$47,818	$81,513	$60,088	—	$0	$189,418
Incident Management: Delay Savings	—	—	—	$1,568,645	$3,841,475	$1,414,152	—	$3,412,247	$10,236,520
Incident Management: Crash Reduction Benefits	—	—	—	$2,841,307	$3,313,552	$2,044,715	—	$3,706,585	$11,906,160
All Strategies: Fuel Savings	—	—	—	$390,570	$613,500	$354,025	—	$1,223,858	$2,581,953
Transit Delay Savings									$689,775

	Corridor								
	A	B	C	D	E	F	G	H	All
Osceola County									
Delay Savings Associated with Recurrent Congestion	—	—	—	—	—	—	$101,997	$0	$101,997
Incident Management: Delay Savings	—	—	—	—	—	—	$51,520	$457,303	$508,823
Incident Management: Crash Reduction Benefits	—	—	—	—	—	—	$6,275,138	$870,463	$7,145,600
All Strategies: Fuel Savings	—	—	—	—	—	—	$755,707	$287,980	$1,043,688
Transit Delay Savings									$535,534

A dash (—) indicates that a segment does not exist in the given jurisdiction.

APPENDIX B

Vision, Goals & Objectives Survey Questionaire

MetroPlan Orlando ITS Master Plan Survey Questionnaire

ITS Steering Committee Members

This survey questionnaire is intended to assist the ITS Steering Committee in developing a draft vision statement, goals, and objectives for the MetroPlan Orlando ITS Master Plan. The survey results will be used to prepare a draft vision statement, along with draft goals and objectives, for a presentation at the next Quarterly Progress Meeting scheduled for March 16, 2016.

Please provide your ideas and suggestions in the spaces below or in a separate email. Your responses can be in sentences, phrases or simply key words. To assist your efforts, we've selected examples of current vision statements, goals and objectives that have been adopted by other MPOs, regional organizations, and counties in Florida and around the nation.

In a separate attachment to this survey, is a list of relevant vision, goals and objectives that are contained in adopted FDOT ITS Plans and MetroPlan Orlando Plans. This information will be useful in helping us to promote consistency between the MetroPlan Orlando ITS Master Plan and other adopted state and regional ITS plans.

1. What should be included in a Vision Statement for the Metroplan Orlando ITS Master Plan? *Think of the vision statement as the purpose of ITS and what ITS should become.*

   Examples of adopted ITS Vision Statements, include:

   - *Maximize the use of the existing Transportation system by providing increased accessibility, reliability, and safety as a part of a fully integrated multi-modal experience. (Space Coast TPO)*
   - *The Intelligent Transportation System shall strive to become an institutionally integrated and fully cooperative coalition of all transportation, public safety and emergency services stakeholders in the region and beyond; an information-rich source of travel information for all wi in the region and beyond;… (First Coast TPO)*
   - *Regional ITS partner agencies will deploy efficient management processes and systems to promote and facilitate cooperative, regional and multimodal operations (Denver Regional Council of Governments)*

2. What are some suggested Goals for the ITS Master Plan? *Consider a Goal to be a way to achieve the ITS Vision…a more defined purpose or end that provides direction for agency and community decisions.*

Examples of adopted ITS Master Plan Goals, include:

- *The metropolitan region will use the best available technology to maximize system efficiencies. (Metropolitan Washington Council of Governments)*
- *Enhance the safety and security for all transportation modes (Hillsborough County MPO).*

3. Identify any Objectives you feel should be used to measure the achievement of a Goal. *Consider an objective to be an attainable and measureable statements of the actions needed to carry out the plan.*

Examples of adopted ITS Master Plan Objectives and measures, include:

- *Reduce system wide delay for automobiles, transit, and trucks. Measure: vehicle hours of delay*
- *Improve real time transit operations. Measure: Percent of transit routes with real time monitoring*
- *Minimize the duration of highway and transit incidents. Measurement: verification, response and clearance times.*
- *Increase ITS investments to improve system performance. Measurement: increase in ITS funding*

Please send your comments to Howard Glassman at hglassman@gfnet.com. I can be reached at (850) 309-7904 (Office) or (850) 508-5029 (Cell) should you have any questions. Thank you for participating.

APPENDIX C

Applicable Regional ITS Architecture Needs

Needs Based on Regional ITS Architecture

Needs	From	To
Alarm	Regional Public Safety Agencies (911 Emergency Call Centers)	Private Fleet Vehicle Dispatch Systems
	Private Fleet Vehicle Dispatch Systems	Regional Public Safety Agencies (911 Emergency Call Centers)
Alarm Notification	All Aboard Florida Vehicles	All Aboard Florida Rail Operations
Alarm Acknowledgement	All Aboard Florida Rail Operations	All Aboard Florida Vehicles
Alert Notification	County EOCs/Warning Points	City of Orlando TMC
	FLDE Headquarters	City of Orlando TMC
	County EOCs/Warning Points	LYNX (Access LYNX Paratransit Systems)
	County EOCs/Warning Points	CFX Expressway Management System
	FDLE Headquarters	CFX Expressway Management System
	County EOCs/Warning Points	City of Winter Park TOC
	FDLE Headquarters	City of Winter Park TOC
	County EOCs/Warning Points	County and City Public Information System
	County EOCs/Warning Points	County and City Roadway Maintenance and Construction Systems
Alert Notification Coordination	Regional Public Safety Agencies (911 Emergency Call Centers)	County EOCs/Warning Points

	County EOCs/Warning Points	Regional Public Safety Agencies (911 Emergency Call Centers)
Alert Status	City of Orlando TMC	County EOCs/Warning Points
	LYNX (Access LYNX Paratransit Systems)	County EOCs/Warning Points
	CFX Expressway Management System	County EOCs/Warning Points
	CFX Expressway Management System	FDLE Headquarters
	City of Winter Park TOC	County EOCs/Warning Points
	City of Winter Park TOC	FDLE Headquarters
	County and City Public Information System	County EOCs/Warning Points
	County and City Roadway Maintenance and Construction Systems	County EOCs/Warning Points
Archive Coordination	FDOT D5 (Central Florida Data Warehouse)	FDOT Statewide OIS Enterprise Databases
Archive Data Products	FDOT District 5 (Central Florida Data Warehouse)	Archive Data User Systems
	FDOT Statewide OIS Enterprise Databases	Archive Data User Systems
	MetroPlan Orlando Transportation Data Collection System	Archive Data User Systems
	FHP Central Data Collection System	FDOT Safety and Crash Data Collection System
Archive Data Product Requests	Archive Data User Systems	FDOT District 5 (Central Florida Data Warehouse)

	Archive Data User Systems	FDOT Statewide OIS Enterprise Databases
	Archive Data User Systems	MetroPlan Orlando Transportation Data Collection System
	FDOT Safety and Crash Data Collection System	FHP Central Data Collection System
Archive Requests	FDOT District 5 (Central Florida Data Warehouse)	City of Orlando TMC
	Local Transportation Data Collection Systems	Regional Public Safety Agencies (911 Emergency Call Centers)
	FDOT D5 (Central Florida Data Warehouse)	Air Freight Terminals
	FDOT D5 (Central Florida Data Warehouse)	Amtrak Passenger Train Terminal
	Local Transportation Data Collection Systems	Amtrak Passenger Train Terminal
	MetroPlan Orlando Transportation Data Collection System	Amtrak Passenger Train Terminal
	Local Transportation Data Collection Systems	Archive Data User Systems
	MetroPlan Orlando Transportation Data Collection System	Brevard County TOC
	FDOT D5 (Central Florida Data Warehouse)	CFX Expressway Management System
	MetroPlan Orlando Transportation Data Collection System	Canaveral/Kennedy Space Port
	FDOT D5 (Central Florida Data Warehouse)	City of Maitland TOC
	FDOT D5 (Central Florida Data Warehouse)	City of Winter Park TOC

	FDOT D5 (Central Florida Data Warehouse)	County and Local Traffic Control Systems
	FDOT D5 (Central Florida Data Warehouse)	Disney TOC
	FDOT D5 (Central Florida Data Warehouse)	Counties and Cities (FlexBus Consortium Transit Management)
	FDOT D5 (Central Florida Data Warehouse)	FDOT (Florida 511)
	FDOT D5 (Central Florida Data Warehouse)	Local Agency Traveler Information System
	FDOT D5 (Central Florida Data Warehouse)	LYNX Transportation Center
	FDOT D5 (Central Florida Data Warehouse)	Orange County TMC
	FDOT D5 (Central Florida Data Warehouse)	Orlando Intermodal Center
	FDOT D5 (Central Florida Data Warehouse)	Orlando International Airport
	FDOT D5 (Central Florida Data Warehouse)	Orlando-Sanford International Airport
	FDOT D5 (Central Florida Data Warehouse)	Osceola County TOC
	FDOT D5 (Central Florida Data Warehouse)	Rail Intermodal Terminals
	FDOT D5 (Central Florida Data Warehouse)	Seminole County TMC
	MetroPlan Orlando Transportation Data Collection System	Daytona Beach International Airport
	FHP Central Data Collection System	FHP Troop D Dispatch

Archive Status	FDOT D5 (Central Florida Data Warehouse)	City of Orlando TMC
	City of Orlando TMC	FLDE Headquarters
	Local Transportation Data Collection Systems	Regional Public Safety Agencies (911 Emergency Call Centers)
	FDOT D5 (Central Florida Data Warehouse)	Air Freight Terminals
	FDOT D5 (Central Florida Data Warehouse)	Amtrak Passenger Train Terminal
	Local Transportation Data Collection Systems	Amtrak Passenger Train Terminal
	MetroPlan Orlando Transportation Data Collection System	Amtrak Passenger Train Terminal
	Local Transportation Data Collection Systems	Archive Data User Systems
	MetroPlan Orlando Transportation Data Collection System	Brevard County TOC
	FDOT D5 (Central Florida Data Warehouse)	CFX Expressway Management System
	MetroPlan Orlando Transportation Data Collection System	Canaveral/Kennedy Space Port
	FDOT D5 (Central Florida Data Warehouse)	City of Maitland TOC
	FDOT D5 (Central Florida Data Warehouse)	City of Winter Park TOC
	FDOT D5 (Central Florida Data Warehouse)	County and Local Traffic Control Systems
	FDOT D5 (Central Florida Data Warehouse)	Disney TOC
	FDOT D5 (Central Florida Data Warehouse)	Counties and Cities (FlexBus Consortium Transit Management)

	FDOT D5 (Central Florida Data Warehouse)	FDOT (Florida 511)
	FDOT D5 (Central Florida Data Warehouse)	FTE Operations Center (Turkey Lake)
	FDOT D5 (Central Florida Data Warehouse)	Local Agency Traveler Information System
	FDOT D5 (Central Florida Data Warehouse)	LYNX Transportation Center
	FDOT D5 (Central Florida Data Warehouse)	Orange County TMC
	FDOT D5 (Central Florida Data Warehouse)	Orlando Intermodal Center
	FDOT D5 (Central Florida Data Warehouse)	Orlando International Airport
	FDOT D5 (Central Florida Data Warehouse)	Orlando-Sanford International Airport
	FDOT D5 (Central Florida Data Warehouse)	Osceola County TOC
	FDOT D5 (Central Florida Data Warehouse)	Rail Intermodal Terminals
	FDOT D5 (Central Florida Data Warehouse)	Seminole County TMC
	MetroPlan Orlando Transportation Data Collection System	Daytona Beach International Airport
	FHP Central Data Collection System	FHP Troop D Dispatch
Asset Inventory	County and Local Asset Management Systems	County and City Roadway Maintenance and Construction Systems
	FDOT Asset Management Systems	FDOT D5 (Construction and Maintenance)

Asset Restrictions	County and Local Asset Management Systems	County and City Roadway Maintenance and Construction Systems
	FDOT Asset Management Systems	FDOT D5 (Construction and Maintenance)
Asset Status Update	County and City Roadway Maintenance and Construction Systems	County and Local Asset Management Systems
	FDOT D5 (Construction and Maintenance)	FDOT Asset Management Systems
Bad Tag List	LYNX (Access LYNX Paratransit Systems)	LYNX (Access LYNX Paratransit Vehicles)
	All Aboard Florida Rail Operations	All Aboard Florida Vehicles
Broadcast Traveler Information	CFX Public Website	Private Travelers Personal Computing Devices
Care Facility Status	Regional Medical Centers	County Sheriffs Vehicles
Care Facility Status Request	County Sheriffs Vehicles	Regional Medical Centers
CCTV Images	LYNX (Access LYNX Paratransit Systems)	County Sheriff Dispatch
	LYNX (Access LYNX Paratransit Systems)	Local Police Dispatch
Commercial Vehicle Breach	Commercial Vehicle	Private Fleet Vehicle Dispatch System

Cooperative Adaptive Cruise Control Parameters	FDOT D5 (Field Equipment)	Commercial Vehicle
Cooperative Adaptive Cruise Control Status	Commercial Vehicle	FDOT D5 (Field Equipment)
Crash Data	Brevard County TOC	MetroPlan Orlando Transportation Data Collection System
Current Asset Restrictions	County and City Roadway Maintenance and Construction System	City of Orlando TMC
	County and City Roadway Maintenance and Construction System	Regional Public Safety Agencies (911 Emergency Call Centers)
	FDOT D5 (Construction and Maintenance)	Regional Public Safety Agencies (911 Emergency Call Centers)
	County and City Roadway Maintenance and Construction Systems	LYNX (Access LYNX Paratransit Systems)
	County and City Roadway Maintenance and Construction Systems	City of Winter Park TOC
	County and City Roadway Maintenance and Construction Systems	City of Maitland TOC
	County and City Roadway Maintenance and Construction Systems	County and Local Traffic Control Systems
	County and City Roadway Maintenance and Construction Systems	County EOCs/Warning Points

	County and City Roadway Maintenance and Construction Systems	County Fire EMC/Rescue Dispatch
	County and City Roadway Maintenance and Construction Systems	County Sheriff Dispatch
	County and City Roadway Maintenance and Construction Systems	Disney Traffic Operations Center
	County and City Roadway Maintenance and Construction Systems	FDOT D5 (EOC)
	County and City Roadway Maintenance and Construction Systems	FlexBus Consortium Transit Management
	County and City Roadway Maintenance and Construction Systems	FDOT (Florida 511)
	County and City Roadway Maintenance and Construction Systems	Florida HAZMAT Permitting System
	County and City Roadway Maintenance and Construction Systems	FTE Operations Center (Turkey Lake)
	County and City Roadway Maintenance and Construction Systems	I-RIDE Tourist Shuttle Dispatch
	County and City Roadway Maintenance and Construction Systems	Local Agency Traveler Information System
	County and City Roadway Maintenance and Construction Systems	Local EOCs
	County and City Roadway Maintenance and Construction Systems	Local Fire/EMS Dispatch

	County and City Roadway Maintenance and Construction Systems	Local Police Dispatch
	County and City Roadway Maintenance and Construction Systems	Local Transit Operator Systems
	County and City Roadway Maintenance and Construction Systems	LYNX On-Demand Transit Management
	County and City Roadway Maintenance and Construction Systems	LYNX Transportation Center
	County and City Roadway Maintenance and Construction Systems	Osceola County TOC
	County and City Roadway Maintenance and Construction Systems	Private Sector Traveler Information Services
	County and City Roadway Maintenance and Construction Systems	School District Transportation Dispatch
	County and City Roadway Maintenance and Construction Systems	Seminole County TMC
Decision Support Information	County Sheriff Dispatch	County Sheriff's Vehicles
Demand Responsive Transit Plan	LYNX (Access LYNX Paratransit Systems)	LYNX Website
Device Control Request	FDOT D5/FHP (FDOT D5 RTMC)	City of Orlando TMC
	City of Orlando TMC	FDOT D5/FHP (FDOT D5 RTMC)
Device Data	FDOT D5/FHP (FDOT D5 RTMC)	City of Orlando TMC

	City of Orlando TMC	FDOT D5/FHP (FDOT D5 RTMC)
Device Status	FDOT D5/FHP (FDOT D5 RTMC)	City of Orlando TMC
	City of Orlando TMC	FDOT D5/FHP (FDOT D5 RTMC)
Driver Alert Response	Commercial Vehicle	Private Fleet Vehicle Dispatch System
Driver Information	FDOT D5 (Field Equipment)	Vehicles
Emergency Archive Data	FHP Troop D Dispatch	FHP Central Data Collection System
Emergency Dispatch Requests	County Sheriff Dispatch	County Sheriff's Vehicles
Emergency Dispatch Response	County Sheriff's Vehicles	County Sheriff Dispatch
Emergency Plan Coordination	City of Orlando TMC	County EOCs/Warning Points
	County EOCs/Warning Points	City of Orlando TMC
	Regional Public Safety Agencies (911 Emergency Call Centers)	County and City Roadway Maintenance and Construction System
	County and City Roadway Maintenance and Construction System	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	County and Local Traffic Control Systems
	County and Local Traffic Control Systems	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	County EOCs/Warning Points

	County EOCs/Warning Points	Regional Public Safety Agencies (911 Emergency Call Centers)
	LYNX (Access LYNX Paratransit Systems)	County EOCs/Warning Points
	County EOCs/Warning Points	LYNX (Access LYNX Paratransit Systems)
	County EOCs/Warning Points	CFX Expressway Management System
	CFX Expressway Management System	County EOCs/Warning Points
	City of Winter Park TOC	County EOCs/Warning Points
	County EOCs/Warning Points	City of Winter Park TOC
	County and City Roadway Maintenance and Construction Systems	County EOCs/Warning Points
	County EOCs/Warning Points	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	County Fire EMC/Rescue Dispatch
	County Fire EMC/Rescue Dispatch	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	County Sheriff Dispatch
	County Sheriff Dispatch	County and City Roadway Maintenance and Construction Systems
Emergency Traffic Control Information	City of Orlando TMC	County EOCs/Warning Points
	County and Local Traffic Control Systems	Regional Public Safety Agencies (911 Emergency Call Centers)

	CFX Expressway Management System	County EOCs/Warning Points
	City of Winter Park TOC	County EOCs/Warning Points
Emergency Traffic Control Request	County EOCs/Warning Points	City of Orlando TMC
	County EOCs/Warning Points	CFX Expressway Management System
	County EOCs/Warning Points	City of Winter Park TOC
Emergency Traffic Coordination	FDOT Statewide ITS WAN/C2C Infrastructure	City of Orlando TMC
	City of Orlando TMC	FDOT Statewide ITS WAN/C2C Infrastructure
	CFX Expressway Management System	FDOT Statewide ITS WAN/C2C Infrastructure
	FDOT Statewide ITS WAN/C2C Infrastructure	CFX Expressway Management System
Emergency Transit Schedule Information	LYNX (Access LYNX Paratransit Systems)	County EOCs/Warning Points
Emergency Transit Service Request	County EOCs/Warning Points	LYNX (Access LYNX Paratransit Systems)
Emergency Transit Service Response	LYNX (Access LYNX Paratransit Systems)	County EOCs/Warning Points
Emergency Traveler Information	County Emergency Broadcast Systems	Private Travelers Personal Computing Devices
Emergency Vehicle Tracking Data	County Sheriff's Vehicles	County Sheriff Dispatch

Environmental Conditions Data	City of Orlando TMC	National Hurricane Center Info. System
	City of Orlando TMC	National Weather Service
	City of Winter Park TOC	National Hurricane Center Info. System
	City of Winter Park TOC	National Weather Service
	County and Local Traffic Control Systems	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	County and Local Traffic Control Systems
	County and Local Traffic Control Systems	County and City Roadway Maintenance and Construction Systems
	FTE Operations Center (Turkey Lake)	County and City Roadway Maintenance and Construction Systems
	Seminole County TMC	County and City Roadway Maintenance and Construction Systems
Environmental Conditions Data Status	National Hurricane Center Info. System	County and City Roadway Maintenance and Construction Systems
	National Weather Service	County and City Roadway Maintenance and Construction Systems
Environmental Probe Data	County and Local Field Equipment	County and City Roadway Maintenance and Construction Systems

Environmental Sensors Control	City of Orlando TMC	City of Orlando (Field Equipment)
	City of Winter Park TOC	City of Winter Park (Field Equipment)
	County and City Roadway Maintenance and Construction Systems	County and City PWD Vehicles
	County and Local Traffic Control Systems	County and Local Field Equipment
	FDOT D5 RTMC	FDOT D5 (Field Equipment)
Environmental Sensor Data	City of Orlando (Field Equipment)	City of Orlando TMC
	City of Winter Park (Field Equipment)	City of Winter Park TOC
	County and City PWD Vehicles	County and City Roadway Maintenance and Construction Systems
Equipment Maintenance Status	County and City Roadway Maintenance and Construction System	City of Orlando TMC
	County and City Roadway Maintenance and Construction Systems	City of Winter Park TOC
	County and City Roadway Maintenance and Construction Systems	City of Maitland TOC
	County and City Roadway Maintenance and Construction Systems	County and Local Traffic Control Systems
	County and City Roadway Maintenance and Construction Systems	Disney Traffic Operations Center

	County and City Roadway Maintenance and Construction Systems	FTE Operations Center (Turkey Lake)
	County and City Roadway Maintenance and Construction Systems	Orange County TMC
	County and City Roadway Maintenance and Construction Systems	Osceola County TOC
	County and City Roadway Maintenance and Construction Systems	Seminole County TMC
Evacuation Coordination	Regional Public Safety Agencies (911 Emergency Call Centers)	County EOCs/Warning Points
	County EOCs/Warning Points	Regional Public Safety Agencies (911 Emergency Call Centers)
Evacuation Information	County EOCs/Warning Points	City of Orlando TMC
	Regional Public Safety Agencies (911 Emergency Call Centers)	County and City Roadway Maintenance and Construction System
	Regional Public Safety Agencies (911 Emergency Call Centers)	County and Local Traffic Control Systems
	County EOCs/Warning Points	LYNX (Access LYNX Paratransit Systems)
	County EOCs/Warning Points	City of Winter Park TOC
	County Fire EMC/Rescue Dispatch	County and City Roadway Maintenance and Construction Systems
	County Sheriff Dispatch	County and City Roadway Maintenance and Construction Systems
	County EOCs/Warning Points	County Emergency Broadcast Systems

Event Confirmation	City of Orlando TMC	Municipality Event Permit Systems
	City of Winter Park TOC	Municipality Event Permit Systems
Event Plans	Municipality Event Permit Systems	City of Orlando TMC
	Local Venue Event Scheduling System	City of Winter Park TOC
	Municipality Event Permit Systems	City of Winter Park TOC
	Local Venue Event Scheduling System	County and City Roadway Maintenance and Construction Systems
	Municipality Event Permit Systems	County and City Roadway Maintenance and Construction Systems
Fare Collection Data	LYNX (Access LYNX Paratransit Vehicles)	LYNX (Access LYNX Paratransit Systems)
	All Aboard Florida Vehicles	All Aboard Florida Rail Operations
Field Equipment Status	City of Orlando TMC	County and City Roadway Maintenance and Construction System
	City of Winter Park TOC	County and City Roadway Maintenance and Construction Systems
	City of Maitland TOC	County and City Roadway Maintenance and Construction Systems

	County and Local Traffic Control Systems	County and City Roadway Maintenance and Construction Systems
	Disney Traffic Operations Center	County and City Roadway Maintenance and Construction Systems
	FTE Operations Center (Turkey Lake)	County and City Roadway Maintenance and Construction Systems
	Orange County TMC	County and City Roadway Maintenance and Construction Systems
	Osceola County TOC	County and City Roadway Maintenance and Construction Systems
	Seminole County TMC	County and City Roadway Maintenance and Construction Systems
Freight Equipment Information	Commercial Vehicle	Private Fleet Vehicle Dispatch System
Freight Transportation Status	Air Freight Terminals	Private Fleet Vehicle Dispatch Systems
	Private Fleet Vehicle Dispatch Systems	Air Freight Terminals
Hazmat Information	CHEMTREC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Private Fleet Vehicle Dispatch Systems
	Private Fleet Vehicle Dispatch Systems	Regional Public Safety Agencies (911 Emergency Call Centers)
	CHEMTREC	County EOCs/Warning Points

	CHEMTREC	County Fire EMS/Rescue Dispatch
	CHEMTREC	FHP Troop D Dispatch
	CHEMTREC	Florida Statewide EOC/Warning Point (SEOC)
	CHEMTREC	FTE Operations Center (Turkey Lake)
	CHEMTREC	Local Fire/EMS Dispatch
	CHEMTREC	Regional HAZMAT Team
Hazmat Information Request	Regional Public Safety Agencies (911 Emergency Call Centers)	CHEMTREC
	County EOCs/Warning Points	CHEMTREC
	County Fire EMS/Rescue Dispatch	CHEMTREC
	FHP Troop D Dispatch	CHEMTREC
	Florida Statewide EOC/Warning Point (SEOC)	CHEMTREC
	FTE Operations Center (Turkey Lake)	CHEMTREC
	Local Fire/EMS Dispatch	CHEMTREC
	Regional HAZMAT Team	CHEMTREC
Highway Control Status	County and Local Field Equipment	County and Local Drawbridge Systems
Highway-Rail Intersection (HRI) Advisories	City of Orlando TMC	Rail Operations Centers
	City of Orlando TMC	SunRail Operations Control Center
	City of Winter Park TOC	Rail Operations Centers

	City of Winter Park TOC	SunRail Operations Control Center
HRI Control Data	City of Winter Park TOC	City of Winter Park (Field Equipment)
	County and Local Traffic Control Systems	County and Local Field Equipment
HRI Operational Status	City of Orlando Field Equipment	Railroad Operators Wayside Equipment
	City of Winter Park (Field Equipment)	Railroad Operators Wayside Equipment
	County and Local Field Equipment	Railroad Operators Wayside Equipment
HRI Request	City of Winter Park TOC	City of Winter Park (Field Equipment)
	County and Local Traffic Control Systems	County and Local Field Equipment
HRI Status	City of Winter Park (Field Equipment)	City of Winter Park TOC
	County and Local Field Equipment	County and Local Traffic Control Systems
Incident Command Information Coordination	Regional Public Safety Agencies (911 Emergency Call Centers)	County EOCs/Warning Points
	County EOCs/Warning Points	Regional Public Safety Agencies (911 Emergency Call Centers)
Incident Information	City of Orlando TMC	Regional Public Safety Agencies (911 Emergency Call Centers)

	Regional Public Safety Agencies (911 Emergency Call Center)	City of Orlando TMC
	City of Orlando TMC	County and City Roadway Maintenance and Construction System
	County and City Roadway Maintenance and Construction System	City of Orlando TMC
	City of Orlando TMC	County EOCs/Warning Points
	County EOCs/Warning Points	City of Orlando TMC
	County Sheriff Dispatch	City of Orlando TMC
	City of Orlando TMC	County Sheriff Dispatch
	City of Orlando TMC	FDOT D5 Construction and Maintenance
	FDOT D5 Construction and Maintenance	City of Orlando TMC
	FDOT Statewide ITS WAN/C2C Infrastructure	City of Orlando TMC
	City of Orlando TMC	FDOT Statewide ITS WAN/C2C Infrastructure
	City of Orlando TMC	County Sheriff Dispatch
	County Sheriff Dispatch	City of Orlando TMC
	City of Orlando TMC	FDOT (Florida 511)
	Local EOCs	City of Orlando TMC
	City of Orlando TMC	Local EOCs
	City of Orlando TMC	Local Fire/EMS Dispatch
	Local Fire/EMS Dispatch	City of Orlando TMC
	City of Orlando TMC	Local Police Dispatch
	Local Police Dispatch	City of Orlando TMC
	Orange County TMC	City of Orlando TMC

	City of Orlando TMC	Private Maintenance Contractors
	Private Maintenance Contractors	City of Orlando TMC
	City of Orlando TMC	Private Sector Traveler Information Services
	City of Orlando EMC	FDOT (Florida 511)
	City of Orlando EMC	Private Sector Traveler Information Services
	Regional Public Safety Agencies (911 Emergency Call Centers)	CFX Construction and Maintenance Operations
	CFX Construction and Maintenance Operations	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	City of Maitland TOC
	City of Maitland TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	City of Winter Park TOC
	City of Winter Park TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	County and City Roadway Maintenance and Construction System
	County and City Roadway Maintenance and Construction System	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	County and Local Traffic Control Systems
	County and Local Traffic Control Systems	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Disney TOC

	Disney TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	FDOT D5 (Construction and Maintenance)
	FDOT D5 (Construction and Maintenance)	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Orange County TMC
	Orange County TMC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Osceola County TOC
	Osceola County TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Private Maintenance Contractors
	Private Maintenance Contractors	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Seminole County TMC
	Seminole County TMC	Regional Public Safety Agencies (911 Emergency Call Centers)
	County EOCs/Warning Points	LYNX (Access LYNX Paratransit Systems)
	Local EOCs	LYNX (Access LYNX Paratransit Systems)
	County EOCs/Warning Points	CFX Construction and Maintenance Operations
	CFX Construction and Maintenance Operations	County EOCs/Warning Points
	County Fire EMS/Rescue Dispatch	CFX Construction and Maintenance Operations
	CFX Construction and Maintenance Operations	County Fire EMS/Rescue Dispatch

	County Sheriff Dispatch	CFX Construction and Maintenance Operations
	CFX Construction and Maintenance Operations	County Sheriff Dispatch
	FDOT D5 EOC	CFX Construction and Maintenance Operations
	CFX Construction and Maintenance Operations	FDOT D5 EOC
	CFX Construction and Maintenance Operations	FDOT D5 RTMC
	FDOT D5 RTMC	CFX Construction and Maintenance Operations
	FHP Troop D Dispatch	CFX Construction and Maintenance Operations
	CFX Construction and Maintenance Operations	FHP Troop D Dispatch
	Local Fire/EMS Dispatch	CFX Construction and Maintenance Operations
	CFX Construction and Maintenance Operations	Local Fire/EMS Dispatch
	Local Police Dispatch	CFX Construction and Maintenance Operations
	CFX Construction and Maintenance Operations	Local Police Dispatch
	County EOCs/Warning Points	CFX Expressway Management System
	CFX Expressway Management System	County EOCs/Warning Points
	CFX Expressway Management System	FDOT Statewide ITS WAN/C2C Infrastructure
	FDOT Statewide ITS WAN/C2C Infrastructure	CFX Expressway Management System
	CFX Expressway Management System	FDOT (Florida 511)

	CFX Expressway Management System	Private Sector Traveler Information Services
	City of Winter Park TOC	County Sheriff Dispatch
	County Sheriff Dispatch	City of Winter Park TOC
	City of Winter Park TOC	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	City of Winter Park TOC
	City of Winter Park TOC	County EOCs/Warning Points
	County EOCs/Warning Points	City of Winter Park TOC
	City of Winter Park TOC	County Fire EMS/Rescue Dispatch
	County Fire EMS/Rescue Dispatch	City of Winter Park TOC
	City of Winter Park TOC	FHP Troop D Dispatch
	FHP Troop D Dispatch	City of Winter Park TOC
	City of Winter Park TOC	FDOT (Florida 511)
	City of Winter Park TOC	Local Fire/EMS Dispatch
	Local Fire/EMS Dispatch	City of Winter Park TOC
	City of Winter Park TOC	Local Police Dispatch
	Local Police Dispatch	City of Winter Park TOC
	City of Winter Park TOC	Private Sector Traveler Information Services
	City of Maitland TOC	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	City of Maitland TOC

	County and City Roadway Maintenance and Construction Systems	County and Local Traffic Control Systems
	County and Local Traffic Control Systems	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	County EOCs/Warning Points
	County EOCs/Warning Points	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	County Fire EMC/Rescue Dispatch
	County Fire EMC/Rescue Dispatch	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	County Sheriff Dispatch
	County Sheriff Dispatch	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	FHP Troop D Dispatch
	FHP Troop D Dispatch	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	FTE Operations Center (Turkey Lake)
	FTE Operations Center (Turkey Lake)	County and City Roadway Maintenance and Construction Systems

	County and City Roadway Maintenance and Construction Systems	Local EOCs
	Local EOCs	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	Local Fire/EMS Dispatch
	Local Fire/EMS Dispatch	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	Local Police Dispatch
	Local Police Dispatch	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	Orange County TMC
	Orange County TMC	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	Osceola County TOC
	Osceola County TOC	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	Seminole County TMC
	Seminole County TMC	County and City Roadway Maintenance and Construction Systems

	County EOCs/Warning Points	County Emergency Broadcast Systems
	FHP Regional Administration	LYNX Virtual Travel Planning Center
	FHP Troop D Dispatch	City of Daytona Beach TMC
Incident Report	Regional Public Safety Agencies (911 Emergency Call Centers)	County EOCs/Warning Points
	County EOCs/Warning Points	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	County Fire EMS/Rescue Dispatch
	County Fire EMS/Rescue Dispatch	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	County Sheriff Dispatch
	County Sheriff Dispatch	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	FHP Troop D Dispatch
	FHP Troop D Dispatch	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Florida Statewide EOC/Warning Point (SEOC)
	Regional Public Safety Agencies (911 Emergency Call Centers)	FTE Operations Center (Turkey Lake)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Local EOCs
	Local EOCs	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Local Fire/EMS Dispatch
	Local Fire/EMS Dispatch	Regional Public Safety Agencies (911 Emergency Call Centers)

	Regional Public Safety Agencies (911 Emergency Call Centers)	Local Police Dispatch
	Local Police Dispatch	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Private/Public Ambulance Dispatch
	Private/Public Ambulance Dispatch	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Regional HAZMAT Team
	Regional Public Safety Agencies (911 Emergency Call Centers)	Regional Incident and Mutual Aid Network
	Regional Incident and Mutual Aid Network	Regional Public Safety Agencies (911 Emergency Call Centers)
	FHP Troop D Dispatch	FHP Troop K Dispatch
	FHP Troop K Dispatch	FHP Troop D Dispatch
	Private/Public Ambulance Dispatch	FHP Troop K Dispatch
	FHP Troop K Dispatch	Private/Public Ambulance Dispatch
Incident Response	County EOCs/Warning Points	City of Orlando TMC
Incident Response Coordination	Regional Public Safety Agencies (911 Emergency Call Centers)	County EOCs/Warning Points
	County EOCs/Warning Points	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	County Fire EMS/Rescue Dispatch
	County Fire EMS/Rescue Dispatch	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	County Sheriff Dispatch

	County Sheriff Dispatch	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	FHP Troop D Dispatch
	FHP Troop D Dispatch	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Local Fire/EMS Dispatch
	Local Fire/EMS Dispatch	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Local Police Dispatch
	Local Police Dispatch	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	LYNX Security Operations Center
	LYNX Security Operations Center	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Private/Public Ambulance Dispatch
	Private/Public Ambulance Dispatch	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Regional Incident and Mutual Aid Network
	Regional Incident and Mutual Aid Network	Regional Public Safety Agencies (911 Emergency Call Centers)
	FHP Troop D Dispatch	FHP Troop K Dispatch
	FHP Troop K Dispatch	FHP Troop D Dispatch
	Private/Public Ambulance Dispatch	FHP Troop K Dispatch
	FHP Troop K Dispatch	Private/Public Ambulance Dispatch

Incident Response Status	Regional Public Safety Agencies (911 Emergency Call Center)	City of Orlando TMC
	County Sheriff Dispatch	City of Orlando TMC
	FHP Troop D Dispatch	City of Orlando TMC
	Local Fire/EMS Dispatch	City of Orlando TMC
	Local Police Dispatch	City of Orlando TMC
	Regional Public Safety Agencies (911 Emergency Call Centers)	CFX Construction and Maintenance Operations
	Regional Public Safety Agencies (911 Emergency Call Centers)	City of Maitland TOC
	Regional Public Safety Agencies (911 Emergency Call Centers)	City of Winter Park TOC
	Regional Public Safety Agencies (911 Emergency Call Centers)	County and City Roadway Maintenance and Construction System
	Regional Public Safety Agencies (911 Emergency Call Centers)	County and Local Traffic Control Systems
	Regional Public Safety Agencies (911 Emergency Call Centers)	Disney TOC
	Regional Public Safety Agencies (911 Emergency Call Centers)	FDOT D5 (Construction and Maintenance)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Orange County TMC
	Regional Public Safety Agencies (911 Emergency Call Centers)	Osceola County TOC
	Regional Public Safety Agencies (911 Emergency Call Centers)	Private Maintenance Contractors
	Regional Public Safety Agencies (911 Emergency Call Centers)	Seminole County TMC
	County EOCs/Warning Points	LYNX (Access LYNX Paratransit Systems)
	County Sheriff Dispatch	All Aboard Florida Rail Operations

	Local Police Dispatch	All Aboard Florida Rail Operations
	County EOCs/Warning Points	CFX Construction and Maintenance Operations
	County Fire EMS/Rescue Dispatch	CFX Construction and Maintenance Operations
	County Sheriff Dispatch	CFX Construction and Maintenance Operations
	FDOT D5 EOC	CFX Construction and Maintenance Operations
	FHP Troop D Dispatch	CFX Construction and Maintenance Operations
	Local Fire/EMS Dispatch	CFX Construction and Maintenance Operations
	Local Police Dispatch	CFX Construction and Maintenance Operations
	County EOCs/Warning Points	CFX Expressway Management System
	County EOCs/Warning Points	City of Orlando TMC
	County Sheriff Dispatch	City of Winter Park TOC
	County EOCs/Warning Points	City of Winter Park TOC
	County Fire EMS/Rescue Dispatch	City of Winter Park TOC
	FHP Troop D Dispatch	City of Winter Park TOC
	Local Fire/EMS Dispatch	City of Winter Park TOC
	Local Police Dispatch	City of Winter Park TOC
	County EOCs/Warning Points	County and City Roadway Maintenance and Construction Systems
	County Fire EMC/Rescue Dispatch	County and City Roadway Maintenance and Construction Systems

	County Sheriff Dispatch	County and City Roadway Maintenance and Construction Systems
	FHP Troop D Dispatch	County and City Roadway Maintenance and Construction Systems
	Local EOCs	County and City Roadway Maintenance and Construction Systems
	Local Fire/EMS Dispatch	County and City Roadway Maintenance and Construction Systems
	Local Police Dispatch	County and City Roadway Maintenance and Construction Systems
	FHP Troop D Dispatch	City of Daytona Beach TMC
Incident Status	County Sheriff's Vehicles	County Sheriff Dispatch
Infrastructure Monitoring Sensor Control	County and City Roadway Maintenance and Construction Systems	County and Local Field Equipment
Infrastructure Monitoring Sensor Data	County and Local Field Equipment	County and City Roadway Maintenance and Construction Systems
Intermodal Freight Archive Data	Air Freight Terminals	FDOT D5 (Central Florida Data Warehouse)
	Port Canaveral	FDOT D5 (Central Florida Data Warehouse)
	Rail Intermodal Terminals	FDOT D5 (Central Florida Data Warehouse)

Intermodal Freight Event Information	Air Freight Terminals	FDOT D5/FHP (FDOT D5 RTMC)
Intermodal Freight Traffic Confirmation	FDOT D5/FHP (FDOT D5 RTMC)	Air Freight Terminals
Intersection Status	FDOT D5 (Field Equipment)	Vehicles
Local Signal Priority Request	LYNX On-Demand Transit Vehicles	City of Orlando Field Equipment
	LYNX On-Demand Transit Vehicles	City of Winter Park (Field Equipment)
	LYNX Transit Vehicles	City of Winter Park (Field Equipment)
	LYNX Transit Vehicles	County and Local Field Equipment
Local Signal Preemption Request	Local Police Vehicles	City of Orlando Field Equipment
	County Fire EMS/Rescue Vehicles	City of Winter Park (Field Equipment)
	Local Fire/EMS Vehicles	City of Winter Park (Field Equipment)
	County Fire EMS/Rescue Vehicles	County and Local Field Equipment
	Local Fire/EMS Vehicles	County and Local Field Equipment
Maintenance and Construction Dispatch Information	County and City Roadway Maintenance and Construction Systems	County and City PWD Vehicles
	FDOT D5 (Construction and Maintenance)	FDOT D5 (Maintenance Vehicles)

Maintenance and Construction Dispatch Status	County and City PWD Vehicles	County and City Roadway Maintenance and Construction Systems
	FDOT D5 (Maintenance Vehicles)	FDOT D5 (Construction and Maintenance)
Maintenance and Construction Equipment Repair Status	County and Local Equipment Repair Facility	County and City Roadway Maintenance and Construction Systems
	FDOT D5 Equipment Repair Facility	FDOT D5 (Construction and Maintenance)
Maintenance and Construction Fleet Information	County and City Roadway Maintenance and Construction Systems	County and Local Equipment Repair Facility
	FDOT D5 (Construction and Maintenance)	FDOT D5 Equipment Repair Facility
Maintenance and Construction Resource Coordination	County and City Roadway Maintenance and Construction Systems	FDOT D5 (Construction and Maintenance)
	FDOT D5 (Construction and Maintenance)	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	Other County and City Maintenance
	Other County and City Maintenance	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	Other FDOT Maintenance and Construction

	Other FDOT Maintenance and Construction	County and City Roadway Maintenance and Construction Systems
Maintenance and Construction Resource Request	City of Orlando TMC	County and City Roadway Maintenance and Construction System
	City of Orlando TMC	FDOT D5 Construction and Maintenance
	City of Orlando TMC	Private Maintenance Contractors
	Regional Public Safety Agencies (911 Emergency Call Centers)	CFX Construction and Maintenance Operations
	Regional Public Safety Agencies (911 Emergency Call Centers)	County and City Roadway Maintenance and Construction System
	Regional Public Safety Agencies (911 Emergency Call Centers)	FDOT D5 (Construction and Maintenance)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Private Maintenance Contractors
	County EOCs/Warning Points	CFX Construction and Maintenance Operations
	County Fire EMS/Rescue Dispatch	CFX Construction and Maintenance Operations
	County Sheriff Dispatch	CFX Construction and Maintenance Operations
	FDOT D5 EOC	CFX Construction and Maintenance Operations
	FDOT D5 RTMC	CFX Construction and Maintenance Operations
	FHP Troop D Dispatch	CFX Construction and Maintenance Operations
	Local Fire/EMS Dispatch	CFX Construction and Maintenance Operations

	Local Police Dispatch	CFX Construction and Maintenance Operations
	City of Winter Park TOC	County and City Roadway Maintenance and Construction Systems
	City of Maitland TOC	County and City Roadway Maintenance and Construction Systems
	County and Local Traffic Control Systems	County and City Roadway Maintenance and Construction Systems
	County EOCs/Warning Points	County and City Roadway Maintenance and Construction Systems
	County Fire EMC/Rescue Dispatch	County and City Roadway Maintenance and Construction Systems
	County Sheriff Dispatch	County and City Roadway Maintenance and Construction Systems
	FHP Troop D Dispatch	County and City Roadway Maintenance and Construction Systems
	FTE Operations Center (Turkey Lake)	County and City Roadway Maintenance and Construction Systems
	Local EOCs	County and City Roadway Maintenance and Construction Systems
	Local Fire/EMS Dispatch	County and City Roadway Maintenance and Construction Systems
	Local Police Dispatch	County and City Roadway Maintenance and Construction Systems

	Orange County TMC	County and City Roadway Maintenance and Construction Systems
	Osceola County TOC	County and City Roadway Maintenance and Construction Systems
	Seminole County TMC	County and City Roadway Maintenance and Construction Systems
Maintenance and Construction Resource Response	County and City Roadway Maintenance and Construction System	City of Orlando TMC
	Private Maintenance Contractors	City of Orlando TMC
	CFX Construction and Maintenance Operations	Regional Public Safety Agencies (911 Emergency Call Centers)
	County and City Roadway Maintenance and Construction System	Regional Public Safety Agencies (911 Emergency Call Centers)
	FDOT D5 (Construction and Maintenance)	Regional Public Safety Agencies (911 Emergency Call Centers)
	Private Maintenance Contractors	Regional Public Safety Agencies (911 Emergency Call Centers)
	CFX Construction and Maintenance Operations	County EOCs/Warning Points
	CFX Construction and Maintenance Operations	County Fire EMS/Rescue Dispatch
	CFX Construction and Maintenance Operations	County Sheriff Dispatch
	CFX Construction and Maintenance Operations	FDOT D5 EOC
	CFX Construction and Maintenance Operations	FDOT D5 RTMC

	CFX Construction and Maintenance Operations	FHP Troop D Dispatch
	CFX Construction and Maintenance Operations	Local Fire/EMS Dispatch
	CFX Construction and Maintenance Operations	Local Police Dispatch
	County and City Roadway Maintenance and Construction Systems	City of Winter Park TOC
	County and City Roadway Maintenance and Construction Systems	City of Maitland TOC
	County and City Roadway Maintenance and Construction Systems	County and Local Traffic Control Systems
	County and City Roadway Maintenance and Construction Systems	County EOCs/Warning Points
	County and City Roadway Maintenance and Construction Systems	County Fire EMC/Rescue Dispatch
	County and City Roadway Maintenance and Construction Systems	County Sheriff Dispatch
	County and City Roadway Maintenance and Construction Systems	FHP Troop D Dispatch
	County and City Roadway Maintenance and Construction Systems	FTE Operations Center (Turkey Lake)
	County and City Roadway Maintenance and Construction Systems	Local EOCs
	County and City Roadway Maintenance and Construction Systems	Local Fire/EMS Dispatch

	County and City Roadway Maintenance and Construction Systems	Local Police Dispatch
	County and City Roadway Maintenance and Construction Systems	Orange County TMC
	County and City Roadway Maintenance and Construction Systems	Osceola County TOC
	County and City Roadway Maintenance and Construction Systems	Seminole County TMC
Maintenance and Construction Vehicle Conditions	County and City PWD Vehicles	County and City Roadway Maintenance and Construction Systems
	County and City PWD Vehicles	County and Local Equipment Repair Facility
	FDOT D5 (Maintenance Vehicles)	FDOT D5 Equipment Repair Facility
	FDOT D5 (Maintenance Vehicles)	FDOT D5 (Construction and Maintenance)
Maintenance and Construction Vehicle Location Data	CFX Maintenance Vehicles	CFX Construction and Maintenance Operations
	County and City PWD Vehicles	County and City Roadway Maintenance and Construction Systems
	FDOT D5 (Maintenance Vehicles)	FDOT D5 (Construction and Maintenance)
Maintenance and Construction Vehicle Operational Data	County and City PWD Vehicles	County and City Roadway Maintenance and Construction Systems

	FDOT D5 (Maintenance Vehicles)	FDOT D5 (Construction and Maintenance)
Maintenance and Construction Work Plans	County and City Roadway Maintenance and Construction System	City of Orlando TMC
	County and City Roadway Maintenance and Construction System	Regional Public Safety Agencies (911 Emergency Call Centers)
	FDOT D5 (Construction and Maintenance)	Regional Public Safety Agencies (911 Emergency Call Centers)
	County and City Roadway Maintenance and Construction Systems	LYNX (Access LYNX Paratransit Systems)
	County and City Public Information System	Amtrak Passenger Train Terminal
	County and City Roadway Maintenance and Construction Systems	Amtrak Passenger Train Terminal
	FDOT D5 (Construction and Maintenance)	Amtrak Passenger Train Terminal
	County and City Roadway Maintenance and Construction Systems	City of Winter Park TOC
	County and City Public Information System	Newspapers, Radio, Television Stations
	County and City Public Information System	Orlando Intermodal Center
	County and City Public Information System	Orlando International Airport
	County and City Public Information System	Orlando-Sanford International Airport
	County and City Public Information System	Rail Operations Centers

	County and City Public Information System	SunRail Operations Center
	County and City Roadway Maintenance and Construction Systems	City of Maitland TOC
	County and City Roadway Maintenance and Construction Systems	County and Local Traffic Control Systems
	County and City Roadway Maintenance and Construction Systems	County EOCs/Warning Points
	County and City Roadway Maintenance and Construction Systems	County Fire EMC/Rescue Dispatch
	County and City Roadway Maintenance and Construction Systems	County Sheriff Dispatch
	County and City Roadway Maintenance and Construction Systems	Disney Traffic Operations Center
	County and City Roadway Maintenance and Construction Systems	FDOT D5 (EOC)
	County and City Roadway Maintenance and Construction Systems	FlexBus Consortium Transit Management
	County and City Roadway Maintenance and Construction Systems	FDOT (Florida 511)
	County and City Roadway Maintenance and Construction Systems	FTE Operations Center (Turkey Lake)
	County and City Roadway Maintenance and Construction Systems	I-RIDE Tourist Shuttle Dispatch

	County and City Roadway Maintenance and Construction Systems	Local Agency Traveler Information System
	County and City Roadway Maintenance and Construction Systems	Local EOCs
	County and City Roadway Maintenance and Construction Systems	Local Fire/EMS Dispatch
	County and City Roadway Maintenance and Construction Systems	Local Police Dispatch
	County and City Roadway Maintenance and Construction Systems	Local Transit Operator Systems
	County and City Roadway Maintenance and Construction Systems	LYNX On-Demand Transit Management
	County and City Roadway Maintenance and Construction Systems	LYNX Transportation Center
	County and City Roadway Maintenance and Construction Systems	Orlando International Airport
	County and City Roadway Maintenance and Construction Systems	Orlando-Sanford International Airport
	County and City Roadway Maintenance and Construction Systems	Newspapers, Radio, Television Stations
	County and City Roadway Maintenance and Construction Systems	Orlando Intermodal Center
	County and City Roadway Maintenance and Construction Systems	Osceola County TOC

	County and City Roadway Maintenance and Construction Systems	Private Sector Traveler Information Services
	County and City Roadway Maintenance and Construction Systems	Rail Operations Center
	County and City Roadway Maintenance and Construction Systems	School District Transportation Dispatch
	County and City Roadway Maintenance and Construction Systems	Seminole County TMC
	County and City Roadway Maintenance and Construction Systems	SunRail Operations Control Center
Multimodal Archive Data	Amtrak Passenger Train Terminal	FDOT D5 (Central Florida Data Warehouse)
	Amtrak Passenger Train Terminal	Local Transportation Data Collection Systems
	Amtrak Passenger Train Terminal	MetroPlan Orlando Transportation Data Collection System
	Canaveral/Kennedy Space Port	FDOT D5 (Central Florida Data Warehouse)
	Canaveral/Kennedy Space Port	MetroPlan Orlando Transportation Data Collection System
	Orlando Intermodal Center	FDOT D5 (Central Florida Data Warehouse)
	Orlando International Airport	FDOT D5 (Central Florida Data Warehouse)
	Orlando-Sanford International Airport	FDOT D5 (Central Florida Data Warehouse)

	Daytona Beach International Airport	MetroPlan Orlando Transportation Data Collection System
Multimodal Crossing Status	County and Local Drawbridge Systems	County and Local Field Equipment
	County and Local Drawbridge Systems	County and Local Traffic Control Systems
Multimodal Information	Orlando International Airport	City of Orlando TMC
Multimodal Service Data	All Aboard Florida Rail Operations	LYNX On-Demand Transit Management
	All Aboard Florida Rail Operations	LYNX Transportation Center
	All Aboard Florida Rail Operations	SunRail Operations Control Center
	Amtrak Passenger Train Terminal	Local Transit Operator Systems
	Amtrak Passenger Train Terminal	LYNX On-Demand Transit Management
	Amtrak Passenger Train Terminal	LYNX Transportation Center
On-Board Vehicle Data	Commercial Vehicle	Private Fleet Vehicle Dispatch System
On-Board Vehicle Request	Private Fleet Vehicle Dispatch System	Commercial Vehicle
Parking Demand Management Request	City of Orlando TMC	Private/Public Parking Facility Operators

	FDOT D5 RTMC	FDOT CV Parking Management System
Parking Demand Management Response	Private/Public Parking Facility Operators	City of Orlando TMC
	FDOT CV Parking Management System	FDOT D5 RTMC
Parking Information	Private/Public Parking Facility Operators	City of Orlando TMC
	FDOT CV Parking Management System	FDOT D5 RTMC
Parking Lot Data Request	City of Orlando TMC	Private/Public Parking Facility Operators
	FDOT D5 RTMC	FDOT CV Parking Management System
Parking Lot Inputs	City of Orlando TMC	Private/Public Parking Facility Operators
Passenger Information	LYNX (Access LYNX Paratransit Systems)	Florida Human Service Agencies
Patient Status	County Sheriffs Vehicles	Regional Medical Centers
Payment	Electronic Payment Card	LYNX (Access LYNX Paratransit Vehicles)
	Electronic Payment Card	All Aboard Florida Vehicles
Payment Requests	LYNX (Access LYNX Paratransit Systems)	Financial Institutions

	LYNX (Access LYNX Paratransit Systems)	Florida Human Service Agencies
	All Aboard Florida Rail Operations	Financial Institutions
Payment Violation Notification	All Aboard Florida Rail Operations	Local Police Dispatch
Personal Transit Information	All Aboard Florida Rail Operations	Private Traveler Personal Computing Devices
Qualified Environmental Conditions Data	National Hurricane Center Info. System	County and City Roadway Maintenance and Construction Systems
	National Weather Service	County and City Roadway Maintenance and Construction Systems
Railroad Advisories	Rail Operations Centers	City of Orlando TMC
	SunRail Operations Control Center	City of Orlando TMC
	Rail Operations Centers	City of Winter Park TOC
	SunRail Operations Control Center	City of Winter Park TOC
Railroad Schedules	Rail Operations Centers	City of Orlando TMC
	SunRail Operations Control Center	City of Orlando TMC
	Rail Operations Centers	City of Winter Park TOC
	SunRail Operations Control Center	City of Winter Park TOC

Remote Surveillance Control	Local EOCs	City of Orlando TMC
	Local Police Dispatch	City of Orlando TMC
	County Sheriff Dispatch	LYNX (Access LYNX Paratransit Systems)
	Local Police Dispatch	LYNX (Access LYNX Paratransit Systems)
Request for Bad Tag List	All Aboard Florida Vehicles	All Aboard Florida Rail Operations
Request for Payment	LYNX (Access LYNX Paratransit Vehicles)	Electronic Payment Card
	All Aboard Florida Vehicles	Electronic Payment Card
Request for Vehicle Measures	All Aboard Florida Rail Operations	All Aboard Florida Vehicles
Resource Coordination	Regional Public Safety Agencies (911 Emergency Call Centers)	County EOCs/Warning Points
	County EOCs/Warning Points	Regional Public Safety Agencies (911 Emergency Call Centers)
	CFX Construction and Maintenance Operations	FDOT D5 (Construction and Maintenance)
	FDOT D5 (Construction and Maintenance)	CFX Construction and Maintenance Operations
Resource Deployment Status	City of Orlando TMC	Regional Public Safety Agencies (911 Emergency Call Center)
	City of Orlando TMC	County EOCs/Warning Points
	City of Orlando TMC	County Sheriff Dispatch
	FDOT D5 Construction and Maintenance	City of Orlando TMC

	City of Orlando TMC	County Sheriff Dispatch
	City of Orlando TMC	Local Fire/EMS Dispatch
	City of Orlando TMC	Local Police Dispatch
	City of Maitland TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	City of Winter Park TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	County and Local Traffic Control Systems	Regional Public Safety Agencies (911 Emergency Call Centers)
	Disney TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Orange County TMC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Osceola County TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Seminole County TMC	Regional Public Safety Agencies (911 Emergency Call Centers)
	CFX Expressway Management System	County EOCs/Warning Points
	City of Winter Park TOC	County Sheriff Dispatch
	City of Winter Park TOC	County EOCs/Warning Points
	City of Winter Park TOC	County Fire EMS/Rescue Dispatch
	City of Winter Park TOC	FHP Troop D Dispatch
	City of Winter Park TOC	Local Fire/EMS Dispatch
	City of Winter Park TOC	Local Police Dispatch
Resource Request	Regional Public Safety Agencies (911 Emergency Call Center)	City of Orlando TMC
	County EOCs/Warning Points	City of Orlando TMC
	County Sheriff Dispatch	City of Orlando TMC

	FHP Troop D Dispatch	City of Orlando TMC
	Local Fire/EMS Dispatch	City of Orlando TMC
	Local Police Dispatch	City of Orlando TMC
	Regional Public Safety Agencies (911 Emergency Call Centers)	City of Maitland TOC
	Regional Public Safety Agencies (911 Emergency Call Centers)	City of Winter Park TOC
	Regional Public Safety Agencies (911 Emergency Call Centers)	County and Local Traffic Control Systems
	Regional Public Safety Agencies (911 Emergency Call Centers)	Disney TOC
	Regional Public Safety Agencies (911 Emergency Call Centers)	Orange County TMC
	Regional Public Safety Agencies (911 Emergency Call Centers)	Osceola County TOC
	Regional Public Safety Agencies (911 Emergency Call Centers)	Seminole County TMC
	County EOCs/Warning Points	CFX Expressway Management System
	County Sheriff Dispatch	City of Winter Park TOC
	County EOCs/Warning Points	City of Winter Park TOC
	County Fire EMS/Rescue Dispatch	City of Winter Park TOC
	FHP Troop D Dispatch	City of Winter Park TOC
	Local Fire/EMS Dispatch	City of Winter Park TOC
	Local Police Dispatch	City of Winter Park TOC
	FHP Troop D Dispatch	City of Daytona Beach TMC
Reversible Lane Control	FDOT D5 RTMC	FDOT D5 (Field Equipment)
Reversible Lane Status	FDOT D5 (Field Equipment)	FDOT D5 RTMC

Right-of-Way Request Notification	City of Orlando (Field Equipment)	City of Orlando TMC
	FDOT D5 Field Equipment	City of Orlando TMC
	City of Winter Park (Field Equipment)	City of Winter Park TOC
	County and Local Field Equipment	County and Local Traffic Control Systems
	FDOT D5 (Field Equipment)	FDOT D5 RTMC
Road Network Conditions	City of Orlando TMC	Regional Public Safety Agencies (911 Emergency Call Center)
	City of Orlando TMC	LYNX (Access LYNX Paratransit Systems)
	City of Orlando TMC	County EOCs/Warning Points
	City of Orlando TMC	County Sheriff Dispatch
	FDOT Statewide ITS WAN/C2C Infrastructure	City of Orlando TMC
	City of Orlando TMC	FDOT Statewide ITS WAN/C2C Infrastructure
	City of Orlando TMC	County Sheriff Dispatch
	City of Orlando TMC	FDOT (Florida 511)
	City of Orlando TMC	Local Agency Traveler Information System
	City of Orlando TMC	Local Fire/EMS Dispatch
	City of Orlando TMC	Local Police Dispatch
	City of Orlando TMC	LYNX (LYNX On-Demand Transit Management)
	City of Orlando TMC	LYNX Virtual Travel Planning Center
	Orange County TMC	City of Orlando TMC

	City of Orlando TMC	Private Sector Traveler Information Services
	City of Orlando TMC	School District Transportation Dispatch
	City of Orlando EMC	FDOT (Florida 511)
	City of Orlando EMC	Private Sector Traveler Information Services
	City of Maitland TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	City of Winter Park TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	County and Local Traffic Control Systems	Regional Public Safety Agencies (911 Emergency Call Centers)
	Disney TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Orange County TMC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Osceola County TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Seminole County TMC	Regional Public Safety Agencies (911 Emergency Call Centers)
	CFX Expressway Management System	LYNX (Access LYNX Paratransit Systems)
	City of Winter Park TOC	LYNX (Access LYNX Paratransit Systems)
	OCCC Operations Center	LYNX (Access LYNX Paratransit Systems)
	Orange County TMC	LYNX (Access LYNX Paratransit Systems)
	Seminole County TMC	LYNX (Access LYNX Paratransit Systems)
	CFX Expressway Management System	CFX Public Website

	CFX Expressway Management System	County EOCs/Warning Points
	CFX Expressway Management System	FDOT (Florida 511)
	CFX Expressway Management System	LYNX On-Demand Transit Management
	CFX Expressway Management System	LYNX Transportation Center
	CFX Expressway Management System	Private Sector Traveler Information Services
	City of Winter Park TOC	County Sheriff Dispatch
	City of Winter Park TOC	County EOCs/Warning Points
	City of Winter Park TOC	County Fire EMS/Rescue Dispatch
	City of Winter Park TOC	FHP Troop D Dispatch
	City of Winter Park TOC	FDOT (Florida 511)
	City of Winter Park TOC	Local Agency Traveler Information System
	City of Winter Park TOC	Local Fire/EMS Dispatch
	City of Winter Park TOC	Local Police Dispatch
	City of Winter Park TOC	LYNX On-Demand Transit Management
	City of Winter Park TOC	LYNX Transportation Center
	City of Winter Park TOC	LYNX Virtual Travel Planning Center
	City of Winter Park TOC	Private Sector Traveler Information Services
	City of Winter Park TOC	School District Transportation Dispatch
	City of Orlando TMC	County EOCs/Warning Points

Road Network Status Assessment	CFX Expressway Management System	County EOCs/Warning Points
	City of Winter Park TOC	County EOCs/Warning Points
	County and City Roadway Maintenance and Construction Systems	County EOCs/Warning Points
Road Weather Information	County and Local Traffic Control Systems	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	County and Local Traffic Control Systems
	County and City Roadway Maintenance and Construction Systems	County EOCs/Warning Points
	County and City Roadway Maintenance and Construction Systems	County Fire EMC/Rescue Dispatch
	County and City Roadway Maintenance and Construction Systems	County Sheriff Dispatch
	FTE Operations Center (Turkey Lake)	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	FTE Operations Center (Turkey Lake)
	County and City Roadway Maintenance and Construction Systems	Local Fire/EMS Dispatch
	County and City Roadway Maintenance and Construction Systems	Local Police Dispatch

	County and City Roadway Maintenance and Construction Systems	Local Transit Operator Systems
	County and City Roadway Maintenance and Construction Systems	School District Transportation Dispatch
	Seminole County TMC	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	Seminole County TMC
Roadway Information System Data	FDOT D5 (RTMC)	Osceola County Expressway Authority (Field Equipment)
	City of Winter Park TOC	City of Winter Park (Field Equipment)
	County and Local Traffic Control Systems	County and Local Field Equipment
	FDOT D5 (Construction and Maintenance)	FDOT D5 (Field Equipment)
Roadway Information System Status	Osceola County Expressway Authority (Field Equipment)	FDOT D5 (RTMC)
	City of Winter Park (Field Equipment)	City of Winter Park TOC
	County and Local Field Equipment	County and Local Traffic Control Systems
	FDOT D5 (Field Equipment)	FDOT D5 (Construction and Maintenance)
Roadway Maintenance Status	County and City Roadway Maintenance and Construction Systems	Local Transit Operator Systems

	County and City Roadway Maintenance and Construction Systems	LYNX Transportation Center
	County and City Roadway Maintenance and Construction Systems	School District Transportation Dispatch
Roadway Safety Data	FDOT D5 (Field Equipment)	Vehicles
Roadway Warning System Control	FDOT D5 RTMC	FDOT D5 (Field Equipment)
Roadway Warning System Status	FDOT D5 (Field Equipment)	FDOT D5 RTMC
Selected Routes	LYNX Website	LYNX (Access LYNX Paratransit Systems)
Short Range Communications Status	FDOT D5 (Field Equipment)	FDOT D5 RTMC
Signal Control Commands	County and Local Traffic Control Systems	County and Local Field Equipment
	FDOT D5 RTMC	FDOT D5 (Field Equipment)
Signal Control Status	County and Local Field Equipment	County and Local Traffic Control Systems
	FDOT D5 (Field Equipment)	FDOT D5 RTMC
Signal Fault Data	FDOT D5 (Field Equipment)	FDOT D5 RTMC

Speed Monitoring Control	FHP Troop D Dispatch	County and Local Field Equipment
Speed Monitoring Information	County and Local Field Equipment	FHP Troop D Dispatch
Suggested Route	County Sheriff Dispatch	County Sheriff's Vehicles
Threat Information	County EOCs/Warning Points	City of Orlando TMC
	Local EOCs	City of Orlando TMC
	County EOCs/Warning Points	LYNX (Access LYNX Paratransit Systems)
	Local EOCs	LYNX (Access LYNX Paratransit Systems)
	County EOCs/Warning Points	CFX Expressway Management System
	County EOCs/Warning Points	City of Winter Park TOC
	County EOCs/Warning Points	County and City Roadway Maintenance and Construction Systems
	Local EOCs	County and City Roadway Maintenance and Construction Systems
Threat Information Coordination	Regional Public Safety Agencies (911 Emergency Call Centers)	County EOCs/Warning Points
	County EOCs/Warning Points	Regional Public Safety Agencies (911 Emergency Call Centers)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Local EOCs
	Local EOCs	Regional Public Safety Agencies (911 Emergency Call Centers)

Toll Data	Florida Statewide Tolling Customer Service Center	CFX Public Website
Toll Data Request	CFX Public Website	Florida Statewide Tolling Customer Service Center
Toll Instructions	Florida Statewide Tolling Customer Service Center	CFX Toll Plaza
	Florida Statewide Tolling Customer Service Center	FTE Express Lane Open Road Tolling Equipment
	FTE Regional Toll Office	FTE Express Lane Open Road Tolling Equipment
Toll Transactions	CFX Toll Plaza	Florida Statewide Tolling Customer Service Center
	FTE Express Lane Open Road Tolling Equipment	Florida Statewide Tolling Customer Service Center
	FTE Express Lane Open Road Tolling Equipment	FTE Regional Toll Office
Track Status		
Traffic Archive Data	City of Orlando TMC	FDOT D5 (Central Florida Data Warehouse)
	Regional Public Safety Agencies (911 Emergency Call Centers)	Local Transportation Data Collection Systems
	CFX Expressway Management System	FDOT D5 (Central Florida Data Warehouse)
	City of Maitland TOC	FDOT D5 (Central Florida Data Warehouse)

	City of Winter Park TOC	FDOT D5 (Central Florida Data Warehouse)
	County and Local Traffic Control Systems	FDOT D5 (Central Florida Data Warehouse)
	Disney TOC	FDOT D5 (Central Florida Data Warehouse)
	FTE Operations Center (Turkey Lake)	FDOT D5 (Central Florida Data Warehouse)
	Orange County TMC	FDOT D5 (Central Florida Data Warehouse)
	Osceola County TOC	FDOT D5 (Central Florida Data Warehouse)
	Seminole County TMC	FDOT D5 (Central Florida Data Warehouse)
Traffic Control Priority Request	I-RIDE Tourist Shuttle Dispatch	City of Orlando TMC
	LYNX Transportation Center	City of Winter Park TOC
Traffic Flow	City of Winter Park (Field Equipment)	City of Winter Park TOC
	County and Local Field Equipment	County and Local Traffic Control Systems
	FDOT D5 (Field Equipment)	FDOT D5 RTMC
Traffic Images	City of Orlando TMC	Regional Public Safety Agencies (911 Emergency Call Center)
	City of Orlando TMC	County Sheriff Dispatch
	FDOT Statewide ITS WAN/C2C Infrastructure	City of Orlando TMC
	City of Orlando TMC	FDOT Statewide ITS WAN/C2C Infrastructure
	City of Orlando TMC	County Sheriff Dispatch

	City of Orlando TMC	FDOT (Florida 511)
	City of Orlando TMC	Local Fire/EMS Dispatch
	City of Orlando TMC	Local Police Dispatch
	Orange County TMC	City of Orlando TMC
	City of Orlando TMC	Private Sector Traveler Information Services
	City of Orlando EMC	FDOT (Florida 511)
	City of Orlando EMC	Private Sector Traveler Information Services
	City of Orlando Field Equipment	County and City Roadway Maintenance and Construction Systems
	City of Maitland TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	City of Winter Park TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	County and Local Traffic Control Systems	Regional Public Safety Agencies (911 Emergency Call Centers)
	Orange County TMC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Osceola County TOC	Regional Public Safety Agencies (911 Emergency Call Centers)
	Seminole County TMC	Regional Public Safety Agencies (911 Emergency Call Centers)
	CFX Expressway Management System	CFX Public Website
	CFX Expressway Management System	FDOT (Florida 511)
	Private Sector Traveler Information Services	CFX Expressway Management System
	CFX Expressway Management System	Private Sector Traveler Information Services

	City of Winter Park (Field Equipment)	City of Winter Park TOC
	City of Winter Park TOC	County Sheriff Dispatch
	City of Winter Park TOC	County Fire EMS/Rescue Dispatch
	City of Winter Park TOC	FHP Troop D Dispatch
	City of Winter Park TOC	FDOT (Florida 511)
	City of Winter Park TOC	Local Fire/EMS Dispatch
	City of Winter Park TOC	Local Police Dispatch
	City of Winter Park TOC	Private Sector Traveler Information Services
	City of Maitland (Field Equipment)	County and City Roadway Maintenance and Construction Systems
	County and Local Field Equipment	County and Local Traffic Control Systems
	FDOT D5 (Field Equipment)	FDOT D5 RTMC
Traffic Information for Media	City of Orlando TMC	Newspapers, Radio, Television Stations
	City of Winter Park TOC	Newspapers, Radio, Television Stations
Traffic Metering Control	FDOT D5 RTMC	FDOT D5 (Field Equipment)
Traffic Metering Status	FDOT D5 (Field Equipment)	FDOT D5 RTMC
Traffic Probe Data	County and Local Field Equipment	County and Local Traffic Control Systems
	Vehicles	County and Local Field Equipment

Traffic Sensor Control	City of Winter Park TOC	City of Winter Park (Field Equipment)
	County and Local Traffic Control Systems	County and Local Field Equipment
Traffic Violation Notification	County and Local Field Equipment	FHP Troop D Dispatch
Traveler Information for Media	CFX Public Website	Newspapers, Radio, Television Stations
Transaction Status	Financial Institutions	LYNX (Access LYNX Paratransit Systems)
	Florida Human Service Agencies	LYNX (Access LYNX Paratransit Systems)
	Financial Institutions	All Aboard Florida Rail Operations
Transit Archive Data	Counties and Cities (FlexBus Consortium Transit Management)	FDOT D5 (Central Florida Data Warehouse)
	LYNX Transportation Center	FDOT D5 (Central Florida Data Warehouse)
Transit and Fare Schedules	LYNX (Access LYNX Paratransit Systems)	FDOT (Florida 511)
	LYNX (Access LYNX Paratransit Systems)	LYNX Virtual Travel Planning Center
	LYNX (Access LYNX Paratransit Systems)	Private Sector Traveler Information Services
	All Aboard Florida Rail Operations	FDOT (Florida 511)

	All Aboard Florida Rail Operations	LYNX Virtual Travel Planning Center
Transit Emergency Data	LYNX (Access LYNX Paratransit Systems)	County EOCs/Warning Points
	LYNX (Access LYNX Paratransit Systems)	Local EOCs
	All Aboard Florida Rail Operations	County Sheriff Dispatch
	All Aboard Florida Rail Operations	Local Police Disptach
Transit Fare Coordination	Polk County Transit Services	LYNX (Access LYNX Paratransit Systems)
	LYNX (Access LYNX Paratransit Systems)	Regional Transit Agencies (Regional Transit Fare Coordination Network)
	Regional Transit Agencies (Regional Transit Fare Coordination Network)	LYNX (Access LYNX Paratransit Systems)
	All Aboard Florida Rail Operations	Regional Transit Agencies (Regional Transit Fare Coordination Network)
	Regional Transit Agencies (Regional Transit Fare Coordination Network)	All Aboard Florida Rail Operations
Transit Fare and Passenger Status	Transit Stops/Stations Equipment	All Aboard Florida Rail Operations
Transit Fare Information	All Aboard Florida Rail Operations	Transit Stops/Stations Equipment

Transit Incident Information	LYNX (Access LYNX Paratransit Systems)	FDOT (Florida 511)
	LYNX (Access LYNX Paratransit Systems)	LYNX Virtual Travel Planning Center
	LYNX (Access LYNX Paratransit Systems)	Private Sector Traveler Information Services
	All Aboard Florida Rail Operations	FDOT (Florida 511)
	All Aboard Florida Rail Operations	Local Agency Traveler Information System
	All Aboard Florida Rail Operations	LYNX Virtual Travel Planning Center
Transit Information Request	FDOT (Florida 511)	LYNX (Access LYNX Paratransit Systems)
	LYNX Virtual Travel Planning Center	LYNX (Access LYNX Paratransit Systems)
	Private Sector Traveler Information Services	LYNX (Access LYNX Paratransit Systems)
	Local Agency Traveler Information System	All Aboard Florida Rail Operations
Transit Information User Request	Private Travelers Personal Computing Devices	All Aboard Florida Rail Operations
	Transit Kiosks	All Aboard Florida Rail Operations
	Transit Stops/Stations Equipment	All Aboard Florida Rail Operations
Transit Multimodal Information	LYNX On-Demand Transit Management	All Aboard Florida Rail Operations
	LYNX Transportation Center	All Aboard Florida Rail Operations

	SunRail Operations Control Center	All Aboard Florida Rail Operations
	Local Transit Operator Systems	Amtrak Passenger Train Terminal
	LYNX On-Demand Transit Management	Amtrak Passenger Train Terminal
	LYNX Transportation Center	Amtrak Passenger Train Terminal
Transit Schedule Adherence Information	LYNX (Access LYNX Paratransit Systems)	FDOT (Florida 511)
	LYNX (Access LYNX Paratransit Systems)	LYNX Virtual Travel Planning Center
	LYNX (Access LYNX Paratransit Systems)	Private Sector Traveler Information Services
	All Aboard Florida Rail Operations	FDOT (Florida 511)
	All Aboard Florida Rail Operations	Local Agency Traveler Information System
Transit Schedule Information	SunRail Operations Control Center	LYNX (Access LYNX Paratransit Vehicles)
Transit Service Coordination	LYNX (Access LYNX Paratransit Systems)	Local Transit Operator Systems
	Local Transit Operator Systems	LYNX (Access LYNX Paratransit Systems)
	LYNX (Access LYNX Paratransit Systems)	LYNX On-Demand Transit Management
	LYNX On-Demand Transit Management	LYNX (Access LYNX Paratransit Systems)
	LYNX (Access LYNX Paratransit Systems)	LYNX Transportation Center

	LYNX Transportation Center	LYNX (Access LYNX Paratransit Systems)
Transit System Status Assessment	LYNX (Access LYNX Paratransit Systems)	County EOCs/Warning Points
Transit Traveler Information	LYNX Transportation Center	LYNX (Access LYNX Paratransit Vehicles)
	All Aboard Florida Rail Operations	All Aboard Florida Vehicles
	All Aboard Florida Rail Operations	Transit Kiosks
	All Aboard Florida Rail Operations	Transit Stops/Stations Equipment
Transit Traveler Request	LYNX (Access LYNX Paratransit Vehicles)	LYNX (Access LYNX Paratransit Systems)
	Polk County Transit Services Paratransit Vehicles	LYNX (Access LYNX Paratransit Systems)
	LYNX (Access LYNX Paratransit Vehicles)	LYNX Transportation Center
	All Aboard Florida Vehicles	All Aboard Florida Rail Operations
	Counties and Cities (FlexBus Consortium Transit Vehicles)	Counties and Cities (FlexBus Consortium Transit Management)
Transit User Information	LYNX (Access LYNX Paratransit Vehicles)	LYNX Transportation Center
Transit Vehicle Conditions	All Aboard Florida Vehicles	All Aboard Florida Rail Operations

Transit Vehicle Loading Data	All Aboard Florida Vehicles	All Aboard Florida Rail Operations
Transit Vehicle Location Data	All Aboard Florida Vehicles	All Aboard Florida Rail Operations
Transit Vehicle Operator Information	LYNX Transportation Center	LYNX (Access LYNX Paratransit Vehicles)
	All Aboard Florida Rail Operations	All Aboard Florida Vehicles
Transit Vehicle Schedule Performance	LYNX (Access LYNX Paratransit Vehicles)	SunRail Operations Control Center
	All Aboard Florida Vehicles	All Aboard Florida Rail Operations
	Counties and Cities (FlexBus Consortium Transit Vehicles)	Counties and Cities (FlexBus Consortium Transit Management)
Transportation Information for Operations	Private Sector Traveler Information Services	City of Orlando TMC
	Private Sector Traveler Information Services	LYNX (Access LYNX Paratransit Systems)
	Private Sector Traveler Information Services	CFX Expressway Management System
	Private Sector Traveler Information Services	City of Winter Park TOC
Transportation System Status	County EOCs/Warning Points	City of Orlando TMC
	Regional Public Safety Agencies (911 Emergency Call Centers)	County EOCs/Warning Points
	County EOCs/Warning Points	Regional Public Safety Agencies (911 Emergency Call Centers)

	County EOCs/Warning Points	LYNX (Access LYNX Paratransit Systems)
	County EOCs/Warning Points	CFX Expressway Management System
	County EOCs/Warning Points	City of Winter Park TOC
	County EOCs/Warning Points	County and City Roadway Maintenance and Construction Systems
	County EOCs/Warning Points	County Emergency Broadcast Systems
Traveler Archive Data	Archive Data User Systems	Local Transportation Data Collection System
	FDOT (Florida 511)	FDOT D5 (Central Florida Data Warehouse)
	Local Agency Traveler Information System	FDOT D5 (Central Florida Data Warehouse)
Vehicle Intersection Safety Data	Vehicles	FDOT D5 (Field Equipment)
Vehicle Location and Motion	Commercial Vehicle	FDOT D5 (Field Equipment)
	Commercial Vehicle	Vehicles
	Vehicles	Commercial Vehicle
Vehicle Payment Information	Florida Statewide Toll Tag	CFX Toll Plaza
	Florida Statewide Toll Tag	FTE Express Lane Open Road Tolling Equipment
	SunPass Tag	FTE Express Lane Open Road Tolling Equipment
Vehicle Payment Request	CFX Toll Plaza	Florida Statewide Toll Tag

	FTE Express Lane Open Road Tolling Equipment	Florida Statewide Toll Tag
	FTE Express Lane Open Road Tolling Equipment	SunPass Tag
Vehicle Payment Update	CFX Toll Plaza	Florida Statewide Toll Tag
	FTE Express Lane Open Road Tolling Equipment	Florida Statewide Toll Tag
	FTE Express Lane Open Road Tolling Equipment	SunPass Tag
Vehicle Platoon Coordination	Commercial Vehicle	FDOT D5 (Field Equipment)
	Commercial Vehicle	Vehicles
	Vehicles	Commercial Vehicle
Vehicle Profile	Commercial Vehicle	FDOT D5 (Field Equipment)
Vehicle Signage Data	FDOT D5 (Field Equipment)	Vehicles
	FDOT D5 RTMC	FDOT D5 (Field Equipment)
Video Surveillance Control	County and City Roadway Maintenance and Construction Systems	City of Orlando Field Equipment
	City of Winter Park TOC	City of Winter Park (Field Equipment)
	County and City Roadway Maintenance and Construction Systems	City of Maitland (Field Equipment)
	County and Local Traffic Control Systems	County and Local Field Equipment

Weather Information	National Hurricane Center Info. System	County and City Roadway Maintenance and Construction Systems
	National Weather Service	County and City Roadway Maintenance and Construction Systems
Work Plan Coordination	County and City Public Information System	One Call System (1-800 Sunshine)
	One Call System (1-800 Sunshine)	County and City Public Information System
	County and City Roadway Maintenance and Construction Systems	One Call System (1-800 Sunshine)
	One Call System (1-800 Sunshine)	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	FDOT D5 (Construction and Maintenance)
	FDOT D5 (Construction and Maintenance)	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	Other County and City Maintenance
	Other County and City Maintenance	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	Other FDOT Maintenance and Construction
	Other FDOT Maintenance and Construction	County and City Roadway Maintenance and Construction Systems

Work Plan Feedback	City of Orlando TMC	County and City Roadway Maintenance and Construction System
	LYNX (Access LYNX Paratransit Systems)	County and City Roadway Maintenance and Construction System
	City of Winter Park TOC	County and City Roadway Maintenance and Construction Systems
	Rail Operations Centers	County and City Public Information System
	City of Maitland TOC	County and City Roadway Maintenance and Construction Systems
	County and Local Traffic Control Systems	County and City Roadway Maintenance and Construction Systems
	Disney Traffic Operations Center	County and City Roadway Maintenance and Construction Systems
	FlexBus Consortium Transit Management	County and City Roadway Maintenance and Construction Systems
	FTE Operations Center (Turkey Lake)	County and City Roadway Maintenance and Construction Systems
	I-RIDE Tourist Shuttle Dispatch	County and City Roadway Maintenance and Construction Systems
	Local Transit Operator Systems	County and City Roadway Maintenance and Construction Systems
	LYNX On-Demand Transit Management	County and City Roadway Maintenance and Construction Systems

	LYNX Transportation Center	County and City Roadway Maintenance and Construction Systems
	Osceola County TOC	County and City Roadway Maintenance and Construction Systems
	Rail Operations Center	County and City Roadway Maintenance and Construction Systems
	School District Transportation Dispatch	County and City Roadway Maintenance and Construction Systems
	Seminole County TMC	County and City Roadway Maintenance and Construction Systems
Work Zone Information	City of Orlando TMC	County and City Roadway Maintenance and Construction System
	FDOT D5 Construction and Maintenance	City of Orlando TMC
	Private Maintenance Contractors	City of Orlando TMC
	County and City Roadway Maintenance and Construction Systems	City of Winter Park TOC
	County and City Roadway Maintenance and Construction Systems	County and Local Traffic Control Systems
	County and City Roadway Maintenance and Construction Systems	Disney Traffic Operations Center
	County and City Roadway Maintenance and Construction Systems	FDOT D5 (Construction and Maintenance)

	FDOT D5 (Construction and Maintenance)	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	FTE Operations Center (Turkey Lake)
	County and City Roadway Maintenance and Construction Systems	Local Transit Operator Systems
	County and City Roadway Maintenance and Construction Systems	LYNX Transportation Center
	County and City Roadway Maintenance and Construction Systems	OCCC Operations Center
	County and City Roadway Maintenance and Construction Systems	Orange County TMC
	County and City Roadway Maintenance and Construction Systems	Osceola County TOC
	County and City Roadway Maintenance and Construction Systems	Other County and City Maintenance
	Other County and City Maintenance	County and City Roadway Maintenance and Construction Systems
	County and City Roadway Maintenance and Construction Systems	Private Maintenance Contractors
	County and City Roadway Maintenance and Construction Systems	School District Transportation Dispatch
	County and City Roadway Maintenance and Construction Systems	Seminole County TMC

Work Zone Status	County and City PWD Vehicles	County and City Roadway Maintenance and Construction Systems
	FDOT D5 (Maintenance Vehicles)	FDOT D5 (Construction and Maintenance)
Work Zone Warning Notification	City of Orlando Field Equipment	County and City PWD Vehicles
	City of Maitland (Field Equipment)	County and City PWD Vehicles
	County and Local Field Equipment	County and City PWD Vehicles
	Orange County (Field Equipment)	County and City PWD Vehicles
	Osceola County (Field Equipment)	County and City PWD Vehicles
	Seminole County (Field Equipment)	County and City PWD Vehicles
	FDOT D5 (Field Equipment)	FDOT D5 (Maintenance Vehicles)
Work Zone Warning Status	City of Orlando Field Equipment	County and City Roadway Maintenance and Construction Systems
	County and City PWD Vehicles	County and City Roadway Maintenance and Construction Systems
	City of Maitland (Field Equipment)	County and City Roadway Maintenance and Construction Systems
	County and Local Field Equipment	County and City Roadway Maintenance and Construction Systems
	Orange County (Field Equipment)	County and City Roadway Maintenance and Construction Systems

	Seminole County (Field Equipment)	County and City Roadway Maintenance and Construction Systems
	Osceola County (Field Equipment)	County and City Roadway Maintenance and Construction Systems
	FDOT D5 (Maintenance Vehicles)	FDOT D5 (Construction and Maintenance)
	FDOT D5 (Field Equipment)	FDOT D5 (Construction and Maintenance)

APPENDIX D

Regional ITS Architecture Data Sharing Needs Definitions

The following are the definitions of the data sharing needs as defined in the Regional ITS Architecture.

- **Alarm** - Information about a Commercial Vehicle or Freight Equipment breach, non-permitted security sensitive hazmat detected at the roadside, route deviation, or Commercial Vehicle Driver / Commercial Vehicle / Freight Equipment assignment mismatches which includes the location of the Commercial Vehicle and appropriate identities.
- **Alarm Acknowledgement** - Confirmation that alarm was received, instructions and additional information for the alarm initiator, and requests for additional information.
- **Alarm Notification** - Notification of activation of an audible or silent alarm by a traveler in a public area or by a transit vehicle operator using an on-board device.
- **Alert Notification** - Notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The flow identifies the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This flow may also identify specific information that should not be released to the public.
- **Alert Notification Coordination** - Coordination of emergency alerts to be distributed to the public. This includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public and status of the public notification.
- **Alert Status** - Information indicating the current status of the emergency alert including identification of the traveler and driver information systems that are being used to provide the alert.
- **Archive Coordination** - Catalog data, meta data, published data, and other information exchanged between archives to support data synchronization and satisfy user data requests.
- **Archive Data Products** - Raw or processed data, meta data, data catalogs and other data products provided to a user system upon request. The response may also include any associated transaction information.
- **Archive Data Product Requests** - A user-specified request for archived data products (i.e. data, meta data, or data catalogs). The request also includes information that is used to identify and authenticate the user and support electronic payment requirements, if any.
- **Archive Requests** - A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.
- **Archive Status** - Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.
- **Asset Inventory** - Information on pavement, bridges, signs and other assets. This includes asset location, installation information, materials information, vendor/contractor information, current maintenance status, and a variety of other information (e.g., video logs) that define the transportation infrastructure.
- **Asset Restrictions** - Restrictions levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard height, width, and weight restrictions by facility as well as special restrictions such as spring weight restrictions and temporary bridge weight restrictions.

- **Asset Status Update** - Changes to status of pavement, bridges, signs and other assets resulting from maintenance or construction activities or infrastructure monitoring. The updates may include changes in installation information, materials information, vendor/contractor information, condition, and current maintenance status. In addition to infrastructure asset updates, the information provided may also include status of the maintenance and construction support assets, including vehicle and equipment utilization and repair records.
- **Bad Tag List** - List of invalid transit user tags which may have previously failed a fare payment transaction.
- **Broadcast Traveler Information** - General traveler information that contains traffic and road conditions, link travel times, incidents, advisories, restrictions, transit service information, weather information, parking information, and other related traveler information.
- **Care Facility Status -** Information regarding facility type and capabilities, facility status, and its ability to admit new patients.
- **Care Facility Status Request -** Request for information regarding care facility availability and status.
- **CCTV Images** - High fidelity, real-time CCTV images.
- **Commercial Vehicle Breach -** Information about a breach or tamper event on a Commercial Vehicle or its attached freight equipment which includes identity, type of breach, location, and time.
- **Cooperative Adaptive Cruise Control Parameters -** Information, instructions, and control parameters for cooperative cruise control including current system conditions and advisories, control parameters (e.g., speed, required vehicle performance profiles, gaps or headways) and check in/checkout instructions.
- **Cooperative Adaptive Cruise Control Status -** Data describing the vehicle's location in three dimensions, heading speed, acceleration, braking status, and size.
- **Crash Data** - Information about incidents on state, county, or city roadways.
- **Current Asset Restrictions** - Restrictions levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.
- **Decision Support Information -** Information provided to support effective and safe incident response, including local traffic, road, and weather conditions, hazardous material information, and the current status of resources that have been allocated to an incident.
- **Demand Responsive Transit Plan** - Plan regarding overall demand responsive transit schedules and deployment.
- **Device Control Request** - Request for device control action.
- **Device Data** - Data from detectors, environmental sensor stations, and traffic control devices including device inventory information.
- **Device Status** - Status information from devices.
- **Driver Alert Response -** Commercial Vehicle Driver response to a breach alert for a Freight Equipment breach or tamper event.
- **Driver Information -** Regulatory, warning, and guidance information provided to the driver while en route to support safe and efficient vehicle operation.

- **Emergency Archive Data -** Logged emergency information including information that characterizes identified incidents (routine highway incidents through disasters), corresponding incident response information, evacuation information, surveillance data, threat data, and resource information. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
- **Emergency Dispatch Requests** - Emergency vehicle dispatch instructions including incident location and available information concerning the incident.
- **Emergency Dispatch Response** - Request for additional emergency dispatch information and provision of en route status.
- **Emergency Plan Coordination** - Information that supports coordination of emergency management plans, continuity of operations plans, emergency response and recovery plans, evacuation plans, and other emergency plans between agencies. This includes general plans that are coordinated prior to an incident and shorter duration tactical plans that are prepared during an incident.
- **Emergency Traffic Control Information** - Status of a special traffic control strategy or system activation implemented in response to an emergency traffic control request, a request for emergency access routes, a request for evacuation, a request to activate closure systems, a request to employ driver information systems to support public safety objectives, or other special requests. Identifies the selected traffic control strategy and system control status.
- **Emergency Traffic Control Request** - Special request to preempt the current traffic control strategy in effect at one or more signalized intersections or highway segments, activate traffic control and closure systems such as gates and barriers, activate safeguard systems, or use driver information systems. For example, this flow can request all signals to red-flash, request a progression of traffic control preemptions along an emergency vehicle route, request a specific evacuation traffic control plan, request activation of a road closure barrier system, or place a public safety or emergency-related message on a dynamic message sign.
- **Emergency Traffic Coordination** - Coordination supporting disaster response including evacuation and reentry. Includes coordination of special traffic control strategies that support efficient evacuation and reentry while protecting and optimizing movement of response vehicles and other resources responding to the emergency.
- **Emergency Transit Schedule Information** - Information on transit schedule and service changes that adapt the service to better meet needs of responders and the general public in an emergency situation, including special service schedules supporting evacuation.
- **Emergency Transit Service Request** - Request to modify transit service and fare schedules to address emergencies, including requests for transit services to evacuate people from and/or deploy response agency personnel to an emergency scene. The request may poll for resource availability or request pre-staging, staging, or immediate dispatch of transit resources.
- **Emergency Transit Service Response** - Response indicating changes to transit service, fares, and/or restrictions that will be made and status of transit resources to be deployed to support emergency response and/or evacuation.
- **Emergency Traveler Information -** Public notification of an emergency such as a natural or man-made disaster, civil emergency, or child abduction. This flow also includes evacuation information including evacuation instructions, evacuation zones, recommended evacuation times, tailored

evacuation routes and destinations, traffic and road conditions along the evacuation routes, traveler services and shelter information, and reentry times and instructions.

- **Vehicle Tracking Data** - The current location and operating status of the emergency vehicle.
- **Environmental Conditions Data** - Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) as measured and reported by fixed and/or mobile environmental sensors and aggregated by the data collector. Attributes relating to the data collection (and aggregation) are also included.
- **Environmental Conditions Data Status -** Status of the data quality of environmental conditions data provided by a data contributor. Includes not only status by sensor, but statistical data regarding the quality checking of data provided.
- **Environmental Probe Data -** Data from vehicle safety and convenience systems that can be used to estimate environmental conditions, including measured air temperature, exterior light status, wiper status, sun sensor status, rain sensor status, traction control status, anti-lock brake status, and other collected vehicle system status and sensor information. The collected data is reported along with the location, heading, and time that the data was collected. Both current data and snapshots of recent events (e.g., traction control or anti-lock brake system activations) may be reported.
- **Environmental Sensors Control** - Data used to configure and control environmental sensors.
- **Environmental Sensor Data** - Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) as measured and reported by fixed and/or mobile environmental sensors. Operational status of the sensors is also included.
- **Equipment Maintenance Status** - Current status of field equipment maintenance actions.
- **Evacuation Coordination** - Coordination of information regarding a pending or in-process evacuation. Includes evacuation zones, evacuation times, evacuation routes, forecast network conditions, and reentry times.
- **Evacuation Information** - Evacuation instructions and information including evacuation zones, evacuation times, and reentry times.
- **Event Confirmation** - Confirmation that special event details have been received and processed.
- **Event Plans** - Plans for major events possibly impacting traffic.
- **Fare Collection Data** - Fare collection information including the summary of on-board fare system data and financial payment transaction data.
- **Field Equipment Status** - Identification of field equipment requiring repair and known information about the associated faults.
- **Freight Equipment Information -** Container, trailer, or chassis information regarding identity, type, location, brake wear data, mileage, seal #, seal type, door open/close status, chassis bare/covered status, tethered / untethered status, Bill of Lading, and sensor status.
- **Freight Transportation Status** - A time-stamped status of a freight shipment as it passes through the supply chain from manufacturer through arrival at its final destination; including cargo movement logs, routing information, and cargo ID's.
- **Hazmat Information** - Information about a particular hazmat load including nature of the load and unloading instructions. May also include hazmat vehicle route and route update information.
- **Hazmat Information Request** - Request for information about a particular hazmat load.

- **Highway Control Status** - Current traffic control equipment status that indicates operational status and right-of-way availability to the non-highway transportation mode at a multimodal crossing.
- **Highway-Rail Intersection (HRI) Advisories** - Notification of Highway-Rail Intersection equipment failure, intersection blockage, or other condition requiring attention, and maintenance activities at or near highway rail intersections.
- **HRI Control Data** - Data required for HRI information transmitted at railroad grade crossings and within railroad operations.
- **HRI Operational Status** - Status of the highway-rail grade crossing equipment including both the current state or mode of operation and the current equipment condition.
- **HRI Request** - A request for highway-rail intersection status or a specific control request intended to modify HRI operation.
- **HRI Status** - Status of the highway-rail intersection equipment including both the current state or mode of operation and the current equipment condition.
- **Incident Command Information Coordination** - Information that supports local management of an incident. It includes resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency or maintenance personnel in the field to implement an effective, safe incident response.
- **Incident Information** - Notification of existence of incident and expected severity, location, time and nature of incident. As additional information is gathered and the incident evolves, updated incident information is provided. Incidents include any event that impacts transportation system operation ranging from routine incidents (e.g., disabled vehicle at the side of the road) through large-scale natural or human-caused disasters that involve loss of life, injuries, extensive property damage, and multi-jurisdictional response. This also includes special events, closures, and other planned events that may impact the transportation system.
- **Incident Report** - Report of an identified incident including incident location, type, severity and other information necessary to initiate an appropriate incident response.
- **Incident Response Coordination** - Incident response procedures and current incident response status that are shared between allied response agencies to support a coordinated response to incidents. This flow provides current situation information, including a summary of incident status and its impact on the transportation system and other infrastructure, and current and planned response activities. This flow also coordinates a positive hand off of responsibility for all or part of an incident response between agencies.
- **Incident Response Status** - Status of the current incident response including a summary of incident status and its impact on the transportation system, traffic management strategies implemented at the site (e.g., closures, diversions, traffic signal control overrides), and current and planned response activities.
- **Incident Status** - Information gathered at the incident site that more completely characterizes the incident and provides current incident response status.
- **Infrastructure Monitoring Sensor Control -** Data used to configure and control infrastructure monitoring sensors.
- **Infrastructure Monitoring Sensor Data -** Data read from infrastructure-based sensors that monitor the condition or integrity of transportation infrastructure including bridges, tunnels,

interchanges, pavement, culverts, signs, transit rail or guideway, and other roadway infrastructure. Includes sensor data and the operational status of the sensors.

- **Intermodal Freight Archive Data** - Information describing demand at intermodal freight terminals including loading/unloading activities of trailers and containers. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
- **Intermodal Freight Event Information** - Plans for movement of intermodal freight from the depot area possibly impacting traffic. May also include requests for special treatment at traffic signals or dynamic lane management systems.
- **Intermodal Freight Traffic Confirmation** - Confirmation that details concerning the movement of intermodal freight on the roadway network have been received and processed. May also include information on traffic conditions affecting the depot including information concerning any special traffic control accommodations or restrictions for commercial vehicles.
- **Intersection Status -** Intersection status including current operational status, signal phase and timing information, intersection geometry, surface conditions, warnings of potential violations or hazardous conditions, and approaching vehicle information. This may include information about the position, velocity, acceleration, and turning status of approaching vehicles.
- **Local Signal Priority Request** - Request from a vehicle to a signalized intersection for priority at that intersection.
- **Local Signal Preemption Request** - Direct control signal or message to a signalized intersection that results in preemption of the current control plan and grants right-of-way to the requesting vehicle.
- **Maintenance and Construction Dispatch Information -** Information used to dispatch maintenance and construction vehicles, equipment, and crews and information used to keep work zone crews informed. This information includes routing information, traffic information, road restrictions, incident information, environmental information, decision support information, maintenance schedule data, dispatch instructions, personnel assignments, alert notifications, and corrective actions.
- **Maintenance and Construction Dispatch Status -** Current maintenance and construction status including work data, operator status, crew status, and equipment status.
- **Maintenance and Construction Equipment Repair Status -** Current maintenance and repair status of the maintenance and construction vehicle fleet and other support equipment. This information includes a record of all maintenance and repair activities performed.
- **Maintenance and Construction Fleet Information -** Information supporting maintenance of the maintenance and construction vehicle fleet and other support equipment. This information includes vehicle status and diagnostic information, vehicle utilization, and coordination of when vehicles will be available for preventative and corrective maintenance.
- **Maintenance and Construction Resource Coordination -** Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response.
- **Maintenance and Construction Resource Request** - Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response. The request

may poll for resource availability or request pre-staging, staging, or immediate dispatch of resources.

- **Maintenance and Construction Resource Response** - Current status of maintenance and construction resources including availability and deployment status. General resource inventory information covering vehicles, equipment, materials, and people and specific resource deployment status may be included.
- **Maintenance and Construction Vehicle Conditions** - Vehicle diagnostics information that is collected, filtered, and selectively reported by a maintenance and construction vehicle. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms concerning the operational condition of the vehicle and ancillary equipment.
- **Maintenance and Construction Vehicle Location Data** - The current location and related status (e.g., direction and speed) of the maintenance/construction vehicle.
- **Maintenance and Construction Vehicle Operational Data -** Data that describes the maintenance and construction activity performed by the vehicle. Operational data includes materials usage (amount stored and current application rate), operational state of the maintenance equipment (e.g., blade up/down, spreader pattern), vehicle safety status, and other measures associated with the operation of a maintenance, construction, or other special purpose vehicle. Operational data may include basic operational status of the vehicle equipment or a more precise record of the work performed (e.g., application of crack sealant with precise locations and application characteristics).
- **Maintenance and Construction Work Plans** - Future construction and maintenance work schedules and activities including anticipated closures with anticipated impact to the roadway, alternate routes, anticipated delays, closure times, and durations.
- **Multimodal Archive Data** - Operational information from alternate passenger transportation modes including air, rail transit, taxis, and ferries. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
- **Multimodal Crossing Status** - Indication of operational status and pending requests for right-of-way from equipment supporting the non-highway mode at multimodal crossings.
- **Multimodal Information** - Schedule information for alternate mode transportation providers such as train, ferry, air and bus.
- **Multimodal Service Data** - Multimodal transportation schedules and other service information.
- **On-Board Vehicle Data -** Information about the commercial vehicle stored on-board (for maintenance purposes, gate access, cargo status, lock status, etc.).
- **On-Board Vehicle Request -** Request for on-board vehicle data.
- **Parking Demand Management Request** - Request to change the demand for parking facility use through pricing or other mechanisms.
- **Parking Demand Management Response** - Response to parking demand management change requests indicating level of compliance with request.
- **Parking Information** - General parking information and status, including current parking availability.
- **Parking Lot Data Request** - Request for parking lot occupancy, fares, and availability. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

- **Parking Lot Inputs** - Instructions for operation of local parking facilities to support regional traffic management objectives (e.g. which parking lot exits to use). Also, includes inputs from traffic sensors to support calculation of parking lot occupancy and support more effective management of parking entrances and exits.
- **Passenger Information** - Provides detailed passenger information. May include scheduled pickup and dropoff information, and passenger (on-board) status. For paratransit and demand-responsive requests. Also, for school bus.
- **Patient Status -** Information that supports assessment of the patient's condition. Information could include general categorization of patient status, patient vital signs, pertinent medical history, and emergency care information.
- **Payment** - Payment of some kind (e.g., toll, parking, fare) by traveler which, in most cases, can be related to a credit account.
- **Payment Requests** - Request for payment from financial institution.
- **Payment Violation Notification** - Notification to enforcement agency of a toll, parking, or transit fare payment violation.
- **Personal Transit Information** - General and personalized transit information for a particular fixed route, flexible route, or paratransit system.
- **Qualified Environmental Conditions Data -** Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) that has had quality checks performed on it and has been formatted and consolidated by the Clarus system. Attributes relating to the data collection (and aggregation) are also included.
- **Railroad Advisories** - Real-time notification of railway-related incident or advisory.
- **Railroad Schedules** - Train schedules, maintenance schedules, and other information from the railroad that supports forecast of HRI closures.
- **Remote Surveillance Control** - The control commands used to remotely operate another center's sensors or surveillance equipment so that roadside surveillance assets can be shared by more than one agency.
- **Request for Bad Tag List** - Request for list of bad vehicle tag IDs.
- **Request for Payment** - Request to deduct cost of service from user's payment account.
- **Request for Vehicle Measures** - Request for vehicle performance and maintenance data collected by onboard sensors.
- **Resource Coordination** - Coordination of resource inventory information, specific resource status information, resource prioritization and reallocation between jurisdictions, and specific requests for resources and responses that service those requests.
- **Resource Deployment Status** - Status of resource deployment identifying the resources (vehicles, equipment, materials, and personnel) available and their current status. General resource inventory information and specific status of deployed resources may be included.
- **Resource Request** - A request for resources to implement special traffic control measures, assist in clean up, verify an incident, etc. The request may poll for resource availability or request pre-staging, staging, or immediate deployment of resources. Resources may be explicitly requested or a service may be requested and the specific resource deployment may be determined by the responding agency.

- **Reversible Lane Control -** Control of automated reversible lane configuration and driver information systems.
- **Reversible Lane Status -** Current reversible lane status including traffic sensor and surveillance data and the operational status and mode of the reversible lane control equipment.
- **Right-of-Way Request Notification** - Notice that a request has occurred for signal prioritization, signal preemption, pedestrian call, multi-modal crossing activation, or other source for right-of-way.
- **Road Network Conditions** - Current and forecasted traffic information, road and weather conditions, and other road network status. Either raw data, processed data, or some combination of both may be provided by this architecture flow. Information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements) in effect is included along with a definition of the links, nodes, and routes that make up the road network.
- **Road Network Status Assessment** - Assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.
- **Road Weather Information -** Road conditions and weather information that are made available by road maintenance operations to other transportation system operators.
- **Roadway Information System Data** - Information used to initialize, configure, and control roadside systems that provide driver information (e.g., dynamic message signs, highway advisory radio, beacon systems). This flow can provide message content and delivery attributes, local message store maintenance requests, control mode commands, status queries, and all other commands and associated parameters that support remote management of these systems.
- **Roadway Information System Status** - Current operating status of dynamic message signs, highway advisory radios, beacon systems, or other configurable field equipment that provides dynamic information to the driver.
- **Roadway Maintenance Status -** Summary of maintenance fleet operations affecting the road network. This includes the status of winter maintenance (snow plow schedule and current status).
- **Roadway Safety Data -** Information about potential safety hazards in the vehicle path such as stalled vehicles, wrong way drivers, debris, or standing water.
- **Roadway Warning System Control -** Information used to configure and control roadway warning systems.
- **Roadway Warning System Status -** Current operating status of roadway warning systems.
- **Selected Routes** - Routes selected based on route request criteria.
- **Short Range Communications Status -** Status of the short range communications equipment including the current state or mode of operation and the current equipment status.
- **Signal Control Commands -** Control of traffic signal controllers or field masters including clock synchronization.
- **Signal Control Status -** Operational and status data of traffic signal control equipment including operating condition and current indications.
- **Signal Fault Data -** Faults from traffic signal control equipment.
- **Speed Monitoring Control -** Information used to configure and control automated speed monitoring, speed warning, and speed enforcement systems.

- **Speed Monitoring Information -** System status including current operational state and logged information including measured speeds, warning messages displayed, and violation records.
- **Suggested Route -** Suggested route for a dispatched emergency or maintenance vehicle that may reflect current network conditions and the additional routing options available to en route emergency or maintenance vehicles that are not available to the general public.
- **Threat Information** - Threats regarding transportation infrastructure, facilities, or systems detected by a variety of methods (sensors, surveillance, threat analysis of advisories from outside agencies, etc.
- **Threat Information Coordination** - Sensor, surveillance, and threat data including raw and processed data that is collected by sensor and surveillance equipment located in secure areas.
- **Toll Data** - Current toll schedules for different types of vehicles as well as advanced toll payment information.
- **Toll Data Request** - Request made to obtain toll schedule information or pay a toll in advance. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.
- **Toll Instructions** - Information provided to configure and support toll plaza operations including toll pricing information.
- **Toll Transactions** - Detailed list of transactions from a toll station.
- **Track Status** - Current status of the wayside equipment and notification of an arriving train.
- **Traffic Archive Data** - Information describing the use and vehicle composition on transportation facilities and the traffic control strategies employed. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
- **Traffic Control Priority Request** - Request for signal priority at one or more intersections along a particular route.
- **Traffic Flow -** Raw and/or processed traffic detector data which allows derivation of traffic flow variables (e.g., speed, volume, and density measures) and associated information (e.g., congestion, potential incidents). This flow includes the traffic data and the operational status of the traffic detectors.
- **Traffic Images** - High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications.
- **Traffic Information for Media** - Report of traffic conditions including traffic incident reports and traffic images for public dissemination through the media. The reports may also include information on diversions and alternate routes, closures, and special traffic restrictions in effect.
- **Traffic Metering Control -** Control commands and operating parameters for ramp meters, interchange meters, mainline meters, and other systems equipment associated with roadway metering operations.
- **Traffic Metering Status -** Current operational status and operating parameters for ramp meters, interchange meters, mainline meters and other control equipment associated with roadway metering operations.
- **Traffic Probe Data -** Vehicle data that is used to determine traffic conditions. In a basic implementation, the data could be limited to time stamped unique identifiers that can be used to measure a vehicle's progress through the network. In more advanced implementations, the vehicle may report current position, speed, and heading and snapshots of recent events including

route information, starts and stops, speed changes, and other information that can be used to estimate traffic conditions.

- **Traffic Sensor Control -** Information used to configure and control traffic sensor systems.
- **Traffic Violation Notification -** Notification to enforcement agency of a detected traffic violation including speed violations, HOV violations, and dynamic lane violations.
- **Traveler Information for Media** - General traveler information regarding incidents, unusual traffic conditions, transit issues, or other advisory information that has been desensitized and provided to the media.
- **Transaction Status** - Response to transaction request. Normally dealing with a request for payment.
- **Transit Archive Data** - Data used to describe and monitor transit demand, fares, operations, and system performance. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
- **Transit and Fare Schedules** - Transit service information including routes, schedules, and fare information.
- **Transit Emergency Data** - Initial notification of transit emergency at a transit stop or on transit vehicles and further coordination as additional details become available and the response is coordinated.
- **Transit Fare Coordination** - Fare and pricing information shared between local/regional transit organizations.
- **Transit Fare and Passenger Status** - Information provided from the traveler location that supports fare payments, passenger data, and associated record-keeping.
- **Transit Fare Information** - Information provided by transit management that supports fare payment transactions and passenger data collection.
- **Transit Incident Information** - Information on transit incidents that impact transit services for public dissemination.
- **Transit Information Request** - Request for transit operations information including schedule and fare information. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.
- **Transit Information User Request** - Request for special transit routing, real-time schedule information, and availability information.
- **Transit Multimodal Information** - Transit schedule information for coordination at modal interchange points.
- **Transit Schedule Adherence Information** - Dynamic transit schedule adherence and transit vehicle location information.
- **Transit Schedule Information** - Current and projected transit schedule information used to initialize the transit vehicle with a vehicle assignment, monitor schedule performance, and develop corrective actions on-board.
- **Transit Service Coordination** - Schedule coordination information shared between local/regional transit organizations.
- **Transit System Status Assessment** - Assessment of damage sustained by the public transportation system including location and extent of the damage, current operational status including an estimate of remaining capacity and necessary restrictions, and time frame for repair and recovery.

- **Transit Traveler Information** - Transit information prepared to support transit users and other travelers. It contains transit schedules, real-time arrival information, fare schedules, alerts and advisories, and general transit service information.
- **Transit Traveler Request** - Request by a Transit traveler to summon assistance, request transit information, or request any other transit services.
- **Transit User Information** - Information about individual transit users boarding a transit vehicle, used to track a user's progress on a scheduled transit trip.
- **Transit Vehicle Conditions** - Operating conditions of transit vehicle (e.g., engine running, oil pressure, fuel level and usage).
- **Transit Vehicle Loading Data** - Data collected on board the transit vehicle relating to passenger boarding and alighting.
- **Transit Vehicle Location Data** - Current transit vehicle location and related operational conditions data provided by a transit vehicle.
- **Transit Vehicle Operator Information** - Transit service instructions, wide area alerts, traffic information, road conditions, and other information for both transit and paratransit operators.
- **Transit Vehicle Schedule Performance** - Estimated times of arrival and anticipated schedule deviations reported by a transit vehicle.
- **Transportation Information for Operations** - Information on the state of transportation system operations including traffic and road conditions, advisories, incidents, transit service information, weather information, parking information, and other related data.
- **Transportation System Status** - Current status and condition of transportation infrastructure (e.g., tunnels, bridges, interchanges, TMC offices, maintenance facilities). In case of disaster or major incident, this flow provides an assessment of damage sustained by the surface transportation system including location and extent of the damage, estimate of remaining capacity and necessary restrictions, and time frame for repair and recovery.
- **Traveler Archive Data** - Data associated with traveler information services including service requests, facility usage, rideshare, routing, and traveler payment transaction data. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.
- **Vehicle Intersection Safety Data -** Vehicle path and acceleration data provided by vehicles approaching or occupying an intersection. It identifies the intersection, vehicle position and motion, the anticipated lane and movement that will be used in the intersection, and notification of potential violations or other detected safety hazards.
- **Vehicle Location and Motion -** Data describing the vehicle's location in three dimensions, heading speed, acceleration, braking status, and size.
- **Vehicle Payment Information** - Information provided for payment of tolls and parking fees including identification that can be used to identify the payment account or source and related vehicle and service information that are used to determine the type and price of service requested.
- **Vehicle Payment Request** - Request for information supporting toll and parking payments.
- **Vehicle Payment Update** - Data written to vehicle equipment to support electronic toll collection or parking payment.
- **Vehicle Platoon Coordination -** Coordination of control commands between leader and follower vehicles allowing vehicles to join, coordinate with, and separate from platoons of cooperative

vehicles. This flow shares platoon size, location, and performance parameters between platooned vehicles. It also coordinates maneuvers between platooned vehicles, including maneuvers as vehicles join and leave the platoon.

- **Vehicle Profile -** Information about a vehicle such as vehicle make and model, fuel type, engine type, average emissions, average fuel consumption, passenger occupancy, or other data that can be used to classify vehicle eligibility for access to specific lanes, road segments, or regions.
- **Vehicle Signage Data -** In-vehicle signing data that augments regulatory, warning, and informational road signs and signals. The information provided would include static sign information (e.g., stop, curve warning, guide signs, service signs, and directional signs) and dynamic information (e.g., current signal states, grade crossing information, local traffic and road conditions, advisories, and detours).
- **Video Surveillance Control** - Information used to configure and control video surveillance systems.
- **Weather Information -** Accumulated forecasted and current weather data (e.g., temperature, pressure, wind speed, wind direction, humidity, precipitation, visibility, light conditions, etc.).
- **Work Plan Coordination** - Coordination of work plan schedules and activities between maintenance and construction organizations or systems. This information includes the work plan schedules and comments and suggested changes that are exchanged as work plans are coordinated and finalized.
- **Work Plan Feedback** - Comments and suggested changes to proposed construction and maintenance work schedules and activities. This information influences work plan schedules so that they minimize impact to other system operations and the overall transportation system.
- **Work Zone Information** - Summary of maintenance and construction work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.
- **Work Zone Status -** Current work zone status including current location (and future locations for moving work zones), impact to the roadway, required lane shifts, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits.
- **Zone Warning Information** - Notification of a work zone emergency or safety issue. This flow identifies that a work zone emergency or safety issue has occurred so that warnings may be generated by more than one system in the work zone.
- **Work Zone Warning Status** - Status of a work zone safety monitoring and warning devices. This flow documents system activations and includes additional supporting information (e.g., an image) that allows verification of the alarm.

APPENDIX E

Existing Market Packages

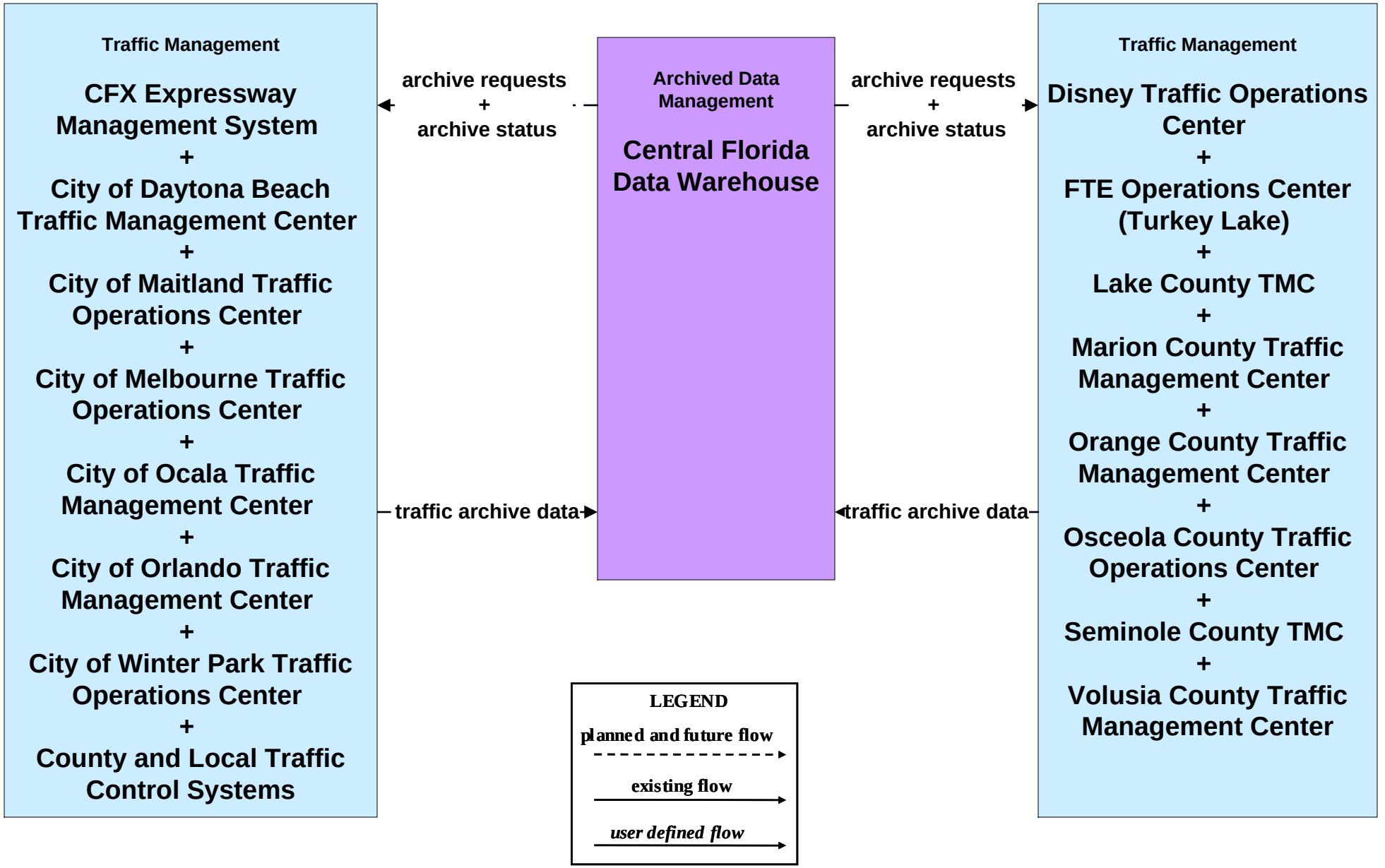
FDOT District 5

Central Florida Regional ITS Architecture

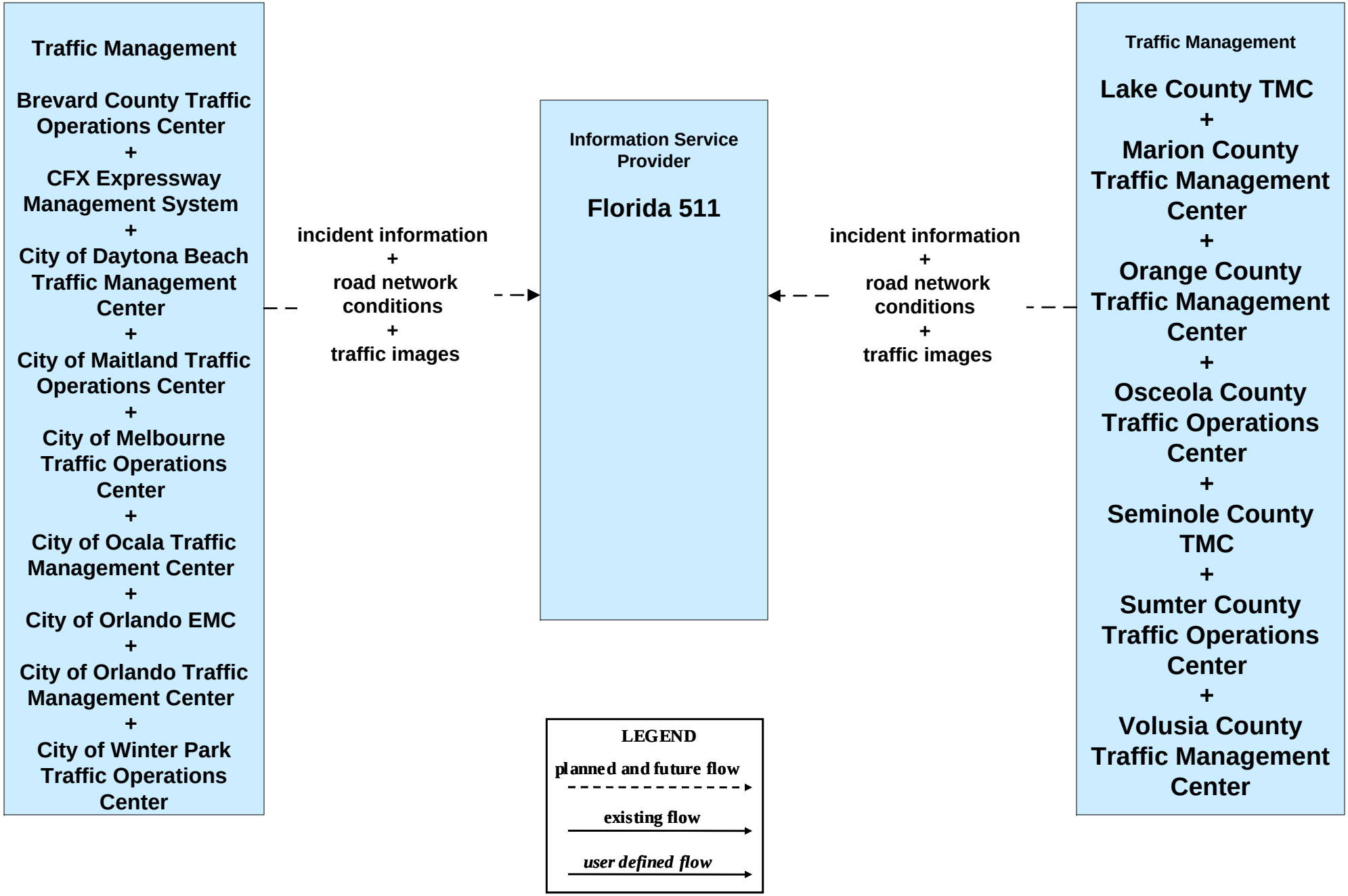
Customized Service Package Diagrams

Central Florida Expressway Authority (CFX)

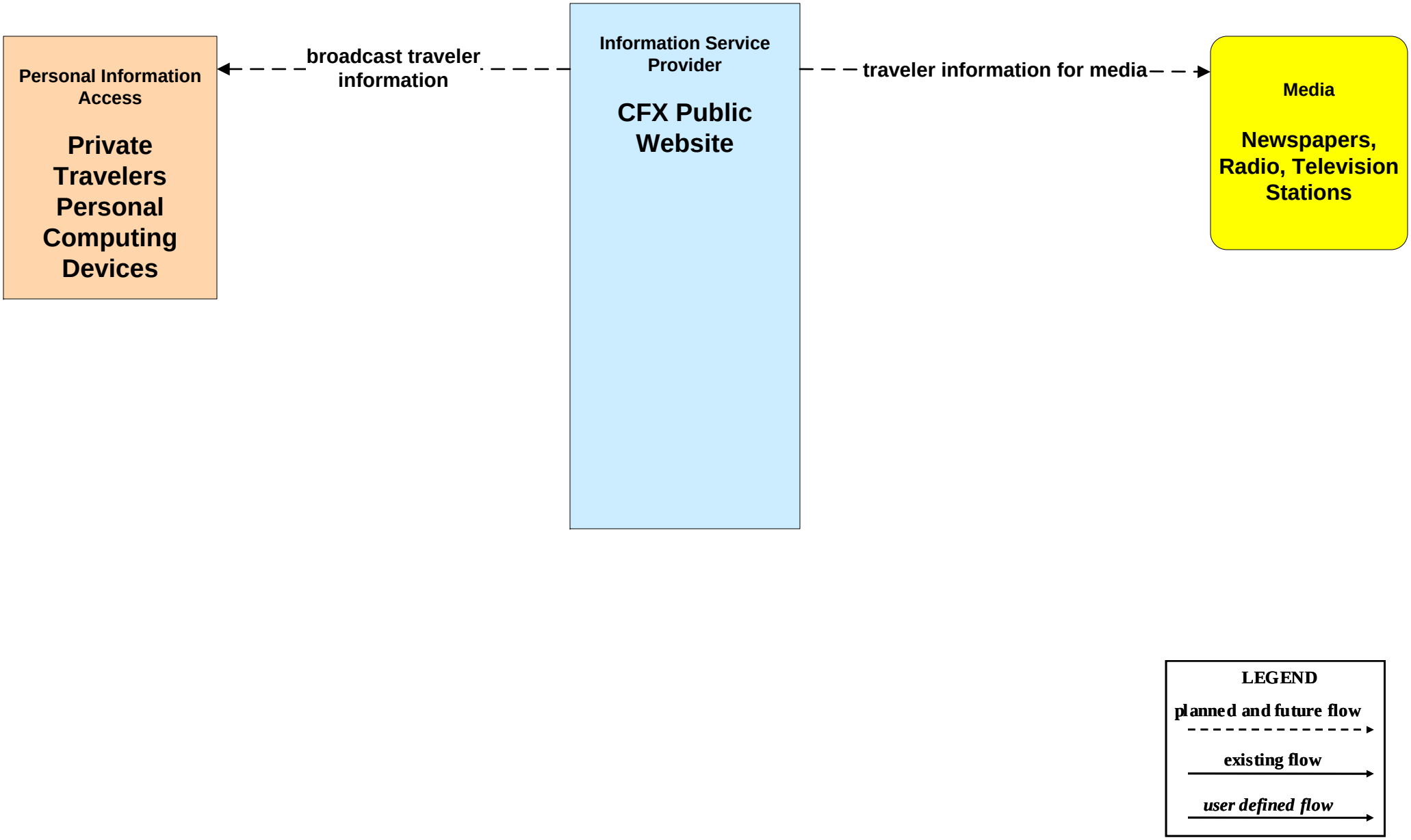
AD2 - ITS Data Warehouse
Central Florida Data Warehouse (1 of 2)



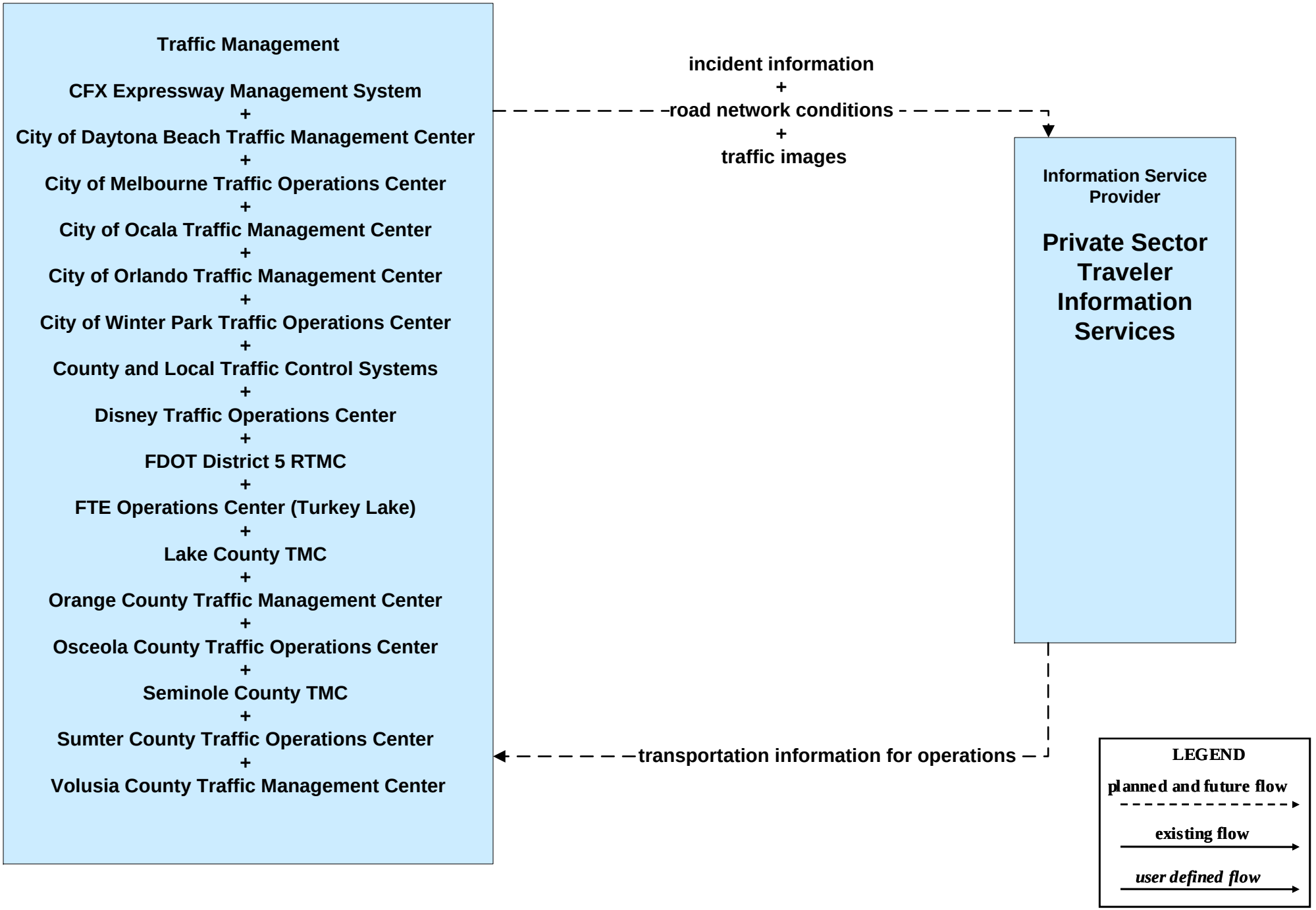
ATIS01 - Broadcast Traveler Information
Florida 511 / Private ISPs (3 of 3)



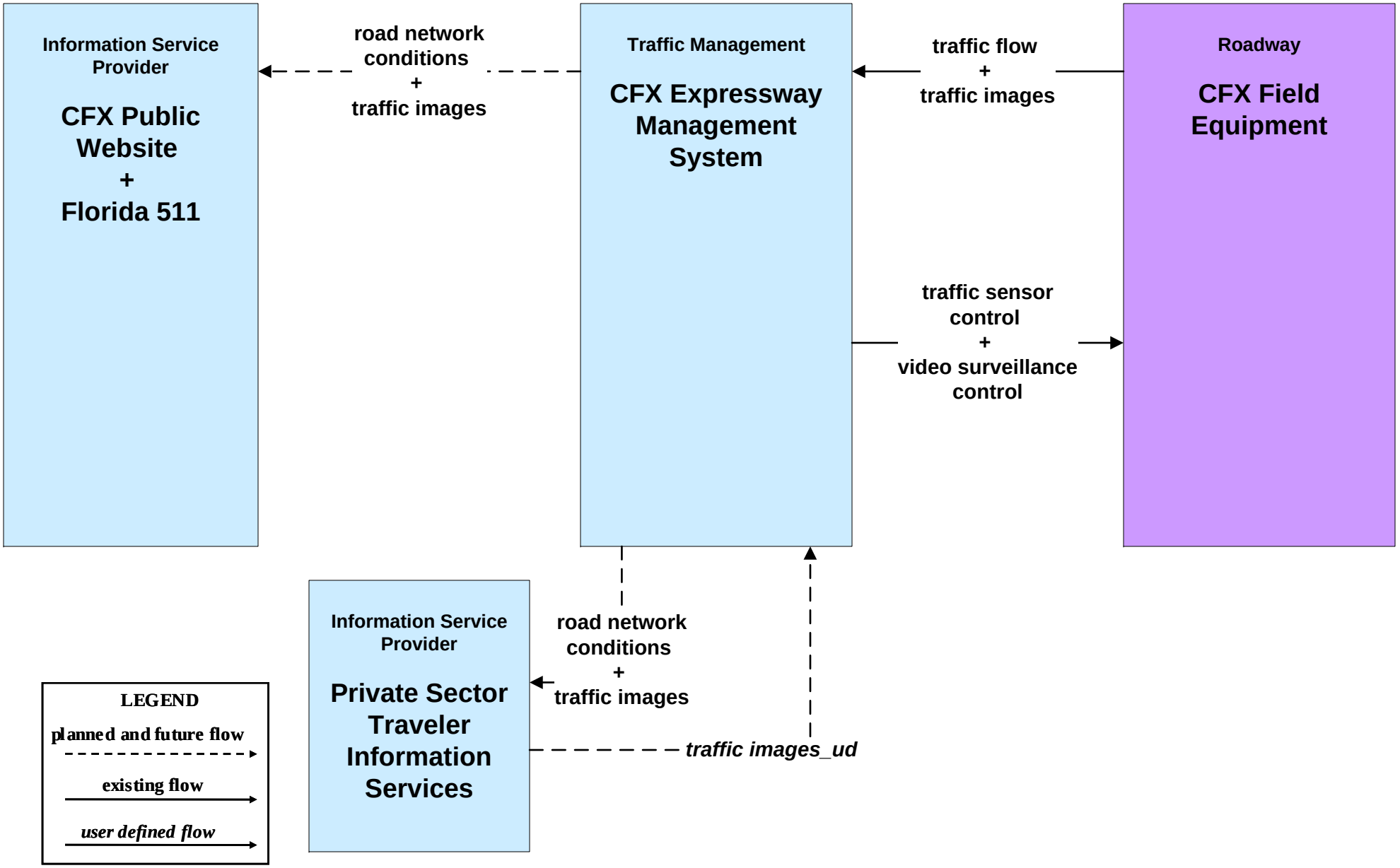
ATIS01 - Broadcast Traveler Information
CFX Public Website



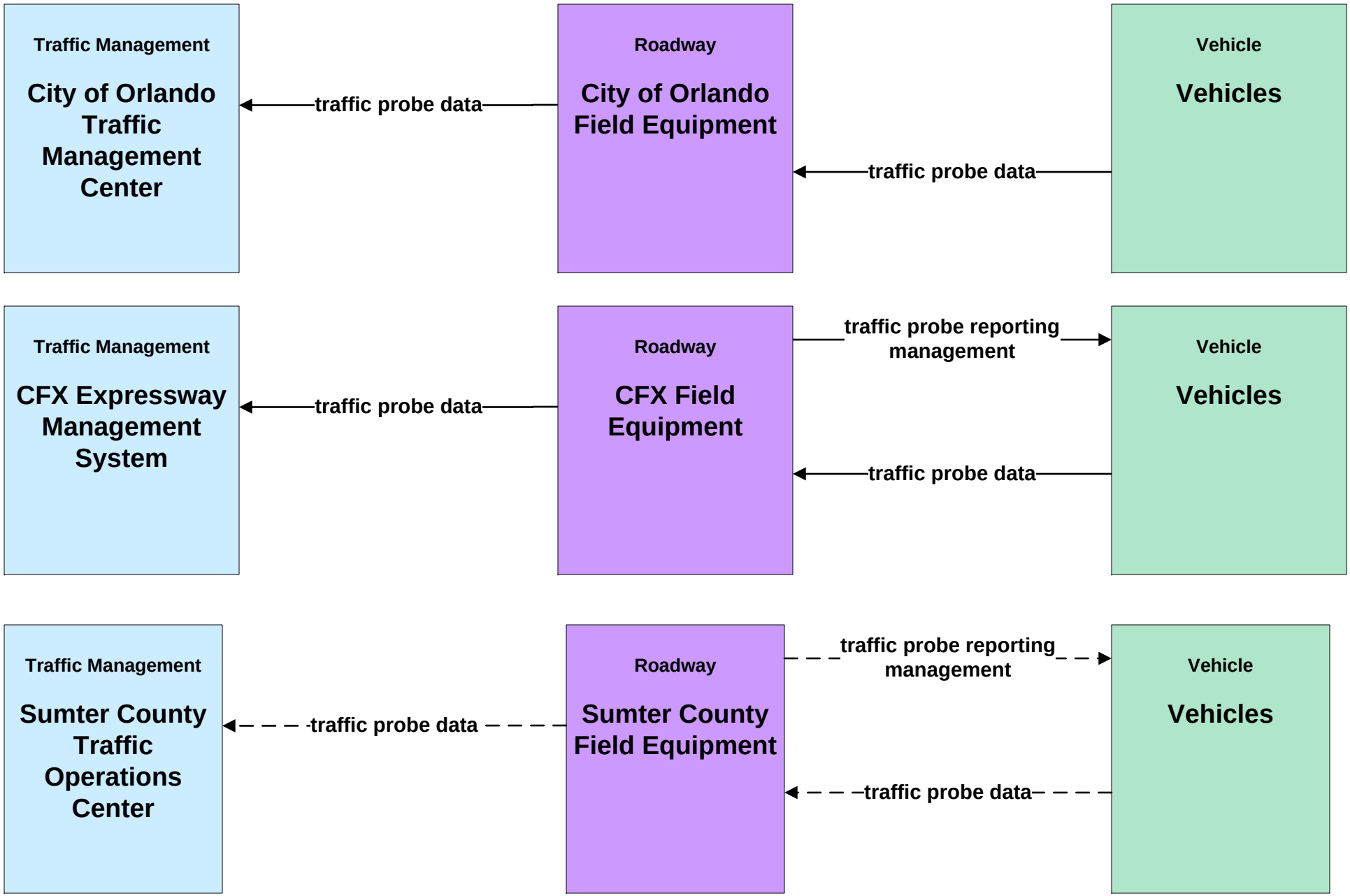
ATIS06 - Transportation Operations Data Sharing
Private Sector ISPs (2 of 2)



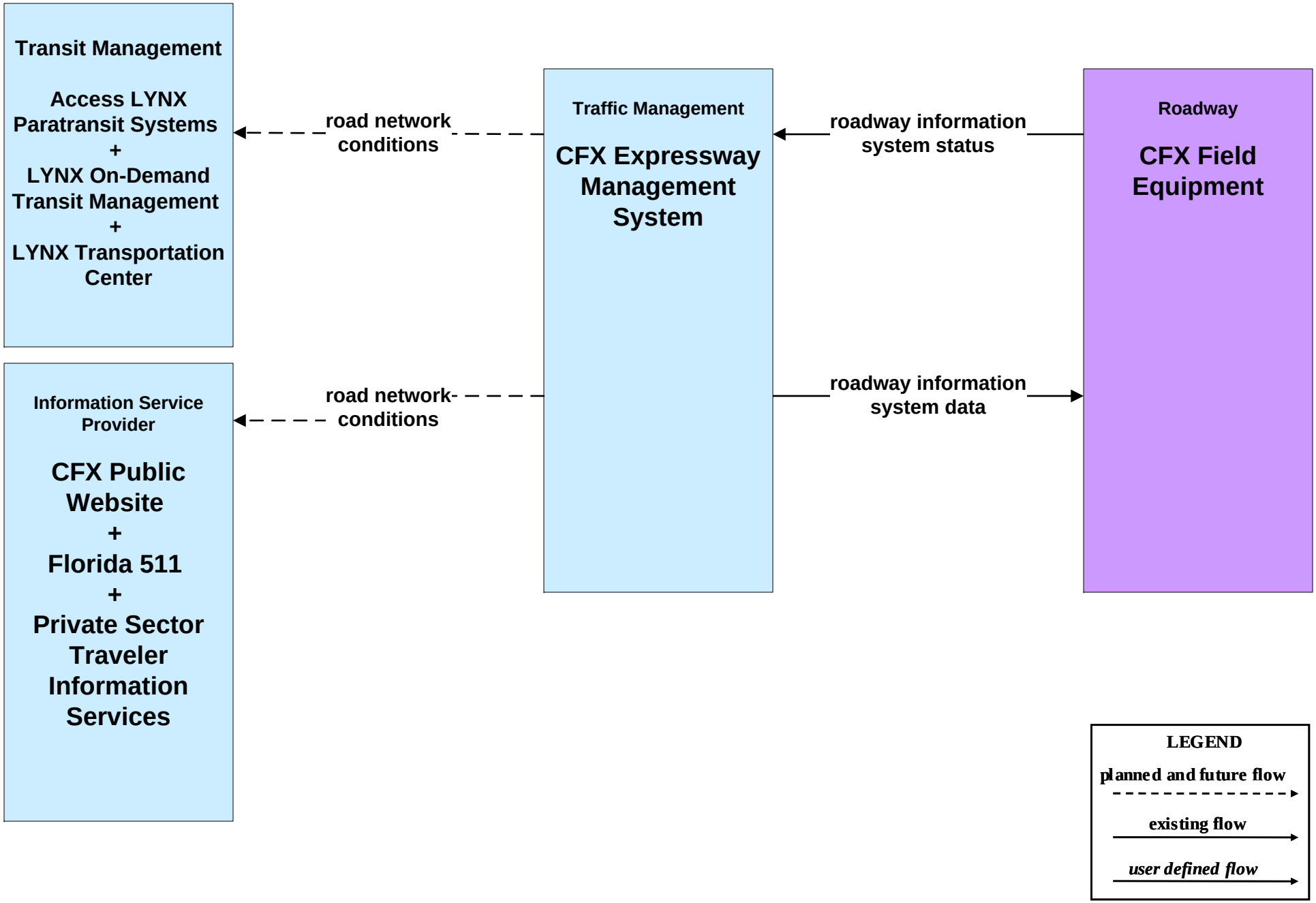
ATMS01 - Network Surveillance
CFX



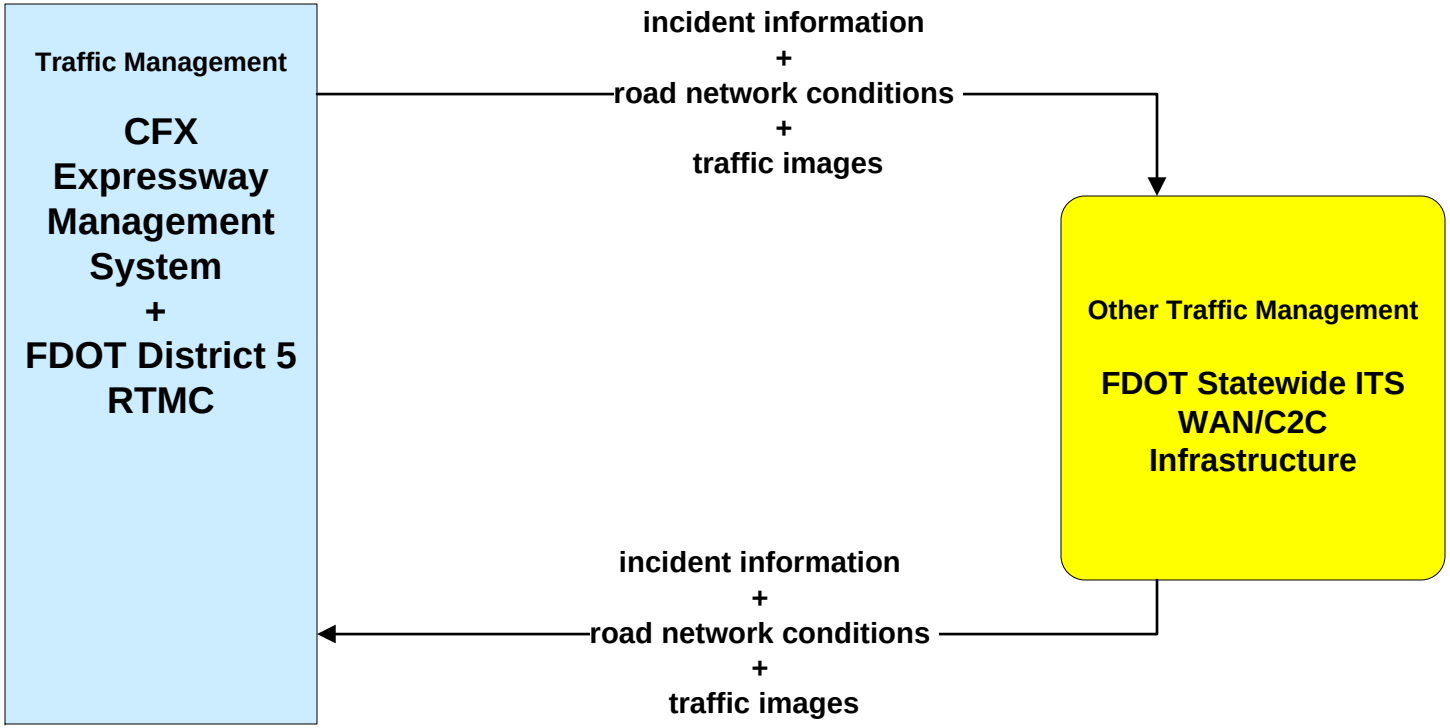
ATMS02 - Traffic Probe Surveillance
City of Orlando / CFX / Sumter County

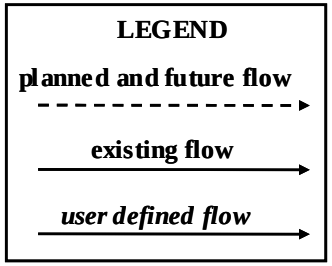


ATMS06 - Traffic Information Dissemination
CFX

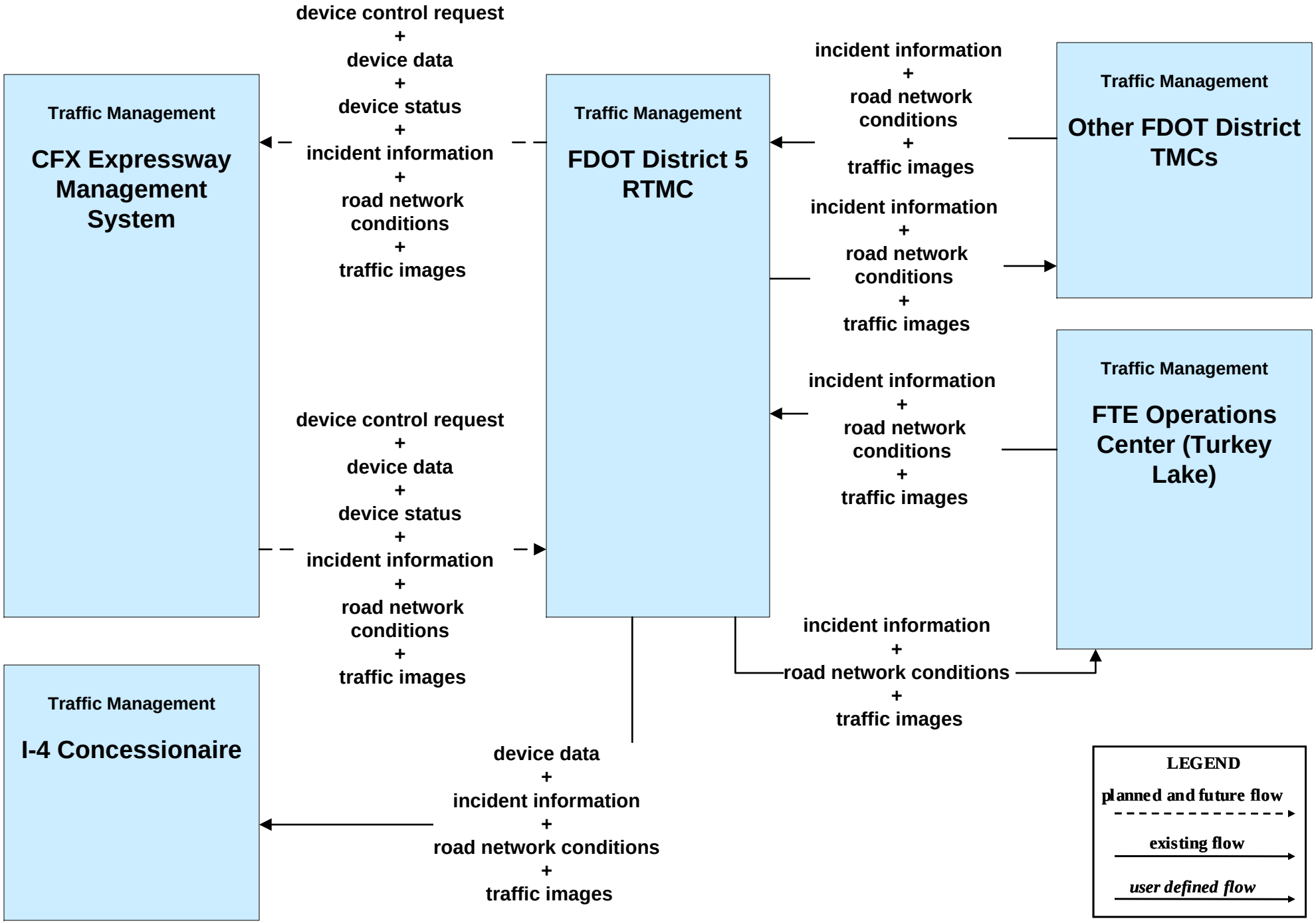


ATMS07 - Regional Traffic Management
FDOT Statewide ITS WAN/C2C Infrastructure

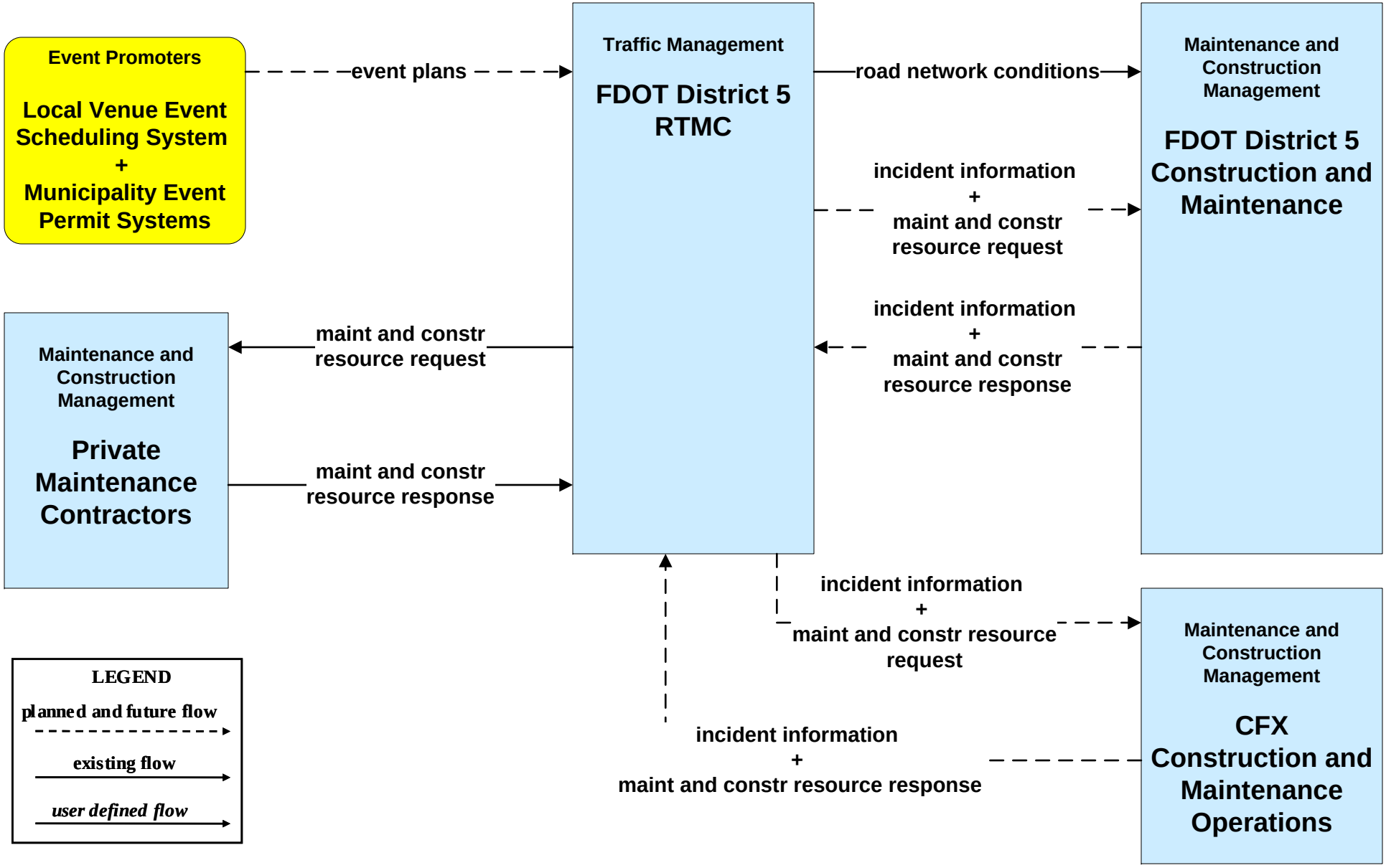




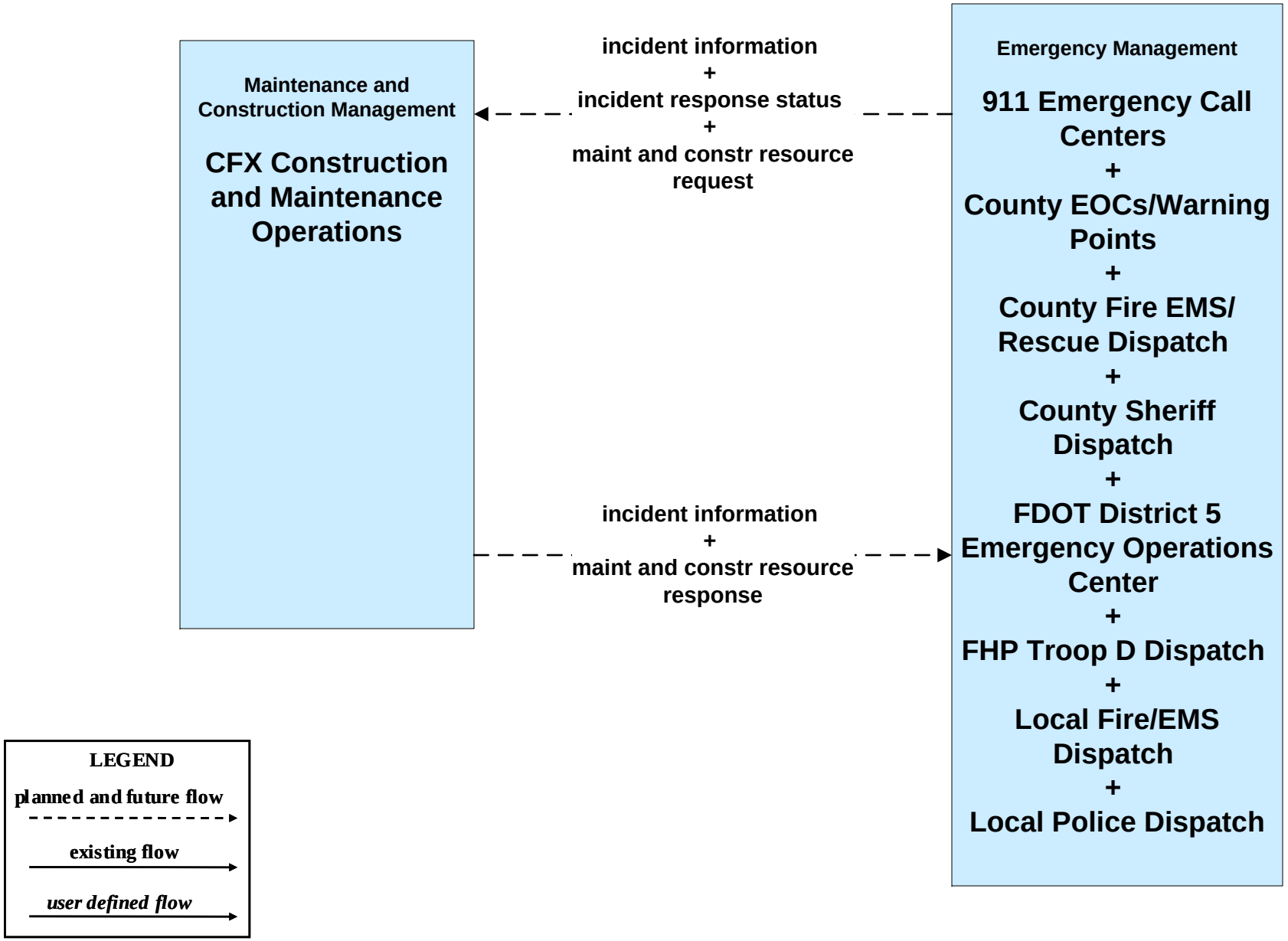
ATMS07 - Regional Traffic Management
FDOT Districts (1 of 3)



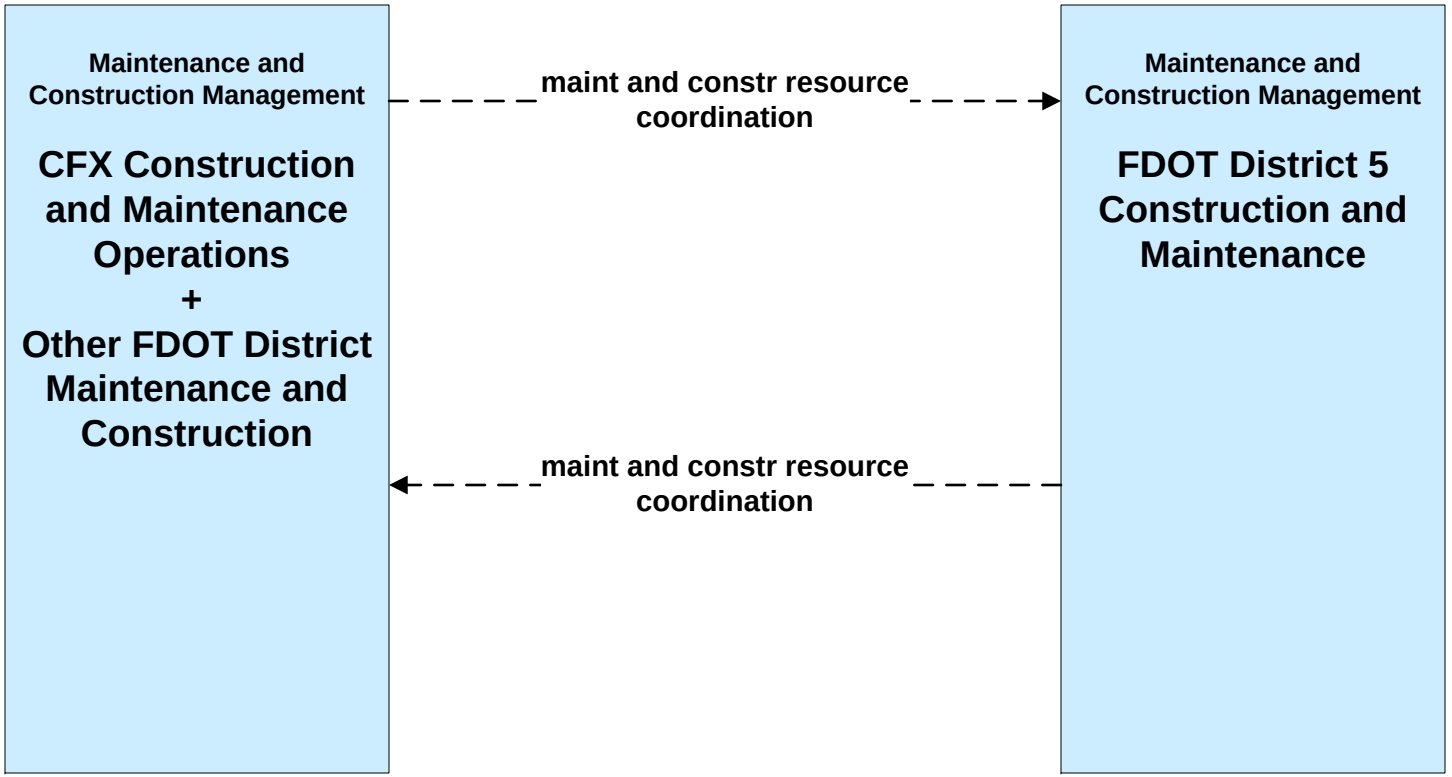
ATMS08 -Traffic Incident Management System
FDOT District 5 (TM to MCM)

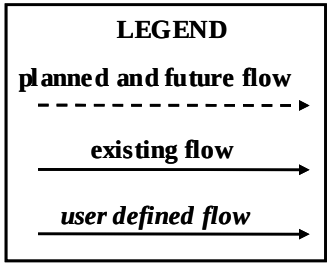


ATMS08 - Traffic Incident Management System
CFX (EM to MCM)

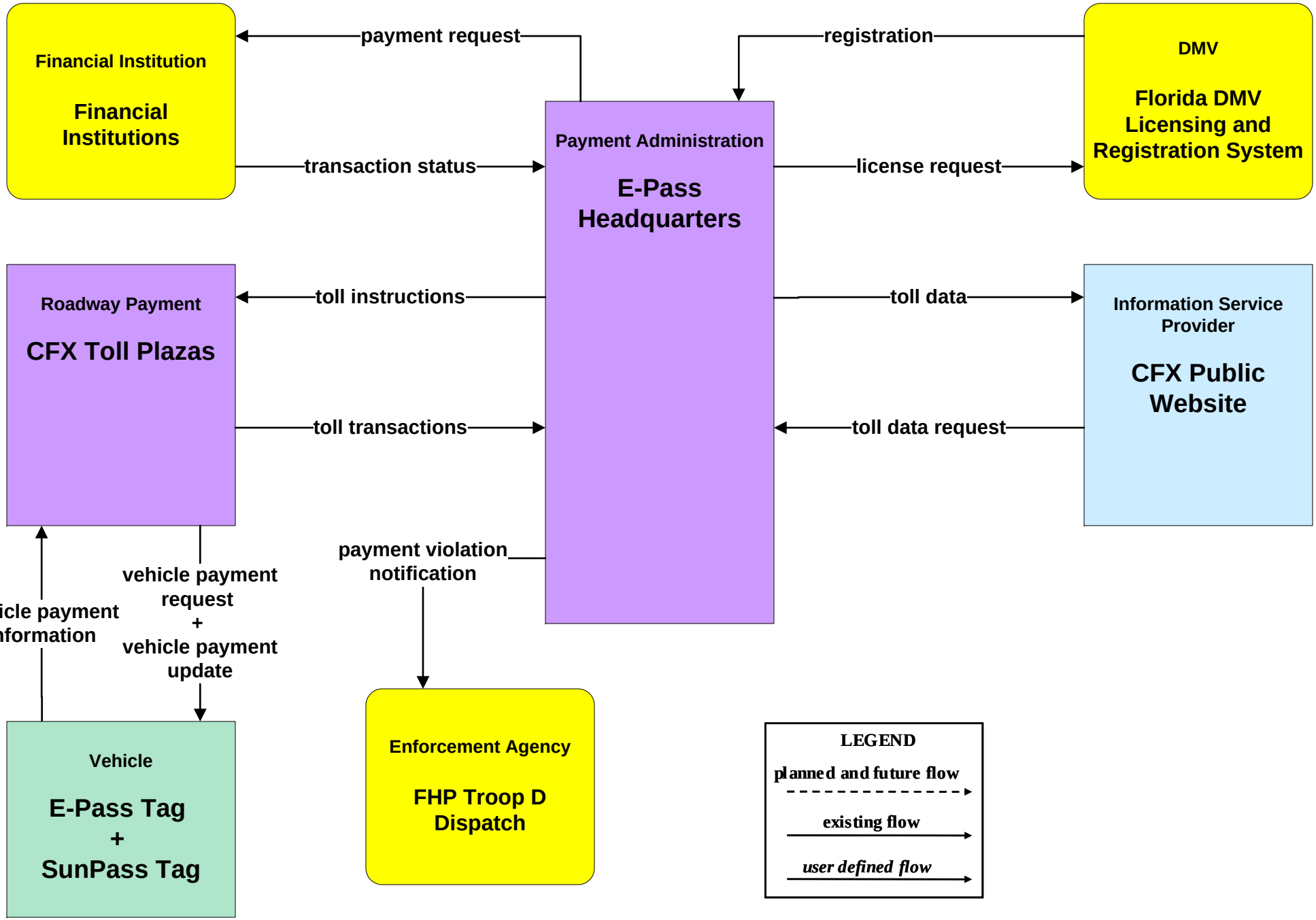


ATMS08 - Traffic Incident Management System
FDOT Districts

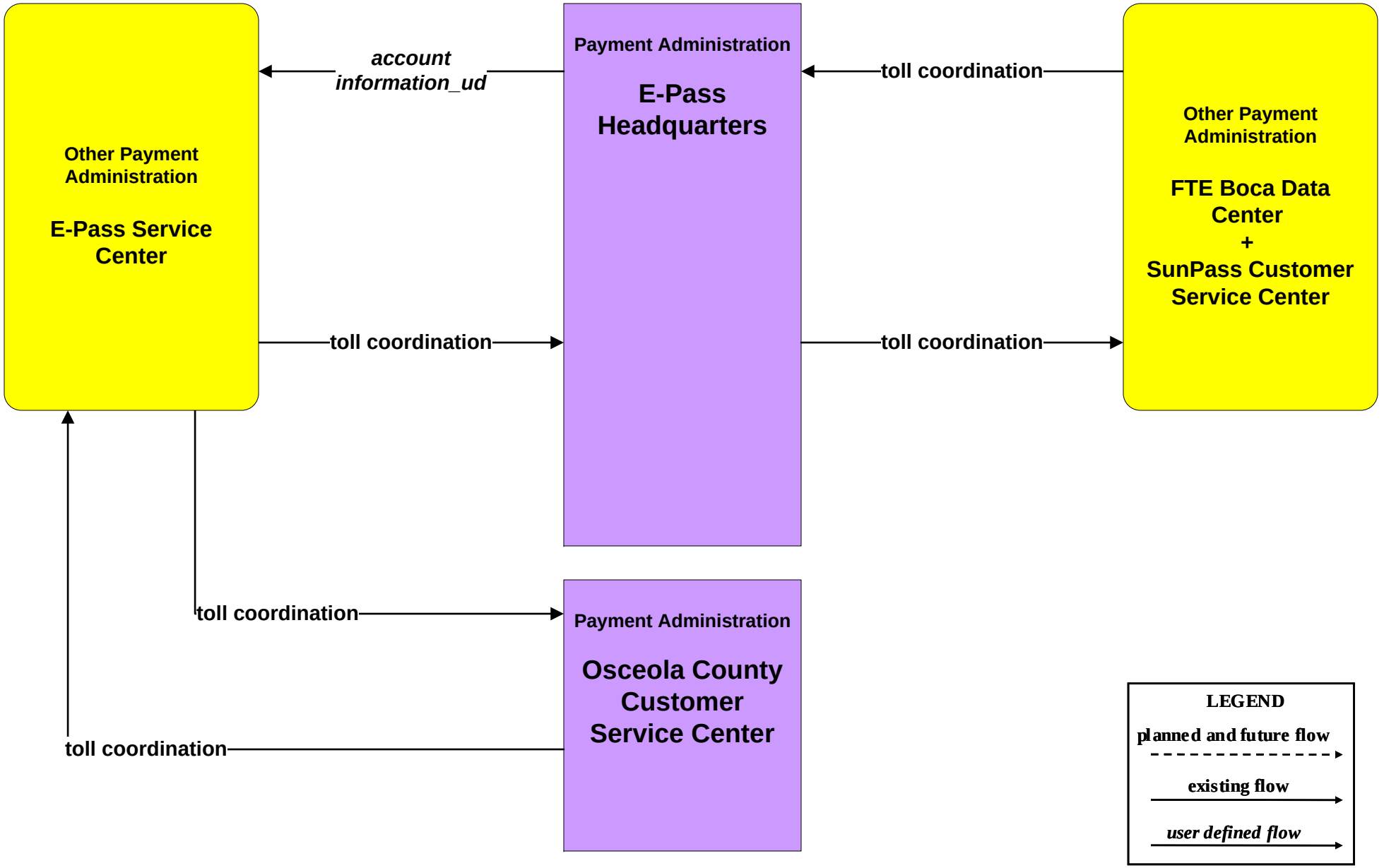




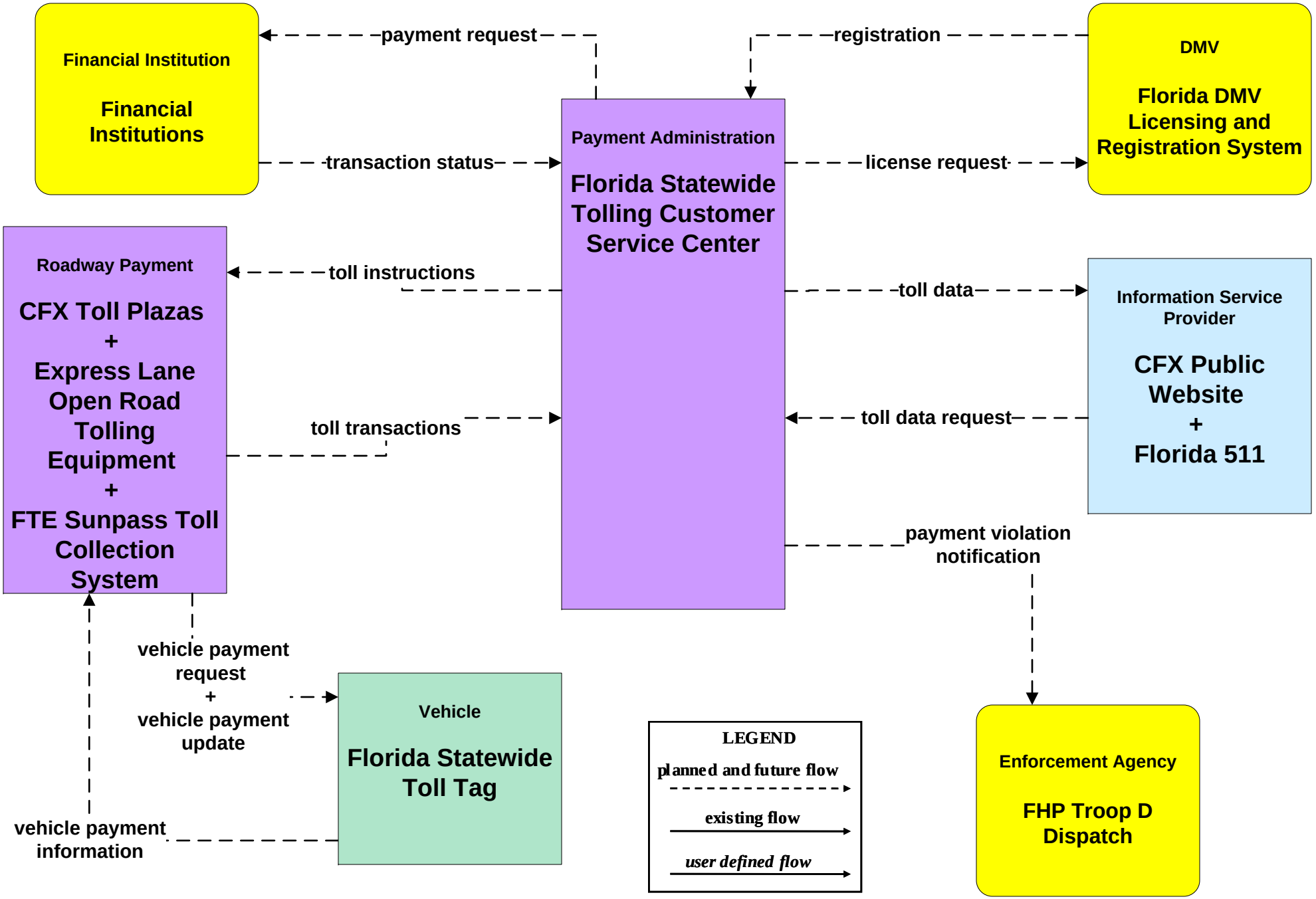
ATMS10 - Electronic Toll Collection
CFX



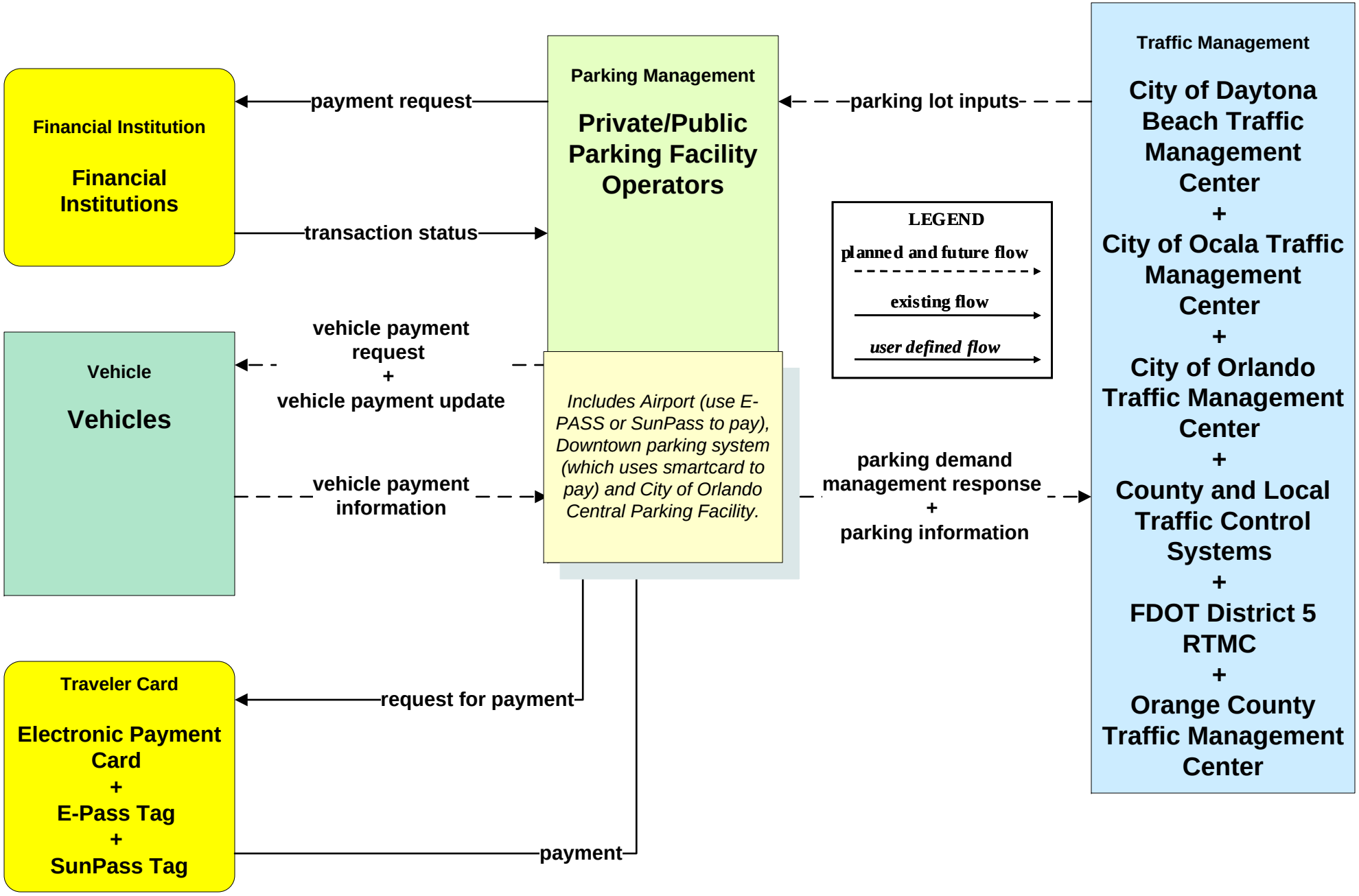
ATMS10 - Electronic Toll Collection
E-Pass/ FDOT Turnpike Enterprise - Reciprocity Network



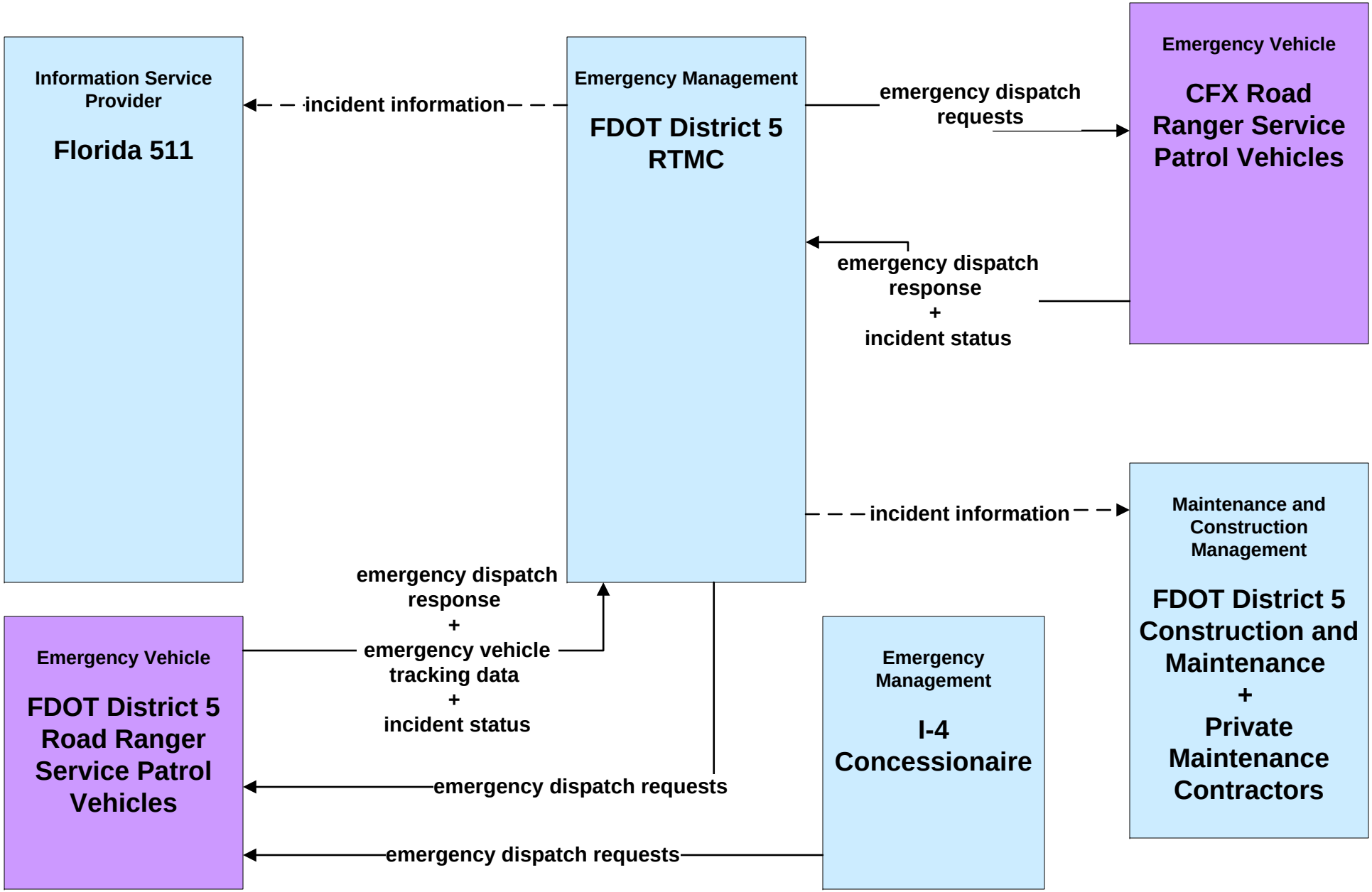
ATMS10 - Electronic Toll Collection
Florida Statewide Tolling



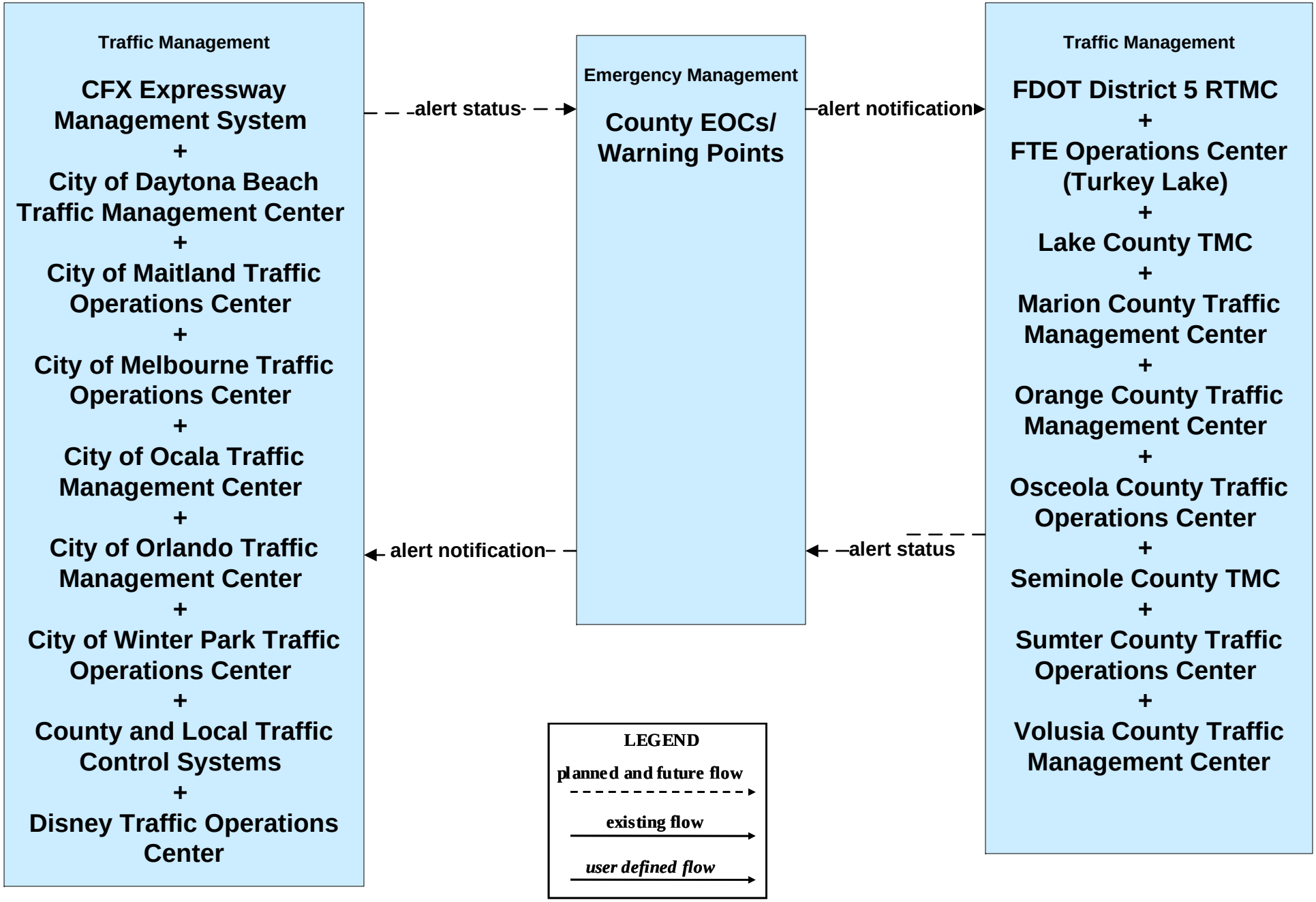
ATMS16 - Parking Facility Management
Parking Facility Operators



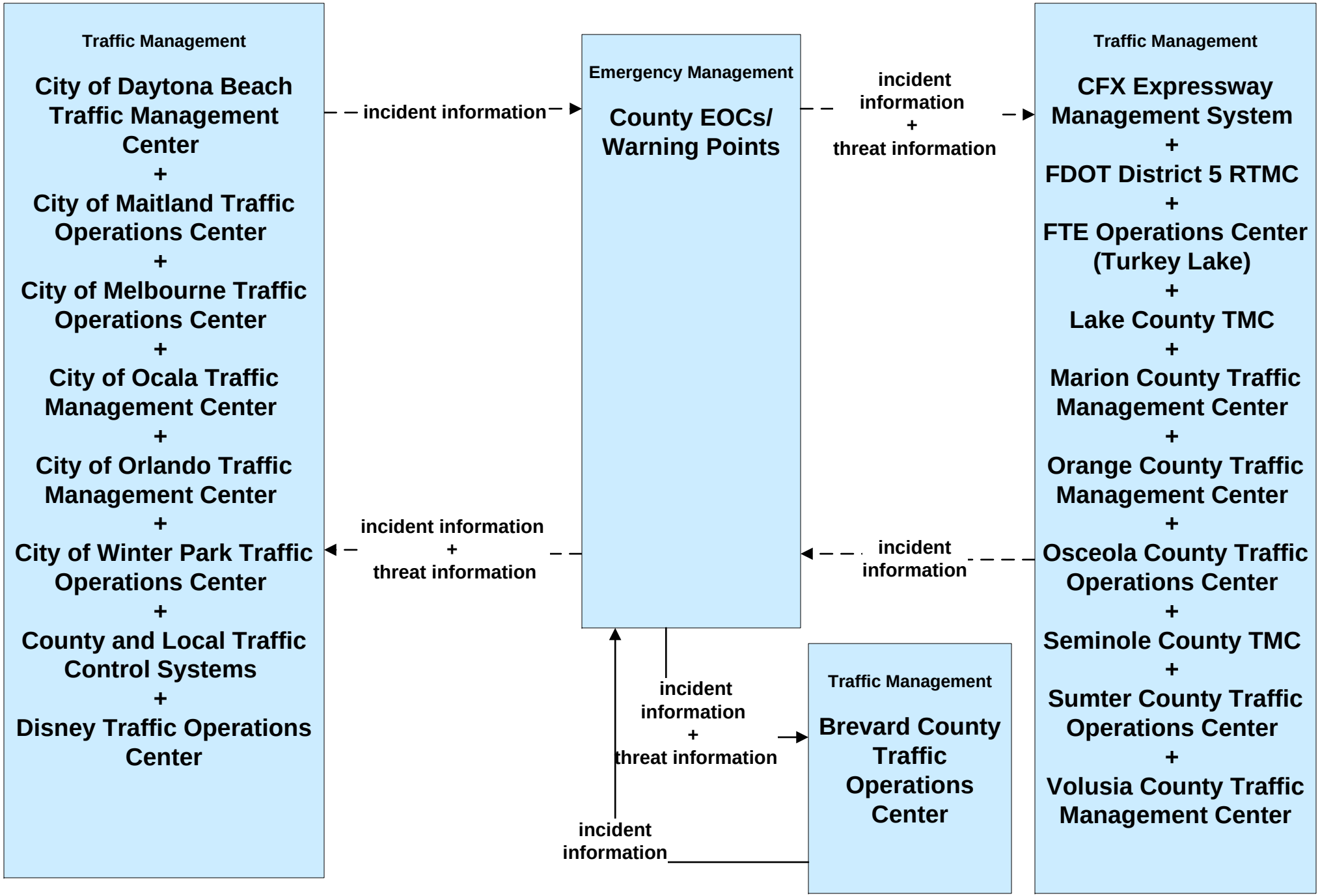
EM04 - Roadway Service Patrols
FDOT District 5 Road Ranger Service Patrol



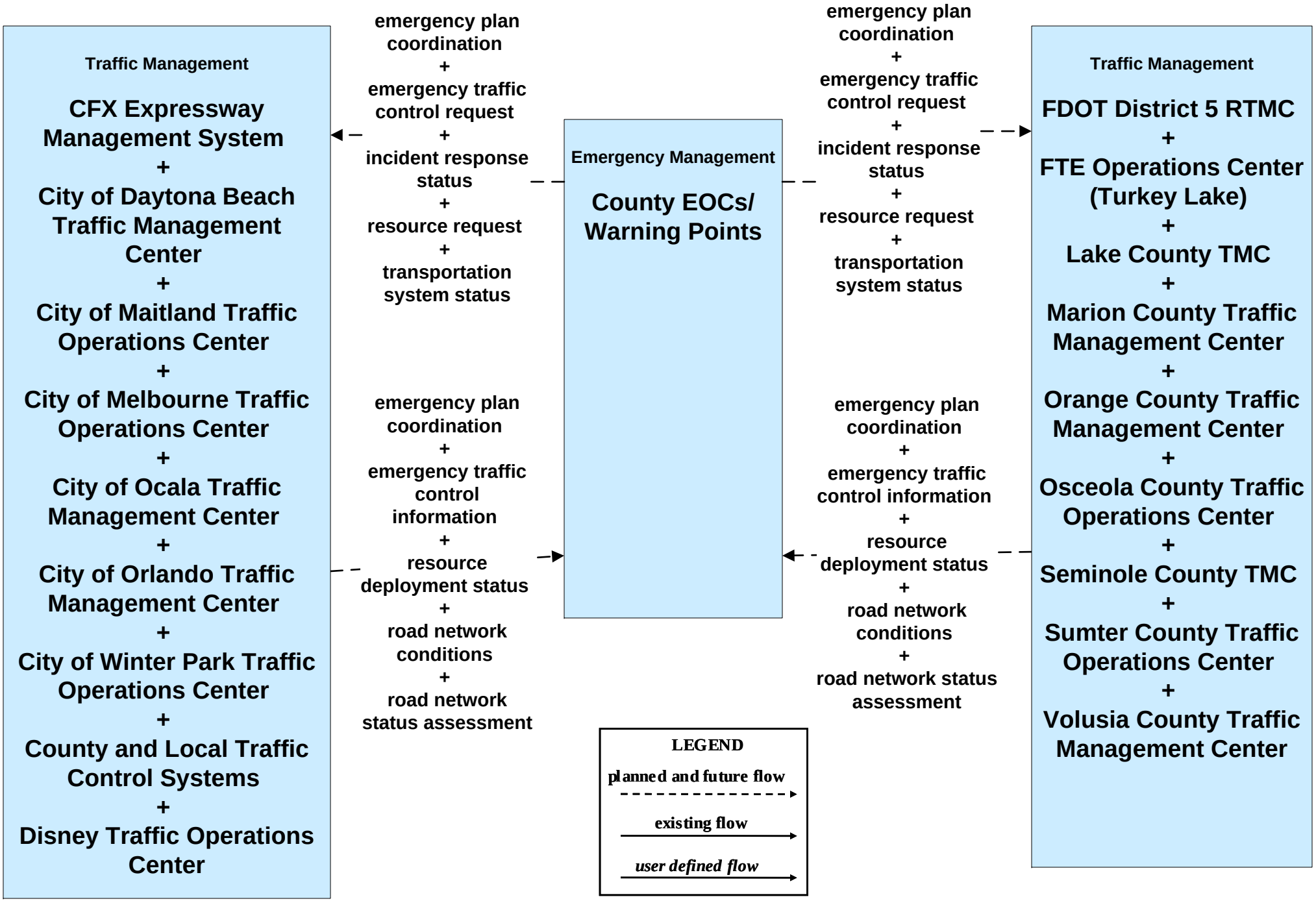
EM06 - Wide Area Alert
County EOCs (1 of 3)



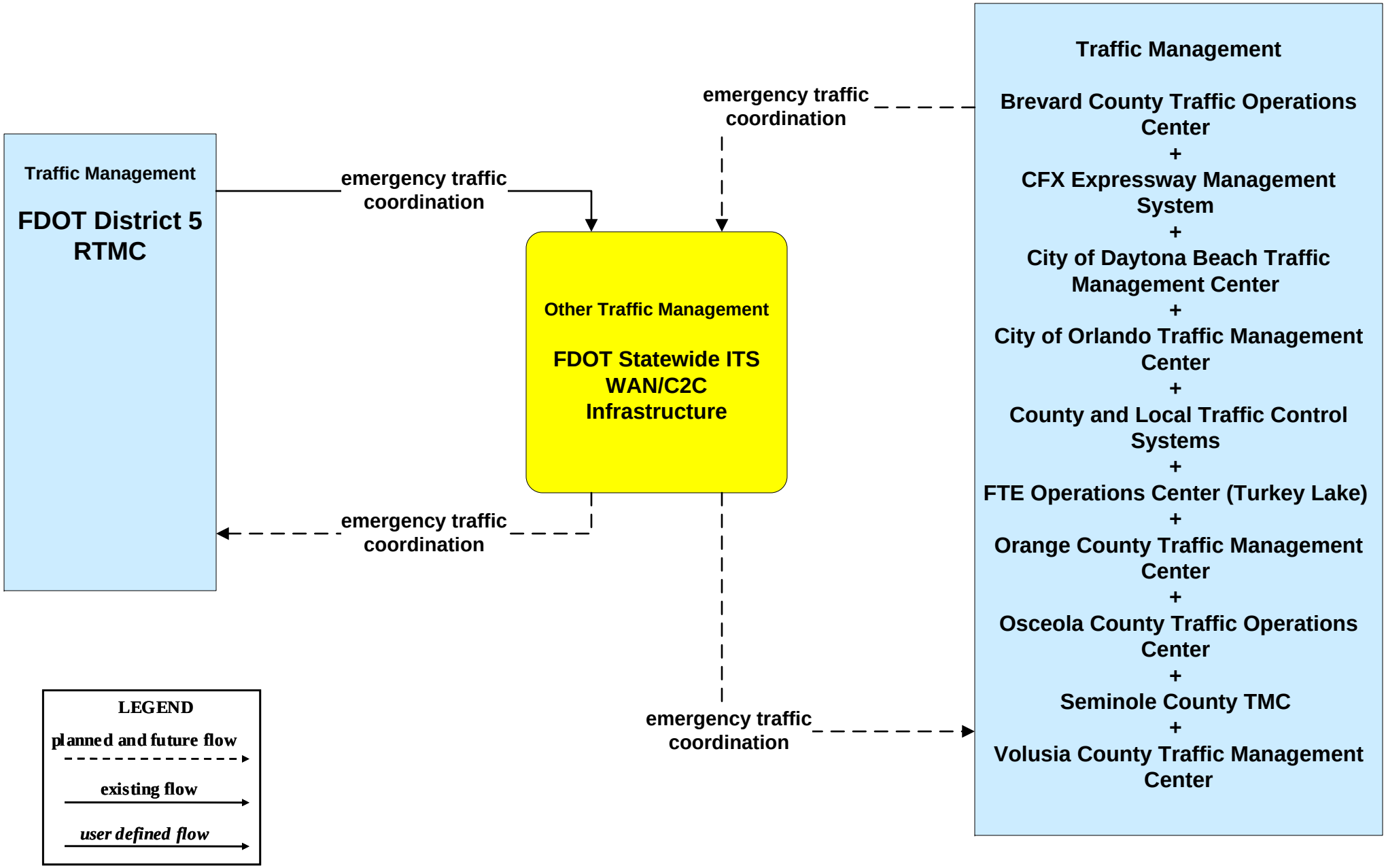
EM07 - Early Warning System
County EOCs (2 of 3)



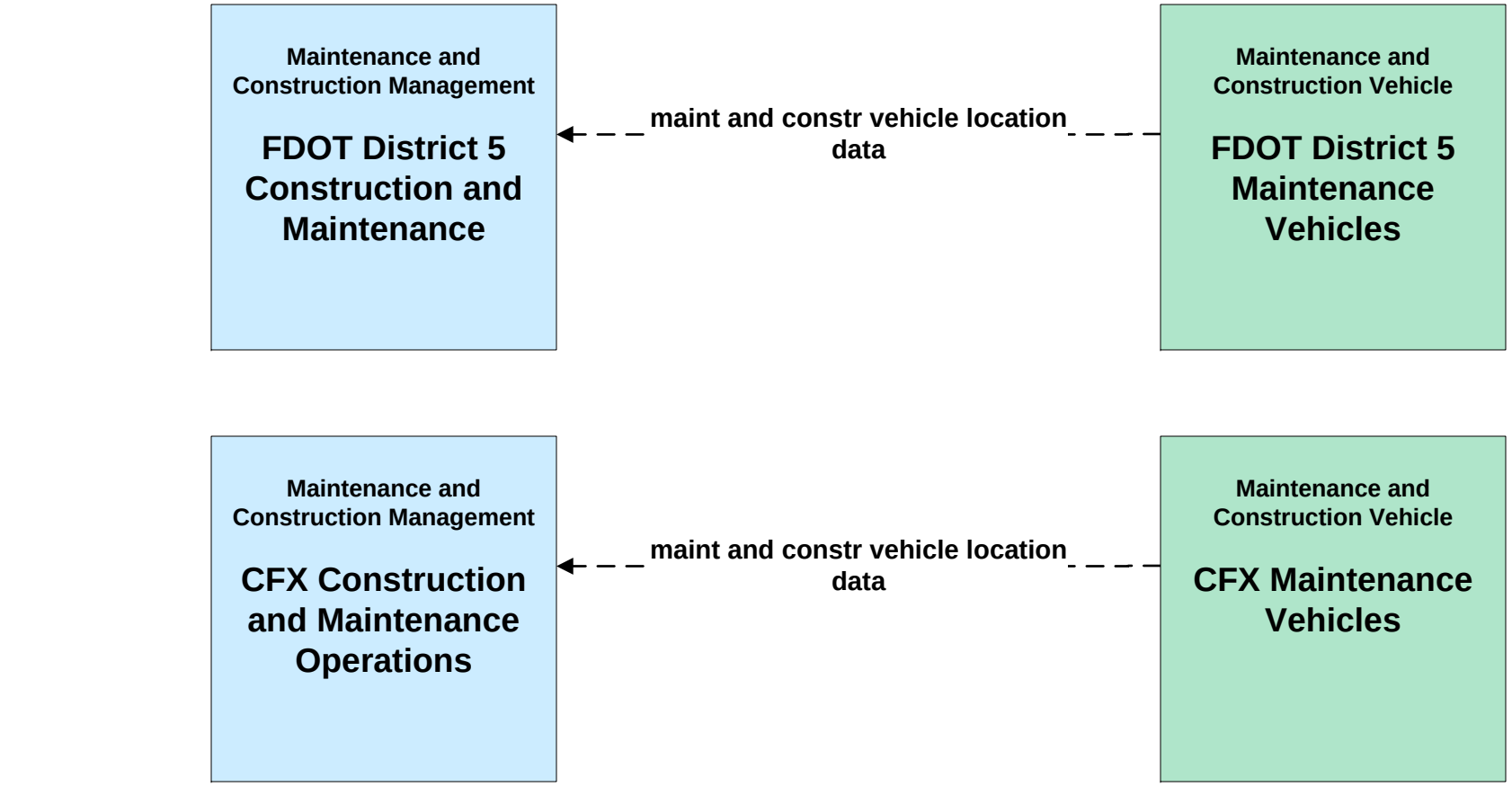
EM08 - Disaster Response and Recovery
County EOCs (2 of 4)

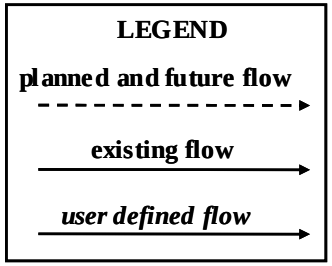


EM09 - Evacuation and Reentry Management
Central Florida Traffic Management Agencies



MC01 - Maintenance and Construction Vehicle and Equipment Tracking
FDOT District 5 / CFX Maintenance





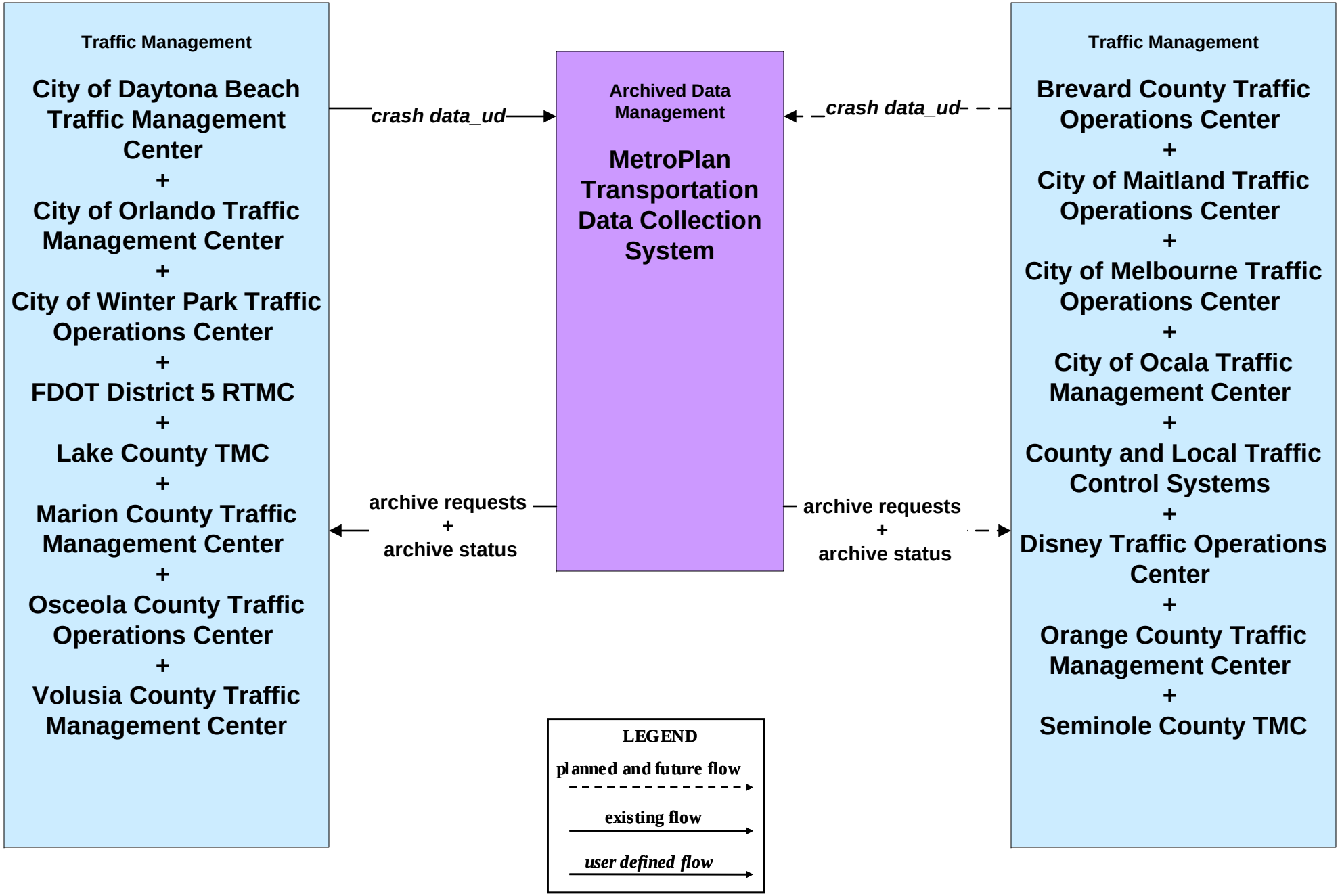
FDOT District 5

Central Florida Regional ITS Architecture

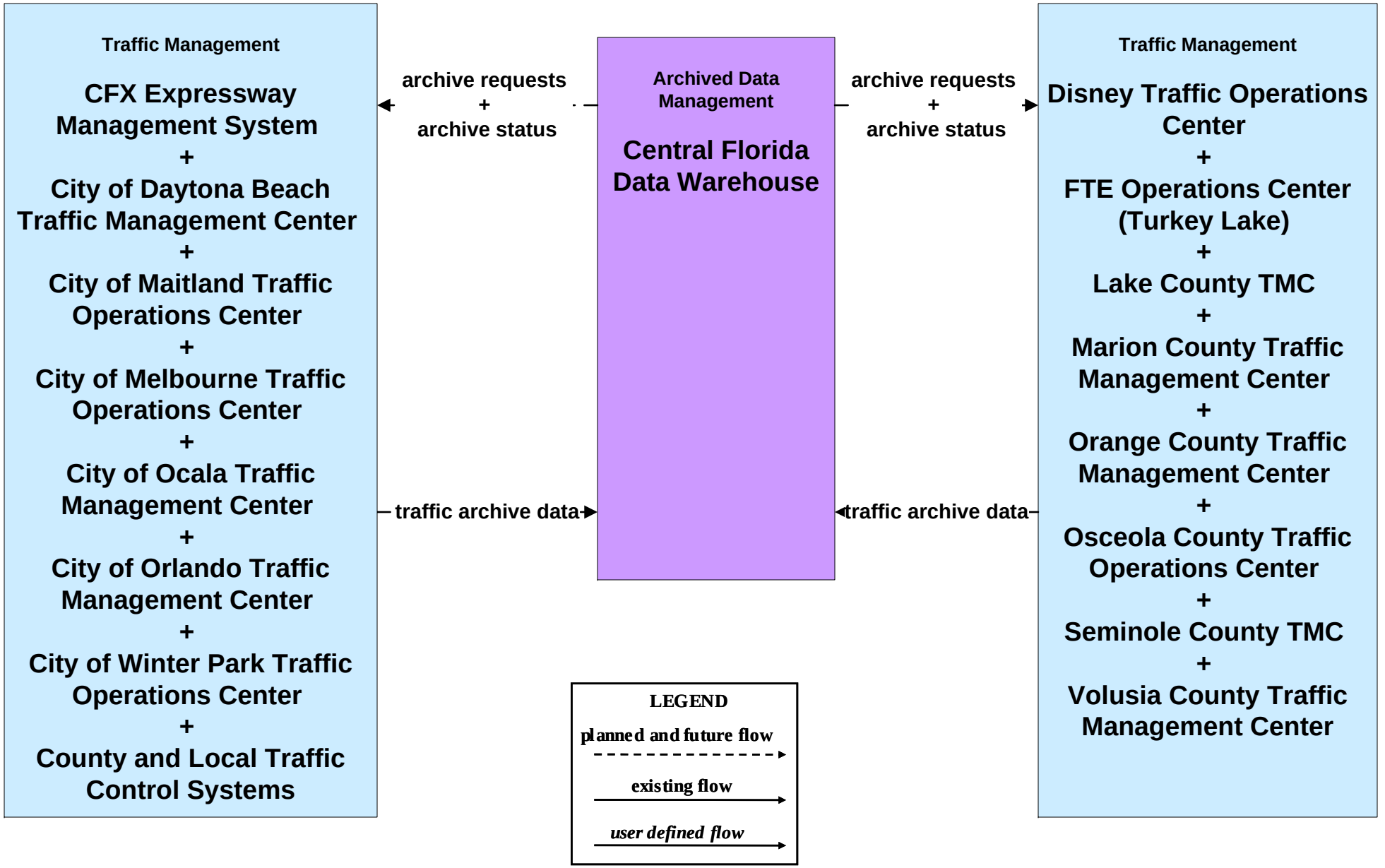
Customized Service Package Diagrams

City of Maitland

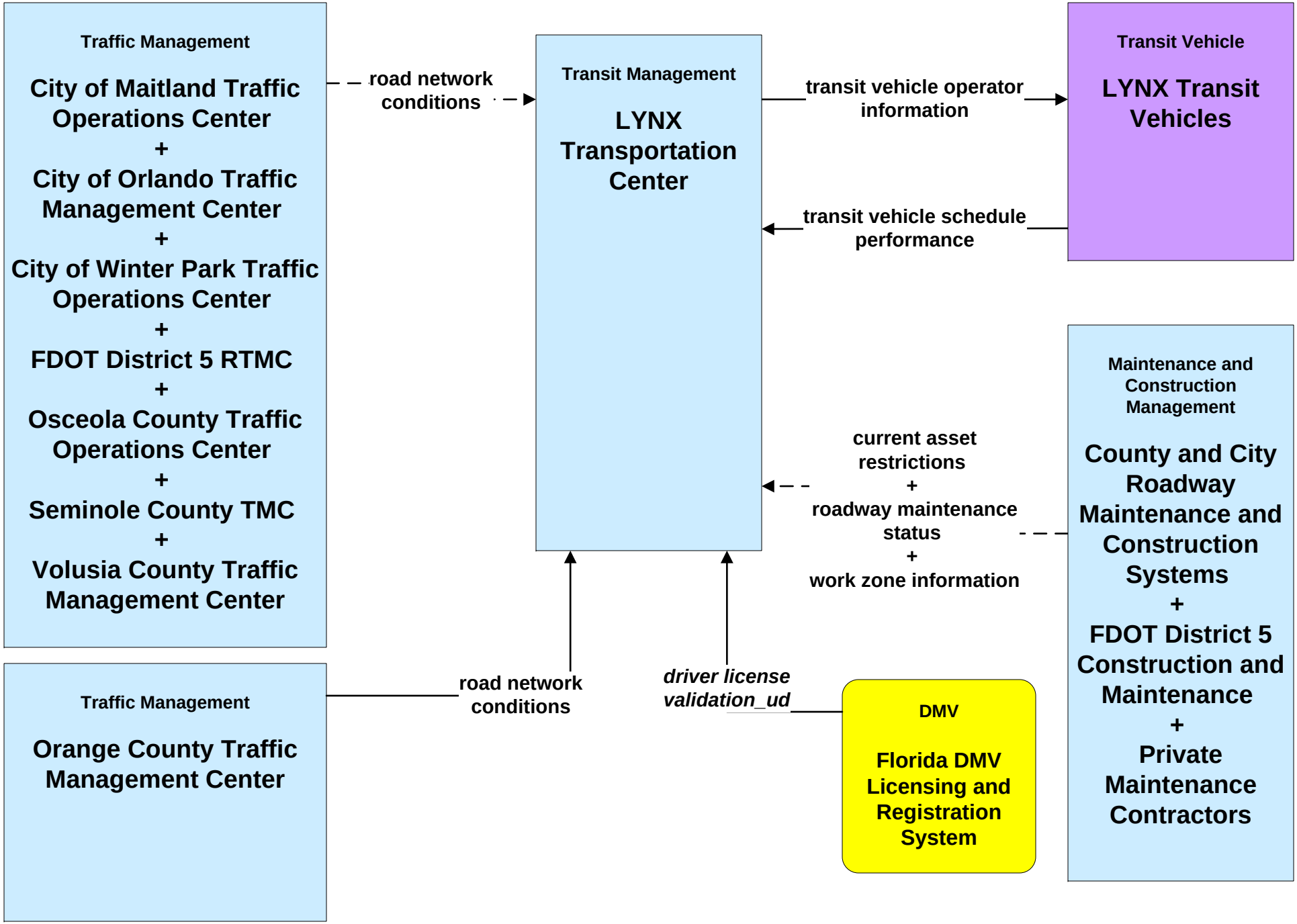
AD1 - ITS Data Mart
MetroPlan Transportation Data Collection System (1 of 2)



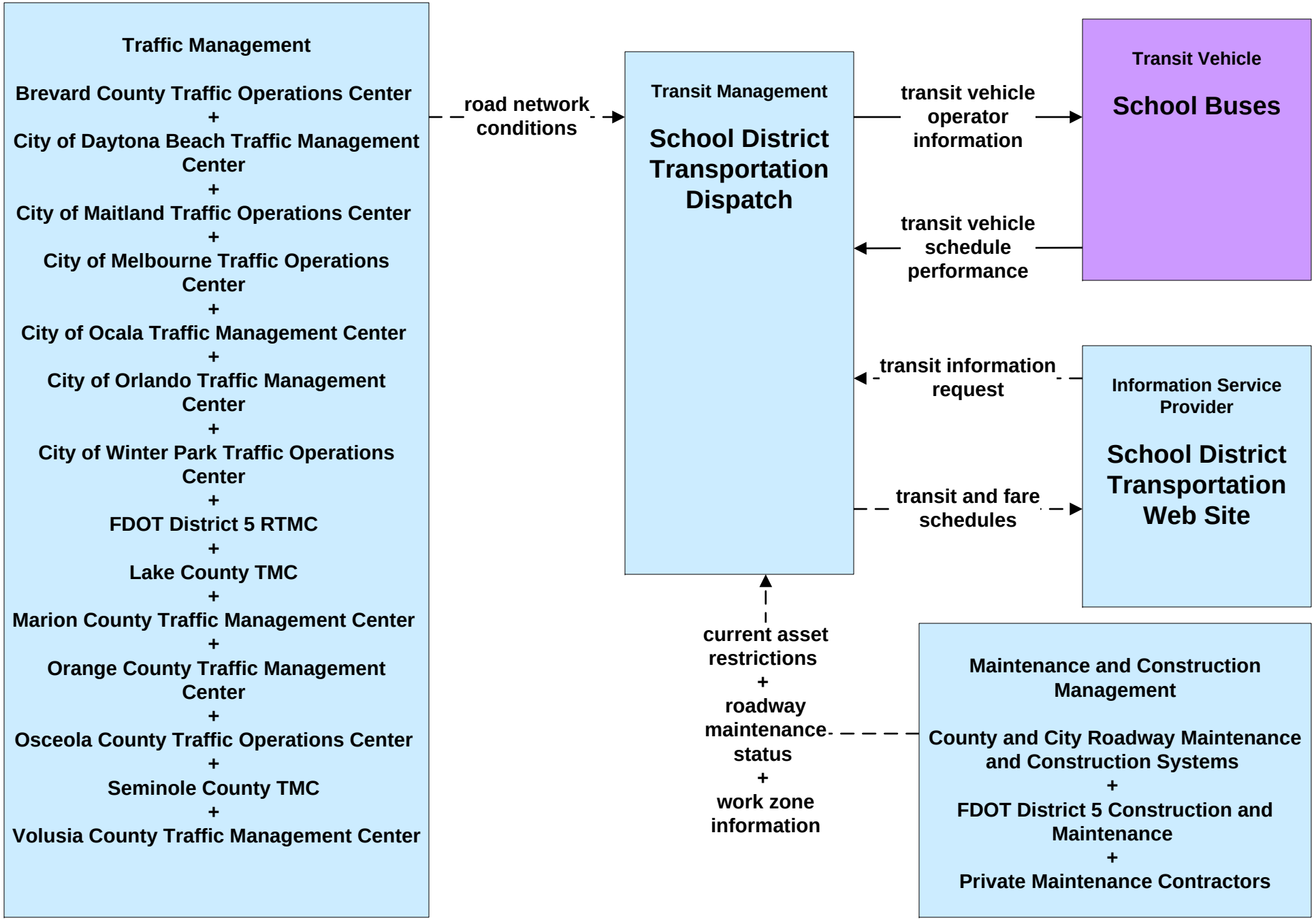
AD2 - ITS Data Warehouse
Central Florida Data Warehouse (1 of 2)



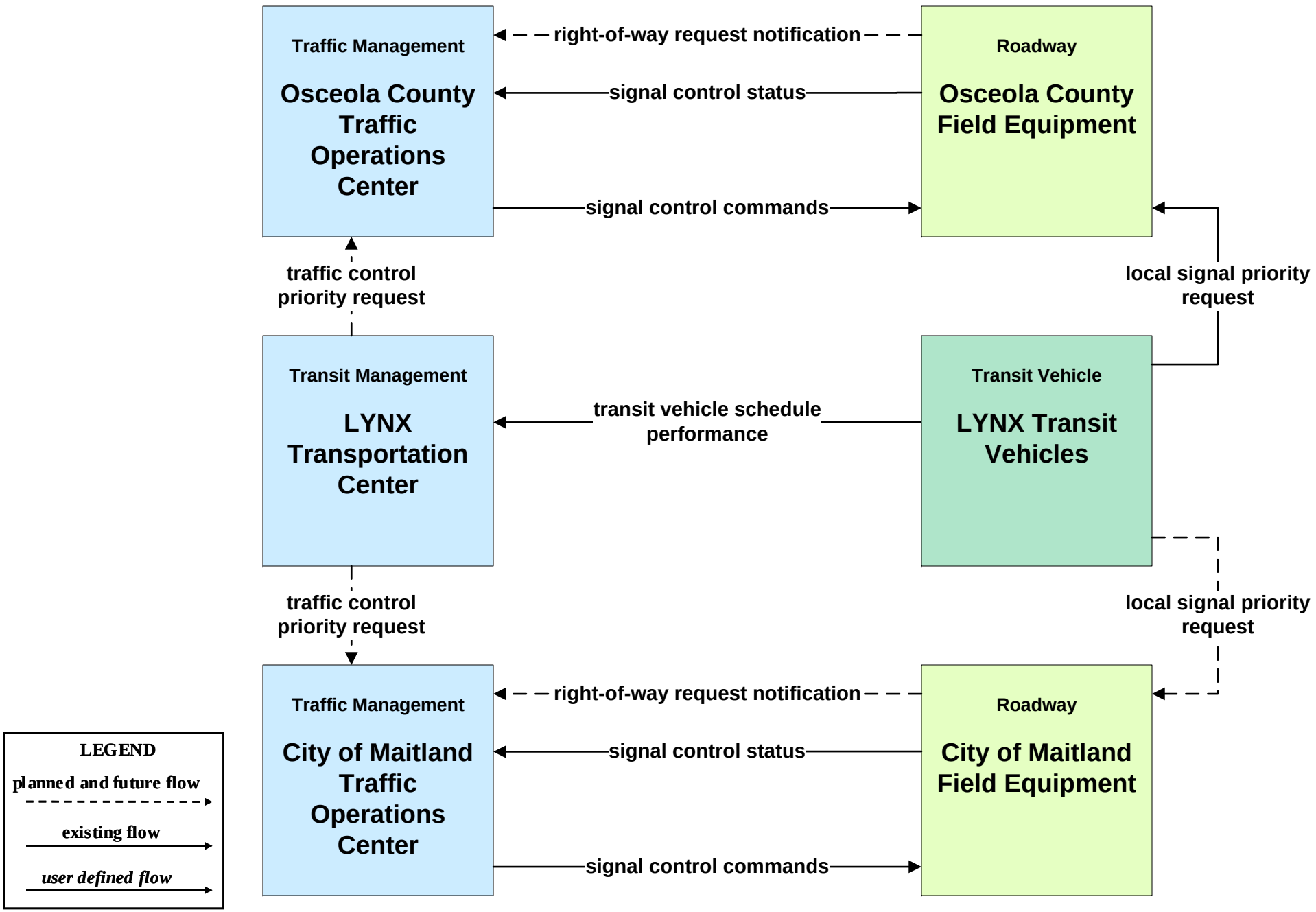
APTS02 - Transit Fixed-Route Operations
LYNX Operations Center



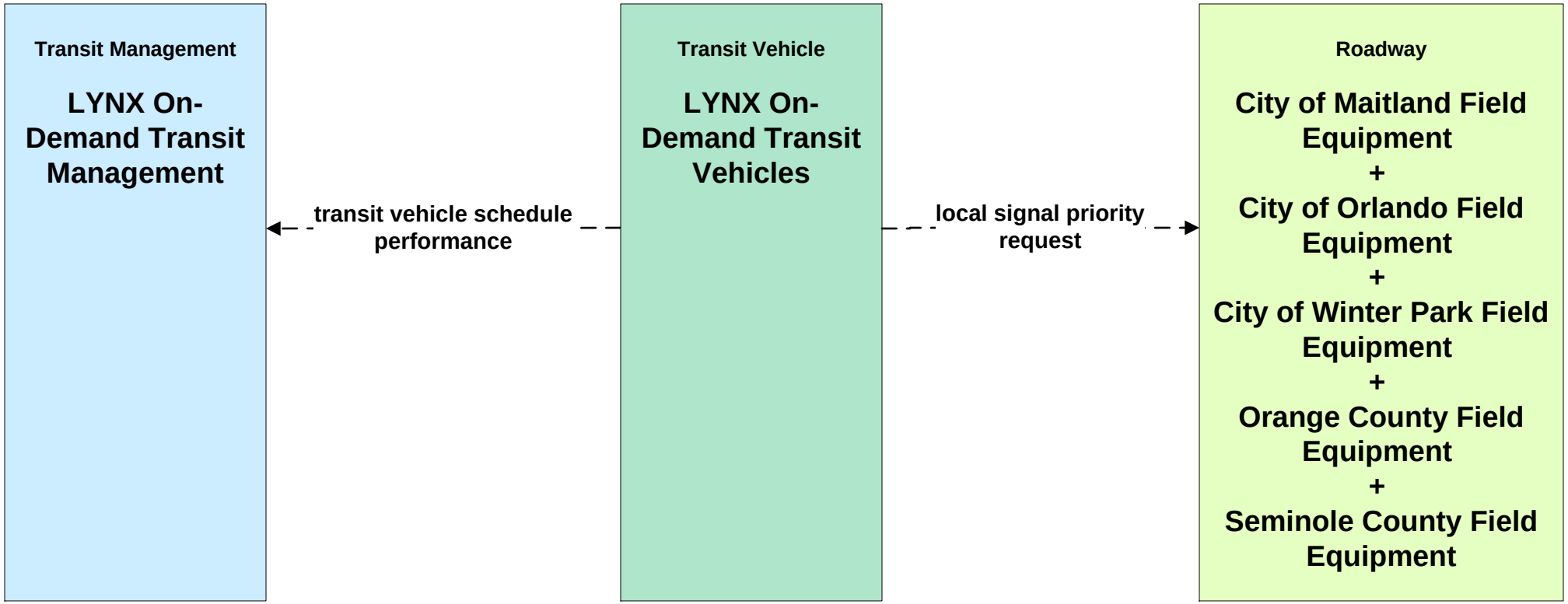
APTS02 - Transit Fixed-Route Operations
School District Transportation Dispatch

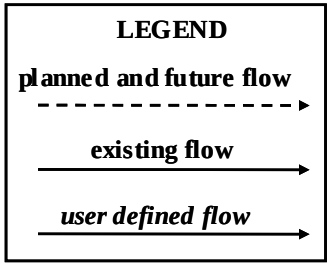


APTS09 - Transit Signal Priority
LYNX (1 of 5)

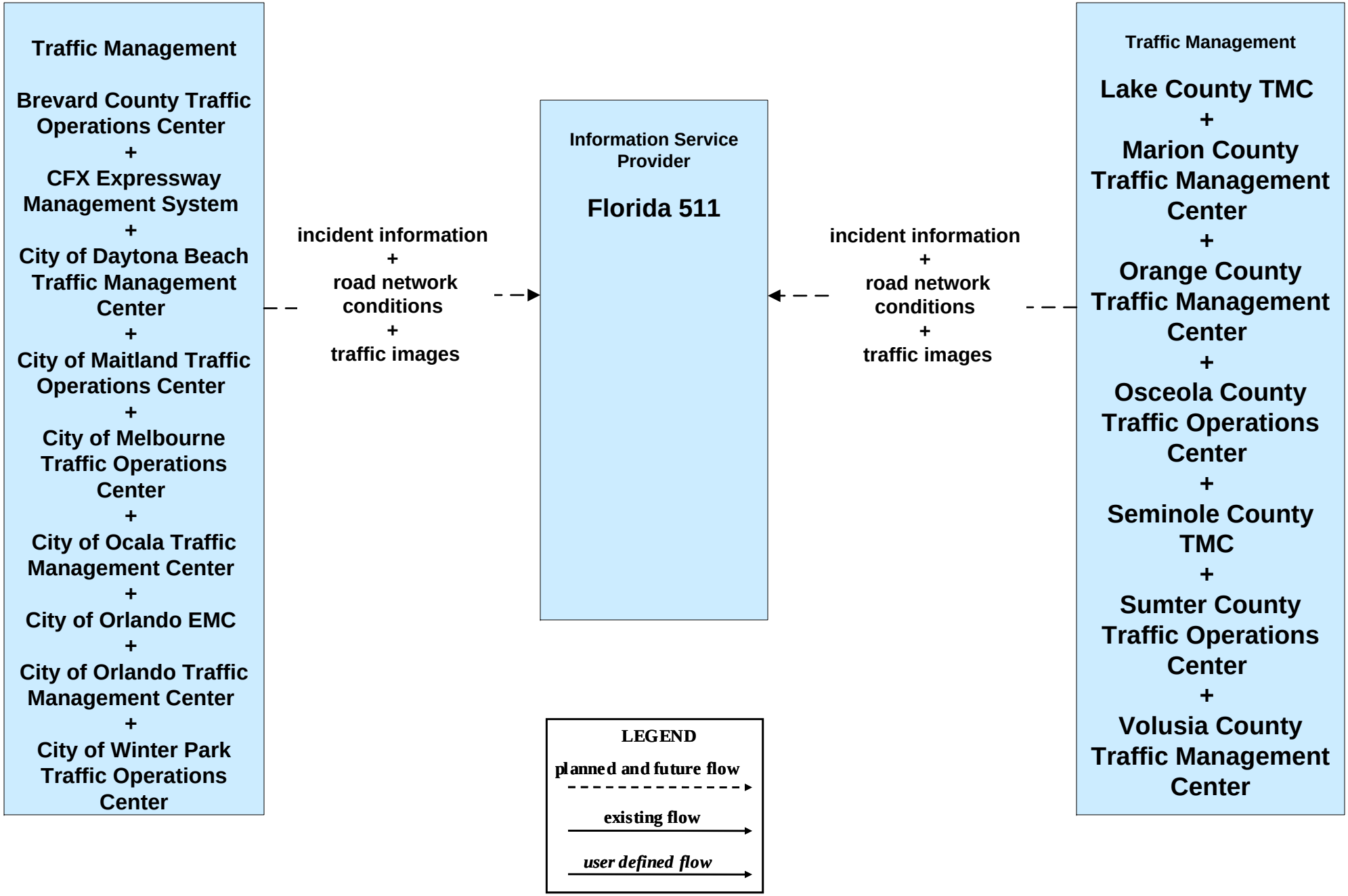


APTS09 - Local Signal Priority
LYNX On-Demand Transit

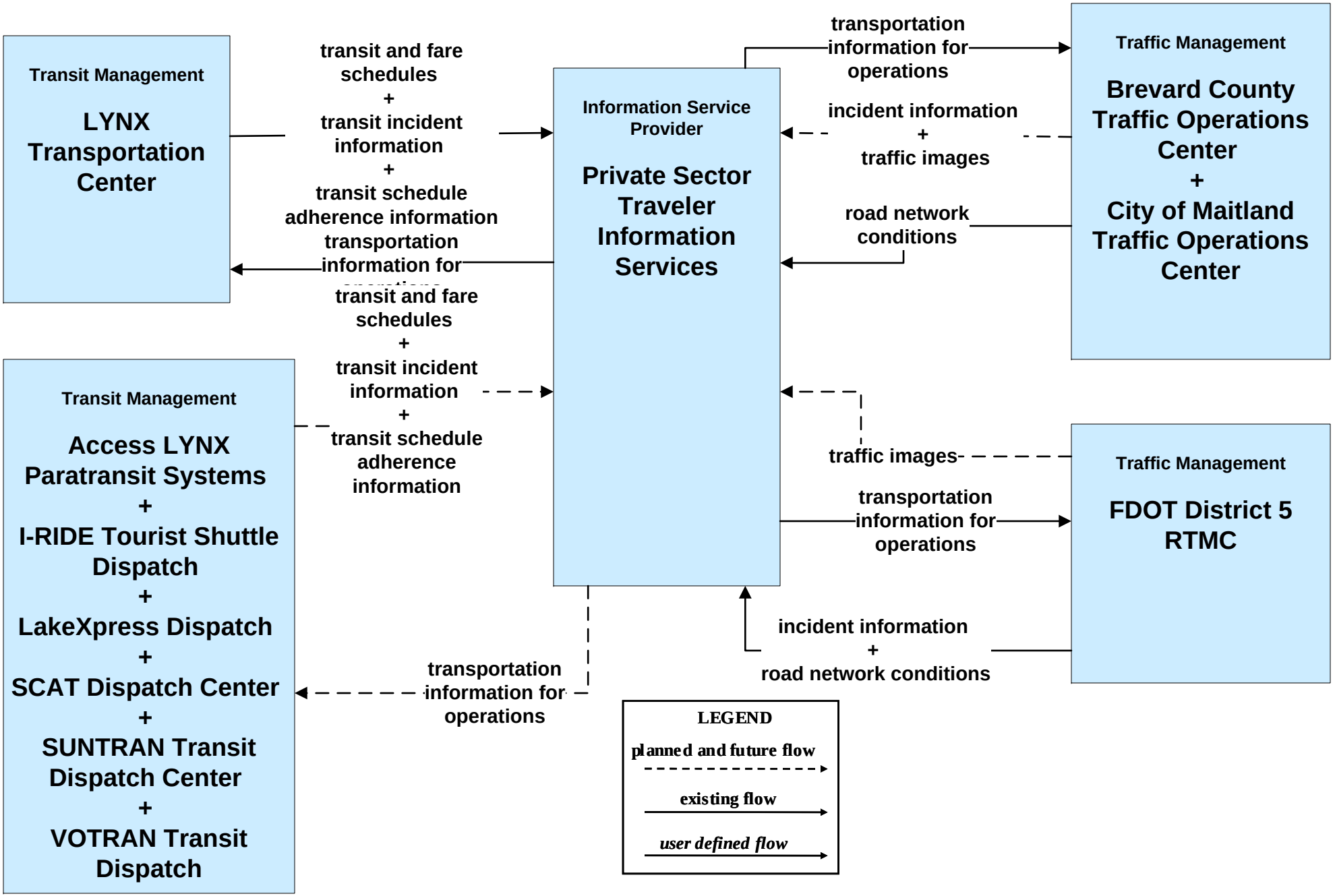




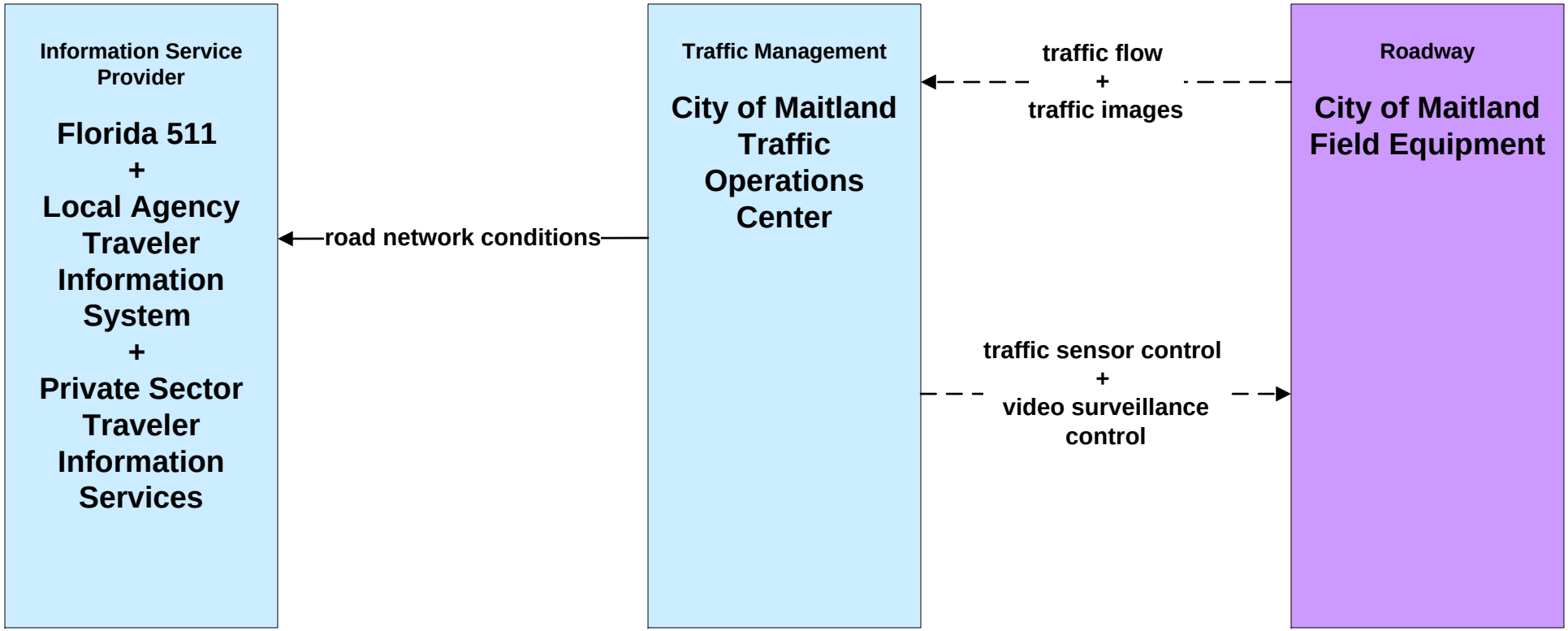
ATIS01 - Broadcast Traveler Information
Florida 511 / Private ISPs (3 of 3)

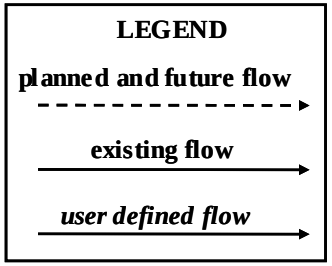


ATIS06 - Transportation Operations Data Sharing
Private Sector ISPs (1 of 2)

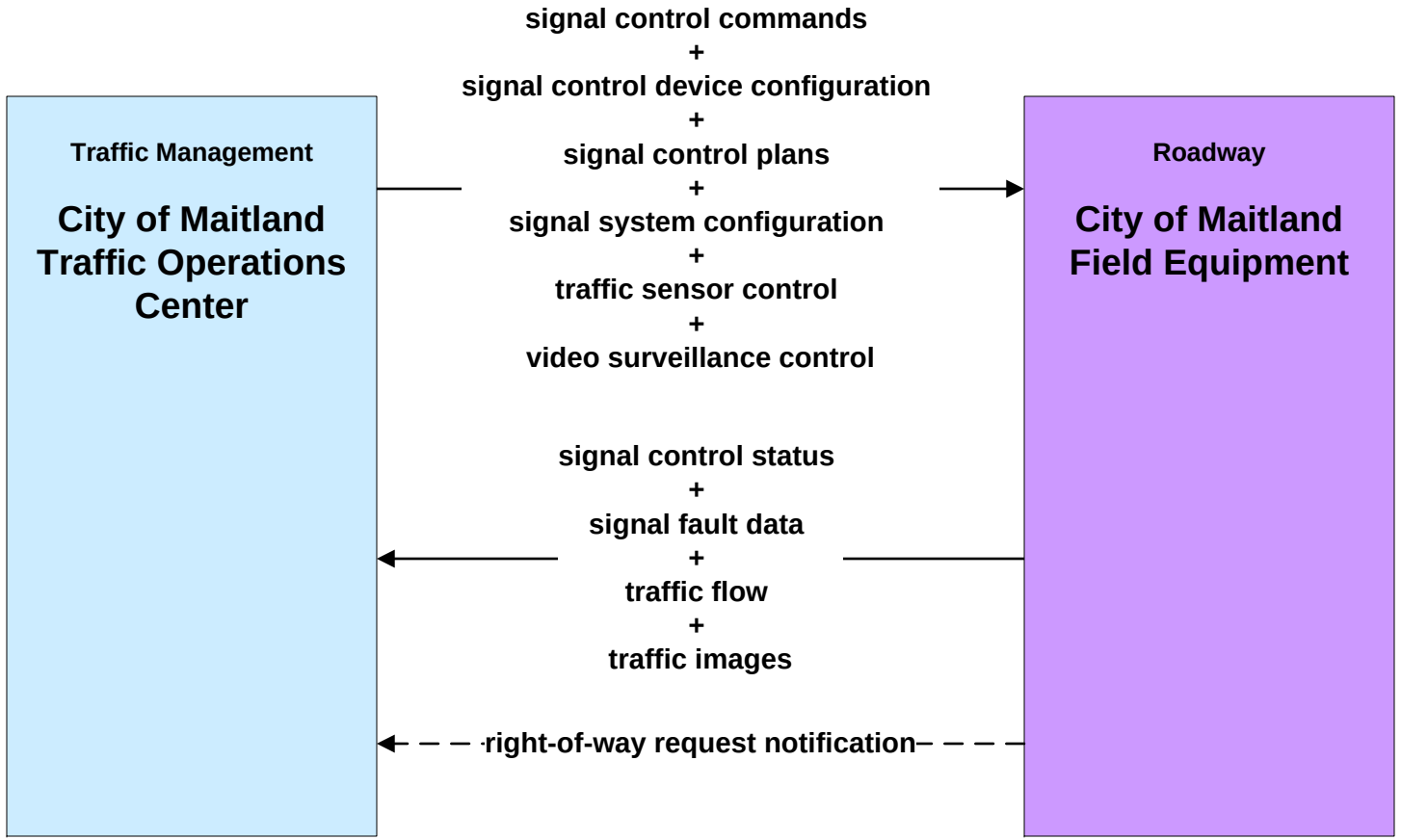


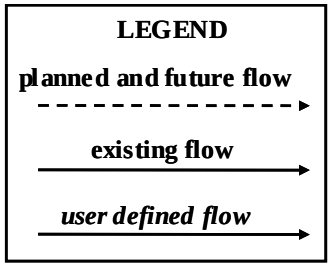
ATMS01 - Network Surveillance
City of Maitland



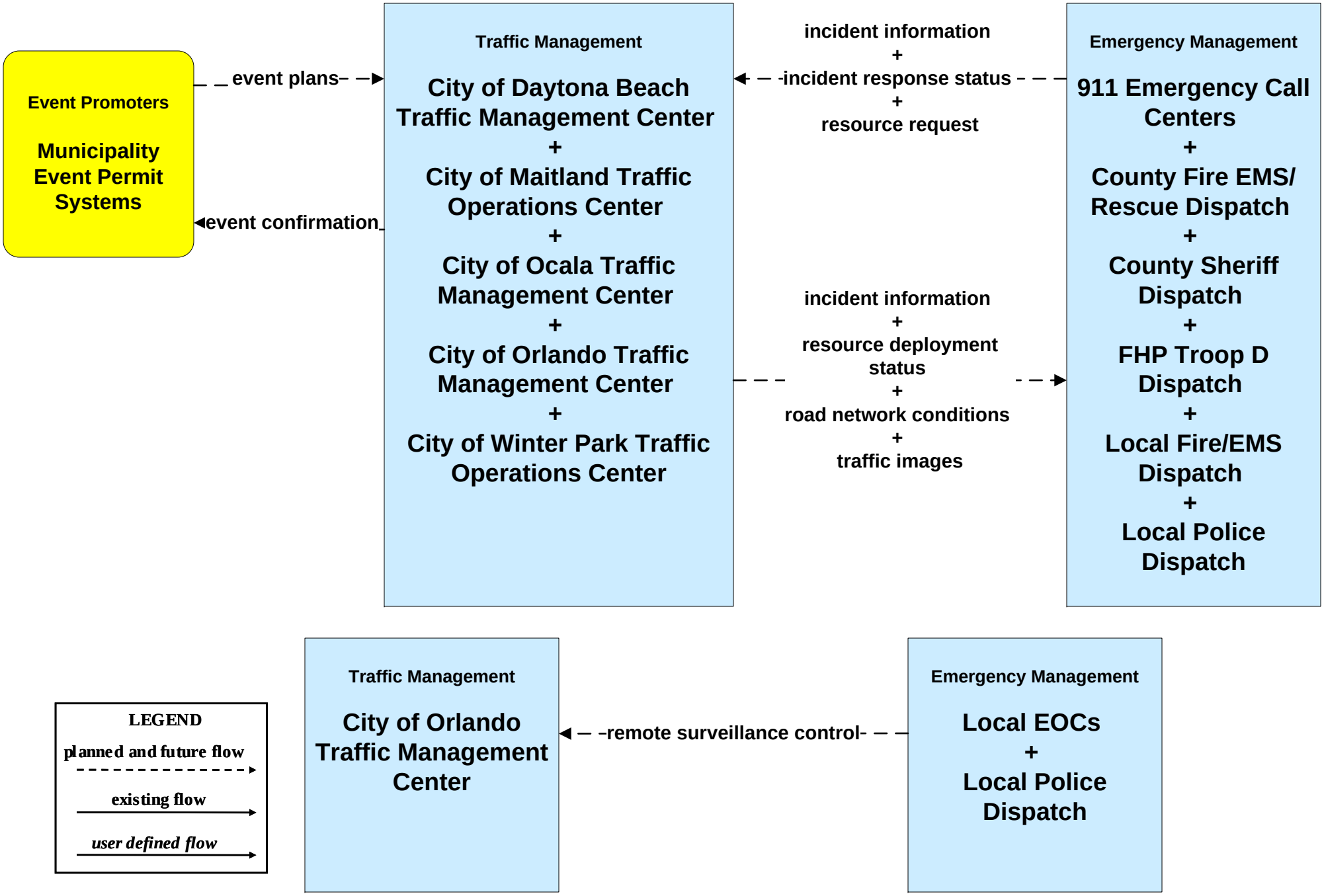


ATMS03 - Traffic Signal Control
City of Maitland

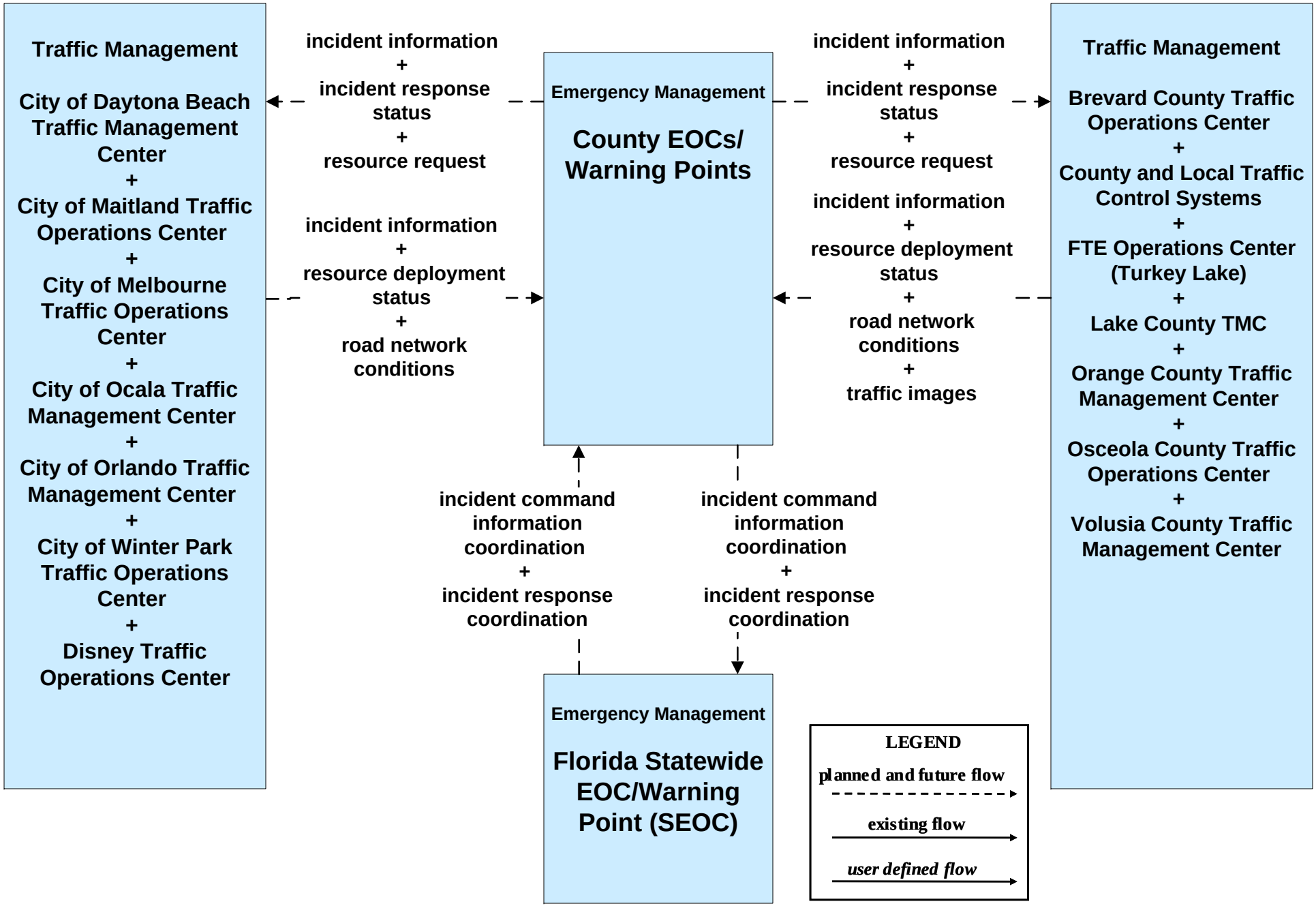




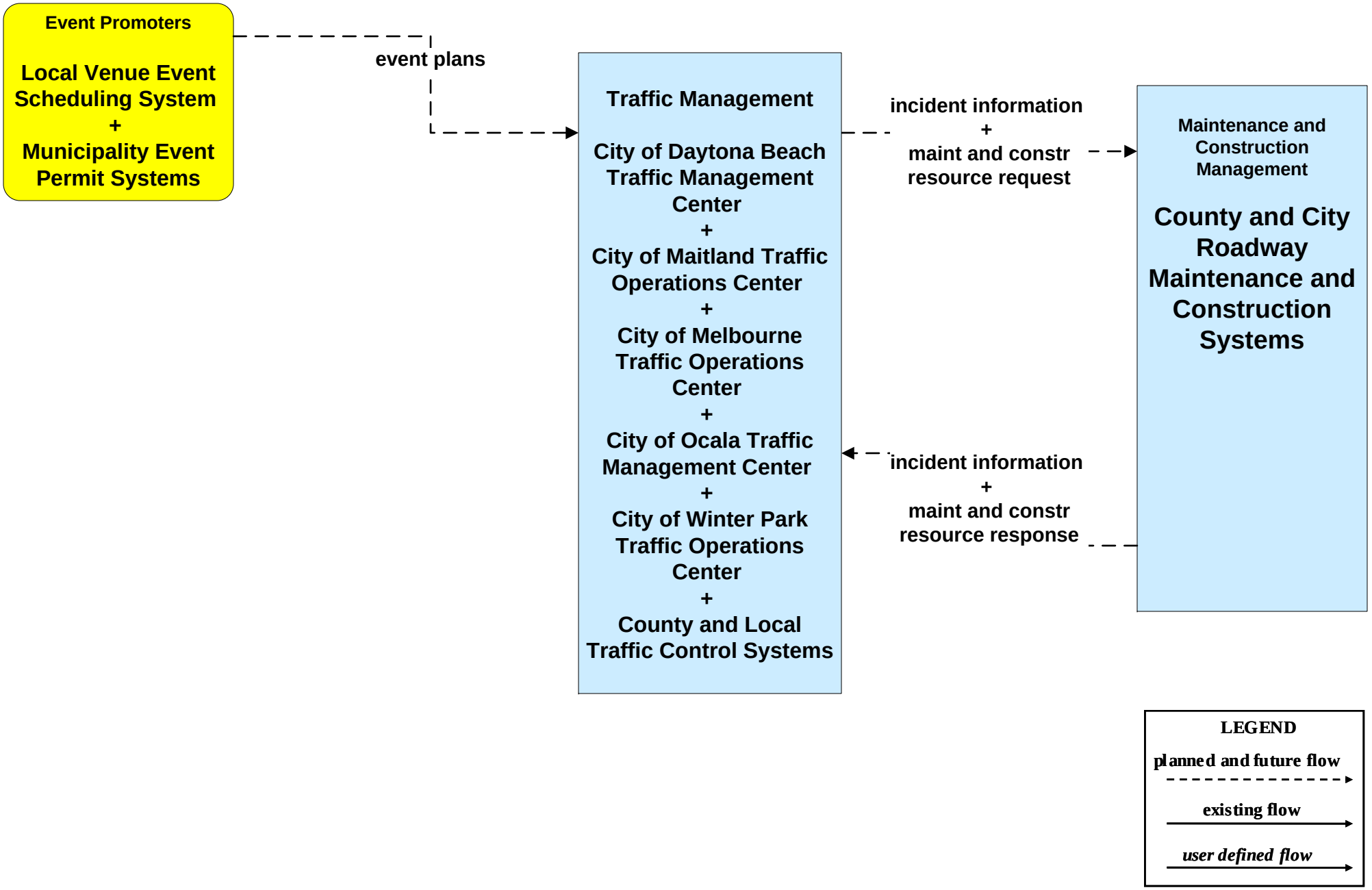
ATMS08 - Traffic Incident Management System
Municipal Traffic Operation Centers (TM to EM)



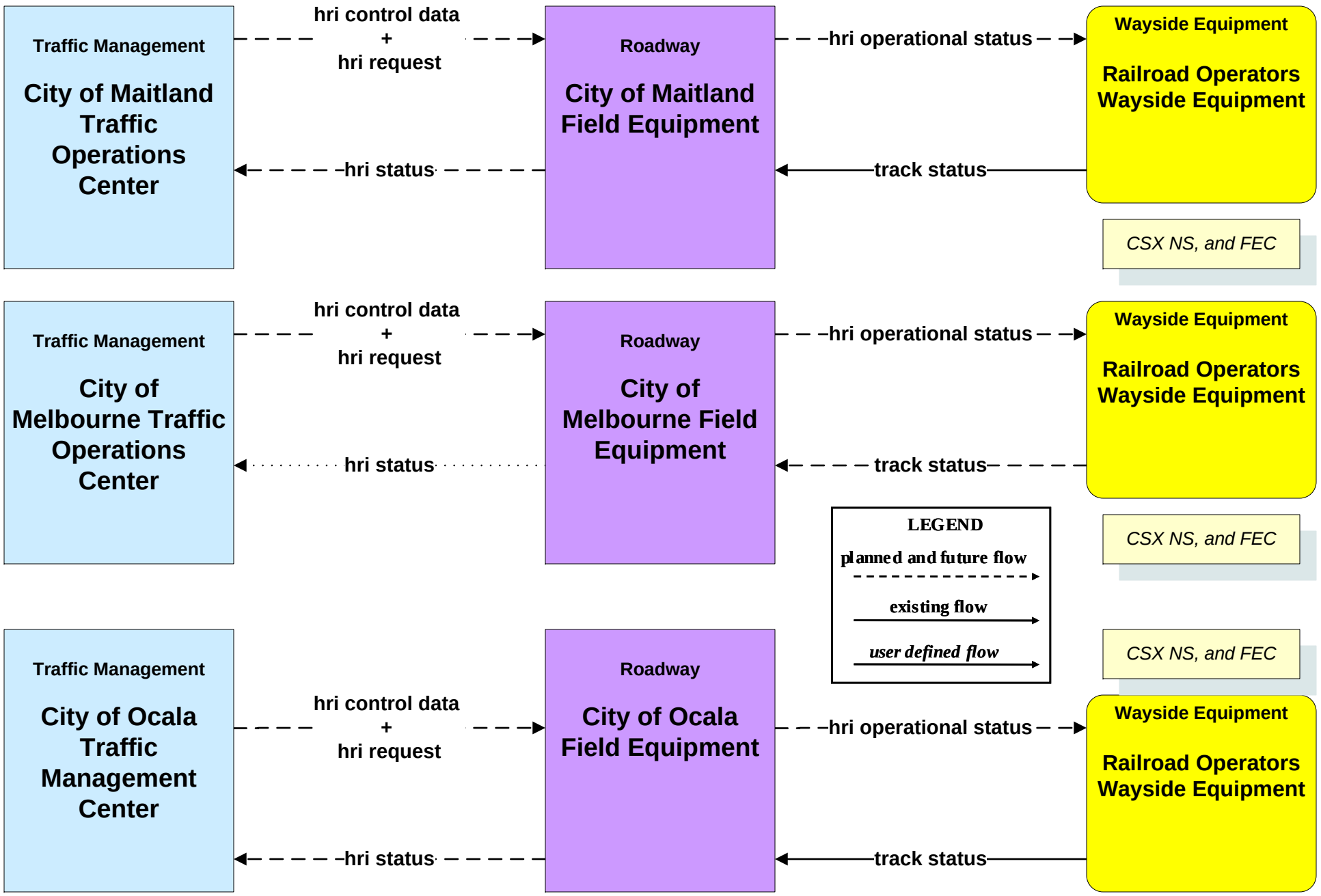
ATMS08 - Traffic Incident Management System
County Emergency Operations Center (TM to EM)



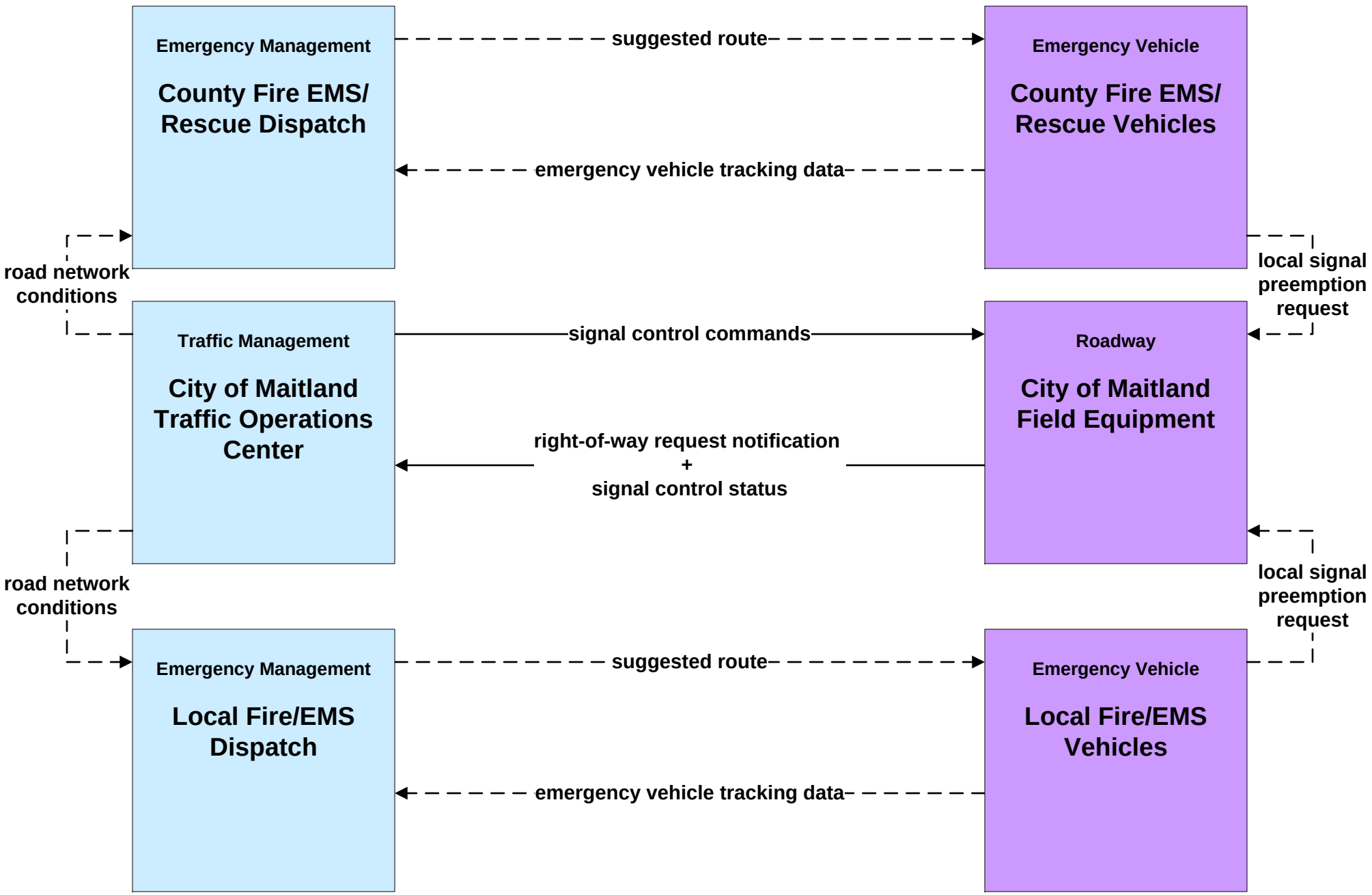
ATMS08 - Traffic Incident Management System
Local Traffic Management Centers (TM to MCM)



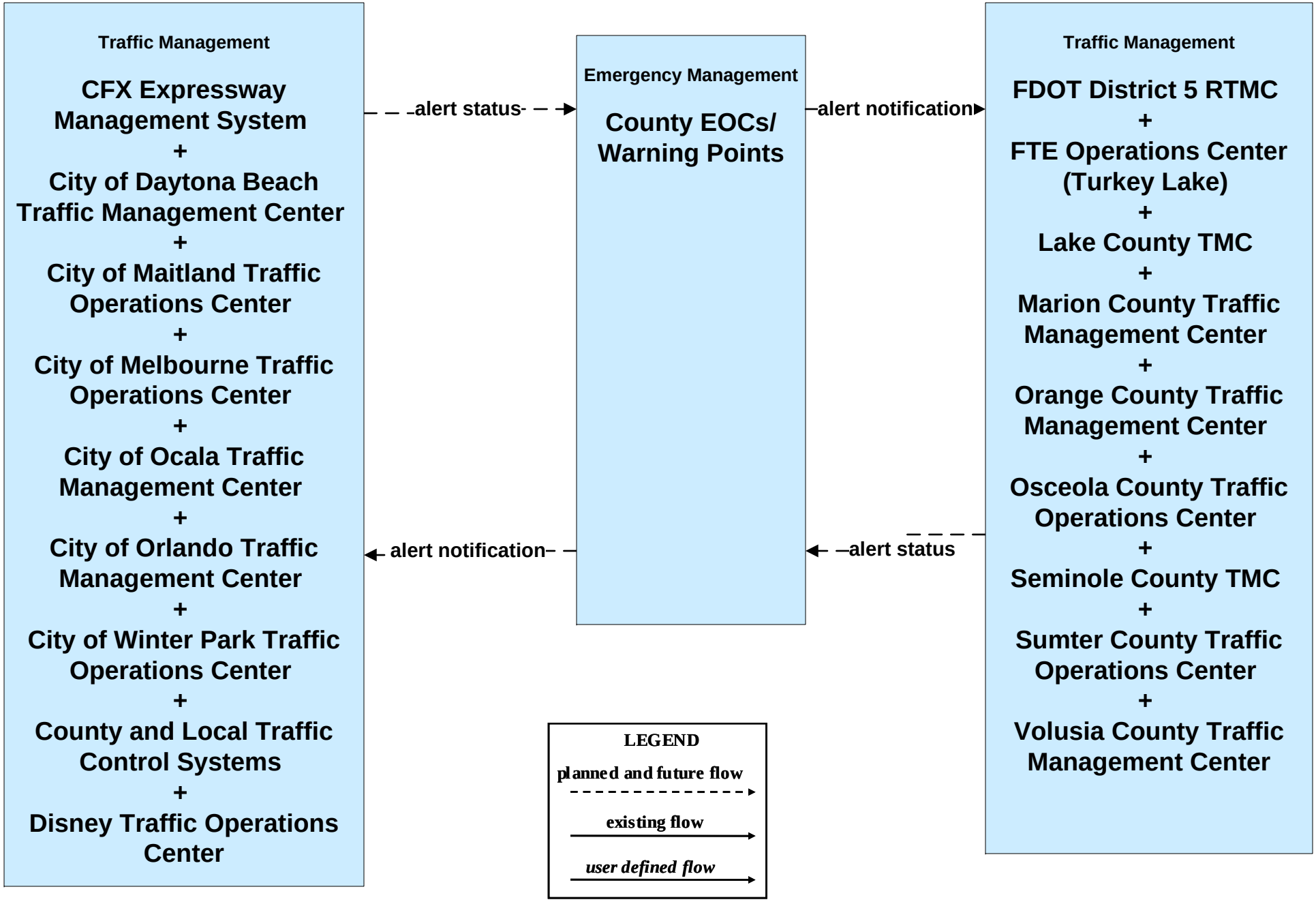
ATMS13 - Standard Railroad Crossing
City of Maitland / City of Melbourne / City of Ocala



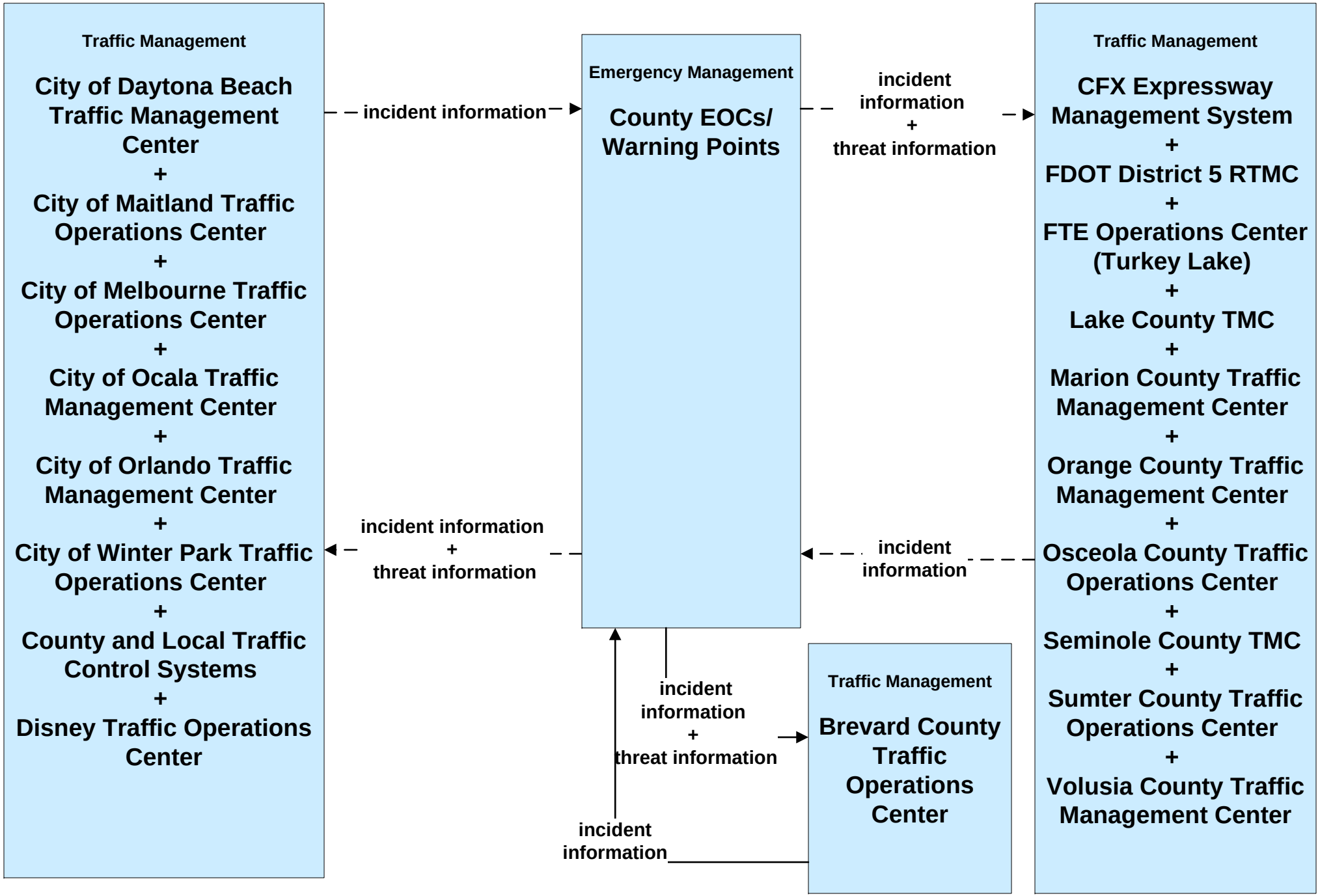
EM02 - Emergency Routing
City of Maitland



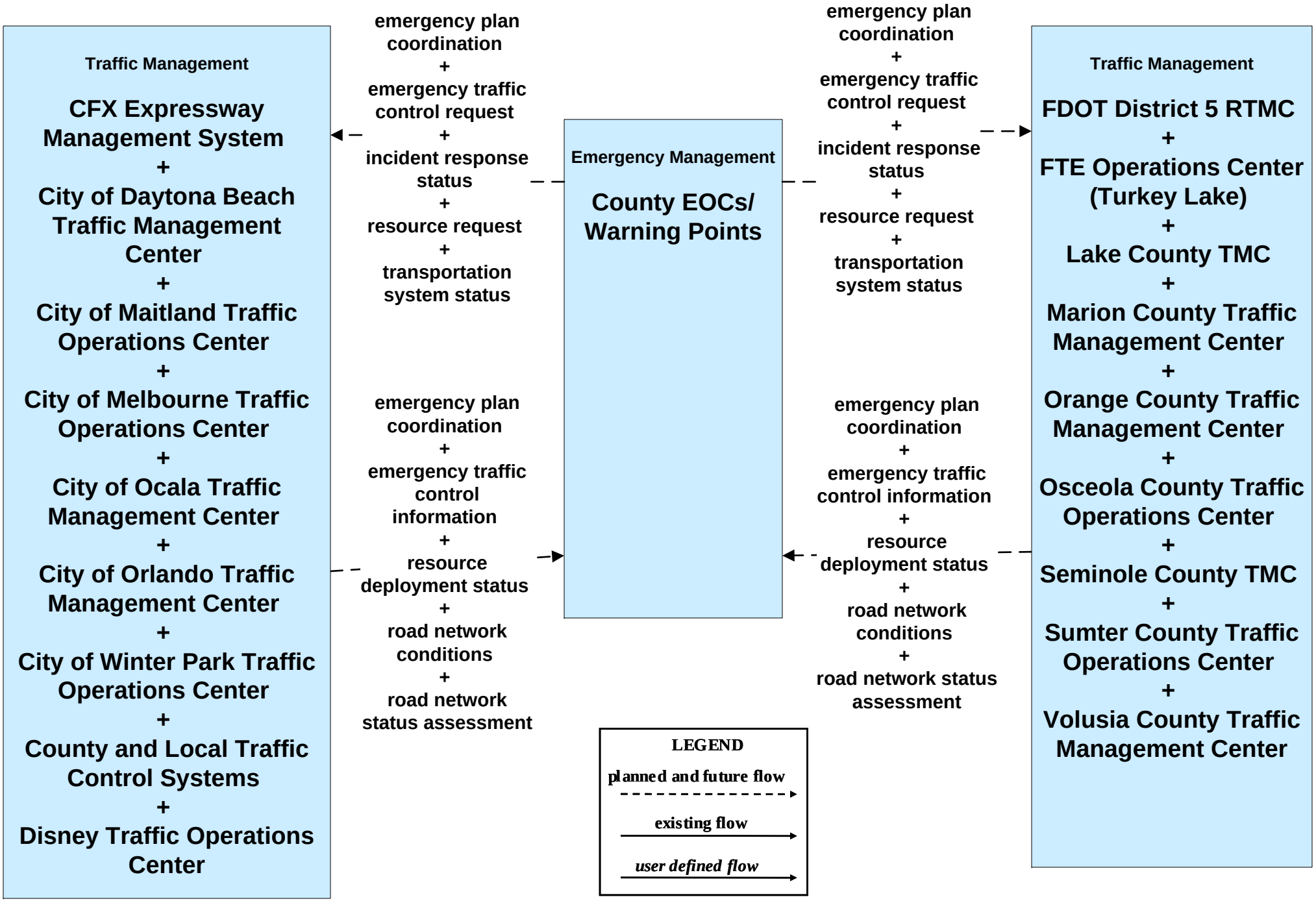
EM06 - Wide Area Alert
County EOCs (1 of 3)



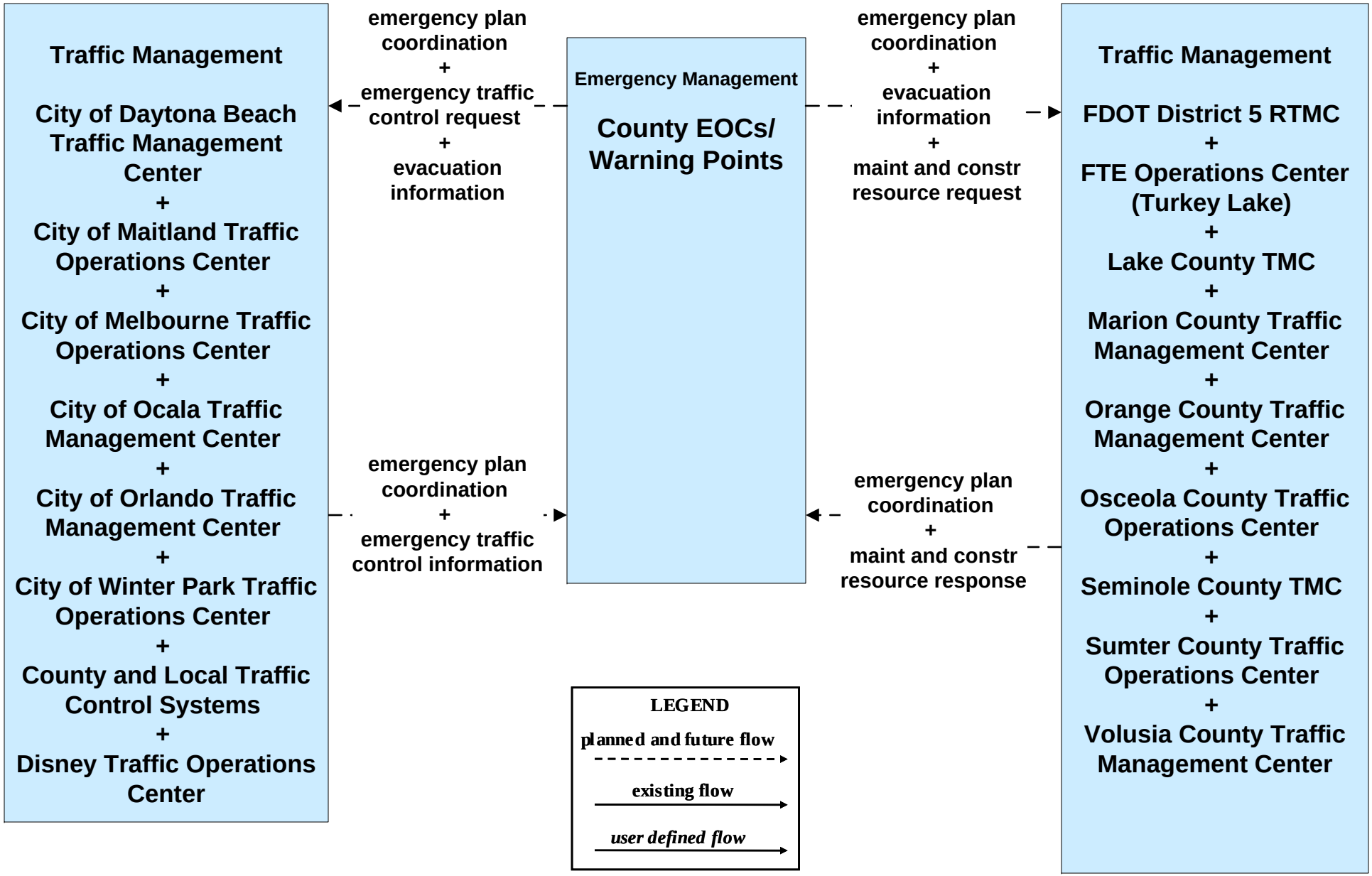
EM07 - Early Warning System
County EOCs (2 of 3)



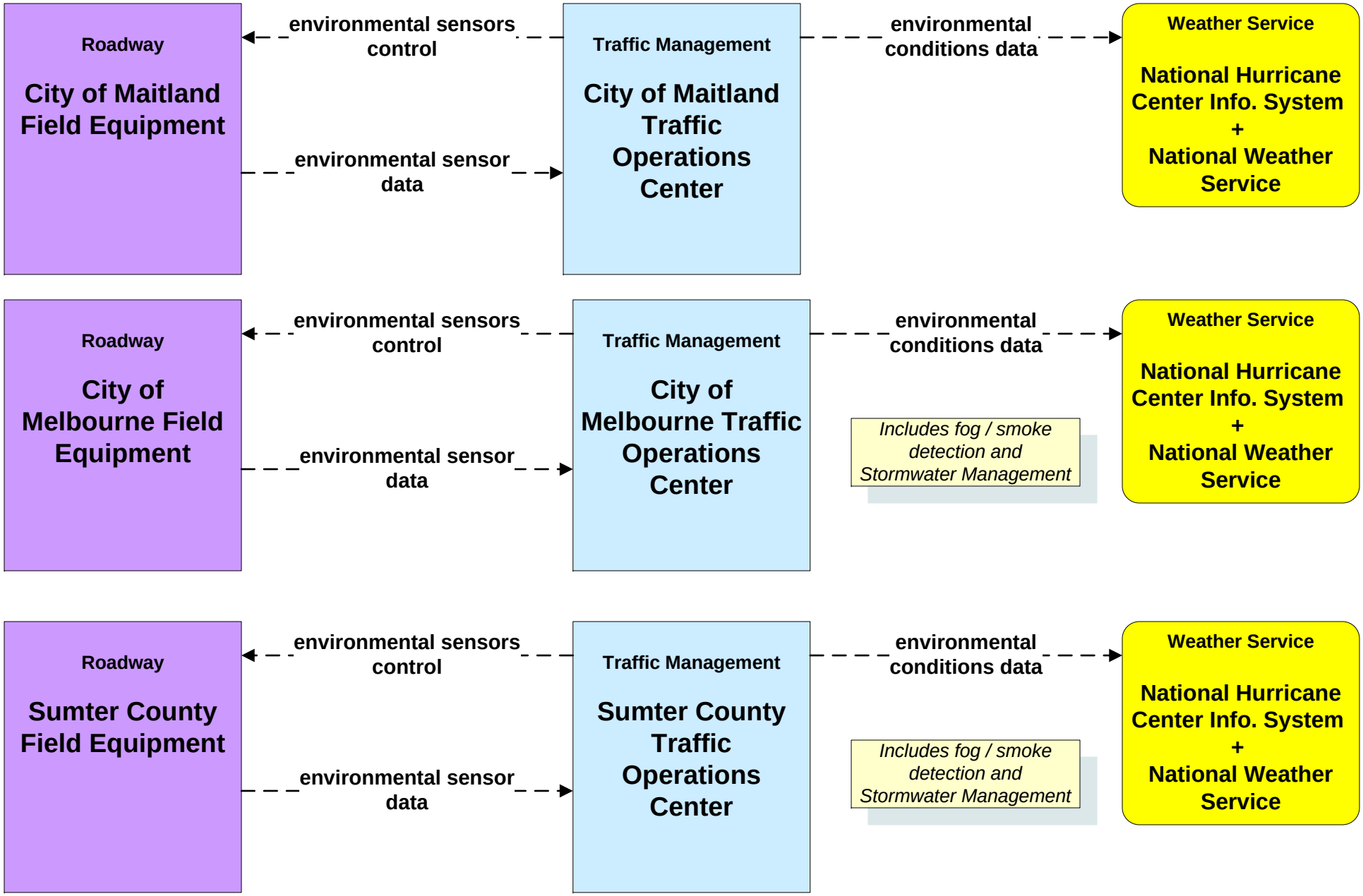
EM08 - Disaster Response and Recovery
County EOCs (2 of 4)



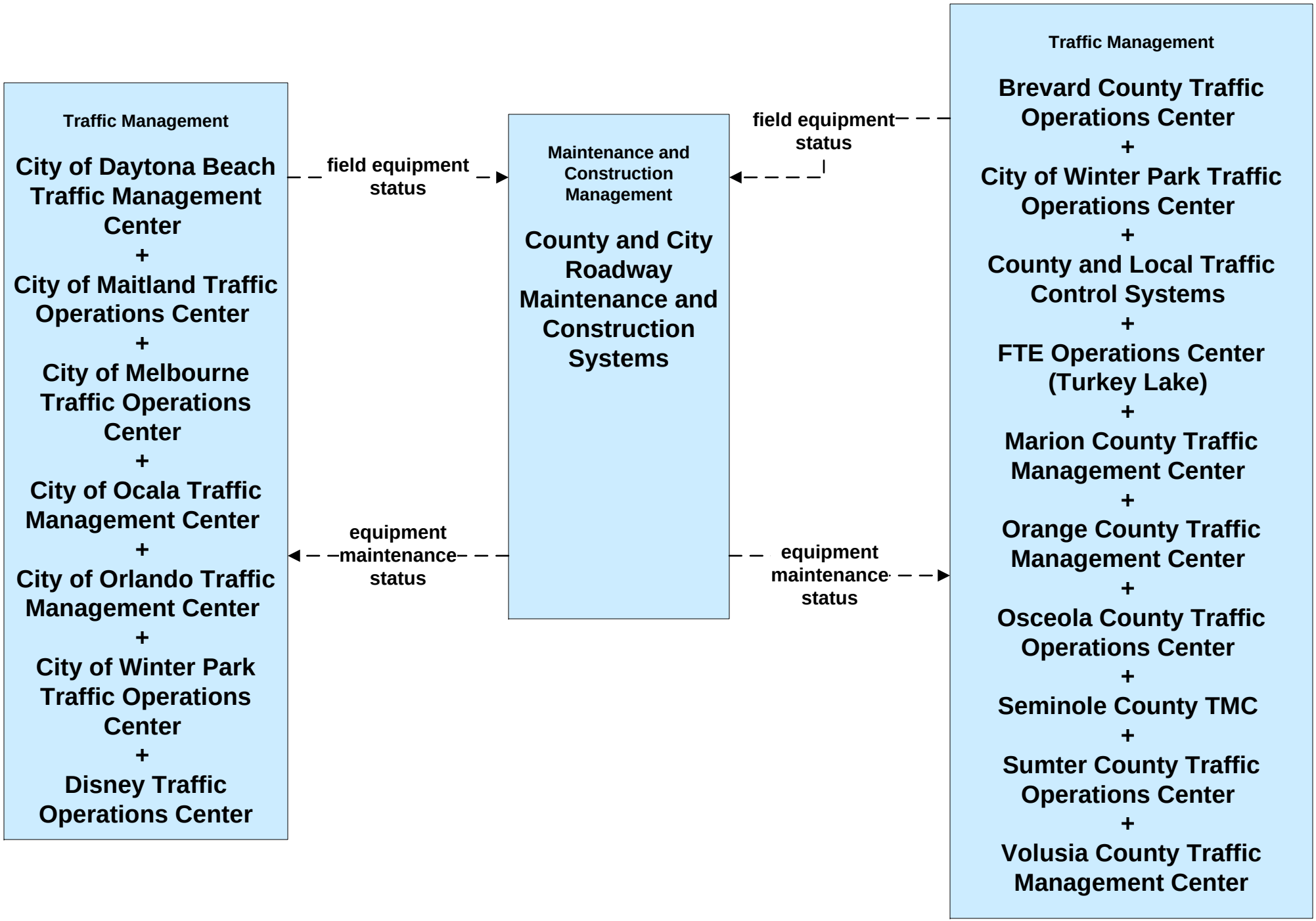
EM09 - Evacuation and Reentry Management
County EOCs (2 of 3)



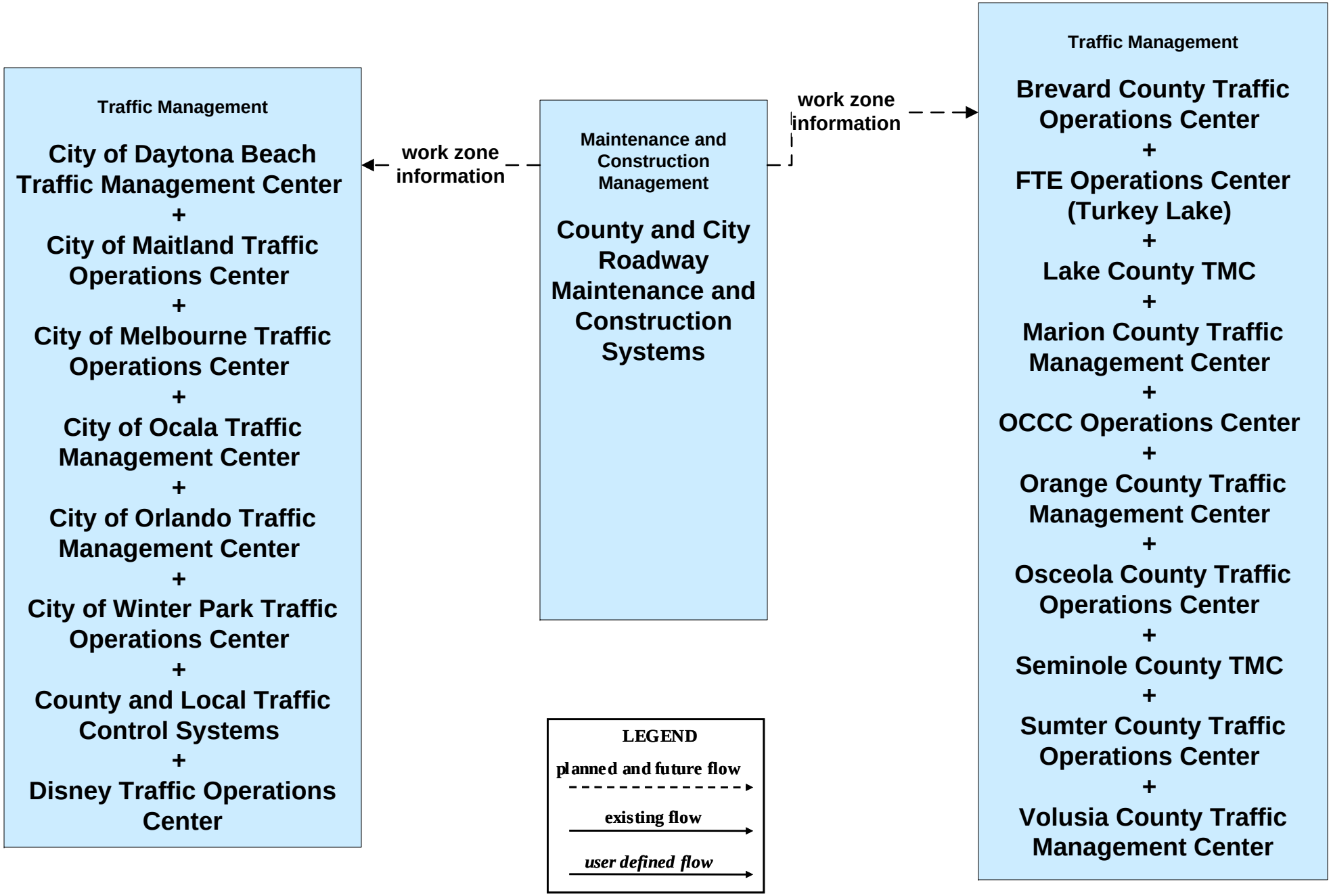
MC03 - Road Weather Data Collection
City of Maitland / City of Melbourne



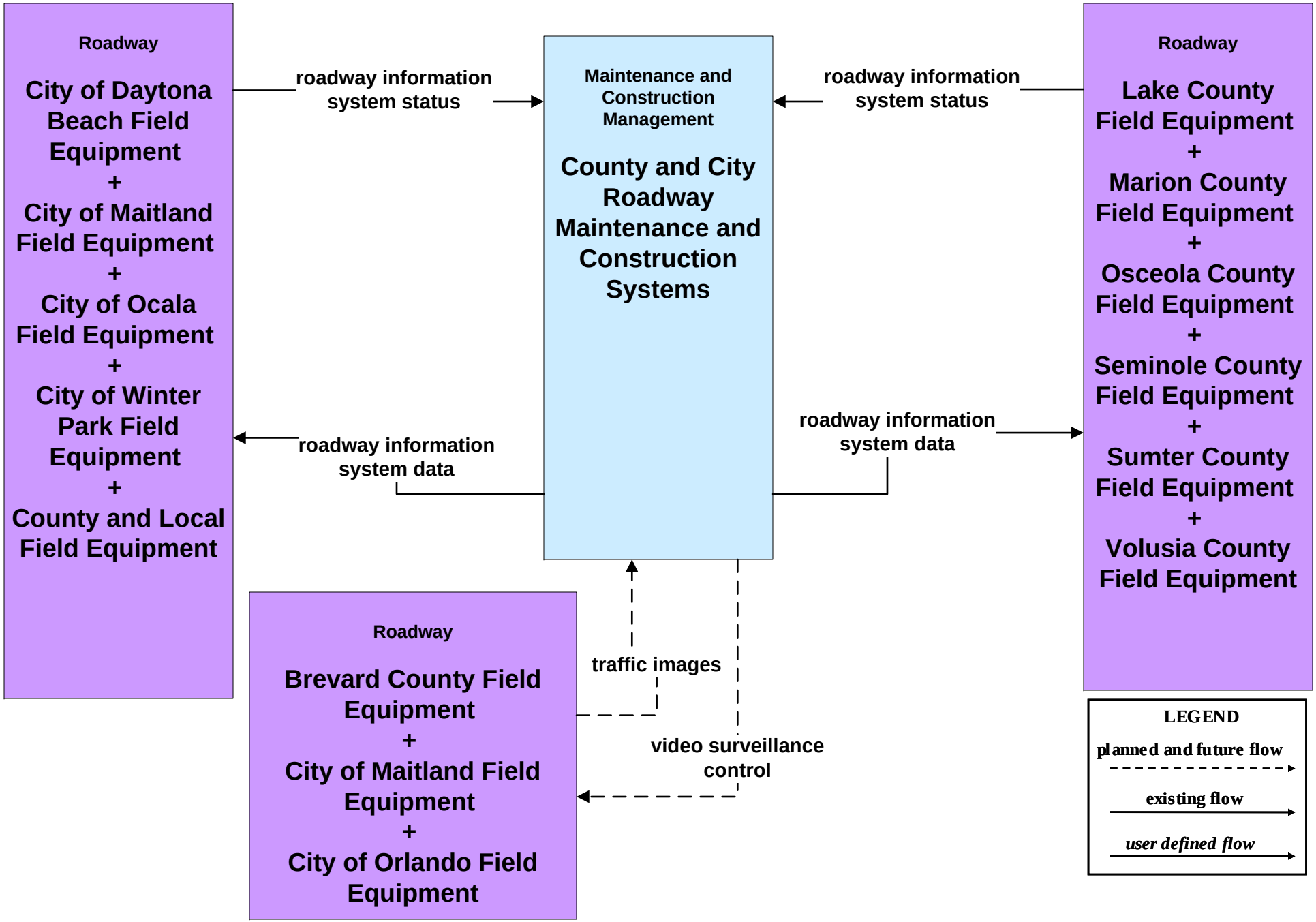
MC07 - Roadway Maintenance and Construction
Counties and Cities (2 of 2)



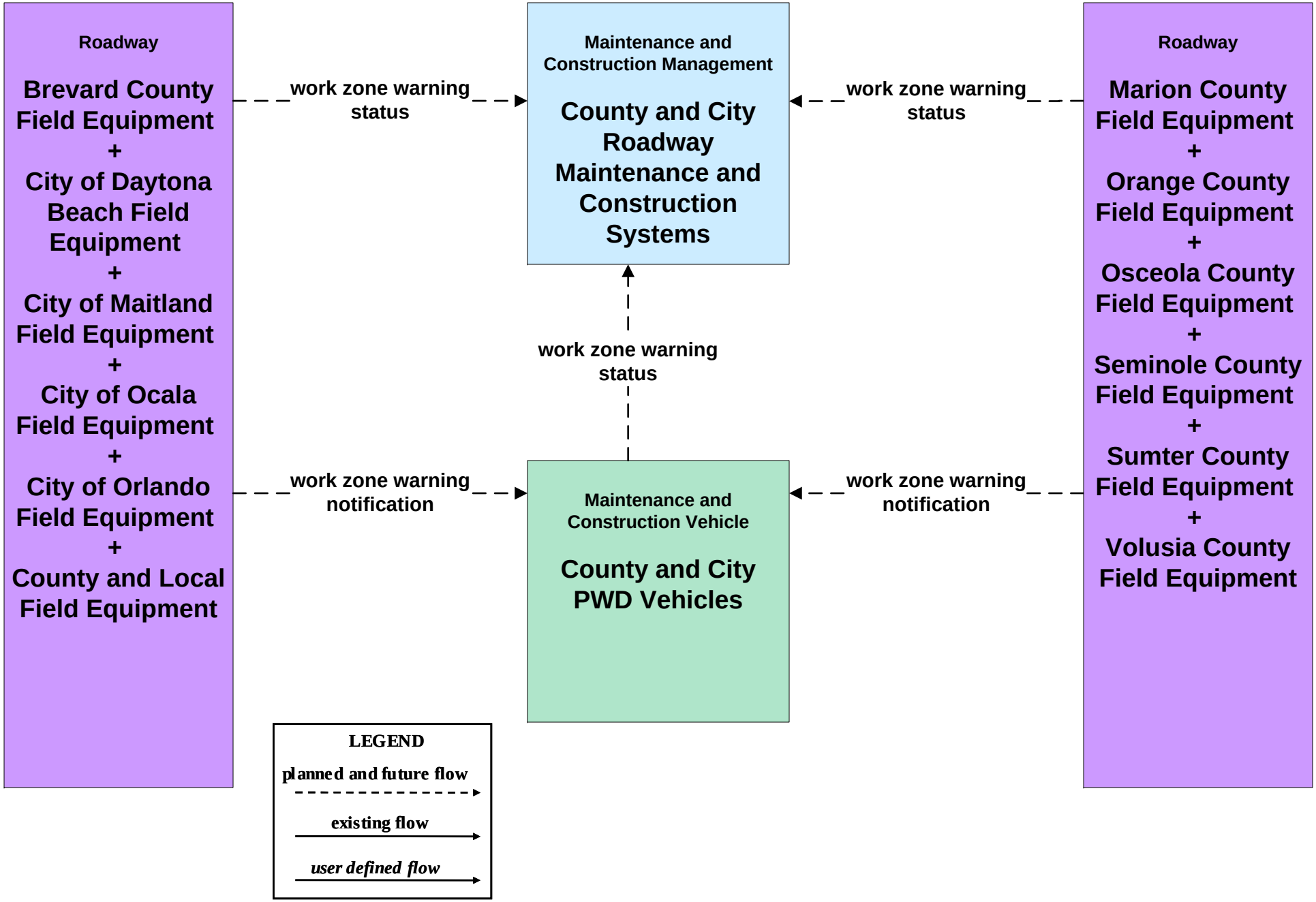
MC08 - Work Zone Management
Counties and Cities (2 of 3)



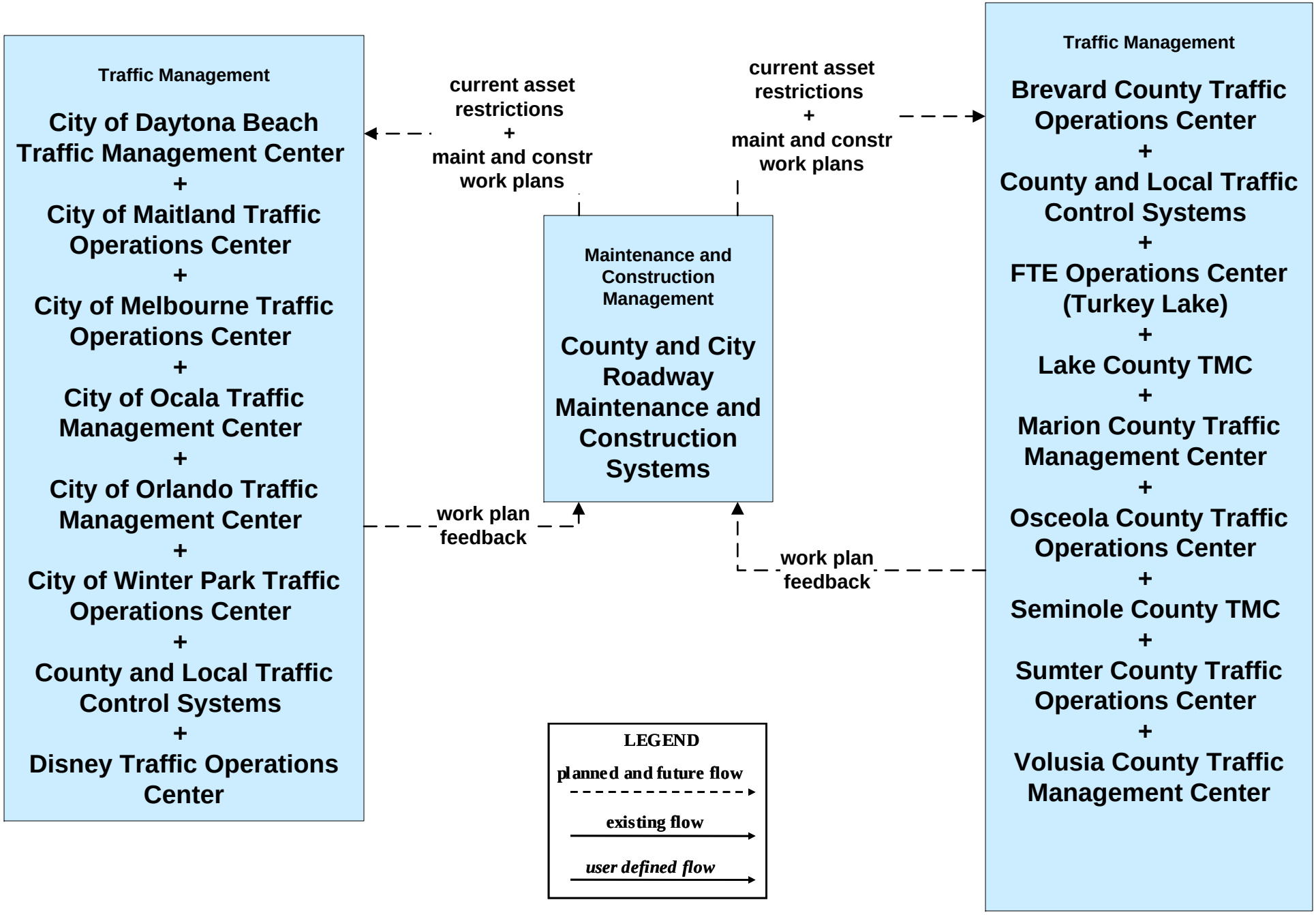
MC08 - Work Zone Management
Counties and Cities (3 of 3)



MC09 - Work Zone Safety Monitoring
Counties and Cities



MC10 - Maintenance and Construction Activity Coordination
Counties and Cities (2 of 4)

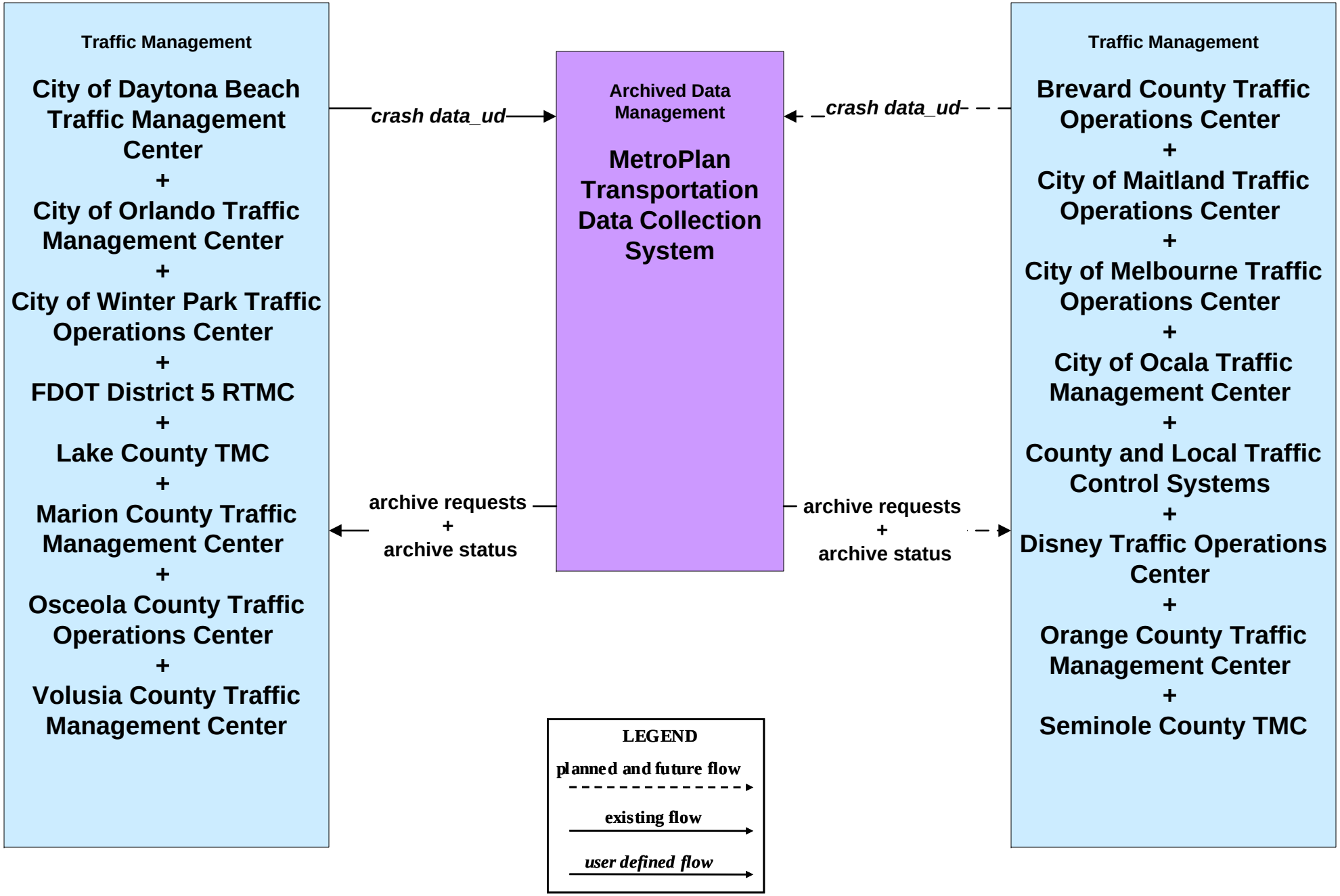


FDOT District 5
Central Florida Regional ITS Architecture

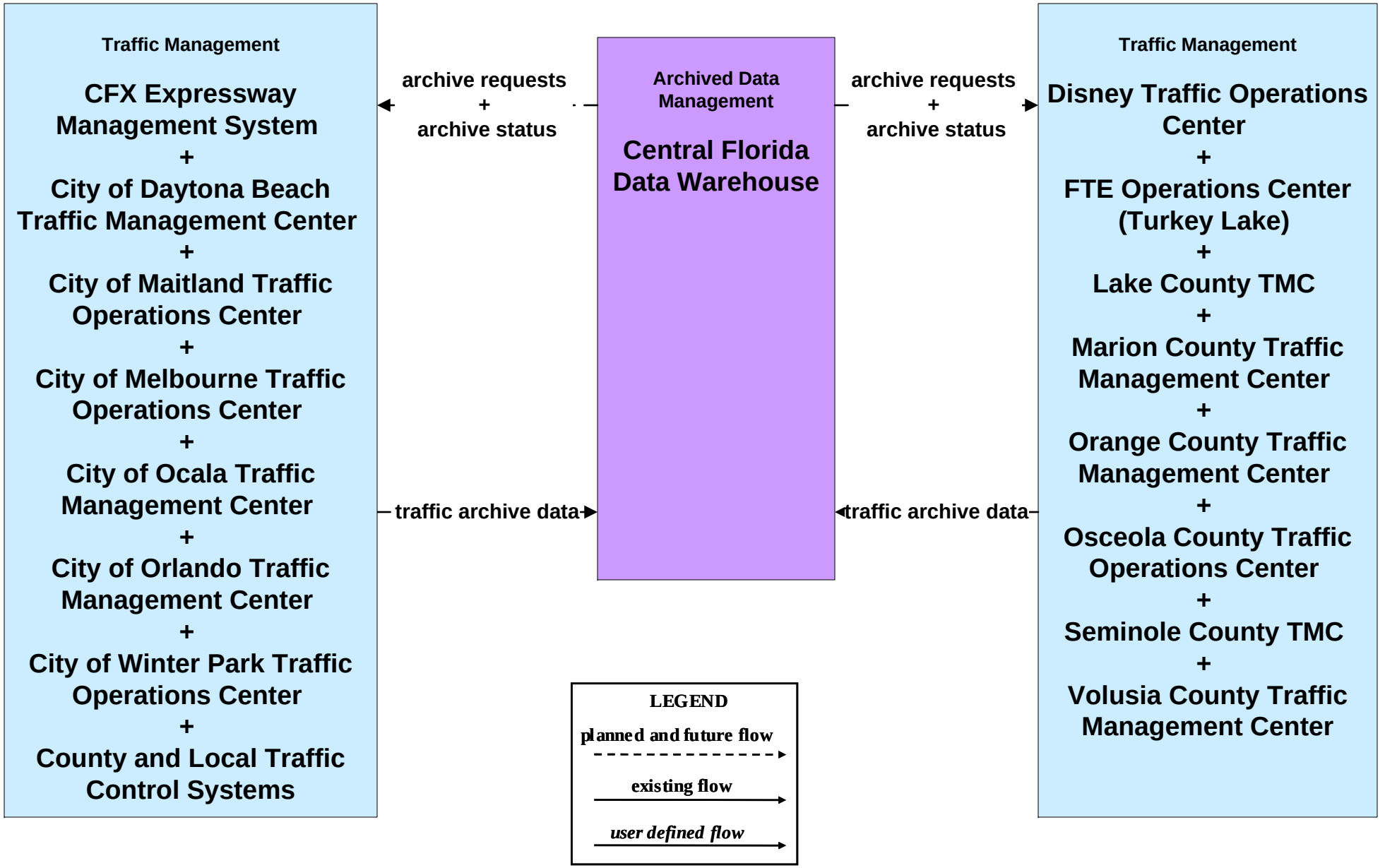
Customized Service Package Diagrams

City of Orlando

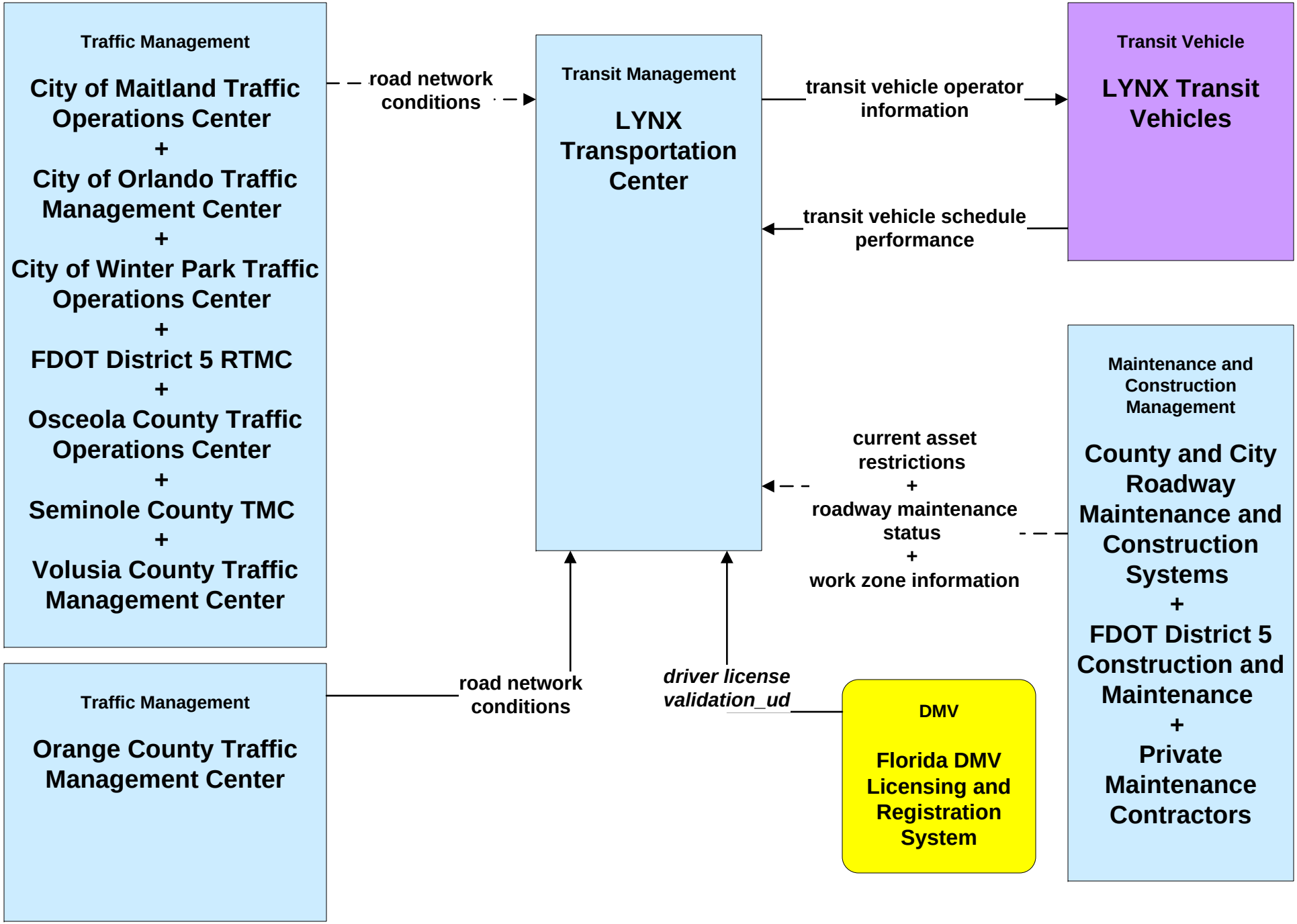
AD1 - ITS Data Mart
MetroPlan Transportation Data Collection System (1 of 2)



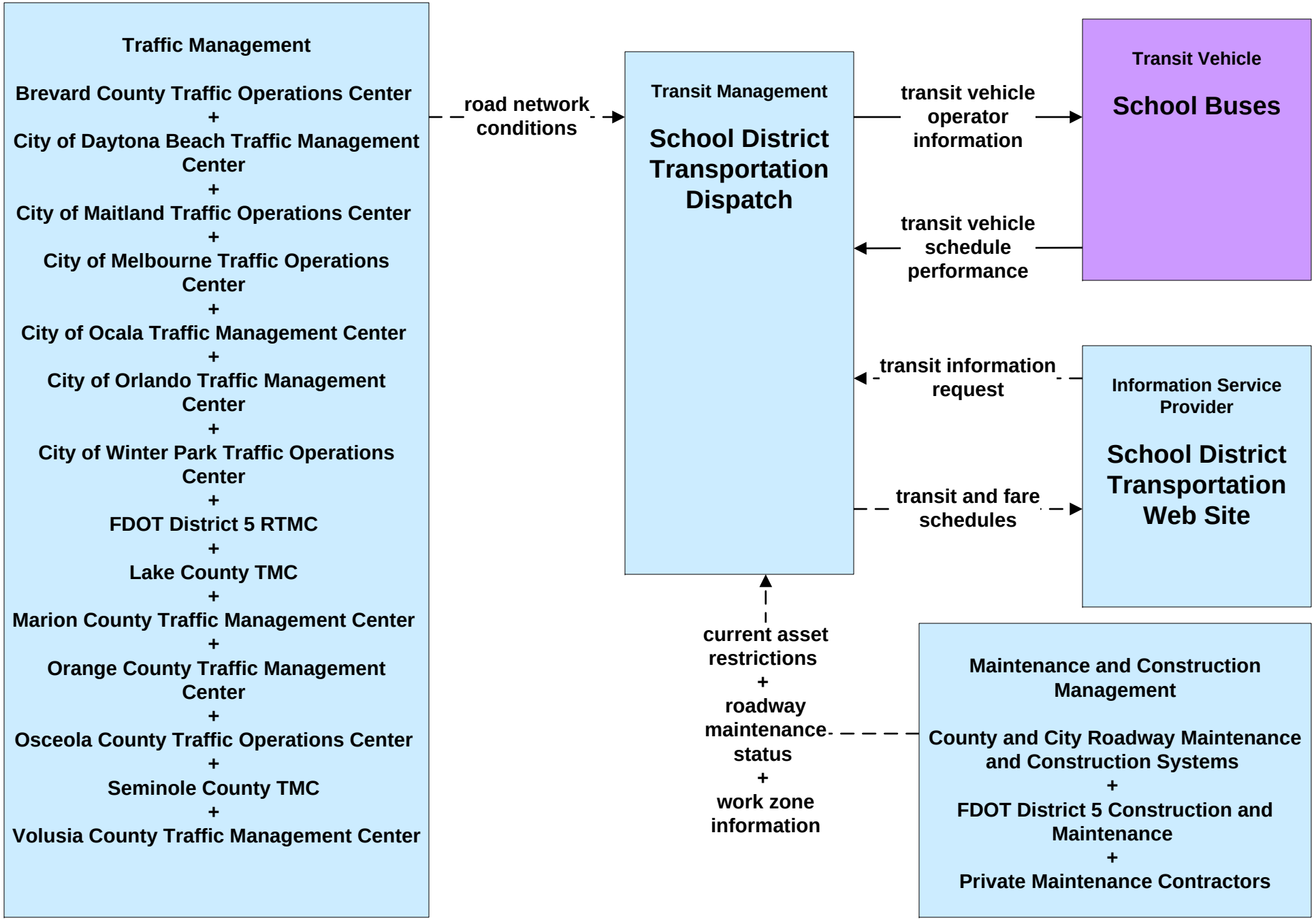
AD2 - ITS Data Warehouse
Central Florida Data Warehouse (1 of 2)



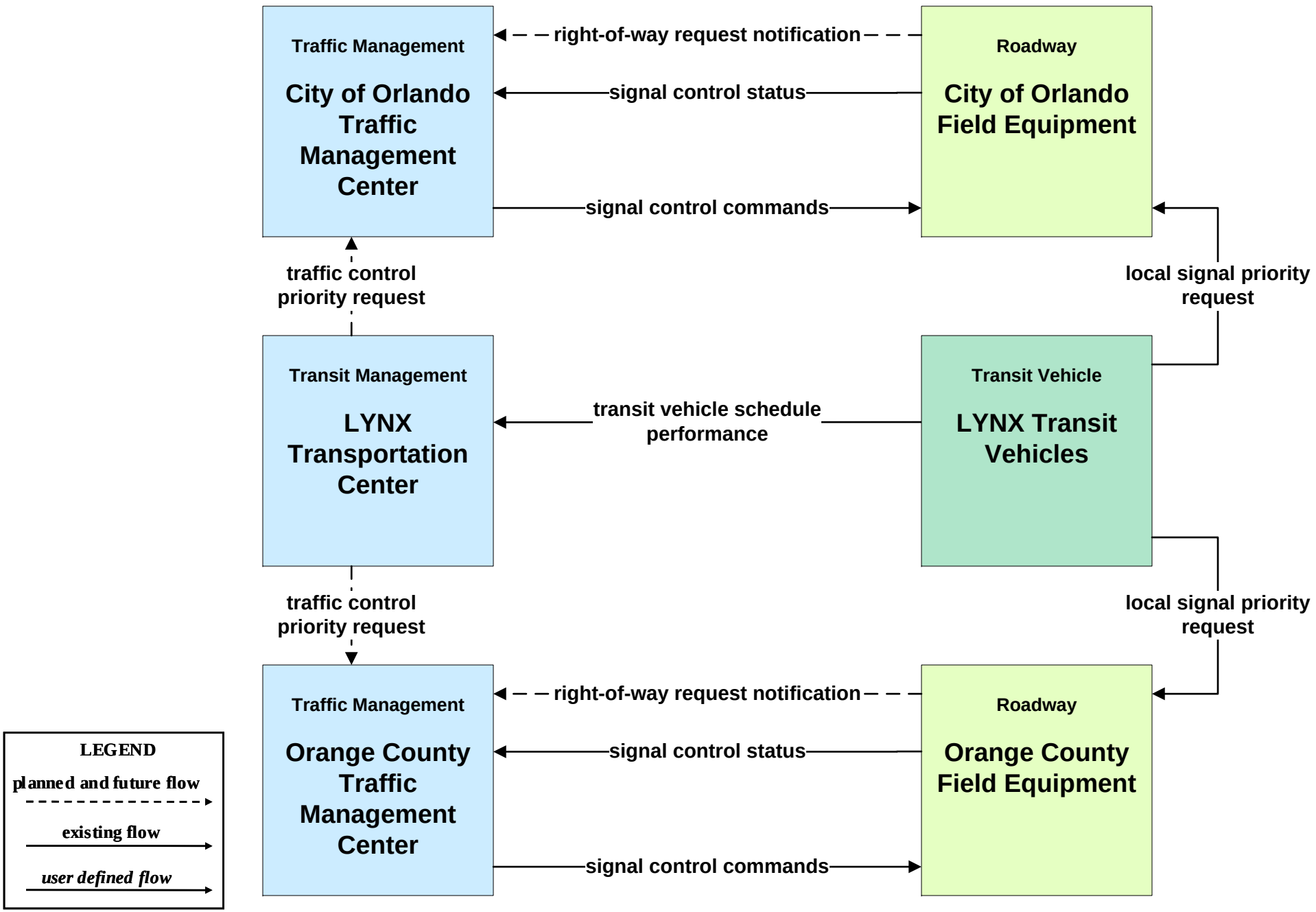
APTS02 - Transit Fixed-Route Operations
LYNX Operations Center



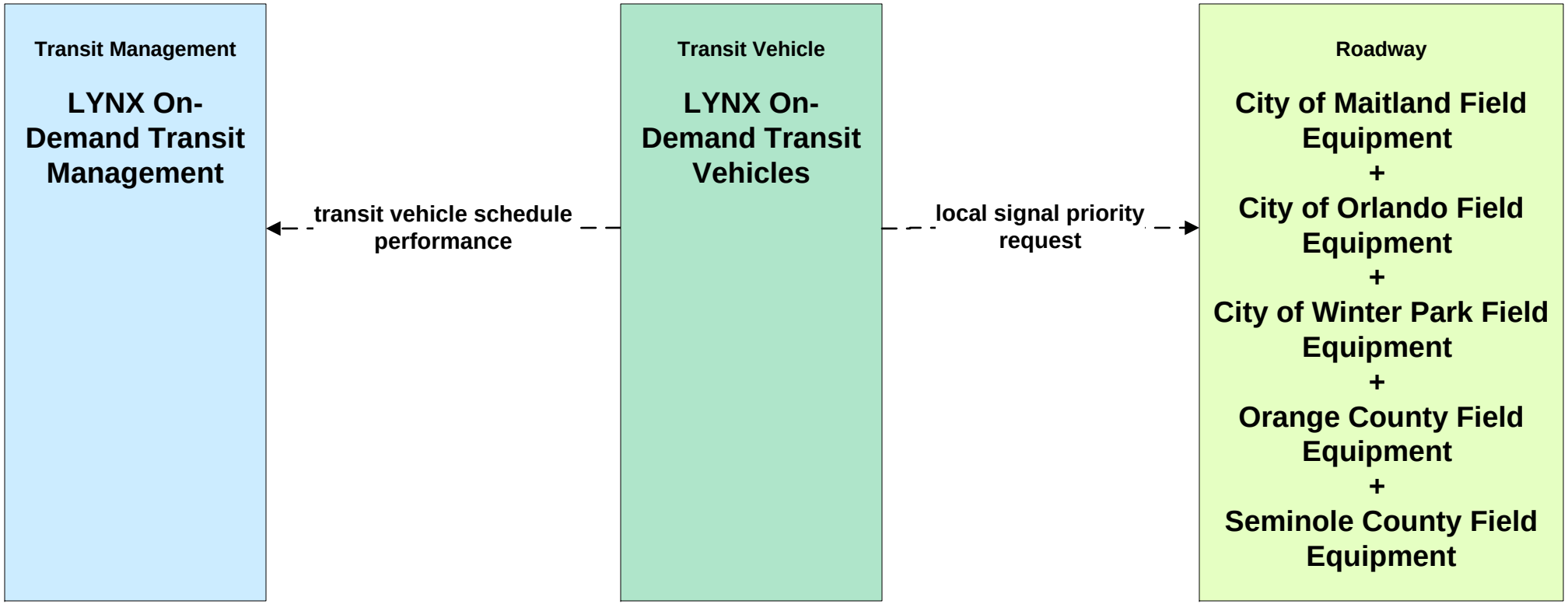
APTS02 - Transit Fixed-Route Operations
School District Transportation Dispatch

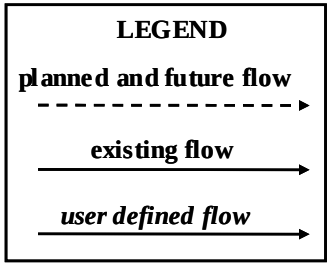


APTS09 - Transit Signal Priority
LYNX (2 of 5)

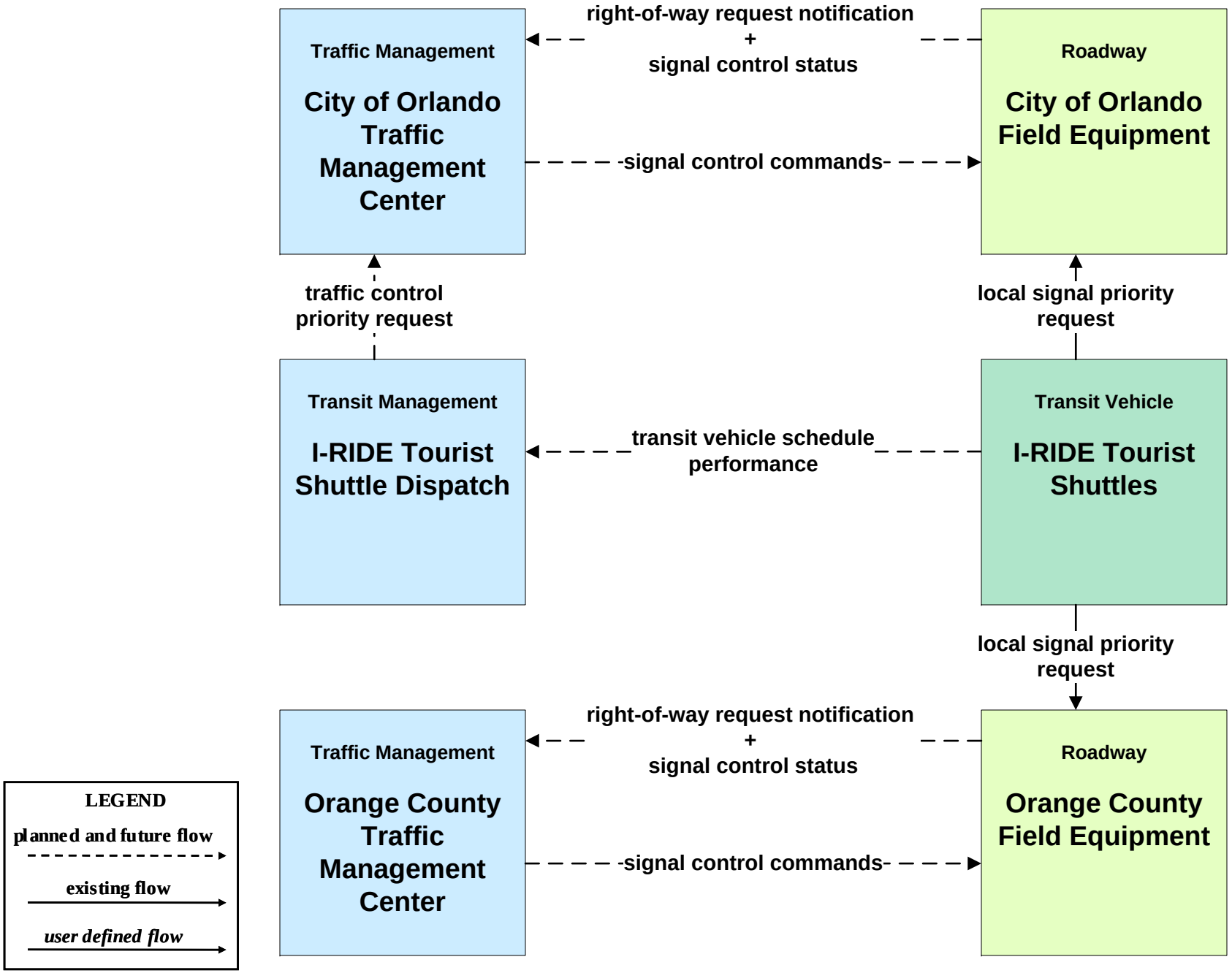


APTS09 - Local Signal Priority
LYNX On-Demand Transit

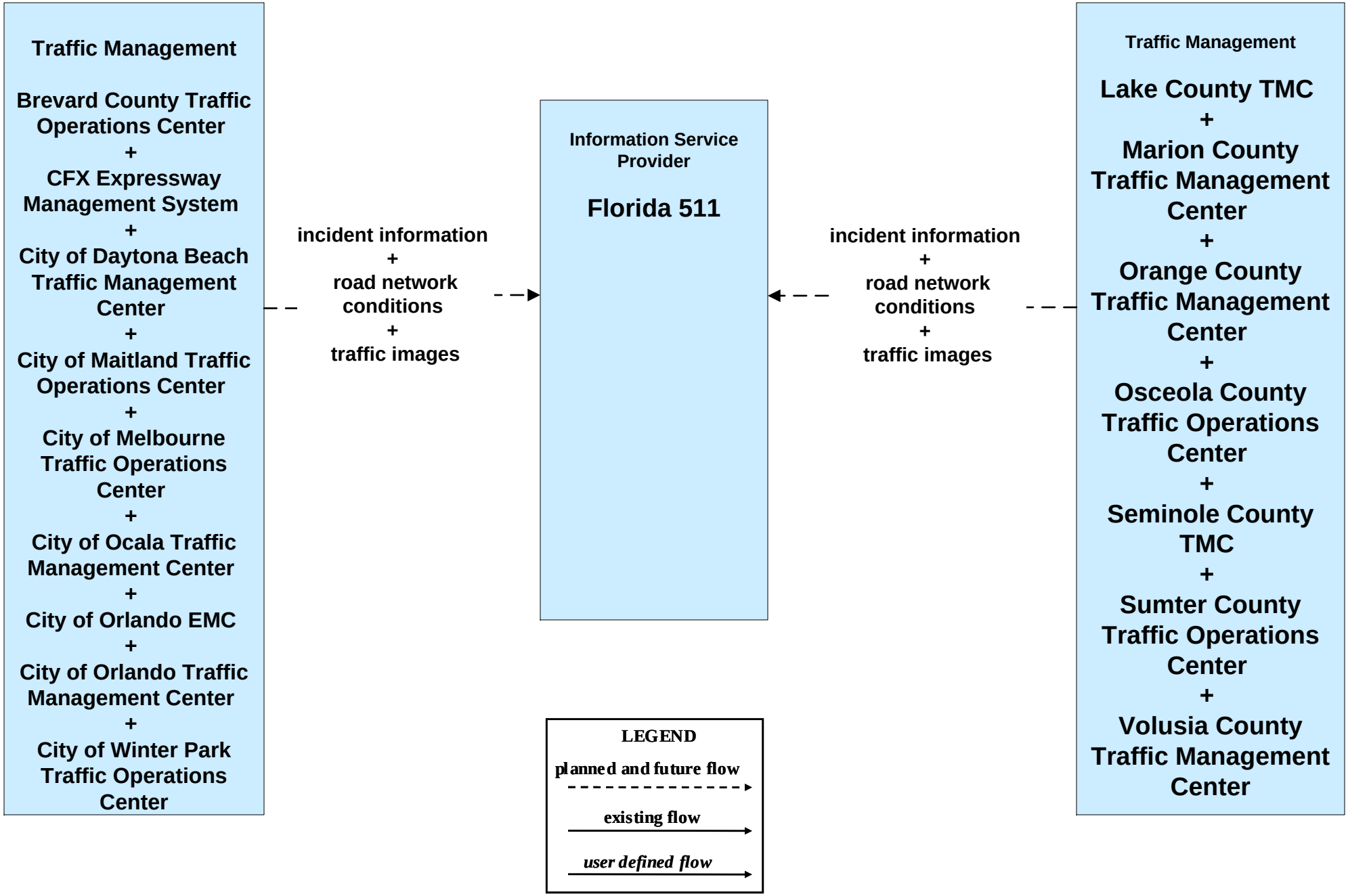




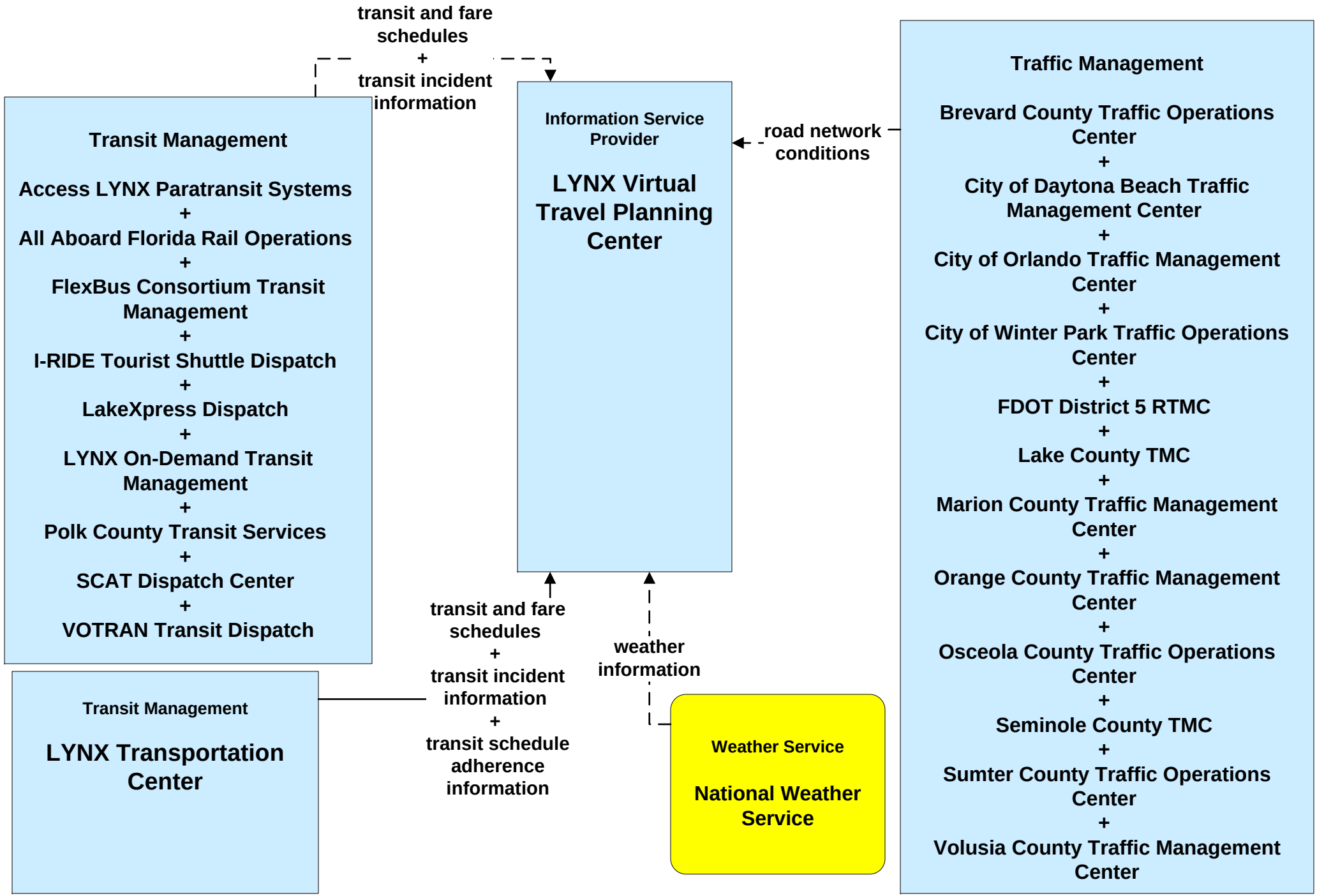
APTS09 - Transit Signal Priority
I-RIDE



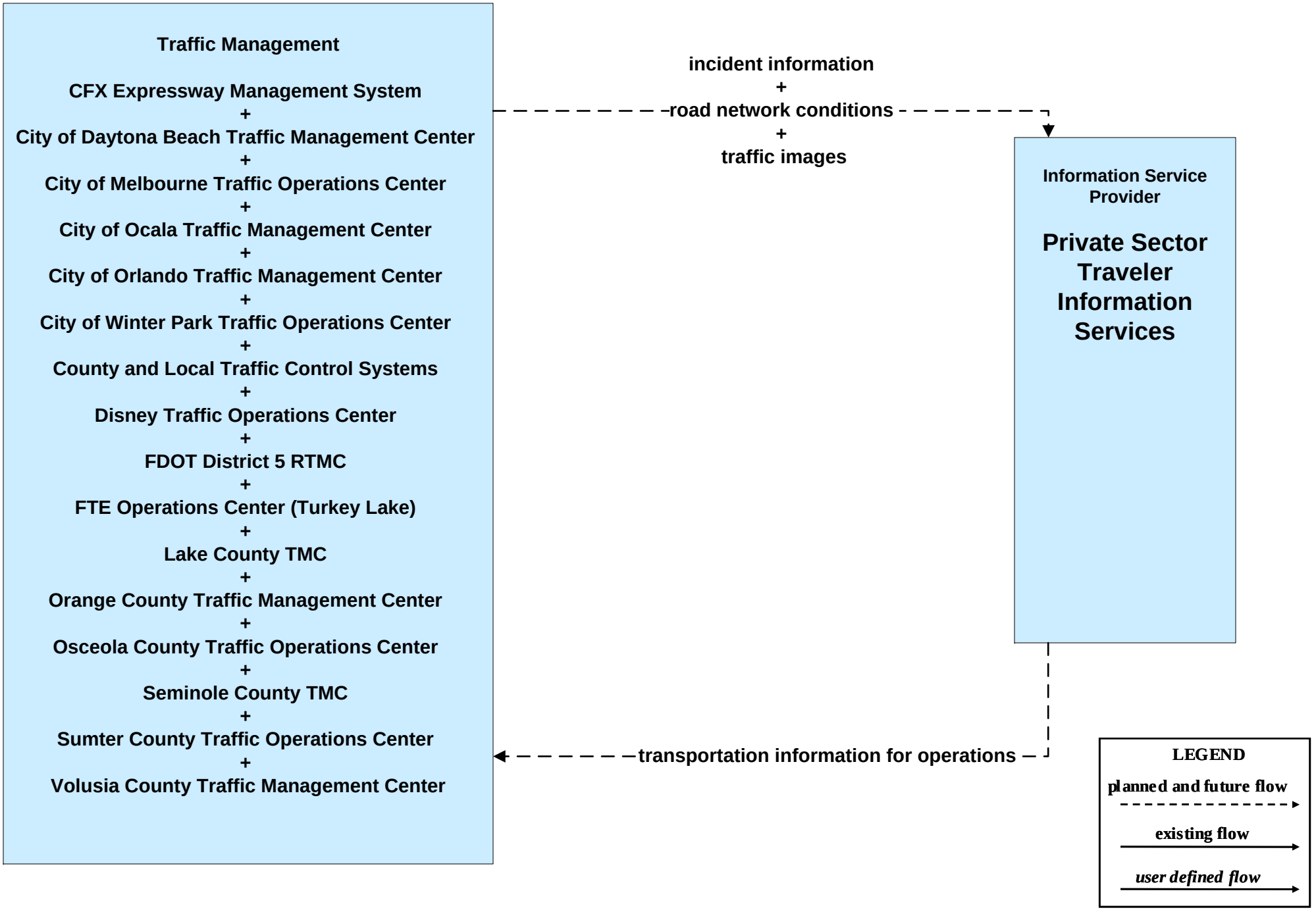
ATIS01 - Broadcast Traveler Information
Florida 511 / Private ISPs (3 of 3)



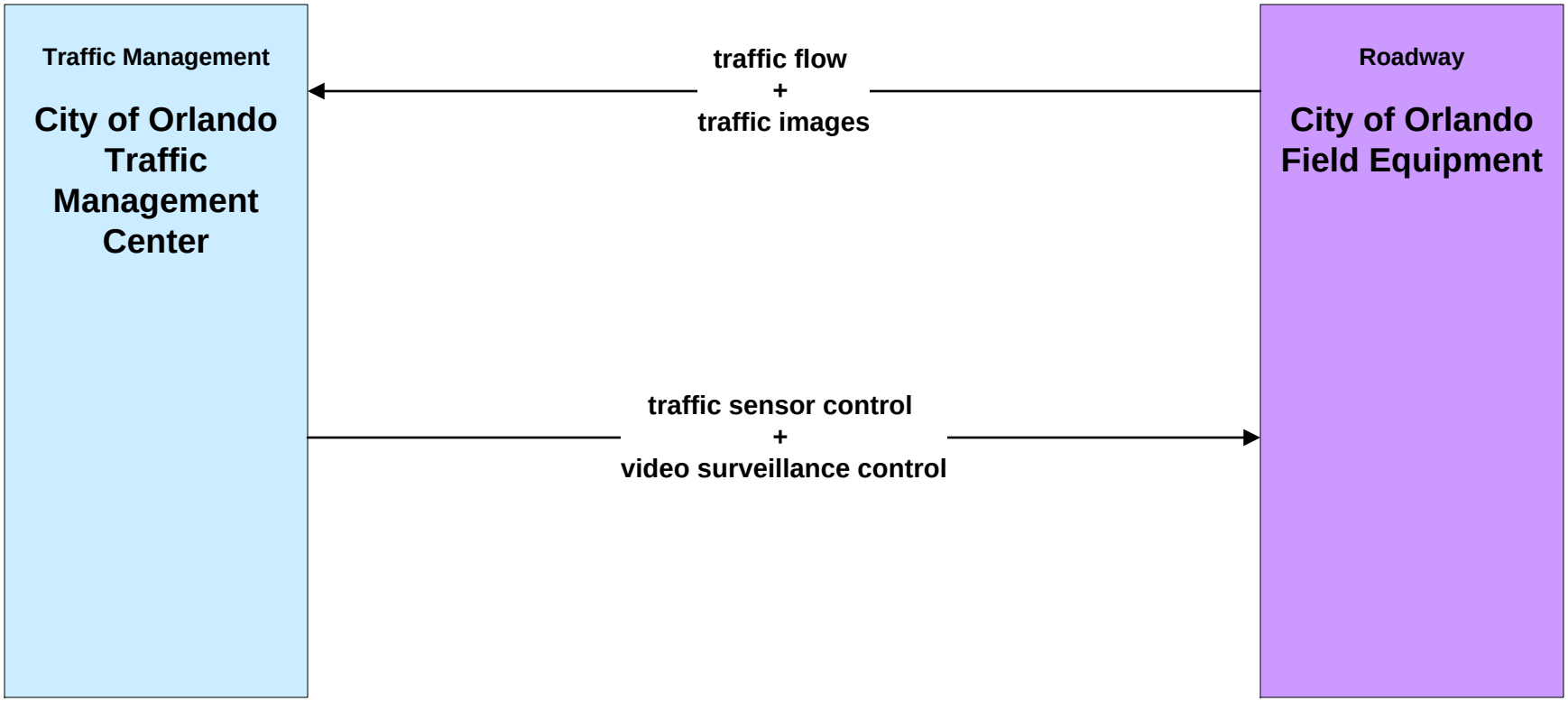
ATIS02 - Interactive Traveler Information
Virtual Travel Planning Center (1 of 2)

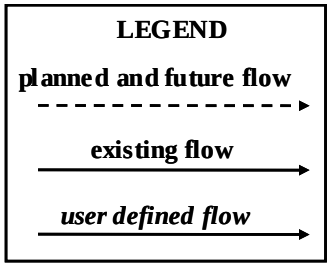


ATIS06 - Transportation Operations Data Sharing
Private Sector ISPs (2 of 2)

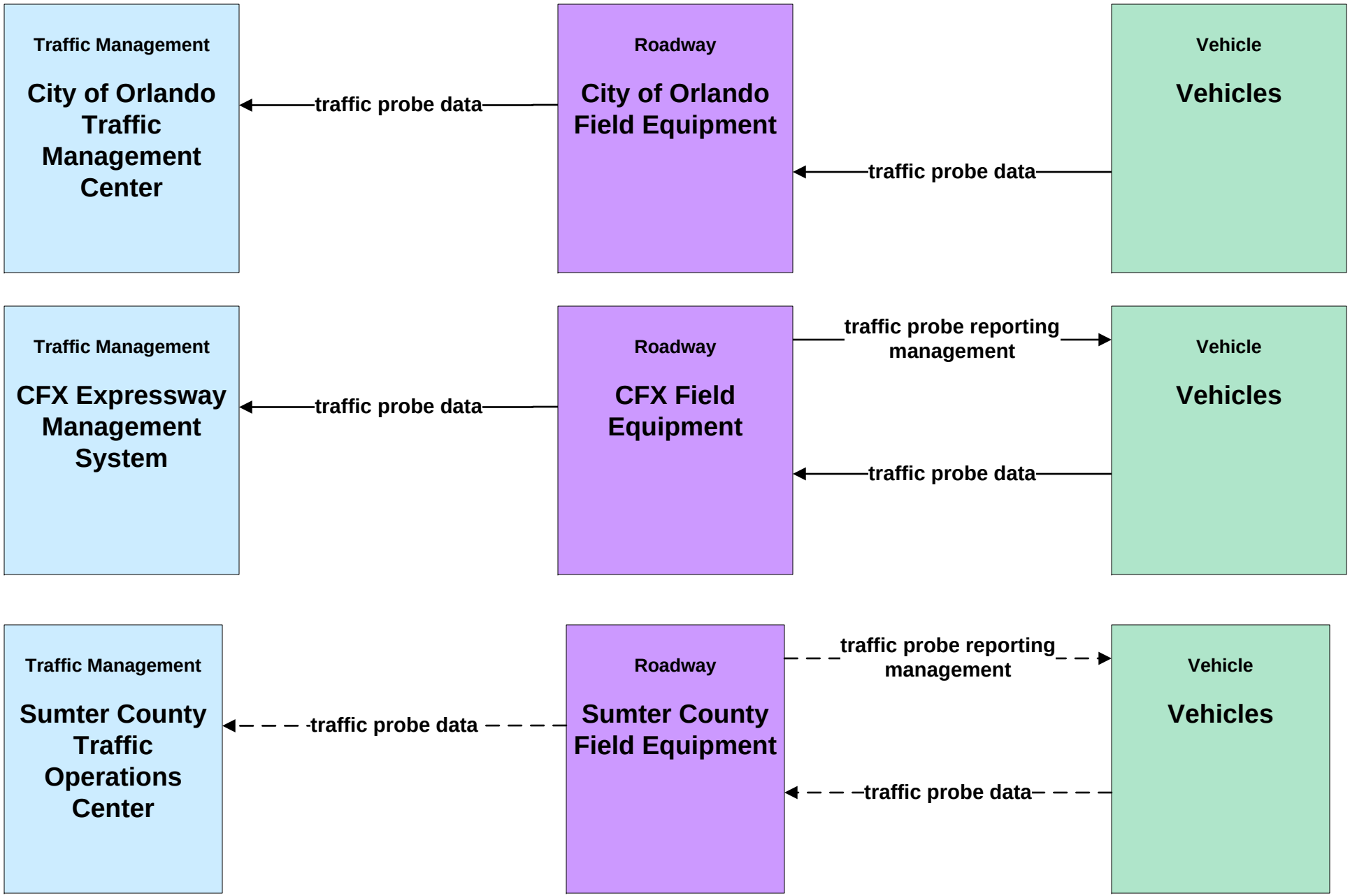


ATMS01 - Network Surveillance
City of Orlando

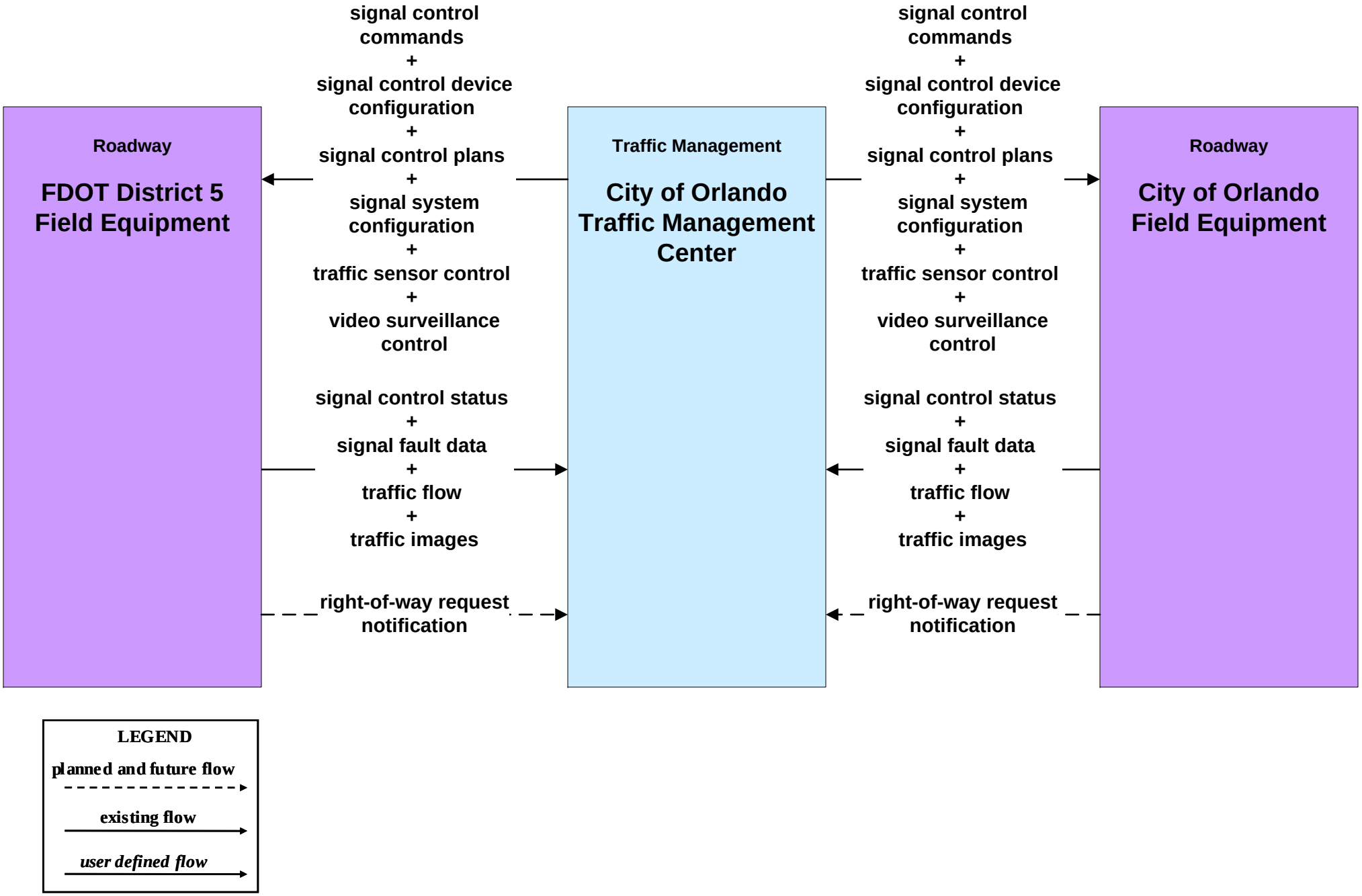




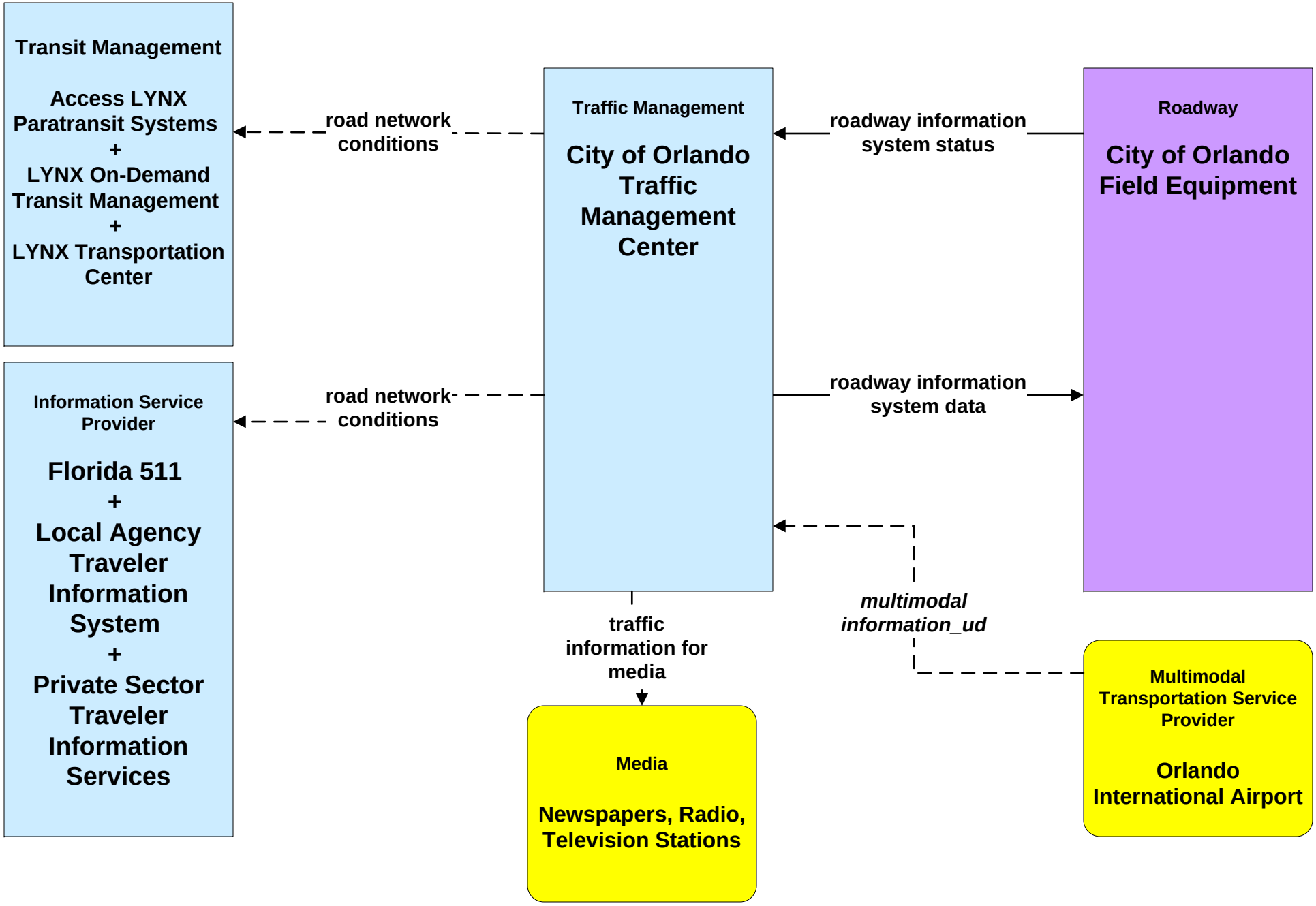
ATMS02 - Traffic Probe Surveillance
City of Orlando / CFX / Sumter County



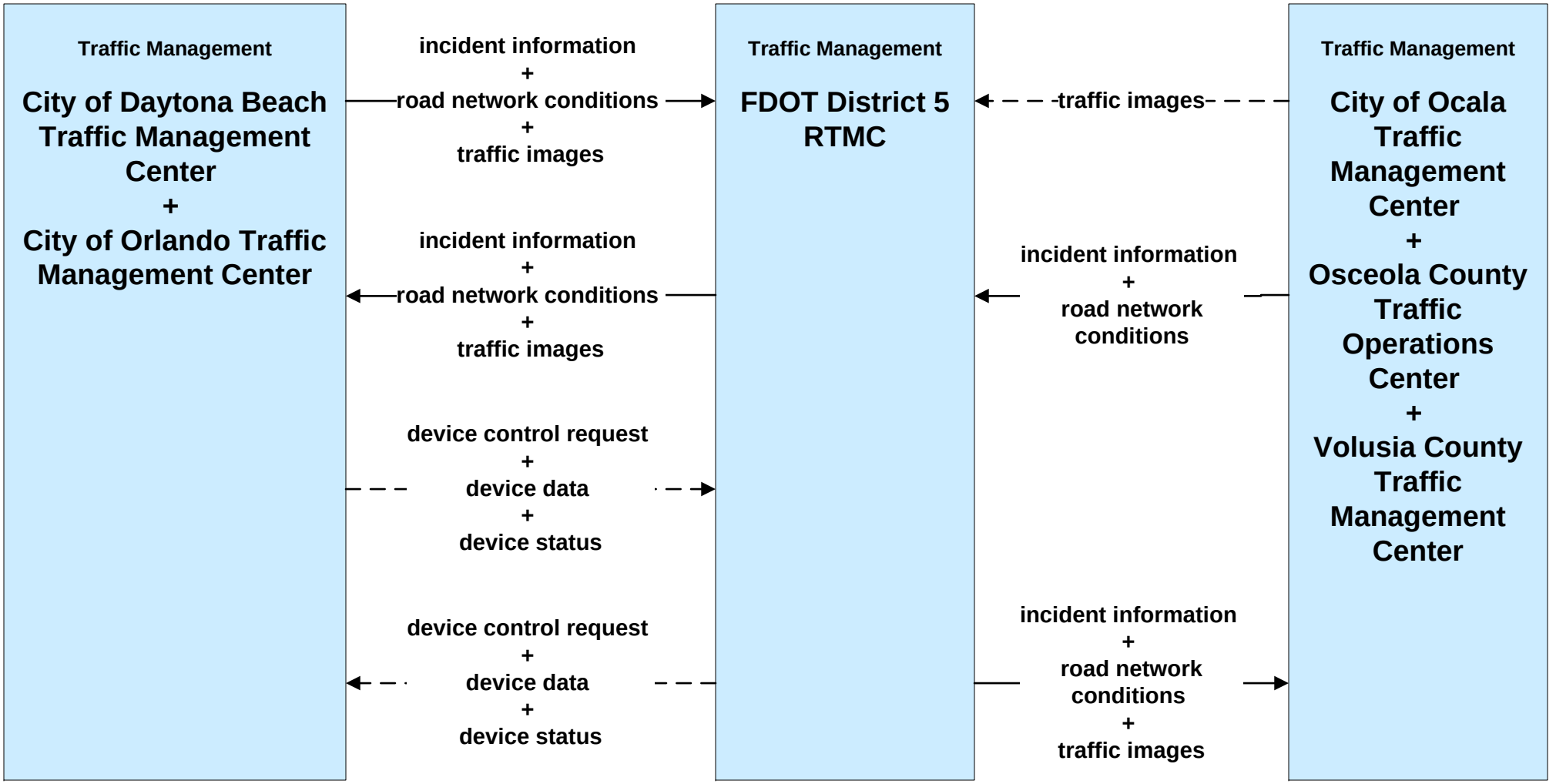
ATMS03 - Traffic Signal Control
City of Orlando



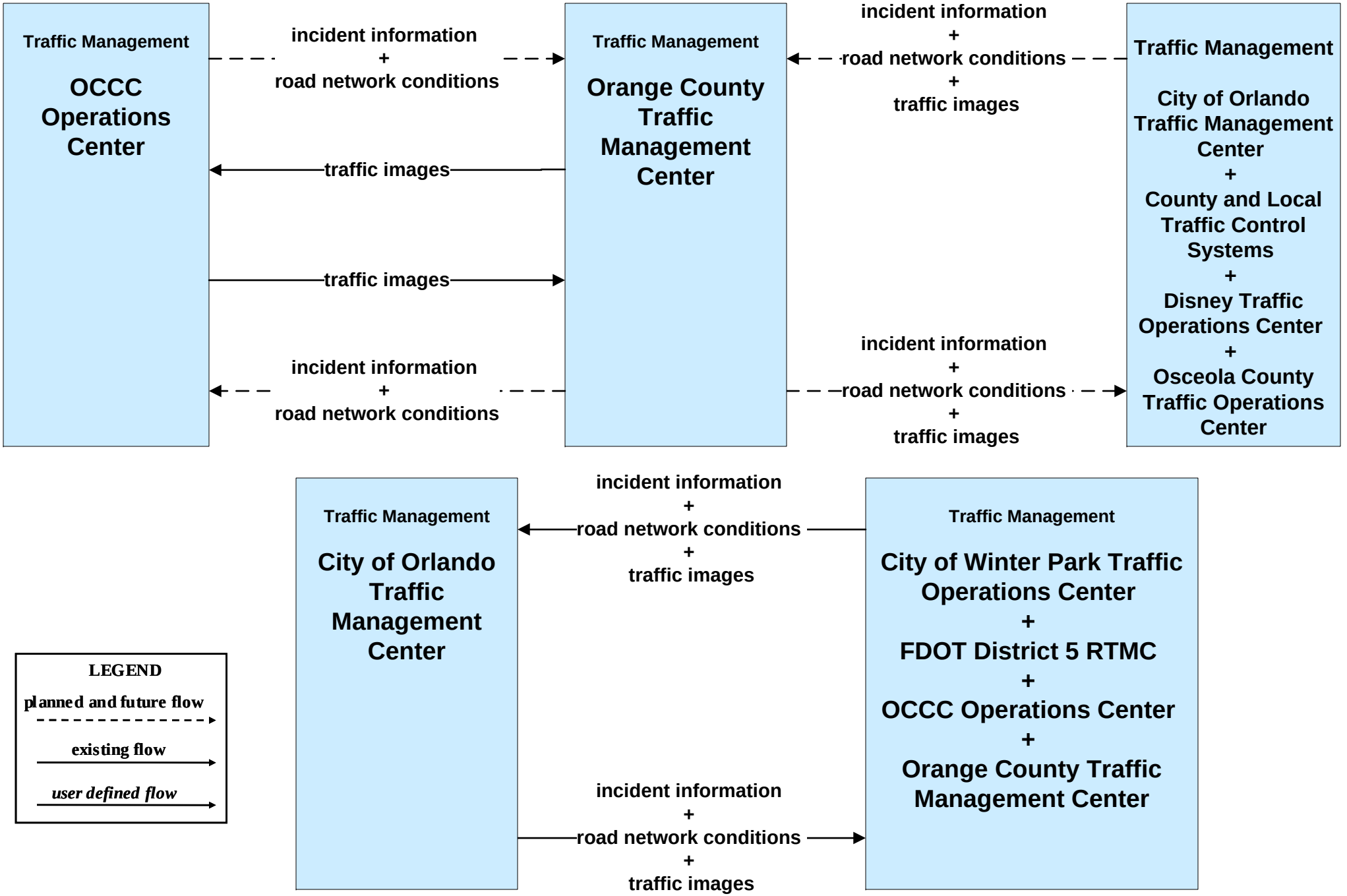
ATMS06 - Traffic Information Dissemination
City of Orlando



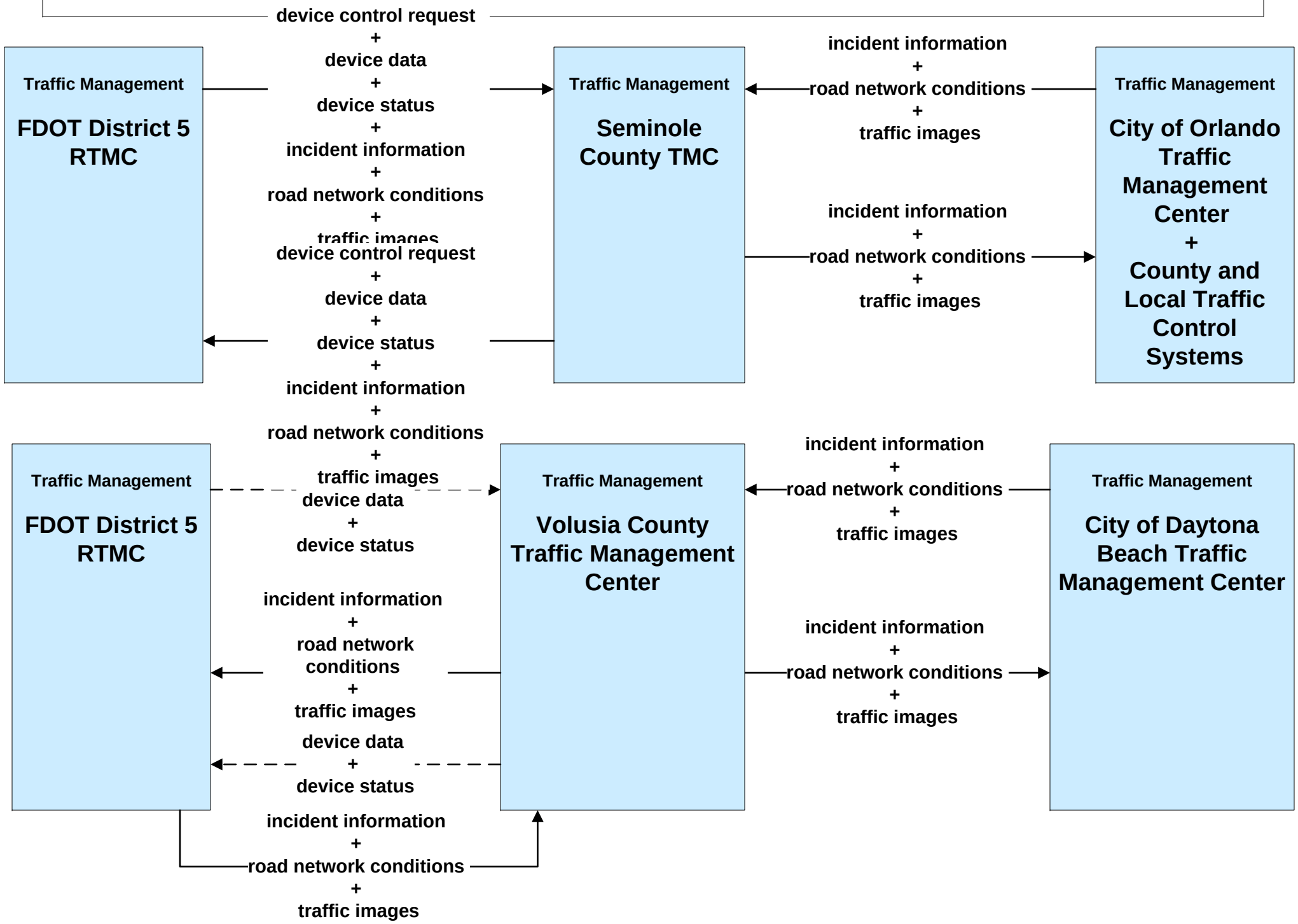
ATMS07 - Regional Traffic Management
FDOT Districts (2 of 3)



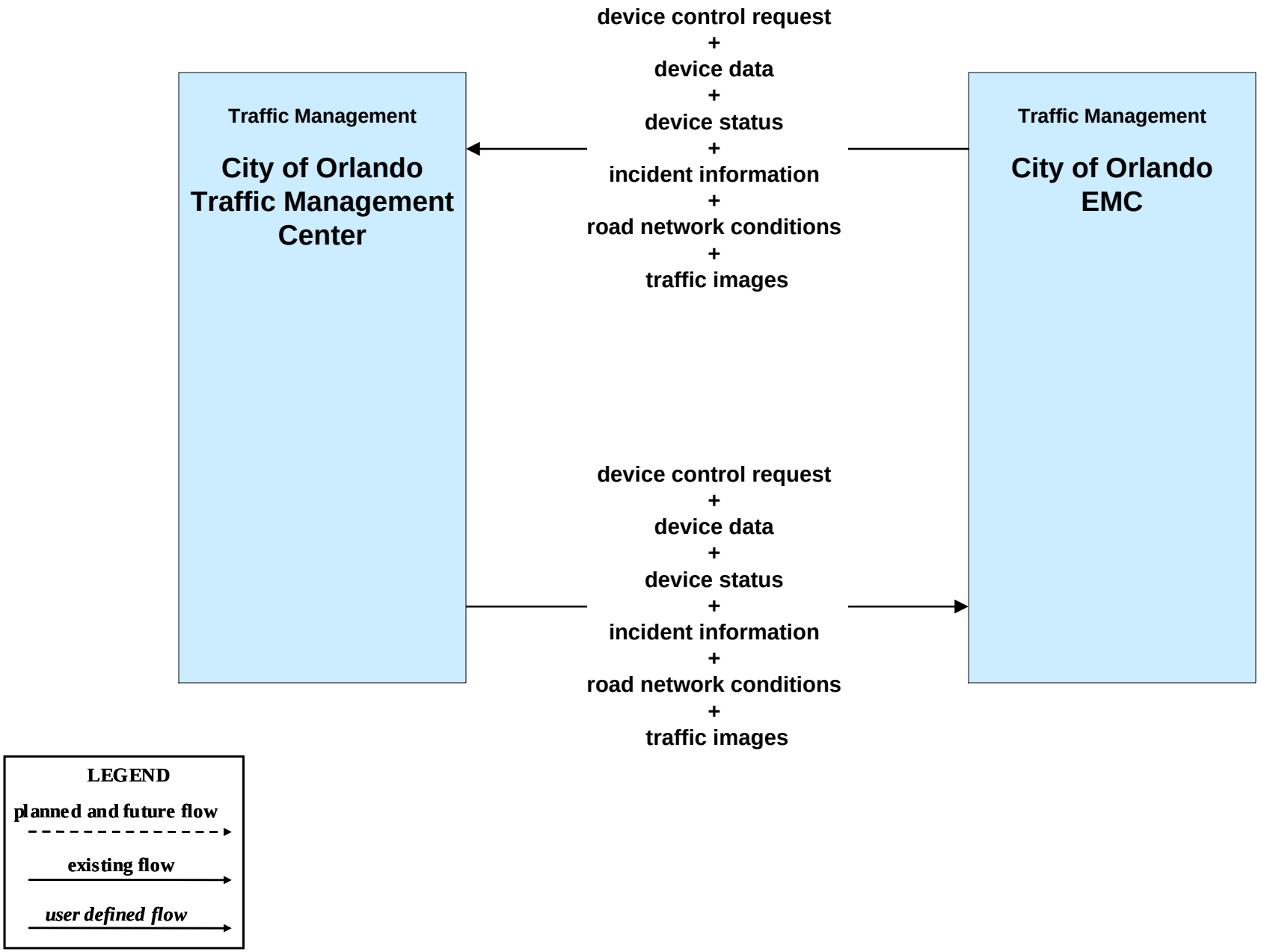
ATMS07 - Regional Traffic Management
Orange County / City of Orlando



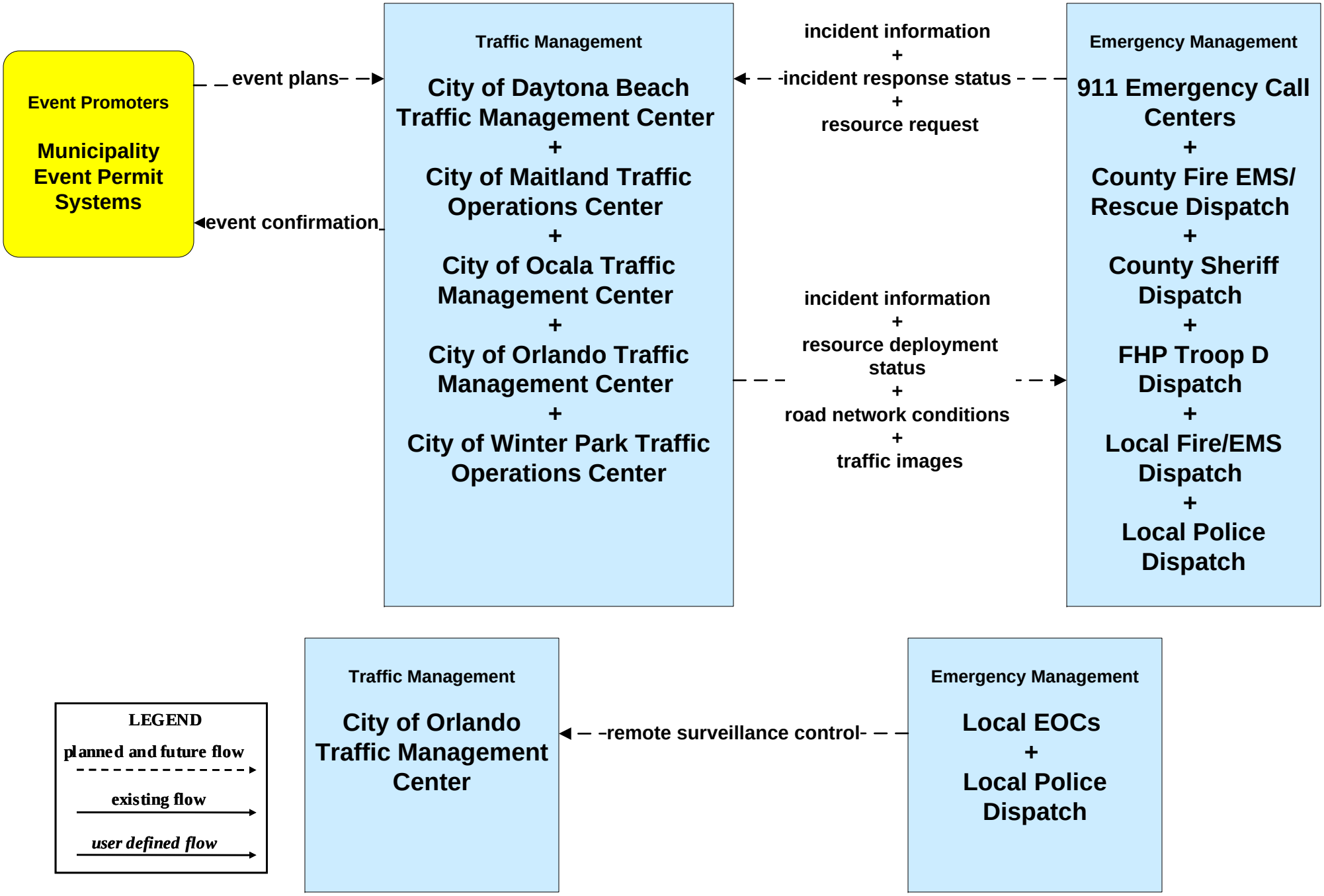
ATMS07 - Regional Traffic Management
Seminole County / Volusia County



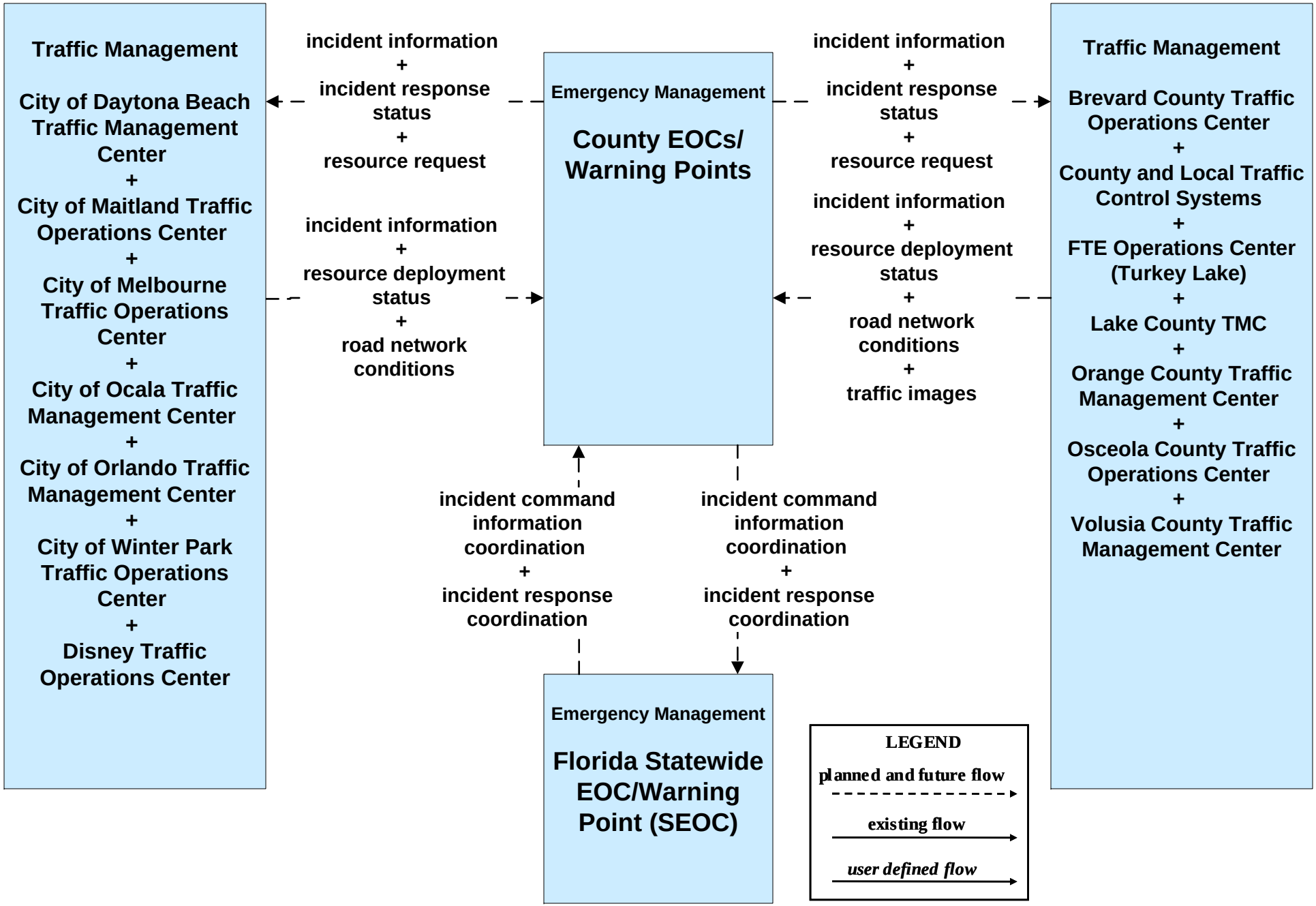
ATMS07 - Regional Traffic Management
City of Orlando



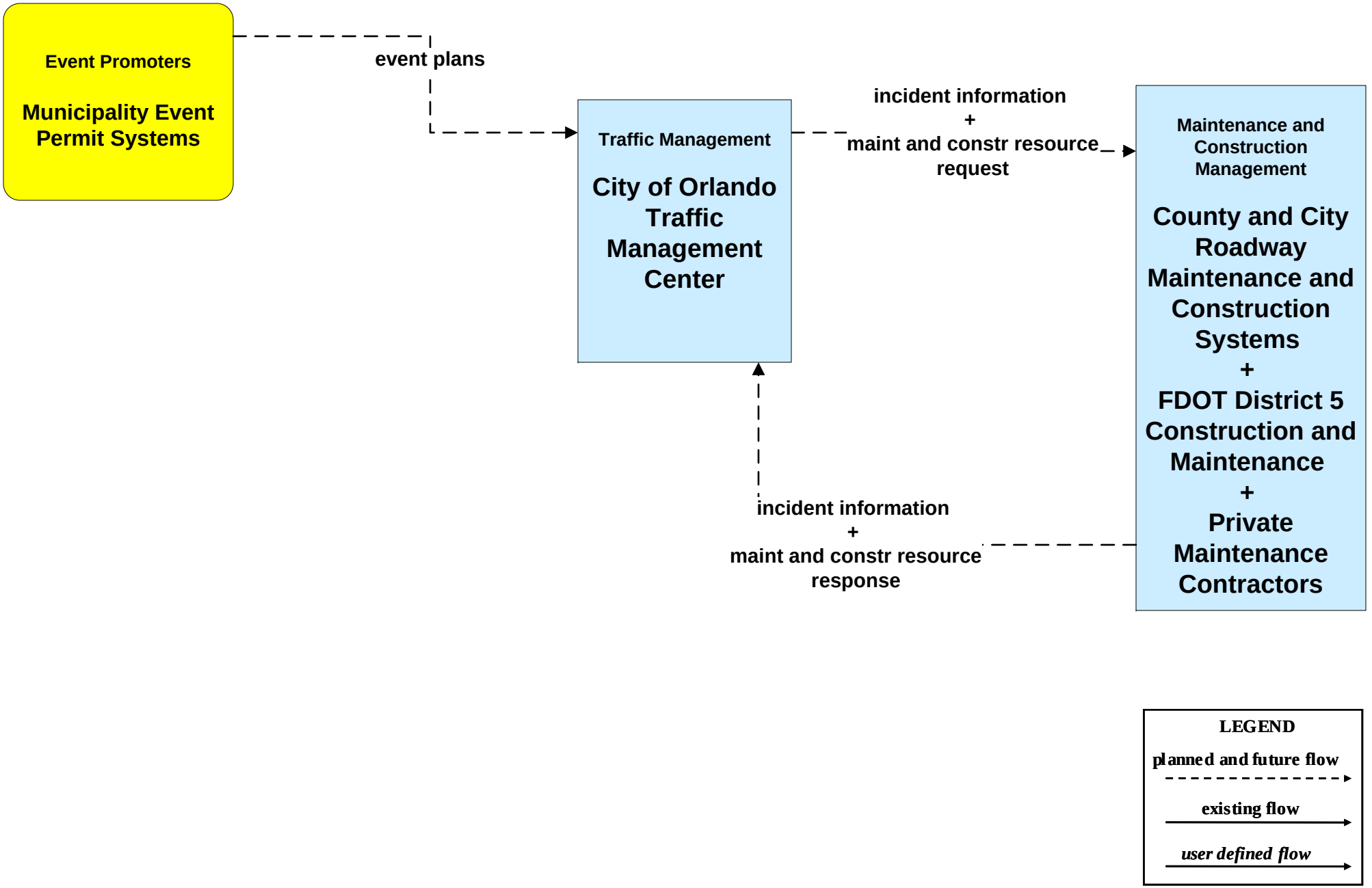
ATMS08 - Traffic Incident Management System
Municipal Traffic Operation Centers (TM to EM)



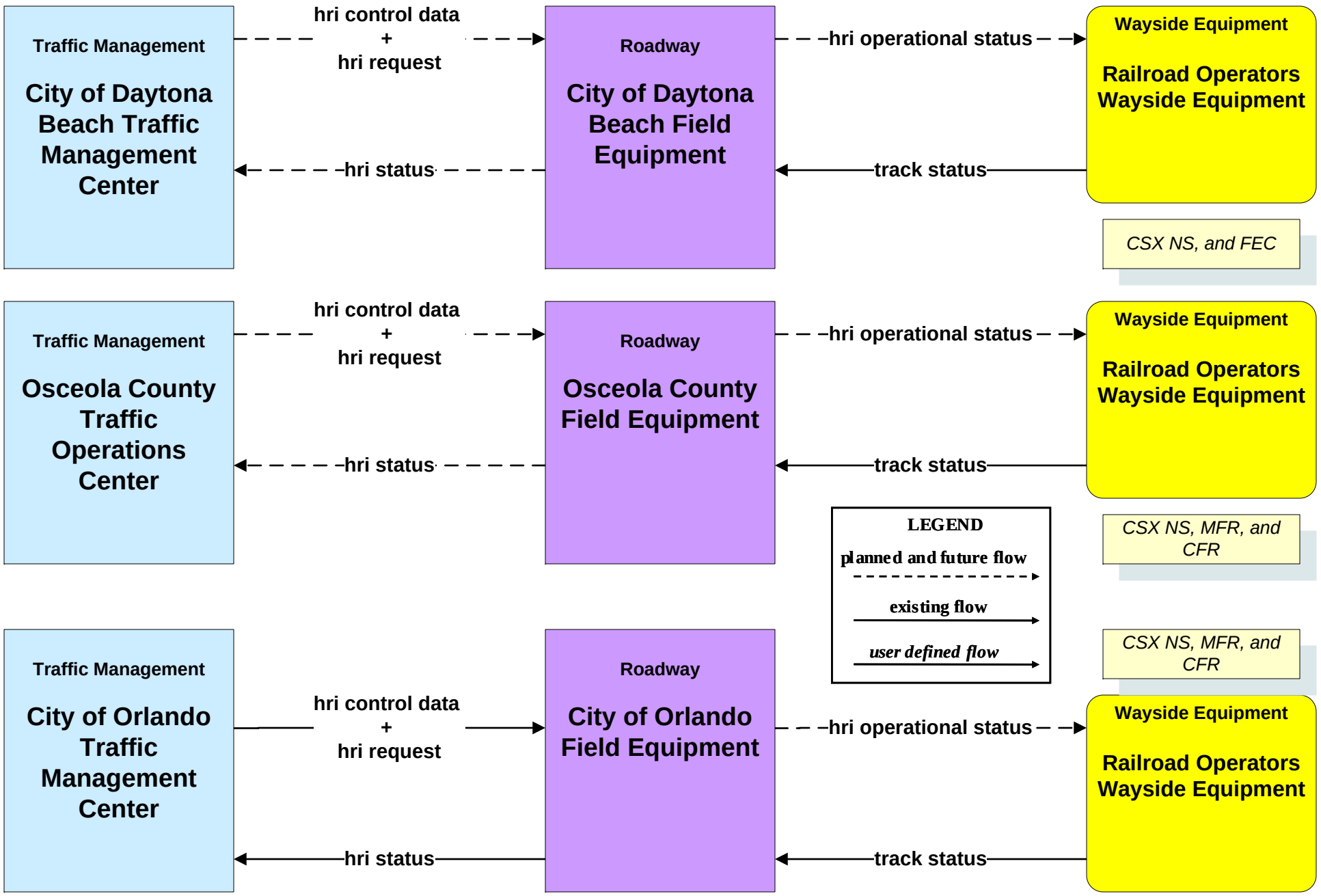
ATMS08 - Traffic Incident Management System
County Emergency Operations Center (TM to EM)



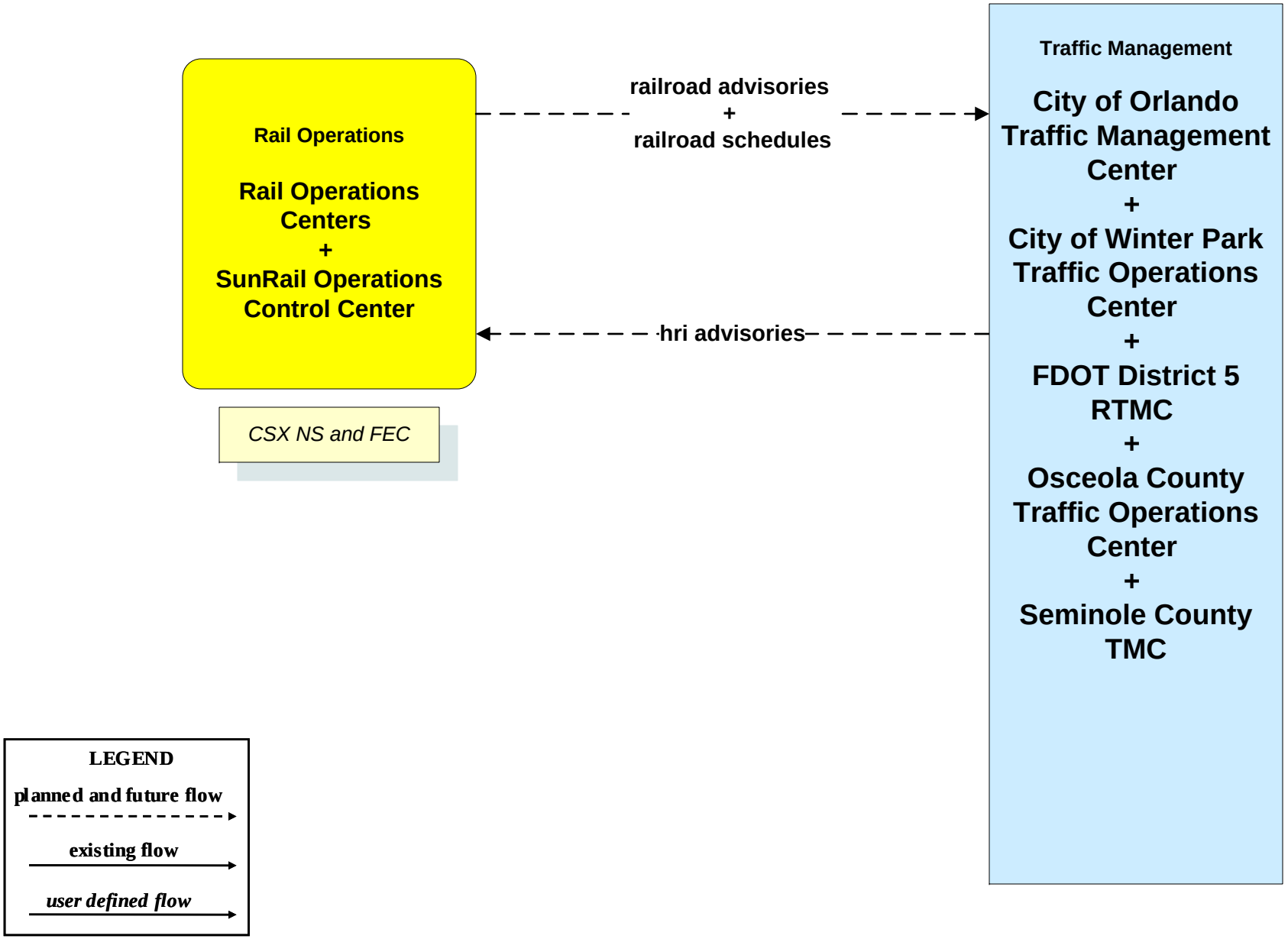
ATMS08 - Traffic Incident Management System
City of Orlando (TM to MCM)



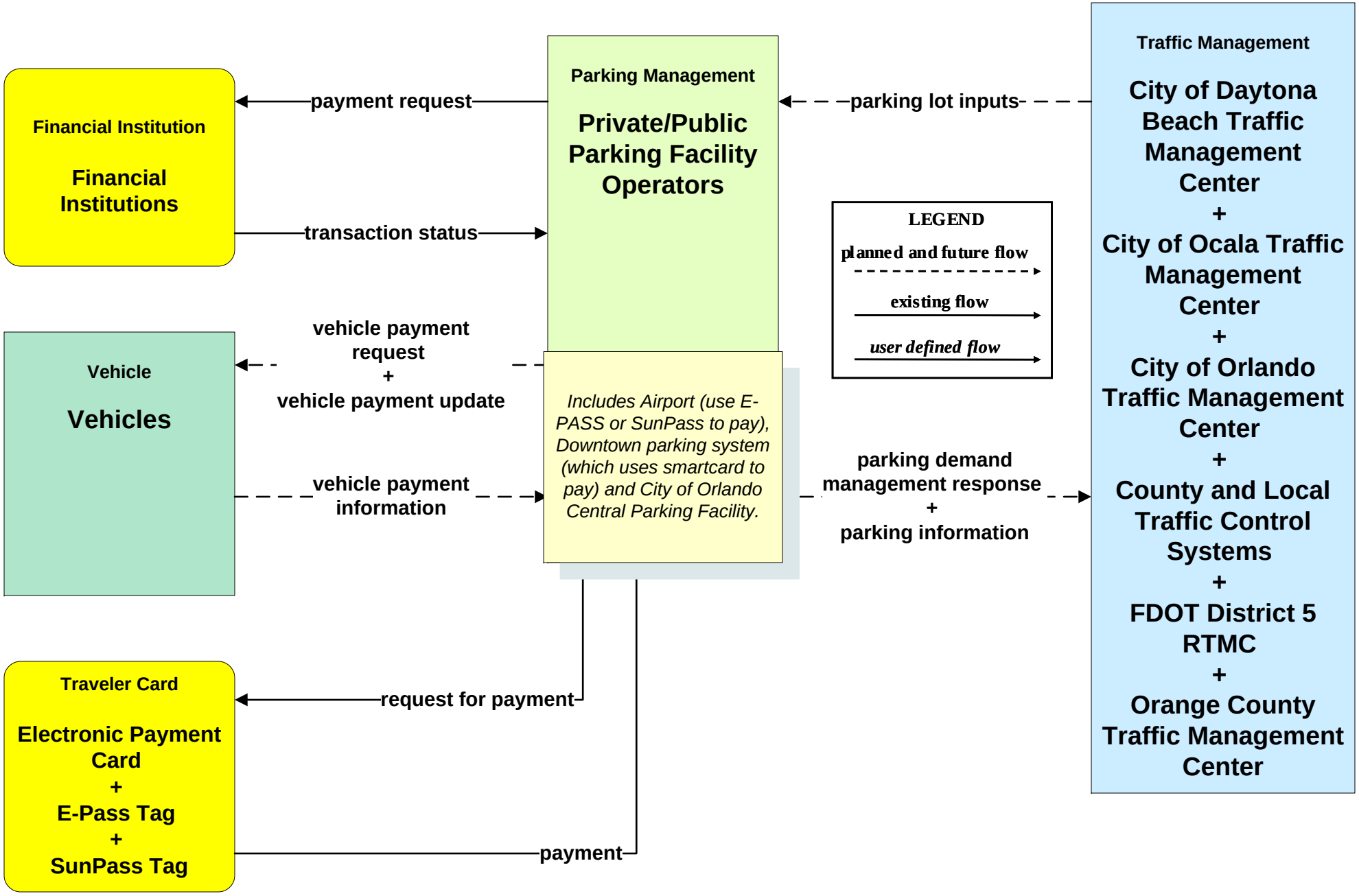
ATMS13 - Standard Railroad Crossing
City of Daytona Beach / City of Orlando / Osceola County



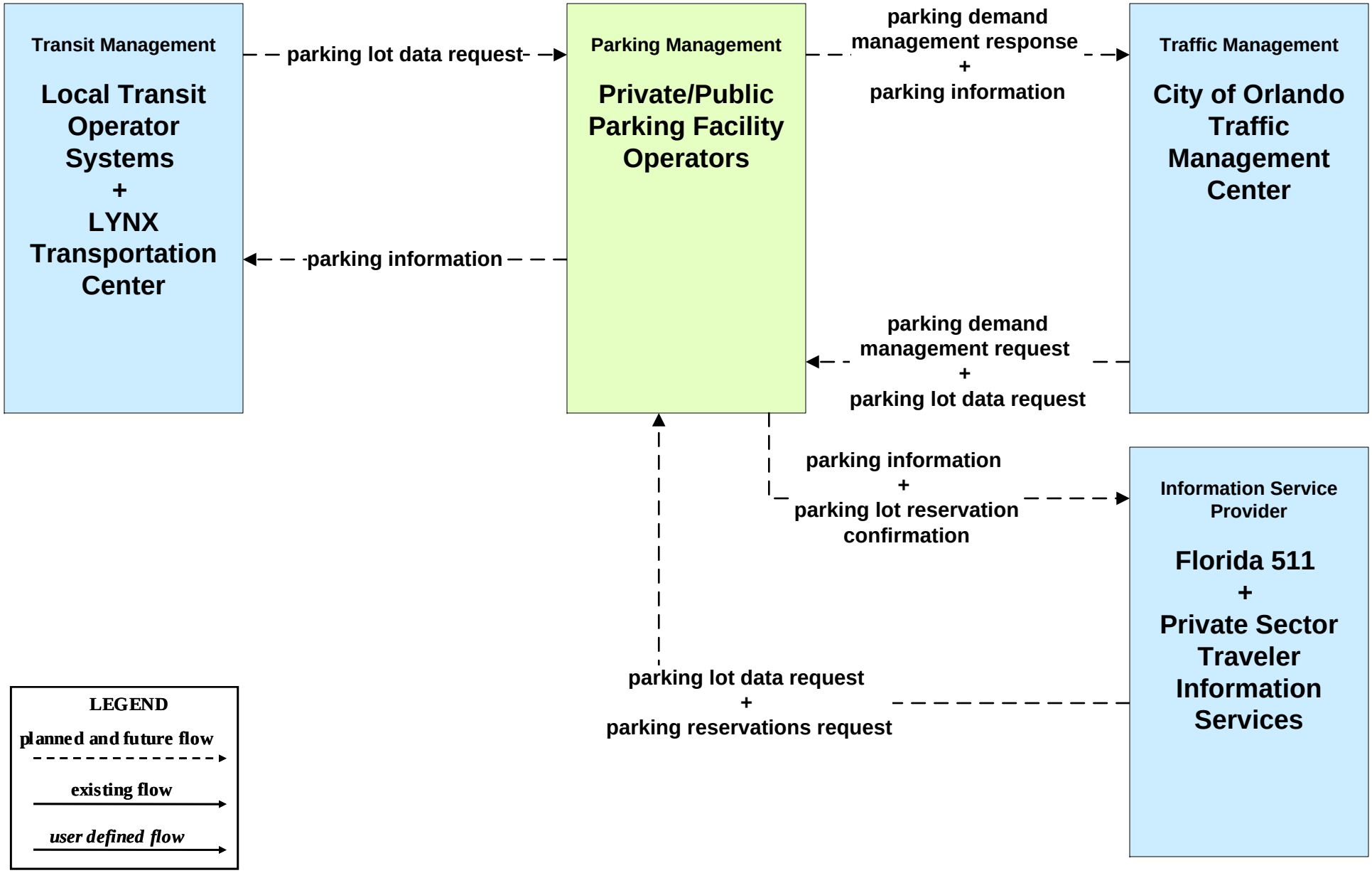
ATMS15 - Railroad Operations Coordination
Rail Operations Centers



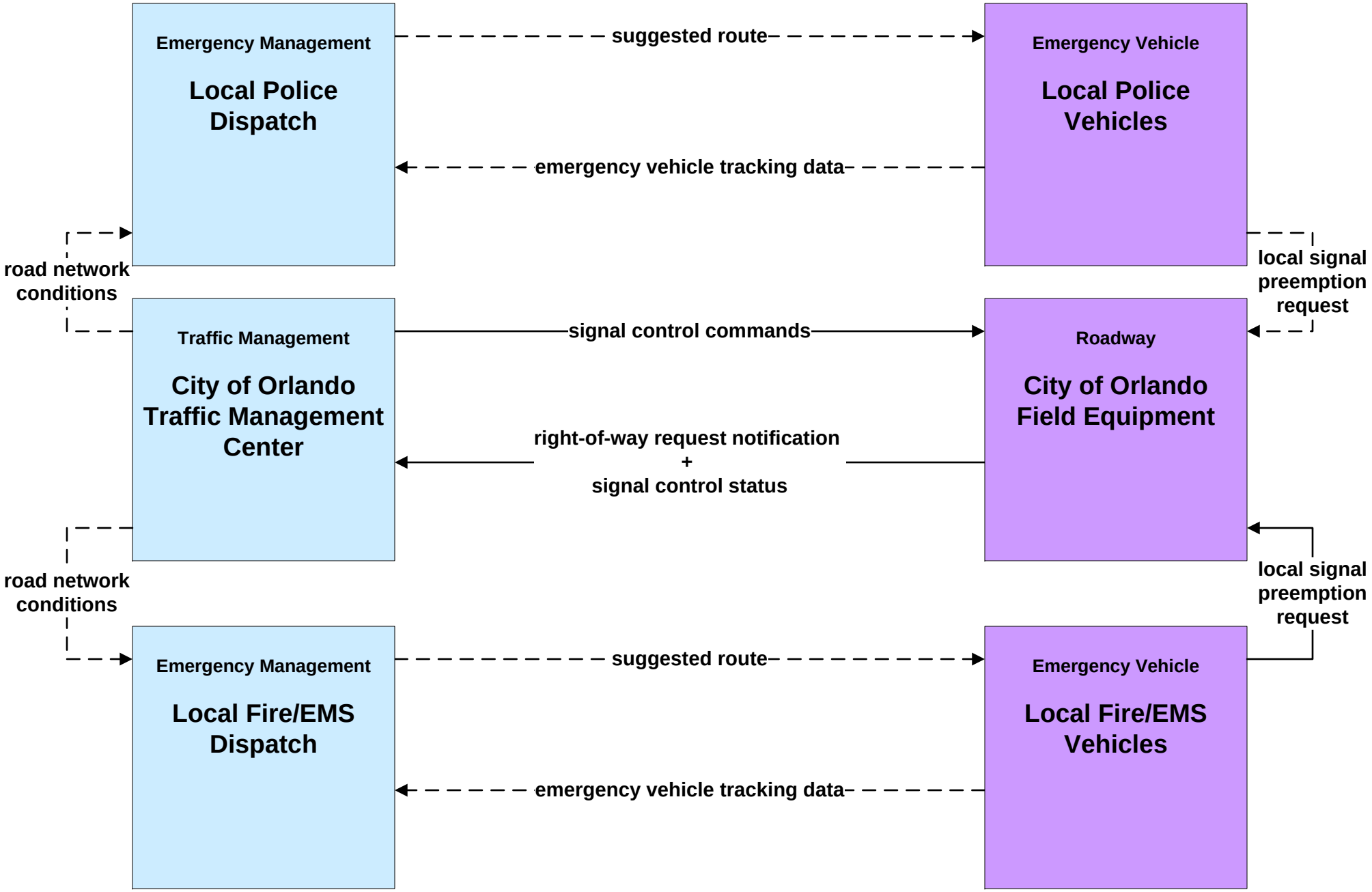
ATMS16 - Parking Facility Management
Parking Facility Operators



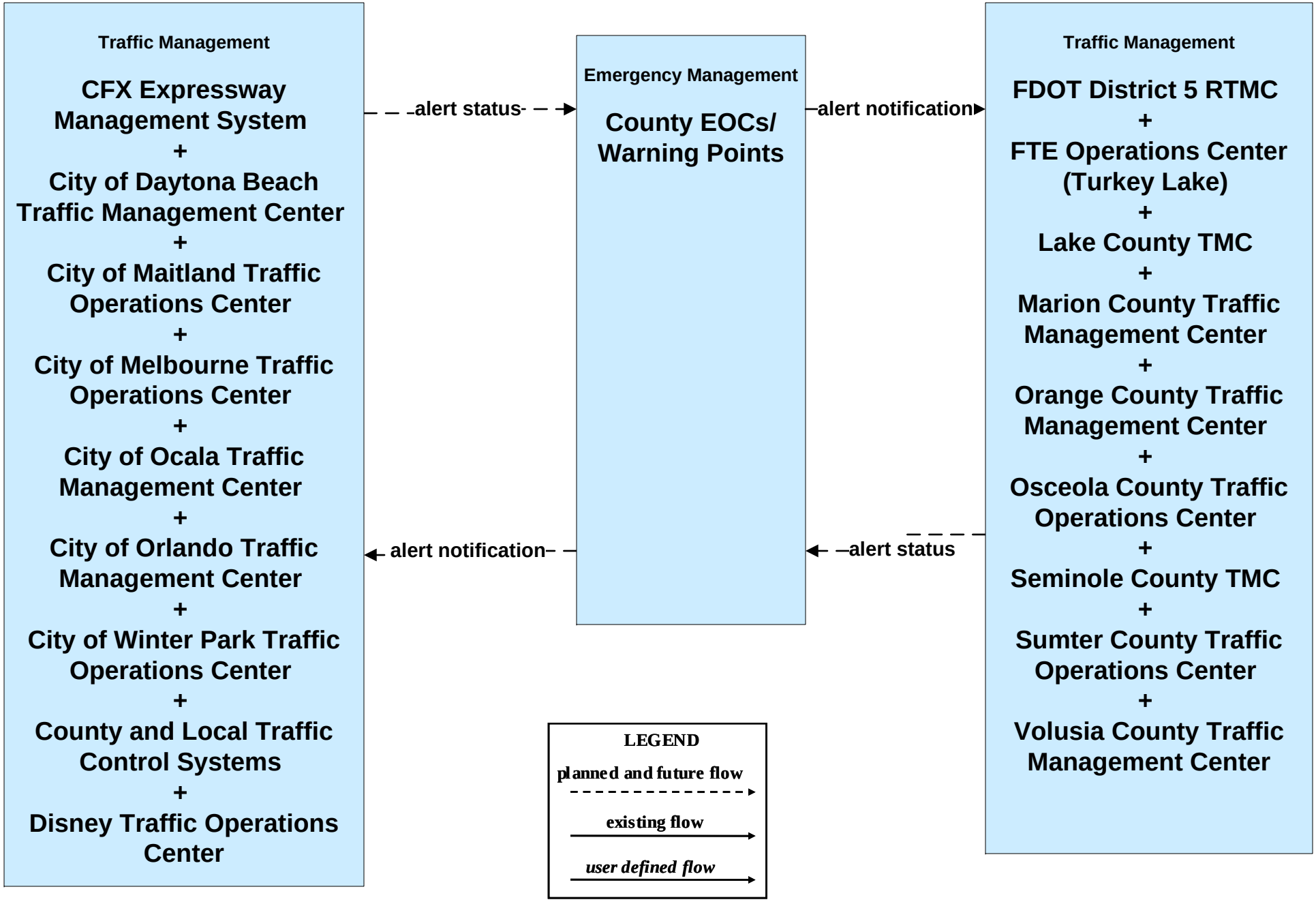
ATMS17 - Regional Parking Management
Parking Facility Operators



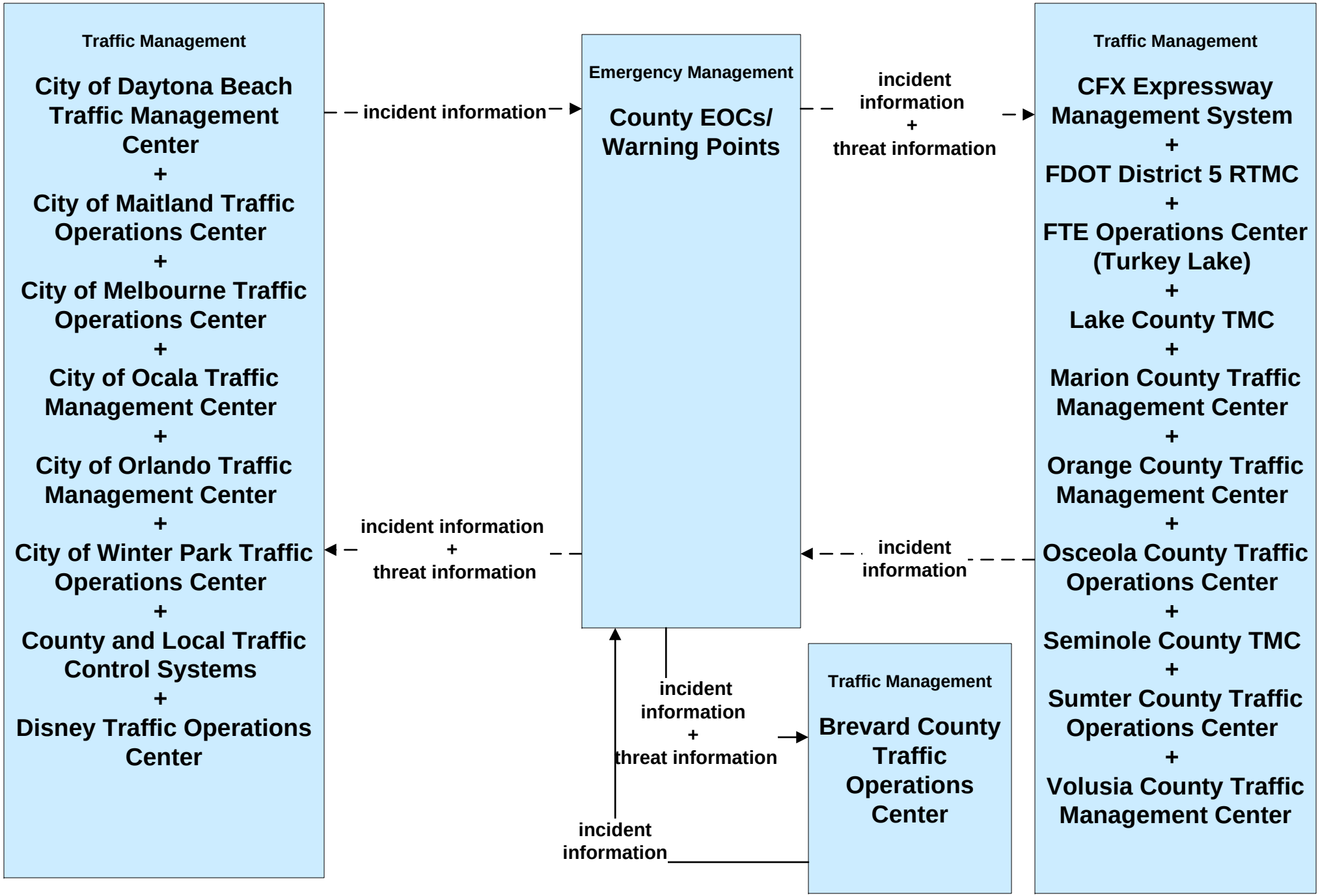
EM02 - Emergency Routing
City of Orlando



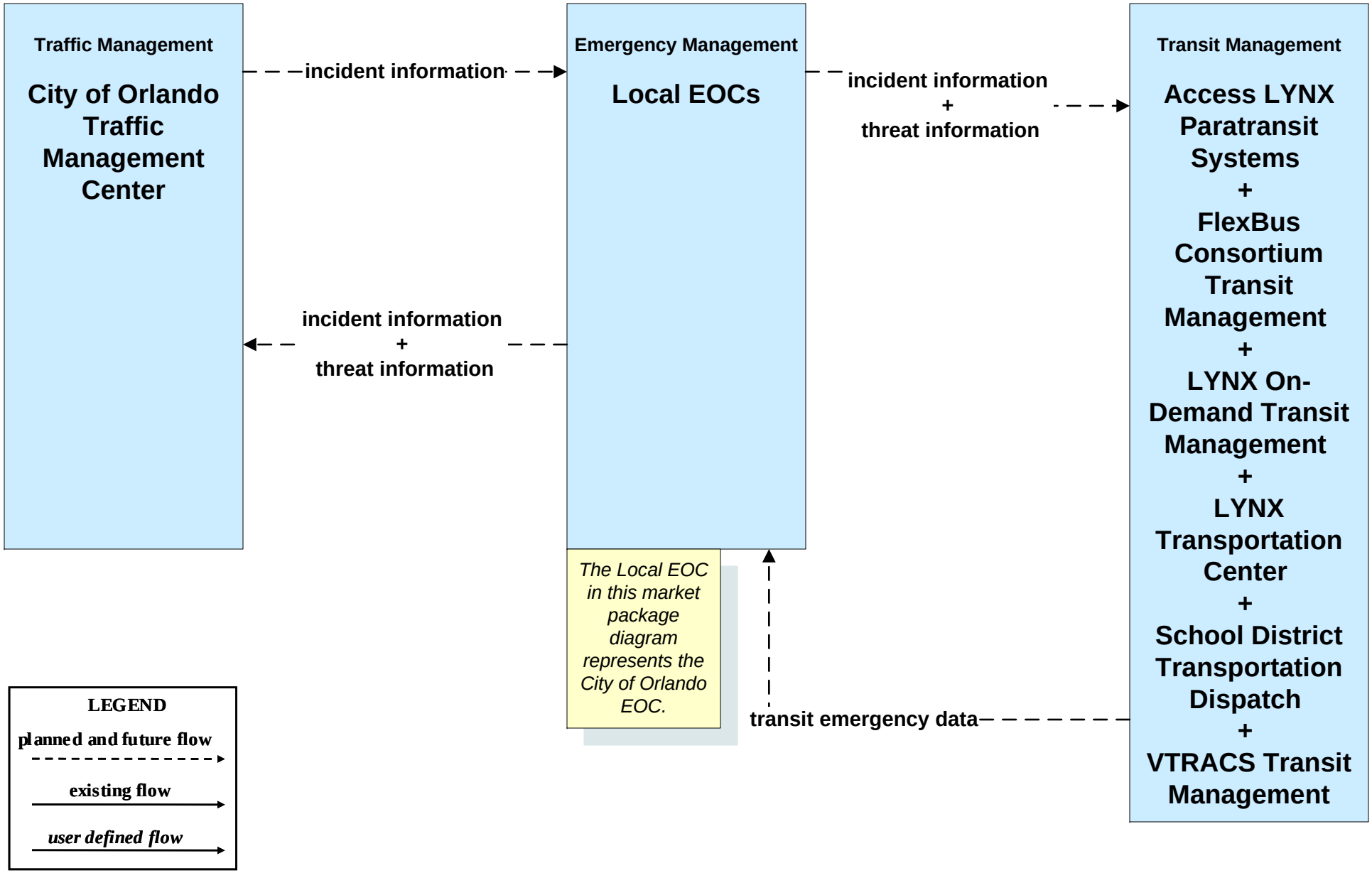
EM06 - Wide Area Alert
County EOCs (1 of 3)



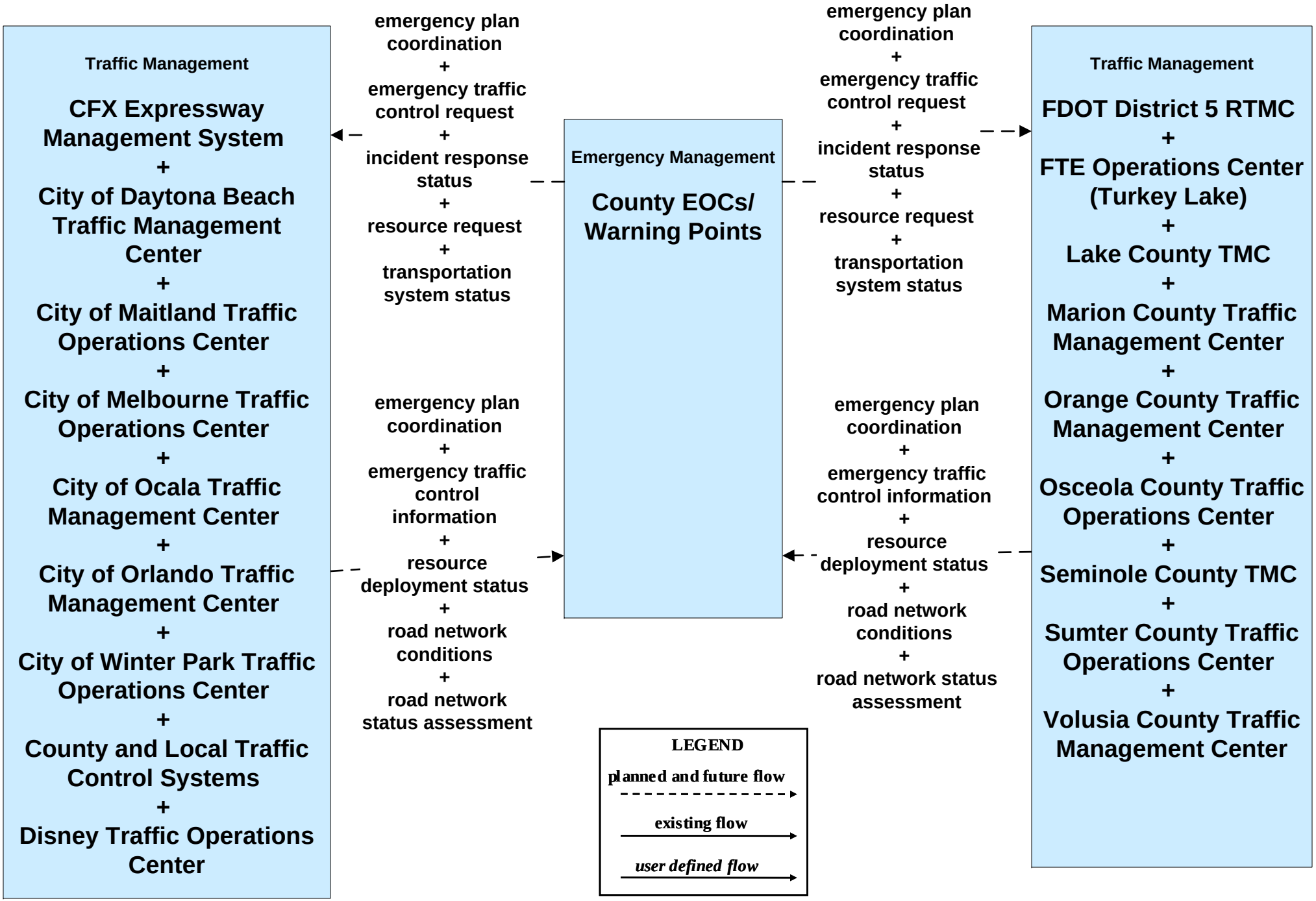
EM07 - Early Warning System
County EOCs (2 of 3)



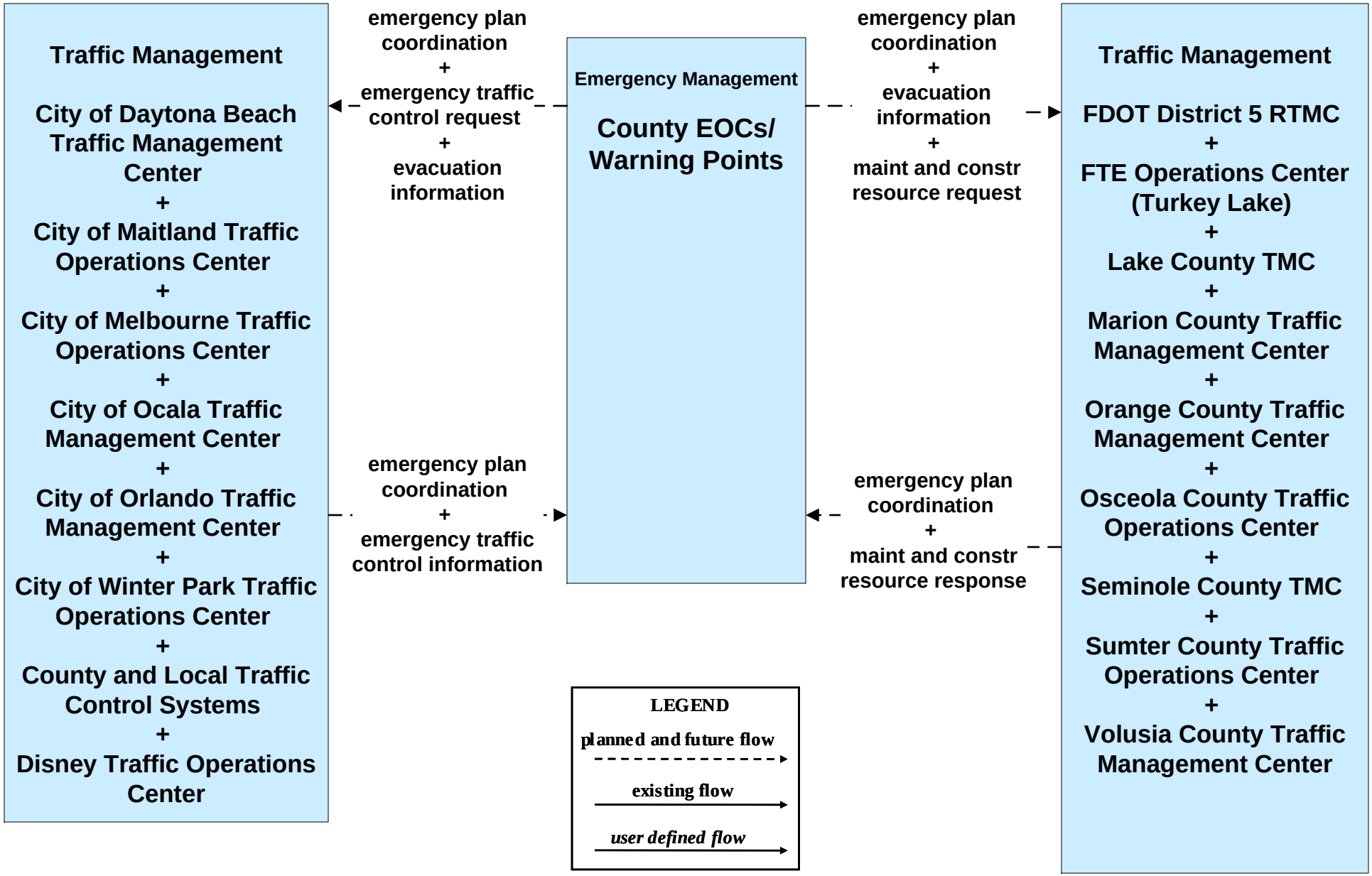
EM07 - Early Warning System
Local EOCs (2 of 2)



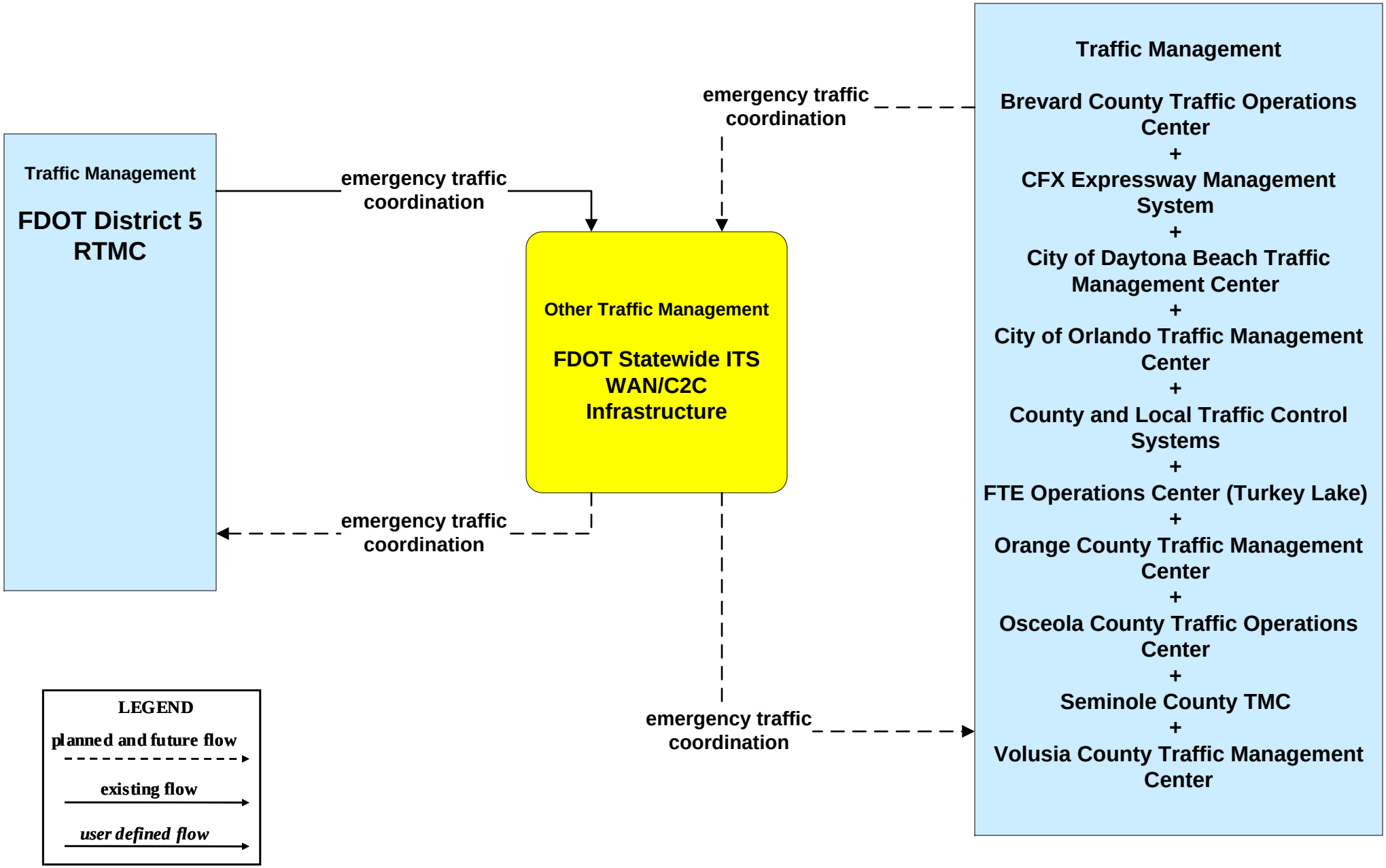
EM08 - Disaster Response and Recovery
County EOCs (2 of 4)



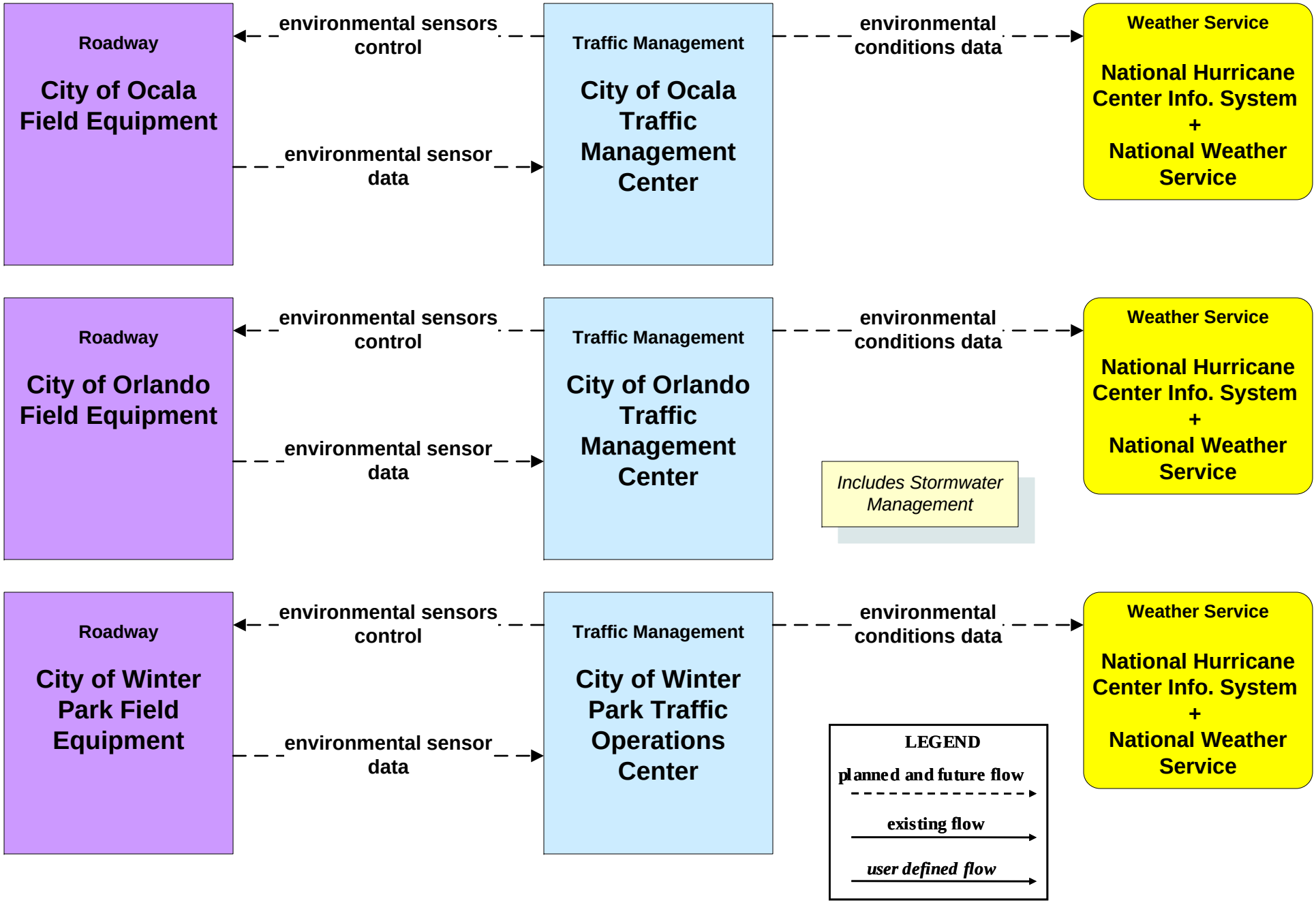
EM09 - Evacuation and Reentry Management
County EOCs (2 of 3)



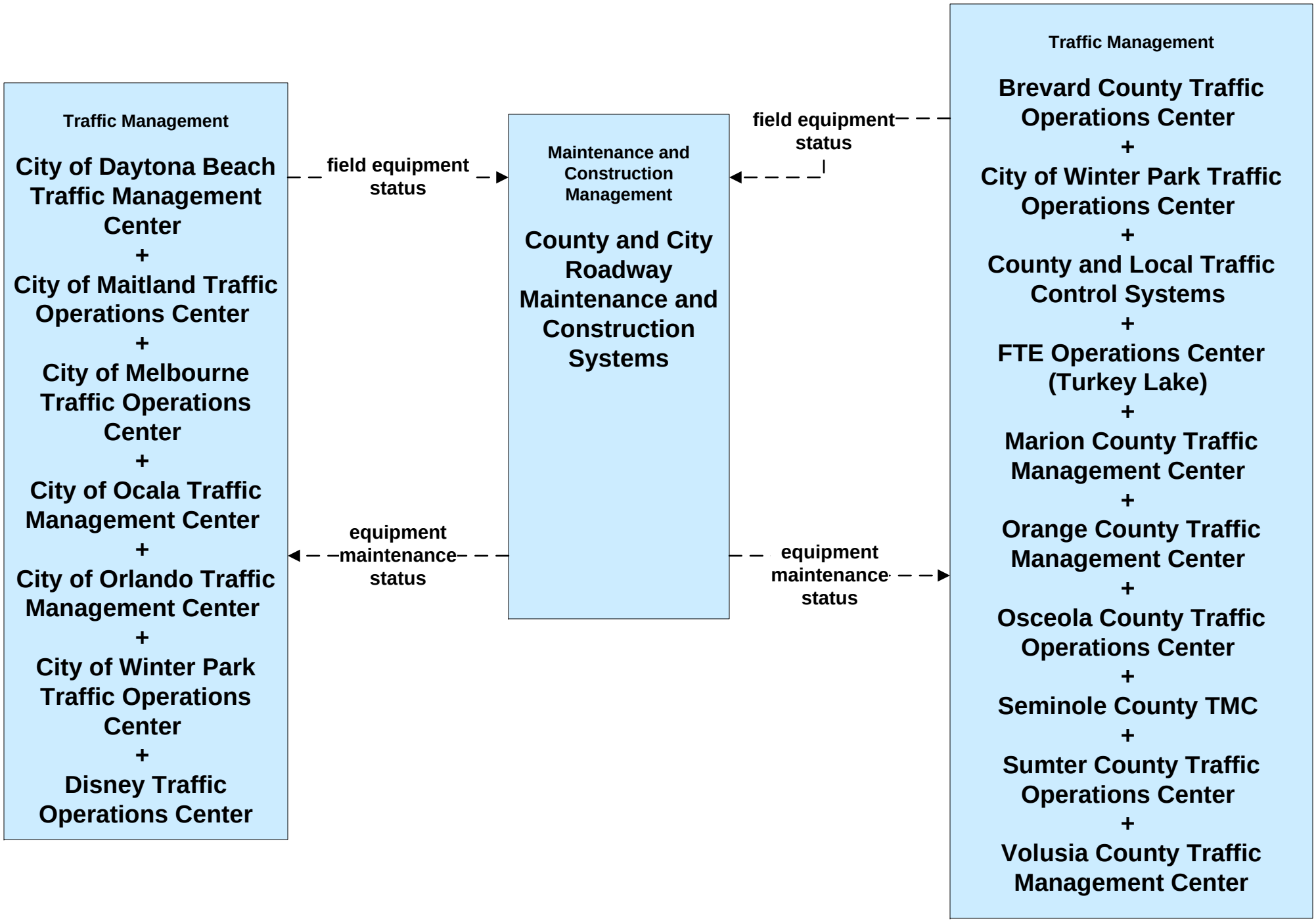
EM09 - Evacuation and Reentry Management
Central Florida Traffic Management Agencies



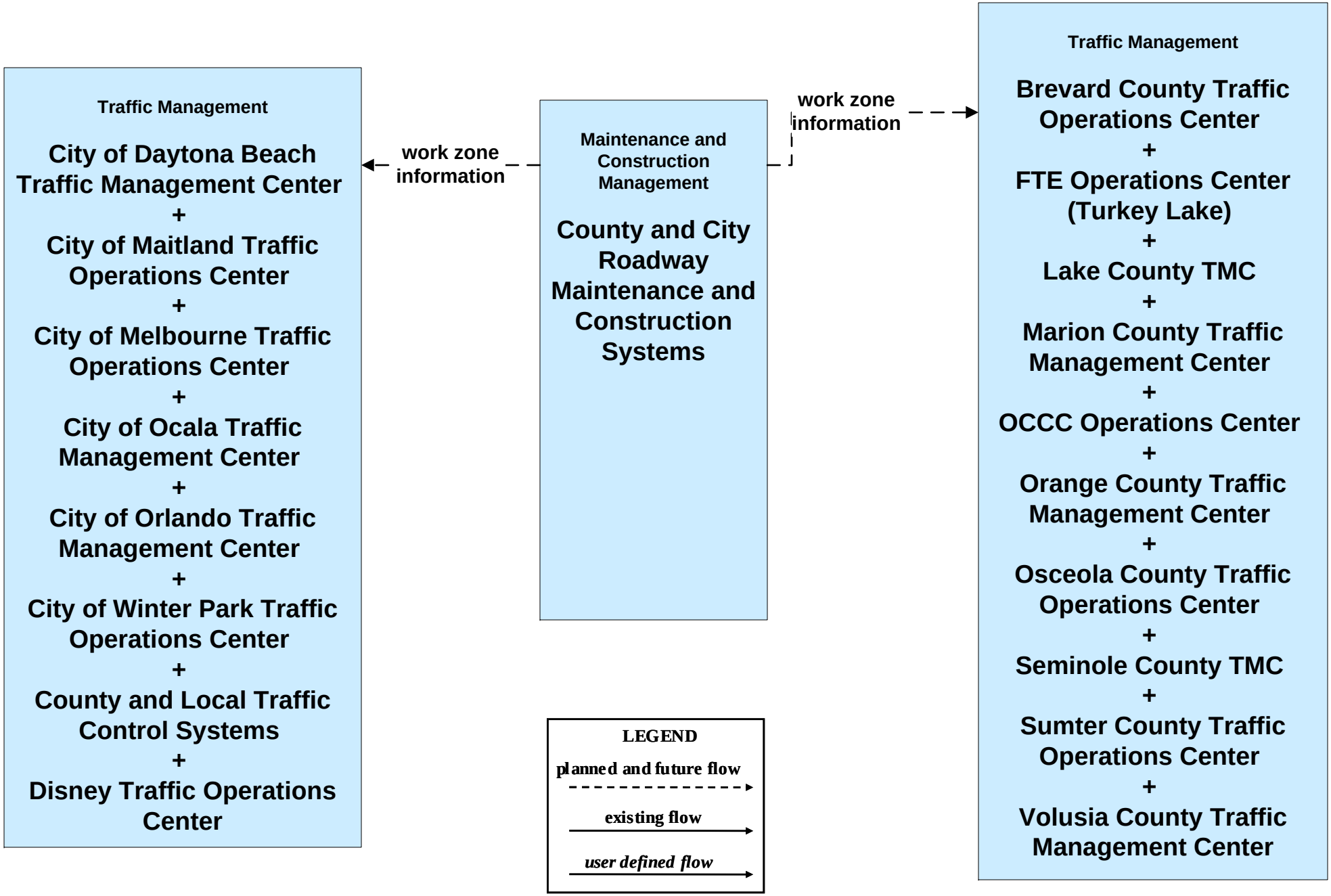
MC03 - Road Weather Data Collection
City of Ocala / City of Winter Park



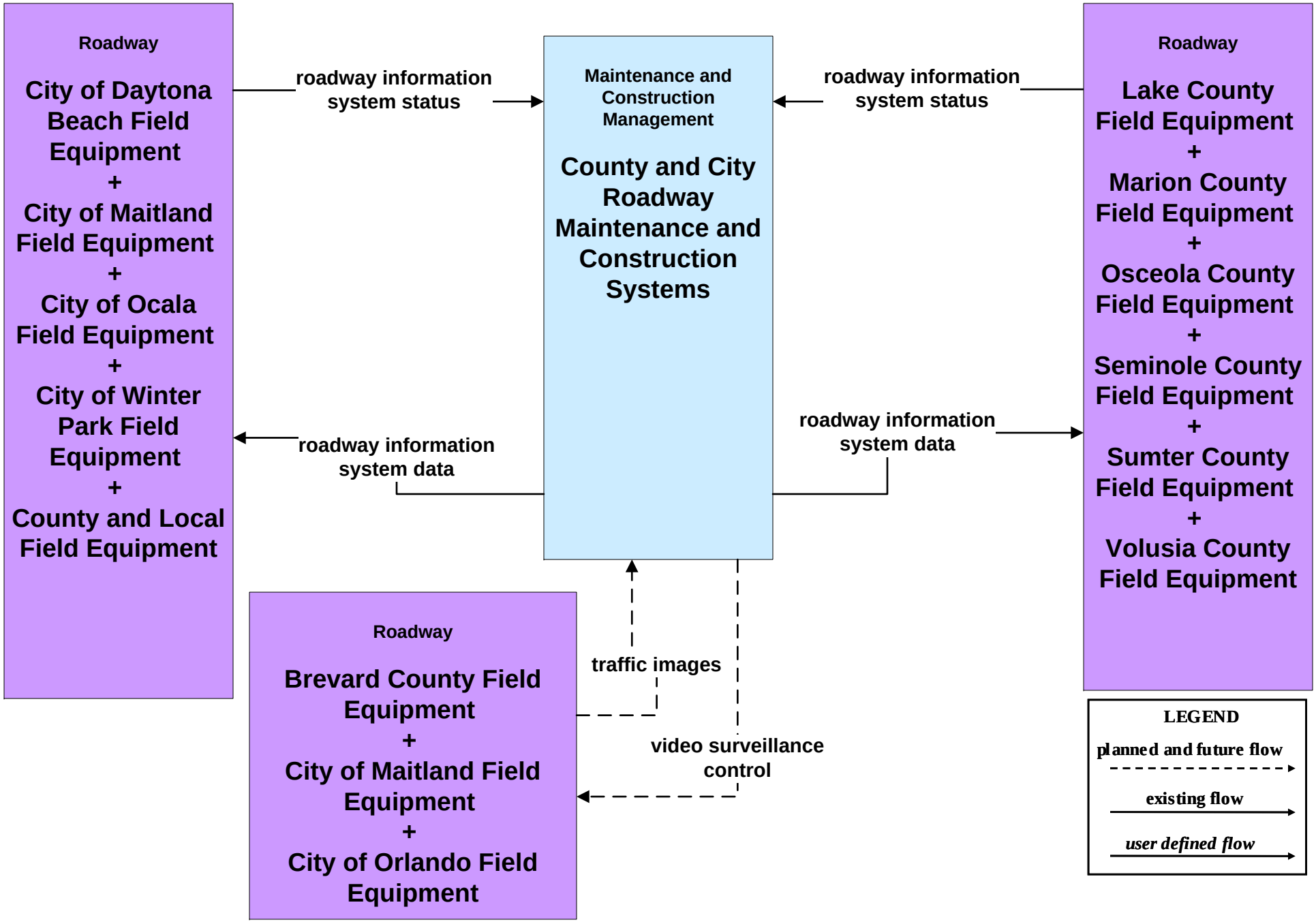
MC07 - Roadway Maintenance and Construction
Counties and Cities (2 of 2)



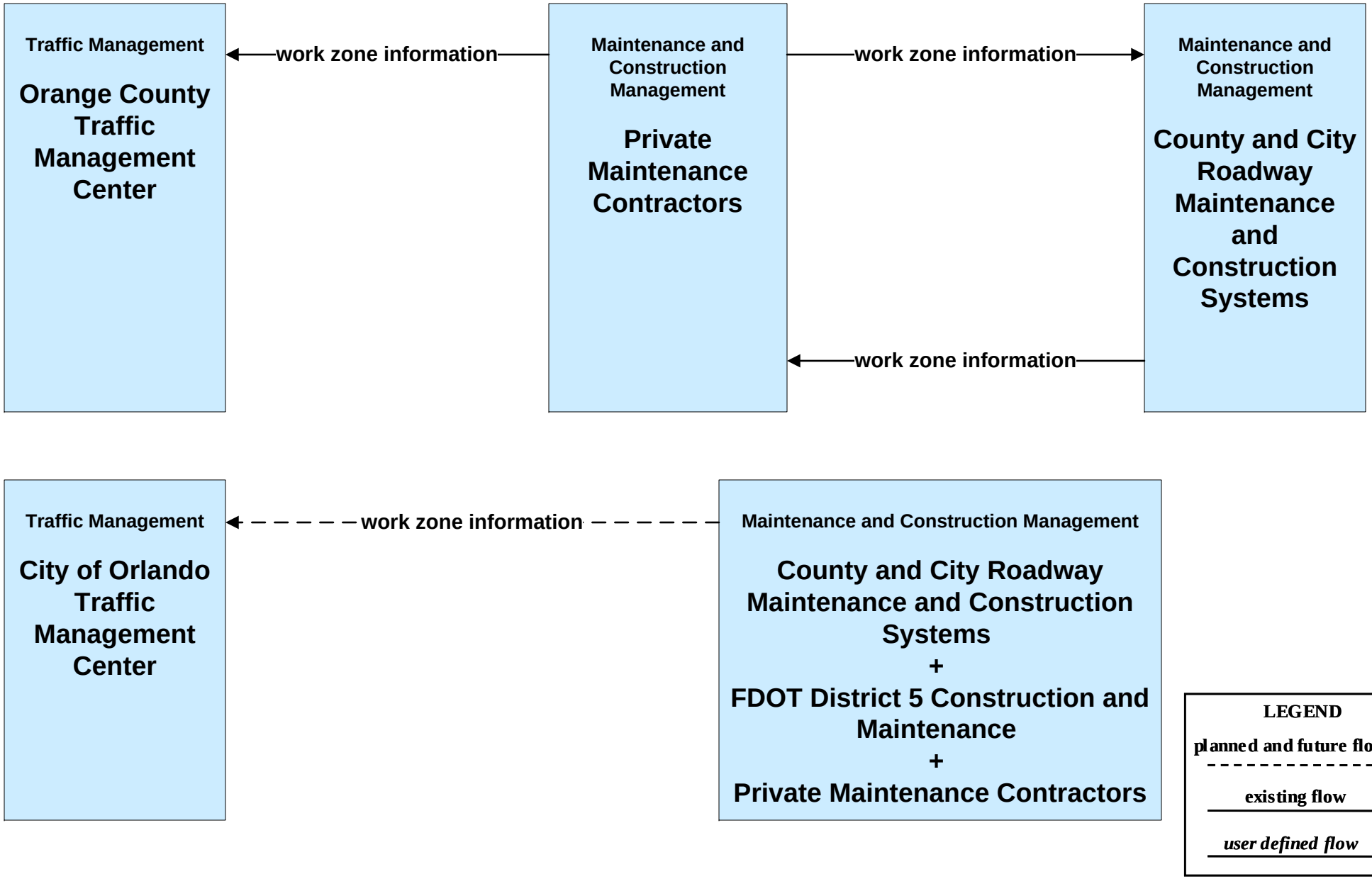
MC08 - Work Zone Management
Counties and Cities (2 of 3)



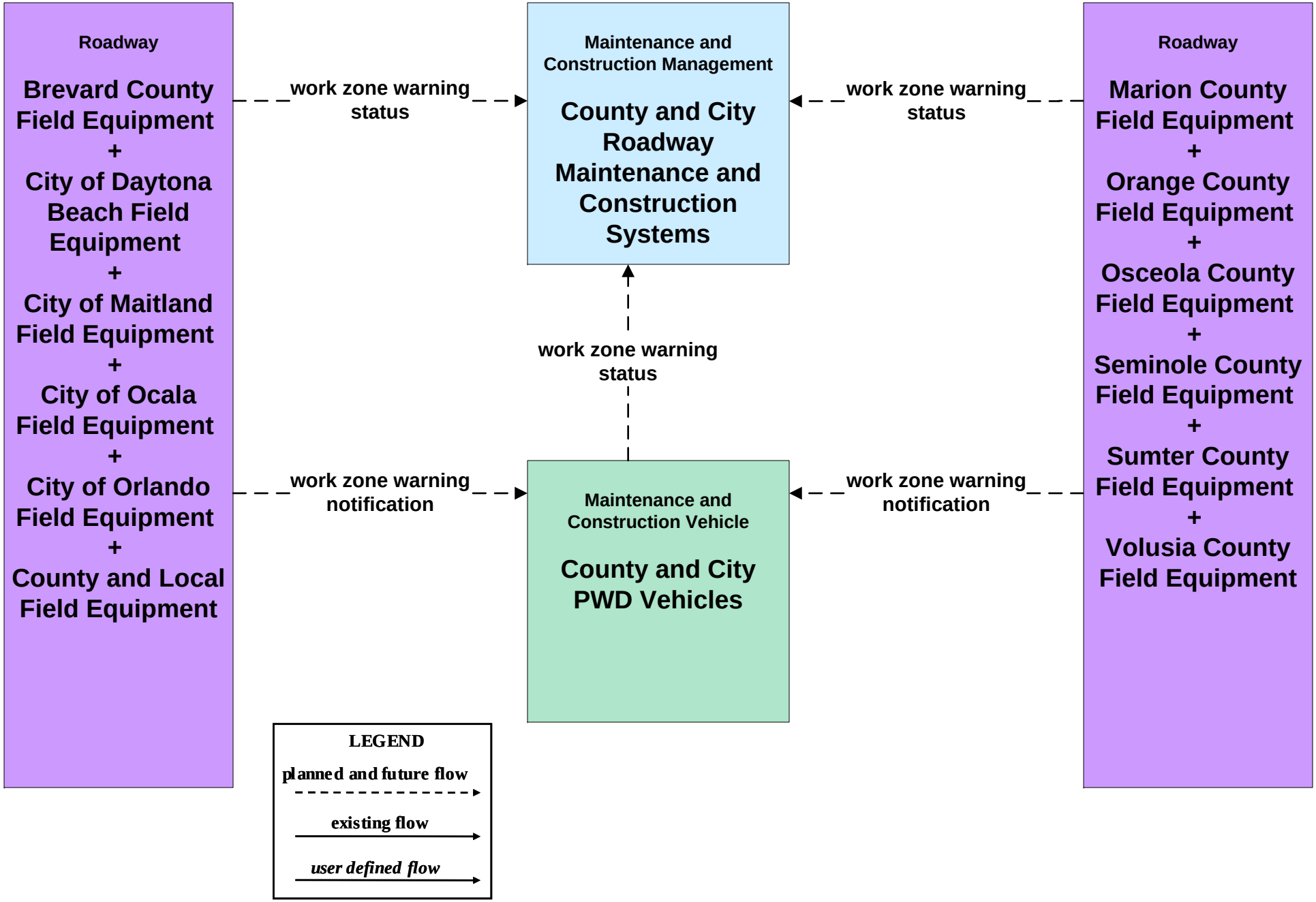
MC08 - Work Zone Management
Counties and Cities (3 of 3)



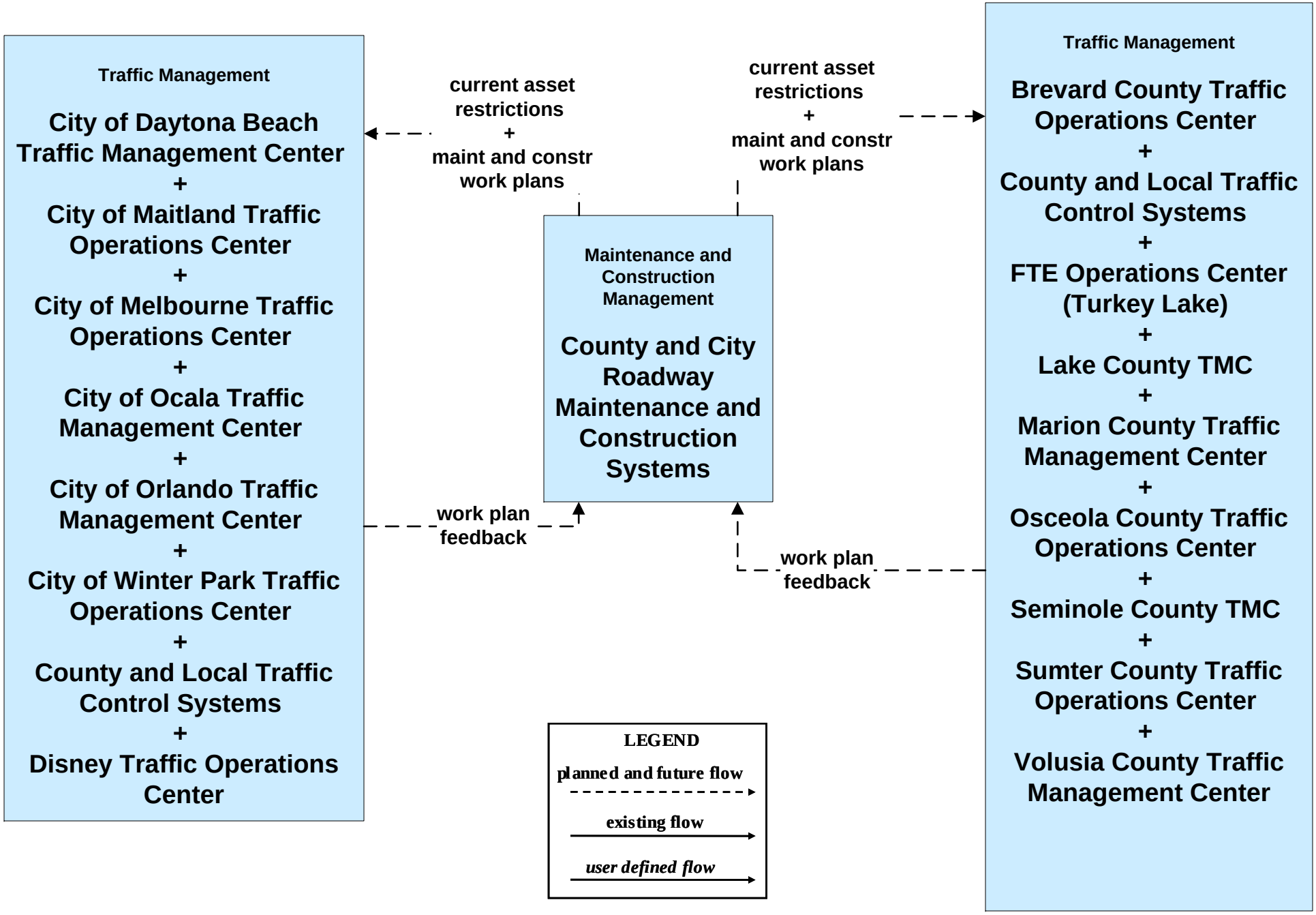
MC08 - Work Zone Management
Orange County and City of Orlando



MC09 - Work Zone Safety Monitoring
Counties and Cities



MC10 - Maintenance and Construction Activity Coordination
Counties and Cities (2 of 4)

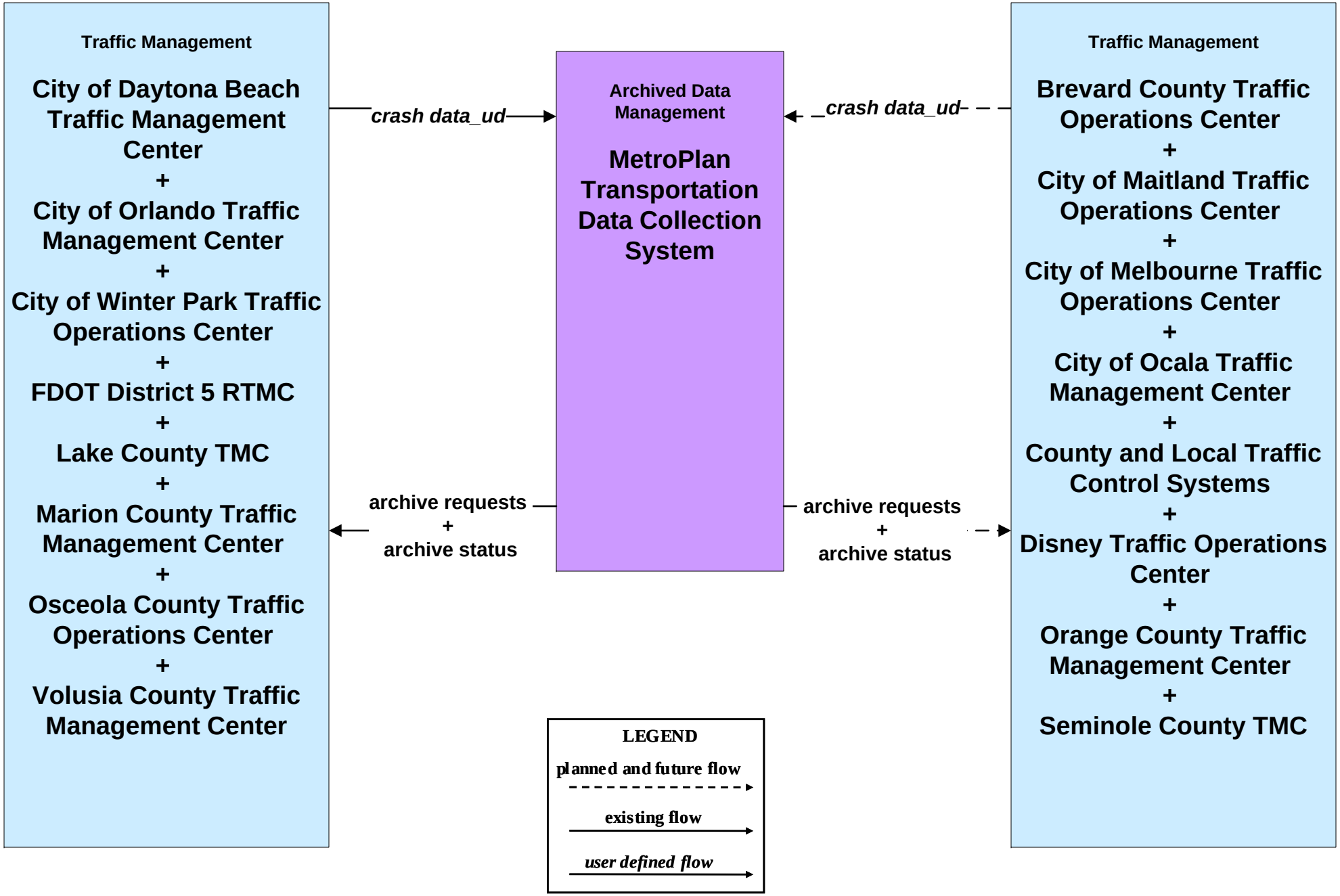


FDOT District 5
Central Florida Regional ITS Architecture

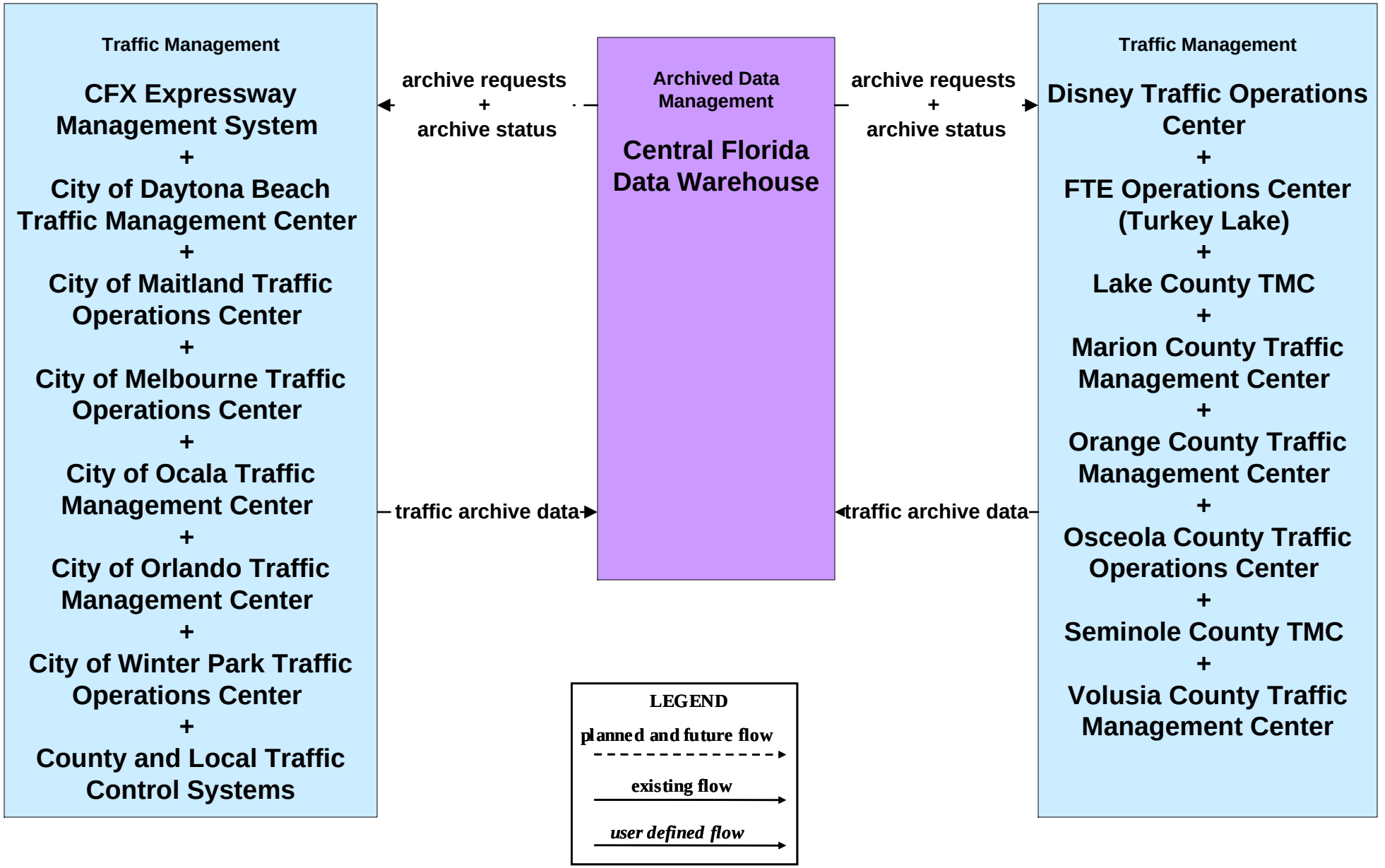
Customized Service Package Diagrams

City of Winter Park

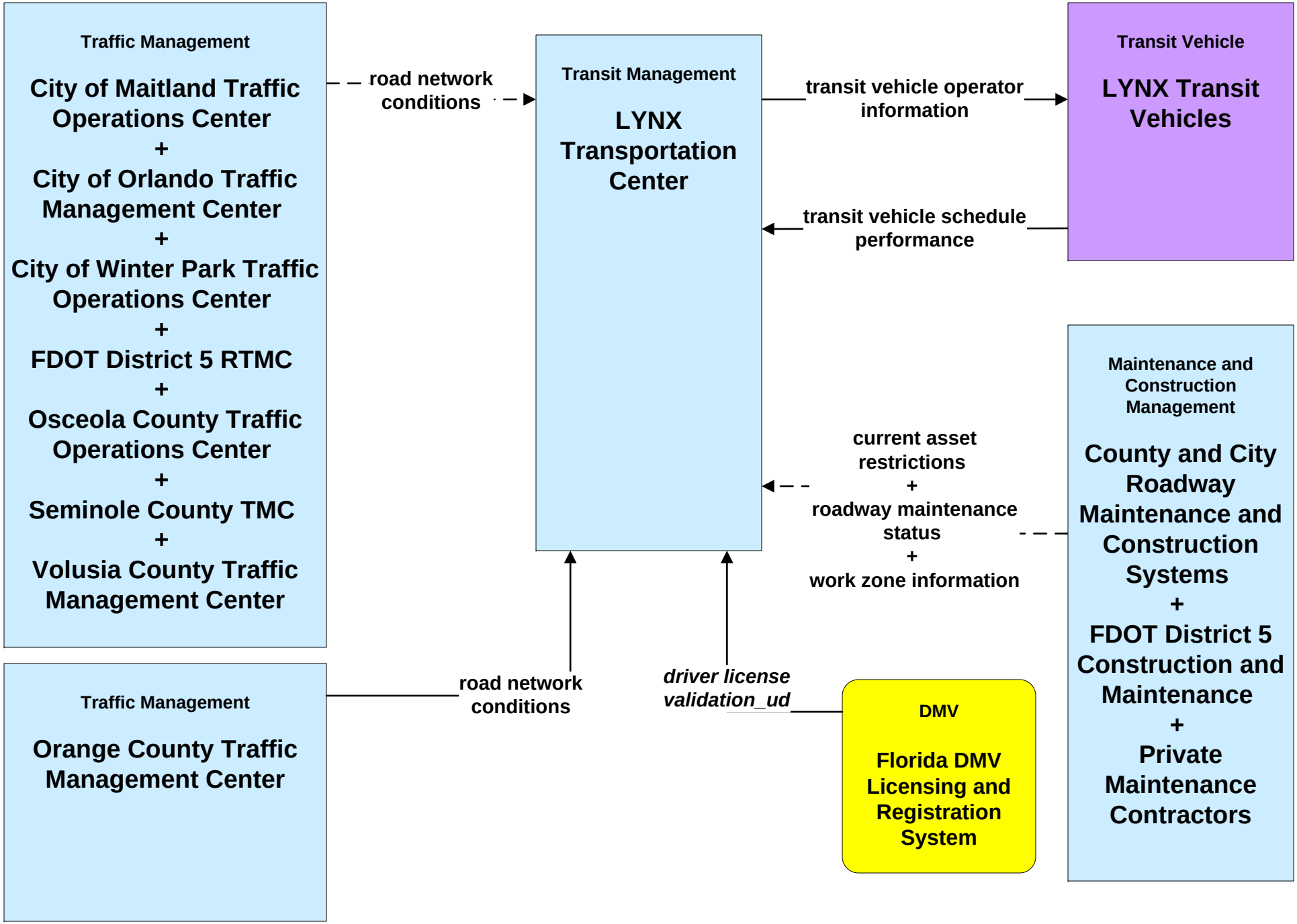
AD1 - ITS Data Mart
MetroPlan Transportation Data Collection System (1 of 2)



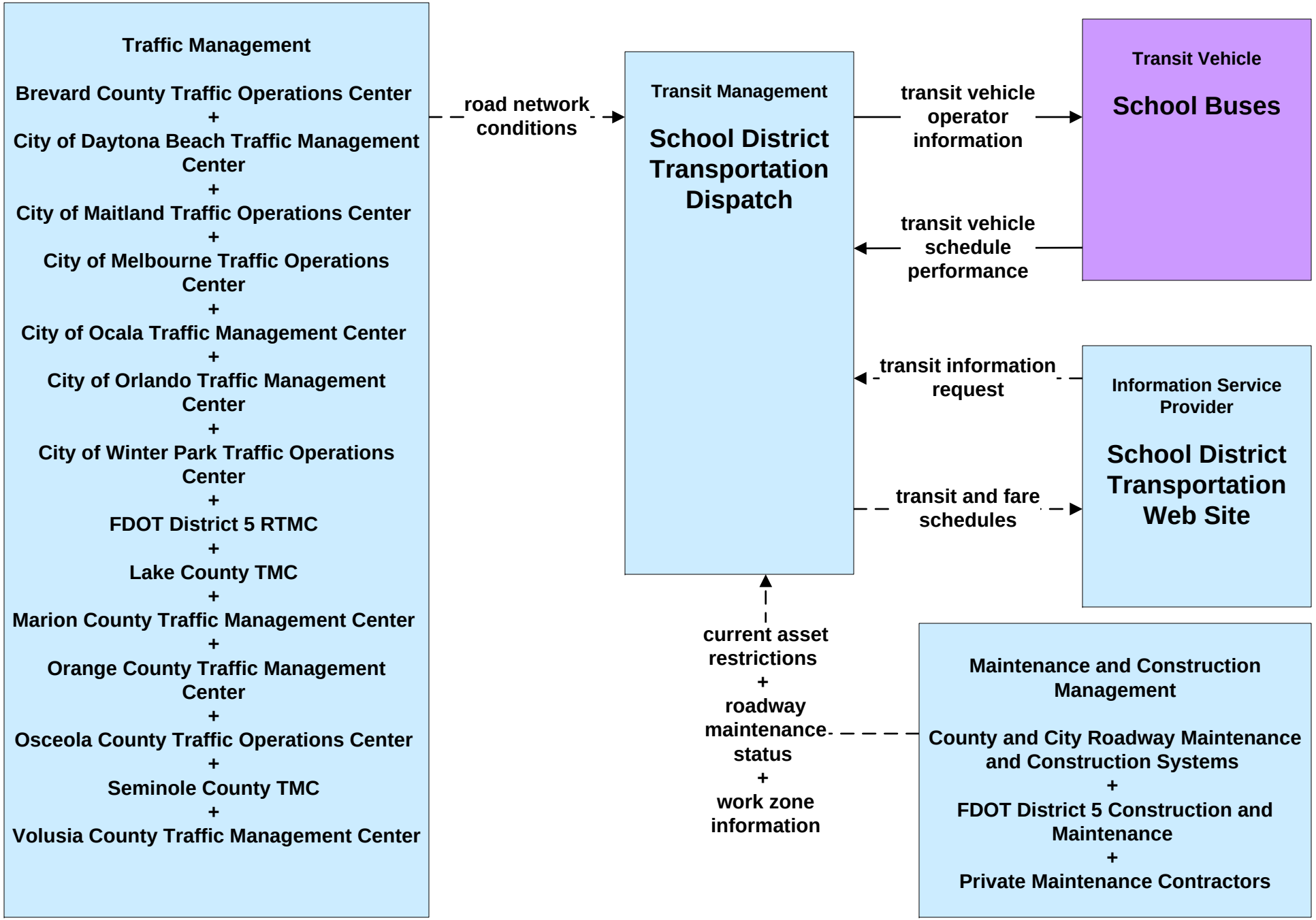
AD2 - ITS Data Warehouse
Central Florida Data Warehouse (1 of 2)



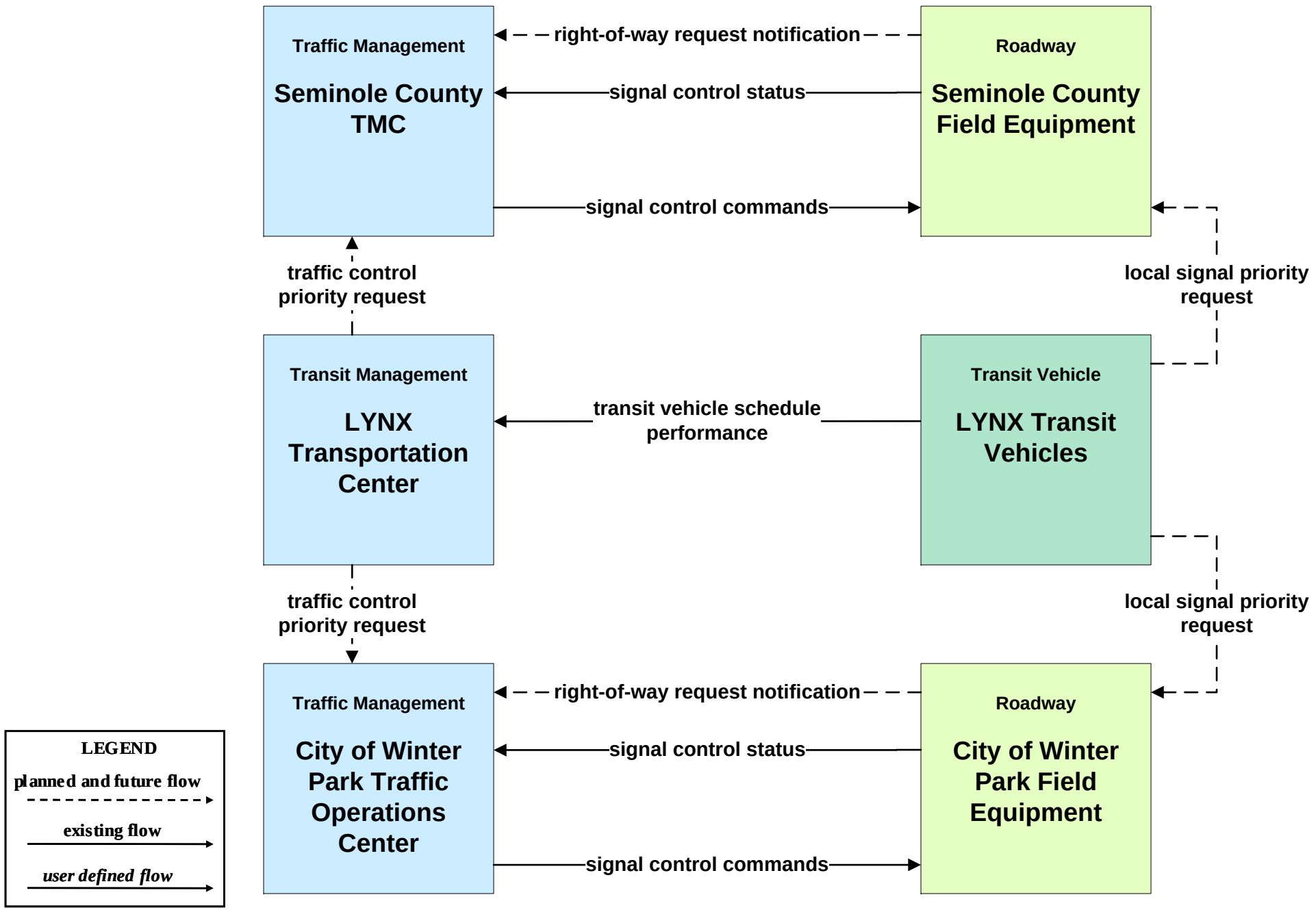
APTS02 - Transit Fixed-Route Operations
LYNX Operations Center



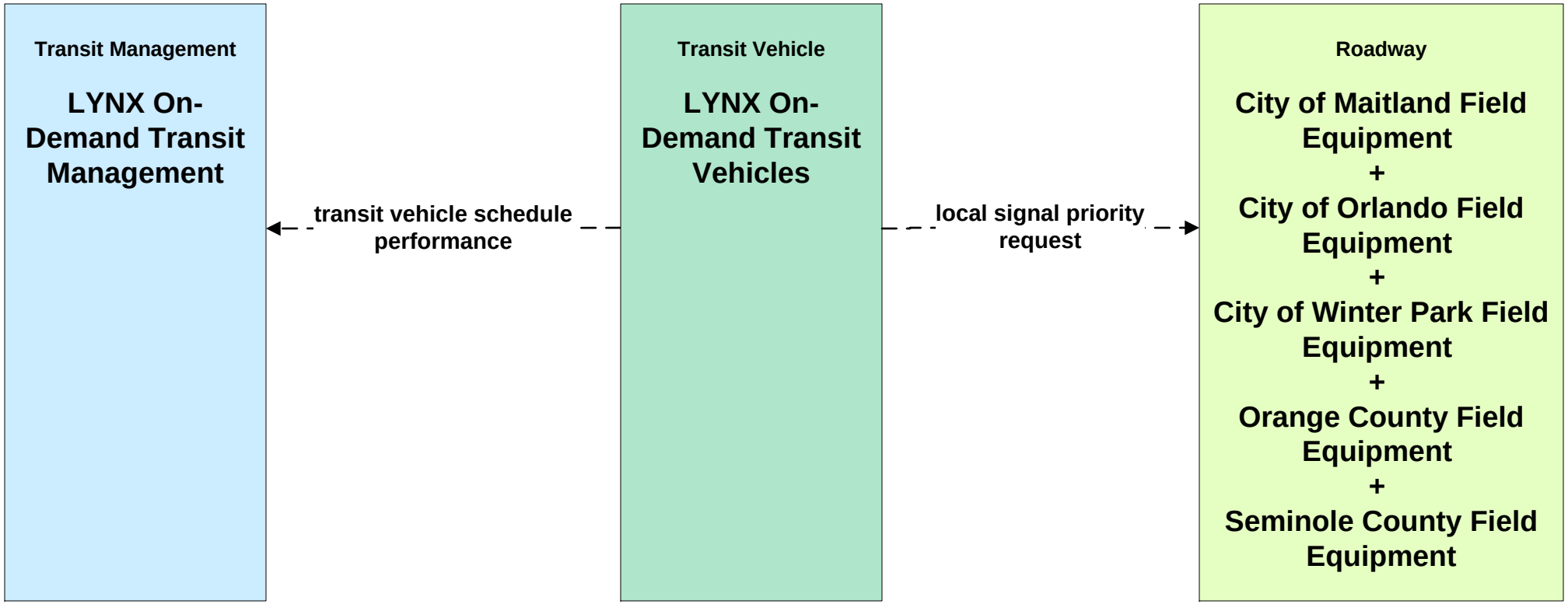
APTS02 - Transit Fixed-Route Operations
School District Transportation Dispatch

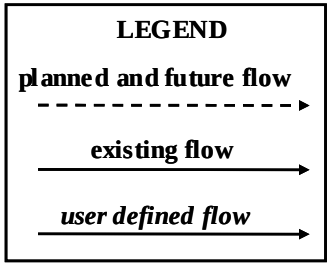


APTS09 - Transit Signal Priority
LYNX (3 of 5)

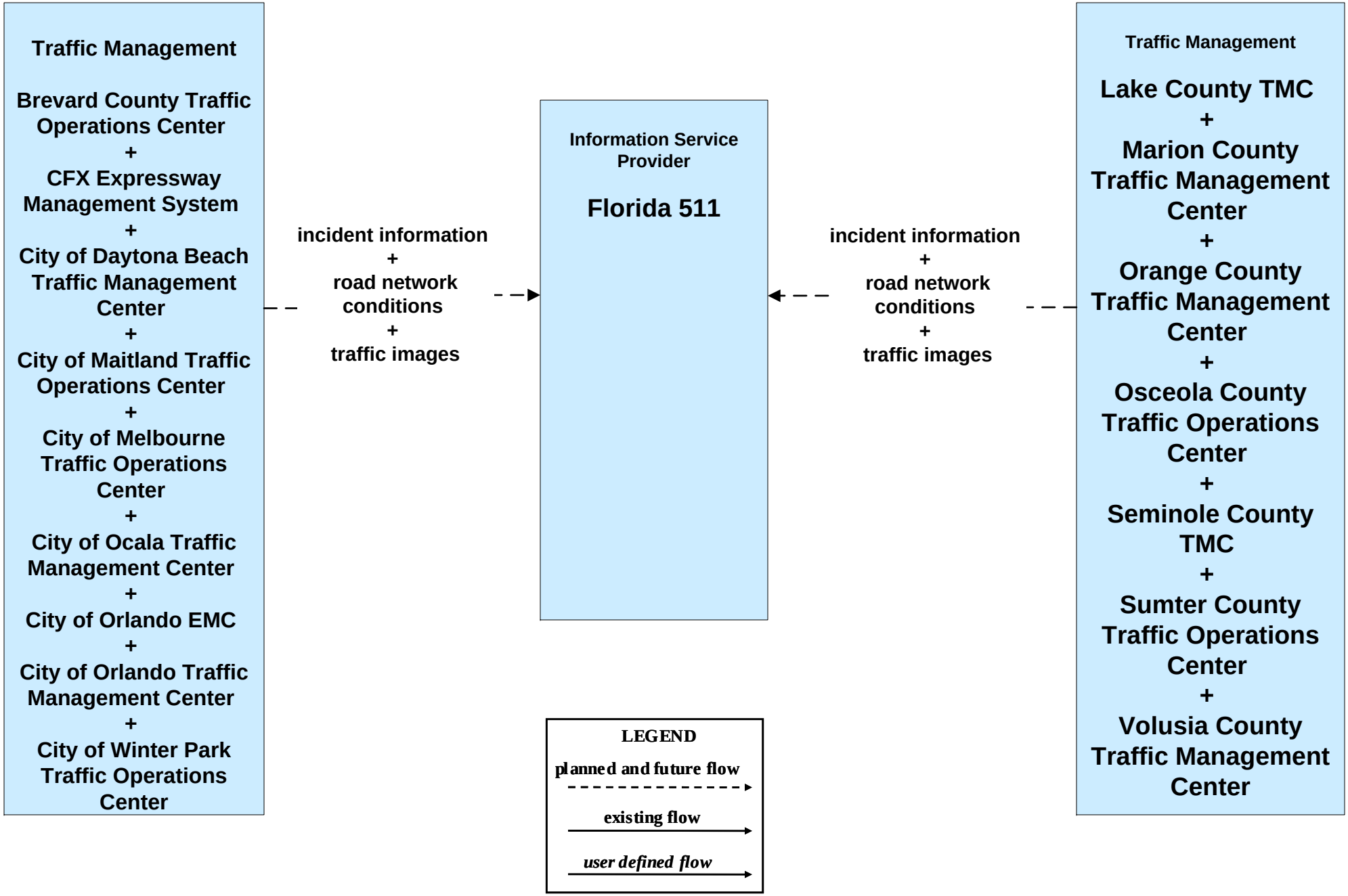


APTS09 - Local Signal Priority
LYNX On-Demand Transit

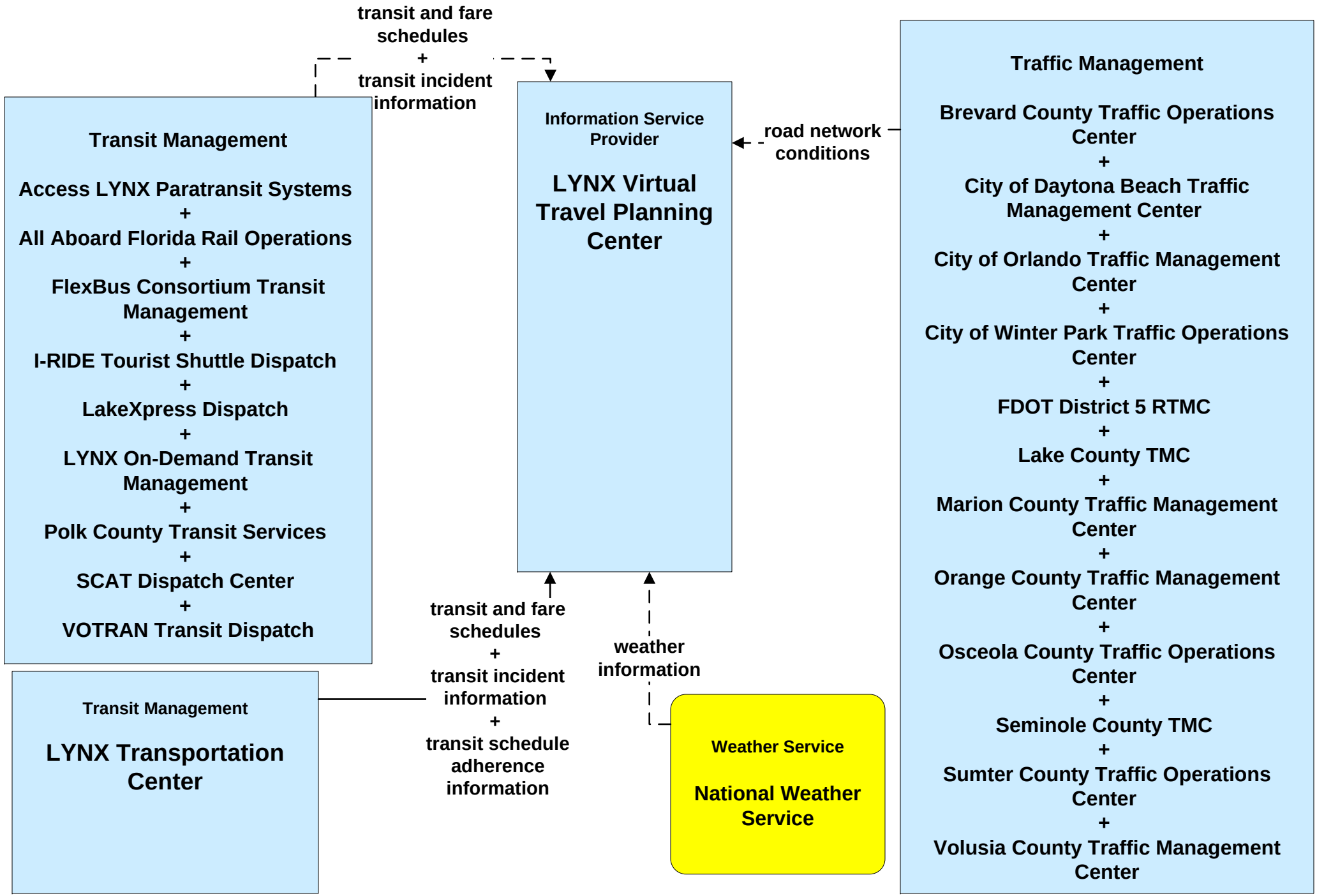




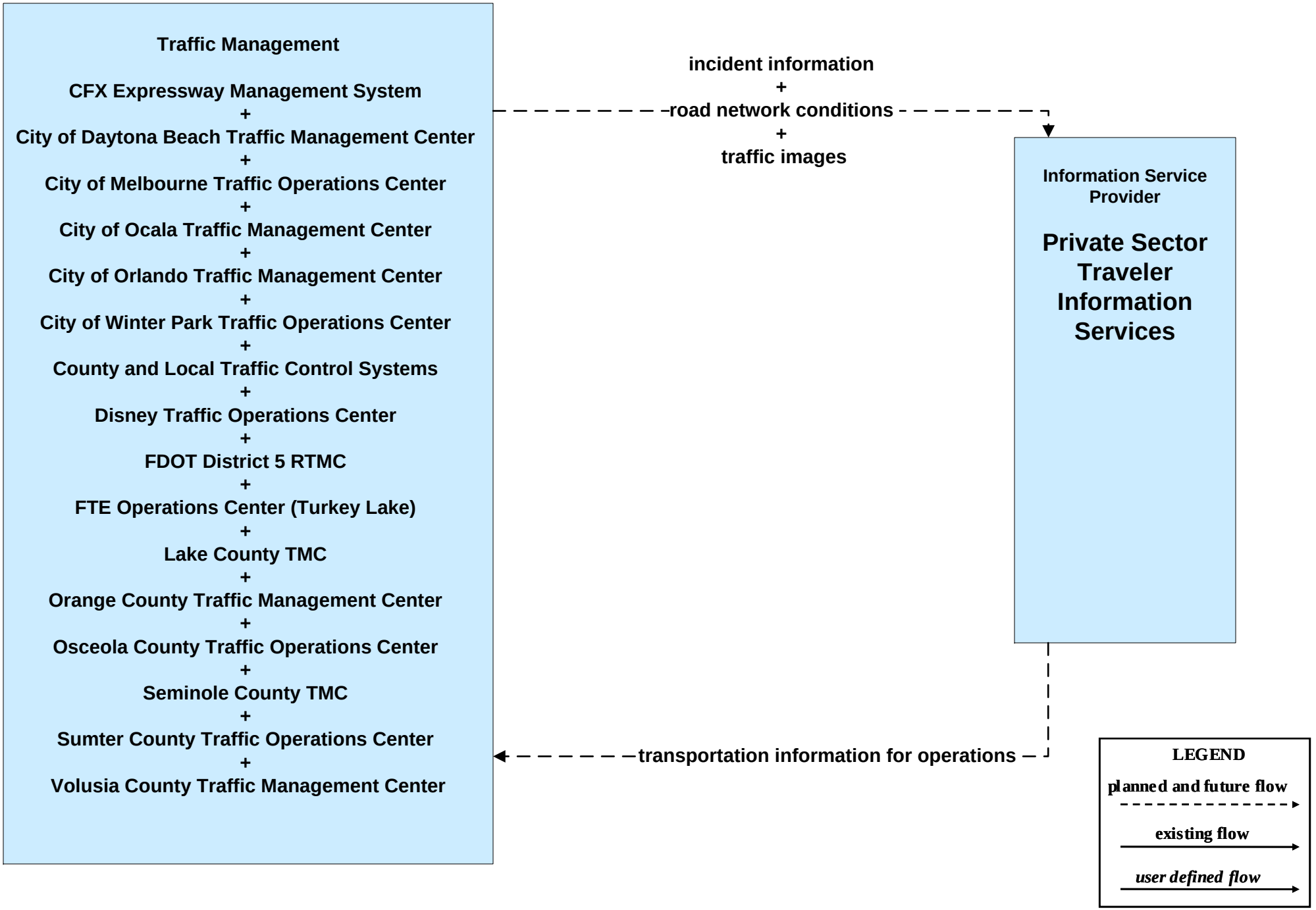
ATIS01 - Broadcast Traveler Information
Florida 511 / Private ISPs (3 of 3)



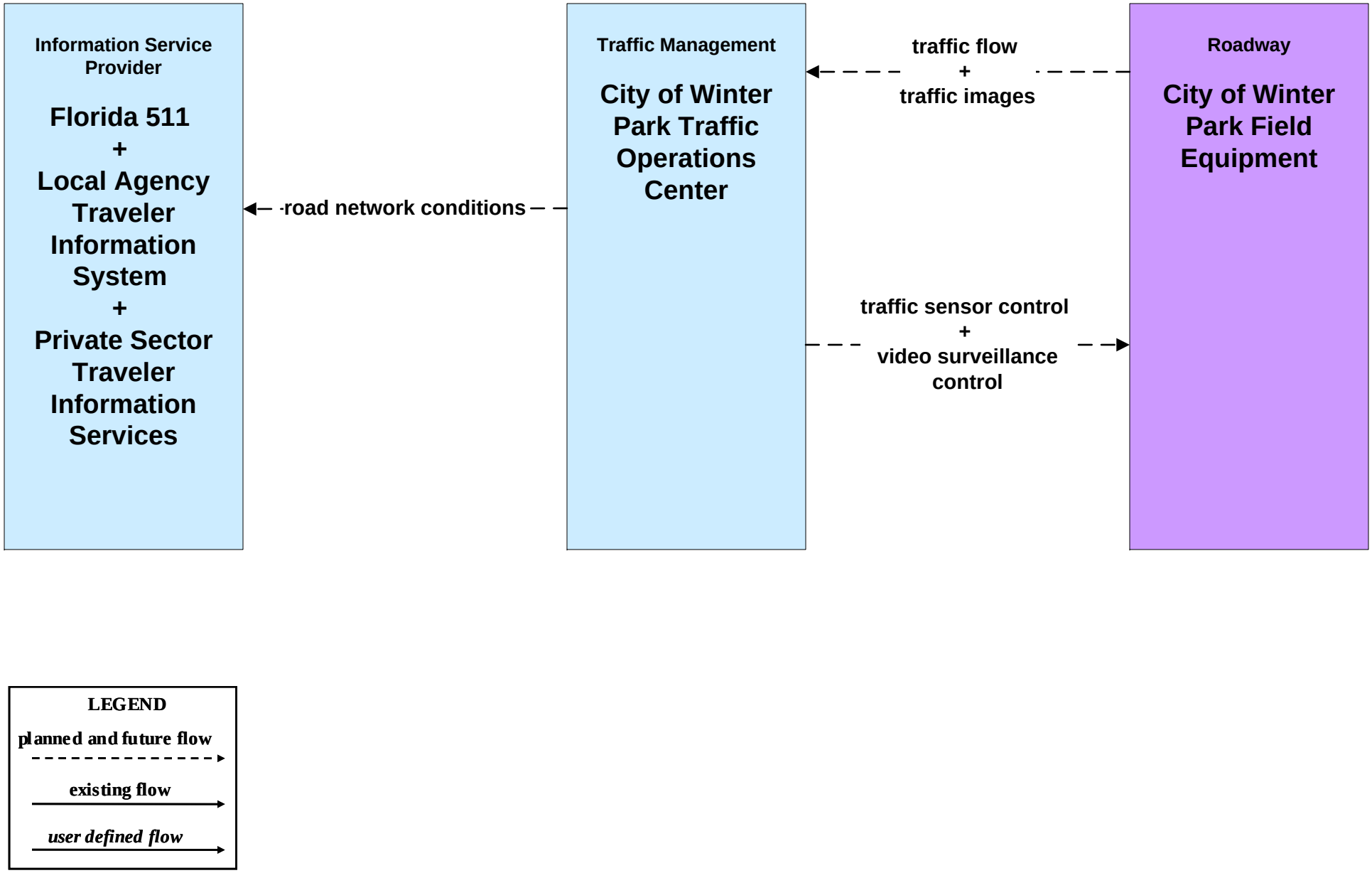
ATIS02 - Interactive Traveler Information
Virtual Travel Planning Center (1 of 2)



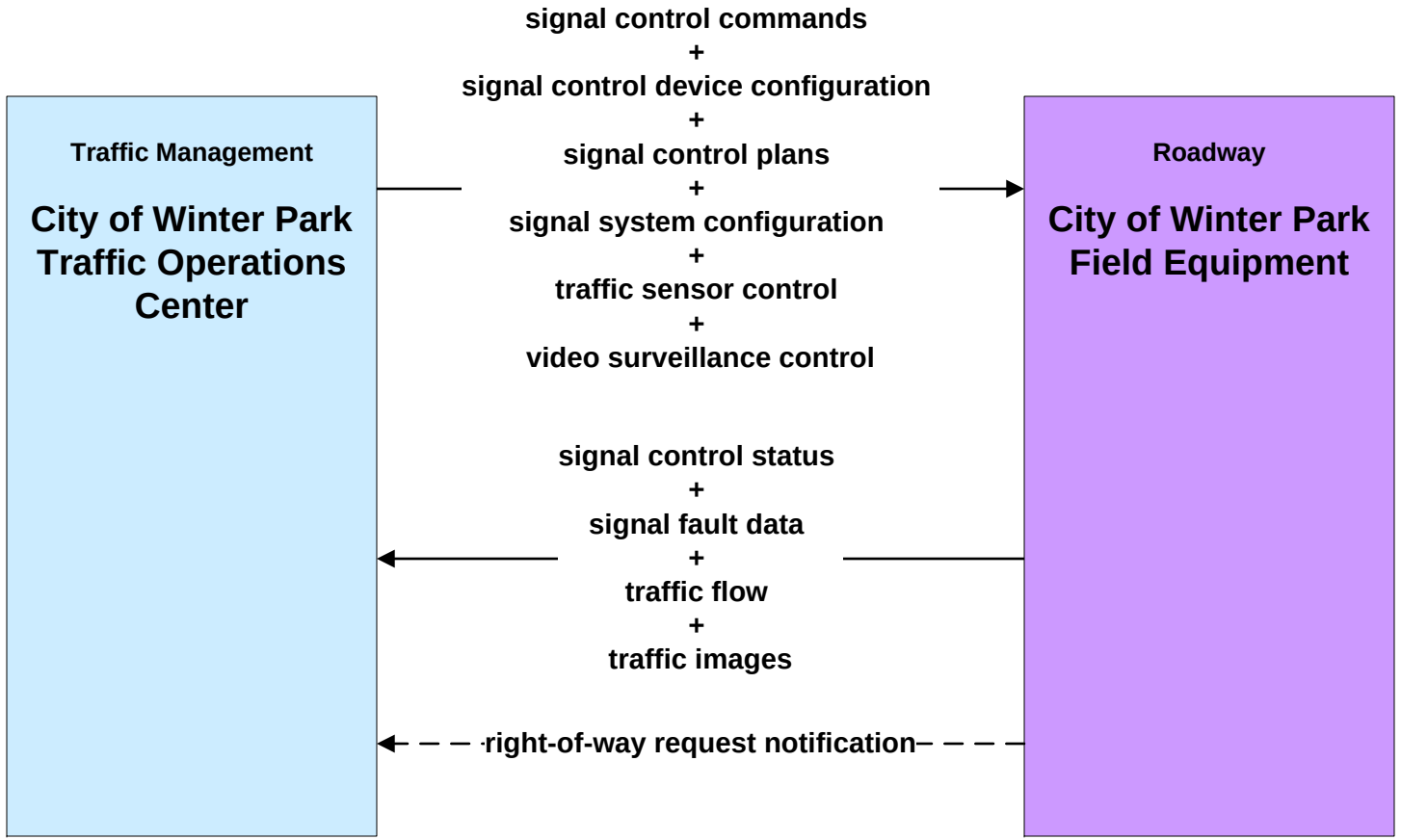
ATIS06 - Transportation Operations Data Sharing
Private Sector ISPs (2 of 2)



ATMS01 - Network Surveillance
City of Winter Park



ATMS03 - Traffic Signal Control
City of Winter Park



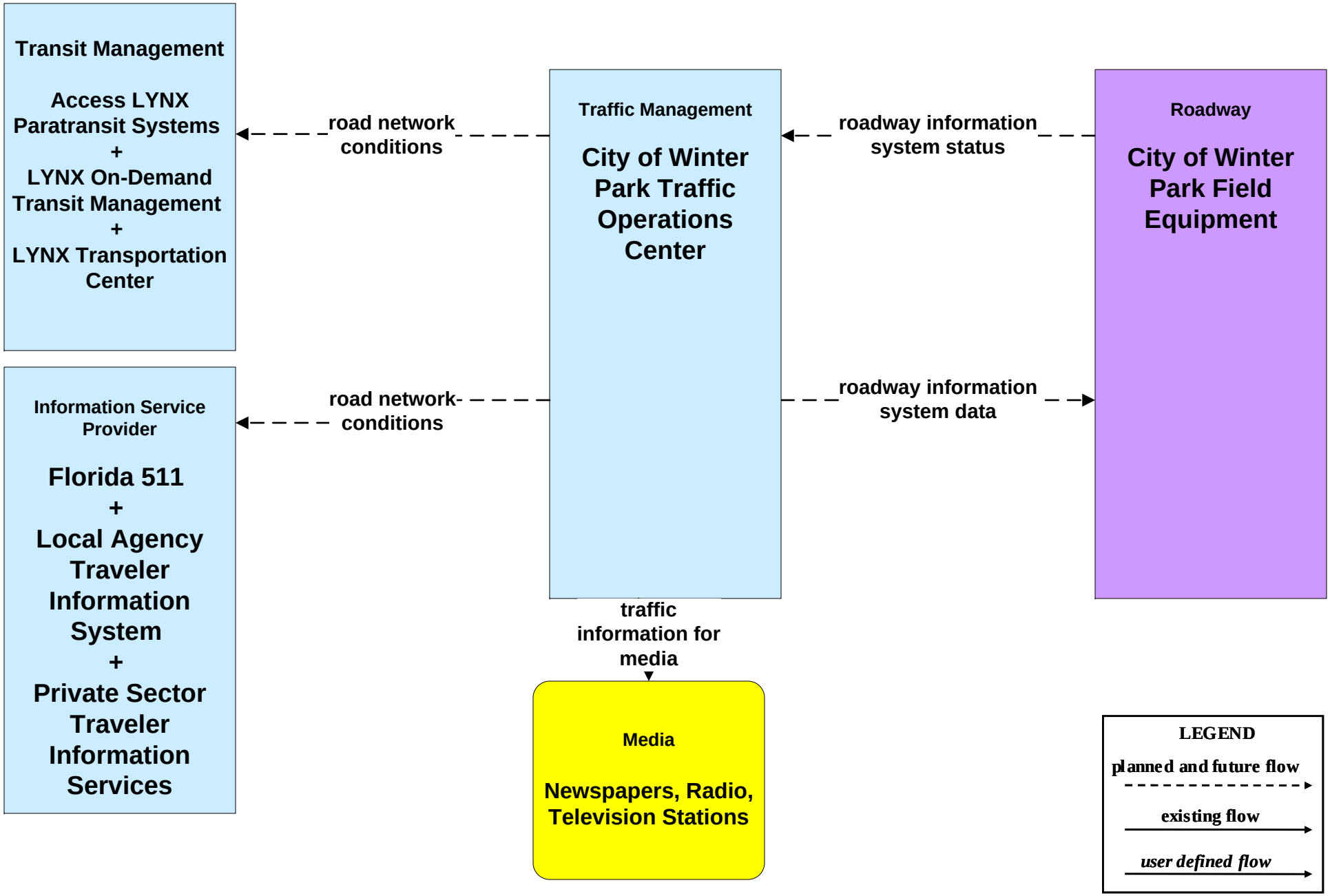
LEGEND

planned and future flow

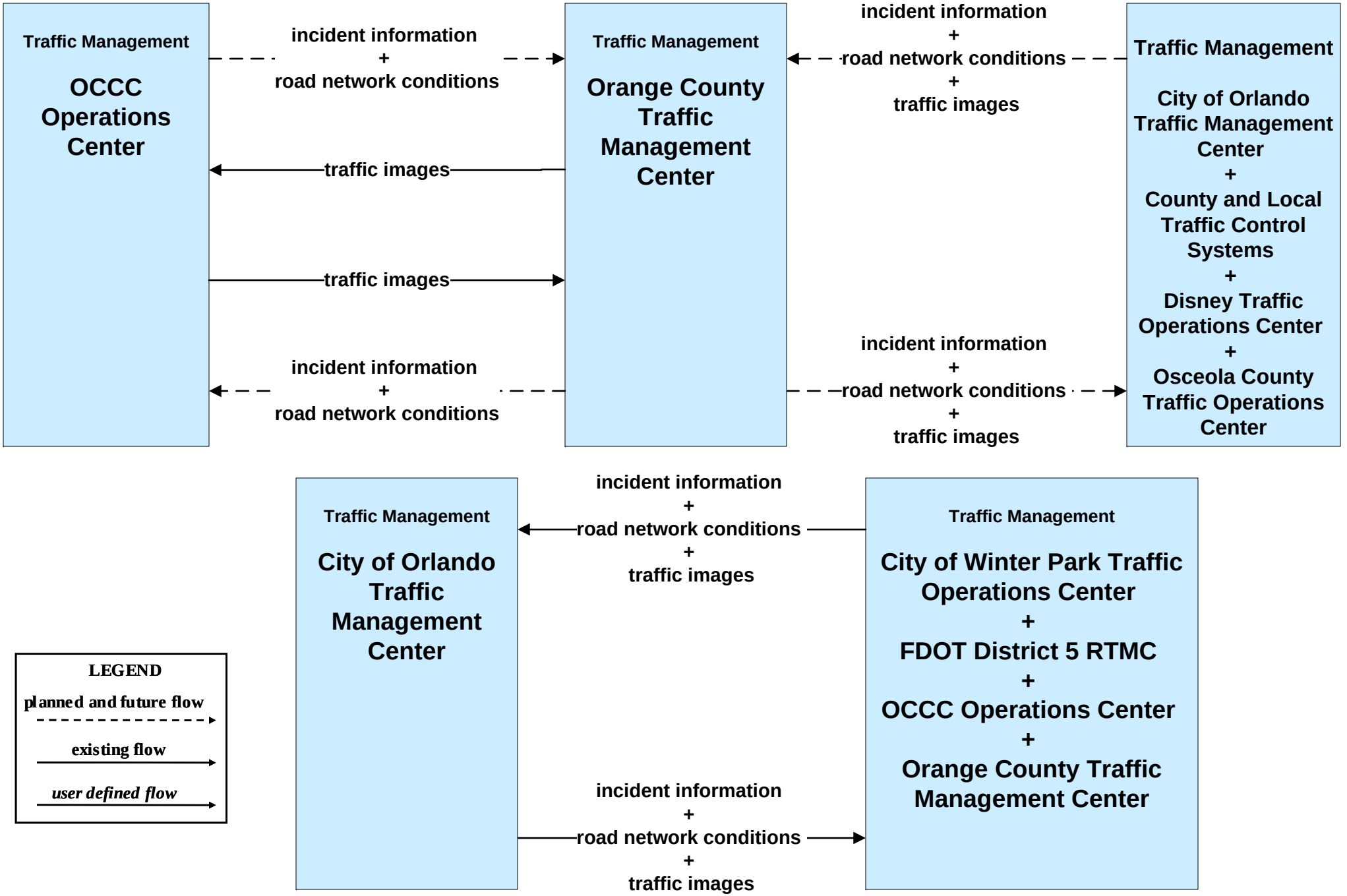
existing flow

user defined flow

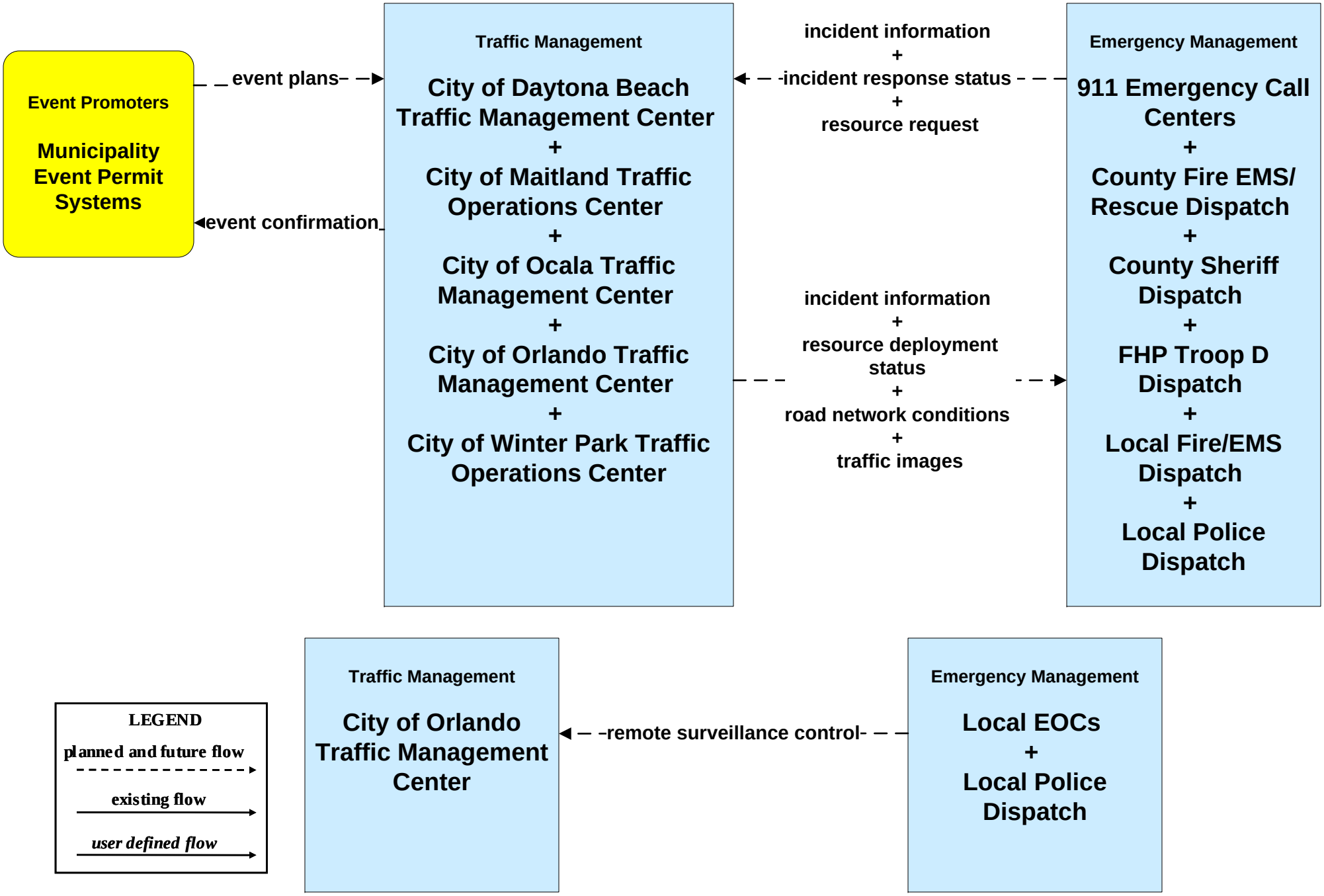
ATMS06 - Traffic Information Dissemination
City of Winter Park



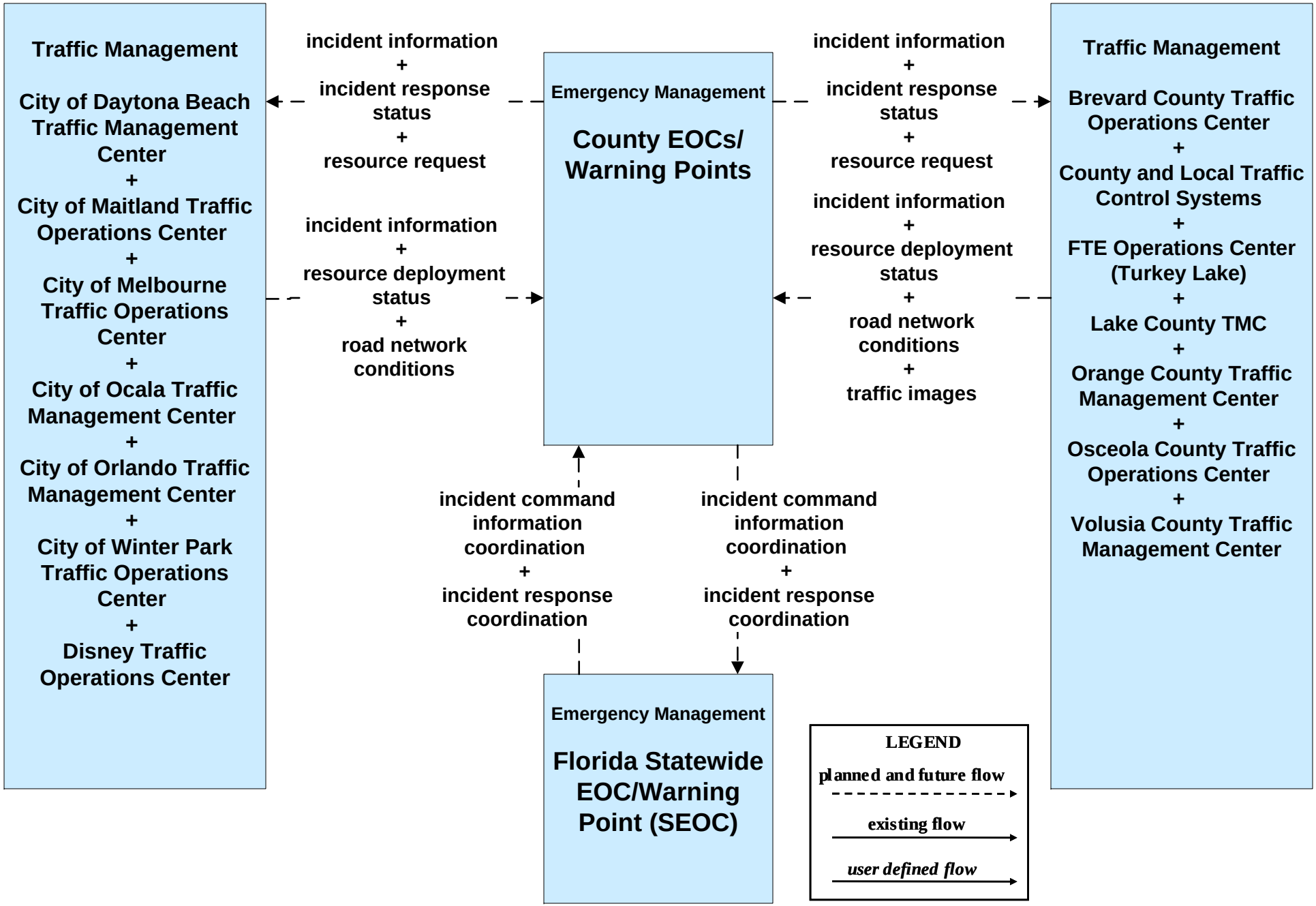
ATMS07 - Regional Traffic Management
Orange County / City of Orlando



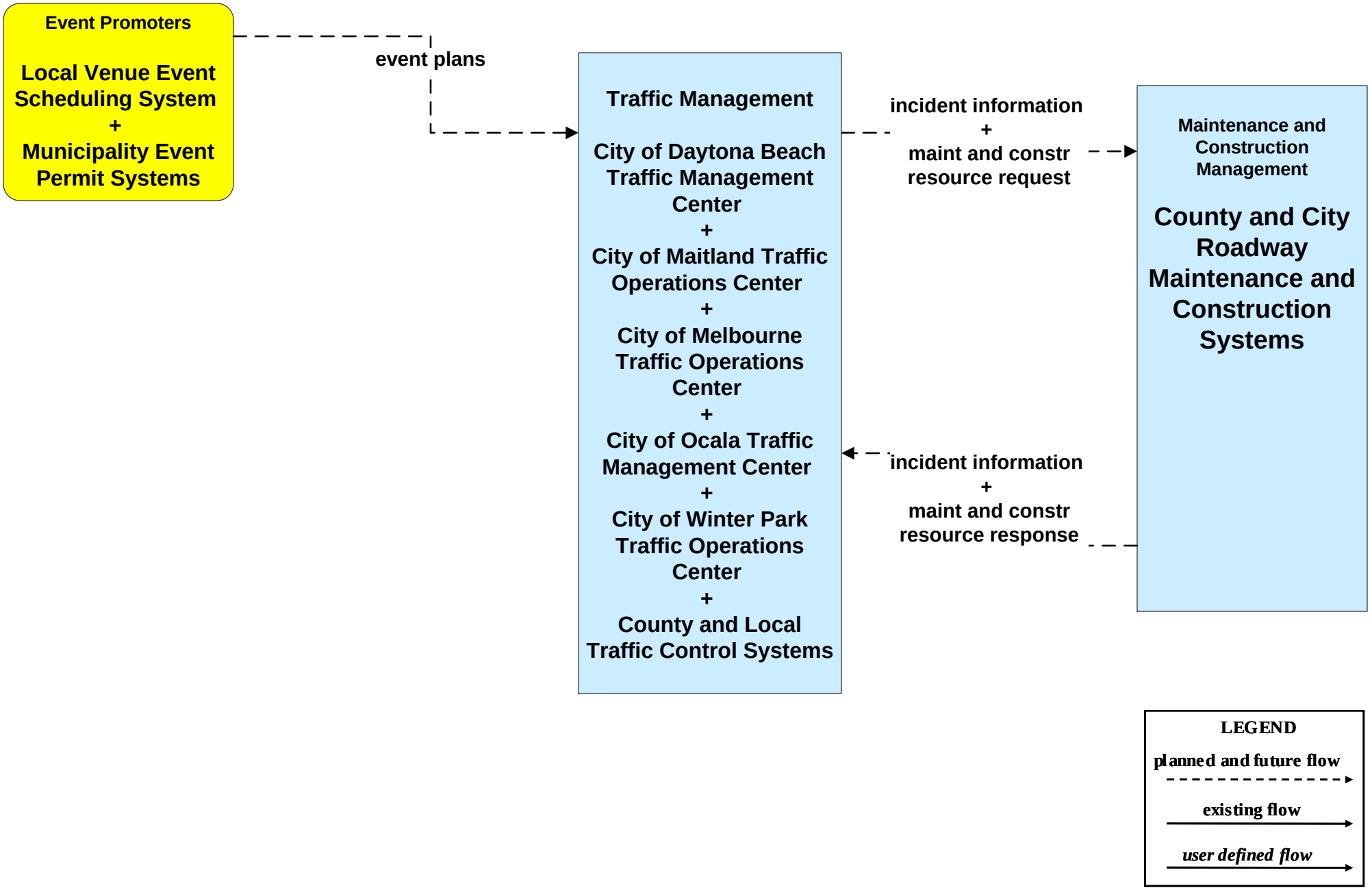
ATMS08 - Traffic Incident Management System
Municipal Traffic Operation Centers (TM to EM)



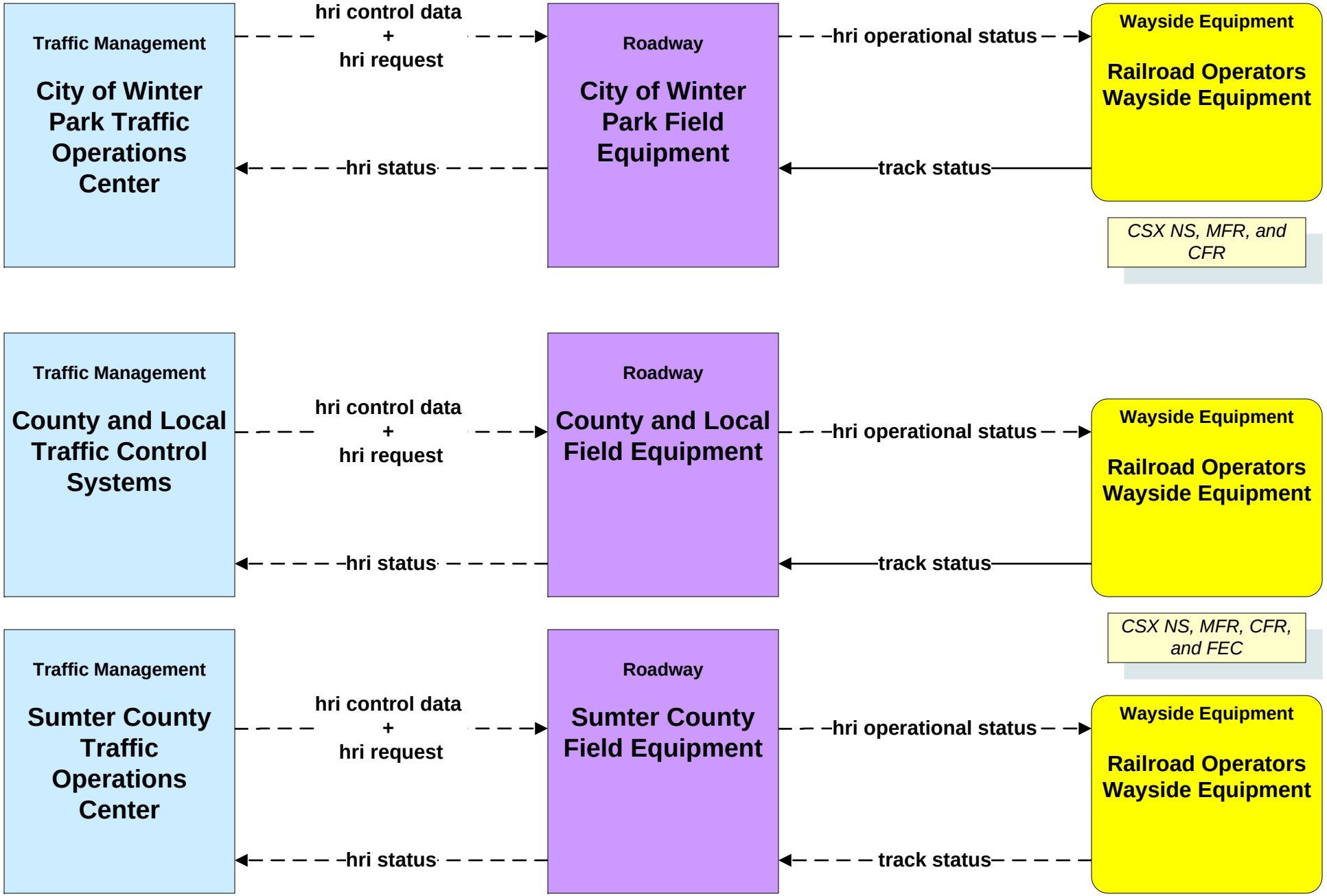
ATMS08 - Traffic Incident Management System
County Emergency Operations Center (TM to EM)



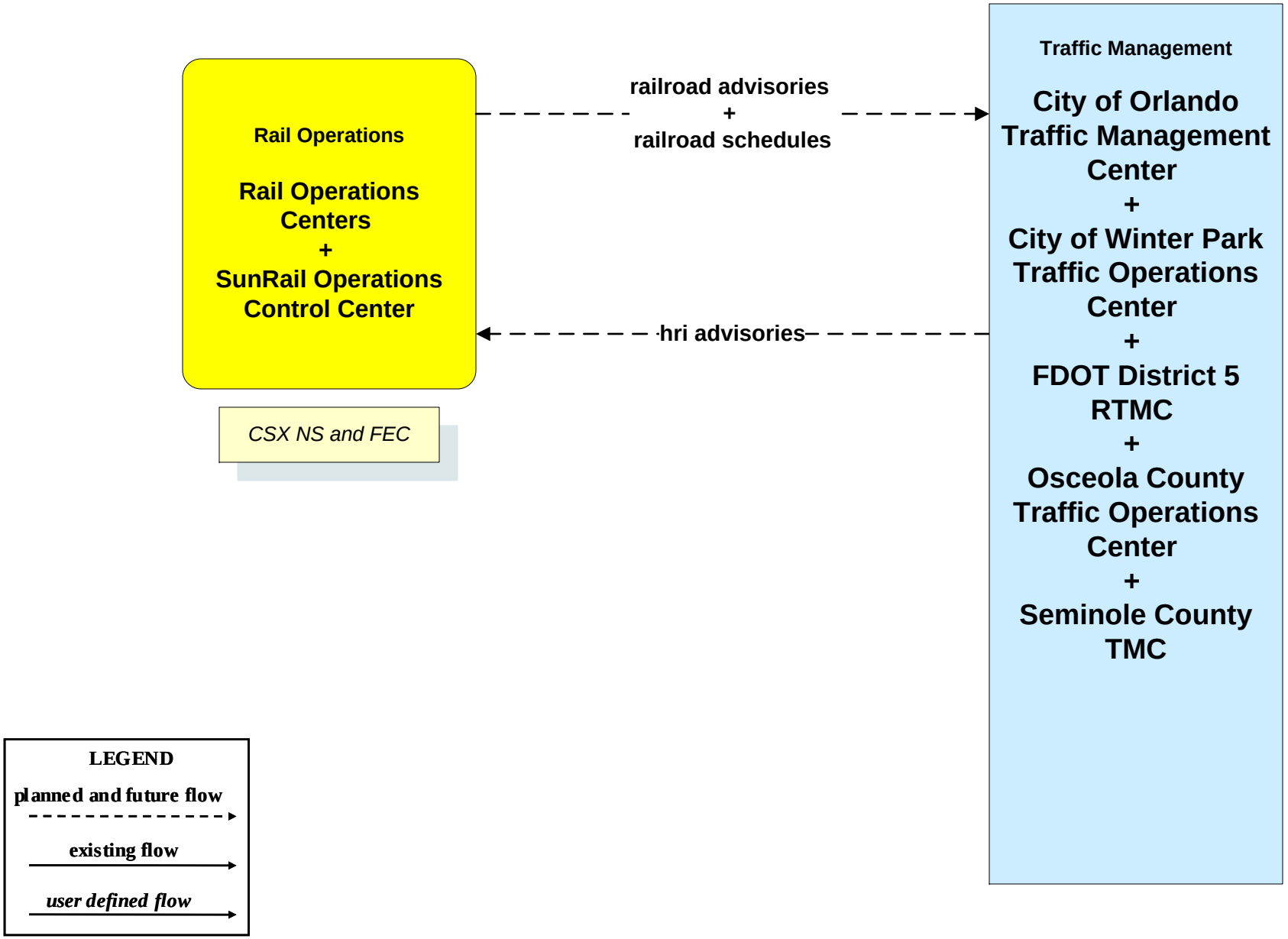
ATMS08 - Traffic Incident Management System
Local Traffic Management Centers (TM to MCM)



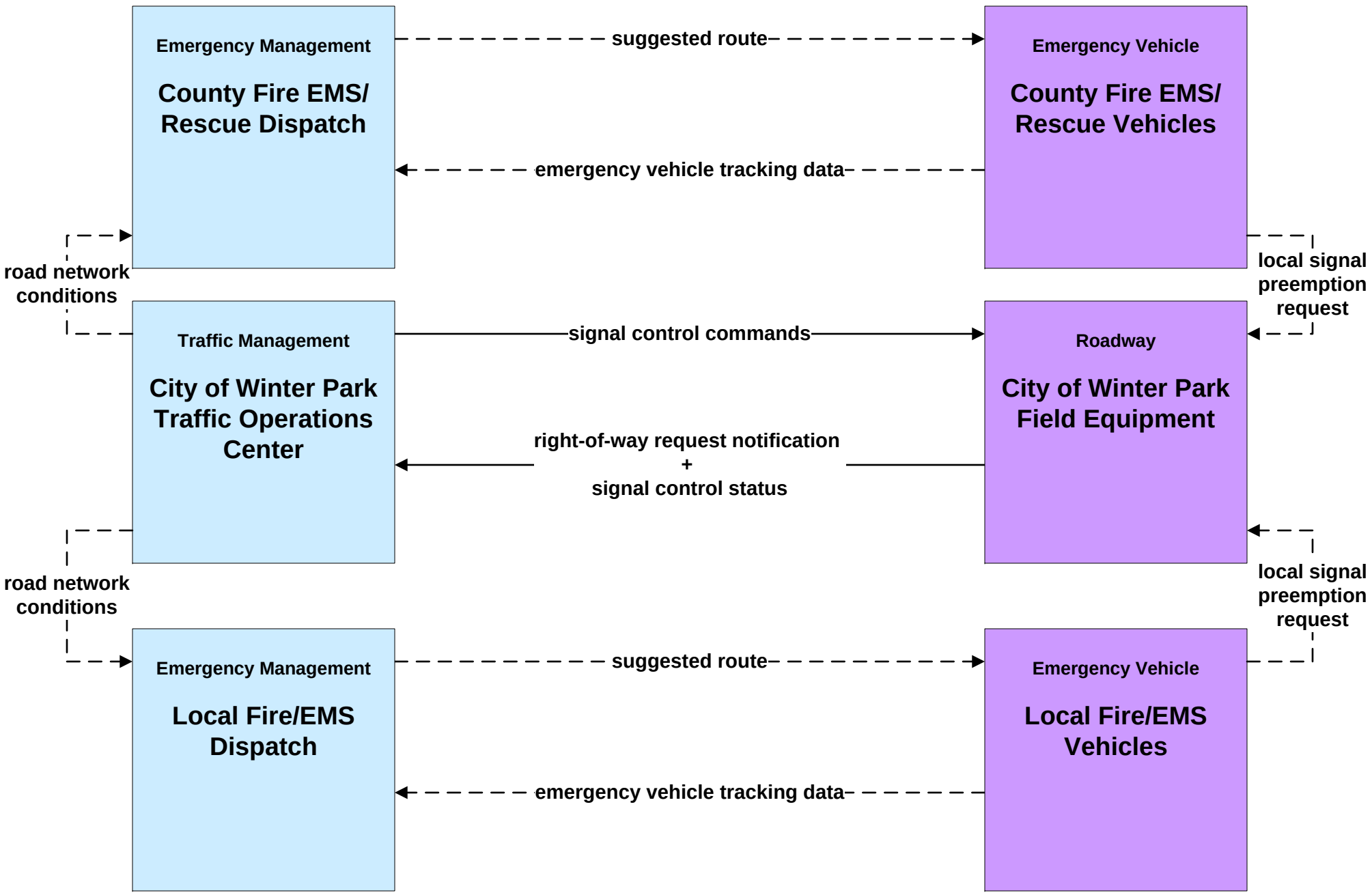
ATMS13 - Standard Railroad Crossing
City of Winter Park / Local Traffic Control Systems



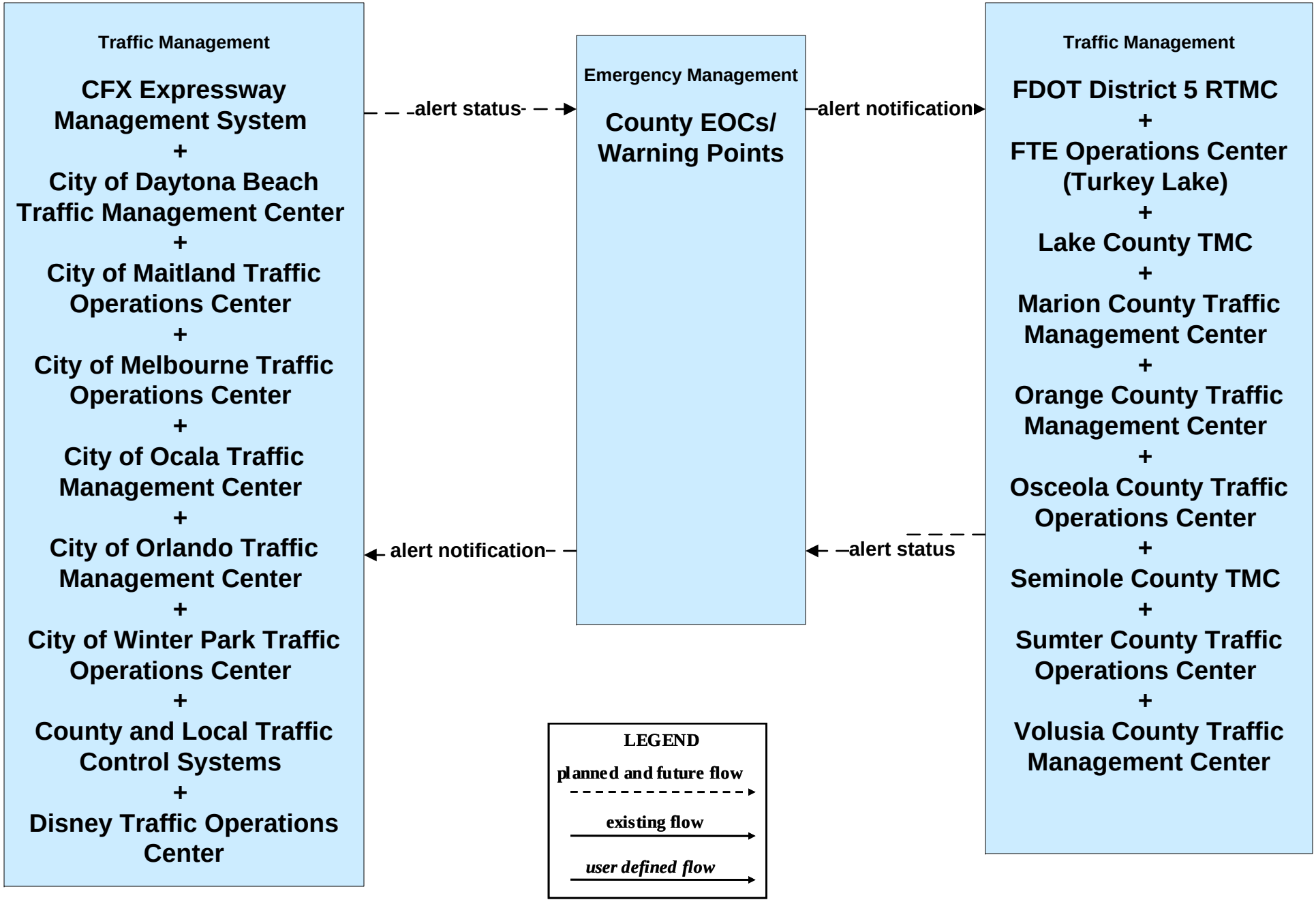
ATMS15 - Railroad Operations Coordination
Rail Operations Centers



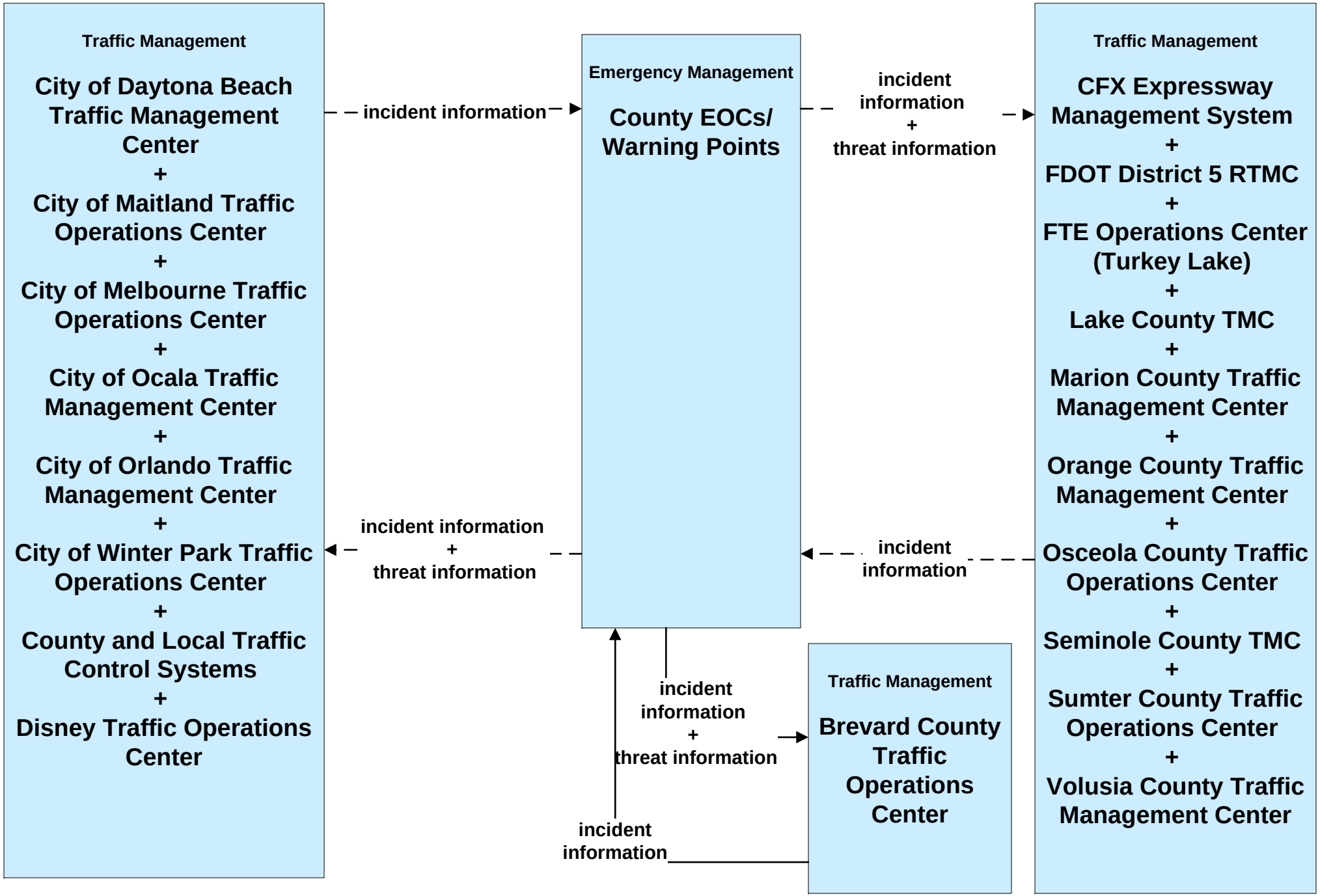
EM02 - Emergency Routing
City of Winter Park



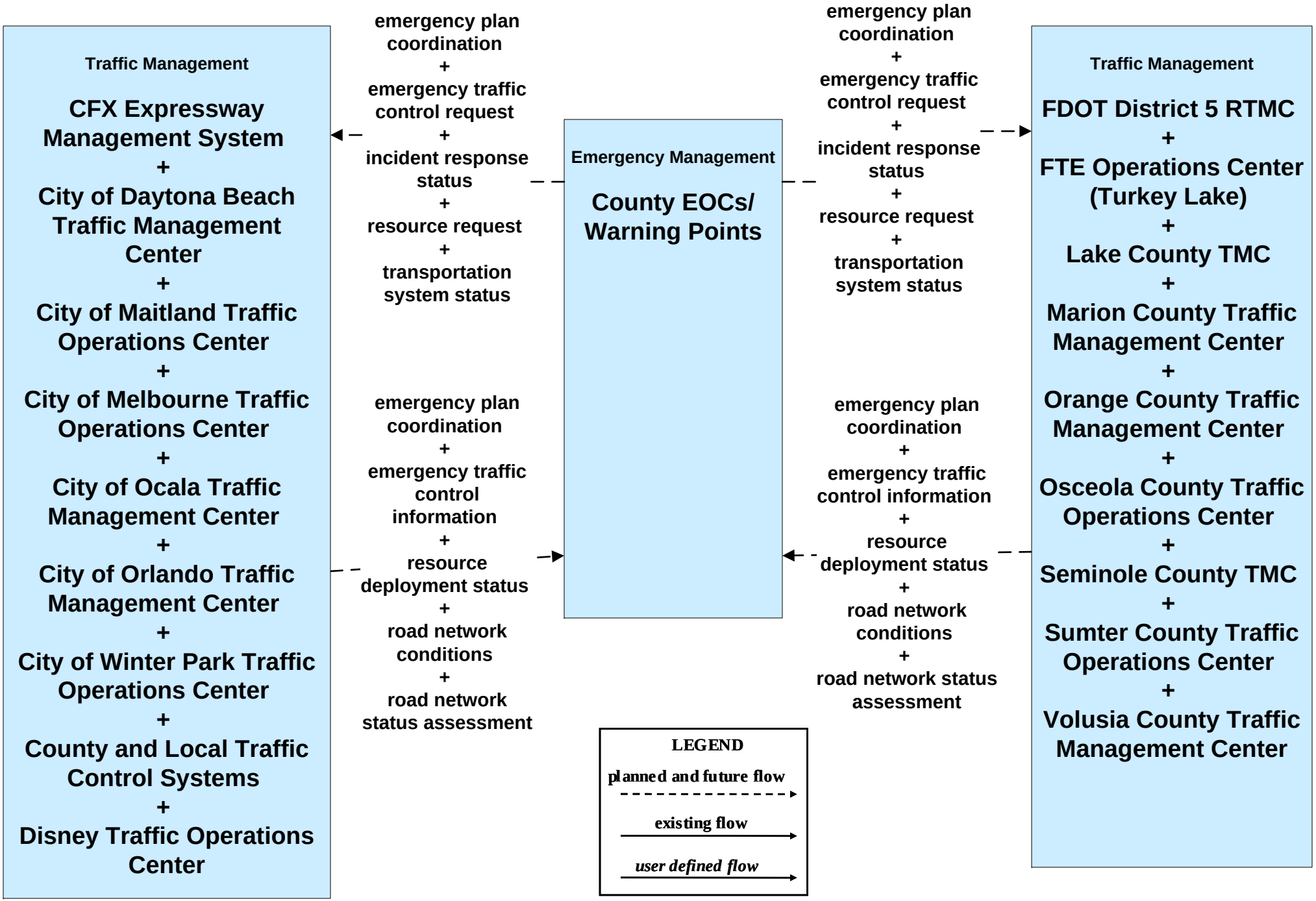
EM06 - Wide Area Alert
County EOCs (1 of 3)



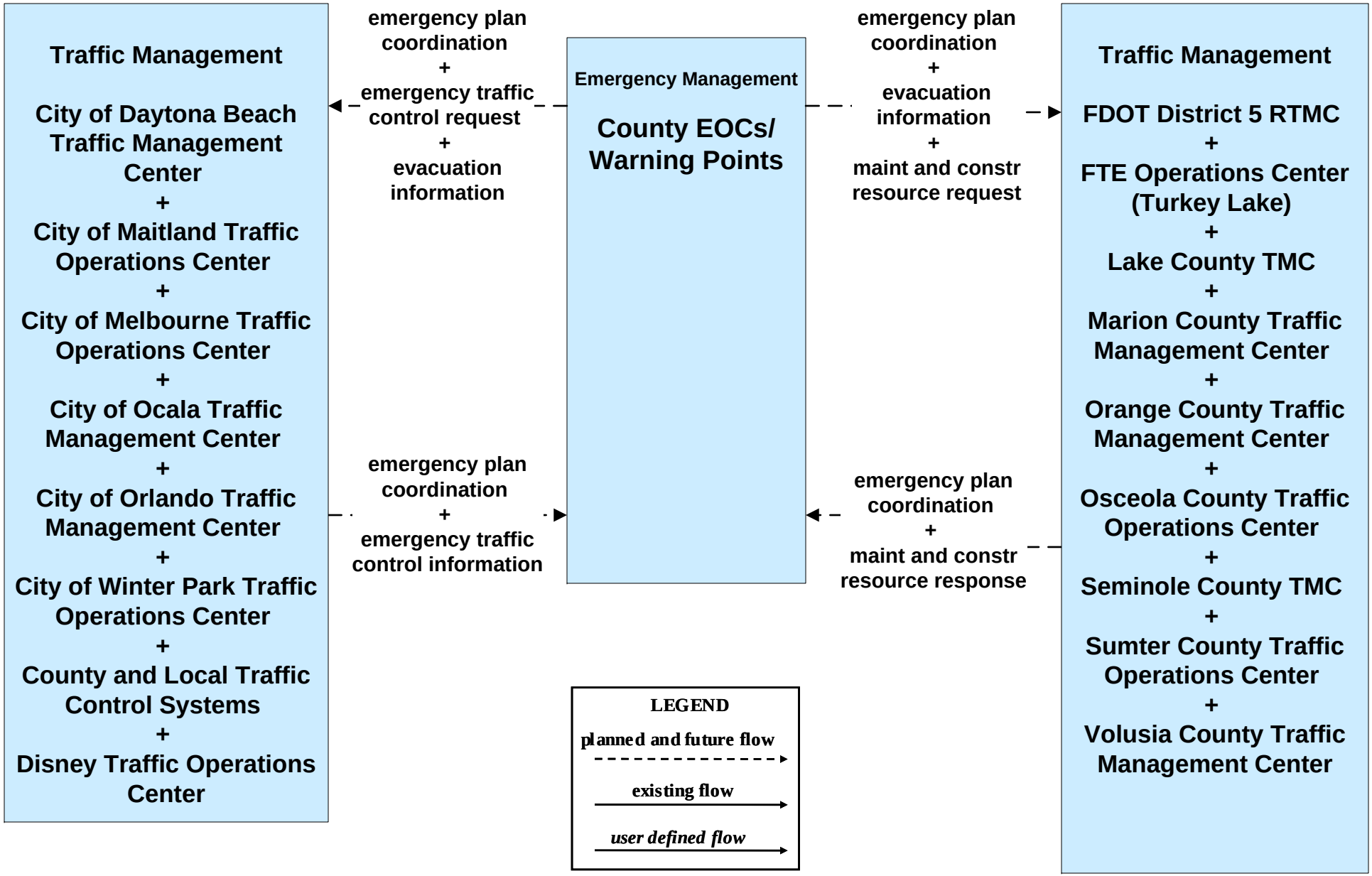
EM07 - Early Warning System
County EOCs (2 of 3)



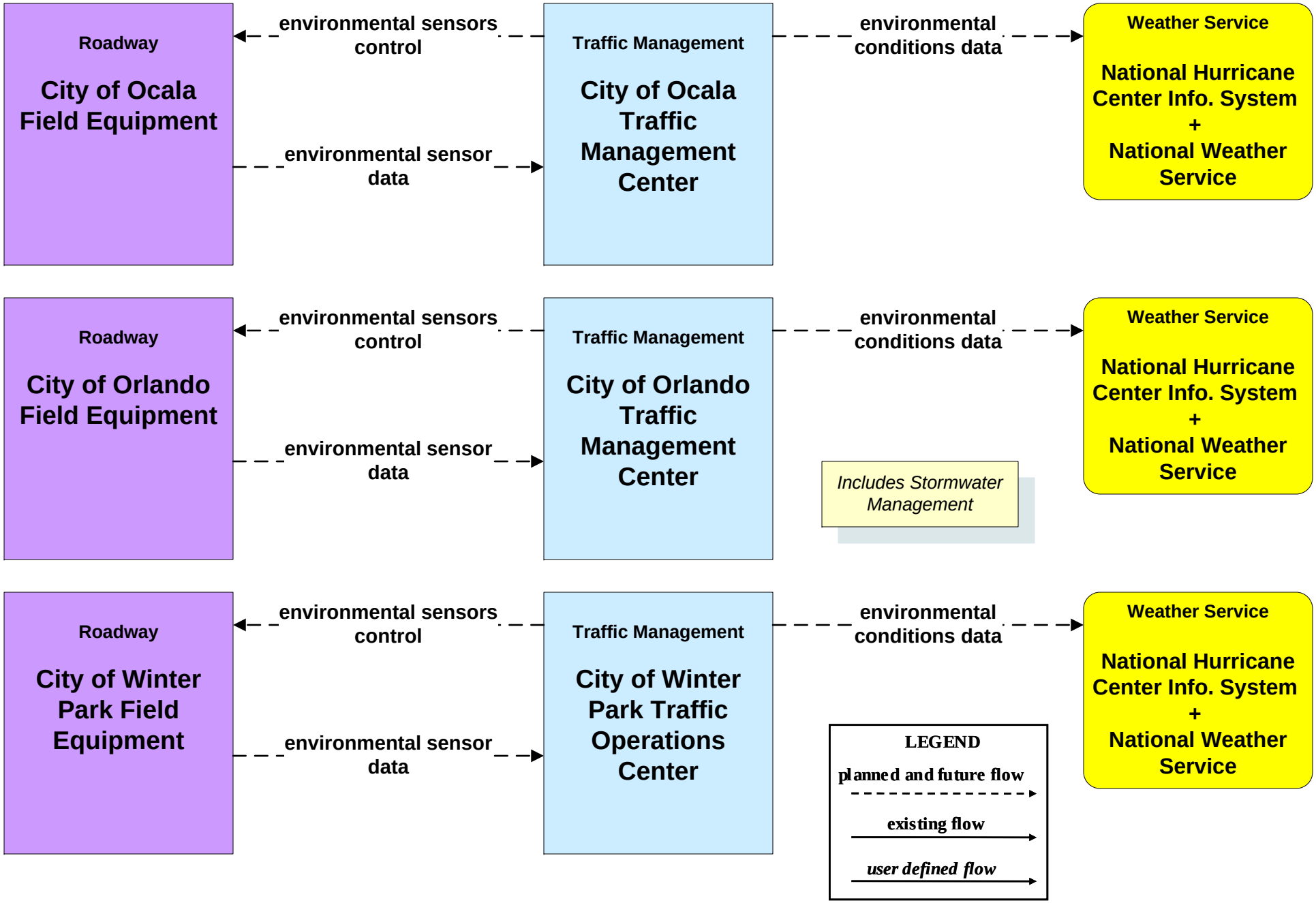
EM08 - Disaster Response and Recovery
County EOCs (2 of 4)



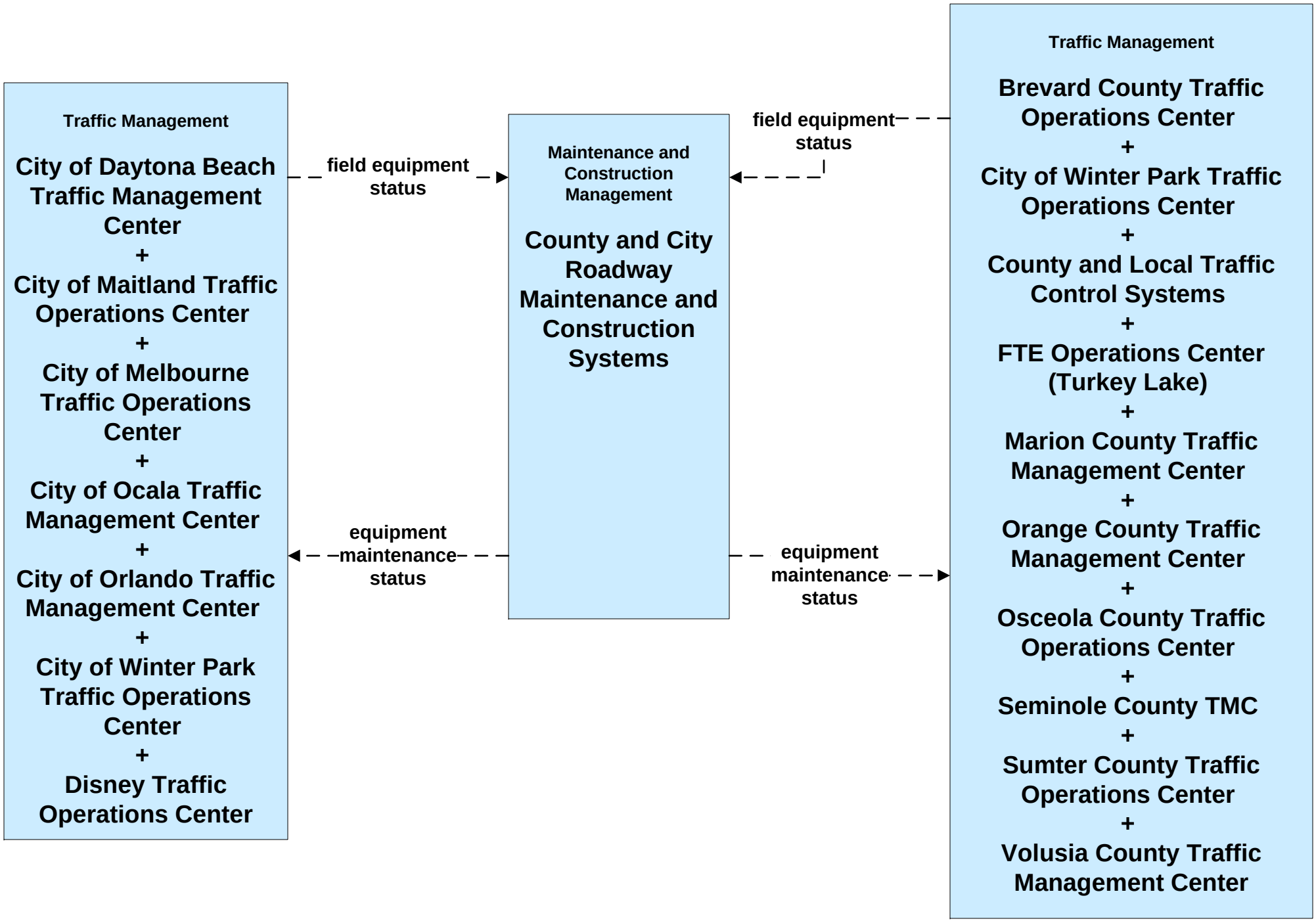
EM09 - Evacuation and Reentry Management
County EOCs (2 of 3)



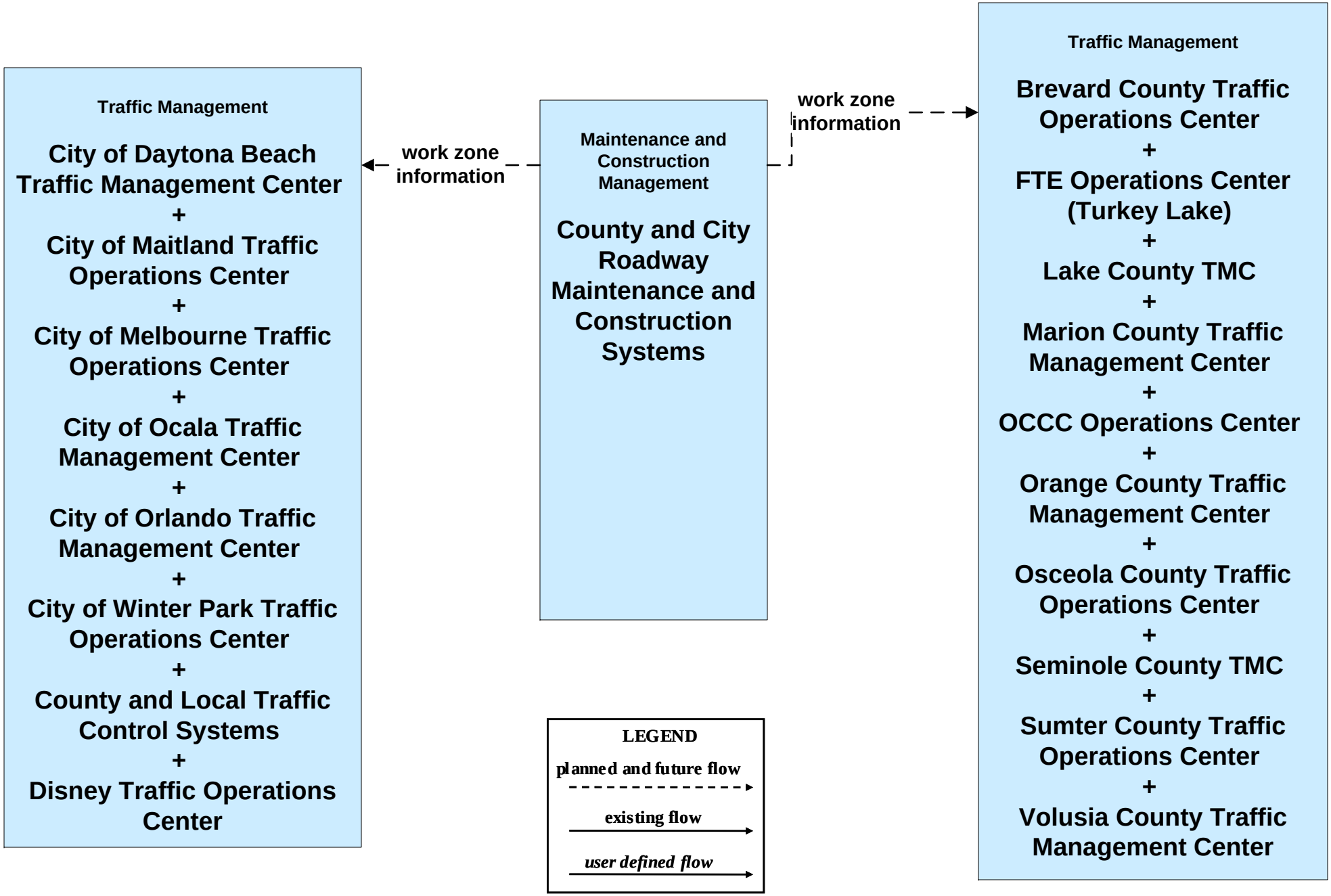
MC03 - Road Weather Data Collection
City of Ocala / City of Winter Park



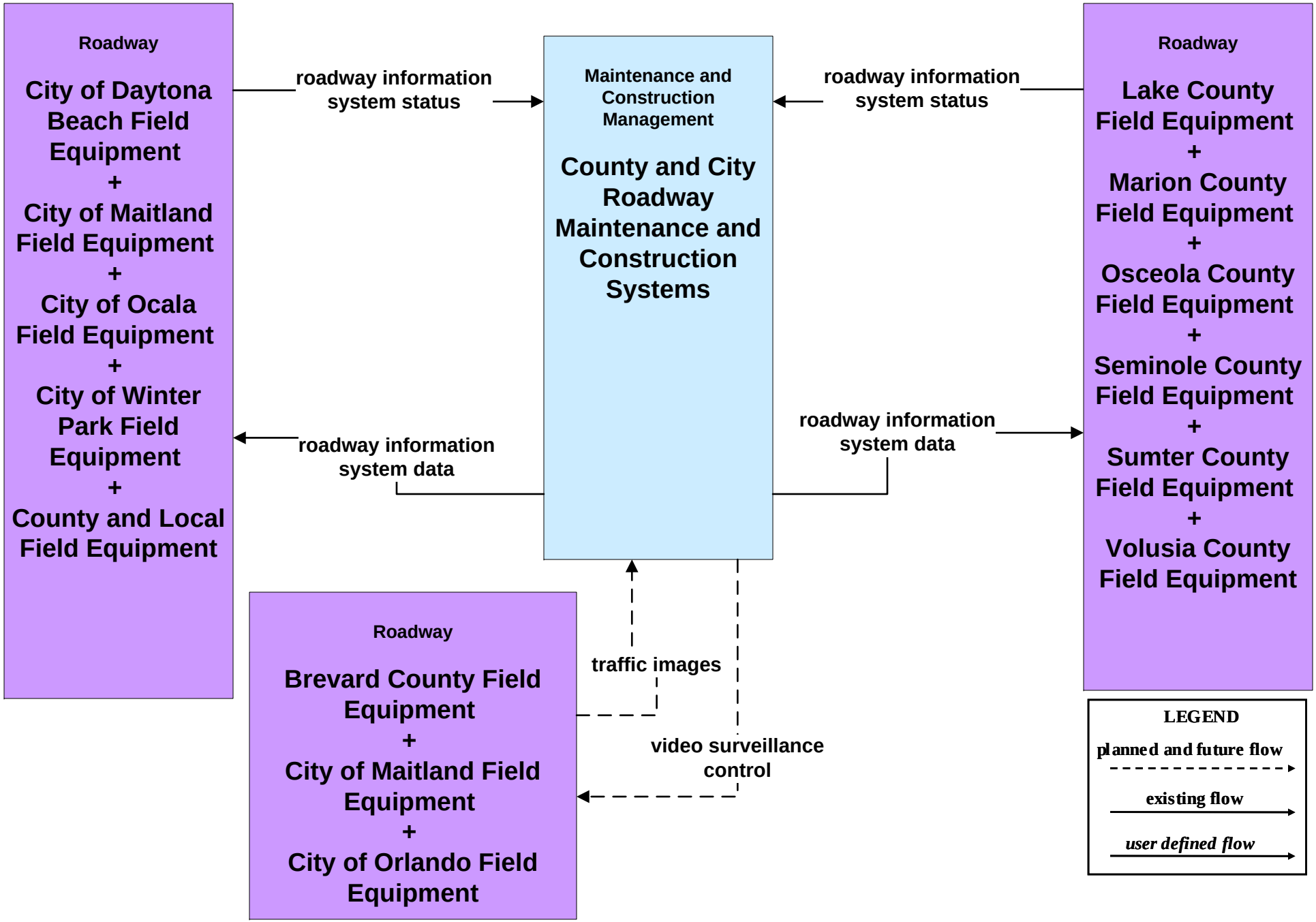
MC07 - Roadway Maintenance and Construction
Counties and Cities (2 of 2)



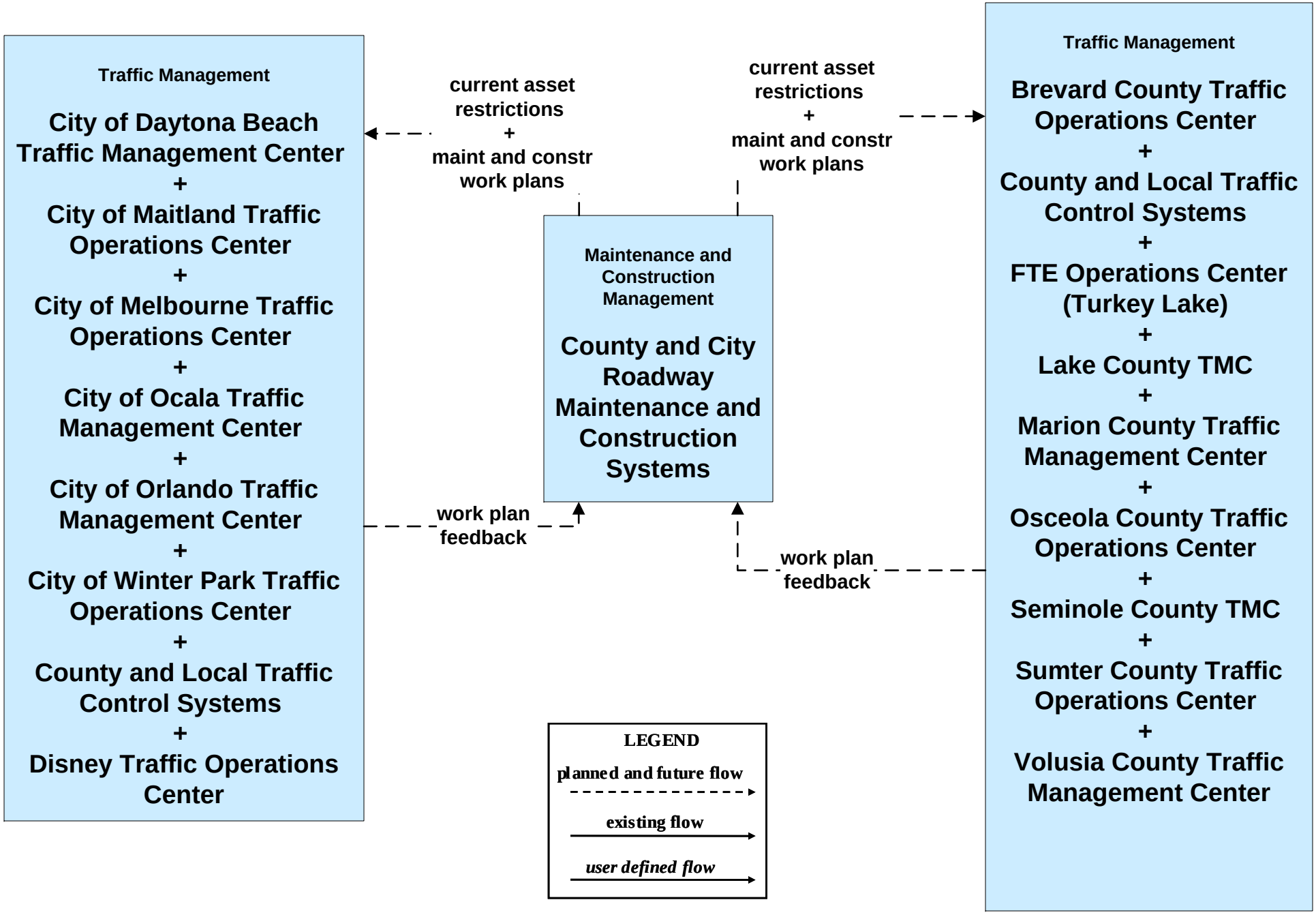
MC08 - Work Zone Management
Counties and Cities (2 of 3)



MC08 - Work Zone Management
Counties and Cities (3 of 3)



MC10 - Maintenance and Construction Activity Coordination
Counties and Cities (2 of 4)



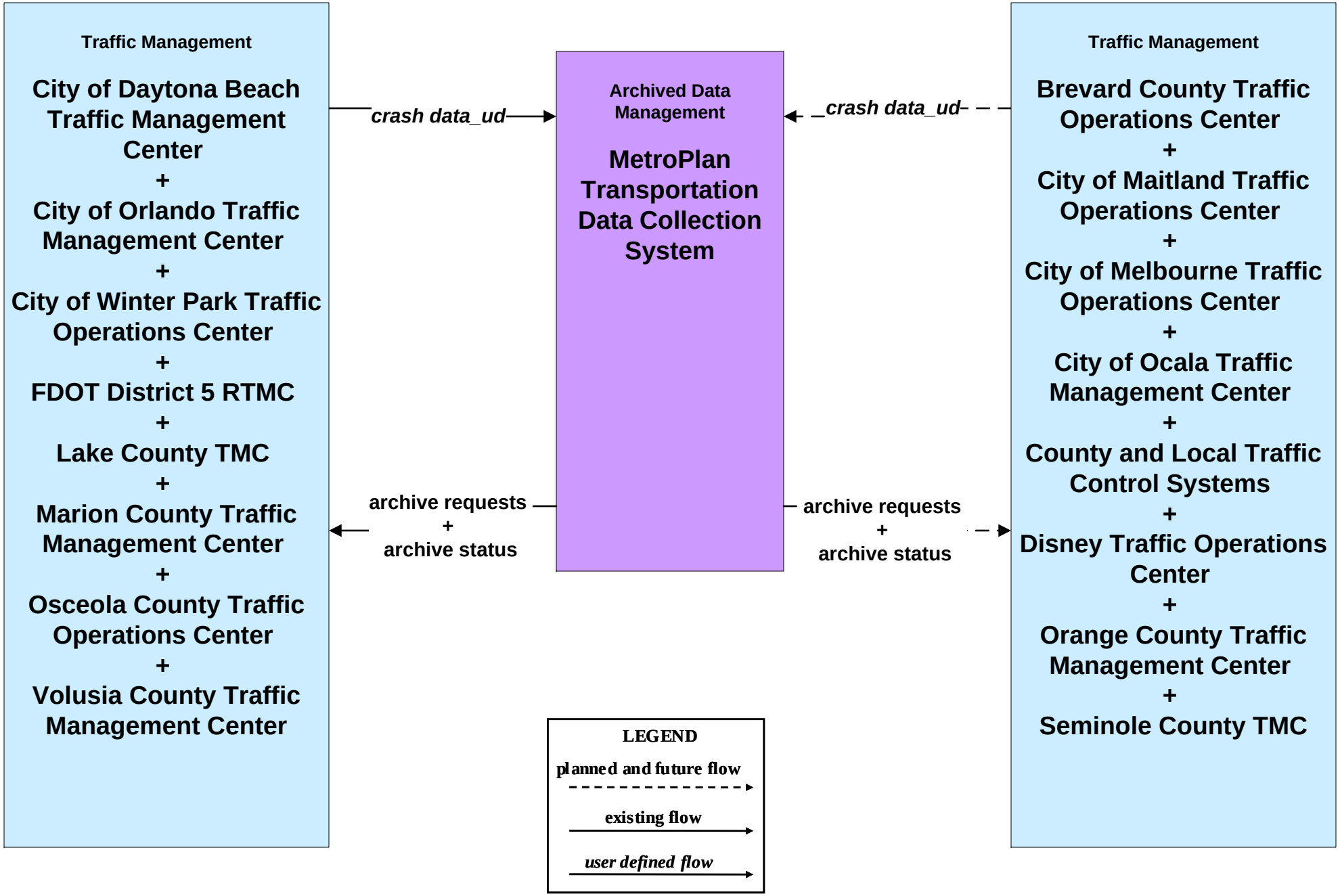
FDOT District 5

Central Florida Regional ITS Architecture

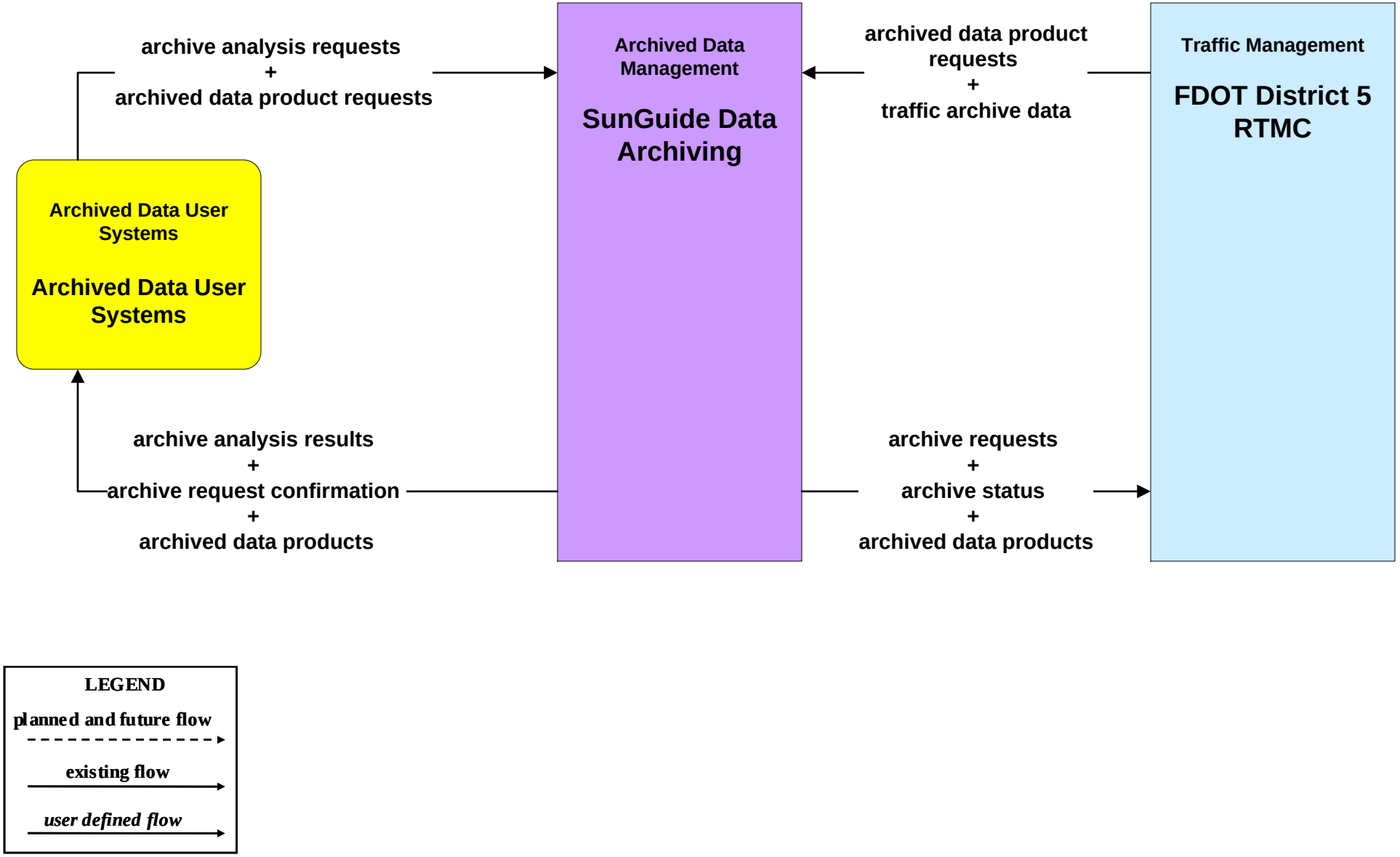
Customized Service Package Diagrams

FDOT District 5

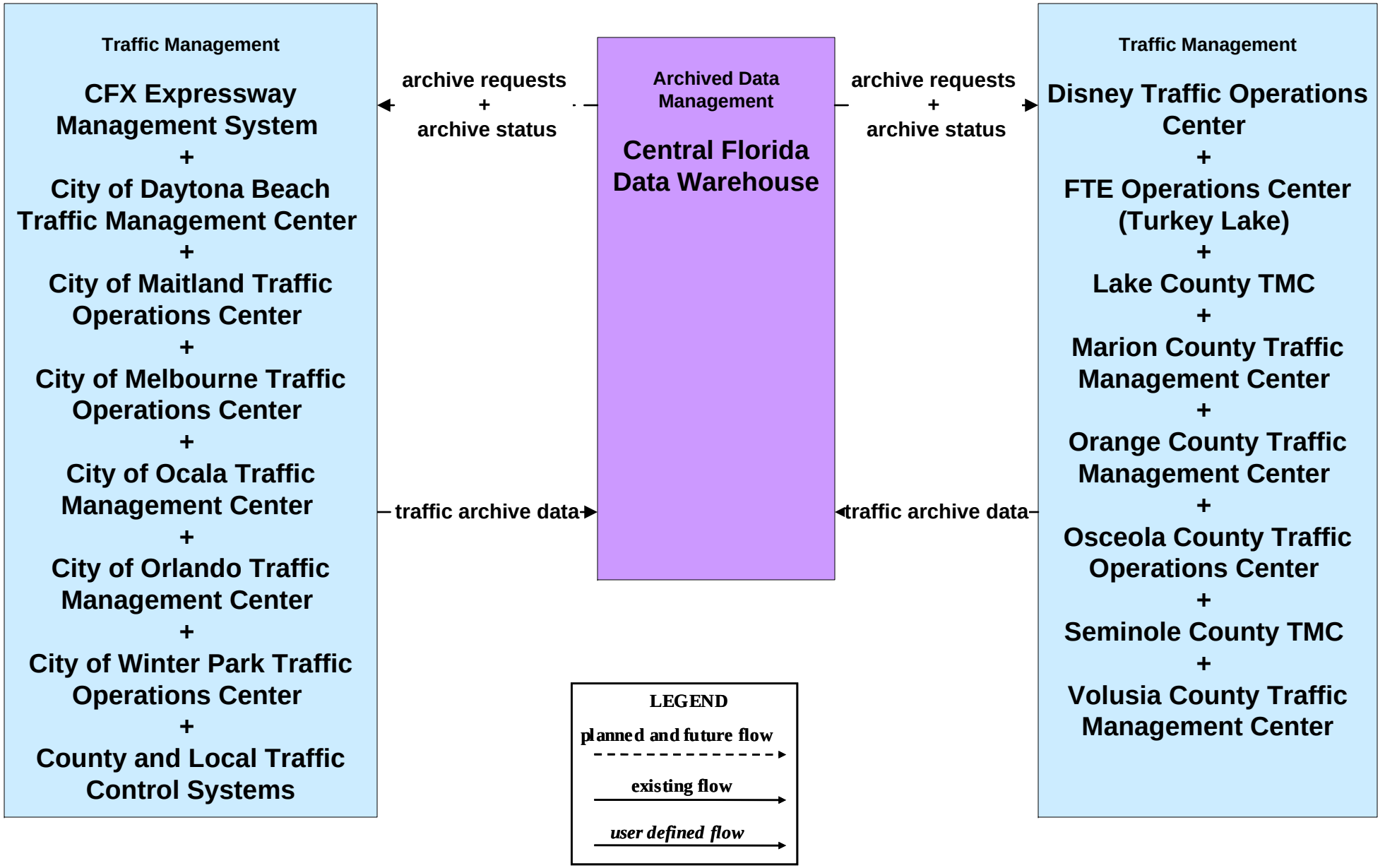
AD1 - ITS Data Mart
MetroPlan Transportation Data Collection System (1 of 2)



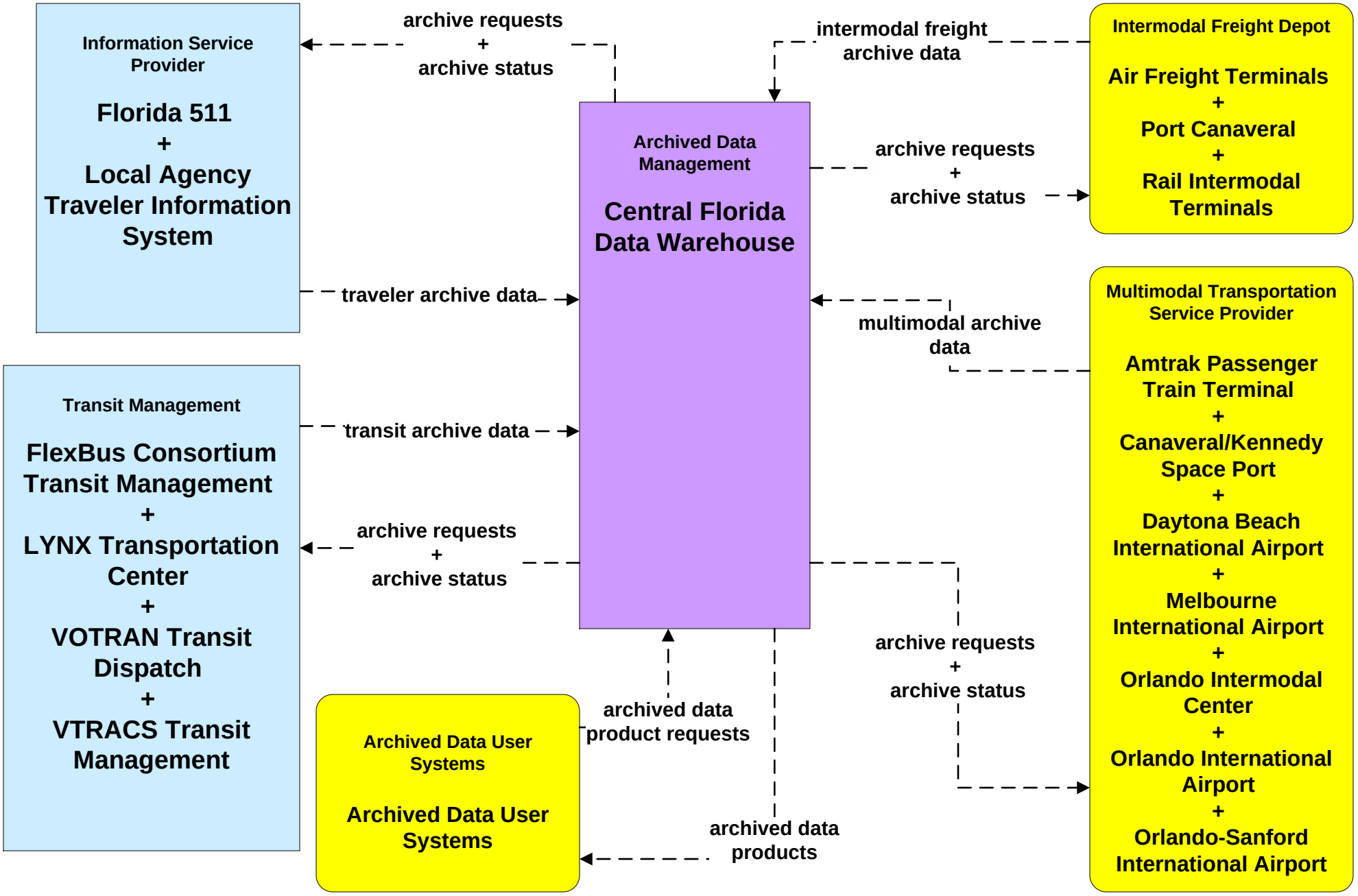
AD2 - ITS Data Warehouse
SunGuide Data Archiving



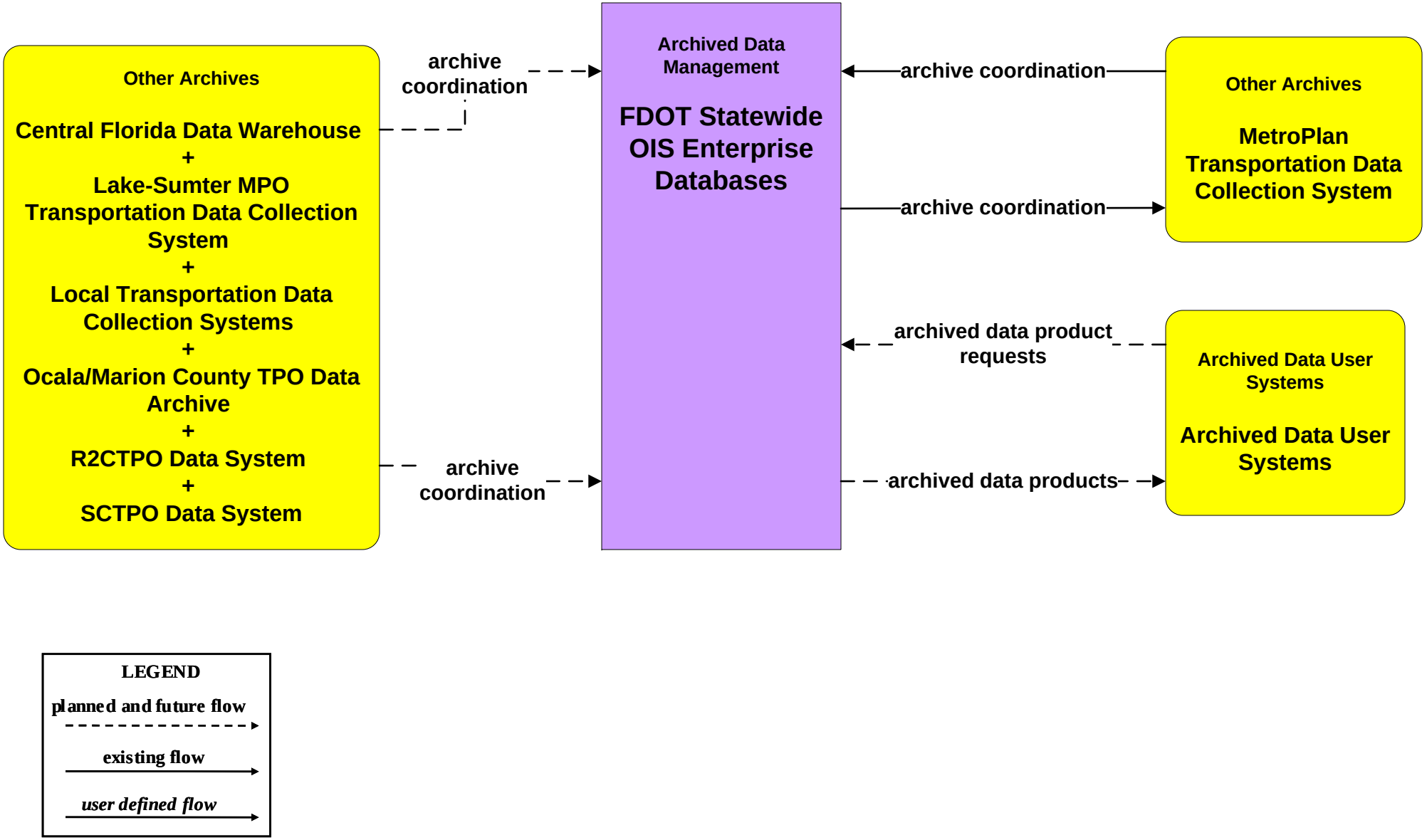
AD2 - ITS Data Warehouse
Central Florida Data Warehouse (1 of 2)



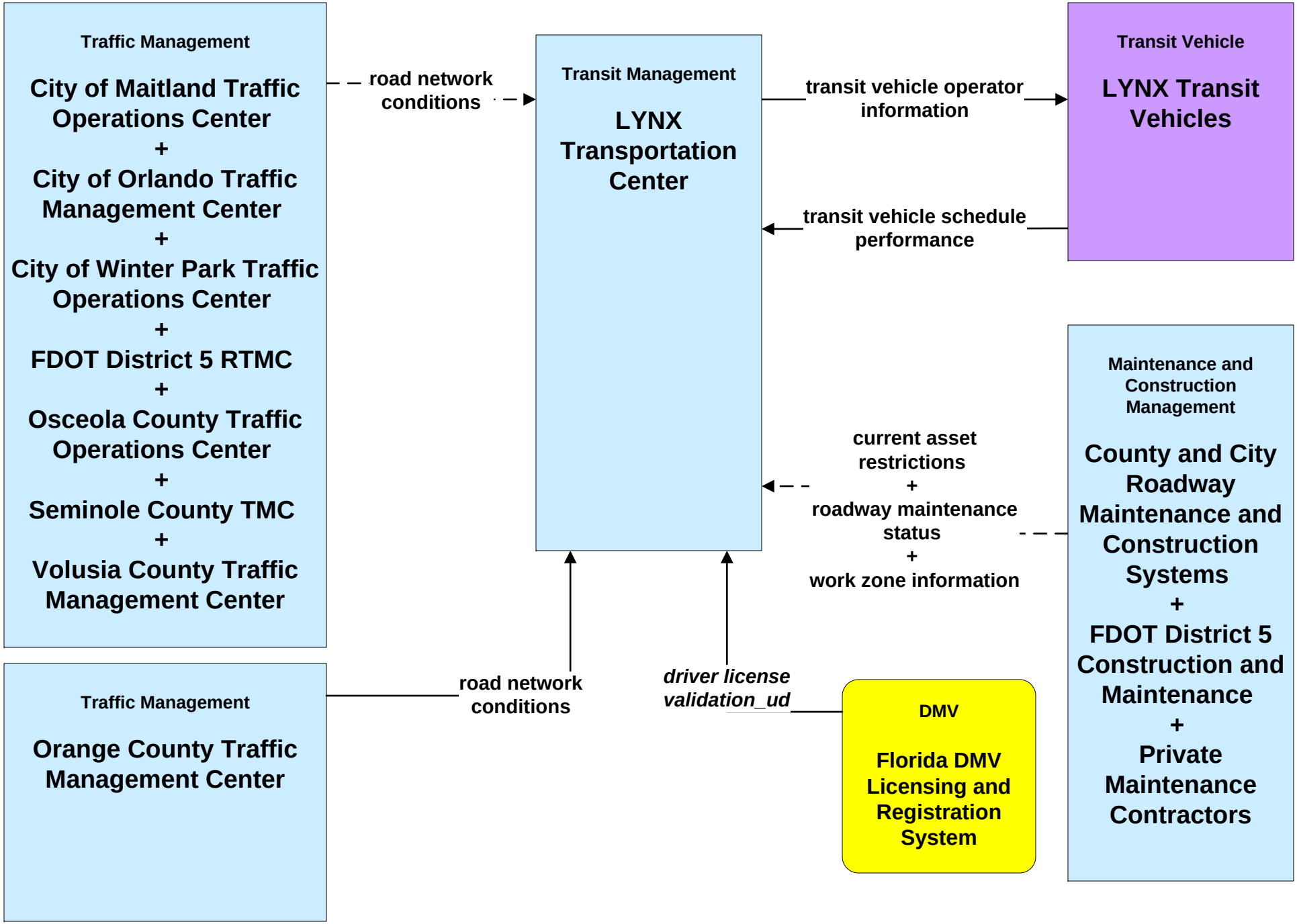
AD2 - ITS Data Warehouse
Central Florida Data Warehouse (2 of 2)



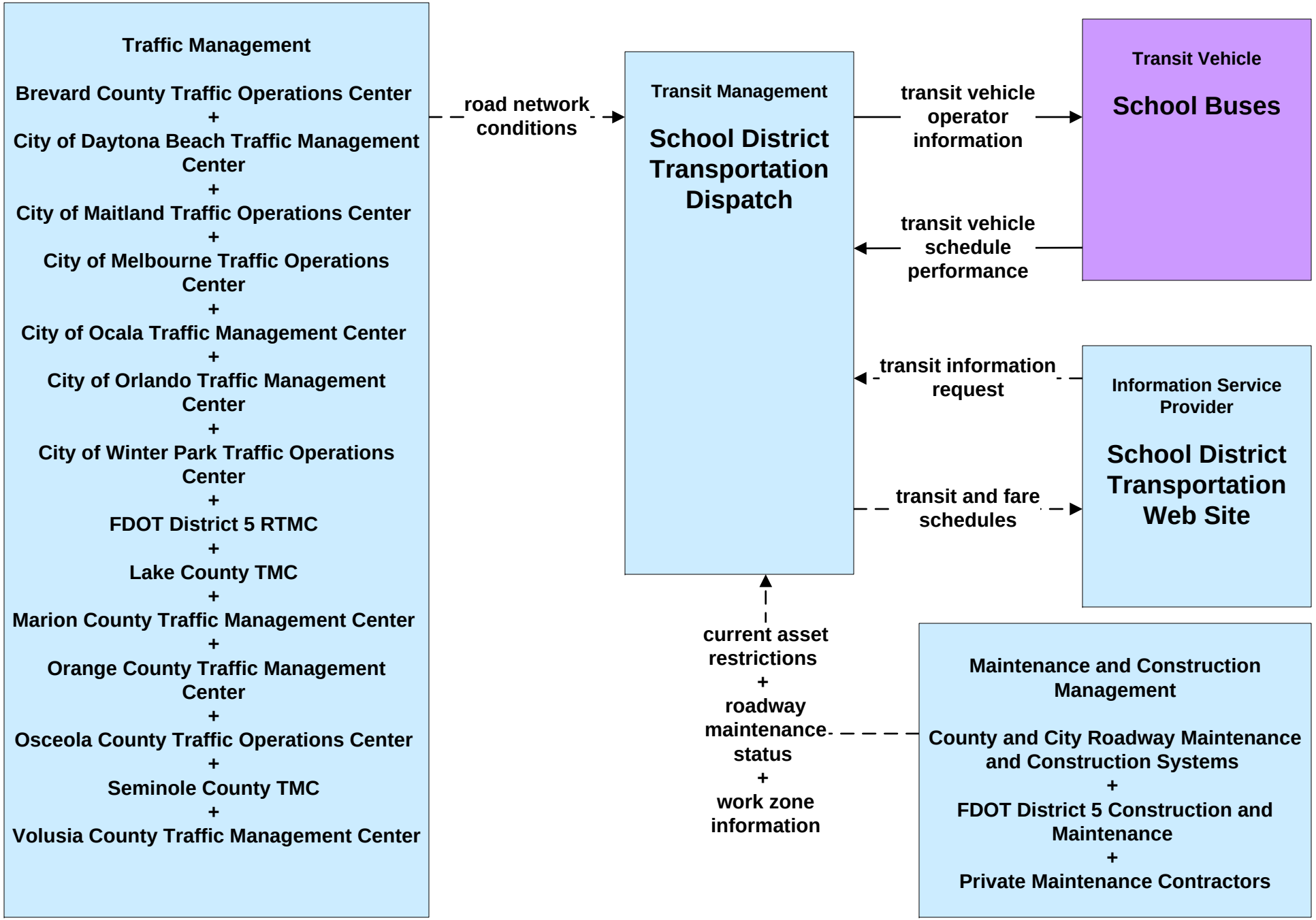
AD3 - ITS Virtual Data Warehouse
FDOT Statewide OIS Enterprise Databases



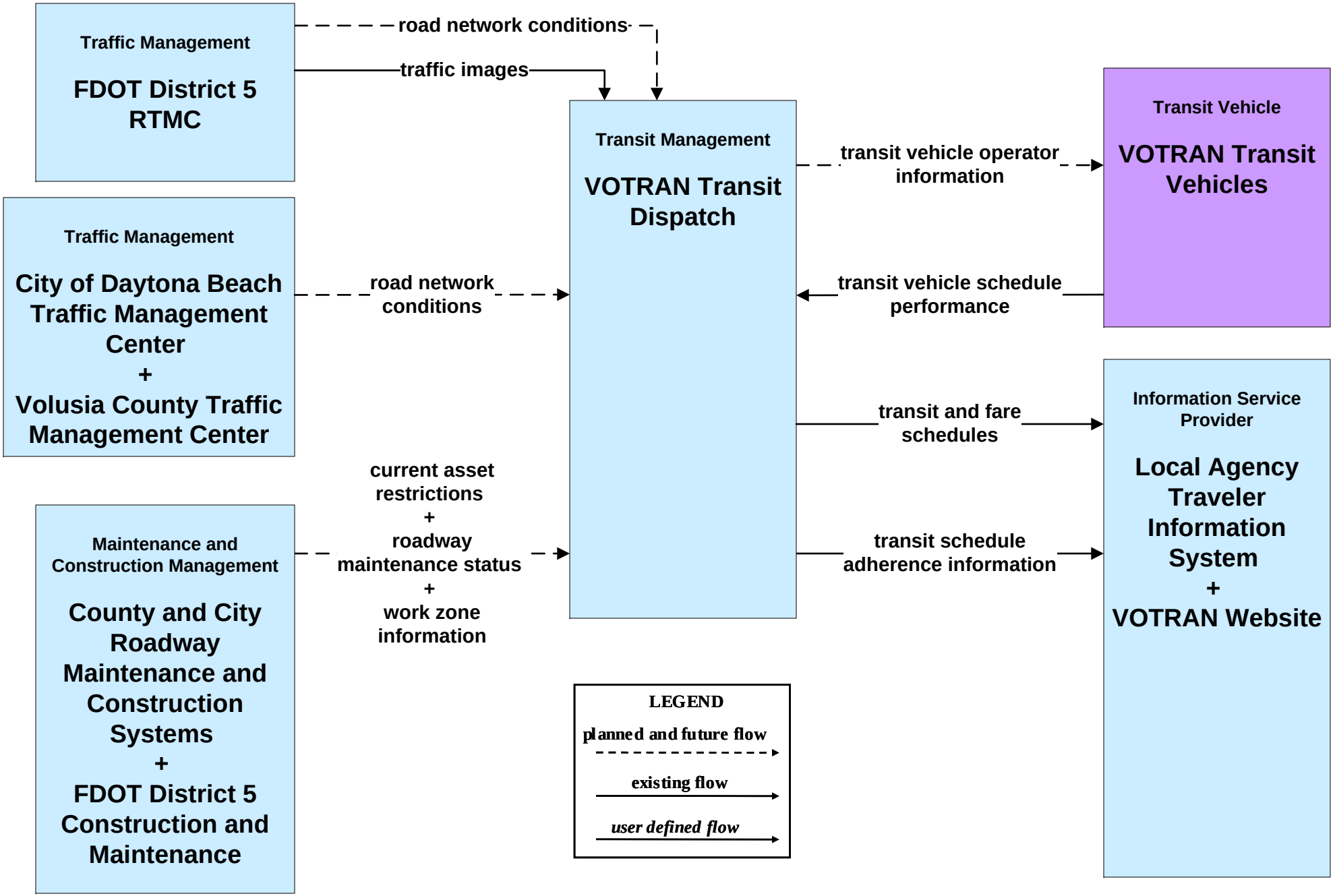
APTS02 - Transit Fixed-Route Operations
LYNX Operations Center



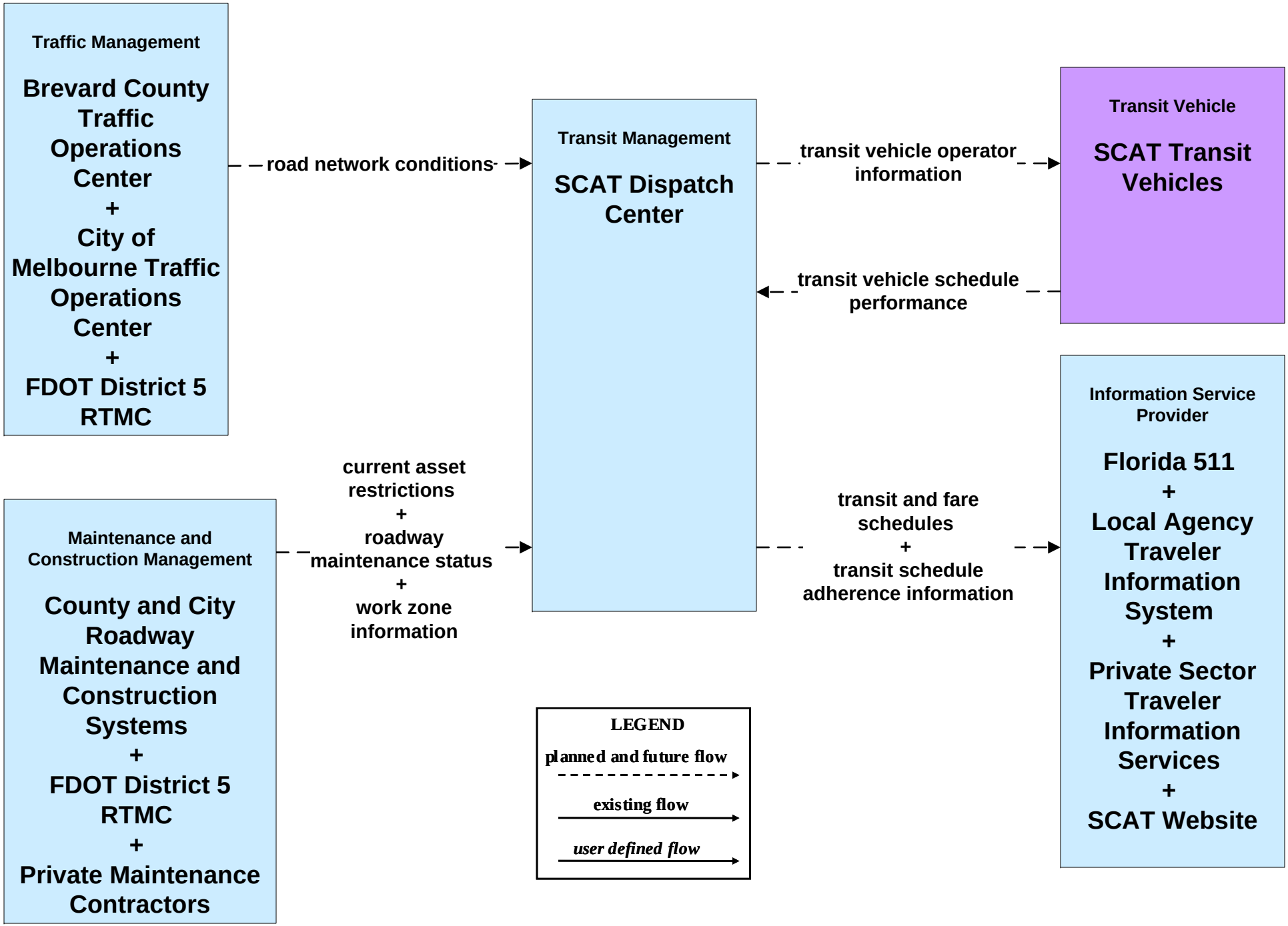
APTS02 - Transit Fixed-Route Operations
School District Transportation Dispatch



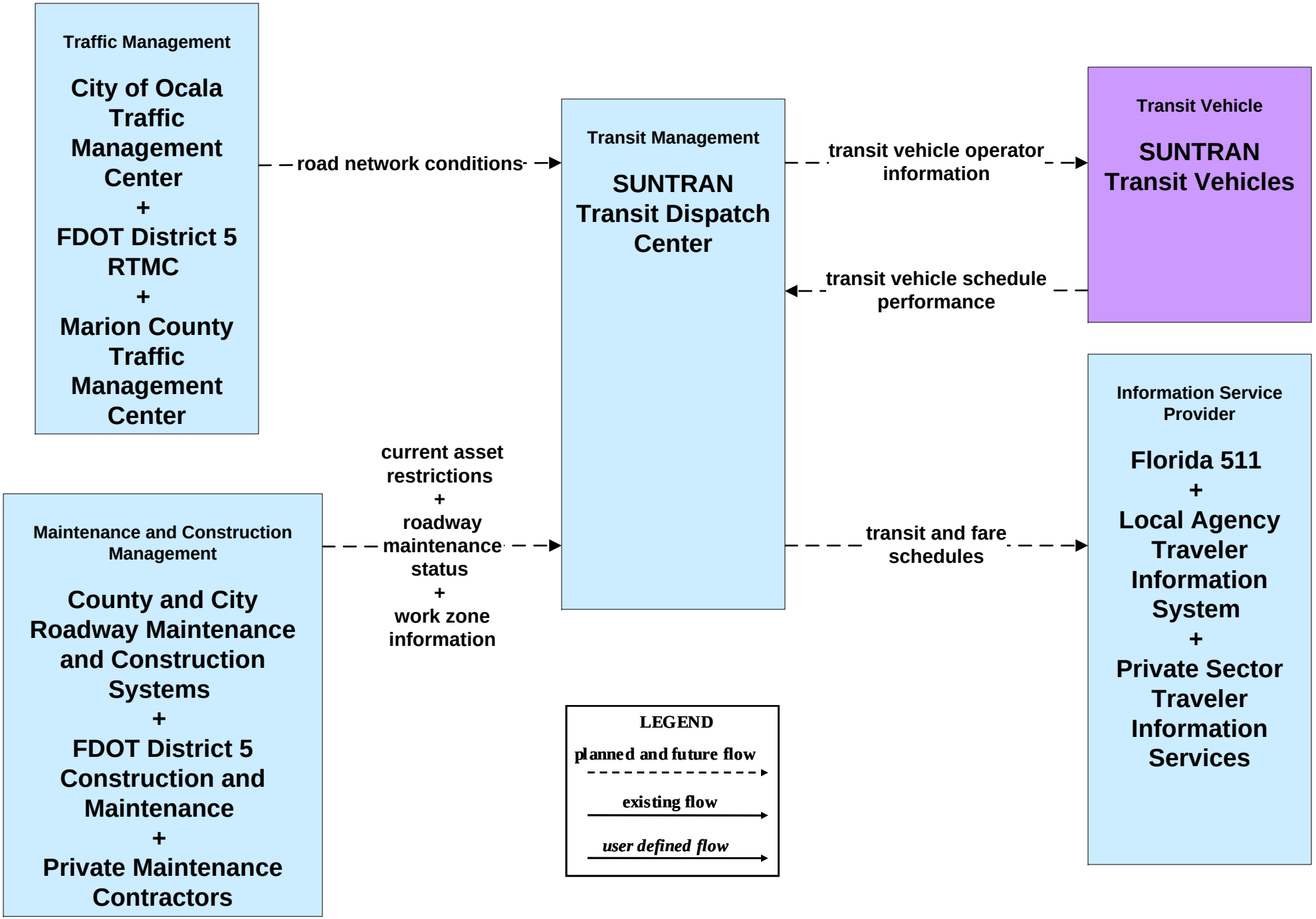
APTS02 - Transit Fixed-Route Operations
VOTRAN Transit Dispatch



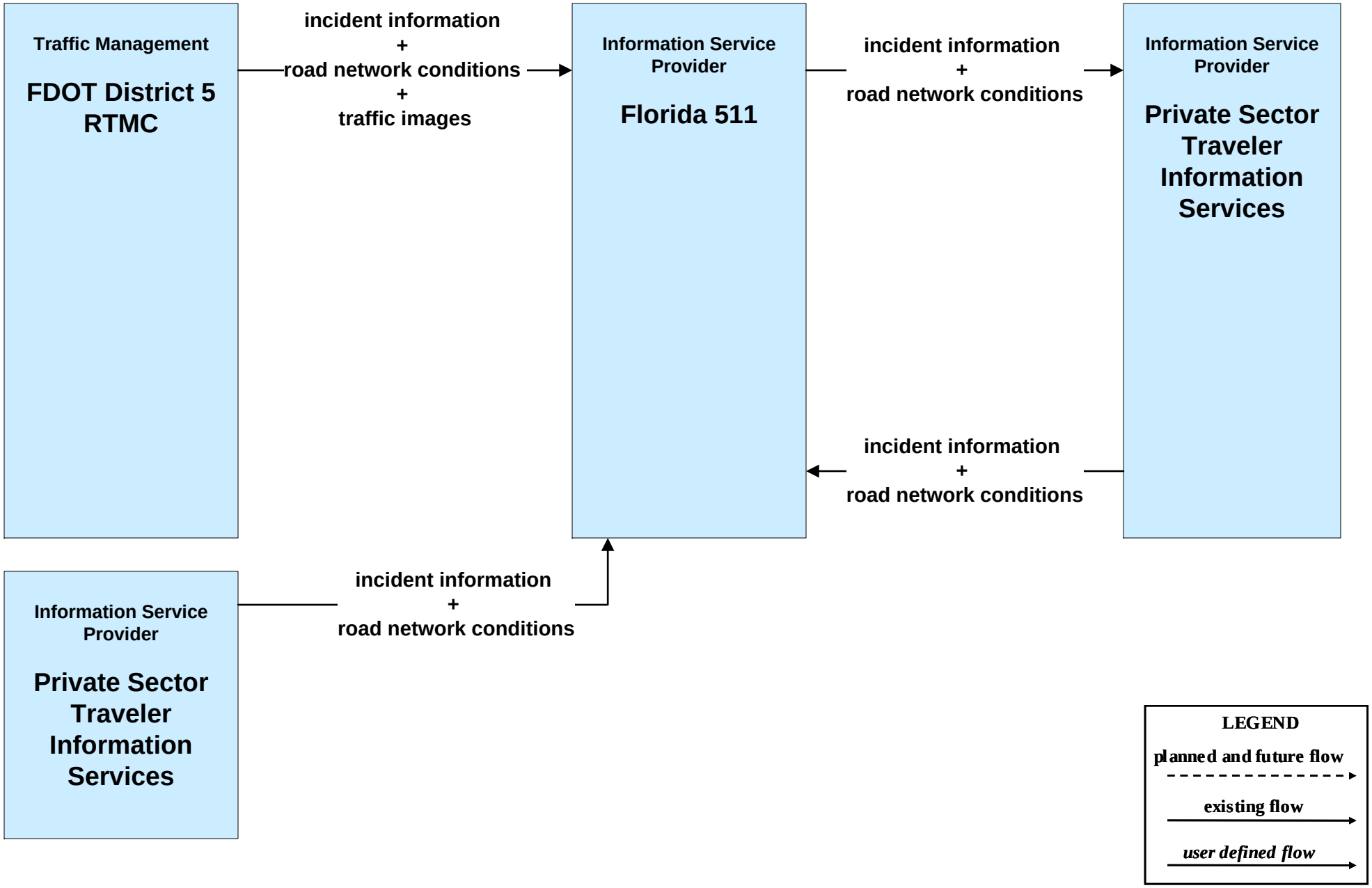
APTS02 - Transit Fixed-Route Operations
SCAT Transit



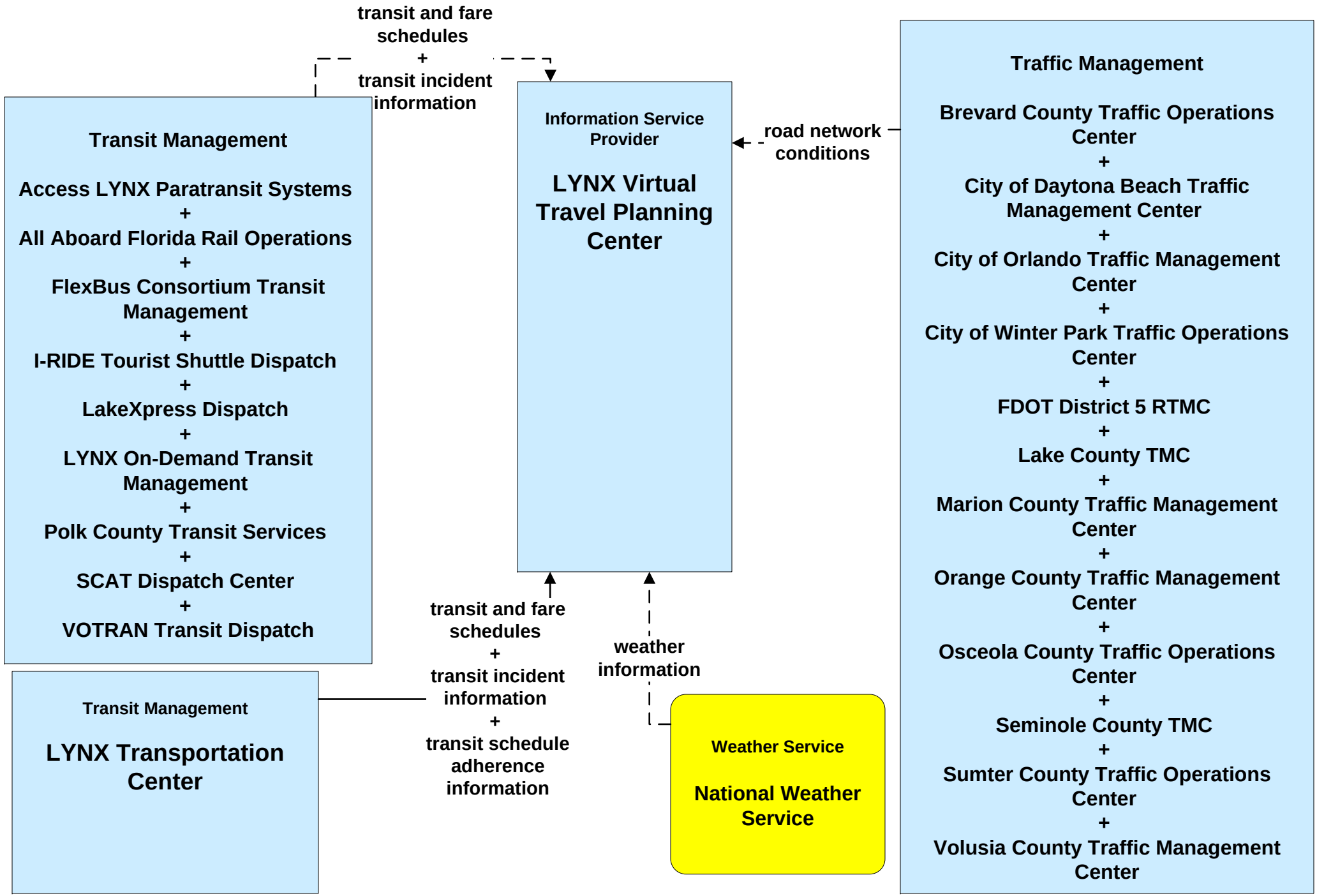
APTS02 - Transit Fixed-Route Operations
SUNTRAN



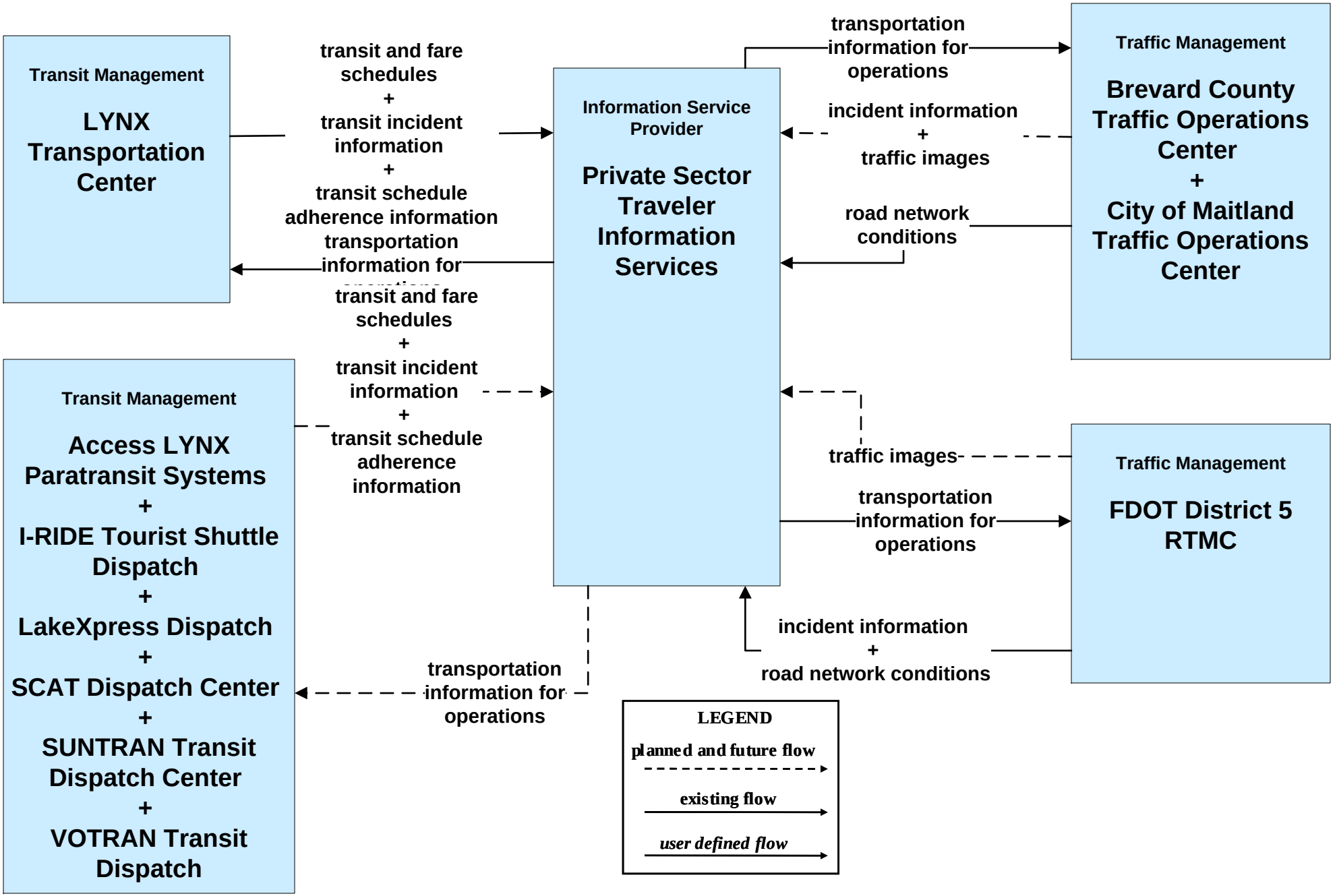
ATIS01 - Broadcast Traveler Information
Florida 511/Private Sector ISPs (1 of 3)



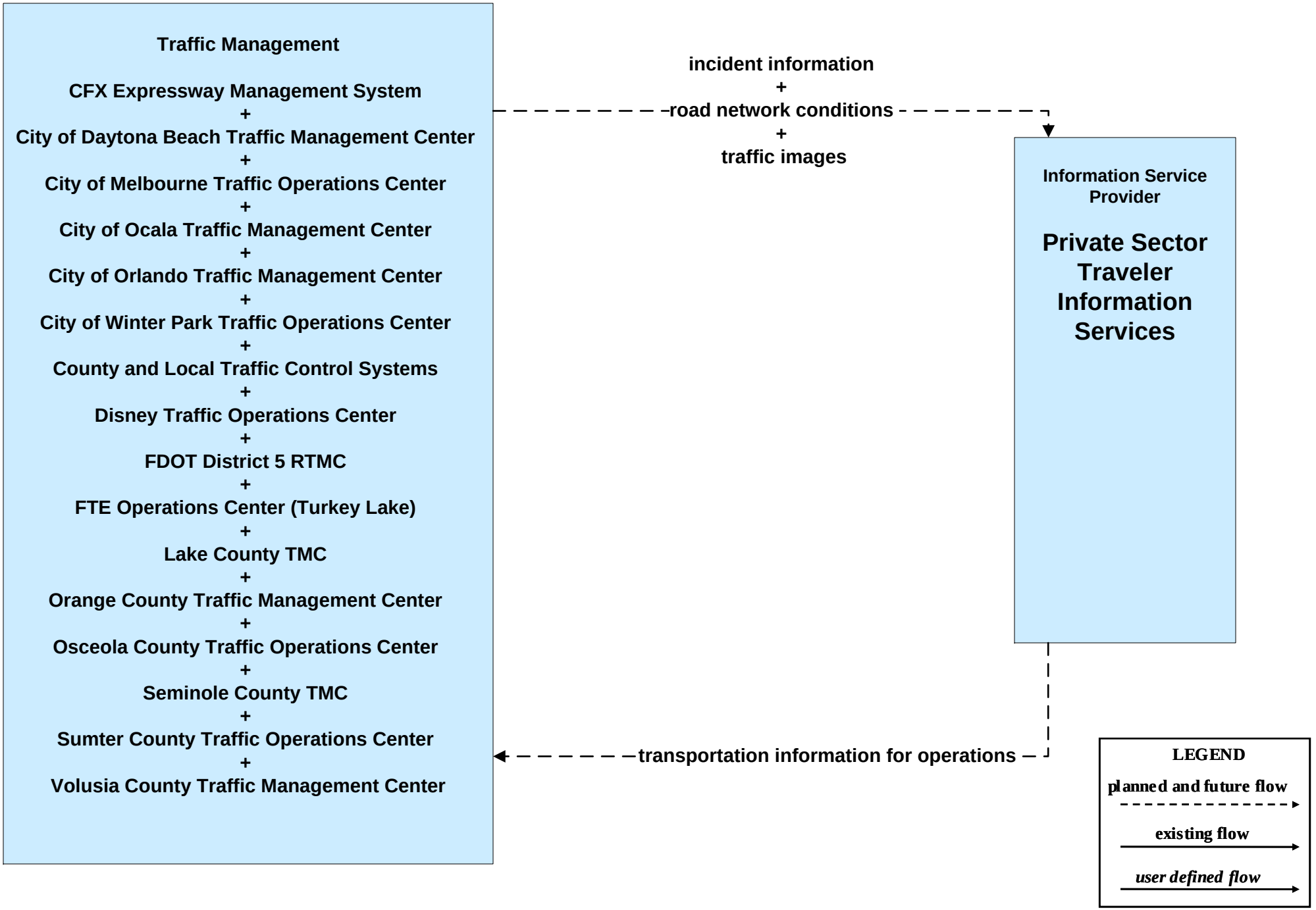
ATIS02 - Interactive Traveler Information
Virtual Travel Planning Center (1 of 2)



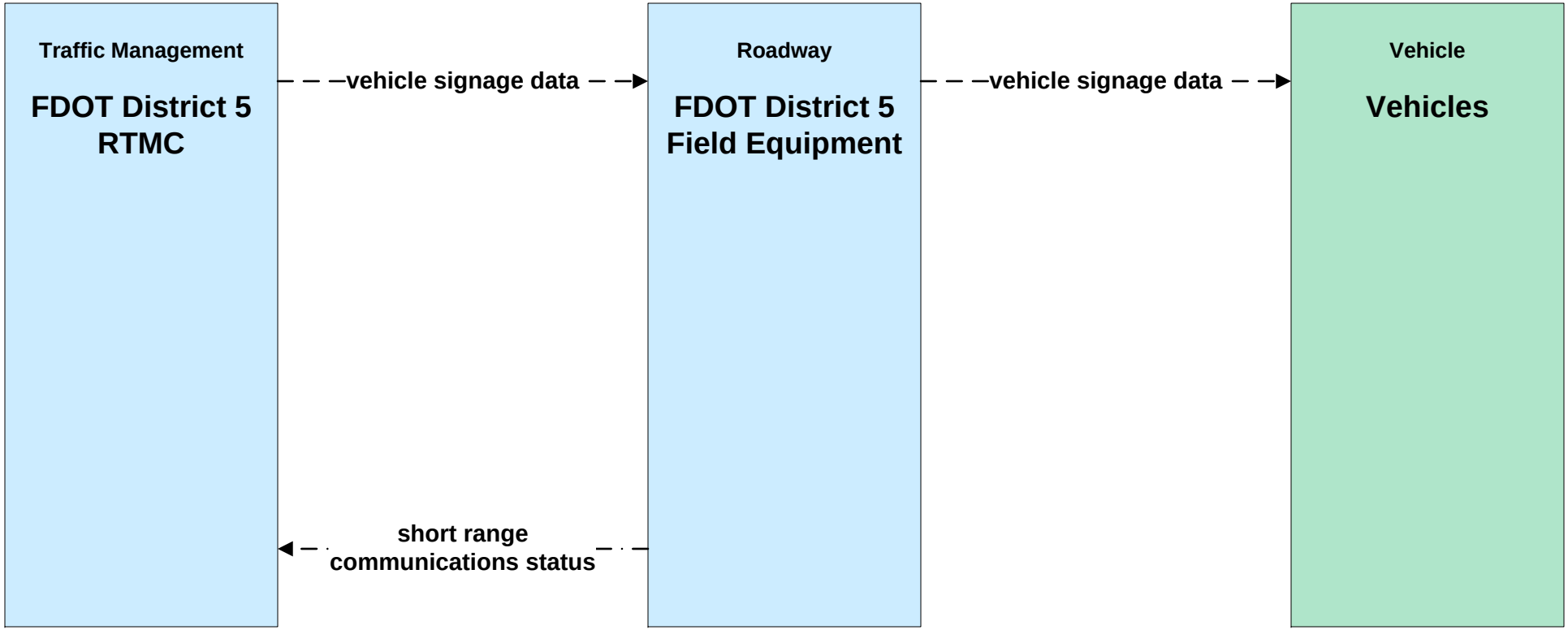
ATIS06 - Transportation Operations Data Sharing
Private Sector ISPs (1 of 2)

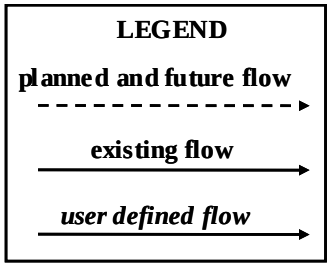


ATIS06 - Transportation Operations Data Sharing
Private Sector ISPs (2 of 2)

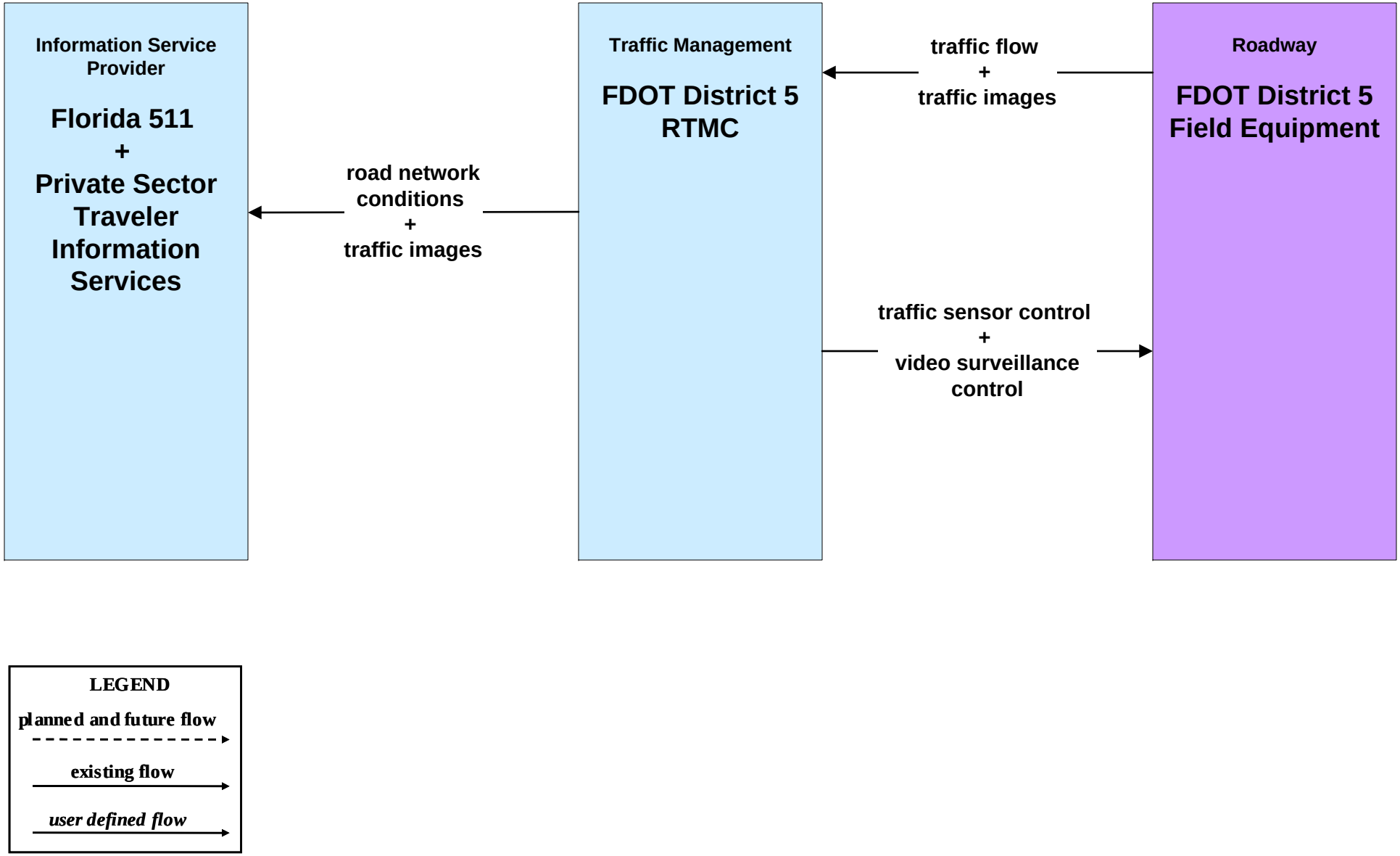


ATIS09 - In-Vehicle Signing
FDOT

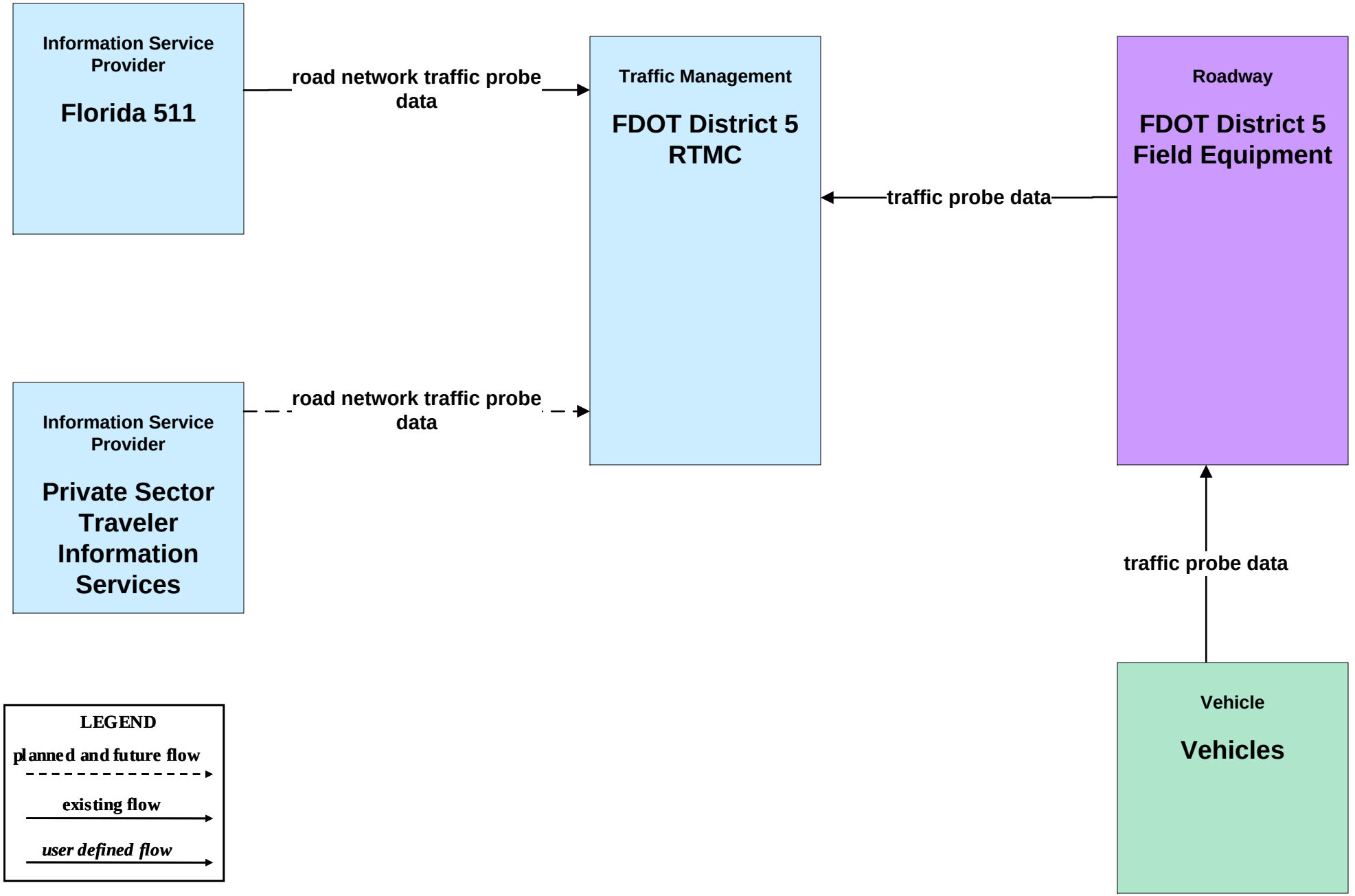




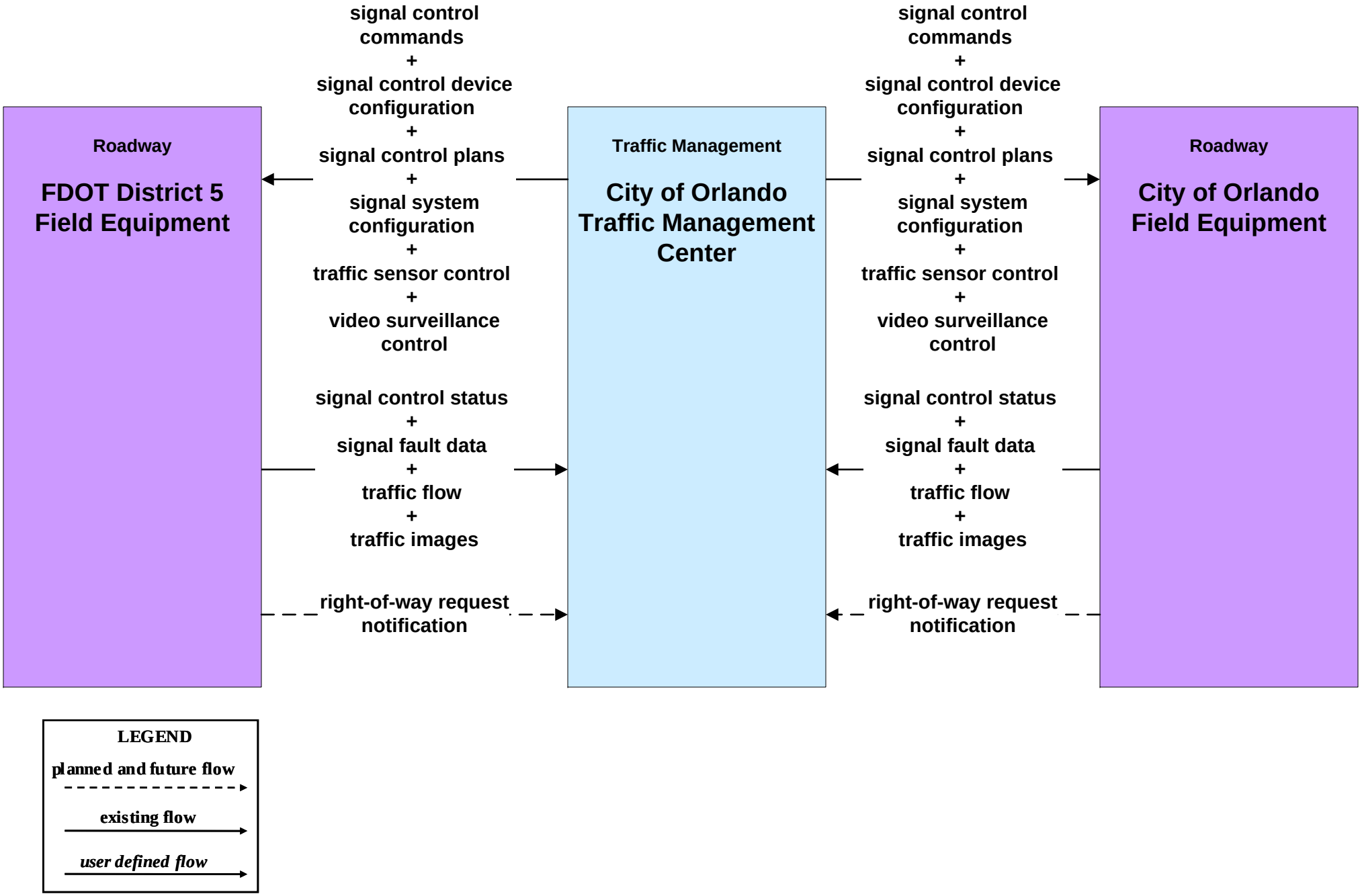
ATMS01 - Network Surveillance
FDOT District 5 RTMC



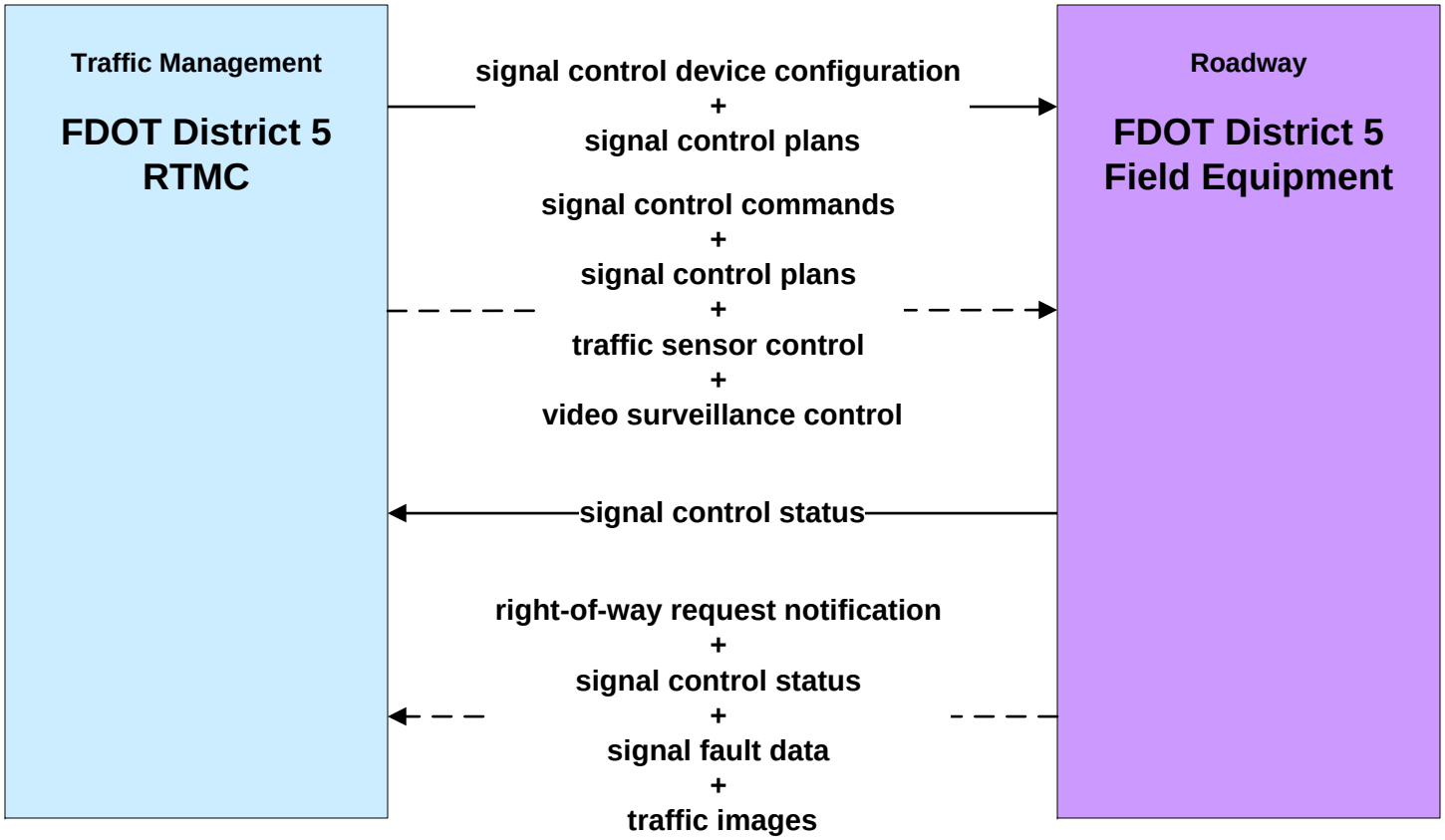
ATMS02 - Traffic Probe Surveillance
FDOT District 5

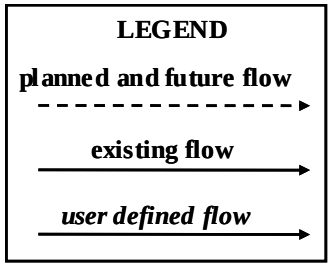


ATMS03 - Traffic Signal Control
City of Orlando

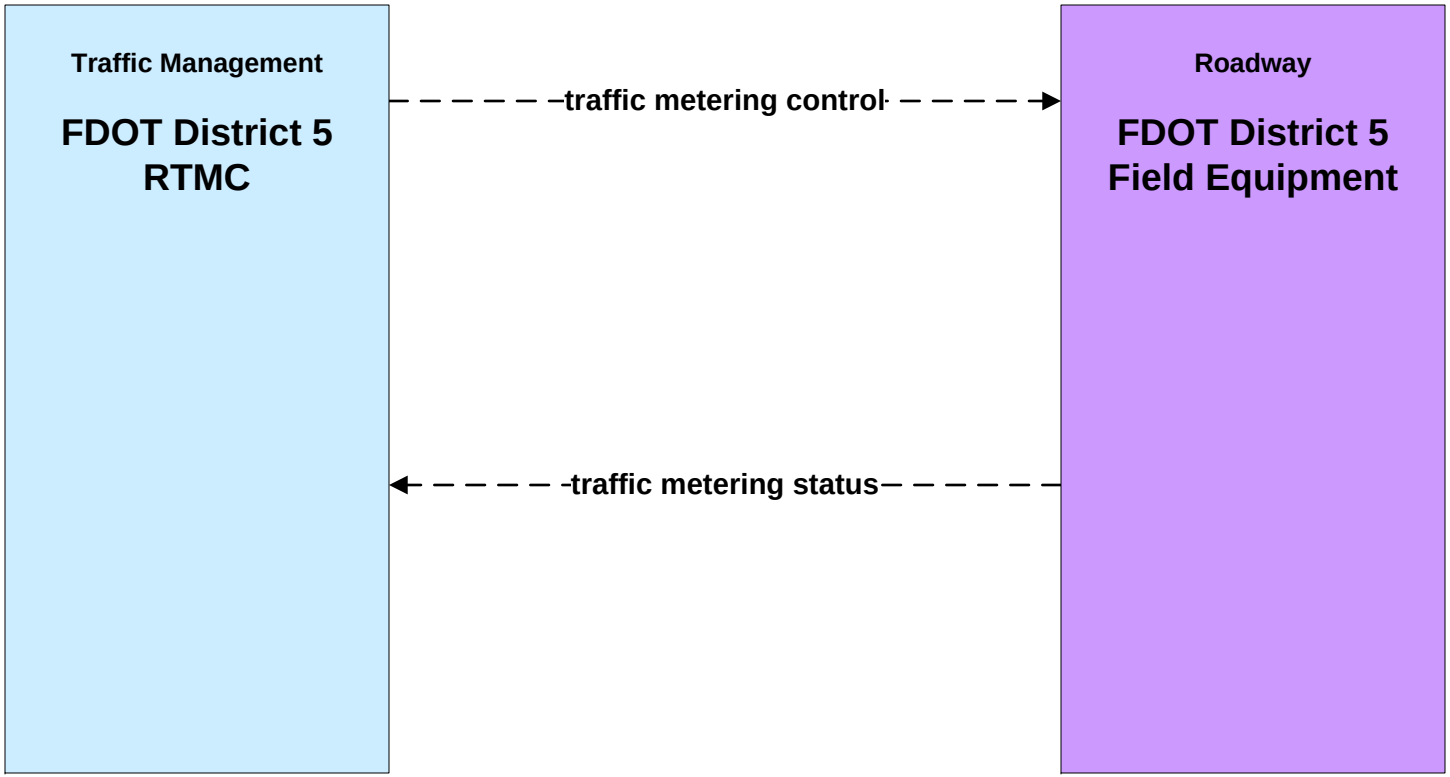


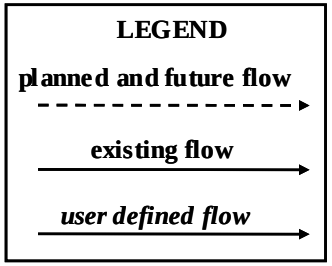
ATMS03 - Traffic Signal Control
FDOT District 5



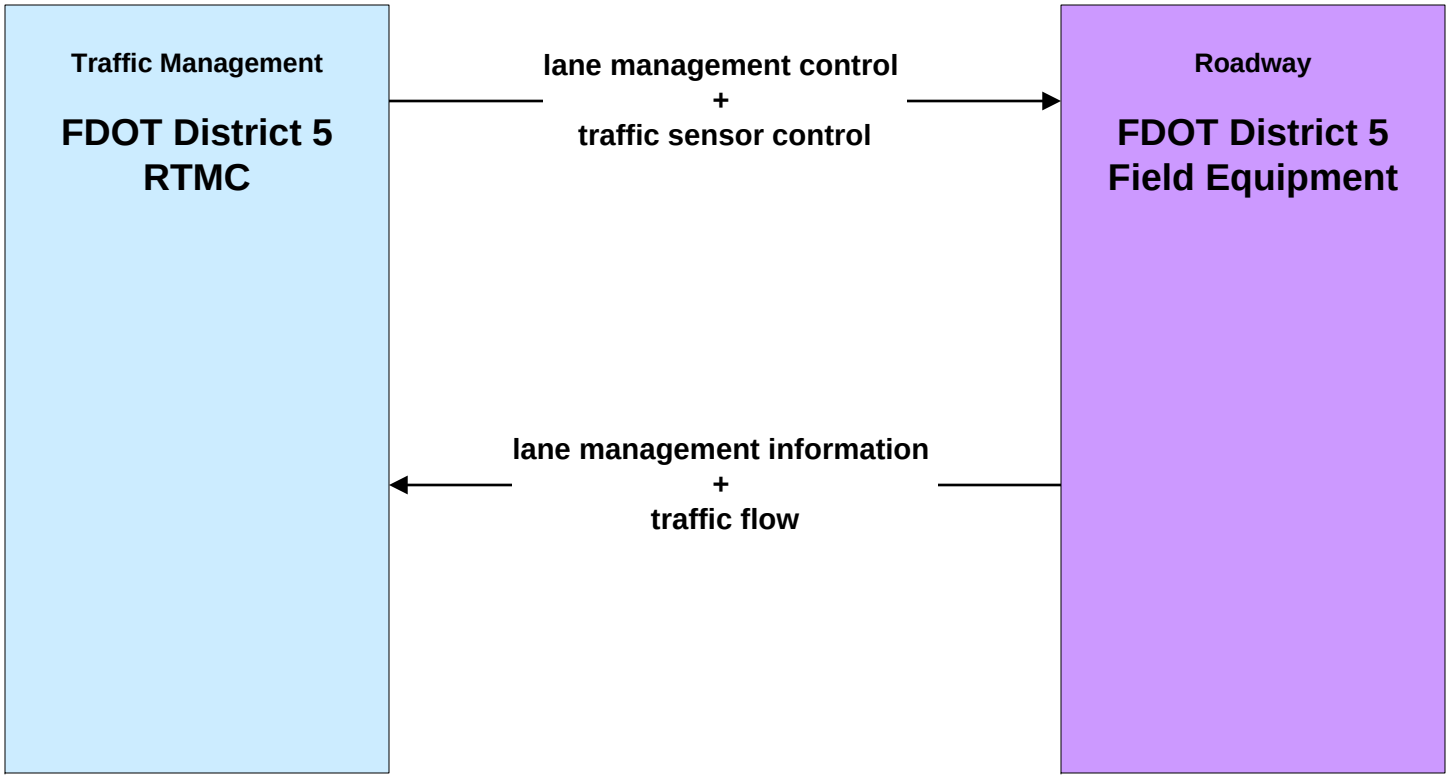


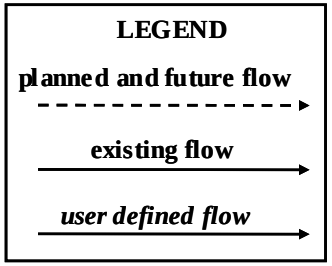
ATMS04 - Traffic Metering
FDOT District 5 RTMC



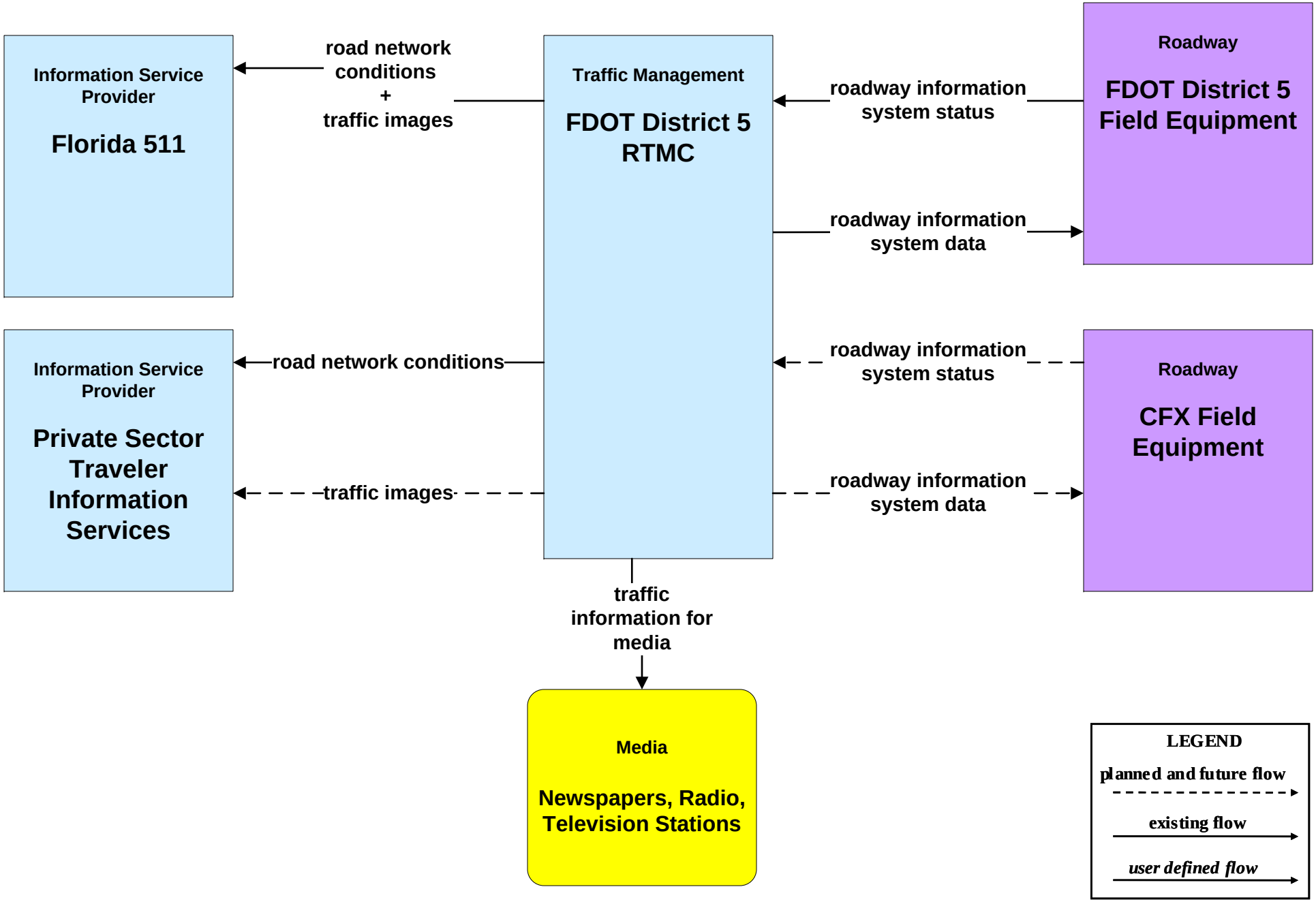


ATMS05 - Express Lane Management
FDOT District 5 Express Lanes

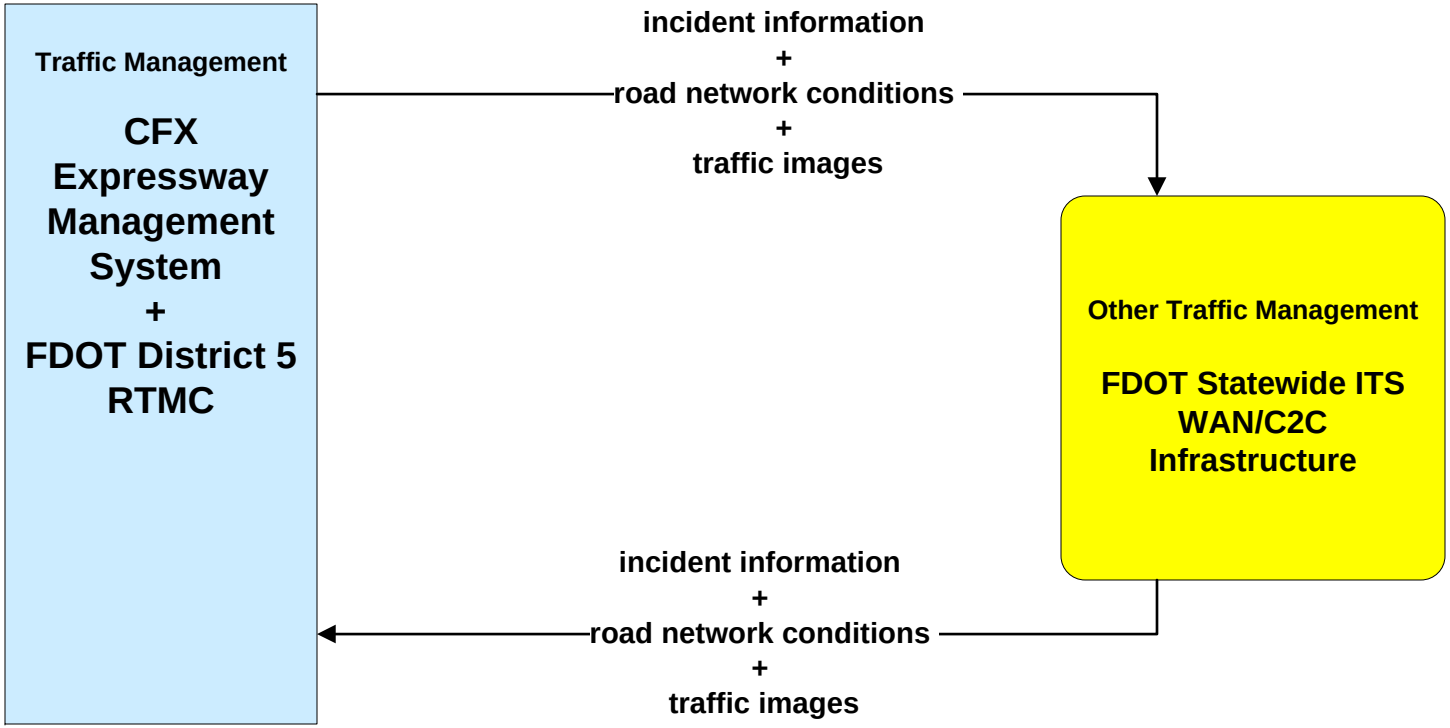


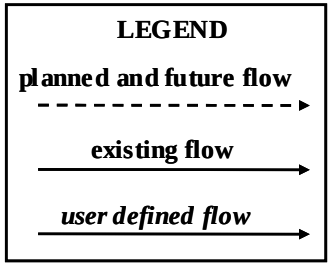


ATMS06 - Traffic Information Dissemination
FDOT District 5

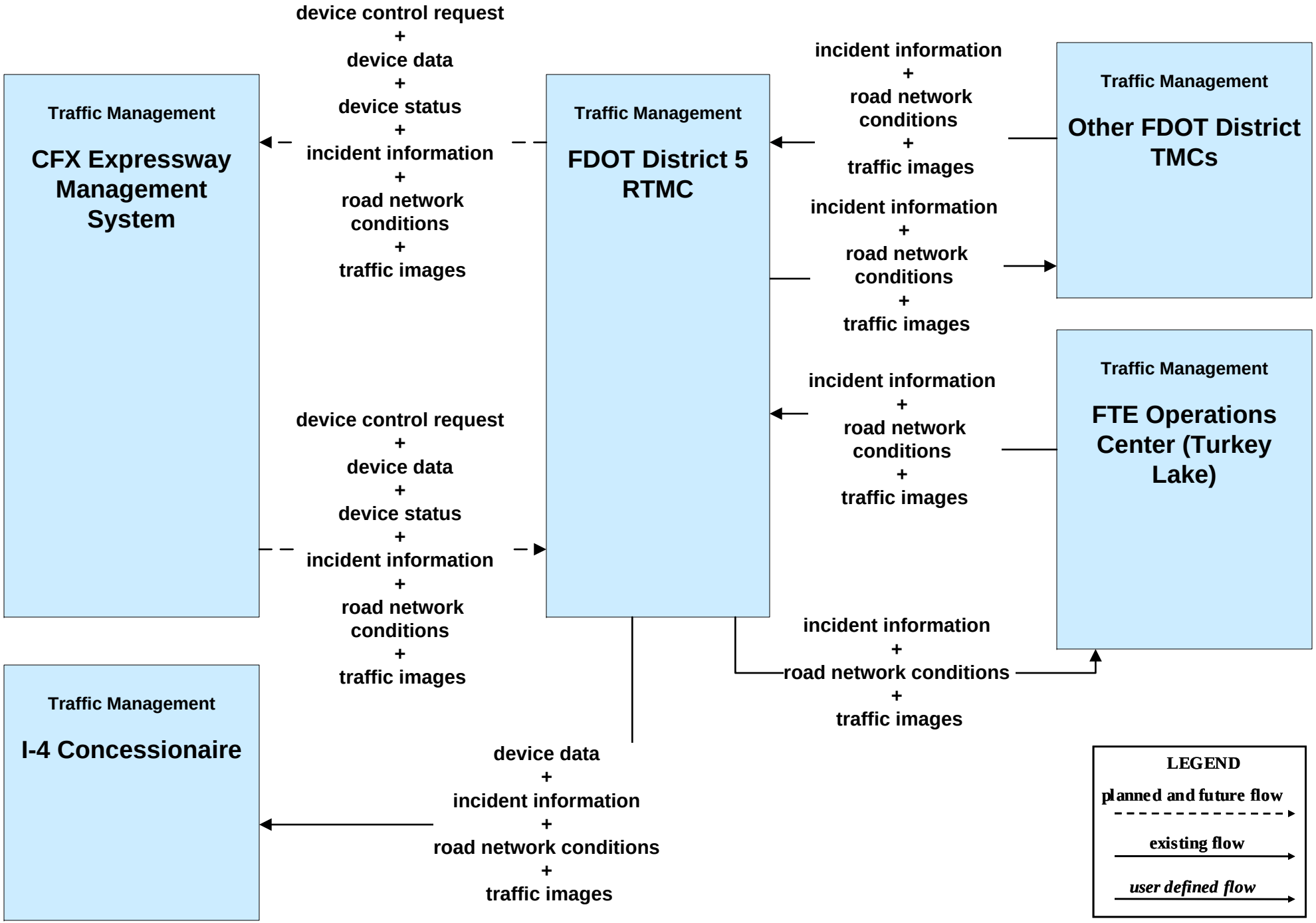


ATMS07 - Regional Traffic Management
FDOT Statewide ITS WAN/C2C Infrastructure

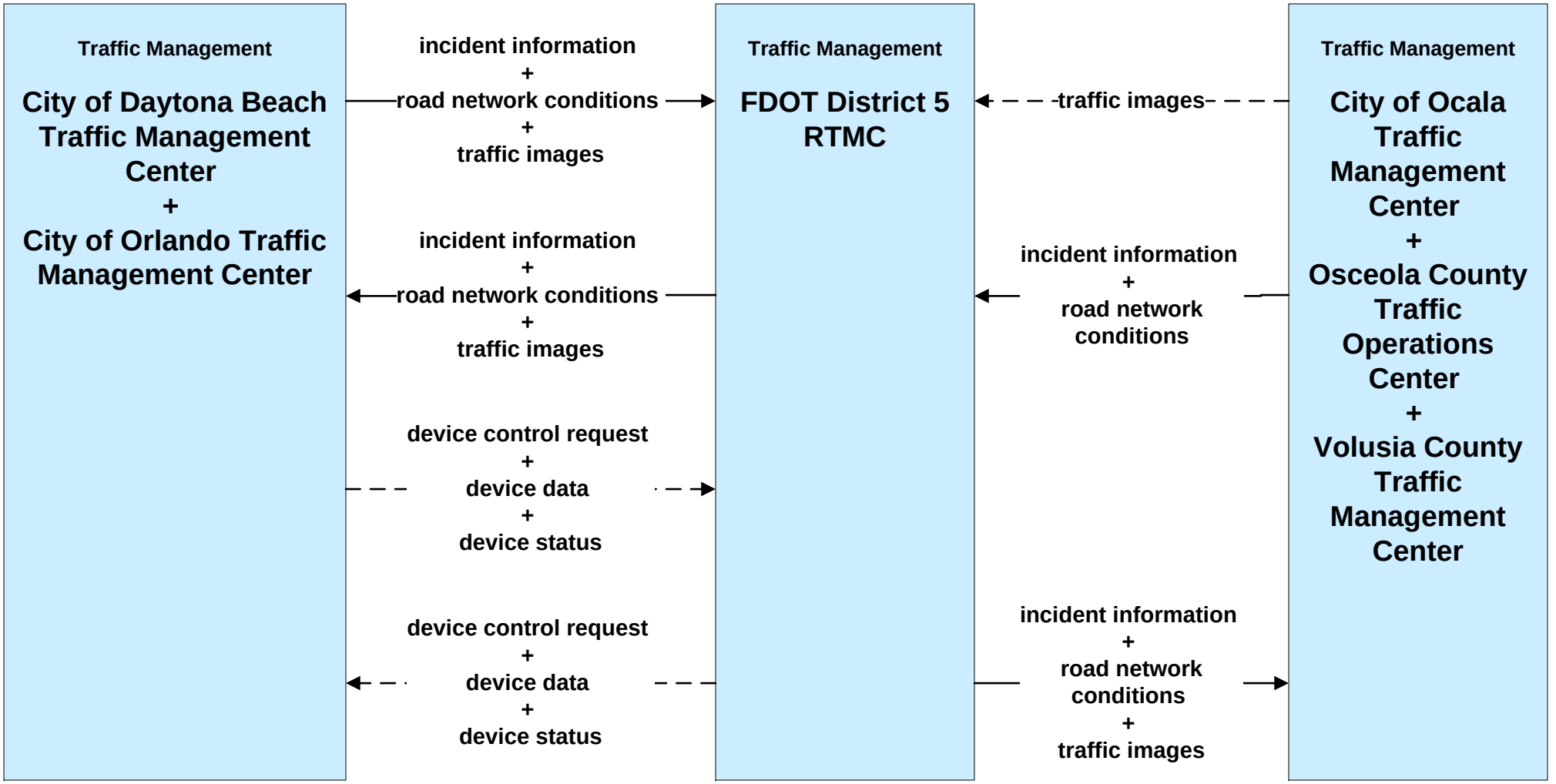




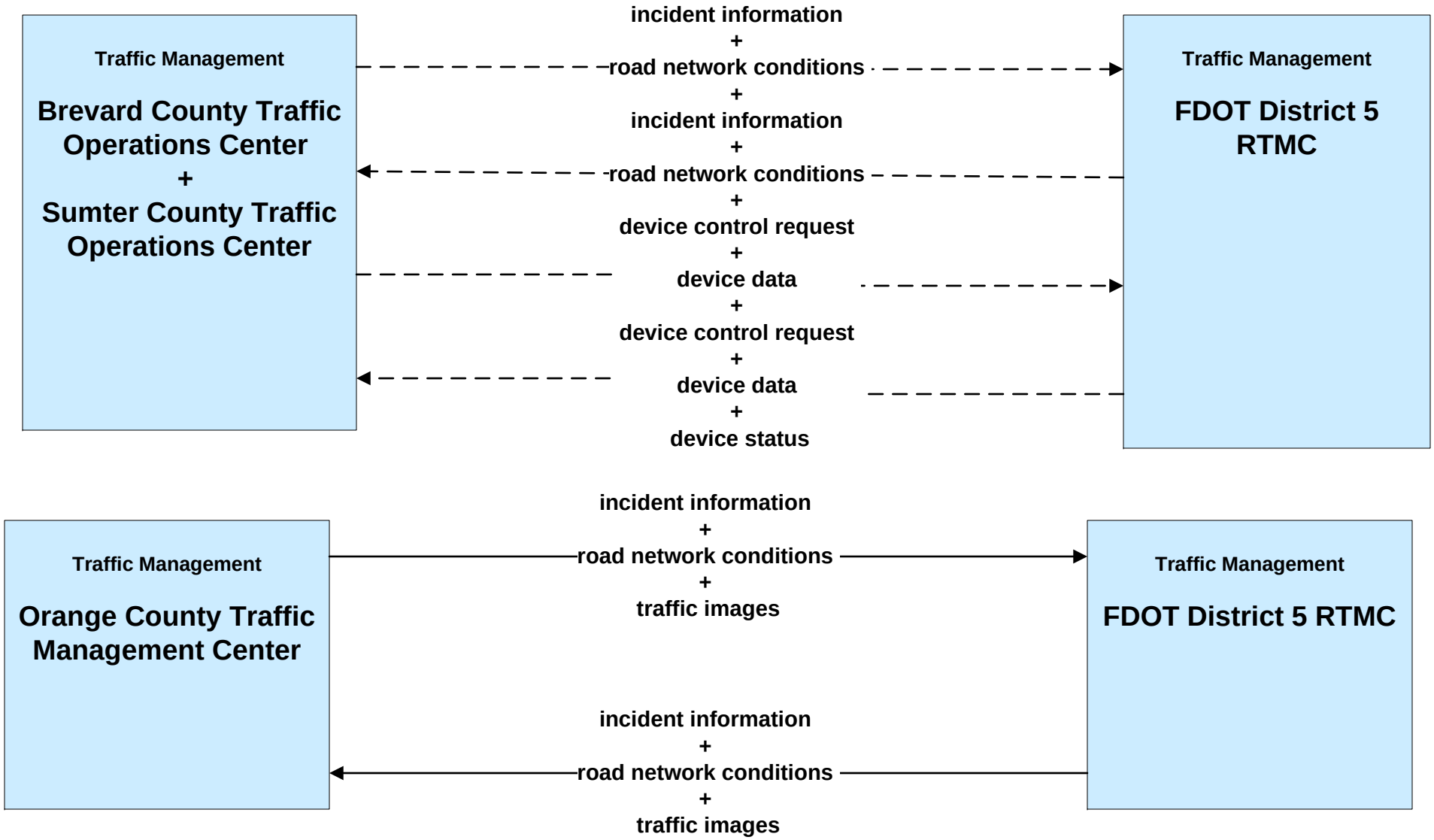
ATMS07 - Regional Traffic Management
FDOT Districts (1 of 3)



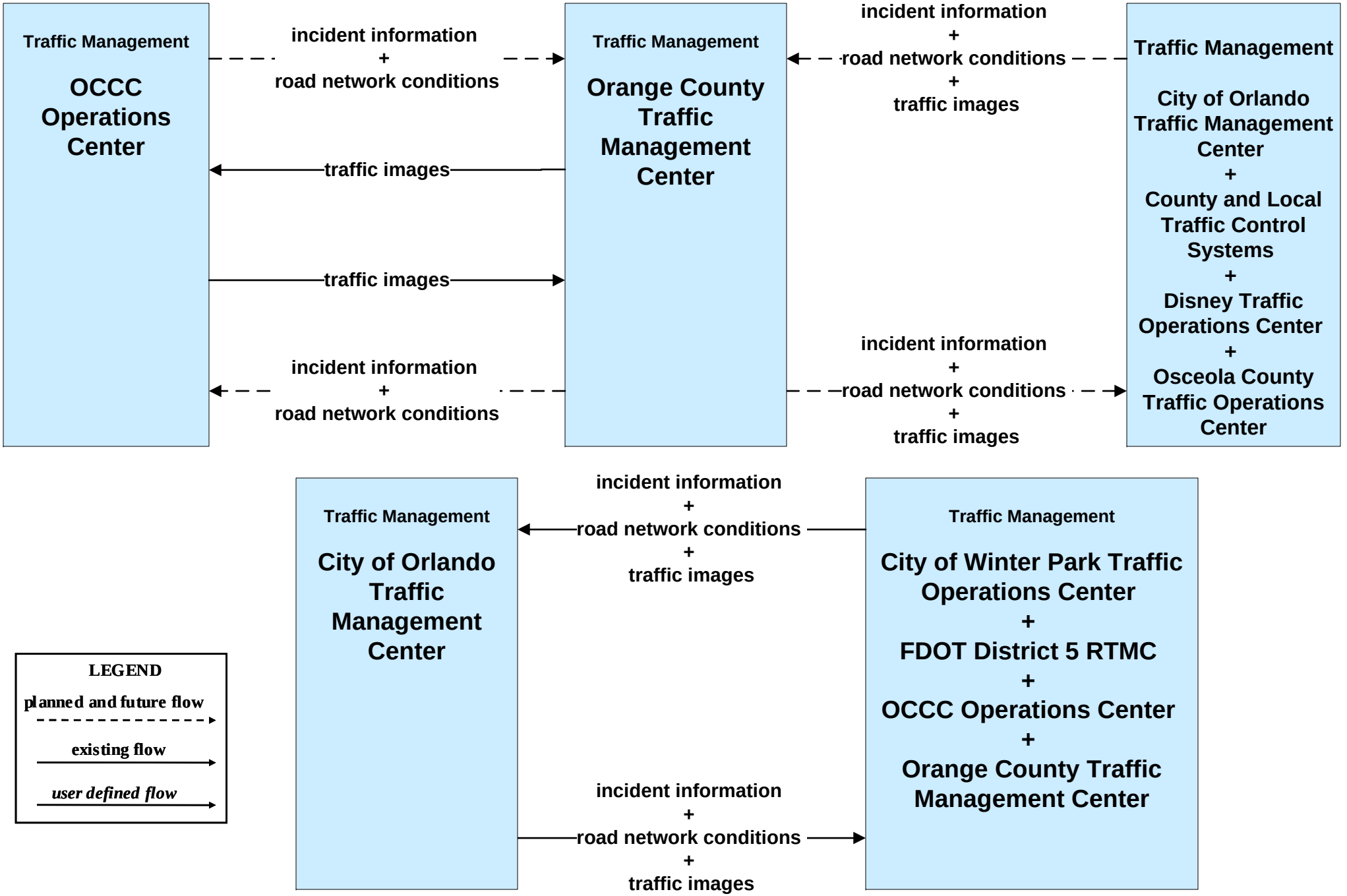
ATMS07 - Regional Traffic Management
FDOT Districts (2 of 3)



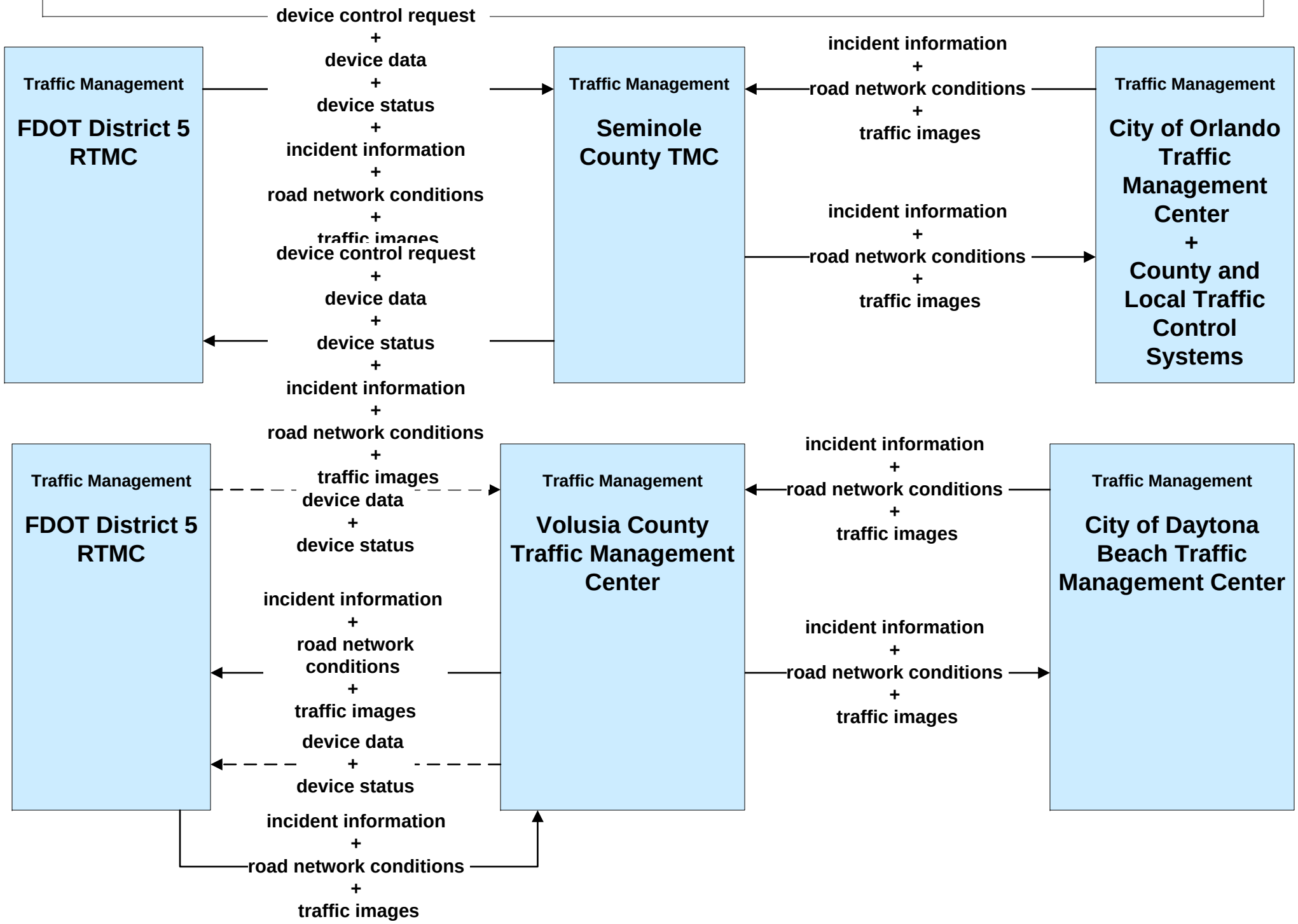
ATMS07 - Regional Traffic Management
FDOT Districts (3 of 3)



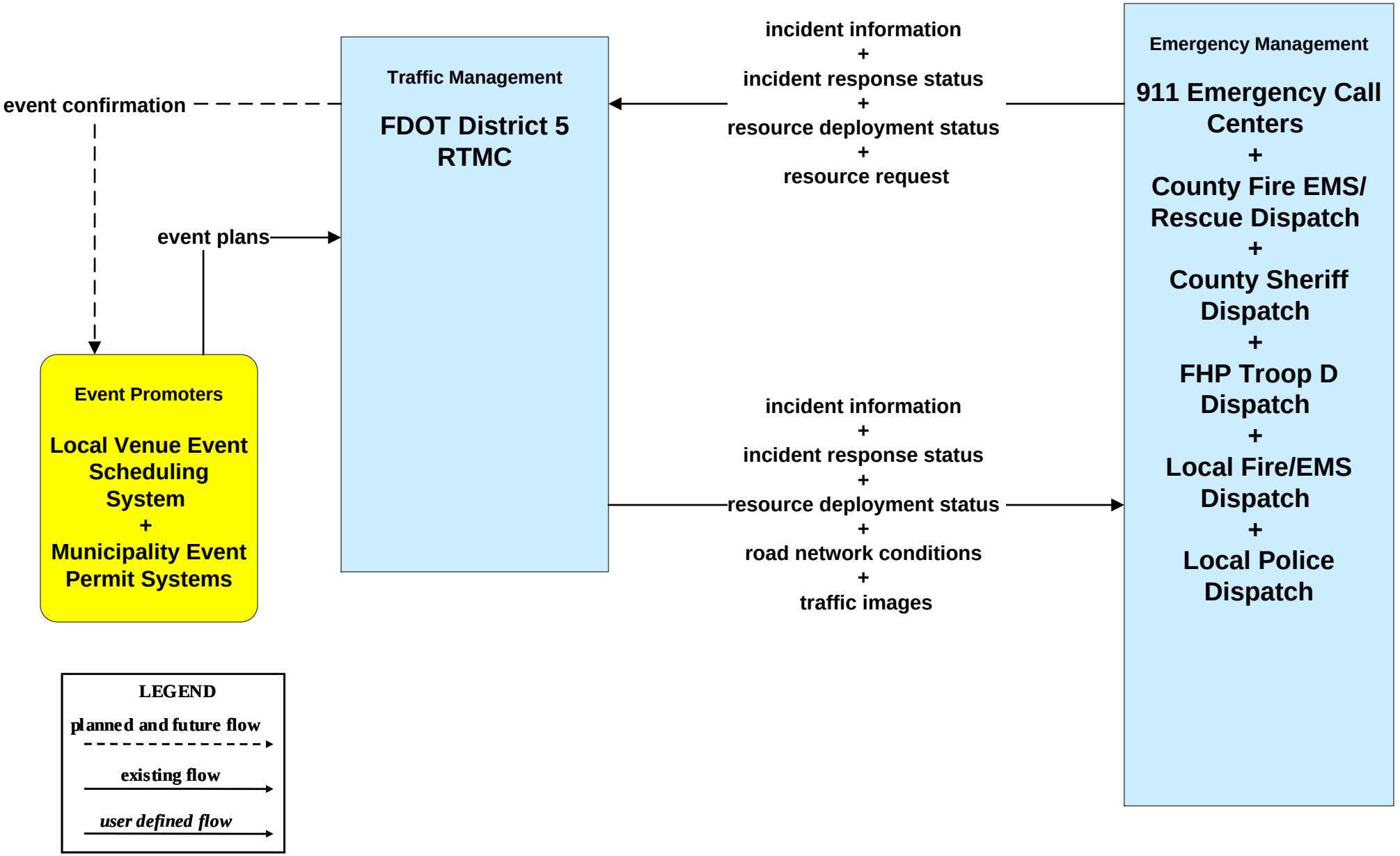
ATMS07 - Regional Traffic Management
Orange County / City of Orlando



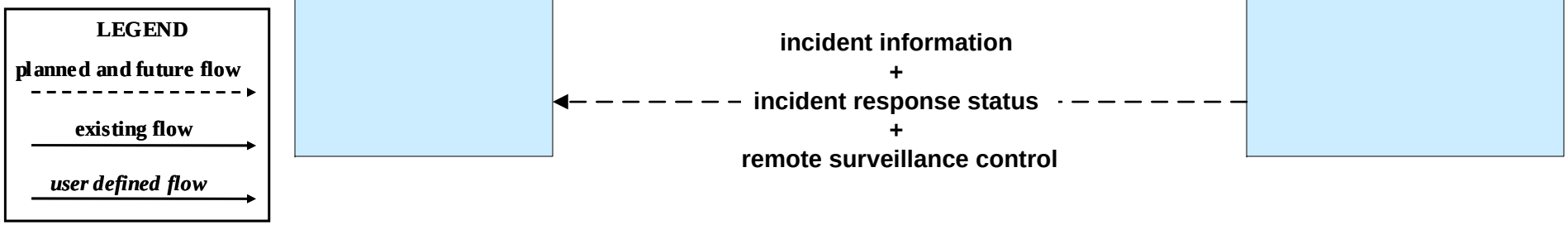
ATMS07 - Regional Traffic Management
Seminole County / Volusia County



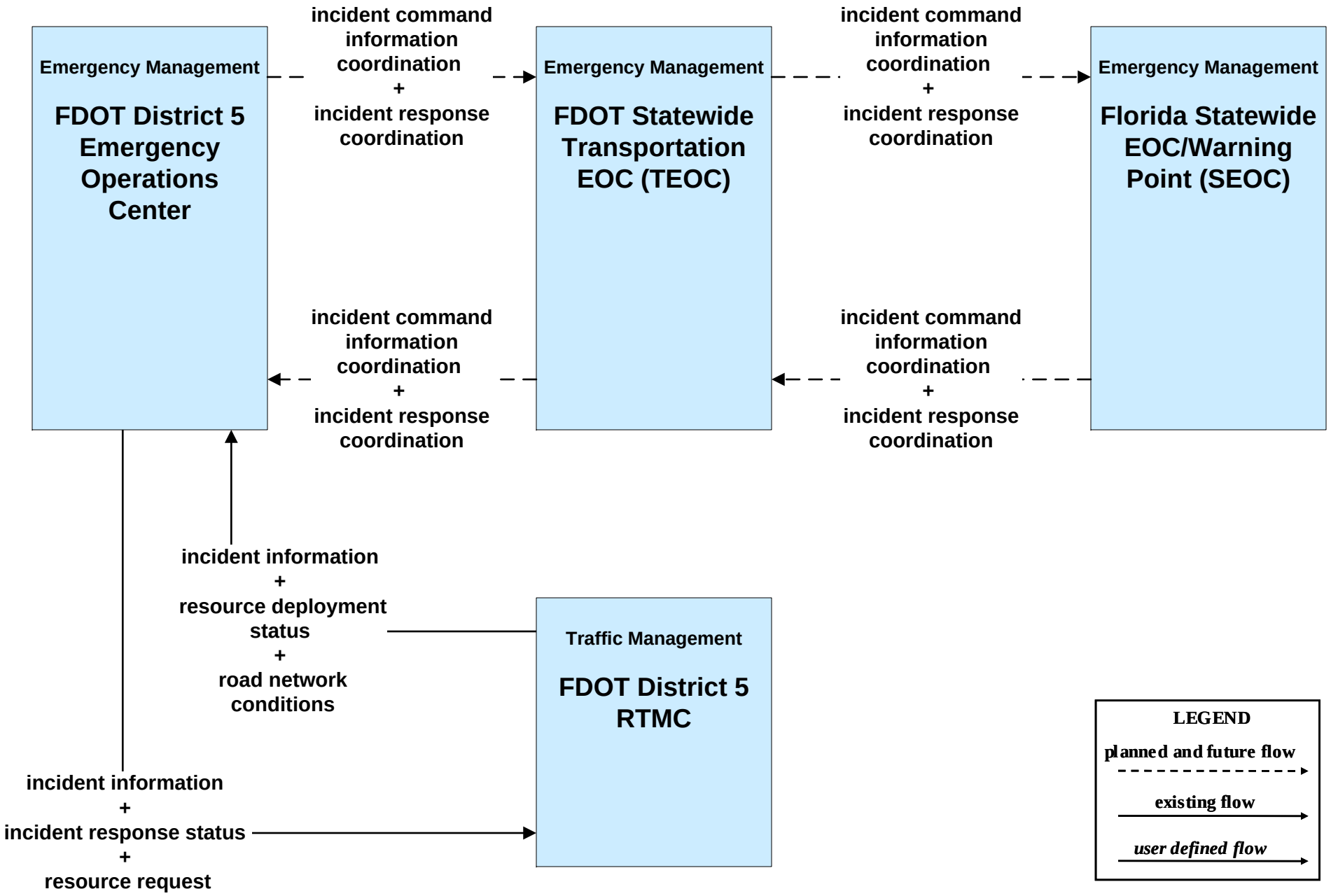
ATMS08 - Traffic Incident Management System
FDOT District 5



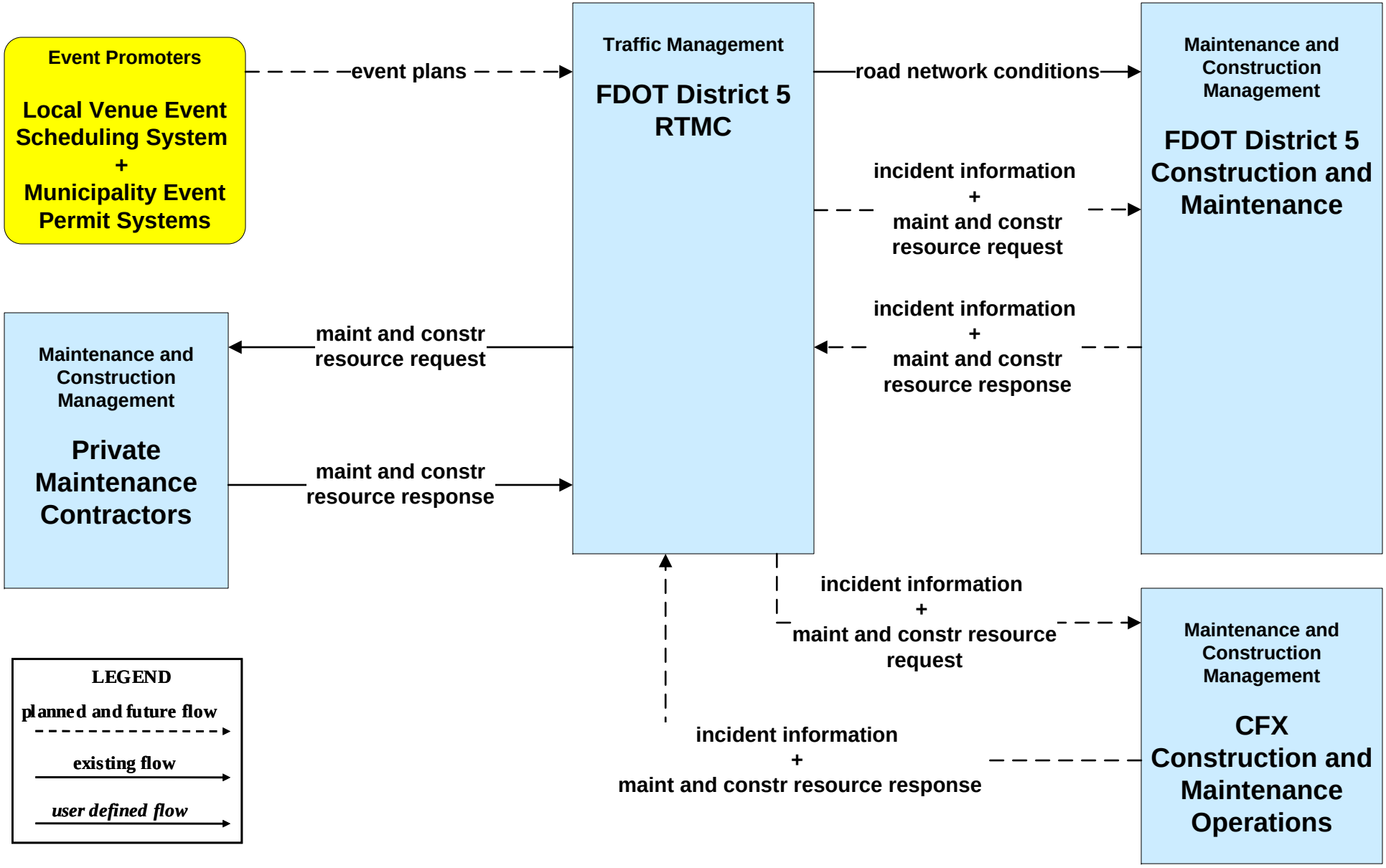
ATMS08 - Traffic Incident Management System
FDOT & County EOC (TM to EM)



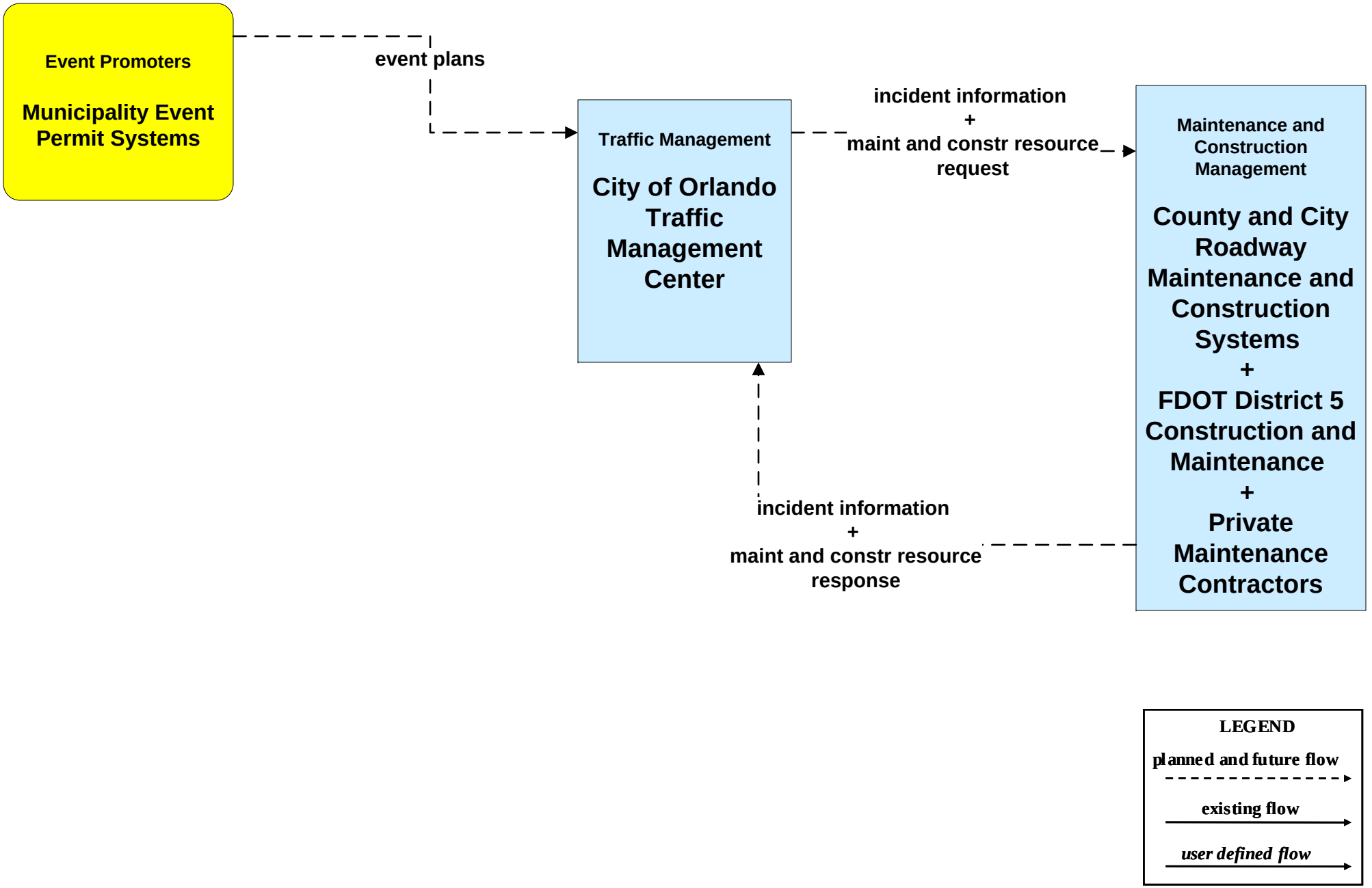
ATMS08 - Traffic Incident Management System
FDOT Transportation EOC (TM to EM)



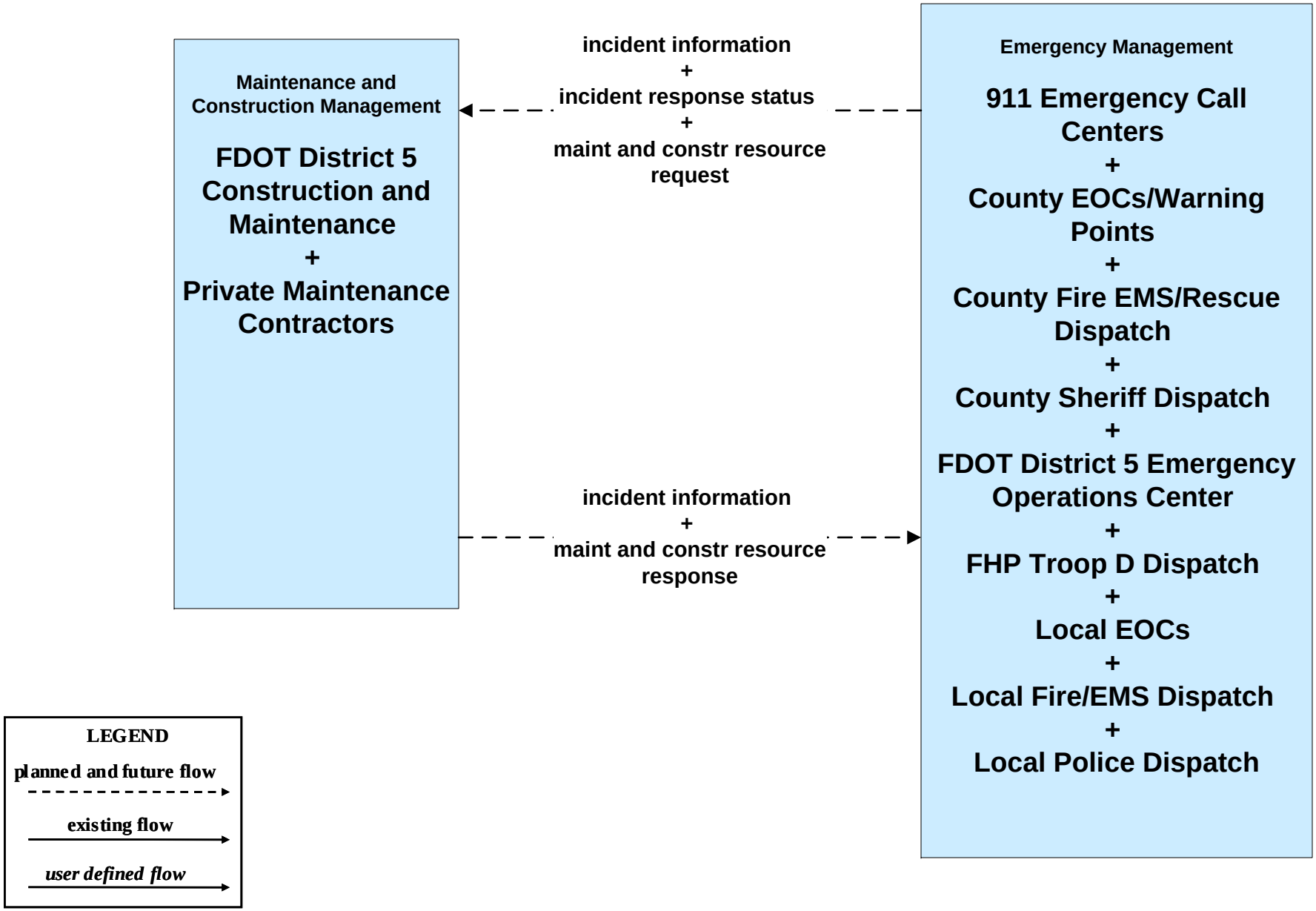
ATMS08 -Traffic Incident Management System
FDOT District 5 (TM to MCM)



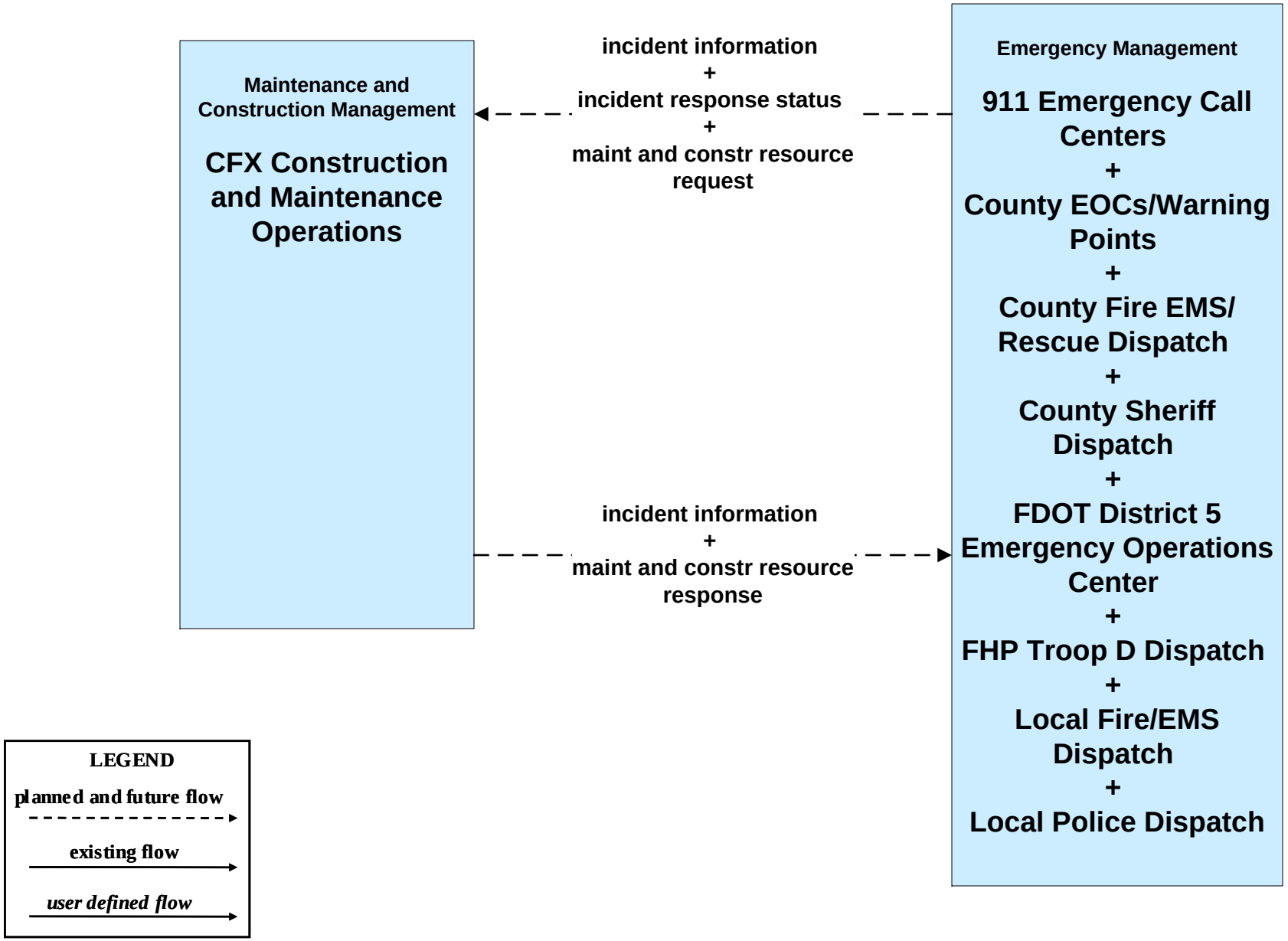
ATMS08 - Traffic Incident Management System
City of Orlando (TM to MCM)



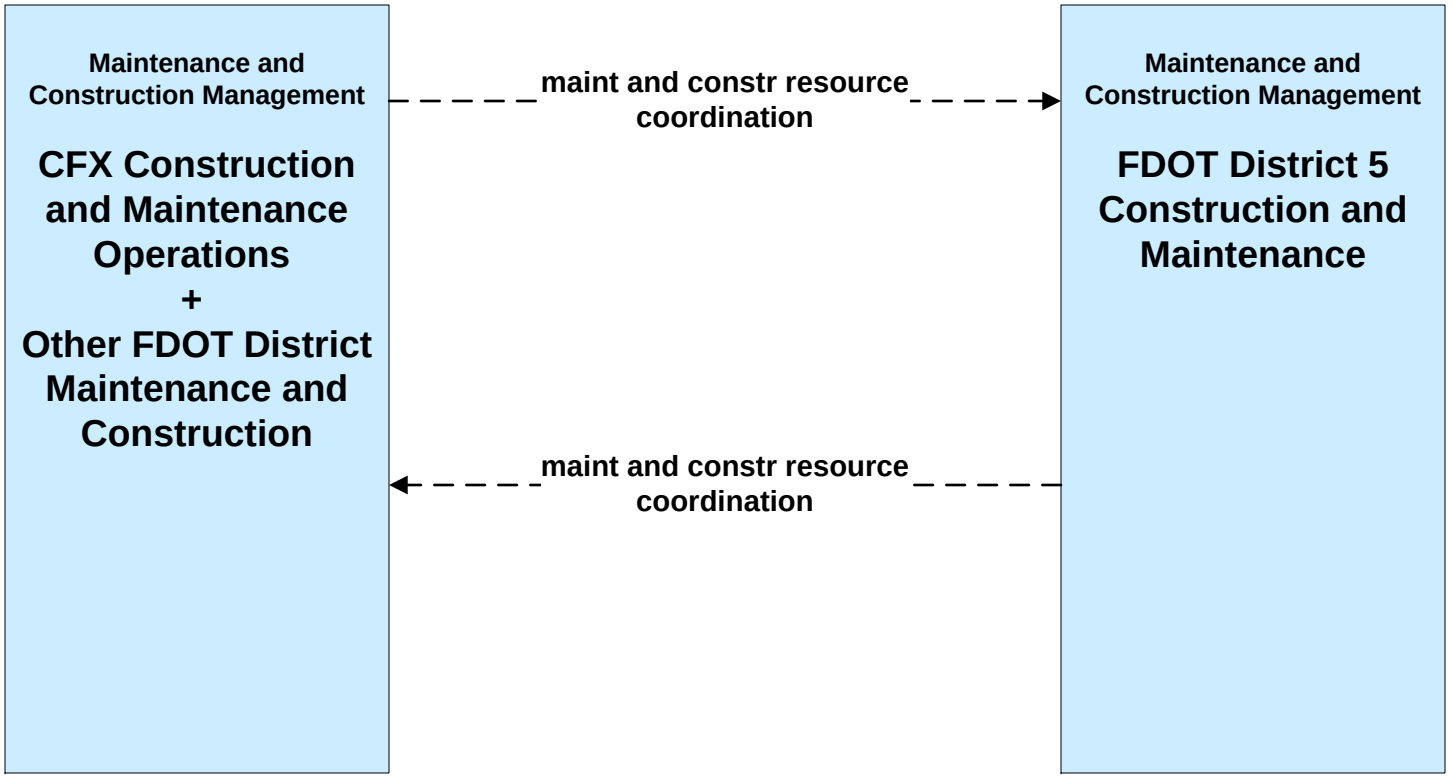
ATMS08 - Traffic Incident Management System
FDOT District 5 (EM to MCM)

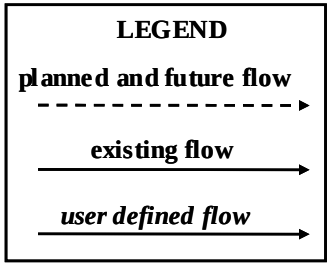


ATMS08 - Traffic Incident Management System
CFX (EM to MCM)

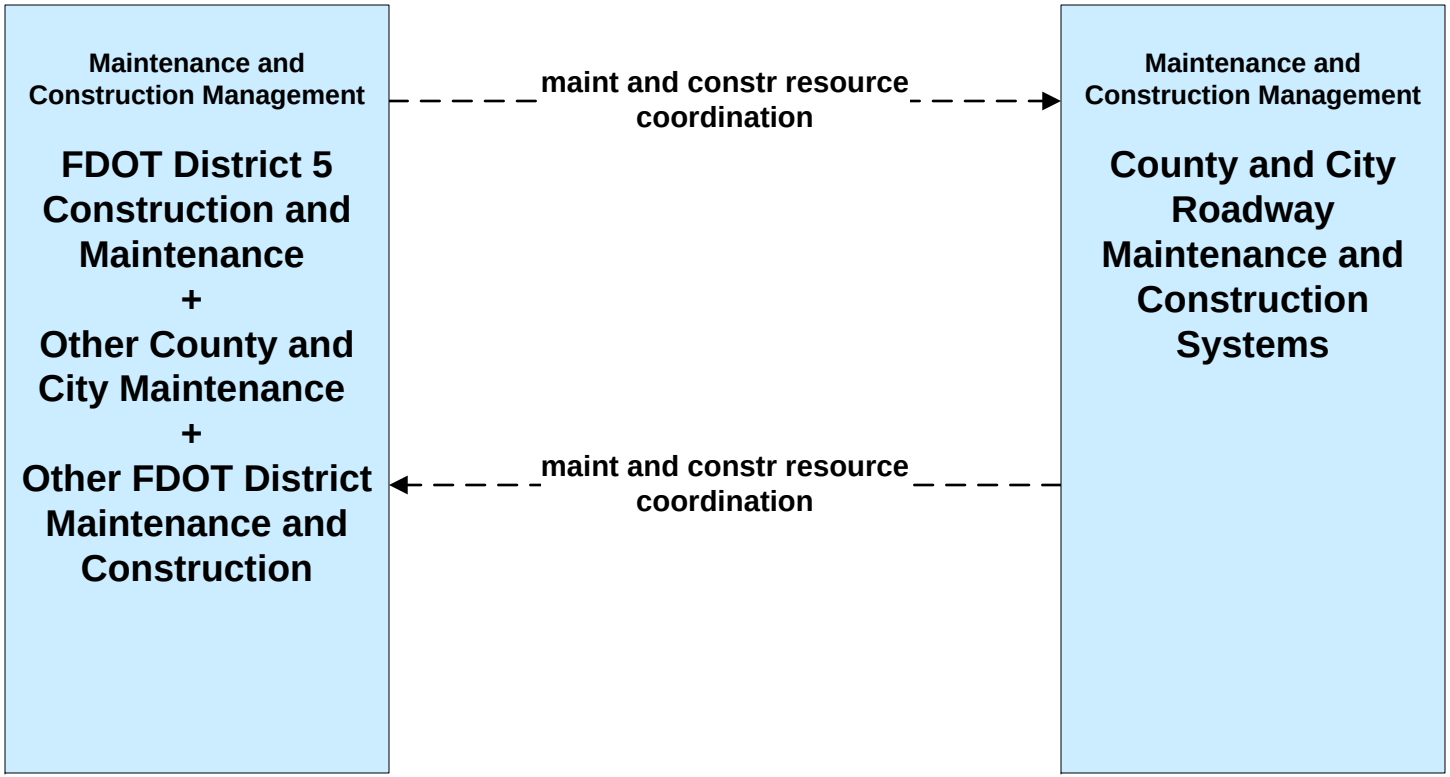


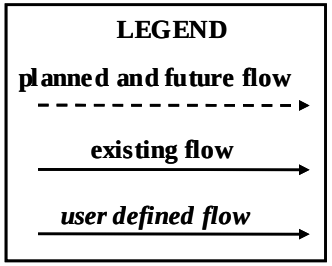
ATMS08 - Traffic Incident Management System
FDOT Districts



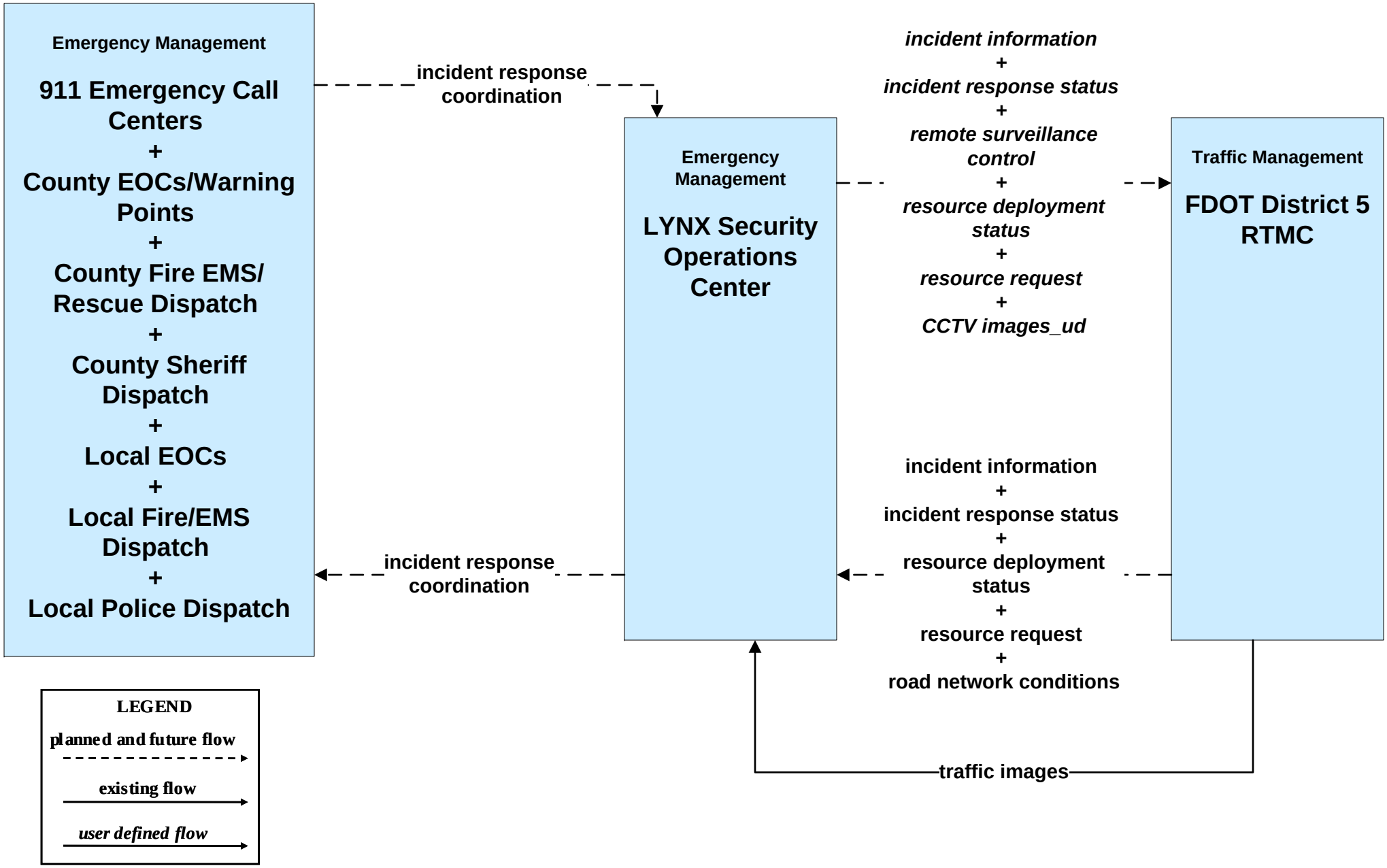


ATMS08 - Traffic Incident Management System
FDOT District 5 / County and City Roadway Maintenance

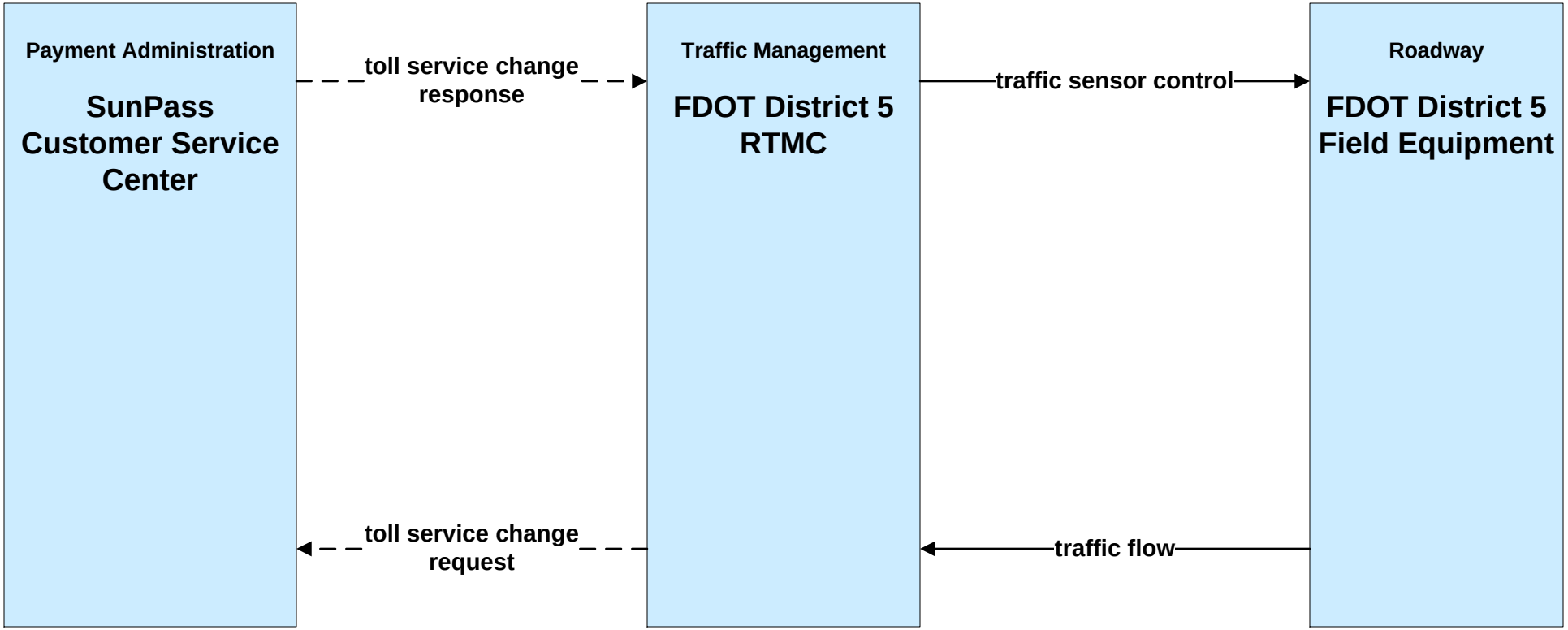


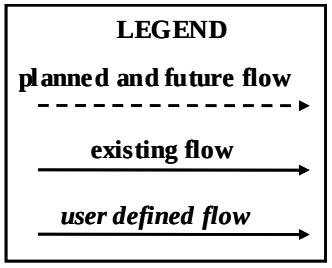


ATMS08 - Traffic Incident Management System
LYNX

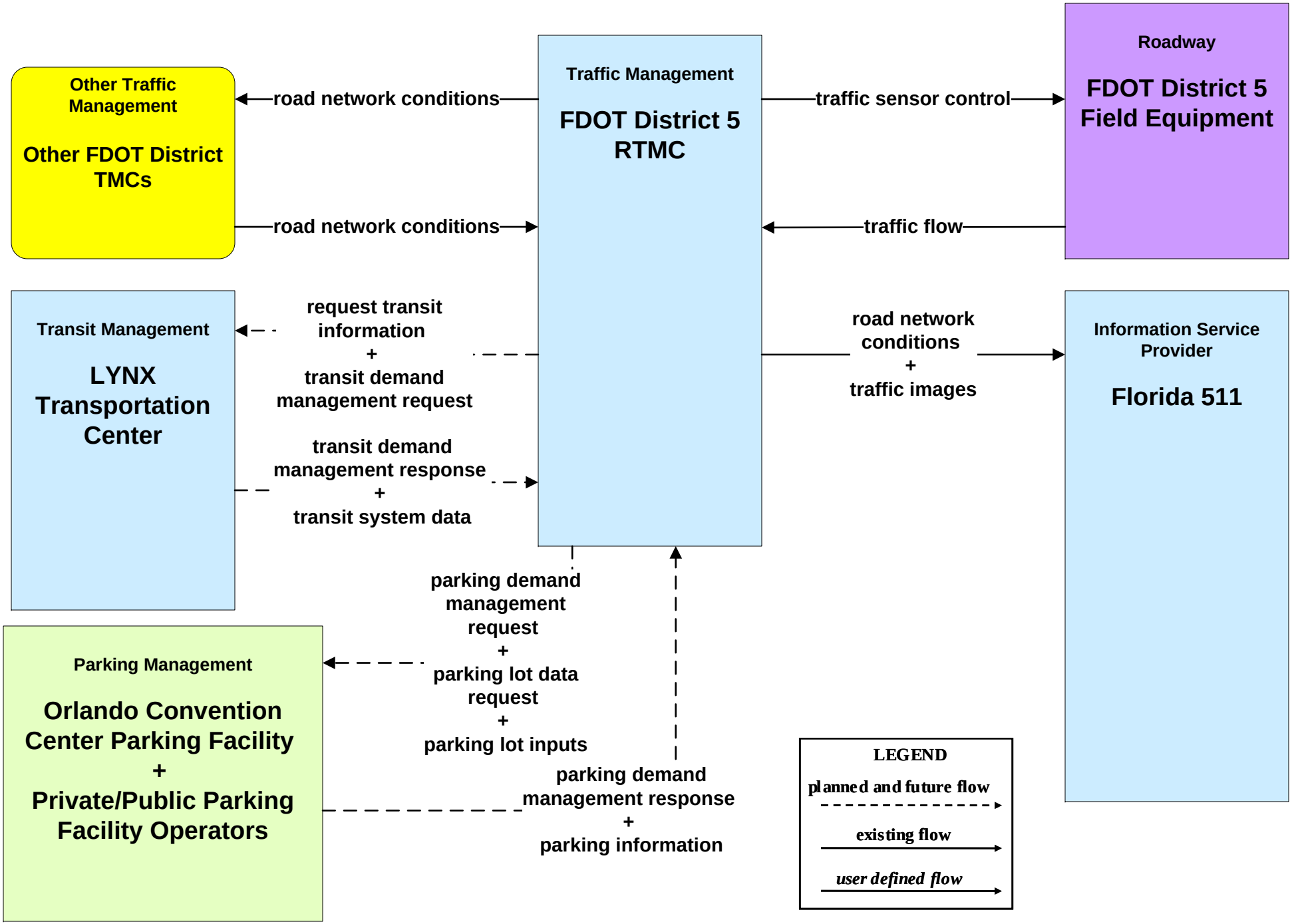


ATMS09 - Transportation Decision Support and Demand Management
Dynamic Express Lane Tolling

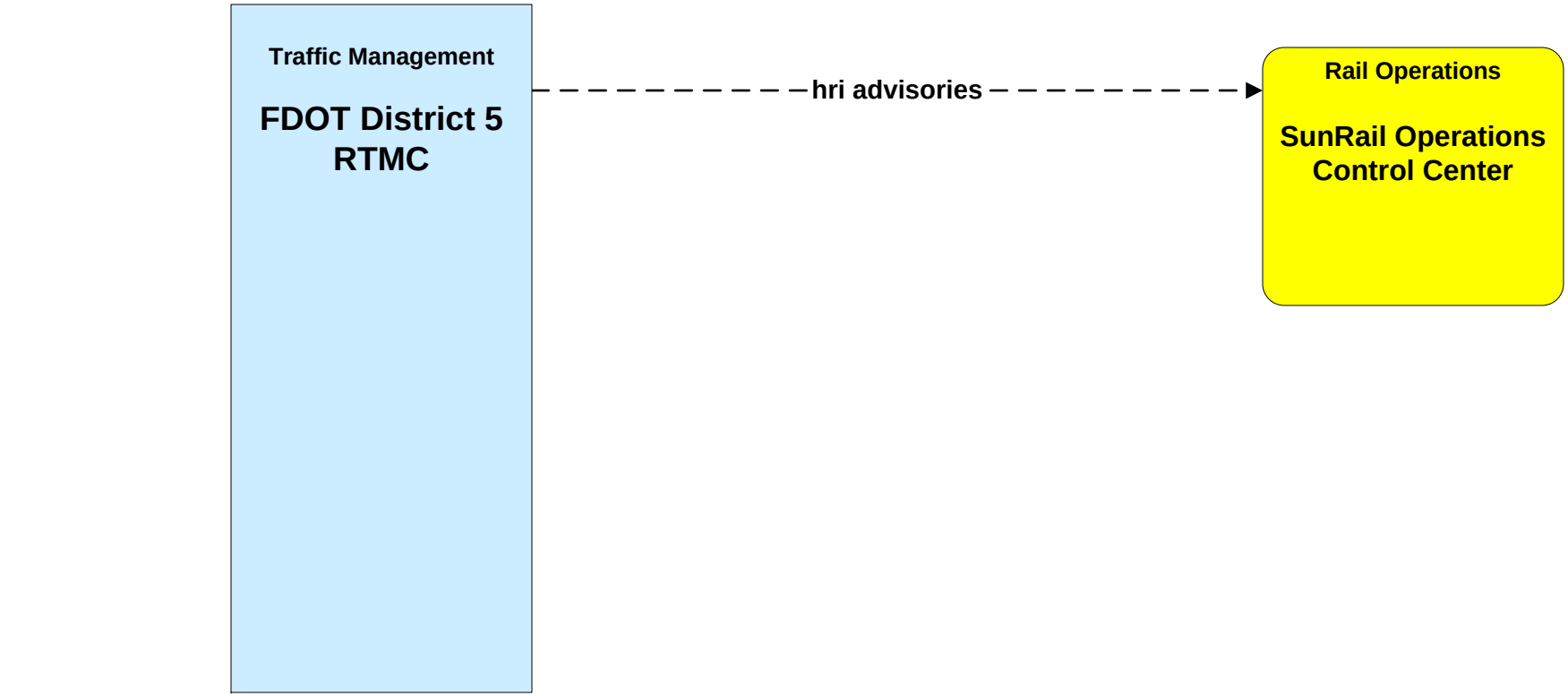


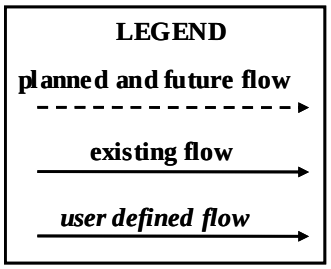


ATMS09 - Transportation Decision Support and Demand Management
FDOT District 5 Integrated Corridor Management

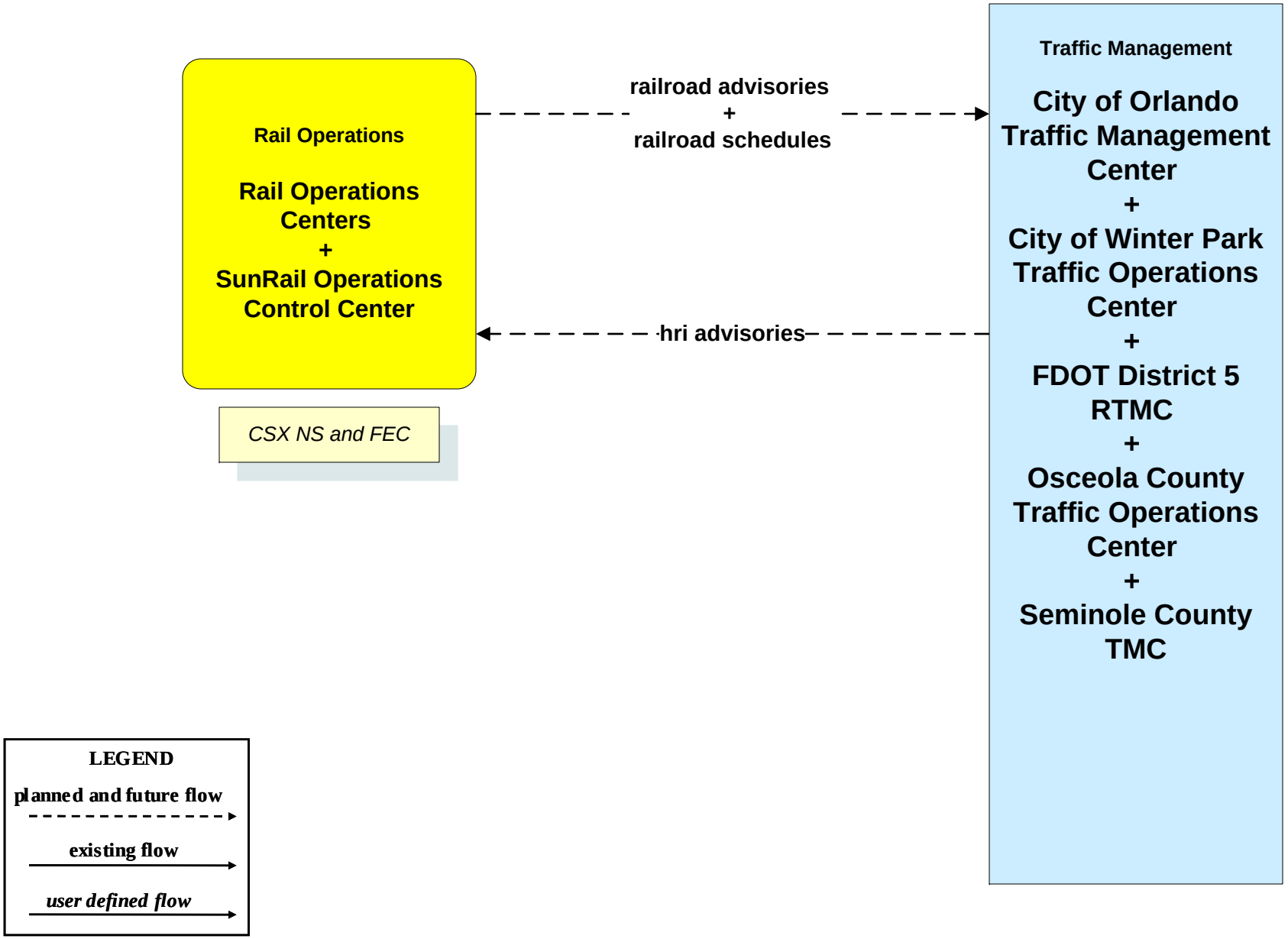


ATMS13 - Standard Railroad Crossing
FDOT

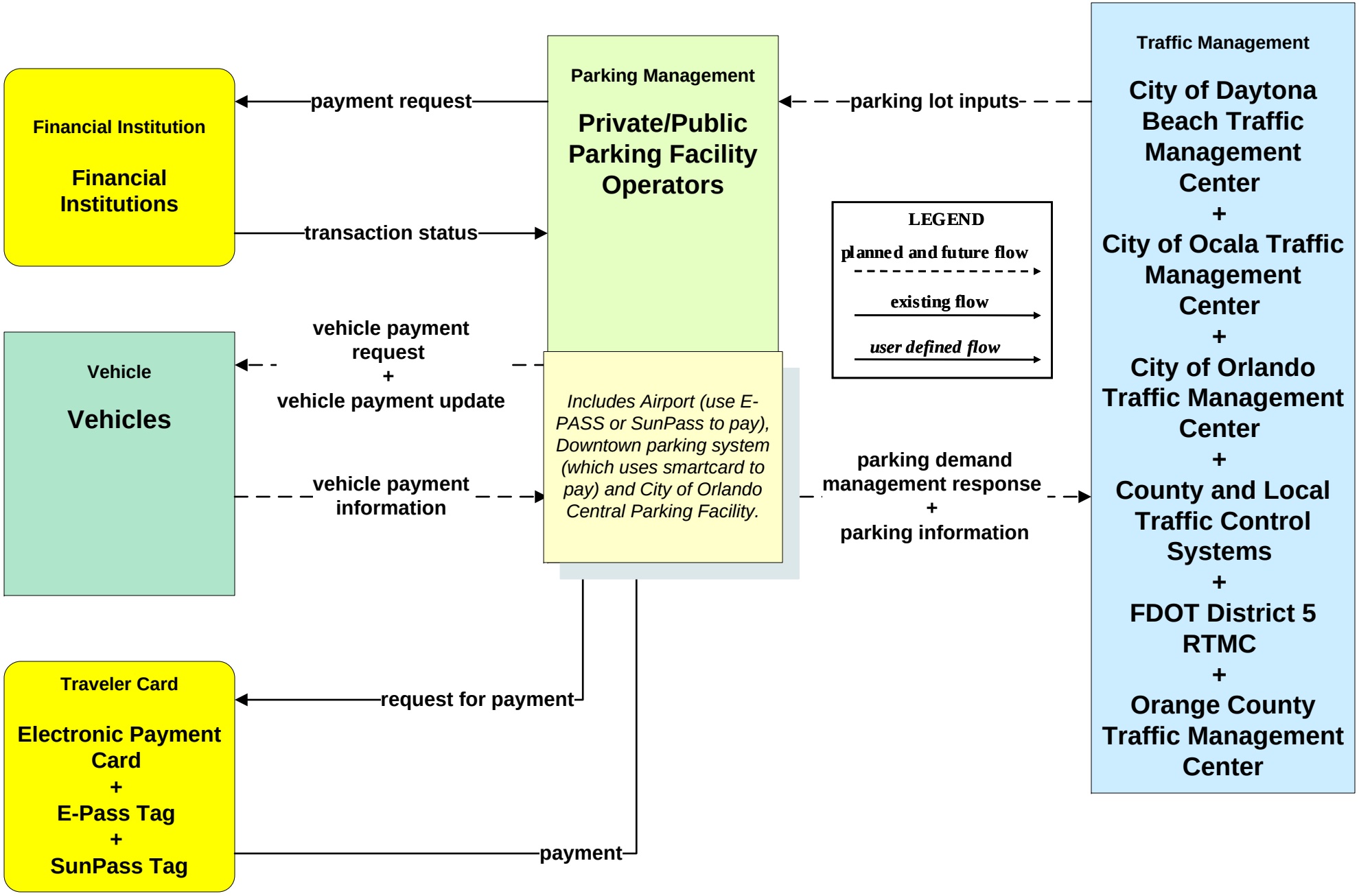




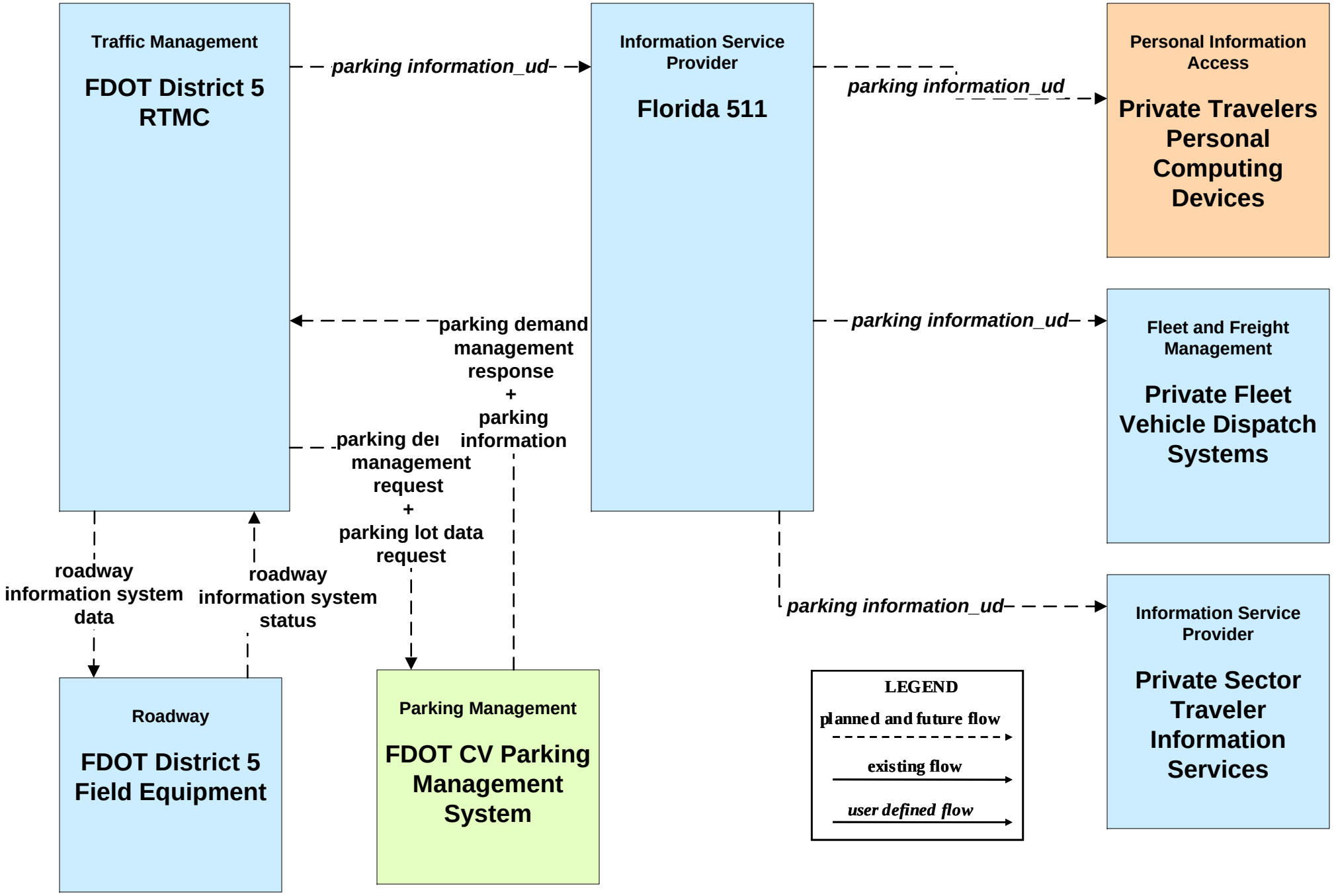
ATMS15 - Railroad Operations Coordination
Rail Operations Centers



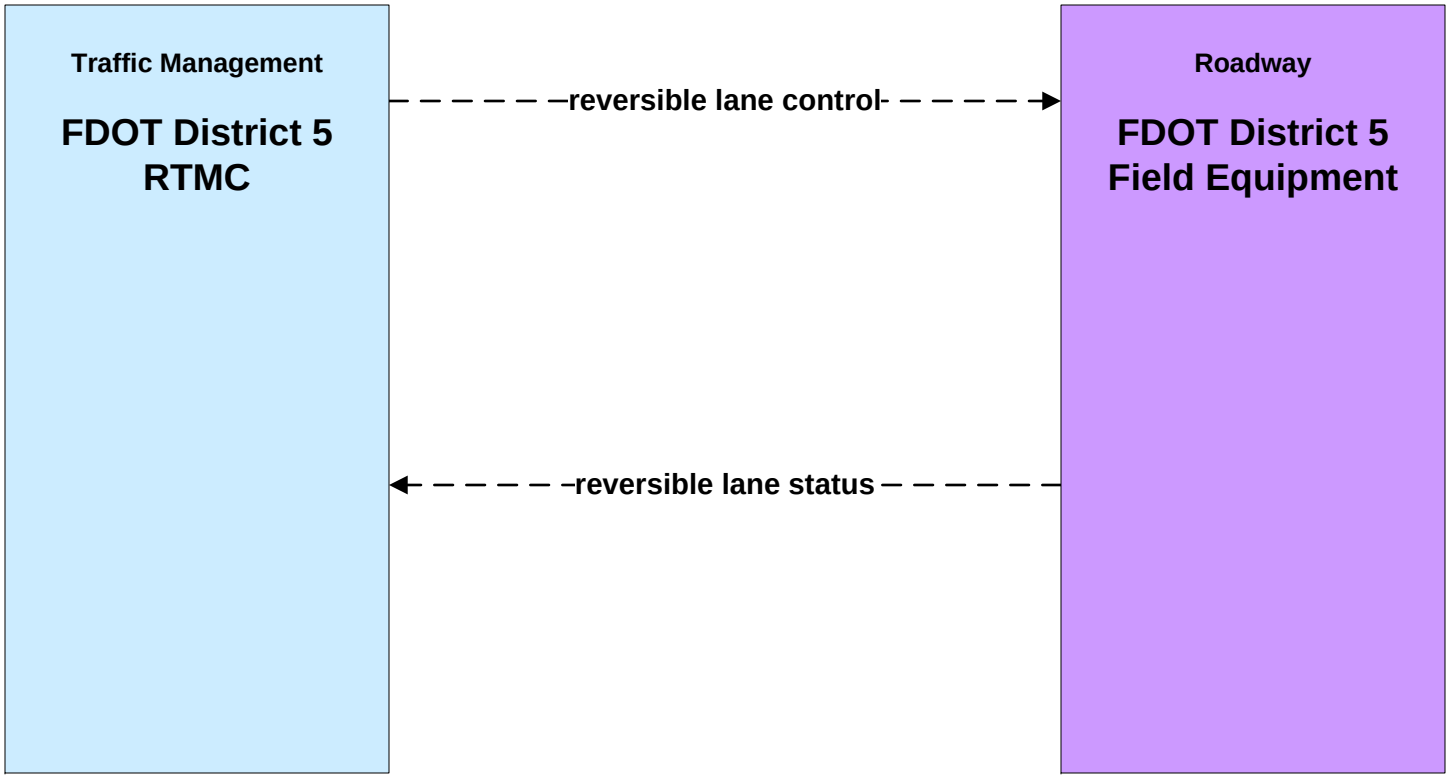
ATMS16 - Parking Facility Management
Parking Facility Operators



ATMS17 - Regional Parking Management
FDOT CV Parking



ATMS18 - Reversible Lane Management
FDOT District 5 RTMC



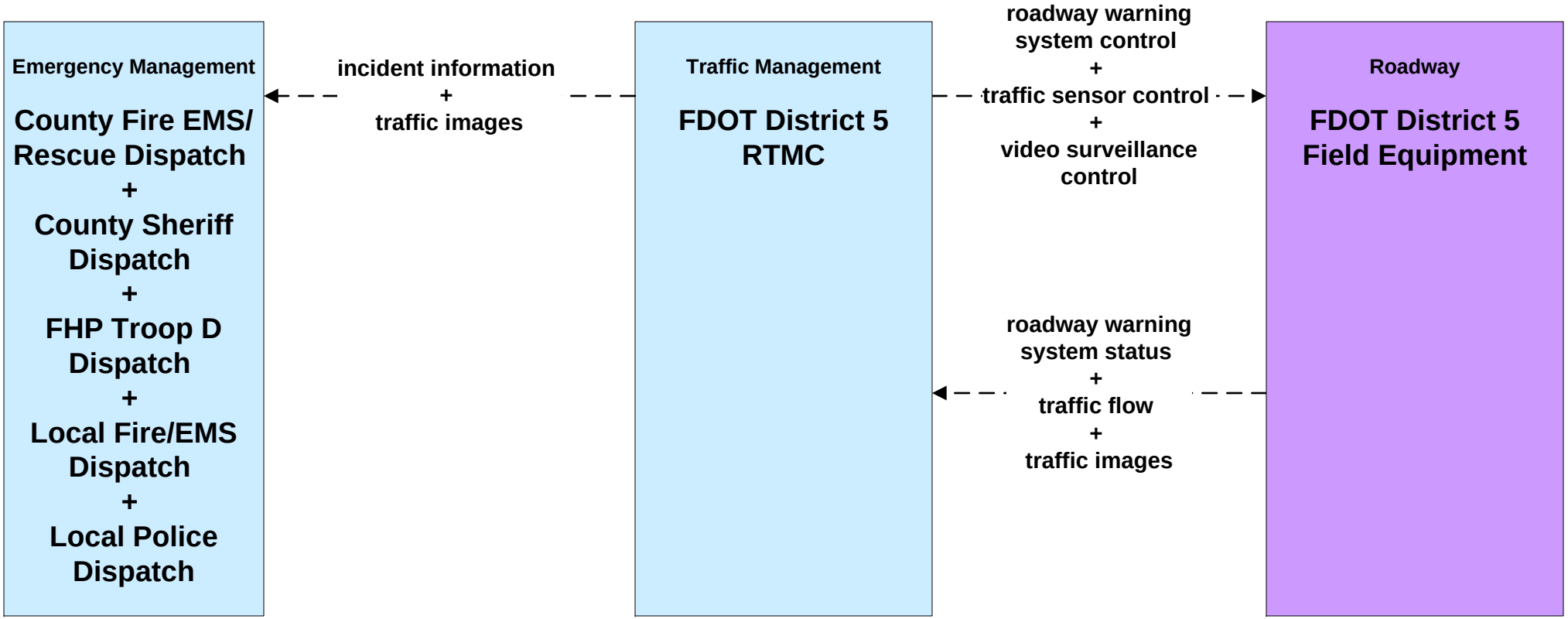
LEGEND

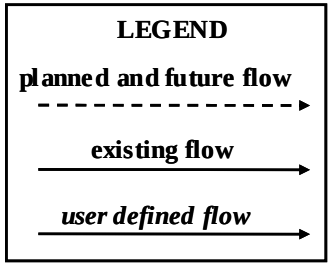
planned and future flow

existing flow

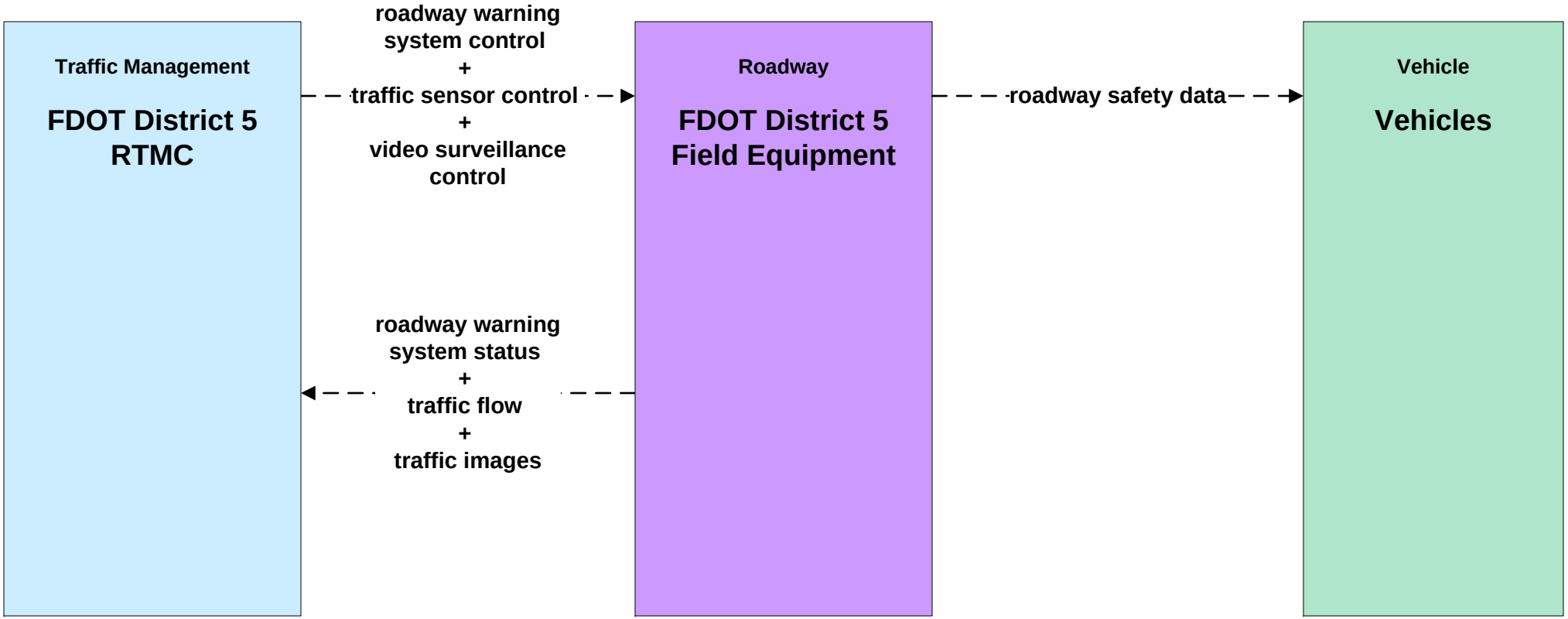
user defined flow

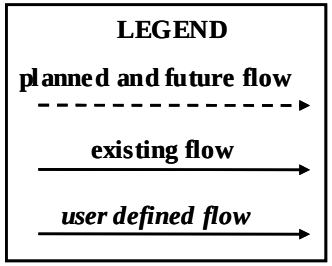
ATMS24 - Dynamic Roadway Warning
FDOT Wrong-Way Driving



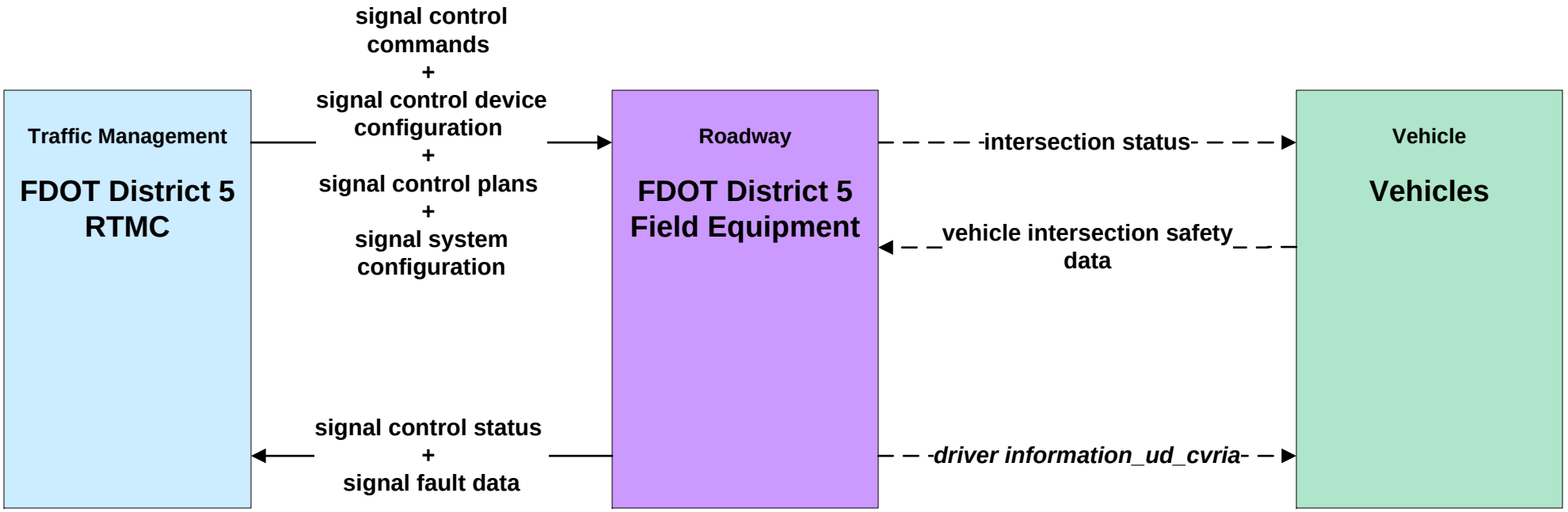


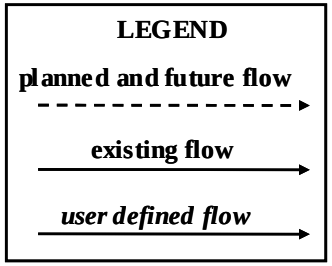
ATMS24 - Dynamic Roadway Warning
Connected Vehicle Wrong Way Driving



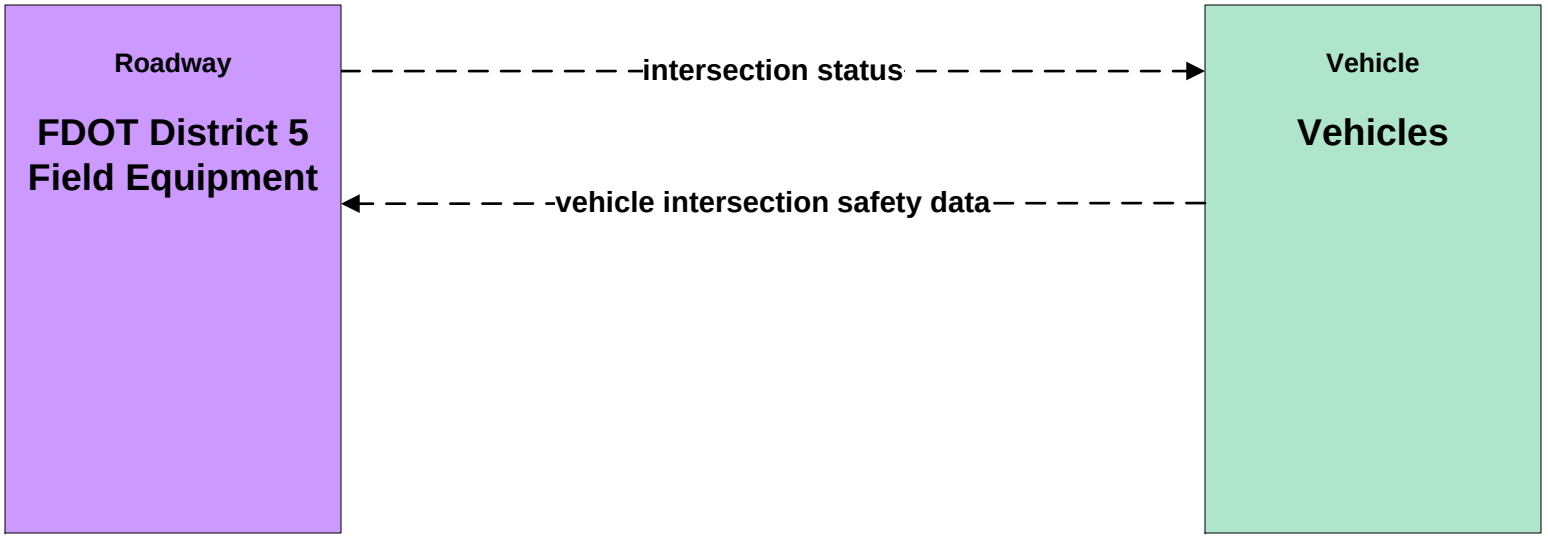


AVSS05 – Intersection Safety Warning
FDOT





AVSS10 – Intersection Collision Avoidance
Seminole County



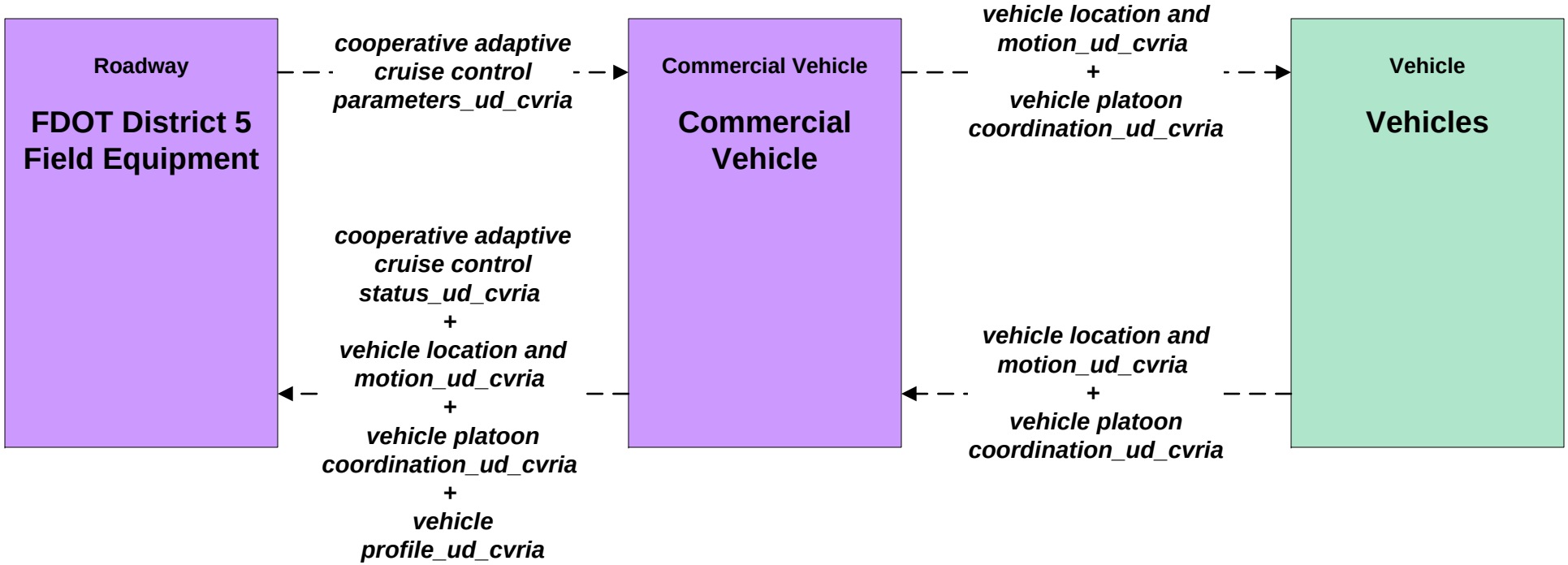
LEGEND

planned and future flow

existing flow

user defined flow

AVSS12 - Cooperative Vehicle Safety Systems
Commercial Vehicle Platooning



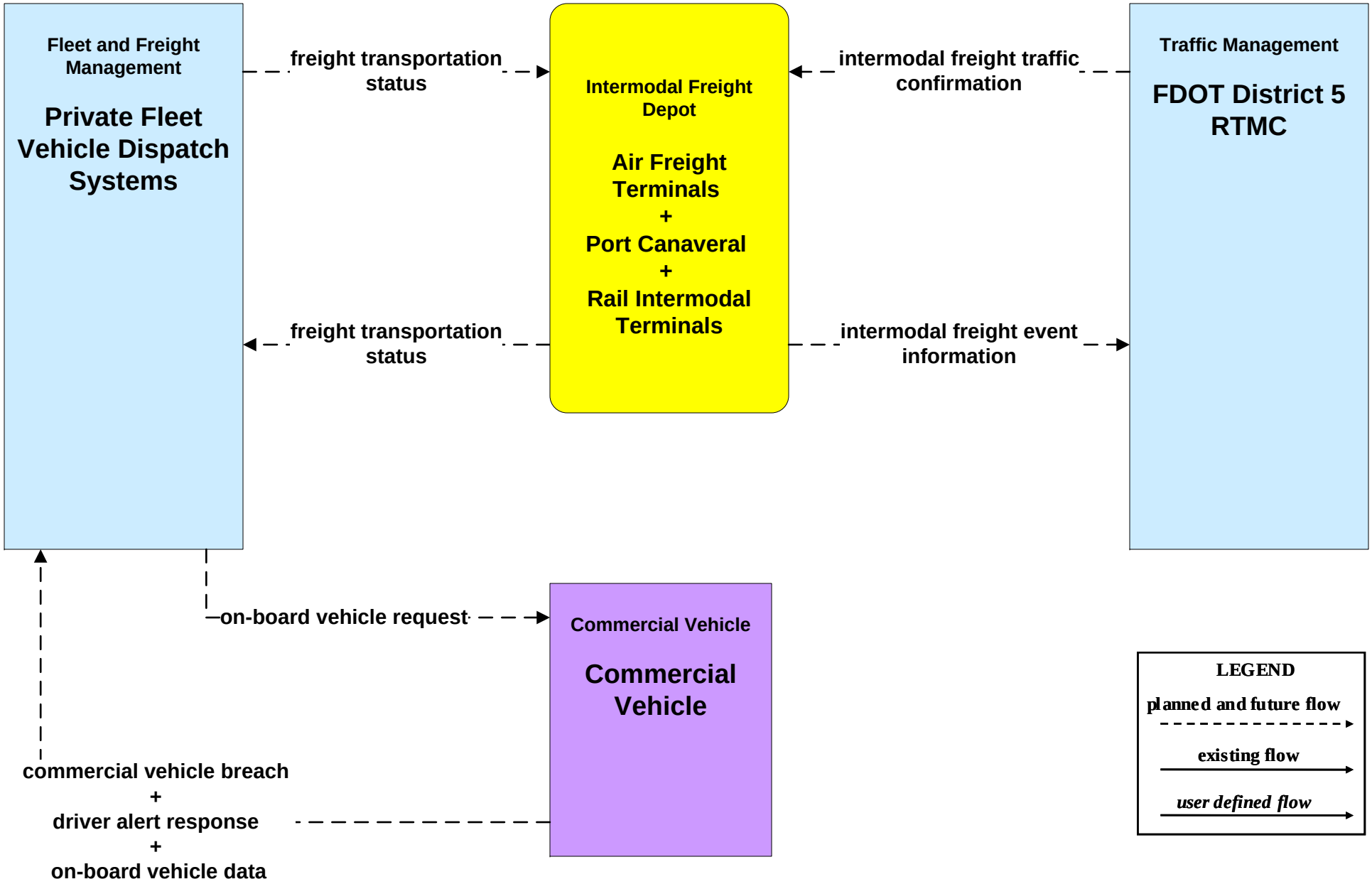
LEGEND

planned and future flow

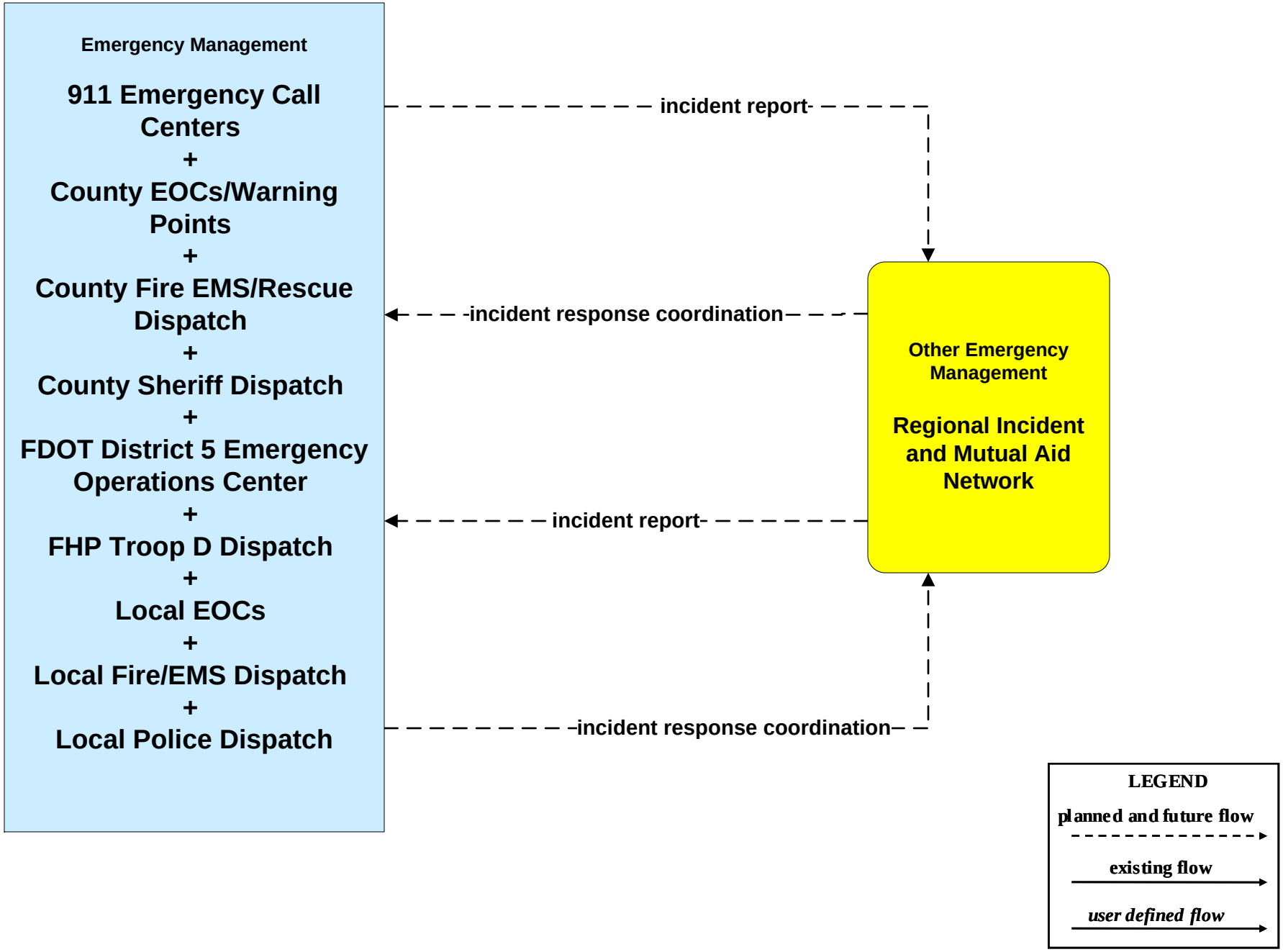
existing flow

user defined flow

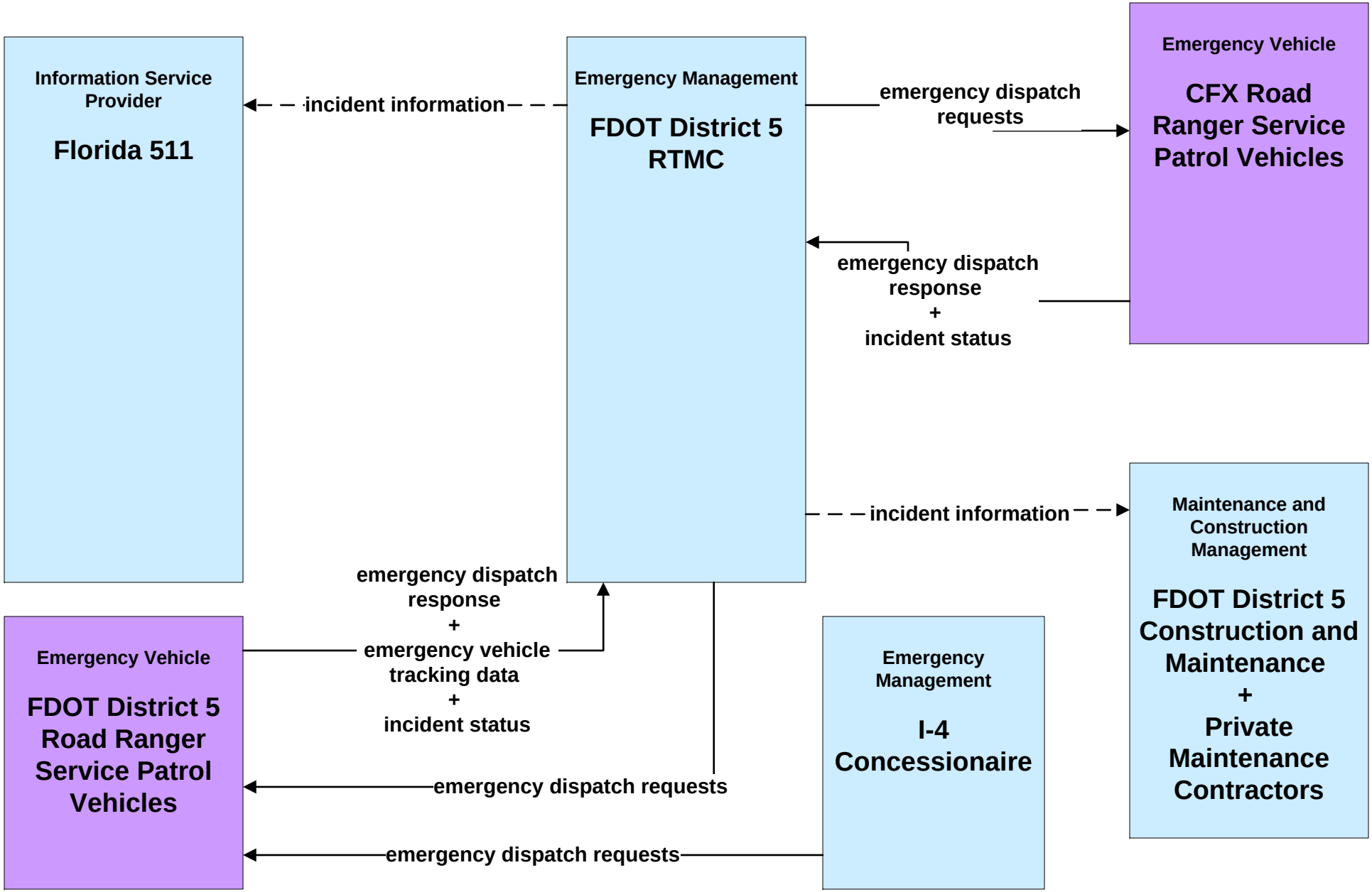
CVO02 - Freight Administration
Freight/Intermodal Terminals



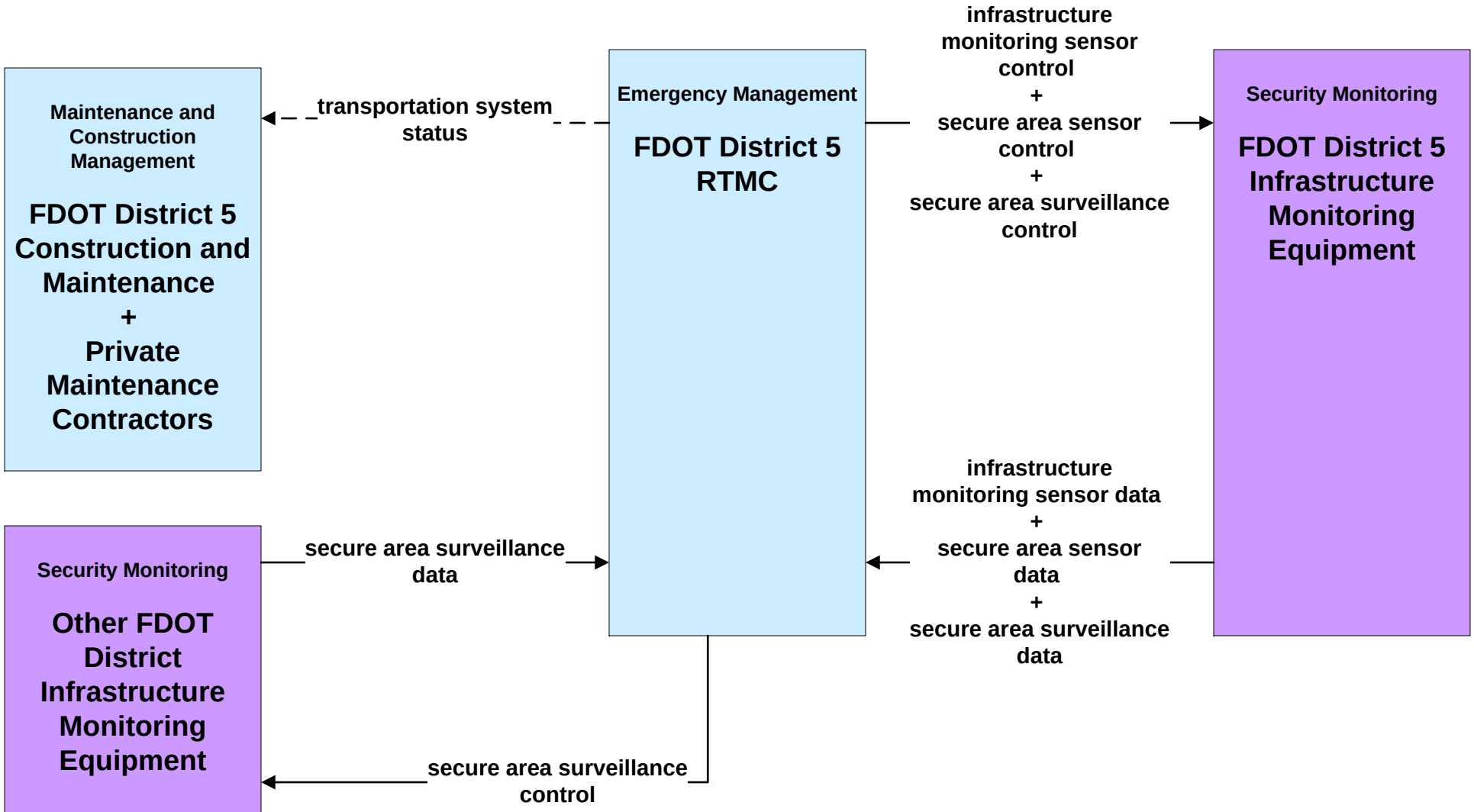
EM01 - Emergency Call-Taking and Dispatch
Central Florida Regional Incident and Mutual Aid Network (EM to Other EM)



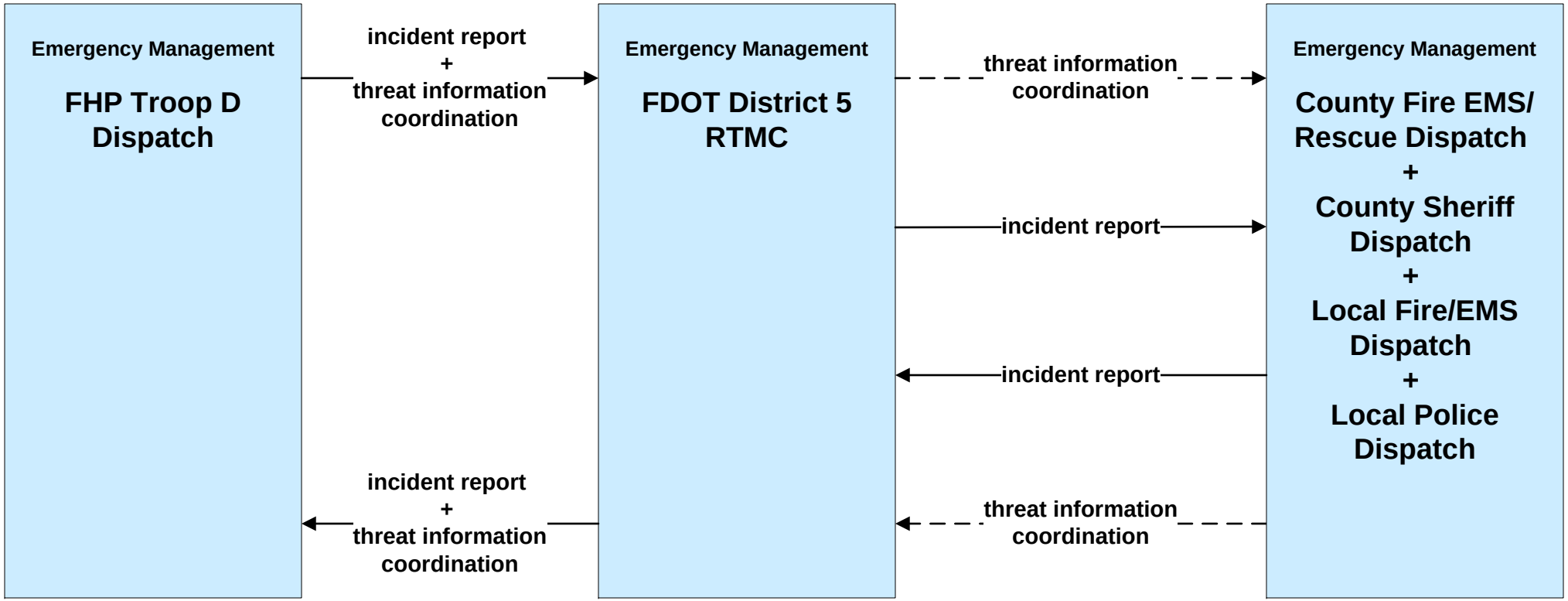
EM04 - Roadway Service Patrols
FDOT District 5 Road Ranger Service Patrol

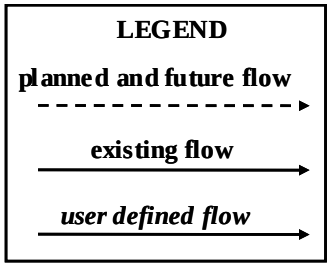


EM05 - Transportation Infrastructure Protection
FDOT District 5 (1 of 2)

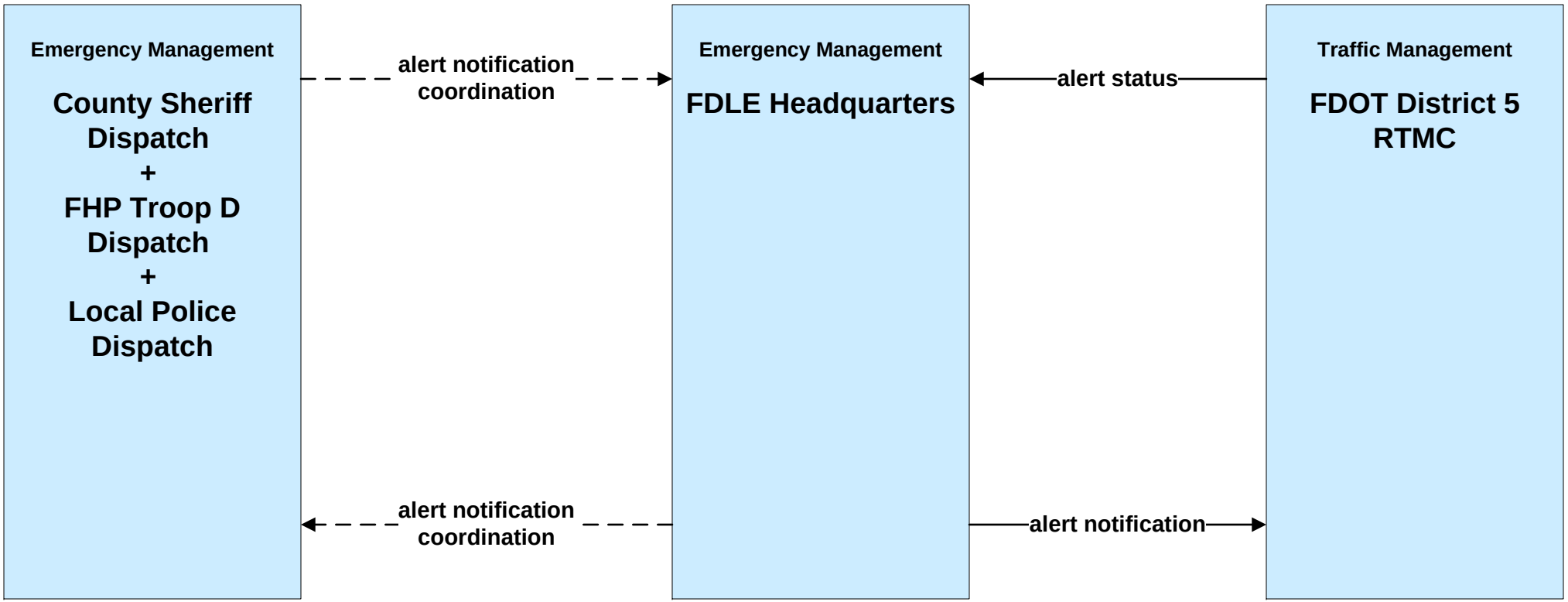


EM05 - Transportation Infrastructure Protection
FDOT District 5 (2 of 2)

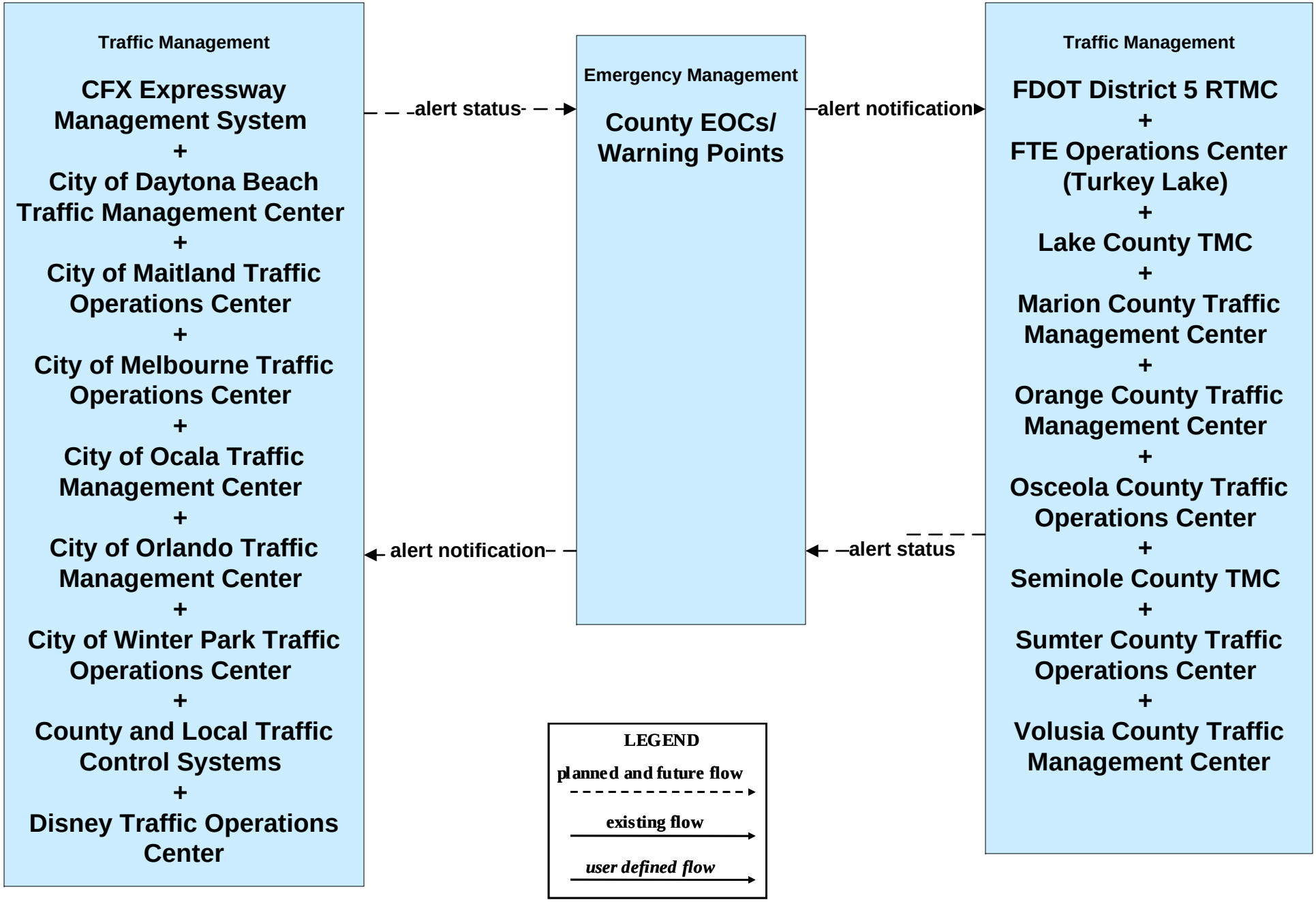




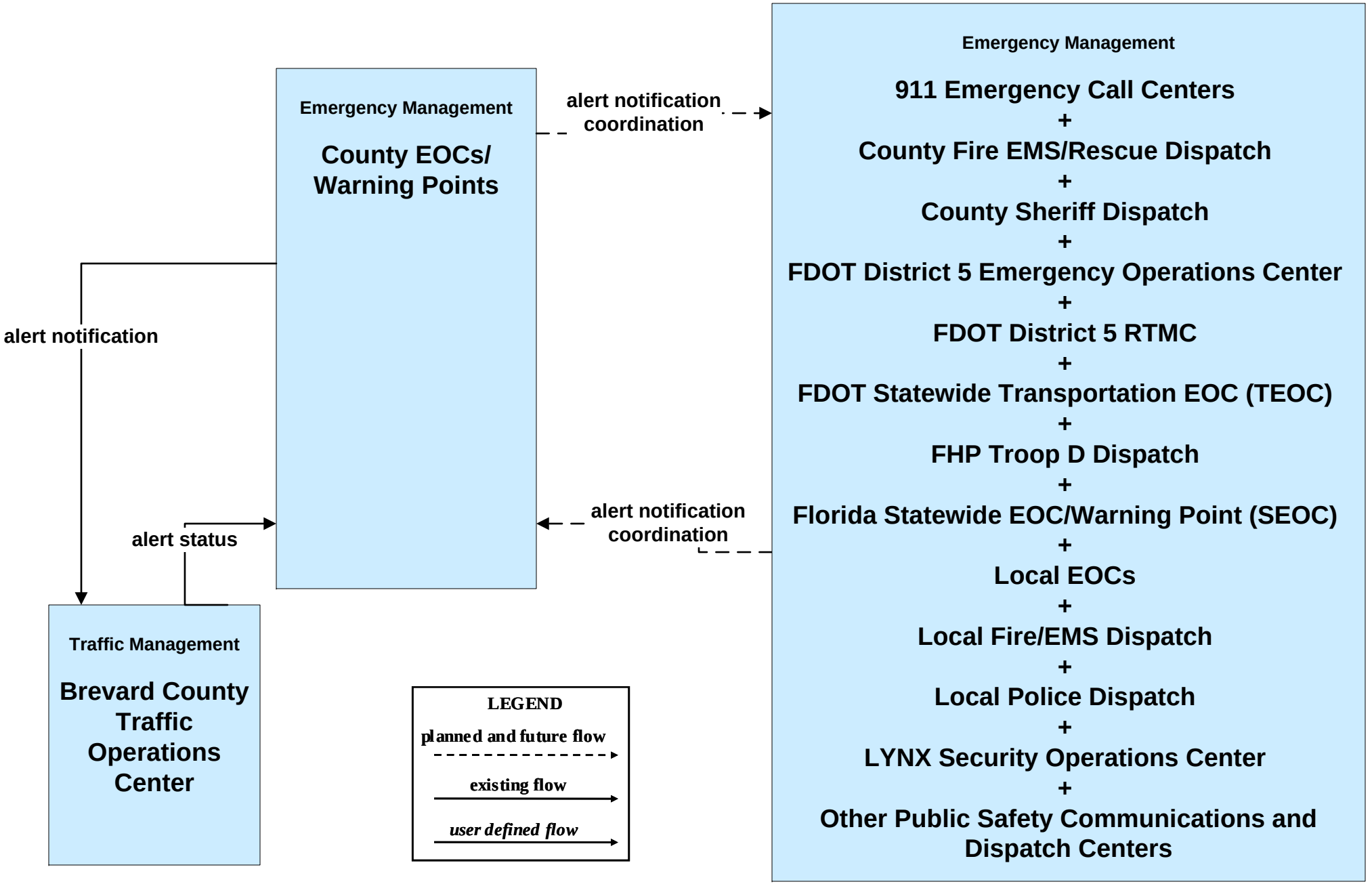
EM06 - Wide Area Alert
Amber, Silver and LEO Alerts



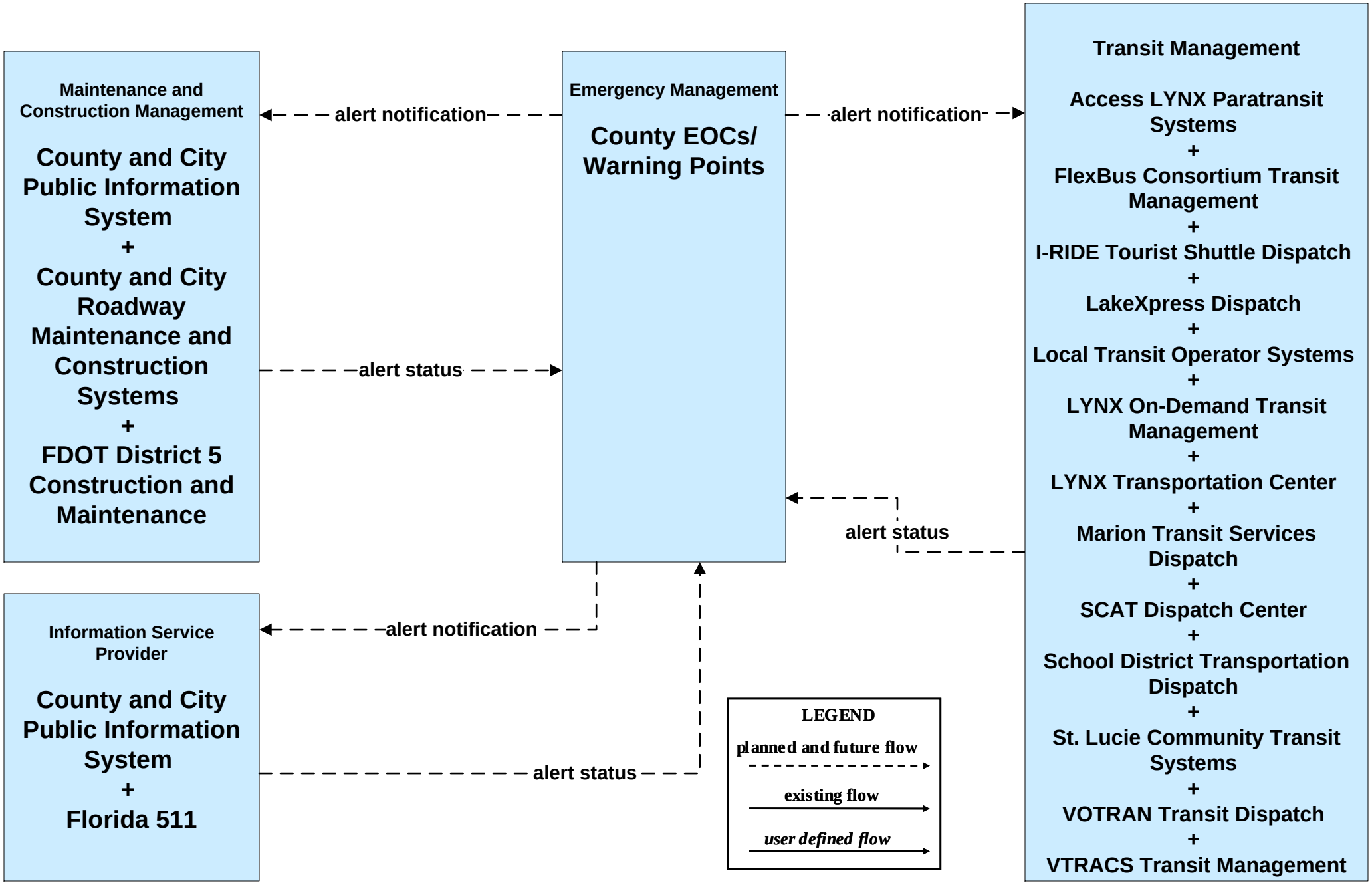
EM06 - Wide Area Alert
County EOCs (1 of 3)



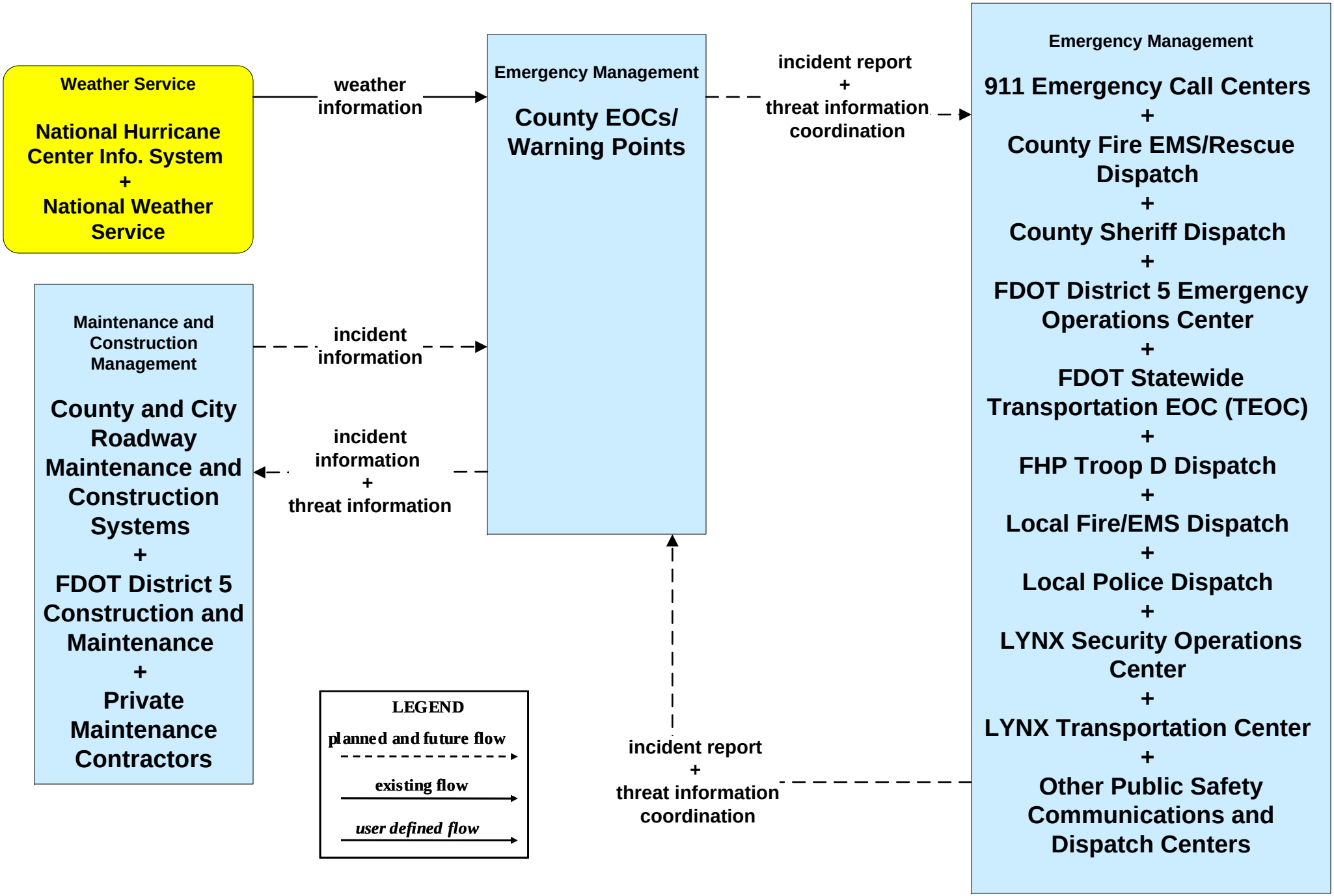
EM06 - Wide Area Alert
County EOCs (2 of 3)



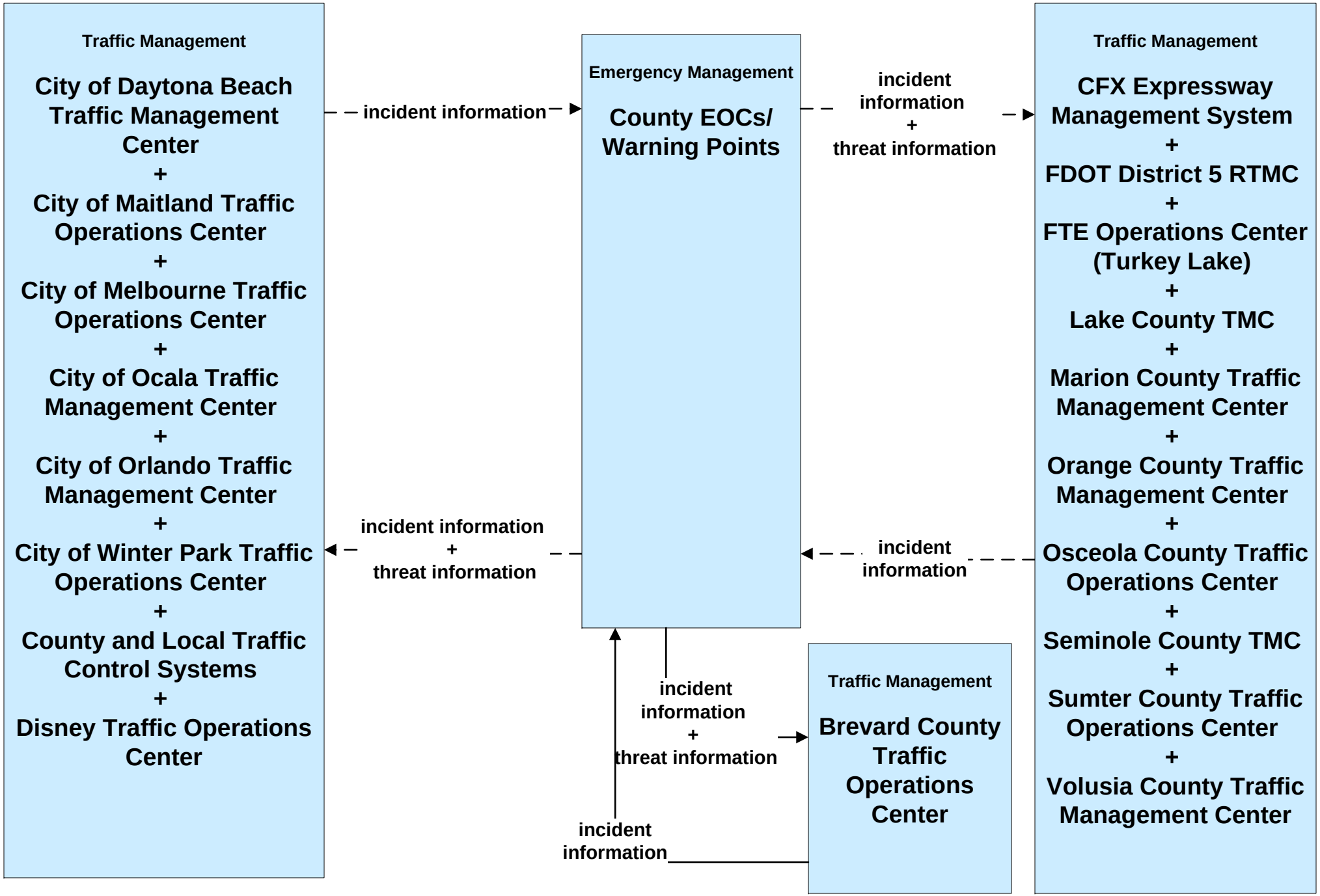
EM06 - Wide Area Alert
County EOCs (3 of 3)



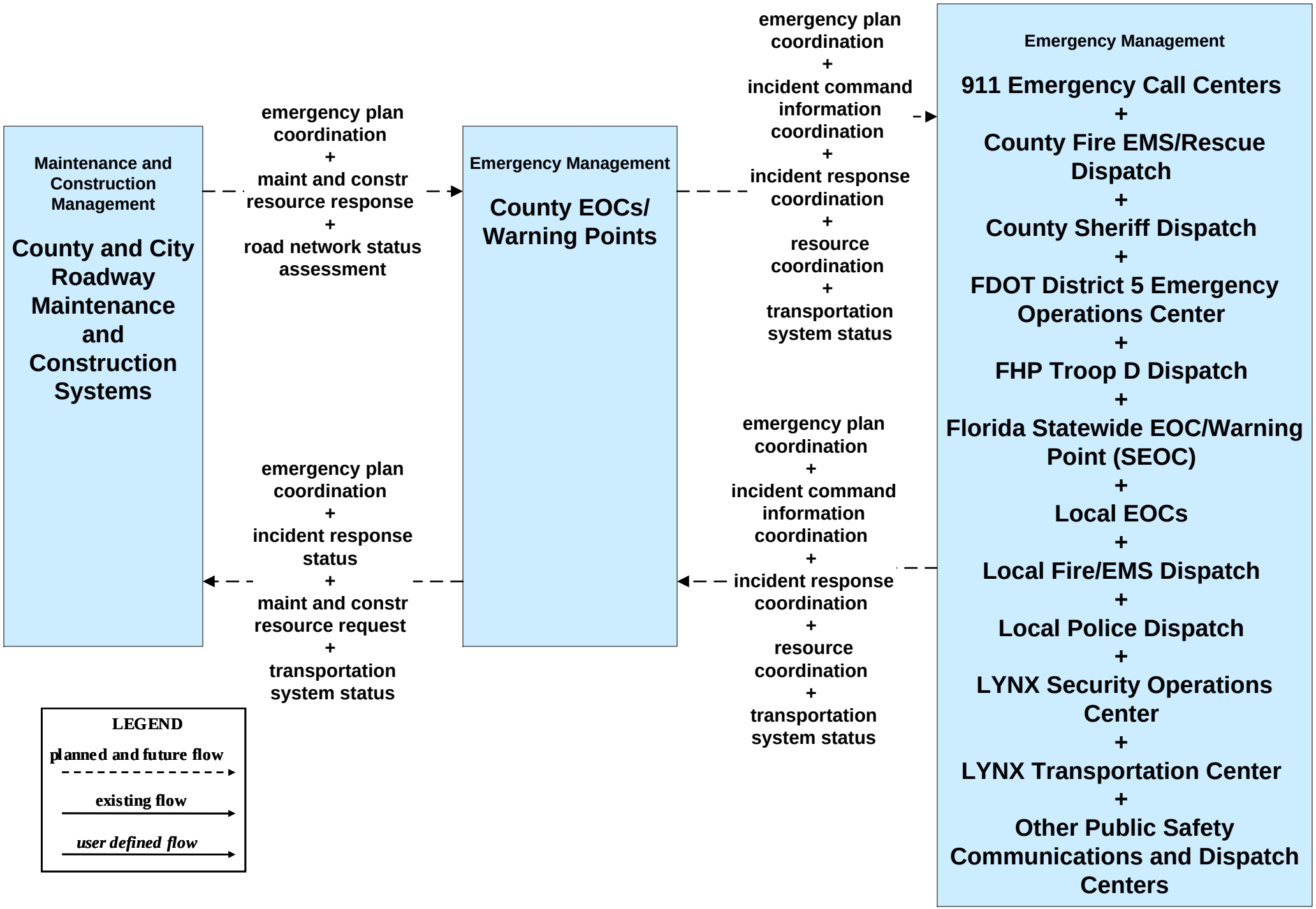
EM07 - Early Warning System
County EOCs (1 of 3)



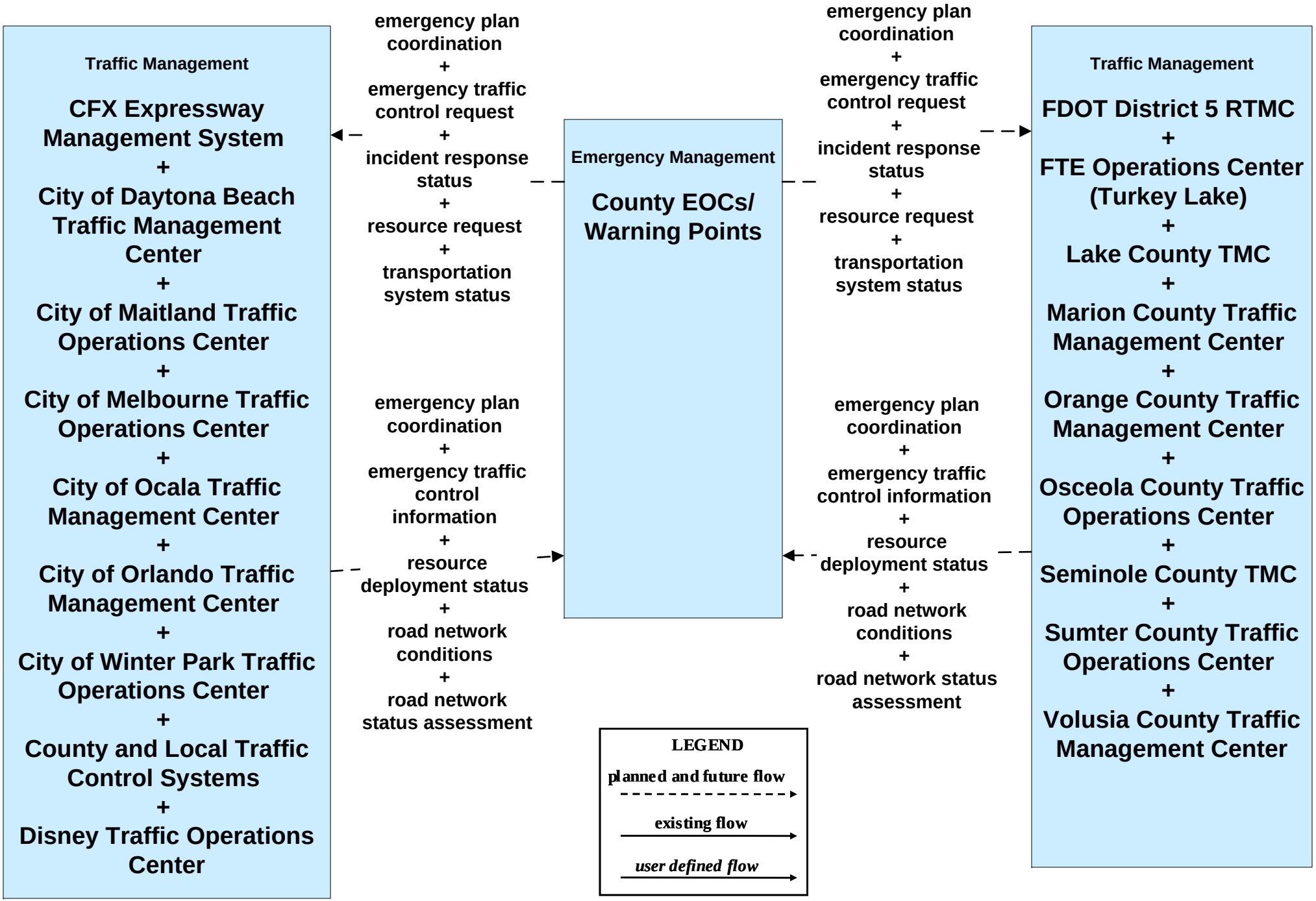
EM07 - Early Warning System
County EOCs (2 of 3)



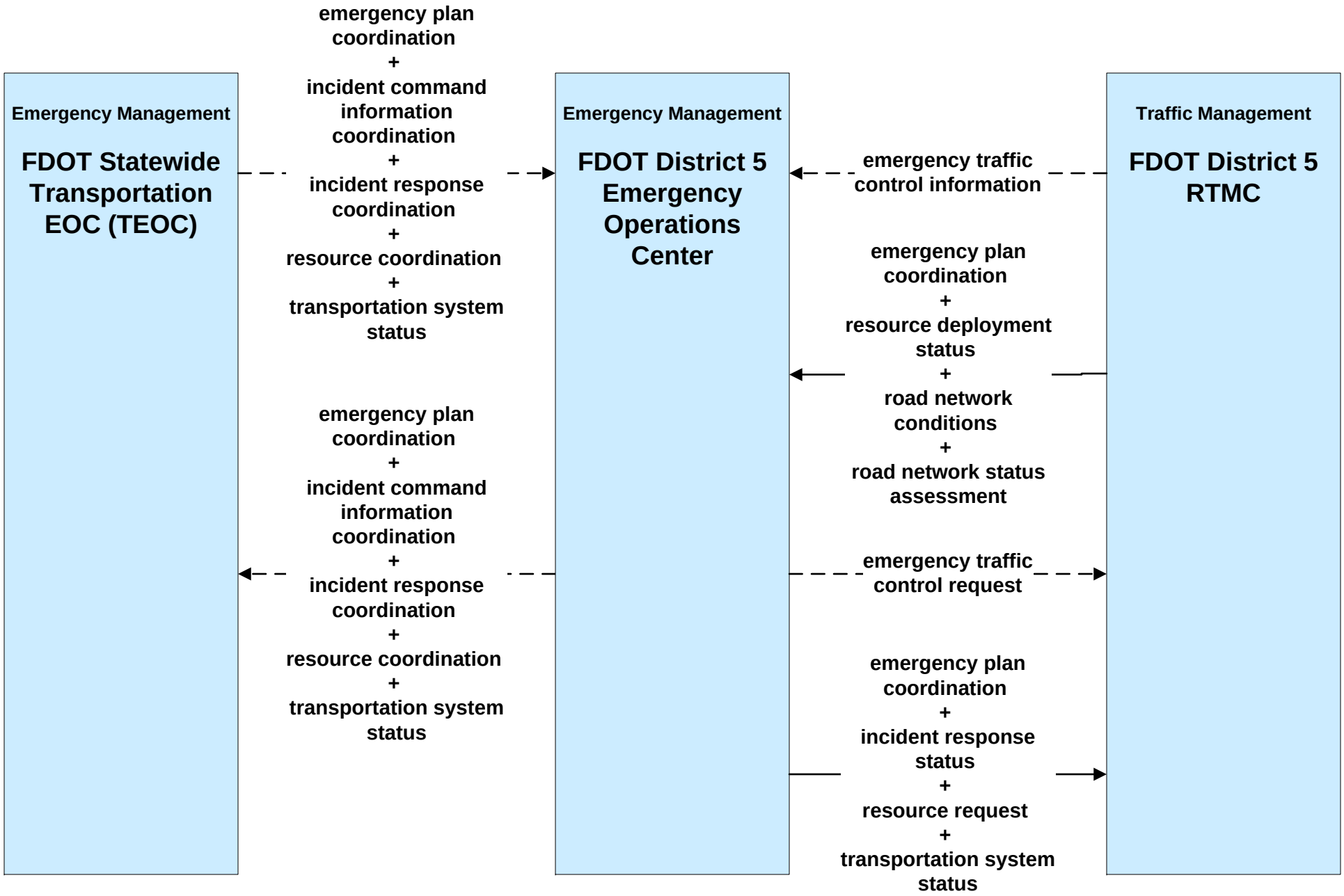
EM08 - Disaster Response and Recovery
County EOCs (1 of 4)



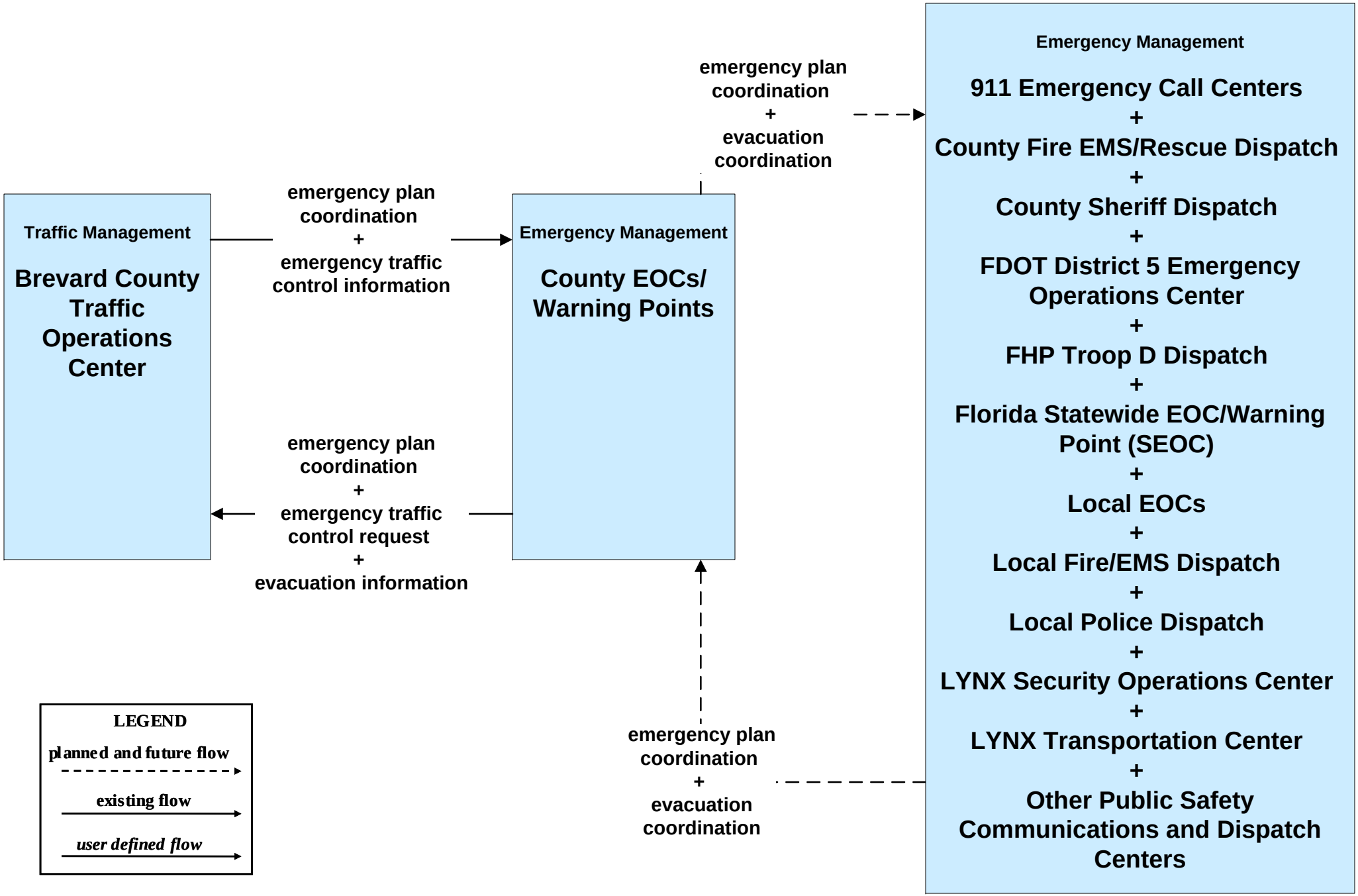
EM08 - Disaster Response and Recovery
County EOCs (2 of 4)



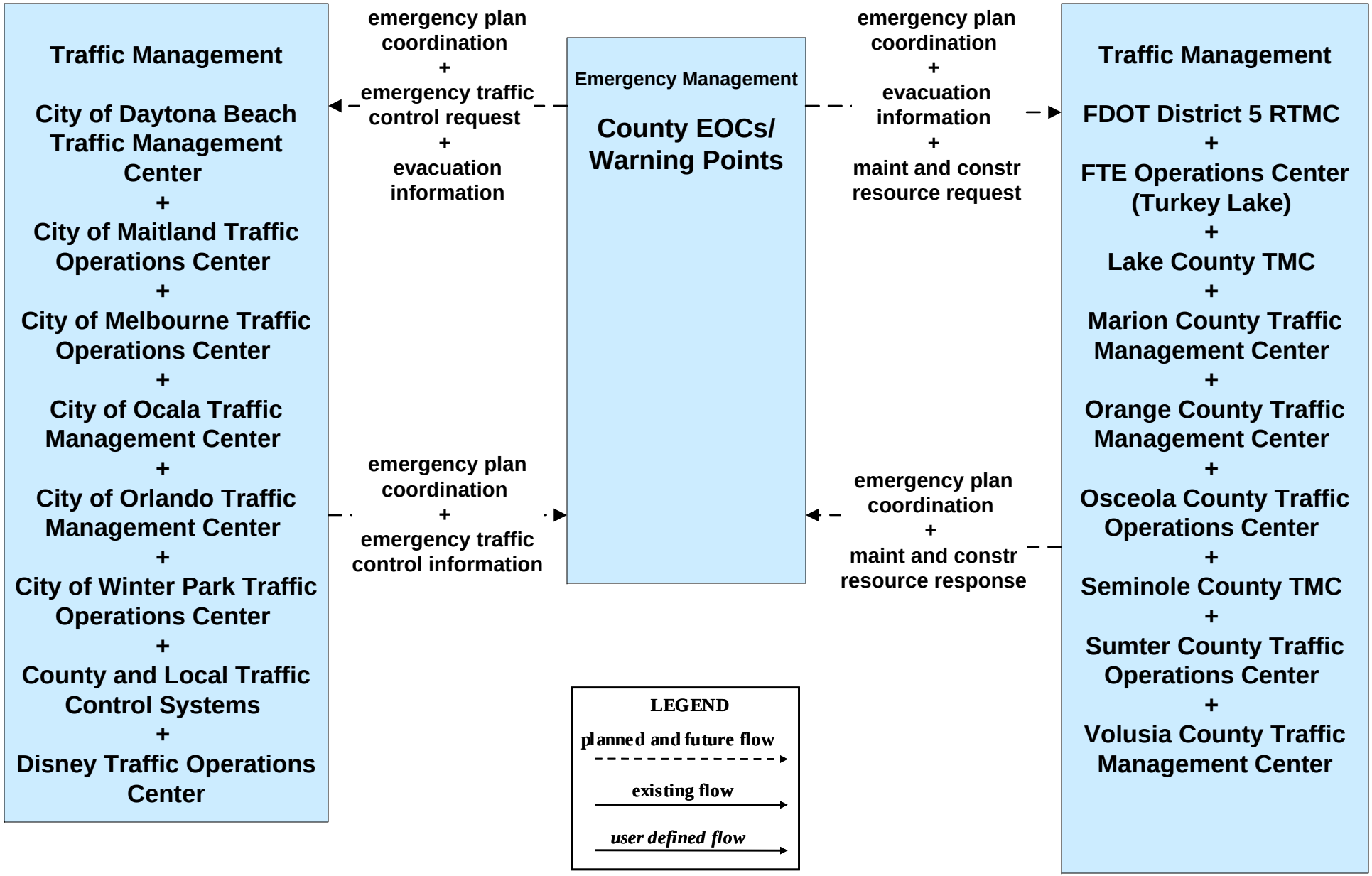
EM08 - Disaster Response and Recovery
FDOT District 5 EOC



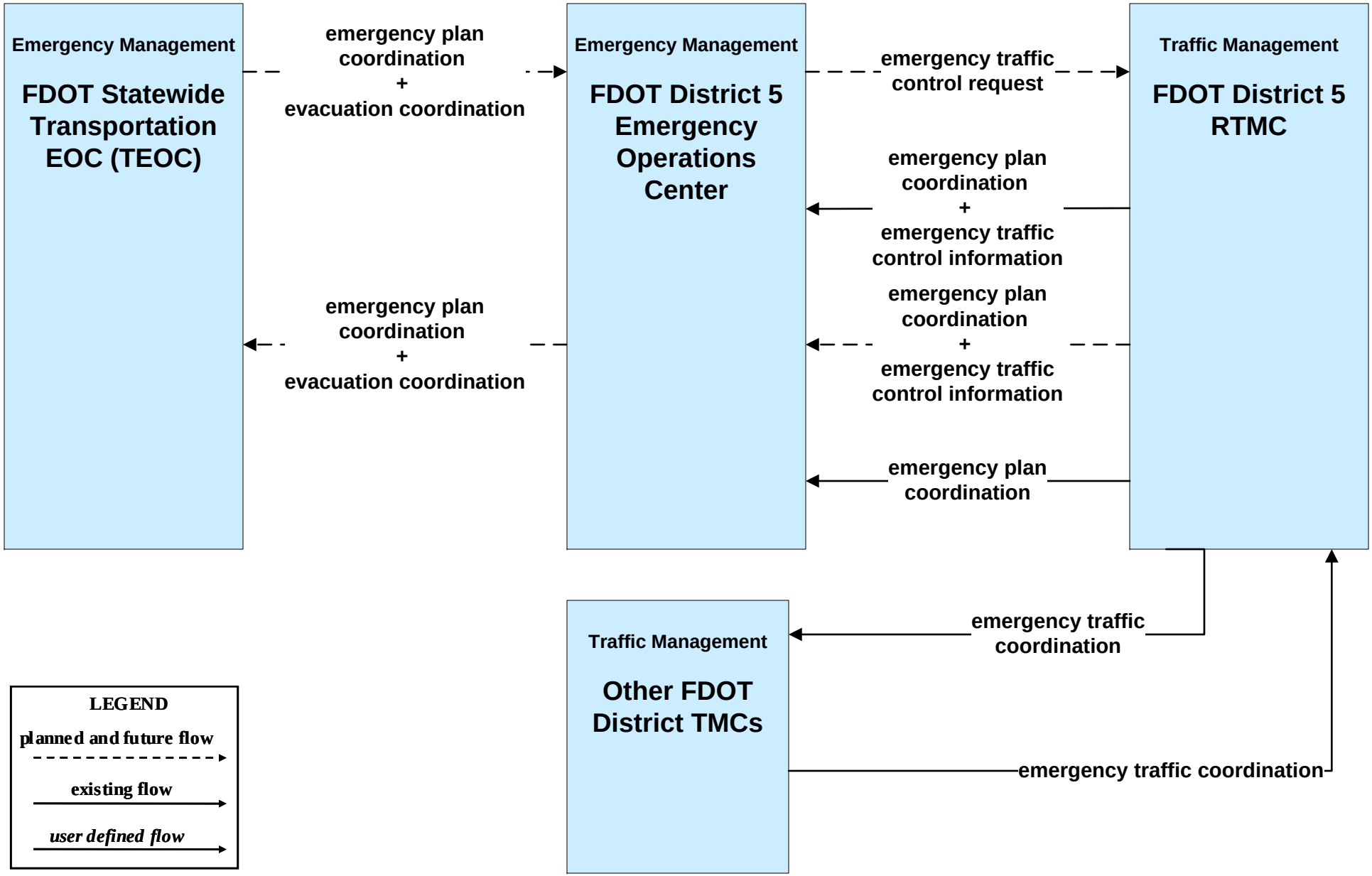
EM09 - Evacuation and Reentry Management
County EOCs (1 of 3)



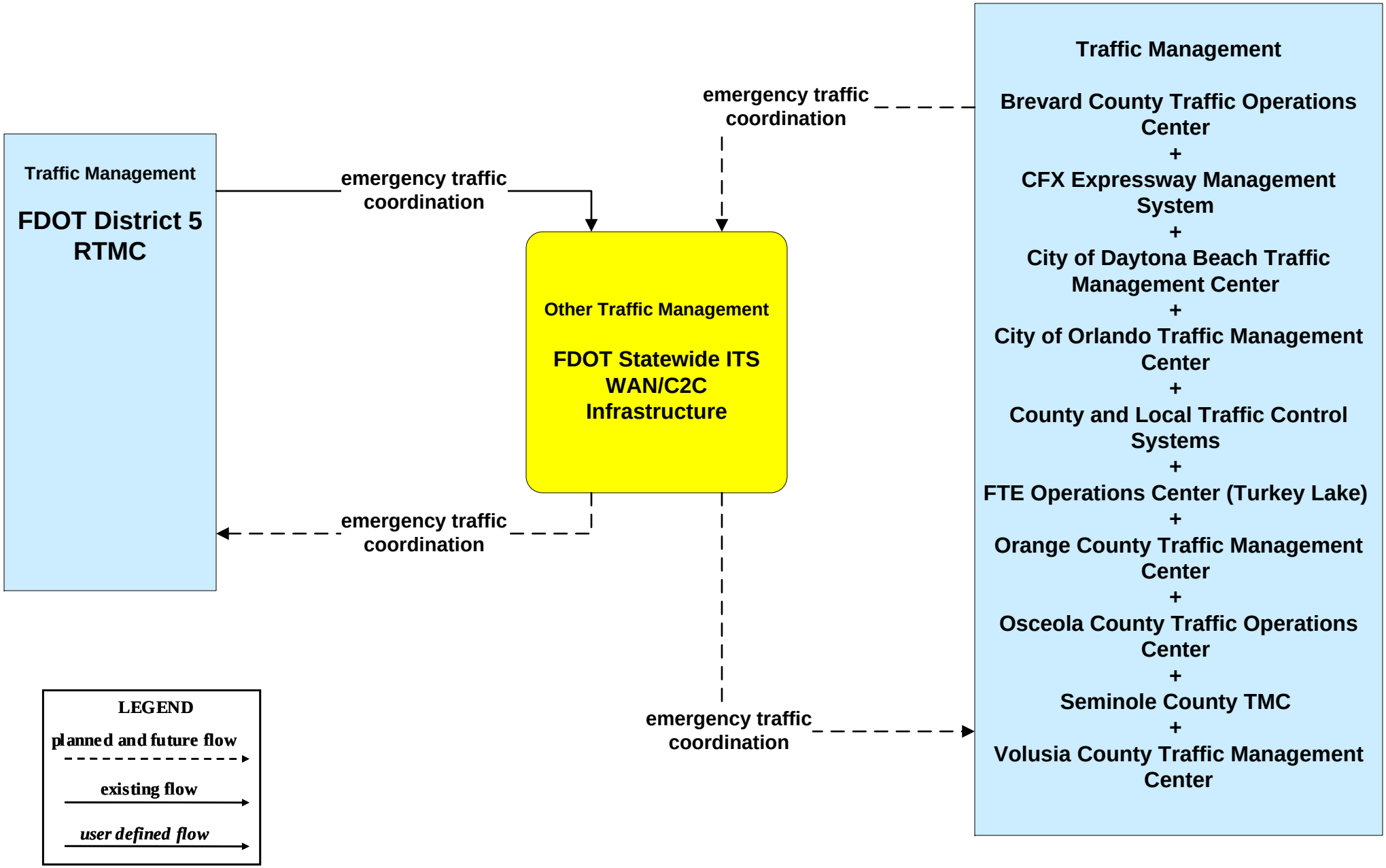
EM09 - Evacuation and Reentry Management
County EOCs (2 of 3)



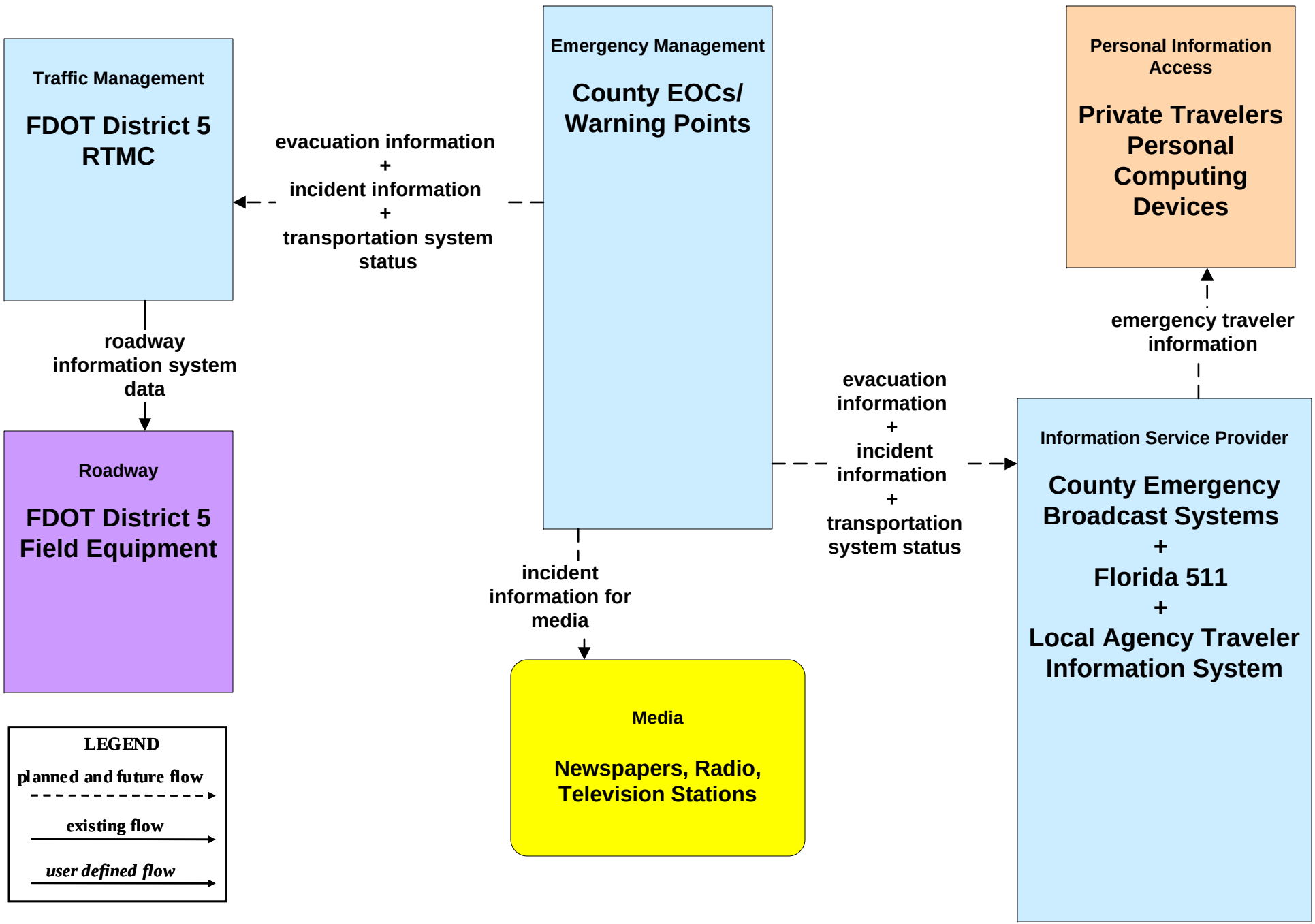
EM09 - Evacuation and Reentry Management
FDOT District 5



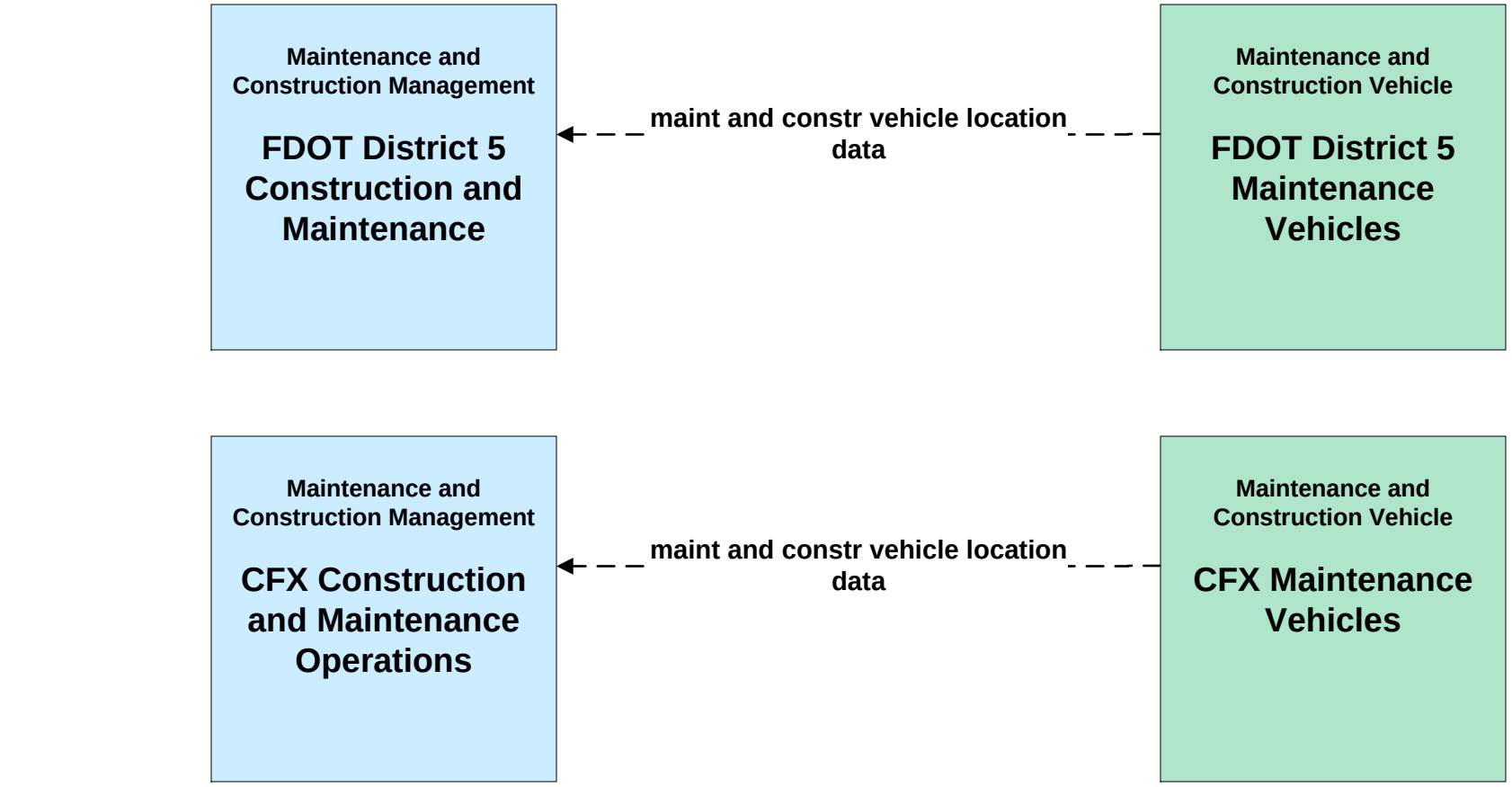
EM09 - Evacuation and Reentry Management
Central Florida Traffic Management Agencies

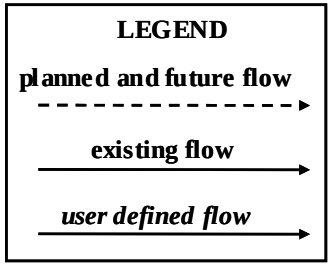


EM10 - Disaster Traveler Information
County Emergency Operations Center

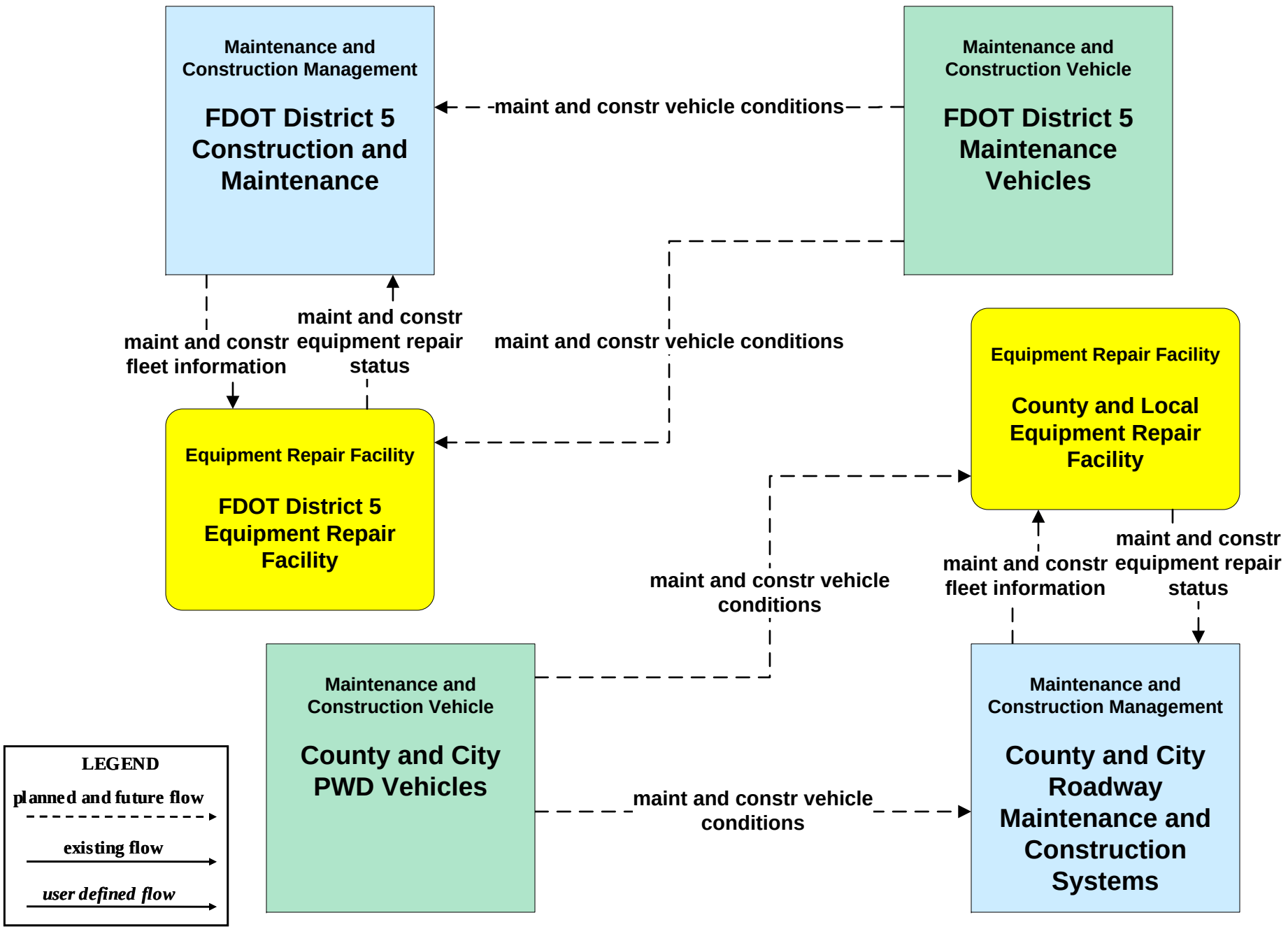


MC01 - Maintenance and Construction Vehicle and Equipment Tracking
FDOT District 5 / CFX Maintenance

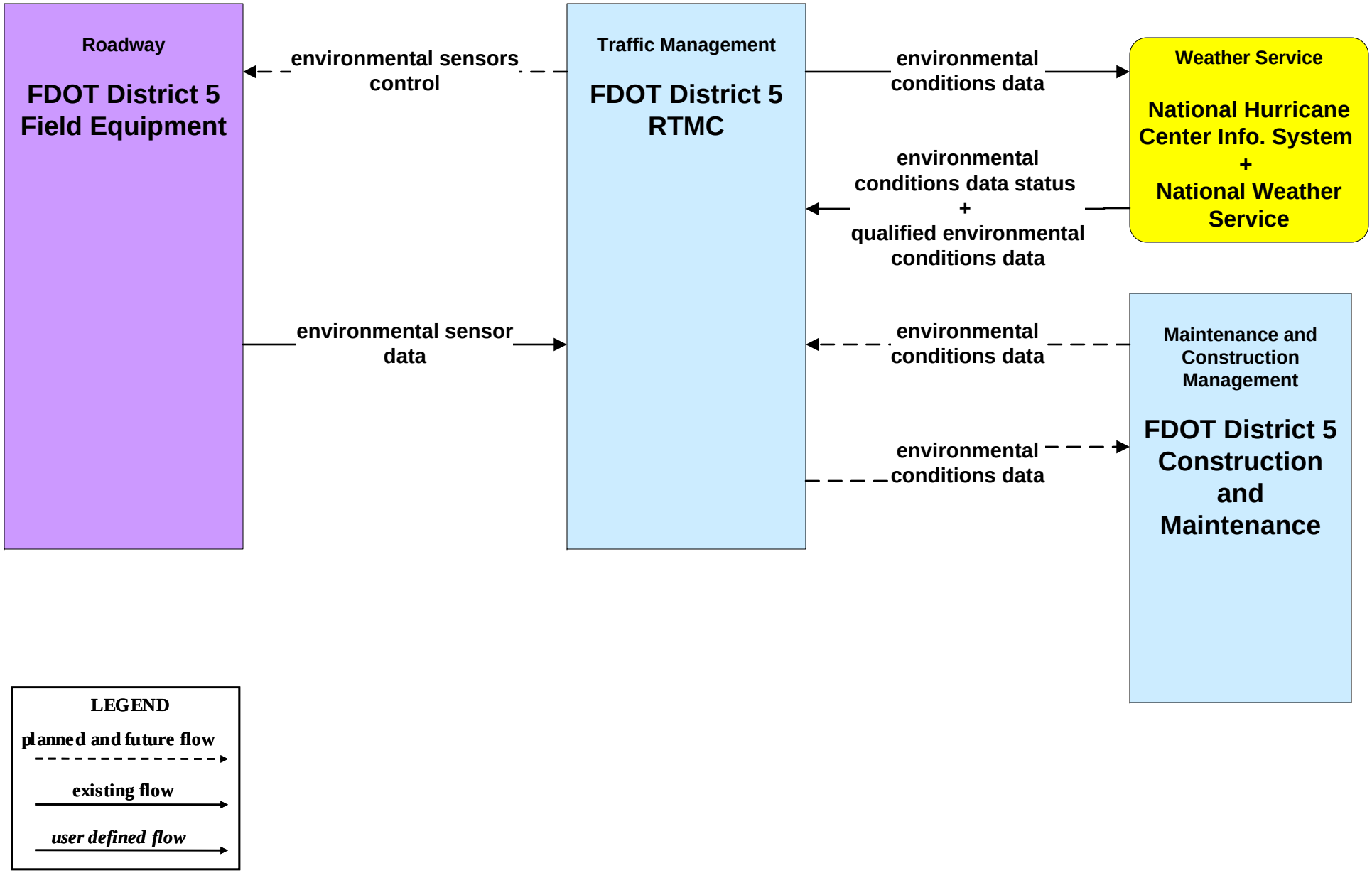




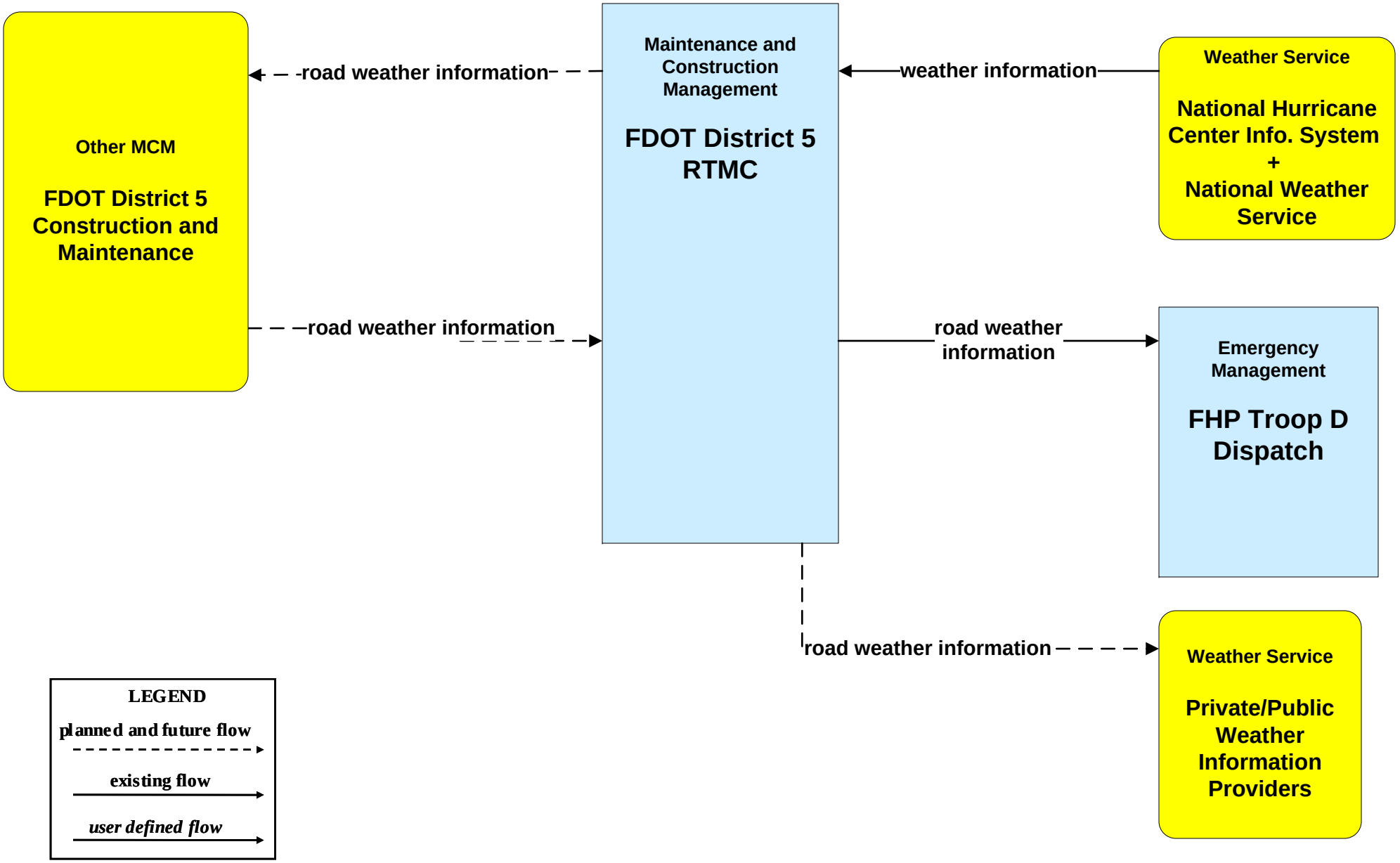
MC02 - Maintenance and Construction Vehicle Maintenance
FDOT District 5 / Counties and Cities



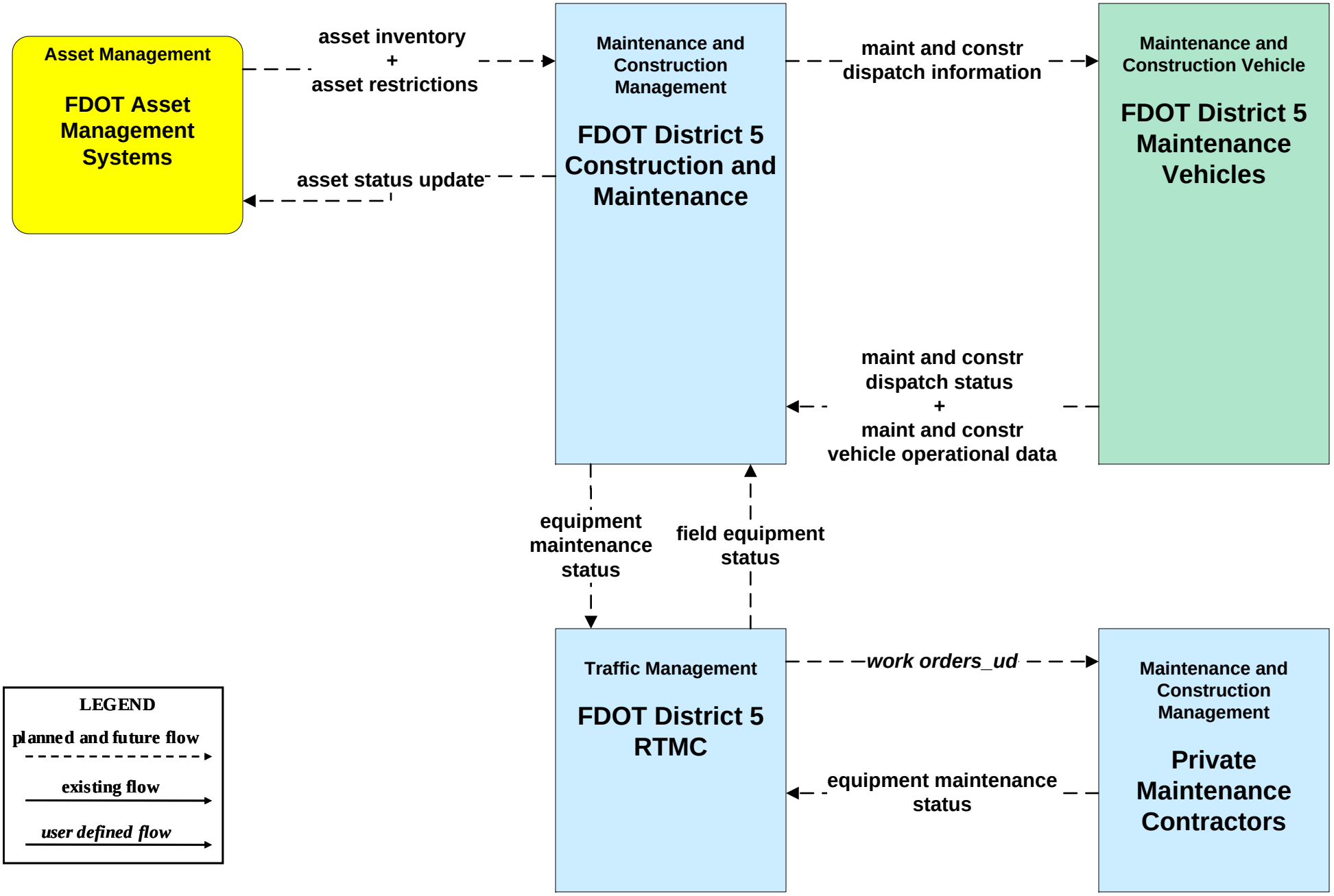
MC03 - Road Weather Data Collection
FDOT District 5



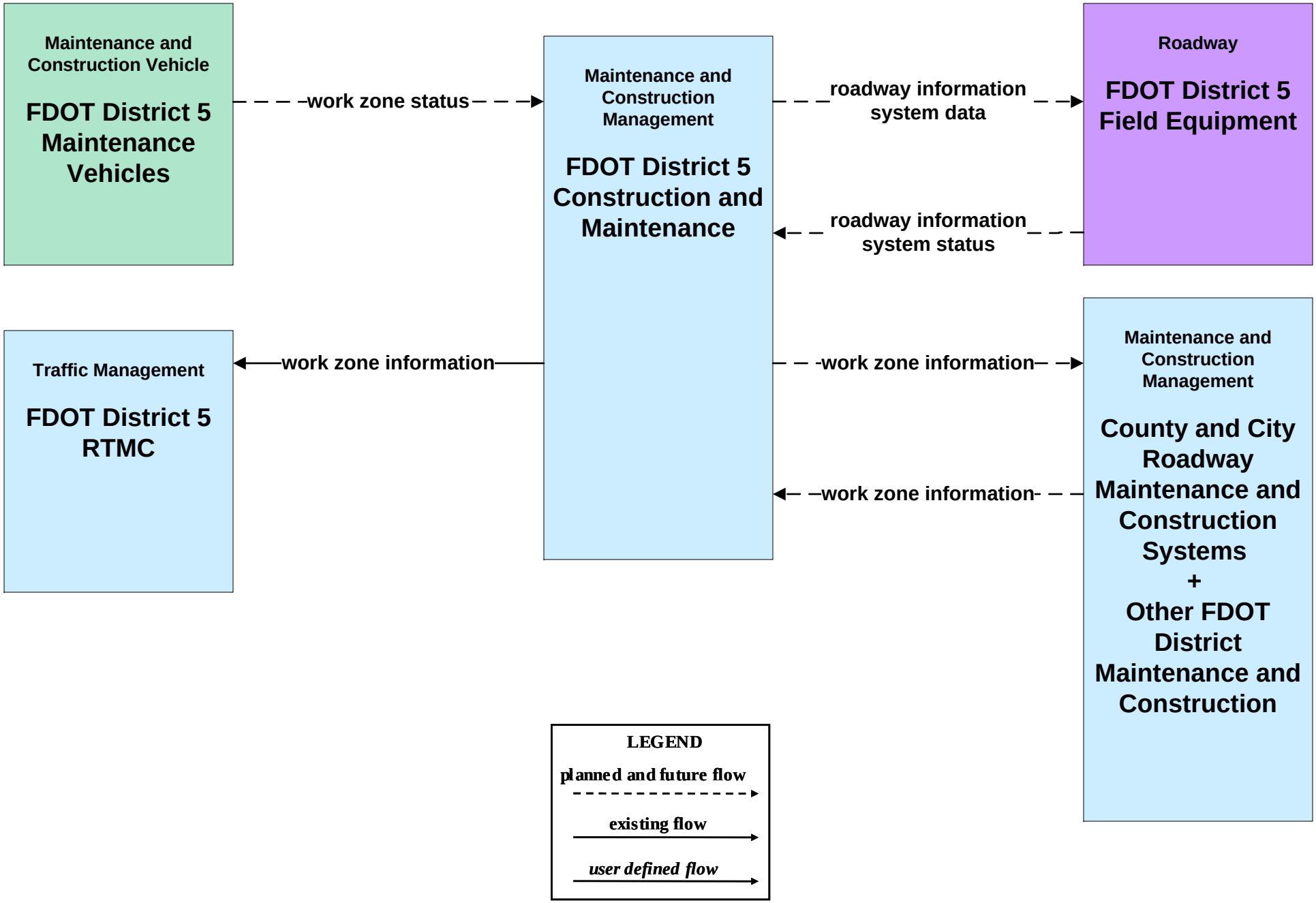
MC04 - Weather Information Processing and Distribution
FDOT District 5 Regional Traffic Management Center



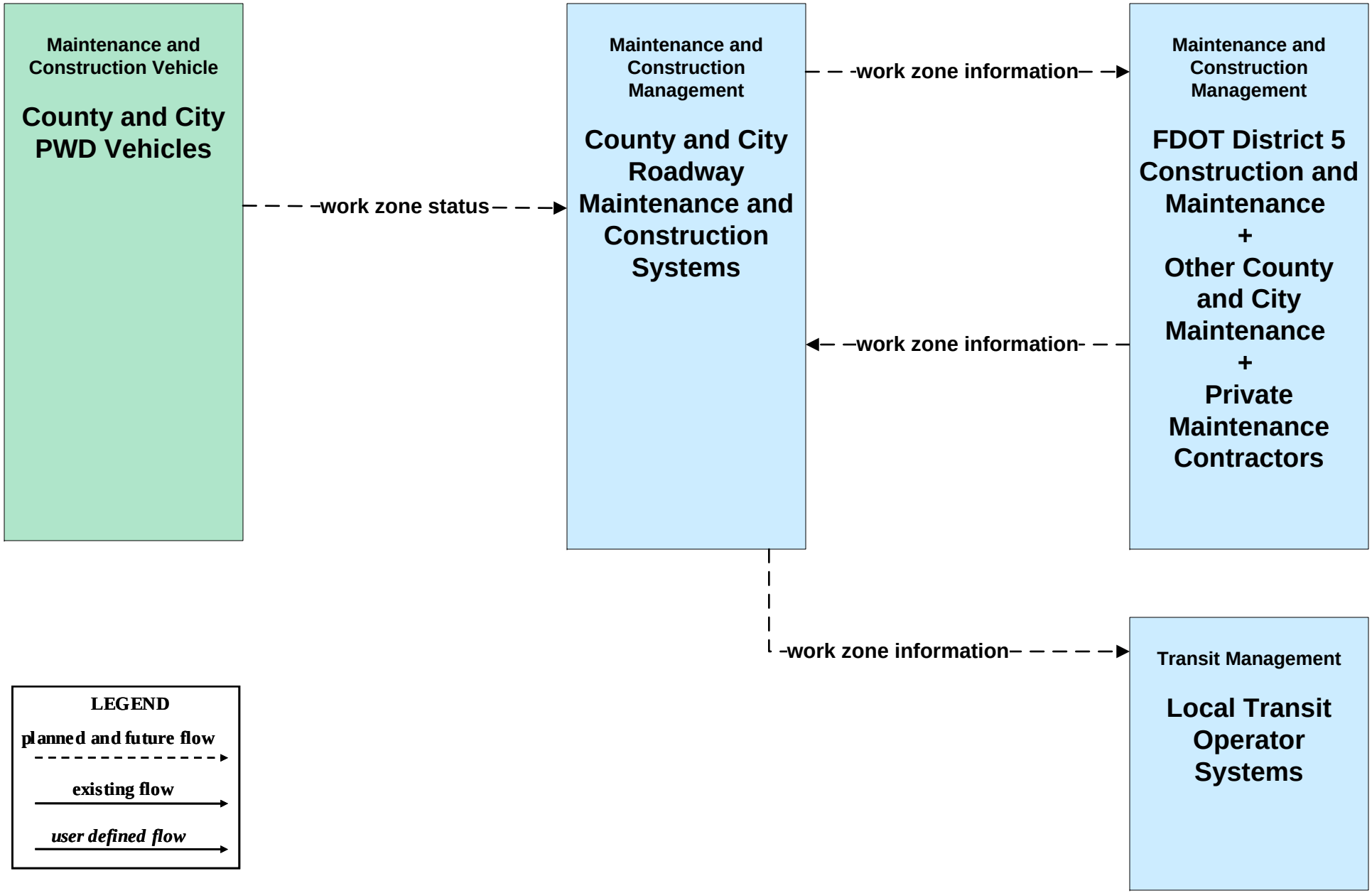
MC07 - Roadway Maintenance and Construction
FDOT District 5



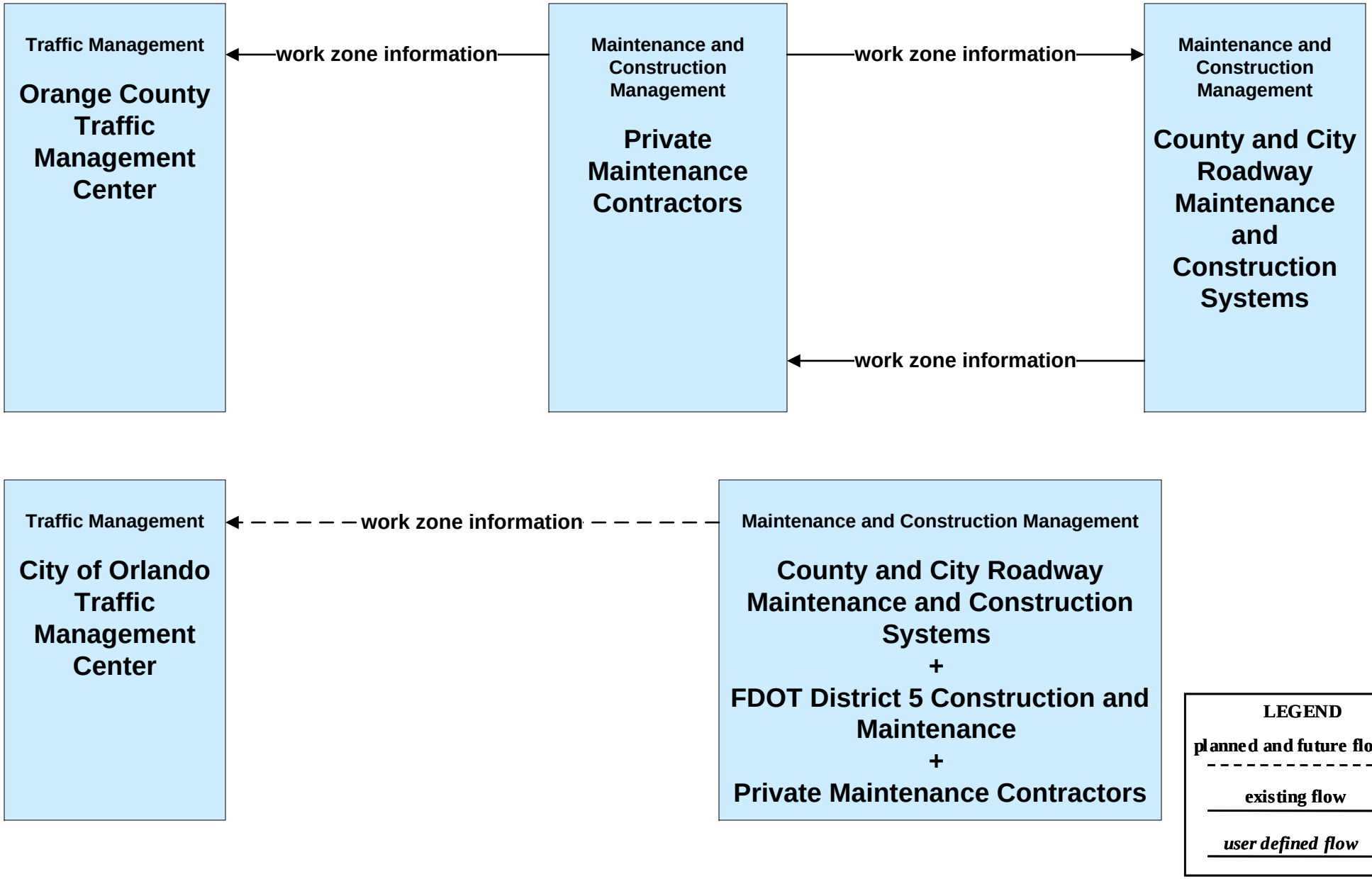
MC08 - Work Zone Management
FDOT District 5



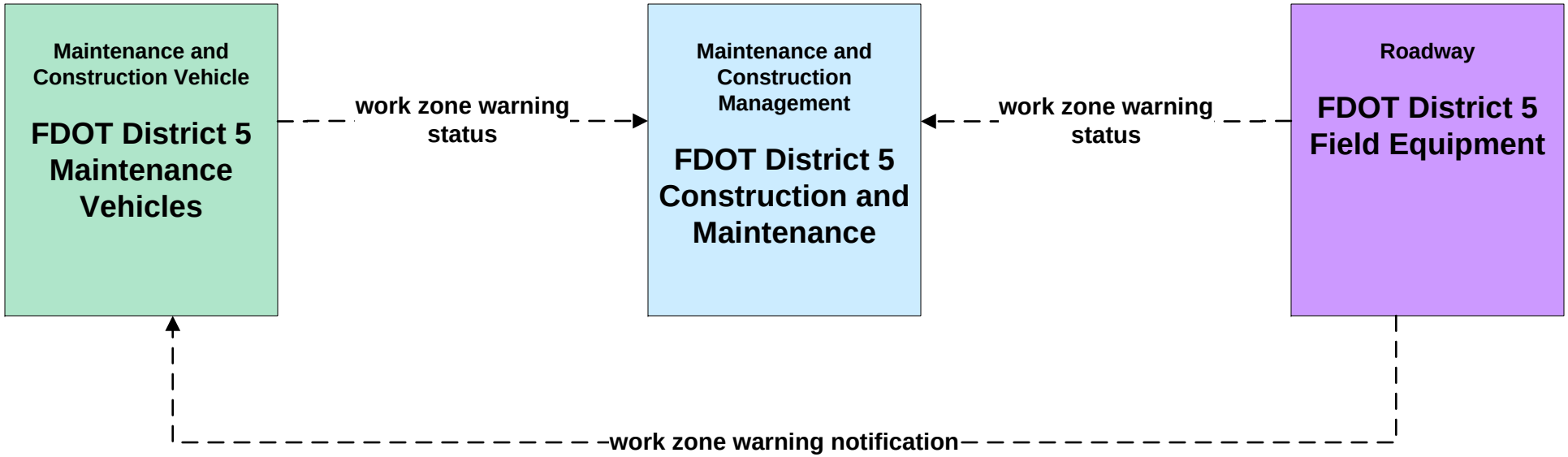
MC08 - Work Zone Management
Counties and Cities (1 of 3)

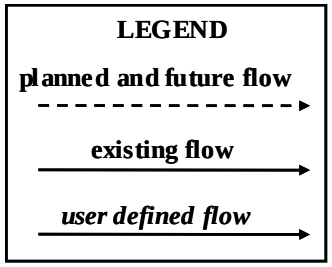


MC08 - Work Zone Management
Orange County and City of Orlando

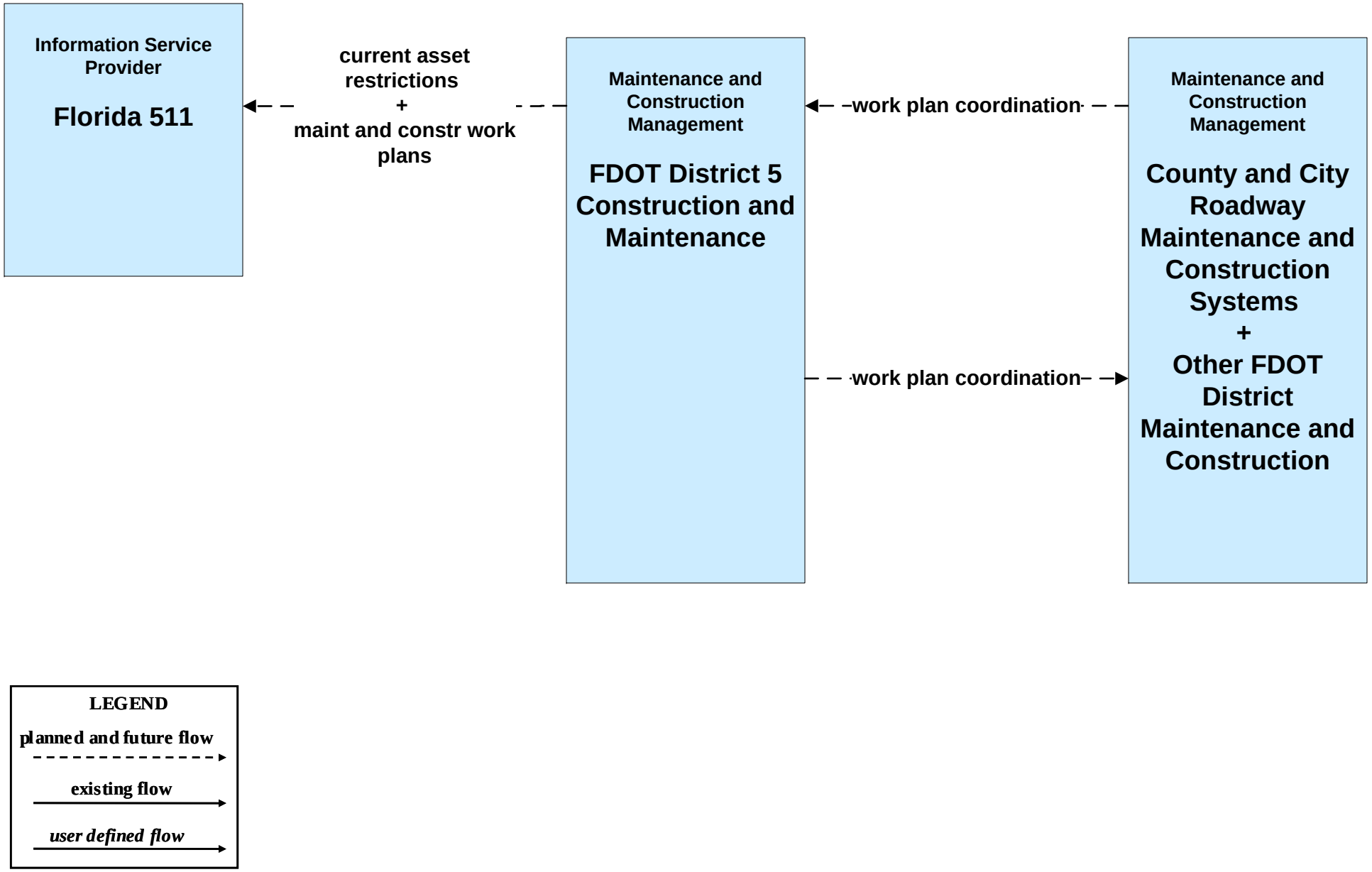


MC09 - Work Zone Safety Monitoring
FDOT District 5

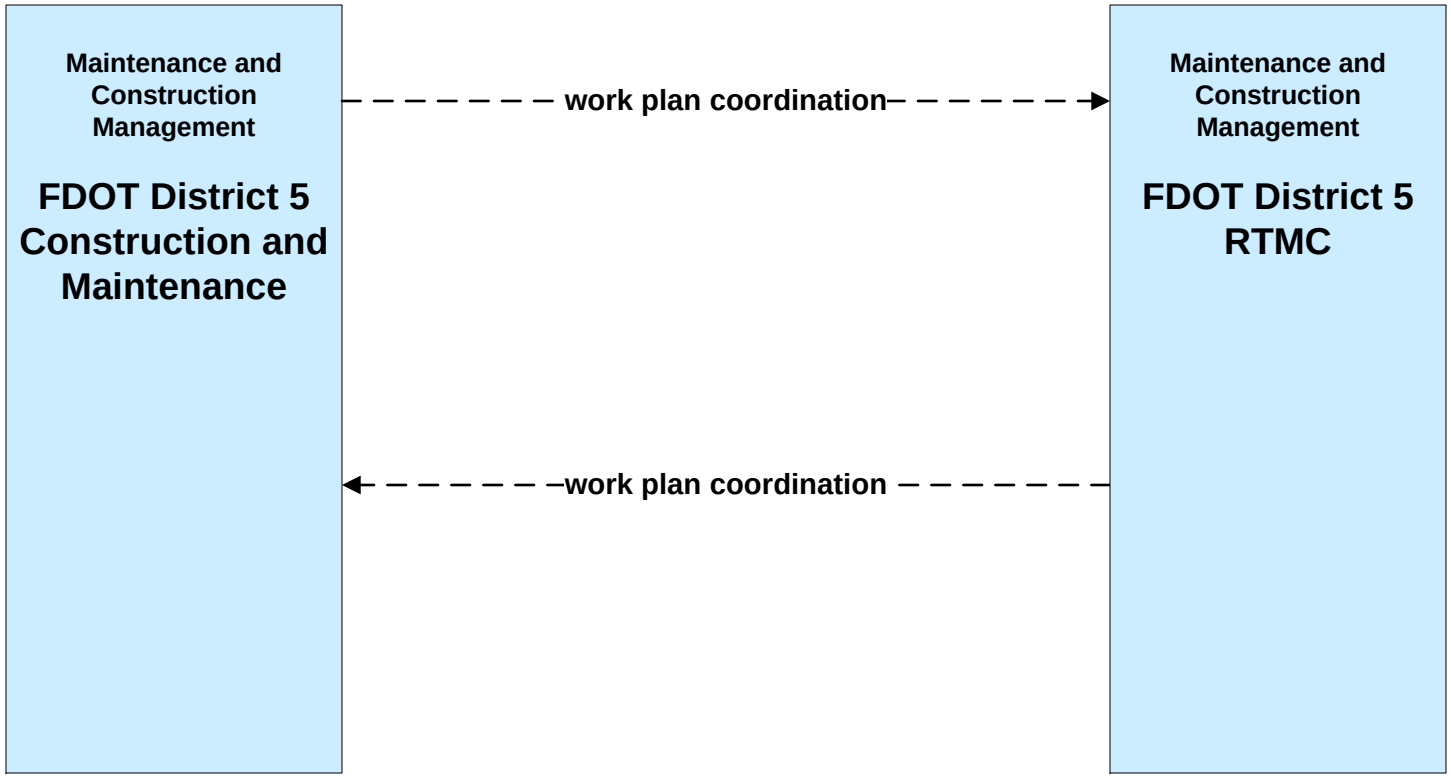


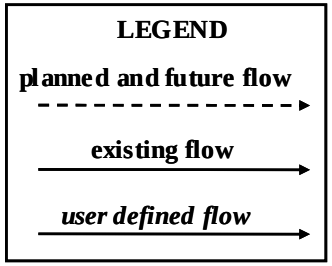


MC10 - Maintenance and Construction Activity Coordination
FDOT District 5 (1 of 4)

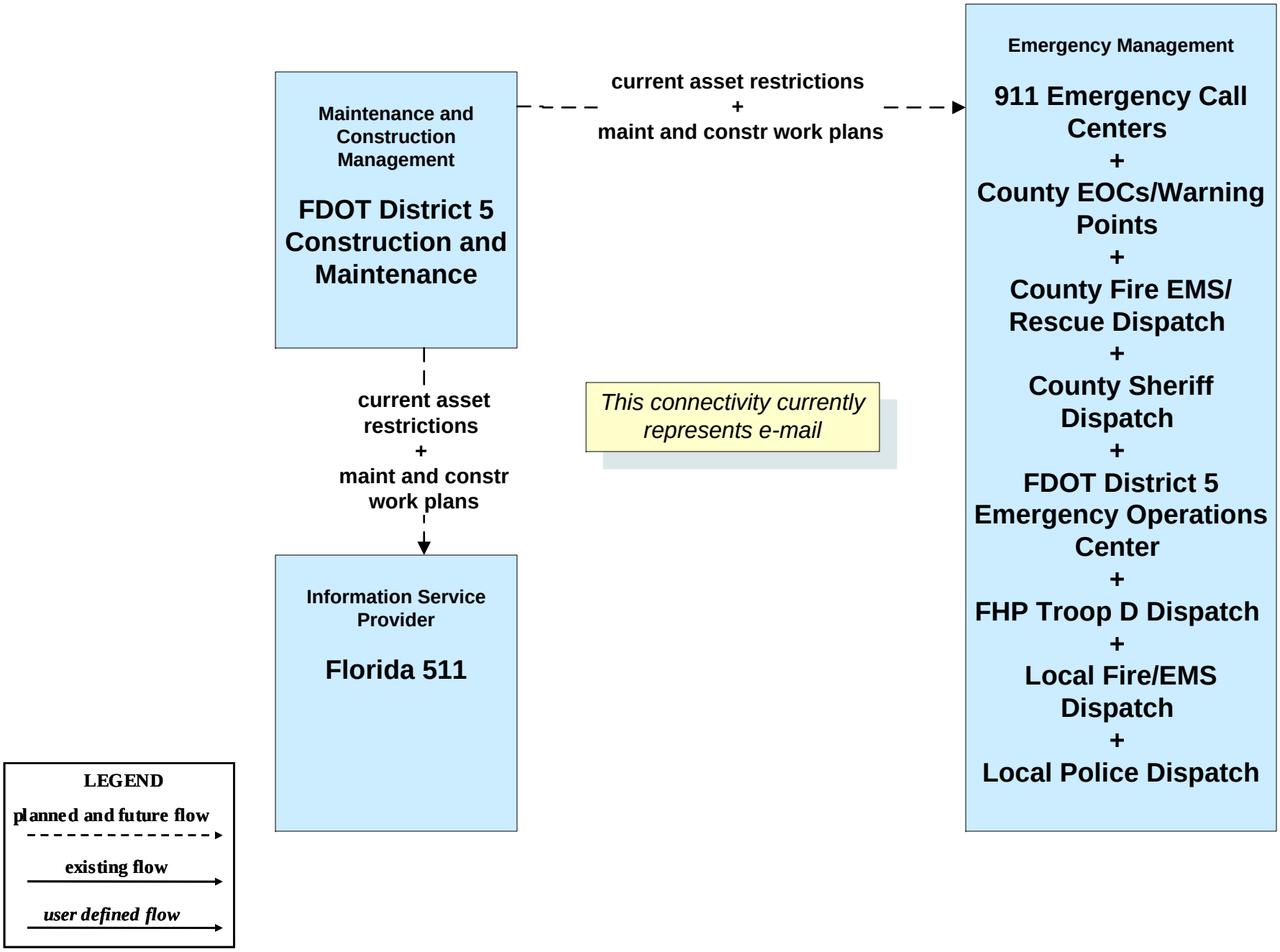


MC10 - Maintenance and Construction Activity Coordination
FDOT District 5 (2 of 4)

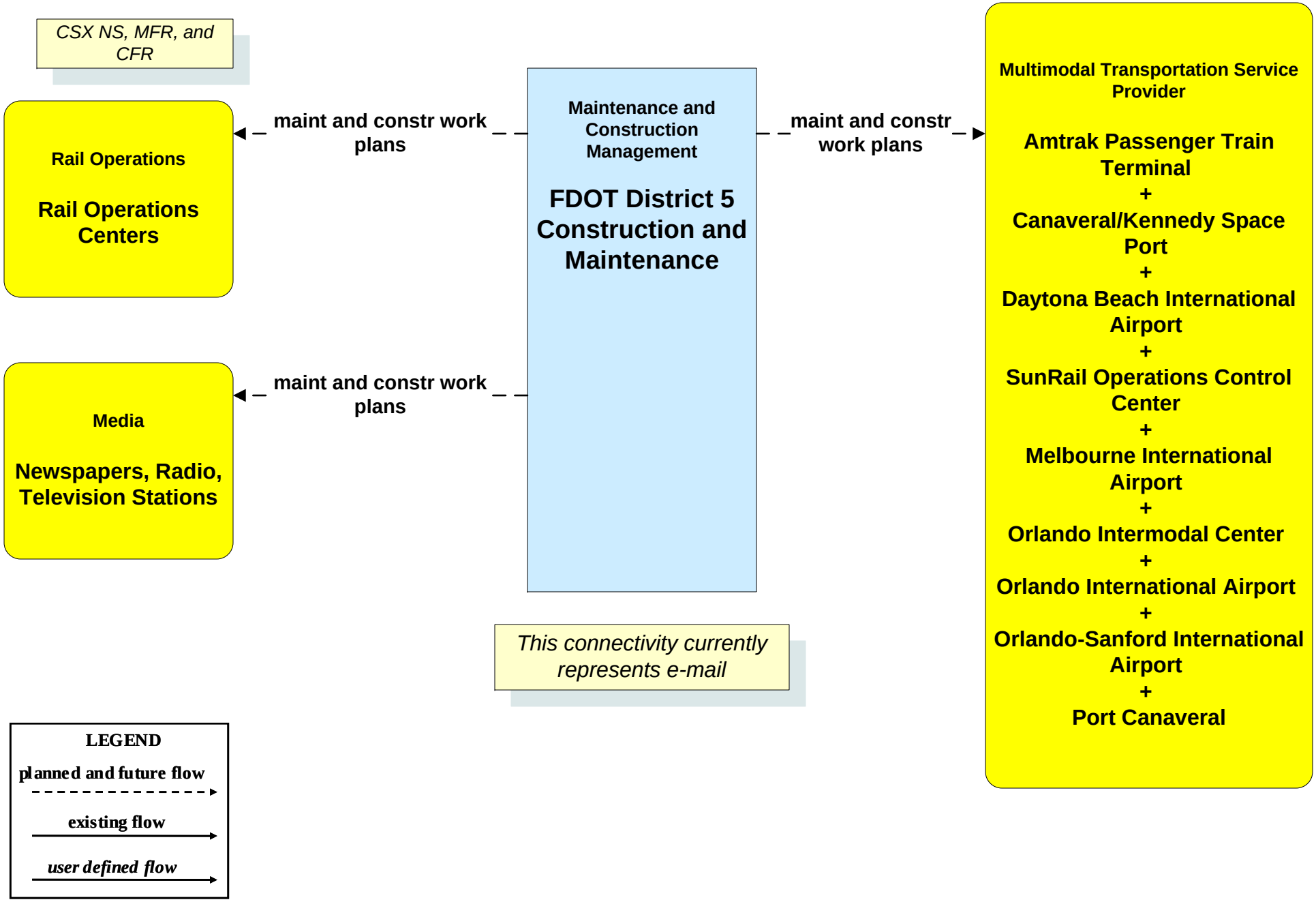




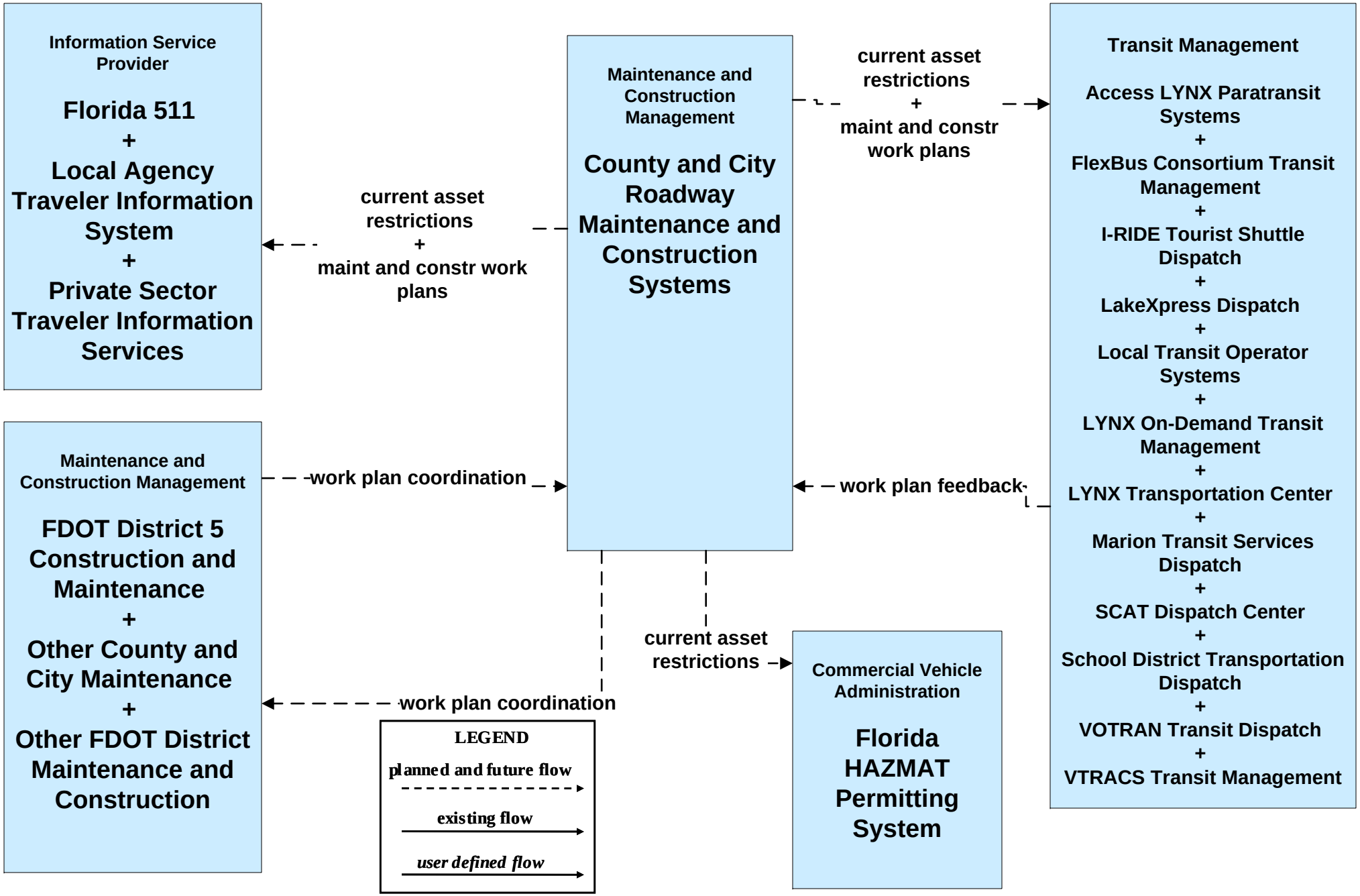
MC10 - Maintenance and Construction Activity Coordination
FDOT District 5 (3 of 4)



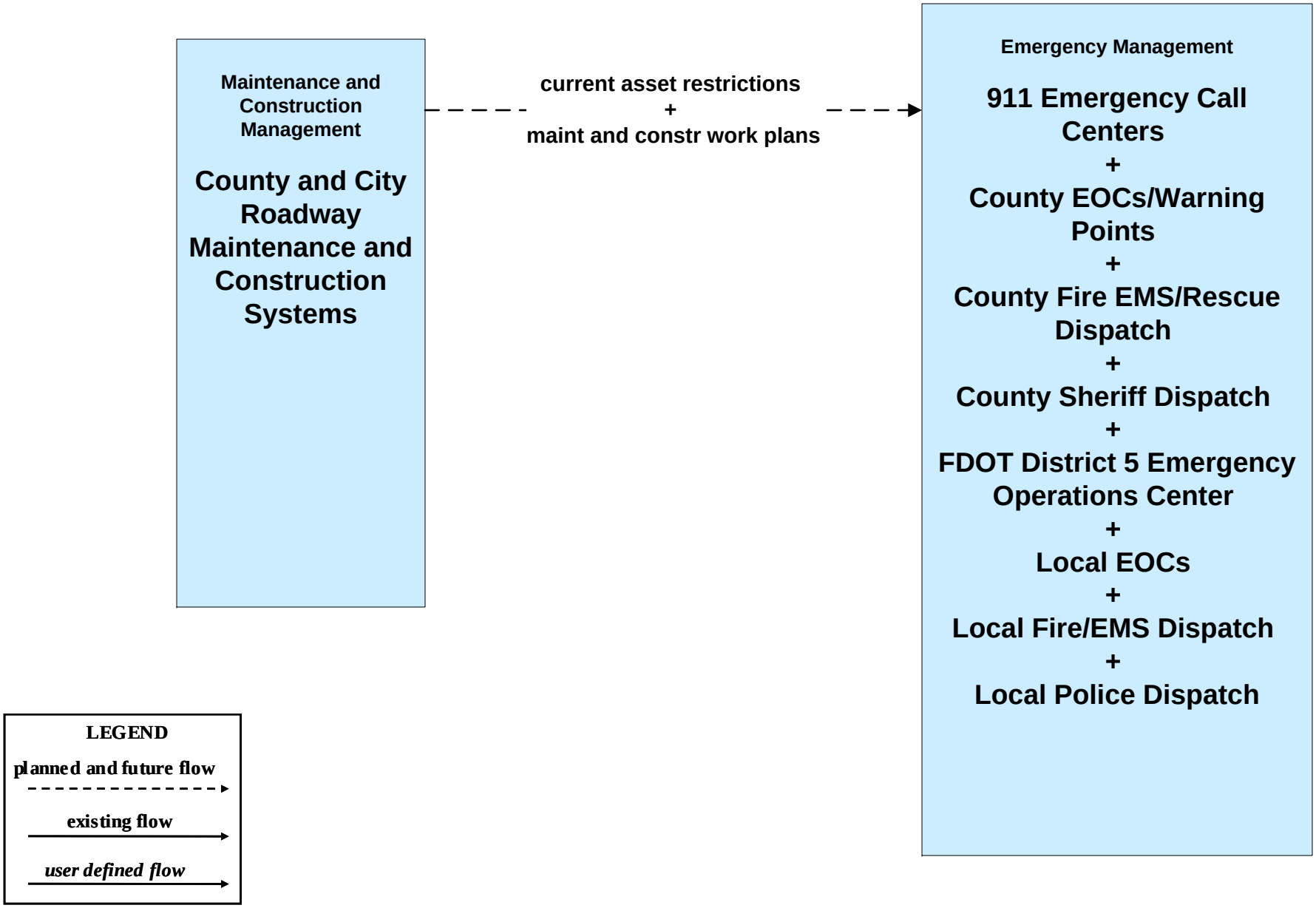
MC10 - Maintenance and Construction Activity Coordination
FDOT District 5 (4 of 4)



MC10 - Maintenance and Construction Activity Coordination
Counties and Cities (1 of 4)



MC10 - Maintenance and Construction Activity Coordination
Counties and Cities (3 of 4)



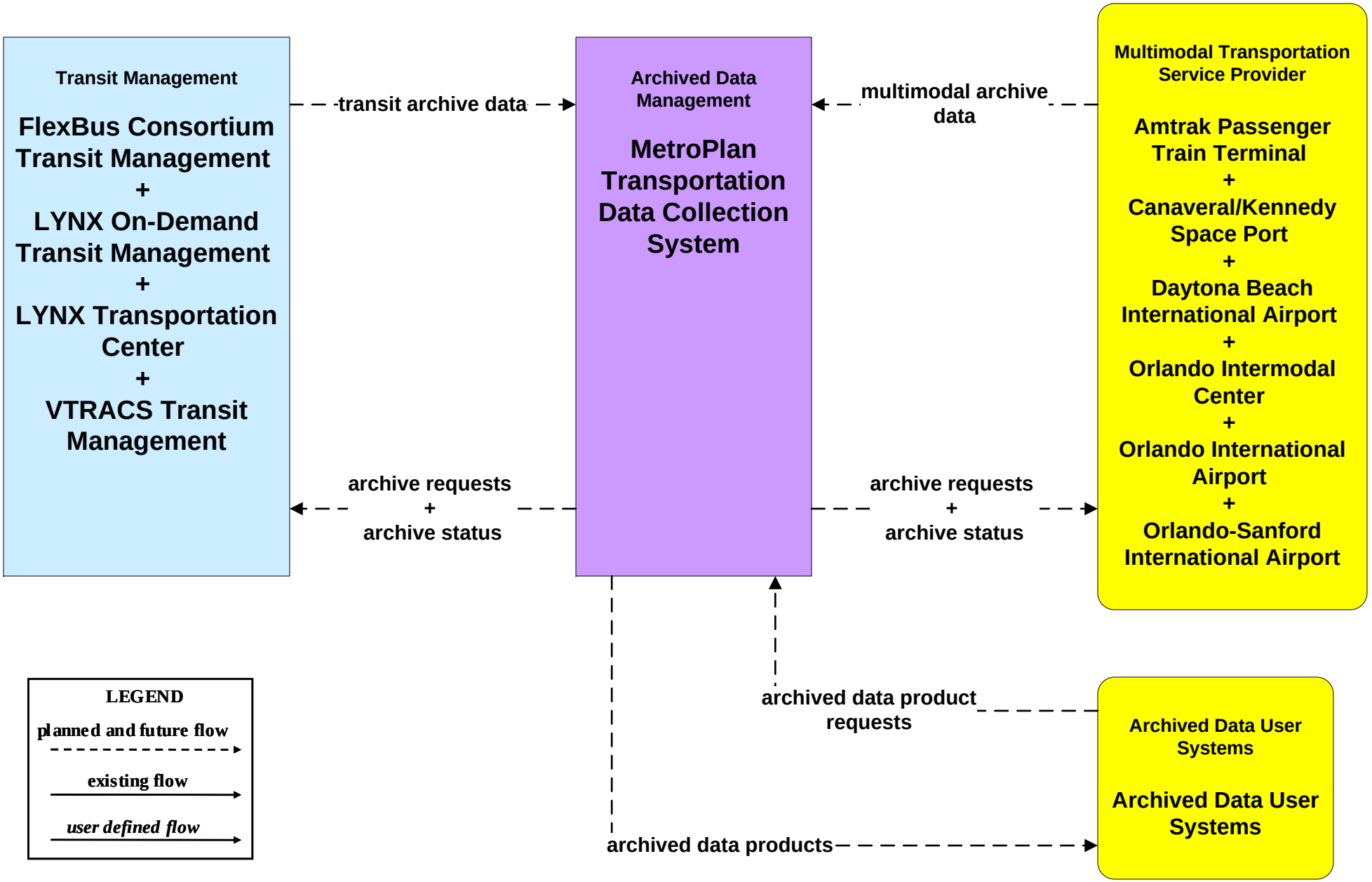
FDOT District 5

Central Florida Regional ITS Architecture

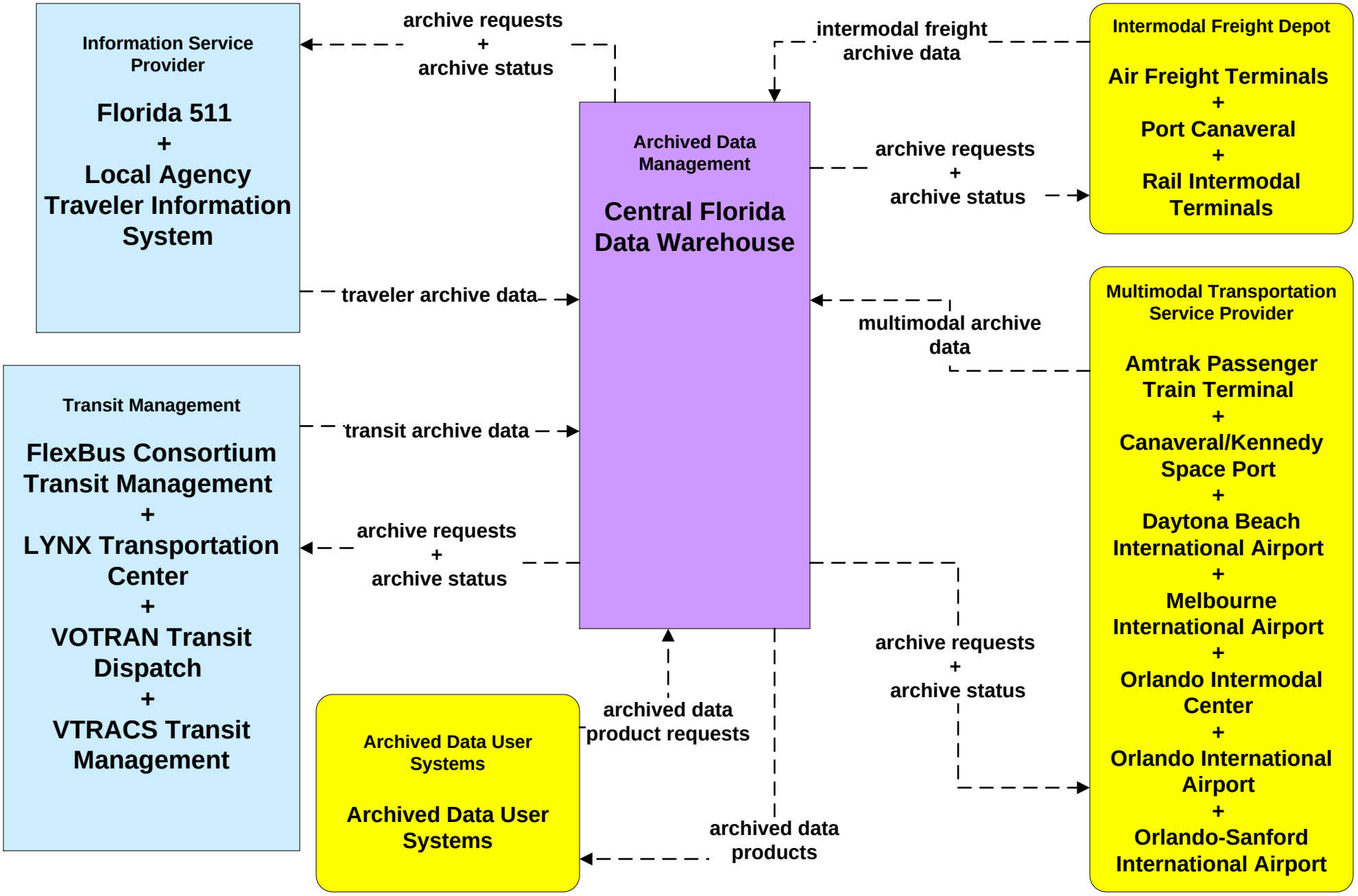
Customized Service Package Diagrams

LYNX

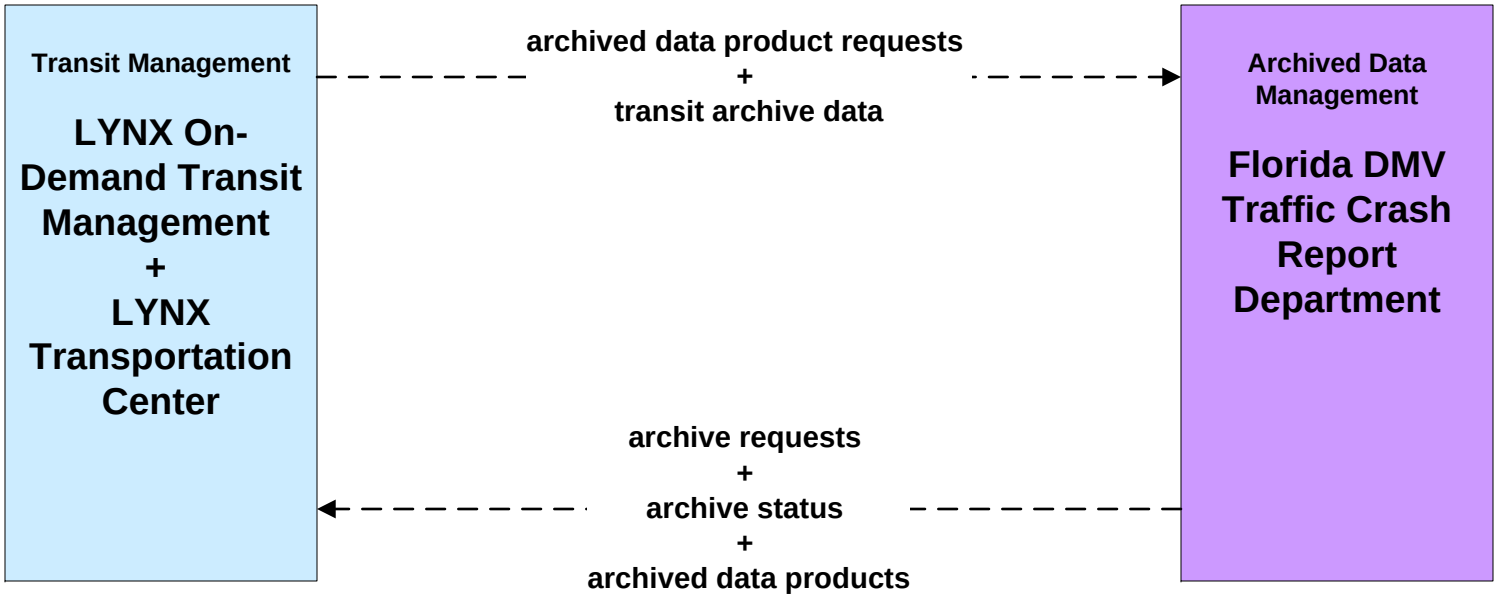
AD1 - ITS Data Mart
MetroPlan Transportation Data Collection System (2 of 2)

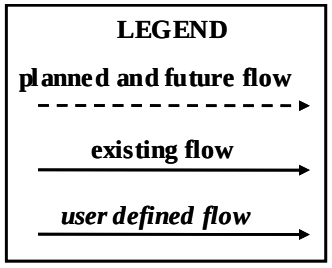


AD2 - ITS Data Warehouse
Central Florida Data Warehouse (2 of 2)

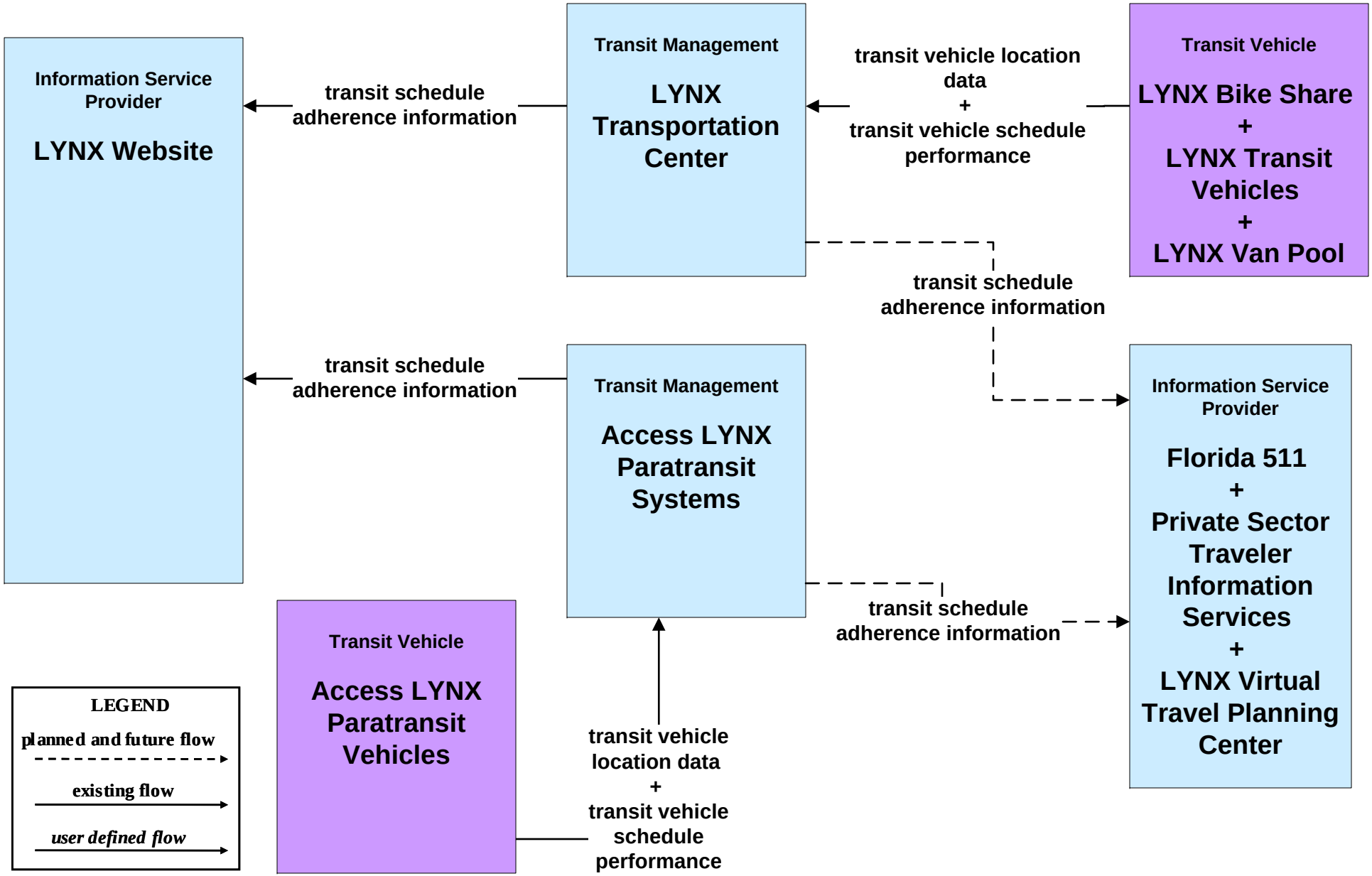


AD2 - ITS Data Warehouse
LYNX/Florida DMV

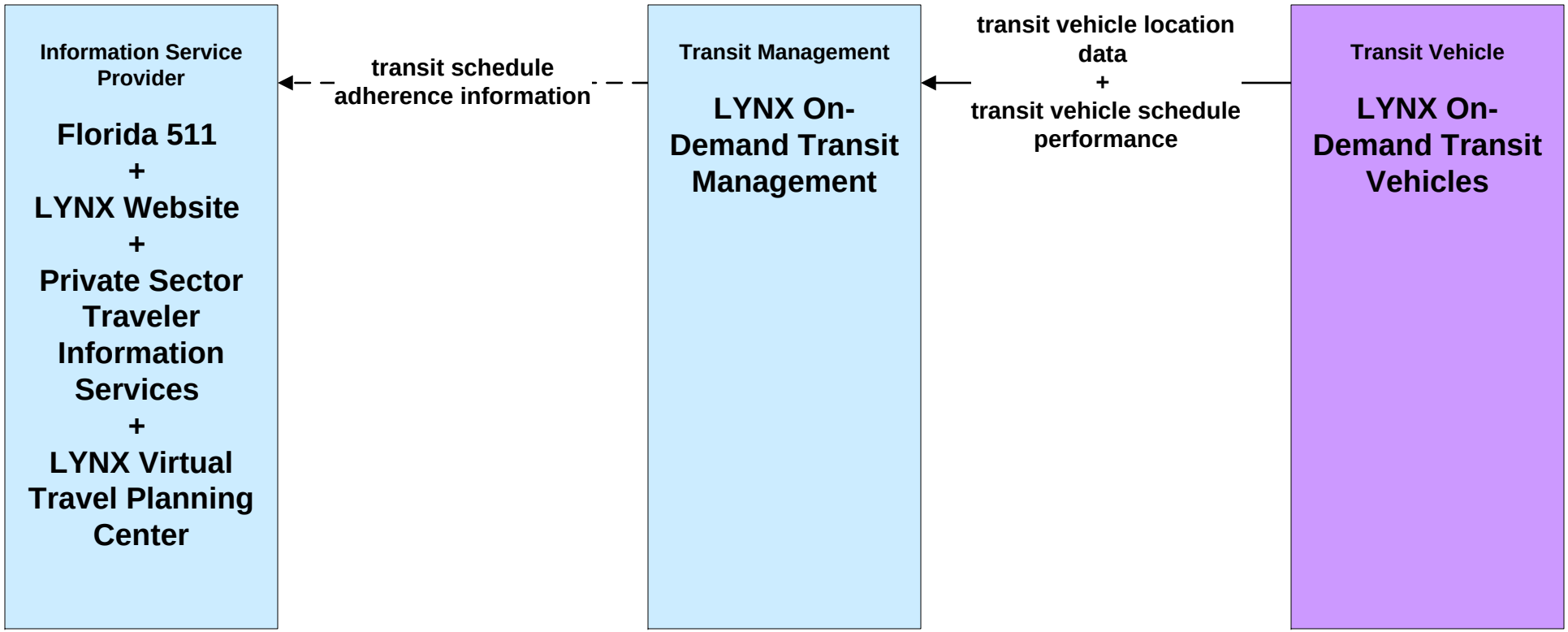


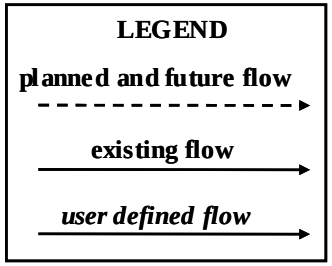


APTS01 - Transit Vehicle Tracking
LYNX

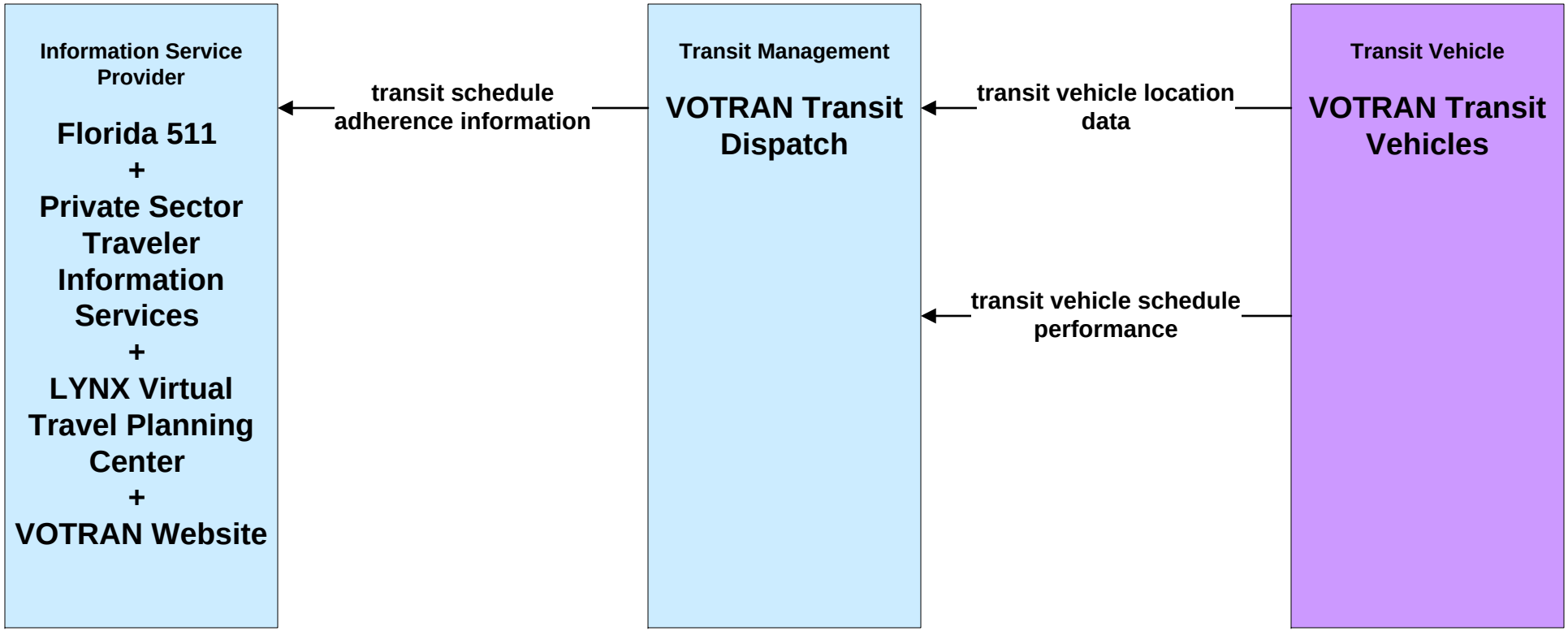


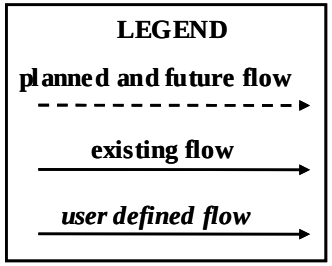
APTS01 - Transit Vehicle Tracking
LYNX On-Demand Transit Management



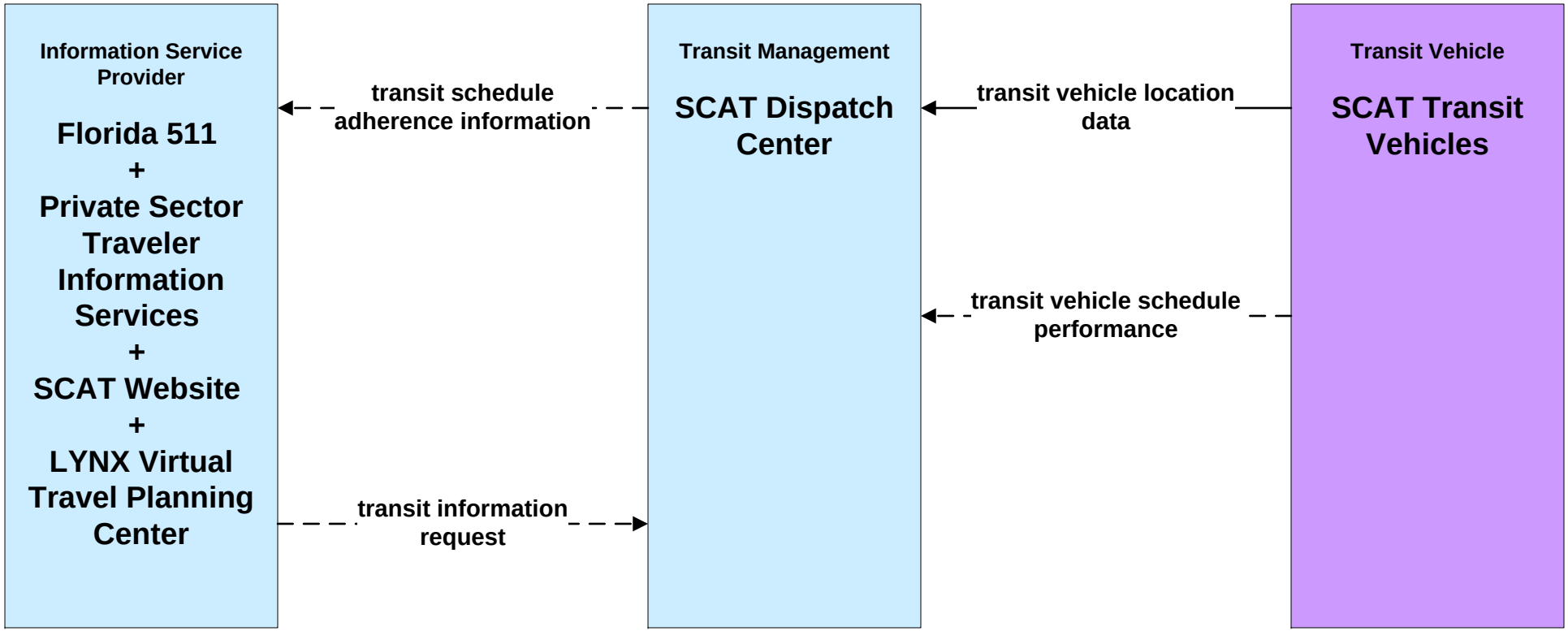


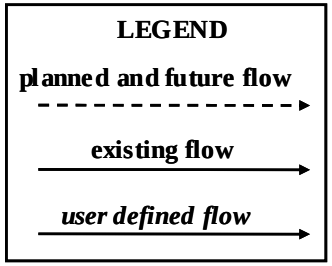
APTS01 - Transit Vehicle Tracking
VOTRAN Transit



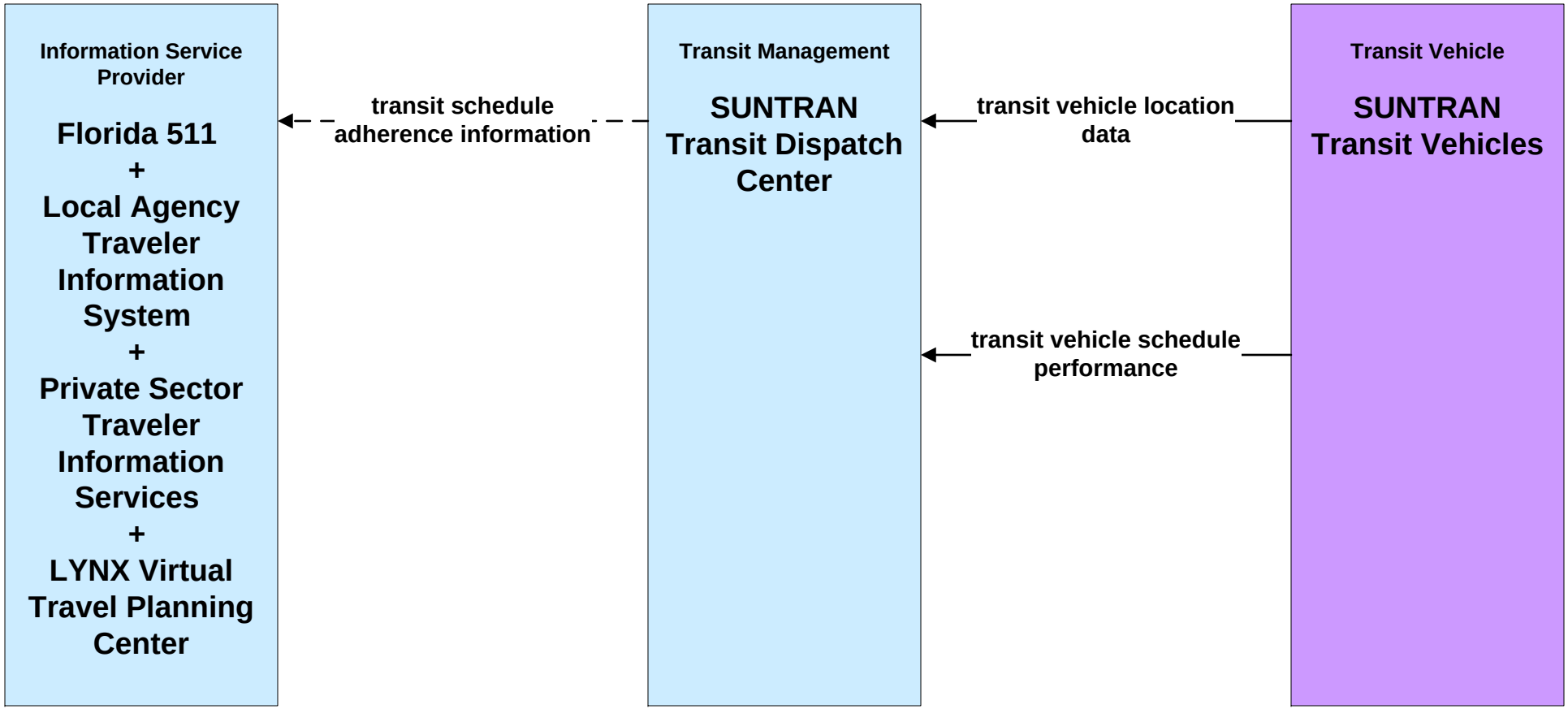


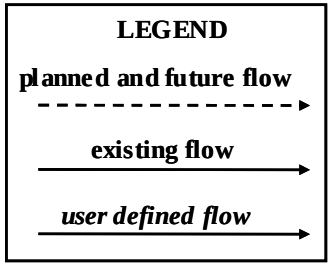
APTS01 - Transit Vehicle Tracking
SCAT Transit



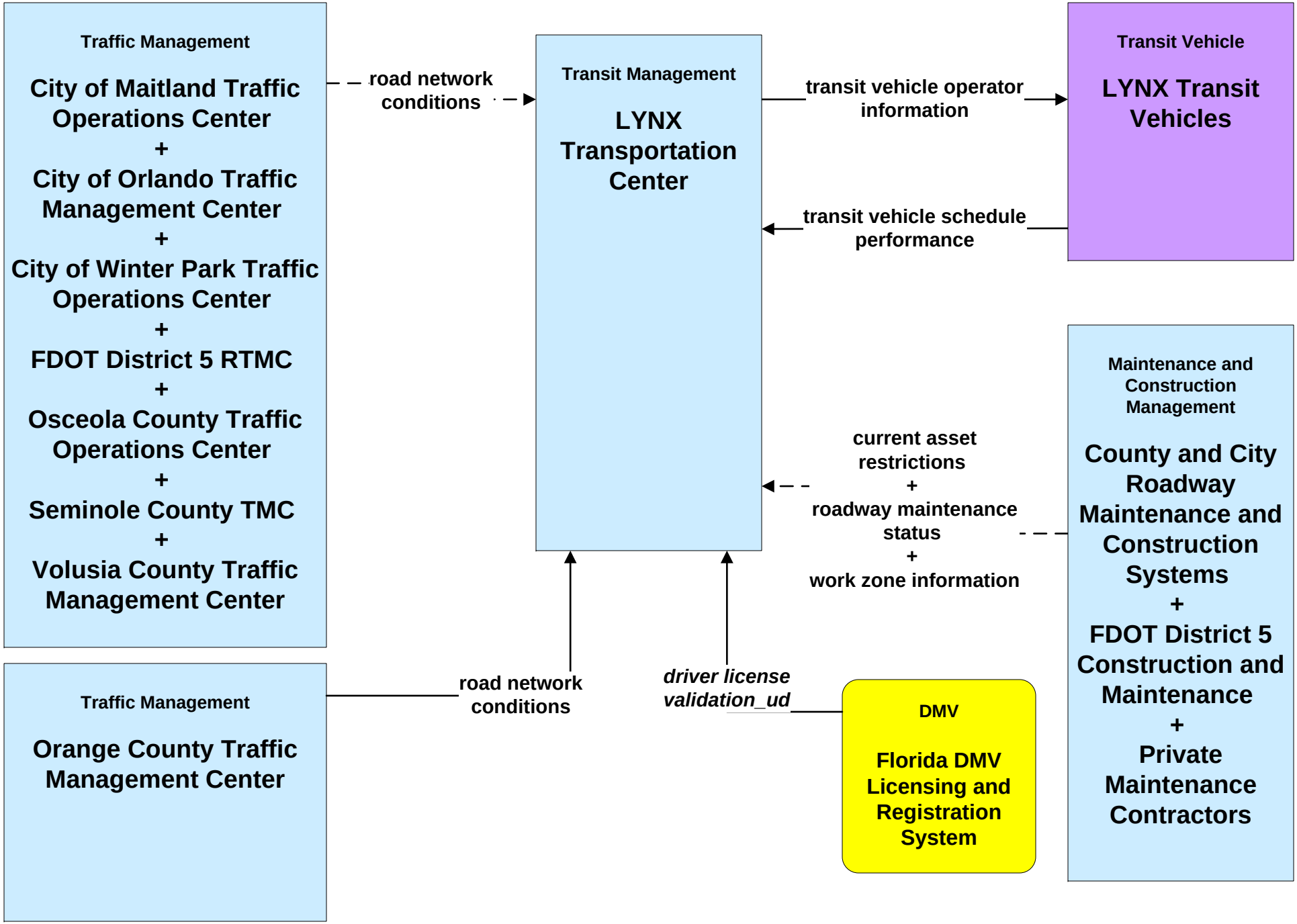


APTS01 - Transit Vehicle Tracking
SUNTRAN Transit

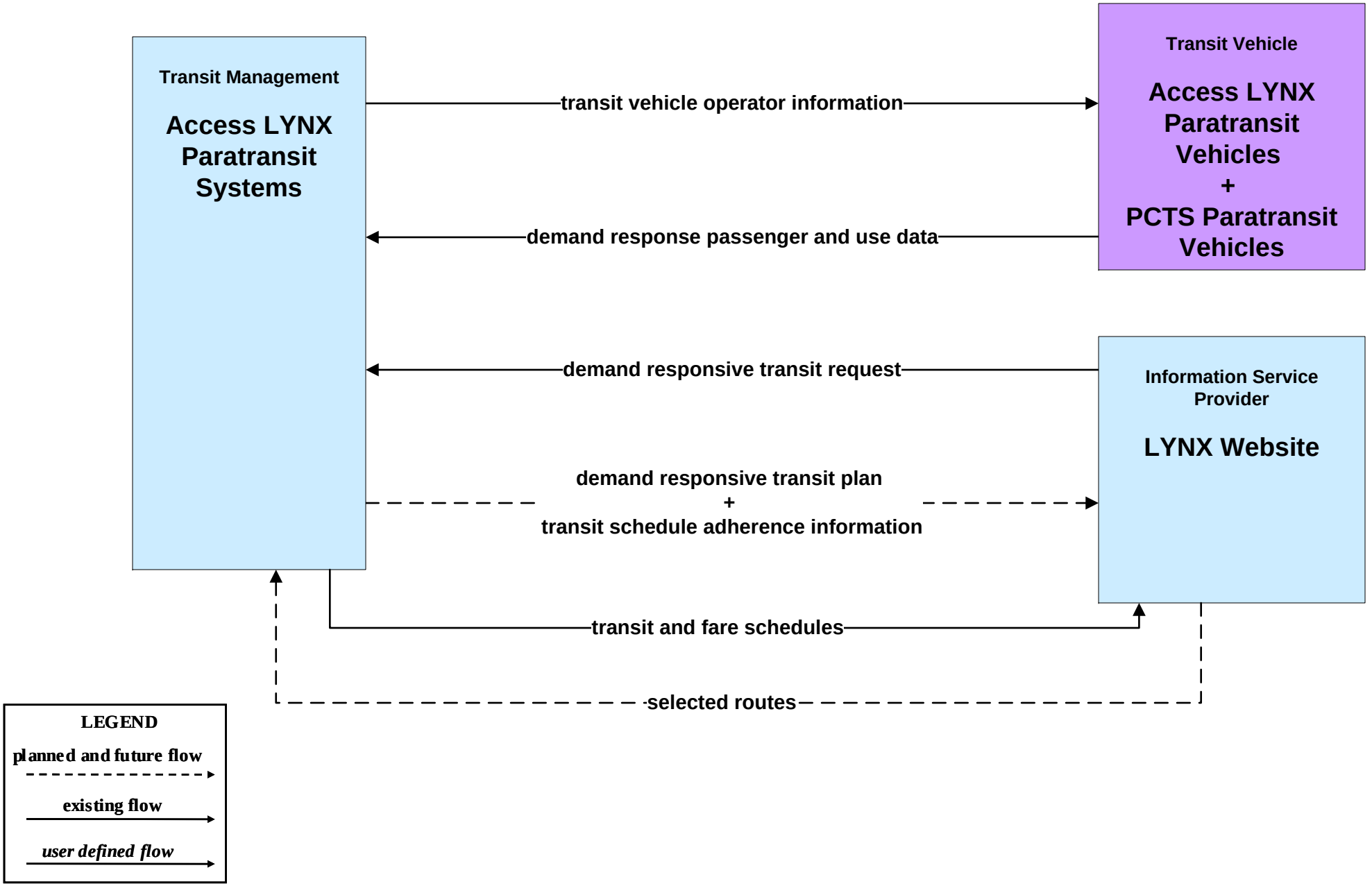




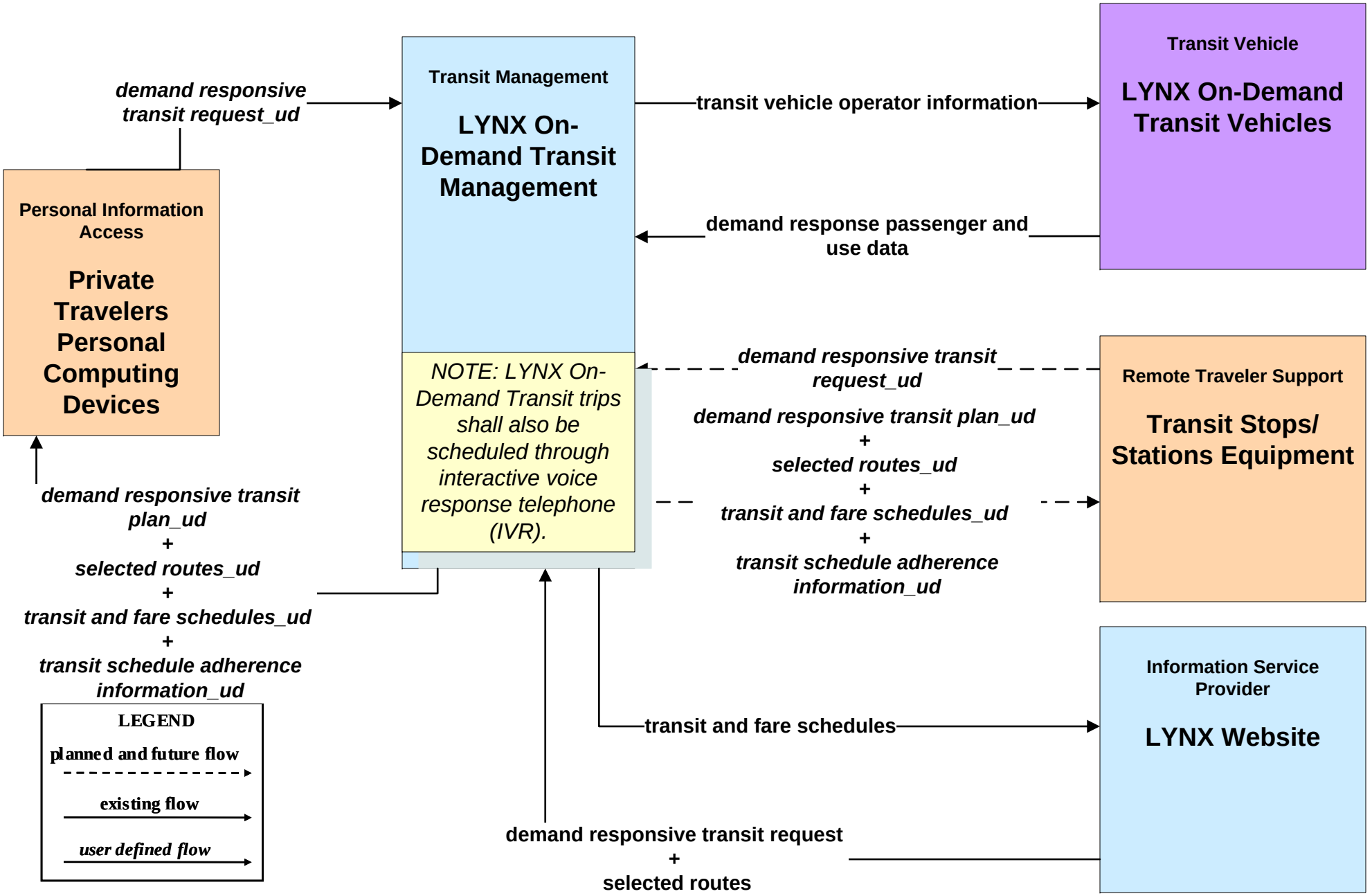
APTS02 - Transit Fixed-Route Operations
LYNX Operations Center



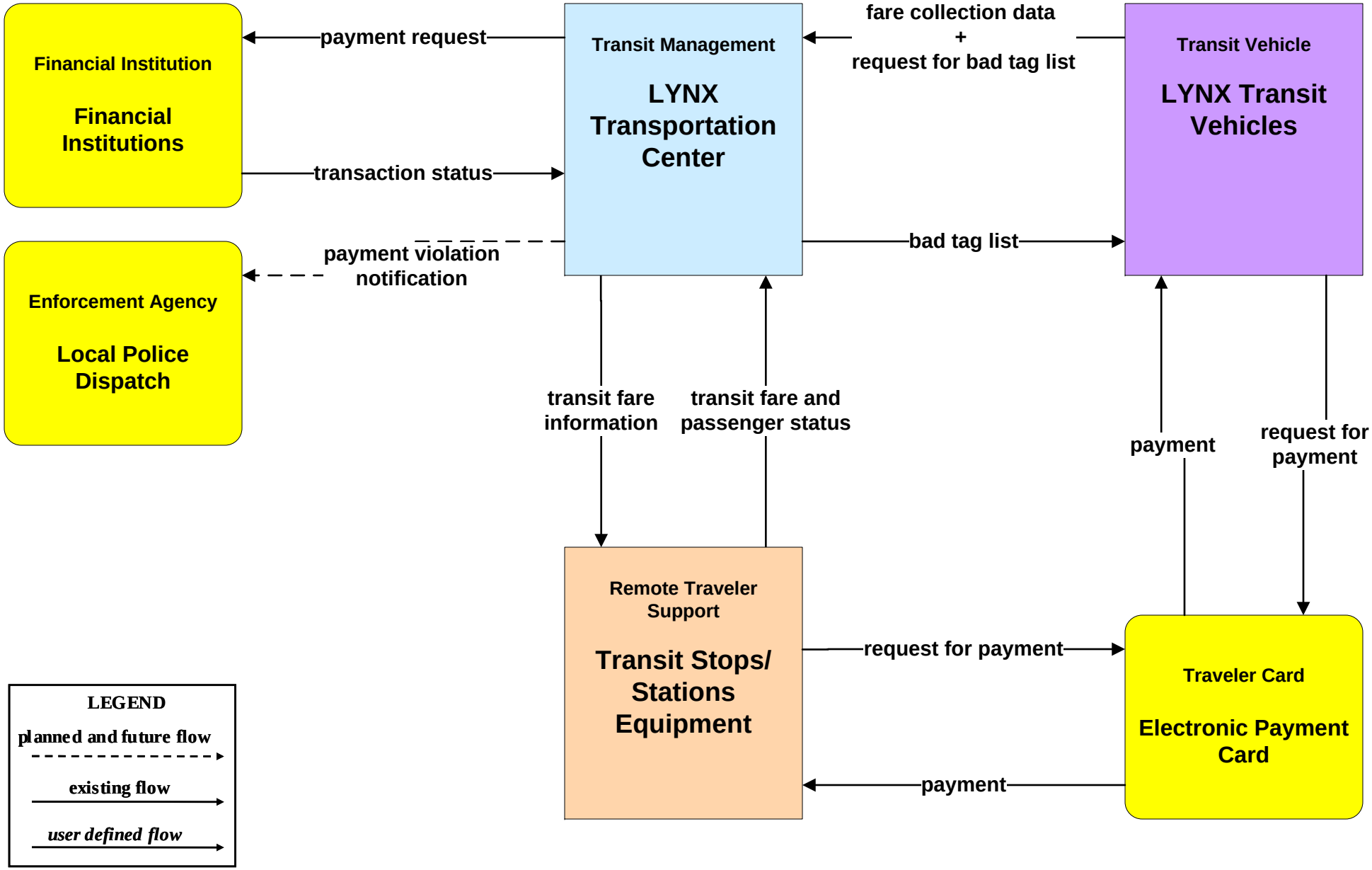
APTS03 - Demand-Responsive Transit Operations
Access LYNX Paratransit Systems



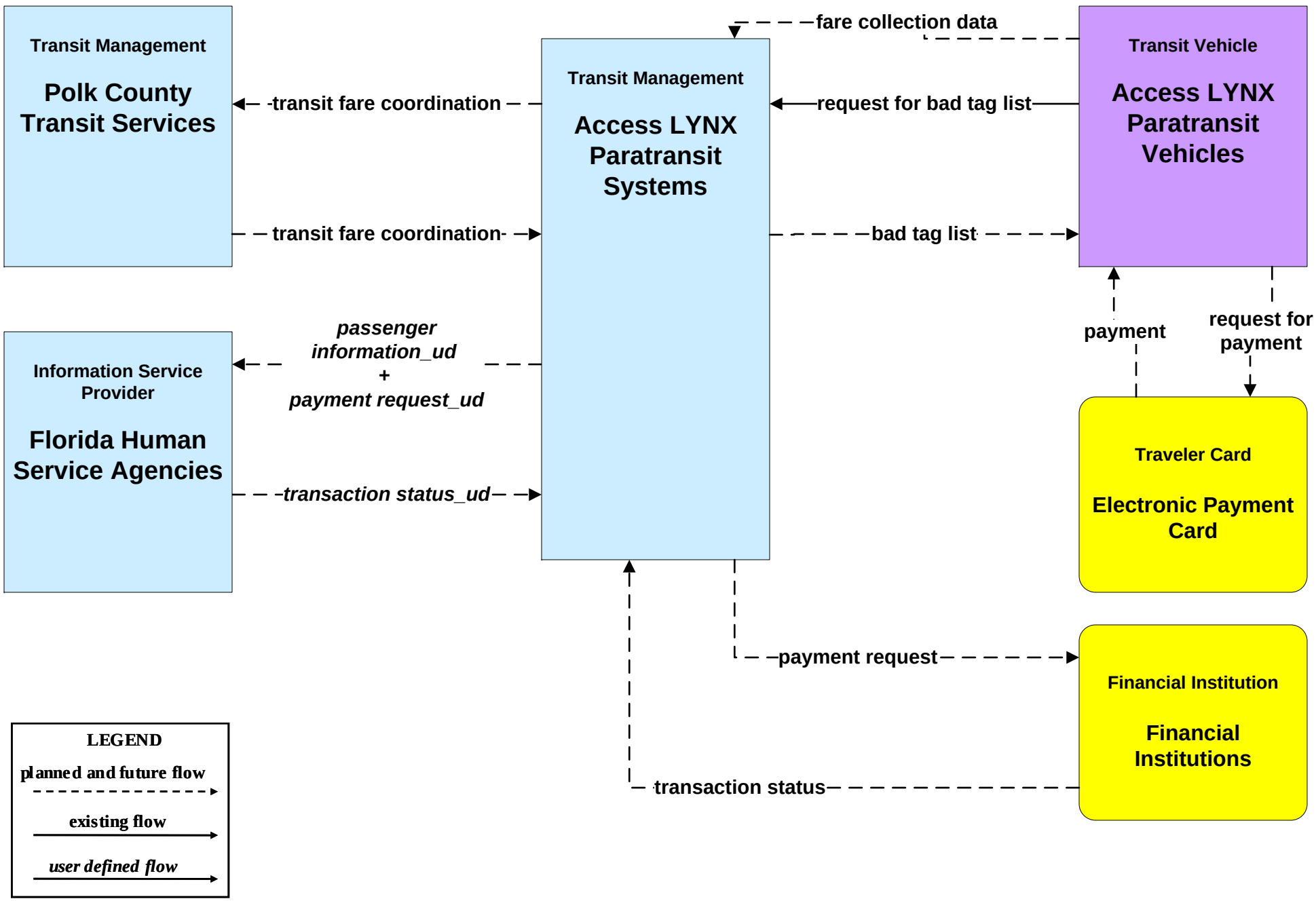
APTS03 - Demand-Responsive Transit Operations
LYNX On-Demand Transit



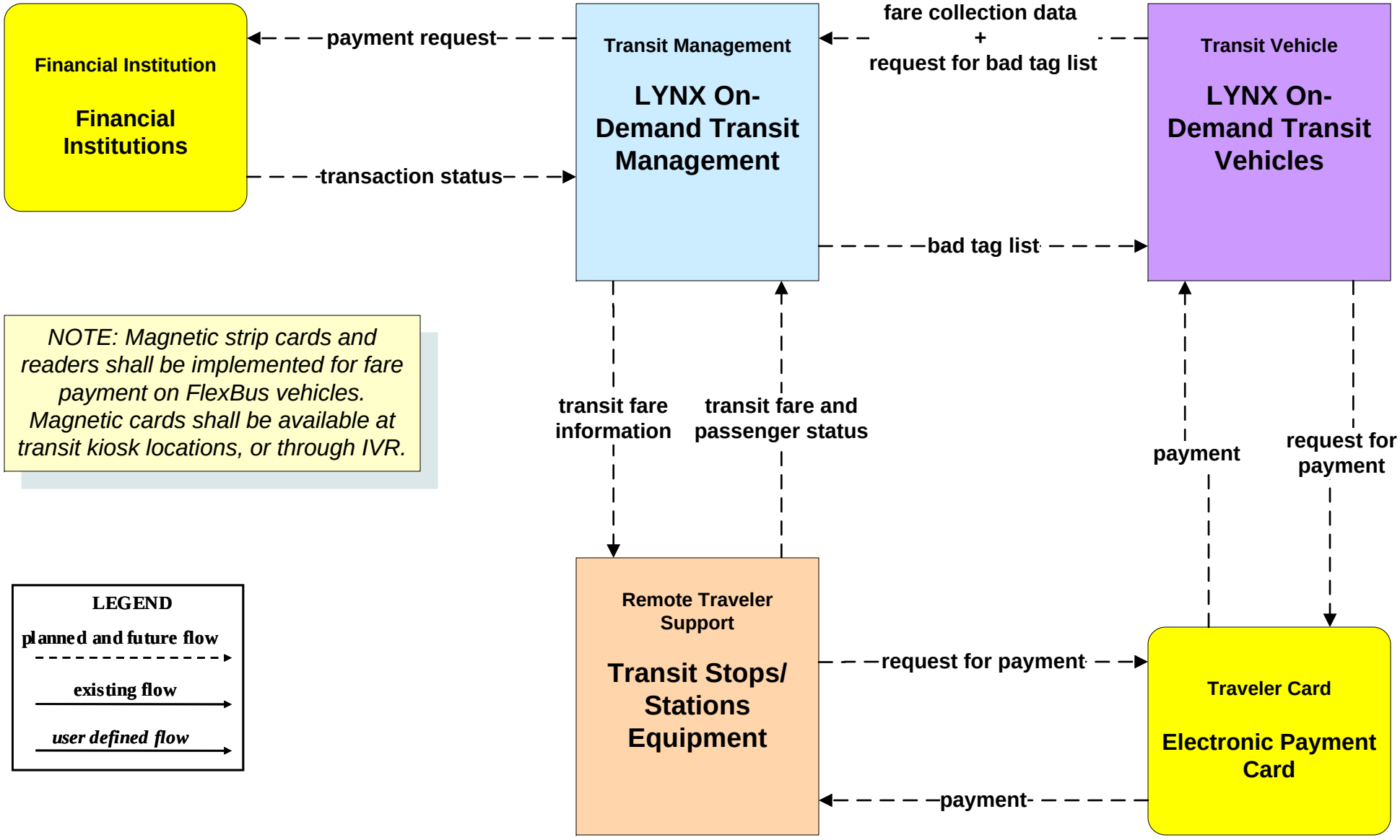
APTS04 - Transit Fare Collection Management
LYNX



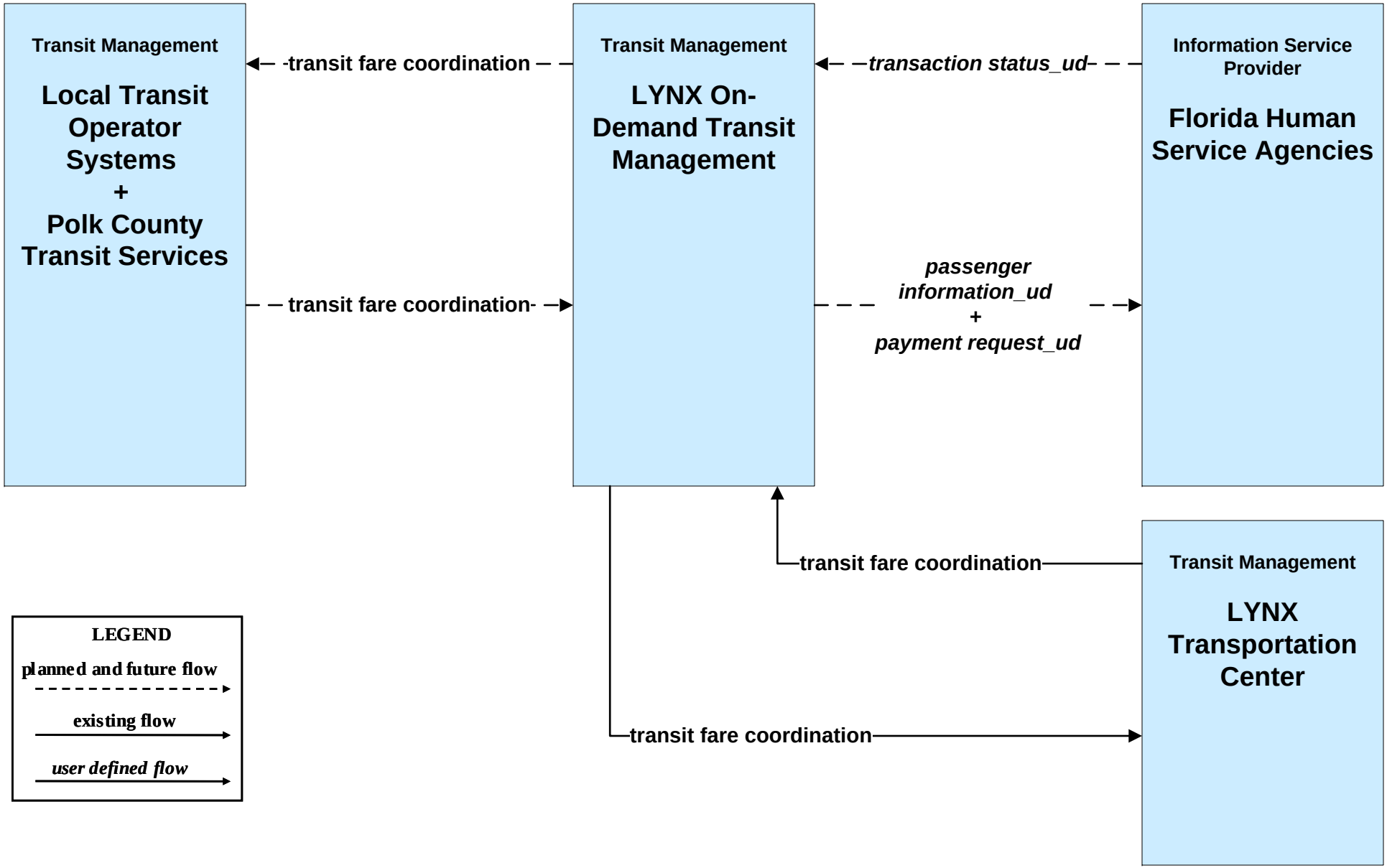
APTS04 - Transit Fare Collection Management
Access LYNX Paratransit



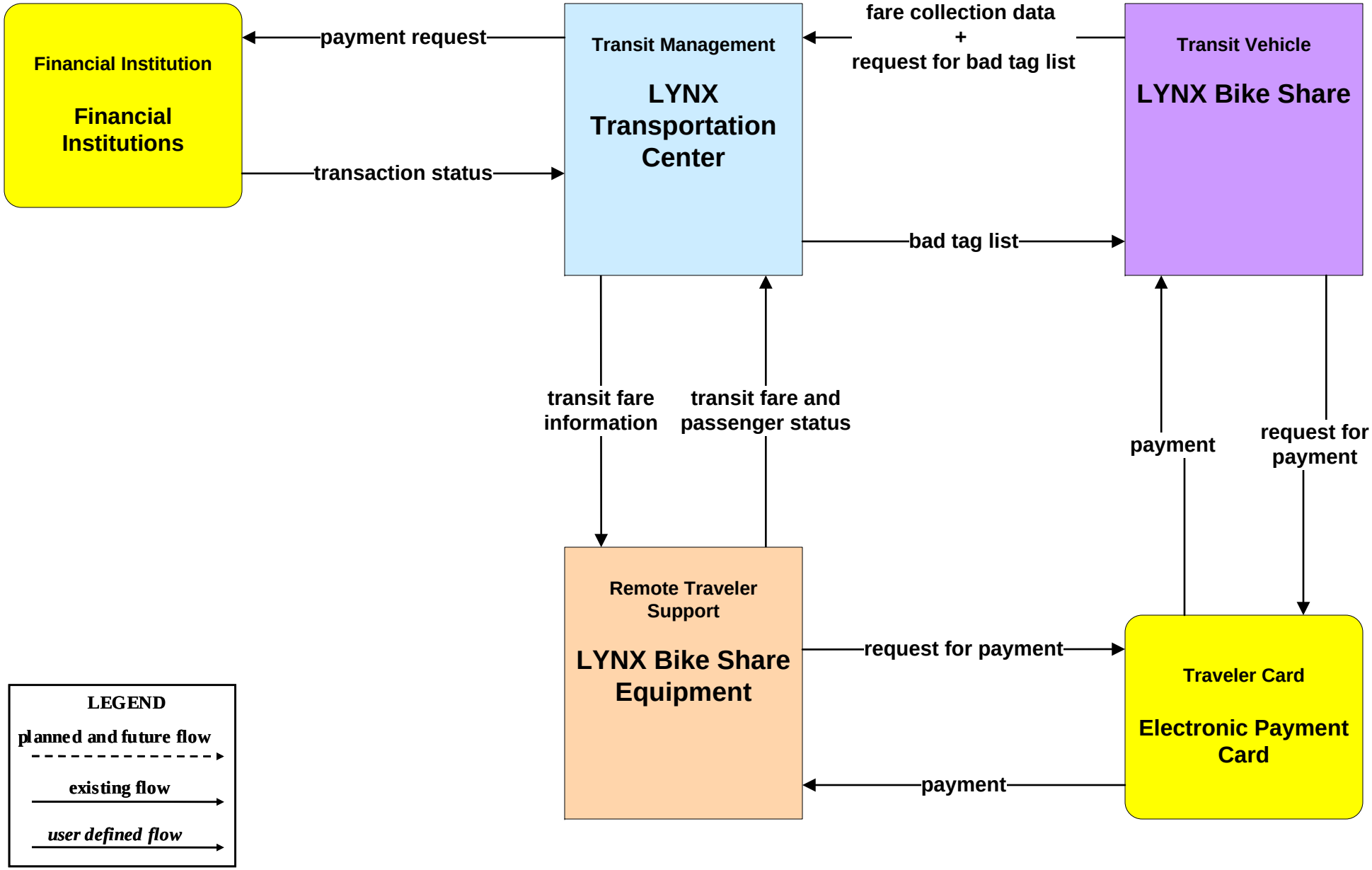
APTS04 - Transit Fare Collection Management
LYNX On-Demand Transit (1 of 2)



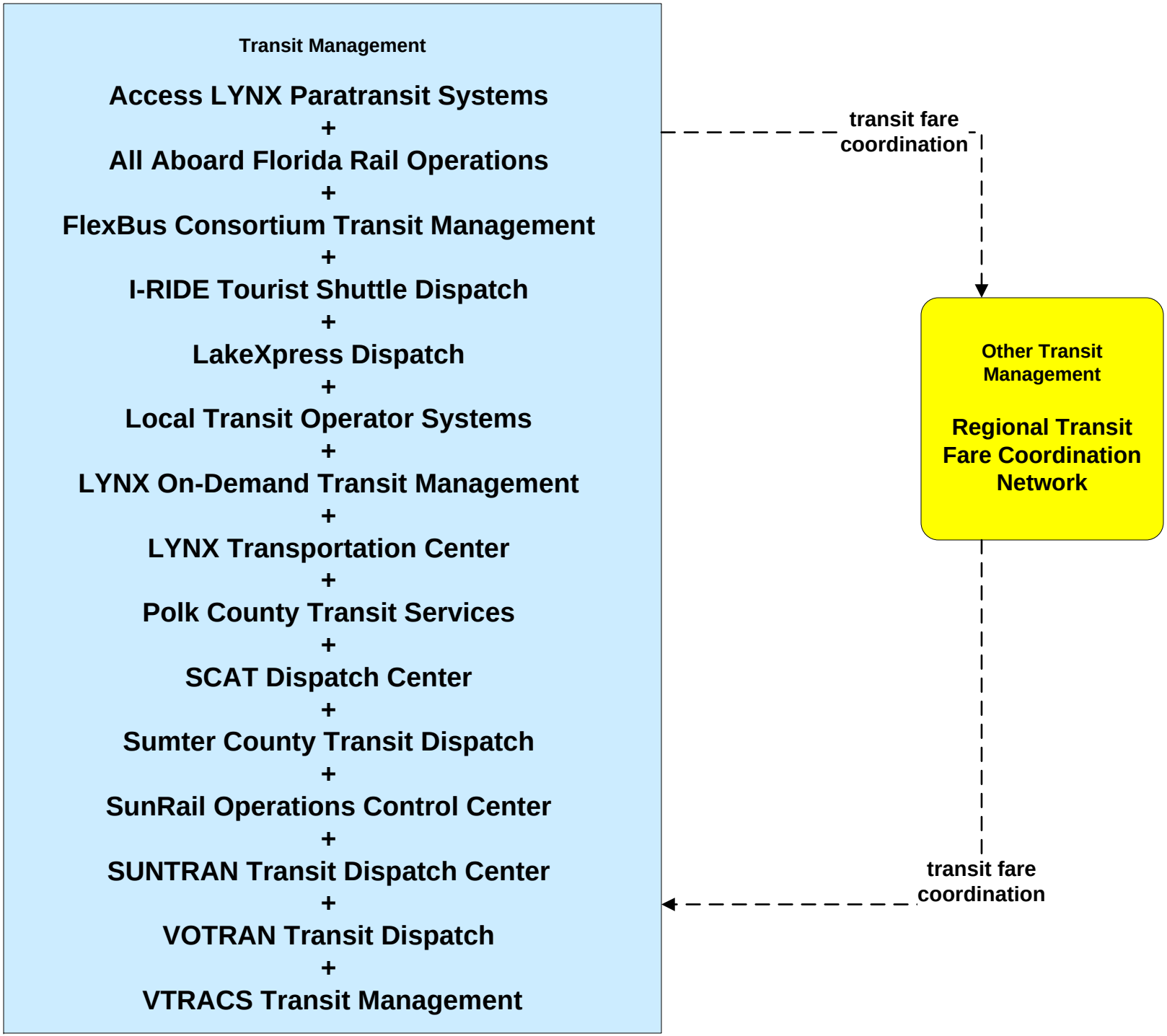
APTS04 - Transit Fare Collection Management
LYNX On-Demand Transit (2 of 2)



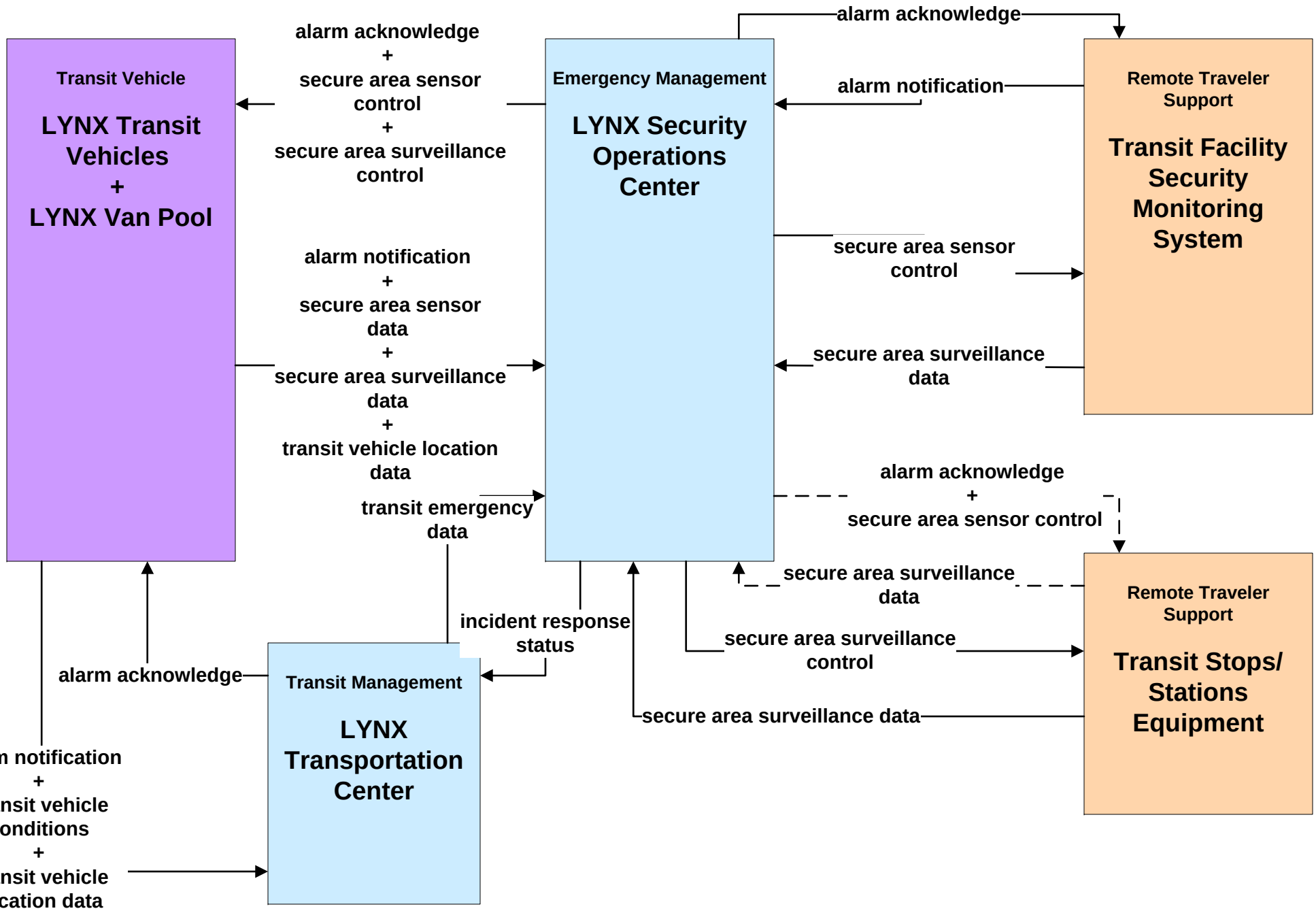
APTS04 - Transit Fare Collection Management
LYNX Bike Share



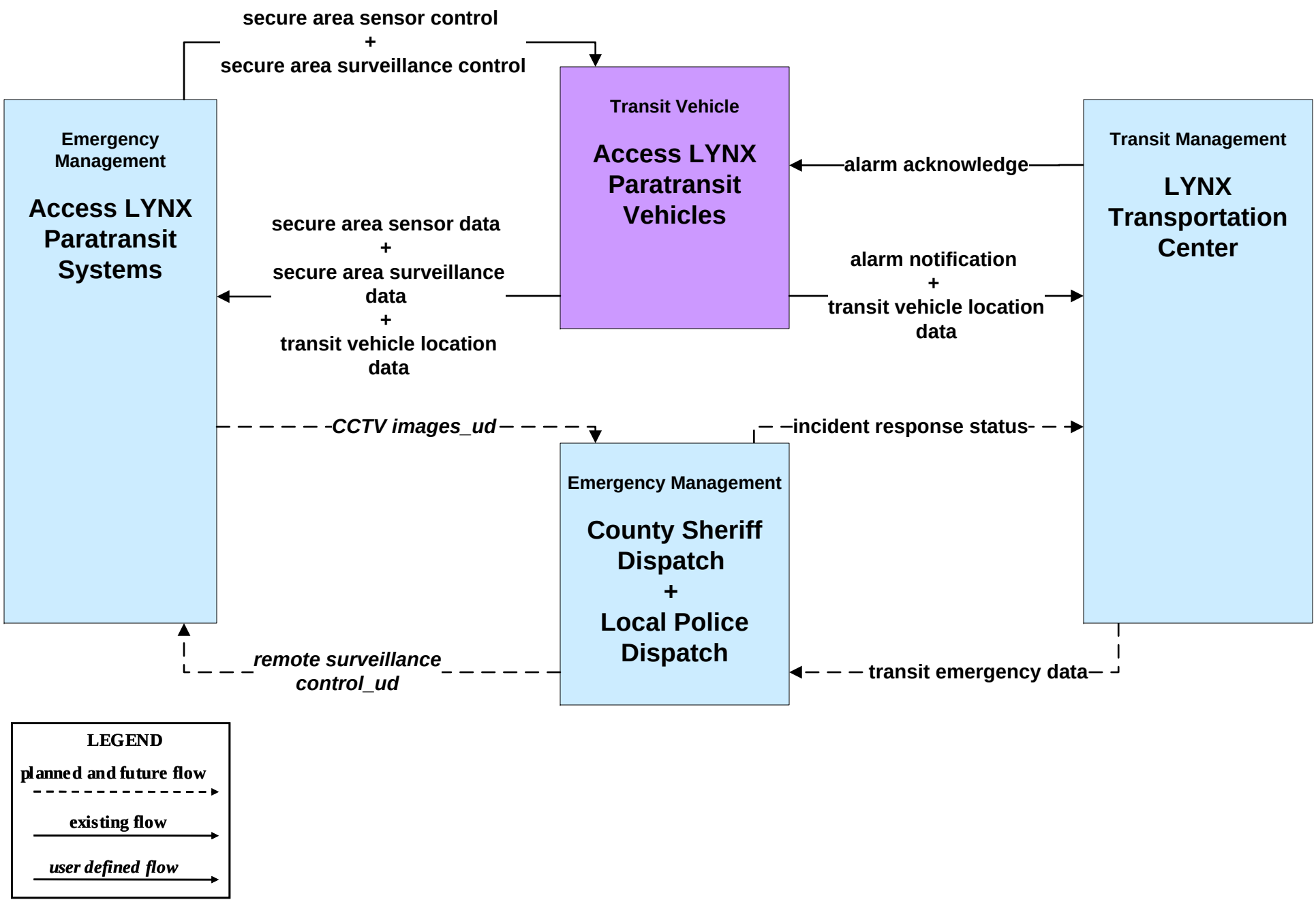
APTS04 - Transit Fare Collection Management
Regional Transit Fare Coordination Network



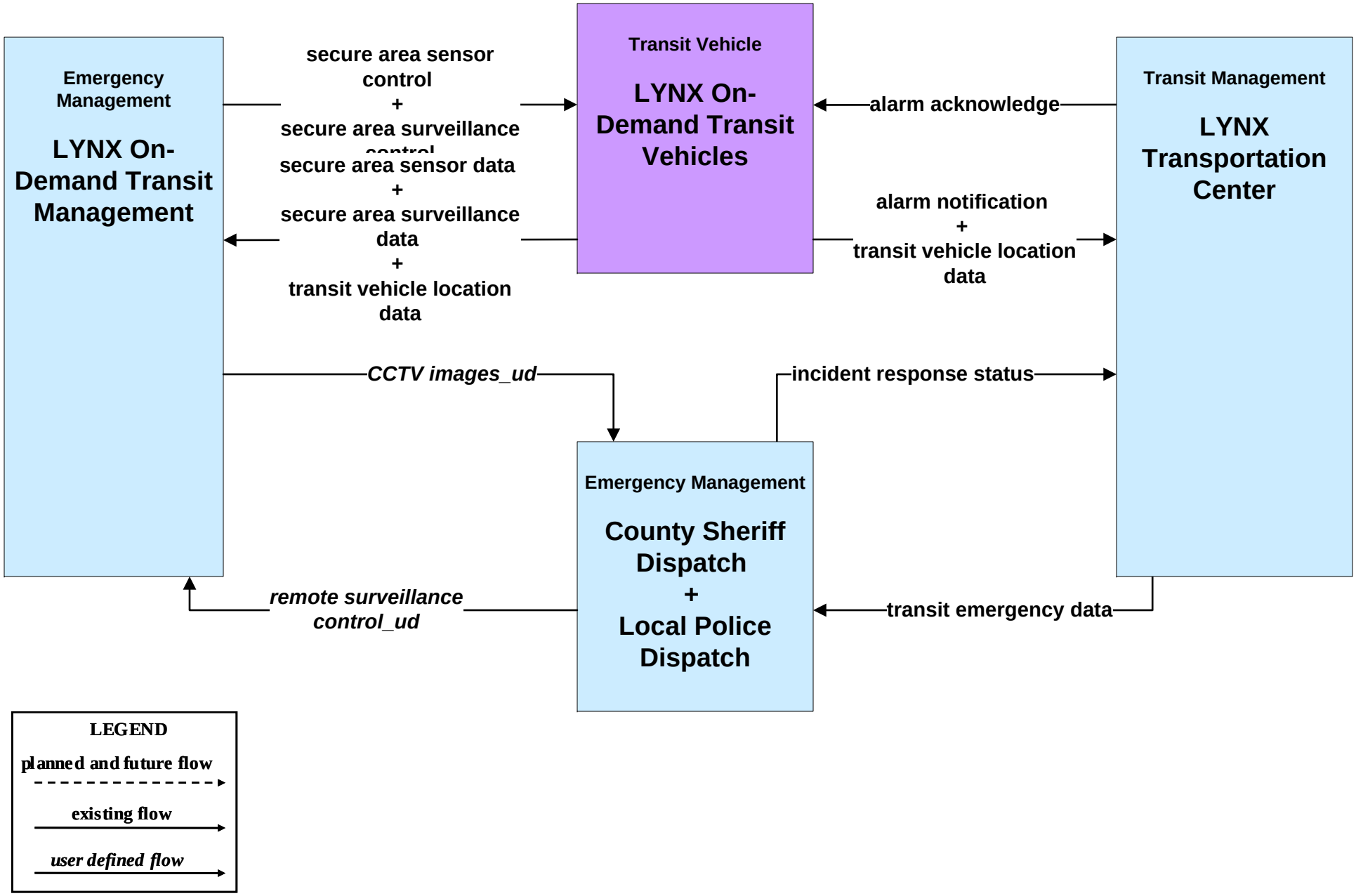
APTS05 - Transit Security
LYNX Operations Center



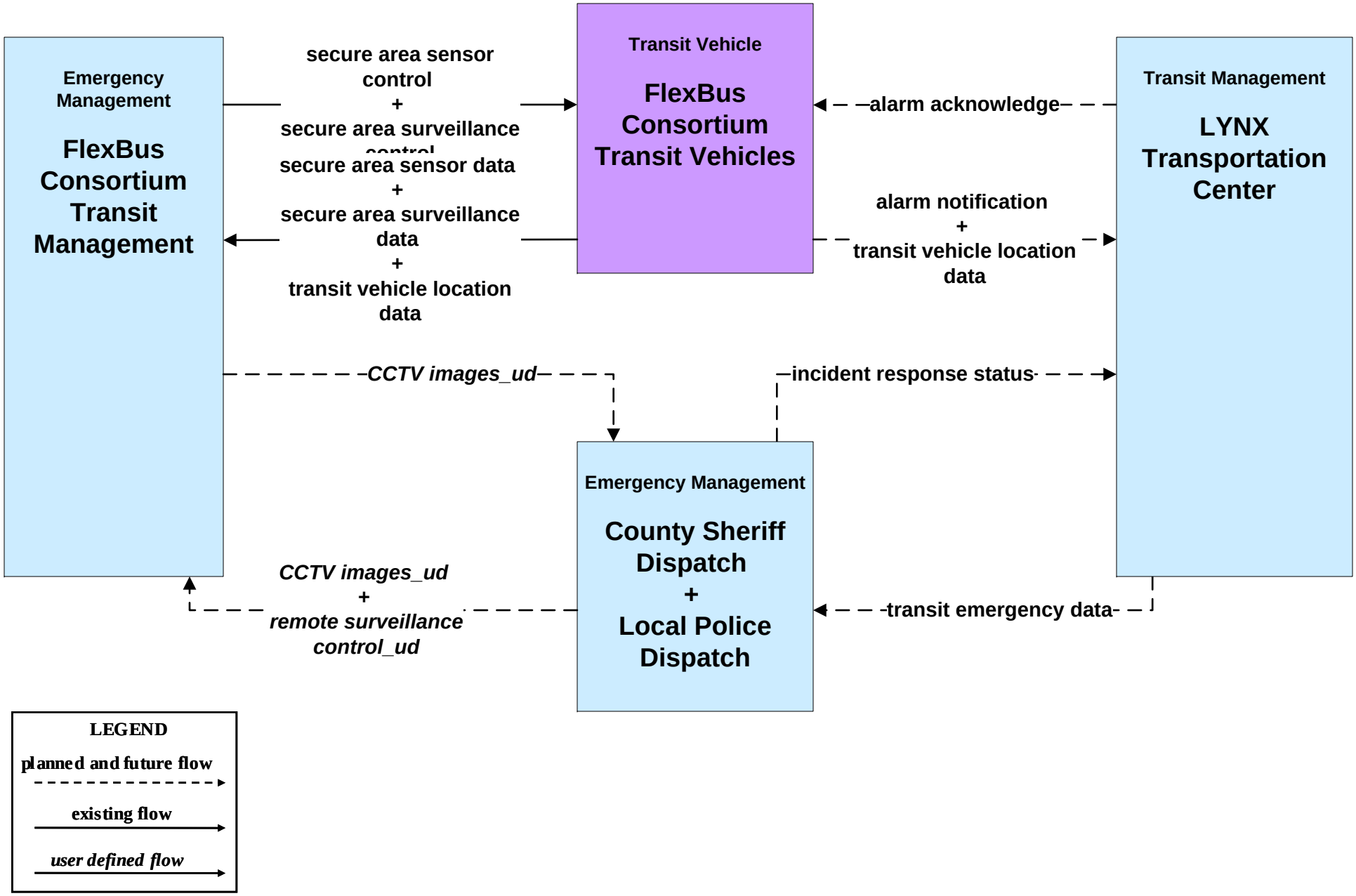
APTS05 - Transit Security
Access LYNX Paratransit



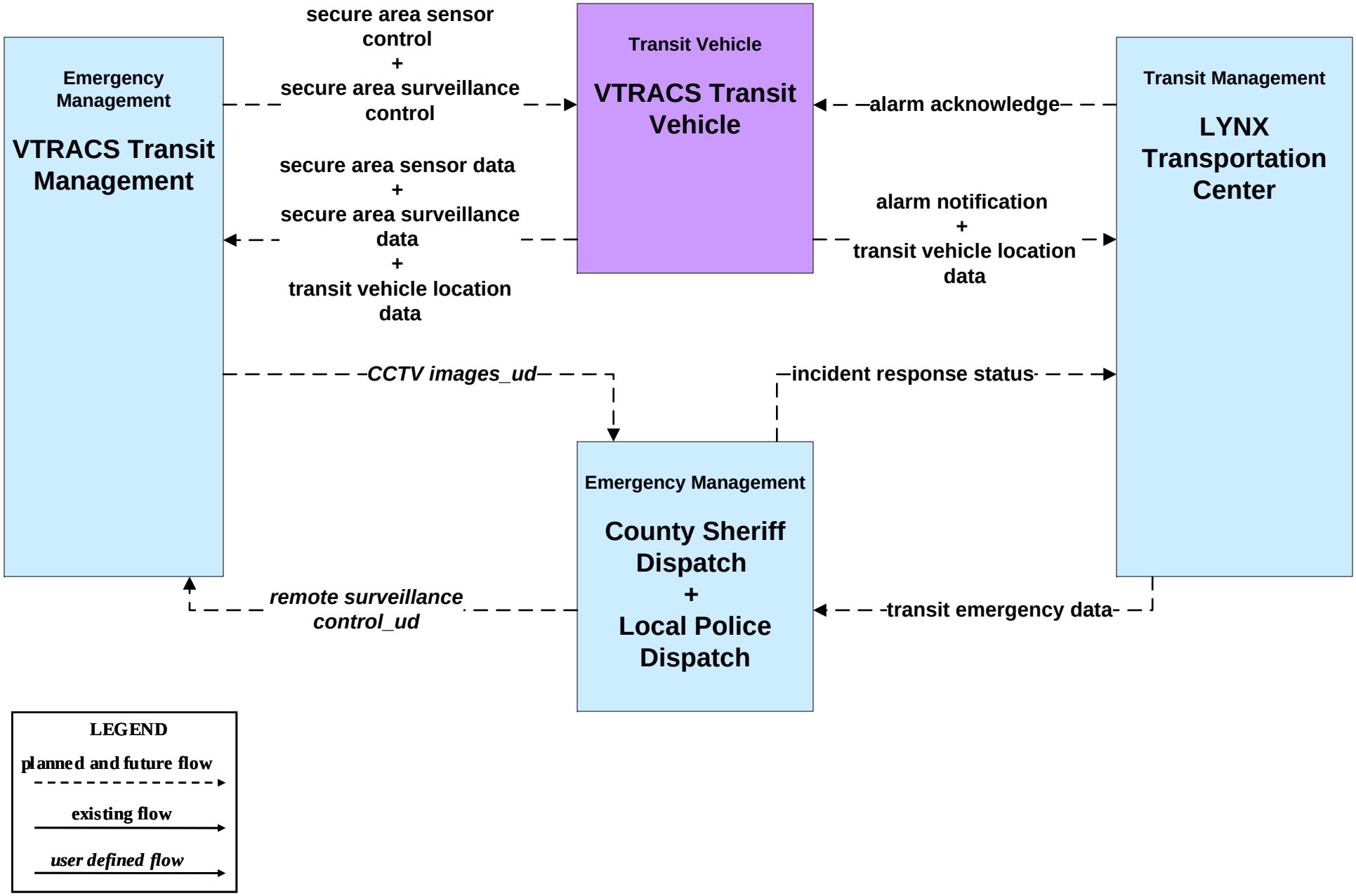
APTS05 - Transit Security
LYNX On-Demand Transit



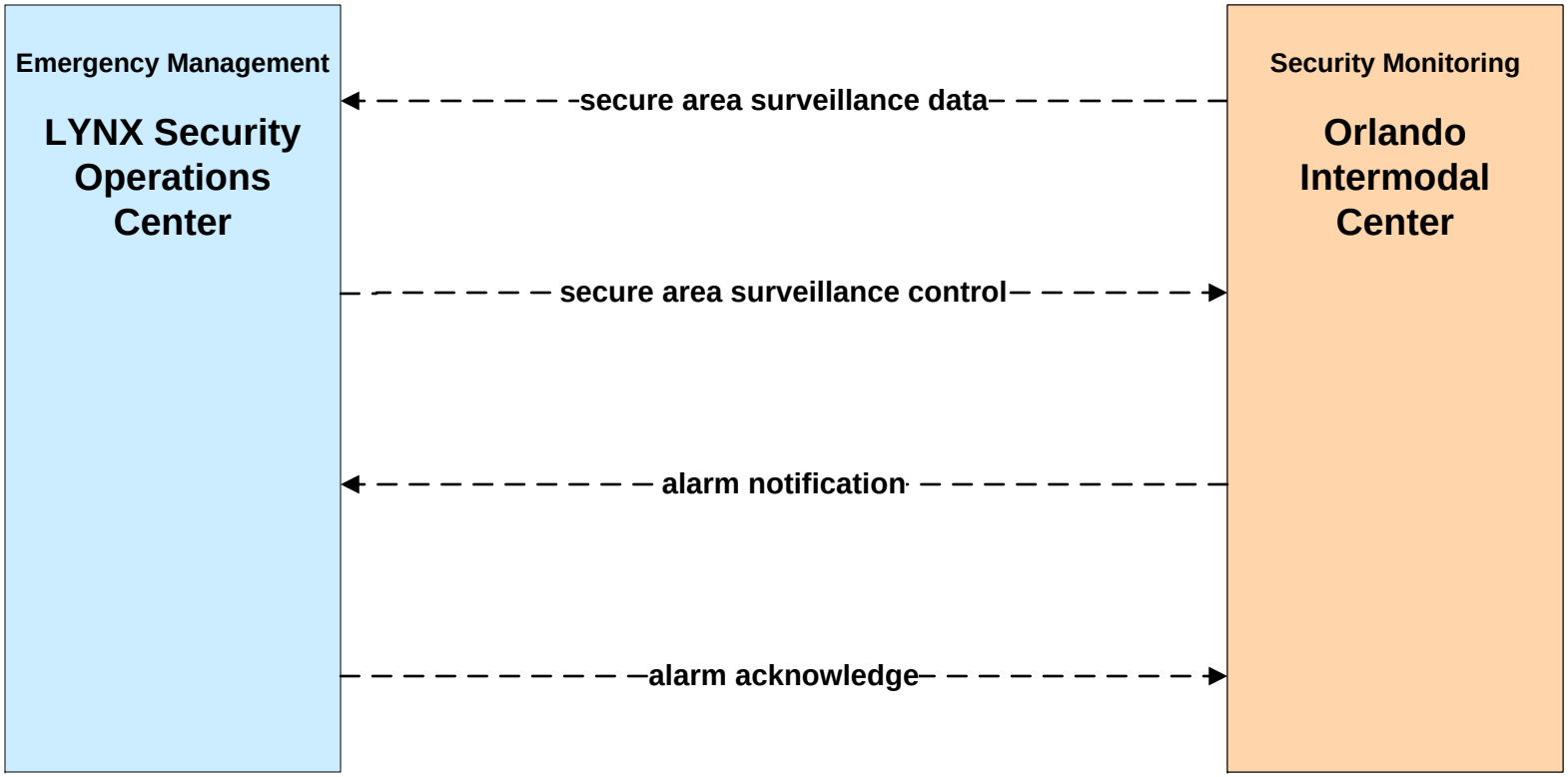
APTS05 - Transit Security
FlexBus Consortium



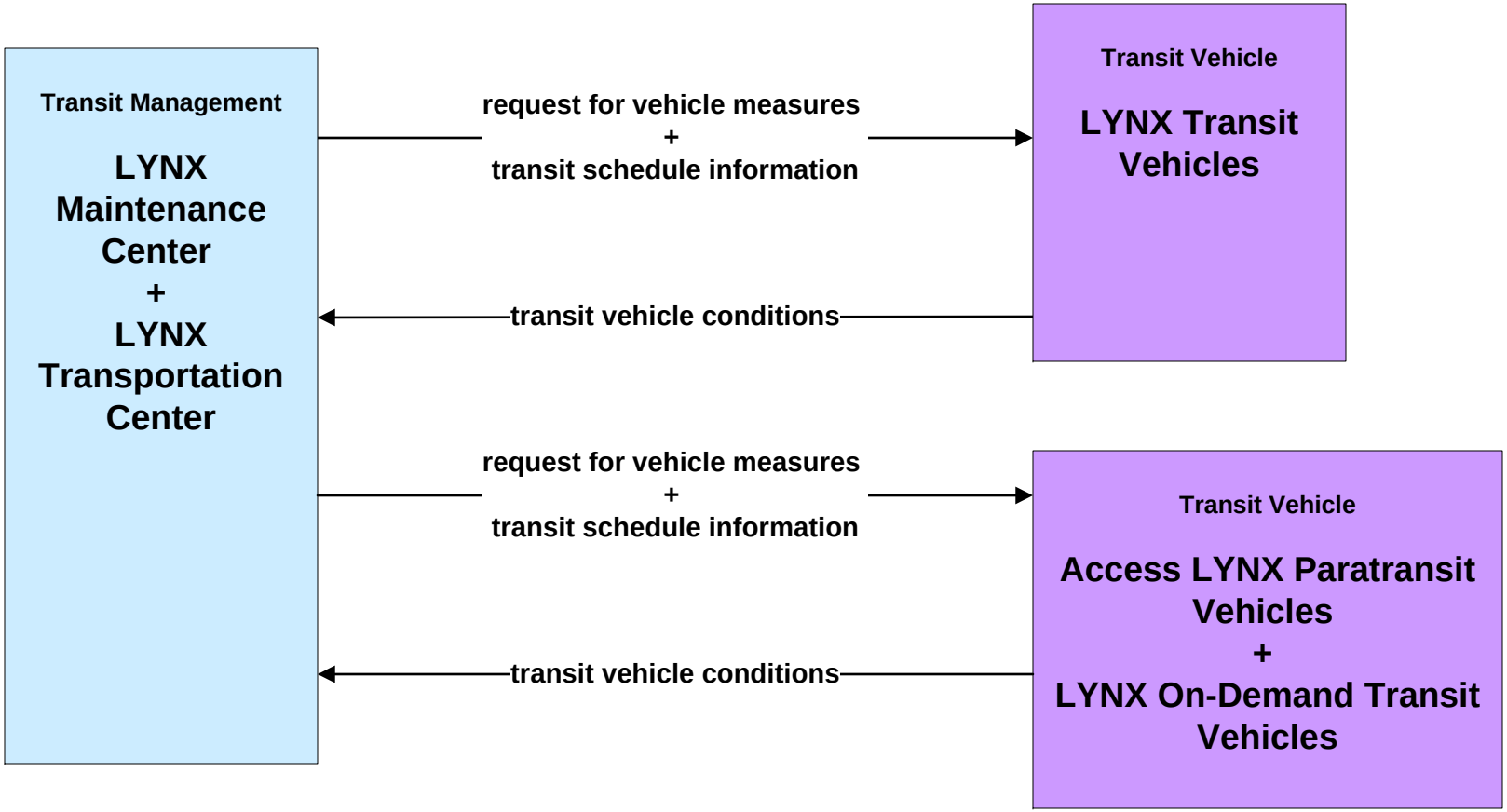
APTS05 - Transit Security
VTRACS



APTS05 - Transit Security
Orlando Intermodal Center



APTS06 - Transit Fleet Management
LYNX



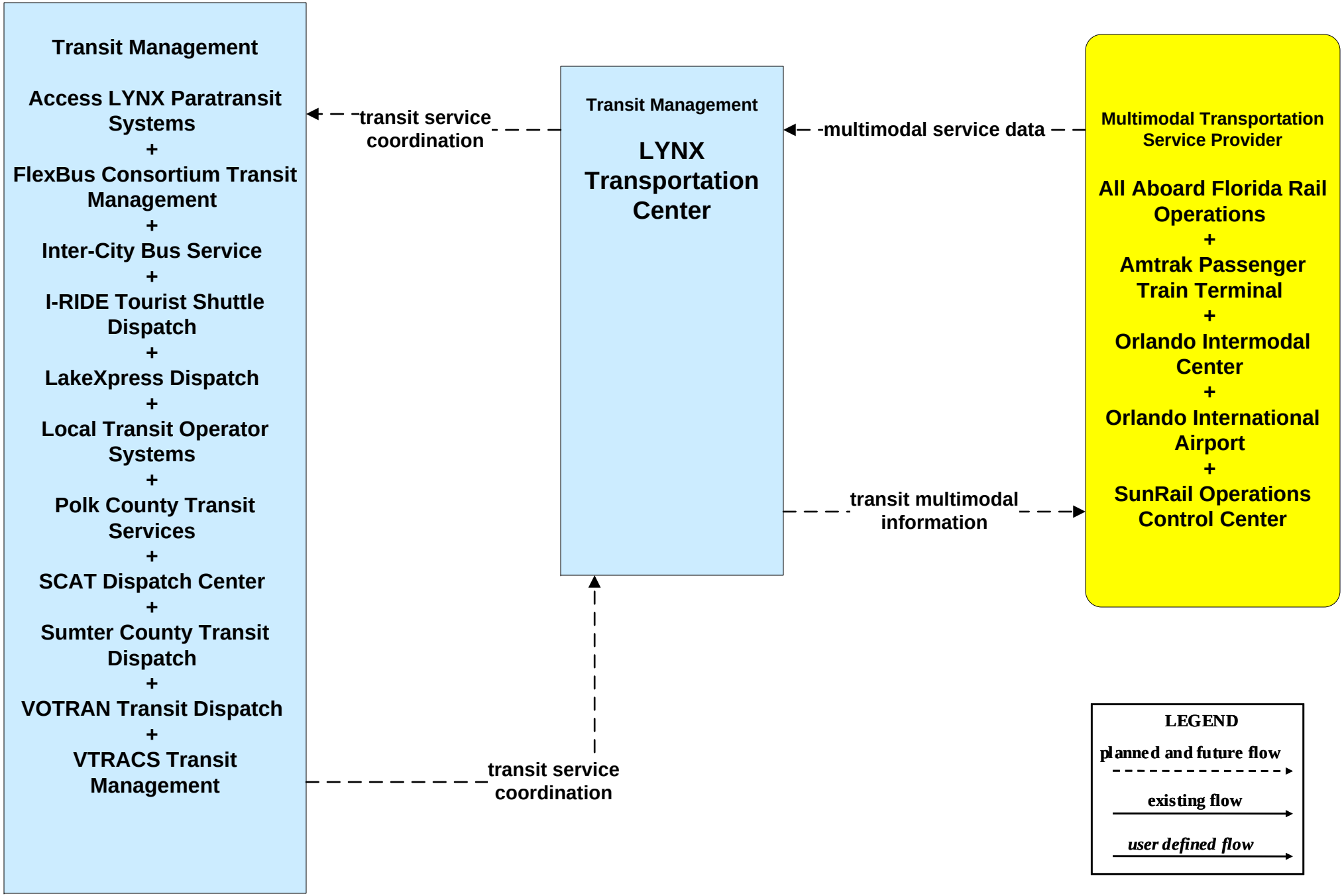
LEGEND

planned and future flow

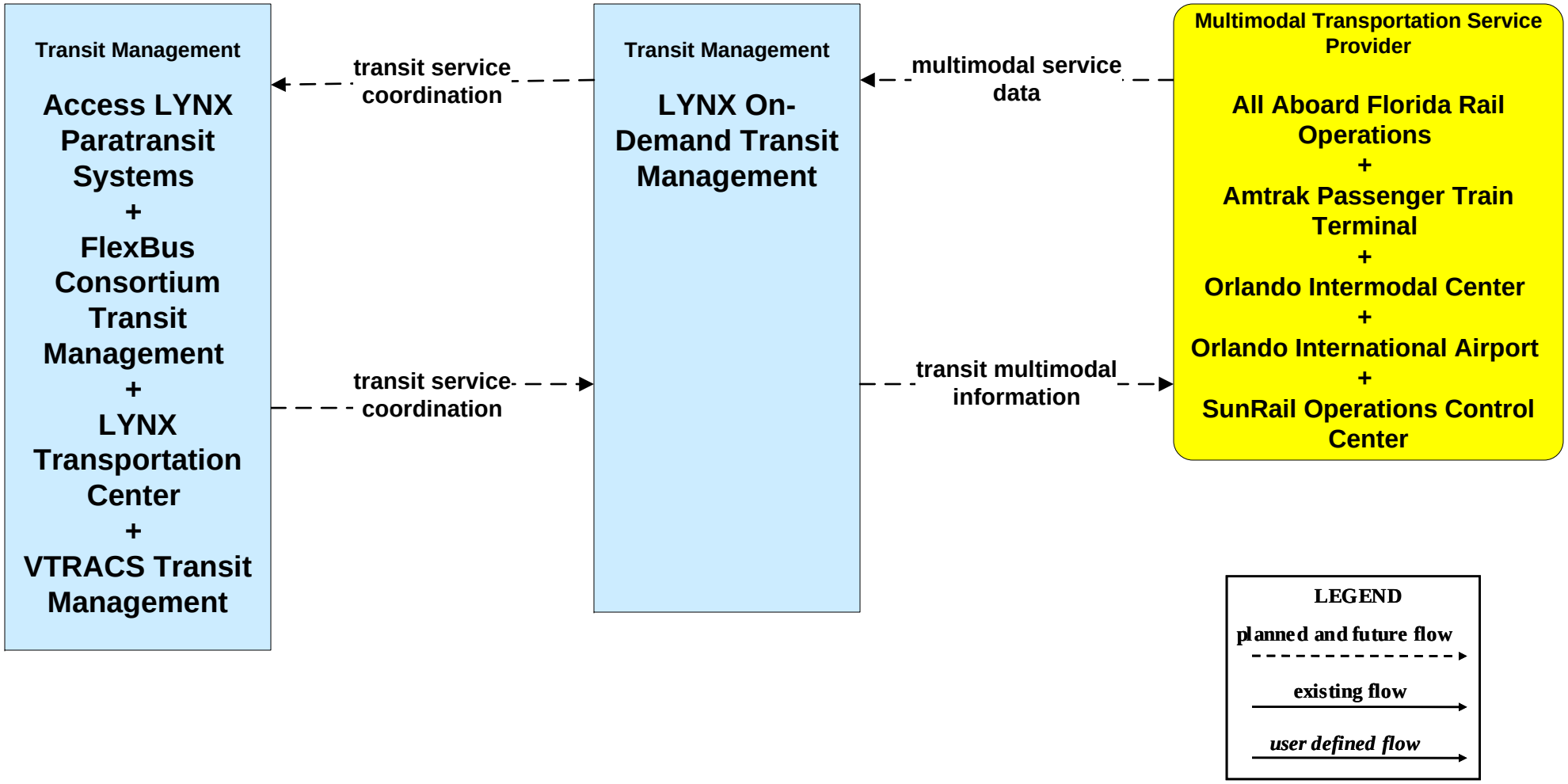
existing flow

user defined flow

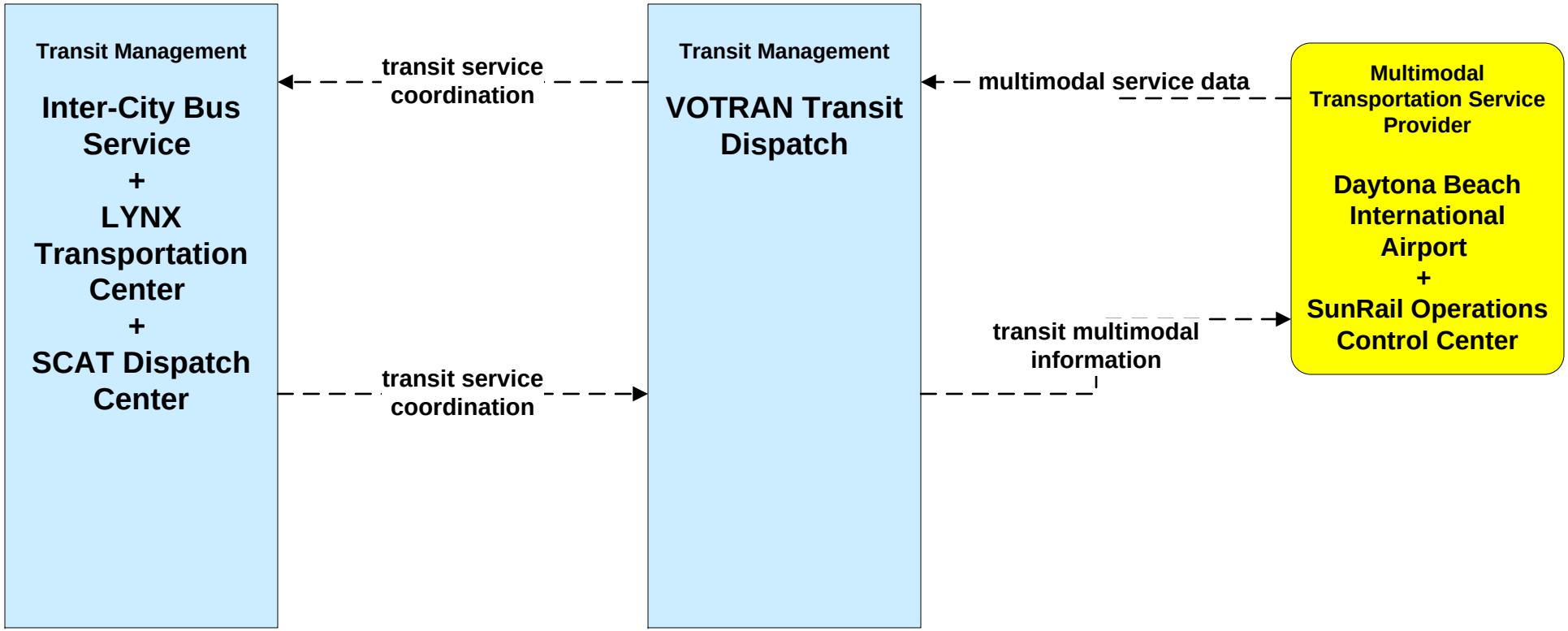
APTS07 - Multi-modal Coordination
LYNX Operations Center

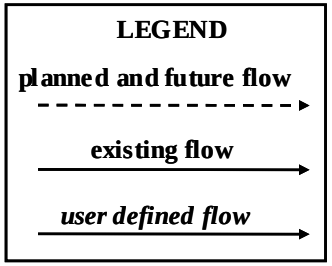


APTS07 - Multi-modal Coordination
LYNX On-Demand Transit Management

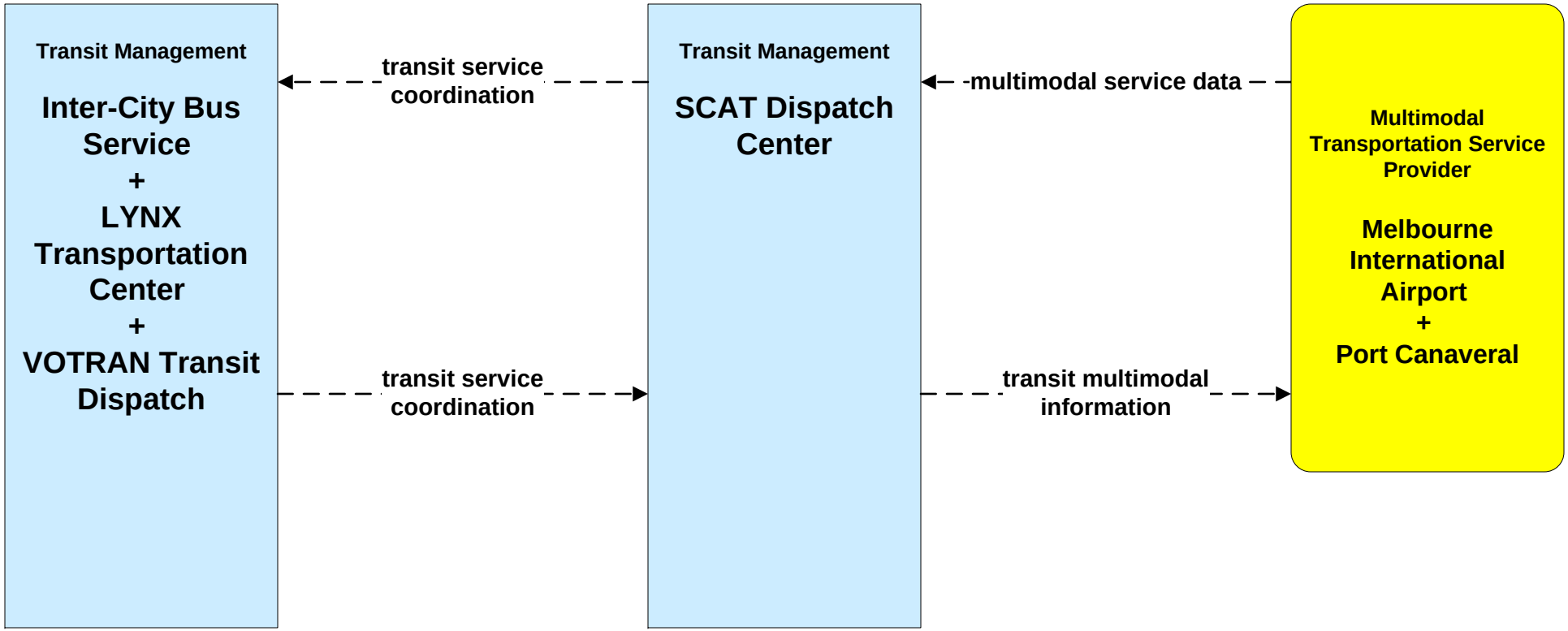


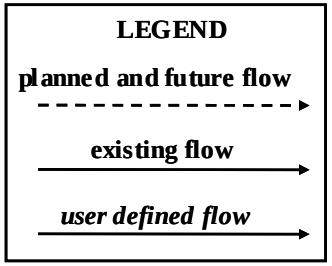
APTS07 - Multi-modal Coordination
VOTRAN Transit Dispatch



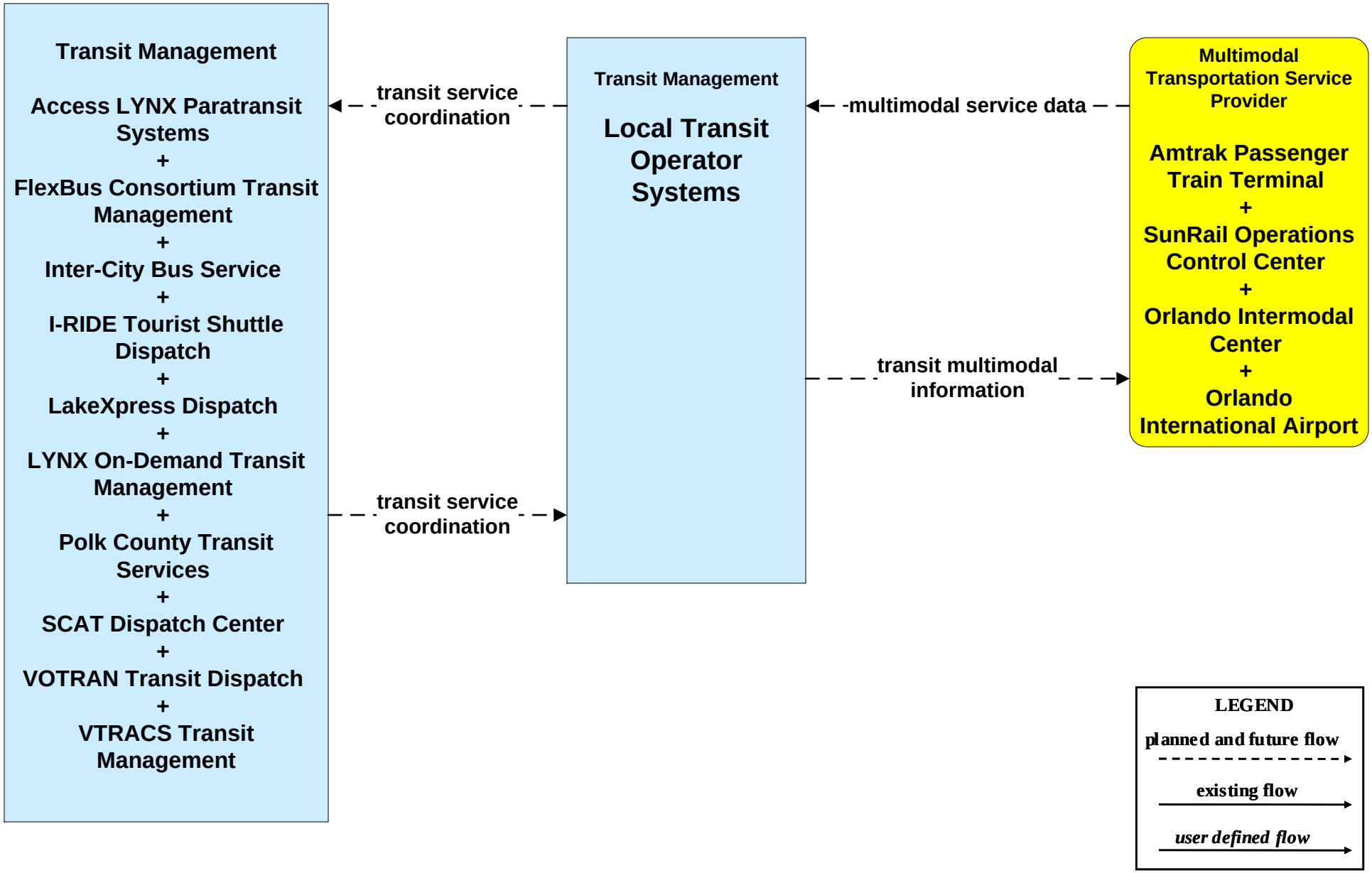


APTS07 - Multi-modal Coordination
SCAT Transit

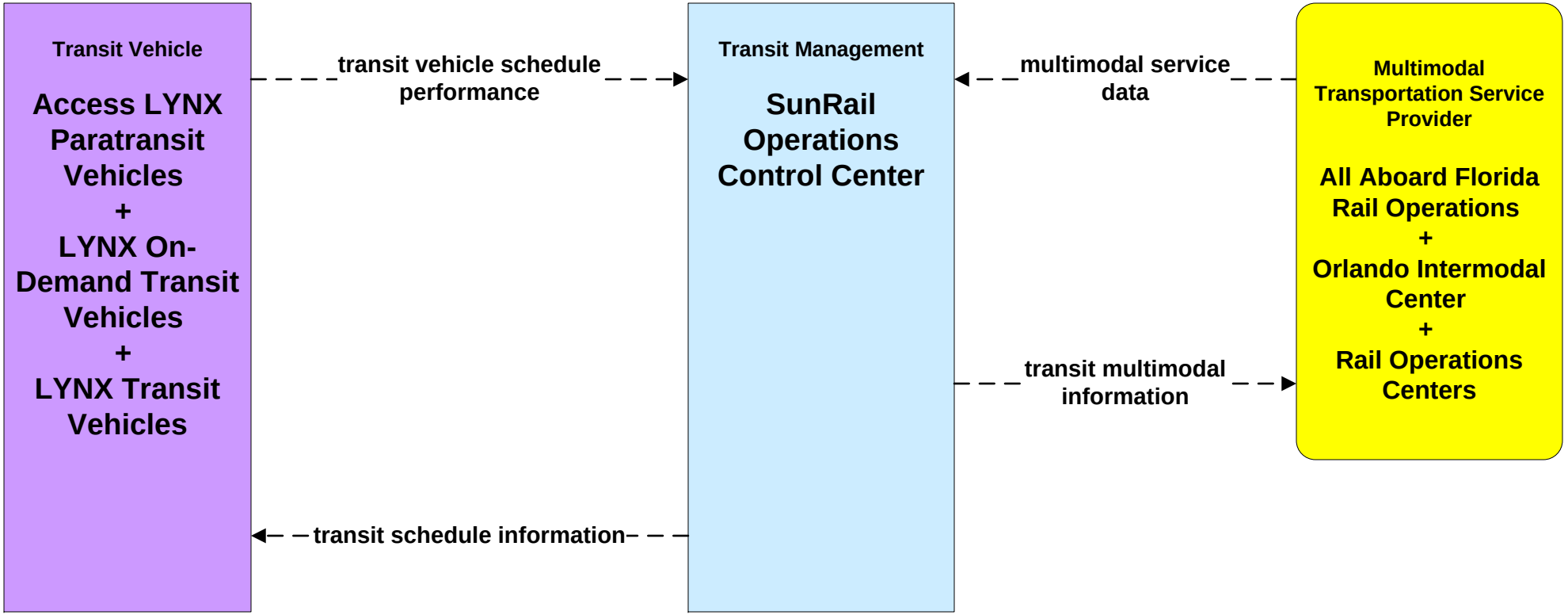


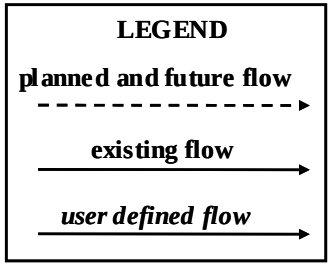


APTS07 - Multi-modal Coordination
Local Transit Operators

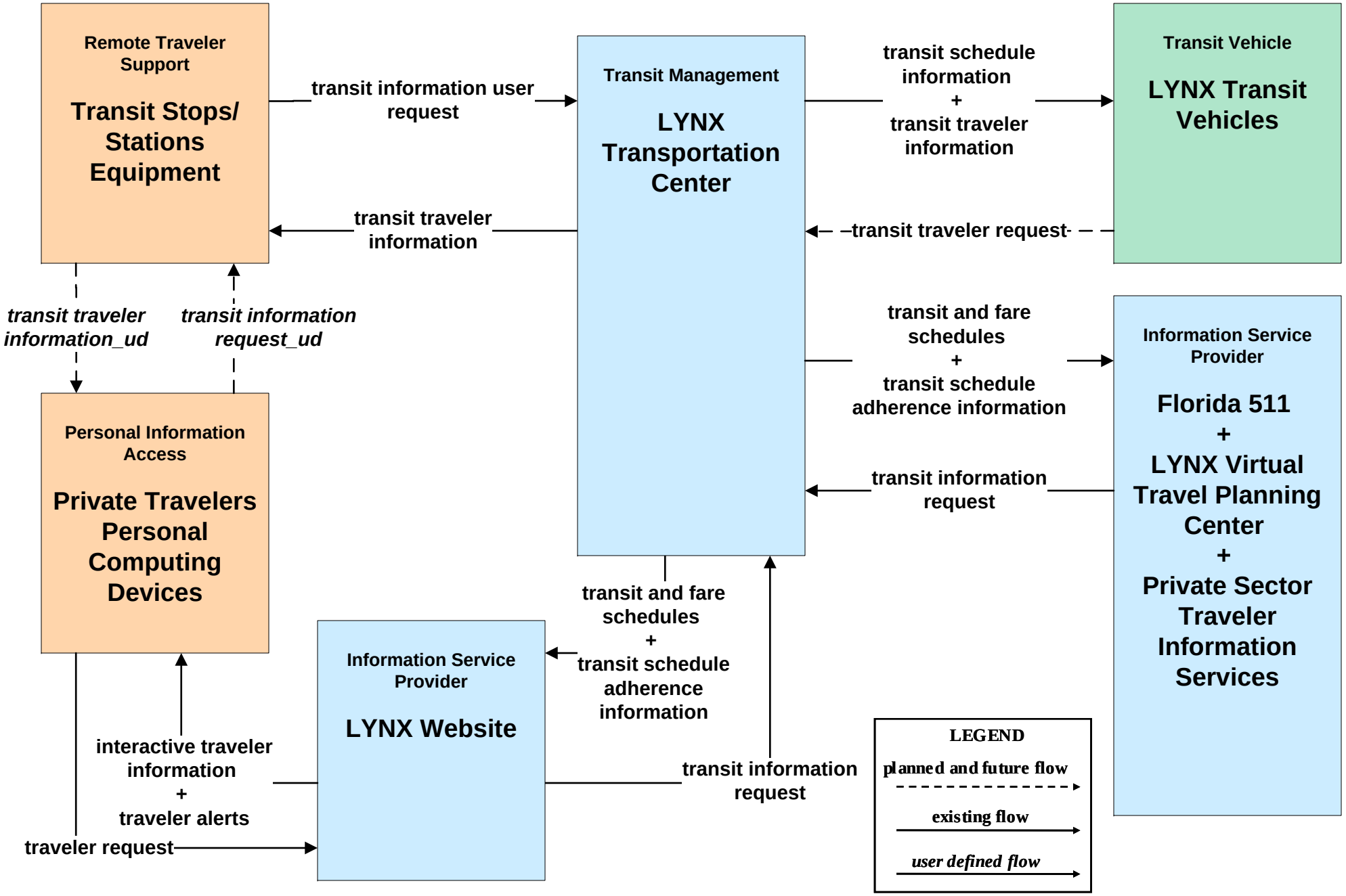


APTS07 - Multi-modal Coordination
SunRail

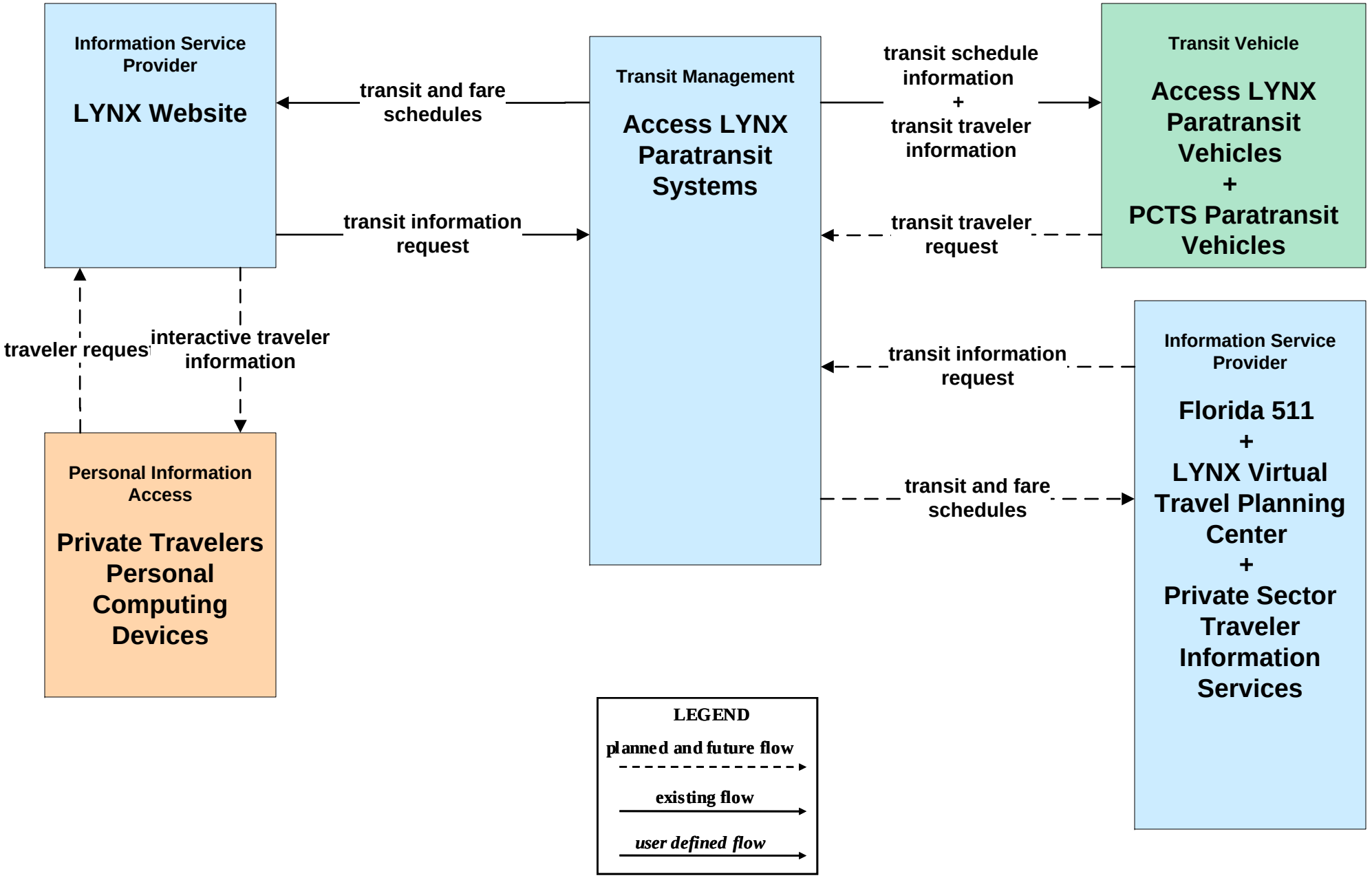




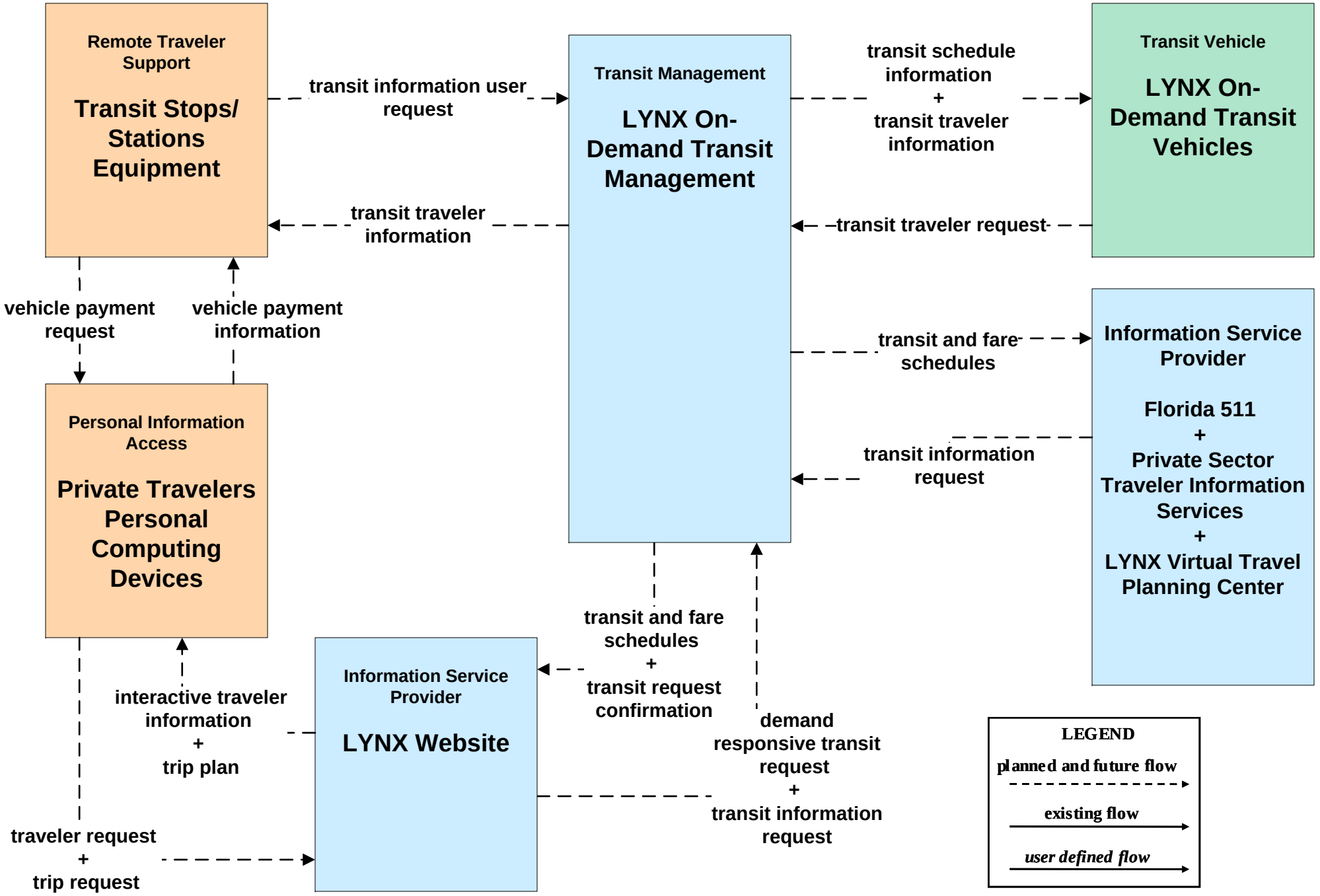
APTS08 - Transit Traveler Information
LYNX Operations Center



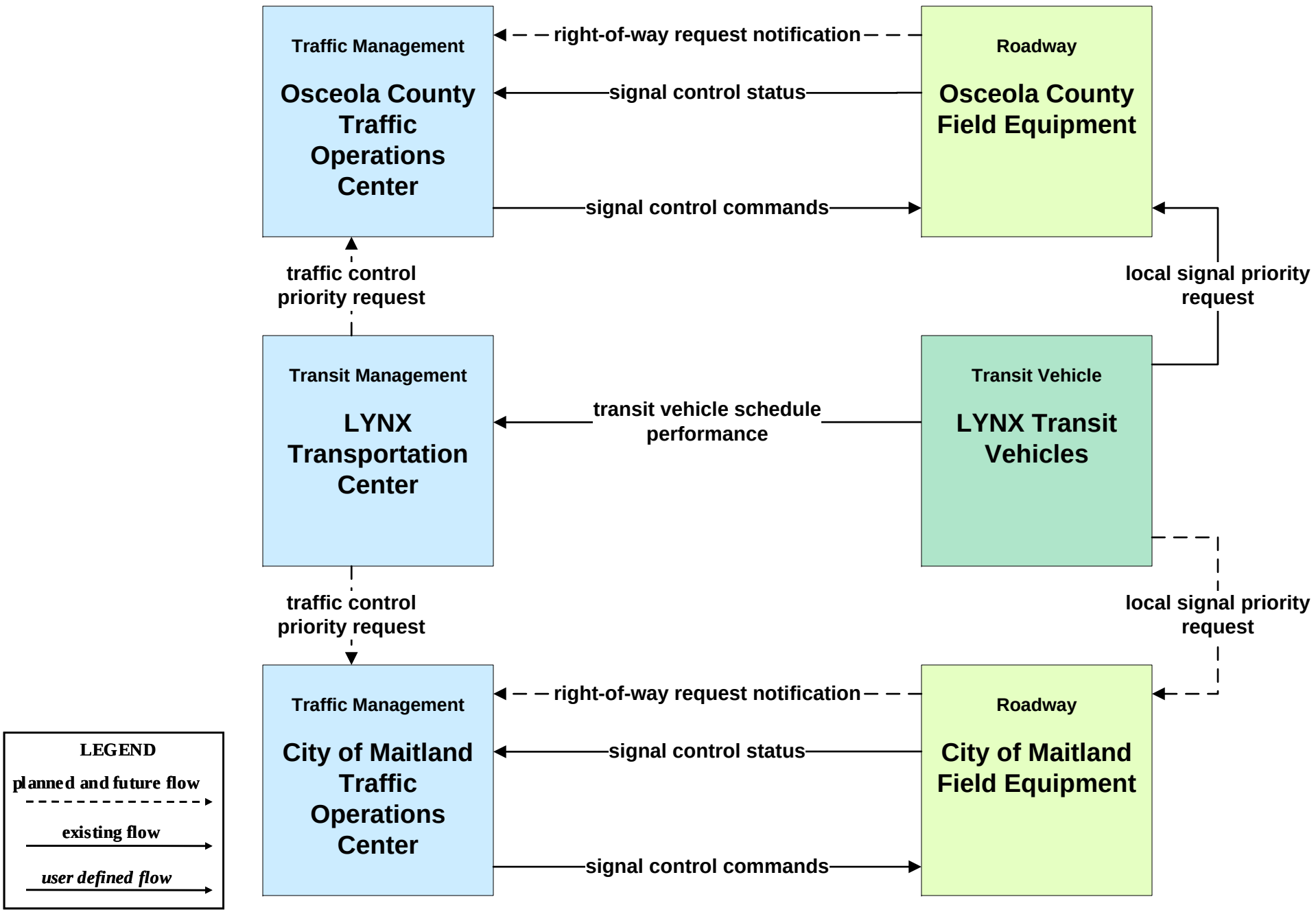
APTS08 - Transit Traveler Information
Access LYNX Paratransit Vehicle



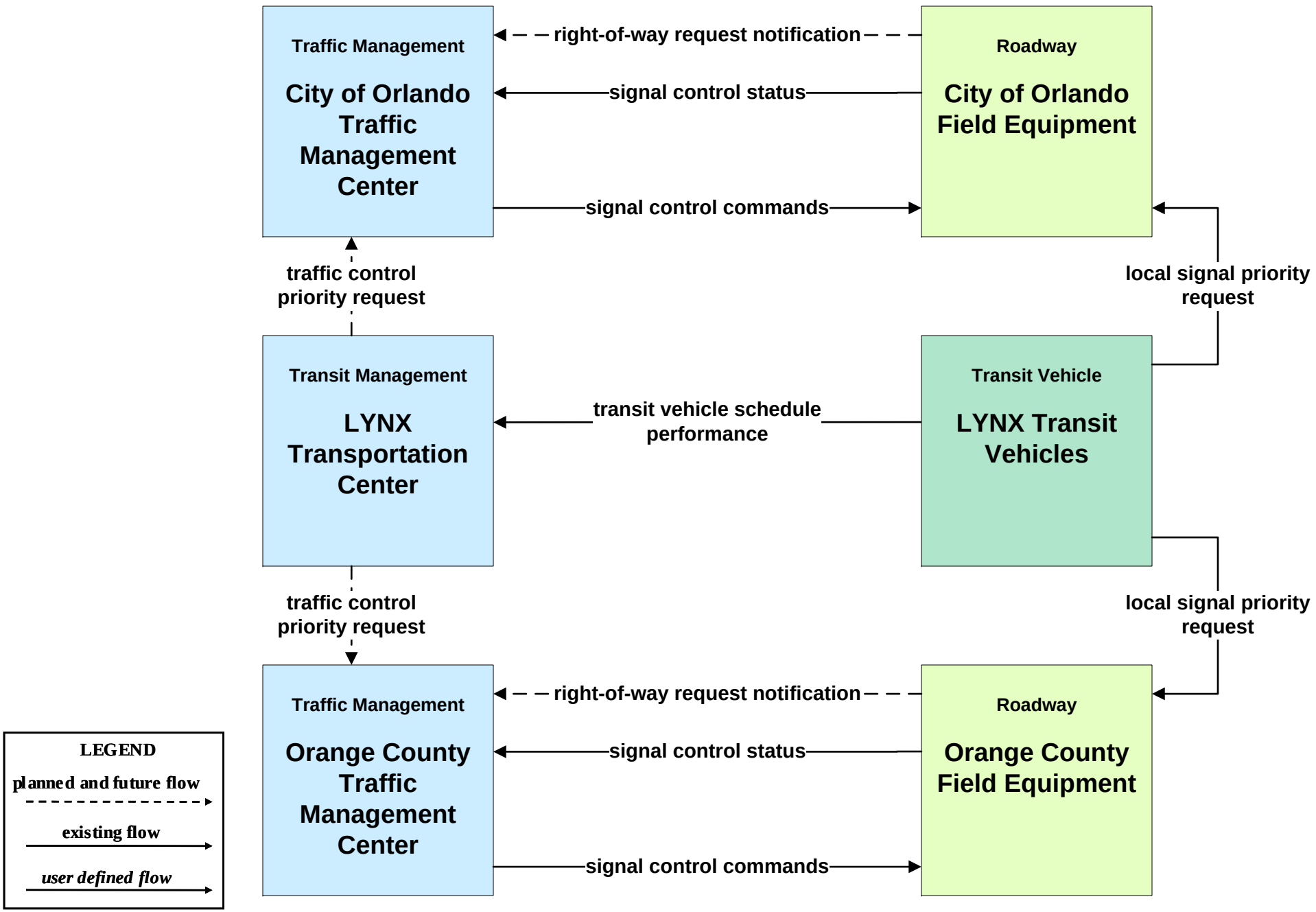
APTS08 - Transit Traveler Information
LYNX On-Demand Transit



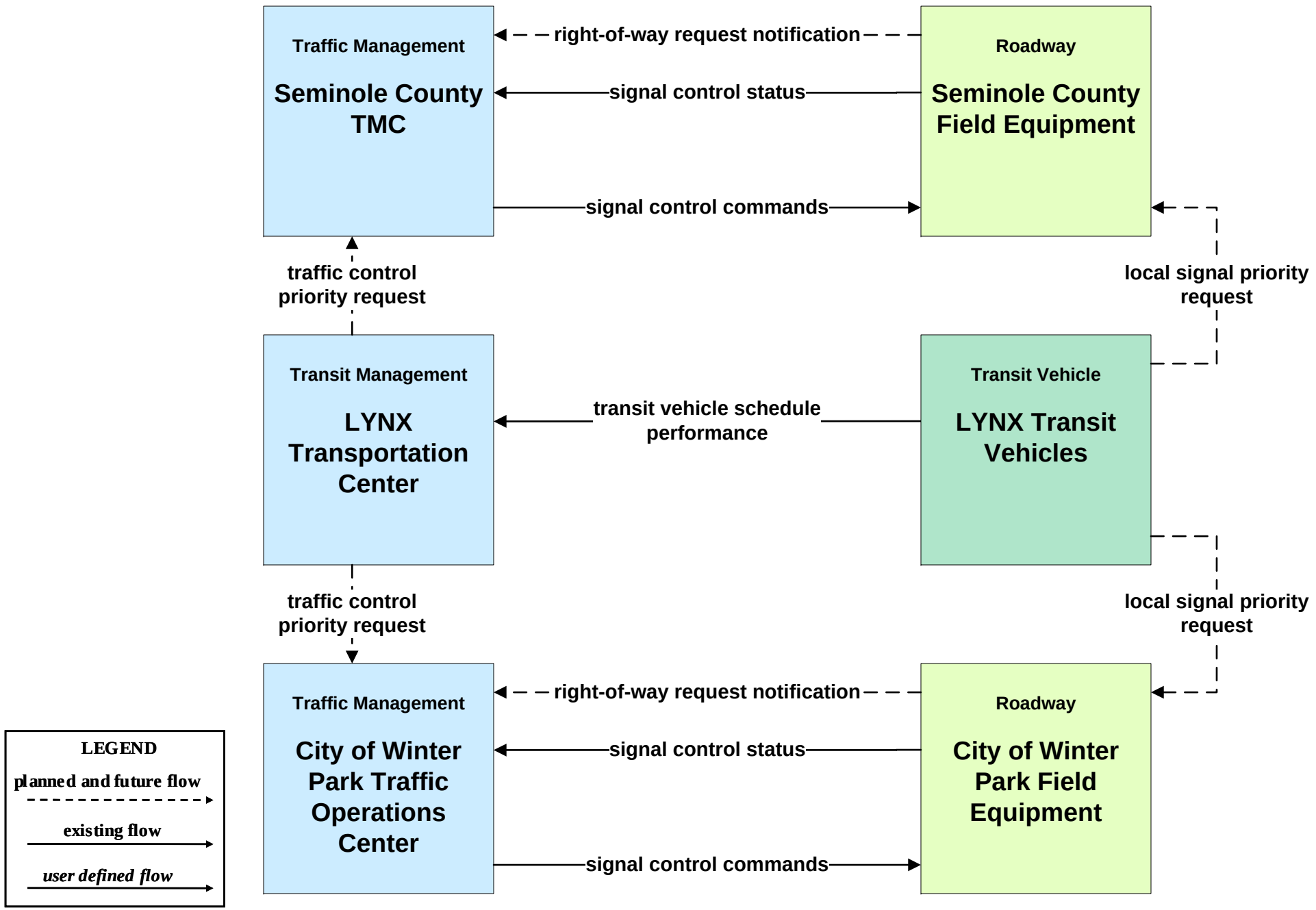
APTS09 - Transit Signal Priority
LYNX (1 of 5)



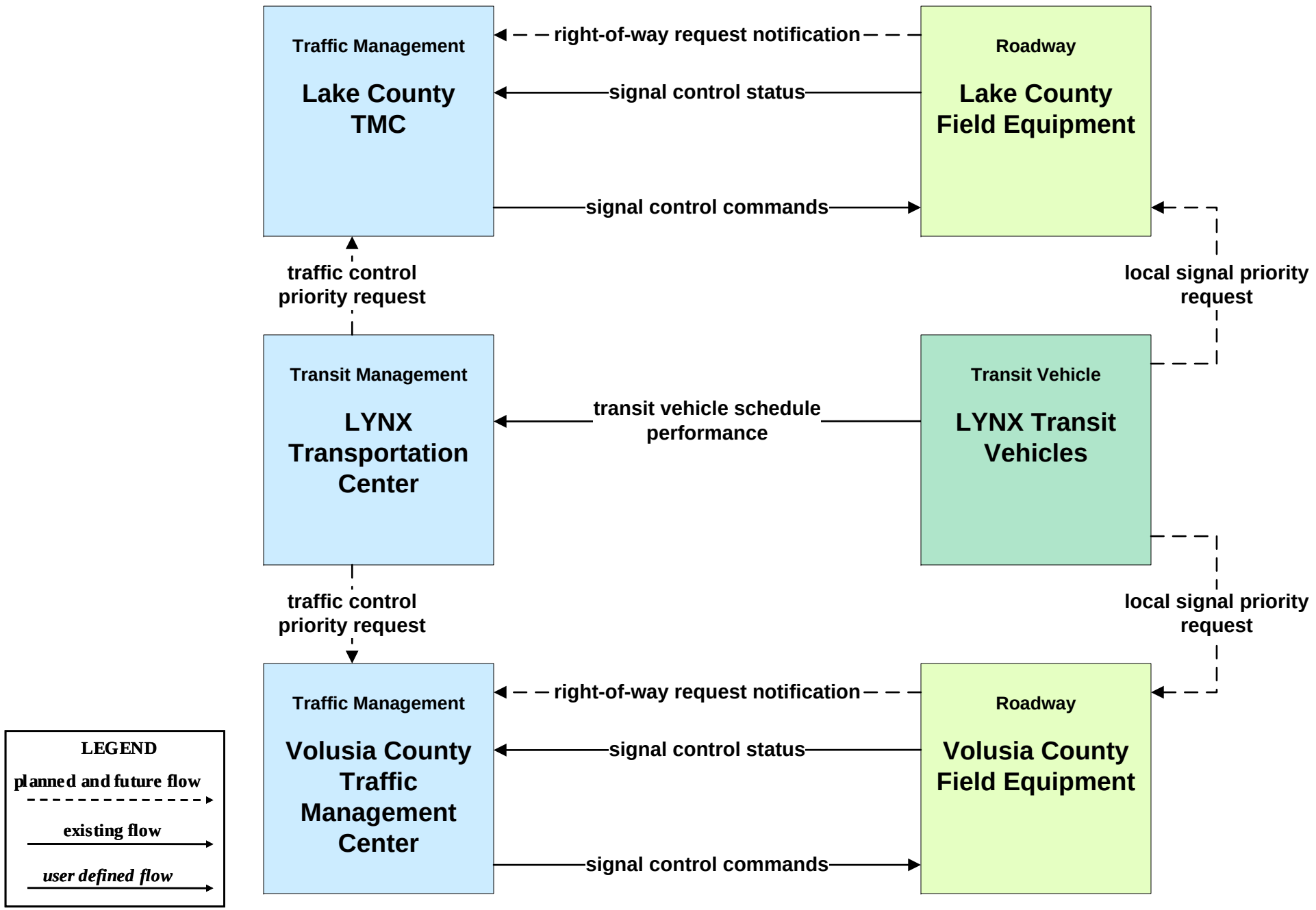
APTS09 - Transit Signal Priority
LYNX (2 of 5)



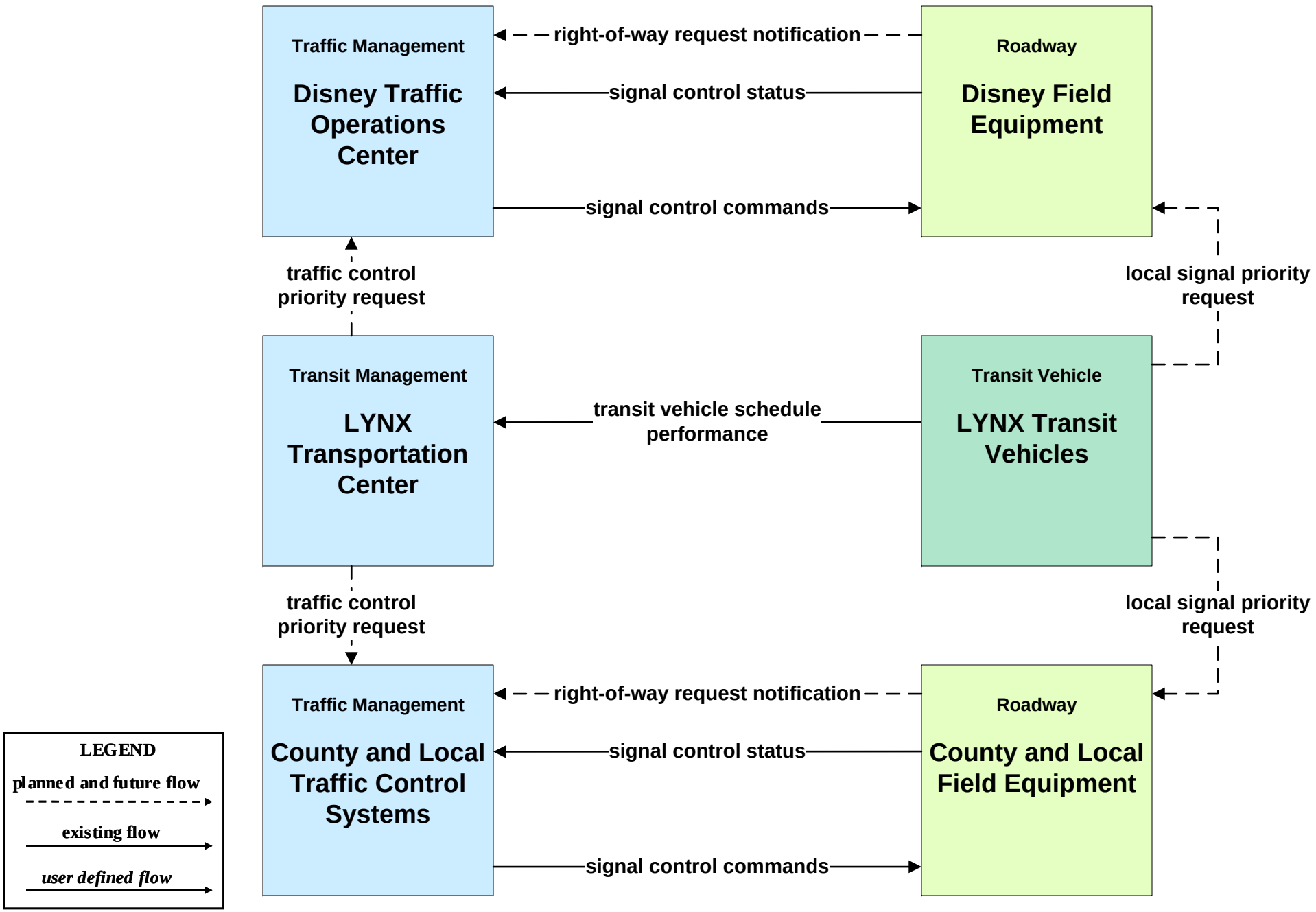
APTS09 - Transit Signal Priority
LYNX (3 of 5)



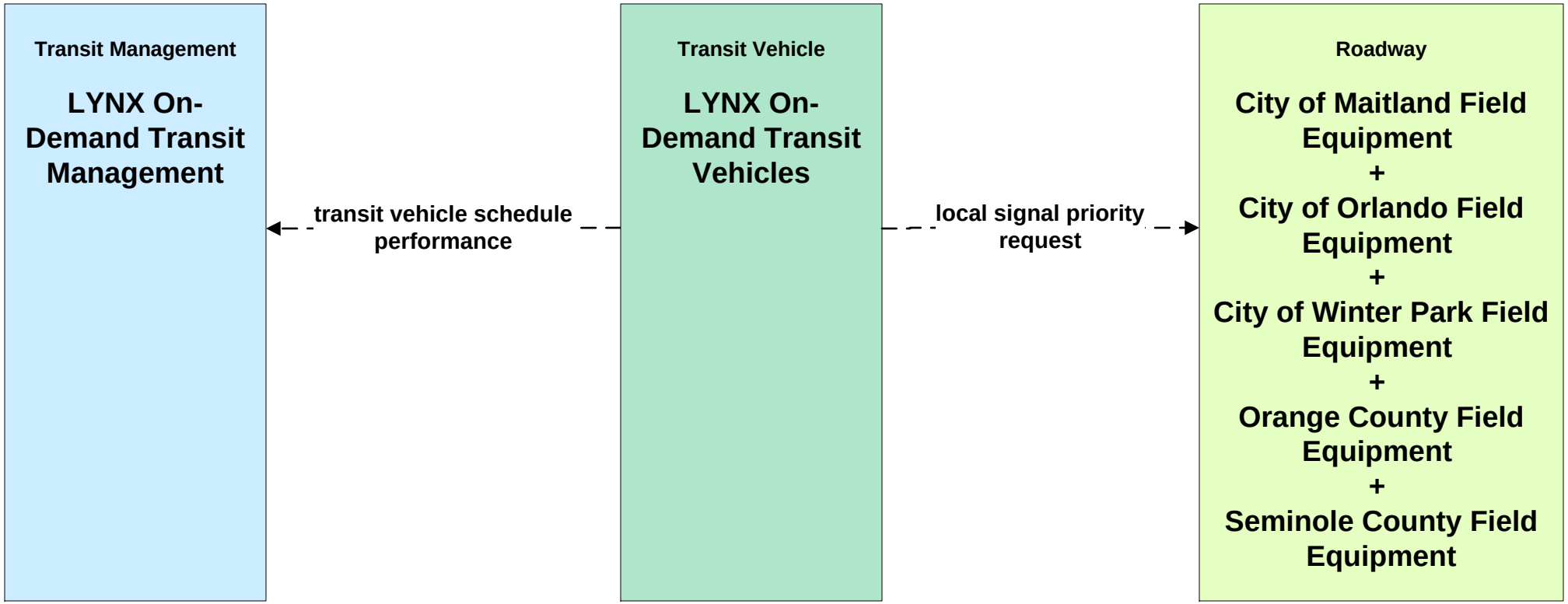
APTS09 - Transit Signal Priority
LYNX (4 of 5)

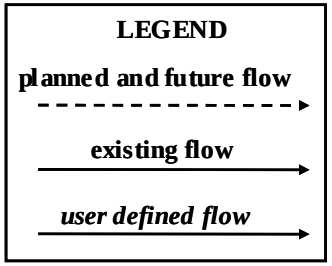


APTS09 - Transit Signal Priority
LYNX (5 of 5)

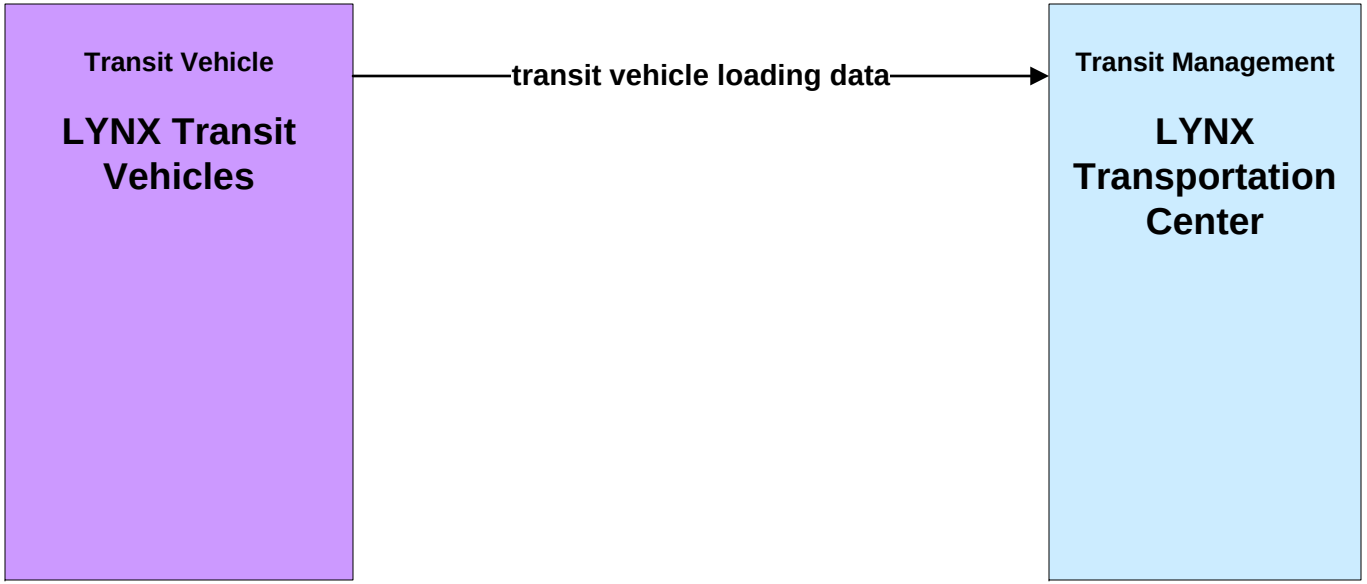


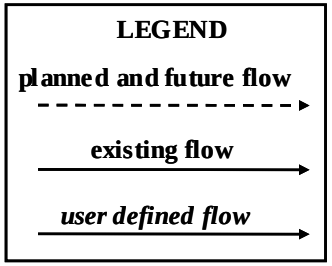
APTS09 - Local Signal Priority
LYNX On-Demand Transit



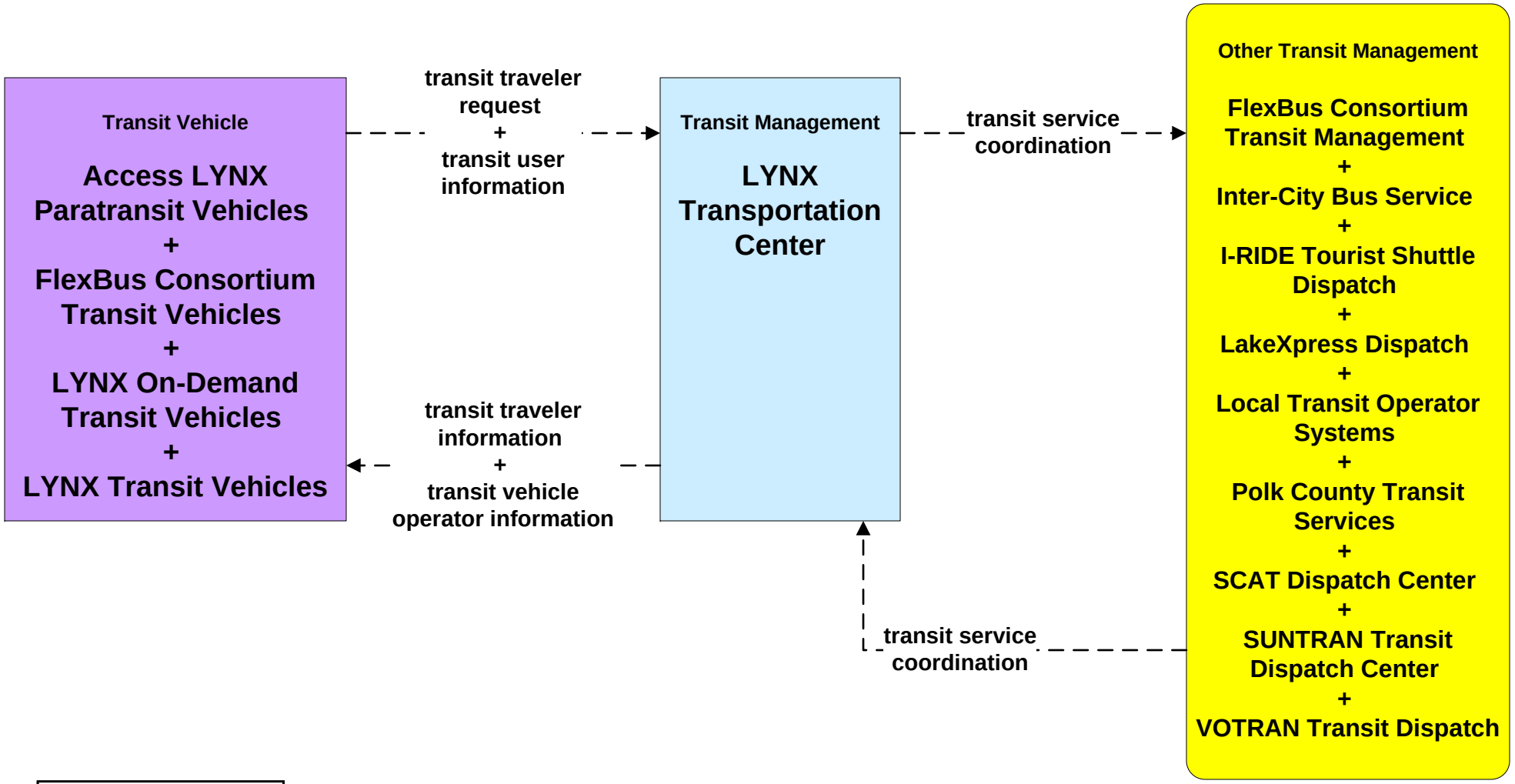


APTS10 - Transit Passenger Counting
LYNX

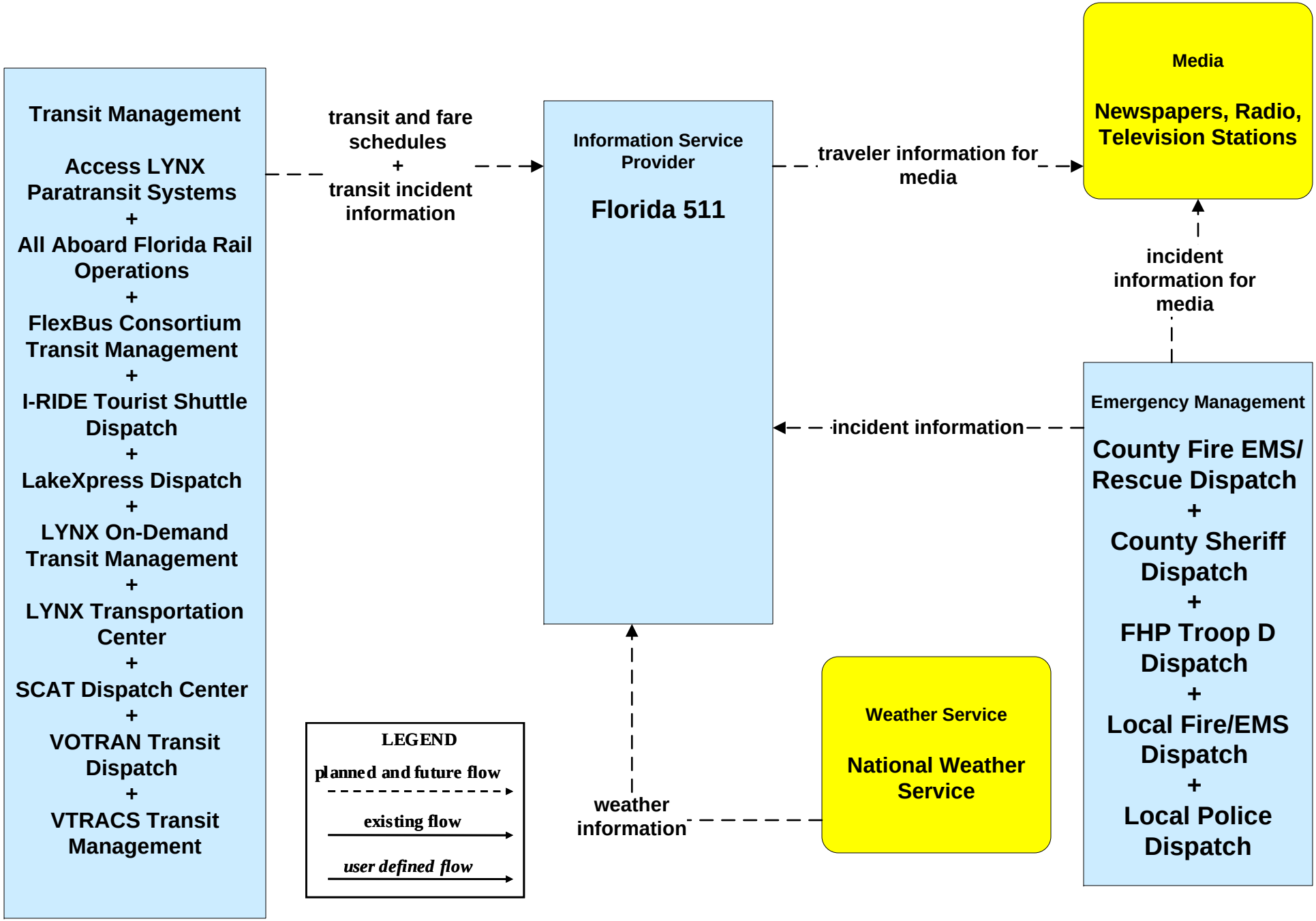




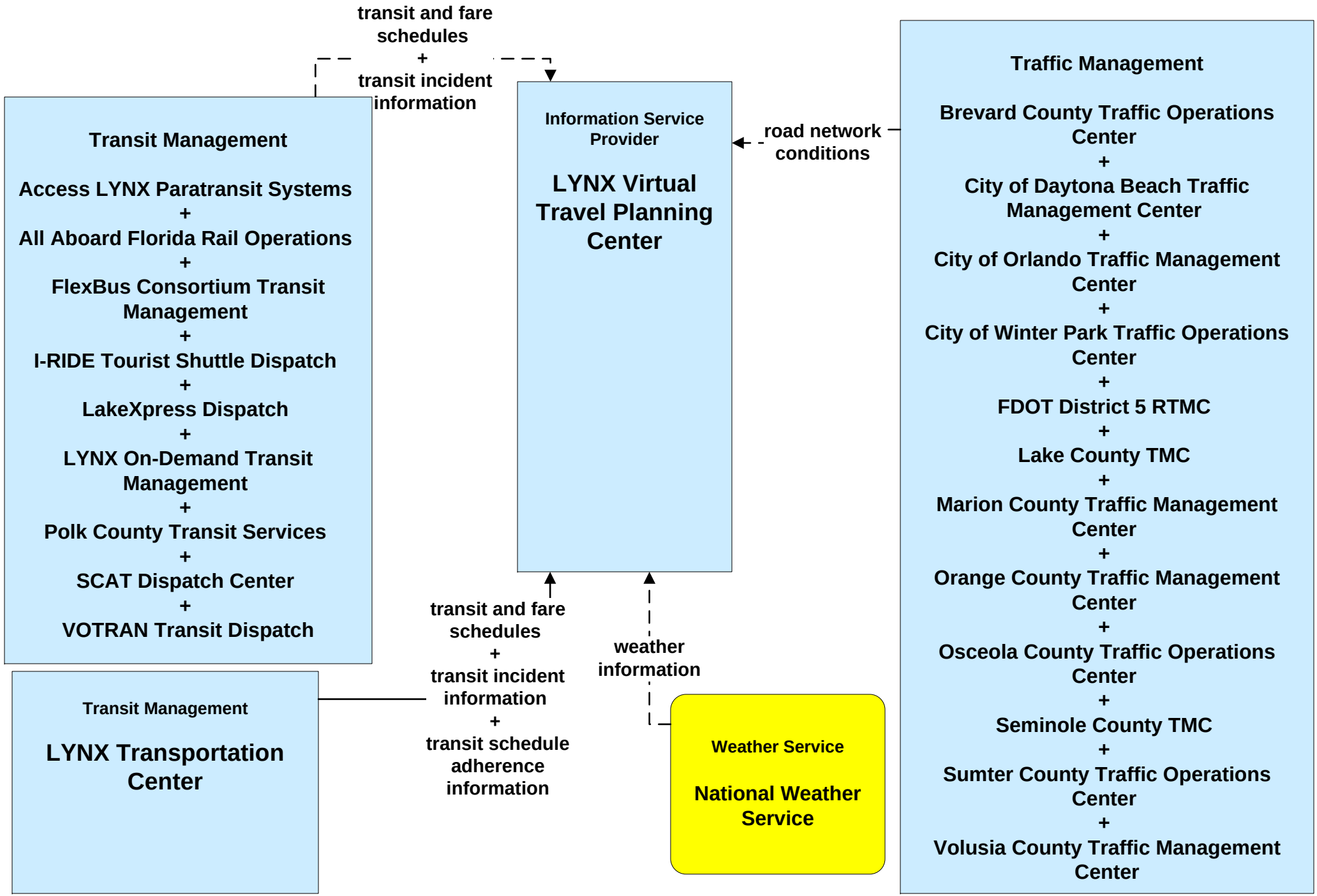
APTS11 - Multimodal Connection Protection
LYNX



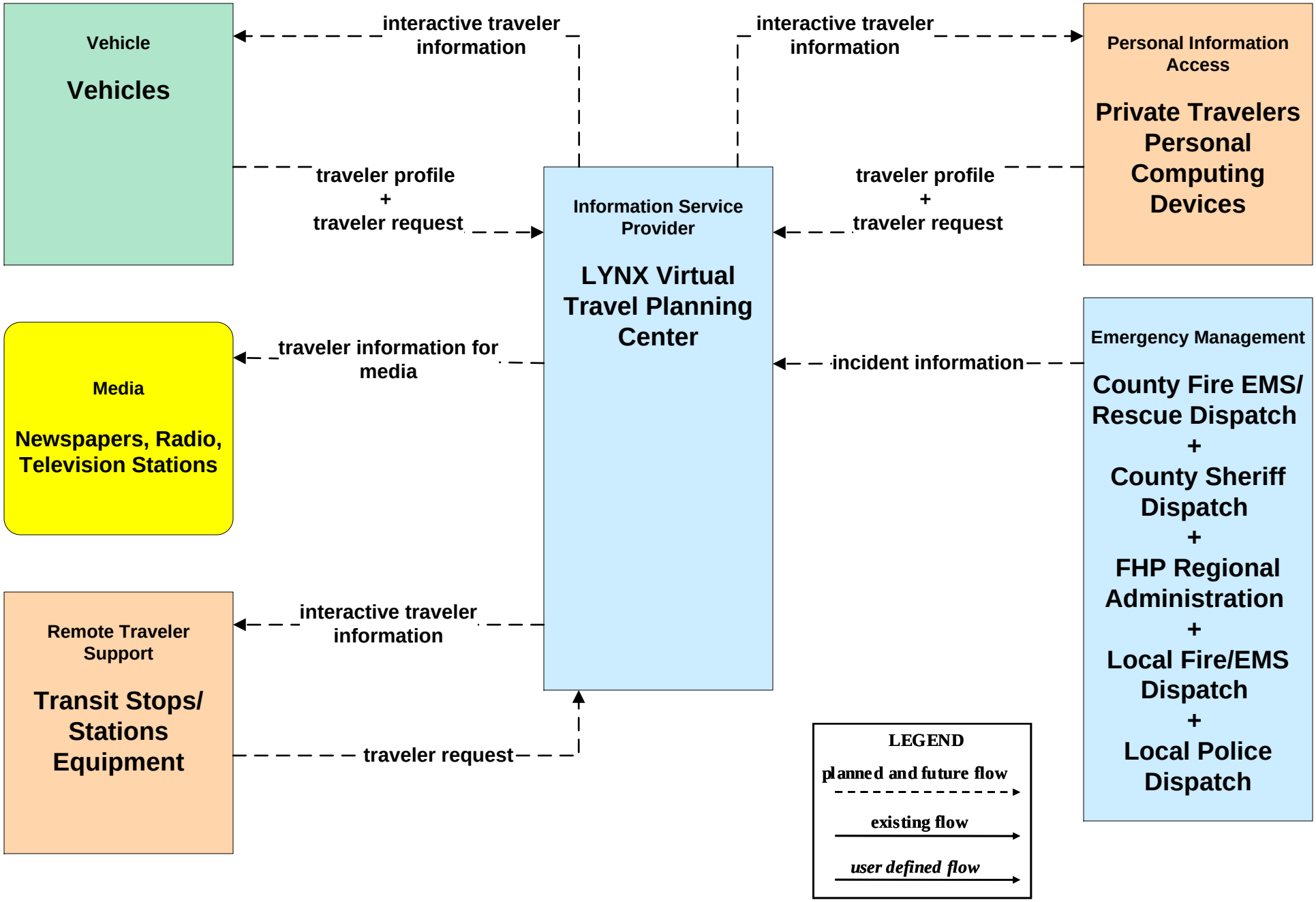
ATIS01 - Broadcast Traveler Information
Florida 511 / Private ISPs (2 of 3)



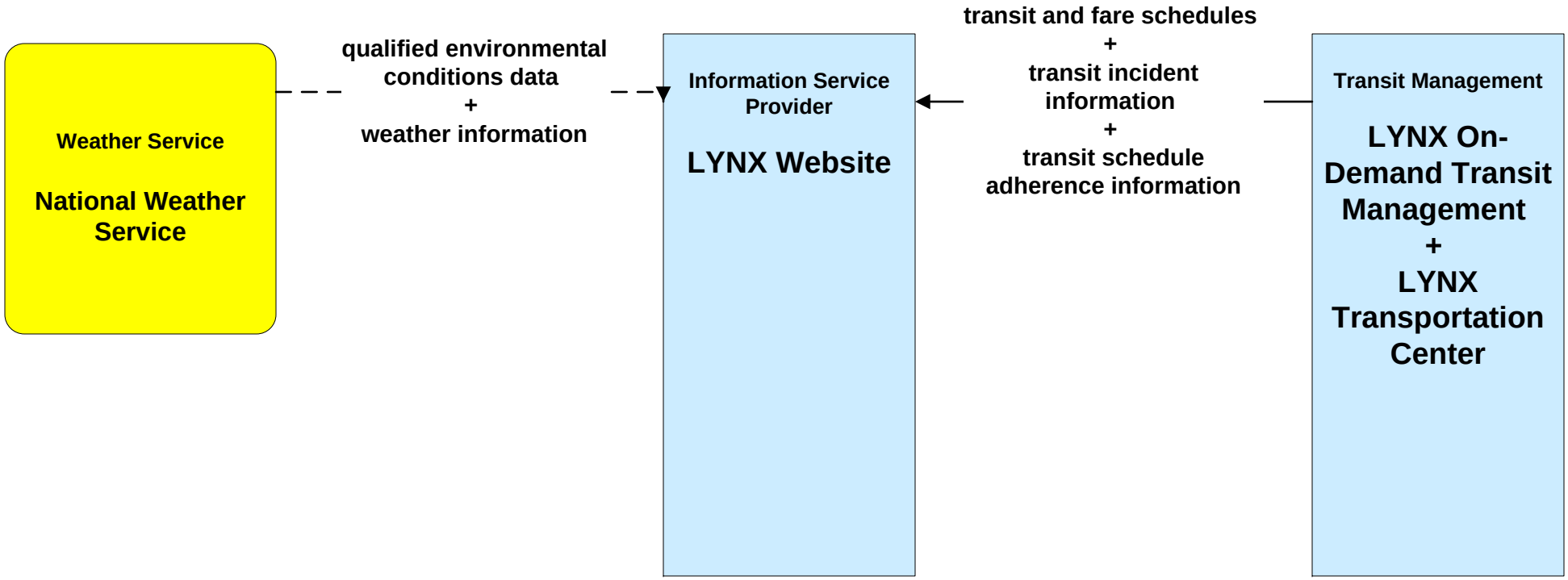
ATIS02 - Interactive Traveler Information
Virtual Travel Planning Center (1 of 2)



ATIS02 - Interactive Traveler Information
Virtual Travel Planning (Outputs)



ATIS02 - Interactive Traveler Information
LYNX Website



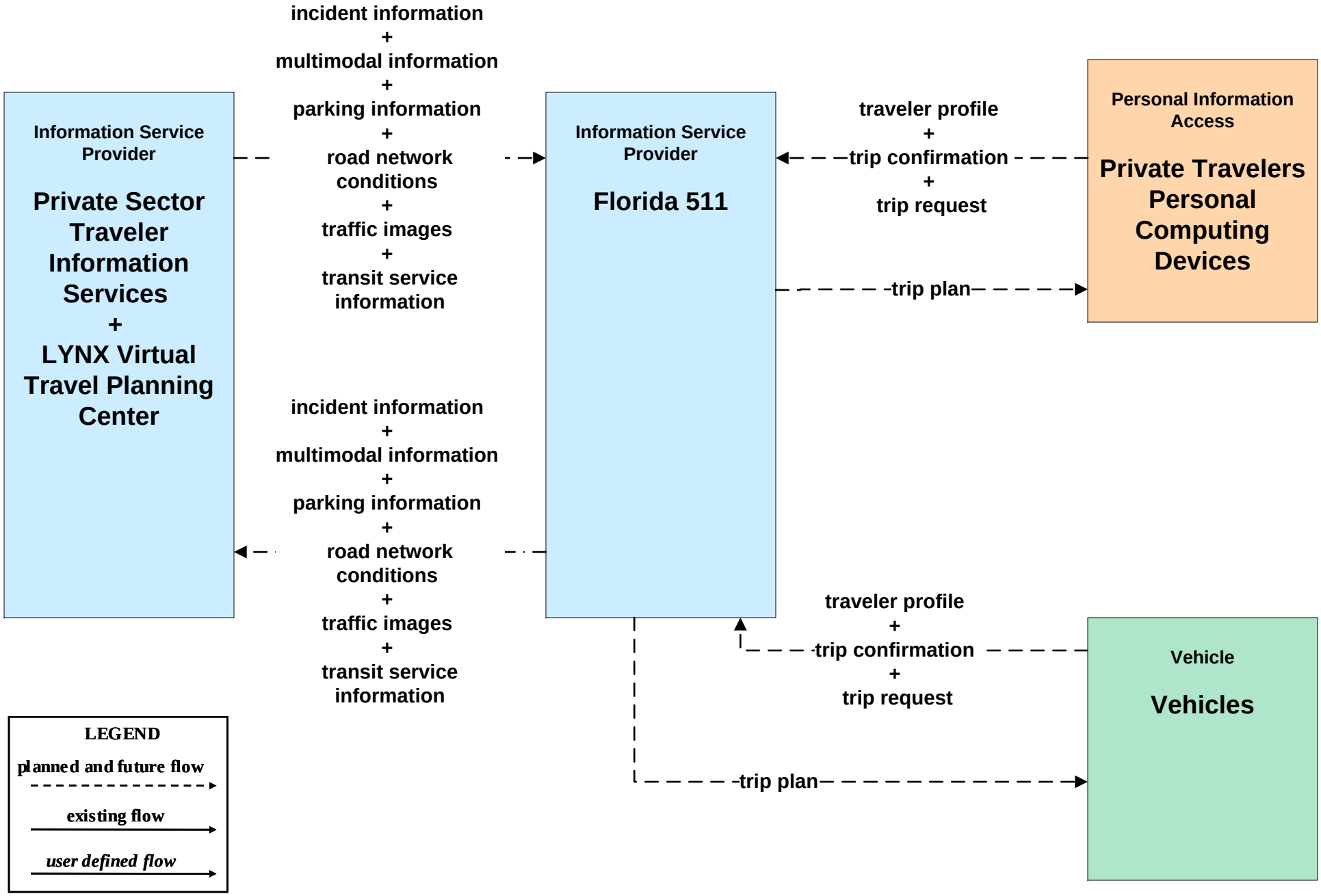
LEGEND

planned and future flow

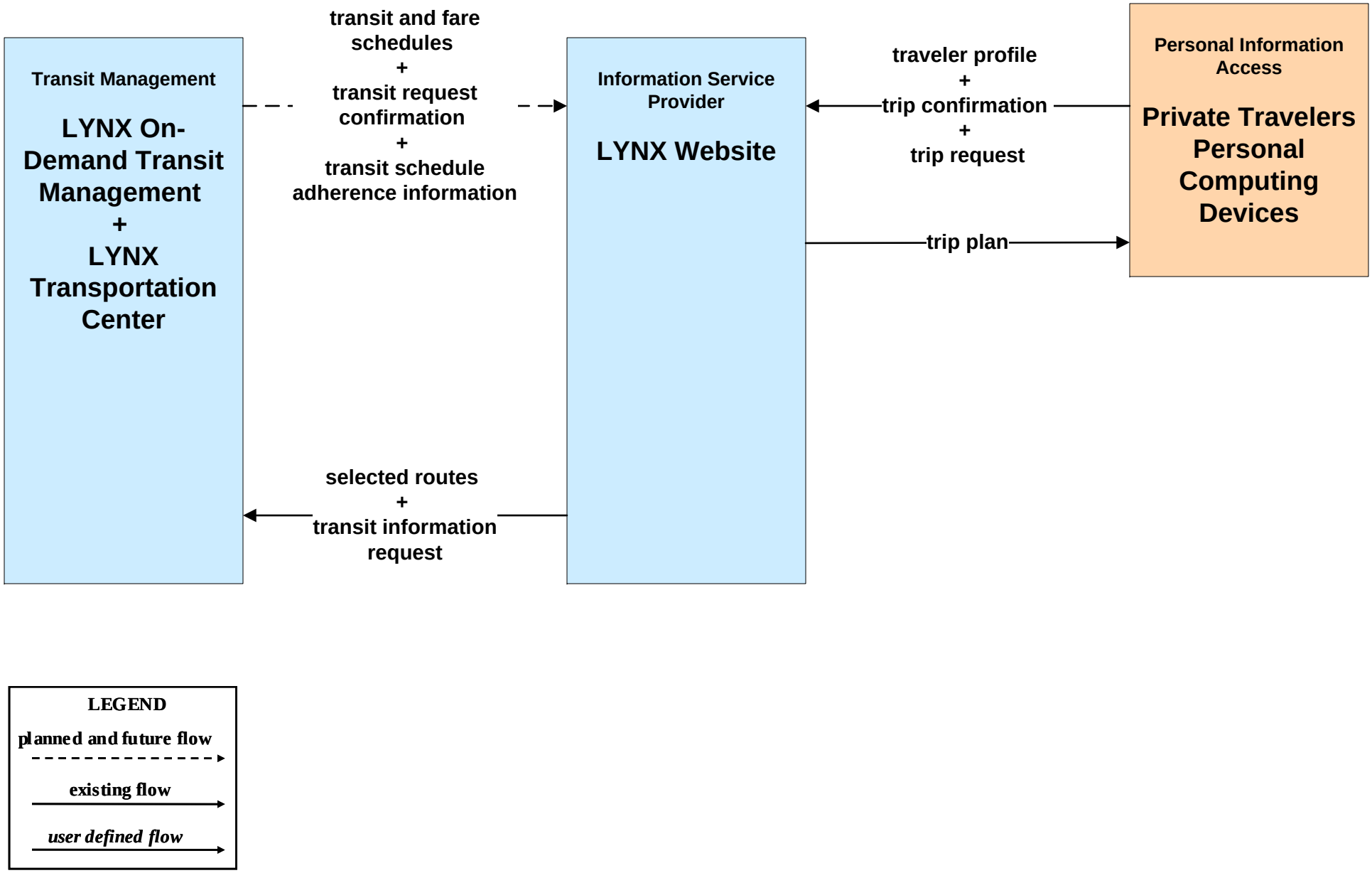
existing flow

user defined flow

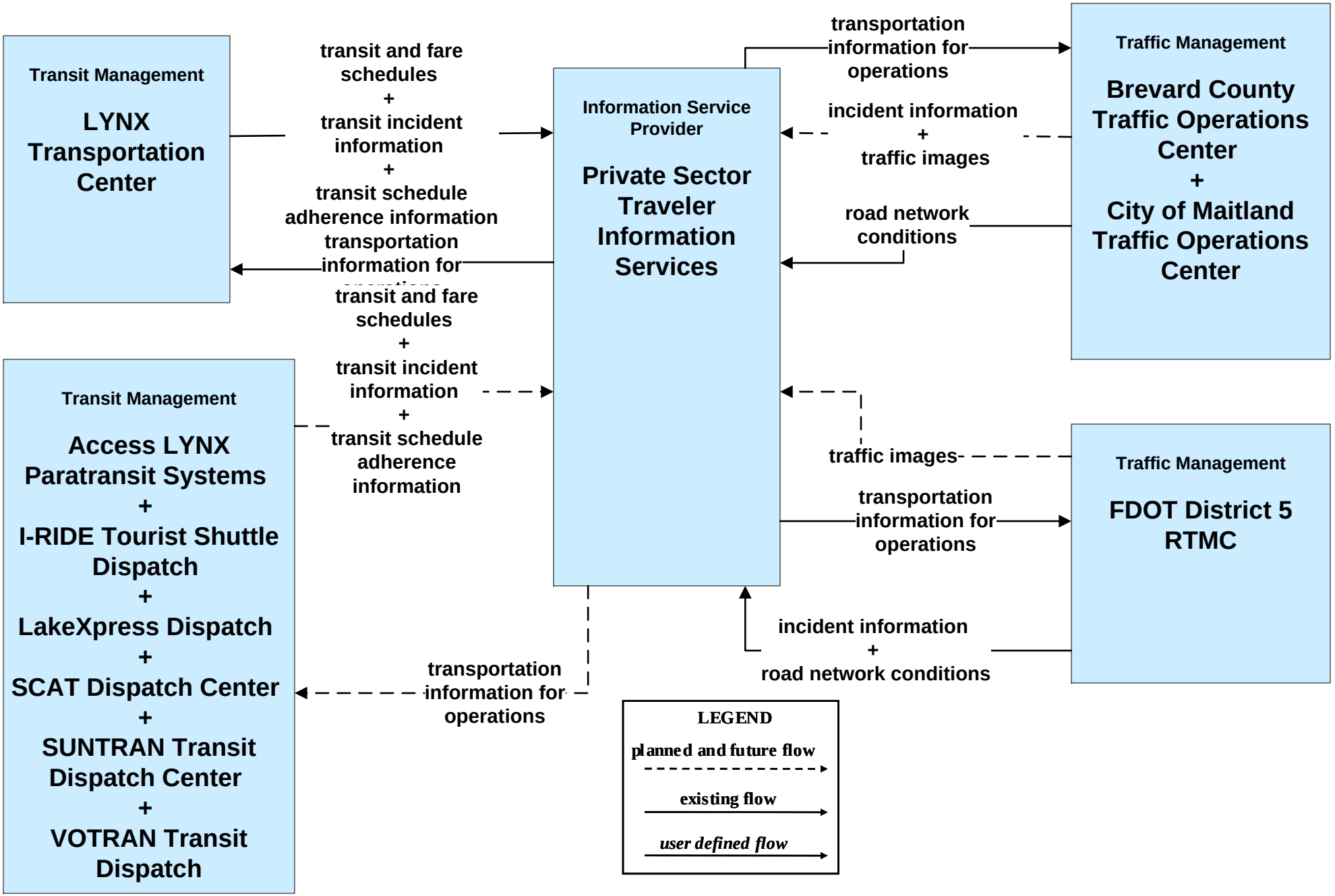
ATIS05 - ISP Based Route Guidance
Florida 511



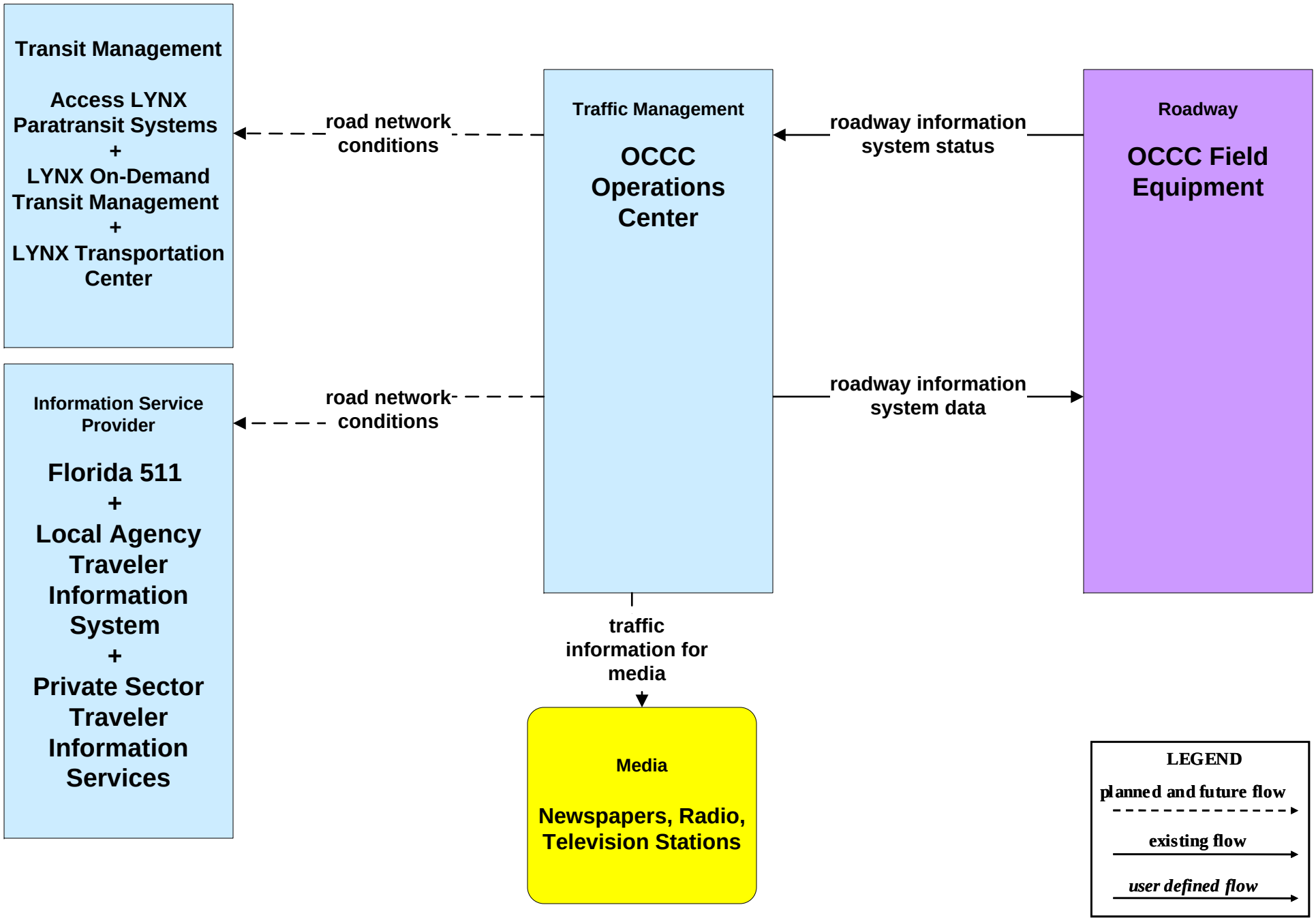
ATIS05 - ISP Based Route Guidance
LYNX Website



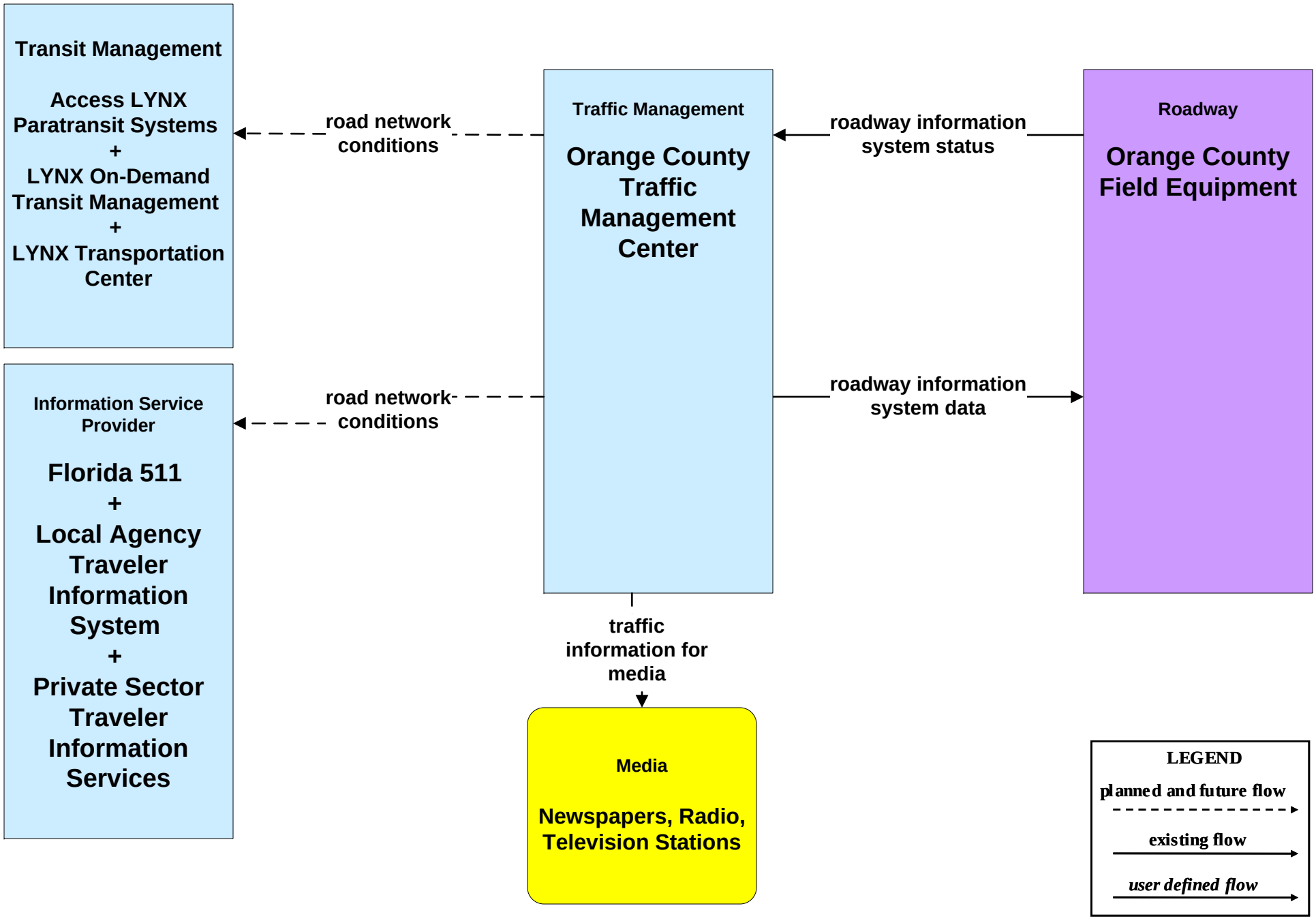
ATIS06 - Transportation Operations Data Sharing
Private Sector ISPs (1 of 2)



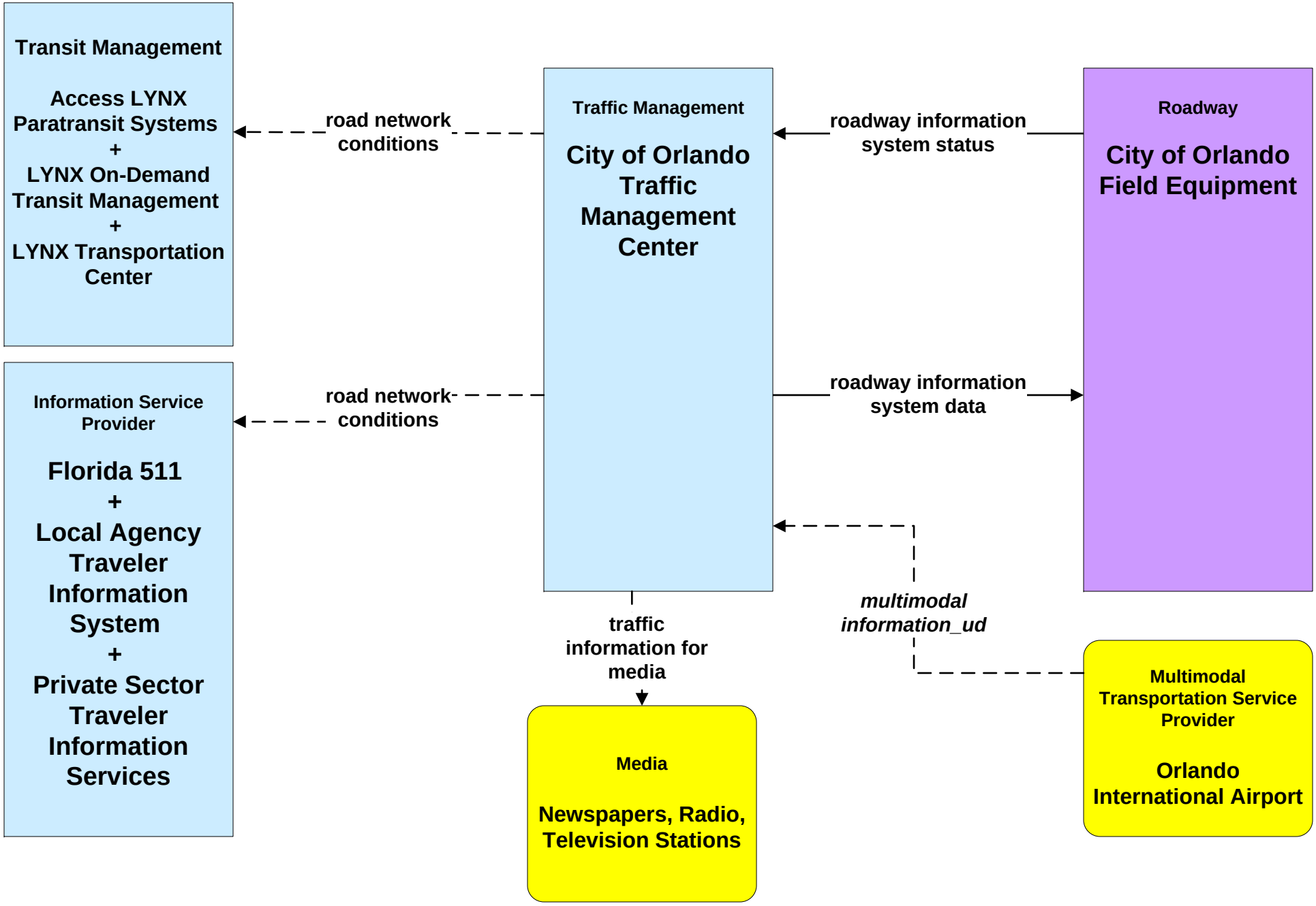
ATMS06 - Traffic Information Dissemination
OCCC



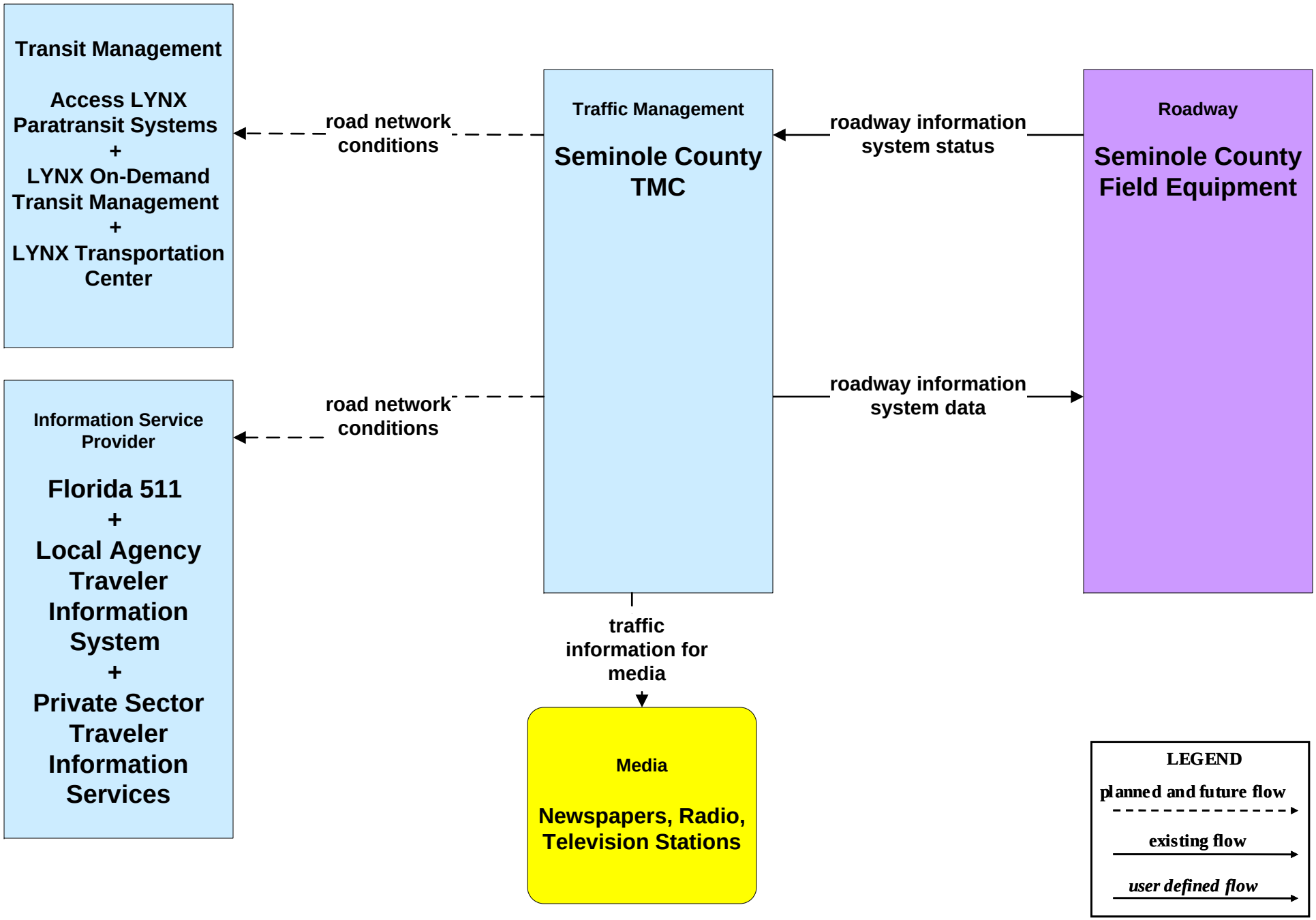
ATMS06 - Traffic Information Dissemination
Orange County



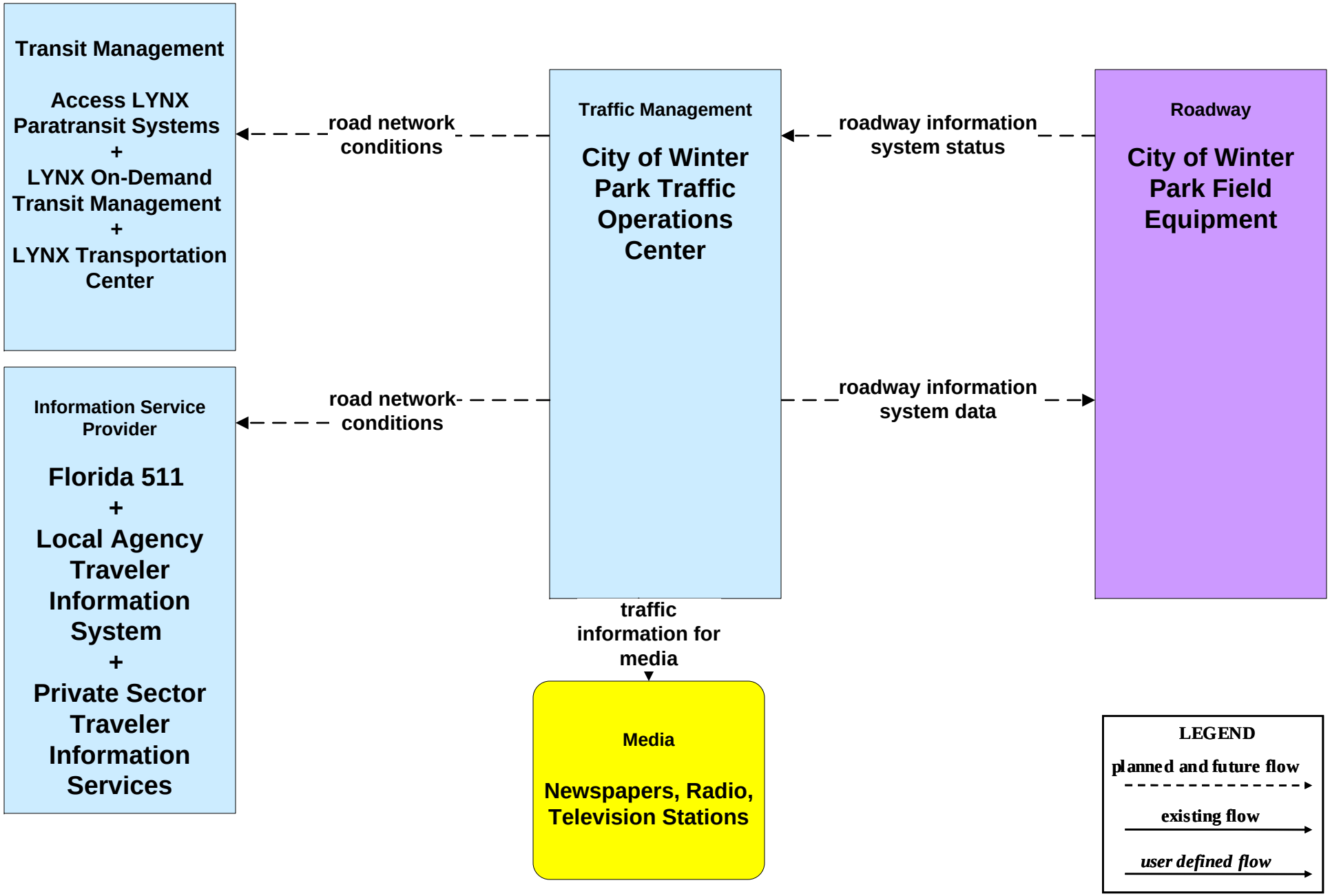
ATMS06 - Traffic Information Dissemination
City of Orlando



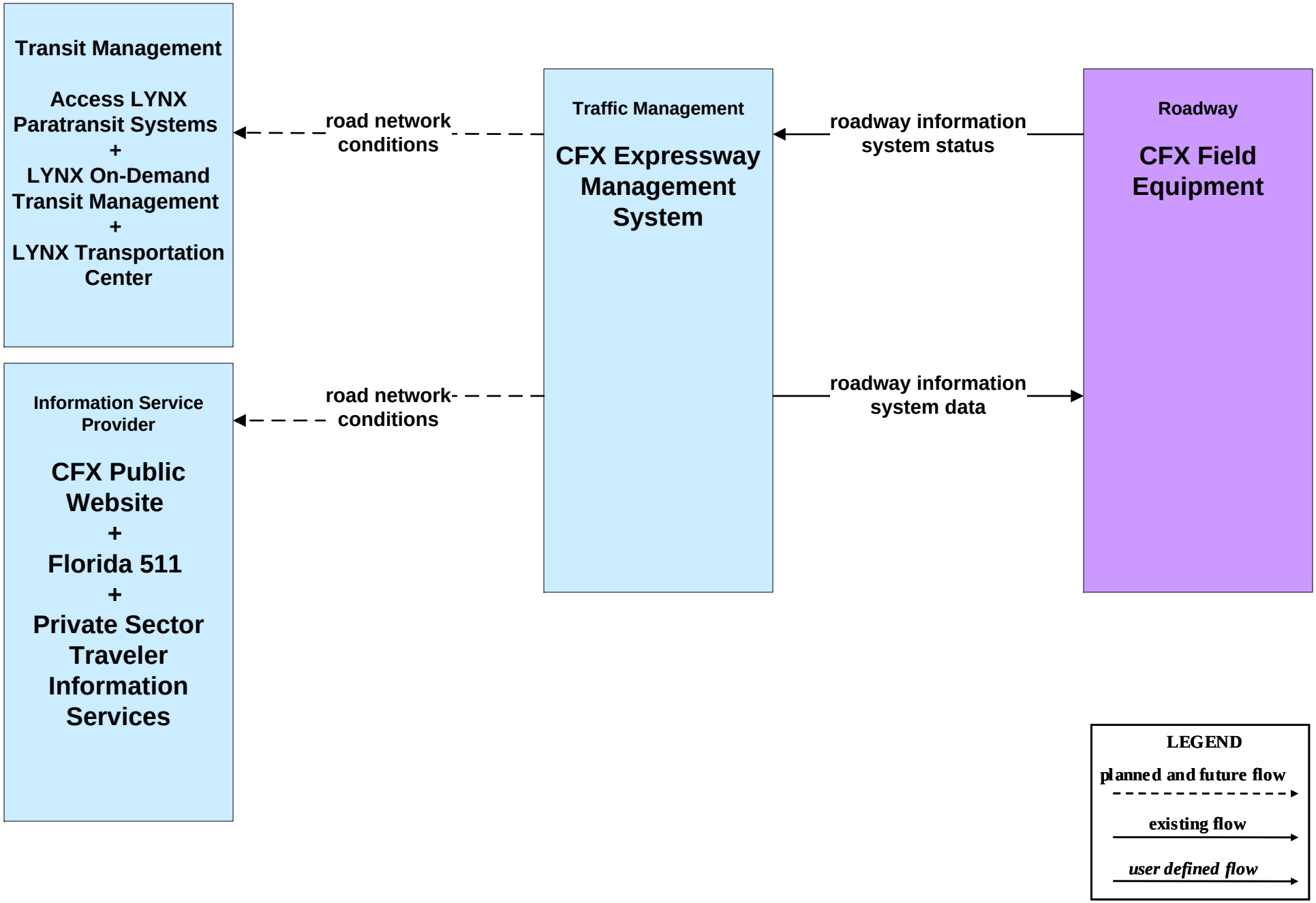
ATMS06 - Traffic Information Dissemination
Seminole County



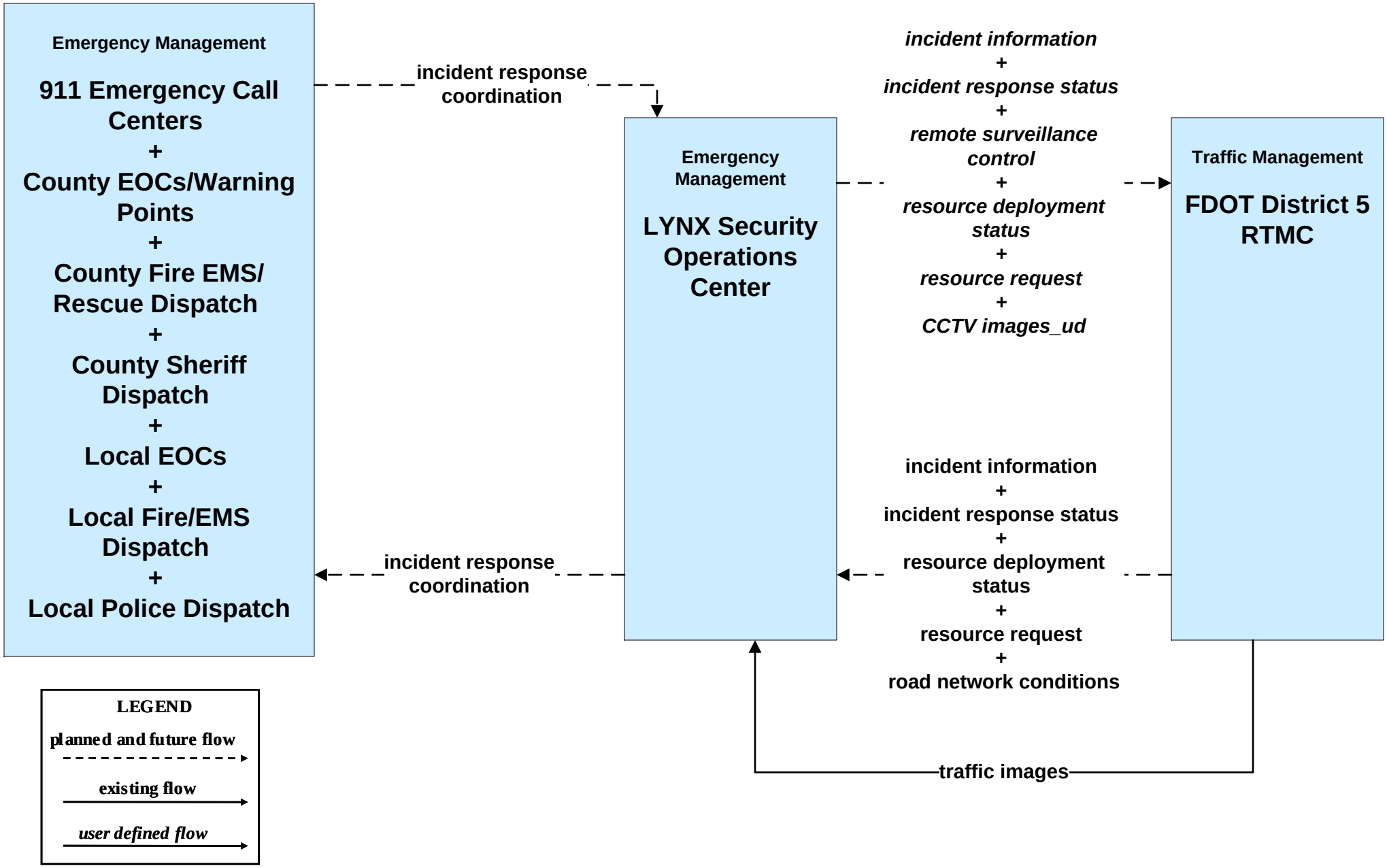
ATMS06 - Traffic Information Dissemination
City of Winter Park



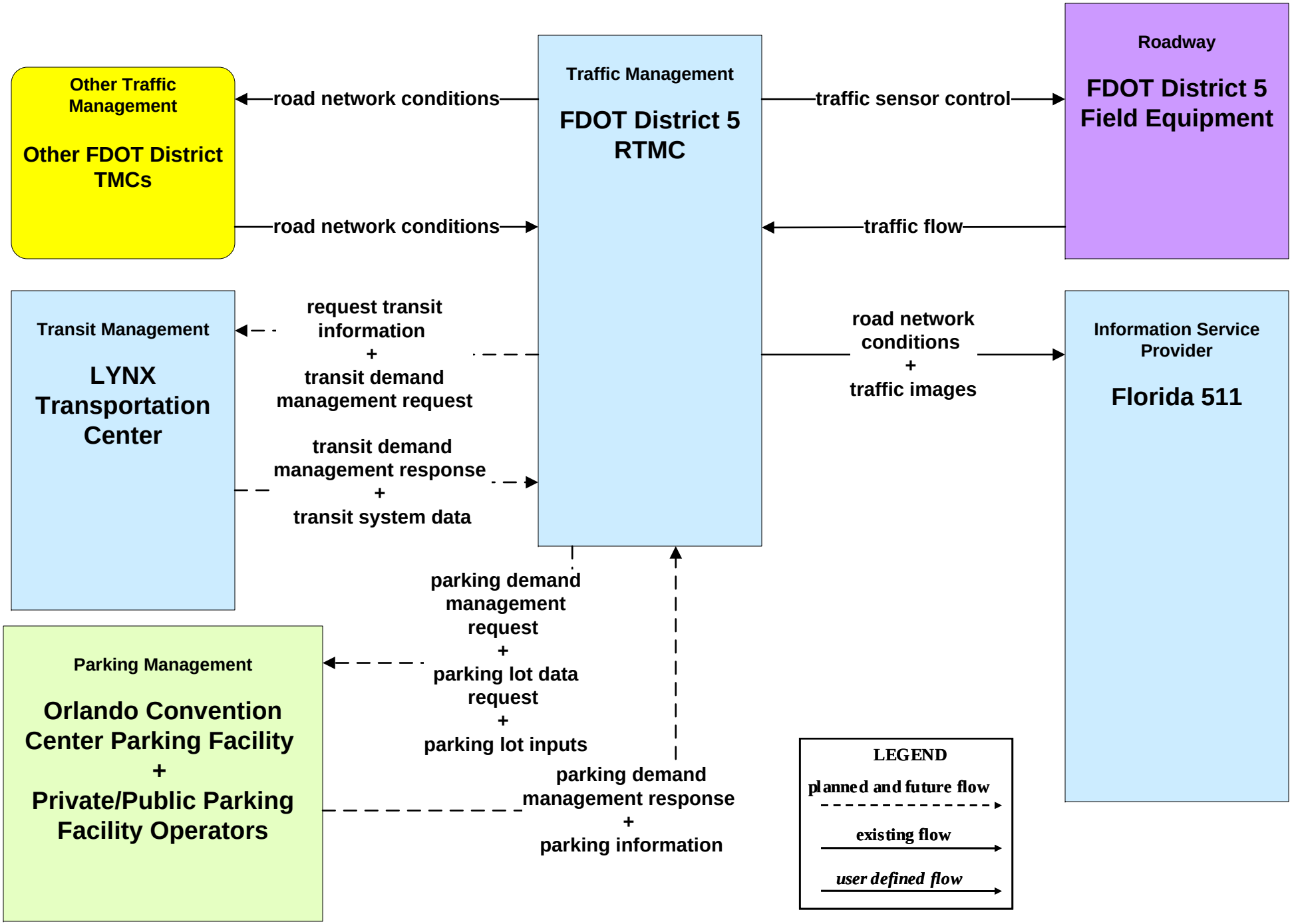
ATMS06 - Traffic Information Dissemination
CFX



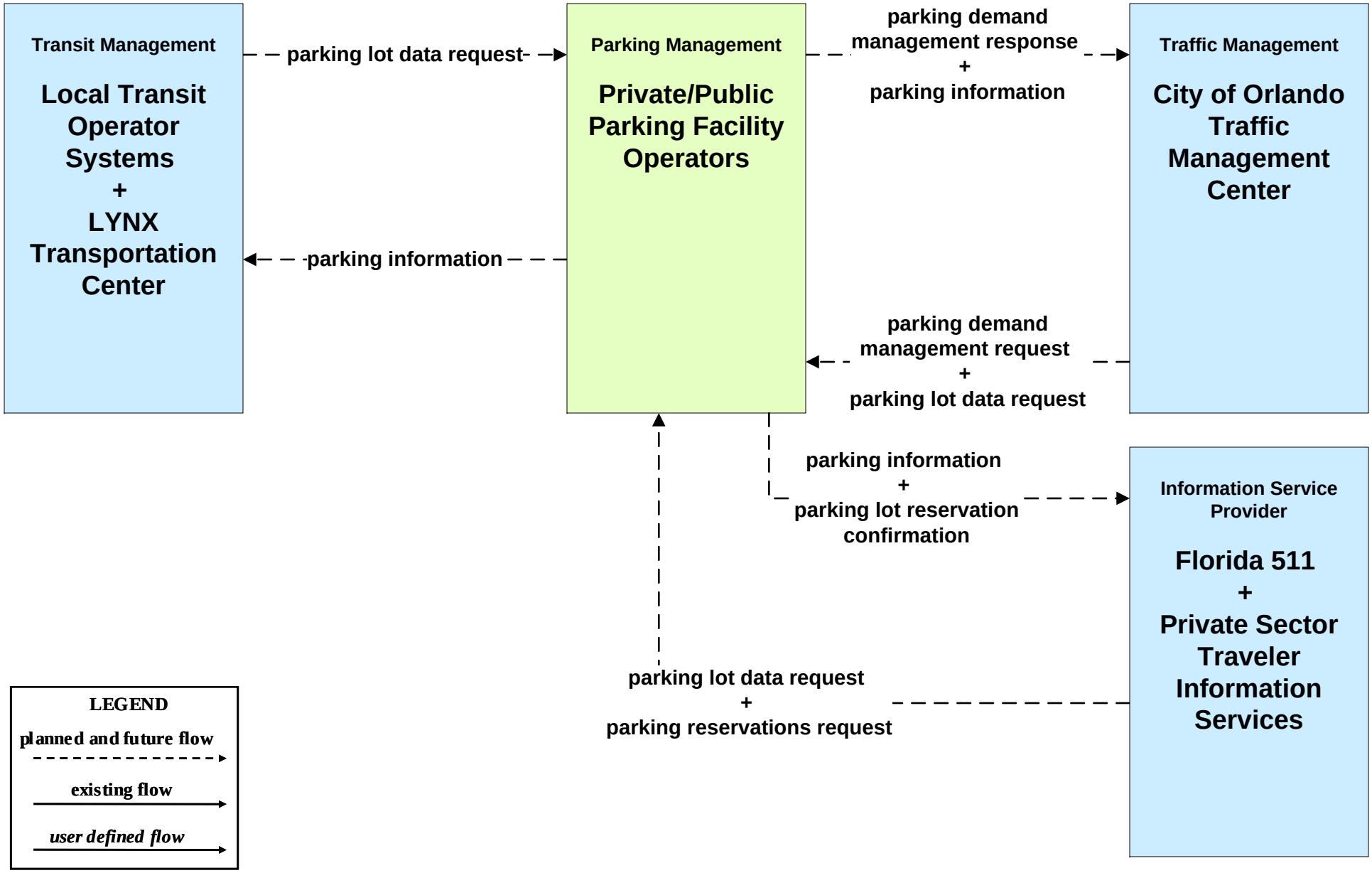
ATMS08 - Traffic Incident Management System
LYNX



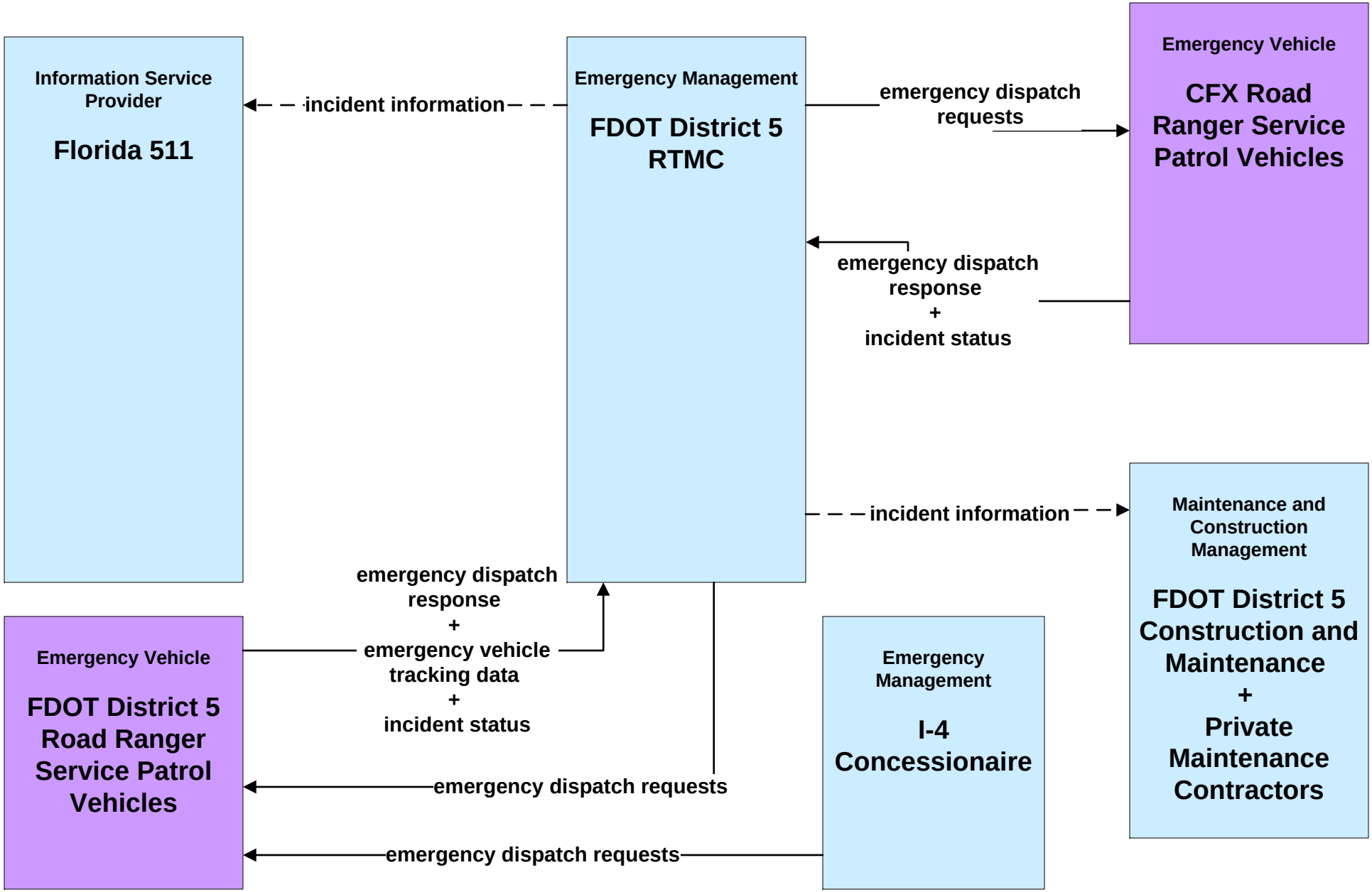
ATMS09 - Transportation Decision Support and Demand Management
FDOT District 5 Integrated Corridor Management



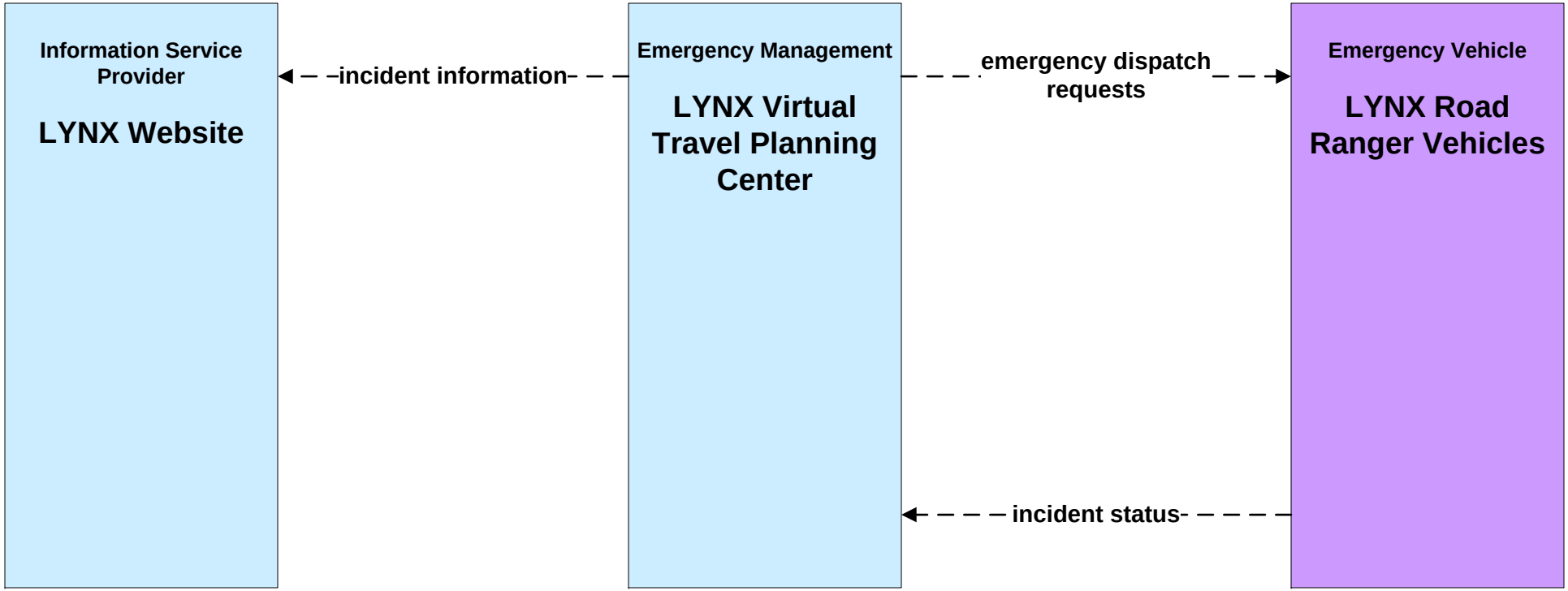
ATMS17 - Regional Parking Management
Parking Facility Operators

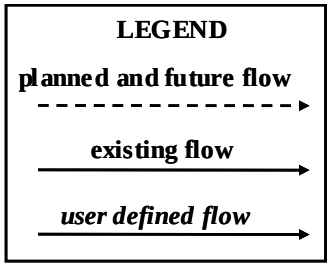


EM04 - Roadway Service Patrols
FDOT District 5 Road Ranger Service Patrol

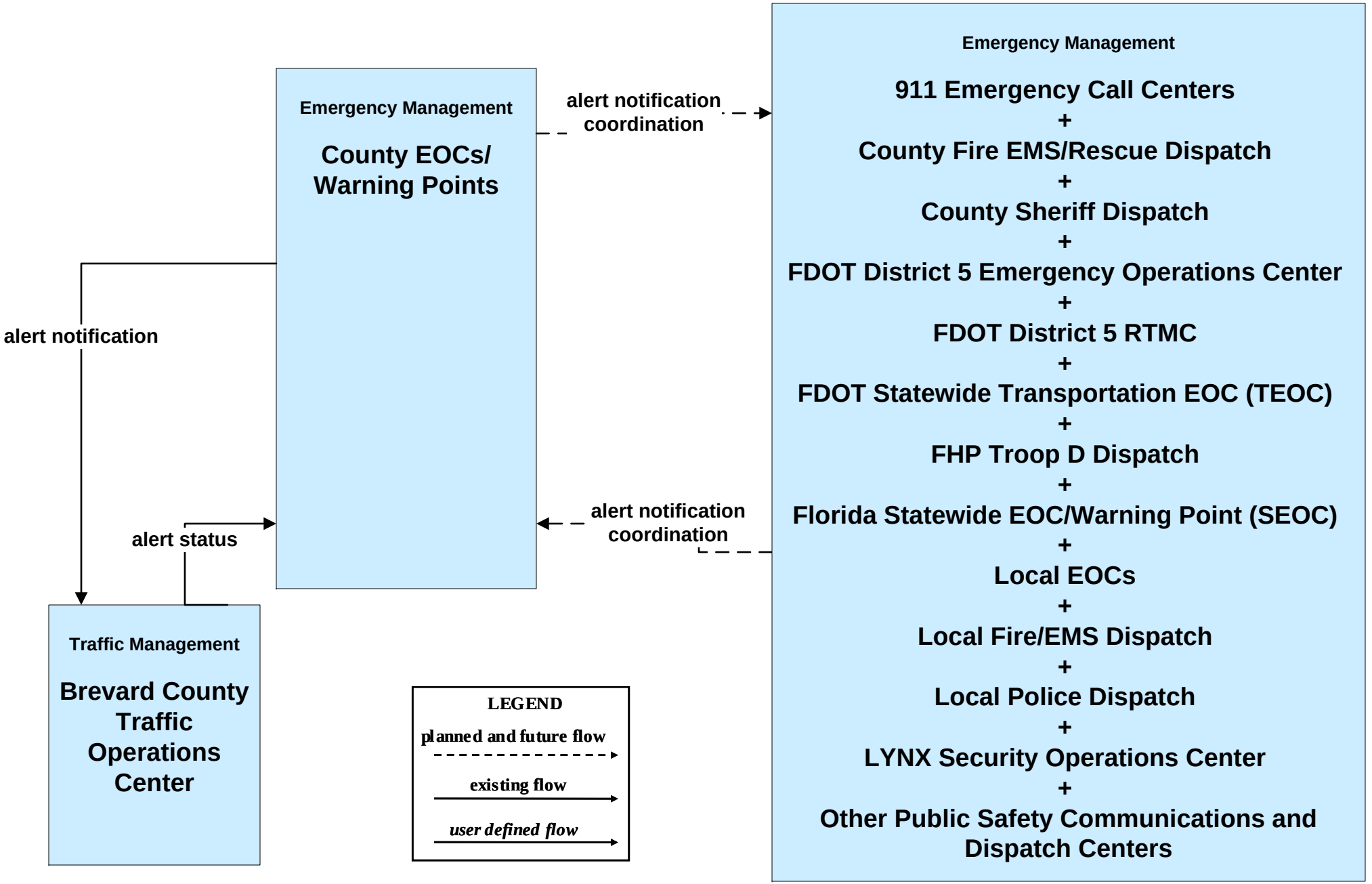


EM04 - Roadway Service Patrols
LYNX Road Rangers

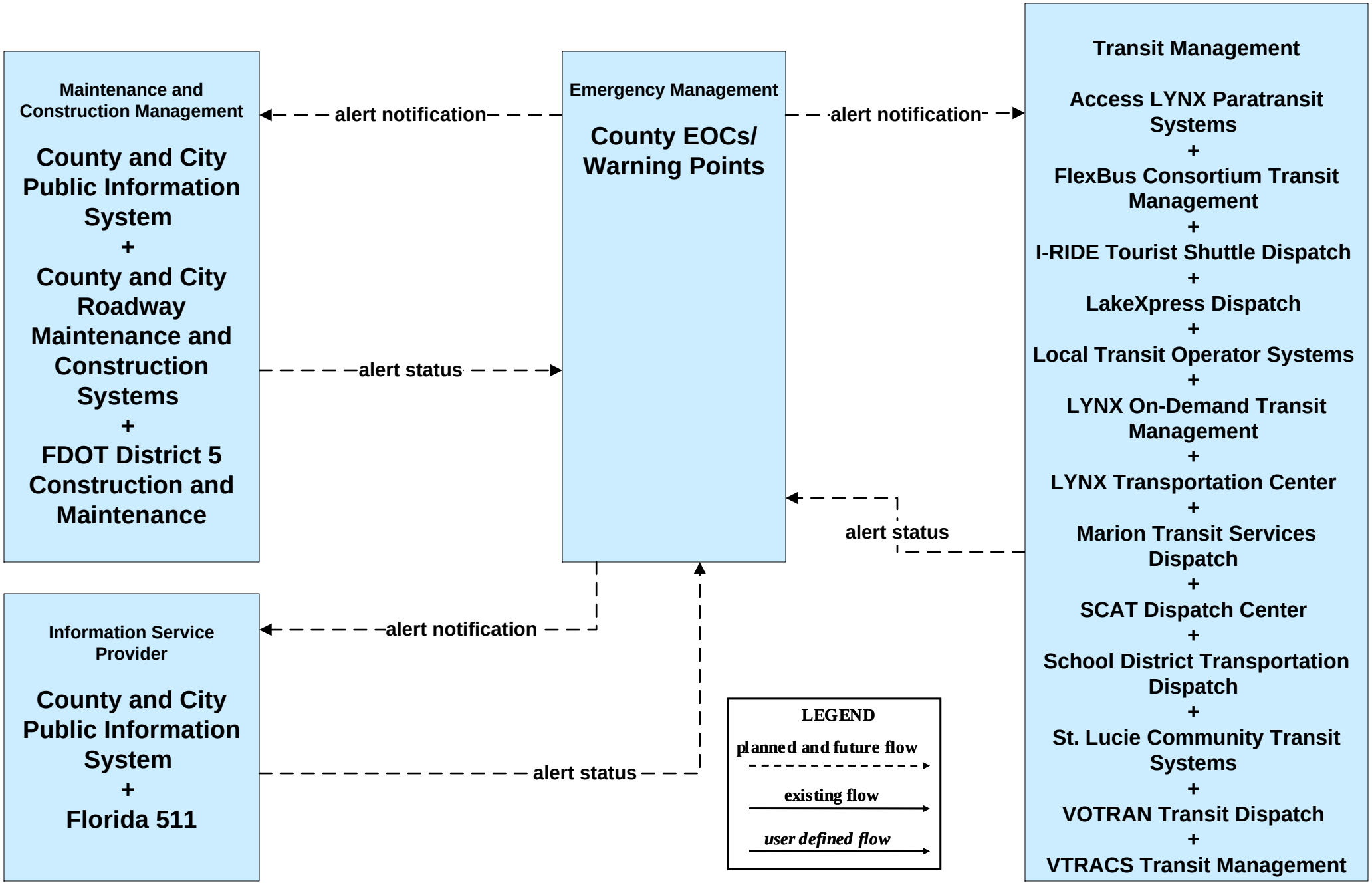




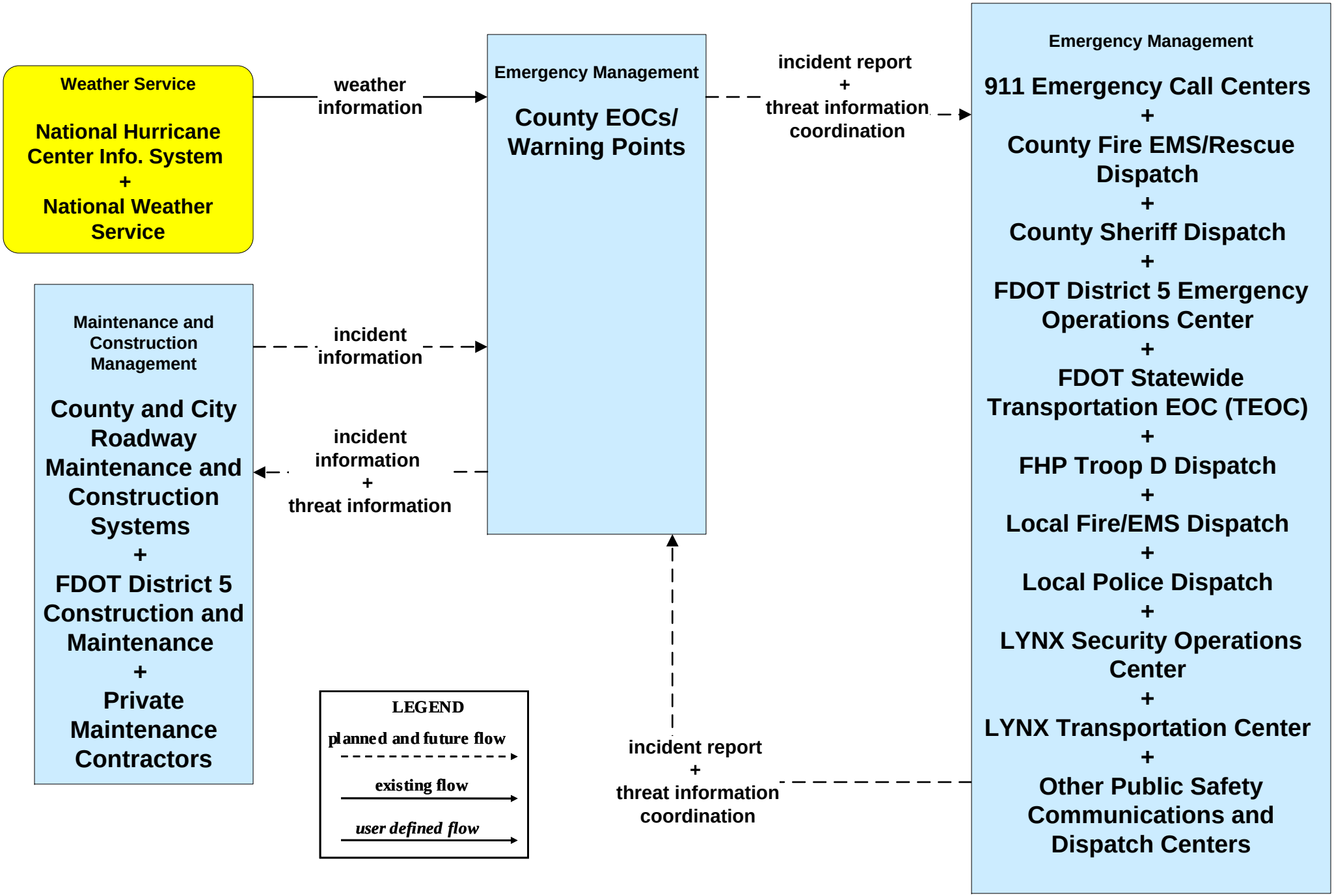
EM06 - Wide Area Alert
County EOCs (2 of 3)



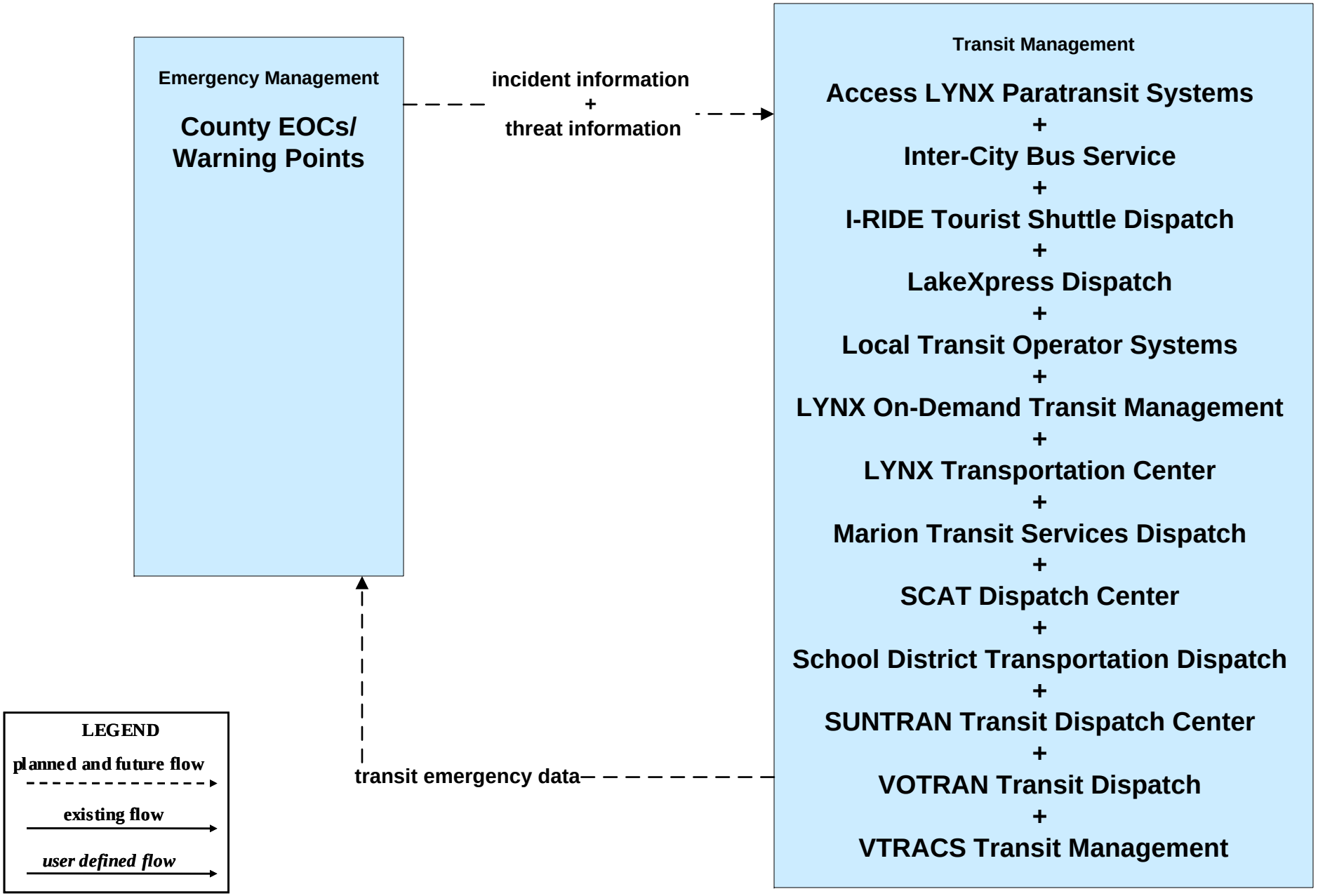
EM06 - Wide Area Alert
County EOCs (3 of 3)



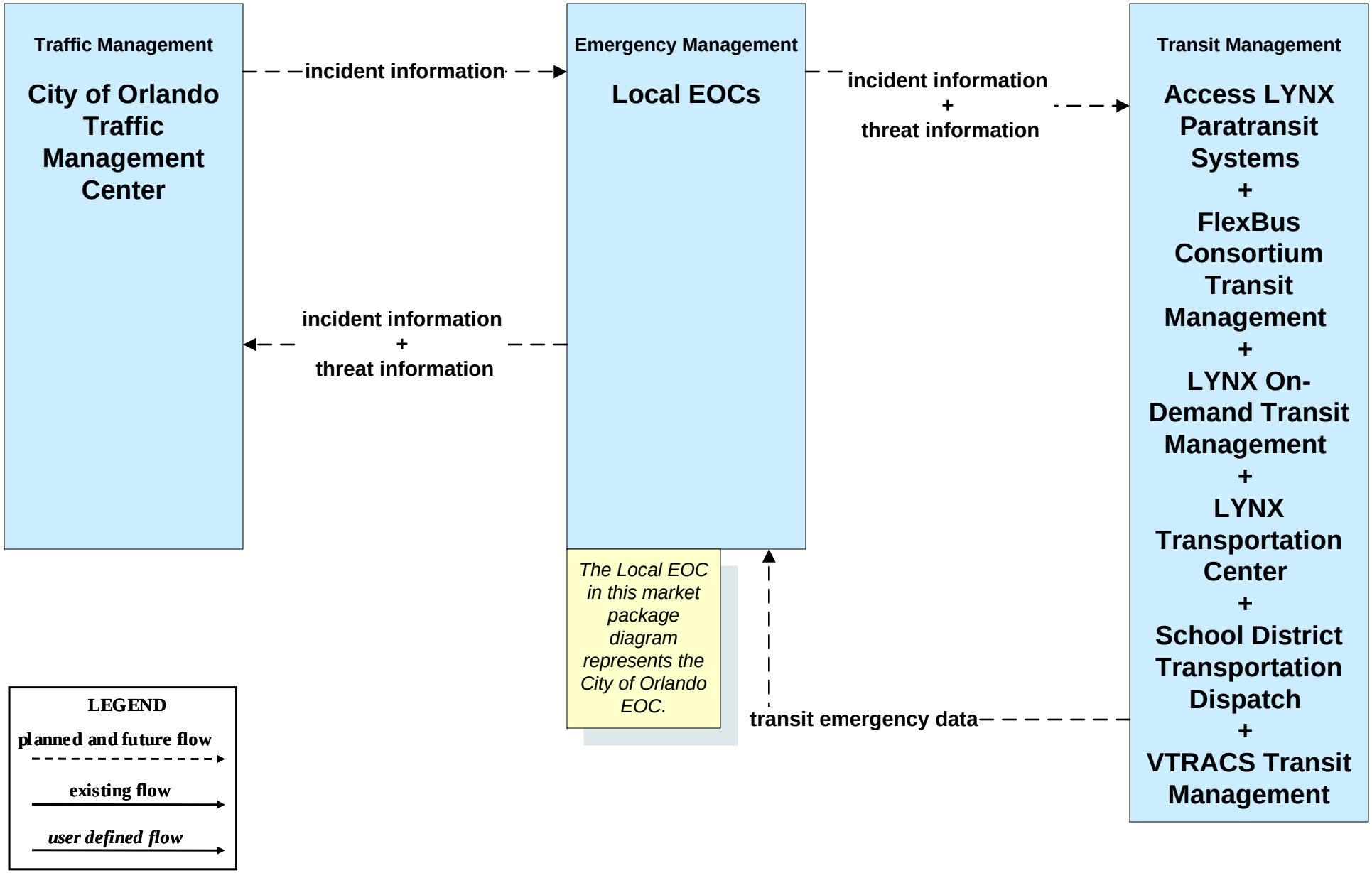
EM07 - Early Warning System
County EOCs (1 of 3)



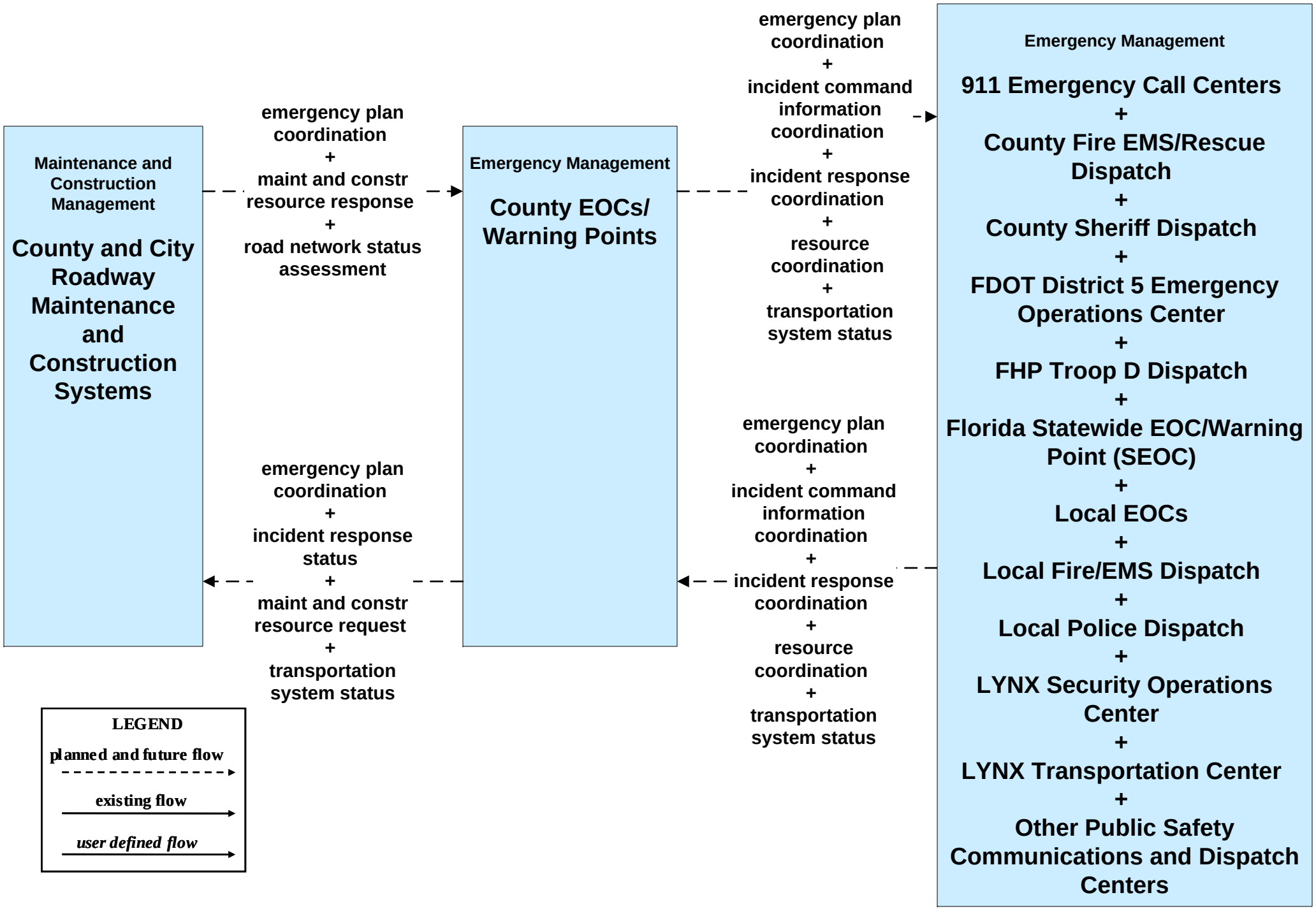
EM07 - Early Warning System
County EOCs (3 of 3)



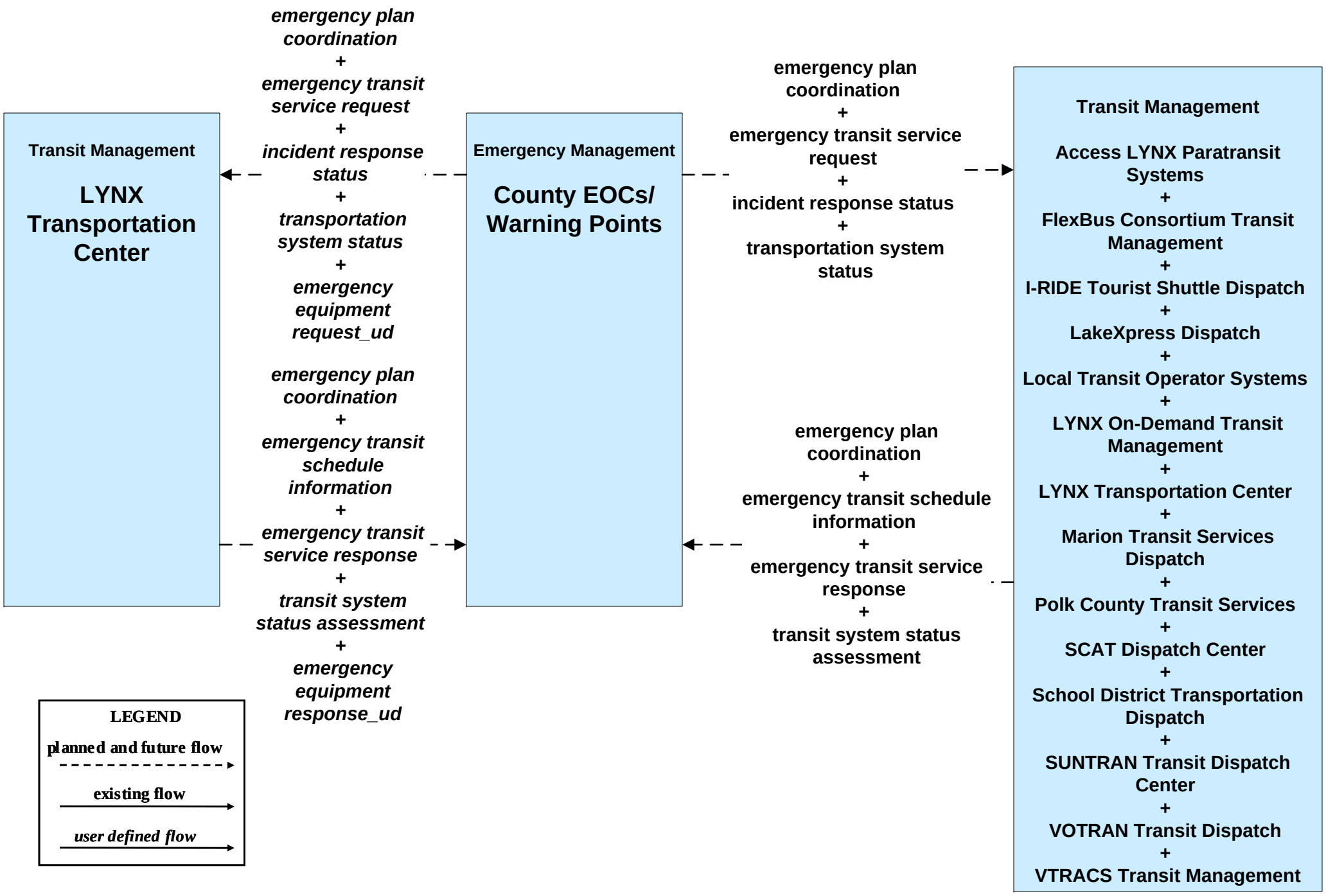
EM07 - Early Warning System
Local EOCs (2 of 2)



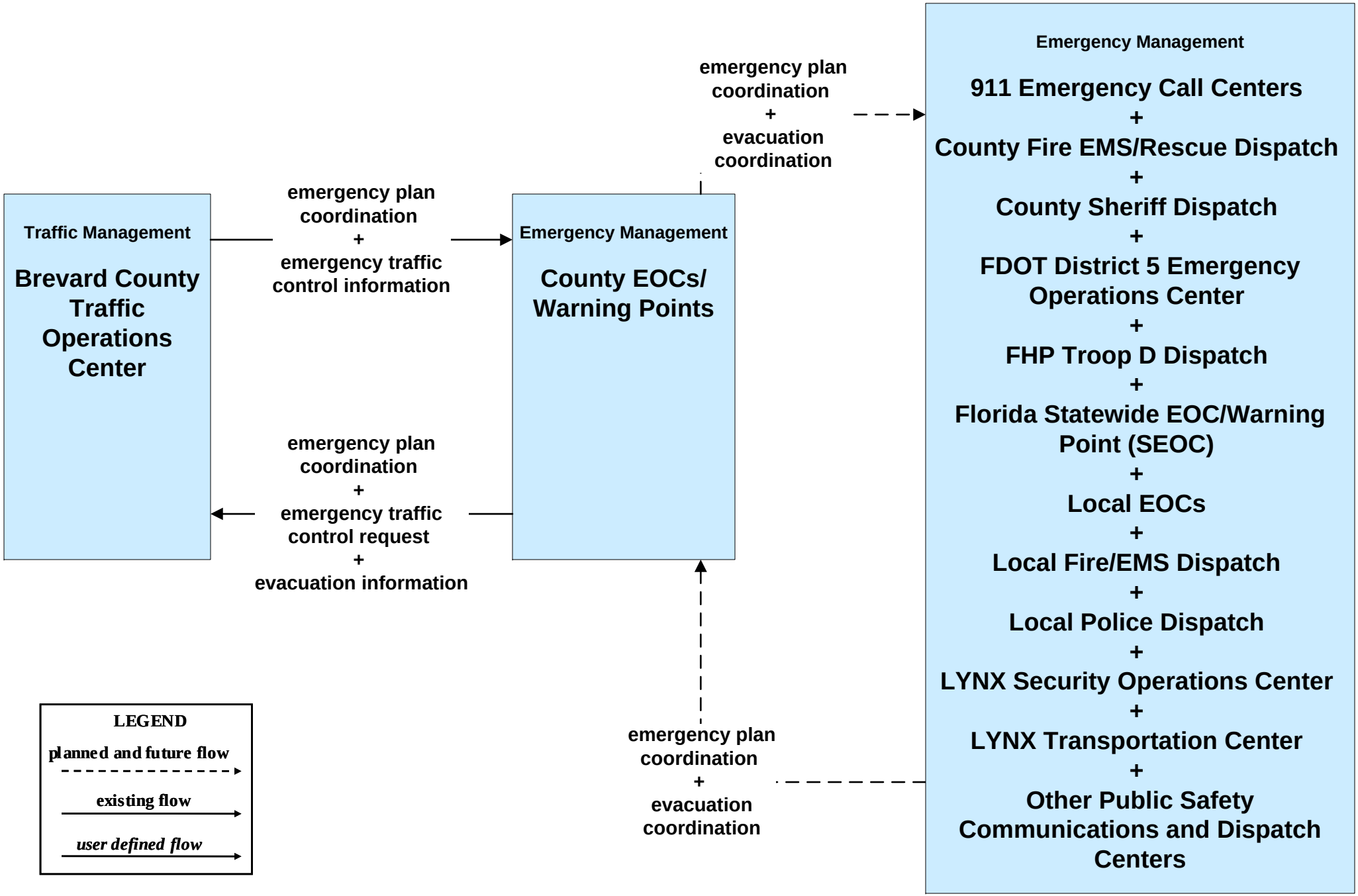
EM08 - Disaster Response and Recovery
County EOCs (1 of 4)



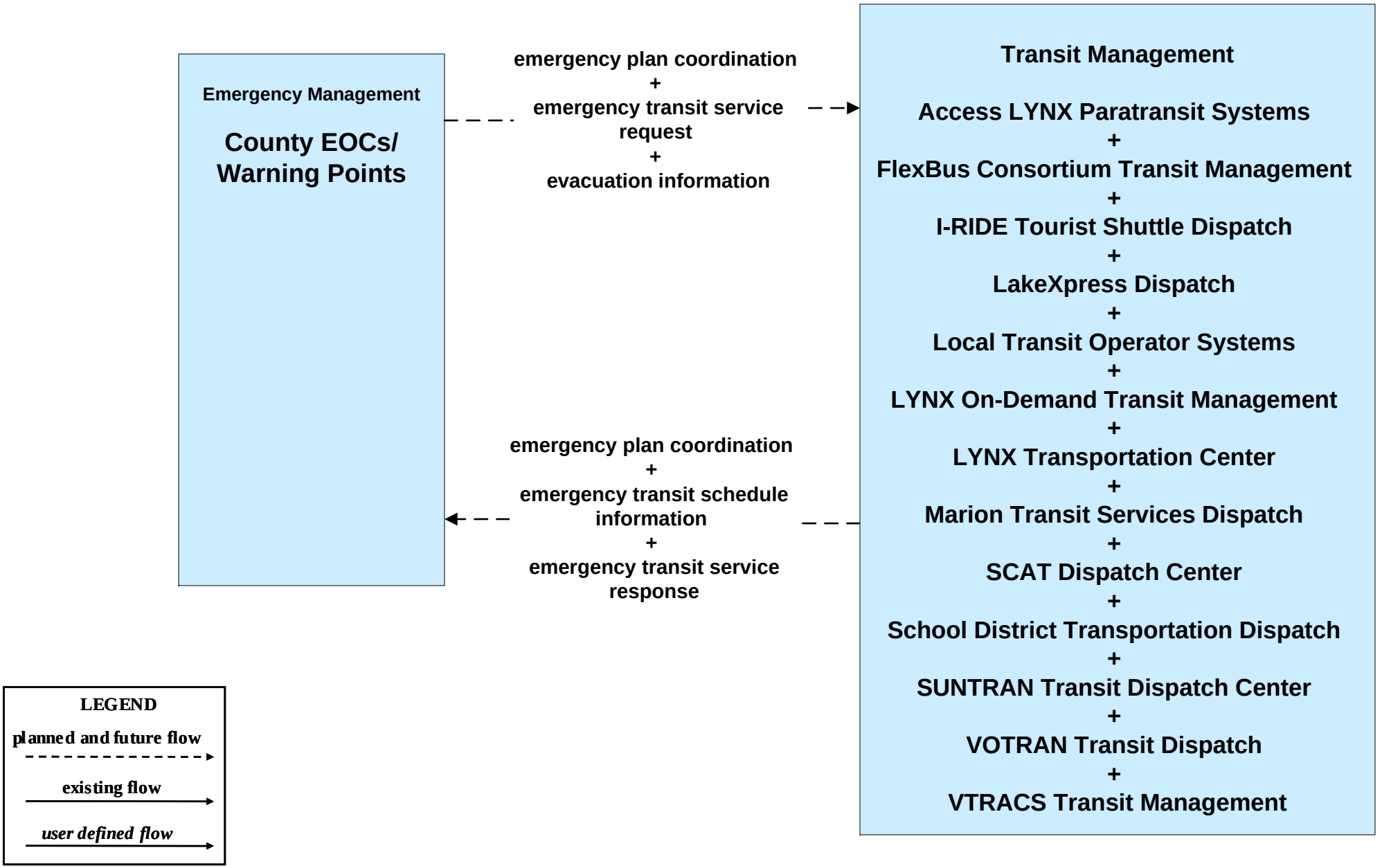
EM08 - Disaster Response and Recovery
County EOCs (4 of 4)



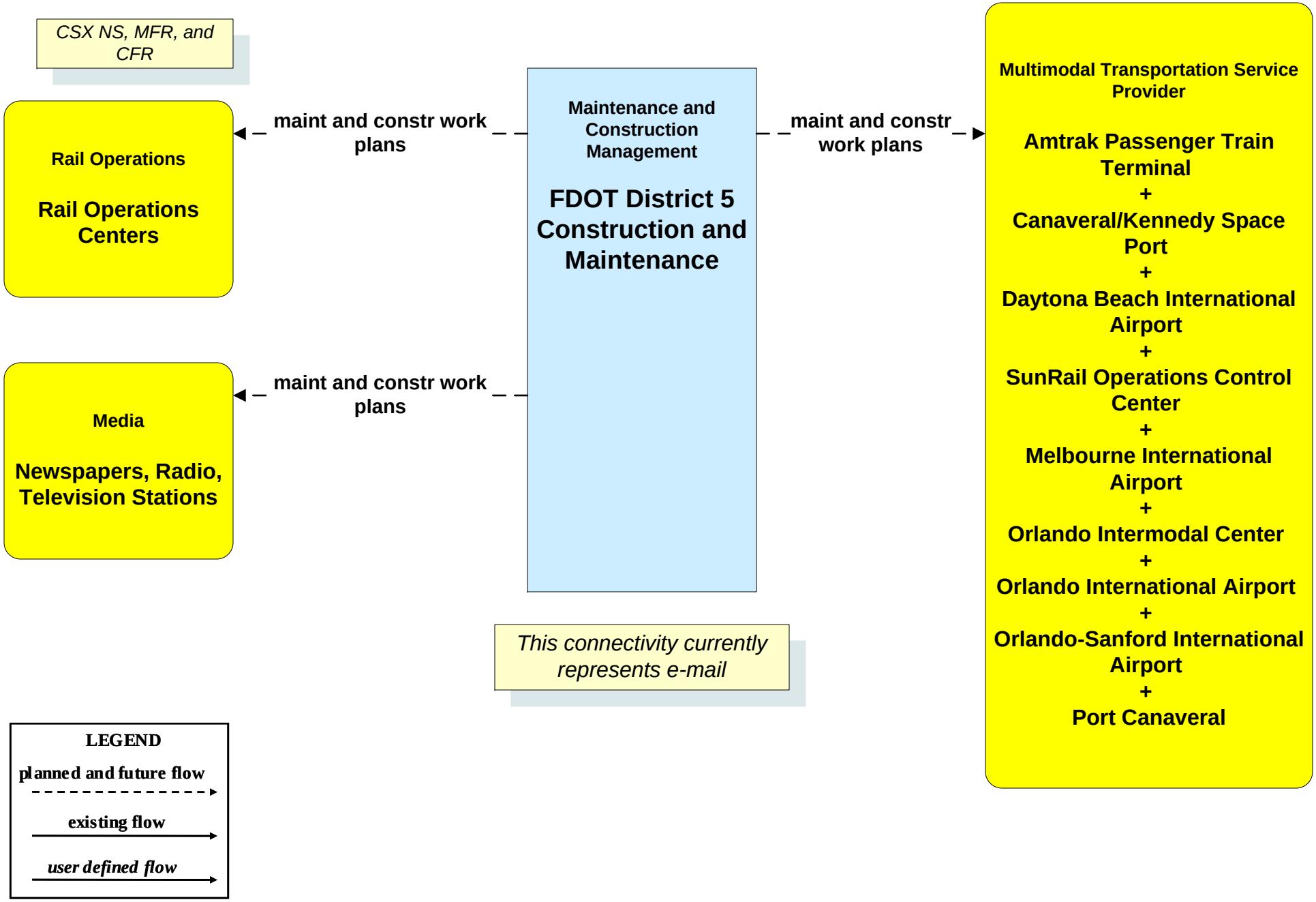
EM09 - Evacuation and Reentry Management
County EOCs (1 of 3)



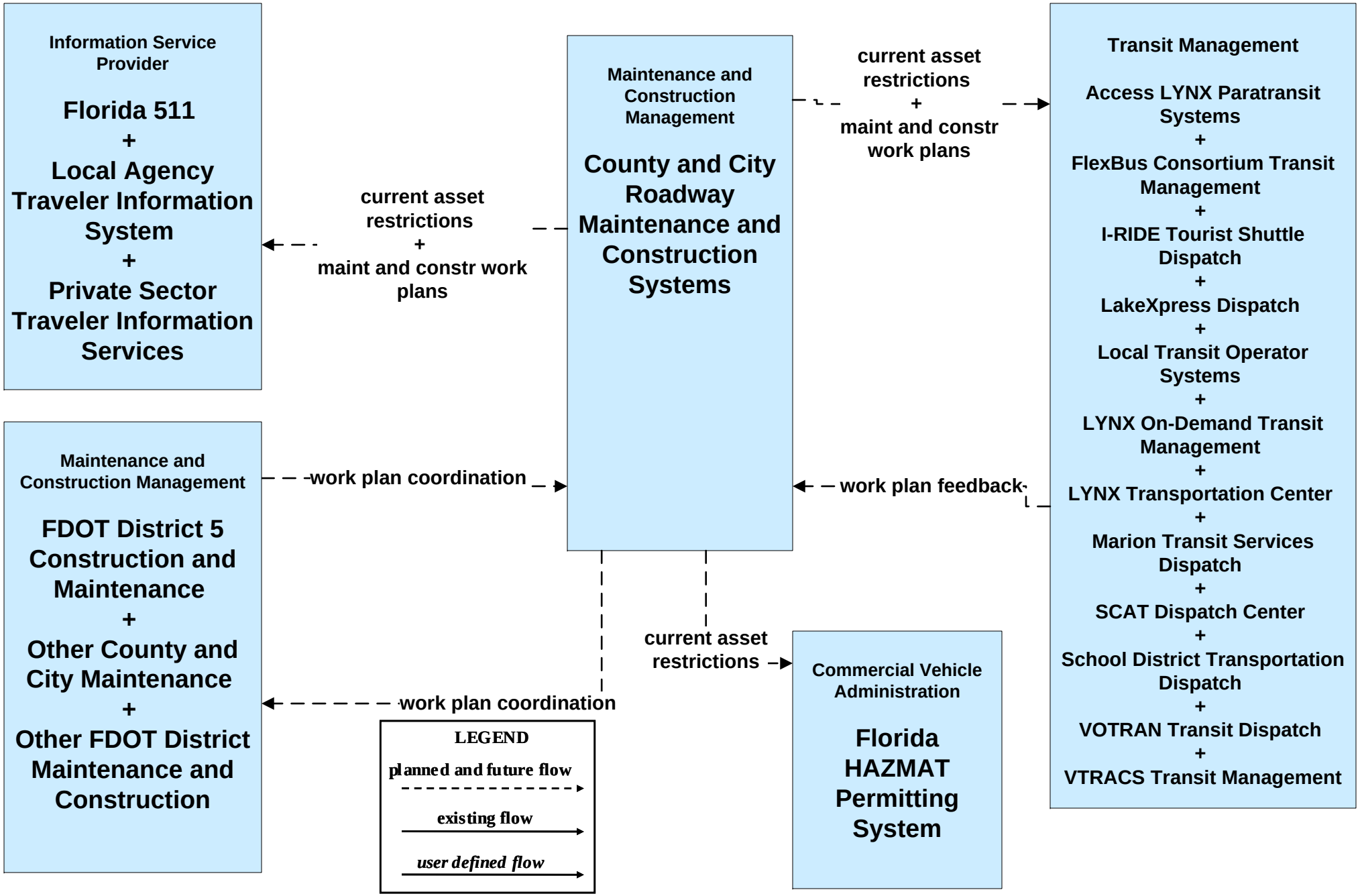
EM09 - Evacuation and Reentry Management
County EOCs (3 of 3)



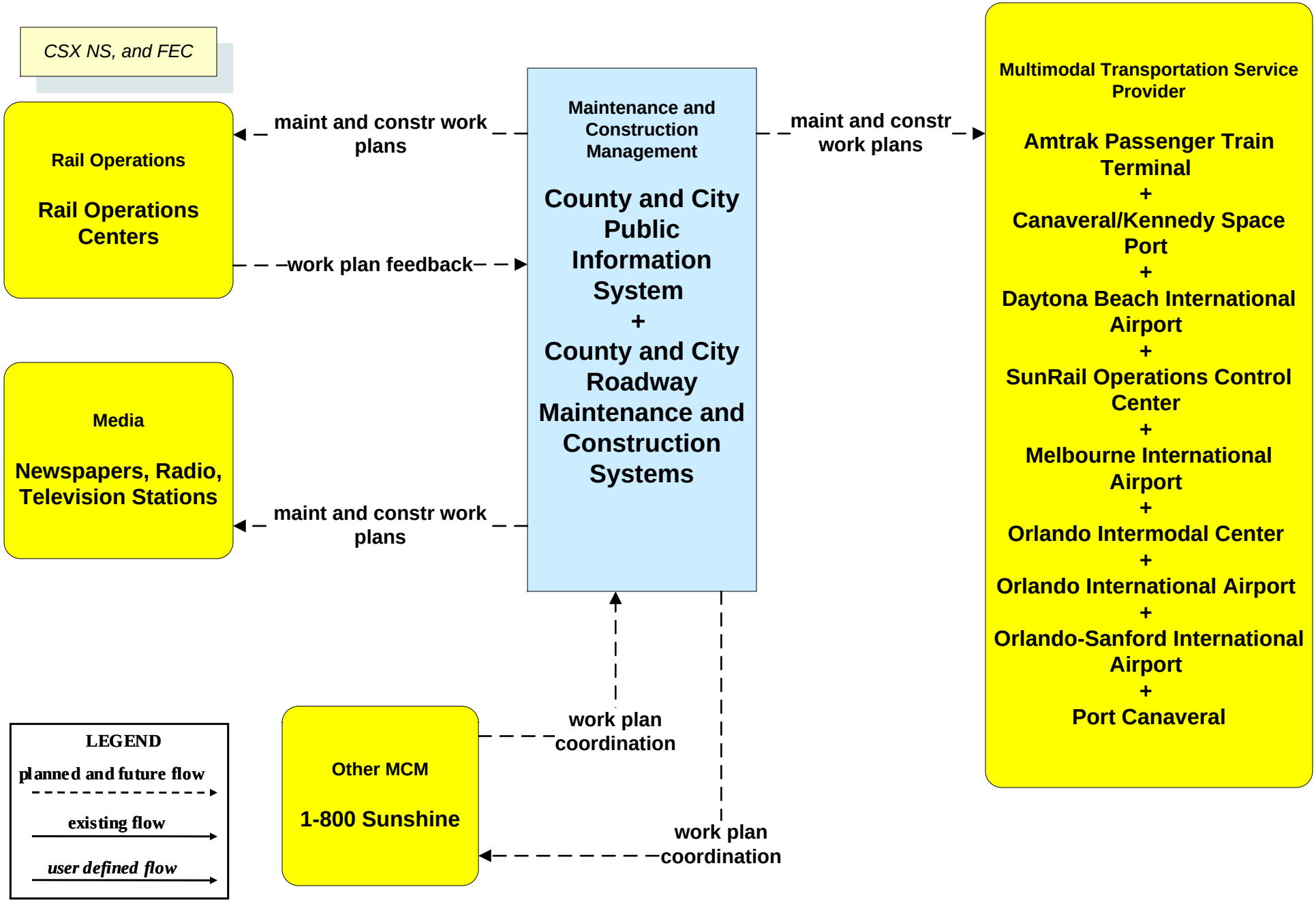
MC10 - Maintenance and Construction Activity Coordination
FDOT District 5 (4 of 4)



MC10 - Maintenance and Construction Activity Coordination
Counties and Cities (1 of 4)



MC10 - Maintenance and Construction Activity Coordination
Counties and Cities (4 of 4)



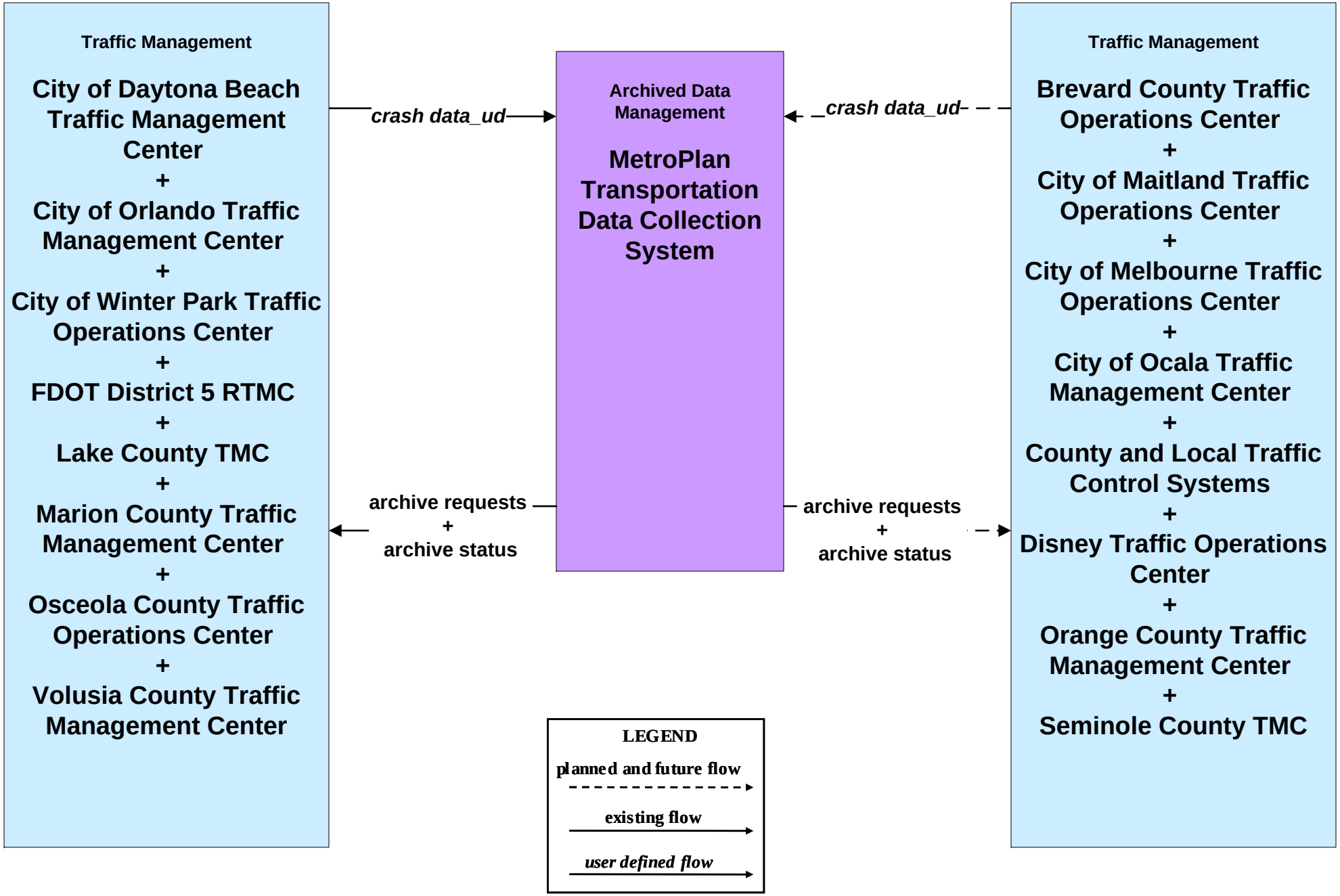
FDOT District 5

Central Florida Regional ITS Architecture

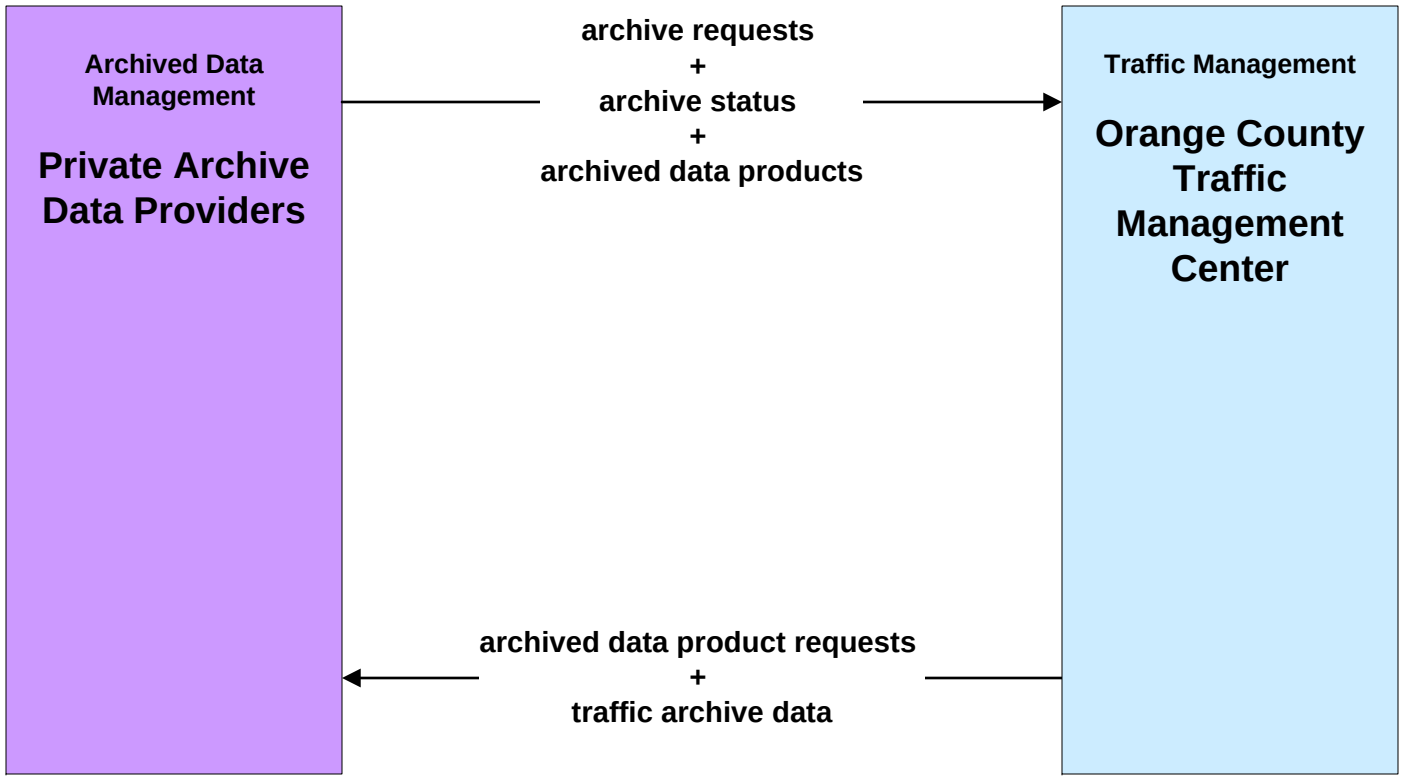
Customized Service Package Diagrams

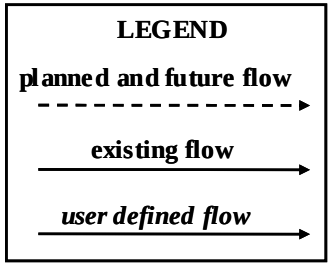
Orange County

AD1 - ITS Data Mart
MetroPlan Transportation Data Collection System (1 of 2)

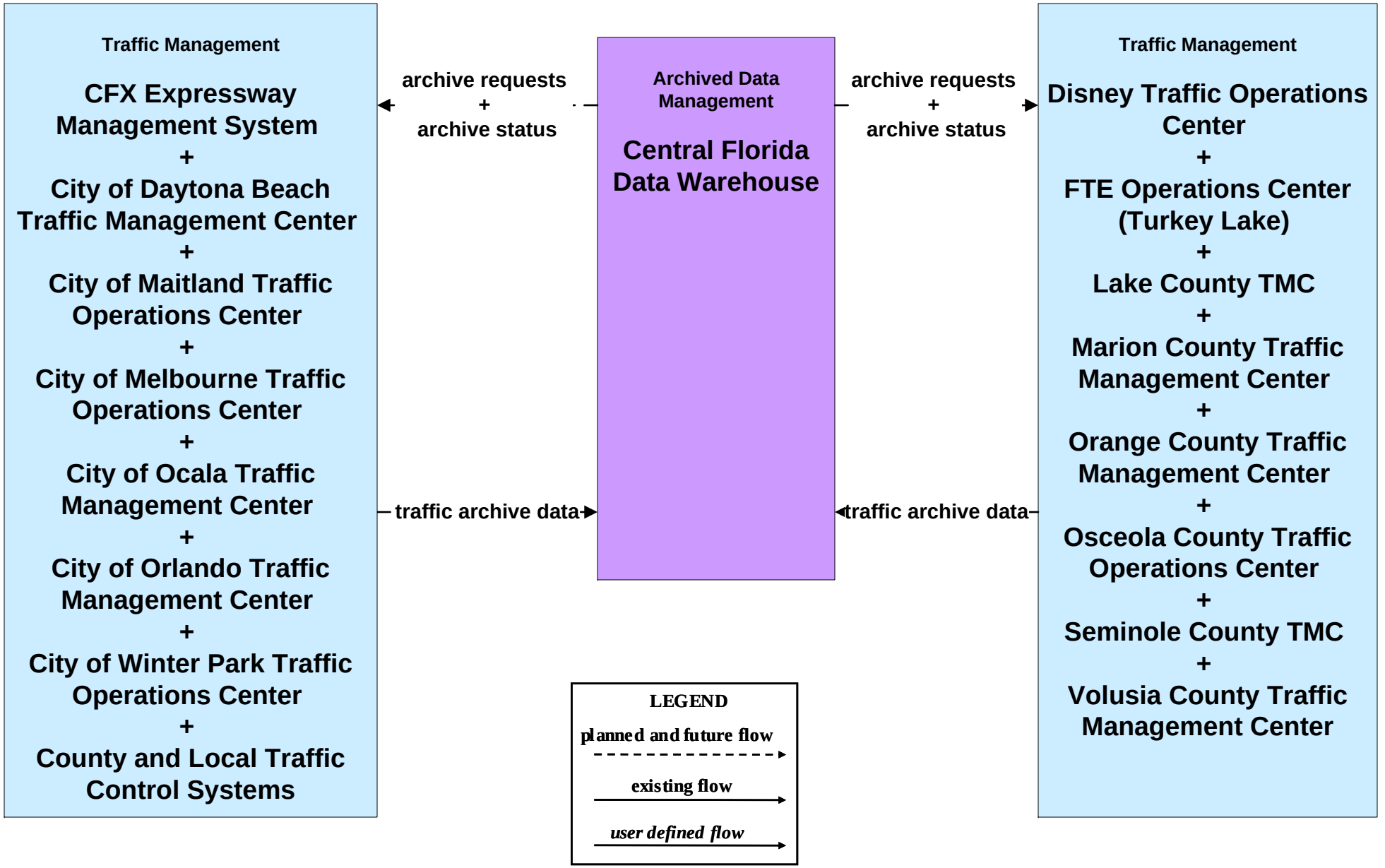


AD1 - ITS Data Mart
Orange County Travel Time

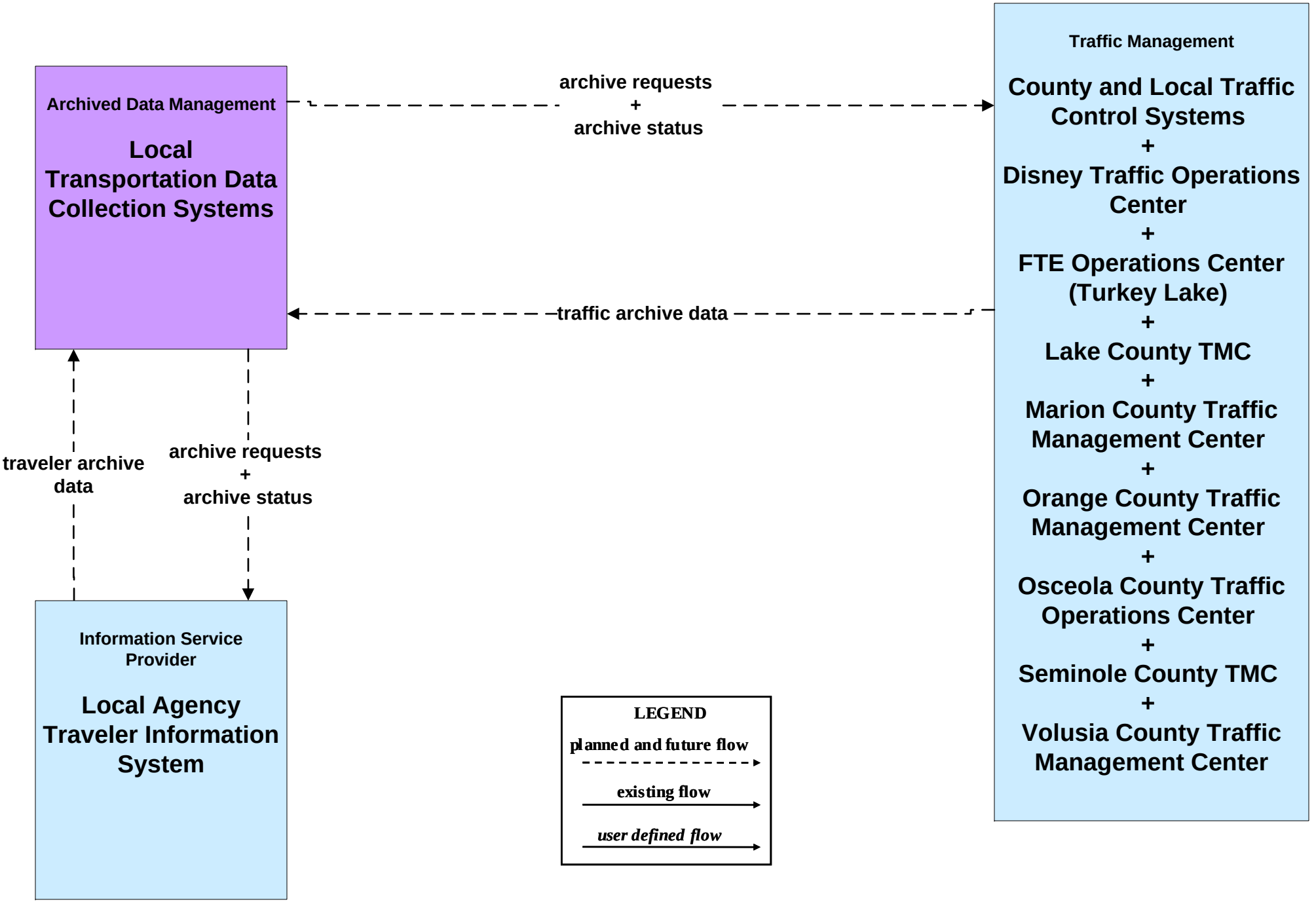




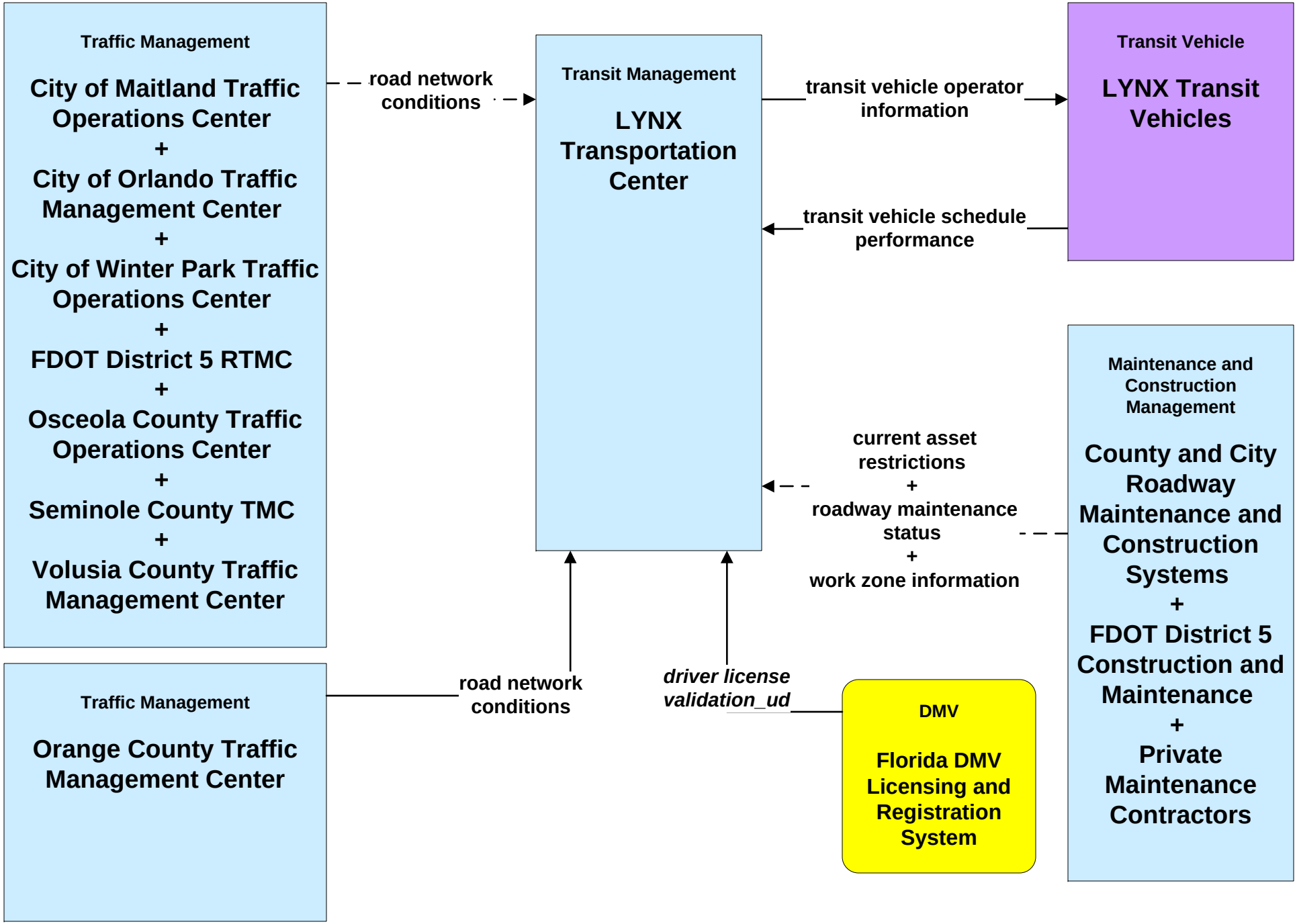
AD2 - ITS Data Warehouse
Central Florida Data Warehouse (1 of 2)



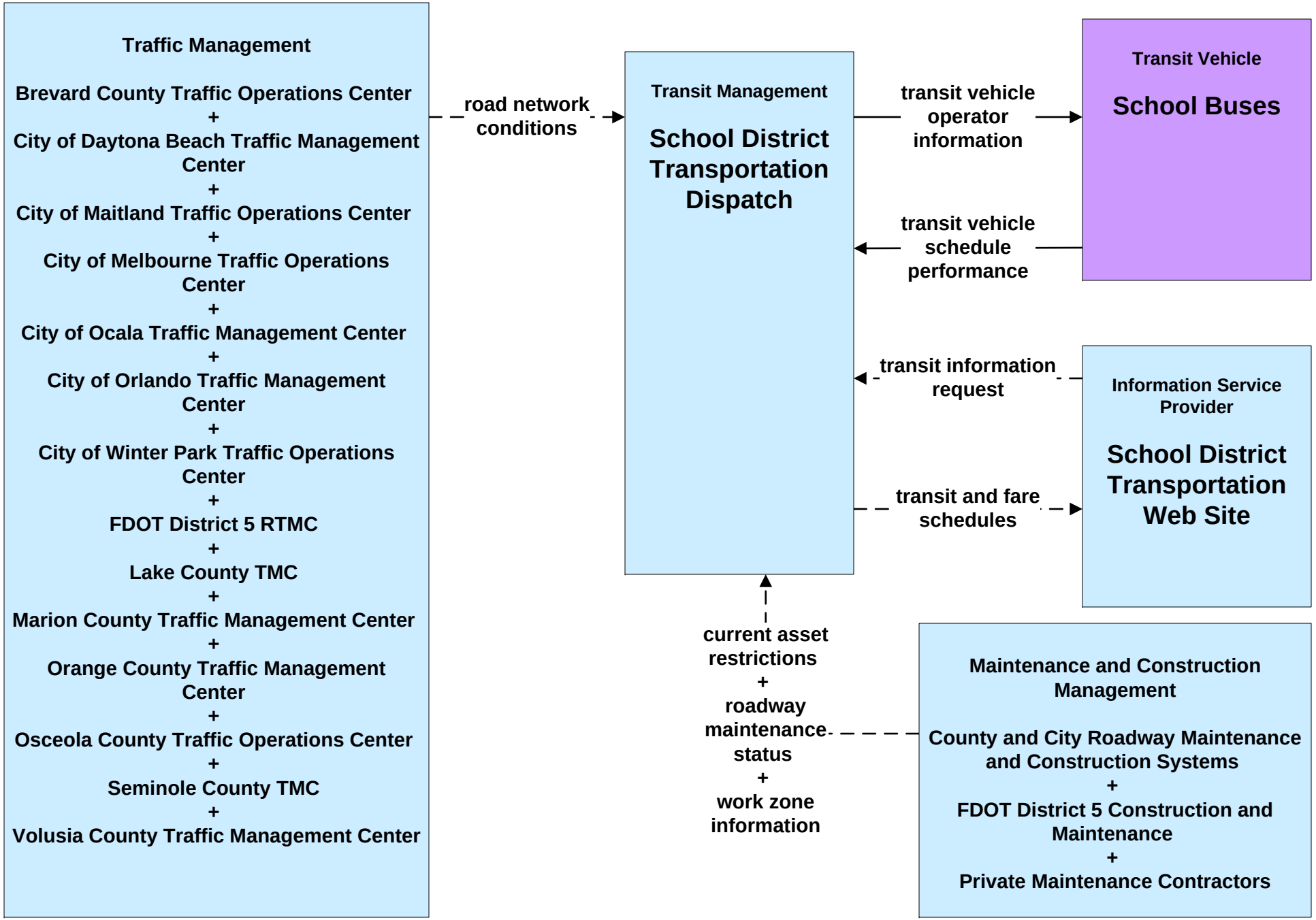
AD2 - ITS Data Warehouse
Local Archives (1 of 2)



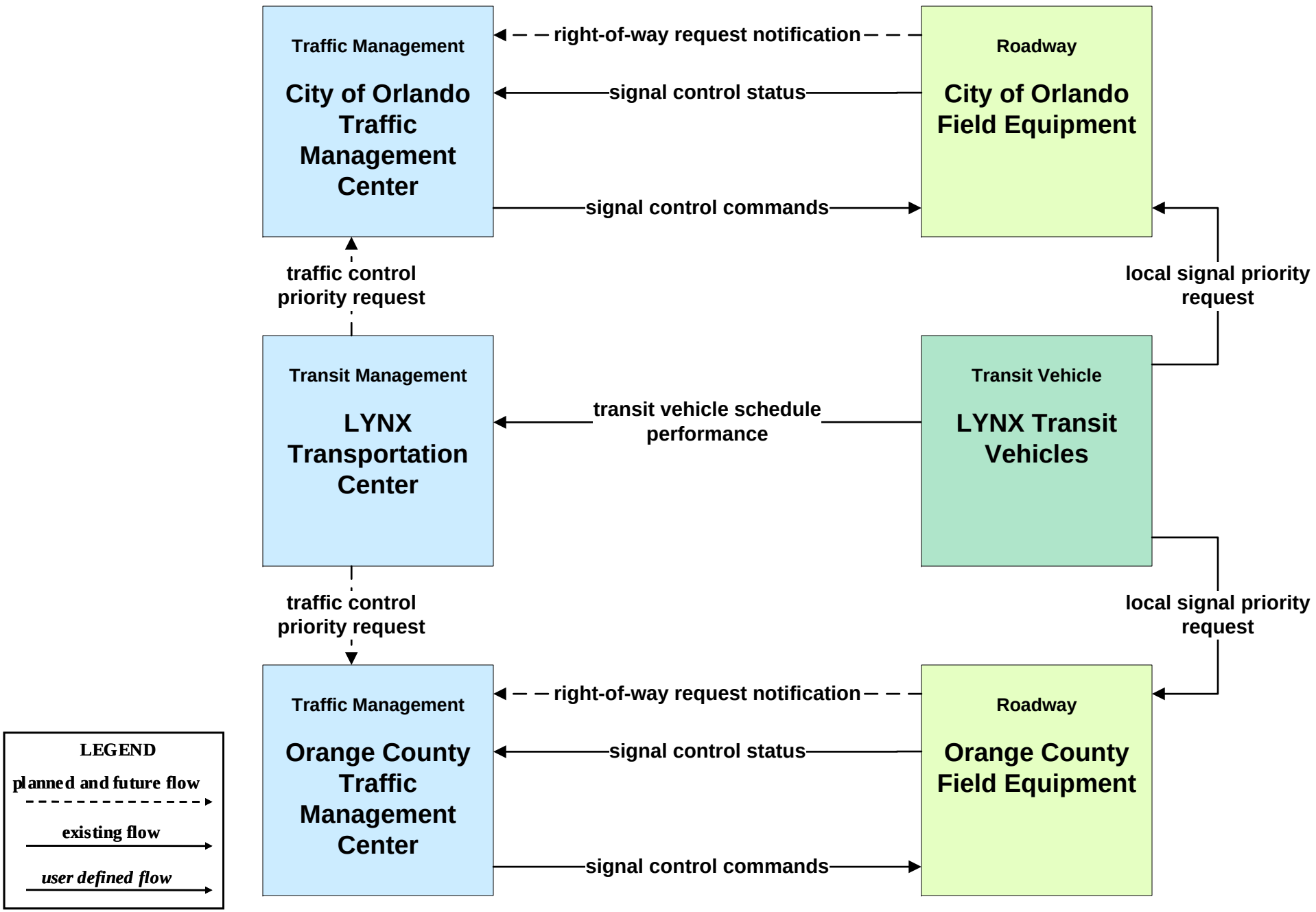
APTS02 - Transit Fixed-Route Operations
LYNX Operations Center



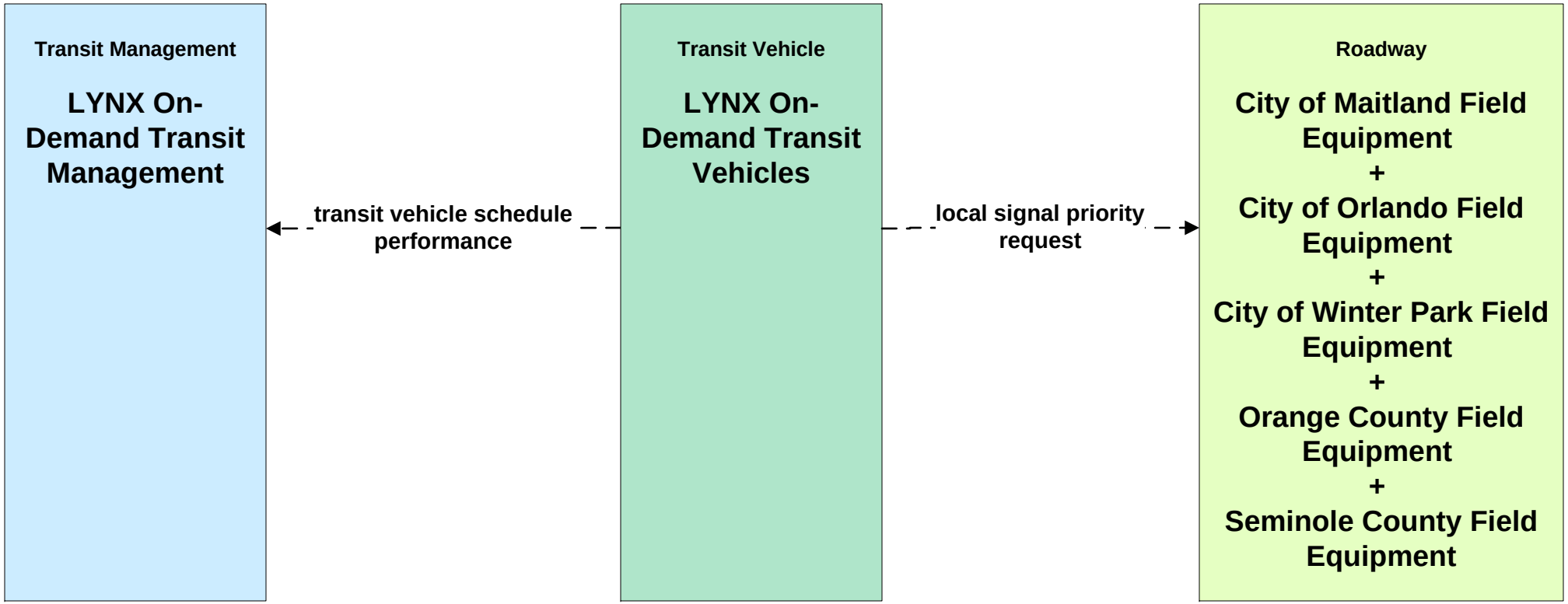
APTS02 - Transit Fixed-Route Operations
School District Transportation Dispatch

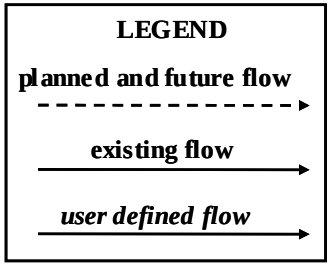


APTS09 - Transit Signal Priority
LYNX (2 of 5)

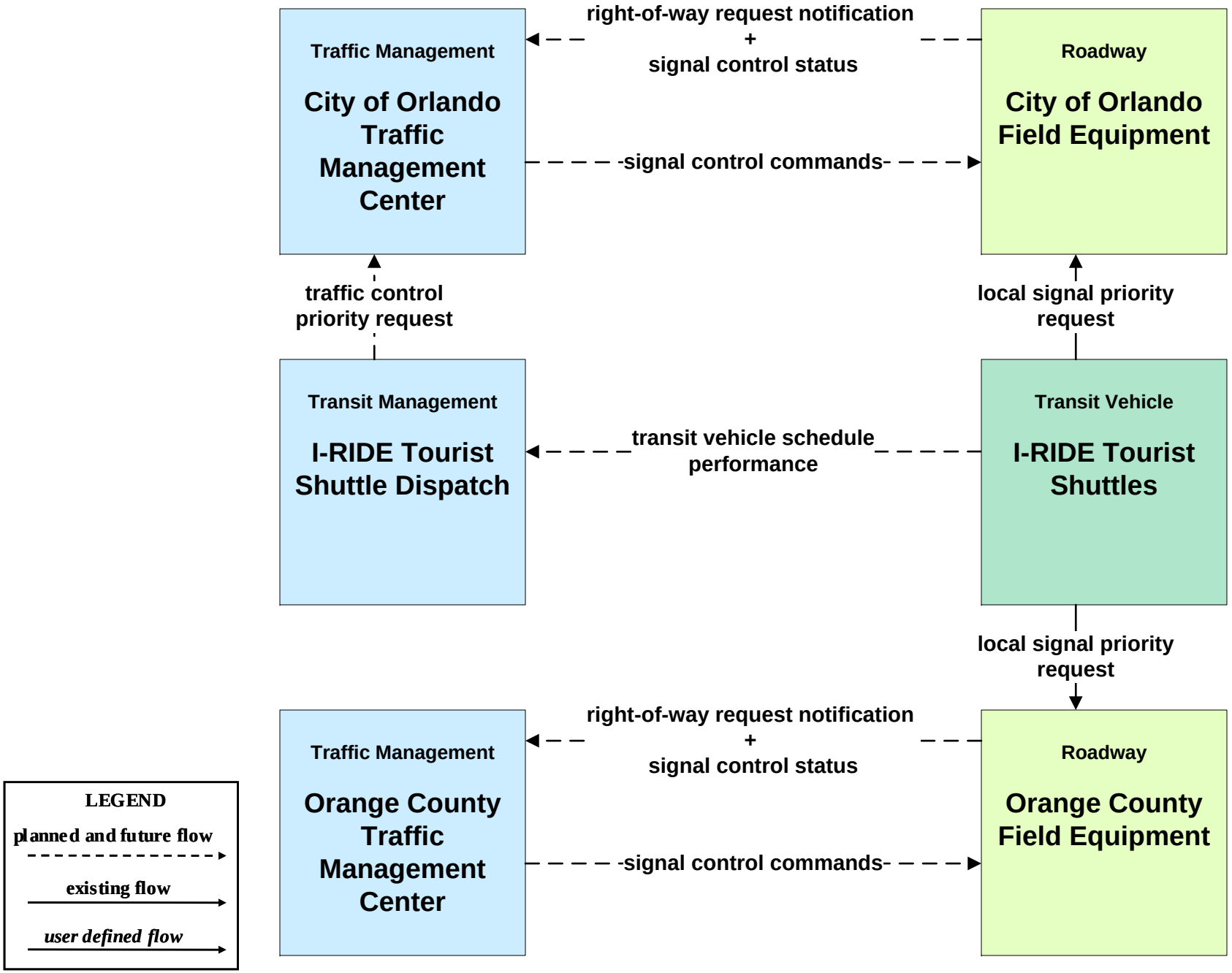


APTS09 - Local Signal Priority
LYNX On-Demand Transit

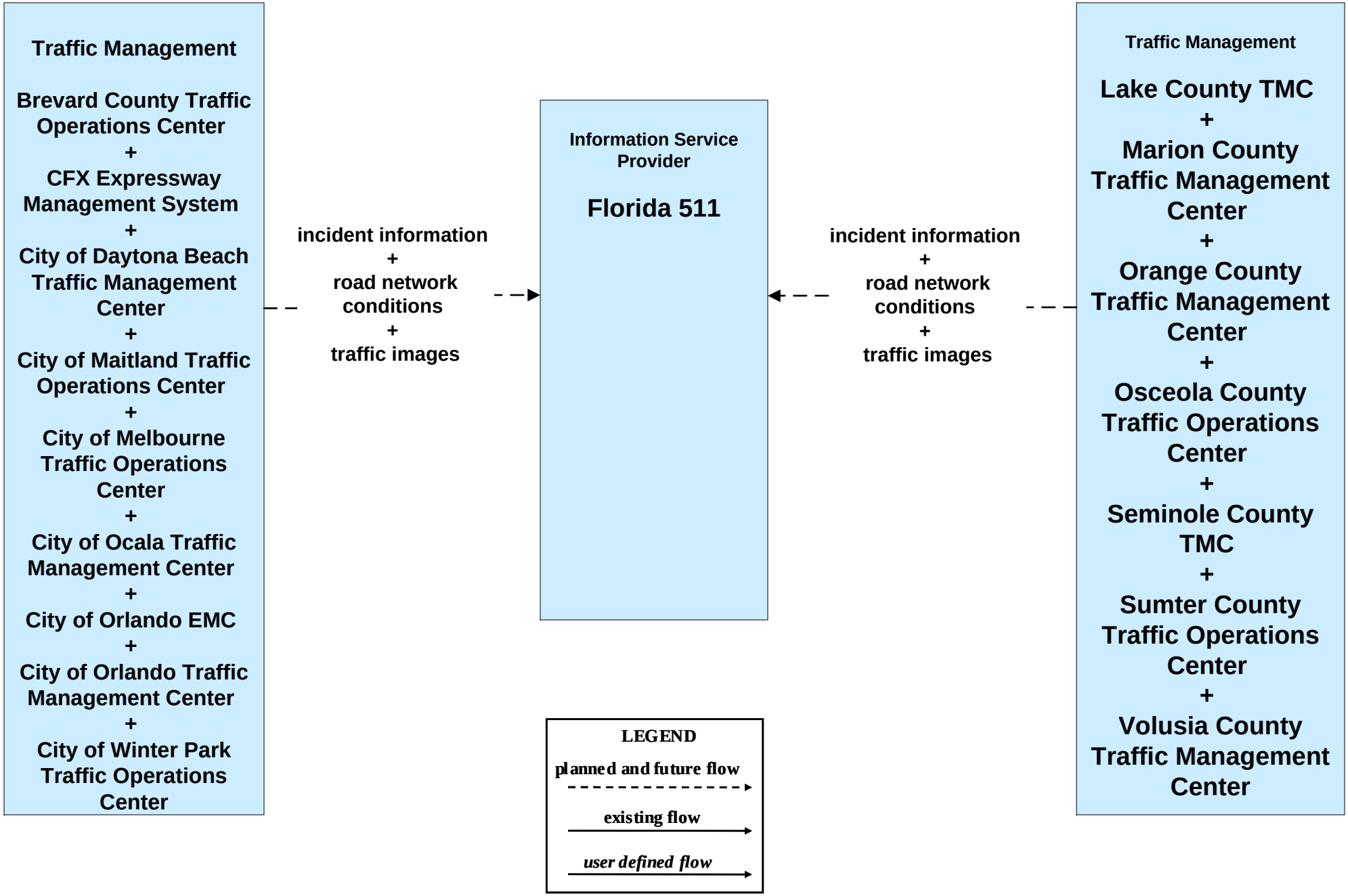




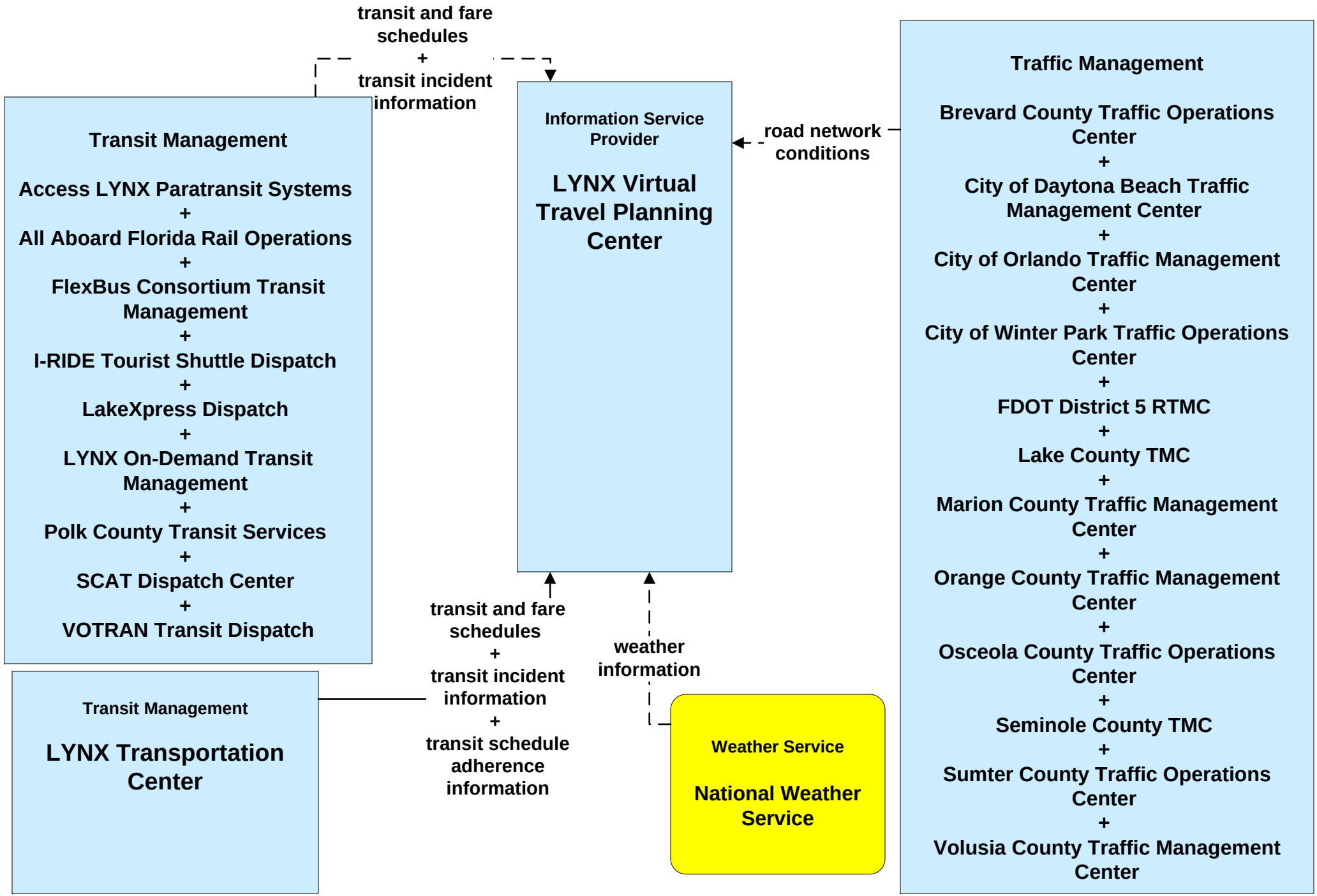
APTS09 - Transit Signal Priority
I-RIDE



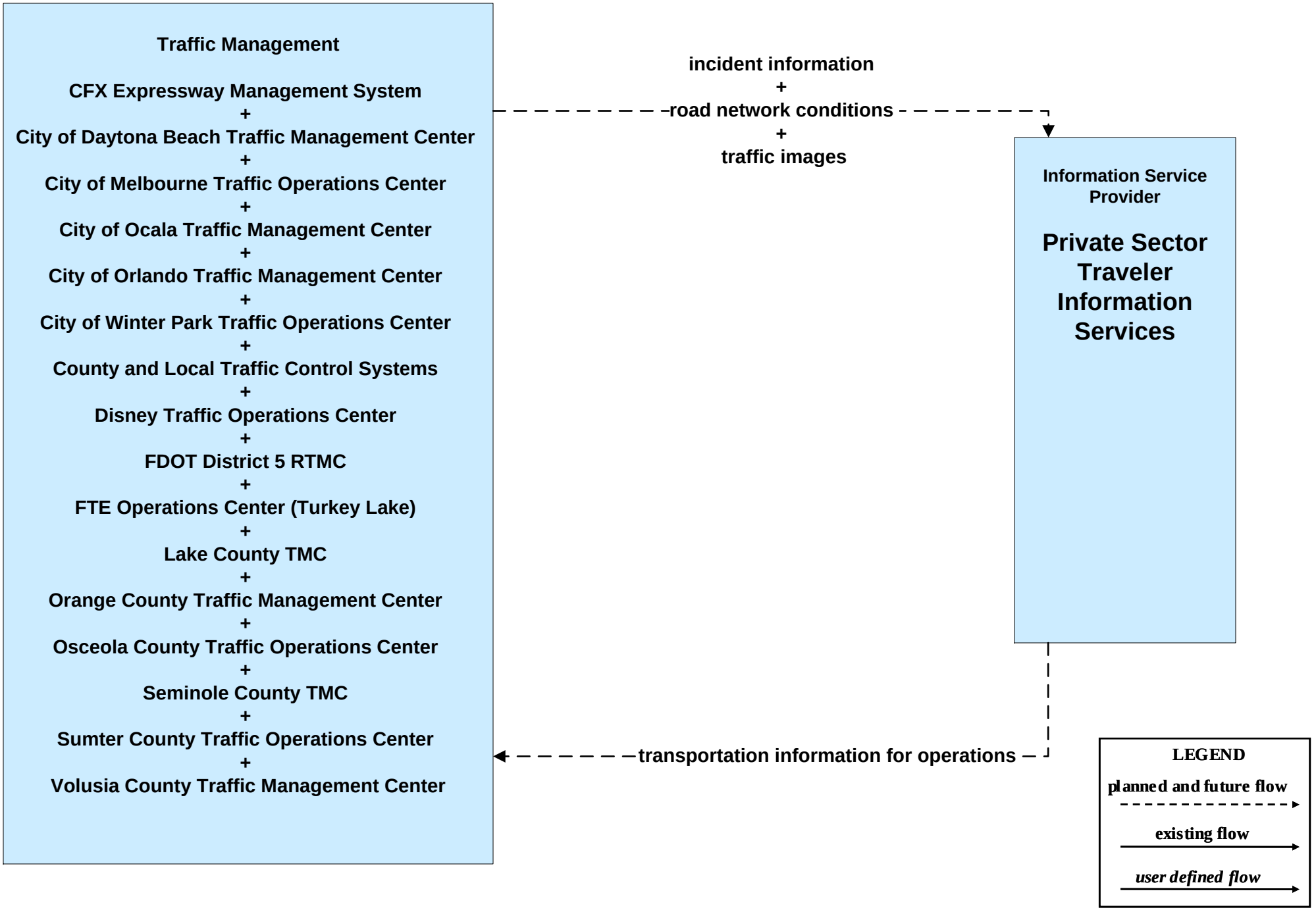
ATIS01 - Broadcast Traveler Information
Florida 511 / Private ISPs (3 of 3)



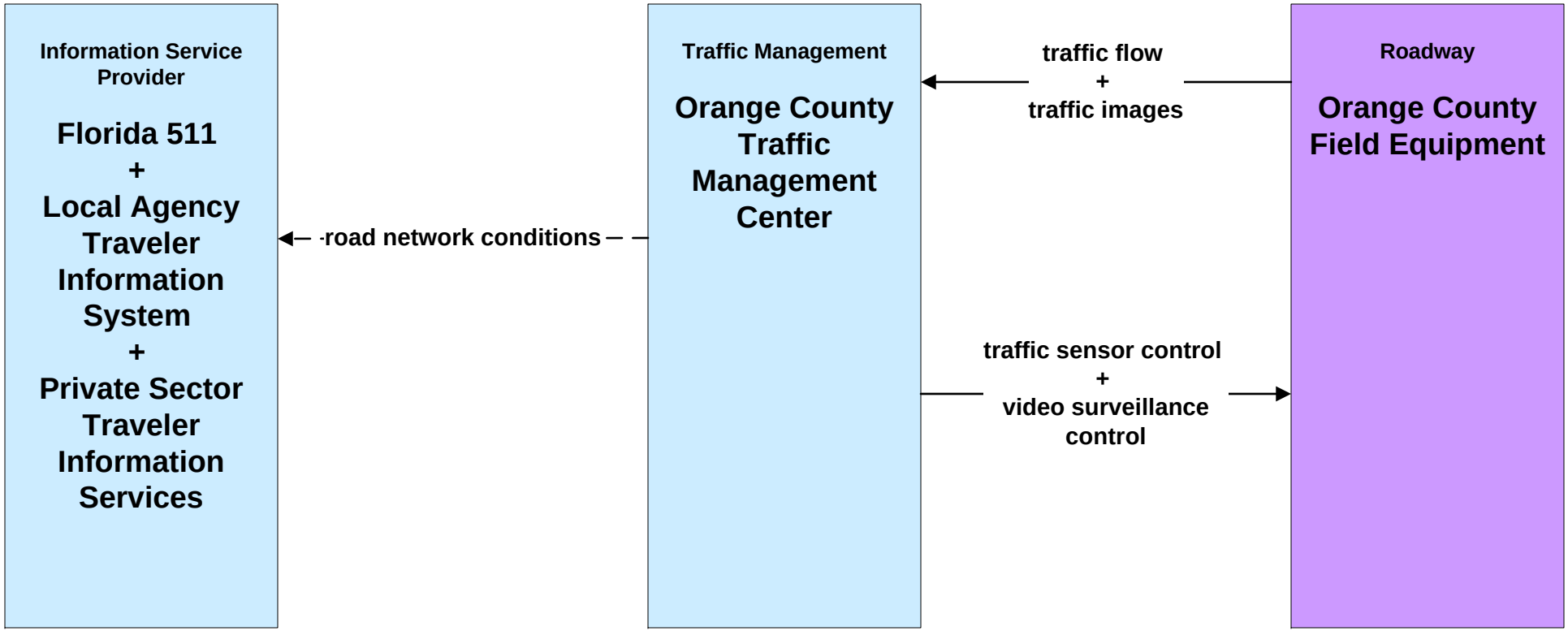
ATIS02 - Interactive Traveler Information
Virtual Travel Planning Center (1 of 2)

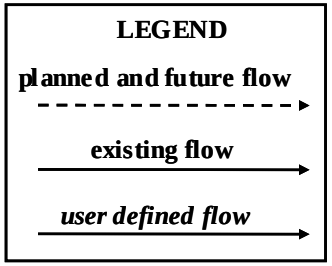


ATIS06 - Transportation Operations Data Sharing
Private Sector ISPs (2 of 2)

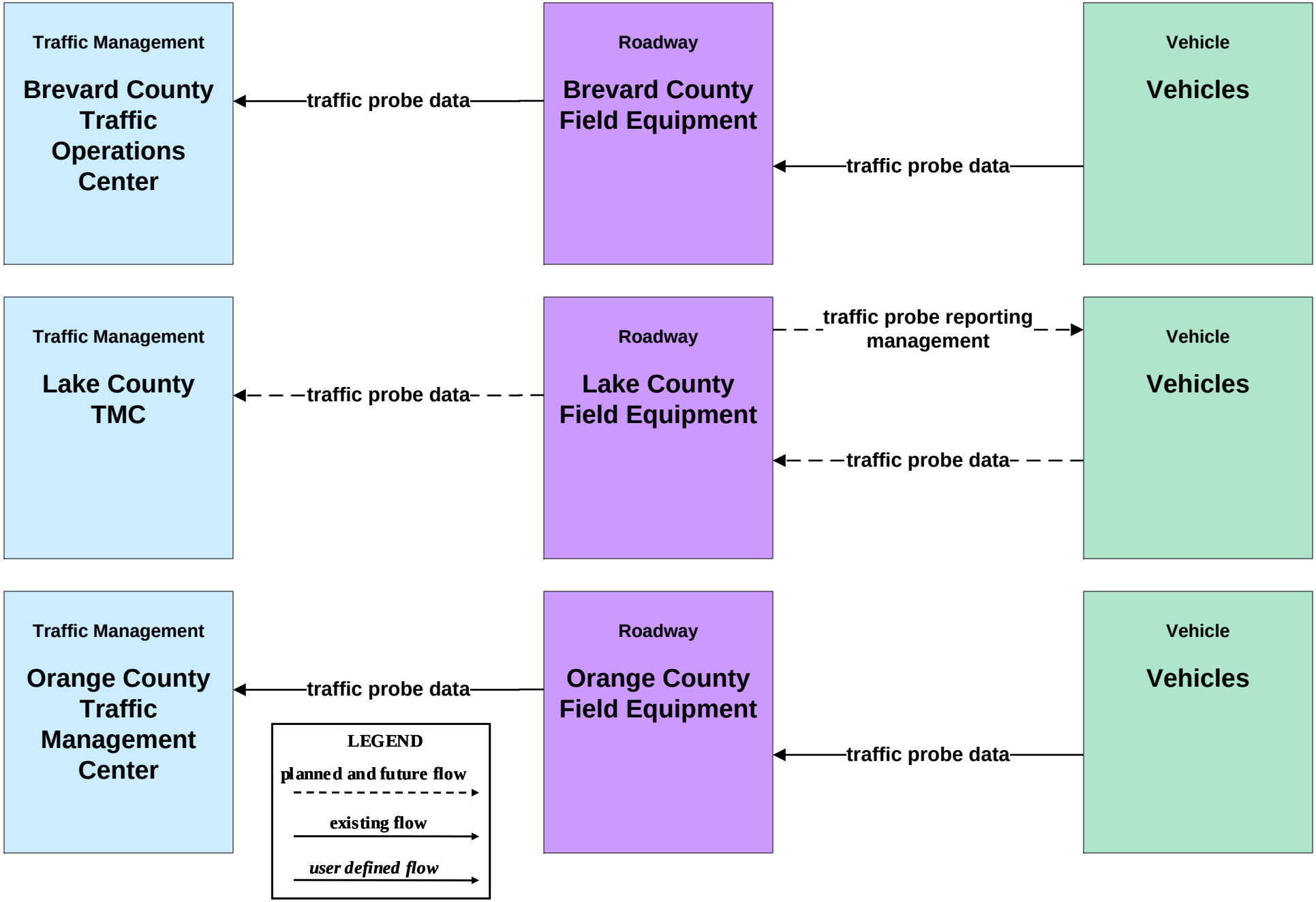


ATMS01 - Network Surveillance
Orange County

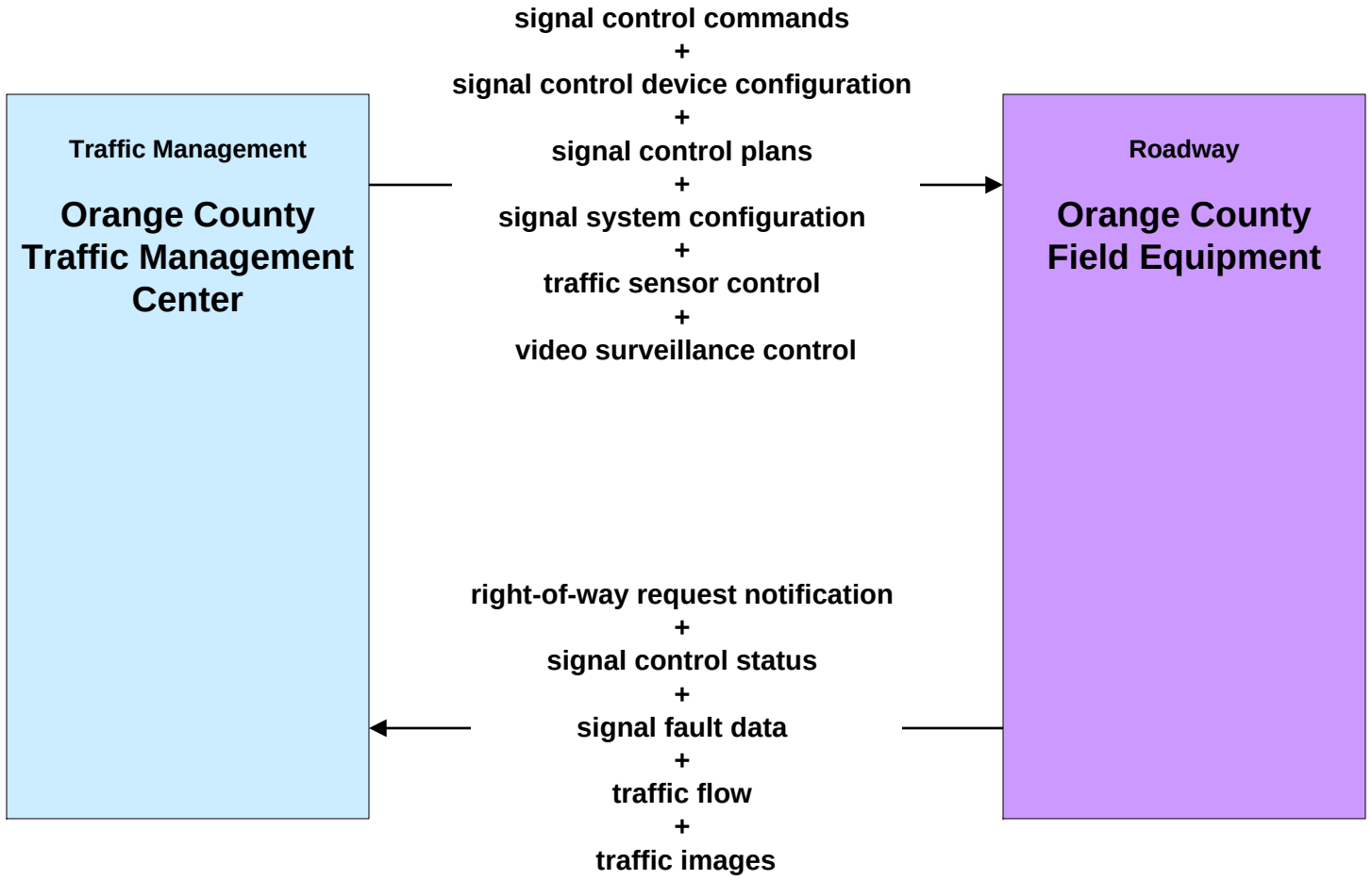


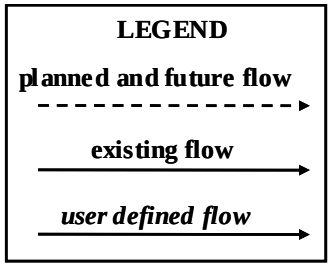


ATMS02 - Traffic Probe Surveillance
Brevard County / Lake County / Orange County

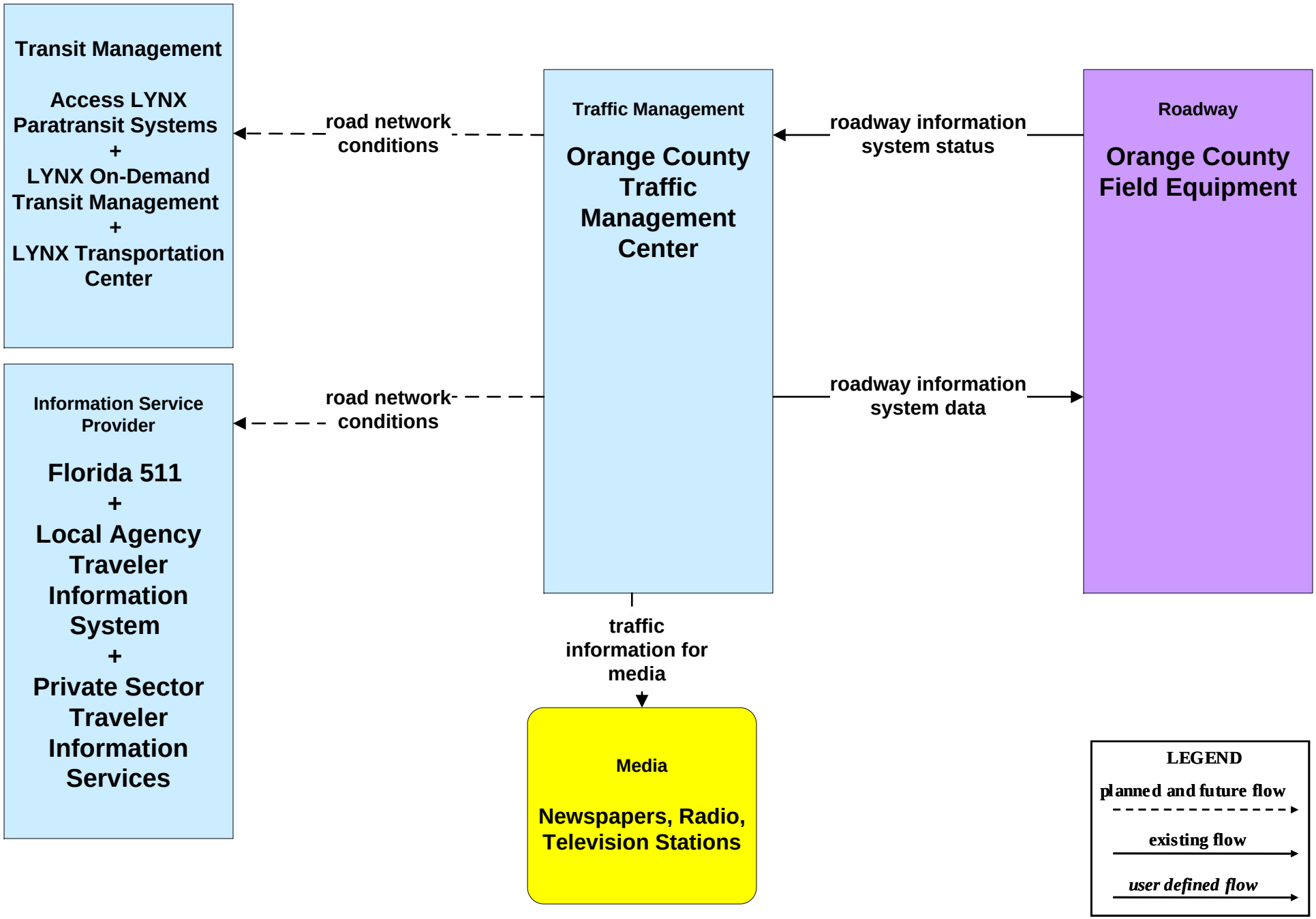


ATMS03 - Traffic Signal Control
Orange County

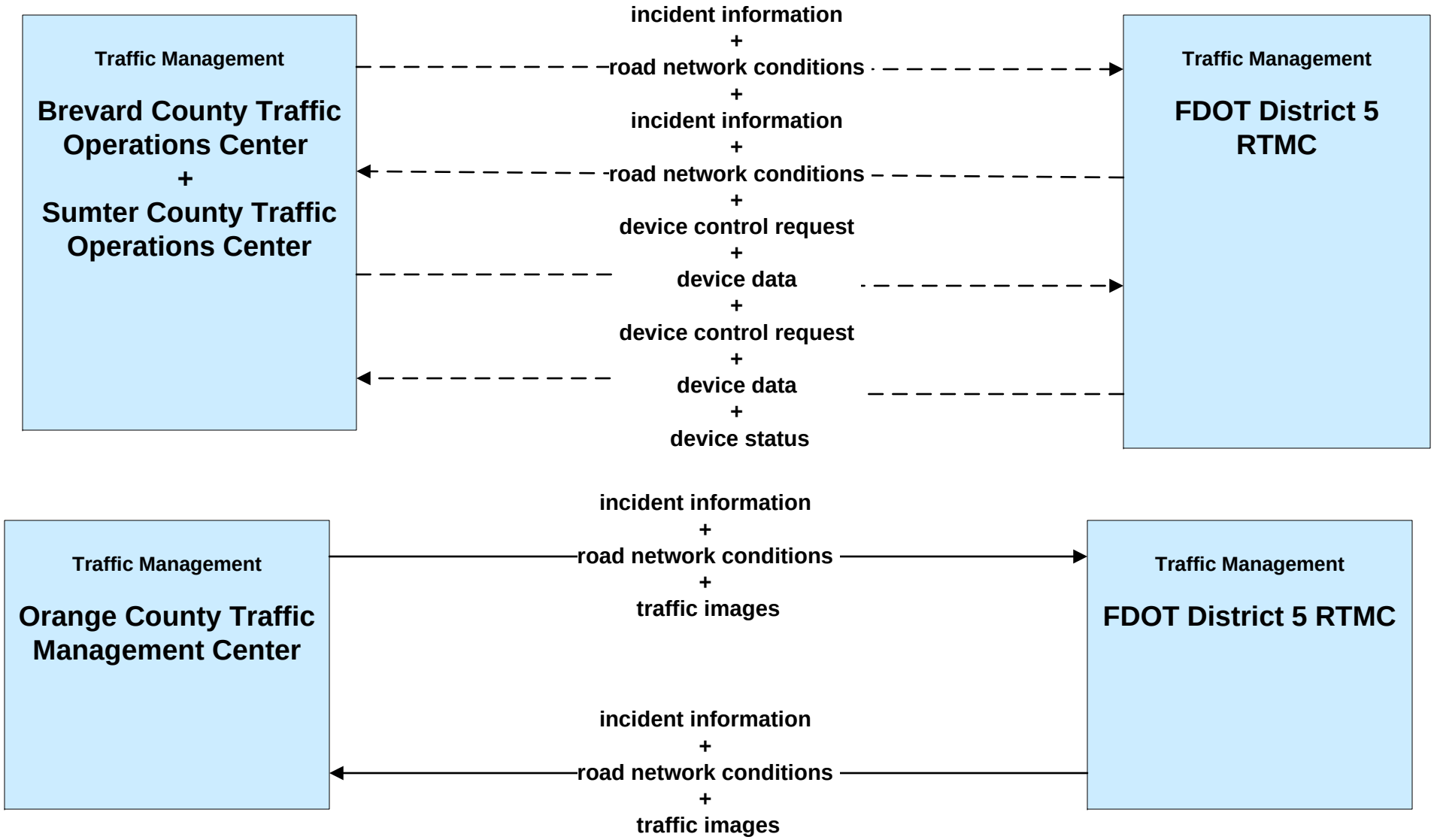




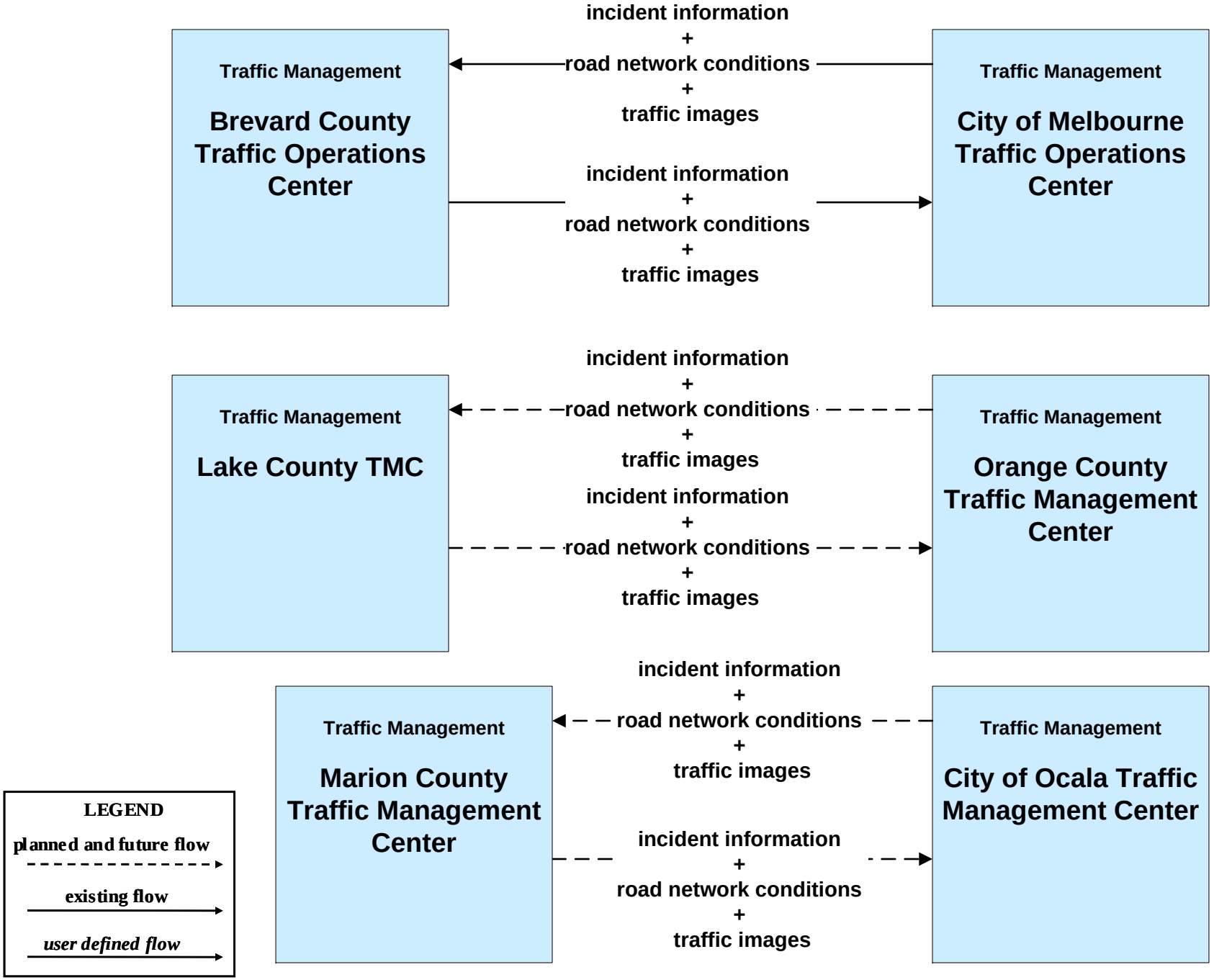
ATMS06 - Traffic Information Dissemination
Orange County



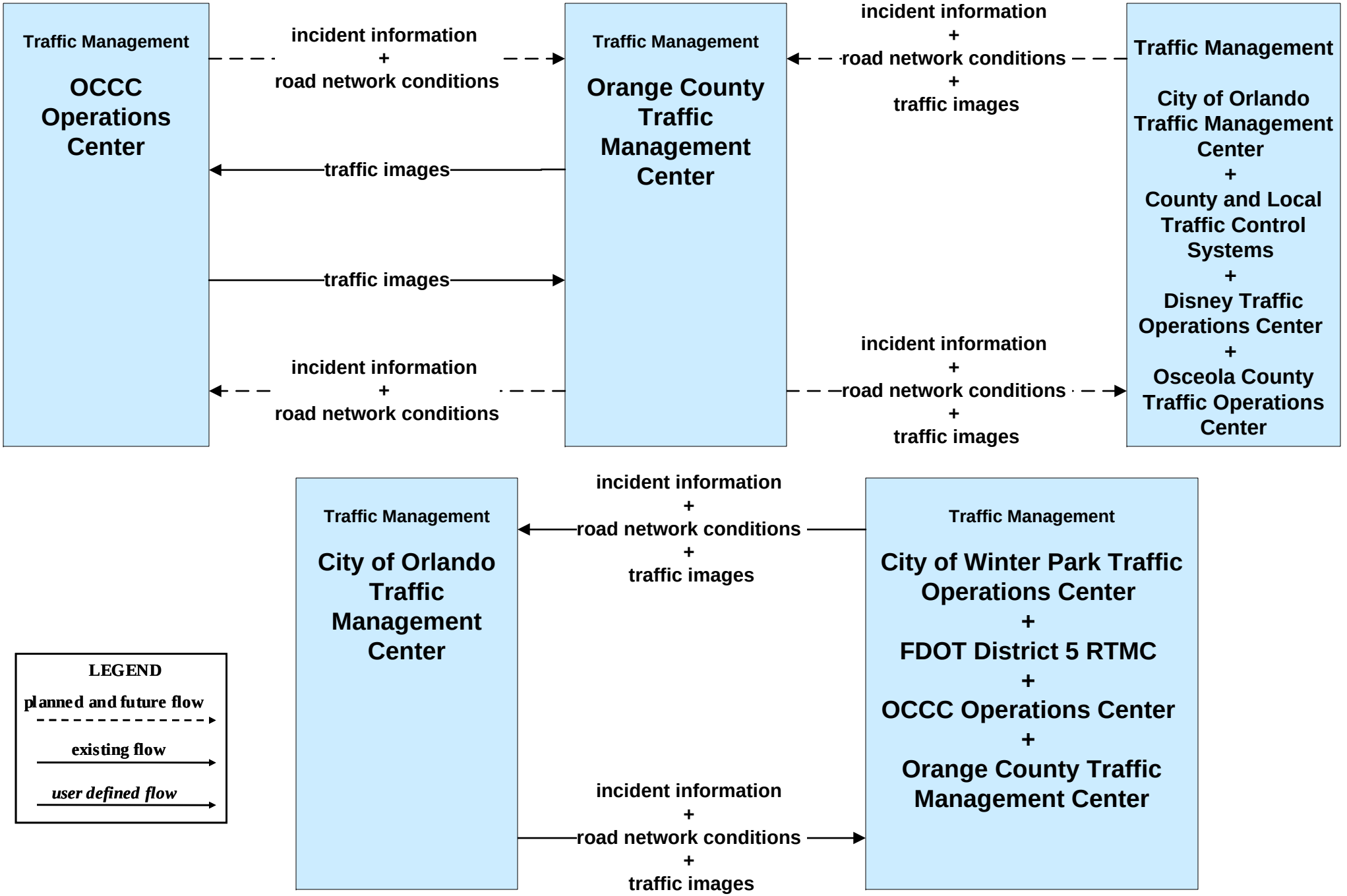
ATMS07 - Regional Traffic Management
FDOT Districts (3 of 3)



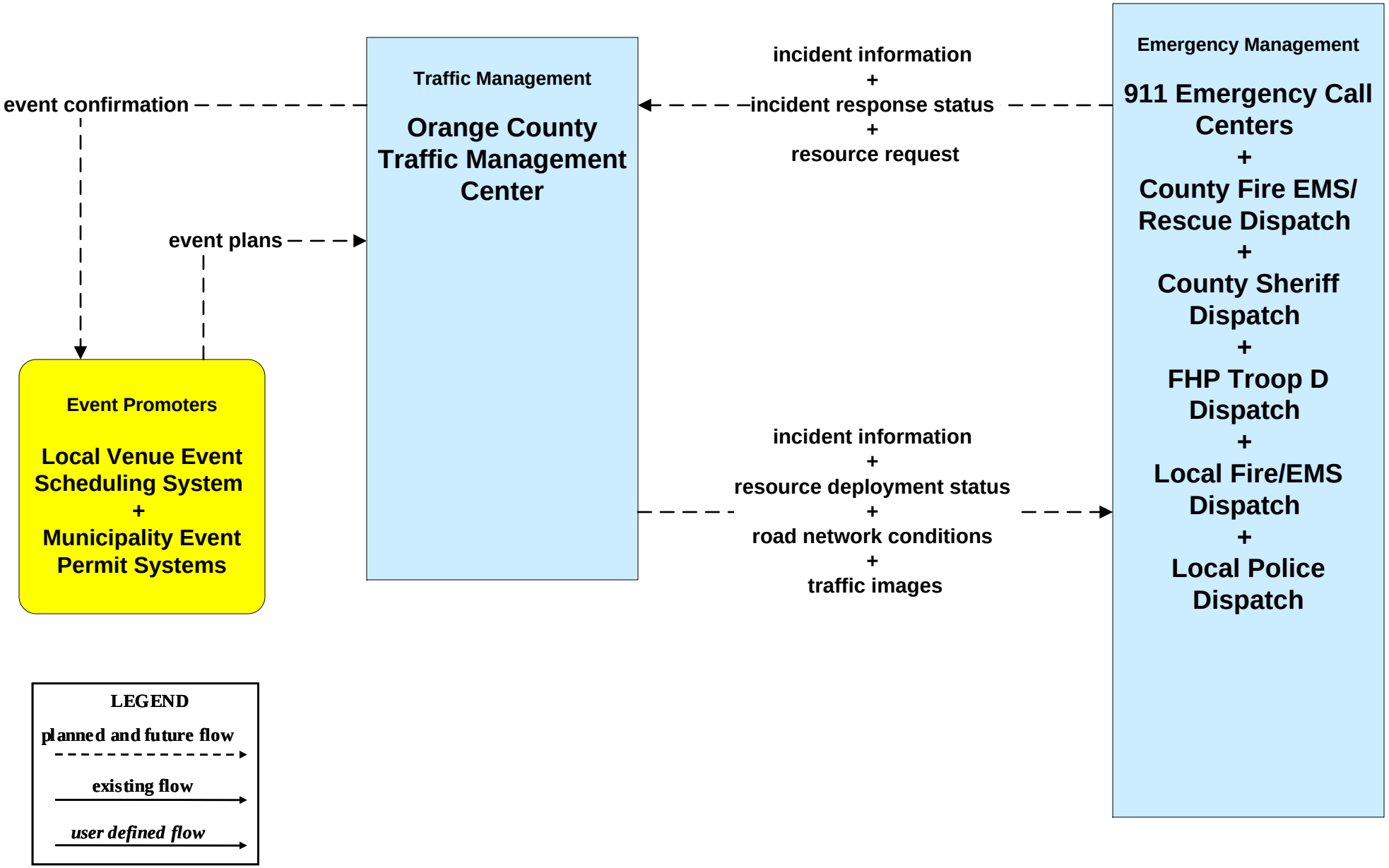
ATMS07 - Regional Traffic Management
Brevard County / Lake County / Marion County



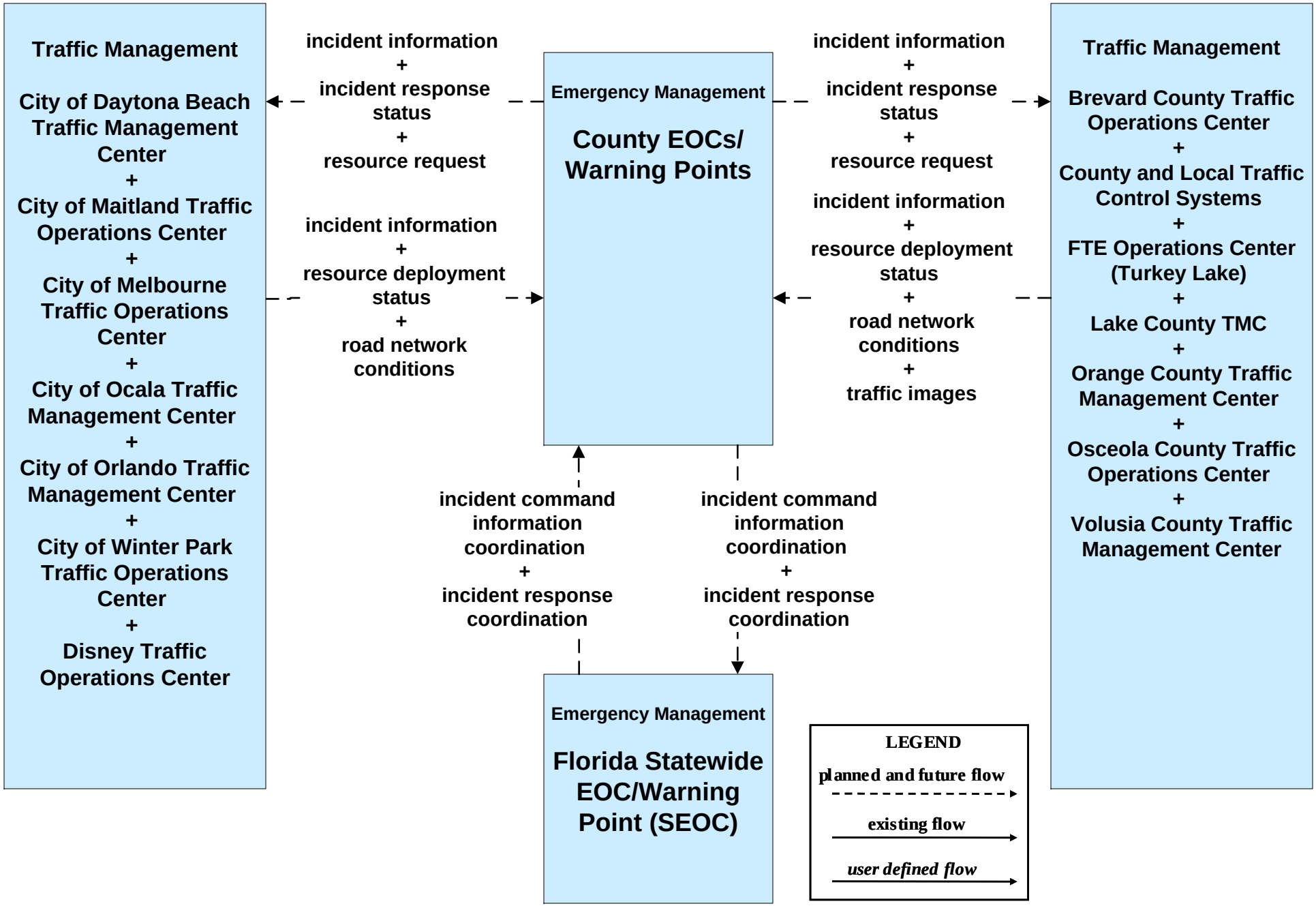
ATMS07 - Regional Traffic Management
Orange County / City of Orlando



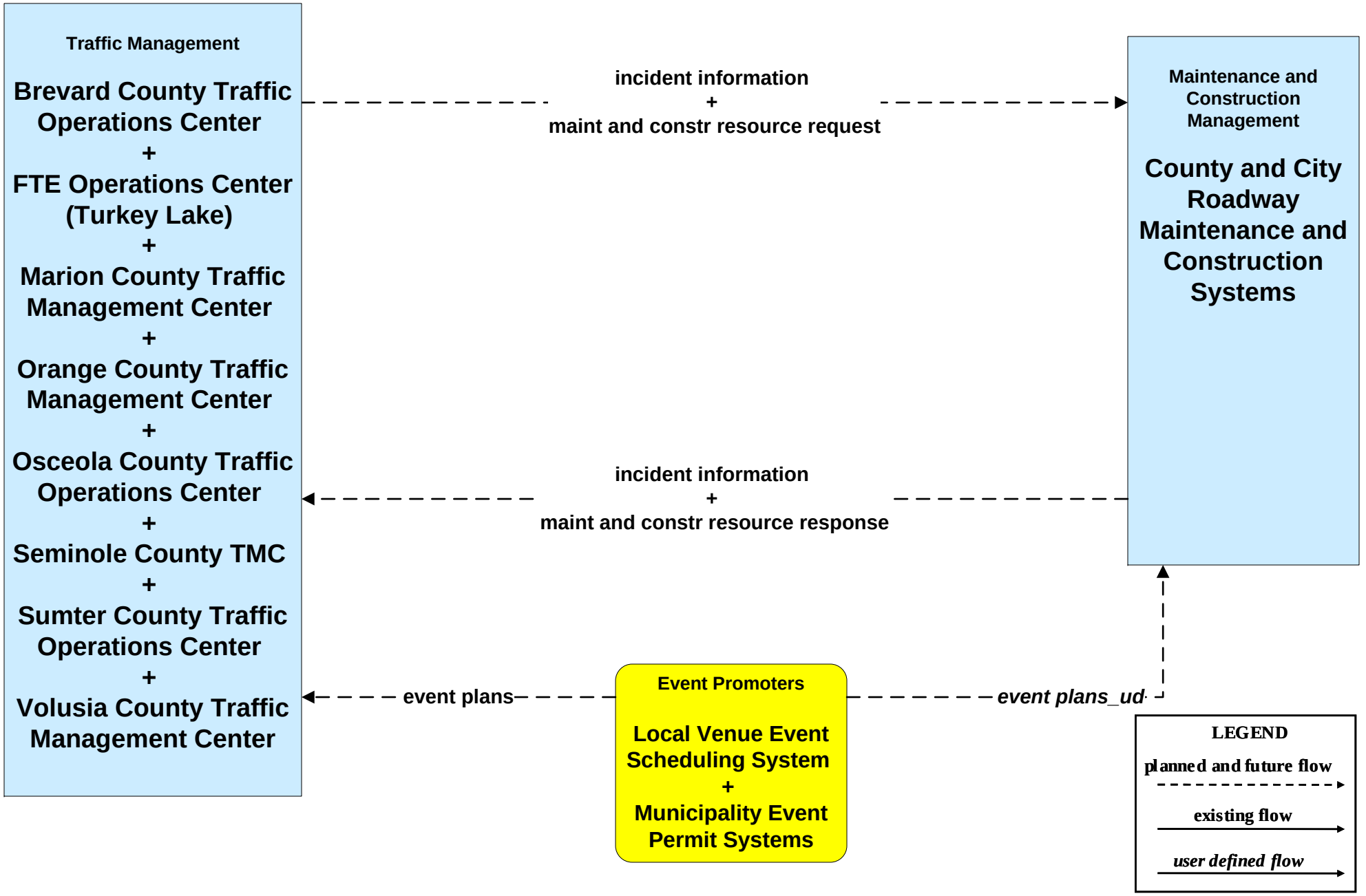
ATMS08 - Traffic Incident Management System
Orange County(TM to EM)



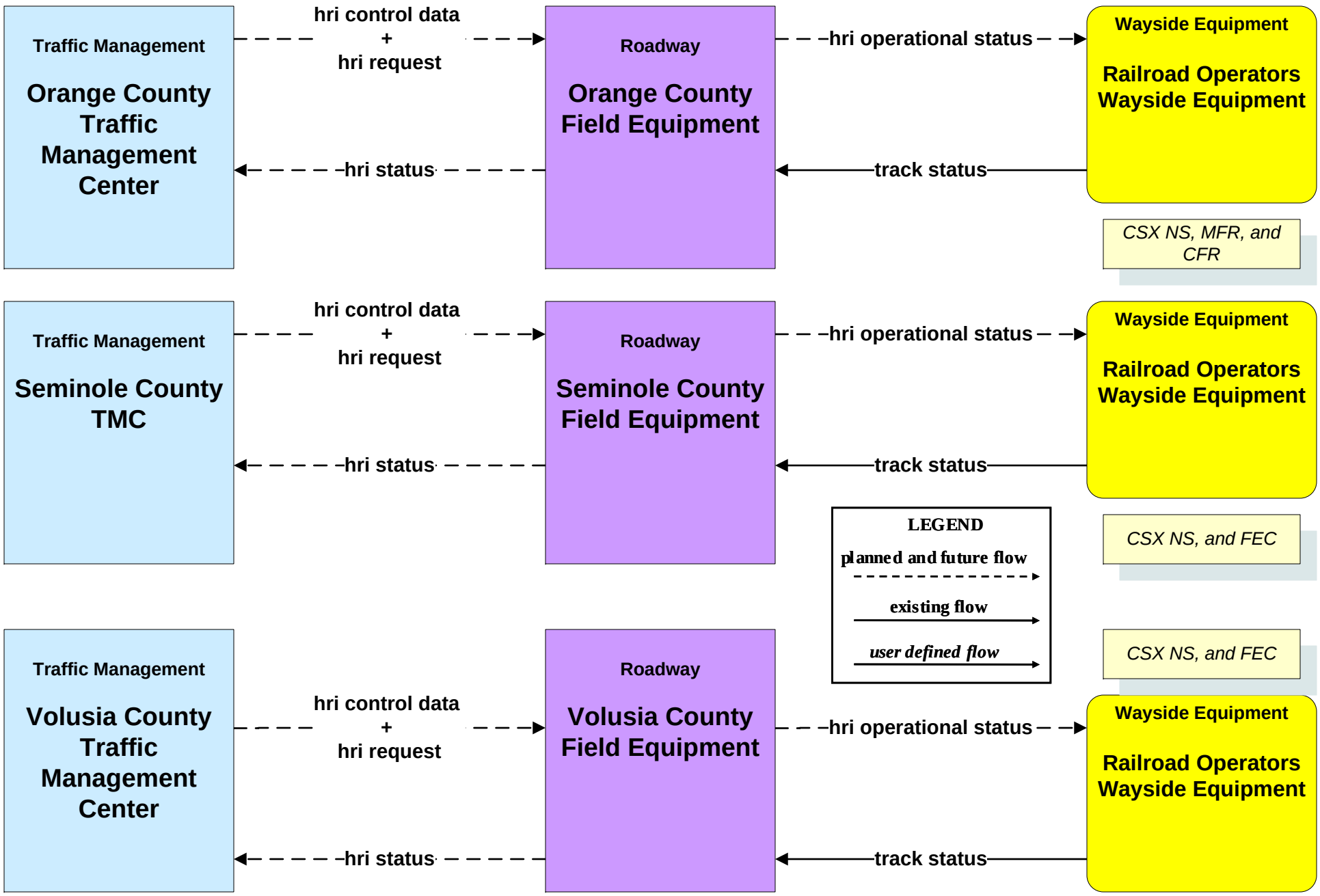
ATMS08 - Traffic Incident Management System
County Emergency Operations Center (TM to EM)



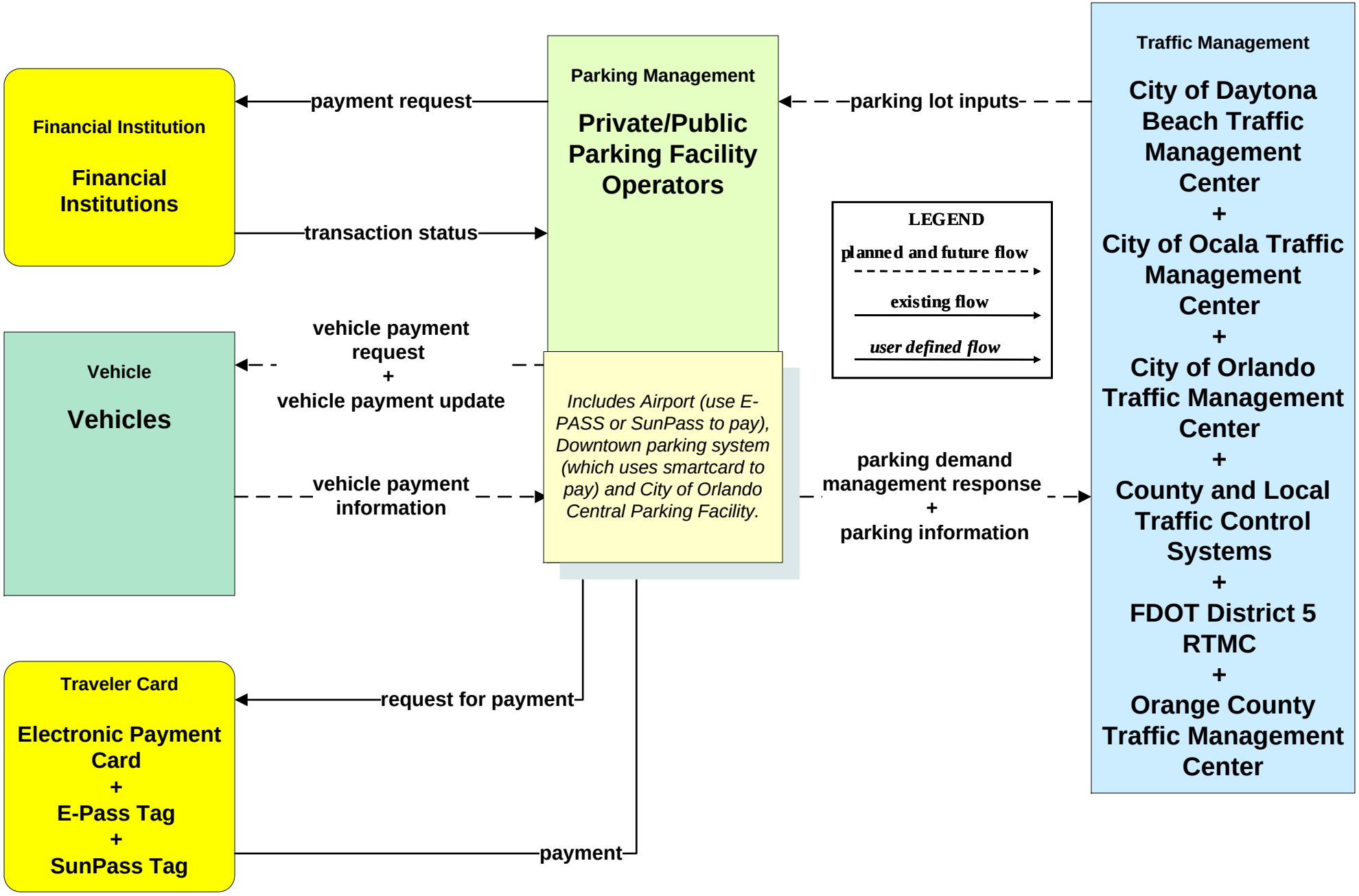
ATMS08 - Traffic Incident Management System
County Traffic Management Centers (TM to MCM)



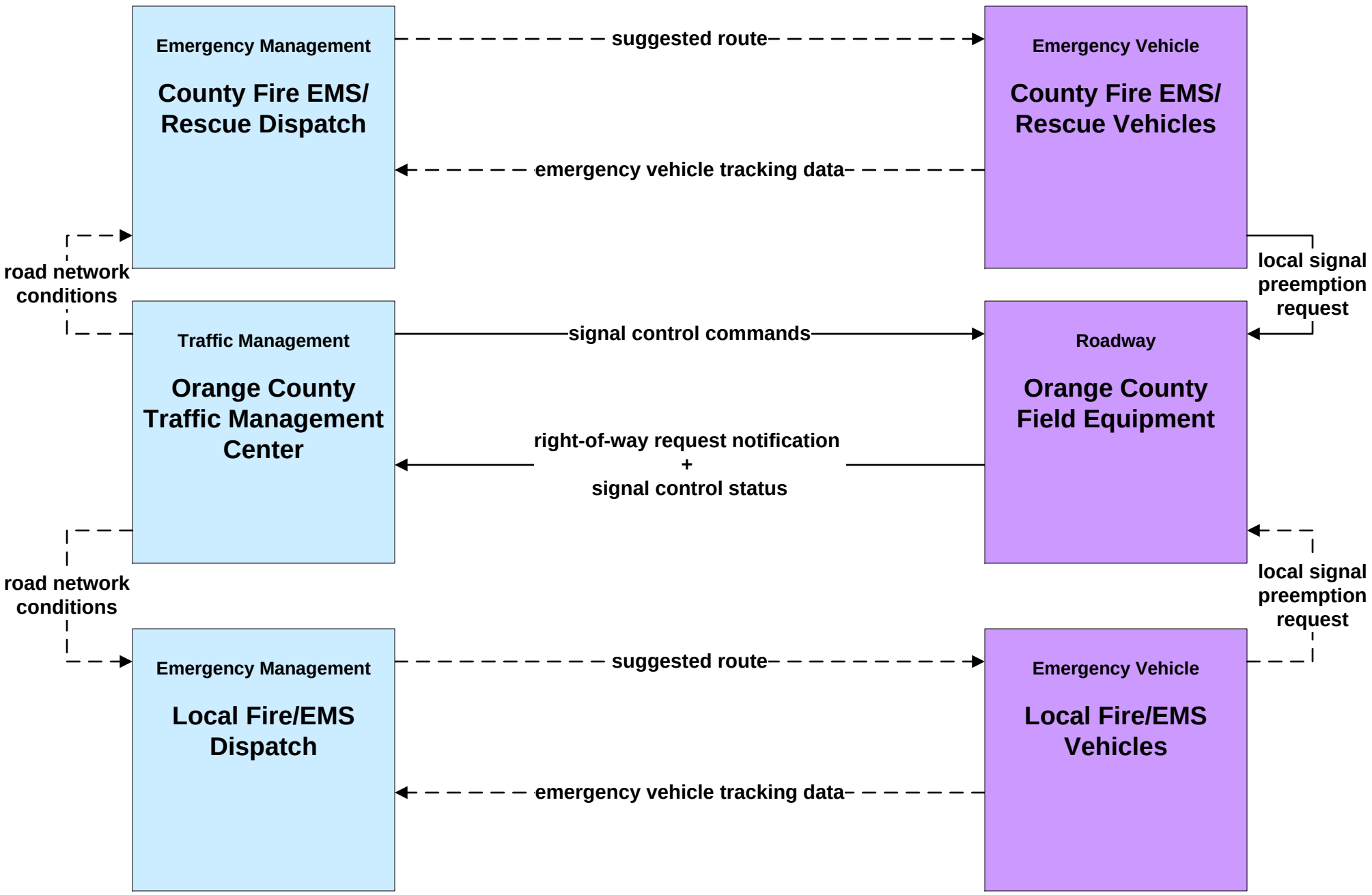
ATMS13 - Standard Railroad Crossing
Orange County / Seminole County / Volusia County



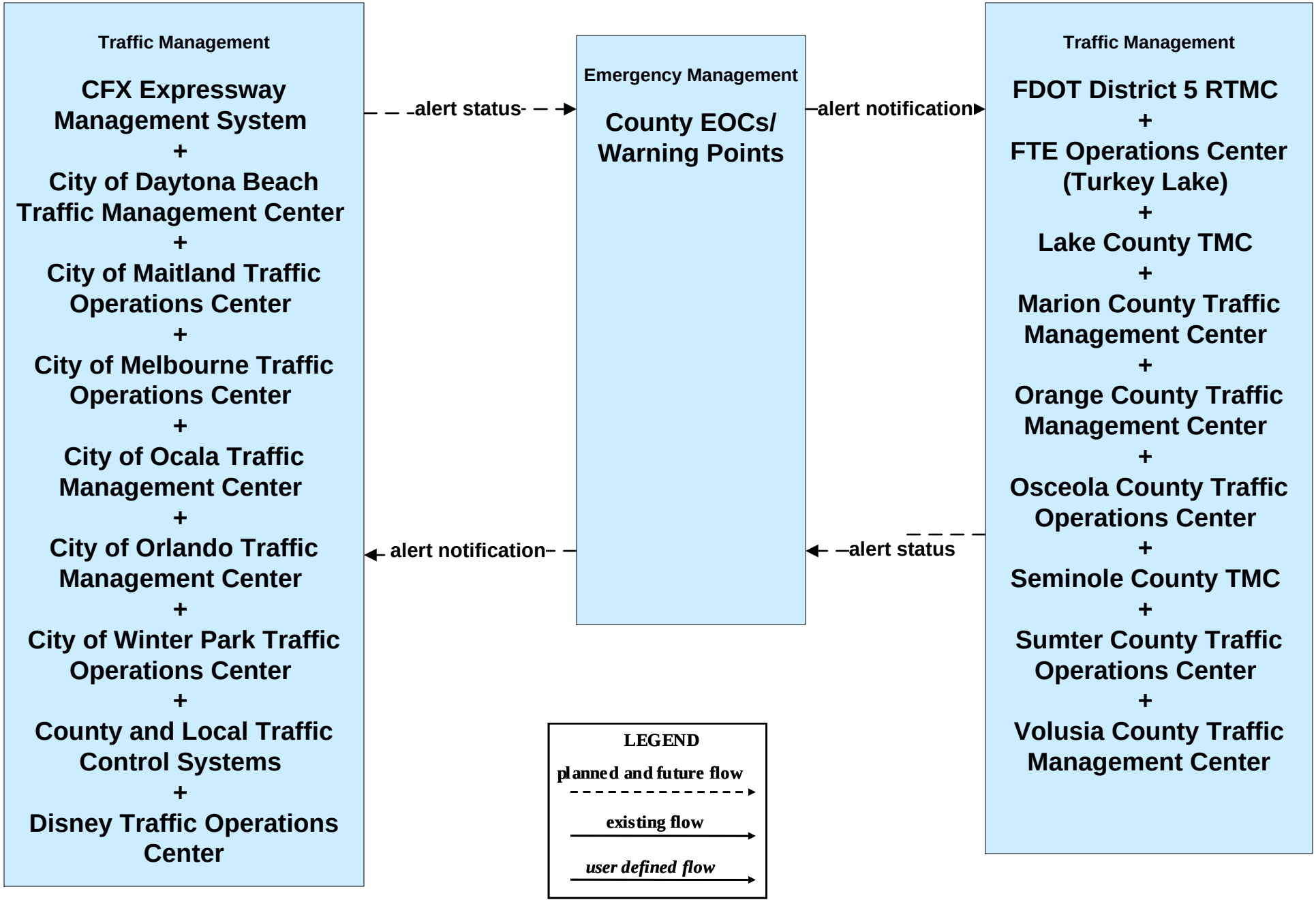
ATMS16 - Parking Facility Management
Parking Facility Operators



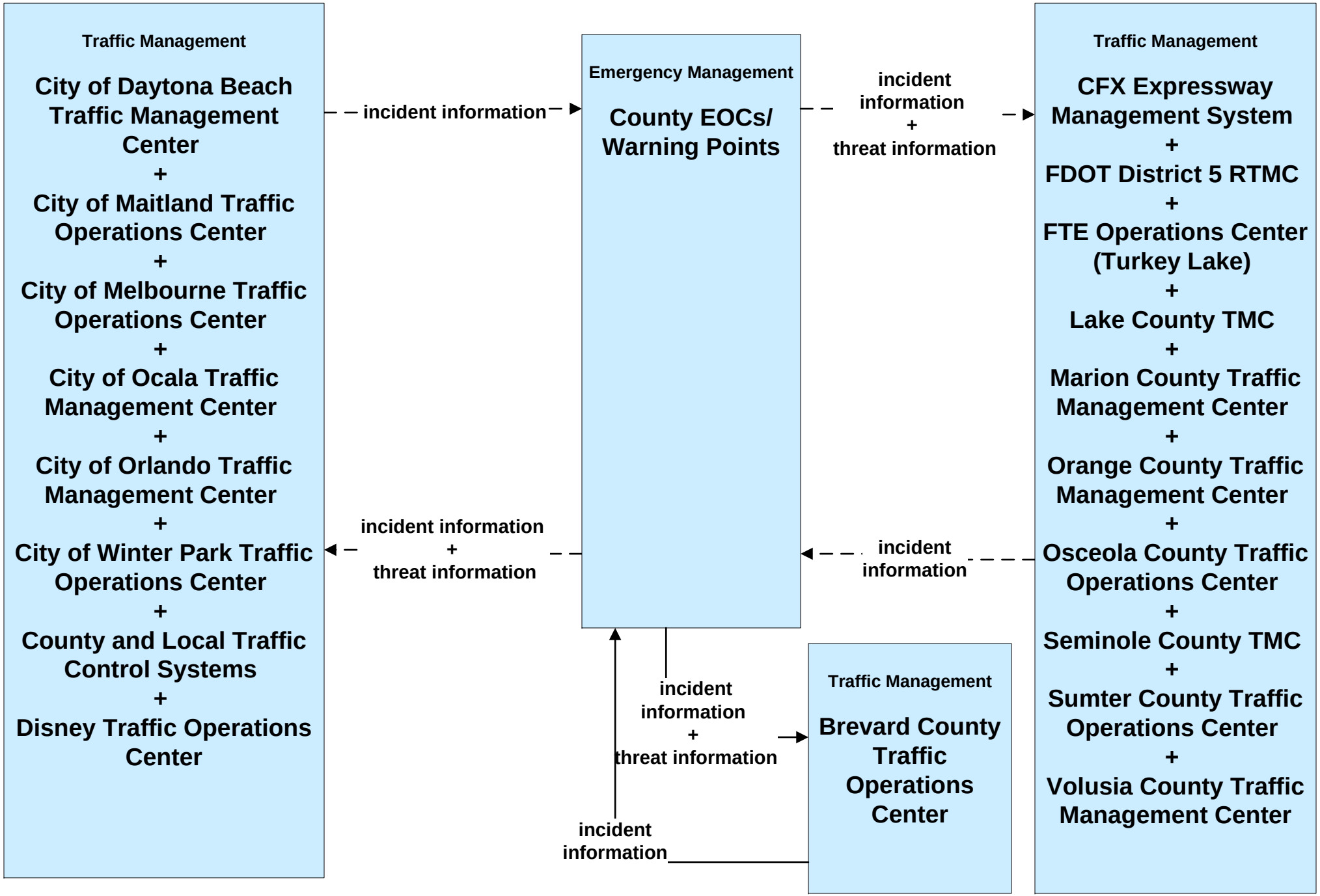
EM02 - Emergency Routing
Orange County



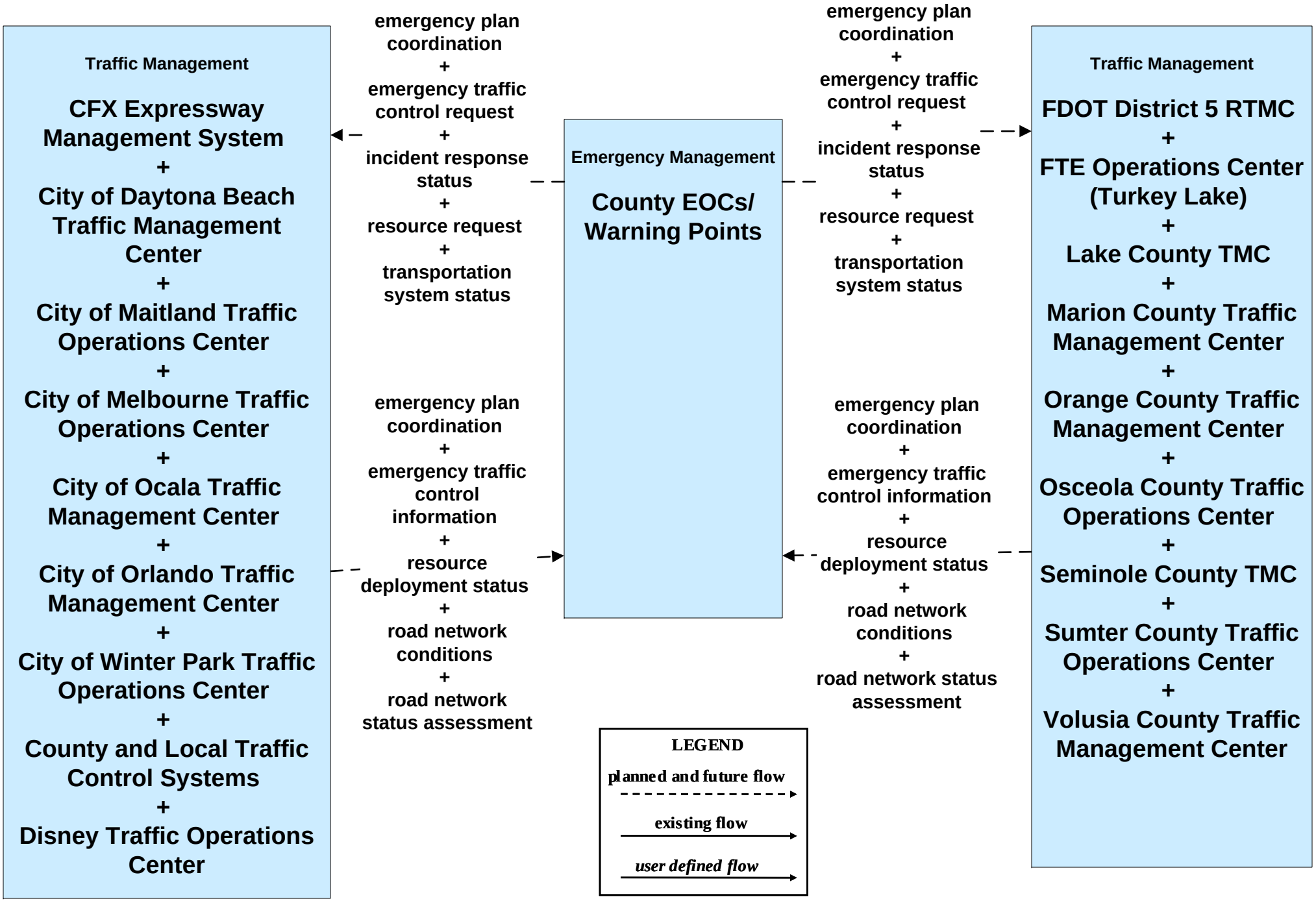
EM06 - Wide Area Alert
County EOCs (1 of 3)



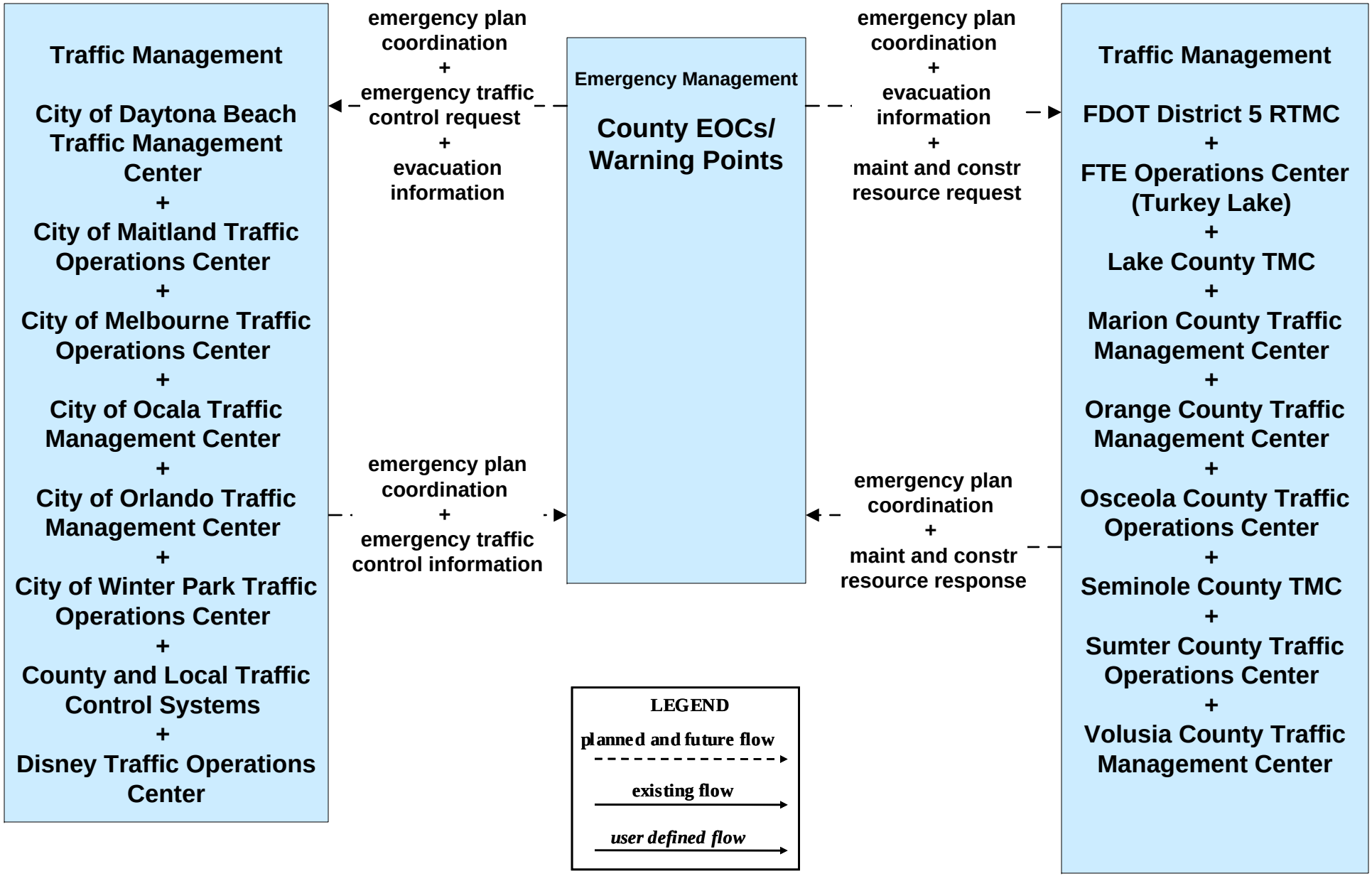
EM07 - Early Warning System
County EOCs (2 of 3)



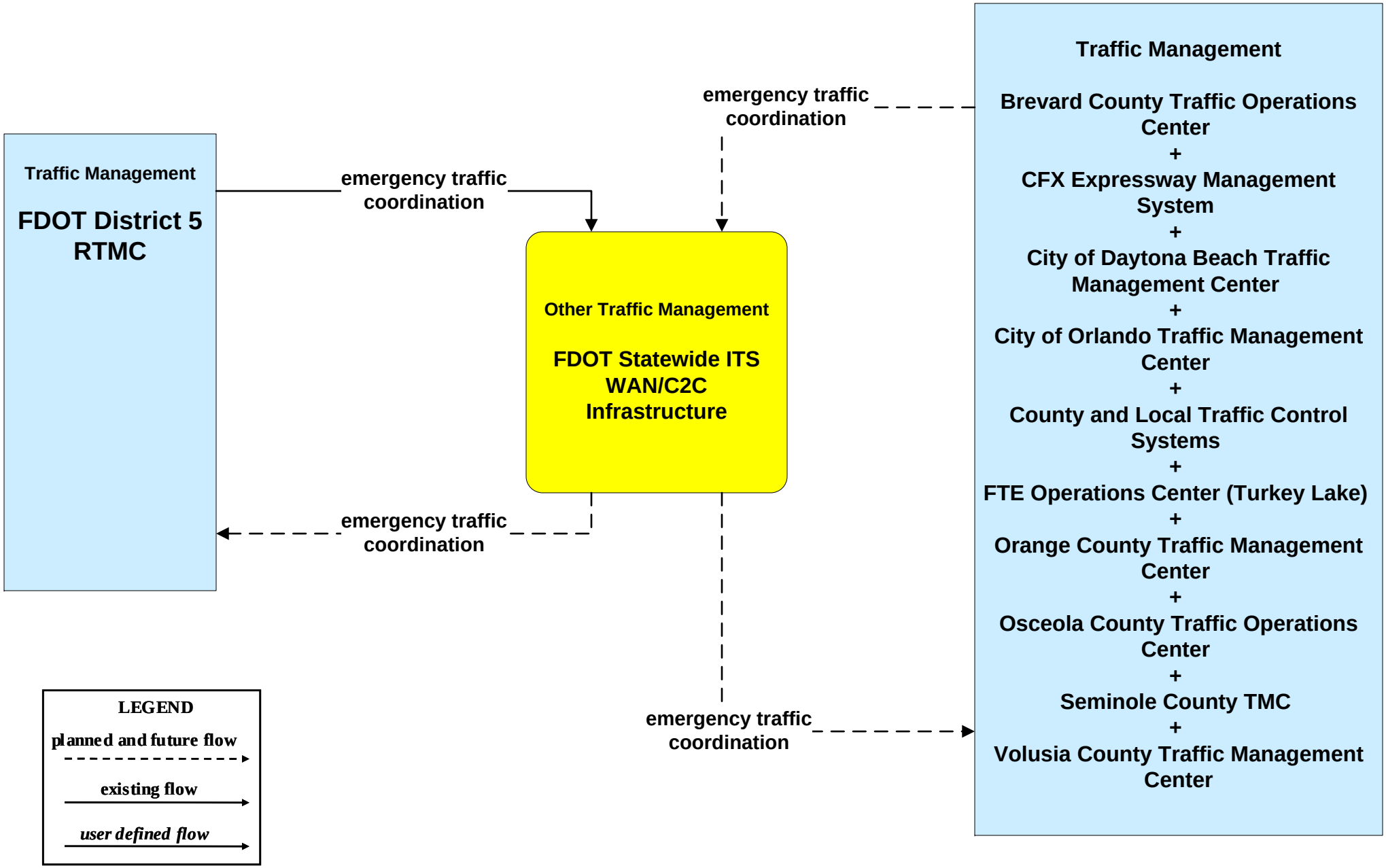
EM08 - Disaster Response and Recovery
County EOCs (2 of 4)



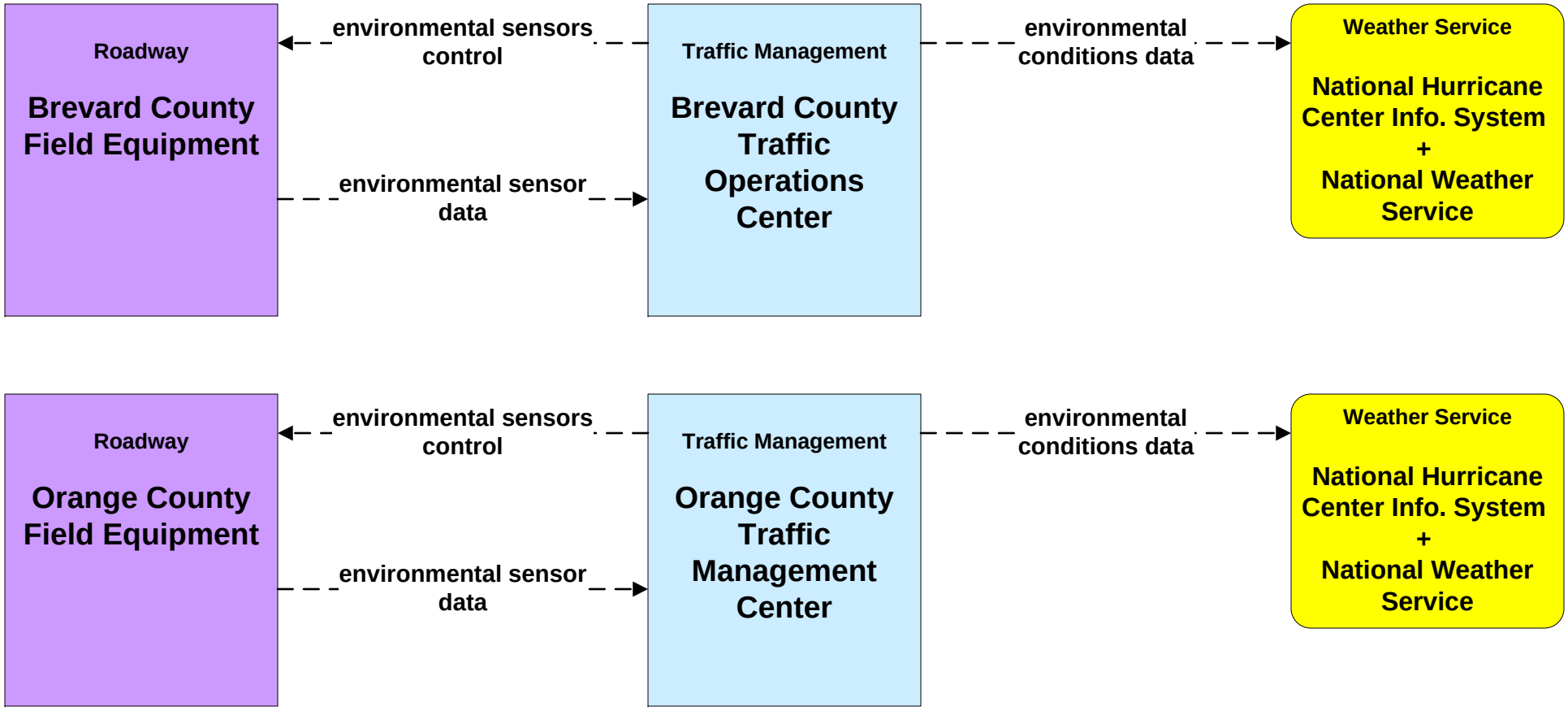
EM09 - Evacuation and Reentry Management
County EOCs (2 of 3)



EM09 - Evacuation and Reentry Management
Central Florida Traffic Management Agencies



MC03 - Road Weather Data Collection
Brevard County / Orange County



LEGEND

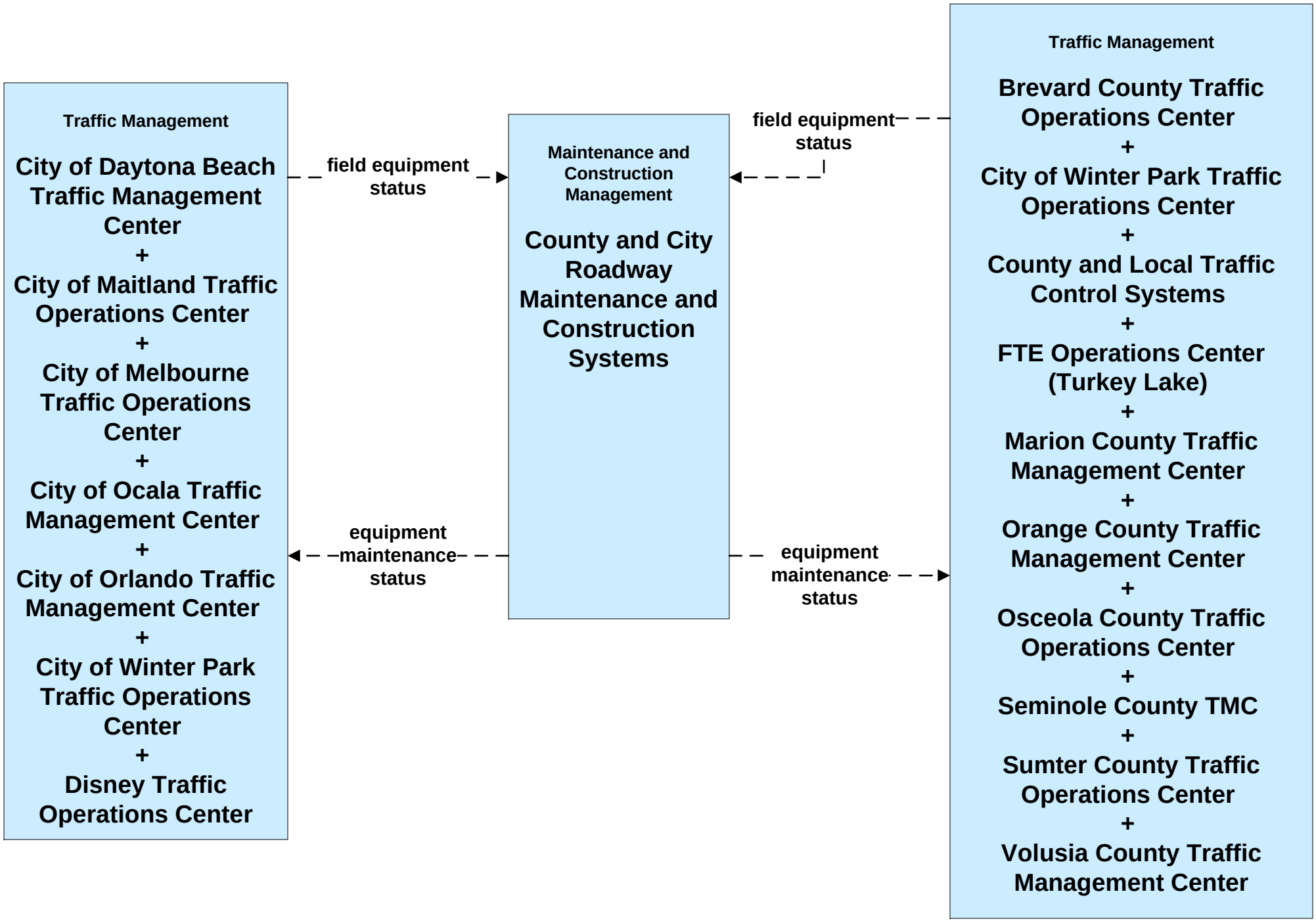
planned and future flow

existing flow

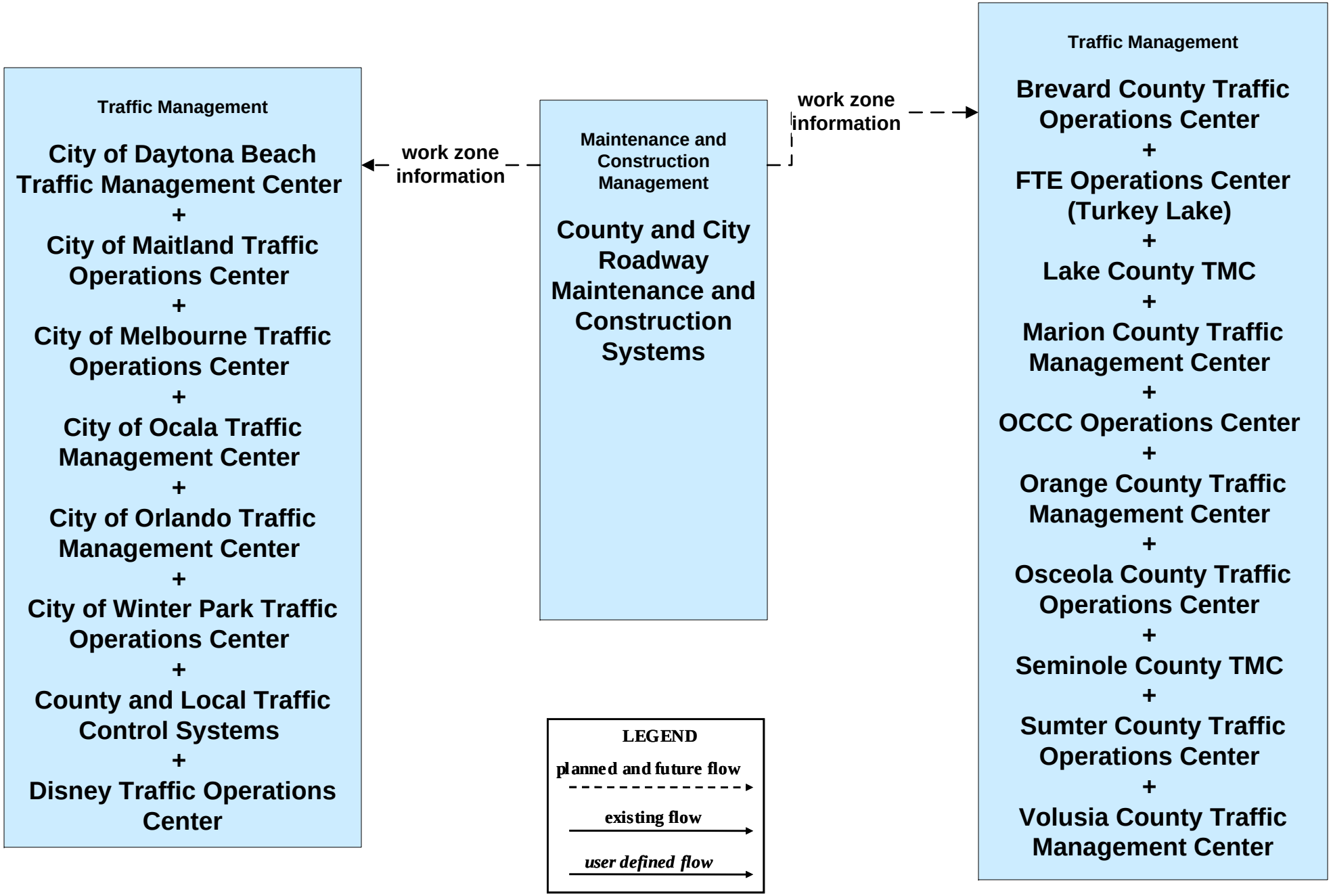
user defined flow

Includes fog / smoke detection

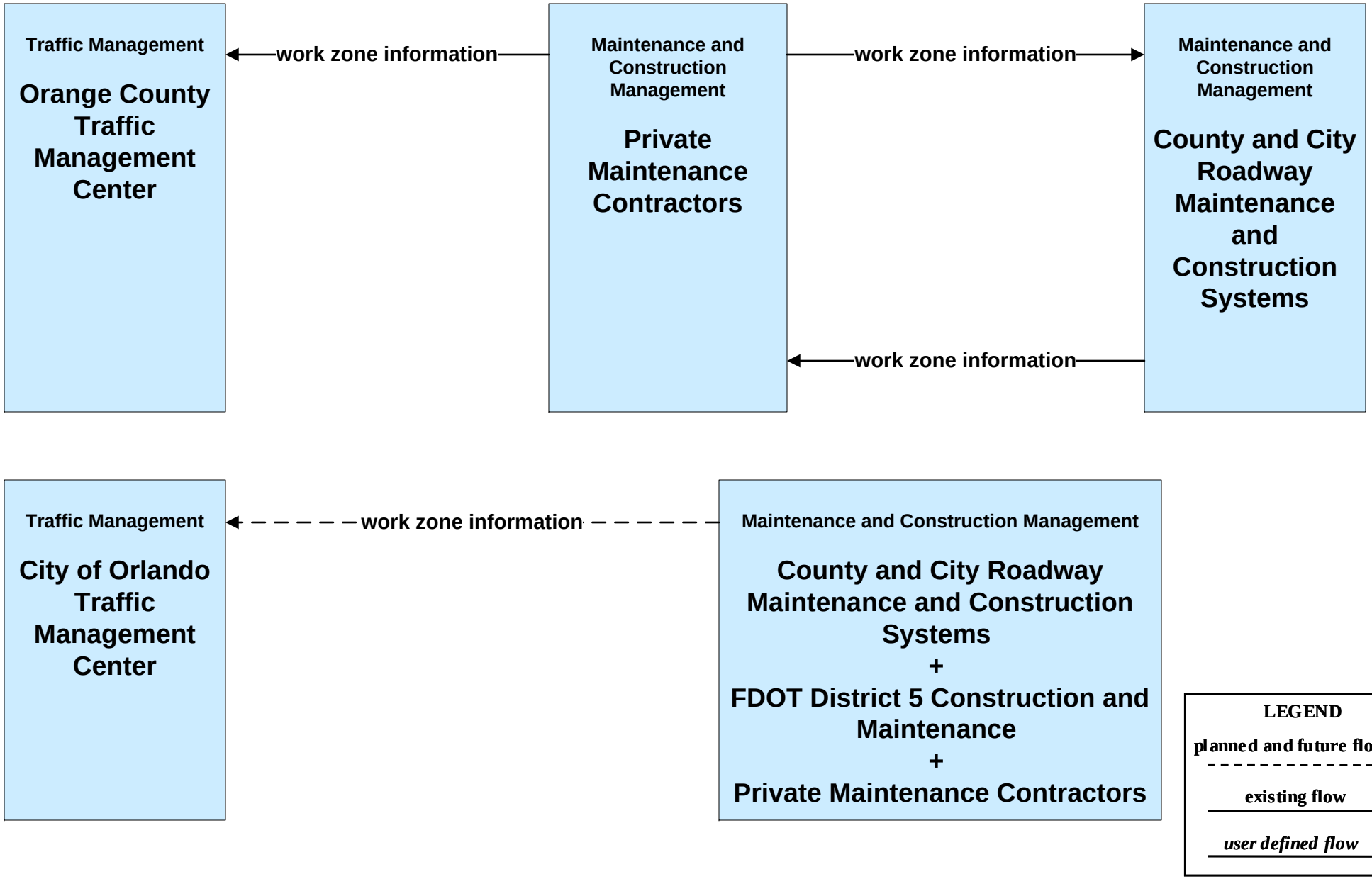
MC07 - Roadway Maintenance and Construction
Counties and Cities (2 of 2)



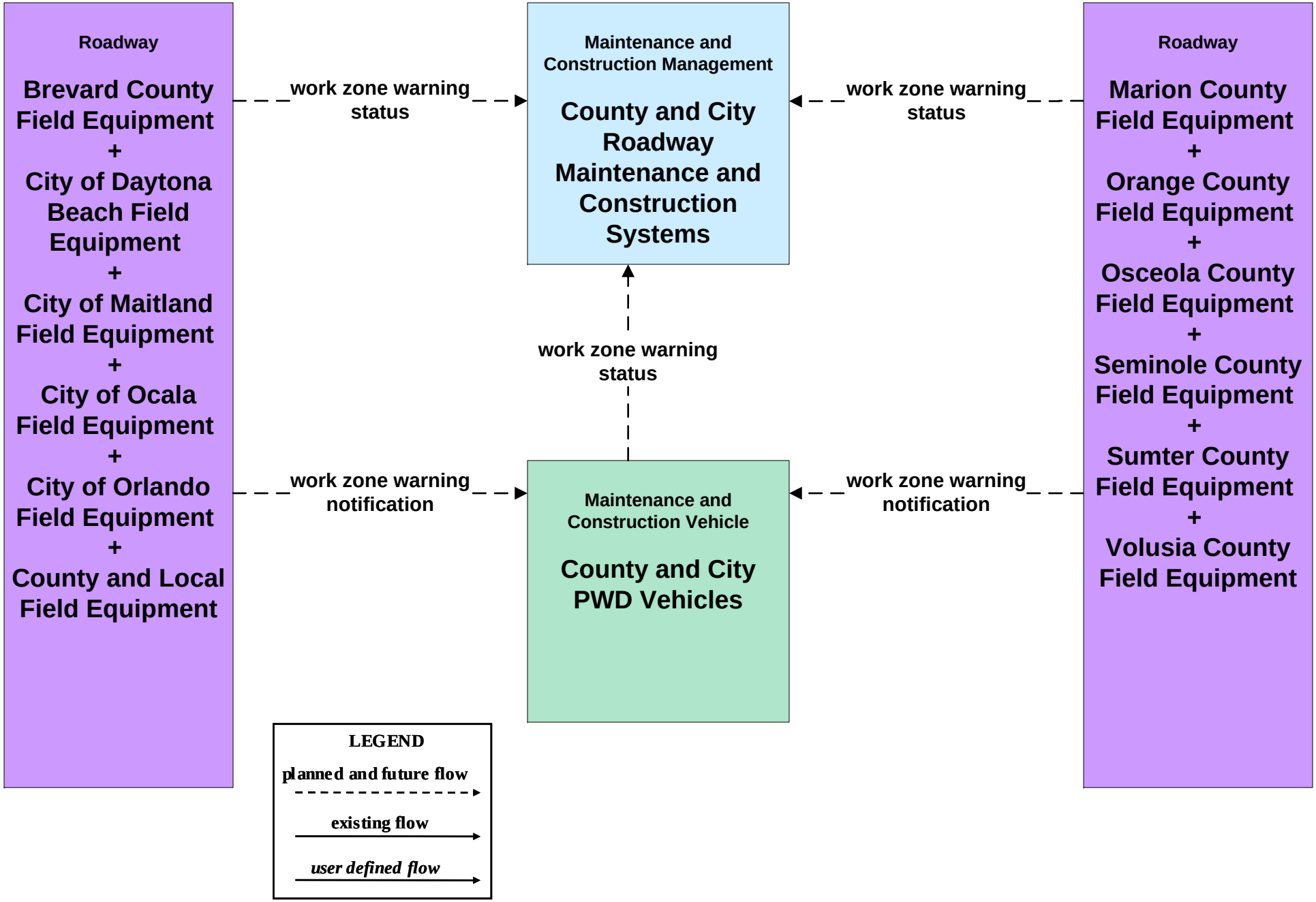
MC08 - Work Zone Management
Counties and Cities (2 of 3)



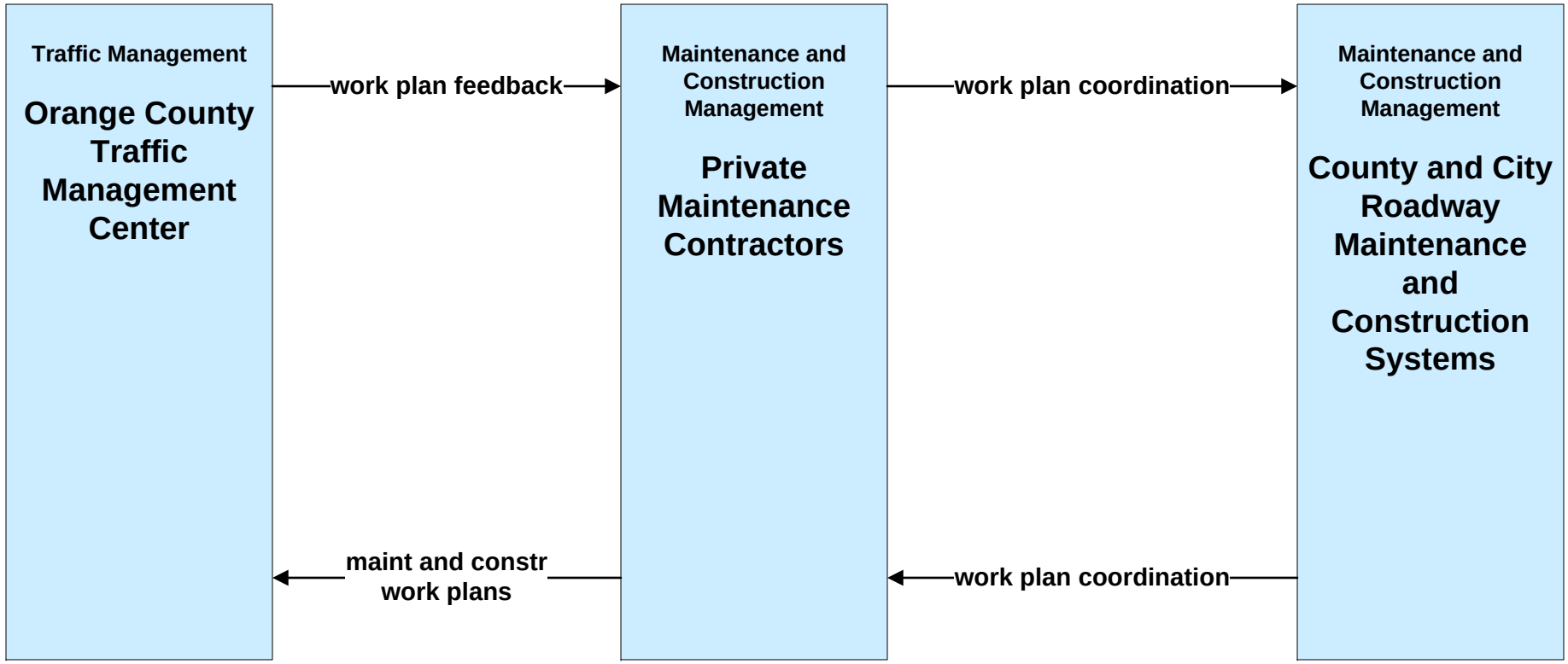
MC08 - Work Zone Management
Orange County and City of Orlando

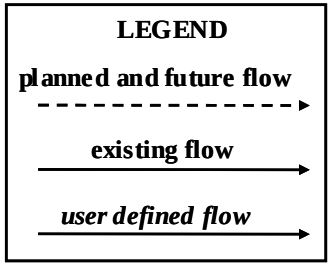


MC09 - Work Zone Safety Monitoring
Counties and Cities



MC10 - Maintenance and Construction Activity Coordination
Orange County





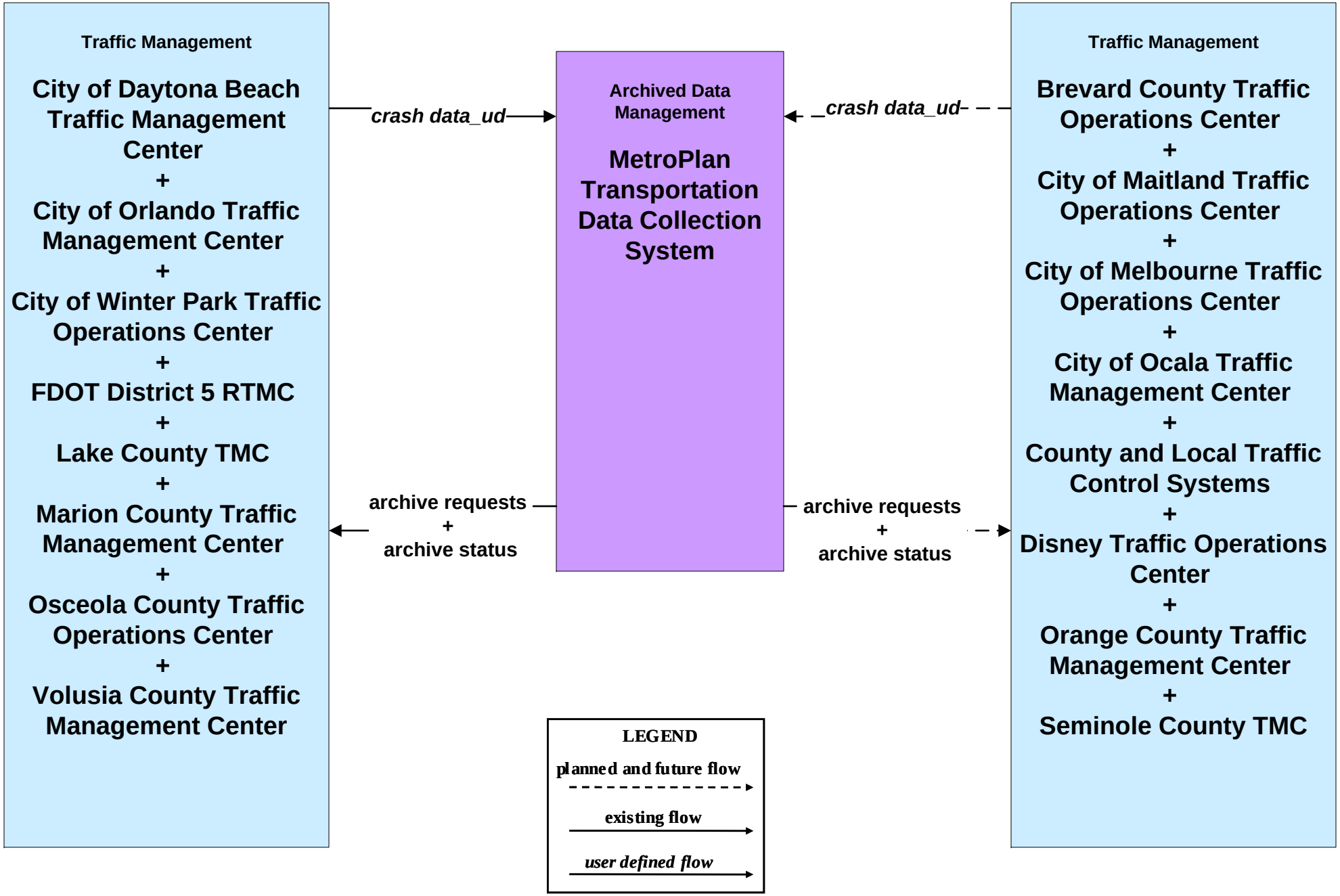
FDOT District 5

Central Florida Regional ITS Architecture

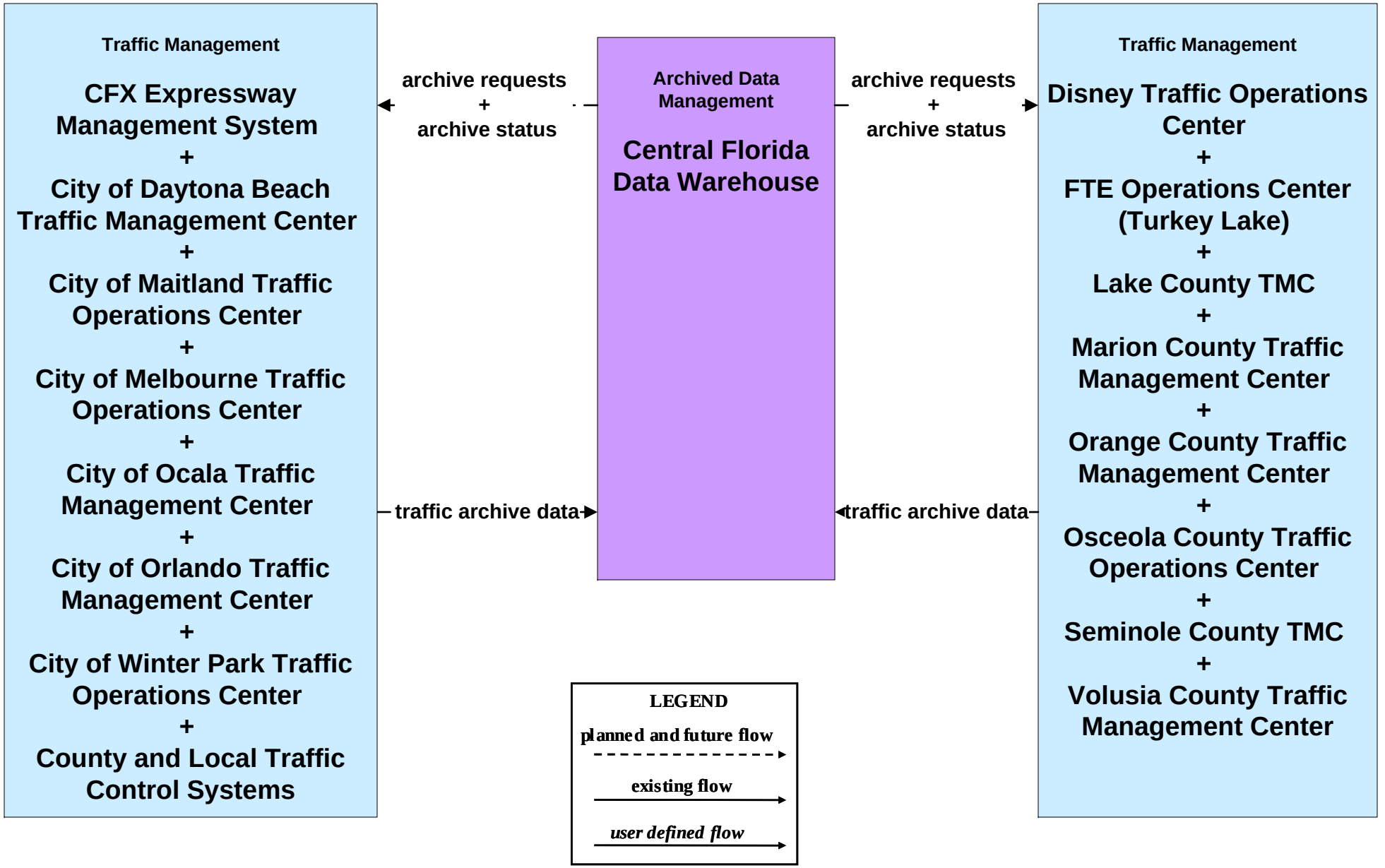
Customized Service Package Diagrams

Osceola County

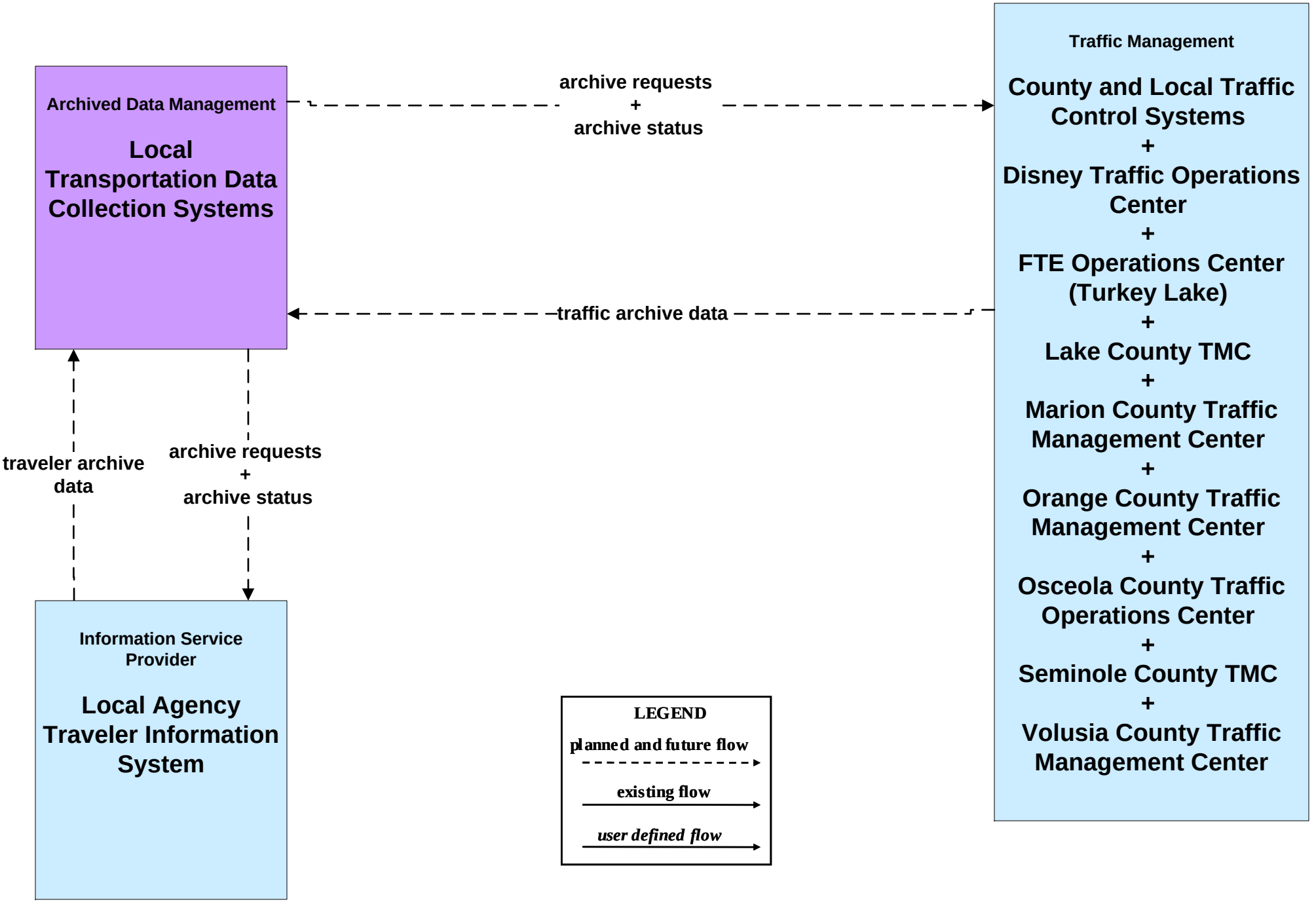
AD1 - ITS Data Mart
MetroPlan Transportation Data Collection System (1 of 2)



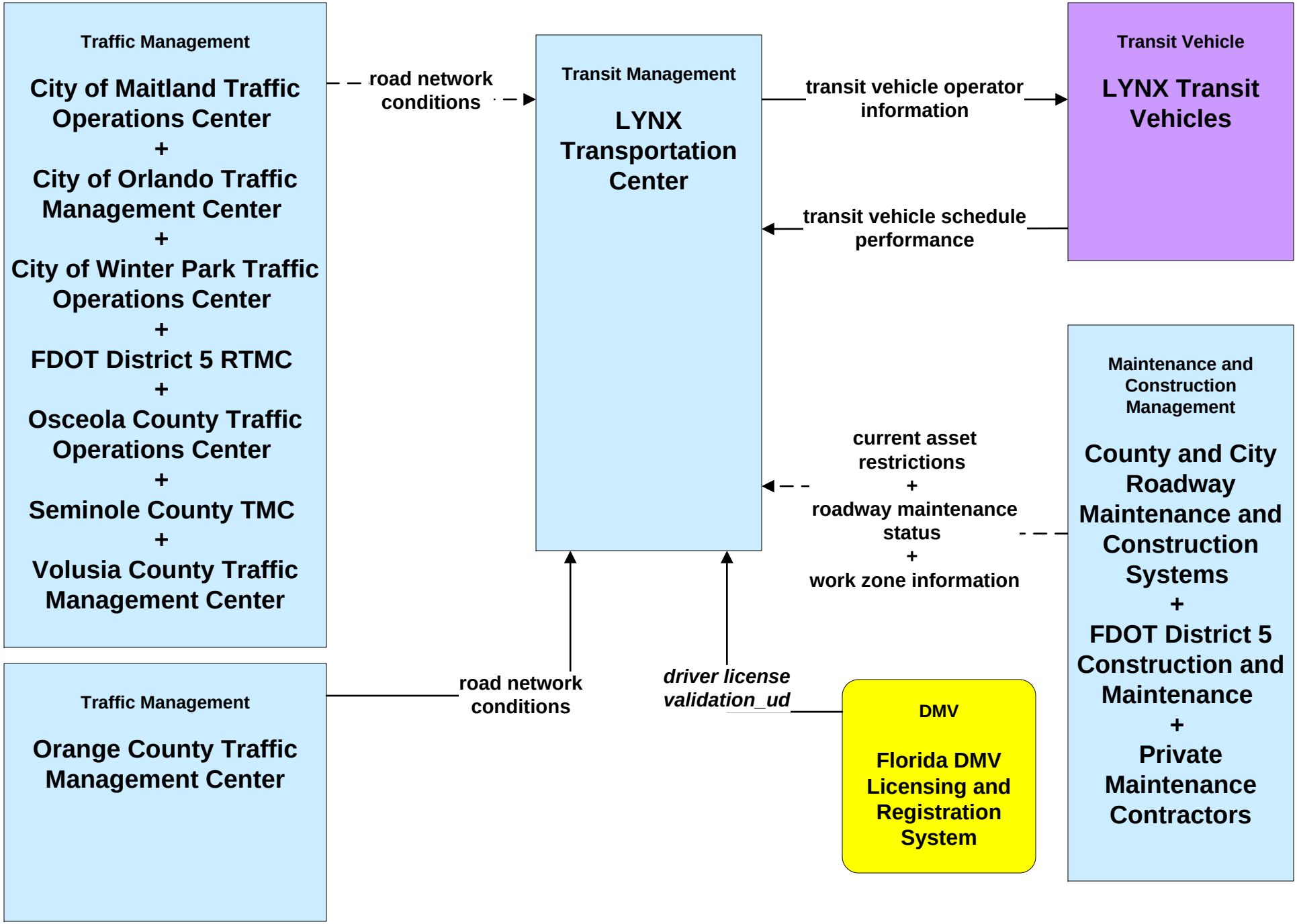
AD2 - ITS Data Warehouse
Central Florida Data Warehouse (1 of 2)



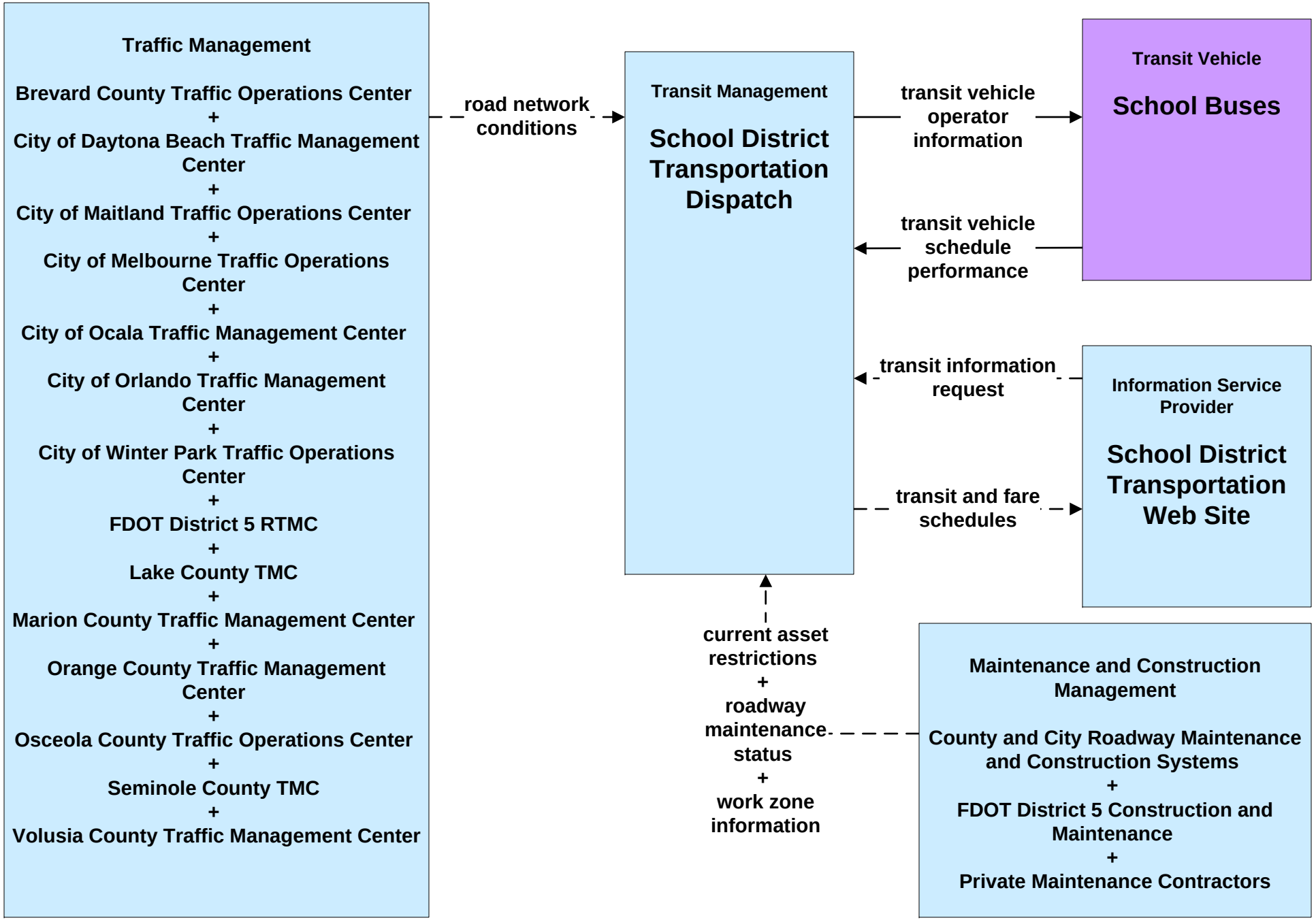
AD2 - ITS Data Warehouse
Local Archives (1 of 2)



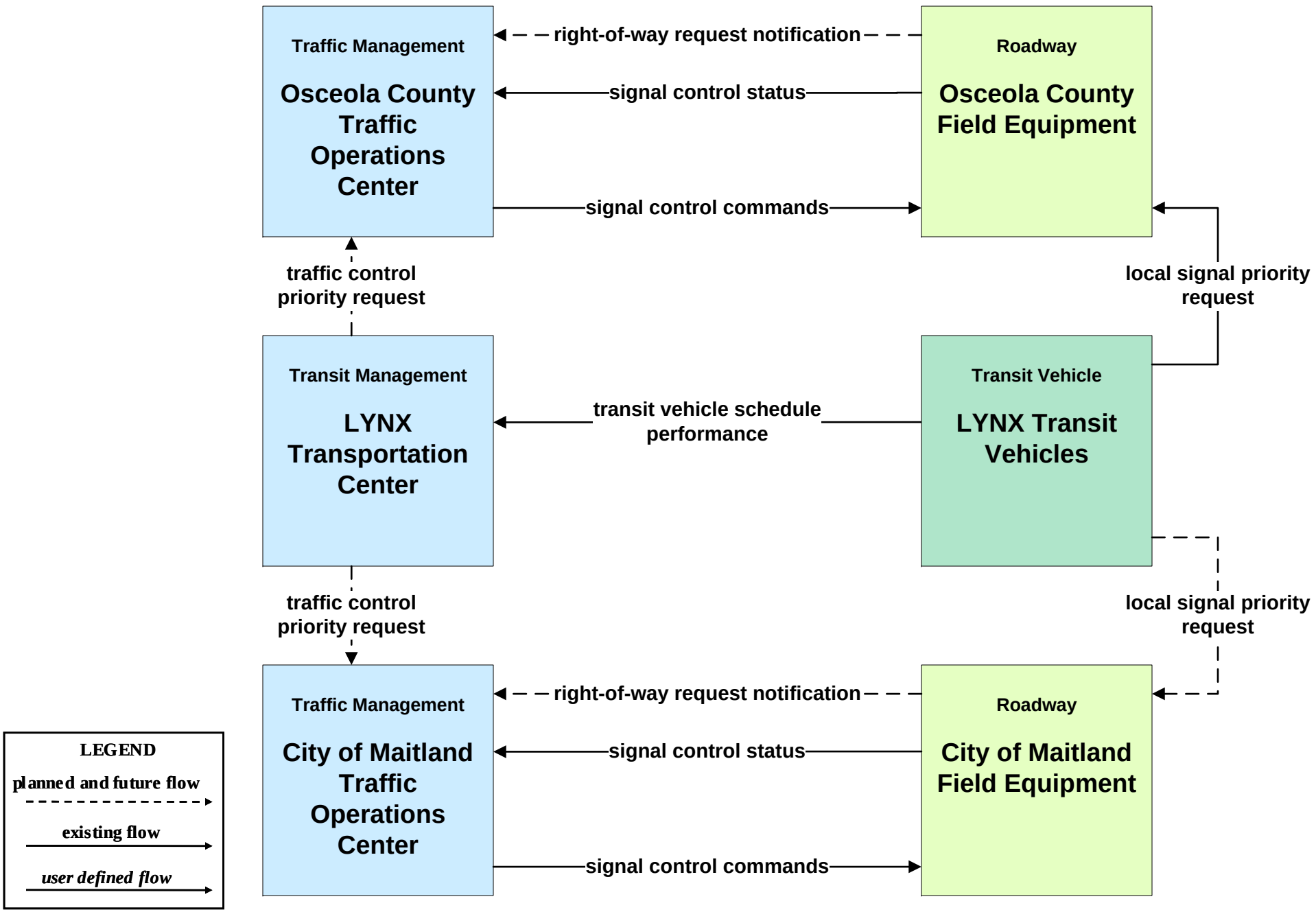
APTS02 - Transit Fixed-Route Operations
LYNX Operations Center



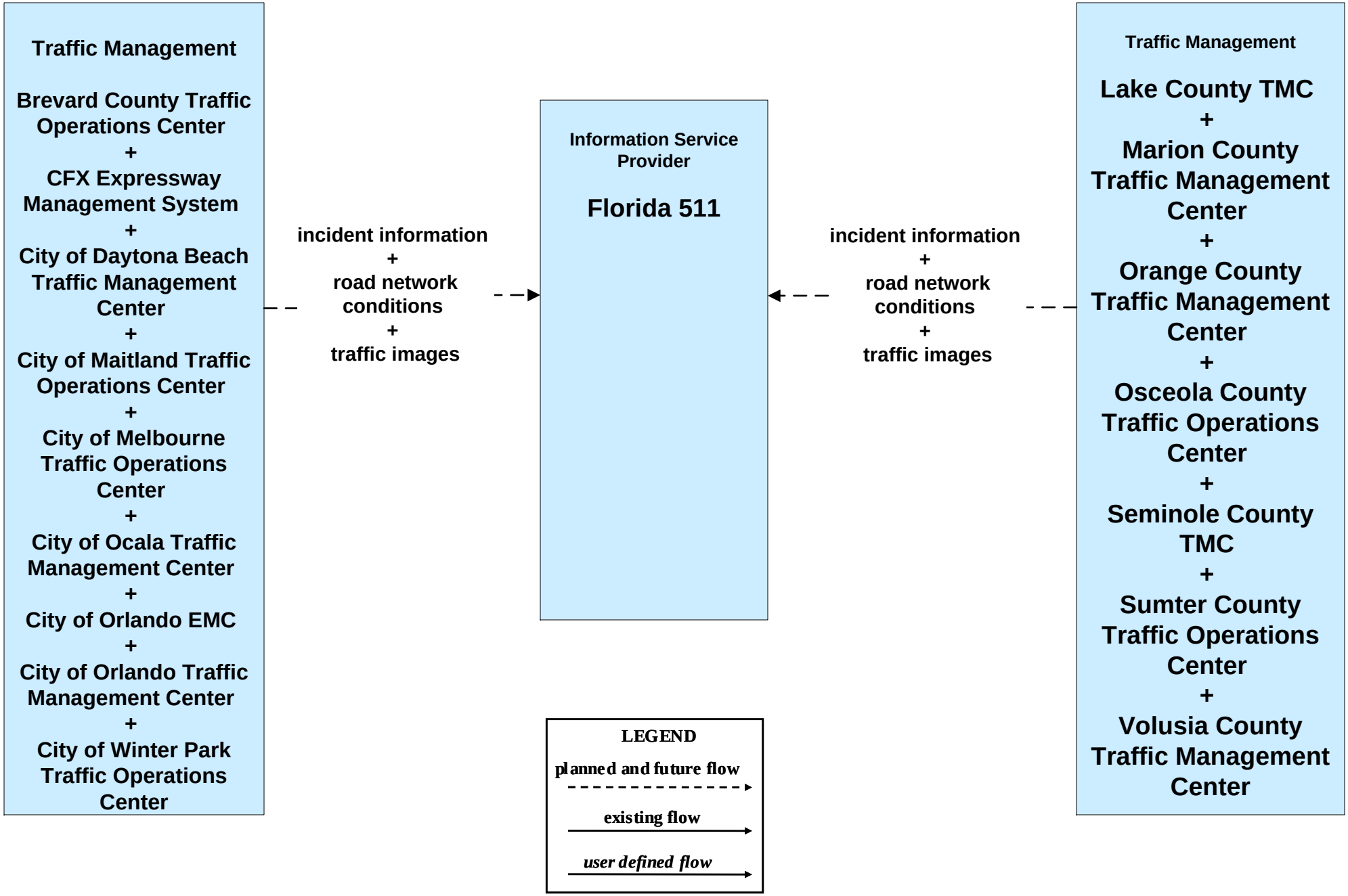
APTS02 - Transit Fixed-Route Operations
School District Transportation Dispatch



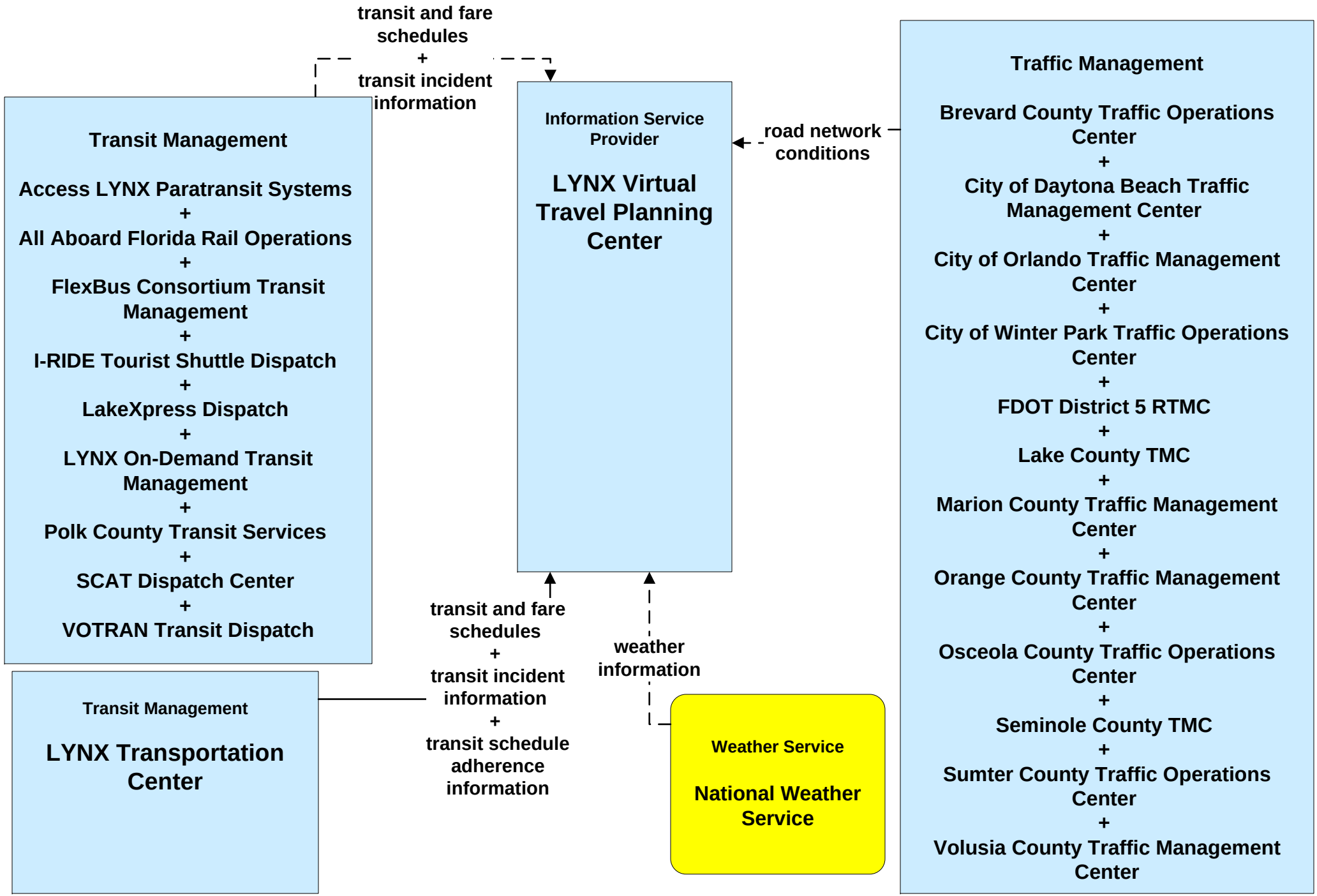
APTS09 - Transit Signal Priority
LYNX (1 of 5)



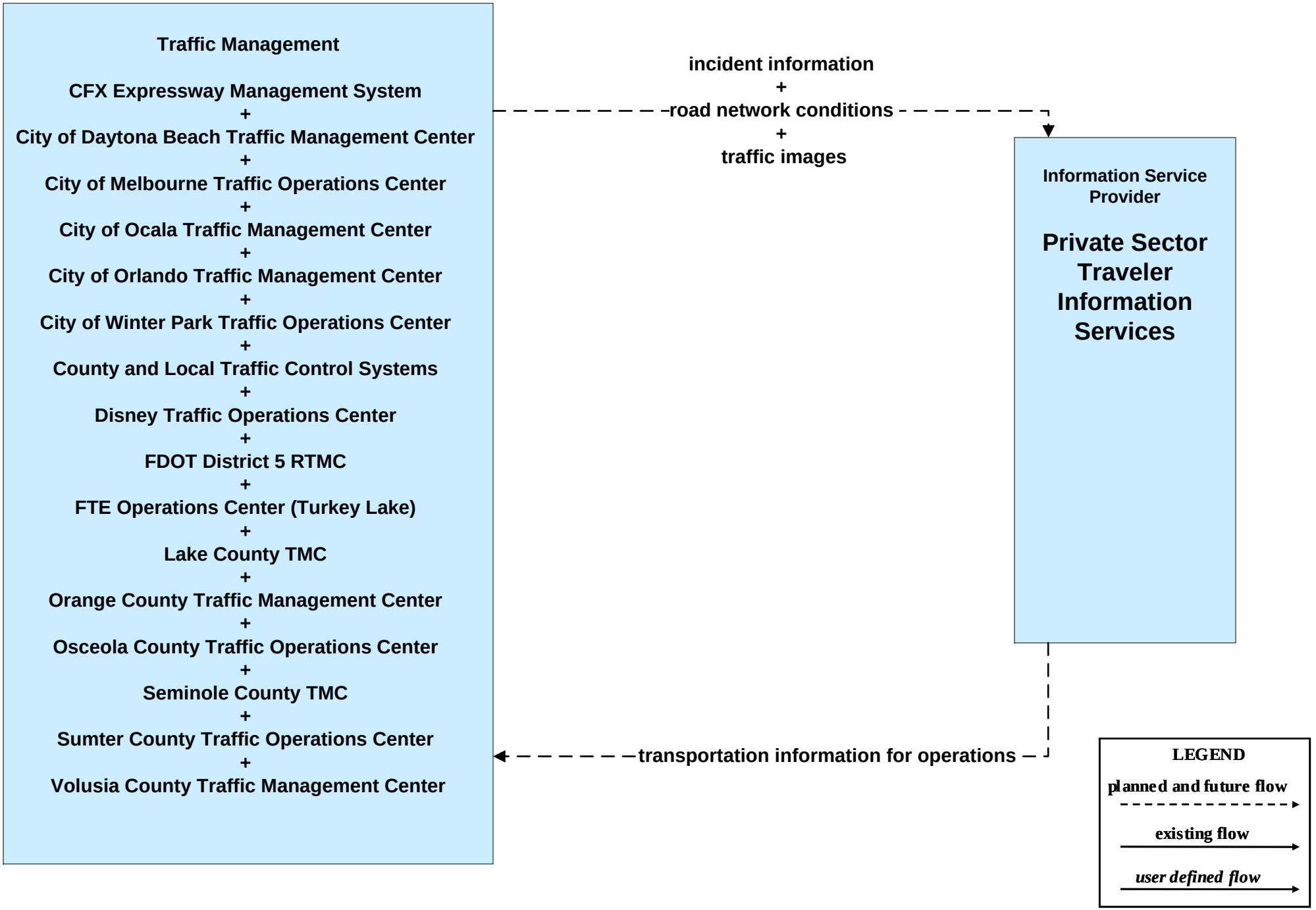
ATIS01 - Broadcast Traveler Information
Florida 511 / Private ISPs (3 of 3)



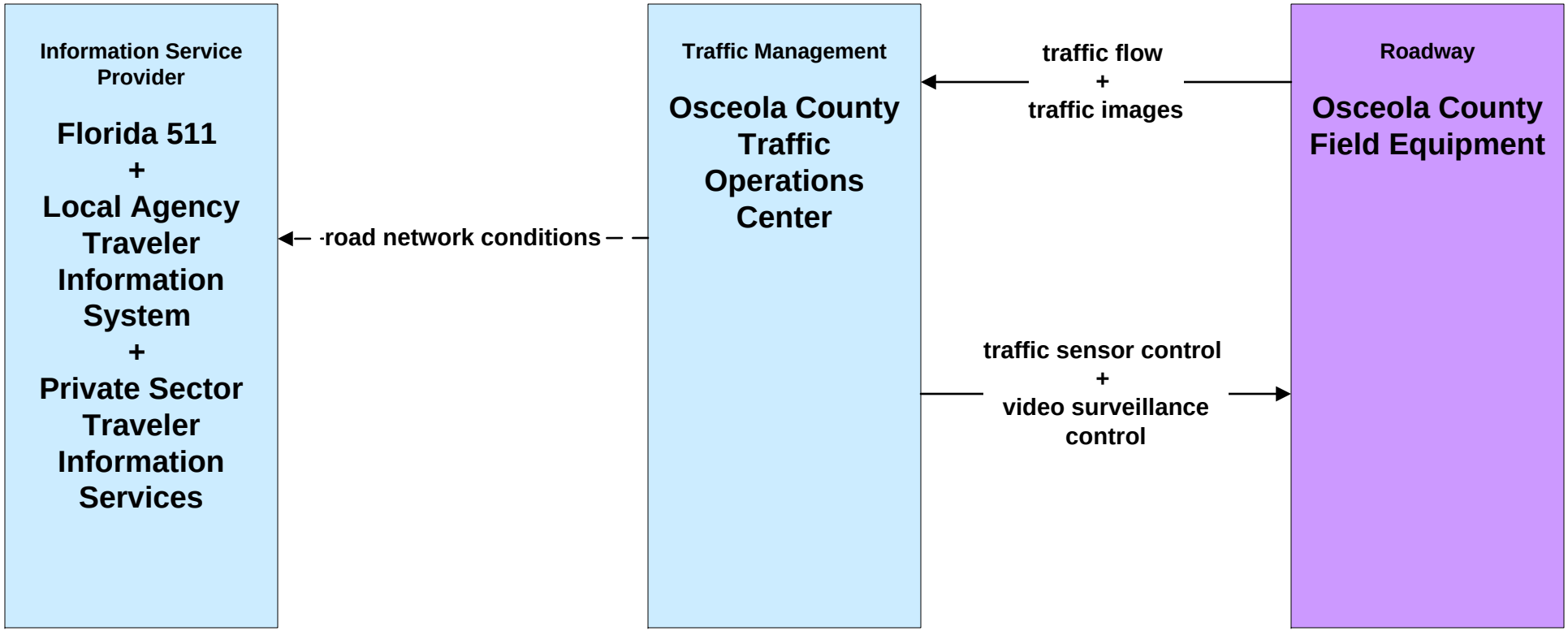
ATIS02 - Interactive Traveler Information
Virtual Travel Planning Center (1 of 2)

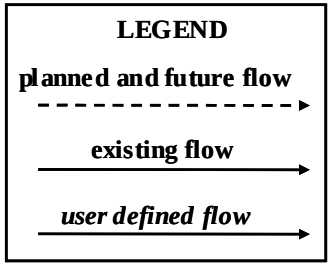


ATIS06 - Transportation Operations Data Sharing
Private Sector ISPs (2 of 2)

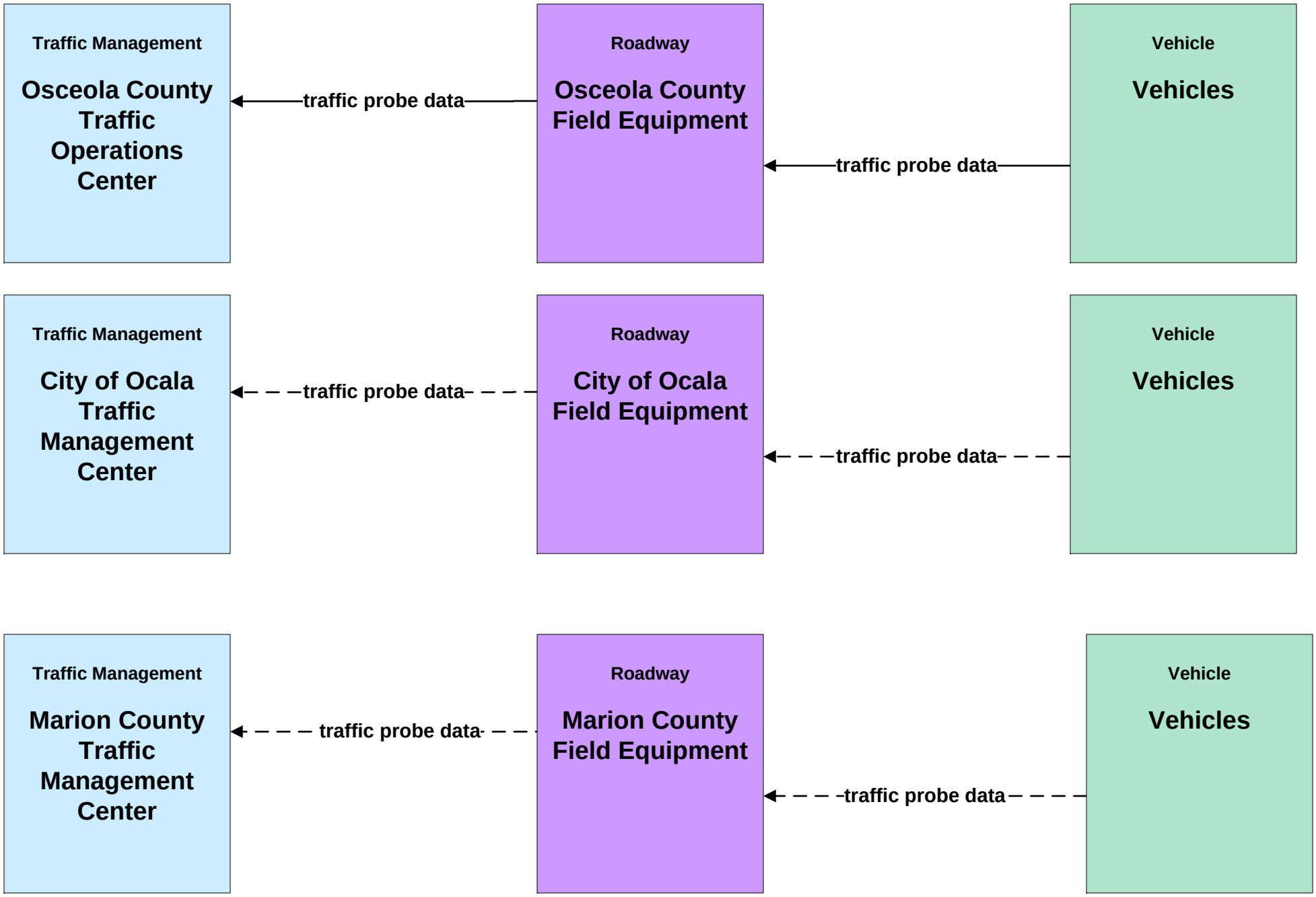


ATMS01 - Network Surveillance
Osceola County

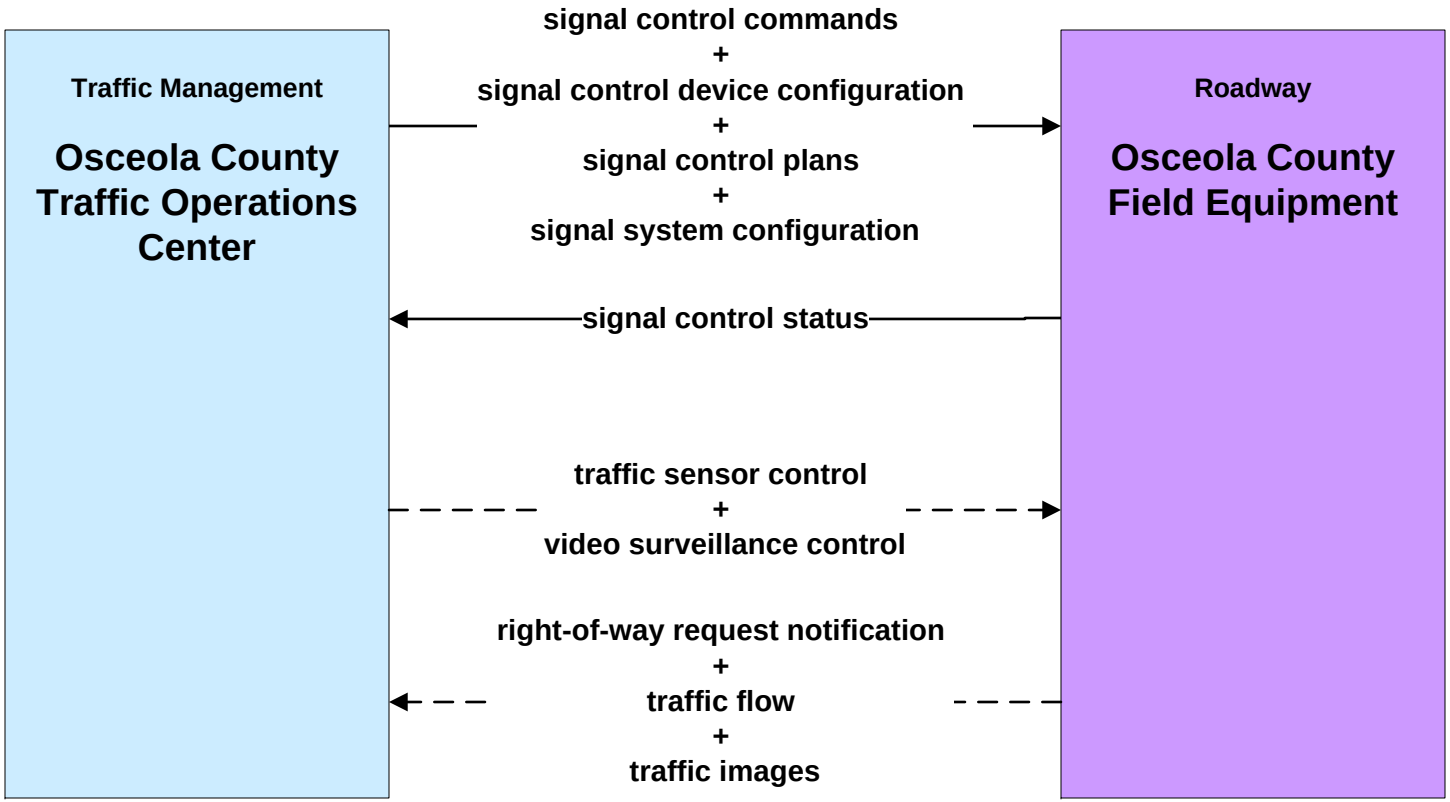


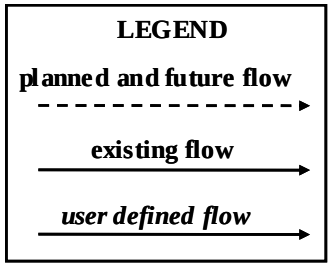


ATMS02 - Traffic Probe Surveillance
Osceola County/ City of Ocala / Marion County

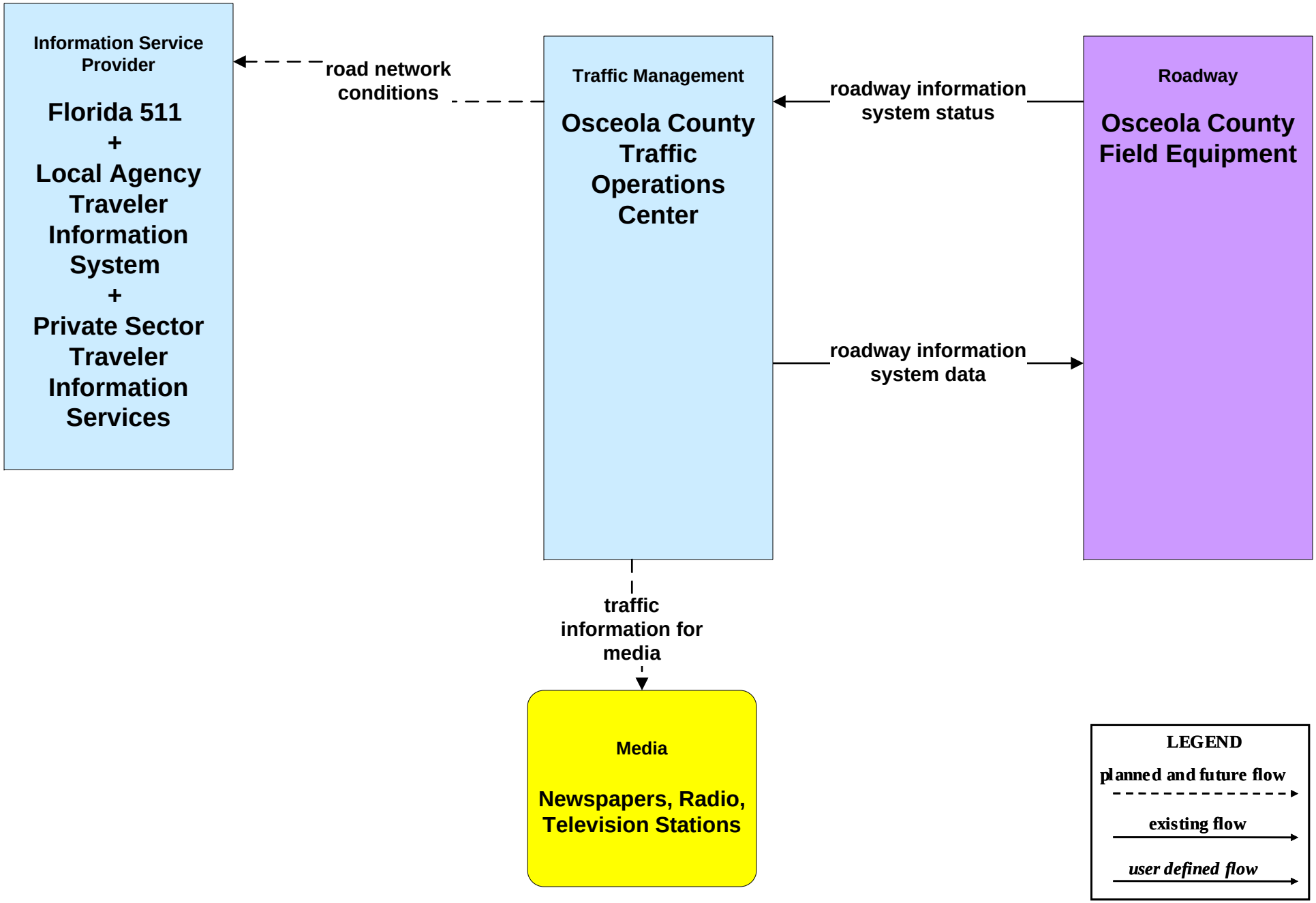


ATMS03 - Traffic Signal Control
Osceola County

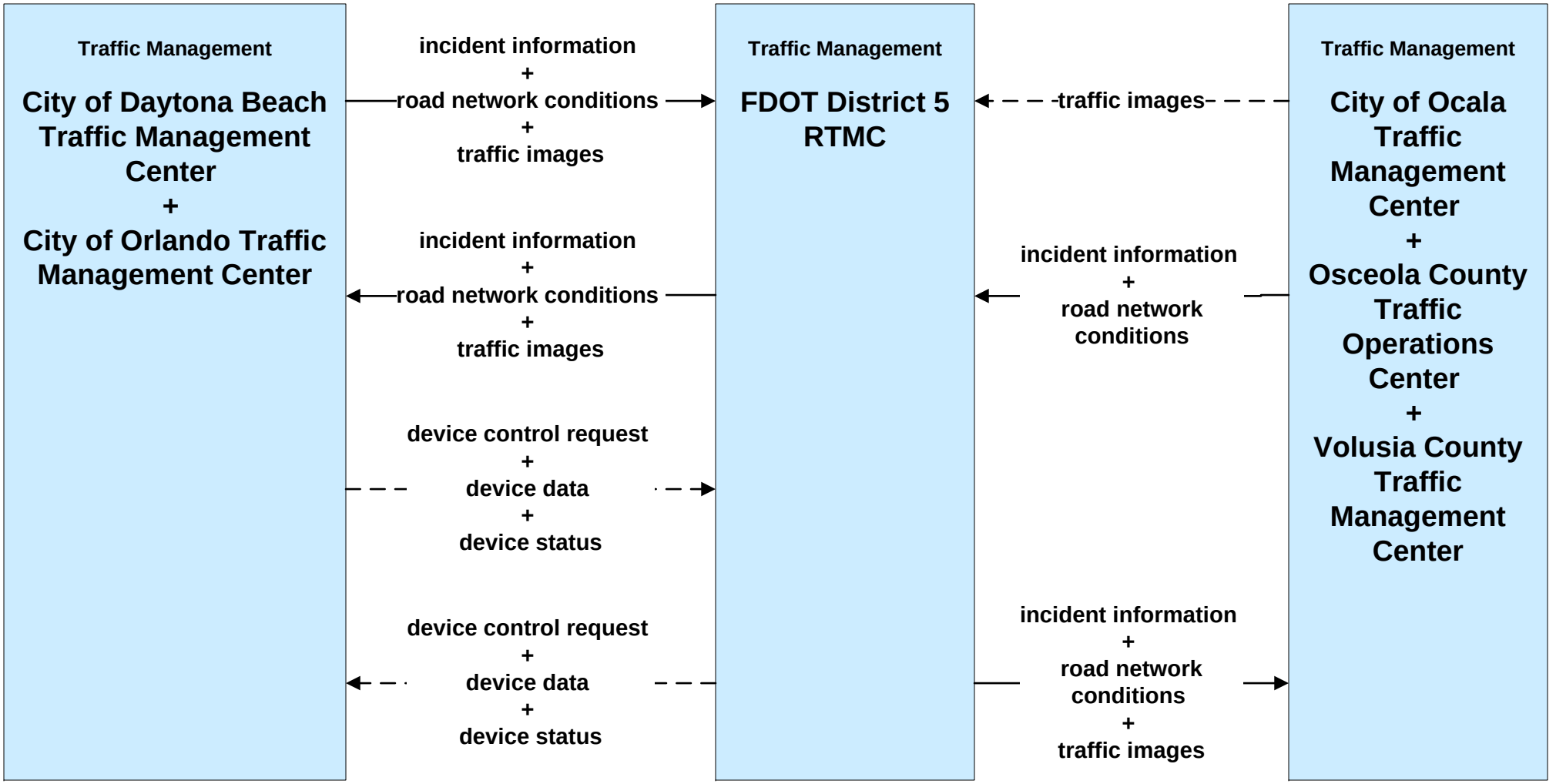




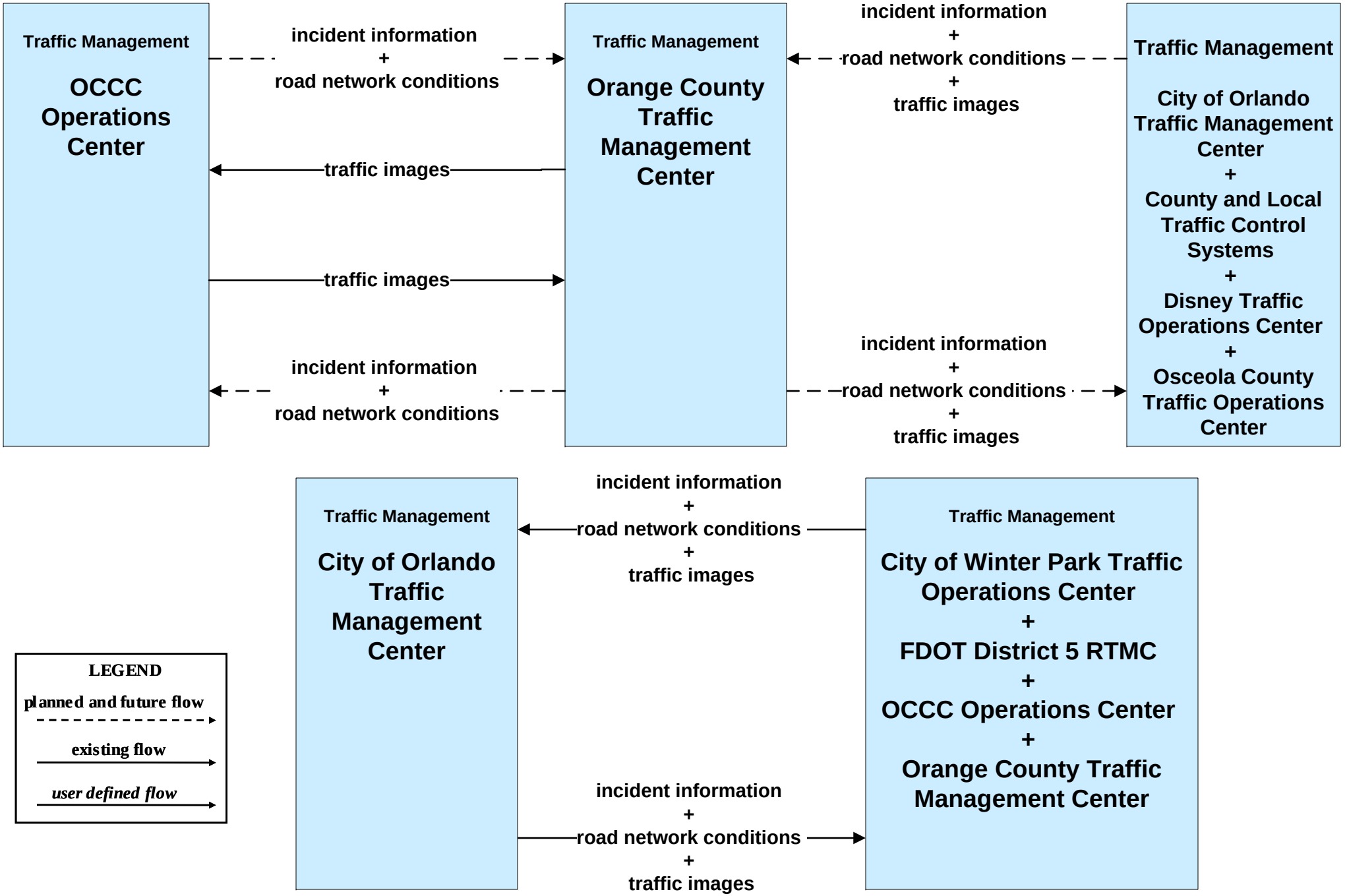
ATMS06 - Traffic Information Dissemination
Osceola County



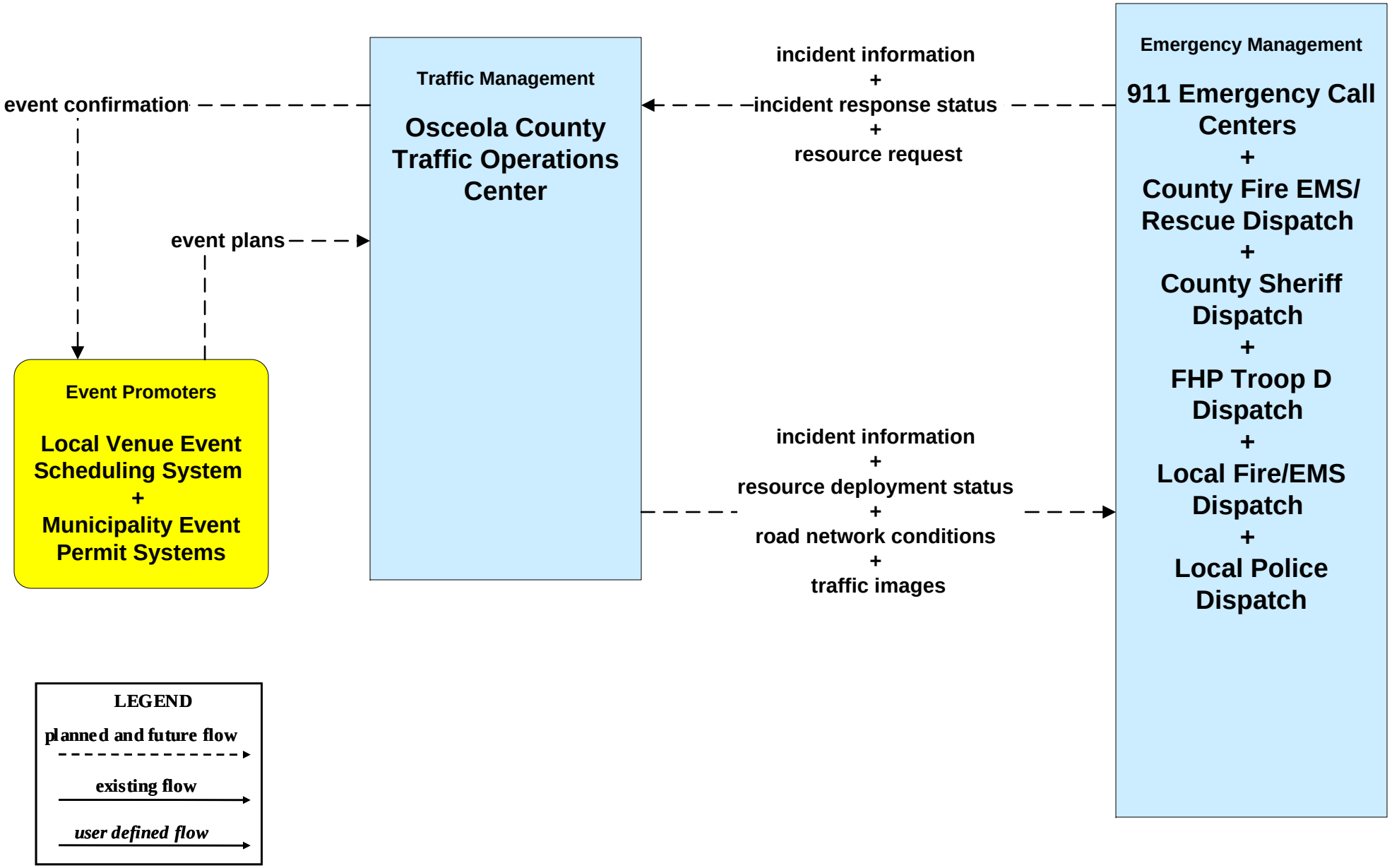
ATMS07 - Regional Traffic Management
FDOT Districts (2 of 3)



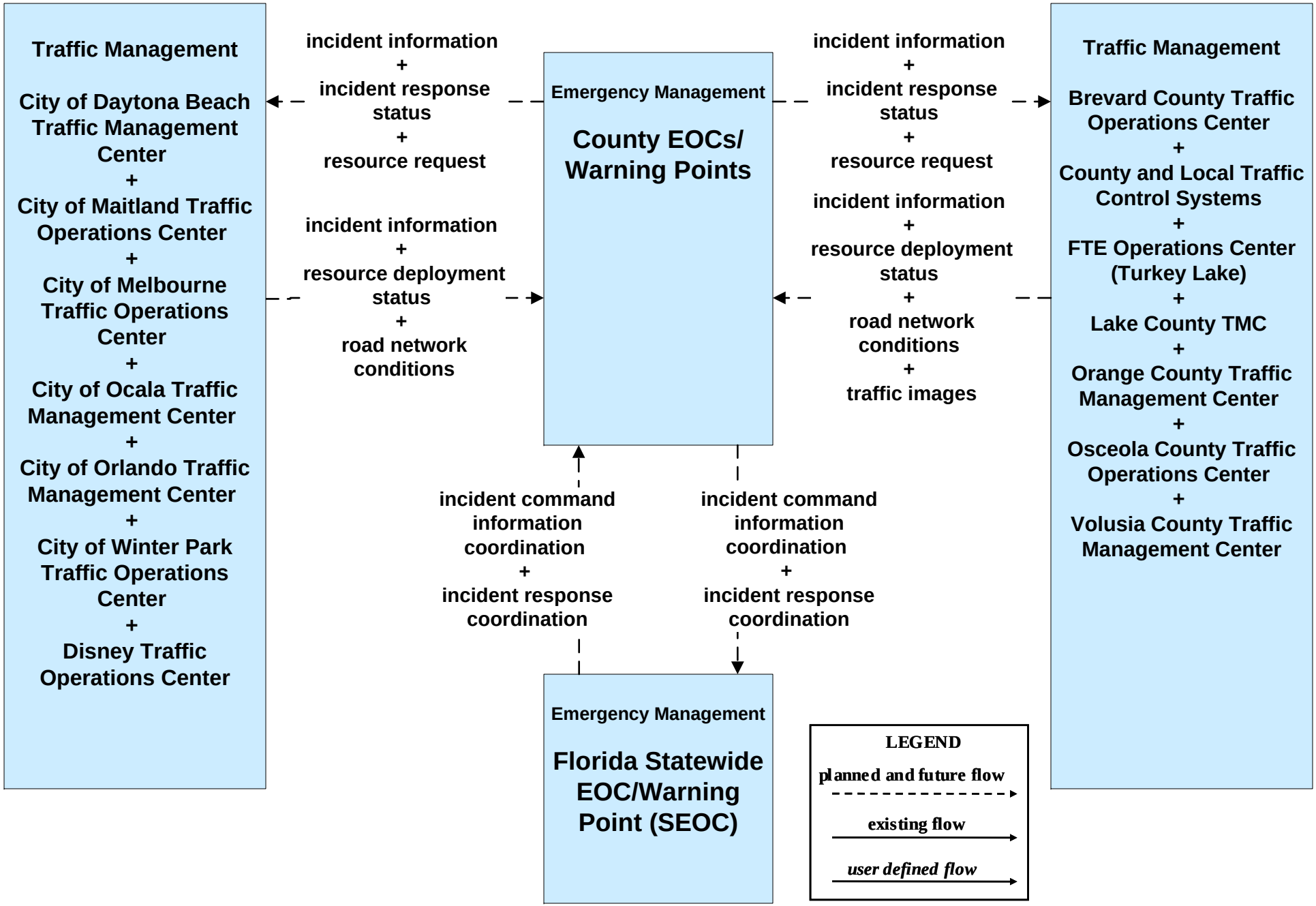
ATMS07 - Regional Traffic Management
Orange County / City of Orlando



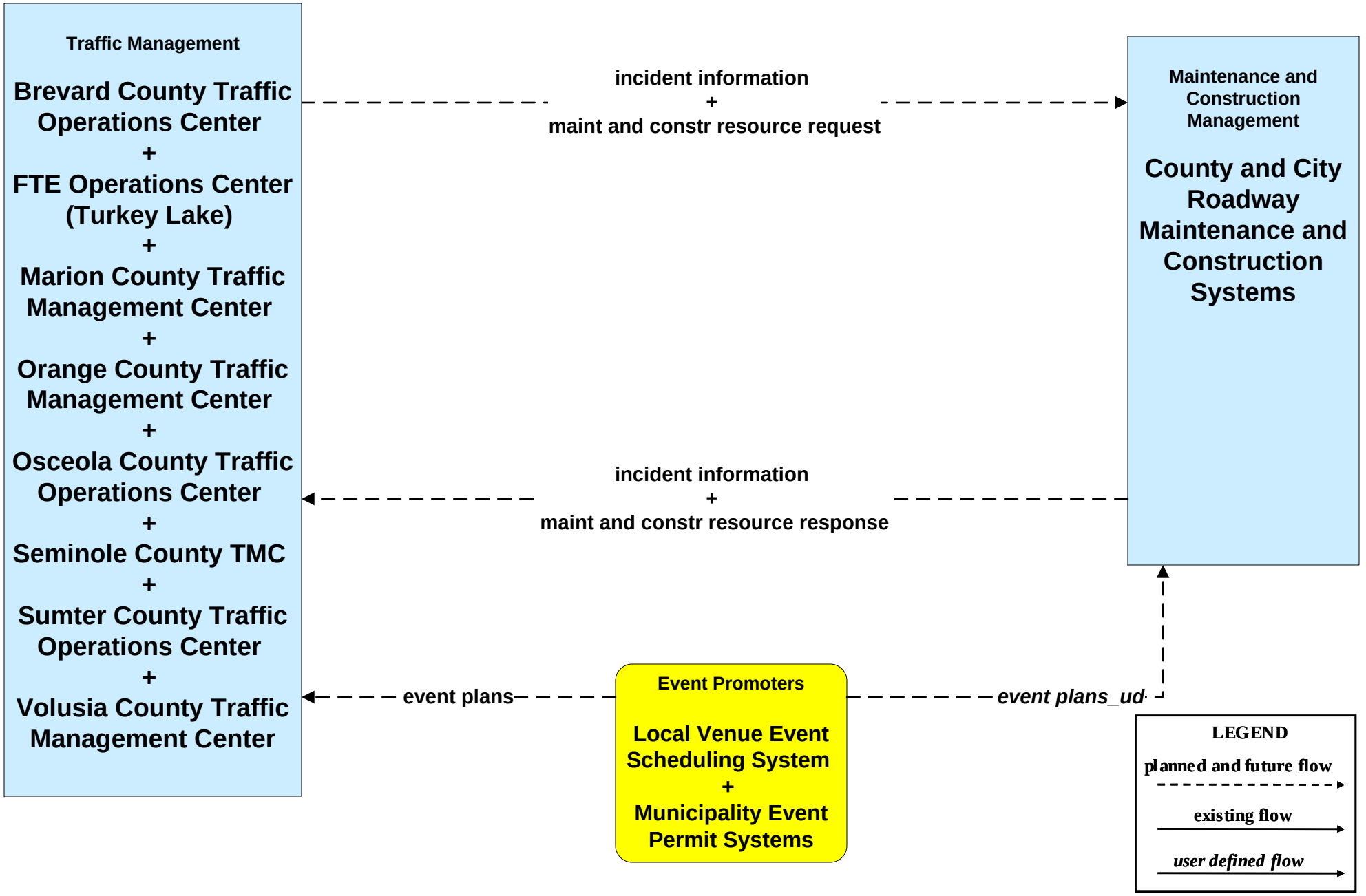
ATMS08 - Traffic Incident Management System
Osceola County (TM to EM)



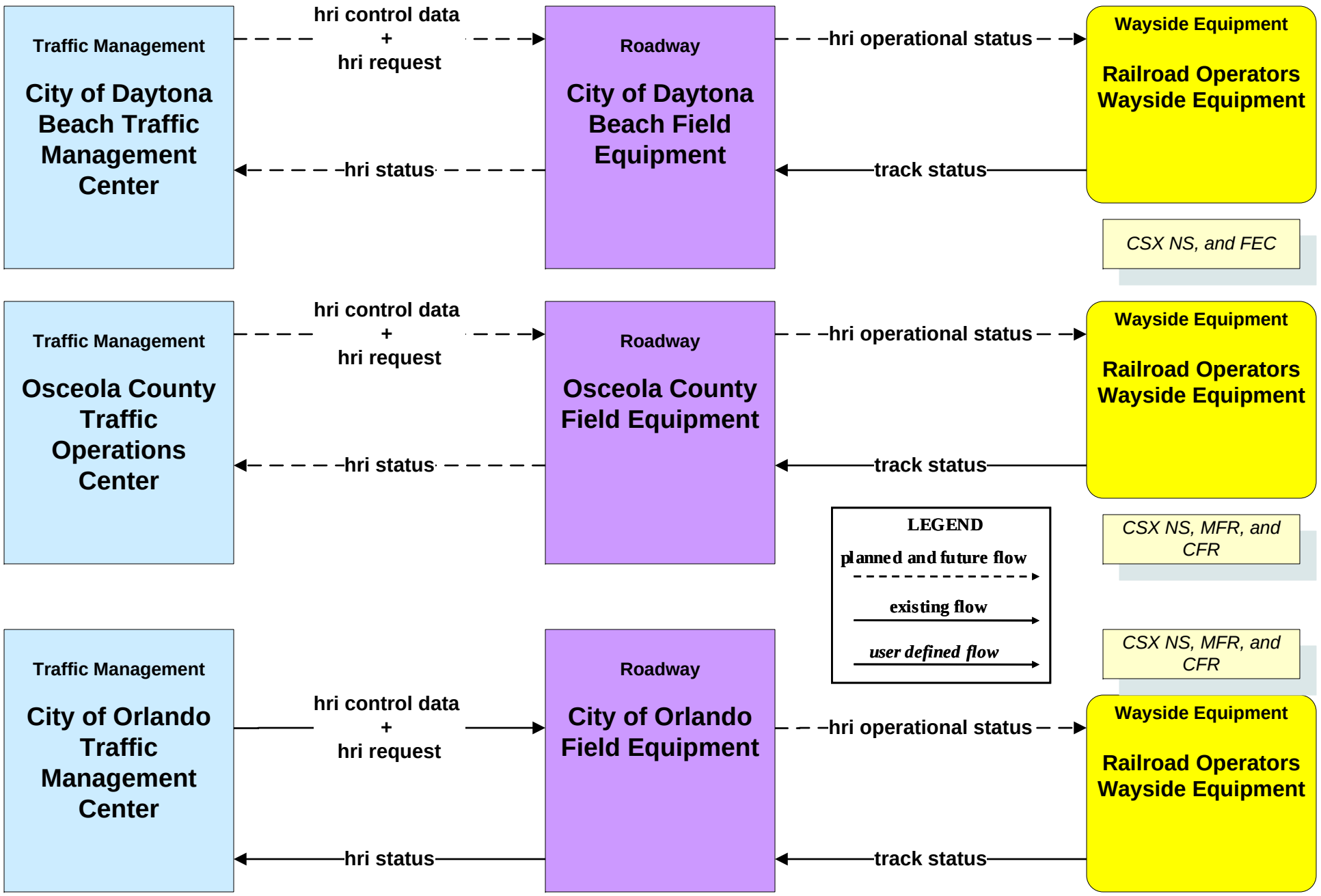
ATMS08 - Traffic Incident Management System
County Emergency Operations Center (TM to EM)



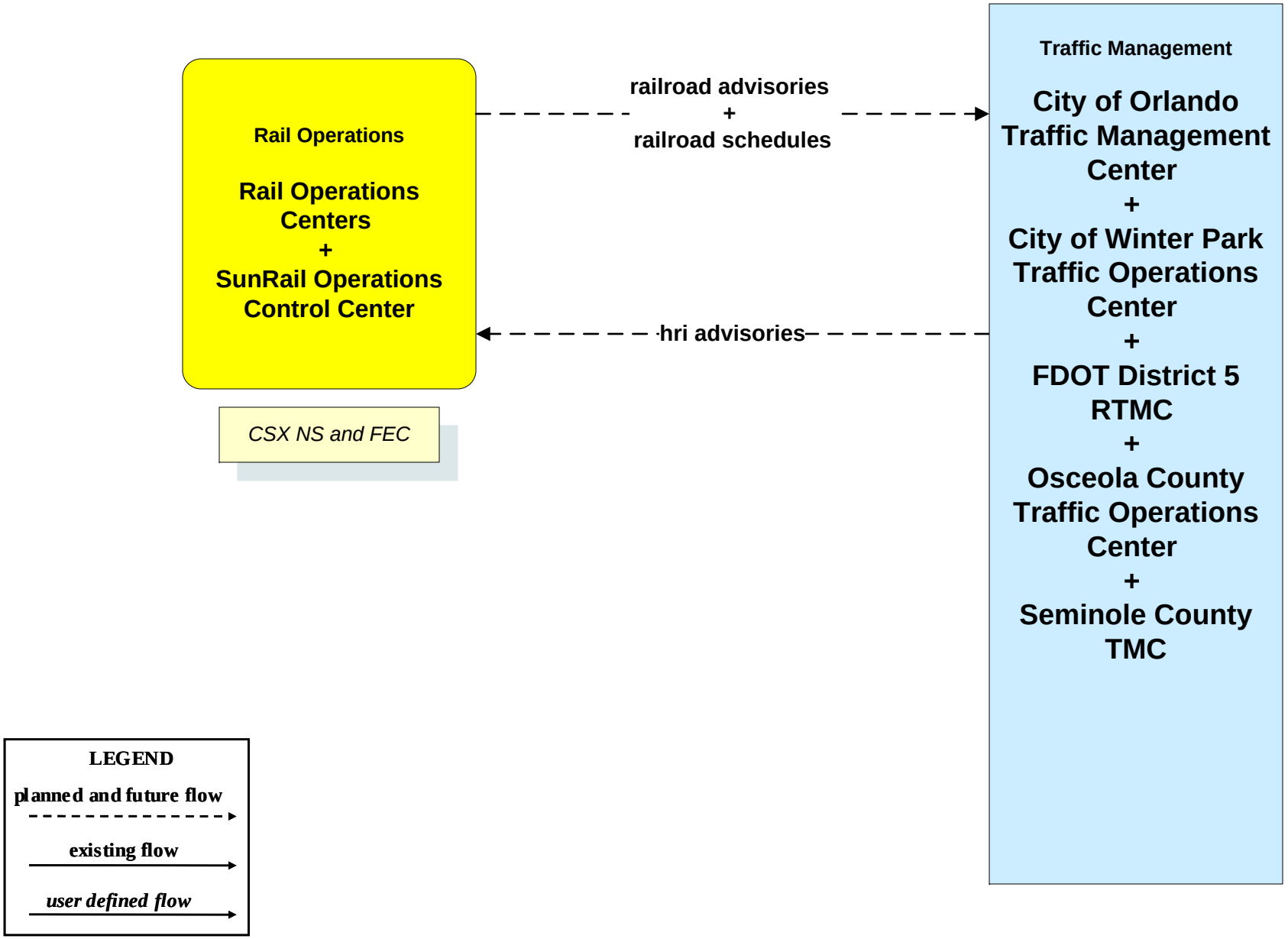
ATMS08 - Traffic Incident Management System
County Traffic Management Centers (TM to MCM)



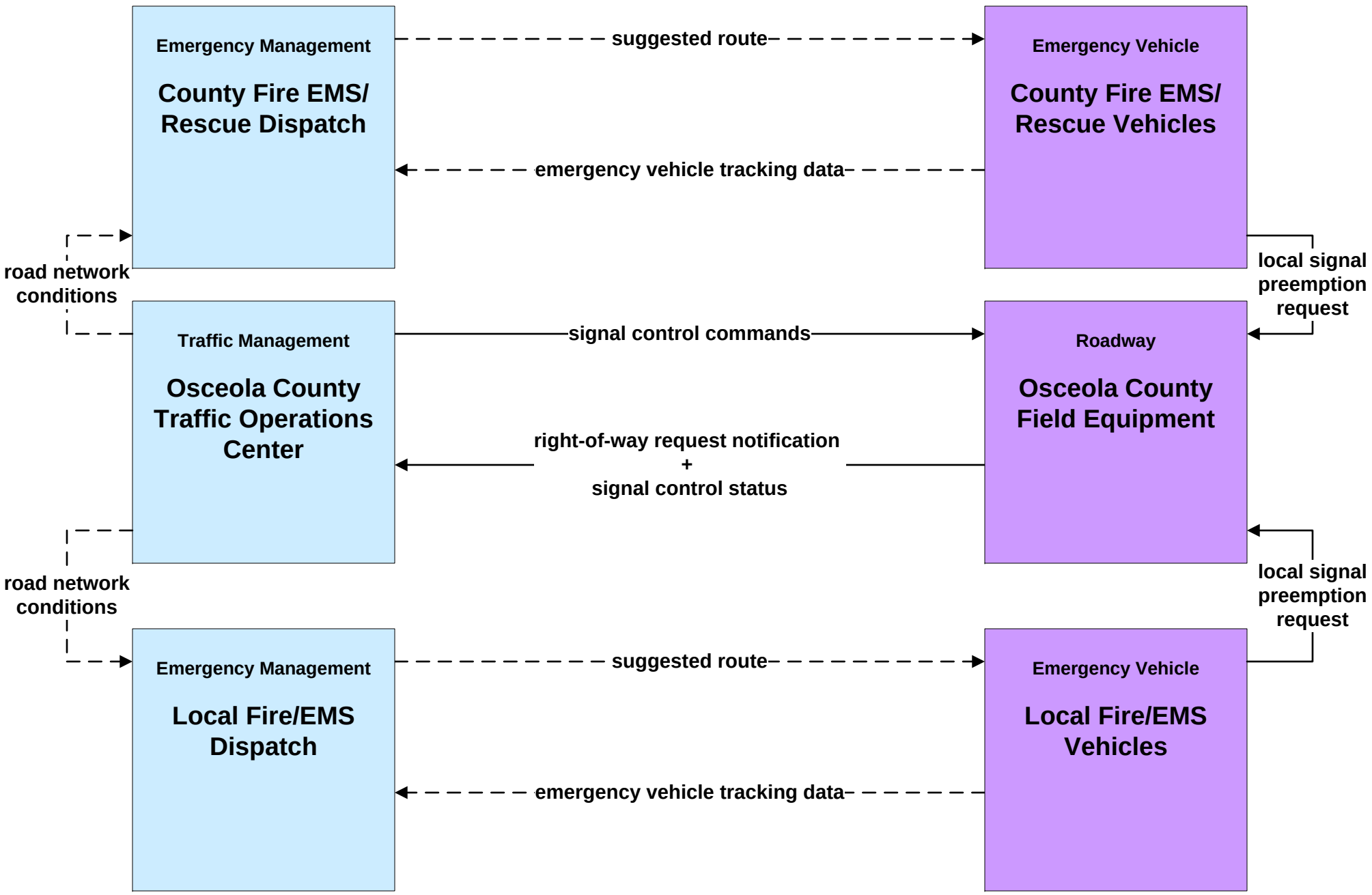
ATMS13 - Standard Railroad Crossing
City of Daytona Beach / City of Orlando / Osceola County



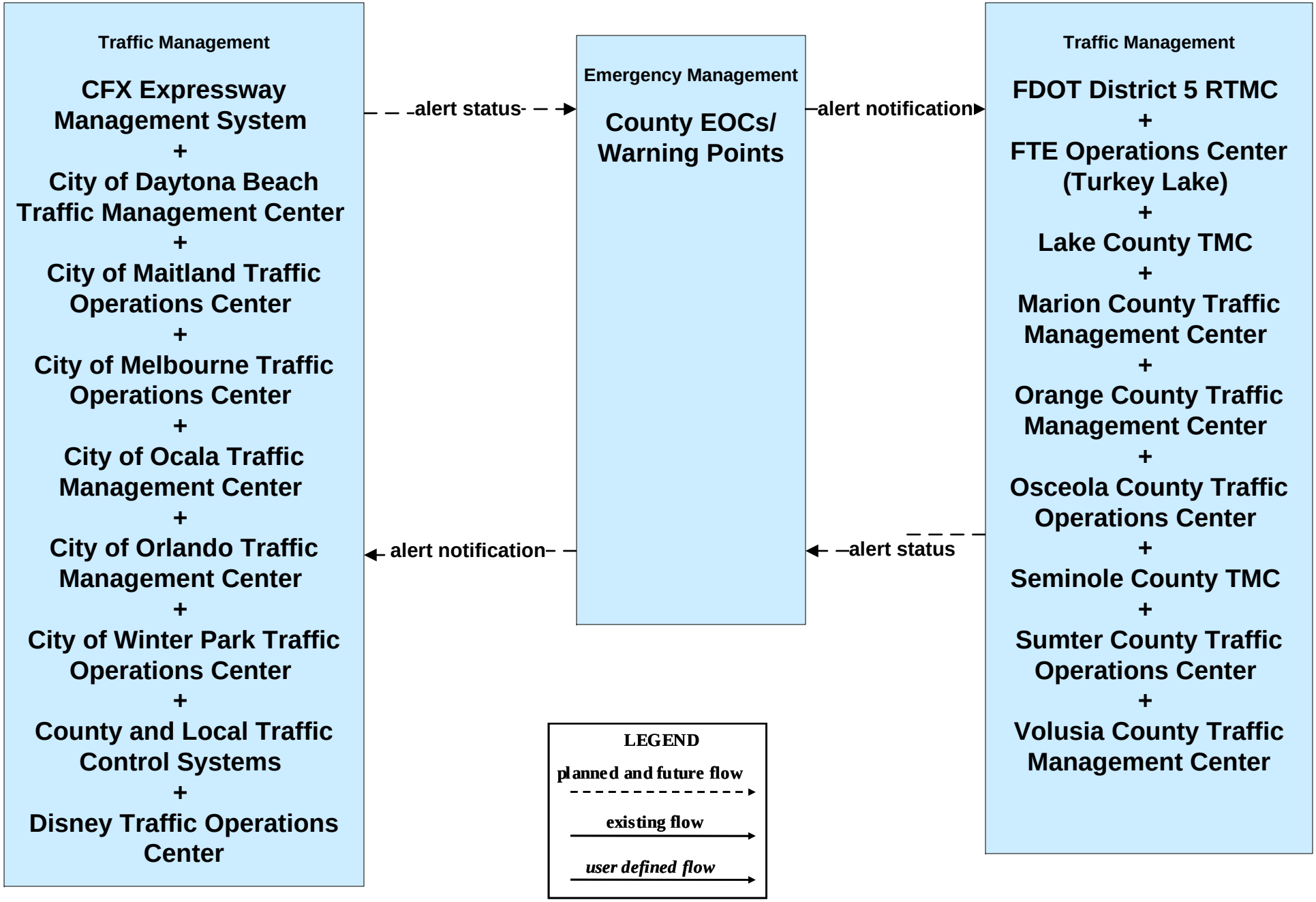
ATMS15 - Railroad Operations Coordination
Rail Operations Centers



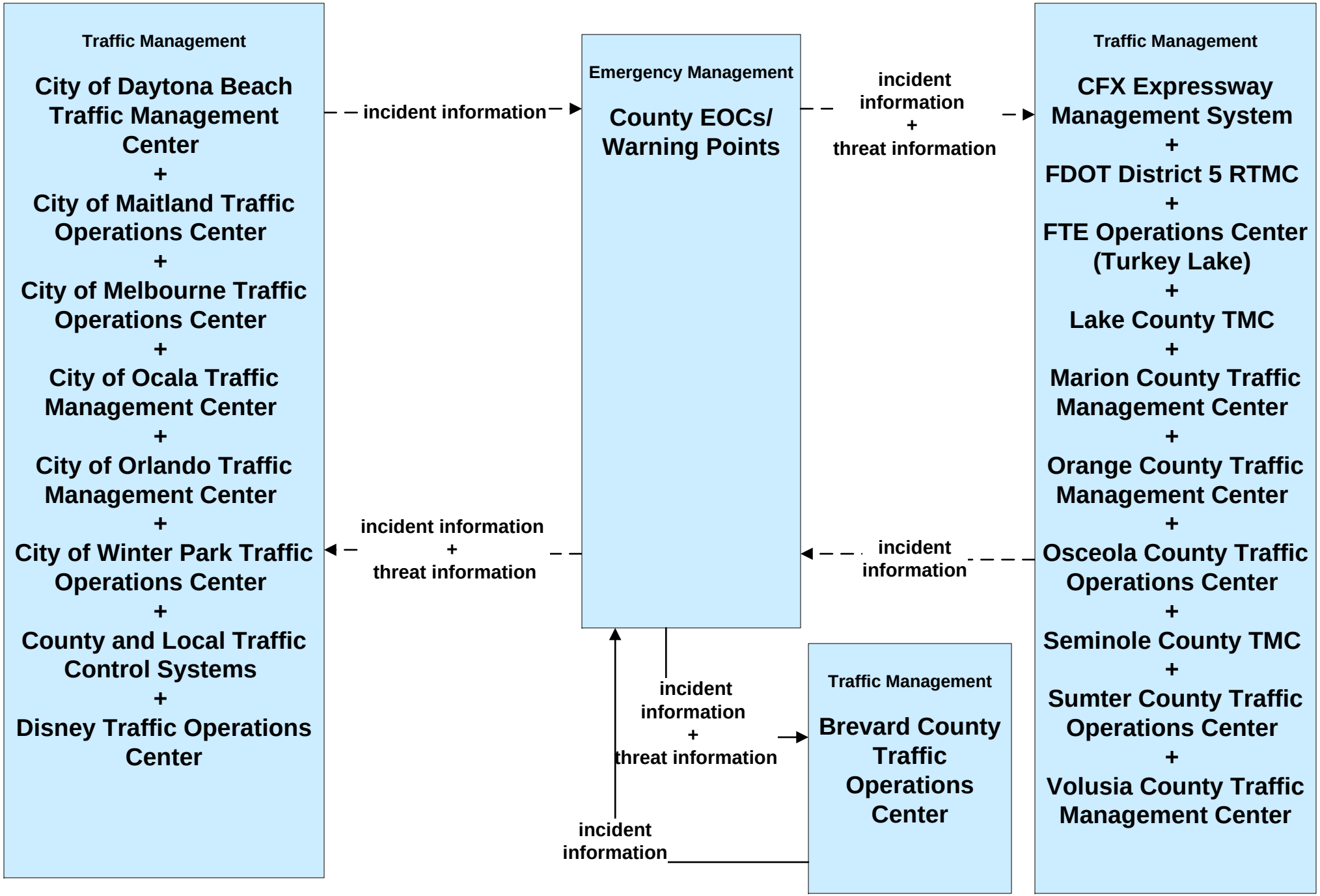
EM02 - Emergency Routing
Osceola County



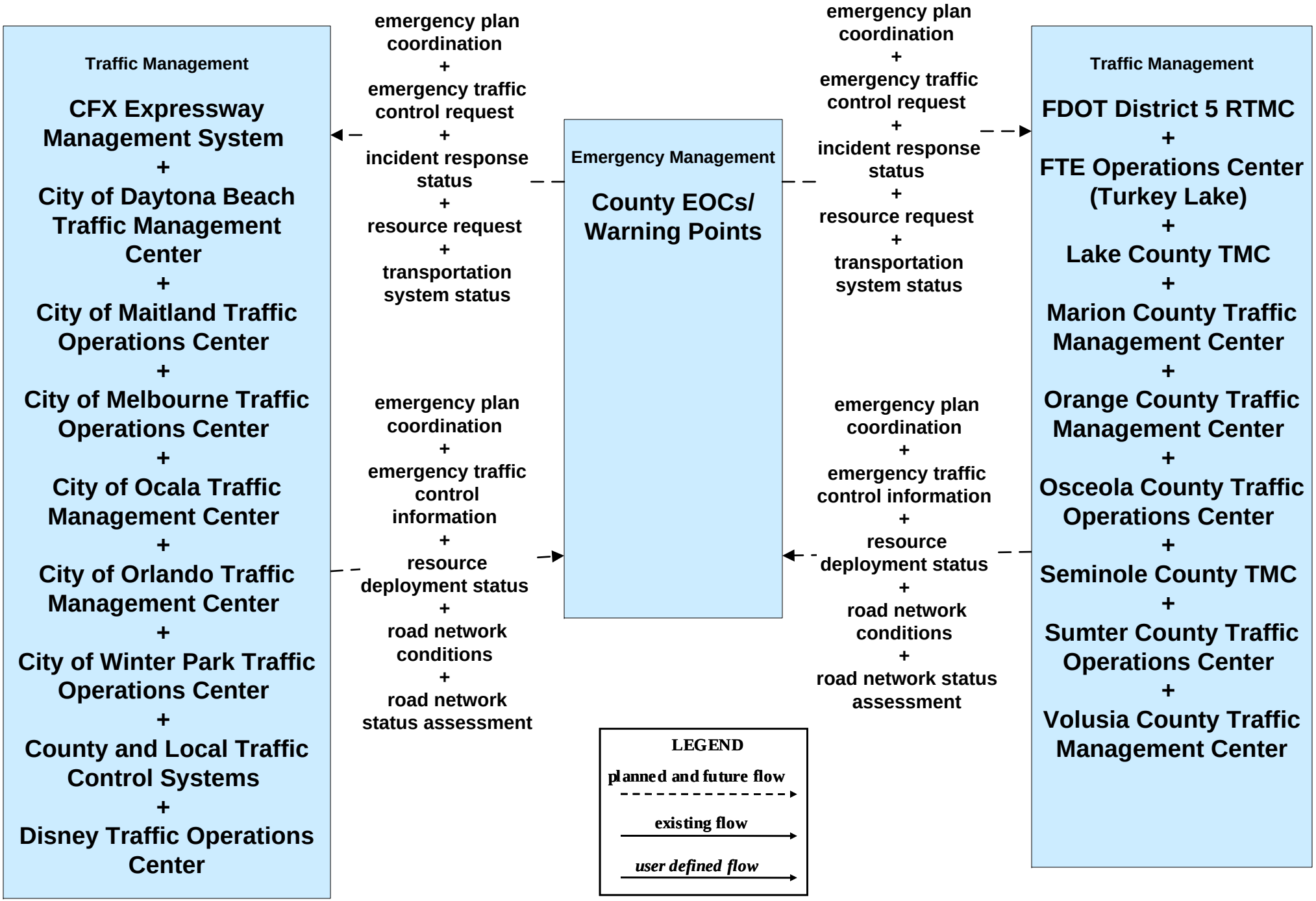
EM06 - Wide Area Alert
County EOCs (1 of 3)



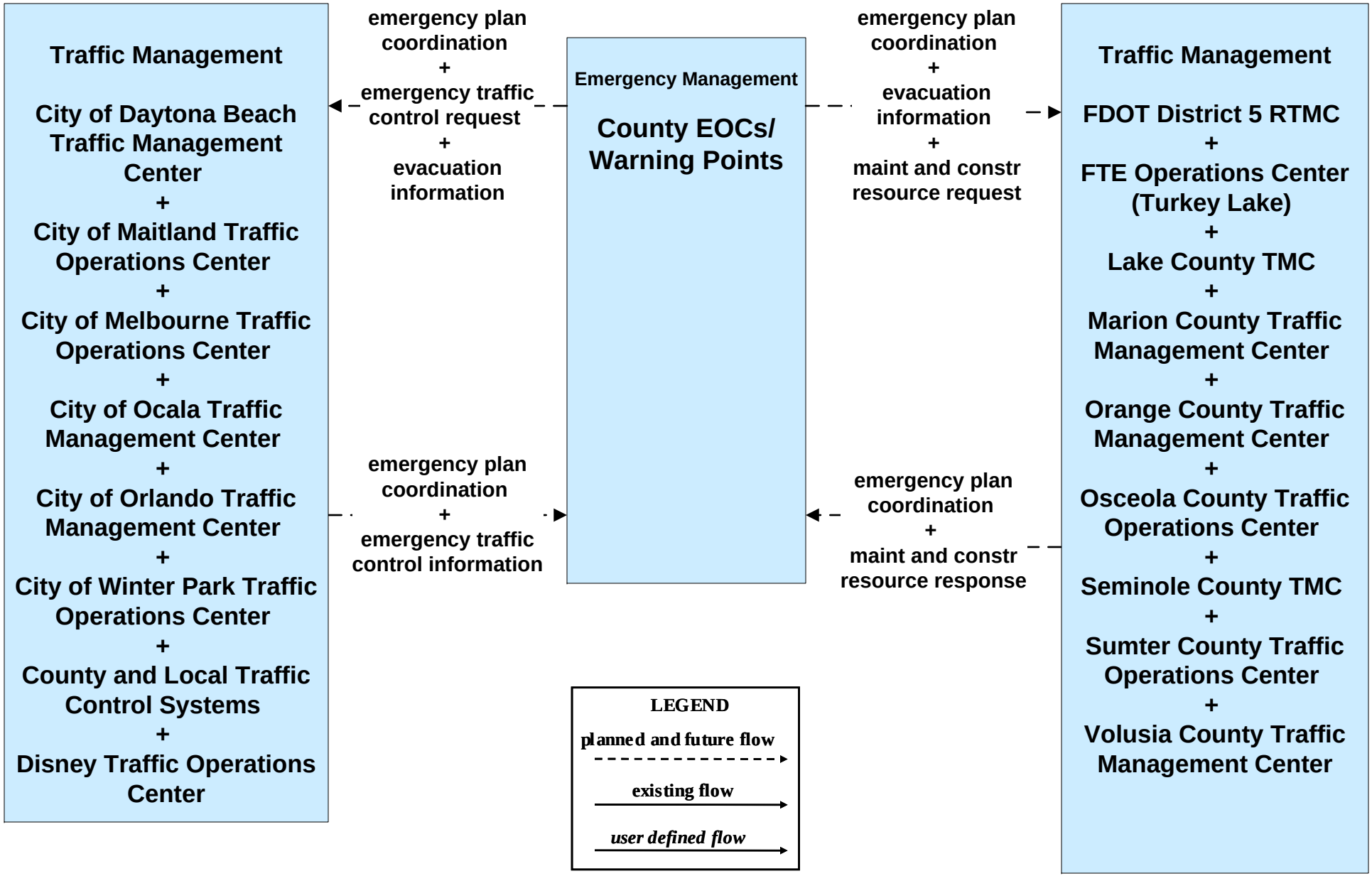
EM07 - Early Warning System
County EOCs (2 of 3)



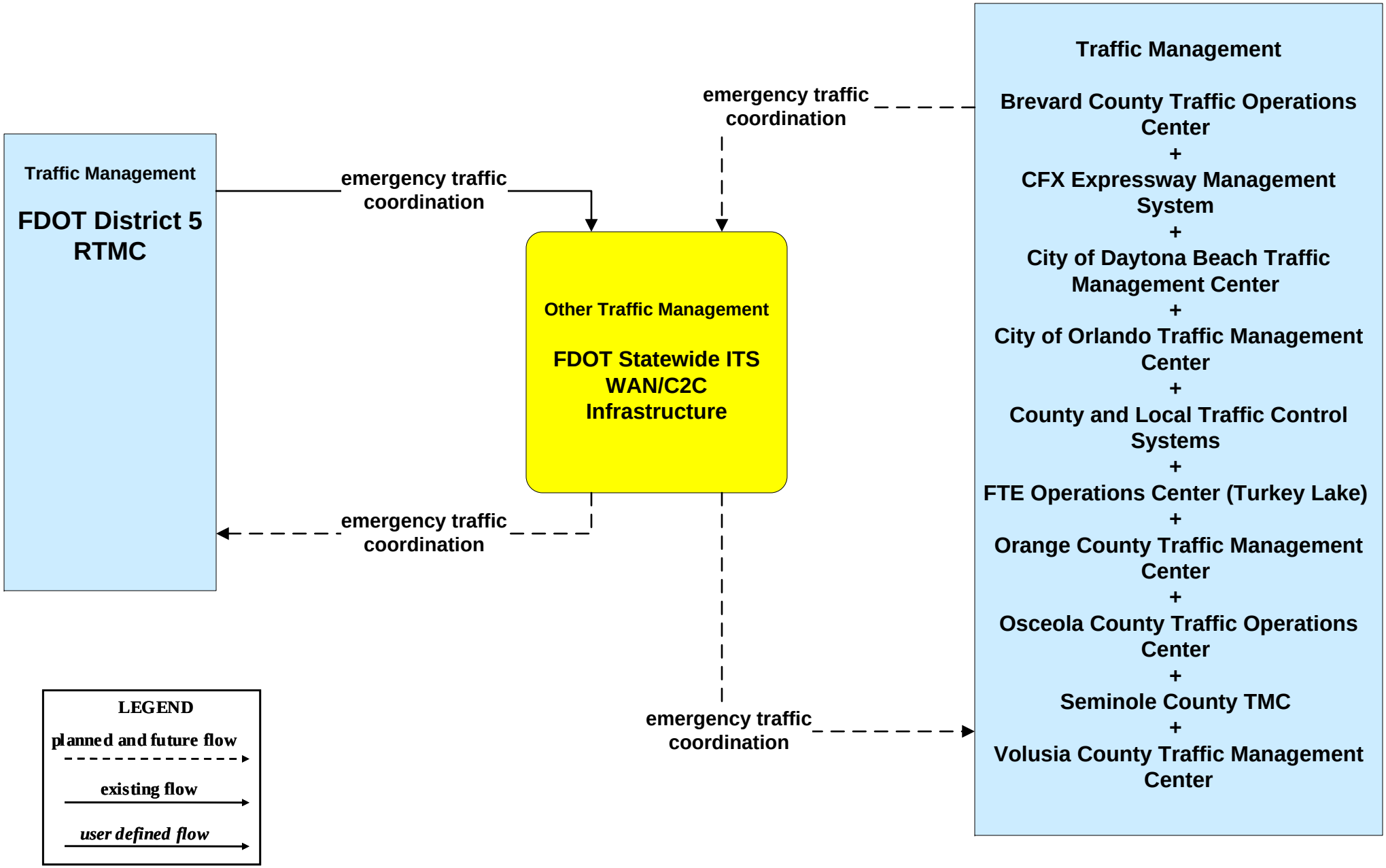
EM08 - Disaster Response and Recovery
County EOCs (2 of 4)



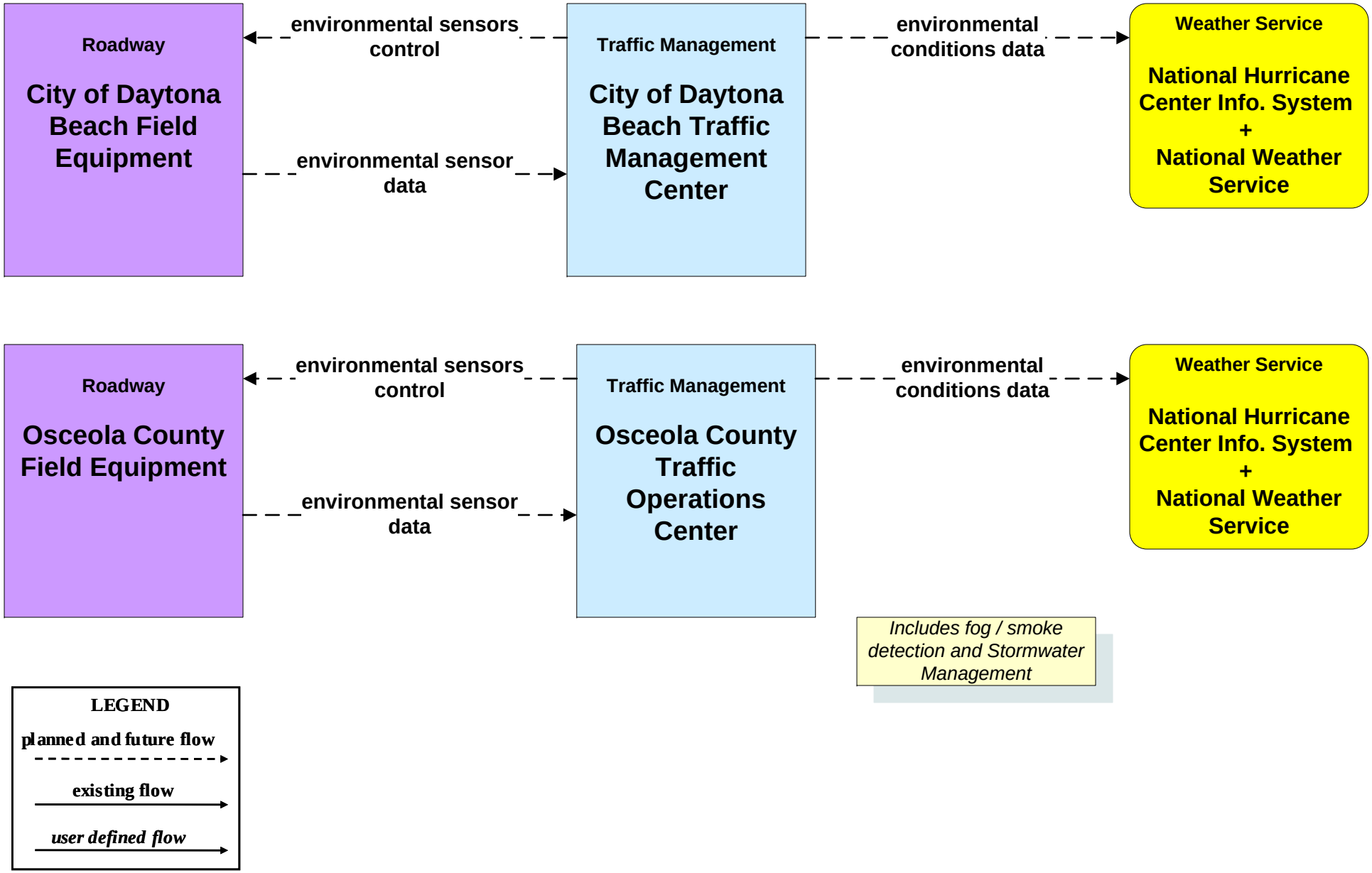
EM09 - Evacuation and Reentry Management
County EOCs (2 of 3)



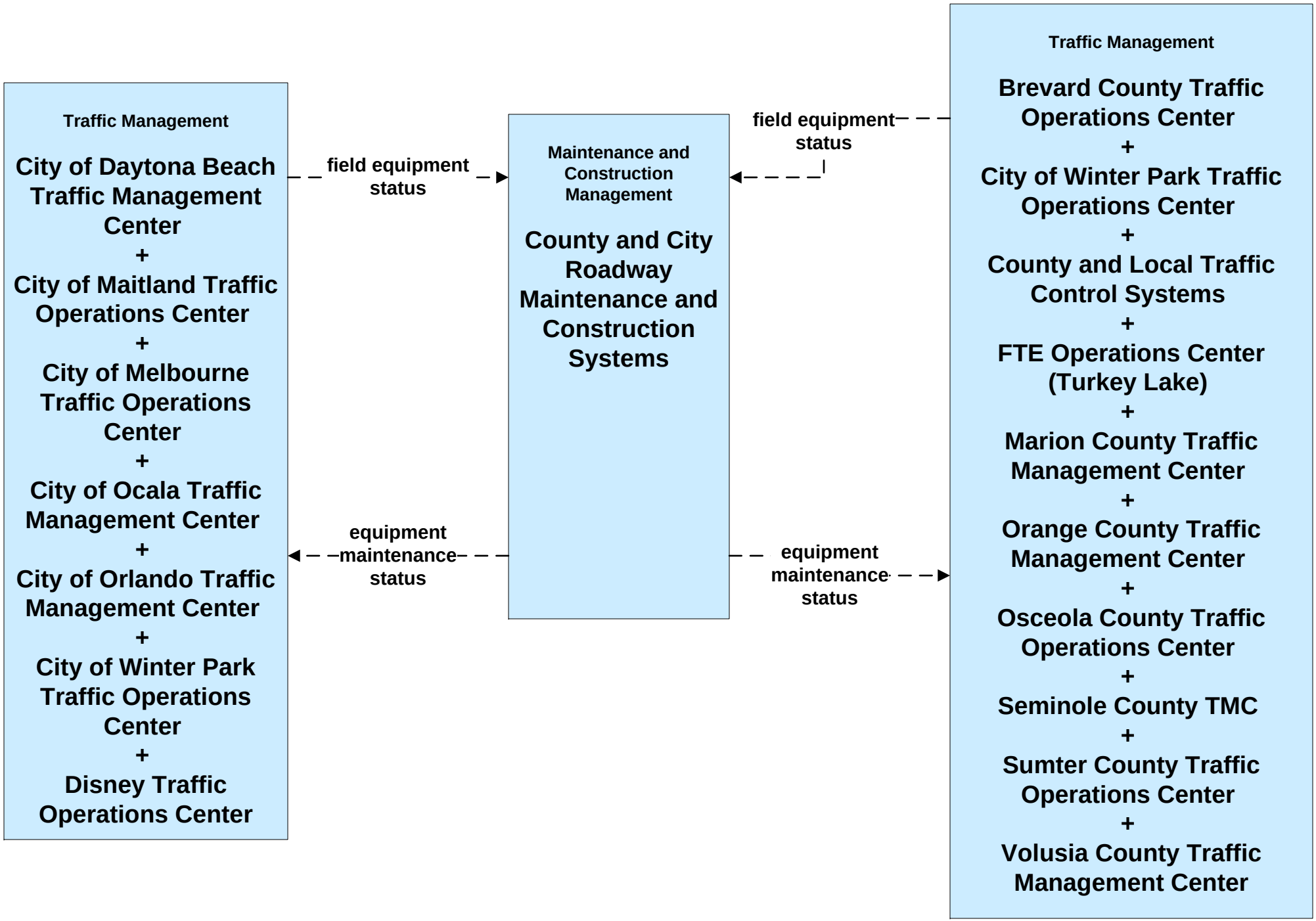
EM09 - Evacuation and Reentry Management
Central Florida Traffic Management Agencies



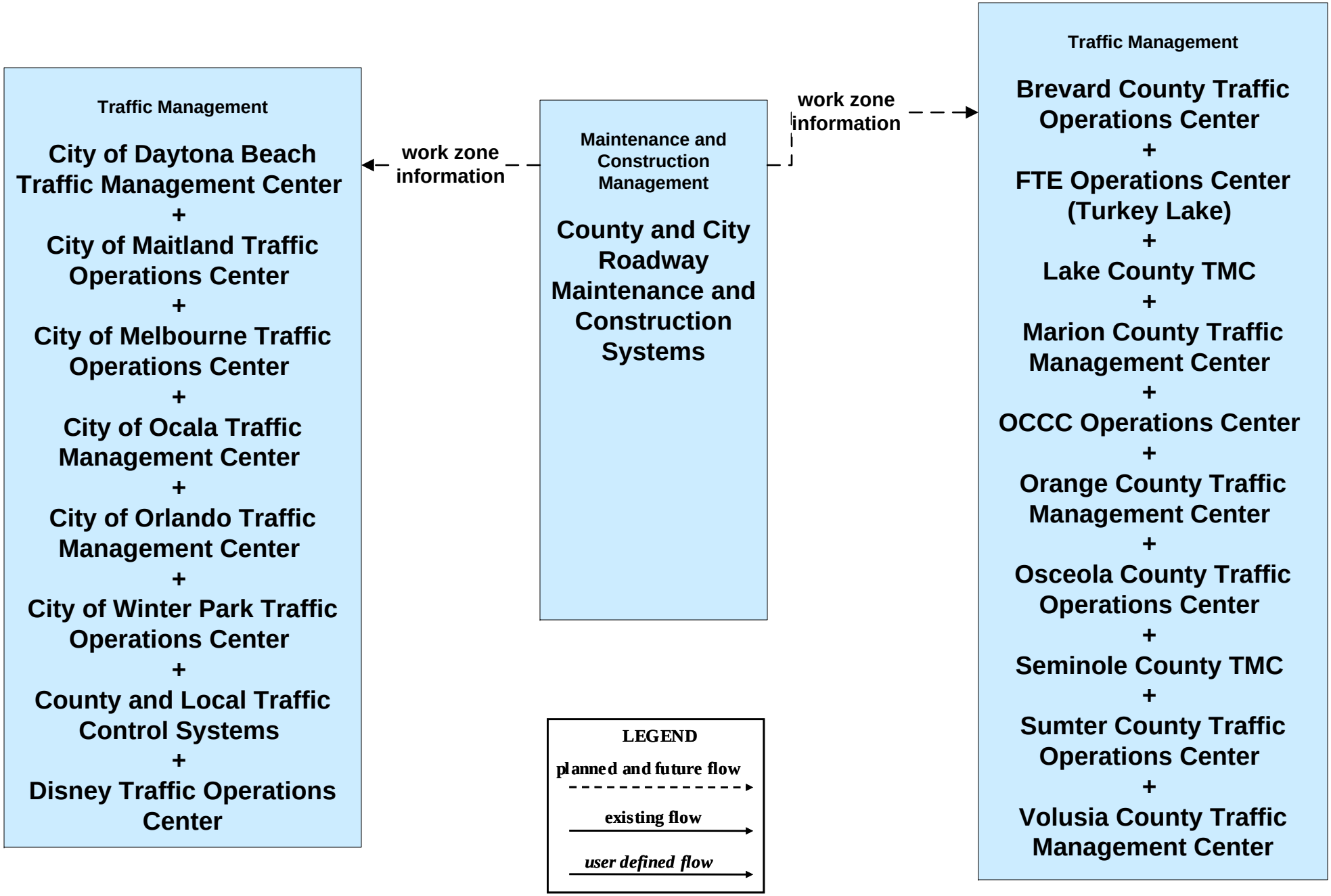
MC03 - Road Weather Data Collection
City of Daytona Beach / Osceola County



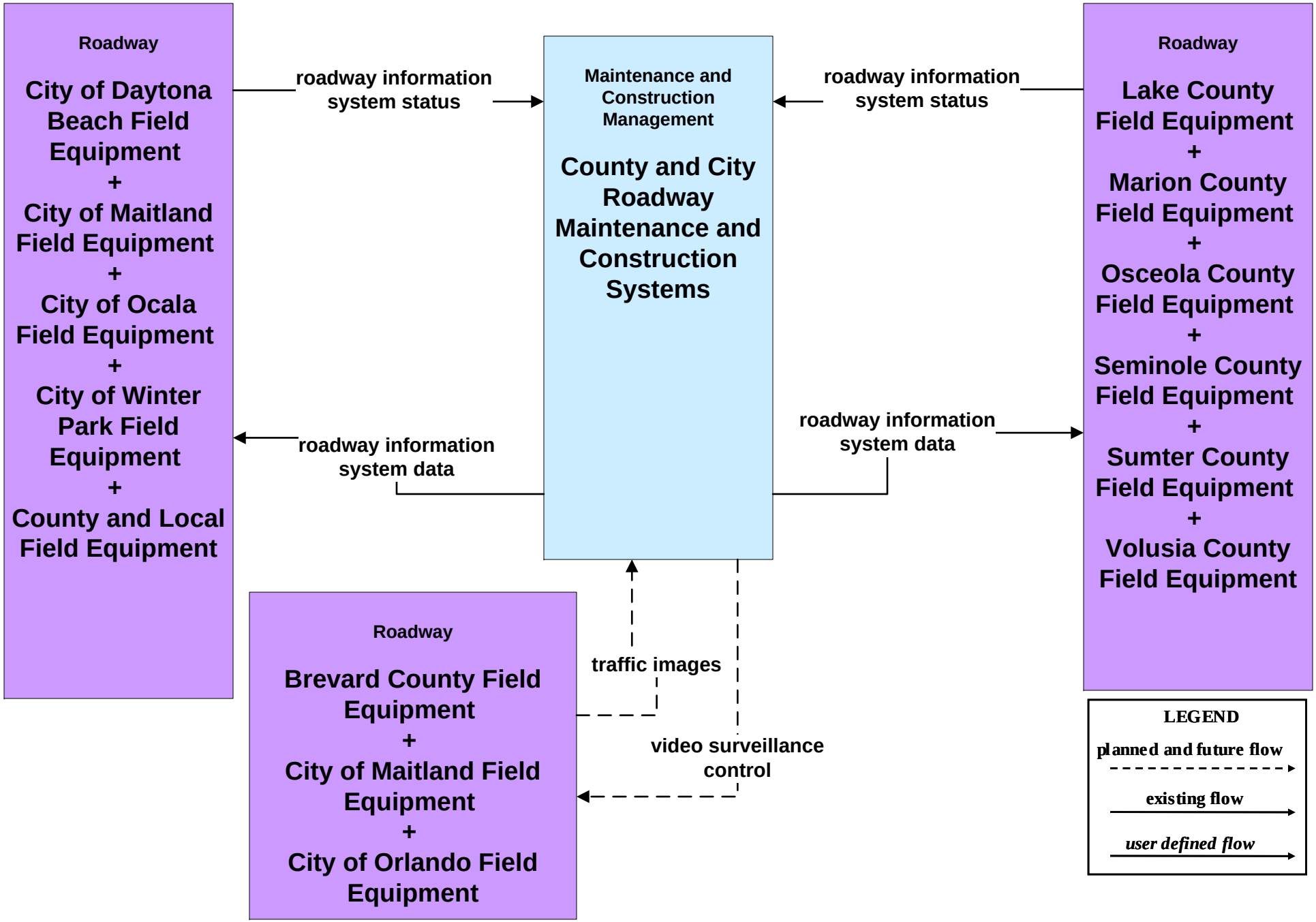
MC07 - Roadway Maintenance and Construction
Counties and Cities (2 of 2)



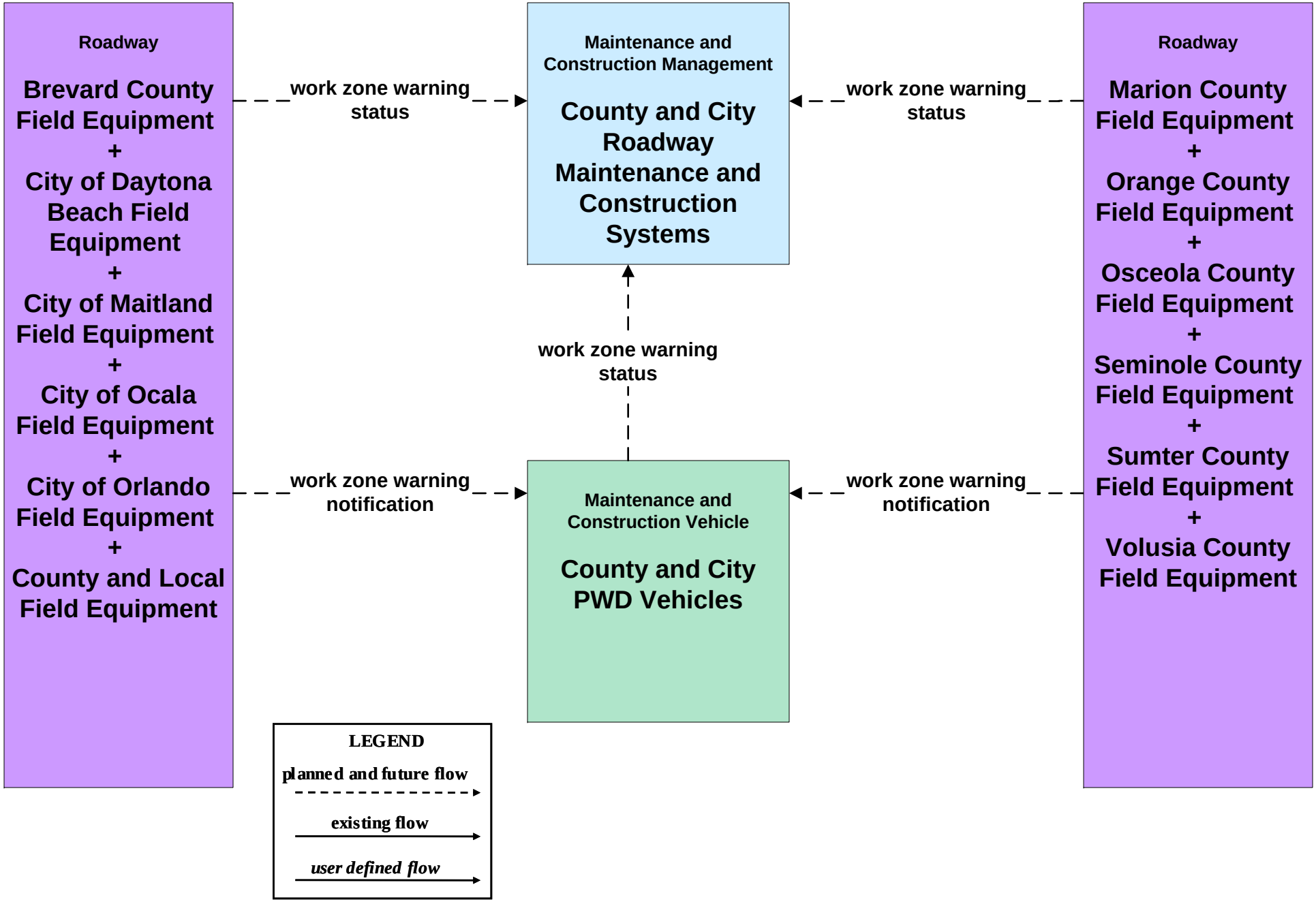
MC08 - Work Zone Management
Counties and Cities (2 of 3)



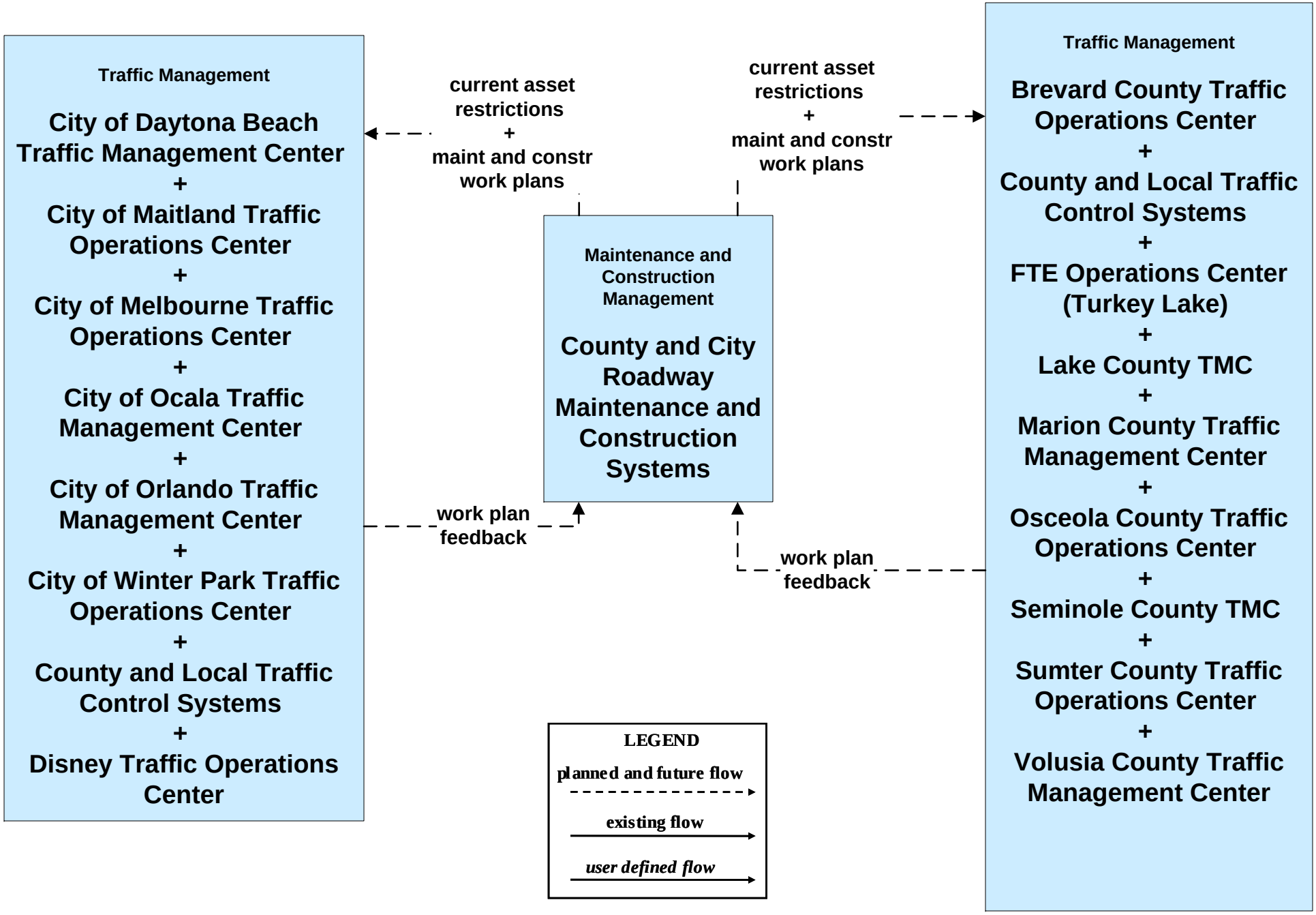
MC08 - Work Zone Management
Counties and Cities (3 of 3)



MC09 - Work Zone Safety Monitoring
Counties and Cities



MC10 - Maintenance and Construction Activity Coordination
Counties and Cities (2 of 4)



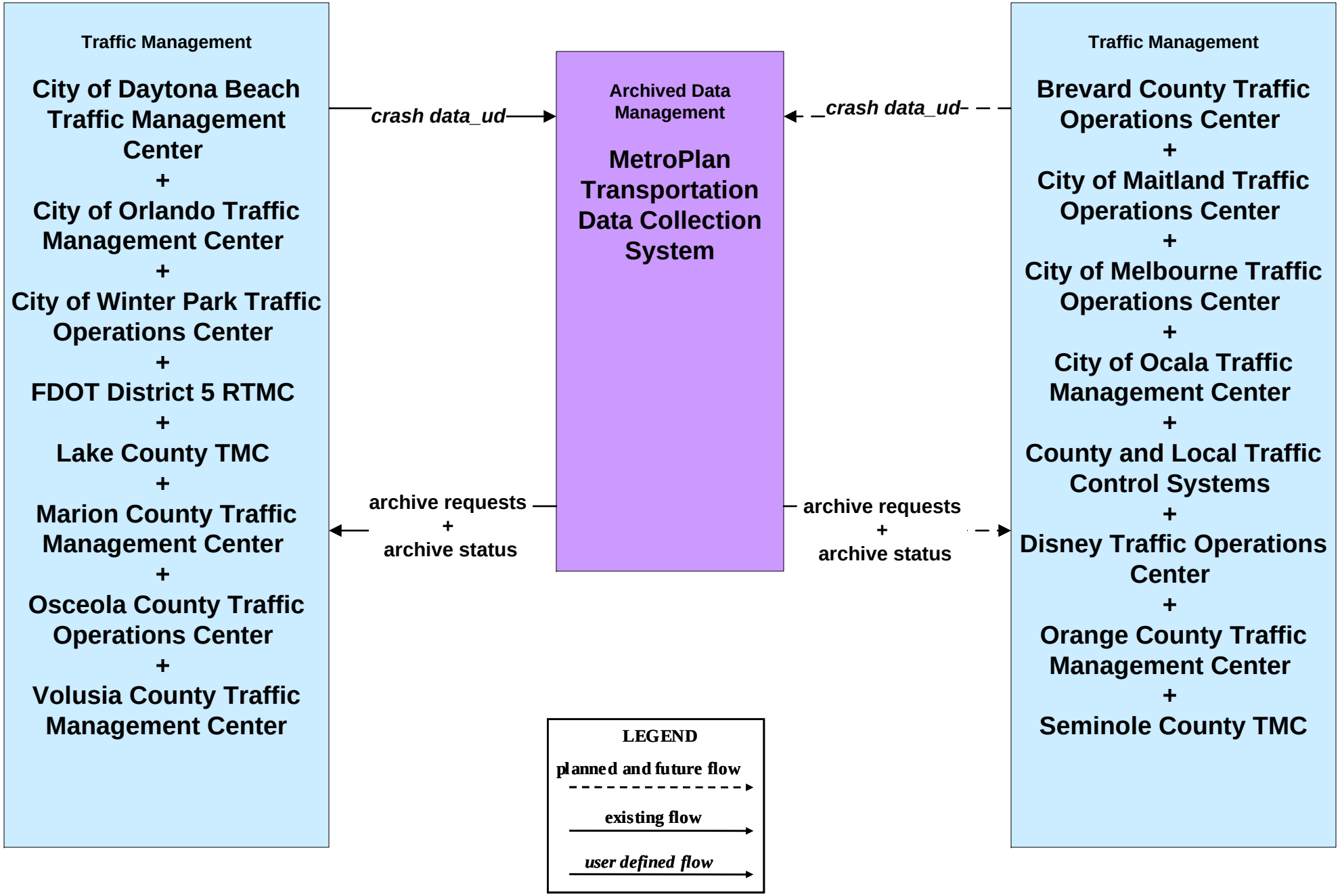
FDOT District 5

Central Florida Regional ITS Architecture

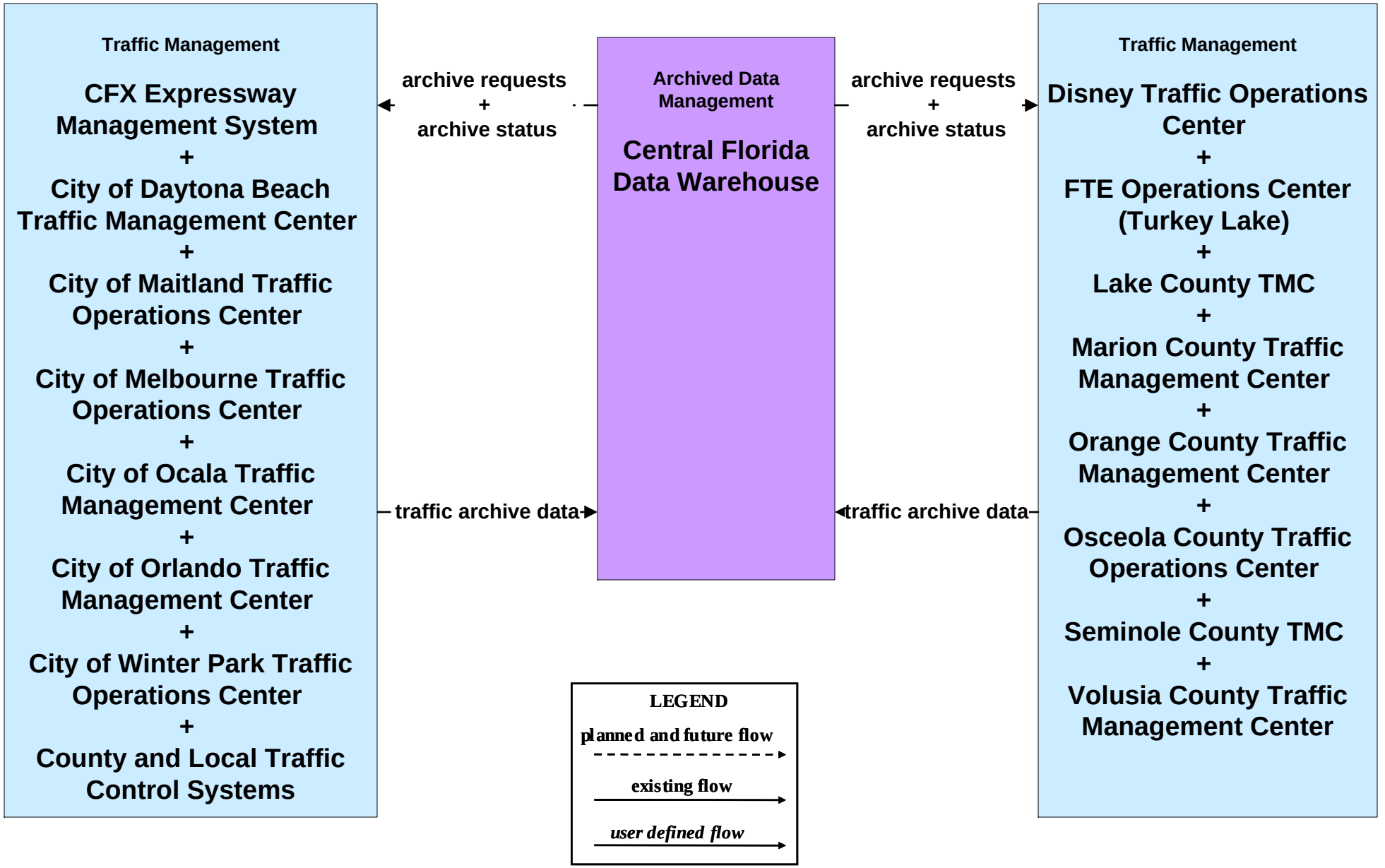
Customized Service Package Diagrams

Seminole County

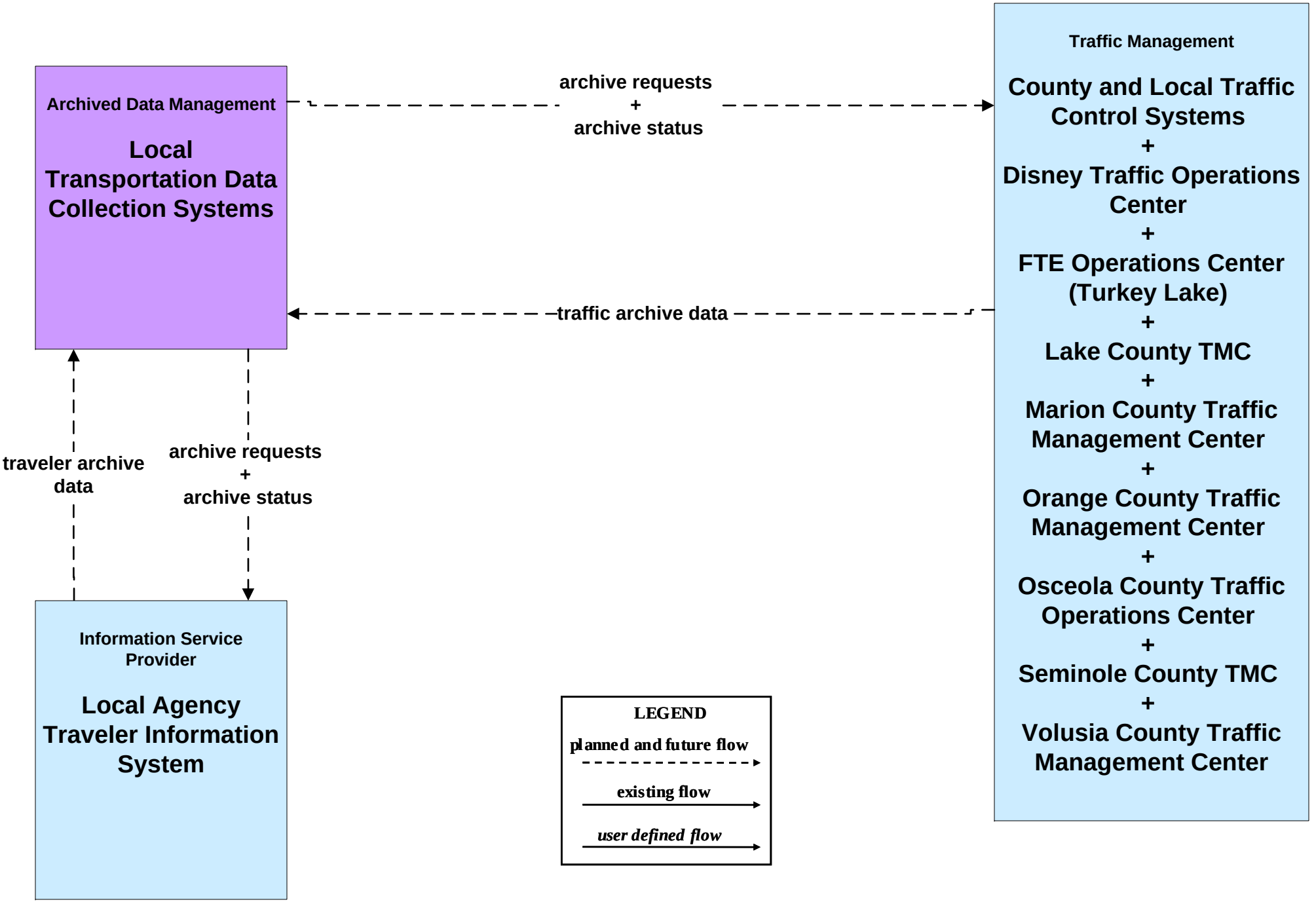
AD1 - ITS Data Mart
MetroPlan Transportation Data Collection System (1 of 2)



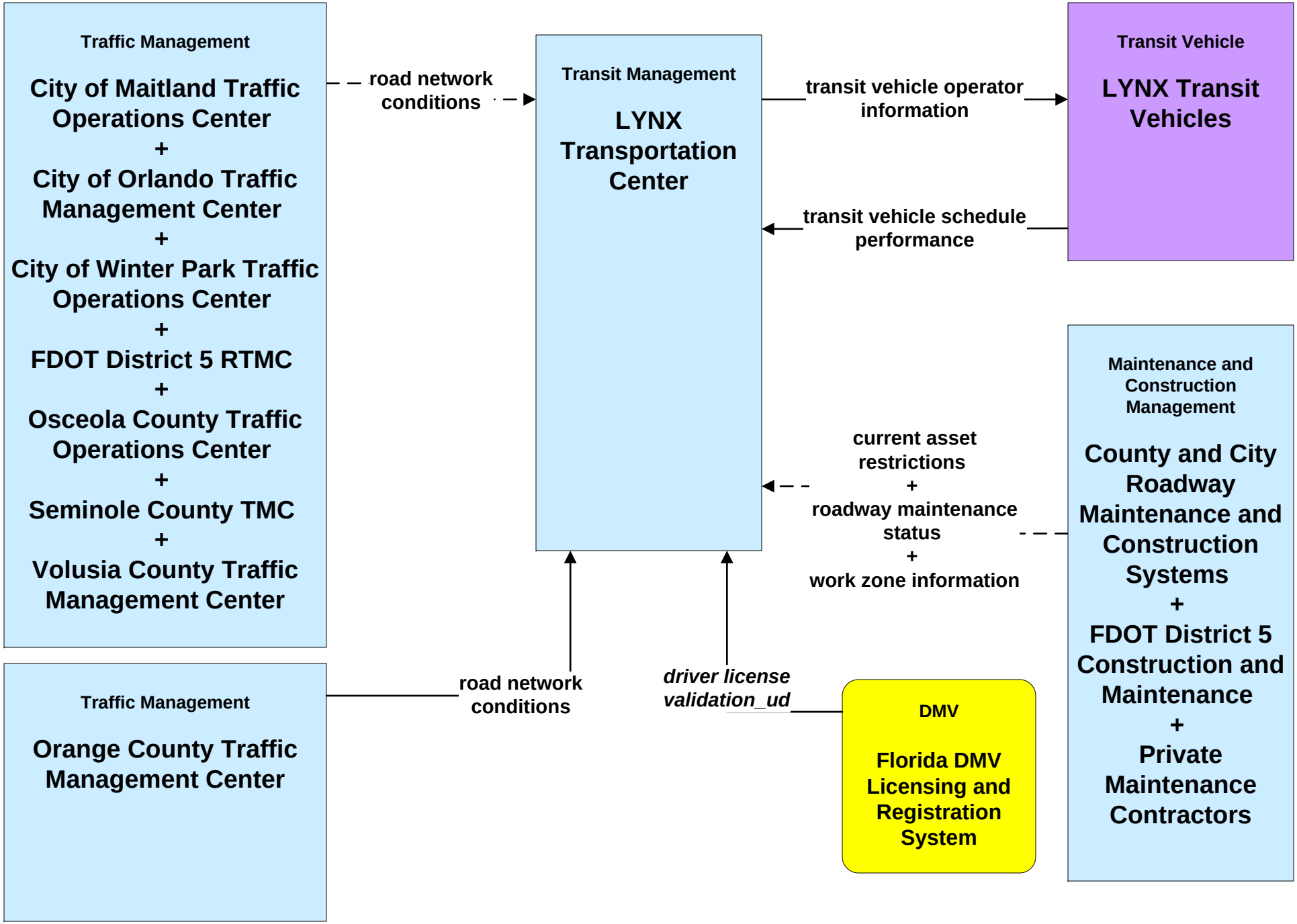
AD2 - ITS Data Warehouse
Central Florida Data Warehouse (1 of 2)



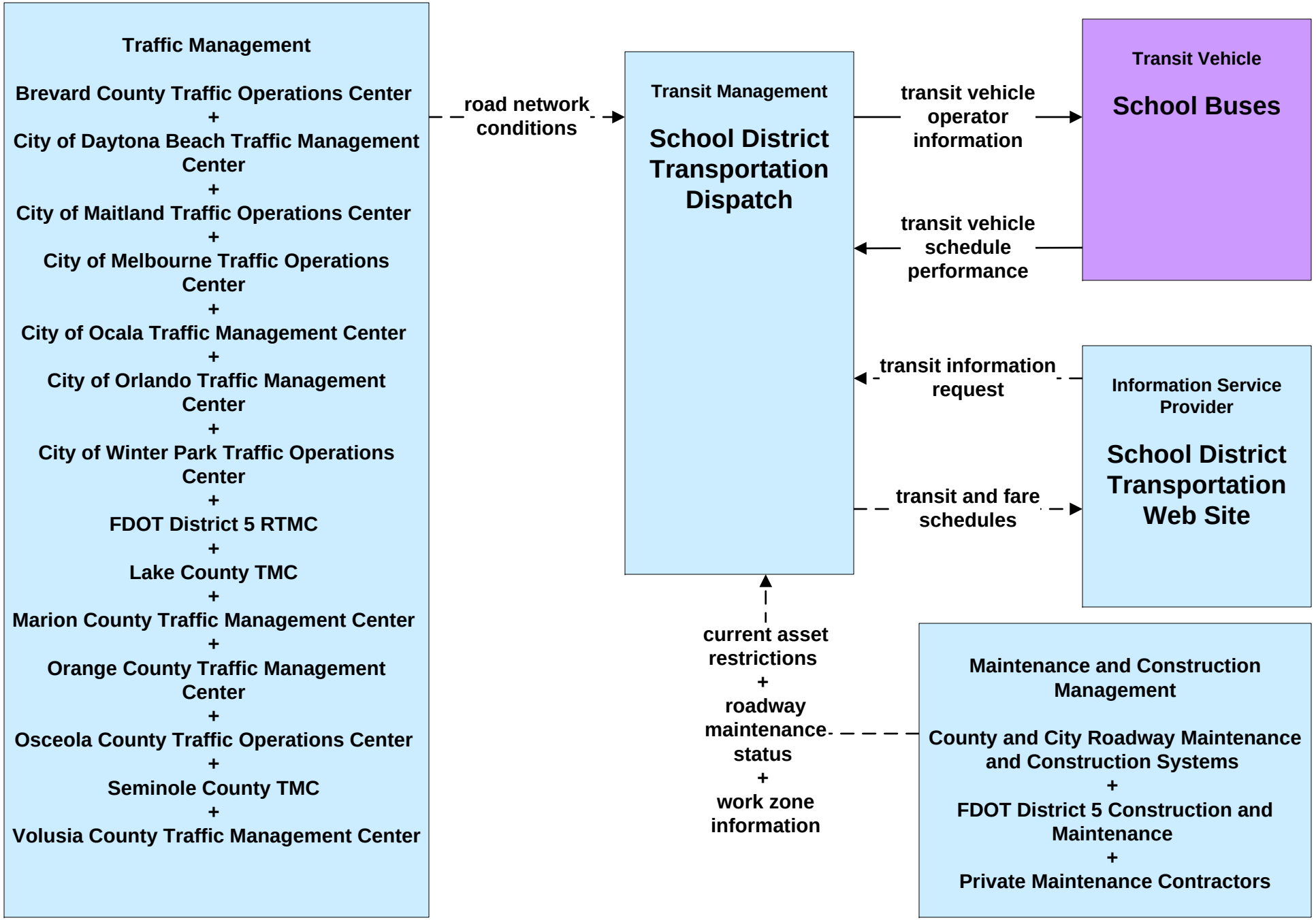
AD2 - ITS Data Warehouse
Local Archives (1 of 2)



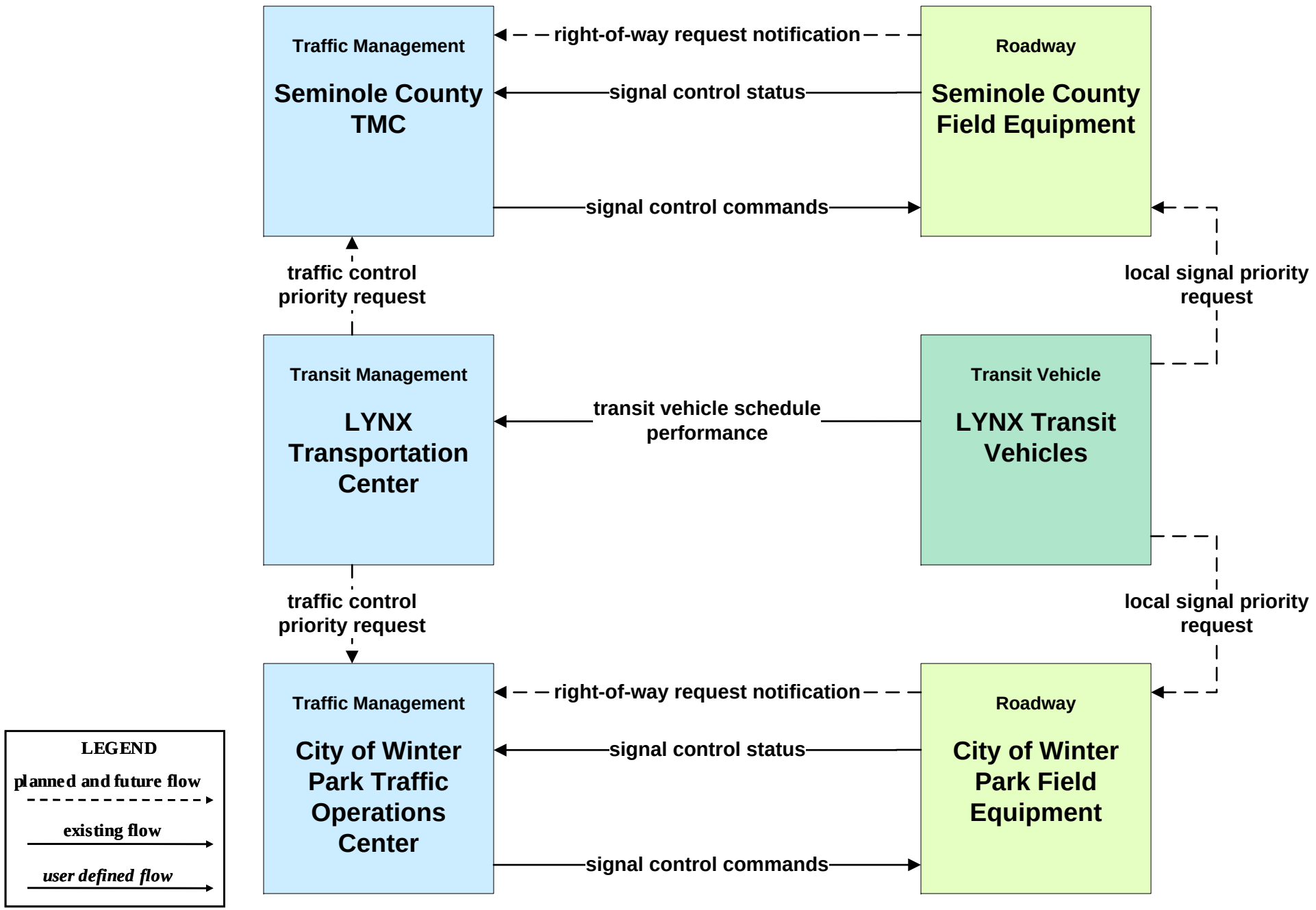
APTS02 - Transit Fixed-Route Operations
LYNX Operations Center



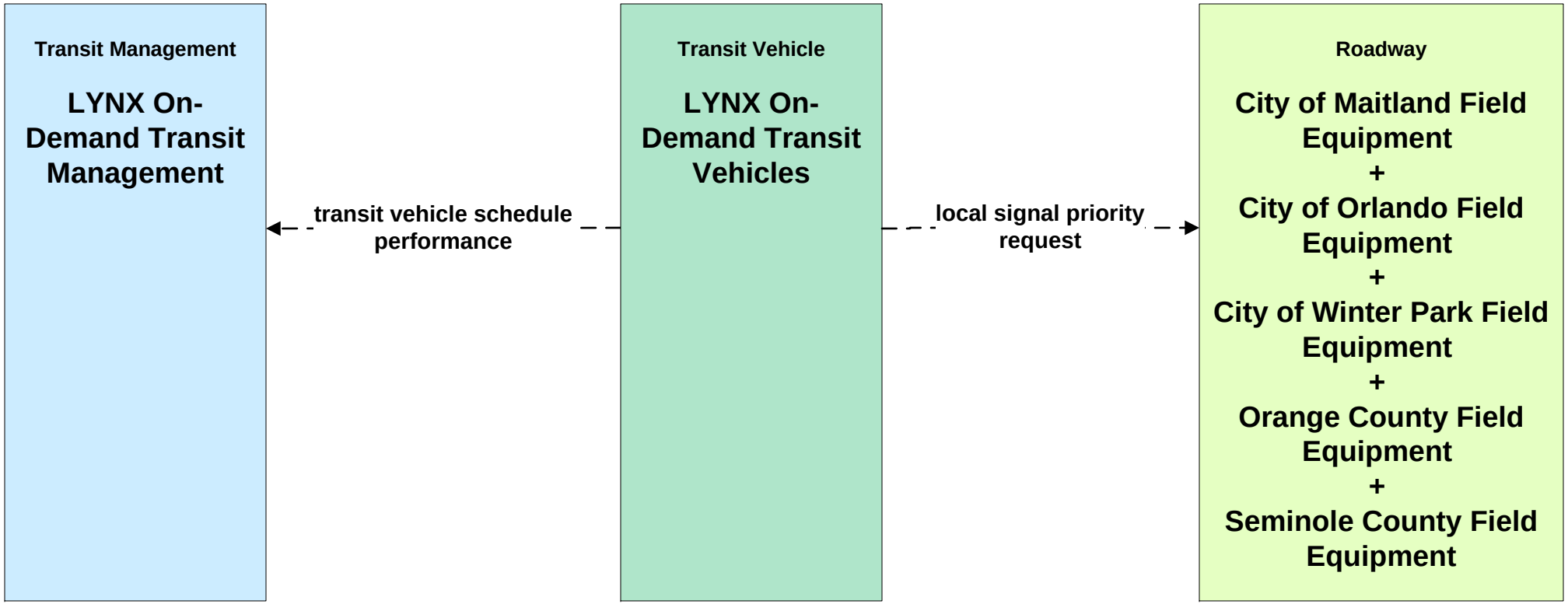
APTS02 - Transit Fixed-Route Operations
School District Transportation Dispatch

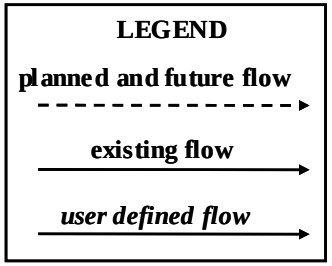


APTS09 - Transit Signal Priority
LYNX (3 of 5)

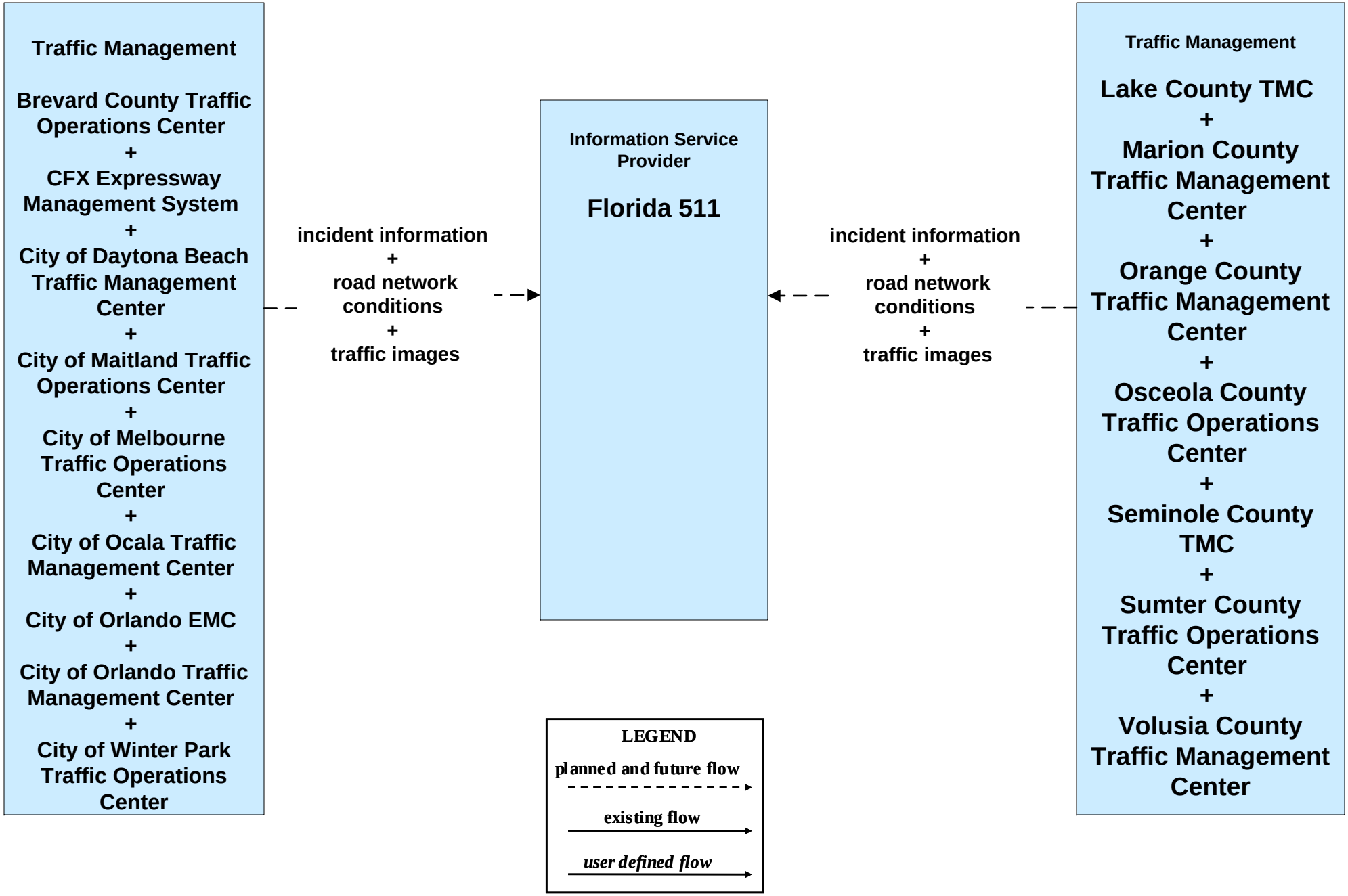


APTS09 - Local Signal Priority
LYNX On-Demand Transit

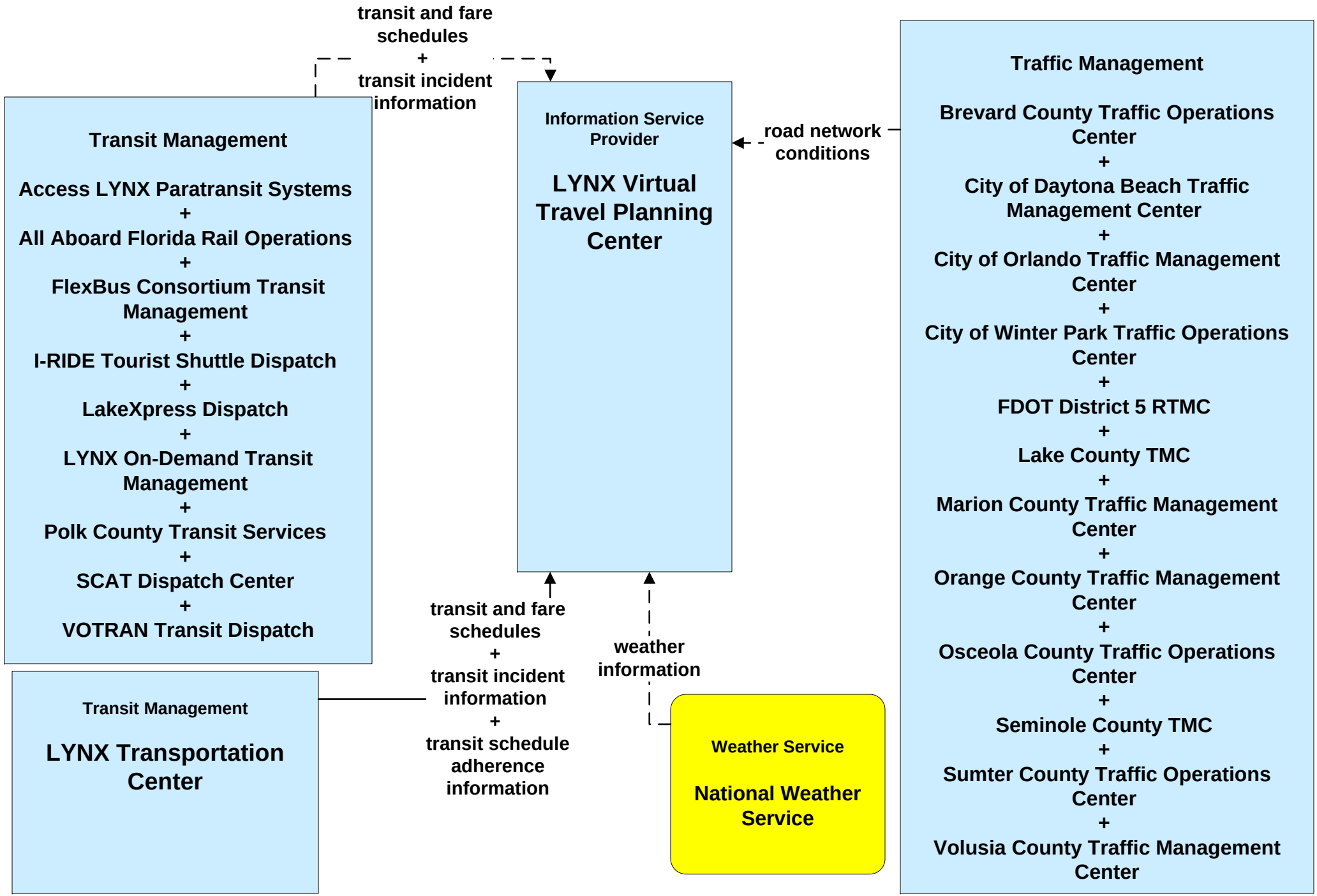




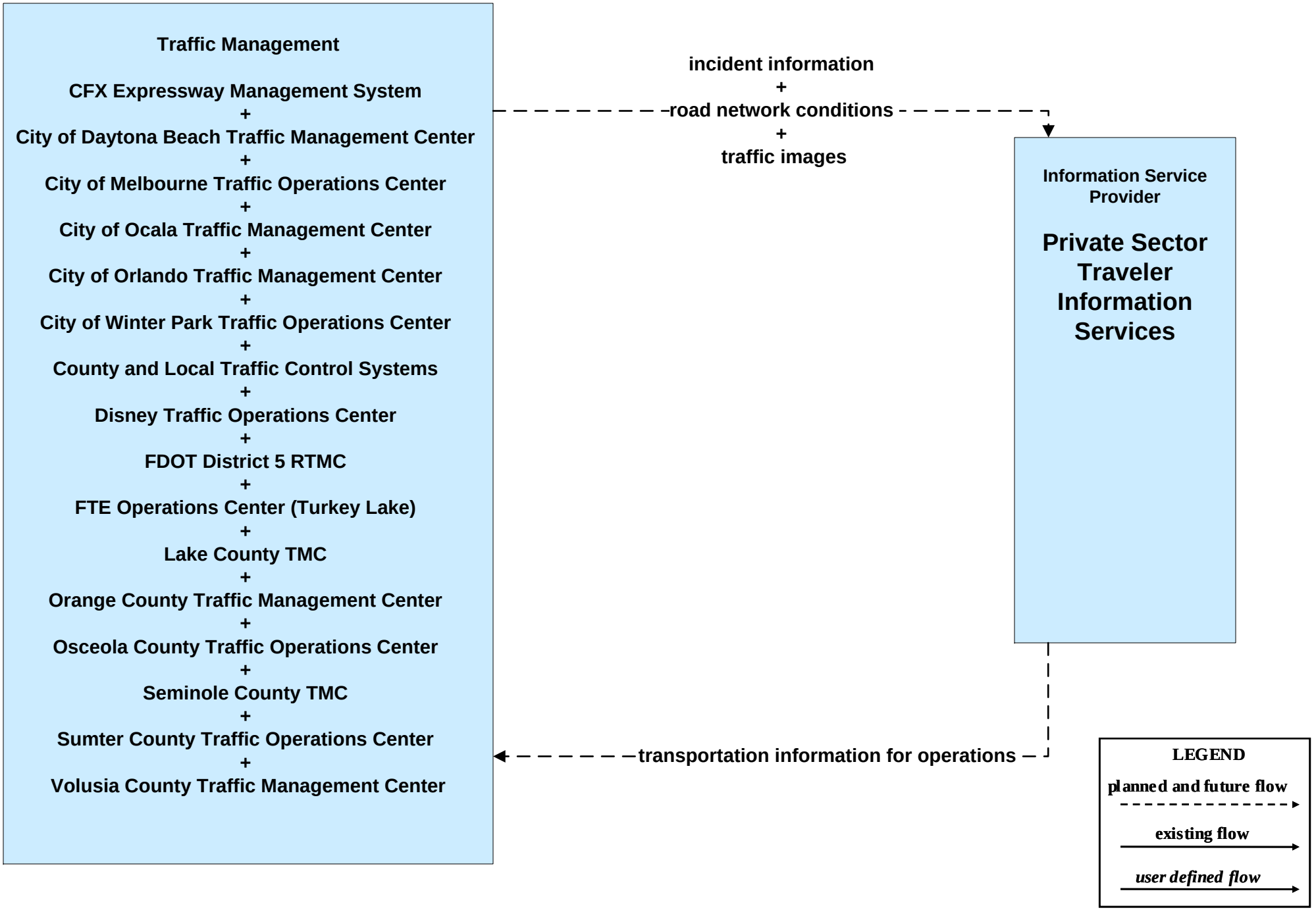
ATIS01 - Broadcast Traveler Information
Florida 511 / Private ISPs (3 of 3)



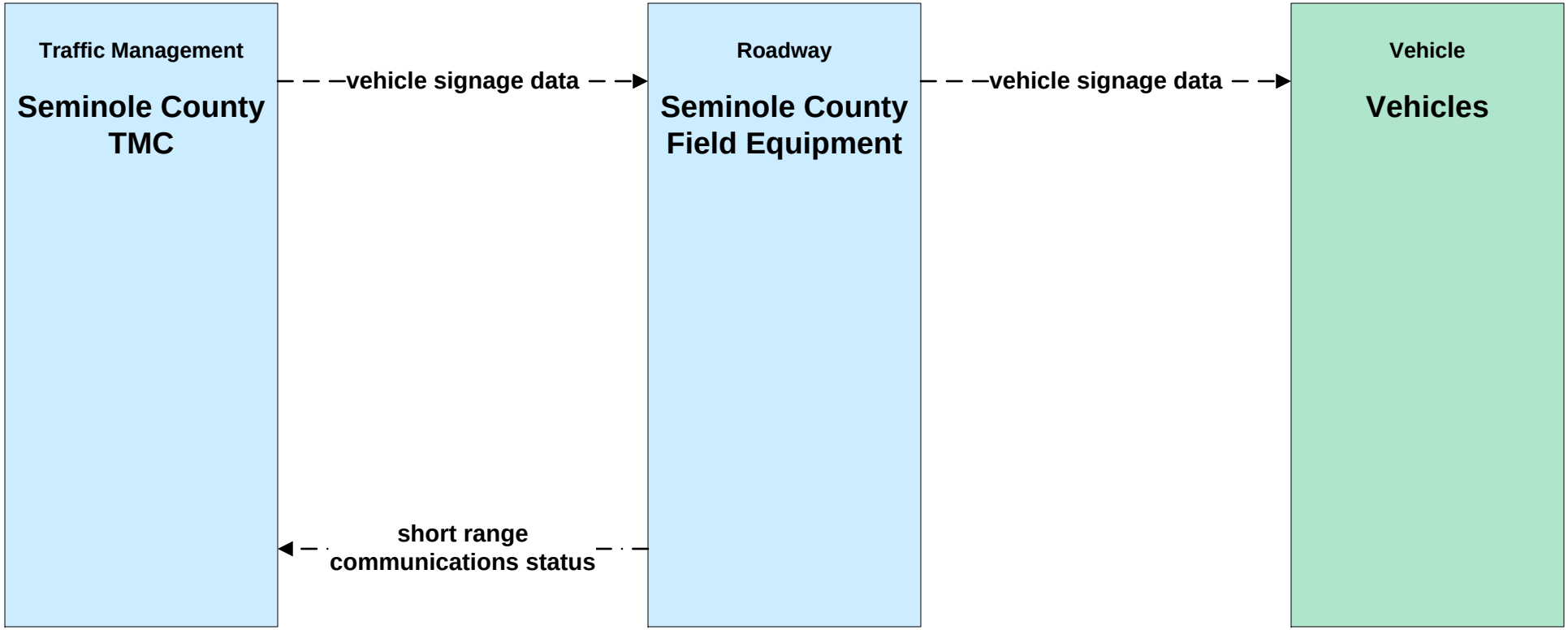
ATIS02 - Interactive Traveler Information
Virtual Travel Planning Center (1 of 2)

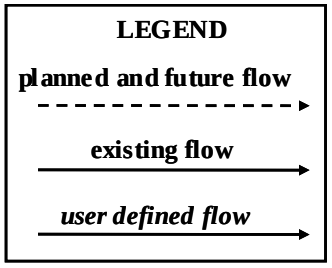


ATIS06 - Transportation Operations Data Sharing
Private Sector ISPs (2 of 2)

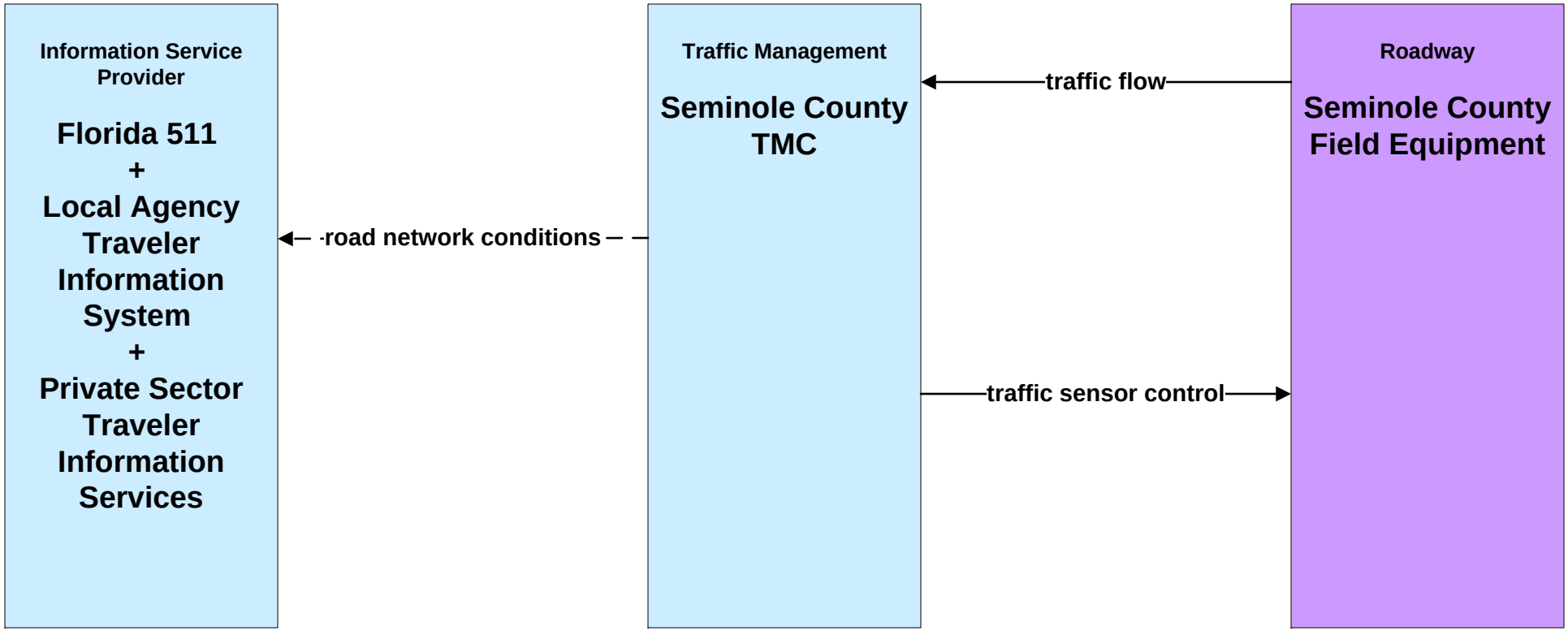


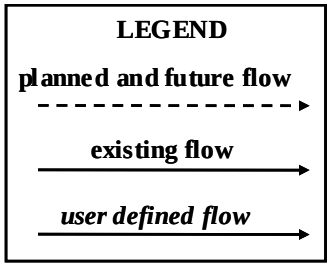
ATIS09 - In-Vehicle Signing
FDOT



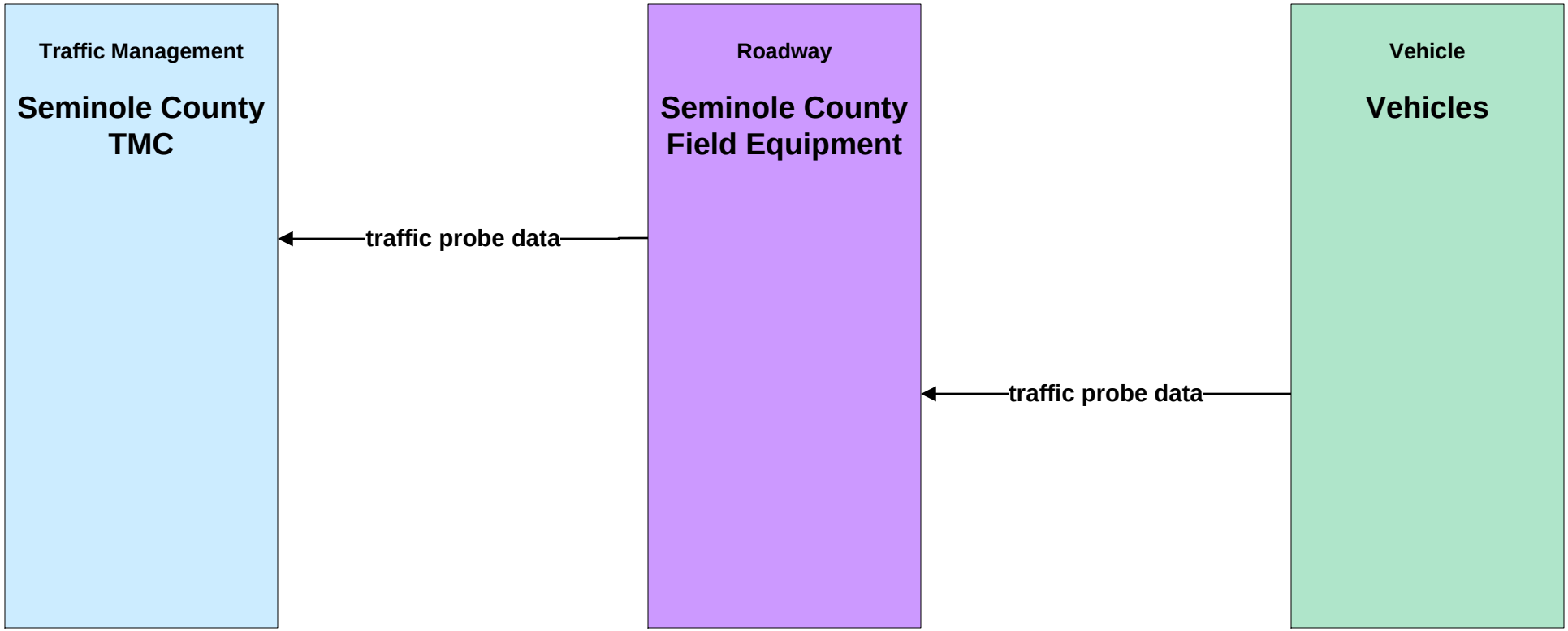


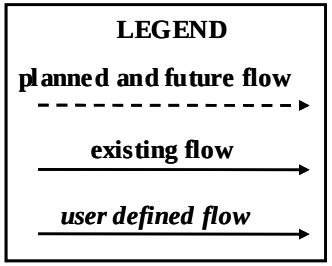
ATMS01 - Network Surveillance
Seminole County



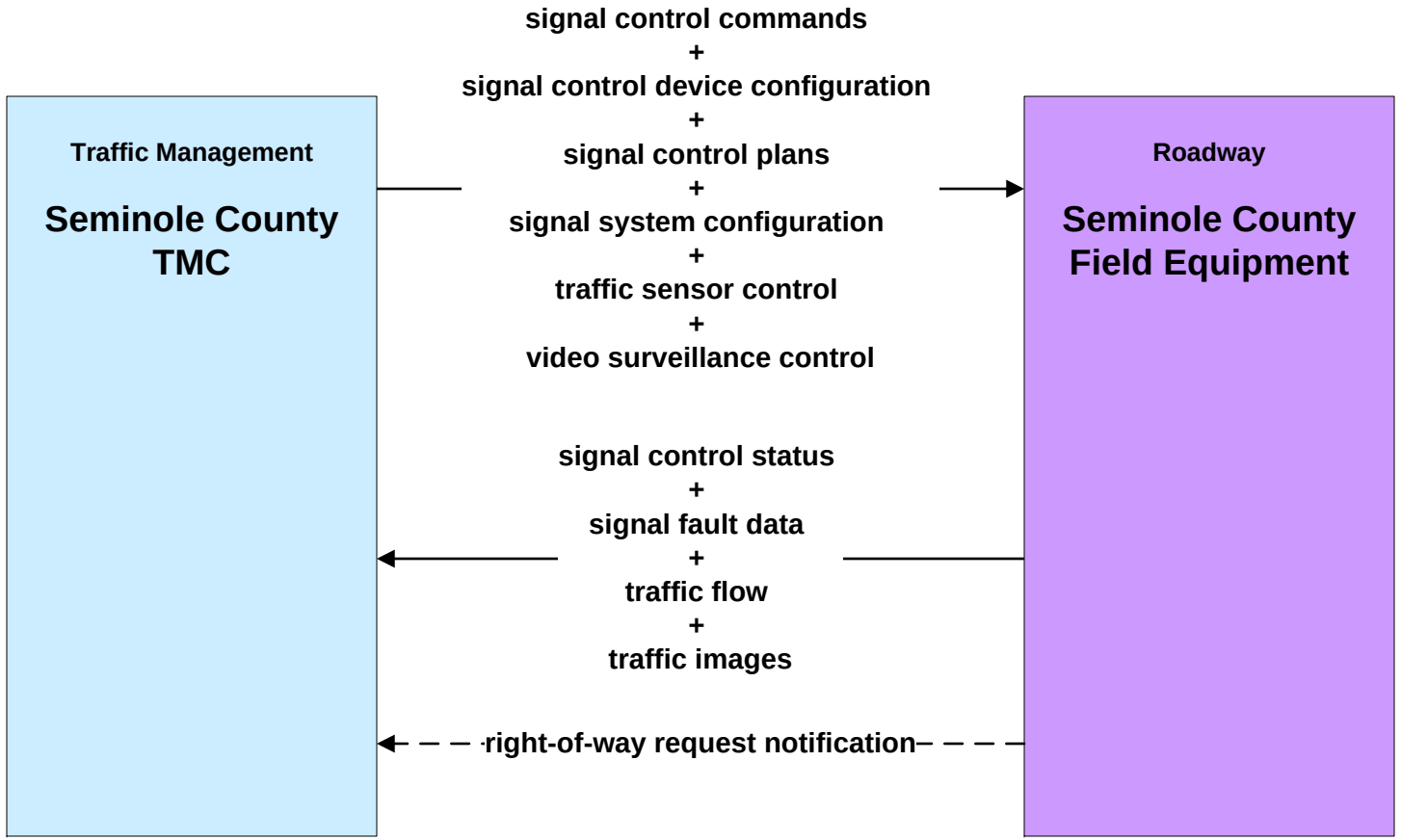


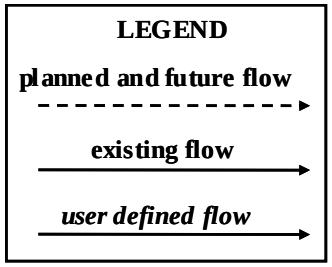
ATMS02 - Traffic Probe Surveillance
Seminole County



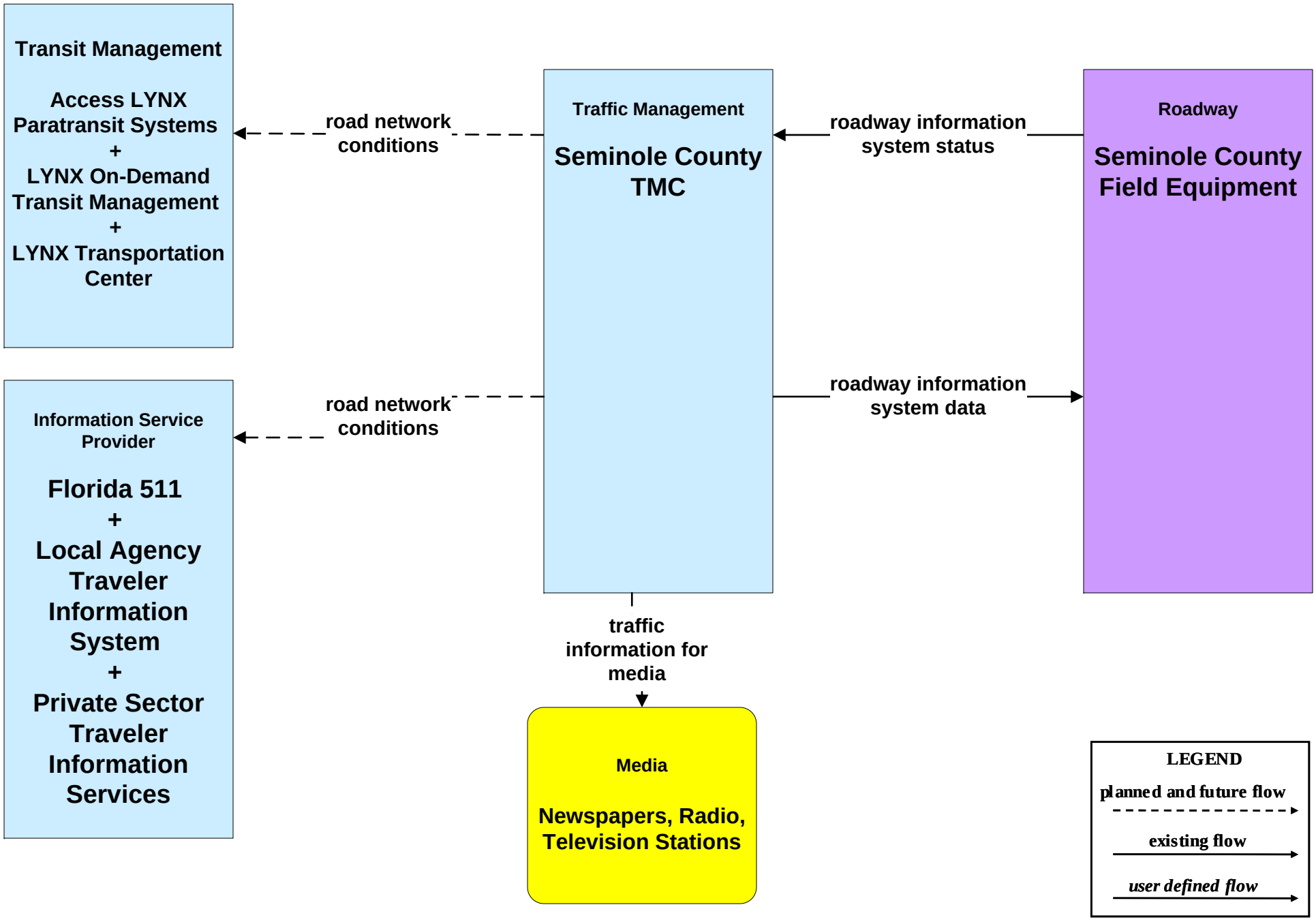


ATMS03 - Traffic Signal Control
Seminole County

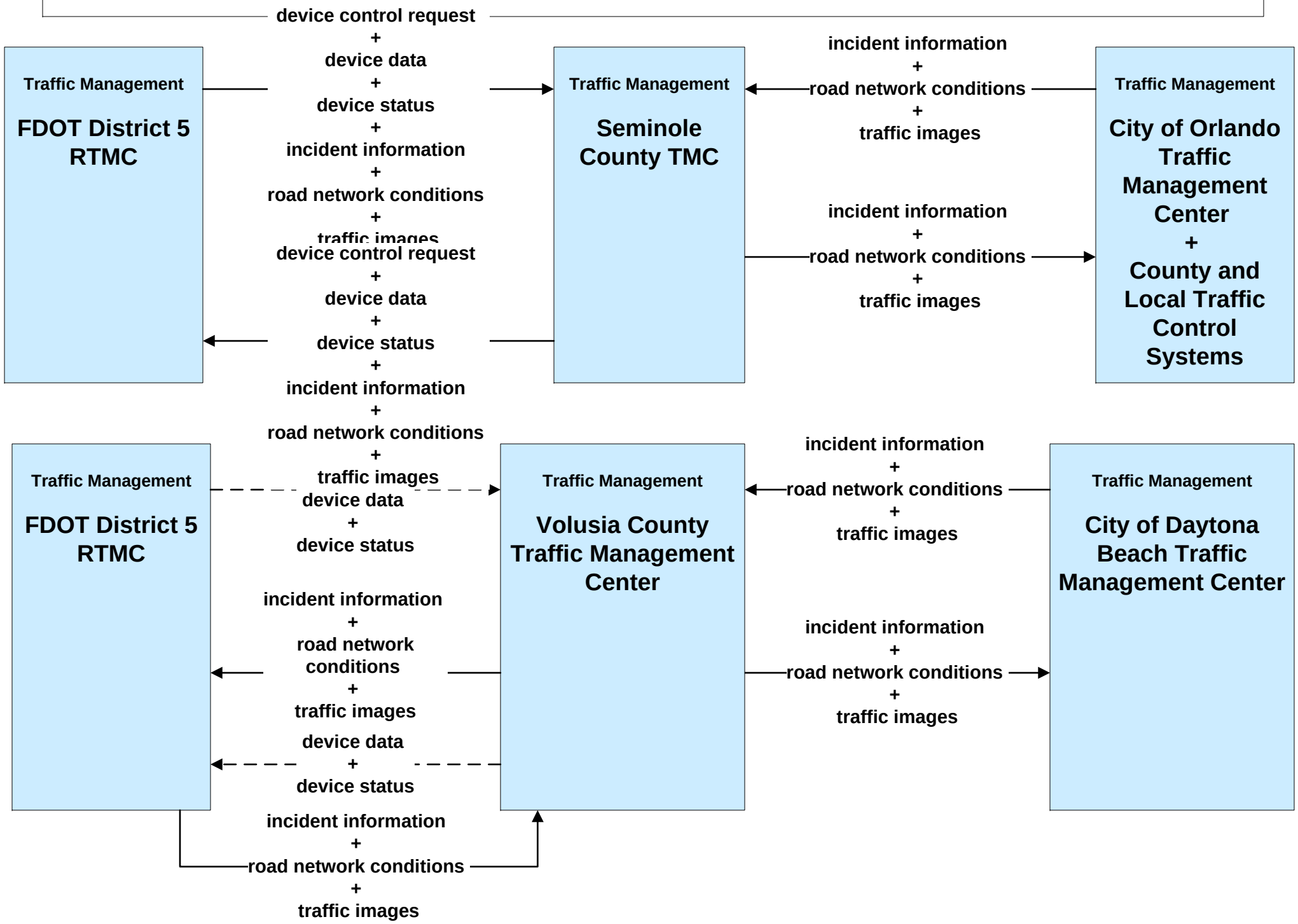




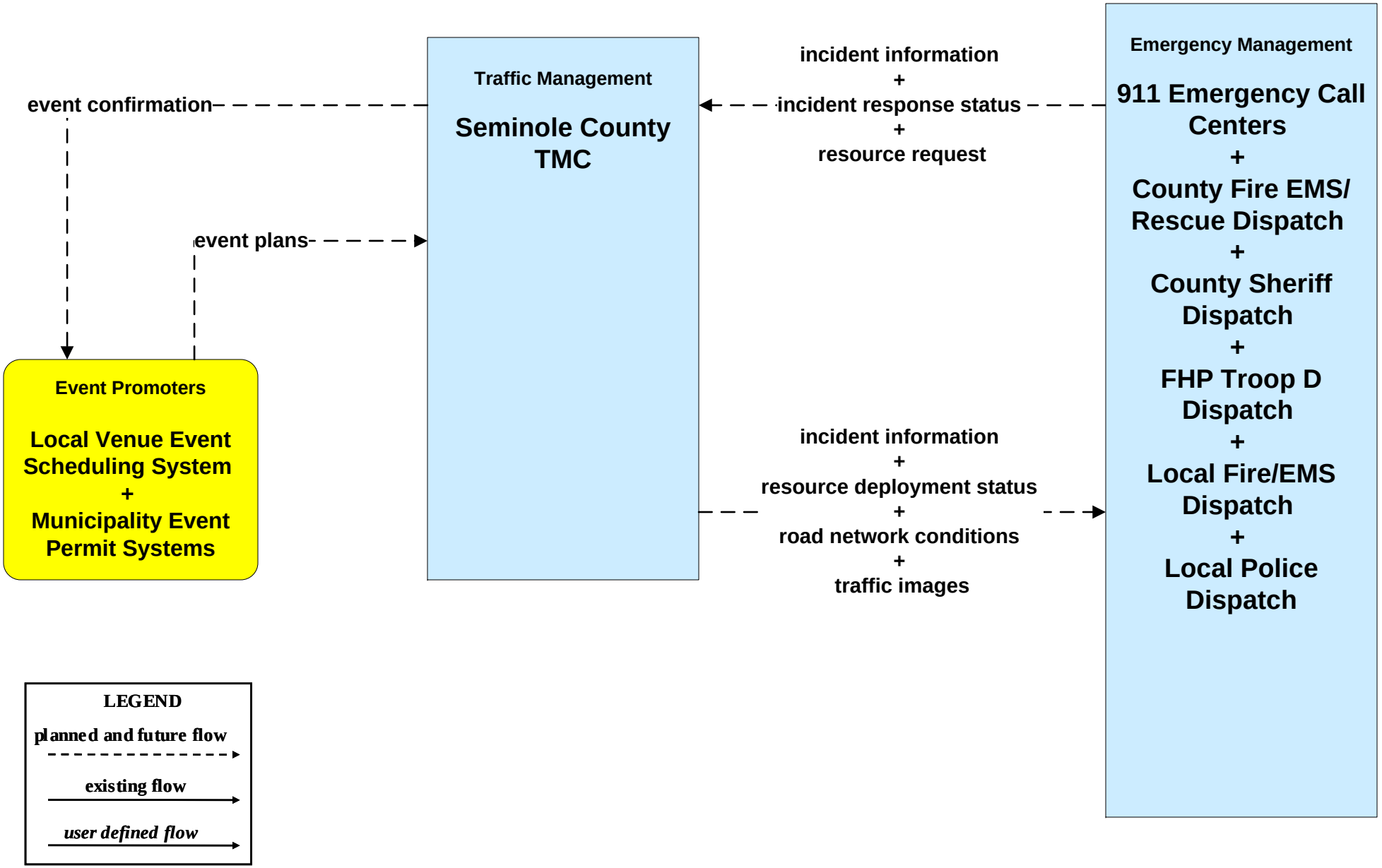
ATMS06 - Traffic Information Dissemination
Seminole County



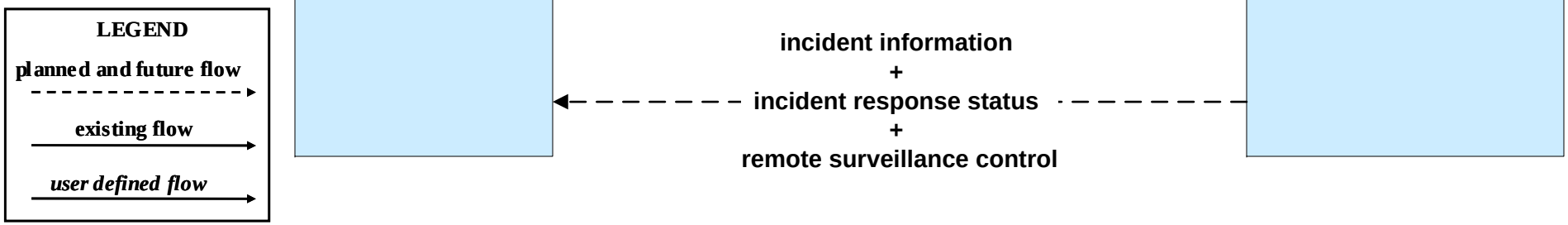
ATMS07 - Regional Traffic Management
Seminole County / Volusia County



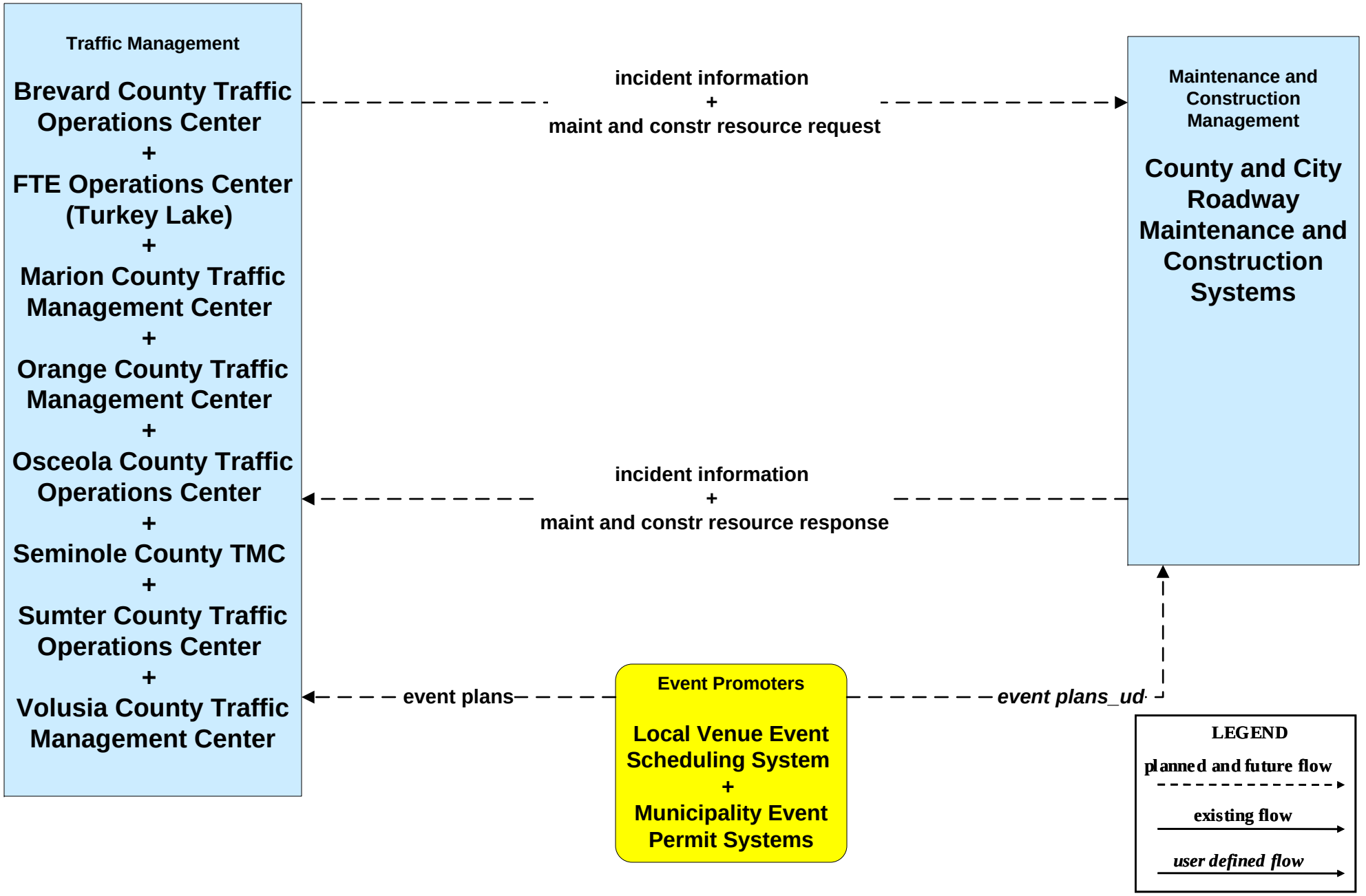
ATMS08 - Traffic Incident Management System
Seminole County(TM to EM)



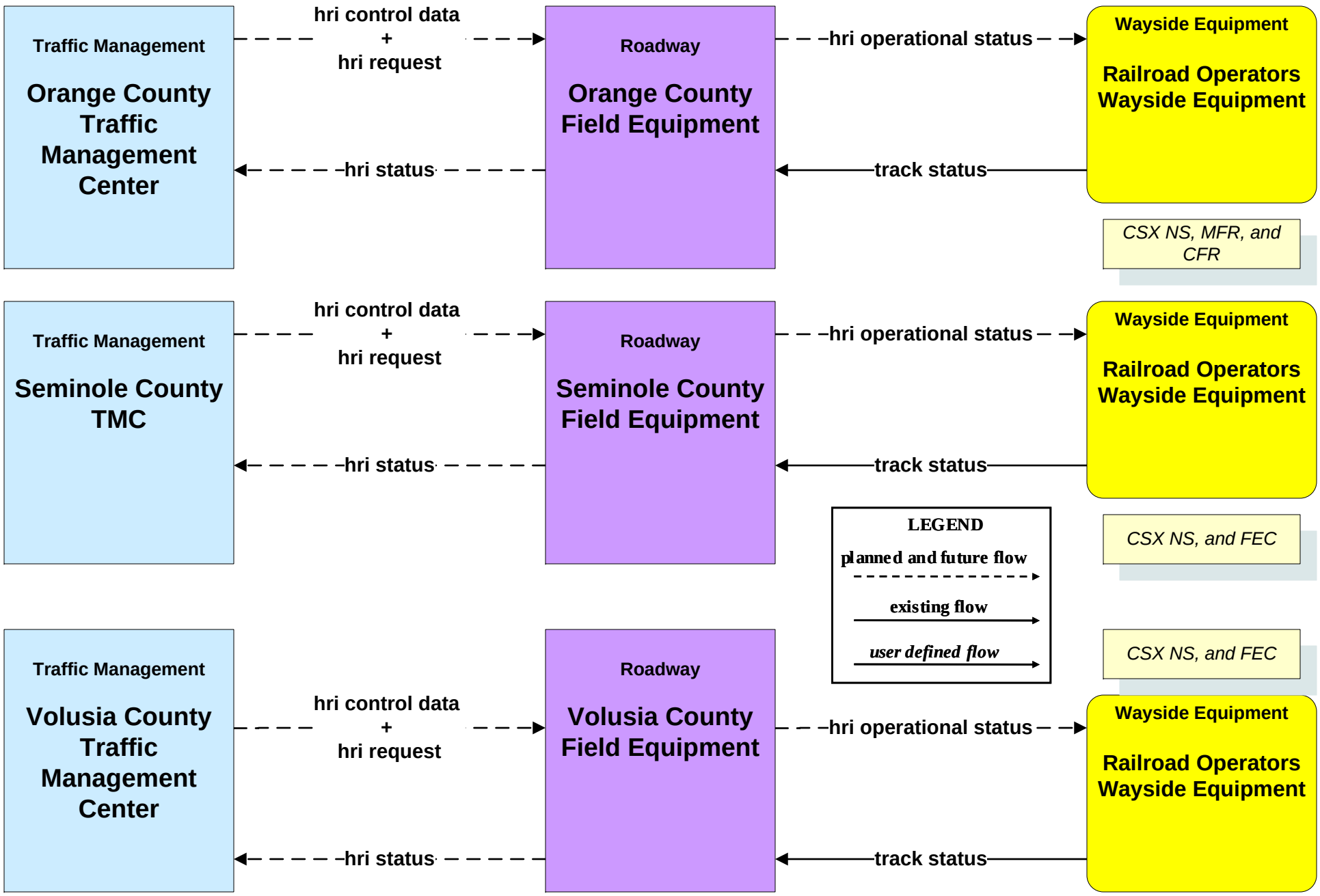
ATMS08 - Traffic Incident Management System
FDOT & County EOC (TM to EM)



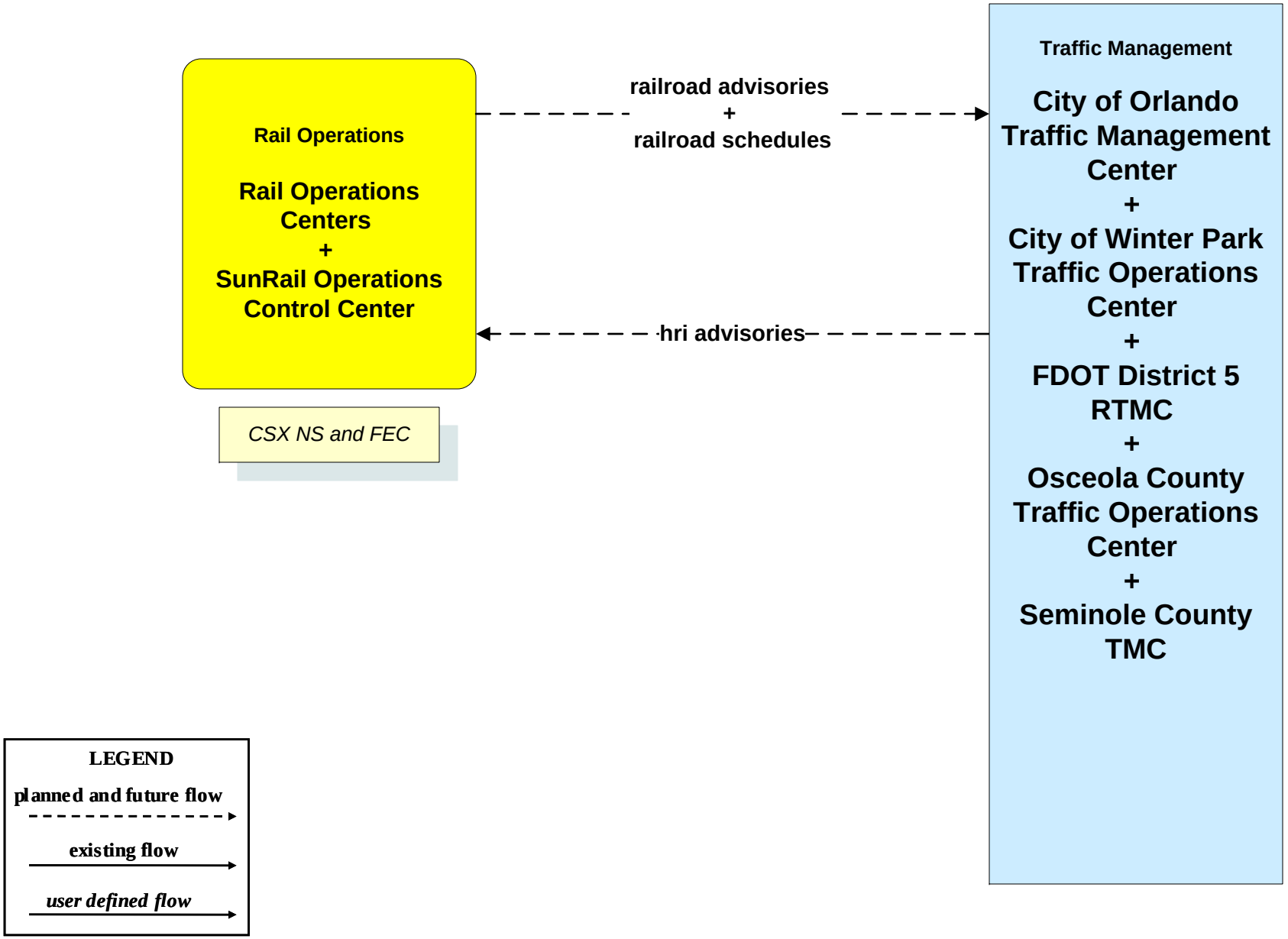
ATMS08 - Traffic Incident Management System
County Traffic Management Centers (TM to MCM)



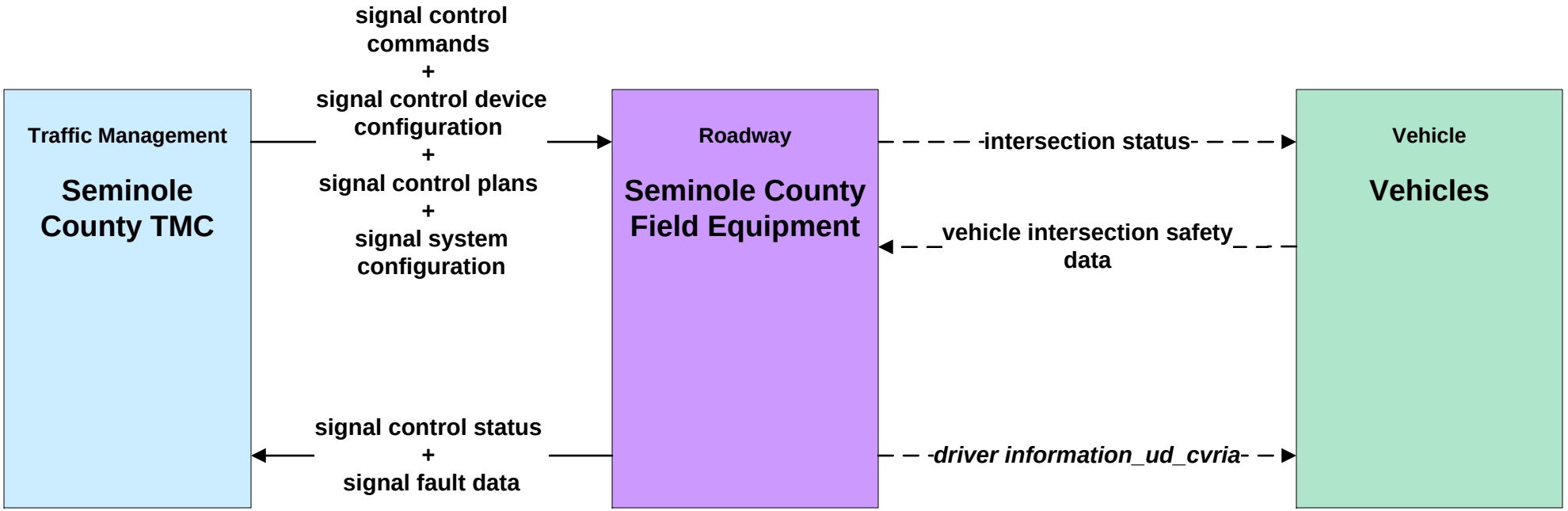
ATMS13 - Standard Railroad Crossing
Orange County / Seminole County / Volusia County

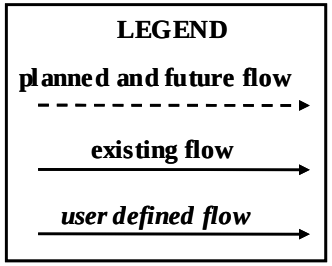


ATMS15 - Railroad Operations Coordination
Rail Operations Centers

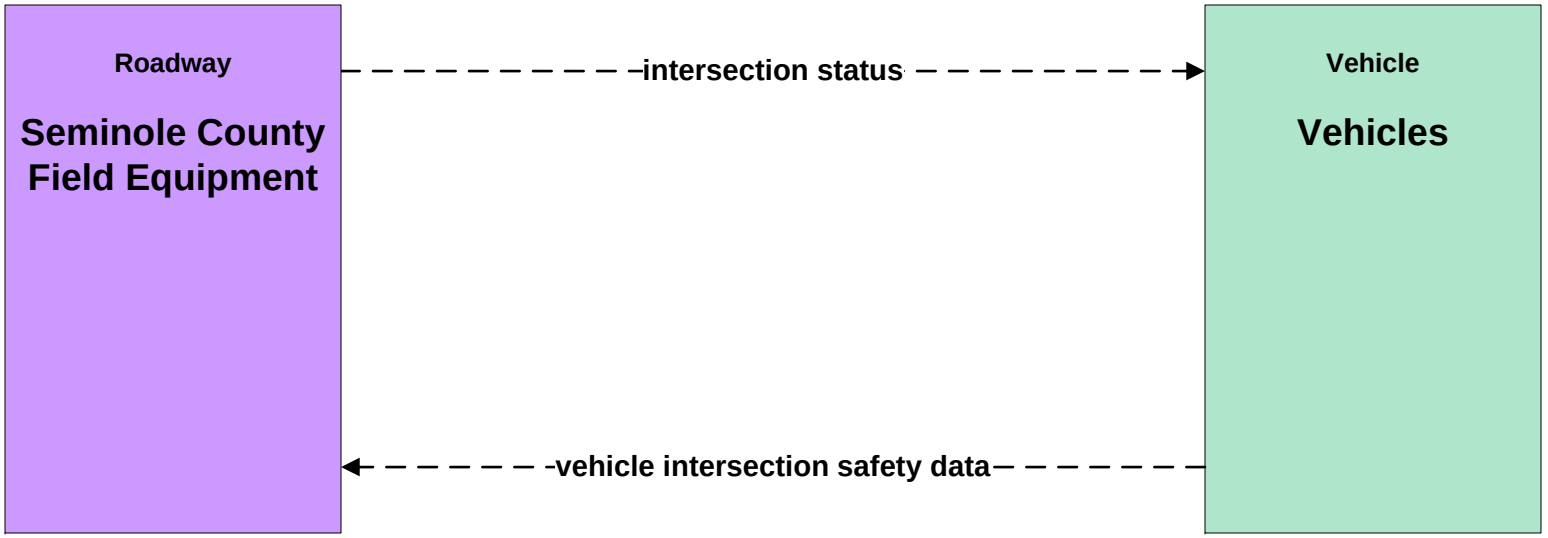


AVSS05 – Intersection Safety Warning
Seminole County





AVSS10 – Intersection Collision Avoidance
Seminole County



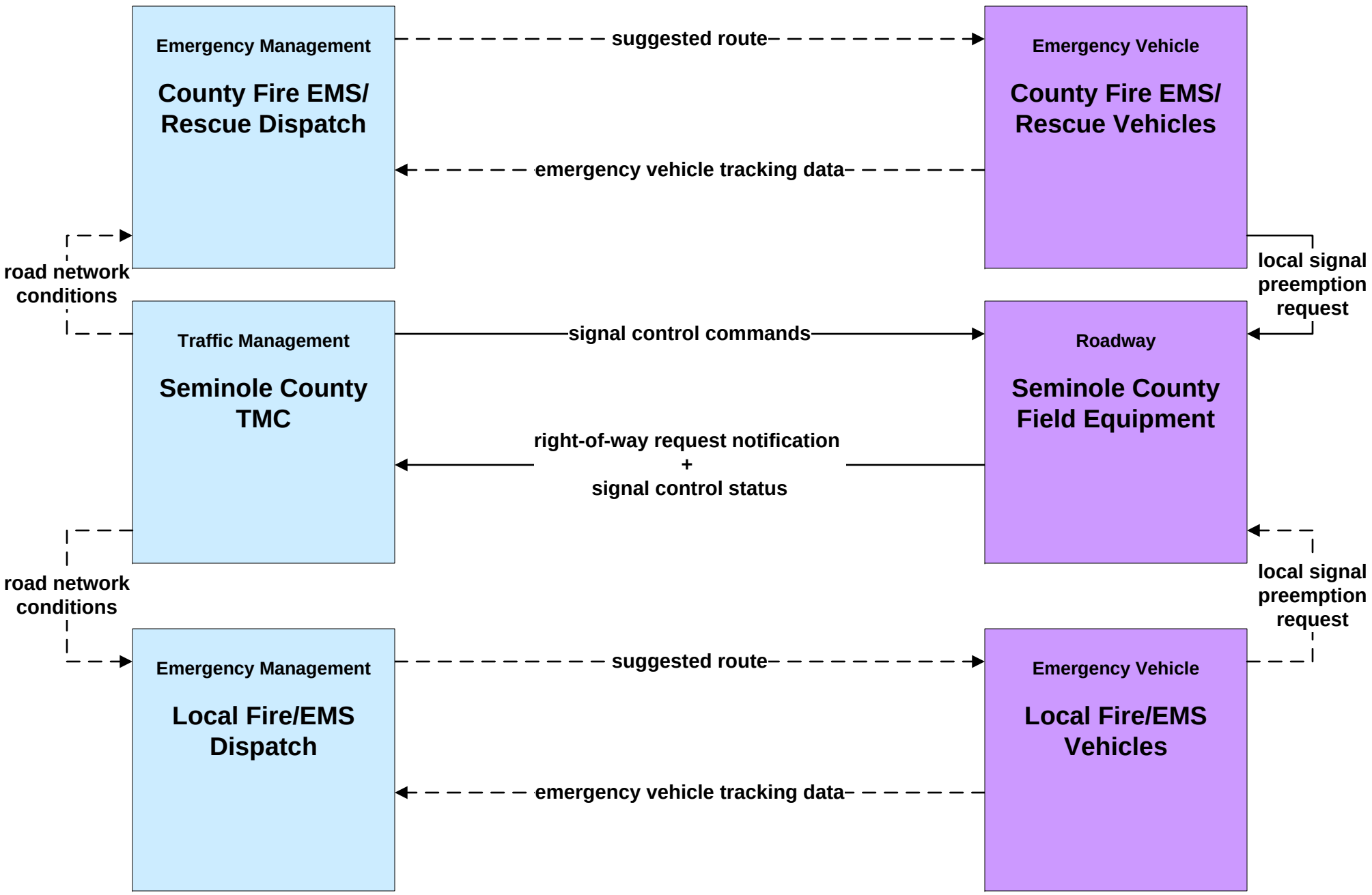
LEGEND

planned and future flow

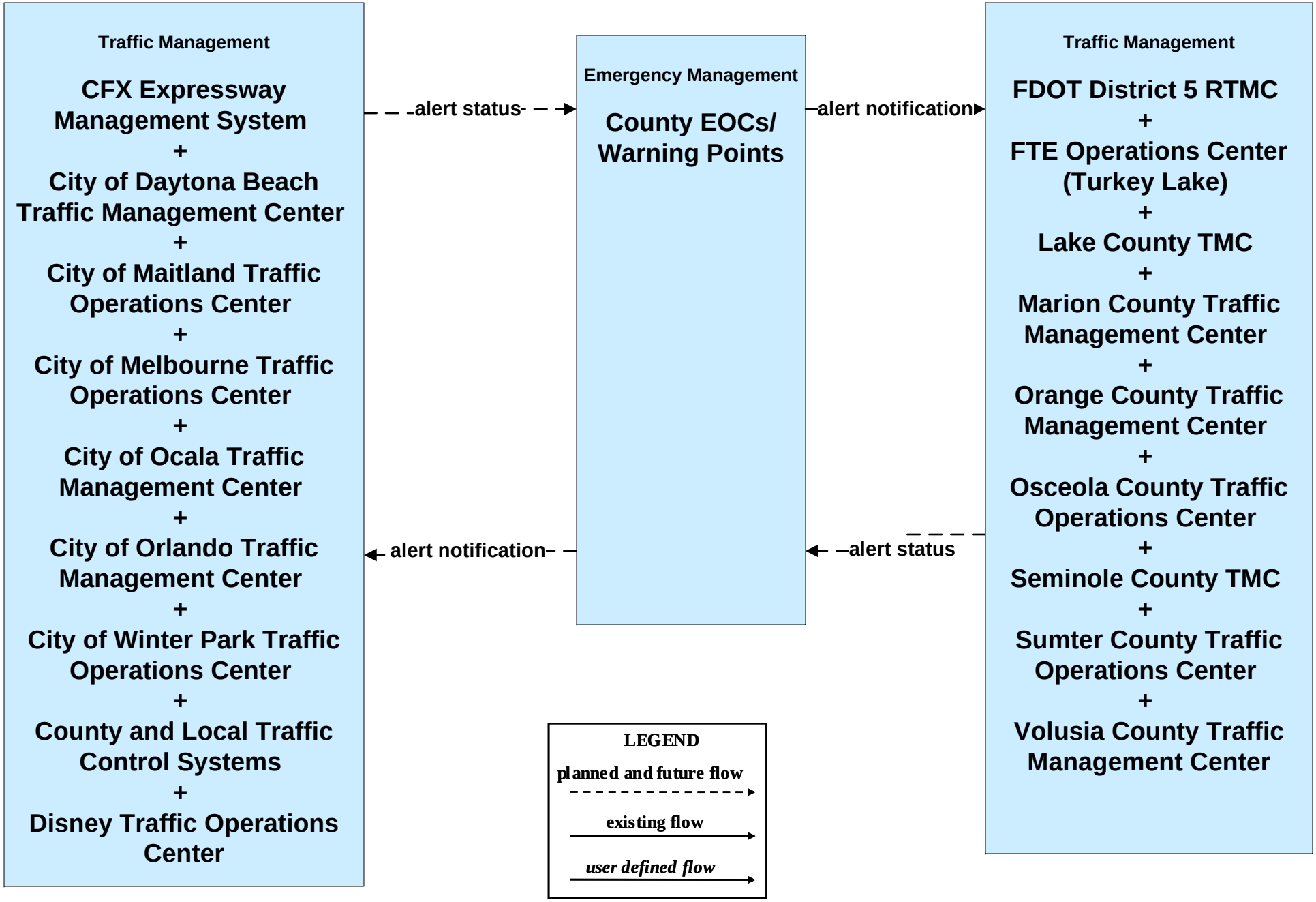
existing flow

user defined flow

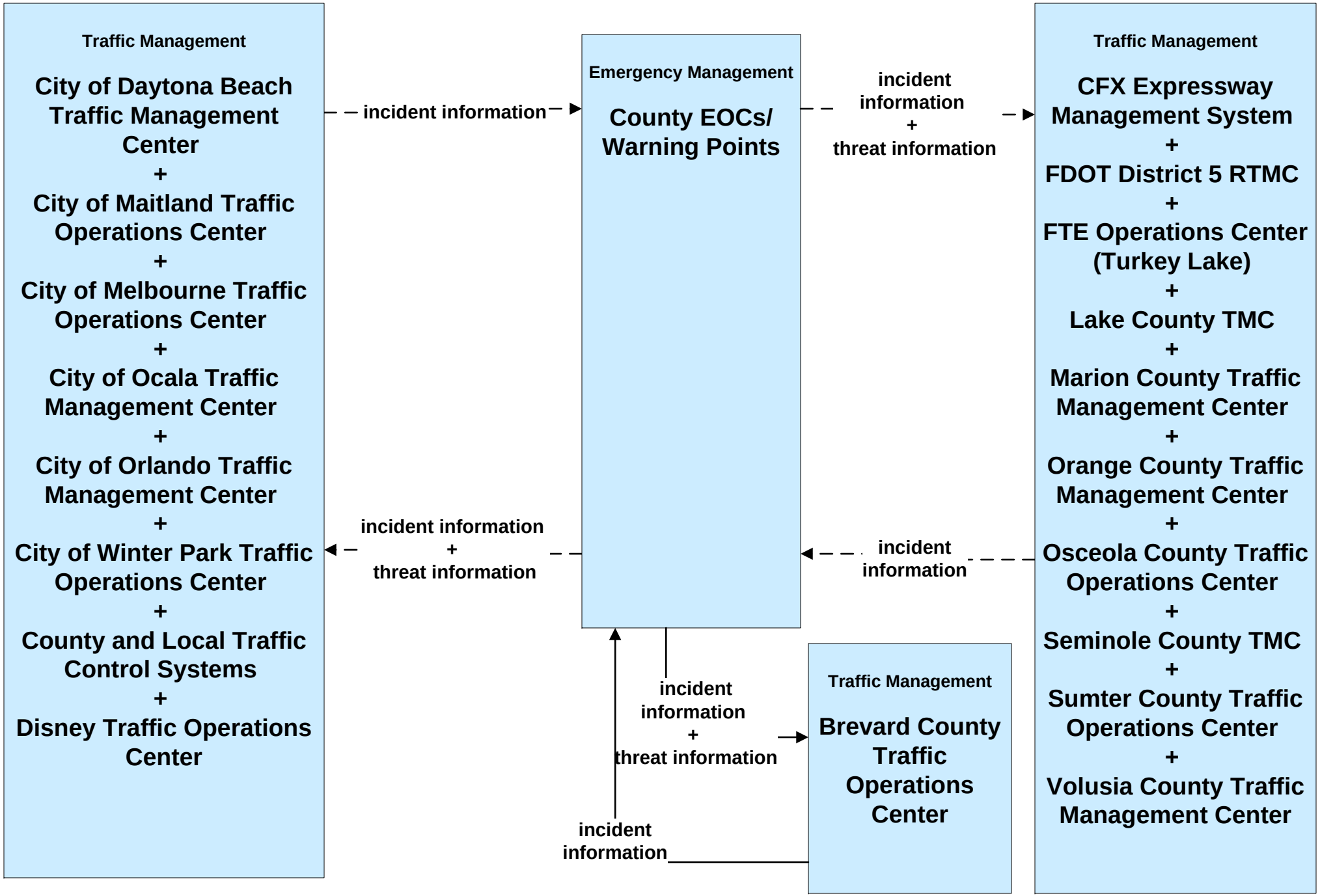
EM02 - Emergency Routing
Seminole County



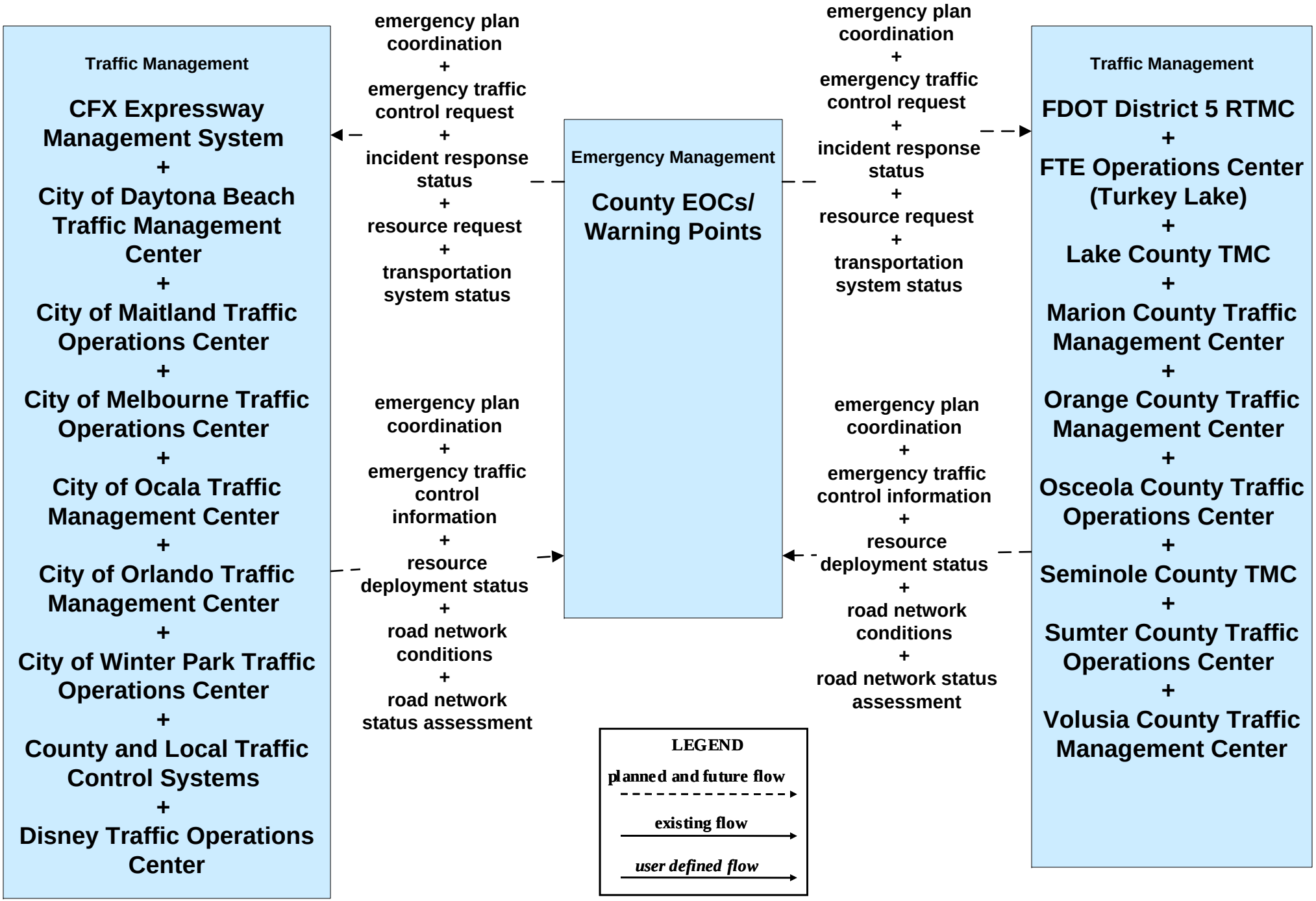
EM06 - Wide Area Alert
County EOCs (1 of 3)



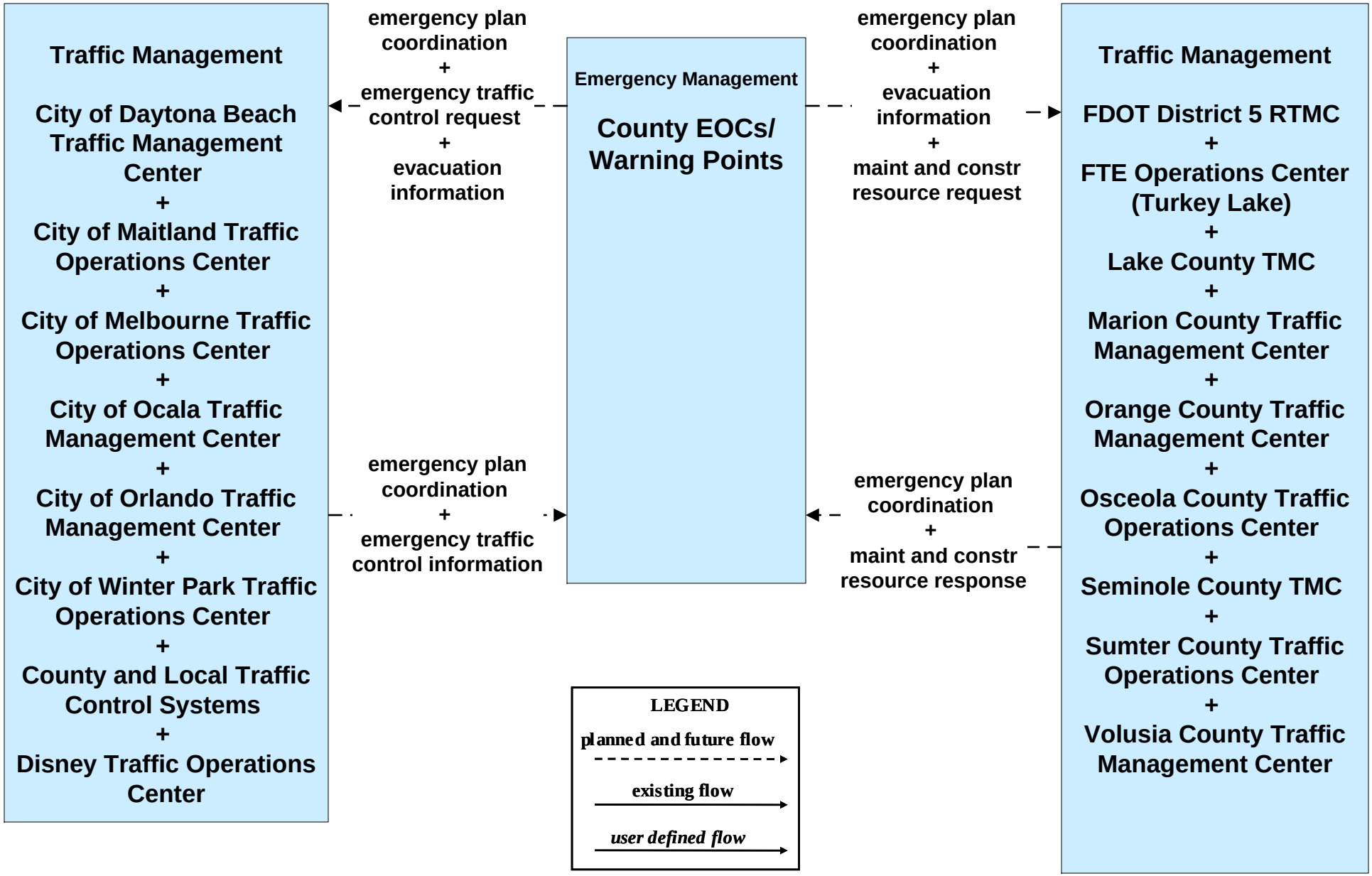
EM07 - Early Warning System
County EOCs (2 of 3)



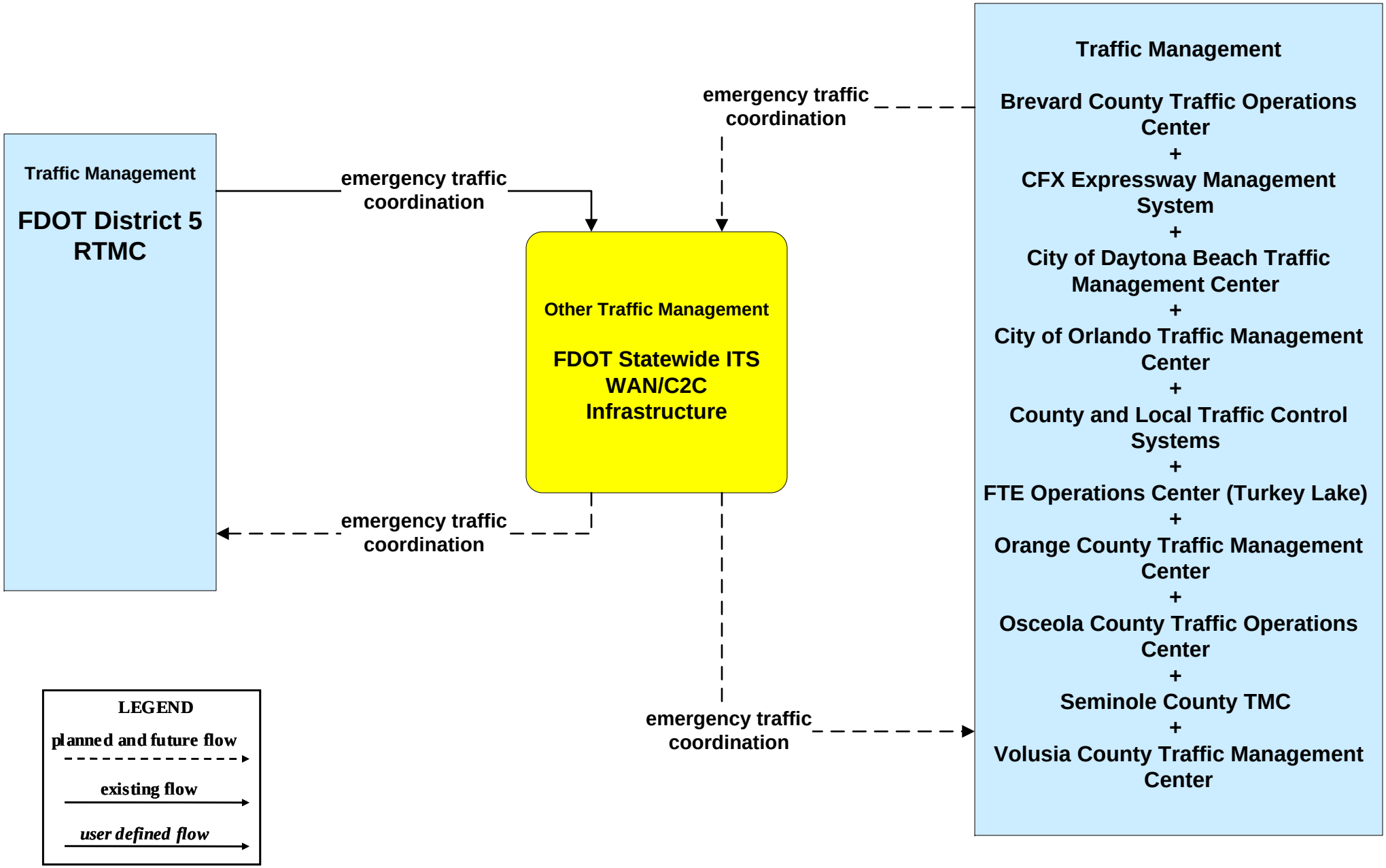
EM08 - Disaster Response and Recovery
County EOCs (2 of 4)



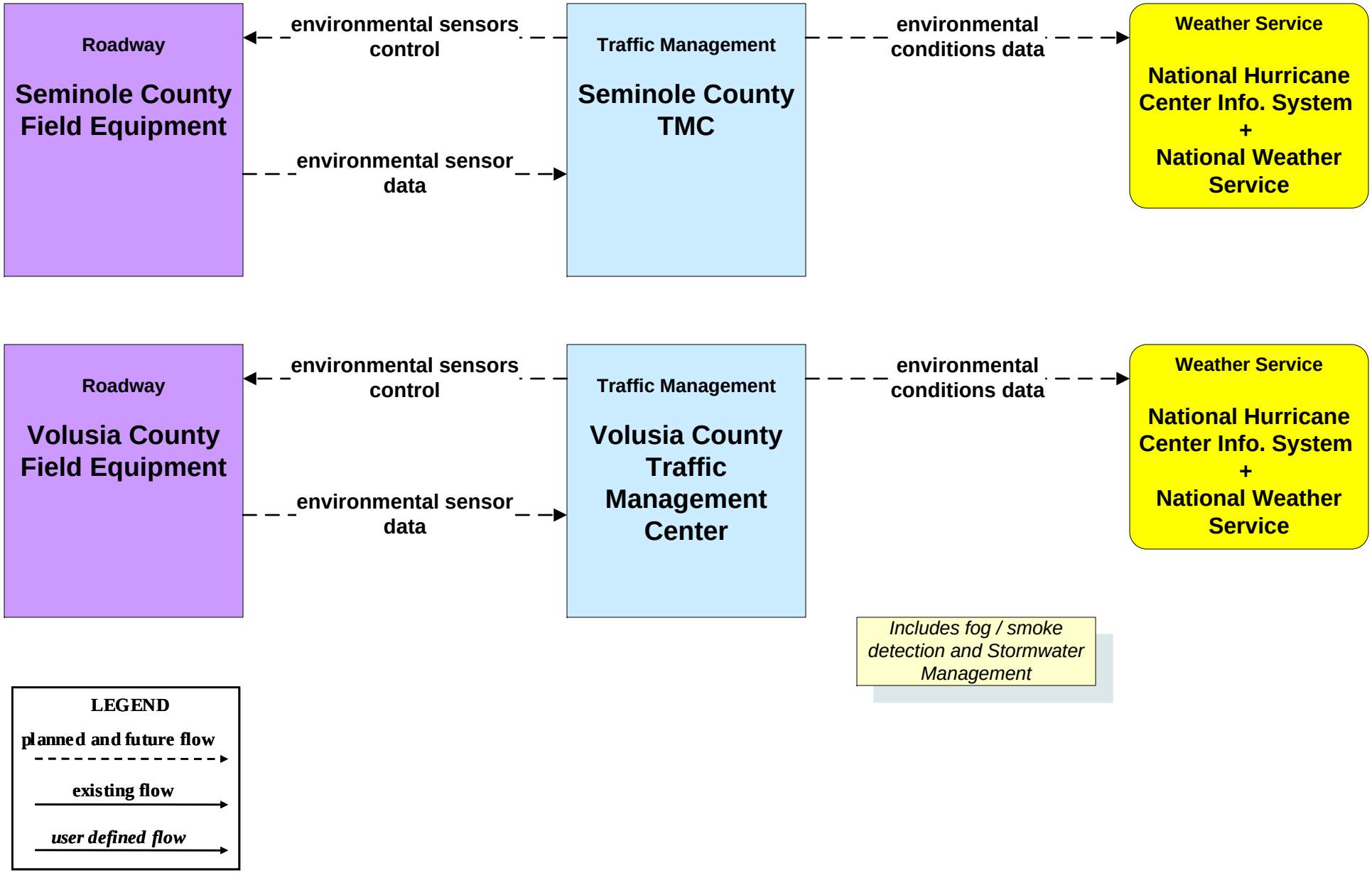
EM09 - Evacuation and Reentry Management
County EOCs (2 of 3)



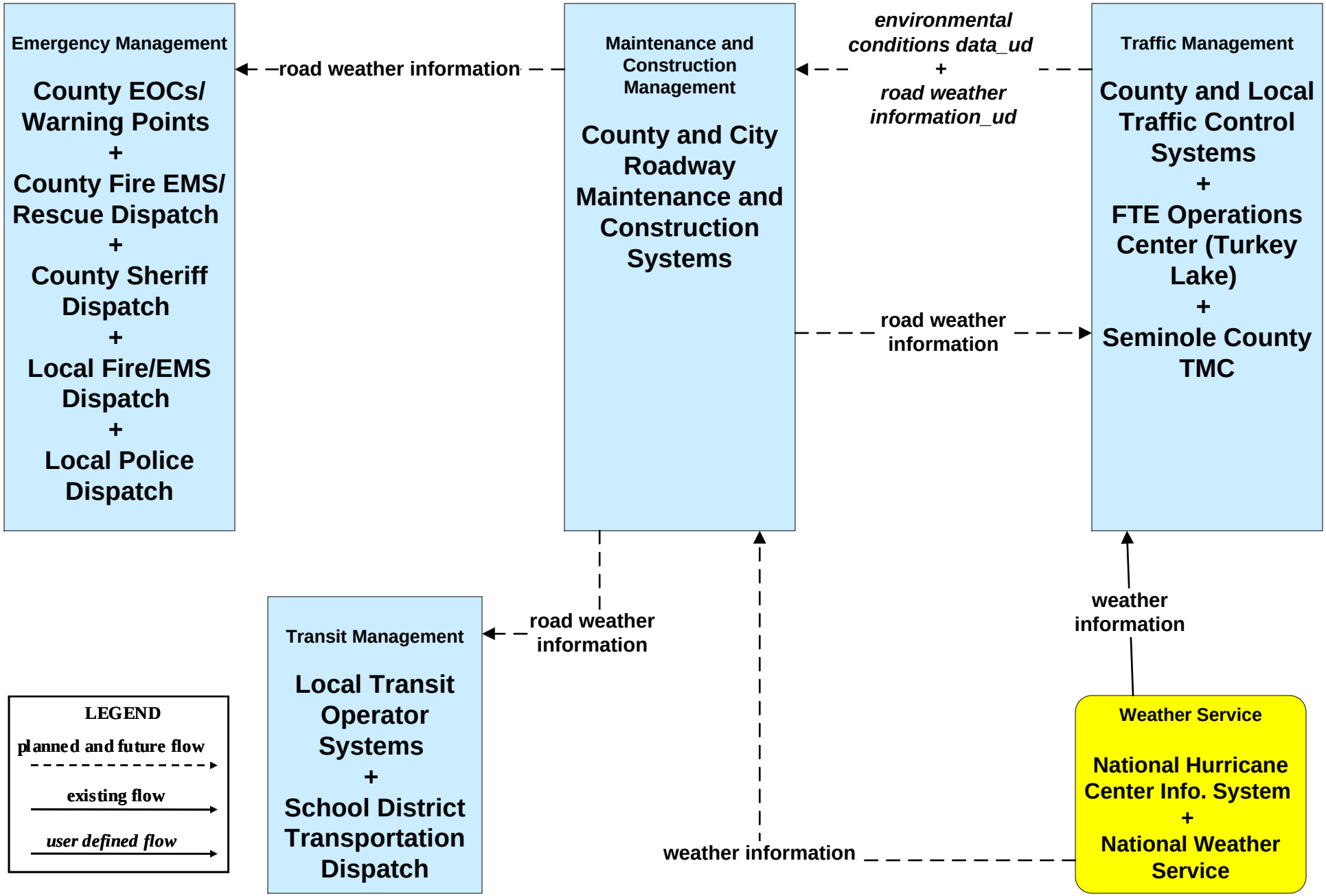
EM09 - Evacuation and Reentry Management
Central Florida Traffic Management Agencies



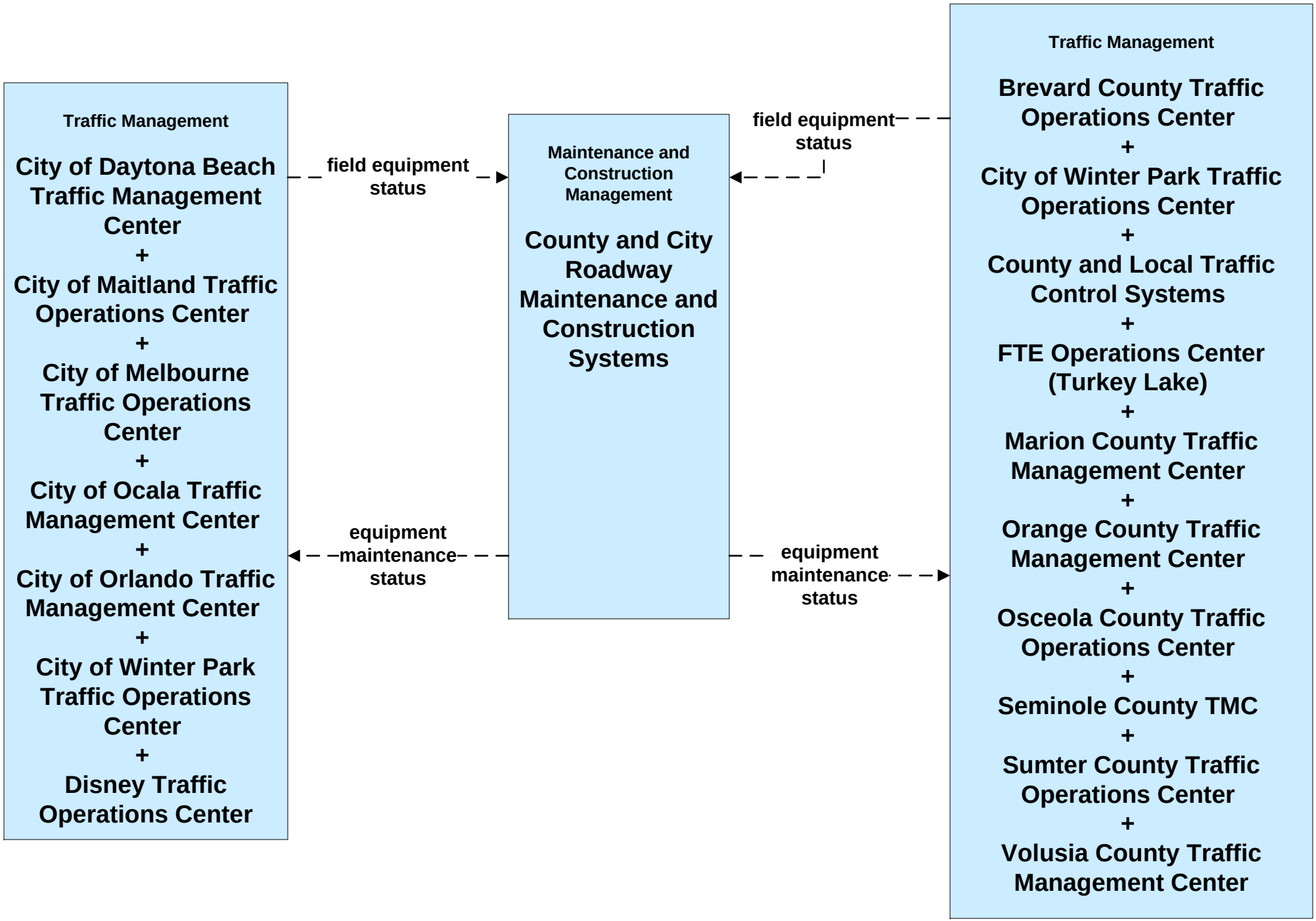
MC03 - Road Weather Data Collection
Seminole County / Volusia County



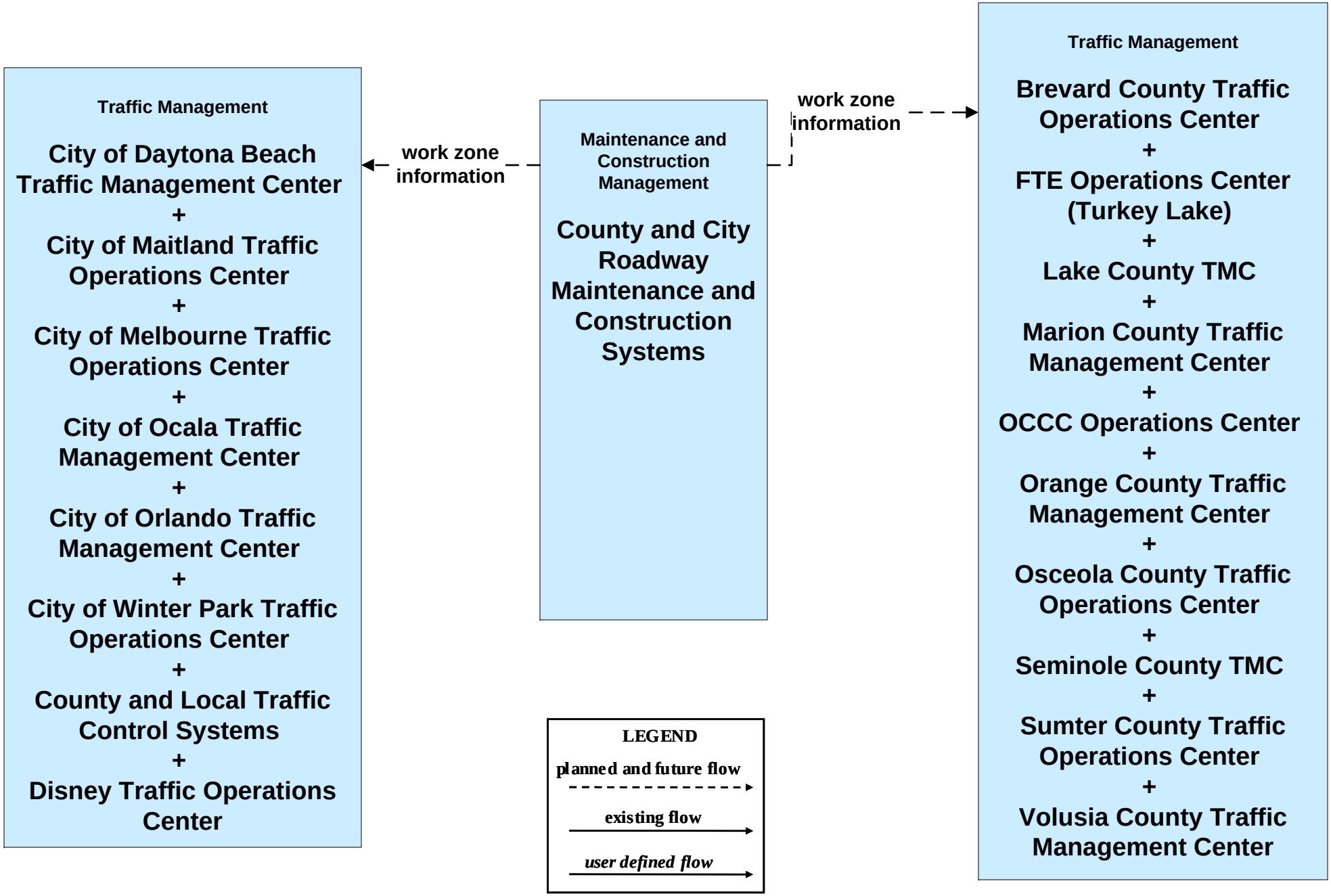
MC04 - Weather Information Processing and Distribution
Counties and Cities



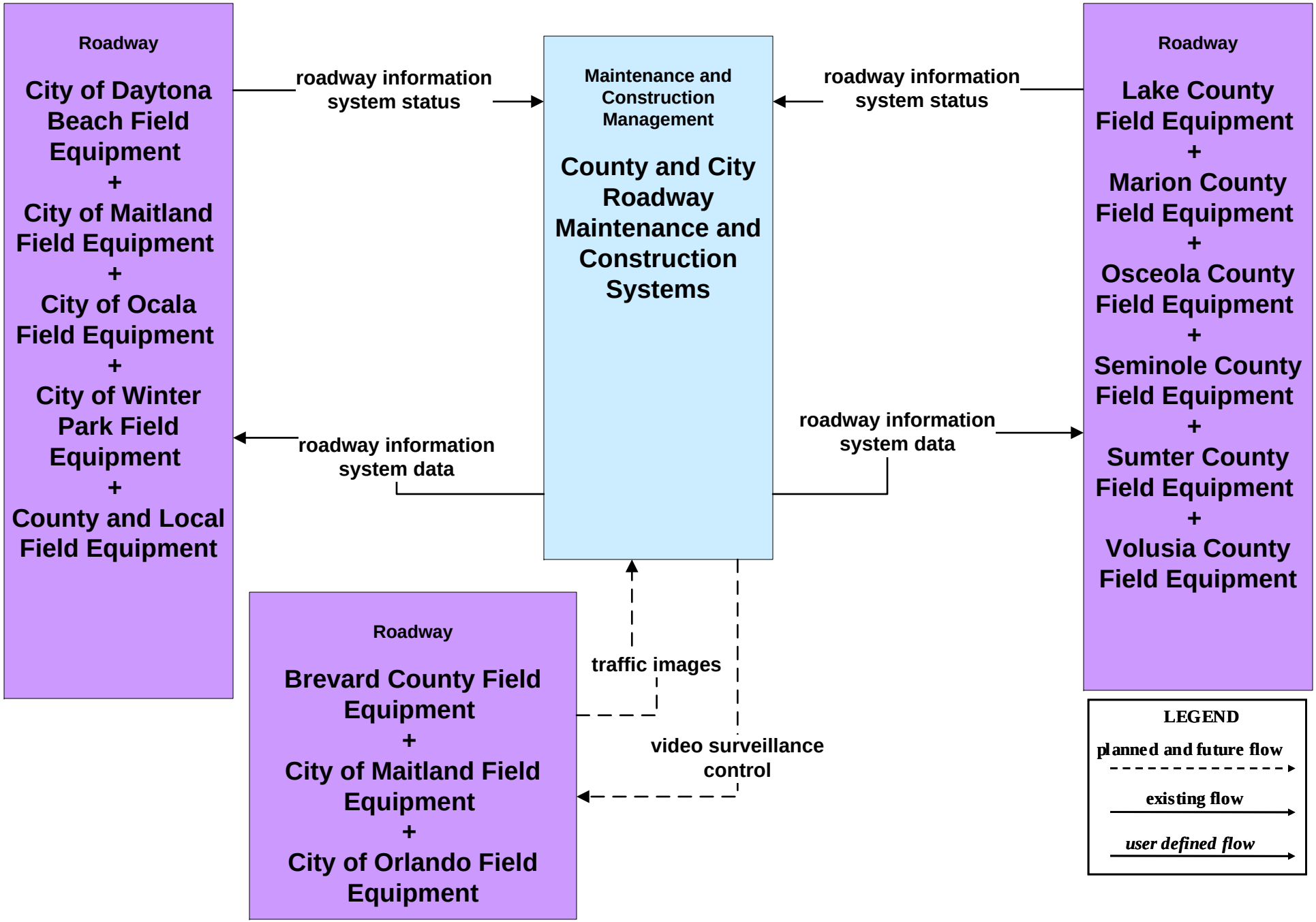
MC07 - Roadway Maintenance and Construction
Counties and Cities (2 of 2)



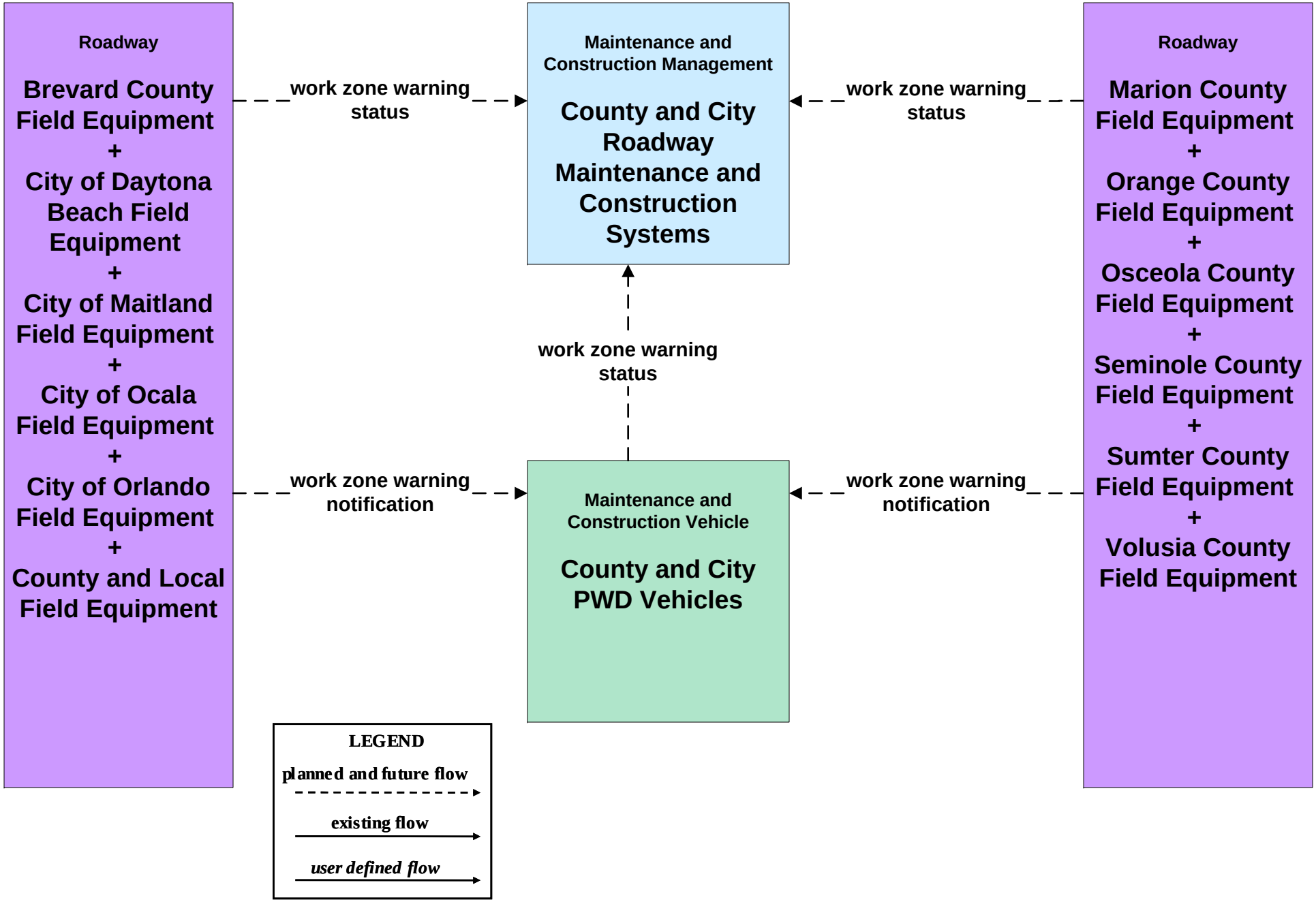
MC08 - Work Zone Management
Counties and Cities (2 of 3)



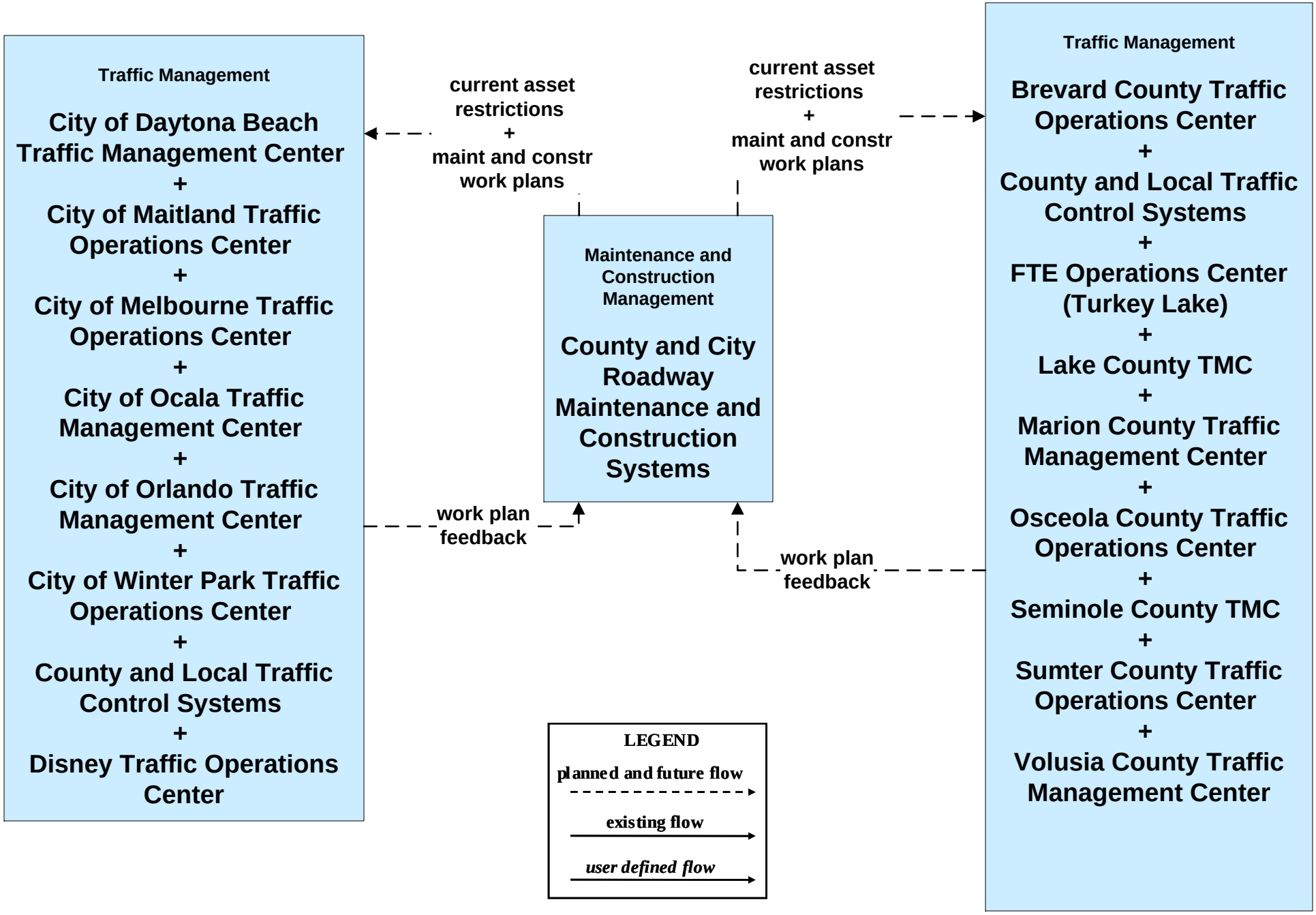
MC08 - Work Zone Management
Counties and Cities (3 of 3)



MC09 - Work Zone Safety Monitoring
Counties and Cities



MC10 - Maintenance and Construction Activity Coordination
Counties and Cities (2 of 4)



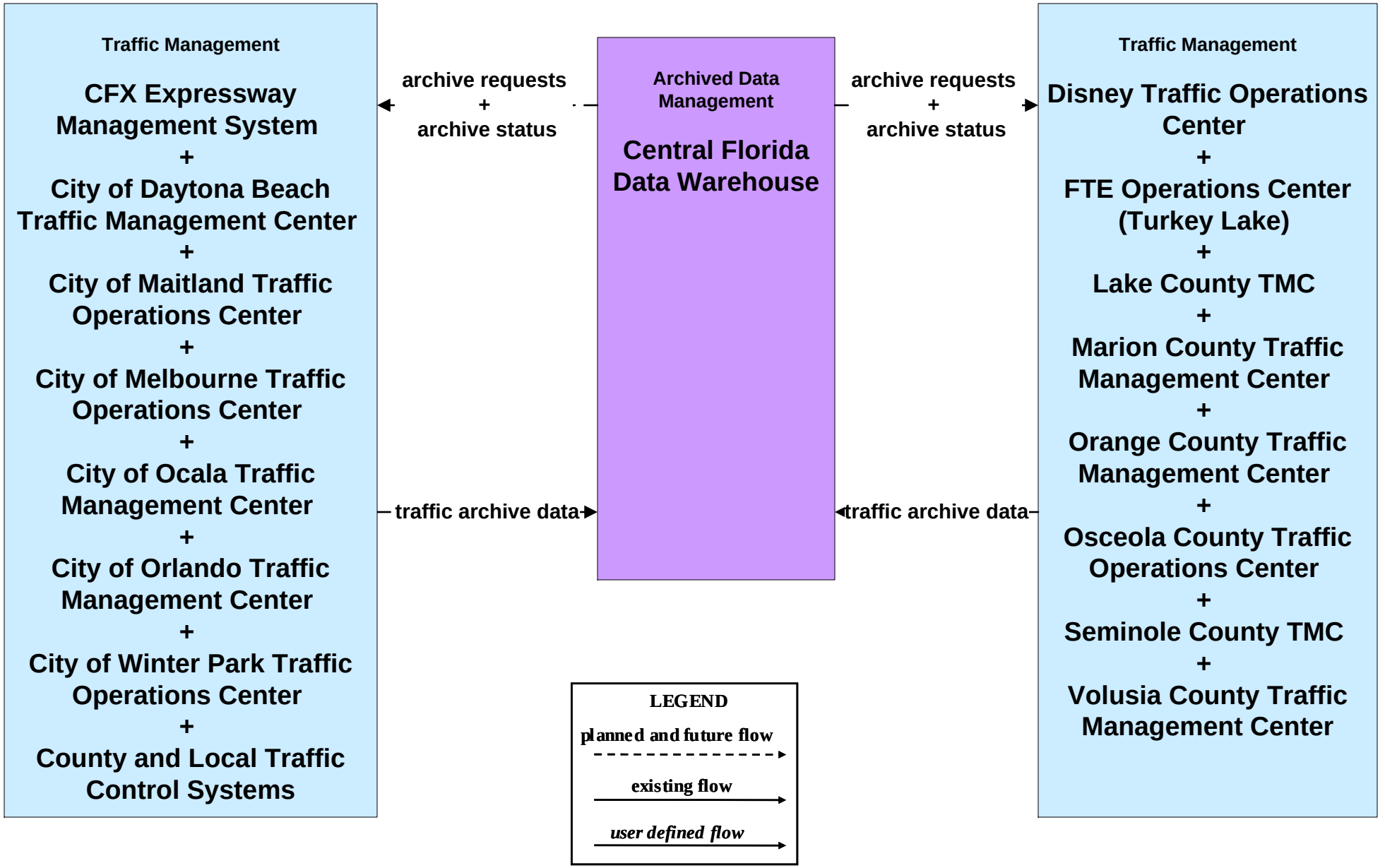
FDOT District 5

Central Florida Regional ITS Architecture

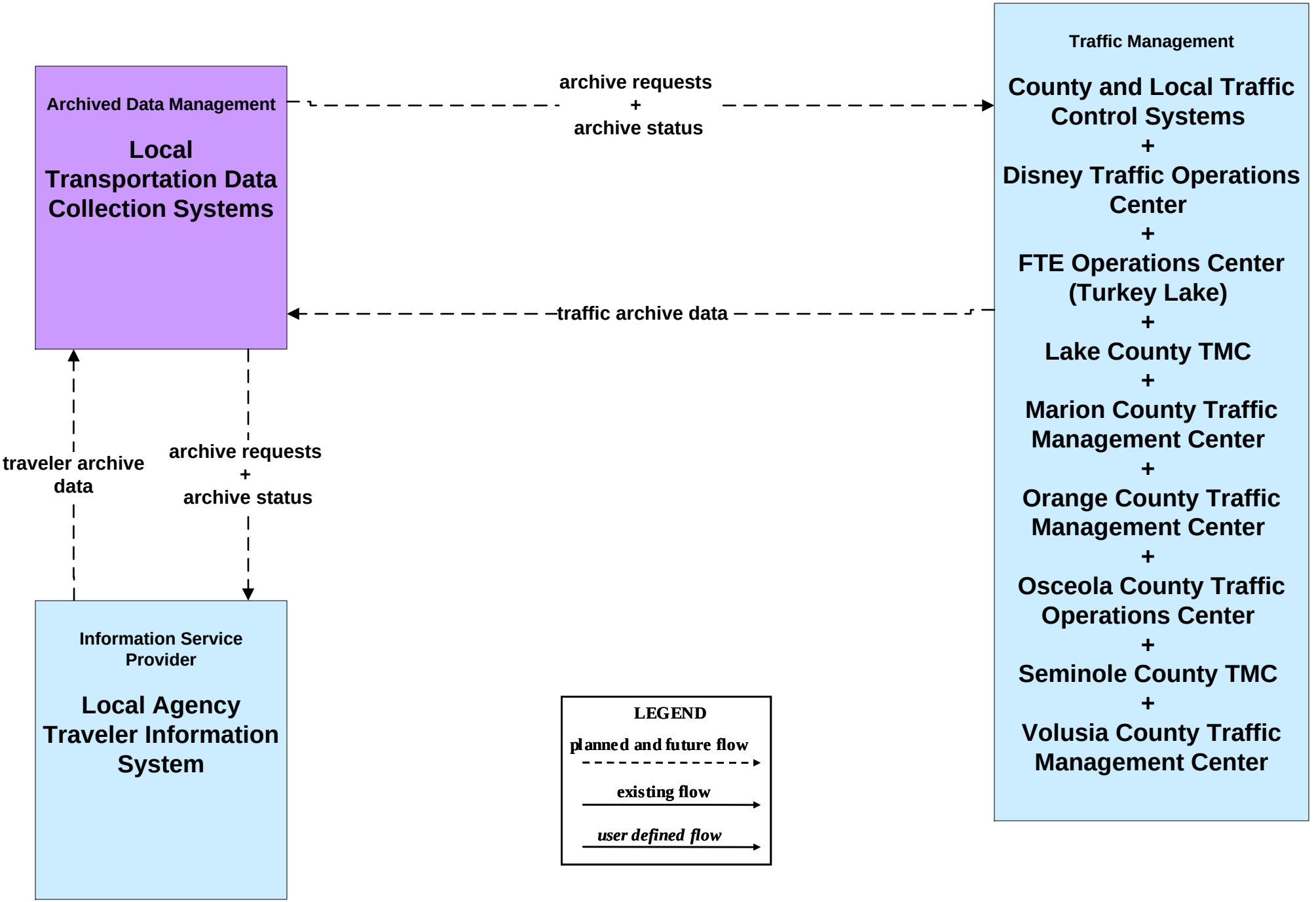
Customized Service Package Diagrams

Florida Turnpike Enterprise

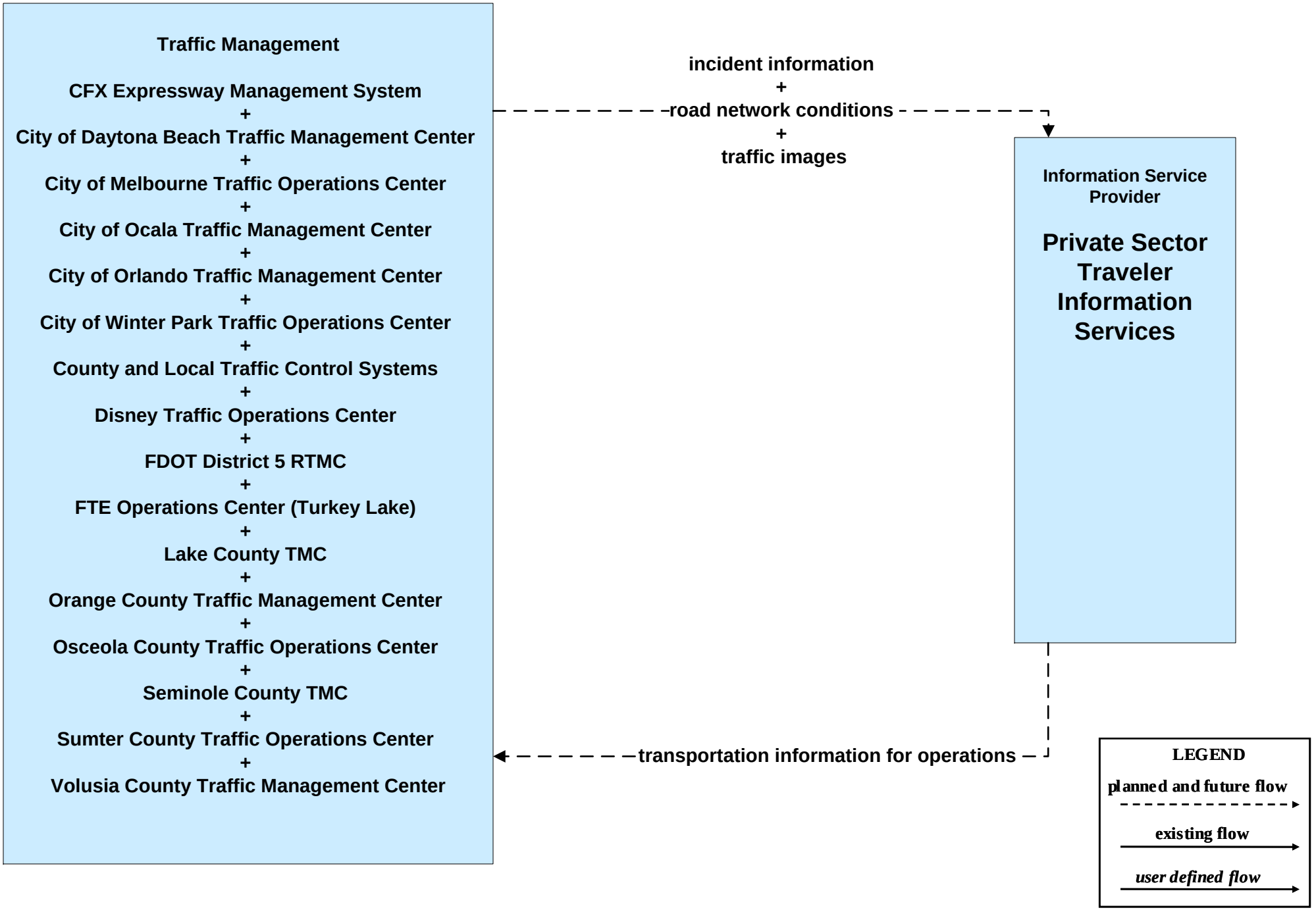
AD2 - ITS Data Warehouse
Central Florida Data Warehouse (1 of 2)



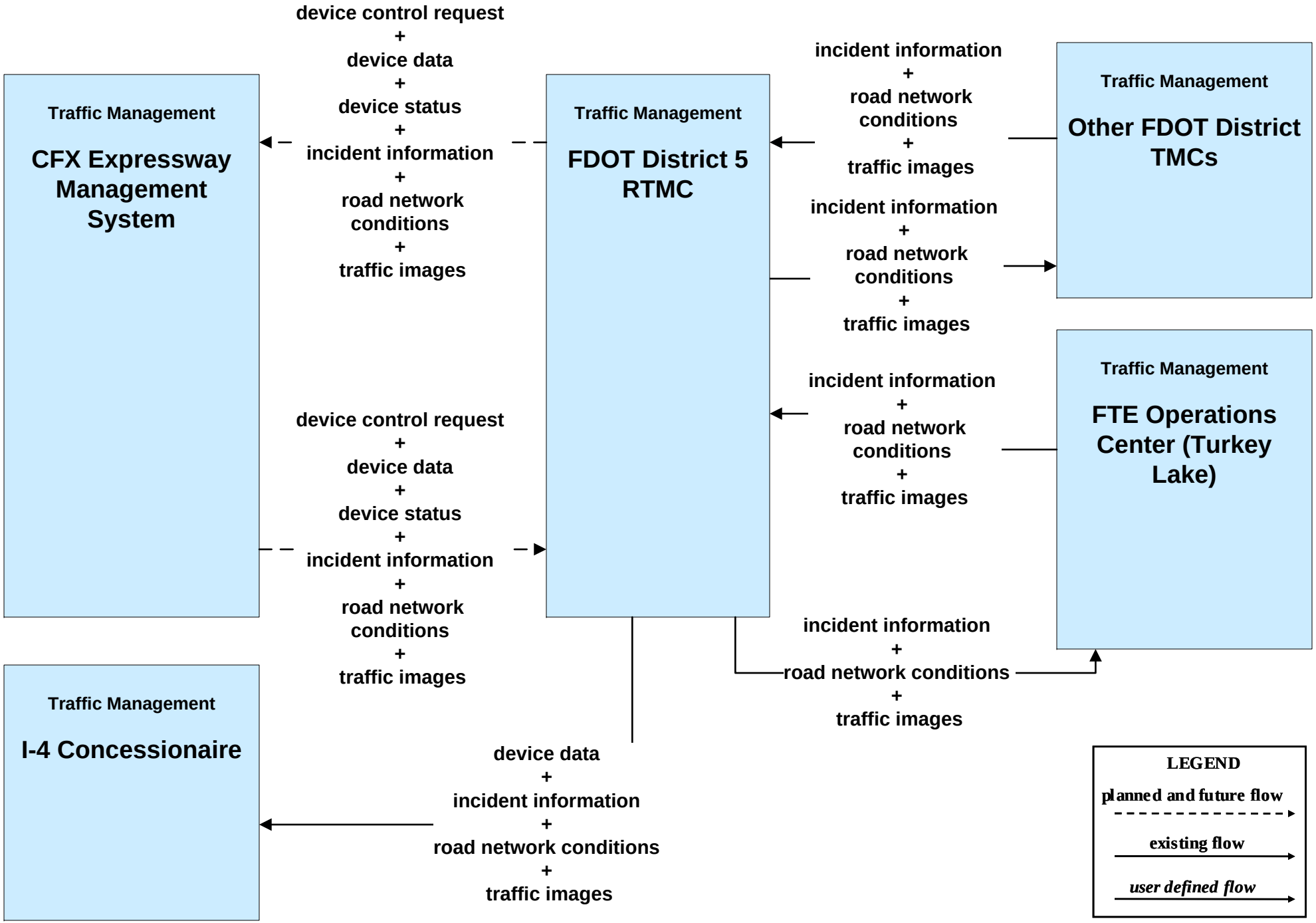
AD2 - ITS Data Warehouse
Local Archives (1 of 2)



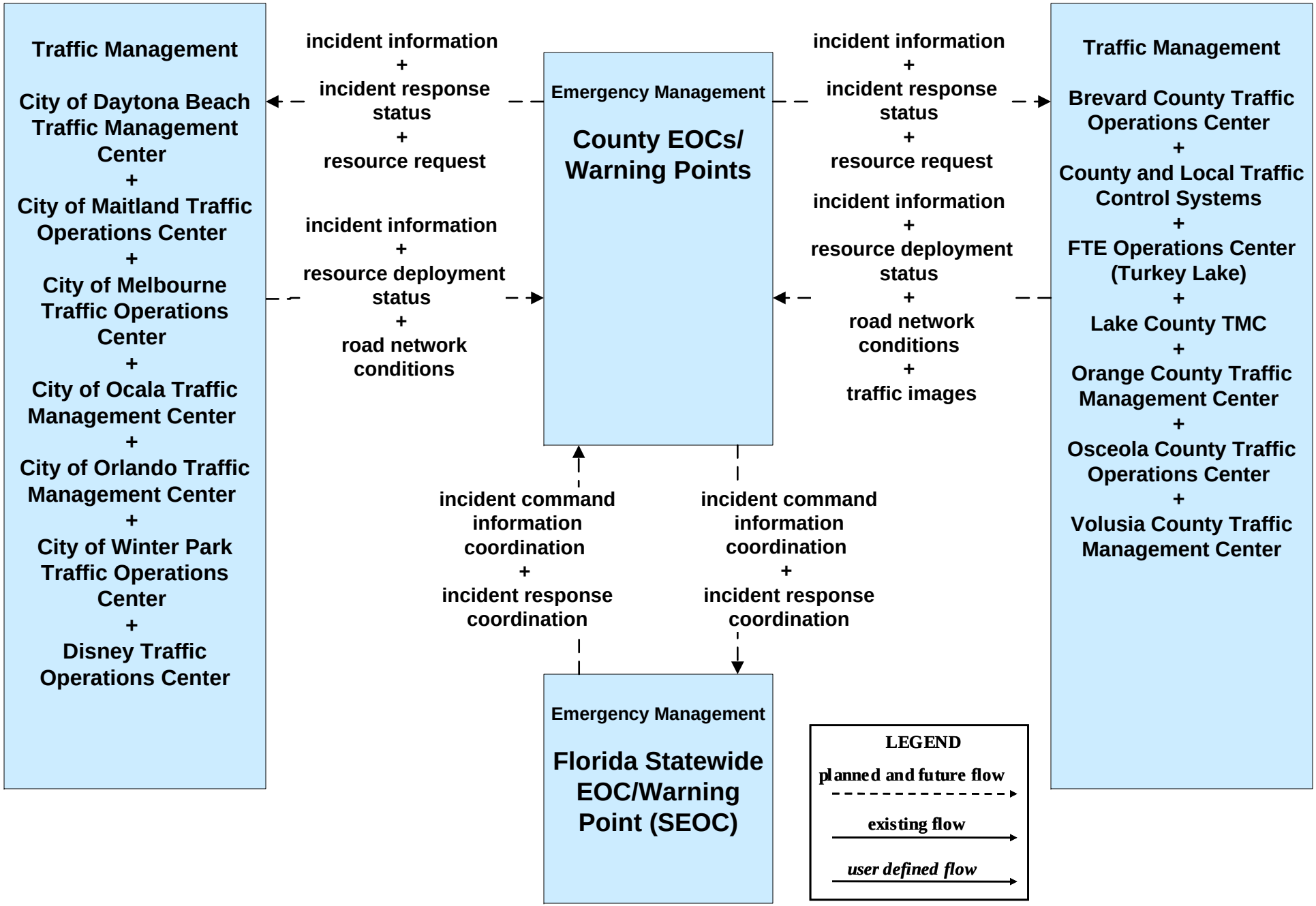
ATIS06 - Transportation Operations Data Sharing
Private Sector ISPs (2 of 2)



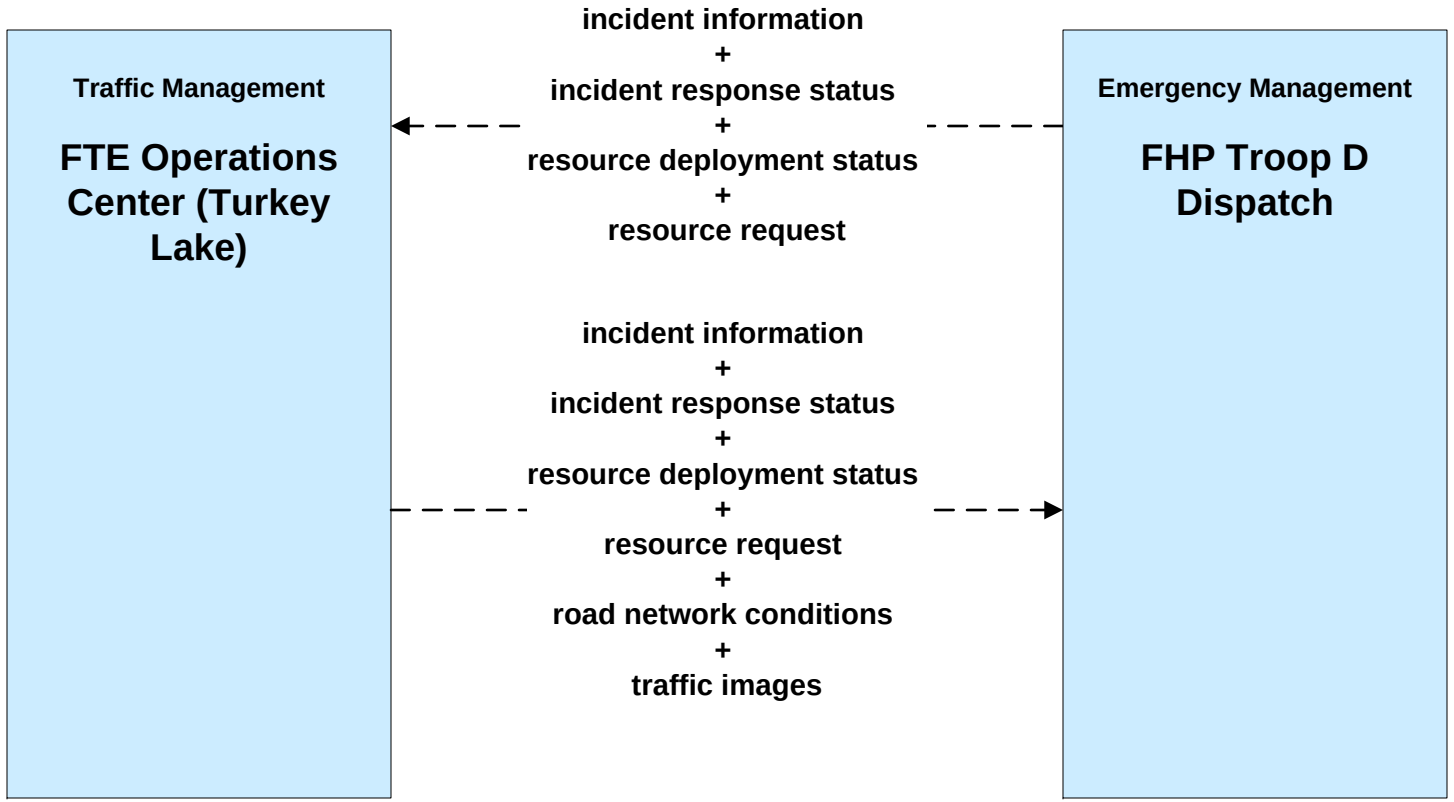
ATMS07 - Regional Traffic Management
FDOT Districts (1 of 3)

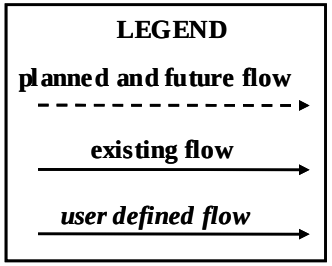


ATMS08 - Traffic Incident Management System
County Emergency Operations Center (TM to EM)

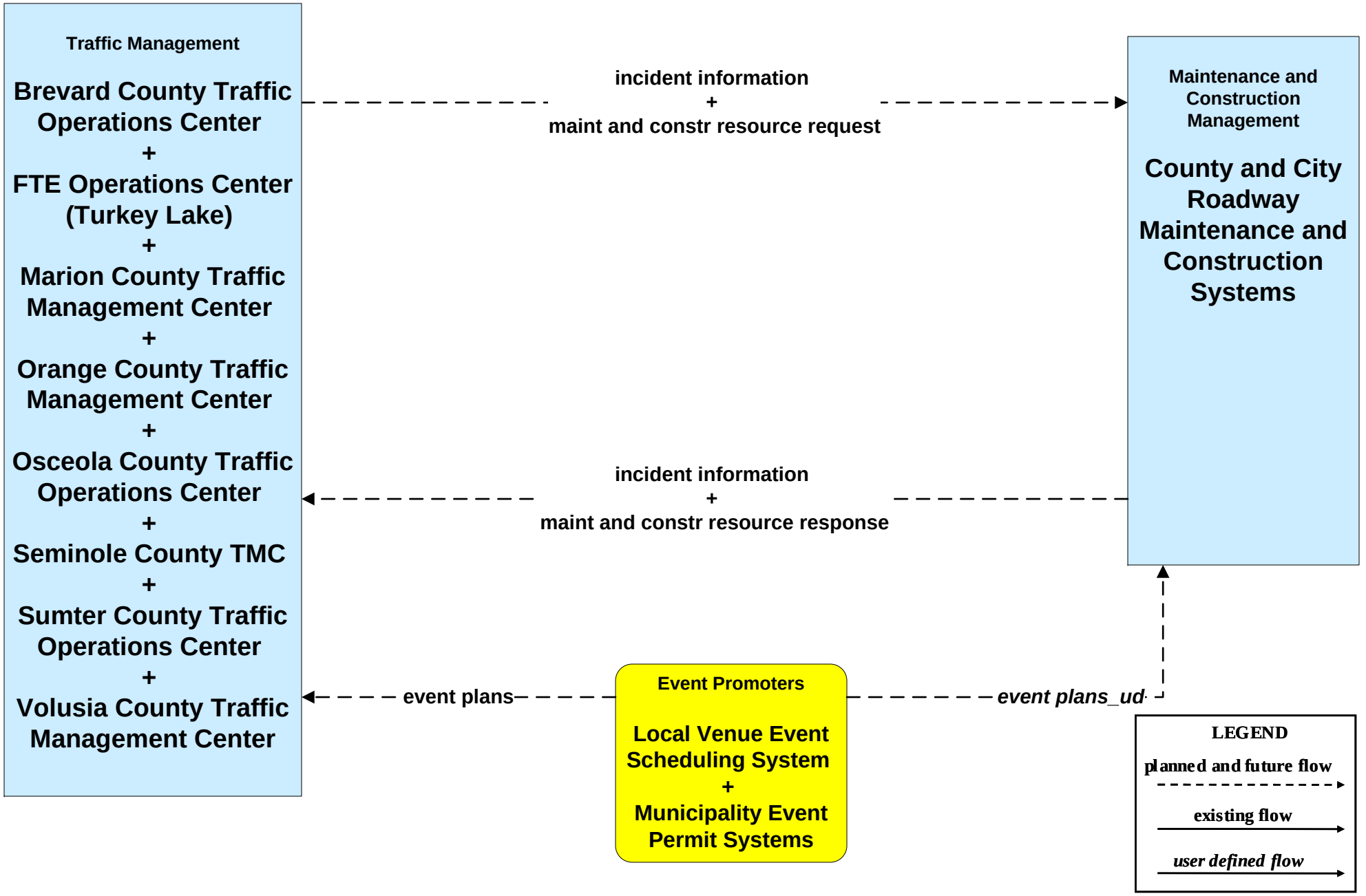


ATMS08 - Traffic Incident Management System
FTE

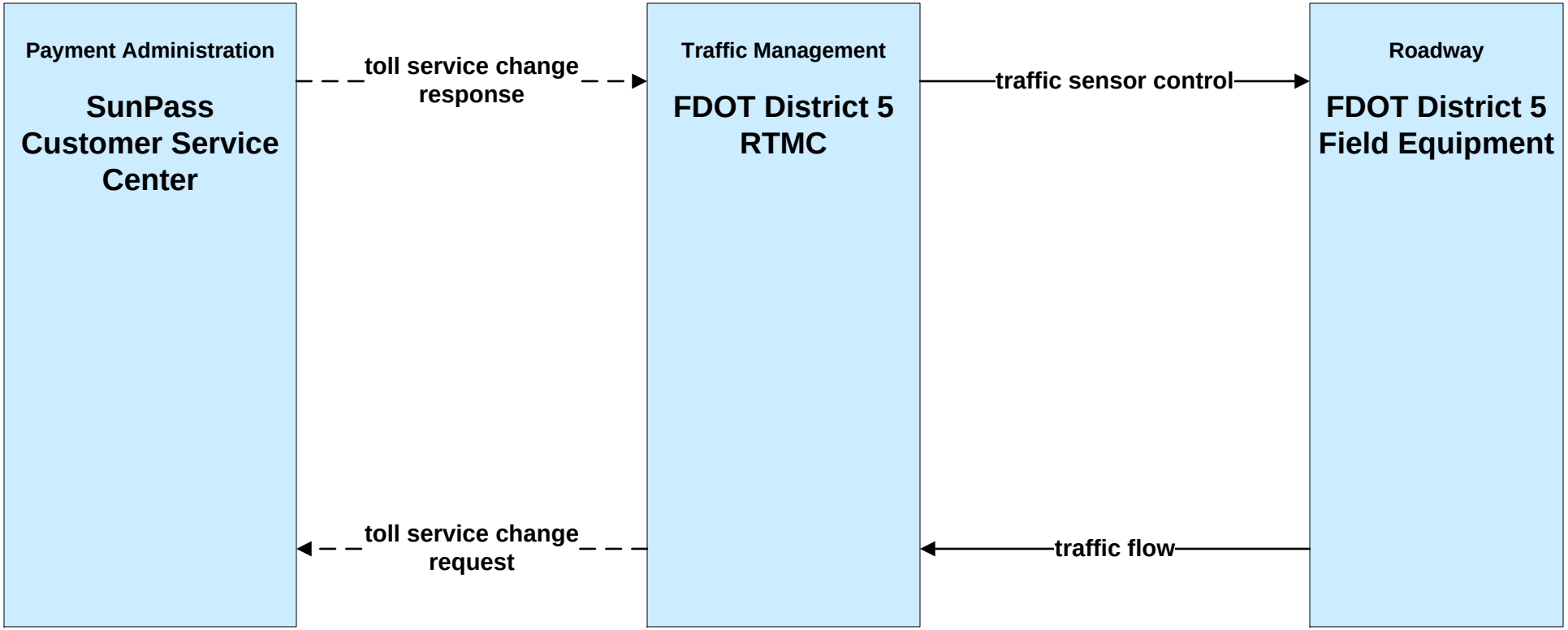


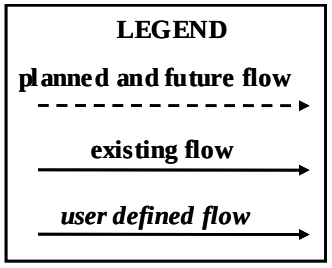


ATMS08 - Traffic Incident Management System
County Traffic Management Centers (TM to MCM)

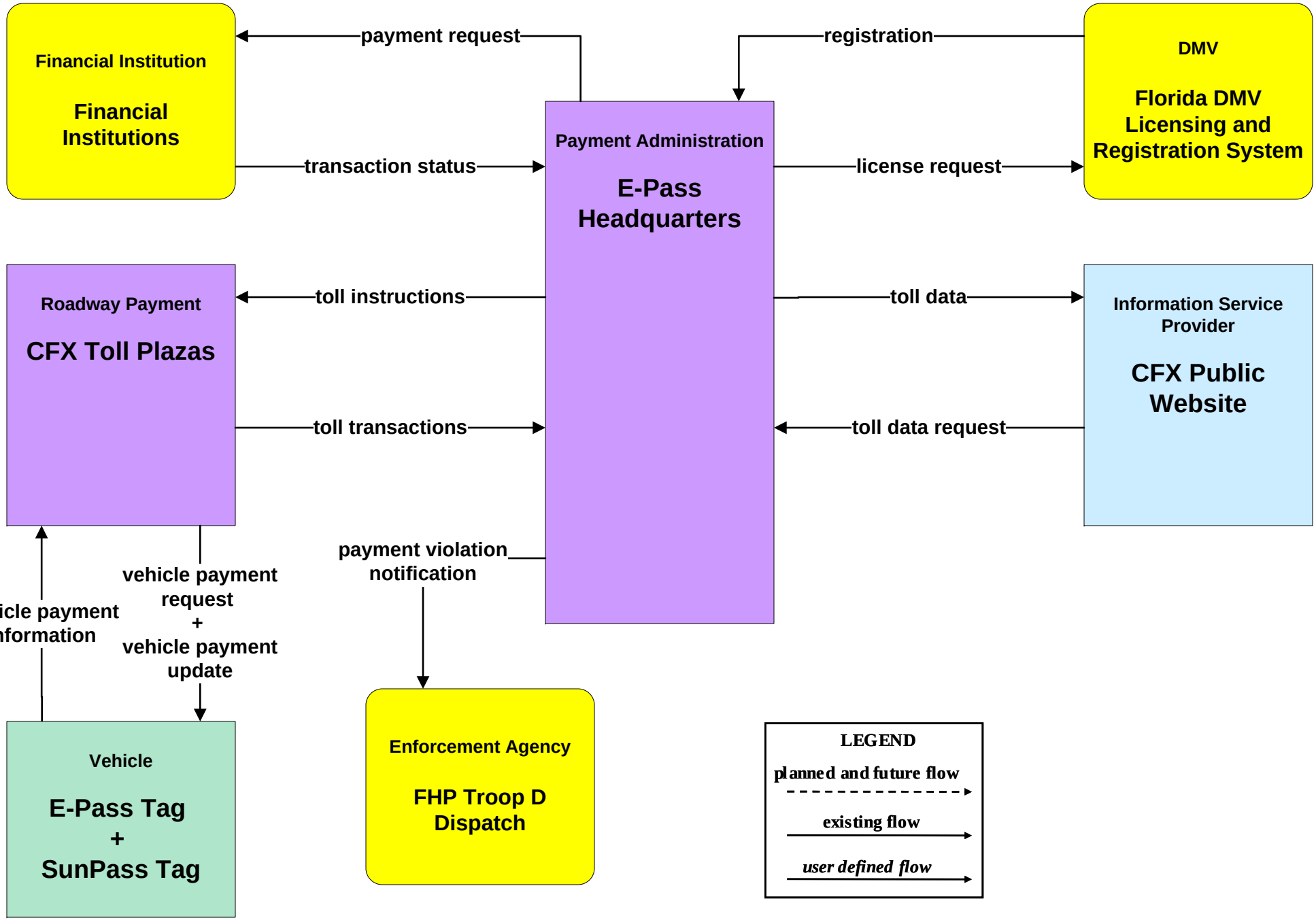


ATMS09 - Transportation Decision Support and Demand Management
Dynamic Express Lane Tolling

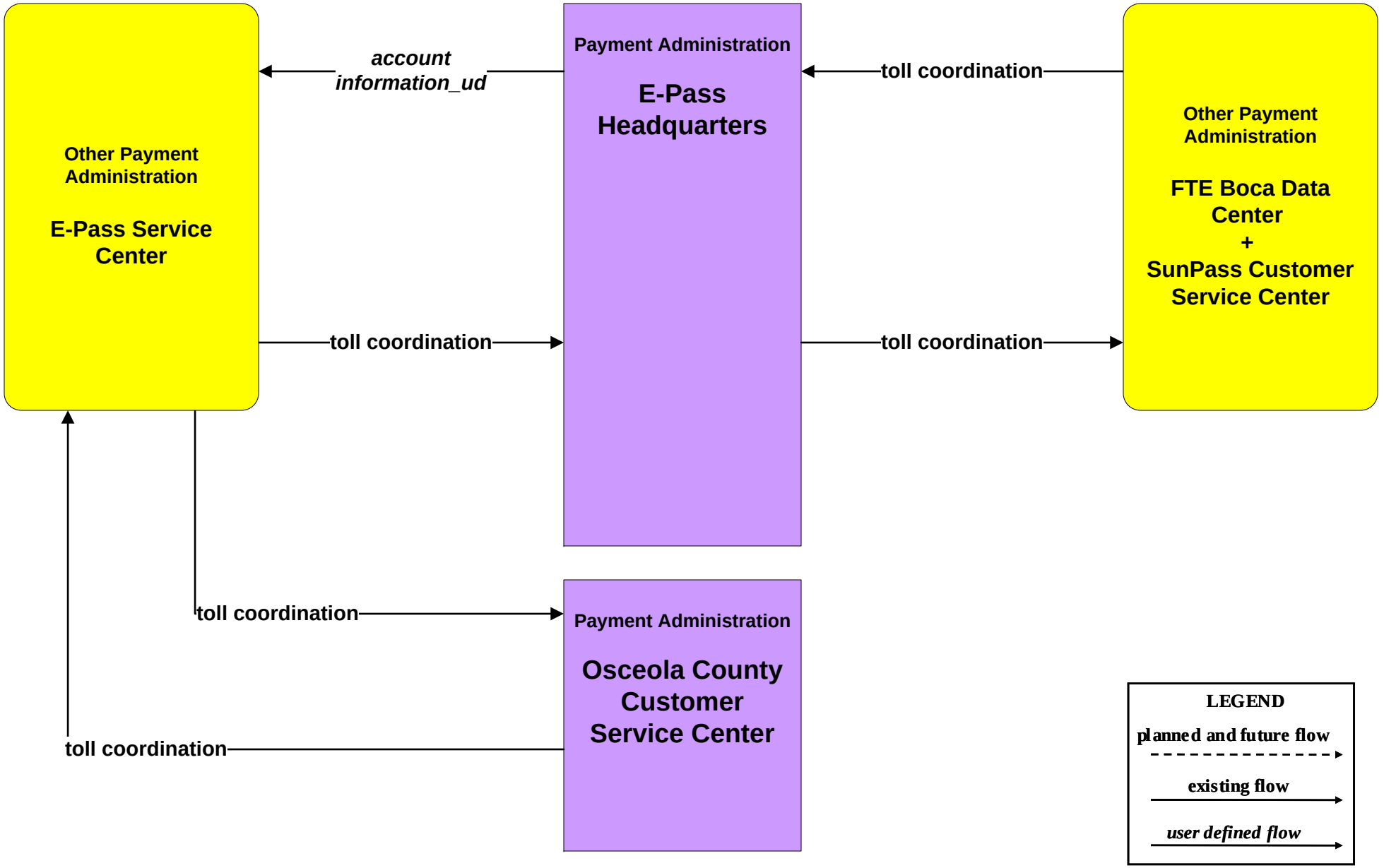




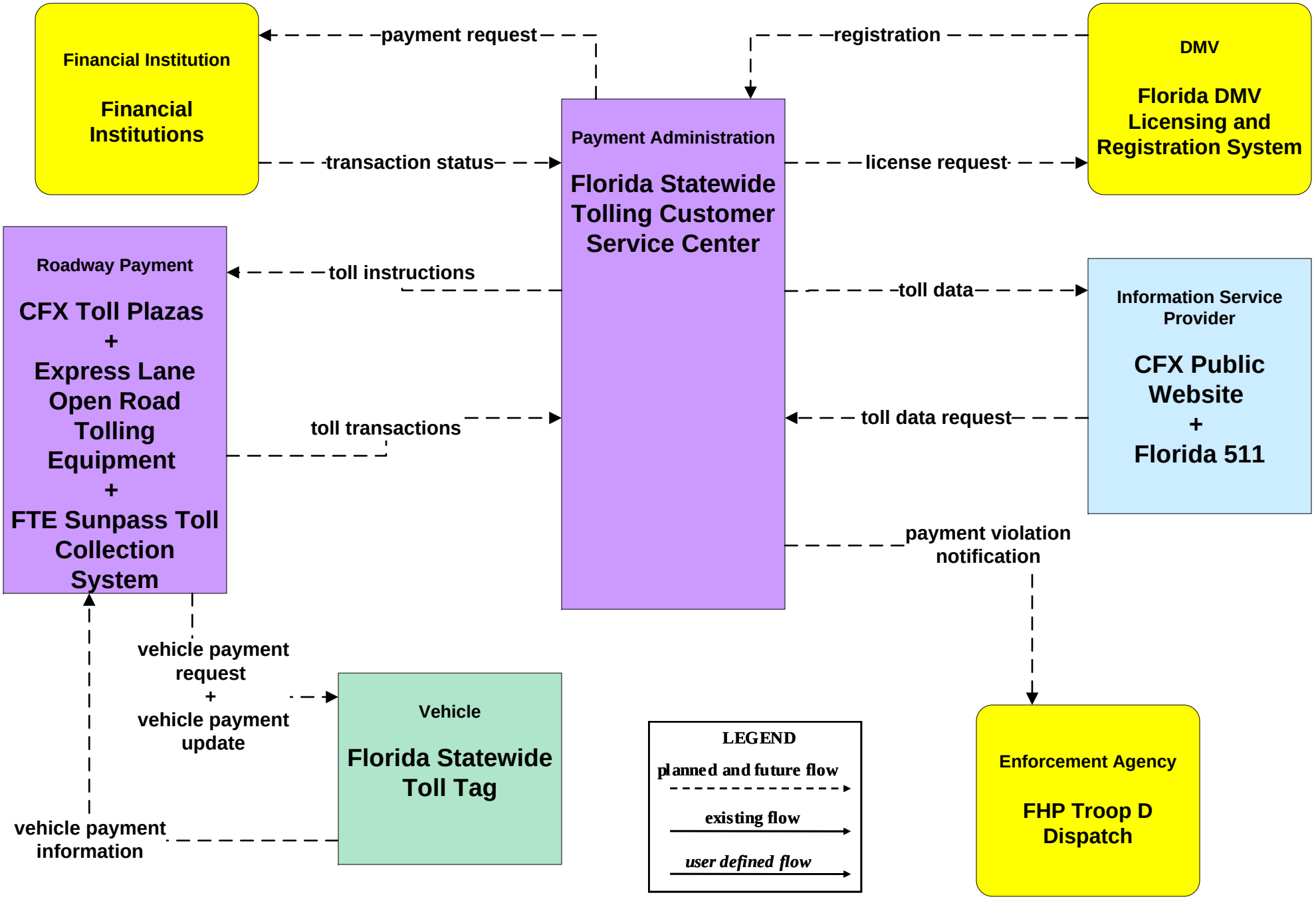
ATMS10 - Electronic Toll Collection
CFX



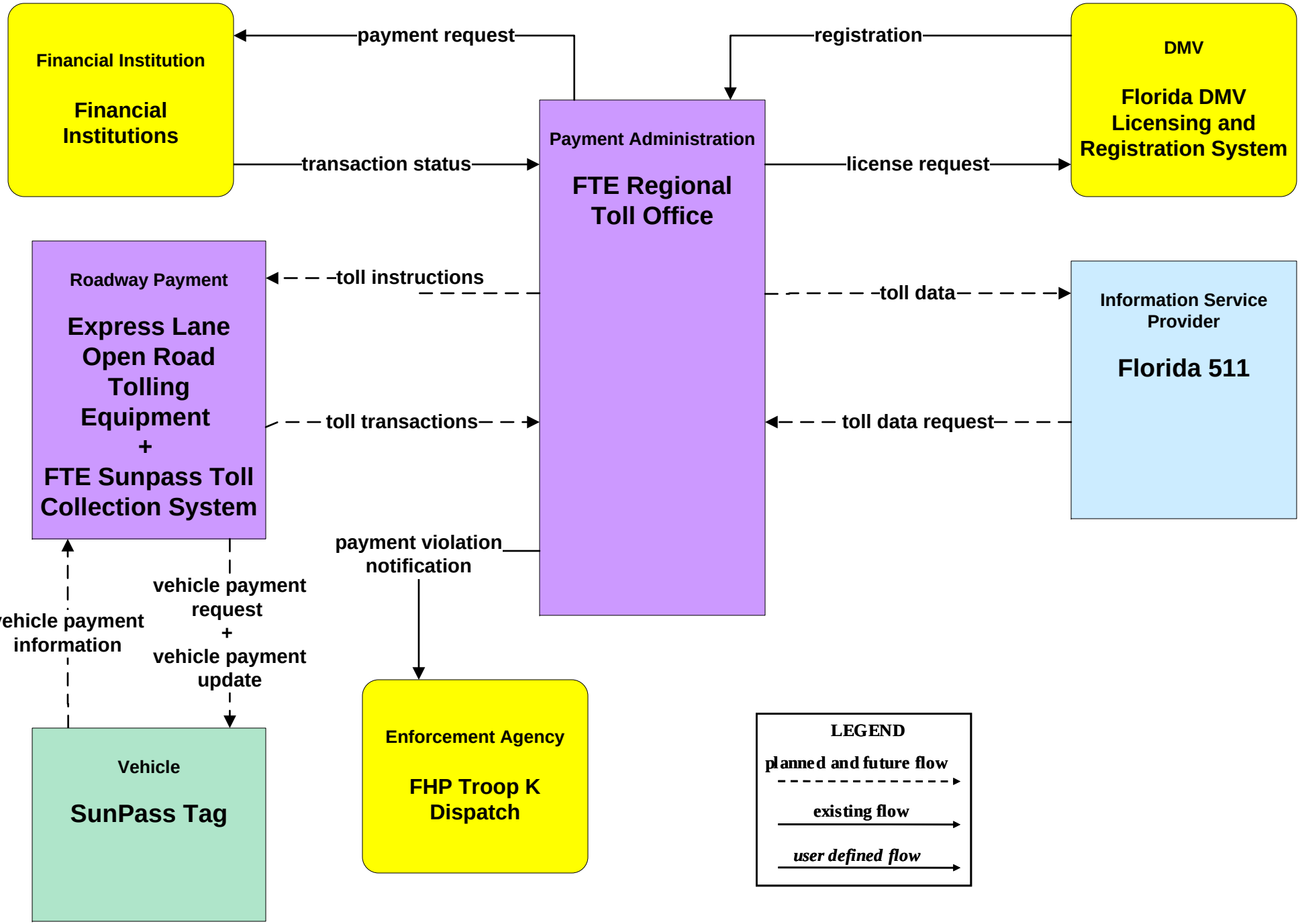
ATMS10 - Electronic Toll Collection
E-Pass/ FDOT Turnpike Enterprise - Reciprocity Network



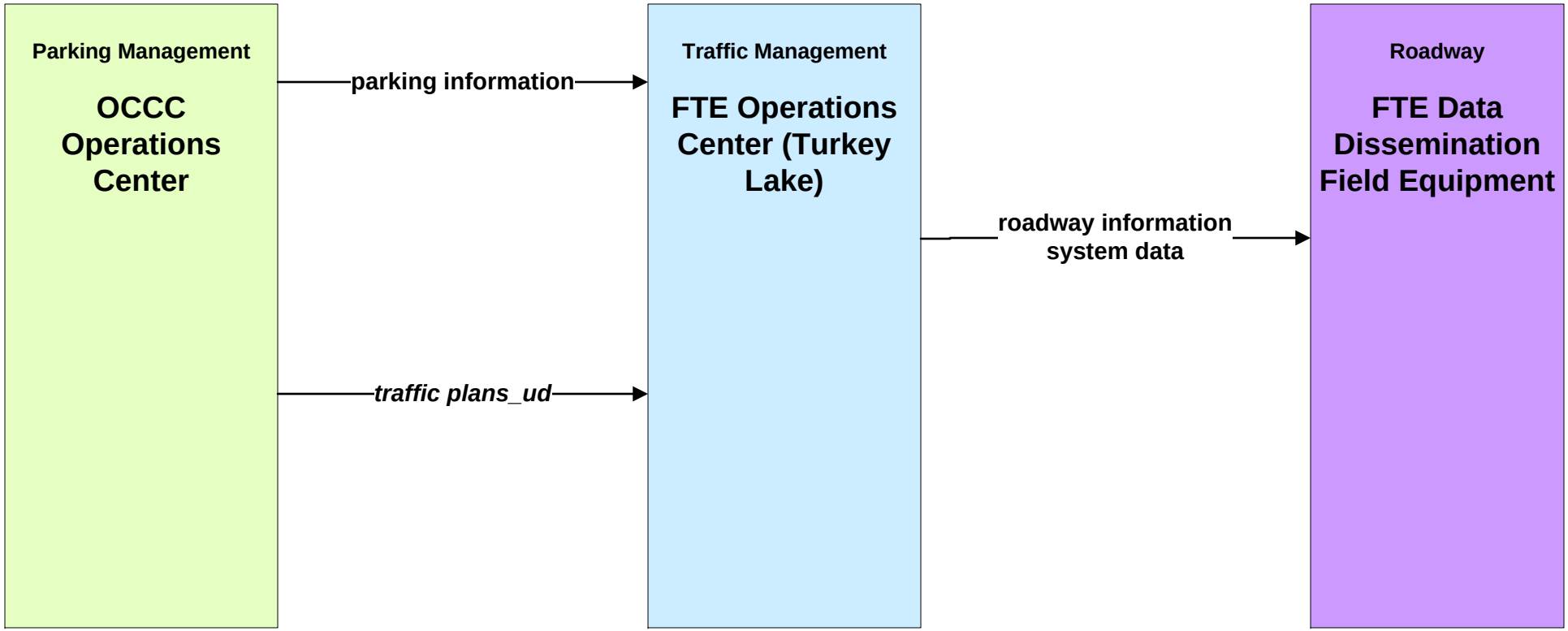
ATMS10 - Electronic Toll Collection
Florida Statewide Tolling



ATMS10 - Electronic Toll Collection
I-4 Express Lanes



ATMS16 - Parking Facility Management
Orlando Convention Center (2 of 2)



LEGEND

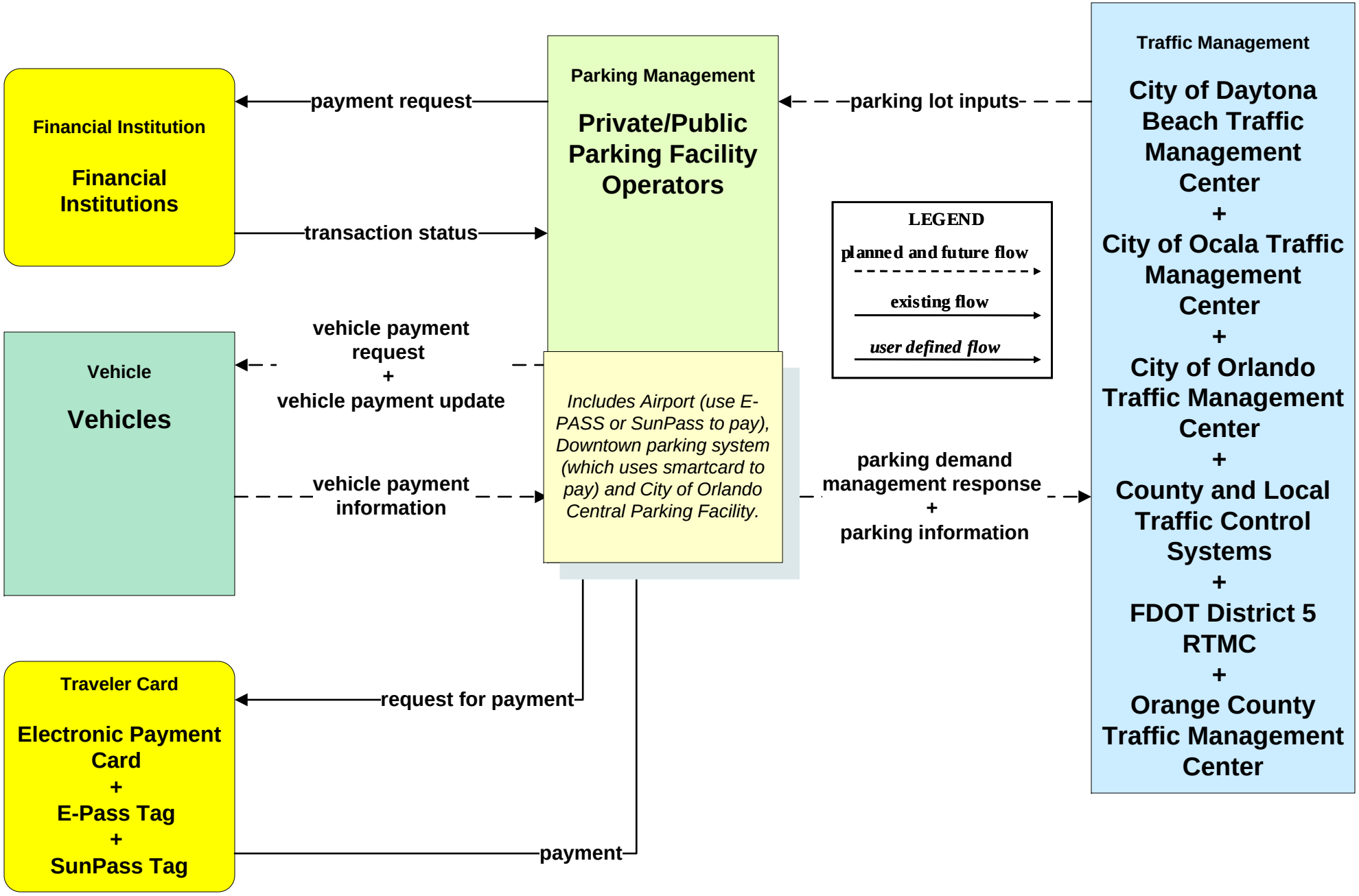
planned and future flow

existing flow

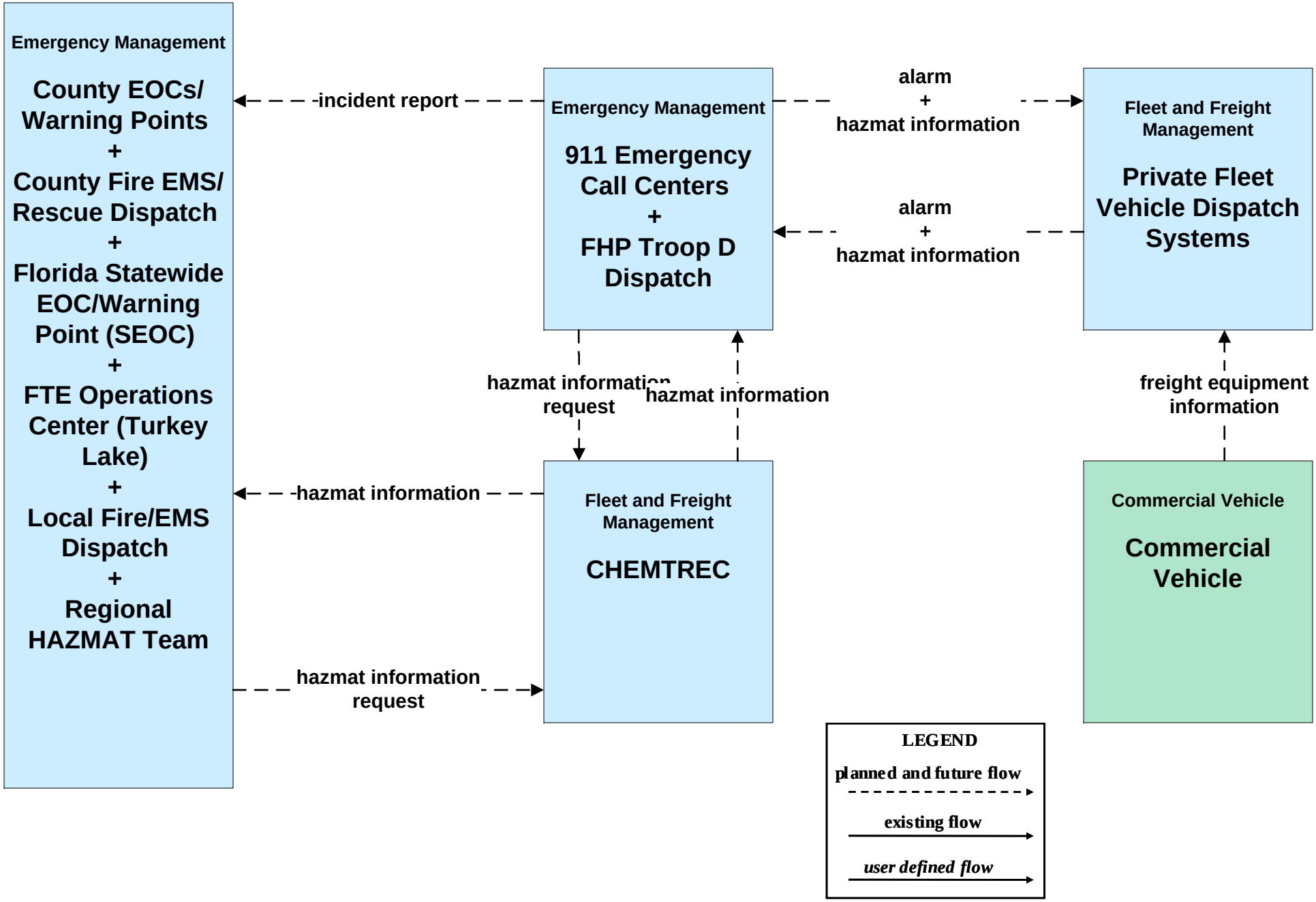
user defined flow

FTE (Turkey Lake) connection to the Convention Center (via DMS with parking information gotten from the Convention Center)

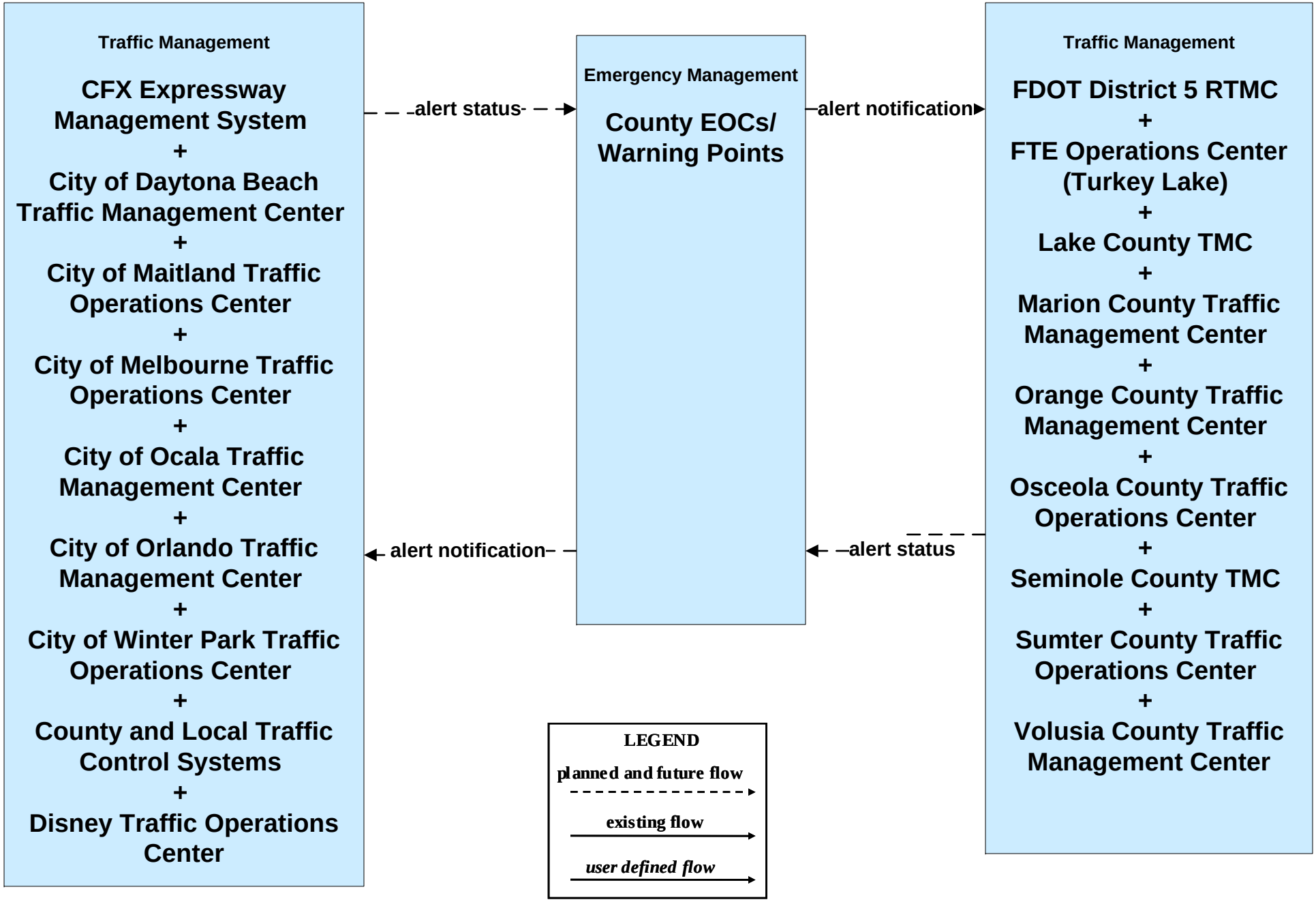
ATMS16 - Parking Facility Management
Parking Facility Operators



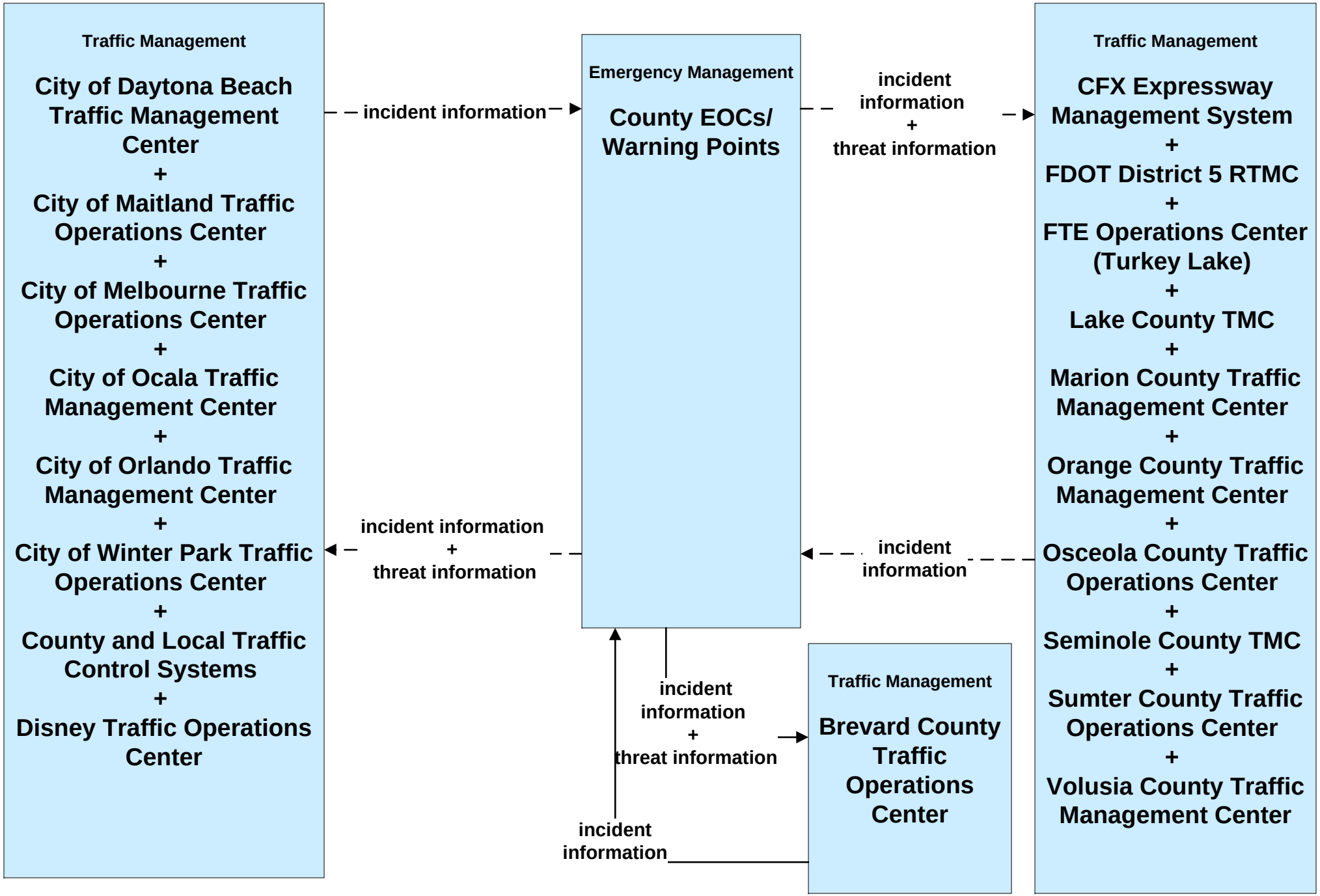
CVO10 - HAZMAT Management
Central Florida



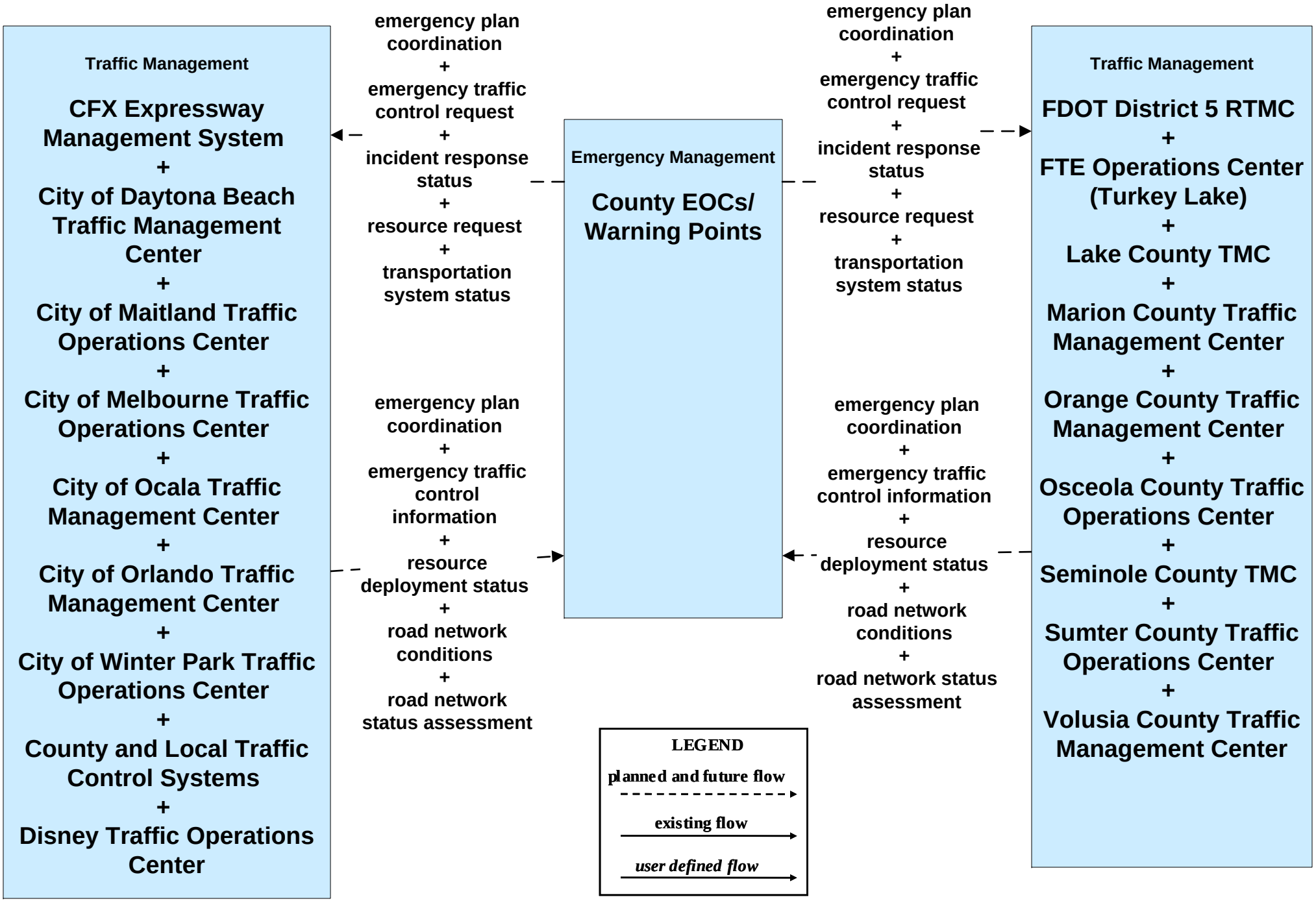
EM06 - Wide Area Alert
County EOCs (1 of 3)



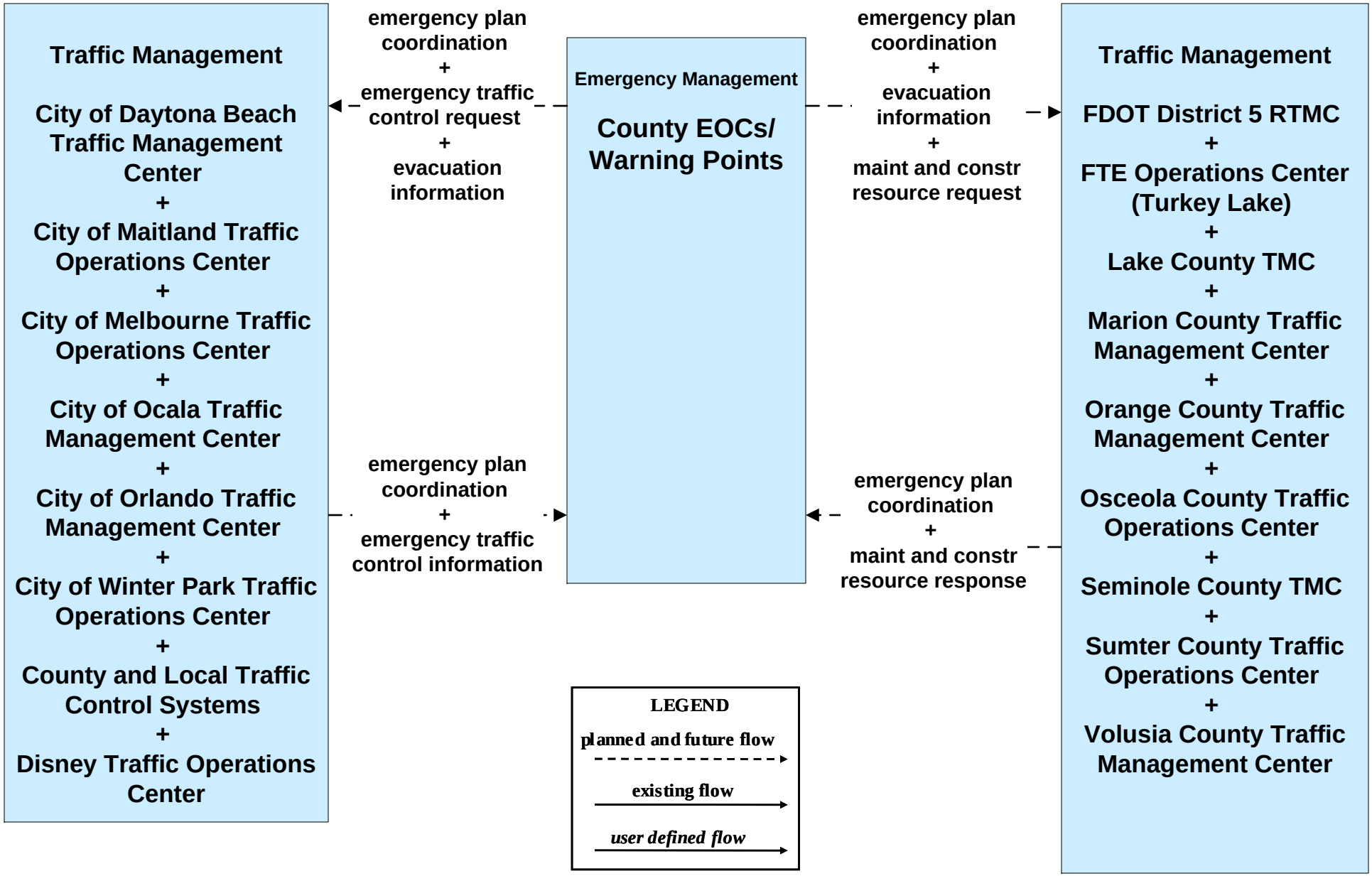
EM07 - Early Warning System
County EOCs (2 of 3)



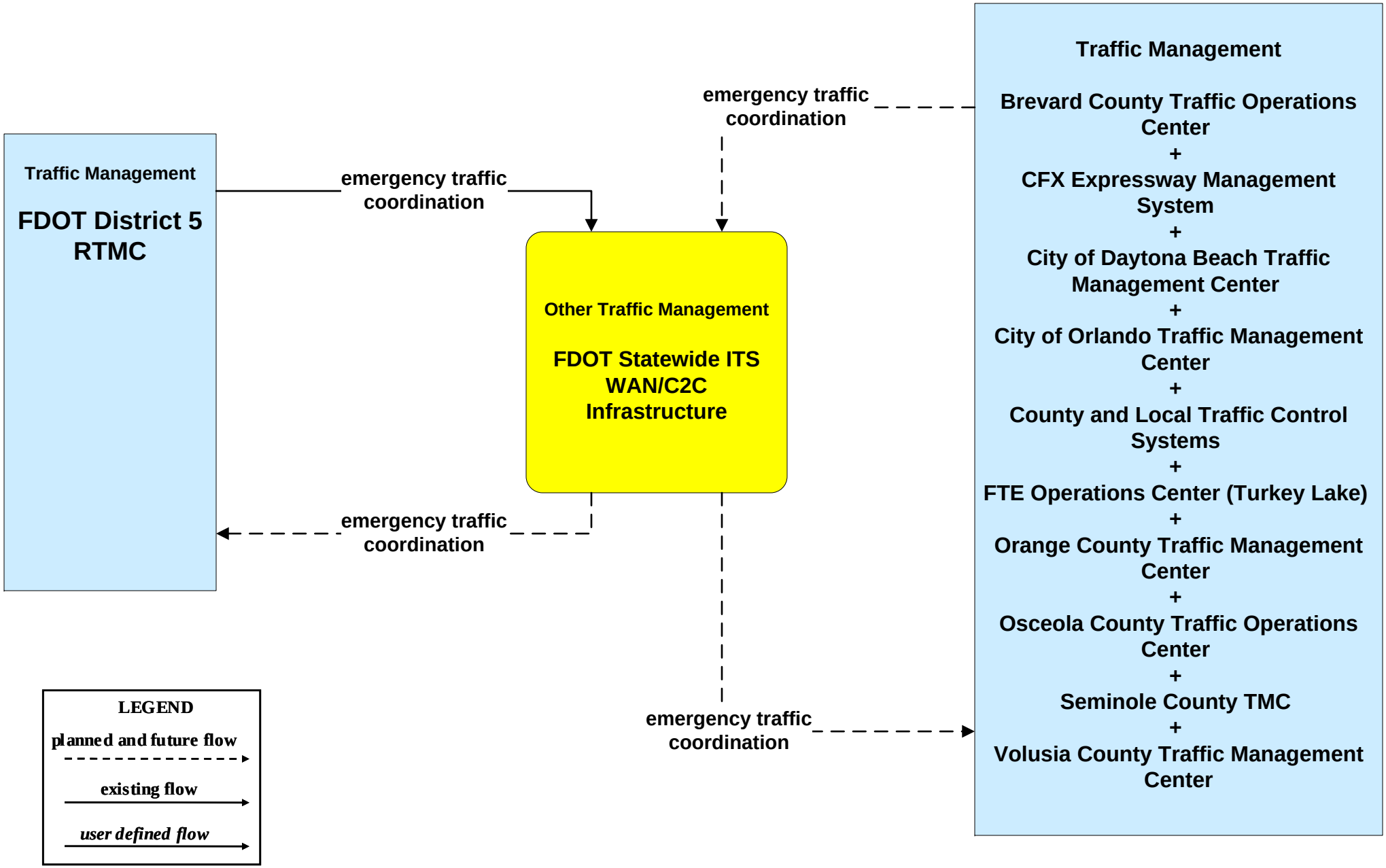
EM08 - Disaster Response and Recovery
County EOCs (2 of 4)



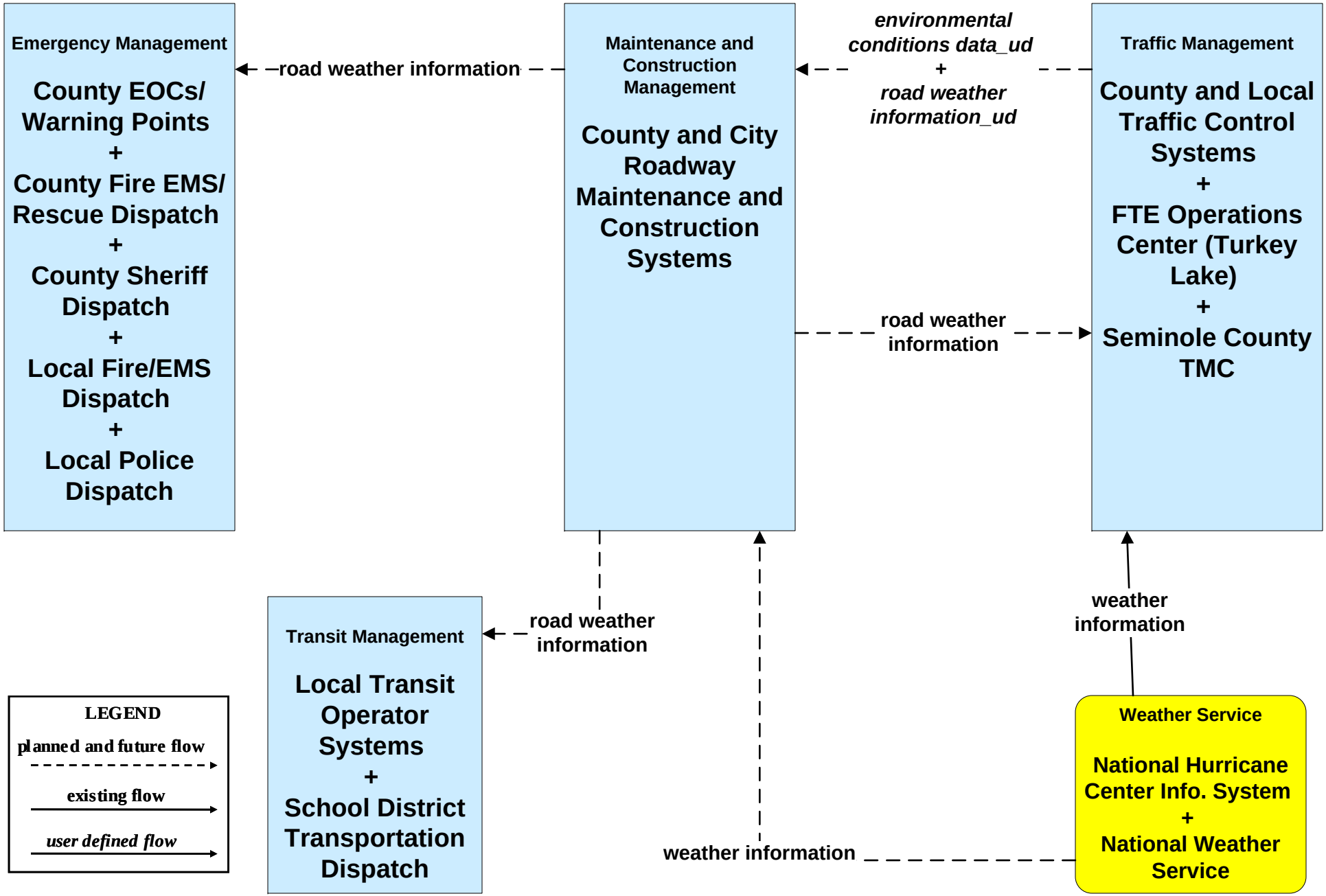
EM09 - Evacuation and Reentry Management
County EOCs (2 of 3)



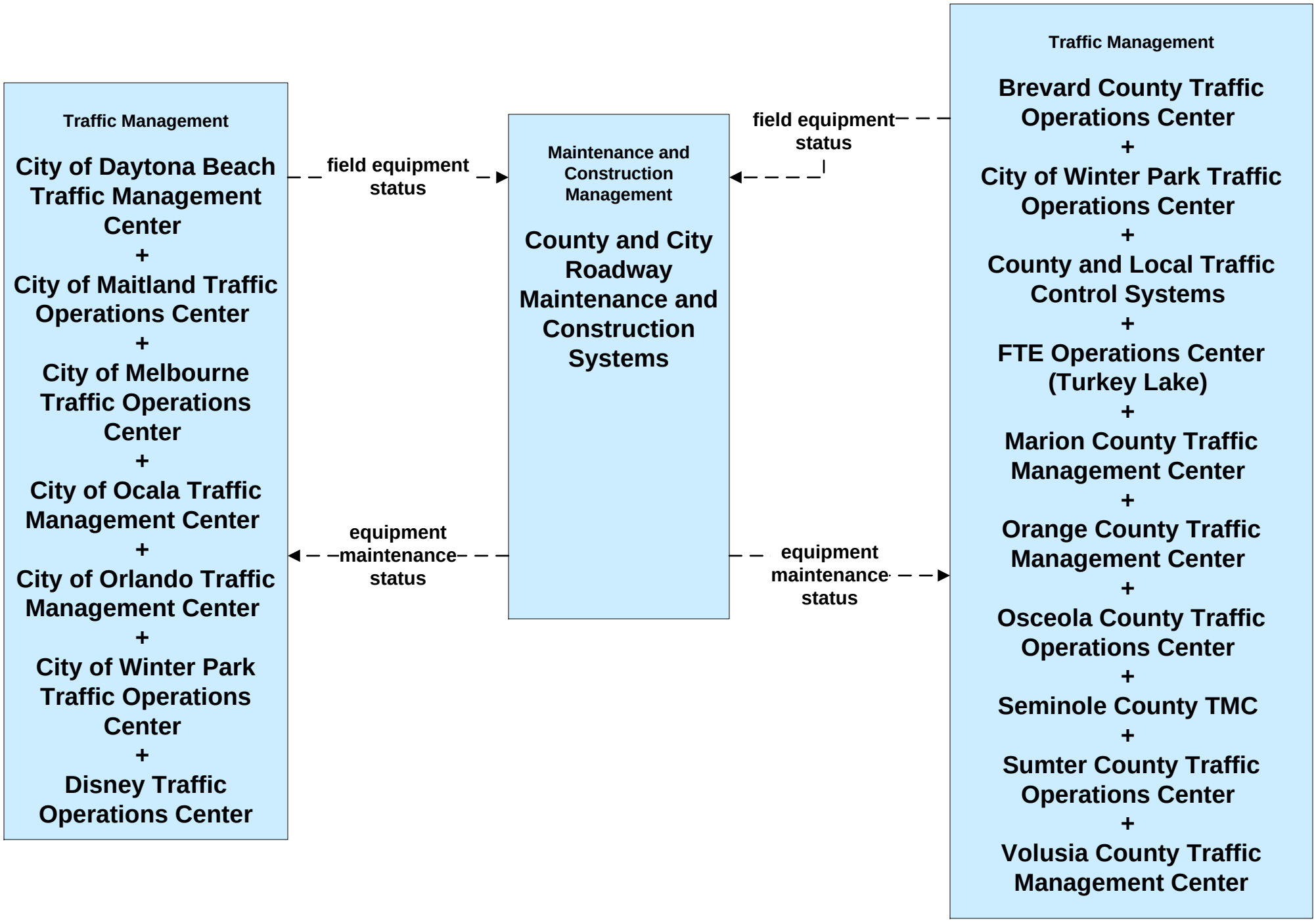
EM09 - Evacuation and Reentry Management
Central Florida Traffic Management Agencies



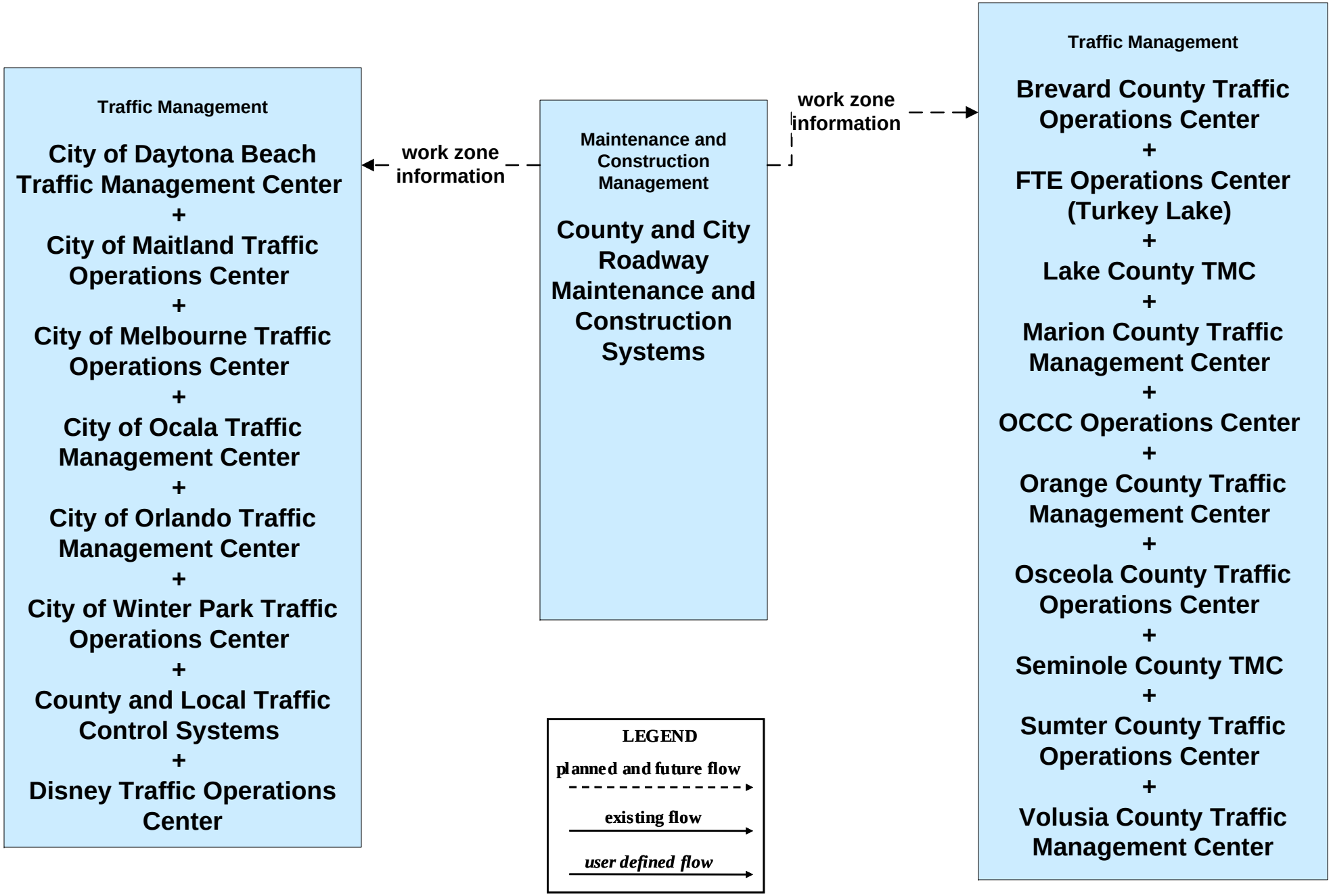
MC04 - Weather Information Processing and Distribution
Counties and Cities



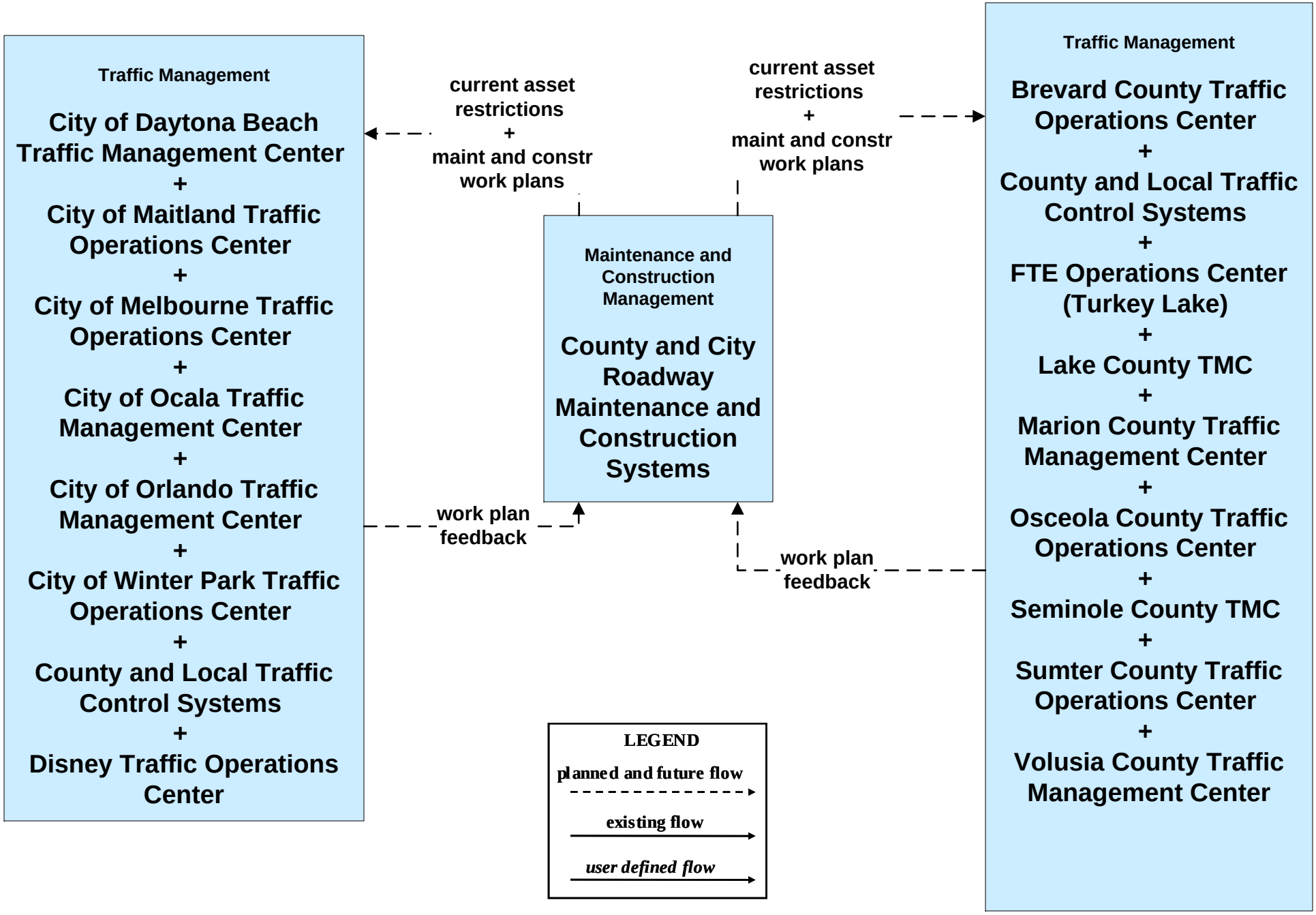
MC07 - Roadway Maintenance and Construction
Counties and Cities (2 of 2)



MC08 - Work Zone Management
Counties and Cities (2 of 3)



MC10 - Maintenance and Construction Activity Coordination
Counties and Cities (2 of 4)



APPENDIX F

TSMO Advisory Committee Roster

Osceola County

Joe del Zaballero

Traffic Operations Engineer

P: 407-742-0623

Alternate: Linette Matheny

Osecola County

Edgar Bryant

Senior Traffic Engineer

P: (407) 742-6648

Alternate: Mary Moskowitz

Orange County

Hazem El-Assar

Chief Engineer

P: (407) 836-7866

Orange County

Brian Sanders

Chief Planner

P: 407-836-8022

Alternate: Renzo Nastasi (407) 836-8072

Seminole County

Jean Jreij

Public Works Director

P: (407) 665-5601

Alternate: Shad Smith (407) 665-5707

Seminole County

Charlie Wetzel

County Traffic Engineer

P: 407-665-5684

Alternate: Steve Douglas 407-665-5684

City of Altamonte Springs

Brett Blackadar

P: 407-571-8538

Chief Transportation Engineer

Alternate: Tim Wilson 407-571-8146

City of Apopka

Jay Davoll, P.E.

City Engineer

P: (407) 703-1712

City of Casselberry

Kelly Brock

City Engineer

P: 407-262-7725

Alternate: Mark Gisclar

City of Edgewood

Councilman Lee Chotas

City of Kissimmee

Jim Arsenault

P: 407-518-2277

Alternate: Nabil Muhaisen

City of Lake Mary

John Omana

Community Development Director

P: (407) 585-1454

Alternate: Steve Noto (407) 585-1440

City of Longwood

Chris Kintner

Community Development Coordinator

P: (407) 260-3468

City of Maitland

Noel Cooper

Transportation Engineer

P: (407) 539-6217

Alternate: Rick Lemke Phone: 407-539-6216

City of Ocoee

Steve Krug

Public Works Director

P: (407) 905-6002

City of Orlando

Frank Consoli

Traffic Operations Engineer

P: (407) 246-2126

Alternate: Jeremy Crowe

City of Orlando

Benton Bonney

Transportation Systems Manager

Alternate: Cade Braun

City of Sanford

Michael Cash

Planning Engineer

P: 407-688-5148

Alternate: Jordan Smith

St. Cloud TSMO

Kevin Felbinger

Engineering Manager

P: 407-957-7353

City of St. Cloud

Kevin Feblinger

Engineering Manager

P: 407-957-7353

Alternate: Jen Giannuzzi 407-957-7253

City of Winter Garden

Donald Cochran

Asst to the City Manager, Public Services

P: (407) 656-4100 x2263

Alternate: Mike Kelley, Assistant City Engineer (407) 656-4100

City of Winter Park

Butch Margraf

Traffic Engineer

P: (407) 599-3411

Alternate: Keith Moore

City of Winter Springs

Brian Fields

City Engineer

P: (407) 327-7597

LYNX

Doug Jamison

Senior ITS Developer

P: 407-254-6071

Alternate: Craig Bayard

Greater Orlando Aviation Authority

Brad Friel

Transportation Planning Manager

P: (407) 825-3139

Alternate: Davin Ruohomaki 407-825-3105

Kissimmee Gateway Airport

Ramon Senorans

P: (407) 518-2516

Alternate: Terry Lloyd 407-518-2516

Reedy Creek Improvement District (RCID)

Lee Pulham

Planner

P: (407) 828-1660

Alternate: Kathryn Kolbo (407) 828-2250

Osceola County CTST

Glen Hammer

P: (407) 518-4546

Alternate: Elizabeth McCormick 407-518-4546

Town of Windermere

Robert McKinley

Councilman

P: (407) 876-2563 X 532

Alternate: David Grimm 407-876-2563

University of Central Florida

Susan Hutson

Asst. Director of Planning

Alternate: Maria Yebra-Teimouri

Orange County CTST

John Rogers

Project Manager II

P: (407) 246-3295

Seminole County CTST

LT. Pete Kelting

P: 407-665-6976

Alternate: LT Pete Brenenstuhl 407-665-1718

Florida Turnpike Enterprise

Eric Gordin

P: (407) 264-3316

FDOT

Heather Garcia

Panning & Corridor Development

P: (386) 943-5077

Alternate: Frank O'Dea 386-943-5000