Amendment to the

Regional ITS Architecture

SEMCOG Region

November 2014 | Version 2

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

The Michigan Department of Transportation (MDOT) has continued to strive to be a leader in the application of technology to improve transportation. Projects that are selected to implement these technological solutions are required to conform to a regional ITS architecture if they utilize federal funds. Prior to 2005, the focus of technology deployments was in the urban areas, but needs began to arise that warranted solutions for other areas of the state. In 2008, the Department completed an effort that supplemented existing documentation and completed regional intelligent transportation systems (ITS) architectures and deployment plans that comprehensively covered all seven regions and provide a statewide vision for MDOT's ITS program. In 2014, MDOT initiated an administrative update for all but two of the regional ITS architectures, the two omitted were completed more recently and cover the metropolitan planning organizations (MPOs) around Grand Rapids and Lansing.

The National ITS Architecture is the standard template that regions and statewide ITS architectures customize to bridge together stakeholders, needs, and solutions for ITS projects. The architecture represents a shared view between agencies on how to integrate information and resources in order to provide solutions that help move travelers through the region safely and efficiently. It is the long range vision for what could be implemented without being technology specific. The architecture is a foundation of that vision and allows stakeholders to derive strategies that can be implemented through more specific ITS projects that benefit the current regional transportation system.

1.1 Project Overview

MDOT initiated a project to perform an administrative update to all but two (2) regional ITS architectures within the state. It is recommended that a full architecture update occurs every 5-7 years however MDOT has decided an administrative update could address the changes and shift in focus for the region. The administrative update incorporates revisions in the National ITS Architecture, updates to portions of the architecture that have been completed, and recent changes in the focus of the region.

The Southeast Michigan Council of Governments (SEMCOG) Region ITS Architecture previously was completed in 2009, using version 6.0 of the National Architecture and version 4.0 for the Turbo Architecture Database. The Amendment to the SEMCOG Region ITS Architecture focuses on the following:

- Format changes – conforming the SEMCOG Region ITS Architecture with the National ITS Architecture and Turbo Architecture Database versions 7
- Content update – adding or revising agency names and inventory statuses, revising current stakeholder relationships, and identifying new stakeholders and their relationships
- Project confirmation – confirming completed projects have been incorporated into the regional ITS architecture and identifying upcoming short term projects (5-6 years) conform to the regional ITS architecture

This update does not include an update to the Deployment Plan.

1.2 National Architecture

The National ITS Architecture and the Turbo Architecture database were updated to Version 7 in January 2012. Version 7 adds a planning view to provide additional details on the connection between the regional ITS architecture and how it can be used to support transportation planning through project development. Version 7 also continues to be consistent with the connected vehicle program. As the program changes,

the National ITS Architecture is updated to be aligned with the current direction. Other new focuses of the National ITS Architecture includes enhancements, additional service packages for active traffic management strategies, alignment with the Federal Motor Carrier Safety Administration (FMCSA) Commercial Vehicle Information Systems and Networks (CVISN), and the synchronization with the Canadian Architecture by updated verbiage and outputs.

To support integration with the planning process, the National ITS Architecture now encompasses a new planning view. This view is highlighting the connection between the services packages within the National ITS Architecture and characteristics of the planning process. The characteristics include performance measures, cost/benefit (http://www.itsbenefits.its.dot.gov/), and goal setting (as identified in 23 CFR 450).

The National ITS Architecture version 7 was updated with minor terminology changes to reflect the connected vehicle program. The connected vehicles topic has emerged with increasing focus on technology and test beds around the world. The updated version continues to accommodate and incorporate these changes to ensure upcoming ITS projects are in compliant. In part with the National ITS Architecture, a new research effort was released known as the Connected Vehicle Reference Implementation Architecture (CVRIA). The website is http://www.iteris.com/cvria/. This effort is to help produce a standardization plan for connected vehicles which in turn will align with the National ITS Architecture both in defining and implementing.

1.3 Document Overview

The Amendment to the SEMCOG Region ITS Architecture is assembled into four main sections. These sections present the consolidation of information collected during administrative update. To a large extent the document is an abridged version of the current regional ITS architecture. Some supplemental information that was not revised during the administrative update can be accessed in the version that is available on the external MDOT ITS Planning website (www.MDOTITSPlanning.com). The sections within the Amendment include:

1 – Introduction

This section provides a project overview and geographic information within the SEMCOG Region.

2 – Administrative Update Process

This section highlights the process taken to develop the Amendment to the SEMCOG Region ITS Architecture. It also identifies the stakeholders who provided comments regarding the administrative updates as well as the updated inventory of the region.

3 – Application of the Regional ITS Architecture

This section reviews standards per the regional ITS architecture and updates to operational concepts identified by stakeholders.

4 – Use and Maintenance

This section highlights the importance of conforming to the regional ITS architecture as well as maintaining the current version. After a period of time, the architecture should be updated with either an administrative or a full update.

The Amendment to the SEMCOG Region ITS Architecture also contains three appendices:

- Appendix A – National ITS Architecture Service Package Definitions
- Appendix B – Customized Service Packages
- Appendix C – Architecture Maintenance Documentation Form

1.4 Geographic Information

The SEMCOG Region's geographic boundary includes the same boundary as MDOT Metro Region and a portion of the University Region. The boundary for the SEMCOG Region ITS Architecture is shown in **Figure 1**.

NOTE: Additional details on the characteristics and existing infrastructure within these defined boundaries can be found in Section 1.4.2 of the SEMCOG Region ITS Architecture (2009).

Figure 1. SEMCOG Region ITS Architecture Boundary Area

2 ADMINISTRATIVE UPDATE PROCESS

The administrative update relied heavily on stakeholder input to reflect the changes within the region. The feedback includes input focused on recently completed projects, upcoming projects, and new or modified agency relationships. These relationships either were within MDOT or between MDOT and another stakeholder. Since this was not a full update, documentation efforts were focused on upcoming projects that are anticipated within the next five years. As newer technological applications are continuously being implemented around the world, stakeholders are often assessing these applications that may have once been disregarded. The administrative update integrates the addition of these newer strategies so projects will be in conformance with the regional ITS architecture when funding becomes available.

The administrative process is less intensive than a full update and focused within a considerably short duration of time. To accommodate the abbreviated process, a majority of the coordination and communication with the stakeholders was conducted either via email or made available on the MDOT ITS Planning website.

The abbreviated process only included one (1) stakeholder workshop. As such, it was important to determine a method that gathers the most effective information and feedback with limited face-to-face coordination with the stakeholders. Including the stakeholder workshop, the complete approach involved:

- Project Level Kick-off Workshop – conference call with primary MDOT regional ITS coordinators to discuss the overall project scope of work, schedule, and the expectations of this effort. Also, preliminary discussions reviewed known projects that could influence the updates.
- Preliminary Revision List – the project list included within the current regional ITS architecture was revised. Revisions included the identification of completed and newly defined projects based on recent project programming documentation and the team's experience of ITS projects in the area.
- Stakeholder Workshop– a SEMCOG Region ITS architecture workshop was conducted with range of stakeholders from multiple agencies within the region. Stakeholders provided comments on the revised project list, agency name changes, identification of projects within the next five years, changes with interagency connections, newly implemented technology, and new technology applications the stakeholders have identified for near term implementations.
- Revised Inventory Table – information gathered during the workshop was used to update the current architecture inventory table.
    - The table presents all of the stakeholders within the region, the elements belonging to that stakeholder, a description of the element, and a status (existing or future)
- Draft Final Amendment Architecture Document – comments received from the revised inventory table were used to update both the service package diagrams within the regional ITS architecture document and the Turbo Architecture Database. The document was provided to the stakeholders for their review.
    - The document included updated tables exported from the Turbo Architecture Database.
- Final Deliverable – comments on the Draft Final Amendment Architecture Document were used to assemble the final deliverables, which included a final Amendment to the SEMCOG Regional ITS Architecture Document and SEMCOG Regional Turbo Architecture database.

Figure 2 below illustrates the process followed.

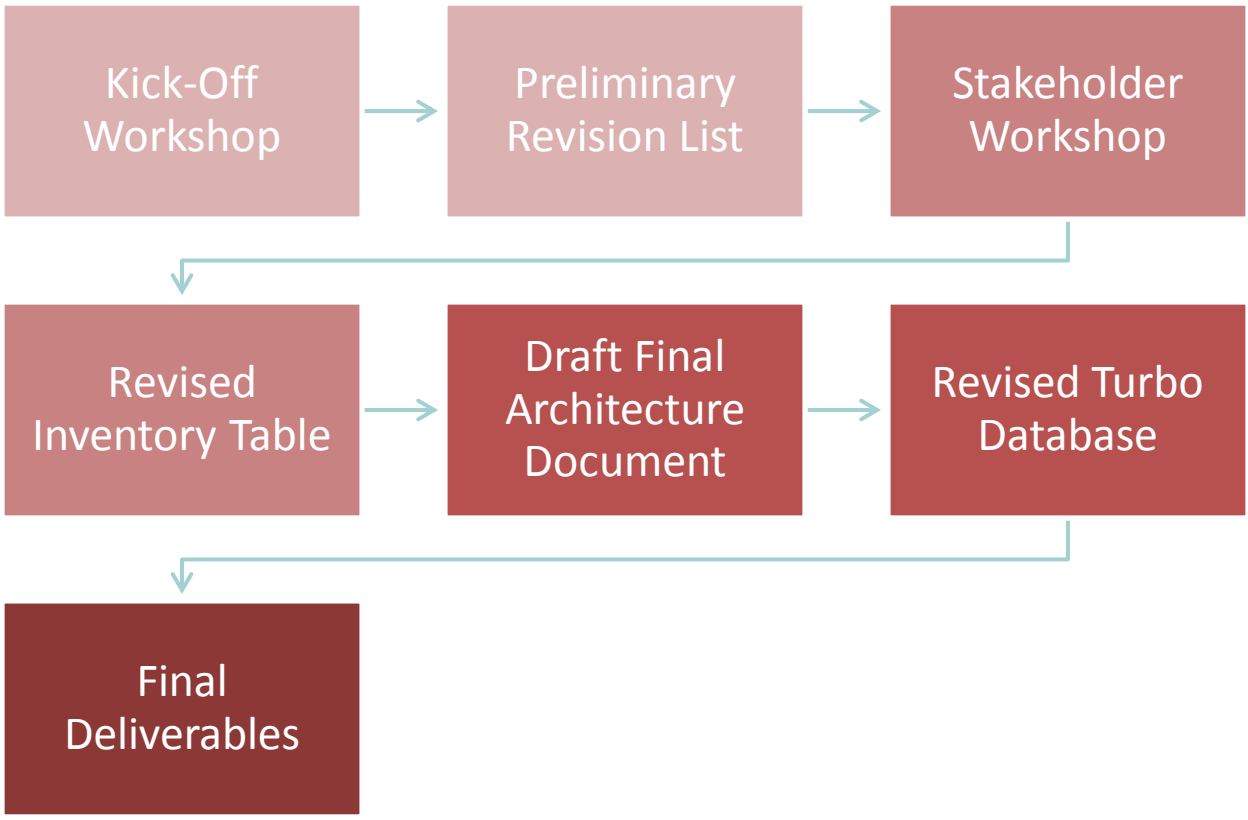


Figure 2. ITS Architecture Administrative Update Process

2.1 Customization

As with the previous architecture process, the administrative update includes an established inventory table of existing ITS elements and elements identified as part of future systems. Stakeholder input was key to an accurate update of this table.

The National ITS Architecture has eight groups of ITS service areas. They include:

- ***Traffic Management*** (ATMS) – includes transportation operations centers, detection systems, closed circuit television (CCTV) cameras, dynamic message signs (DMS), portable changeable message signs (PCMS), and other related technologies.
- ***Emergency Management*** (EM) – includes emergency operations/management centers, improved information sharing among traffic and emergency services, automated vehicle location (AVL) on emergency vehicles, traffic signal preemption for emergency vehicles, and wide-area alerts.
- ***Maintenance and Construction Management*** (MC) – includes work zone management, roadway maintenance and construction information, winter maintenance, and road weather information systems (RWIS).
- ***Public Transportation Management*** (APTS) – includes transit and paratransit AVL, dispatch systems, transit travel information systems, electronic fare collection, and transit security.

- ***Commercial Vehicle Operations*** (CVO) – includes coordination with Commercial Vehicle Information Systems and Networks (CVISN) efforts, hazardous material (HAZMAT) management, weigh-in motion (WIM) technology, and security technology, including driver authentication.
- ***Traveler Information*** (ATIS) – includes broadcast traveler information such as web sites, traveler information kiosks, and highway advisory radio (HAR).
- ***Archived Data Management*** (AD) – includes electronic data management and archiving systems.
- ***Vehicle Safety*** (AVSS) – includes connected vehicle technology such as collision avoidance and vehicle automation, specifically speed and steering.

As mentioned above, customizing the elements was based on the previous inventory table and feedback captured during the SEMCOG Regional ITS Architecture Workshop. The local agency elements were used to capture agencies with longer term planned implementations versus calling each out specifically at this time. If an agency has implemented a project, and their elements should be updated to existing, the agency then is documented separately. This strategy allows the regional ITS architecture to cover those agencies and remain eligible for federal funds for an ITS deployments.

NOTE: Additional details regarding subsystems and terminators can be found in Section 3.3.1 of the SEMCOG Regional ITS Architecture.

2.1.1 ITS Inventory by Stakeholder

Each stakeholder is associated with one or more systems or elements that together comprise the transportation system in the SEMCOG Region. Input from the stakeholders was critical to ensure the information within the architecture is accurate and easily reviewed to demonstrate project conformance. A listing of stakeholders, description of the agency, and contact information of those stakeholders who assisted with achieving this goal is found in **Table 1**.

Table 1. SEMCOG Region Stakeholders

Organization	Name		Email
Beaubien Engineering	Richard	Beaubien	rfbeaubienpe@gmail.com
City of Ann Arbor	Pat	Cawley	pcawley@a2gov.org
City of Ann Arbor	Les	Sipowski	lsipowski@a2gov.org
City of Detroit Department of Public Works	Sunny	Jacob	sunjac@ddot.ci.detroit.mi.us
City of Windsor	John	Wolf	jwolf@city.windsor.on.ca
DDOT	Wilfred	Beal	wilbea@detroitmi.gov
Detroit Windsor Tunnel LLC	Robert	Howell	rhowell@dwtunnel.com
Detroit Windsor Tunnel LLC	Jerry	Prudden	jprudden@dwtunnel.com
DTMB	Monroe	Pendleton	PendletonM@michigan.gov
FHWA - Michigan	Morrie	Hoevel	Morris.Hoevel@fhwa.dot.gov
Livingston County 911	Donald	Arbic	DArbic@co.livingston.mi.us
Livingston County Road Commission	Mike	Goryl	mail@livingstonroads.org
Livingston County Sheriff	Bob	Bezotte	bbezotte@co.livingston.mi.us
Macomb County Department of Road (MCDR)	Adam	Merchant	amerchant@rcmcweb.org

Organization	Name		Email
Macomb County Department of Road (MCDR)	Ken	Webb	geninfo@rcmcweb.org
MCDR- Traffic Operations Center	Jonathan	Coleman	jcoleman@rcmcweb.org
MDOT	Eric	Mueller	MuellerE@michigan.gov
MDOT - Blue Water Bridge	Meghan	Butler	ButlerM14@michigan.gov
MDOT - Blue Water Bridge	Marlon	Spinks	SpinksM@michigan.gov
MDOT - Blue Water Bridge	Michael	Szuch	SzuchM@michigan.gov
MDOT - Brighton TSC	Craig	Heidelberg	HeidelbergC@michigan.gov
MDOT - Brighton TSC	Andy	Hodges	HodgesA@michigan.gov
MDOT - Brighton TSC	Wendy	Ramirez	RamirezW@michigan.gov
MDOT - Detroit TSC	Rita	Screws	SCREWSR@michigan.gov
MDOT - ITS Program Office	Luke	Biernbaum	BiernbaumL@michigan.gov
MDOT - ITS Program Office	Collin	Castle	CastleC@michigan.gov
MDOT - ITS Program Office	Elise	Kapphahn	KapphahnE@michigan.gov
MDOT - Metro Region	Michele	Mueller	muellerm2@michigan.gov
MDOT - Metro Region	Mia	Silver	SilverM1@michigan.gov
MDOT - Metro Region	Matt	Smith	SmithM81@michigan.gov
MDOT - Oakland TSC	Steve	Stramsak	StramsakS@michigan.gov
MDOT - Port Huron TSC	Larry	Young	YoungL@michigan.gov
MDOT - SEMTOC	Oladayo	Akinyemi	AkinyemiO@michigan.gov
MDOT - SEMTOC	Sarah	Gill	gills@michigan.gov
MDOT - SEMTOC	Stanley	Quinney	quinneys@michigan.gov
MDOT - SEMTOC	Marji	Zabel	zabelm@michigan.gov
MDOT - University Region	Jennifer	Foley	FoleyJ3@michigan.gov
MDOT - University Region	Stephanie	Palmer	PalmerS3@michigan.gov
Monroe County Road Commission	Janeen	Abar	MCRC@chartermi.net
MSP - Brighton Post #12	Joel	Allen	Allenjj@michigan.gov
MSP - Monroe Post #14	Tony	Cuevas	cuevast@michigan.gov
ODOT District 2	Michael	Stormer	Michael.stormer@dot.state.oh.us
Road Commission for Oakland County	Dawn	Bierlien	dbierlein@rcoc.org
Road Commission for Oakland County	Danielle	Deneau	ddeneau@rcoc.org
SEMCOG	Tom	Bruff	bruff@semcog.org
SEMCOG	Sayeed	Mallick	mallick@semcog.org
SEMCOG	Natalie	Youakim	youakim@semcog.org
Suburban Mobility Authority for Regional Transportation (SMART)	Steve	Brown	sbrown@smartbus.org
University of MichiganTransportation Research Institute (UMTRI)	Peter	Sweatman	umtri-director@umich.edu
Washtenaw Area Transportation Study	Ryan	Buck	buckr@miwats.org
Washtenaw County 911	David	Halteman	haltemad@ewashtenaw.org
Washtenaw County Road Commission	Brent	Shlack	schlackb@wcroads.org

Organization	Name		Email
Wayne County Detroit Metro A/P Communications	Jim	Osborn	jim.osborn@wcaa.us
Wayne Police Department	John	Williams	
Wayne State University	Joseph	Hummer	joseph.hummer@wayne.edu
	Richard	Beaubien	

Table 2 sorts the inventory by stakeholder so that each stakeholder can easily identify and review all of the architecture elements associated with their agency and its status. An added feature of the inventory table is an element's association with the service areas. This feature helps to quickly identify the relationship between the elements and the service it is providing. However, if an element status is considered existing this does not necessarily equate to the flows within a service package as existing.

For example, the elements: MDOT Maintenance Decision Support Software and MBA TOC are existing elements, but currently the flow of information between the elements are not automated, so this is considered a planned flow.

*KEY for **Table 2***

ATMS	Traffic Management
EM	Emergency Management
MC	Maintenance & Construction Management
APTS	Public Transportation

CVO	Commercial Vehicle Operations
ATIS	Traveler Information
AD	Archived Data Management
AVSS	Vehicle Safety

Table 2. SEMCOG Region Inventory of ITS Elements

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Ann Arbor Area Transportation Authority (AAATA)	AAATA Archive	The transit data archive for the Ann Arbor Area Transportation Authority. Used by FTA and MDOT.	Planned							X	
	AAATA CCTV Surveillance	CCTV surveillance at the Blue Water Area Transit Dispatch Center.	Existing				X				
	AAATA Dispatch Center	Provides local public transportation and associated facilities in the greater Ann Arbor-Ypsilanti Area	Existing		X	X	X		X	X	
	AAATA Electronic Fare Payment Card	Medium for collection of transit fares electronically.	Planned				X				
	AAATA Kiosks	Kiosks for dissemination of transit traveler information. Kiosks can also be used for the purchase and recharging of electronic fare payment cards.	Planned				X				
	AAATA Vehicles	Transit Vehicles owned by Ann Arbor Area Transportation Authority Transit	Existing				X				
	AAATA Website	Website with information about fares and schedules.	Existing				X				
Blue Water Area Transit	Blue Water Area Transit CCTV Surveillance	CCTV surveillance at the Blue Water Area Transit Dispatch Center.	Planned				X				
	Blue Water Area Transit Center	Provides public transportation in Port Huron and St. Clair County.	Existing	X	X		X		X	X	
	Blue Water Area Transit Data Archive	The transit data archive for Blue Water Area Transit. Used by FTA and MDOT.	Existing							X	
	Blue Water Area Transit Electronic Fare Payment Card	Medium for collection of transit fares electronically.	Planned				X				
	Blue Water Area Transit Kiosks	Kiosks for dissemination of transit traveler information. Kiosks can also be used for the purchase and recharging of electronic fare payment cards.	Planned				X				

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Blue Water Area Transit	Blue Water Area Transit Vehicles	Transit Vehicles owned by Blue Water Area Transit	Existing				X				
	Blue Water Area Transit Website	Website with information about fares and schedules.	Existing				X				
Centra Ambassador Bridge Corporation	Ambassador Bridge Authority	Oversees the movement of people and goods across the Ambassador Bridge.	Existing	X							
	Ambassador Bridge CCTV Cameras	Closed circuit television cameras operated by the Centra Ambassador Bridge Corporation for traffic condition monitoring and management of incidents.	Existing	X							
	Ambassador Bridge DMS	Dynamic message signs operated by a local agency to provide information to drivers such as lane closures due to a crash or from the weather.	Existing	X							
	Ambassador Bridge Operations Center	Operations Center responsible for bridge system operations at the Ambassador Bridge.	Existing	X	X			X			
	Ambassador Bridge Security Monitoring Field Equipment	Roadside equipment located on the Ambassador Bridge routes that is used for monitoring key infrastructure elements from damage or attacks. These elements include structures such as bridges or dams.	Existing		X						
	Ambassador Bridge Toll Plazas	Toll collection location for use of the Detroit Windsor Tunnel.	Existing	X							
	Ambassador Bridge Vehicle Detectors	Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as VIVDS, RTMS and any other type of vehicle detection.	Existing	X							

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Centra Ambassador Bridge Corporation	Ambassador Bridge Website	Provides information about the history of the bridge, the fare schedule, and provides an up-to-date traveler information. The website also provides the current bridge conditions as well as monthly travel statistics.	Existing	X							
City of Ann Arbor	City of Ann Arbor CCTV	Roadside equipment on local routes used for traffic condition monitoring and management of incidents and collected by the City of Ann Arbor TOC.	Planned	X							
	City of Ann Arbor TOC	City of Ann Arbor Traffic Operations Center responsible for municipal signal system operations.	Existing	X							
	City of Ann Arbor Traffic Signals	Multiple traffic signals interconnected and operated by the City of Ann Arbor.	Existing	X							
	City of Ann Arbor Vehicle Detectors	Roadway equipment on local routes used to detect vehicle volumes and/or speeds. This information is used in the operation of the traffic signal system and collected by the City of Ann Arbor TOC.	Existing	X							
City of Detroit	City of Detroit CCTV Cameras	Roadside equipment on local routes used for traffic condition monitoring and management of incidents and collected by the City of Detroit TOC.	Existing	X							
	City of Detroit DPW	Department of Public Works run by the City of Detroit	Existing	X	X				X	X	
	City of Detroit Municipal Parking Department	System operated by City of Detroit Municipal Parking Department that monitors available vehicle parking at key parking facilities.	Existing	X							
	City of Detroit TOC	City of Detroit Traffic Operations Center responsible for municipal signal system operations.	Existing	X	X		X		X	X	X
	City of Detroit Traffic Signals	Multiple traffic signals interconnected and operated by the City of Detroit.	Existing	X	X		X				

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
City of Detroit	City of Detroit Vehicle Detectors	Roadway equipment on local routes used to detect vehicle volumes and/or speeds. This information is used in the operation of the traffic signal system and collected by the City of Detroit TOC.	Existing	X							
	City of Detroit Website	Website for City of Detroit	Planned	X							
	Detroit People Mover CCTV Surveillance	CCTV surveillance at the City of Detroit DTC People Mover Dispatch Center.	Planned				X				
	Detroit People Mover Data Archive	The transit data archive for the City of Detroit DTC People Mover. Used by FTA and MDOT.	Existing							X	
	Detroit People Mover Dispatch Center	Detroit People Mover is a safe, reliable, efficient, and accessible rail transportation operating to enhance the unencumbered pedestrians or vehicle travel through the central business district of Detroit.	Existing	X			X		X	X	
	Detroit People Mover Electronic Fare Payment Card	Medium for collection of transit fares electronically.	Planned				X				
	Detroit People Mover Kiosks	Kiosks for dissemination of transit traveler information. Kiosks can also be used for the purchase and recharging of electronic fare payment cards.	Planned				X				
	Detroit People Mover Vehicle	Transit Vehicles owned by City of Detroit DTC People Mover	Existing				X				
	Detroit People Mover Website	Website with information about fares and schedules.	Existing				X				
City of Port Huron	City of Port Huron Drawbridge Management Center	Management of the waterways used by boats and ferries and the roadways used by vehicles.	Planned	X							
	City of Port Huron TOC	City of Port Huron Traffic Operations Center responsible for municipal signal system operations.	Planned	X							

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Detroit and Canada Tunnel Corporation	Detroit Windsor Tunnel DMS	Dynamic message signs operated by a local agency to provide information to drivers such as lane closures due to a crash or from the weather.	Existing	X							
	Detroit Windsor Tunnel Security Monitoring Field Equipment	Roadside equipment located on Detroit Windsor Tunnel routes that is used for monitoring key infrastructure elements from damage or attacks. These elements include structures such as bridges or dams.	Existing		X						
	Detroit Windsor Tunnel TOC	Traffic Operations Center responsible for tunnel system operations at the Detroit Windsor Tunnel.	Existing	X	X			X			
	Detroit Windsor Tunnel Toll Plazas	Toll collection location for use of the Detroit Windsor Tunnel.	Existing	X							
Detroit Department of Transportation (DDOT)	DDOT Center CCTV Surveillance	CCTV surveillance at the DDOT Transit Dispatch Center.	Planned				X				
	DDOT Data Archive	The transit data archive for DDOT. Used by FTA and MDOT.	Existing							X	
	DDOT Electronic Fare Payment Card	Medium for collection of transit fares electronically.	Planned				X				
	DDOT Kiosks	Kiosks for dissemination of transit traveler information. Kiosks can also be used for the purchase and recharging of electronic fare payment cards.	Planned				X				
	DDOT Transit Dispatch Center	Provides public transportation services and facilities in the greater Detroit area.	Existing	X	X	X	X		X	X	
	DDOT Vehicles	Transit Vehicles owned by DDOT Transit	Existing				X				
	DDOT Website	Website with information about fares and schedules.	Existing				X				
Financial Institution	Financial Service Provider	Handles exchange of money for transit electronic payment collection.	Planned	X			X				

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Financial Institution	Service Agency	Agency responsible for payment of transit fares for medical transportation as part of government subsidized medical care. This includes Medicare, and VA programs.	Existing				X				
Lake Erie Transportation Commission - Lake Erie Transit (LET)	LET CCTV Surveillance	CCTV surveillance at the Lake Erie Transportation Commission Dispatch Center.	Planned				X				
	LET Data Archive	The transit data archive for the Lake Erie Transportation Commission. Used by FTA and MDOT.	Planned							X	
	LET Dispatch Center	The Lake Erie Transportation Commission is responsible for the public transportation and associated facilities in the Monroe County Area.	Existing		X		X		X	X	
	LET Electronic Fare Payment Card	Medium for collection of transit fares electronically.	Planned				X				
	LET Kiosks	Kiosks for dissemination of transit traveler information. Kiosks can also be used for the purchase and recharging of electronic fare payment cards.	Planned				X				
	LET Vehicles	Transit Vehicles owned by Lake Erie Transportation Commission	Existing				X				
	LET Website	Website with information about fares and schedules.	Existing				X				
Livingston County Road Commission	Livingston County Intermodal Transportation Facility	The Livingston County Intermodal Transportation facility is responsible for the public transportation and associated facilities in the Monroe County Area.	Planned				X				
	Livingston County TOC	Livingston County Traffic Operations Center responsible for municipal signal system operations.	Existing	X							

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Livingston County Road Commission	Livingston County Traffic Signals	Multiple traffic signals interconnected and operated by Livingston County Road Commission.	Existing	X							
	Livingston County Transit CCTV Surveillance	CCTV surveillance at the Livingston County Intermodal Transportation Facility.	Planned				X				
	Livingston County Transit Electronic Fare Payment Card	Medium for collection of transit fares electronically.	Planned				X				
	Livingston County Transit Kiosks	Kiosks for dissemination of transit traveler information. Kiosks can also be used for the purchase and recharging of electronic fare payment cards.	Planned				X				
	Livingston County Transit Vehicles	Transit Vehicles owned by Livingston County Transit	Planned				X				
	Livingston County Transit Website	Website with information about fares and schedules.	Planned				X				
Local Agency	County 911 Dispatch	Central Dispatch is responsible for the dispatch of all public safety vehicles (police and fire). After hours Central Dispatch will also dispatch the Street Department on-call emergency responder.	Existing				X				
	County Road Commission	Duties include road and bridge construction and maintenance, snow removal and salting, surface treatments, street lane painting and markings, controlling roadside vegetation and mowing, gravel road grading, and roadside ditch and drain maintenance.	Existing			X					
	County Road Commission Maintenance Vehicles	County Road Commission vehicles used in maintenance operations.	Existing			X					

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Local Agency	Flint MTA Control Center	Flint-Mass Transportation Authority (Flint MTA) - Transit dispatch center responsible for the tracking, scheduling and dispatching of fixed route and paratransit vehicles operated by Flint-Mass Transportation Authority.	Existing				X				
	Local Agency 911 Dispatch	Answers all 911 calls made from within the local area and then forwards the call to the appropriate dispatcher.	Existing	X	X	X	X		X		
	Local Agency Anti-Icing Field Equipment	Roadside equipment located along routes maintained by local agencies that collects weather data such as temperature and visibility.	Planned			X					
	Local Agency CCTV Cameras	Closed circuit television cameras operated by the Local Agency TOC for traffic condition monitoring and management of incidents.	Planned	X							
	Local Agency DMS	Dynamic message signs operated by a local agency to provide information to drivers such as lane closures due to a crash or from the weather.	Planned	X							
	Local Agency DPW	Department of Public Works run by individual local agencies.	Existing	X	X	X	X	X	X	X	
	Local Agency Emergency Operations Center (EOC)	Central command and control facility responsible for carrying out the principles of emergency preparedness and emergency management, or disaster management functions at a strategic level in an emergency situation.	Planned		X				X		
	Local Agency Equipment Repair	Local repair facilities (garages) for maintenance and construction vehicles	Planned			X					
	Local Agency Maintenance Garages	Local garages used in maintenance operations.These includes cities contracted with MDOT.	Existing			X					
	Local Agency Maintenance Vehicles	Local Agency vehicles used in maintenance operations.	Existing			X					

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Local Agency	Local Agency Public Safety Vehicles	Local law enforcement, fire and EMS vehicles. Includes the ITS equipment installed on the cruisers (AVL, MDTs, etc.).	Existing		X						
	Local Agency Ridesharing Program	System used for matching riders with similar origins and destinations to promote carpooling.	Planned						X		
	Local Agency Smart Work Zone Equipment	Portable ITS equipment that can be used in work zone to more efficiently manage traffic and provide traveler information. Includes CCTV, vehicle detection, and/or DMS.	Planned			X					
	Local Agency TOC	Local Traffic Operations Center responsible for municipal signal system operations.	Planned	X	X	X	X		X	X	
	Local Agency Traffic Signals	Multiple traffic signals interconnected and operated by a Local Agency. Local Agencies include Ferndale, Pontiac, Holly, Royal Oak, and Dearborn.	Existing	X	X						
	Local Agency Vehicle Detectors	Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as VIVDS, RTMS or traditional loops.	Planned	X							
	Local Agency Website	Website for the Local Agencies	Planned	X							
	Local Agency Work Zone Safety Monitoring Equipment	Equipment used to detect vehicle intrusion within work zones and provide notifications of the identified hazard.	Planned			X					
	Wayne County Detroit Stadium	System operated by Wayne County Detroit Stadium Authority that monitors available vehicle parking at key parking facilities.	Planned	X							
Macomb County Department of Roads (MCDR)	MCDR CCTV Cameras	Roadside equipment on local routes used for traffic condition monitoring and management of incidents and collected by the MCDR COMTEC	Existing	X							

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Macomb County Department of Roads (MCDR)	MCDR COMTEC	MCDR Commuications and Technology center responsible for municipal signal system operations.	Existing	X	X		X		X	X	X
	MCDR Data Archive	Archive that contains historical traffic data such as volume and occupancy	Existing							X	
	MCDR Traffic Signals	Multiple traffic signals interconnected and operated by MCDR.	Existing	X	X						
	MCDR Vehicle Detectors	Roadway equipment on local routes used to detect vehicle volumes and/or speeds. This information is used in the operation of the traffic signal system and collected by the MCDR COMTEC.	Existing	X							
	MCDR Website	Website for MCDR	Existing	X							
MDOT	MDOT Anti-Icing Field Equipment	Roadside equipment located along MDOT routes that collects weather data such as temperature and visibility.	Planned			X					
	MDOT Asset Management Database	Statewide database that collects and tracks the assets throughout the state, including the connection between devices, when a device was installed, and maintenance information.	Existing			X					
	MDOT ATMS	Advanced Transportation Management Software - Statewide software that integrates the operations of ITS field devices via a single interface. The information collected and disseminated is for construction and maintenance activities, incidents, and special events.	Existing	X		X		X	X		
	MDOT Blue Water Bridge	The MDOT Blue Water Bridge Authority is responsible for the construction, maintenance, and operation of roadways on the Blue Water Bridge.	Existing	X							

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
MDOT	MDOT BWB DMS	Dynamic message signs operated by a local agency to provide information to drivers such as lane closures due to a crash or from the weather.	Existing	X							
	MDOT BWB HAR	Highway advisory radio operated by the MDOT Blue Water Bridge TOC to get information to drivers.	Existing	X							
	MDOT BWB Security Monitoring Field Equipment	Roadside equipment located on MDOT Blue Water Bridge routes that is used for monitoring key infrastructure elements from damage or attacks. These elements include structures such as bridges or dams.	Existing		X						
	MDOT BWB TOC	MDOT Blue Water Bridge Traffic Operations Center responsible for municipal signal system operations.	Existing	X	X			X			
	MDOT BWB Toll Plazas	Toll collection location for use of the Blue Water Bridge	Existing	X							
	MDOT BWB Website	Website with information about fares and schedules.	Existing	X							
	MDOT CCTV Cameras	Roadside equipment located on local roadways used for traffic condition monitoring and management of incidents.	Existing	X							
	MDOT Commercial Vehicle Permitting System	MDOT system for tracking and monitoring oversize and overweight permits for commercial vehicles.	Existing					X			
	MDOT Data Warehouse	Archive that contains historical traffic data such as volume and speed information.	Existing							X	
	MDOT DMS	Roadside equipment on MDOT routes used to share traveler information with motorists through dynamic messaging.	Existing	X	X	X					
	MDOT Drawbridge Control Equipment	The physical equipment used to control the actual lifting of the bridge.	Existing	X							

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
MDOT	MDOT Drawbridge Management Center	Management of the waterways used by boats and ferries and the roadways used by vehicles.	Existing	X							
	MDOT Drawbridge Notification Equipment	The physical equipment used to warn drivers of drawbridge and the actual lifting of the bridge.	Planned	X							
	MDOT Dynamic Trailblazer Signs	Roadside equipment on MDOT routes used to share traveler information with motorists through dynamic messaging.	Existing	X							
	MDOT ESS	Environmental sensor stations located on MDOT routes that collect information about the roadways such as temperature and moisture levels.	Planned			X					
	MDOT Freeway Courtesy Patrol Vehicles	Fully equipped vehicles that provide motorist assistance to vehicles in need on MDOT facilities.	Existing		X						
	MDOT HAR	Highway advisory radio allows roadway conditions, incidents, etc. to be broadcast to travelers.	Existing		X	X					
	MDOT Highway Toll Plazas	Fee collection locations on the MDOT trunklines toll routes.	Planned	X							
	MDOT Lane Control Signals	Roadside equipment on MDOT freeways used to manage traffic dynamically by providing available lanes for use.	Existing	X							
	MDOT Maintenance Decision Support System Software	System that collects RWIS data and distributes the information to maintenance garages to determine maintenance needs in real time.	Existing			X					
	MDOT Maintenance Garages	Michigan Department of Transportation garages used in maintenance operations.	Existing			X					
	MDOT Maintenance Vehicles	Michigan Department of Transportation vehicles used in maintenance operations.	Existing			X					

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
MDOT	MDOT Metro Region Commercial Vehicle Parking Management System	Direct commercial vehicles to available parking at rest stops and truck stops. Goal is to prevent overcrowding at certain locations and keep trucks from parking along the highway.	Planned	X							
	MDOT Metro Region Equipment Repair	Repair facilities (garages) for maintenance and construction vehicles within the Michigan Department of Transportation's Metro Region.	Existing			X					
	MDOT Metro Region TSCs	MDOT field office that oversees road construction and maintenance on MDOT facilities. Most maintenance and snow removal in this region is achieved through contract agencies.	Existing	X	X	X	X	X	X	X	
	MDOT MI Drive Website	MDOT website for dissemination of real-time traveler information for travel conditions for unplanned and planned events.	Existing	X					X		
	MDOT Office of Communications	Michigan Department of Transportation responsible for the dissemination of traffic information to the media and public.	Existing			X			X		
	MDOT Planning Division Data Warehouse	Archive that contains historical traffic data such as volume and speed information.	Existing							X	
	MDOT Portable CCTV Cameras	Portable roadside equipment located on local roadways used for traffic condition monitoring and management of incidents.	Existing	X							
	MDOT Queue Warning System	Roadside equipment that provides a warning (flashing lights or signs) to motorists of stop-and-go traffic ahead.	Planned	X							
	MDOT Roadside Equipment for Connected Vehicles	Equipment located along MDOT routes that allows communication between roadside devices and vehicles.	Existing								X

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
MDOT	MDOT Ramp Meters	Traffic signals placed on the ramps to control the frequency vehicles enter on the freeway.	Planned	X							
	MDOT Roadside Intersection Collision Avoidance Equipment	Equipment located along MDOT routes that communicate between multiple roadside devices and vehicles to alert of unsafe travel conditions or conditions conducive to crashes.	Planned								X
	MDOT Roadside Signing Equipment	Equipment located along MDOT routes that provide data through dynamic messaging or in-vehicle messaging.	Planned						X		
	MDOT Security Monitoring Field Equipment	Roadside equipment located on MDOT routes that is used for monitoring key infrastructure elements from damage or attacks. These elements include structures such as bridges or dams.	Existing		X						
	MDOT SEMTOC	MDOT traffic operations center located in the Detroit. SEMTOC operates the freeway management system and ITS deployments within the Metro Region.	Existing	X	X	X	X		X	X	X
	MDOT Smart Work Zone Equipment	Portable ITS equipment that can be used in work zone to more efficiently manage traffic and provide traveler information. Includes CCTV, vehicle detection, and/or DMS.	Existing			X					
	MDOT STOC	MDOT statewide traffic operations center located in Lansing. The STOC operates the freeway management system and statewide ITS deployments outside the areas of SEMTOC and WMTOC. The STOC does operate WMTOC system during off-hours and weekends. The STOC also dispatches freeway courtesy patrol vehicles for those areas covered by STOC operations.	Existing	X	X	X	X		X	X	X

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
MDOT	MDOT Toll Authority	Division of MDOT responsible for the oversight and management of toll routes operated on the state trunklines	Planned	X							
	MDOT Traffic Signals	Multiple traffic signals interconnected and operated by MDOT.	Existing	X	X		X				
	MDOT Traveler Information Kiosks	Interactive kiosks that provides users the ability to request and received transportation information.	Planned						X		
	MDOT University Region Commercial Vehicle Parking Management System	Direct commercial vehicles to available parking at rest stops and truck stops. Goal is to prevent overcrowding at certain locations and keep trucks from parking along the highway.	Planned	X							
	MDOT University Region Equipment Repair	Repair facilities (Garages) for maintenance and construction vehicles within MDOT's University Region	Existing			X					
	MDOT University Region TSCs	MDOT field office that oversees road construction and maintenance on MDOT facilities. Most maintenance and snow removal in this region is achieved through contract agencies.	Existing	X	X	X	X	X	X	X	
	MDOT Variable Speed Limit Signs	Roadside equipment dynamically changed as traffic conditions change.	Planned	X							
	MDOT Vehicle Detectors	Roadway equipment located on MDOT roadways used to detect vehicle volumes and/or speeds. This information is used in the operation of the traffic signal system and collected by the TOC. MDOT field sensors include VIVDS and any other vehicle detection.	Existing	X							
	MDOT Weigh-in-Motion	In-road equipment that monitors vehicle weights	Existing					X			

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
MDOT	MDOT WMTOC	MDOT traffic operations center located in Grand Rapids. WMTOC is responsible for the operations along the freeway around the Grand Rapids area.	Existing	X							
	MDOT Work Zone Safety Monitoring Equipment	Equipment used to detect vehicle intrusion within work zones and provide notifications of the identified hazard.	Planned			X					
Media	Local Print and Broadcast Media	Local media that provide traffic or incident information to the public.	Existing	X	X	X			X		
Monroe County Road Commission	Monroe County CCTV Cameras	Roadside equipment on local routes used for traffic condition monitoring and management of incidents and collected by the Monroe County Road Commission TOC.	Planned	X							
	Monroe County TOC	Monroe County Road Commission Traffic Operations Center responsible for municipal signal system operations.	Existing	X							
	Monroe County Traffic Signals	Multiple traffic signals interconnected and operated by Monroe County Road Commission.	Existing	X							
	Monroe County Vehicles Detectors	Roadway equipment on local routes used to detect vehicle volumes and/or speeds. This information is used in the operation of the traffic signal system and collected by the Monroe County Road Commission TOC.	Planned	X							
MSP	CJIC Database	Criminal Justice Information Center Database stores criminal justice data and can be accessed by multiple agencies.	Existing							X	
	MIOC	The Michigan Intelligence Operations Center 24-hours a day statewide information sharing among local, state and federal public safety agencies	Existing		X	X		X	X		

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
MSP	MSP Commercial Vehicle Enforcement Division (CVED)	Division of the MSP responsible for monitoring and enforcing weight restrictions on commercial vehicles operated on state trunklines.	Existing					X			
	MSP District 2	Michigan State Police dispatch for the Detroit area. They are co-located at SEMTOC.	Existing	X	X	X	X	X	X		
	MSP Gaylord Regional	Dispatch center providing additional service support within District 3, 7, and a small portion of Oakland County. Also answers 911 calls within Otsego County.	Existing		X	X			X		
	MSP Lansing Regional	Michigan State Police dispatch center providing additional support within District 5, 6, and 1.	Existing	X	X	X	X	X	X		
	MSP Office of Highway Safety Planning	Manages crash data for MDOT routes.	Existing							X	
	MSP Vehicles	Public Safety vehicles owned and operated by Michigan State Police. Includes the ITS equipment installed on the cruisers (AVL, MDTs, etc.).	Existing		X						
	MSP Winter Travel Advisory Website	Traveler Information website operated by Michigan State Police for dissemination of winter weather advisories	Existing			X					
	MSP Winter Travel Toll Free Number	Toll-free number operated by the Michigan State Police that provides travel information to the public.	Existing			X					
Ohio Department of Transportation (ODOT)	ODOT District 2 Maintenance Garages	Dispatch function for ODOT maintenance, construction and snow and ice removal vehicles. ODOT District 2 maintains all freeways in their district. State routes within city limits are maintained by cities. Outside city limits ODOT maintains state routes.	Existing			X					
	ODOT District 2 Office	Primary traffic management location for ODOT-managed roads in District 2.	Existing			X					

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Ohio Department of Transportation (ODOT)	ODOT Toledo Freeway Management Center	Control system to manage lane restrictions, closures, future ramp meters, incidents; includes web page for providing information about road work and snow. Also will dispatch the freeway service patrol.	Planned	X							
Other Agencies	Department of Homeland Security	Cabinet department of the Federal Government responsible for protecting the United States from terrorist attacks and responding to natural disasters.	Existing		X						
	National Weather Service	Provides official US weather, marine, fire and aviation forecasts, warnings, meteorological products, climate forecasts, and information about meteorology.	Existing			X			X		
	US Coast Guard	Military unit responsible for maritime and coastal patrol.	Existing	X	X						
Other Elements	ASOS Weather Stations	Automated Surface Observing System operated and maintained through a partnership of FAA, NWS, and DoD. Stations are located at airports able to detect significant changes in the weather pattern for aviation operations and weather forecasting.	Planned			X					
	AWOS Weather Stations	Automated Weather Observing System operated and maintained by FAA. Stations typically located at airports collecting weather data used for aviation operations as well as weather forecasting	Existing			X					
	C-TPAT	C-TPAT - Customs-Trade Partnership Against Terrorism is a joint government-business initiative to build cooperative relationships that strengthen overall supply chain and border security	Existing					X			

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Other Elements	Detroit Edison Emergency Operations Center	Central command and control facility responsible for carrying out the principles of emergency preparedness and emergency management, or disaster management functions at a strategic level in an emergency situation.	Existing					X			
	FAST	FAST - The Free and Secure Trade program is a joint Canadian-United Stated initiative involving the Canada Border Services Agency and the US Customs and Border Protection (CBP)	Existing					X			
	IFTA	IFTA - International Fuel Tax Agreement is an agreement between member jurisdictions to simplify the reporting of motor fuel use tax	Planned					X			
	IRP	IRP - International Registration Plan is a federally encouraged program to facilitate commercial vehicle registration and operation among states and Canadian jurisdictions.	Planned					X			
	MAWN Stations	Michigan Automated Weather Network stations (Enviro-weather) are used to collect weather related data as part of the Michigan State University agricultural program. Data includes air temp, humidity, speed, and precipitation.	Planned			X					
	NEXUS	NEXUS - a joint Canada-United Stated program designed to let pre-approved travelers cross between Canada and United States more quickly	Existing					X			
	PIP	PIP - Partner's in Protection is a multi-disciplinary partnership whose initiative is to reduce the risk of fire losses and to enhance safety in the wild land urban interface	Existing					X			

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Other Elements	Potential Obstacles	Obstacles that could interfere with the safe operation of vehicles.	Existing								X
	Rail Operator Wayside Equipment	Equipment located along the tracks including railroad crossing gates, bells, and lights as well as the interface to the traffic signal controller indicating the presence of a train.	Planned	X							
	Railroad Blockage Notification System	System shares highway-rail intersection (HRI) status for at-grade crossings with users through traveler information tools.	Planned	X							
	RAWS Stations	Remote Automatic Weather Stations strategically placed to monitor the weather. The data collected is used for monitoring air quality, fire dangers, and research.	Existing			X					
	Roadway Environment	All objects and conditions in the vicinity of the traveler that can affect the operations of the traveler.	Existing								X
	SEMCOG Data Warehouse	Archive that contains historical traffic data such as volume, speed information, incident, travel time, and traffic signal inventory..	Existing							X	
	Special Event Venue	Special events in the SEMCOG Region including Detroit-Wayne County Stadium Authority, DTE Energy Music Theatre, and The Palace.	Existing	X							
	SSRS	SSRS - Single State Registration System is a program in which for-hire carriers of passengers or property file their US DOT authority and proof of insurance with the base state in which the carrier has its principal place of business	Planned					X			
	Traveler Card	Medium for collection of transit fares electronically.	Planned	X							

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Other States and Countries	Canadian Border Services Agency	Canadian Border Services Agency is responsible for regulating and facilitating international trade and enforcing Canadian trade laws as well as the protection and safety of Canadians citizens and businesses	Existing					X			
	Canadian National Railroad Operations Center	Canada's largest freight railroad, provides transportation and intermodal services throughout North America	Existing	X							
	Lucas County Emergency Operations Center	The Lucas County Emergency Services Building houses City of Toledo 911 call takers and dispatchers, amateur radio emergency services (ARES), and weapons of mass destruction group (Lucas County WMD/Terrorism Advisory Team).	Existing		X						
	TARTA	Toledo Area Regional Transit Authority (TARTA)	Existing				X				
Private Information Service Provider	Private Sector ISP	Private entities that collect and disseminate traffic information.	Existing						X		
	Private Sector Traveler Information Services	Website sponsored by a private entity. Often this information is provided through a subscription.	Existing	X			X				
Private Operators	Contractor Smart Work Zone Equipment	Smart work zone equipmentt owned by a contractor. Portable ITS equipment that can be used in work zone to more efficiently manage traffic and provide traveler information. Includes CCTV, vehicle detection, and/or DMS.	Planned			X					
	Multimodal Service Provider	Agency that offers services across multiple transportation modes.	Planned						X		
	Private Concierge Providers	Private entities that provides customized services to the traveler. This service is usually subscription based (such as On star).	Existing		X						

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Private Operators	Private Fleet Operations	Private companies that proactively manage and operate their fleet routing. Includes reactions to incidents and possible delays.	Existing					X			
	Third Party Traffic Data Provider	Private vendor providing real-time information for distribution of weather, travel times, and traffic information to the public.	Existing							X	
Private Transportation Providers	Private Transportation Providers	Private providers of transportation services in the Region such as taxis and intercity bus services.	Existing				X				
Province of Ontario Ministry of Transportation (MTO)	MTO TOC	The Ministry of Transportation TOC is responsible for the construction, maintenance, and operation of roadways in the Province of Ontario Canada	Existing	X							
	Transit Windsor	The Transit Windsor is responsible for the public transportation and associated facilities in the City of Windsor and surrounding area. Also operates transit services across the border into Detroit.	Existing				X				
Regional Demand Response Transit Providers	Regional Demand Response Transit Providers CCTV Surveillance	CCTV surveillance at the Blue Water Area Transit Dispatch Center.	Planned				X				
	Regional Demand Response Transit Providers Data Archive	The transit data archive for the Regional Demand Responsive Transit Providers Data Archive. Used by FTA and MDOT Office of Passenger Transportation	Planned							X	
	Regional Demand Response Transit Providers Dispatch Center	Transit dispatch center responsible for the tracking, scheduling, and dispatching of demand response vehicles operated by Regional Demand Response Transit Providers.	Existing	X			X		X	X	

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Regional Demand Response Transit Providers	Regional Demand Response Transit Providers Electronic Fare Payment Card	Medium for collection of transit fares electronically.	Planned				X				
	Regional Demand Response Transit Providers Vehicle	Transit Vehicles owned by the regional demand responsive transit providers.	Existing				X				
	Regional Demand Response Transit Providers Website	Website with information about fares and schedules.	Existing				X				
Regional Transportation Authority (RTA)	RTA CCTV Surveillance	CCTV Surveillance at the RTA Dispatch Center	Planned				X				
	RTA Data Archive	Transit data archive for RTA. Used by FTA and MDOT	Planned				X				
	RTA Dispatch Center	Provides transportation services and facilities for Macomb, Oakland, Washtenaw, and Wayne Counties	Planned				X				
	RTA Electronic Fare Card	Medium for collection of transit fares electronically	Planned				X				
	RTA Kiosks	Kiosks for dissemination of transit traveler information. Kiosks can also be used for the purchase and recharging of electronic fare payment cards.	Planned				X				
	RTA Transit Website	Website with information about RTA fares and schedules	Planned				X				
Road Commission for Oakland County (RCOC)	RCOC CCTV Cameras	Roadside equipment on local routes used for traffic condition monitoring and management of incidents and collected by the RCOC TOC.	Existing	X							
	RCOC Data Archive	Archive that contains historical traffic data such as volume and occupancy	Existing							X	
	RCOC TOC	RCOC Traffic Operations Center responsible for municipal signal system operations.	Existing	X	X		X		X	X	X
	RCOC Traffic Signals	Multiple traffic signals interconnected and operated by RCOC.	Existing	X	X		X				

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Road Commission for Oakland County (RCOC)	RCOC Vehicle Detectors	Roadway equipment on local routes used to detect vehicle volumes and/or speeds and occupancy. This information is used in the operation of the SCATS traffic signal system and collected by the RCOC TOC.	Existing	X							
	RCOC Website	Website for RCOC	Existing	X					X		
	SEMSIM	Southeast Michigan Snow and Ice Management (SEMSIM) - complex AVL system utilizing radio system to provide communication between vehicles and computer terminals (partners include: RCOC, RCMC, City of Detroit, SMART, Wayne County Department of Public Services)	Existing				X				
St. Clair County Road Commission	St. Clair County Drawbridge Management Center	Management of the waterways used by boats and ferries and the roadways used by vehicles.	Planned	X							
	St. Clair County TOC	St. Clair County Traffic Operations Center responsible for municipal signal system operations.	Existing	X							
	St. Clair County Traffic Signals	Multiple traffic signals interconnected and operated by St. Clair County Road Commission.	Existing	X							
	St. Clair County Transit Center	Provides public transportation in St. Clair County.	Existing	X							
Suburban Mobility Authority for Regional Transportation (SMART)	SMART Center CCTV Surveillance	CCTV surveillance at the SMART Central Dispatch Center.	Planned				X				
	SMART Center Customer Kiosks	Kiosks for dissemination of transit traveler information. Kiosks can also be used for the purchase and recharging of electronic fare payment cards.	Planned				X				
	SMART Central Dispatch Archive	The transit data archive for SMART. Used by FTA and MDOT.	Existing							X	

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Suburban Mobility Authority for Regional Transportation (SMART)	SMART Central Dispatch Center	Suburban Mobility Authority for Regional Transportation (SMART) - Provides transportation services and facilities for Macomb, Oakland, Wayne, and Monroe Counties including service between the suburbs and Detroit and suburbs to suburbs.	Existing	X	X	X	X		X	X	
	SMART Electronic Fare Payment Card	Medium for collection of transit fares electronically.	Planned				X				
	SMART Transit Vehicles	Transit Vehicles owned by SMART Transit	Existing				X				
	SMART Website	Website with information about fares and schedules.	Existing				X				
System Users	Archived Data Users	Those who request information from the data archive systems	Existing							X	
	Commercial Vehicle	Privately owned commercial vehicles that travel throughout the Region. Included in the architecture to cover HAZMAT incident reporting.	Existing					X			
	Commercial Vehicle Driver	The operator of the commercial vehicle.	Existing					X			
	Maintenance and Construction Field Personnel	The individuals working at the maintenance or construction site.	Existing			X					
	Other Vehicle	Vehicles outside of the control of the driver.	Existing								X
	Private Provider Vehicle Detection	Vehicle detection sponsored by a private entity	Existing	X							
	Private Travelers Personal Computing Devices	Computing devices that travelers use to access public information.	Existing		X		X		X		
	Private Vehicles	Vehicles operated by the public.	Existing	X	X	X			X		X
	Traveler	Individual using the transportation network	Existing				X				

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
University of Michigan Parking and Transportation Services (UM-PTS)	UM-PTS CCTV Surveillance	CCTV surveillance at the University of Michigan Parking and Transportation Service Dispatch Center.	Planned				X				
	UM-PTS Data Archive	The transit data archive for the University of Michigan Parking and Transportation Services. Used by FTA and MDOT.	Planned							X	
	UM-PTS Dispatch Center	The University of Michigan Parking and Transportation Services is responsible for public transportation facilities in the surrounding campuses of the University of Michigan	Existing		X		X		X	X	
	UM-PTS Electronic Fare Payment Card	Medium for collection of transit fares electronically.	Planned				X				
	UM-PTS Kiosks	Kiosks for dissemination of transit traveler information. Kiosks can also be used for the purchase and recharging of electronic fare payment cards.	Planned				X				
	UM-PTS Vehicles	Transit Vehicles owned by University of Michigan Parking & Transportation Services	Existing				X				
	UM-PTS Website	Website with information about fares and schedules.	Existing				X				
US Customs and Border Protection	US Customs and Border Protection	US Customs and Border Protection is responsible for regulating and facilitating international trade and enforcing U.S. trade laws as well as the protection and safety of American citizens and businesses	Existing	X	X			X			
	US Customs and Border Protection Website	US Custom and Border Protection website providing information on customs and immigration, monthly traffic statistics, traffic trends, and toll rates.	Existing	X							

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
Washtenaw County Road Commission (WCRC)	Washtenaw County CCTV Cameras	Roadside equipment on local routes used for traffic condition monitoring and management of incidents and collected by the Washtenaw County TOC.	Existing	X							
	Washtenaw County DMS	Roadside equipment on arterial routes within the county used to share traveler information with motorists through dynamic messaging.	Existing	X							
	Washtenaw County TOC	Washtenaw County Traffic Operations Center consists of a central server that can operate local systems.	Existing	X							
	Washtenaw County Traffic Signals	Multiple traffic signals interconnected and operated by Washtenaw County Road Commission.	Existing	X							
Wayne County Airport Authority	Detroit Metro Wayne County Airport (DTW)	Detroit Metropolitan Wayne County Airport, Detroit Michigan. The Wayne County Airport Authority is responsible for the management and operation of the airfield and airport facilities.	Existing	X							
	DTW DMS	Detroit Metro Wayne County Airport - Dynamic message signs operated by a local agency to provide information to drivers such as lane closures due to a crash or from the weather.	Existing	X							
	DTW Operations Center	Detroit Metro Wayne County Airport central command and control facility responsible for airport operations.	Existing	X	X		X				
	DTW Security Monitoring Field Equipment	Detroit Metro Wayne County Airport - Roadside equipment located on Detroit Metro Wayne County Airport routes that is used for monitoring key infrastructure elements from damage or attacks.	Existing		X						
	DTW Traveler Information Website	Detroit Metro Wayne County Airport - web site that links the users to multiple data sources for weather, traffic, and flight information.	Existing						X		

Stakeholder	Element Name	Element Description	Element Status	ATMS	EM	MC	APTS	CVO	ATIS	AD	AVSS
	DTW Vehicle Parking Management System	System operated by Wayne County Airport Authority that monitors available vehicle parking at key parking facilities.	Planned	X							
Wayne County Department of Public Services	Wayne County Communication Center	Wayne County central dispatch center for maintenance and operations of maintenance vehicles. This center is not used for traffic operations.	Existing			X					
	Wayne County COMPASS	A public website that displays real-time traffic, cameras, location of road maintenance trucks, and weather. It utilizes a satellite version of the Wayne County road system.	Existing						X		
	Wayne County TOC	Wayne County Traffic Operations Center responsible for municipal signal system operations.	Planned	X							
	Wayne County Traffic Signals	Multiple traffic signals interconnected and operated by Wayne County Department of Public Services.	Planned	X							
	Wayne County Transit Center	Provides public transportation in Wayne County	Existing	X							

2.1.2 Top Level Regional System Interconnect Diagram

A system interconnect diagram, or “sausage diagram”, shows the systems and primary interconnects in the Region. The National ITS Architecture interconnect diagram has been customized for the SEMCOG Region based on the system inventory and information gathered from the stakeholders. **Figure 4** summarizes the existing and planned ITS elements for the SEMCOG Region in the context of a physical interconnect. Subsystems and elements specific to the Region are called out in the boxes surrounding the main interconnect diagram, and these are color-coded to the subsystem with which they are associated. Subsystems and terminators are the entities that represent systems in ITS.

Subsystems are the highest level building blocks of the physical architecture, and the National ITS Architecture groups them into four major classes: Centers, Field, Vehicles, and Travelers. Each of these major classes includes various components that represent a set of transportation functions (or processes). Each set of functions is grouped under one agency, jurisdiction, or location, and correspond to physical elements such as: traffic operations centers, traffic signals, or vehicles. Communication functions between the subsystems are represented in the ovals. Fixed-point to fixed-point communications include not only twisted pair and fiber optic technologies, but also wireless technologies such as microwave and spread spectrum.

Terminators are the people, systems, other facilities, and environmental conditions outside of ITS that need to communicate or interface with ITS subsystems. Terminators help define the boundaries of the National ITS Architecture as well as a regional system. Examples of terminators include: drivers, weather information providers, and information service providers.

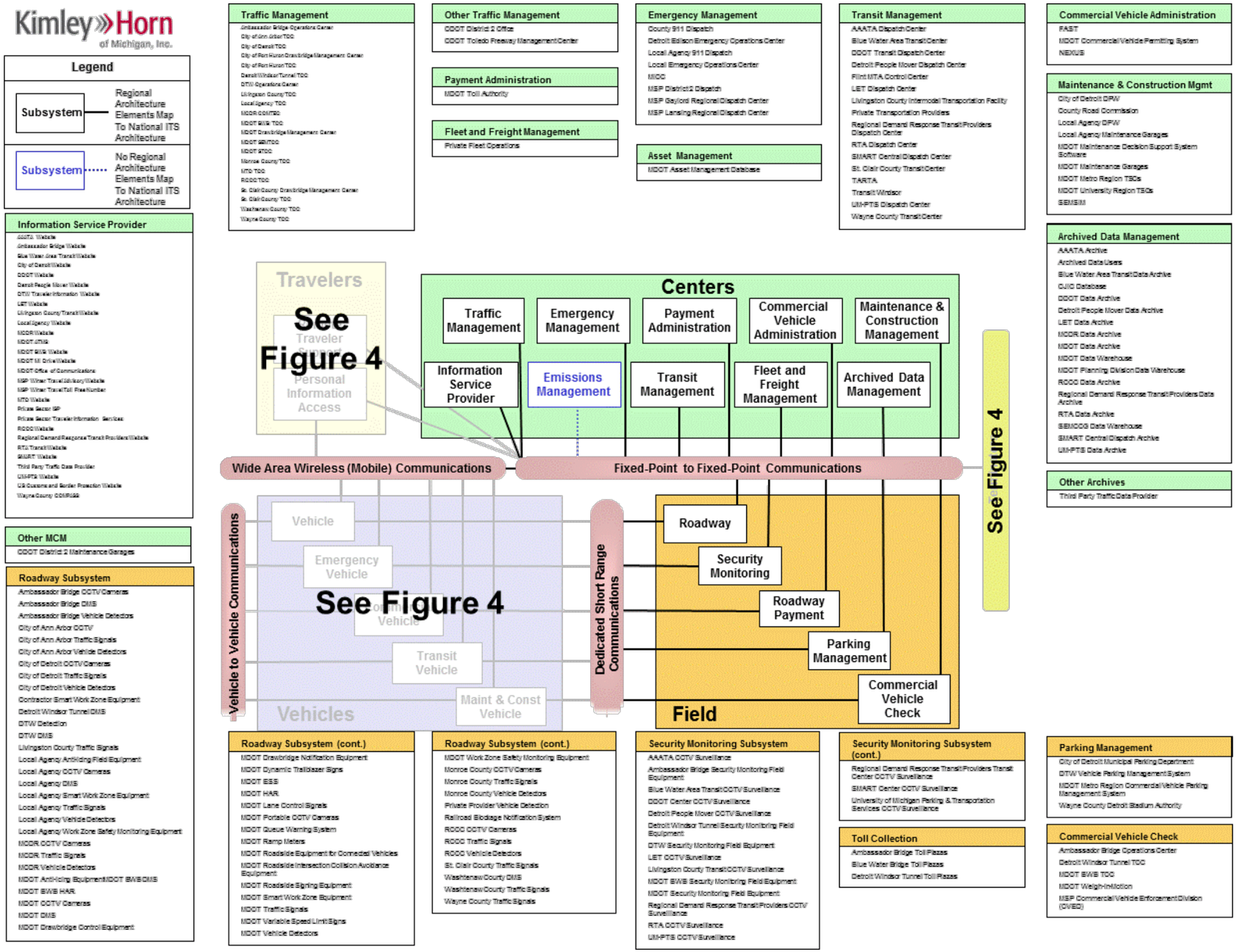


Figure 3. SEMCOG Region System Interconnect Diagram

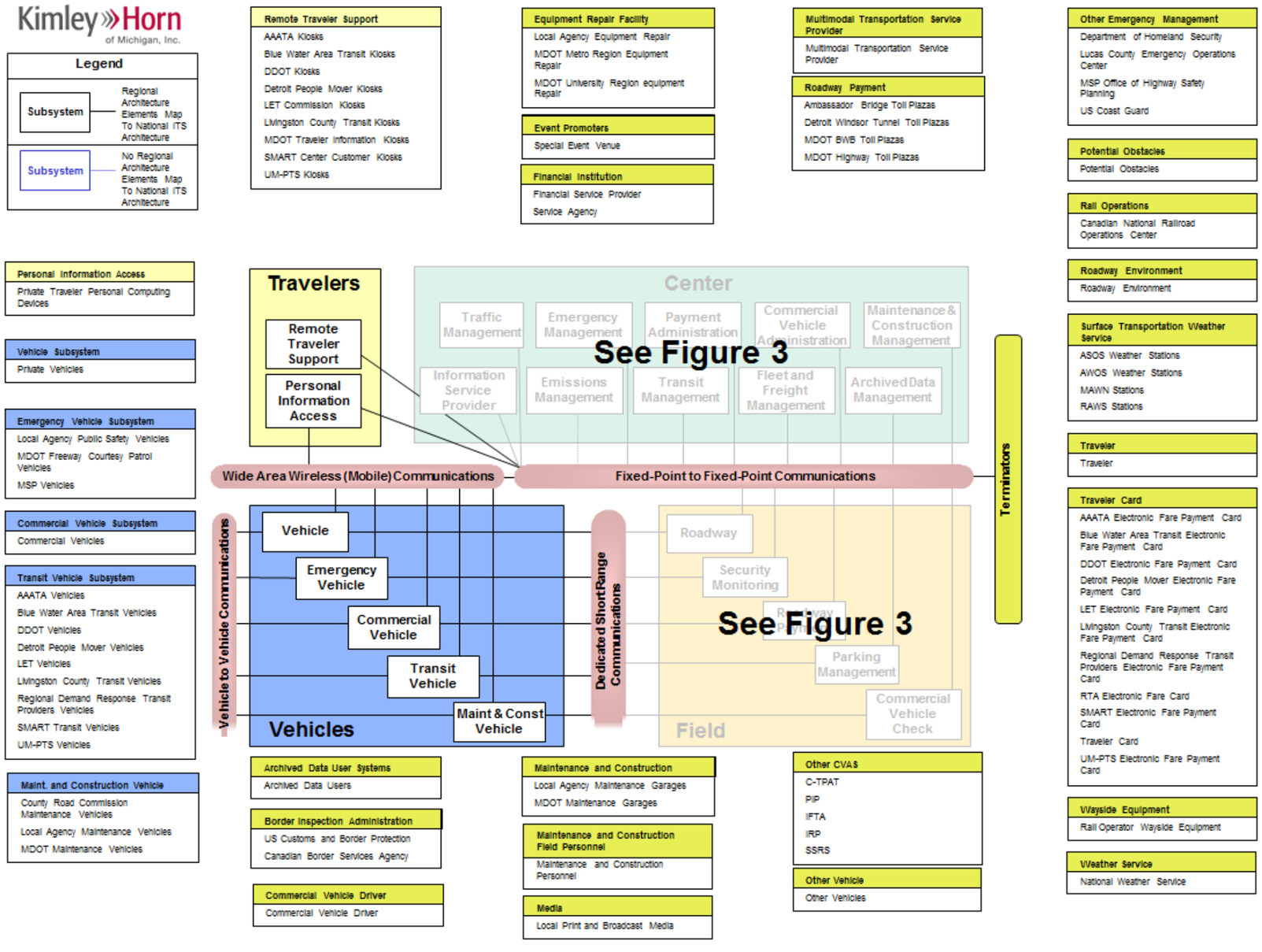


Figure 4. SEMCOG Region System Interconnect Diagram

2.1.3 Service Packages

The National ITS Architecture Version 7.0 references services as service packages. This is a revision from the previous version where services were called market packages. The primary catalyst in this revision is to align the National ITS Architecture with the Canadian ITS Architecture. Service packages can include several stakeholders and elements that work together to provide a service in the Region. They are customized to reflect the unique systems, subsystems, and terminators in the SEMCOG Region. Each service package is shown graphically with the service package name, agencies and elements involved, and desired data flows included.

For the administrative update, the focus included revisions to existing service packages and the inclusion of any additional services packages currently not included. The SEMCOG Regional ITS Architecture provides a more extensive overview of service packages. The document discusses how service packages were identified and selected and then prioritized by functional area. It also presents examples on how the service packages were customized with element interfaces based on needs within the region (*reference Section 3.4 and Section 3.5*). **Appendix A** provides definitions for all of the service packages available in the National ITS Architecture Version 7.0. **Appendix B** includes the service packages that have been updated specific to the SEMCOG region.

3 APPLICATION OF THE REGIONAL ITS ARCHITECTURE

Once a region has identified the desired components of ITS for their area and established which agencies and systems need to be connected, the structure of the National ITS Architecture assists with the region's planning and implementation. This section addresses the application of the regional ITS architecture in the SEMCOG Region. The National ITS Architecture provides recommendations for standards that should be considered when implementing ITS elements. In addition, an operational concept has been developed for the Region and documents the roles and responsibilities of stakeholders in the operation of the regional ITS. Both sections have been updated to reflect changes within the architecture.

3.1 Standards

Standards are an important tool that will allow efficient implementation of the elements in the SEMCOG Regional ITS Architecture over time. Standards facilitate deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances, vendors change, and as new approaches evolve. **Table 3** identifies each of the ITS standards that could apply to the SEMCOG Regional ITS Architecture.

Table 3. SEMCOG Region Applicable ITS Standards

Document ID	Standard Title	SDO
APTA TCIP-S-001 3.0.4	Standard for Transit Communications Interface Profiles	APTA
ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems	ASTM
ASTM E2665-08	Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data	ASTM
ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	SAE

Document ID	Standard Title	SDO
ATIS Low Bandwidth	Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group	SAE
DSRC 5GHz	Dedicated Short Range Communication at 5.9 GHz Standards Group	ASTM/IEEE/SAE
DSRC 915MHz	Dedicated Short Range Communication at 915 MHz Standards Group	ASTM
IEEE 1455-1999	Standard for Message Sets for Vehicle/Roadside Communications	IEEE
IEEE 1570-2002	Standard for the Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection	IEEE
IEEE IM	Incident Management Standards Group	IEEE
IEEE P1609.11	Standard for Wireless Access in Vehicular Environments (WAVE) - Over- the-Air Data Exchange Protocol for Intelligent Transportation Systems (ITS)	IEEE
ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	AASHTO/ITE
Mayday	On-board Vehicle Mayday Standards Group	SAE
NTCIP 1201	Global Object Definitions	AASHTO/ITE/NEMA
NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	AASHTO/ITE/NEMA
NTCIP 1203	Object Definitions for Dynamic Message Signs (DMS)	AASHTO/ITE/NEMA
NTCIP 1204	Object Definitions for Environmental Sensor Stations (ESS)	AASHTO/ITE/NEMA
NTCIP 1205	Object Definitions for Closed Circuit Television (CCTV) Camera Control	AASHTO/ITE/NEMA
NTCIP 1206	Object Definitions for Data Collection and Monitoring (DCM) Devices	AASHTO/ITE/NEMA
NTCIP 1208	Object Definitions for Closed Circuit Television (CCTV) Switching	AASHTO/ITE/NEMA
NTCIP 1209	Data Element Definitions for Transportation Sensor Systems (TSS)	AASHTO/ITE/NEMA
NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	AASHTO/ITE/NEMA
NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	AASHTO/ITE/NEMA
NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	AASHTO/ITE/NEMA
NTCIP C2C	NTCIP Center-to-Center Standards Group	AASHTO/ITE/NEMA
NTCIP C2F	NTCIP Center-to-Field Standards Group	AASHTO/ITE/NEMA
SAE J2735	Dedicated Short Range Communications (DSRC) Message Set Dictionary	SAE

3.2 Operational Concepts

An operational concept documents each stakeholder's current and future roles and responsibilities. It spans across a range of transportation services, as grouped in the Operational Concepts section of Turbo Architecture Database. The services covered are:

- ***Arterial Management*** *– The development of signal systems that react to changing traffic conditions and provide coordinated intersection timing over a corridor, an area, or multiple jurisdictions.*
- ***Highway Management*** *– The development of systems to monitor freeway (or tollway) traffic flow and roadway conditions, and provide strategies such as ramp metering or lane access control to improve the flow of traffic on the freeway. Includes systems to provide information to travelers on the roadway.*
- ***Incident Management*** *– The development of systems to provide rapid and effective response to incidents. Includes systems to detect and verify incidents, along with coordinated agency response to the incidents.*
- ***Emergency Management*** *– The development of systems to provide emergency call taking, public safety dispatch, and emergency operations center operations.*
- ***Maintenance and Construction Management*** *– The development of systems to manage the maintenance of roadways in the Region, including winter snow and ice clearance. Includes the managing of construction operations.*
- ***Transit Management*** *– The development of systems to more efficiently manage fleets of transit vehicles or transit rail. Includes systems to provide transit traveler information both pre-trip and during the trip.*
- ***Electronic Payment*** *– The development of electronic fare payment systems for use by transit and other agencies (e.g., parking).*
- ***Commercial Vehicle Operations*** *– The development of systems to facilitate the management of commercial vehicles (e.g., electronic clearance).*
- ***Traveler Information*** *– The development of systems to provide static and real time transportation information to travelers.*
- ***Archived Data Management*** *– The development of systems to collect transportation data for use in non-operational purposes (e.g., planning and research).*
- ***Advanced Vehicle Safety*** *– The development of systems to support private sector vehicle safety initiatives (e.g., intersection collision avoidance)*

Table 4 identifies the roles and responsibilities of key stakeholders for a range of transportation services.

Table 4. SEMCOG Region Stakeholder Roles and Responsibilities

Transportation Service	Stakeholder	Roles/Responsibilities
Arterial Management	City of Ann Arbor	Operate traffic signal systems on local routes.
		Operate network surveillance equipment including CCTV cameras and field sensors on local routes to facilitate traffic signal operations.
		Provide traffic information reports to regional information service providers.
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media.
		Coordinate traffic information and control with MDOT STOC.
		Coordinate traffic information with other local agencies.
		Coordinate HRI signal adjustments with private rail operators.
		Provide traffic signal preemption for emergency vehicles.
	City of Detroit	Operate traffic signal systems on local routes.
		Operate network surveillance equipment including CCTV cameras and field sensors on local routes to facilitate traffic signal operations.
		Provide traffic information reports to regional information service providers.
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media.
		Coordinate traffic information and control with MDOT SEMTOC.
		Coordinate traffic information with other local agencies.
		Coordinate HRI signal adjustments with private rail operators.
		Provide traffic signal preemption for emergency vehicles.

Transportation Service	Stakeholder	Roles/Responsibilities
Arterial Management	City of Port Huron	Operate traffic signal systems on local routes.
		Operate network surveillance equipment including CCTV cameras and field sensors on local routes to facilitate traffic signal operations.
		Provide traffic information reports to regional information service providers.
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media.
		Coordinate traffic information and control with MDOT SEMTOC.
		Coordinate traffic information with other local agencies.
		Coordinate HRI signal adjustments with private rail operators.
		Provide traffic signal preemption for emergency vehicles.
	Local Agency	Operate traffic signal systems on local routes.
		Operate network surveillance equipment including CCTV cameras and field sensors on local routes to facilitate traffic signal operations.
		Provide traffic information reports to regional information service providers.
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media.
		Coordinate traffic information and control with MDOT SEMTOC.
		Coordinate traffic information with other local agencies.
		Coordinate HRI signal adjustments with private rail operators.
		Provide traffic signal preemption for emergency vehicles.
	MDOT	Operate and maintain traffic signal systems on MDOT routes not managed by local agencies.

Transportation Service	Stakeholder	Roles/Responsibilities
Arterial Management	MDOT	Operate network surveillance equipment including CCTV cameras and field sensors on MDOT routes not managed by local agencies to facilitate traffic signal operations.
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media.
		Coordinate traffic information and control with local agency TOCs and other MDOT TOCs.
		Provide traffic signal preemption for emergency vehicles.
	Province of Ontario Ministry of Transportation (MTO)	Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media.
		Coordinate traffic information and control with local agency TOCs and other MDOT TOCs.
	MCDR	Operate traffic signal systems within the County.
		Operate network surveillance equipment including CCTV cameras and field sensors on local and state routes to facilitate traffic signal operations.
		Provide traffic information reports to regional information service providers.
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media.
		Coordinate traffic information and control with MDOT SEMTOC.
		Coordinate traffic information with other local agencies.
		Coordinate HRI signal adjustments with Private Rail Operators.
		Provide traffic signal preemption for emergency vehicles.
	RCOC	Operate traffic signal systems within the County.
		Operate network surveillance equipment including CCTV cameras and field sensors on local and state routes to facilitate traffic signal operations.

Transportation Service	Stakeholder	Roles/Responsibilities
Arterial Management	RCOC	Provide traffic information reports to regional information service providers.
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media.
		Coordinate traffic information and control with MDOT SEMTOC.
		Coordinate traffic information with other local agencies.
		Coordinate HRI signal adjustments with Private Rail Operators.
		Provide traffic signal preemption for emergency vehicles.
Freeway Management	Ambassador Bridge	Operate network surveillance equipment including CCTV cameras and field sensors, as well as DMS, to convey traffic information on Ambassador Bridge and surrounding routes.
		Provide traffic information to regional information service providers.
		Coordinate traffic information and traffic control with other MDOT SEMTOC.
	Detroit and Canada Tunnel Corporation	Operate network surveillance equipment including CCTV cameras and field sensors, as well as DMS, to convey traffic information within Tunnel and surrounding routes.
		Provide traffic information to regional information service providers.
		Coordinate traffic information and traffic control with other MDOT SEMTOC.
	MDOT	Operate network surveillance equipment including CCTV cameras and field sensors, as well as DMS, to convey traffic information on MDOT highway routes.
		Provide traffic information to regional information service providers.
		Provide traffic information to regional transportation agencies and the general public through traffic information devices (primarily DMS).

Transportation Service	Stakeholder	Roles/Responsibilities
Freeway Management	MDOT	Coordinate traffic information and traffic control with other MDOT TOCs.
		Provides video images to a large number of road and law enforcement agencies through a secure web access.
	Third Party Traffic Data Provider	Provide traffic information to regional information service providers.
		Coordinate traffic information and traffic control with other MDOT SEMTOC and MDOT STOC.
	Ohio Department of Transportation (ODOT)	Provide traffic information to regional information service providers.
		Coordinate traffic information and traffic control with other MDOT TOCs.
	Province of Ontario Ministry of Transportation (MTO)	Provide traffic information to regional information service providers.
		Coordinate traffic information and traffic control with other MDOT SEMTOC.
	MCDR	Operate network surveillance equipment including CCTV cameras and field sensors, as well as DMS, to convey traffic information on county routes.
		Provide traffic information to regional information service providers.
		Provide traffic information to regional transportation agencies and the general public through traffic information devices (primarily DMS).
		Coordinate traffic information and traffic control with MDOT SEMTOC.
	RCOC	Operate network surveillance equipment including CCTV cameras and field sensors to convey traffic information on county routes.
		Provide traffic information to regional information service providers.

Transportation Service	Stakeholder	Roles/Responsibilities
	RCOC	Provide traffic information to regional transportation agencies and the general public through traffic information devices (primarily web site).
		Coordinate traffic information and traffic control with MDOT SEMTOC.
Incident Management (Traffic)	Local Agency	Perform network surveillance for detection and verification of incidents on local routes.
		Provide incident information to regional emergency responders, including the MSP and MDOT.
		Coordinate maintenance resources for incident response with SEMCOG Region TSCs and Local Agencies.
	MDOT	Perform network surveillance for detection and verification of incidents on MDOT routes.
		Provide incident information to travelers via traffic information devices on highways (e.g. MDOT DMS).
		Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management.
		Coordinate maintenance resources for incident response with MDOT TSC Construction and Maintenance Operations.
		Responsible for the development, coordination, and execution of special traffic management strategies during an evacuation.
	Monroe County Road Commission	Perform network surveillance for detection and verification of incidents within the County
		Provide incident information to regional emergency responders, including the MSP and MDOT.
		Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management.
		Coordinate maintenance resources for incident response with SEMCOG Region TSCs and other local agencies.

Transportation Service	Stakeholder	Roles/Responsibilities
Incident Management (Traffic)	Ohio Department of Transportation (ODOT)	Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management.
		Coordinate maintenance resources for incident response with MDOT TSC Construction and Maintenance Operations.
	MCDR	Perform network surveillance for detection and verification of incidents within the County
		Provide incident information to regional emergency responders, including the MSP and MDOT.
		Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management.
		Coordinate maintenance resources for incident response with SEMCOG Region TSCs and other local agencies.
	RCOC	Provide incident information to regional emergency responders, including the MSP and MDOT.
		Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management.
		Coordinate maintenance resources for incident response with SEMCOG Region TSCs and other local agencies.
Incident Management (Emergency)	Local Agency	Receive emergency calls for incidents on local routes.
		Dispatch the local agency emergency vehicles to incidents, including the local agency Police, Fire, and EMS/Rescue.
		Coordinate public safety resources for incident response on local routes.
		Coordinate incident response with other public safety agencies (fire, EMS, ambulance, etc.).
		Perform incident detection and verification on local routes and provide this information to the Local Agency TOC.
	MSP	Receive emergency calls for incidents on local routes.

Transportation Service	Stakeholder	Roles/Responsibilities
Incident Management (Emergency)	MSP	Dispatch MSP vehicles for incidents on highways.
		Dispatch the local agency emergency vehicles to incidents, including the local agency Police, Fire, and EMS/Rescue in areas where MSP has primary 911 call-taking responsibilities.
		Coordinate incident response with other public safety agencies (local police, fire, EMS, sheriff) as well as MDOT.
		Coordinate public safety resources for incident response on local routes.
		Perform incident detection and verification for the highways within the region and provide this information to traffic and other public safety agencies.
Emergency Management	Local Agency	Participate in the incident response, coordination, and reporting.
		Dispatch local agency fire/EMS/police vehicles.
		Receive AMBER Alert and other wide area alert information from MSP.
		Respond to transit emergencies/alarms on-board transit vehicles or at the transit facilities of local transit agencies.
	MIOC	Participate in the incident response, coordination, and reporting.
	MSP	Dispatch MSP vehicles to incidents within their jurisdiction.
		Dispatch Local Agency emergency vehicles to incidents in areas where MSP has primary 911 call-taking responsibilities.
		Receive AMBER Alert and other Wide Area Alert information from MSP Headquarters.
		Receive early warning information and threat information from the NWS and Local Agencies.

Transportation Service	Stakeholder	Roles/Responsibilities
Emergency Management	MSP	Coordinate with regional emergency management providers, maintenance and construction providers, and regional traffic management providers for emergency plans and evacuation and reentry plans.
		Provide regional traffic, transit, emergency management, and maintenance operations with disaster information to disseminate to the traveling public.
		Provide security monitoring of critical infrastructure for MDOT.
	MCDR	Video link with traffic images with COMTEC
	RCOC	Video link with traffic images with Oakland County EM
Maintenance and Construction Management	Local Agency	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Receive vehicle location information from local agency DPW vehicles.
		Dispatch local agency maintenance vehicles.
		Provide maintenance of local routes and MDOT facilities (per contract), including pavement maintenance, construction activities, and snow removal.
		Receive requests for maintenance resources for incident response from regional emergency management agencies.
		Supports coordinated response to incidents.
		Responsible for the tracking and dispatch of MDOT maintenance vehicles.
	MDOT	Receive vehicle maintenance conditions from MDOT maintenance and construction vehicle and coordinate fleet management with the MDOT equipment repair facility

Transportation Service	Stakeholder	Roles/Responsibilities
Maintenance and Construction Management	MDOT	Collect road weather information with MDOT equipment and distribute it to regional traffic, maintenance, and transit agencies.
		Provide maintenance of state highways within the region, including pavement maintenance, winter maintenance, and construction activities.
		Manage work zones on all MDOT maintenance and construction activities, as well as monitor work zone safety with MDOT field devices and vehicles.
		Coordinate maintenance and construction activities with other regional maintenance and construction agencies.
		Distribute maintenance and construction plans and work zone information to regional information service providers, regional traffic operations, transit operations, emergency operations, rail operations, and the media.
		Perform maintenance of ITS field equipment owned by MDOT.
		Coordinate snow removal resources with other regional maintenance providers.
	Monroe County Road Commission	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Receive vehicle location information from local agency DPW vehicles.
		Dispatch local agency maintenance vehicles.
		Provide maintenance of local routes and MDOT facilities (per contract), including pavement maintenance, construction activities, and snow removal.
	National Weather Service	Collect weather data from field devices.
	MCDR	Receive a request for maintenance resources for incident response from regional emergency management agencies.

Transportation Service	Stakeholder	Roles/Responsibilities
Maintenance and Construction Management	MCDR	Coordinate maintenance resources for incidents with other regional maintenance providers.
		Receive vehicle location information from local agency DPW vehicles.
		Dispatch local agency maintenance vehicles.
		Provide maintenance of local routes and MDOT facilities (per contract), including pavement maintenance, construction activities, and snow removal.
	RCOC	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Receive vehicle location information from agency vehicles.
		Dispatch local agency maintenance vehicles.
		Provide maintenance of local routes and MDOT facilities (per contract), including pavement maintenance, construction activities, and snow removal.
	St. Clair County Road Commission	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Receive vehicle location information from local agency DPW vehicles.
		Dispatch local agency maintenance vehicles.
		Provide maintenance of local routes and MDOT facilities (per contract), including pavement maintenance, construction activities, and snow removal.
	Washtenaw County Road Commission	Receive a request for maintenance resources for incident response from regional emergency management agencies.

Transportation Service	Stakeholder	Roles/Responsibilities
Maintenance and Construction Management	Washtenaw County Road Commission	Coordinate maintenance resources for incidents with other regional maintenance providers.
		Receive vehicle location information from local agency DPW vehicles.
		Dispatch local agency maintenance vehicles.
		Provide maintenance of local routes and MDOT facilities (per contract), including pavement maintenance, construction activities, and snow removal.
	Wayne County Department of Public Services	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Receive vehicle location information from local agency DPW vehicles.
		Dispatch local agency maintenance vehicles.
		Provide maintenance of local routes and MDOT facilities (per contract), including pavement maintenance, construction activities, and snow removal.
Transit Management	Ann Arbor Area Transportation Authority	Provide fixed route bus service for the Ann Arbor Area Transportation Authority's service area.
		Provide demand response transit service for the Ann Arbor Area Transportation Authority's service area.
		Track and evaluate schedule performance on all Ann Arbor Area Transportation Authority fixed route and demand response vehicles.
		Provide transit schedule and fare information to the Ann Arbor Area Transportation Authority website and private sector traveler information service providers.

Transportation Service	Stakeholder	Roles/Responsibilities
Transit Management	Ann Arbor Area Transportation Authority	Provide a demand response transit plan from the agency website.
		Provide transit passenger electronic fare payment on all Ann Arbor Area Transportation Authority fixed route and demand response transit vehicles.
		Provide transit security on all transit vehicles and at transit terminals through silent alarms and surveillance systems.
		Provide automated transit maintenance scheduling through automated vehicle conditions reports on all Ann Arbor Area Transportation Authority fixed route and demand response vehicles.
		Coordinate transit service with other regional transit providers as well as regional intermodal terminals and the regional airport.
		Provide transit traveler information to the agency website and local private sector traveler information services in addition to making it available on transit information kiosks.
		Coordinate emergency plans with the local public safety agency and provide emergency transit services for evacuations, fires, and disasters (including re-entry)
		Collect and archive transit data from Ann Arbor Area Transportation Authority transit operations.
	Blue Water Area Transit	Provide fixed route bus service for the Blue Water Area Authority's service area.
		Provide demand response transit service for the Blue Water Area Authority's service area.
		Track and evaluate schedule performance on all Blue Water Area Authority fixed route and demand response vehicles.
		Provide transit schedule and fare information to the Blue Water Area Authority website and private sector traveler information service providers.
		Provide a demand response transit plan from the agency website.

Transportation Service	Stakeholder	Roles/Responsibilities
Transit Management	Blue Water Area Transit	Provide transit passenger electronic fare payment on all Blue Water Area Authority fixed route and demand response transit vehicles.
		Provide transit security on all transit vehicles and at transit terminals through silent alarms and surveillance systems.
		Provide automated transit maintenance scheduling through automated vehicle conditions reports on all Blue Water Area Authority fixed route and demand response vehicles.
		Coordinate transit service with other regional transit providers as well as regional intermodal terminals and the regional airport.
		Provide transit traveler information to the agency website and local private sector traveler information services in addition to making it available on transit information kiosks.
		Coordinate emergency plans with the local public safety agency and provide emergency transit services for evacuations, fires, and disasters (including re-entry)
		Collect and archive transit data from Blue Water Area Authority transit operations.
	Detroit Department of Transportation (DDOT)	Provide fixed route bus service for DDOT's service area.
		Provide demand response transit service for the DDOT service area.
		Track and evaluate schedule performance on all DDOT fixed route and demand response vehicles.
		Provide transit schedule and fare information to the DDOT website and private sector traveler information service providers.
		Provide a demand response transit plan from the agency website.
		Provide transit passenger electronic fare payment on all DDOT fixed route and demand response transit vehicles.

Transportation Service	Stakeholder	Roles/Responsibilities
Transit Management	Detroit Department of Transportation (DDOT)	Provide transit security on all transit vehicles and at transit terminals through silent alarms and surveillance systems.
		Provide automated transit maintenance scheduling through automated vehicle conditions reports on all DDOT fixed route and demand response vehicles.
		Coordinate transit service with other regional transit providers as well as regional intermodal terminals and the regional airport.
		Provide transit traveler information to the agency website and local private sector traveler information services in addition to making it available on transit information kiosks.
		Coordinate emergency plans with the local public safety agency and provide emergency transit services for evacuations, fires, and disasters (including re-entry)
		Collect and archive transit data from DDOT transit operations.
	Flint-Mass Transportati on Authority	Coordinate transit service with other regional transit providers as well as regional intermodal terminals and the regional airport.
	Regional Demand Response Transit Providers	Provide demand response transit service for the Regional Demand Response Transit Providers.
		Track and evaluate schedule performance on all Regional Demand Response Transit Providers' transit vehicles.
		Provide transit schedule and fare information to the Regional Demand Response Transit Providers website and private sector traveler information service providers.
		Provide a demand response transit plan for the agency website.
		Provide transit passenger electronic fare payment on all Regional Demand Response Transit Providers' transit vehicles.
		Provide transit security on all transit vehicles and at transit terminals through silent alarms and surveillance systems.

Transportation Service	Stakeholder	Roles/Responsibilities
Transit Management	Regional Demand Response Transit Providers	Provide automated transit maintenance scheduling through automated vehicle conditions reports on all Regional Demand Response Transit Providers' demand response vehicles.
		Coordinate transit service with other regional transit providers as well as regional intermodal terminals and the regional airport.
		Coordinate emergency plans with the local public safety agency and provide emergency transit services for evacuations, fires, and disasters (including re-entry)
		Collect and archive transit data from Regional Demand Response Transit Providers transit operations.
	Suburban Mobility Authority for Regional Transportation (SMART)	Provide fixed route bus service for SMART's service area.
		Provide demand response transit service for the SMART service area.
		Track and evaluate schedule performance on all SMART fixed route and demand response vehicles.
		Provide transit schedule and fare information to the SMART website and private sector traveler information service providers.
		Provide a demand response transit plan from the agency website.
		Provide transit passenger electronic fare payment on all SMART fixed route and demand response transit vehicles.
		Provide transit security on all transit vehicles and at transit terminals through silent alarms and surveillance systems.
		Provide automated transit maintenance scheduling through automated vehicle conditions reports on all SMART fixed route and demand response vehicles.

Transportation Service	Stakeholder	Roles/Responsibilities
Transit Management (continued)	Suburban Mobility Authority for Regional Transportation (SMART)	Coordinate transit service with other regional transit providers as well as regional intermodal terminals and the regional airport.
		Provide transit traveler information to the agency website and local private sector traveler information services in addition to making it available on transit information kiosks.
		Coordinate emergency plans with the local public safety agency and provide emergency transit services for evacuations, fires, and disasters (including re-entry)
		Collect and archive transit data from SMART transit operations.
Commercial Vehicle Operations	MDOT	Provide route restriction information to private fleet systems.
		Provide automated weigh-in-motion inspections for private fleet operations.
		Provide permit information to regional emergency management providers and regional enforcement agencies.
	MSP	Provide enforcement of permits for overheight/overweight or HAZMAT commercial vehicles.
		Provide first response to commercial vehicle incidents and coordinate for HAZMAT conditions/clean-up.
Traveler Information	Local Agency	Collect traffic information (road network conditions), work zone information, travel times, and weather information.
		Coordinate and share traveler information with all other traveler information providers within the region.
	MDOT	Collection, processing, storage, and broadcast dissemination of traffic, transit, maintenance and construction, and weather information to travelers via the MI Drive website.

Transportation Service	Stakeholder	Roles/Responsibilities
Traveler Information	MDOT	Provide traveler information to private travelers through in vehicle, personal computing devices or kiosks upon request.
		Provide traveler information to the media.
	MSP	Collect traffic information (road network conditions), work zone information, travel times, and weather information.
Archived Data Management	MDOT	Collect and archive asset status information from all MDOT maintenance offices and MDOT asset management systems.
		Collect and archive traffic information from regional traffic management providers and centers, emergency information from MSP and Local Agency Police, and transit information from regional transit agencies for planning purposes.
		Coordinate with MDOT Transportation Planning Division.
	MSP	Collect and archive asset status information from all MDOT maintenance offices and MDOT asset management systems.
	SEMCOG	Collect and archive traffic information from regional traffic management providers and centers, emergency information from MSP and Local Agency Police, and transit information from regional transit agencies for planning purposes.
		Coordinate with MDOT Transportation Planning Division.
		Collect and archive emergency and incident information from MSP and the region's emergency responders.
Advanced Vehicle Safety	MDOT	Collect and share traffic safety information that is distributed from vehicle to vehicle.
		Collect and share potential dangers with the driver of the vehicles.

4 USE AND MAINTENANCE

As the Region grows, needs change, and, as technology progresses, new ITS opportunities arise. Shifts in regional needs, changes in the regional focus, and revisions to the National ITS Architecture will

necessitate that the SEMCOG Regional ITS Architecture be updated to remain a useful resource. If the resources are not available, and the changes within a region do not warrant a full update, an administrative update or abbreviated update process can facilitate the integration of the minor updates. The administrative update for the SEMCOG Region addresses the region's changes since 2009.

4.1 Conformity

To satisfy federal requirements and remain eligible to use federal funds, a project must be accurately documented and in conformity with the regional ITS architecture. MDOT ITS Program Office (IPO) oversees the regional ITS architecture maintenance conformance forms. These forms document any necessary changes to the architecture affected by a project. If there are no revisions, the project is in conformance; if there are changes required within the architecture, the form provides an opportunity to describe and illustrate the modifications. Once the form has been completed, it is submitted to the MDOT IPO for approval. Once approved, the form is sent to FHWA/FTA as a record of conformity. During updates to the architecture all existing maintenance forms are referenced so documented changes can be incorporated.

Figure 5 illustrates the process project managers take to determine architecture conformity. The SEMCOG Regional ITS Architecture provides additional details regarding this process and each step (*see Section 5.1*).

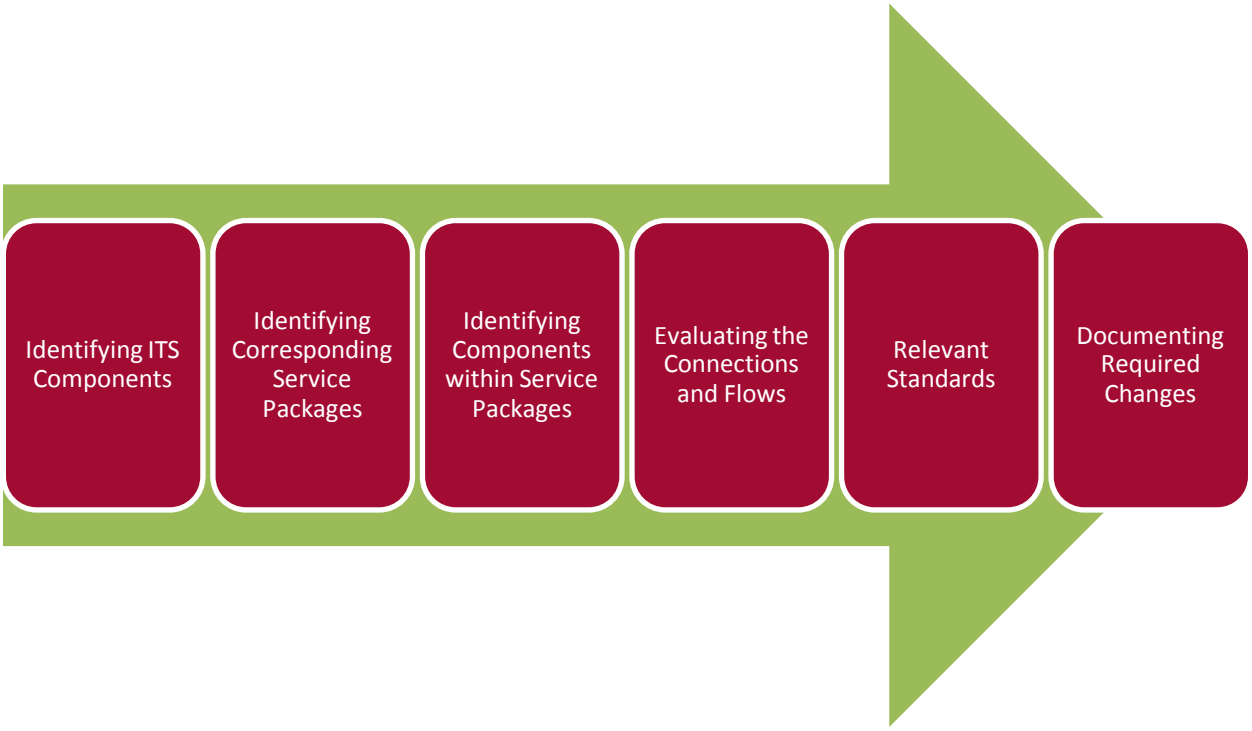


Figure 5. Steps to Determining Architecture Conformity

4.2 Maintenance

MDOT ITS Program Office will be responsible for leading the maintenance of the SEMCOG Regional ITS Architecture in coordination with the regional contact. The SEMCOG Regional ITS Architecture describes the maintenance plan put in place for a full update. However it does not describe the administrative update as part of this overall plan.

Regional ITS architectures are not static documents. The documents represent regional visions and should be amended as regional needs change, names change, new stakeholders are introduced, or if updates to one architecture affect an adjoining architecture. Updates are completed to incorporate those changes along with necessary format changes driven by newer versions of the National ITS Architecture. There are no set time limits on when to perform an update, but they should be considered if considerable changes have occurred within a region or state.

In between the scheduled updates, each region should continue to update using the ITS Architecture Maintenance Documentation Form (**Appendix C**) and submitting to the MDOT IPO. Additional details on this are included within Section 5.3 of the SEMCOG Regional ITS Architecture.

If cost and resources are an issue, the easiest and quickest way to update the architecture is through an administrative update. An administrative update typically is less intensive, requiring fewer in-person interactions and less demanding on available resources, whether funding or time. Most of the updates are driven by project implementation with documented changes within maintenance forms or updates to the National ITS Architecture. The information updated is focused around agency name changes, element changes, and flow status. The changes must be documented within both the service packages and the Turbo architecture database. The accompanying document is more concise than one developed as part of a full architecture development, as it is intended to highlight the changes driving the update.

A full update focuses on updating all facets of a regional architecture. It requires more interactions with the stakeholders over several workshops. The workshops begin at a much higher planning level, looking at the long term vision; asking the stakeholder where they see transportation needs in 20 years. The needs are used to select and prioritize service packages that build the structure for the regional ITS architecture. A full update typically warrants twice the amount of time to complete due to the amount of data collection and stakeholder involvement necessary to accurately capture all components of the architecture.

Table 5 documents the version history of the SEMCOG Regional ITS Architecture and Turbo architecture database. **Figure 6** illustrates a timeline capturing the last revision, the administrative update, and forecasting for the next full architecture update.

Table 5. Version History

SEMCOG Region		Version History	Architecture Version	Turbo Version
	Last Revision	February 2009	V6.0	v4.0
	New Revision	August 2014	v7.0	v7.0

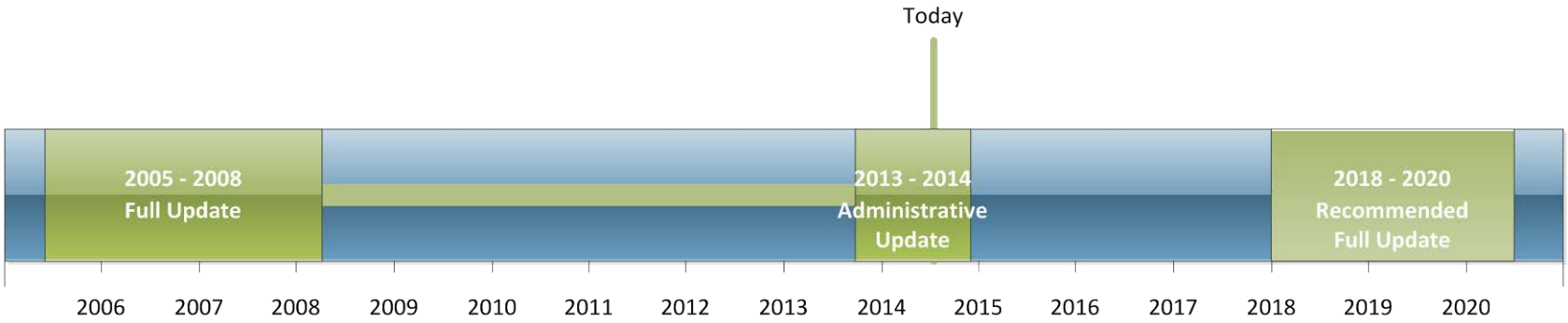


Figure 6. Time Lapse between Architecture Updates

APPENDIX A – SERVICE PACKAGE DEFINITIONS

Service Package	Service Package Name	Description
Traffic Management Service Area		
ATMS01	Network Surveillance	Collects and transmits data to a traffic management center from devices such as traffic detectors, CCTV cameras, and other surveillance equipment.
ATMS02	Traffic Probe Surveillance	Provides road network conditions such as average speed and congestion conditions using position and speed information from probe vehicles.
ATMS03	Traffic Signal Control	Provides the control and monitoring, communications, and signal control equipment to support local street and/or arterial traffic management. Consistent with urban traffic signal control systems.
ATMS04	Traffic Metering	Provides the control and monitoring, communications, and field equipment to support metering of traffic. Such strategies include ramp, interchange, and mainline metering. It also incorporates instrumentation from ATMS01 to support traffic monitoring so responsive and adaptive strategies can be implemented.
ATMS05	HOV Lane Management	Manages HOV lanes by coordinating freeway ramp meters and connector signals with HOV lane usage signals.
ATMS06	Traffic Information Dissemination	Provides drivers with traffic information using roadway equipment; most frequently dynamic message signs or highway advisory radio. Information can include road conditions, closures, detour information, incident information, emergency alerts, and advisories.
ATMS07	Regional Traffic Management	Shares traffic information and control among traffic management centers. Examples include: coordinated signal operations across jurisdictional boundaries; coordination between freeway operations and arterial signal control; and sharing of congestion or incident information.
ATMS08	Traffic Incident Management System	Manages both unexpected incidents and planned events by coordinating with other agencies to support traffic operations personnel in developing an appropriate response to minimize the impact to the transportation network and traveler safety. Includes coordination with emergency management and roadway maintenance agencies to support a coordinated response.
ATMS09	Traffic Decision Support and Demand Management	Recommends courses of action based on an assessment of the current and forecast road network performance as well as information on special events, parking, or transit operations if applicable. Example responses include predefined incident response plans, transit strategies, and congestion management strategies.
ATMS10	Electronic Toll Collection	Provides the ability to collect tolls electronically and detect and process violations. Toll tags and roadside readers also can be used to collect road use statistics for highway authorities.
ATMS11	Emissions Monitoring and Management	Collects and monitors air quality data collected by wide area or point emissions monitoring sensors.
ATMS12	Roadside Lighting System Control	Monitors operational conditions along the roadway to vary the amount of light that is provided along the roadside.
ATMS13	Standard Railroad Grade Crossing	Manages highway traffic at highway-rail intersections (HRIs) where operational requirements do not dictate more advanced features (typically where rail operational speeds are less than 80 miles per hour).
ATMS14	Advanced Railroad Grade Crossing	Manages highway traffic at highway-rail intersections (HRIs) where operational requirements demand advanced features (typically where rail operational speeds are greater than 80 miles per hour).
ATMS15	Railroad Operations Coordination	Provides an additional level of strategic coordination between freight rail operations and traffic management centers. Could include train schedules, maintenance schedules or any other anticipated HRI closures.
ATMS16	Parking Facility Management	Provides enhanced monitoring and management of parking facilities. Market package assists in the management of parking operations, coordinates with transportation authorities, and supports electronic collection of parking fees.
ATMS17	Regional Parking Management	Supports communication and coordination between parking facilities as well as coordination between parking facilities and traffic and transit management systems.

Service Package	Service Package Name	Description
Traffic Management Service Area (continued)		
ATMS18	Reversible Lane Management	Provides the management of reversible lane facilities. Includes the field equipment, lane access controls, and associated electronics.
ATMS19	Speed Warning and Enforcement	Monitors the speeds of vehicles traveling through a roadway system and warns the driver when their speed is excessive. This service can also support notifications to an enforcement agency to enforce the speed limit and roadside safe speed advisories based on current roadway conditions.
ATMS20	Drawbridge Management	Supports systems that manage drawbridges at rivers and canals and other multimodal crossings. Includes control devices as well as traveler information systems.
ATMS21	Roadway Closure Management	Closes roadways to vehicular traffic automatically or using remote activation when driving conditions are unsafe, maintenance must be performed, or in other situations where access must be prohibited. Includes gates or barriers to control access, control and monitoring systems, and field devices.
ATMS22	Variable Speed Limits	Sets variable speed limits along a roadway to create more uniformed speeds, promote safer driving during adverse conditions, and reduce air pollution. This service monitors traffic and environmental conditions along the roadway to then calculate and set suitable speed limits. Can be monitored and controlled by a management center or autonomous.
ATMS23	Dynamic Lane Management and Shoulder Use	Provides lane configuration changes on the roadway according to traffic demands and lane destination along a section. Can be used to allow temporary or interim use of shoulders as travel lanes. Lanes can be designated for use by special vehicles (buses), HOV, or special event, etc.
ATMS24	Dynamic Roadway Warning	Provides warning to the driver of approaching hazards on the roadway dynamically. Warnings can be warning signs, flashing lights, in-vehicle messages, etc. This service does not include speed warnings considered by roadway geometry limitations – *see ATMS19*.
ATMS25	VMT Road User Payment	Supports charging fees to vehicle owners traveling on a specific roadway with potentially different rates based on a number of considerations – time of day, roadway used, class of vehicles, etc. Owners register with a single payment entity and pay according to the policy set in place.
ATMS26	Mixed Use Warning Systems	Supports the sensing and warning systems used to interact with pedestrians, bicyclists, and other vehicles that operate on the main vehicle roadway or those that intersect with the main roadway. These systems are either automated warnings or active protection for the user.
Emergency Management Service Area		
EM01	Emergency Call - Taking and Dispatch	Provides basic emergency call-taking and dispatch services. Includes emergency vehicle equipment, dispatch centers, communications, and coordination between emergency management agencies.
EM02	Emergency Routing	Provides special priority and other specific emergency traffic control strategies to help improve the response of a vehicles en-route as well as coordination between emergency management agencies. Includes traffic information, road conditions, and signal preemption.
EM03	Mayday and Alarms Support	Supports user request for emergency assistance. The assistance includes gathering information about the location and incident, and then determining the appropriate response.
EM04	Roadway Service Patrols	Provides roadway services to vehicles for minor incidents, such as flat tires, out of gas, etc. Incident information is collected and shared with traveler information systems, traffic management, and maintenance and construction.
EM05	Transportation Infrastructure Protection	Supports monitoring of transportation infrastructure such as bridges, tunnels, and TMCs for potential threats and provides safeguards against them or strategies to minimize the impact if one should occur.
EM06	Wide-Area Alert	Provides information about alerts to the public in emergency situations such as child abductions, severe weather, or other life threatening situations.

Service Package	Service Package Name	Description
Emergency Management Service Area		
EM07	Early Warning System	Monitors and detects potential or actual natural or man-made disaster and notifies appropriate responding agencies.
EM08	Disaster Response and Recovery	Supports the coordination of emergency response plans to address natural or man-made disasters. It identifies key points of integration between agencies and their basic responses to address the transportation system and maintain awareness.
EM09	Evacuation and Reentry Management	Supports coordination of evacuation plans of the general public for all types of disasters. Information is shared amongst all agencies involved to implement specific strategies to effectively implement resources at the right time and right place.
EM10	Disaster Traveler Information	Provides disaster-related information to the public during a disaster. It is used to assist the public by providing evacuation route information, emergency instructions, roadway conditions and other traveler information.
Maintenance and Construction Management Service Area		
MC01	Maintenance and Construction Vehicle and Equipment Tracking	Tracks the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities.
MC02	Maintenance and Construction Vehicle Maintenance	Performs routine and corrective vehicle maintenance scheduling using on-board sensors that automatically perform diagnostics on the vehicles.
MC03	Road Weather Data Collection	Collects current road and weather conditions from sensors placed alongside the roadway. Data may also be requested or received from other meteorological systems (i.e. National Weather Service)
MC04	Weather Information Processing and Distribution	Uses the environmental data collected to help detect hazards, such as icy roads, high winds, or dense fog. The data can be used to help make decisions and keep operators updated on current condition information.
MC05	Roadway Automated Treatment	Automatically treats a section of road based on conditions detected by environmental sensors. Treatment options could include anti-icing chemical or, fog dispersion techniques, among others.
MC06	Winter Maintenance	Supports winter road maintenance. Monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities.
MC07	Roadway Maintenance and Construction	Supports management of scheduled and unscheduled maintenance and construction services on the roadway.
MC08	Work Zone Management	Manages work zones by monitoring traffic conditions, coordinating with other agencies, and providing speed and delay information to the public prior to the work zone.
MC09	Work Zone Safety Monitoring	Detects intrusions in the work zone and warns workers of the potential hazards. Crews are monitored to warn those who leave the designated safety zone. Supports both mobile and stationary work zones.
MC10	Maintenance and Construction Activity Coordination	Supports the dissemination of maintenance and construction activity to centers that can utilize it as part of their operations. (i.e., traffic management, transit, emergency management)
MC11	Environmental Probe Surveillance	Collects real-time data from on-board vehicle systems about environmental conditions on the roadway.
MC12	Infrastructure Monitoring	Monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure using fixed and vehicle-based monitoring sensors.
Public Transportation Service Area		
APTS1	Transit Vehicle Tracking	Monitors current transit vehicle locations using an automated vehicle location (AVL) system. Location data may be used to determine real time schedule adherence.

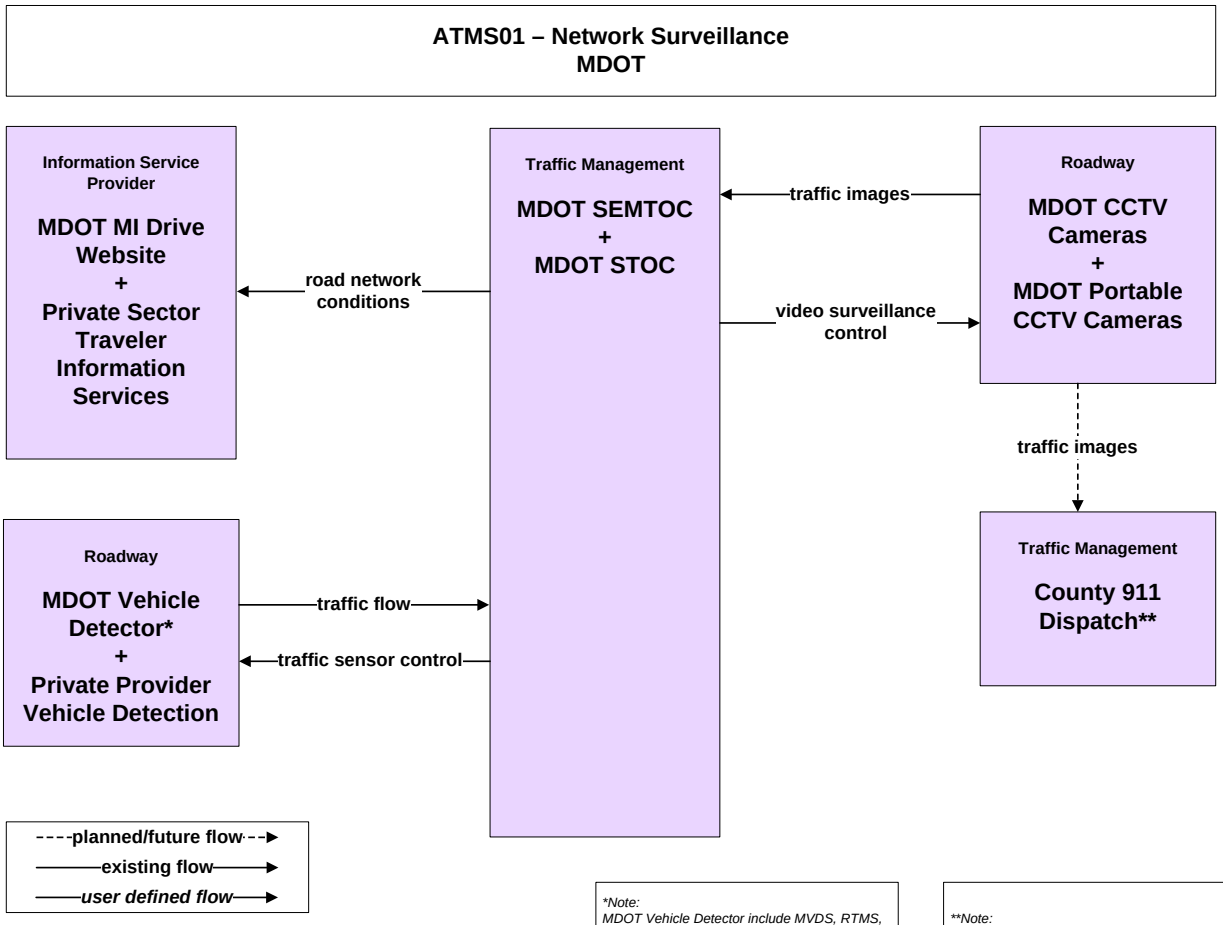
Service Package	Service Package Name	Description
Public Transportation Service Area		
APTS2	Transit Fixed-Route Operations	Performs automated dispatch and system monitoring for fixed-route and flexible-route transit services. This service performs scheduling activities including the creation of schedules, as well as operator assignment.
APTS3	Demand Response Transit Operations	Performs vehicle routing and scheduling, as well as operator assignment and system monitoring for demand response transit services.
APTS4	Transit Fare Collection Management	Manages transit fare collection on-board transit vehicles and at transit stops using electronic means.
APTS5	Transit Security	Provides for the physical security of transit passengers and transit vehicle operators. Includes on-board security cameras and panic buttons.
APTS6	Transit Fleet Management	Provides on-board monitoring of vehicle status. Information is processed and transmitted to schedule preventative and corrective maintenance.
APTS7	Multi-modal Coordination	Establishes two-way communications between multiple transit and traffic agencies to improve service coordination and operating efficiency.
APTS8	Transit Traveler Information	Provides transit information for those at transit stops and on-board transit vehicles. Also provides transit trip itineraries and other tailored information services that may occur pre-trip.
APTS9	Transit Signal Priority	Determines the need for transit priority on routes and at certain intersections and requests transit vehicle priority at these locations through coordination between traffic and transit management centers.
APTS10	Transit Passenger Counting	Counts the number of passengers entering and exiting a transit vehicle using sensors mounted on the vehicle and communicates the collected passenger data back to the management center.
APTS11	Multimodal Connection Protection	Supports the coordination of multimodal services to optimize the travel time of travelers as they move from one mode to another mode (or different routes within a single mode). Agencies coordinate routes so passengers have the opportunity to transfer with minimum wait time to either another route or mode of transportation.
Commercial Vehicle Operations Service Area		
CVO01	Carrier Operations and Fleet Management	Provides the capabilities to manage a fleet of commercial vehicles. Vehicle routing and tracking as well as notification of emergency management of any troublesome route deviations (such as a HAZMAT vehicle) are part of this market package.
CVO02	Freight Administration	Tracks the movement of cargo and monitors the cargo condition.
CVO03	Electronic Clearance	Provides for automatic clearance at roadside check facilities. Allows a good driver/vehicle/carrier to pass roadside facilities at highway speeds using transponders and dedicated short range communications to the roadside.
CVO04	CV Administrative Processes	Provides for electronic application, processing, fee collection, issuance and distribution of CVO credentials and tax filing.
CVO05	International Border Electronic Clearance	Provides for automated clearance at international border crossings. Works in coordination with the electronic clearance (CVO 03) services to gather data about the vehicle, cargo, and driver.
CVO06	Weigh-In-Motion	Provides for high speed weigh-in-motion with or without automated vehicle identification (AVI) capabilities. Works in conjunction with CVO03.
CVO07	Roadside CVO Safety	Provides for automated roadside safety monitoring and reporting by automating commercial vehicle safety inspections at the roadside check locations.
CVO08	On-board CVO Safety	Provides for on-board commercial vehicle safety monitoring and reporting as well as roadside support for reading on-board safety data via tags.
CVO09	CVO Fleet Maintenance	Supports maintenance of CVO fleet vehicles with on-board monitoring equipment and automated vehicle location capabilities by recording vehicle mileage, repairs, and safety violations.

Service Package	Service Package Name	Description
Commercial Vehicle Operations Service Area		
CVO10	HAZMAT Management	Supports coordination between incident management response and commercial vehicle tracking to ensure HAZMAT materials are effectively treated during an incident.
CVO11	Roadside HAZMAT Security Detection and Mitigation	Provides the capability to detect and classify security sensitive HAZMAT on commercial vehicles using roadside sensing and imaging technology. Credentials information can be accessed to verify if the commercial driver, vehicle and carrier are permitted to transport the identified HAZMAT.
CVO12	CV Driver Security Authentication	Provides the ability to detect when an unauthorized driver attempts to drive a vehicle using stored identity information. If an unauthorized driver has been detected, the commercial vehicle can be disabled.
CVO13	Freight Assignment Tracking	Provides tracking, and monitoring of the commercial vehicle, freight equipment, and commercial vehicle driver during a shipment.
Traveler Information Service Area		
ATIS01	Broadcast Traveler Information	Collects traffic conditions, advisories, general public transportation information, toll and parking information, incident information, roadway maintenance and construction information, and air quality and weather information for dissemination through wide area digital broadcast services such as using radio or internet websites.
ATIS02	Interactive Traveler Information	Provides the traveler with current information regarding traffic conditions, roadway maintenance and construction, transit services, parking management, detours and pricing information based on the request made by the traveler. 511 services are included in this market package.
ATIS03	Autonomous Route Guidance	Enables route planning and detailed route guidance based on static, stored information.
ATIS04	Dynamic Route Guidance	Offers advanced route planning and guidance that is responsive to current conditions.
ATIS05	ISP Based Trip Planning and Route Guidance	Provides pre-trip route planning and route guidance based on traveler preference and constraints. May or may not utilize real-time network conditions.
ATIS06	Transportation Operations Data Sharing	Provides current traffic and travel conditions to transportation system operators to facilitate information exchange between agencies.
ATIS07	Travel Services Information and Reservation	Provides travel information and reservation services to the user through multiple ways for accessing information.
ATIS08	Dynamic Ridesharing	Provides near real time ridesharing/ride matching services to travelers.
ATIS09	In Vehicle Signing	Provides sign and signal information directly to the driver through in-vehicle devices. Information includes static sign information and dynamic information.
ATIS10	VII Traveler Info	Provides location-specific information including travel times, incident information, road conditions, and emergency traveler information to travelers in vehicles using Vehicle Infrastructure Integration (VII).
Archived Data Management Service Area		
AD01	ITS Data Mart	Houses archived data from a single agency/organization. Data is typically focused on a single transportation mode or one jurisdiction.
AD02	ITS Data Warehouse	Includes all data collection and management of ITS Data Mart, but includes data from multiple agencies/organizations across modal and jurisdictional boundaries.
AD03	ITS Virtual Data Warehouse	Includes all data collection and management of ITS Data Warehouse, but supports access between several archives in different physical locations.
Advanced Vehicle Safety		
AVSS01	Vehicle Safety Monitoring	Monitors the vehicle's condition, performance, on-board safety data, and display information using on-board sensors.

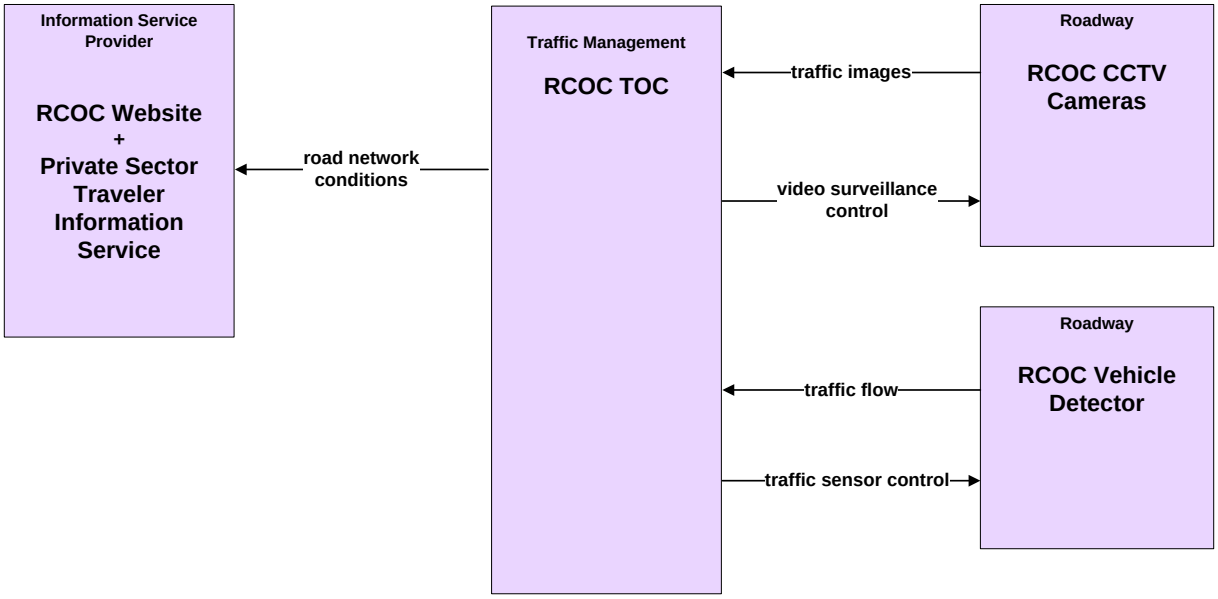
Service Package	Service Package Name	Description
Advanced Vehicle Safety		
AVSS02	Driver Safety Monitoring	Monitors the driver's condition, performance, on-board safety data, and display information using on-board sensors.
AVSS03	Longitudinal Safety Monitoring	Utilizes safety and collision sensors to monitor in front of and behind the vehicle to warn the driver of potential hazards.
AVSS04	Lateral Safety Warning	Utilizes safety and collision sensors to monitor the sides of the vehicle to warn the driver of potential hazards.
AVSS05	Intersection Safety Warning	Monitors potential conflicts between approaching vehicles to an intersection and provides a warning to those vehicles involved using short range communications and/or signs/signals in the intersection.
AVSS06	Pre-Crash Restraint Deployment	Monitors the vehicle's local environment using in-vehicle sensors and on-board communications to determine collision probability. If needed it will deploy a pre-crash safety system.
AVSS07	Driver Visibility Improvement	Enhances the driver's visibility using an enhanced vision system. On-board display hardware is needed
AVSS08	Advanced Vehicle Longitudinal Control	Utilizes safety and collision sensors to measure longitudinal gaps and a processor for controlling the vehicle speed and throttle.
AVSS09	Advanced Vehicle Lateral Control	Utilizes safety and collision sensors to measure the vehicle's lane position and lateral deviations and a processor for controlling the vehicle steering.
AVSS10	Intersection Collision Avoidance	Utilizes roadway sensors and communications equipment to assess vehicle locations and speeds near an intersection to determine the probability of a collision. Timely warnings are provided and avoidance actions are taken.
AVSS11	Automated Vehicle Operations	Enables communications between vehicles and between vehicles and supporting infrastructure for check-in and check-out from the automated highway system.
AVSS12	Cooperative Vehicle Safety Systems	Enhances stand-alone warning systems by exchanging messages with surrounding vehicles and roadside equipment. Special messages from approaching emergency vehicles also may be received and processed.

APPENDIX B – CUSTOMIZED SERVICE PACKAGES

Advanced Traffic Management System

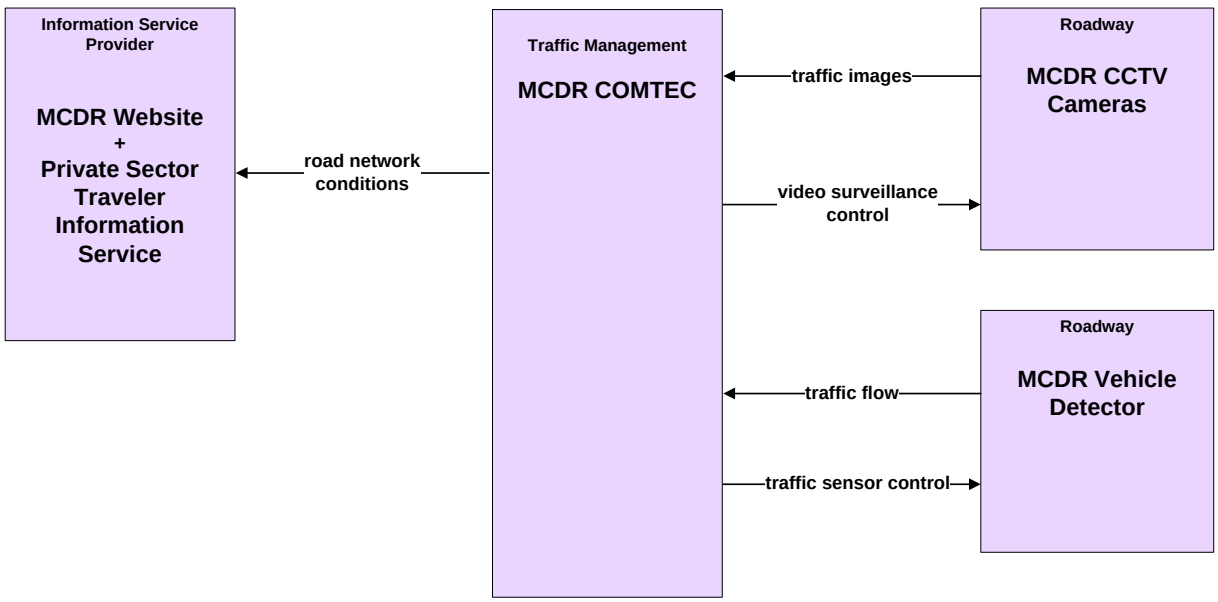


ATMS01 – Network Surveillance
RCOC



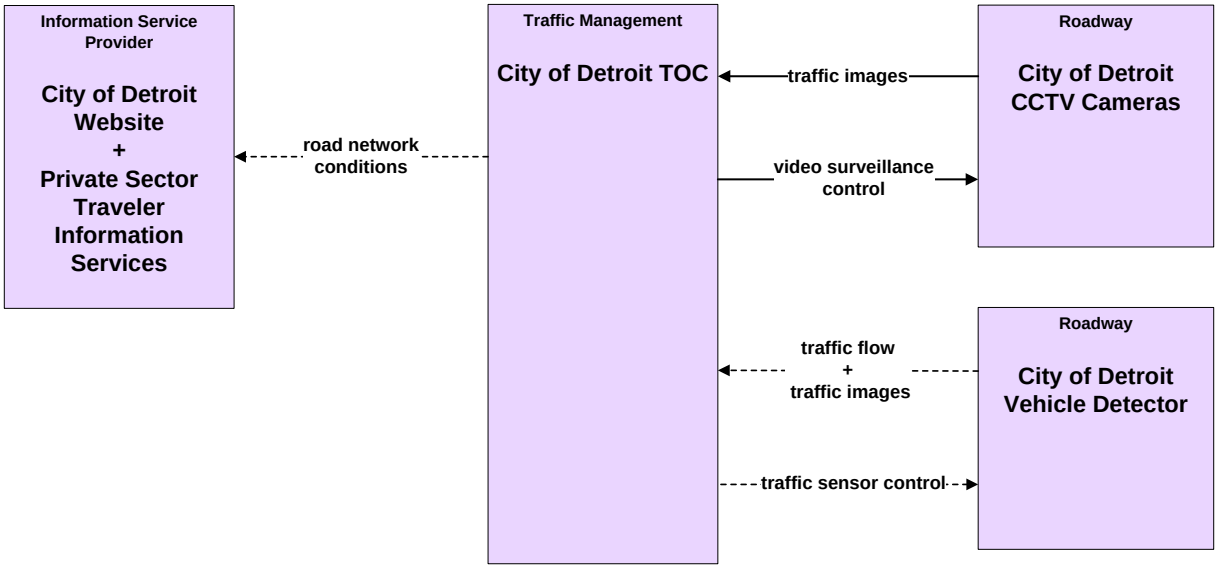
Note:
County Vehicle Detector include MVDS, RTMS, ATR and any other type of vehicle detection. There are ATR existing stations in the Region.

ATMS1 – Network Surveillance
MCDR



Note:
County Vehicle Detector include MVDS, RTMS, ATR and any other type of vehicle detection. There are ATR existing stations in the Region.

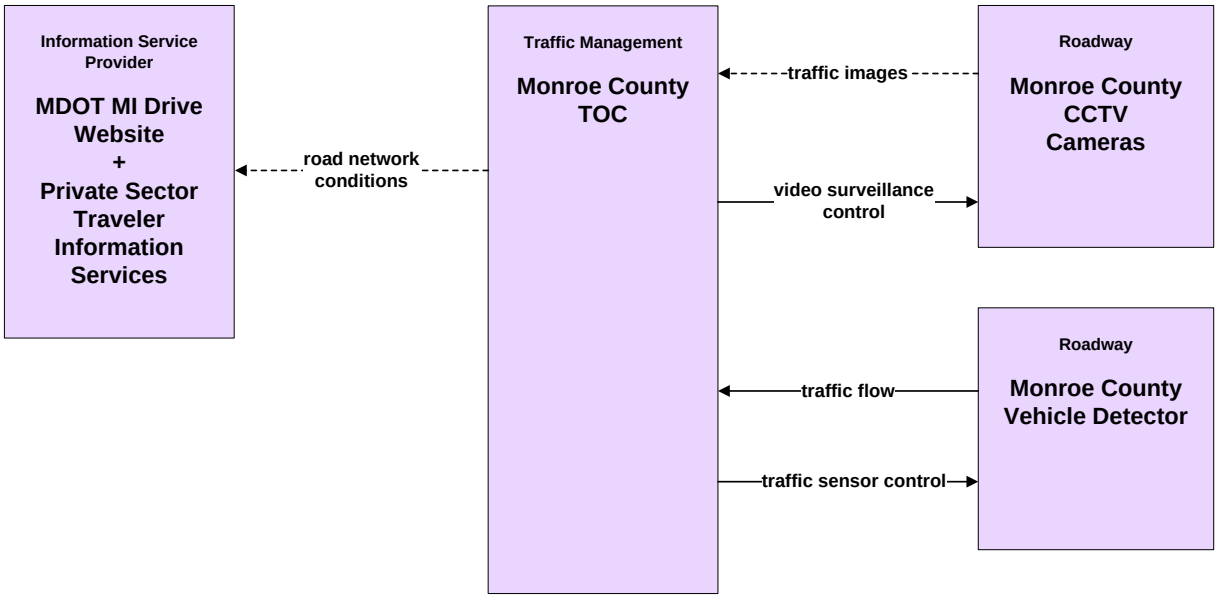
ATMS01 – Network Surveillance
City of Detroit



planned/future flow
existing flow
user defined flow

Note:
City of Detroit Vehicle Detector include MVDS, RTMS, and any other type of vehicle detection.

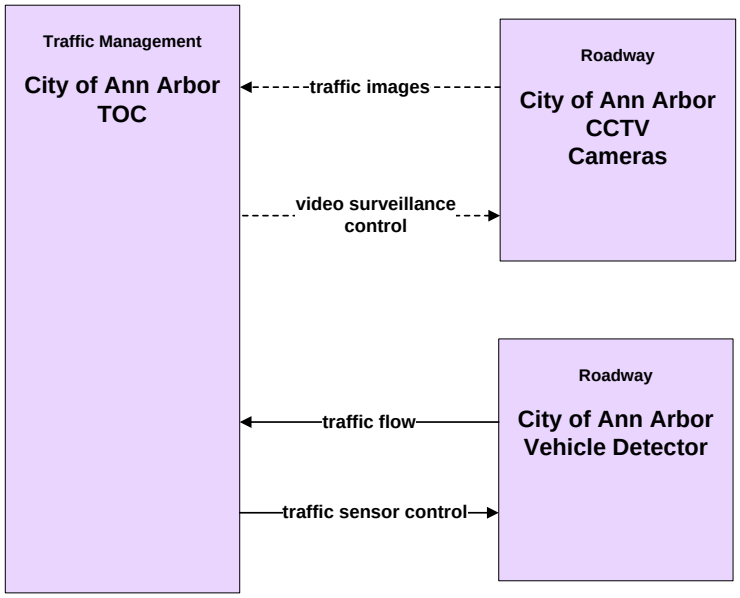
ATMS01 – Network Surveillance
Monroe County



planned/future flow
existing flow
user defined flow

Note:
County Vehicle Detector include MVDS, RTMS ATR and any other type of vehicle detection.

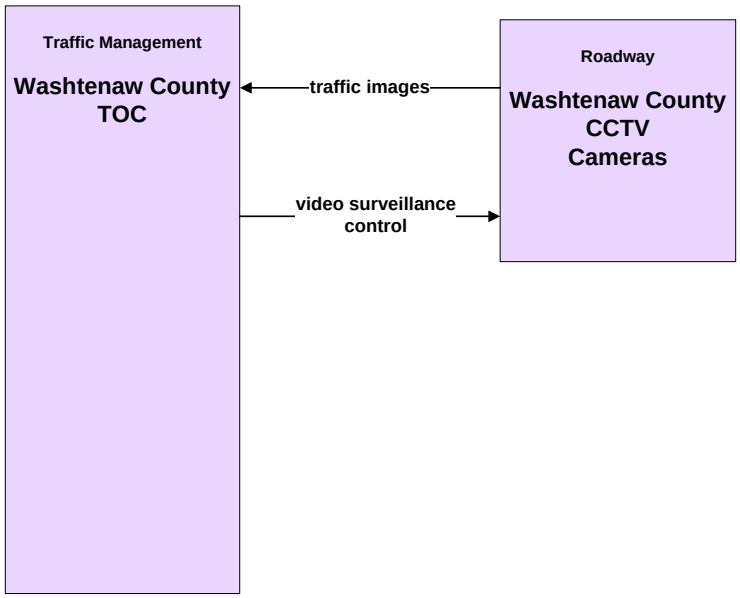
ATMS01 – Network Surveillance
City of Ann Arbor



planned/future flow
existing flow
user defined flow

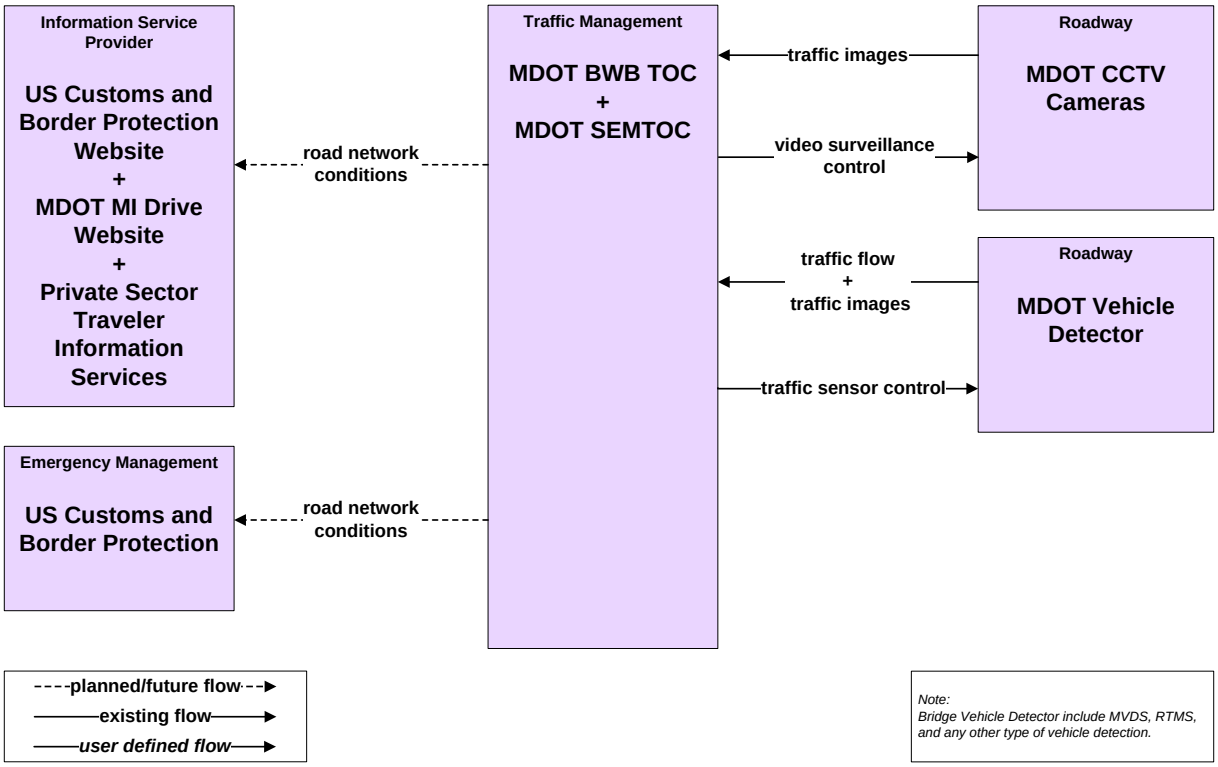
Note:
City Vehicle Detector include MVDS, RTMS, ATR and any other type of vehicle detection. Primarily used for traffic signal control.

ATMS01 – Network Surveillance
Washtenaw County

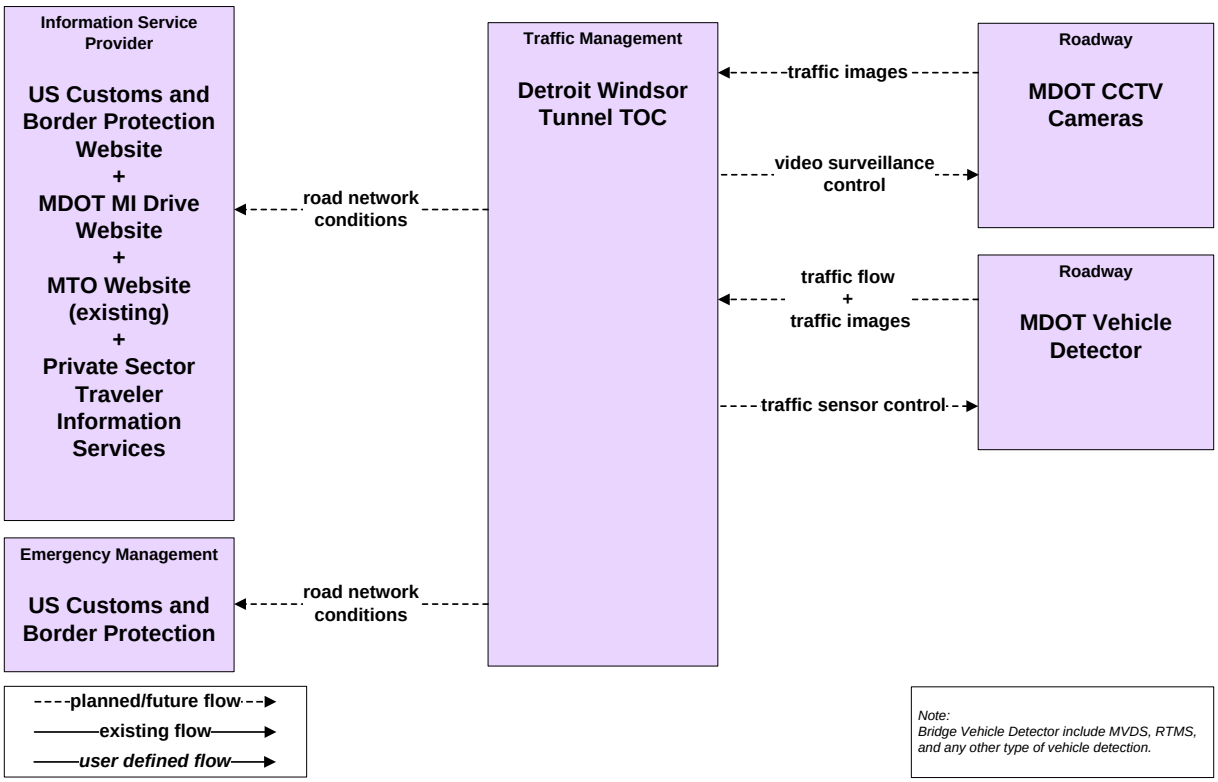


planned/future flow
existing flow
user defined flow

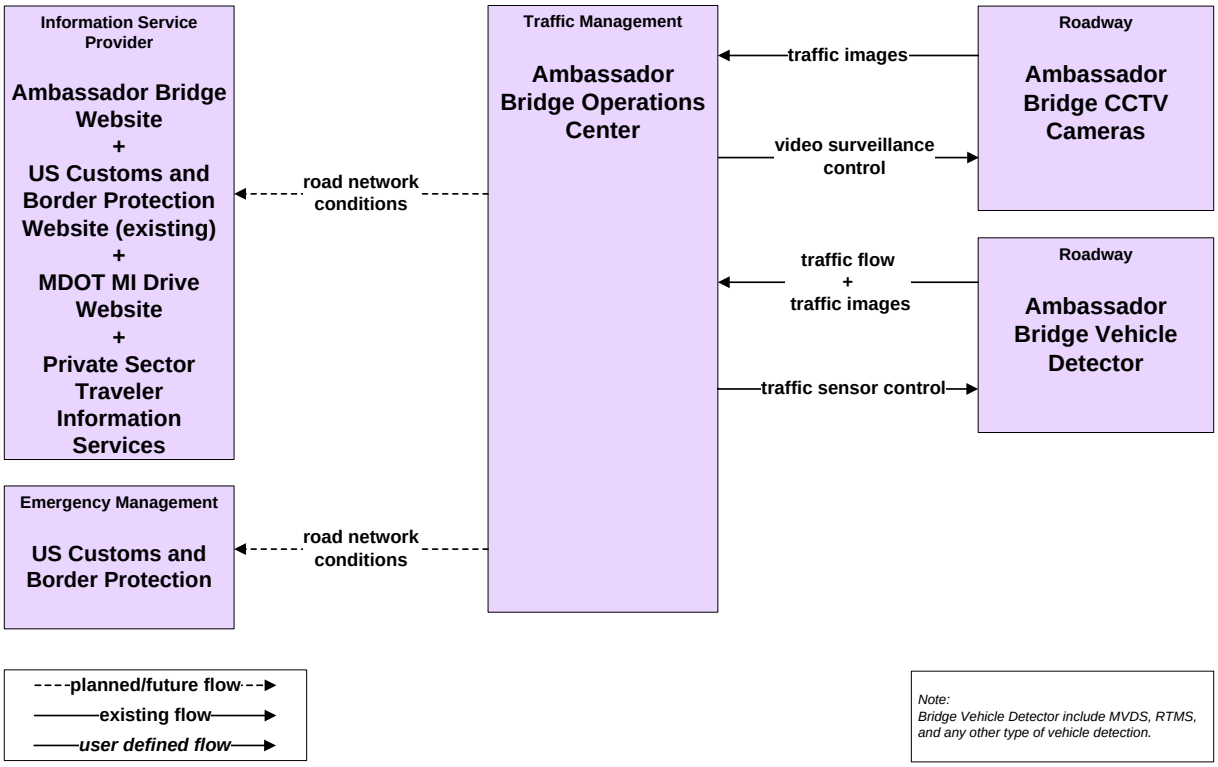
ATMS01 – Network Surveillance
MDOT Blue Water Bridge



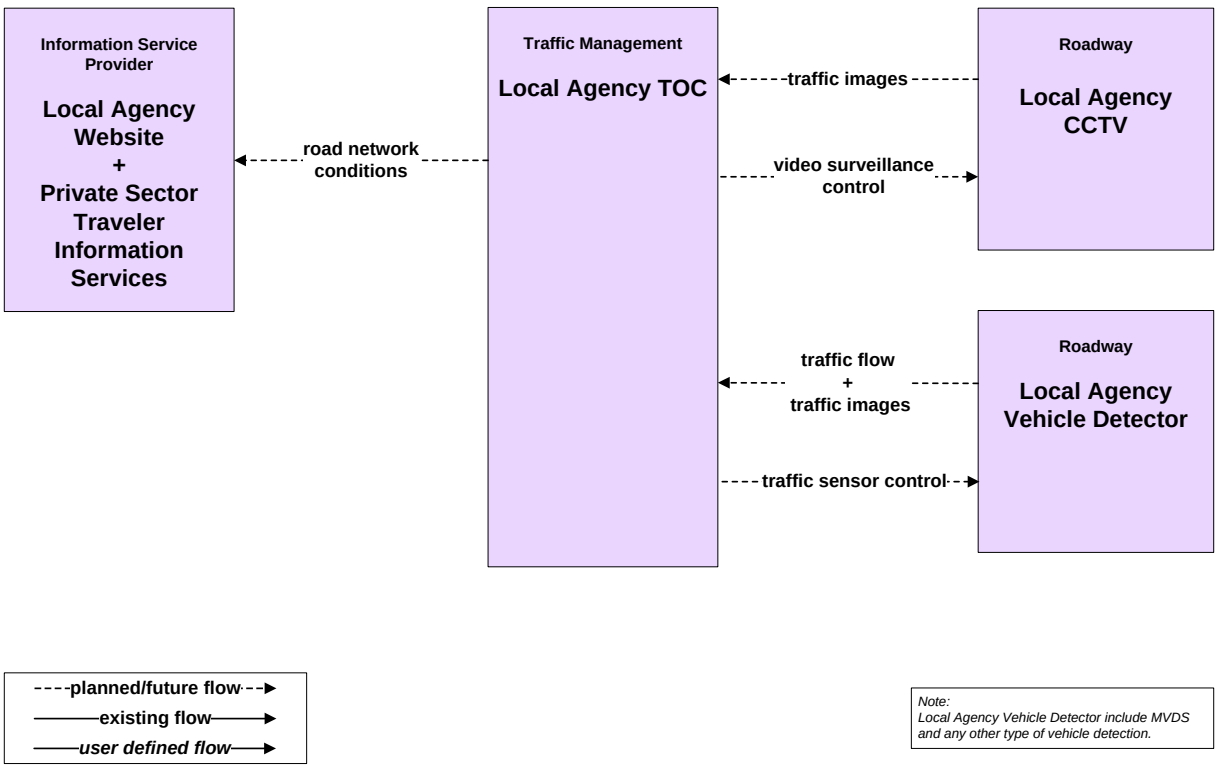
ATMS01 – Network Surveillance
Detroit Windsor Tunnel



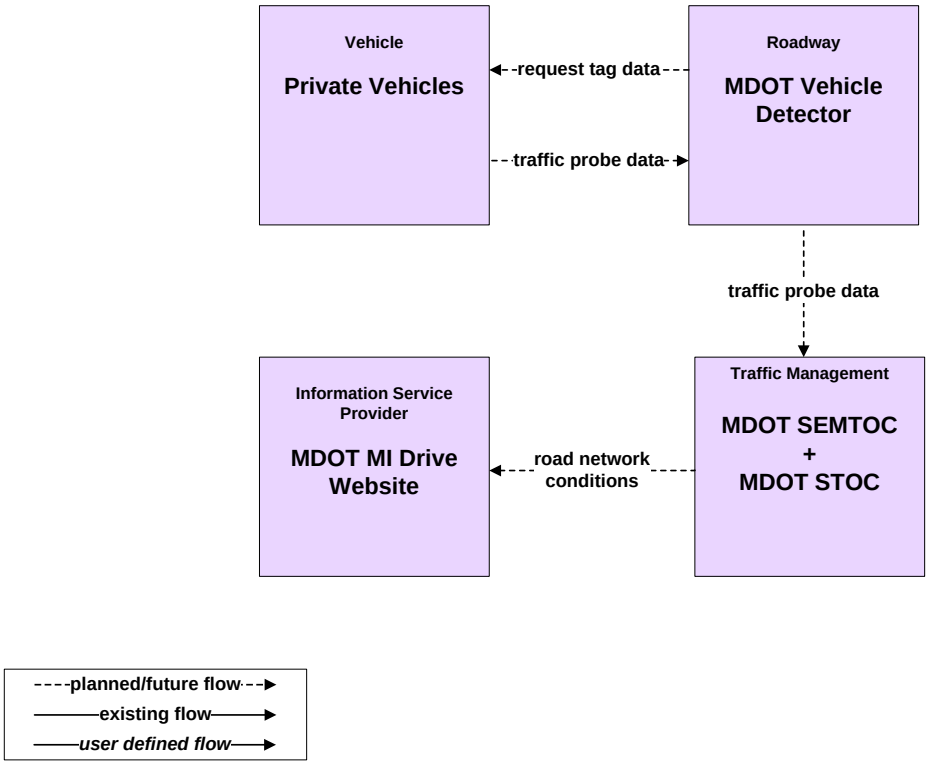
ATMS01 – Network Surveillance
Ambassador Bridge Authority



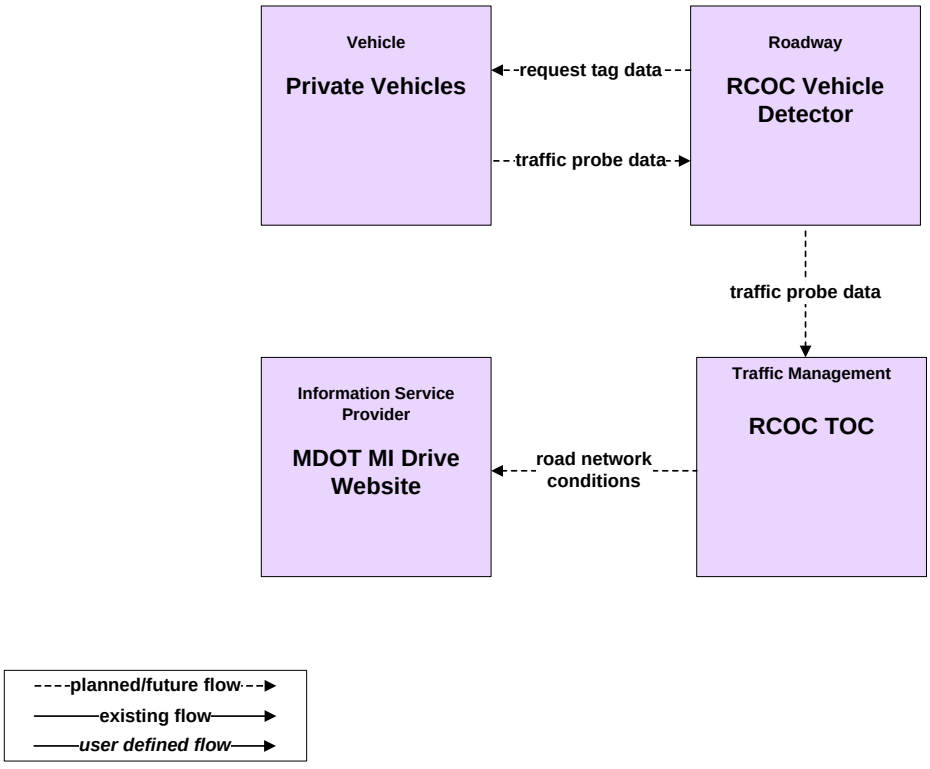
ATMS01 – Network Surveillance
Local Agency



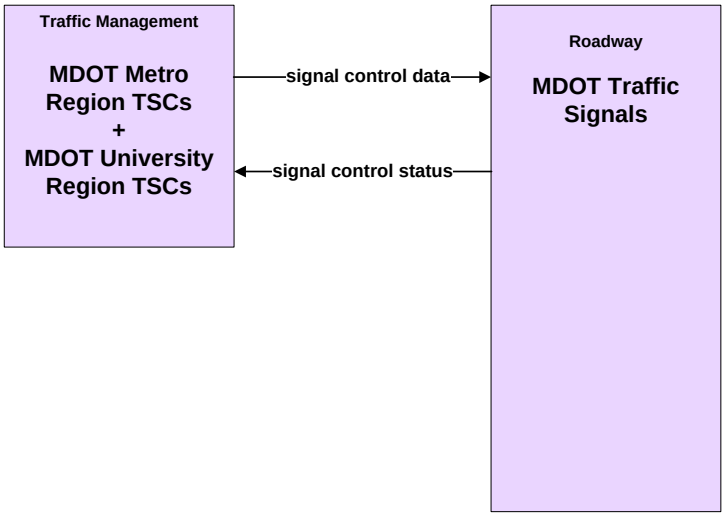
ATMS02 – Probe Surveillance
MDOT

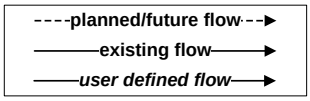


ATMS02 – Probe Surveillance
RCOC

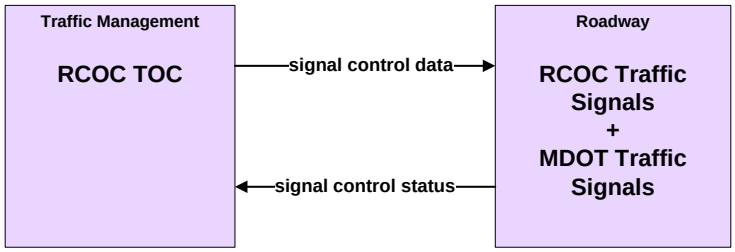


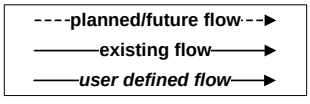
ATMS03 – Traffic Signal Control
MDOT



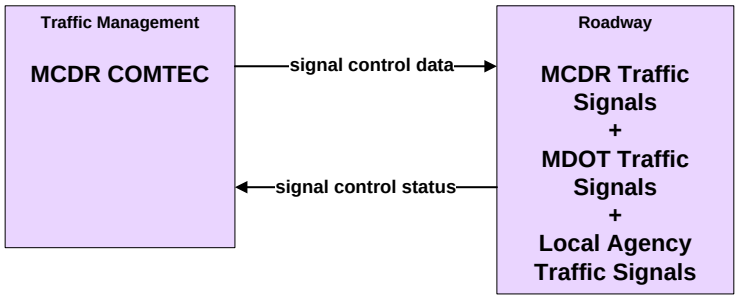


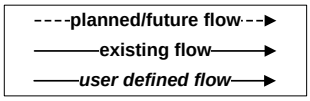
ATMS03 – Traffic Signal Control
RCOC



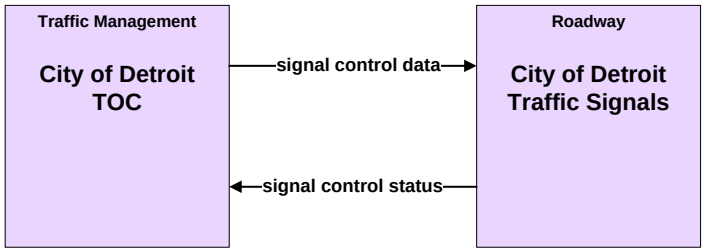


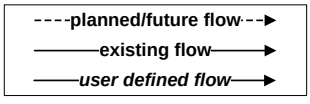
ATMS03 – Traffic Signal Control
MCDR



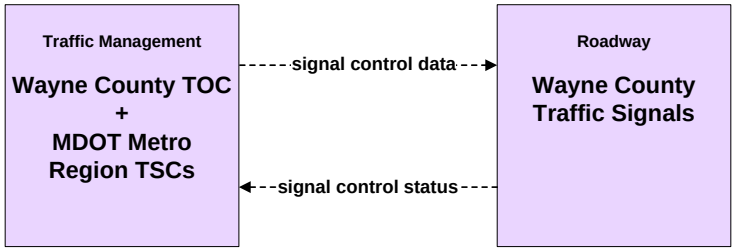


ATMS03 – Traffic Signal Control
City of Detroit





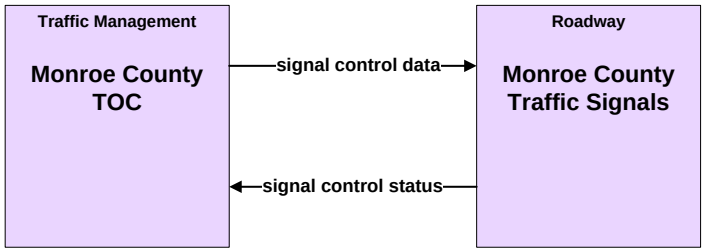
ATMS03 – Traffic Signal Control
Wayne County



planned/future flow
existing flow
user defined flow

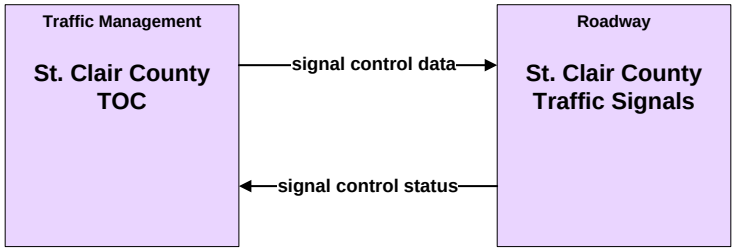
Note:
Detroit and Dearborn are self maintained

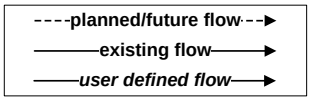
ATMS03 – Traffic Signal Control
Monroe County



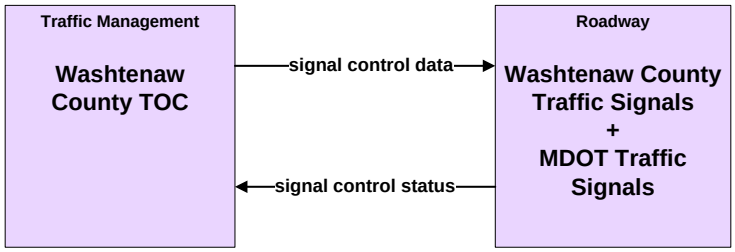
planned/future flow
existing flow
user defined flow

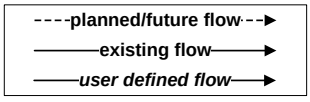
ATMS03 – Traffic Signal Control
St. Clair County



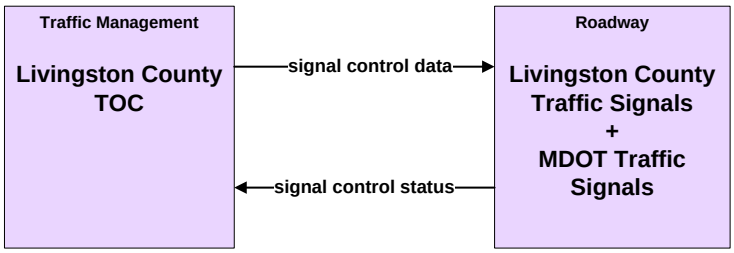


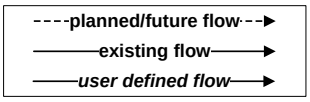
ATMS03 – Traffic Signal Control
Washtenaw County



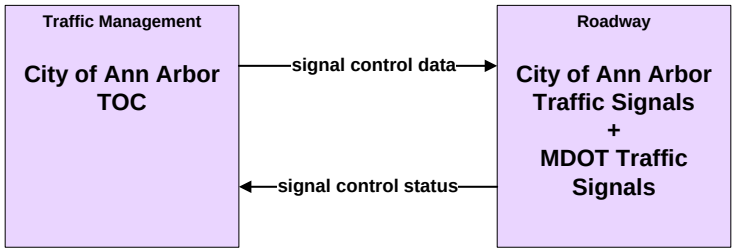


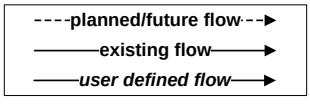
ATMS03 – Traffic Signal Control
Livingston County





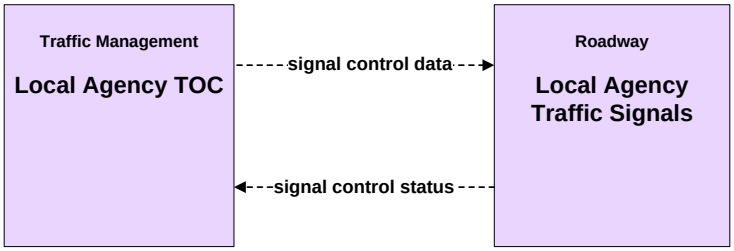
ATMS03 – Traffic Signal Control
City of Ann Arbor





Note:
Regional coordination between MDOT signals and Ann Arbor

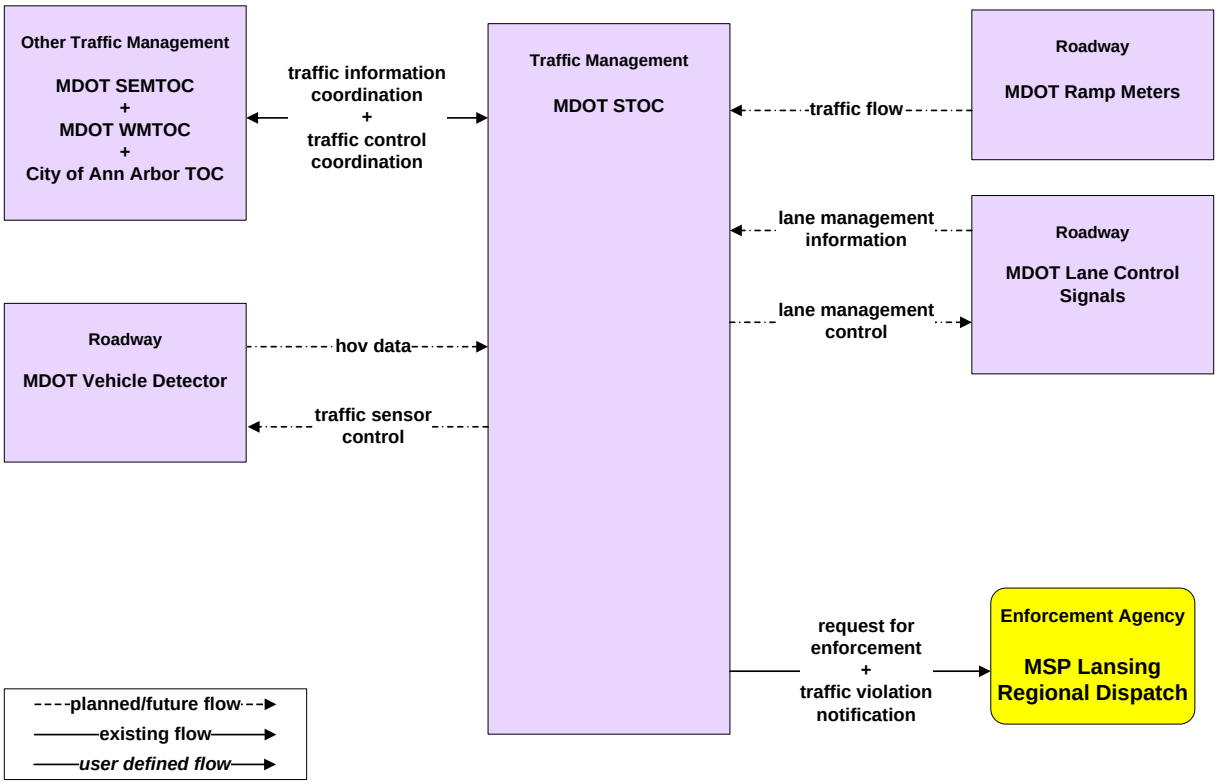
ATMS03 – Traffic Signal Control
Local Agency

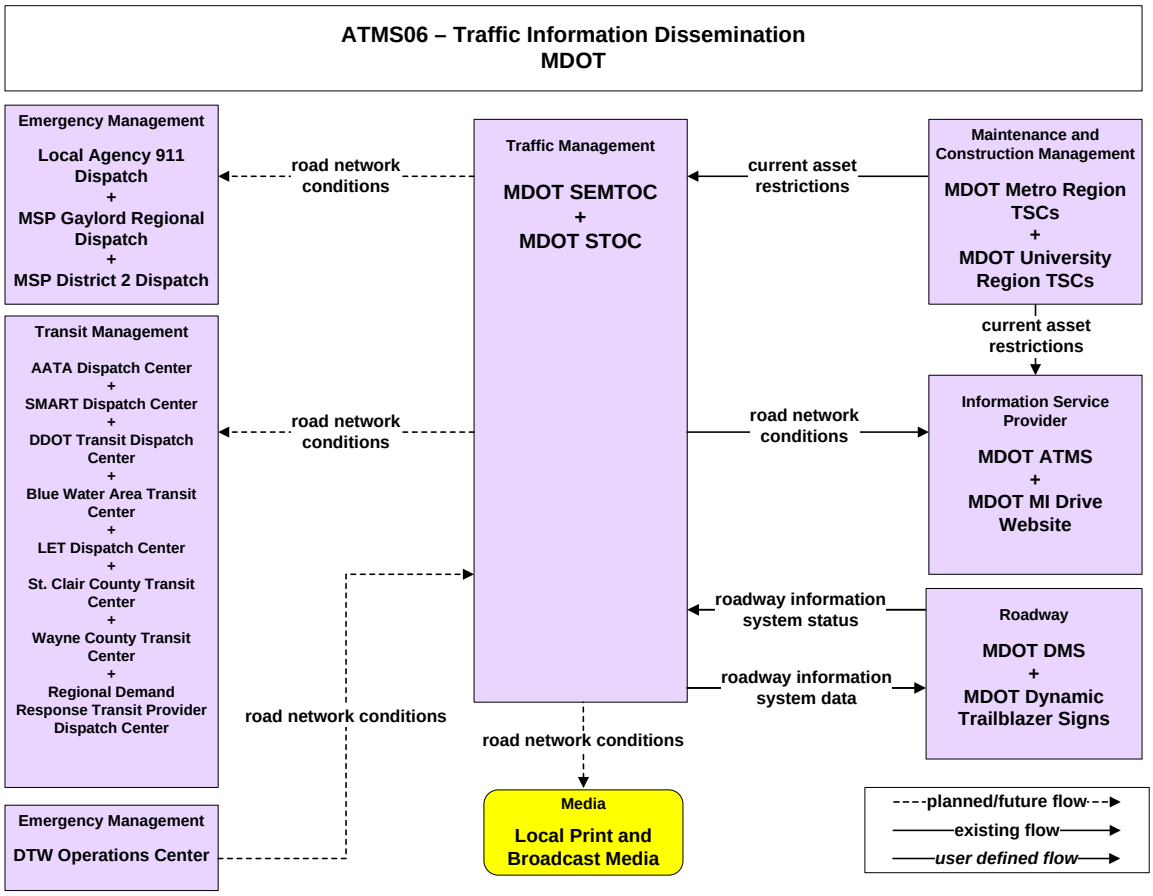


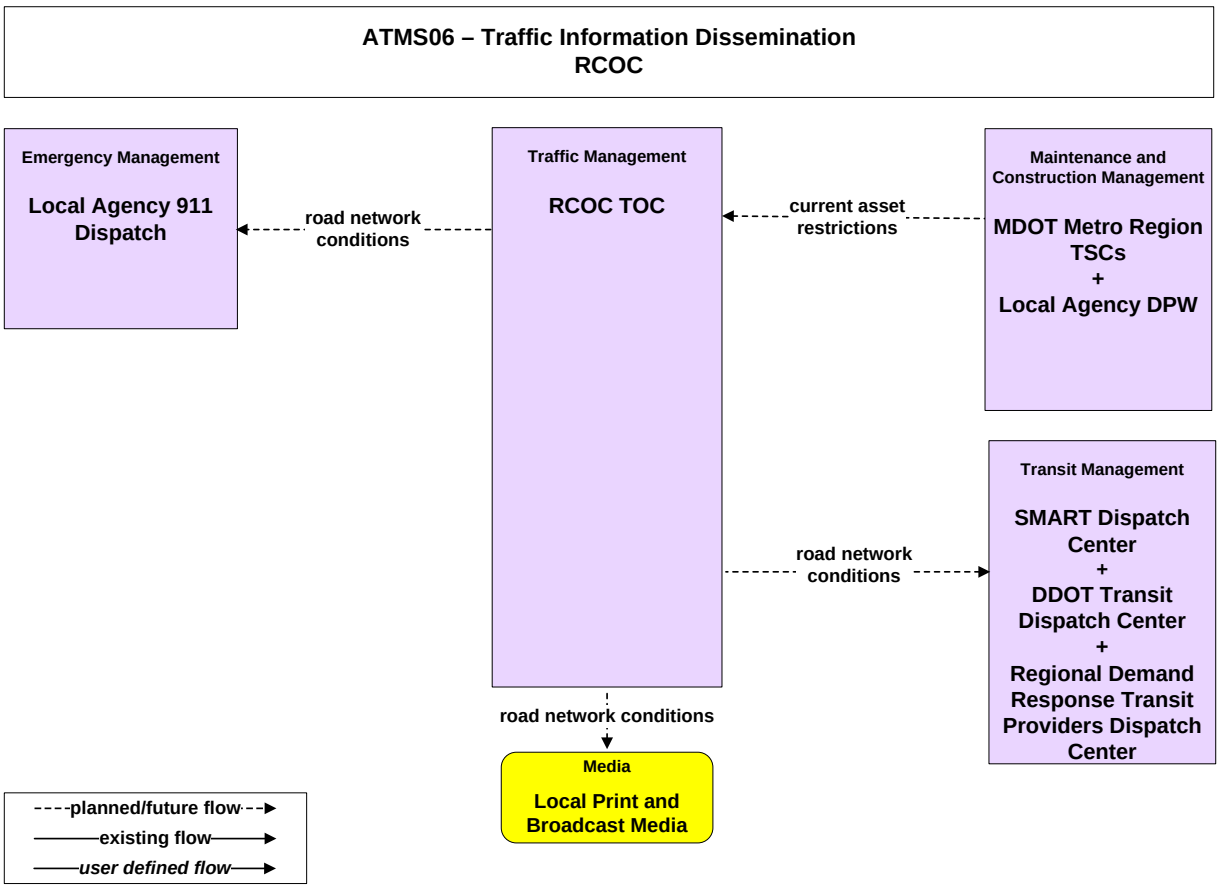
planned/future flow
existing flow
user defined flow

Note: Includes: Ferndale, Pontiac, Holly, Royal Oak, Dearborn

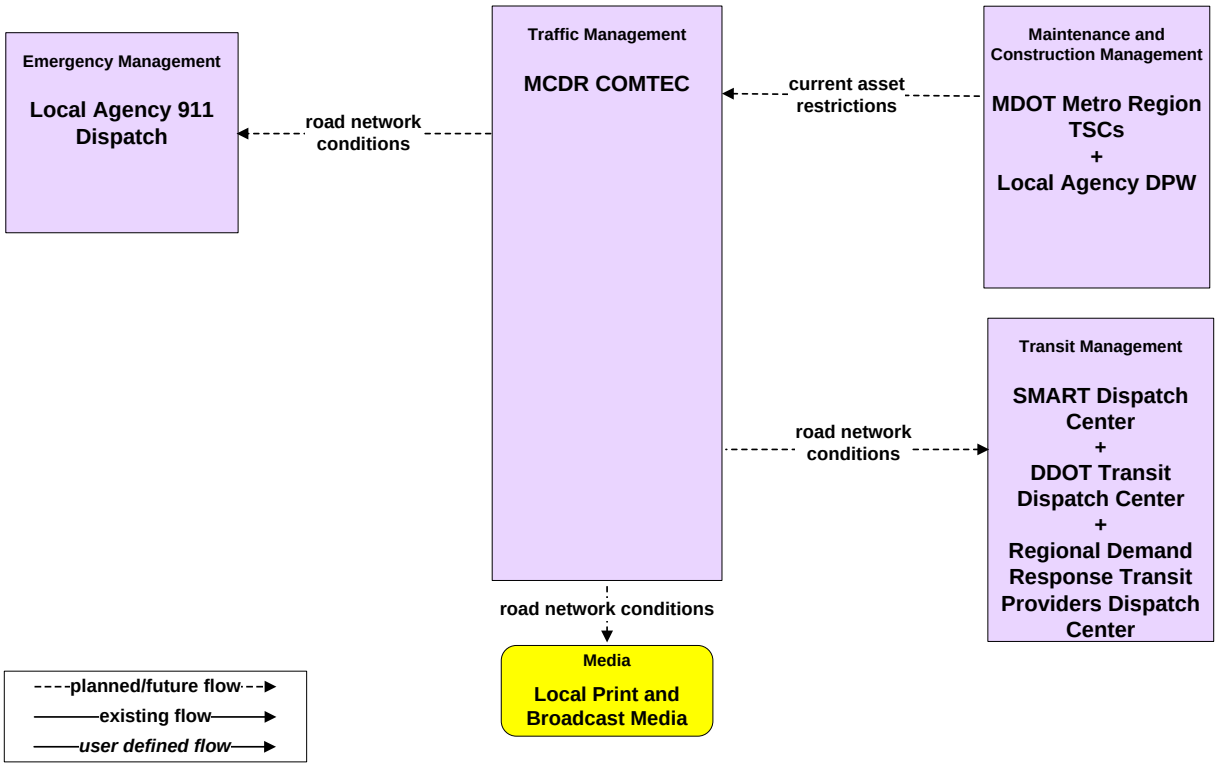
ATMS5 – HOV Lane Management
MDOT



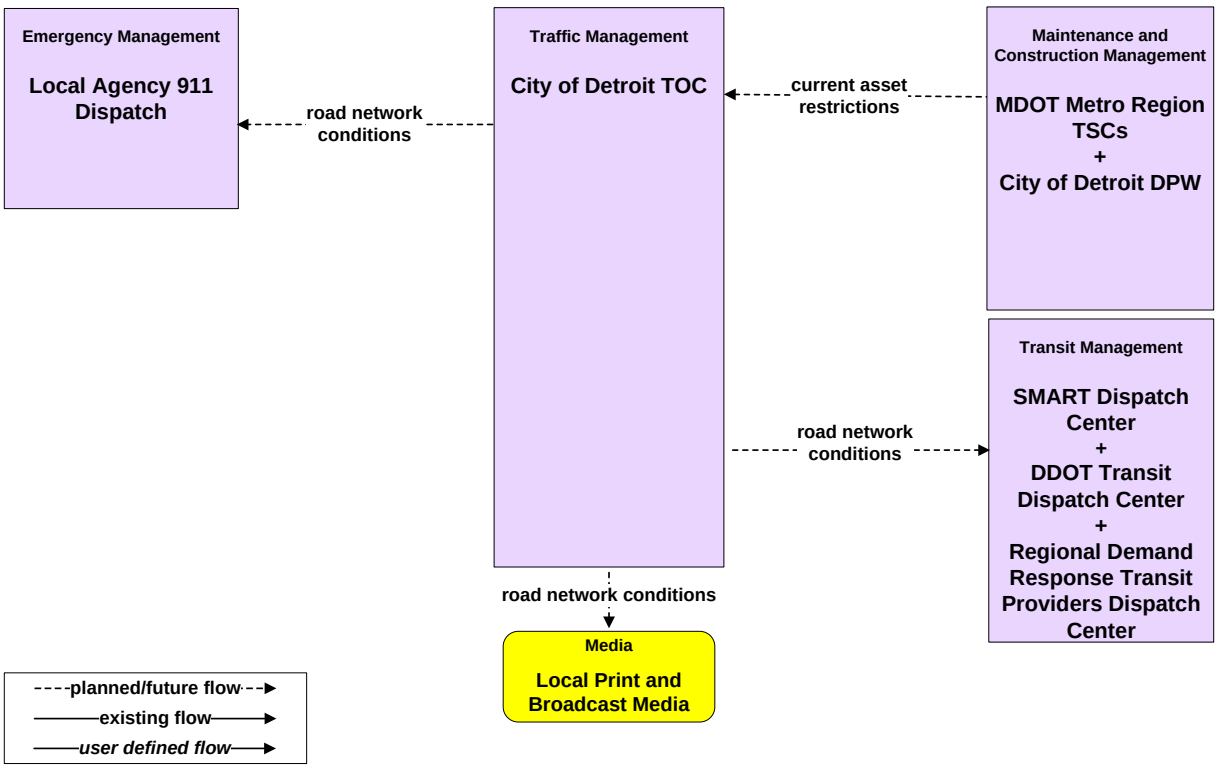

ATMS06 – Traffic Information Dissemination
MDOT
Emergency Management
Local Agency 911 Dispatch
+
MSP Gaylord Regional Dispatch
+
MSP District 2 Dispatch
road network conditions
Traffic Management
MDOT SEMTOC
+
MDOT STOC
current asset restrictions
Maintenance and Construction Management
MDOT Metro Region TSCs
+
MDOT University Region TSCs
current asset restrictions
Transit Management
AATA Dispatch Center
+
SMART Dispatch Center
+
DDOT Transit Dispatch Center
+
Blue Water Area Transit Center
+
LET Dispatch Center
+
St. Clair County Transit Center
+
Wayne County Transit Center
+
Regional Demand Response Transit Provider Dispatch Center
road network conditions
road network conditions
Information Service Provider
MDOT ATMS
+
MDOT MI Drive Website
roadway information system status
roadway information system data
Roadway
MDOT DMS
+
MDOT Dynamic Trailblazer Signs
road network conditions
road network conditions
Emergency Management
DTW Operations Center
Media
Local Print and Broadcast Media
planned/future flow
existing flow
user defined flow


ATMS06 – Traffic Information Dissemination
RCOC
Emergency Management
Local Agency 911 Dispatch
road network conditions
Traffic Management
RCOC TOC
current asset restrictions
Maintenance and Construction Management
MDOT Metro Region TSCs
+
Local Agency DPW
Transit Management
SMART Dispatch Center
+
DDOT Transit Dispatch Center
+
Regional Demand Response Transit Providers Dispatch Center
road network conditions
road network conditions
Media
Local Print and Broadcast Media
planned/future flow
existing flow
user defined flow

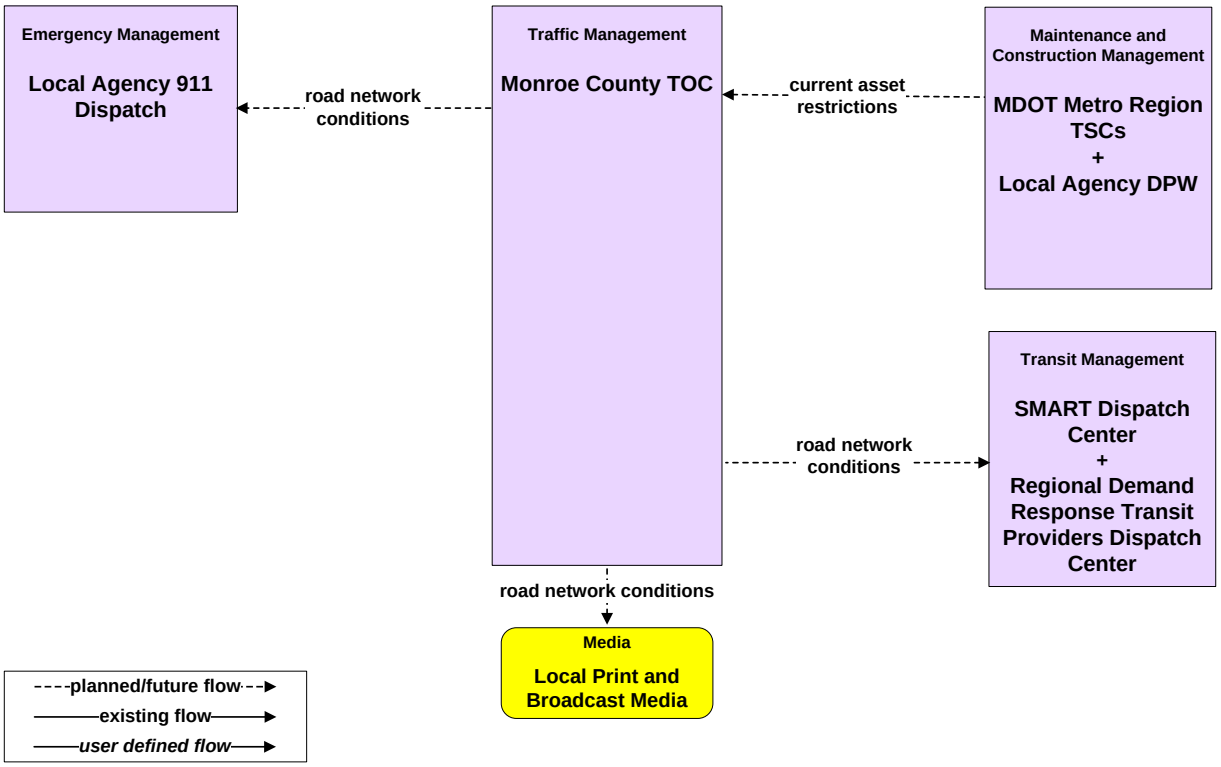
ATMS06 – Traffic Information Dissemination
MCDR



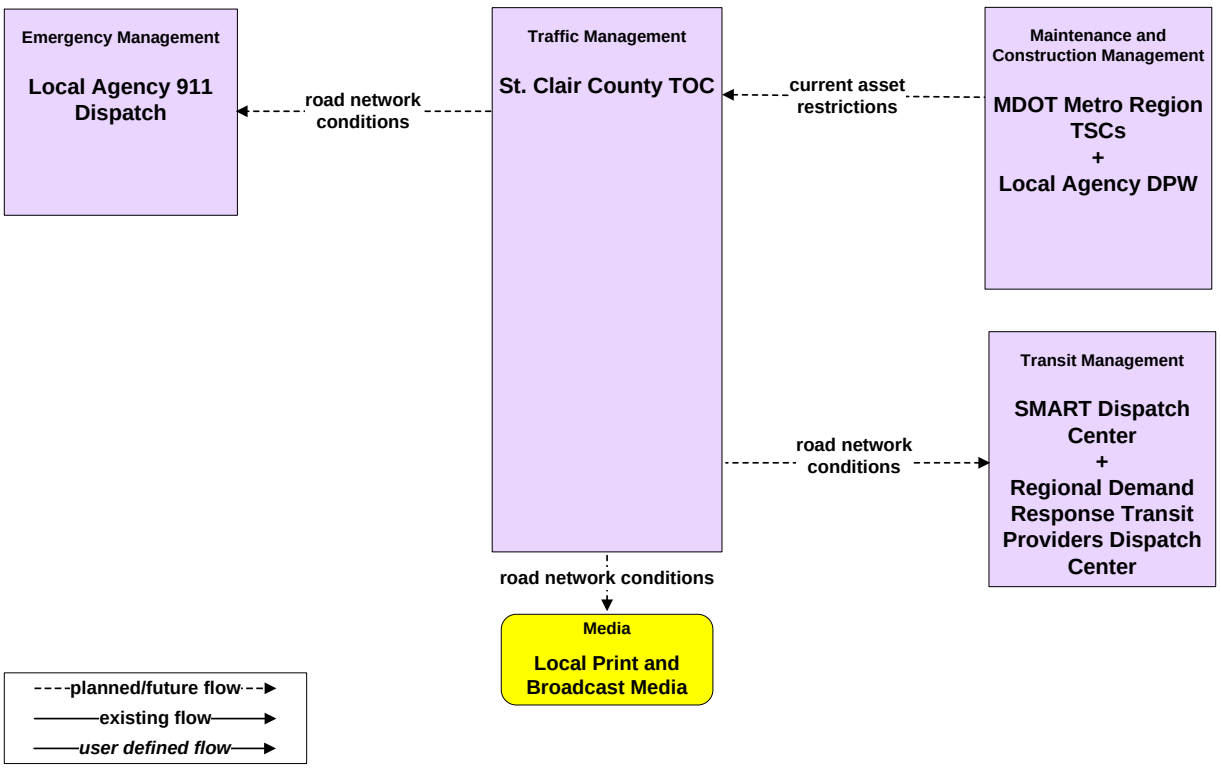
ATMS06 – Traffic Information Dissemination
City of Detroit



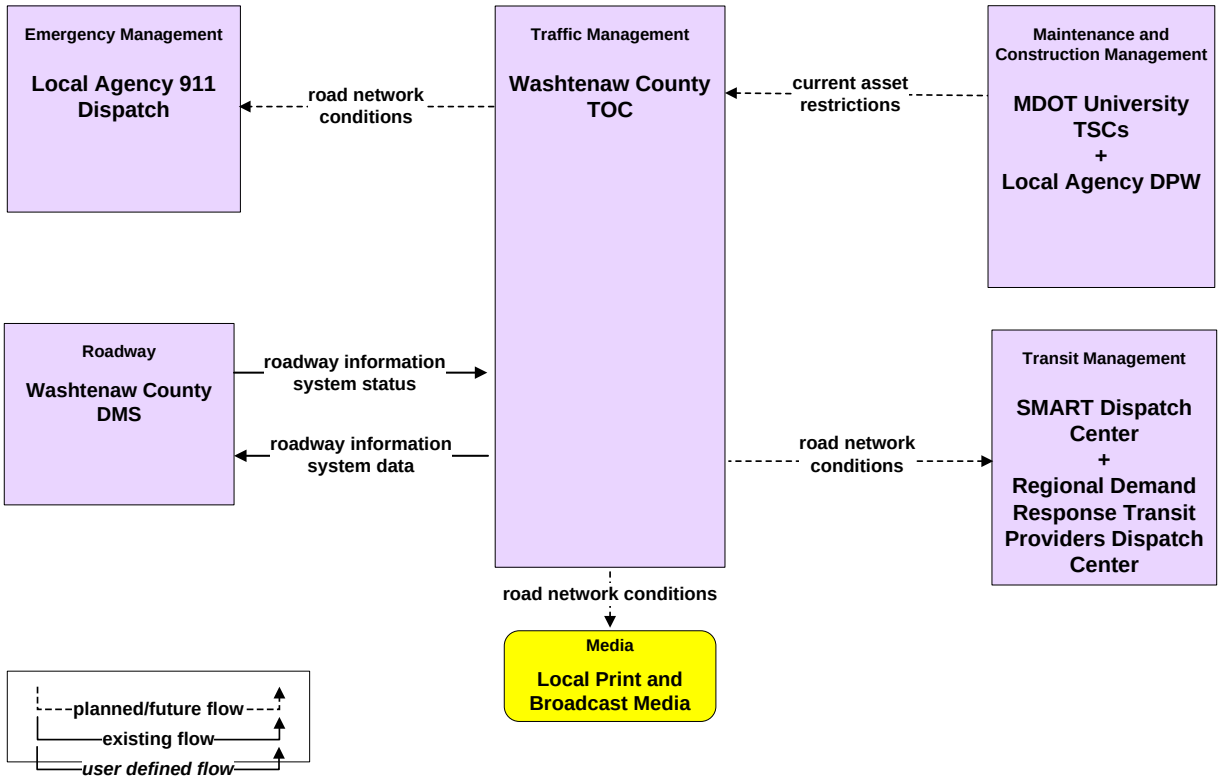
ATMS06 – Traffic Information Dissemination
Monroe County



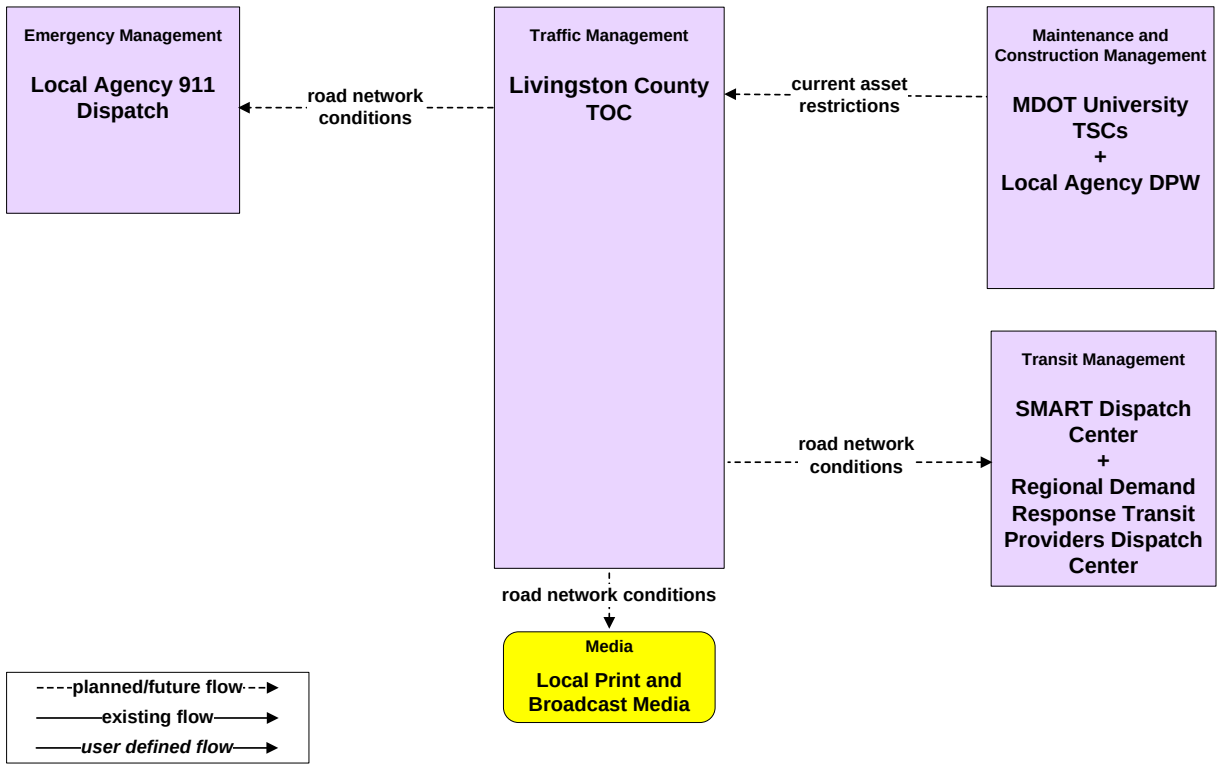
ATMS06 – Traffic Information Dissemination
St. Clair County



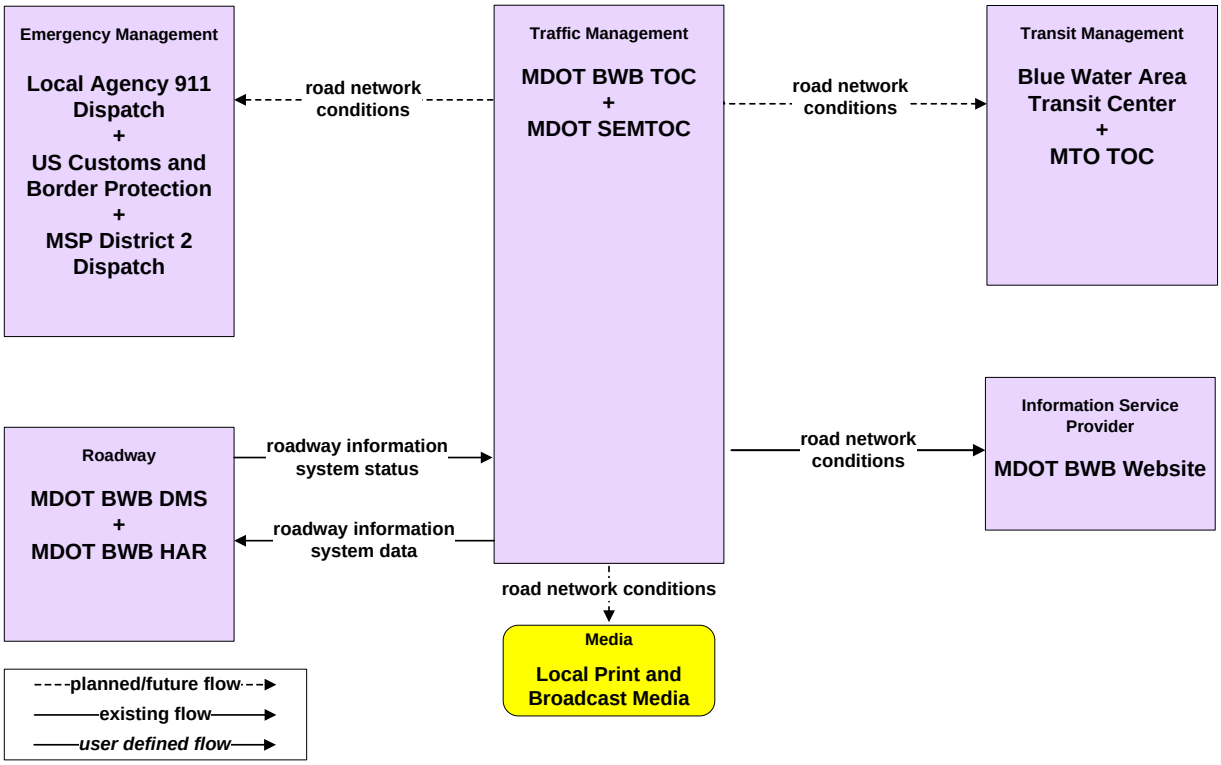
ATMS06 – Traffic Information Dissemination
Washtenaw County



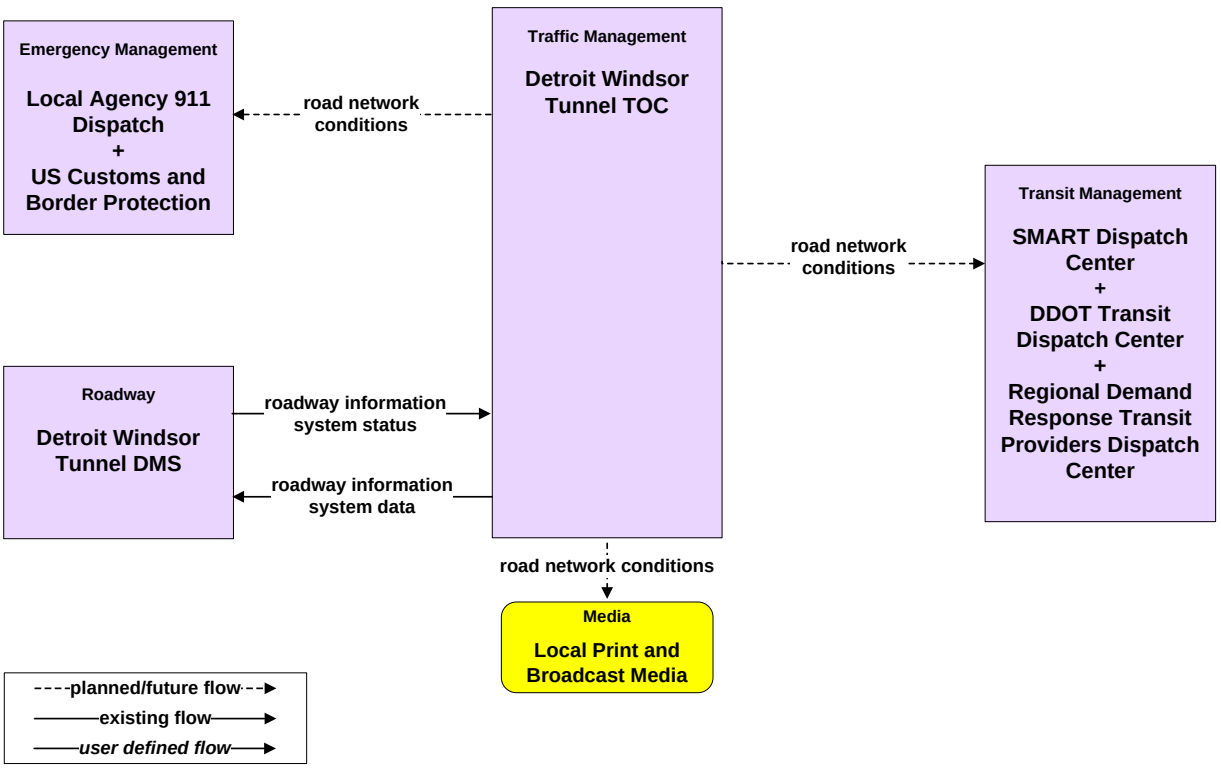
ATMS06 – Traffic Information Dissemination
Livingston County



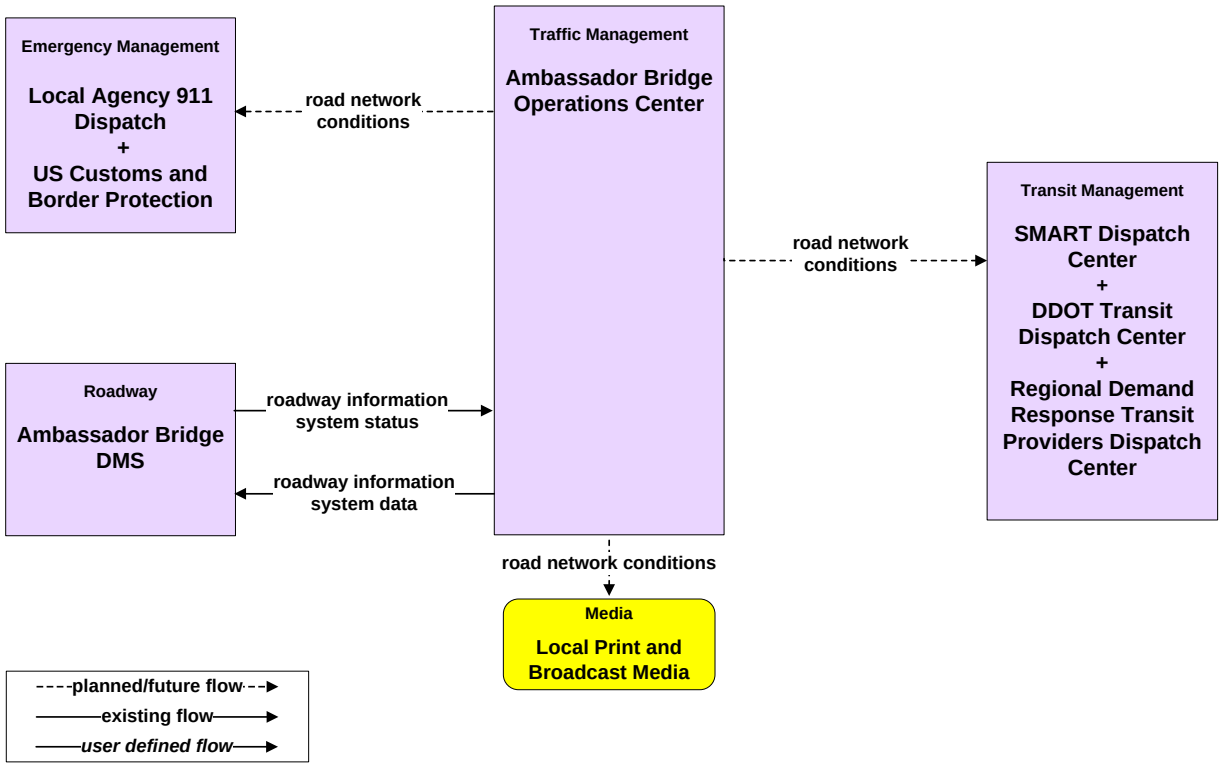
ATMS06 – Traffic Information Dissemination
MDOT Blue Water Bridge (BWB)



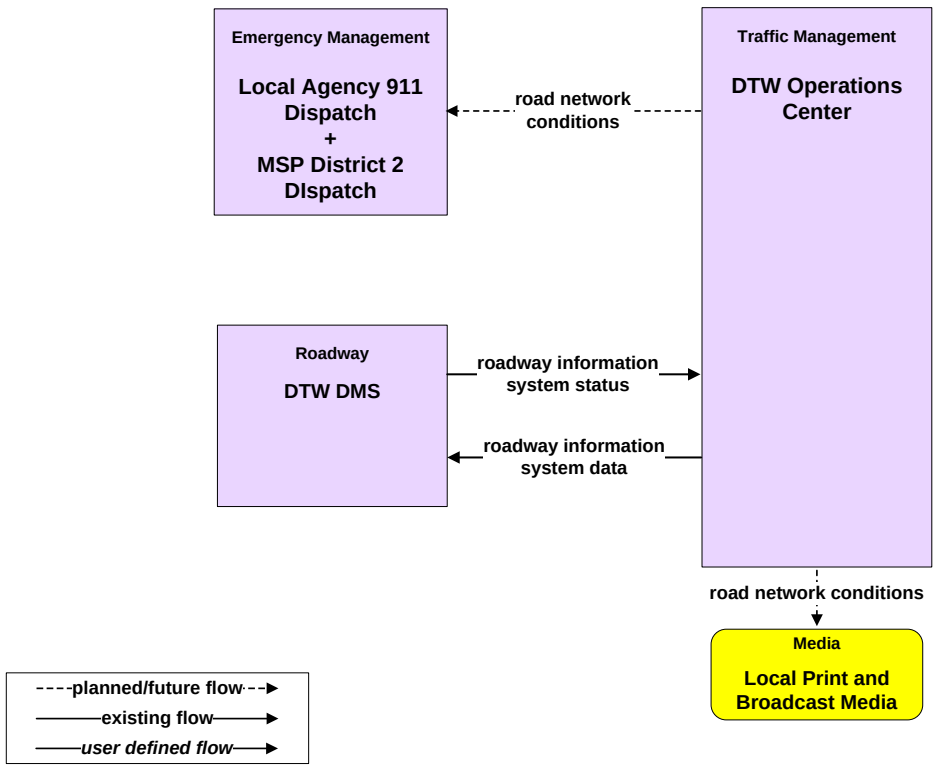
ATMS06 – Traffic Information Dissemination
Detroit Windsor Tunnel



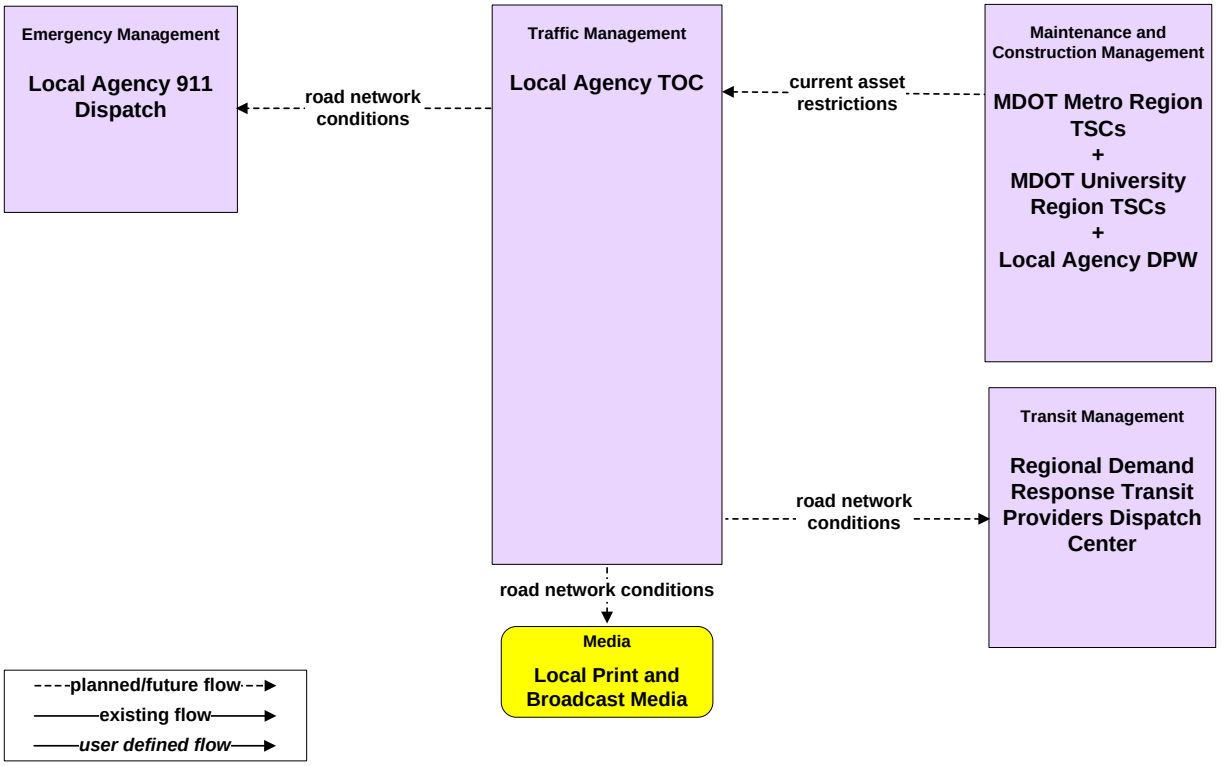
ATMS06 – Traffic Information Dissemination
Ambassador Bridge



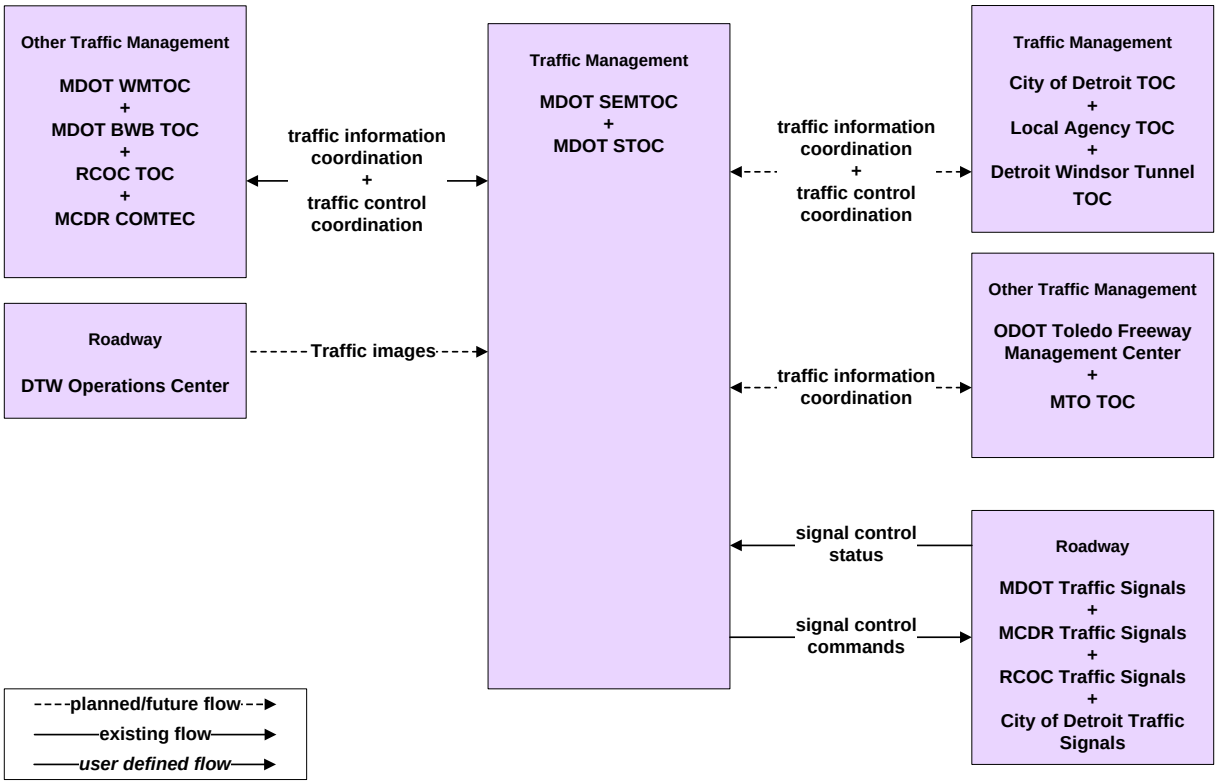
ATMS06 – Traffic Information Dissemination
DTW



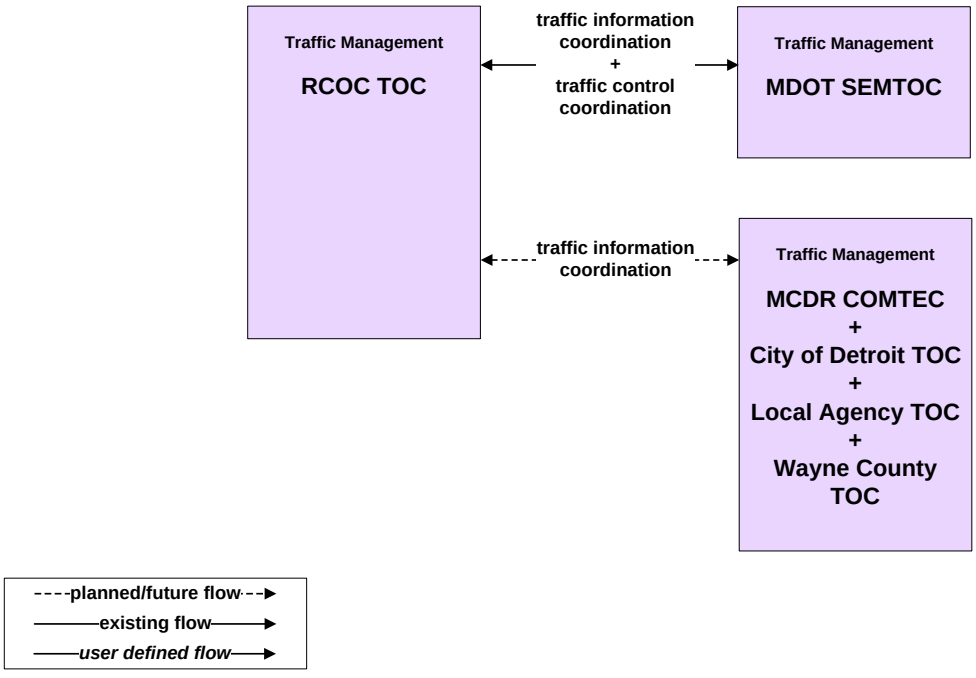
ATMS06 – Traffic Information Dissemination
Local Agency



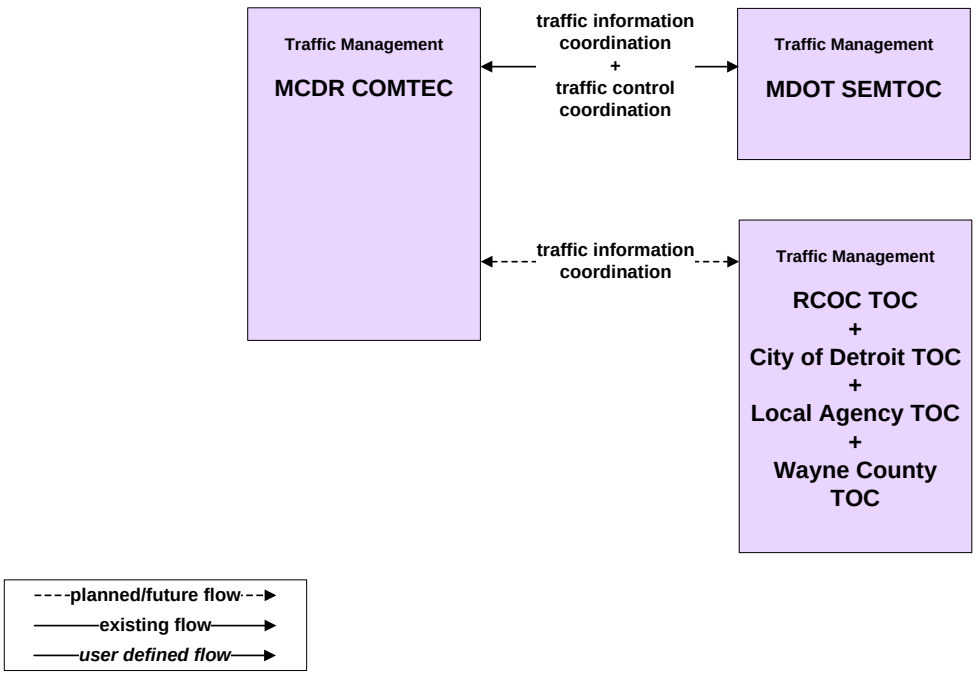
ATMS07 - Regional Traffic Management
MDOT



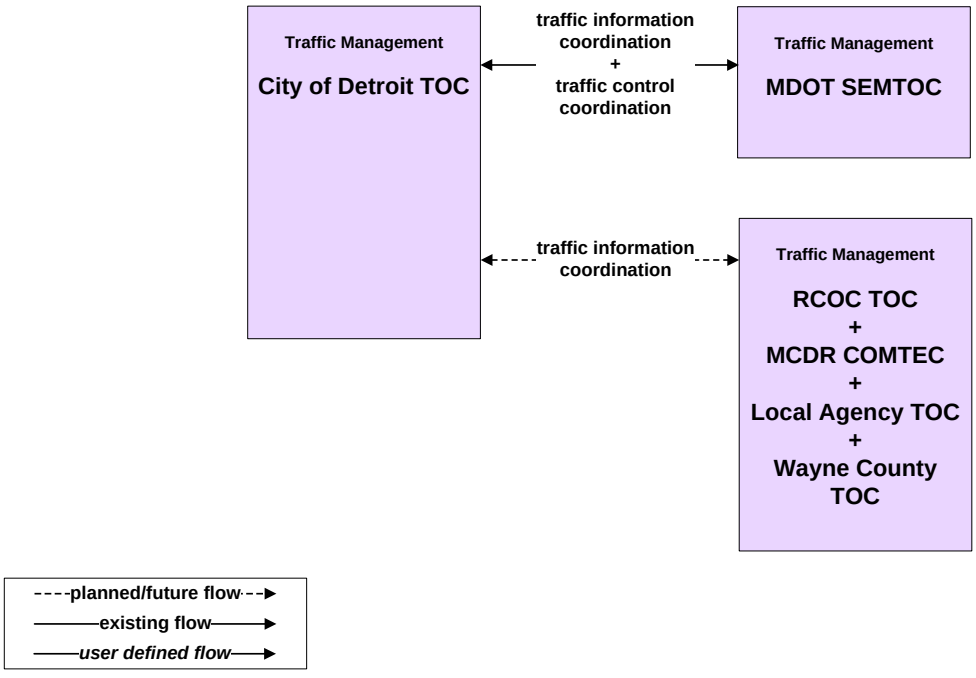
ATMS07 - Regional Traffic Management
RCOC



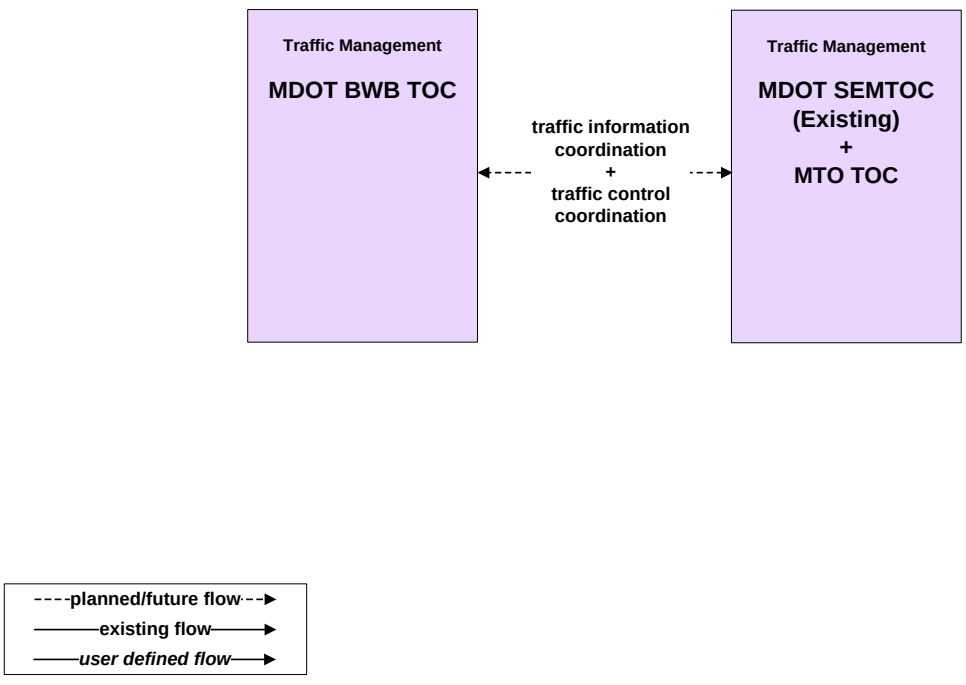
ATMS07 - Regional Traffic Management
MCDR



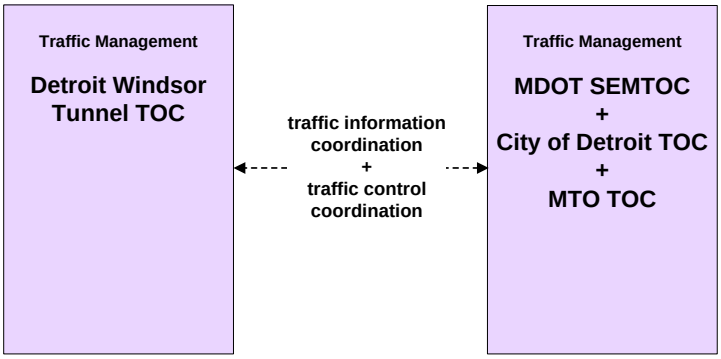
ATMS07 - Regional Traffic Management
City of Detroit

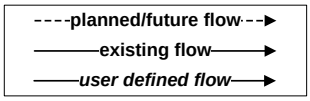


ATMS07 - Regional Traffic Management
MDOT Blue Water Bridge

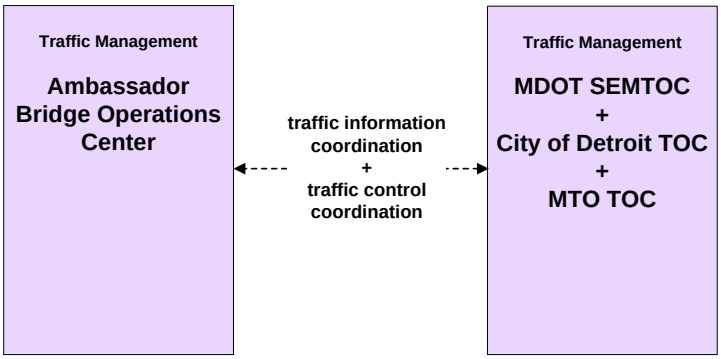


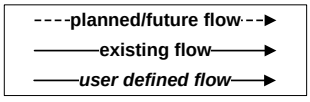
ATMS07 - Regional Traffic Management
Detroit Windsor Tunnel



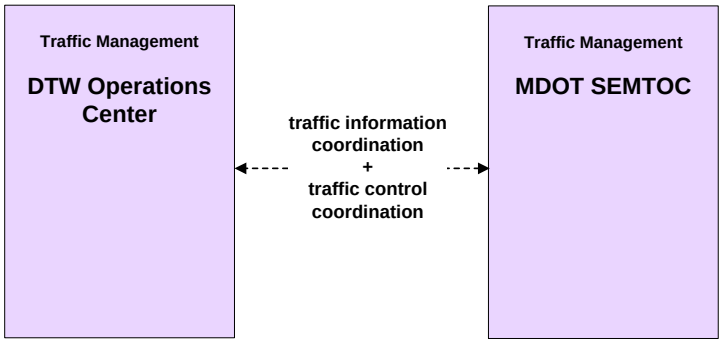


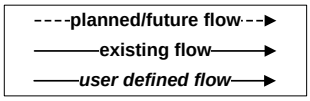
ATMS07 - Regional Traffic Management
Ambassador Bridge



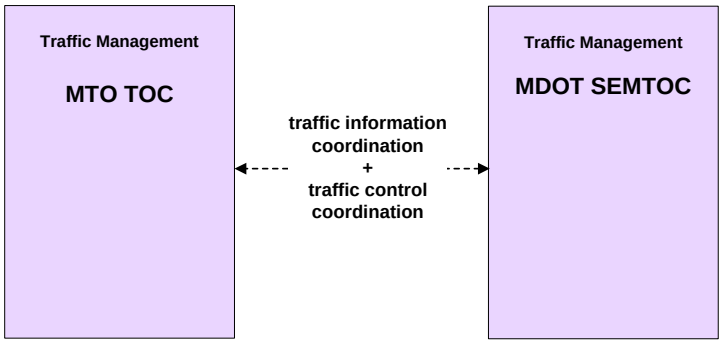


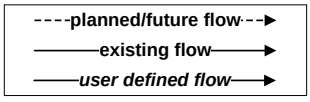
ATMS07 - Regional Traffic Management
DTW Operations Center



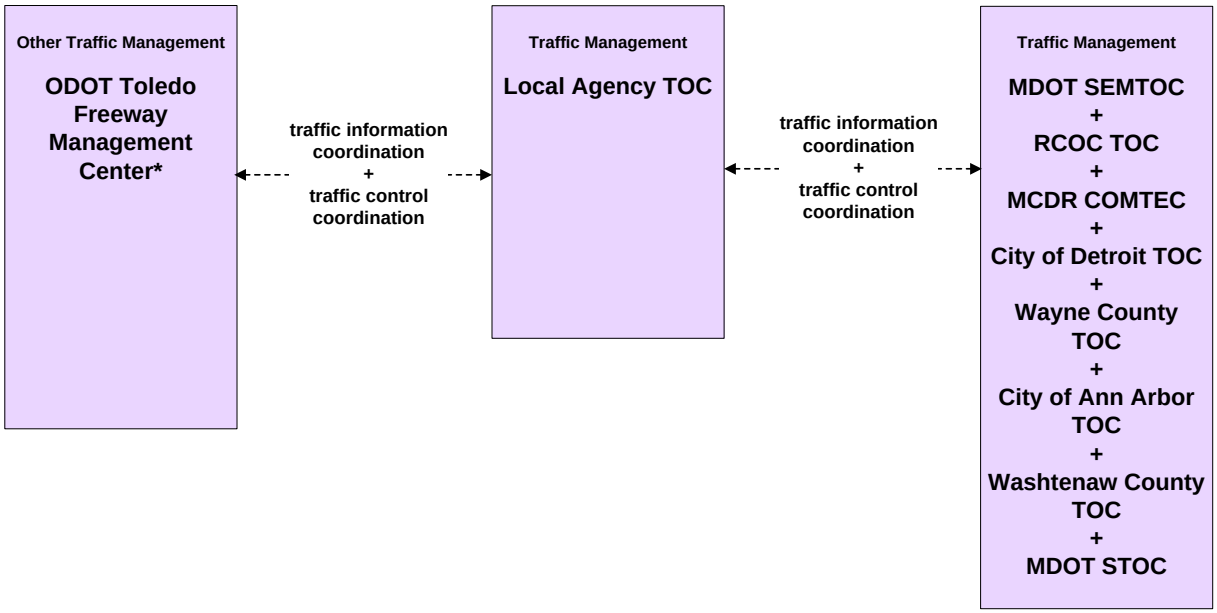


ATMS07 - Regional Traffic Management
Province of Ontario Ministry of Transportation (MTO)





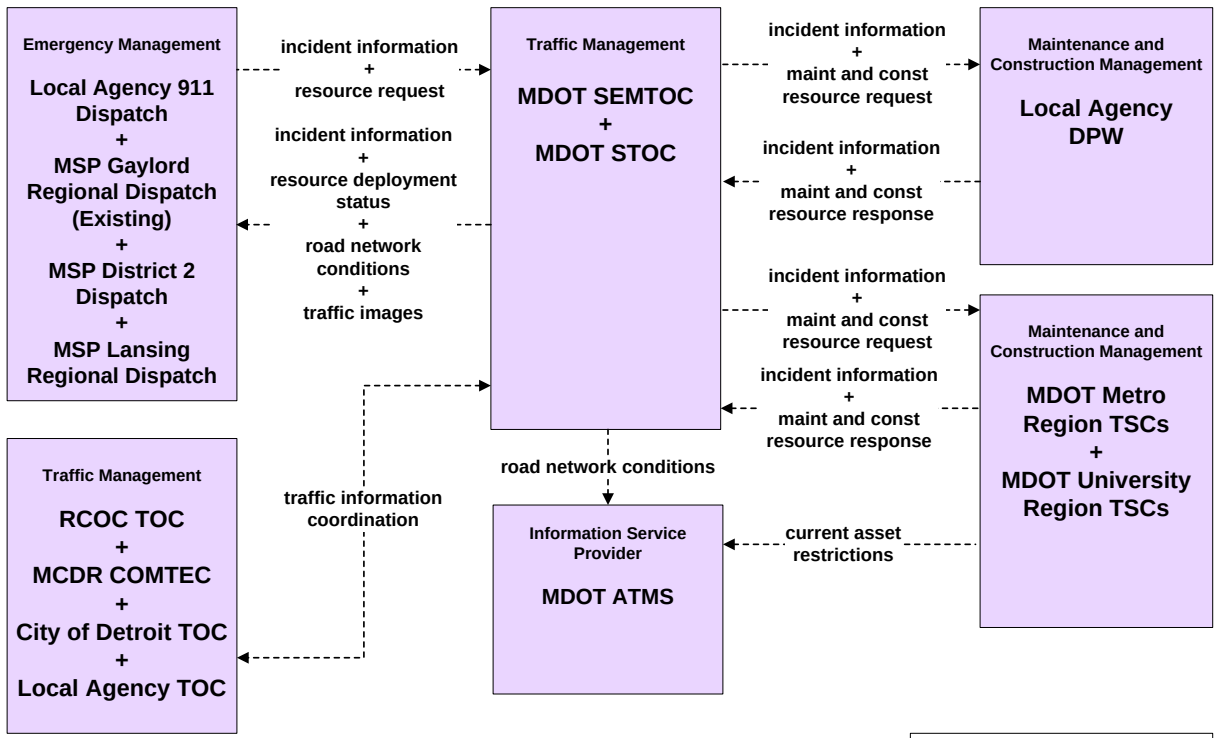
ATMS07 - Regional Traffic Management
Local Agency



planned/future flow
existing flow
user defined flow

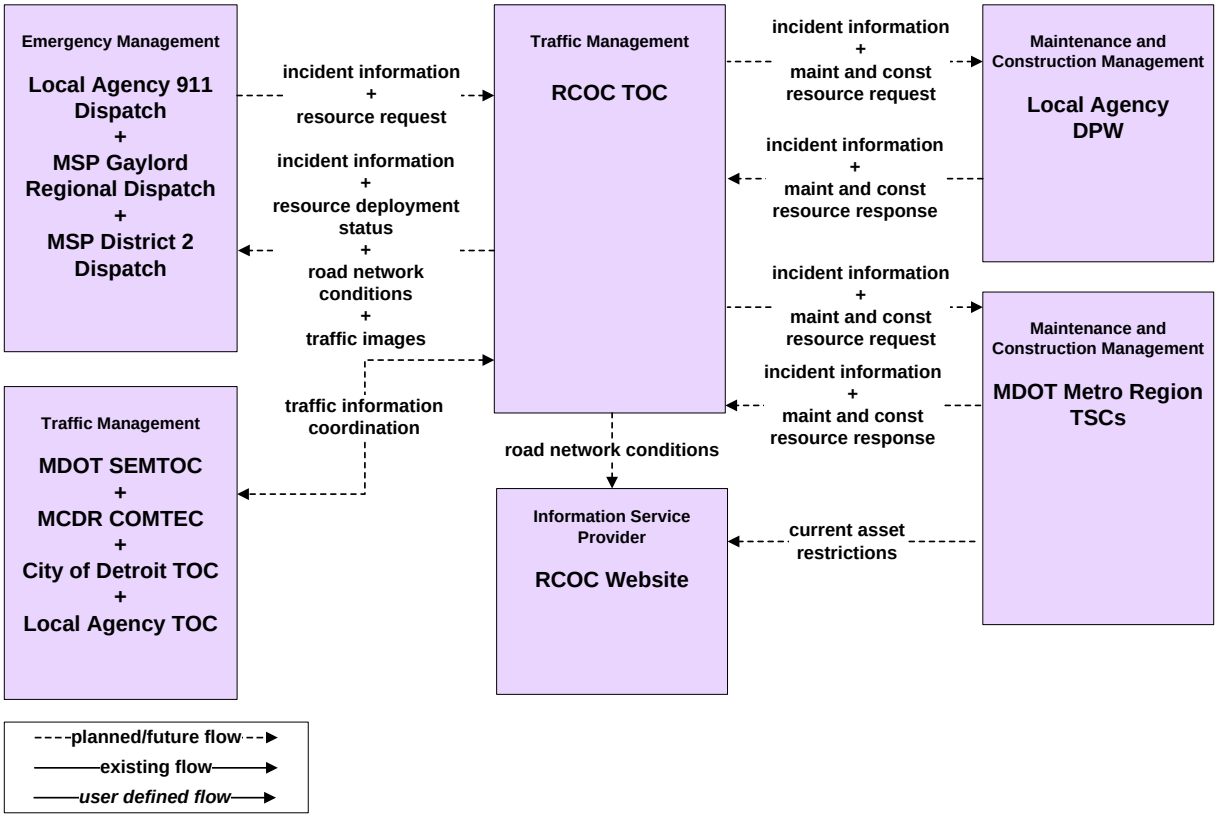
Note:
** Planned Interconnect with MDOT University Region from Toledo Metro Area Region ITS Architecture*

ATMS08 – Incident Management
MDOT

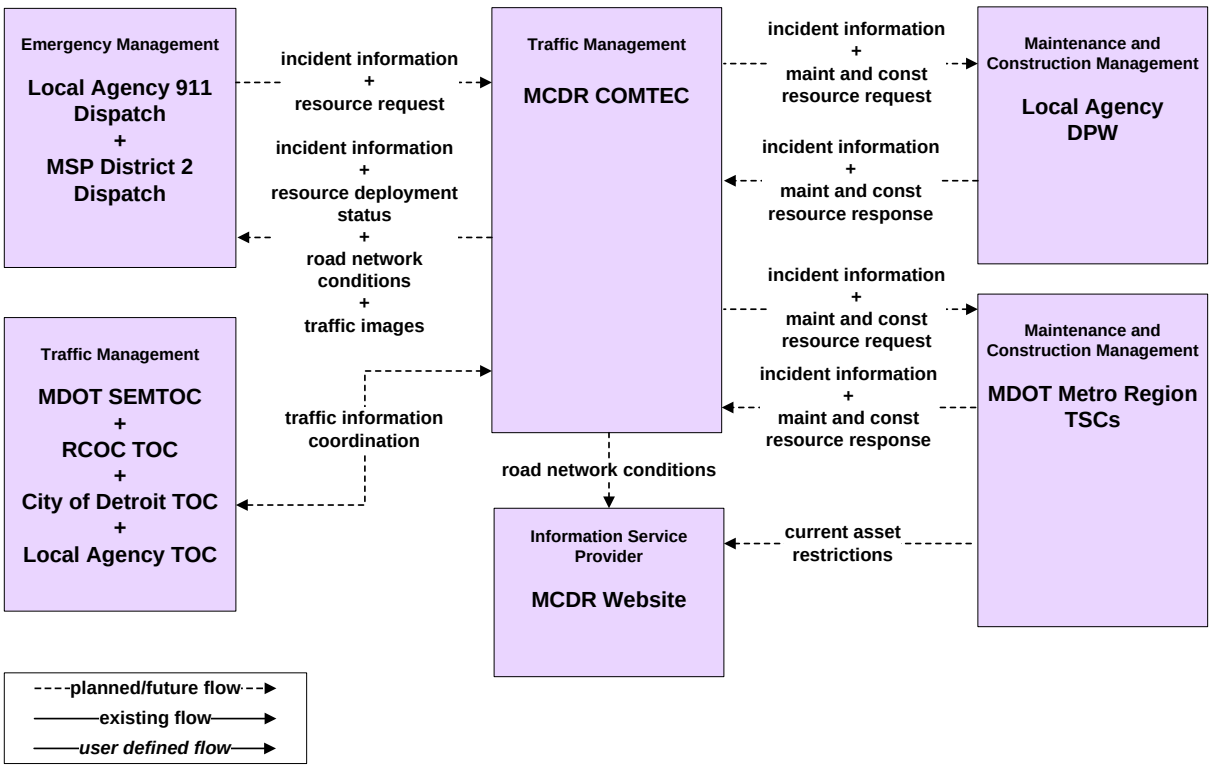


planned/future flow
existing flow
user defined flow

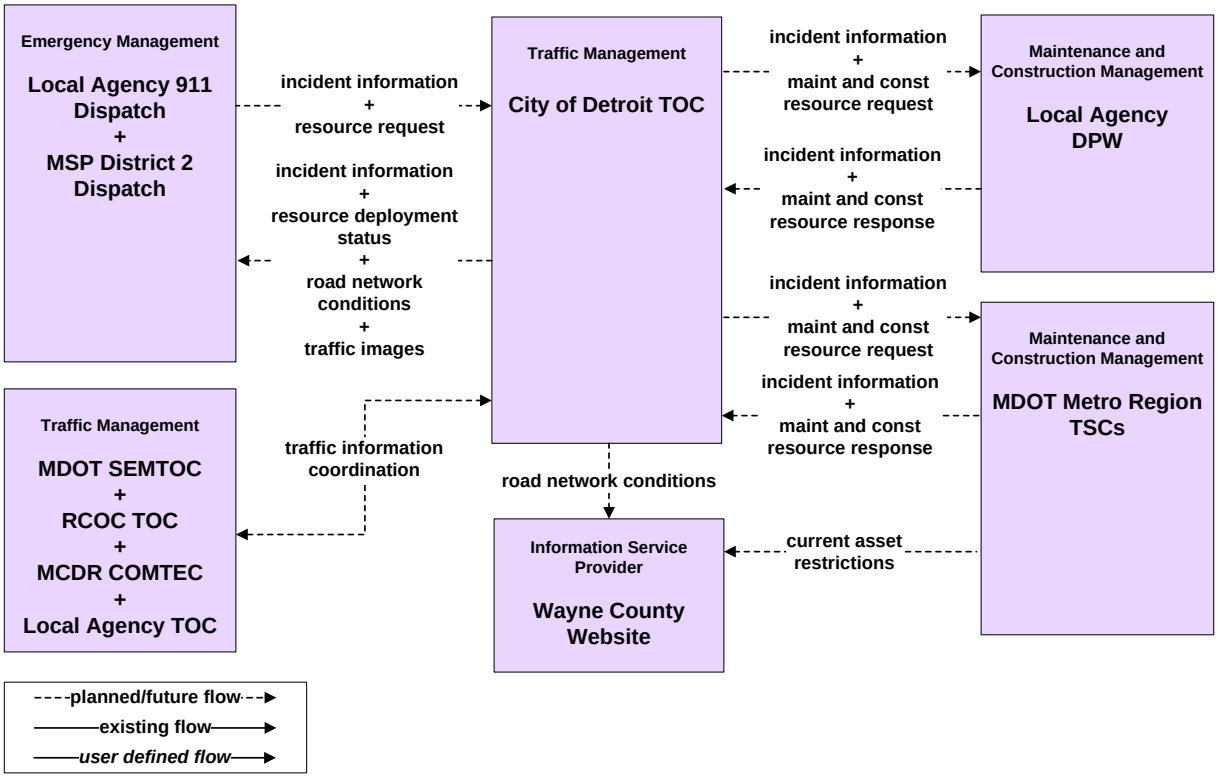
ATMS08 – Incident Management
RCOC



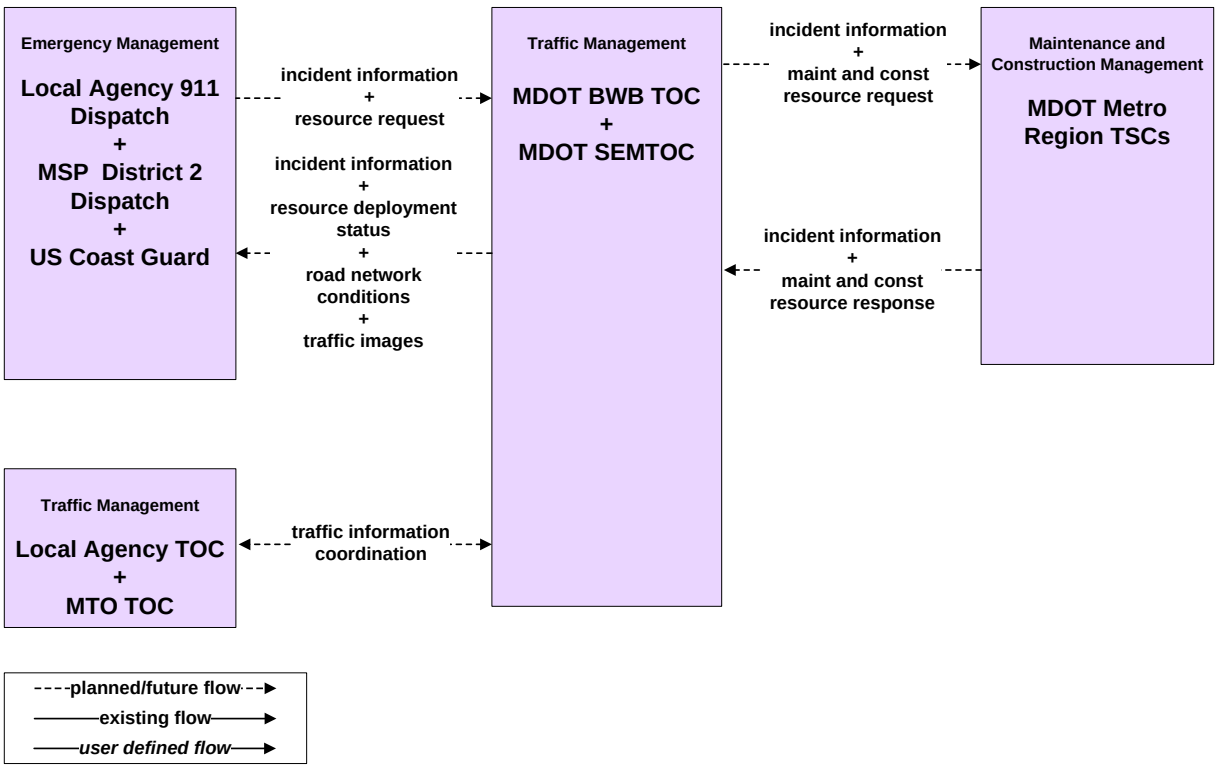
ATMS08 – Incident Management
MCDR



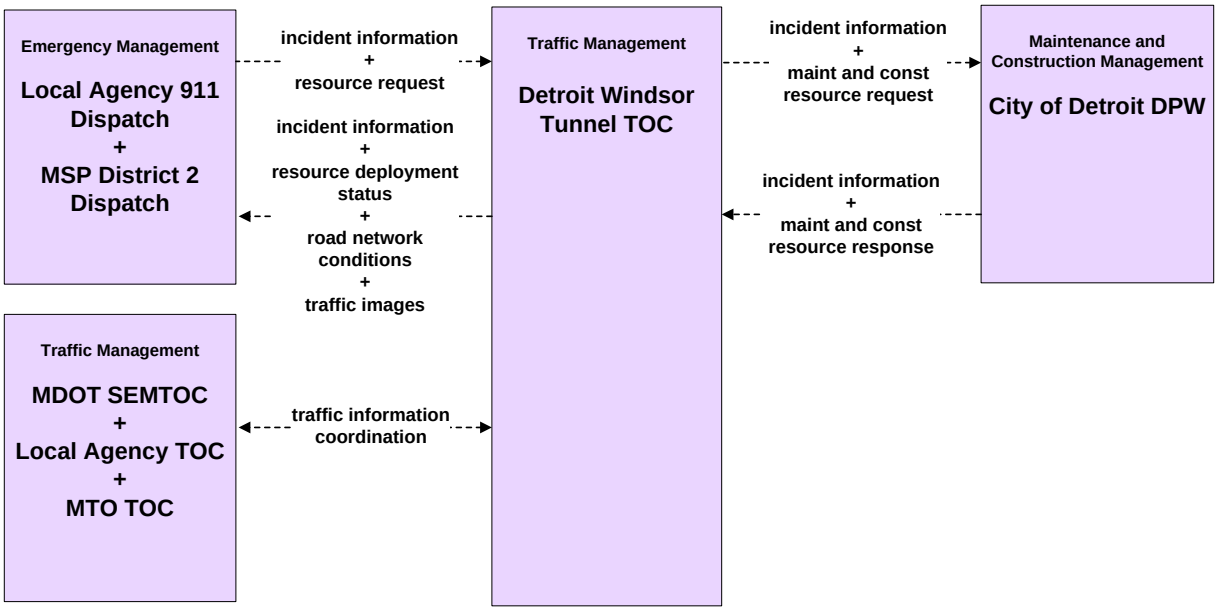
ATMS08 – Incident Management
City of Detroit



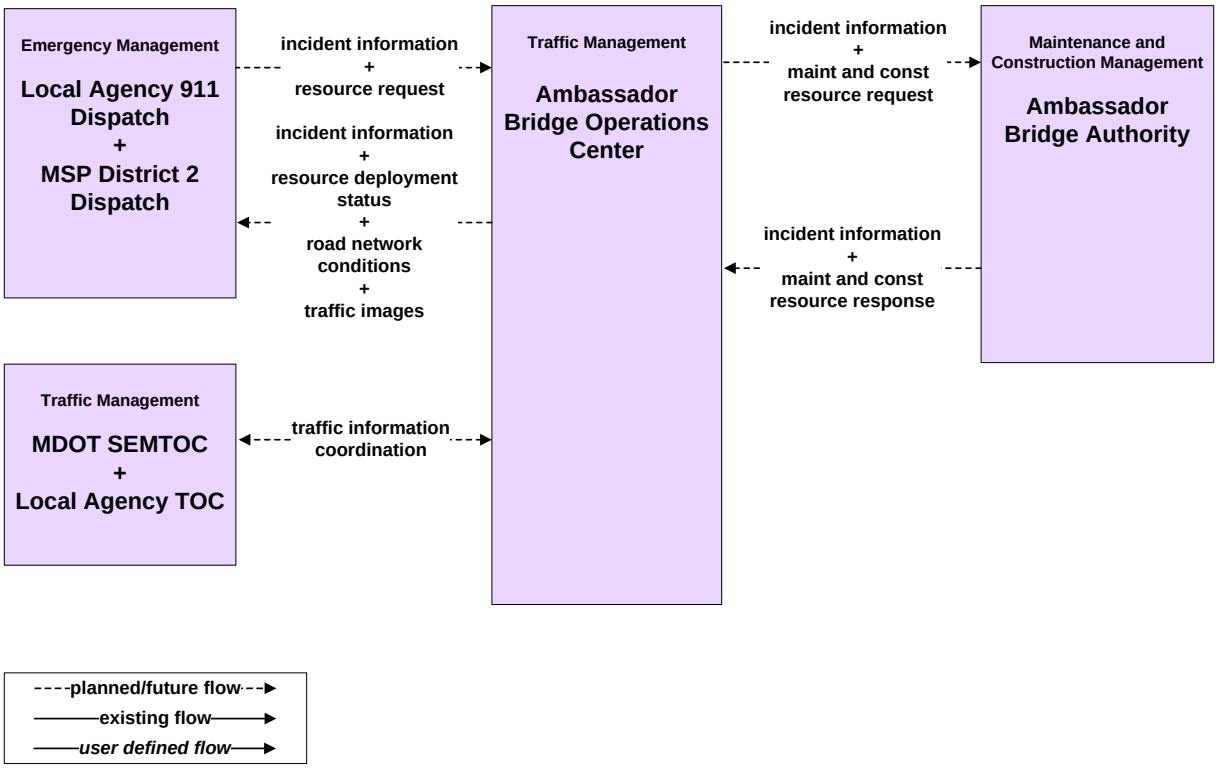
ATMS08 – Incident Management
MDOT Blue Water Bridge



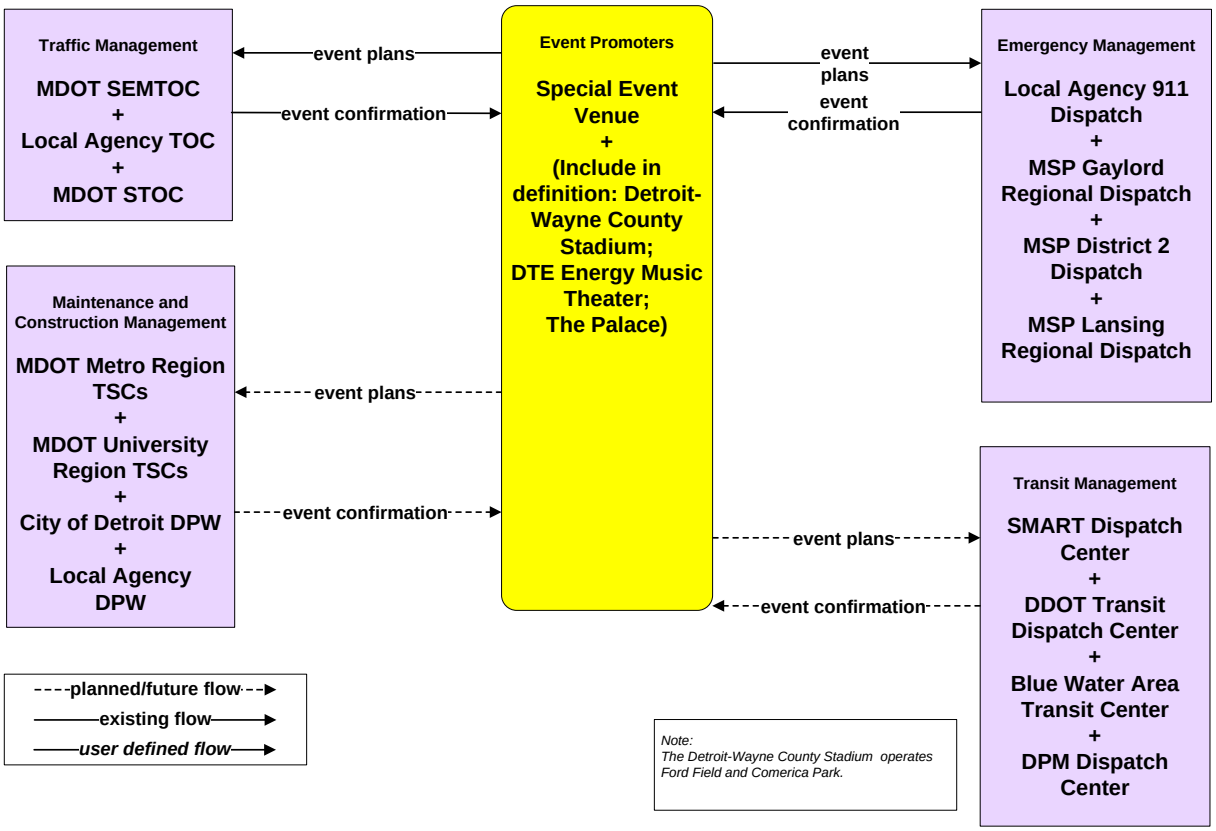
ATMS08 – Incident Management
Detroit Windsor Tunnel



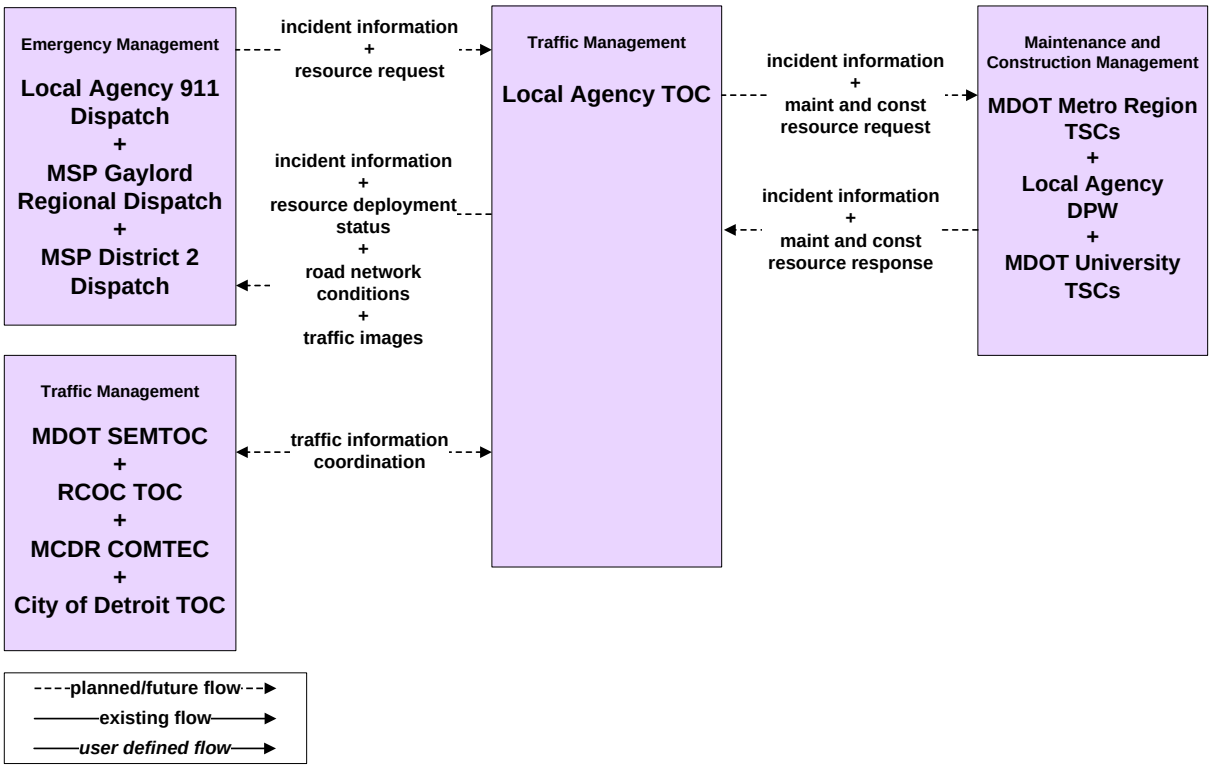
ATMS08 – Incident Management
Ambassador Bridge



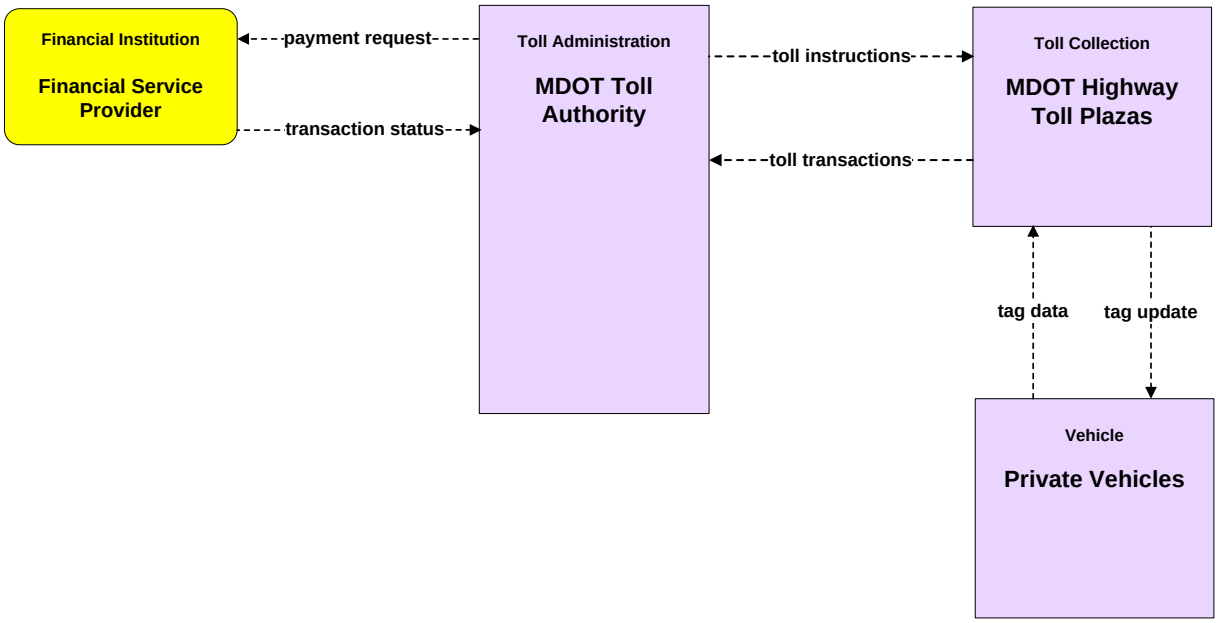
ATMS08 – Traffic Incident Management
Regional Special Event Management

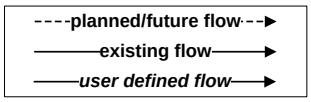


ATMS08 – Incident Management
Local Agency TOC

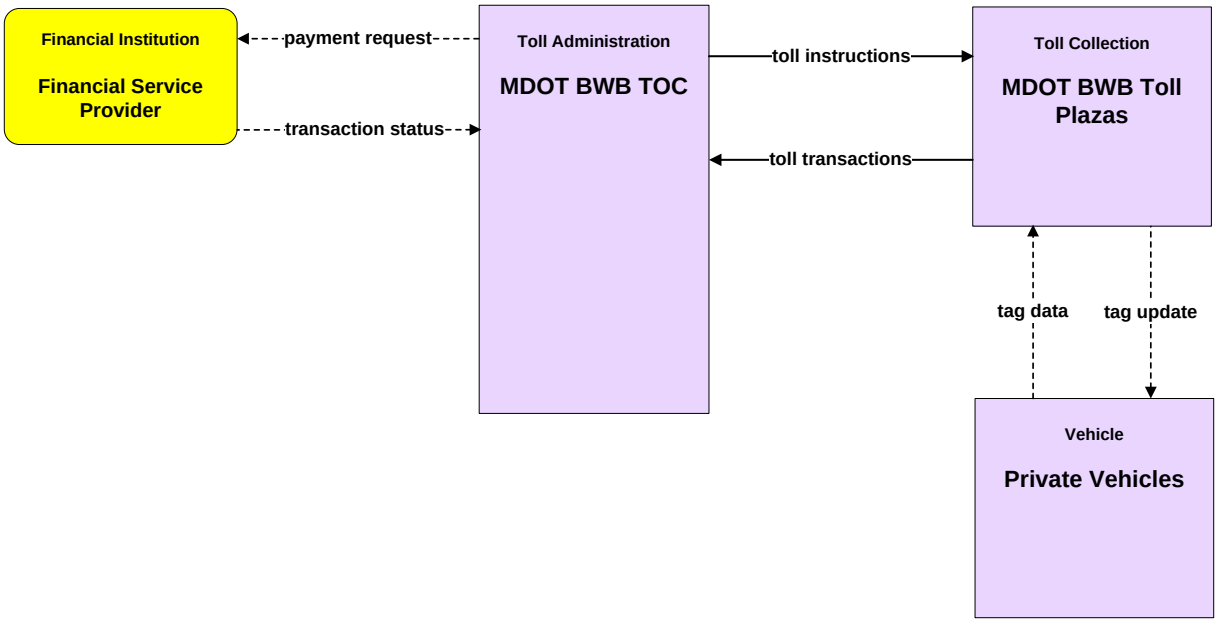


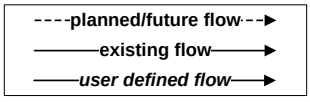
ATMS10 – Electronic Toll Collection
MDOT



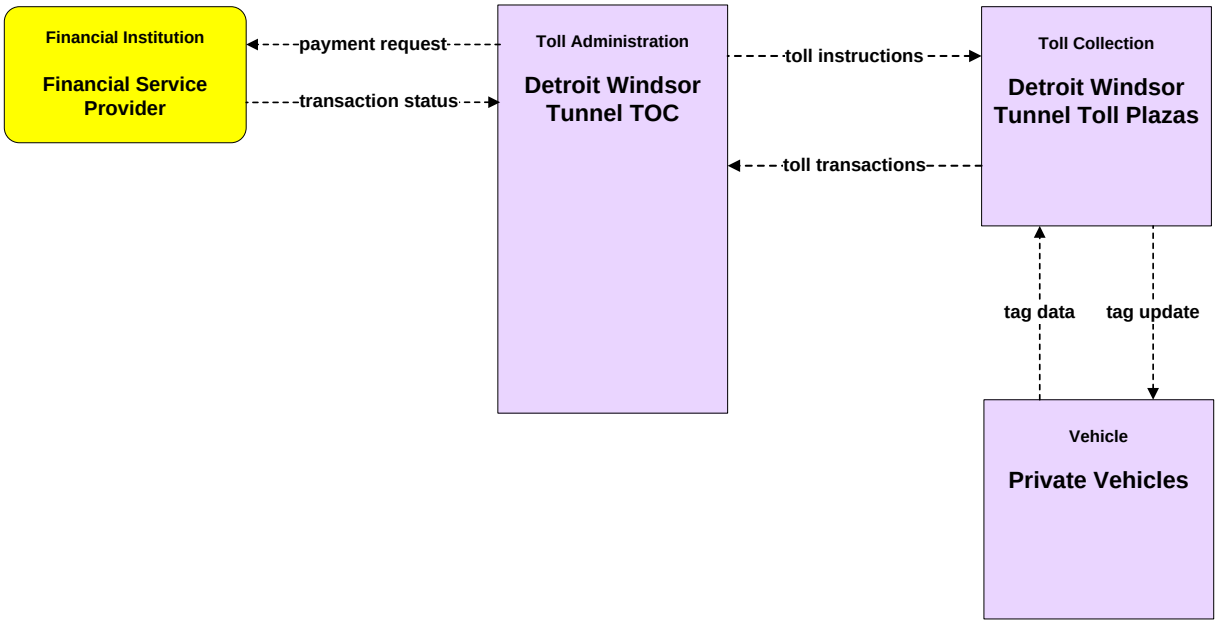


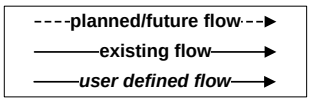
ATMS10 – Electronic Toll Collection
MDOT Blue Water Bridge



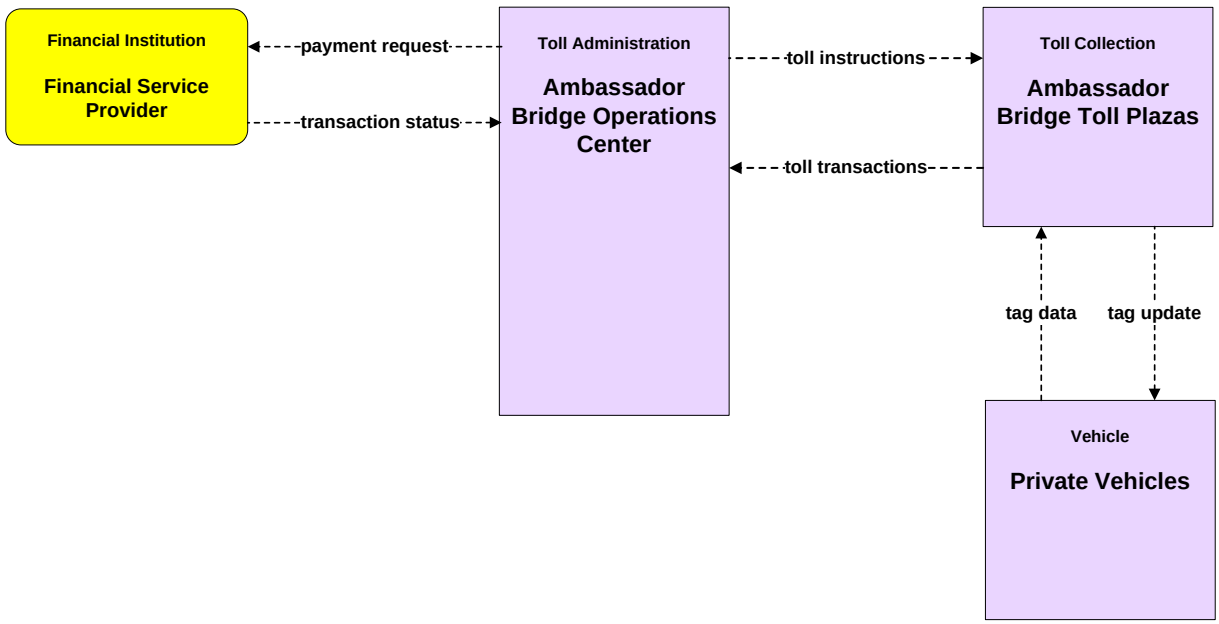


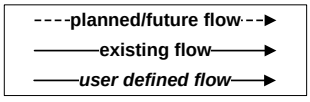
ATMS10 – Electronic Toll Collection
Detroit Windsor Tunnel

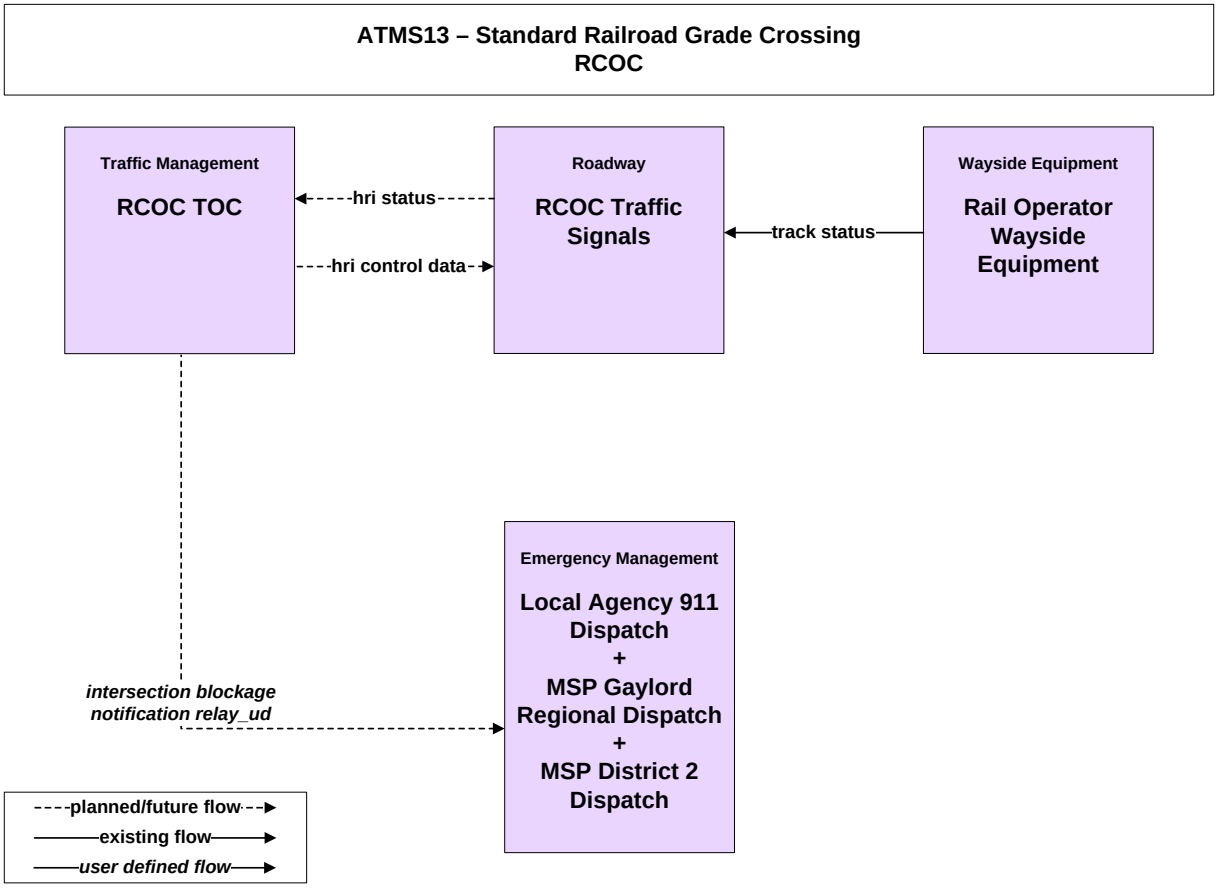


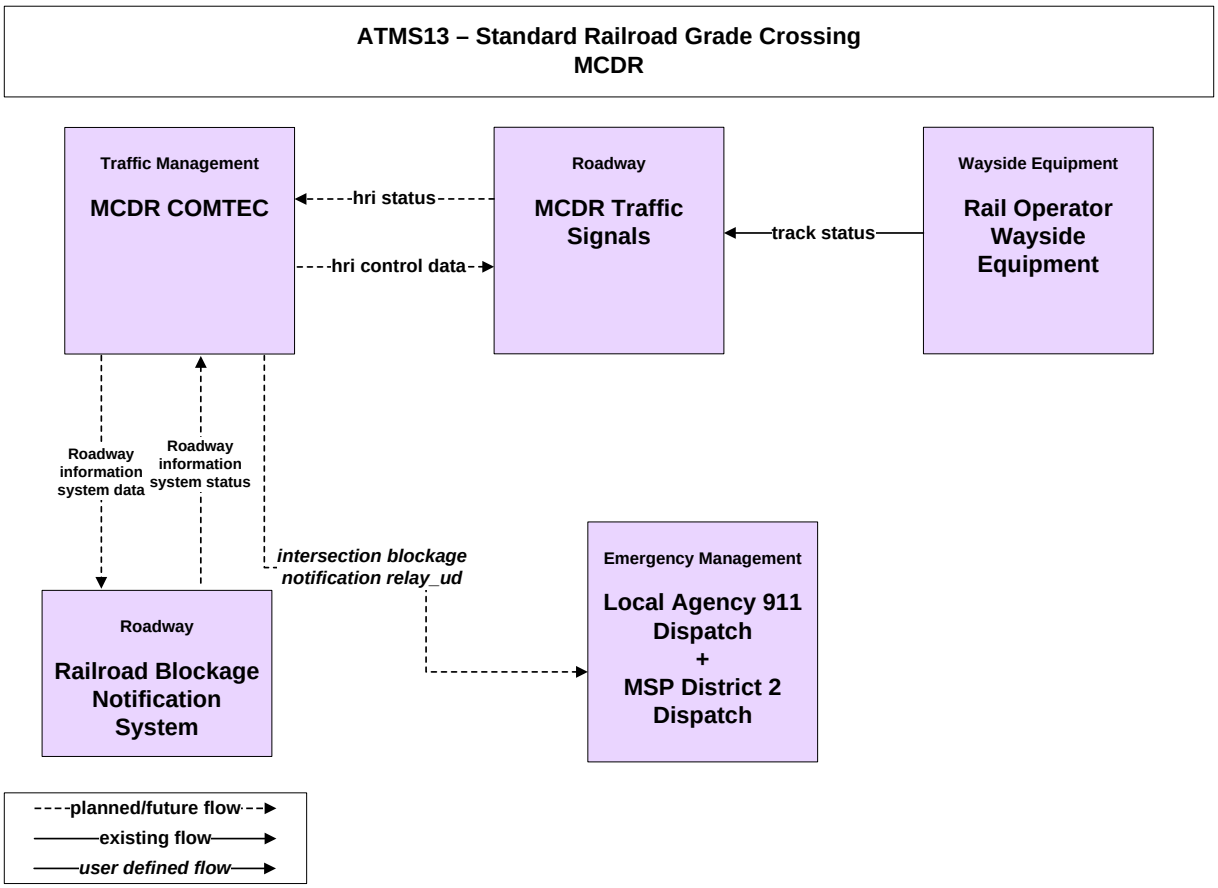


ATMS10 – Electronic Toll Collection
Ambassador Bridge

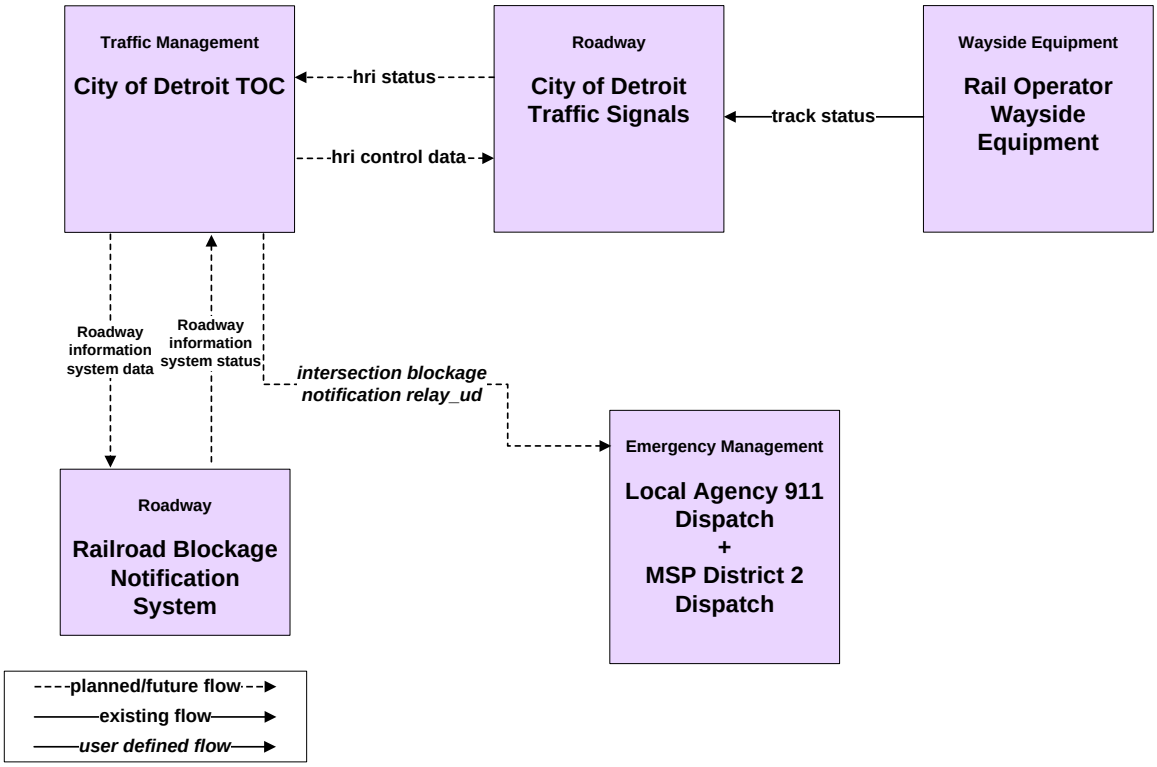




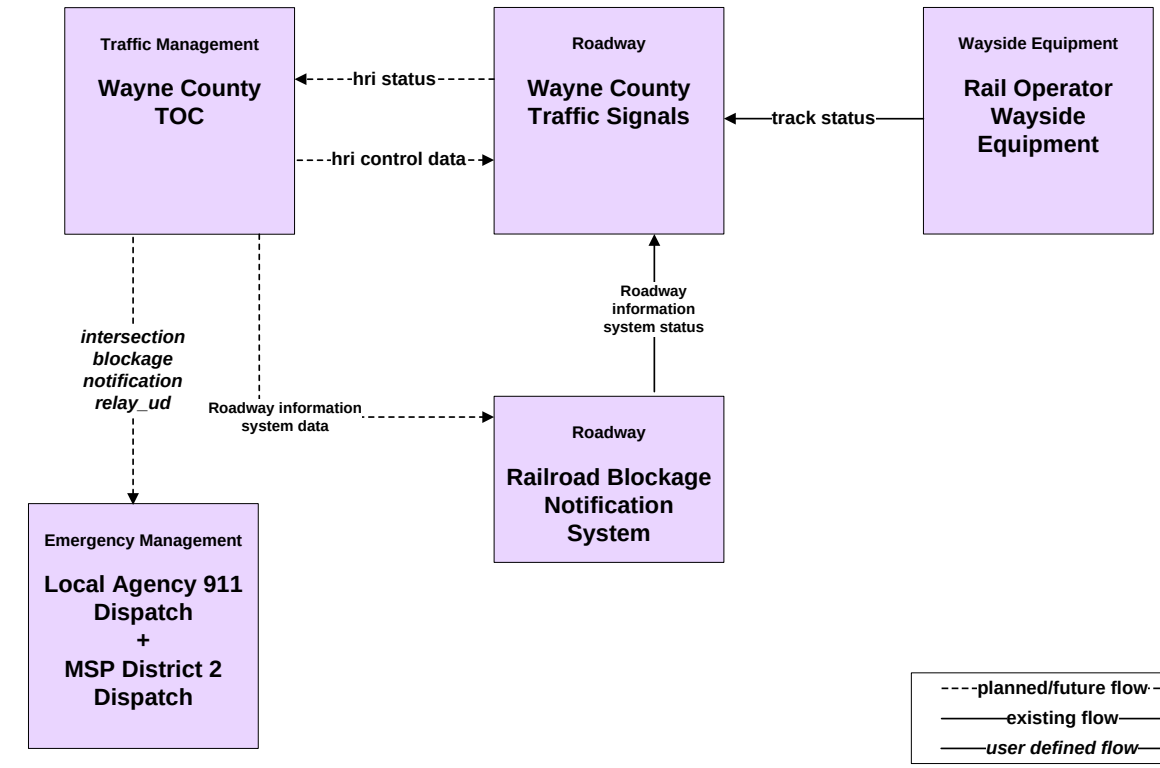

ATMS13 – Standard Railroad Grade Crossing
RCOC
Traffic Management
RCOC TOC
hri status
hri control data
Roadway
RCOC Traffic Signals
track status
Wayside Equipment
Rail Operator Wayside Equipment
intersection blockage notification relay_ud
Emergency Management
Local Agency 911 Dispatch
+
MSP Gaylord Regional Dispatch
+
MSP District 2 Dispatch
planned/future flow
existing flow
user defined flow


ATMS13 – Standard Railroad Grade Crossing
MCDR
Traffic Management
MCDR COMTEC
hri status
hri control data
Roadway
MCDR Traffic Signals
track status
Wayside Equipment
Rail Operator Wayside Equipment
Roadway information system data
Roadway information system status
intersection blockage notification relay_ud
Roadway
Railroad Blockage Notification System
Emergency Management
Local Agency 911 Dispatch
+
MSP District 2 Dispatch
planned/future flow
existing flow
user defined flow

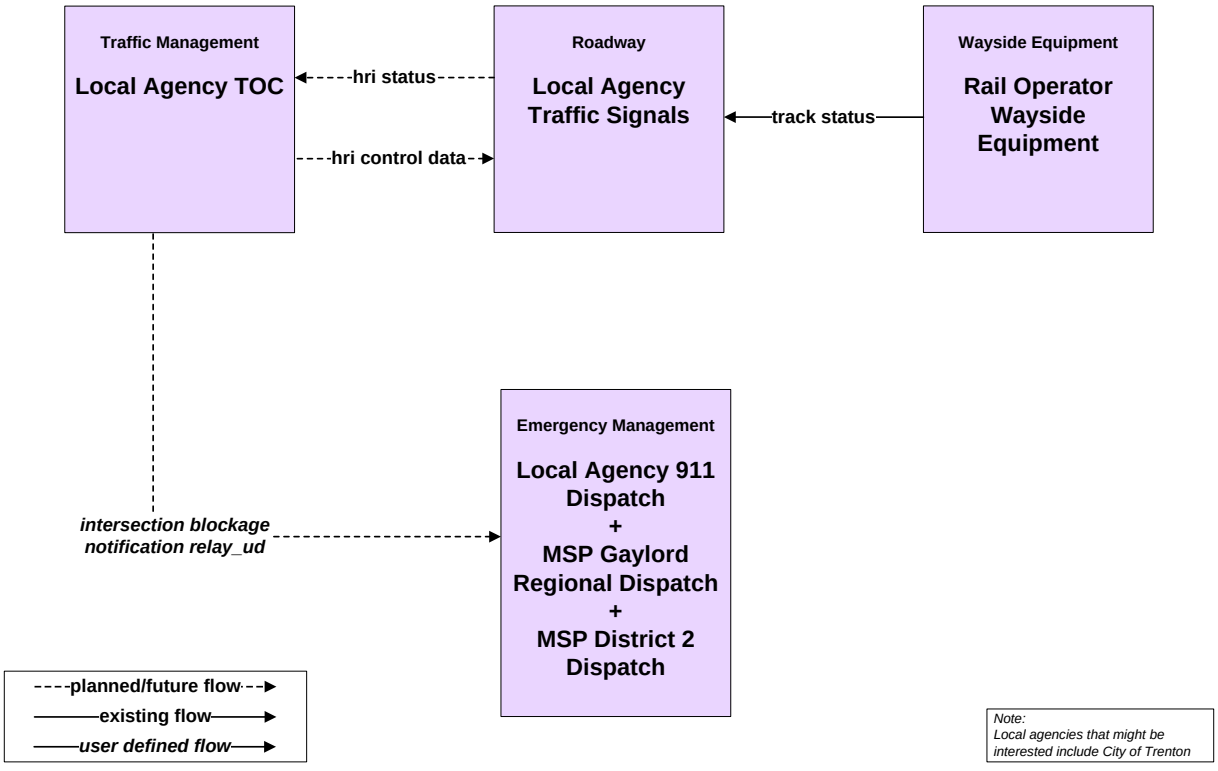
ATMS13 – Standard Railroad Grade Crossing
City of Detroit



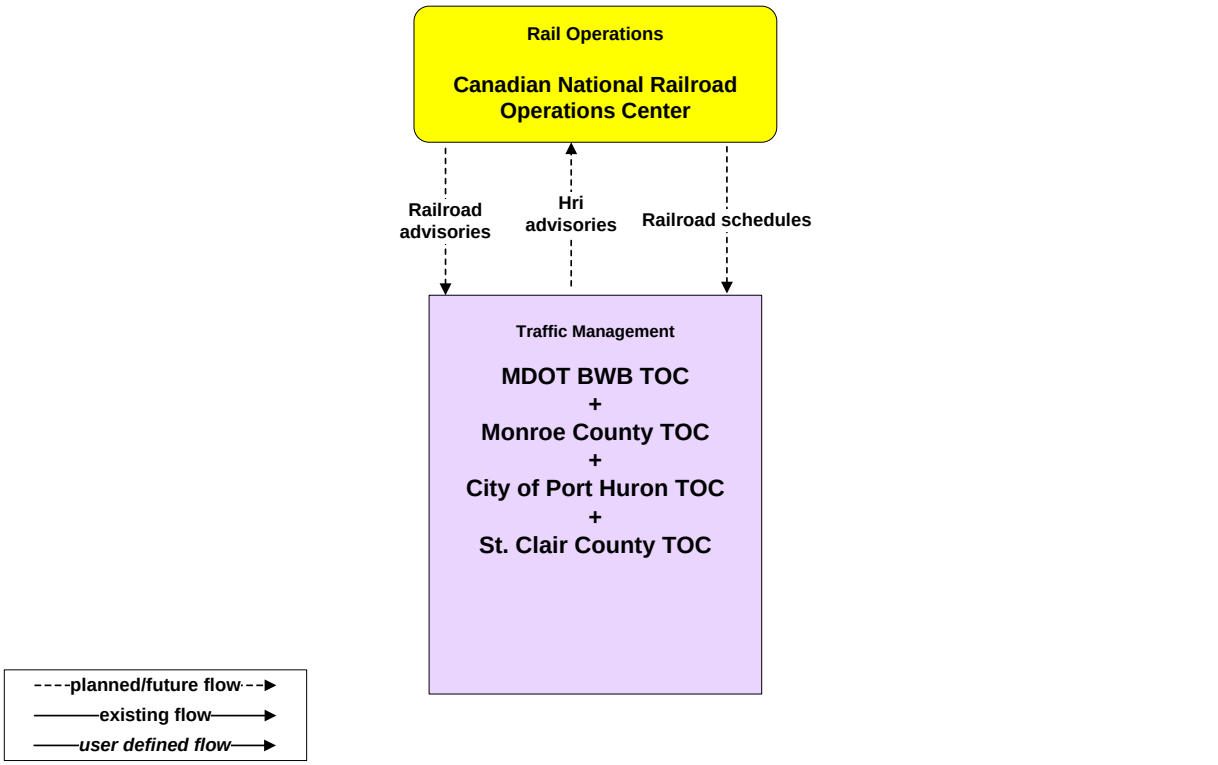
ATMS13 – Standard Railroad Grade Crossing
Wayne County



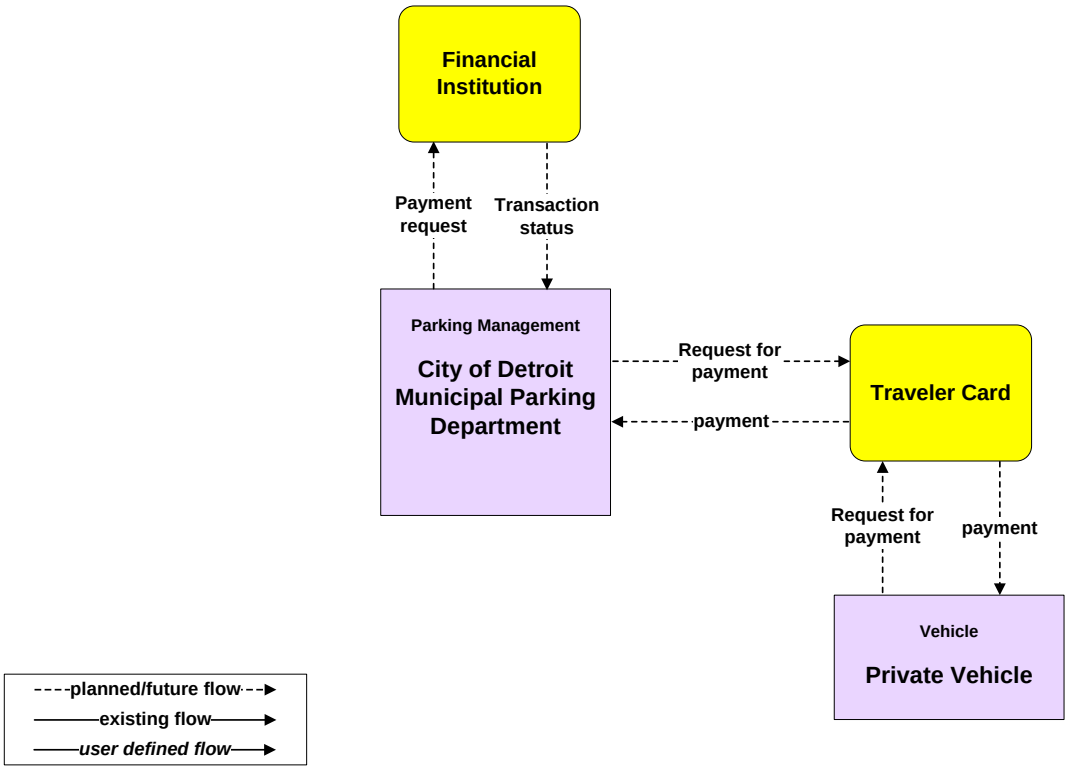
ATMS13 – Standard Railroad Grade Crossing
Local Agency



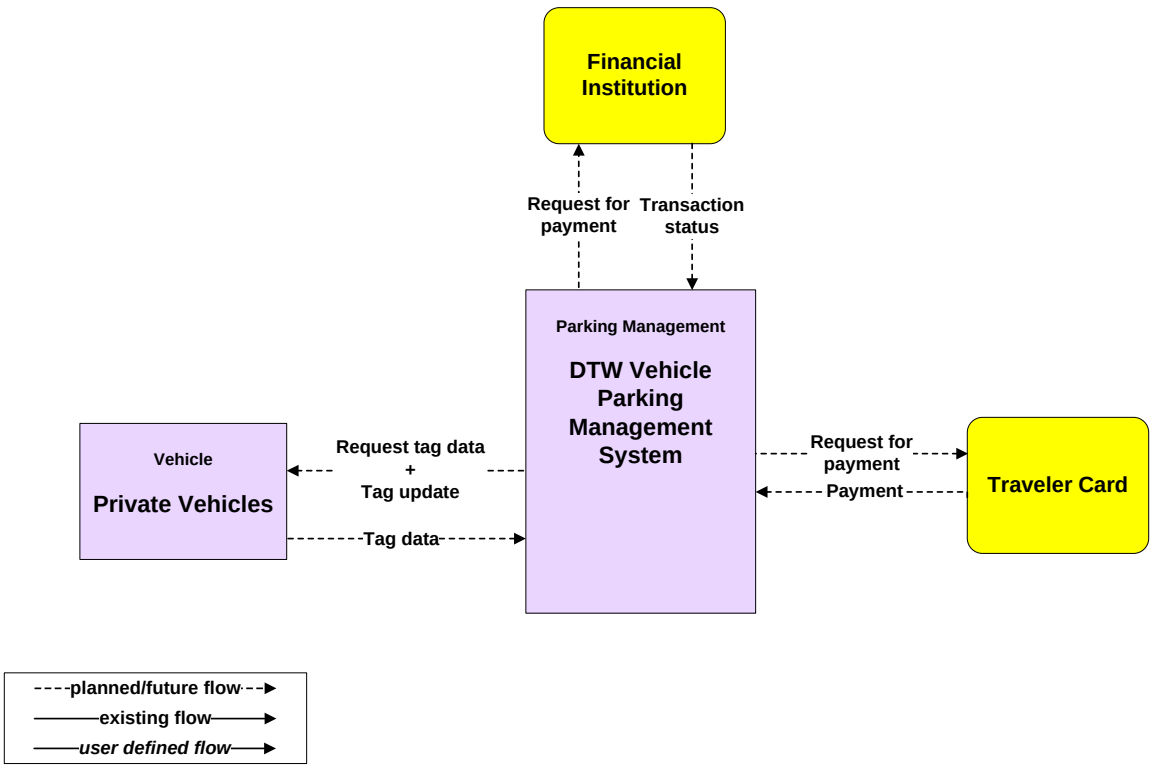
ATMS15 – Railroad Operations Coordination
Canadian National Railroad



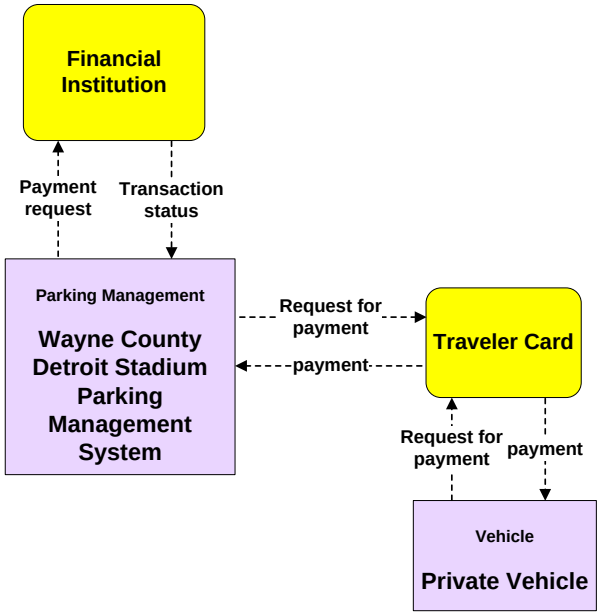
ATMS16 – Parking Facility Management
City of Detroit



ATMS16 – Parking Facility Management
Wayne County Airport Authority (Detroit Metro Wayne County Airport - DTW)



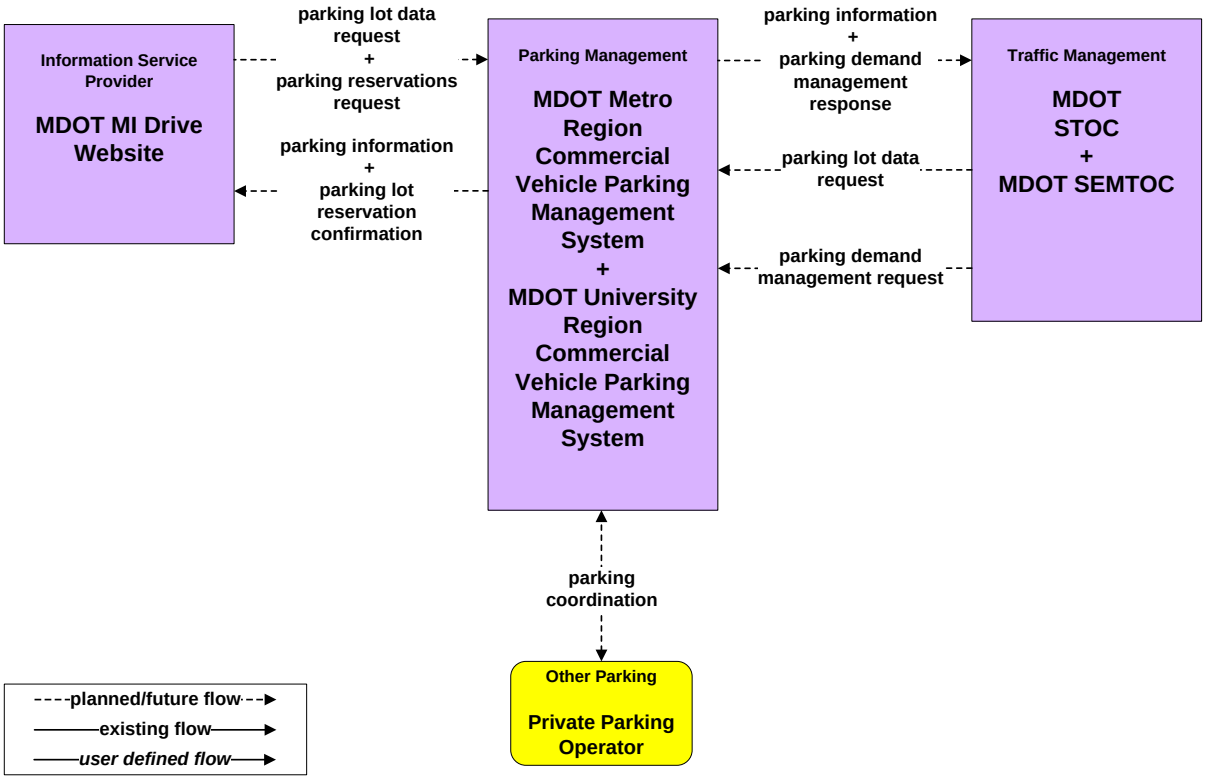
ATMS16 - Parking Facility Management
Special Event Coordination



----planned/future flow-->
————existing flow————>
——*user defined flow*——>

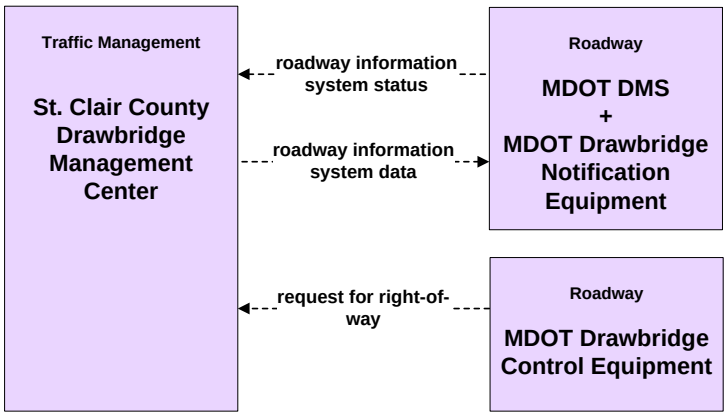
Note:
All privately owned

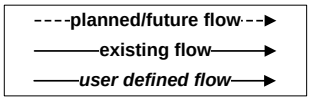
ATMS17 – Regional Parking Management
MDOT



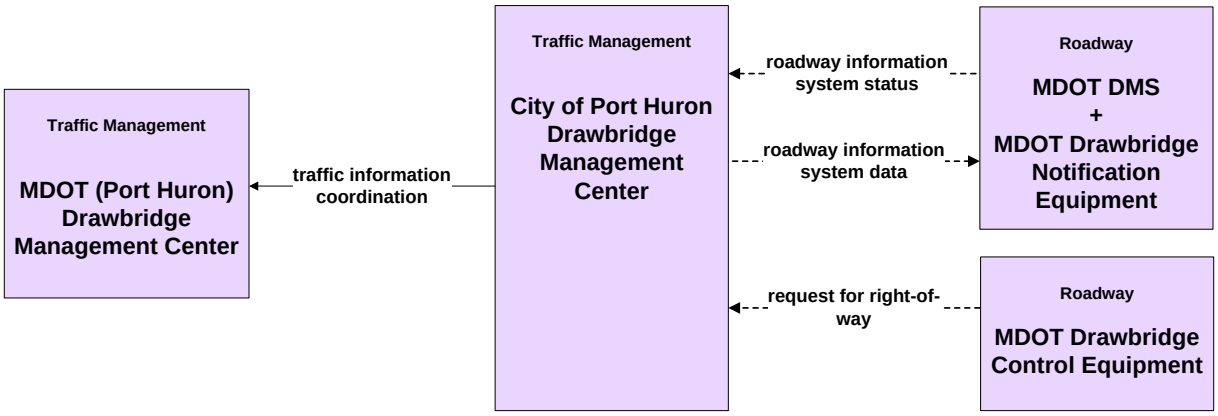
----planned/future flow-->
————existing flow————>
——*user defined flow*——>

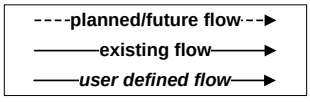
ATMS20 – Drawbridge Management
St Clair County Drawbridges





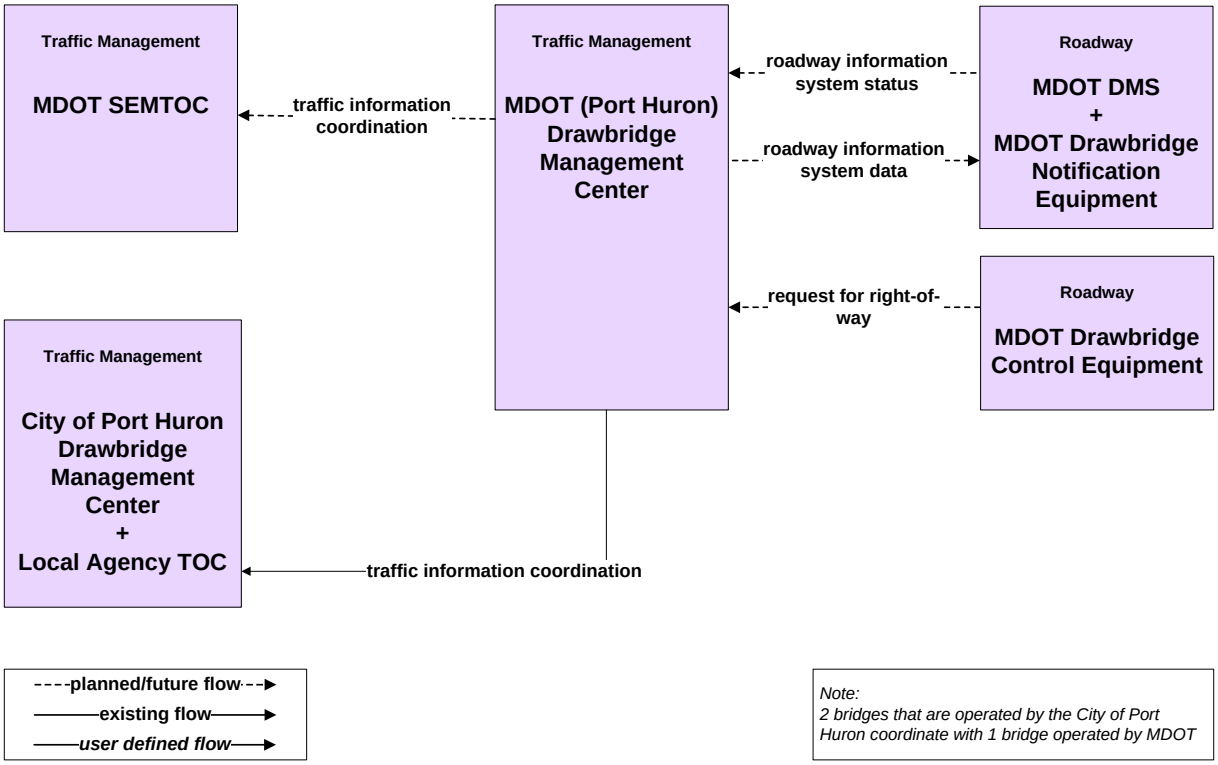
ATMS20 – Drawbridge Management
City of Port Huron Drawbridges



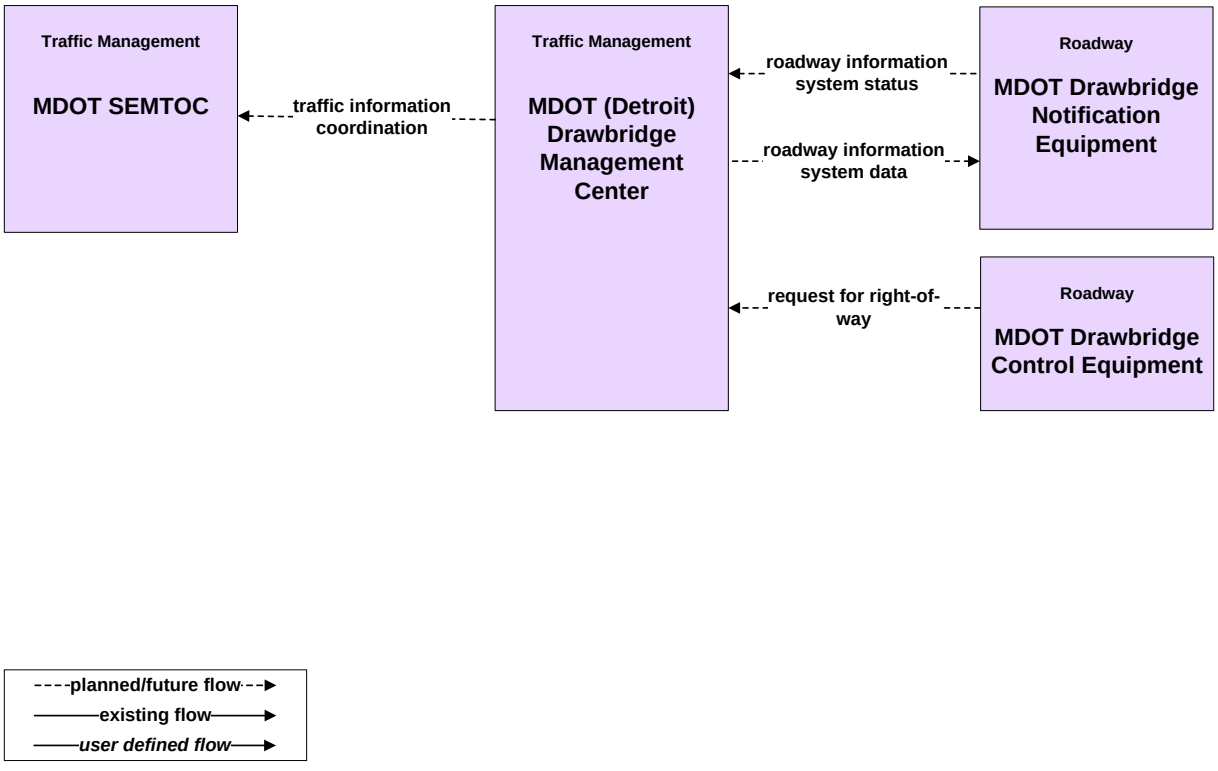


Note:
2 bridges that are operated by the City of Port Huron coordinate with 1 bridge operated by MDOT

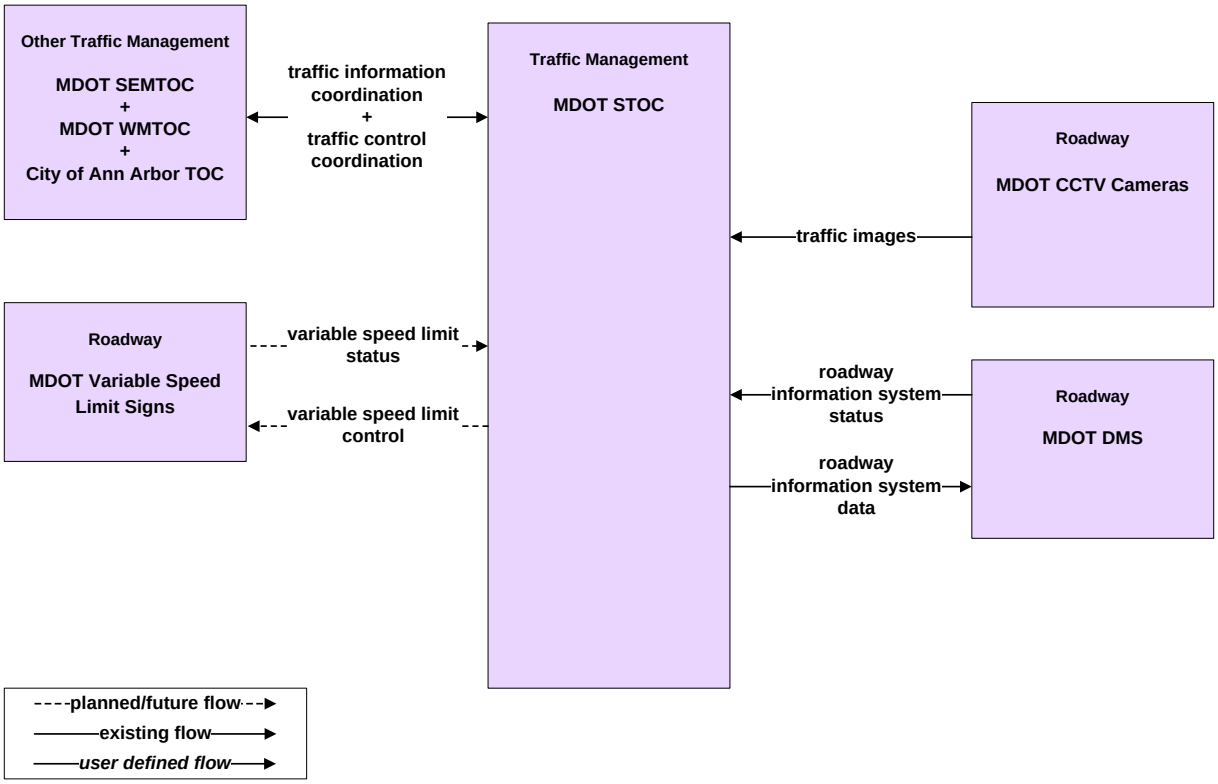
ATMS20 – Drawbridge Management
MDOT (Port Huron) Drawbridges



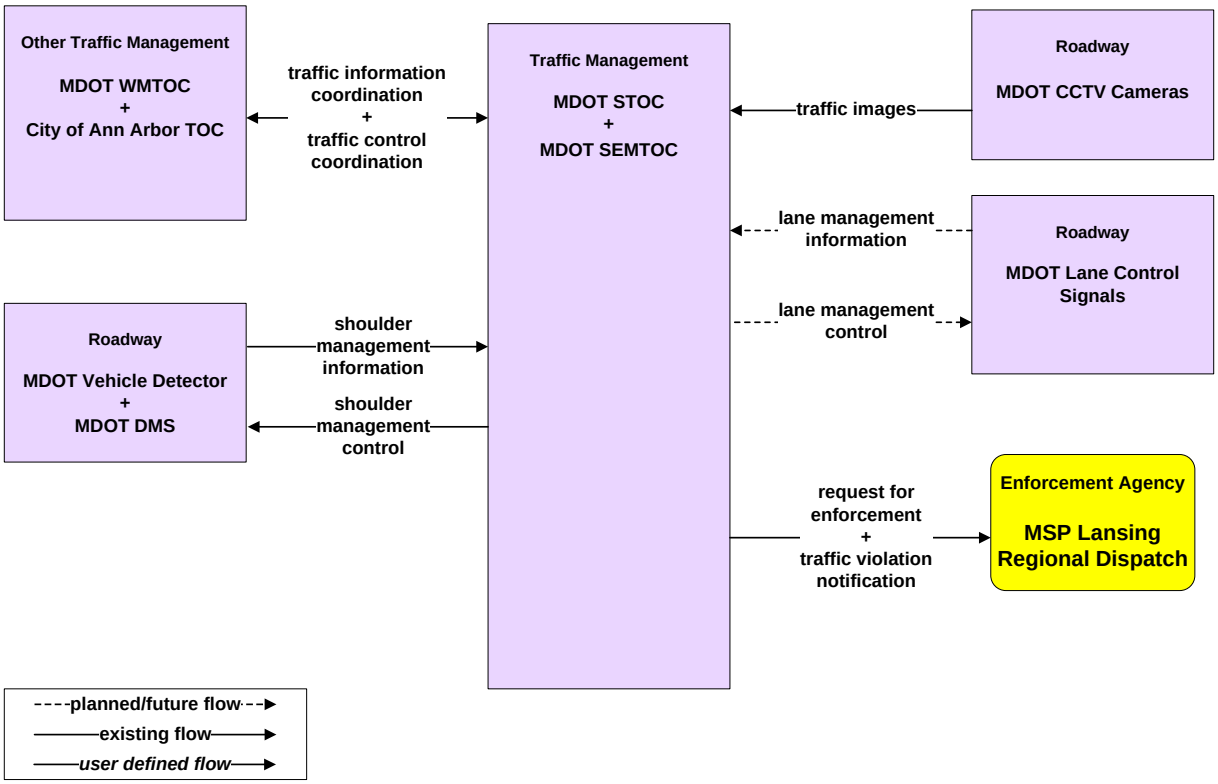
ATMS20 – Drawbridge Management
MDOT (Detroit) Drawbridges

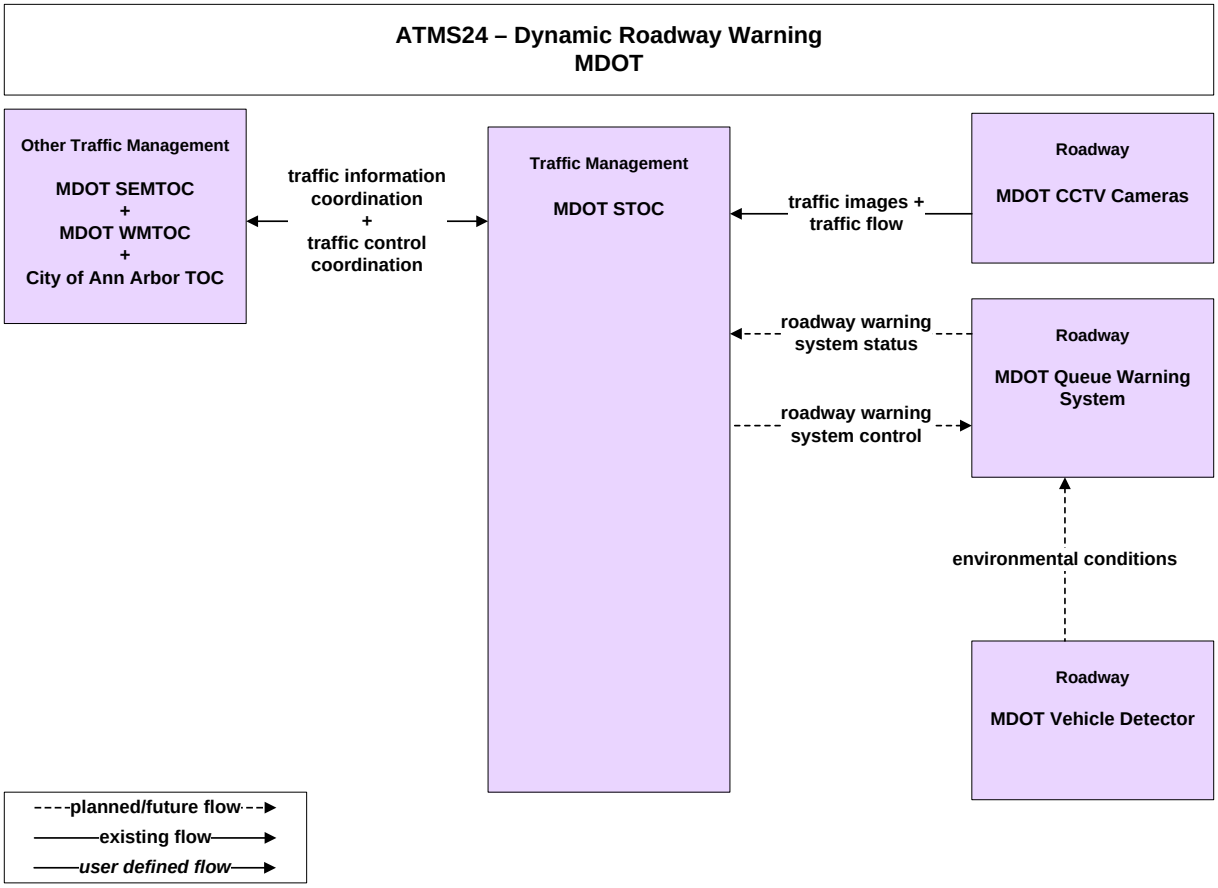


ATMS22 – Variable Speed Limits
MDOT



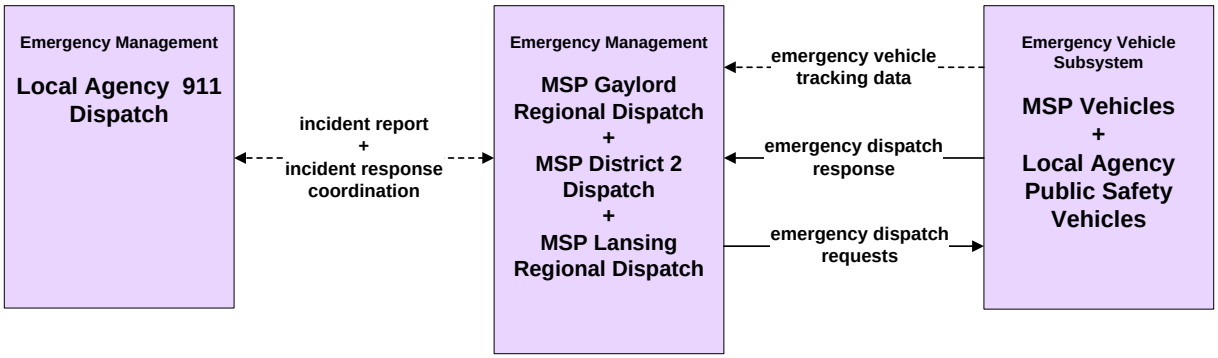
ATMS23 – Dynamic Lane Management and Shoulder Use
MDOT

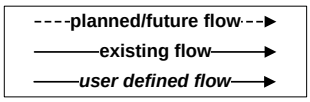




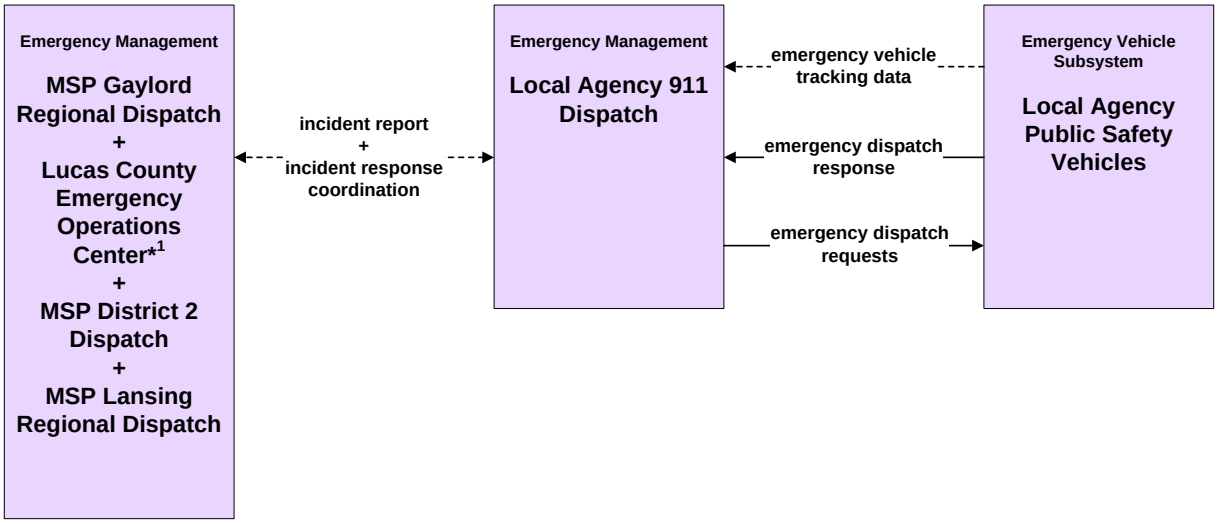
Emergency Management

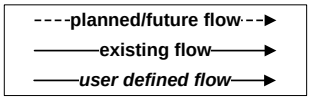
EM01 – Emergency Call Taking and Dispatch
Michigan State Police





EM01 – Emergency Call Taking and Dispatch
Local Agency

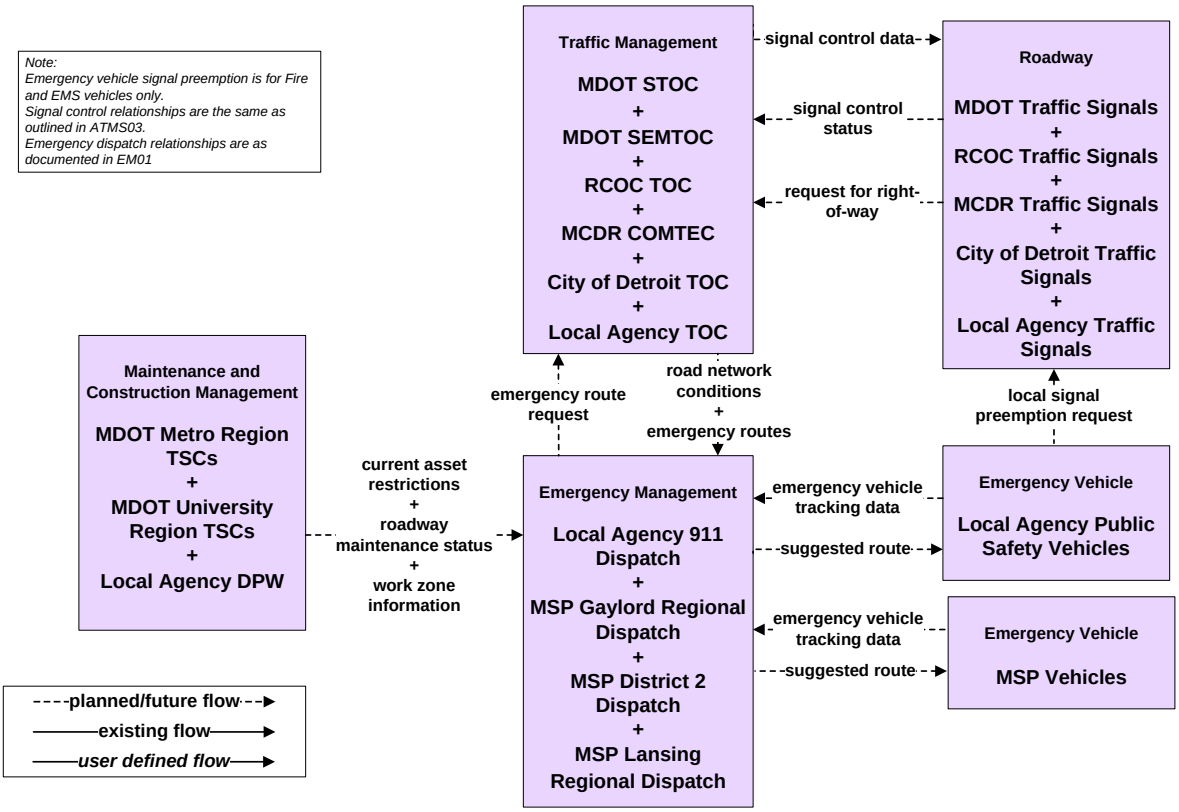




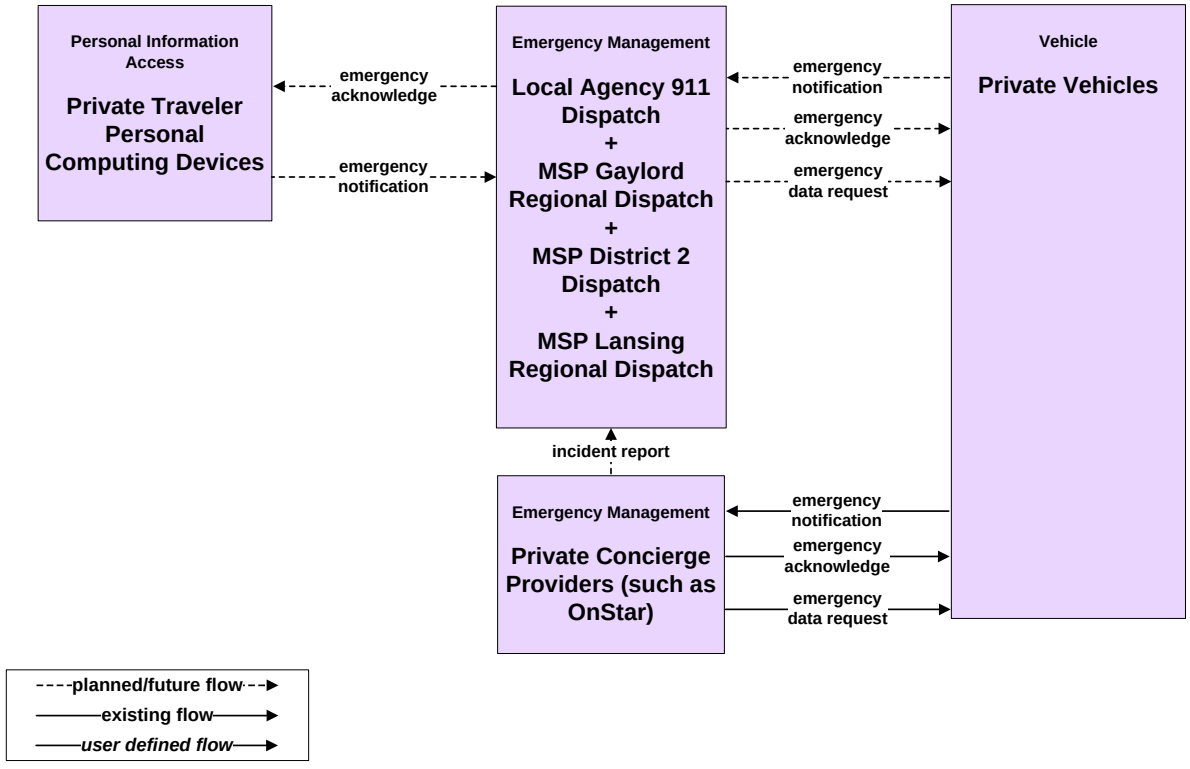
Note:
** Planned Interconnects with Monroe County Public Safety Sdispatch from Toledo Metro Area Region ITS Architecture*

[1] Also includes Interconnect with Monroe County EOC

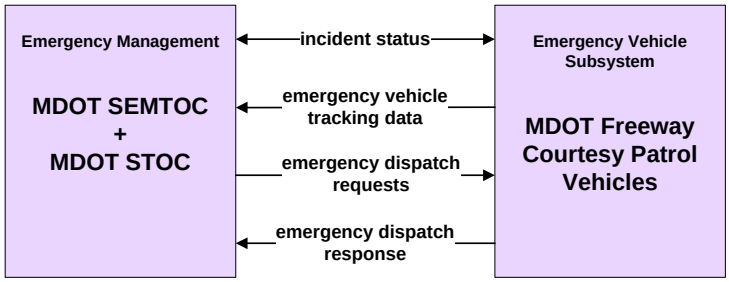
EM02 – Emergency Routing
Local Agency

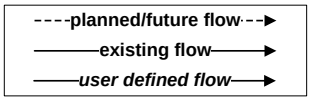


EM03 – Mayday and Alarm Support
Local Agency

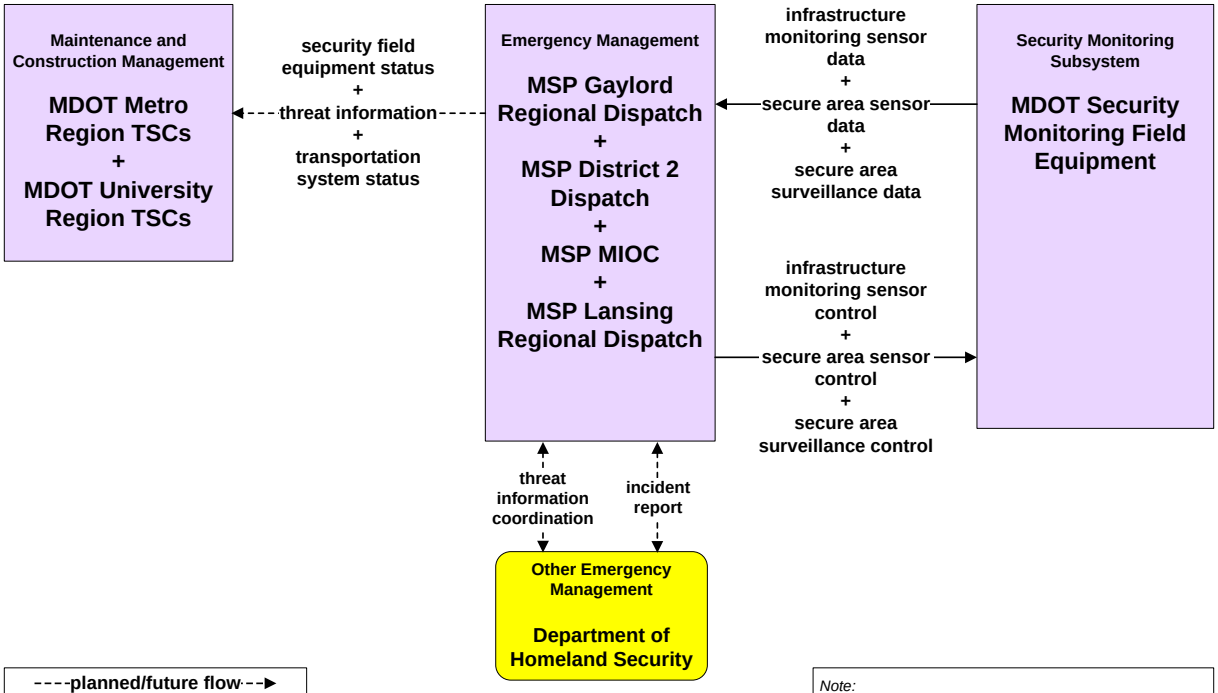


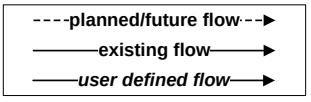
EM04 – Roadway Service Patrols
MDOT





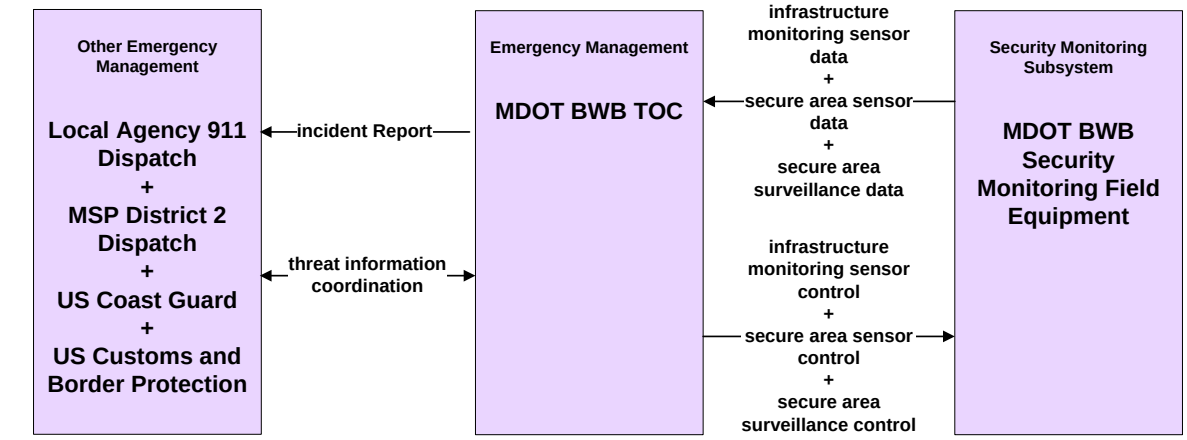
EM05 – Transportation Infrastructure Protection
MDOT

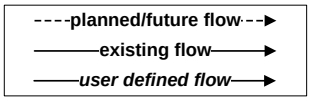




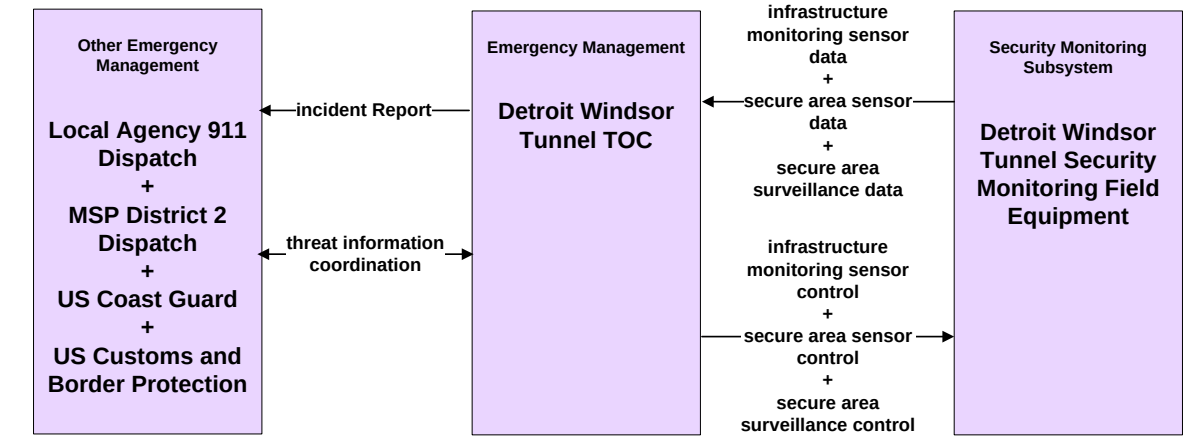
Note:
SEMTOC and MDOT BWB are the only facilities that have monitoring equipment or the capabilities. MIOC in Lansing will have video access to those facilities.

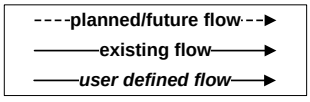
EM05 – Transportation Infrastructure Protection
MDOT Blue Water Bridge



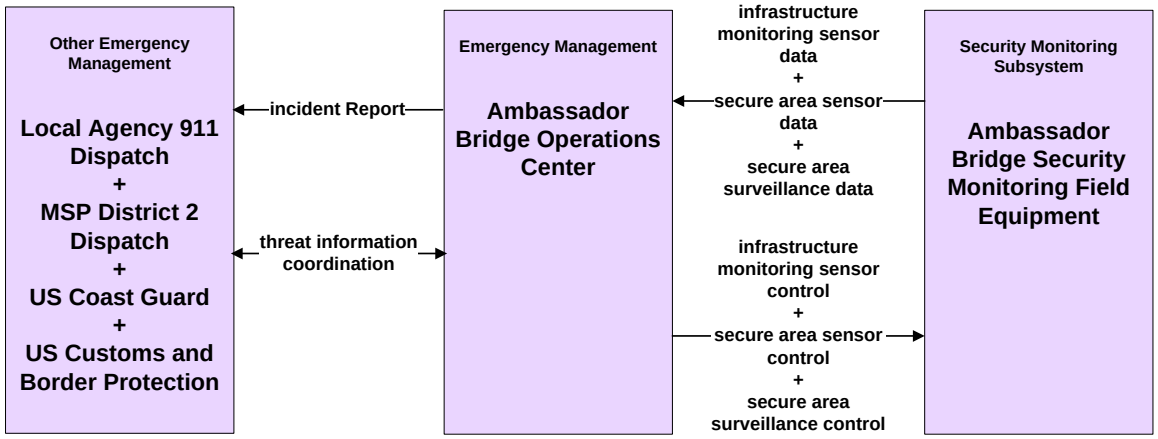


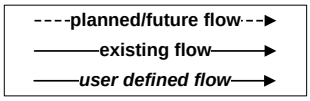
EM05 – Transportation Infrastructure Protection
Detroit Windsor Tunnel



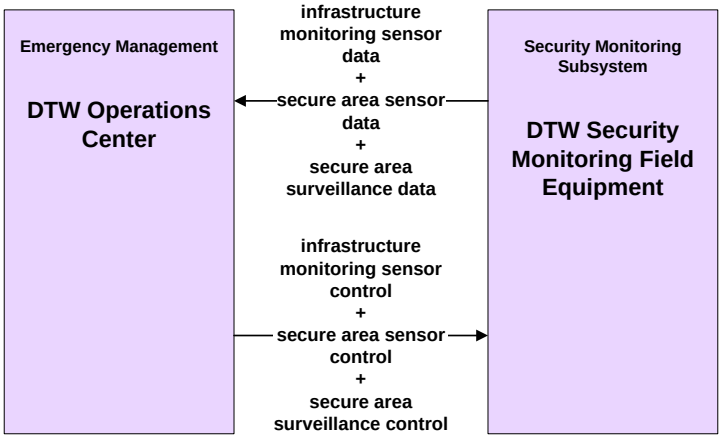


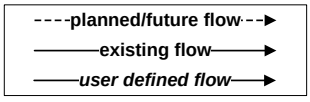
EM05 – Transportation Infrastructure Protection
Ambassador Bridge



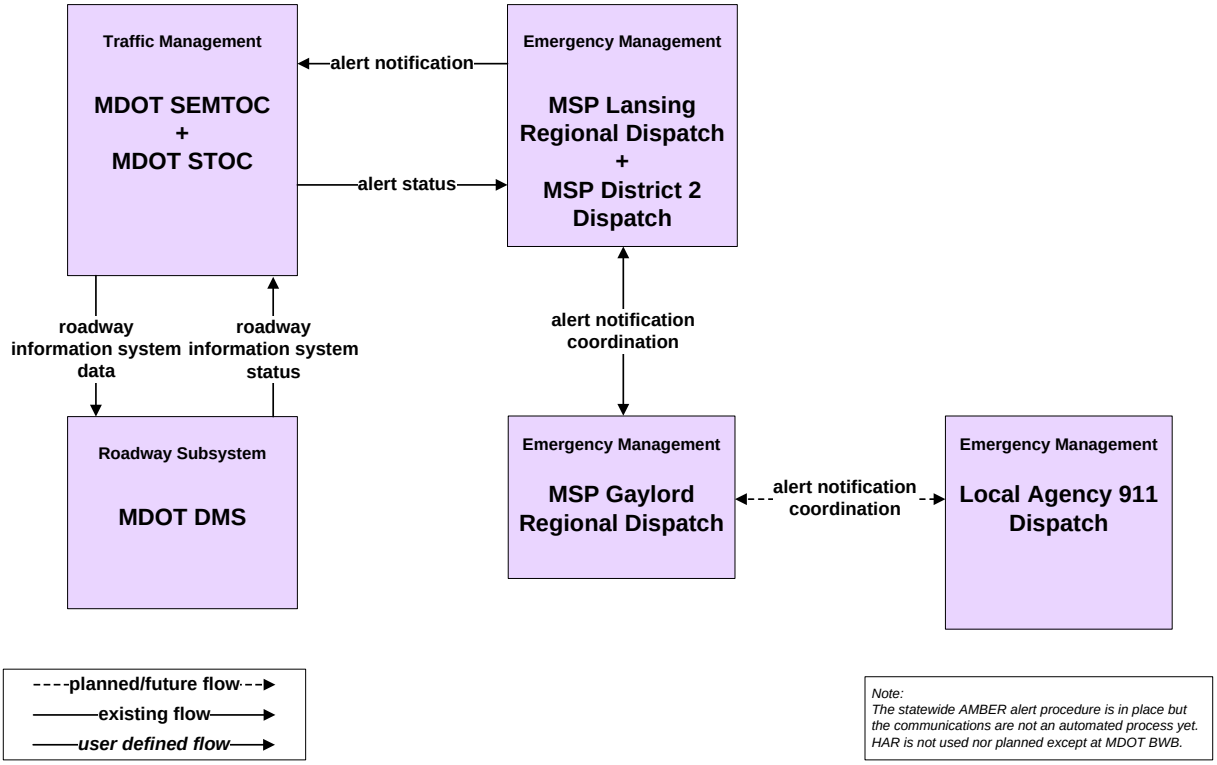


EM05 – Transportation Infrastructure Protection
Wayne County Airport Authority (Detroit Metro Wayne County Airport - DTW)



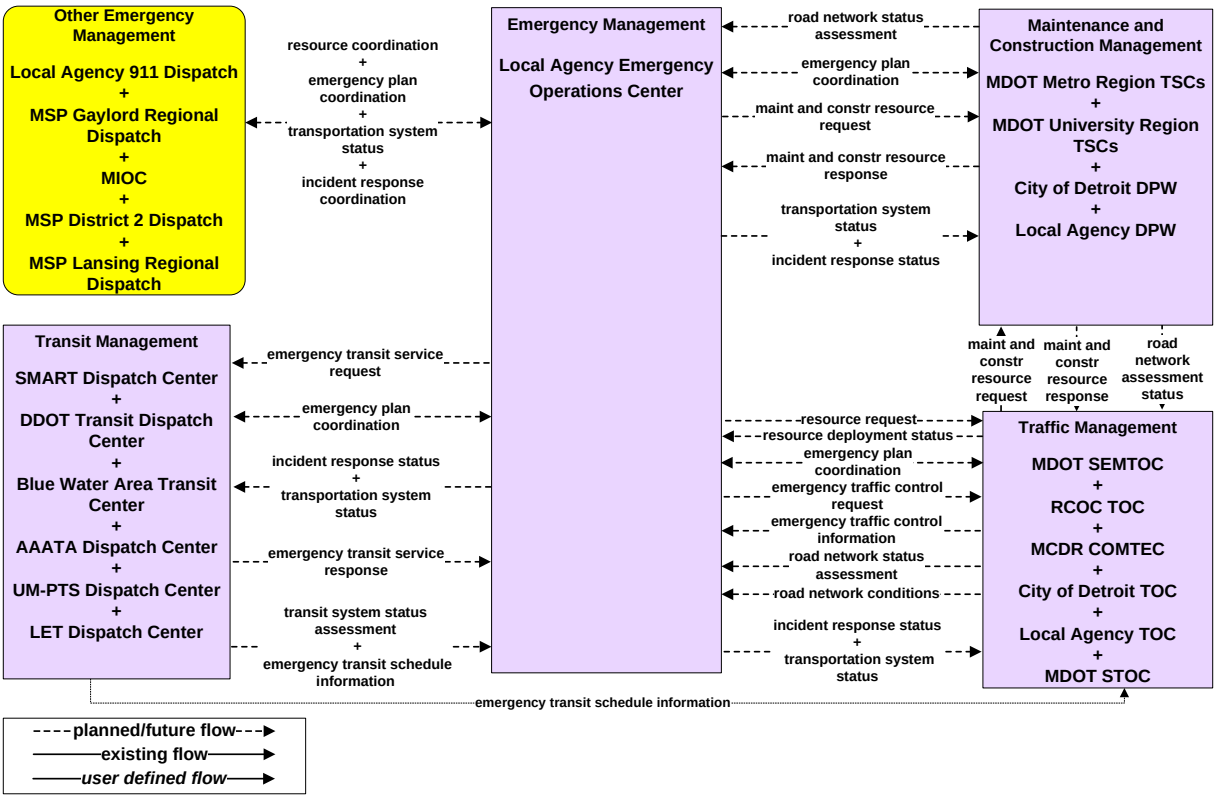


EM06 – Wide-Area Alerts
AMBER Alert

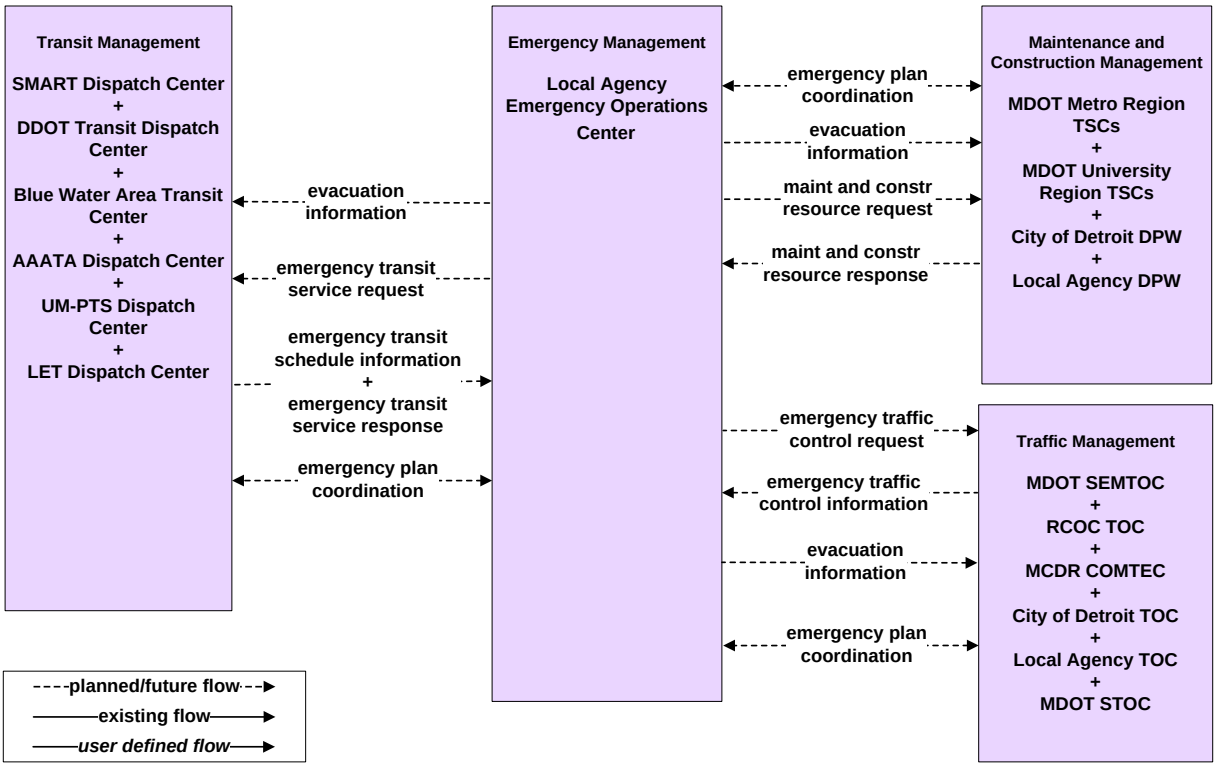


Note:
The statewide AMBER alert procedure is in place but the communications are not an automated process yet. HAR is not used nor planned except at MDOT BWB.

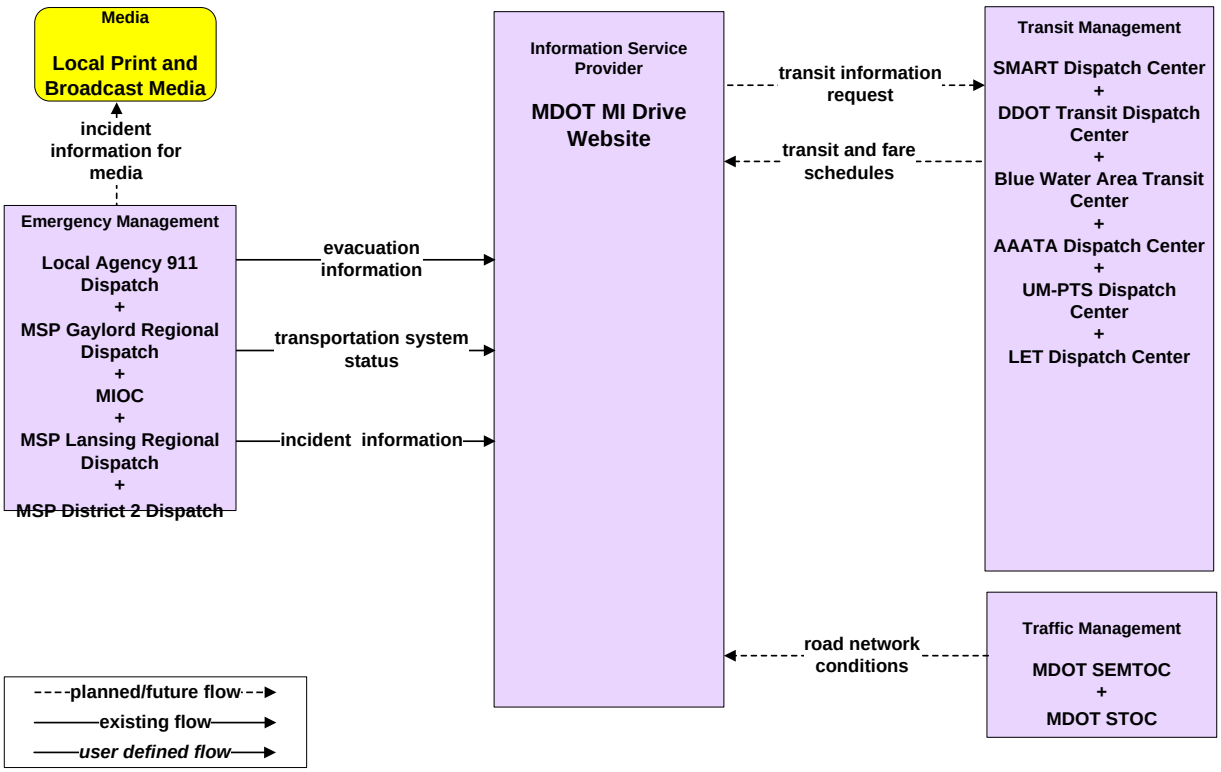
EM08 – Disaster Response and Recovery
Local Agency



EM09 – Evacuation and Reentry Management
Local Agency

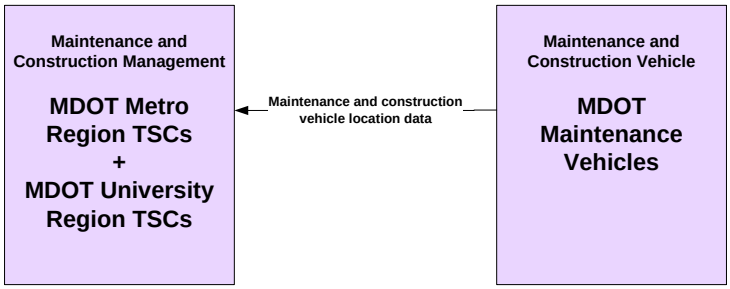


EM10 – Disaster Traveler Information
MDOT



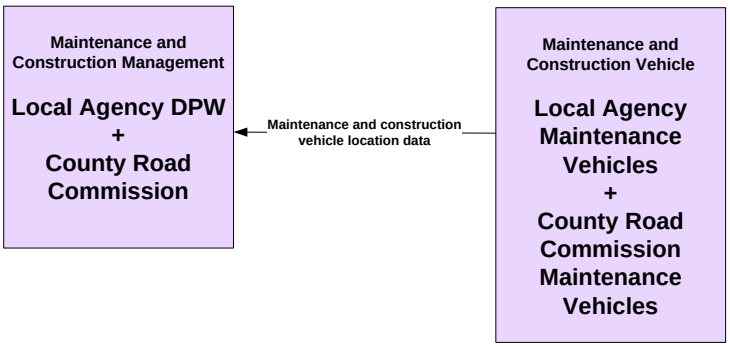
Maintenance and Construction Management

MC01 – Maintenance and Construction Vehicle Tracking
MDOT



----planned/future flow-->
————existing flow————>
——*user defined flow*——>

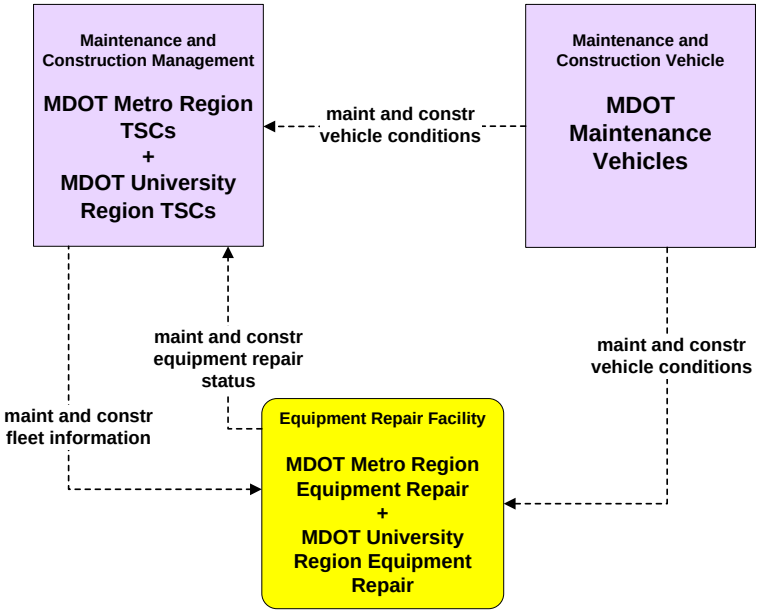
MC01 – Maintenance and Construction Vehicle Tracking
Local Agency



----planned/future flow-->
————existing flow————>
——*user defined flow*——>

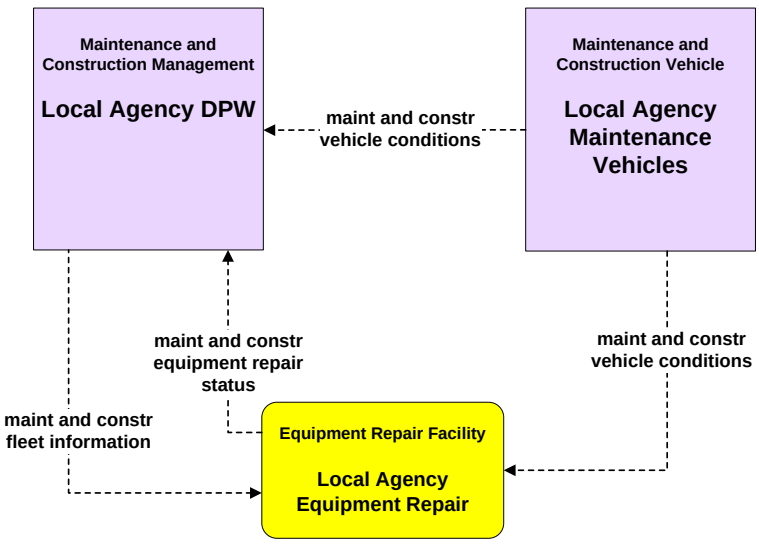
Note:
Oakland, Macomb, and Wayne counties all have an existing flow

MC02 – Maintenance and Construction Vehicle Maintenance
MDOT



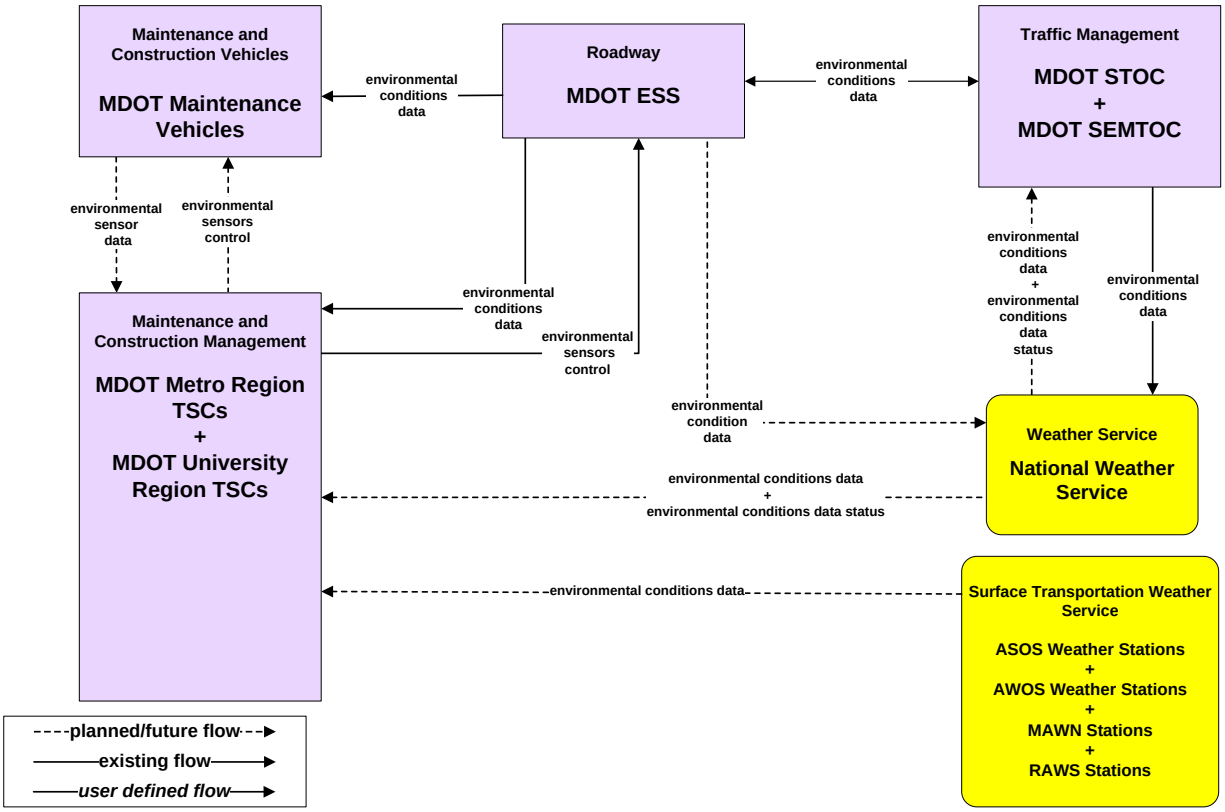
planned/future flow
existing flow
user defined flow

MC02 – Maintenance and Construction Vehicle Maintenance
Local Agency

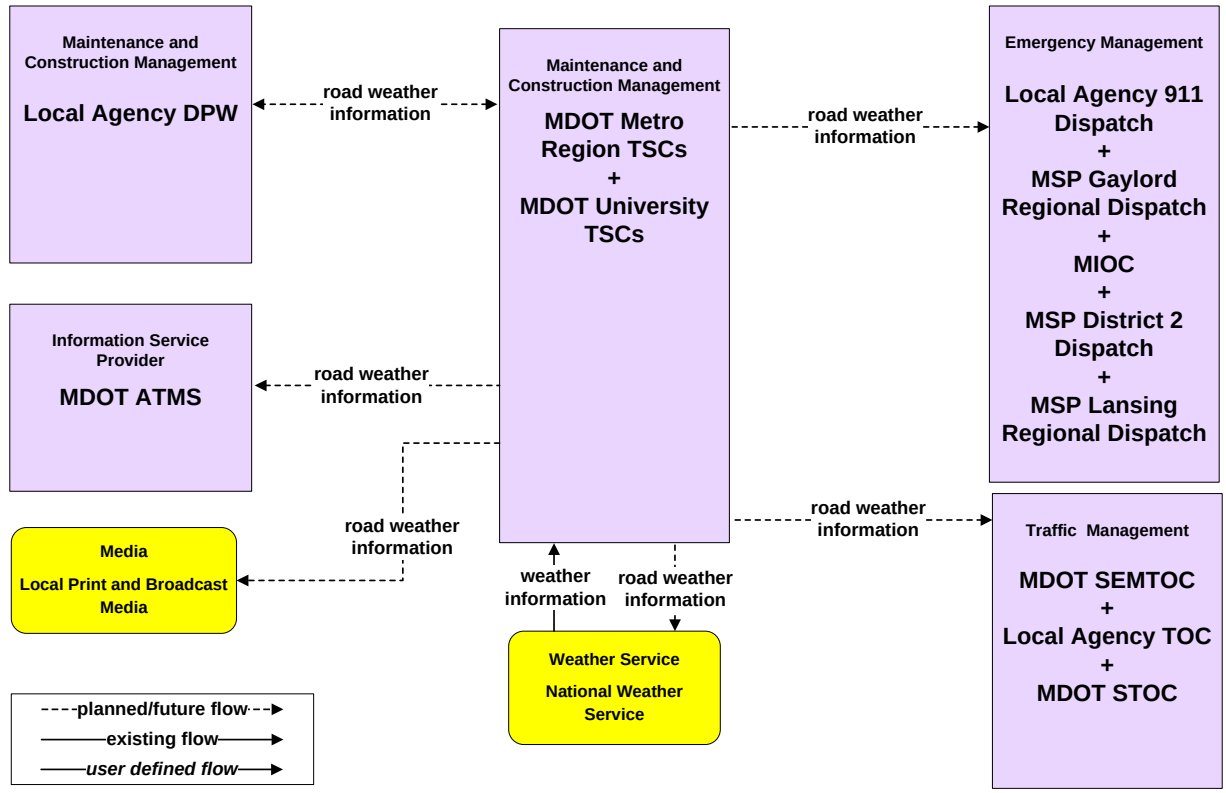


planned/future flow
existing flow
user defined flow

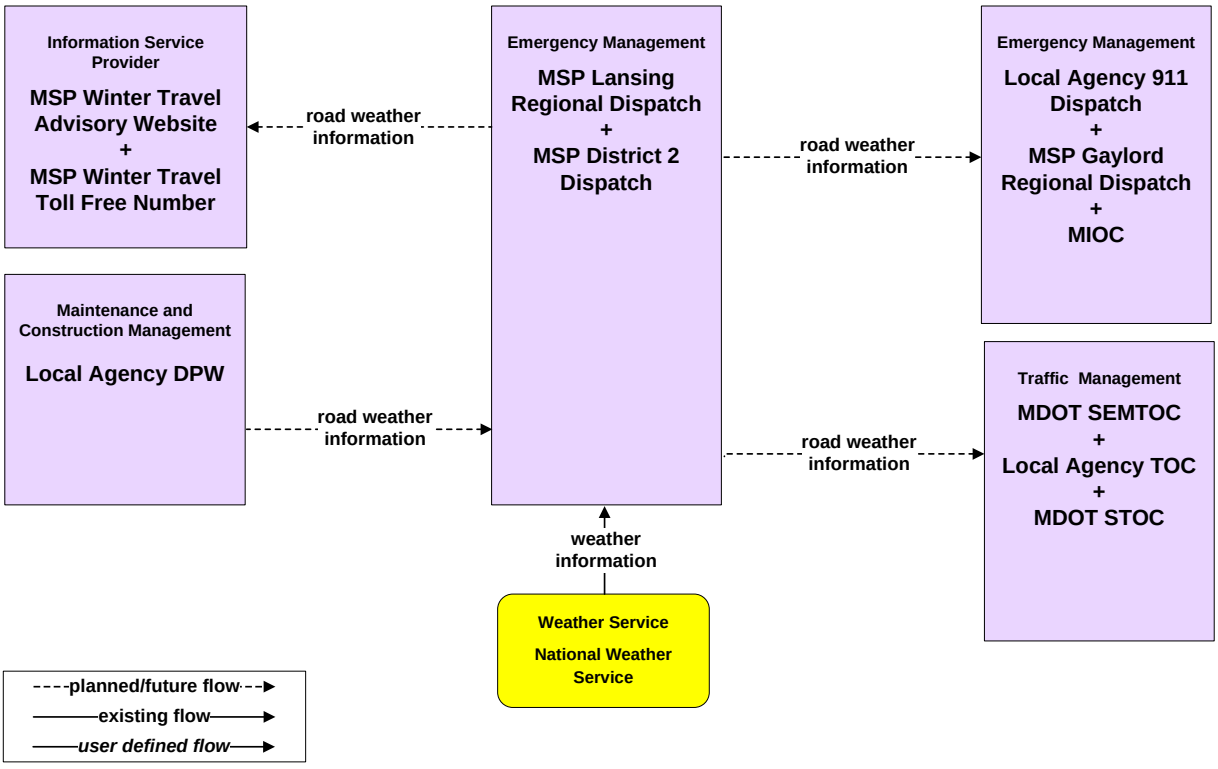
MC03 – Road Weather Data Collection
MDOT



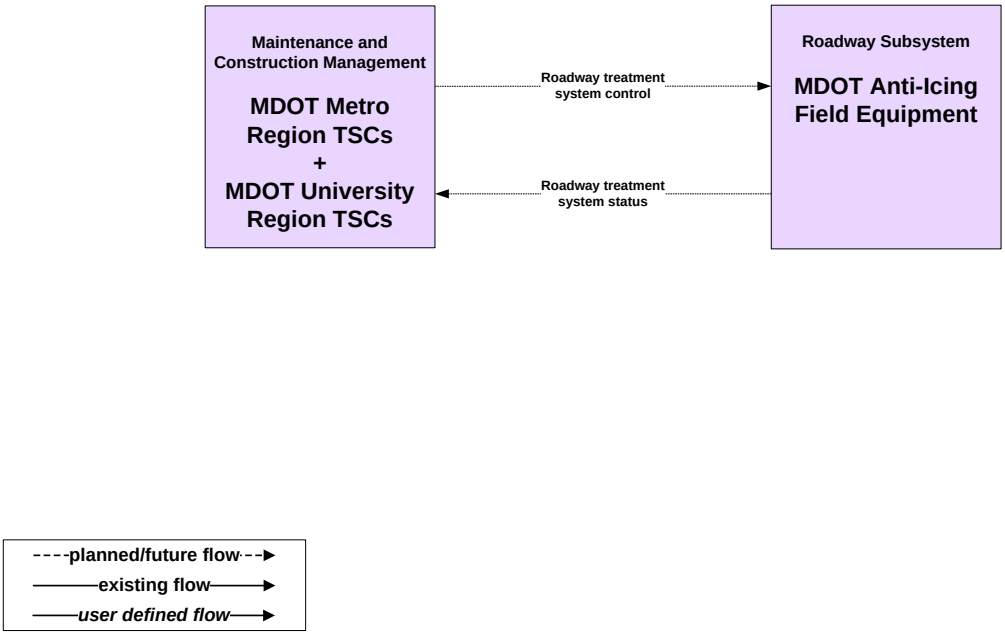
MC04 – Weather Information Processing and Distribution
MDOT



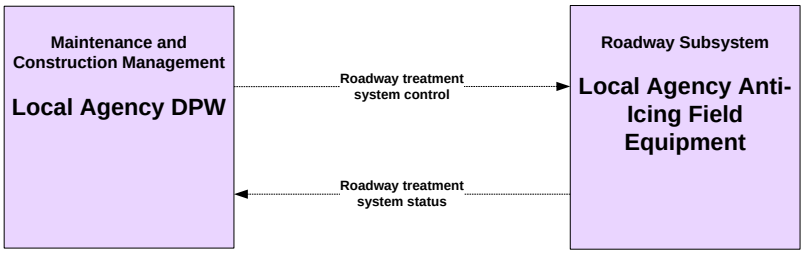
MC04 – Weather Information Processing and Distribution
Michigan State Police



MC05 – Roadway Automated Treatment
MDOT

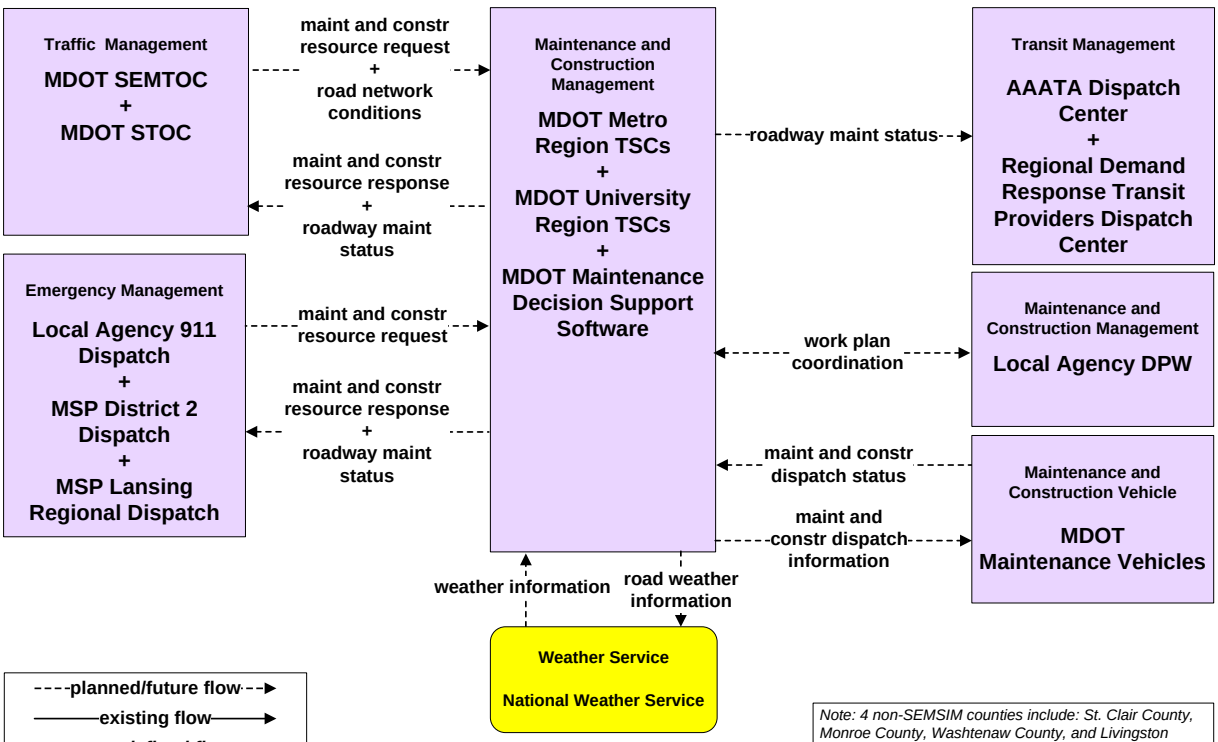


MC05 – Roadway Automated Treatment
MDOT



planned/future flow
existing flow
user defined flow

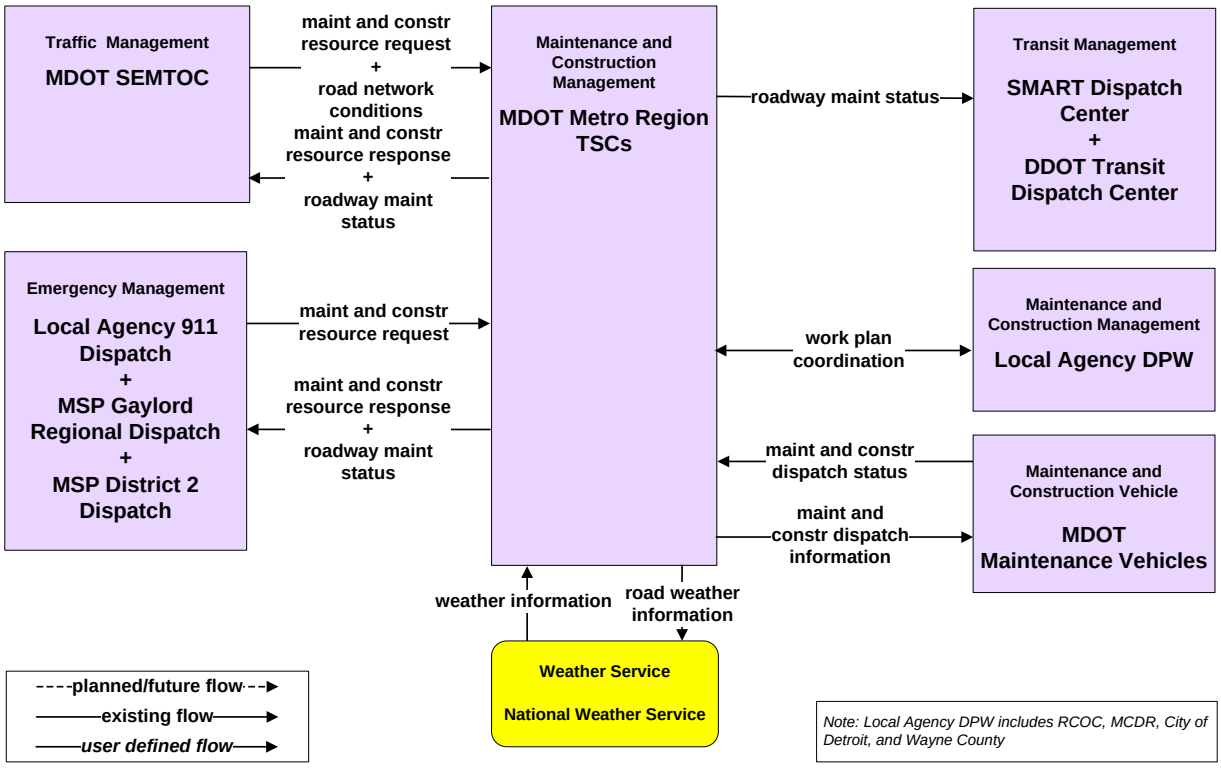
MC06 – Winter Maintenance
MDOT



planned/future flow
existing flow
user defined flow

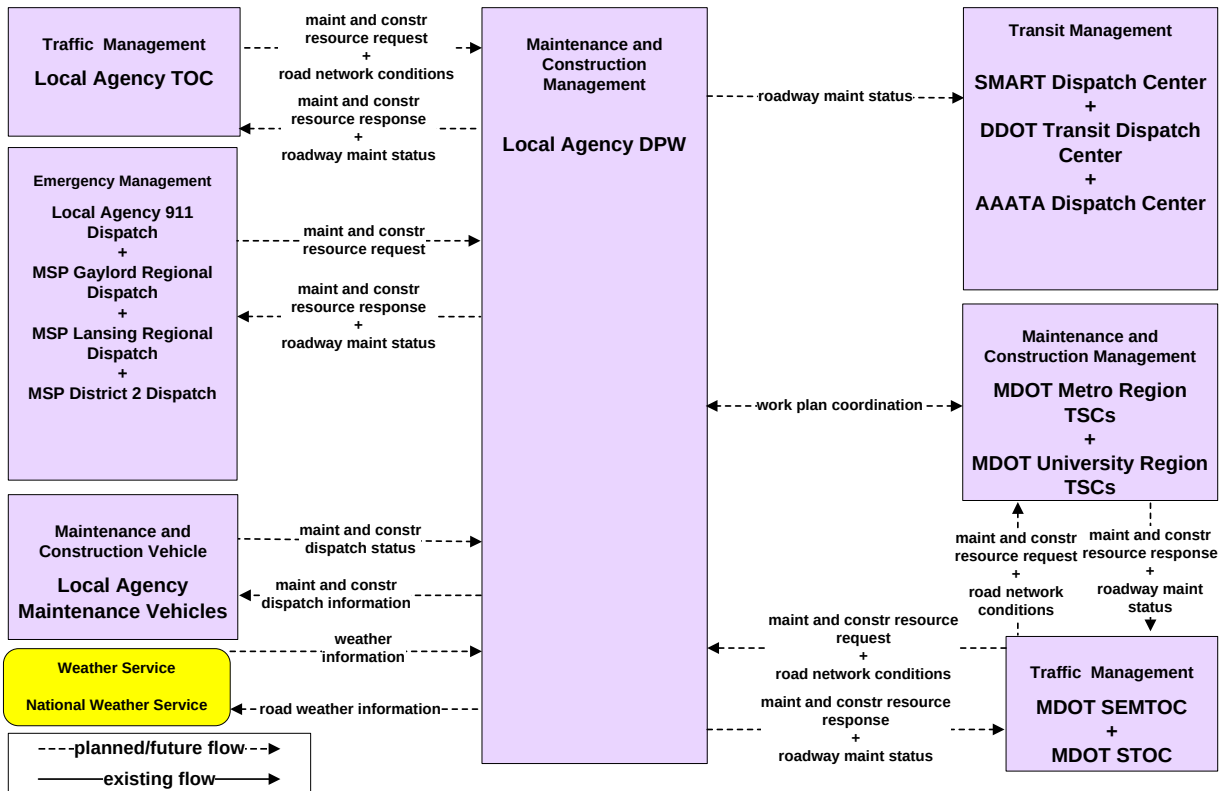
Note: 4 non-SEMSIM counties include: St. Clair County, Monroe County, Washtenaw County, and Livingston County

MC06 – Winter Maintenance
SEMSIM Partners

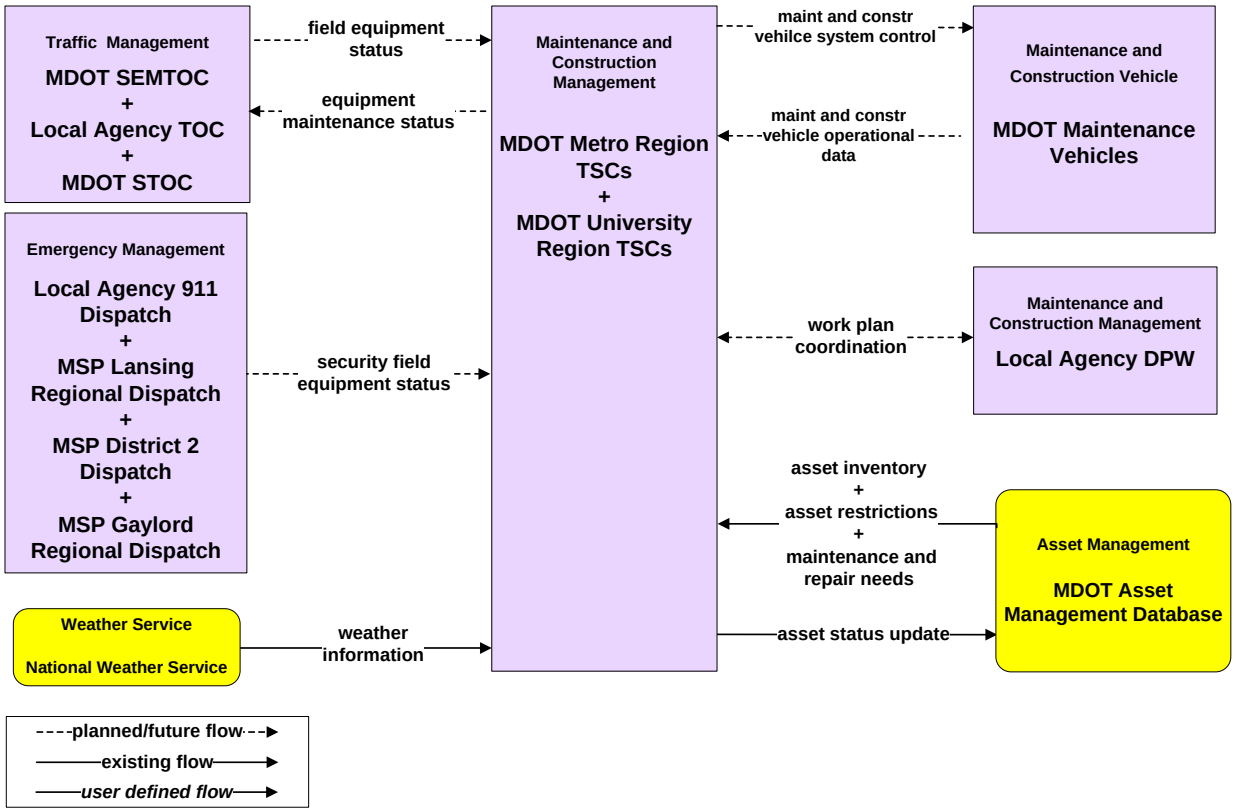


Note: Local Agency DPW includes RCOC, MCDR, City of Detroit, and Wayne County

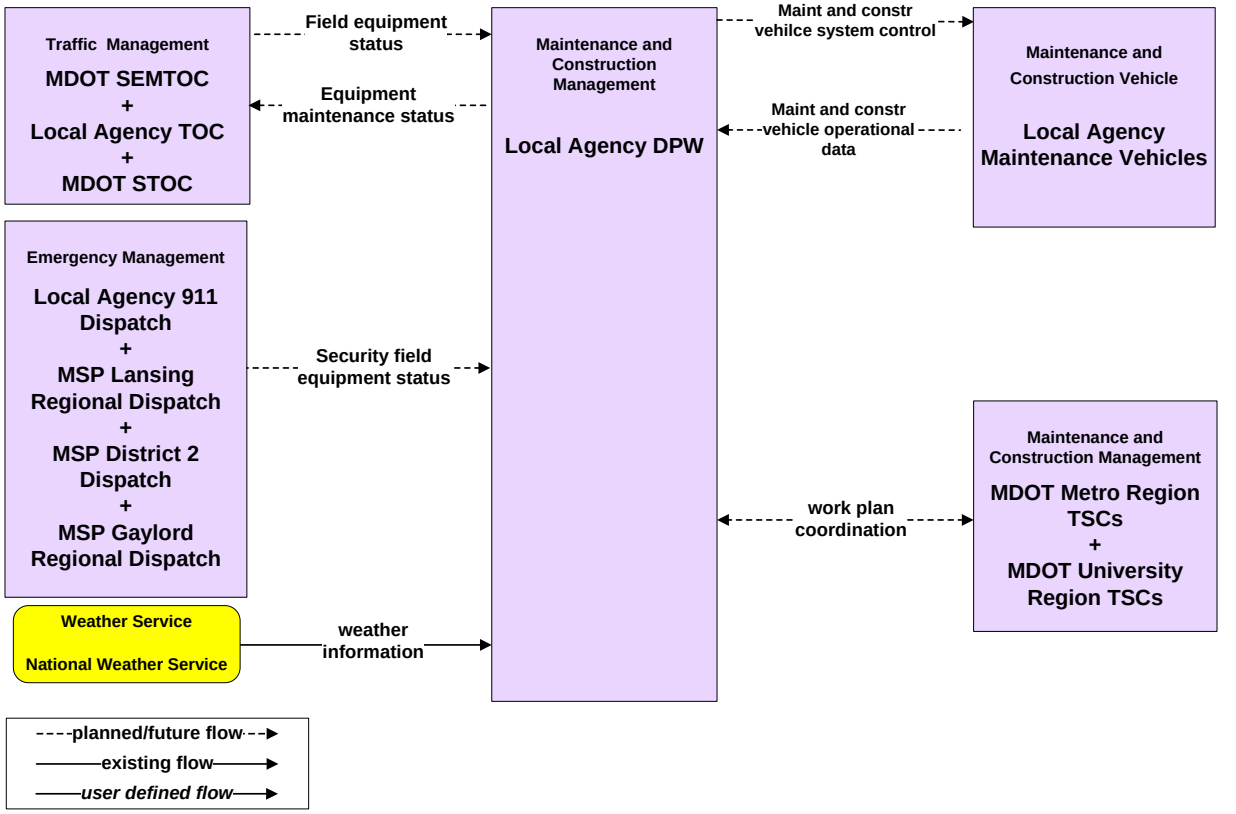
MC06 – Winter Maintenance
Local Agency



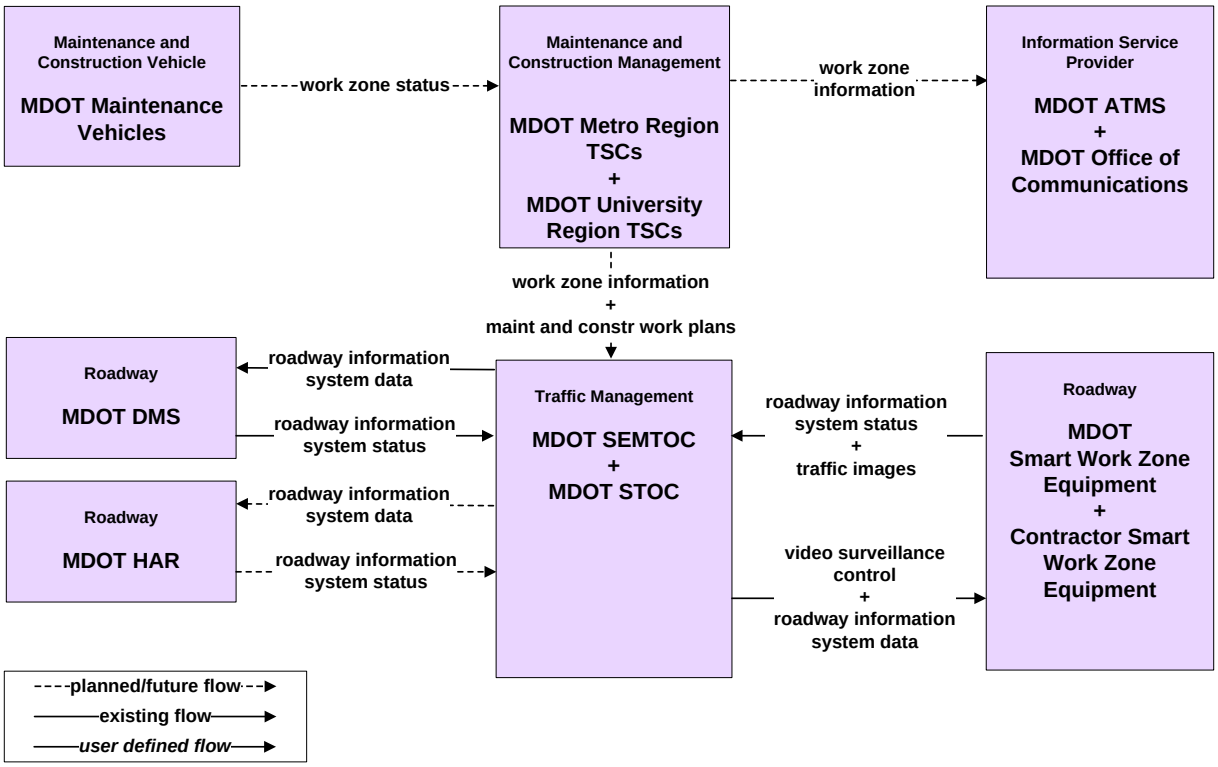
MC07 – Roadway Maintenance and Construction
MDOT



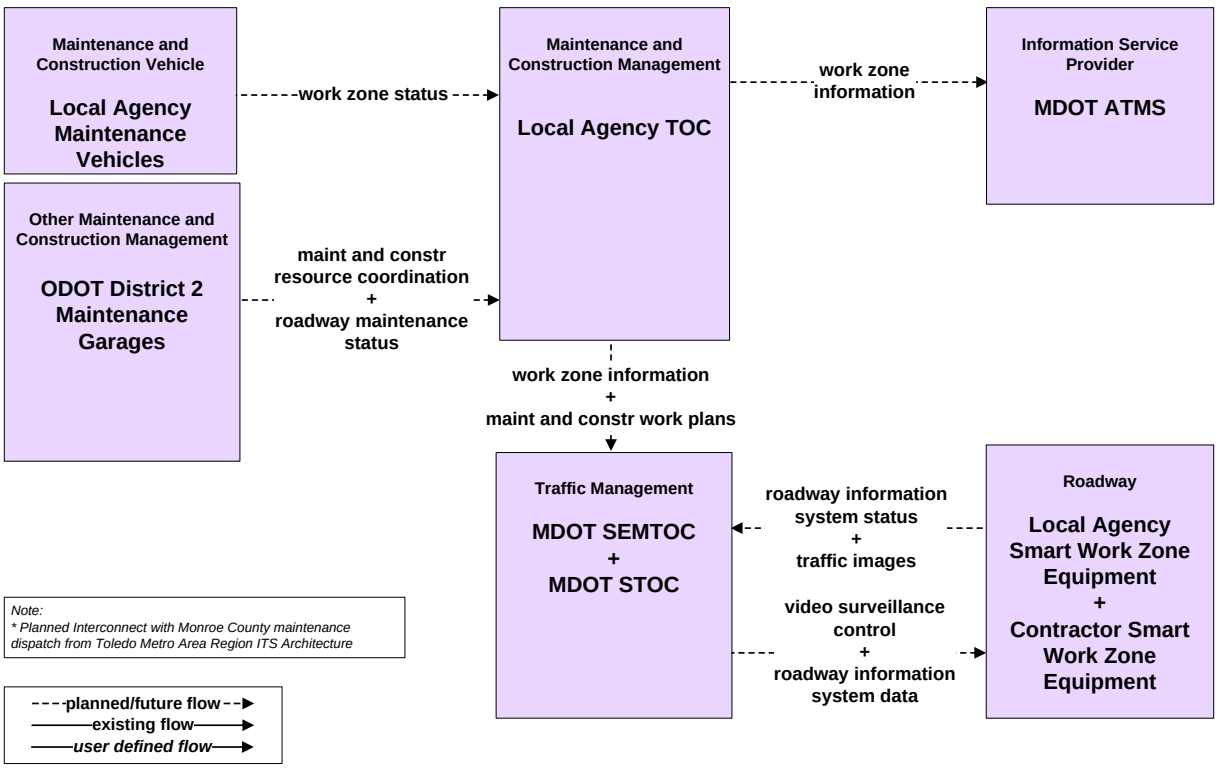
MC07 – Roadway Maintenance and Construction
Local Agency



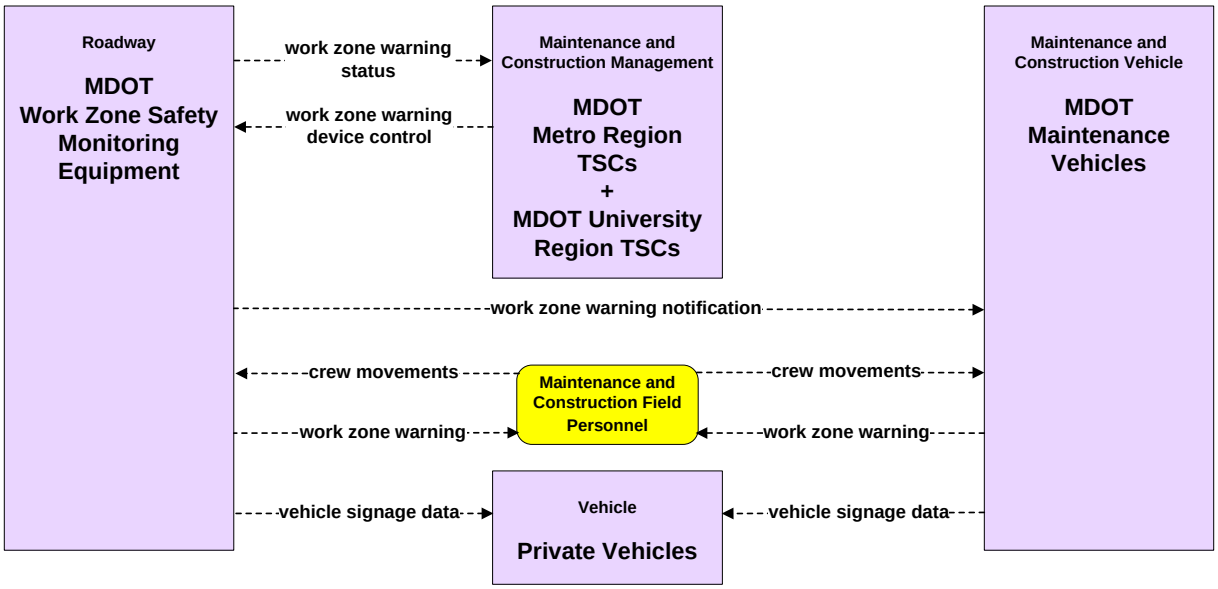
MC08 – Work Zone Management
MDOT

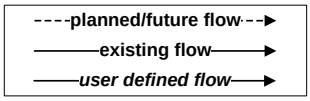


MC08 – Work Zone Management
Local Agency

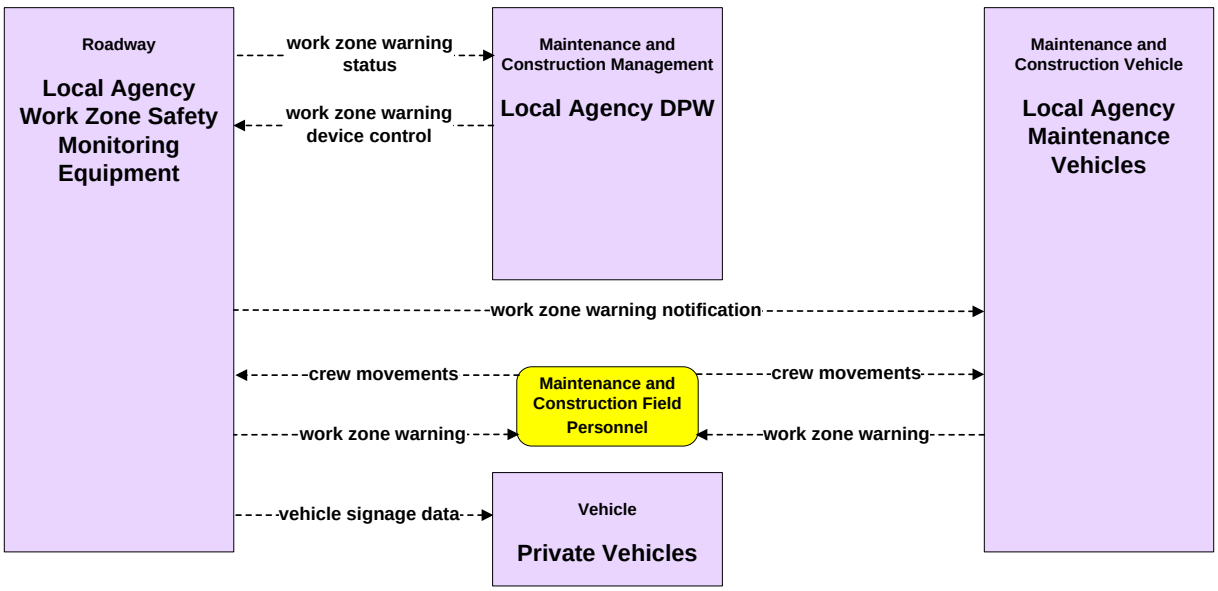


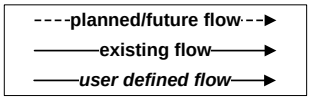
MC09 – Work Zone Safety Monitoring
MDOT



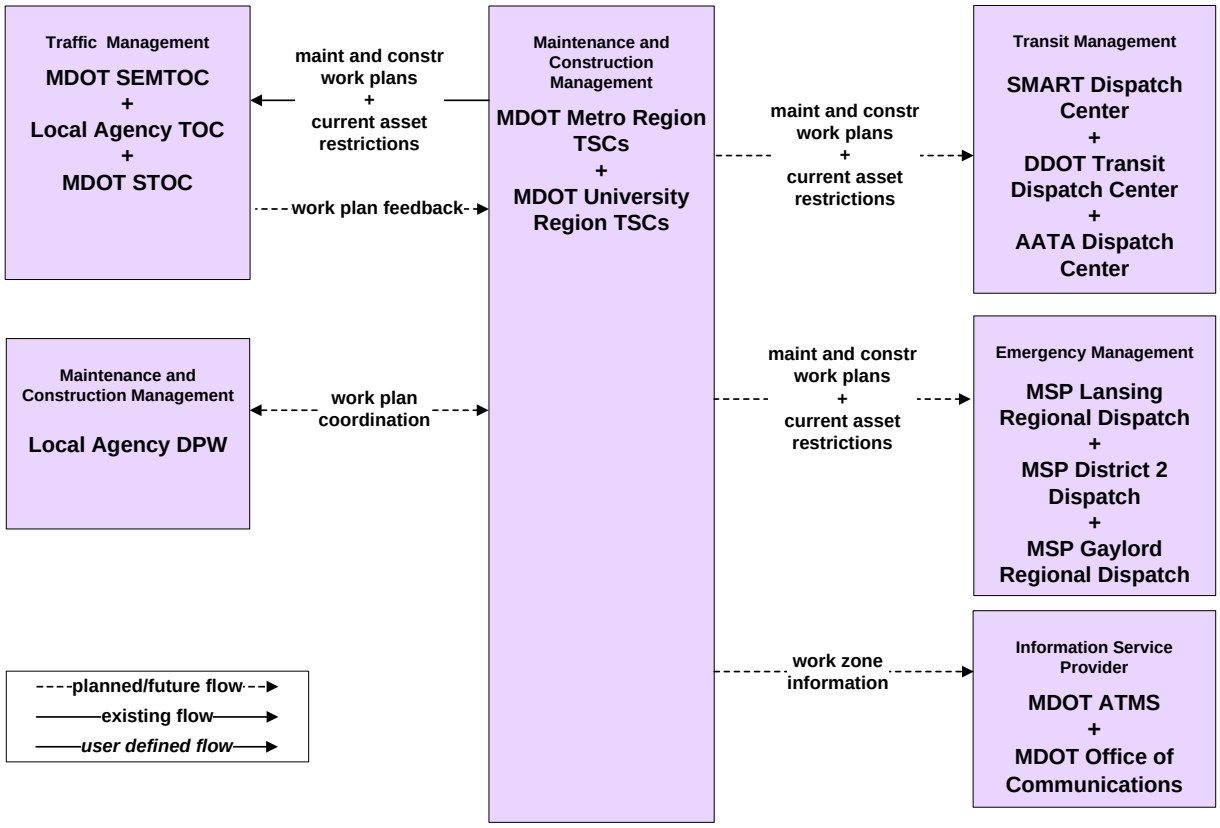


MC09 – Work Zone Safety Monitoring
Local Agency

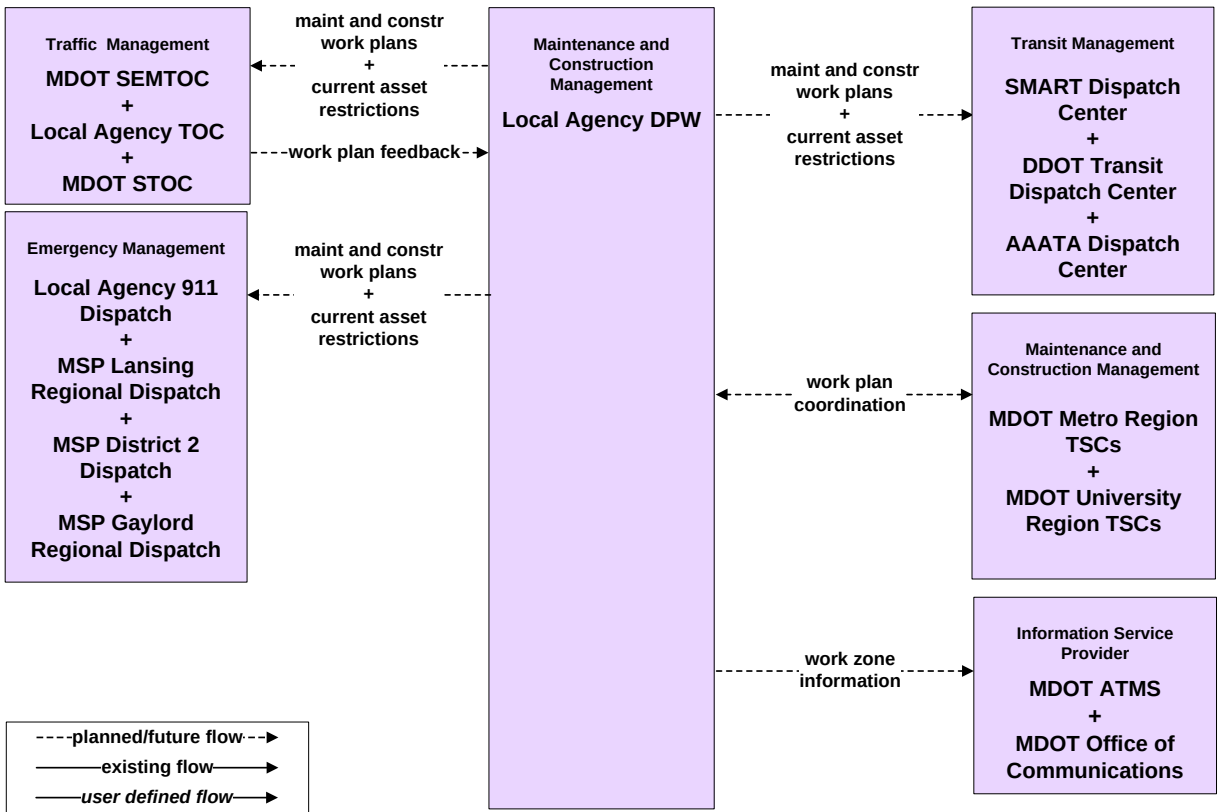




MC10 – Maintenance and Construction Activity Coordination
MDOT

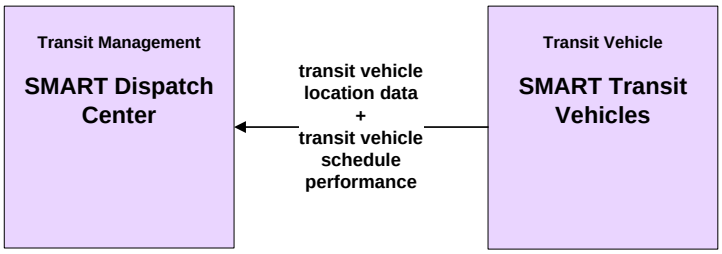


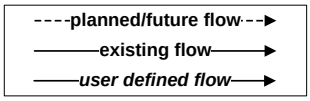
MC10 – Maintenance and Construction Activity Coordination
Local Agency



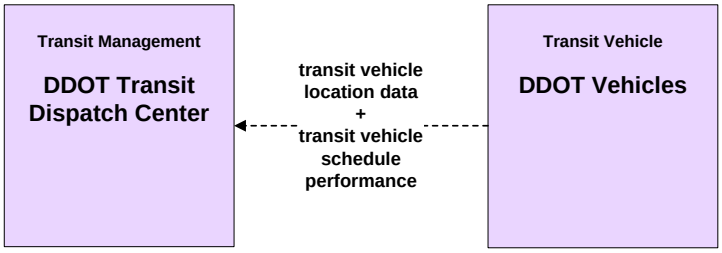
Advanced Public Transportation Systems

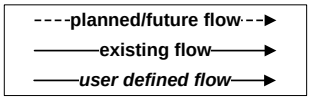
APTS1 – Transit Vehicle Tracking
SMART



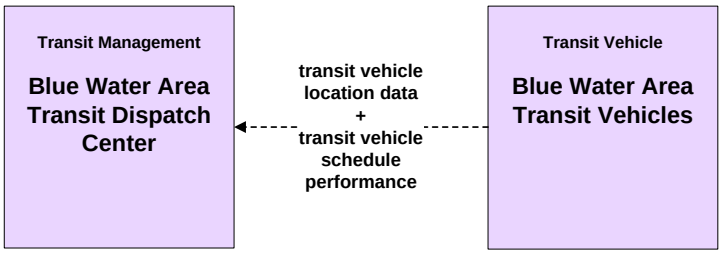


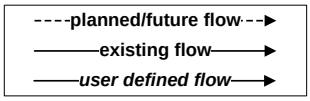
APTS1 – Transit Vehicle Tracking
DDOT



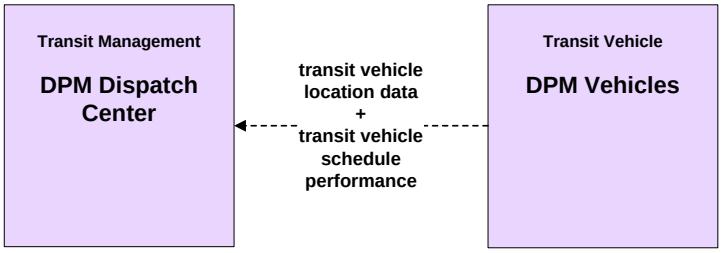


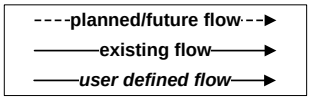
APTS1 – Transit Vehicle Tracking
Blue Water Area Transit



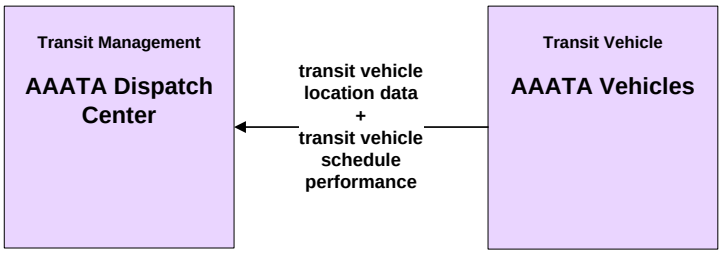


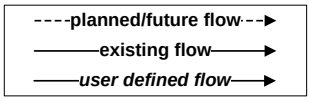
APTS1 – Transit Vehicle Tracking
Detroit People Mover (DPM)



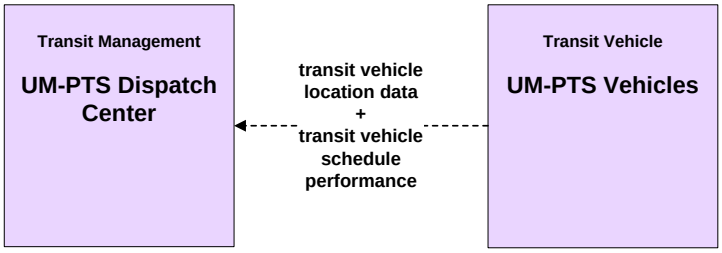


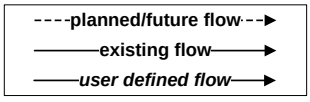
APTS1 – Transit Vehicle Tracking
Ann Arbor Area Transportation Authority (AAATA)



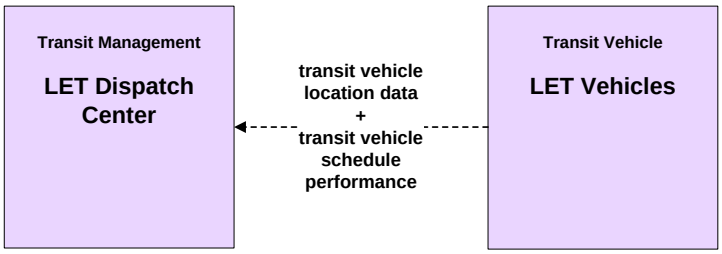


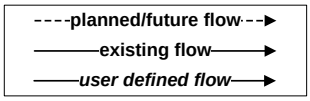
APTS1 – Transit Vehicle Tracking
University of Michigan Parking and Transportation Services (UM-PTS)



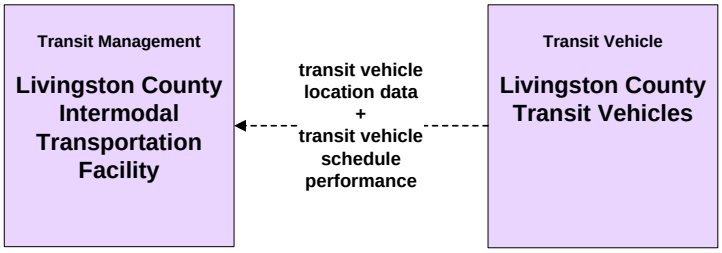


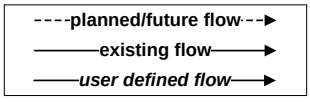
APTS1 – Transit Vehicle Tracking
Lake Erie Transportation Commission - Lake Erie Transit (LET)



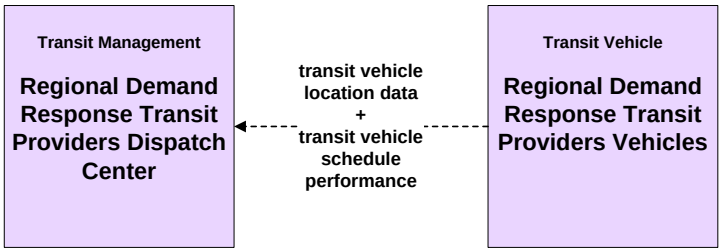


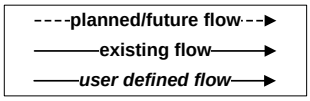
APTS1 – Transit Vehicle Tracking
Livingston County



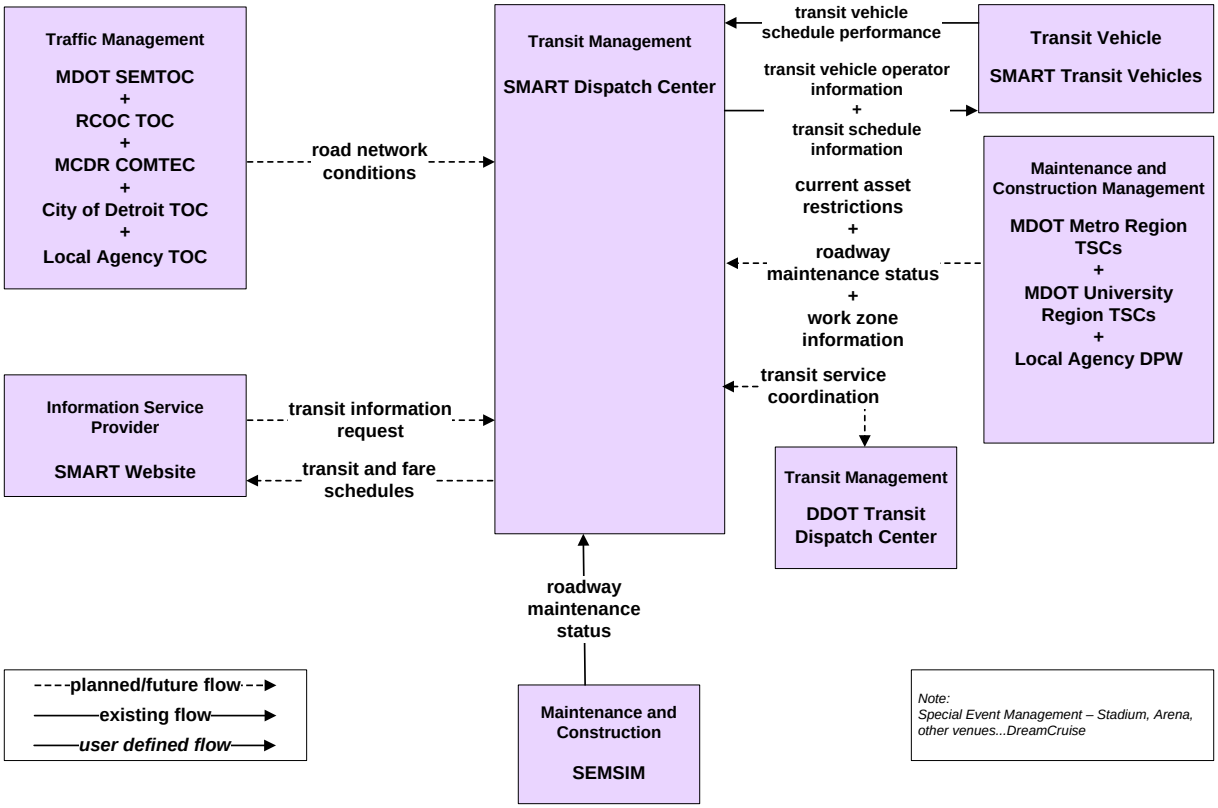


APTS1 – Transit Vehicle Tracking
Regional Demand Response Transit Provider

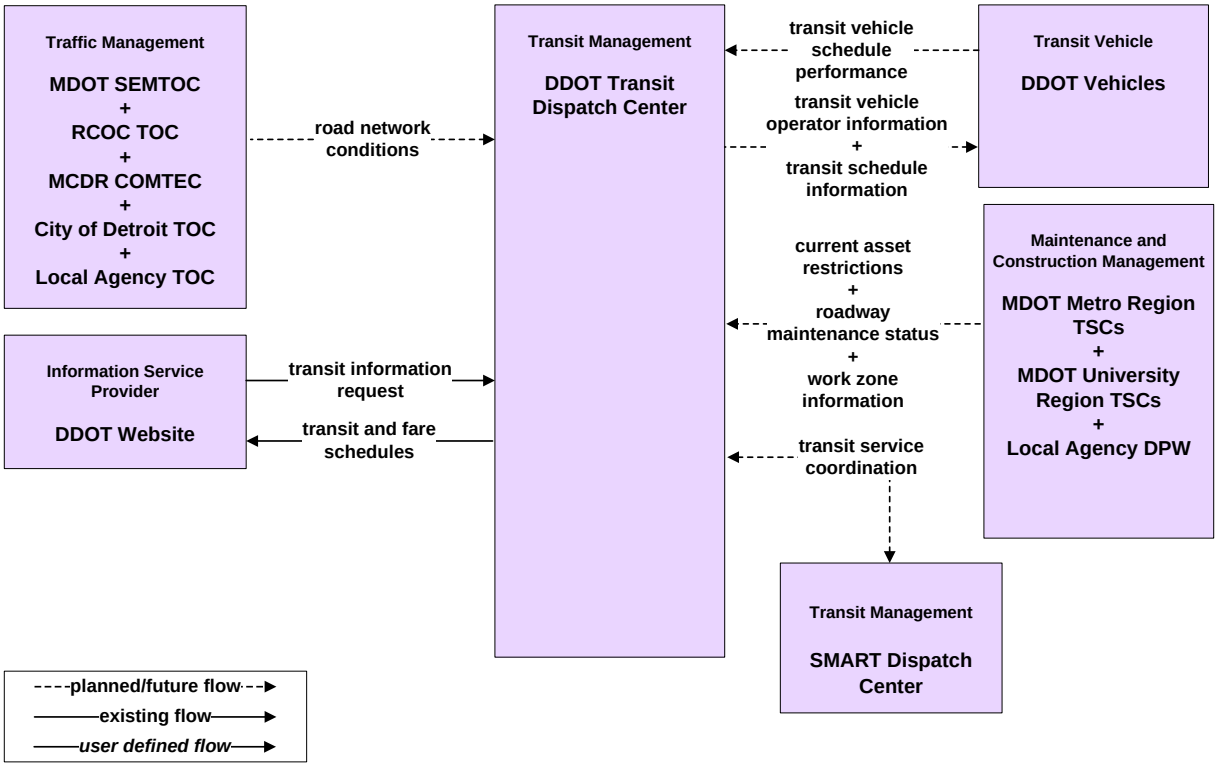




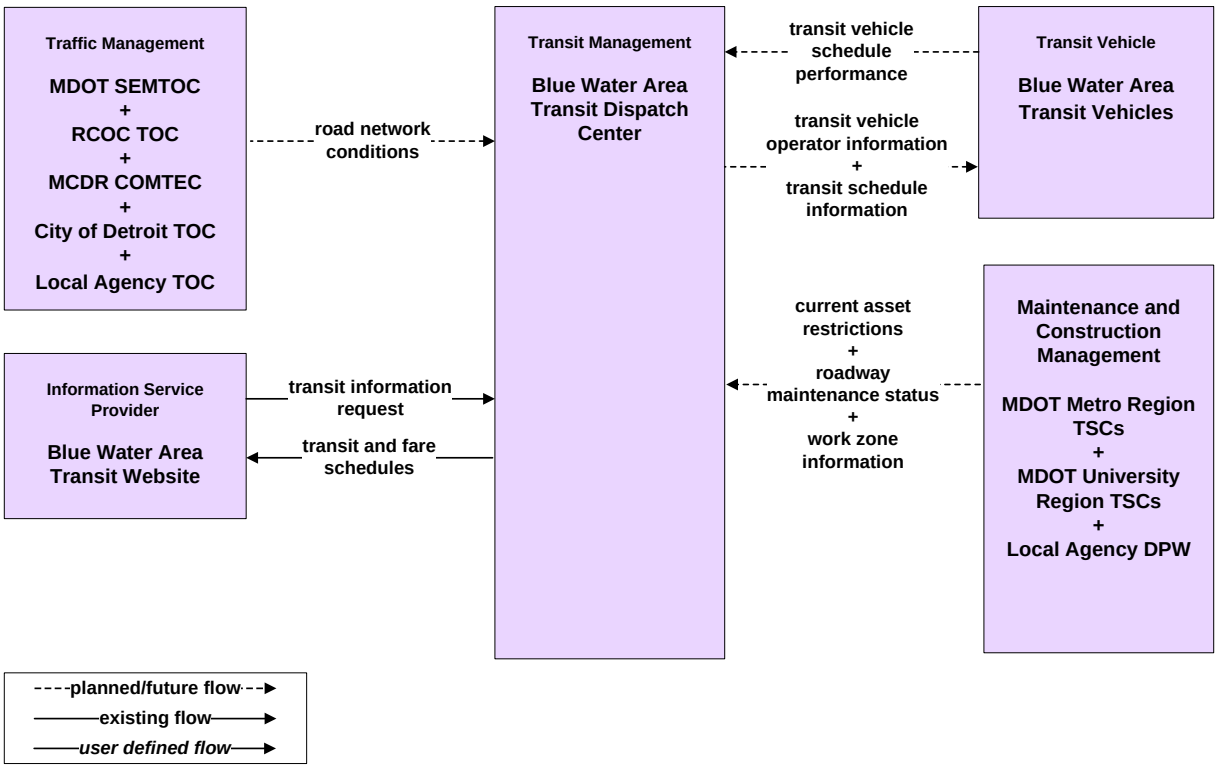
APTS2 – Transit Fixed Route Operations
SMART



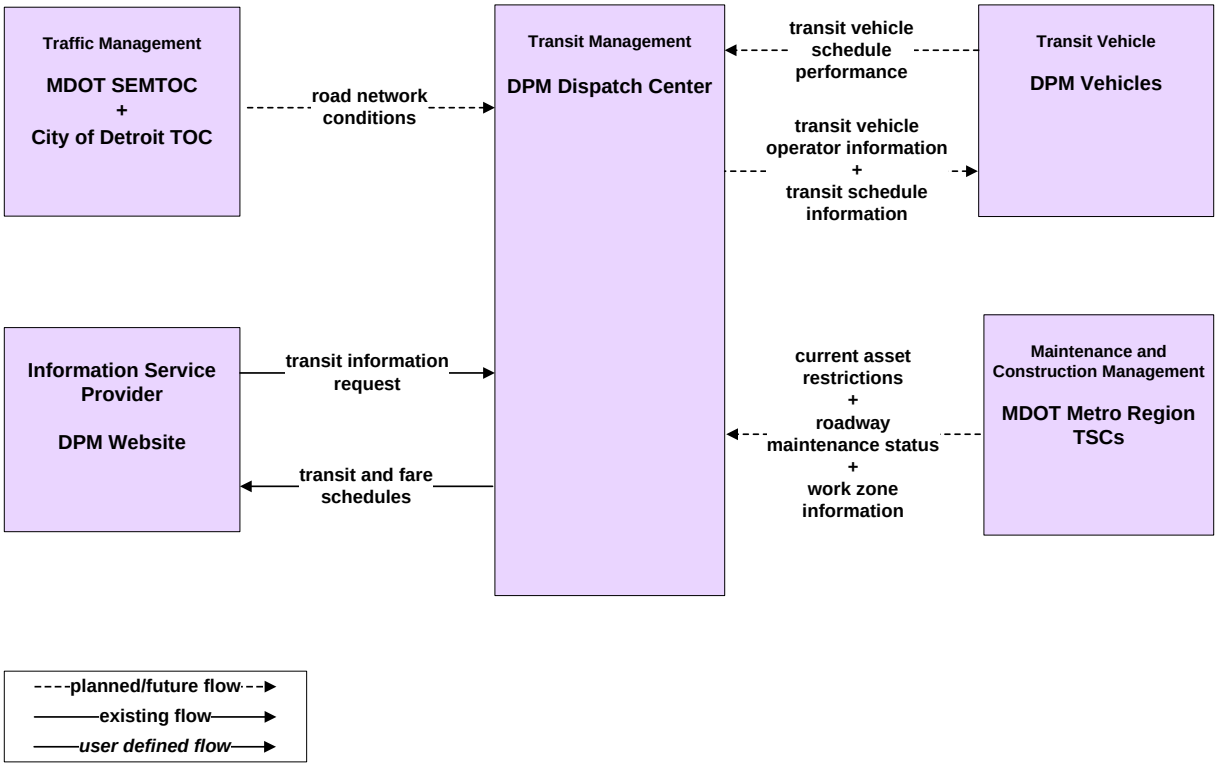
APTS2 – Transit Fixed Route Operations
DDOT



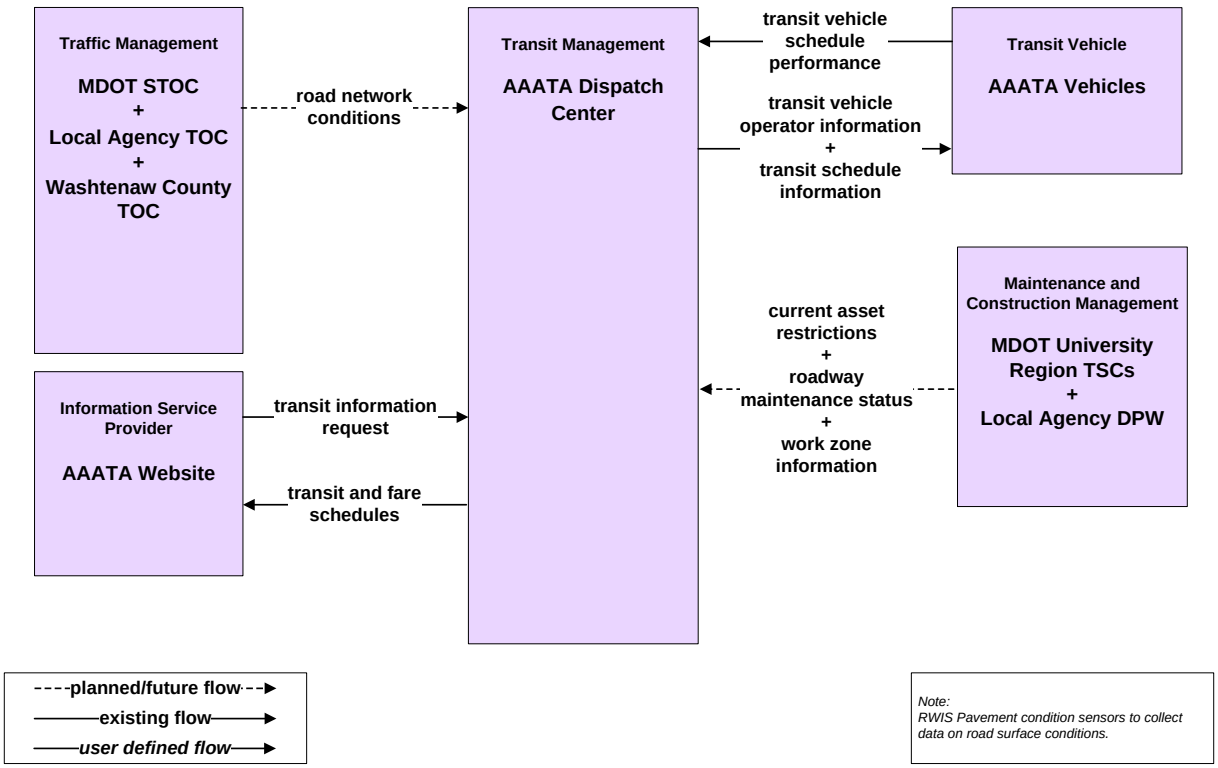
APTS2 – Transit Fixed Route Operations
Blue Water Area Transit



APTS2 – Transit Fixed Route Operations
Detroit People Mover (DPM)

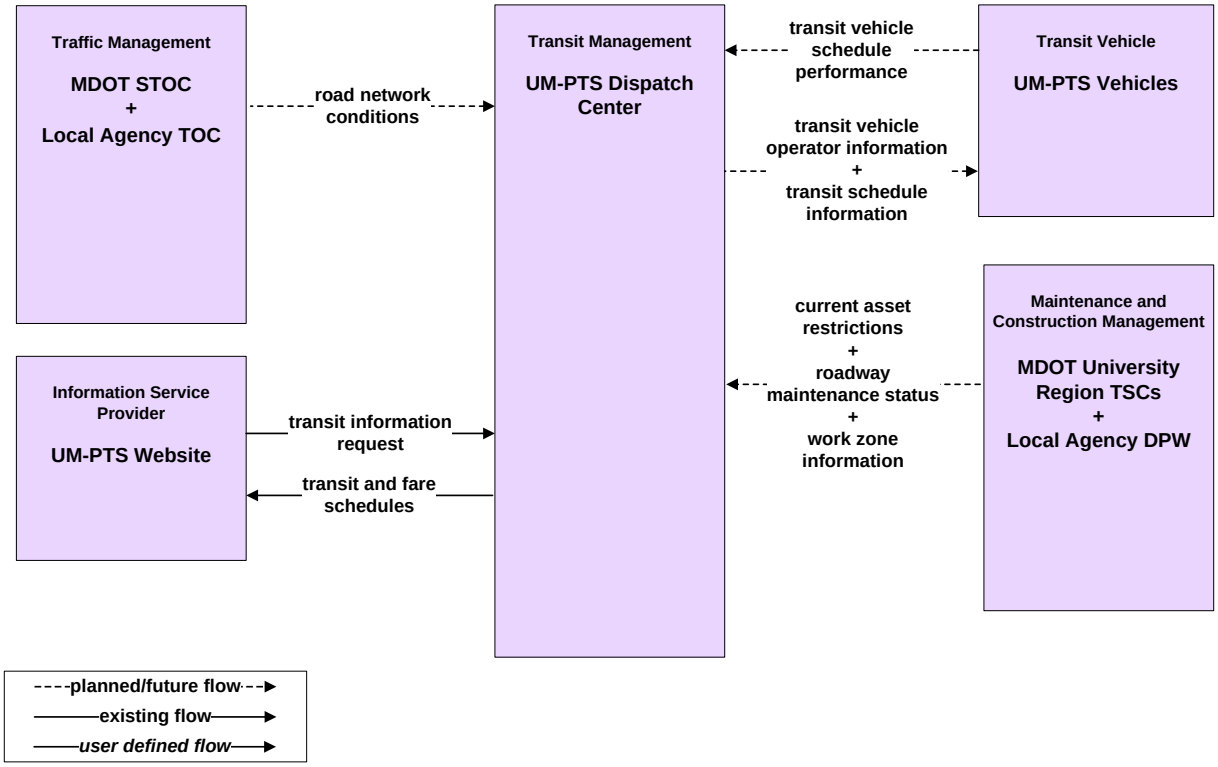


APTS2 – Transit Fixed Route Operations
Ann Arbor Area Transportation Authority (AAATA)

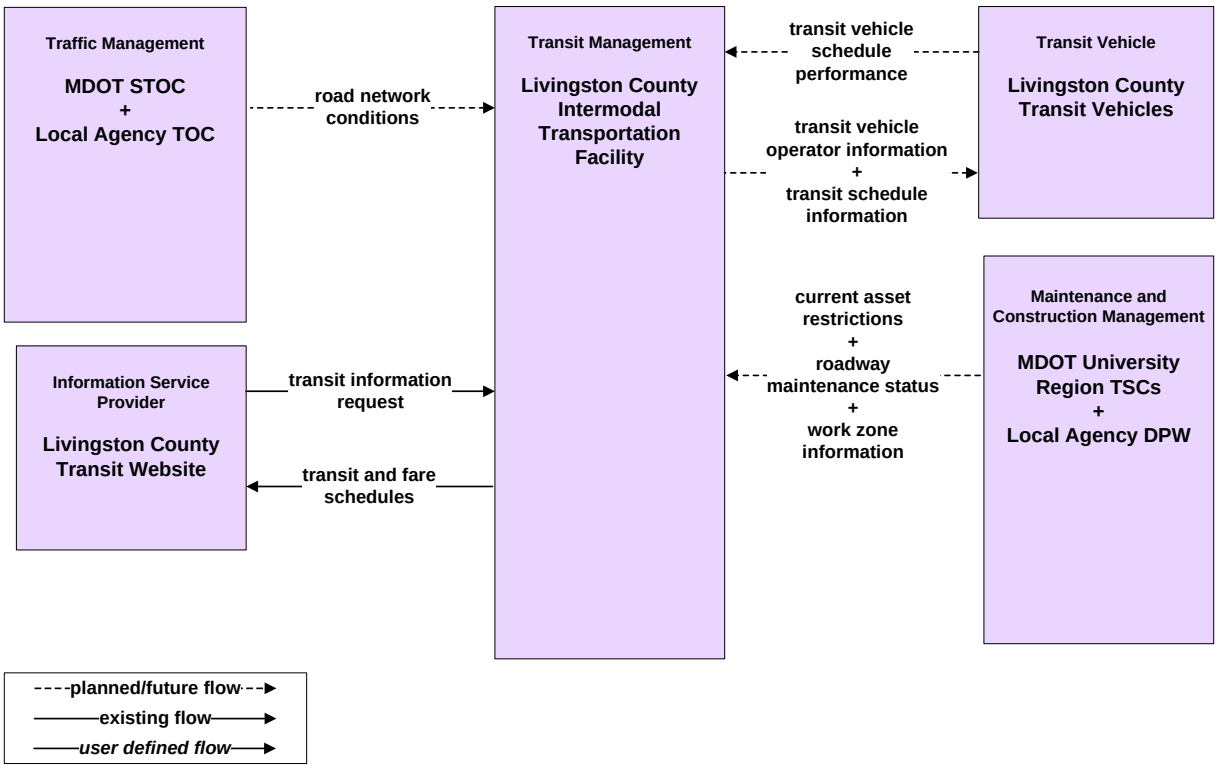


Note:
RWIS Pavement condition sensors to collect data on road surface conditions.

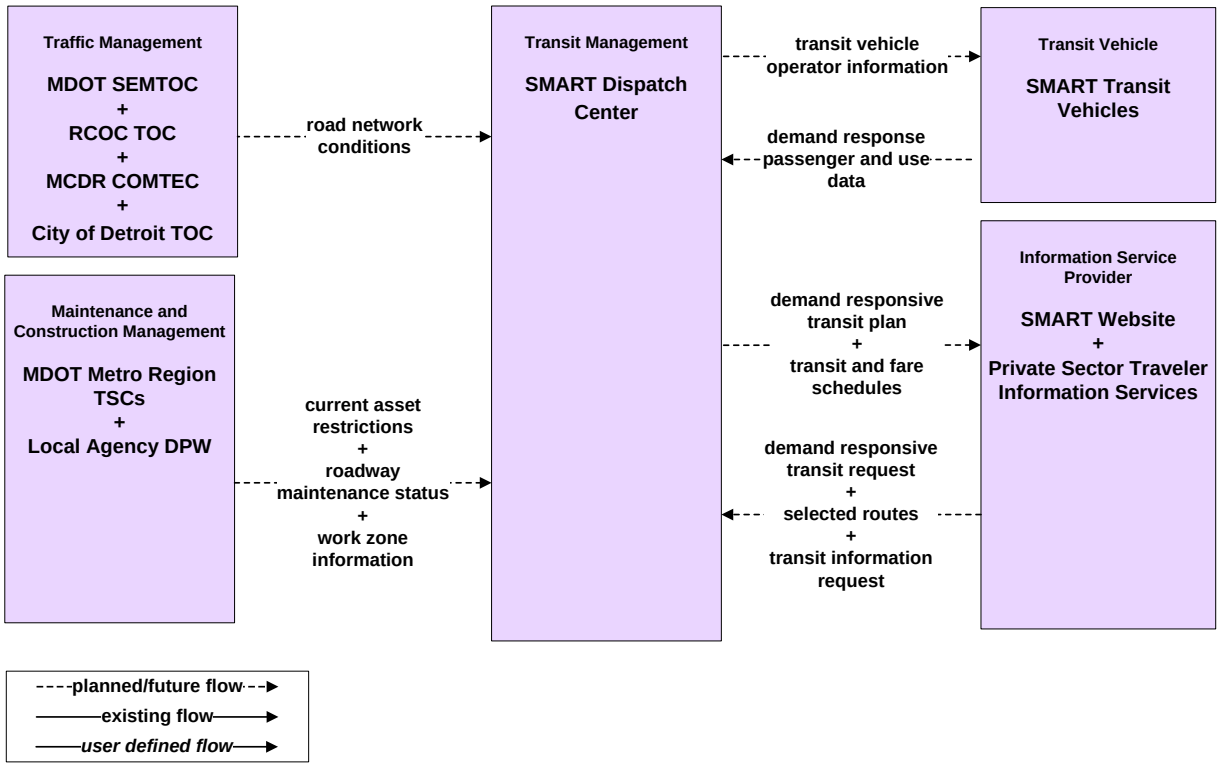
APTS2 – Transit Fixed Route Operations
University of Michigan Parking and Transportation Services (UM-PTS)



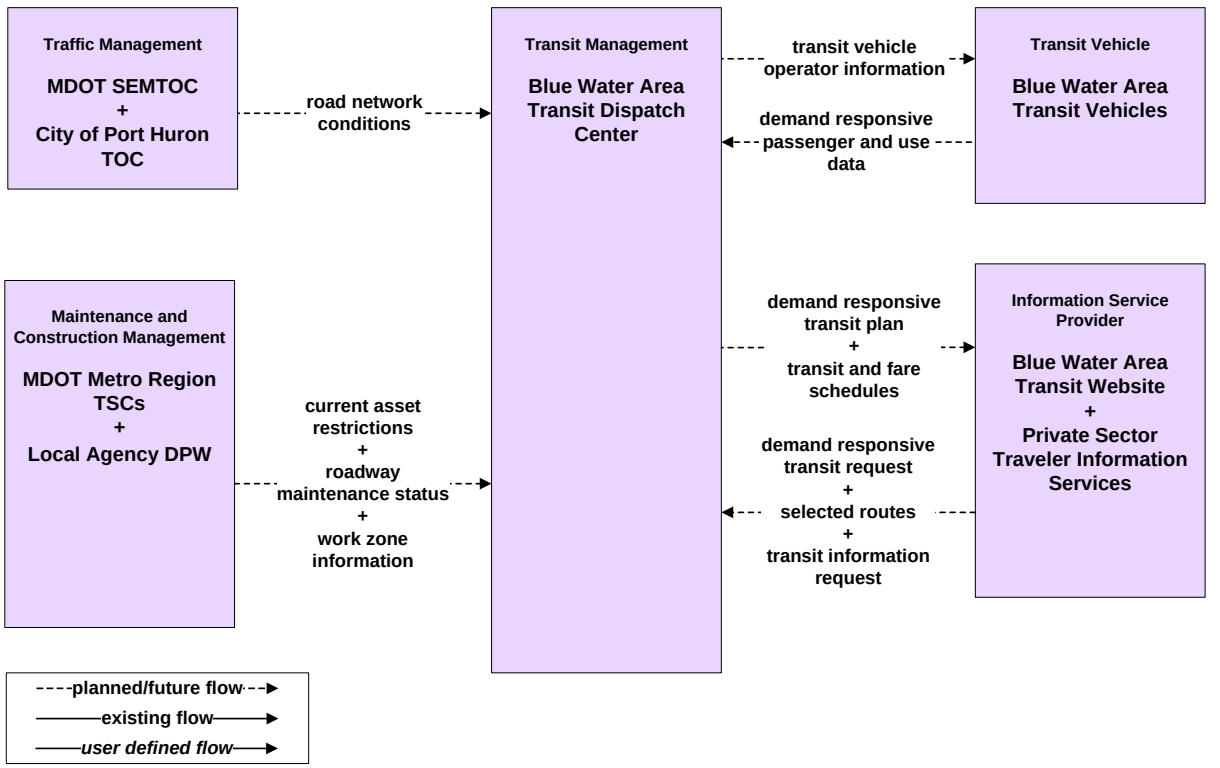
APTS2 – Transit Fixed Route Operations
Livingston County



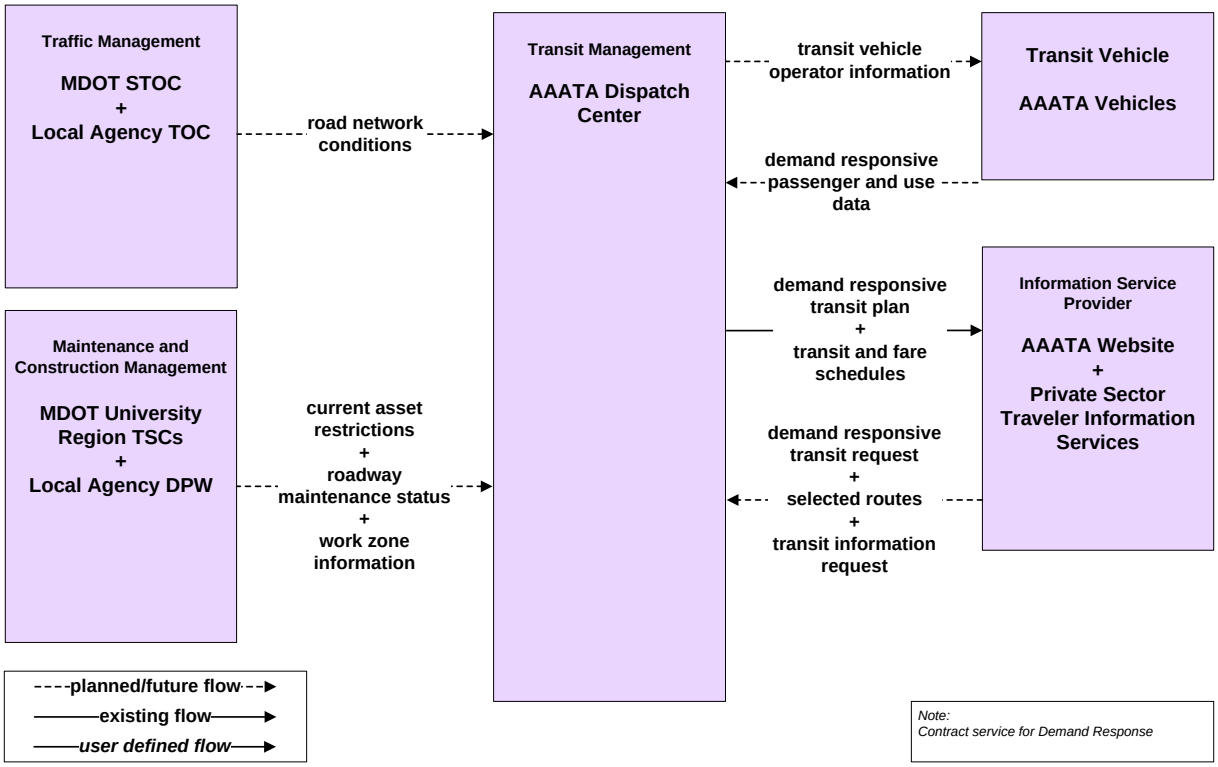
APTS3 – Demand Response Transit Operations
SMART



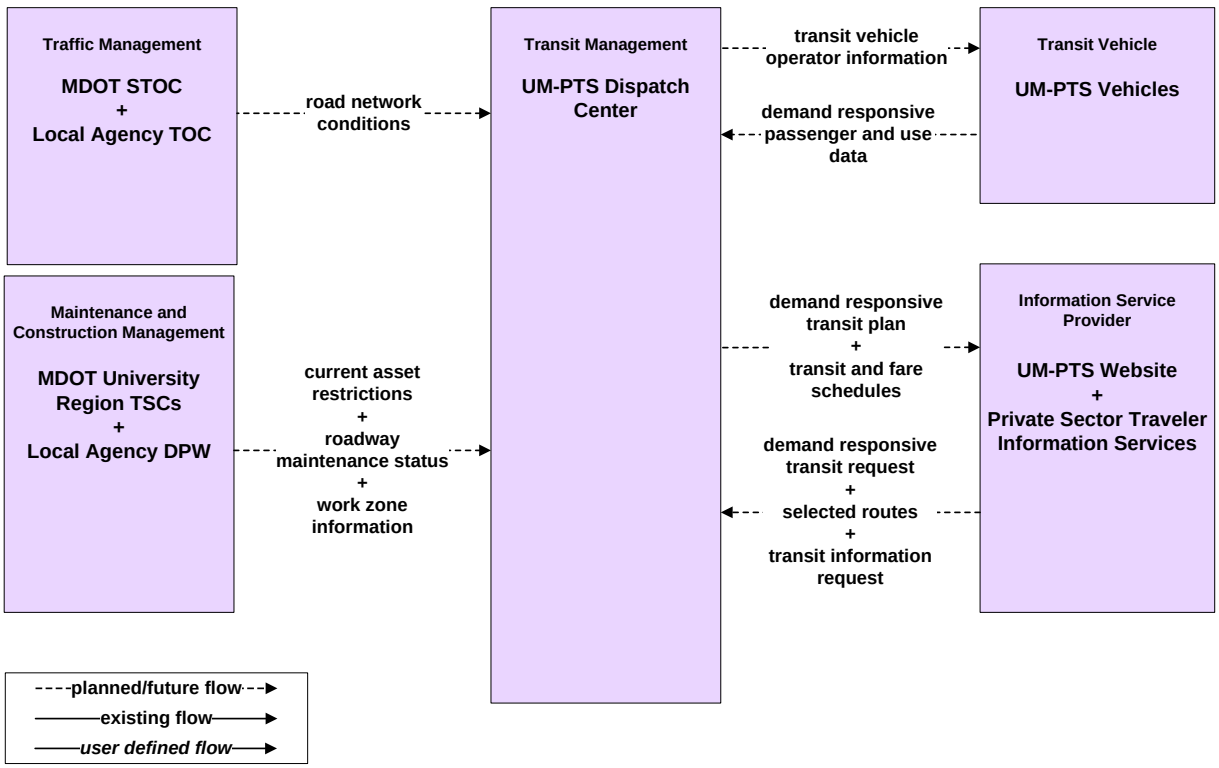
APTS3 – Demand Response Transit Operations
Blue Water Area Transit



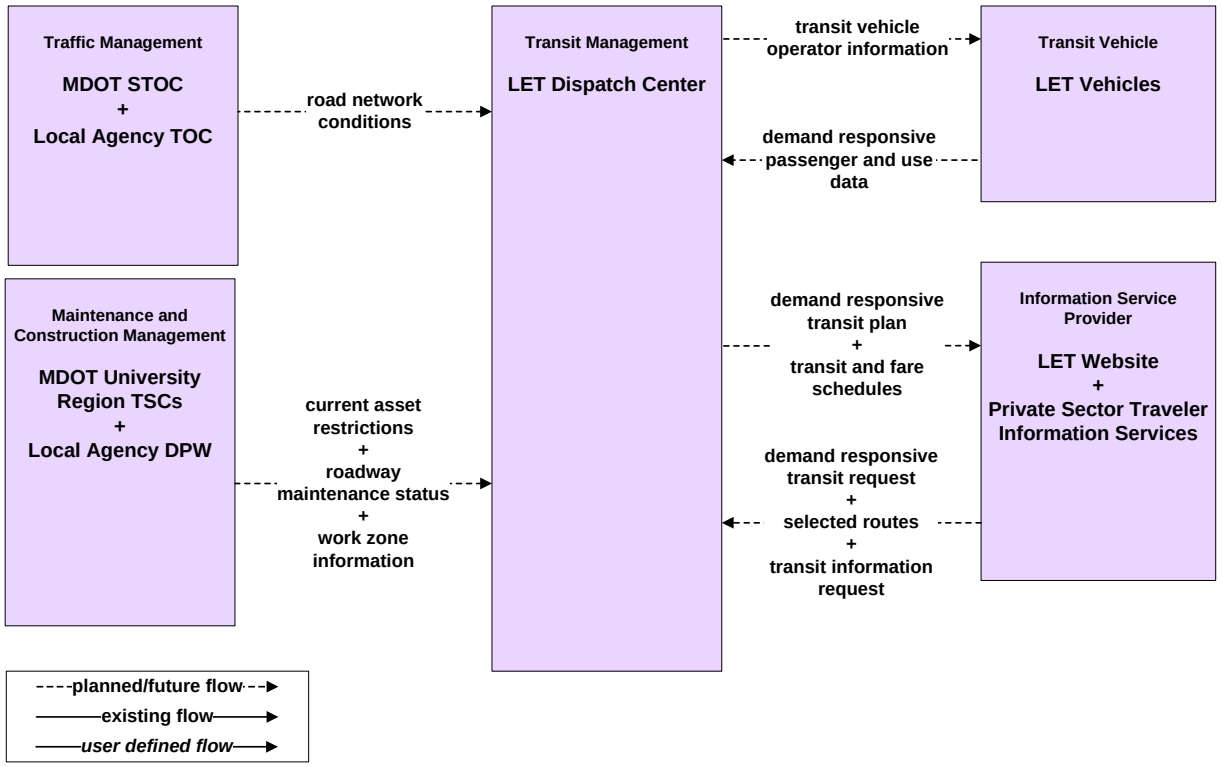
APTS3 – Demand Response Transit Operations
Ann Arbor Area Transportation Authority (AAATA)



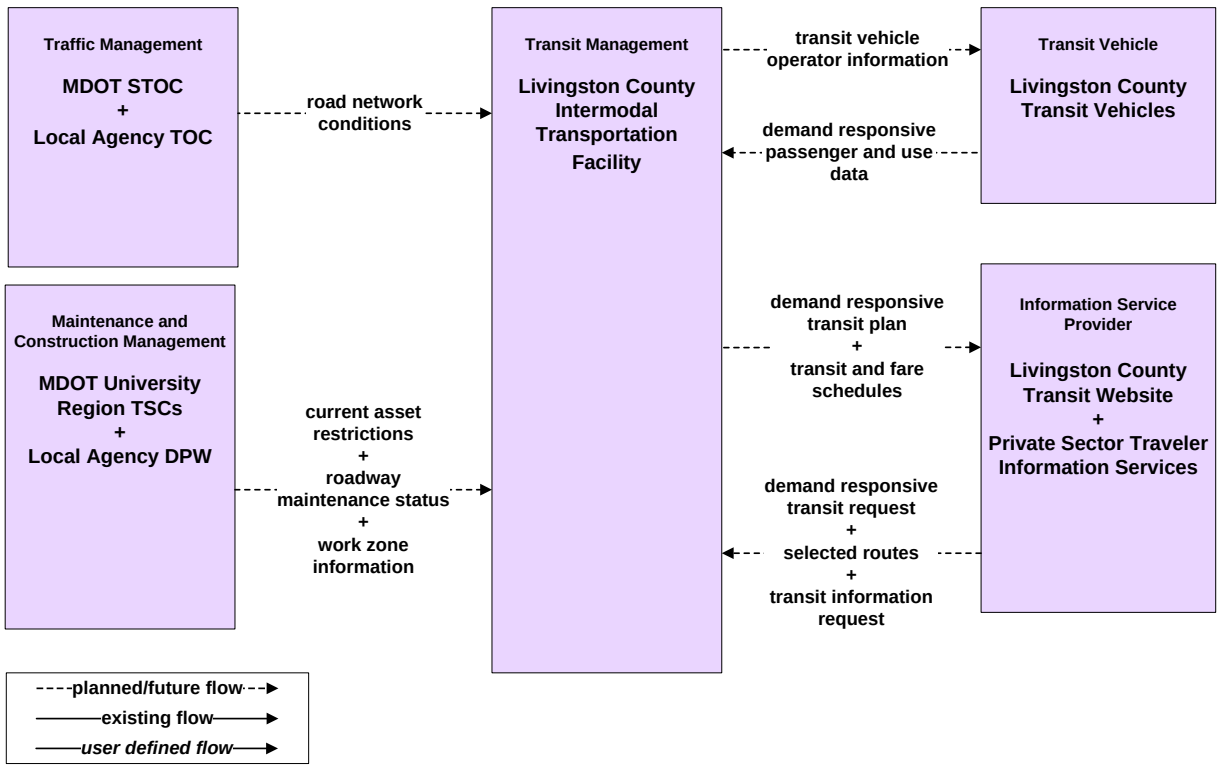
APTS3 – Demand Response Transit Operations
University of Michigan Parking and Transportation Services (UM-PTS)



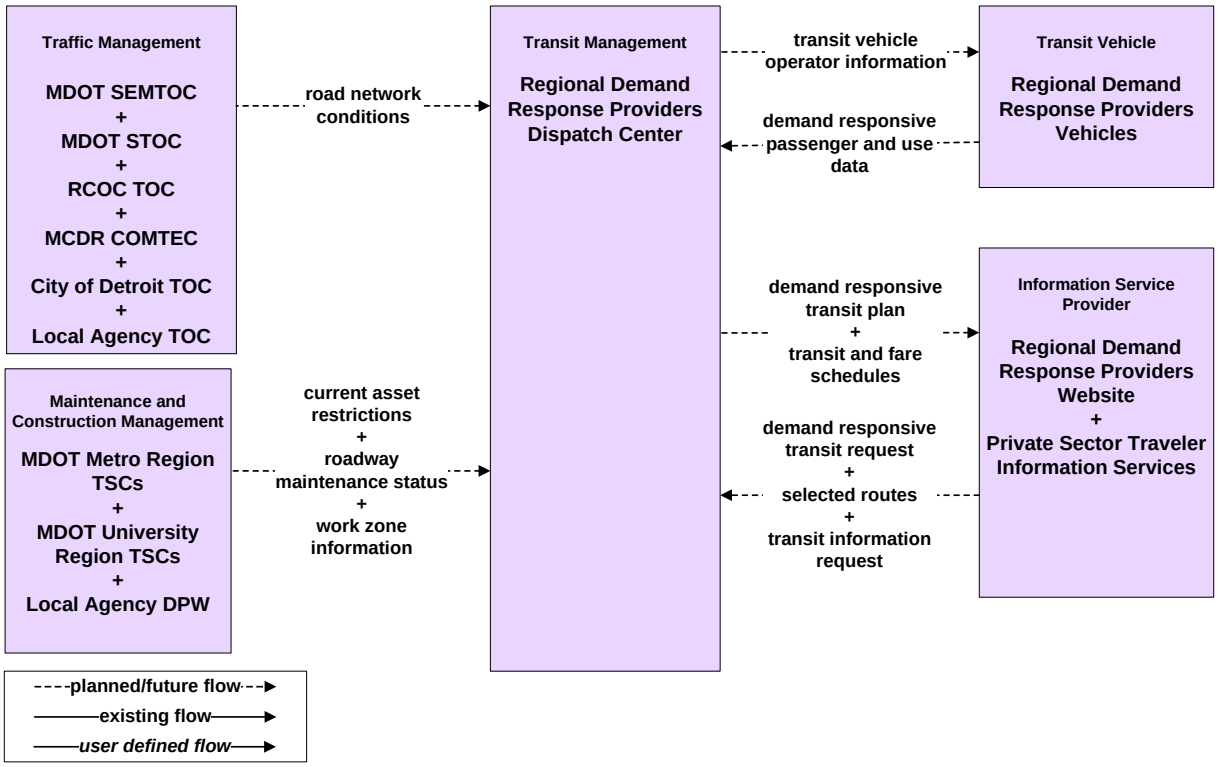
APTS3 – Demand Response Transit Operations
Lake Erie Transportation Commission - Lake Erie Transit (LET)



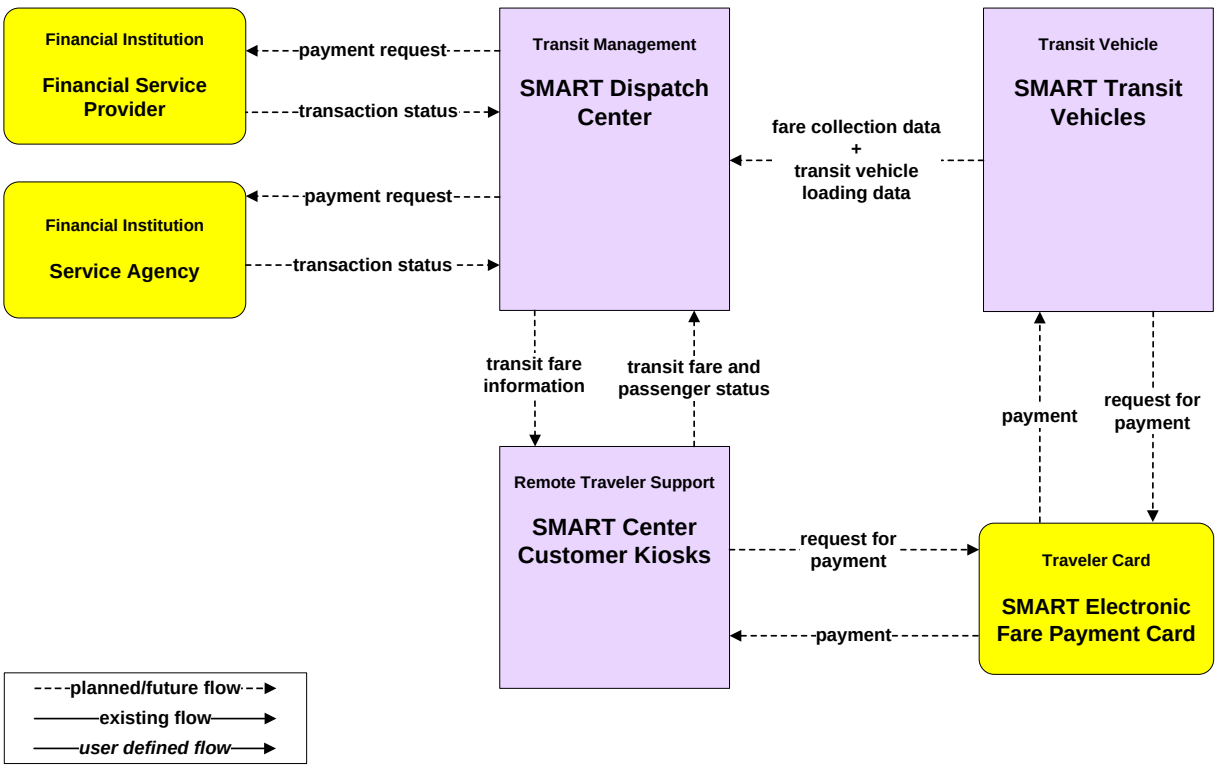
APTS3 – Demand Response Transit Operations
Livingston County



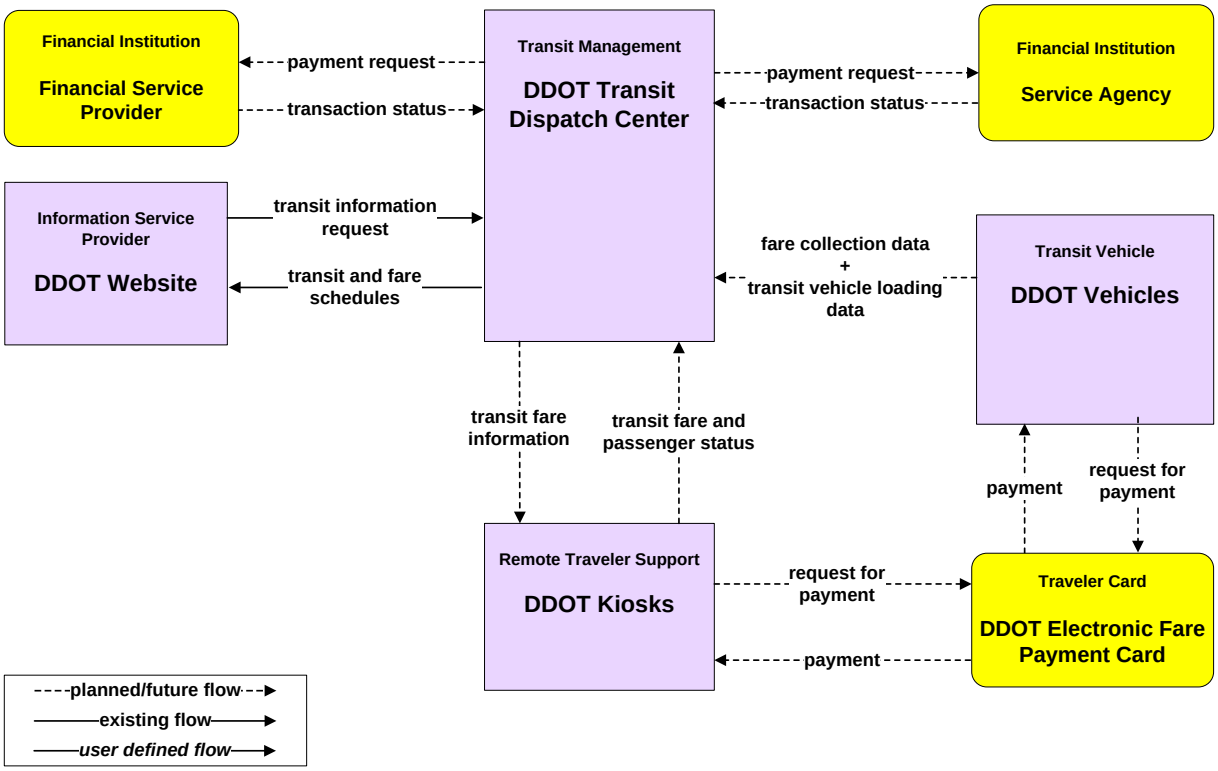
APTS3 – Demand Response Transit Operations
Regional Demand Response Transit Provider



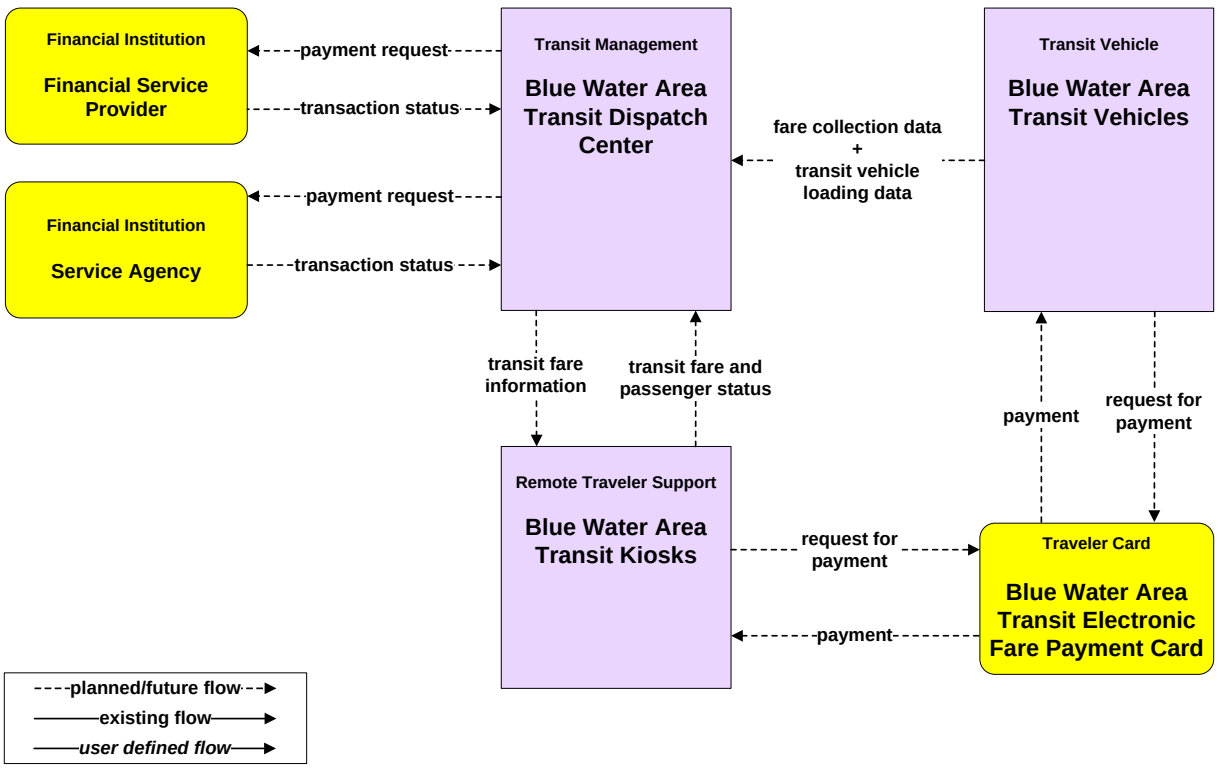
APTS4 – Transit Passenger and Fare Management
SMART



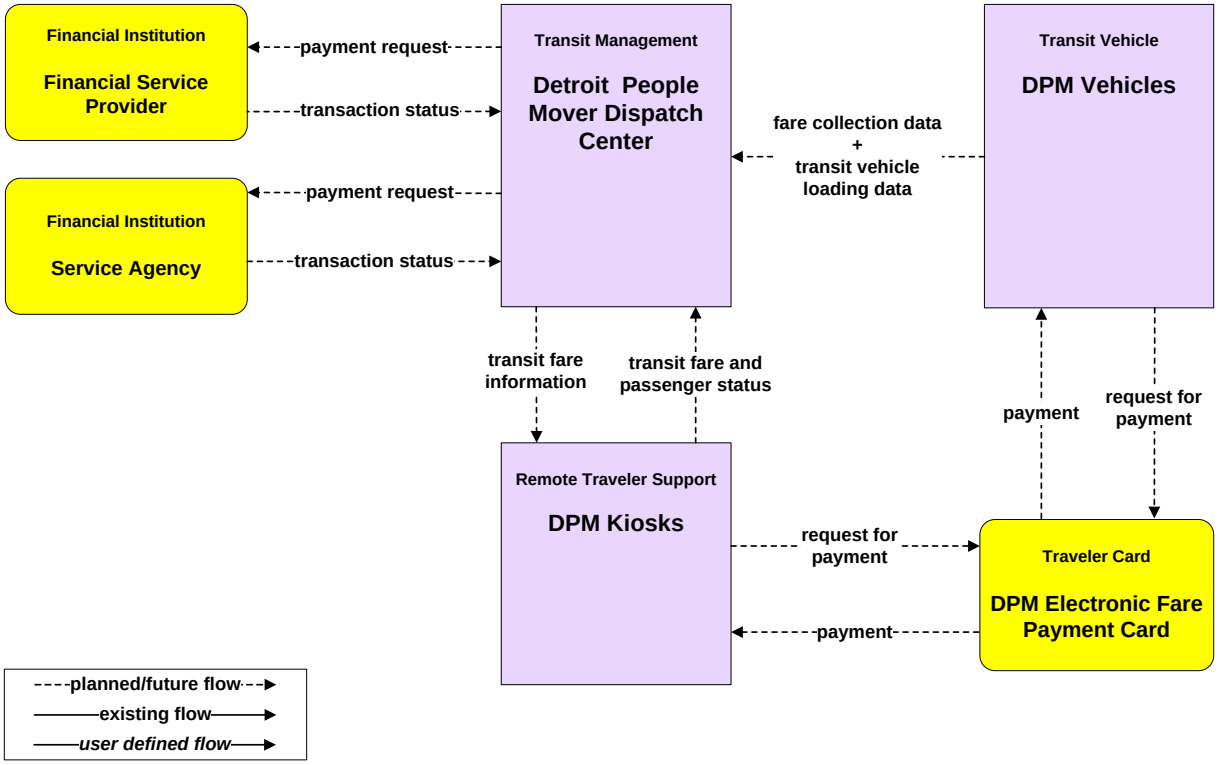
APTS4 – Transit Passenger and Fare Management
DDOT



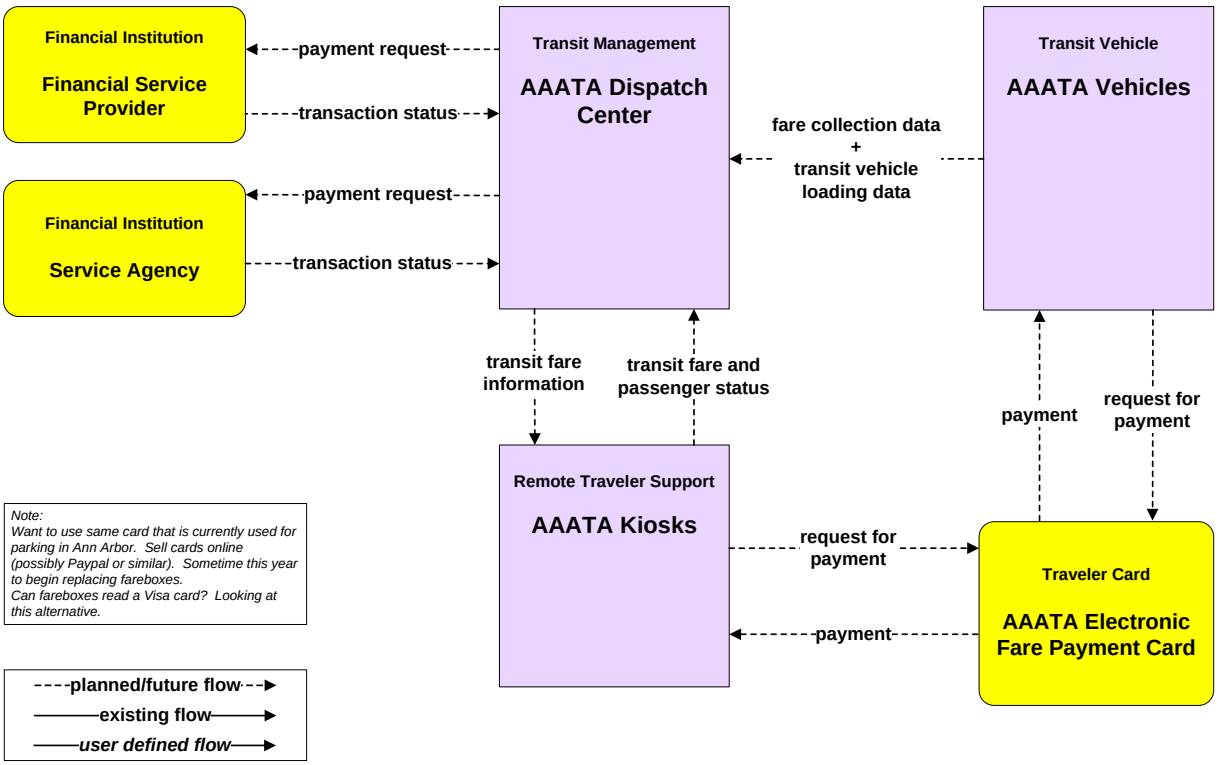
APTS4 – Transit Passenger and Fare Management
Blue Water Area Transit



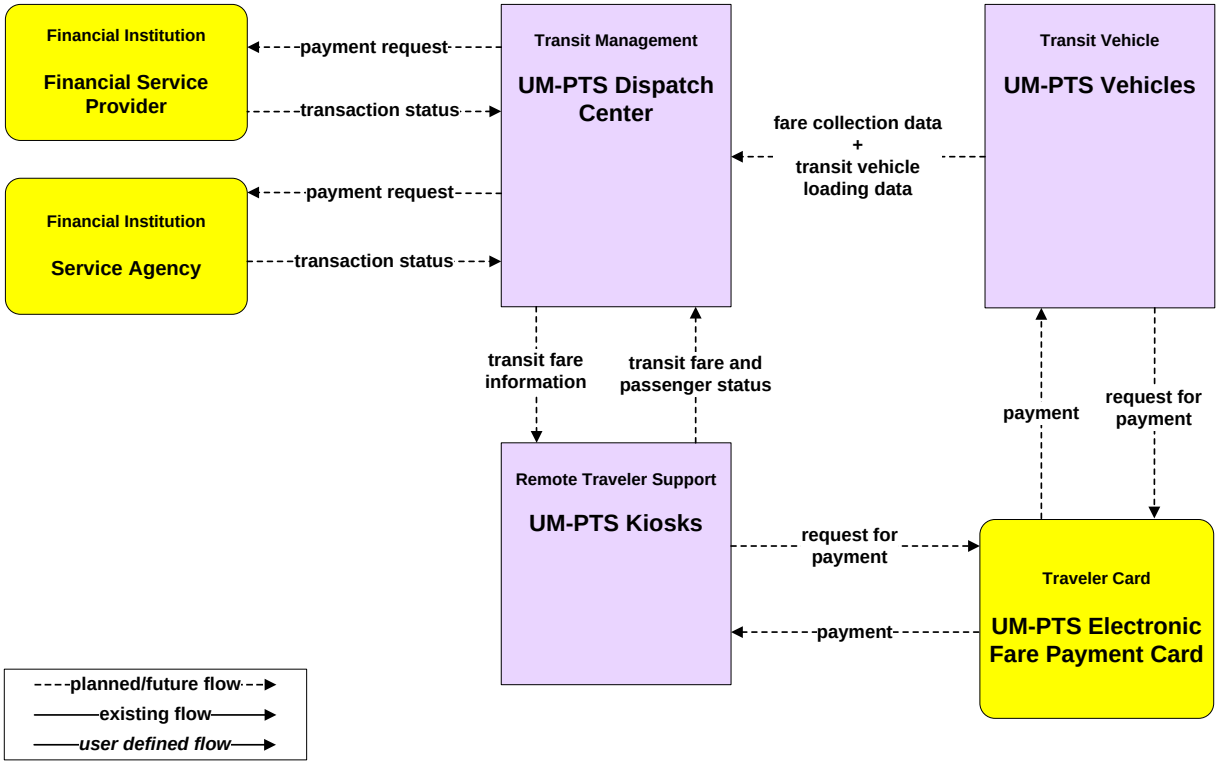
APTS4 – Transit Passenger and Fare Management
Detroit People Mover (DPM)



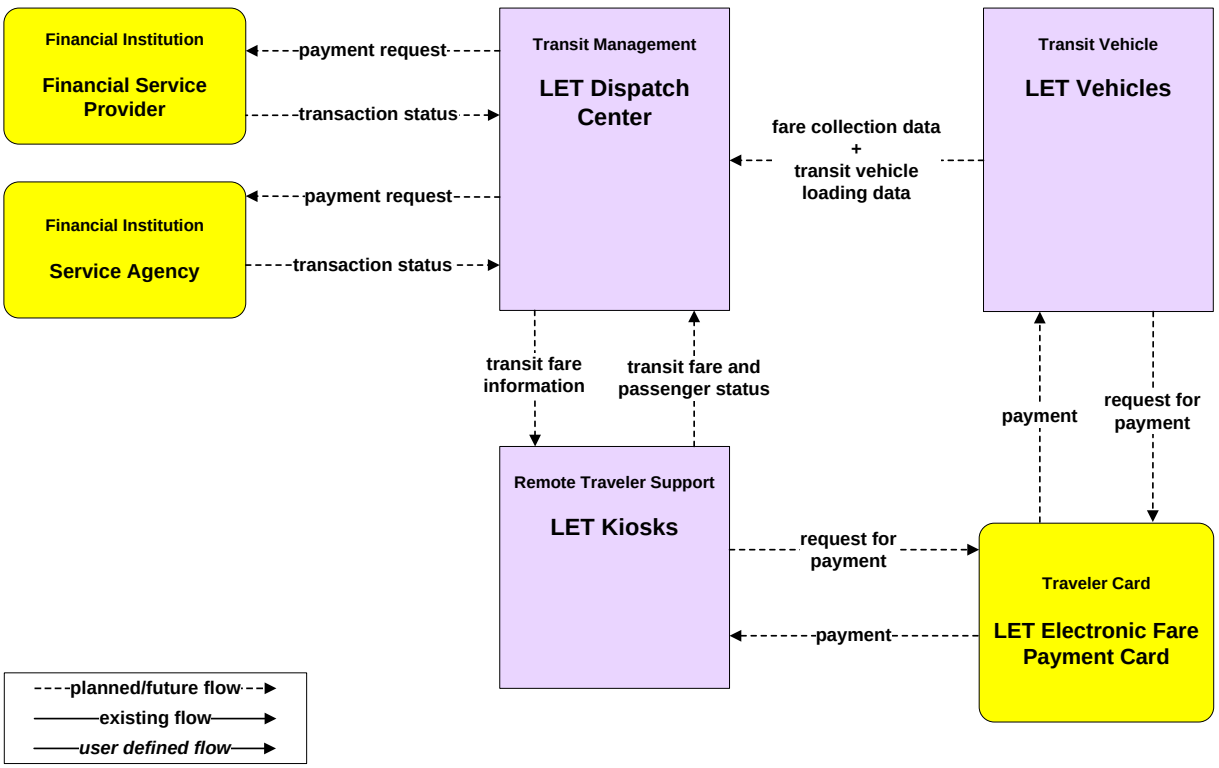
APTS4 – Transit Passenger and Fare Management
Ann Arbor Area Transportation Authority (AAATA)



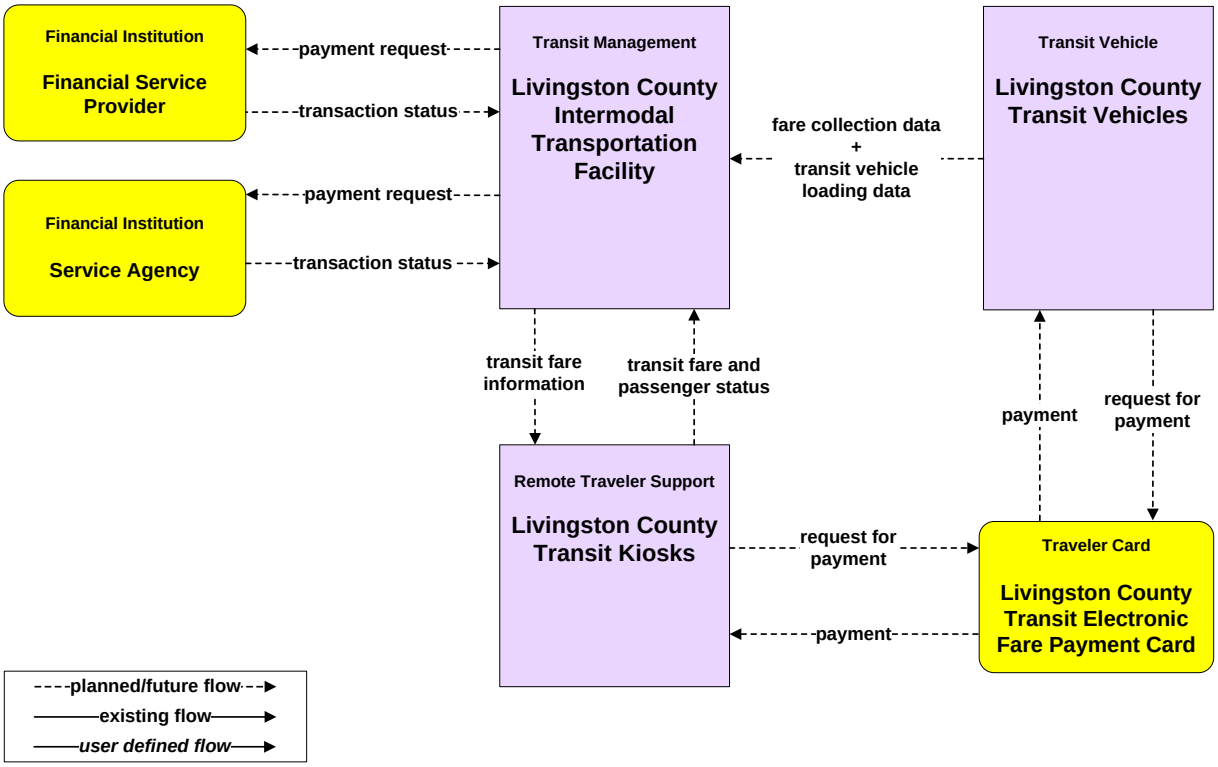
APTS4 – Transit Passenger and Fare Management
University of Michigan Parking and Transportation Services (UM-PTS)



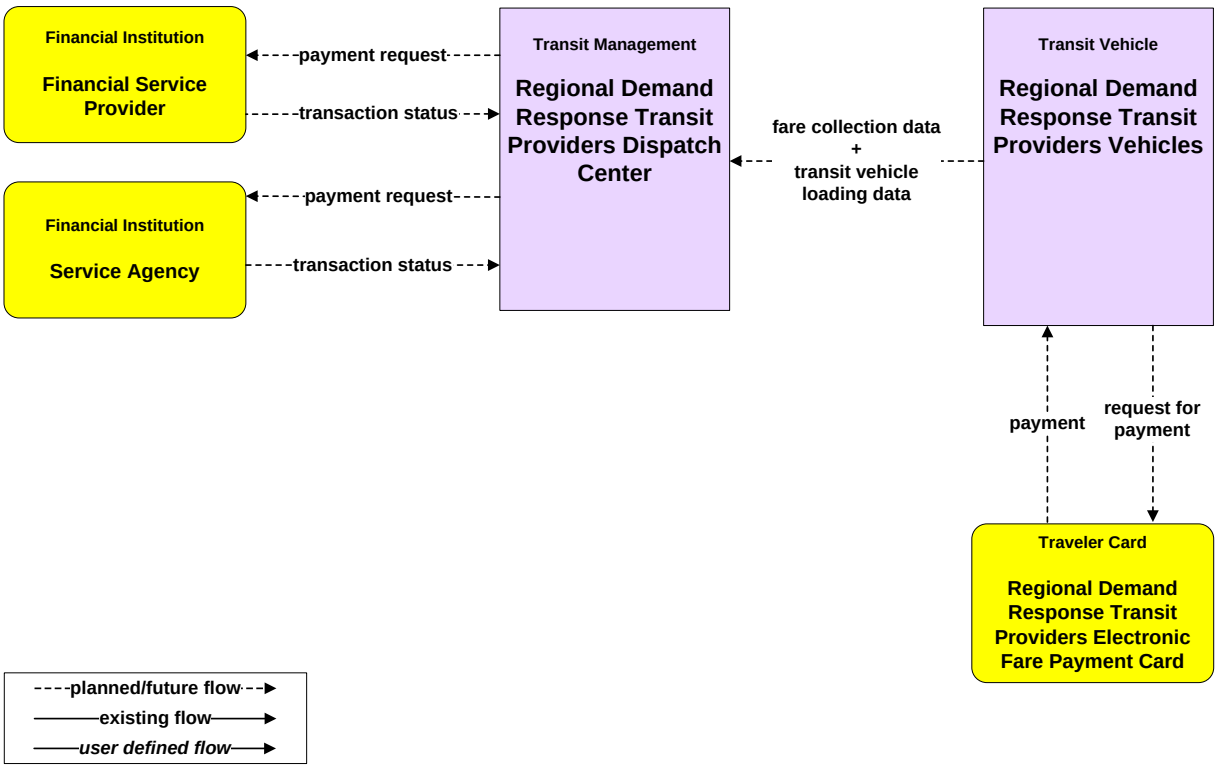
APTS4 – Transit Passenger and Fare Management
Lake Erie Transportation Commission - Lake Erie Transit (LET)



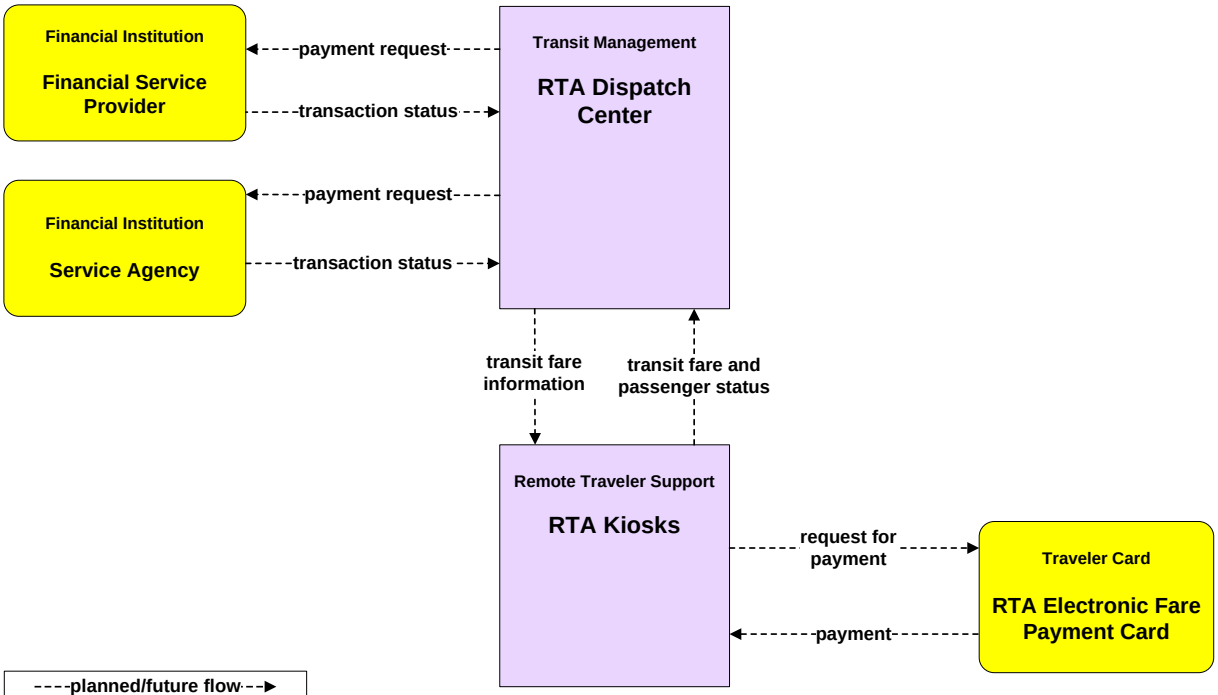
APTS4 – Transit Passenger and Fare Management
Livingston County



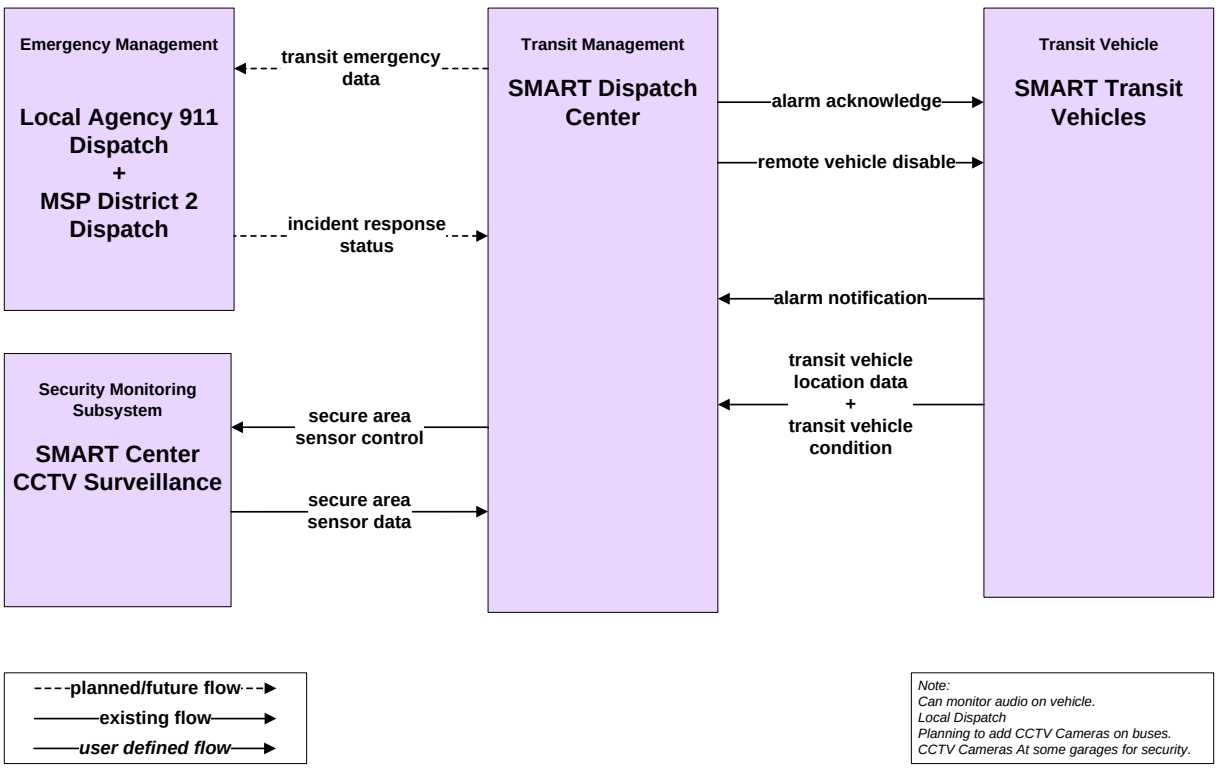
APTS4 – Transit Passenger and Fare Management
Regional Demand Response Transit Provider



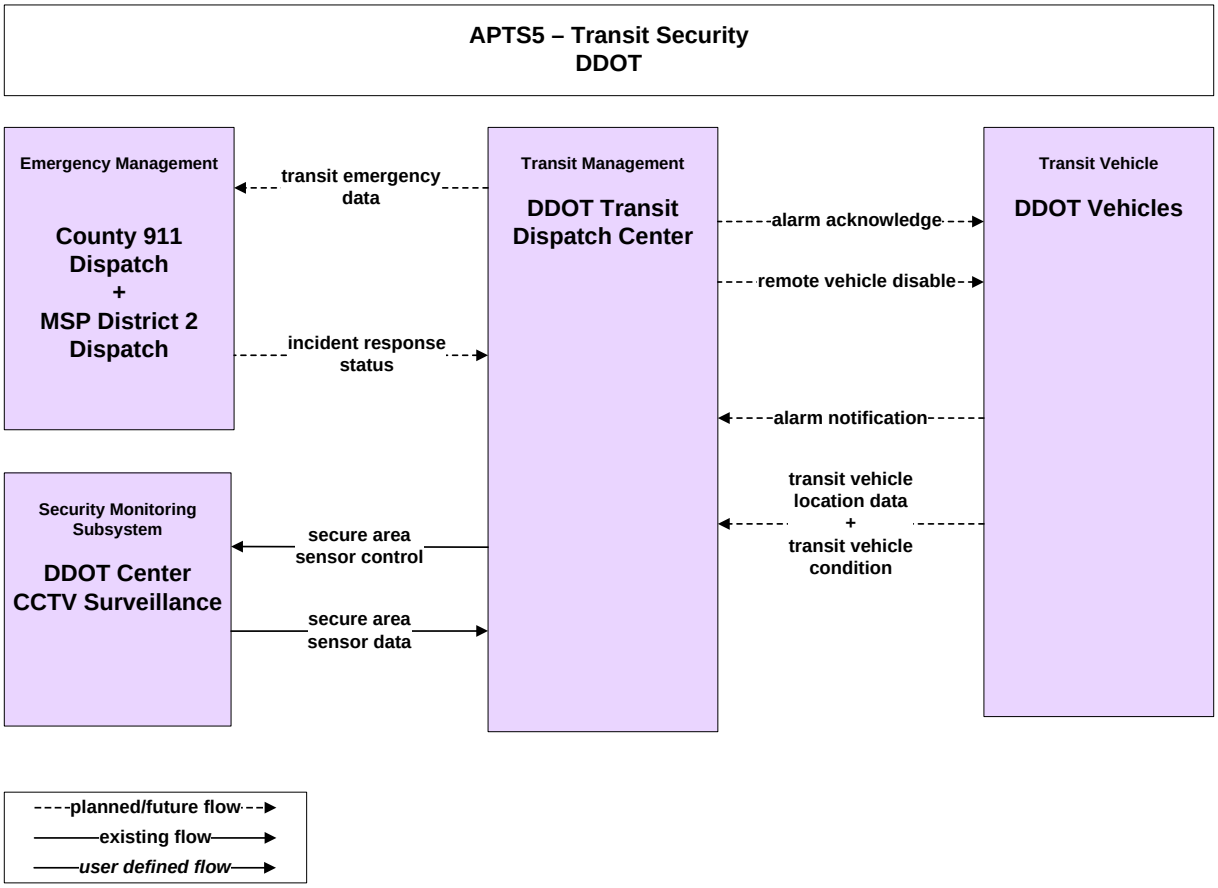
APTS4 – Transit Passenger and Fare Management
RTA

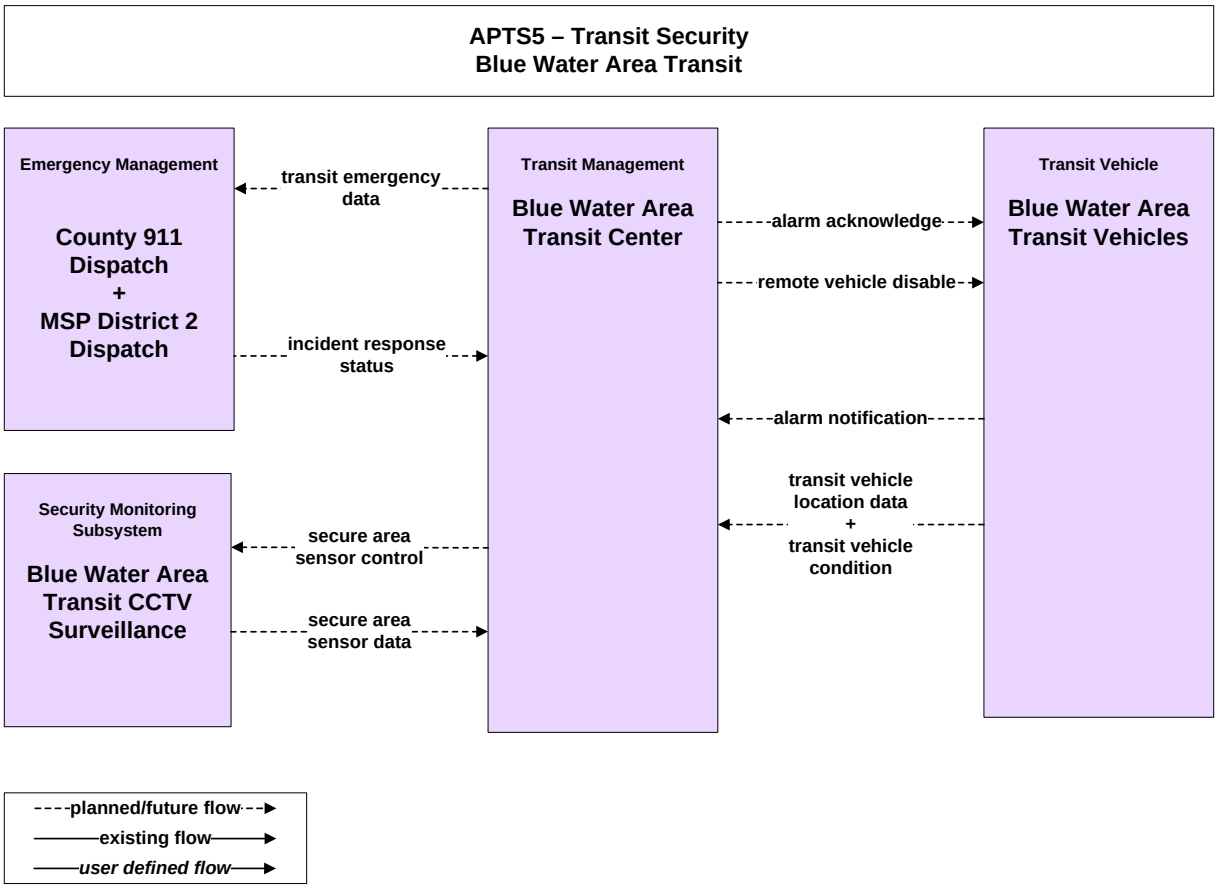


APTS5 – Transit Security
SMART

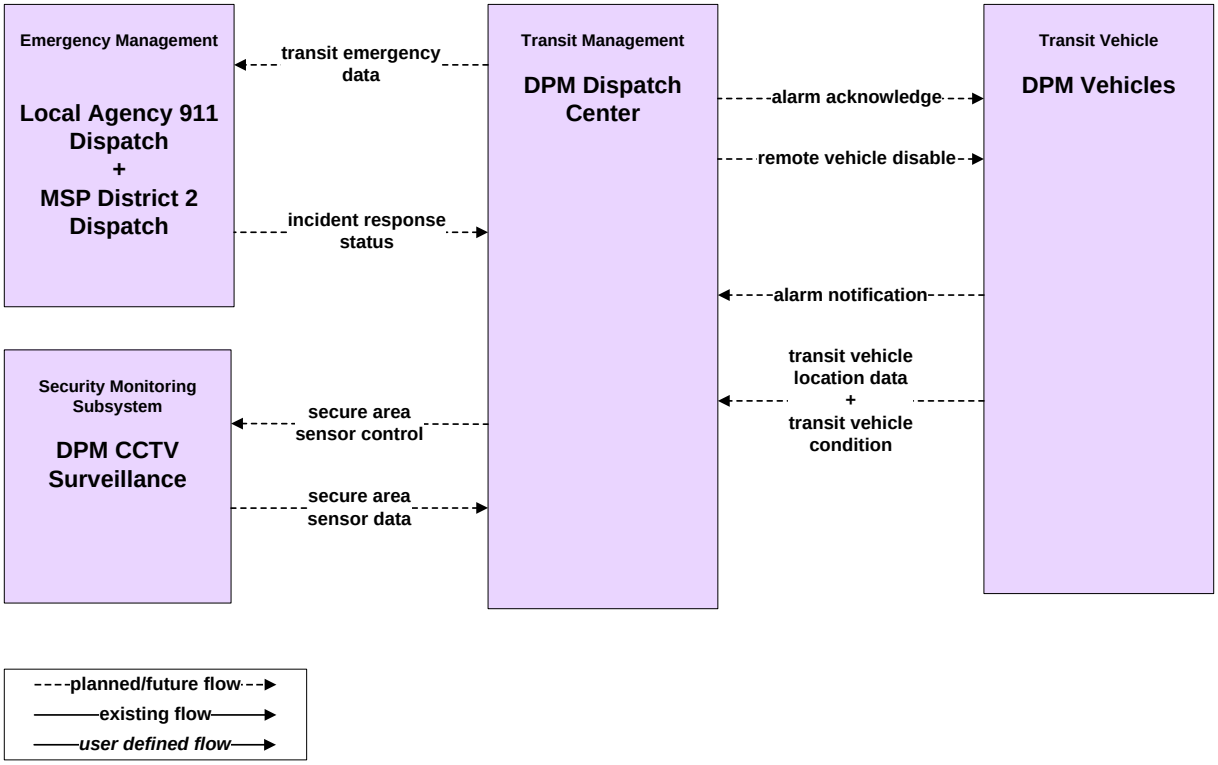


Note:
Can monitor audio on vehicle.
Local Dispatch
Planning to add CCTV Cameras on buses.
CCTV Cameras At some garages for security.

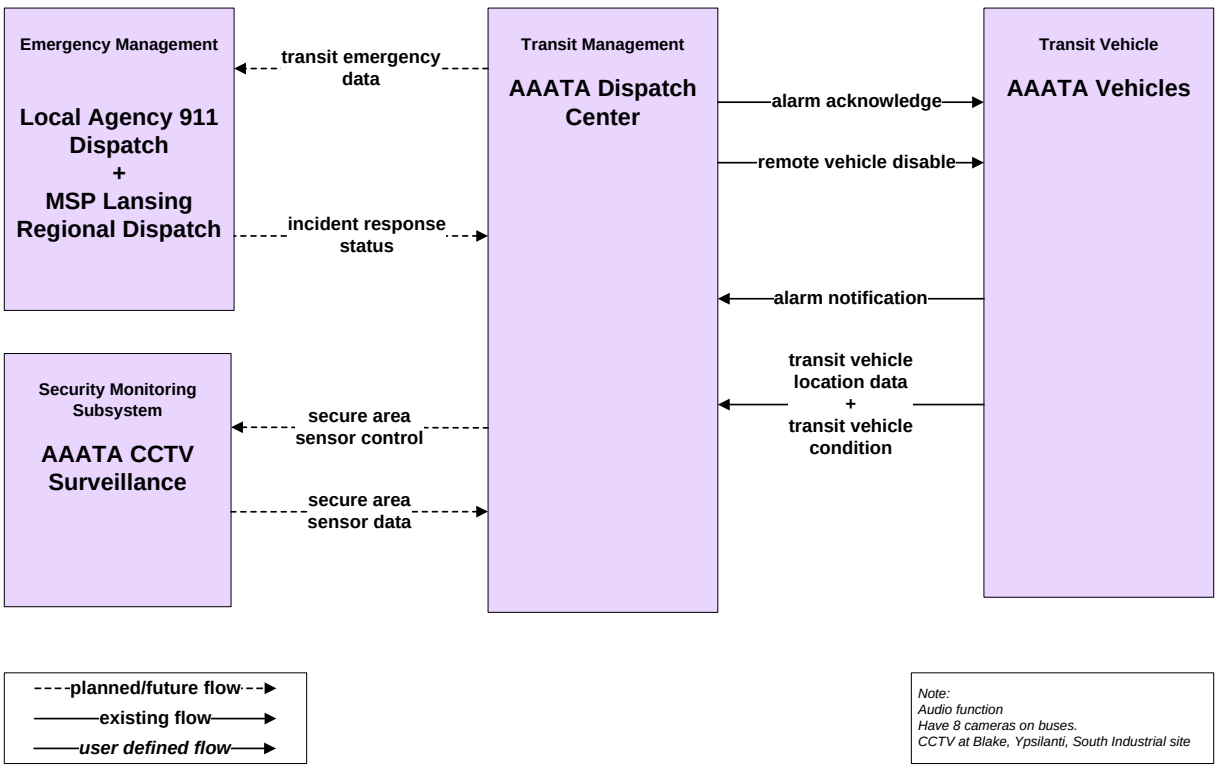

APTS5 – Transit Security
DDOT
Emergency Management
County 911 Dispatch + MSP District 2 Dispatch
transit emergency data
incident response status
Transit Management
DDOT Transit Dispatch Center
alarm acknowledge
remote vehicle disable
alarm notification
transit vehicle location data + transit vehicle condition
Transit Vehicle
DDOT Vehicles
Security Monitoring Subsystem
DDOT Center CCTV Surveillance
secure area sensor control
secure area sensor data
planned/future flow
existing flow
user defined flow


APTS5 – Transit Security
Blue Water Area Transit
Emergency Management
County 911 Dispatch + MSP District 2 Dispatch
transit emergency data
incident response status
Transit Management
Blue Water Area Transit Center
alarm acknowledge
remote vehicle disable
alarm notification
transit vehicle location data + transit vehicle condition
Transit Vehicle
Blue Water Area Transit Vehicles
Security Monitoring Subsystem
Blue Water Area Transit CCTV Surveillance
secure area sensor control
secure area sensor data
planned/future flow
existing flow
user defined flow

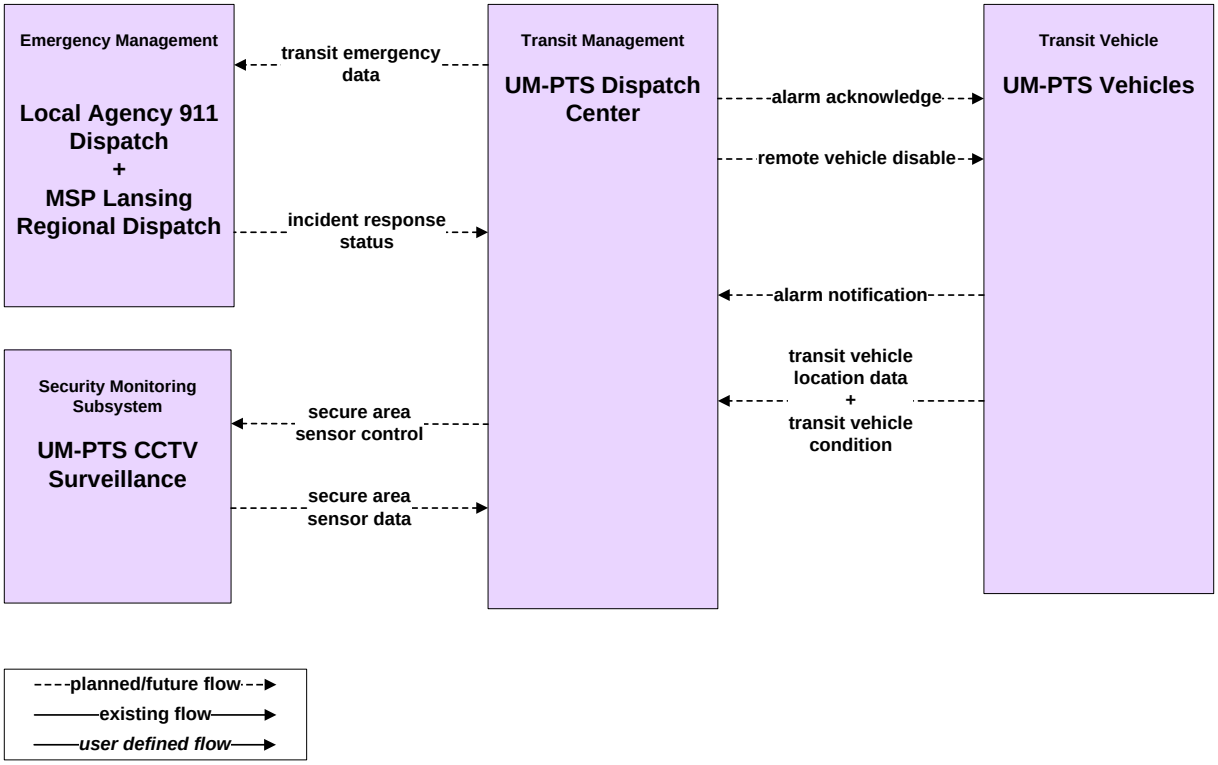
APTS5 – Transit Security
Detroit People Mover (DPM)



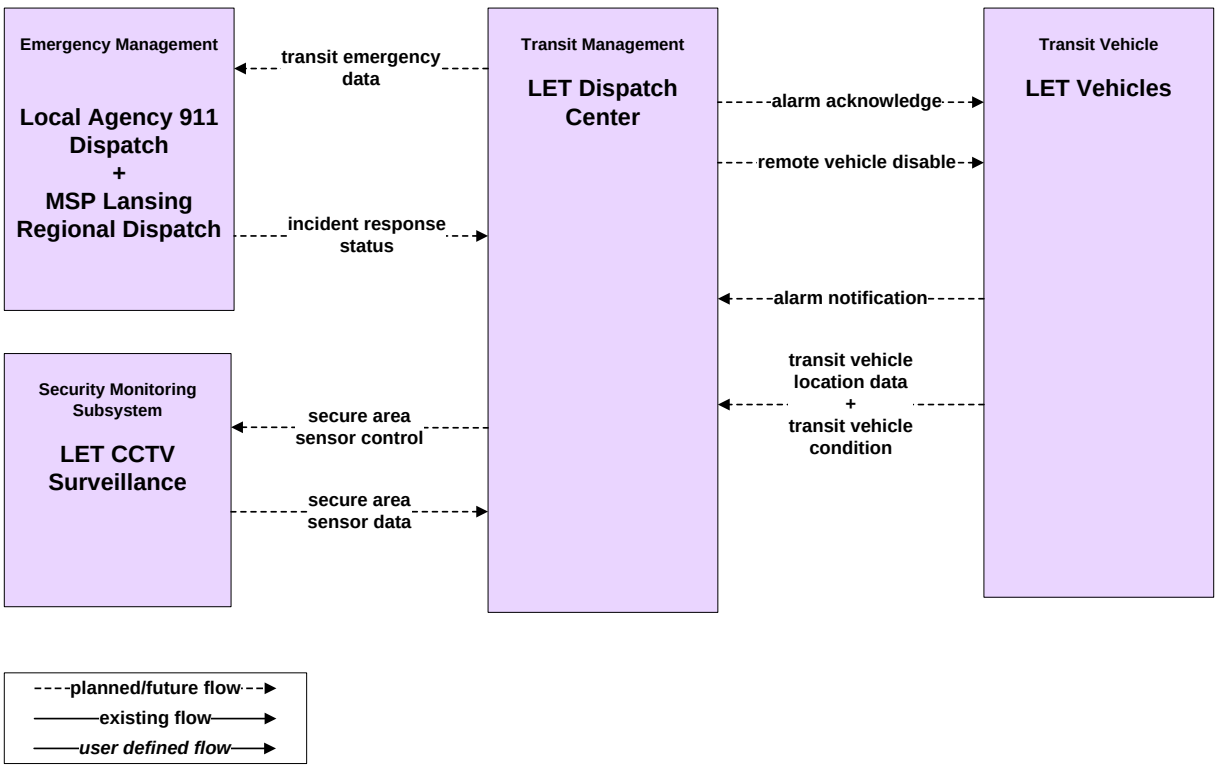
APTS5 – Transit Security
Ann Arbor Area Transportation Authority (AAATA)



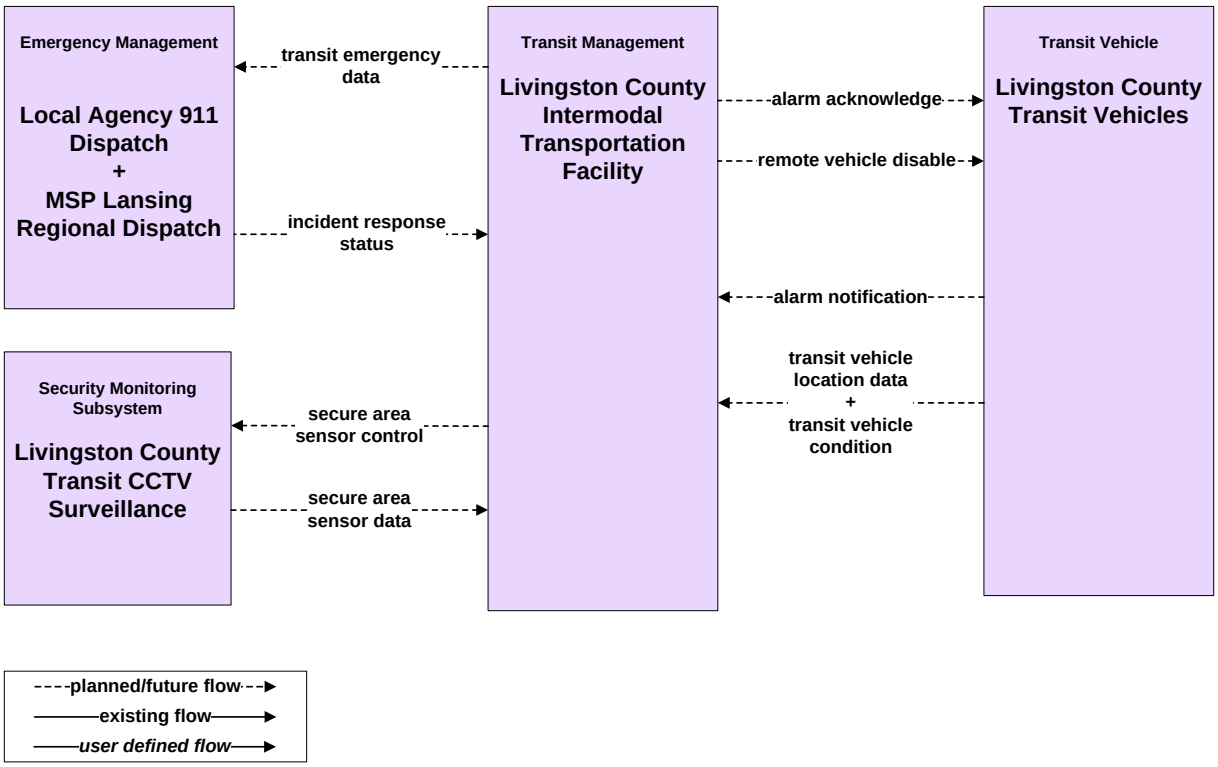
APTS5 – Transit Security
University of Michigan Parking and transportation Service (UM-PTS)



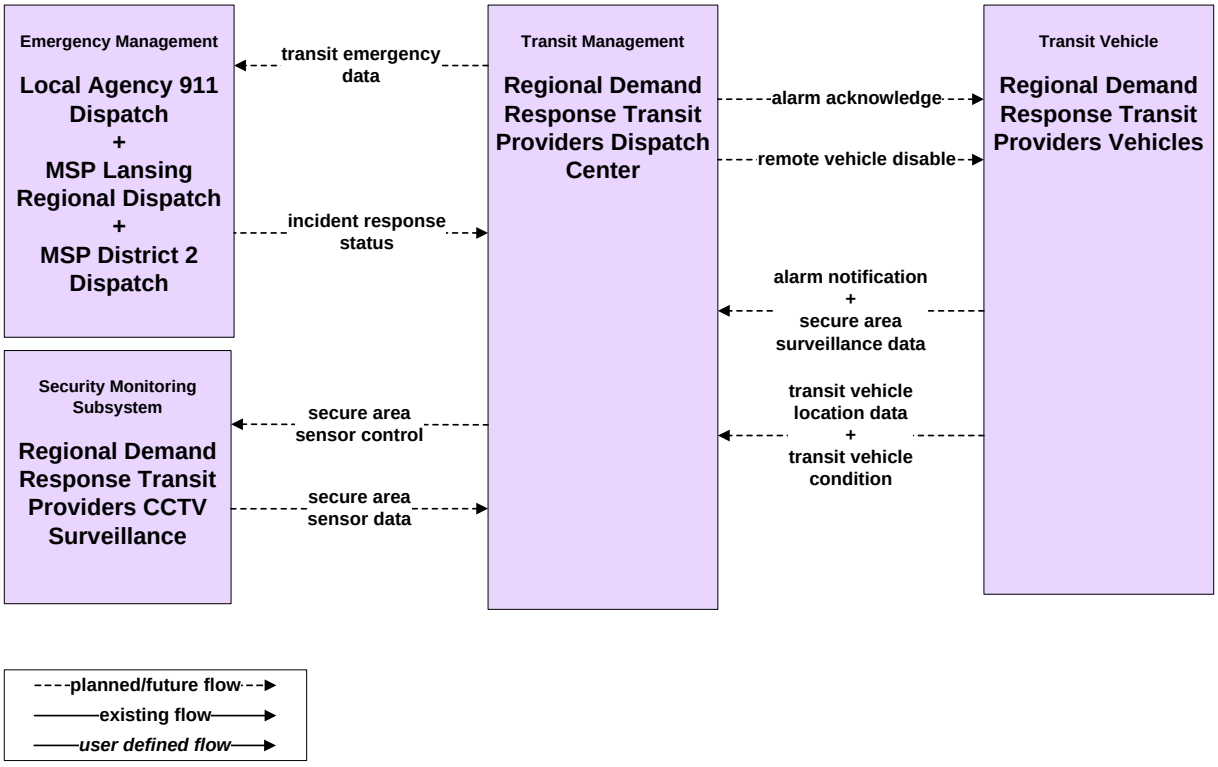
APTS5 – Transit Security
Lake Erie Transportation Commission – Lake Erie Transit (LET)



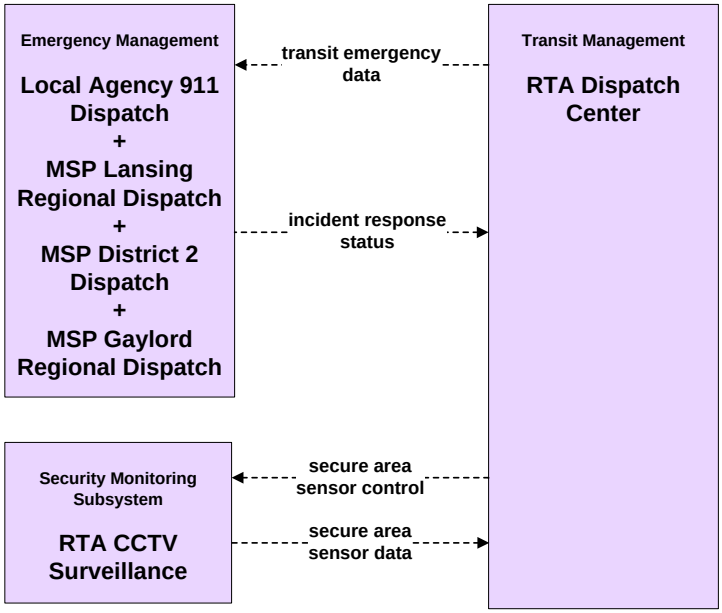
APTS5 – Transit Security
Livingston County



APTS5 – Transit Security
Regional Demand Response Transit Provider

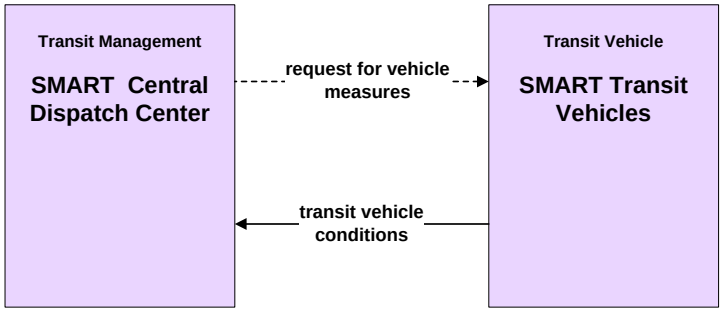


APTS5 – Transit Security
RTA



----planned/future flow-->
————existing flow————>
——*user defined flow*——>

APTS6 – Transit Maintenance
SMART



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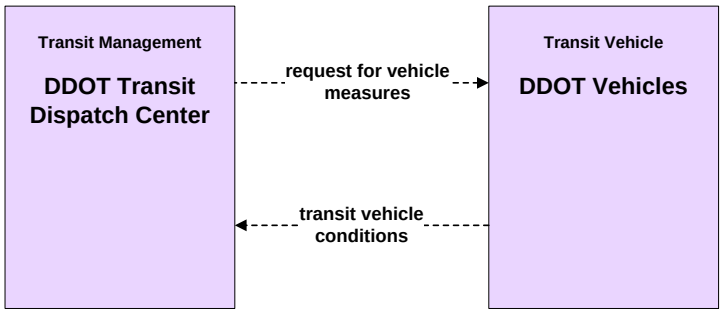
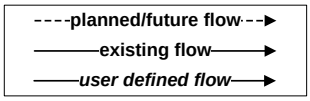
————existing flow————>
——*user defined flow*——>

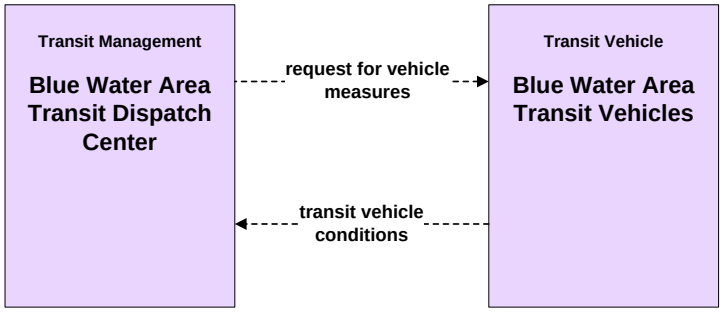
Note:
Transit maintenance data is collected every 60 seconds.

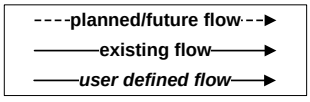
APTS6 – Transit Maintenance
DDOT



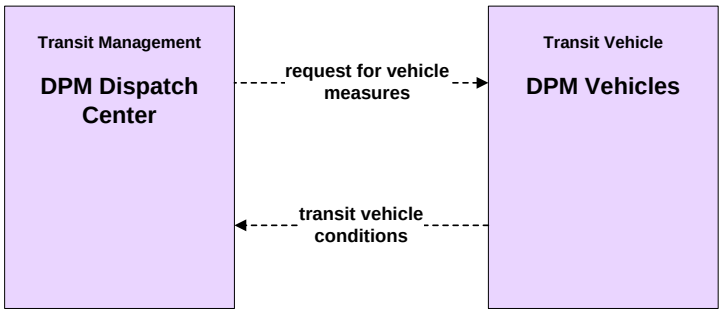


APTS6 – Transit Maintenance
Blue Water Area Transit





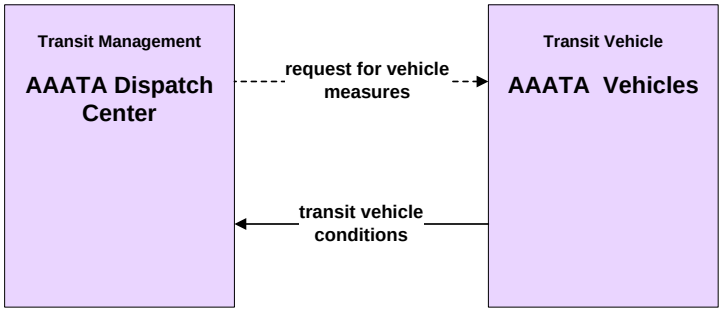
APTS6 – Transit Maintenance
Detroit People Mover (DPM)



----planned/future flow-->
————existing flow————>
——*user defined flow*——>

Note:
Transit maintenance data will be collected at the maintenance garage at the end of the day rather than real-time.

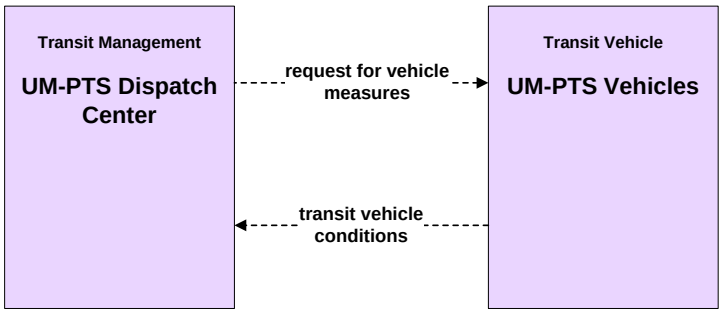
APTS6 – Transit Maintenance
Ann Arbor Area Transportation Authority (AAATA)



----planned/future flow-->
————existing flow————>
——*user defined flow*——>

Note:
Transit maintenance data is collected every 60 seconds.

APTS6 – Transit Maintenance
University of Michigan Parking and Transportation Services (UM-PTS)



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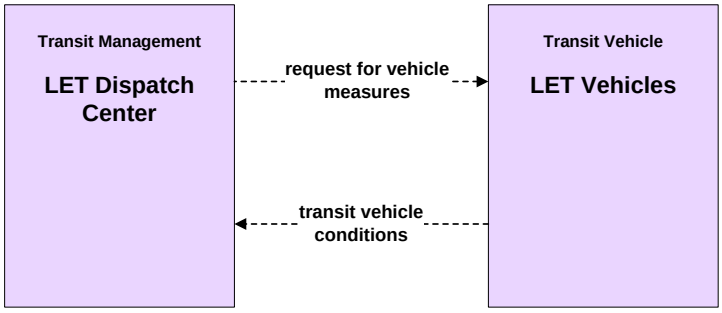
Note:
Transit maintenance data will be collected at the maintenance garage at the end of the day rather than real-time.

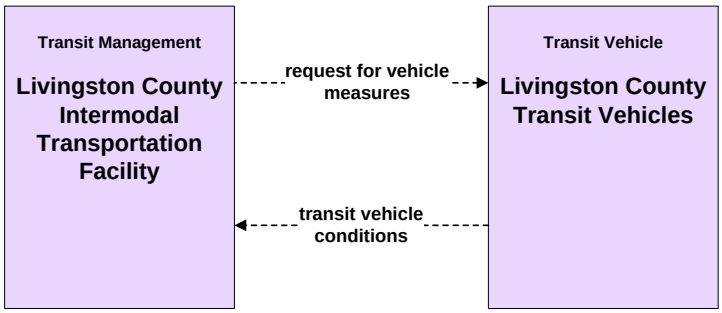
APTS6 – Transit Maintenance
Lake Erie Transportation Commission - Lake Erie Transit (LET)



----planned/future flow-->
————existing flow————>
——*user defined flow*——>

Note:
Transit maintenance data will be collected at the maintenance garage at the end of the day rather than real-time.

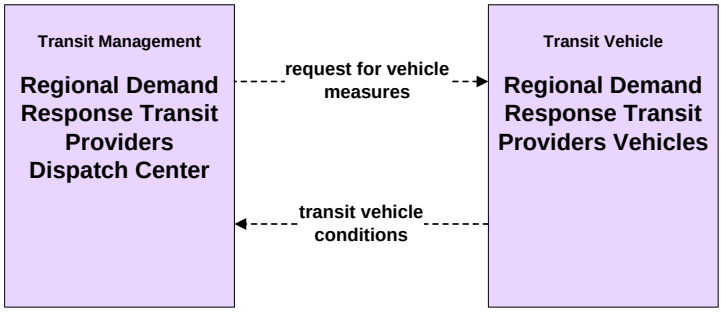
APTS6 – Transit Maintenance
Livingston County



----planned/future flow-->
————existing flow————>
——*user defined flow*——>

Note:
Transit maintenance data will be collected at the maintenance garage at the end of the day rather than real-time.

APTS6 – Transit Maintenance
Regional Demand Response Transit Provider



----planned/future flow-->
————existing flow————>
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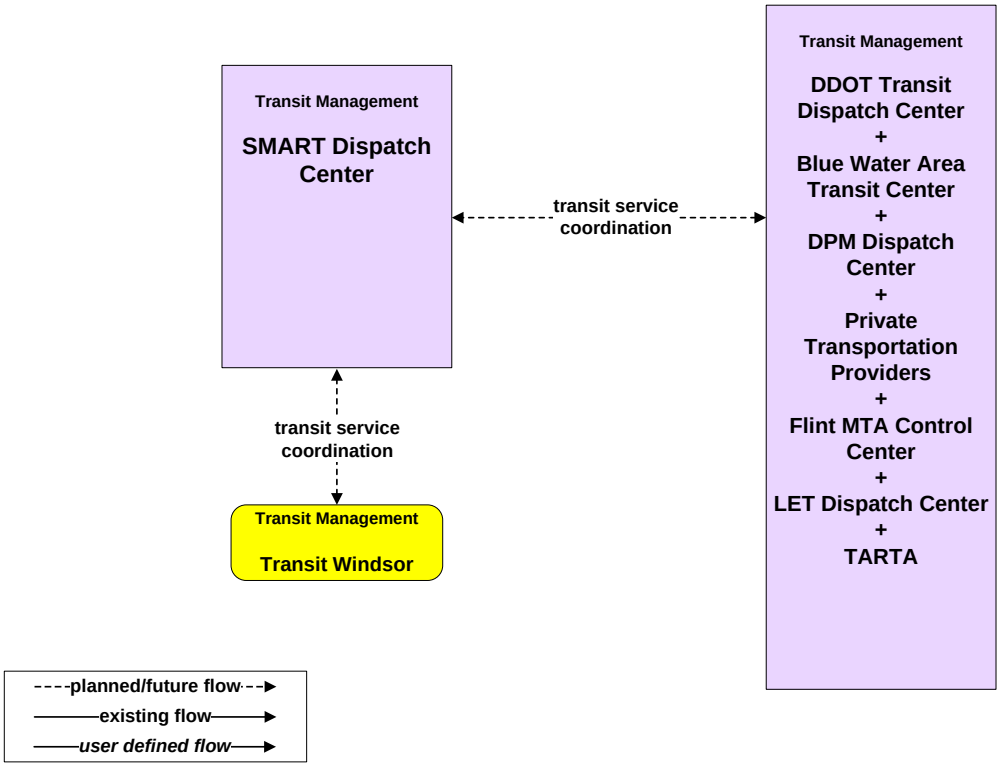
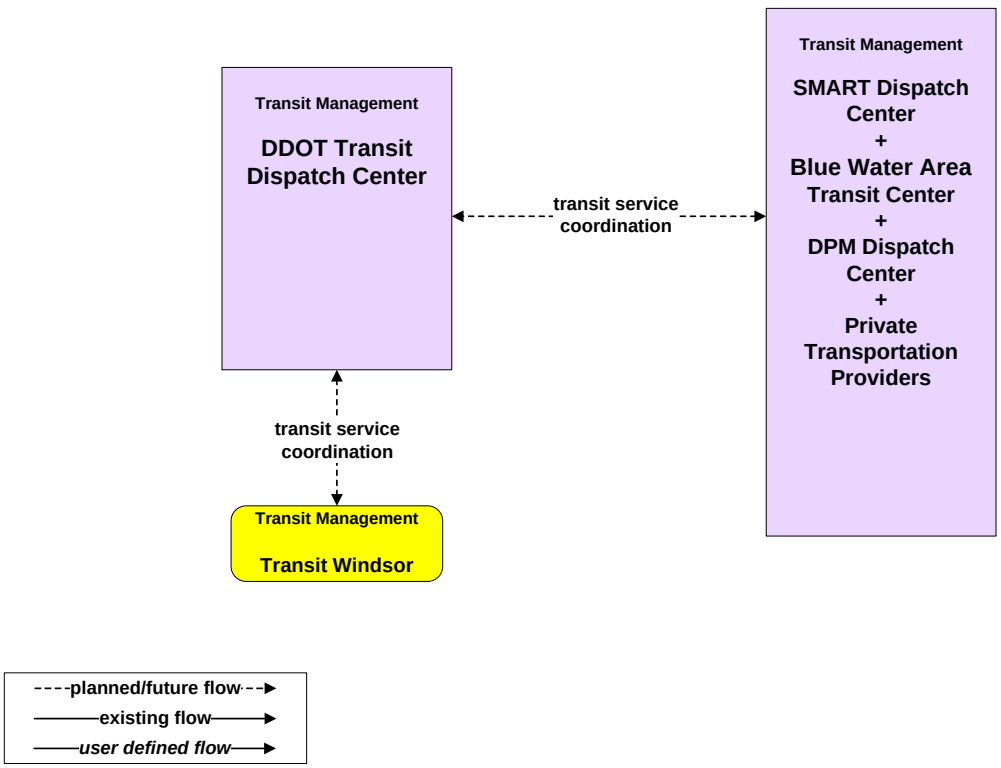
Note:
Transit maintenance data will be collected at the maintenance garage at the end of the day rather than real-time.

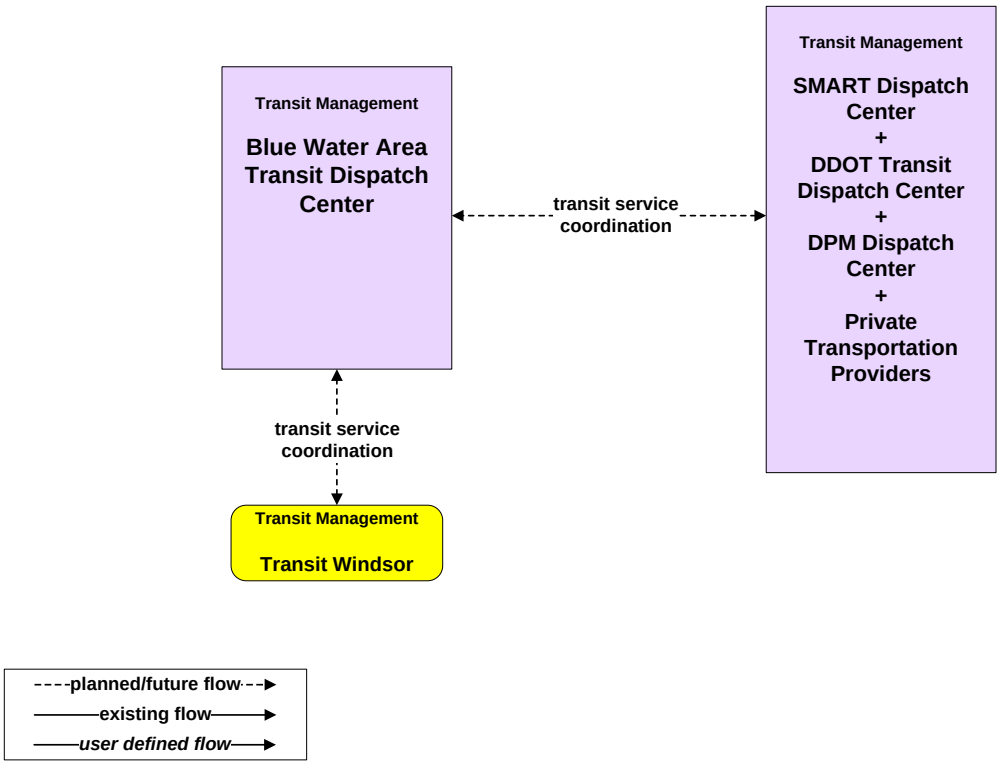
APTS7 – Multi-modal Coordination
SMART



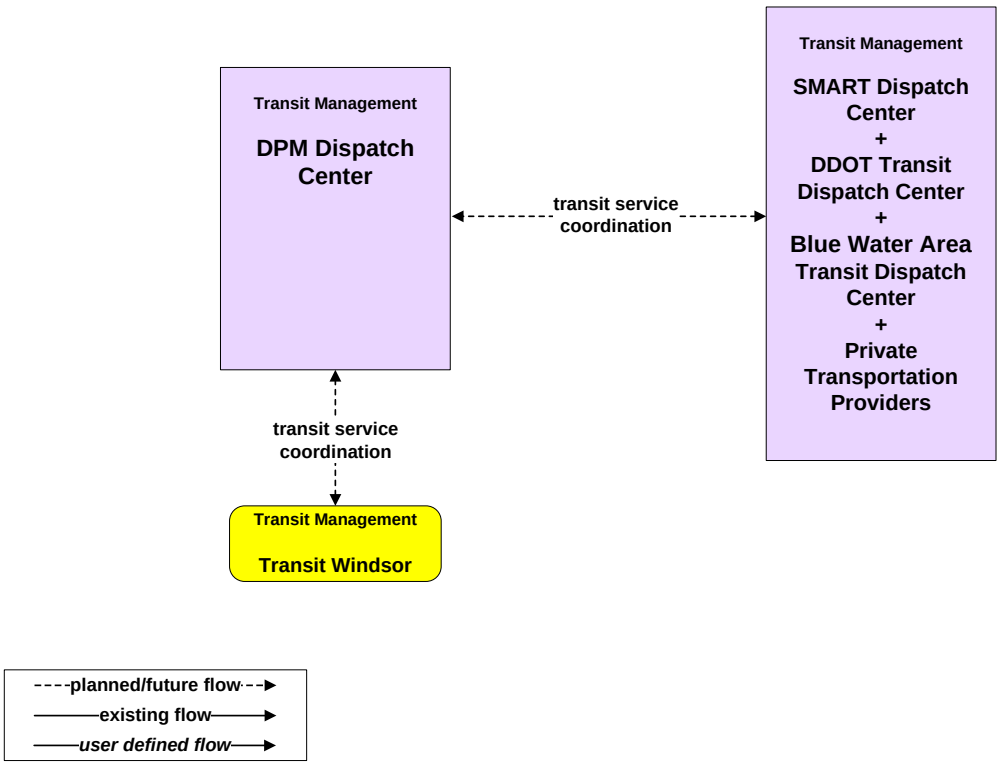
APTS7 – Multi-modal Coordination
DDOT



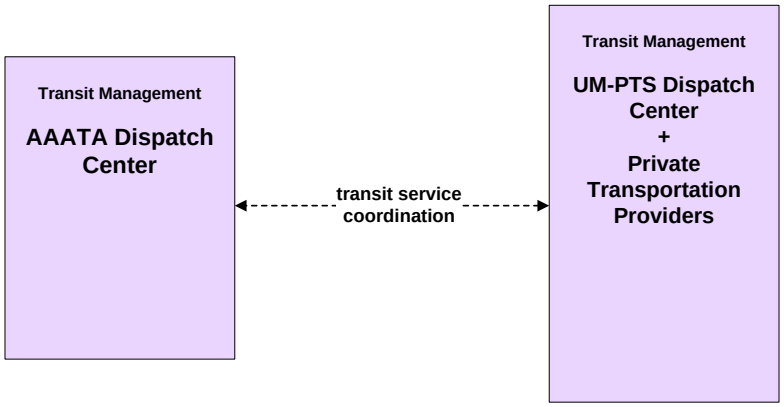
APTS7 – Multi-modal Coordination
Blue Water Area Transit

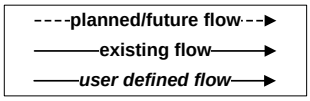


APTS7 – Multi-modal Coordination
Detroit People Mover (DPM)

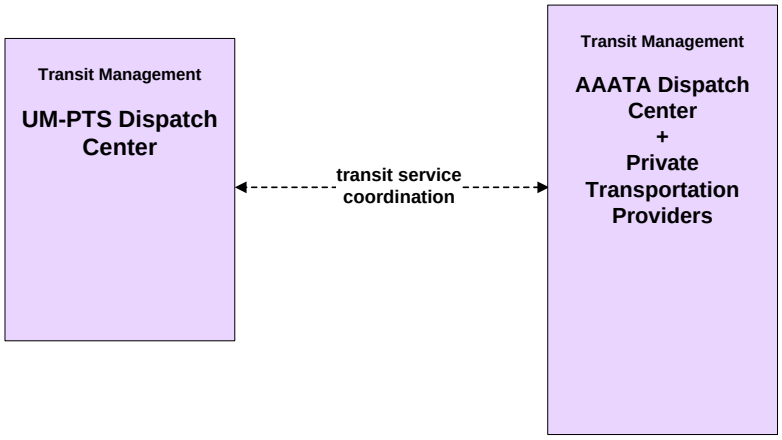


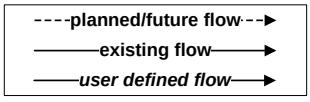
APTS7 – Multi-modal Coordination
Ann Arbor Area Transportation Authority (AAATA)



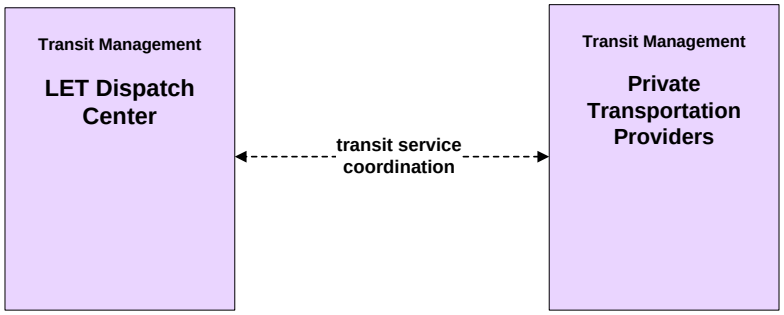


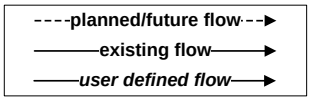
APTS7 – Multi-modal Coordination
University of Michigan Parking and Transportation Services (UM-PTS)



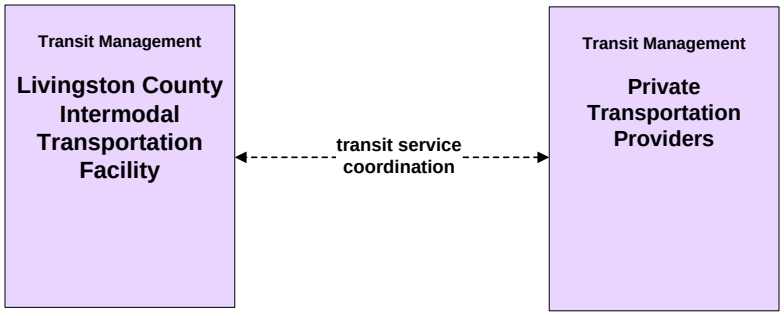


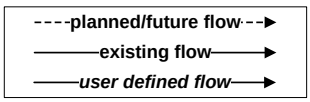
APTS7 – Multi-modal Coordination
Lake Erie Transportation Commission - Lake Erie Transit (LET)



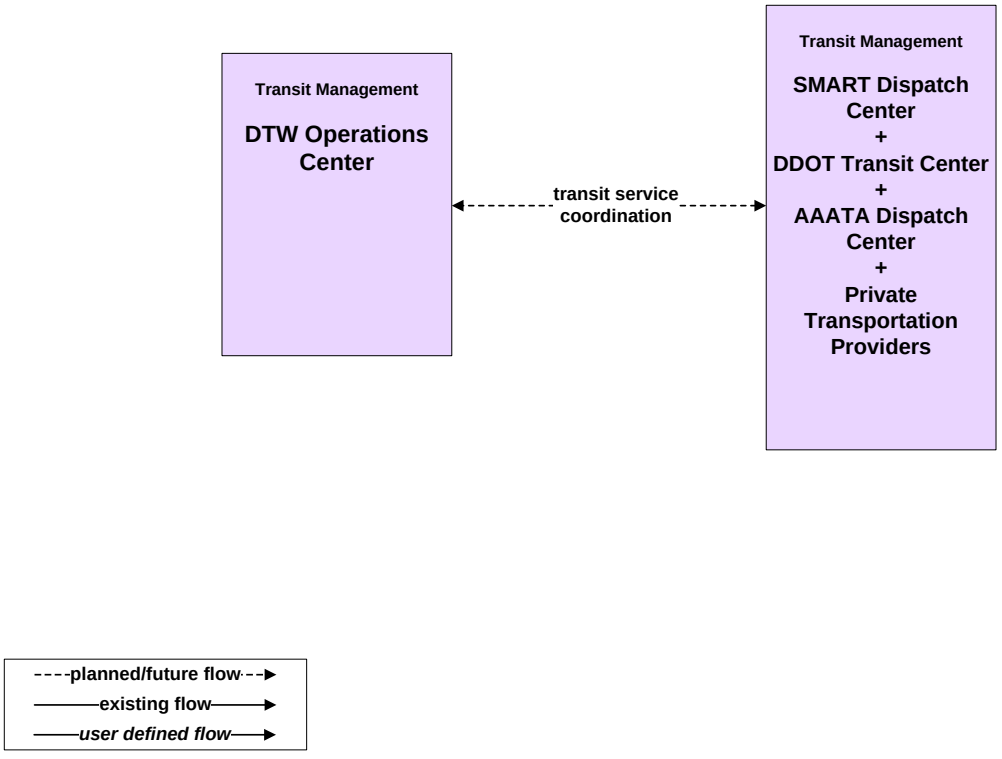


APTS7 – Multi-modal Coordination
Livingston County

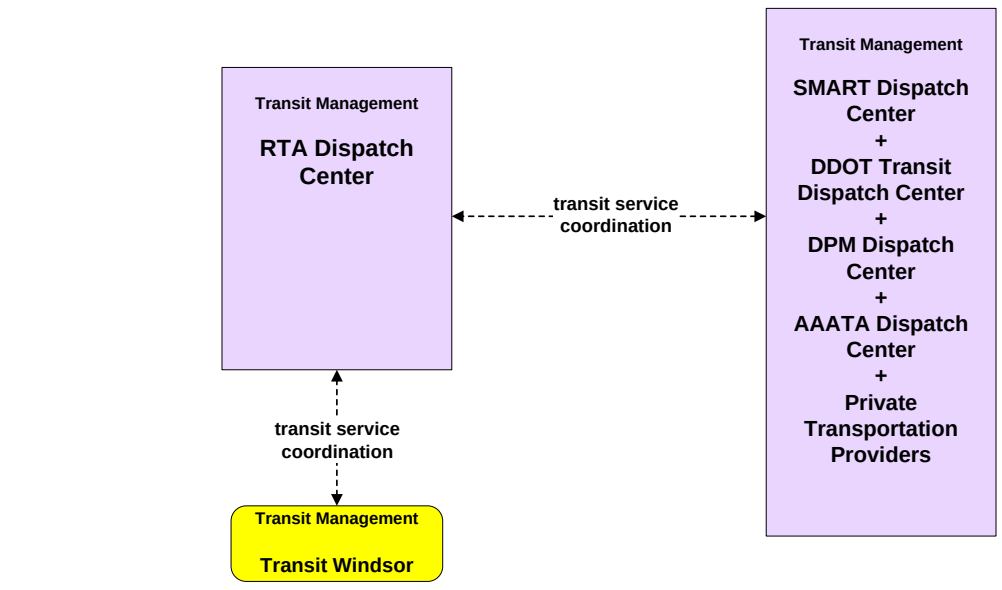




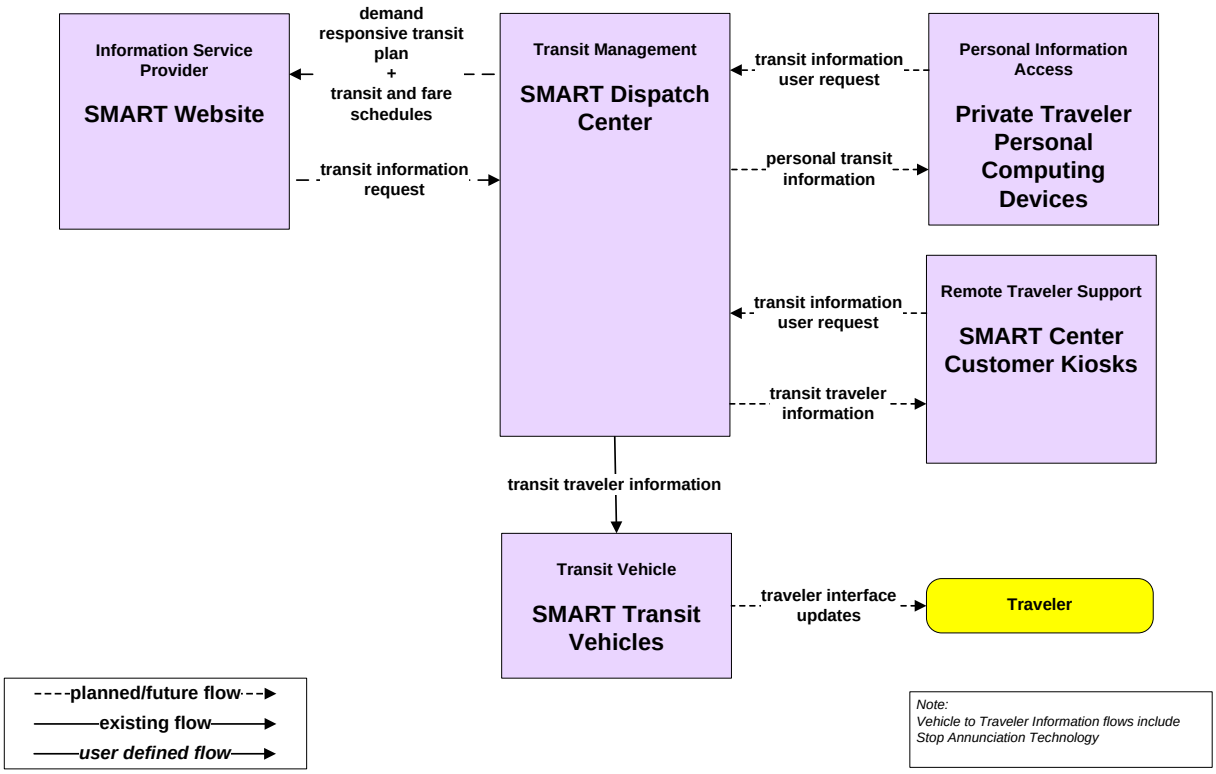
APTS7 – Multi-modal Coordination
Wayne County Airport Authority (Detroit Metro Wayne County Airport - DTW)



APTS7 – Multi-modal Coordination
RTA

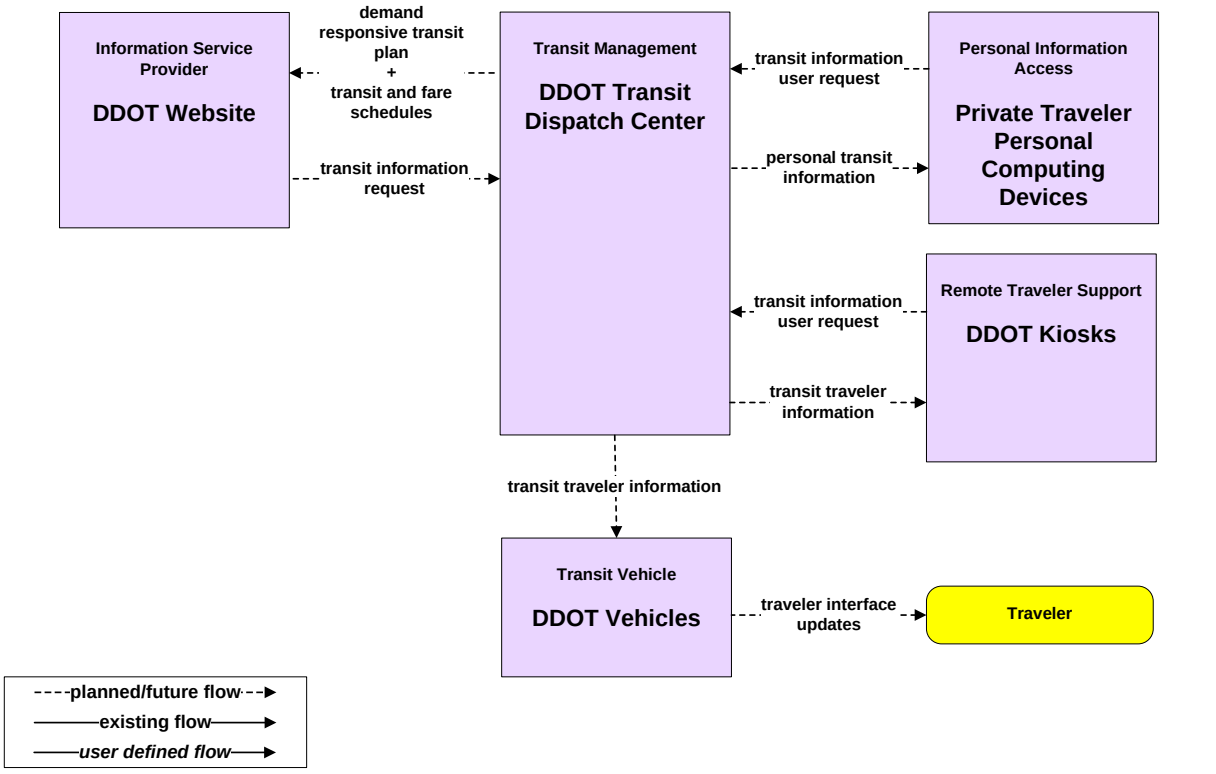


APTS8 – Transit Traveler Information
SMART

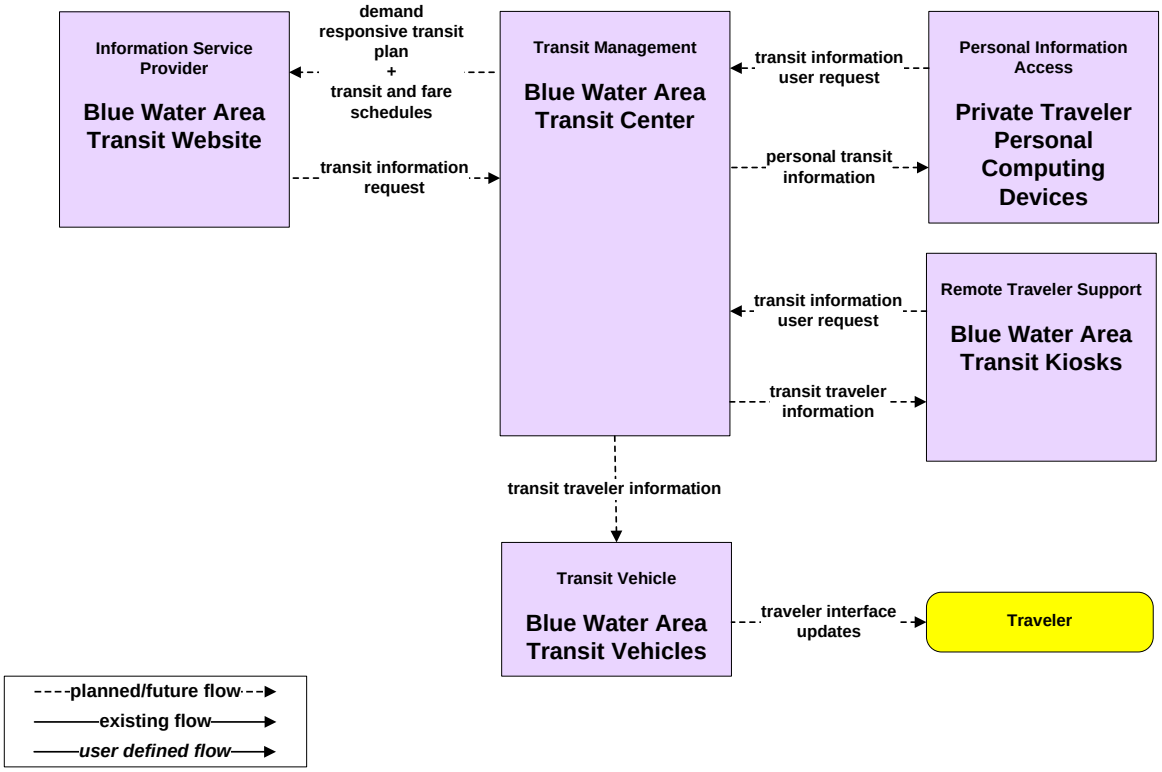


Note:
Vehicle to Traveler Information flows include Stop Annunciation Technology

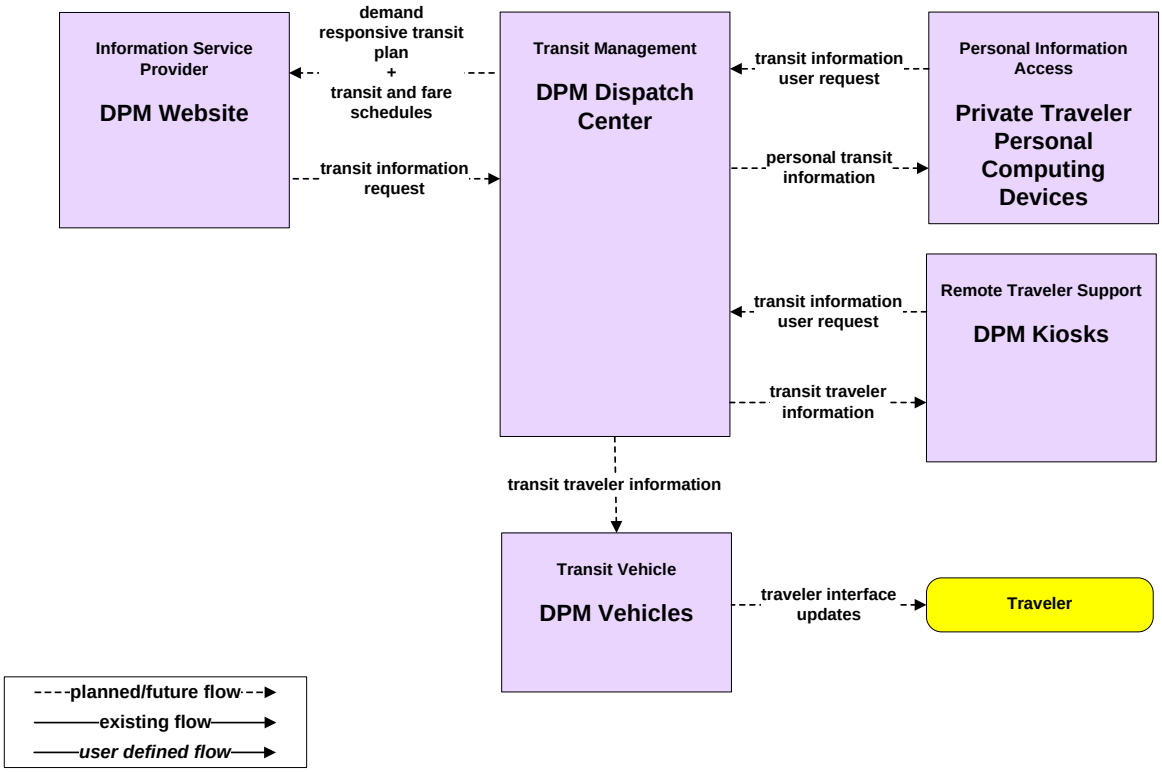
APTS8 – Transit Traveler Information
DDOT



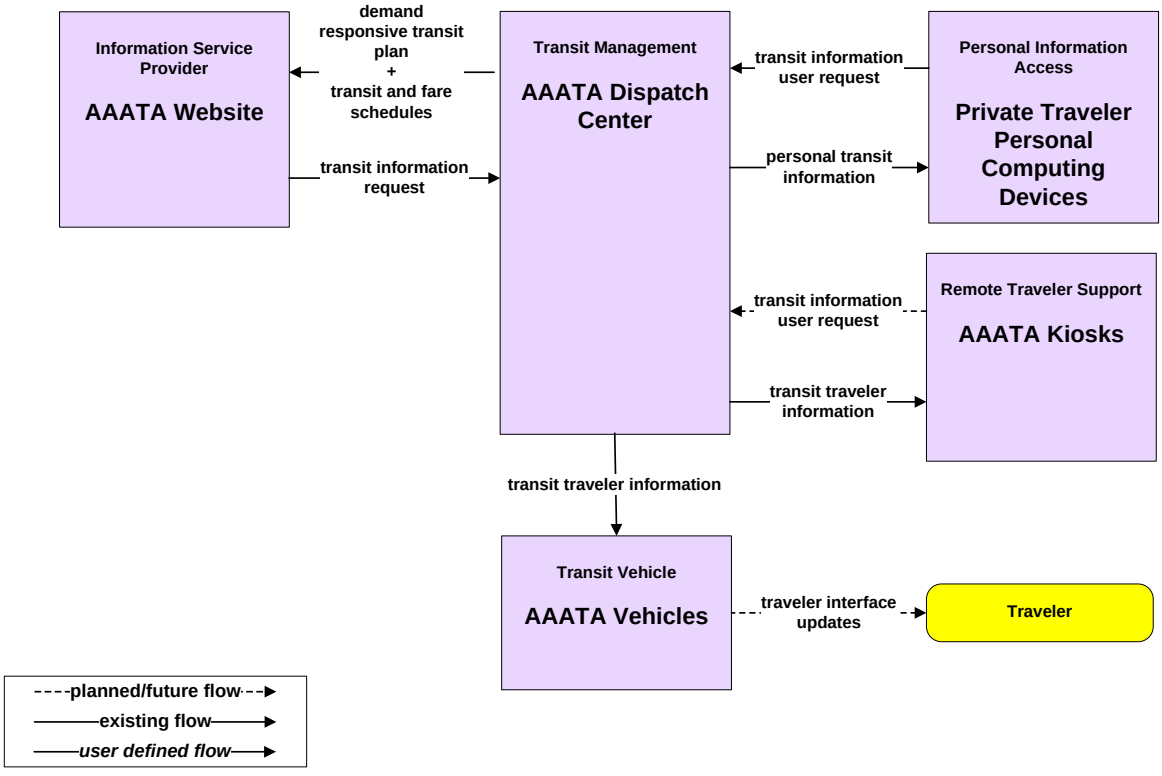
APTS8 – Transit Traveler Information
Blue Water Area Transit



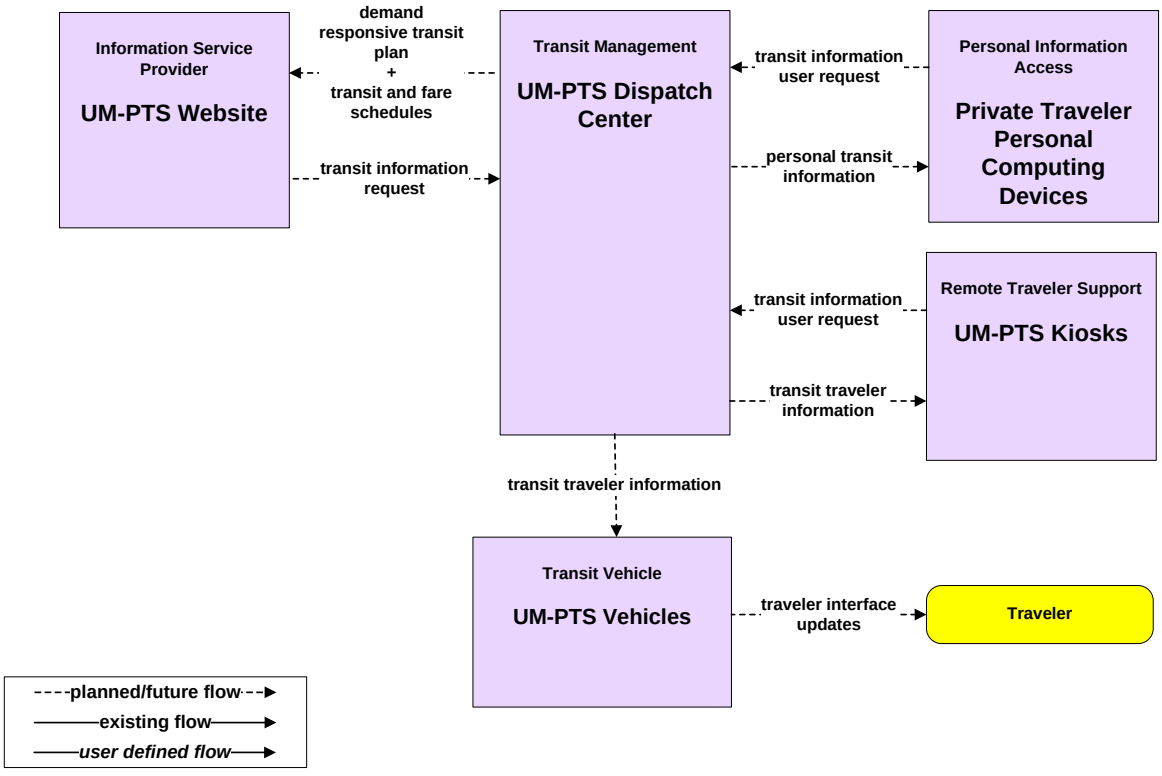
APTS8 – Transit Traveler Information
Detroit People Mover (DPM)



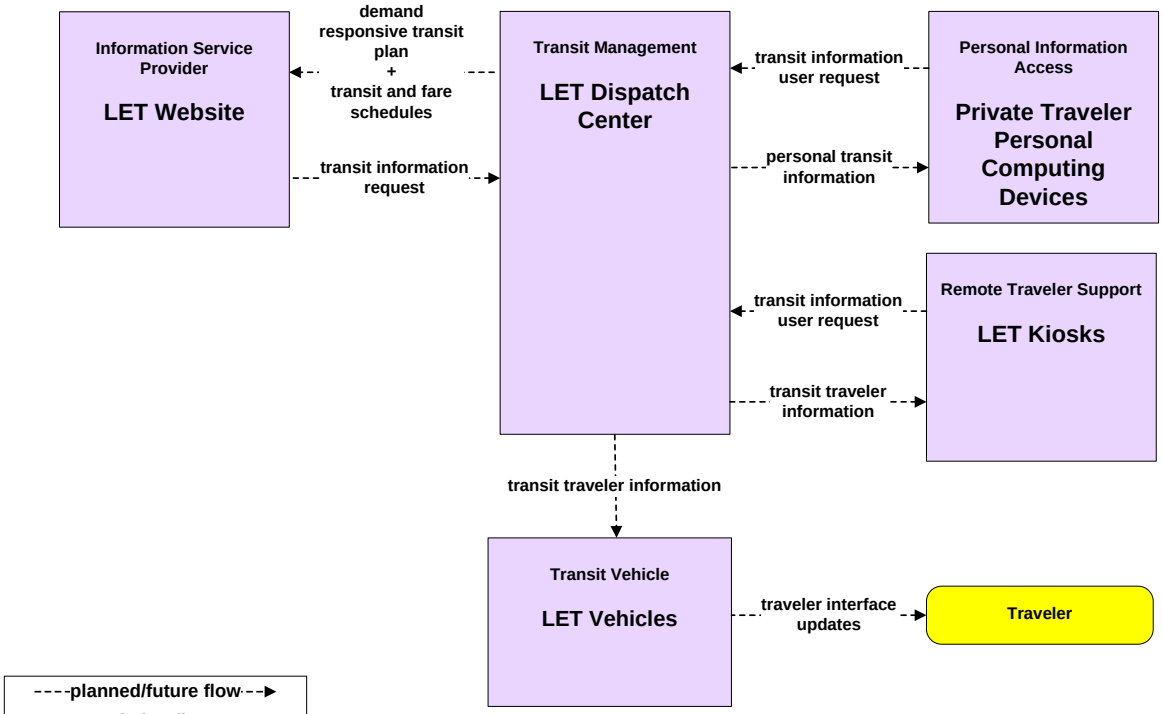
APTS8 – Transit Traveler Information
Ann Arbor Area Transportation Authority (AAATA)



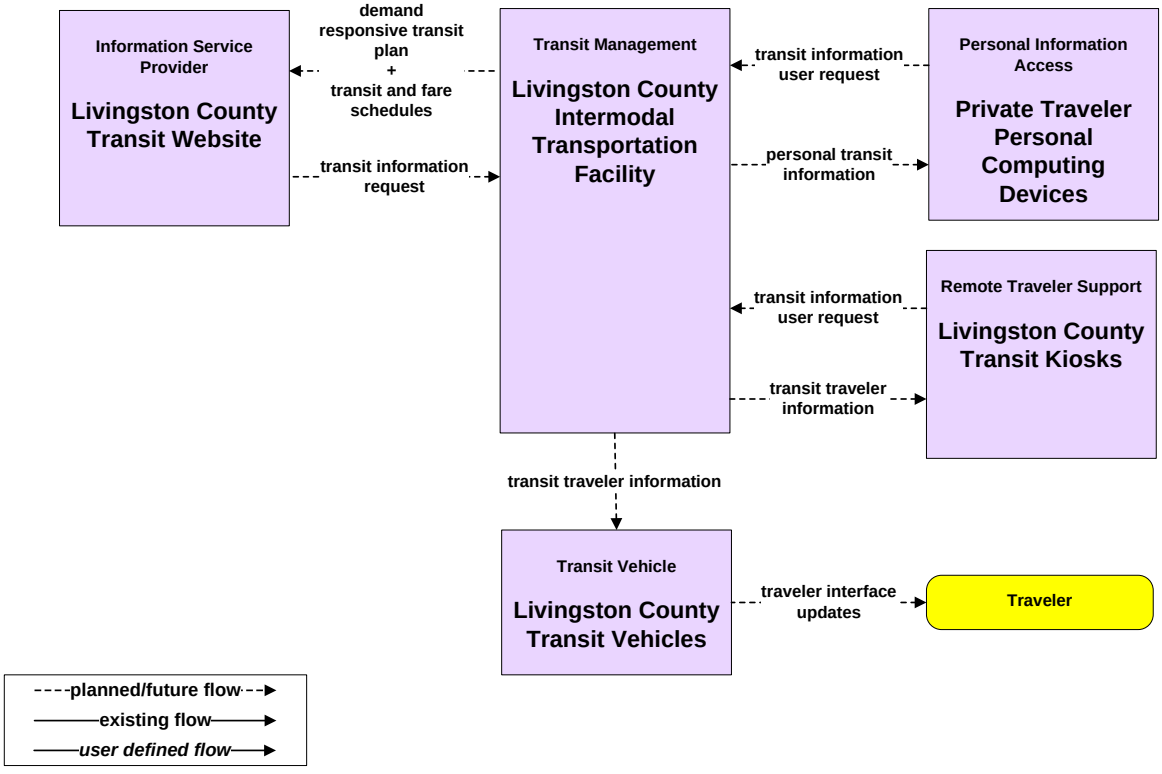
APTS8 – Transit Traveler Information
University of Michigan Parking and Transportation Services (UM-PTS)



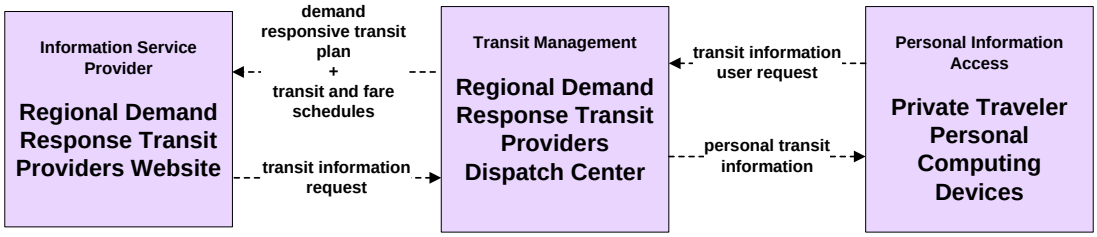
APTS8 – Transit Traveler Information
Lake Erie Transportation Commission - Lake Erie Transit (LET)

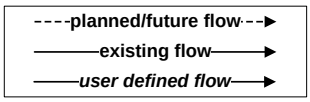


APTS8 – Transit Traveler Information
Livingston County

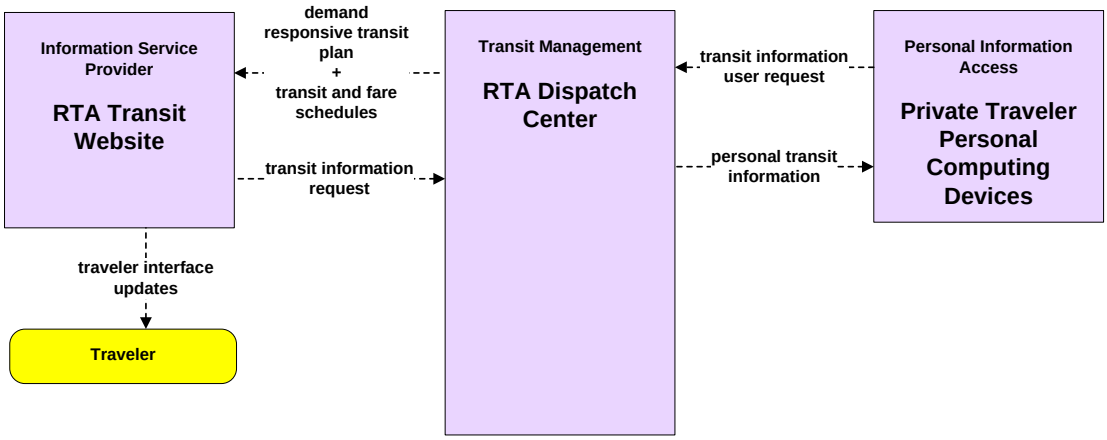


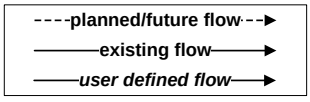
APTS8 – Transit Traveler Information
Regional Demand Response Transit Providers



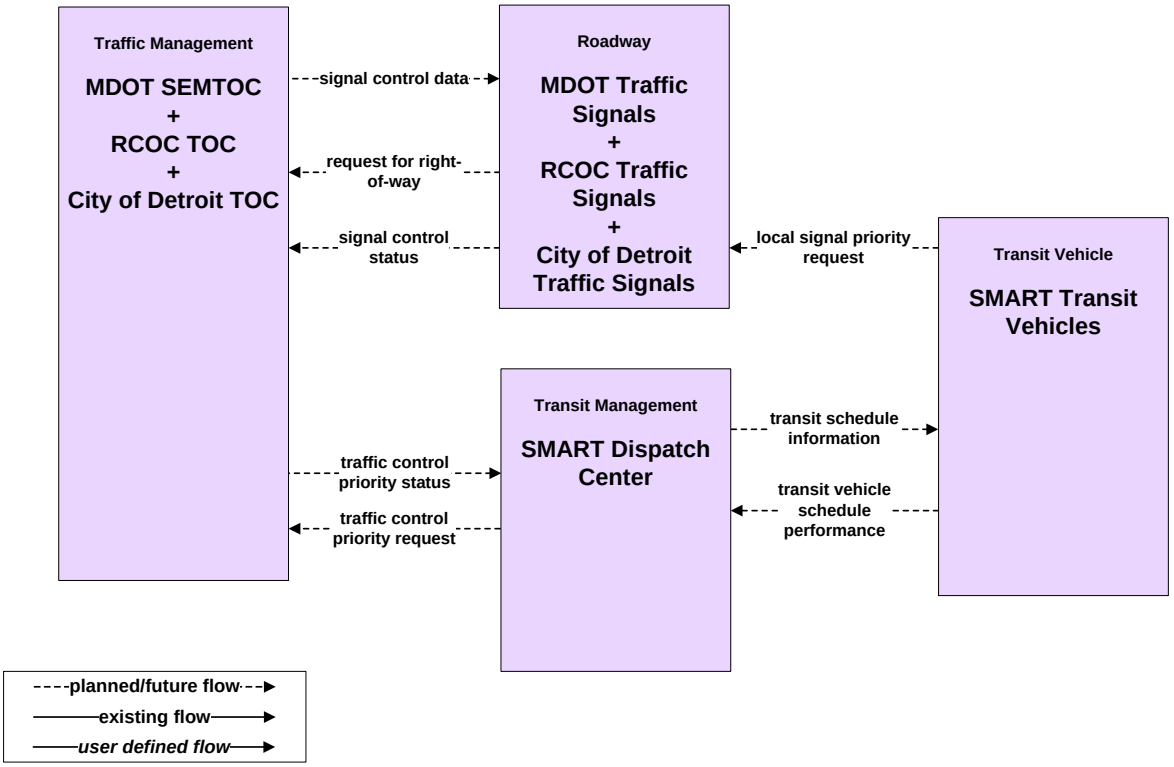


APTS8 – Transit Traveler Information
RTA

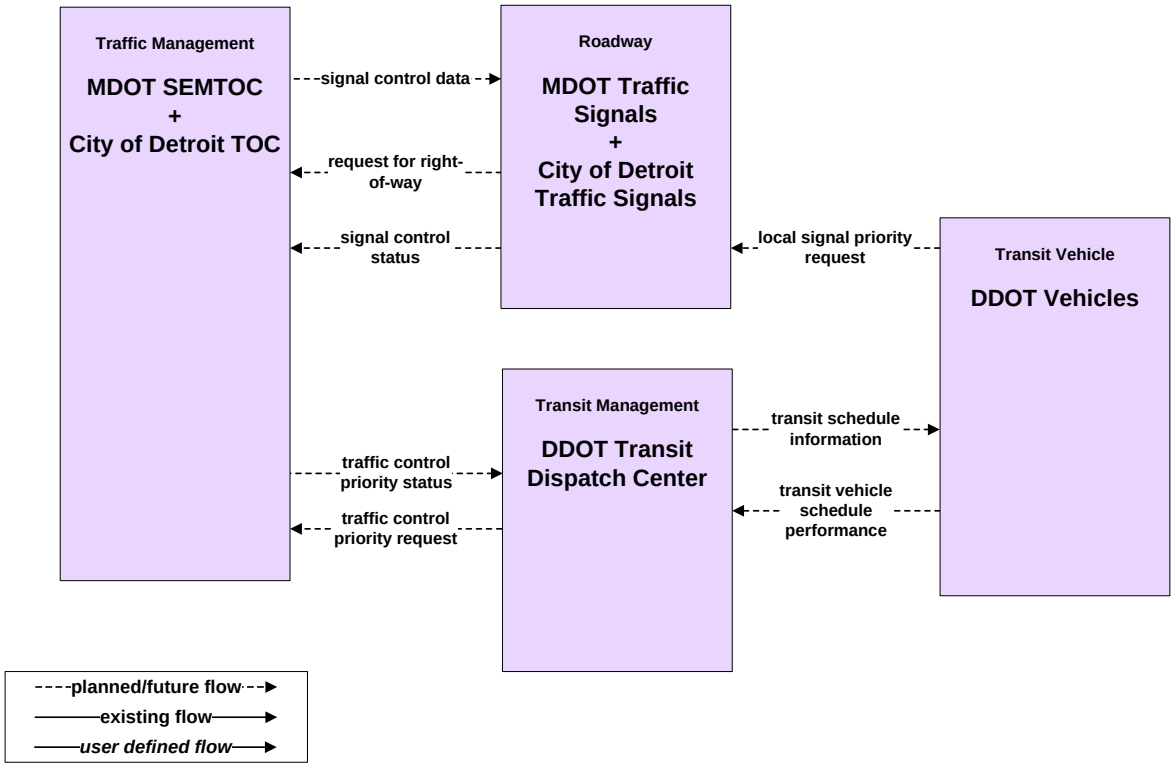




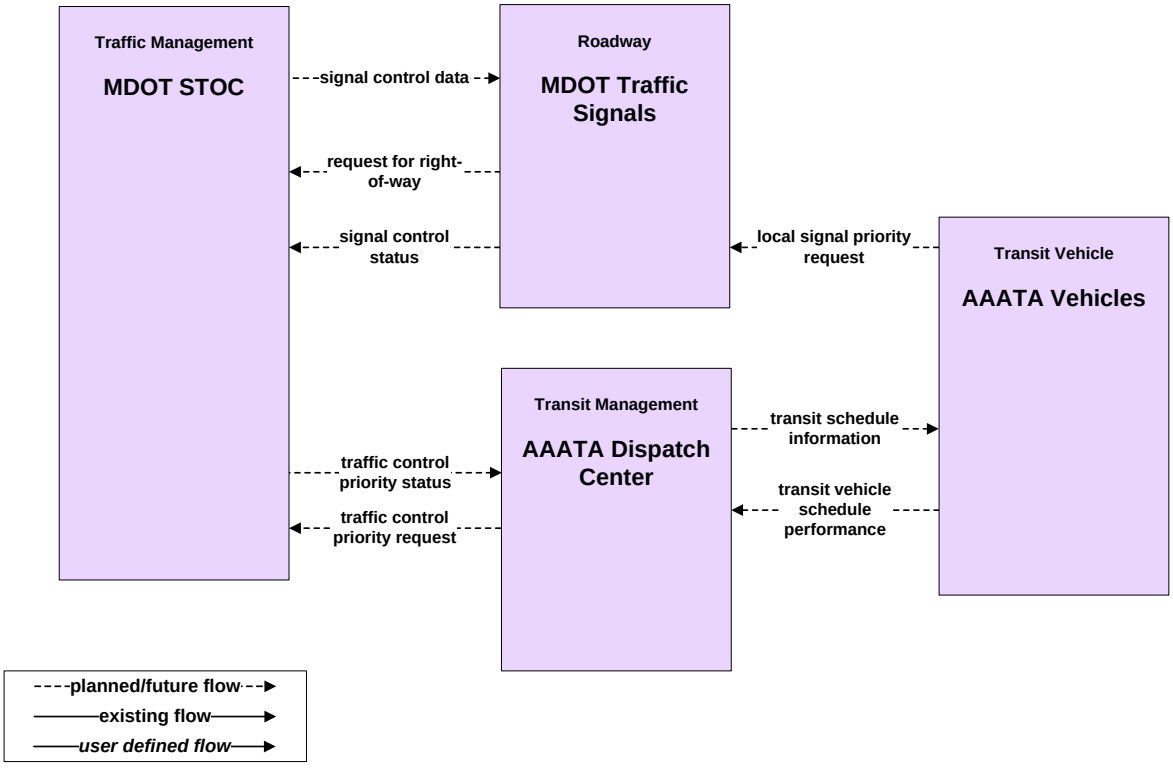
APTS9 – Transit Signal Priority
SMART



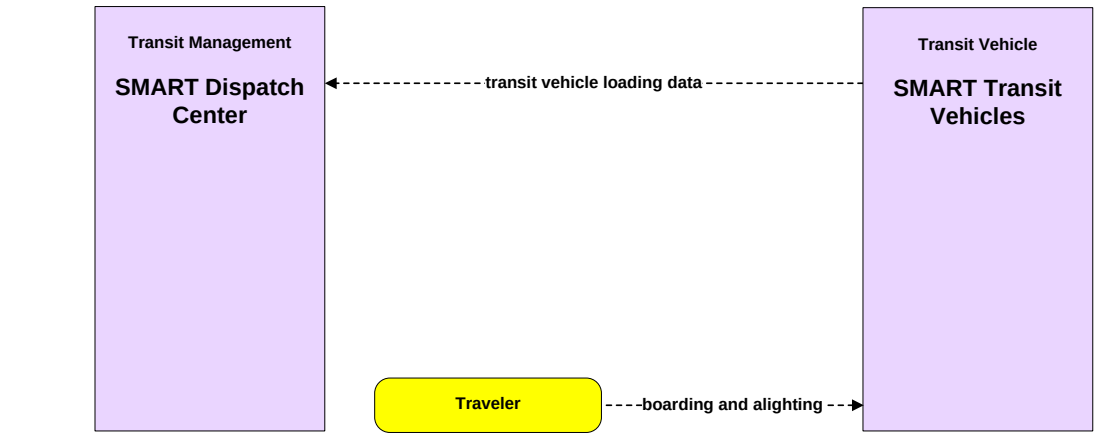
APTS9 – Transit Signal Priority
DDOT



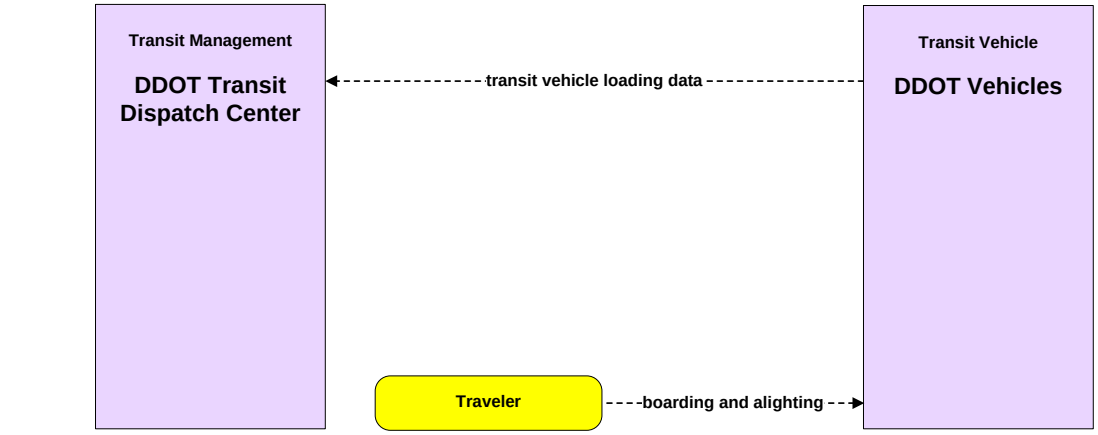
APTS9 – Transit Signal Priority
Ann Arbor Area Transportation Authority (AAATA)

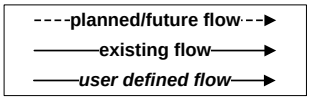


APTS10 – Transit Passenger Counting
SMART

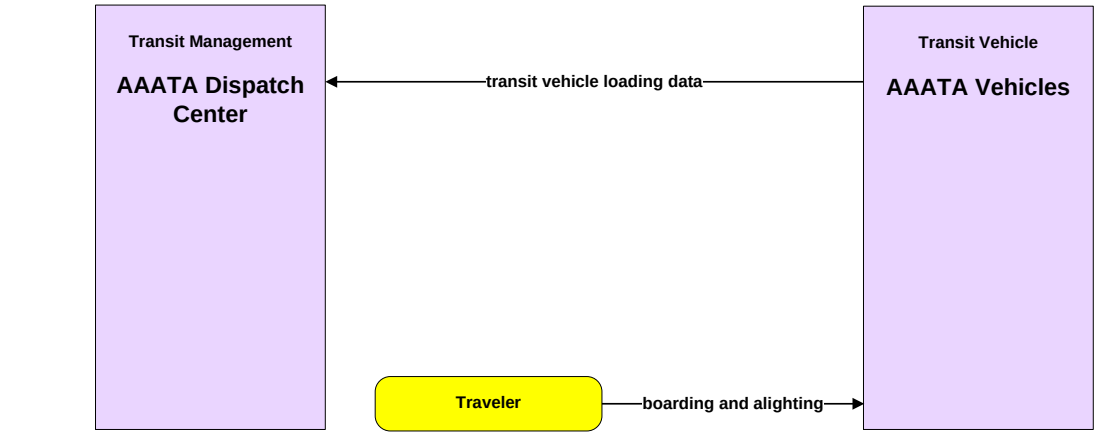


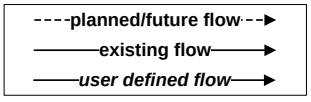
APTS10 – Transit Passenger Counting
DDOT



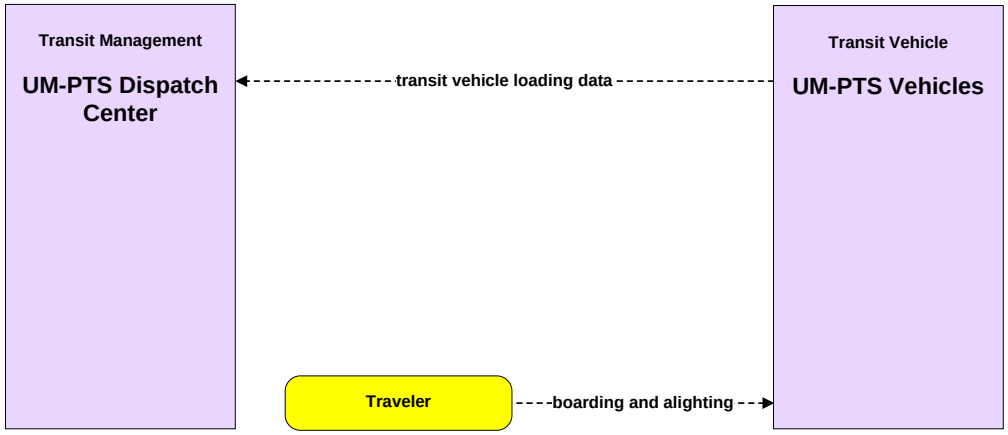


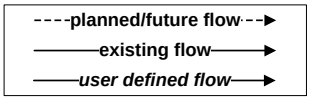
APTS10 – Transit Passenger Counting
Ann Arbor Area Transportation Authority (AAATA)





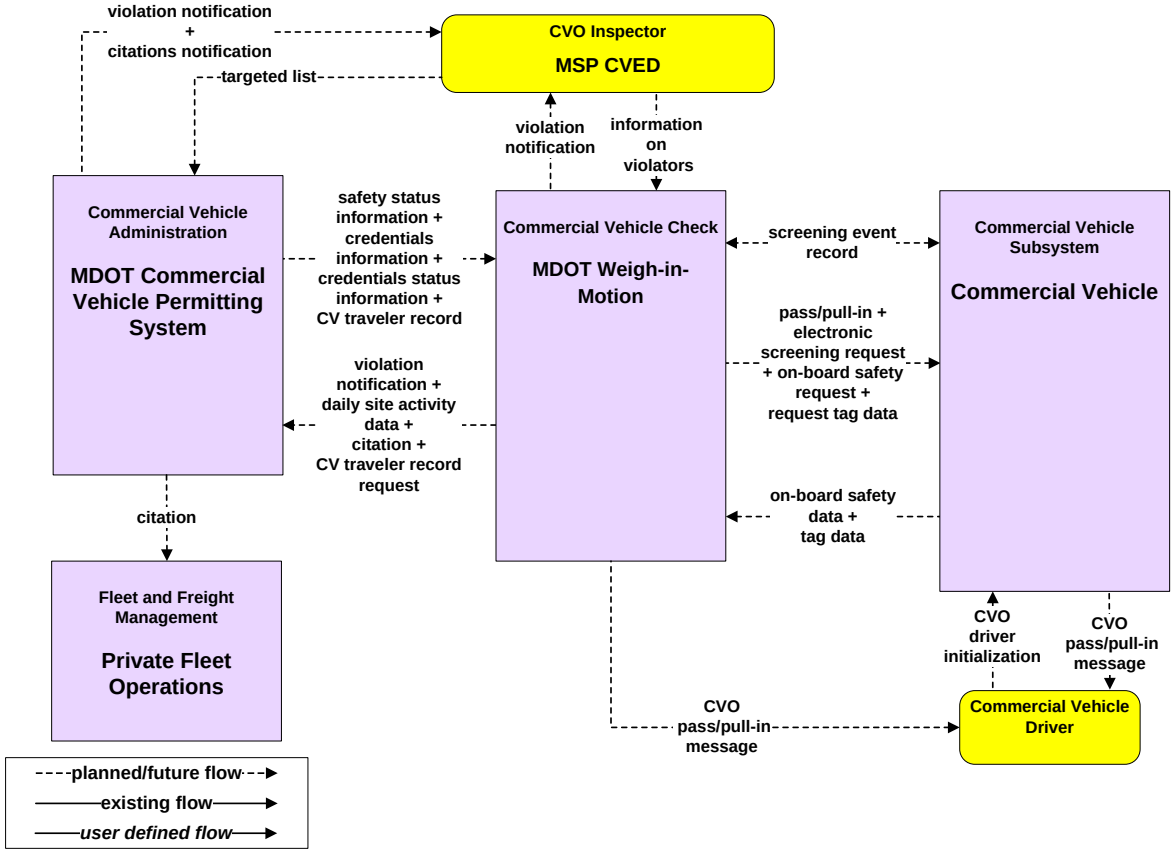
APTS10 – Transit Passenger Counting
University of Michigan Parking and Transportation Services (UM-PTS)



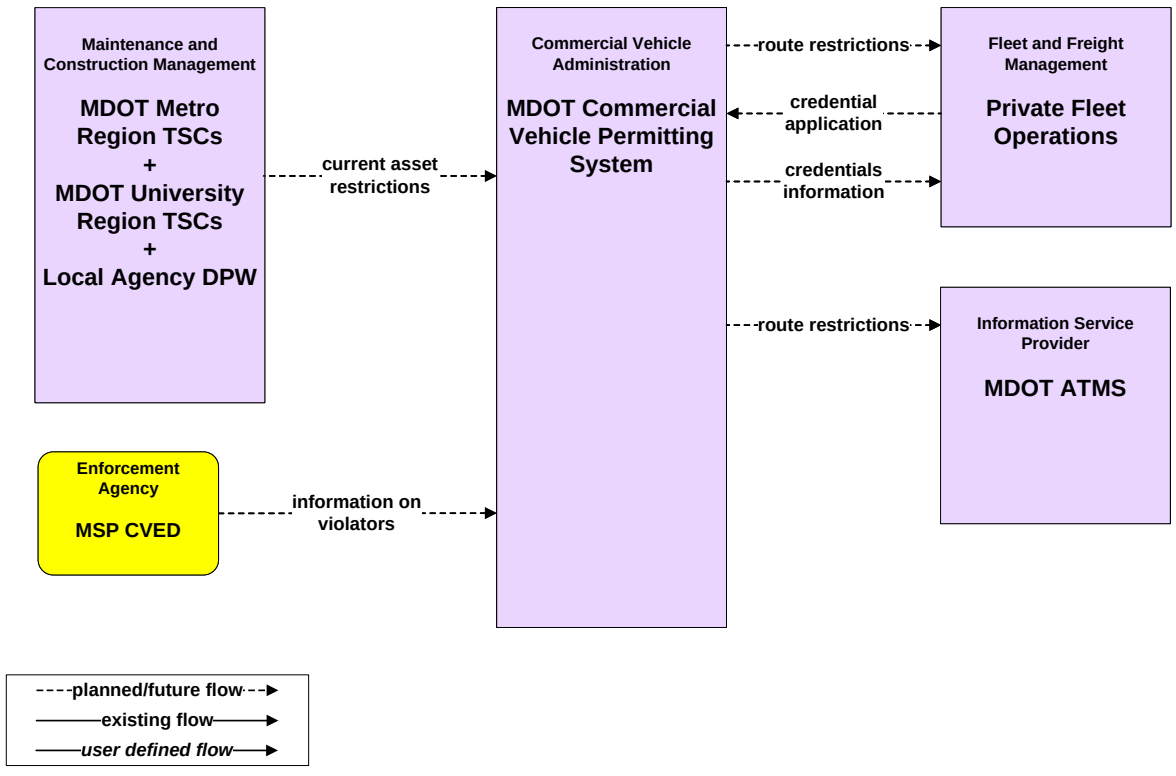


Commercial Vehicle Operations

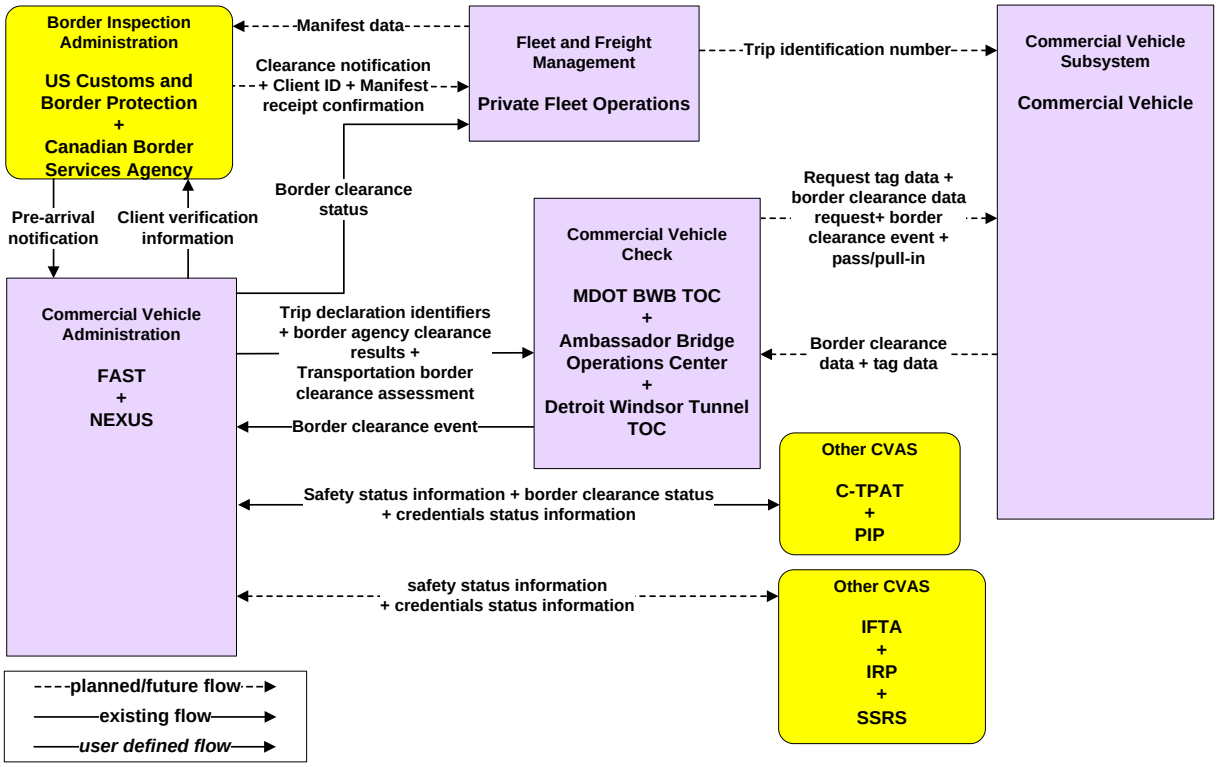
CVO3 – Electronic Clearance
MDOT



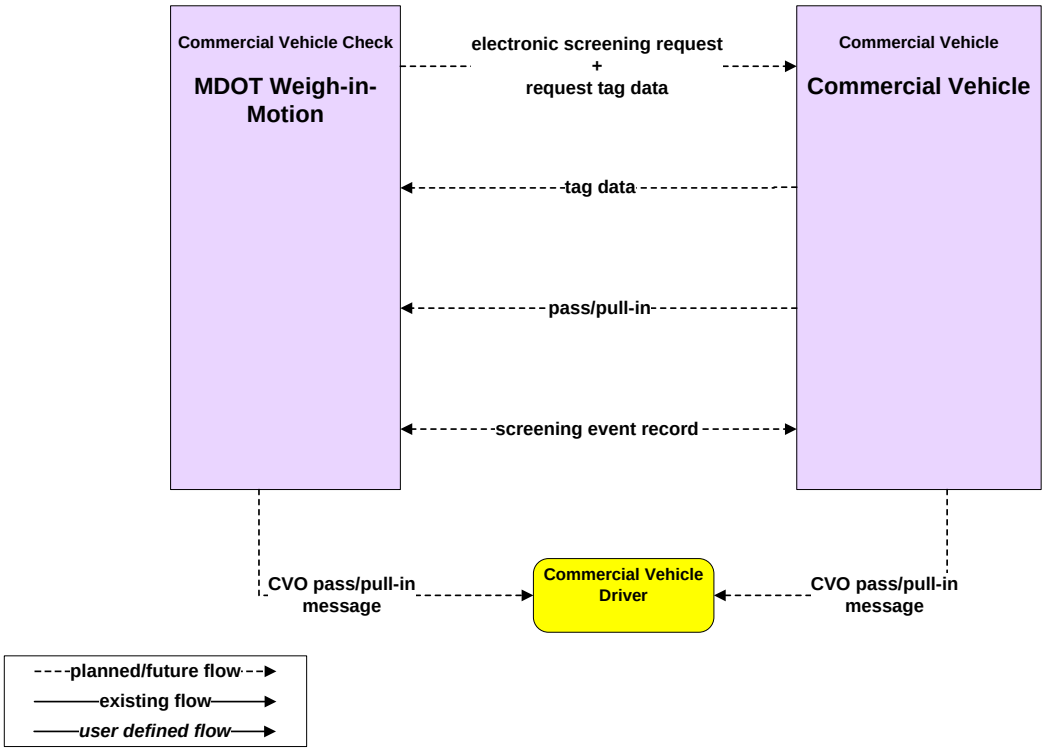
CVO04 – CV Administration Process
MDOT

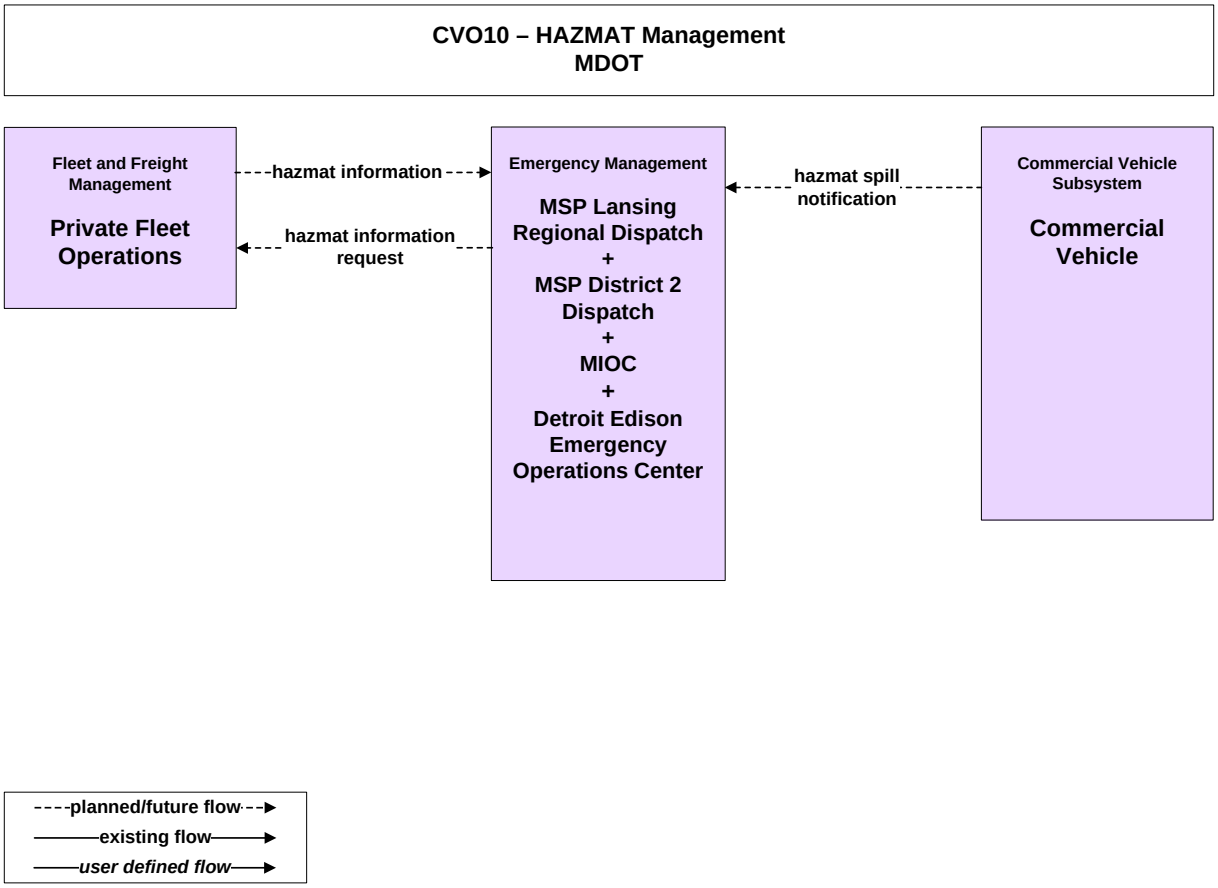


CVO05 – International Border Electronic Clearance
US Customs



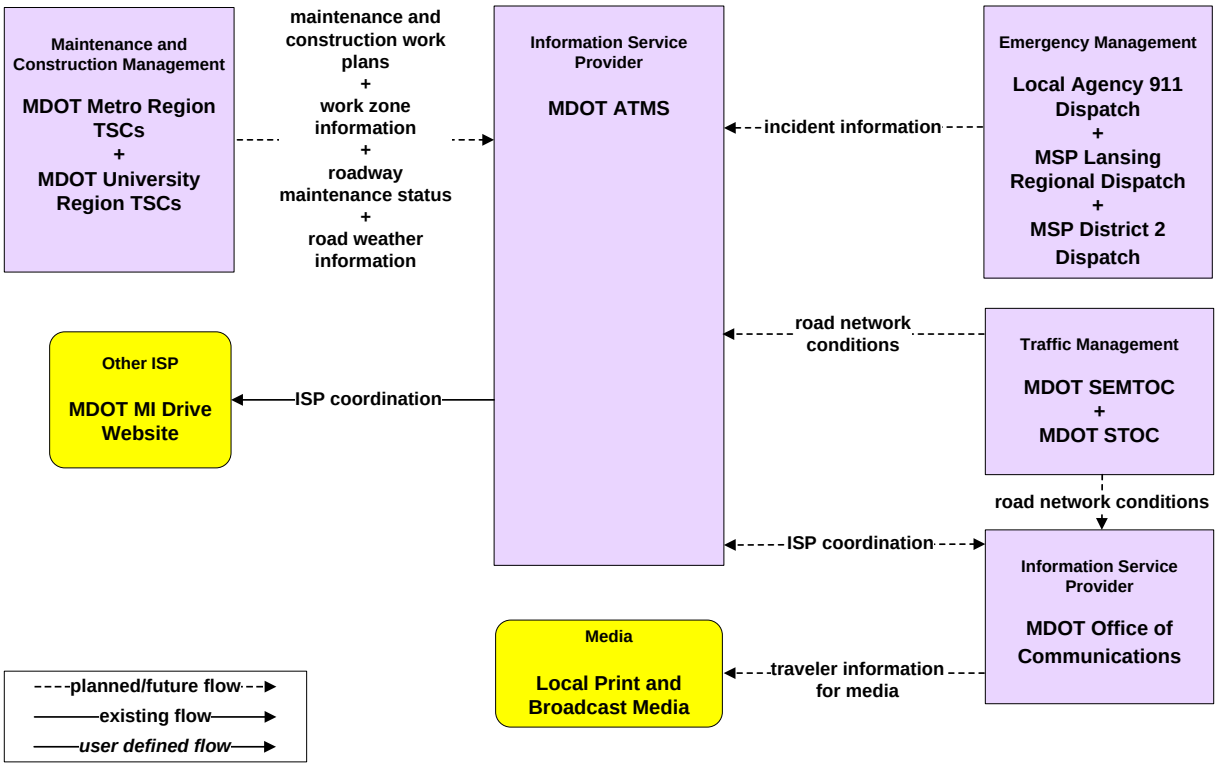
CVO06 – Weigh-In-Motion
MDOT



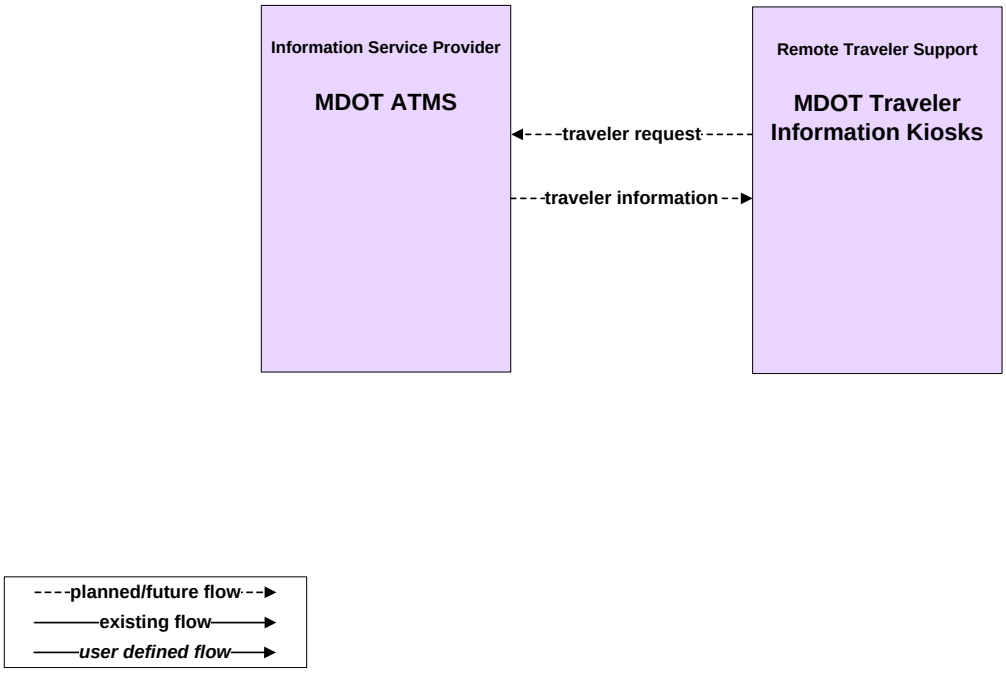


Advanced Traveler Information System

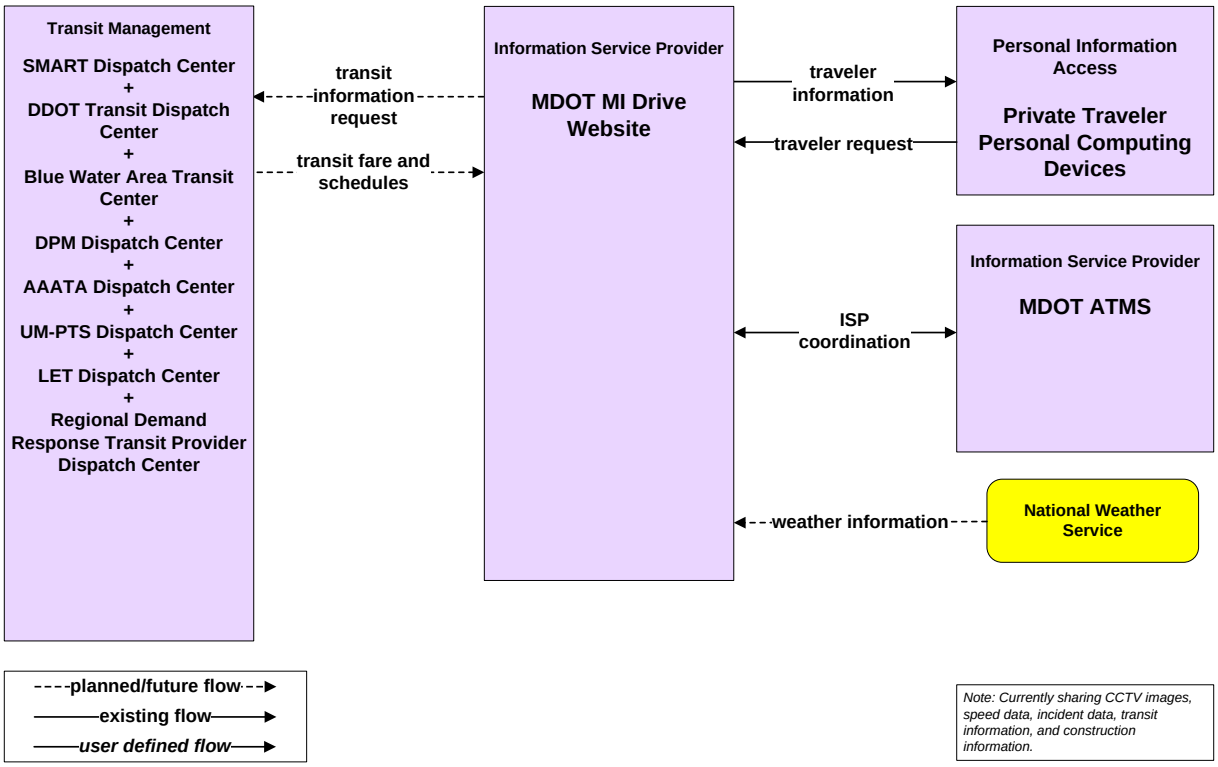
ATIS1 – Broadcast Traveler Information
MDOT



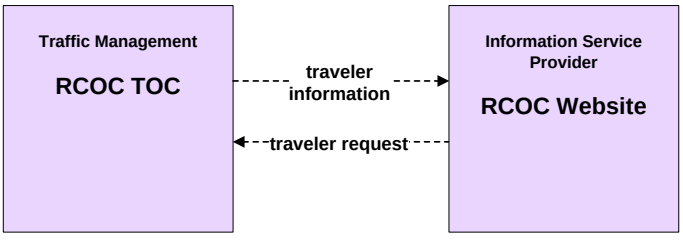
ATIS2 – Interactive Traveler Information
MDOT



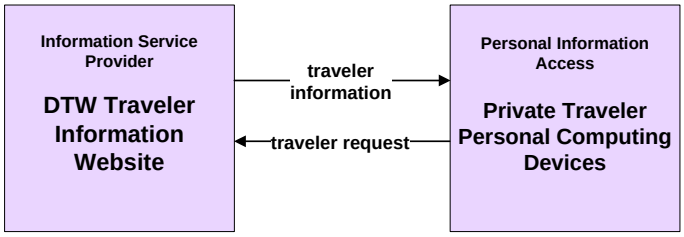
ATIS2 – Interactive Traveler Information
MDOT

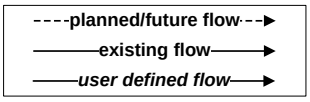


ATIS2 – Interactive Traveler Information
RCOC

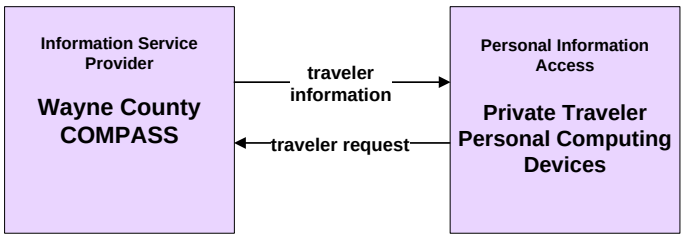


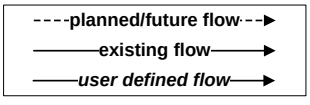
ATIS2 – Interactive Traveler Information
Wayne County Airport Authority (Detroit Metro Wayne County Airport - DTW)



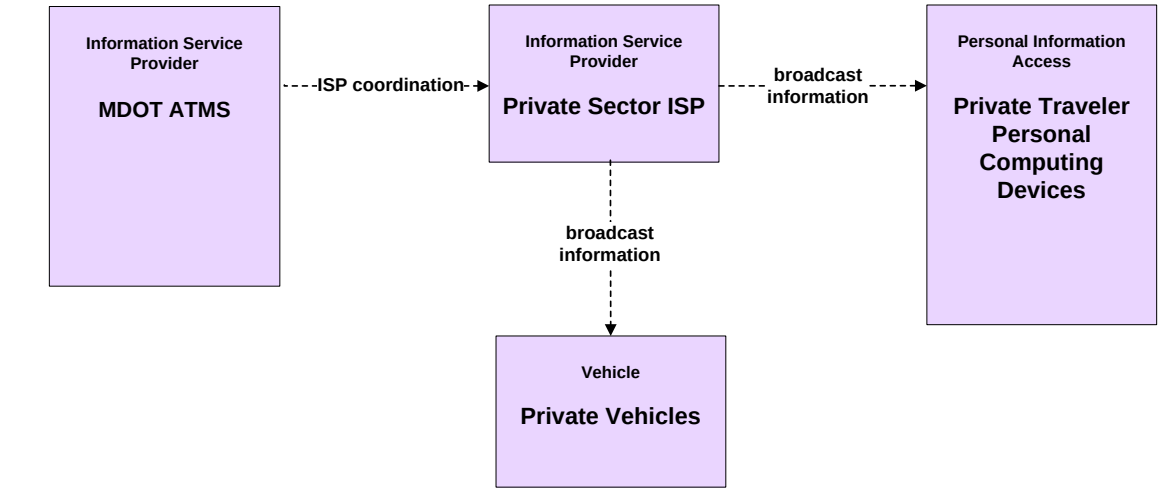


ATIS2 – Interactive Traveler Information
Wayne County





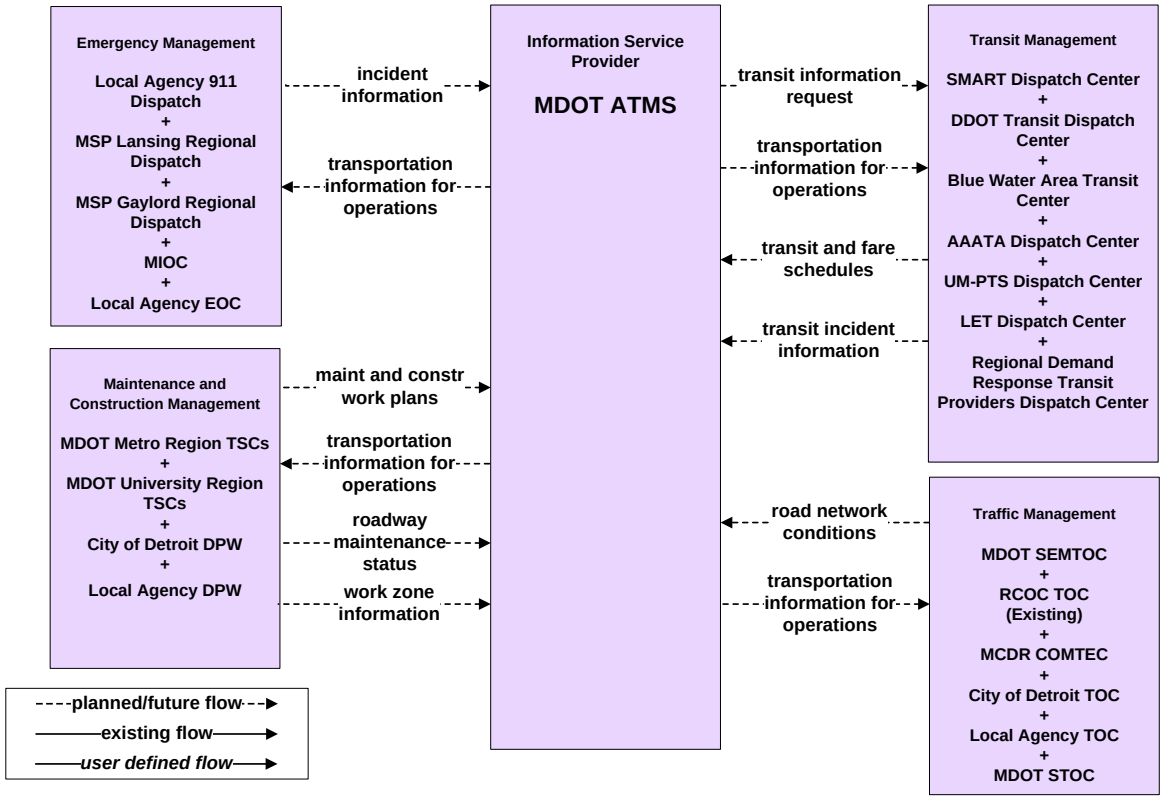
ATIS4 – Dynamic Route Guidance
MDOT



planned/future flow
existing flow
user defined flow

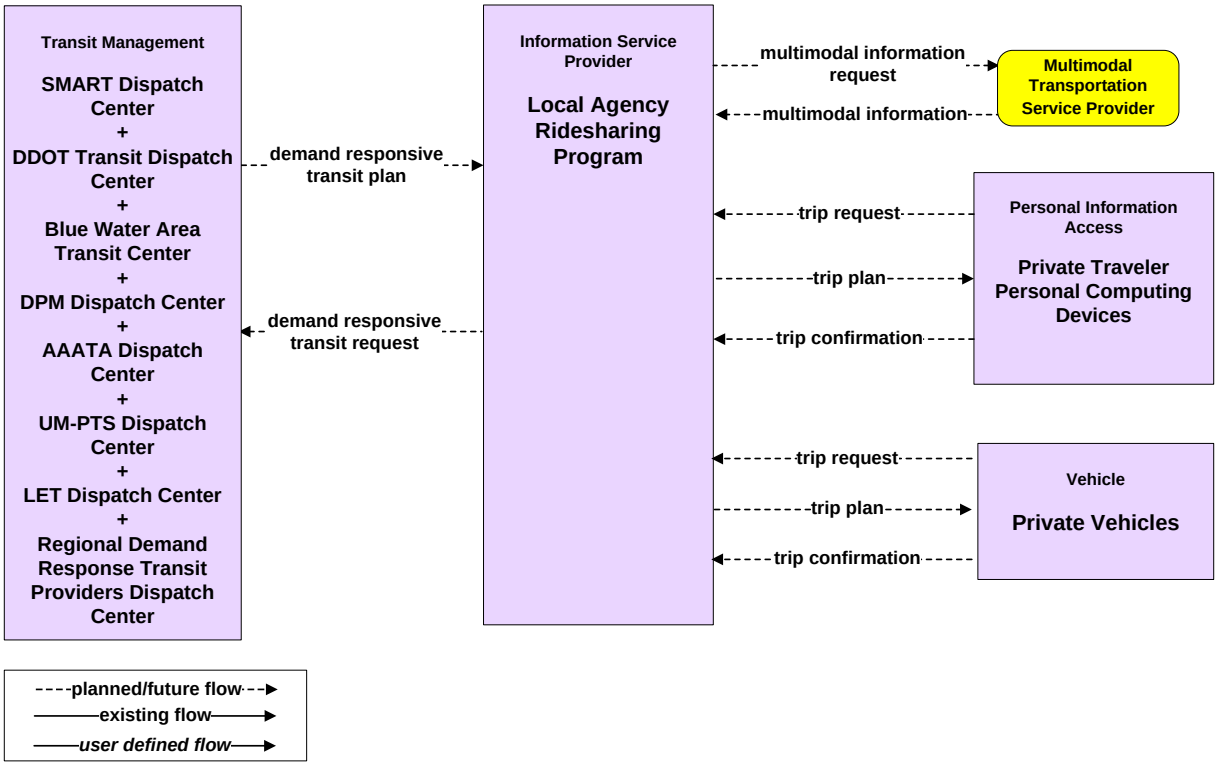
Note: 3rd party system will provide dynamic route guidance. MDOT will provide data.

ATIS6 – Transportation Operations Data Sharing
MDOT

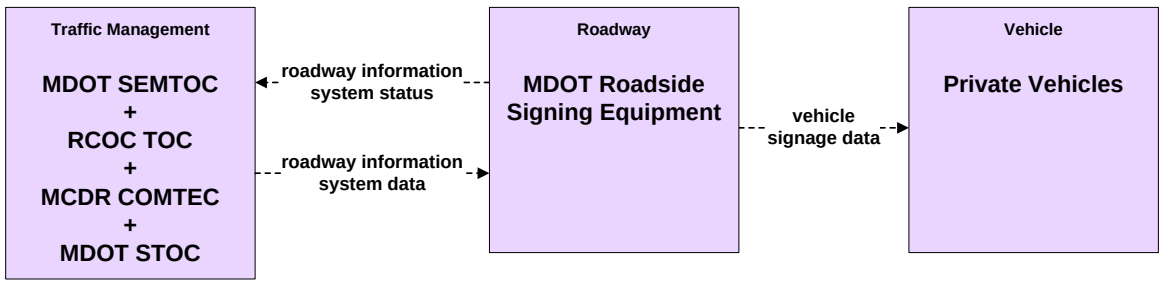


planned/future flow
existing flow
user defined flow

ATIS8 – Dynamic Ridesharing
MDOT

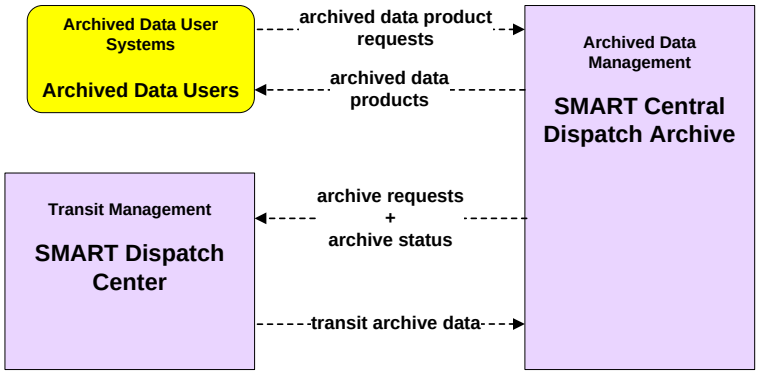


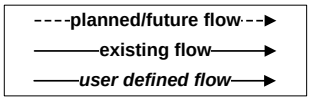
ATIS9 – In Vehicle Signing
MDOT



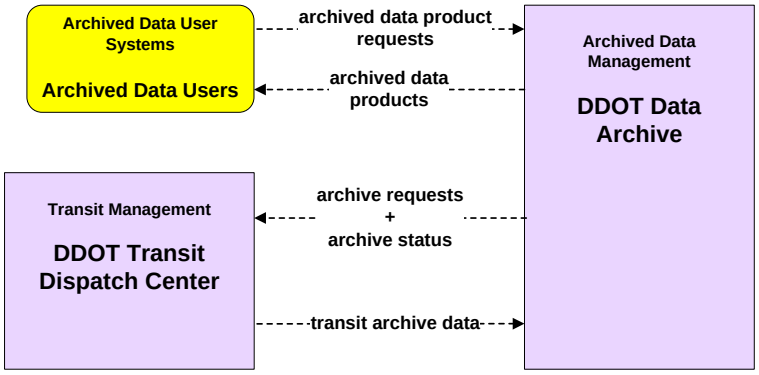
Archived Data

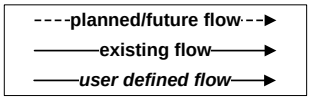
AD1 – ITS Data Mart
SMART



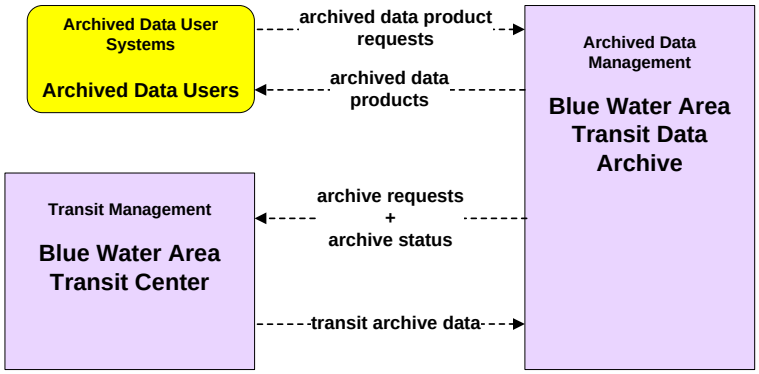


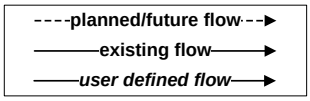
AD1 – ITS Data Mart
DDOT



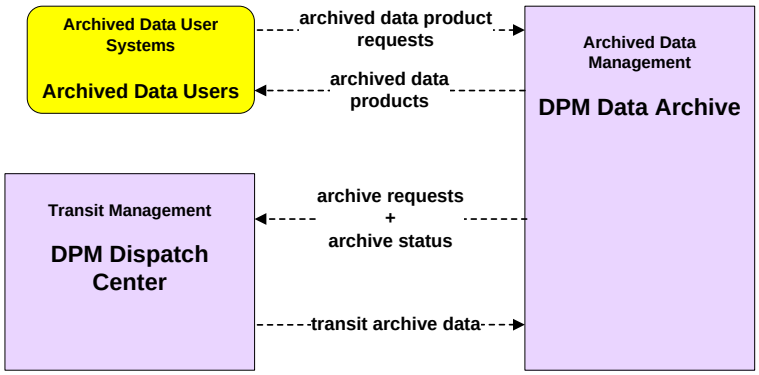


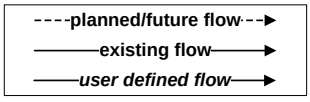
AD1 – ITS Data Mart
Blue Water Area Transit



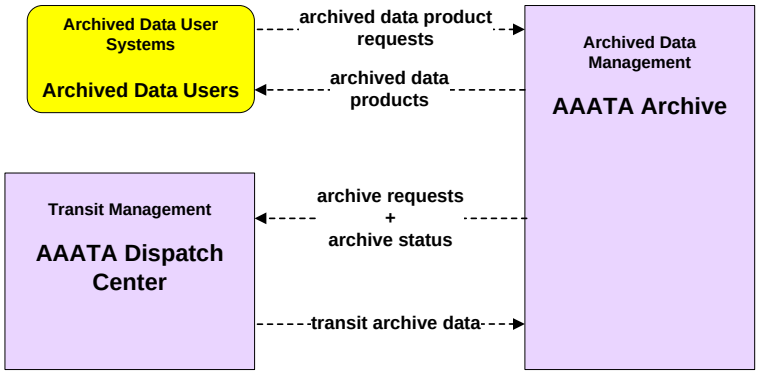


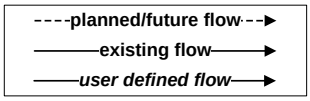
AD1 – ITS Data Mart
Detroit People Mover (DPM)



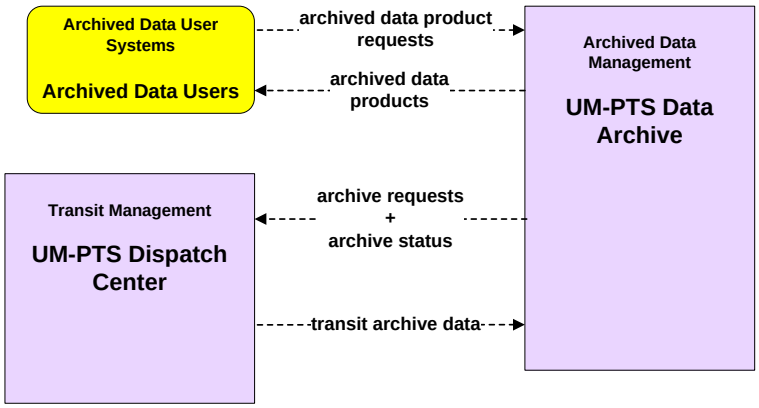


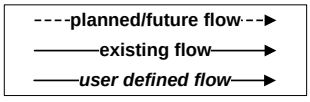
AD1 – ITS Data Mart
Ann Arbor Area Transportation Authority (AAATA)



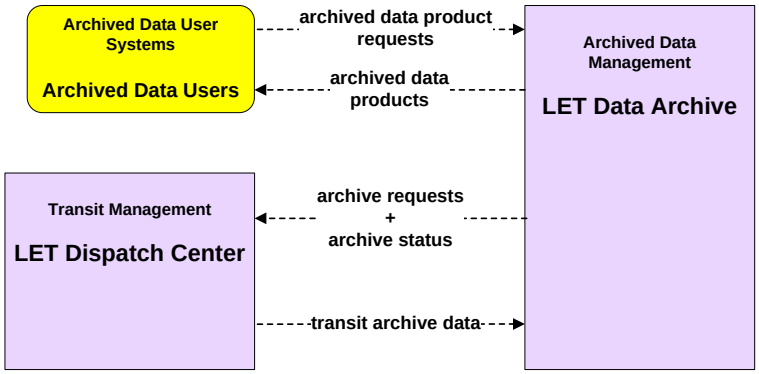


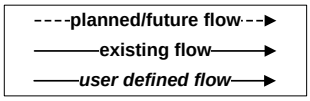
AD1 – ITS Data Mart
University of Michigan Parking and Transportation Services (UM-PTS)



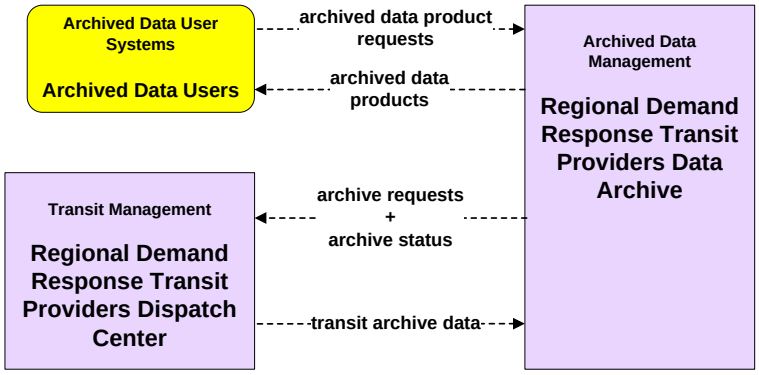


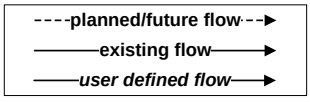
AD1 – ITS Data Mart
Lake Erie Transportation Commission - Lake Erie Transit (LET)



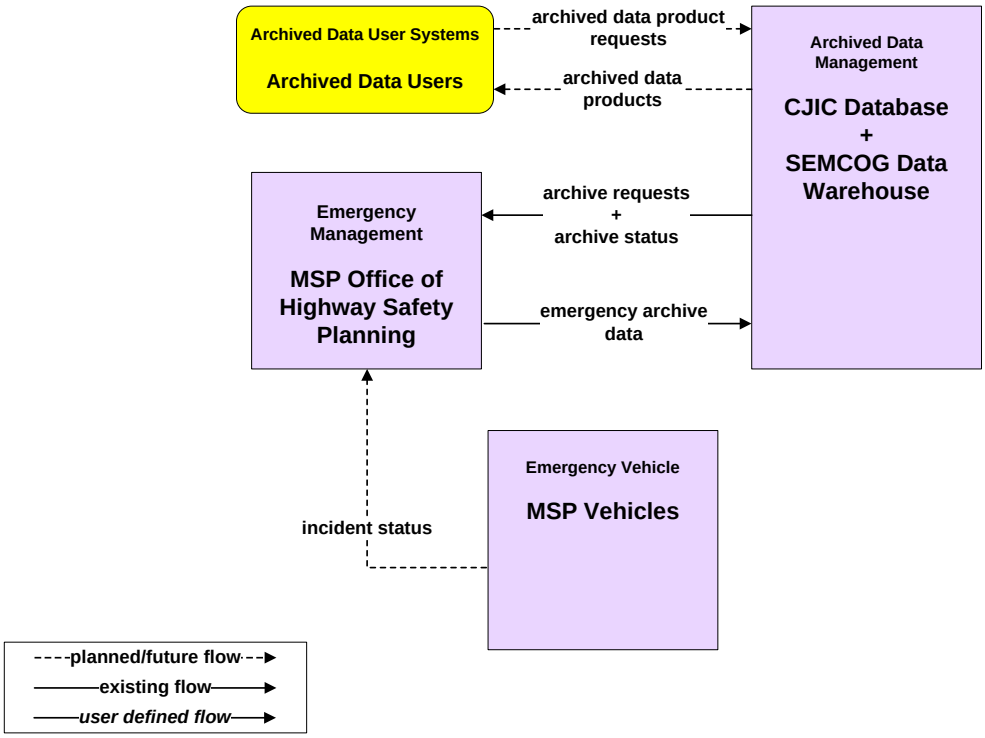


AD1 – ITS Data Mart
Regional Demand Response Transit Provider

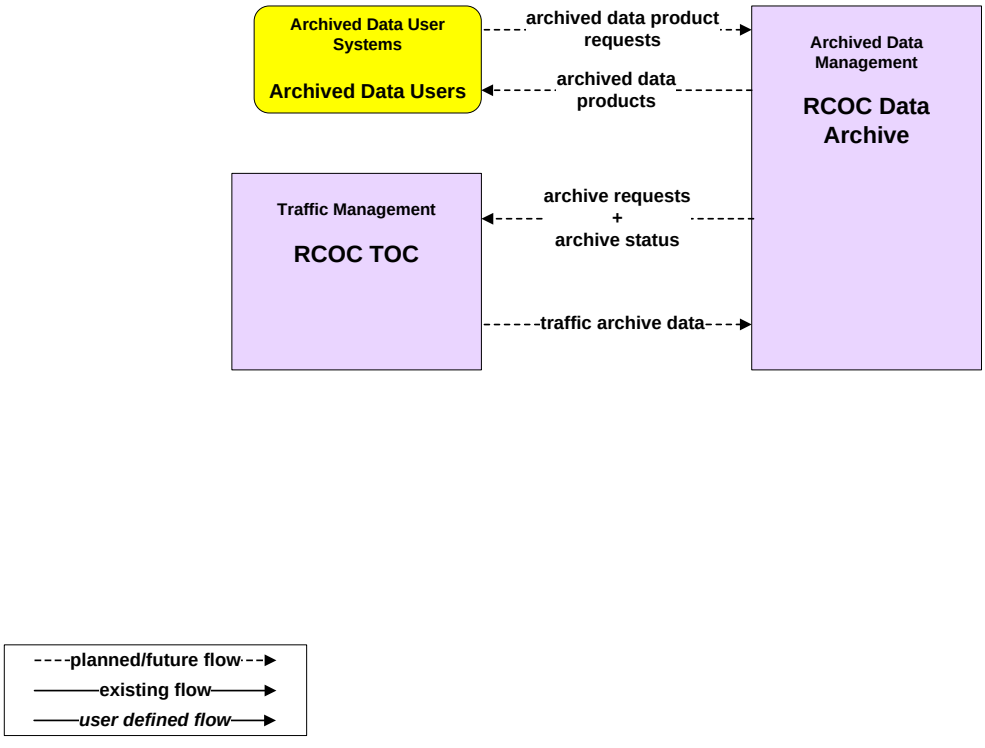




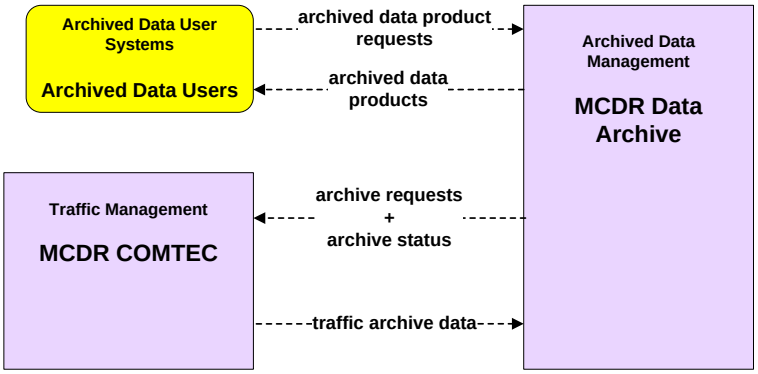
AD1 – ITS Data Mart
Criminal Justice Information Center

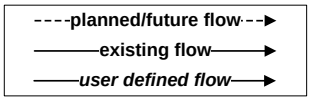


AD1 – ITS Data Mart
RCOC

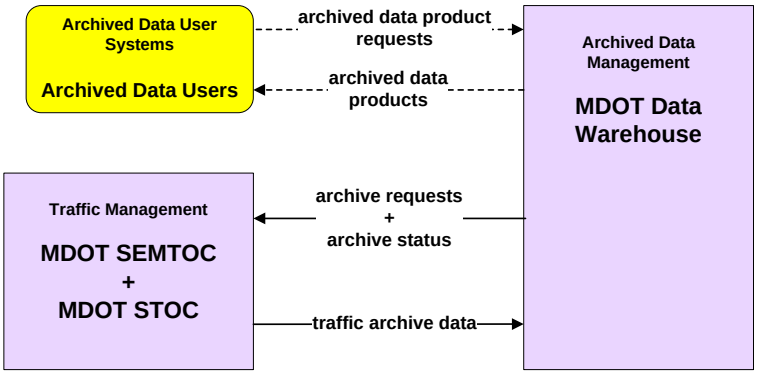


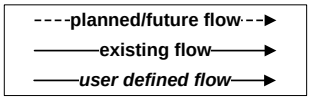
AD1 – ITS Data Mart
MCDR



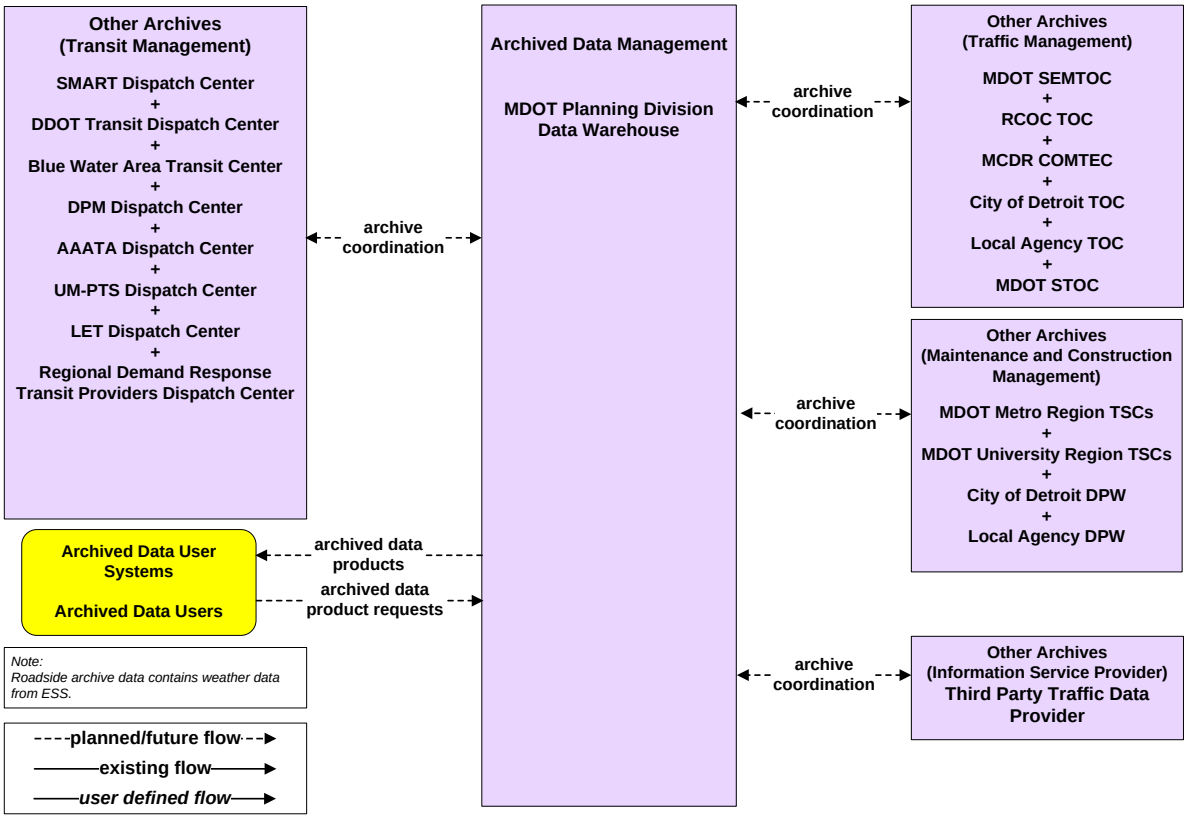


AD1 – ITS Data Mart
MDOT

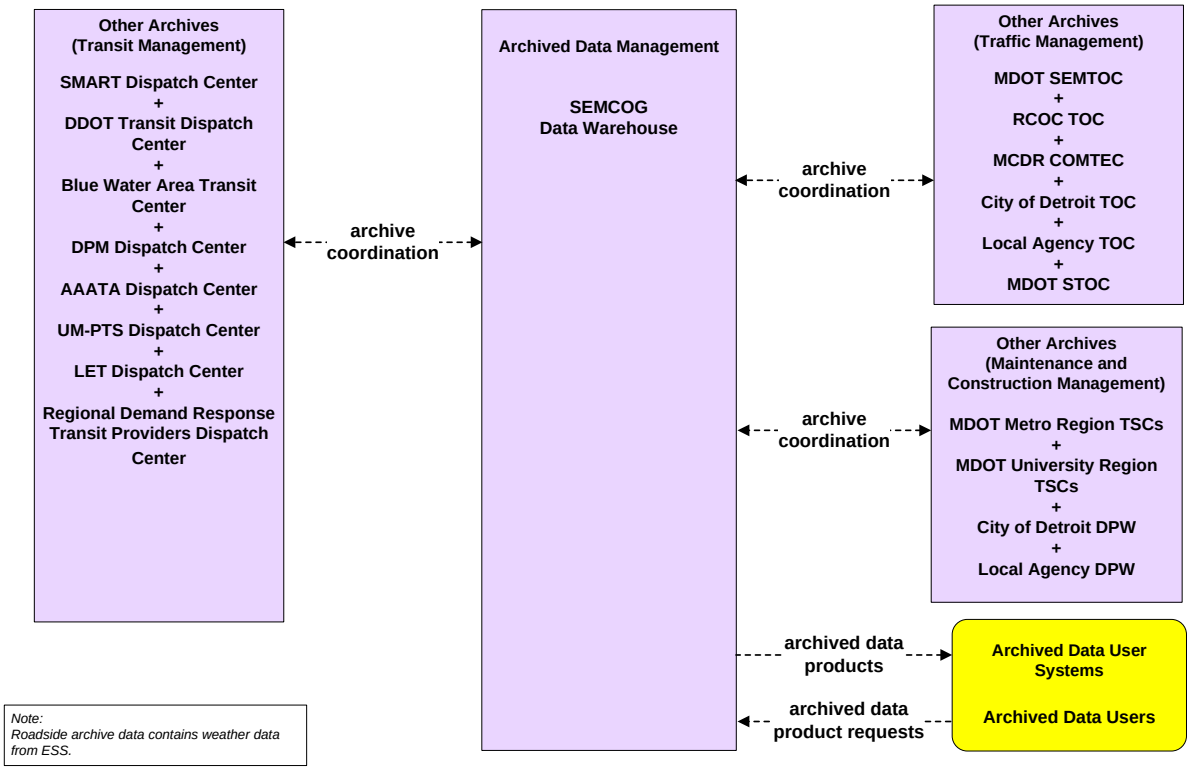




AD3 – ITS Virtual Data Warehouse
MDOT

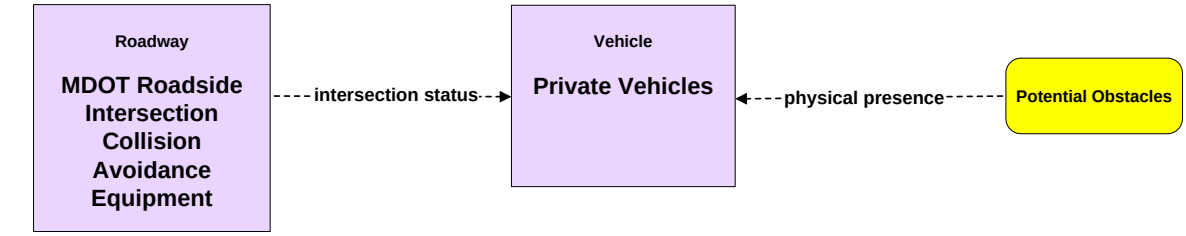


AD3 – ITS Virtual Data Warehouse
SEMCOG



Advanced Vehicle Safety System

AVSS10 – Intersection Collision Avoidance
MDOT



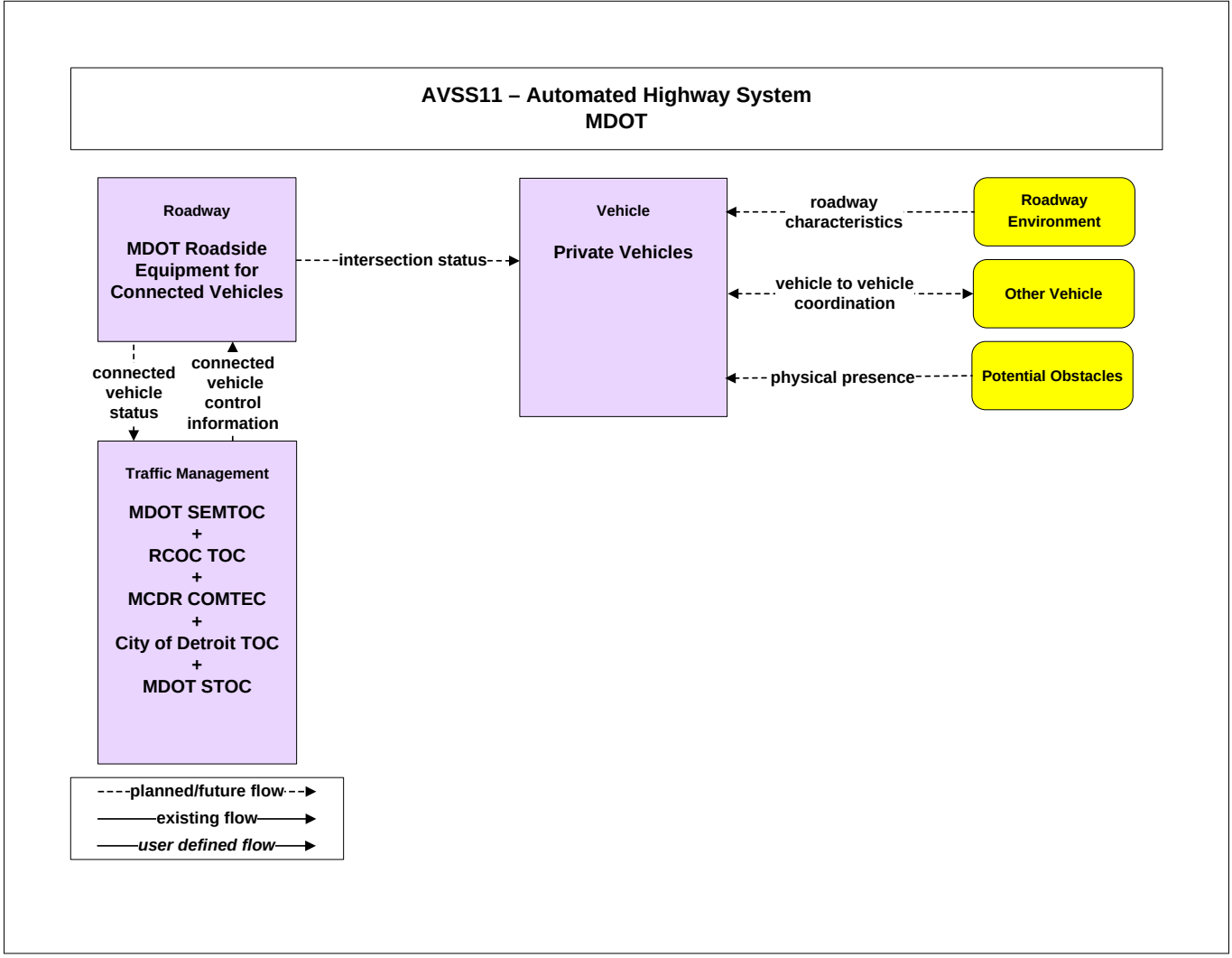
planned/future flow

existing flow

user defined flow

Note: Refer to FHWA Cooperative Intersection Collision Avoidance System (CICAS) initiative.

http://www.its.dot.gov/cicas/index.htm


AVSS11 – Automated Highway System
MDOT
Roadway
MDOT Roadside Equipment for Connected Vehicles
intersection status
Vehicle
Private Vehicles
roadway characteristics
Roadway Environment
vehicle to vehicle coordination
Other Vehicle
physical presence
Potential Obstacles
connected vehicle status
connected vehicle control information
Traffic Management
MDOT SEMTOC
+
RCOC TOC
+
MCDR COMTEC
+
City of Detroit TOC
+
MDOT STOC
planned/future flow
existing flow
user defined flow

APPENDIX C – ARCHITECTURE CONFORMANCE AND MAINTENANCE FORM

REGIONAL ITS ARCHITECTURE CONFORMANCE AND MAINTENANCE DOCUMENTATION FORM

Please complete the following questionnaire to document conformance or changes for the Regional ITS Architecture. Modifications will be made during the next architecture update.

AGENCY			
AGENCY CONTACT PERSON			
STREET ADDRESS	CITY	STATE	ZIP CODE
TELEPHONE	FAX	E-MAIL	

PROJECT INFORMATION

PROJECT NAME	PROJECT DESCRIPTION	
PROJECT SPONSOR (Agency providing funds)	ESTIMATED COST	DEPLOYMENT PLAN PROJECT NUMBER (if applicable)
MDOT OR LOCAL AGENCY PROJECT NUMBER (If applicable)	MDOT JOB NUMBER (If applicable)	MDOT CONTROL SECTION (If applicable)

REGION

CONFORMANCE TO REGIONAL ITS ARCHITECTURE

☐ This project conforms to the existing Regional ITS Architecture. No changes are required.

☐ This project does not conform to the existing Regional ITS Architecture. Requested changes are noted in the next section.

CHANGE INFORMATION

Please indicate the type of change:

☐ Level 1: Basic changes that does not affect the structure of the architecture. Examples include: Changes to the stakeholder or element name, element status, or data flow status.

☐ Level 2: Structural changes that impact only one agency. Examples include: Addition of a new market package or modifications to an existing market package that affects only your agency.

☐ Level 3: Structural changes that have the potential to impact multiple agencies. Examples include: Addition of a new market package or modifications to an existing market package that involves multiple agencies, incorporation of a new stakeholder into the architecture.

DESCRIBE REQUESTED CHANGE

IF THE PROPOSED CHANGE IMPACTS ANY MARKET PACKAGES, LIST THOSE MARKET PACKAGES (NOTE: If the proposed change involves creating or modifying a market package please attach a sketch of the new or modified market package.)

IF THE PROPOSED CHANGE AFFECTS ANY STAKEHOLDERS, LIST THOSE STAKEHOLDERS

Clear Form

IF COORDINATION WITH IMPACTED STAKEHOLDERS HAS OCCURRED, DESCRIBE THE RESULTS

☐ Approved by regional contact	REGIONAL CONTACT NAME	DATE
☐ Approved by ITS Program Office	ITS PROGRAM OFFICE NAME	DATE
☐ Forwarded to FHWA		DATE

Please submit change forms to:
MDOT-ITS-Architecture@michigan.gov

Transit-related projects should also be sent to:
MDOT – Bureau of Passenger Transportation and
Federal Transit Authority (FTA)

Process for Documenting Regional ITS Architecture Conformance and Maintenance

- ☐ The project manager evaluates the projects conformance to the Regional ITS Architecture.
- ☐ The project manager then completes the architecture conformance and maintenance documentation form and submits it to ITS Program Office.
- ☐ If the form is approved by the ITS Program Office, it is then submitted to the FHWA, the regional contact, the project manager and if applicable, the corresponding Metropolitan Planning Organization (MPO).
- ☐ If the form is rejected, the ITS Program Office coordinates with the project manager and the regional contact to then re-submit the new form for approval.
- ☐ To request a new form Contact your business area Forms Coordinator or Connie Bretes, MDOT FMO at (517) 335-2520.