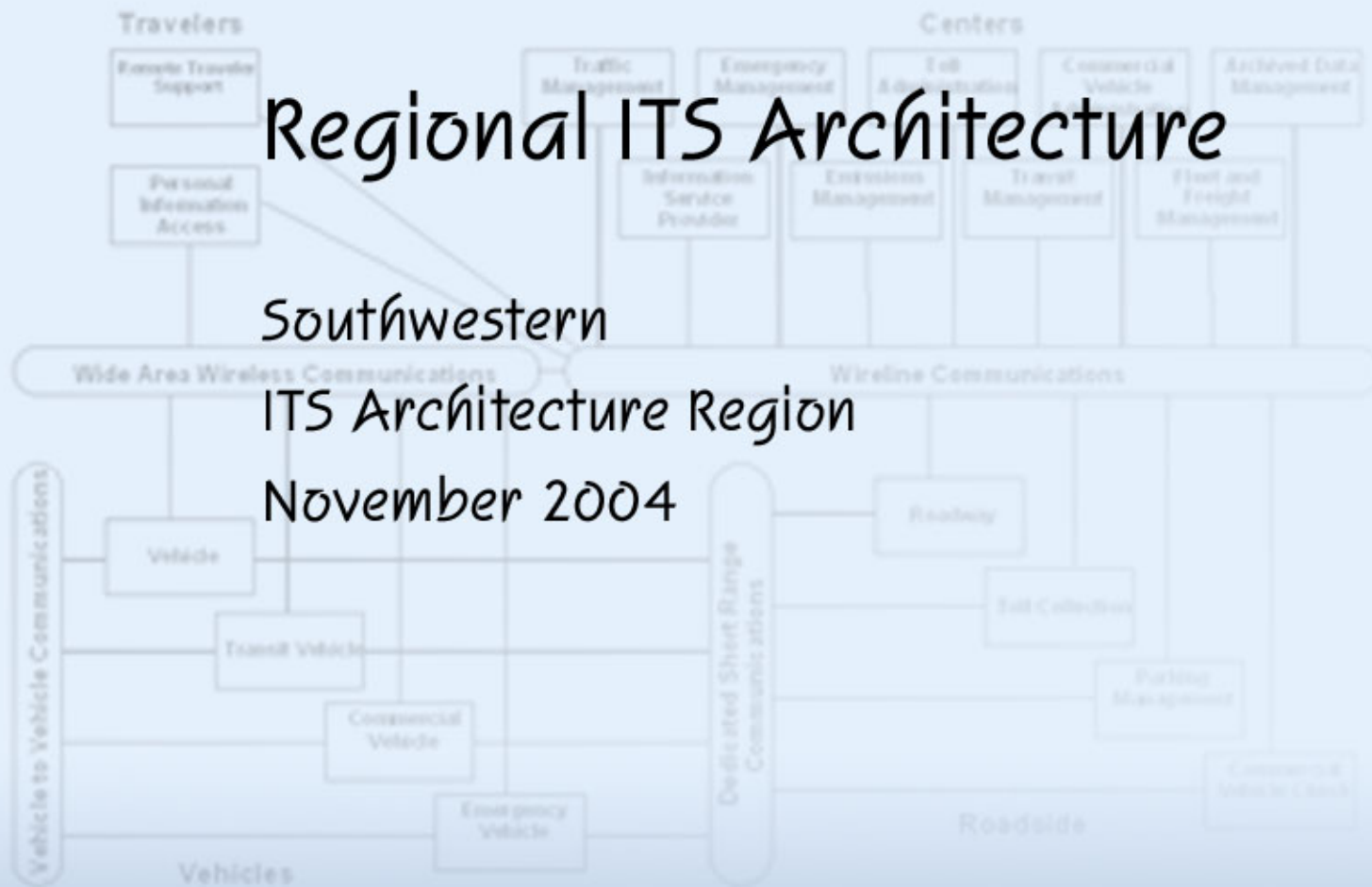


# Regional ITS Architecture

Southwestern  
ITS Architecture Region  
November 2004



PA

r e n i t e c t u r e



## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	ARCHITECTURE PROCESS .....	2
1.2	USING THIS DOCUMENT .....	3
1.3	UTILITY OF THE ARCHITECTURE .....	7
1.4	ITS STANDARDS.....	8
1.5	MAINTAINING THE ARCHITECTURE .....	10
1.6	MOVING FORWARD/INSTITUTIONALIZING ITS .....	16
<b>2</b>	<b>ARCHITECTURE SCOPE .....</b>	<b>23</b>
2.1	SCOPE OF SERVICES .....	23
2.2	CONFORMITY MATRIX .....	23
2.3	DESCRIPTION OF THE REGION .....	26
2.4	REGIONAL STAKEHOLDERS .....	31
2.5	REGIONAL ITS PROJECTS .....	34
<b>3</b>	<b>REGIONAL SYSTEMS INVENTORY, NEEDS, AND SERVICES .....</b>	<b>48</b>
3.1	ELEMENT DESCRIPTIONS .....	48
3.2	SYSTEMS INVENTORY.....	59
3.3	NEEDS .....	137
3.4	SERVICES .....	166
<b>4</b>	<b>REGIONAL ITS ARCHITECTURE.....</b>	<b>196</b>
4.1	SUBSYSTEM INTERCONNECT DIAGRAM .....	198
4.2	REGIONAL SUBSYSTEM INTERCONNECT DIAGRAM SHOWING ELEMENTS .....	200
4.3	INTERCONNECT MATRIX.....	206
4.4	ITS ARCHITECTURE .....	212
	<b>REFERENCES.....</b>	<b>871</b>
	<b>APPENDIX A: ACRONYMS .....</b>	<b>872</b>
	<b>APPENDIX B: ITS DEFINITIONS .....</b>	<b>875</b>
	<b>APPENDIX C: SUBSYSTEM AND TERMINATOR DEFINITIONS .....</b>	<b>878</b>
	<b>APPENDIX D: ARCHITECTURE FLOW DEFINITIONS .....</b>	<b>886</b>
	<b>APPENDIX E: OPERATIONS COVERAGE.....</b>	<b>898</b>
	<b>APPENDIX F: BOOKEND I MEETING MINUTES.....</b>	<b>901</b>
	<b>APPENDIX G: VALIDATION MEETING MINUTES .....</b>	<b>909</b>
	<b>APPENDIX H: BOOKEND II MEETING MINUTES .....</b>	<b>945</b>

## LIST OF TABLES

TABLE 2-1: SOUTHWESTERN ITS ARCHITECTURE REGION POPULATION BY COUNTY .....	27
TABLE 2-2: COMPARISON OF KEY POPULATION DEMOGRAPHICS SOUTHWESTERN ITS ARCHITECTURE REGION, PENNSYLVANIA, AND THE UNITED STATES .....	27
TABLE 2-3: COMPARISON OF COMMUTING PATTERNS AMONG WORKERS 16 & OVER SOUTHWESTERN ITS ARCHITECTURE REGION, PENNSYLVANIA, AND THE UNITED STATES	28
TABLE 2-4: SOUTHWESTERN ITS ARCHITECTURE REGION LINEAR MILES.....	28
TABLE 2-5: SOUTHWESTERN DAILY VEHICLE MILES OF TRAVEL .....	29
TABLE 2-6: SIGNIFICANT HIGHWAY CORRIDORS.....	29
TABLE 2-7: REGIONAL ITS PROJECTS .....	35
TABLE 3-1: REGIONAL SYSTEMS INVENTORY .....	60
TABLE 3-2: REGIONAL NEEDS TABLE .....	138
TABLE 3-3: REGIONAL SERVICES TABLE .....	167
TABLE 4-1: REGIONAL SUBSYSTEMS/TERMINATORS.....	202
TABLE 4-2: REGIONAL INTERCONNECT MATRIX.....	207

## TABLE OF FIGURES

FIGURE 1-1: PENNDOT ITS ARCHITECTURE REGIONS .....	1
FIGURE 1-2: PENNSYLVANIA ITS ARCHITECTURE PROCESS SCHEMATIC .....	3
FIGURE 1-3: PENNSYLVANIA ITS ARCHITECTURE WEB SITE.....	6
FIGURE 1-4: PENNDOT DISTRICT MAP .....	17
FIGURE 1-5: PENNSYLVANIA MPO/RPO MAP .....	17
FIGURE 2-1: SOUTHWESTERN ITS ARCHITECTURE REGION .....	26
FIGURE 4-1: SUBSYSTEM INTERCONNECT DIAGRAM .....	199
FIGURE 4-2: REGIONAL SUBSYSTEM INTERCONNECT DIAGRAM SHOWING ELEMENTS .....	201

**Southwestern Pennsylvania Commission – Metropolitan  
Planning Organization**

*Adopted on December 6, 2004*

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### **Statewide Working Group**

The Statewide Working Group guided the Commonwealth through the development of the Architectures. Their principal role was to ensure that the Regional Architectures were reasonably uniform and consistent.

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### **Regional Champion**

The Regional Champion supported the RAP by facilitating the RAP meetings and played a critical role in coordinating with the Statewide Working Group for merging statewide visions with Regional characteristics. The Champion for this Region was:

**Chuck DiPietro** – Southwest Pennsylvania Commission

## **Regional Advisory Panel**

The Regional Advisory Panel lead and guided the Regional ITS Architecture development in the Southwest ITS Architecture Region. The Architecture was developed with input from regional stakeholders, channeled and focused by the RAP.

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## **Parsons Brinckerhoff**

The principal role of Parsons Brinckerhoff was to oversee and produce the Regional ITS Architectures. The PB Team consisted of:

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Steve Kimble – PB Farradyne –  
Southwestern Region Support

## Conformity Statement

*The Southwestern Region of the Commonwealth of Pennsylvania is in compliance with the requirements of the “Intelligent Transportation Systems Architecture and Standards,” as mandated by the Federal Highway Administration (23 CFR 940) and supported by the policy of the Federal Transit Administration.*

*The following policy objectives are enumerated in 23 CFR 940.5: “ITS projects shall conform to the National ITS Architecture and standards in accordance with the requirements contained in this [Federal rule]. Conformance with the National ITS Architecture is interpreted to mean the use of the National ITS Architecture to develop a [R]egional ITS Architecture, and the subsequent adherence of all ITS projects to that [R]egional ITS Architecture. Development of the [R]egional ITS Architecture should be consistent with the transportation planning process for Statewide and Metropolitan Transportation Planning.”*

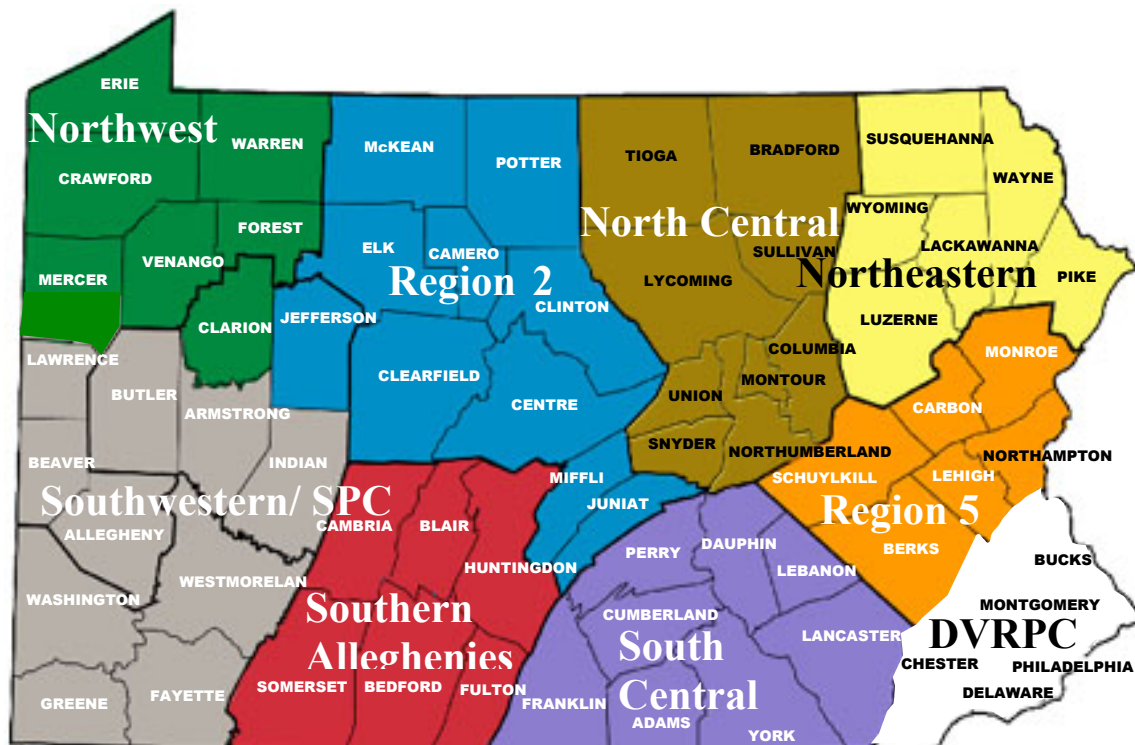
*The Southwestern Region’s ITS Architecture was developed to address these specific policy objectives. The resultant Regional ITS Architecture is consistent with Pennsylvania’s statewide and metropolitan transportation planning processes.*

## 1 Introduction

This document, developed under the *Pennsylvania Intelligent Transportation Systems (ITS) Architecture* initiative, presents the ITS Architecture for Pennsylvania's Southwestern Region, which is comprised of ten counties in the southwestern part of the state. The document is the result of intensive data-gathering, research, and planning activities conducted between March 2003 and November 2004. The current version of the ITS Architecture was generated in November 2004.

The Southwestern Regional ITS Architecture was prepared under the auspices of a Regional Advisory Panel (RAP), a panel of experts drawn from transportation stakeholder organizations across the Region and State. Additional stakeholder organizations participated in the process of "validating" the Architecture. PB Farradyne, a division of Parsons Brinckerhoff, Inc., executed development of the Architecture under contract to the Pennsylvania Department of Transportation (PennDOT). PennDOT appointed an ITS Statewide Working Group to establish statewide ITS Architecture standards, advise and guide the statewide process, and ensure consistency across the Regions.

The Southwestern Regional ITS Architecture is one of nine Regional Architectures being developed across the Commonwealth of Pennsylvania, as shown in Figure 1-1, below:



**Figure 1-1: PennDOT ITS Architecture Regions**



## **1.1 Architecture Process**

PennDOT took a structured approach to developing Regional ITS Architectures throughout the State. The Regional ITS Architecture development process was defined and documented in the “Pennsylvania ITS Architecture Phase I Report,” dated February 2003. PennDOT, the Federal Highway Administration (FHWA), the Pennsylvania State Police (PSP), and the Planning Partners championed the former effort.

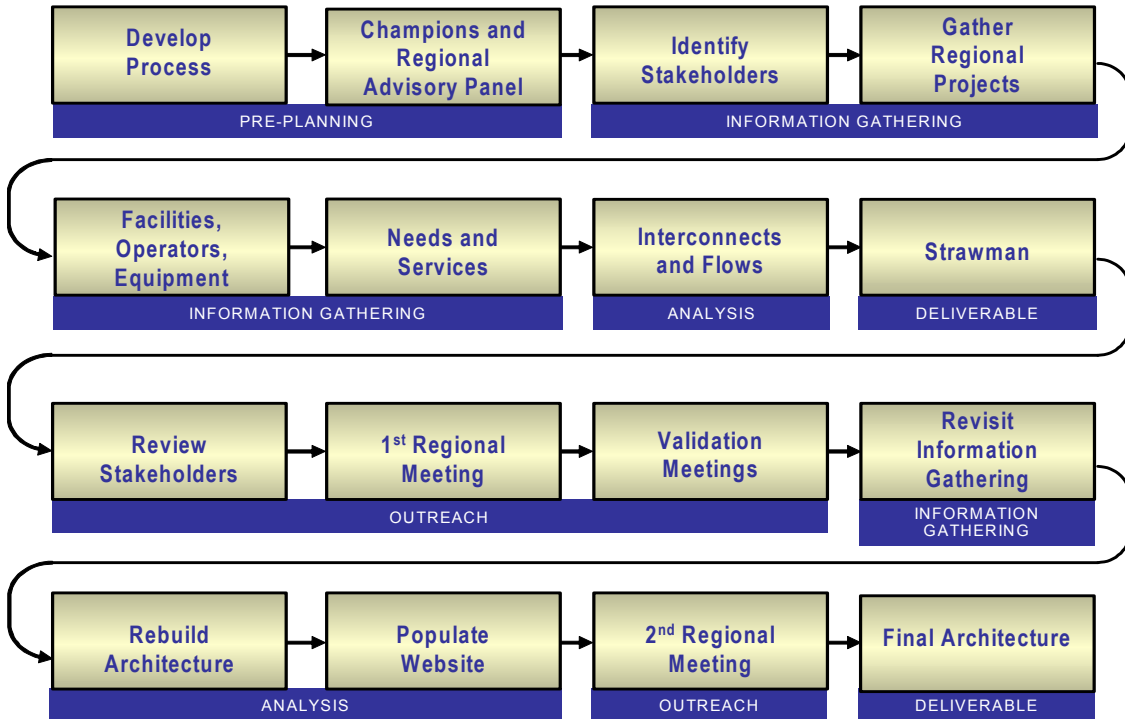
The Phase I Report describes PennDOT’s approach towards developing Regional ITS Architectures in Pennsylvania while utilizing the national guidance. The approach ensures that the resultant Architectures depict the ITS infrastructure in the Region and conform to the National ITS Architecture. The process developed is inherently flexible and adaptable so that special conditions and circumstances in each Region can be effectively addressed or otherwise accommodated, while maintaining statewide consistency.

The development process was specifically designed to support the preparation and refinement of Regional ITS Architectures across Pennsylvania. The process benefits the Pennsylvania environment, optimizes the national guidance, and creates an efficient and effective response to regional needs and circumstances.

The complete process for developing Regional ITS Architectures in Pennsylvania, as described in the Phase I Report, is:

- Task 1.0 — Define Architecture Scope
- Task 2.0 — Inventory Systems and Define Needs, Services, and Operations Concept
- Task 3.0 — Generate Strawman Regional ITS Architecture
- Task 4.0 — Conduct Outreach to Validate Regional ITS Architecture
- Task 5.0 — Finalize the Regional ITS Architecture

The process is depicted in further detail in the following schematic:



**Figure 1-2: Pennsylvania ITS Architecture Process Schematic**

## 1.2 Using this Document

This document is, principally, a resource instrument, designed to assist engineers, planners, designers, developers, managers, and decision-makers in defining a regionally-integrated surface transportation infrastructure that promotes safety, maximizes operational efficiencies, and utilizes appropriate technologies. Materials in the document are targeted at traditional surface transportation organizations, transit agencies, and the host of entities that interface with the transportation infrastructure. The latter include incident and emergency management personnel, commercial vehicle operators, shippers, operators of tourist destinations, event managers, traveler information providers, etc.

The document is a resource instrument to be consulted during the planning process. It is not intended as a textbook to be read from cover-to-cover.

The term “ITS” implies the use of technologies or other innovations to achieve new operational efficiencies in transportation. Yet, an ITS Architecture is, itself, technology-independent; that is, it identifies *who and what* need to connect, but not *how* those connections ought to best be accomplished.

An ITS Architecture describes the interrelationships that exist—or ought to exist—among transportation “elements” across the Region. It distinguishes between those

relationships that exist now and those planned for the future. However, the Architecture does not judge the efficacy, or utility, of those relationships or assess whether the technologies or procedures supporting those linkages are optimized.

These sorts of judgments will need to be made after the Regional ITS Architecture is finalized.

### **Document Organization and Access Strategies**

The ITS Architecture is presented in five primary sections:

- Section 1 — *Introduction*
- Section 2 — *Architecture Scope*
- Section 3 — *Regional Systems Inventory, Needs, and Services*
- Section 4 — *Regional Architecture*
- *Appendices*

Section 1, *Introduction*, contains important background information and establishes the “context” for the Architecture effort. This section defines key concepts and terms, examines the utility of a Regional ITS Architecture, the importance of maintaining the Architecture, ITS standards, and strategies for mainstreaming, or institutionalizing, ITS. This section should be read in its entirety.

Section 2, *Architecture Scope*, summarizes the general scope and magnitude of the Regional ITS Architecture effort. It describes the Southwestern Region, emphasizing those characteristics that potentially impact transportation activities and performance. It further identifies major ITS stakeholders and existing and planned ITS projects across the Region. This section of the document should also be read in its totality.

Section 3, *Regional Systems Inventory, Needs, and Services*, contains the essential “building blocks” of the ITS Architecture. It identifies and defines each pertinent ITS “element” in the Region. “Elements” are the organizational entities (e.g., the PennDOT District Offices, 911 Communications Centers, and Regional Transit Agency Offices) that operate in the transportation environment. Additionally, the section presents the ITS Systems Inventory, organized by element and linked back to the Projects List in Section 2. The Needs and Services tables establish the interrelationships among the Region’s ITS elements. Each element in the Needs Table is defined in terms of the “inputs” it requires from the other elements with which it interacts; similarly, each element in the Services Table is defined in terms of the “outputs” it furnishes to other elements.

Users of the ITS Architecture should familiarize themselves with the general content of Section 3. Thereafter, when they are engaged in ITS deployment planning or related

activities, they can generally proceed directly to Section 4. Users can return to Section 3, as needed, for descriptions of the elements being investigated, identification of the pertinent roadway corridors, and more comprehensive understanding of the interrelationships across elements.

Section 4, *Regional Architecture*, graphically displays the details of the ITS Architecture. Notably, Figure 4-2, *Regional Subsystem Interconnect Diagram Showing Elements*, identifies the systems and subsystems with which each regional ITS element is associated; elements are color-coded—here and throughout the remainder of the document—according to which of the four primary systems they fall under (i.e., Centers, Roadside, Vehicles, or Travelers). Similarly, Table 4-2, *Regional Interconnect Matrix*, specifies which elements gather inputs from—or furnish outputs to—other elements. The remainder of Section 4 is a compendium of the ITS elements. Each element is depicted in terms of the other elements with which it interfaces, and then each “element pair” is examined in detail. The detailed pairings show the types of information that pass between the elements, the direction of the information flow, and whether the flow currently exists or is planned.

Practitioners consulting the Regional ITS Architecture can use Table 4-2 to determine those elements pertinent to their investigations and proceed directly to the corresponding interconnect diagrams. From the diagrams, practitioners can gather the essential information.

The *Appendices* contain a wealth of supplemental materials to assist practitioners in comprehending the Architecture. These include: (1) ITS acronyms; (2) definitions of ITS terminology; (3) definitions of subsystems/terminators and architecture flows identified and defined in the National ITS Architecture; (4) “operations coverage” across the Region; and (5) summaries of Outreach and Validation meetings.

### **Sample Access Scenario**

The Regional ITS Architecture is a valuable planning tool. The following sample scenario defines how a stakeholder in the Region might utilize the material presented in this document:

A transit agency planner in Pennsylvania’s Southwestern Region preparing to deploy an automatic vehicle location (AVL) system on its buses can learn a great deal from consulting the Regional ITS Architecture. By turning to the Regional Transit Agency Offices’ Interconnect Diagram, the transit planner can immediately grasp the range of stakeholders potentially interested in receiving pertinent vehicle location and more detailed transit data (e.g., 911 Communication Centers, PennDOT Traffic Management Centers, Park-n-Ride Facilities, Regional Travel Information System, Personal Traveler Information Devices, etc.). The planner would discover that connections between 911 Communication Centers are generally in place; that the remaining interfaces do not currently exist, but are planned for the future.

By consulting the interconnect and information flow diagrams, the transit planner would further learn that AVL inputs might effectively be used to improve the detail, precision, and timeliness of transit emergency data that already pass to other agencies in the Region. The diagrams further show that future “hooks” are planned for communicating bus status data to other agencies. For example, PennDOT would like to use the transit vehicles as probe data to identify congested corridors in the Region. Other stakeholders, including Regional Traveler Information System providers and Park-n-Ride Facility operators, might be interested in broadcasting vehicle status or delay data to their users.

Access to the ITS Architecture enables users to view the pertinent infrastructure before new ITS projects are undertaken. Existing and planned interrelationships can be quickly viewed and grasped, and the realm of agencies and other entities with a potential stake in the subject matter can be easily identified. Details about the information passing between stakeholders offer insight into optimizing future deployments and concretizing the range of possibilities for important new projects.

### Accessing the Architecture On-Line

Key sections of the Regional ITS Architecture—notably Section 4 of the hardcopy document—are accessible on-line. To access the Southwestern Regional Architecture, go to:

[www.paits.org/sw](http://www.paits.org/sw)

When you access this location, the web screen shown in Figure 1-3 will be displayed:

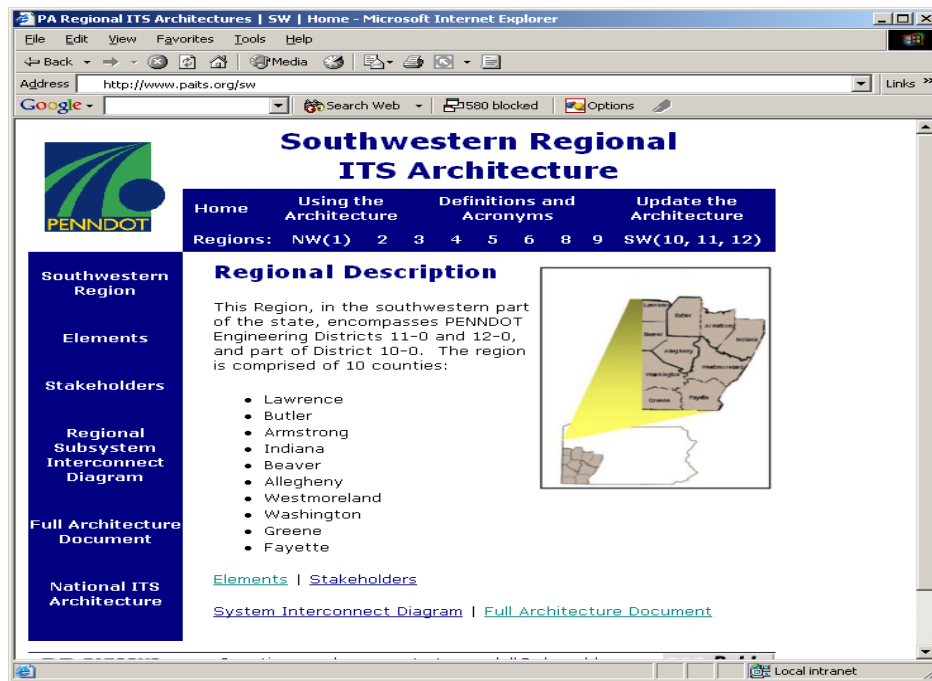


Figure 1-3: Pennsylvania ITS Architecture Web Site

From the Southwestern Regional ITS Architecture Homepage ([www.paits.org/sw](http://www.paits.org/sw)), there are three ways to access information about a specific element:

1. Click on “Elements” and select any element from the list.
2. Click on “Stakeholders” and select the correct stakeholder, and then select an element.
3. Click on the “System Interconnect Diagram” for a sausage diagram of the Region that lists the elements grouped by type. Clicking on the element in the diagram will take you to page associated with the selected element.

After locating the page for a given element, users can download a PDF file that includes the interconnect diagram and architectural flow diagrams.

Definitions of Architecture terms, acronyms, information flows, and subsystem terminators are also included on the website.

### **1.3 Utility of the Architecture**

Developing, maintaining, and utilizing the ITS Architecture offers a range of significant benefits to the adopting Region. These benefits include the following:

- A Regional ITS Architecture enables planning and deployment to occur in an organized and coordinated manner. It offers a framework for systematically identifying and evaluating prospective solutions to the transportation problems in the Region. It establishes an environment for inter-agency cooperation and coordination. Stakeholders across the Region may use the Architecture to plan their ITS projects to support regional goals and priorities. Utilization of the Architecture also helps to ensure consistency among the state, regional, and local planning processes.
- A Regional ITS Architecture establishes institutional mechanisms that promote the development and deployment of ITS projects. The Architecture compels the Region to set up forums for the discussion of regional transportation requirements. These forums, in turn, encourage the building of relationships among transportation professionals and stakeholders across the Region—these professionals are thereby given opportunities to understand the needs, issues, constraints, etc. of other transportation sectors. As the regional dialogue expands, institutional barriers tend to crumble and the integration of disparate goals, concepts, approaches, and solutions is increasingly possible. With this institutional integration comes the sharing of technologies and information, so that innovative, region-wide thinking becomes a guiding principle in transportation planning and new, synergistic relationships take hold. Additionally, the Architecture provides the basis for updating the Transportation Plan, the Transportation Improvement Program (TIP), the Statewide TIP, and the State Implementation Plan (SIP).

- A Regional ITS Architecture promotes interoperability. The Architecture reveals to stakeholders the key interrelationships presently established in the Region and those planned for the future. These interrelationship requirements identify those areas where operational or technology bridges to multiple agencies are needed. In this way, the Architecture helps to anticipate and plan for the integration requirements between state, regional, and local systems. Significantly, the Architecture promotes adherence to consistent and uniform standards across the Region. By its very nature, it also ensures consistency in documentation of ITS elements across the Region.
- A Regional ITS Architecture encourages efficient investment. As prospective new ITS projects are identified in the Region, they can be “plotted” on the Regional Architecture and their interrelationships with existing and planned components assessed. This lessens the probability that a particular project will result in a “dead-end” investment. It also helps planners to identify and invest in projects capable of addressing multiple needs, such as automated vehicle location (AVL) systems that can both improve on-road performance and inform customers of status conditions. In general, the Architecture offers regional stakeholders a basis for prioritizing ITS projects and making sound investment choices.
- A Regional ITS Architecture satisfies the Federal mandate. The mandate of the U.S. Federal Highway Administration (FHWA) requires that Regional ITS Architectures be completed by April 2005, in order for stakeholders in the Region to continue using Federal funds for the development and deployment of ITS projects. Consequently, promulgation of Regional ITS Architectures is necessary for continued access to Federal funds for ITS deployment.

## **1.4 ITS Standards**

ITS standards are industry-consensus standards that define how system components operate within a consistent framework. By specifying how systems and components interconnect, ITS standards promote interoperability.

A seamless transportation system relies on clear communication between agencies, systems, and individuals. To ensure that different entities can communicate, the systems must be designed according to standards. For PennDOT, this might mean systems that can exchange data between regional and statewide centers. At the local level, this can mean data exchanges between jurisdictions concerning incidents, congestion, and signal timing plans.

An interoperable and seamless transportation system provides several benefits. Transportation agencies are now increasingly communicating with law enforcement, as police are usually the first to learn of incidents. Many transportation agencies are linking their transportation management centers with police dispatch. When systems are interoperable, police and emergency units can respond faster to crashes; this often

relieves congestion and improves safety. In an emergency, quick and reliable communication is even more crucial.

To accrue the benefits noted above, systems and the underlying equipment must be designed according to standards that enable interoperability. Future systems and equipment should be designed to meet these standards. Existing systems and equipment, additionally, should be updated to meet the standards.

The USDOT's ITS Standards Program is working with existing standards development organizations (SDO's) to establish a national collection of ITS standards. The following organizations participate in ITS standards activities:

- AASHTO (American Association of State Highway and Transportation Officials)
- ASTM (American Society for Testing and Materials)
- IEEE (Institute of Electrical and Electronics Engineers)
- ITE (Institute of Transportation Engineers)
- NEMA (National Electrical Manufacturers Association)
- SAE (Society of Automotive Engineers)

The following organization oversees the development of ITS standards:

- ANSI (American National Standards Institute)

For more information on ITS standards, visit [www.standards.its.dot.gov](http://www.standards.its.dot.gov) or [www.ntcip.org](http://www.ntcip.org).

To identify ITS standards applicable to the Southwestern Regional ITS Architecture, visit the National ITS Architecture website. This site provides a listing of all National ITS Architecture information flows and their associated standards. A Southwestern ITS Architecture user can access applicable ITS standards by:

1. Viewing the information flow diagrams in the Southwestern Regional ITS Architecture document.
2. Visiting the National ITS Architecture website:  
<http://itsarch.iteris.com/itsarch/html/af/padde.htm>
3. Identifying a specific Architecture Flow, by name, in the Regional ITS Architecture document, clicking on that Architecture Flow name on the National ITS Architecture website, and the reviewing the details under "Standard Activities."

The current ITS standards—or pertinent standards activities—will be displayed for the information flow that the user specifies.



## 1.5 Maintaining the Architecture

As ITS projects are planned and implemented, the Regional ITS Architecture will need to be updated to reflect the new ITS priorities and strategies emerging through the transportation planning process. The Regional ITS Architecture is not a static document, but rather is a “living” document. The ITS Architecture must grow and adapt as plans change, ITS projects are implemented, and ITS needs and services evolve in the Region.

In order to serve as a regional framework, the Regional Architecture must be maintained so that it continues to reflect the current and planned ITS systems, interconnections, etc. The following circumstances or conditions may all trigger the need to make changes to the Architecture:

- Changes in Regional needs. Regional ITS Architectures are created to support transportation planning in addressing regional needs. Over time, these needs can change and the corresponding aspects of the Regional ITS Architecture that address these needs may have to be updated. These changes in needs will also typically be expressed in updates to planning documents, such as regional transportation plans.
- New stakeholders. As new stakeholders become active in ITS, the Regional ITS Architecture should be updated to reflect their place in the regional view of ITS elements, interfaces, and information flows. Why might new stakeholders emerge? The stakeholders might represent new organizations that were not in place during the original Architecture development. Maybe the geographic scope of the Architecture is being expanded, bringing in new stakeholders. Perhaps additional transportation modes or transportation services are being considered that touch the systems of additional stakeholders.
- Changes in scope of services considered. The range of services considered by the Regional ITS Architecture expands. This might happen because the National ITS Architecture has been expanded and updated to include new user services or to better define how existing elements satisfy the user services. A Regional ITS Architecture based on an earlier version of the National ITS Architecture should take into consideration these changes as the Regional ITS Architecture is updated. The National ITS Architecture may have expanded to include a user service that has been discussed in the Region, but not included in the Architecture, or was included in a cursory manner. Changes in the National ITS Architecture are not, of themselves, a reason to update a Regional ITS Architecture, but the Region may want to consider new services in the context of their regional needs.
- Changes in stakeholder or element names. An agency’s name, or the name used to describe their element(s), undergoes change. Transportation agencies occasionally merge, split, or just rename themselves. In addition, element names may evolve as projects are defined. The Regional ITS Architecture

should be updated to use the current names for both stakeholders and elements.

- Changes in other Architectures. A Regional ITS Architecture covers not only elements and interfaces within the Region, but also interfaces to elements in adjoining Regions. Changes in the Regional ITS Architecture in one Region may necessitate changes in the Architecture in an adjoining Region to maintain consistency between the two.

There are also several changes relating to project definition that will cause the need for updates.

- Change due to project definition or implementation. When actually defined or implemented, a project may add, subtract, or modify elements, interfaces, or information flows from the Regional ITS Architecture. Because the Regional Architecture is meant to describe the current (as well as future) regional implementation of ITS, it must be updated to accurately reflect how the developed projects integrate into the Region.
- Change due to project addition/deletion. Occasionally a project will be added or deleted through the planning process, or even during project delivery. Some aspects of the Regional ITS Architecture that are associated with the project may be expanded, changed, or removed.
- Change in project priority. Due to funding constraints or other considerations, the planned project sequencing may change. Delaying a project may have a ripple effect on other projects that depend on it; conversely, raising the priority for a project's implementation may impact other projects that are related to it.

The purpose of maintaining the Architecture is to keep it current and relevant, so that stakeholders will use it as a technical and institutional reference when developing specific ITS project plans. In order to maintain the Architecture, three decisions must be discussed:

- Who — Who will lead and implement the maintenance effort?
- When — When will the Regional ITS Architecture change be updated?
- What — What parts of the Regional ITS Architecture will be maintained?
- How — How will the Architecture be maintained?

### **Who Will Maintain the Architecture?**

In cooperation with the Pennsylvania ITS Architecture Regions, PennDOT Central Office expects to utilize a statewide approach to maintaining the Commonwealth's nine Regional ITS Architectures. Although PennDOT Central Office will lead the

maintenance effort in the Southwestern Region, *all* stakeholders will still need to participate in the process. Maintenance of the Architecture is a recurring, long-term effort that requires inputs from all stakeholders in the Region.

### **When Will the Architecture be Updated?**

The Regional ITS Architecture is expected to be updated every four years to coincide with updates to long-range plans throughout the Commonwealth. There will be a process planning effort prior to the update in order to ensure statewide consistency of the updates. This timeframe will be used throughout the state. The next update to the Southwestern Regional ITS Architecture is projected to be completed by Autumn 2008.

### **What Will be Maintained?**

The constituent parts of the Regional ITS Architecture that will be maintained is referred to as the “baseline.” The baseline of the Regional ITS Architecture for the Southwestern Region includes:

- Description of the Region. This description includes the geographic scope, functional scope, and architecture horizon. Geographic scope defines the ITS elements within the Region. Functional scope defines which services are included. Architecture horizon is the distance (in years) into the future that the Architecture will consider.
- Regional ITS Projects Matrix. The matrix includes a list of existing and planned ITS projects for the Region.
- List of stakeholders. The listing and description of ITS Stakeholders in the Region should be revised as stakeholders evolve, consolidate, or separate.
- List of elements. The inventory of ITS elements is a key aspect to the Architecture. Changes in stakeholders, as well as operational concepts, may impact the inventory of elements. Furthermore, implementation and planning status may change (i.e., change from planned to existing).
- Systems Inventory. Links the ITS Projects Matrix to Regional elements. Additionally, the Systems Inventory defines the functionalities of the elements.
- Needs and Services Tables. The Needs and Services Tables define the existing and future flow of information being shared between elements. The Needs and Services tables serve as the building blocks for the programming/building of the Architecture.
- Interconnect diagrams. Interfaces between elements define the interactions between one another. They provide information on “who” is talking to “whom.”

- Information flow diagrams. Information flows between elements define the details of the Architecture. They are the detailed description of how elements interact or will interact in the future. This is the key aspect of the baseline and will likely see the greatest amount of change.
- Applicable ITS Standards. The selection of standards depends on the information exchange requirements. The maintenance process should consider how ITS standards may have evolved and matured since the last update.

### **How Will the Architecture be Maintained?**

PennDOT Central Office will be responsible for updating the aforementioned parts of the Regional ITS Architecture. In order to document the necessary changes to the Regional ITS Architecture, the Pennsylvania ITS Architecture website ([www.paits.org](http://www.paits.org)) will be utilized as a tool for tracking changes to the Architecture.

All stakeholders in the Region involved in ITS project activity will be responsible for documenting additions, changes, and updates to the ITS Architecture.

To document an update, go to the Southwestern Regional ITS Architecture Homepage ([www.paits.org/sw](http://www.paits.org/sw)) and follow these steps:

1. Select the “Architecture Update Form” at the top of the screen. This link takes you to the requisite form.
2. Complete the “Architecture Update Form.” The form, shown on the following page allows a stakeholder to suggest an update to the Architecture. The form is broken into five sections: (1) Contact Information, (2) New ITS Project, (3) New Stakeholder, (4) New Element, and (5) Other Changes. Each section is described below:
  - Contact Information — Contains contact information (name, organization, email, and phone number) so that the stakeholder submitting the form can be contacted in the future.
  - New ITS Project — Future ITS projects considered for State and/or Federal funding should be documented in this section. Project name, stakeholder, type of funding requested, location, deployment date, and a brief description of the project should be inputted here.
  - New Stakeholder — Requests for new stakeholders and changes to stakeholder names/descriptions should be identified in this section of the form. The status, existing or planned, should also be identified.
  - New Element — Requests for a new element and changes to element names/descriptions should be identified in this section of the form. The status, existing or planned, should also be identified.

- Other Changes — Other changes to the Regional ITS Architecture can be documented in this section.
3. Submit the “Architecture Update Form.” The form can be submitted by clicking on the “Submit” button on the bottom of the webpage. Once submitted, the form will be sent to the webmaster who will compile the information. The information will be utilized for the next update to the Regional ITS Architecture.
  4. Once the “Architecture Update Form” has been submitted, the information will be sent to the webmaster. The webmaster will compile the information and post it on the Architecture website. Once posted, the information can be accessed by (1) clicking on the “update list” link at the top of the “Architecture Maintenance Form” webpage or (2) going to <http://paitis.org/sw/update.htm>.

## Southwestern ITS Architecture Maintenance Form

### Contact Information

Name of Submitter:	Submission Date:
Organization:	Phone Number:
Email Address:	

### New ITS Project

Project Name:	
Stakeholders:	Funding: <input type="checkbox"/> Local Funding <input type="checkbox"/> State Funding <input type="checkbox"/> Federal Funding Details:
Location:	Deployment Date:
Project Description:	

### New Stakeholder

Stakeholder Name:
Status: <input type="checkbox"/> Existing <input type="checkbox"/> Planned
Stakeholder Description:

### New Element

Element Name:	Stakeholder:
Status: <input type="checkbox"/> Existing <input type="checkbox"/> Planned	
Element Description:	

### Other Changes

Other Changes:
----------------

Contact the [PAITS Webmaster](#) with questions and comments.

## **1.6 Moving Forward/Institutionalizing ITS**

Across the State, PennDOT has enjoyed strong commitment to ITS deployment initiatives, some through traditional funding mechanisms and most through federal funds earmarked for ITS. In virtually all Regions, there is an increasing emphasis on regional deployments and coordination among public agencies, illuminated by the cooperative effort displayed by the creation of Regional ITS Architectures. An integral part of the ITS planning, agency coordination, and program development activities is the cooperation and coordination with PennDOT Districts, MPO's and/or RPO's throughout the State that overlap, and regional stakeholders.

The application of advanced technologies to solve some of the transportation-related problems was first initiated by staff from DVRPC in the Philadelphia Region a few decades ago. Since then, there is a fully integrated system in place in Pittsburgh and operation centers are being explored in many other areas of the State. However, only since 2002, has there been a concerted effort to consolidate all of the individual ITS efforts by each agency and jurisdiction into a comprehensive and consolidated plan, starting with the creation of Regional ITS Architectures for each Region of the State that are coordinated and have statewide consistency.

Each regional agency represented in these Regional ITS Architectures has unique responsibilities for planning, operating, maintaining, or monitoring the transportation system.

Responsibility for, and involvement with, ITS by key agencies in the Southwestern Region has become a joint effort between PennDOT Districts, MPO's, and regional stakeholders. These groups, together, have assumed responsibility for coordinating regional ITS planning and deployment.

Figure 1-4 shows a map of the current PennDOT district boundaries by county. Figure 1-5 shows a map of the current MPO and RPO boundaries by county. The purpose of these figures is to give the reader context into the PennDOT district and MPO boundaries.

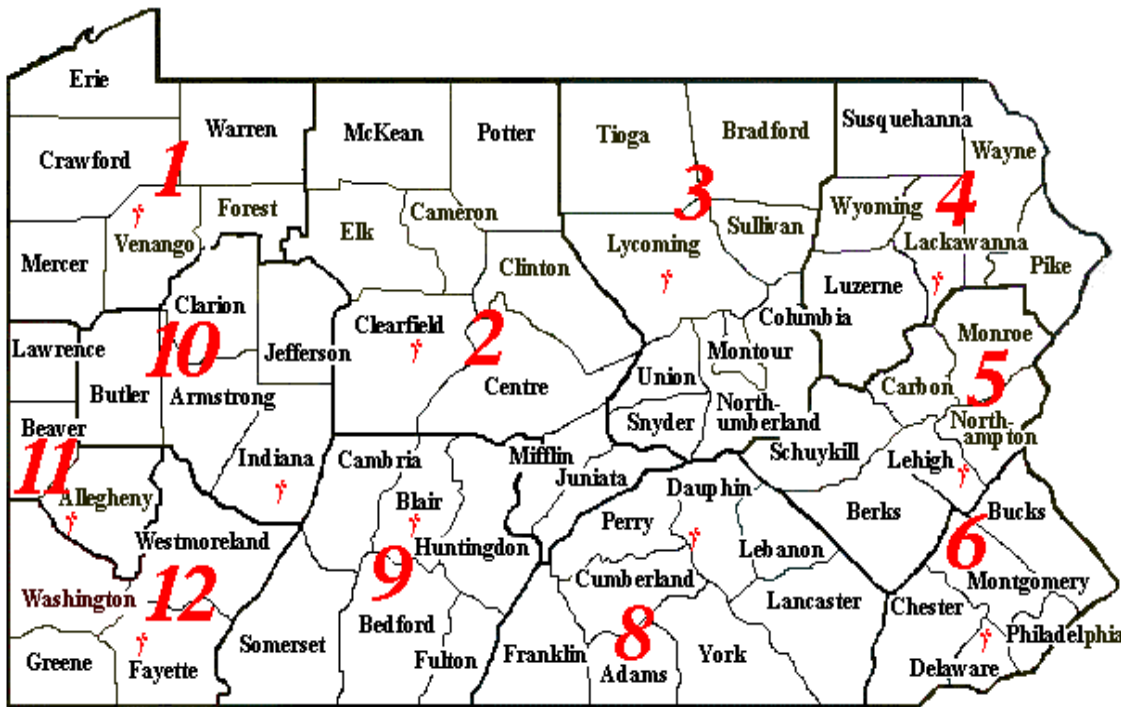


Figure 1-4: PennDOT District Map

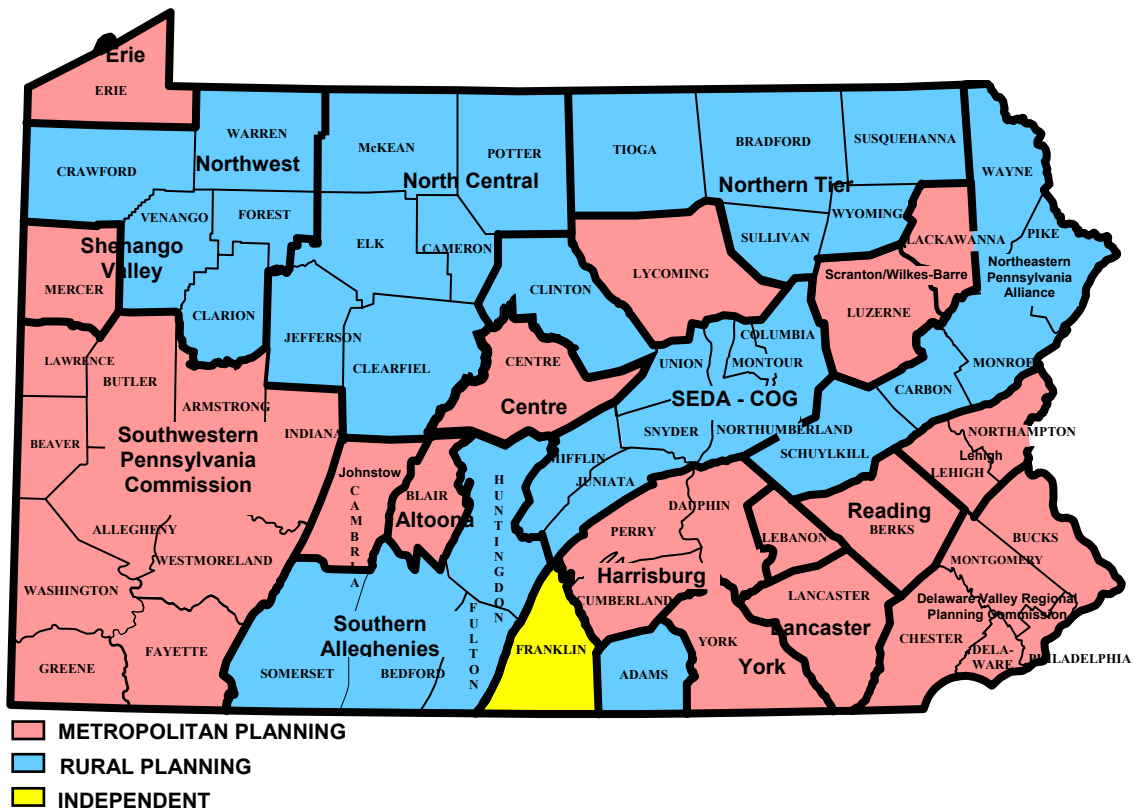


Figure 1-5: Pennsylvania MPO/RPO Map



## **Mainstreaming**

To date, there have been ITS plans in place to cover a few metropolitan areas across the Commonwealth of Pennsylvania. These early plans have led to isolated, non-integrated ITS equipment being scattered throughout the State, except for in the Pittsburgh and Philadelphia Regions. The current deployments have primarily been PennDOT led. The ITS projects deployed to date have already produced important benefits for PennDOT and the traveling public. Unfortunately they have also led to questions about integration across boundaries and the costs, in labor and resources, associated with operating and maintaining these technology deployments.

The Regional ITS Architecture effort has helped to begin addressing these issues by, first, bringing regional agencies to the table to discuss regional technology deployment. Secondly, the Architectures have built a regional foundation for understanding the needs, applications, and linkages to the technologies that are currently deployed or scheduled to be deployed. Lastly, the ITS Architectures will set the stage for “mainstreaming” to occur.

“Mainstreaming” is, simply, getting technology issues in the transportation environment in front of the representative regional bodies for discussion, analysis, and decision making, in the same way that traditional transportation improvements are processed. ITS and operations can no longer be considered just a PennDOT initiative, but must now be viewed as requiring regional input.

Throughout the State, MPO’s and RPO’s will work with PennDOT and other regional stakeholders to include ITS as part of long-range plans that eventually spill into regional and statewide Transportation Improvement Programs (TIP’s). MPO’s and RPO’s should strive to go beyond the basic federal requirement of including transportation projects receiving certain types of federal funds in a Region’s TIP and use the TIP to highlight ITS projects. Project evaluation criteria used to select projects might now be modified in order for ITS projects to be fairly evaluated. Most traditional selection processes to date have excluded valuable ITS projects by not considering the regional needs and benefits associated with technology projects.

There are key factors that can contribute to increased coordination and mainstreaming of ITS within the transportation planning process throughout the Commonwealth of Pennsylvania:

- Creating and utilizing committees or task forces that foster ITS discussions and open communications.
- Cultivating support for ITS deployments, coordination, and integration from the administrators of influential state and regional transportation agencies.
- Creating committees to target coordination, integration, technical, and policy issues.

- Learning from previous ITS deployments.
- Instilling trust in representatives of area agencies in the responsibilities and performance of the MPO, RPO, PennDOT, and regional stakeholder staff that enable them to mainstream ITS and coordinate the area's ITS/Operations efforts.
- Encouraging advocacy for ITS initiatives among top managers.
- Incorporating ITS projects in the Region's long-range transportation plans.
- Developing ITS programs and plans.
- Utilizing the Regional ITS Architecture.
- Including ITS projects within the TIP.
- Utilizing enhanced criteria for selecting ITS projects for inclusion in the TIP.
- Educating elected officials and agency administrators in ITS terminology and strategies.
- Educating other prime stakeholders (beyond traditional transportation agencies) about ITS.
- Educating MPO and RPO staff about ITS.
- Conducting scanning reviews to ITS deployments in external regions and states.

### ***MPO, RPO, and PennDOT Role***

Throughout the State, transportation officials can look to the MPO/RPO to function in the role of ITS facilitator, ITS educator, and ITS project funding prioritizer. The MPO/RPO is often best able to provide a regional context for projects in geographic areas with many political boundaries and to better understand the experiences of a traveling public that tends to have minimal interest in the jurisdictions they pass through. The MPO/RPO has historically been able to recognize the different philosophies of sub-regions and fuse these philosophies into common goals and priorities when working on regional projects. In addition, the MPO/RPO offers a direct conduit to the politicians and is, therefore, seen as the only entity fully capable of educating elected officials about ITS regional applications.

MPO/RPO staff members must recognize, however, that their involvement with specific ITS projects relies on invitations to participate from the sponsoring agencies, such as PennDOT. Inclusion in non-planning activities is generally possible because the MPO/RPO staff have an established record of being knowledgeable, cooperative, and trustworthy. The MPO/RPO staff has earned the respect of the Region not only from their collective knowledge and responsiveness, but also because they have not

overreached their authority. Indeed, when the MPO/RPO staff is knowledgeable about ITS applications, good listeners, and not prone to pressing a narrow agenda, the process to mainstreaming ITS products and services is much simpler since the agency most attuned to the transportation planning process is also the agency most trusted. These conditions may prove to be the most critical toward mainstreaming ITS in the transportation planning process.

### **Regional ITS Coordination Committees**

Regional agencies should consider coordinating all regional ITS efforts into a single regional operations plan. To do this, a committee composed of transportation agencies and operators should be formed. There should be a policy body and a technical body to the committee. This plan should then be used as input into the regional long-range plan.

Elected officials and transportation managers sometimes use or form committees through which they act as regional advocates for ITS. These can be non-profit government organizations composed of elected officials, as well as business interests. The primary goal of these committees is generally to use technology to improve mobility through political and project advocacy. On an annual basis, the committee members adopt a set of projects with regional significance; these include ITS products and services promoted to municipal managers and local transportation officials.

In some metropolitan areas around the country, elected officials and transportation managers have personally taken on the responsibility to act as advocates for ITS products and services. Strong leadership from top management of transportation providers can elevate ITS throughout the Region.

ITS technologies tend to be most useful when planned and deployed from a regional perspective that cuts across geographic boundaries, agencies, and transportation modes. A wide range of stakeholders should have input into ITS planning and deployment activities since many of these agencies will be required to operate these systems or provide coordination and information to enable these systems to function efficiently. This requires elected officials and staff within—and across agencies—to communicate and coordinate with one another. It can, however, be difficult to plan for and deploy ITS within a Region, especially in areas comprised of many local autonomous communities.

One role of a regional committee is to aid in coordinating ITS activities across jurisdictions and agencies. In keeping with the coordinating role, the committee can form a workgroup to improve procedures for incident clearance and make the procedures more uniform within the Region. The workgroup can consist of law enforcement personnel, MPO staff, DOT staff, and officials from select municipalities.

## **Endorsement of ITS**

Public endorsement of ITS products and services demonstrates to all regional stakeholders that ITS is accepted as a tool to solve transportation problems and will be seriously considered as a funding option in the Region's transportation planning process. Elected officials are the most important people from whom to garner support for ITS since they make funding decisions and can influence support by other stakeholders. It is also important for mid- and upper-level transportation managers to support ITS since they inform elected officials and guide funding decisions within their respective transportation organizations. To gain their support, elected officials and transportation managers need to be provided with data and information that define ITS products and services, explain how the technologies are used, and detail the benefits of ITS that can potentially accrue.

In the Southwestern Region, regular updates from the MPO's to elected officials should be considered during ITS program planning, and implementation. For example, to secure support, the MPO's can brief officials on the logical arguments supporting freeway management in order to receive congestion information and show relationships among incidents, congestion, and air pollution. Local problems can be highlighted and then examined in terms of how ITS products and services can help solve these problems. The message is that transportation professionals in the Region should aggressively manage traffic and focus on reliability and mobility.

## **Education**

Education can improve coordination across jurisdictions and modes in several ways, including increasing awareness of ITS products and services, reducing tensions between agencies representing different transportation modes, and getting planners and operations staff to understand each other's responsibilities and terminology. A lack of awareness of ITS products and services, and their associated benefits, hinders the routine consideration of ITS technologies in a Region's planning and deployment processes. Until a few years ago, ITS education was primarily the responsibility of each agency considering ITS. However, MPO staff should consider taking the lead in creating and providing programs to educate regional stakeholders.

There are many forums available for educating and training transportation professionals in ITS, and not all require a formal classroom setting. For instance, "scanning tours" take place outside a classroom. These tours enable participants to learn how to use the technologies and then interject some first-hand knowledge about the equipment being analyzed into the ITS discussion. Invitees to these scanning tours can consist of:

- County commissioners,
- Executive boards,
- Policy boards,
- Transit operations staff,
- MPO staff,
- Politicians, and

- Public safety officials.

A mixture of upper management, operations, and policy people should be considered. Scanning tours should be taken at the beginning of regional planning efforts or when exposure is needed in advance of a specific project to help decision-makers conceptualize what they need. Elected officials and transportation managers can also become educated about ITS technologies, products, and services by participating on regional, statewide, or national committees, especially those established to consider ITS solutions.

Training courses are available for stakeholders in the Region to learn more about ITS. Such courses are available through the National Highway Institute (NHI) at the following website:

<http://www.nhi.fhwa.dot.gov/default.asp>

National ITS Architecture and Turbo Architecture training are available through the U.S. Department of Transportation. Information on training can be found at the following website:

<http://itsarch.iteris.com/itsarch/html/training/training.htm>

## 2 Architecture Scope

This section summarizes the study's scope of services and identifies the matrix used to assess "conformity." The Conformity Matrix, developed by the Statewide Working Group, is specific to Pennsylvania and has been used in every Region across the Commonwealth to ensure statewide consistency. Descriptions of the Region, regional stakeholders, and existing regional ITS projects are also included in this section.

### 2.1 Scope of Services

At the outset of the study, the Southwestern Architecture Region's Regional Advisory Panel (RAP) determined that the Region would need to work through all five of the study tasks required to develop the Regional ITS Architecture. The five tasks are:

- Define an Architecture Scope,
- Inventory Systems and Define Needs, Services, and an Operations Coverage,
- Generate a Strawman Regional ITS Architecture,
- Conduct Outreach to Validate the Regional ITS Architecture, and
- Finalize the Regional ITS Architecture.

Consistent with its mandate, the RAP oversaw execution of the Architecture development methodology.

### 2.2 Conformity Matrix

The Pennsylvania Architecture Checklist, specified in the Phase I Report, that preceded the Architecture study, was used to verify compliance of the Southwestern Regional ITS Architecture with the prescribed methodology. By checking off the bulleted list of outputs and considerations in the checklist tables, below, a Region and State ensures conformity with the Federal Mandate and consistency among the Architectures.

Compliance of the Southwestern Regional ITS Architecture with the Pennsylvania Architecture Checklist is validated in the following tables:

**Checklist Table #1**

Key Task To Complete	Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)	Considerations and Conformity & Validation Checks (Did we consider and address?)
<b>Define the Regional Architecture Scope</b>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Description-of-region map and text, that includes:                             <ul style="list-style-type: none"> <li>✓ Geographic area (Districts, Counties, Cities, Corridors)</li> <li>✓ Service boundaries, major roadway systems</li> <li>✓ Relationship among jurisdictions within Region</li> <li>✓ Relationship to adjacent Regions and jurisdictions</li> </ul> </li> <li><input checked="" type="checkbox"/> Existing projects matrix (key projects only), that includes:                             <ul style="list-style-type: none"> <li>✓ Project description</li> <li>✓ Impacts on Region</li> <li>✓ ITS components</li> <li>✓ Timetables</li> </ul> </li> <li><input checked="" type="checkbox"/> Scope of services summary (If Not Previously Developed), that includes:                             <ul style="list-style-type: none"> <li>✓ Regional stakeholders list</li> <li>✓ Owners and operators of ITS systems in Region</li> <li>✓ Entities with stake or interest in Regional transportation issues</li> <li>✓ Conformity requirements matrix</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Has a Regional Champion been identified?</li> <li><input checked="" type="checkbox"/> Have traditional, existing, transportation planning documentation been reviewed?</li> <li><input checked="" type="checkbox"/> Is there consistency between regional scope and transportation plans?</li> <li><input checked="" type="checkbox"/> Is there consistency between Regional scope and National ITS Architecture</li> </ul>

**Checklist Table #2**

Key Task to Complete	Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)	Considerations and Conformity & Validation Checks (Did we consider and address?)
<b>Develop an Inventory of Regional Systems &amp; Define Regional Needs, Services, and Operational Concept</b>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> System inventory, that includes:                             <ul style="list-style-type: none"> <li>✓ System name(s)</li> <li>✓ Descriptions</li> <li>✓ Status (existing or planned)</li> <li>✓ Associated subsystems/terminators in National ITS Architecture</li> <li>✓ System owner/operator (stakeholders and system elements)</li> </ul> </li> <li><input checked="" type="checkbox"/> Needs and services summary, that includes:                             <ul style="list-style-type: none"> <li>✓ Regional needs</li> <li>✓ ITS services (planned or implemented)</li> </ul> </li> <li><input checked="" type="checkbox"/> Operations coverage that includes:                             <ul style="list-style-type: none"> <li>✓ Operational roadways.</li> <li>✓ Assignment of operational coverage</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Is there completeness and consistency of the inventory among stakeholders?</li> <li><input checked="" type="checkbox"/> Is the conformity to and compatibility with the Architecture?</li> <li><input checked="" type="checkbox"/> Has the Region considered the following:                             <ul style="list-style-type: none"> <li>✓ System operations that extend beyond Regional boundaries</li> <li>✓ Impacts on contiguous Regions or jurisdictions</li> <li>✓ Operational characteristics along corridors and at local levels</li> <li>✓ Locations and operational characteristics of planned traffic operations centers (TMC)</li> <li>✓ Working relationship among stakeholder organizations</li> </ul> </li> </ul>

**Checklist Table #3**

Key Task to Complete	Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)	Considerations and Conformity & Validation Checks (Did we consider and address?)
<p><b>Generate Strawman (Rough Draft) Architecture</b></p>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Develop a Regional systems interconnect summary, that includes:                             <ul style="list-style-type: none"> <li>✓ Diagram of actual and potential connections between subsystems</li> <li>✓ Connection status (existing or planned) for each connection</li> </ul> </li> <li><input checked="" type="checkbox"/> Develop Regional information flow diagrams, that include:                             <ul style="list-style-type: none"> <li>✓ Descriptive name for the information</li> <li>✓ Information flow status (existing or planned)</li> <li>✓ Direction of information flow</li> </ul> </li> <li><input checked="" type="checkbox"/> Develop a Regional Strawman Architecture, that includes:                             <ul style="list-style-type: none"> <li>✓ Architecture approach</li> <li>✓ Needs &amp; services</li> <li>✓ Systems inventory</li> <li>✓ Interconnects</li> <li>✓ Information flows</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Have the interconnections and information exchanges across Regional boundaries been identified?</li> <li><input checked="" type="checkbox"/> Has the ability of the communications infrastructure to support the proposed interconnections been addressed at a high-level?</li> <li><input checked="" type="checkbox"/> Is there completeness and consistency in the interconnects summary?</li> <li><input checked="" type="checkbox"/> Is there completeness and consistency among the information flow diagrams?</li> <li><input checked="" type="checkbox"/> Is there consistency and compatibility with the completed or evolving Architectures in other Regions in the state?</li> <li><input checked="" type="checkbox"/> Is there conformity and compatibility with the National ITS Architecture?</li> </ul>

**Checklist Table #4**

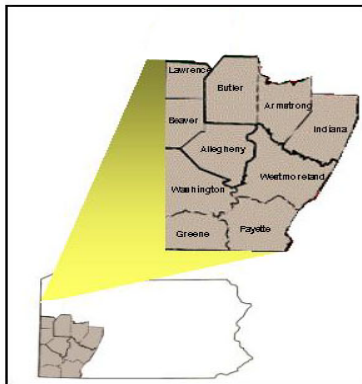
Key Task to Complete	Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)	Considerations and Conformity & Validation Checks (Did we consider and address?)
<p><b>Conduct Outreach to Validate Architecture</b></p>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Develop Stakeholders' guide to Regional Architecture, that could include:                             <ul style="list-style-type: none"> <li>✓ Background on Regional Architecture project</li> <li>✓ Stakeholder review and validation process</li> <li>✓ Glossary of technical terms</li> </ul> </li> <li><input checked="" type="checkbox"/> Documentation of stakeholder inputs</li> <li><input checked="" type="checkbox"/> Refined and validated Architecture</li> </ul>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Have real-world and program issues been considered?</li> <li><input checked="" type="checkbox"/> Have any unusual institutional Issues been identified?</li> <li><input checked="" type="checkbox"/> Have any specialized data-sharing requirements been identified?</li> <li><input checked="" type="checkbox"/> Have political considerations been identified?</li> <li><input checked="" type="checkbox"/> Have any other unique conditions, circumstances, or issues in the Region been identified?</li> <li><input checked="" type="checkbox"/> Have Stakeholders from areas contiguous to the Region been involved?</li> <li><input checked="" type="checkbox"/> Is there conformity with FHWA Regional ITS Architecture Assessment Criteria?</li> </ul>



**Checklist Table #5**

Key Task to Complete	Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)	Considerations and Conformity & Validation Checks (Did we consider and address?)
<b>Finalize the Regional Architecture</b>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Final Regional ITS Architecture Document</li> <li><input checked="" type="checkbox"/> Statewide Operations Framework Input                             <ul style="list-style-type: none"> <li>✓ Regional Architecture overview</li> <li>✓ High-level Regional operations summary</li> <li>✓ Relationship between Region and State</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Is there consistency and compatibility among the Regional ITS Architectures?</li> </ul>

### 2.3 Description of the Region



This Region, in the southwestern part of the state, is comprised of 10 counties: Lawrence, Butler, Armstrong, Indiana, Beaver, Allegheny, Westmoreland, Washington, Greene, and Fayette. As shown in Figure 2-1, the Region encompasses PennDOT Engineering Districts 11-0 and 12-0, and parts of District 10-0.

**Figure 2-1: Southwestern ITS Architecture Region**

The PennDOT District 11-0 Regional Traffic Management Center (RTMC) currently controls the PennDOT District 1-0 ITS field devices on Interstates 79 and 80 in both Butler and Mercer Counties. Other operations unrelated to the ITS field devices for example, emergency management services and transit operations, are included in the Northwest Region Architecture.

The city of Pittsburgh, in Allegheny County, is the economic hub of the Region, with the overwhelming majority of the Region’s residents living in the Pittsburgh metropolitan area. Indeed, virtually all of the interstate highways that traverse the Region pass near or through Pittsburgh. Though the core of the Region has a predominantly urban character, the outlying parts of the Region are decidedly rural in nature.

Table 2-1 reveals that 2.7 million people—or nearly one in every four statewide residents of the Commonwealth of Pennsylvania—live in the Southwestern ITS Architecture Region. Nearly one-half of the Region’s population resides in Allegheny County, with the remainder scattered among the other ten counties of the Region. The population of the city of Pittsburgh, as reported in the 2000 Decennial Census, is 334,563. The population of the entire Pittsburgh metropolitan statistical area (MSA) is nearly 2.4 million people.

**Table 2-1: Southwestern ITS Architecture Region Population by County**

<b>County</b>	<b>% Population</b>
<b>Allegheny</b>	<b>48%</b>
<b>Armstrong</b>	<b>3%</b>
<b>Beaver</b>	<b>7%</b>
<b>Butler</b>	<b>7%</b>
<b>Fayette</b>	<b>6%</b>
<b>Greene</b>	<b>2%</b>
<b>Indiana</b>	<b>3%</b>
<b>Lawrence</b>	<b>4%</b>
<b>Washington</b>	<b>8%</b>
<b>Westmoreland</b>	<b>14%</b>
<b>Total Population in the SW Region</b>	<b>2,656,007</b>

(Source: U.S. Census Bureau, 2000)

Table 2-2 compares specific population traits in the Southwestern ITS Architecture Region to those across Pennsylvania and the U.S. generally. For instance, the residents of the Region are somewhat more homogeneous than are their statewide and national counterparts. Whereas 10 percent of the residents of the Southwestern ITS Architecture Region are characterized as minorities, the minority population is 15 percent statewide and 25 percent nationwide. Also, the population in Southwestern skews marginally older—and mean family size slightly lower—than the corresponding state and national populations. Per capita income in the Region is very slightly lower than the state and national totals.

**Table 2-2: Comparison of Key Population Demographics Southwestern ITS Architecture Region, Pennsylvania, and the United States**

<b>Demographic Factor</b>	<b>SW Region</b>	<b>Pennsylvania</b>	<b>United States</b>
<b>Total Population</b>	<b>2,656,007</b>	<b>12,281,054</b>	<b>281,421,906</b>
<b>% Minority Population</b>	<b>9.7%</b>	<b>14.6%</b>	<b>24.9%</b>
<b>Median Age (In Years)</b>	<b>38.6</b>	<b>38.0</b>	<b>35.3</b>
<b>Mean Family Size</b>	<b>2.96</b>	<b>3.04</b>	<b>3.14</b>
<b>Per Capita Income</b>	<b>\$20,364</b>	<b>\$20,880</b>	<b>\$21,587</b>

(Source: U.S. Census Bureau, 2000)

Table 2-3 examines commuting patterns in the Region to the state and national commuting conditions. Nearly four-out-of-five Southwestern workers drive to work alone, just a bit higher than the state and national “drive-alone” rates. Ten percent of workers in the Region carpool to work, comparable to the statewide average. Approximately 5.6 percent of workers use public transportation, marginally better than

state and national transit usage trends. The average one-way commute time for Southwestern ITS Architecture Region workers is 24 minutes, which compares favorably to the 25-26 minutes for Pennsylvania and U.S. workers generally.

**Table 2-3: Comparison of Commuting Patterns Among Workers 16 & Over Southwestern ITS Architecture Region, Pennsylvania, and the United States**

<b>Commuting Pattern</b>	<b>SW Region</b>	<b>Pennsylvania</b>	<b>United States</b>
<b>Total Workers 16 &amp; Over</b>	<b>1,179,218</b>	<b>5,556,311</b>	<b>128,279,228</b>
<b>% Commuters Driving Alone</b>	<b>77.8%</b>	<b>76.5%</b>	<b>75.7%</b>
<b>% Commuters Carpooling</b>	<b>9.7%</b>	<b>10.4%</b>	<b>12.2%</b>
<b>% Commuters Using Public Transportation</b>	<b>5.6%</b>	<b>5.2%</b>	<b>4.7%</b>
<b>Mean Travel Time to Work (Minutes)</b>	<b>24.2</b>	<b>25.2</b>	<b>25.5</b>

(Source: U.S. Census Bureau, 2000)

As shown in Table 2-4, the Southwestern Region encompasses a substantial network of roadways. As reported in PennDOT's 2002 Highway Statistics, the Region contains 24,821.4 linear miles of roadway, signifying 20.6 percent of the Commonwealth's total linear mileage. This includes 7,912.4 linear miles of roadway maintained by PennDOT, with the remaining road miles maintained by the PTC, municipalities, etc.

**Table 2-4: Southwestern ITS Architecture Region Linear Miles**

<b>County</b>	<b>PennDOT Linear Miles</b>	<b>Total Linear Miles</b>
<b>Allegheny</b>	<b>1,176.2</b>	<b>5,713.9</b>
<b>Armstrong</b>	<b>658.0</b>	<b>1,809.9</b>
<b>Beaver</b>	<b>604.7</b>	<b>1,674.3</b>
<b>Butler</b>	<b>655.4</b>	<b>2,266.5</b>
<b>Fayette</b>	<b>756.9</b>	<b>2,081.8</b>
<b>Greene</b>	<b>576.3</b>	<b>1,520.8</b>
<b>Indiana</b>	<b>801.0</b>	<b>2,066.2</b>
<b>Lawrence</b>	<b>387.1</b>	<b>1,194.1</b>
<b>Washington</b>	<b>1,095.9</b>	<b>2,852.2</b>
<b>Westmoreland</b>	<b>1,200.9</b>	<b>3,641.7</b>
<b>Regional Total</b>	<b>7,912.4</b>	<b>24,821.4</b>
<b>Statewide Total</b>	<b>39,905.5</b>	<b>120,297.7</b>

Table 2.5 depicts the daily vehicle miles of travel (DVMT) across the Region, which is substantial. Total DVMT on all roadways in the Region, as reported in the 2002 Highway Statistics was approximately 60.1 million miles. The DVMT on PennDOT roadways was approximately 43.9 million miles.

**Table 2-5: Southwestern Daily Vehicle Miles of Travel**

<b>County</b>	<b>PennDOT DVMT</b>	<b>Total DVMT</b>
<b>Allegheny</b>	<b>16,830,482</b>	<b>25,432,182</b>
<b>Armstrong</b>	<b>1,507,004</b>	<b>1,717,505</b>
<b>Beaver</b>	<b>2,967,899</b>	<b>4,032,559</b>
<b>Butler</b>	<b>3,901,583</b>	<b>4,654,156</b>
<b>Fayette</b>	<b>2,327,852</b>	<b>2,761,666</b>
<b>Greene</b>	<b>1,023,766</b>	<b>1,170,828</b>
<b>Indiana</b>	<b>1,911,484</b>	<b>2,202,912</b>
<b>Lawrence</b>	<b>1,572,405</b>	<b>2,152,817</b>
<b>Washington</b>	<b>5,423,279</b>	<b>6,238,771</b>
<b>Westmoreland</b>	<b>6,470,258</b>	<b>9,822,056</b>
<b>Regional Total</b>	<b>43,936,012</b>	<b>60,185,452</b>
<b>Statewide</b>	<b>217,331,036</b>	<b>287,203,348</b>

The Southwestern ITS Architect Region contains significant highway corridors as defined by the RAP, including:

**Table 2-6: Significant Highway Corridors**

<b>Interstates</b>	<b>United States (U.S.) Routes</b>	<b>Pennsylvania (PA) Routes</b>
Interstate 70 (I-70)	US Route 22 (US-22)	PA Route 8 (PA-8)
Interstate 76 (I-76)	US Route 30 (US-30)	PA Route 28 (PA-28)
Interstate 79 (I-79)	US Route 40 (US-40)	PA Route 60 (PA-60)
Interstate 279 (I-279)	US Route 119 (US-119)	PA Route 88 (PA-88)
Interstate 376 (I-376)	US Route 322 (US-322)	
Interstate 579 (I-579)	US Route 422 (US-422)	

The Southwestern Pennsylvania Region contains intermodal facilities and service providers that support passenger and freight, including:

- The Pittsburgh International Airport,
- A freight and shipping centers located at Pitcairn Yards,

- The Chartiers Valley Region,
- The Port of Pittsburgh, and
- Other waterway centers located along the Region's rivers.

The Southwestern ITS Architecture Region also contains stadiums that house major sporting and recreational events in Pittsburgh, and other major recreational destinations, including:

- PNC Park,
- Heinz Field,
- Mellon Arena,
- Meadowlands Racetrack,
- Falconi Field, and
- Star Lake.

The Region houses one of the nine nuclear power facilities in Pennsylvania in Shippingport.

A range of providers offer transit services in the Southwestern ITS Architecture Region, including:

- Port Authority of Allegheny County,
- Mid Mon Valley Transit Authority,
- Beaver County Transit Authority,
- Fayette County Transit,
- Westmoreland County Transit Authority, and
- A range of paratransit providers.

The Region contains houses a variety of information service providers (ISP), including:

- Pittsburgh-based TV and radio stations,
- Metro Traffic,
- The Weather Channel,
- Mobility Technologies, and
- WPCB-TV 40 Greensburg-Pittsburgh.

Several significant ongoing planning initiatives are underway in the Region, including the following:

- 2030 Plan,
- Traditional Twelve-Year Plan,
- Statewide Transportation Improvement Plan, and
- Major on-going corridor studies (i.e., Mon-Fayette, Airport, and North Shore).

## 2.4 Regional Stakeholders

This section documents the Regional stakeholders defined by the RAP for inclusion and participation in the Regional ITS Architecture effort. Stakeholders are generally identified in terms of agencies and specific individuals in those agencies responsible for policy and operations. Agencies were selected by assessing the mission of operation of services related to the transportation system. Therefore Emergency Management Services (EMS), Incident Management (IM), ITS, Transit, and enforcement activities were all included. Planning agencies were included as well because capital and some Operations & Maintenance (O&M) funds are programmed through these agencies.

**Allegheny County Airport Authority:** The Allegheny County Airport Authority operates the Pittsburgh International and Allegheny County Airports, and is dedicated to the safety and security of passengers, employees and all other users of the airport. The Airport Authority oversees all aspects of airport operations including new development, environmental issues, airline and tenant management, as well as airfield operations.

**Beaver County Transit Authority:** The Beaver County Transit Authority (BCTA) operates fixed-route and paratransit public transportation serving Beaver County and certain parts of Allegheny County. The Mobility Manager program encompasses the agency's on-demand (or paratransit) service to urban and rural areas for the general public, the elderly, persons with disabilities, and others with specialized transportation needs. Fixed-route transit is extensive, and primarily services commuters in Beaver County. For more information, visit the BCTA website (<http://www.bcta.com>).

**City of Pittsburgh:** The City of Pittsburgh is a large metropolitan city, serving as the primary source and destination of most travel within the Region. Transportation departments operating ITS include the Engineering and Construction Department (Bureau of Engineering's Division of Traffic), Department of Public Safety (bureaus of police, fire, EMS, and emergency management), and the Parking Authority.

**Commercial Vehicle Companies:** Privately owned trucking companies responsible for the safe and efficient movement of goods using the transportation system in the Region. Services provided by various commercial vehicle agencies include the delivery of intermodal shipments (containers and trailers), bulk materials (including chemical and hazmat products), and specialized cargo (legal, over-dimensional, and heavy haul shipments).

**Counties:** Lawrence, Butler, Beaver, Armstrong, Indiana, Allegheny, Westmoreland, Washington, Greene, and Fayette county government operations are included within the Region. Departments typically participating in emergency management operations include county police, fire, EMS, 911, and emergency management agencies.

**General Public:** The community or the people as a whole using the transportation system. The general public may be an automobile driver, transit passenger, computer, or cell-phone user obtaining travel information, or any other person interacting with the transportation system in the Region.

**Mobility Technologies:** A private traveler information service provider, Mobility Technologies provides real-time traffic and logistics information solutions for consumers, businesses, and transportation agencies. For more information, visit the Mobility Technologies website (<http://www.mobilitytechnologies.com>).



**Municipalities:** Pennsylvania cities (excluding Pittsburgh), boroughs, or townships incorporated for local governments throughout the Region. Municipalities are responsible for various local operations within its limits, including public safety (police, fire, and EMS) and traffic signal systems.



**Pennsylvania Department of Transportation (PennDOT):**

The Pennsylvania Department of Transportation is the Commonwealth's statewide transportation agency responsible for building, maintaining, and operating the state's roads, bridges and tunnels. PennDOT consists of a single Central Office and 11 District Offices throughout the state.

PennDOT's Central Office consists of several internal organizations, including the Bureau of Maintenance and Operations (BOMO), Motor Carrier Division, Bureau of Planning and Research (BPR), Bureau of Highway Safety and Traffic Engineering (BHSTE), Bureau of Driver Licensing, Bureau of Motor Vehicles, Bureau of Rail Freight, Ports, and Waterways, Bureau of Information Systems, and Press Office. PennDOT's Central Office oversees statewide operations and is responsible for coordination of transportation services between the 11 Districts.

PennDOT's District Offices are responsible for the design, operation, maintenance, and construction of state highways and bridges in their respective districts.

For more information, visit PennDOT's website (<http://www.dot.state.pa.us>).



**Pennsylvania Emergency Management Agency (PEMA):**

The Pennsylvania Emergency Management Agency (PEMA) coordinates state agency emergency response, including the Office of the State Fire Commissioner and Office of Homeland Security, to support county and local governments in the areas of civil defense, disaster mitigation and preparedness, planning, and response to and recovery from man-made and natural disasters.

For more information, visit PEMA's website (<http://www.pema.state.pa.us>).

**Pennsylvania Office of Homeland Security:**

Pennsylvania Homeland Security addresses the security needs of the state. Developed in response to 9/11 the Homeland Security Office is focusing on a range of important security needs and services, including transportation-related issues. Potential high-threat topics — e.g., nuclear power plants, DOE shipments, chemical industry, major distribution of gas and electric utilities, and other target infrastructure — are all covered through the Office’s Homeland Security mission. Initially, the ITS Architecture focuses on security issues as part of incident management. In the future, as the Office’s mandate is refined, additional security services and needs are likely to be reflected in the Architecture.



**Pennsylvania State Police (PSP):** The Pennsylvania State Police is a full service statewide law enforcement agency that fulfills the law enforcement needs of the general public across the Commonwealth of Pennsylvania. Transportation services provided by the Pennsylvania State Police include: (1) incident response, (2) commercial vehicle inspections, and (3) law enforcement on state highways. For more information, visit the Pennsylvania State Police website (<http://www.psp.state.pa.us>).



**Pennsylvania Turnpike Commission (PTC):** The Pennsylvania Turnpike Commission maintains and operates the 531-mile Pennsylvania Turnpike. The Pennsylvania Turnpike is a key transportation route within the state and a vital link in the transportation network of the eastern United States. The Turnpike contains 57 fare-collection facilities, 21 service plazas and two traveler information centers, 21 maintenance facilities, 8 State Police barracks, and 5 tunnels. For more information, visit the PTC’s website (<http://www.paturndpike.com>).

**Port Authority of Allegheny County:** The Port Authority of Allegheny County (PAAC) operates light rail, bus (bus way systems), two inclined plane railways, and paratransit (for elders and disabled). The PAAC operates about 1,000 buses, 55 light rail vehicles (28 more ordered), and about 100 paratransit vehicles. The agency also operates about 50 Park-n-Ride lots within the Region. There are about 15,000 bus stop shelters and transit stations interfaced with the street system. The PAAC also has an extensive public safety force providing security and responding to incidents involving PAAC vehicles or facilities. For more information, visit the PAAC website (<http://www.portauthority.org>).

**Port of Pittsburgh Commission:** The Port of Pittsburgh operates a strategic intermodal center, served by more than 30 privately owned public river terminals and connected to the rest of the nation by 18 barge lines, two railroads, and four interstate highways.



**Private Companies:** Private companies contributing to transportation operations within the Region. Includes privately-owned port operators, as well as road service towing companies.

**Regional Media:** The regional media consists of all regional/local television and radio stations that provide weather, traffic, and other information to the general public via means of mass communication.

**Regional Transit Agencies:** Agencies operating public transportation services within the Region, including Westmoreland County Transit Authority (WCTA), Butler Township-City Joint Municipal Transit Authority (BTCTMTA), Town and Country Transit (TACT—operating in Armstrong County), Fayette Area Coordinated Transportation (FACT), Washington County Transit Authority (WCTA), GG&C Bus Company (operating in Washington County), New Castle Area Transit Authority (NTA—serving Lawrence County), Indiana County Transit (IndiGo), and the Mid-Mon Valley Transit Authority (MMVTA).

**Southwest Pennsylvania Commission:** The SPC is the regional planning agency serving the Pittsburgh 10-county area (Same as Region: Allegheny, Armstrong, Beaver, Butler, Fayette, Greene, Indiana, Lawrence, Washington, and Westmoreland Counties) and providing essential services to the region. The official Metropolitan Planning Organization (MPO), SPC directs the use of all state and federal transportation and economic development funds allocated to the region. For further information, visit the SPC's website (<http://www.spcregion.org/>)

**Transportation Management Associations:** TMA's operating within the Region include the Airport Corridor Transportation Association (ACTA), Oakland Transportation Management Association (OTMA), and the Pittsburgh Downtown Partnership (PDP). These organizations work in conjunction to respond to the transportation issues within the immediate communities as well as regional transportation needs throughout Southwestern Pennsylvania. The TMA ultimate role is to communicate the public sector position, while bringing the message of the community back to the transportation decision-makers in the public sector.

**Various Stakeholders:** Represents several stakeholders within the Southwest Pennsylvania Region working in conjunction to initiate, own, operate, and/or maintain transportation infrastructure within the Region.

## **2.5 Regional ITS Projects**

The Regional ITS Projects Matrix identifies ITS projects in the Region and provides a high-level description of the projects. The matrix denotes the status of each project, as follows:

- Existing — An ITS project that is deployed and operational.
- Planned 1 — A future ITS project that is programmed or formally documented by the MPO, DOT, transit agency, police, or other transportation stakeholder.
- Planned 2 — A future ITS project that is not programmed or documented.

The information on projects shown in the matrix (see Table 2-7) was collected from Regional or Municipal planning documents, or otherwise enunciated by members of the RAP. Regional stakeholders went through a process of defining projects as existing, planned 1, or planned 2. A planning horizon of 20 years was used as a criterion in determining those projects to include in the matrix.

**Table 2-7: Regional ITS Projects**

<b>Stakeholder</b>	<b>Project</b>	<b>Status</b>	<b>Project Description</b>
<b>Allegheny County Airport Authority</b>	ACAA Dynamic Message Signs	Planned 1	This project will include installation of ACAA-operated DMS's on approach roads to Pittsburgh International Airport.
<b>Allegheny County Airport Authority</b>	ACAA Parking Management	Existing	ACAA manages the parking facilities at the Pittsburgh Regional Airport and utilizes a traveler information website and PennDOT D11 HAR and DMS to relay parking lot status.
<b>Beaver County Transit Authority</b>	BCTA Automated Reservation System	Existing	Beaver County Transit Authority provides an automated phone system that allows users to call and make reservations for the DART (on-demand paratransit) vehicles.
<b>Beaver County Transit Authority</b>	BCTA AVL	Planned 1	Installation of Automated Vehicle Location (AVL) in all vehicles for tracking and schedule adherence monitoring.
<b>Beaver County Transit Authority</b>	BCTA Central Dispatch Software	Planned 2	Bus dispatchers will be able to view real-time bus movement superimposed over a geographic map of the area, possibly with real-time traffic conditions.

<b>Stakeholder</b>	<b>Project</b>	<b>Status</b>	<b>Project Description</b>
<b>Beaver County Transit Authority</b>	BCTA Electronic Fare Collection	Existing	BCTA has electronic fare collection that allows transit users to carry a "smart" card to increase user ease of payment and agency tracking of these payments.
<b>Beaver County Transit Authority</b>	BCTA Remote Traveler Information Systems	Planned 1	Beaver County Transit Authority remote traveler support includes real-time schedule adherence through a traveler information website, electronic signs at major stops and kiosks
<b>Beaver County Transit Authority</b>	BCTA Traffic Signal Priority	Planned 1	A signal priority system between BCTA and local municipalities would give transit vehicles priority through intersections helping them to run on schedule.
<b>City of Pittsburgh</b>	City of Pittsburgh Traffic Management System	Existing	The City of Pittsburgh Traffic Management System includes communications between signal controllers and centralized software to control and monitor traffic signals throughout downtown business district.
<b>City of Pittsburgh Parking Authority</b>	City of Pittsburgh Downtown Parking Management	Planned 2	Future automated collection of parking fees, and distribution of parking information to vehicles using downtown business parking garages/lots.
<b>City of Pittsburgh Parking Authority</b>	Automated Payment Parking Meters	Existing	Use card readers to collect automated payment for parking along metered sections of downtown business area.
<b>Commercial Vehicle Companies</b>	Private Carrier Commercial Vehicle Tracking System	Existing	Commercial Vehicle Tracking System provides tracking information of all the trucks using the system. Commercial vehicles also have communication devices to communicate with the trucking agency on-route.

<b>Stakeholder</b>	<b>Project</b>	<b>Status</b>	<b>Project Description</b>
<b>Commercial Vehicle Companies</b>	Private Carrier Fleet Maintenance Management	Existing	This program provides capabilities to administer preventive maintenance schedules.
<b>Commercial Vehicle Companies</b>	FHWA Carrier Compliance Review	Existing	The FHWA Compliance Review process involves examining carrier records to ensure that the carrier meets all safety-related regulations and does not have unsafe operating practices.
<b>Counties</b>	County Emergency Operation Centers	Existing	Countywide emergency operations centers that can be activated to coordinate response agencies for various levels of emergency events.
<b>Counties</b>	County / Municipal PSAP/911 Centers	Existing	The County 911 Centers dispatch and manage resources for incidents. County 911 Centers dispatch all fire, police, EMS and other public safety services, excluding a few municipalities that dispatch their own local services. In those municipalities a “ring down” dispatch centers receive transfer calls from the county 911 center.
<b>Fayette County Coordinated Transit</b>	FCCT On-demand AVL	Existing	AVL systems in on-demand vehicles used for tracking through dispatch center.
<b>Mobility Technologies</b>	Mobility Technologies Information Collection/Distribution	Existing	Mobility Technologies is a private company that collects traffic flow and incident data into a database, fuses it into traveler information, and then distributes it to various media outlets and the public using web-based applications

<b>Stakeholder</b>	<b>Project</b>	<b>Status</b>	<b>Project Description</b>
<b>Mobility Technologies</b>	Mobility Technologies Traffic Monitoring	Existing	Mobility Technologies identifies incidents and locations, monitors roadways using CCTV, and measures travel speeds and times, as well as vehicle classifications.
<b>Municipalities</b>	Remote Traffic Signal Control and Monitoring Systems	Existing	Several municipalities within the Region have deployed traffic signal systems that can be remotely operated and monitored by software packages, allowing municipal traffic offices to change signal timings and detect if there are problems.
<b>Municipalities</b>	Emergency Vehicle Traffic Signal Preemption	Existing	Several municipalities throughout the Region have deployed emergency vehicle preemption systems that receive communication from approaching police, fire, and EMS vehicles to provide passage through a signalized intersection.
<b>Municipalities</b>	Transit Vehicle Traffic Signal Priority	Existing	A few municipalities throughout the Region have deployed transit vehicle preemption systems that receive signals from approaching public transportation vehicles to provide prioritized passage through a signalized intersection.
<b>General Public</b>	E-Z Pass Toll Collection	Existing	E-Z Pass is an electronic toll collection system used on the Pennsylvania Turnpike and other toll roads in the Commonwealth. E-Z Pass allows passenger vehicles to pay tolls at toll both without stopping.
<b>General Public</b>	Personal Traveler Information Devices	Existing	Includes personal computers, PDA's, cell phones, etc. that allow users to access transportation related information.

<b>Stakeholder</b>	<b>Project</b>	<b>Status</b>	<b>Project Description</b>
<b>PennDOT (Central Office)</b>	Winter Road Condition Hotline for Interstate Highways	Existing	A hotline phone service that disseminates seasonal statewide road conditions including road closures, detours, alternative routes, work zone/ construction events, and road surface conditions.
<b>PennDOT (Central Office)</b>	Roadway Weather Information System (RWIS)	Existing	Road Weather Information Systems collect weather information/images throughout the state. RWIS information is made available to the public and transportation agencies via a webpage.
<b>PennDOT (Central Office)</b>	PennDOT Performance and Registration Information Systems Management (PRISM)	Existing	This project began as an effort to explore the potential of linking the Commercial Vehicle registration process to motor carrier safety.
<b>PennDOT (Central Office)</b>	PennDOT Safety and Fitness Electronic Record (SAFER)	Planned 1	SAFER is a software program that enables the enforcement community to transmit and receive data on CVO safety, credential, and inspection to and from the roadside.
<b>PennDOT (Central Office)</b>	PennDOT Transportation Management Centers (TMC's)	Planned 2	The Pennsylvania Department of Transportation (PennDOT) intends to enhance existing Transportation Management Centers (TMC's), and establish new TMC's, to monitor and control the transportation system in partnership with other transportation operations providers.
<b>PennDOT (Central Office)</b>	PennDOT "Wizard" Work Zone Alert Radio	Planned 1	The alert radio alerts truck drivers to work zone conditions.
<b>PennDOT (Central Office)</b>	Statewide Telecommunication	Planned 2	This project would develop a statewide telecommunication system

<b>Stakeholder</b>	<b>Project</b>	<b>Status</b>	<b>Project Description</b>
<b>PennDOT (Central Office)</b>	Construction Projects (current and future)	Existing	This projects allows for road closure, work zone and construction information dissemination through PennDOT website.
<b>PennDOT (Central Office)</b>	Central Repository	Planned 2	This project would involve developing a central repository for information. The central repository information would include work zone information, real time traffic information, and accident information among others. The central repository will facilitate better coordination among various PennDOT offices and the customers.
<b>PennDOT (Central Office)</b>	Real -time Traffic Information Website	Planned 2	This project would include deployment of a real time traffic information website which would disseminate the following real time information: traffic information, incident information, work zone information and weather advisory information.
<b>PennDOT (Central Office)</b>	Statewide GIS based Incident Detour Map	Planned 2	This project would develop a statewide GIS based incident detour map for various major interstate routes.  The statewide GIS based data would be consistent with the Counties' GIS data.
<b>PennDOT (Central Office)</b>	Video Sharing	Planned 2	This project would involve sharing of video images among various PennDOT Districts, PSP, PEMA, and other coordinating agencies.
<b>PennDOT (Central Office)</b>	Web site Portal for Assisting Commercial Vehicle Operators	Planned 2	In addition to the real time traffic information, this website would assist the commercial vehicle operators by providing video images, incident alerts, customized incident information/alerts, site restrictions. This website would also assist the commercial vehicle operators by reducing paper work necessary for their operations.

<b>Stakeholder</b>	<b>Project</b>	<b>Status</b>	<b>Project Description</b>
<b>Pennsylvania Department of Transportation (PennDOT)</b>	PennDOT Regional Mile-post Marker Installation	Planned 2	This project is needed to better identify locations for accidents and other incidents along roadways. Mile-post markers allow callers to better report their location when talking to response dispatchers. However, the functionality of this deployment may be overlapped by future deployment of wireless-enhanced 911 systems, which use geo-location to automatically identify in the dispatch system the location of wireless callers. (Note: this project does not require specific information transfer, and therefore is not reflected in the Southwest PA Regional ITS Architecture)
<b>PennDOT (District 10)</b>	D10 Traveler Information	Existing	DMS and HAR are located throughout the district to provide current traveler information. A Website is also managed by PennDOT District 10 to provide travel advisories and construction information.
<b>PennDOT (District 10)</b>	D10 Collision Avoidance System	Existing	Detects speed of vehicles approaching intersection and warns drivers of hazards using DMS.
<b>PennDOT (District 10)</b>	D10 Traffic Management Center (TMC)	Planned 2	The TMC will gather roadway data from sensors and CCTV cameras, control various ITS field devices in PennDOT District 10-0, disseminate information to the public and other agencies, as well as coordinate incident response throughout the district.
<b>PennDOT (District 11)</b>	D11 Camera Image Sharing	Existing	D11 TMC shares CCTV camera images with: Pennsylvania State Police (Pittsburgh Barracks), WTAE (TV), KDKA (TV), WPXI (TV), and Clear Channel Communications.



<b>Stakeholder</b>	<b>Project</b>	<b>Status</b>	<b>Project Description</b>
<b>PennDOT (District 11)</b>	D11 Camera Image Sharing Expansion	Planned 1	D11 TMC will share CCTV images with various agencies, including Allegheny County EMS, Mobility Technologies, BCTA, and PAAC.
<b>PennDOT (District 11)</b>	D11 Roadway Weather Monitoring	Existing	RWIS stations collect information regarding temperature, water/ ice presence, wind speed and direction and snow and rain precipitation.
<b>PennDOT (District 11)</b>	D11 Traffic Monitoring	Existing	Freeway traffic monitoring and detection takes place on freeways. This data is gathered at the TMC and used to supply traffic conditions and CCTV images to other agencies.
<b>PennDOT (District 11)</b>	D11 Traveler Information	Existing	DMS and HAR are used to provide information from the Pittsburgh TMC to travelers. Messages are provided from the Pittsburgh TMC. A Website is also managed by PennDOT District 11 to provide travel advisories, construction information, and CCTV camera images.
<b>PennDOT (District 11)</b>	D11 Pittsburgh Regional Traffic Management Center (RTMC)	Existing	The TMC gathers roadway data from sensors and CCTV cameras, controls various ITS field devices in multiple PennDOT Districts, disseminates information to the public and other agencies, as well as coordinates incident response throughout the district.
<b>PennDOT (District 11)</b>	D11 Regional Service Patrols	Existing	Regional service patrol vehicles travel along freeways to aid motorists with minor vehicle problems and request additional response resources when needed.

<b>Stakeholder</b>	<b>Project</b>	<b>Status</b>	<b>Project Description</b>
<b>PennDOT (District 12)</b>	D12 Bridge De-icing	Existing	Currently bridges are equipped with technology to detect the presence of a freezing on a bridge and automatically anti-icing materials.
<b>PennDOT (District 12)</b>	D12 Traveler Information	Existing	DMS and HAR are located throughout the district to provide current traveler information. A Website is also managed by PennDOT District 12 County Maintenance Offices to provide travel advisories and construction information.
<b>PennDOT (District 12)</b>	D12 Collision Avoidance Signal Preemption System	Existing	Detects trucks traveling at high speeds toward intersection and communicates with municipally-operated traffic signal to provide extended green if warranted.
<b>PennDOT (District 12)</b>	D12 Traffic Management Center (TMC)	Planned 2	The TMC will gather roadway data from sensors and CCTV cameras, control various ITS field devices in PennDOT District 12-0, disseminate information to the public and other agencies, as well as coordinate incident response throughout the district.
<b>Pennsylvania Emergency Management Agency (PEMA)</b>	PEMA Emergency Operation Center	Existing	Emergency Operation Center provides agency coordination for significant incidents, events, and emergencies throughout Pennsylvania. Also collects/distributes information from various agencies for a Daily Incident Report webpage.
<b>Pennsylvania Emergency Management Agency (PEMA)</b>	PEMA Truck	Existing	PEMA truck acts as a backup to the operations of the PEMA's Emergency Operations Center. The mobility of the truck allows establishing an Emergency Operations Center at the incidence location in case of major incident.

<b>Stakeholder</b>	<b>Project</b>	<b>Status</b>	<b>Project Description</b>
<b>Pennsylvania Emergency Management Agency (PEMA)</b>	Pennsylvania Emergency Information Reporting System (PEIRS)	Existing	A statewide electronic database, the Pennsylvania Emergency Information Reporting System (PEIRS) collects information from all state agencies responding to incidents/emergencies in the Commonwealth of Pennsylvania.
<b>Pennsylvania State Police (PSP)</b>	Incident Information Management System (IIMS)	Existing	The Incident Information Management System is a database used to provide PSP vehicles incident reporting and dispatching capabilities.
<b>Pennsylvania State Police (PSP)</b>	PSP Dispatch Centers	Existing	PSP Dispatch Centers are responsible for PSP operations. Dispatch Centers dispatch PSP Vehicles to incidents and emergencies on state highways. PSP currently dispatches the District 11-0 Service Patrols using PennDOT radios located in the PSP Barracks.
<b>Pennsylvania State Police (PSP)</b>	PSP Consolidated Dispatch Center	Planned 1	PSP Consolidated Dispatch Centers will provide consolidated dispatch and management of PSP resources for incident/emergency operations throughout the coverage area.
<b>Pennsylvania State Police (PSP)</b>	Mobile Data Terminals (MDT's)	Existing and Planned 1	In-vehicle systems used by the vehicles to communicate and receive dispatch information from PSP and other agencies' systems. MDT's are currently being integrated with other state agencies now (i.e. PEMA) and municipal agencies in the future.
<b>Pennsylvania Turnpike Commission (PTC)</b>	Pennsylvania Turnpike Field Devices	Existing and Planned 1	Pennsylvania Turnpike Commission existing and planned field devices including: DMS, RWIS, HAR, CCTV, CADS, and TRWS.

<b>Stakeholder</b>	<b>Project</b>	<b>Status</b>	<b>Project Description</b>
<b>Pennsylvania Turnpike Commission (PTC)</b>	PTC ATIS Integration Project	Planned 1	The PTC will integrate DMS, RWIS, HAR, CCTV, and CADS sub-systems into an integrated traffic management system.
<b>Pennsylvania Turnpike Commission (PTC)</b>	PTC *11 Phone Service	Existing	The PTC *11 Phone Service allows motorists to notify the PTC of incidents and emergencies on the Pennsylvania Turnpike.
<b>Pennsylvania Turnpike Commission (PTC)</b>	PTC E-Z Pass Toll Collection System	Existing	E-Z Pass is an electronic toll collection system used on the Pennsylvania Turnpike and other toll roads in the Commonwealth. E-Z Pass allows passenger vehicles to pay tolls at toll both without stopping.
<b>Pennsylvania Turnpike Commission (PTC)</b>	PTC Service Plazas	Existing	PTC Service Plazas serve as a center for traveler information. Service plazas utilize scrolling message boards to broadcast weather and lodging information.
<b>Pennsylvania Turnpike Commission (PTC)</b>	PTC Traffic Operation Center (TOC)	Existing	The PTC Traffic Operation Center, located near Harrisburg, is responsible for detecting, monitoring, managing, operating, dispatching resources in response to incidents, events, construction and maintenance work for the entire length of the Pennsylvania Turnpike.
<b>Port Authority of Allegheny County</b>	PAAC Central Dispatch Software	Planned 1	Bus dispatchers will be able to view real-time bus and rail movement superimposed over a geographic map of the area, possibly with real-time traffic conditions.
<b>Port Authority of Allegheny County</b>	PAAC Interactive Trip Planning	Planned 1	A voice response system will allow users to plan trips, check schedules or have basic questions answered regarding the transit system.

<b>Stakeholder</b>	<b>Project</b>	<b>Status</b>	<b>Project Description</b>
<b>Port Authority of Allegheny County</b>	PAAC Remote Traveler Information Systems	Planned 1	PAAC plans to provide traveler information through kiosks in public areas and at park-n-ride lots, as well as real-time arrival information display signs in train stations and at bus stops.
<b>Port Authority of Allegheny County</b>	PAAC Vehicle Tracking	Planned 1	Use of AVL in transit vehicles for tracking and for dispatchers to have information regarding schedule and route adherence vehicles.
<b>Port Authority of Allegheny County</b>	Port Authority of Allegheny County Park-n-Ride Lot Operations	Planned 2	Future management of parking facilities and distribution of parking information to vehicles approaching park-n-ride facilities.
<b>Port of Pittsburgh Commission</b>	Port of Pittsburgh Travel Information Distribution	Planned 2	The Port of Pittsburgh Commission is interested in collecting travel conditions from PennDOT, PTC, and City of Pittsburgh to distribute it to privately-operated port outlets where commercial vehicles are entering the highway system.
<b>Regional Transit Agencies</b>	Regional Transit Electronic Fare Collection	Planned 2	Regional transit agencies would jointly run an automated payment system that would be compatible on all systems.
<b>Southwest Pennsylvania Commission (SPC)</b>	Regional Ridesharing Coordination	Existing	Since the 1970's, SPC continues to direct and maintain the Region's ridesharing program, called CommuteInfo, that offers a wide range of free ridesharing services to employees and employers within the ten county region.
<b>Southwest Pennsylvania Commission (SPC)</b>	Regional Transit Schedule Coordination	Planned 2	Regional transit agencies will coordinate schedules and use of a traveler information website and/or other traveler information so transit users can easily navigate multi-agency transfers.

<b>Stakeholder</b>	<b>Project</b>	<b>Status</b>	<b>Project Description</b>
<b>Various Stakeholders</b>	800 MHz Statewide Communication System	Existing	This project involves the deployment of a statewide 800 MHz wireless communication system for state agencies.
<b>Various Stakeholders</b>	800 MHz Statewide Communication System Regional Expansion	Planned 2	This project involves the deployment of 800 MHz wireless communications system for county and municipal agencies within the Region.
<b>Various Stakeholders</b>	Regional Traveler Information System	Planned 2	Future project to be deployed by a yet-to-be determined agency, or group of agencies within the Region. The deployed system will provide “one stop trip planning” for travelers. Information that can be collected from various participating regional agencies includes road and traffic conditions, transit scheduling, emergency/incident information, and other transportation-related data that will be distributed to agencies and the general public.
<b>Various Stakeholders</b>	511 Traveler Information Phone System	Planned 2	Project that may be initiated by PennDOT and the PTC to collect and distribute traveler information via a dedicated 511 phone number throughout the state.
<b>Various Stakeholders</b>	AMBER Alert Coordination	Existing	AMBER alert coordination between PennDOT Central Office, PEMA, PennDOT District Offices, and PSP.

### 3 Regional Systems Inventory, Needs, and Services

The National ITS Architecture provides guidance on collecting and creating ITS Architectures using regional data. Given this guidance, this section provides a common sense approach to gathering information, providing a logical flow down to this information in order to create the Regional ITS Architecture. This section documents elements (groups that operate), systems inventory (what these groups are doing), needs (information or data that these groups need or use from others) and services (information or data that these groups provide to others). This section also includes a section on operations coverage.

#### 3.1 Element Descriptions

Element descriptions are furnished below to document the groups that operate in the transportation environment as related to ITS. These elements are described in terms of their mission and relationship to the Regional ITS Architecture. Elements refer to organizational entities that operate in the transportation environment and are stakeholders in the effort. Elements also include planning agencies that are involved in the “business” of programming ITS into the mainstream project planning process.



**911 Communication Centers:** This element includes County and municipal-operated locations serving as Public Safety Answering Points (PSAP’s) for answering and managing 911 calls at centralized county locations, “ring-down” centers located in specific municipalities where county 911 centers do not dispatch directly, and systems and personnel that coordinate incident dispatch with various emergency response agencies and responders in the field. (Municipal Public Safety Vehicles and other specialty response vehicles, such as wreckers and hazmat teams, are dispatched by the 911 centers).

**ACAA Field Devices:** This element consists of Allegheny County Airport Authority–operated field devices and includes existing/future parking management devices, variable message signs for traveler information regarding the Pittsburgh International Airport, and other information passed along from various agencies.

**ACAA Office:** This element manages Allegheny County Airport Authority operations, and includes offices that manage external airport communications and parking operations and systems and personnel that provide broadcasted airport information to the public, as well as traffic and emergency coordination with other agencies.



**Adjacent PennDOT District and County Offices:** This element includes existing and future PennDOT TMC's, RTMC's, county maintenance offices, and stockpiles located in PennDOT Districts 1-0, 2-0, and 9-0, which are located north, northeast, and east (respectively) of the Region. The element includes personnel and systems that coordinate with PennDOT entities within the region to perform traffic management, maintenance and construction, and incident/emergency management operations at or near district borders. PennDOT TMC's and RTMC's will coordinate responsibilities under the proposed statewide operations framework.

**BCTA Remote Traveler Support:** This element consists of Beaver County Transit Authority-operated remote traveler information and support systems and includes existing/future electronic displays with dynamic traveler information at bus stops as well as kiosks for transit information and fare payment or debit increase using electronic fare cards.

**BCTA Transit Management Center:** This element consists of the Beaver County Transit Authority Expressway Travel Center and surrounding facilities and includes systems and personnel that provide centralized transit and emergency management, advanced transit information (including on-site trip planning kiosks), vehicle maintenance, and security operations for the BCTA.

**BCTA Transit Vehicles:** Beaver County Transit Authority-operated fixed route and paratransit vehicles. Includes drivers and systems that provide existing/future driver-to-dispatch communications, automated payment, automated passenger count, AVL, as well as vehicle maintenance and diagnostics tracking.

**City of Pittsburgh Field Devices:** This element consists of traffic and parking management field devices owned by the City of Pittsburgh and includes existing/future traffic signal system components, emergency/transit vehicle priority systems, parking lot systems and street meters that support automated payments, as well as traffic monitoring devices.



**City of Pittsburgh Parking Authority Offices:** This element consists of Pittsburgh Parking Authority offices and garage/lot locations managing parking and traffic operations and includes systems and personnel that manage coordination of downtown events with other agencies. The element may eventually provide traveler information using city of Pittsburgh-owned field devices.

**City of Pittsburgh TMC:** This element consists of the City of Pittsburgh traffic management center located downtown and other locations that house city maintenance operations. The element includes systems and personnel located within the TMC and city maintenance locations to monitor and control signalized intersections, coordinate timing plans with other agencies, exchange traffic archived data with other agencies, maintain city streets and traffic infrastructure, as well as coordinate emergency operations.



**Commercial Vehicle Company Offices:** Commercial Vehicle Company Offices owned by private freight hauling agencies operating in the Region. This element also includes the Pennsylvania Motor Trucking Association. Includes the existing and future Commercial Vehicle Company systems which provide the capability for freight managers to furnish drivers with routing information, support safety and hazardous materials credentialing, conduct safety checks, support vehicle diagnostic checks and on-board monitoring, automate recordkeeping, etc.

**Commercial Vehicles:** Privately-owned freight hauling vehicles operating in the Region. This element includes existing and future in-vehicle devices enabling vehicles to communicate with (1) Commercial Vehicle Company Offices, (2) Commercial Vehicle Company systems, and (3) and other agency systems throughout Pennsylvania.



**County EMA Centers:** This element consists of County Emergency Management Agency-operated locations where centralized emergency coordination is located during emergency situations. The element includes systems and personnel at the EMA center that provide a single point of coordination by collocating representatives from various emergency response agencies/departments. EMA Centers manage hazard identification, risk assessment, emergency planning, as well as emergency response and recovery monitoring, coordination, and control for emergencies and disasters.

**High-Threat Facilities:** Operations and management headquarters for major security assets located within or adjacent to the Region, which require special treatment in terms of emergency response and security. Existing/future systems include facility surveillance and secure communications with local, state, and national police and emergency management agencies.

**Mobility Technologies ATIS Administration:** This element consists of Mobility Technologies-owned entities (including systems at regional headquarters and staff located at PennDOT D11 TMC) operating advanced traveler information systems (ATIS). This private company collects traffic flow, construction, and incident data through its own traffic detection devices, as well as through information exchange with other agencies. Current travel conditions are then provided through a web-based service to media outlets, service subscribers (through automated alerts), and directly to the general public through its website.

**Mobility Technologies Field Devices:** This element consists of Mobility Technologies-owned and operated field devices for private-sector traveler information and includes existing traffic detection, monitoring cameras, as well as future weather condition monitoring.

**Municipal Field Devices:** This element consists of municipality-operated (excluding City of Pittsburgh) traffic management field devices and includes traffic signal system components and vehicle priority systems.

**Municipal Public Safety Offices:** This element consists of municipality-operated (including City of Pittsburgh) public safety offices and includes systems and personnel from police, fire, and EMS agencies that provide local incident response and traffic control (especially in rural areas) services.

**Municipal Public Safety Vehicles:** This element consists of municipality-operated (including City of Pittsburgh) public safety vehicles and includes systems and personnel operating police, fire, EMS, and other emergency response vehicles. Existing/future in-vehicle systems include voice/data communications and traffic signal priority systems.



**Municipal Traffic Management Offices:** This element consists of municipality-operated (excluding City of Pittsburgh) traffic engineering and operations offices throughout the Region. It includes systems and personnel that provide existing/future monitoring, controlling, and maintaining of traffic management field devices – typically signal systems. The element also provides traffic signal timing change coordination, as well as emergency, maintenance, and construction coordination with other agencies. Operations coordinated between municipal traffic offices are also present within the Region, including existing “Traffic Information Coordination” and planned “Traffic Control Coordination” information flows.

**PAAC Centers:** This element consists of Port Authority of Allegheny County-operated centers, garages and offices and includes systems and personnel located at the TMC and Rail Operations Control Center (ROCC) located at South Hills Village; various PAAC vehicle garages and Port Authority Police and Security Services Department office locations; the PAAC administrative headquarters; and dispatching offices for contracted Access Transportation Systems Inc. demand response transit operations. The PAAC TMC manages surface street transit vehicles. PAAC headquarters archives ridership data and manages the website through PAAC Technology Center. PAAC garages operate automated vehicle diagnostics that are used for downloading information from vehicles. The ROCC manages rail transit vehicles and existing/future in-vehicle systems; controls signals, traffic systems, SCADA, tunnel controls, and radio communications; monitors CCTV camera images; archives ridership data; tracks rail vehicle locations; and receives emergency signal information from rail vehicles.

**PAAC Remote Traveler Support:** This element consists of Port Authority of Allegheny County-operated remote traveler information and support systems and includes existing/future electronic displays with dynamic traveler information at bus/train stops/stations as well as kiosks for transit information and fare payment or debit increase using electronic fare cards.



**PAAC Transit Vehicles:** This element consists of Port Authority of Allegheny County-operated fixed route and contracted paratransit surface street vehicles and light rail “T” vehicles. The element includes drivers and in-vehicle systems that provide existing/future driver-to-dispatch communications, automated payment, transit signal priority, automated passenger count, emergency signal alert, AVL, and vehicle maintenance and diagnostics tracking.

**Park-n-Ride Facilities:** This element consists of parking systems, offices, booths, and personnel that are located at existing/planned intermodal (highway to bus/rail) transfer stations and associated facilities throughout the region. This element is operated, owned, and maintained by various different agencies – many having multiple agencies providing support and services. Existing and future agencies contributing to park-n-ride facilities include PennDOT, regional transit agencies, airports, private entities, and local municipalities. Existing and future entities include real-time measuring of parking availability, payment collection, security, and transit/road information dissemination.



**Passenger Vehicles:** This element consists of systems within all passenger vehicles, excluding commercial vehicles, owned by the general public. The element also encompasses in-vehicle systems used to communicate with other systems such as E-Z Pass toll tags and devices used to communicate with parking facilities.

**PEMA Emergency Operation Center:** Systems housed at the PEMA Statewide Emergency Operation Center (Harrisburg), Western Area Office (Indiana), and Eastern Area Office (Hamburg). PEMA Western and Eastern Regional Offices serve as regional operational arms of the Statewide Emergency Operation Center in Harrisburg.



PEMA stores, coordinates, and utilizes emergency response and evacuation information/plans to facilitate coordinated emergency response for all responding agencies throughout Pennsylvania. PEMA supports county and local governments in the areas of civil defense, disaster mitigation and preparedness, planning, and response to and recovery from manmade or natural disasters. It interfaces with other emergency management agencies to support coordinated emergency response involving multiple agencies. As the response progresses, situation information including damage assessments, response status, and evacuation and resource data are shared to keep all allied agencies apprised of the response.

**PennDOT Central Office Field Devices:** Field devices owned and operated by PennDOT Central Office. Field devices include existing/future RWIS stations,

commercial vehicle check systems, automatic traffic recorders, and other field devices distributed on and along the roadway that monitor, control, and manage traffic.

**PennDOT Central Office Organizations:** Systems located at the PennDOT Central Office Organizations in Harrisburg. The element consists of those Central Office Organizations operating transportation systems, including the Bureau of Maintenance and Operations (BOMO), Motor Carrier Division, Bureau of Planning and Research (BPR), Bureau of Highway Safety and Traffic Engineering (BHSTE), Bureau of Licensing, Bureau of Motor Vehicles, Bureau of Freights and Rails, Bureau of Information Systems, Communication Office of Information Technology, and Press Office.

**PennDOT D1 Field Devices:** This element consists of Pennsylvania Department of Transportation Engineering District 1-0 field devices that are currently operated by the PennDOT D11 TMC and includes existing/future HAR, DMS, and de-icing bridge sprayers.

**PennDOT D10 County Maintenance Offices:** This element consists of Pennsylvania Department of Transportation Engineering District 10-0 County Maintenance Offices and stockpile locations in Butler, Armstrong, and Indiana Counties and includes personnel and existing/future systems that provide overall coordination and support for construction and routine maintenance on PennDOT roadways, traffic control and other resources for incidents, as well as management of construction and maintenance equipment.



**PennDOT D10 Field Devices:** This element consists of Pennsylvania Department of Transportation Engineering District 10-0-operated field devices and includes existing/future HAR, CCTV, rural crash avoidance systems, and DMS.

**PennDOT D10 TMC:** This element consists of the Pennsylvania Department of Transportation Engineering District 10-0 office in Indiana, PA responsible for Butler, Armstrong, and Indiana counties within the Region. The element includes personnel and existing/future systems that provide traffic management, incident/emergency response, as well as maintenance and construction coordination along PennDOT roadways. The existing District 10-0 ITS operations within the traffic unit will act as a District Transportation Management Center.

**PennDOT D10 Vehicles:** This element consists of Pennsylvania Department of Transportation Engineering District 10-0-operated vehicles and includes field personnel and existing/future in-vehicle systems within routine construction and maintenance vehicles.

**PennDOT D11 County Maintenance Offices:** This element consists of Pennsylvania Department of Transportation Engineering District 11-0 County Maintenance Offices and stockpile locations in Lawrence, Beaver, and Allegheny Counties, as well as the tunnels organization office. The element includes personnel and existing/future systems that provide overall coordination and support for construction and routine maintenance on PennDOT roadways, traffic control and other resources for incidents, and management of construction and maintenance equipment. In the future, county maintenance offices will communicate directly with District 11-0 field devices to provide traveler information.

**PennDOT D11 Field Devices:** This element consists of Pennsylvania Department of Transportation Engineering District 11-0-operated field devices and includes existing/future, traffic detectors, CCTV, HOV lane management devices, RWIS, HAR, and DMS.



**PennDOT D11 Remote Traveler Support:** This element consists of Pennsylvania Department of Transportation Engineering District 11-0-operated remote traveler information and support systems and includes future deployment of public kiosks displaying multi-modal traveler information.



**PennDOT D11 RTMC:** This element consists of the Pennsylvania Department of Transportation Engineering District 11-0 Office, in Bridgeville, PA responsible for Lawrence, Beaver, and Allegheny counties within the Region. The element includes personnel and existing/future systems housed in the Pittsburgh Regional TMC office wing, which manages traffic and emergencies, and provides traveler information; the district maintenance and construction units, which manage construction and maintenance activities and provide traveler information; and the traffic management unit, which monitors traffic signals.

**PennDOT D11 Vehicles:** This element consists of Pennsylvania Department of Transportation Engineering District 11-0-operated vehicles and includes personnel and existing/future systems within highway service patrol vehicles and routine construction and maintenance vehicles.



**PennDOT D12 County Maintenance Offices:** This element consists of Pennsylvania Department of Transportation Engineering District 12-0 County Maintenance Offices and stockpile locations in Washington, Greene, Westmoreland, and Fayette counties and includes personnel and existing/future systems that provide overall coordination and support for construction and routine maintenance on PennDOT roadways, traffic control and other resources for incidents, as well as management of construction and maintenance equipment.

**PennDOT D12 Field Devices:** This element consists of Pennsylvania Department of Transportation Engineering District 12-0-operated field devices and includes existing/future HAR, DMS, CCTV, fog detection, truck detection/signal preemption system, and truck rollover systems.

**PennDOT D12 TMC:** This element consists of Pennsylvania Department of Transportation Engineering District 12-0 existing office in Uniontown, PA responsible for Washington, Greene, Westmoreland, and Fayette counties. The element includes personnel and existing/future systems that provide traffic management, incident/emergency response, and maintenance and construction coordination along PennDOT roadways.

**PennDOT D12 Vehicles:** This element consists of Pennsylvania Department of Transportation Engineering District 12-0-operated vehicles and includes field personnel and existing/future in-vehicle systems within routine construction and maintenance vehicles.

**PennDOT STMC:** A potential future PennDOT transportation management center for providing statewide coordination and operations. The STMC is based on the latest PennDOT Statewide Transportation Management Approach and will be located in Harrisburg and provide (1) traffic, incident, and emergency management operations and (2) will be a collection/distribution point for traveler information data throughout the entire state of Pennsylvania. Additionally, the PennDOT STMC will be responsible for (1) coordinating PennDOT statewide operations, (2) coordinating among Districts and adjacent states, (3) coordinating with other state agencies (PSP, PTC, and PEMA), (4) performing political and public relations, (5) coordinating weather events, and (6) commercial vehicle operations.

**Pennsylvania Office of Homeland Security:** State-level department responsible for coordination of activities between other state agencies involved in security and threat management. Appropriate communications and management systems are still under development.



**Personal Traveler Information Devices:** This element consists of Personal Traveler Information Devices owned by the general public used to access and provide transportation information. Personal Traveler Information devices include personal computers, phones (including cell phones for reporting incidents and retrieving travel conditions en-route), and personal digital assistants (PDA's).

**Port Facilities:** This element consists of privately-operated receiving and shipping facilities at river terminals within the region. The element includes personnel and future systems located at intermodal river terminals that provide traffic conditions and other traveler information to freight haulers leaving ports and entering the highway system.

**Port of Pittsburgh Commission Office:** This element consists of the Port of Pittsburgh Commission management office located in downtown Pittsburgh and includes personnel and systems that provide emergency coordination with other agencies as well as future systems that may collect and distribute current roadway conditions to privately-operated river terminals serving the Port of Pittsburgh.



**PSP Offices:** Includes the (1) Pennsylvania State Police Headquarters located in Harrisburg Pennsylvania, (2) existing barracks, and (3) existing/future Consolidated Dispatch Centers. PSP Offices represent public safety systems that support incident management, disaster response and evacuation, security monitoring, disseminating incident information and other security and public safety-oriented ITS applications.

PSP Offices utilize several existing and future systems including mobile data terminals (MDT's) and IIMS. MDT's are used to communicate and dispatch PSP vehicles. MDT's are currently being integrated with other state agencies now (i.e. PEMA) and municipal agencies in the future. Additionally, PSP Offices interface with other Emergency Management agencies to support coordinated emergency response. The IIMS is an all exclusive system performing dispatch and reporting functions throughout the Region and state.

**PSP Troop T Highspire:** Existing Pennsylvania State Police Troop T barracks currently dispatch PSP units on the Pennsylvania Turnpike. PSP Troop T Dispatch Centers represent public safety systems that support incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications for the Pennsylvania Turnpike.

**PSP Troop T Vehicles:** All existing/future systems within Pennsylvania State Police vehicles Troop T vehicles. In-vehicle systems include voice communications and mobile data terminals (MDT's) used by the vehicles to communicate and receive dispatch information from PSP and other agencies' systems. MDT's are currently being integrated with other state agencies (i.e., PEMA) and will be integrated with municipal agencies in the future.



**PSP Vehicles:** All existing/future systems within Pennsylvania State Police vehicles. In-vehicle systems include voice communications and mobile data terminals (MDT's) used by the vehicles to communicate and receive dispatch information from PSP and other agency systems. MDT's are currently being integrated with other state agencies (i.e., PEMA) and will be integrated with municipal agencies in the future.

**PTC Field Devices:** Existing and future Pennsylvania Turnpike Commission Field Devices located within the Region. This element encompasses existing/future traffic

detectors, HAR, RWIS, DMS, CCTV cameras, over-height vehicle detection systems, call boxes, truck rollover warning systems (TRWS), and other field devices distributed on and along the roadway that monitor, control, and manage traffic.

**PTC Maintenance and Construction Vehicles:** Pennsylvania Turnpike Commission-operated in-vehicle systems that perform maintenance and construction operations along the Turnpike. Includes existing/planned in-vehicle systems on snowplows and other vehicles for communicating with dispatch centers and tracking maintenance activity.

**PTC Offices:** The Pennsylvania Turnpike Commission Offices consist of systems housed at the Operations Control Center, located in Harrisburg, as well as at all other offices/towers along the Turnpike. The PTC Offices' element serves as the focal point for Turnpike emergency management, traffic management, maintenance and construction management, toll administration, traveler information, and other activities associated with the Pennsylvania Turnpike.



- PTC Offices support incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications along the Turnpike. It interfaces with other emergency management agencies to support coordinated emergency response.
- Traffic management operations performed by the PTC Offices include monitoring and controlling traffic and the road network. The PTC Offices also coordinate traffic information and control strategies with neighboring agencies, including PennDOT and adjacent states.
- PTC Offices are responsible for monitoring and managing Turnpike roadway infrastructure construction and maintenance activities. The offices also manage equipment at the roadside, including environmental sensors (RWIS), and the repair and maintenance of both non-ITS and ITS equipment.
- PTC Offices also provide toll administration capabilities. Functions include general payment administration and the electronic transfer of authenticated funds from the customer to the Pennsylvania Turnpike Commission.

**PTC Service Plazas:** Existing/future systems housed in Pennsylvania Turnpike Commission-operated plazas along the Turnpike. Currently providing traveler information, this is fed by PTC Offices to the Service Plazas using scrolling message boards.



**PTC Toll Plazas:** Existing/future Pennsylvania Turnpike Commission-operated systems/equipment located at tolling plazas. PTC Toll plazas encompass E-Z Pass electronic toll capabilities, ticketed systems, archived toll data, and E-Z Pass video enforcement systems. CVO credentialing at PTC Toll Plazas is planned for the future.



**Regional Media Outlets:** This element consists of existing/future personnel and systems housed at regional television, newspaper, and radio offices that collect, process, store, and/or disseminate transportation information to the traveling public. Regional Media provides information on basic advisories, traffic and road conditions, ridesharing, construction, transit schedules, and parking to the general public.

**Regional Personal Traveler Cards:** This element consists of existing/future regional fare/travel card owned by the general public. Existing parking meter payment cards are being used in downtown Pittsburgh. Future regional fare cards will be compatible with BCTA, PAAC, and other regional transit agency systems to facilitate transit fare payment for multiple transit providers using one card, as well as park-n-ride lots, rideshare services, and ACAA airport parking lots.

**Regional Transit Agency Offices:** This element consists of all transit agency offices in the region, excluding the BCTA and PAAC, which manage fixed-route and paratransit transit operations. The element includes systems and personnel that provide centralized transit and emergency management and vehicle maintenance.

**Regional Transit Vehicles:** This element consists of all transit agency vehicles and in-vehicle systems in the region, excluding the BCTA and PAAC, and includes drivers and in-vehicle systems that provide existing/future driver-to-dispatch communications, automated payment, transit signal priority, automated passenger count, AVL, as well as vehicle maintenance and diagnostics tracking.

**Regional Travel Information System:** This element consists of a future regional traveler information system to be deployed by one or more agencies within the Region. The system may include a common regional traveler scheduling information system or traveler information website for "one stop trip planning". Information that can be collected, processed, and distributed includes incident locations and anticipated delays, transit schedules and current vehicle adherence, traffic congestion, maintenance/construction schedules and delays, emergency and travel advisories, weather and road surface conditions, tourism, rideshare and commuting services, parking and special events, as well as general travel times and suggested routes.

**SPC Office:** This element consists of ridesharing and planning (data archiving) operations administered by the Southwestern Pennsylvania Planning Commission

(SPC). Existing/future SPC ridesharing services include a website and other operations to match commuters for carpooling, provide vans for vanpooling, as well as provide information about transit, bicycling, traffic conditions, and other commuting options.

**TMA Offices:** This element consists of Transportation Management Associations who administer rideshare and carpooling programs. The element includes the Airport Corridor Transportation Association (ACTA), the Pittsburgh Downtown Partnership, and the Oakland Transportation Management Association.

**Towing Industry Responders:** This element consists of privately-owned wrecker companies operating in the Region and their corresponding vehicles responsible for the towing and cleanup of traffic incidents.

### **3.2 Systems Inventory**

Using existing documentation, ITS systems in the Region — both existing and planned — were identified. The inventory is presented in tabular format by agency. The information presented here provides traceability from the systems projects initially entered into the Architecture. Because the Architecture is a “living” document, this section will need to be updated as time passes. Projects are grouped into three categories: *Existing*, *Planned 1*, and *Planned 2*. As noted previously, *Planned 1* projects refer to efforts that are currently programmed or funded, whereas *Planned 2* projects are neither funded nor programmed.

**Table 3-1: Regional Systems Inventory**

Element	Stakeholder	Functionality	Status	Associated Project(s)
911 Communication Centers	Counties	The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers	Planned 1	<ul style="list-style-type: none"> <li>800 MHz Statewide Communication System Regional Expansion</li> <li>County/Municipal PSAP/911 Centers</li> <li>District 11 Camera Image Sharing</li> </ul>
		PTC plans to share CCTV camera images with D11, State Police, emergency management, and others	Planned 2	
		Allegheny County 911 and EMA have need for current traffic information and flow from City of Pittsburgh and PennDOT D11 RTMC	Planned 2	
		Allegheny County EMA will eventually get video from D11 RTMC, maybe control	Planned 1	
		Roadway incident notification to the County and Municipal 911 centers comes from public phone calls and State Police Dispatch, PennDOT Offices, or PTC Office if local jurisdiction services are needed on the scene	Existing	
		A GIS system is currently being developed in Allegheny County EMA Center and will be linked to the CAD system in the future. GIS mapping will provide incident location, as well as primary and alternate routing to public service vehicles headed to an incident	Planned 1	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		911 communication centers will typically get a hold of the PennDOT County Maintenance Office for resource requests, rather than through the PennDOT District office. PennDOT District office is typically only informed of incident if multi county/district	Existing	
		County/Municipal 911 centers are contacted by field command to dispatch specialty services and vehicles, such as wreckers and hazmat teams	Existing	
		Allegheny County has a portable Motorola "COW" system that provides a short range voice communications on system radios handed out to responders at incident scene	Existing	
		There is a need to integrate wireless enhanced 911 geo-location data from cell-phones so that callers/incidents can be more accurately located on dispatch GIS mapping systems	Planned 2	
		County 911 centers archive voice and CAD system communications and provide voice archives for municipal ring down centers	Existing	
ACAA Field Devices	Allegheny County	ACAA plans to install DMS for traveler information	Planned 1	<ul style="list-style-type: none"> <li>ACAA Parking</li> </ul>

Element	Stakeholder	Functionality	Status	Associated Project(s)
	Airport Authority	ACAA airport parking lots will have automated payment collection from vehicle tags or traveler cards	Planned 2	<ul style="list-style-type: none"> <li>Management</li> <li>ACAA Dynamic Message Signs</li> </ul>
ACAA Office	Allegheny County Airport Authority	Allegheny County Airport Association manages parking facilities at the Pittsburgh International Airport	Existing	<ul style="list-style-type: none"> <li>ACAA Dynamic Message Signs</li> <li>ACAA Parking Management</li> </ul>
		BCTA plans on coordinating airport parking data	Planned 2	
		ACAA parking management presents current parking lot information (full/open) via its website	Existing	
		ACAA plans to install DMS for traveler information	Planned 1	
		ACAA communicates directly with PennDOT D11 HAR device	Existing	
Adjacent PennDOT District and County Offices	Pennsylvania Department of Transportation (PennDOT)	PennDOT D11-0 currently gets faxed weather bulletins from PennDOT D1-0 with info from I-79 weather stations. Weather info is then relayed to D1-0 HAR radios	Existing	<ul style="list-style-type: none"> <li>District 11 Pittsburgh Regional Traffic Management Center (RTMC)</li> <li>District 12 Traffic Management Center (TMC)</li> </ul>
		PennDOT D10 currently coordinates operations with D9, D2, D1, D11, and D12 offices	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Assumes control of adjacent District ITS devices during off-peak periods	Planned 1	<ul style="list-style-type: none"> <li>District 10 Traffic Management Center (TMC)</li> </ul>
		Proactive incident/congestion management (24x7 operations)	Planned 2	
		PennDOT D12 Office currently coordinates incident and traffic management operations with adjacent PennDOT D11, D12, and D9 offices, as well as county maintenance offices in adjacent PennDOT Districts	Existing	
		PennDOT D2 RTMC to control field devices in PennDOT D10 counties along I-80	Planned 1	
BCTA Remote Traveler Support	Beaver County Transit Authority (BCTA)	BCTA plans to deploy security monitoring cameras at bus stops and other BCTA-operated facilities	Planned 1	<ul style="list-style-type: none"> <li>BCTA Remote Traveler Information Systems</li> <li>Regional Transit Electronic Fare Collection</li> <li>Regional Transit Schedule Coordination</li> </ul>
		BCTA has major bus stops that electronically display dynamic traveler information	Existing	
		Plans for transit fare payment or debit increase at kiosks using regional fare cards	Planned 2	
BCTA Transit	Beaver County Transit	Paratransit vehicles that operate under CAD	Existing	<ul style="list-style-type: none"> <li>Regional Transit Schedule</li> </ul>

Element	Stakeholder	Functionality	Status	Associated Project(s)
Management Center	Authority (BCTA)	BTCA installation of county-wide GIS map and vehicle tracking	Planned 1	<ul style="list-style-type: none"> <li>Coordination</li> <li>Regional Transit Electronic Fare Collection</li> <li>Regional Traveler Information System</li> <li>District 11 Camera Image Sharing Expansion</li> <li>BCTA AVL</li> <li>BCTA Central Dispatch Software</li> <li>BCTA Automated Reservation System</li> <li>BCTA Remote Traveler Information Systems</li> </ul>
		BCTA would like to tie into D11 system for traffic, weather, flow speeds, conditions	Planned 2	
		BCTA will provide real-time schedule adherence and arrival/ departure time information through web sites, kiosks, email and out of vehicle DMS at stops	Planned 1	
		BCTA operators or dispatchers report transit vehicle and general traffic incidents, as reported by drivers.	Existing	
		BCTA has some real-time monitoring of vehicles	Existing	
		BCTA has paratransit scheduling software	Existing	
		BCTA has a need for coordinating bus adherence with other agencies at multi-carrier transfers	Planned 2	
		BCTA use of database with storage of data and support of the Passenger Information System	Planned 1	
		The BCTA ATIS will eventually include multi-modal/multi-carrier information from other transit operators, as well as current highway information	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		The PAAC and BCTA transit management offices have need for traffic flow and road information from the City of Pittsburgh TMC	Planned 2	
		BCTA use of Real-Time Traveler Information Services	Planned 1	
		BCTA collection of automated driver logs	Planned 1	
		BCTA vehicle safety monitoring through surveillance, communications, and silent alarms, images go to dispatch	Planned 1	
		BCTA use of Real-Time Fleet Monitoring	Planned 1	
		BCTA use of Computer Aided Dispatch and Scheduling	Planned 1	
		BCTA workstations will monitor AVL for schedule adherence, voice and data communication	Planned 1	
		BCTA automated phone system for reservations	Existing	
		Existing Beaver County Traveler Information System (BCTIS)	Existing	



Element	Stakeholder	Functionality	Status	Associated Project(s)
		Communications within Mobility Manager: vehicle location and speed, passenger count, fare transactions, unscheduled stop reporting, silent alarm, next stop data	Planned 1	
		BCTA plans on coordinating airport parking data	Planned 2	
		BCTA has a static estimated trip planner	Existing	
		Garages currently downloading maintenance records, diagnostics, and schedules from vehicles	Existing	
		BCTA plans to deploy security monitoring cameras at bus stops and other BCTA-operated facilities	Planned	
		BCTA Transit drivers provide emergency notification to BCTA transit management operators	Existing	
		BCTA incident reporting: from driver to dispatch to employee of authority and 911 dispatch	Existing	
BCTA Transit Vehicles	Beaver County Transit Authority (BCTA)	BCTA operators or dispatchers report transit vehicle and general traffic incidents, as reported by drivers	Existing	<ul style="list-style-type: none"> <li>Transit Vehicle Traffic Signal Priority</li> <li>Regional Transit Electronic Fare Collection</li> </ul>
		BCTA has vehicles with magnetic stripe readers for fare payment	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		BCTA has vehicles with AVL	Existing	<ul style="list-style-type: none"> <li>• BCTA Electronic Fare Collection</li> <li>• BCTA Traffic Signal Priority</li> <li>• BCTA AVL</li> </ul>
		BCTA has vehicles with Automatic Passenger Counters	Existing	
		Garages currently downloading maintenance records, diagnostics, and schedules from vehicles	Existing	
		BCTA use of van shuttles with advance and real-time reservations	Planned 1	
		BCTA plans to have vehicles with traffic signal priority	Planned 1	
		BCTA will provide real-time schedule adherence and arrival/ departure time information through automated telephone system, in-vehicle DMS and audible enunciators	Planned 1	
		BCTA has vehicles with automated dispatching or control software	Existing	
		BCTA workstations monitor AVL for schedule adherence, voice and data communication	Planned 1	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		BCTA Transit drivers provide emergency notification to BCTA transit management operators	Existing	
		BCTA has vehicles equipped with mobile data terminals	Existing	
		BCTA plans to have vehicles with smart card readers	Planned 1	
		Fixed route transit vehicles with AVL	Existing	
		Paratransit vehicles that operate under CAD	Existing	
		BCTA use of In-Vehicle Route Guidance	Planned 1	
		BCTA Electronic Fare Collection, "smart" cards	Planned 1	
		Fixed route buses accepting electronic payment, single use card that is discarded when value is used	Existing	
City of Pittsburgh Field Devices	City of Pittsburgh	There is the potential for the city of Pittsburgh Parking Management to communicate with city owned devices to relay current parking conditions	Planned 2	<ul style="list-style-type: none"> <li>Automated Payment Parking Meters</li> </ul>

Element	Stakeholder	Functionality	Status	Associated Project(s)
		There is a need to have City of Pittsburgh signal priority for PAAC buses	Planned 2	<ul style="list-style-type: none"> <li>Emergency Vehicle Traffic Signal Preemption</li> <li>Transit Vehicle Traffic Signal Priority</li> <li>BCTA Traffic Signal Priority</li> <li>City of Pittsburgh Traffic Management System</li> </ul>
		The city allows for signal priority for transit vehicles at some intersections	Existing	
		City of Pittsburgh Parking Authority has parking meters that accept payment via payment card	Existing	
		City of Pittsburgh traffic office plans on CCTV surveillance of roads	Planned 2	
		The city operates signals under closed or central loop control	Existing	
		PennDOT D11 HOV devices automatically notify city of Pittsburgh signal devices when HOV lanes are opened. This causes signal timing patterns to adjust.	Existing	
City of Pittsburgh Parking Authority Offices	City of Pittsburgh	There is the potential for the city of Pittsburgh Parking Management to communicate with city owned devices to relay current parking conditions	Planned 2	<ul style="list-style-type: none"> <li>Regional Traveler Information System</li> <li>City of Pittsburgh Downtown Parking Management</li> </ul>
		Possible City of Pittsburgh Parking Management as stakeholder in the regional smart card initiative	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		City of Pittsburgh Parking Administration currently coordinates event and parking operations with PennDOT D11 RTMC	Existing	
		City of Pittsburgh Parking Authority Offices provide traffic and event information to local media and other information service providers	Existing	
City of Pittsburgh Traffic Management Center	City of Pittsburgh	Traffic count information from arterial street locations	Planned 1	<ul style="list-style-type: none"> <li>District 11 Camera Image Sharing</li> <li>City of Pittsburgh Traffic Management System</li> </ul>
		The city coordinates changes to timing plans with other agencies	Existing	
		Signalized intersections under centralized or closed loop control	Existing	
		City of Pittsburgh traffic office plans on CCTV surveillance of roads	Planned 2	
		The PAAC and BCTA transit management offices have need for traffic flow and road information from the City of Pittsburgh TMC	Planned 2	
		Allegheny County 911 and EMA have need for current traffic information and flow from City of Pittsburgh and PennDOT D11 RTMC	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Port of Pittsburgh would be interested in acting as a hub for collecting and distributing current roadway conditions (for arterials, state roads, and turnpike) to freight drivers leaving various privately owned port facilities along rivers	Planned 2	
		City of Pittsburgh traffic office provides information to local media about traffic, maintenance, and construction events	Existing	
		The city plans to have electronic data collection capabilities at intersections, using loop detectors	Planned 1	
		City of Pittsburgh receives archived data from Mobility Technologies	Existing	
Commercial Vehicle Company Offices	Commercial Vehicle Companies	Provides the PennDOT Motor Carrier Division with appropriate credentials, registration, and title fees	Existing	<ul style="list-style-type: none"> <li>• Private Carrier Commercial Vehicle Tracking System</li> <li>• Private Carrier Fleet Maintenance Management</li> <li>• FHWA Carrier Compliance Review</li> </ul>
		Provides vehicle tracking of Commercial Vehicles	Existing	
		Provides capabilities to track cargo and freight	Existing	
		Provides capabilities to generate preventative maintenance schedule based on the vehicle miles traveled determined using vehicle tracking	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Provides appropriate transportation and emergency agencies with hazmat and emergency information	Existing	
Commercial Vehicles	Commercial Vehicle Companies	Monitors adherence to the PennDOT Motor Carrier Division weight and safety enforcement activities	Existing	<ul style="list-style-type: none"> <li>Private Carrier Commercial Vehicle Tracking System</li> <li>Private Carrier Fleet Maintenance Management</li> <li>FHWA Carrier Compliance Review</li> </ul>
		Supports devices to communicate with Commercial Vehicle Company Offices. May include the addition of a cell-based radio and equipment	Existing	
		Offers the capability for Commercial Vehicle Offices to track vehicles using automatic vehicle location (AVL) systems and to monitor the movement of cargo and freight	Existing	
County EMA Centers	Counties	The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers	Planned 1	<ul style="list-style-type: none"> <li>District 11 Camera Image Sharing</li> <li>Regional Traveler Information System</li> <li>800 MHz Statewide Communication System Regional Expansion</li> </ul>
		PennDOT BHSTE coordinates with PEMA and other agencies (PennDOT Districts, PSP, County EMA's, etc.) in case of major incidents	Existing	
		PEMA gathers/provides specific incident information from/to County EMA's, PA State Police, PennDOT, and PTC	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		County EMA Centers contact PSP when incidents occur on state roadways	Existing	
		A GIS system is currently being developed in Allegheny County EMA Center and will be linked to the CAD system in the future. GIS mapping will provide incident location, as well as primary and alternate routing to public service vehicles headed to an incident	Planned 1	
		Allegheny County 911 and EMA have need for current traffic information and flow from City of Pittsburgh and PennDOT D11 RTMC	Planned 2	
		Any PEMA contact with on-site field officers is through the County EMA's	Existing	
		Allegheny County EMA will eventually get video from D11 RTMC, maybe control	Planned 1	
		PTC may contact the County EMA if they receive the initial call and dispatch of municipality public service vehicles is needed	Existing	
		County EMA centers contact PennDOT District offices for some incidents along state roadways	Existing	



Element	Stakeholder	Functionality	Status	Associated Project(s)
		PTC plans to share CCTV camera images with D11, State Police, various emergency management agencies, and others	Planned 2	
High Threat Facilities	Various Stakeholders	Major facilities that require special security and/or emergency response coordination	Existing	
		Report high threat facility information to 911 Communication and EMA Centers	Existing	
Mobility Technologies ATIS Administration	Mobility Technologies	SPC plans to manage regional transit information, as well as ridesharing and other demand management through ATIS deployments	Planned 2	<ul style="list-style-type: none"> <li>Regional Traveler Information System</li> <li>Mobility Technologies Traffic Monitoring</li> <li>Mobility Technologies Traveler Information Collection/Distribution</li> <li>District 11 Camera Image Sharing Expansion</li> </ul>
		PTC plans to share CCTV camera images with D11, State Police, various emergency management agencies, and others	Planned 2	
		City of Pittsburgh receives archived data from Mobility Technologies	Existing	
		ATIS measures actual speeds by lane, lane occupancy, vehicle characteristics, geo-located event and incident identification	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Mobility Technologies is currently collecting and distributing CCTV images from their devices. These are distributed to media.	Existing	
		District 11-0 Traffic Office currently uses Mobility Technologies' archived traffic detection data for planning and other purposes	Existing	
		Mobility Technologies currently has its own operator personnel and interface workstation in D11 RTMC. Operator can view and input information into Mobility Technologies' system, as well as view and control some devices using D11 system. Likewise, D11 staff can gain information residing within Mobility Technologies' system workstation at the RTMC.	Existing	
		Mobility Technologies may be interested in collecting and distributing roadway weather information	Planned 2	
		Archives detector data extensively	Existing	
		Mobility Technologies wants D11 RTMC camera images	Planned 2	
		TV stations get current traffic flow info from web-based service	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Mobility Technologies raw traffic data will be sent to D11 RTMC to be used in incident detection algorithms	Planned 2	
		Web-based "traffic pulse network" map provides color indicating traffic flows	Existing	
		Information is sent to radio stations from Mobility Technologies	Existing	
		Mobility Technologies will likely have need for detailed/advanced construction information from D11 in future	Planned 2	
		MT provides travel times along parkways into city	Existing	
		Plans to exchange raw traffic data between Mobility Technologies and D11	Planned 1	
Mobility Technologies Field Devices	Mobility Technologies	Mobility Technologies may be interested in collecting and distributing roadway weather information	Planned 2	<ul style="list-style-type: none"> <li>Mobility Technologies Traffic Monitoring</li> </ul>
		Mobility Technologies has ISO detectors in field that are supposed to comply with ITS Architecture	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Mobility Technologies is currently collecting and distributing CCTV images from their devices. These are distributed to media.	Existing	
Municipal Field Devices	Municipalities	Some municipalities can communicate with field devices via dial-up connection	Existing	<ul style="list-style-type: none"> <li>• Remote Traffic Signal Control and Monitoring Systems</li> <li>• BCTA Traffic Signal Priority</li> <li>• Emergency Vehicle Traffic Signal Preemption</li> <li>• Transit Vehicle Traffic Signal Priority</li> </ul>
		Emergency vehicle preemption exists in some municipalities as vehicle to field device communication	Existing	
		Consideration is given to the concept of a "central command post" for regional municipal systems to remotely monitor devices and change timings	Planned 2	
		BCTA plans to have vehicles with traffic signal priority	Planned 1	
		PennDOT D11 traffic office has communication capability with municipal traffic control devices, which is used almost exclusively for monitoring purposes	Existing	
		Butler County and other Regional Transit Agencies plan on deploying transit signal priority systems in near to far future	Planned	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Cranberry Township currently monitors intersections using video detection cameras	Existing	
		Local municipalities are currently archiving traffic data from field devices for things like volume and flow	Existing	
		Municipalities generally have operations including basic device monitoring for maintenance purposes, "resetting" of controllers, verification of malfunction reports, and any timing changes	Existing	
Municipal Public Safety Offices	Municipalities	The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers	Planned 1	<ul style="list-style-type: none"> <li>800 MHz Statewide Communication System Regional Expansion</li> </ul>
		PFD dispatch center distributes road closures to vehicles	Existing	
		PFD dispatch has a direct contact with PSP	Existing	
		Dispatch for local public vehicles goes from the County/Municipal EMA center directly to the local municipality vehicles	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		A significant number of municipalities in Allegheny County answer 911 calls and dispatch their own vehicles for incidents in their localities. Outside Allegheny County is typically all handled by the County EMA 911 center.	Existing	
		PHPD shares real-time traffic incident information with other law enforcement agencies and fire and rescue agencies	Existing	
		PAAC police force coordinates with State Police and local emergency management	Existing	
		PFD shares real-time traffic incident information with other fire/rescue agencies and local law enforcement agencies	Existing	
		PennDOT District offices will coordinate event traffic operations with local police	Existing	
		Regarding incident management, 911 calls are taken at the County EMA who dispatches state and local police	Existing	
		PTC may contact the County EMA if they receive the initial call and dispatch of municipality public service vehicles is needed	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		County 911 centers archive voice and CAD system communications and provide voice archives for municipal ring down centers	Existing	
		PFD distributes major event notification to PEMA	Existing	
		Allegheny County Police patrol airport parking facilities	Existing	
Municipal Public Safety Vehicles	Municipalities	PFD has vehicles with traffic signal system communication	Existing	<ul style="list-style-type: none"> <li>• 800 MHz Statewide Communication System Regional Expansion</li> <li>• Emergency Vehicle Traffic Signal Preemption</li> </ul>
		The City of Pittsburgh public safety plans to have newly installed MDT's in vehicles	Planned 1	
		Dispatch for local public vehicles goes from the County/Municipal EMA center directly to the local municipality vehicles	Existing	
		Emergency management vehicles under CAD	Existing	
		Emergency vehicle preemption exists in some municipalities as vehicle to field device communication	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers	Planned 1	
		PHFD has vehicles that operate under a CAD system	Existing	
		A GIS system is currently being developed in Allegheny County EMA Center and will be linked to the CAD system in the future. GIS mapping will provide incident location, as well as primary and alternate routing to public service vehicles headed to an incident.	Planned 1	
		PennDOT County Maintenance Offices coordinate with local police in field for scene traffic management	Existing	
		Emergency management vehicles with on-vehicle navigation capabilities	Planned 2	
		PFD dispatch center distributes road closures to vehicles	Existing	
		Any PEMA contact with on-site field officers is through the County EMA's	Existing	
		PPD has vehicles that operate under a CAD system	Existing	



Element	Stakeholder	Functionality	Status	Associated Project(s)
		A significant number of municipalities in Allegheny County answer 911 calls and dispatch their own vehicles for incidents in their localities. Outside Allegheny County is typically all handled by the County EMA/911 Center	Existing	
Municipal Traffic Management Offices	Municipalities	Some municipalities can communicate with field devices via dial-up connection	Existing	<ul style="list-style-type: none"> <li>Remote Traffic Signal Control and Monitoring Systems</li> </ul>
		Cranberry Township currently monitors intersections using video detection cameras	Existing	
		Consideration is given to the concept of a "central command post" for regional municipal systems to remotely monitor devices and change timings.	Planned 2	
		Municipalities generally have operations including basic device monitoring for maintenance purposes, "resetting" of controllers, verification of malfunction reports, and any timing changes	Existing	
		PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		There is a general need for coordinating PennDOT detour routes and timing plans with municipalities	Planned 2	
		Local municipalities are currently archiving traffic data from field devices for things like volume and flow	Existing	
PAAC Centers	Port Authority of Allegheny County (PAAC)	Rail OCC controls signals, traffic system, SCADA, tunnel controls and radio	Existing	<ul style="list-style-type: none"> <li>Port Authority of Allegheny County Interactive Trip Planning</li> <li>Regional Transit Schedule Coordination</li> <li>Regional Traveler Information System</li> <li>District 11 Camera Image Sharing Expansion</li> <li>Regional Transit Electronic Fare Collection</li> <li>Port Authority of Allegheny County Remote Traveler Information Systems</li> <li>Port Authority of Allegheny</li> </ul>
		PAAC would like to station an employee at the PennDOT D11 RTMC, similar to the MT positions	Planned 2	
		PAAC would like to display travel times of highway vs. transit on PennDOT D11 DMS	Planned 2	
		PAAC has installed some new "IVAN" boxes the performs in-vehicle diagnostics and information is downloaded at the garages	Existing	
		CCTV surveillance of transit facilities	Existing	
		BCTA, PAAC and Westmoreland would have need for regional fare card	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		ROCC currently receives emergency signal from subway vehicles	Existing	County Vehicle Tracking <ul style="list-style-type: none"> <li>Port Authority of Allegheny County Central Dispatch Software</li> </ul>
		PAAC Garages plan to download fare and passenger count data from vehicles	Existing	
		PAAC archives ridership data	Existing	
		PAAC TCC will coordinate parking and traffic management with Park-n-Ride lots	Planned 2	
		Improve interactive voice response system to better recognize non-native speakers and the elderly	Planned 1	
		Pager/ PDA messaging to provide users with bus or train arrival time or more advanced GPS location determination and automated fare payment	Planned 1	
		PAAC rail stations have and monitor CCTV cameras	Existing	
		PAAC garages house police centers where CCTV cameras are monitored from	Existing	
		PAAC operators or dispatchers report traffic incidents	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PAAC police force coordinates with State Police and local emergency management	Existing	
		PAAC archives ridership data	Existing	
		Internet availability of bus schedules, route information and multiple ride ticket sales	Existing	
		The PAAC and BCTA transit management offices have need for traffic flow and road information from the City of Pittsburgh TMC	Planned 2	
		PAAC Rail Operations Center tracks all rail vehicles with AVL	Existing	
PAAC Remote Traveler Support	Port Authority of Allegheny County (PAAC)	Use kiosks for fare card value increases	Planned 1	<ul style="list-style-type: none"> <li>Port Authority of Allegheny County Remote Traveler Information Systems</li> <li>Regional Traveler Information System</li> <li>Regional Transit Electronic Fare Collection</li> <li>Regional Transit Schedule Coordination</li> </ul>
		PAAC plans light rail stations with magnetic stripe card readers and smart card readers	Planned 1	
		PAAC would like to develop and maintain a kiosk network between for transit, D11 and the airport as a regional traveler information clearinghouse	Planned 2	
		Plans for transit fare payment or debit increase at kiosks using regional fare cards	Planned 1	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PAAC garages house police centers where CCTV cameras are monitored	Existing	
		Internet kiosks in public areas to provide transit information to users	Planned 2	
		Display real-time arrival information at bus stops and train stations	Planned 1	
PAAC Transit Vehicles	Port Authority of Allegheny County (PAAC)	PAAC Rail Operations Center tracks all rail vehicles with AVL	Existing	<ul style="list-style-type: none"> <li>Port Authority of Allegheny County Vehicle Tracking</li> <li>Transit Vehicle Traffic Signal Priority</li> </ul>
		PAAC has buses with traffic signal priority	Existing	
		Rail OCC controls signals, traffic system, SCADA, tunnel controls and radio	Existing	
		Plans to download fare and passenger count data from vehicles	Existing	
		Ability to display and record vehicles running off-route or off-schedule	Planned 1	
		AVL devices on transit vehicles for on-time studies	Planned 1	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Smart-card fare system planned fare boxes for Port Authority buses and trolleys	Planned 1	
		AVL/ GPS system for buses	Planned 1	
		Demand responsive scheduling and reservation system	Planned 1	
		PAAC has installed some new "IVAN" boxes the performs in-vehicle diagnostics and information is downloaded at the garages	Existing	
		PAAC ROCC is currently tracking location of subway trains.	Existing	
		Widespread traffic signal prioritization for bus lines	Planned 2	
		There is a need to have City of Pittsburgh signal priority for PAAC buses.	Planned 2	
		Transit in-vehicle video surveillance	Planned 1	
		Install automatic passenger counters in buses and rail cars	Planned 1	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		ROCC currently receives emergency signal from subway vehicles	Existing	
		Transit in-vehicle computer unit containing GPS receiver, interfaced with mobile radio unit	Planned 1	
Park-n-Ride Facilities	Various Stakeholders	PAAC TCC will coordinate parking and traffic management with Park-n-Ride lots	Planned 2	<ul style="list-style-type: none"> <li>Port Authority of Allegheny County Remote Traveler Information Systems</li> <li>Port Authority of Allegheny County Park-n-Ride Lot Operations</li> </ul>
		BCTA, PAAC, PennDOT, private companies, and other regional agencies plan, deploy, own, and/or operate Park-n-Ride Facilities within the Region currently, or in the future	Existing	
		PAAC Park-n-ride lots could be controlling D11 DMS signs to post current parking conditions	Planned 2	
		PAAC Park-n-Ride Lots will be collecting automatic payment from vehicle tags or traveler cards in future	Planned 2	
Passenger Vehicles	General Public	Provides the capability for vehicle operators to pay toll without stopping	Existing	<ul style="list-style-type: none"> <li>Pennsylvania Turnpike E-Z Pass Toll System</li> <li>ACAA Parking Management</li> </ul>
		PAAC Park-n-Ride Lots will be collecting automatic payment from vehicle tags or traveler cards in future	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		ACAA airport parking lots will have automated payment collection from vehicle tags or traveler cards	Planned 1	<ul style="list-style-type: none"> <li>City of Pittsburgh Downtown Parking Management</li> <li>Regional Transit Electronic Fare Collection</li> </ul>
PEMA Emergency Operation Center	Pennsylvania Emergency Management Agency (PEMA)	Notifies appropriate transportation and emergency agencies of any major disasters	Existing	<ul style="list-style-type: none"> <li>PEMA Emergency Operation Center</li> <li>PEMA Truck</li> <li>Pennsylvania Emergency Information Reporting System (PEIRS)</li> </ul>
		Coordinates with cooperating agencies in case of major disasters	Existing	
		Runs a statewide electronic database, Pennsylvania Emergency Information Reporting System (PEIRS) that collects information from all state agencies responding to incidents/emergencies statewide	Existing	
		PEMA gathers/provides specific incident information from/to County Emus, Pennsylvania State Police, PennDOT, and PTC	Existing	
		Gathers current and forecast road conditions and surface weather information from a variety of sources to monitor major natural disasters	Existing	
		Disseminates disaster information to the public	Existing	



Element	Stakeholder	Functionality	Status	Associated Project(s)
		Monitors alerting and advisory systems reported by other emergency agencies	Existing	
		Develops and stores emergency evacuation plans	Existing	
		Serves as one-point contact for all the coordinating agencies during emergencies	Existing	
		Provides incident command in case of a major event	Existing	
		Contacts on-site field officers through the County EMA agencies	Existing	
		Plans to control PTC DMS during emergencies	Planned 2	
PennDOT Central Office Field Devices	Pennsylvania Department of Transportation (PennDOT)	Monitors roadway weather conditions and provide PennDOT Central Office and County Maintenance Offices with RWIS data	Existing	<ul style="list-style-type: none"> <li>Roadway Weather Information System (RWIS)</li> <li>PennDOT Commercial Vehicle Information Systems and Networks (CVISN) Project</li> </ul>
		Collects Commercial Vehicle safety inspection and violations data	Existing	
PennDOT Central Office Organizations	Pennsylvania Department of Transportation	PennDOT BHSTE coordinates with PEMA and other agencies (PennDOT Districts, PSP, County EMA's, Transit agencies, etc.) in case of major incidents	Existing	<ul style="list-style-type: none"> <li>PennDOT Transportation Management Centers</li> </ul>

Element	Stakeholder	Functionality	Status	Associated Project(s)
	(PennDOT)	The PennDOT Central Office Press Office communicates traffic-related information to Regional Media Outlets		(TMC's)
		PennDOT (Motor Carrier Division) maintains commercial vehicle registrations	Existing	<ul style="list-style-type: none"> <li>• Winter Road Condition Hotline for Interstate Highways</li> </ul>
		CVO Supports the exchange of safety credential information across the jurisdictions	Existing	<ul style="list-style-type: none"> <li>• Roadway Weather Information System (RWIS)</li> <li>• PennDOT Commercial Vehicle Information Systems and Networks (CVISN) Project</li> </ul>
		CVO Supports the collection and review of carrier safety data and determines the carrier safety rating	Planned 1	<ul style="list-style-type: none"> <li>• PennDOT Performance and Registration Information Systems Management (PRISM)</li> </ul>
		PennDOT Motor Carrier Division conducts roadside commercial vehicle inspections	Existing	<ul style="list-style-type: none"> <li>• PennDOT Safety and Fitness Electronic Record (SAFER)</li> </ul>
		PennDOT Motor Carrier Division provides appropriate credentials to motor carriers as well as collecting necessary registration and title fees	Existing	<ul style="list-style-type: none"> <li>• PennDOT ITS Transportation Management Approach</li> </ul>
		PennDOT Motor Carrier Division conducts weight enforcement activities	Existing	<ul style="list-style-type: none"> <li>• Construction Projects (current and future)</li> </ul>
		PennDOT Bureau of Planning and Research owns and maintains Automatic Traffic Recorders throughout the state	Existing	<ul style="list-style-type: none"> <li>• Central Repository</li> <li>• Real -time Traffic Information Website</li> </ul>

Element	Stakeholder	Functionality	Status	Associated Project(s)
		RWIS data flows from the RWIS site to Central Office (BOMO) to a public website	Existing	<ul style="list-style-type: none"> <li>Statewide GIS based Incident Detour Map</li> <li>Video Sharing</li> <li>Web site Portal for Assisting Commercial Vehicle Operators</li> <li>Statewide Telecommunication</li> </ul>
		RWIS monitor roadway weather conditions and transfer information to PennDOT BOMO	Existing	
PennDOT D1 Field Devices	Pennsylvania Department of Transportation (PennDOT)	PennDOT District RWIS Stations currently transmit snapshot images of road conditions to PennDOT Central Office BOMO	Existing	<ul style="list-style-type: none"> <li>District 11 Pittsburgh Regional Traffic Management Center (RTMC)</li> </ul>
PennDOT D10 County Maintenance Offices	Pennsylvania Department of Transportation (PennDOT)	PennDOT D11 Office coordinates operations with District 10 and 12 County Maintenance Offices	Existing	<ul style="list-style-type: none"> <li>District 10 Traveler Information</li> </ul>
		911 communication centers will typically get a hold of the PennDOT County Maintenance Office for resource requests, rather than through the PennDOT District office. PennDOT District office is typically only informed of incident if multi county/district	Existing	
		Coordination between PSP Dispatch Centers and PennDOT County Maintenance Offices or District Offices happens for requesting salt, and other maintenance operations	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT D10 County Maintenance Offices provide construction and maintenance information on their websites	Existing	
		Recommends maintenance courses of action based on current and forecast environmental and road conditions	Existing	
		Receives environmental conditions information from various weather sources to aid in scheduling routine maintenance activities	Existing	
		PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices	Existing	
		PennDOT stockpile locations receive RWIS data for road maintenance operations, as well as coordinate snow removal operations with PennDOT District and County Maintenance Offices	Existing	
		County Maintenance Offices get RWIS information in real-time. Everyone else has to get the information from the public website. It takes approximately 1 hour for information to be published on the website	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Manages winter maintenance including snow plow operations	Existing	
		PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles	Existing	
		PennDOT County Maintenance Offices provide information about maintenance activities to local media	Existing	
		PennDOT D10 vehicles have computers that talk to the County Offices for snow removal and sprayer information	Existing	
		Monitors vehicle and equipment conditions, tracks maintenance history, and schedules routine and corrective maintenance	Existing	
		Provides overall management and support for routine maintenance on a roadway system or right-of-way	Existing	
PennDOT D10 Field Devices	Pennsylvania Department of	PennDOT D2 RTMC to control field devices in PennDOT D10 counties along I-80	Planned 1	<ul style="list-style-type: none"> <li>District 10 Traveler</li> </ul>

Element	Stakeholder	Functionality	Status	Associated Project(s)
	Transportation (PennDOT)	PennDOT Central Office Bureau downloads data from traffic counters in the field throughout the Region	Existing	Information <ul style="list-style-type: none"> <li>District 10 Collision Avoidance System</li> <li>District 10 Traffic Management Center (TMC)</li> </ul>
		Other pavement loop detectors in D10	Existing	
		PennDOT District RWIS Stations currently transmit snapshot images of road conditions to PennDOT Central Office BOMO	Existing	
		I-79 HAR and DMS in D10	Existing	
		Automatic traffic recorders in D10	Existing	
		D11 Tunnels County Maintenance Division monitors CCTV cameras in tunnels	Existing	
		Complete truck inspection while in motion	Planned 2	
PennDOT D10 TMC	Pennsylvania Department of Transportation (PennDOT)	Roadway incident notification to the County and Municipal 911 centers comes from public phone calls and State Police Dispatch, PennDOT Offices, or PTC Office if local jurisdiction services are needed on the scene	Existing	<ul style="list-style-type: none"> <li>District 10 Traveler Information</li> <li>Regional Traveler Information System</li> </ul>

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT District offices will coordinate event traffic operations with local police	Existing	<ul style="list-style-type: none"> <li>• AMBER Alert Coordination</li> <li>• District 10 Traffic Management Center (TMC)</li> <li>• District 11 Pittsburgh Regional Traffic Management Center (RTMC)</li> </ul>
		PennDOT BHSTE coordinates with PEMA and other agencies (PennDOT Districts, PSP, County EMA's, etc.) in case of major incidents	Existing	
		County EMA centers contact PennDOT District offices for some incidents along state roadways	Existing	
		PennDOT D12 and D10 Offices coordinate incident response and other operations along Route 22	Existing	
		PennDOT Districts Offices 10, 11, and 12 provide maintenance and construction information to local media outlets	Existing	
		Plans to archive traffic and other data	Planned 1	
		PSP get work zone coverage plans and requests for troopers to work overtime shifts to cover work zones from PennDOT District Offices	Existing	
		The PennDOT D10 office has a dial-up connection to RWIS information collected by BOMO	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		There is a general need for coordinating PennDOT detour routes and timing plans with municipalities	Planned 2	
		PennDOT D12 Office, PennDOT D11 Office, and PennDOT D10 Office currently coordinate AMBER alert operations.	Existing	
		PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles	Existing	
		Coordination between PSP Dispatch Centers and PennDOT County Maintenance Offices or District Offices happens for requesting salt, and other maintenance operations	Existing	
		PennDOT D10 currently coordinates operations with D9, D2, D1, D11, and D12 offices	Existing	
		PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices	Existing	



Element	Stakeholder	Functionality	Status	Associated Project(s)
		911 communication centers will typically get a hold of the PennDOT County Maintenance Office for resource requests, rather than through the PennDOT District office. PennDOT District office is typically only informed of incident if multi county/district	Existing	
PennDOT D10 Vehicles	Pennsylvania Department of Transportation (PennDOT)	PennDOT County Maintenance Offices coordinate with local police in field for scene traffic management	Existing	<ul style="list-style-type: none"> <li>(Not Applicable)</li> </ul>
		PennDOT D10 vehicles have computers that talk to the County Offices for snow removal and sprayer information	Existing	
		PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles	Existing	
PennDOT D11 County Maintenance Offices	Pennsylvania Department of Transportation (PennDOT)	PennDOT D11 County Maintenance Offices will have control of DMS and HAR messages in future	Planned 1	<ul style="list-style-type: none"> <li>District 11 Regional Service Patrols</li> <li>District 11 Roadway Weather Monitoring</li> </ul>
		PennDOT County Maintenance Offices provide information about maintenance activities to local media	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Provides overall management and support for routine maintenance on a roadway system or right-of-way	Existing	
		In future, PennDOT County Maintenance Offices may post information to ATIS systems because they are staffed 24/7	Planned 2	
		PSP Dispatch Centers coordinate with PennDOT D11 Tunnel Division Office for traffic control, debris clearing, move cameras, and major accidents/emergencies	Existing	
		Coordination between PSP Dispatch Centers and PennDOT County Maintenance Offices or District Offices happens for requesting salt, and other maintenance operations	Existing	
		D11 Tunnels County Maintenance Division monitors CCTV cameras in tunnels	Existing	
		County Maintenance Offices get RWIS information in real-time. Everyone else has to get the information from the public website. It takes approximately 1 hour for information to be published on the website.	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles	Existing	
		Receives environmental conditions information from various weather sources to aid in scheduling routine maintenance activities	Existing	
		Monitors vehicle and equipment conditions, tracks maintenance history, and schedules routine and corrective maintenance	Existing	
		Manages winter maintenance including snow plow operations	Existing	
		911 communication centers will typically get a hold of the PennDOT County Maintenance Office for resource requests, rather than through the PennDOT District office. PennDOT District office is typically only informed of incident if multi county/district	Existing	
		PennDOT stockpile locations receive RWIS data for road maintenance operations, as well as coordinate snow removal operations with PennDOT District and County Maintenance Offices	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT D11 County offices have remote access to control DMS signs	Existing	
		PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices	Existing	
		Recommends maintenance courses of action based on current and forecast environmental and road conditions	Existing	
		PennDOT D11 has over height vehicle detection devices that automatically alert D11 Tunnel County Maintenance office if there is approaching over height vehicle	Existing	
PennDOT D11 Field Devices	Pennsylvania Department of Transportation (PennDOT)	PennDOT has permanent and portable CMS on freeways	Existing	<ul style="list-style-type: none"> <li>• Port Authority of Allegheny County Park-n-Ride Lot Operations</li> <li>• District 11 Roadway Weather Monitoring</li> <li>• District 11 Pittsburgh Regional Traffic Management Center (RTMC)</li> </ul>
		PennDOT D11 has over height vehicle detection devices that automatically alert D11 Tunnel County Maintenance office if there is approaching over height vehicle	Existing	
		PennDOT D11 County Maintenance Offices will have control of DMS and HAR messages in future	Planned 1	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT collects and archives traffic volumes, speeds, lane occupancy and vehicle classification	Existing	<ul style="list-style-type: none"> <li>• District 11 Traffic Monitoring</li> <li>• District 11 Traveler Information</li> <li>• ACAA Parking Management</li> </ul>
		Install fog detection system in D11	Planned 1	
		Freeway with surveillance cameras	Existing	
		PennDOT D11 HOV devices automatically notify city of Pittsburgh signal devices when HOV lanes are opened. This causes signal timing patterns to adjust	Existing	
		Mobility Technologies currently has its own operator personnel and interface workstation in D11 RTMC. Operator can view and input information into Mobility Technologies' system, as well as view and control some devices using D11 system. Likewise, D11 staff can gain information residing within Mobility Technologies' system workstation at the RTMC.	Existing	
		PennDOT District RWIS Stations currently transmit snapshot images of road conditions to PennDOT Central Office BOMO	Existing	
		Automatic traffic recorders in D11	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT D11 RTMC has a direct connection to 2 RWIS stations. The remainder of information is gathered from a web connection to BOMO data	Existing	
		PennDOT D11 County Offices have remote access to control DMS signs	Existing	
		PennDOT Central Office Bureau downloads data from traffic counters in the field throughout the Region	Existing	
		D11 RTMC currently controls gates for HOV	Existing	
		ACAA communicates directly with PennDOT D11 HAR device	Existing	
		PAAC Park-n-ride lots could be controlling D11 DMS signs to post current parking conditions	Planned 2	
		Implement pre-planned detour routes in D11 for use during incidents, construction or special events	Planned 1	
		Highway sensors and signs to alert drivers of dangerous conditions	Planned 1	

Element	Stakeholder	Functionality	Status	Associated Project(s)
PennDOT D11 Remote Traveler Support	Pennsylvania Department of Transportation (PennDOT)	D11 is interested in placing kiosks in various public places with currently available traveler information (e.g., camera images)	Planned 2	<ul style="list-style-type: none"> <li>Regional Traveler Information System</li> </ul>
		In future, PennDOT County Maintenance Offices may post information to ATIS systems because they are staffed 24/7	Planned 2	
PennDOT D11 RTMC	Pennsylvania Department of Transportation (PennDOT)	There is a general need for coordinating PennDOT detour routes and timing plans with municipalities	Planned 2	<ul style="list-style-type: none"> <li>District 11 Pittsburgh Regional Traffic Management Center (RTMC)</li> <li>AMBER Alert Coordination</li> <li>District 11 Camera Image Sharing</li> <li>District 11 Traveler Information</li> <li>Regional Traveler Information System</li> <li>District 11 Traffic Monitoring</li> <li>District 11 Roadway Weather Monitoring</li> <li>District 11 Camera Image</li> </ul>
		Port of Pittsburgh would be interested in acting as a hub for collecting and distributing current roadway conditions (for arterials, state roads, and turnpike) to freight drivers leaving various privately owned port facilities along rivers	Planned 2	
		PennDOT uses pagers and fax services to distribute freeway travel times, travel speeds and incident information	Existing	
		PennDOT D11 traffic office has communication capability with municipal traffic control devices, which is used almost exclusively for monitoring purposes	Existing	
		Amber Alert operations	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		D11 currently provides email updates to Mobility Technologies on construction activity	Existing	Sharing Expansion <ul style="list-style-type: none"> <li>• ACAA Parking Management</li> </ul>
		D11 currently has an incident detection algorithm in its software system	Existing	
		Allegheny County 911 and EMA have need for current traffic information and flow from City of Pittsburgh and PennDOT D11 RTMC	Planned 2	
		Coordination between PSP Dispatch Centers and PennDOT County Maintenance Offices or District Offices happens for requesting salt, and other maintenance operations	Existing	
		PTC would like 24/7 capabilities to coordinate traffic and incident management with D11 PennDOT staff	Planned 2	
		D11 Parkway Service Patrol vehicles may be dispatched by State Police or D11 RTMC operators	Existing	
		PEMA gathers/provides specific incident information from/to County EMA's, PA State Police, PennDOT, and PTC	Existing	
		County EMA centers contact PennDOT District offices for some incidents along state roadways	Existing	



Element	Stakeholder	Functionality	Status	Associated Project(s)
		A PennDOT radio link allows for voice communications between State Police, Parkway Service Patrols, and the RTMC	Existing	
		Roadway incident notification to the County and Municipal 911 centers comes from public phone calls and State Police Dispatch, PennDOT Offices, or PTC Office if local jurisdiction services are needed on the scene	Existing	
		PTC would like D11 RTMC to have full control of field devices within PTC Mon/Fayette	Planned 2	
		PAAC would like to display travel times of highway vs. transit on PennDOT D11 DMS	Planned 2	
		D11 currently contacts PA State Police if it detects incidents	Existing	
		D11 currently contacts PTC if it detects major incidents that will affect traffic on PA turnpike	Existing	
		Allegheny County EMA will eventually get video from D11 RTMC, maybe control	Planned 1	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PTC plans to share CCTV camera images with D11, State Police, various emergency management agencies, and others	Planned 1	
		PennDOT D12 Office, PennDOT D11 Office, and PennDOT D10 Office currently coordinate AMBER alert operations	Existing	
		City of Pittsburgh Parking Administration currently coordinates event and parking operations with PennDOT D11 RTMC	Existing	
		PennDOT has a maintenance program for system maintenance concept and requirements, CMS, CCTV, Comm. network, detectors and HOV system	Existing	
		Beaver County Traveler Information System to integrate with PennDOT's Freeway Management System and Pittsburgh's ATMS	Planned 2	
		D11 provides CCTV and control to PA State Police Pittsburgh Barracks	Existing	
		PennDOT D11 shares incident information with public safety agencies	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		<p>Mobility Technologies currently has its own operator personnel and interface workstation in D11 RTMC. Operator can view and input information into Mobility Technologies' system, as well as view and control some devices using D11 system. Likewise, D11 staff can gain information residing within Mobility Technologies' system workstation at the RTMC.</p>	Existing	
		<p>Regional radio and television stations can gain access to incident and event data, as well as CCTV images and camera control from the media room at the RTMC location</p>	Existing	
		<p>D11 is interested in placing kiosks in various public places with currently available traveler information (e.g., camera images)</p>	Planned 2	
		<p>Plans to exchange raw traffic data between Mobility Technologies and D11</p>	Planned 1	
		<p>Mobility Technologies will likely have need for detailed/advanced construction information from D11 in future</p>	Planned 2	
		<p>D11 RTMC currently controls gates for HOV</p>	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Mobility Technologies wants D11 RTMC camera images	Planned 2	
		PennDOT District offices will coordinate event traffic operations with local police	Existing	
		PennDOT D11 is interested in collecting information/status data from PTC field devices within and adjacent to their jurisdiction; possibility of control for PTC devices by D11 personnel within RTMC needs to be further explored	Planned 2	
		Proactive incident/congestion management (24x7 operations)	Planned 2	
		PennDOT has an Archived Data Management System (ADMS)	Existing	
		Mobility Technologies raw traffic data will be sent to D11 RTMC to be used in incident detection algorithms	Planned 1	
		T.V. Stations currently get camera images from D11	Existing	
		D11 currently give press releases for DMS messages within work zones	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		D10 and D12 operate as ITS satellite offices to D11 RTMC and most functions are carried out in D11	Existing	
		PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices	Existing	
		911 Communication Centers will typically get a hold of the PennDOT County Maintenance Office for resource requests, rather than through the PennDOT District office. PennDOT District office is typically only informed of incident if multi county/district	Existing	
		Use of DMS to alert PAAC users to special transit situations. These signs would be owned and operated by PennDOT or an MPO, but the message would be supplied by the Port Authority	Planned 2	
		Assumes control of adjacent District ITS devices during off-peak periods	Planned 1	
		BCTA would like to tie into D11 system for traffic, weather, flow speeds, conditions	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers	Planned 2	
		PennDOT shares real-time traffic incident information with state law enforcement	Existing	
		Freeway incident detection algorithms	Existing	
		PAAC would like to station an employee at the PennDOT D11 RTMC, similar to the MT positions	Planned 2	
		PSP get work zone coverage plans and requests for troopers to work overtime shifts to cover work zones from PennDOT District Offices	Existing	
		D11 has need for better verifying incidents picked up by its incident detection algorithm	Planned 2	
		PennDOT BHSTE coordinates with PEMA and other agencies (PennDOT Districts, PSP, County EMA's, etc.) in case of major incidents	Existing	
		PennDOT Districts Offices 10, 11, and 12 provide maintenance and construction information to local media outlets	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT D11 Office coordinates operations with District 10 and 12 County Maintenance Offices	Existing	
		D11 traffic office currently uses Mobility Technologies' archived traffic detection data for planning and other purposes	Existing	
		PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles	Existing	
		PennDOT D11 RTMC has a direct connection to 2 RWIS stations. The remainder of information is gathered from a web connection to BOMO data	Existing	
		D11 has need for pre-developed traffic management action scenarios to be displayed to operators at workstations once incidents are detected and verified	Planned 2	
PennDOT D11 Vehicles	Pennsylvania Department of Transportation (PennDOT)	PennDOT has freeway service patrols	Existing	<ul style="list-style-type: none"> <li>District 11 Regional Service Patrols</li> </ul>
		PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PSP Dispatch Centers talk to PennDOT D11 Parkway Service Patrol directly. Service Patrols let PSP Dispatch know if incidents are cleared, and will call in to request resources.	Existing	
		The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers	Planned 2	
		PennDOT County Maintenance Offices coordinate with local police in field for scene traffic management	Existing	
		D11 Parkway Service Patrol vehicles may be dispatched by State Police or D11 RTMC operators	Existing	
		A PennDOT radio link allows for voice communications between State Police, Parkway Service Patrols, and the RTMC	Existing	
PennDOT D12 County Maintenance Offices	Pennsylvania Department of Transportation (PennDOT)	Coordination between PSP Dispatch Centers and PennDOT County Maintenance Offices or District Offices happens for requesting salt, and other maintenance operations	Existing	<ul style="list-style-type: none"> <li>District 12 Traveler Information</li> </ul>



Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices	Existing	
		Recommends maintenance courses of action based on current and forecast environmental and road conditions	Existing	
		PennDOT stockpile locations receive RWIS data for road maintenance operations, as well as coordinate snow removal operations with PennDOT District and County Maintenance Offices	Existing	
		County Maintenance Offices get RWIS information in real-time. Everyone else has to get the information from the public website. It takes approximately 1 hour for information to be published on the website.	Existing	
		PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles	Existing	
		PennDOT County Maintenance Offices provide information about maintenance activities to local media	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT D11 Office coordinates operations with District 10 and 12 County Maintenance Offices	Existing	
		911 communication centers will typically get a hold of the PennDOT County Maintenance Office for resource requests, rather than through the PennDOT District office. PennDOT District office is typically only informed of incident if multi county/district	Existing	
		PennDOT D12-0 County Maintenance Offices Provides roadwork advisories on its website	Existing	
		PennDOT D12 County Maintenance Offices currently control anti-icing bridge sprayers remotely	Existing	
		Monitors vehicle and equipment conditions, tracks maintenance history, and schedules routine and corrective maintenance	Existing	
		Receives environmental conditions information from various weather sources to aid in scheduling routine maintenance activities	Existing	
		Manages winter maintenance including snow plow operations	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT D12 County Maintenance offices post travel advisories and construction information on a district-wide website	Existing	
		PennDOT D12 County Maintenance offices can post messages on D12 HAR	Existing	
		Provides overall management and support for routine maintenance on a roadway system or right-of-way	Existing	
PennDOT D12 Field Devices	Pennsylvania Department of Transportation (PennDOT)	Truck Rollover Warning System	Existing	<ul style="list-style-type: none"> <li>• District 12 Traveler Information</li> <li>• District 12 Bridge De-icing</li> <li>• District 12 Collision Avoidance Signal Preemption System</li> <li>• District 12 Traffic Management Center (TMC)</li> </ul>
		PennDOT D12 County Maintenance Offices currently control anti-icing bridge sprayers remotely	Existing	
		PennDOT District RWIS Stations currently transmit snapshot images of road conditions to PennDOT Central Office BOMO	Existing	
		PennDOT Central Office Bureau downloads data from traffic counters in the field throughout the Region	Existing	
		PennDOT D12 County Maintenance offices can post messages on D12 HAR	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT D12 has a truck rollover system that collects and archives data	Existing	
		DMS and HAR in D12	Planned 1	
		SR-31 Truck Preemption System in Westmoreland County - located on a downhill before a signal, it gives fast moving trucks a green light	Existing	
PennDOT D12 TMC	Pennsylvania Department of Transportation (PennDOT)	PennDOT D12 Office, PennDOT D11 Office, and PennDOT D10 Office currently coordinate AMBER alert operations	Existing	<ul style="list-style-type: none"> <li>District 12 Traffic Management Center (TMC)</li> <li>AMBER Alert Coordination</li> <li>District 11 Pittsburgh Regional Traffic Management Center (RTMC)</li> <li>District 12 Bridge De-icing</li> <li>Regional Traveler Information System</li> </ul>
		911 communication centers will typically get a hold of the PennDOT County Maintenance Office for resource requests, rather than through the PennDOT District office. PennDOT District office is typically only informed of incident if multi county/district	Existing	
		PennDOT BHSTE coordinates with PEMA and other agencies (PennDOT Districts, PSP, County EMA's, etc.) in case of major incidents	Existing	
		Coordination between PSP Dispatch Centers and PennDOT County Maintenance Offices or District Offices happens for requesting salt, and other maintenance operations	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices	Existing	
		Central software system to manage and operate all existing systems in D12	Planned 2	
		The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers	Planned 2	
		PennDOT Districts Offices 10, 11, and 12 provide maintenance and construction information to local media outlets	Existing	
		Roadway incident notification to the County and Municipal 911 centers comes from public phone calls and State Police Dispatch, PennDOT Offices, or PTC Office if local jurisdiction services are needed on the scene	Existing	
		There is a general need for coordinating PennDOT detour routes and timing plans with municipalities	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PSP get work zone coverage plans and requests for troopers to work overtime shifts to cover work zones from PennDOT District Offices	Existing	
		County EMA centers contact PennDOT District offices for some incidents along state roadways	Existing	
		D12 access to D11 images adjacent to their jurisdiction	Planned 2	
		PennDOT D12 Office currently coordinates incident and traffic management operations with adjacent PennDOT D11, D12, and D9 offices, as well as county maintenance offices in adjacent PennDOT Districts	Existing	
		PEMA gathers/provides specific incident information from/to County EMA's, PA State Police, PennDOT, and PTC	Existing	
		PennDOT District offices will coordinate event traffic operations with local police	Existing	
		PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT D12 and D10 Offices coordinate incident response and other operations along Route 22	Existing	
		PTC plans to share CCTV camera images with D11, State Police, various emergency management agencies, and others	Planned 2	
PennDOT D12 Vehicles	Pennsylvania Department of Transportation (PennDOT)	PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles	Existing	<ul style="list-style-type: none"> <li>(Not Applicable)</li> </ul>
		PennDOT County Maintenance Offices coordinate with local police in field for scene traffic management	Existing	
PennDOT STMC	Pennsylvania Department of Transportation (PennDOT)	Could potentially serve as back-up operations management to PennDOT RTMC's	Planned 2	<ul style="list-style-type: none"> <li>PennDOT Transportation Management Centers (TMC's)</li> <li>Winter Road Condition Hotline for Interstate Highways</li> <li>Roadway Weather Information System (RWIS)</li> <li>PennDOT Commercial</li> </ul>
		May support ATIS systems	Planned 2	
		May coordinate statewide operations (among districts and other states) and other state agencies (PSP, PTC, PEMA)	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		May perform political and public relations on behalf of PennDOT	Planned 2	Vehicle Information Systems and Networks (CVISN) Project <ul style="list-style-type: none"> <li>• PennDOT Performance and Registration Information Systems Management (PRISM)</li> <li>• PennDOT Safety and Fitness Electronic Record (SAFER)</li> <li>• PennDOT ITS Transportation Management Approach</li> <li>• Construction Projects (current and future)</li> <li>• Central Repository</li> <li>• Real -time Traffic Information Website</li> <li>• Statewide GIS based Incident Detour Map</li> <li>• Video Sharing</li> <li>• Web site Portal for Assisting Commercial Vehicle Operators</li> <li>• Statewide Telecommunication</li> </ul>
		May coordinate weather events throughout PennDOT	Planned 2	
		May coordinate incident, emergency, and inter/intra-state events	Planned 2	
		May act as central data repository	Planned 2	
		May coordinate Amber Alert for PennDOT	Planned 2	
		May be responsible for maintaining commercial vehicle registrations and credentials	Planned 2	
		May be responsible for maintaining the state's Motor Carrier Safety Assistance Program (MCSAP) files	Planned 2	
		May be responsible for conducting roadside inspections	Planned 2	
		May be responsible for conducting weight enforcement activities	Planned 2	



Element	Stakeholder	Functionality	Status	Associated Project(s)
Pennsylvania Office of Homeland Security	Pennsylvania Office of Homeland Security	Coordinates homeland security activities within the Commonwealth, both with local and county officials and with the federal Department of Homeland Security	Existing	
Personal Traveler Information Devices	General Public	There is a need to integrate wireless enhanced 911 geo-location data from cell-phones so that callers/incidents can be more accurately located on dispatch GIS mapping systems	Planned 2	<ul style="list-style-type: none"> <li>• BCTA Remote Traveler Information Systems</li> <li>• PTC *11 Phone Service</li> <li>• 511 Traveler Information Phone System</li> <li>• BCTA Automated Reservation System</li> <li>• County/Municipal PSAP/911 Centers</li> <li>• District 11 Pittsburgh Regional Traffic Management Center (RTMC)</li> <li>• Mobility Technologies Traveler Information Collection/Distribution</li> <li>• Port Authority of Allegheny County Interactive Trip Planning</li> </ul>
		SPC plans to manage regional transit information, as well as ridesharing and other demand management through ATIS deployments	Planned 2	
		RWIS data flows from the RWIS site to Central Office (BOMO) to a public website	Existing	
		PennDOT uses pagers and fax services to distribute freeway travel times, travel speeds and incident information	Existing	
		PennDOT D12-0 County Maintenance Offices Provides roadwork advisories on its website	Existing	
		PennDOT D12 County Maintenance offices post travel advisories and construction information on a district-wide Website	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PennDOT D10 County Maintenance Offices provide construction and maintenance information on their websites	Existing	<ul style="list-style-type: none"> <li>Regional Traveler Information System</li> <li>Regional Transit Schedule Coordination</li> <li>Regional Ridesharing Coordination</li> </ul>
		BCTA transit users call a phone reservation system for paratransit service	Existing	
		Regional transit agencies provide schedules via their own dedicated websites	Existing	
Port Facilities	Private Companies	Port of Pittsburgh would be interested in acting as a hub for collecting and distributing current roadway conditions (for arterials, state roads, and turnpike) to freight drivers leaving various privately owned port facilities along rivers		<ul style="list-style-type: none"> <li>Port of Pittsburgh Travel Information Distribution</li> </ul>
Port of Pittsburgh Commission Office	Port of Pittsburgh Commission	PTC plans to share CCTV camera images with D11, State Police, various emergency management agencies, and others	Planned 2	<ul style="list-style-type: none"> <li>Port of Pittsburgh Travel Information Distribution</li> <li>Regional Traveler Information System</li> </ul>
		Port of Pittsburgh would be interested in acting as a hub for collecting and distributing current roadway conditions (for arterials, state roads, and turnpike) to freight drivers leaving various privately owned port facilities along rivers	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
PSP Offices	Pennsylvania State Police (PSP)	Roadway incident notification to the County and Municipal 911 centers comes from public phone calls and State Police Dispatch, PennDOT Offices, or PTC Office if local jurisdiction services are needed on the scene	Existing	<ul style="list-style-type: none"> <li>District 11 Camera Image Sharing</li> <li>Pennsylvania State Police Dispatch Centers</li> <li>Incident Information Management System (IIMS)</li> <li>Pennsylvania State Police Consolidated Dispatch Center</li> <li>800 MHz Statewide Communication System</li> <li>AMBER Alert Coordination</li> </ul>
		PTC plans to share CCTV camera images with D11, State Police, various emergency management agencies, and others	Planned 1	
		PSP get work zone coverage plans and requests for troopers to work overtime shifts to cover work zones from PennDOT District Offices	Existing	
		PAAC police force coordinates with State Police and local emergency management	Existing	
		D11 currently contacts PA State Police if it detects incidents	Existing	
		County EMA centers contact PSP when incidents occur on state roadways	Existing	
		A PennDOT radio link allows for voice communications between State Police, Parkway Service Patrols, and the RTMC	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PFD dispatch has a direct contact with PSP	Existing	
		PennDOT BHSTE coordinates with PEMA and other agencies (PennDOT Districts, PSP, County EMA's, etc.) in case of major incidents	Existing	
		D11 Parkway Service Patrol vehicles may be dispatched by State Police or D11 RTMC operators	Existing	
		PEMA gathers/provides specific incident information from/to County EMA's, PA State Police, PennDOT, and PTC	Existing	
		The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers	Planned 1	
		D11 provides CCTV and control to PA State Police Pittsburgh Barracks	Existing	
		PSP Dispatch Centers coordinate with PennDOT D11 Tunnel Division Office for traffic control, debris clearing, move cameras, and major accidents/emergencies	Existing	
		Radio stations currently get incident information from State Police	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		PSP Dispatch Centers talk to PennDOT D11 Parkway Service Patrol directly. Service Patrols let PSP Dispatch know if incidents are cleared, and will call in to request resources	Existing	
		Coordinates between PSP Dispatch Centers and PennDOT County Maintenance Offices or District Offices happens for requesting salt, and other maintenance operations	Existing	
PSP Troop T Highspire	Pennsylvania State Police (PSP)	Provides roadway incident notification to the County and Municipal 911 centers if local jurisdiction services are needed on the scene	Existing	<ul style="list-style-type: none"> <li>• Pennsylvania State Police Dispatch Centers</li> <li>• Incident Information Management System (IIMS)</li> <li>• Pennsylvania State Police Consolidated Dispatch Center</li> <li>• 800 MHz Statewide Communication System</li> <li>• AMBER Alert Coordination</li> </ul>
		Acts as first-responder at an incident site	Existing	
		PEMA gathers/provides specific incident information from/to PSP	Existing	
		Provides radio stations with incident information	Existing	
		Tracks and maintains PSP vehicles	Existing	
		Dispatches PSP Troop T Vehicles for incidents on the Pennsylvania Turnpike	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
PSP Troop T Vehicles	Pennsylvania State Police (PSP)	PSP Troop T Vehicles are dispatched from PTC Offices and PSP Troop T Dispatch Centers	Existing	<ul style="list-style-type: none"> <li>▪ 800 MHz Statewide Communication System</li> <li>• Emergency Vehicle Traffic Signal Preemption</li> <li>• Mobile Data Terminals (MDT's)</li> </ul>
		Responds to incidents of the Pennsylvania Turnpike	Existing	
PSP Vehicles	Pennsylvania State Police (PSP)	Receives incident and dispatch information from PSP Offices	Existing	<ul style="list-style-type: none"> <li>• 800 MHz Statewide Communication System</li> <li>• Emergency Vehicle Traffic Signal Preemption</li> <li>• Mobile Data Terminals (MDTs)</li> </ul>
		Coordinates with PSP Dispatch Center and other emergency management agencies during incidents	Existing	
PTC Field Devices	Pennsylvania Turnpike Commission (PTC)	Collects traffic and roadway information (vehicle counts, etc.) for transportation planning purposes	Existing	<ul style="list-style-type: none"> <li>• Pennsylvania Turnpike Field Devices</li> <li>• PTC ATIS Integration Project</li> </ul>
		Disseminates traffic and roadway conditions to the public using DMS, HAR, and other mechanisms	Existing	
		Provide incident detection capabilities. The PTC provides call boxes for incident detection/verification	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Monitors roadway weather conditions using RWIS that measures temperature, humidity, wind speed and direction, and rain and snow precipitation	Existing	
PTC Offices	Pennsylvania Turnpike Commission (PTC)	Coordinates traffic and emergency operations with agencies throughout the state	Existing	<ul style="list-style-type: none"> <li>• PTC *11 Phone Service</li> <li>• PTC ATIS Integration Project</li> <li>• PTC Traffic Operation Center (TOC)</li> <li>• PTC E-Z Pass Toll Collection System</li> </ul>
		Provides support for special event traffic management	Existing	
		Provides freeway management including integration of surveillance information for the purpose of information sharing	Planned 1	
		Monitors alerts and advisory systems reported by other agencies	Existing	
		Plans to share CCTV camera images with PennDOT Districts, PSP, various emergency management agencies, and others.	Planned 1	
		Provides 24x7 capabilities to coordinate traffic and incident management with PennDOT staff	Planned 2	
		Provides incident management services including the dispatch of emergency and service vehicles and coordinates with appropriate agencies	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Detects and verifies incidents. PTC uses a free cell phone service for incident detection	Existing	
		Provides dispatch of emergency and service vehicles	Existing	
		Tracks PTC emergency service vehicles	Existing	
		Provides detour routes in case of incidents and shares this information with PennDOT and other transportation agencies	Existing	
		Provides capabilities to be contacted by PennDOT Districts in case of major incidents that may affect traffic on Pennsylvania Turnpike	Existing	
		Shares real-time incident information with other transportation agencies, local and state law enforcement and fire and rescue agencies	Existing	
		Provides traffic and incident information to freeway and arterial management agencies, public transit, and safety agencies	Existing	



Element	Stakeholder	Functionality	Status	Associated Project(s)
		Distributes real-time traffic information to the public through dedicated, automated phone service, web sites, email and cell phone/automated voice methods	Existing	
		Distributes information regarding freeway travel times and speeds, incident information, special events, work zones, weather and road conditions	Existing	
		Stores processed data using an Archived Database Management System. PTC uses archived data for impact on work zones, capital planning/ analysis, operations planning/analysis, safety analysis and traffic control	Existing	
		PTC collects traffic volume, vehicle classification, road conditions, weather conditions and video surveillance information	Existing	
		PTC collects route designations, current work zones, emergency/evacuation routes and procedures and incident information from other agencies	Existing	
		Collects toll collection fees and supports electronic toll collection using E-Z Pass	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Collects and stores toll information for operational analysis and determining pricing structure	Existing	
		Monitors current and forecasted weather conditions for issuing general travel advisories	Existing	
		Coordinates with PennDOT County Maintenance Offices to reduce the impact of traffic during work zone activities	Existing	
		Provides monitoring and remote diagnostics of field equipment failures, issues problem reports, and tracks the repairs or replacement of the failed equipment	Existing	
PTC Maintenance and Construction Vehicles	Pennsylvania Turnpike Commission (PTC)	Provide on-board systems that support routine winter maintenance on a roadway system	Existing	
PTC Service Plazas	Pennsylvania Turnpike Commission (PTC)	Provides traffic information on the Pennsylvania Turnpike	Planned 1	<ul style="list-style-type: none"> <li>PTC Service Plazas</li> </ul>
		Provides traveler information, weather information centers, and lodging call centers, using scrolling message boards	Existing and Planned 1	

Element	Stakeholder	Functionality	Status	Associated Project(s)
PTC Toll Plazas	Pennsylvania Turnpike Commission (PTC)	Provides capability to automatically identify the vehicle type using tag reader and automatically perform toll collection	Existing	<ul style="list-style-type: none"> <li>PTC E-Z Pass Toll Collection System</li> </ul>
		Serve as electronic screening and safety inspection stations for the Pennsylvania Turnpike	Planned 2	
Regional Media Outlets	Regional Media	PennDOT Districts Offices 10, 11, and 12 provide maintenance and construction information to local media outlets	Existing	<ul style="list-style-type: none"> <li>Mobility Technologies Traveler Information Collection/Distribution</li> <li>Regional Traveler Information System</li> </ul>
		PennDOT County Maintenance Offices provide information about maintenance activities to local media	Existing	
		Radio stations currently get incident information from State Police	Existing	
		Mobility Technologies currently provides traffic flow and incident data to radio stations--Clear Channel	Existing	
		City of Pittsburgh traffic office provides information to local media about traffic, maintenance, and construction events	Existing	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		Mobility Technologies is currently collecting and distributing CCTV images from their devices. These are distributed to media	Existing	
		City of Pittsburgh Parking Authority Offices provide traffic and event information to local media and other information service providers	Existing	
		"Regional radio and television stations can gain access to incident and event data, as well as CCTV images and camera control from the media room at the RTMC location"	Existing	
Regional Personal Traveler Cards	General Public	City of Pittsburgh Parking Authority has parking meters that accept payment via payment card	Existing	<ul style="list-style-type: none"> <li>Regional Transit Electronic Fare Collection</li> <li>City of Pittsburgh Downtown Parking Management</li> <li>ACAA Parking Management</li> <li>BCTA Electronic Fare Collection</li> <li>Automated Payment</li> </ul>
		BCTA, PAAC and Westmoreland would have need for regional fare card	Planned 2	
		Plans for transit fare payment or debit increase at kiosks using regional fare cards	Planned 1	
		PAAC Park-n-Ride Lots will be collecting automatic payment from vehicle tags or traveler cards in future	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
		ACAA airport parking lots will have automated payment collection from vehicle tags or traveler cards	Planned 1	Parking Meters
		Use of new fare boxes in transit vehicles able to automatically count money and accept "smart" fare cards	Planned 1	
		Fixed route buses accepting electronic payment, single use card that is discarded when value is used	Existing	
Regional Transit Agency Offices	Regional Transit Agencies	Westmoreland County Transit Authority (WCTA) has plans to participate in county-wide 800 MHz initiative for interoperable emergency management communications with public safety community	Planned	<ul style="list-style-type: none"> <li>Regional Traveler Information System</li> <li>Fayette County Coordinated Transit On-demand AVL</li> <li>Regional Transit Schedule Coordination</li> </ul>
		FCCT uses data collecting work stations at vehicle garages to collect fare data	Existing	
		Regional transit agencies provide schedules via their own dedicated websites	Existing	
		FCCT has 3 AVL for on-demand system buses	Existing	
		FCCT looking at new technologies for collecting passenger data in vehicle fare boxes	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
Regional Transit Vehicles	Regional Transit Agencies	FCCT looking at new technologies for collecting passenger data in vehicle fare boxes	Planned 2	<ul style="list-style-type: none"> <li>Regional Transit Electronic Fare Collection</li> <li>Transit Vehicle Traffic Signal Priority</li> <li>Fayette County Coordinated Transit On-demand AVL</li> </ul>
		FCCT has 3 AVL for on-demand system buses	Existing	
		Butler County and other Regional Transit Agencies plan on deploying transit signal priority systems in near to far future	Planned 1	
Regional Travel Information System	Various Stakeholders	SPC plans to manage regional transit information, as well as ridesharing and other demand management through ATIS deployments	Planned 2	<ul style="list-style-type: none"> <li>Regional Traveler Information System</li> <li>511 Traveler Information Phone System</li> <li>Regional Ridesharing Coordination</li> <li>Regional Transit Schedule Coordination</li> </ul>
SPC Office	Southwest Pennsylvania Commission (SPC)	SPC currently operates a ride-share system that matches user needs with other travelers' needs	Existing	<ul style="list-style-type: none"> <li>Regional Traveler Information System</li> <li>Regional Ridesharing Coordination</li> </ul>
		SPC is interested in collecting transit information from agencies throughout region and distribute on its ride-share website	Planned 2	

Element	Stakeholder	Functionality	Status	Associated Project(s)
TMA Offices	Transportation Management Associations	Transportation Management Associations (TMA's) throughout the Region currently collect incident and other traveler advisories and broadcast messages to participating companies and other users	Existing	<ul style="list-style-type: none"> <li>Regional Traveler Information System</li> <li>Mobility Technologies Traveler Information Collection/Distribution</li> </ul>
		TMA's are interested in collecting information from various agencies throughout the region and distribute to its participating companies and other users	Planned 2	
Towing Industry Responders	Private Companies	County/Municipal 911 centers are contacted by field command to dispatch specialty services and vehicles, such as wreckers and hazmat teams	Existing	

### **3.3 Needs**

Sections 3.3 and 3.4 examine each element defined in Section 3.2 in terms of *needs* (what each element — i.e., agency stakeholder — needs from others) and *services* (what each element can provide to others). This information is used to program *Turbo Architecture*, the National ITS Architecture software. “Needs” refer to the information inputs from one agency operation to another; they are presented in tabular format and trace back to the systems inventory.



**Table 3-2: Regional Needs Table**

Element	Need (operation/data inputs from others)	Status	Origin Element
911 Communication Centers	Incident notification and information	Existing	Personal Traveler Information Devices, PennDOT D11 RTMC, PennDOT D10 TMC, PennDOT D12 TMC, PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PSP Offices, PTC Offices, PEMA Emergency Operation Center, BCTA Transit Management Center, PAAC Centers, Municipal Public Safety Offices, County EMA Centers, Regional Transit Agency Offices
		Planned 2	Mobility Technologies ATIS Administration
	Resource dispatch requests	Existing	Municipal Public Safety Vehicles, PSP Offices, PTC Offices, PEMA Emergency Operation Center, County EMA Centers
	Vehicle tracking data	Planned 2	Municipal Public Safety Vehicles
	Roadway conditions	Existing	PennDOT D11 RTMC
		Planned 1	PennDOT D10 TMC, PennDOT D12 TMC
	ACAA Field Devices	Parking lot status and travel advisory DMS messages	Planned 1
Payment information		Planned 2	Regional Personal Traveler Cards, Passenger Vehicles
ACAA Office	Large-scale emergency notification and coordination	Existing	County EMA Centers

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
	Parking information and coordination	Existing	ACAA Field Devices
		Planned 1	Park-n-Ride Facilities
	Traffic information	Existing	PennDOT D11 RTMC
Adjacent PennDOT District and County Offices	Maintenance and construction coordination	Existing	PennDOT D11 County Maintenance Offices, PennDOT D10 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PennDOT D11 RTMC, PennDOT D10 TMC, PennDOT D12 TMC
	Incident response coordination	Existing	PennDOT D11 RTMC, PennDOT D10 TMC, PennDOT D12 TMC
	Device control coordination	Existing	PennDOT D11 RTMC
		Planned 2	PennDOT D10 TMC, PennDOT D12 TMC
BCTA Remote Traveler Support	Schedule adherence and arrival/ departure information	Existing	BCTA Transit Management Center
	Trip plan	Planned 1	BCTA Transit Management Center
	Regional traveler information	Planned 2	Regional Travel Information System
	Payment information	Planned 1	Regional Personal Traveler Cards
BCTA Transit Management Center	Coordinating bus schedule adherence and transit traveler information with other transit agencies for customer transfers	Planned 2	PAAC Centers, Regional Transit Agency Offices
	Surveillance images	Planned 1	BCTA Remote Traveler Support
	Parking coordination	Planned 2	ACAA Office

Element	Need (operation/data inputs from others)	Status	Origin Element
	Vehicle speed, fare transactions, silent alarm, and passenger count	Planned 1	BCTA Transit Vehicles
	Vehicle location, next stop, unscheduled stop information	Existing	BCTA Transit Vehicles
	Roadway incident reporting from drivers to center	Existing	BCTA Transit Vehicles
	Traffic, weather, road conditions, and incident information	Planned 2	PennDOT D11 RTMC, City of Pittsburgh TMC, Mobility Technologies ATIS Administration
	Incident and emergency coordination	Existing	County EMA Centers, 911 Communication Centers
	Parking coordination	Planned 1	Park-n-Ride Facilities
	Passenger count, automated driver logs, and fare payment information from vehicles	Existing	BCTA Transit Vehicles
	Vehicle diagnostics and maintenance information	Planned 1	BCTA Transit Vehicles
BCTA Transit Vehicles	Paratransit real-time scheduling and route information	Planned 1	BCTA Transit Management Center
	Payment information from BCTA traveler cards	Existing	Regional Personal Traveler Cards
City of Pittsburgh Field Devices	Signal system timing changes	Existing	City of Pittsburgh TMC
	Location signals from transit vehicles for signal priority	Existing	PAAC Transit Vehicles, BCTA Transit Vehicles
	Traffic management messages for DMS	Planned 1	City of Pittsburgh Parking Authority Offices, City of Pittsburgh TMC
	Camera control	Planned 2	City of Pittsburgh TMC
	Traffic signal device coordination	Planned 2	Municipal Field Devices
	HOV gate device coordination with traffic signals	Existing	PennDOT D11 Field Devices

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
	Parking meter or lot payment information from regional traveler cards or in-vehicle tags	Planned 2	Regional Personal Traveler Cards, Passenger Vehicle
	Location from public safety vehicles for signal priority	Planned 1	Municipal Public Safety Vehicles
City of Pittsburgh Parking Authority Offices	Parking coordination information	Planned 1	City of Pittsburgh TMC, PennDOT D11 RTMC
	Traffic information coordination	Existing	PennDOT D11 RTMC
City of Pittsburgh TMC	Traffic information coordination	Planned 1	PennDOT D11 RTMC, Municipal Traffic Management Offices
	Parking coordination information	Planned 1	City of Pittsburgh Parking Authority Offices
	Traffic control coordination	Planned 2	City of Pittsburgh Parking Authority Offices
	CCTV camera images	Planned 2	City of Pittsburgh Field Devices
	Traffic flow, and count information	Planned 1	City of Pittsburgh Field Devices
	Emergency coordination	Existing	County EMA Centers
	Signal timing change coordination with other jurisdictions	Existing	Municipal Traffic Management Offices
	Construction and maintenance information	Existing	PennDOT D11 RTMC
Commercial Vehicle Company Offices	Detour route and traffic information	Existing	PTC Offices
	Relaying information from emergency operations to trucking companies	Existing	PTC Offices, PennDOT D5 TMC, PSP Offices
	On-board safety information	Planned 1	Commercial Vehicle Vehicles
	Trip log and identification information	Planned 1	Commercial Vehicle Vehicles

Element	Need (operation/data inputs from others)	Status	Origin Element
	Safety inspection/screening records	Existing	PennDOT Central Office Field Devices
Commercial Vehicles	Fleet coordination with Commercial Vehicle Companies	Planned 1	Commercial Vehicle Company Offices
County EMA Centers	Real-time roadway traffic and incident information	Planned 2	Mobility Technologies ATIS Administration, PennDOT D11 RTMC, PennDOT D10 TMC, PennDOT D12 TMC, PTC Offices, City of Pittsburgh TMC, Municipal Traffic Management Offices
	CCTV images	Planned 1	PennDOT D11 RTMC, PTC Offices
		Existing	PennDOT D11 County Maintenance Offices
	Incident and emergency coordination	Existing	PEMA Emergency Operation Center, PSP Offices, Municipal Public Safety Offices, 911 Communication Centers, ACAA Office, BCTA Transit Management Center, City of Pittsburgh TMC, Municipal Traffic Management Offices, PAAC Centers, PennDOT D11 RTMC, PennDOT D10 TMC, PennDOT D12 TMC, PennDOT D11 County Maintenance Offices, Regional Transit Agency Offices
High Threat Facilities	N/A	N/A	N/A
Mobility Technologies ATIS Administration	Traffic conditions	Existing	Mobility Technologies Field Devices, PennDOT D11 RTMC, City of Pittsburgh TMC, PTC Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
		Planned 2	Municipal Traffic Management Offices
	Incident information	Planned 2	911 Communication Centers
	Traveler trip request information	Planned 1	Personal Traveler Information Devices
	Travel information coordination	Existing	PennDOT D11 RTMC
		Planned 2	Port of Pittsburgh Commission Office, Regional Travel Information System, SPC Office, TMA Offices
	Incident report	Existing	Regional Media Outlets
	Field device maintenance status	Existing	Mobility Technologies Field Devices
	Detailed construction information	Planned 2	PennDOT D11 RTMC
	Raw/archived traffic data	Planned 1	PennDOT D11 RTMC
	CCTV camera images	Planned 2	PennDOT D11 RTMC, PTC Offices
		Existing	Mobility Technologies Field Devices
	Roadway weather conditions	Planned 2	Mobility Technologies Field Devices, PennDOT D12 TMC
Mobility Technologies Field Devices	Device control	Existing	Mobility Technologies ATIS Administration
Municipal Field Devices	Location signals from public safety vehicles for signal priority	Existing	Municipal Public Safety Vehicles
	Traffic signal timing changes and monitoring	Existing	Municipal Traffic Management Offices, PennDOT D11 RTMC
	Truck preemption signal for traffic signal adjustment	Existing	PennDOT D12 Field Devices

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
	Traffic signal system coordination	Planned 2	City of Pittsburgh Field Devices
	Location from transit vehicles for signal priority	Planned 2	BCTA Transit Vehicles, Regional Transit Vehicles, PAAC Transit Vehicles
Municipal Public Safety Offices	Public safety vehicle location	Planned 2	Municipal Public Safety Vehicles
	Incident and emergency response coordination	Existing	911 Communication Centers, County EMA Centers, PAAC Centers, PSP Offices
Municipal Public Safety Vehicles	Incident dispatch, detection and location information	Existing	911 Communication Centers, Municipal Public Safety Offices
Municipal Traffic Management Offices	General existing traffic information	Existing	PennDOT D11 RTMC, PennDOT D10 TMC, PennDOT D12 TMC
		Planned 2	City of Pittsburgh TMC
	Signal timing change coordination with other jurisdictions	Planned 2	City of Pittsburgh TMC
	Incident and emergency response coordination	Existing	County EMA Centers
	Maintenance and construction information	Existing	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices
	Traffic control coordination	Existing	PennDOT D11 RTMC
		Planned 2	PennDOT D10 TMC, PennDOT D12 TMC

Element	Need (operation/data inputs from others)	Status	Origin Element
	Signal status information, camera images, and traffic flow information	Existing	Municipal Field Devices
PAAC Centers	CCTV images	Planned 1	PAAC Remote Traveler Support
	Incident and congestion data	Existing	Mobility Technologies ATIS Administration
		Planned 2	PennDOT D11 RTMC, City of Pittsburgh TMC
	Transit operations coordination	Planned 1	BCTA Transit Management Center, Regional Transit Agency Offices
	Incident and emergency response coordination	Existing	County EMA Centers, PEMA Emergency Operation Center, 911 Communication Centers, Municipal Public Safety Offices
	Emergency alert signal	Existing	PAAC Transit Vehicles
	Vehicle GIS location via AVL/GPS	Existing	PAAC Transit Vehicles
	Parking and traffic coordination	Planned 2	Park-n-Ride Facilities, ACAA Office
	Bus security camera images	Planned 1	PAAC Transit Vehicles
	Fare and passenger count data	Planned 1	PAAC Transit Vehicles
	In-vehicle diagnostics and status data	Existing	PAAC Transit Vehicles
PAAC Remote Traveler Support	Real-time bus and rail schedule adherence and arrival information	Planned 1	PAAC Centers
	CCTV monitoring camera control	Planned 1	PAAC Centers
	Regional traveler information	Planned 2	Regional Travel Information System



Element	Need (operation/data inputs from others)	Status	Origin Element
	Payment information	Planned 2	Regional Personal Traveler Cards
	Multi-modal travel information	Planned 2	PAAC Centers
PAAC Transit Vehicles	Paratransit radio dispatch and location information	Existing	PAAC Centers
	Payment information from PAAC/regional traveler cards	Planned 2	Regional Personal Traveler Cards
	Demand responsive dispatch and GIS map location data for paratransit	Planned 1	PAAC Centers
Park-n-Ride Facilities	Payment information	Planned 2	Passenger Vehicles, Regional Personal Traveler Cards
	Parking and traffic coordination	Existing	PAAC Centers
		Planned	ACAA Office, BCTA Transit Management Center, PennDOT D11 RTMC, Regional Transit Agency Offices
Passenger Vehicles	Request for electronic payment	Existing	PTC Toll Plazas, City of Pittsburgh Field Devices, ACAA Field Devices, Park-n-Ride Facilities
PEMA Emergency Operation Center	Incident/emergency information and response coordination	Existing	911 Communication Centers, County EMA Centers, PennDOT Central Office Organizations, PennDOT STMC, Pennsylvania Office of Homeland Security
	Traffic conditions	Existing	PTC Offices
		Planned 2	PennDOT STMC
	Traffic control coordination	Planned 2	PTC Offices
	Hazmat information	Existing	Commercial Vehicle Company Offices

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
Pennsylvania Office of Homeland Security	High Threat Facility Incident Information	Existing	PEMA Emergency Operation Center
PennDOT Central Office Field Devices	RWIS device control	Existing	PennDOT Central Office
		Planned 2	PennDOT STMC
	Safety inspection and electronic screening information	Planned 2	Commercial Vehicles, PennDOT STMC
PennDOT Central Office Organizations	PennDOT Bureau of Planning and Research collects archived data	Existing	Regional Transit Agencies, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PTC Offices
		Planned 2	PennDOT STMC
	Incident/emergency response coordination and information	Existing	PEMA Emergency Operation Center, PennDOT D10 RTMC, PennDOT D11 RTMC, PennDOT D12 TMC, PSP Offices, PTC Offices
		Planned 2	PennDOT STMC
	Work plan coordination	Existing	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC
		Planned 2	PennDOT STMC
	Maintenance and construction coordination	Existing	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC

Element	Need (operation/data inputs from others)	Status	Origin Element
	Traffic information and roadway conditions	Existing	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC
		Planned 2	PennDOT STMC
	Weather information	Planned 2	PennDOT STMC
	Request for traffic and emergency information for the media	Existing	Regional Media Outlets
	PennDOT Motor Carrier Division conducts weight enforcement activities	Existing	PSP Offices
		Planned 2	PennDOT STMC
	PennDOT (Motor Carrier Division) maintains commercial vehicle registrations	Existing	Commercial Vehicle Company Offices
		Planned 2	PennDOT STMC
	Tax credentials, audits information, and ax-related enforcement activities (Motor Carrier Division)	Existing	Commercial Vehicle Company Offices
		Planned 2	PennDOT STMC
	RWIS information (BOMO)	Existing	PennDOT Central Office Field Devices
		Planned 2	PennDOT STMC

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
PennDOT D1 Field Devices	HAR and DMS control	Existing	PennDOT D11 RTMC
PennDOT D10 County Maintenance Offices	Maintenance resource request	Existing	911 Communication Centers, Municipal Public Safety Offices
	Maintenance and construction coordination	Existing	Municipal Traffic Management Offices, PennDOT D10 Vehicles, PennDOT D10 TMC PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PennDOT D11 RTMC, Adjacent PennDOT District and County Offices, PSP Offices, PTC Offices
	Vehicle diagnostics and operational data	Existing	PennDOT D10 Vehicles
	Incident and emergency coordination	Existing	PennDOT D10 TMC, 911 Communication Centers
	CCTV camera images	Planned 2	PennDOT D10 Field Devices
	RWIS weather data	Existing	PennDOT D10 Field Devices, PennDOT Central Office Field Devices
PennDOT D10 Field Devices	DMS and HAR messages	Existing	PennDOT D10 TMC, PennDOT D11 RTMC
		Planned 1	PennDOT D10 County Maintenance Offices, Adjacent PennDOT District and County Offices
	RWIS control settings	Planned 1	PennDOT D10 County Maintenance Offices, PennDOT D10 TMC

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
	Anti-icing bridge sprayer control	Planned 2	PennDOT D10 County Maintenance Offices
	CCTV camera control	Planned 2	PennDOT D10 TMC
PennDOT D10 TMC	Traffic count data from detectors	Planned 2	PennDOT D10 Field Devices
	CCTV camera images	Planned 2	PennDOT D10 Field Devices
	Traffic management coordination	Existing	PennDOT D11 RTMC, PennDOT D12 TMC, Adjacent PennDOT District and County Offices
	Incident and emergency response coordination	Existing	County EMA Centers, PennDOT D11 RTMC, PennDOT D12 TMC, PSP Offices, PTC Offices, PennDOT Central Office Organizations, PennDOT D10 County Maintenance Offices
	Incident response resource request	Existing	911 Communication Centers, PSP Offices, Municipal Public Safety Offices, Adjacent PennDOT District and County Offices
	Coordinated freeway detour information	Planned 2	Municipal Traffic Management Offices
	Field device control coordination		Existing
		Planned 2	PennDOT D12 TMC, Adjacent PennDOT District and County Offices

Element	Need (operation/data inputs from others)	Status	Origin Element
	Maintenance and construction coordination	Existing	PennDOT D10 Vehicles, PennDOT D10 County Maintenance Offices, Municipal Traffic Management Offices, PennDOT D11 RTMC, PennDOT D12 TMC, Adjacent PennDOT District and County Offices
PennDOT D10 Vehicles	Maintenance and construction coordination	Existing	PennDOT D10 TMC, PennDOT D10 County Maintenance Offices
PennDOT D11 County Maintenance Offices	RWIS weather data	Existing	PennDOT D11 Field Devices
	CCTV camera images	Existing	PennDOT D11 Field Devices
	Over height vehicle detection warning	Existing	PennDOT D11 Field Devices
	Maintenance resource request	Existing	Municipal Public Safety Offices
	Incident and emergency response coordination	Existing	911 Communication Centers, County EMA Centers, Municipal Public Safety Offices, PennDOT D11 RTMC
	ITS device control coordination	Existing	PennDOT D11 RTMC
	Traffic flow data	Existing	PennDOT D11 Field Devices
	Maintenance and construction coordination	Existing	PennDOT D11 Vehicles, PennDOT D11 RTMC, Municipal Traffic Management Offices, PennDOT D10 County Maintenance Offices, PennDOT D12 County Maintenance Offices, Adjacent PennDOT District and County Offices
PennDOT D11 Field Devices	DMS and HAR messages	Existing	PennDOT D11 RTMC, PennDOT D11 County Maintenance Offices

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
		Planned 2	Park-n-Ride Facilities
	HOV lane gate control	Existing	PennDOT D11 RTMC
	Device control	Existing	PennDOT D11 RTMC, PennDOT D11 County Maintenance Offices
	HOV gate device coordination with traffic signals	Existing	City of Pittsburgh Field Devices
	Parking lot status for broadcast on HAR	Existing	ACAA Office
PennDOT D11 Remote Traveler Support	Current traveler information for public kiosks	Planned 2	PennDOT D11 RTMC, ACAA Office, PAAC Centers, PennDOT D11 County Maintenance Offices, Regional Travel Information System
PennDOT D11 RTMC	RWIS weather information	Existing	PennDOT Central Office Organizations, PennDOT D11 Field Devices
	CCTV images	Existing	PennDOT D11 Field Devices
	Traffic flow data	Existing	PennDOT D11 Field Devices
	Weather/AMBER message requests for HAR/DMS	Existing	Adjacent PennDOT District and County Offices, PSP Offices
	Incident response resource request	Existing	911 Communication Centers, PSP Offices, Municipal Public Safety Offices
	CCTV images	Planned 2	PTC Offices
	Information and status data from PTC field devices	Planned 2	PTC Offices

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
	Incident and emergency response coordination	Existing	County EMA Centers, PennDOT D10 TMC, PennDOT D12 TMC, Municipal Public Safety Offices, PSP Offices, PTC Offices, PennDOT Central Office Organizations, PennDOT D11 County Maintenance Offices, PennDOT D10 County Maintenance Offices, PennDOT D12 County Maintenance Offices, 911 Communication Centers, PAAC Centers, PennDOT D11 Vehicles, Adjacent PennDOT District and County Offices
	External incident report	Existing	Regional Media Outlets
	Camera control request	Existing	PSP Offices
	Signal status information	Existing	Municipal Field Devices
	Coordinated freeway detour information	Planned 2	Municipal Traffic Management Offices
	Vehicle location data	Planned 2	PennDOT D11 Vehicles
	Maintenance and construction coordination	Existing	PennDOT D11 Vehicles, PennDOT D11 County Maintenance Offices, Municipal Traffic Management Offices, PennDOT D10 County Maintenance Offices, PennDOT D12 County Maintenance Offices, Adjacent PennDOT District and County Offices, PennDOT D10 TMC, PennDOT D12 TMC



Element	Need (operation/data inputs from others)	Status	Origin Element
	Field device control coordination	Existing	ACAA Office, Mobility Technologies ATIS Administration, Municipal Traffic Management Offices, PennDOT D10 TMC, PennDOT D12 TMC, PennDOT D11 County Maintenance Offices, Adjacent PennDOT District and County Offices
		Planned 2	City of Pittsburgh TMC
	Traffic information dissemination coordination	Existing	Mobility Technologies ATIS Administration
	Traffic information coordination	Existing	ACAA Office, City of Pittsburgh Parking Authority Offices, City of Pittsburgh TMC, Mobility Technologies ATIS Administration, Municipal Traffic Management Offices, PennDOT D10 TMC, PennDOT D12 TMC, PennDOT D11 County Maintenance Offices, Adjacent PennDOT District and County Offices
	Parking coordination	Existing	City of Pittsburgh Parking Authority Offices, Park-n-Ride Facilities
PennDOT D11 Vehicles	Incident status and location	Existing	PennDOT D11 RTMC
	Vehicle dispatch	Existing	PennDOT D11 RTMC, PSP Offices
	Maintenance and construction coordination	Existing	PennDOT D11 RTMC, PennDOT D11 County Maintenance Offices
PennDOT D12 County Maintenance	RWIS weather data	Existing	PennDOT D12 Field Devices, PennDOT Central Office Organizations

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
Offices	Incident and emergency response coordination	Existing	911 Communication Centers, PennDOT D12 TMC, PSP Offices
	Maintenance resource request	Existing	911 Communication Centers, Municipal Public Safety Offices
	Maintenance and construction coordination	Existing	PennDOT D12 Vehicles, PennDOT D12 TMC, PennDOT D11 RTMC, PennDOT D11 County Maintenance Offices, PennDOT D10 County Maintenance Offices, Adjacent PennDOT District and County Offices, Municipal Traffic Management Offices, PSP Offices, PTC Offices
	CCTV camera images	Planned 2	PennDOT D12 Field Devices
	Vehicle diagnostics and operational data	Existing	PennDOT D12 Vehicles
PennDOT D12 Field Devices	DMS and HAR messages	Existing	PennDOT D12 TMC, PennDOT D11 RTMC
		Planned 1	PennDOT D12 County Maintenance Offices
	RWIS control settings	Planned 1	PennDOT D12 County Maintenance Offices, PennDOT D12 TMC
	Anti-icing bridge sprayer control	Existing	PennDOT D12 County Maintenance Offices
		Planned 2	PennDOT D12 TMC
	Field device coordination	Existing	Municipal Field Devices
	CCTV camera control	Planned 2	PennDOT D12 TMC

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>	
PennDOT D12 TMC	Traffic count data from detectors	Planned 2	PennDOT D12 Field Devices	
	CCTV camera images	Planned 2	PennDOT D12 Field Devices	
	RWIS weather data	Planned 2	PennDOT D12 Field Devices	
	Traffic management coordination	Existing	PennDOT D11 RTMC, PennDOT D10 TMC, Adjacent PennDOT District and County Offices	
	Incident and emergency response coordination	Existing	County EMA Centers, PennDOT D11 RTMC, PennDOT D10 TMC, PSP Offices, PTC Offices, PennDOT Central Office Organizations, PennDOT D12 County Maintenance Offices, Adjacent PennDOT District and County Offices	
	Incident response resource request	Existing	911 Communication Centers, PSP Offices, Municipal Public Safety Offices	
	Coordinated freeway detour information	Planned 2	Municipal Traffic Management Offices	
	Field device control coordination		Existing	PennDOT D11 RTMC
			Planned 2	PennDOT D10 TMC, Adjacent PennDOT District and County Offices
Maintenance and construction coordination	Existing	PennDOT D12 Vehicles, PennDOT D12 County Maintenance Offices, Municipal Traffic Management Offices, PennDOT D11 RTMC, PennDOT D10 TMC, Adjacent PennDOT District and County Offices		
PennDOT D12 Vehicles	Maintenance and construction coordination	Existing	PennDOT D12 TMC, PennDOT D12 County Maintenance Offices	

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
PennDOT STMC	Incident/emergency information and coordination	Planned 2	PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PSP Offices, PTC Offices
	Traffic control coordination	Planned 2	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC
	Traffic conditions and information	Planned 2	PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PTC Offices
	Archived data	Planned 2	PennDOT Central Office Organizations, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC
	Weather information	Planned 2	PennDOT Central Office Organizations PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PennDOT Central Office Field Devices
	Work zone information	Planned 2	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC
	Special event information	Planned 2	Event Promoters
	Maintenance and Construction information including snow removal	Planned 2	PennDOT Central Office Organizations
	Vehicle registrations	Planned 2	PennDOT Central Office Organizations, Commercial Vehicle Company Offices

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
	Credentialing information	Planned 2	PennDOT Central Office Organizations, PennDOT Central Office Field Devices, Commercial Vehicle Company Offices
	Hazmat information	Planned 2	Commercial Vehicle Company Offices
Personal Traveler Information Devices	Broadcasted road and travel conditions	Existing	ACAA Office, Mobility Technologies ATIS Administration, PennDOT D10 County Maintenance Offices, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 County Maintenance Offices, PTC Offices, Regional Travel Information System, TMA Offices
	Transit traveler information	Existing	BCTA Transit Management Center, PAAC Centers, Regional Transit Agency Offices
	Trip planning	Existing	BCTA Transit Management Center,
		Planned 1	Mobility Technologies ATIS Administration, PAAC Centers, SPC Office
		Planned 2	Regional Transit Agency Offices, Regional Travel Information System
Rideshare information	Existing	SPC Office	
Port Facilities	Special routes for commercial vehicles	Planned 2	Port of Pittsburgh Commission Office
Port of Pittsburgh Commission Office	Roadway and traffic conditions	Planned 2	City of Pittsburgh TMC, PennDOT D11 RTMC, PTC Offices

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>	
	Travel information distribution coordination	Planned 2	Mobility Technologies ATIS Administration, Regional Travel Information System	
PSP Offices	Incident and emergency information and coordination	Existing	911 Communication Centers, County EMA Centers,, Municipal Public Safety Offices, PennDOT Central Office Organizations, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PSP Vehicles, PTC Offices, PSP Troop T Highspire	
		Planned 2	PennDOT STMC	
	Credentialing and safety inspection information	Existing	PennDOT Central Office Organizations	
		Planned 2	PennDOT STMC	
	Maintenance and Construction information	Existing	PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices	
		Planned 2	PennDOT STMC	
	Traffic conditions	Existing	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC	
		Planned 2	PennDOT STMC	
	Weather information	Existing	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC	
		Planned 2	PennDOT STMC	
	PSP Troop T	Incident and emergency information and coordination	Existing	PSP Offices, PTC Offices

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
Highspire	Weather information	Existing	PTC Offices
	Traffic information/conditions	Existing	PTC Offices
PSP Troop T Vehicles	Incident and emergency information on the Pennsylvania Turnpike	Existing	PTC Offices, PSP Troop T Highspire
	Dispatch to incidents on the Pennsylvania Turnpike	Existing	PTC Offices, PSP Troop T Highspire
PSP Vehicles	Incident and emergency information on state highways	Existing	PSP Offices
	Dispatch to incidents on state highways	Existing	PSP Offices
PTC Field Devices	DMS and HAR messages	Existing	PTC Offices
	CCTV control	Existing	PTC Offices
	Roadway treatment control	Planned 1	PTC Offices
	RWIS control	Planned 1	PTC Offices
PTC Maintenance and Construction Vehicles	Maintenance dispatch information	Existing	PTC Offices
PTC Offices	Incident and emergency information and coordination	Existing	911 Communication Centers, County EMA Centers, PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PSP Offices, PSP Troop T Highspire
		Planned 2	PennDOT STMC
	Request for maintenance and construction services	Existing	911 Communication Centers, County EMA Centers

Element	Need (operation/data inputs from others)	Status	Origin Element
	Maintenance and Construction coordination	Existing	PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices
	Traffic control coordination (control of DMS along the Turnpike)	Planned 2	PEMA Emergency Operation Center, PennDOT D11 RTMC, PennDOT D12 TMC, PennDOT STMC
	Traffic information and conditions	Existing	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PTC Field Devices, PSP Troop T Highspire
		Planned 2	PennDOT STMC
	Weather conditions	Existing	PennDOT Central Office Organizations, PSP Troop T Highspire
	Work zone and plan information	Existing	PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC
		Planned 2	PennDOT STMC
	CVO violation information (overweight vehicles)	Existing	PTC Field Devices
	CCTV images	Existing	PTC Field Devices
	RWIS and roadway treatment data	Planned 1	PTC Field Devices
	CCTV security monitoring information	Planned 2	PTC Field Devices
	Toll information	Existing	PTC Toll Plazas



<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
	Information for the media	Existing	Regional Media Outlets
	Hazmat information	Existing	Commercial Vehicle Company Offices
	Credentialing information	Existing	Commercial Vehicle Company Offices
PTC Service Plazas	Traveler information	Existing	Information Service Providers, PTC Offices
PTC Toll Plazas	E-Z Pass tag reader information	Existing	Passenger Vehicles, Commercial Vehicles
Regional Media Outlets	Traffic and roadway conditions	Existing	City of Pittsburgh Parking Authority Offices, City of Pittsburgh TMC, Municipal Traffic Management Offices
	Incident and emergency information	Existing	Count EMA Centers, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PennDOT D11 County Maintenance Offices
	Traveler information	Existing	Mobility Technologies ATIS Administration
	Maintenance and construction information	Existing	PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
Regional Personal Traveler Cards	Request for payment	Existing	BCTA Transit Vehicles, BCTA Remote Traveler Support, ACAA Field Devices, City of Pittsburgh Field Devices, PAAC Remote Traveler Support, PAAC Transit Vehicles, Park-n-Ride Facilities, Regional Transit Vehicles
Regional Transit Agency Offices	Transit management coordination	Planned 1	PAAC Centers, BCTA Transit Management Center
	Incident and emergency response coordination	Existing	911 Communication Centers, County EMA Centers
	Passenger count, automated driver logs, and fare payment information from vehicles	Planned 2	Regional Transit Vehicles
	Vehicle diagnostics and maintenance information	Planned 1	Regional Transit Vehicles
	Fare payment information	Planned 2	Regional Transit Vehicles
	Vehicle location data	Planned 1	Regional Transit Vehicles
	Parking coordination information	Planned 2	Park-n-Ride Facilities
	Road and weather information	Planned 2	PennDOT D11 RTMC
Regional Transit Vehicles	Payment information from regional traveler cards	Planned 2	Regional Personal Traveler Cards
	Driver dispatch and management information	Existing	Regional Transit Agency Offices
Regional Travel Information System	Travel information coordination	Planned 2	Mobility Technologies ATIS Administration, Port of Pittsburgh Commission Office, SPC Office, TMA Offices

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
	Transit traveler information	Planned 2	BCTA Transit Management Center, PAAC Centers, Regional Transit Agency Offices
	Current traveler information for public kiosks	Planned 2	PennDOT D11 Remote Traveler Support
	Broadcasted road and travel conditions	Planned 2	Personal Traveler Information Devices
	Trip planning	Planned 2	Personal Traveler Information Devices
	Traffic and roadway information	Planned 2	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PTC Offices
	Traveler archived data	Planned 2	SPC Office
SPC Office	Transit traveler information	Existing	BCTA Transit Management Center, PAAC Centers, Regional Transit Agency Offices
	Traveler information distribution coordination	Planned 2	Mobility Technologies ATIS Administration, Regional Travel Information System
	Traffic and roadway traveler information	Planned 2	PennDOT D11 RTMC
	Traveler profile and trip request information	Planned 2	Personal Traveler Information Devices
	Traveler archived data	Planned 2	Regional Travel Information System
TMA Offices	Traveler information distribution coordination	Planned 2	Mobility Technologies ATIS Administration, Regional Travel Information System
	Traveler profile information	Existing	Personal Traveler Information Devices

<b>Element</b>	<b>Need (operation/data inputs from others)</b>	<b>Status</b>	<b>Origin Element</b>
Towing Industry Responders	Dispatch information	Existing	911 Communication Centers, PSP Offices

### 3.4 Services

Sections 3.3 and 3.4 examine each element defined in Section 3.2 in terms of *needs* (what each element — i.e., agency stakeholder — needs from others) and *services* (what each element can provide to others). This information is used to program *Turbo Architecture*, the National ITS Architecture software. “Services” refer to the information outputs from one agency operation to another; they are presented in tabular format and trace back to the systems inventory.

**Table 3-3: Regional Services Table**

<b>Element</b>	<b>Service (operation/data outputs to others)</b>	<b>Status</b>	<b>Destination Element</b>
911 Communication Centers	Incident/emergency dispatch	Existing	Municipal Public Safety Vehicles, PSP Offices, Towing Industry Responders
	Incident and emergency coordination	Existing	BCTA Transit Management Center, County EMA Centers, Municipal Public Safety Offices, PAAC Centers, PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, Regional Transit Agency Offices
		Planned 2	Mobility Technologies ATIS Administration, Regional Travel Information System
	Maintenance resource request	Existing	PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices
ACAA Field Devices	Payment request	Planned 2	Regional Personal Traveler Cards, Passenger Vehicles
	Parking coordination	Existing	ACAA Office
ACAA Office	Parking lot percent full and open/ closed status	Existing	Personal Traveler Information Devices

<b>Element</b>	<b>Service (operation/data outputs to others)</b>	<b>Status</b>	<b>Destination Element</b>
	Parking lot status travel advisories broadcast on PennDOT D11 HAR	Existing	PennDOT D11 Field Devices
	Incident and emergency coordination	Existing	County EMA Centers
	Parking coordination	Planned 2	PAAC Centers, BCTA Transit Management Center, Park-n-Ride Facilities
	Device control coordination	Existing	PennDOT D11 RTMC
	Current traveler information for public kiosks	Planned 2	PennDOT D11 Remote Traveler Support
	Parking lot status and travel advisory DMS messages	Planned 1	ACAA Field Devices
Adjacent PennDOT District and County Offices	Maintenance and construction coordination	Existing	PennDOT D11 County Maintenance Offices, PennDOT D10 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PennDOT D11 RTMC, PennDOT D10 TMC, PennDOT D12 TMC
	Incident response coordination	Existing	PennDOT D11 RTMC, PennDOT D10 TMC, PennDOT D12 TMC
	Device control	Planned 1	PennDOT D10 Field Devices
	Device control coordination	Existing	PennDOT D11 RTMC
BCTA Remote Traveler Support	Surveillance images	Planned 1	BCTA Transit Management Center
	Request for payment	Existing	Regional Personal Traveler Cards
	Trip request information	Planned 2	Regional Travel Information System
BCTA Transit	Incident notification and information	Existing	911 Communication Centers

<b>Element</b>	<b>Service (operation/data outputs to others)</b>	<b>Status</b>	<b>Destination Element</b>
Management Center	Schedule adherence and arrival/ departure information	Existing	BCTA Remote Traveler Support
	Trip plan	Planned 1	BCTA Remote Traveler Support , Personal Traveler Information Devices
	Paratransit real-time scheduling and route information	Planned 1	BCTA Transit Vehicles
	Incident and emergency coordination	Existing	County EMA Centers
	Regional fare collection system	Planned 2	PAAC Centers
	Transit management coordination	Planned 1	PAAC Centers, Regional Transit Agency Offices
	Parking and traffic coordination	Planned	Park-n-Ride Facilities
	Transit traveler information	Existing	Personal Traveler Information Devices
		Planned 2	Regional Travel Information System, SPC Office
BCTA Transit Vehicles	Vehicle speed, fare transactions, silent alarm, and passenger count	Planned 1	BCTA Transit Management Center
	Vehicle location, next stop, unscheduled stop information	Existing	BCTA Transit Management Center
	Roadway incident reporting from drivers to center	Existing	BCTA Transit Management Center
	Passenger count, automated driver logs, and fare payment information from vehicles	Existing	BCTA Transit Management Center
	Vehicle diagnostics and maintenance information	Planned 1	BCTA Transit Management Center
	Location signals from transit vehicles for signal priority	Existing	City of Pittsburgh Field Devices



Element	Service (operation/data outputs to others)	Status	Destination Element
		Planned 2	Municipal Field Devices
	Request for payment	Existing	Regional Personal Traveler Cards
City of Pittsburgh Field Devices	CCTV camera images	Planned 2	City of Pittsburgh TMC
	Traffic flow, and count information	Planned 1	City of Pittsburgh TMC
	Traffic signal system coordination	Planned 2	Municipal Field Devices
	Request for payment	Existing	Passenger Vehicles, Regional Personal Traveler Cards
	HOV gate device coordination with traffic signals	Existing	PennDOT D11 Field Devices
City of Pittsburgh Parking Authority Offices	Traffic management messages for DMS	Planned 1	City of Pittsburgh Field Devices
	Parking coordination information	Planned 1	City of Pittsburgh TMC, PennDOT D11 RTMC
	Traffic control coordination	Planned 2	City of Pittsburgh TMC
	Traffic information coordination	Existing	PennDOT D11 RTMC
	Traffic and roadway conditions	Existing	Regional Media Outlets
City of Pittsburgh TMC	Traffic, weather, road conditions, and incident information	Planned 2	BCTA Transit Management Center, PAAC Centers
	Signal system timing changes	Existing	City of Pittsburgh Field Devices
	Traffic management messages for DMS	Planned 1	City of Pittsburgh Field Devices
	Camera control	Planned 2	City of Pittsburgh Field Devices
	Parking coordination information	Planned 1	City of Pittsburgh Parking Authority Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Real-time roadway traffic and incident information	Planned 2	County EMA Centers
	Incident and emergency response coordination	Existing	County EMA Centers
	Traffic conditions	Existing	Mobility Technologies ATIS Administration, Regional Media Outlets
		Planned 2	Port of Pittsburgh Commission Office
	General existing traffic information	Planned 2	Municipal Traffic Management Offices
	Signal timing change coordination with other jurisdictions	Planned 2	Municipal Traffic Management Offices
	Field device control coordination	Planned 2	PennDOT D11 RTMC
	Traffic information coordination	Existing	PennDOT D11 RTMC
Commercial Vehicle Company Offices	Hazmat information	Existing	PEMA Emergency Operation Center, PTC Offices, PennDOT STMC
	Tax, audit and credentialing information	Planned 2	PennDOT Central Office Organizations, PennDOT STMC
	Commercial vehicle tracking and coordination	Planned 1	Commercial Vehicles
Commercial Vehicles	Safety inspection and screening information	Planned 1	PTC Toll Plazas, PennDOT Central Office Field Devices
	Commercial vehicle tracking and coordination	Planned 1	Commercial Vehicle Company Offices
County EMA Centers	Incident notification and information	Existing	911 Communication Centers
	Resource dispatch requests	Existing	911 Communication Centers

Element	Service (operation/data outputs to others)	Status	Destination Element
	Incident and emergency response coordination	Existing	Municipal Public Safety Offices, Municipal Traffic Management Offices, PAAC Centers, PennDOT D10 TMC, PennDOT D11 County Maintenance Offices, PennDOT D11 RTMC, PennDOT D12 TMC, Regional Transit Agency Offices, City of Pittsburgh TMC, BCTA Transit Management Center, ACAA Office
High Threat Facilities	High threat facility incident information	Existing	911 Communication Centers, County EMA Centers
Mobility Technologies ATIS Administration	Traffic, weather, road conditions, and incident information	Planned 2	BCTA Transit Management Center, PAAC Centers
	Real-time roadway traffic and incident information	Planned 2	County EMA Centers
	Device control	Existing	Mobility Technologies Field Devices
	Field device control coordination	Existing	PennDOT D11 RTMC
	Traffic information dissemination coordination	Existing	PennDOT D11 RTMC
	Traffic information coordination	Existing	PennDOT D11 RTMC
	Broadcasted road and travel conditions	Existing	Personal Traveler Information Devices
	Trip planning	Planned 1	Personal Traveler Information Devices
	Travel information distribution coordination	Planned 2	Port of Pittsburgh Commission Office, Regional Travel Information System, SPC Office, TMA Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Traveler information	Existing	Regional Media Outlets
Mobility Technologies Field Devices	Traffic conditions	Existing	Mobility Technologies ATIS Administration
	Field device maintenance status	Existing	Mobility Technologies ATIS Administration
	CCTV camera images	Existing	Mobility Technologies ATIS Administration
	Roadway weather conditions	Planned 2	Mobility Technologies ATIS Administration
Municipal Field Devices	Traffic signal device coordination	Planned 2	City of Pittsburgh Field Devices
	Signal status information, camera images, and traffic flow information	Existing	Municipal Traffic Management Offices
	Signal status information	Existing	PennDOT D11 RTMC
	Field device coordination	Existing	PennDOT D12 Field Devices
Municipal Public Safety Offices	Incident and emergency response coordination	Existing	911 Communication Centers, County EMA Centers, PennDOT D11 County Maintenance Offices, PennDOT D11 RTMC, PAAC Centers
	Incident dispatch, detection and location information	Existing	Municipal Public Safety Vehicles
	Maintenance resource request	Existing	PennDOT D10 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PennDOT D11 County Maintenance Offices
	Incident response resource request	Existing	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC

<b>Element</b>	<b>Service (operation/data outputs to others)</b>	<b>Status</b>	<b>Destination Element</b>
Municipal Public Safety Vehicles	Resource dispatch requests	Existing	911 Communication Centers
	Vehicle tracking data	Planned 2	911 Communication Centers, Municipal Public Safety Offices
	Location from public safety vehicles for signal priority	Planned 1	City of Pittsburgh Field Devices, Municipal Field Devices
Municipal Traffic Management Offices	Incident and emergency coordination	Existing	County EMA Centers
	Traffic conditions	Planned 2	Mobility Technologies ATIS Administration, Regional Media Outlets
	Traffic signal timing changes and monitoring	Existing	Municipal Field Devices
	Maintenance and construction coordination	Existing	PennDOT D10 County Maintenance Offices, PennDOT D10 TMC, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PennDOT D12 TMC
	Coordinated freeway detour information	Planned 2	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC
	Maintenance and construction information	Existing	PennDOT D11 RTMC
	Field device control coordination	Existing	PennDOT D11 RTMC
	Traffic information coordination	Existing	PennDOT D11 RTMC
PAAC Centers	Incident notification and information	Existing	911 Communication Centers

Element	Service (operation/data outputs to others)	Status	Destination Element
	Coordinating bus schedule adherence and transit traveler information with other transit agencies for customer transfers	Planned 2	BCTA Transit Management Center
	Incident and emergency response coordination	Existing	County EMA Centers, Municipal Public Safety Offices, PennDOT D11 RTMC
	Real-time bus and rail schedule adherence and arrival information	Planned 1	PAAC Remote Traveler Support
	CCTV monitoring camera control	Planned 1	PAAC Remote Traveler Support
	Multi-modal travel information	Planned 2	PAAC Remote Traveler Support, PennDOT D11 Remote Traveler Support
	Paratransit radio dispatch and location information	Existing	PAAC Transit Vehicles
	Demand responsive dispatch and GIS map location data for paratransit	Planned 1	PAAC Transit Vehicles
	Parking and traffic coordination	Existing	Park-n-Ride Facilities
	Transit traveler information	Existing	Personal Traveler Information Devices,
		Planned 2	Regional Travel Information System, SPC Office
	Trip planning	Planned 1	Personal Traveler Information Devices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Transit management coordination	Existing	BCTA Transit Management Center
		Planned 1	Regional Transit Agency Offices
Park-n-Ride Facilities	Parking coordination information	Planned 1	ACAA Office, BCTA Transit Management Center, PAAC Centers, PennDOT D11 RTMC, Regional Transit Agency Offices
	Request for electronic payment	Existing	Passenger Vehicles
	DMS and HAR messages	Planned 2	PennDOT D11 Field Devices
	Request for payment	Existing	Regional Personal Traveler Cards
PAAC Remote Traveler Support	CCTV images	Planned 1	PAAC Centers
	Request for payment	Existing	Regional Personal Traveler Cards
	Trip request information	Planned 2	Regional Travel Information System
PAAC Transit Vehicles	Location from transit vehicles for signal priority	Existing	City of Pittsburgh Field Devices
		Planned 2	Municipal Field Devices
	Emergency alert signal	Existing	PAAC Centers
	Vehicle GIS location via AVL/GPS	Existing	PAAC Centers
	Bus security camera images	Planned 1	PAAC Centers
	Fare and passenger count data	Planned 1	PAAC Centers
	In-vehicle diagnostics and status data	Existing	PAAC Centers
	Request for payment	Existing	Regional Personal Traveler Cards

<b>Element</b>	<b>Service (operation/data outputs to others)</b>	<b>Status</b>	<b>Destination Element</b>
Passenger Vehicles	Payment information	Planned 2	ACAA Field Devices, Park-n-Ride Facilities
	Receive E-Z Pass tag reader information	Existing	PTC Toll Plazas
PEMA Emergency Operation Center	Incident and emergency information and coordination	Existing	911 Communication Centers, County EMA Centers, PTC Offices, PennDOT STMC
	High threat information coordination	Existing	Pennsylvania Office of Homeland Security
Pennsylvania Office of Homeland Security	High threat information and coordination	Existing	PEMA Emergency Operation Center
PennDOT Central Office Field Devices	RWIS information	Existing	PennDOT Central Office Organizations, PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices
		Planned 2	PennDOT STMC
	Safety inspection reports and violation notification	Existing	PennDOT Central Office Organizations
		Planned 2	PennDOT STMC
PennDOT Central Office Organizations	Request for archived data (BPR)	Existing	Regional Transit Offices, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC
		Planned 2	PennDOT STMC



Element	Service (operation/data outputs to others)	Status	Destination Element	
	Incident and emergency information and coordination (BHSTE)	Existing	PEMA Emergency Operation Center, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PSP Offices	
		Planned 2	PennDOT STMC	
	Traffic information and conditions (BHSTE)	Existing	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC	
		Planned 2	PennDOT STMC	
	Work zone information (BOMO)	Existing	PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC	
		Planned 2	PennDOT STMC	
	Maintenance and Construction coordination		PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC	
		Planned 2	PennDOT STMC	
	Commercial vehicle enforcement information (Motor Carrier Division)	Existing	PSP Offices	
		Planned 2	PennDOT STMC	
	Media information	Existing	Regional Media Outlets	
	PennDOT D1 Field Devices	N/A	N/A	N/A
	PennDOT D10 County	Incident notification and information	Existing	911 Communication Centers

<b>Element</b>	<b>Service (operation/data outputs to others)</b>	<b>Status</b>	<b>Destination Element</b>
Maintenance Offices	Maintenance and construction coordination	Existing	Adjacent PennDOT District and County Offices, PennDOT D10 TMC, PennDOT D11 RTMC, Municipal Traffic Management Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PennDOT D10 Vehicles
	DMS and HAR messages	Planned 1	PennDOT D10 Field Devices
	RWIS control settings	Planned 1	PennDOT D10 Field Devices
	Anti-icing bridge sprayer control	Planned 2	PennDOT D10 Field Devices
	Incident and emergency response coordination	Existing	PennDOT D10 TMC, PennDOT D11 RTMC
	Broadcasted road and travel conditions	Existing	Personal Traveler Information Devices
	Maintenance and construction information	Existing	Regional Media Outlets
PennDOT D10 Field Devices	CCTV camera images	Planned 2	PennDOT D10 County Maintenance Offices
	RWIS weather data	Existing	PennDOT D10 County Maintenance Offices
	Traffic count data from detectors	Planned 2	PennDOT D10 TMC
	CCTV camera images	Planned 2	PennDOT D10 TMC
	Device control	Planned 1	Adjacent PennDOT District and County Offices
PennDOT D10 TMC	Incident notification and information	Existing	911 Communication Centers

Element	Service (operation/data outputs to others)	Status	Destination Element
	Roadway conditions	Planned 1	911 Communication Centers, Municipal Traffic Management Offices
	Maintenance and construction coordination	Existing	Adjacent PennDOT District and County Offices, PennDOT D10 County Maintenance Offices, PennDOT D12 TMC, PennDOT D11 RTMC, Municipal Traffic Management Offices, PennDOT D10 Vehicles
	Incident response coordination	Existing	Adjacent PennDOT District and County Offices, PennDOT D11 RTMC, PennDOT D12 TMC, County EMA Centers
	Device control coordination	Planned 2	Adjacent PennDOT District and County Offices, PennDOT D11 RTMC, PennDOT D12 TMC
	Real-time roadway traffic and incident information	Planned 2	County EMA Centers
	Traffic management coordination	Planned 2	Municipal Traffic Management Offices
	Incident and emergency coordination	Existing	PennDOT D10 County Maintenance Offices
	DMS and HAR messages	Existing	PennDOT D10 Field Devices
	RWIS control settings	Planned 1	PennDOT D10 Field Devices
	CCTV camera control	Planned 2	PennDOT D10 Field Devices
	Traffic information coordination	Existing	PennDOT D11 RTMC

<b>Element</b>	<b>Service (operation/data outputs to others)</b>	<b>Status</b>	<b>Destination Element</b>
	Broadcasted road and travel conditions	Existing	Personal Traveler Information Devices
	Traffic, incident and emergency information	Existing	Regional Media Outlets, Regional Travel Information System
PennDOT D10 Vehicles	Maintenance and construction coordination	Existing	PennDOT D10 County Maintenance Offices, PennDOT D10 TMC
	Vehicle diagnostics and operational data	Existing	PennDOT D10 County Maintenance Offices
PennDOT D11 County Maintenance Offices	Incident notification and information	Existing	911 Communication Centers
	Maintenance and construction coordination	Existing	Adjacent PennDOT District and County Offices, Municipal Traffic Management Offices, PennDOT D10 County Maintenance Offices, PennDOT D11 RTMC, PennDOT D11 Vehicles, PennDOT D12 County Maintenance Offices
	CCTV images	Existing	County EMA Centers, PennDOT D11 RTMC
	Incident and emergency coordination	Existing	County EMA Centers
	DMS and HAR messages	Existing	PennDOT D11 Field Devices
	Device control	Existing	PennDOT D11 Field Devices
	Current traveler information for public kiosks	Planned 2	PennDOT D11 Remote Traveler Support

Element	Service (operation/data outputs to others)	Status	Destination Element
	Field device control coordination	Existing	PennDOT D11 RTMC
	Traffic information coordination	Existing	PennDOT D11 RTMC
	Incident and emergency information	Existing	Regional Media Outlets
	Maintenance and construction information	Existing	Regional Media Outlets
PennDOT D11 Field Devices	HOV gate device coordination with traffic signals	Existing	City of Pittsburgh Field Devices
	RWIS weather data	Existing	PennDOT D11 County Maintenance Offices, PennDOT D11 RTMC
	CCTV camera images	Existing	PennDOT D11 County Maintenance Offices, PennDOT D11 RTMC
	Over height vehicle detection warning	Existing	PennDOT D11 County Maintenance Offices
	Traffic flow data	Existing	PennDOT D11 County Maintenance Offices, PennDOT D11 RTMC
PennDOT D11 RTMC	Incident notification and information	Existing	911 Communication Centers
	Maintenance and construction coordination	Existing	Adjacent PennDOT District and County Offices, City of Pittsburgh TMC, Municipal Traffic Management Offices, PennDOT D10 County Maintenance Offices, PennDOT D10 TMC, PennDOT D12 TMC

Element	Service (operation/data outputs to others)	Status	Destination Element
	Incident and emergency response coordination	Existing	Adjacent PennDOT District and County Offices, County EMA Centers, PennDOT D10 TMC, PennDOT D11 County Maintenance Offices, PennDOT D10 County Maintenance, PennDOT D11 Vehicles, PennDOT D12 County Maintenance Offices, PennDOT D12 TMC
	Device control coordination	Existing	Adjacent PennDOT District and County Offices, PennDOT D10 TMC, PennDOT D11 County Maintenance, PennDOT D12 TMC
	Traffic, weather, road conditions, and incident information	Existing	Mobility Technologies ATIS Administration
		Planned 2	BCTA Transit Management Center, PAAC Centers, Port of Pittsburgh Commission Office, Regional Transit Agency Offices
	Parking coordination information	Planned 1	City of Pittsburgh Parking Authority Offices, Park-n-Ride Facilities
	Traffic information coordination	Existing	ACAA Office , City of Pittsburgh Parking Authority Offices, City of Pittsburgh TMC, Municipal Traffic Management Offices
	Real-time roadway traffic and incident information	Planned 2	County EMA Centers
	CCTV images	Planned 1	County EMA Centers

Element	Service (operation/data outputs to others)	Status	Destination Element
		Planned 2	Mobility Technologies ATIS Administration
	Travel information distribution coordination	Existing	Mobility Technologies ATIS Administration
	Detailed construction information	Planned 2	Mobility Technologies ATIS Administration
	Raw/archived traffic data	Planned 1	Mobility Technologies ATIS Administration
	Traffic signal timing changes and monitoring	Existing	Municipal Field Devices
	Traffic control coordination	Existing	Municipal Traffic Management Offices
	HAR and DMS control	Existing	PennDOT D1 Field Devices, PennDOT D10 Field Devices, PennDOT D12 Field Devices
	DMS and HAR messages	Existing	PennDOT D11 Field Devices
	HOV lane gate control	Existing	PennDOT D11 Field Devices
	Device control	Existing	PennDOT D11 Field Devices
	Current traveler information for public kiosks	Planned 2	PennDOT D11 Remote Traveler Support
	Vehicle dispatch and incident information	Existing	PennDOT D11 Vehicles
	Broadcasted road and travel conditions	Existing	Personal Traveler Information Devices
	Incident and emergency information	Existing	Regional Media Outlets

Element	Service (operation/data outputs to others)	Status	Destination Element
	Maintenance and construction information	Existing	Regional Media Outlets
	Traffic and roadway information	Planned 2	Regional Travel Information System, SPC Office
PennDOT D11 Remote Traveler Support	Trip request information	Planned 2	Regional Travel Information System
PennDOT D11 Vehicles	Maintenance and construction coordination	Existing	PennDOT D11 County Maintenance Offices, PennDOT D11 RTMC
	Incident and emergency response coordination	Existing	PennDOT D11 RTMC
	Vehicle location data	Planned 2	PennDOT D11 RTMC
PennDOT D12 County Maintenance Offices	Incident notification and information	Existing	911 Communication Centers
	Maintenance and construction coordination	Existing	Adjacent PennDOT District and County Offices, Municipal Traffic Management Offices, PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D11 RTMC, PennDOT D12 TMC, PennDOT D12 Vehicles
	Incident and emergency response coordination	Existing	PennDOT D11 RTMC, PennDOT D12 TMC
	DMS and HAR messages	Planned 1	PennDOT D12 Field Devices
	RWIS control settings	Planned 1	PennDOT D12 Field Devices
	Anti-icing bridge sprayer control	Existing	PennDOT D12 Field Devices
	Broadcasted road and travel conditions	Existing	Personal Traveler Information Devices



<b>Element</b>	<b>Service (operation/data outputs to others)</b>	<b>Status</b>	<b>Destination Element</b>
	Maintenance and construction information	Existing	Regional Media Outlets
PennDOT D12 Field Devices	Truck preemption signal for traffic signal adjustment	Existing	Municipal Field Devices
	RWIS weather data	Existing	PennDOT D12 County Maintenance Offices, PennDOT D12 TMC
	Traffic count data from detectors	Planned 2	PennDOT D12 TMC
	CCTV camera images	Planned 2	PennDOT D12 TMC
PennDOT D12 TMC	Incident notification and information	Existing	911 Communication Centers
	Roadway conditions	Planned 1	911 Communication Centers
	Maintenance and construction coordination	Existing	Adjacent PennDOT District and County Offices, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 County Maintenance Offices, PennDOT D12 Vehicles
	Incident and emergency response coordination	Existing	Adjacent PennDOT District and County Offices, County EMA Centers, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 County Maintenance Offices
	Real-time roadway traffic and incident information	Planned 2	County EMA Centers
	Roadway weather conditions	Planned 2	Mobility Technologies ATIS Administration
	Maintenance and construction information	Existing	Municipal Traffic Management Offices
	Traffic management coordination	Planned 2	Municipal Traffic Management Offices, PennDOT D10 TMC

Element	Service (operation/data outputs to others)	Status	Destination Element
	Field device control coordination	Existing	PennDOT D11 RTMC
		Planned 2	Adjacent PennDOT District and County Offices, PennDOT D10 TMC
	Traffic information coordination	Existing	PennDOT D11 RTMC
	DMS and HAR messages	Existing	PennDOT D12 Field Devices
	RWIS control settings	Planned 1	PennDOT D12 Field Devices
	Anti-icing bridge sprayer control	Planned 2	PennDOT D12 Field Devices
	CCTV camera control	Planned 2	PennDOT D12 Field Devices
	Incident and emergency information	Existing	Regional Media Outlets
	Maintenance and construction information	Existing	Regional Media Outlets
	Traffic and roadway information	Planned 2	Regional Travel Information System
PennDOT D12 Vehicles	Maintenance and construction coordination	Existing	PennDOT D12 County Maintenance Offices, PennDOT D12 TMC
	Vehicle diagnostics and operational data	Existing	PennDOT D12 County Maintenance Offices
PennDOT STMC	Incident and emergency information and coordination	Planned 2	PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PSP Offices, PTC Offices
	Request for archived data	Planned 2	PennDOT Central Office Organizations, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC

<b>Element</b>	<b>Service (operation/data outputs to others)</b>	<b>Status</b>	<b>Destination Element</b>
	Traffic information, restrictions, and conditions	Planned 2	PennDOT Central Office Organizations, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PTC Offices
	Work zone information	Planned 2	PennDOT Central Office Organizations, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PTC Offices
	Maintenance and Construction coordination	Planned 2	PennDOT Central Office Organizations, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PTC Offices
	Commercial vehicle enforcement information	Planned 2	PennDOT Central Office Organizations, Commercial Vehicle Company Offices
	Road weather information	Planned 2	PennDOT Central Office Organizations, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PTC Offices, Regional Media Outlets
	Media information	Planned 2	Regional Media Outlets
Personal Traveler Information Devices	Incident notification and information	Existing	911 Communication Centers
	Traveler trip request information	Planned 1	Mobility Technologies ATIS Administration
		Planned 2	Regional Travel Information System
	Traveler profile and trip request information	Planned 2	SPC Office

Element	Service (operation/data outputs to others)	Status	Destination Element
	Traveler profile information	Existing	TMA Offices
Port Facilities	Broadcast travel information	Planned 2	Commercial Vehicles
Port of Pittsburgh Commission Office	Traveler information distribution coordination	Planned 2	Mobility Technologies ATIS Administration, Regional Travel Information System
	Special routes for commercial vehicles	Planned 2	Port Facilities
PSP Offices	Incident and emergency information and coordination	Existing	911 Communication Centers, County EMA Centers, Municipal Public Safety Offices, PennDOT Central Office Organizations, PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PTC Offices, PSP Troop T Highspire
		Planned 2	PennDOT STMC
	Commercial vehicle credentialing and safety information (overweight vehicles)	Existing	PennDOT Central Office Organizations
	Maintenance and Construction information	Existing	PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices
	Request for towing	Existing	Towing Industry Responders
	Incident and emergency dispatch of PSP Vehicles	Existing	PSP Vehicles

<b>Element</b>	<b>Service (operation/data outputs to others)</b>	<b>Status</b>	<b>Destination Element</b>
	Information for the media	Existing	Regional Media Outlets
PSP Troop T Highspire	Incident and emergency information and coordination	Existing	PSP Offices, PTC Offices
	Information for the media	Existing	Regional Media Outlets
	Incident and emergency dispatch of PSP Vehicles	Existing	PSP Troop T Vehicles
PSP Troop T Vehicles	Emergency dispatch information	Existing	PSP Troop T Highspire, PTC Offices
	Vehicle tracking	Existing	PSP Troop T Highspire, PTC Offices
PSP Vehicles	Emergency dispatch information	Existing	PSP Offices
	Vehicle tracking	Existing	PSP Offices
PTC Field Devices	CCTV images used for surveillance	Existing	PTC Offices
	Traffic flow information	Existing	PTC Offices
	RWIS data	Planned 2	PTC Offices
	CCTV images used infrastructure monitoring	Planned 2	PTC Offices
PTC Maintenance and Construction Vehicles	Maintenance and Construction information	Existing	PTC Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
PTC Offices	Incident and emergency information and coordination	Existing	911 Communication Centers, County EMA Centers, PEMA Emergency Operation Center, PennDOT Central Office Organizations, PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PSP Offices, PSP Troop T Highspire
		Planned 2	PennDOT STMC
	Traffic information and conditions	Existing	County EMA Centers, PEMA Emergency Operation Center, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, Commercial Vehicle Company Offices
		Planned 2	PennDOT STMC
	DMS control coordination	Planned 2	PEMA Emergency Operation Center, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC
		Planned 2	PennDOT STMC
	Work plan information	Existing	PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices

Element	Service (operation/data outputs to others)	Status	Destination Element
	Maintenance and Construction information	Existing	PennDOT D10 County Maintenance Offices, PennDOT D11 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PennDOT D10 TMC, PennDOT D11 RTMC, PennDOT D12 TMC, PTC Maintenance and Construction Vehicles
		Planned 2	PennDOT STMC
	Traveler information	Existing	Personal Traveler Information Devices, PTC Service Plazas
	Field device control	Existing	PTC Field Devices
	Toll information	Existing	PTC Toll Plazas
	Media information	Existing	Regional Media Outlets
PTC Service Plazas	N/A	N/A	N/A
PTC Toll Plazas	Toll payment information	Existing	PTC Offices
	Commercial Vehicle credentialing information	Existing	PTC Offices
Regional Media Outlets	Traffic, incident, and traveler information	Existing	Personal Traveler Information Devices
Regional Personal Traveler Cards	Road weather information Incident and emergency dispatch information	Existing	PSP Troop T Highspire
		Existing	PSP Troop T Vehicles
		Planned 2	ACAA Field Devices, PAAC Transit Vehicles, Park-n-Ride Facilities, Regional Transit Vehicles, PAAC Remote Traveler Support

Element	Service (operation/data outputs to others)	Status	Destination Element
	Parking meter or lot payment information from regional traveler cards or in-vehicle tags	Planned 2	City of Pittsburgh Field Devices
Regional Transit Agency Offices	Incident notification and information	Existing	911 Communication Centers
	Incident and emergency coordination	Existing	County EMA Centers
	Transit operations coordination	Planned 1	PAAC Centers, BCTA Transit Management Center
	Parking and traffic coordination	Planned	Park-n-Ride Facilities
	Transit traveler information	Existing	Personal Traveler Information Devices, SPC Office
		Planned 2	Regional Travel Information System
	Trip planning	Planned 2	Personal Traveler Information Devices
	Driver dispatch and management information	Existing	Regional Transit Vehicles
Regional Transit Vehicles	Location from transit vehicles for signal priority	Planned 2	Municipal Field Devices
	Request for payment	Existing	Regional Personal Traveler Cards
	Passenger count, automated driver logs, and fare payment information from vehicles	Planned 2	Regional Transit Agency Offices
	Vehicle diagnostics and maintenance information	Planned 1	Regional Transit Agency Offices
	Fare payment information	Planned 2	Regional Transit Agency Offices
	Vehicle location data	Planned 1	Regional Transit Agency Offices



<b>Element</b>	<b>Service (operation/data outputs to others)</b>	<b>Status</b>	<b>Destination Element</b>
Regional Travel Information System	Travel information distribution coordination	Planned 2	Mobility Technologies ATIS Administration, SPC Office, TMA Offices, Port of Pittsburgh Commission Office
	Regional traveler information	Planned 2	PAAC Remote Traveler Support, BCTA Remote Traveler Support
	Current traveler information for public kiosks	Planned 2	PennDOT D11 Remote Traveler Support
	Broadcasted road and travel conditions	Planned 2	Personal Traveler Information Devices
	Trip planning	Planned 2	Personal Traveler Information Devices
	Traveler archived data	Planned 2	SPC Office
SPC Office	Travel information coordination	Planned 2	Mobility Technologies ATIS Administration, Regional Travel Information System
	Trip planning	Planned 1	Personal Traveler Information Devices
	Rideshare information	Existing	Personal Traveler Information Devices
	Traveler archived data	Planned 2	Regional Travel Information System
TMA Offices	Travel information coordination	Planned 2	Mobility Technologies ATIS Administration, Regional Travel Information System

<b>Element</b>	<b>Service (operation/data outputs to others)</b>	<b>Status</b>	<b>Destination Element</b>
	Broadcasted road and travel conditions	Existing	Personal Traveler Information Devices
Towing Industry Responders	N/A	N/A	N/A

## 4 Regional ITS Architecture

The Regional ITS Architecture was created using the process discussed in Section 1.1 'Architecture Process' on this document. The development of the Regional ITS Architecture consisted of: (1) developing a Strawman document using the RAP as a source of information gathering, (2) outreaching to ITS stakeholders in the Region and validating the Strawman, and (3) revising the Architecture to reflect stakeholder inputs from the outreach process. This process is further discussed below.

### **Strawman**

Using existing documentation and information gathered from the RAP (Section 3 tables) a Strawman, or draft, Regional ITS Architecture was developed. The RAP consisted of key stakeholders in the Region and was used to gather preliminary information for Architecture development. This information was then used to assign actual and potential "interconnects" and "information flows" between among the ITS elements. The result was this effort was a draft version of this Final Report, known as the Strawman Architecture. The Strawman Architecture document was created and submitted to PennDOT on April 22, 2004.

### **Outreach**

Outreach is the sharing of information to stakeholders. The ITS Architecture effort was led with outreach being a central activity of the project. Stakeholders were gathered through an extensive effort working with the RAP. RAP members identified key regional persons and agencies involved in surface transportation activities that may benefit from the ITS Architecture effort. Three outreach segments were scheduled into the process to gather input and reach out to these important stakeholders:

Outreach Activity 1: Regional Meeting (called the 1st Bookend meeting) - this meeting provided an introduction to ITS, provided context for the effort and set the stage for smaller working meetings.

Outreach Activity 2: Small Working Meetings (called Validation meetings) - these were a series of meetings that were smaller in size and broken into functional areas such as; traffic, emergency management, incident management, enforcement, transit and planning. Stakeholders attending these meetings reviewed and edited a piece of the draft of the ITS Architecture that pertained directly to their agency and job function. In this way the ITS Architecture became validated by each stakeholder represented in the ITS Architecture.

Outreach Activity 3: Regional Meeting (called the 2nd Bookend meeting) - this meeting concluded the ITS Architecture effort and launched the next steps of preparing a regional operations plan, that has input into the regional long-range plan and regional transportation improvement program.

All of these activities were led by PennDOT and regional champions. In many cases RAP members championed the effort as well. The success of this regions ITS Architecture effort can be directly tied to the efforts of regional champions and the willingness of the regional stakeholders to participate to complete this effort.

#### Bookend Meeting #1

On June 3, 2004, a Stakeholders Bookend Meeting convened in Monroeville Pennsylvania. The meeting began the outreach process by introducing Regional stakeholders to ITS operation, ITS planning, and the Architecture project.

One hundred seventy nine stakeholders were invited to the Bookend Meeting and fifty four attended. Agencies represented at the Bookend Meeting included PennDOT, PTC, SPC, airports, transit agencies, counties, cities, emergency management agencies, planning offices, townships, partnership organizations, the enforcement community, and policy organizations. Detailed meeting minutes, including the stakeholders in attendance, are included in Appendix F.

#### Validation Meetings

Validation meetings were conducted in June 2004 with small intimate groups of stakeholders to validate the Strawman Architecture. These meetings were used to expand, tailor, and refine the documentation of existing and planned interconnects and information flows. Detailed meeting minutes from the Validation Meetings are contained in Appendix G.

#### Bookend Meeting #2

Bookend Meeting #2 was held on November 5, 2004 in Mars, Pennsylvania. The meeting included many of the stakeholders that participated at the first Bookend Meeting and validation meetings. Detailed meeting minutes are included in Appendix H.

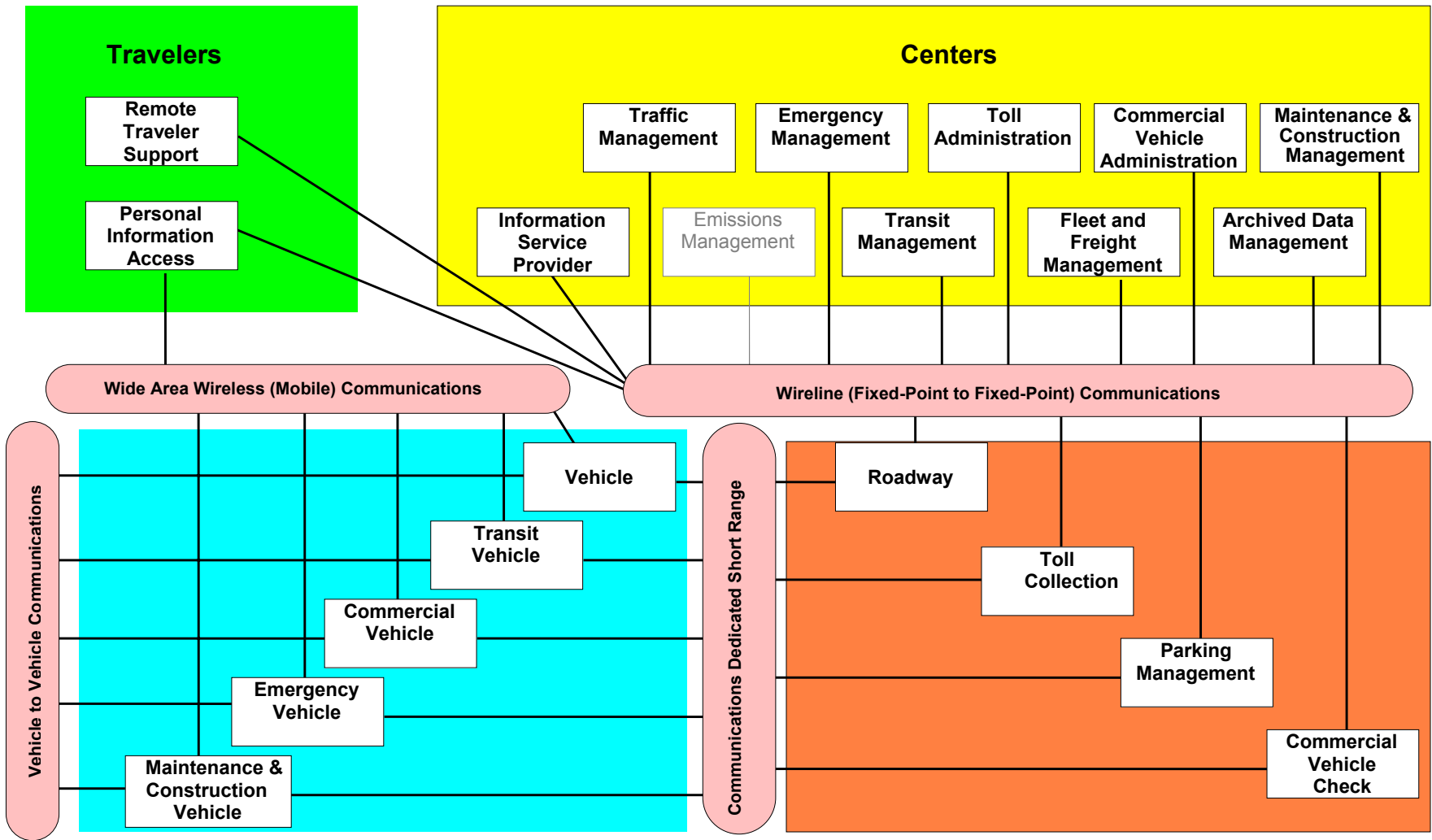
### ***Final Architecture***

This report, Final Regional ITS Architecture, was developed based on comments received from stakeholders during the outreach process. Stakeholder comments from the outreach process were reconciled and incorporated into the Strawman document, resulting in the Final Architecture. The following sections depict the final ITS Architecture diagrams. These diagrams include:

- Subsystem Interconnect Diagrams,
- Interconnect Diagrams, and
- Information Flow Diagrams.

## **4.1 Subsystem Interconnect Diagram**

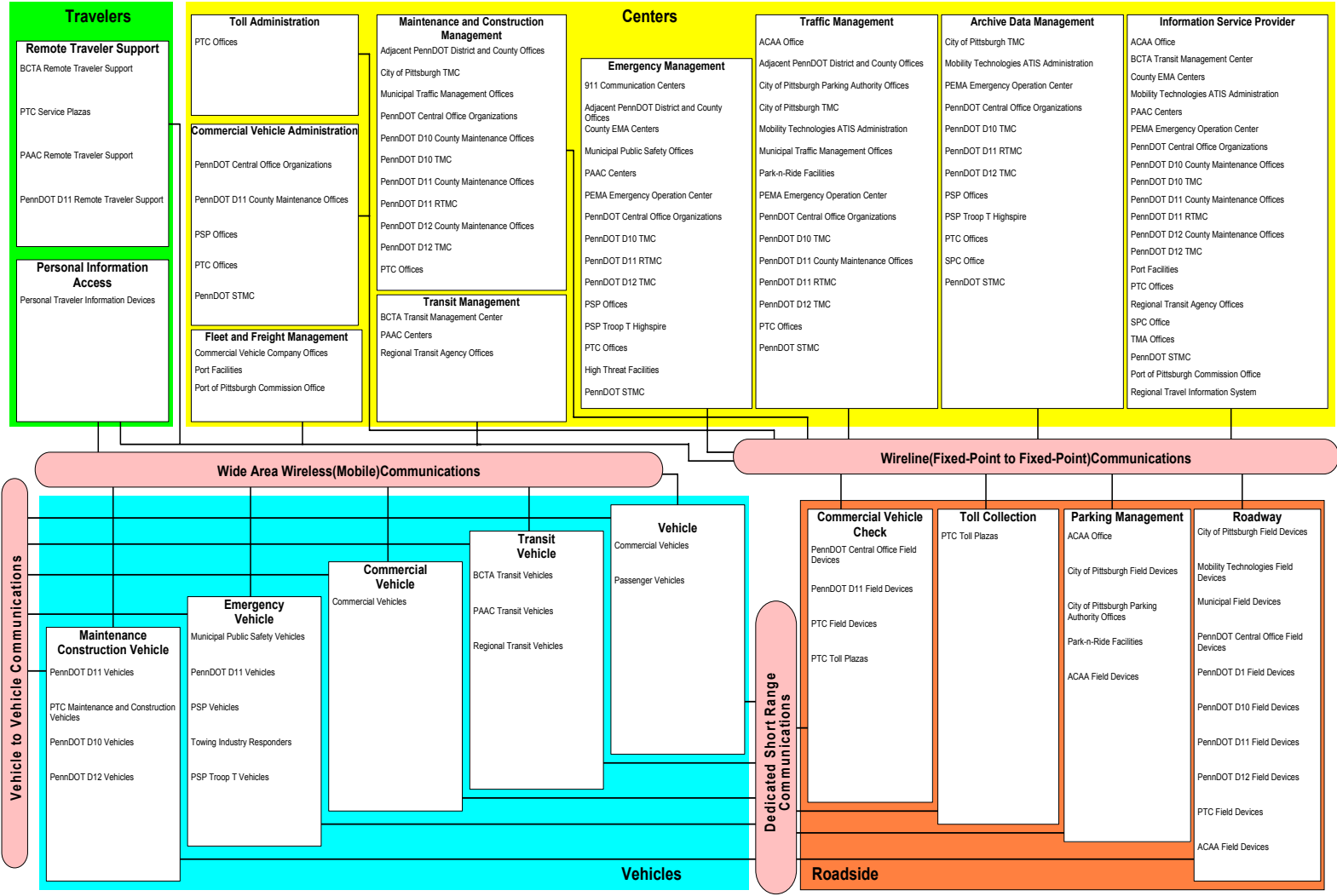
This diagram presents the Regional ITS Architecture relationships between subsystems and the communication between them. As shown this diagram provides a visual representation of data used in the development of the Regional ITS Architecture. Subsystems that do not pertain this particular Regional ITS Architecture are denoted in a light grey text. The Subsystem Interconnect Diagram is divided into four system classes; Travelers, Centers, Vehicles, and Roadside. A color scheme (green, yellow, blue, and red) links subsystems and elements back to the System Interconnect Diagram.



**Figure 4-1: Subsystem Interconnect Diagram**

## **4.2 Regional Subsystem Interconnect Diagram showing Elements**

This diagram presents the regional ITS Architecture relationships between subsystems, the communication between them, and the elements within each subsystem. As shown this diagram provides a visual representation of data used in the development of the Regional ITS Architecture. In this diagram elements have been added to make this diagram useful for regional specificity. This information is also provided in a tabular format listed by element.



**Figure 4-2: Regional Subsystem Interconnect Diagram showing Elements**



**Table 4-1: Regional Subsystems/Terminators**

<b>Element</b>	<b>Subsystem/Terminator mapped to:</b>
911 Communication Centers	Emergency Management
ACAA Field Devices	Parking Management Roadway
ACAA Office	Information Service Provider Parking Management Traffic Management
Adjacent PennDOT District and County Offices	Emergency Management Maintenance and Construction Management Traffic Management
BCTA Remote Traveler Support	Remote Traveler Support
BCTA Transit Management Center	Information Service Provider Transit Management
BCTA Transit Vehicles	Transit Vehicle
City of Pittsburgh Field Devices	Parking Management Roadway
City of Pittsburgh Parking Authority Offices	Parking Management Traffic Management
City of Pittsburgh TMC	Archived Data Management Archived Data User Maintenance and Construction Management Traffic Management
Commercial Vehicle Company Offices	Fleet and Freight Management
Commercial Vehicles	Commercial Vehicle Vehicle
County EMA Centers	Emergency Management Information Service Provider
High Threat Facilities	Emergency Management
Mobility Technologies ATIS Administration	Archived Data Management Information Service Provider Traffic Management
Mobility Technologies Field Devices	Roadway
Municipal Field Devices	Roadway

<b>Element</b>	<b>Subsystem/Terminator mapped to:</b>
Municipal Public Safety Offices	Emergency Management
Municipal Public Safety Vehicles	Emergency Vehicle
Municipal Traffic Management Offices	Maintenance and Construction Management Traffic Management
PAAC Centers	Emergency Management Information Service Provider Transit Management
PAAC Remote Traveler Support	Remote Traveler Support
PAAC Transit Vehicles	Transit Vehicle
Park-n-Ride Facilities	Parking Management Traffic Management
Passenger Vehicles	Vehicle
PEMA Emergency Operation Center	Archived Data Management Emergency Management Information Service Provider
PennDOT Central Office Field Devices	Commercial Vehicle Check Roadway
PennDOT Central Office Organizations	Archived Data Management Archived Data User Commercial Vehicle Administration Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
PennDOT D1 Field Devices	Roadway
PennDOT D10 County Maintenance Offices	Archived Data User Information Service Provider Maintenance and Construction Management
PennDOT D10 Field Devices	Roadway
PennDOT D10 TMC	Archived Data Management Archived Data User Emergency Management Information Service Provider Maintenance and Construction Management

<b>Element</b>	<b>Subsystem/Terminator mapped to:</b>
	Traffic Management
PennDOT D10 Vehicles	Maintenance and Construction Vehicle
PennDOT D11 County Maintenance Offices	Archived Data User Information Service Provider Maintenance and Construction Management
PennDOT D11 Field Devices	Roadway
PennDOT D11 Remote Traveler Support	Remote Traveler Support
PennDOT D11 RTMC	Archived Data Management Archived Data User Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
PennDOT D11 Vehicles	Emergency Vehicle Maintenance and Construction Vehicle
PennDOT D12 County Maintenance Offices	Archived Data User Information Service Provider Maintenance and Construction Management
PennDOT D12 Field Devices	Roadway
PennDOT D12 TMC	Archived Data Management Archived Data User Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
PennDOT D12 Vehicles	Maintenance and Construction Vehicle
PennDOT STMC	Archived Data Management Archived Data User Commercial Vehicle Administration Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
Pennsylvania Office of Homeland Security	Emergency Management

Element	Subsystem/Terminator mapped to:
Personal Traveler Information Devices	Personal Information Access
Port Facilities	Fleet and Freight Management Information Service Provider
Port of Pittsburgh Commission Office	Fleet and Freight Management Information Service Provider
PSP Offices	Archived Data Management Commercial Vehicle Administration Emergency Management
PSP Troop T Highspire	Archived Data Management Emergency Management
PSP Troop T Vehicles	Emergency Vehicle
PSP Vehicles	Emergency Vehicle
PTC Field Devices	Commercial Vehicle Check Emergency Telecommunications System Roadway
PTC Maintenance and Construction Vehicles	Maintenance and Construction Vehicle
PTC Offices	Archived Data Management Commercial Vehicle Administration Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management Toll Administration
PTC Service Plazas	Remote Traveler Support
PTC Toll Plazas	Commercial Vehicle Check Toll Collection
Regional Media Outlets	Media
Regional Personal Traveler Cards	Traveler Card
Regional Transit Agency Offices	Information Service Provider Transit Management
Regional Transit Vehicles	Transit Vehicle
Regional Travel Information System	Information Service Provider
SPC Office	Archived Data Management

Element	Subsystem/Terminator mapped to:
	Information Service Provider
TMA Offices	Information Service Provider
Towing Industry Responders	Emergency Vehicle

### **4.3 Interconnect Matrix**

This section documents the actual and potential “interconnects” (i.e., interfaces) among the ITS elements. Interconnects show where one operation will connect data or information with another operation. The section is primarily documented as Turbo software output.













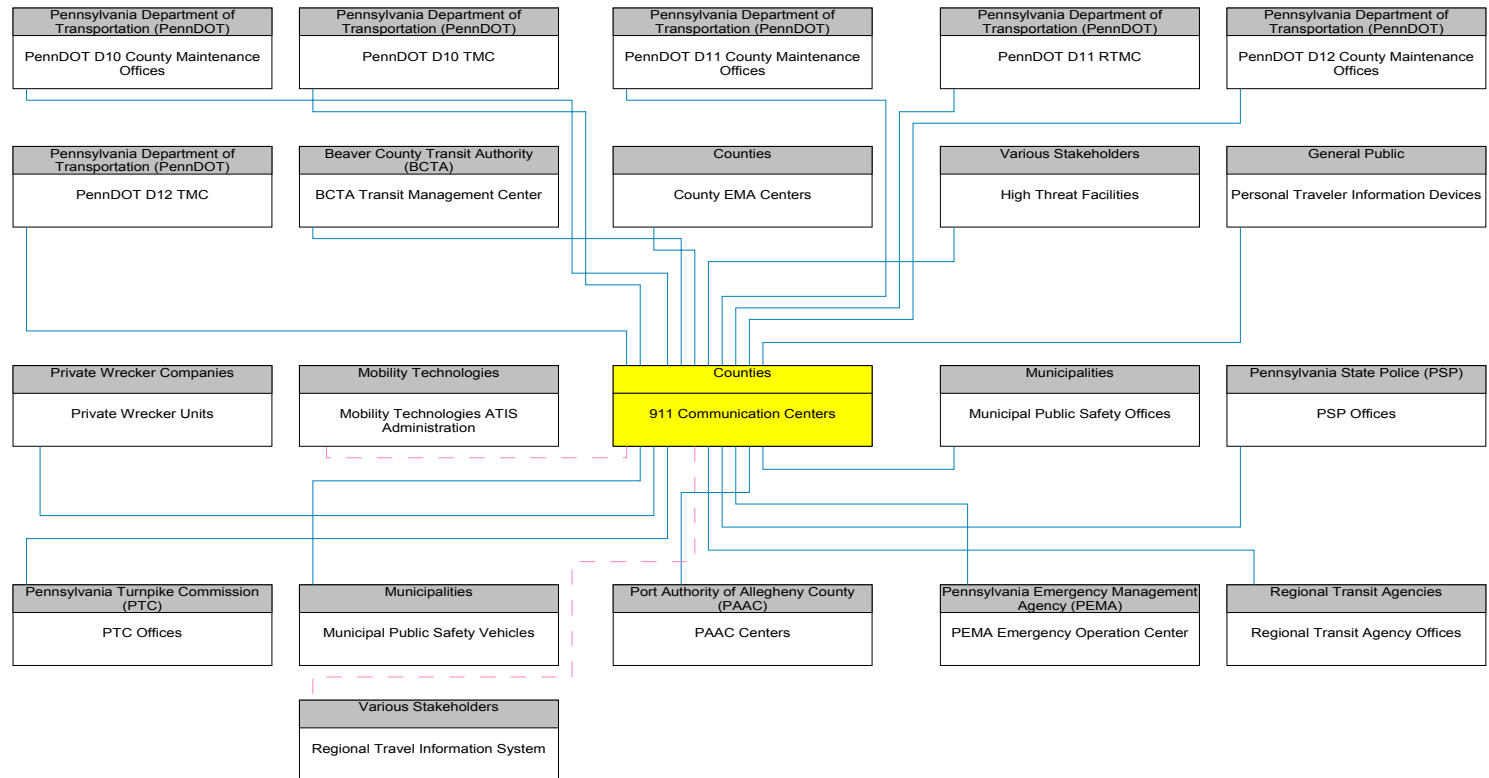
#### **4.4 ITS Architecture**

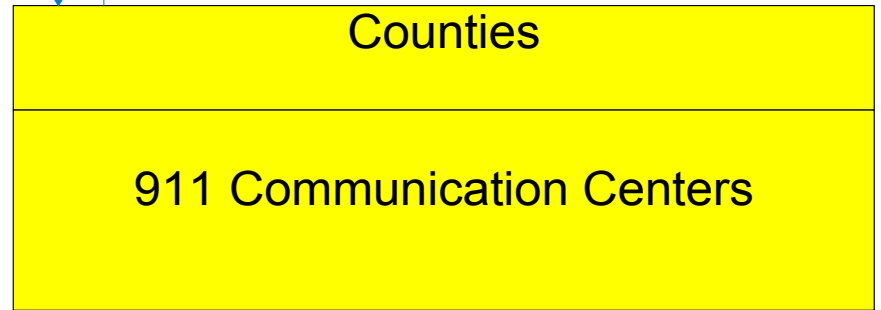
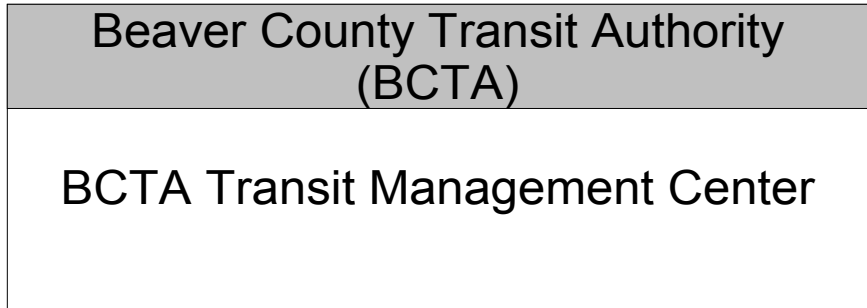
This section documents the “information flow” between the elements. The information flows describe what data or information is passing between one operation and another operation. The section is primarily documented as Turbo software outputs.

# 911 Communication Centers



# 911 Communication Centers Interconnect Diagram



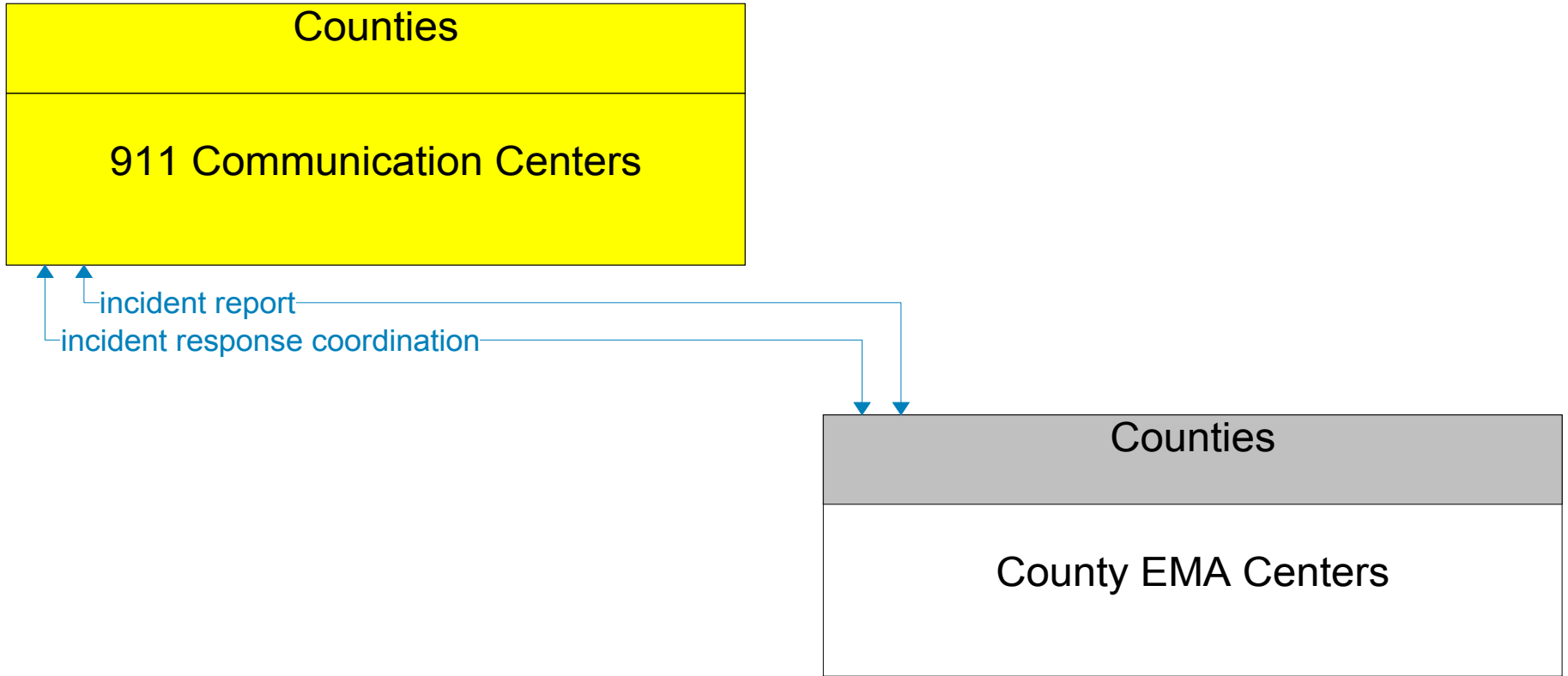


transit emergency coordination data

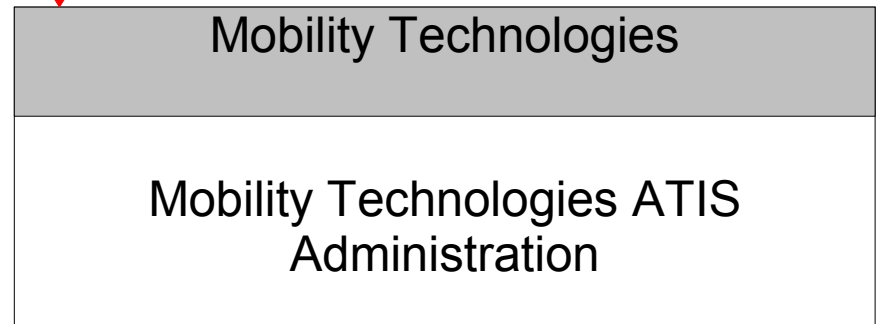
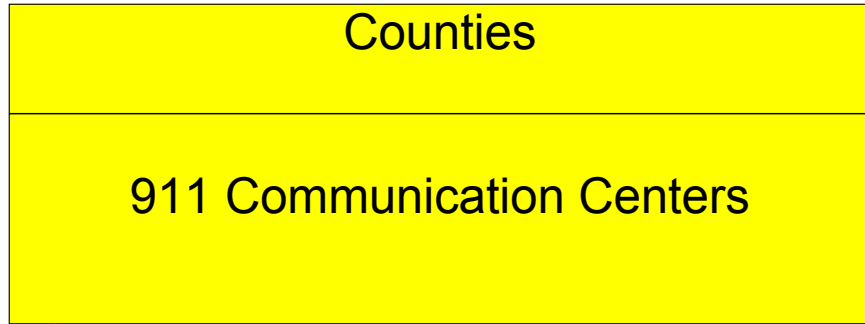
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Existing

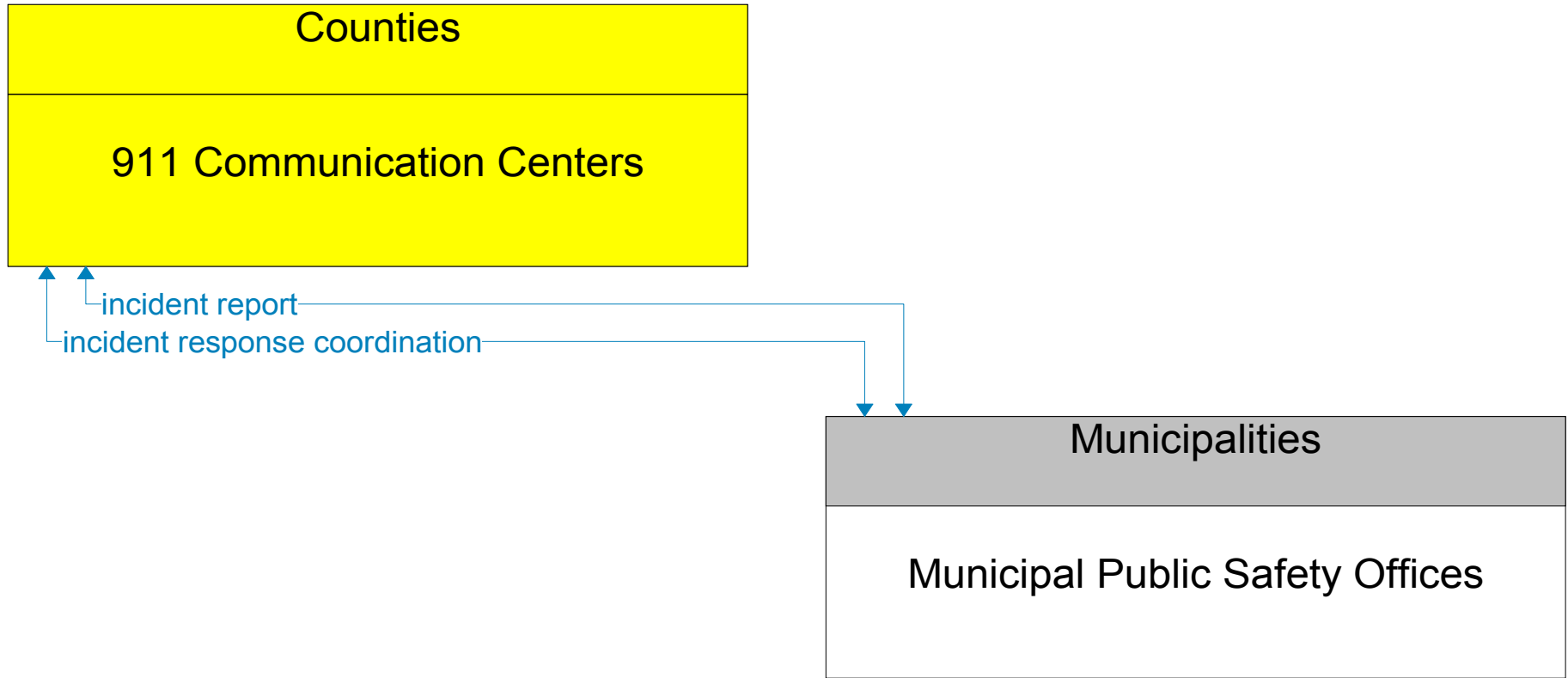
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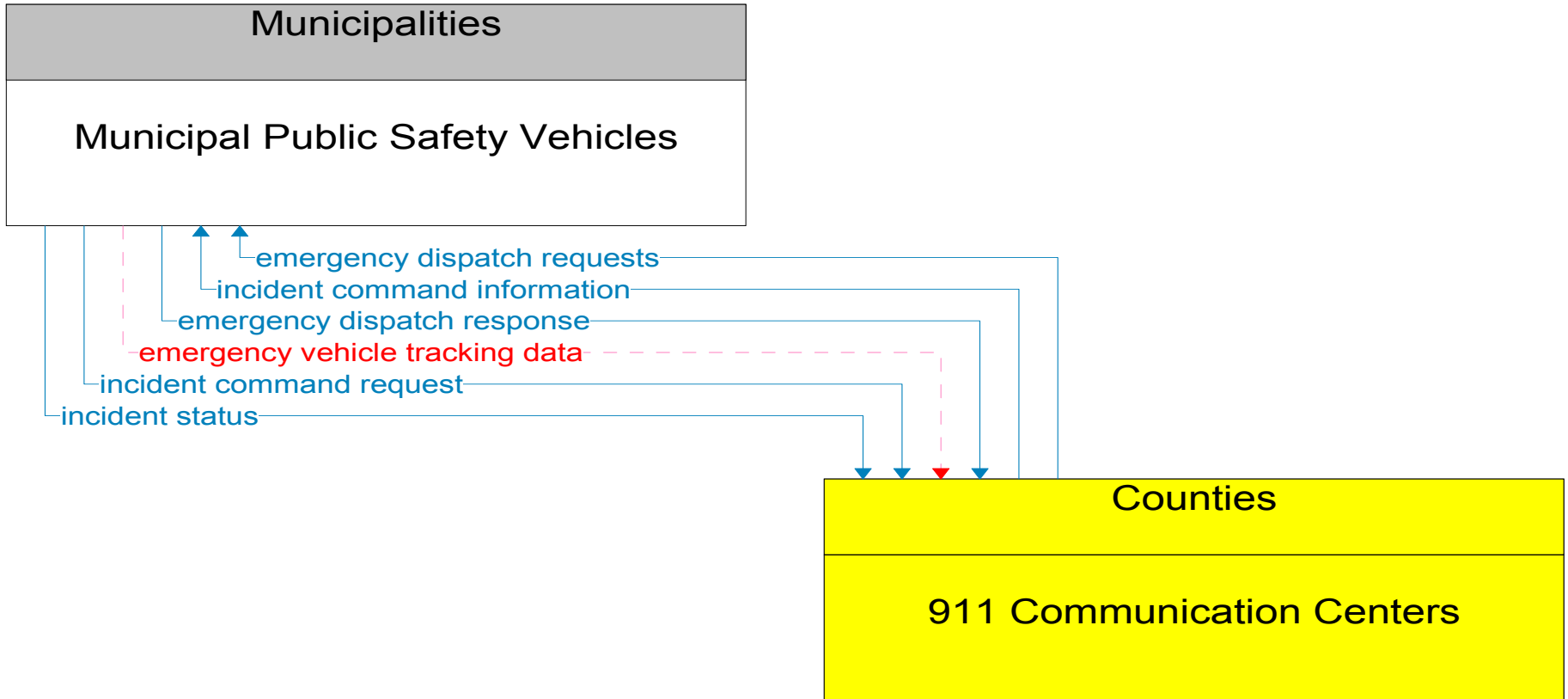
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- - - - - Planned



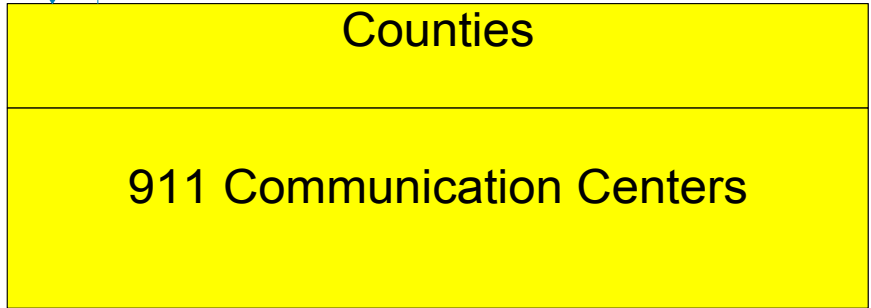
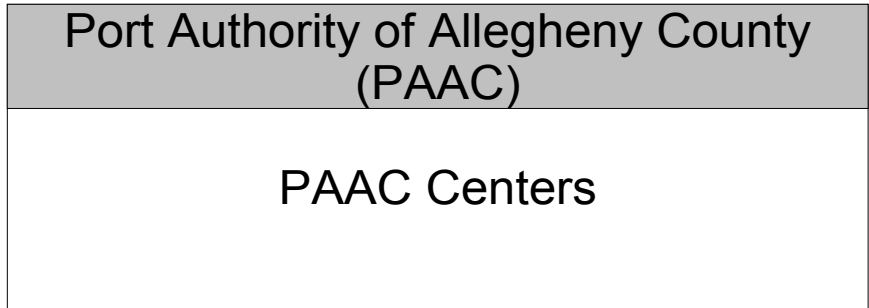




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- - - - - Planned



Existing  
Planned

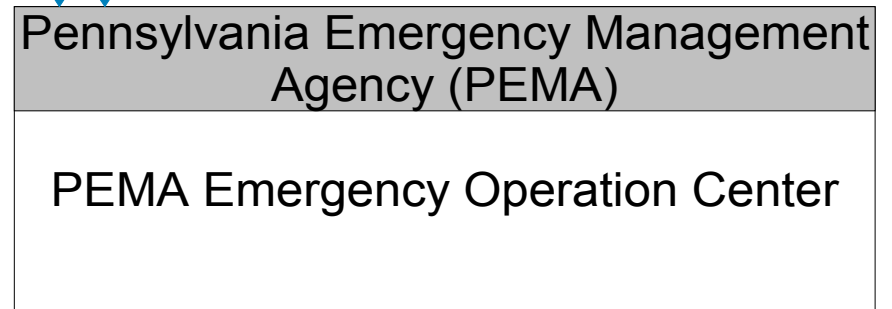
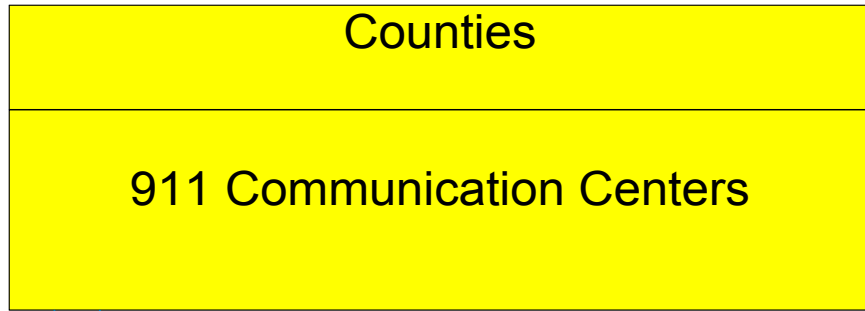


transit emergency coordination data

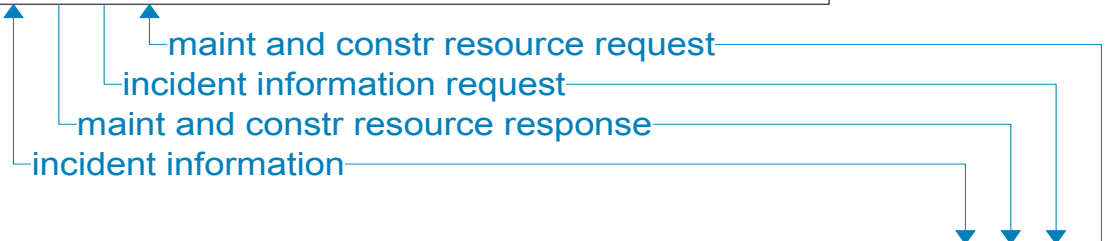
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Planned

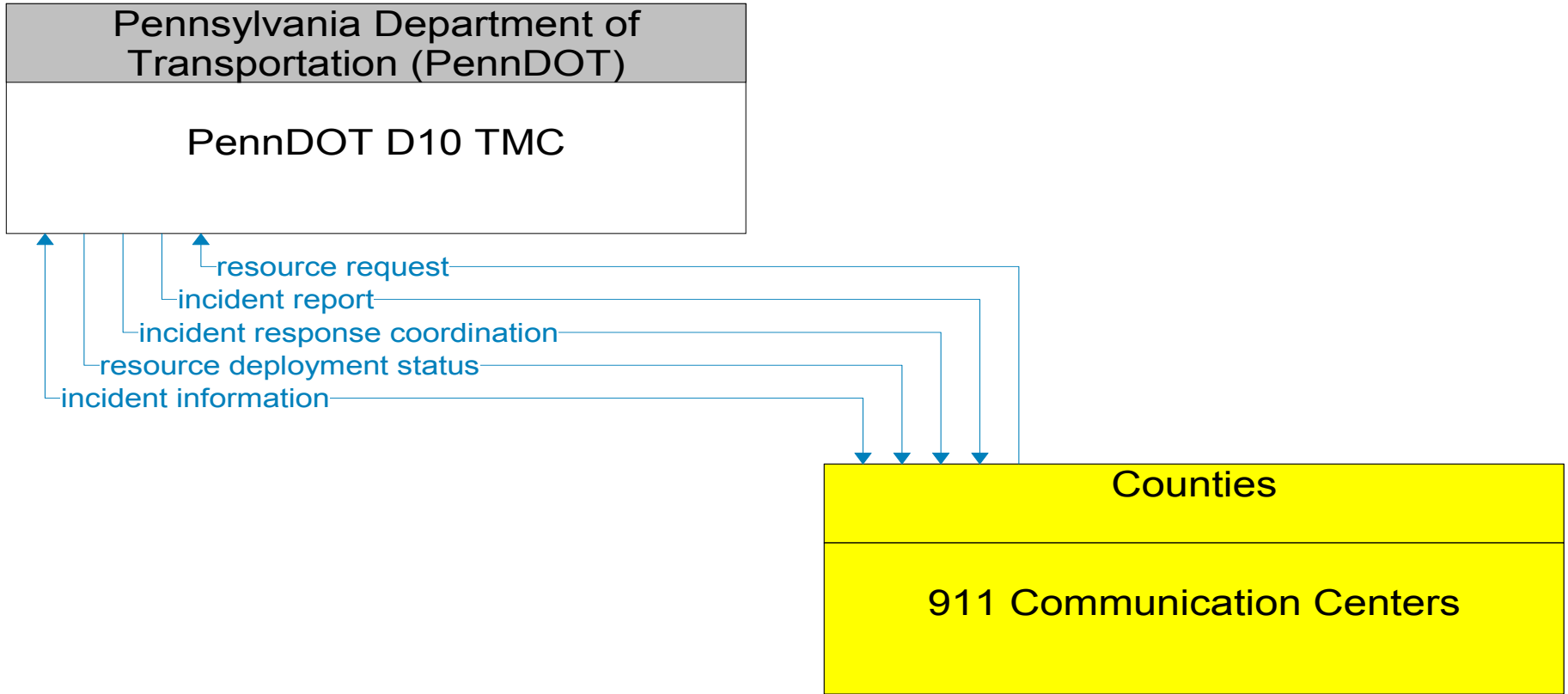


Pennsylvania Department of Transportation (PennDOT)  
PennDOT D10 County Maintenance Offices

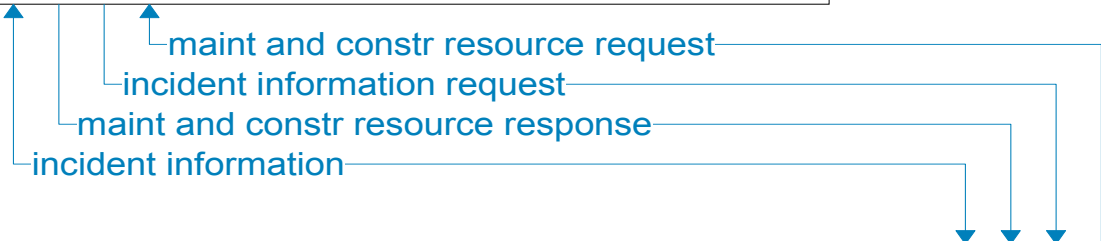


Counties  
911 Communication Centers

———— Existing  
- - - - - Planned

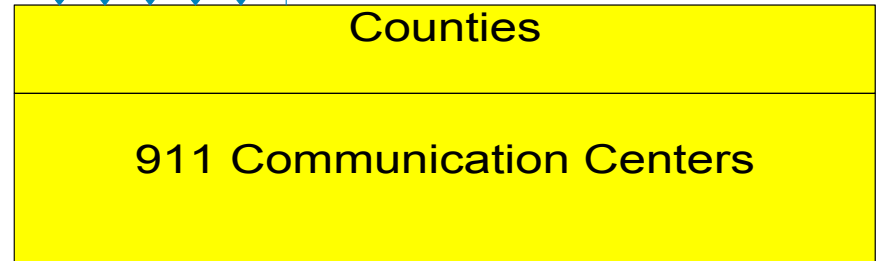
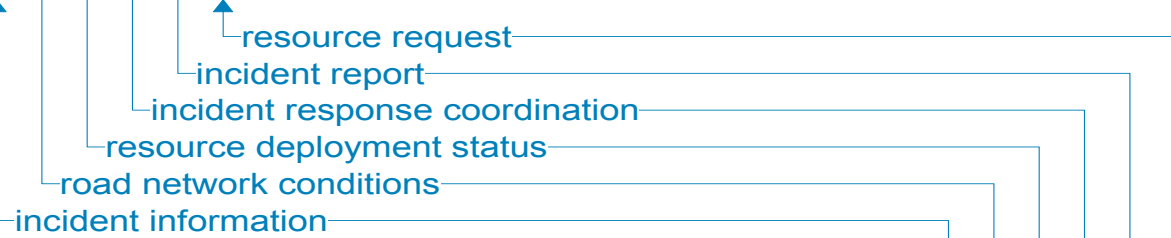
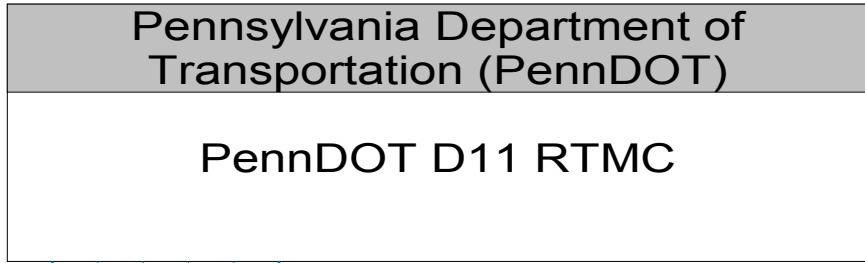


Pennsylvania Department of Transportation (PennDOT)  
PennDOT D11 County Maintenance Offices



Counties  
911 Communication Centers

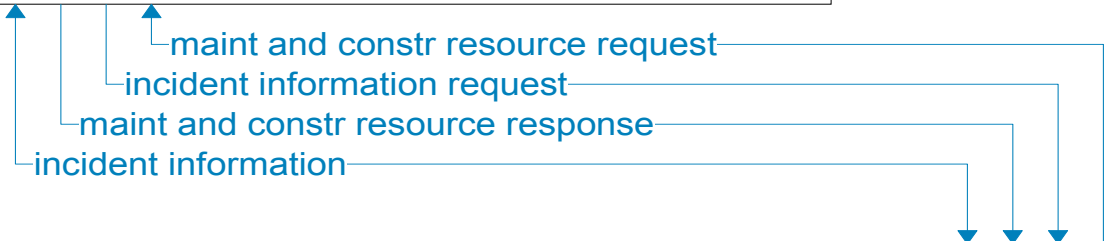
———— Existing  
- - - - - Planned





Pennsylvania Department of  
Transportation (PennDOT)

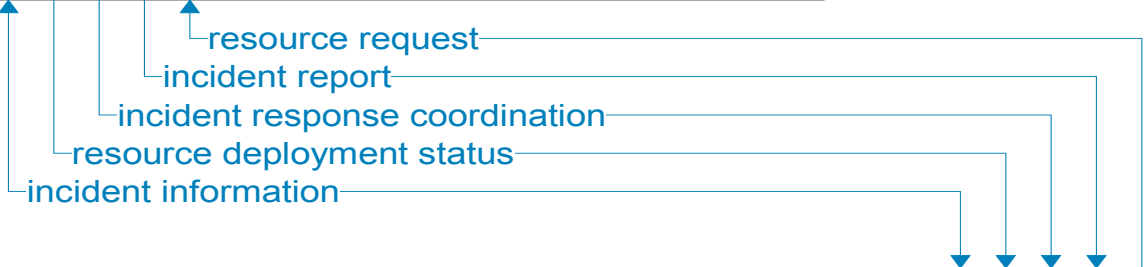
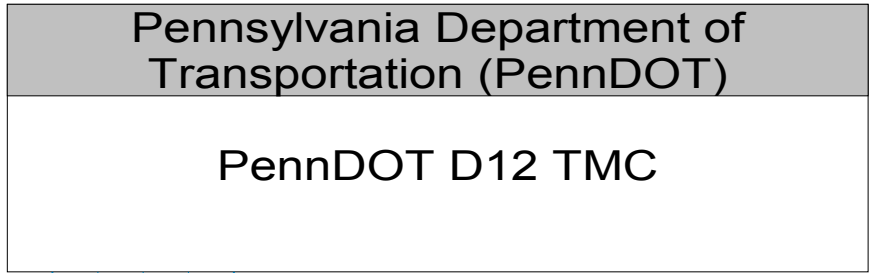
PennDOT D12 County Maintenance  
Offices



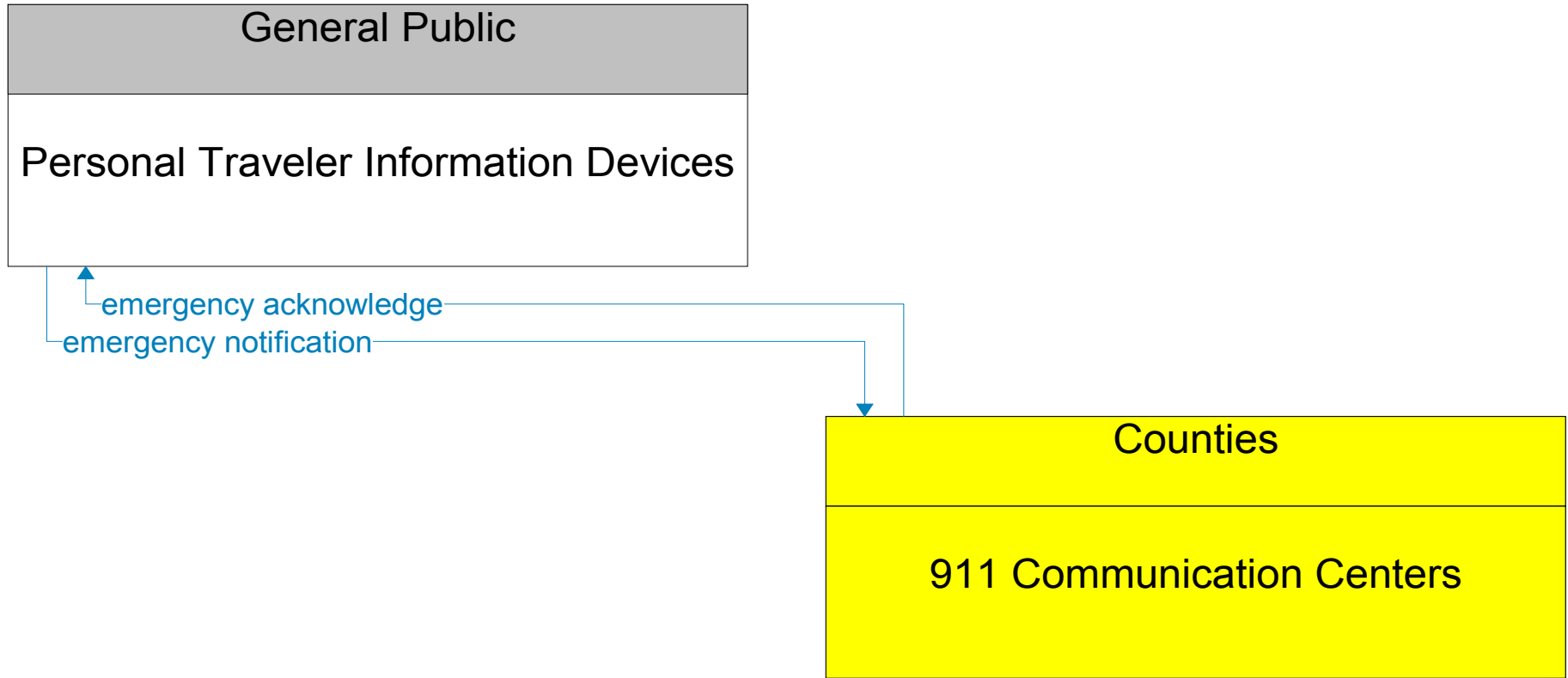
Counties

911 Communication Centers

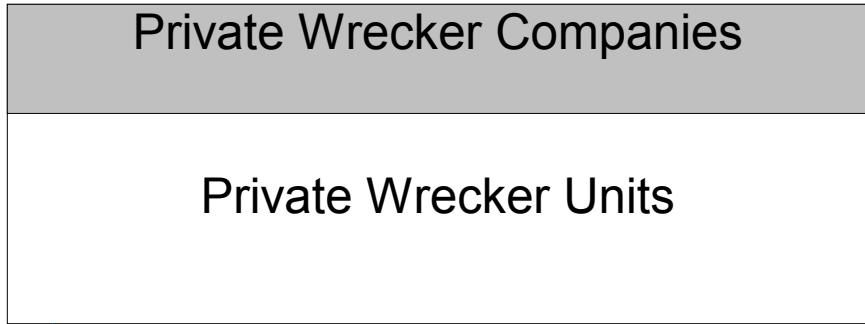
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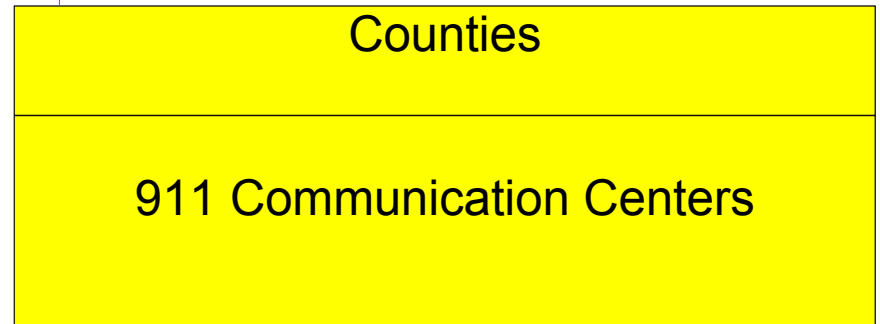
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Planned



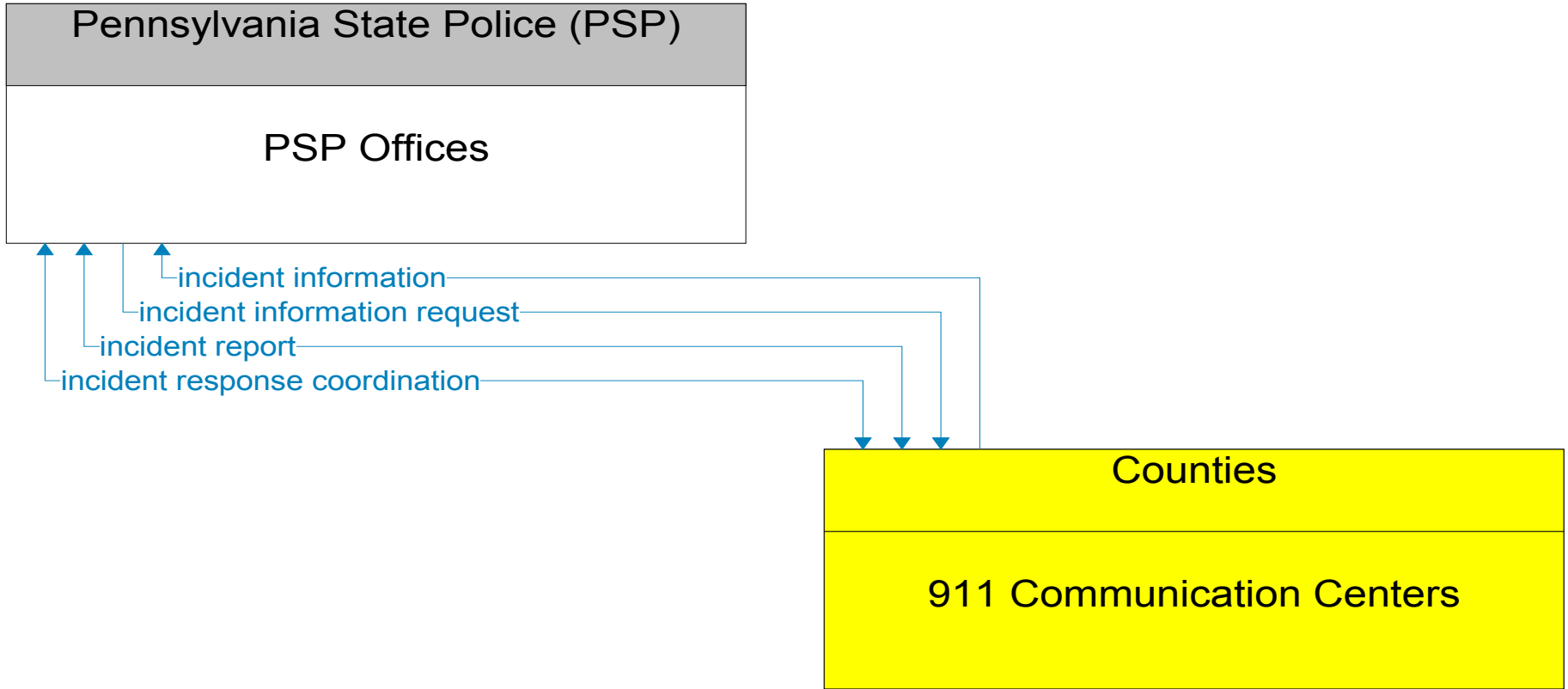
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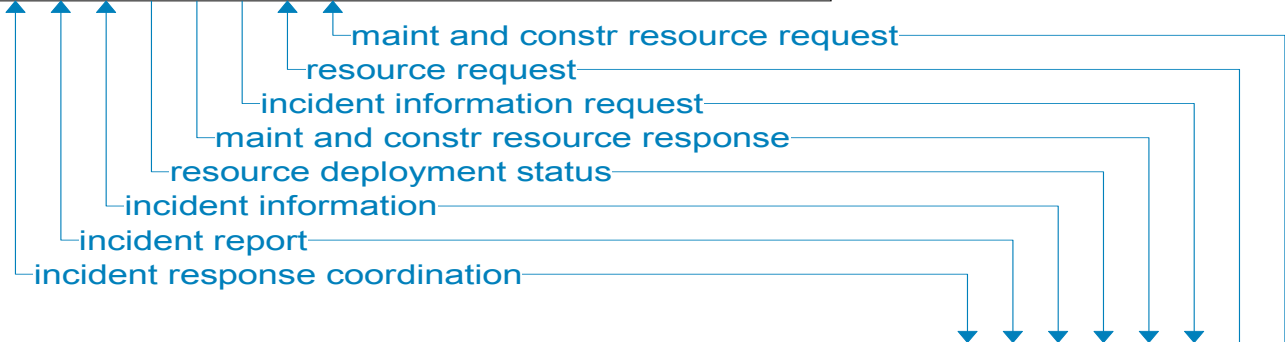
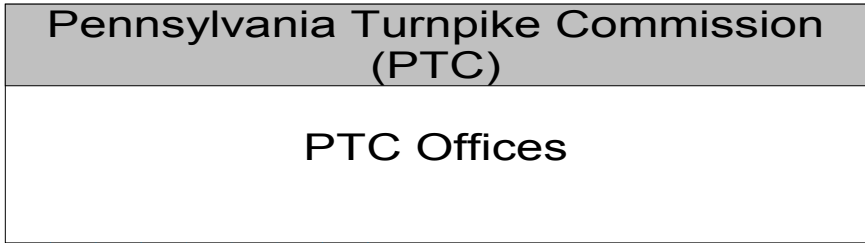
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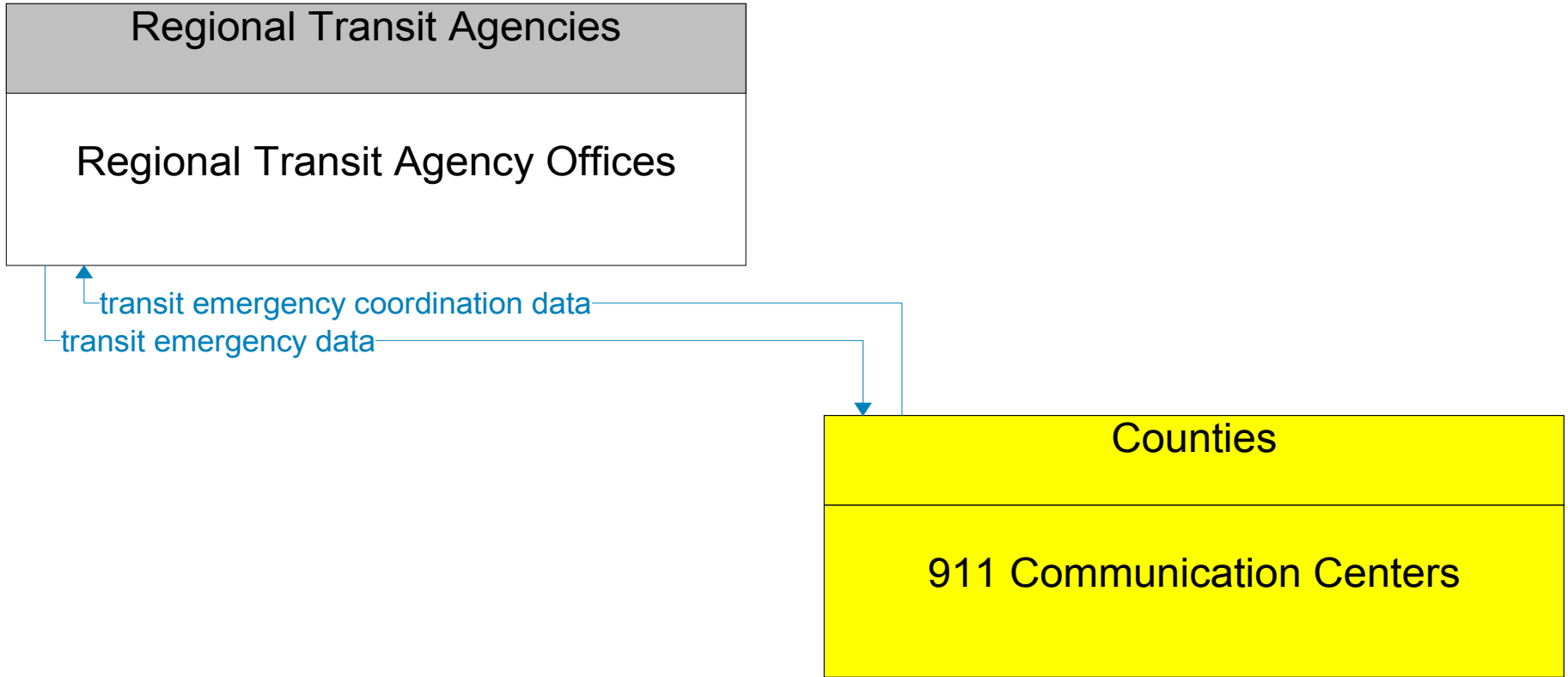
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Planned



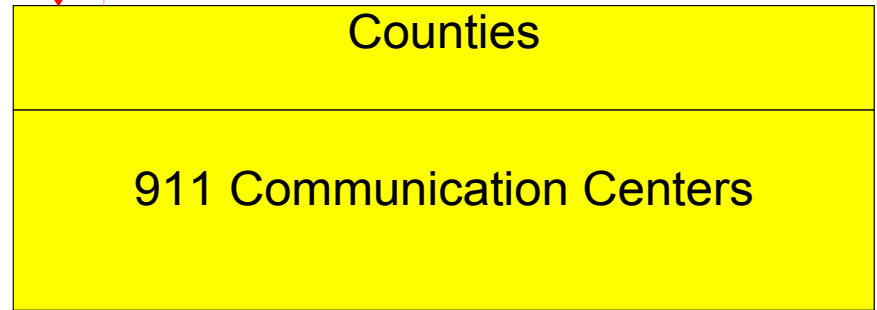
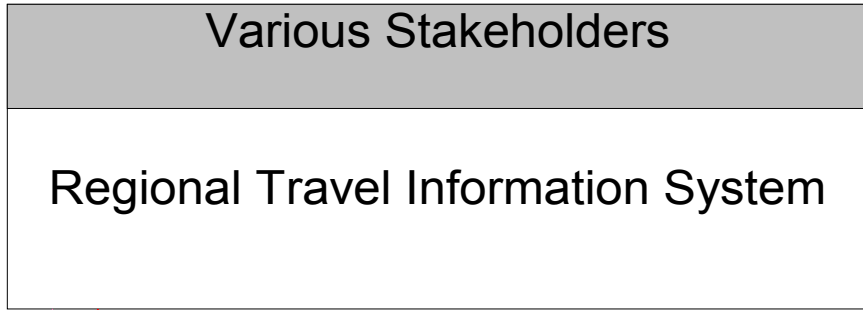
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———— Existing  
- - - - - Planned

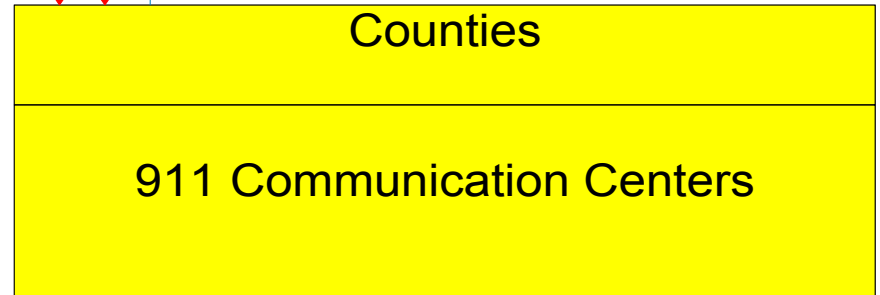
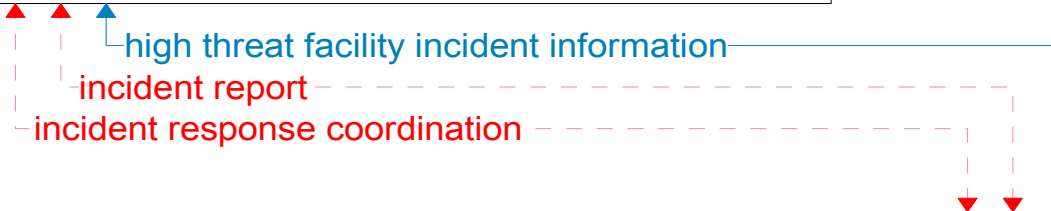
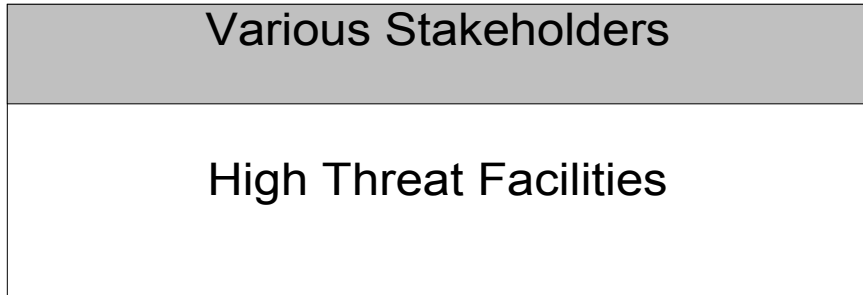


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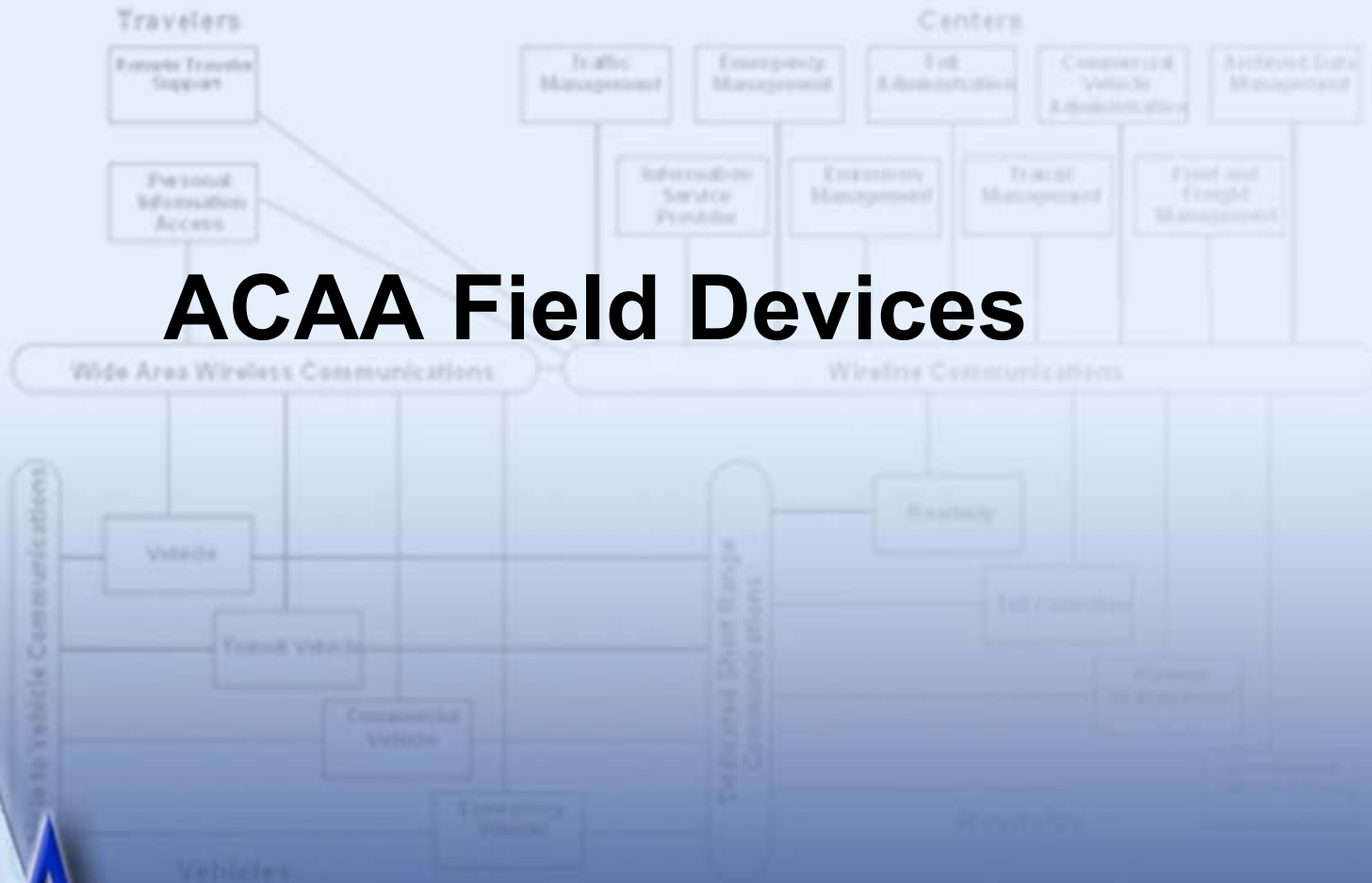
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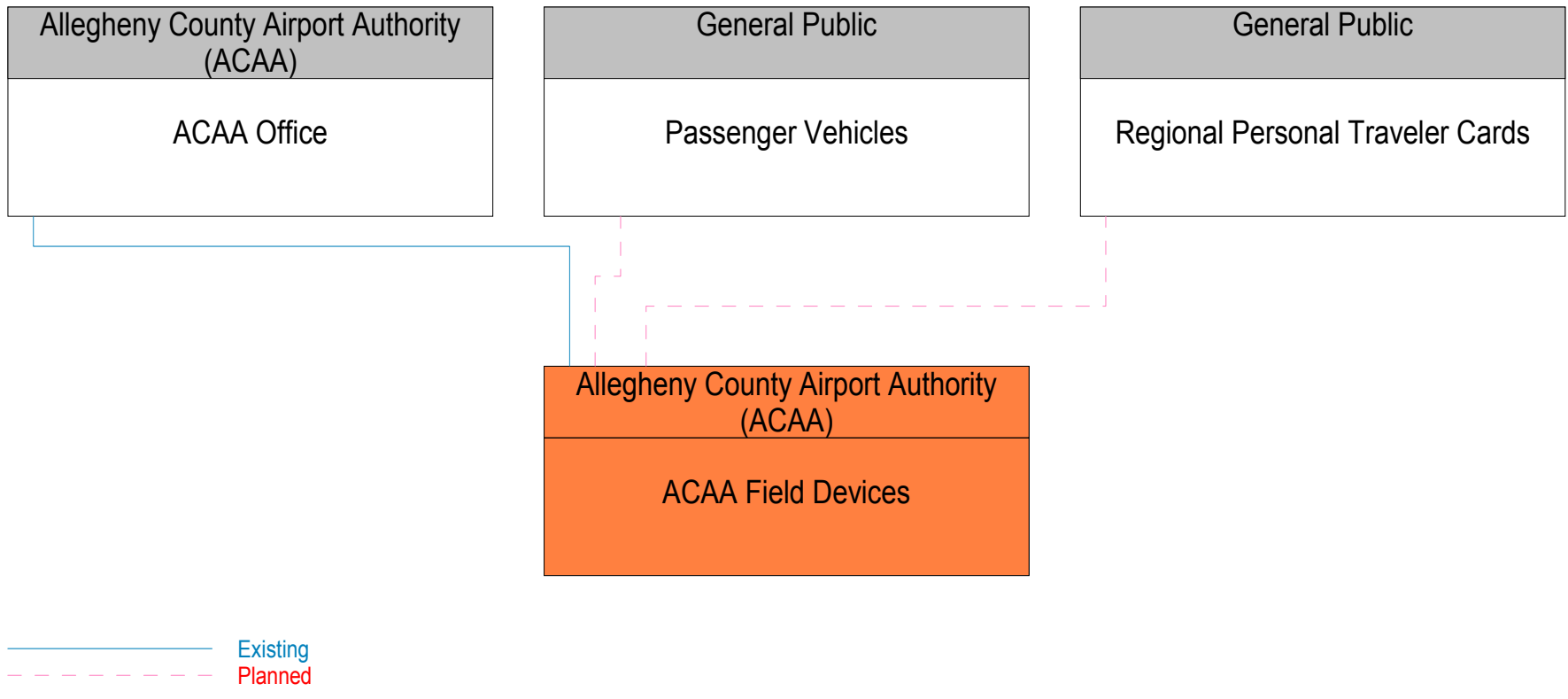


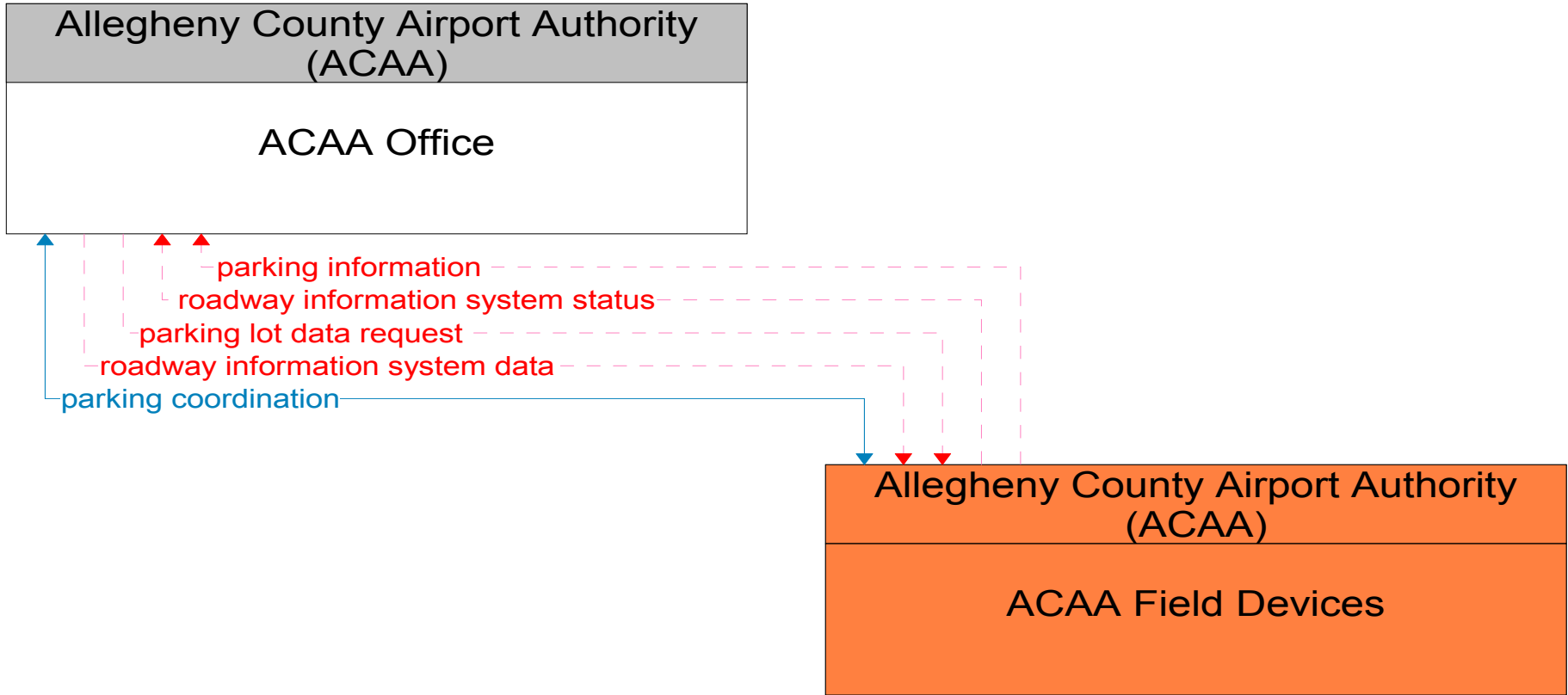
Existing  
Planned

# ACAA Field Devices

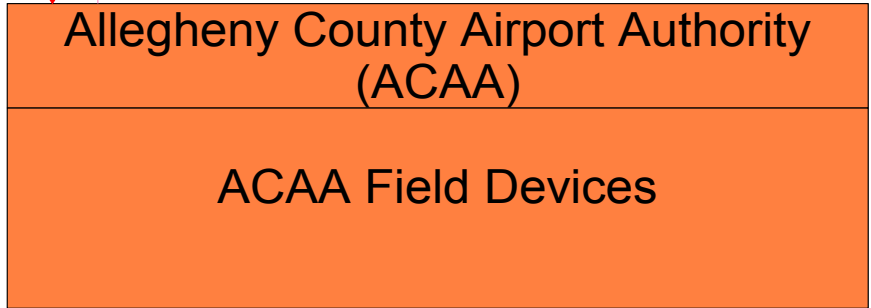
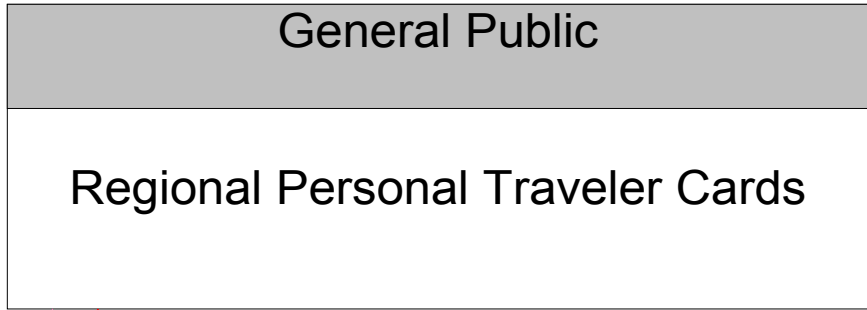


# ACAA Field Devices Interconnect Diagram

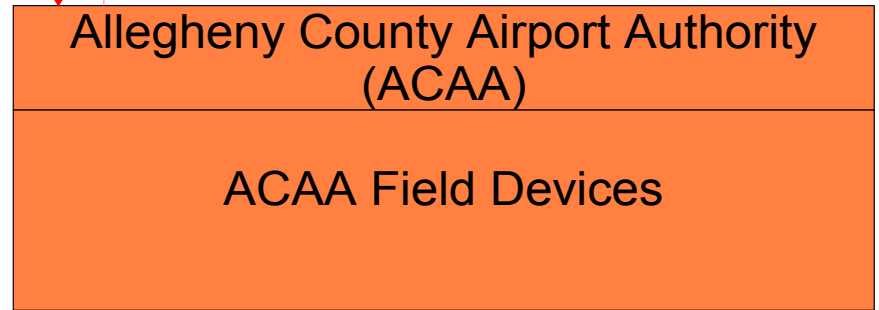
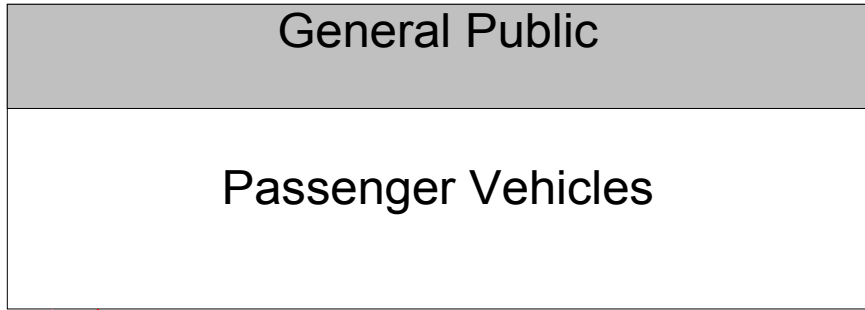




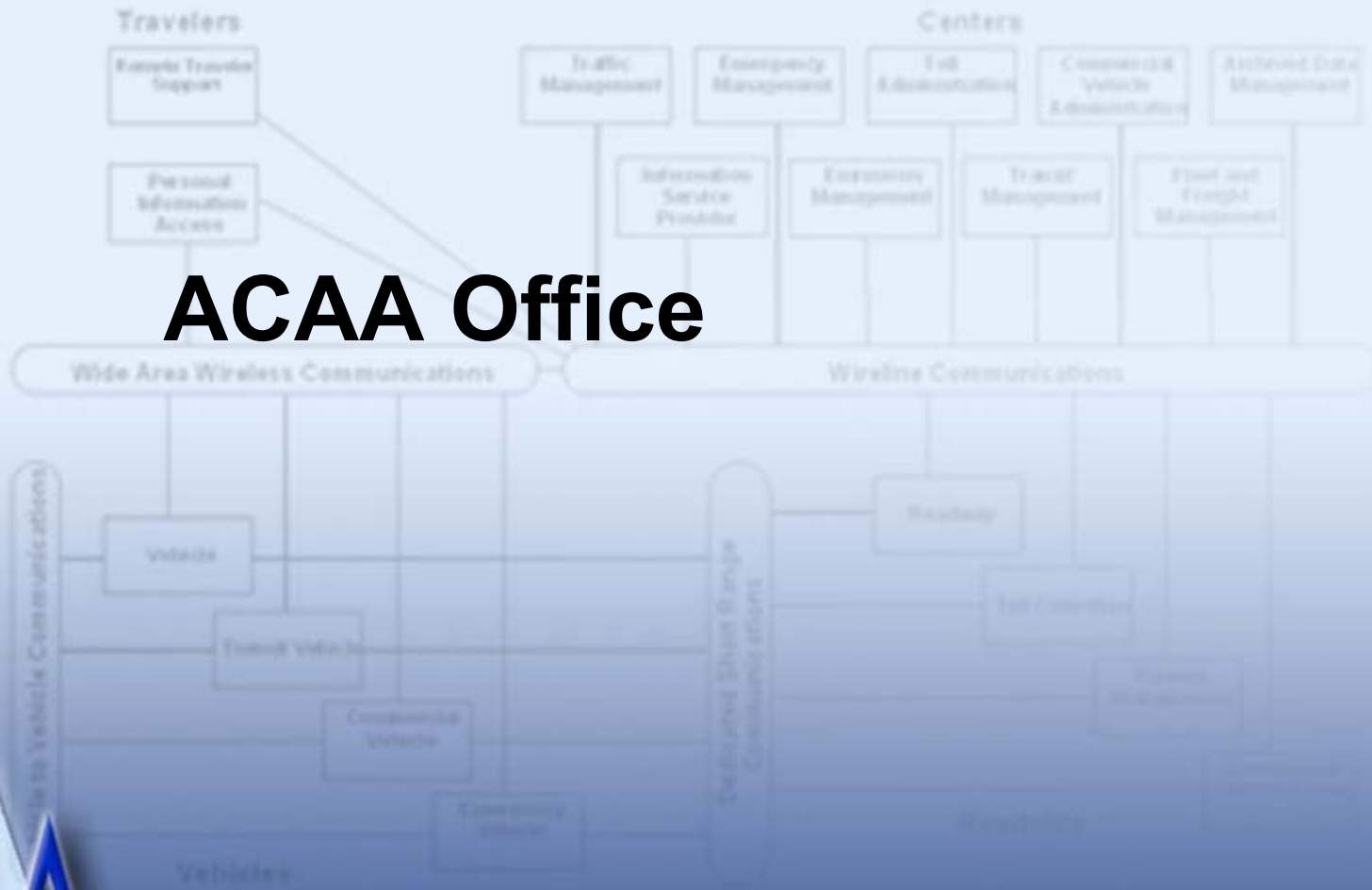
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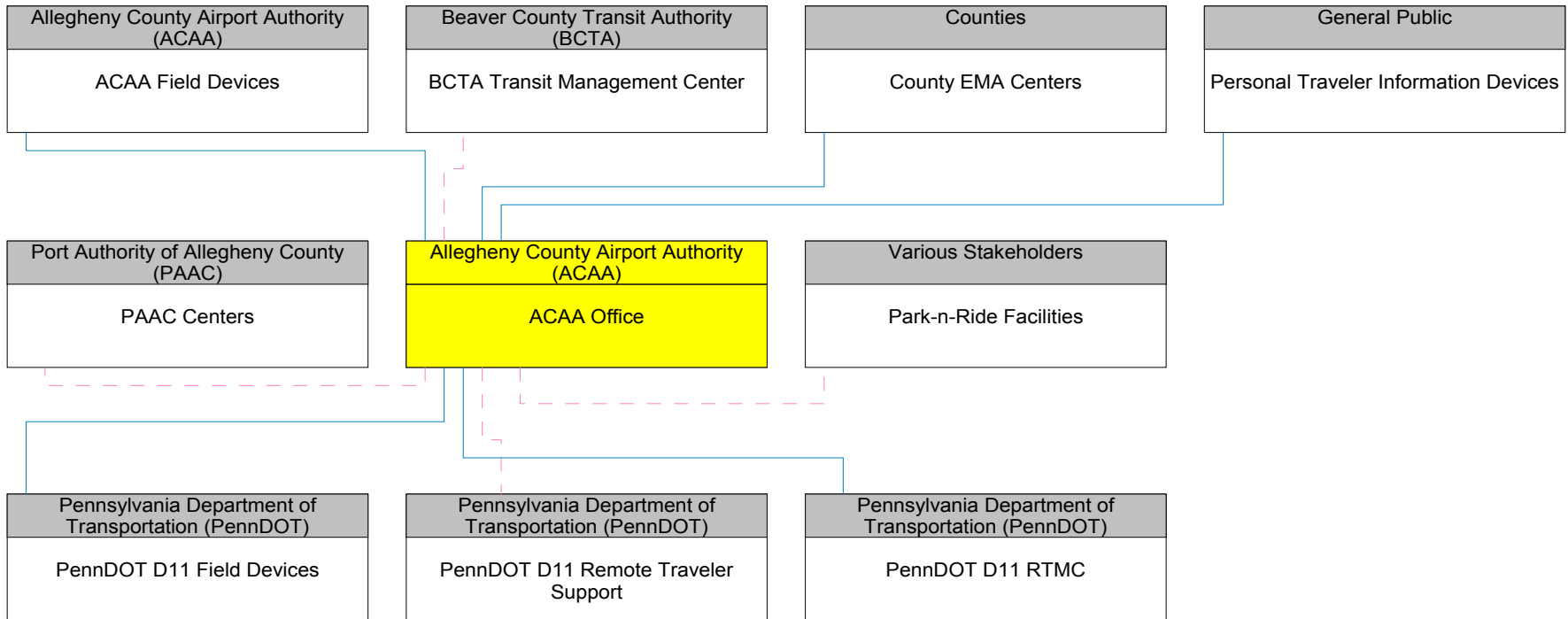
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# ACAA Office

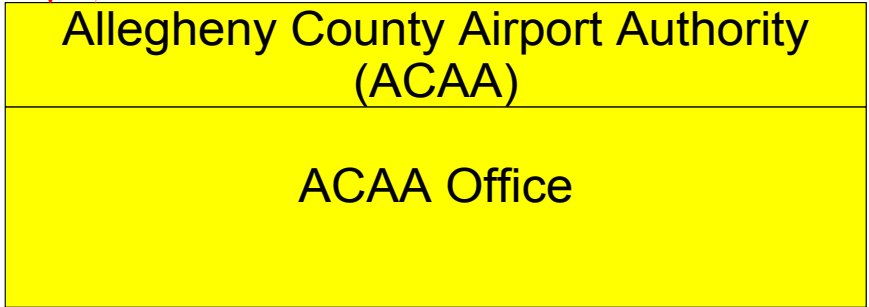
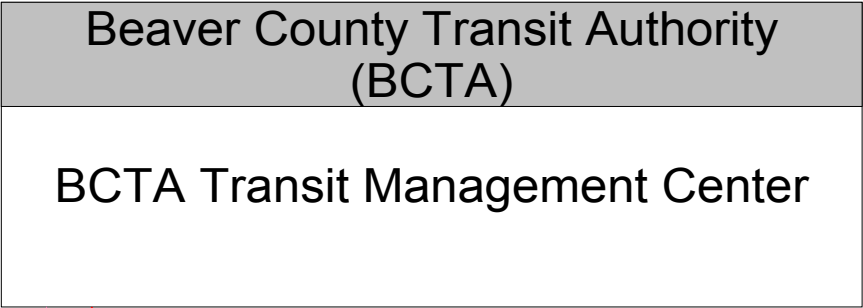


# ACAA Office Interconnect Diagram



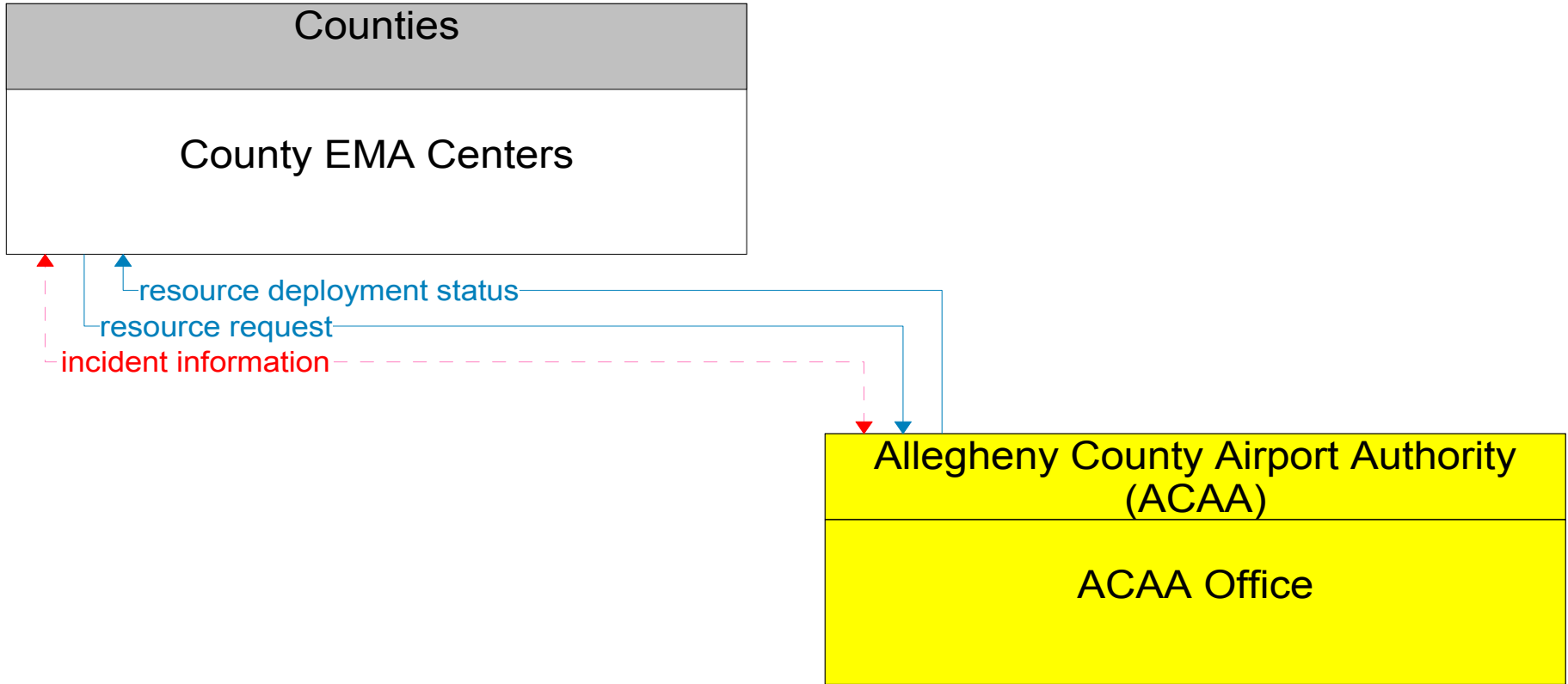
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 - - - Planned



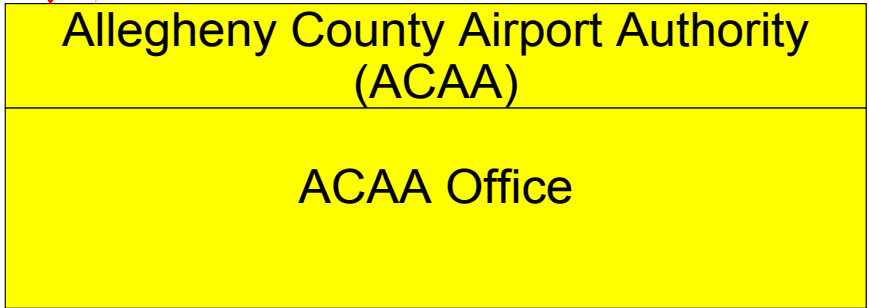
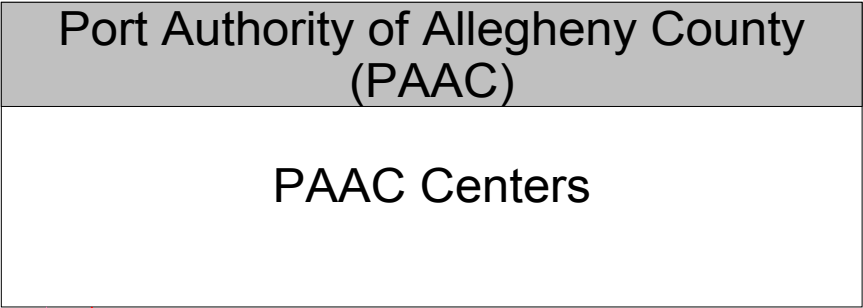


parking information  
parking lot data request

———— Existing  
- - - - - Planned

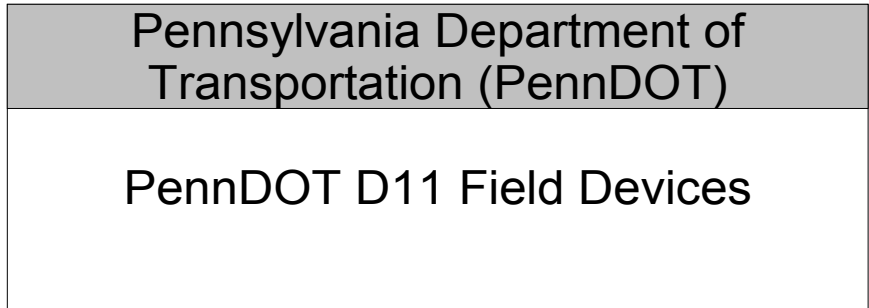


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Planned



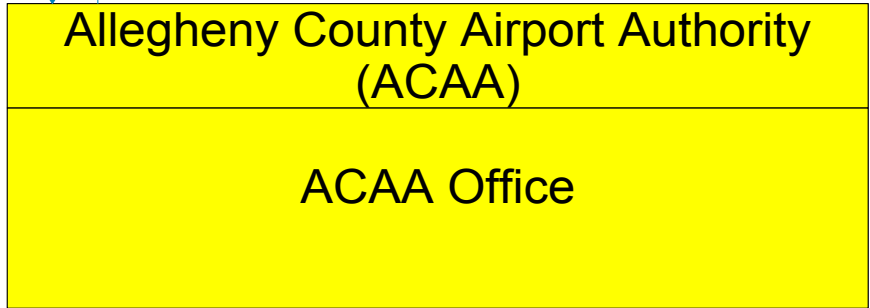
parking information  
parking lot data request

———— Existing  
- - - - - Planned



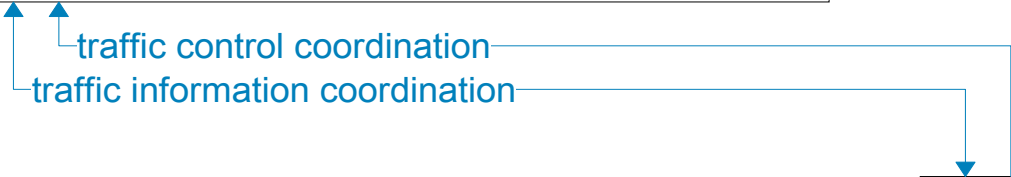
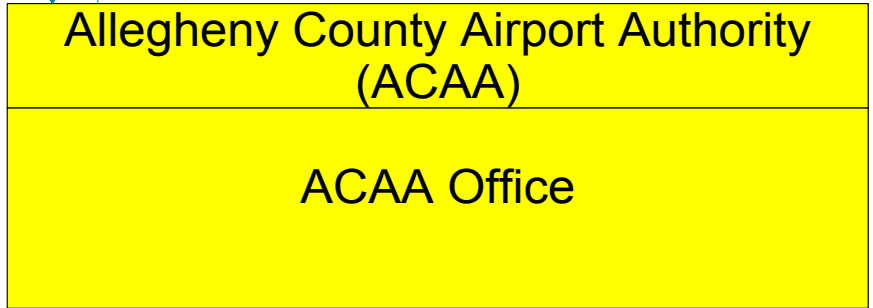
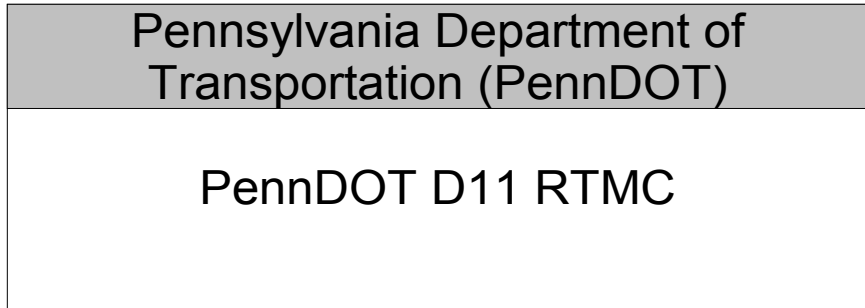
roadway information system data

roadway information system status



Existing

Planned



———— Existing  
----- Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 Remote Traveler  
Support

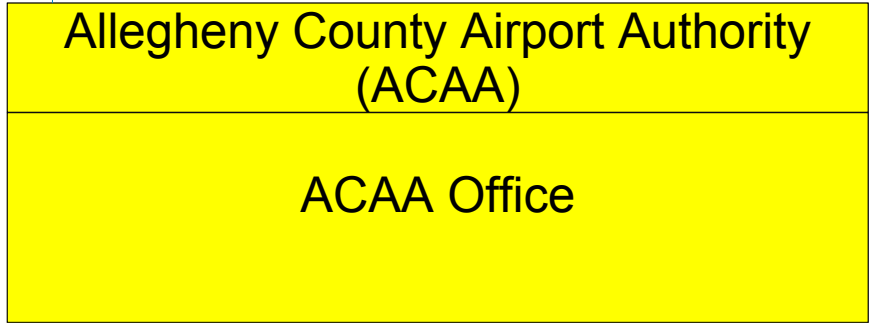
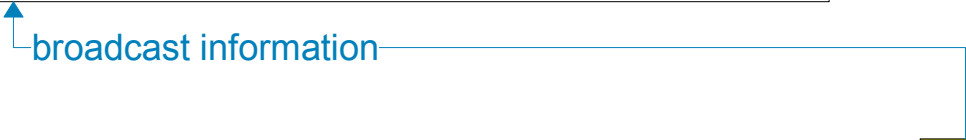
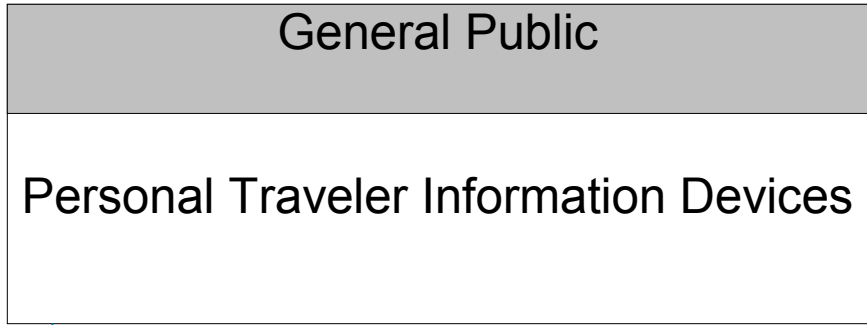


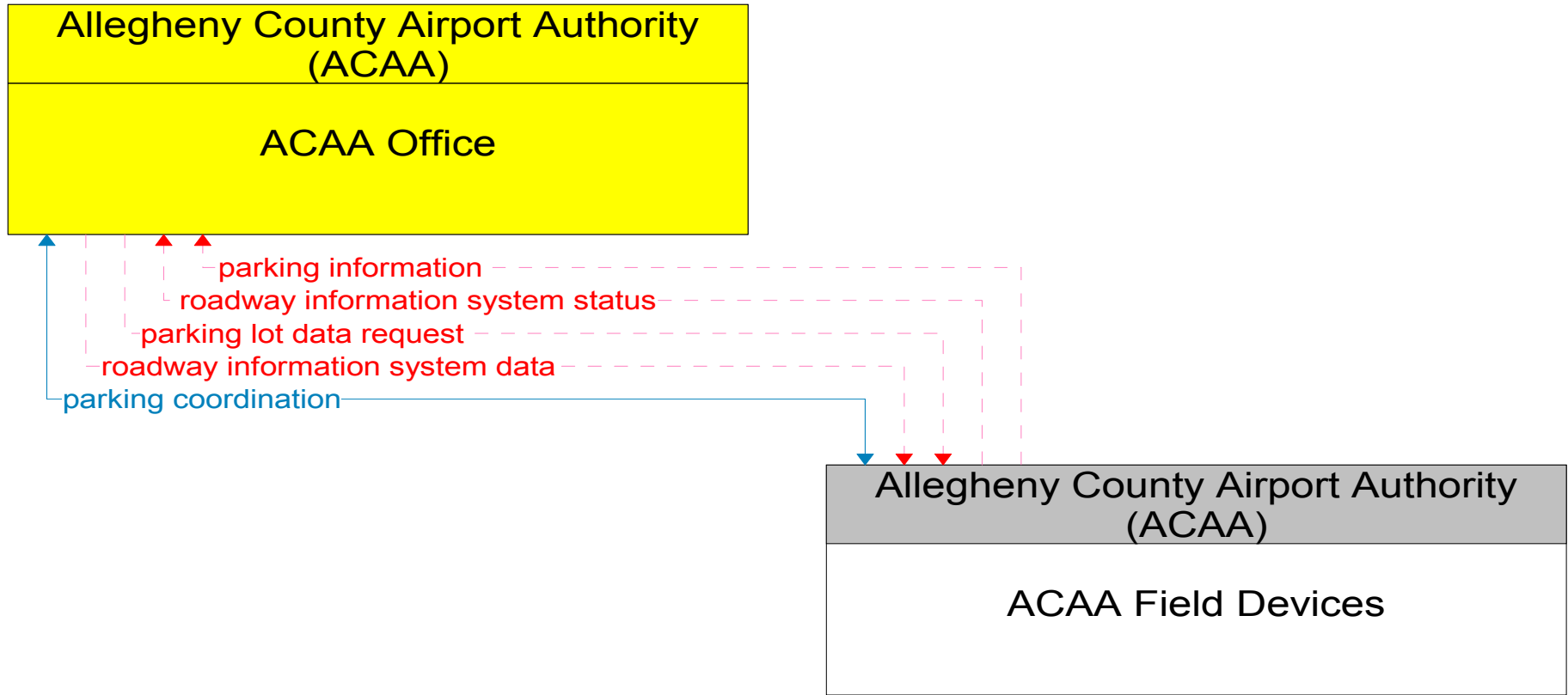
broadcast information

Allegheny County Airport Authority  
(ACAA)

ACAA Office

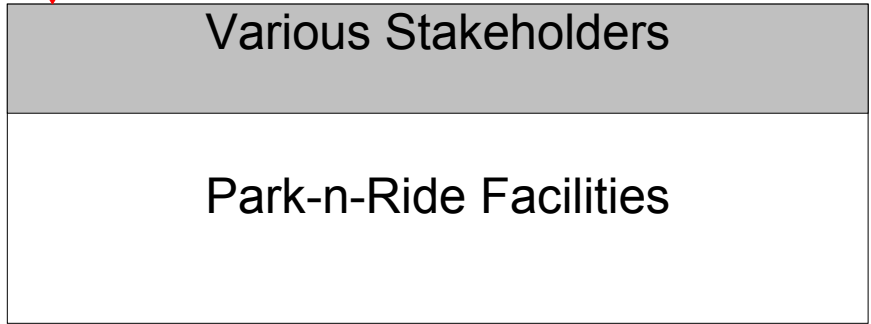
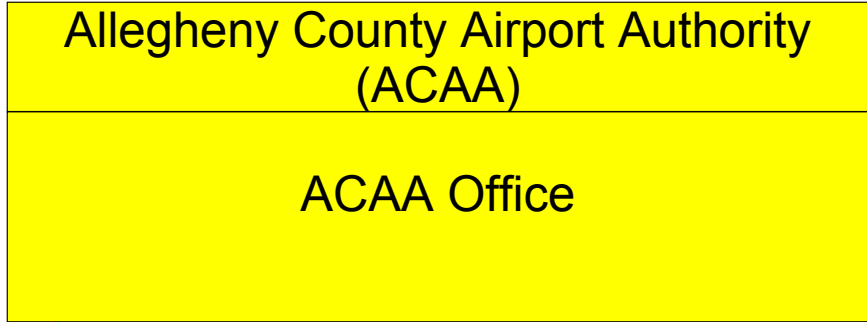
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Planned



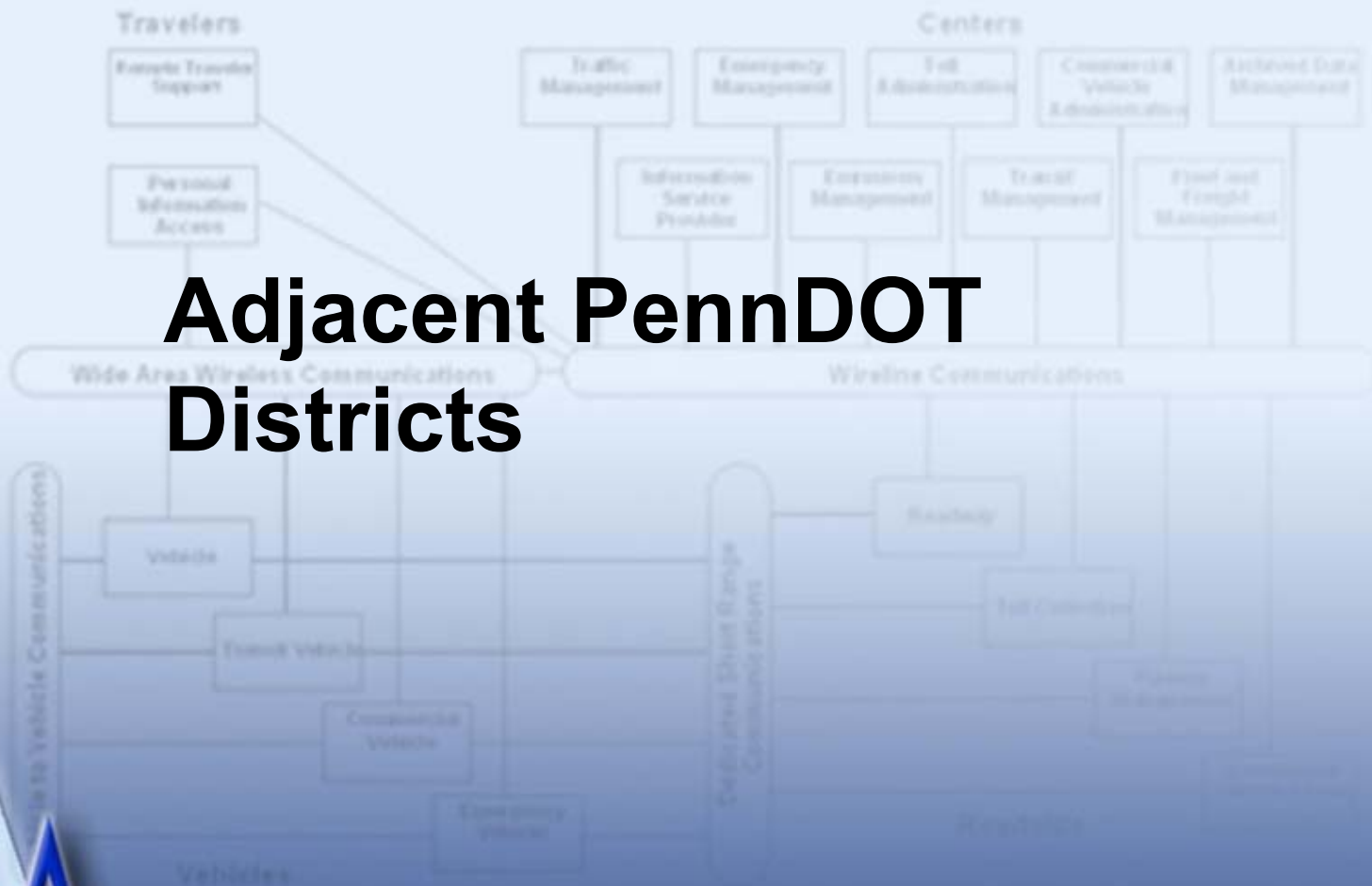


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- - - - - Planned

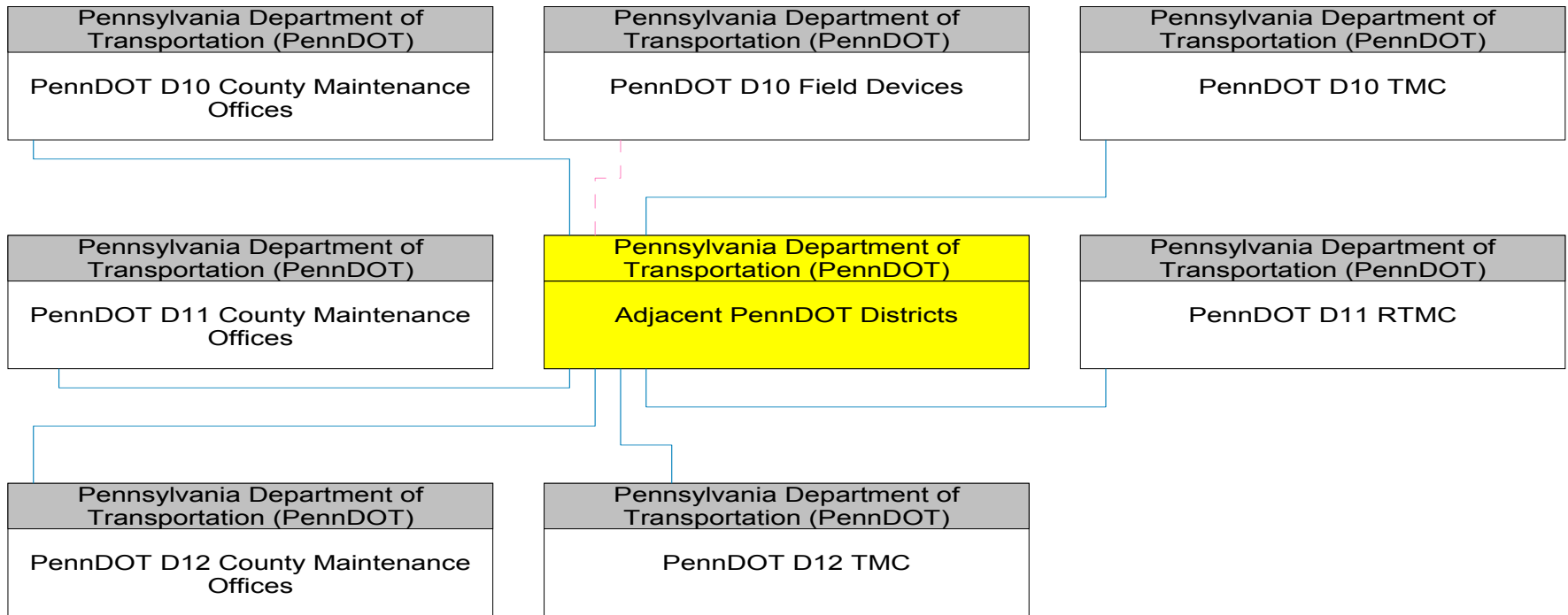




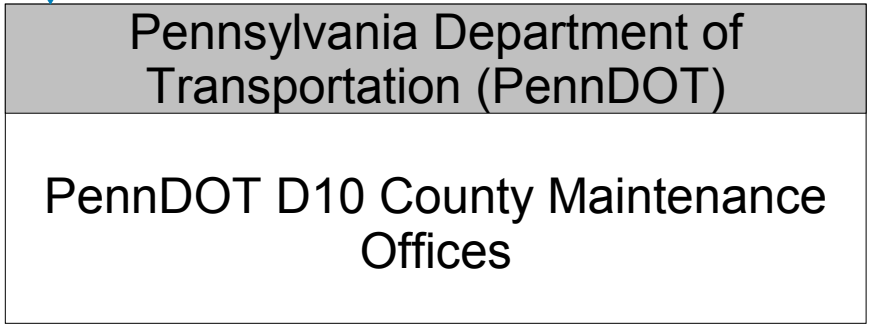
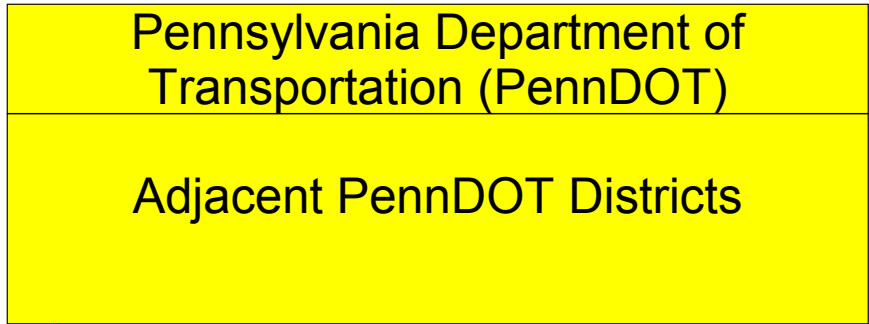
# Adjacent PennDOT Districts



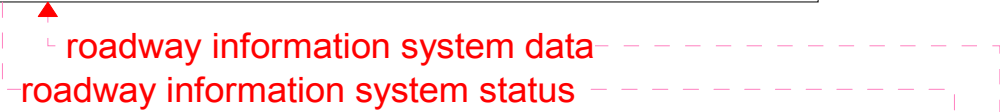
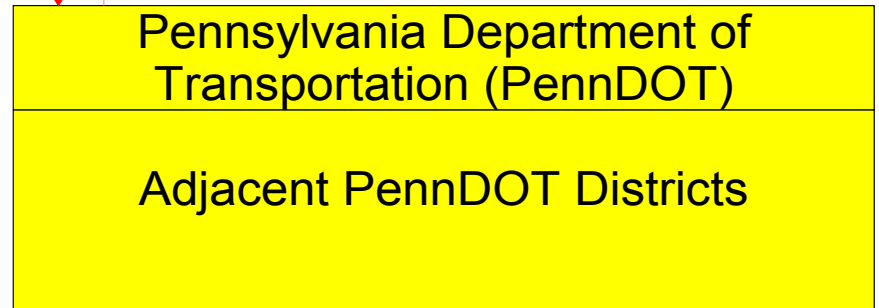
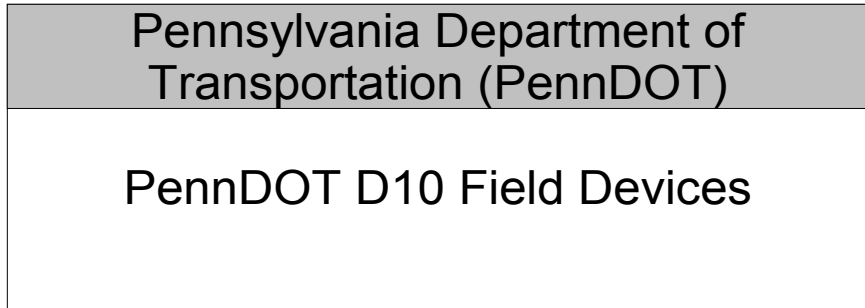
# Adjacent PennDOT Districts Interconnect Diagram



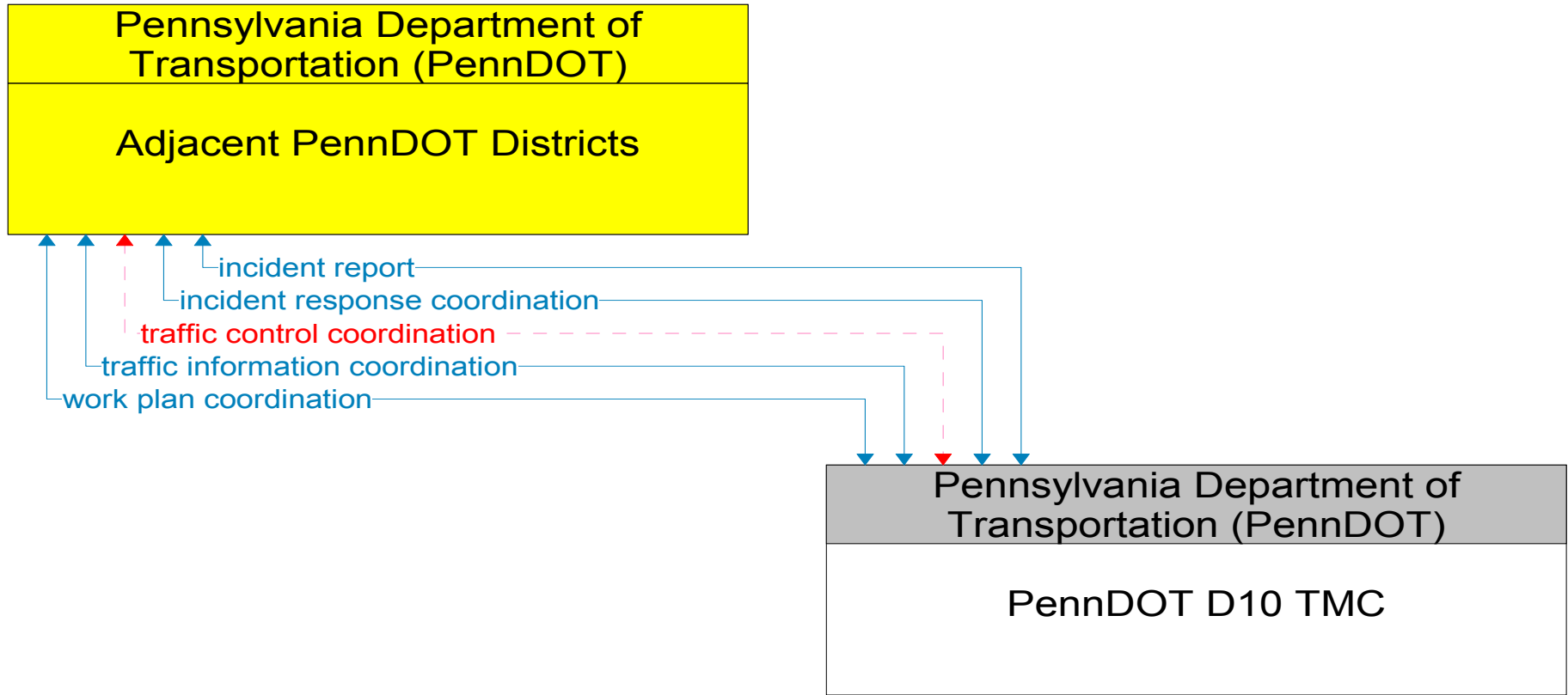
— Existing  
- - - Planned



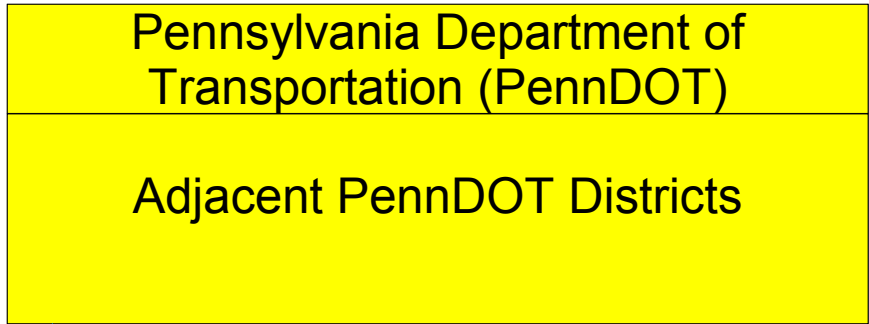
———— Existing  
- - - - - Planned



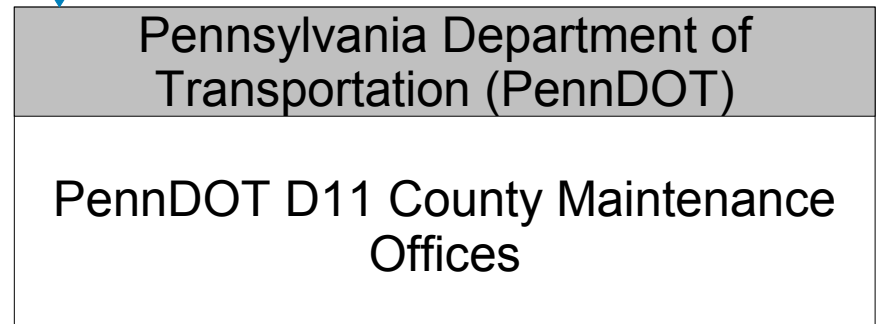
———— Existing  
- - - - - Planned



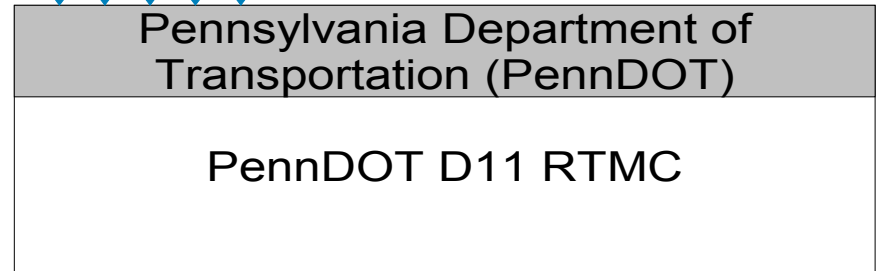
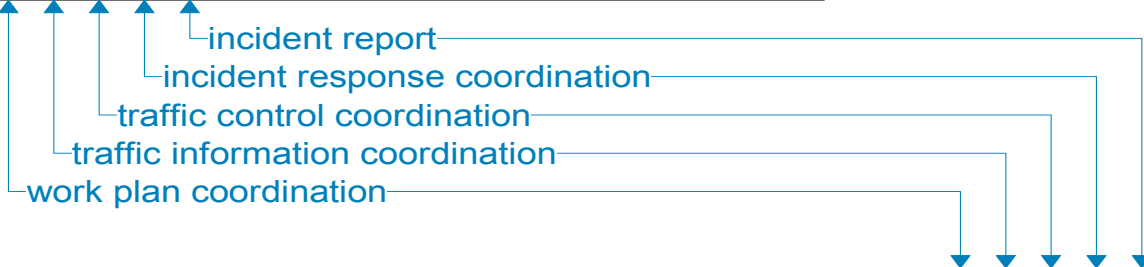
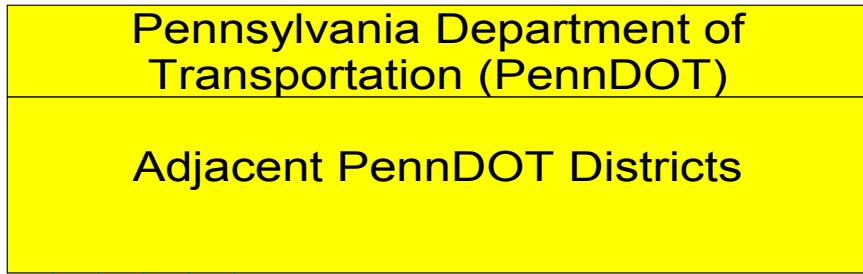
———— Existing  
- - - - - Planned



maint and constr resource coordination

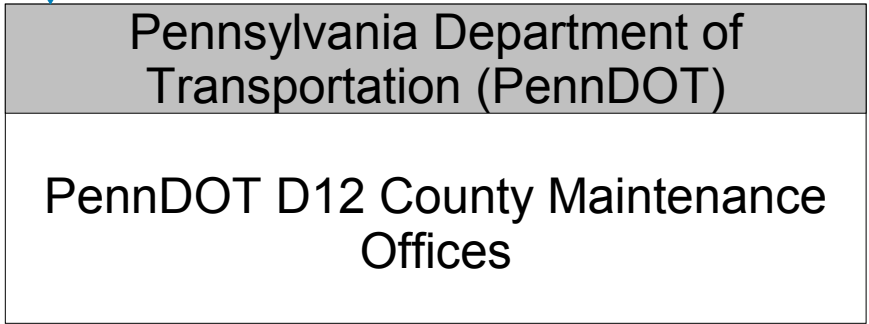
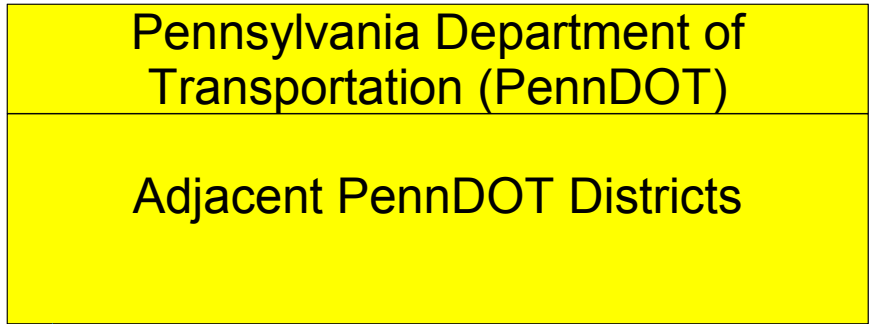


Existing  
Planned

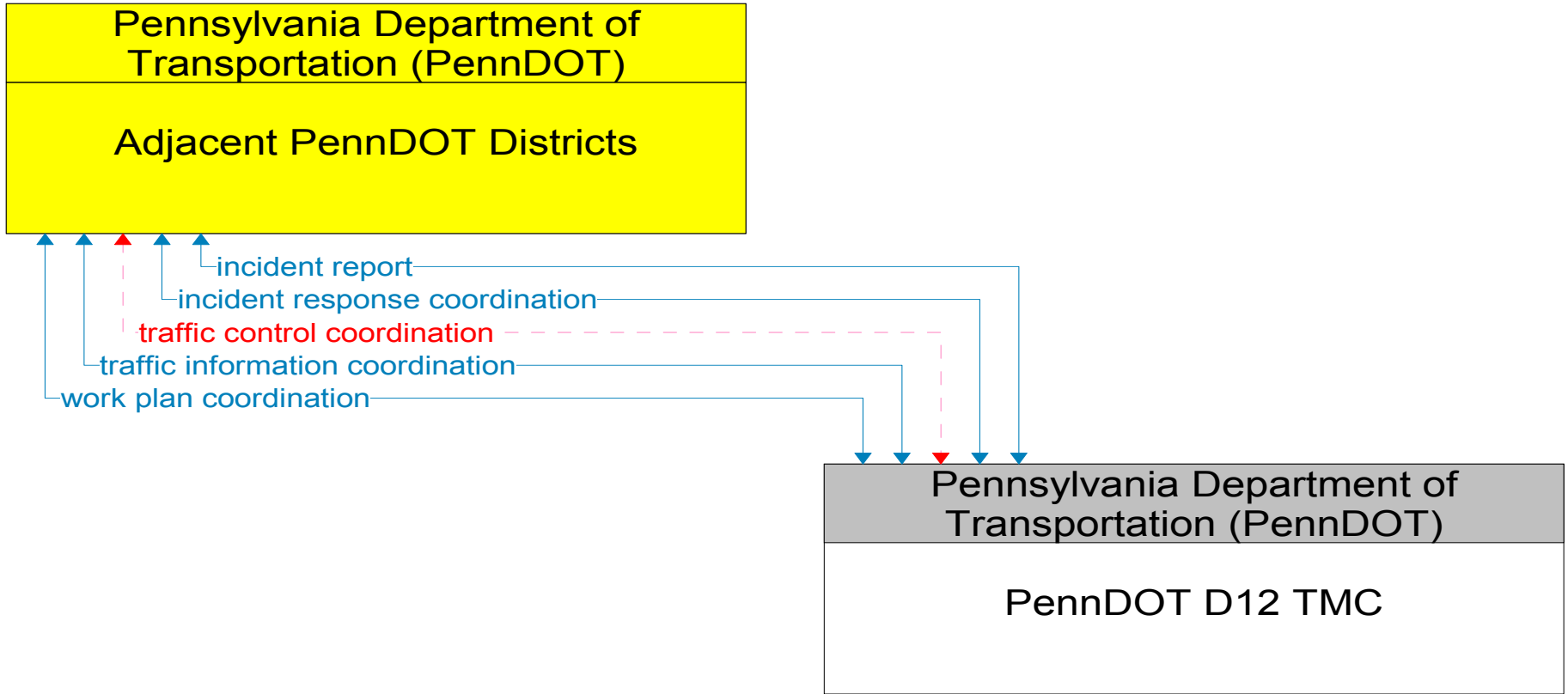


———— Existing  
- - - - - Planned



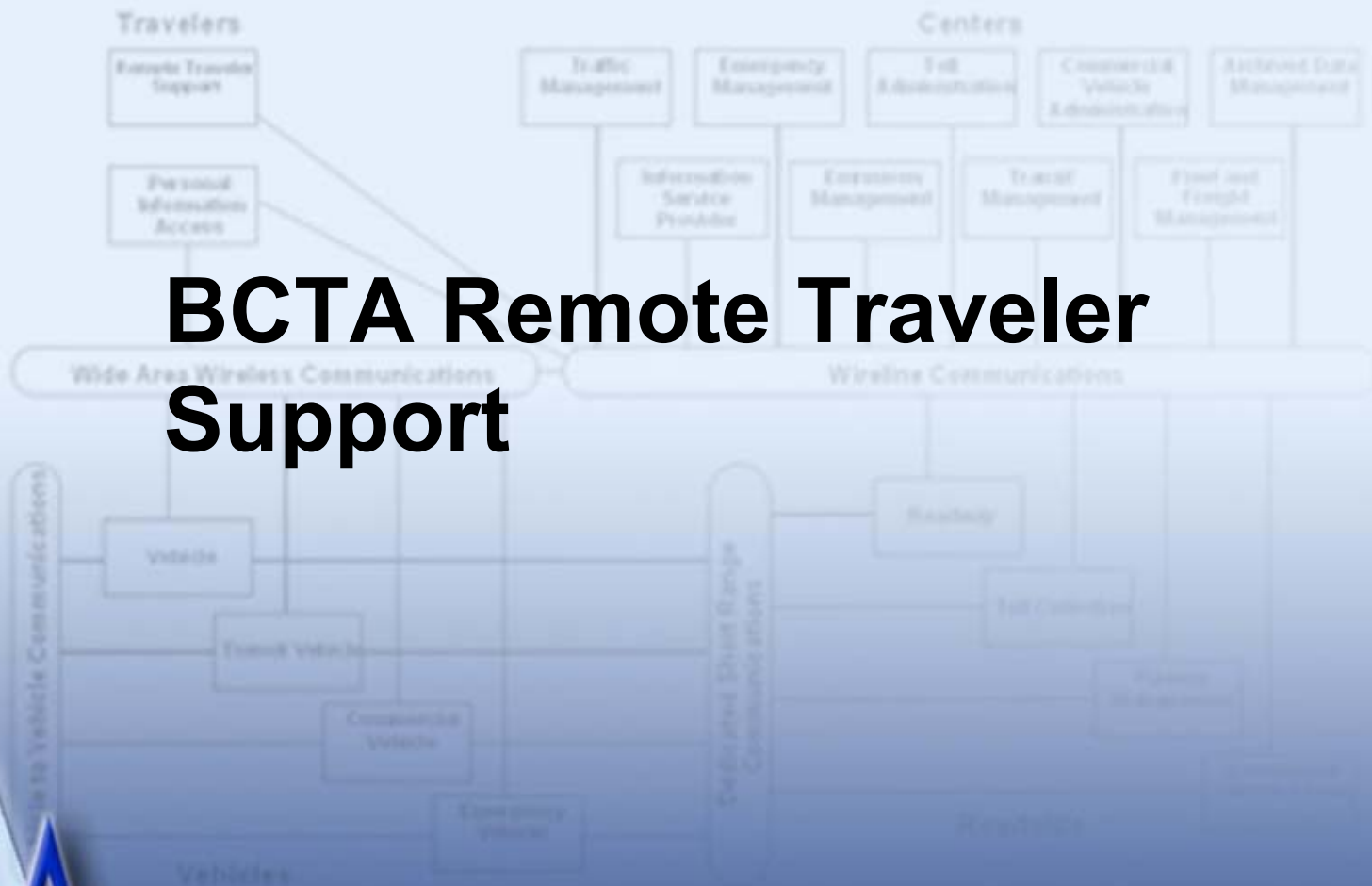


———— Existing  
- - - - - Planned



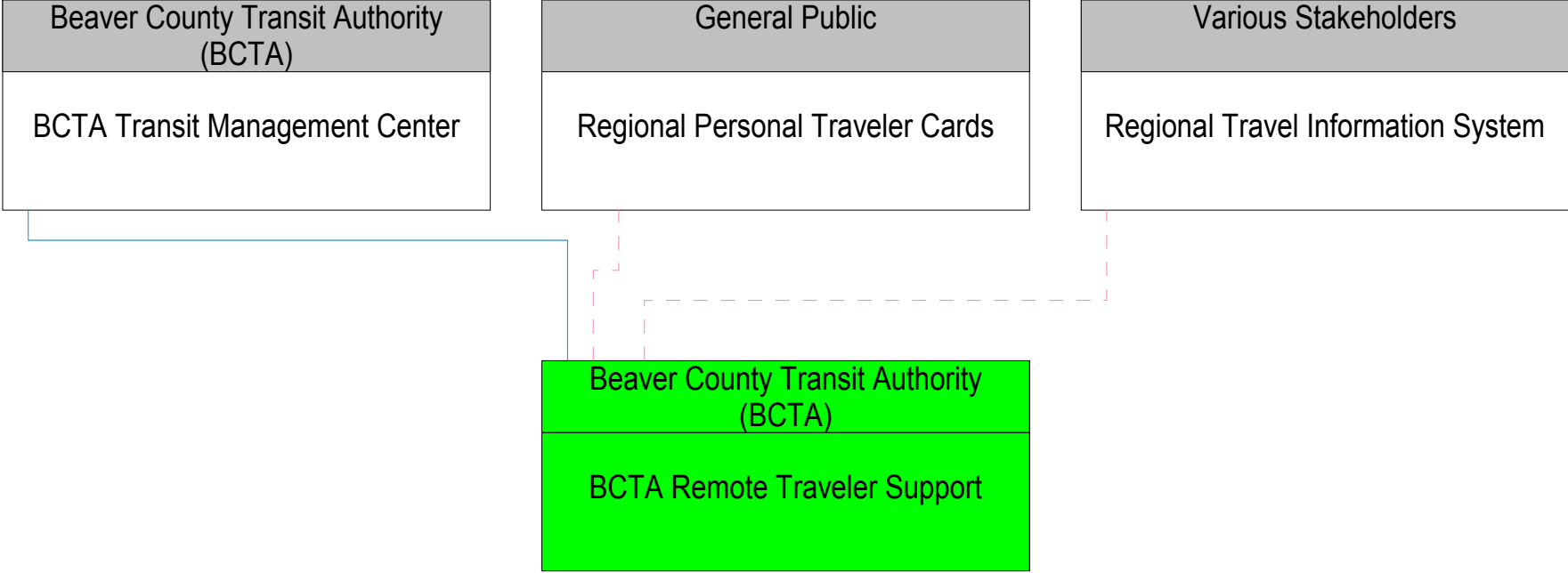
———— Existing  
- - - - - Planned

# BCTA Remote Traveler Support

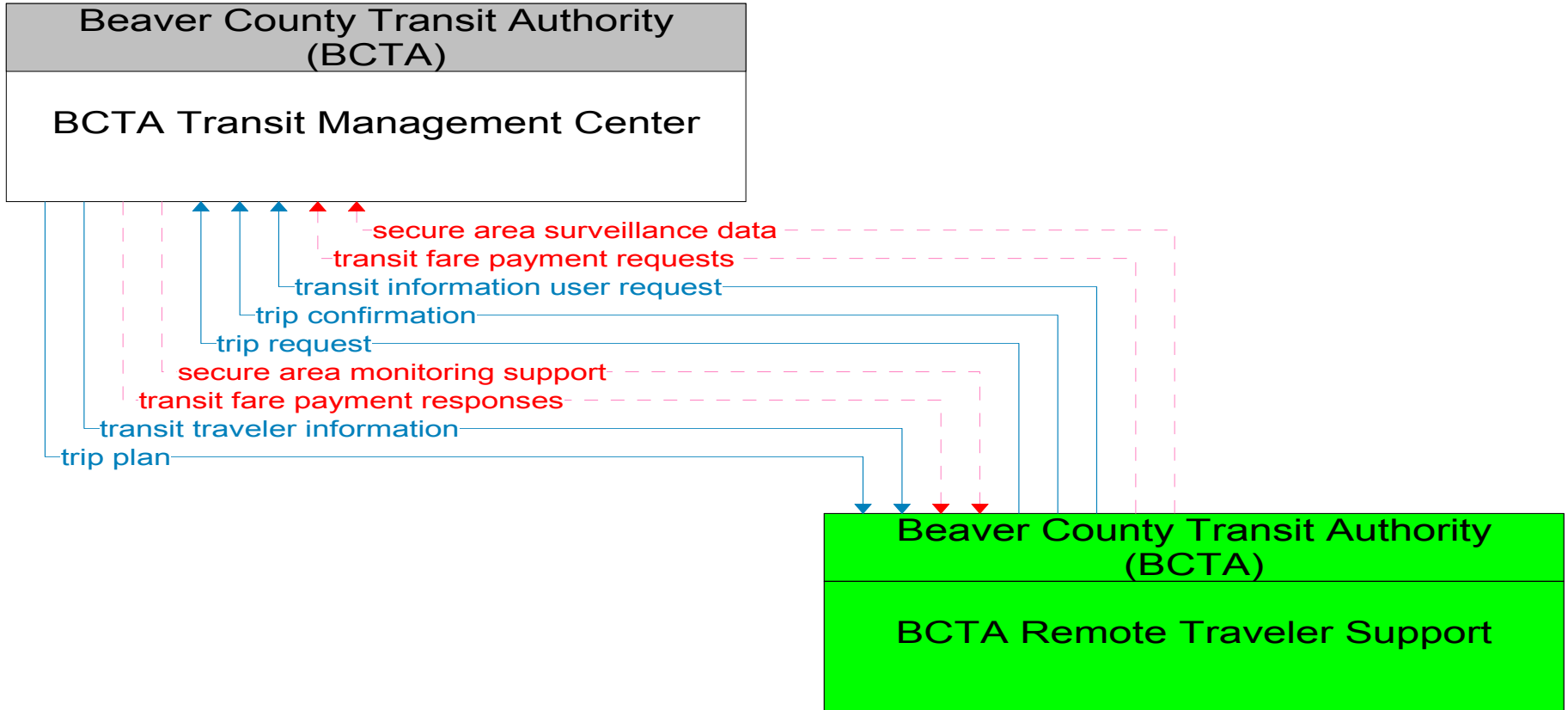


PA

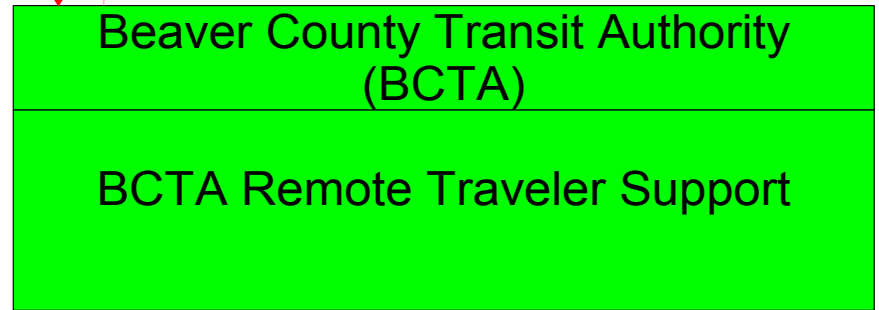
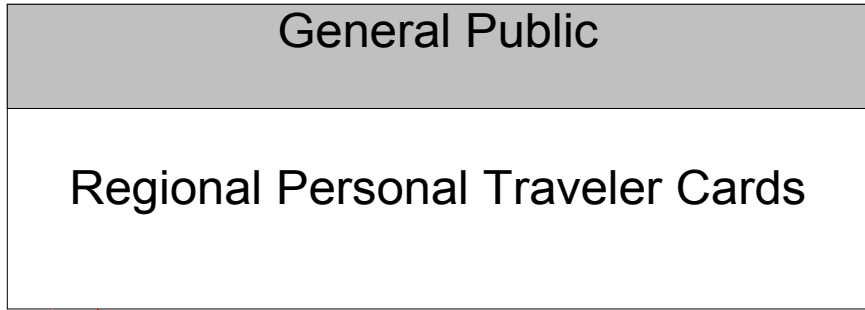
# BCTA Remote Traveler Support Interconnect Diagram



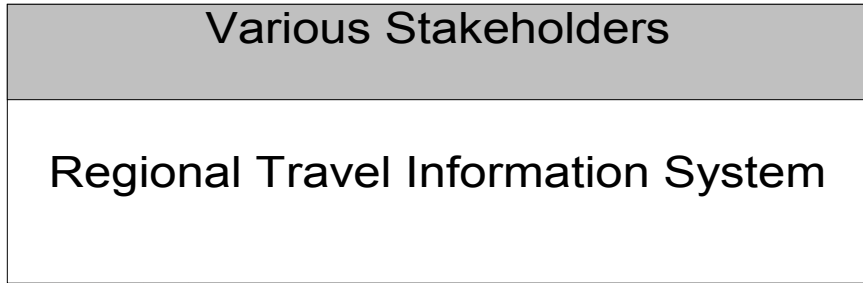
— Existing  
- - - Planned



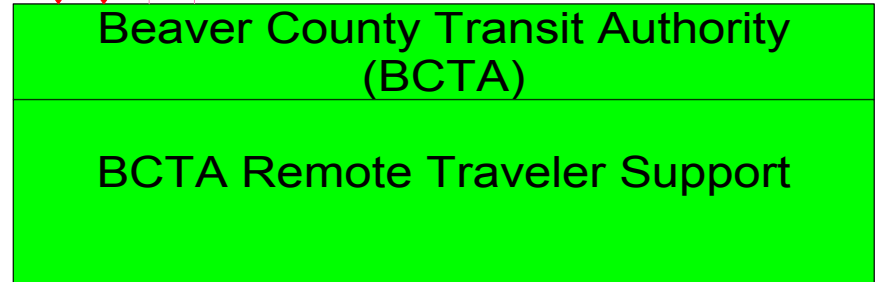
———— Existing  
- - - - - Planned



Existing  
Planned

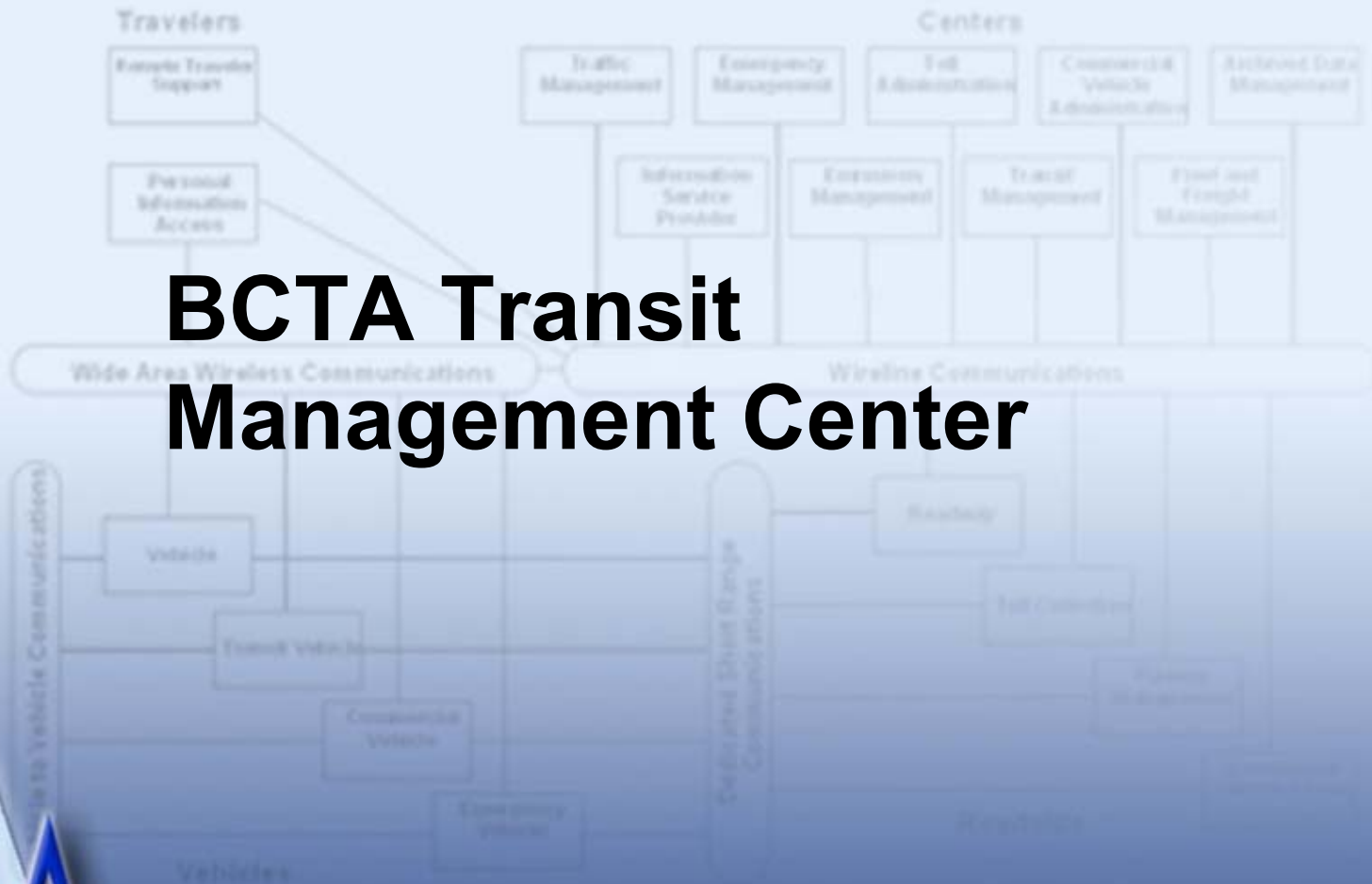


- trip confirmation
- trip request
- broadcast information
- trip plan



———— Existing  
- - - - - Planned

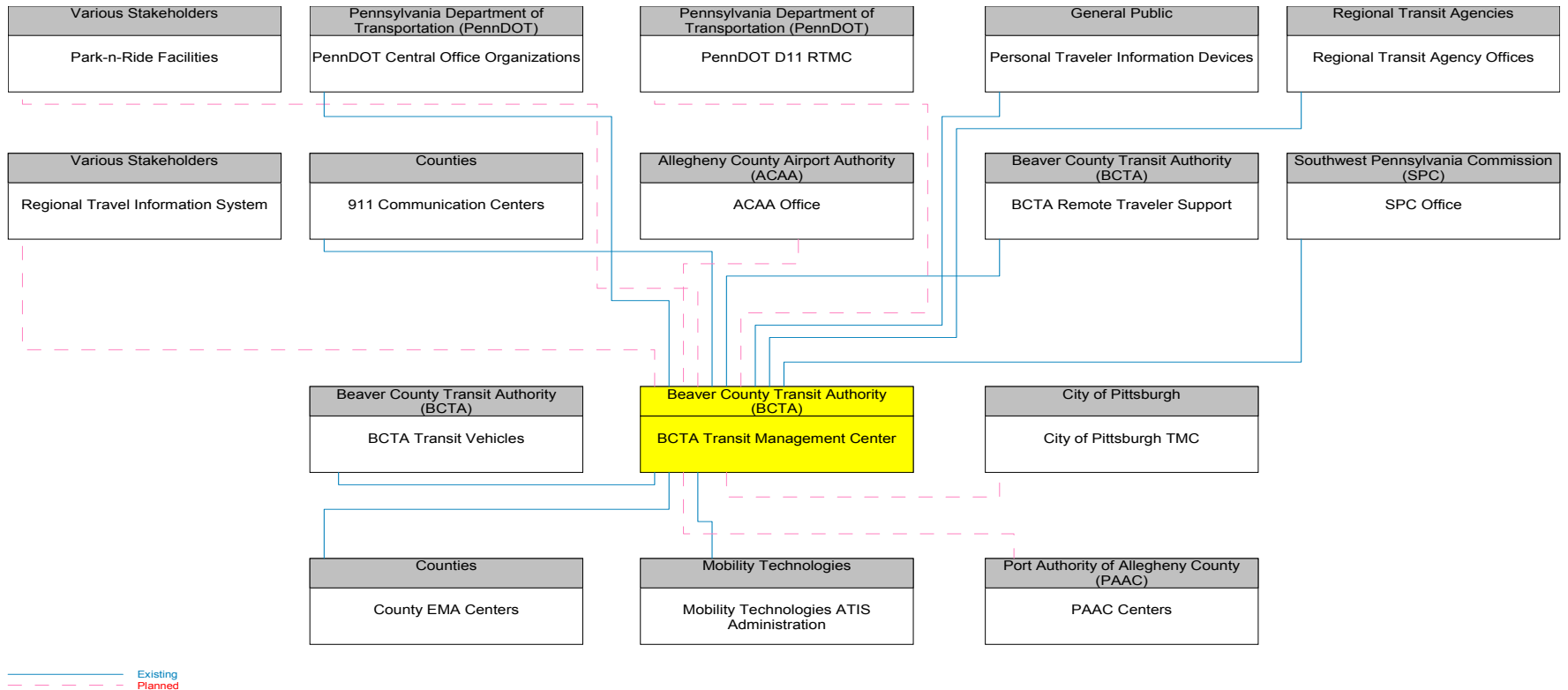
# BCTA Transit Management Center

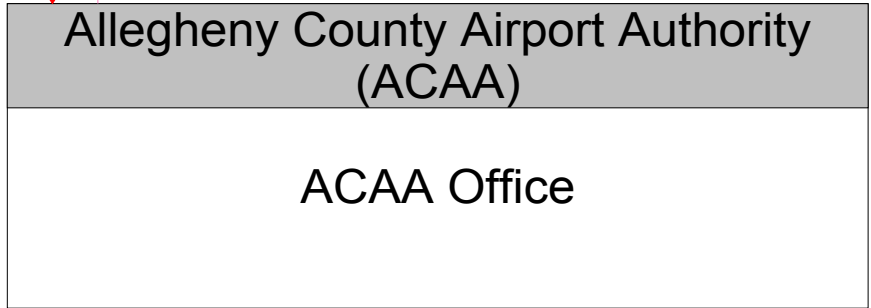
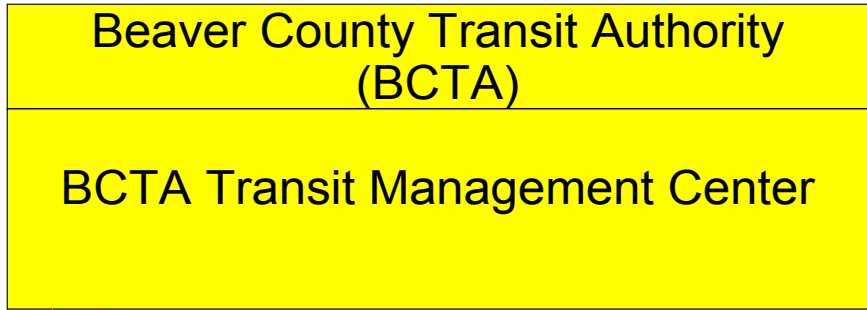


PA



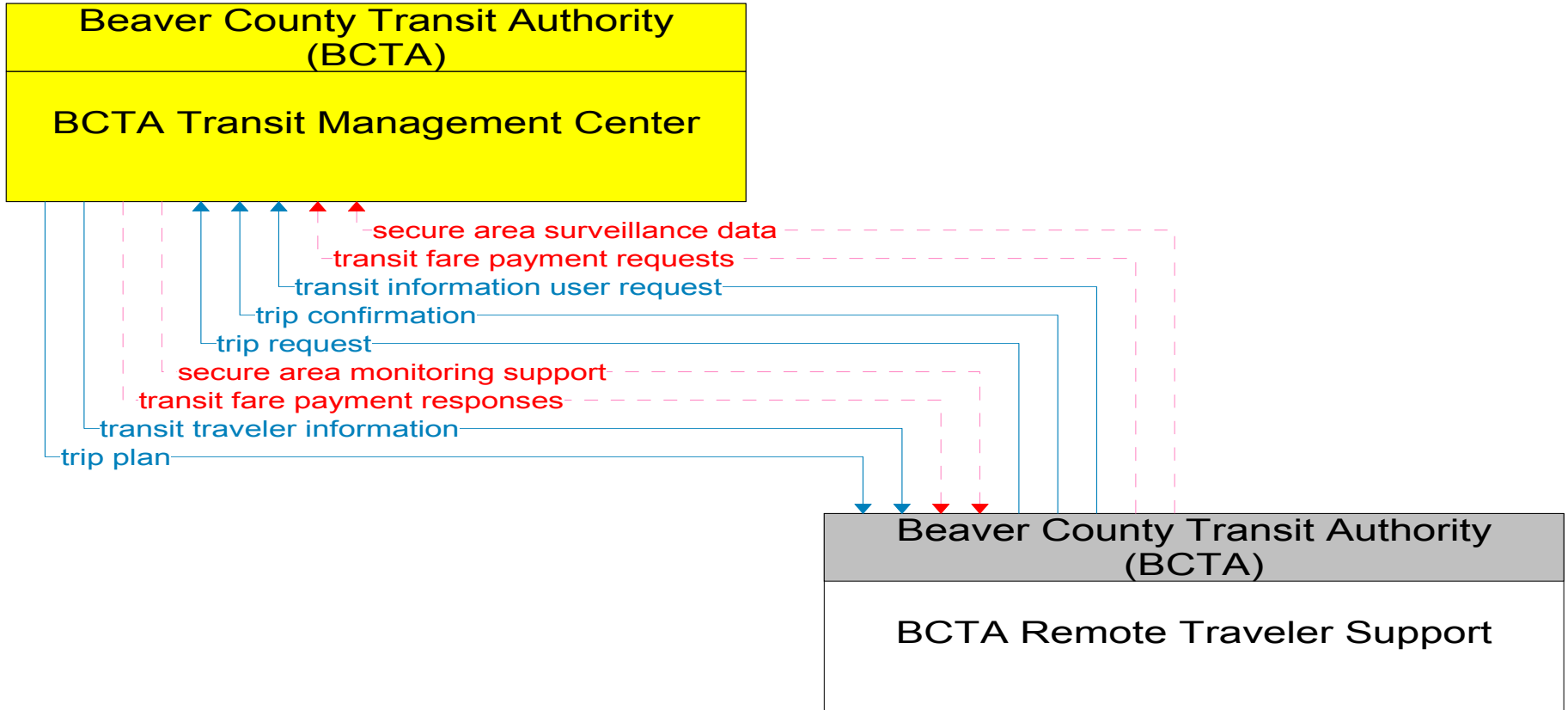
# BCTA Transit Management Center Interconnect Diagram

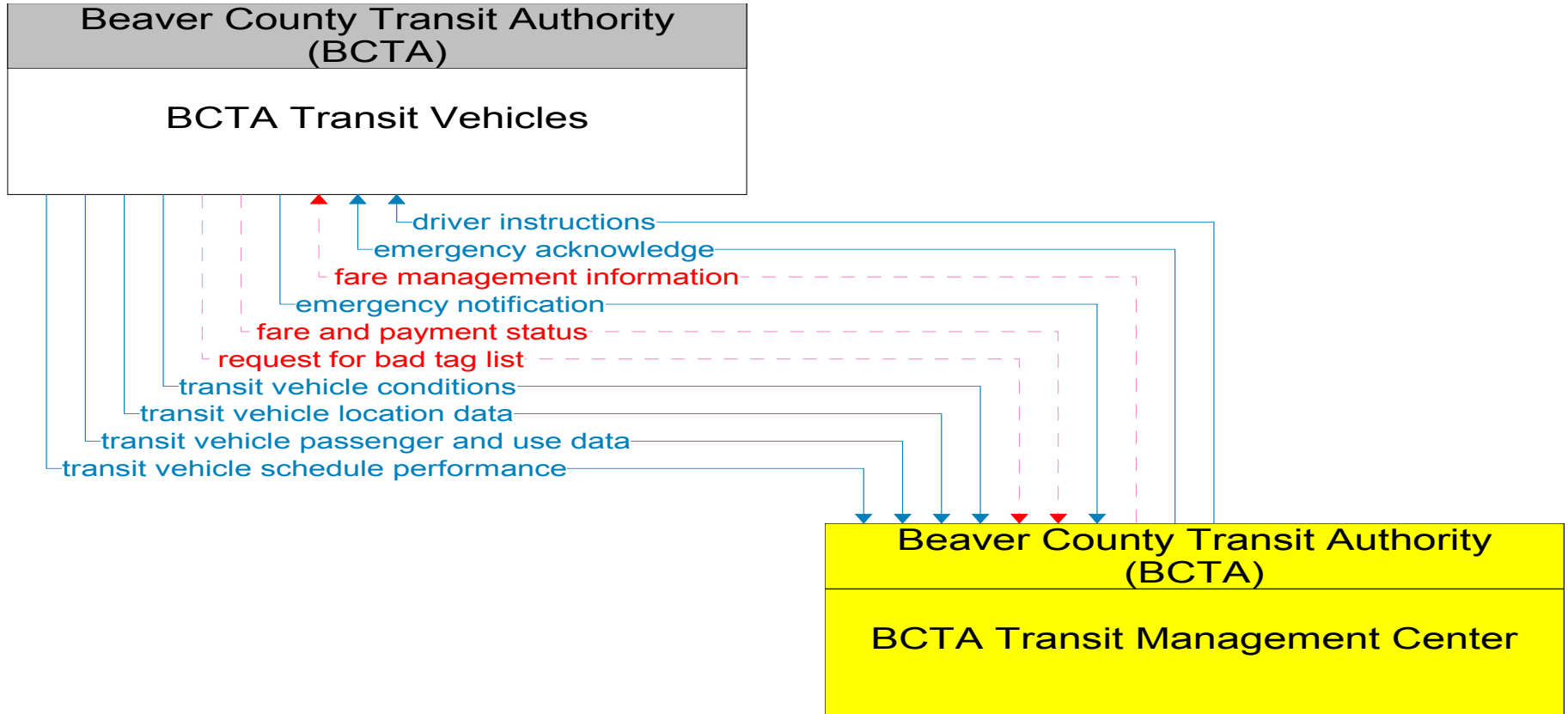


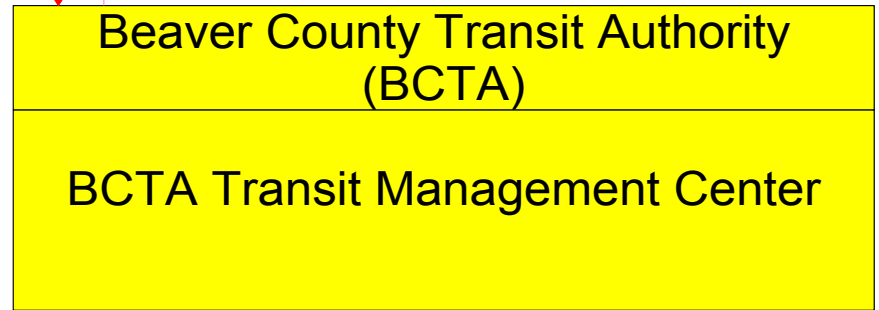
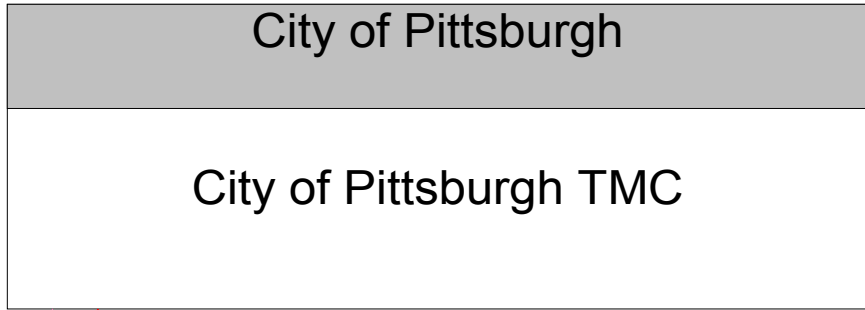


parking information  
parking lot data request

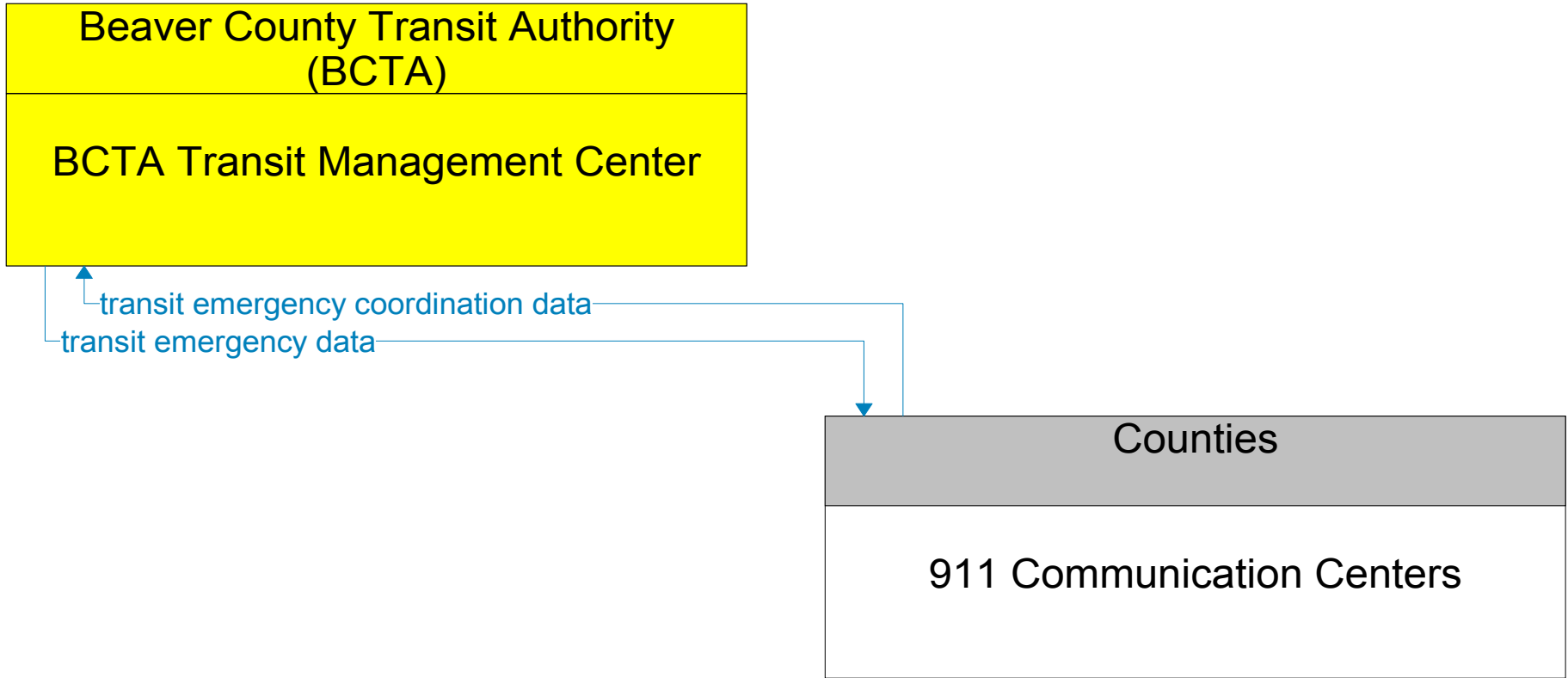
———— Existing  
- - - - - Planned



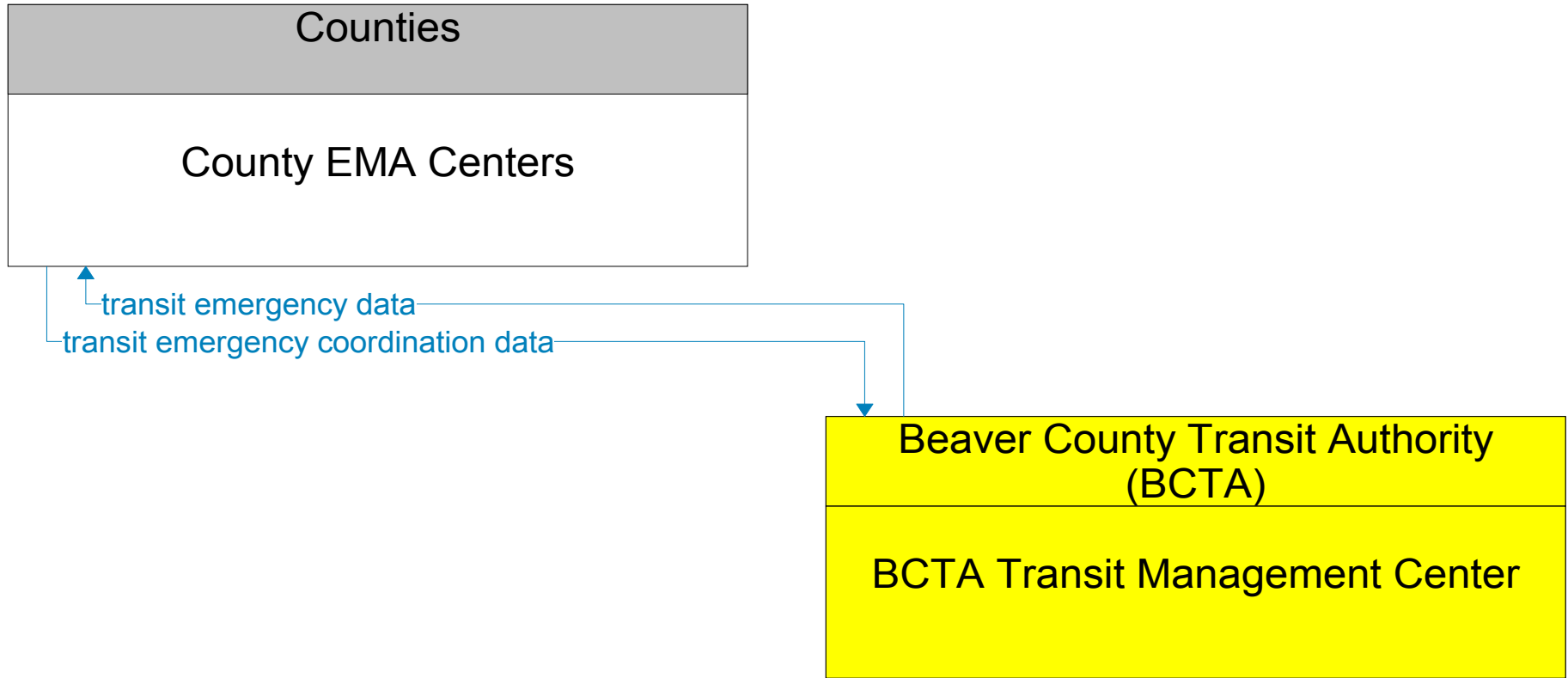




———— Existing  
- - - - - Planned



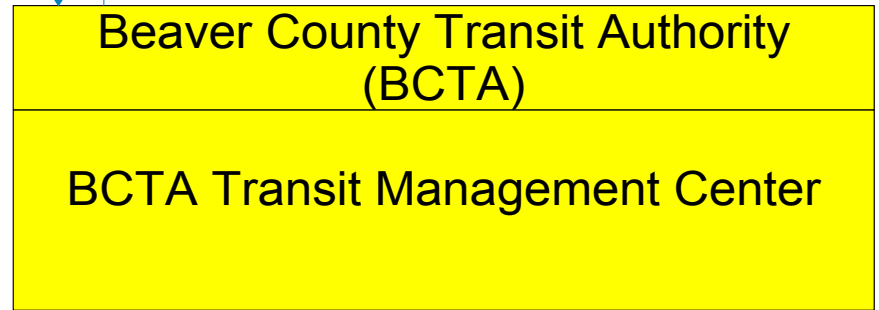
———— Existing  
- - - - - Planned



———— Existing  
----- Planned

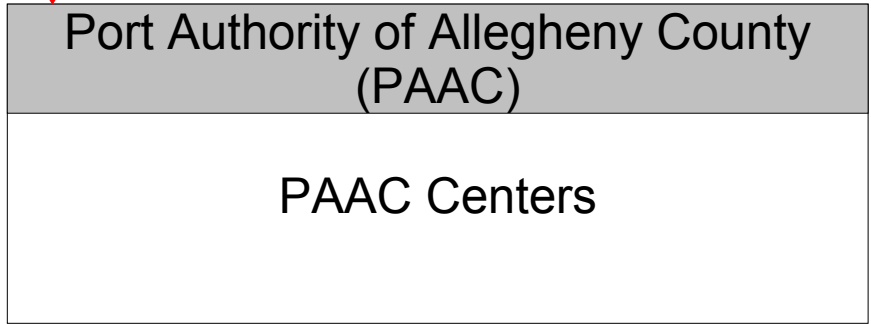
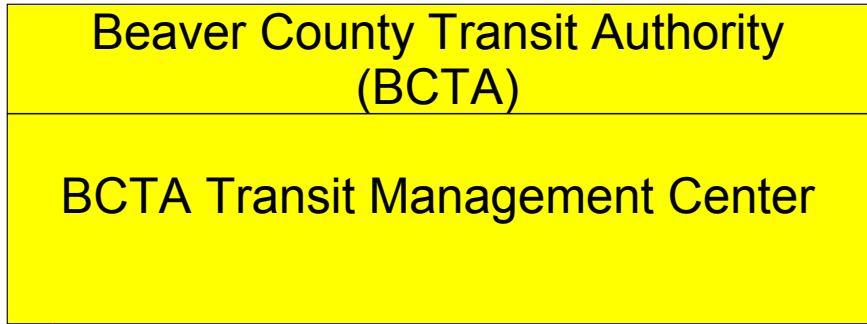


request for road network conditions  
road network conditions



Existing  
Planned





Pennsylvania Department of  
Transportation (PennDOT)

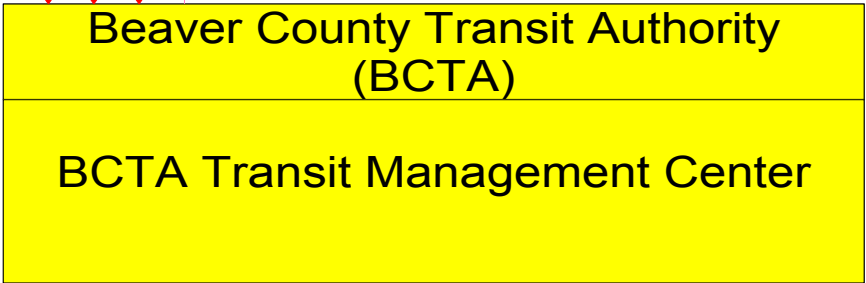
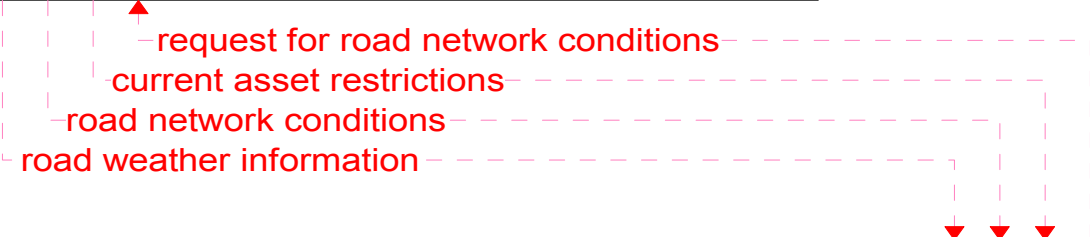
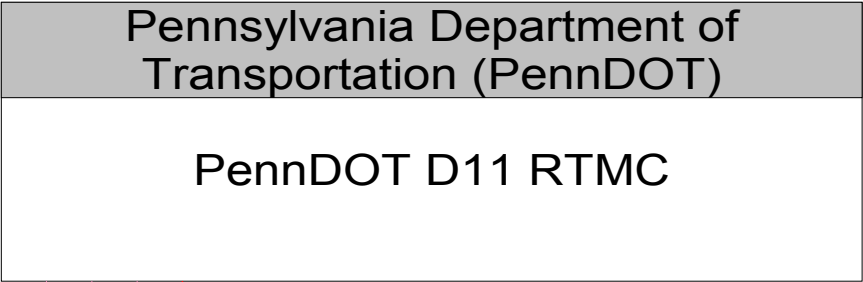
PennDOT Central Office Organizations

transit archive data  
archive requests

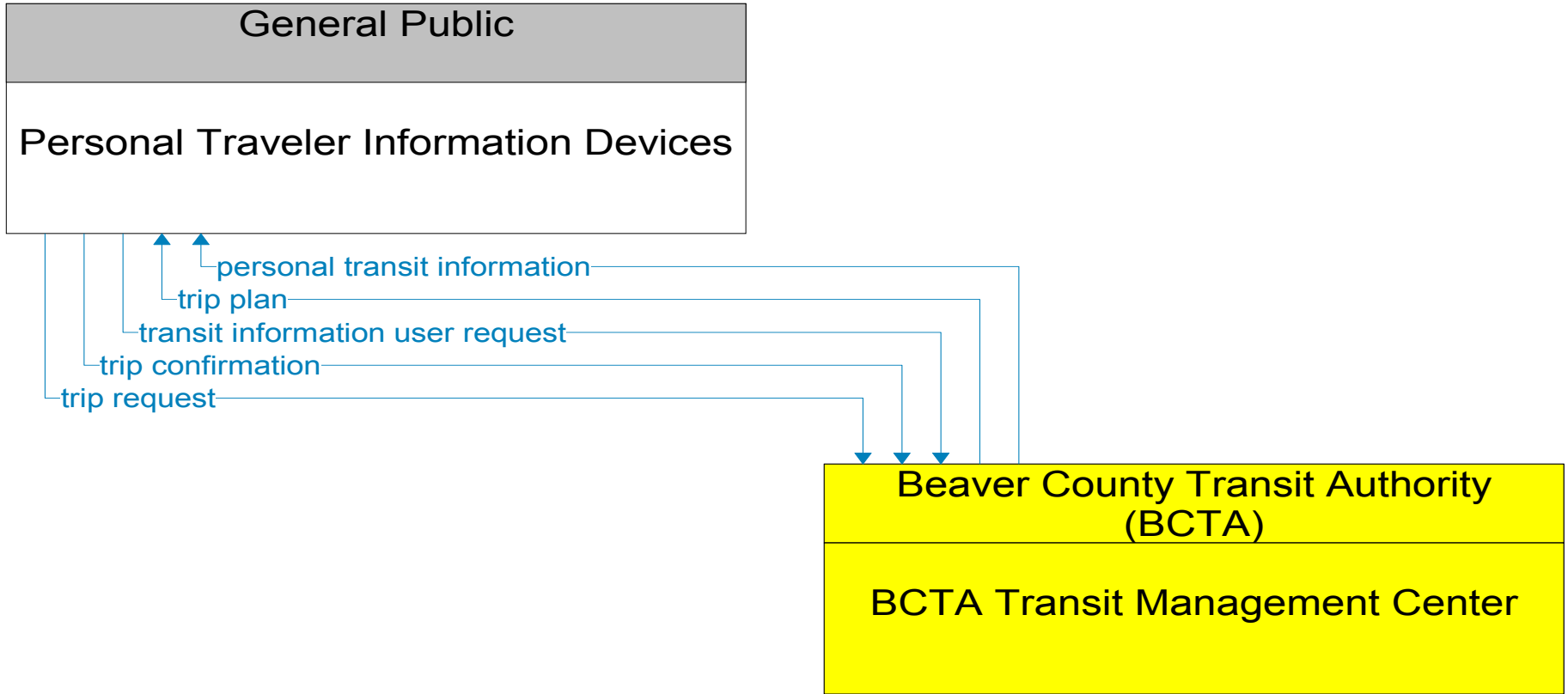
Beaver County Transit Authority  
(BCTA)

BCTA Transit Management Center

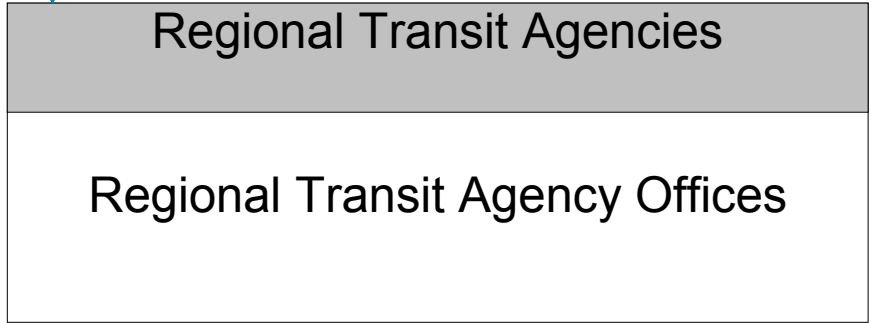
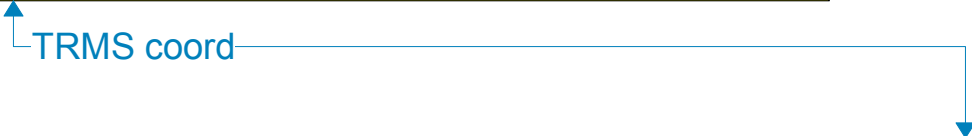
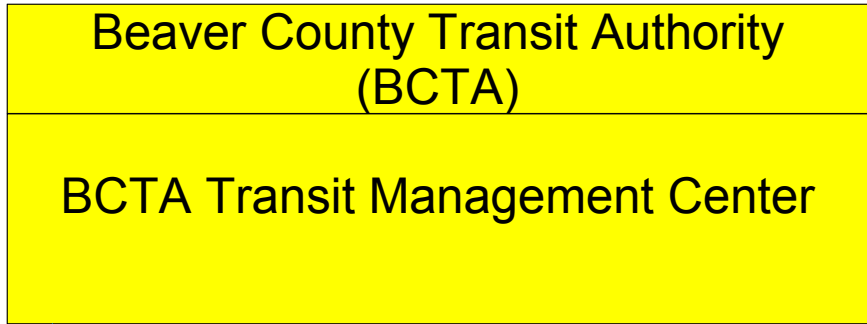
———— Existing  
----- Planned



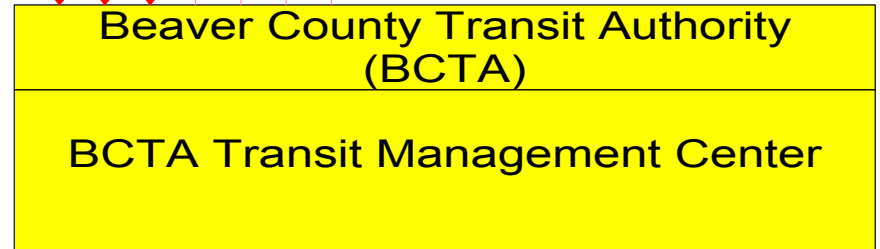
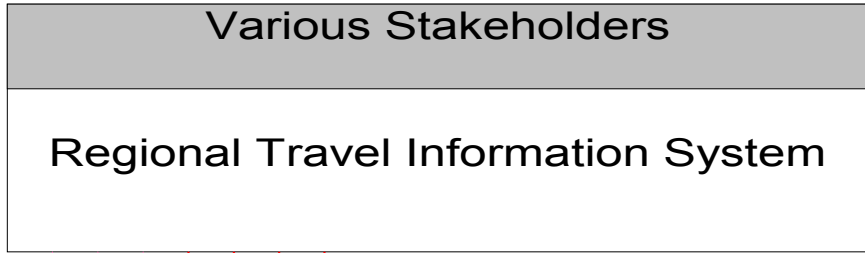
Existing  
Planned



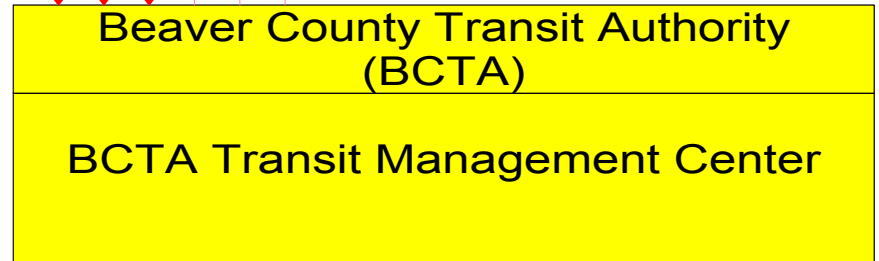
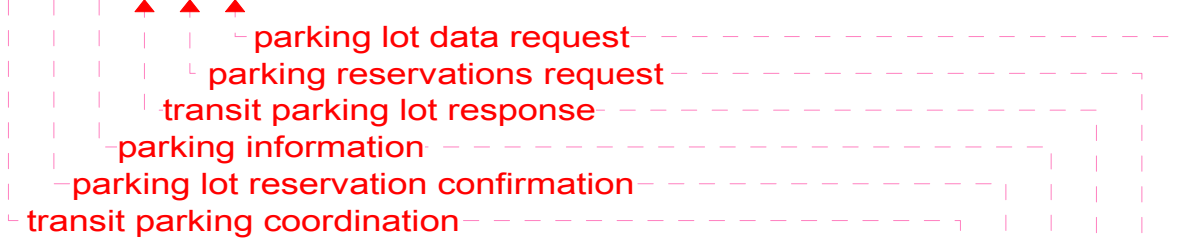
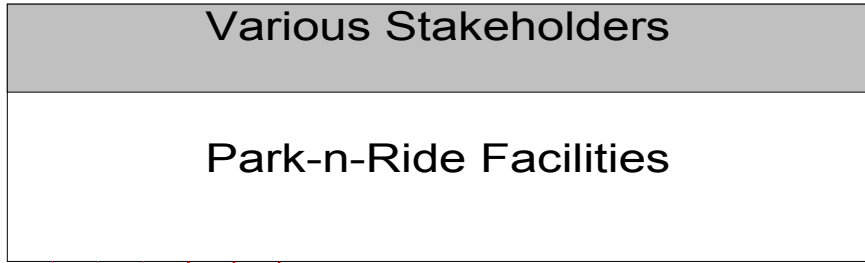
———— Existing  
----- Planned



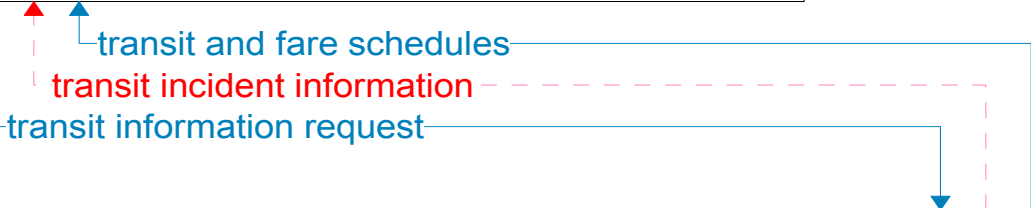
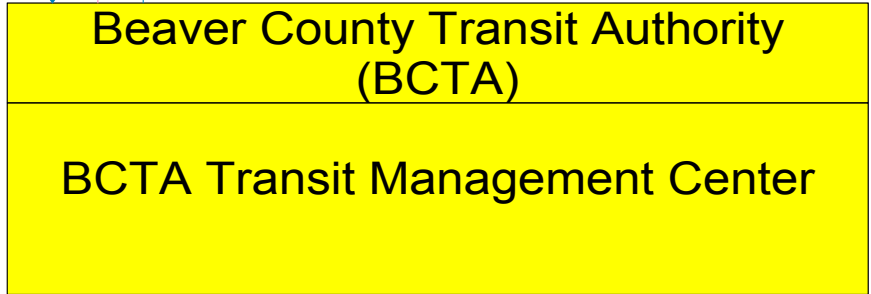
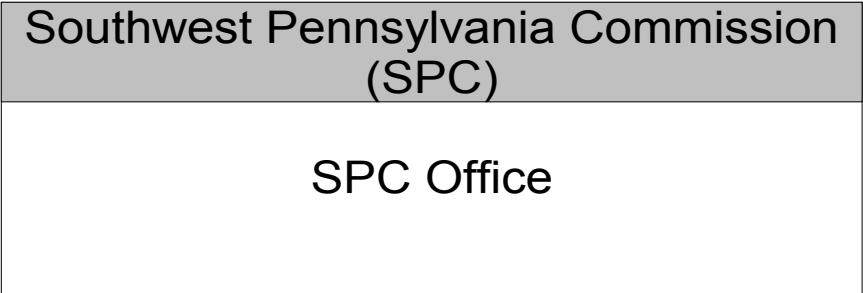
———— Existing  
- - - - - Planned



———— Existing  
- - - - - Planned

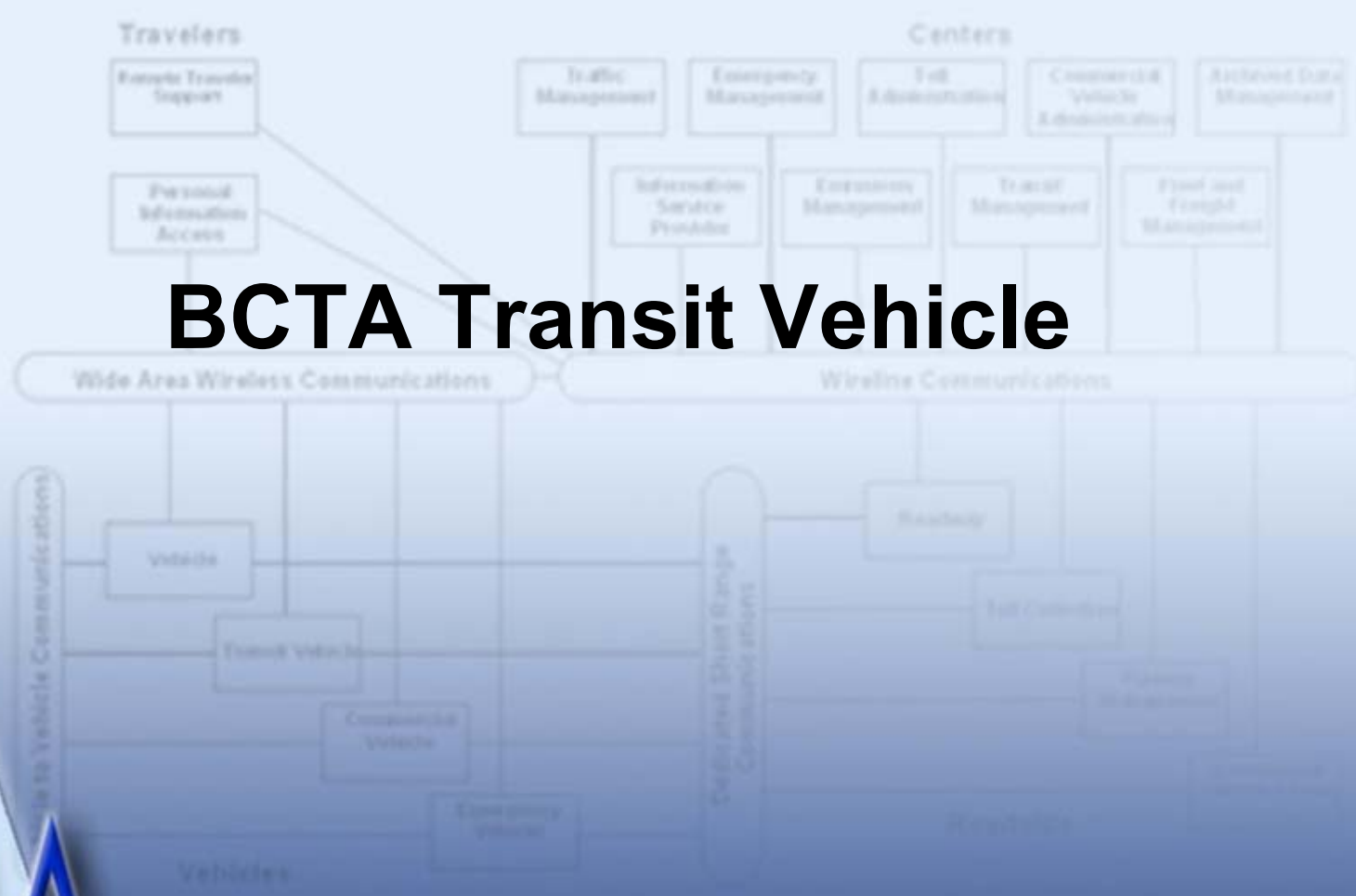


Existing  
Planned



Existing  
Planned

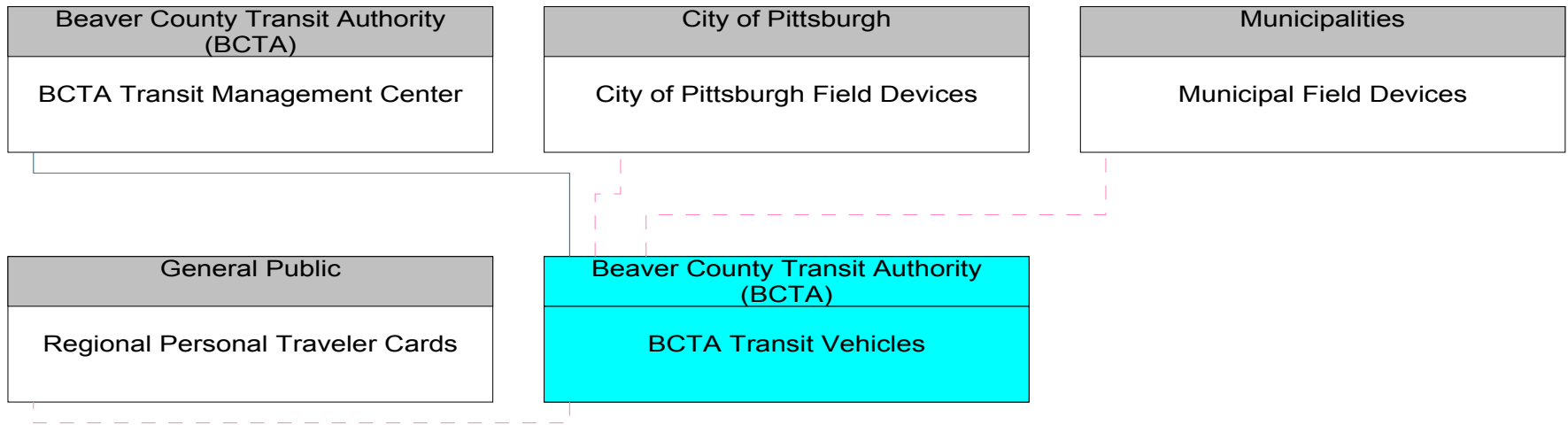




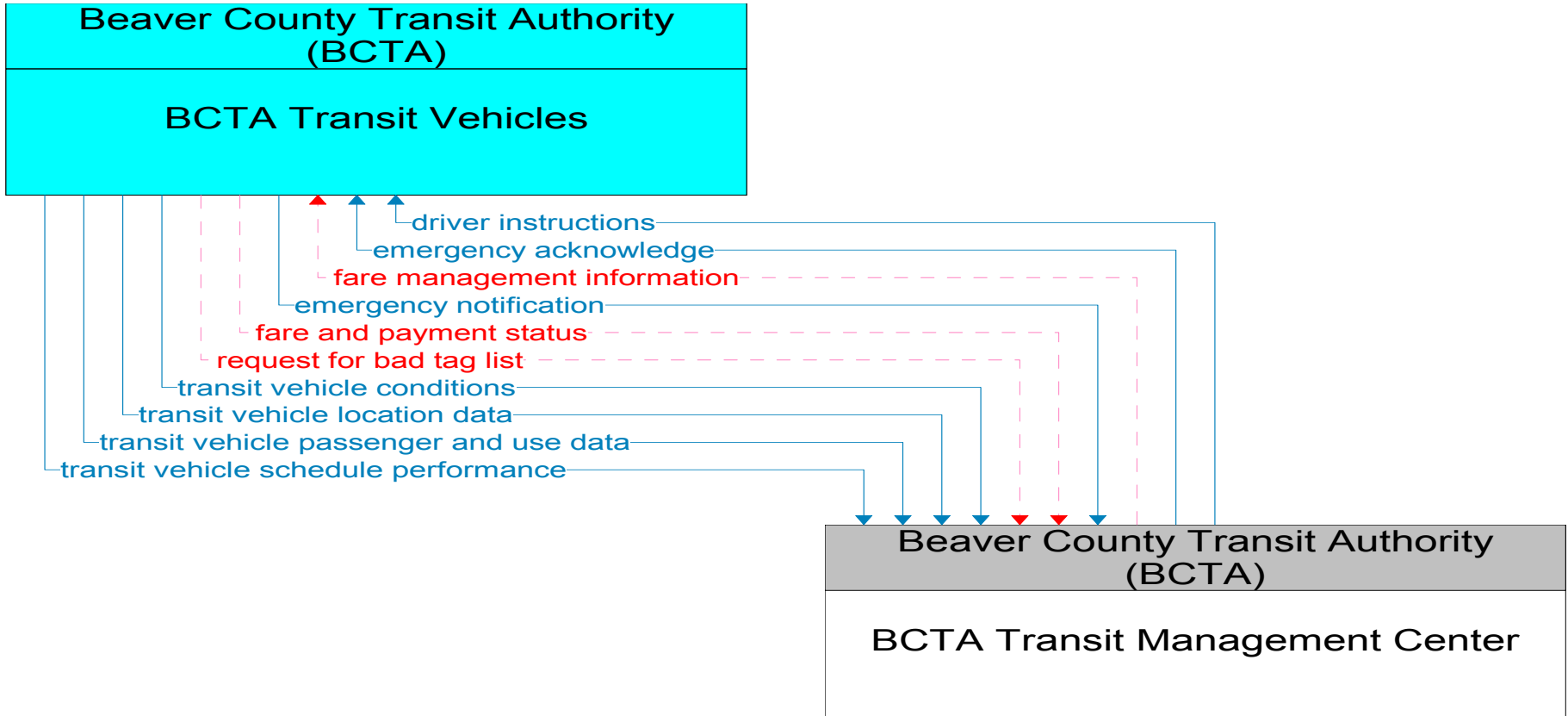
# BCTA Transit Vehicle

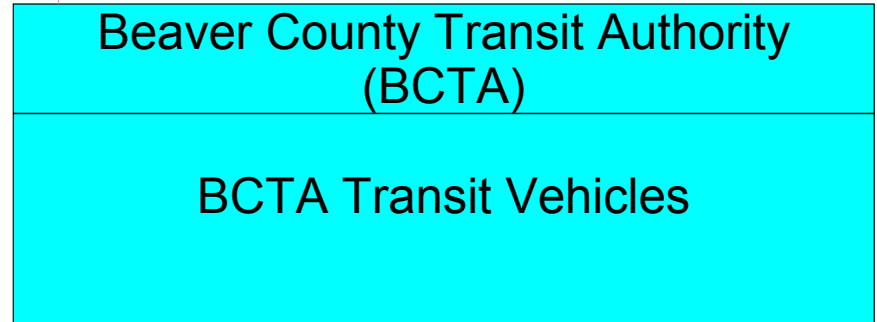
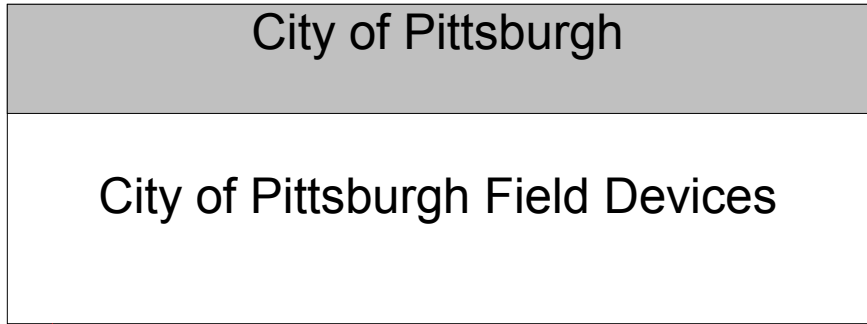
PA

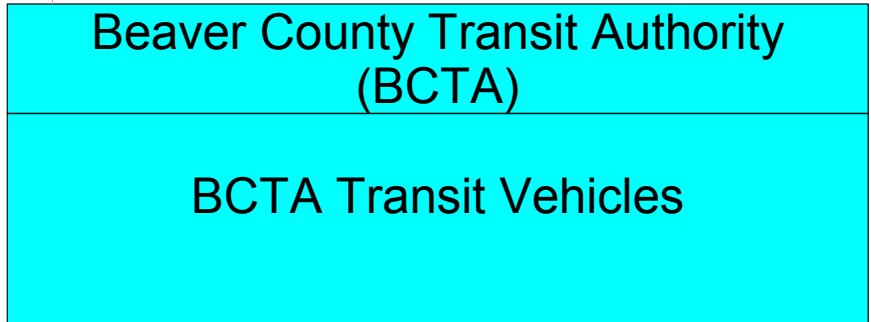
# BCTA Transit Vehicles Interconnect Diagram

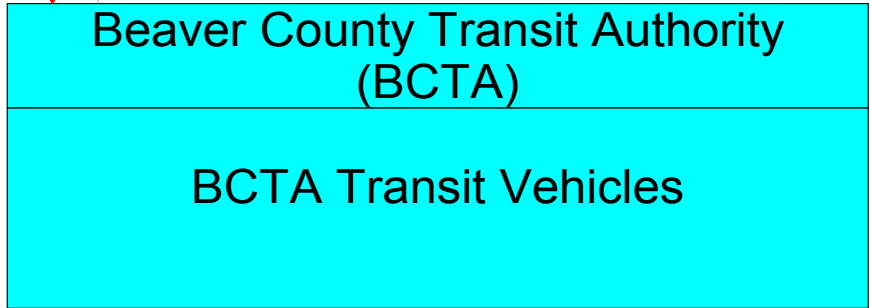
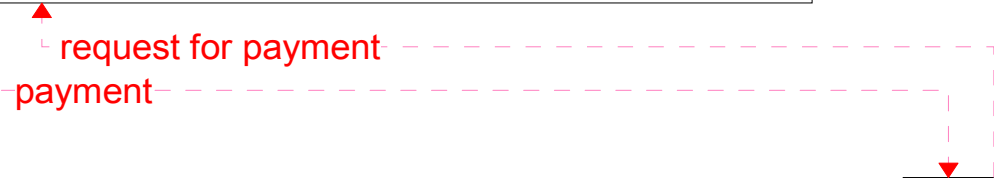
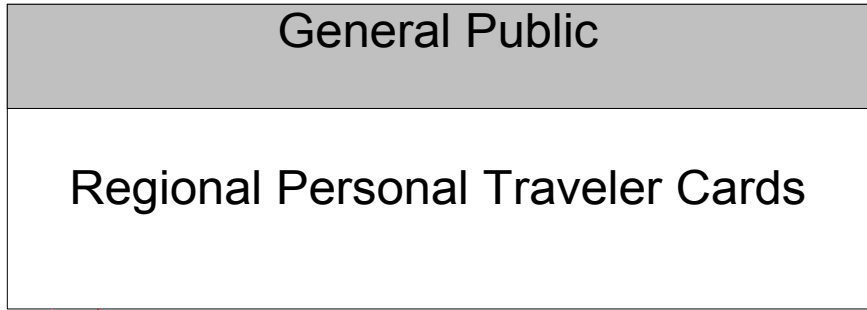


Existing  
Planned



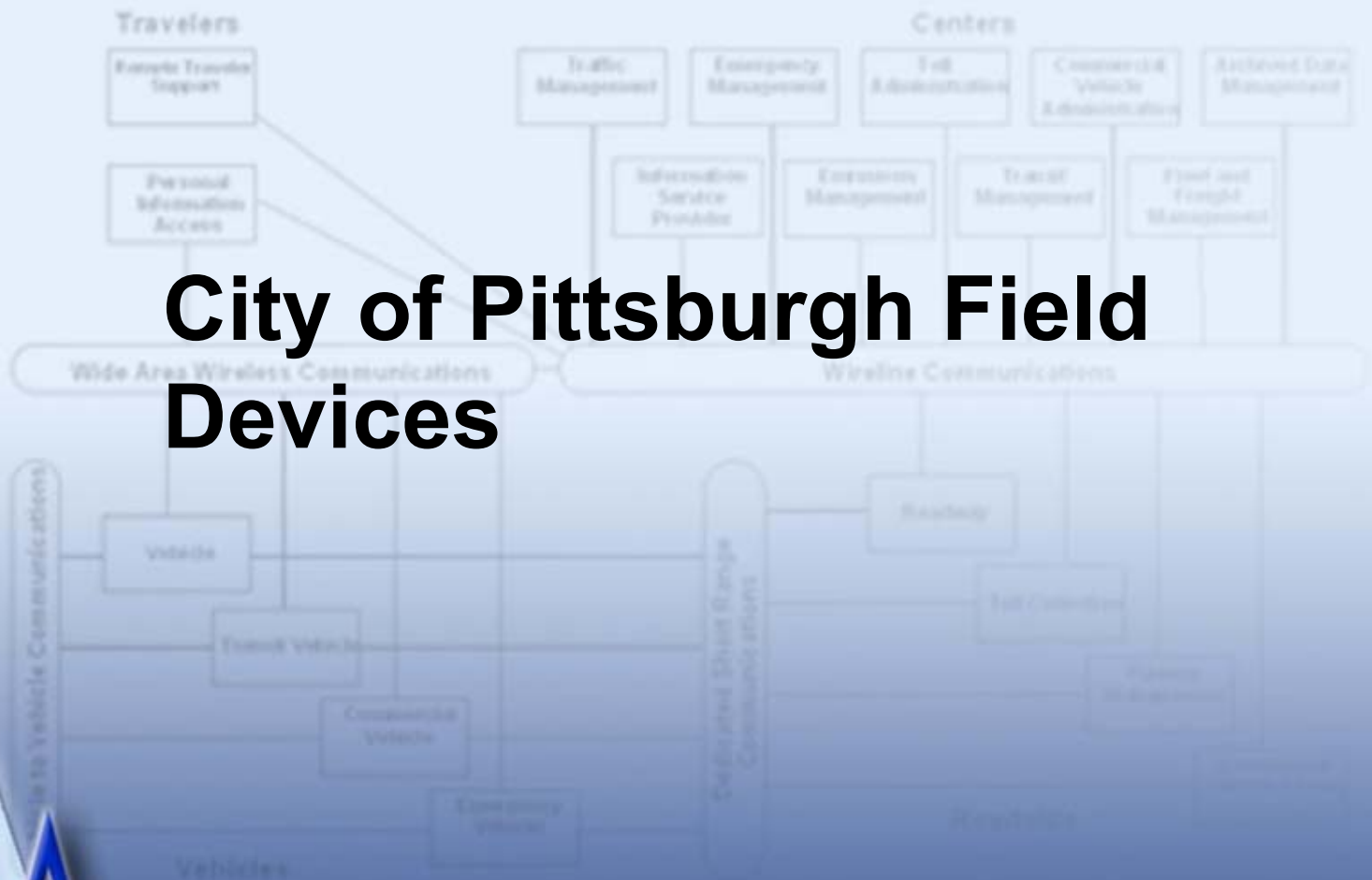




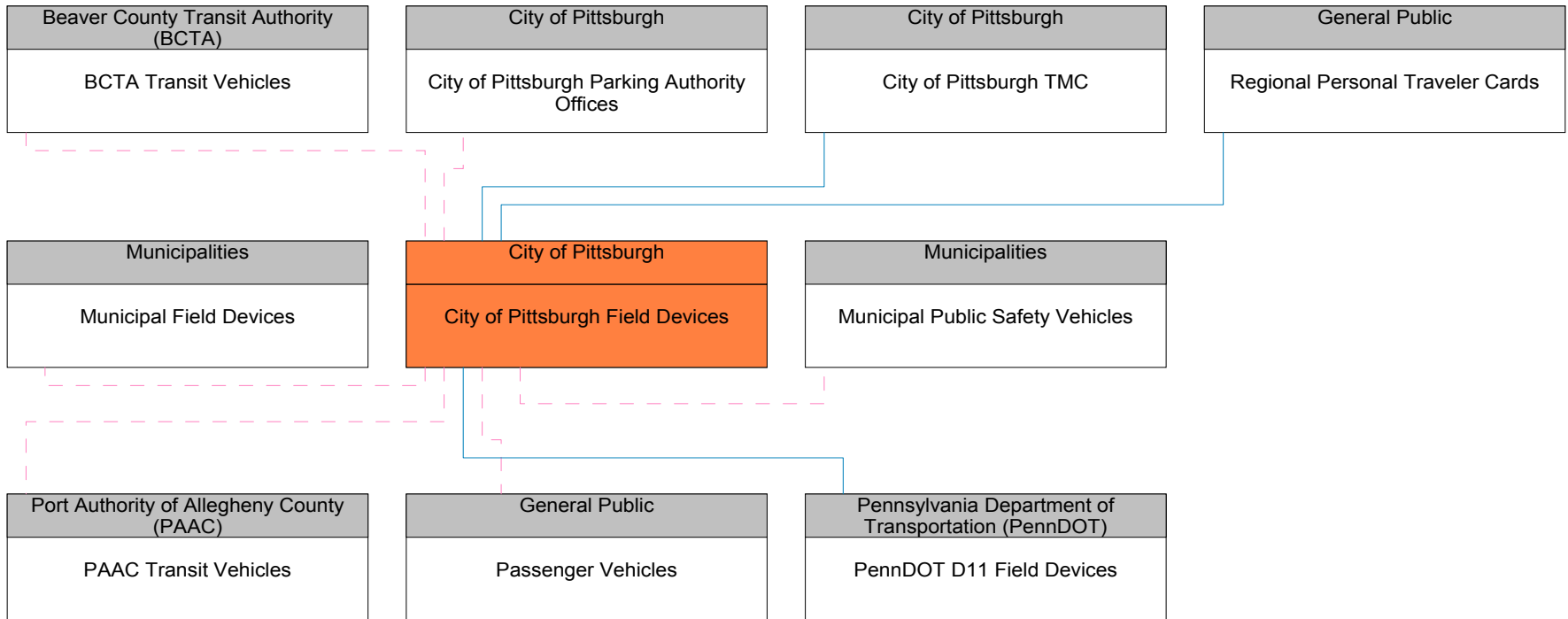


Existing  
Planned

# City of Pittsburgh Field Devices

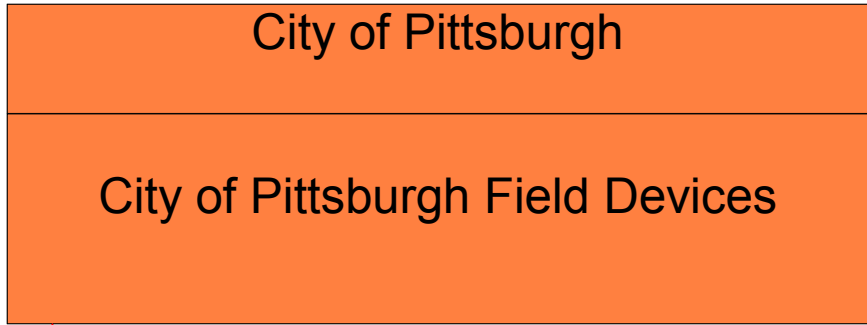


# City of Pittsburgh Field Devices Interconnect Diagram

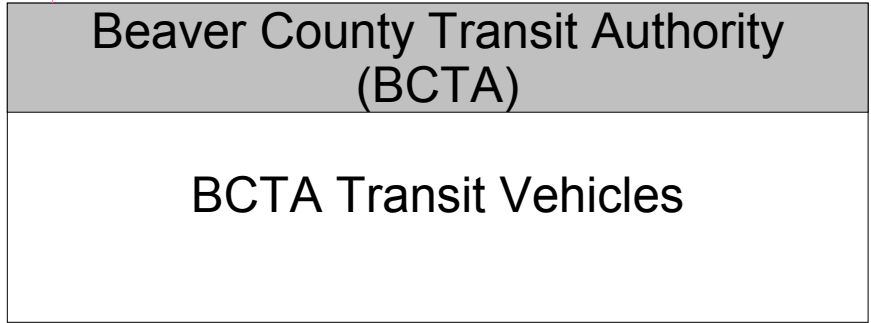


— Existing  
- - - Planned

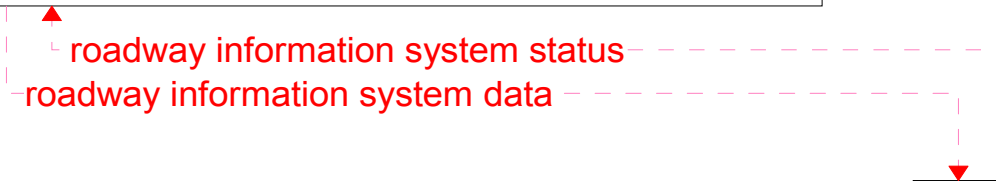
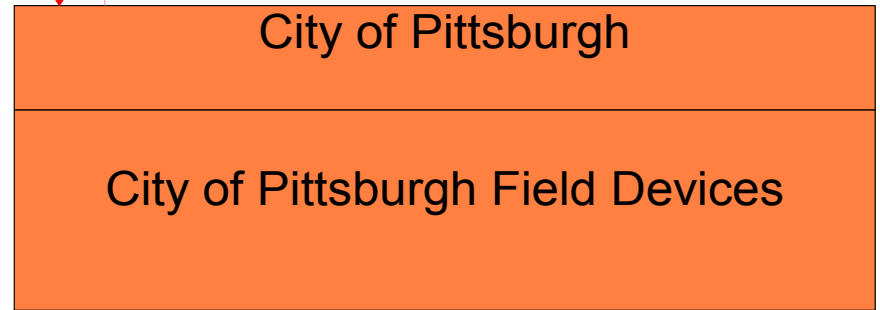
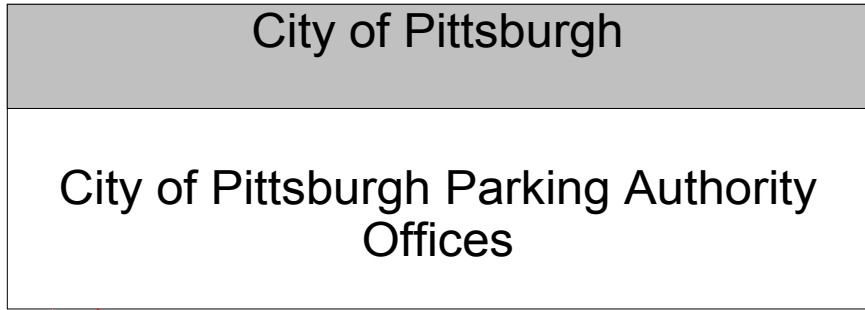




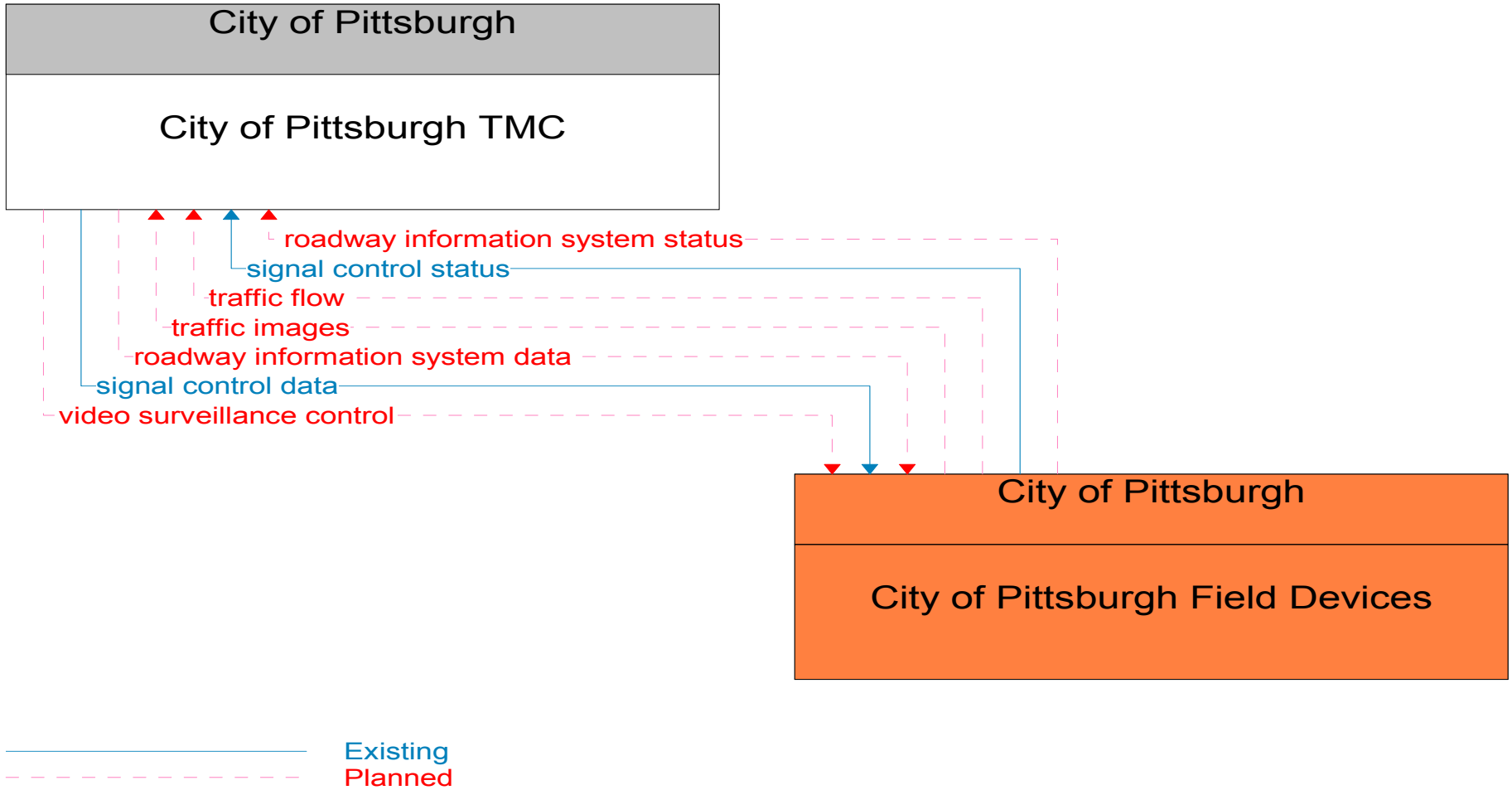
local signal priority request

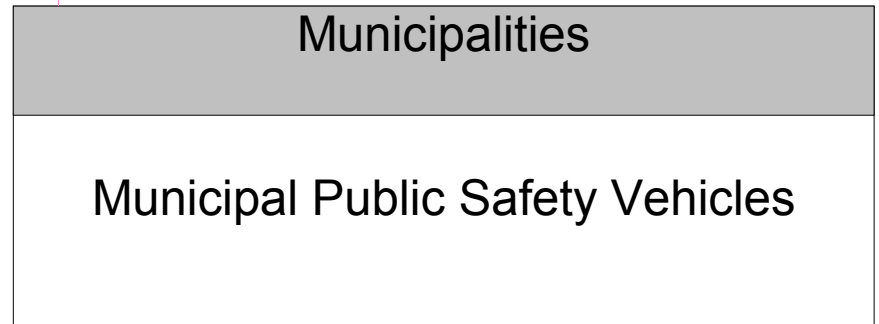
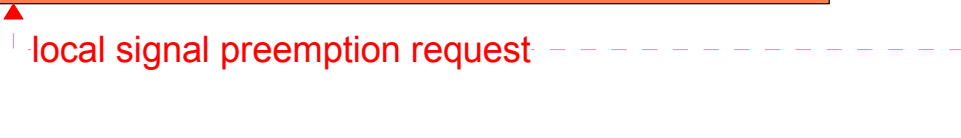
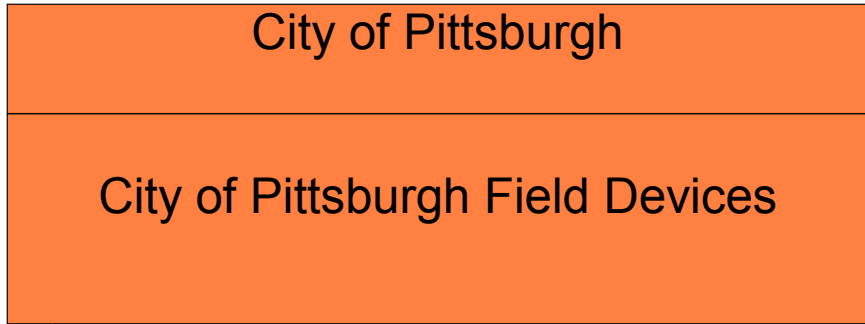


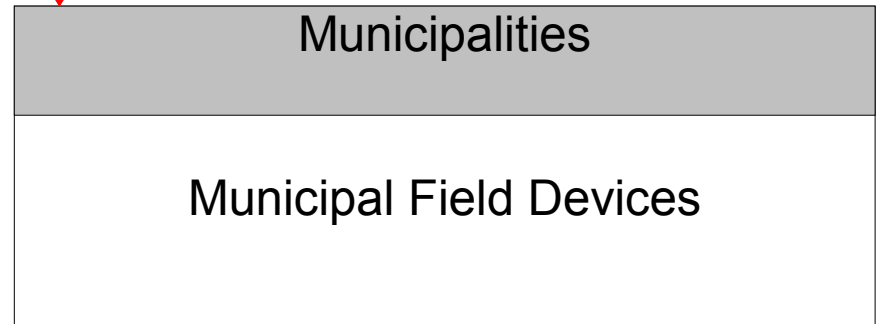
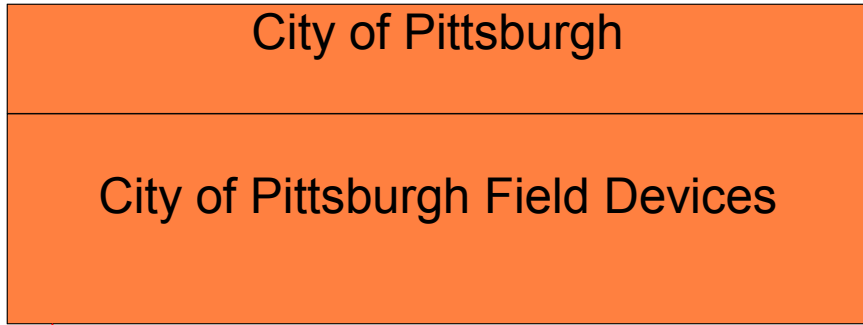
Existing  
Planned

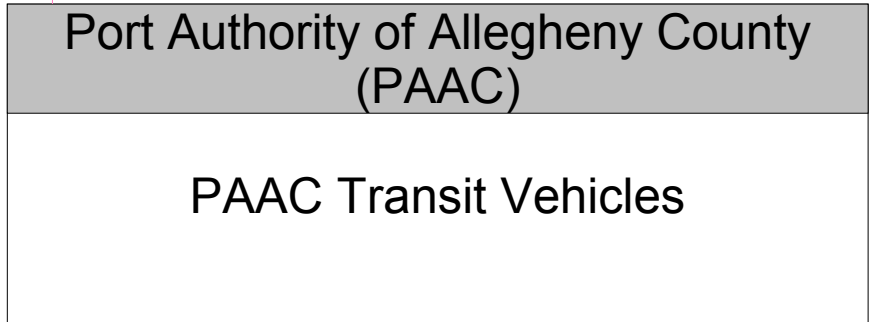
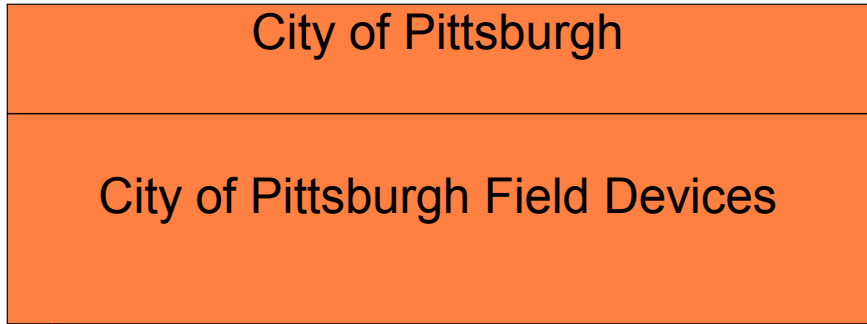


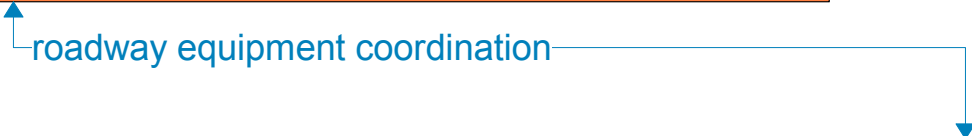
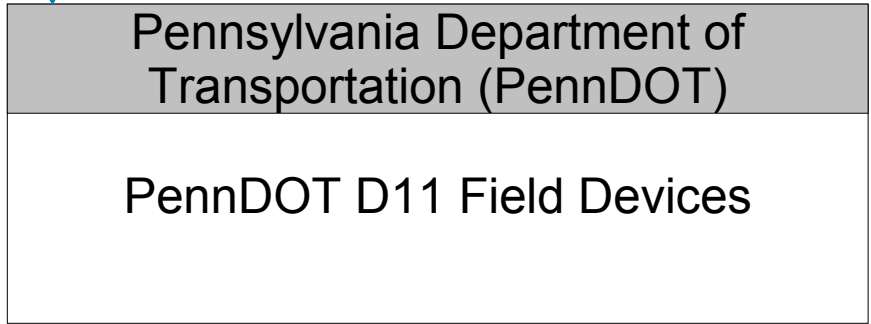
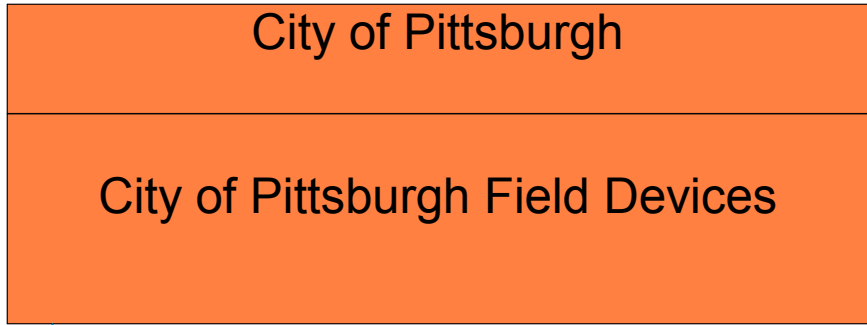
Existing  
Planned



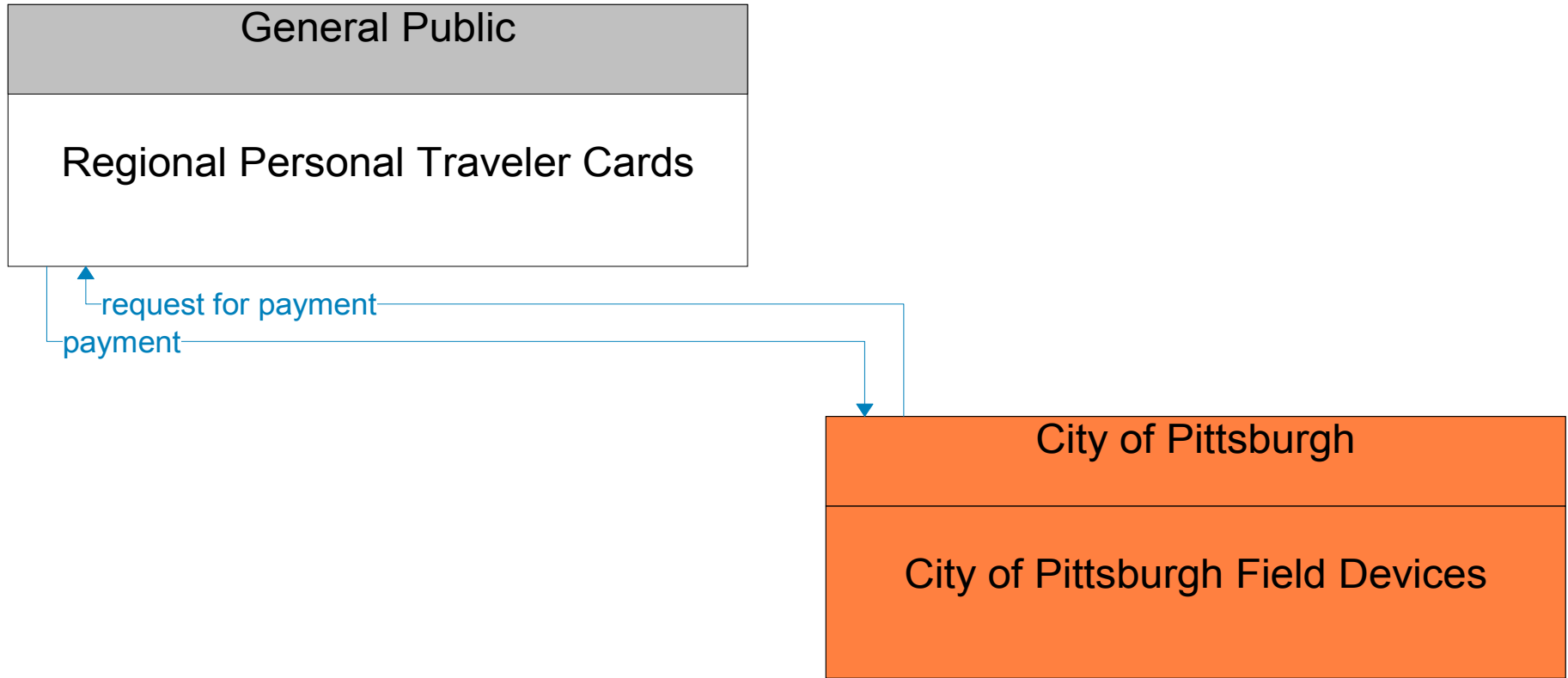






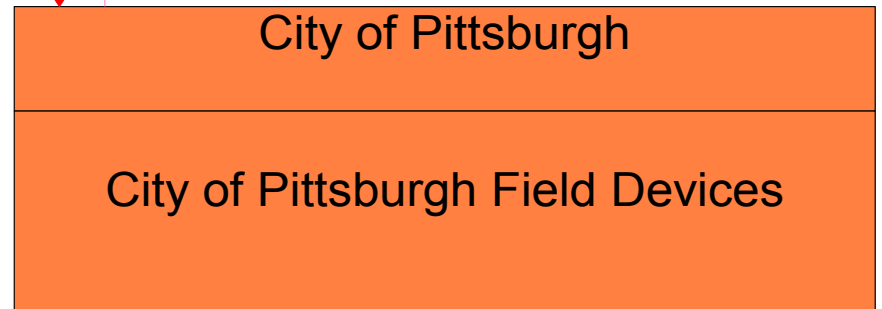
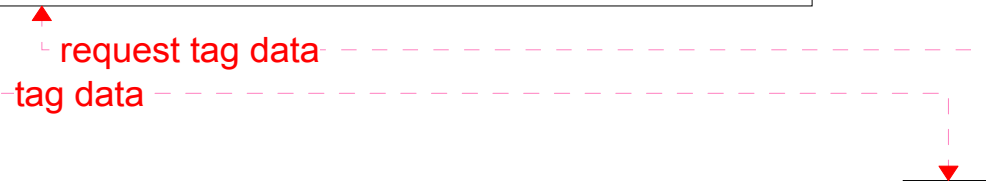
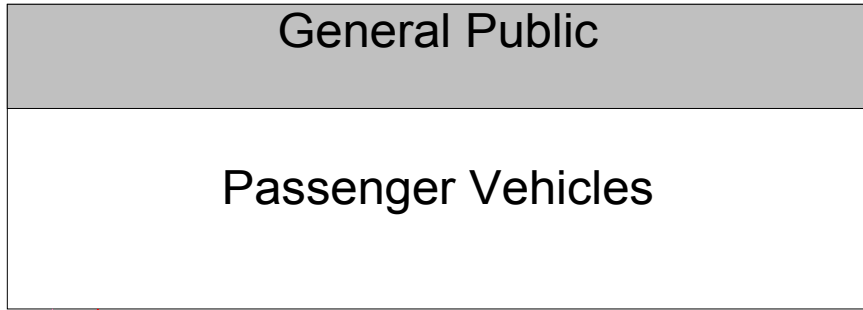


———— Existing  
- - - - - Planned



———— Existing  
----- Planned

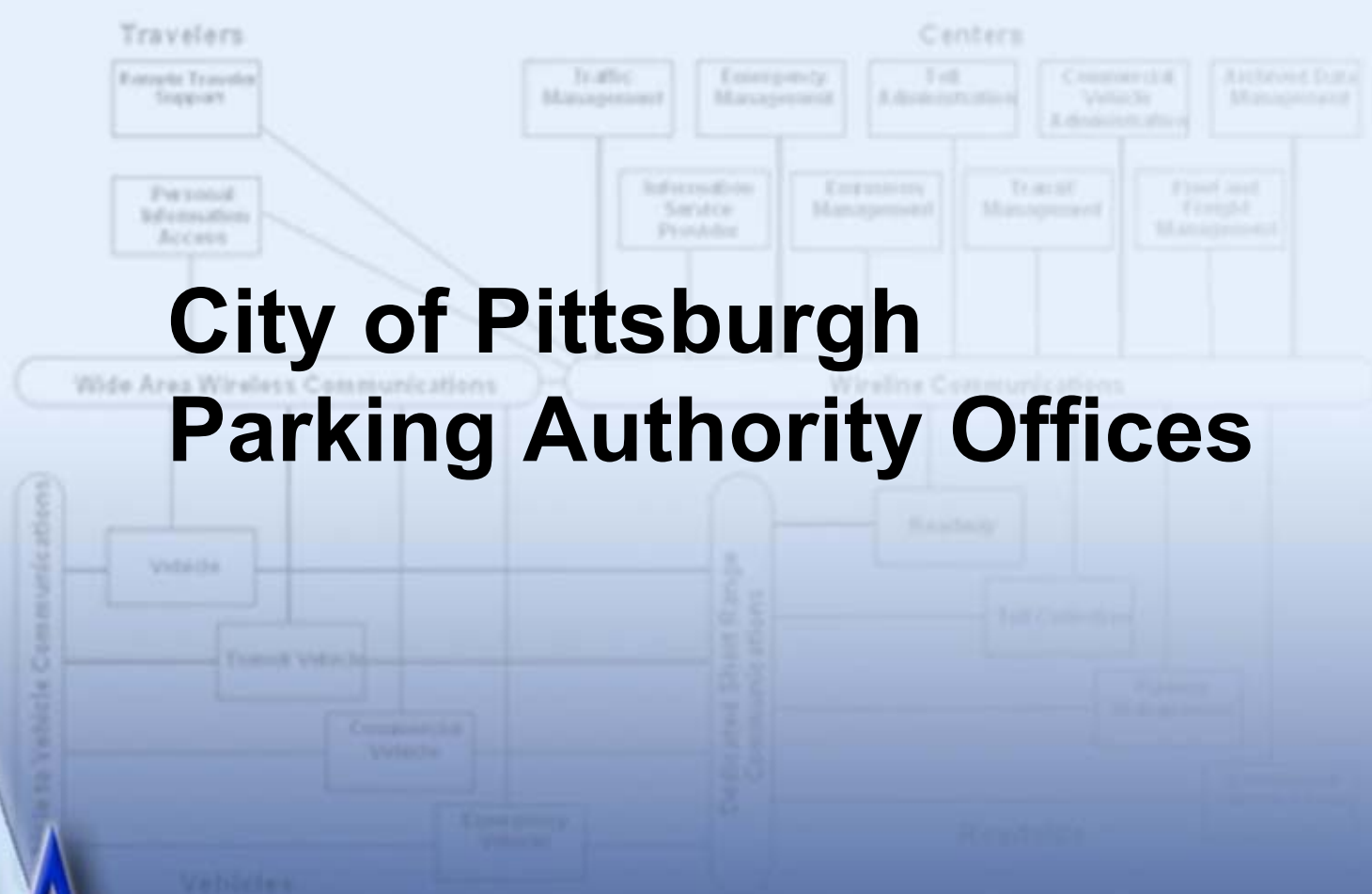




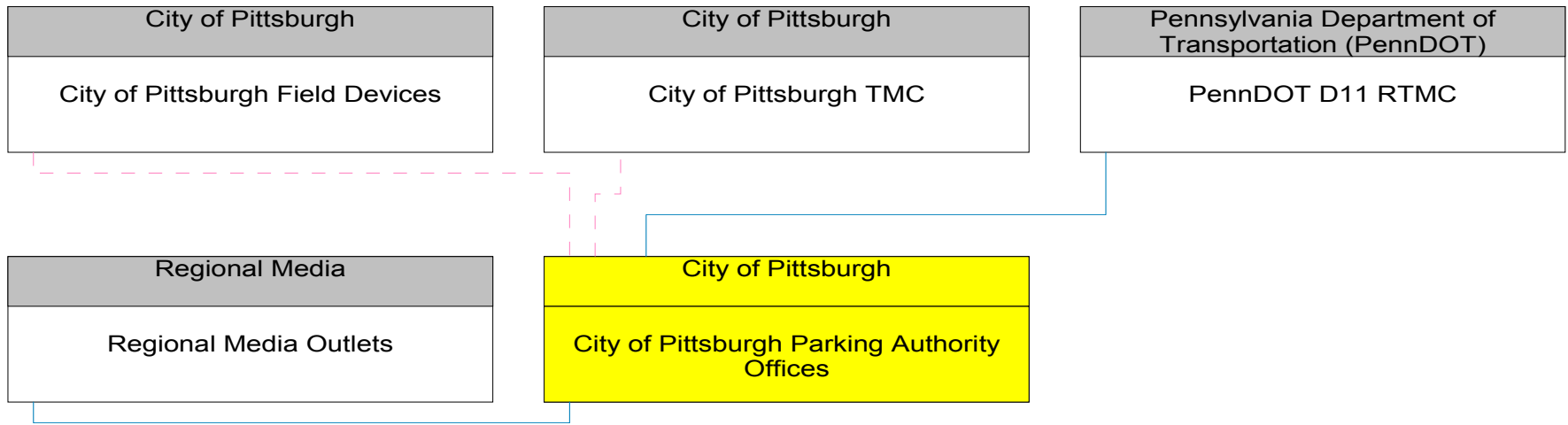
Existing  
Planned

A legend showing a solid blue line next to the word "Existing" and a dashed red line next to the word "Planned".

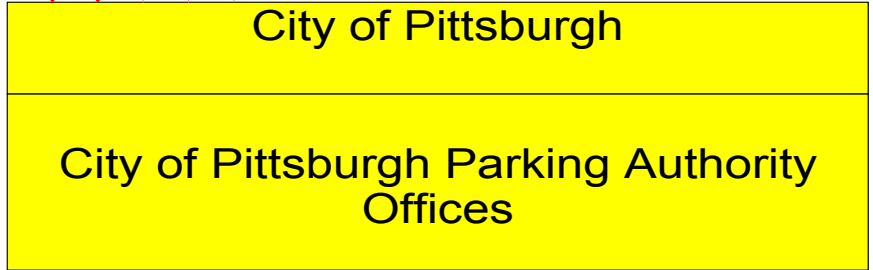
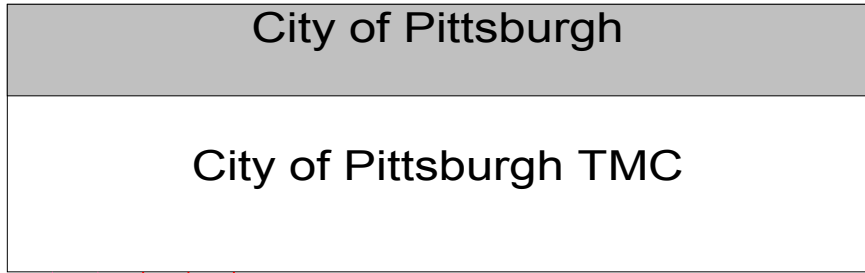
# City of Pittsburgh Parking Authority Offices



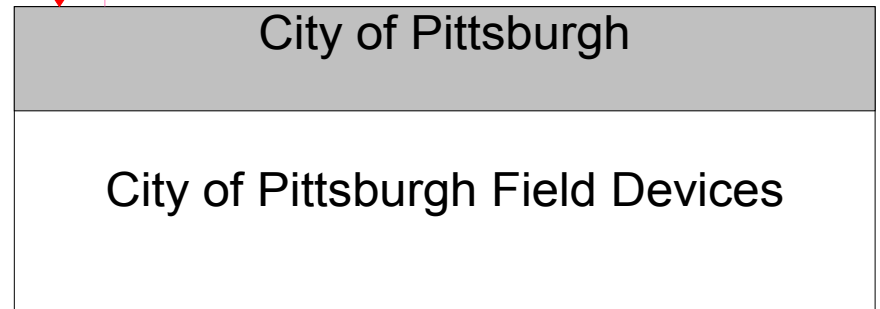
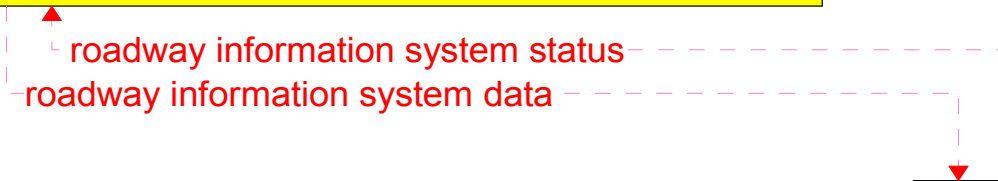
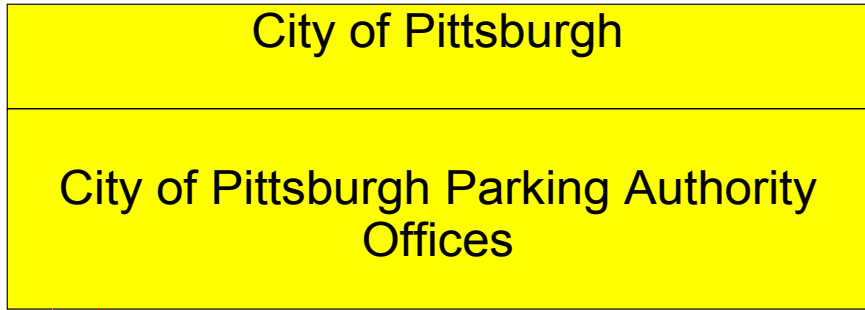
# City of Pittsburgh Parking Authority Offices Interconnect Diagram



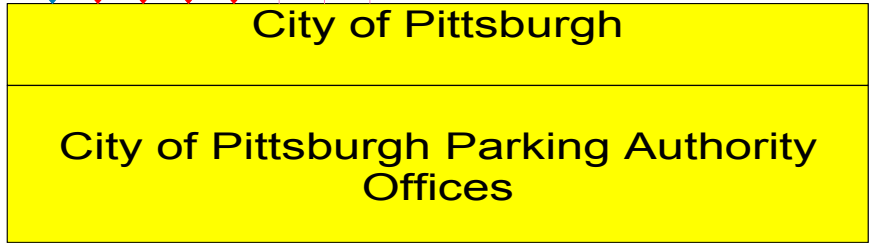
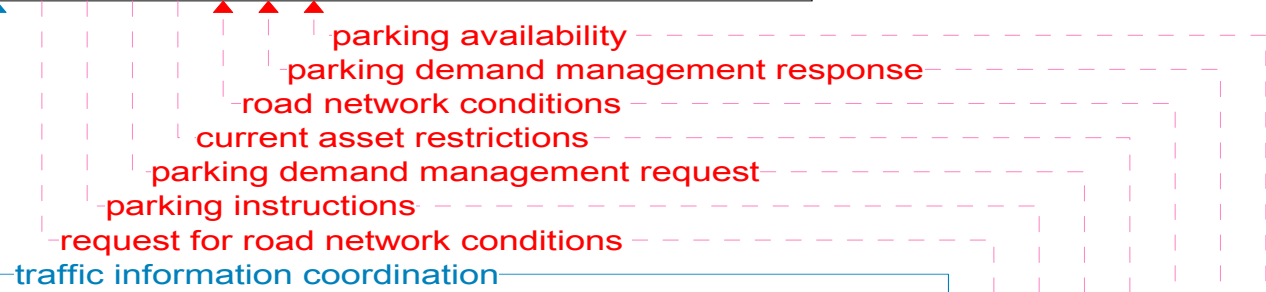
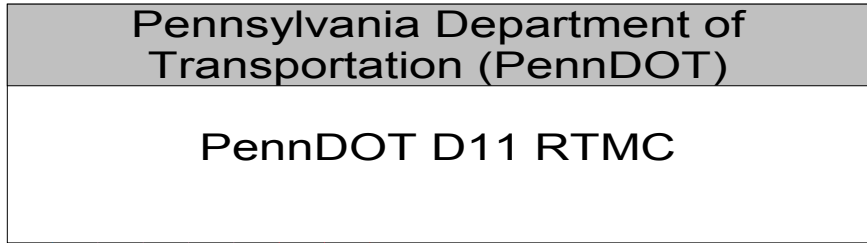
— Existing  
- - - Planned



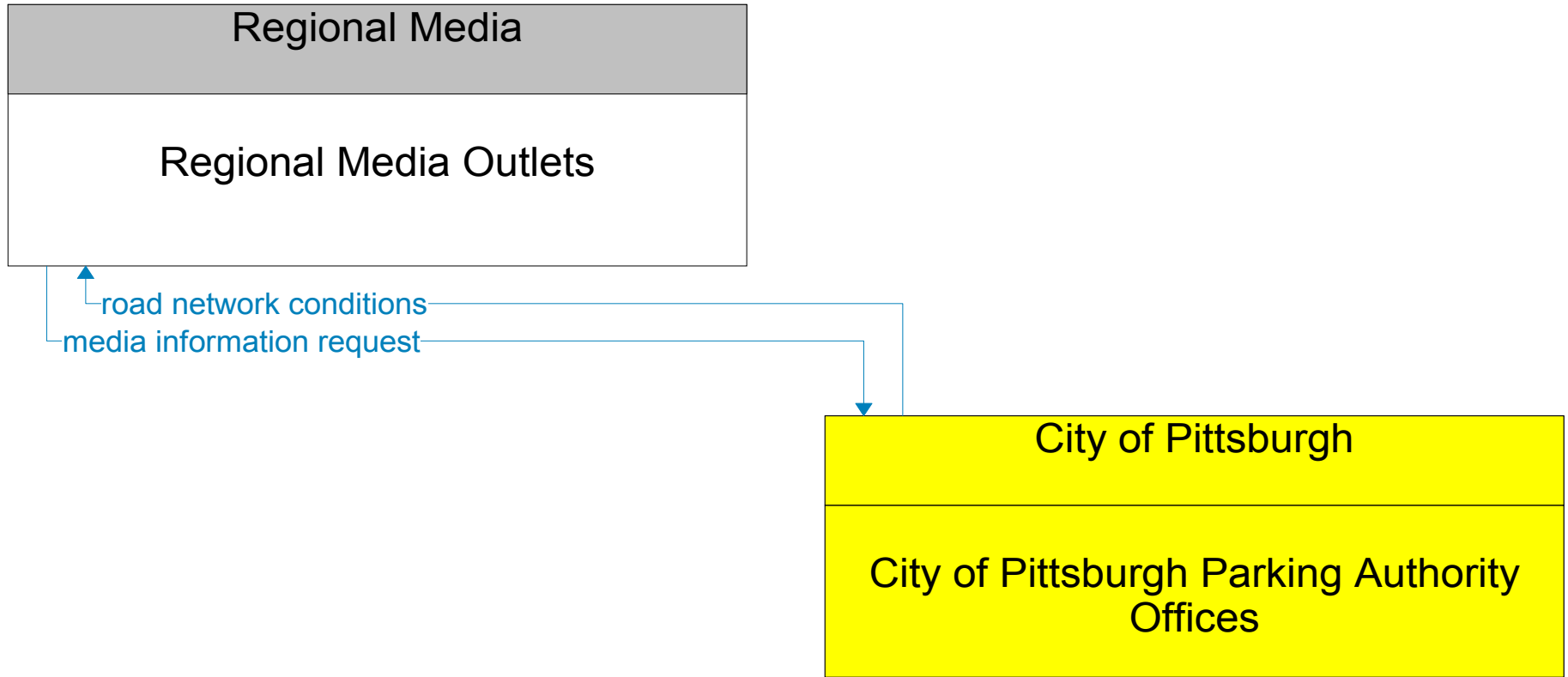
Existing  
Planned



———— Existing  
- - - - - Planned

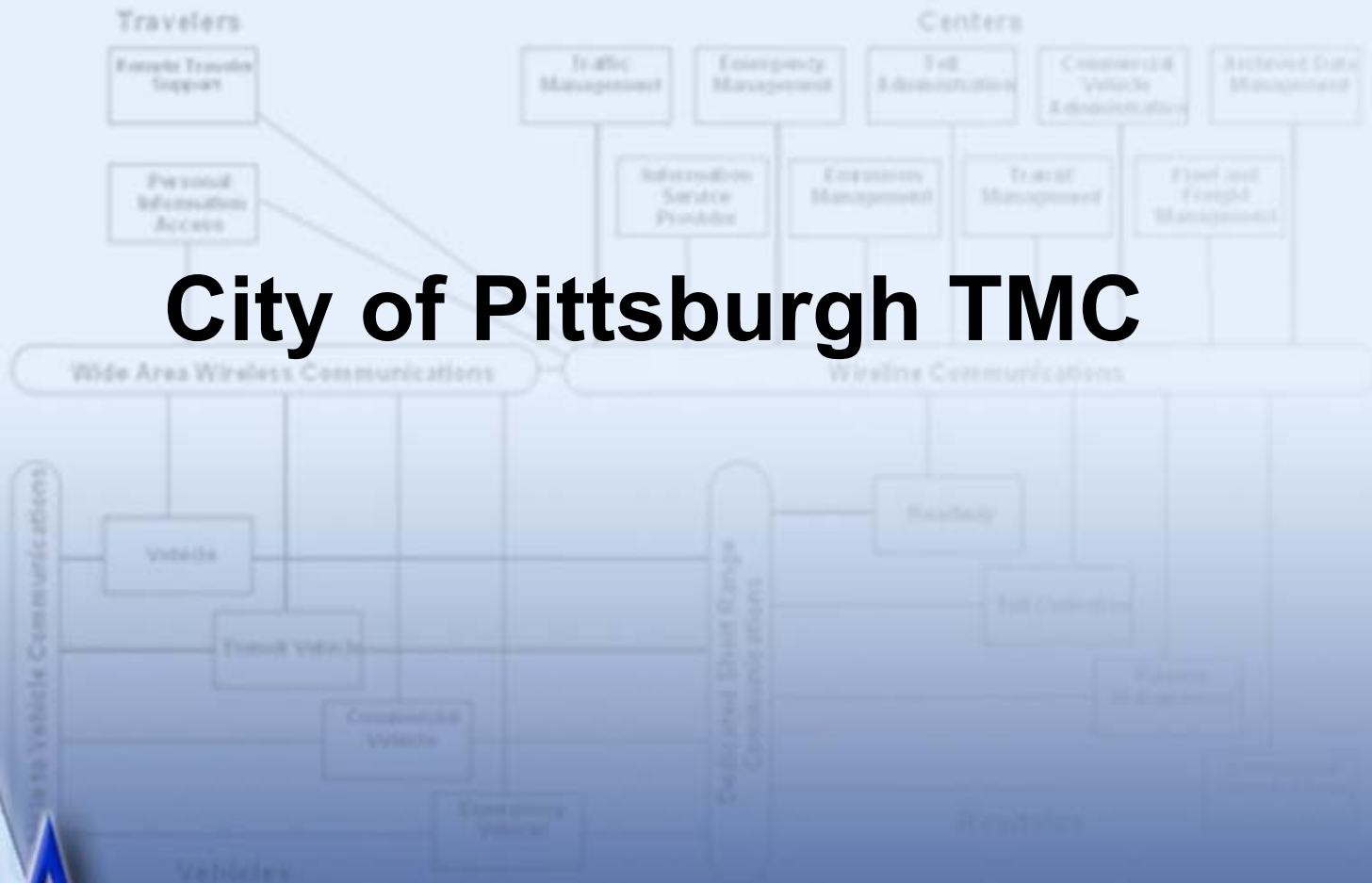


Existing  
Planned



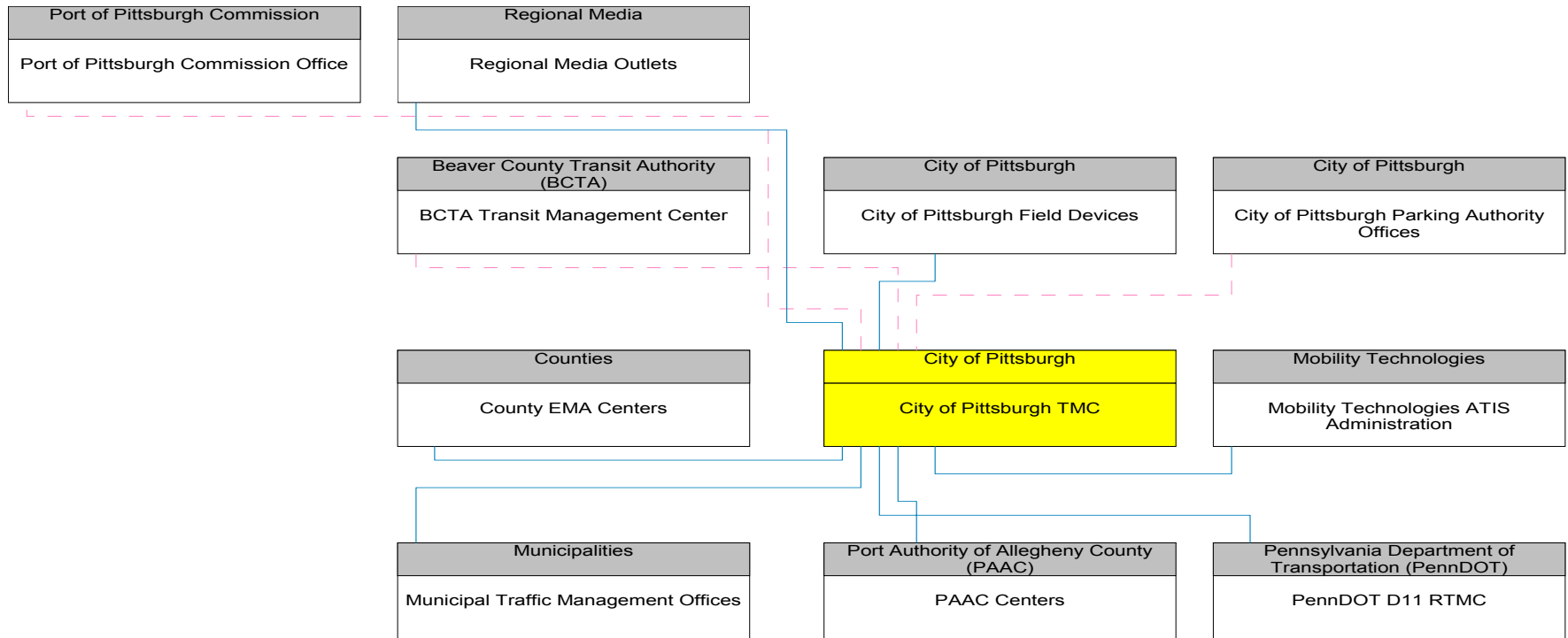
———— Existing  
----- Planned

# City of Pittsburgh TMC

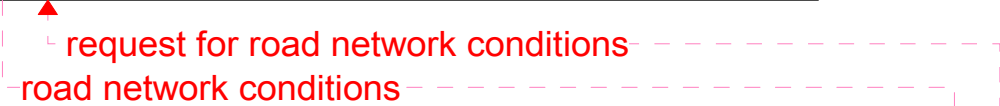
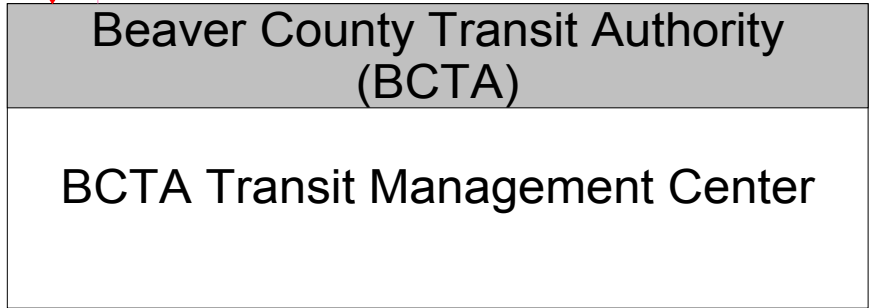
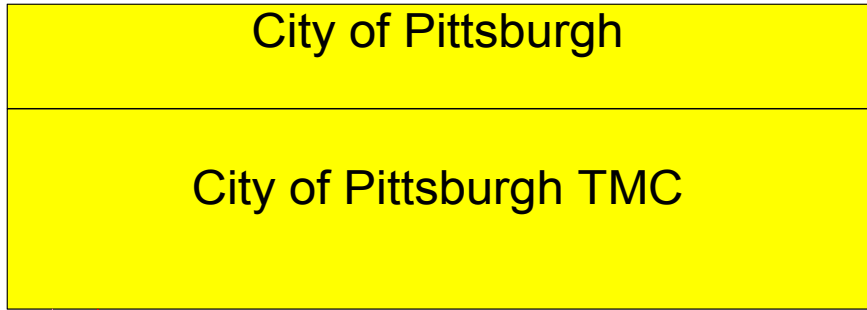




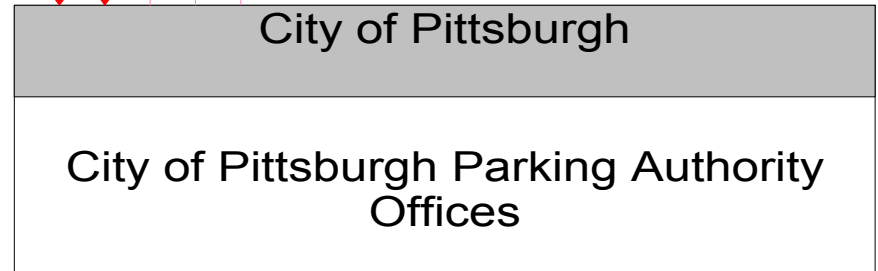
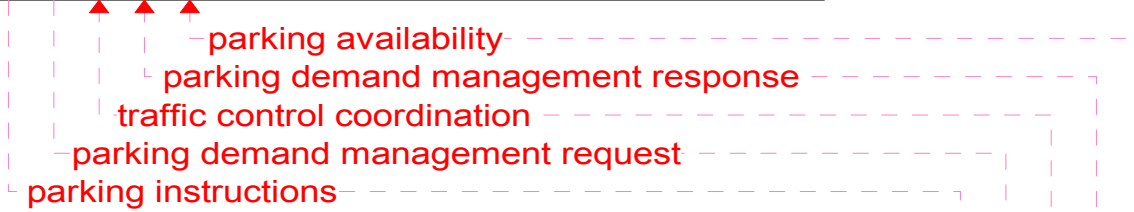
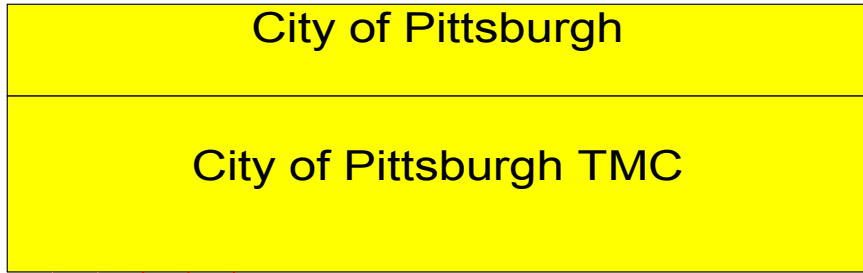
# City of Pittsburgh TMC Interconnect Diagram



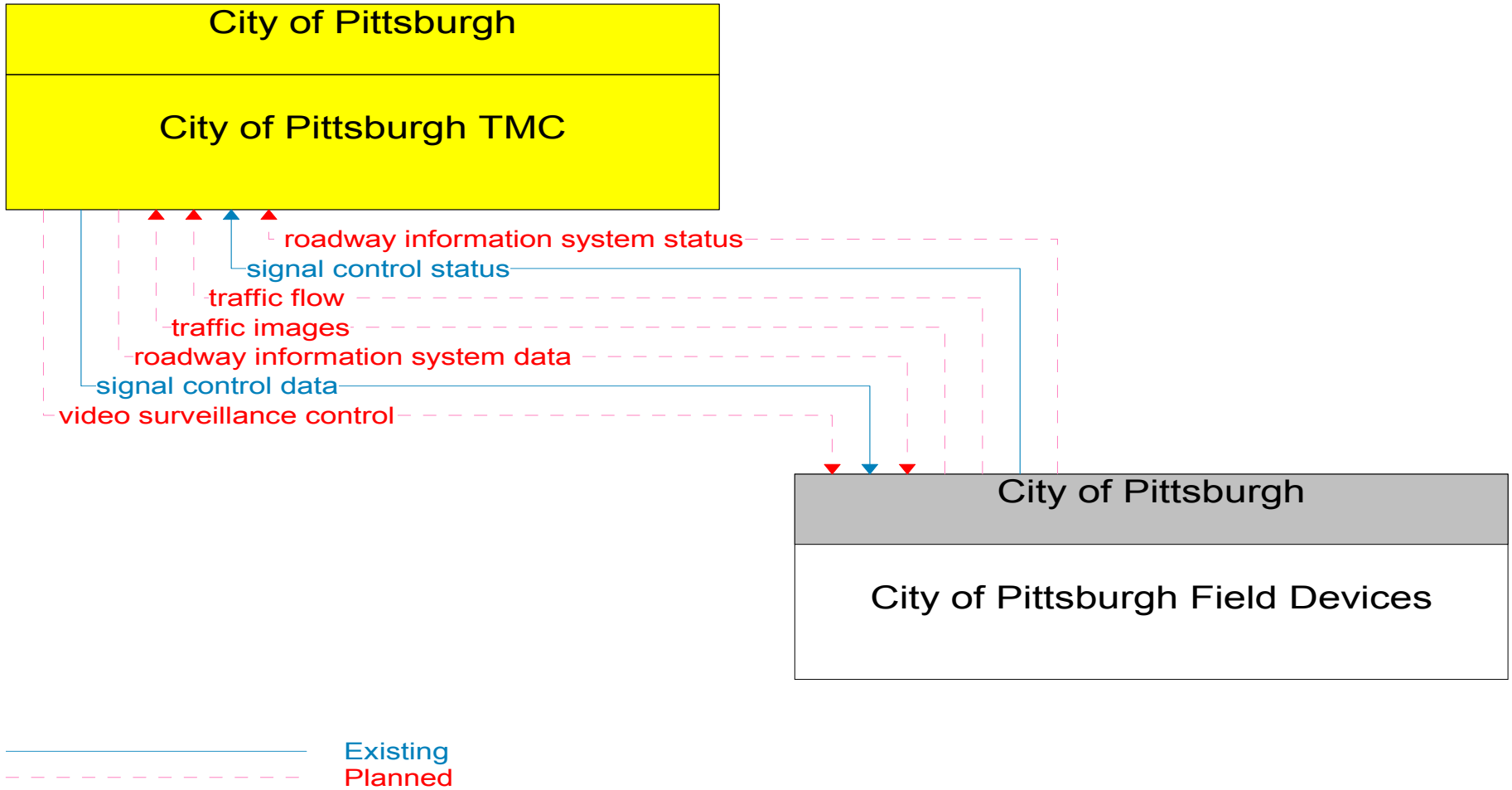
Existing  
Planned

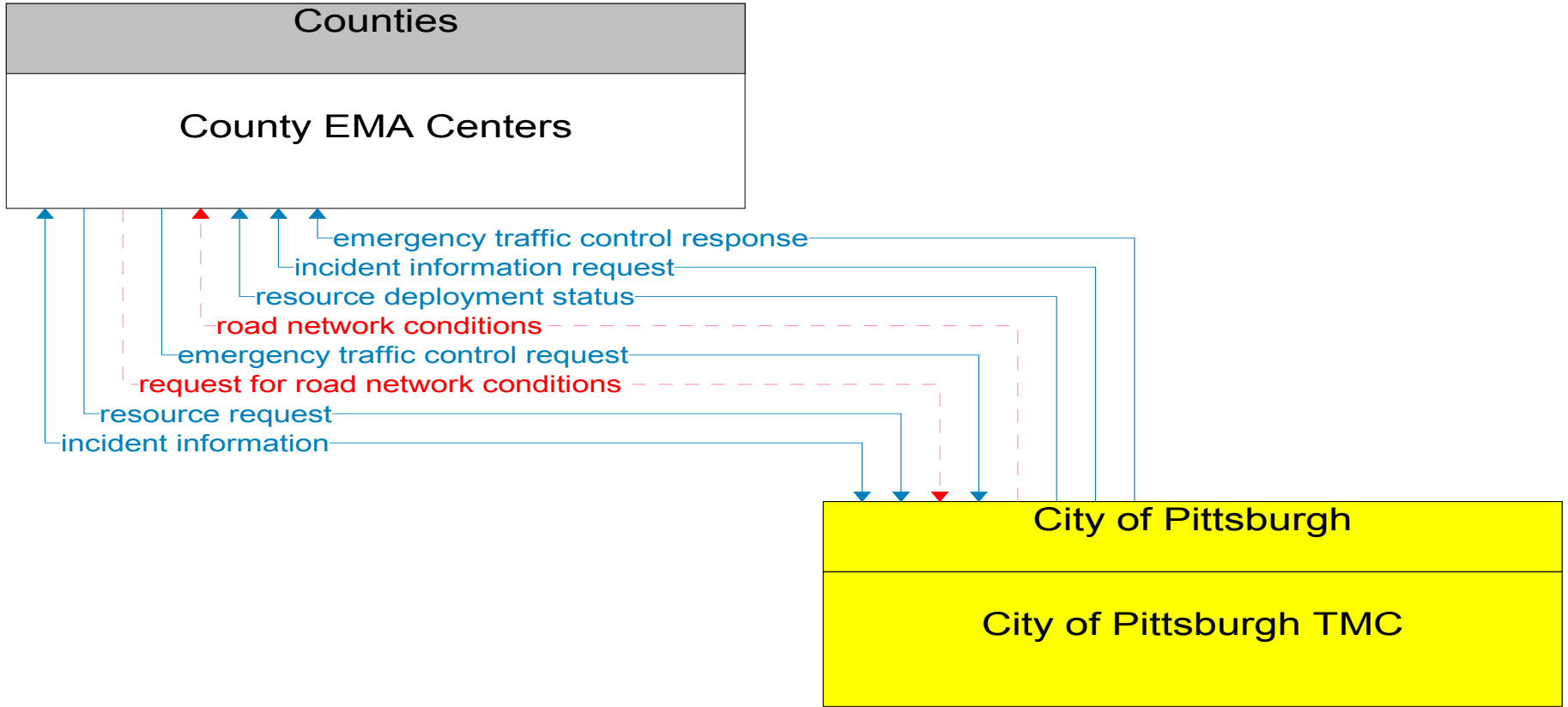


———— Existing  
- - - - - Planned

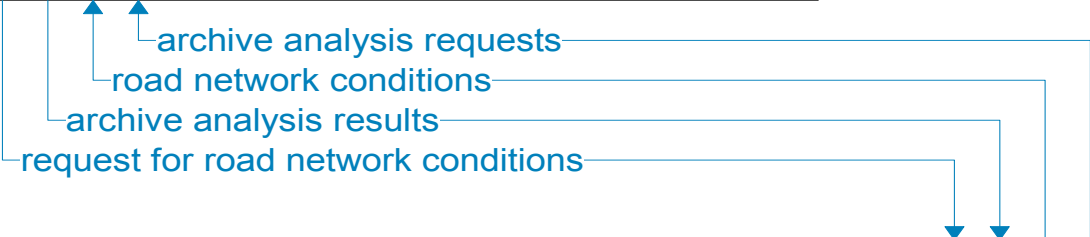
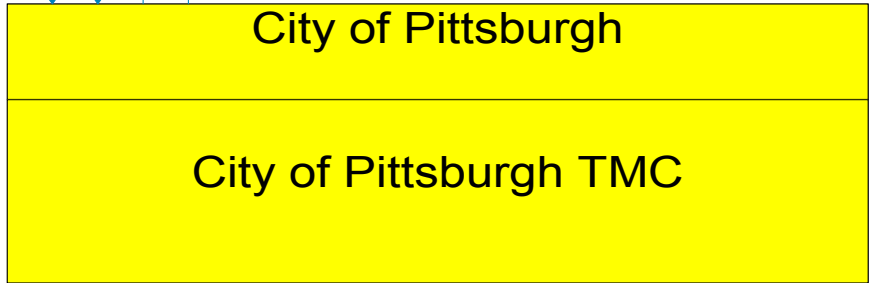


———— Existing  
- - - - - Planned

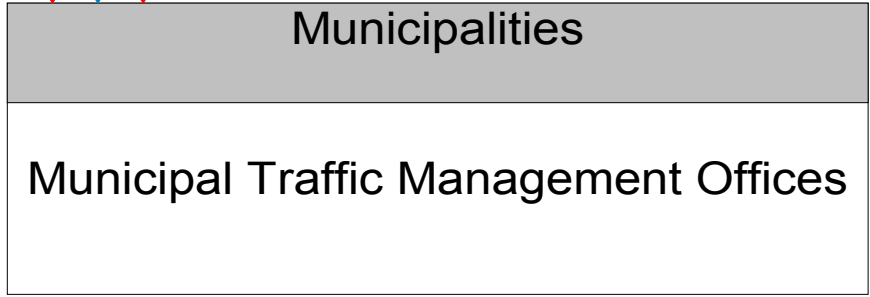
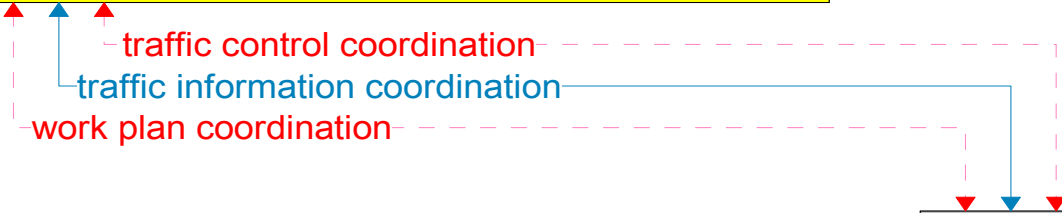
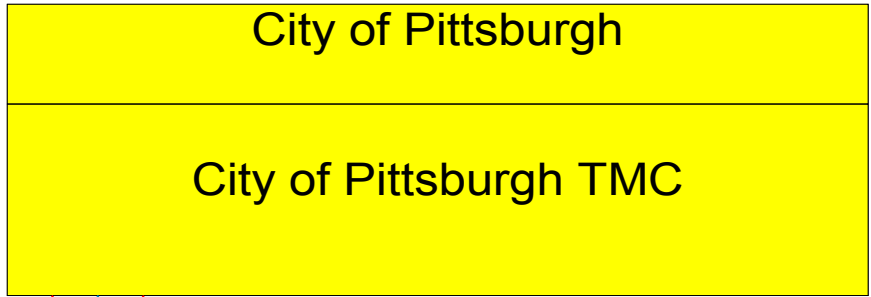




———— Existing  
- - - - - Planned

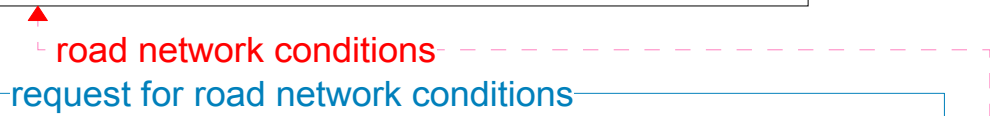
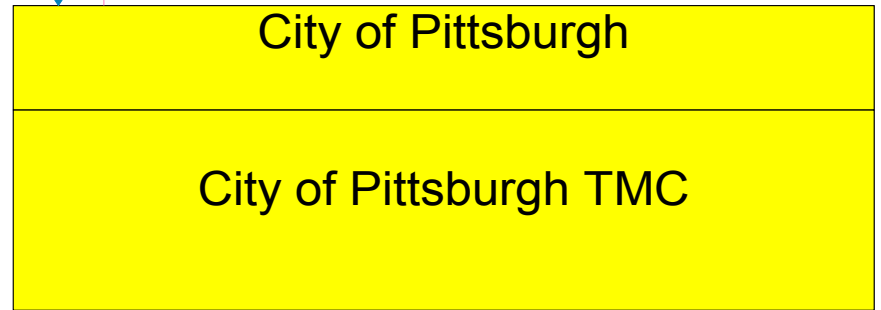
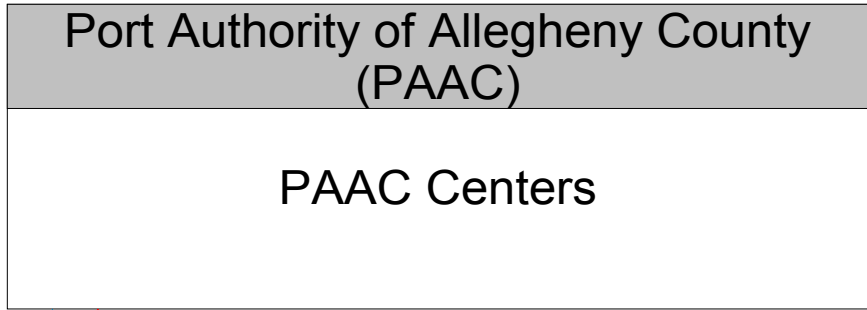


Existing  
Planned

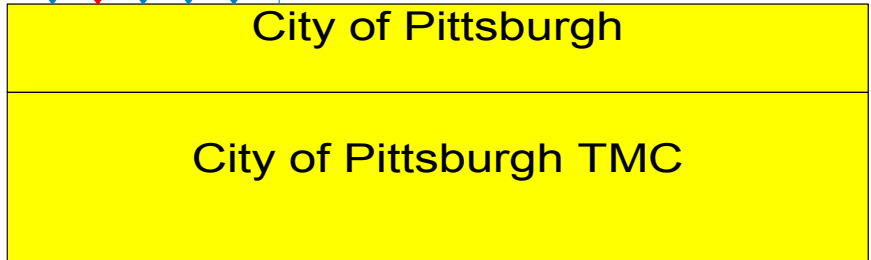
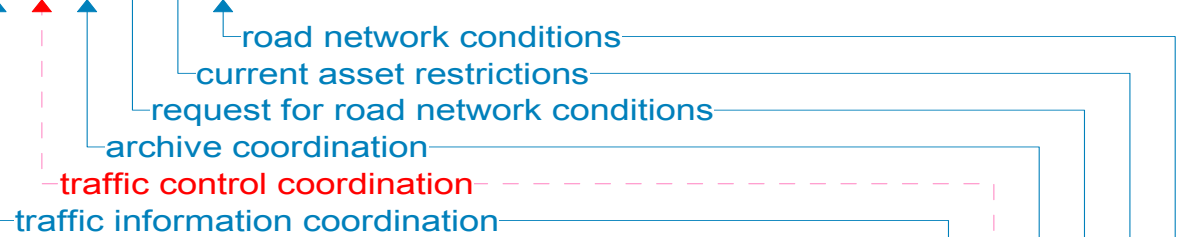
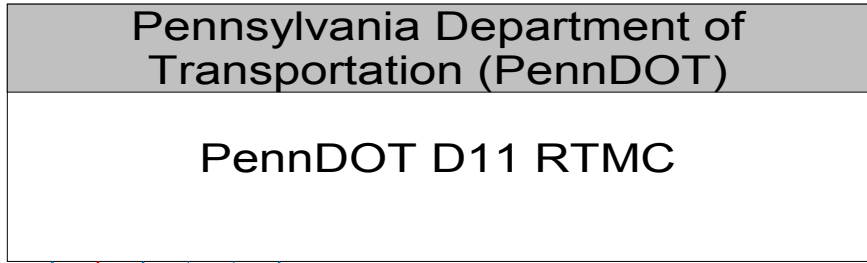


Existing

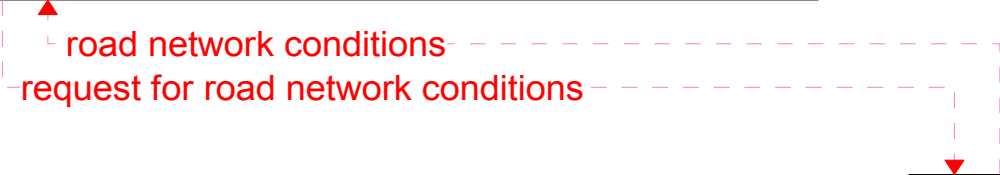
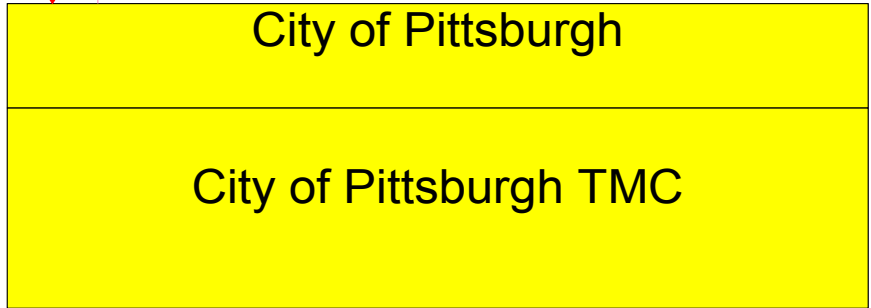
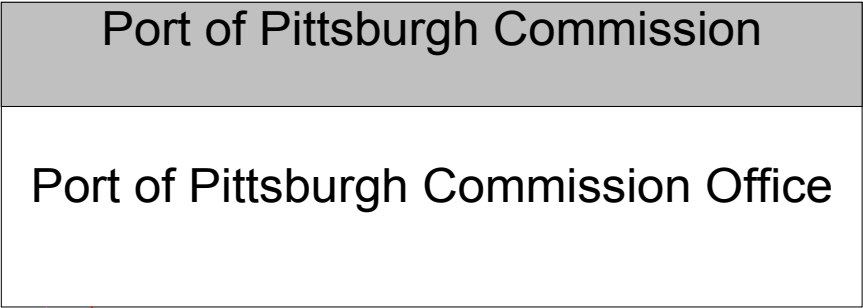
Planned



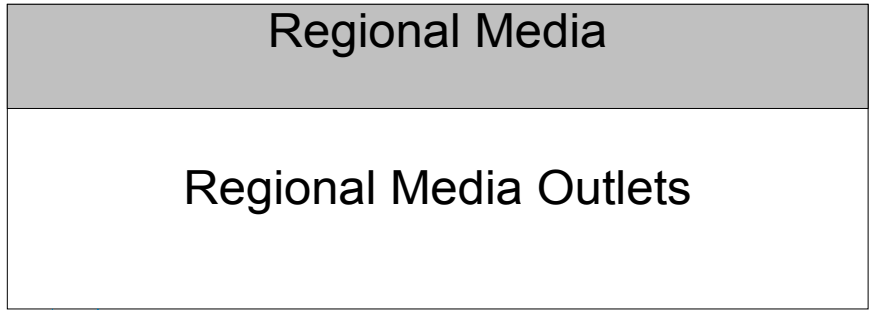




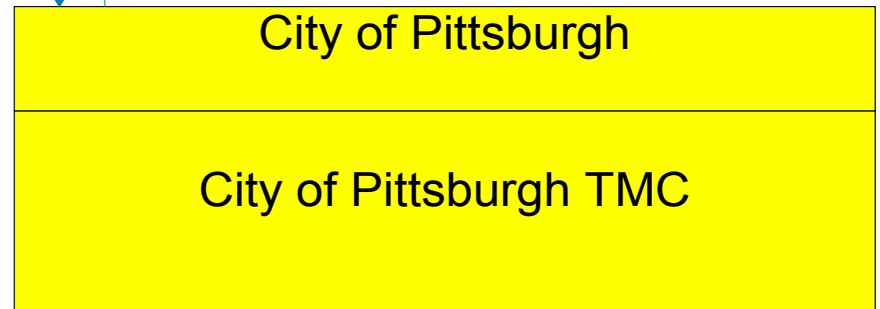
Existing  
Planned



———— Existing  
- - - - - Planned

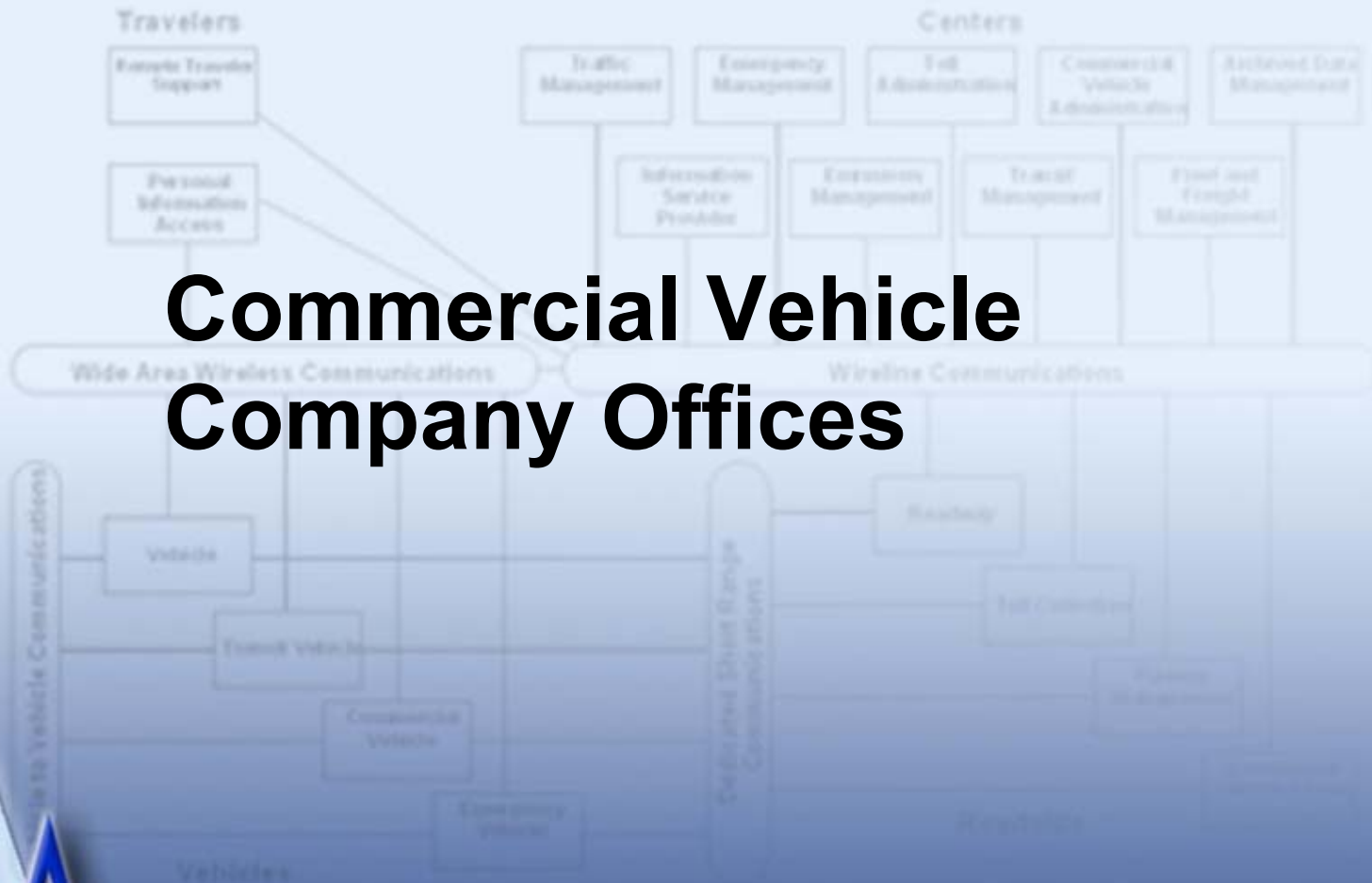


road network conditions  
media information request

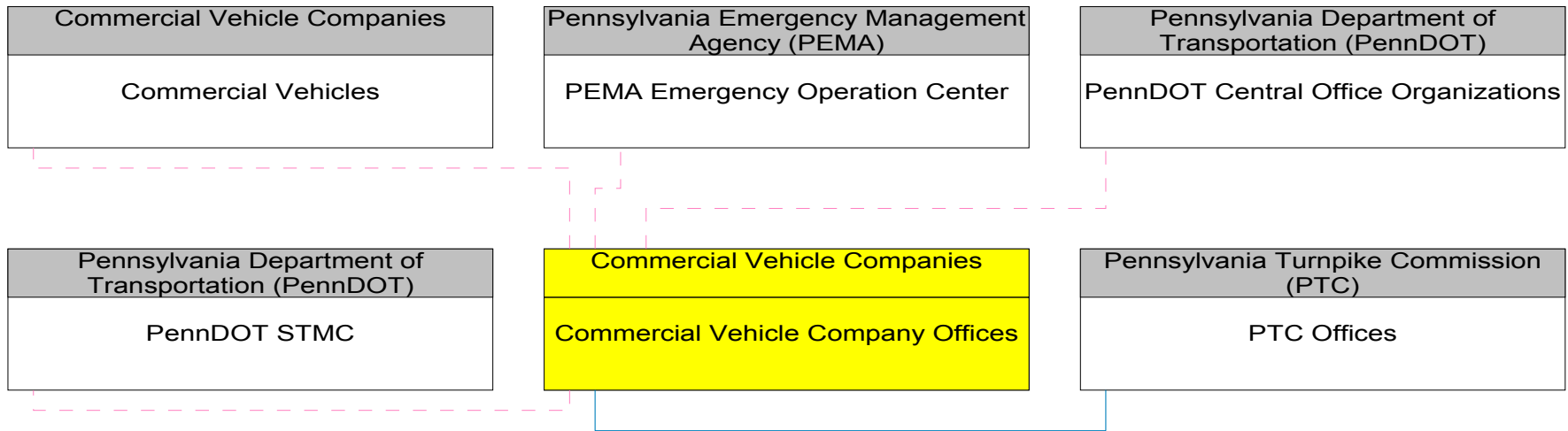


Existing  
Planned

# Commercial Vehicle Company Offices



# Commercial Vehicle Company Offices Interconnect Diagram



————— Existing  
- - - - - Planned

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center



hazmat information

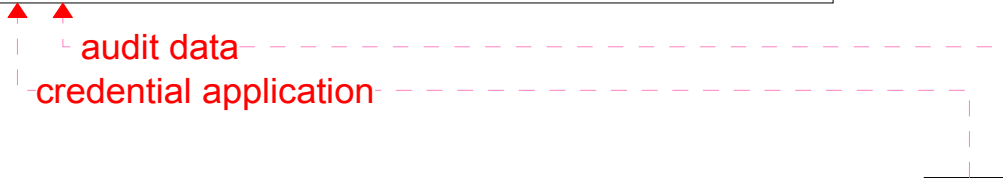
Commercial Vehicle Companies

Commercial Vehicle Company Offices

Existing  
Planned

Pennsylvania Department of  
Transportation (PennDOT)

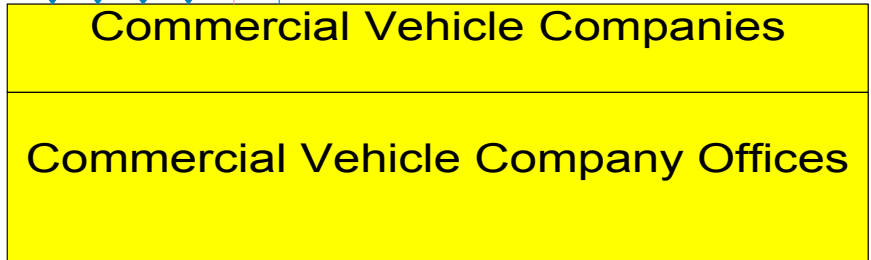
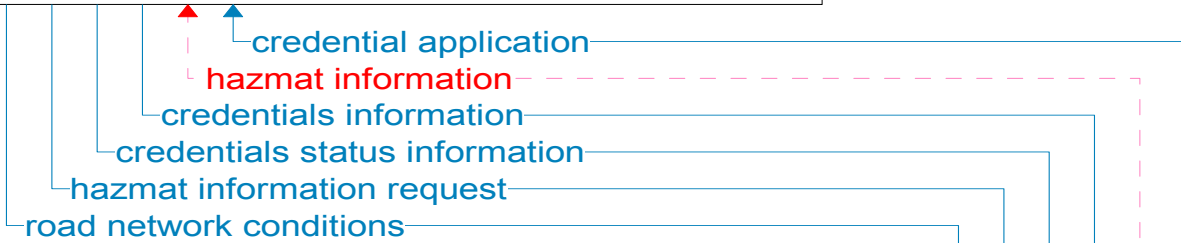
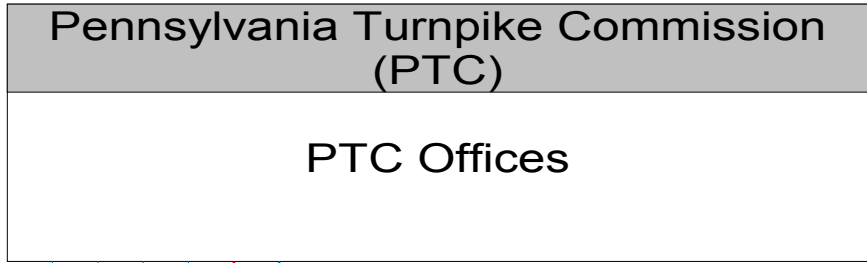
PennDOT Central Office Organizations



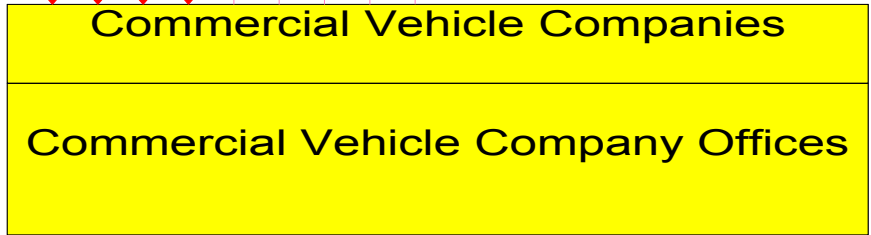
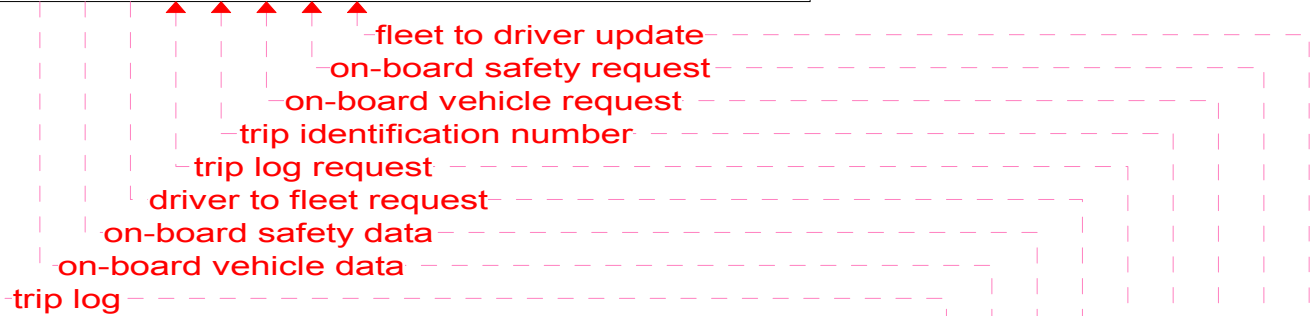
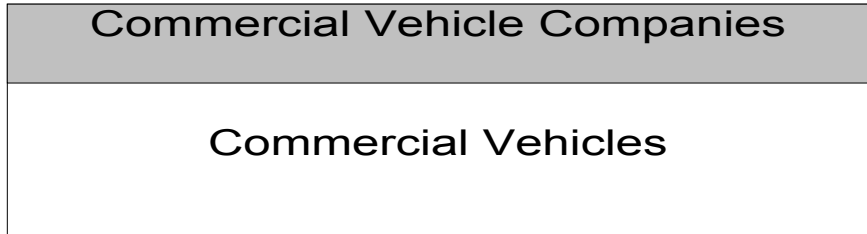
Commercial Vehicle Companies

Commercial Vehicle Company Offices

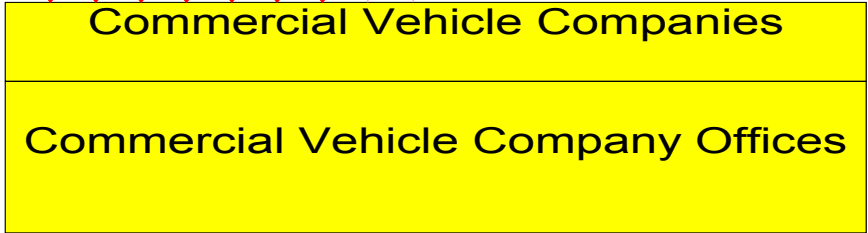
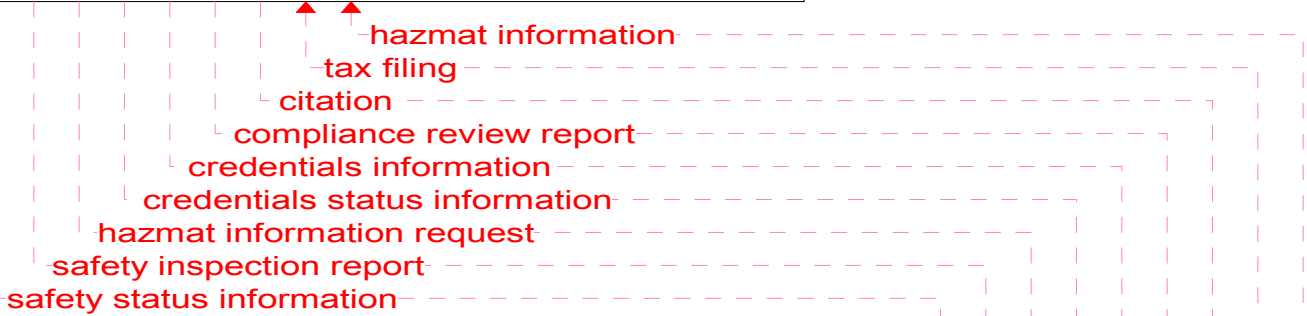
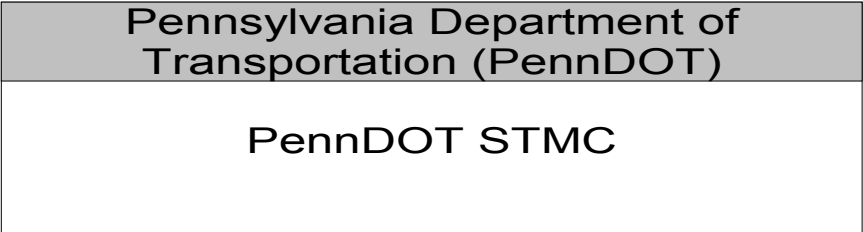
———— Existing  
- - - - - Planned





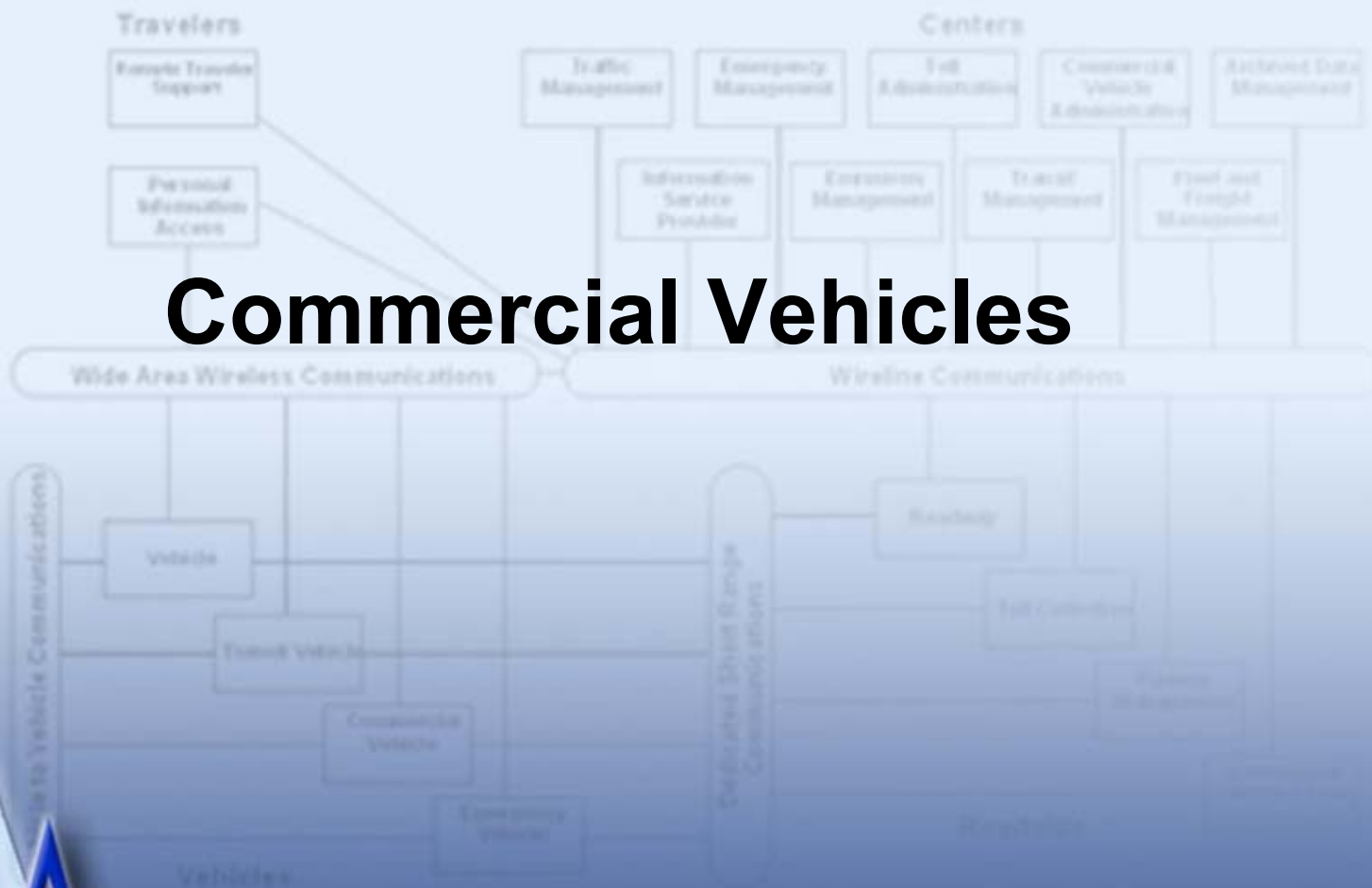


———— Existing  
- - - - - Planned



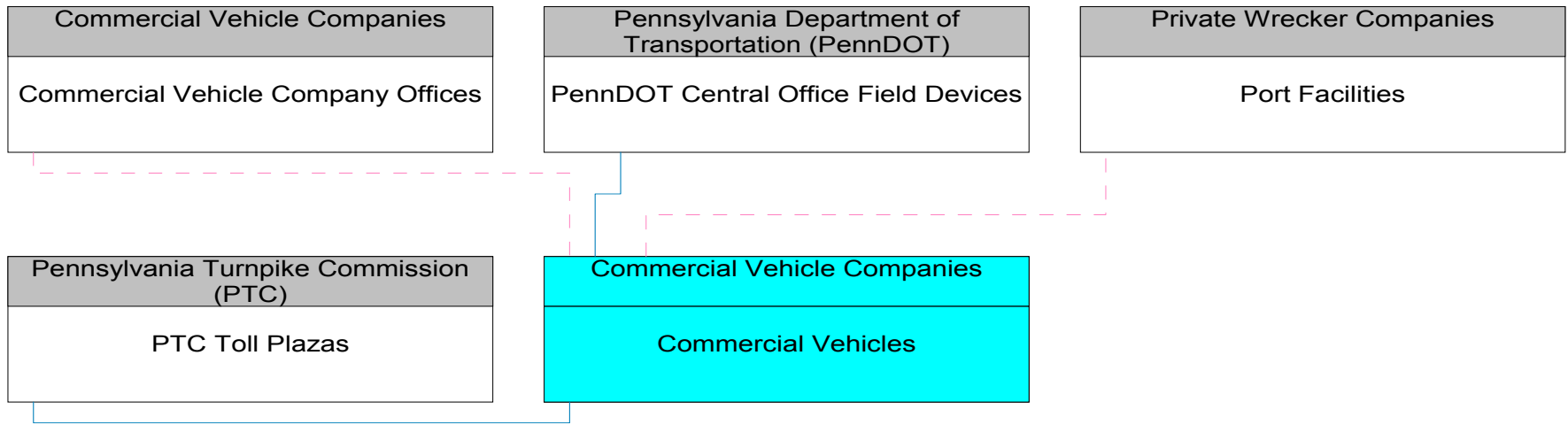
———— Existing  
- - - - - Planned

# Commercial Vehicles

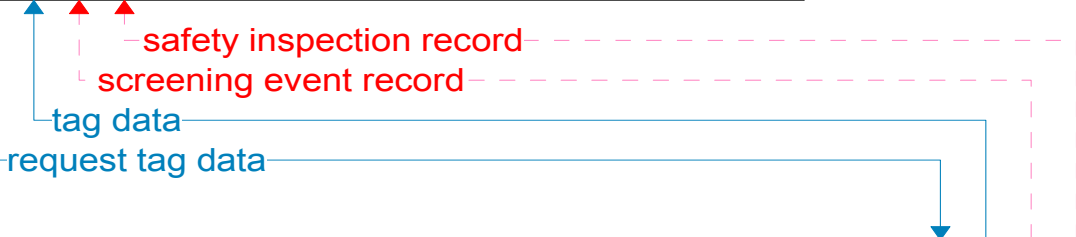
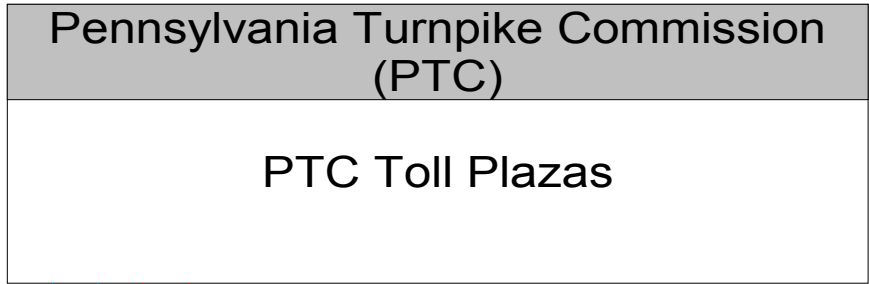


PA

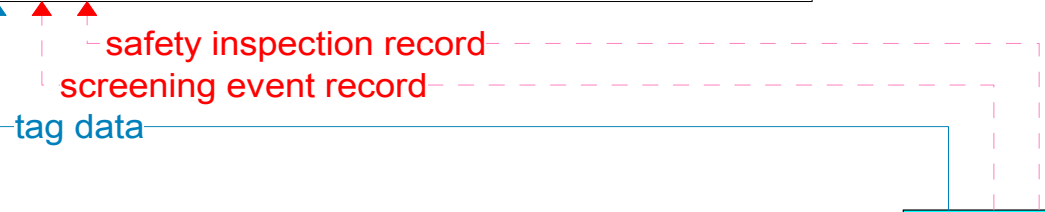
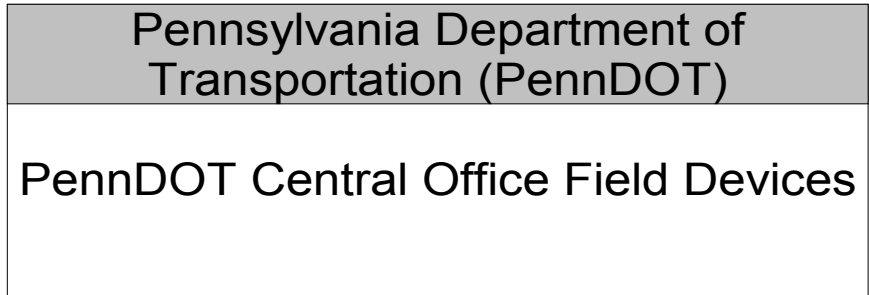
# Commercial Vehicles Interconnect Diagram



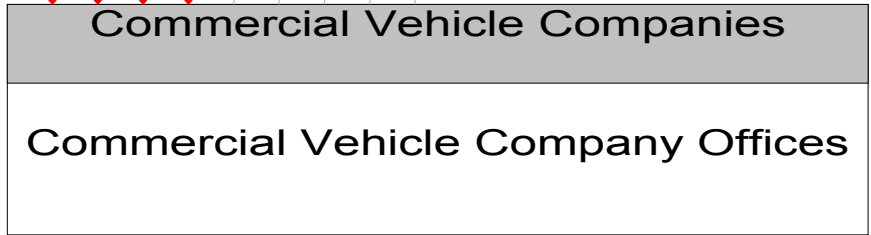
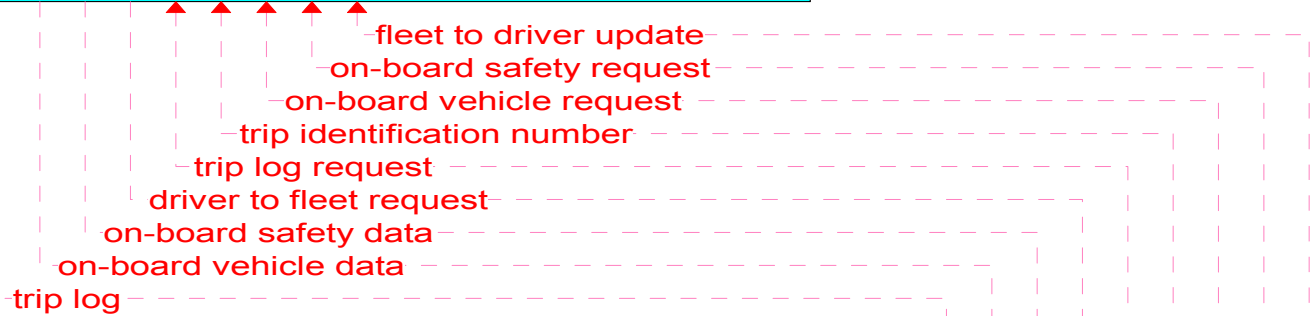
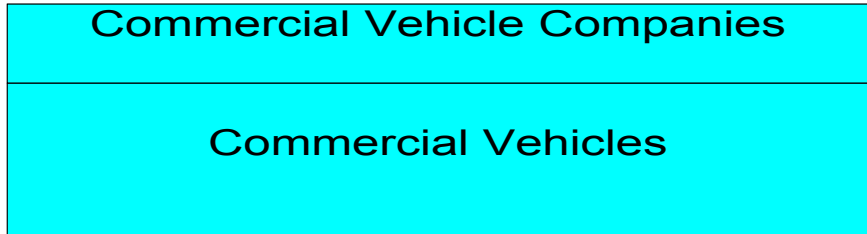
———— Existing  
- - - - - Planned



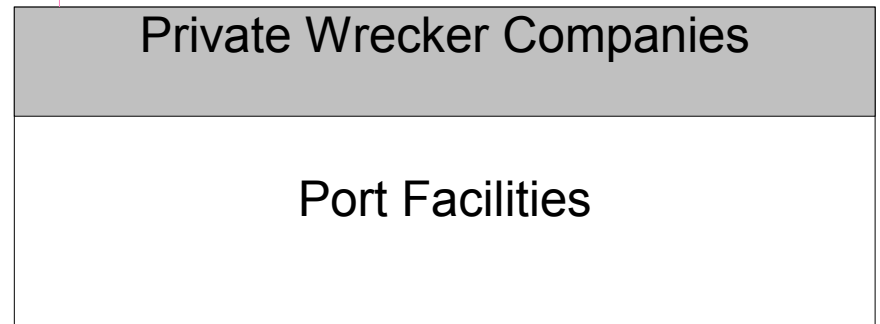
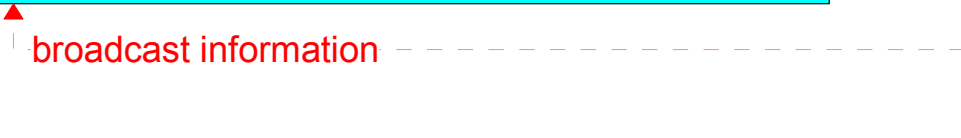
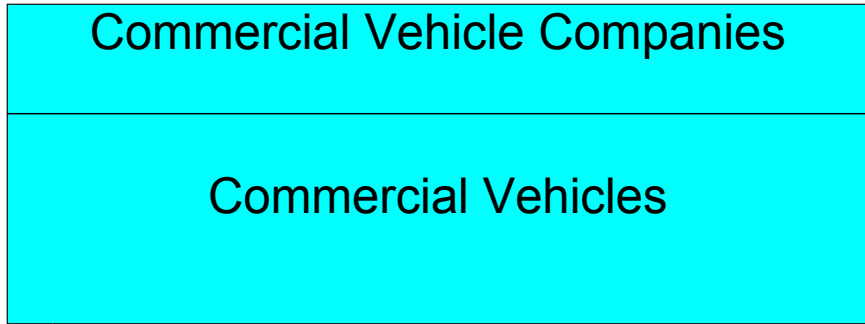
Existing  
Planned



Existing  
Planned

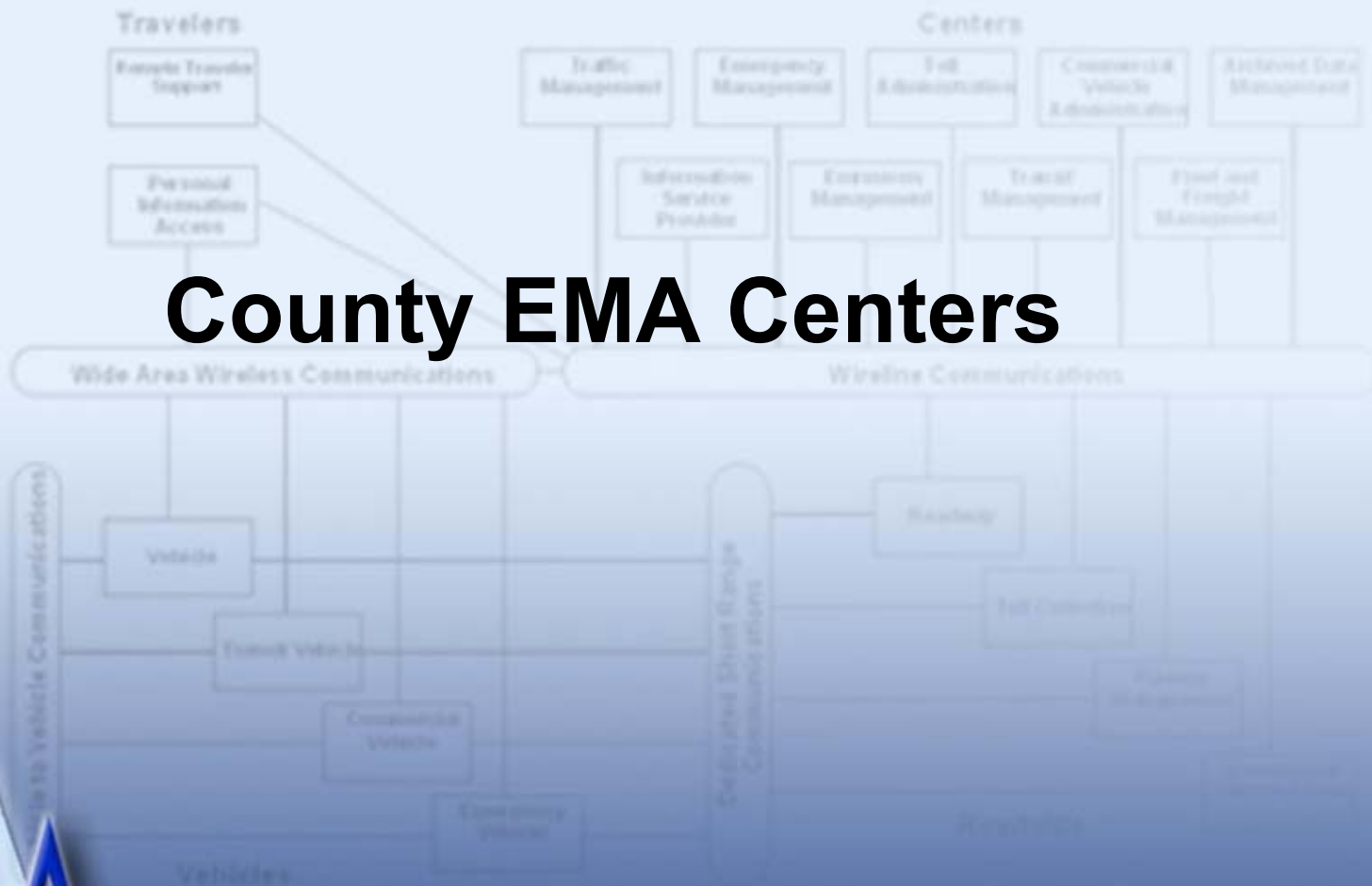


Existing  
Planned

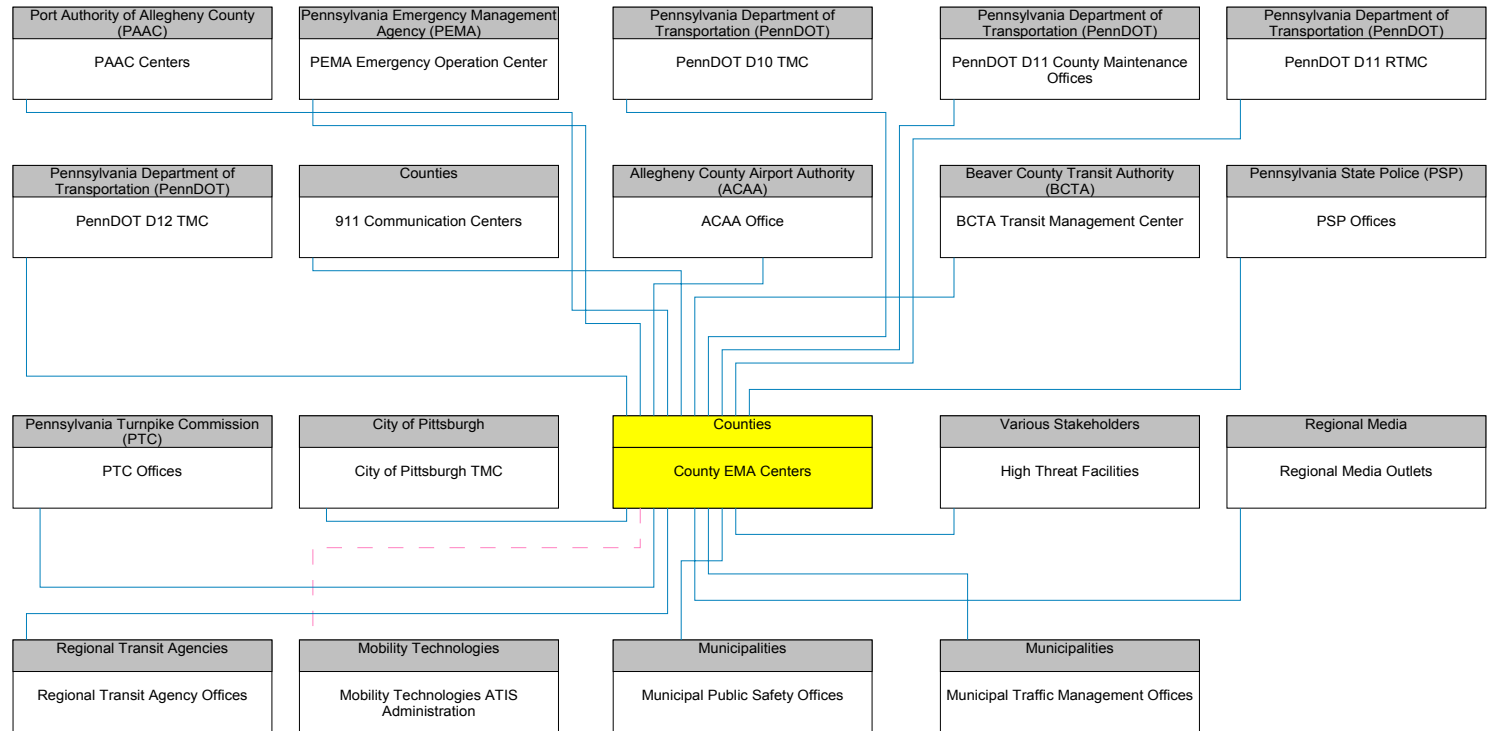




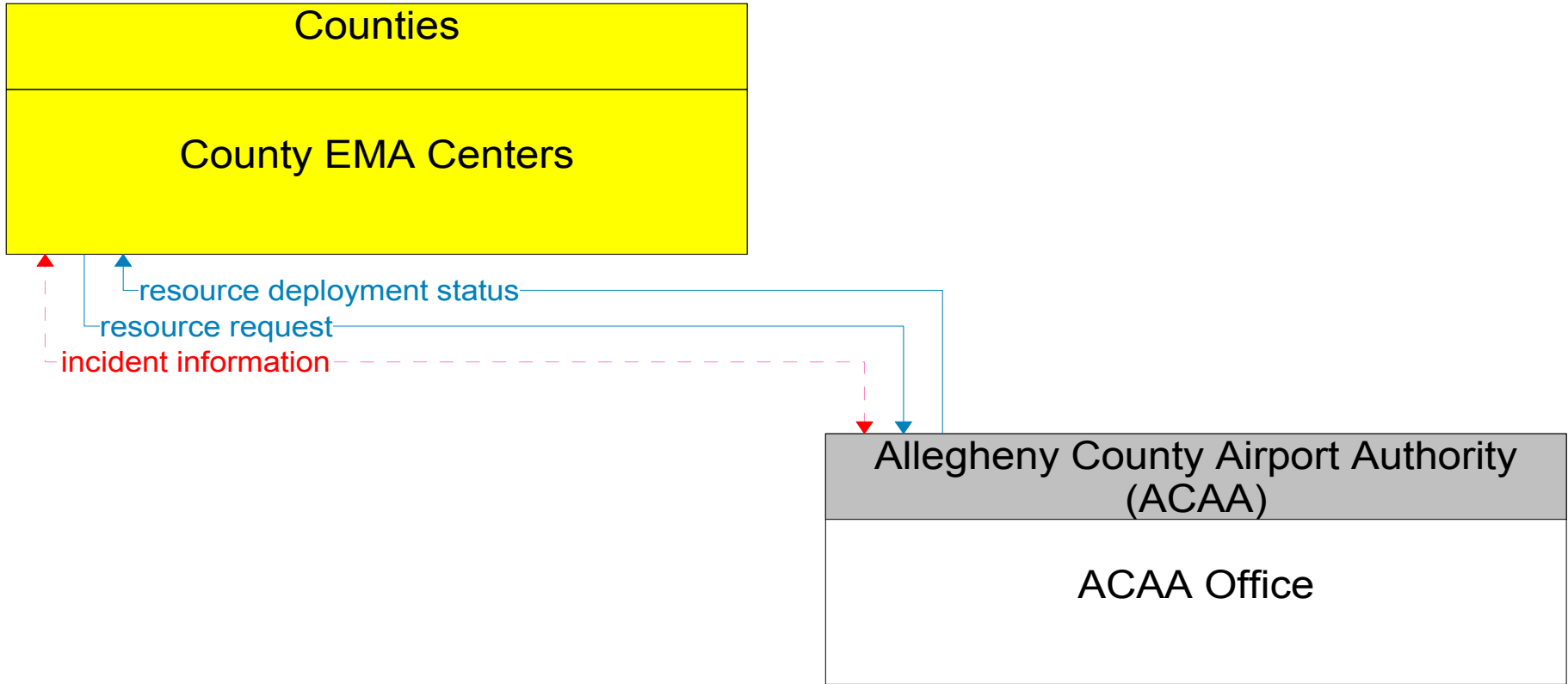
# County EMA Centers



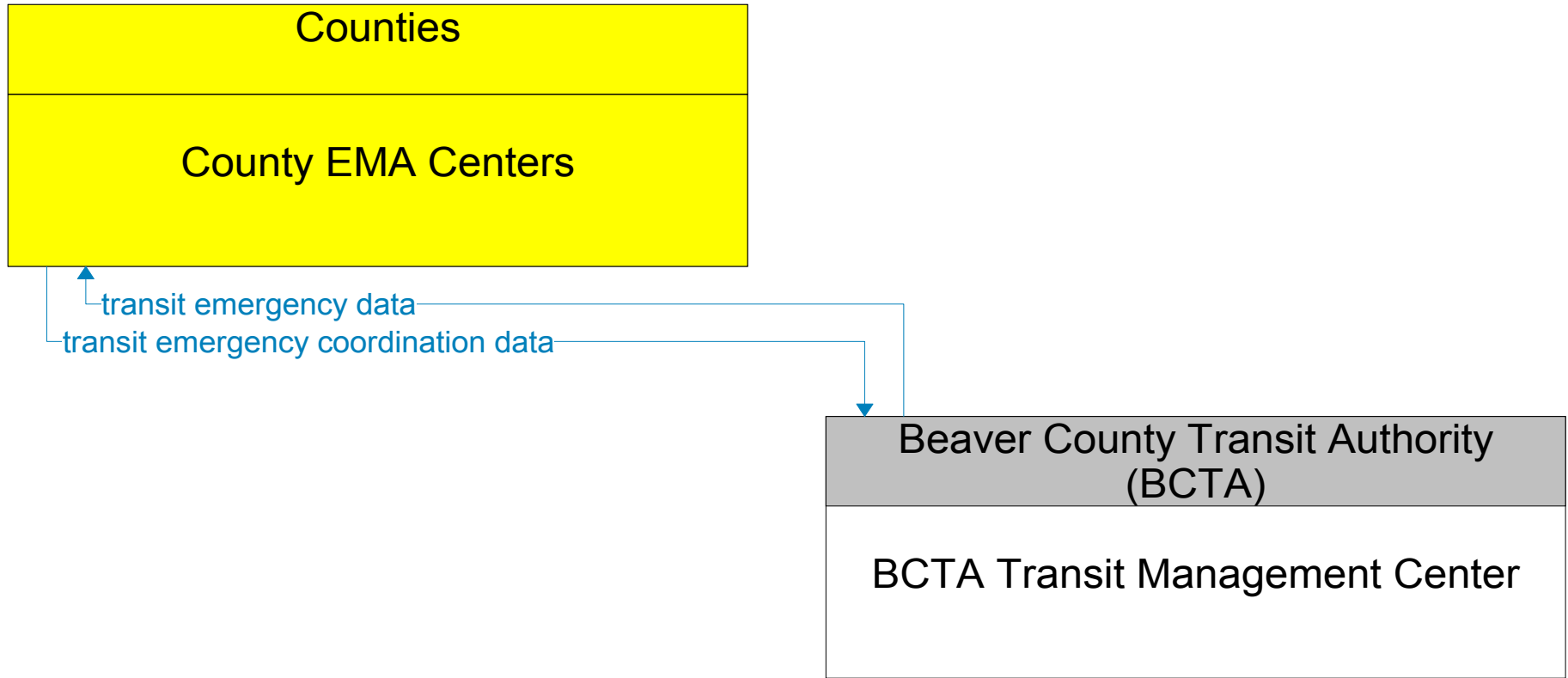
# County EMA Centers Interconnect Diagram



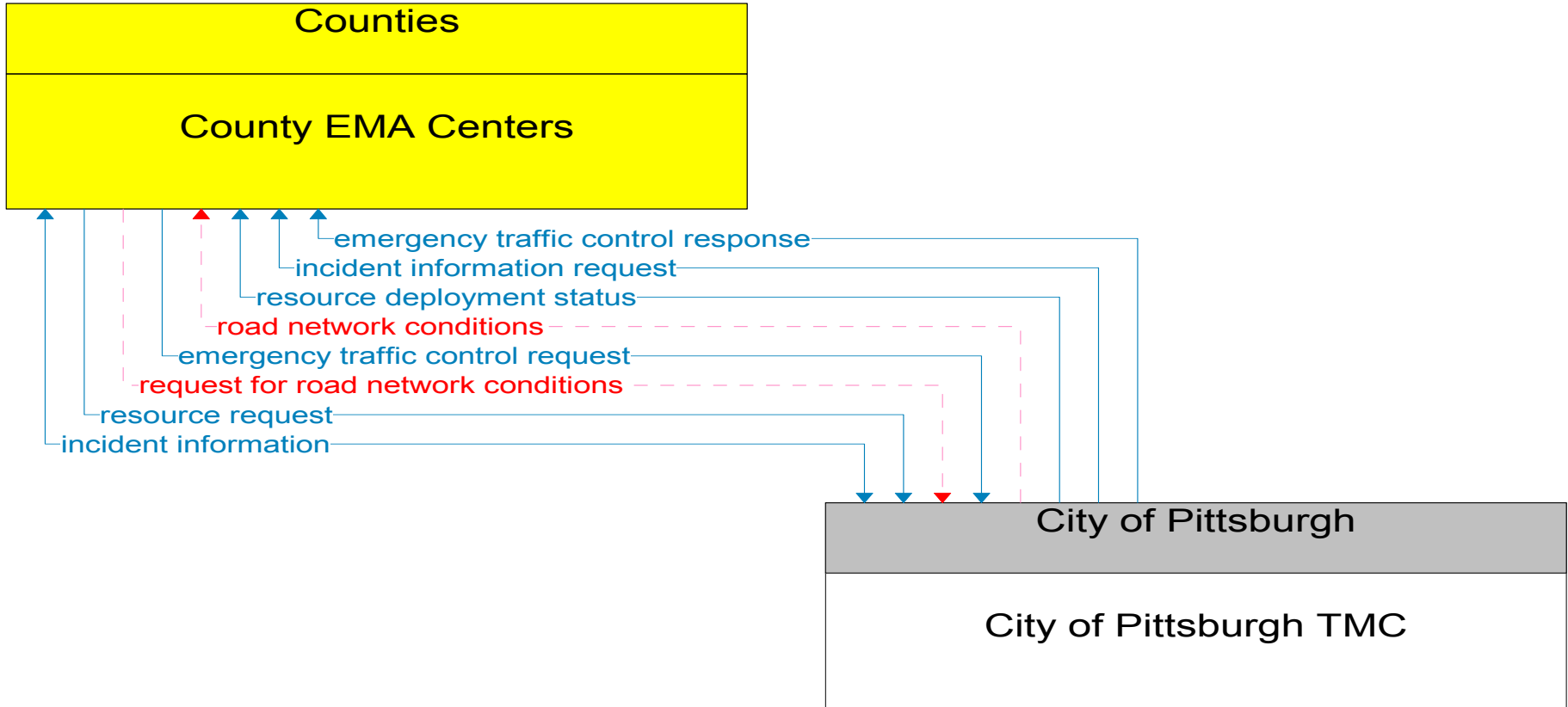
— Existing  
- - - Planned



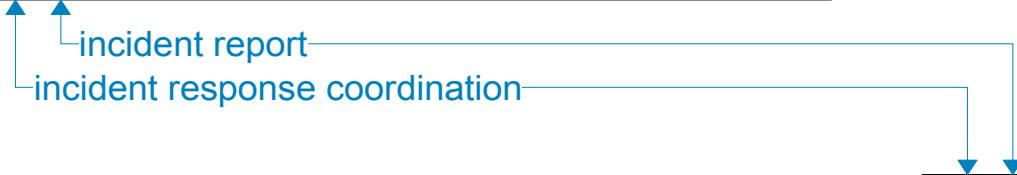
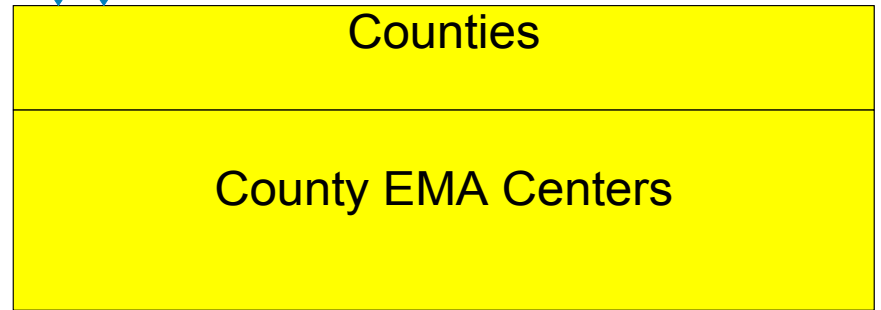
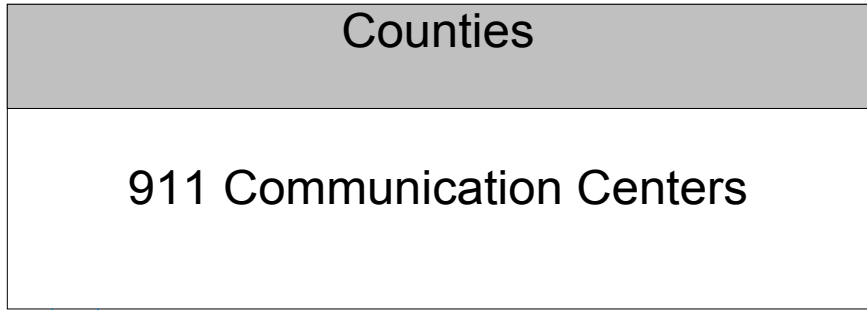
———— Existing  
- - - - - Planned



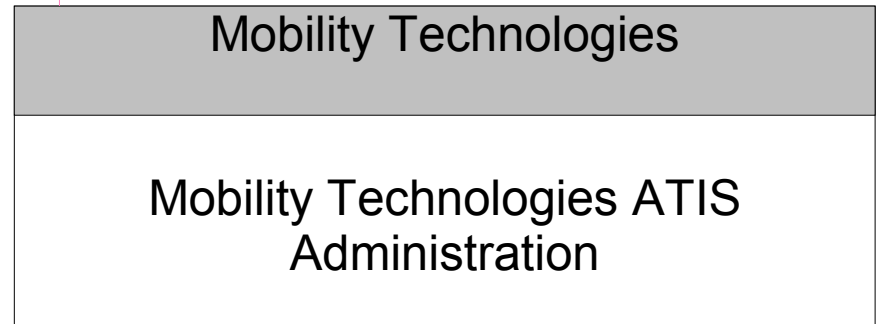
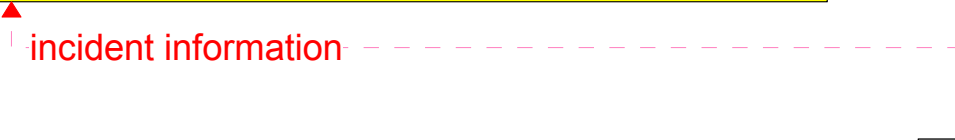
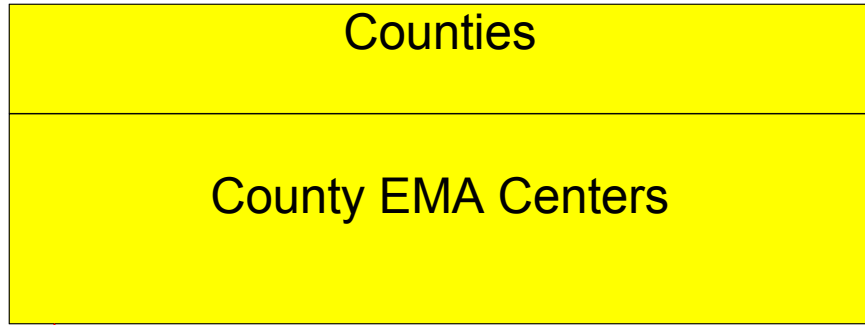
———— Existing  
----- Planned

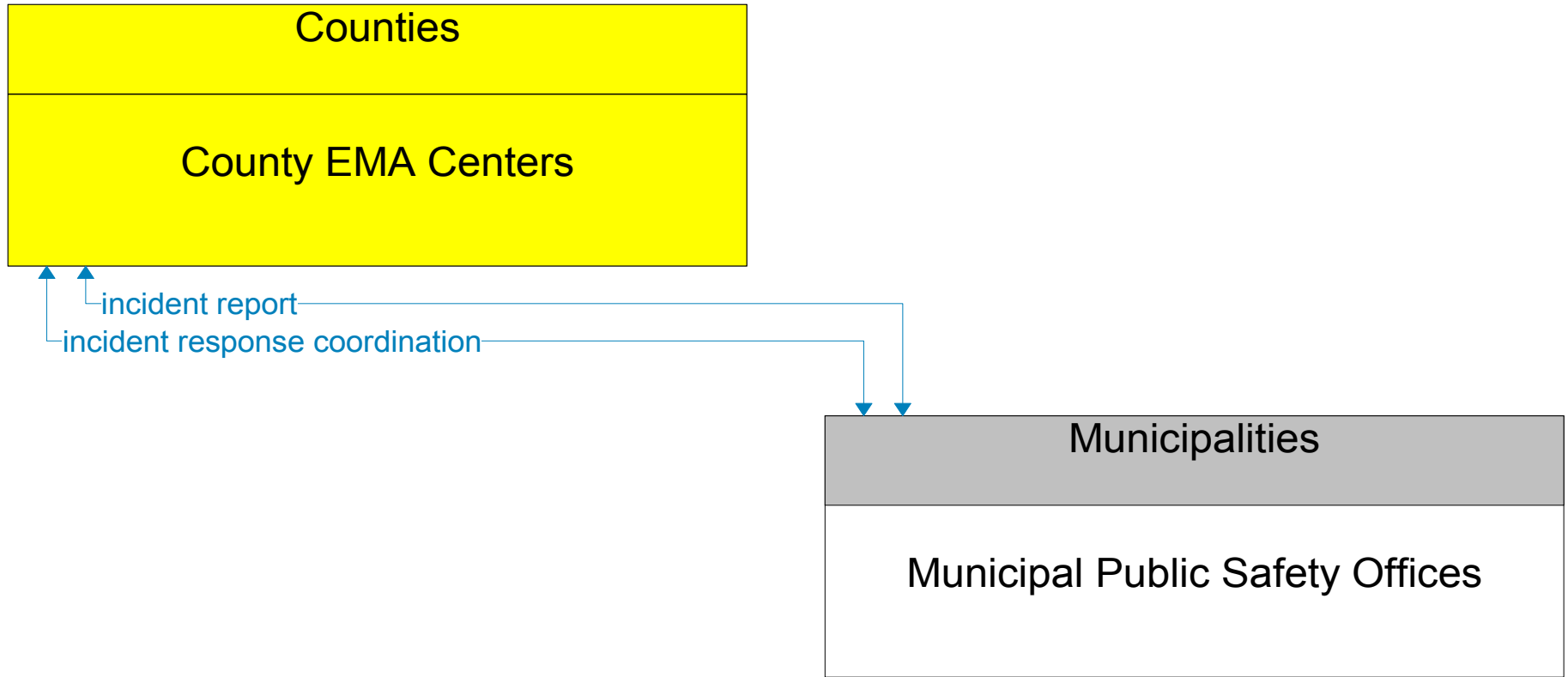


———— Existing  
- - - - - Planned



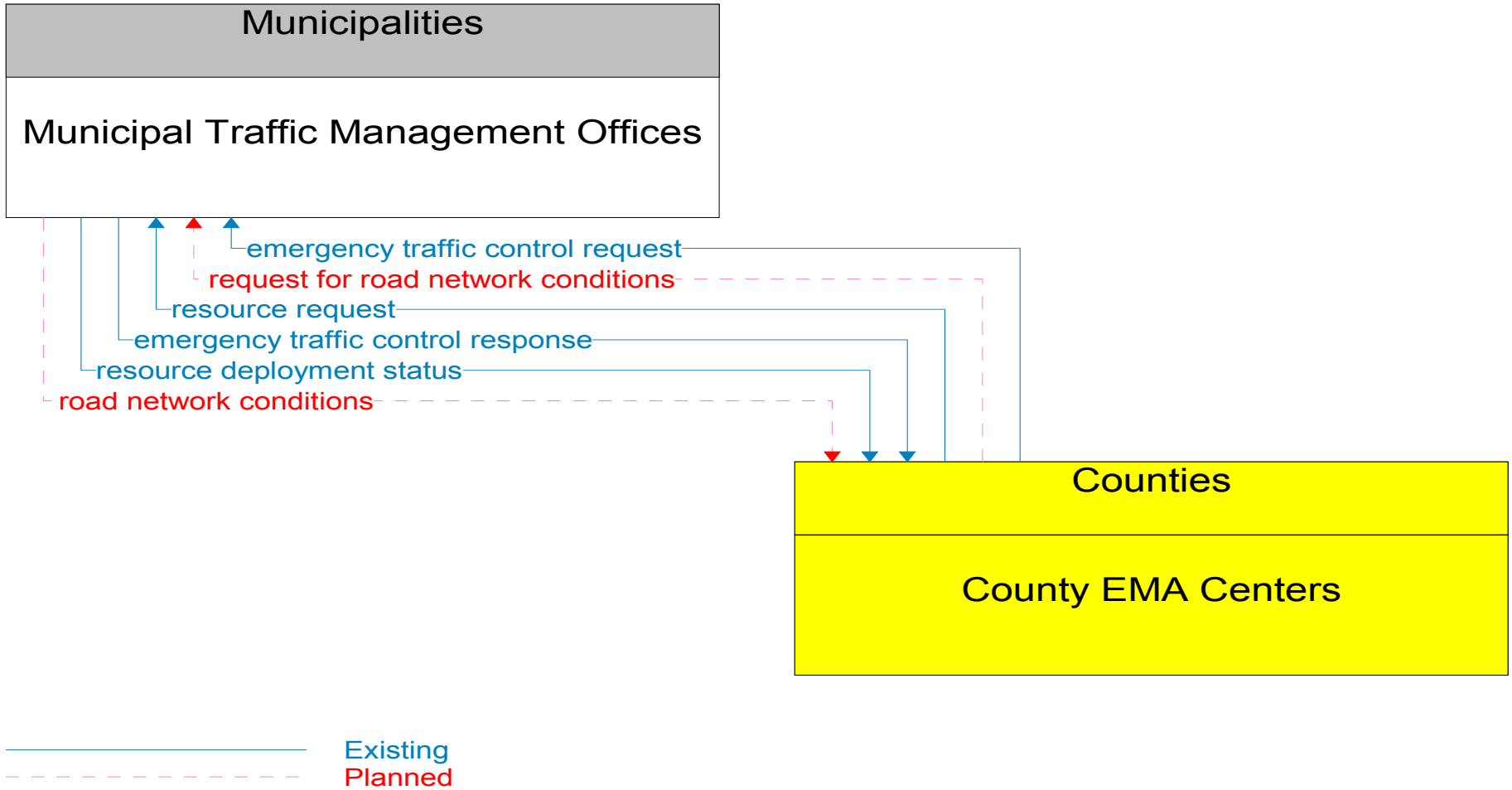
———— Existing  
----- Planned

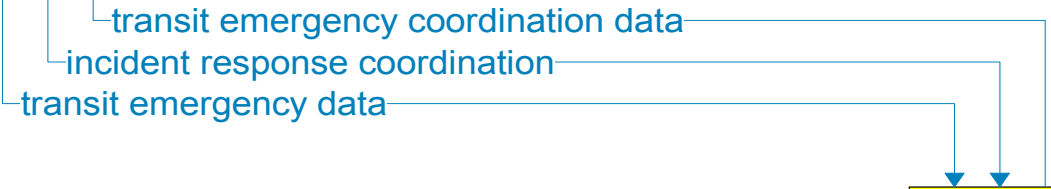
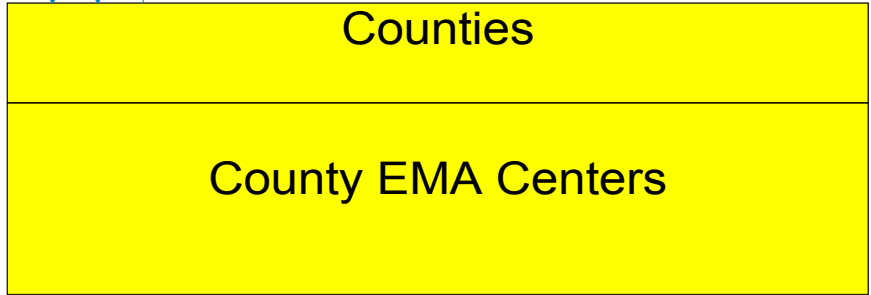
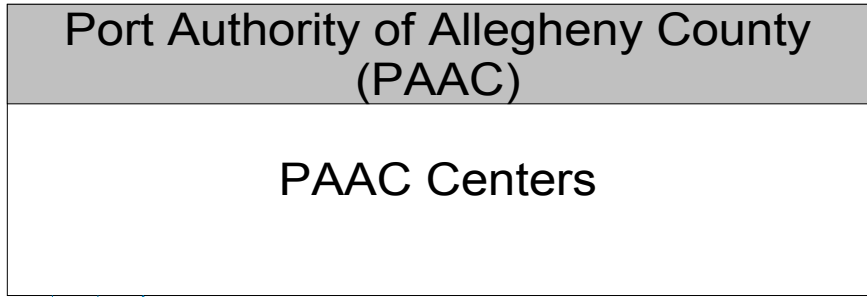




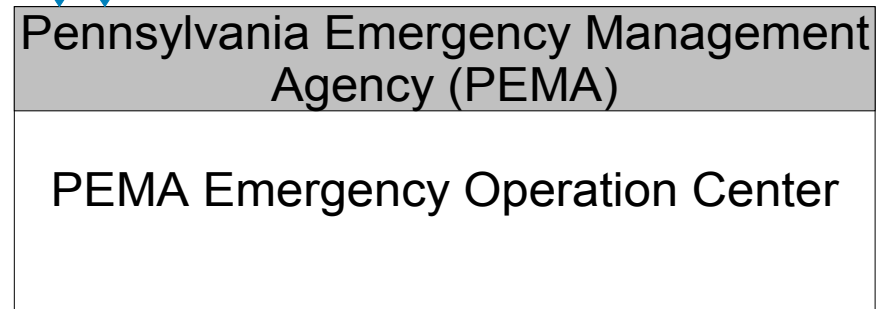
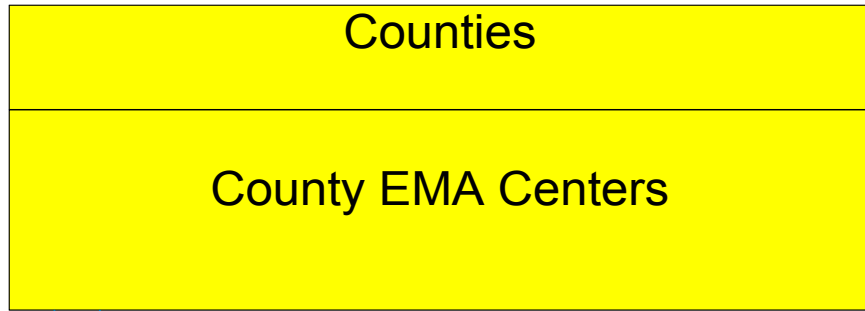
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----- Planned



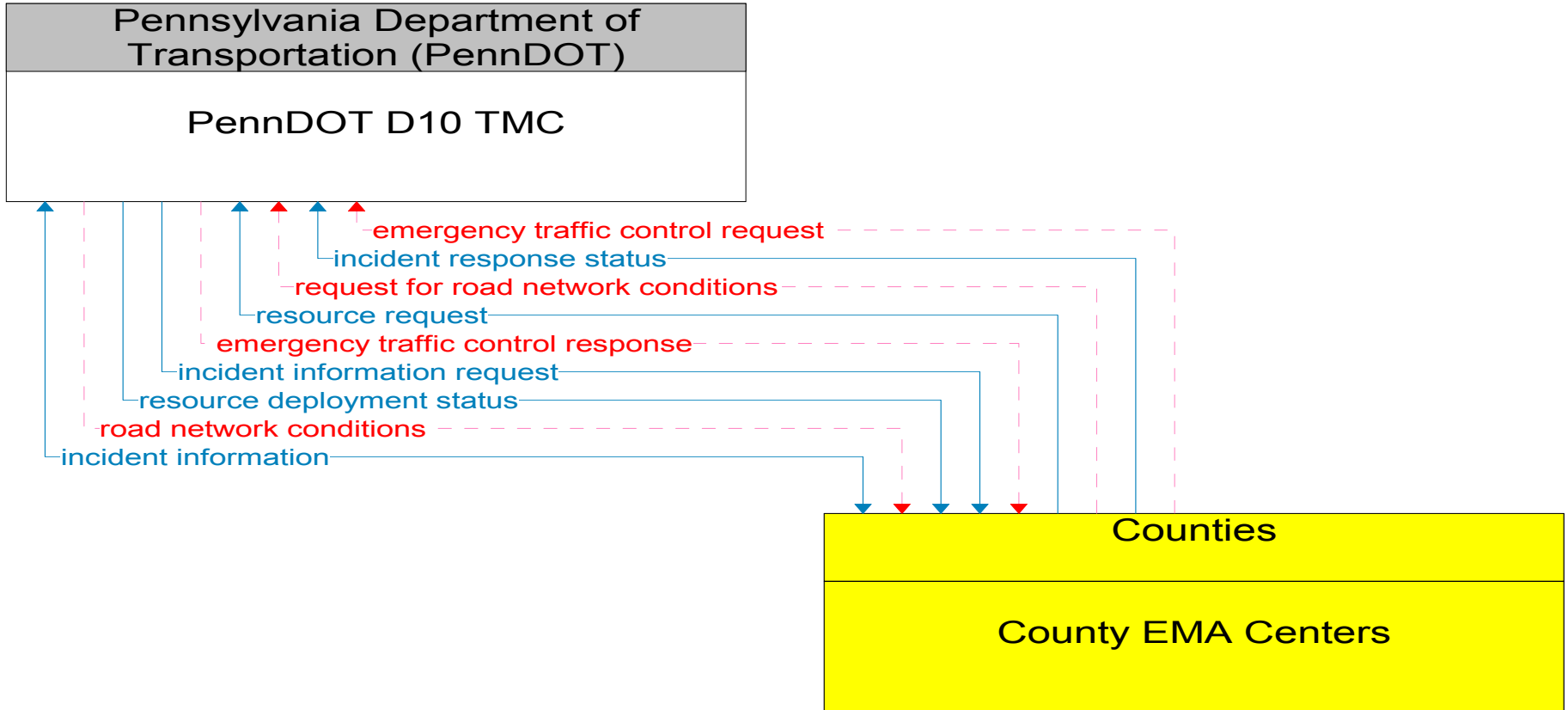




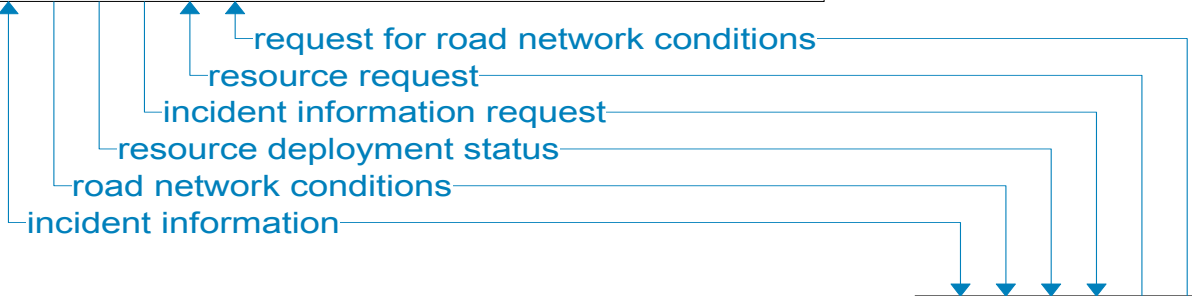
———— Existing  
- - - - - Planned



Existing  
Planned

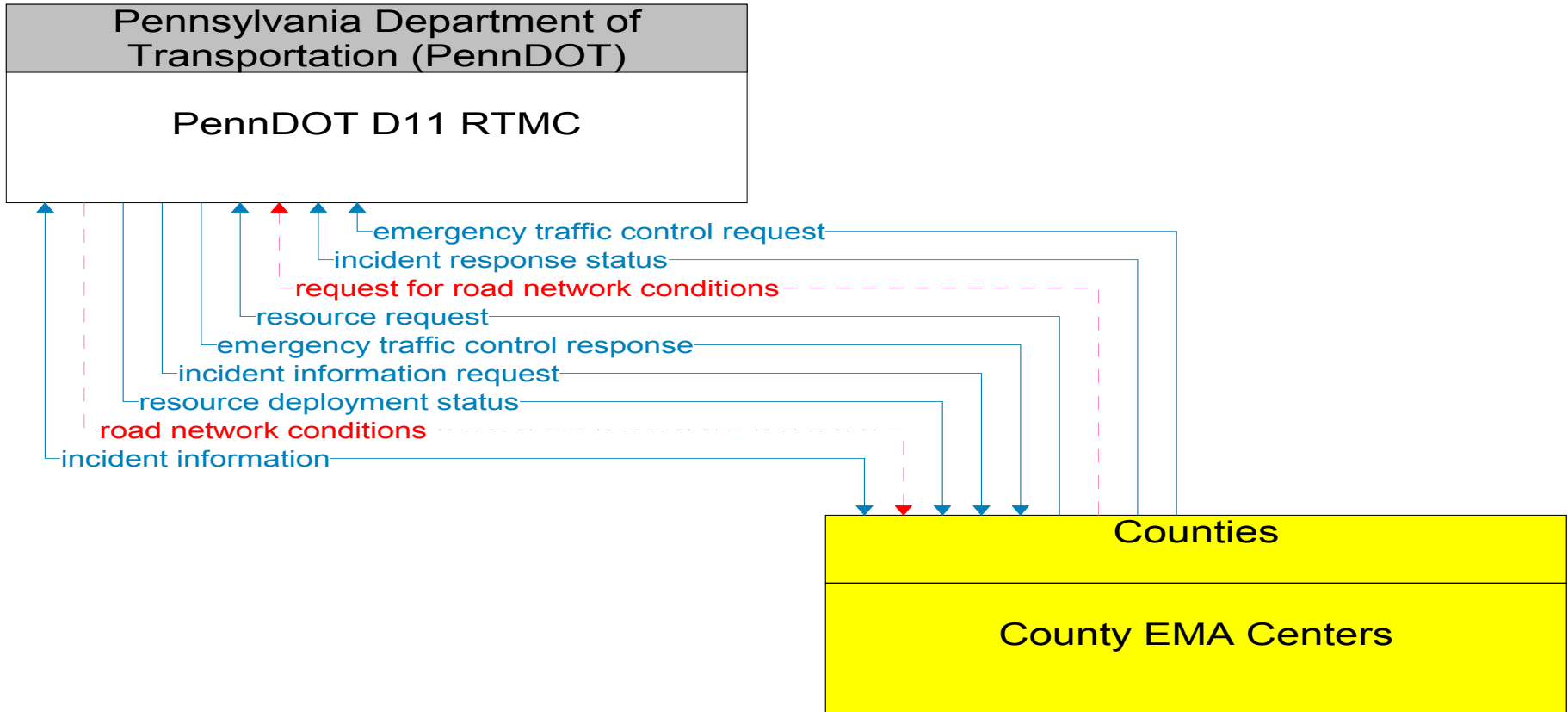


Pennsylvania Department of Transportation (PennDOT)  
PennDOT D11 County Maintenance Offices

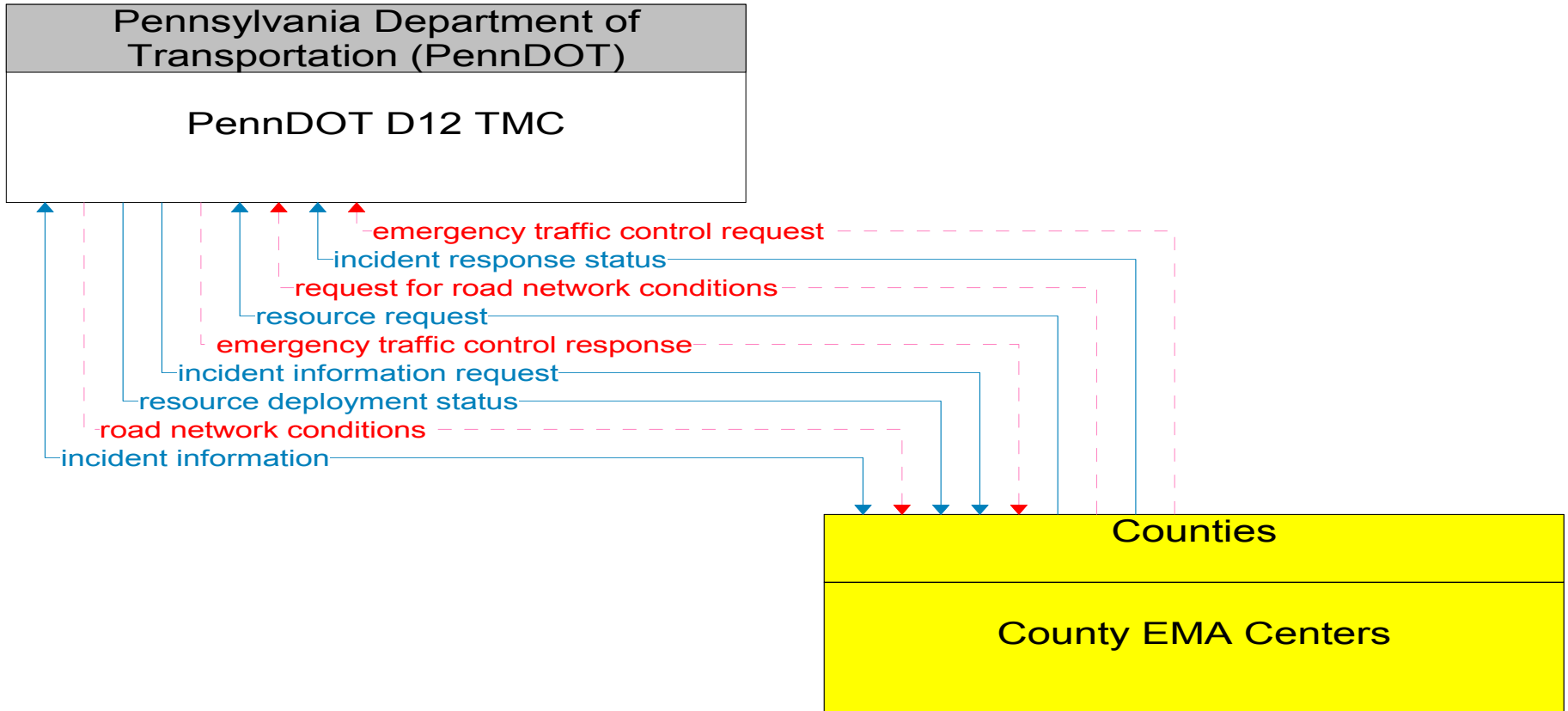


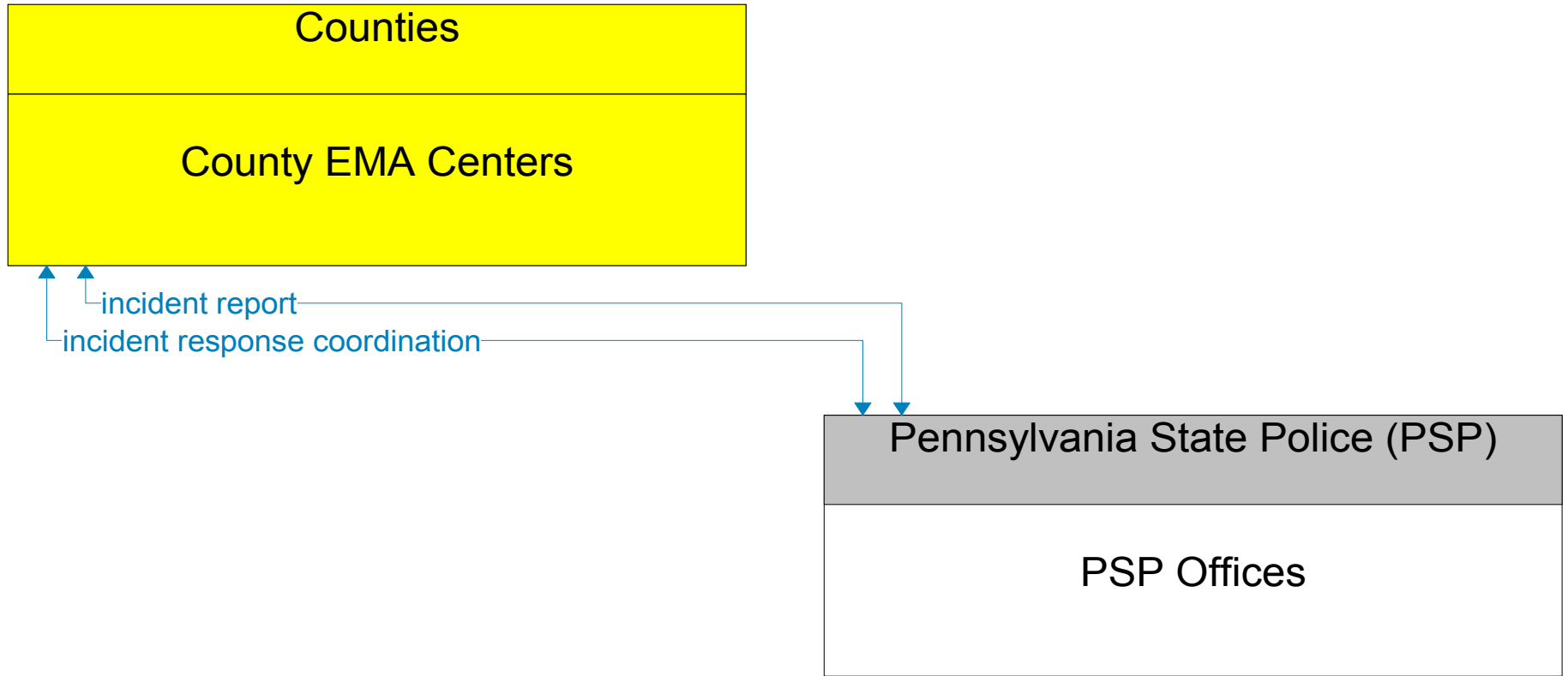
Counties  
County EMA Centers

Existing  
Planned



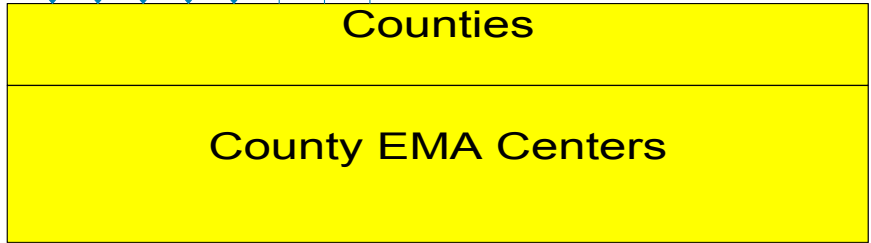
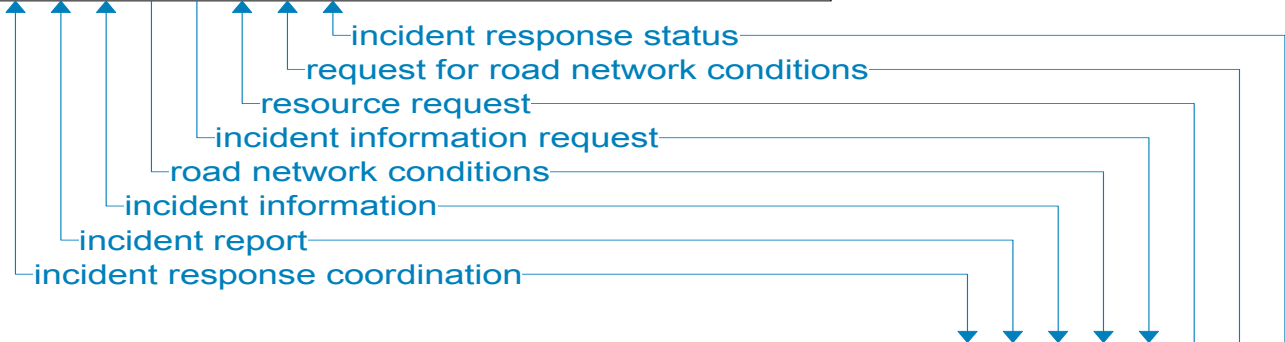
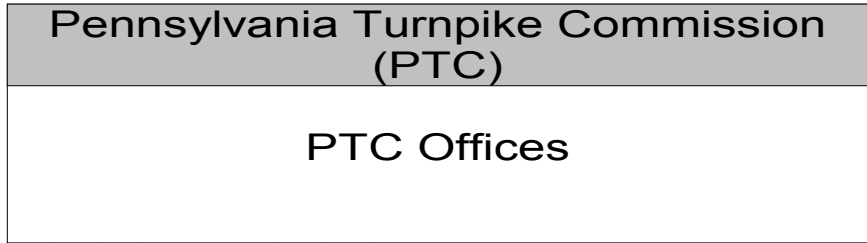
———— Existing  
- - - - - Planned



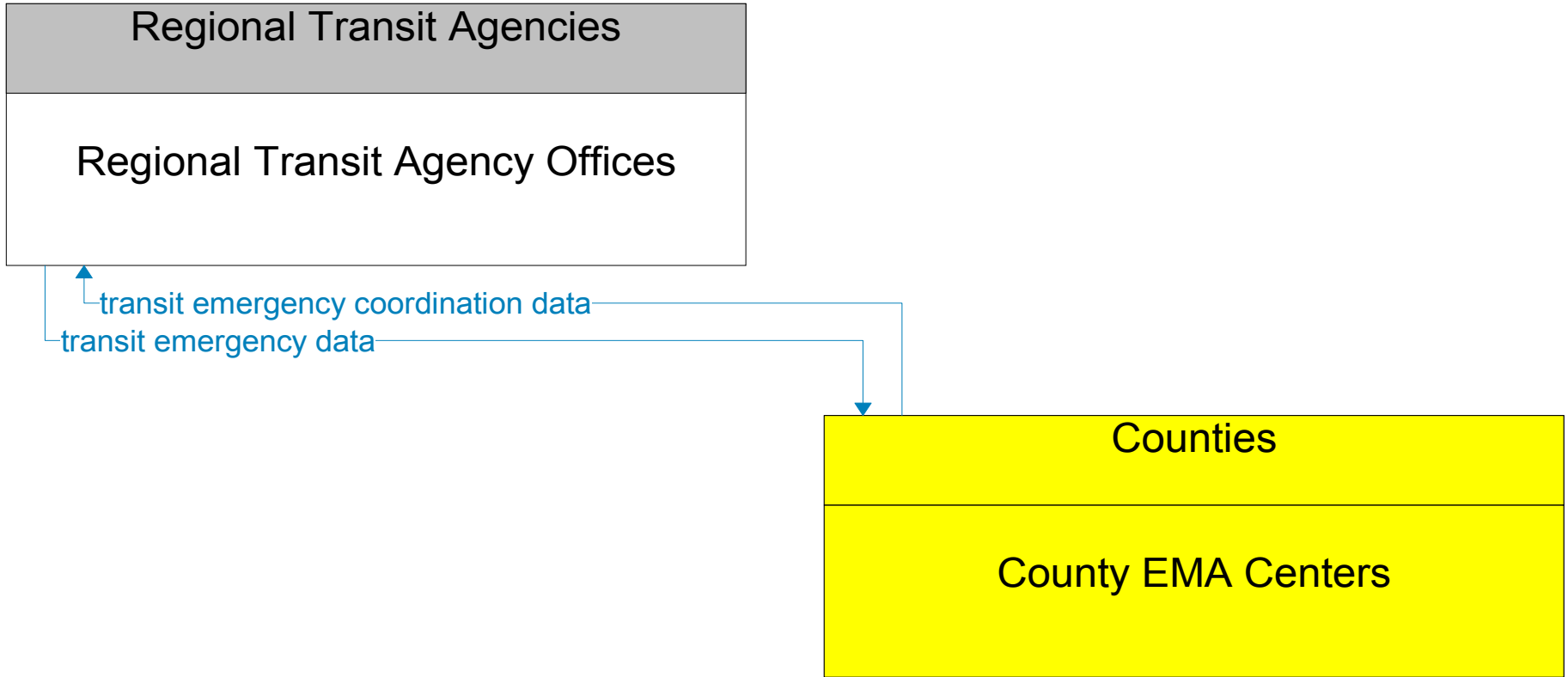


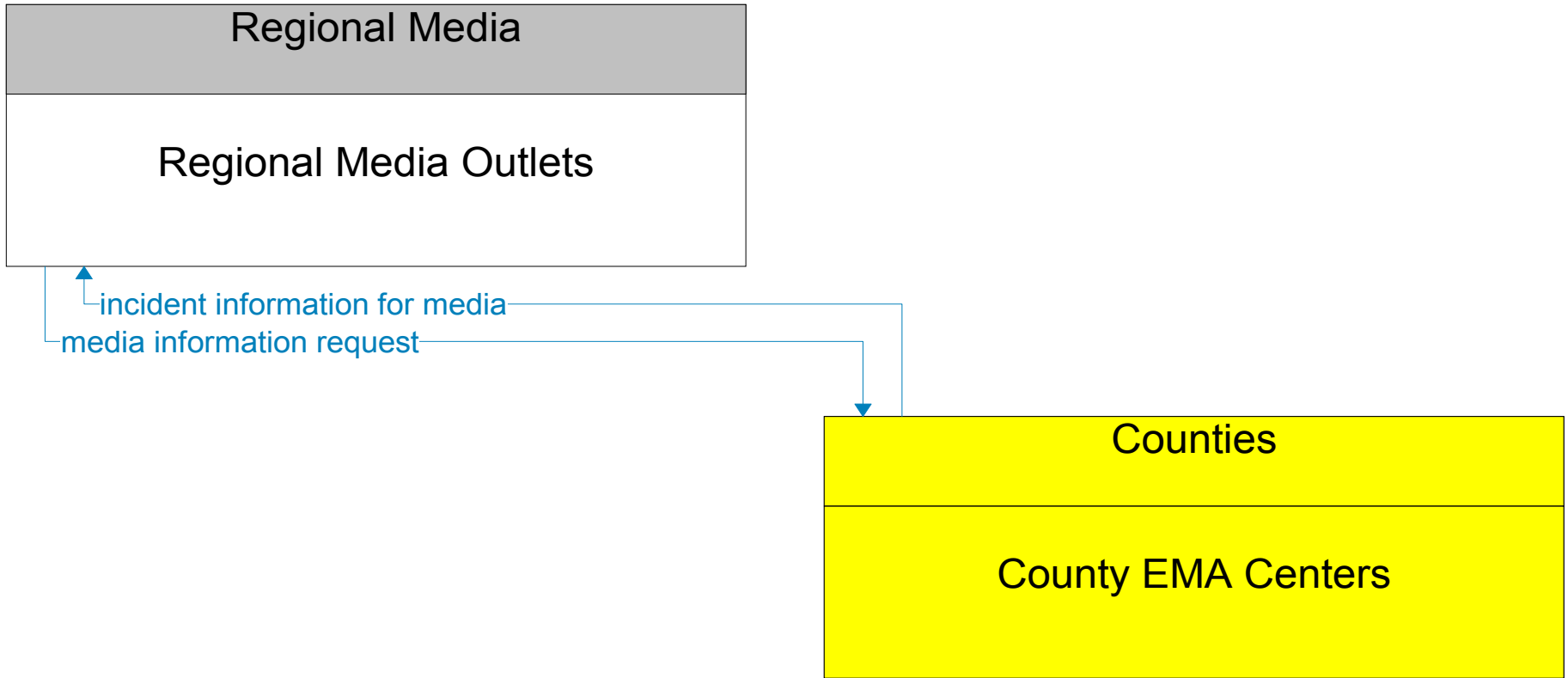
— Existing  
- - - Planned



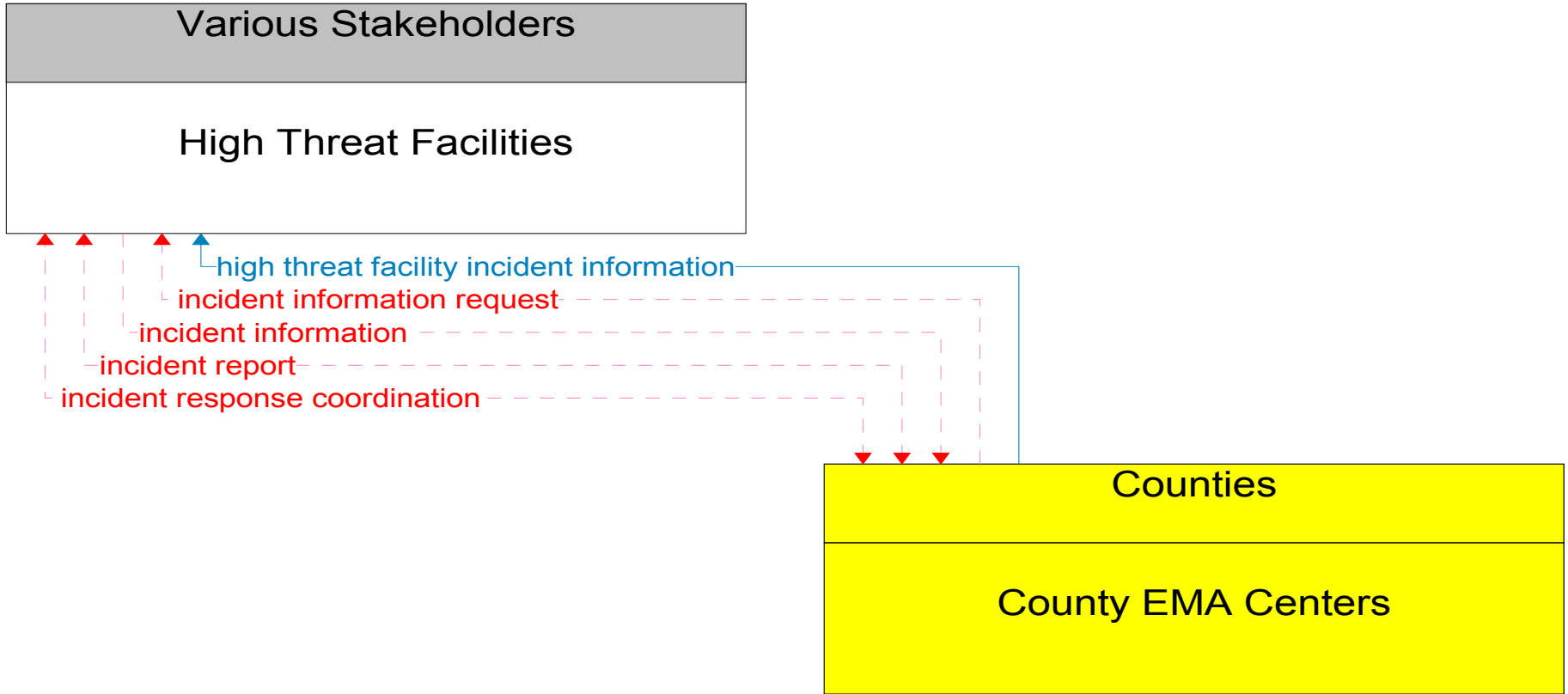


Existing  
Planned





———— Existing  
----- Planned



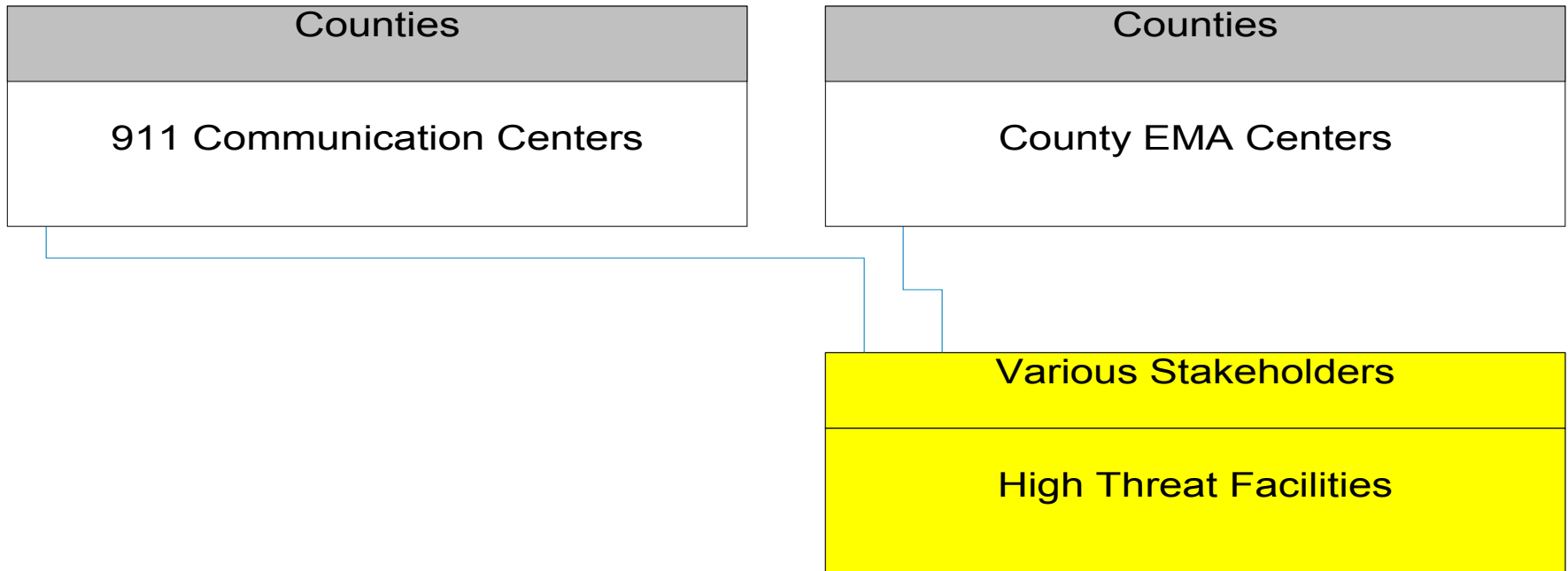
———— Existing  
- - - - - Planned

# High Threat Facilities

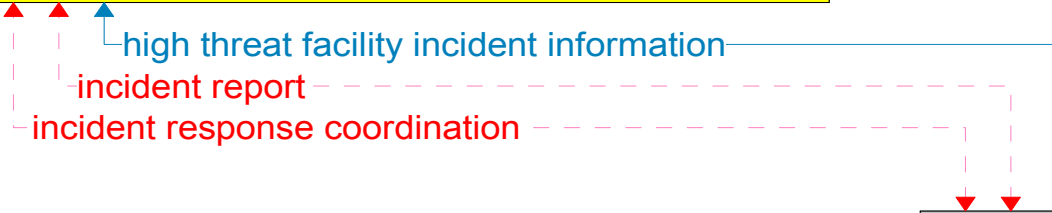
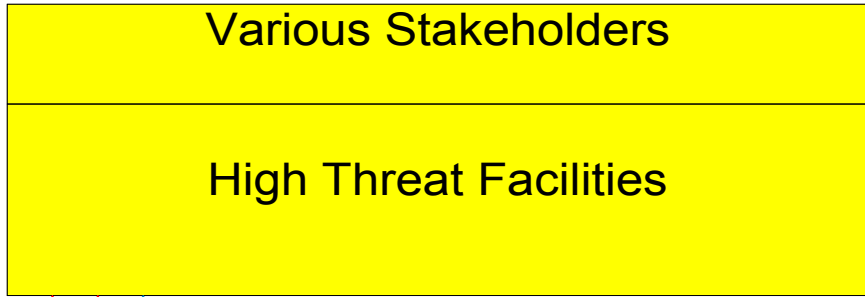


PA

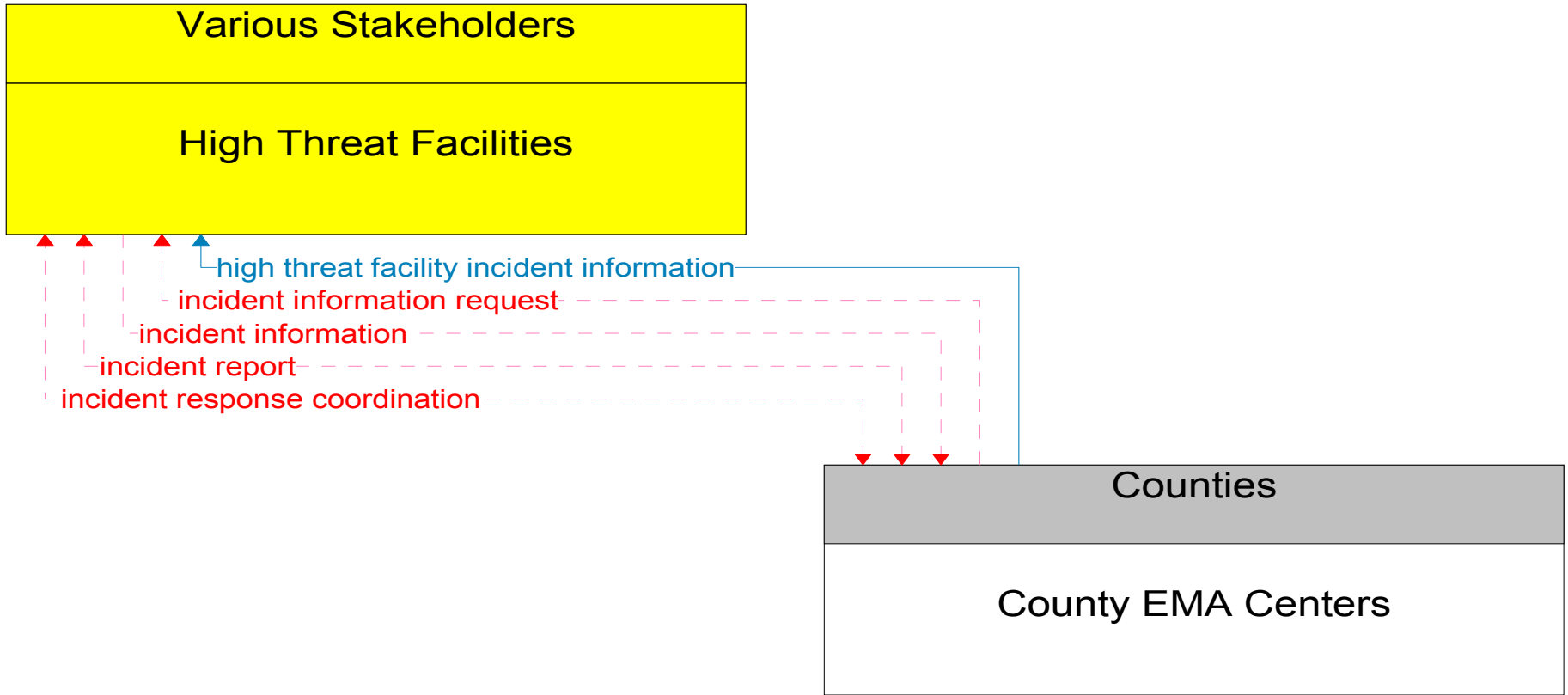
# High Threat Facilities Interconnect Diagram



———— Existing  
- - - - - Planned



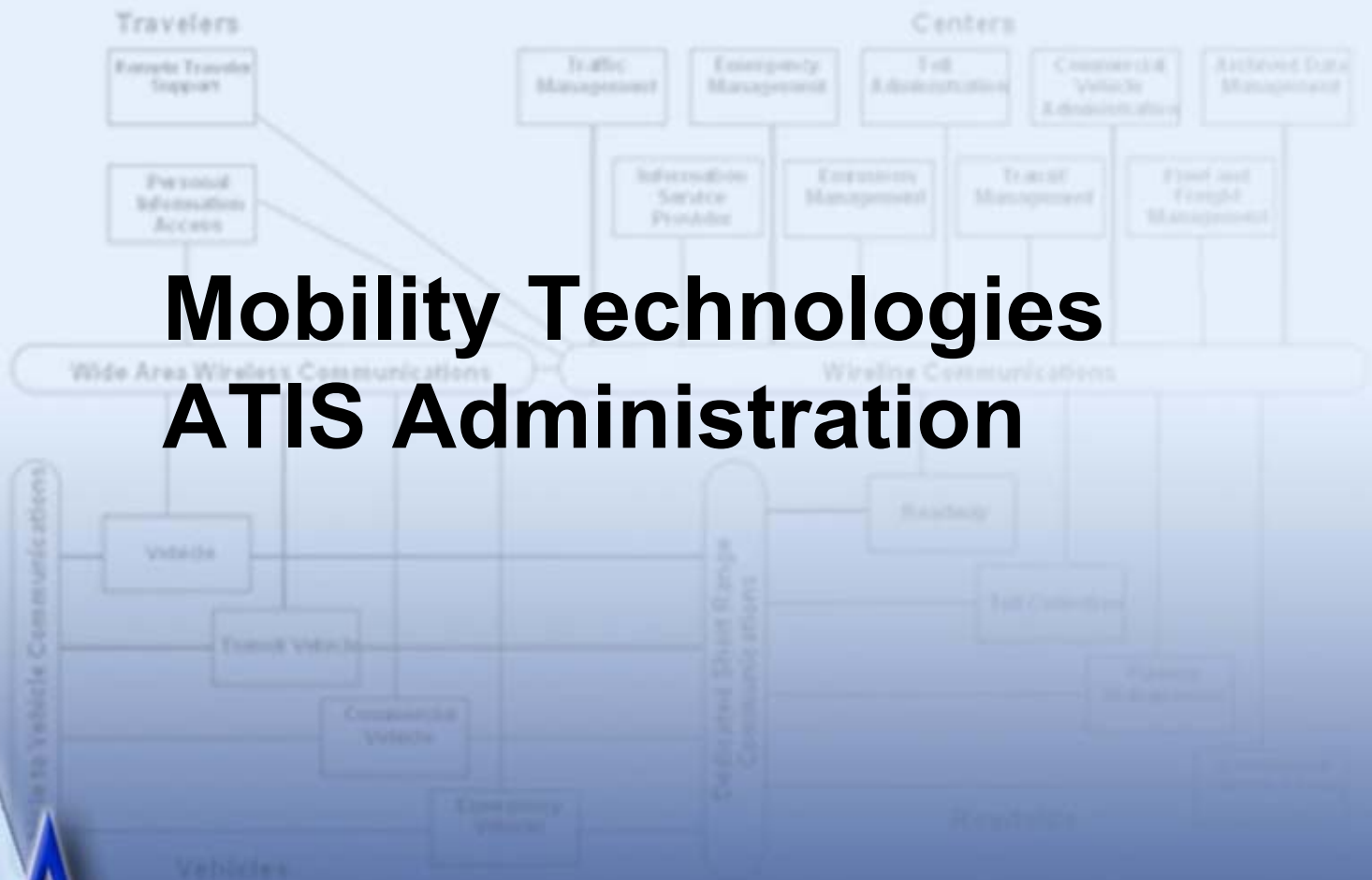
———— Existing  
- - - - - Planned



———— Existing  
- - - - - Planned

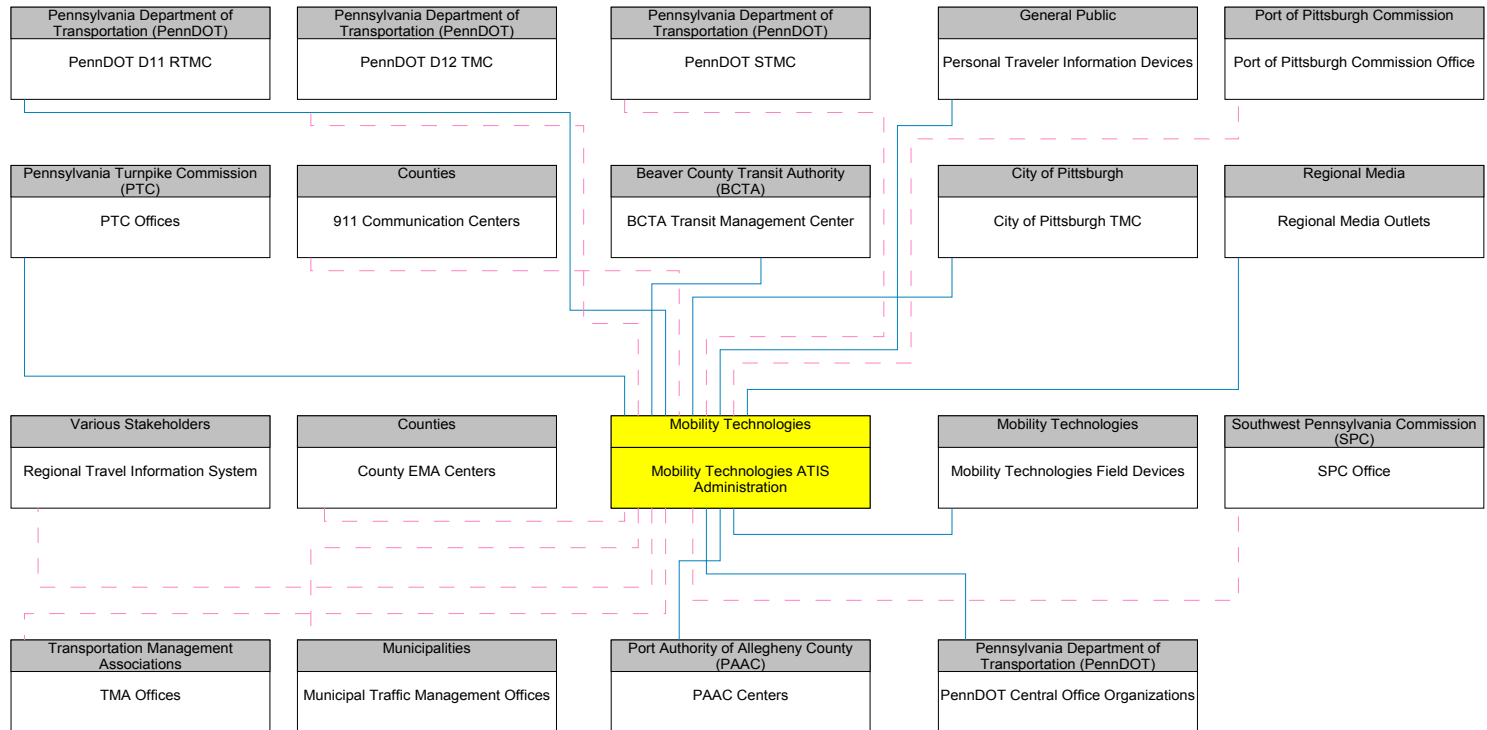


# Mobility Technologies ATIS Administration

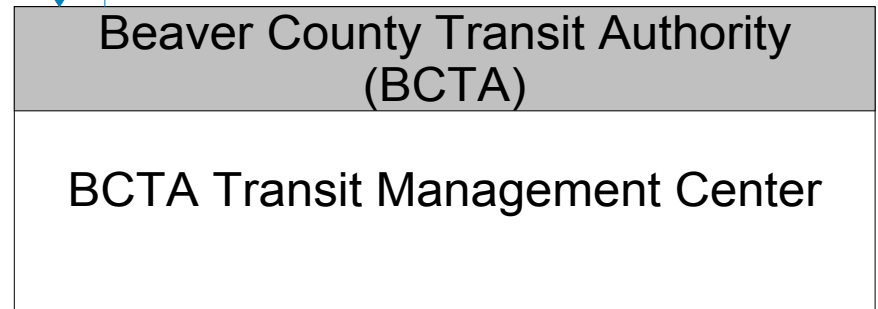
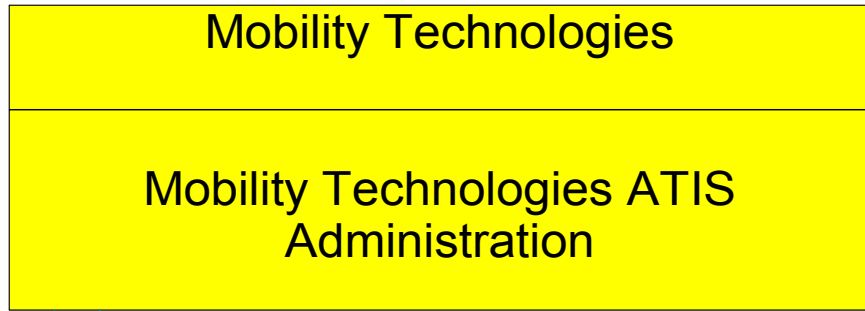


PA

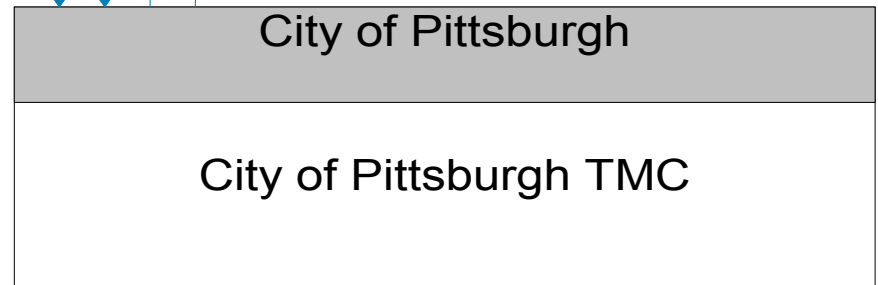
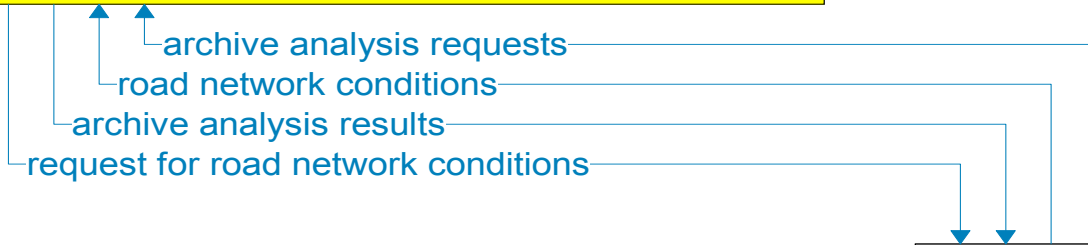
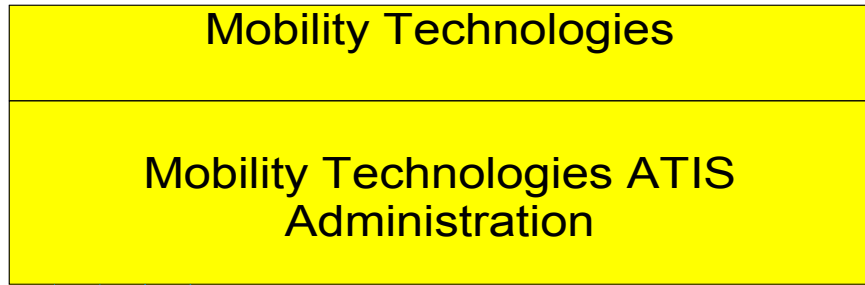
# Mobility Technologies ATIS Administration Interconnect Diagram

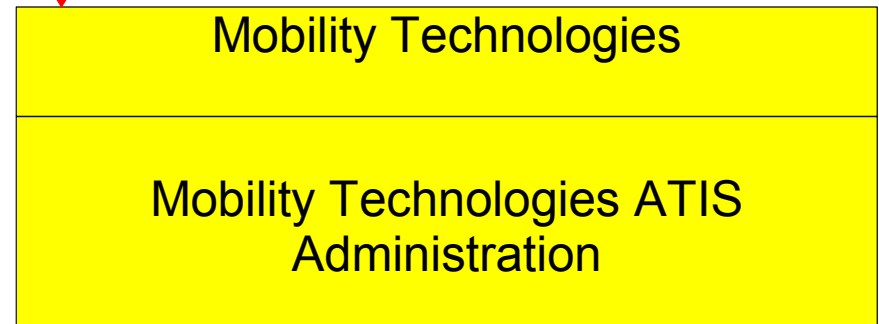
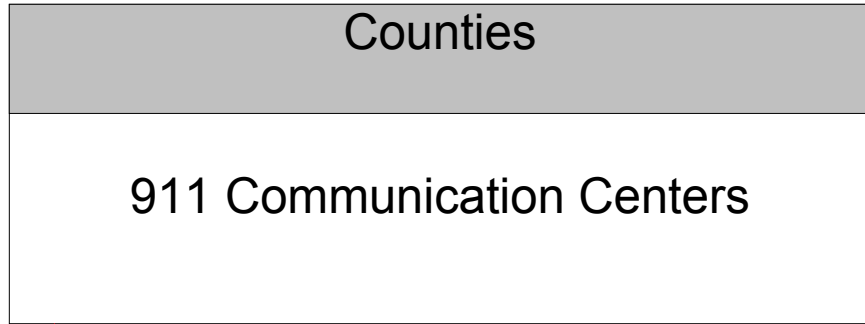


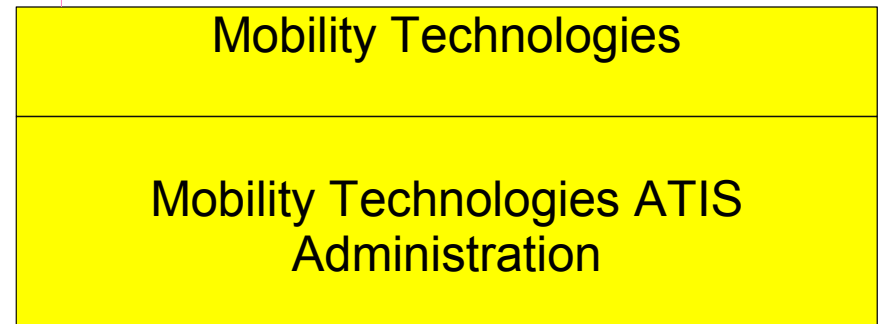
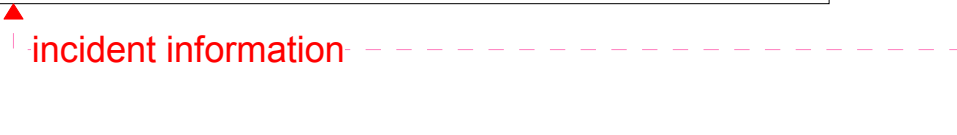
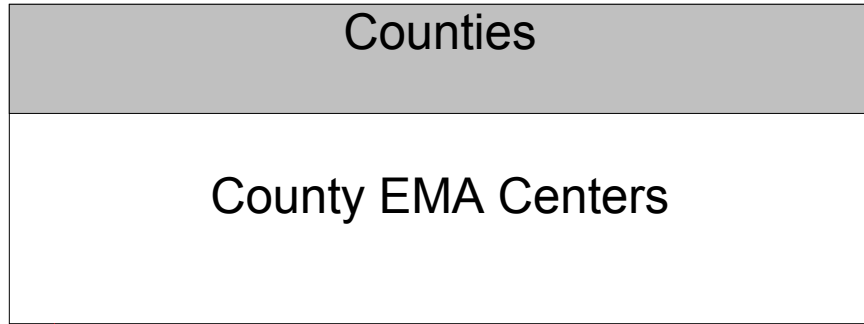
— Existing  
- - - Planned

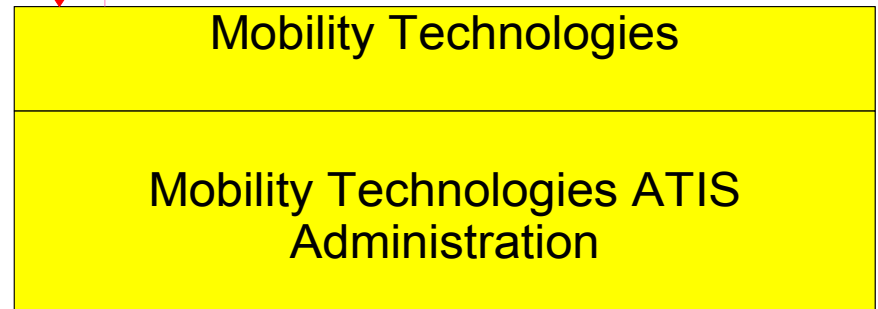
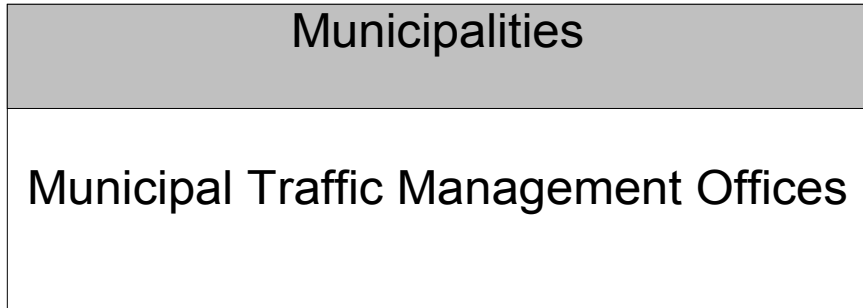


———— Existing  
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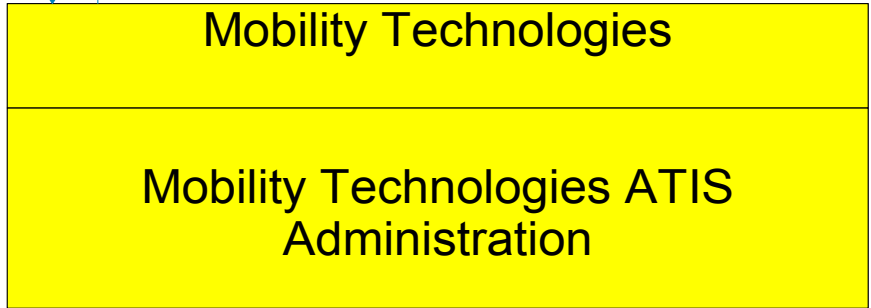
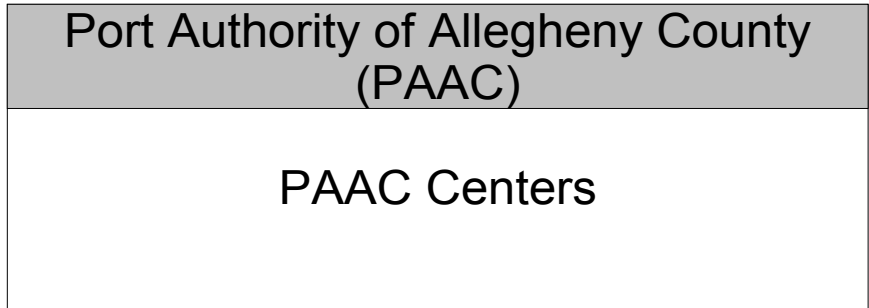








———— Existing  
- - - - - Planned





Pennsylvania Department of  
Transportation (PennDOT)

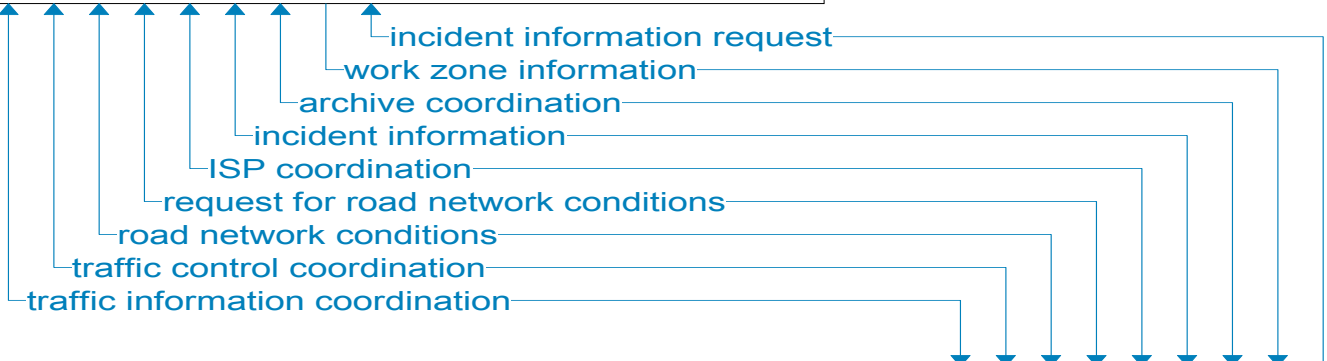
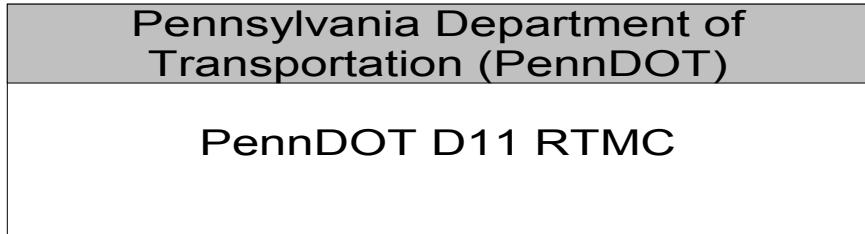
PennDOT Central Office Organizations

archive analysis results  
archive analysis requests

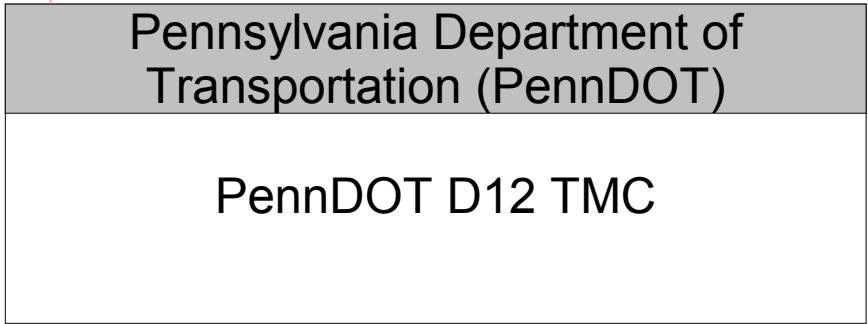
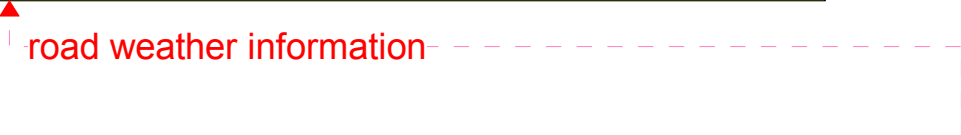
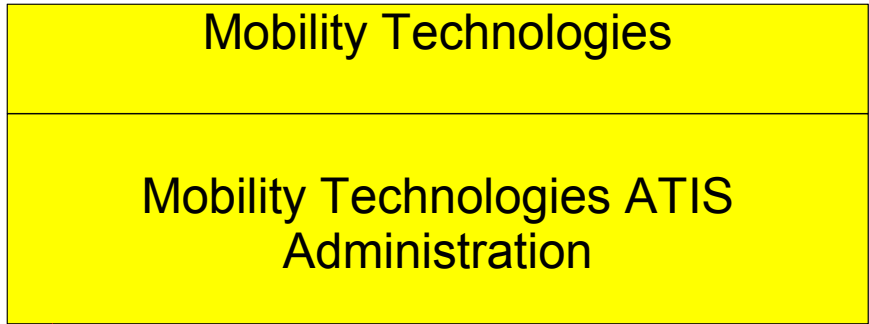
Mobility Technologies

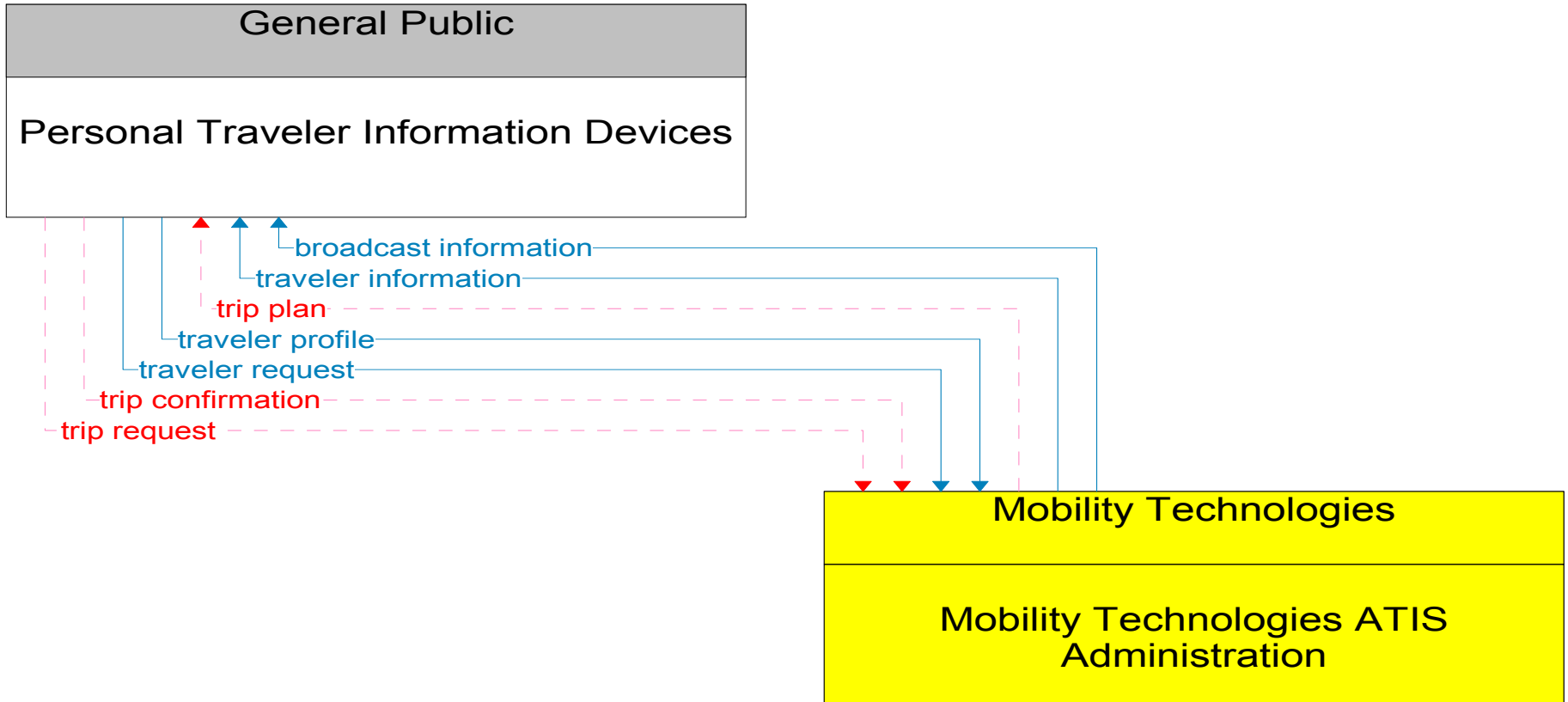
Mobility Technologies ATIS  
Administration

Existing  
Planned

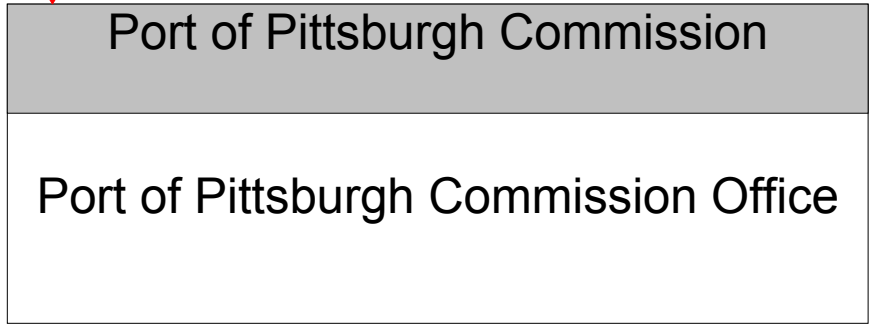
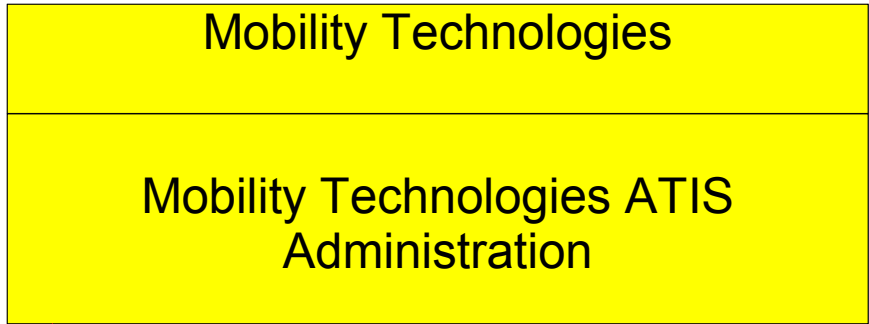


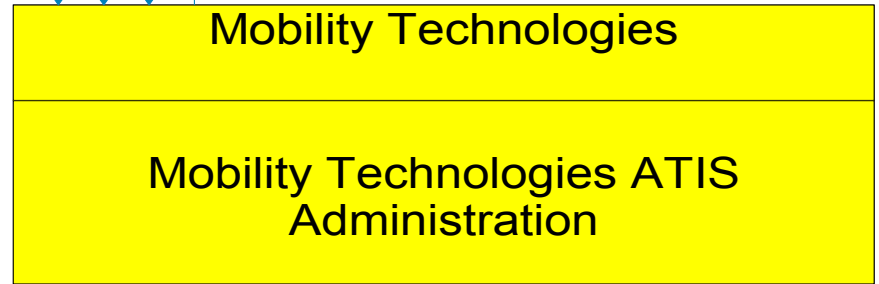
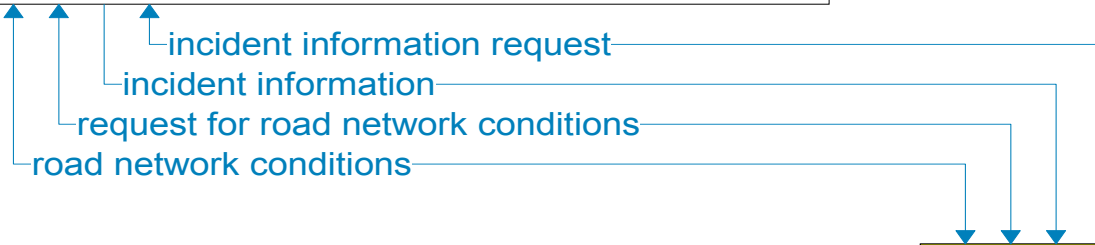
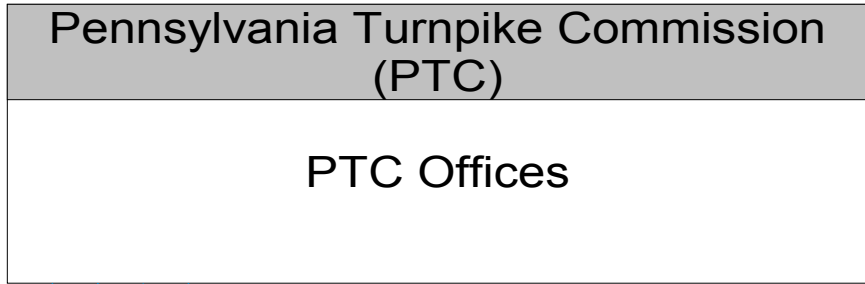
———— Existing  
- - - - - Planned



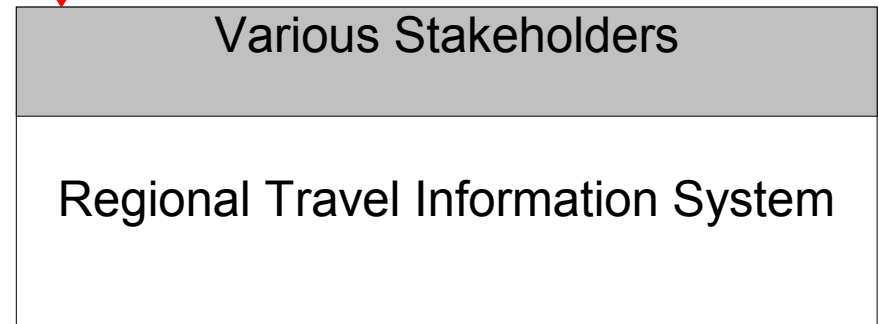
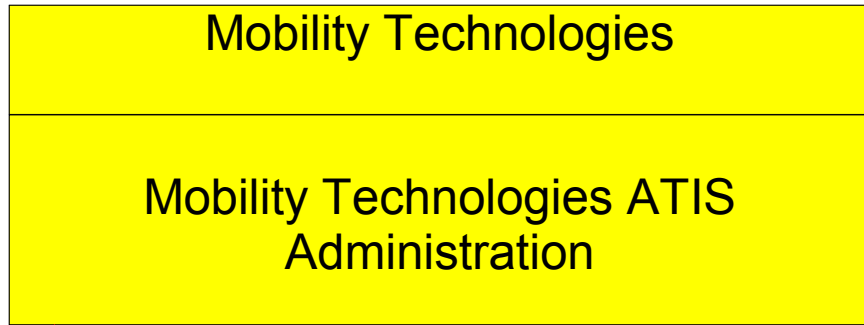


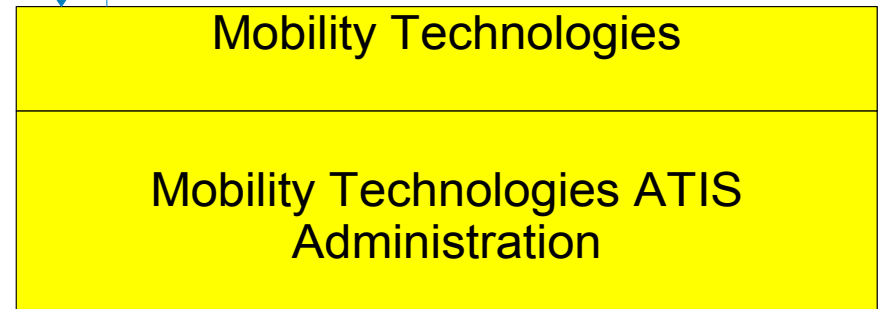
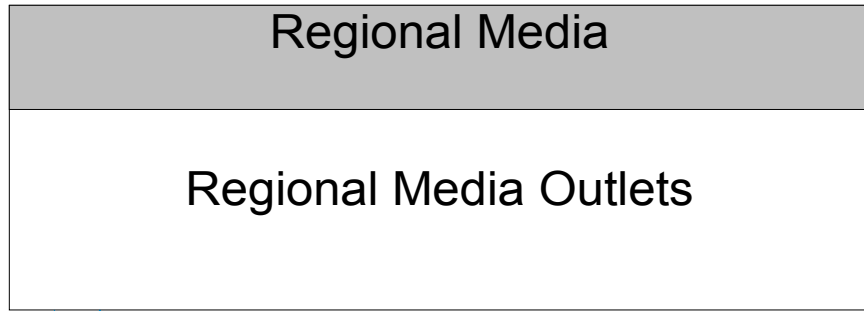
———— Existing  
- - - - - Planned





Existing  
Planned





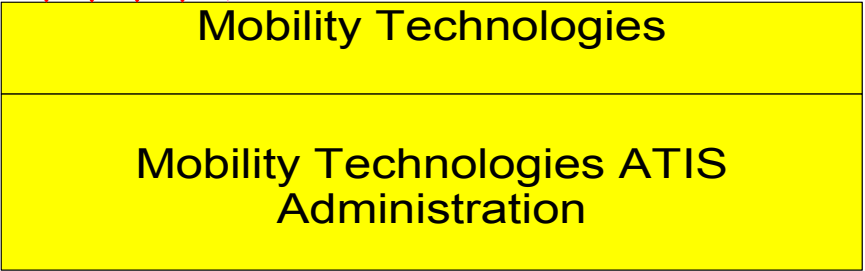
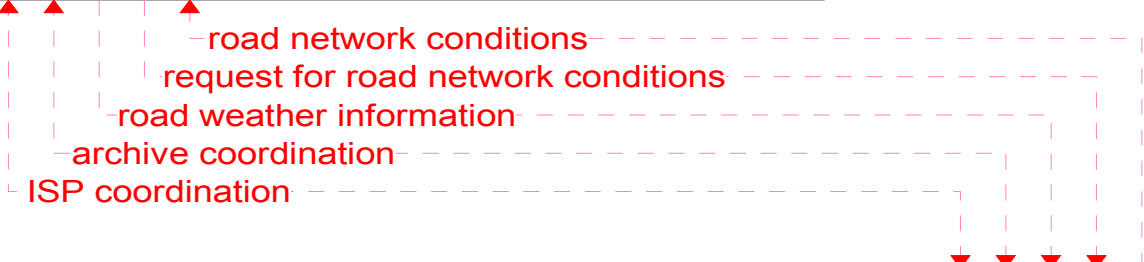
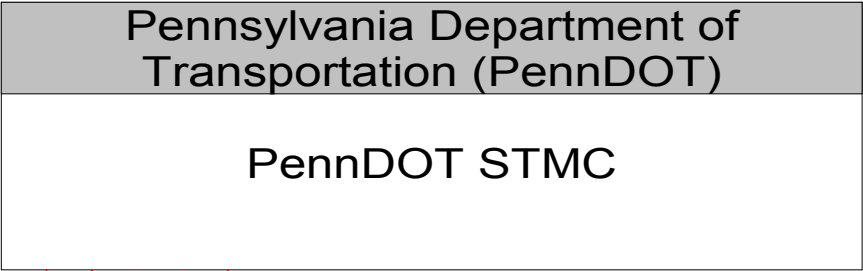
traveler information for media

external reports

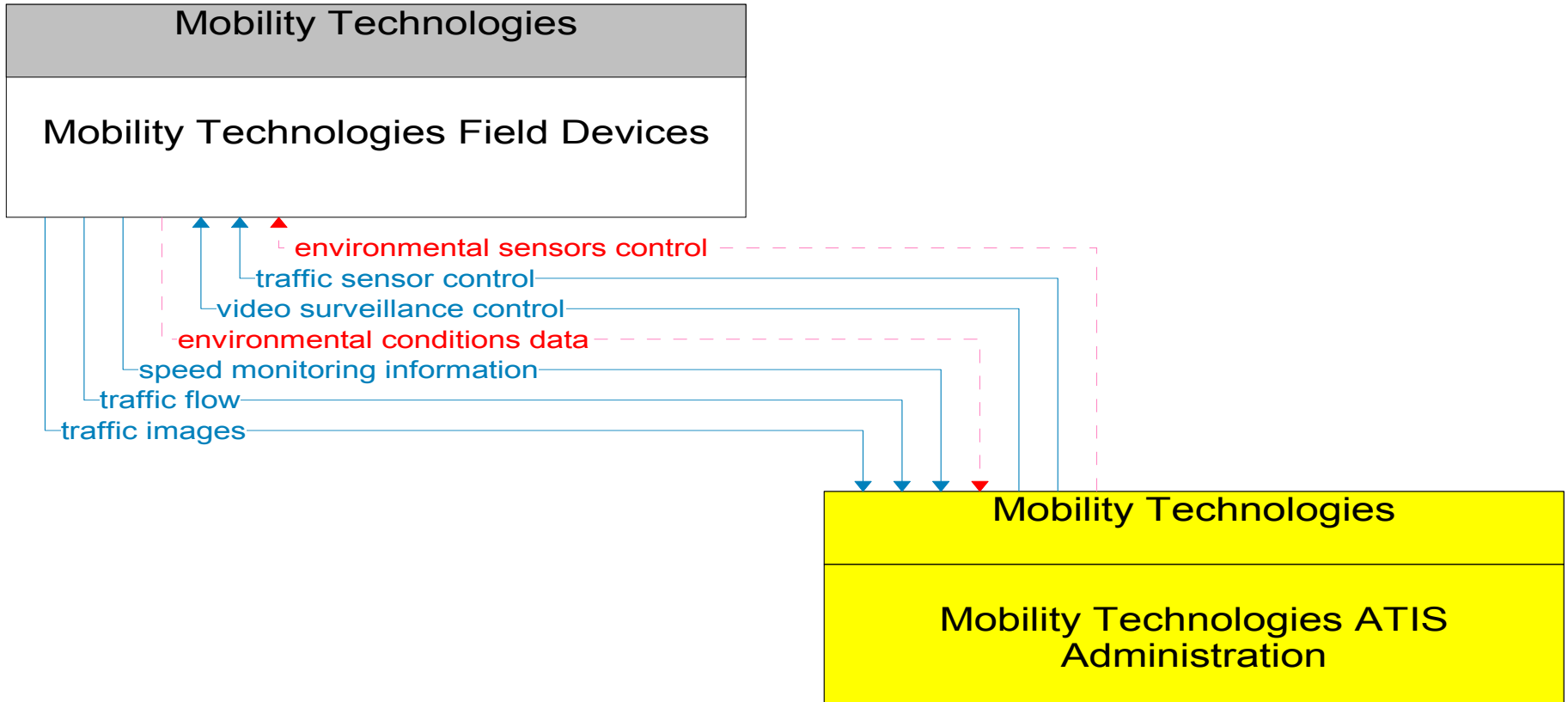
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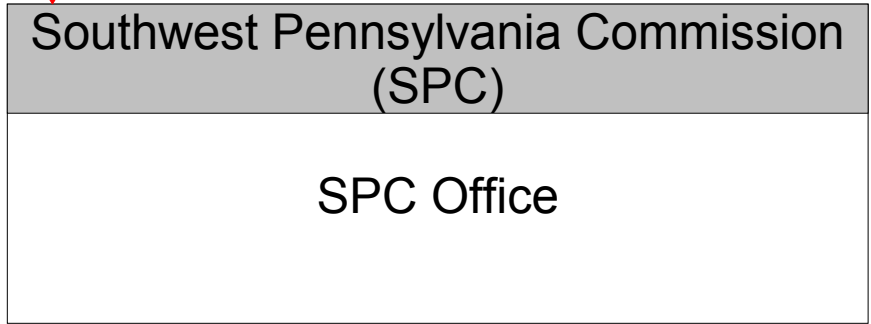
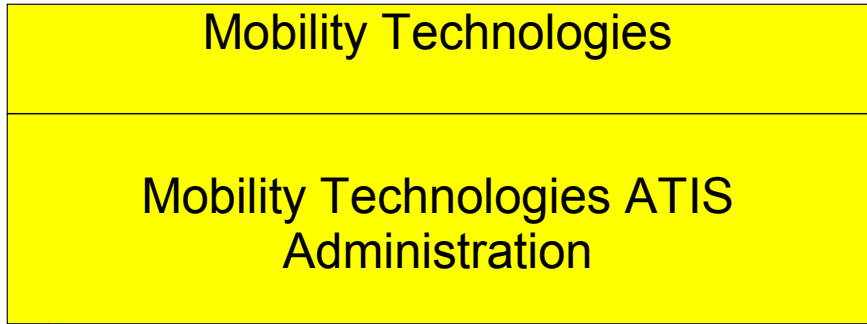
Planned

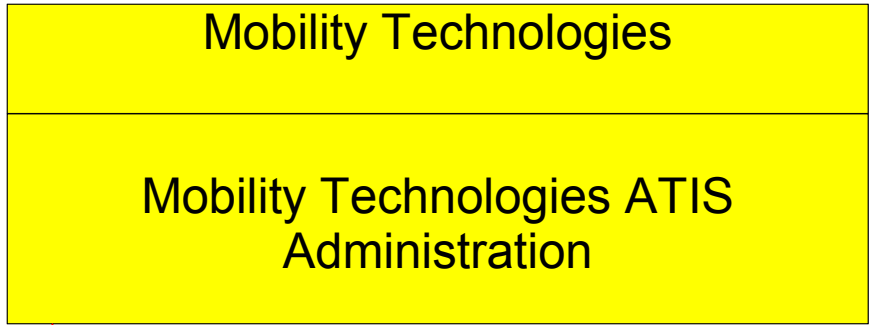




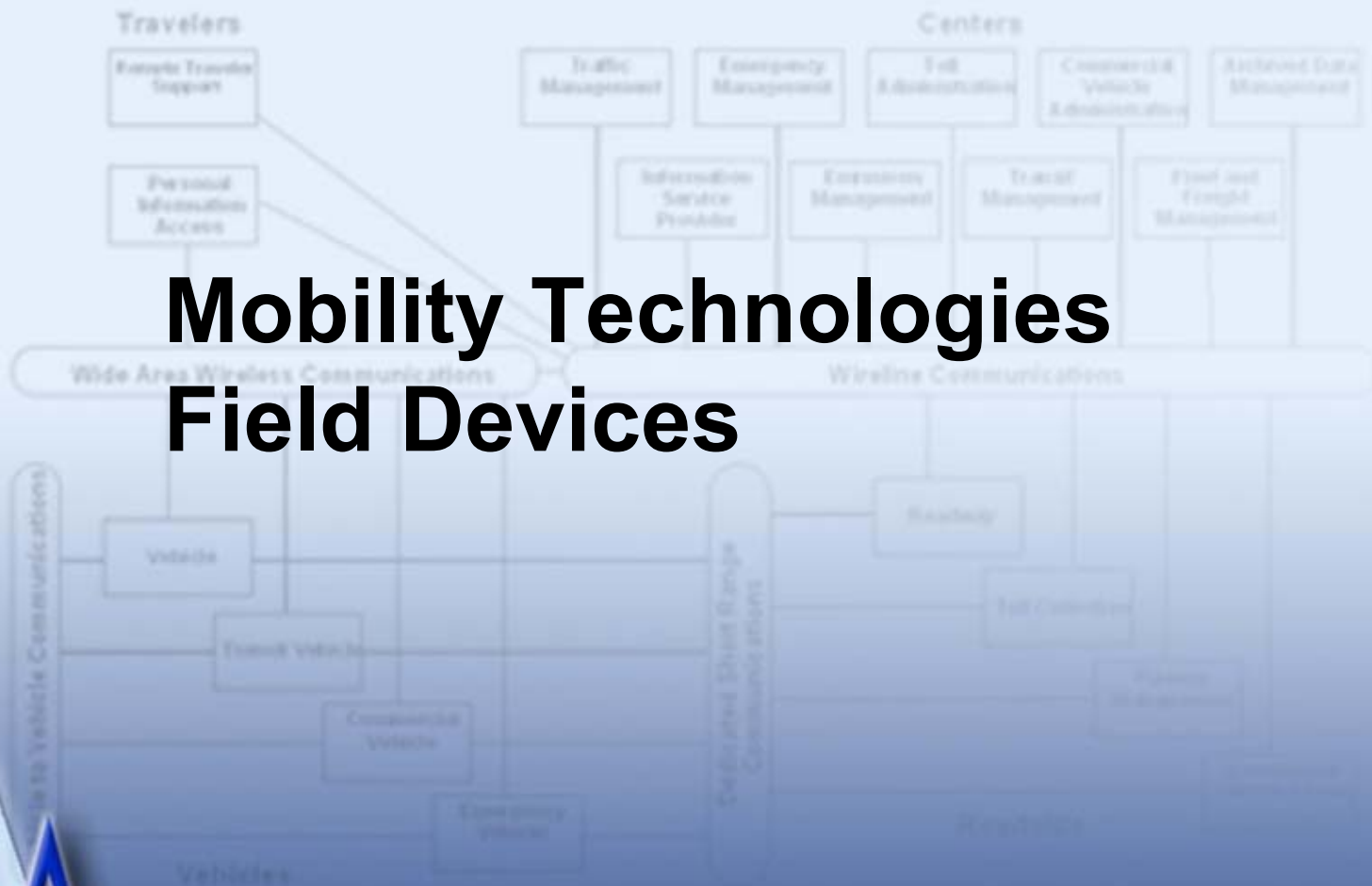
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- - - - - Planned





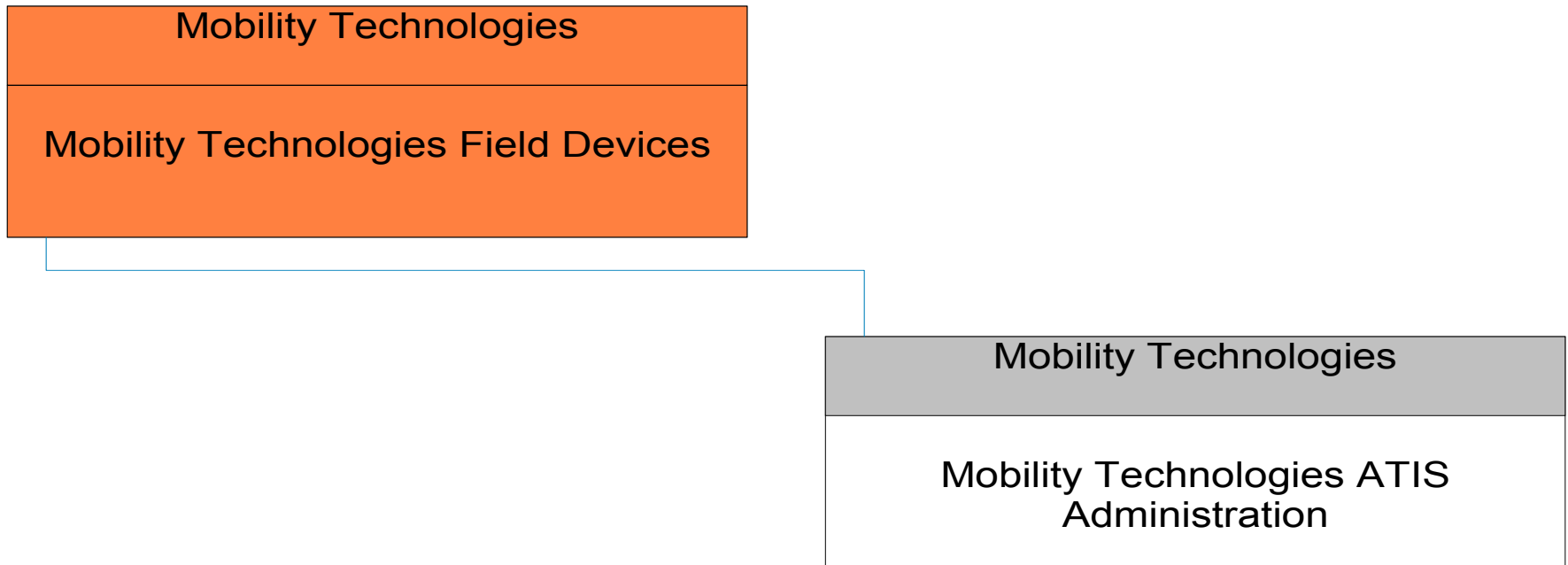


# Mobility Technologies Field Devices

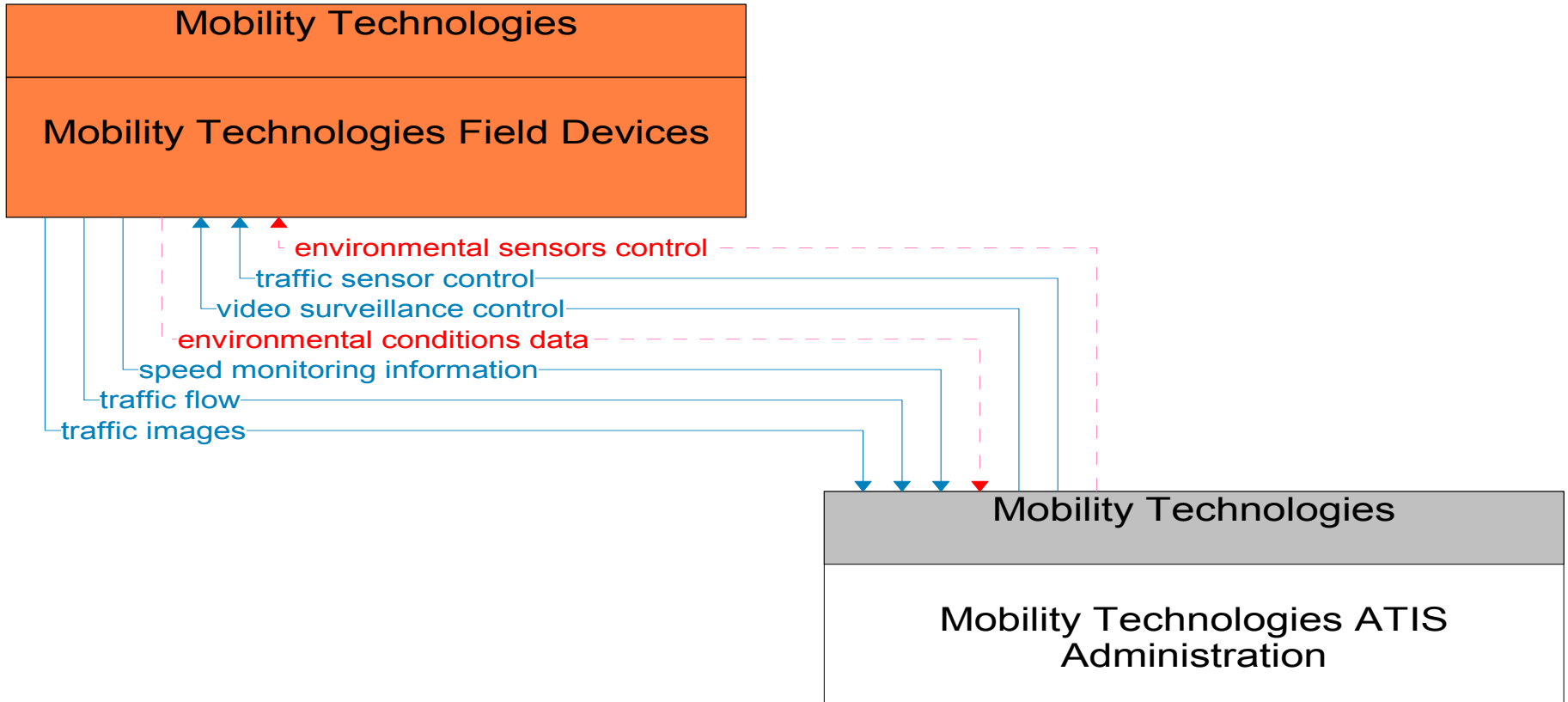


PA

# Mobility Technologies Field Devices Interconnect Diagram

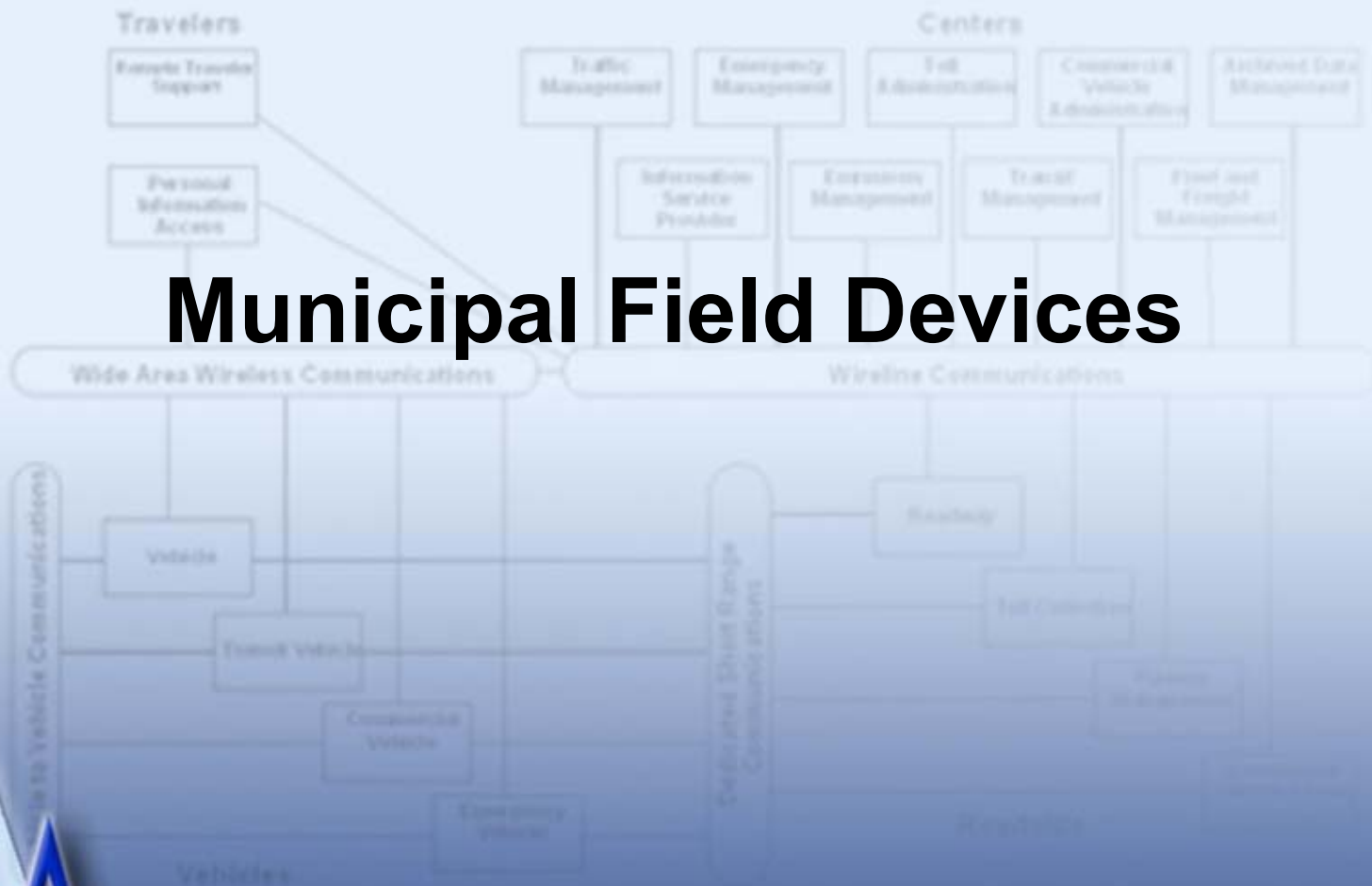


———— Existing  
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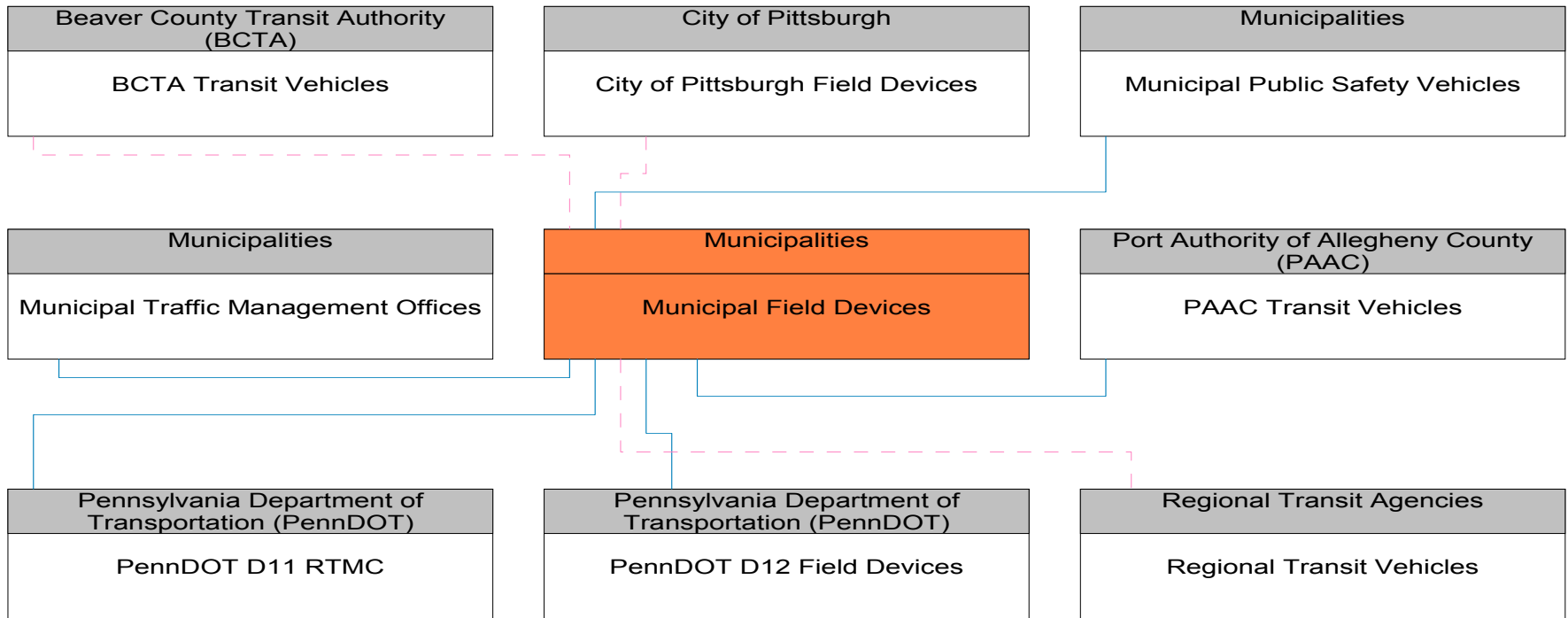
———— Existing  
- - - - - Planned

# Municipal Field Devices

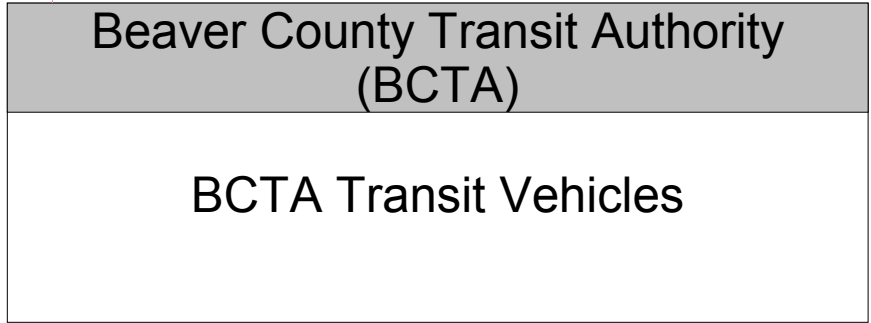


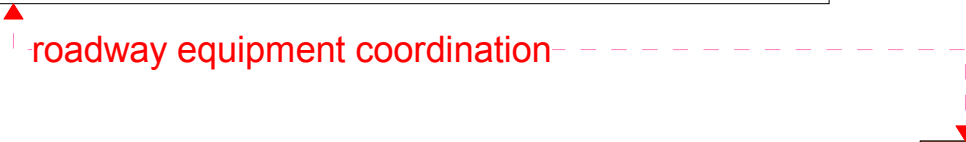
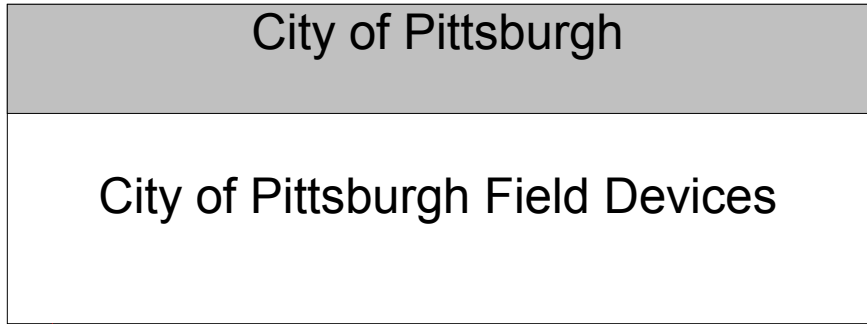


# Municipal Field Devices Interconnect Diagram



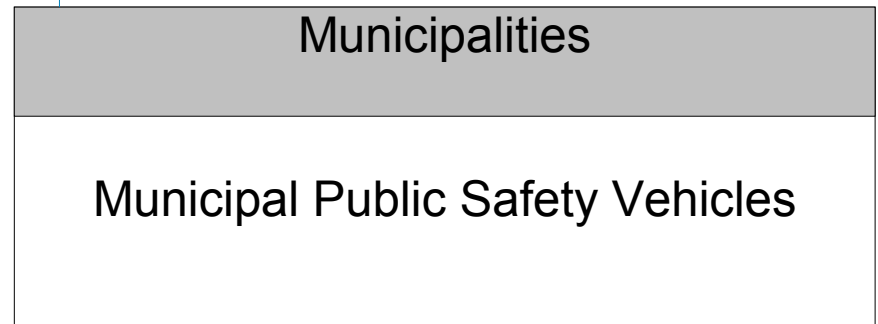
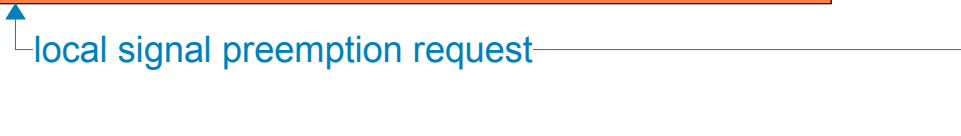
————— Existing  
- - - - - Planned

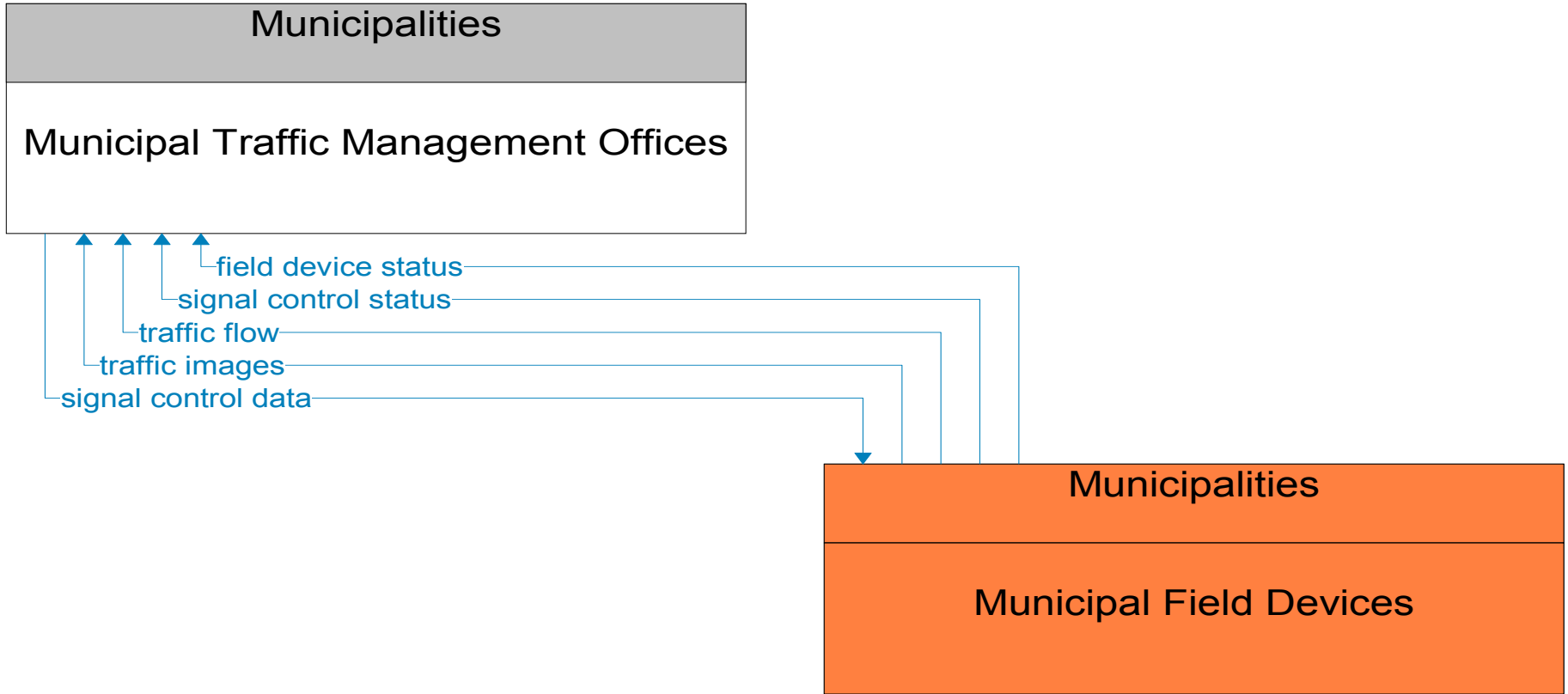




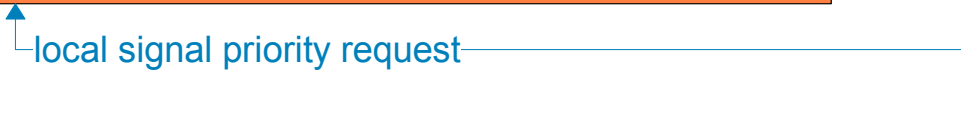
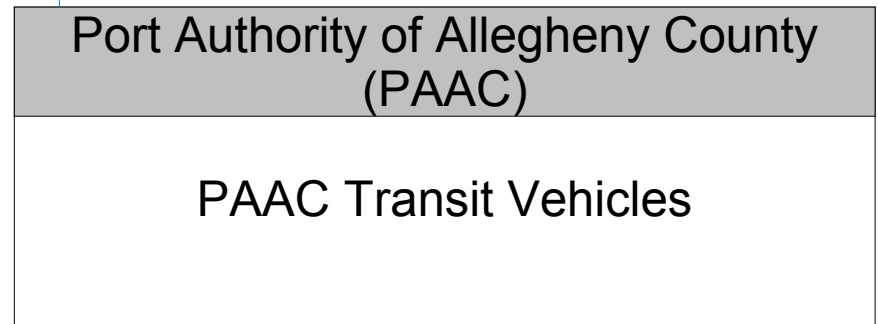
Existing  
Planned

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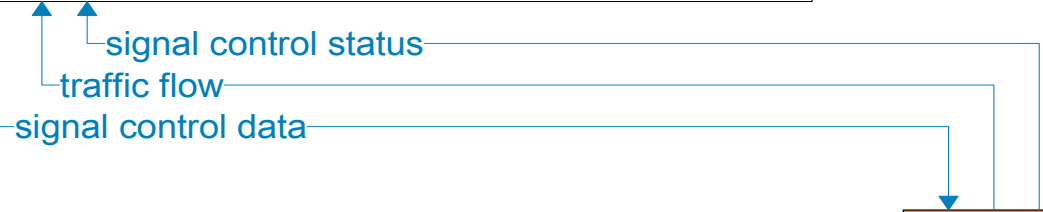
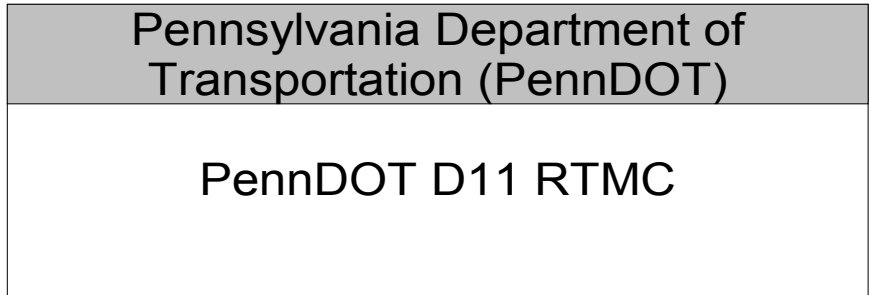


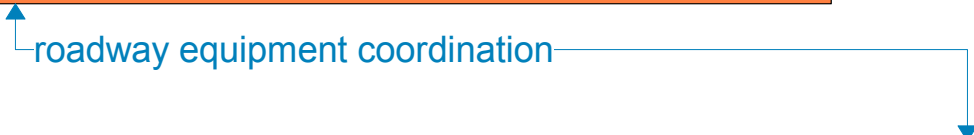
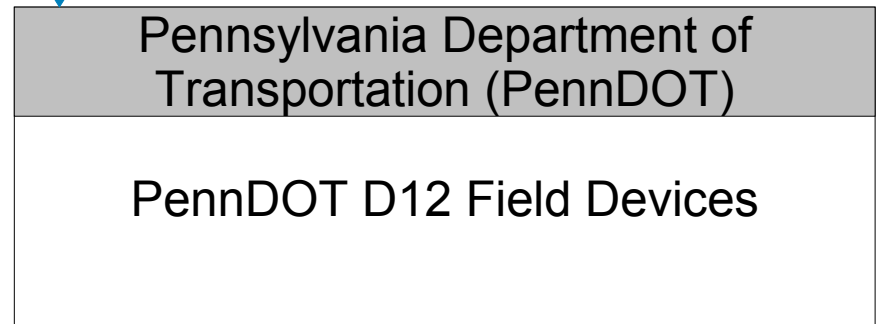


———— Existing  
----- Planned



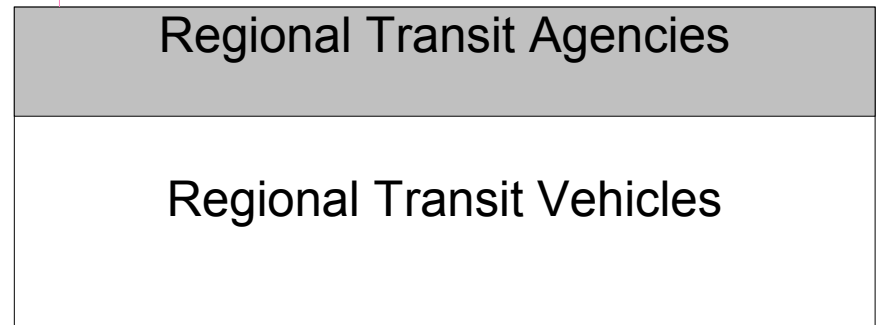
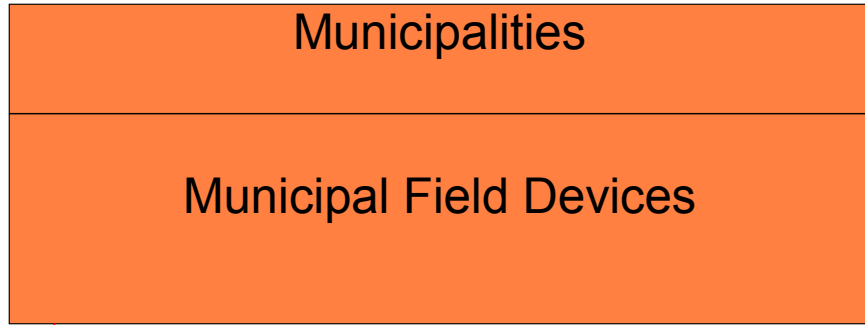
———— Existing  
- - - - - Planned





———— Existing  
- - - - - Planned

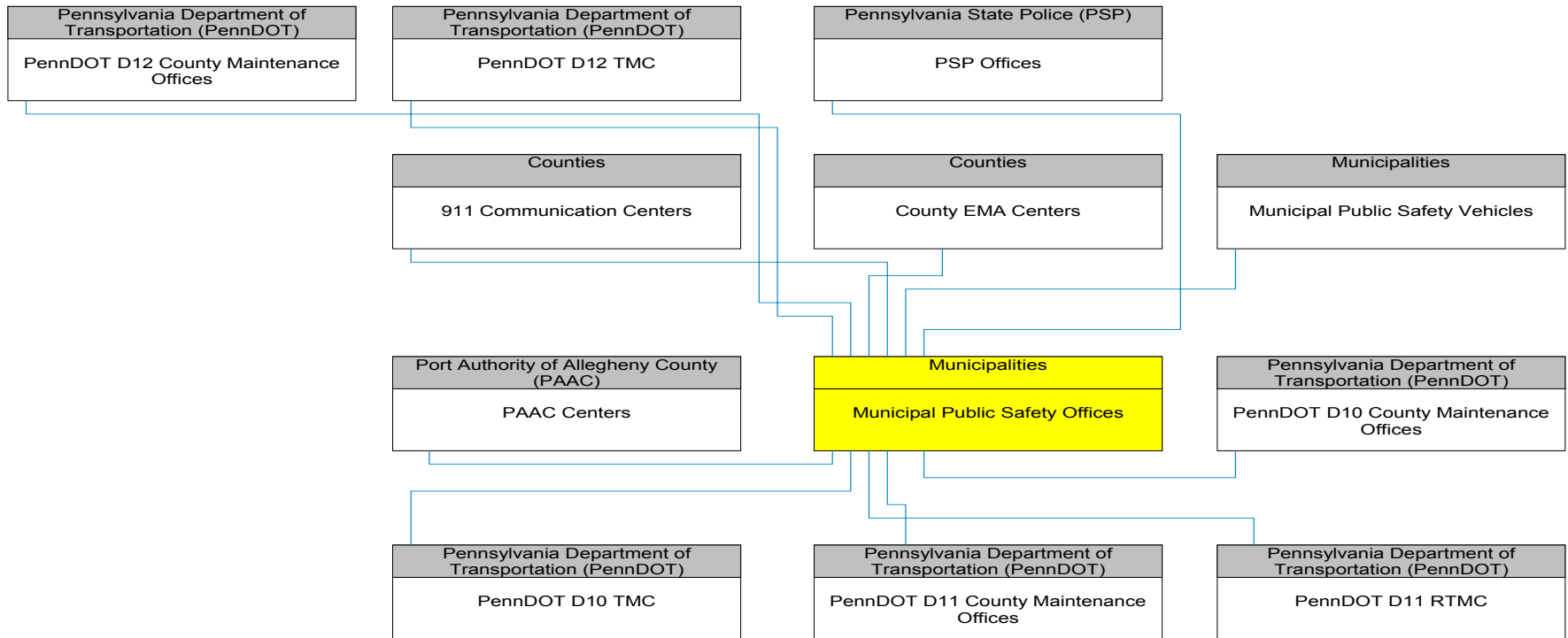




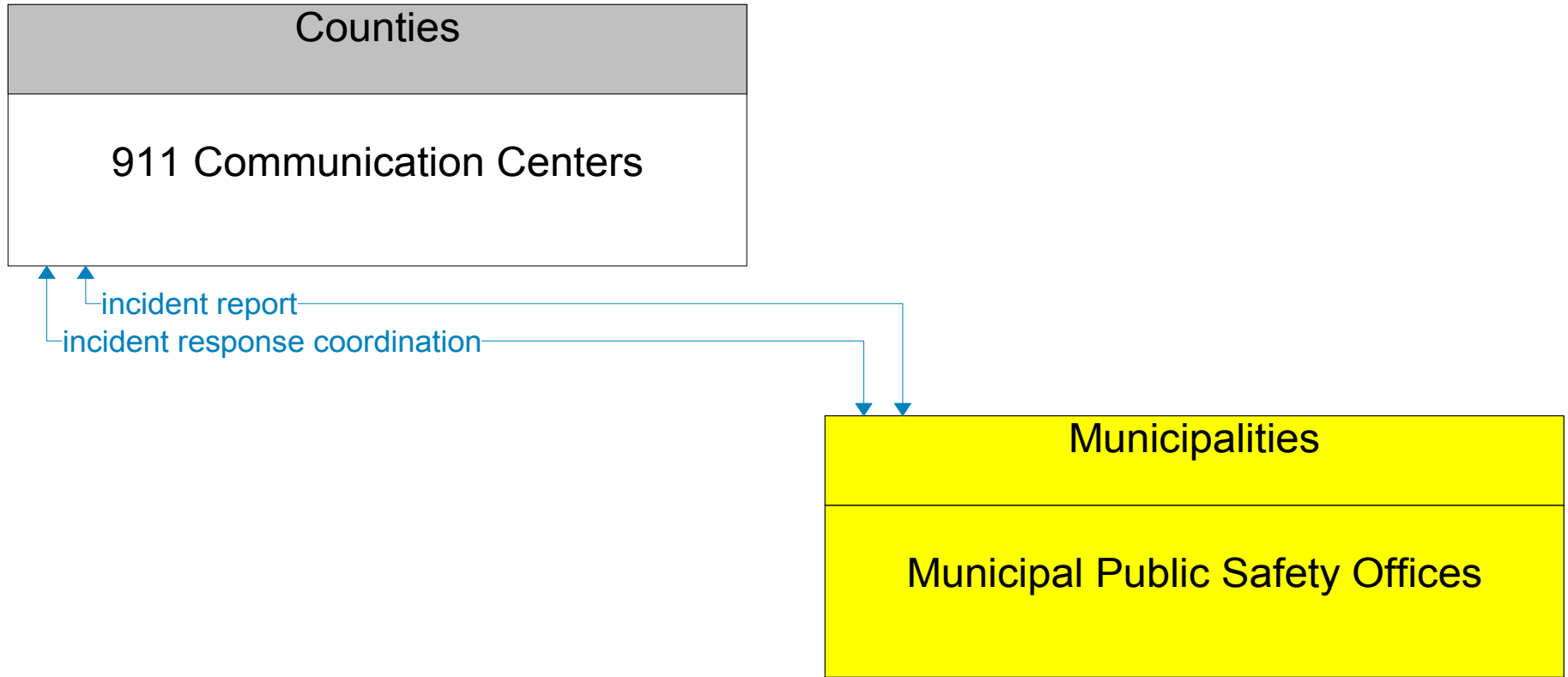
# Municipal Public Safety Offices



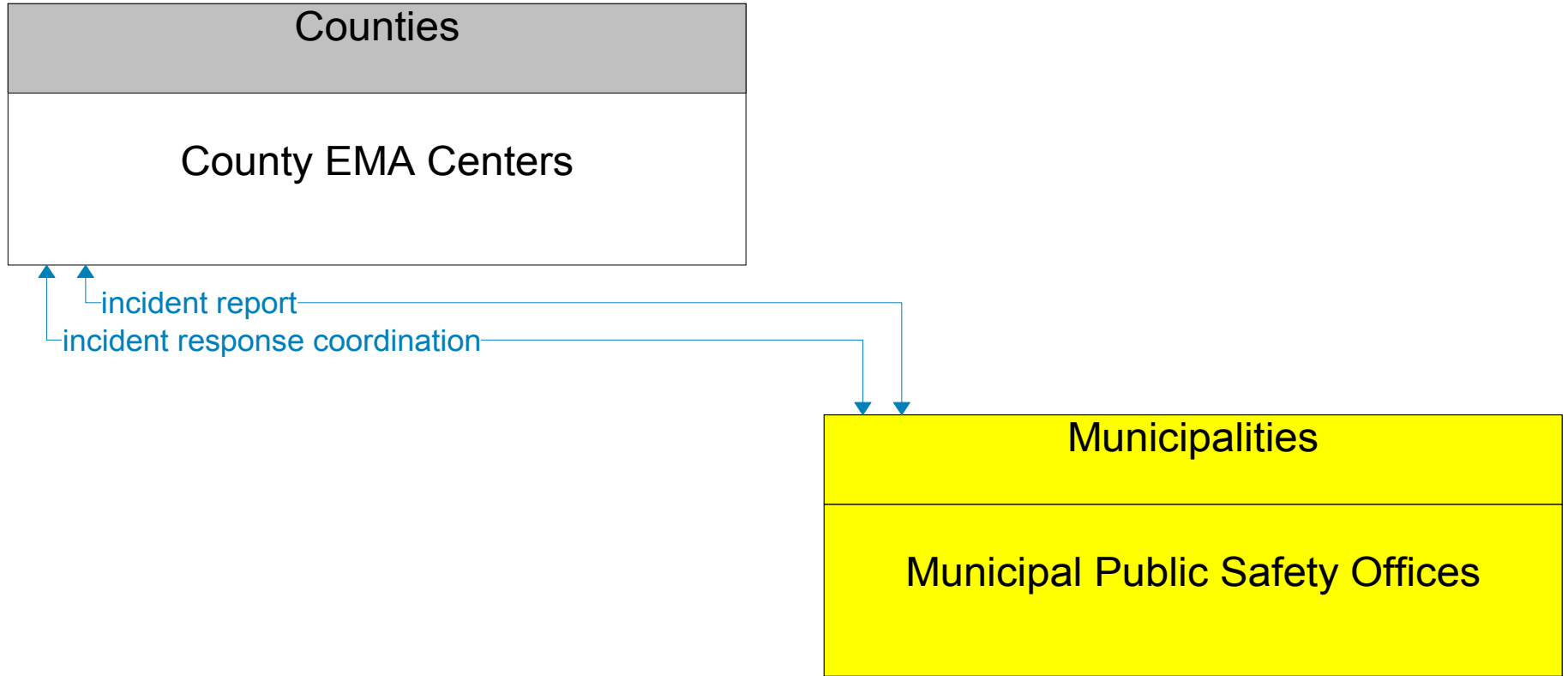
# Municipal Public Safety Offices Interconnect Diagram



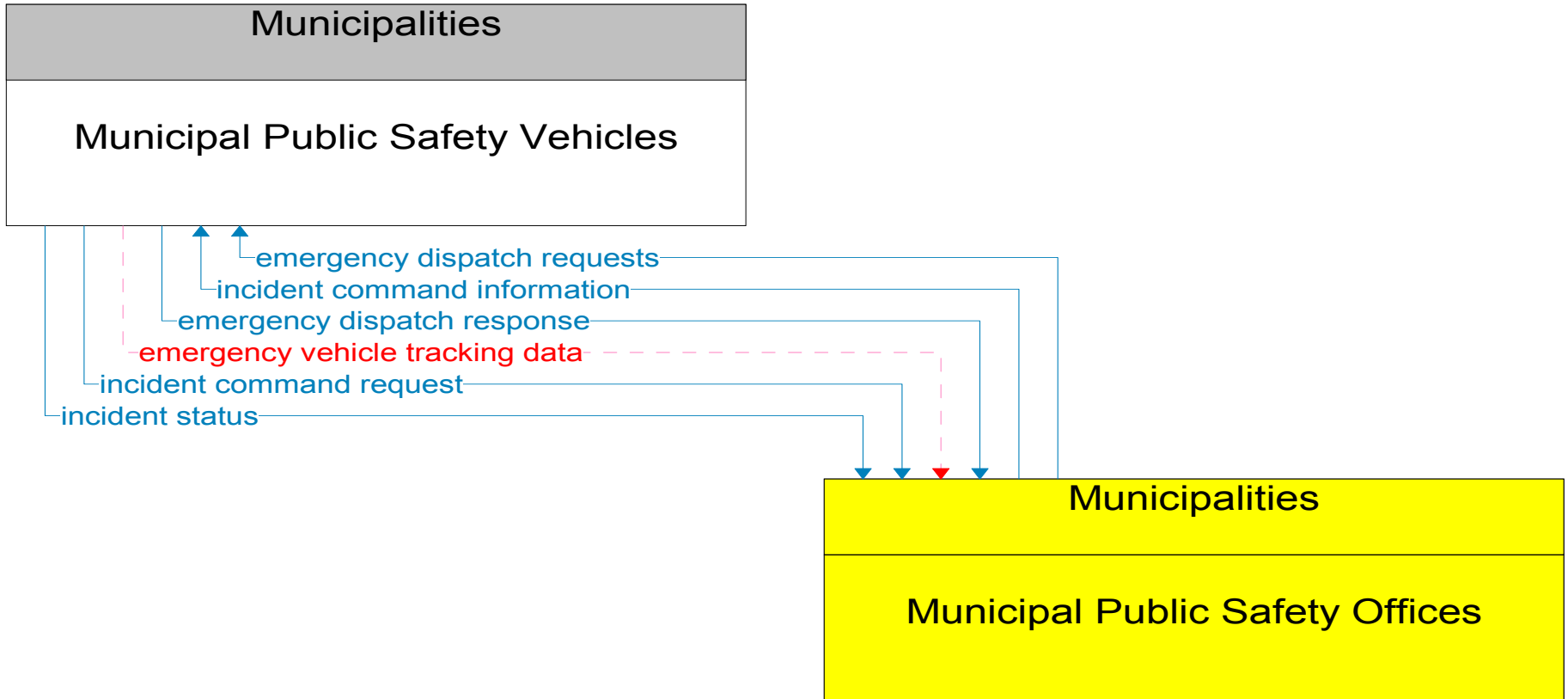
Existing  
Planned



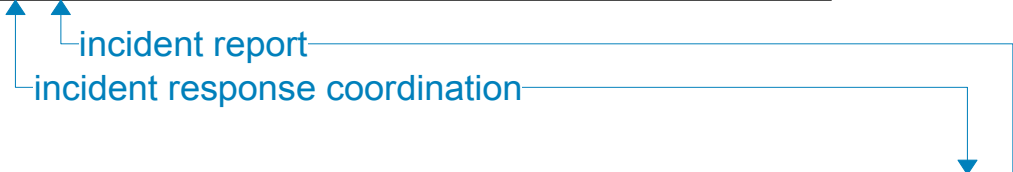
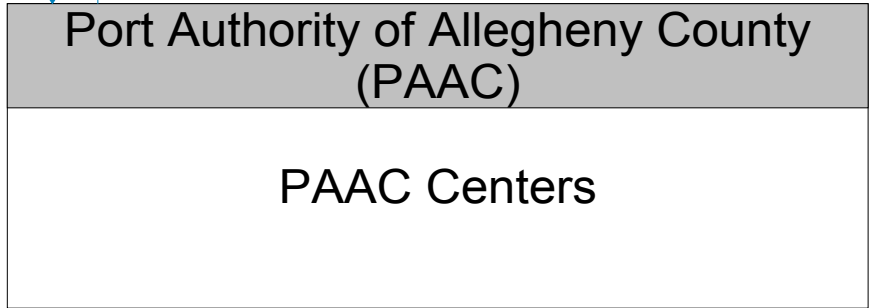
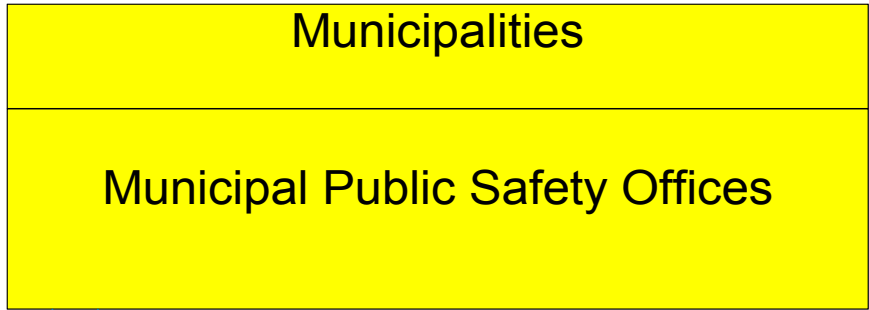
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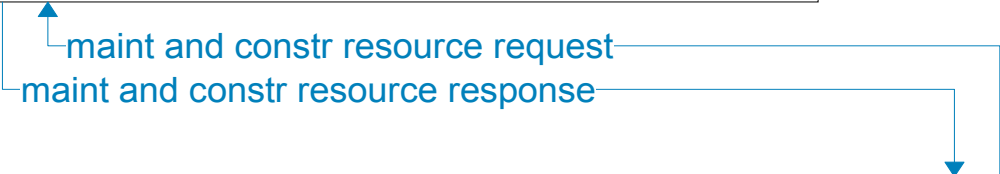
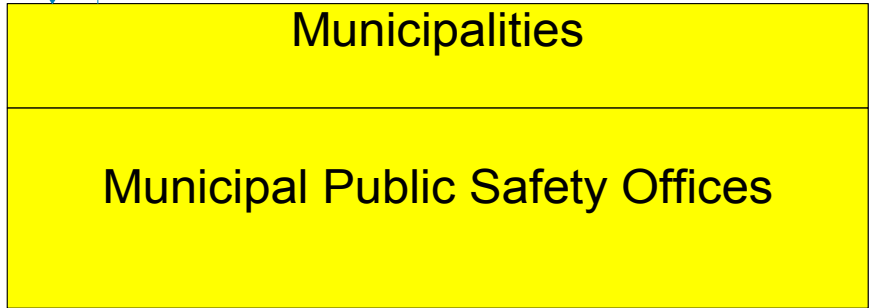
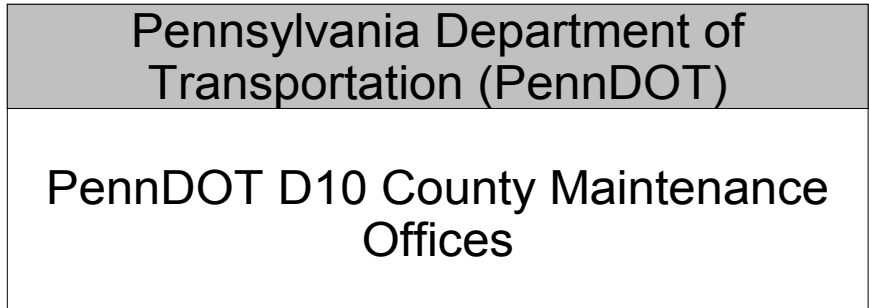
———— Existing  
----- Planned



———— Existing  
- - - - - Planned

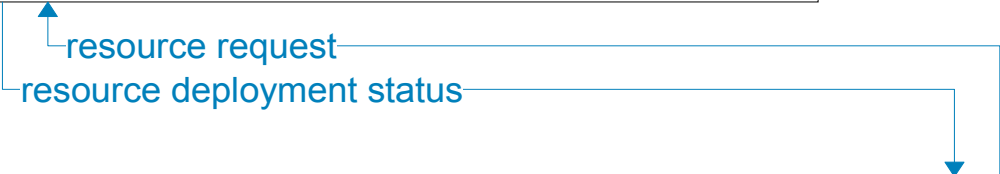
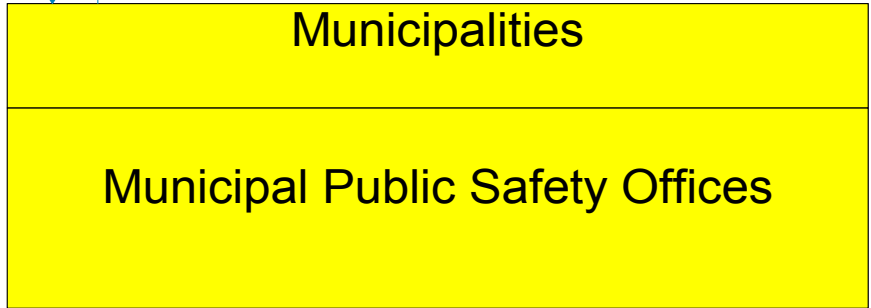
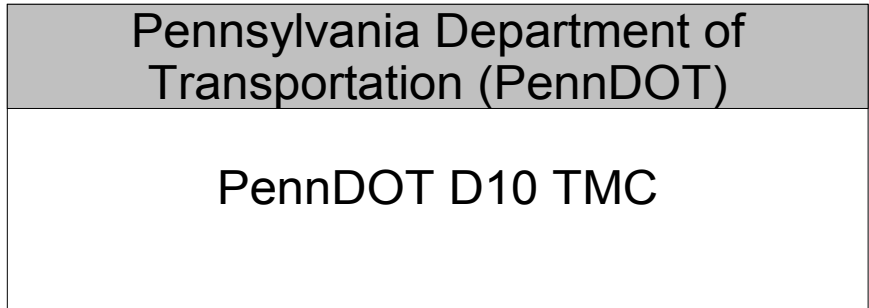


Existing  
Planned



———— Existing  
- - - - - Planned





———— Existing  
----- Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 County Maintenance  
Offices

maint and constr resource request

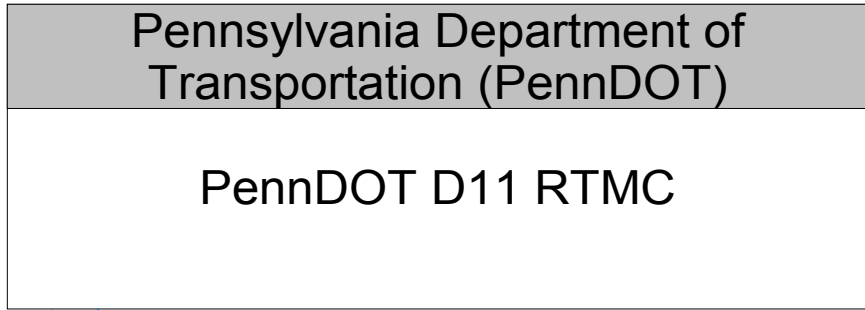
maint and constr resource response

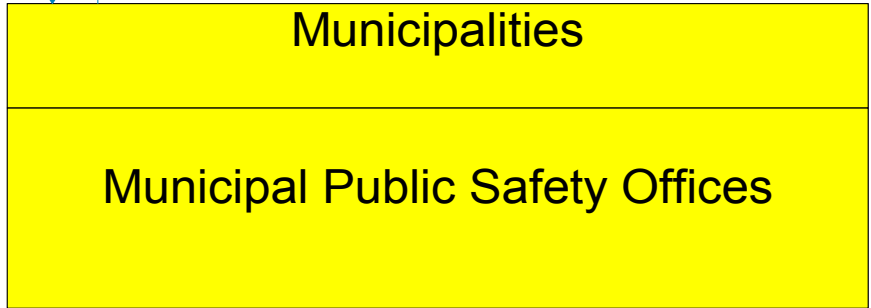
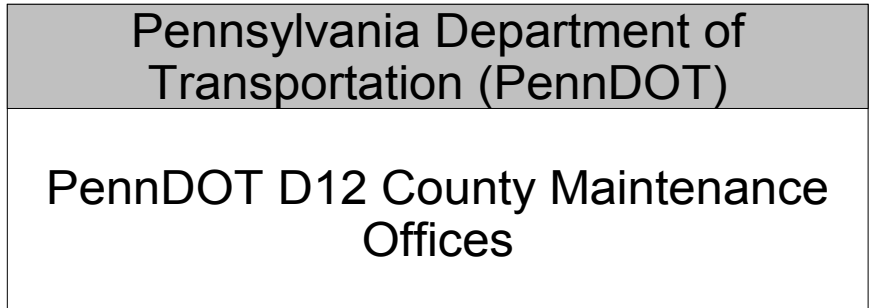
Municipalities

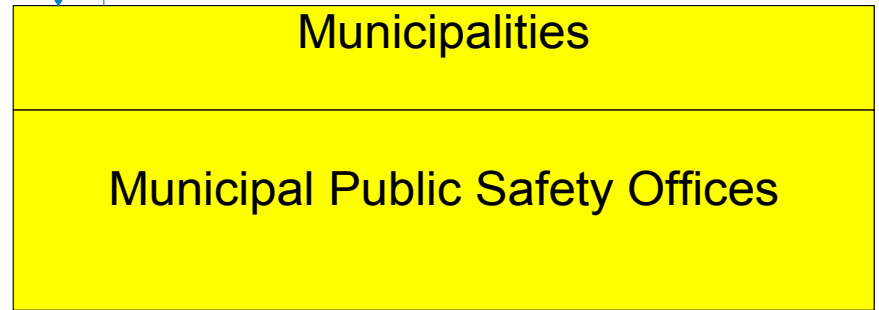
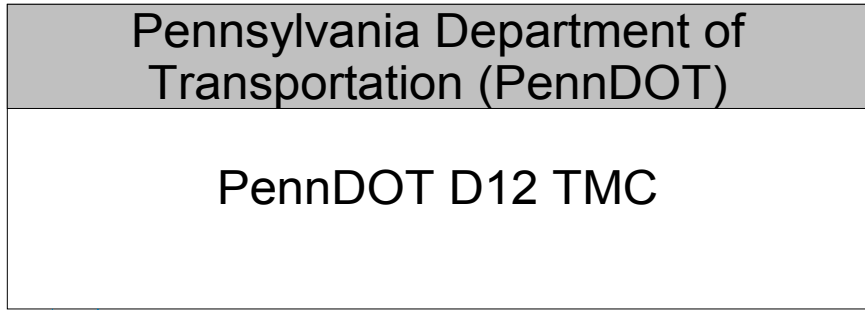
Municipal Public Safety Offices

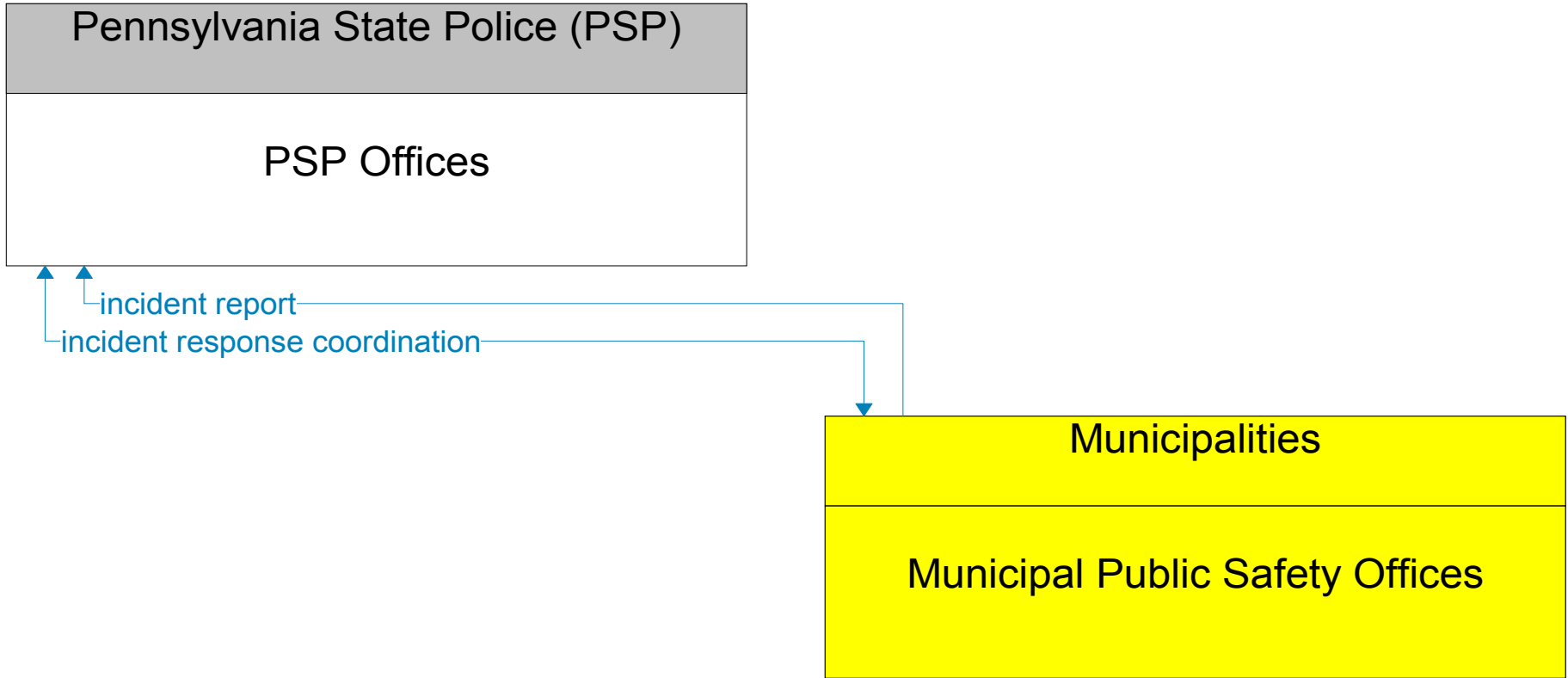
Existing

Planned



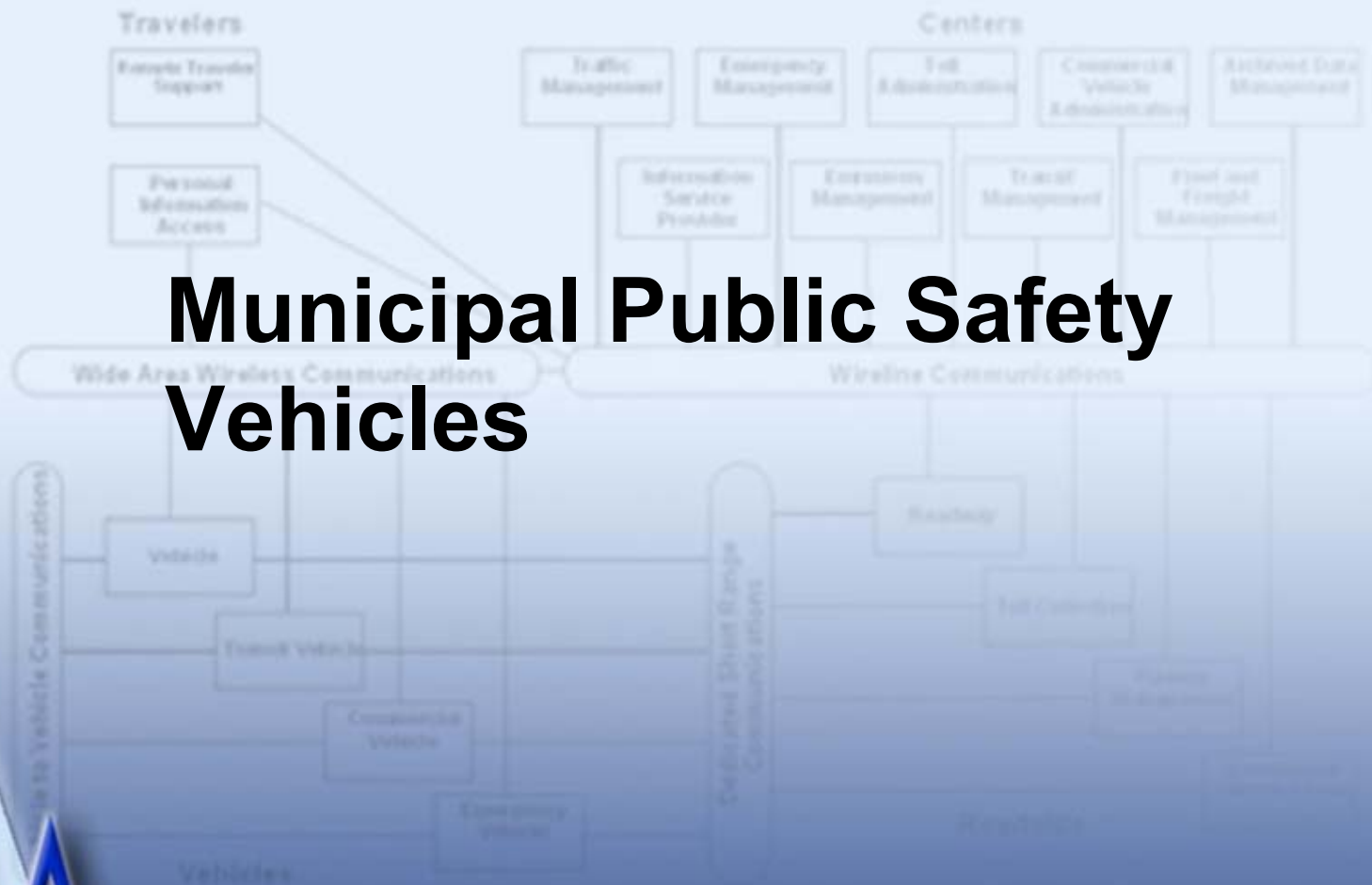




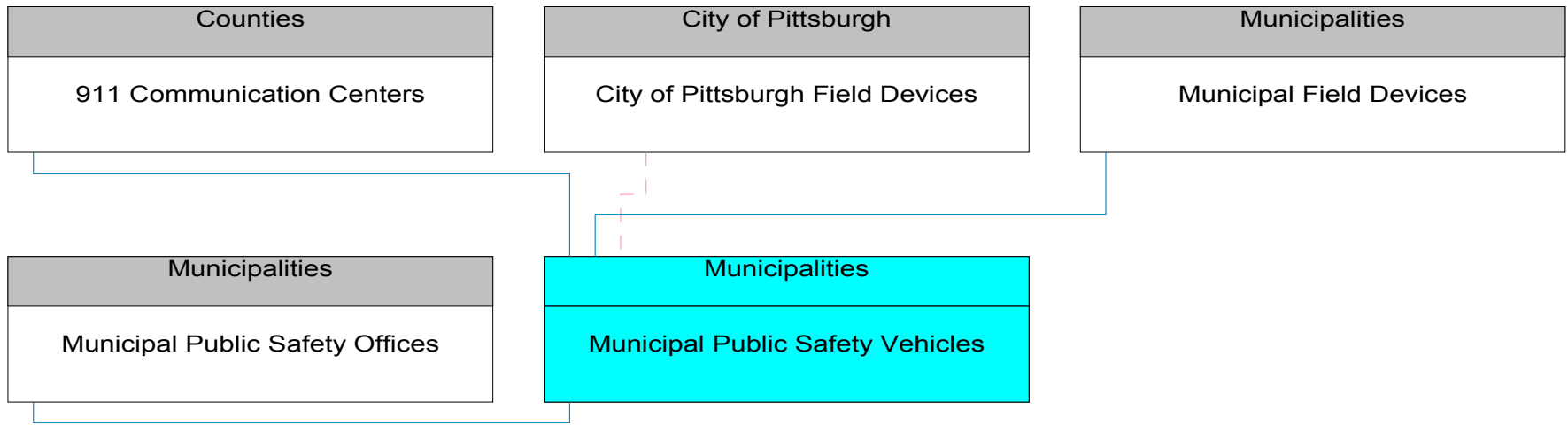


———— Existing  
----- Planned

# Municipal Public Safety Vehicles

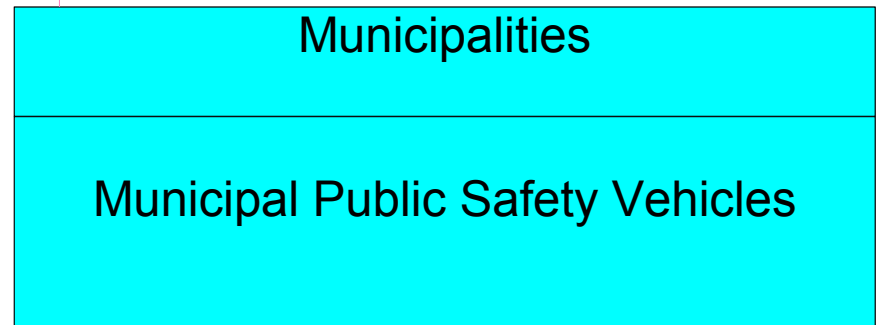
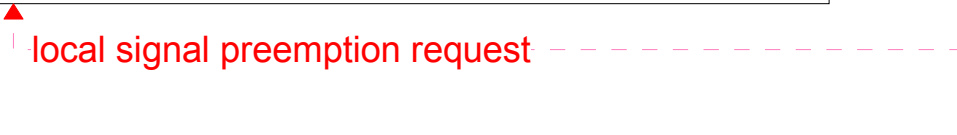
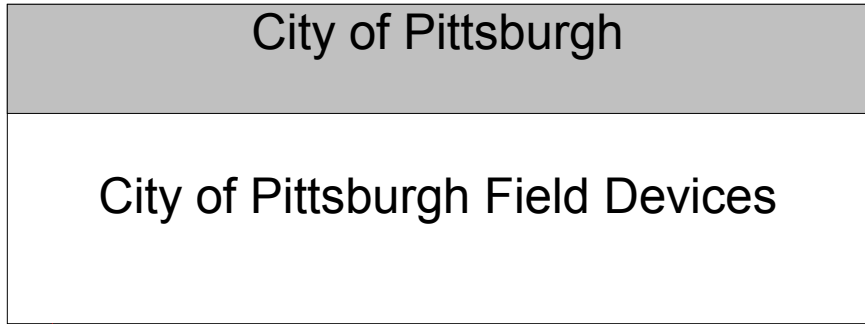


# Municipal Public Safety Vehicles Interconnect Diagram

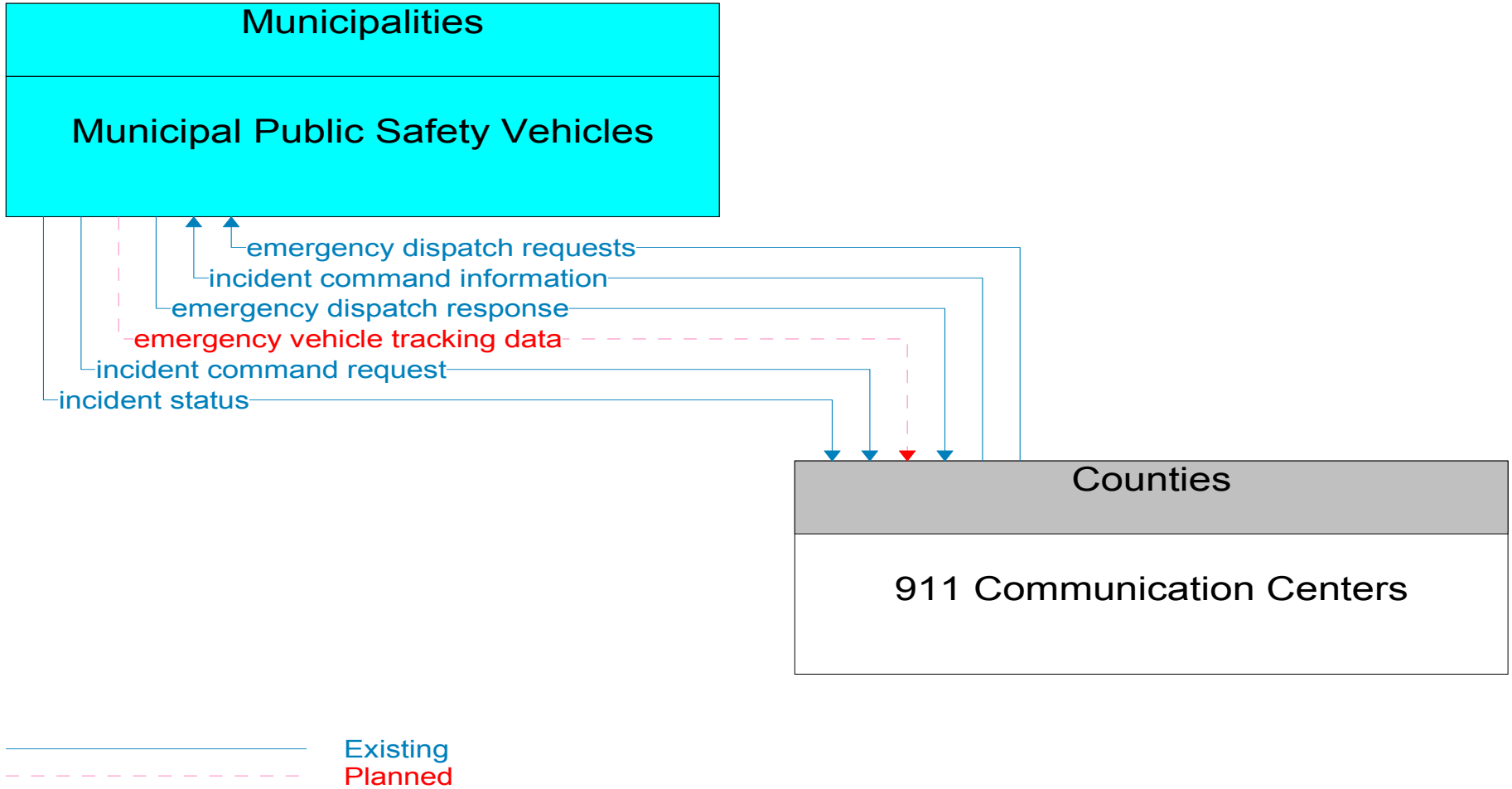


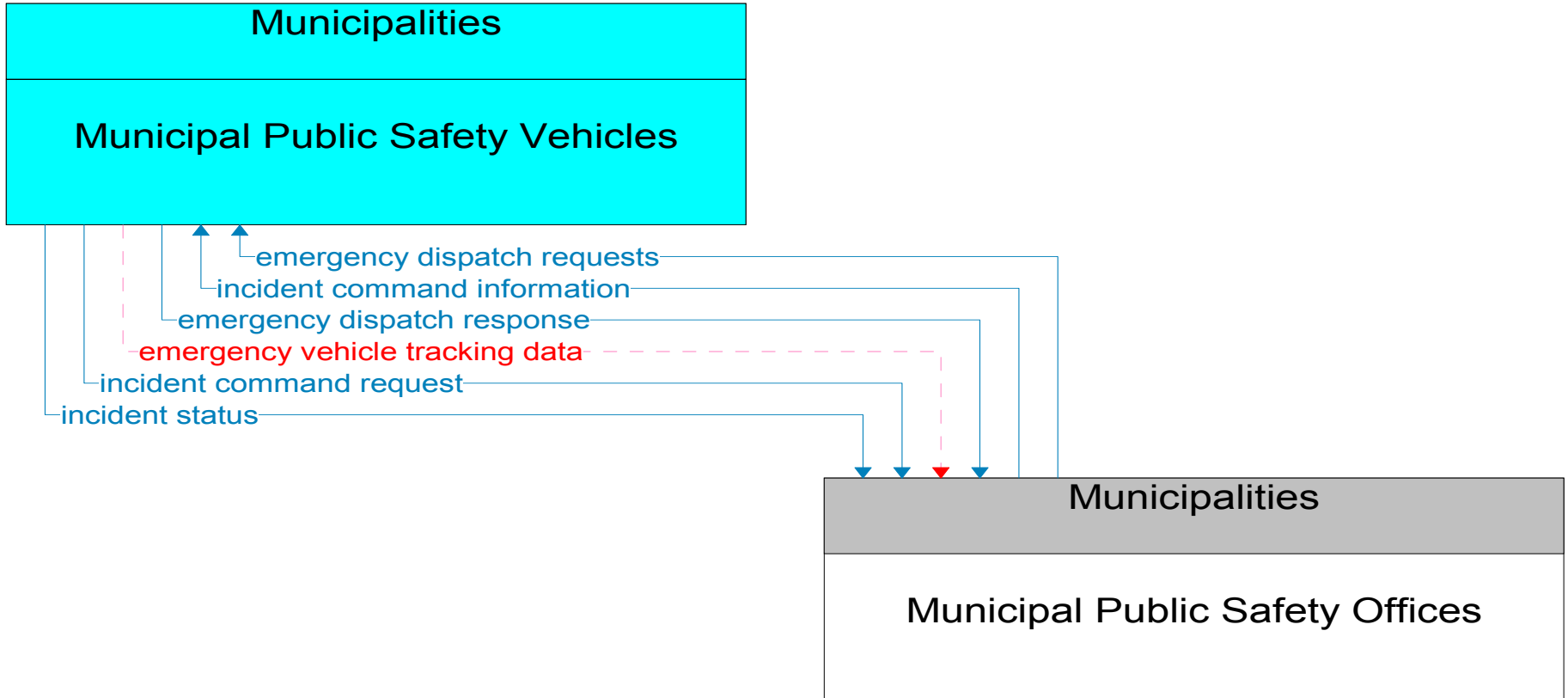
— Existing  
- - - Planned



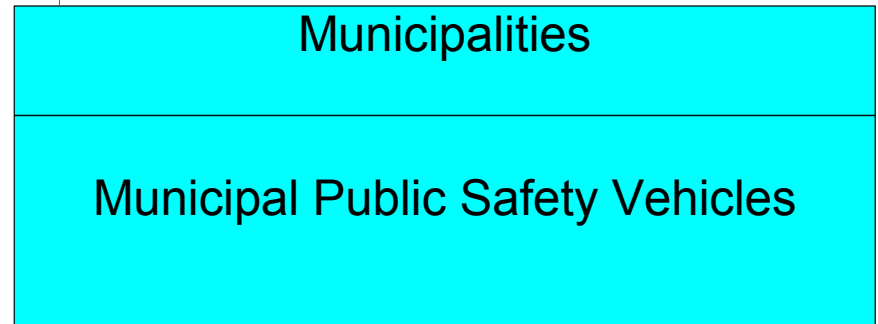
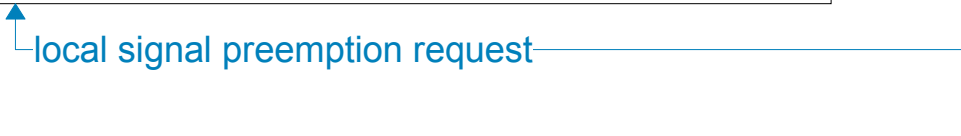


———— Existing  
- - - - - Planned

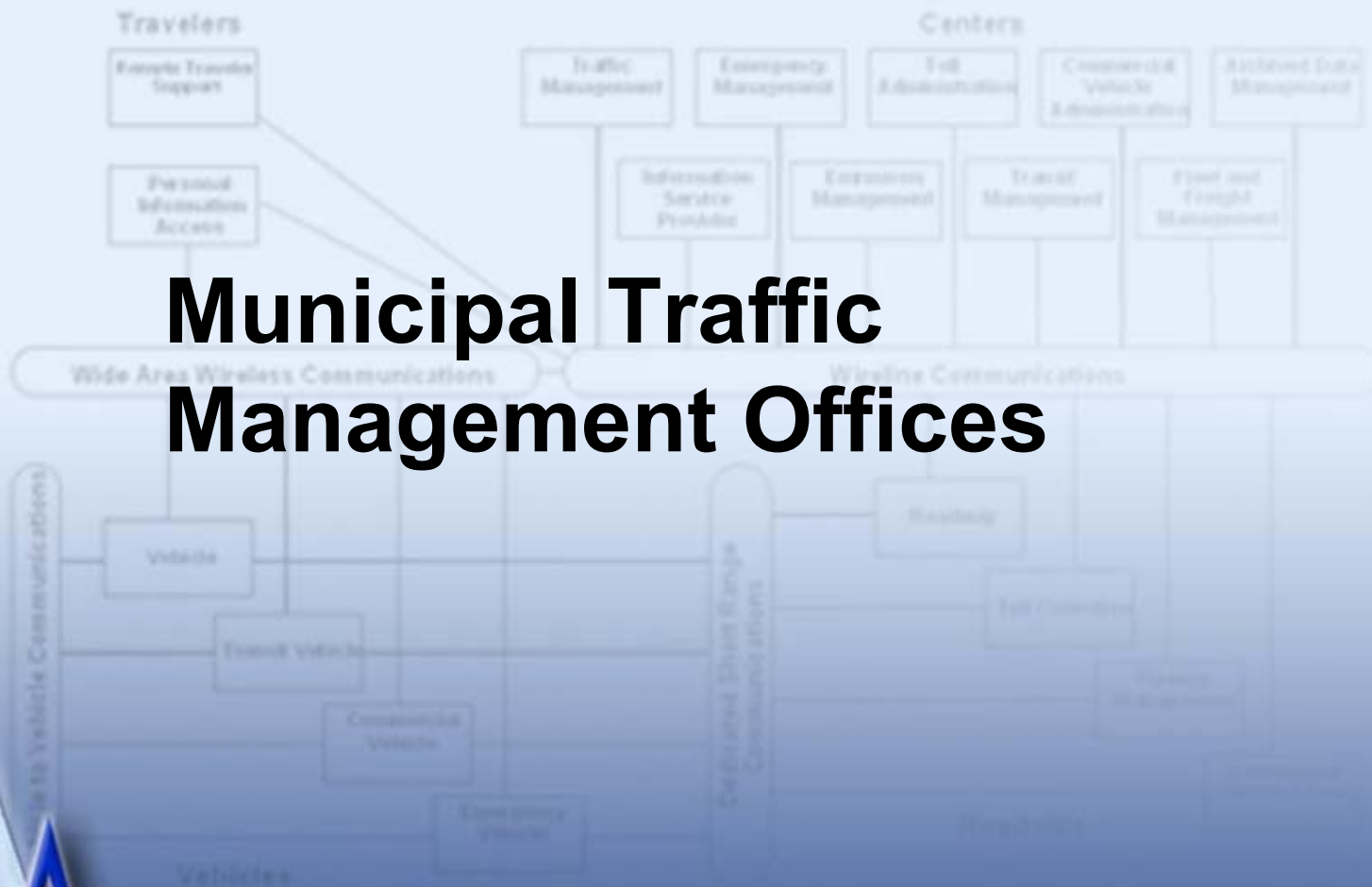




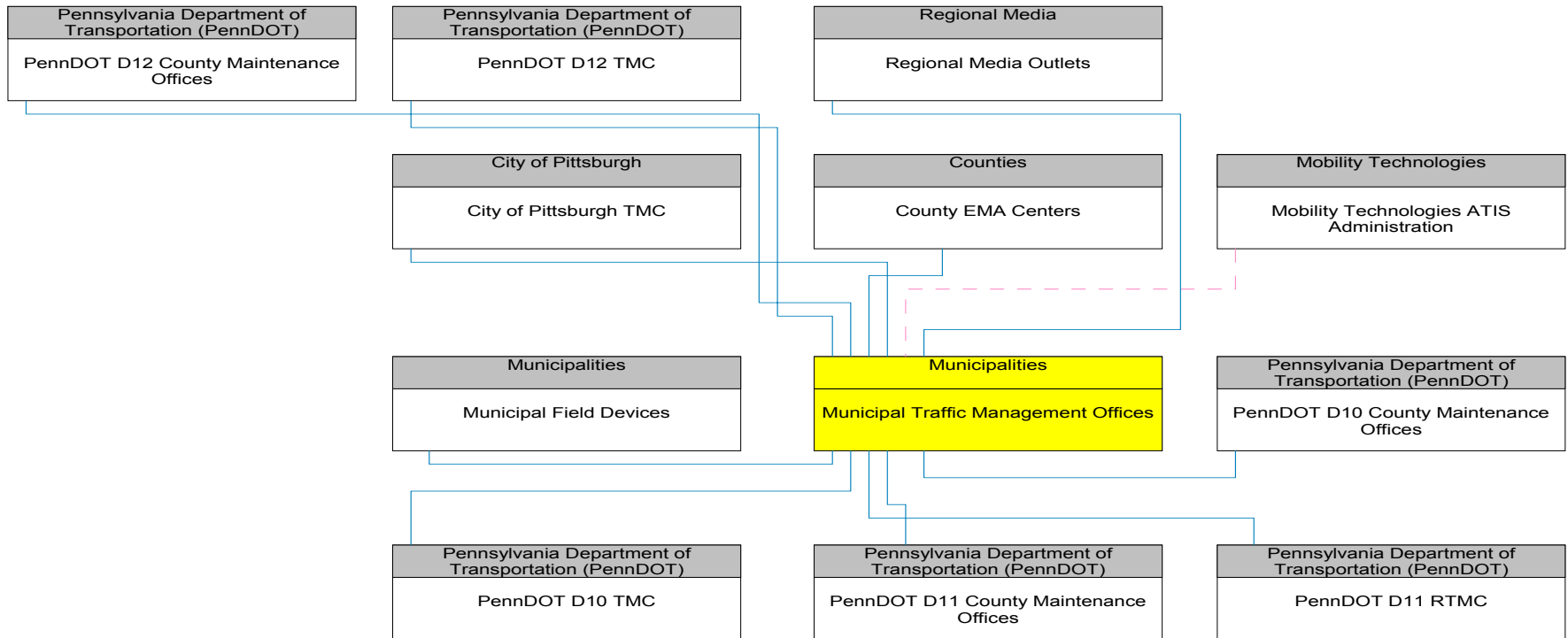
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- - - - - Planned



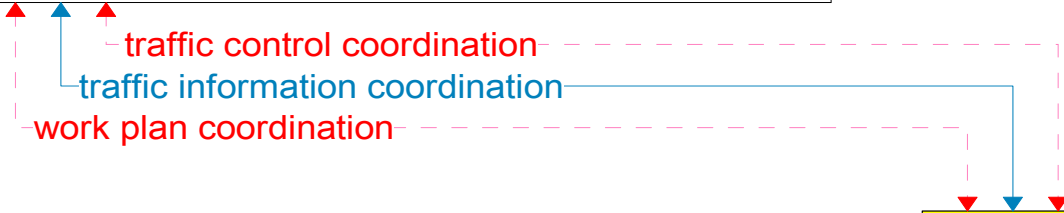
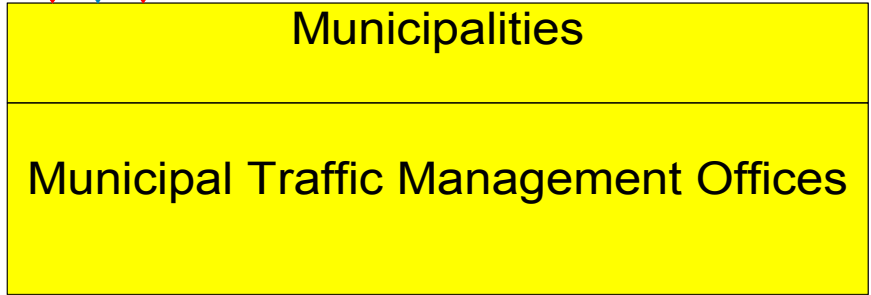
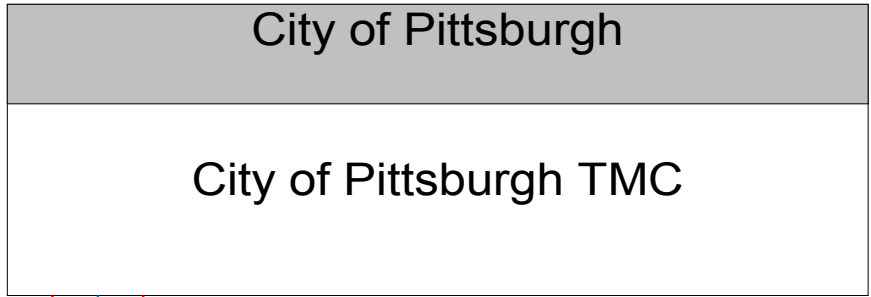
# Municipal Traffic Management Offices



# Municipal Traffic Management Offices Interconnect Diagram

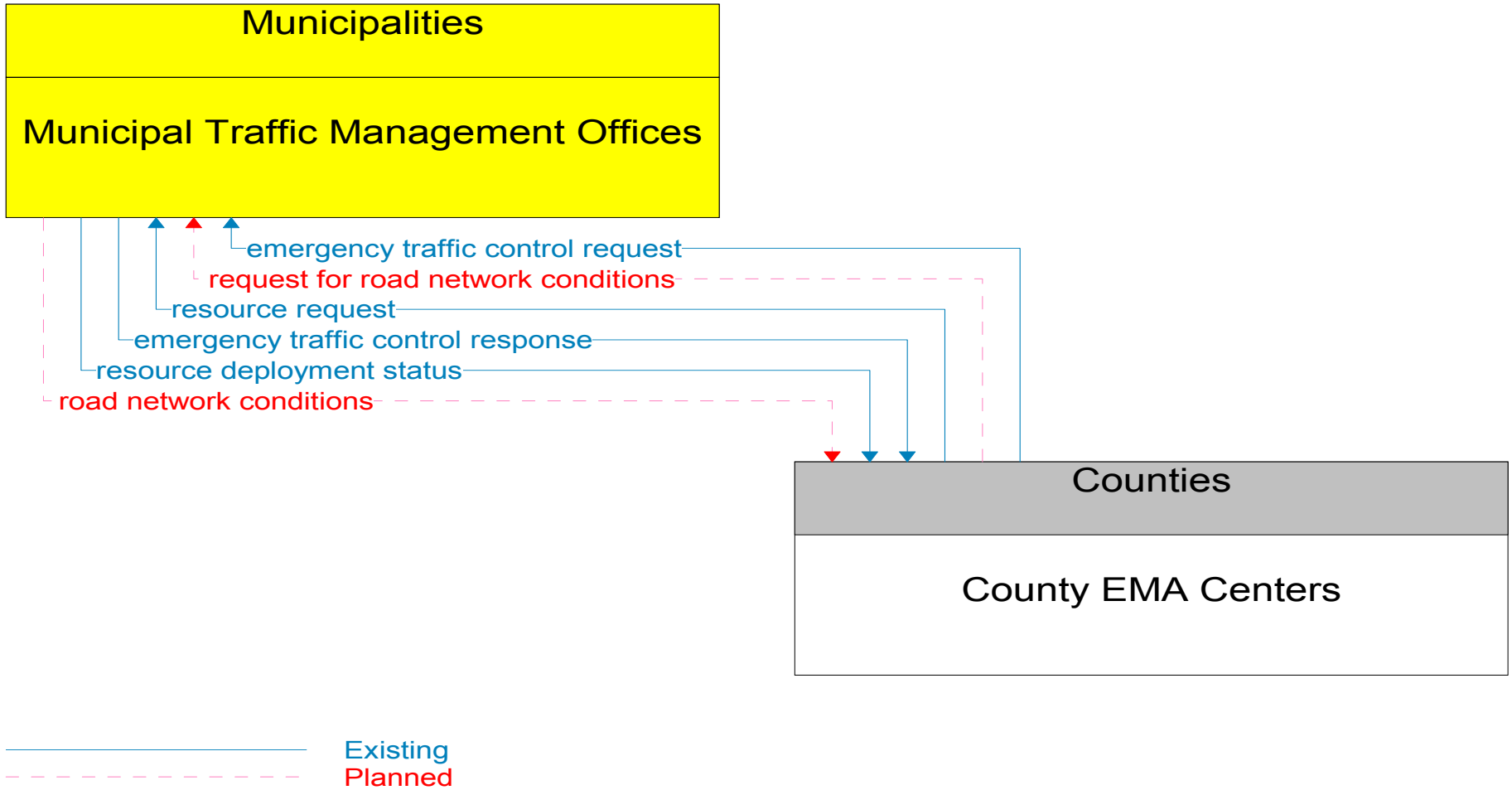


Existing  
Planned

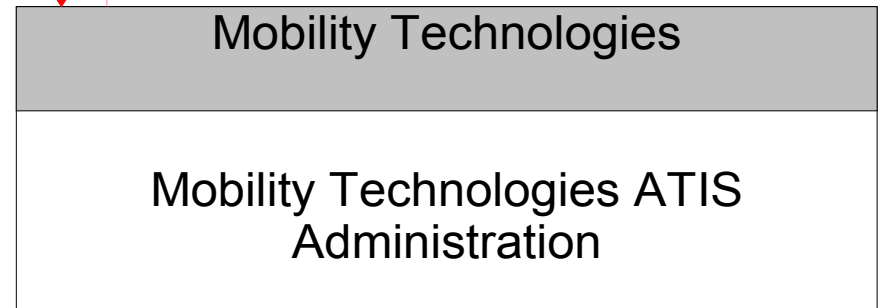
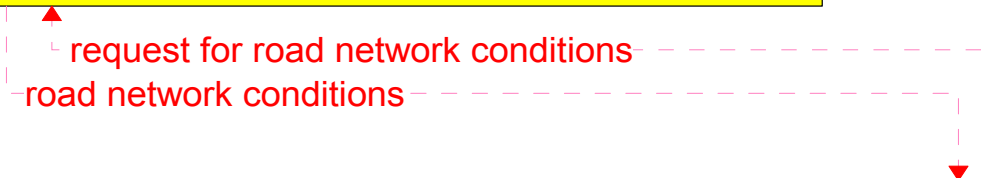
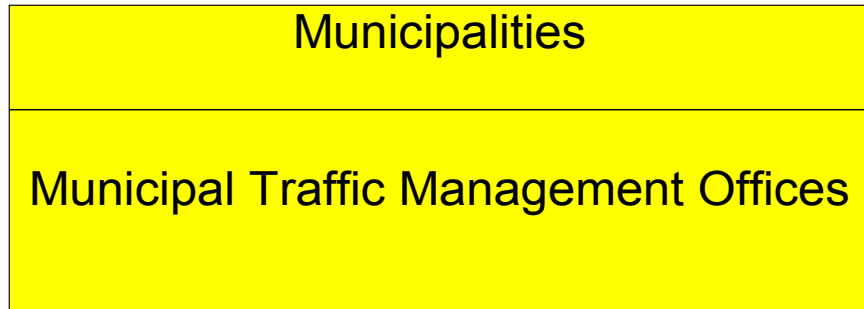


Existing

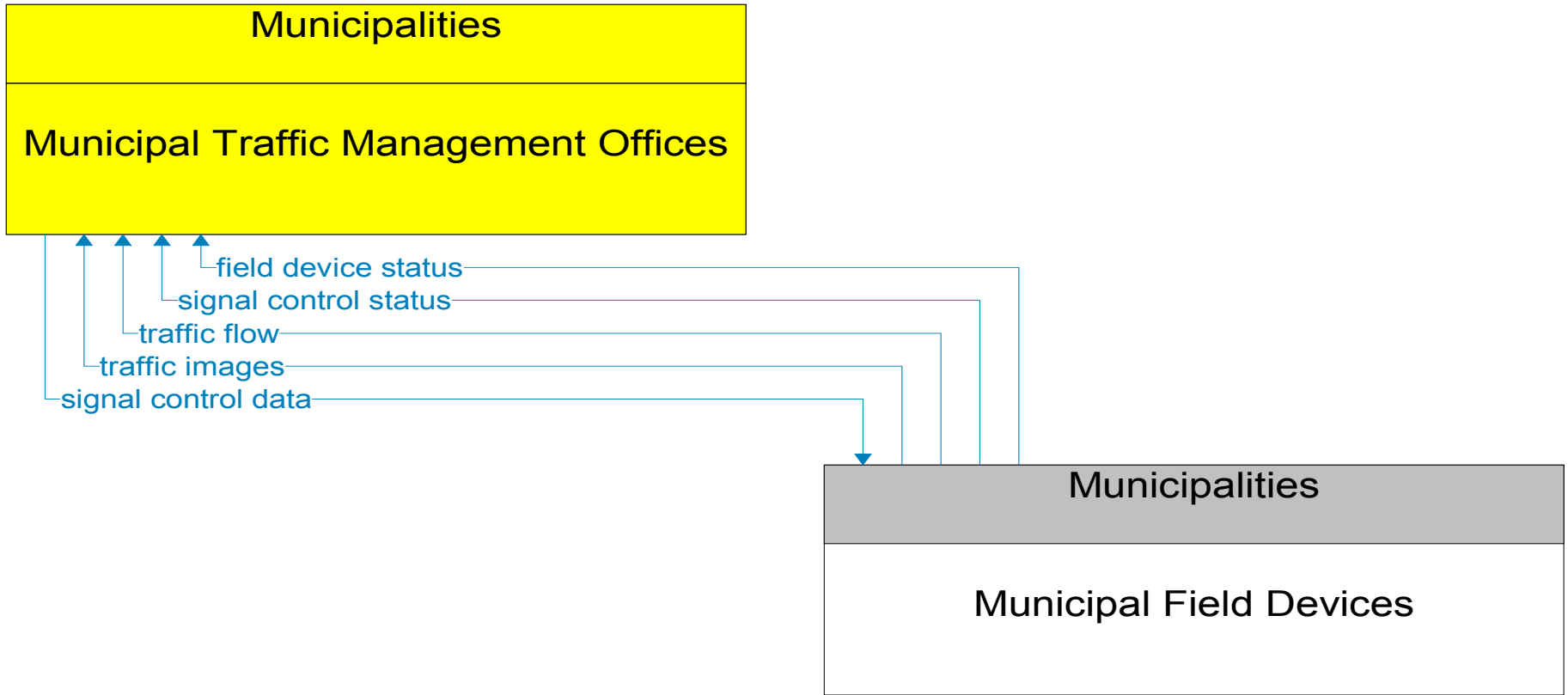
Planned



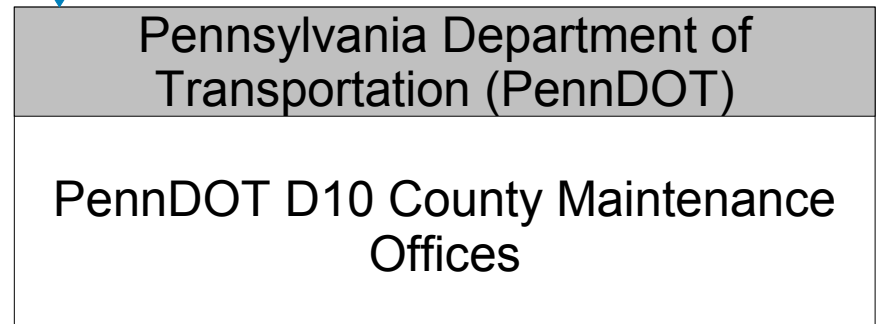




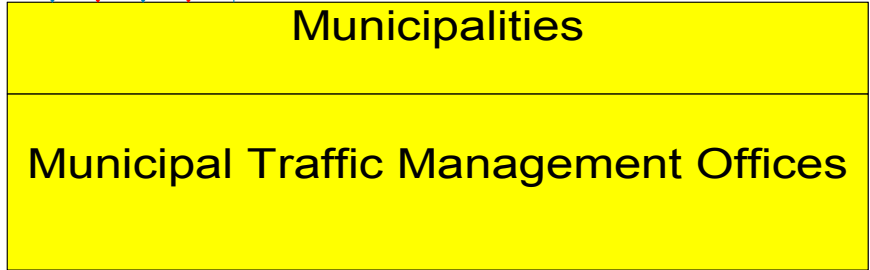
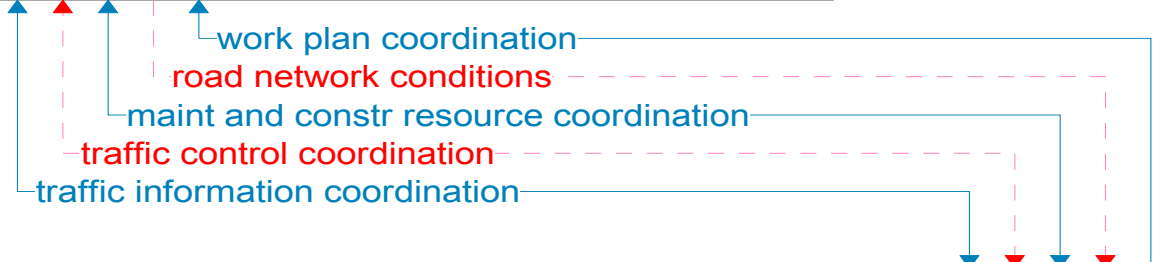
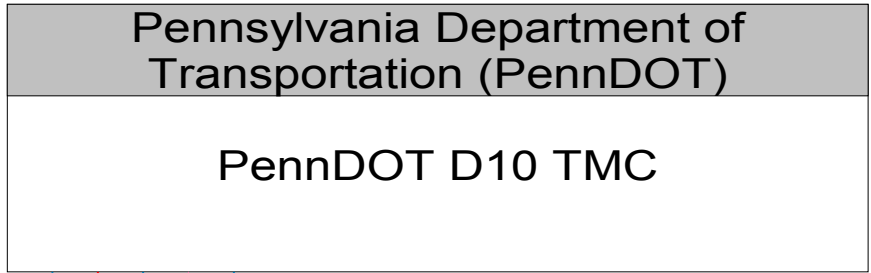
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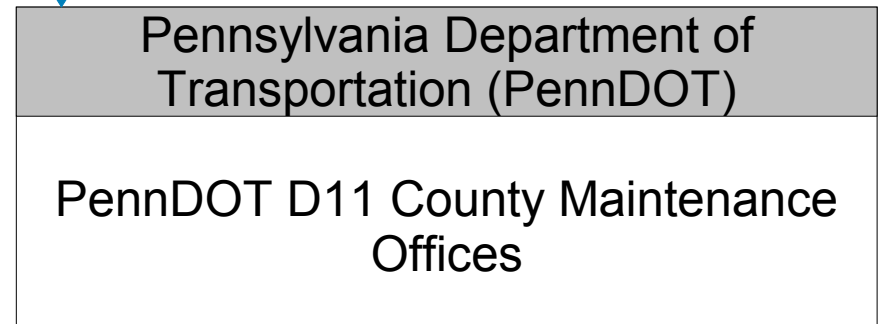
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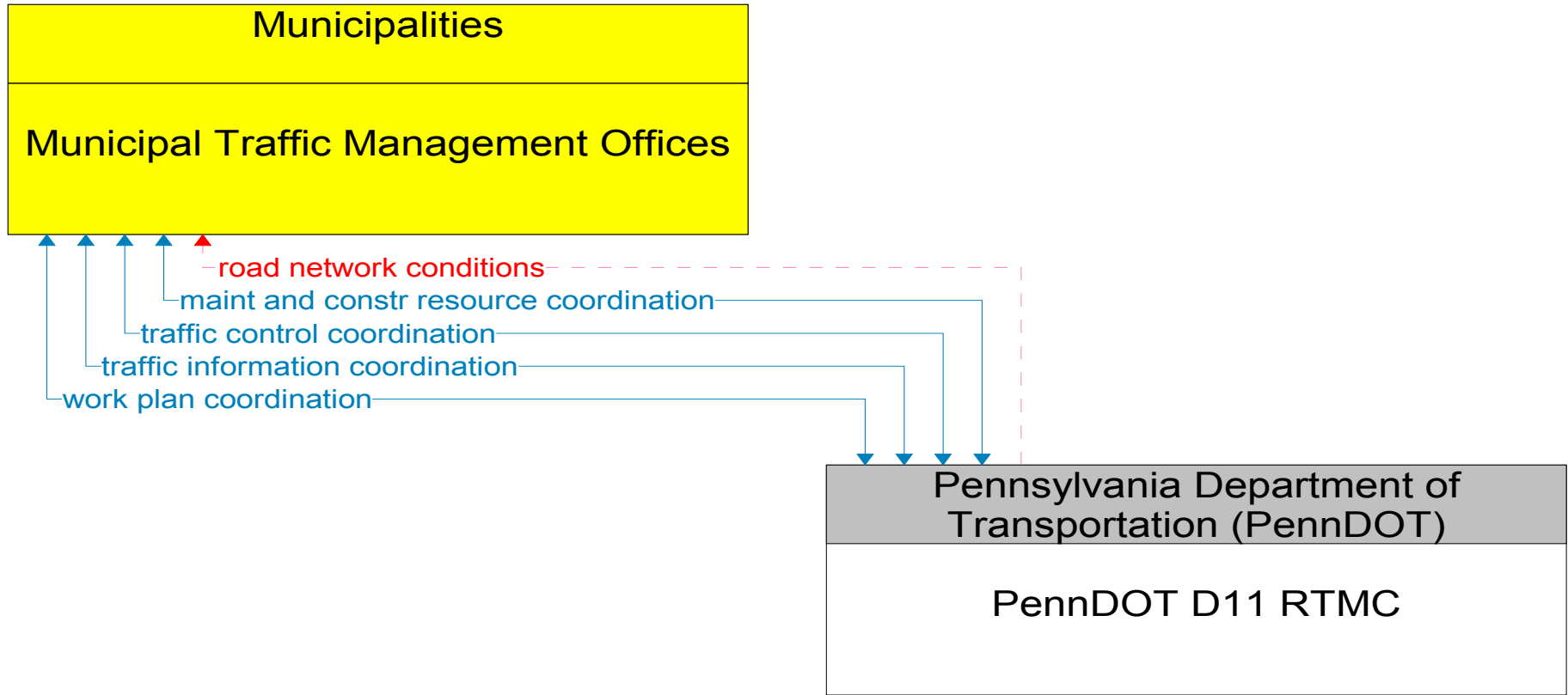
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- - - - - Planned

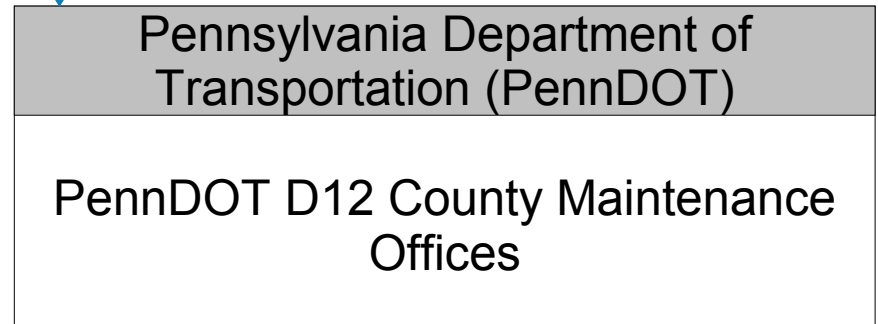


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- - - - - Planned

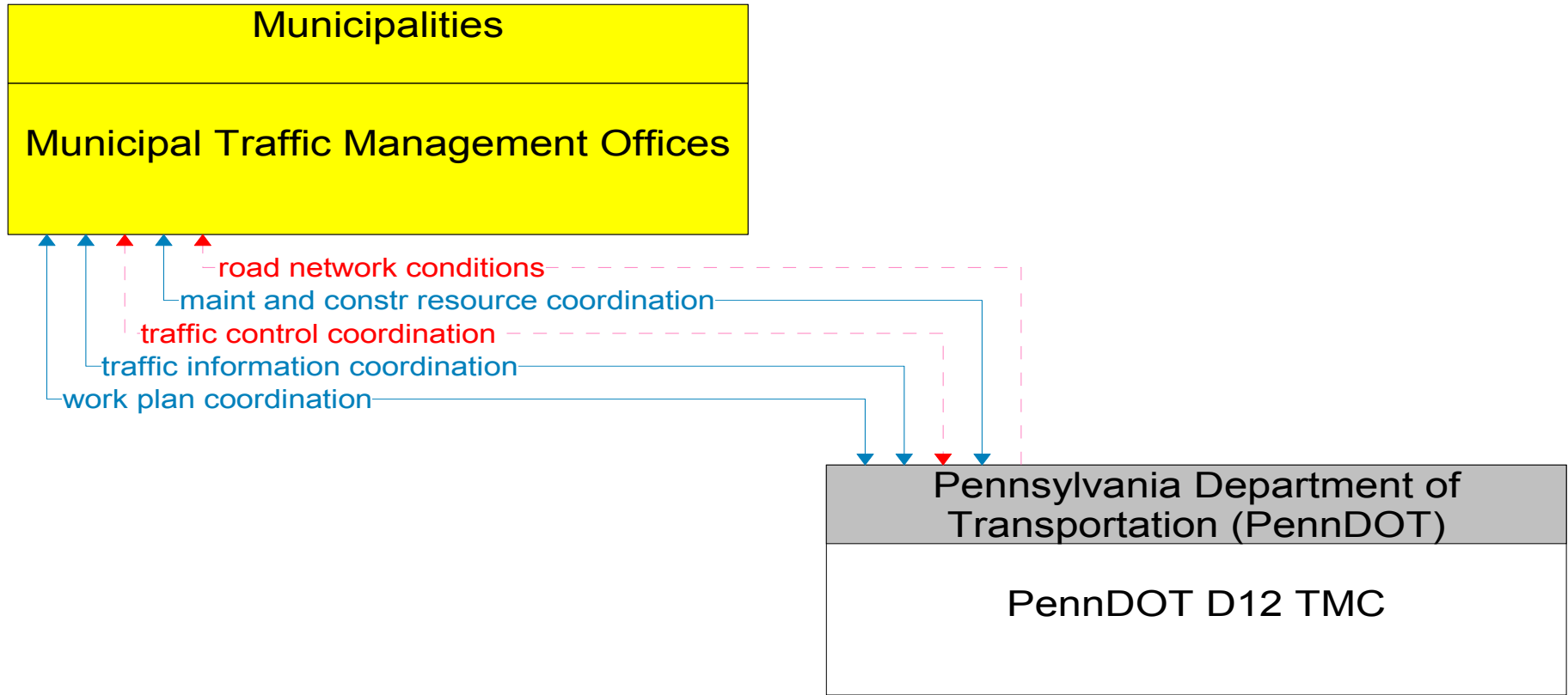


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- - - - - Planned



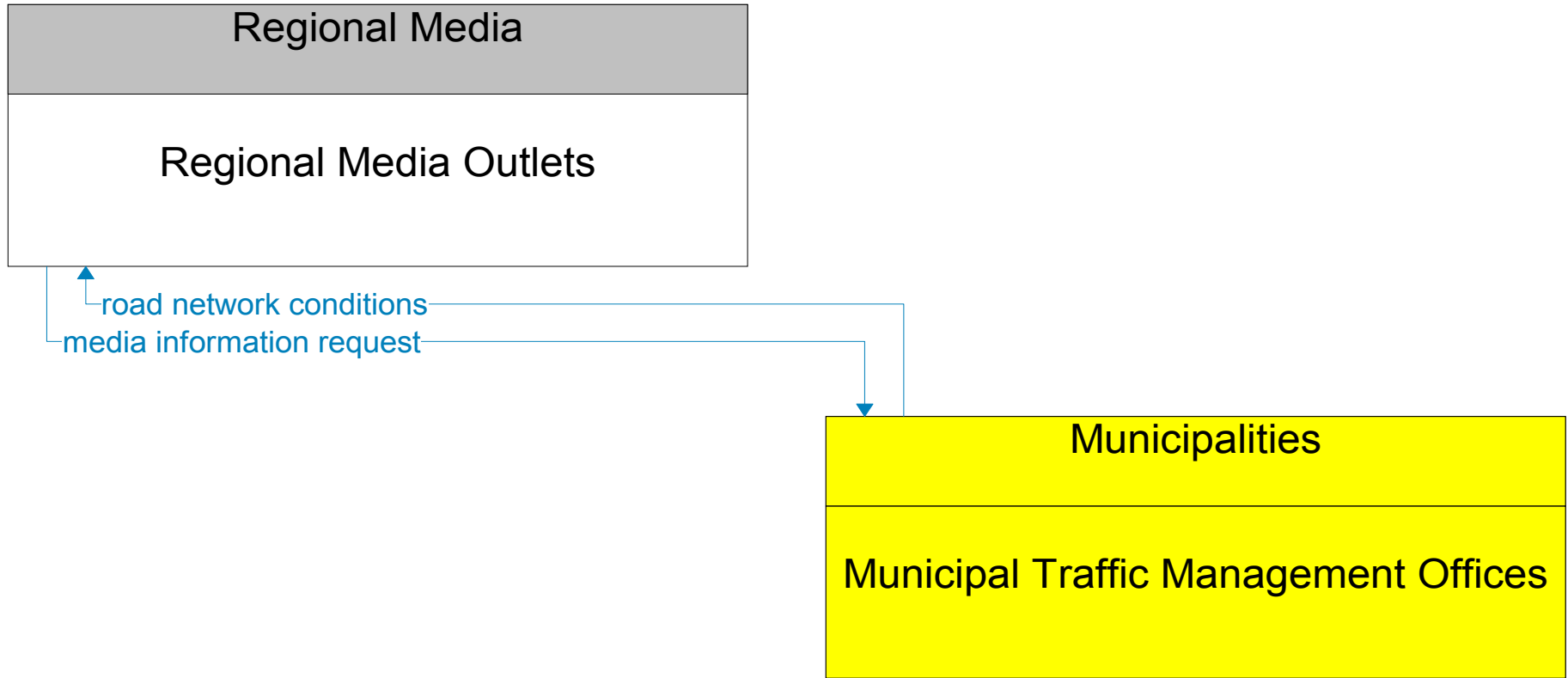


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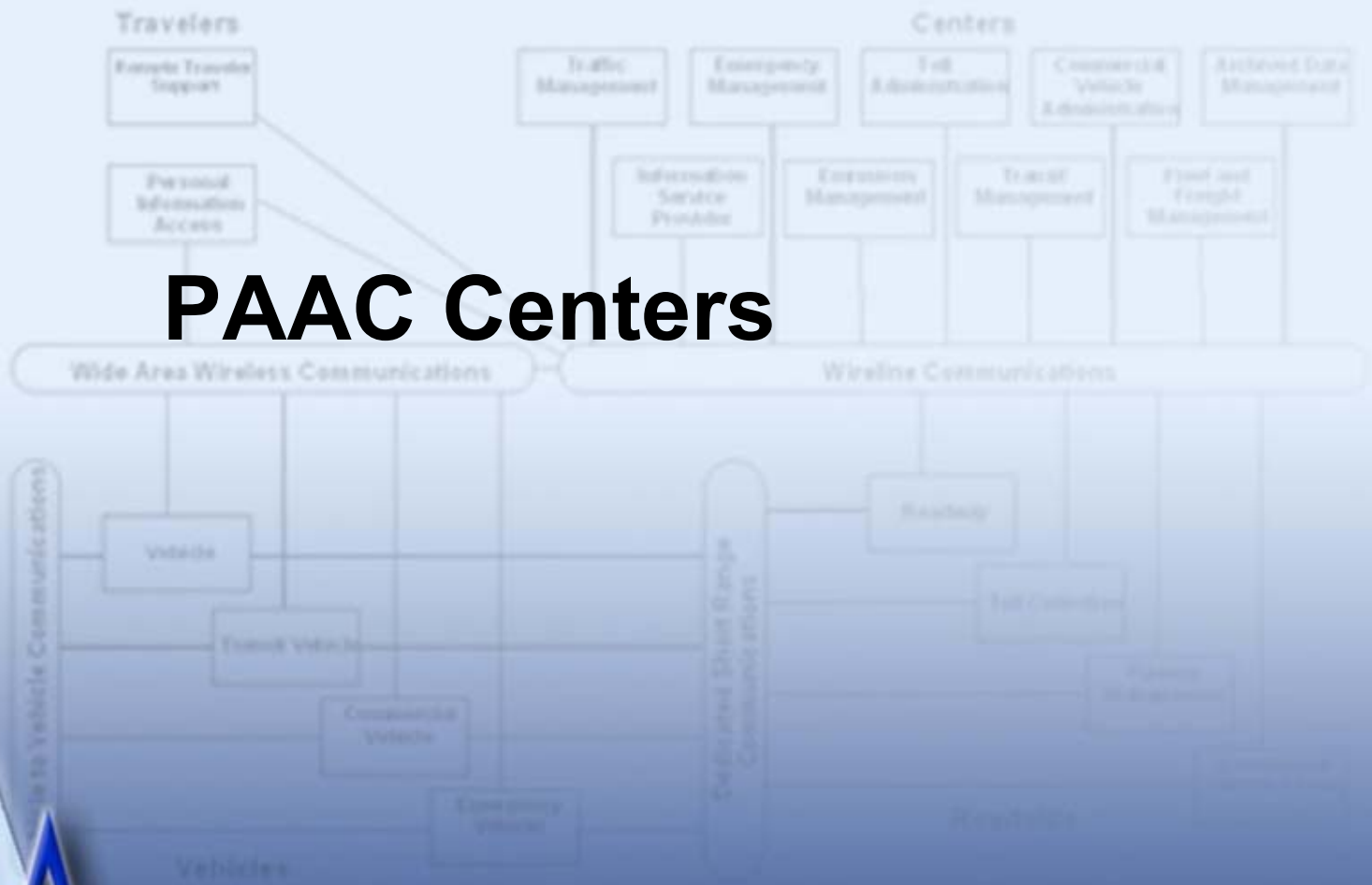
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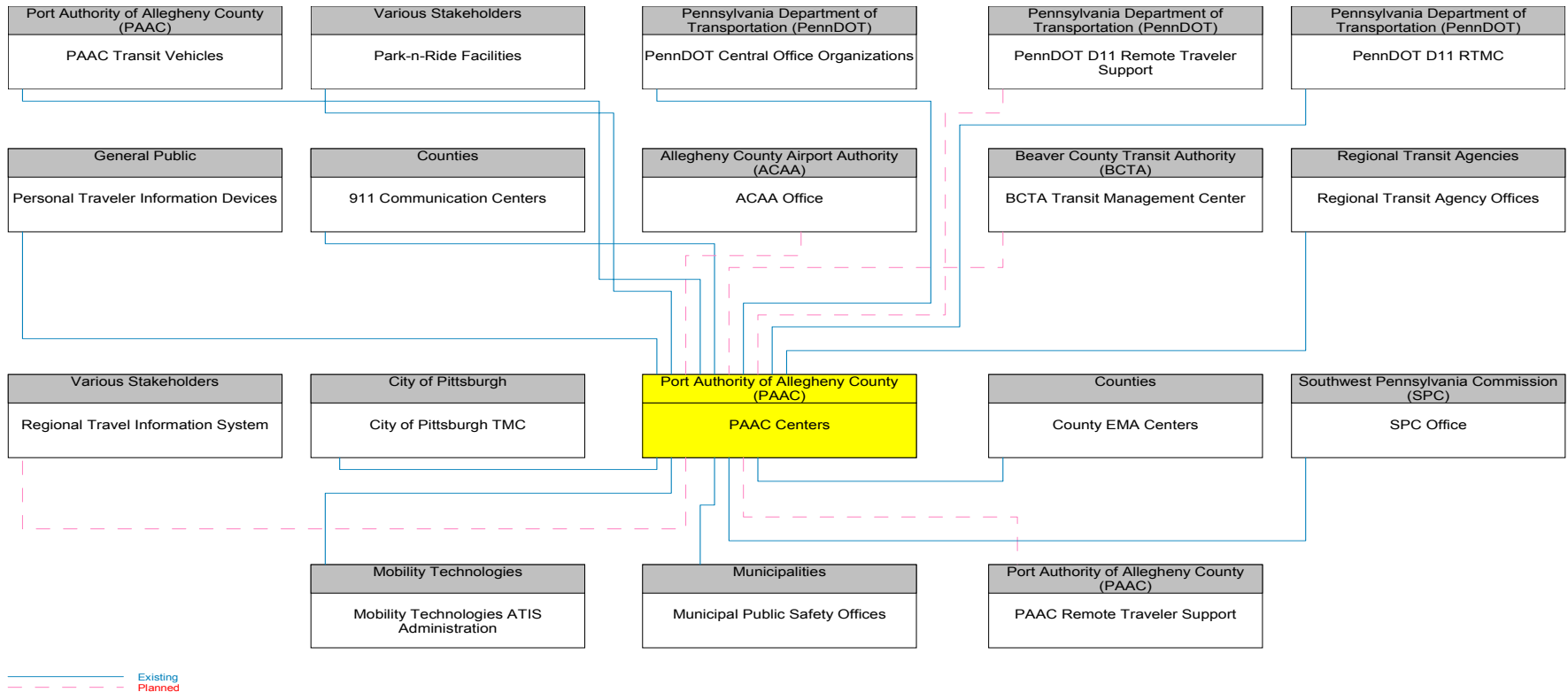
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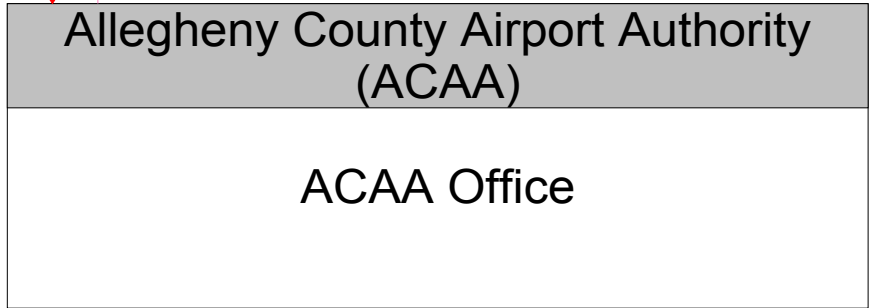
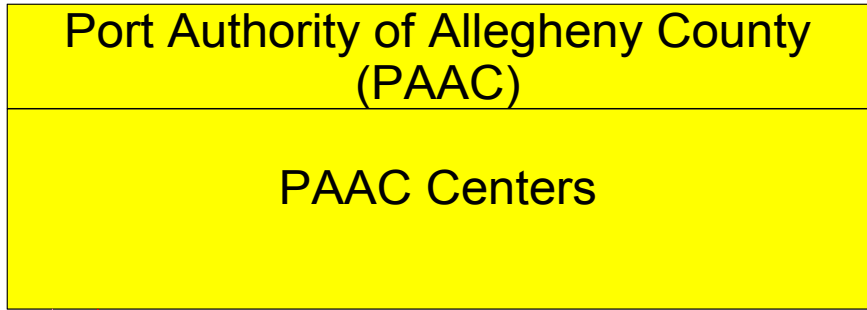
# PAAC Centers



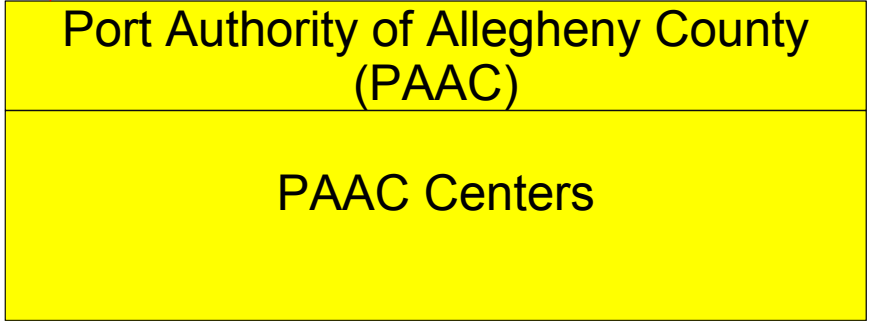
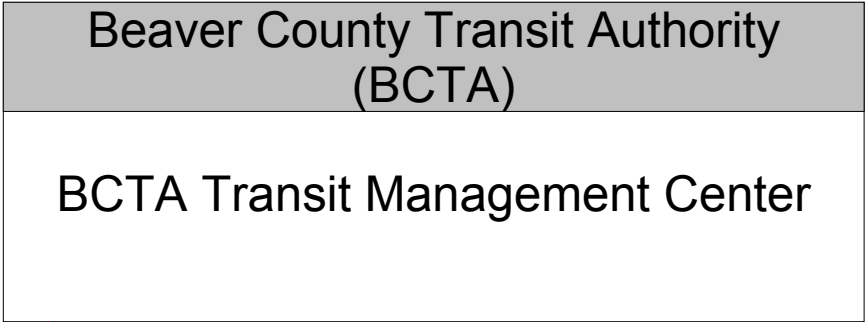
PA

# PAAC Centers Interconnect Diagram

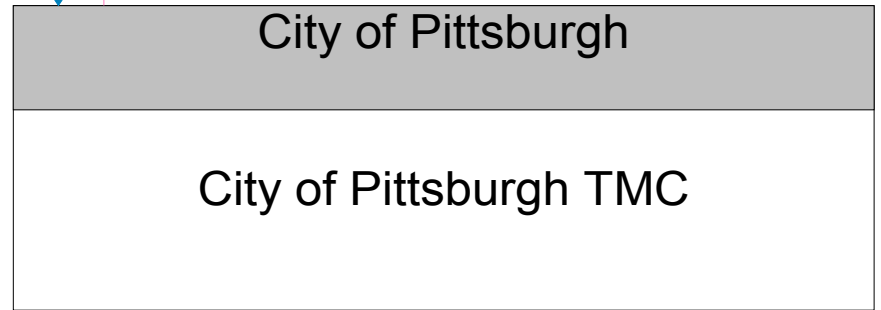
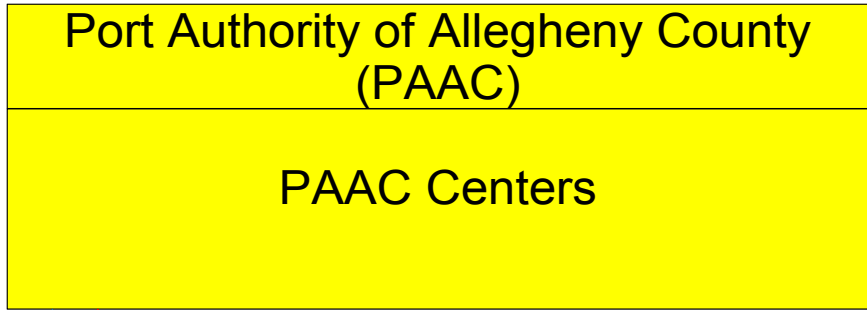




———— Existing  
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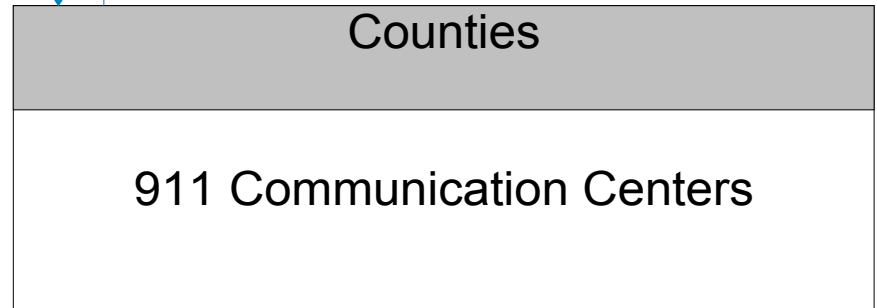
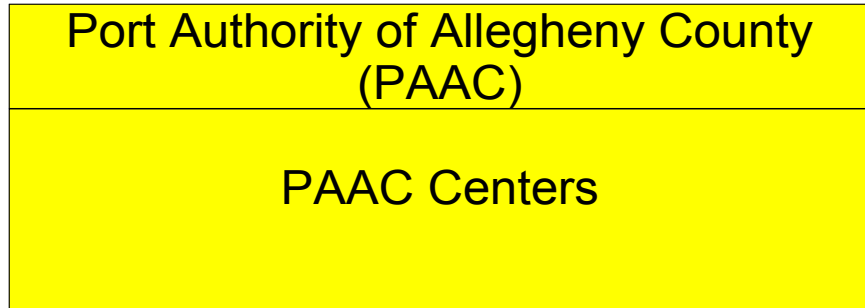
———— Existing  
- - - - - Planned



request for road network conditions

road network conditions

Existing  
Planned

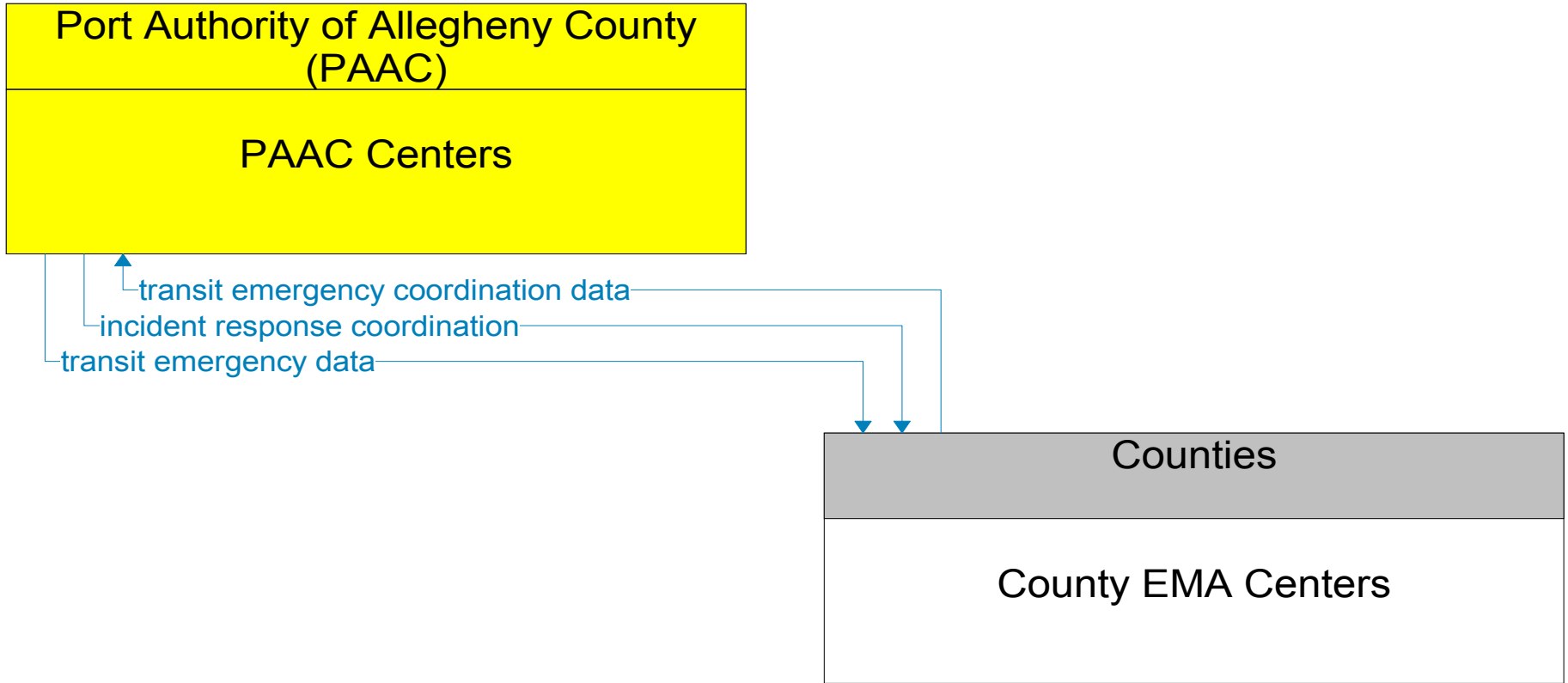


transit emergency coordination data

transit emergency data

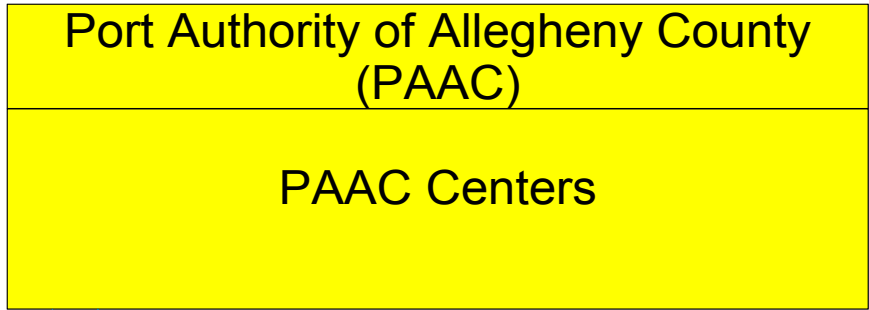
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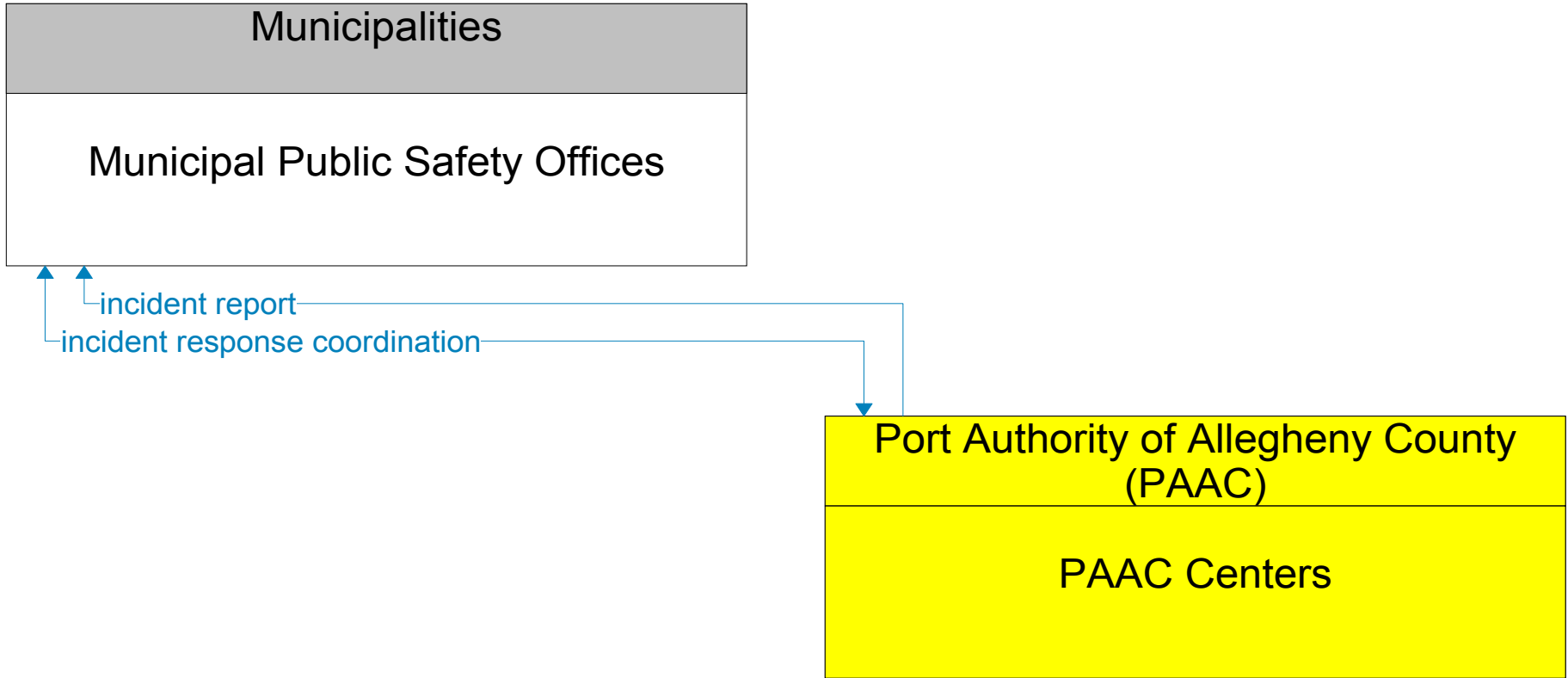
Planned



— Existing  
- - - Planned



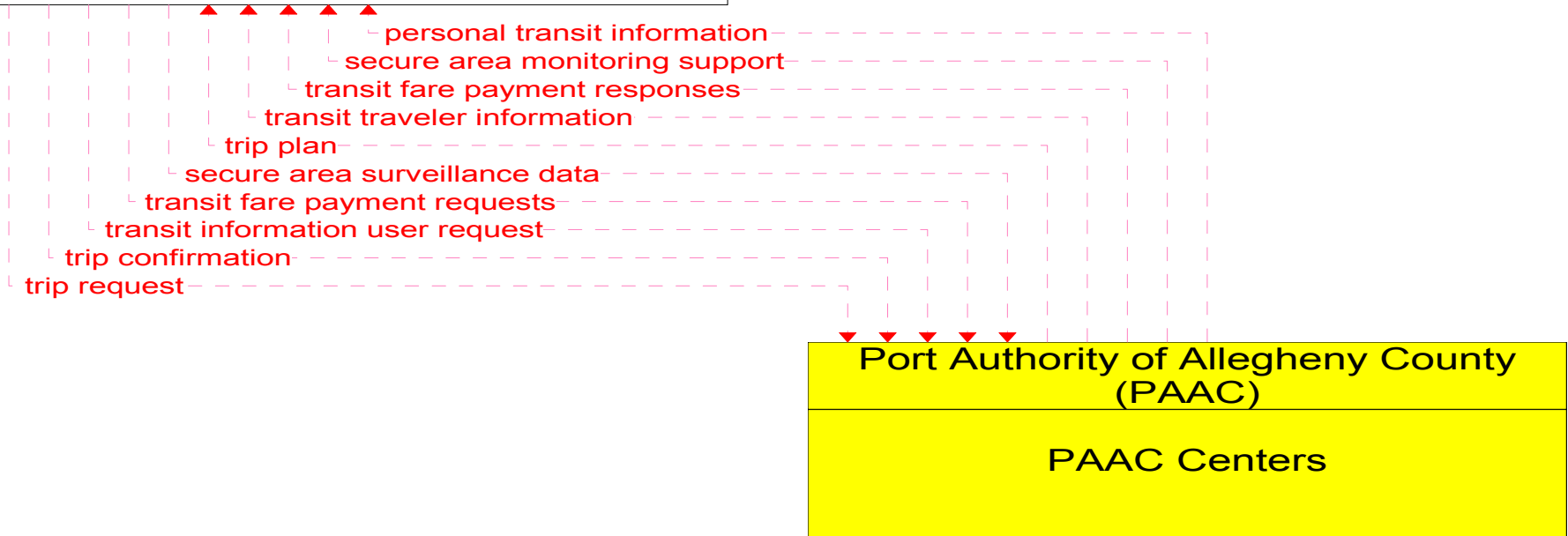


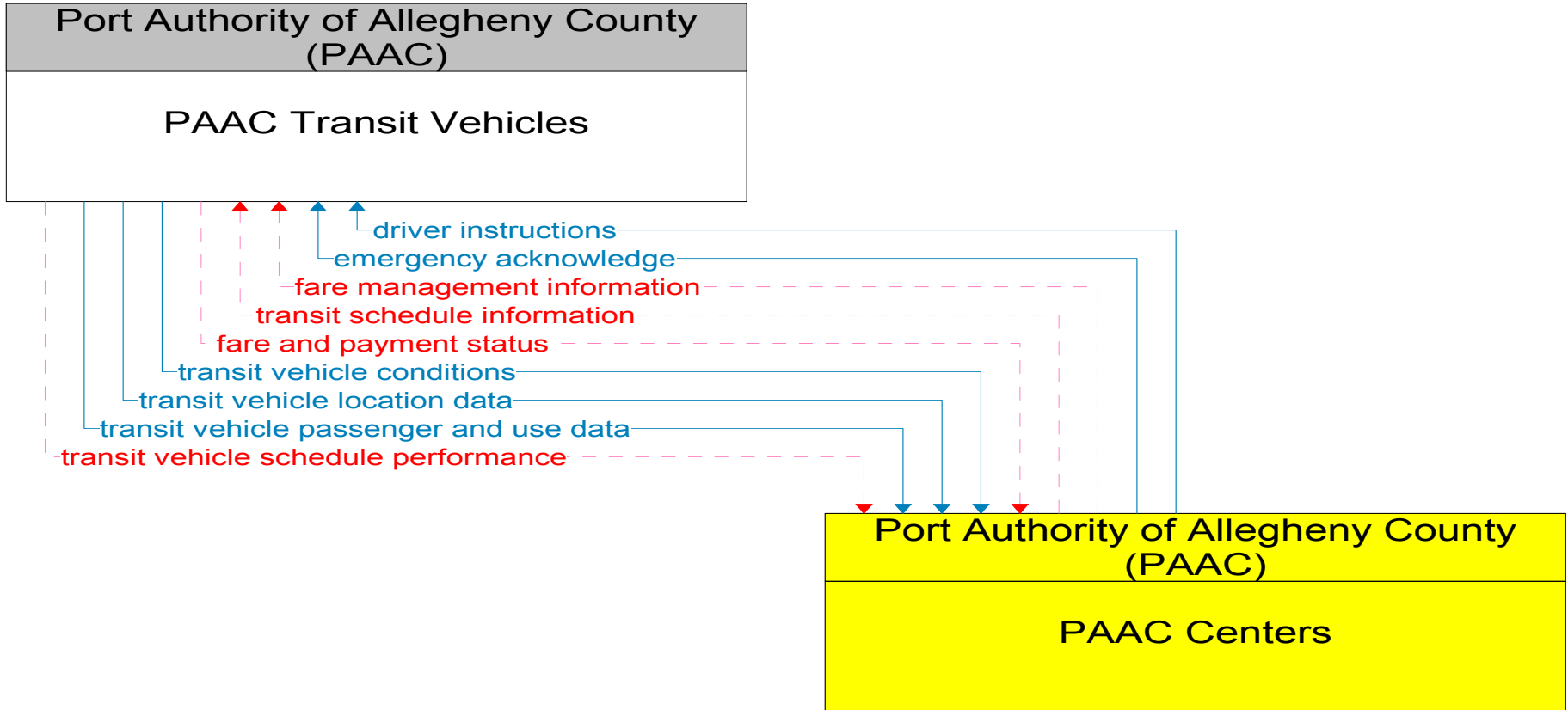


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----- Planned

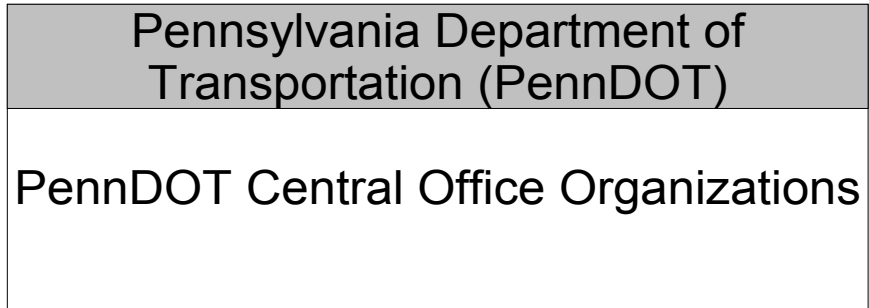
Port Authority of Allegheny County  
(PAAC)

PAAC Remote Traveler Support

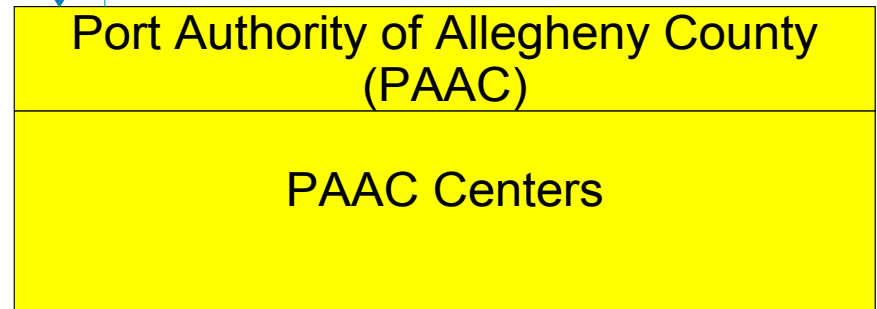




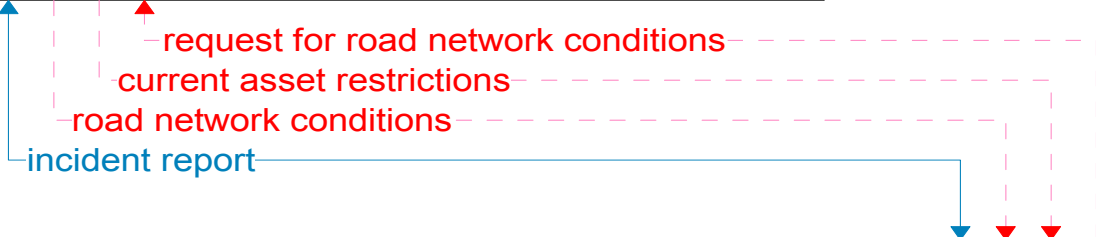
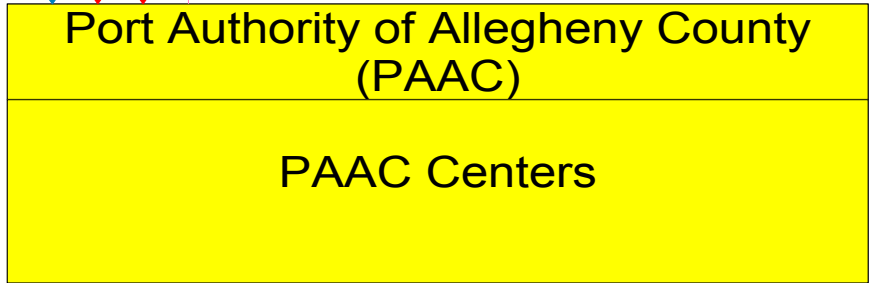
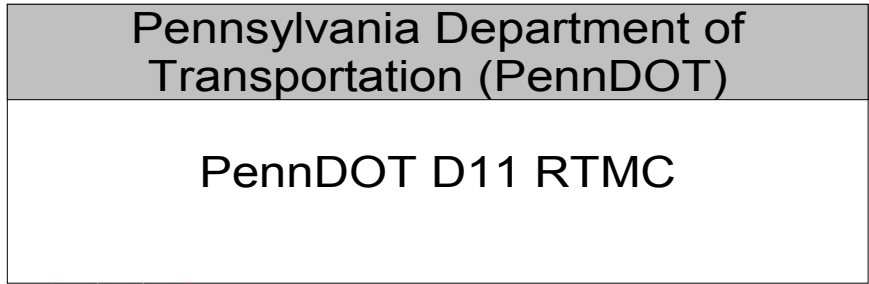
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- - - - - Planned



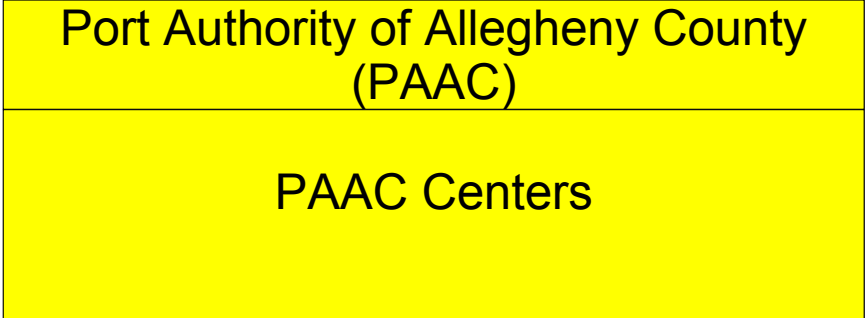
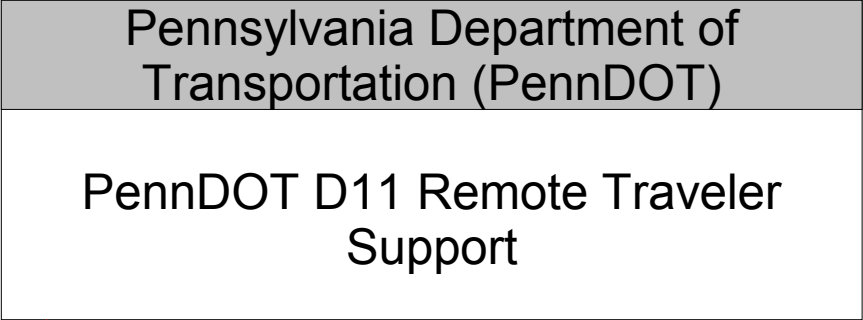
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archive requests



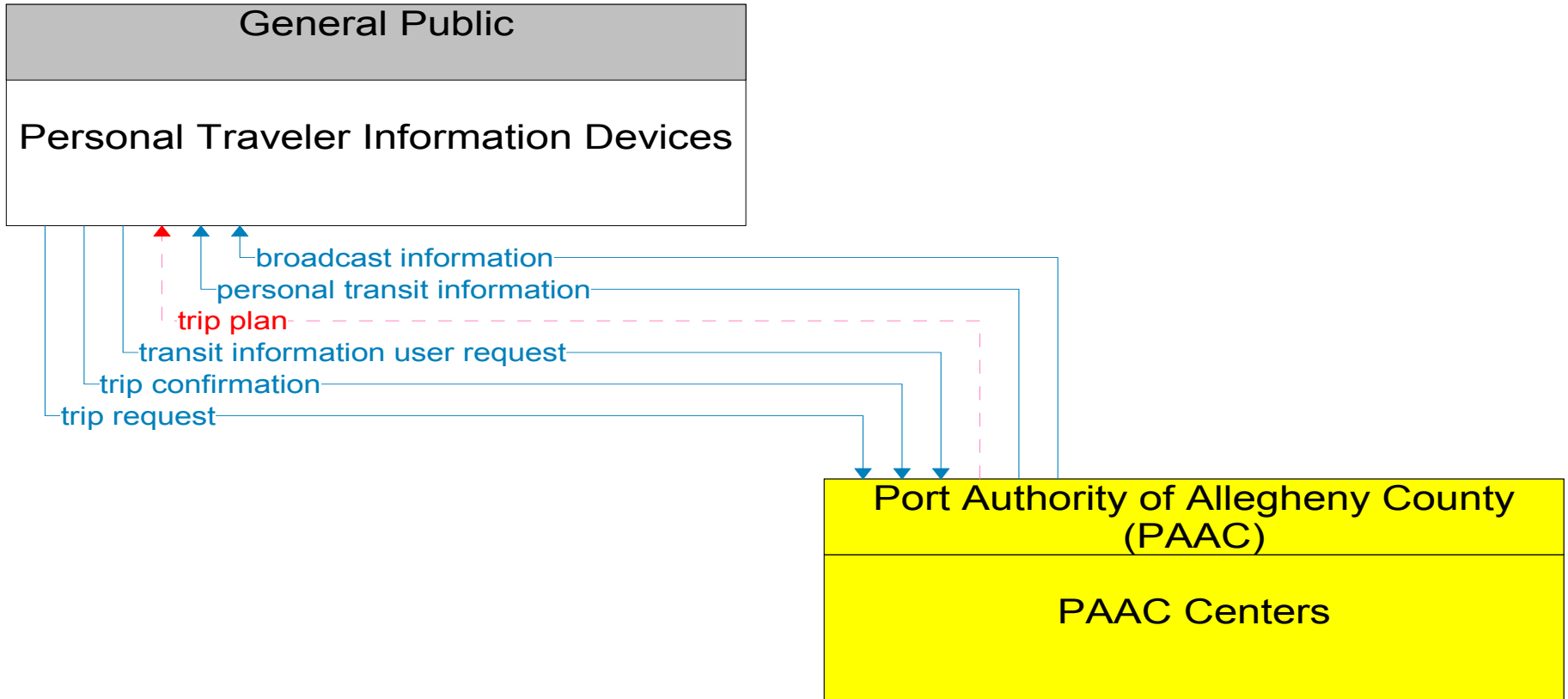
———— Existing  
----- Planned



Existing  
Planned

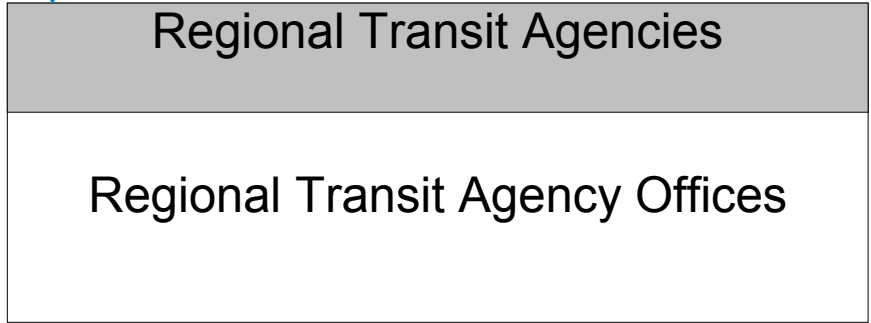
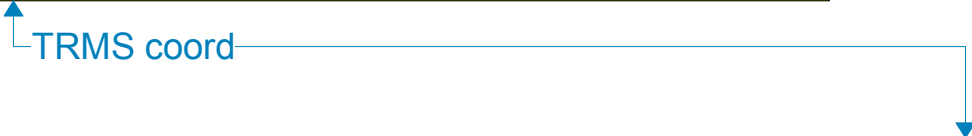
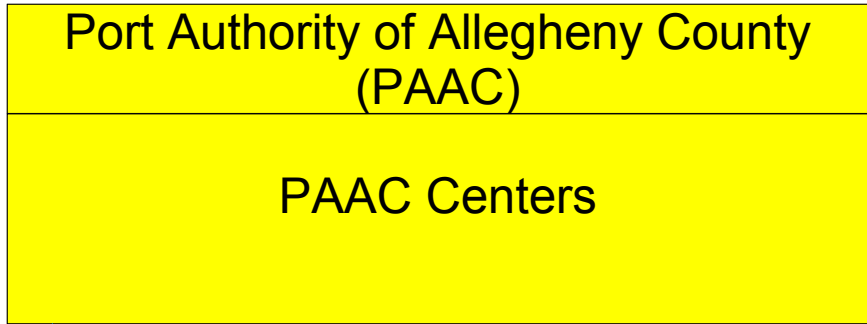


———— Existing  
- - - - - Planned

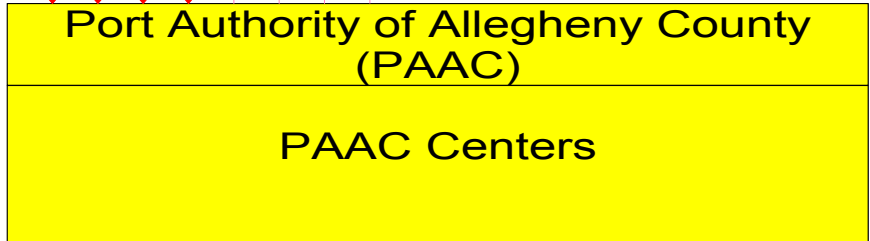
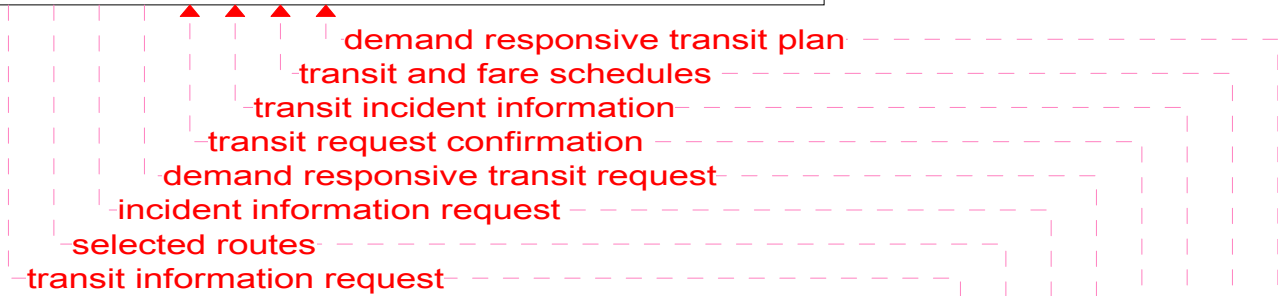
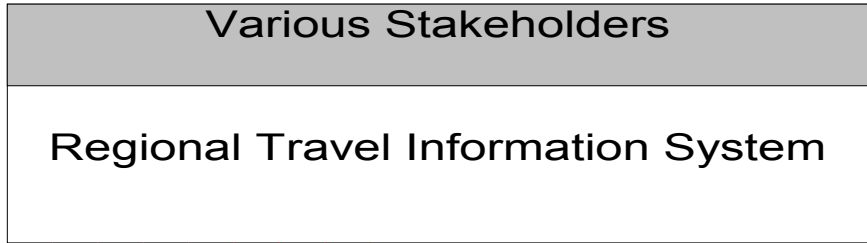


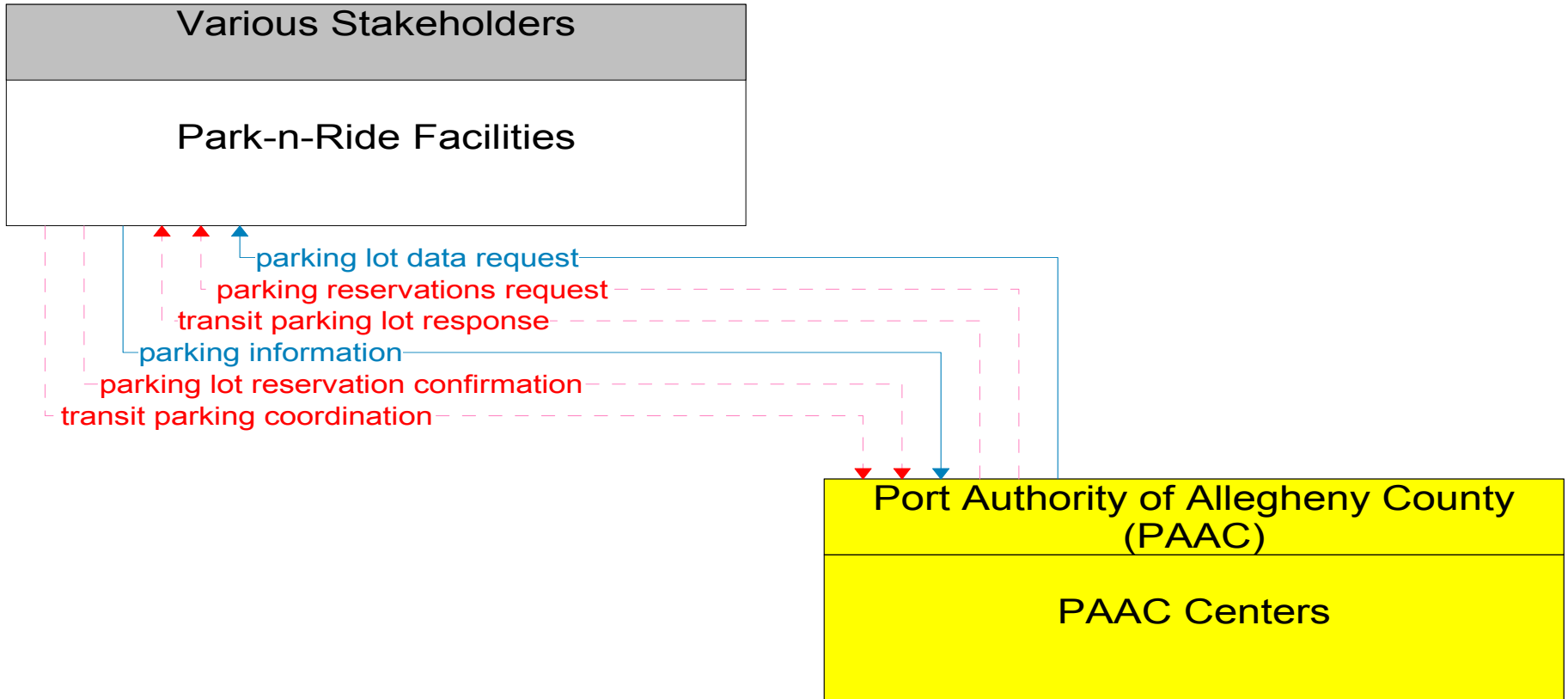
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- - - - - Planned



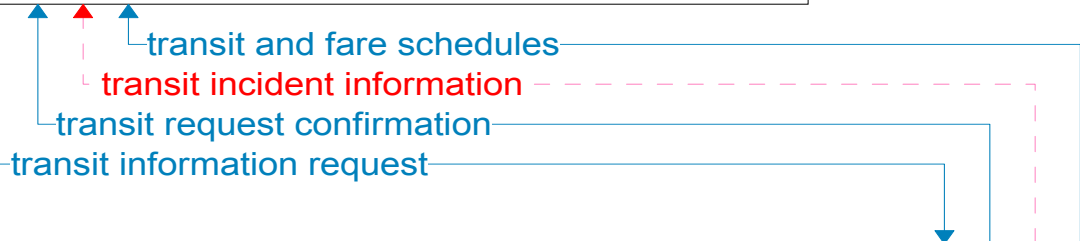
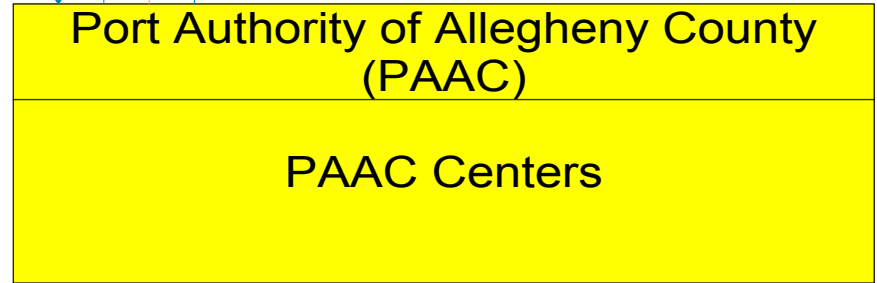
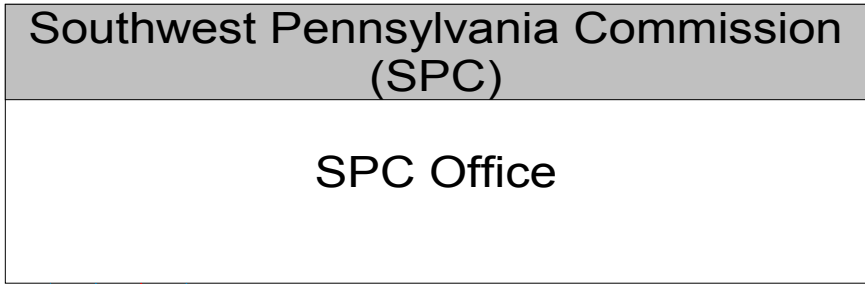


———— Existing  
- - - - - Planned



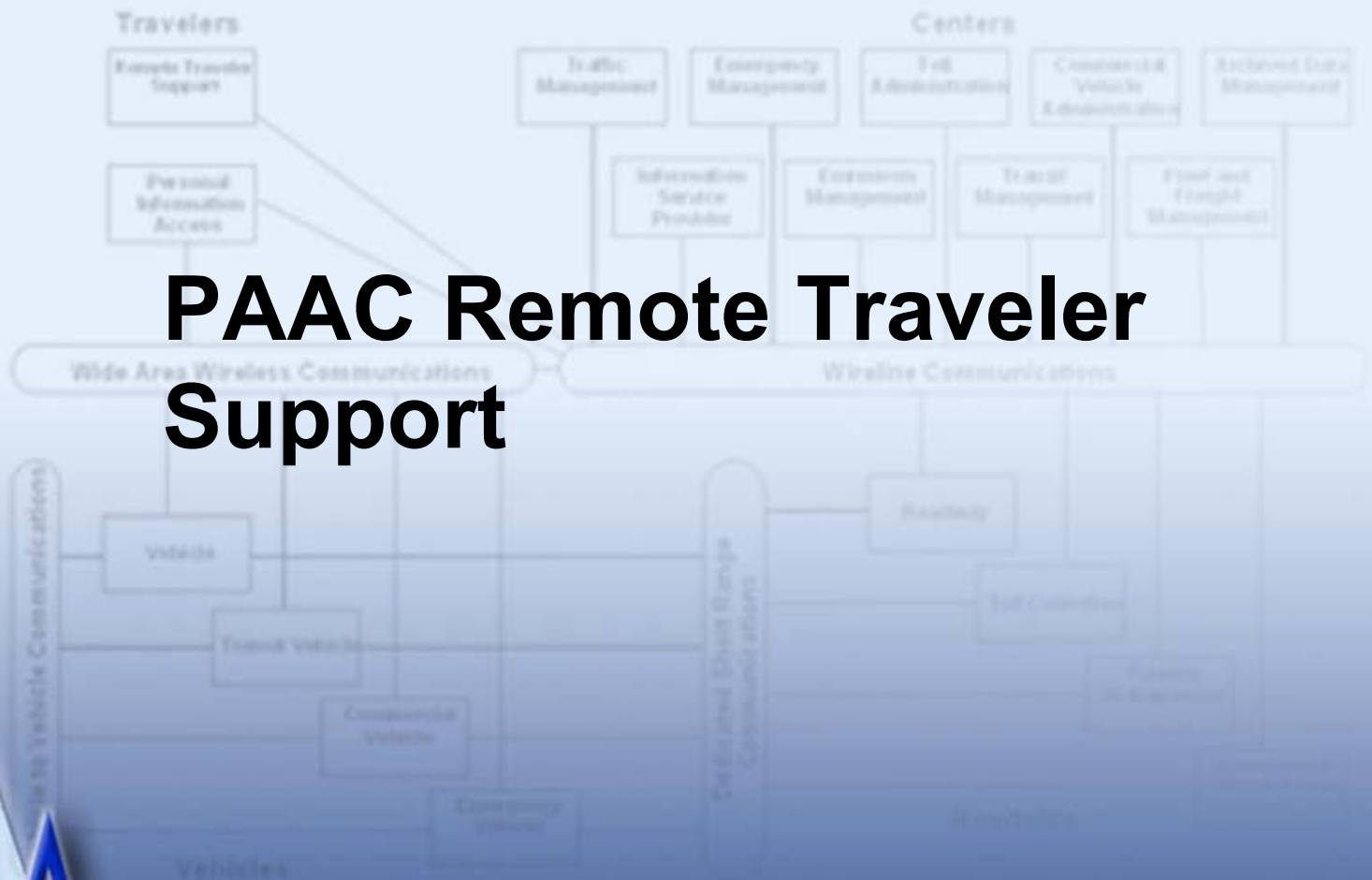


Existing  
Planned



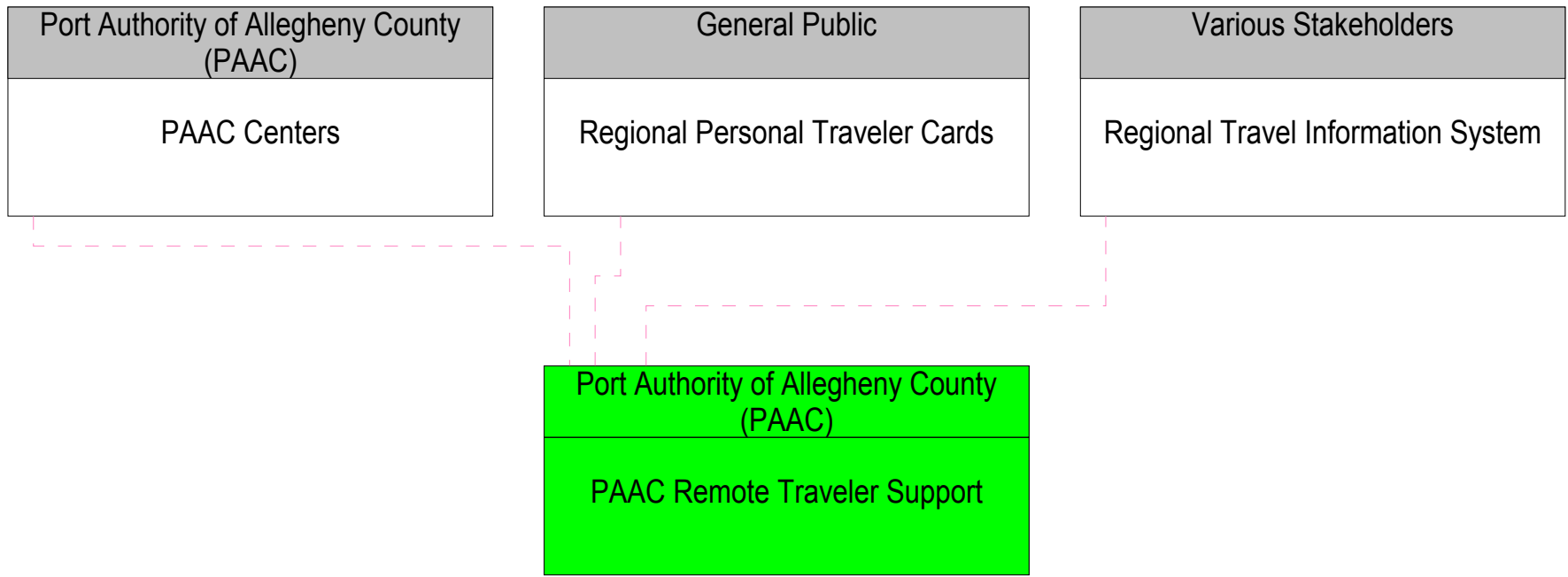
Existing  
Planned

# PAAC Remote Traveler Support



PA

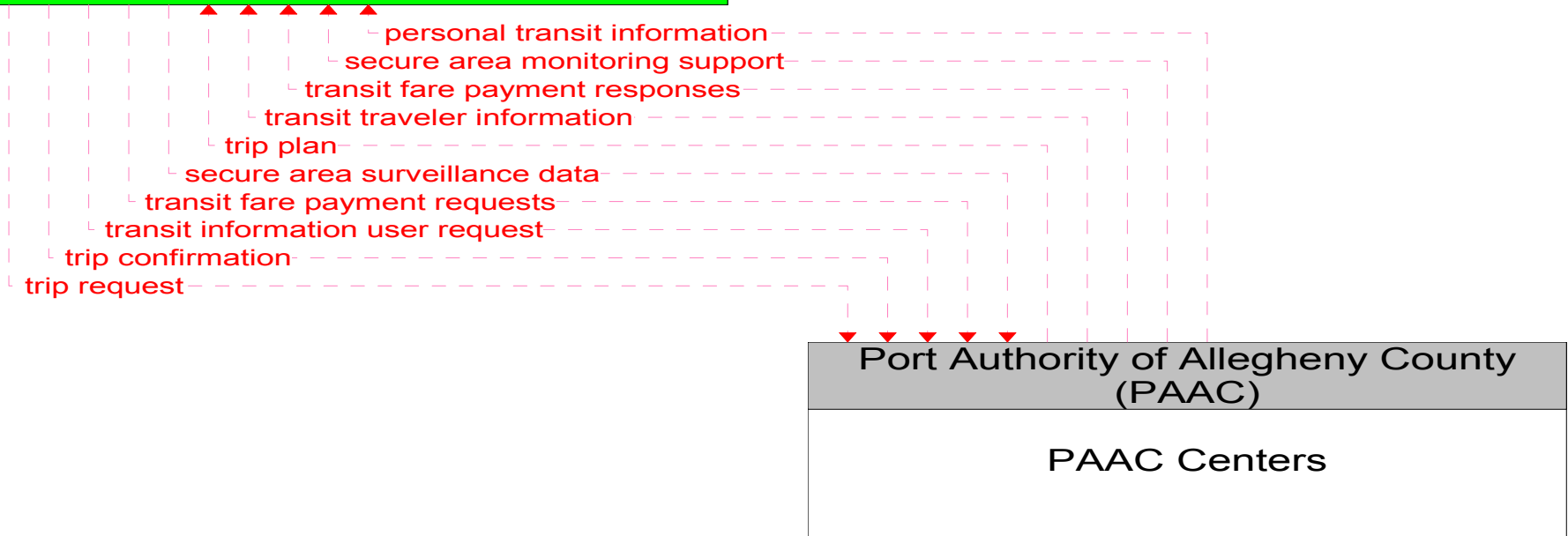
# PAAC Remote Traveler Support Interconnect Diagram



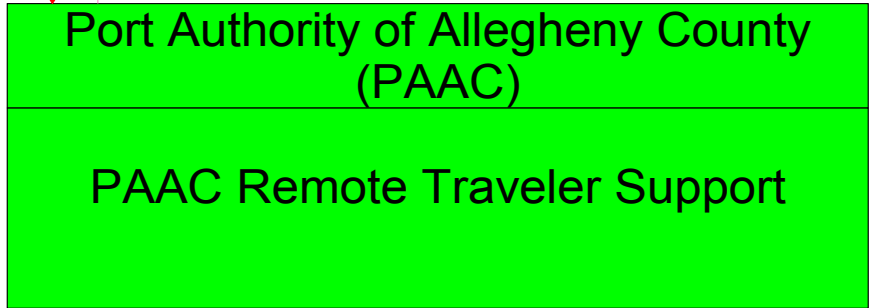
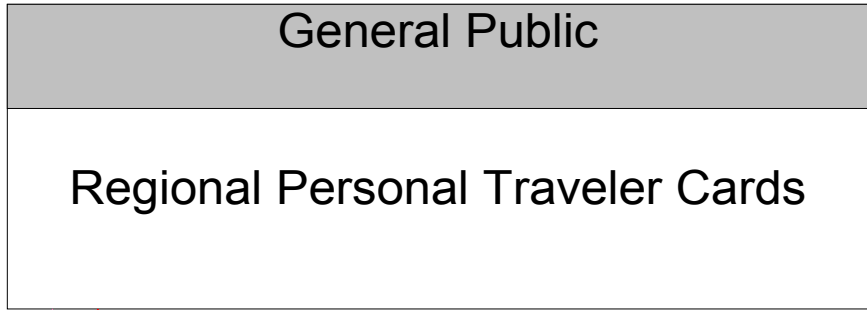
— Existing  
- - - Planned

# Port Authority of Allegheny County (PAAC)

## PAAC Remote Traveler Support

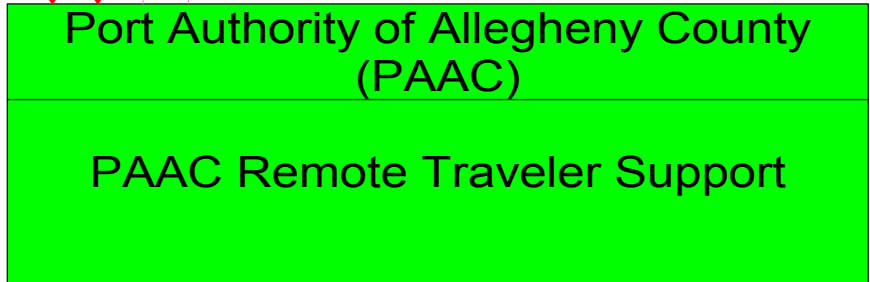
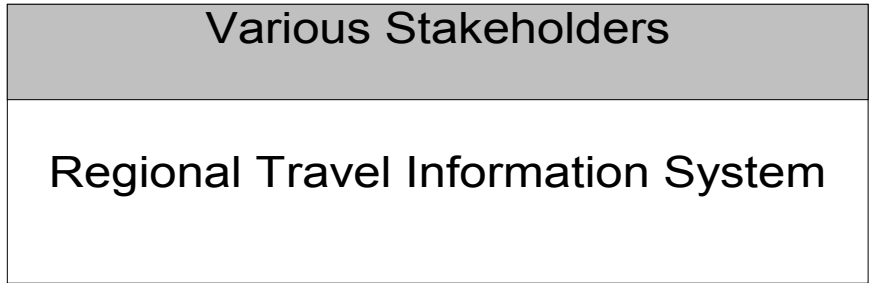


———— Existing  
- - - - - Planned



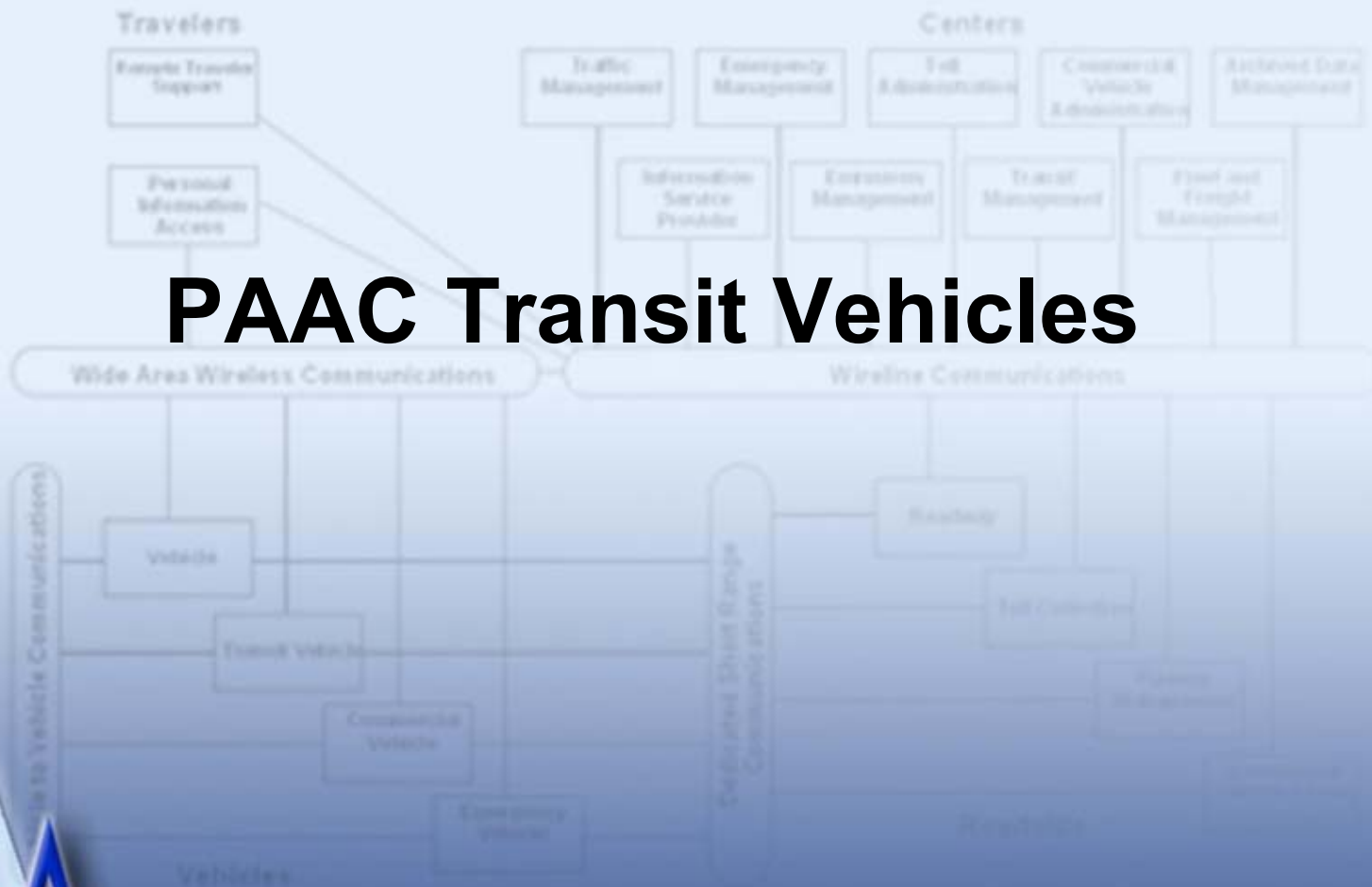
Existing  
Planned





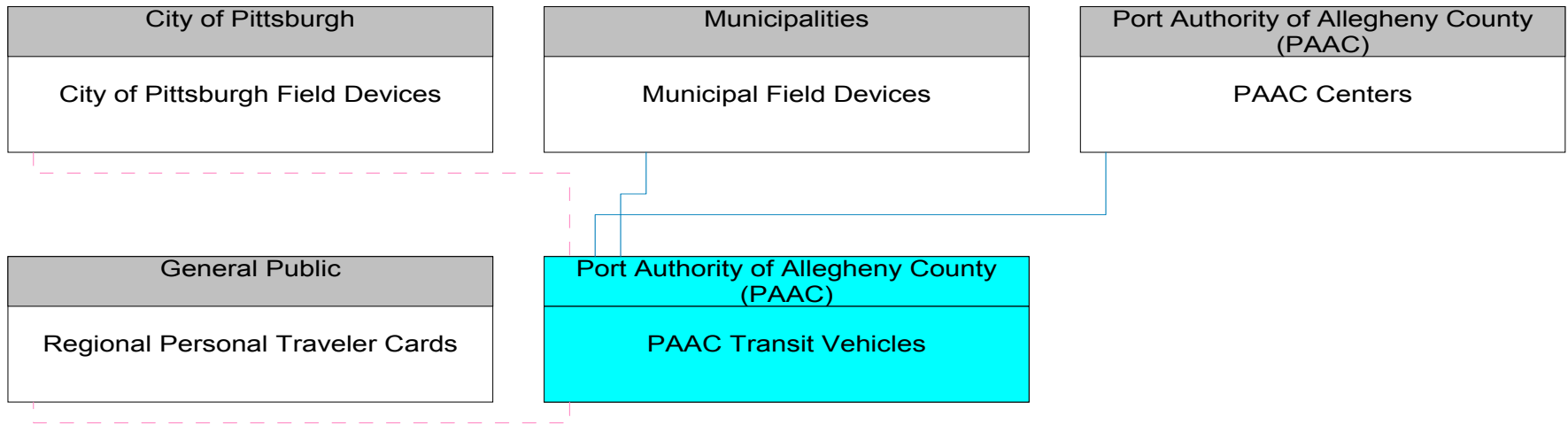
———— Existing  
- - - - - Planned

# PAAC Transit Vehicles

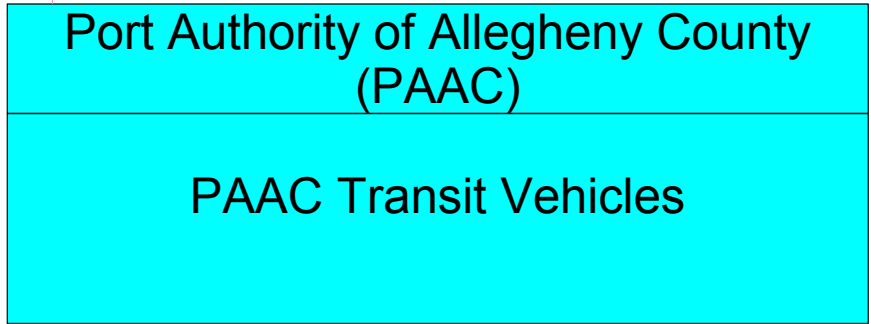
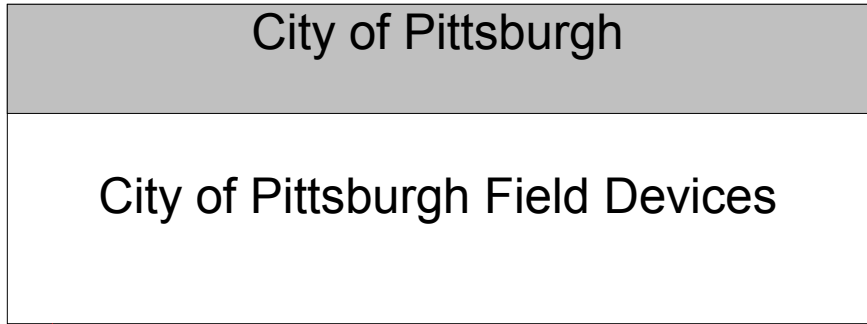


PA

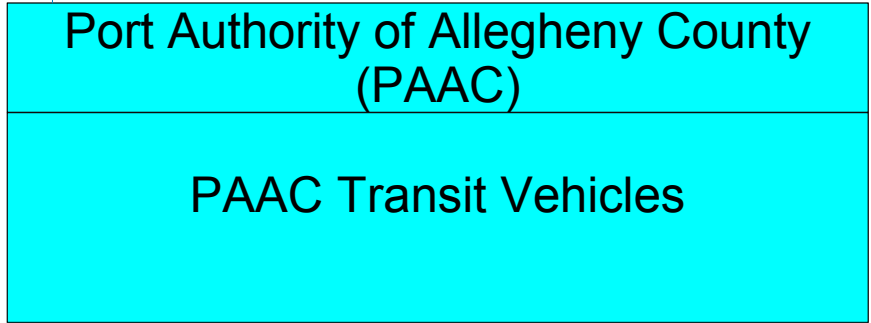
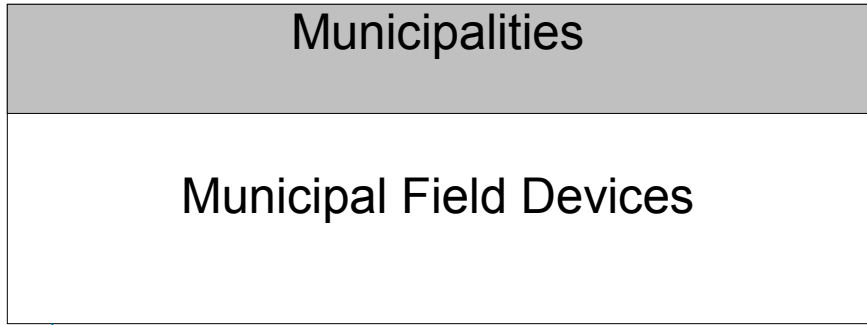
# PAAC Transit Vehicles Interconnect Diagram



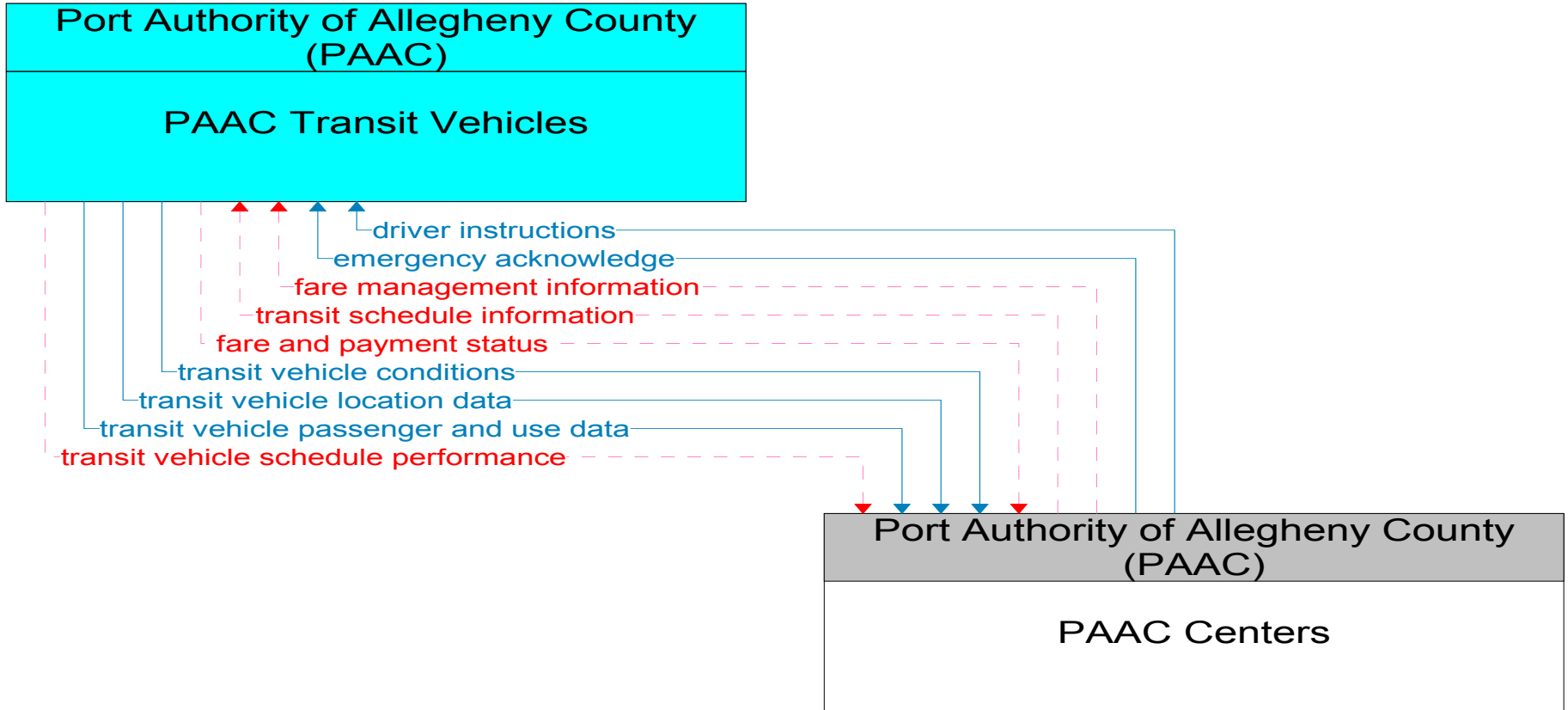
— Existing  
- - - Planned



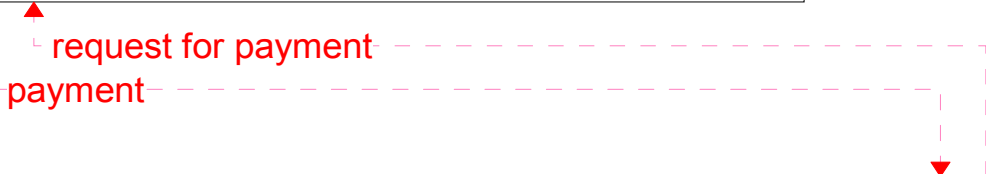
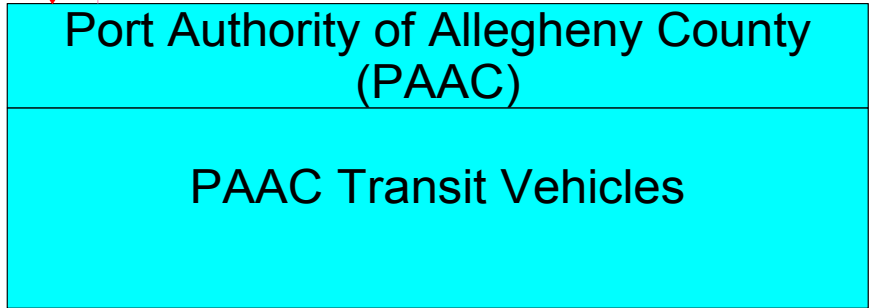
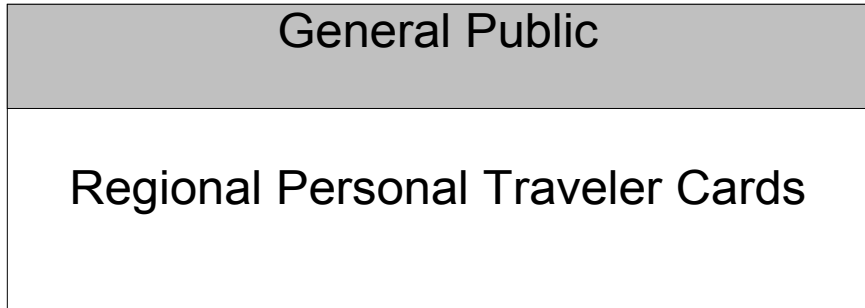
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- - - - - Planned



———— Existing  
- - - - - Planned



Existing  
Planned



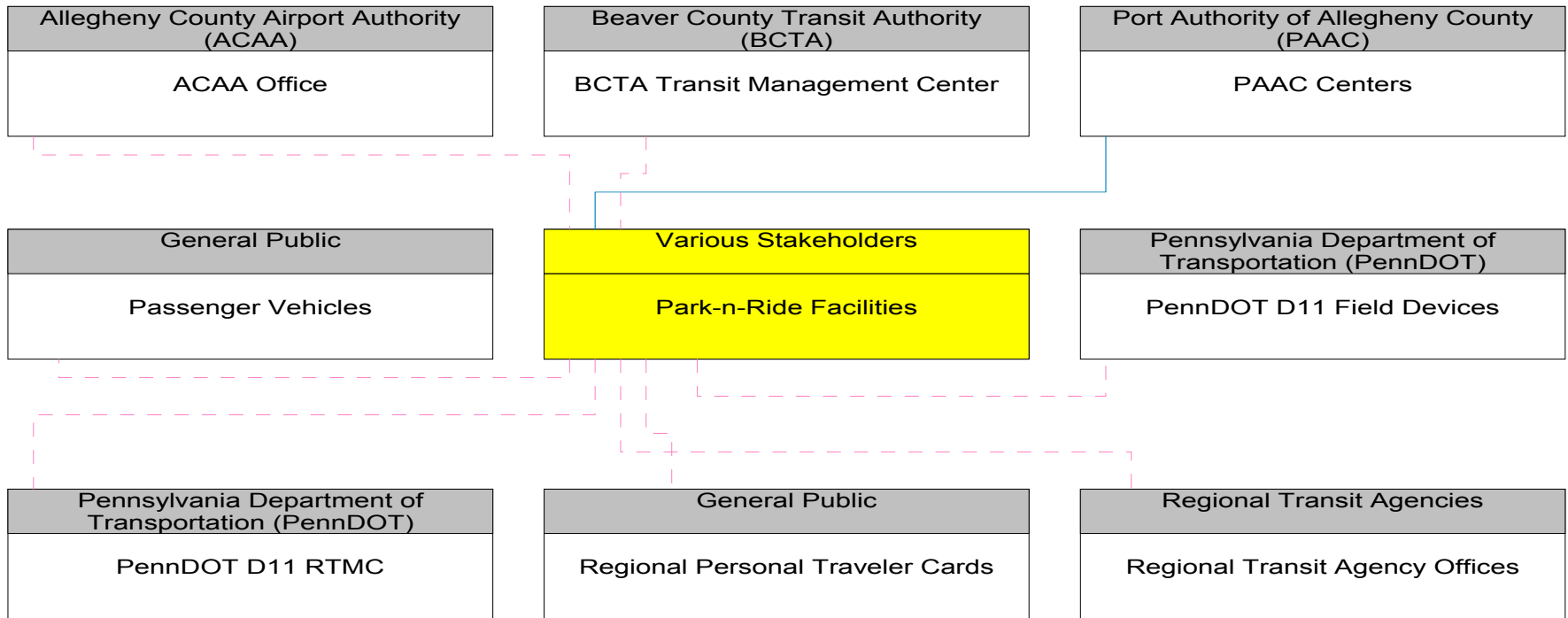
Existing  
Planned

# Park-n-Ride Facilities

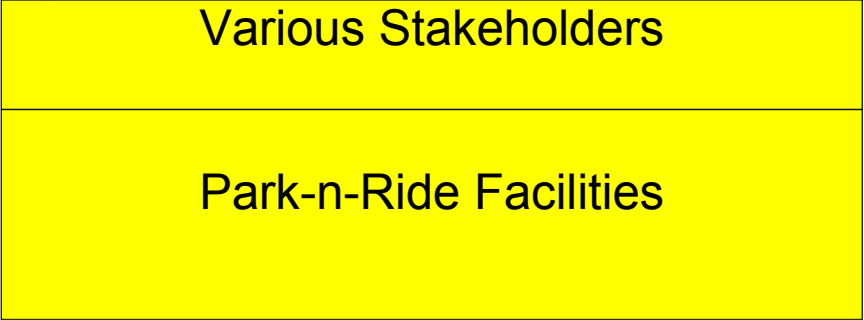
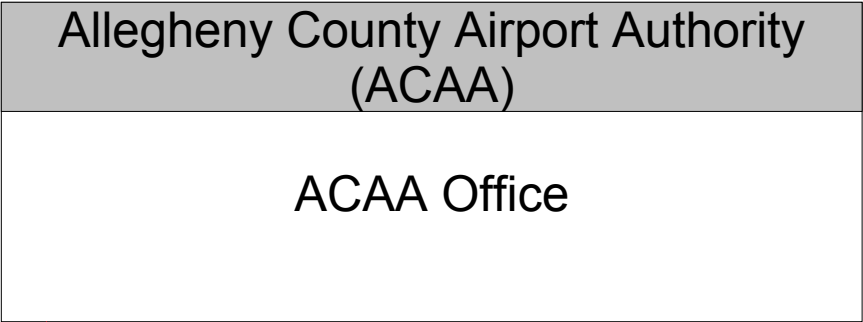




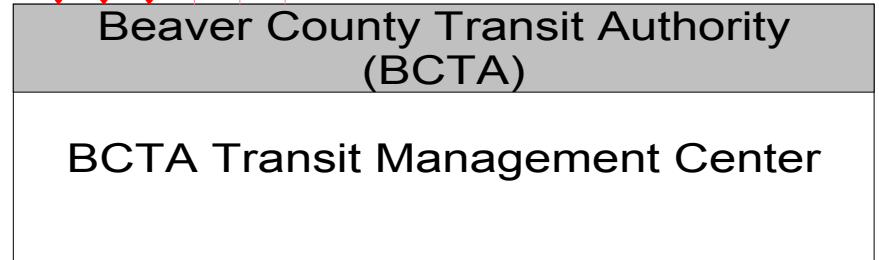
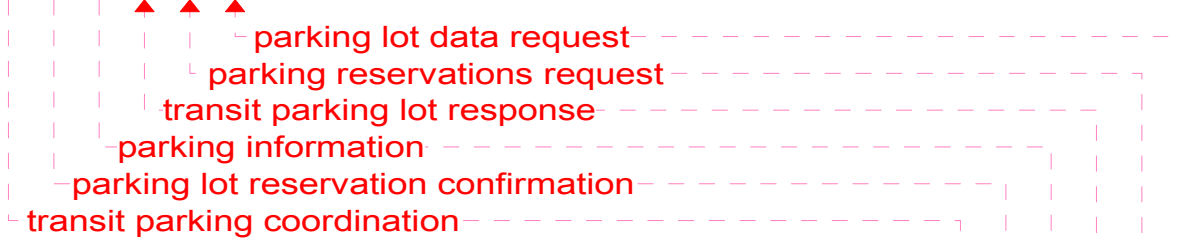
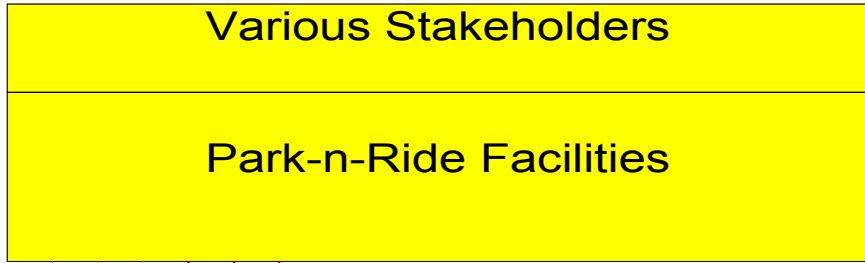
# Park-n-Ride Facilities Interconnect Diagram



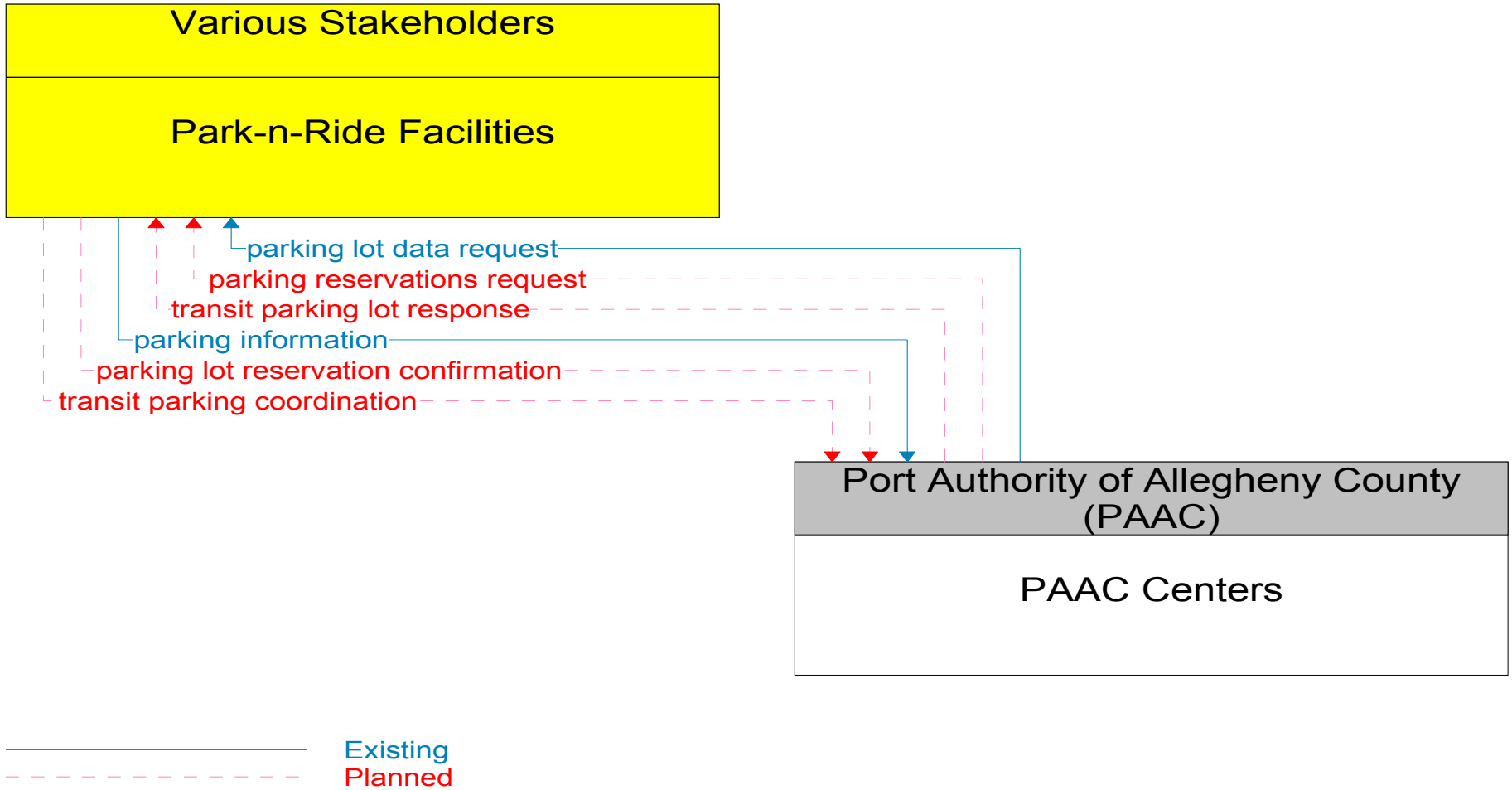
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- - - - - Planned

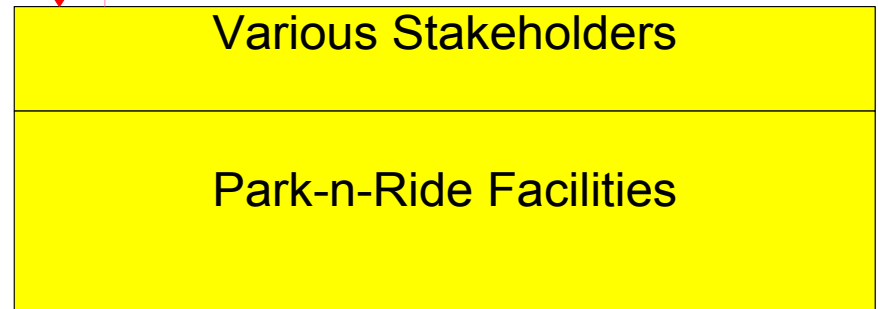
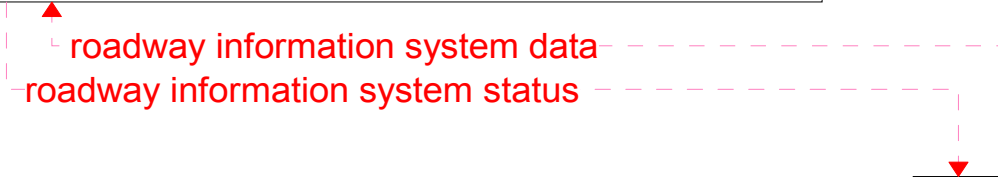
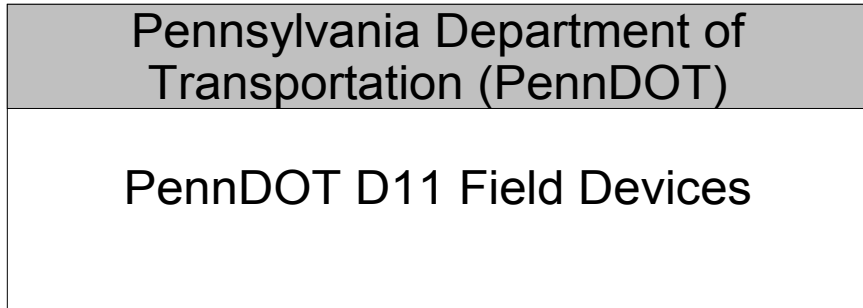


Existing  
Planned

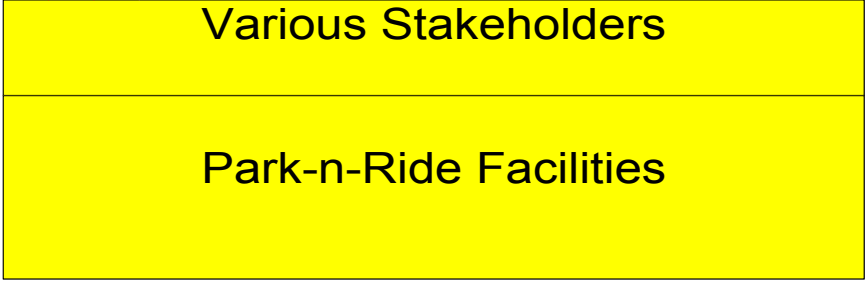
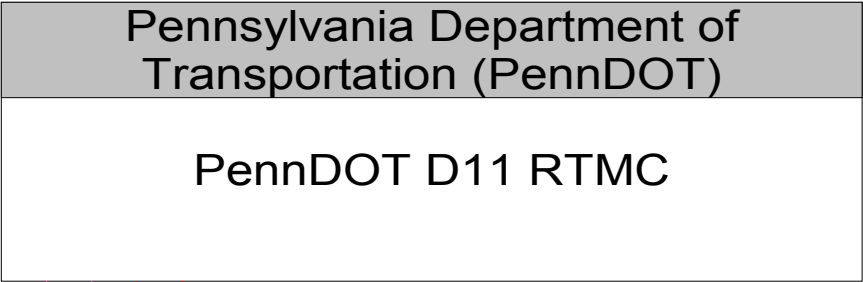


———— Existing  
- - - - - Planned

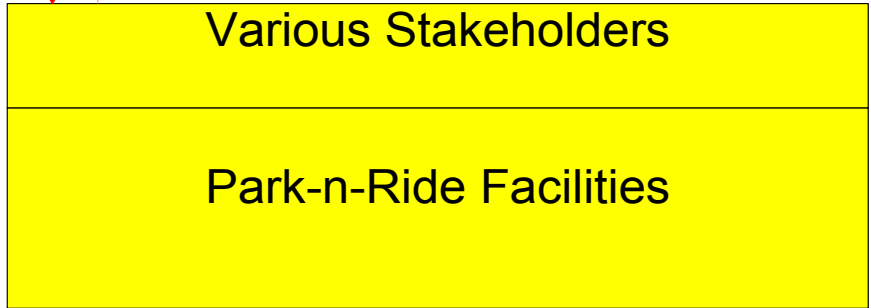
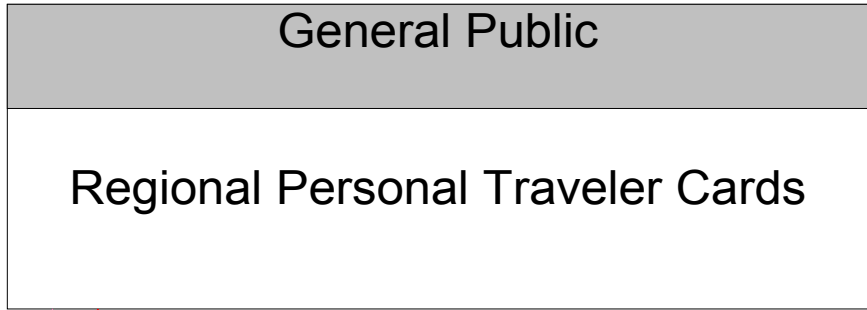


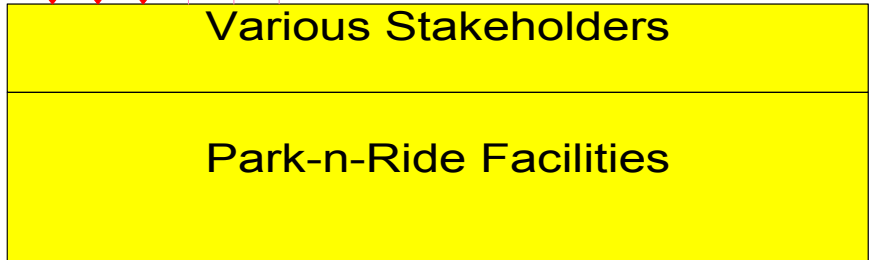
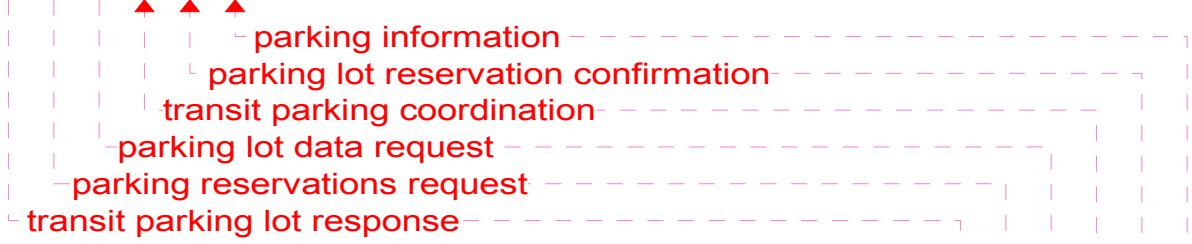
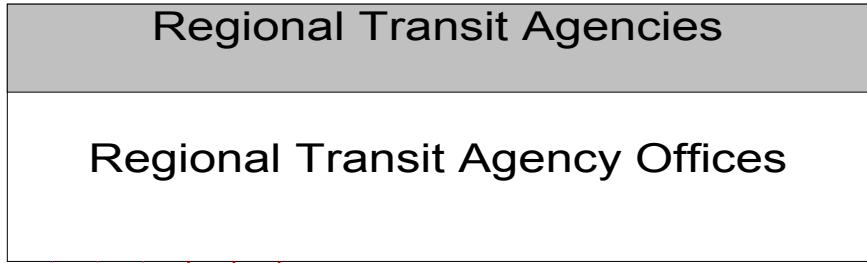


———— Existing  
- - - - - Planned



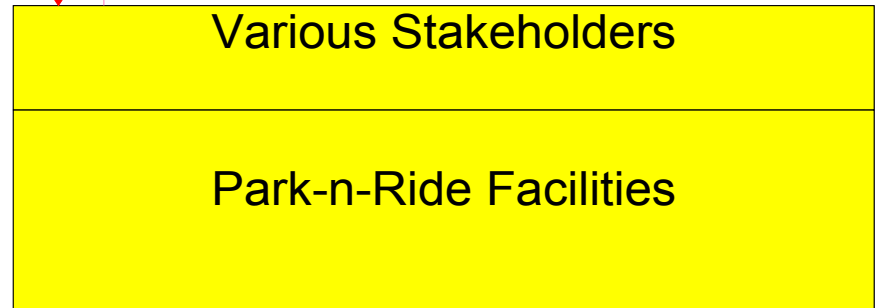
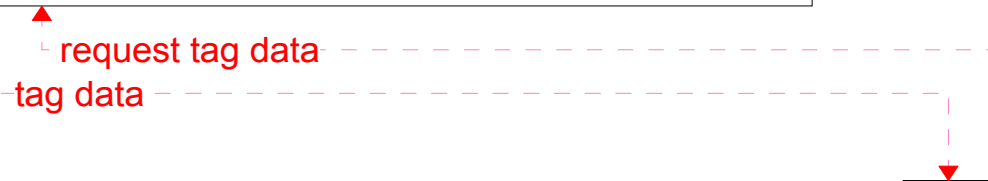
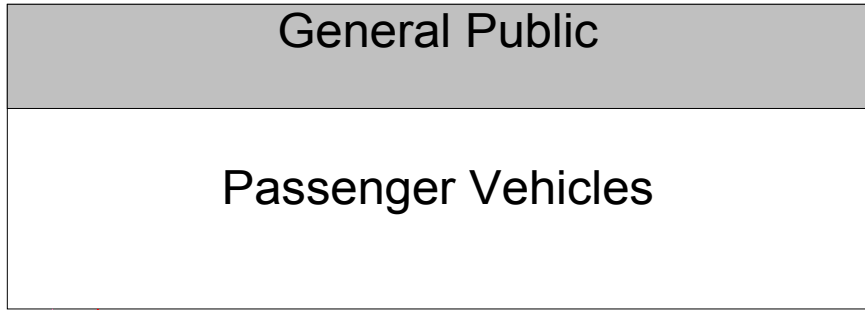
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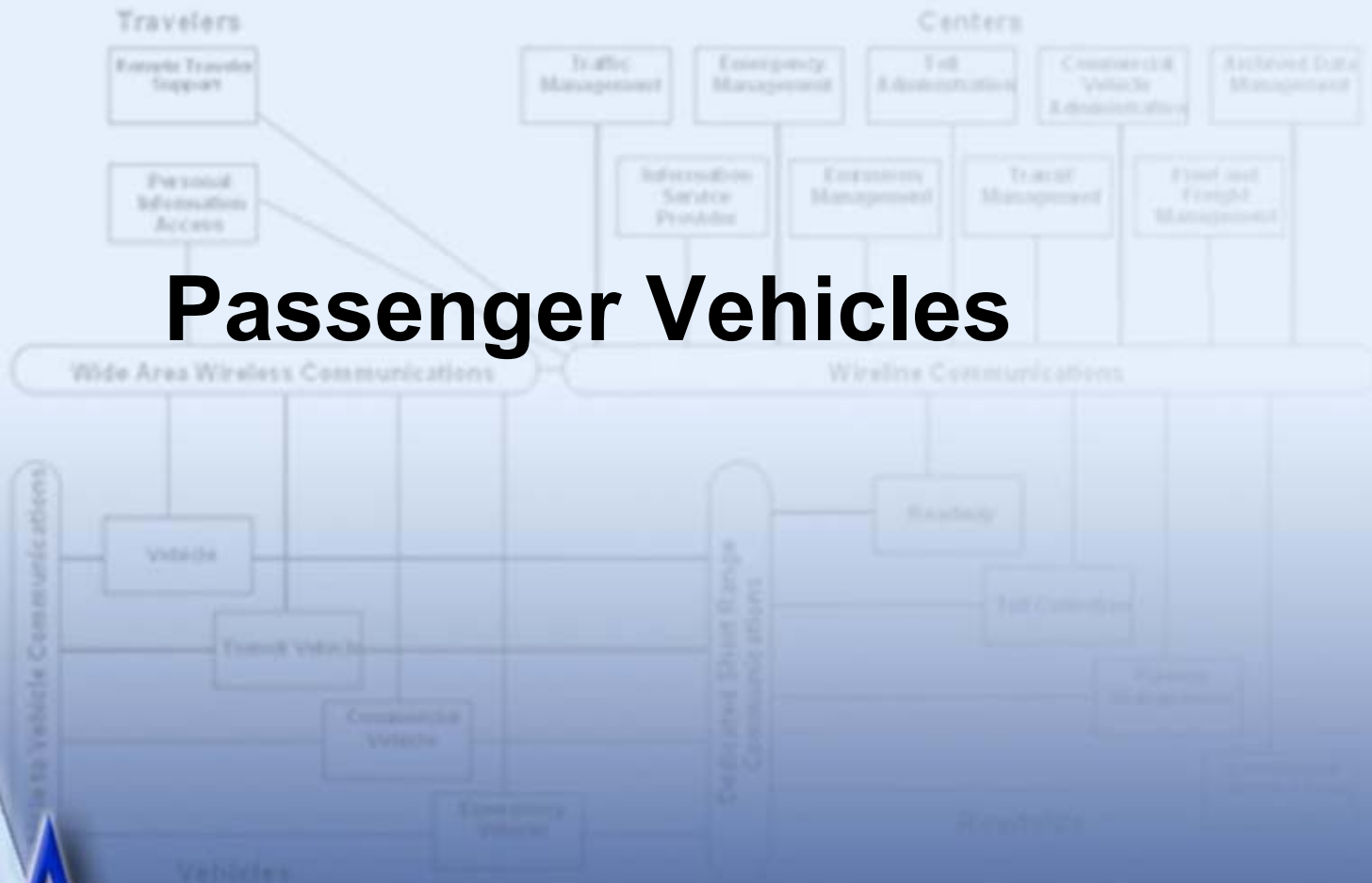
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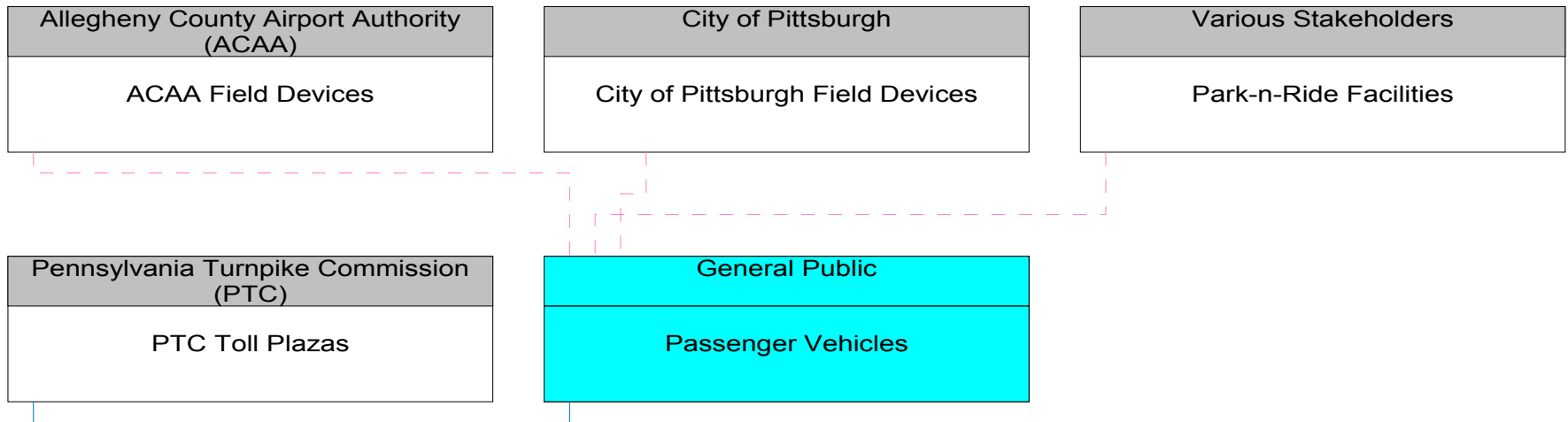
———— Existing  
- - - - - Planned

# Passenger Vehicles

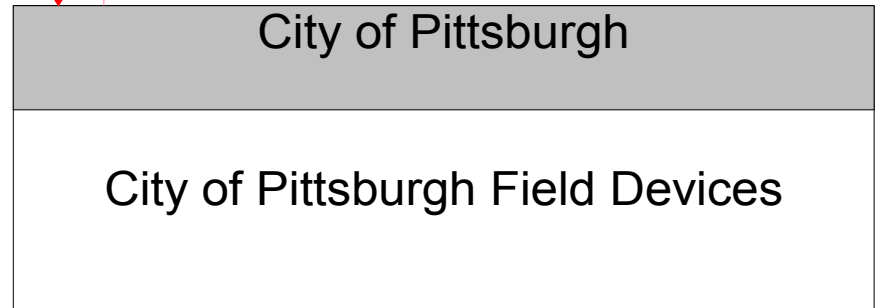
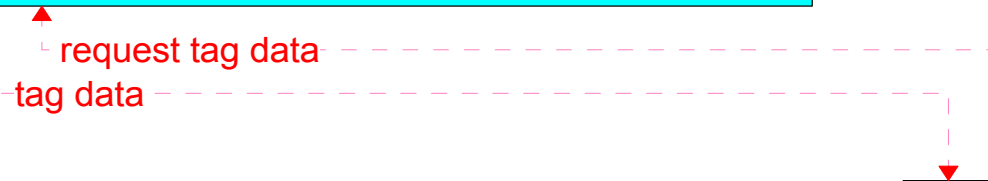
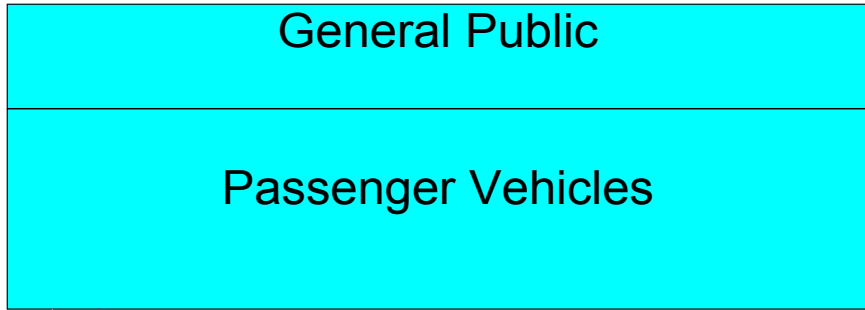


PA

# Passenger Vehicles Interconnect Diagram

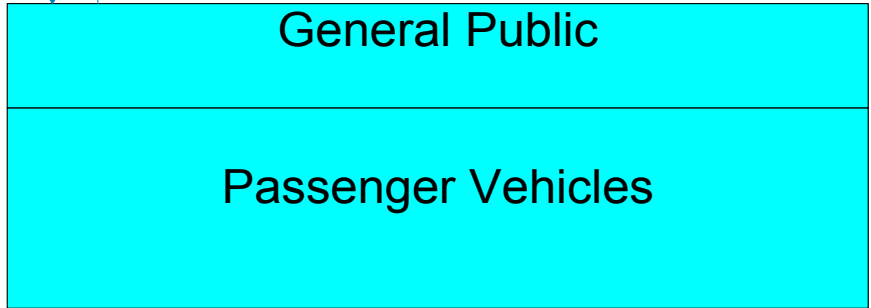
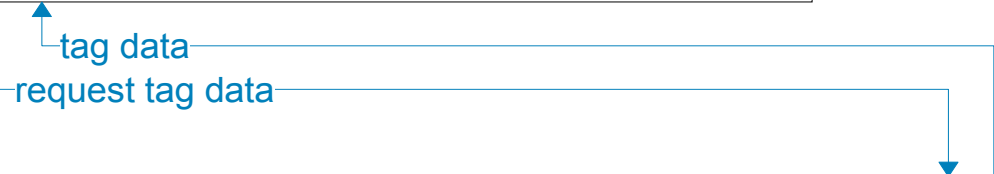
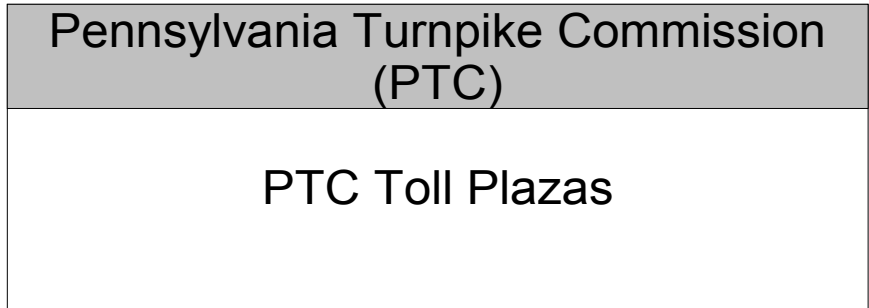


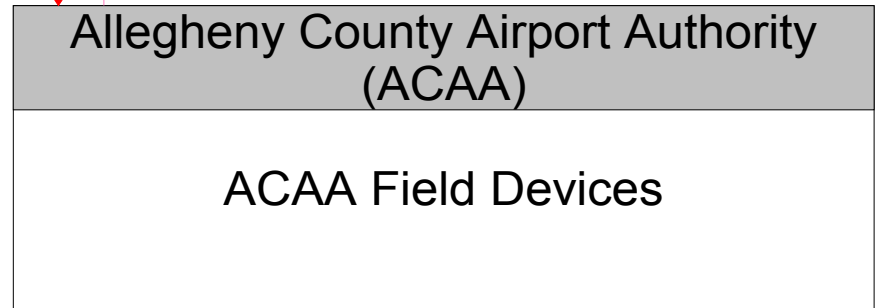
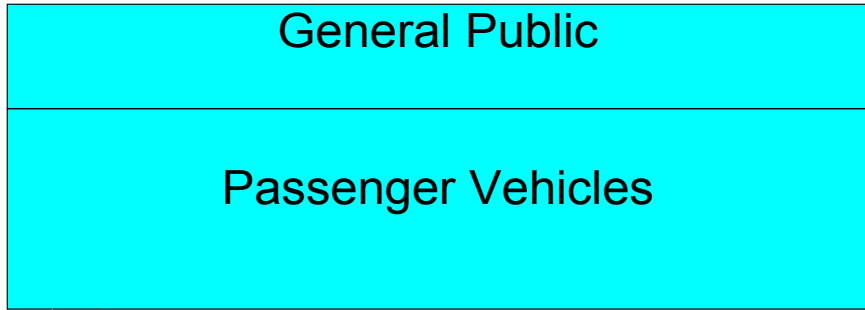
— Existing  
- - - Planned



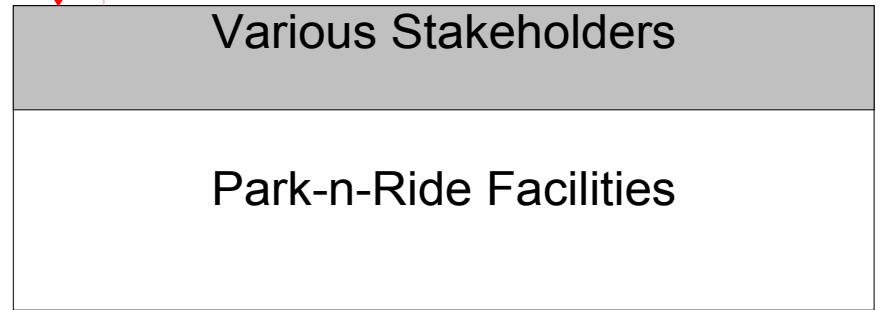
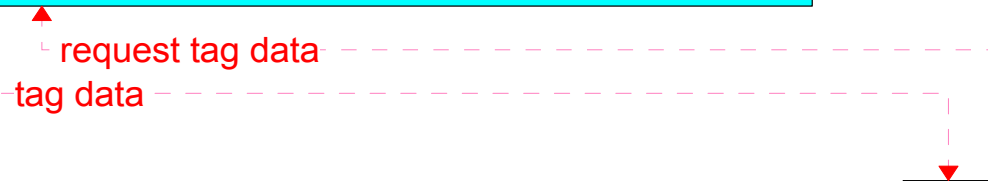
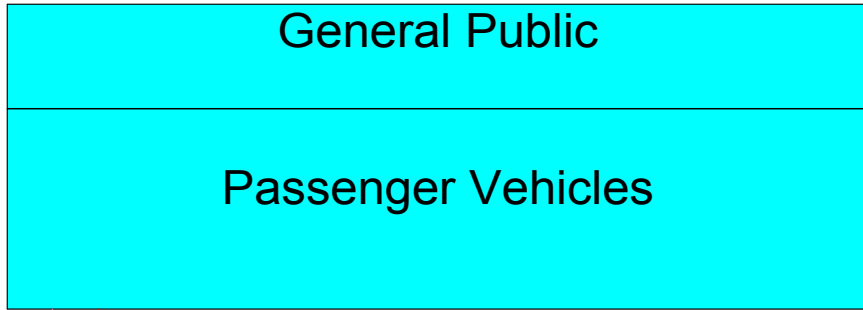
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Planned



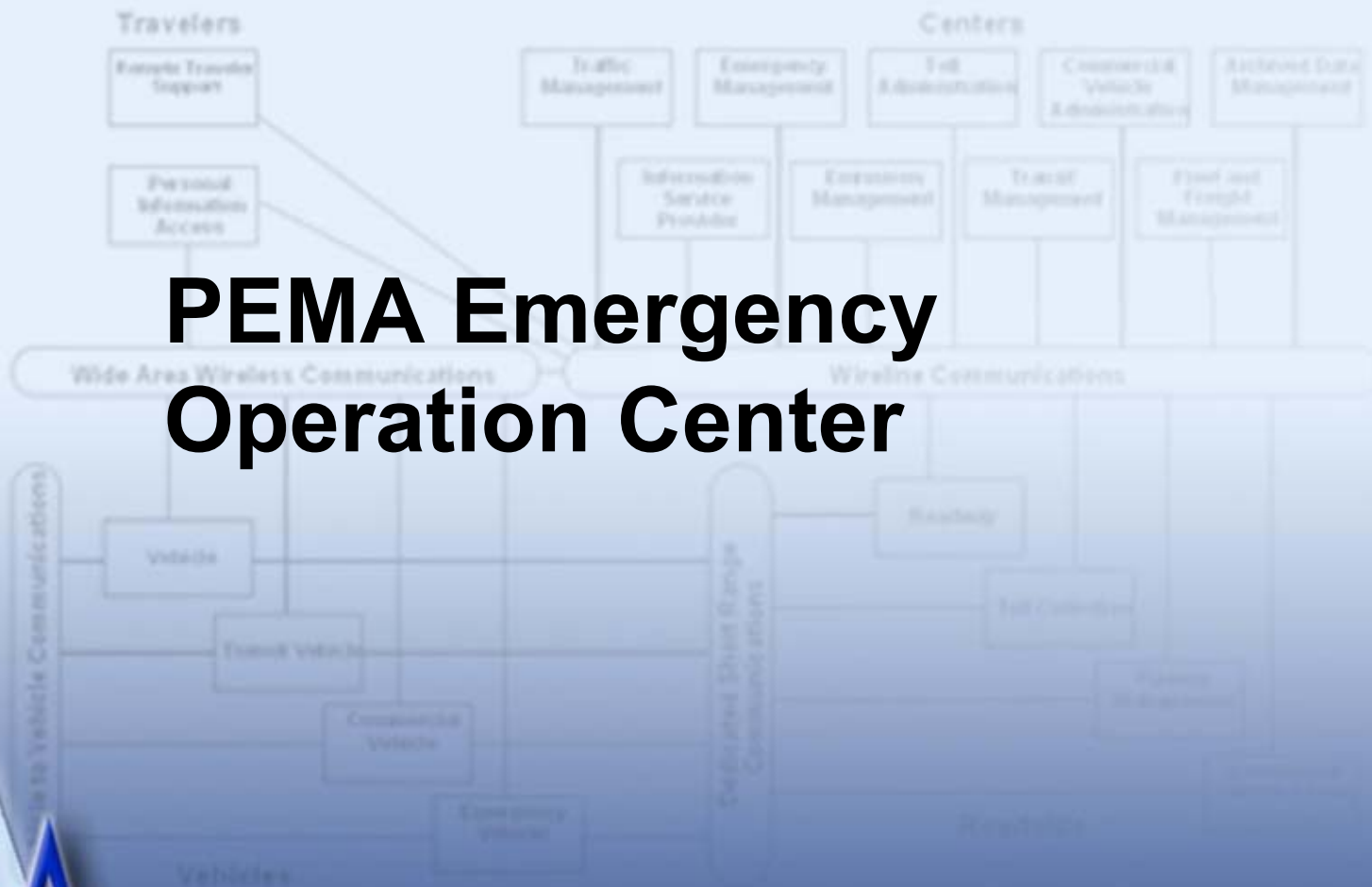


———— Existing  
- - - - - Planned



———— Existing  
- - - - - Planned

# PEMA Emergency Operation Center



PA

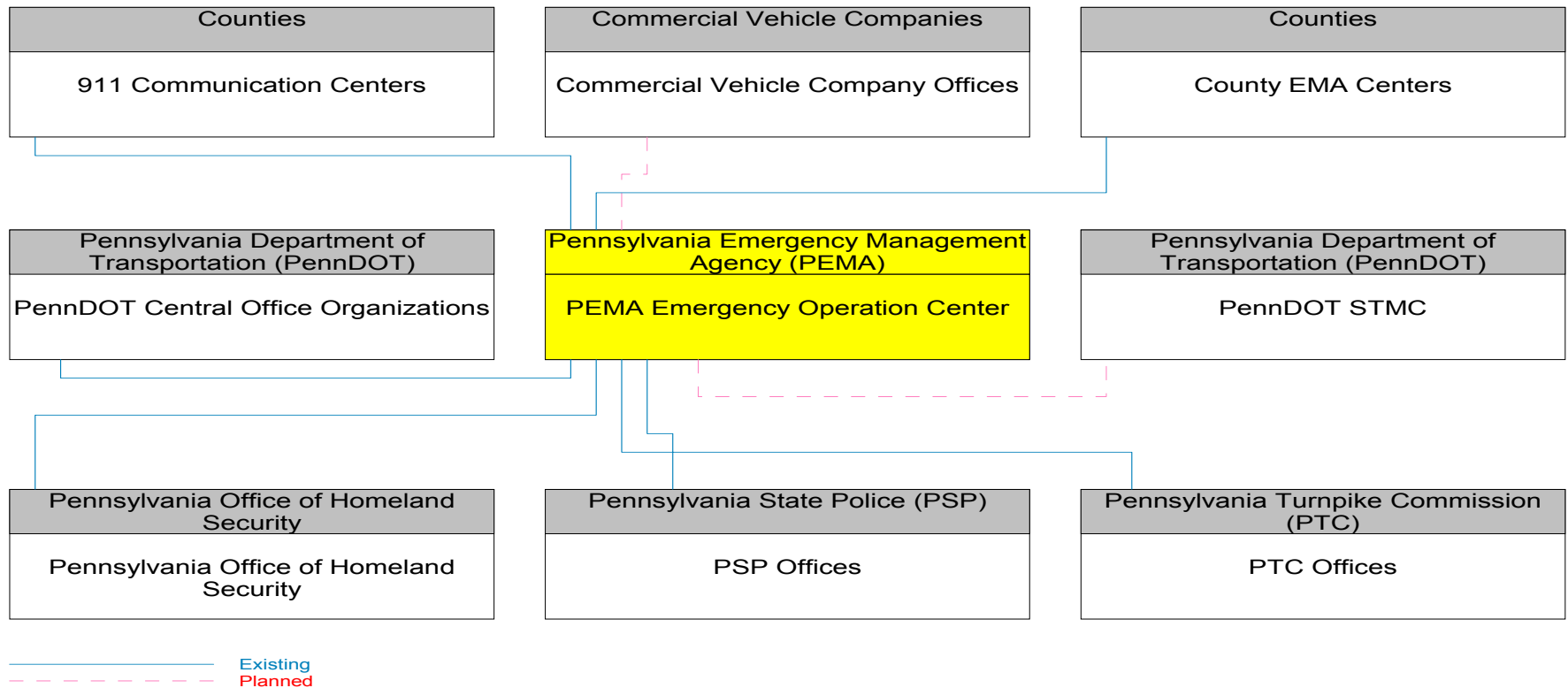
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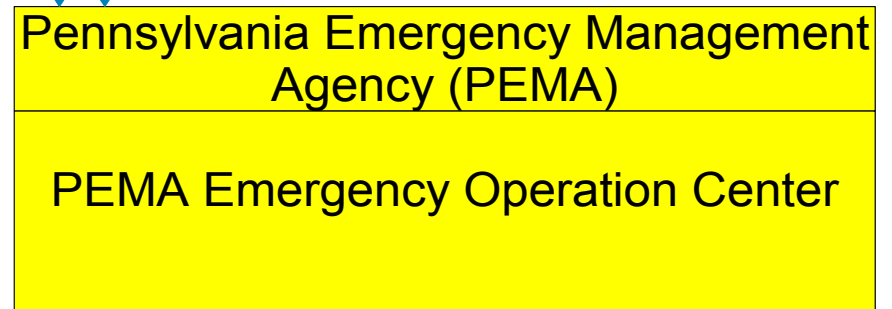
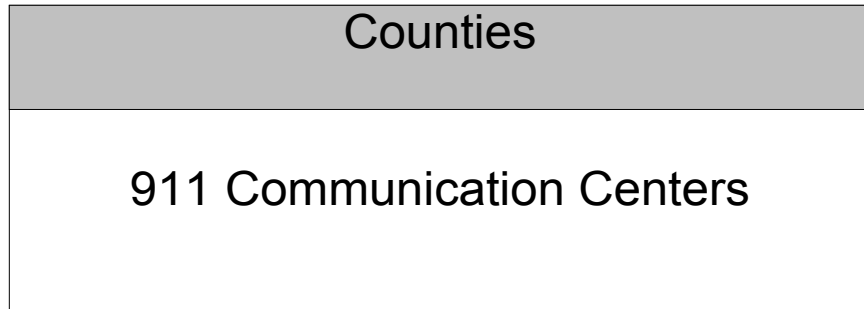
architecture

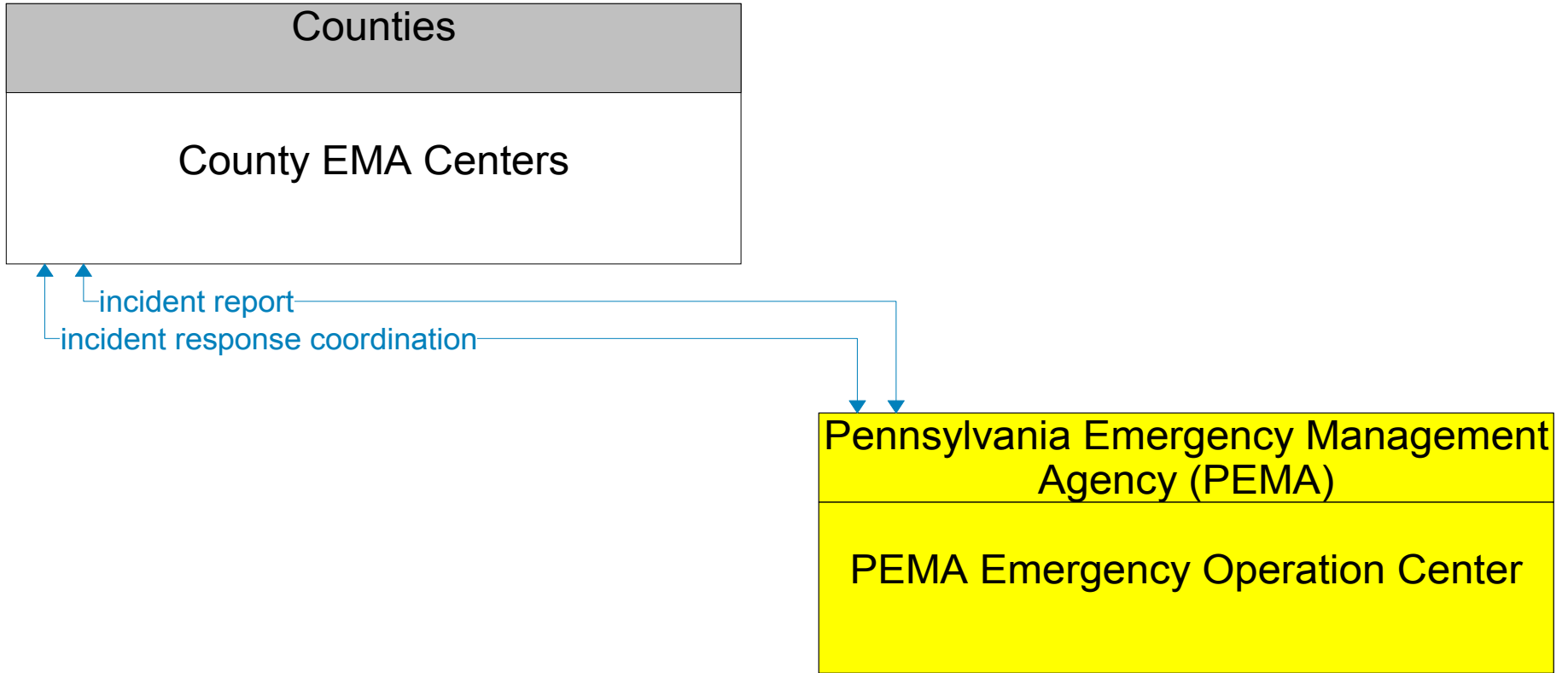




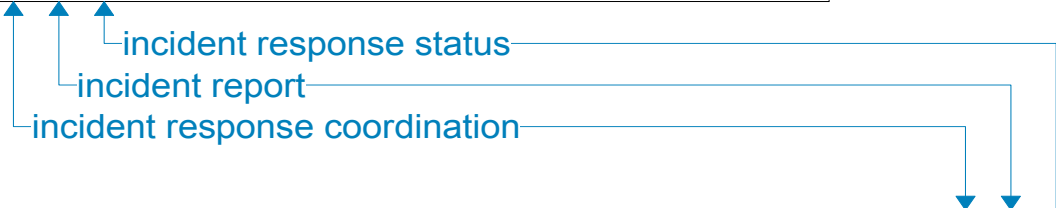
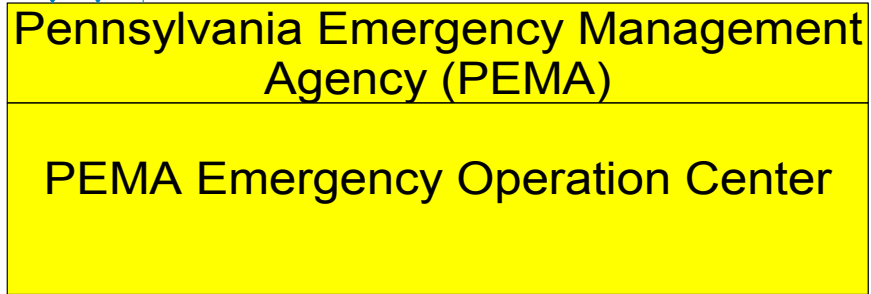
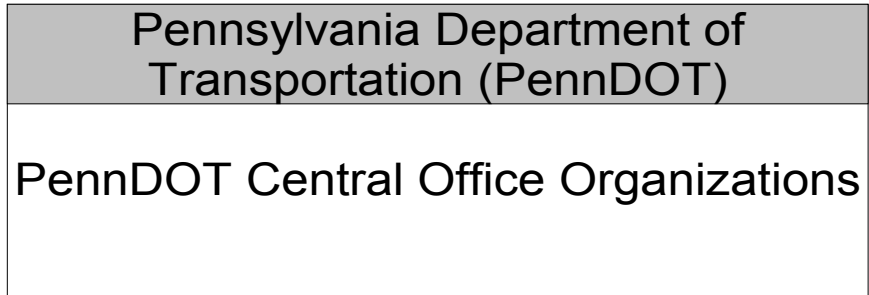
# PEMA Emergency Operation Center Interconnect Diagram



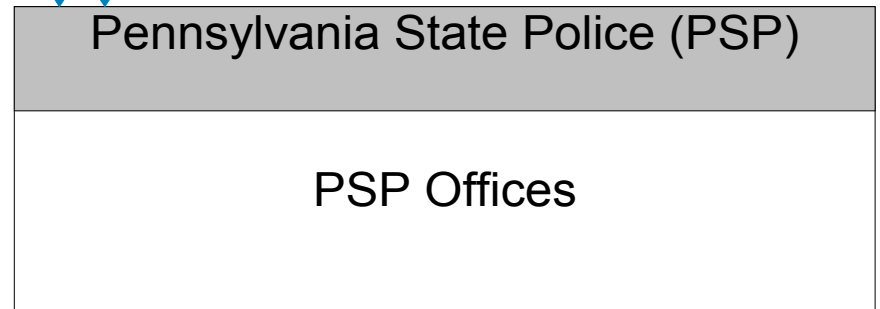
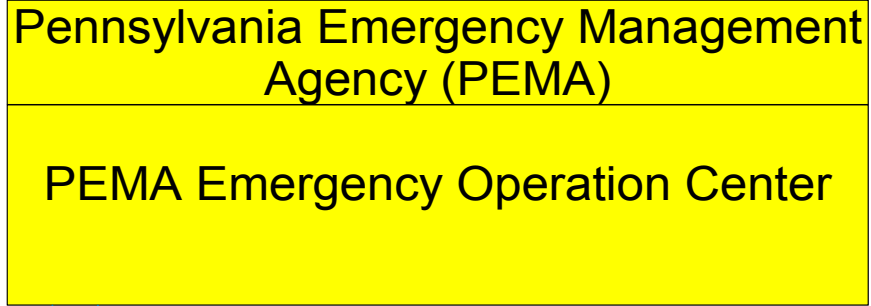




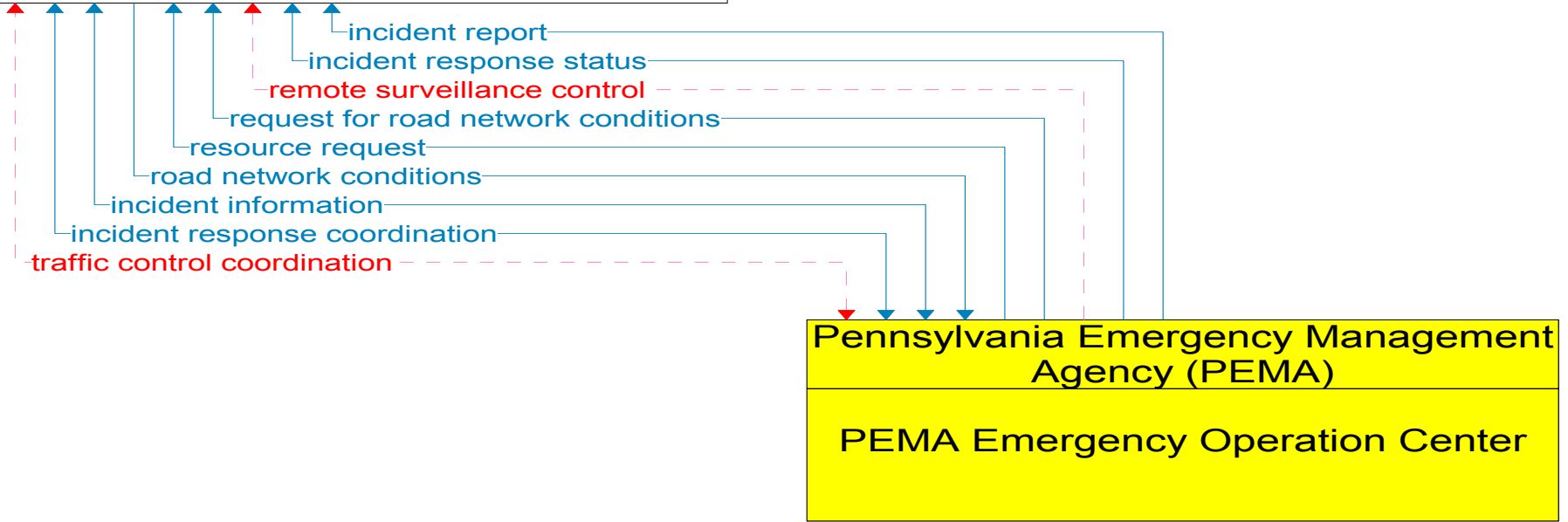
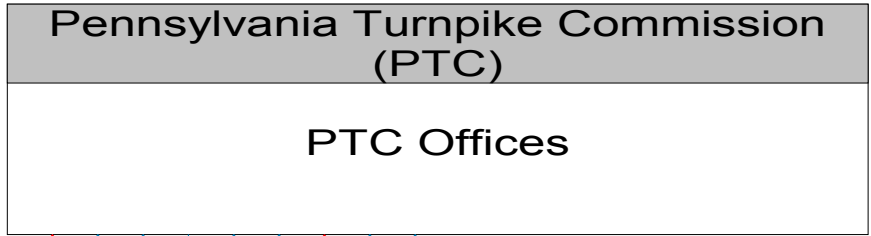
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- - - - - Planned



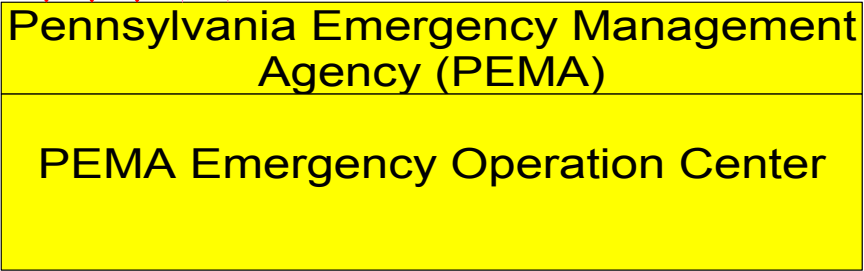
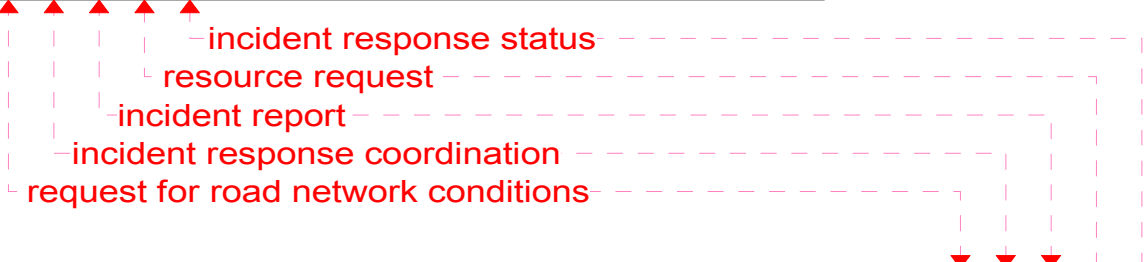
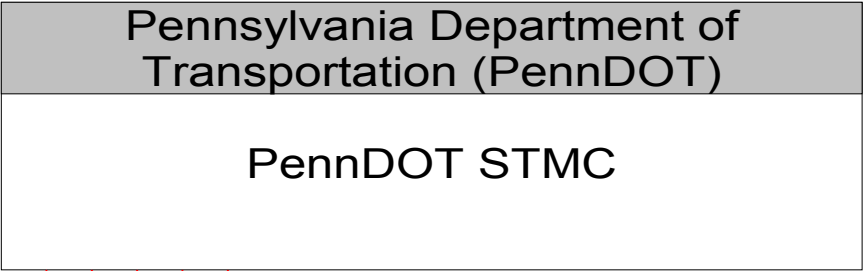
———— Existing  
- - - - - Planned



Existing  
Planned



Existing  
Planned



———— Existing  
- - - - - Planned

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center



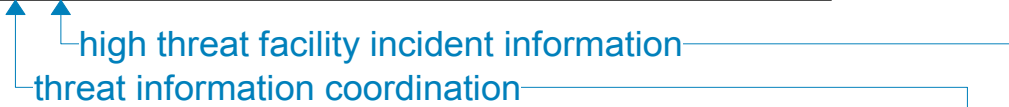
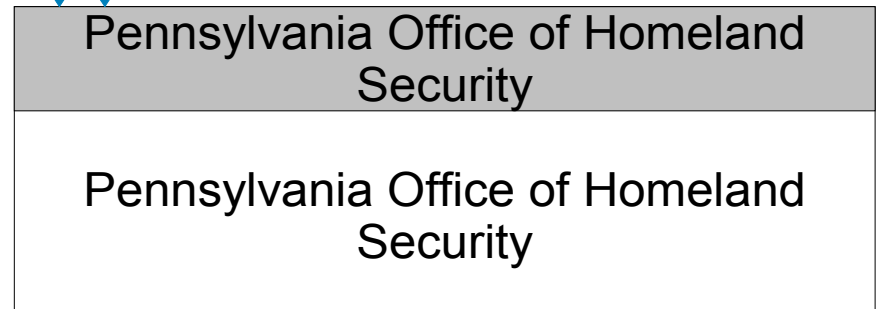
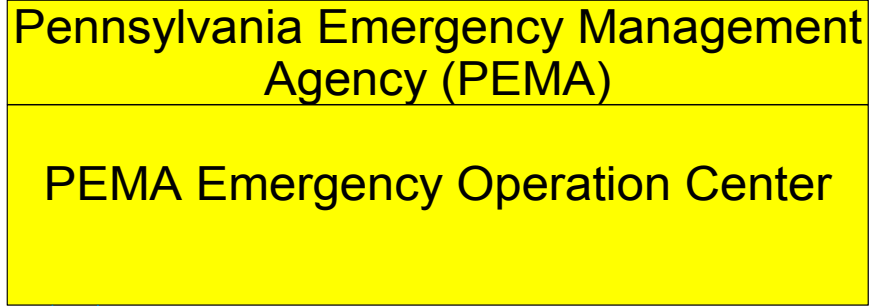
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Commercial Vehicle Companies

Commercial Vehicle Company Offices

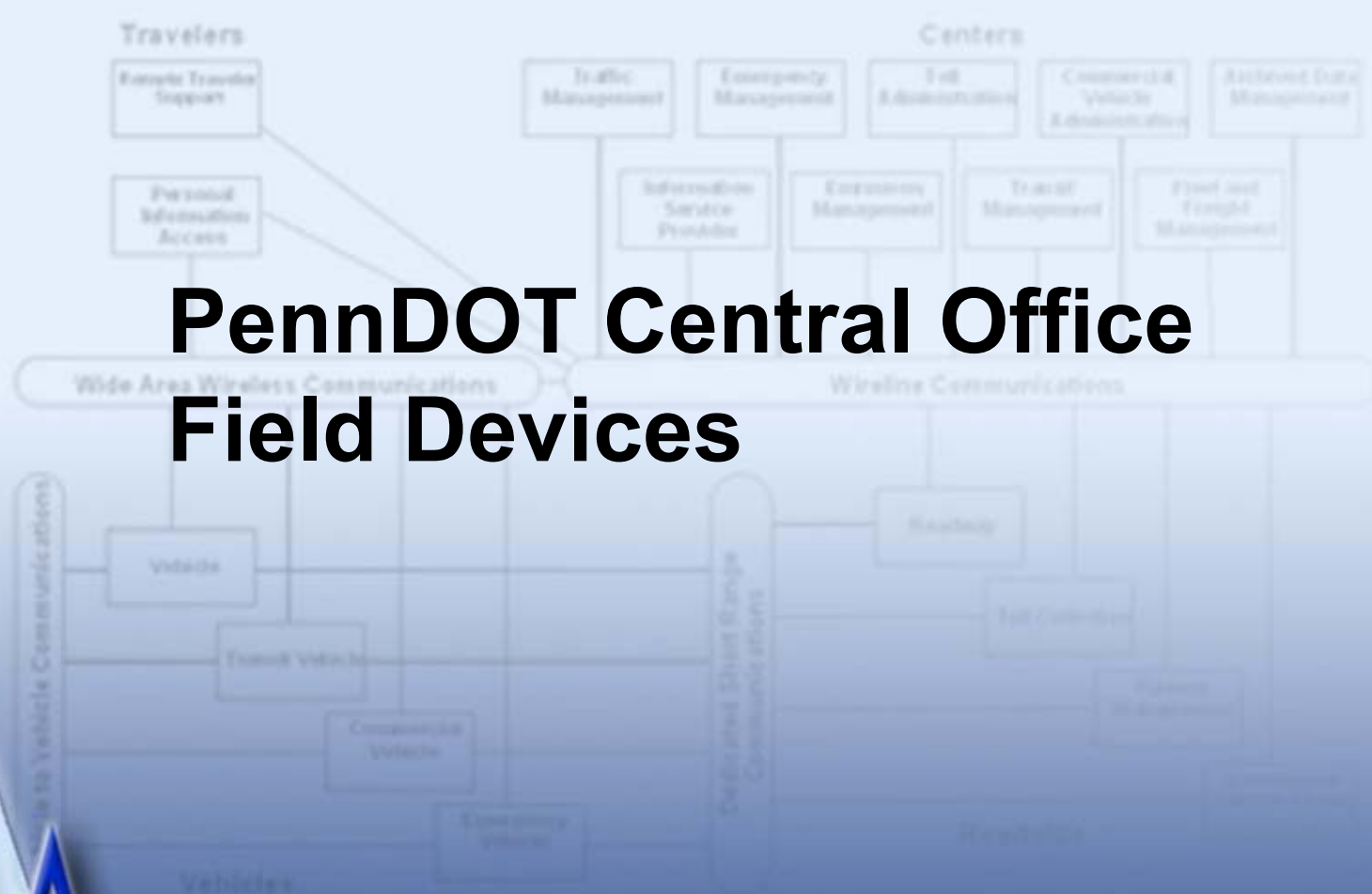
Existing  
Planned





———— Existing  
- - - - - Planned

# PennDOT Central Office Field Devices

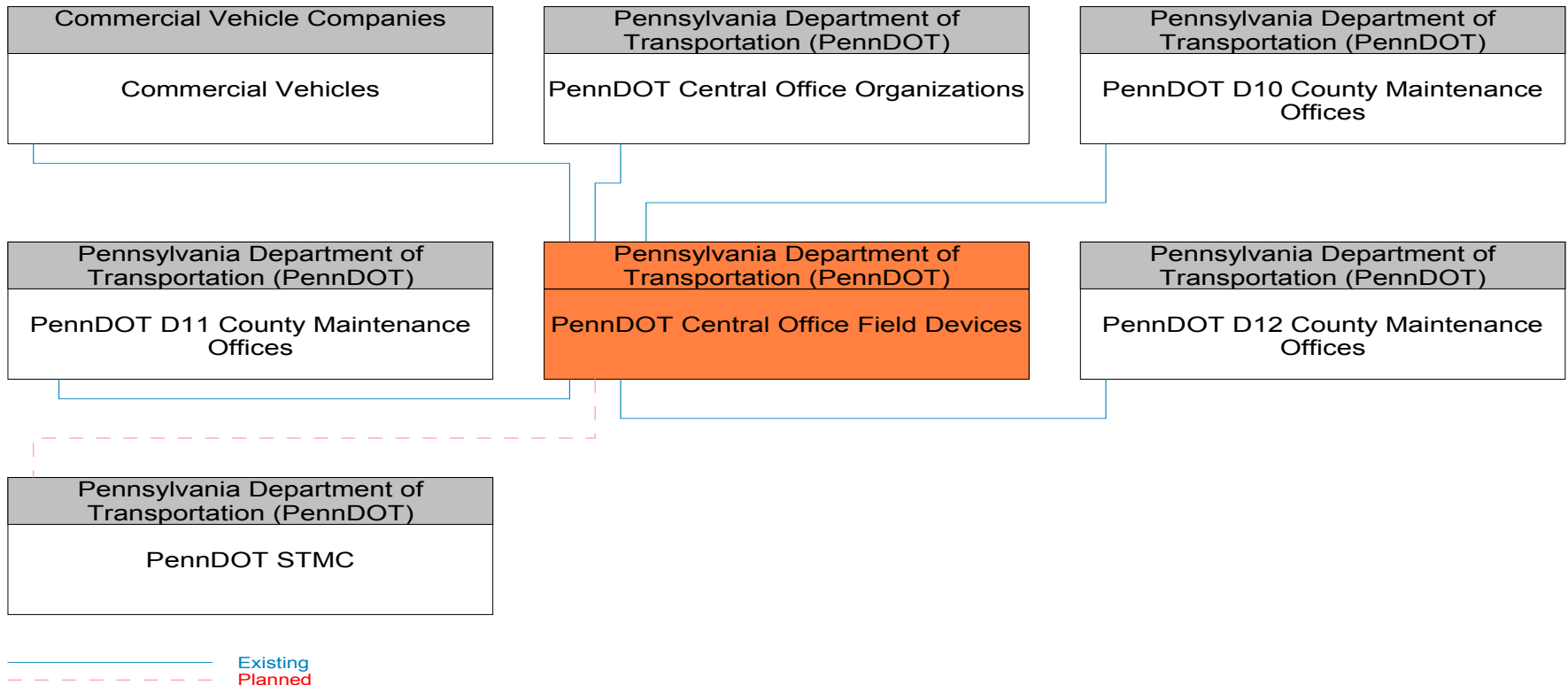


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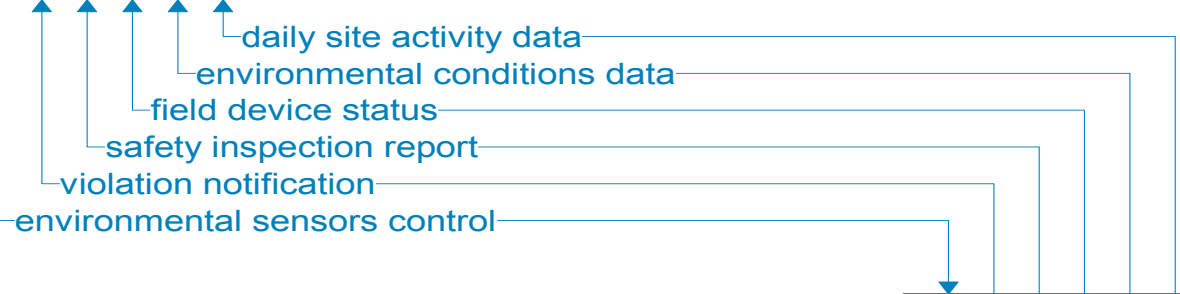
architecture



# PennDOT Central Office Field Devices Interconnect Diagram



Pennsylvania Department of Transportation (PennDOT)  
PennDOT Central Office Organizations



Pennsylvania Department of Transportation (PennDOT)  
PennDOT Central Office Field Devices

———— Existing  
- - - - - Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D10 County Maintenance  
Offices

environmental conditions data

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT Central Office Field Devices

Existing  
Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 County Maintenance  
Offices

environmental conditions data

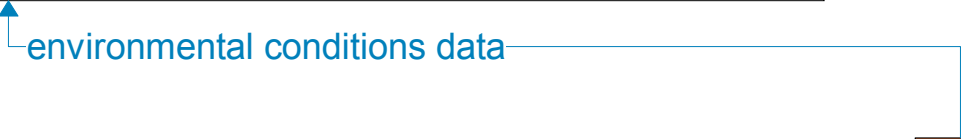
Pennsylvania Department of  
Transportation (PennDOT)

PennDOT Central Office Field Devices

Existing  
Planned

Pennsylvania Department of  
Transportation (PennDOT)

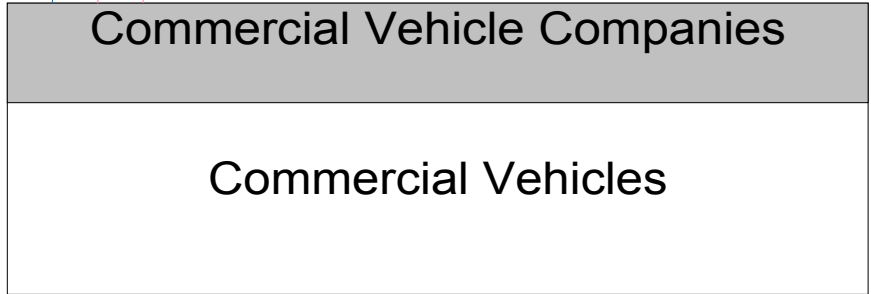
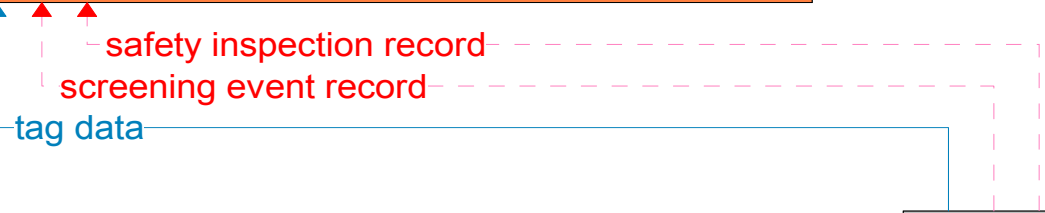
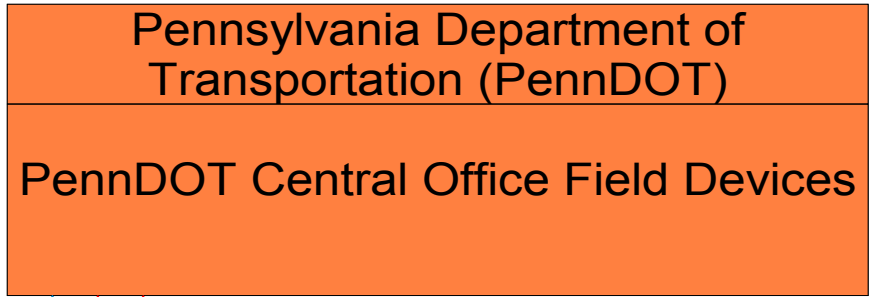
PennDOT D12 County Maintenance  
Offices



Pennsylvania Department of  
Transportation (PennDOT)

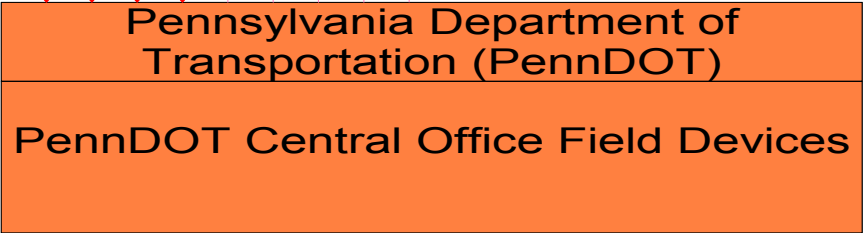
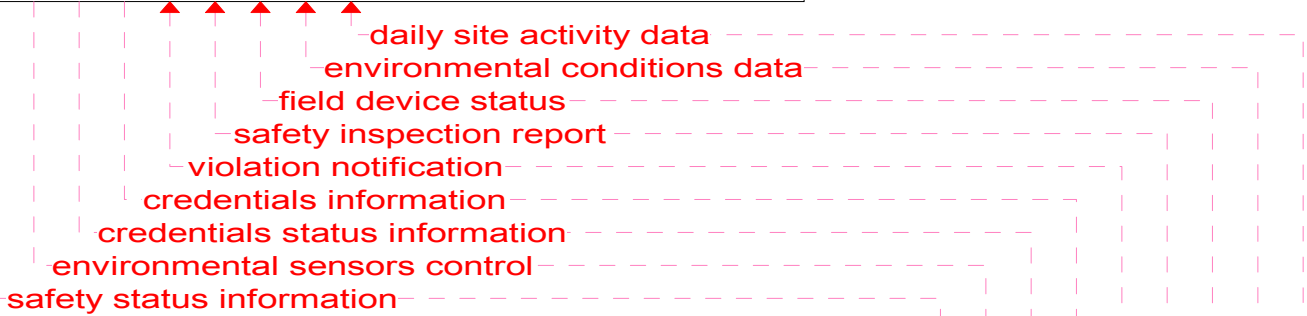
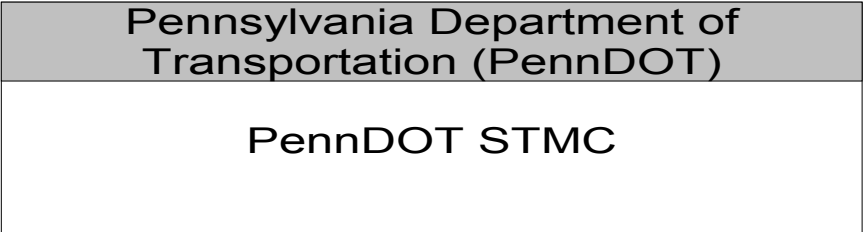
PennDOT Central Office Field Devices

———— Existing  
- - - - - Planned



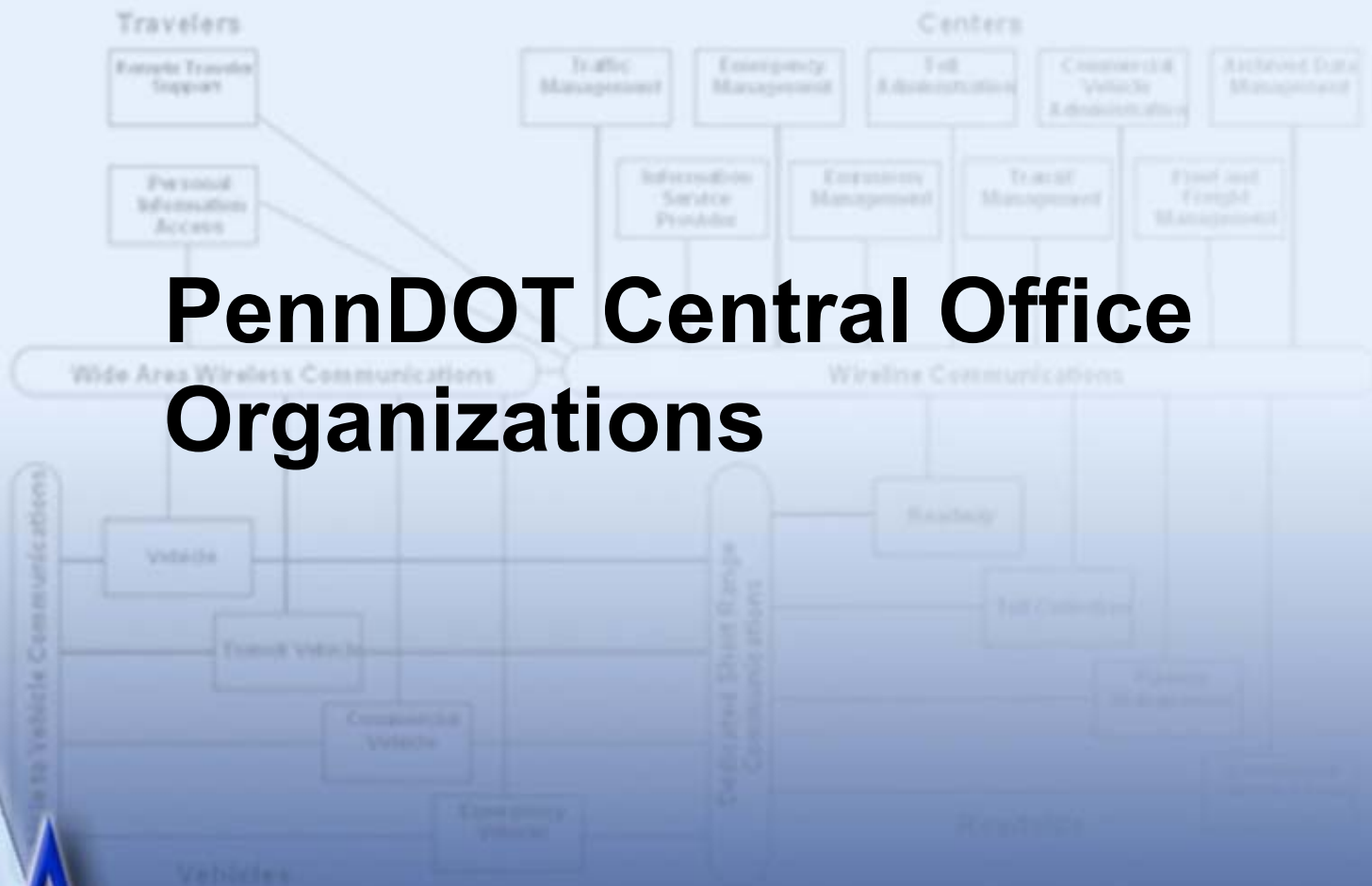
Existing  
Planned



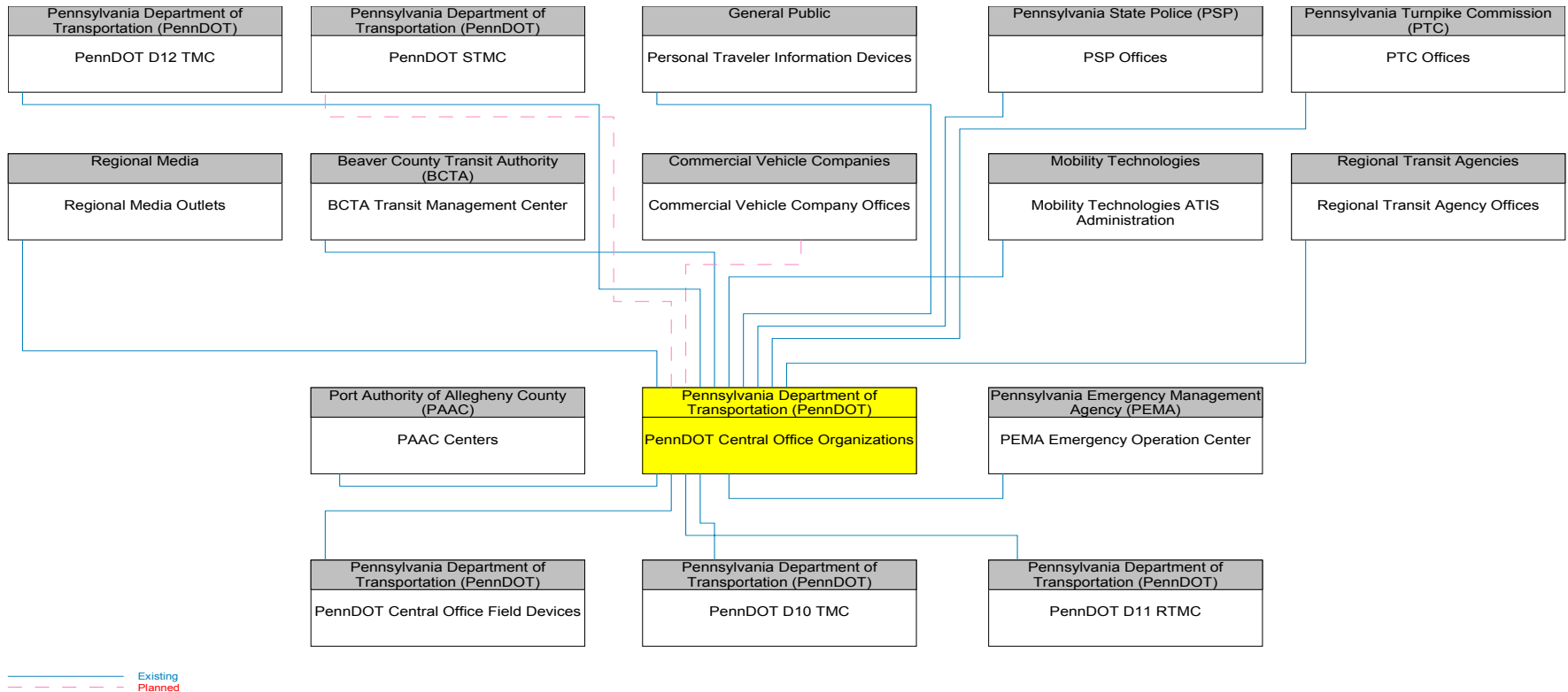


———— Existing  
- - - - - Planned

# PennDOT Central Office Organizations



# PennDOT Central Office Organizations Interconnect Diagram



Pennsylvania Department of  
Transportation (PennDOT)

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PennDOT Central Office Organizations

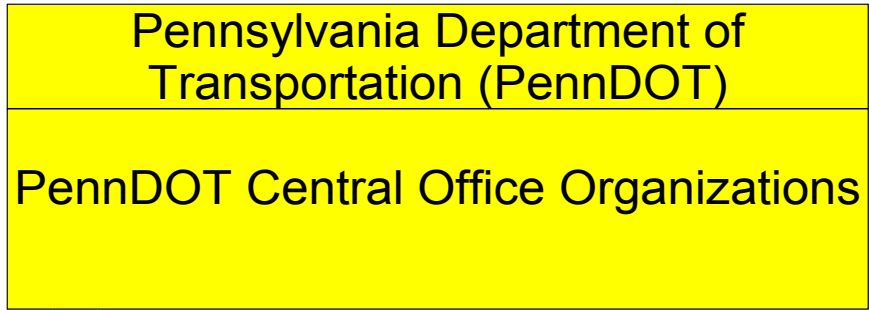
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archive requests

Beaver County Transit Authority  
(BCTA)

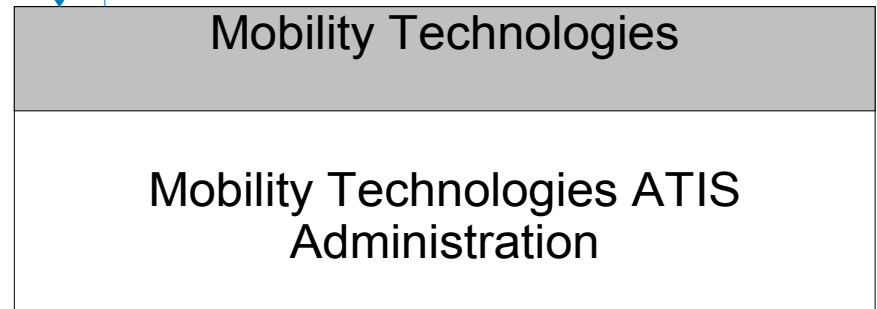
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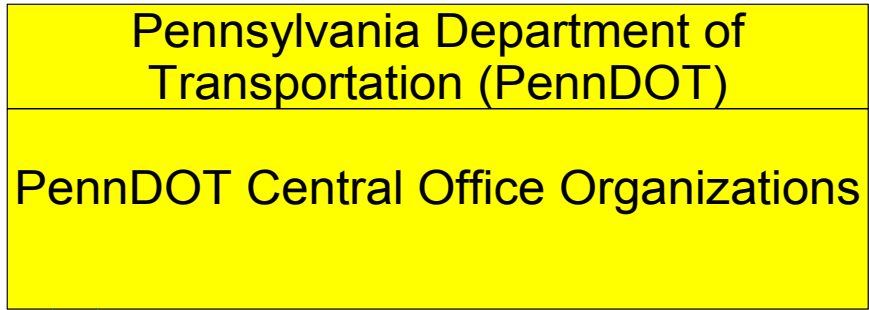
———— Existing  
----- Planned



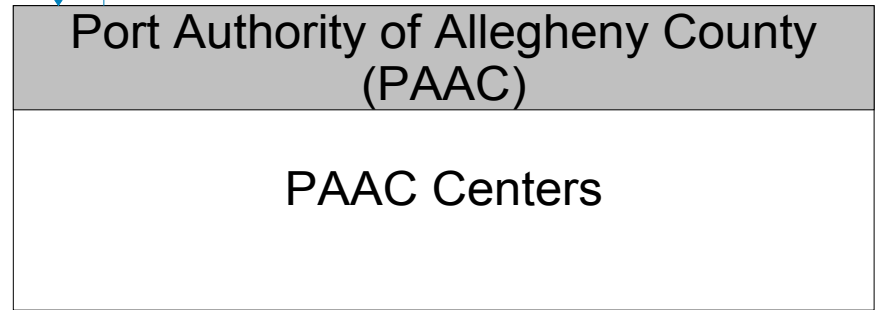
archive analysis results  
archive analysis requests



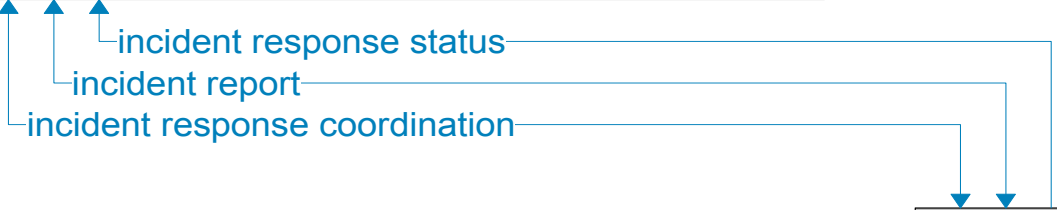
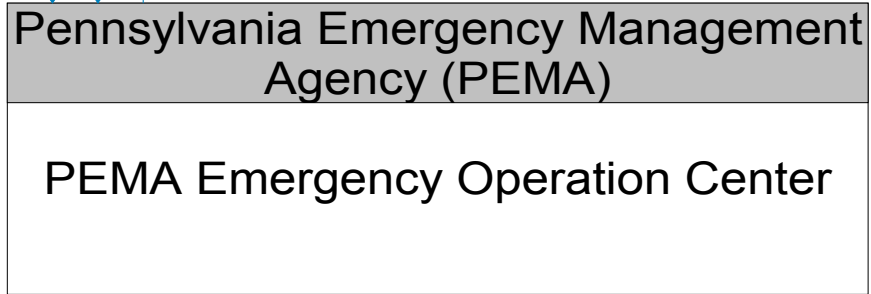
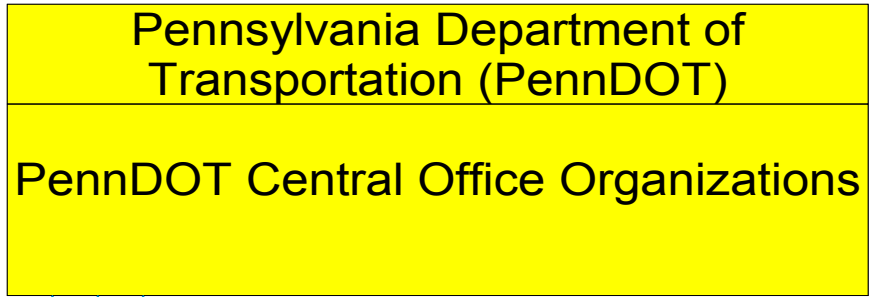
———— Existing  
----- Planned



transit archive data  
archive requests



———— Existing  
----- Planned

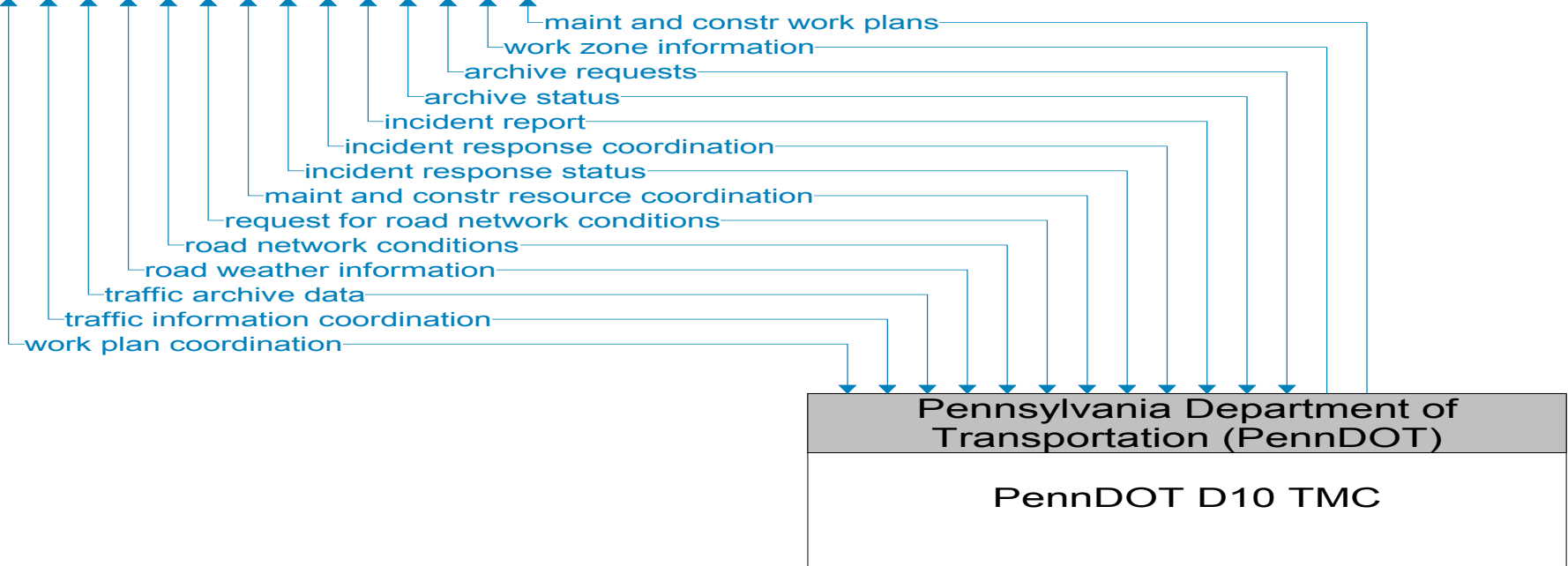


———— Existing  
- - - - - Planned

**Pennsylvania Department of Transportation (PennDOT)**

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**PennDOT Central Office Organizations**



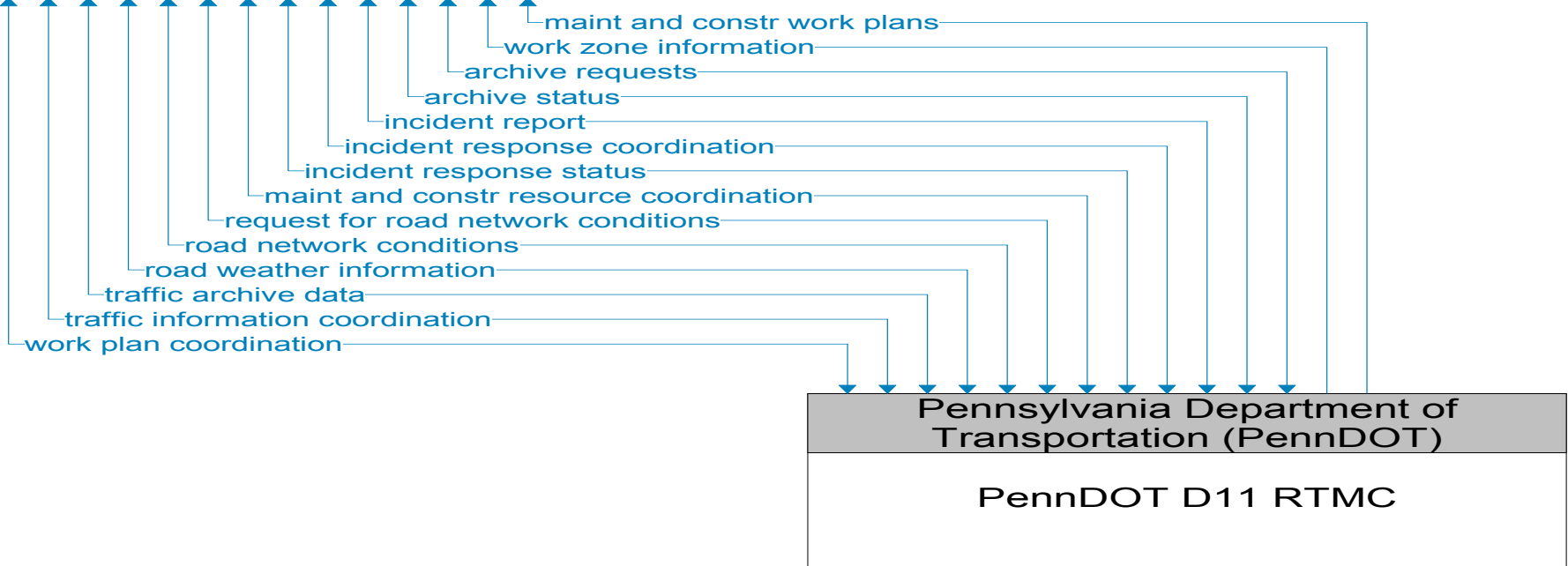
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 - - - - - Planned



**Pennsylvania Department of Transportation (PennDOT)**

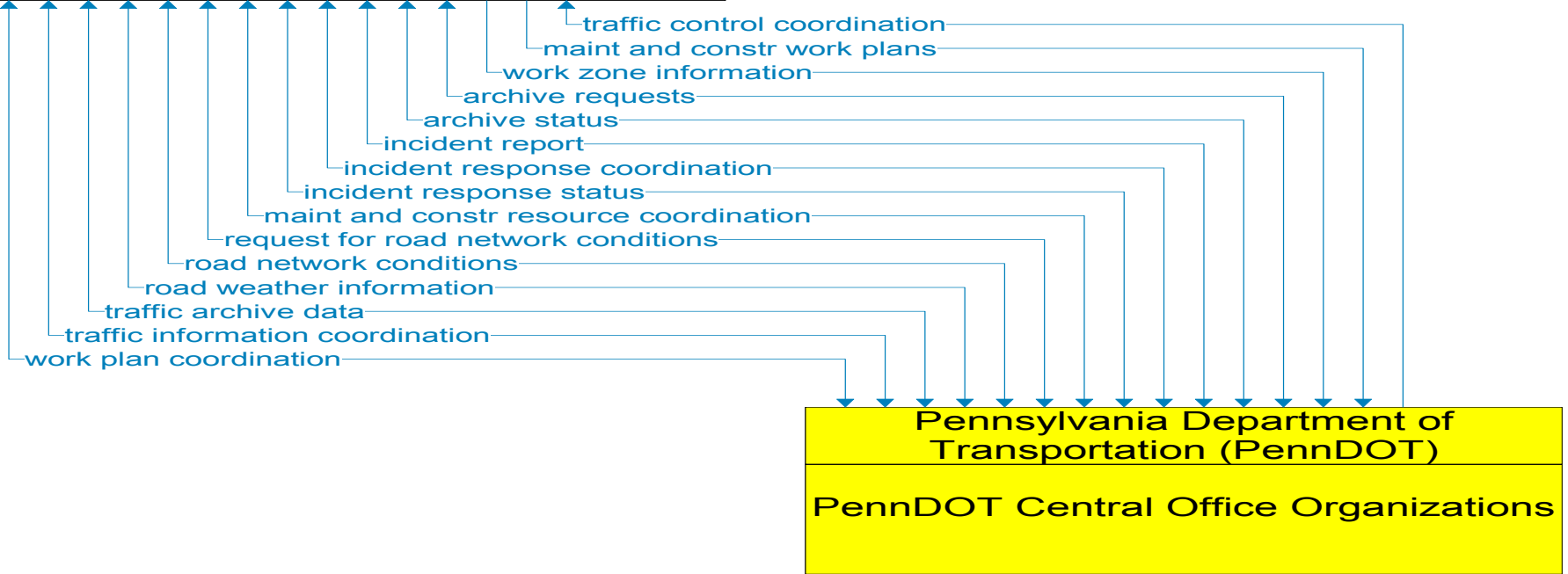
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**PennDOT Central Office Organizations**

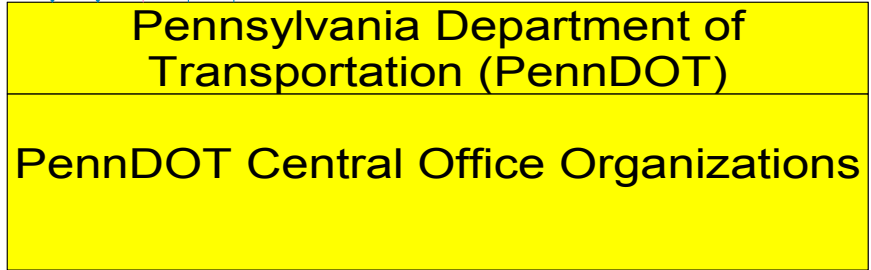
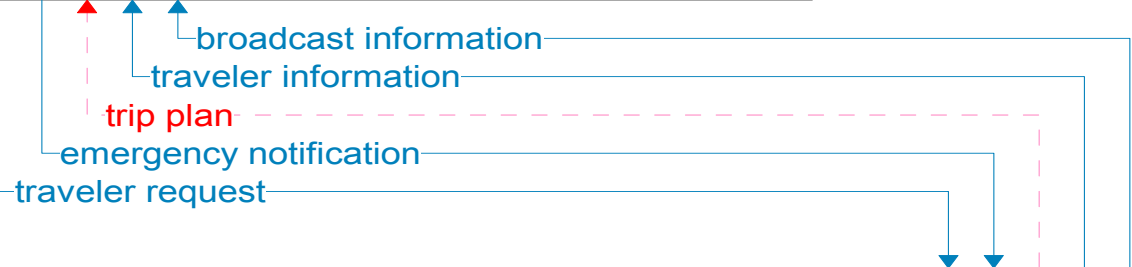
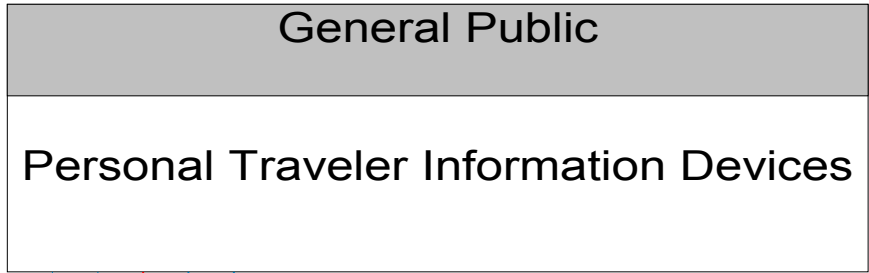


———— Existing  
- - - - - Planned

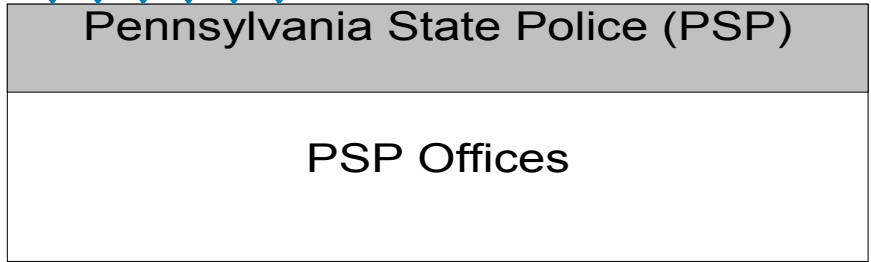
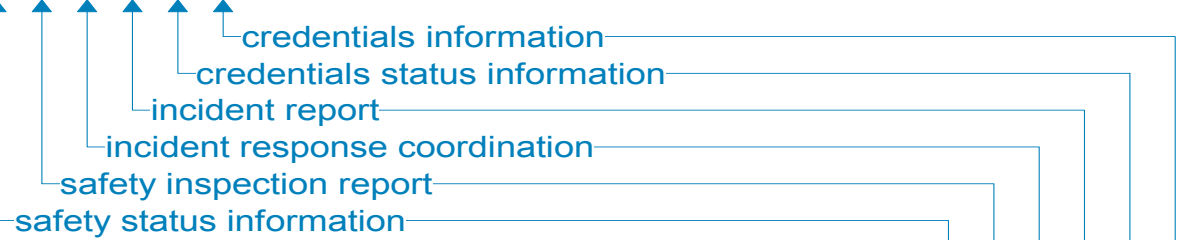
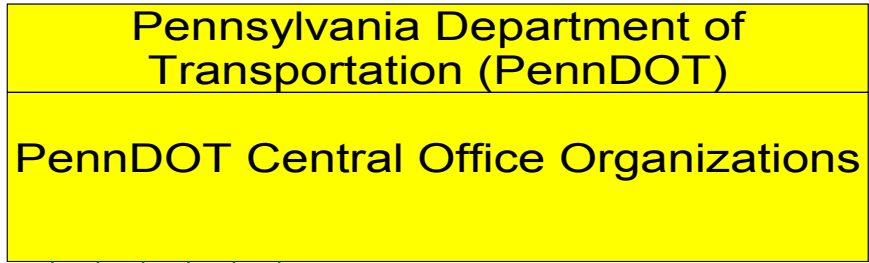
**Pennsylvania Department of Transportation (PennDOT)**  
**PennDOT D12 TMC**



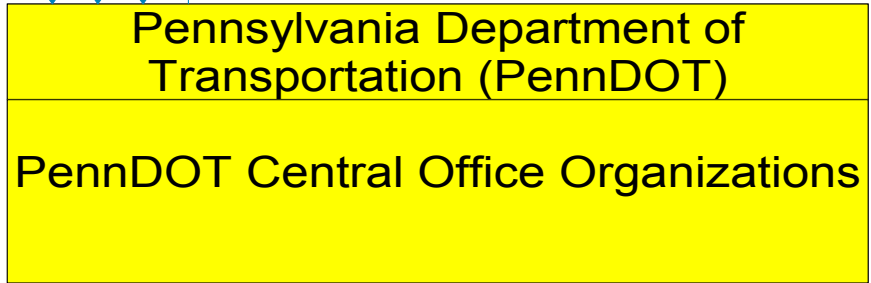
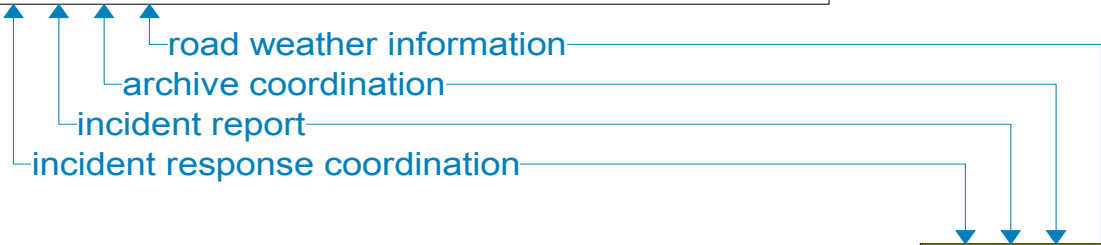
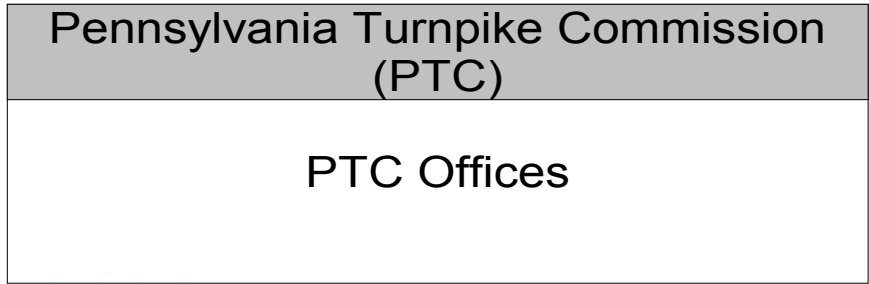
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- - - - - Planned



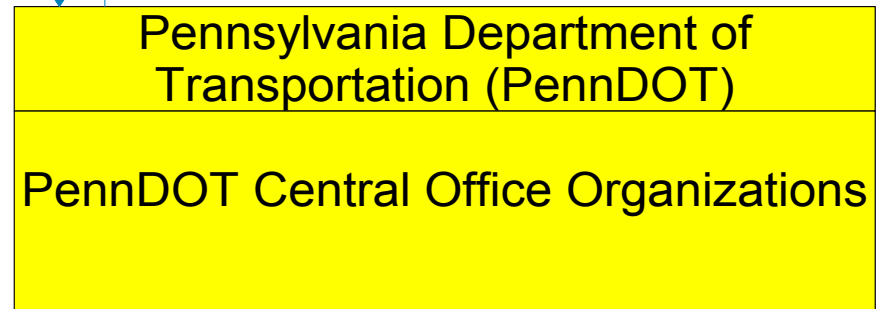
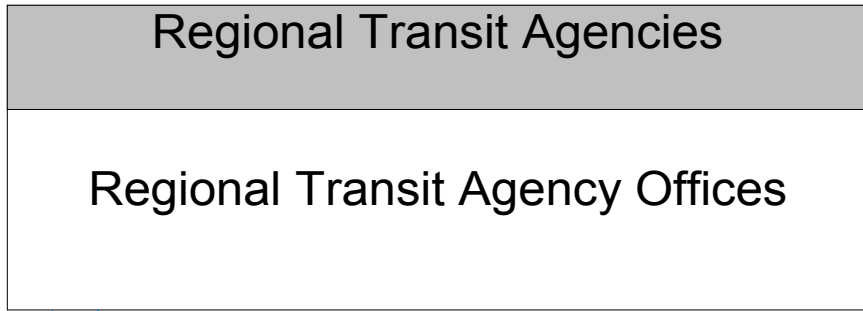
Existing  
Planned



———— Existing  
- - - - - Planned



———— Existing  
----- Planned

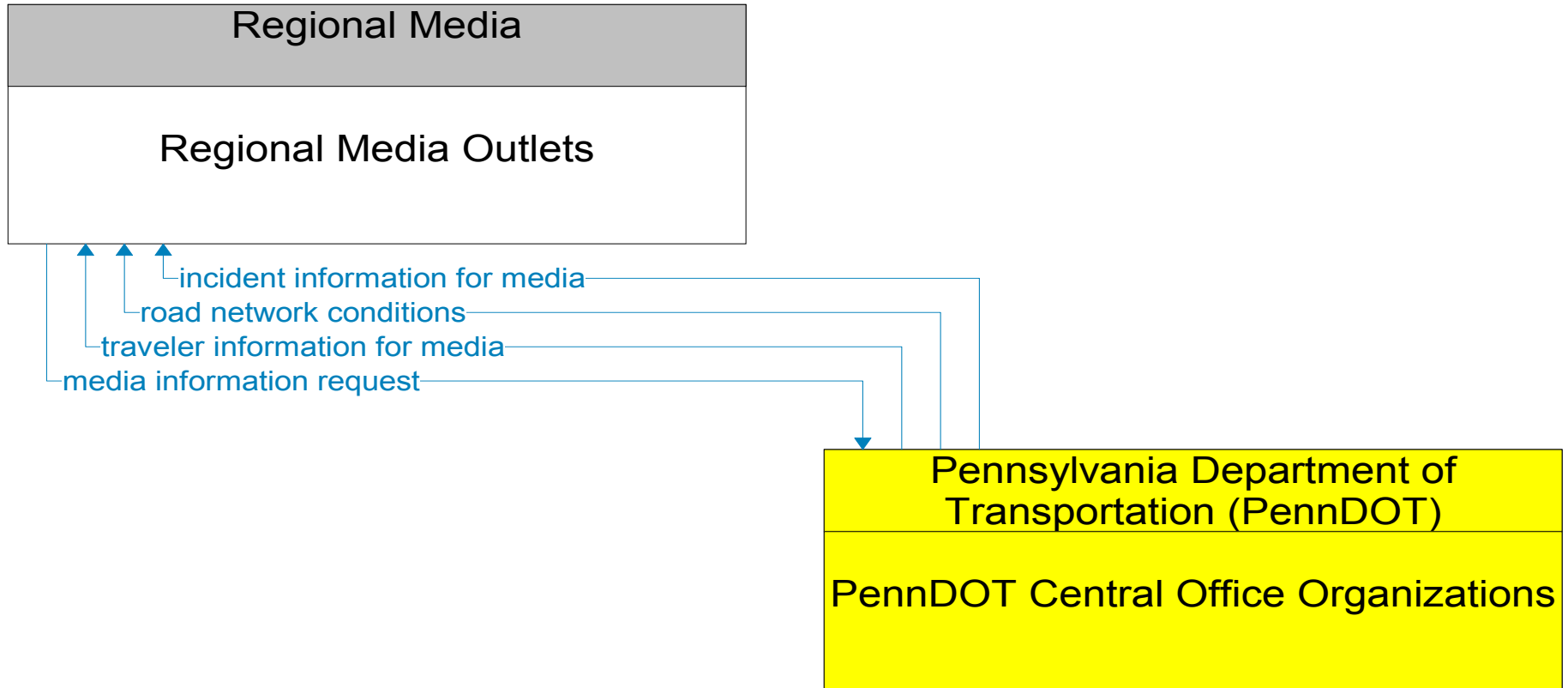


archive requests

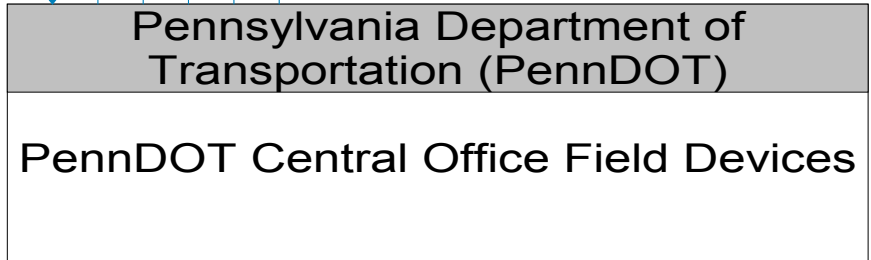
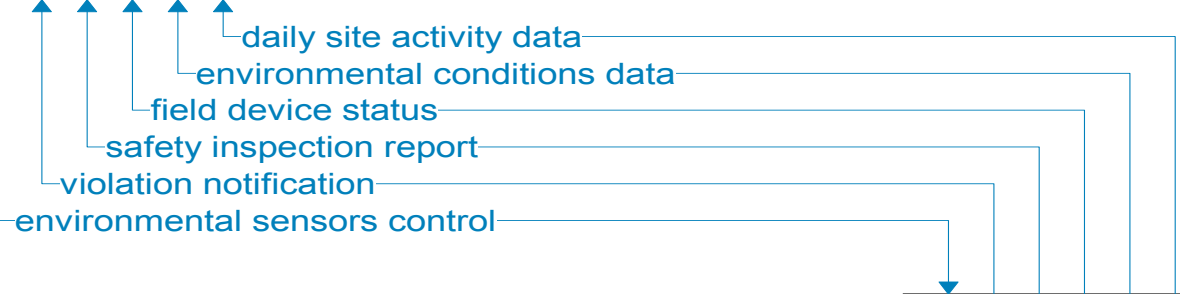
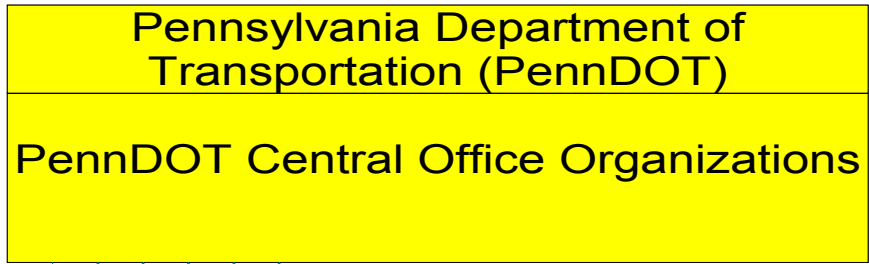
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Existing

Planned



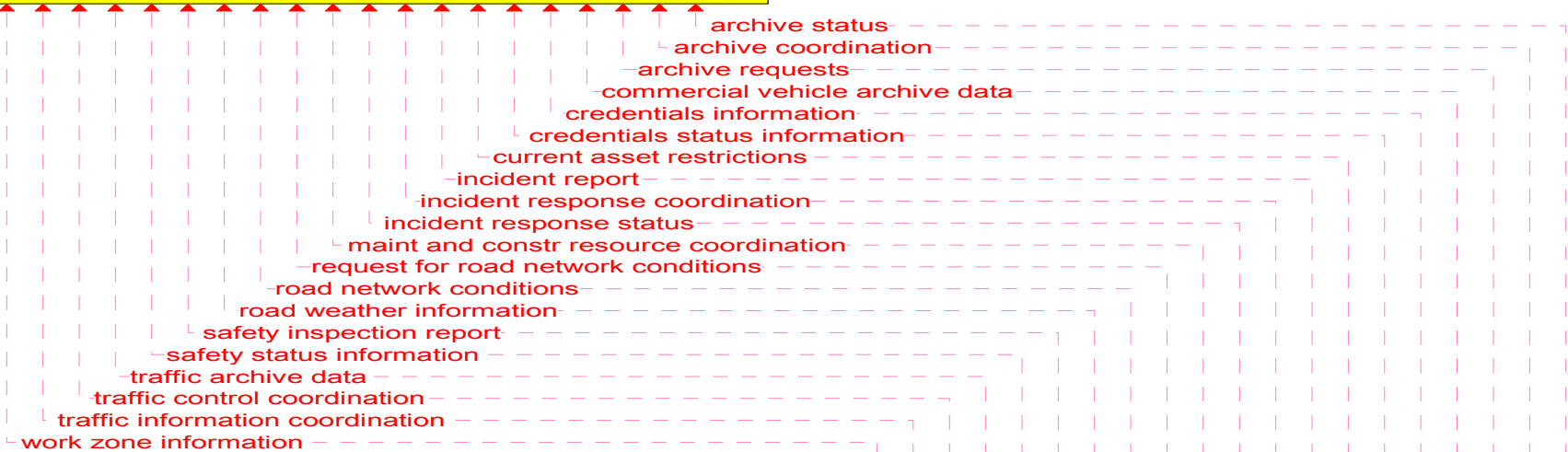
———— Existing  
- - - - - Planned





**Pennsylvania Department of Transportation  
(PennDOT)**

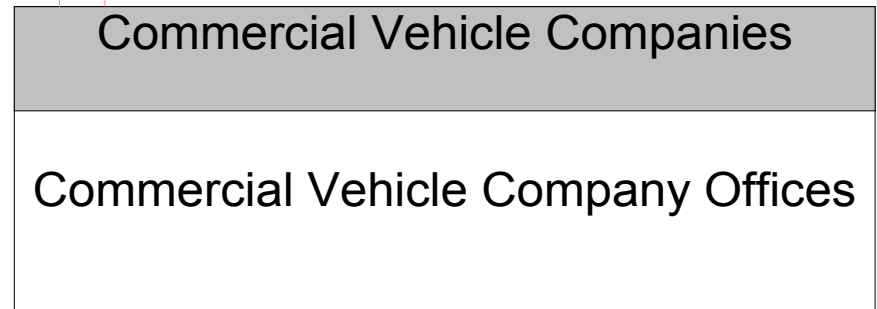
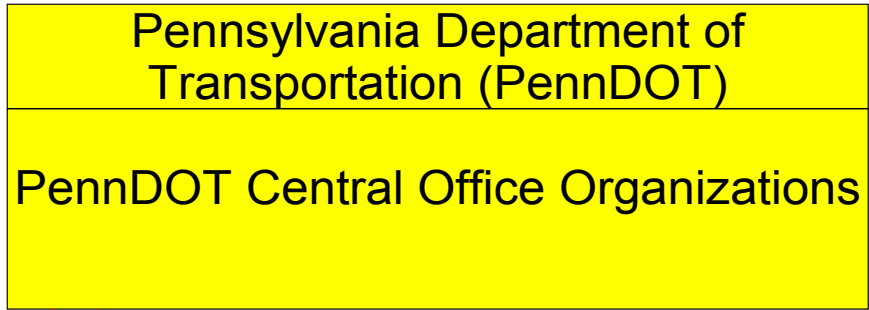
**PennDOT Central Office Organizations**



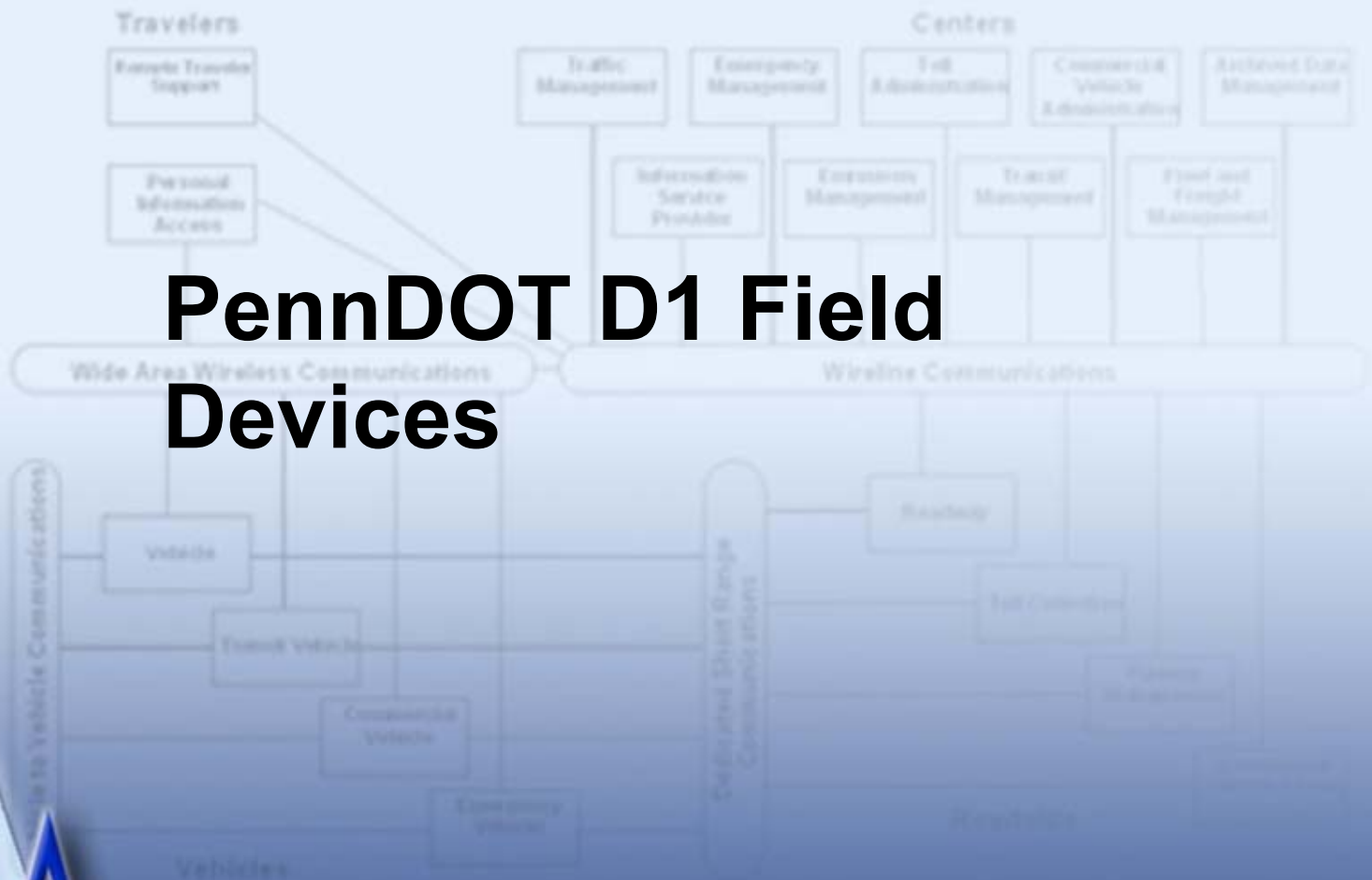
**Pennsylvania Department of Transportation  
(PennDOT)**

**PennDOT STMC**

Existing  
Planned



# PennDOT D1 Field Devices

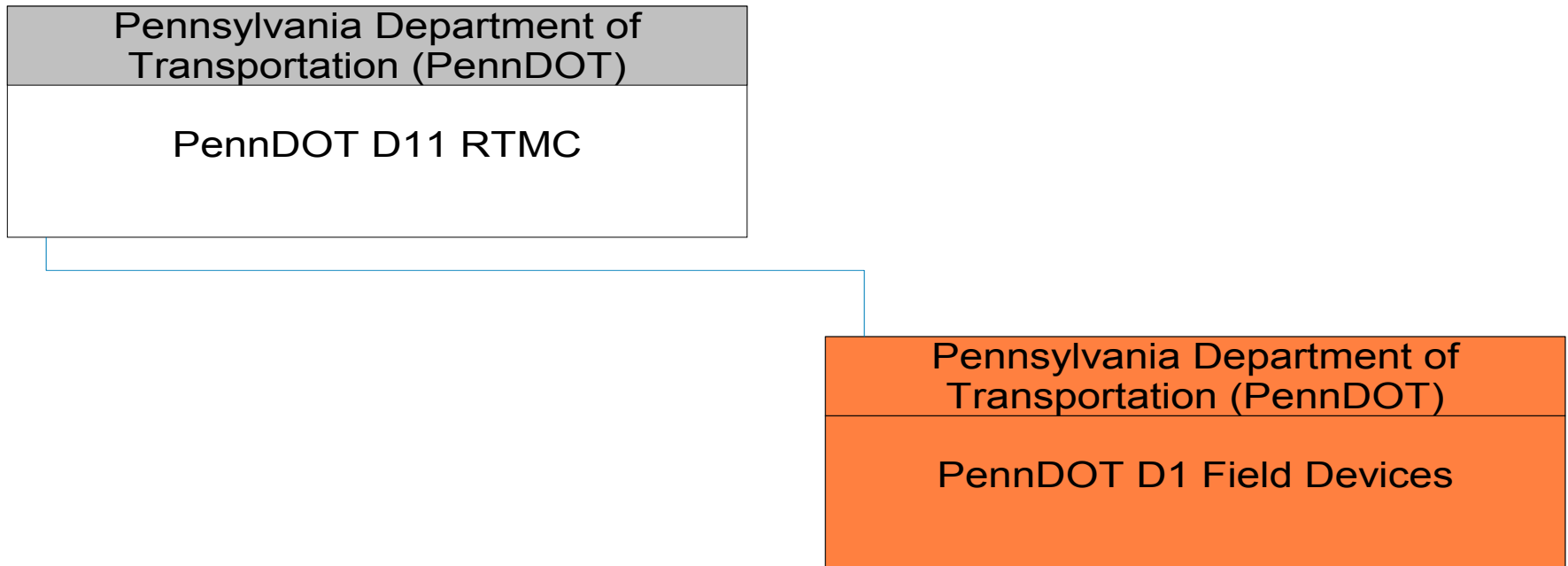


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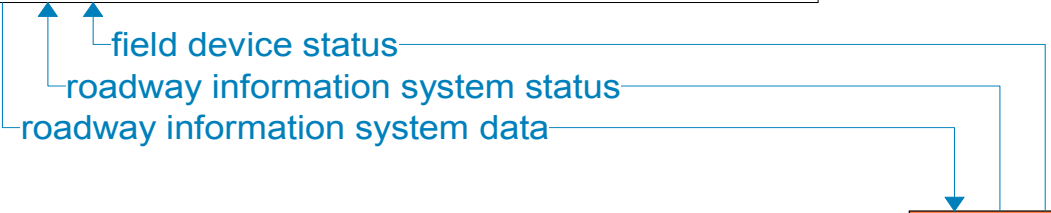
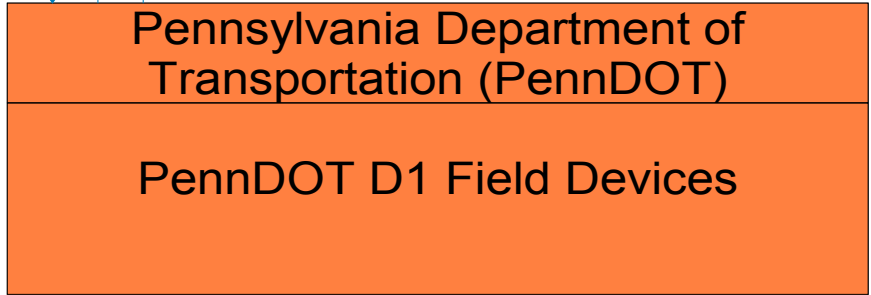
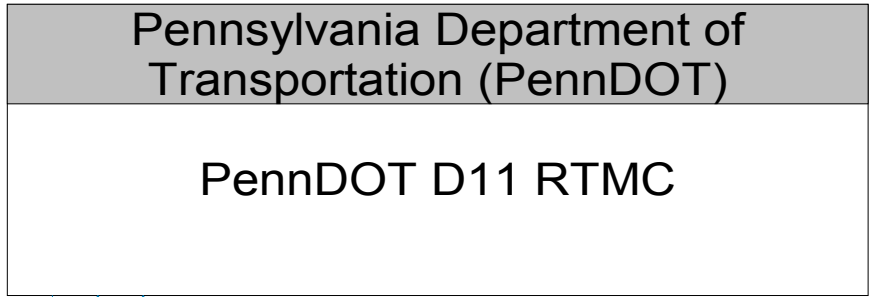
architecture



# PennDOT D1 Field Devices Interconnect Diagram

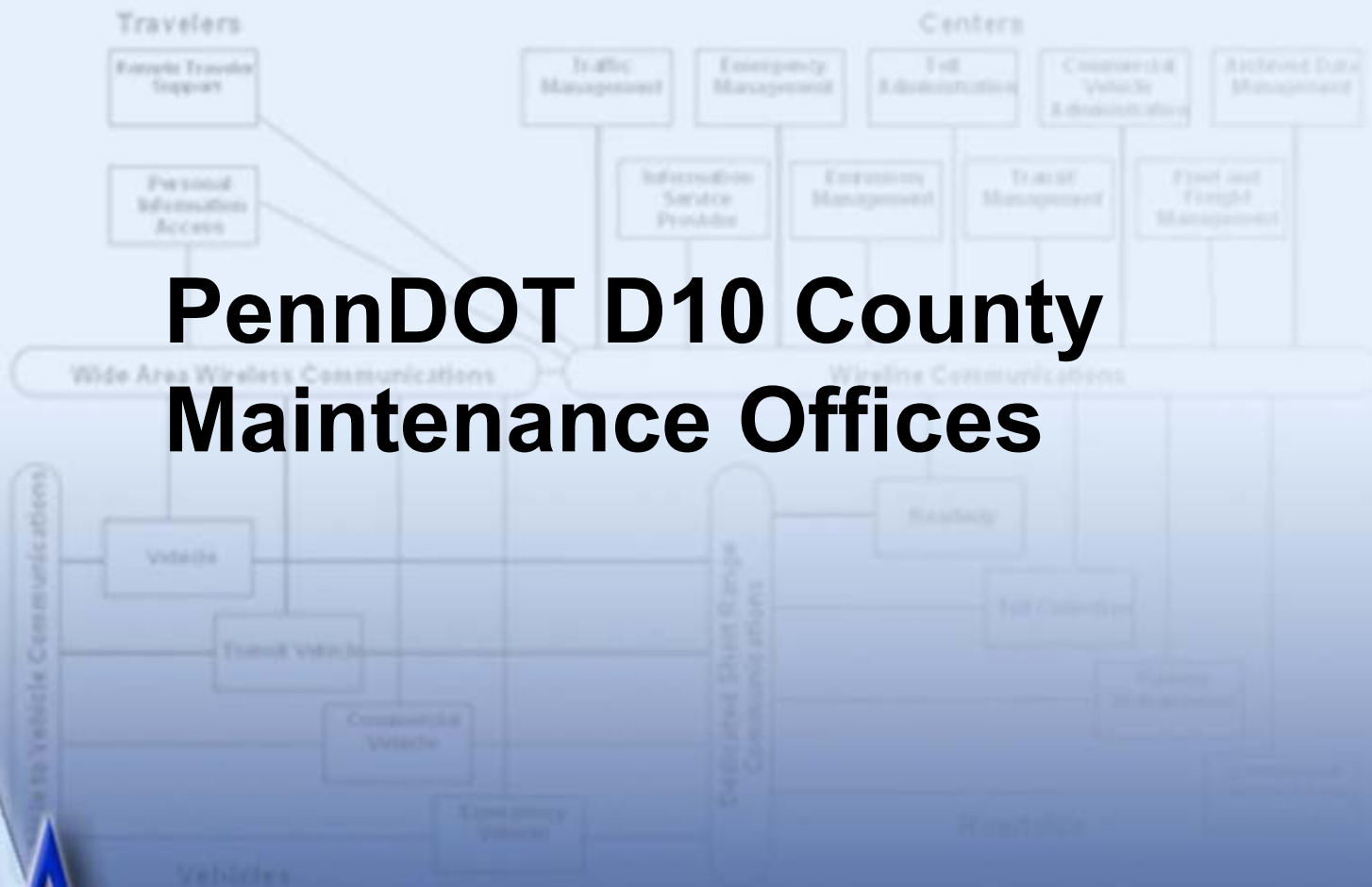


———— Existing  
----- Planned

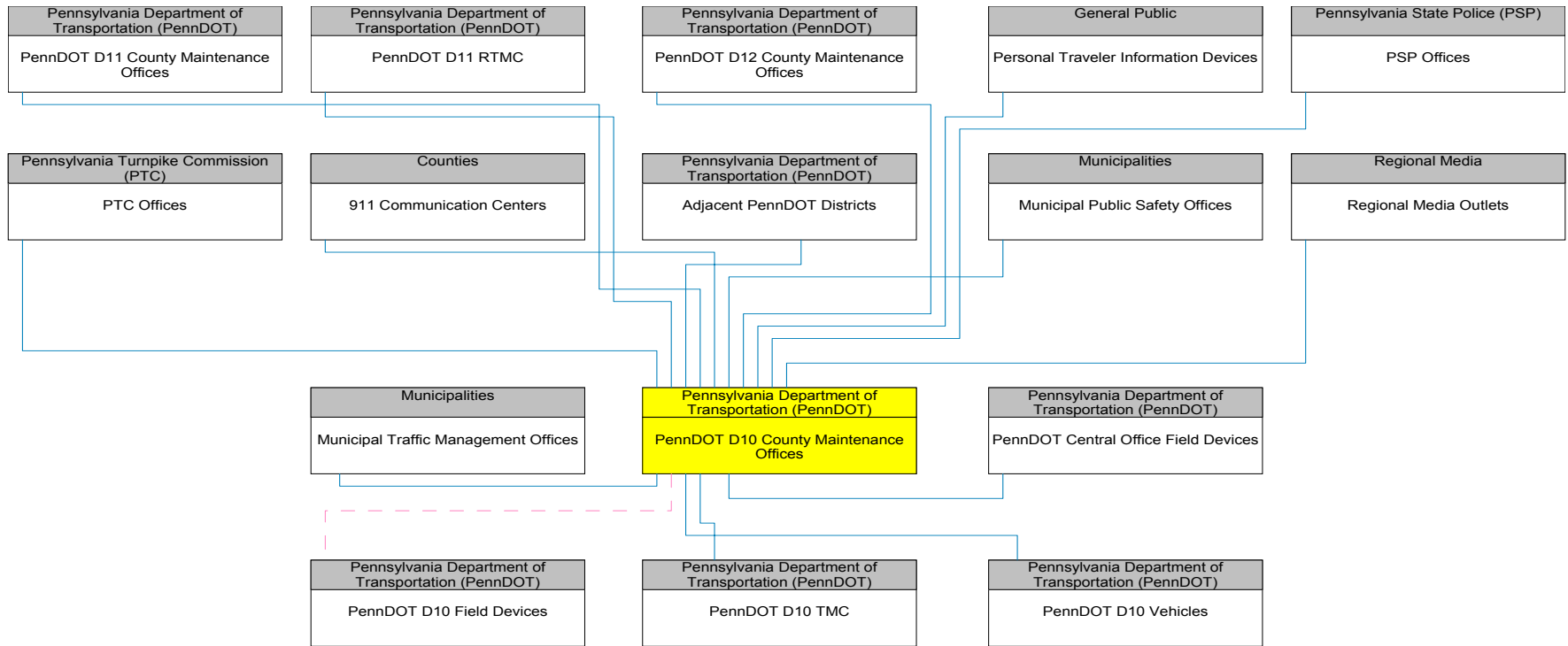


———— Existing  
----- Planned

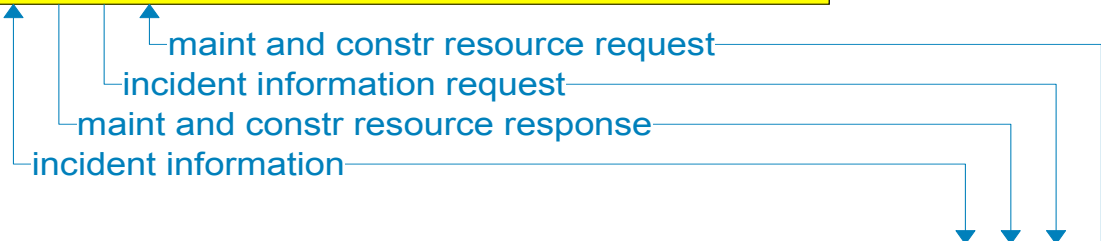
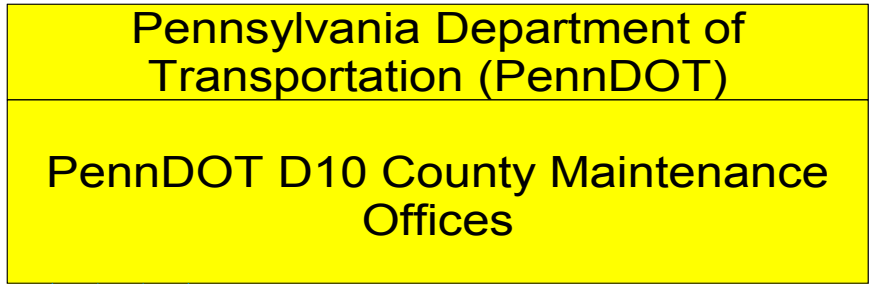
# PennDOT D10 County Maintenance Offices



# PennDOT D10 County Maintenance Offices Interconnect Diagram

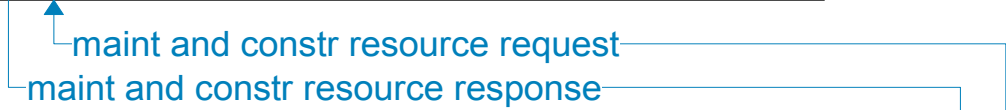
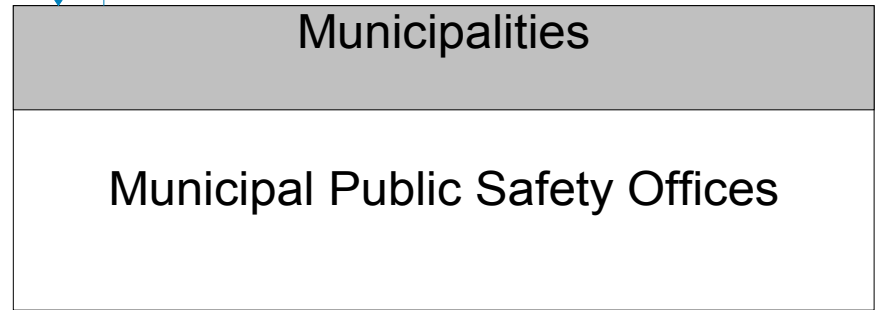
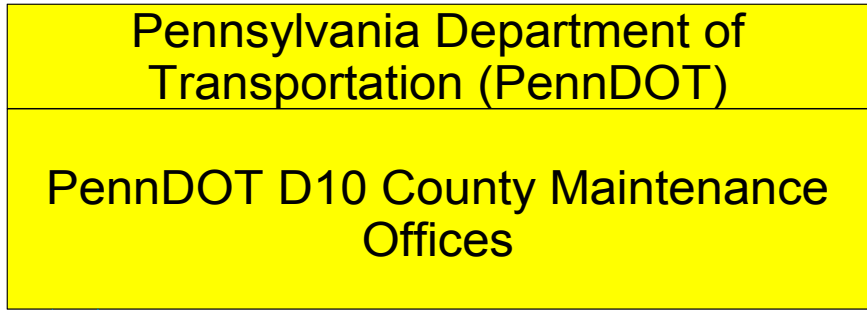


— Existing  
- - - Planned

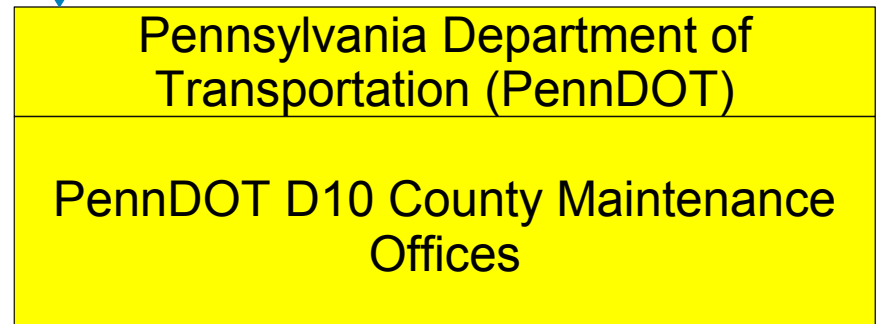
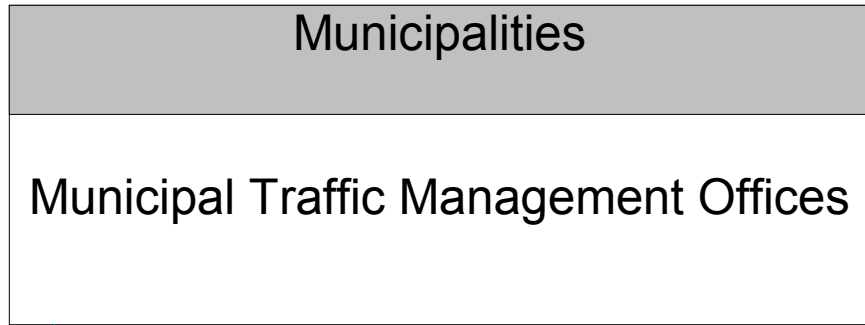


Existing  
Planned





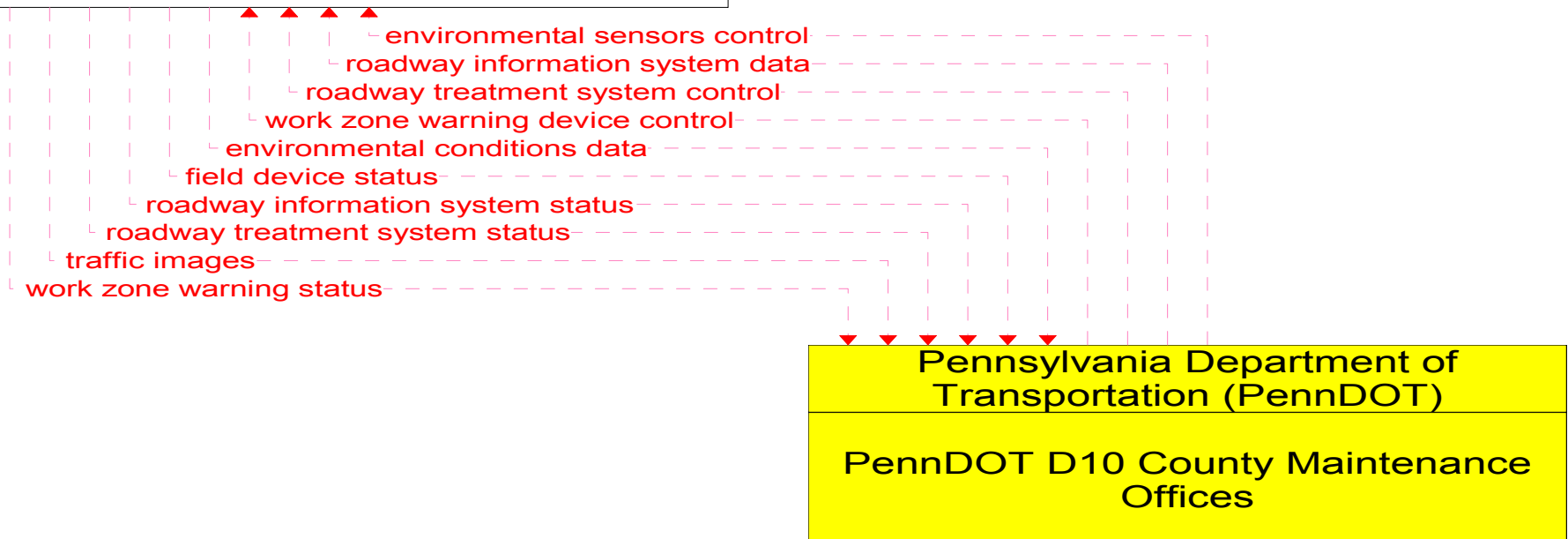
———— Existing  
- - - - - Planned



———— Existing  
- - - - - Planned

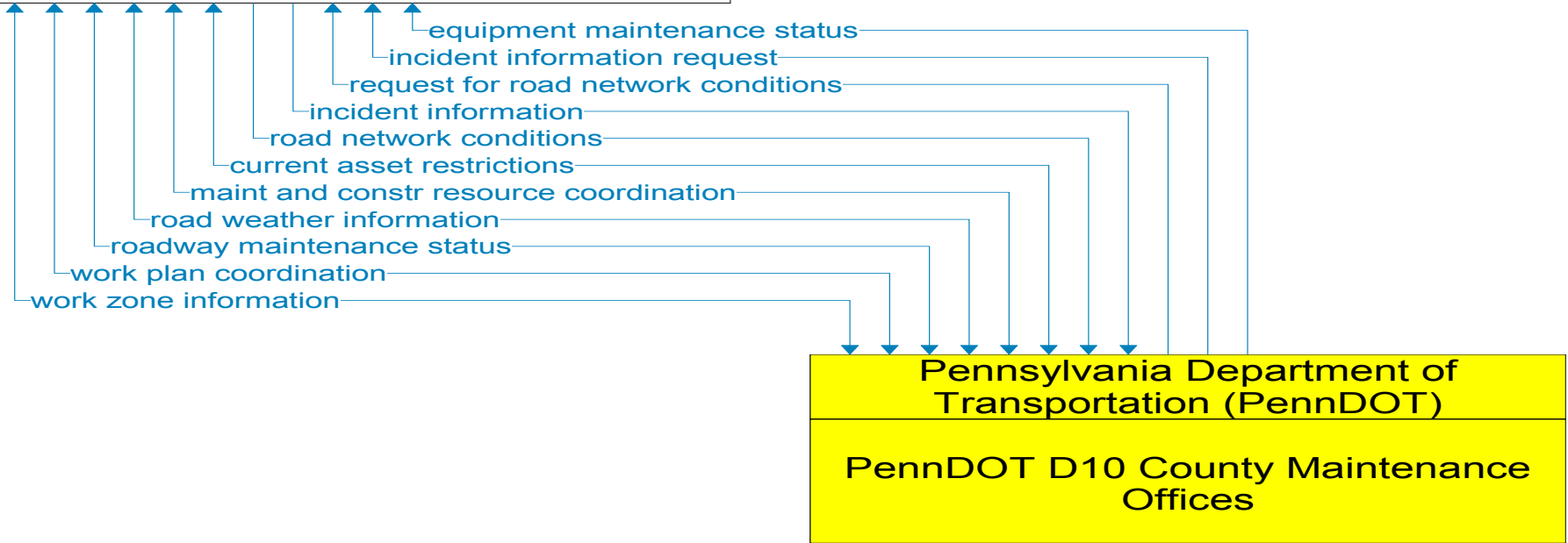
Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D10 Field Devices

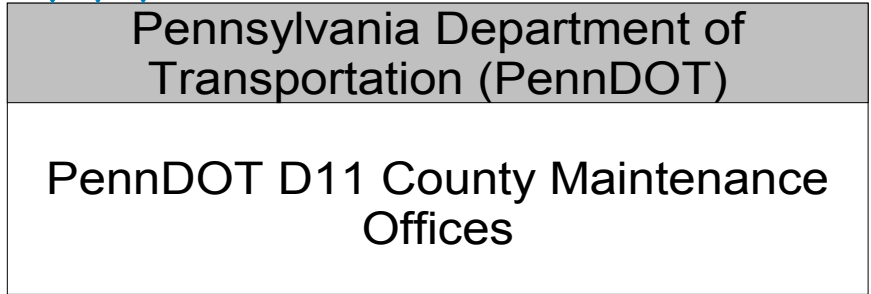
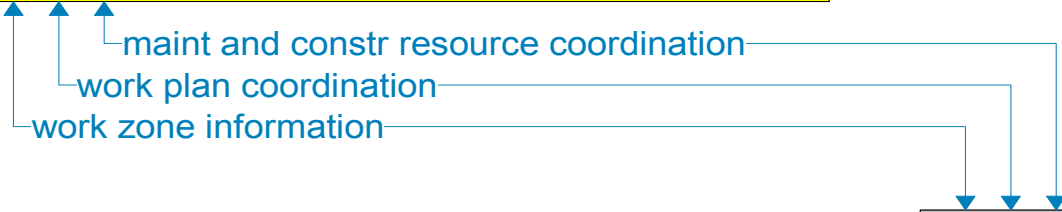
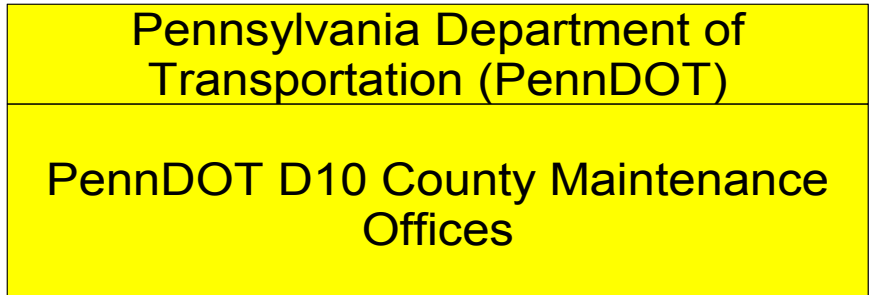


Existing  
Planned

**Pennsylvania Department of  
Transportation (PennDOT)**  
  
PennDOT D10 TMC



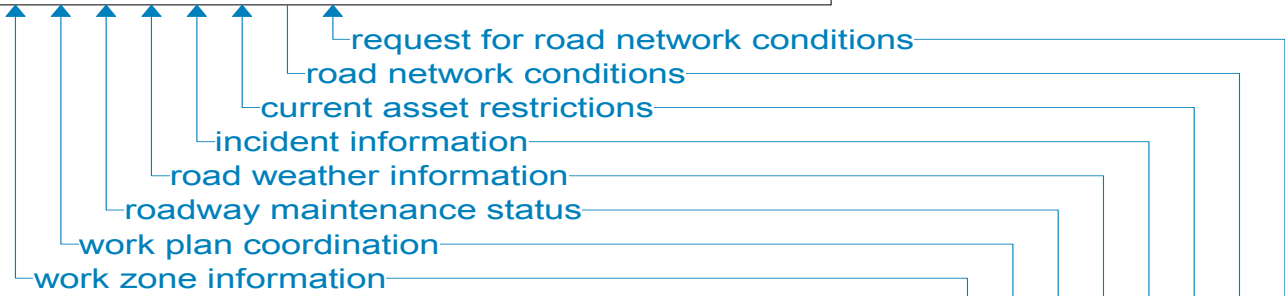
———— Existing  
- - - - - Planned



———— Existing  
- - - - - Planned

Pennsylvania Department of  
Transportation (PennDOT)

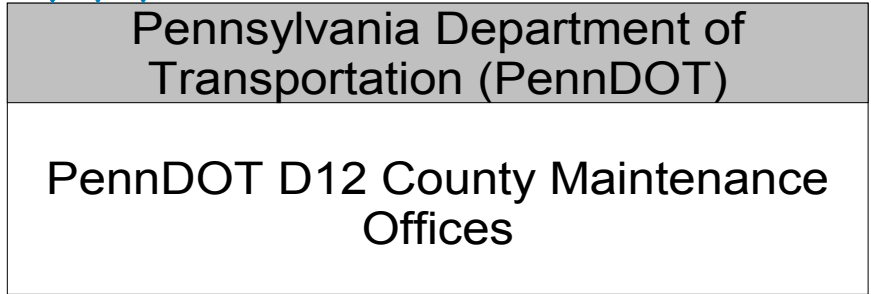
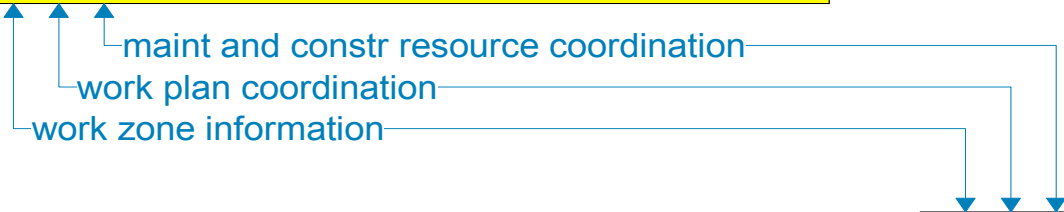
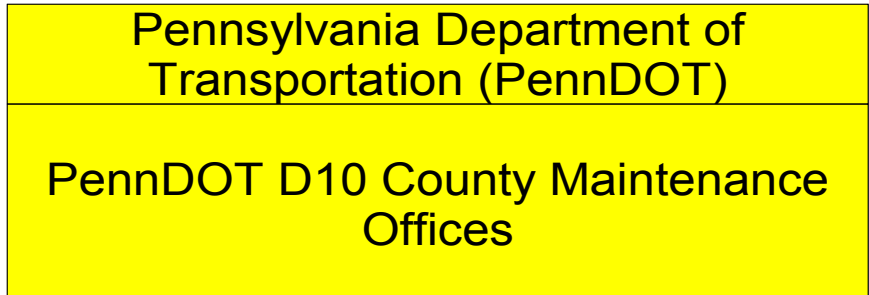
PennDOT D11 RTMC



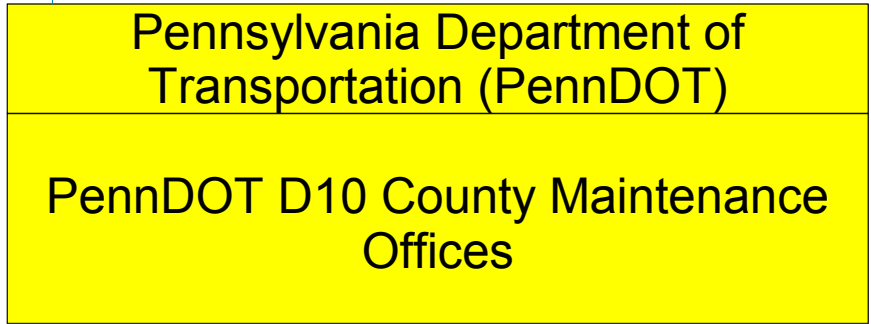
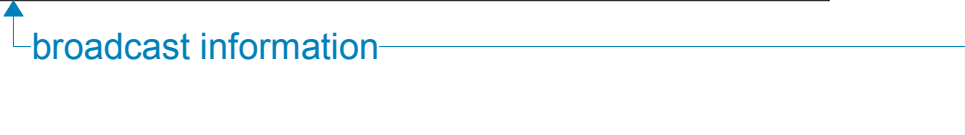
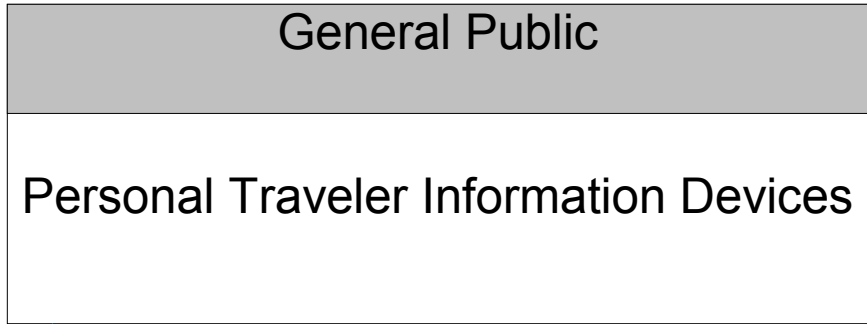
Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D10 County Maintenance  
Offices

———— Existing  
- - - - - Planned

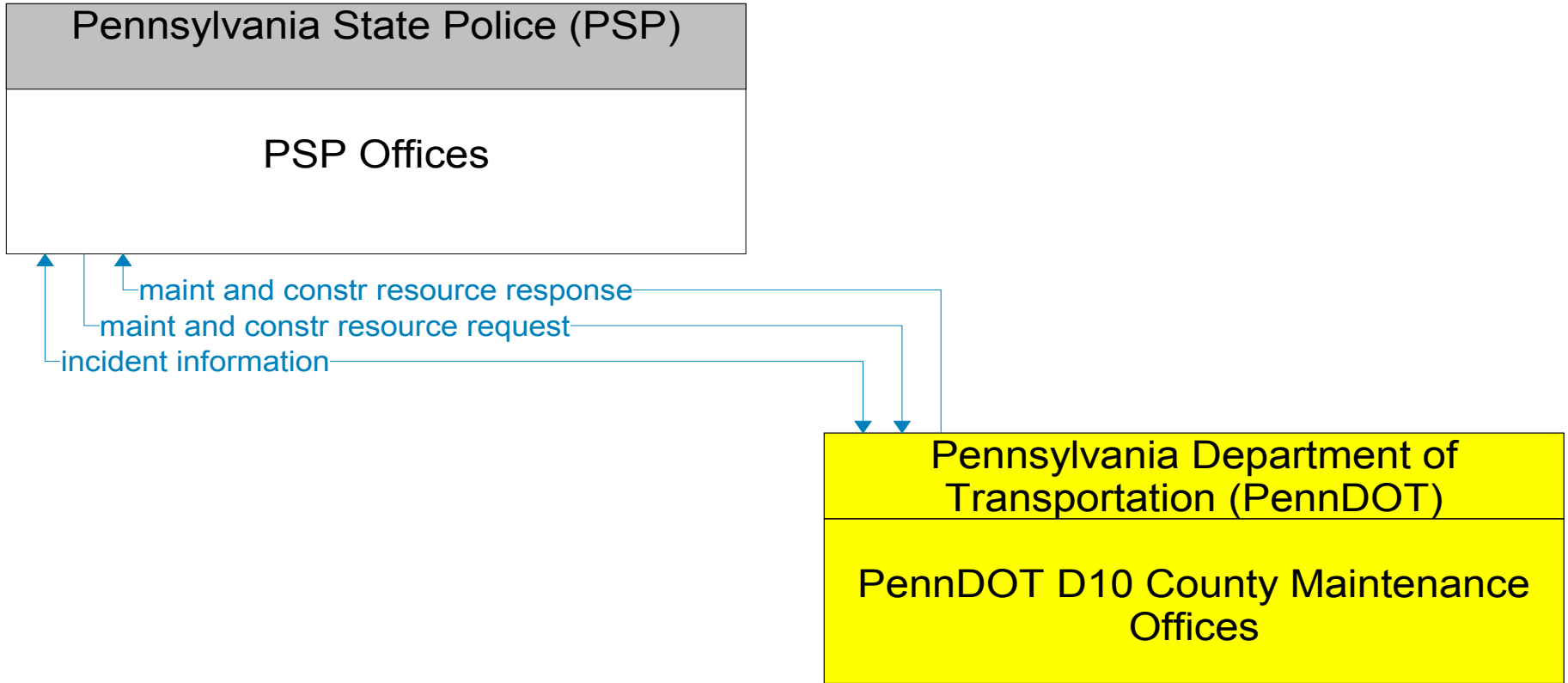


———— Existing  
- - - - - Planned

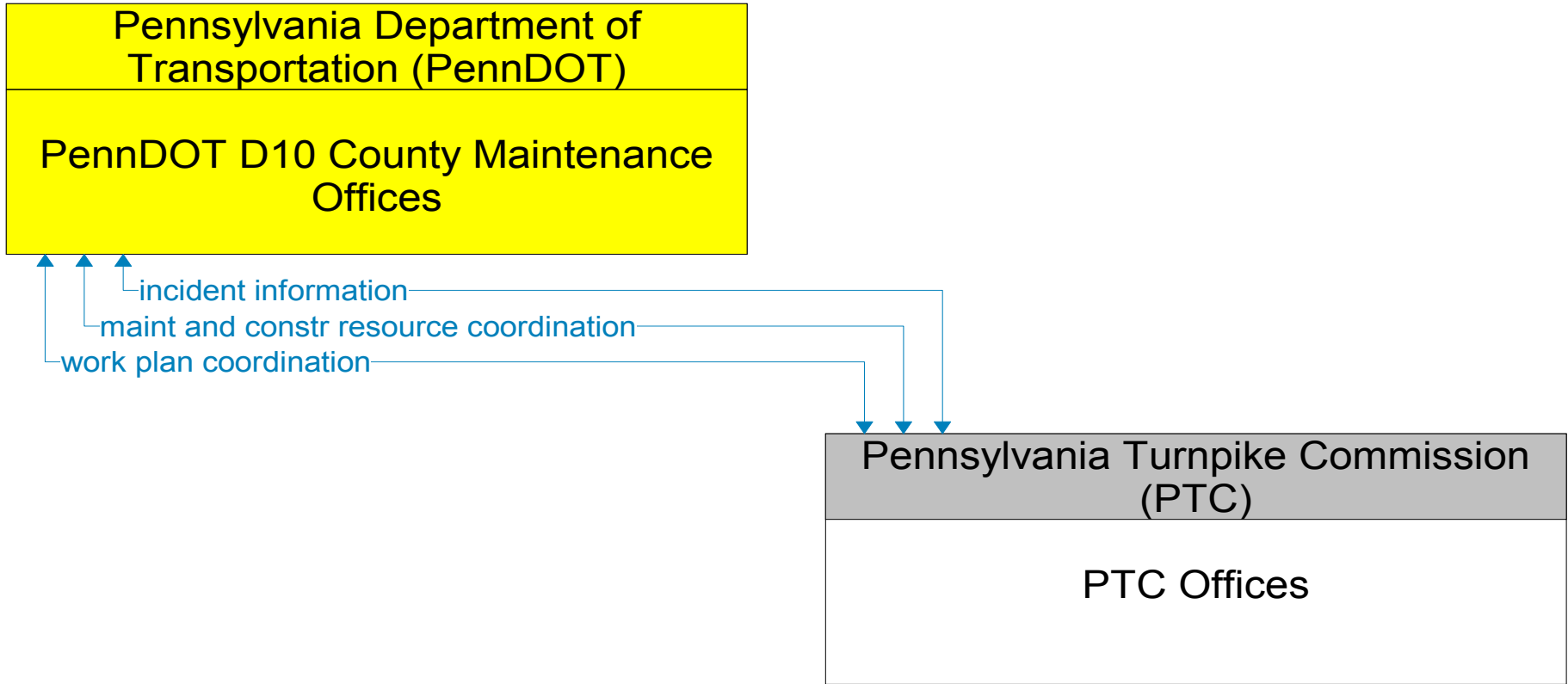


———— Existing  
- - - - - Planned

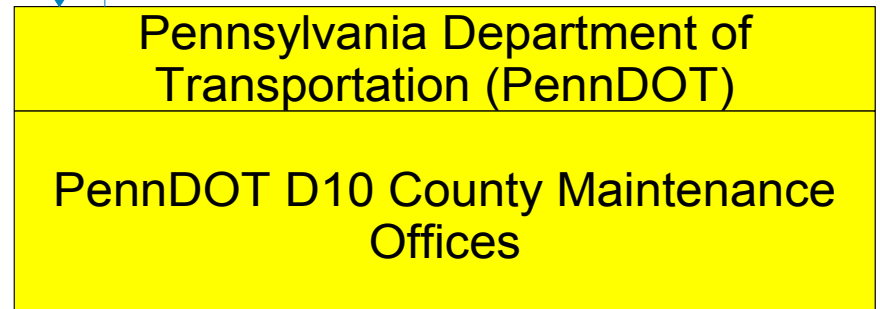
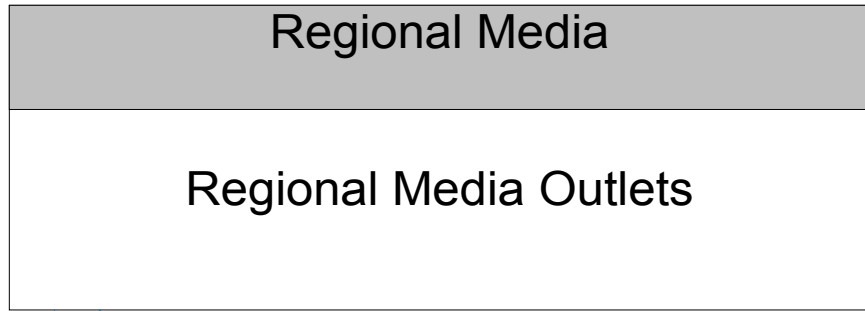




———— Existing  
----- Planned

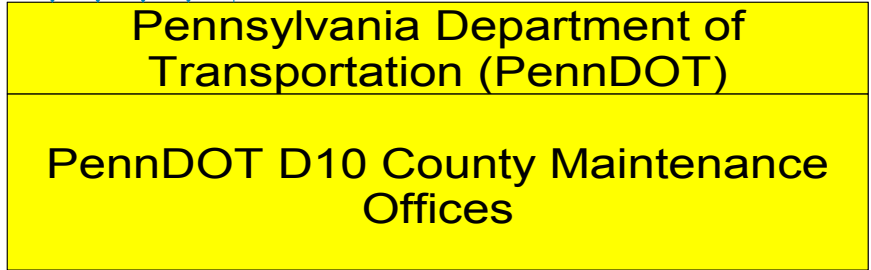
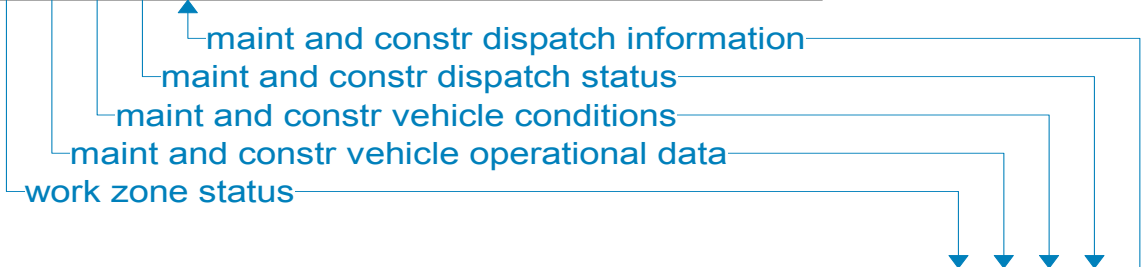
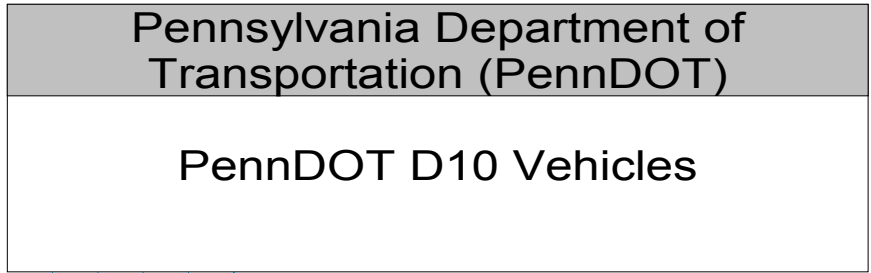


———— Existing  
----- Planned

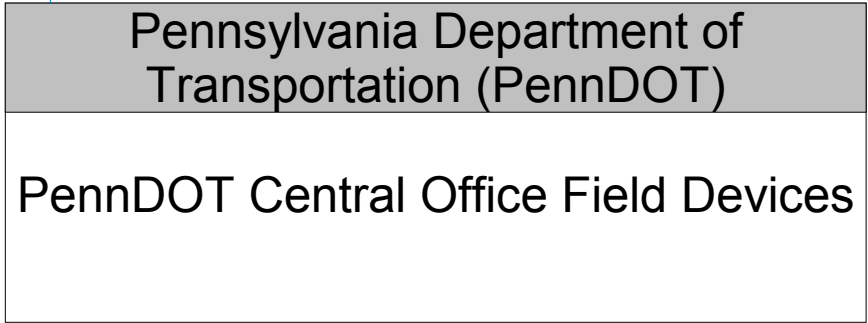
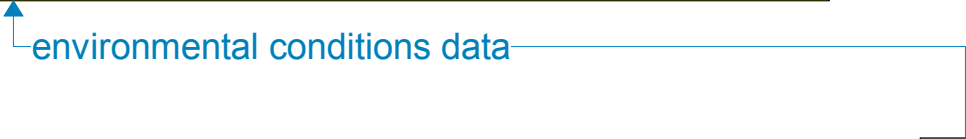
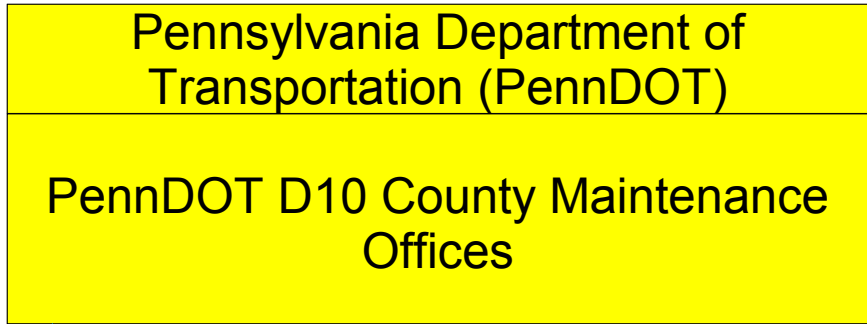


maint and constr work plans  
media information request

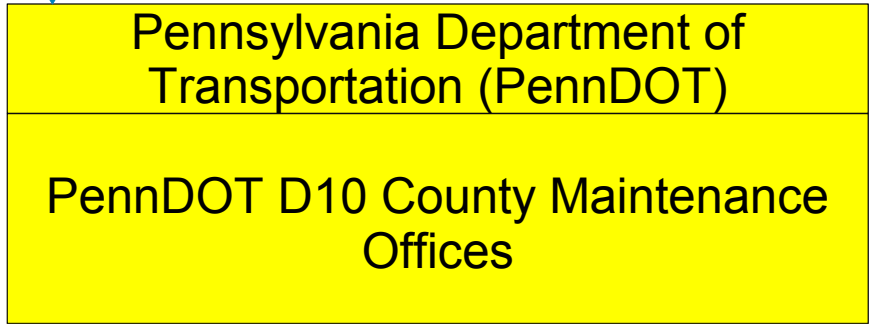
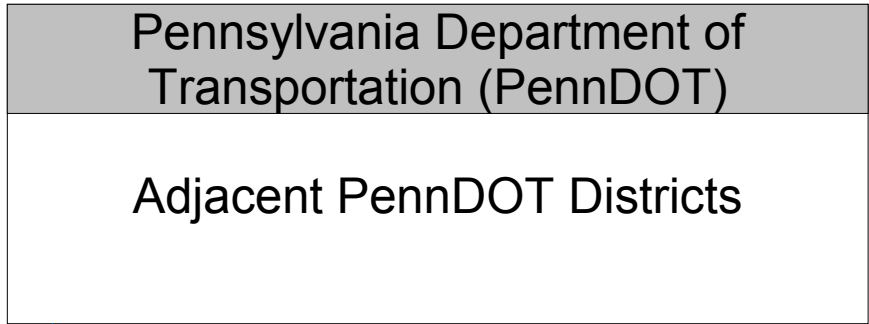
Existing  
Planned



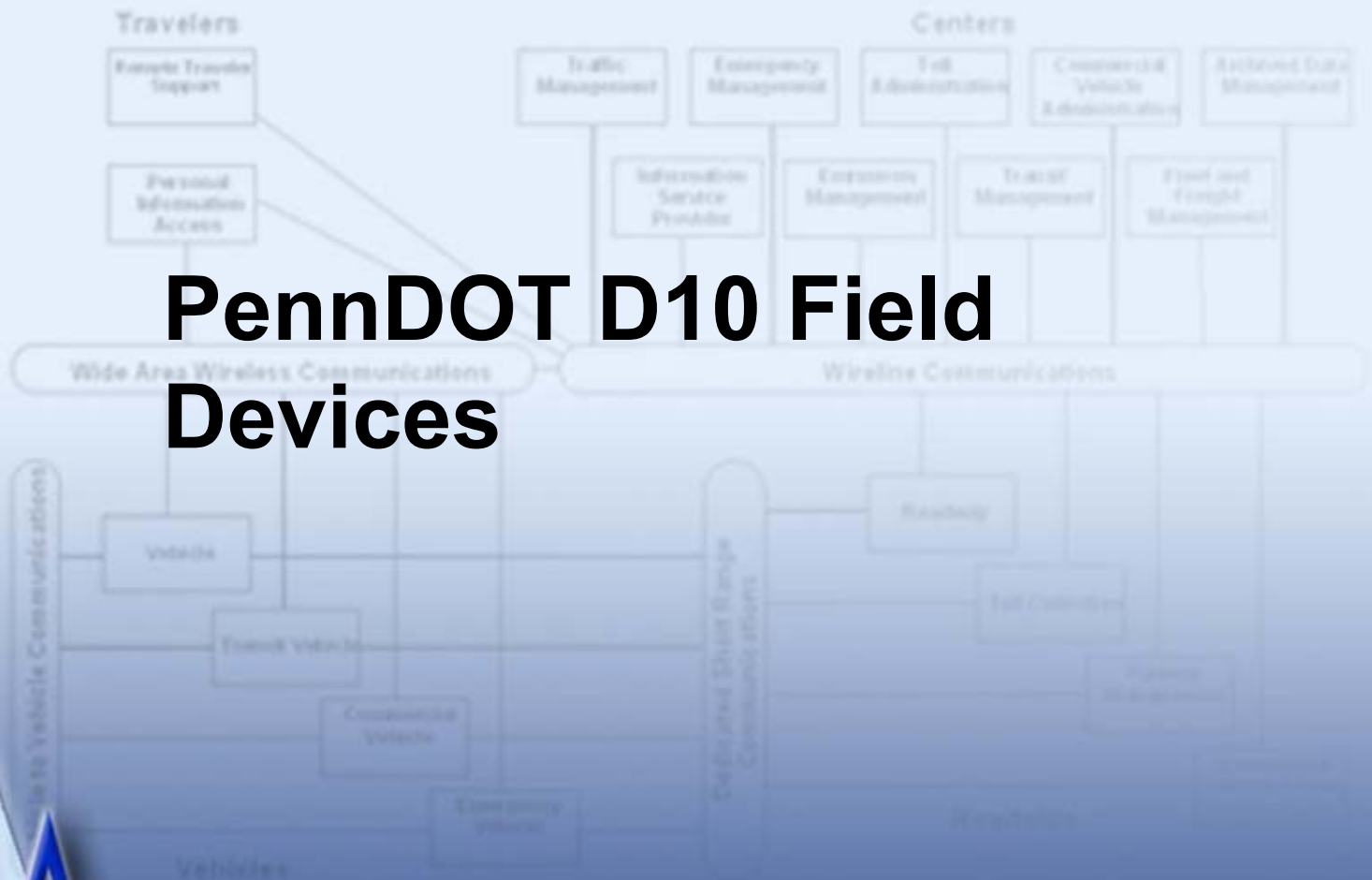
———— Existing  
----- Planned



———— Existing  
- - - - - Planned

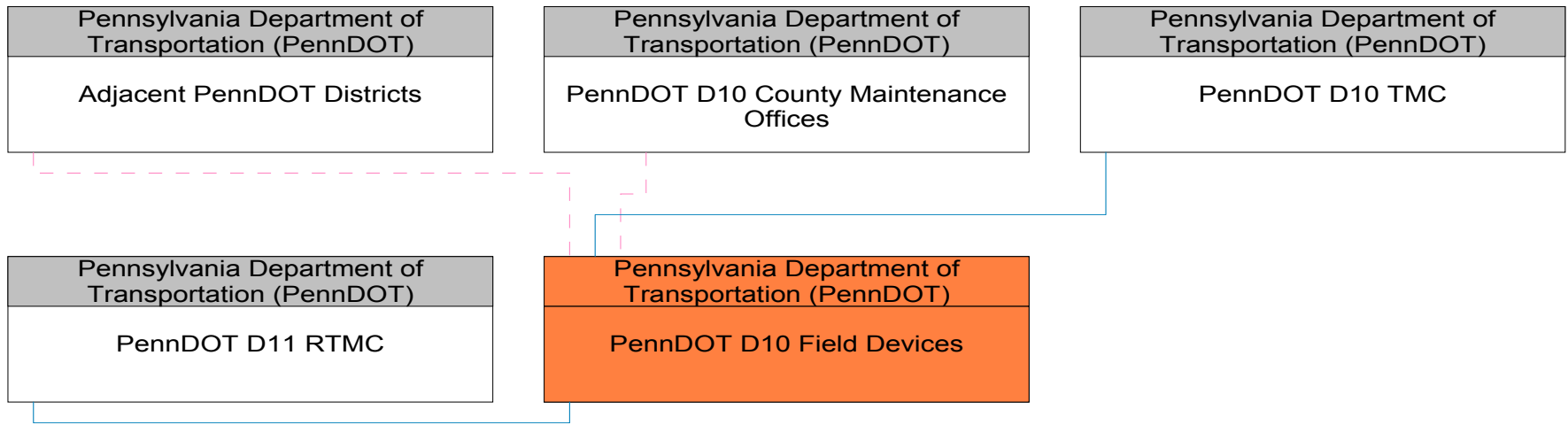


# PennDOT D10 Field Devices



PA

# PennDOT D10 Field Devices Interconnect Diagram



— Existing  
- - - Planned



**Pennsylvania Department of  
Transportation (PennDOT)**

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**PennDOT D10 Field Devices**

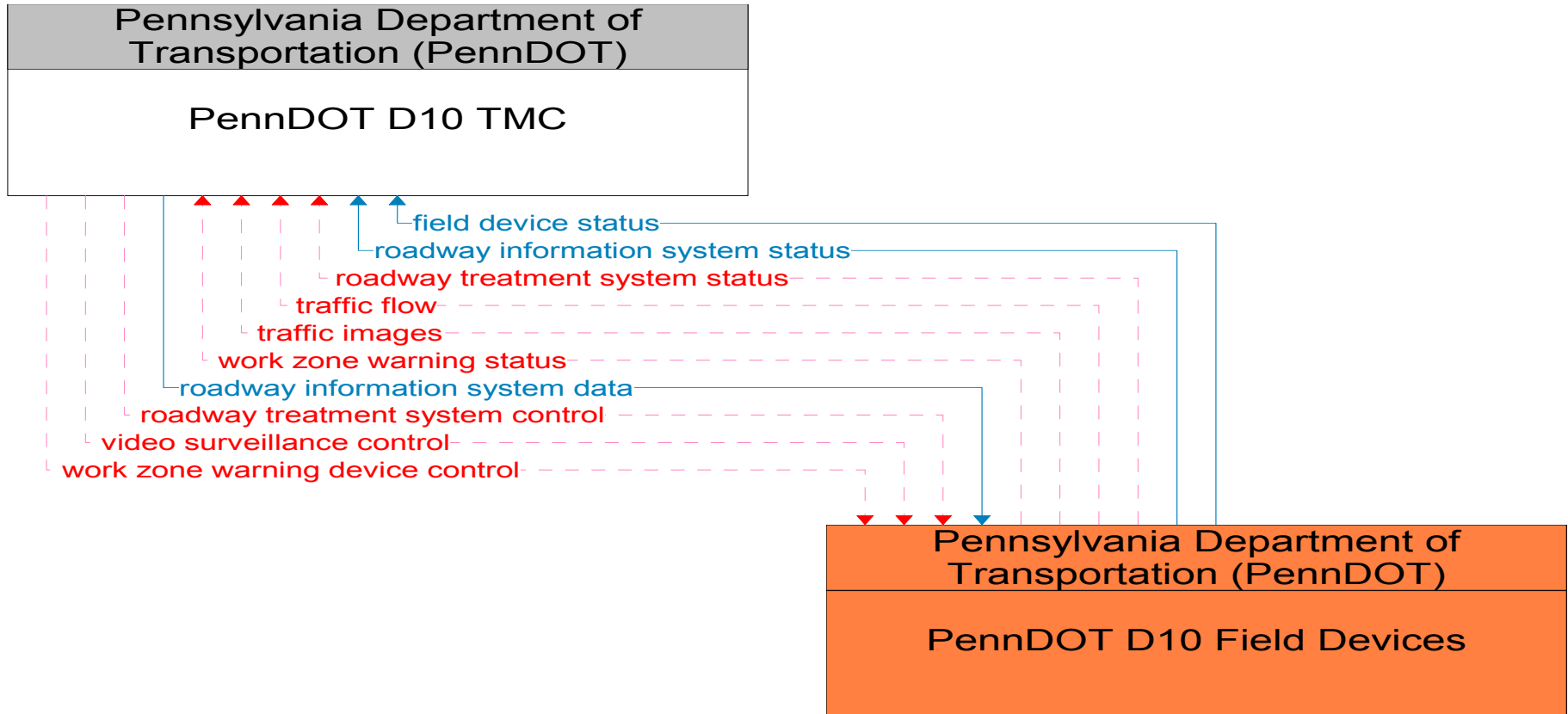
- ▲ ▲ ▲ ▲
- └ environmental sensors control
- └ roadway information system data
- └ roadway treatment system control
- └ work zone warning device control
- └ environmental conditions data
- └ field device status
- └ roadway information system status
- └ roadway treatment system status
- └ traffic images
- └ work zone warning status

**Pennsylvania Department of  
Transportation (PennDOT)**

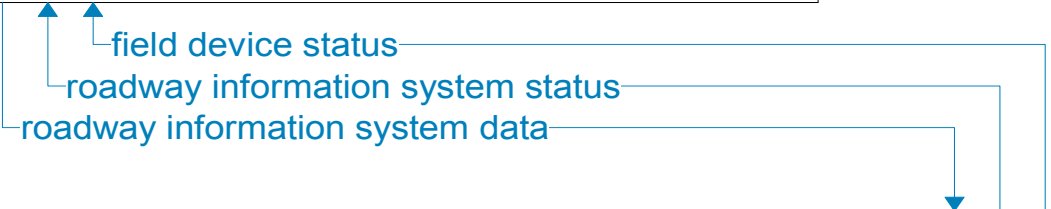
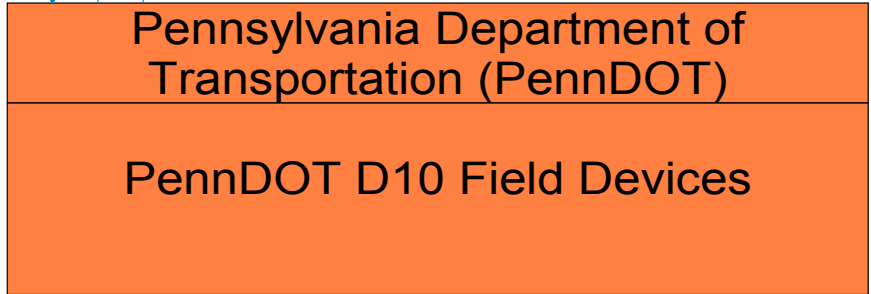
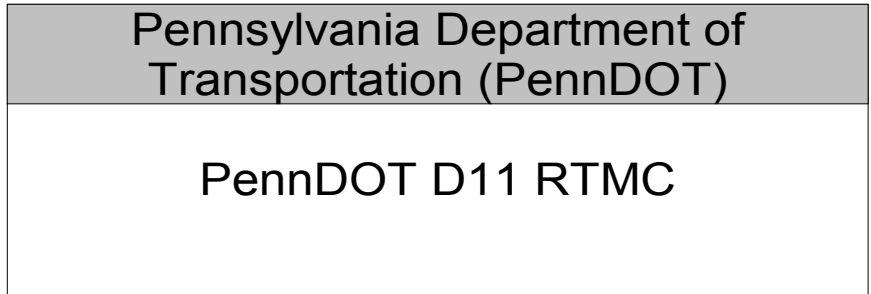
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**PennDOT D10 County Maintenance  
Offices**

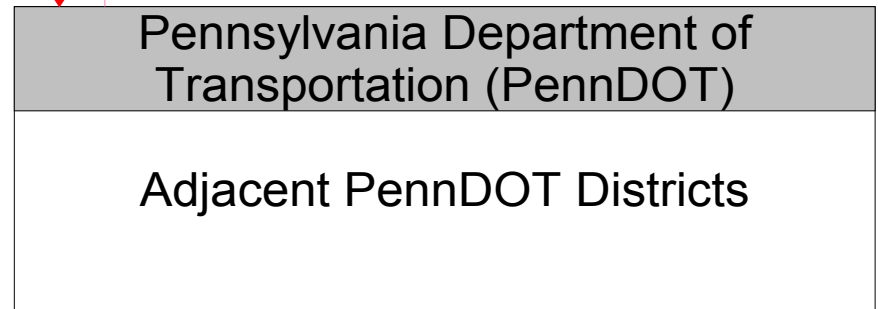
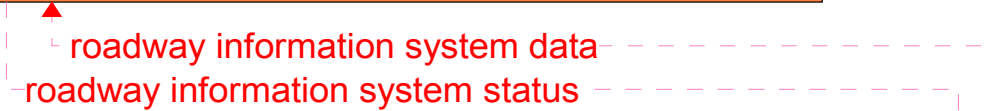
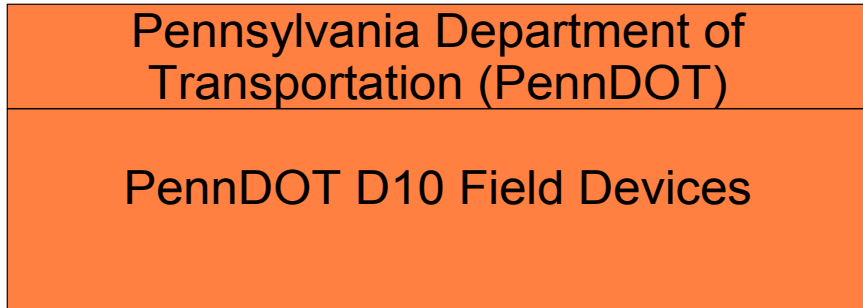
———— Existing  
- - - - - Planned



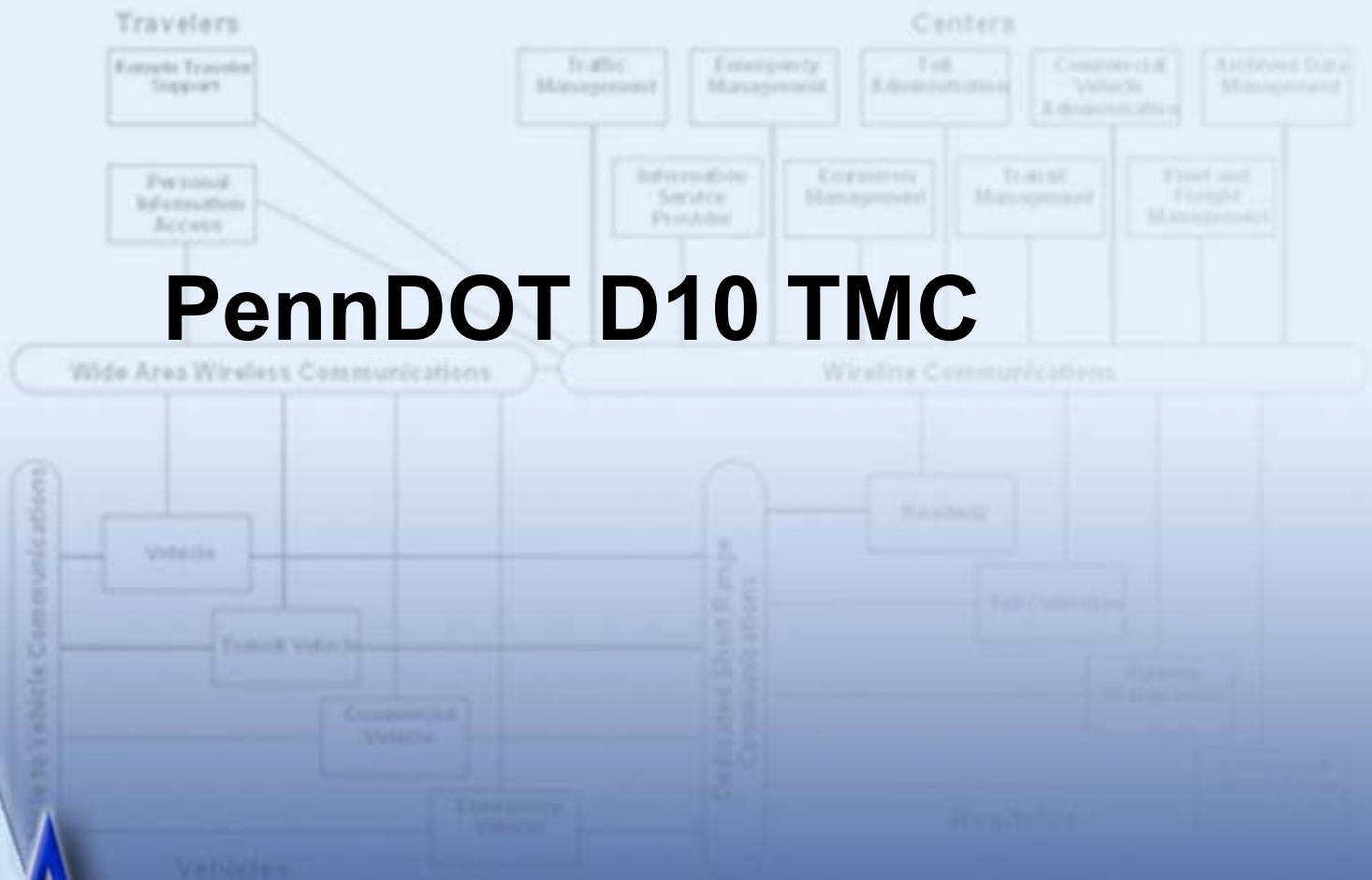
———— Existing  
- - - - - Planned



Existing  
Planned

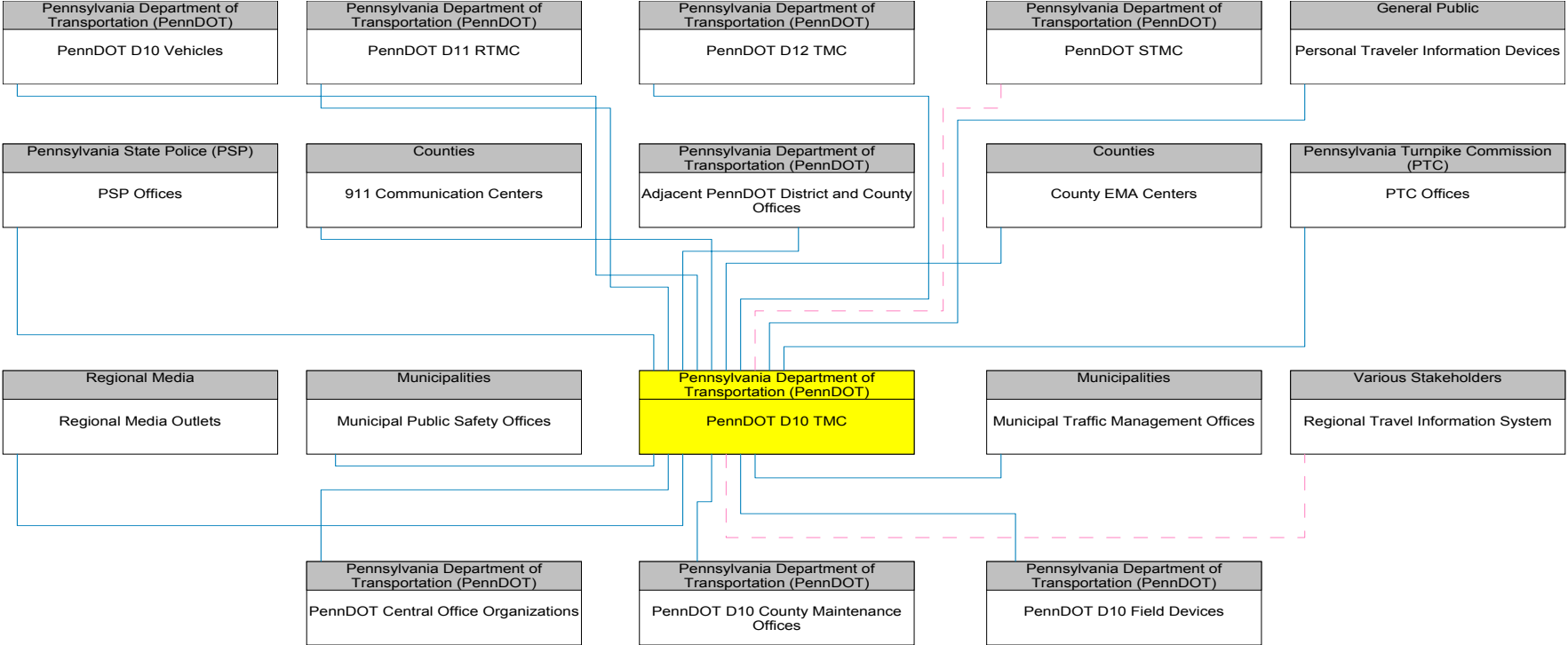


# PennDOT D10 TMC

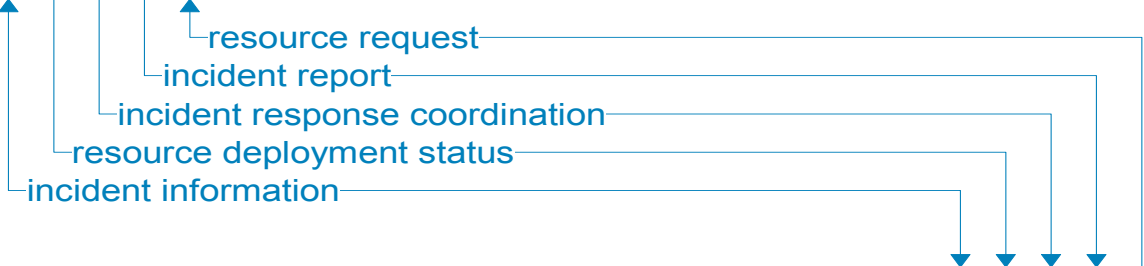
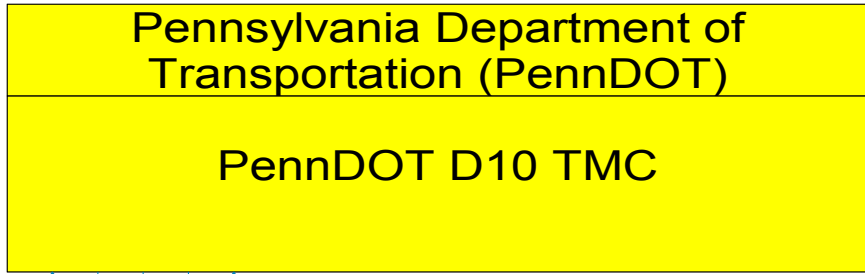


PA

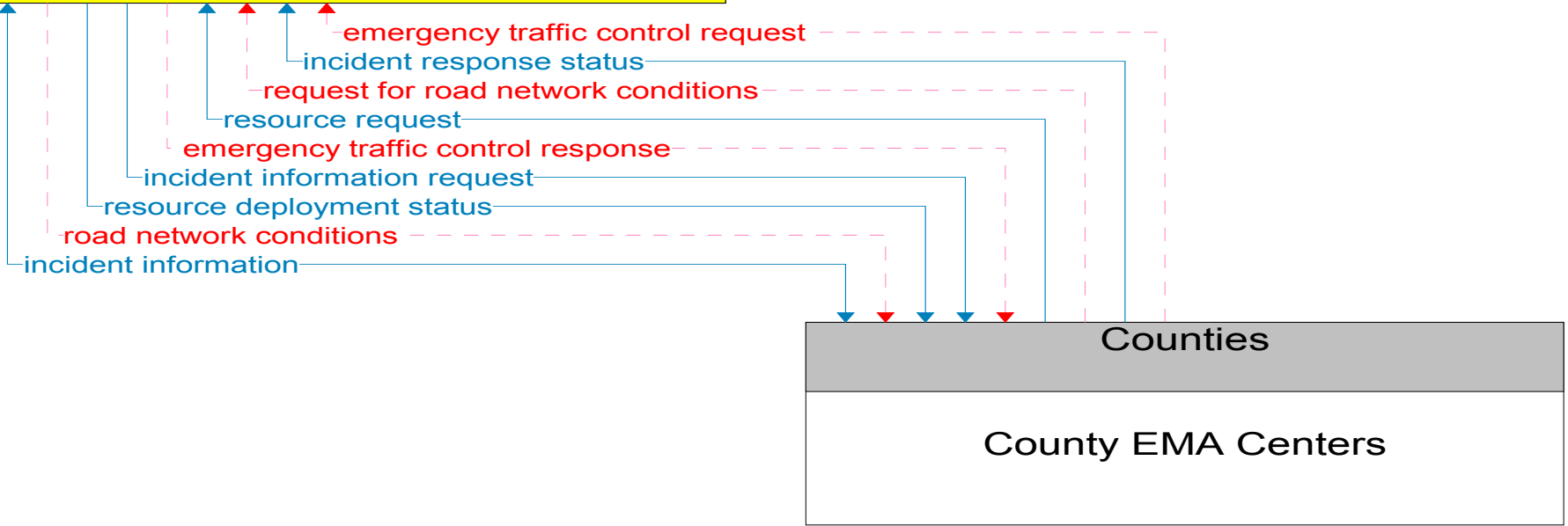
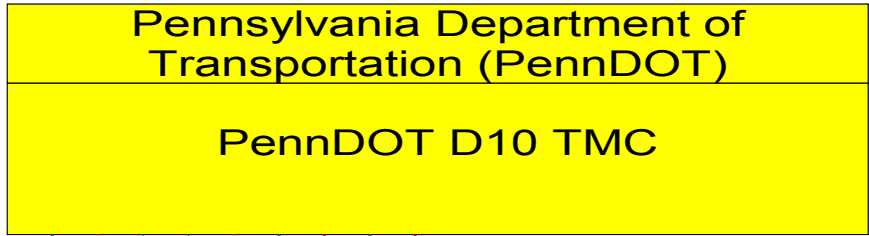
# PennDOT D10 TMC Interconnect Diagram



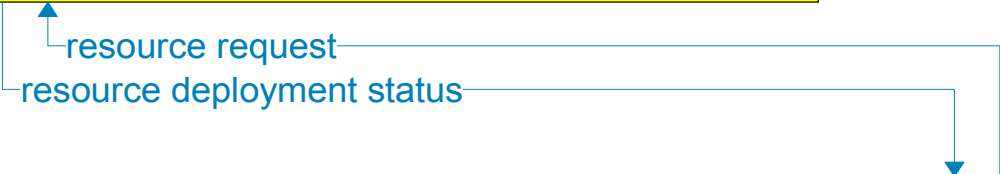
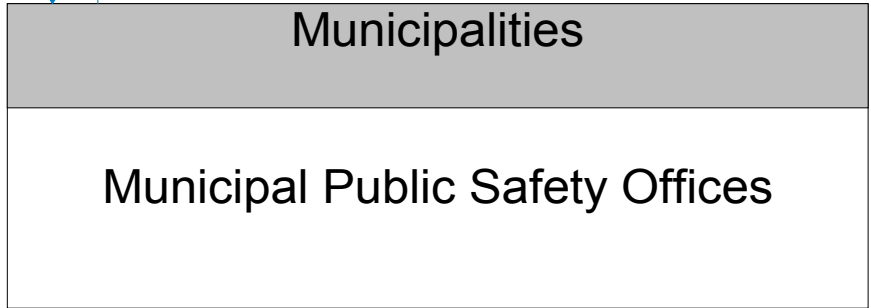
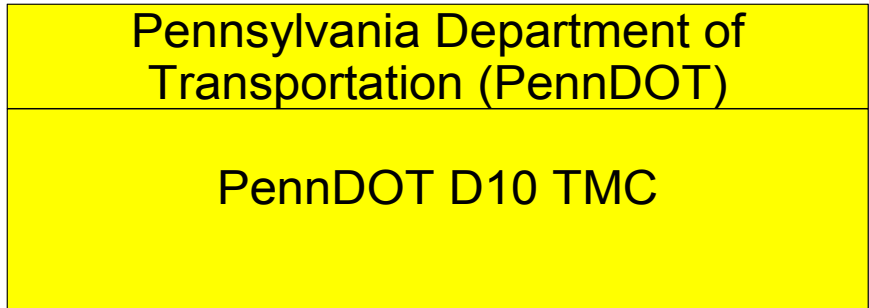
— Existing  
- - - Planned



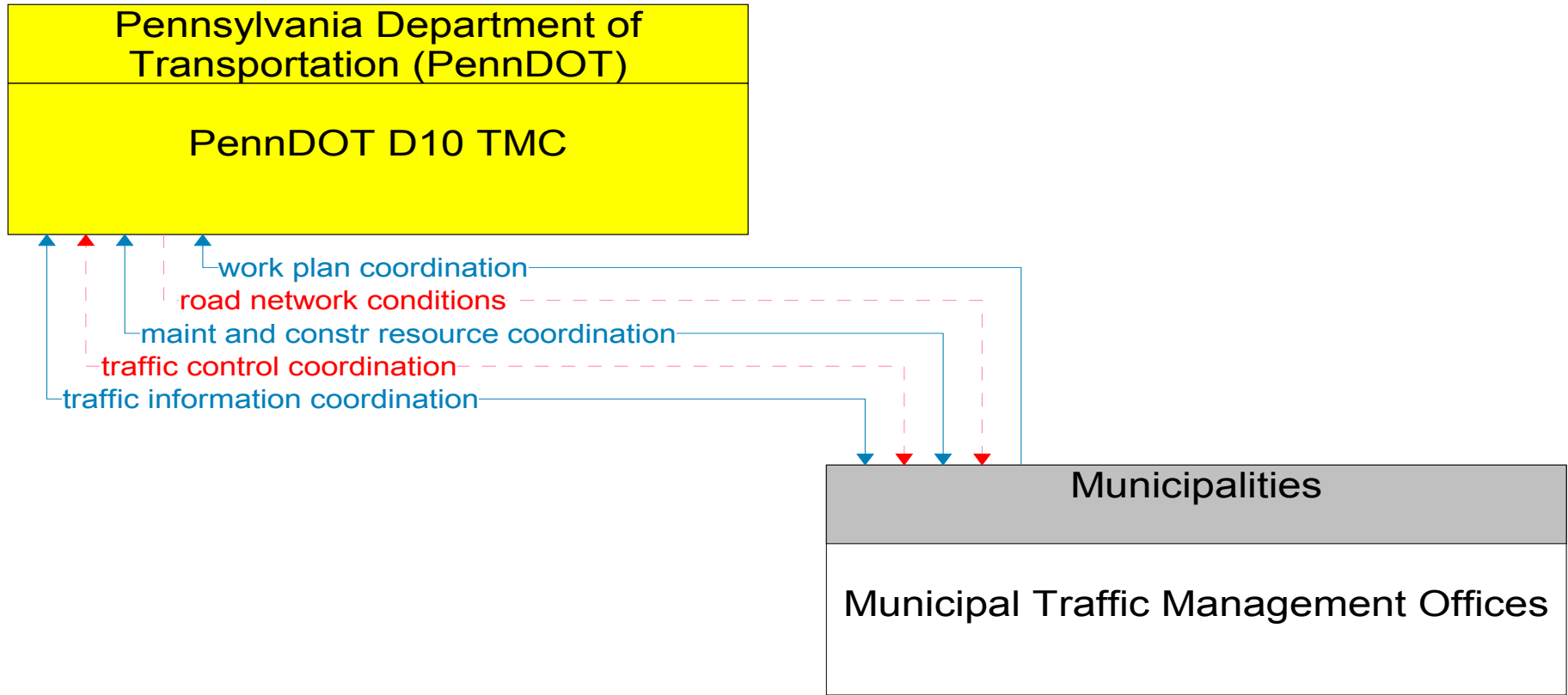
Existing  
Planned





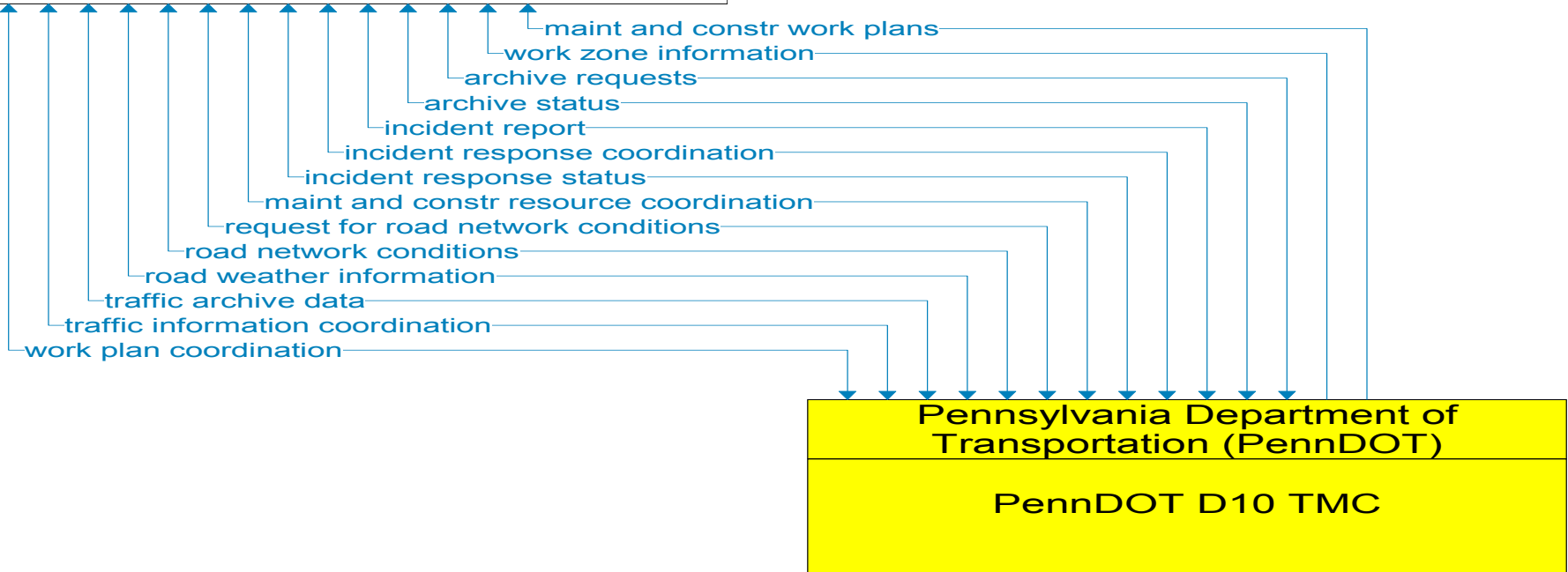


———— Existing  
----- Planned



**Pennsylvania Department of Transportation (PennDOT)**

**PennDOT Central Office Organizations**

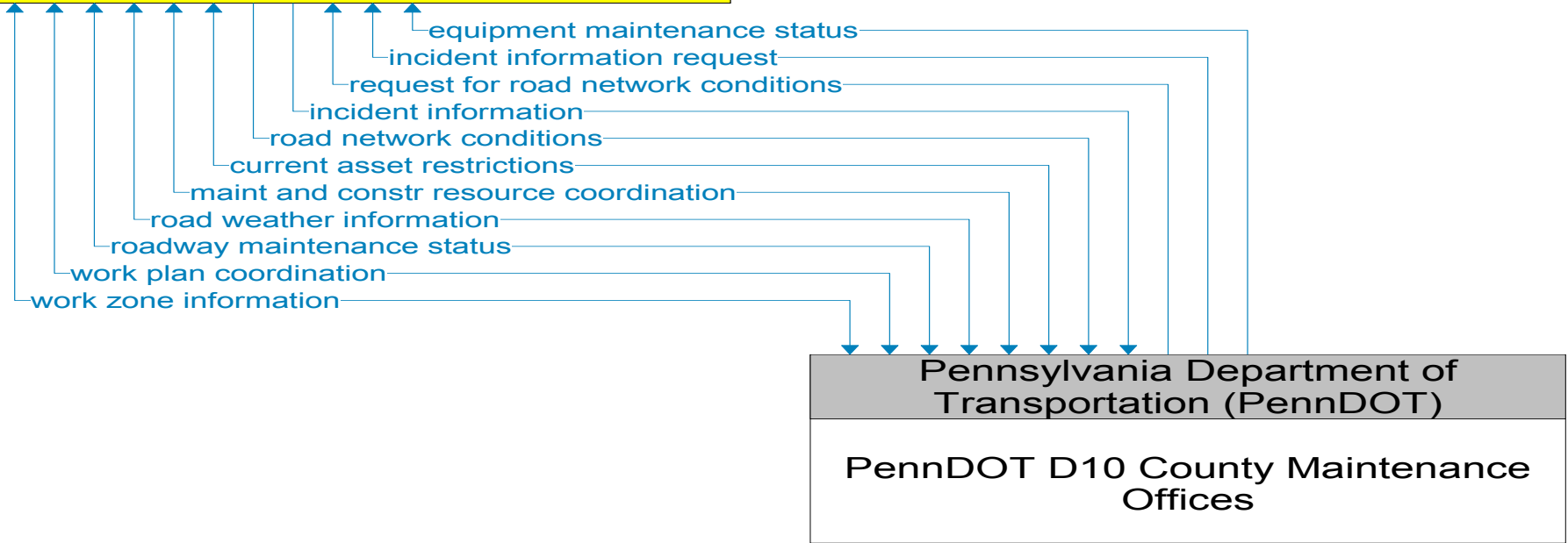


Existing  
Planned

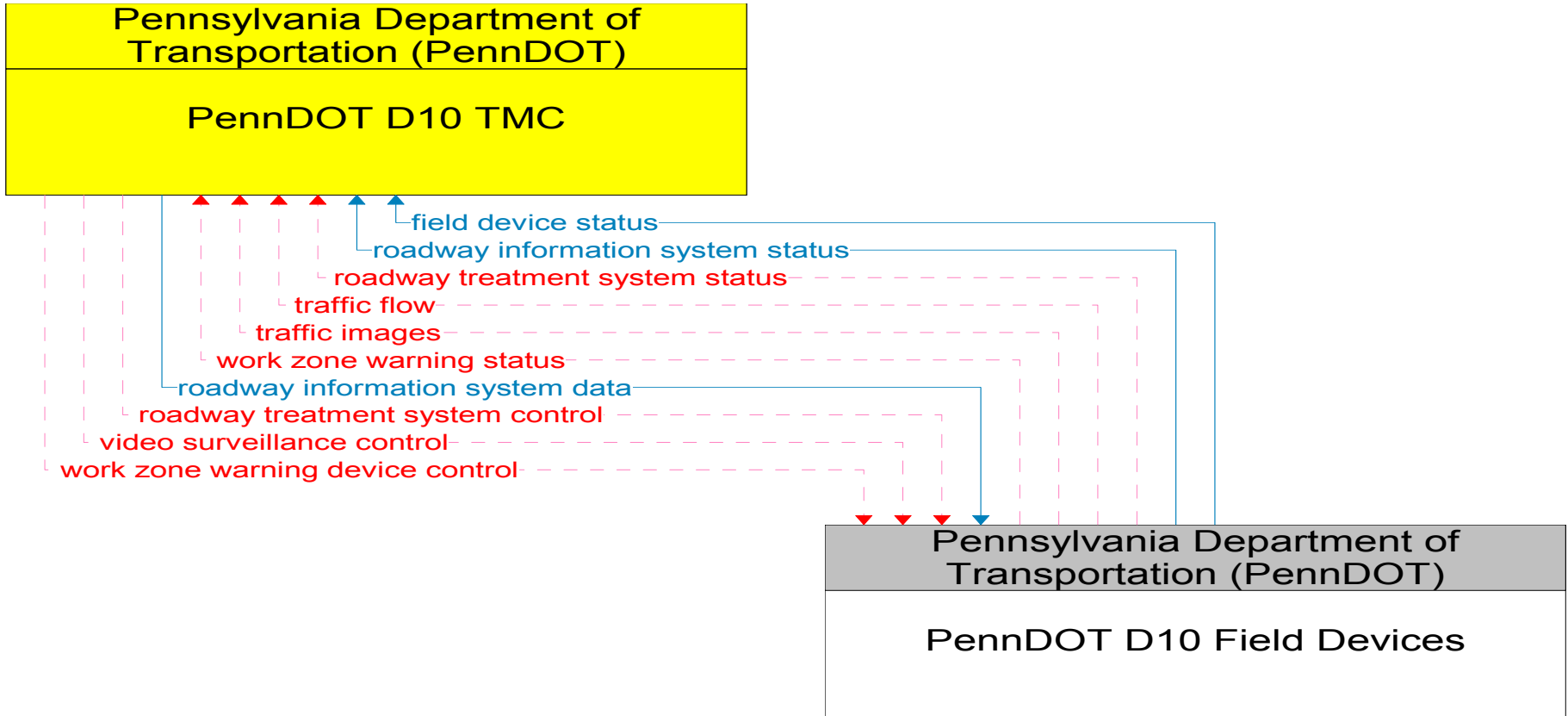
Pennsylvania Department of  
Transportation (PennDOT)

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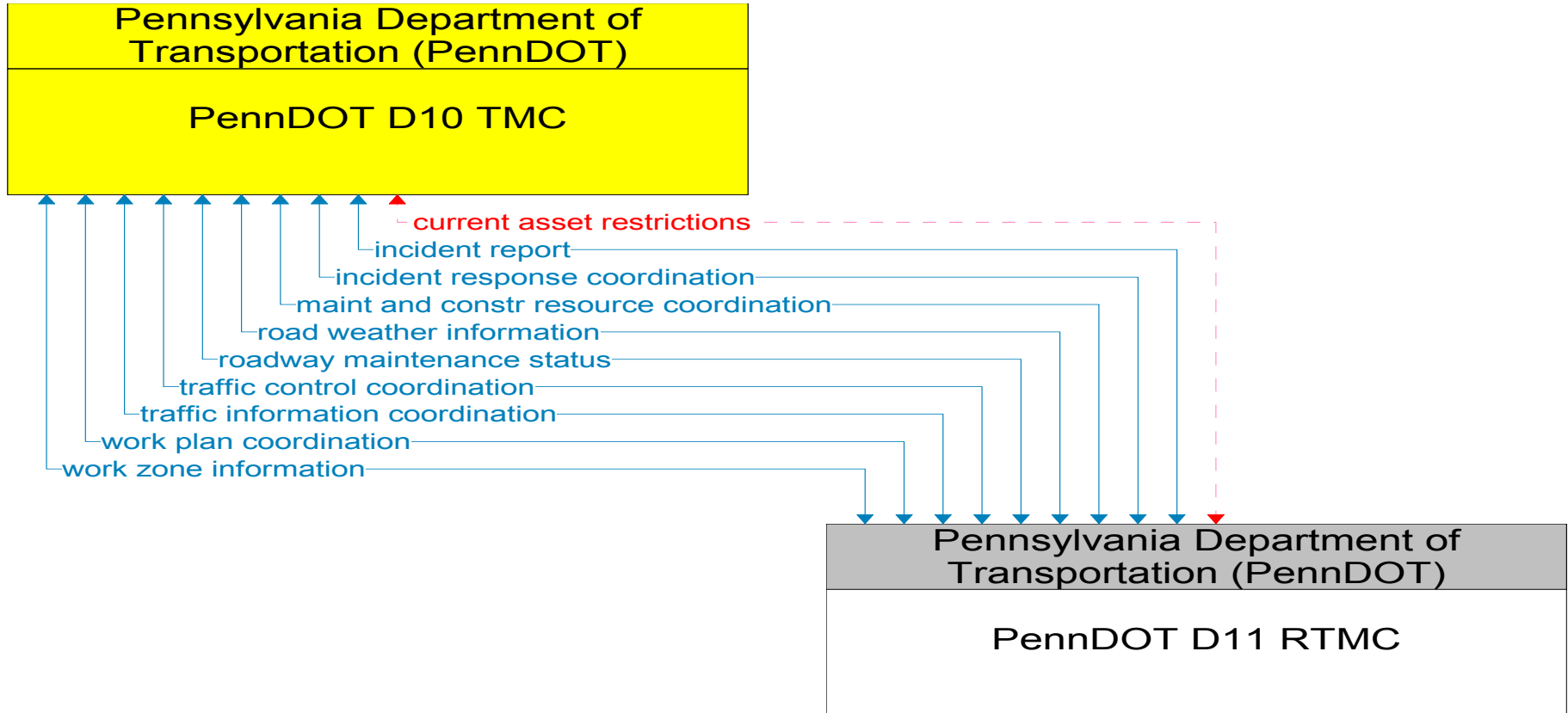
PennDOT D10 TMC



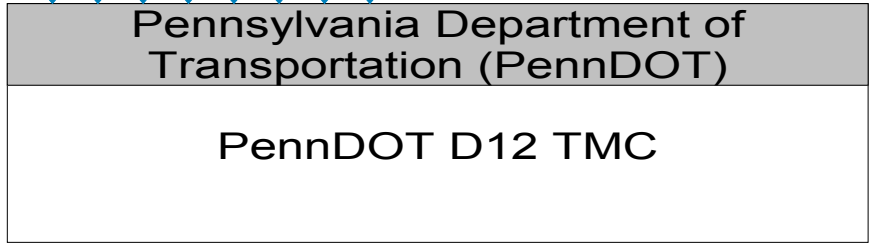
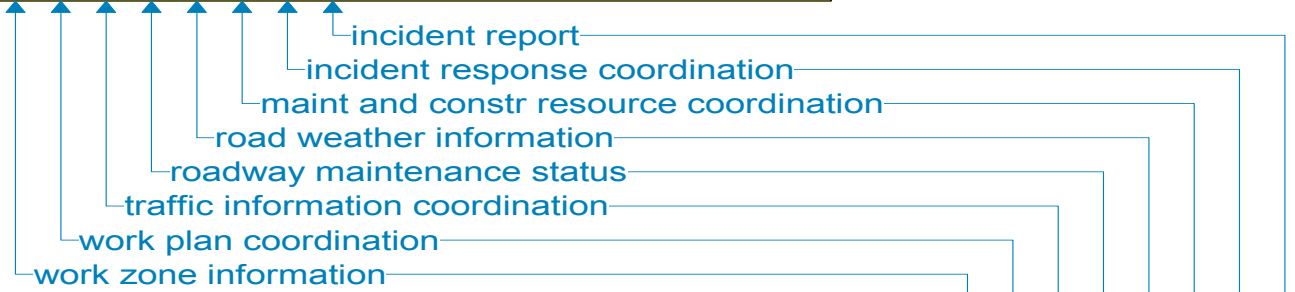
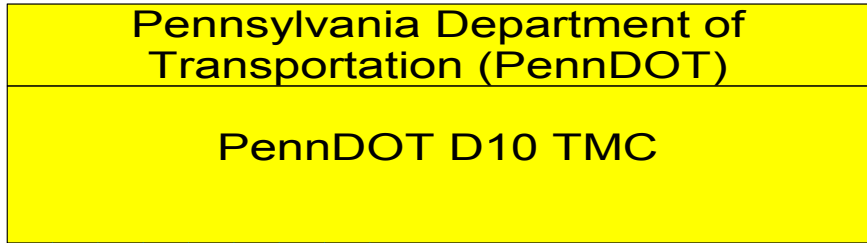
———— Existing  
- - - - - Planned



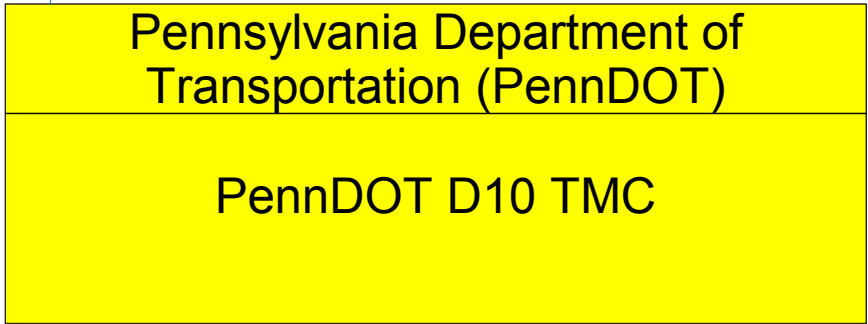
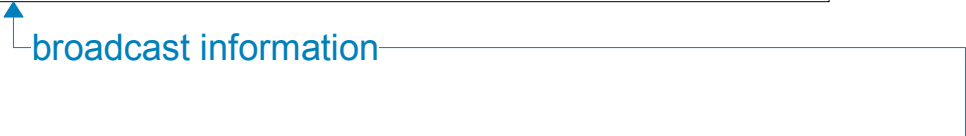
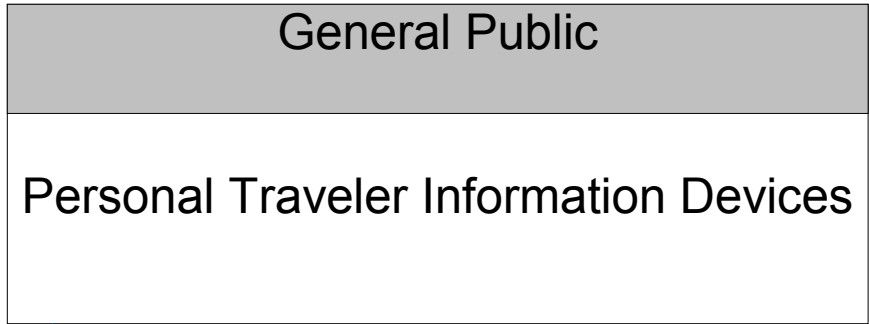
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----- Planned



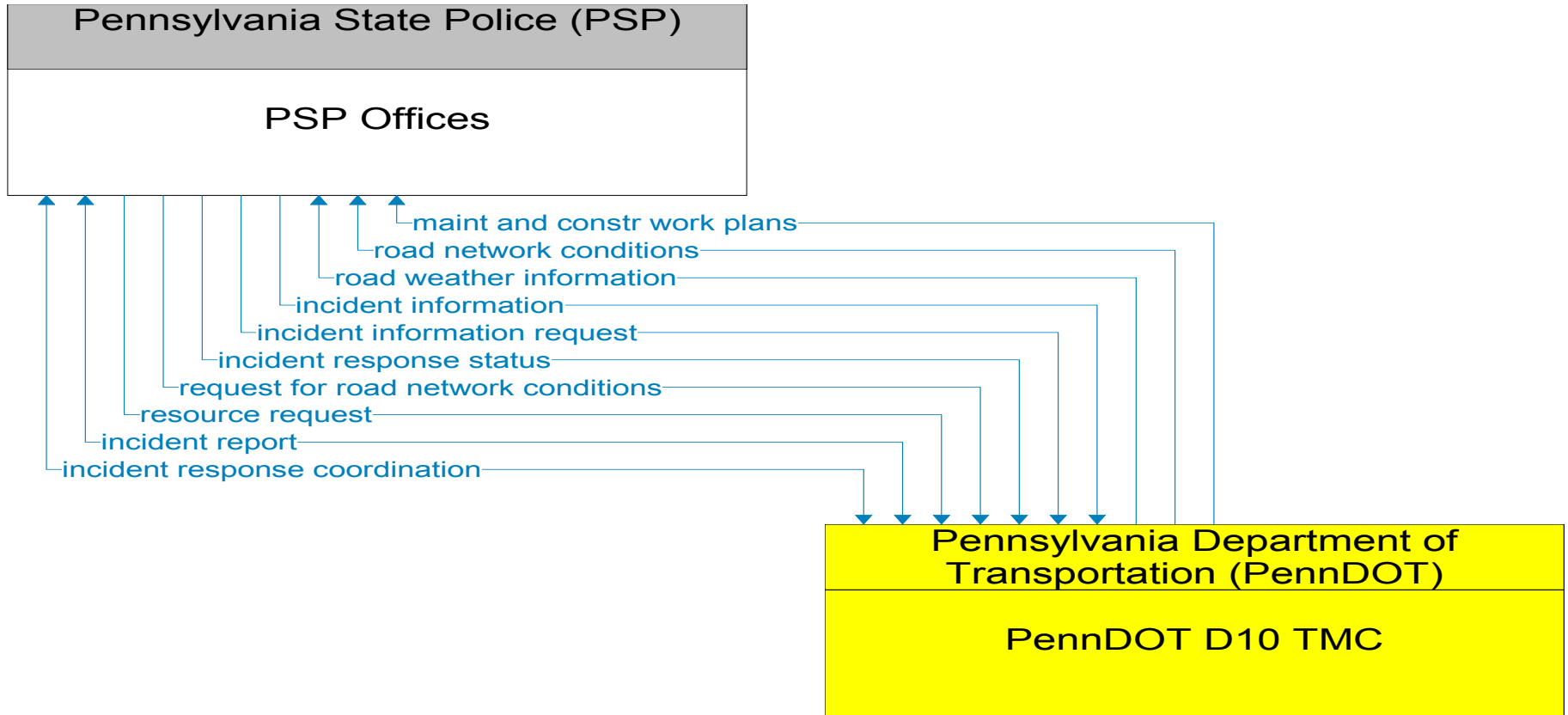
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- - - - - Planned



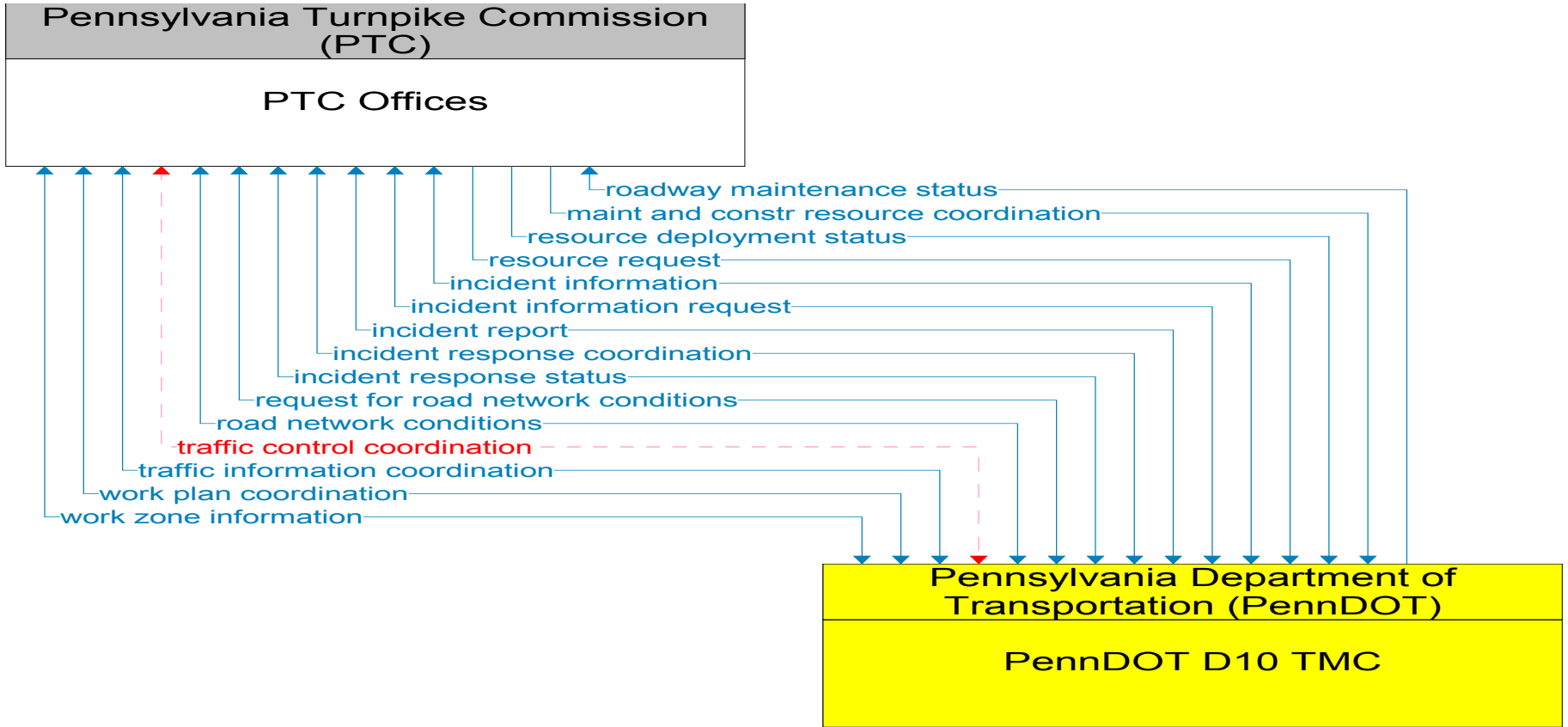
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- - - - - Planned



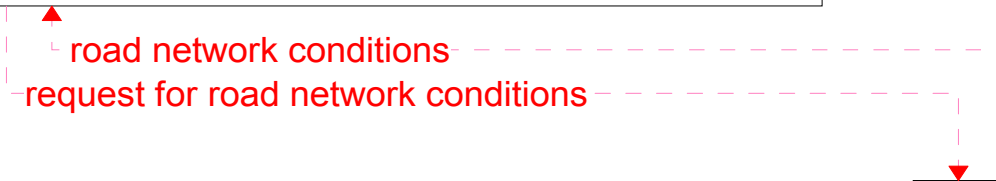
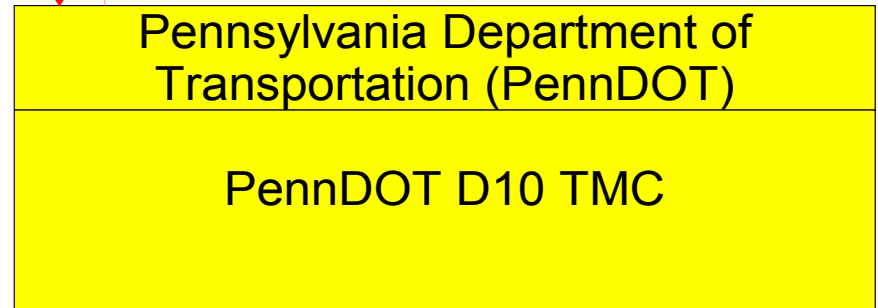
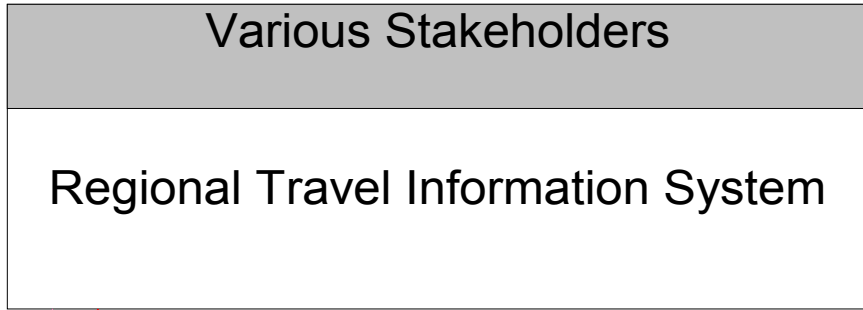




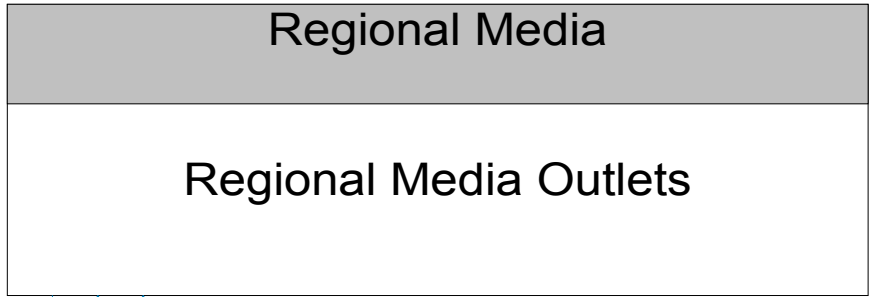
———— Existing  
- - - - - Planned



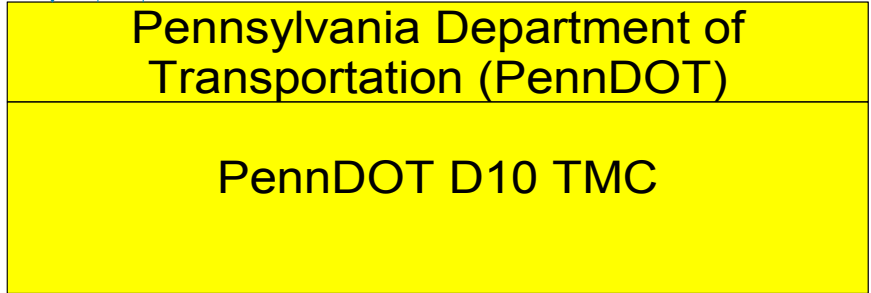
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- - - - - Planned



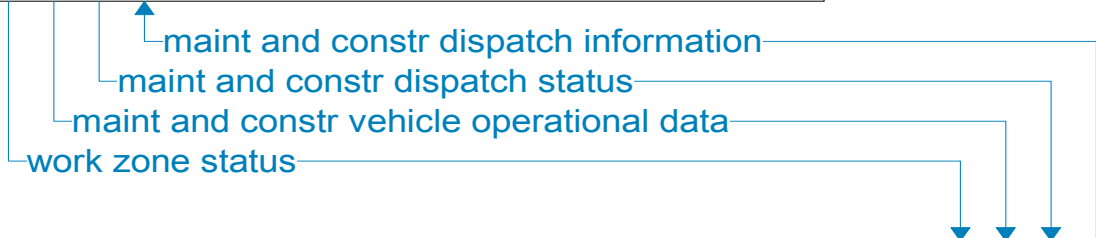
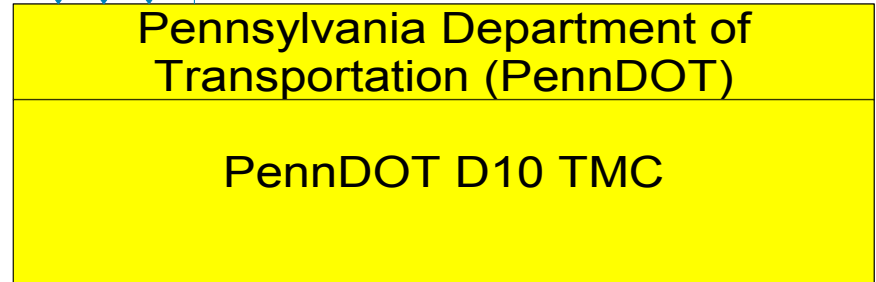
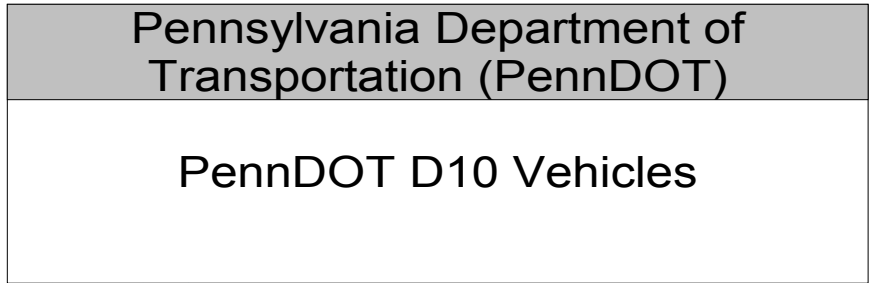
———— Existing  
- - - - - Planned



incident information for media  
road network conditions  
media information request



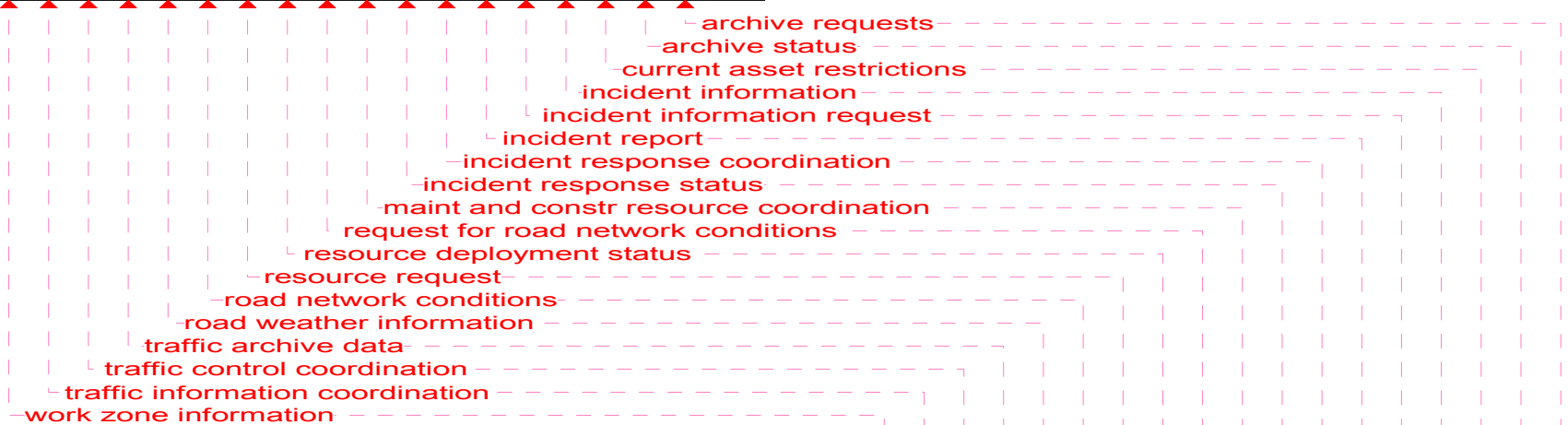
Existing  
Planned



———— Existing  
----- Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D10 TMC



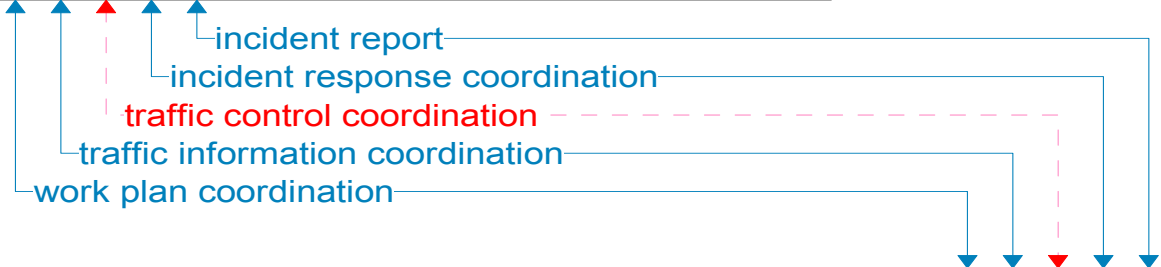
Pennsylvania Department of  
Transportation (PennDOT)

PennDOT STMC

Existing  
Planned

Pennsylvania Department of  
Transportation (PennDOT)

Adjacent PennDOT District and County  
Offices



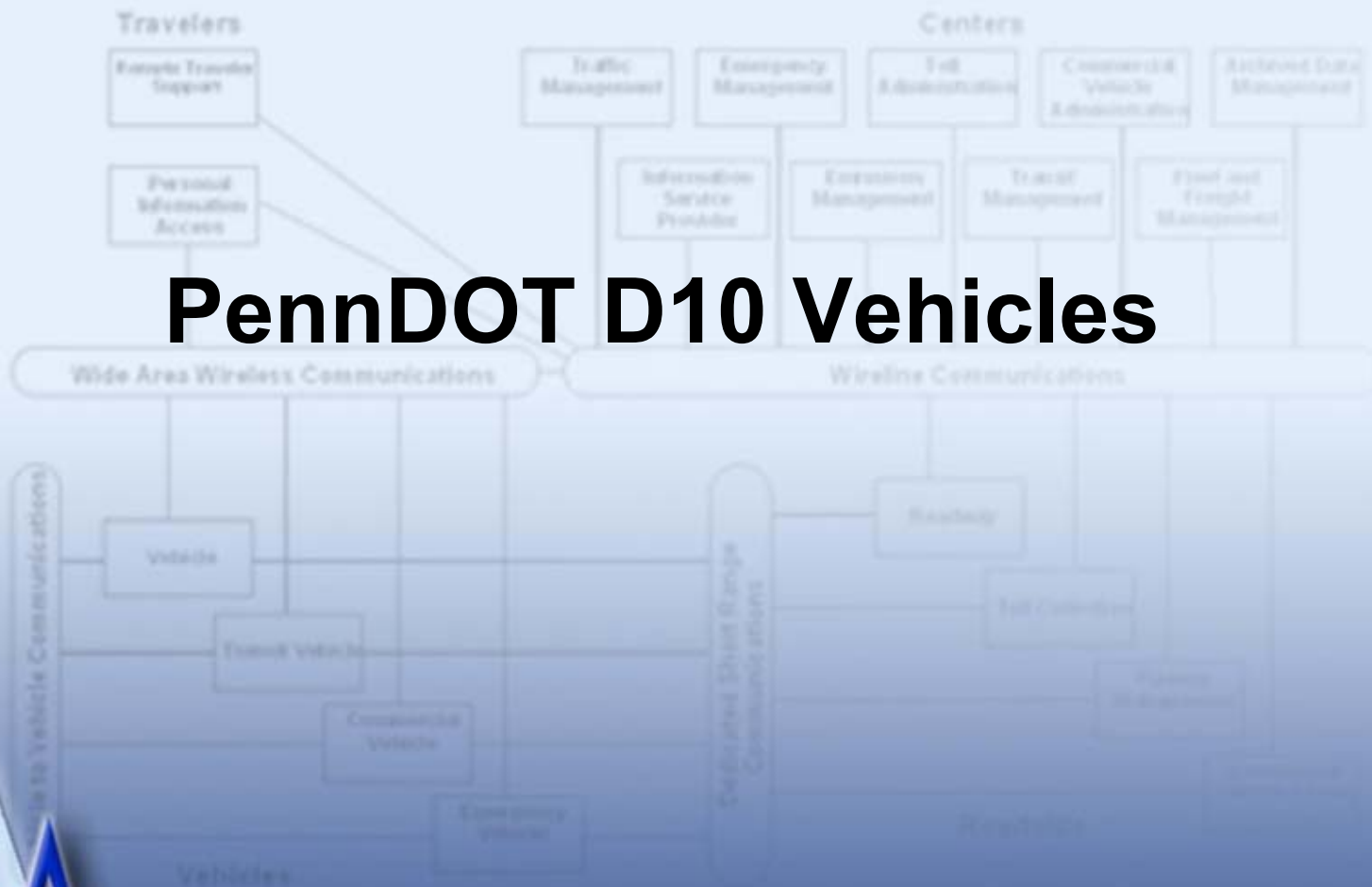
Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D10 TMC

Existing

Planned

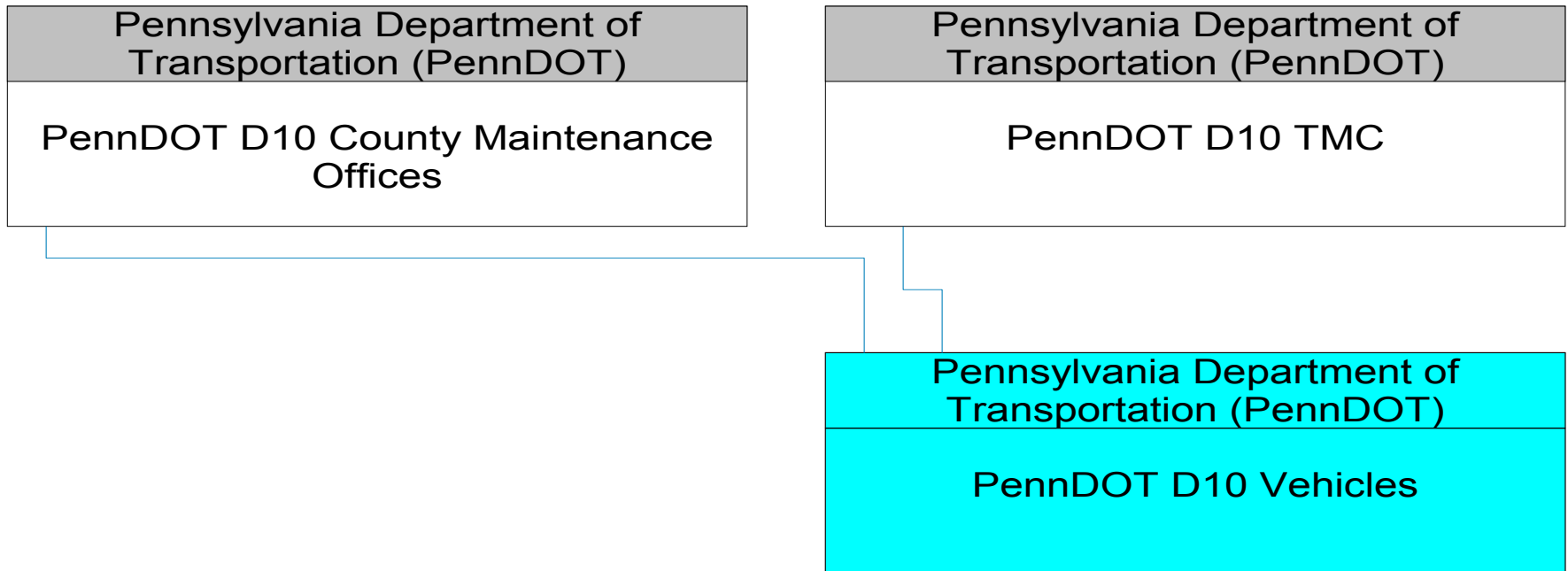
# PennDOT D10 Vehicles



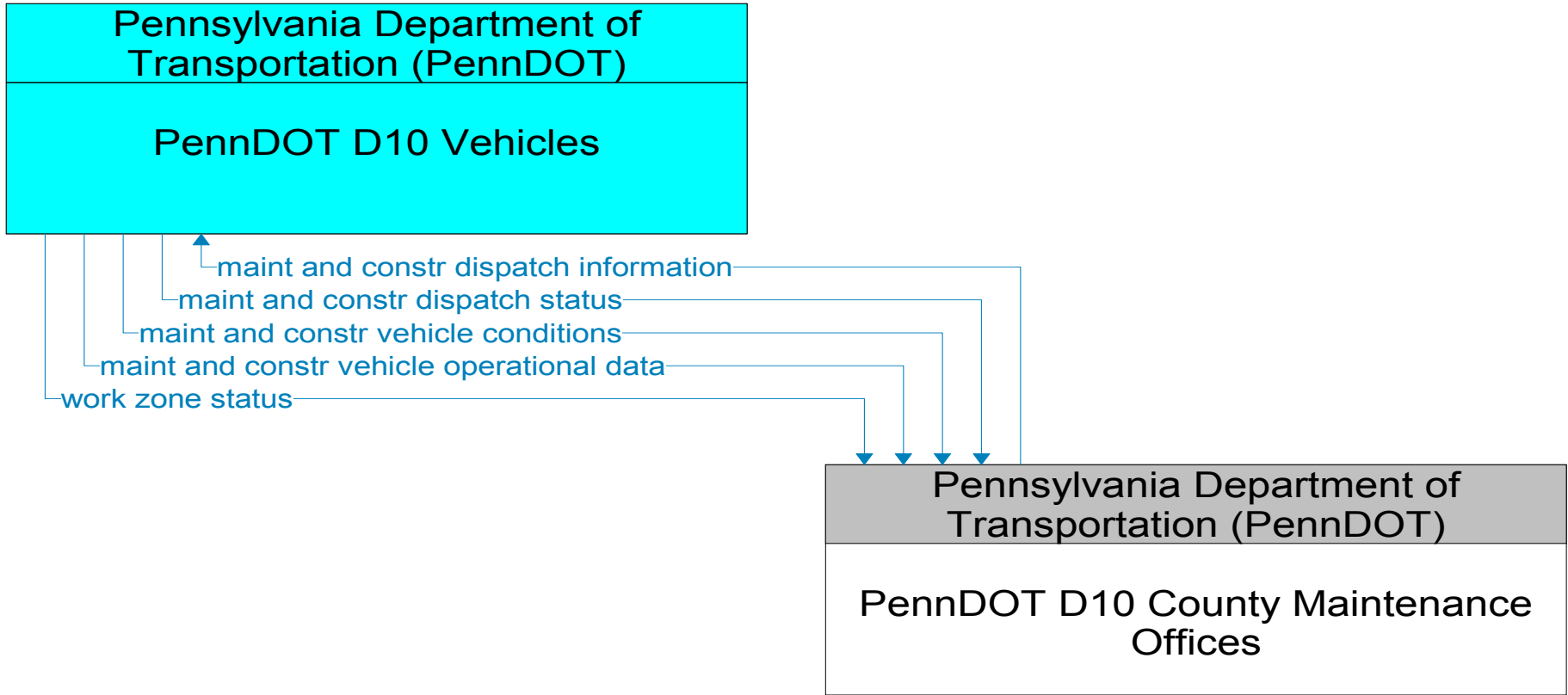
PA



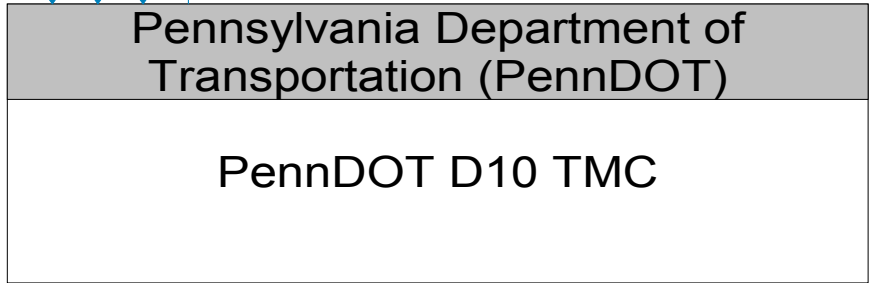
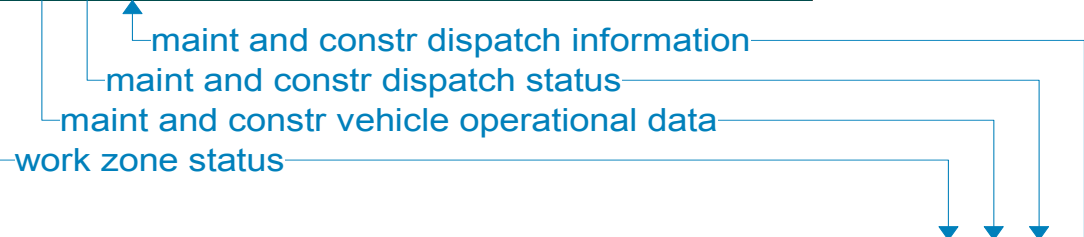
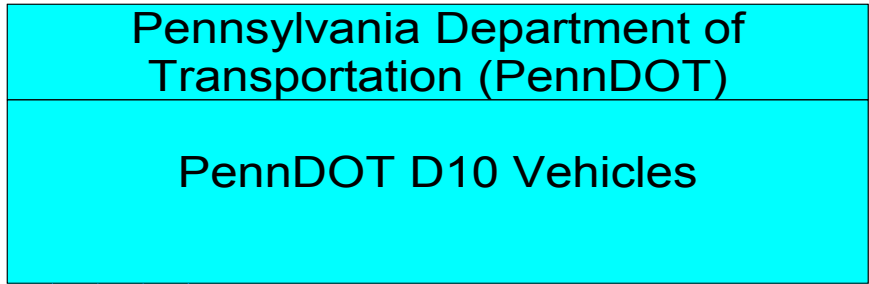
# PennDOT D10 Vehicles Interconnect Diagram



———— Existing  
----- Planned

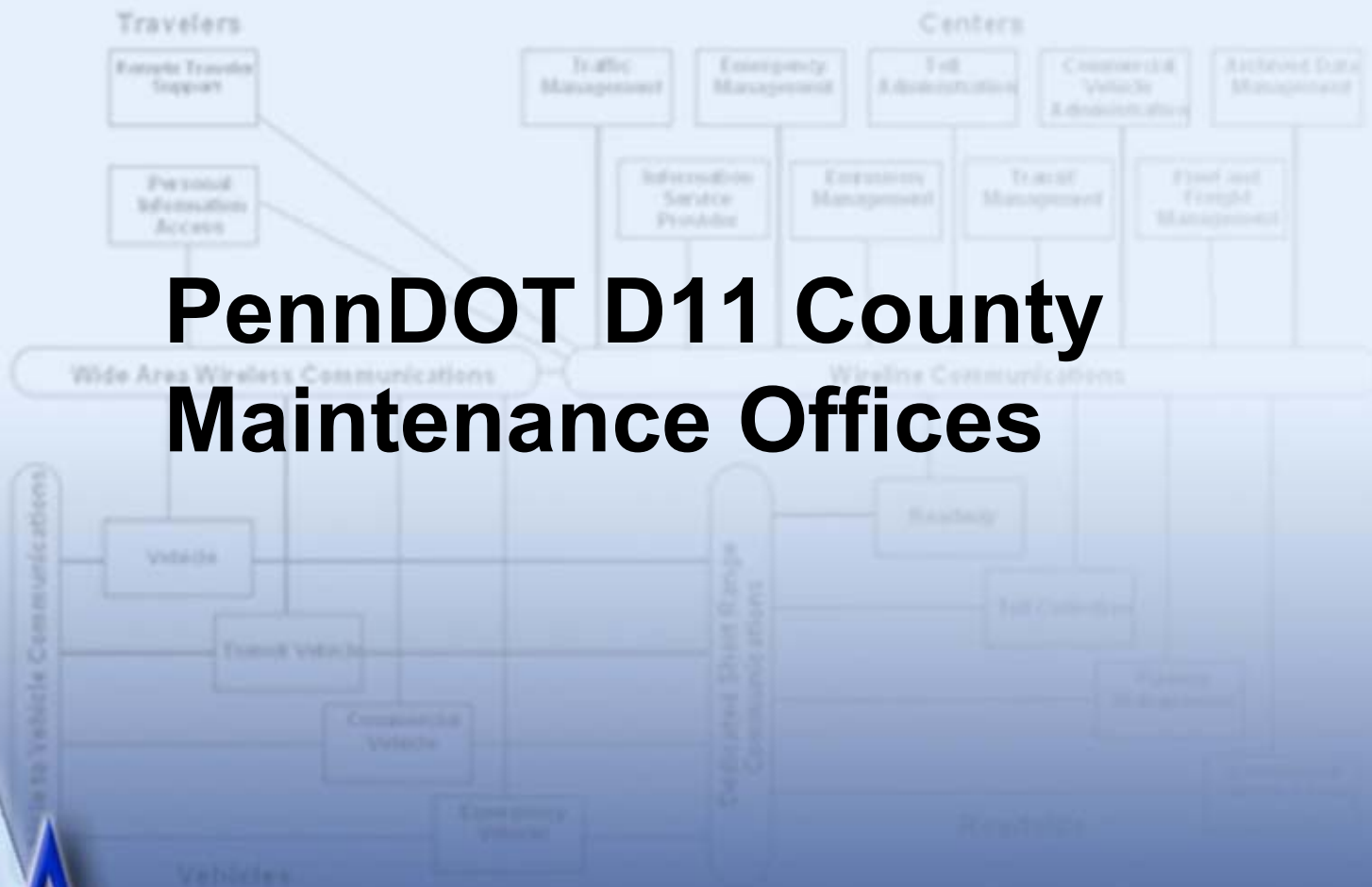


———— Existing  
- - - - - Planned

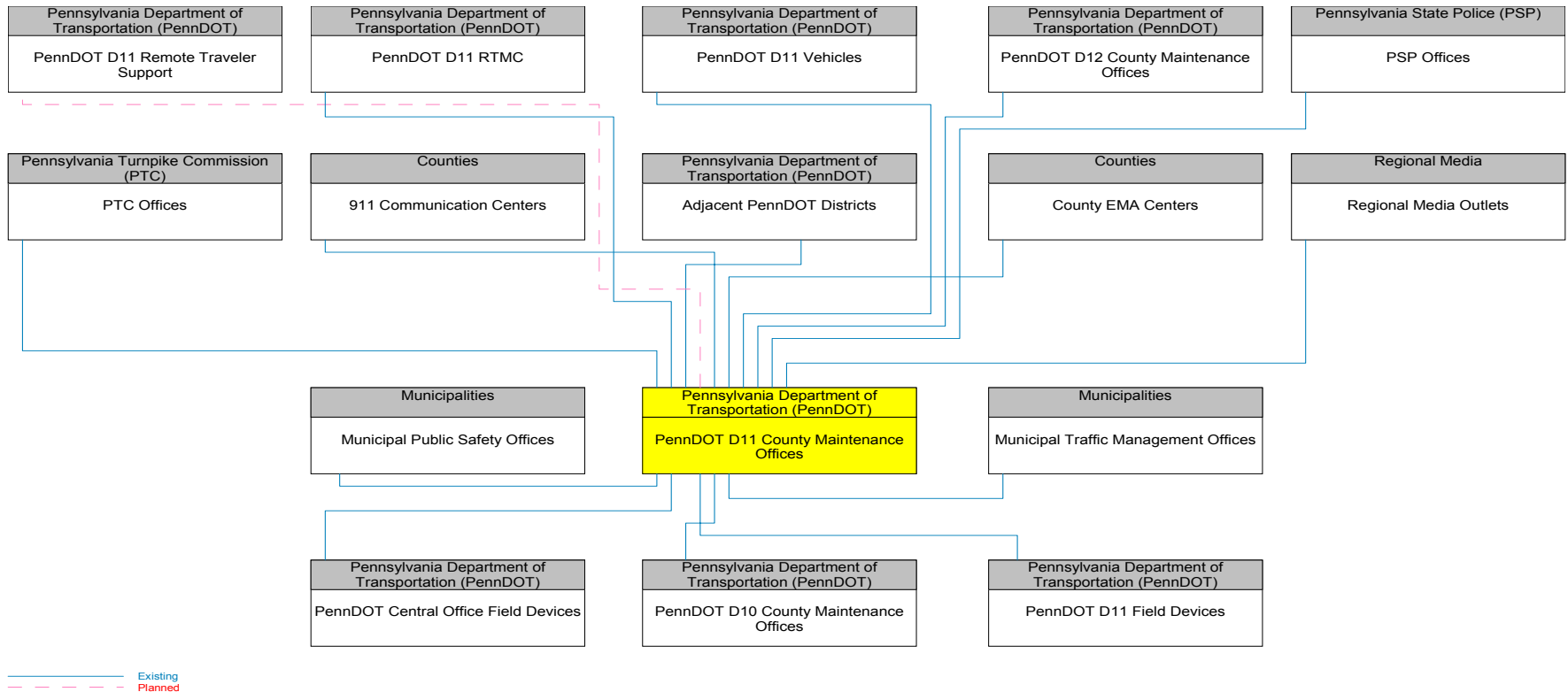


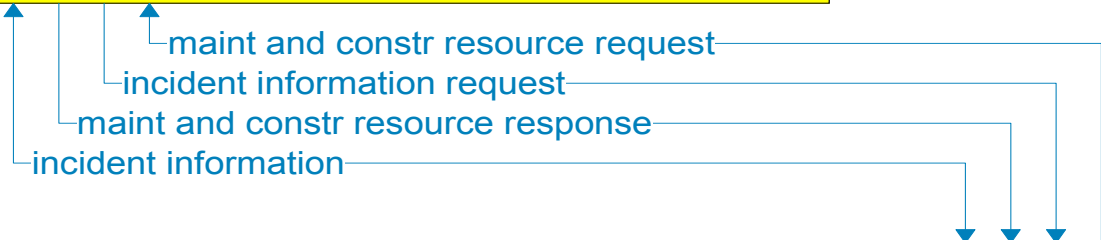
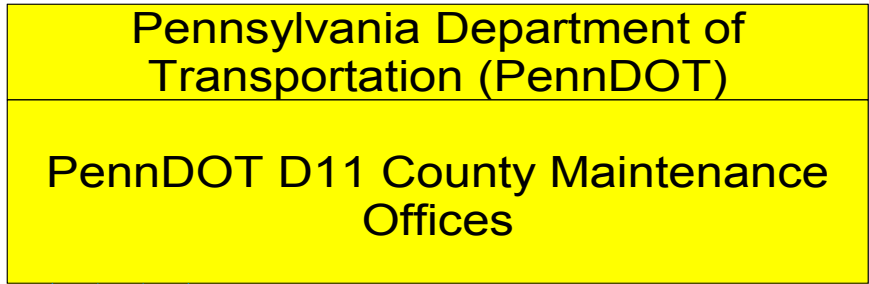
———— Existing  
- - - - - Planned

# PennDOT D11 County Maintenance Offices

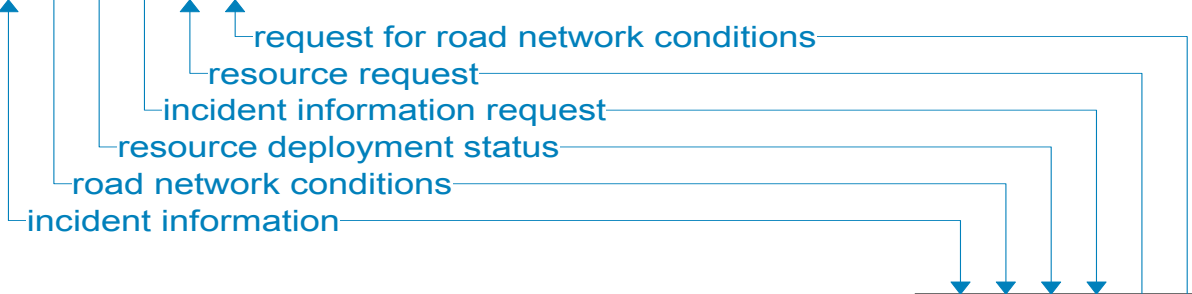
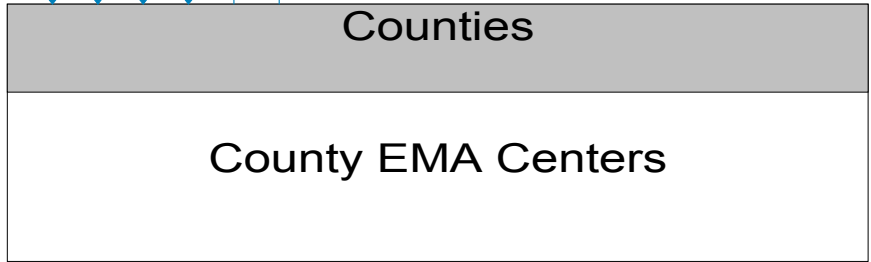
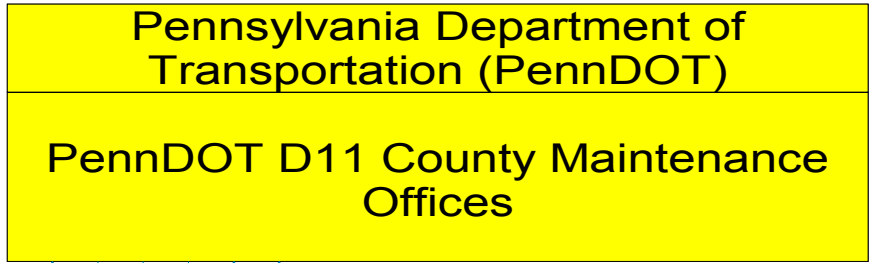


# PennDOT D11 County Maintenance Offices Interconnect Diagram

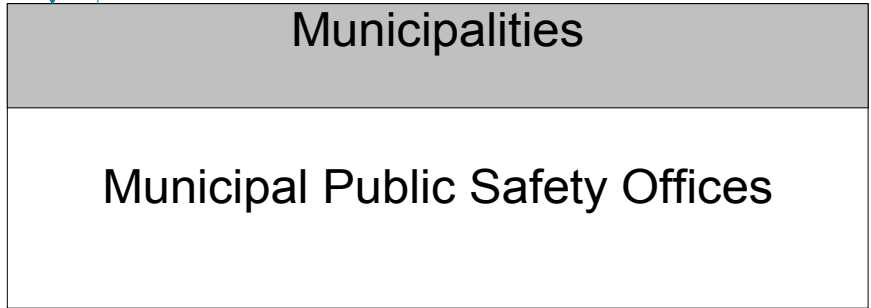
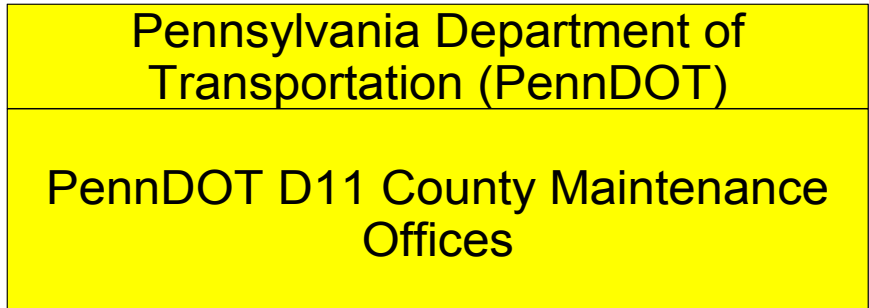




———— Existing  
- - - - - Planned

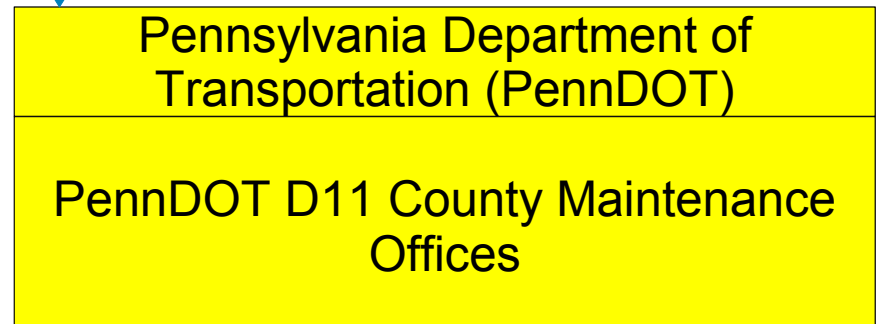
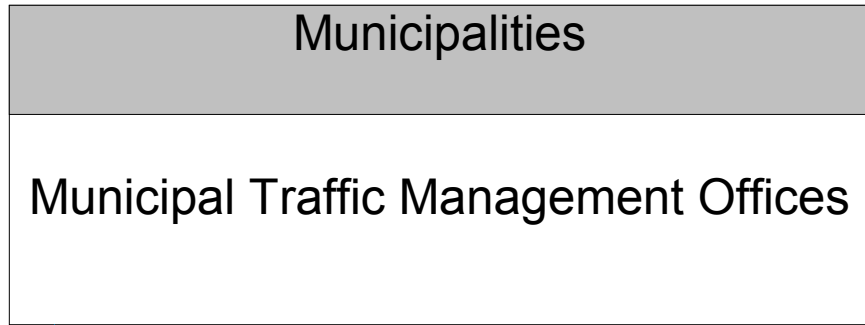


Existing  
Planned



———— Existing  
----- Planned

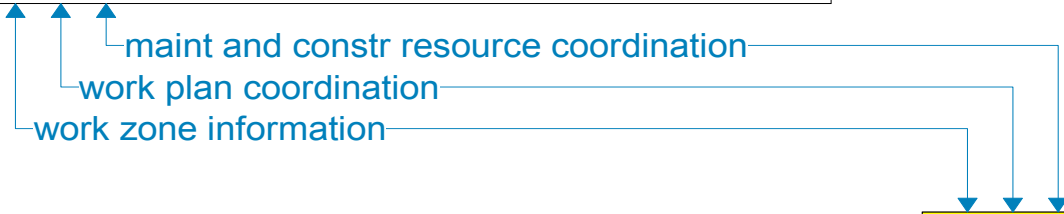




———— Existing  
- - - - - Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D10 County Maintenance  
Offices

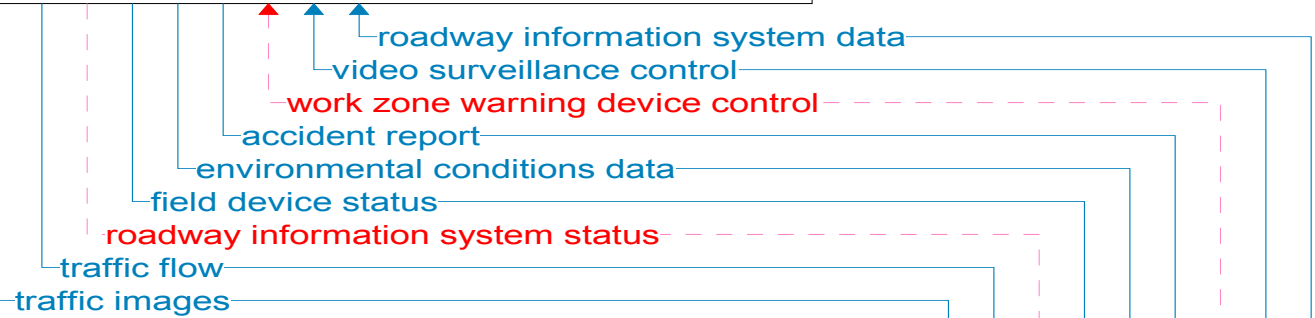


Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 County Maintenance  
Offices

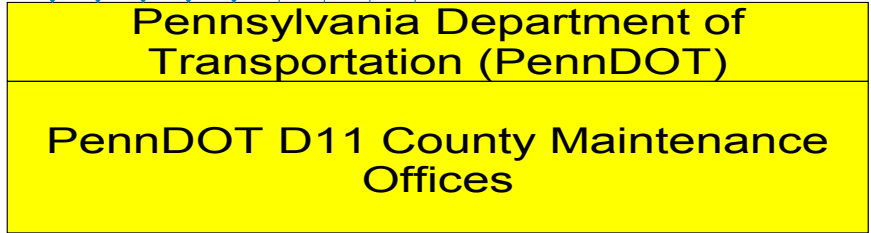
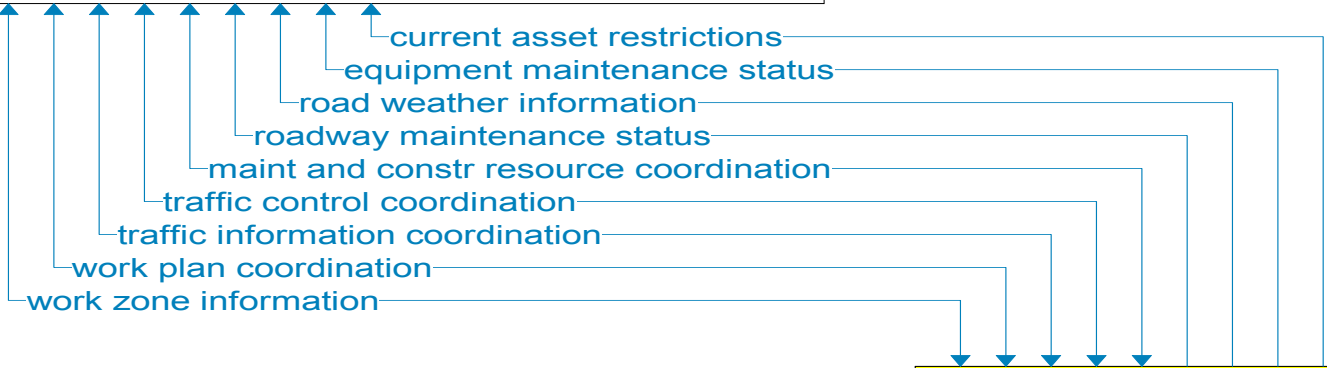
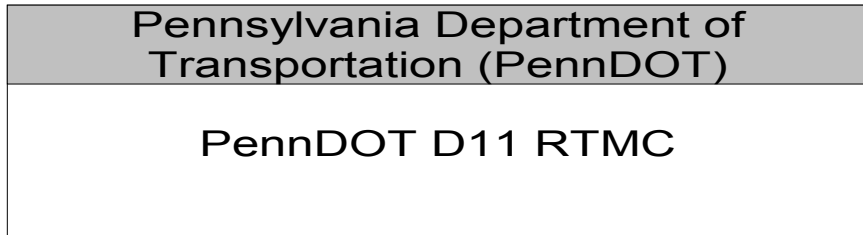
———— Existing  
- - - - - Planned

Pennsylvania Department of Transportation (PennDOT)  
PennDOT D11 Field Devices



Pennsylvania Department of Transportation (PennDOT)  
PennDOT D11 County Maintenance Offices

Existing  
Planned



———— Existing  
- - - - - Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 Remote Traveler  
Support

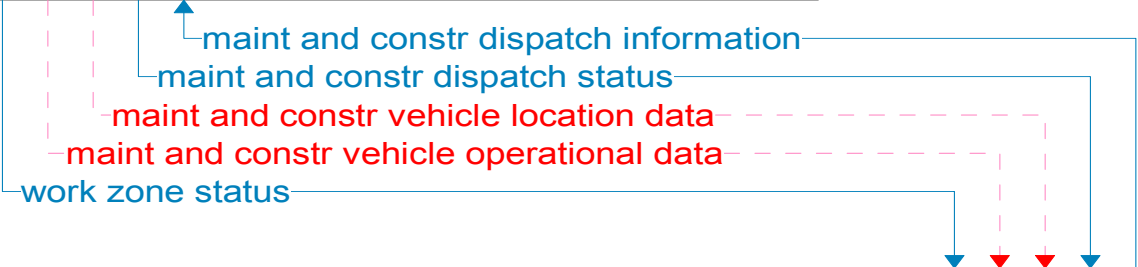
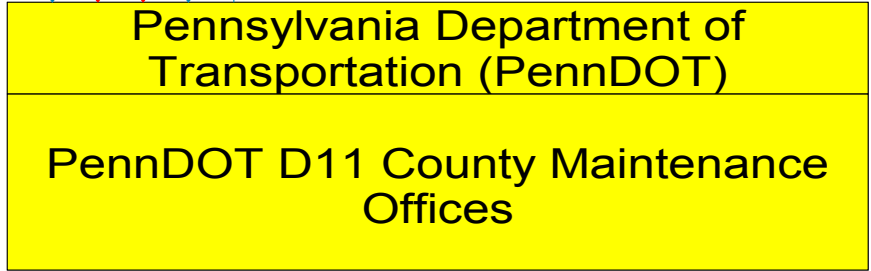
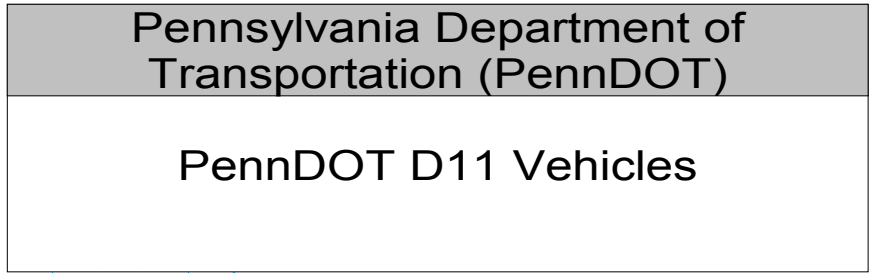


broadcast information

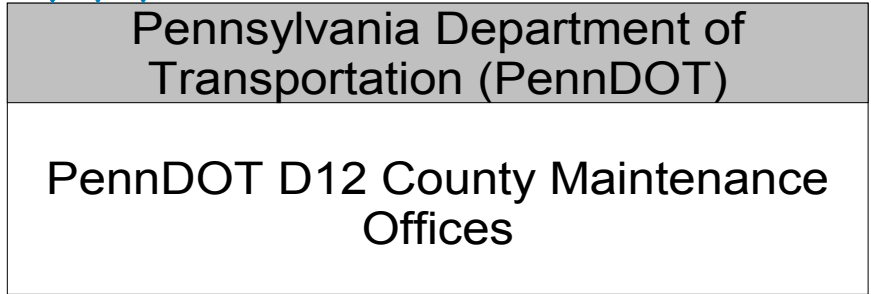
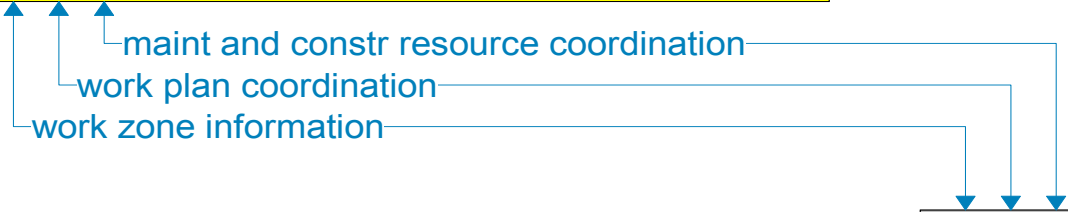
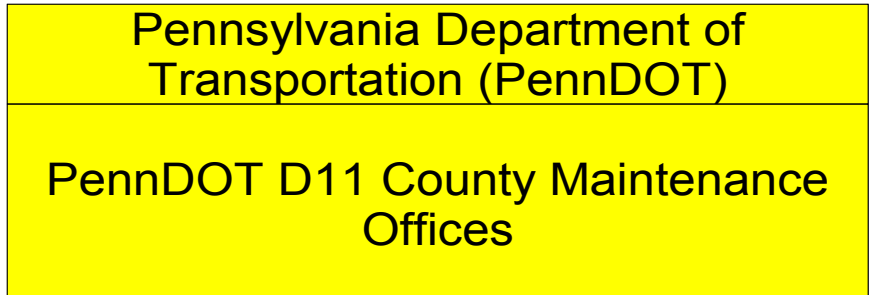
Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 County Maintenance  
Offices

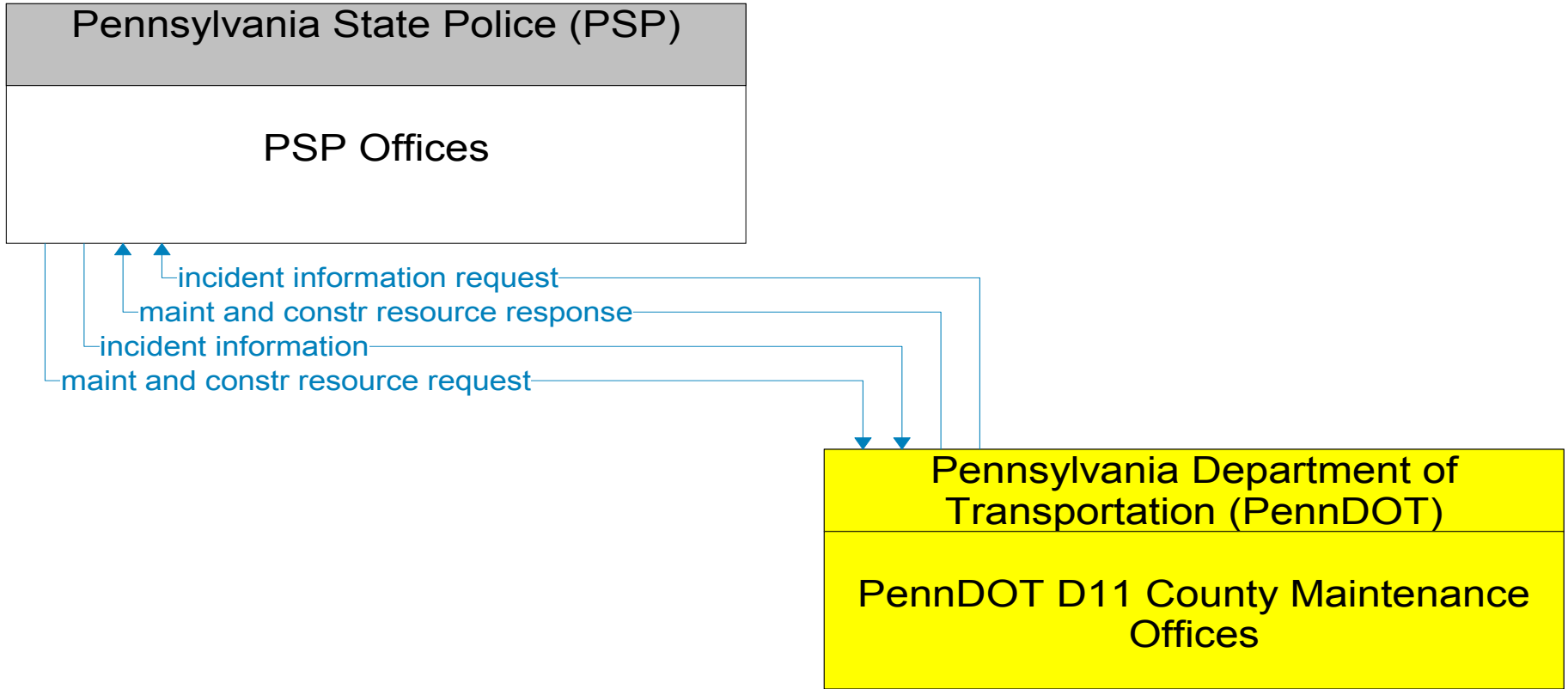
Existing  
Planned



Existing  
Planned

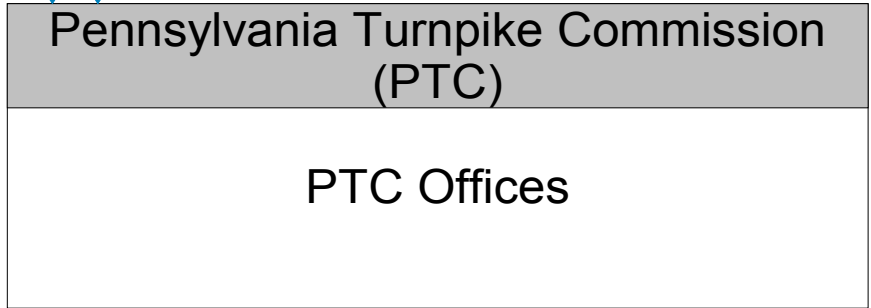
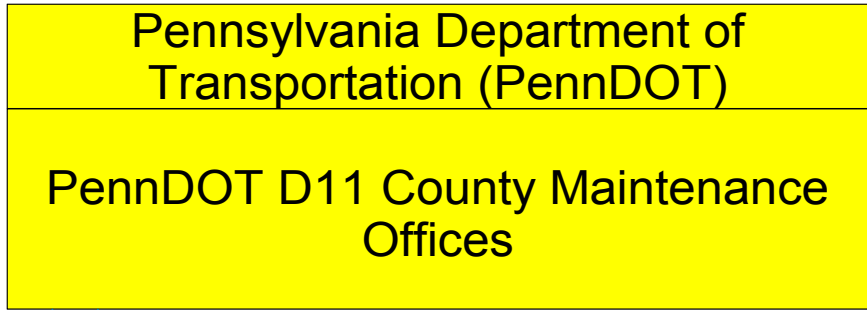


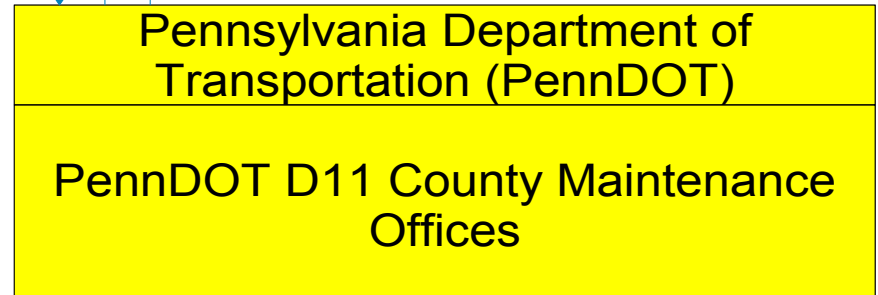
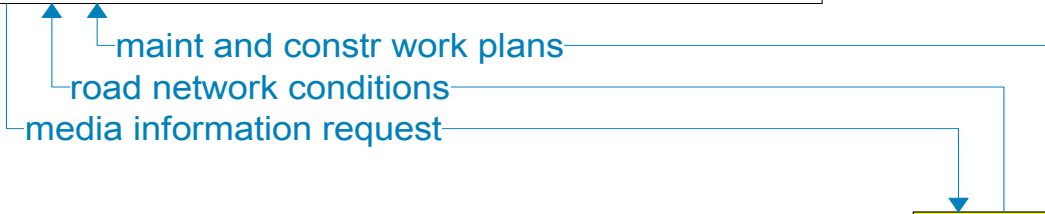
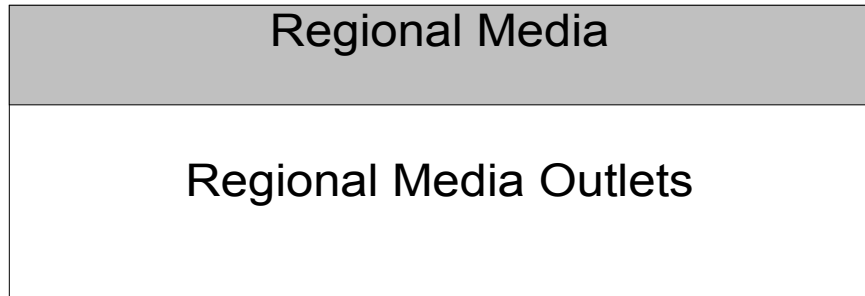
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----- Planned



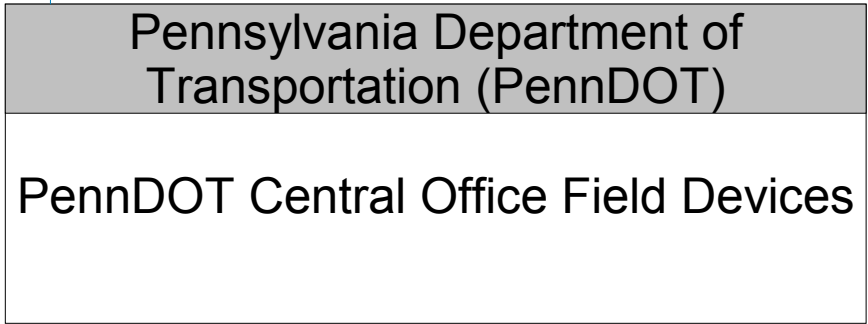
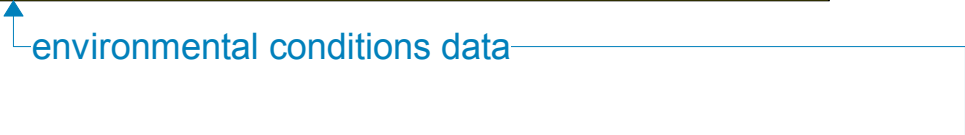
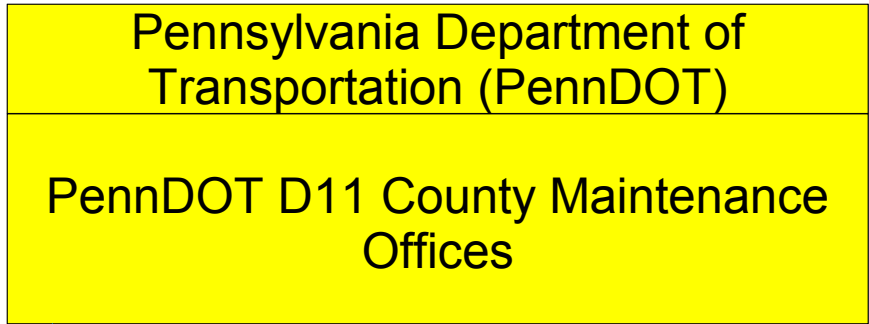
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- - - - - Planned



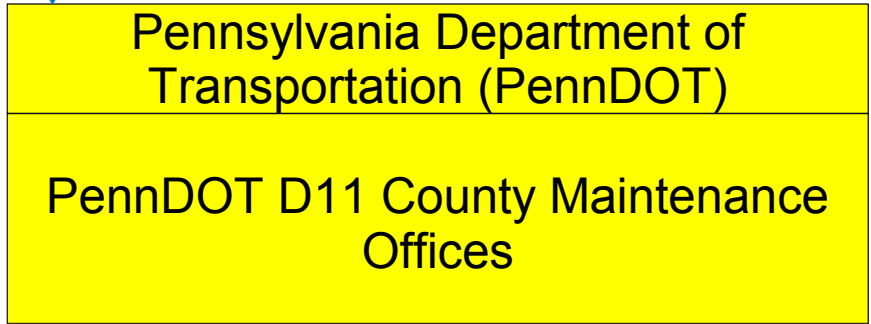
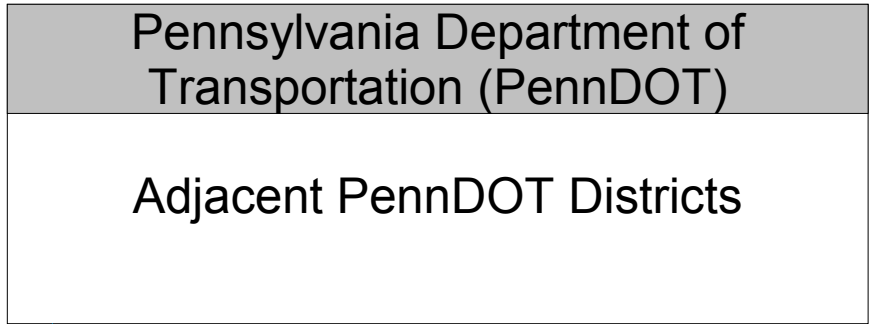




Existing  
Planned

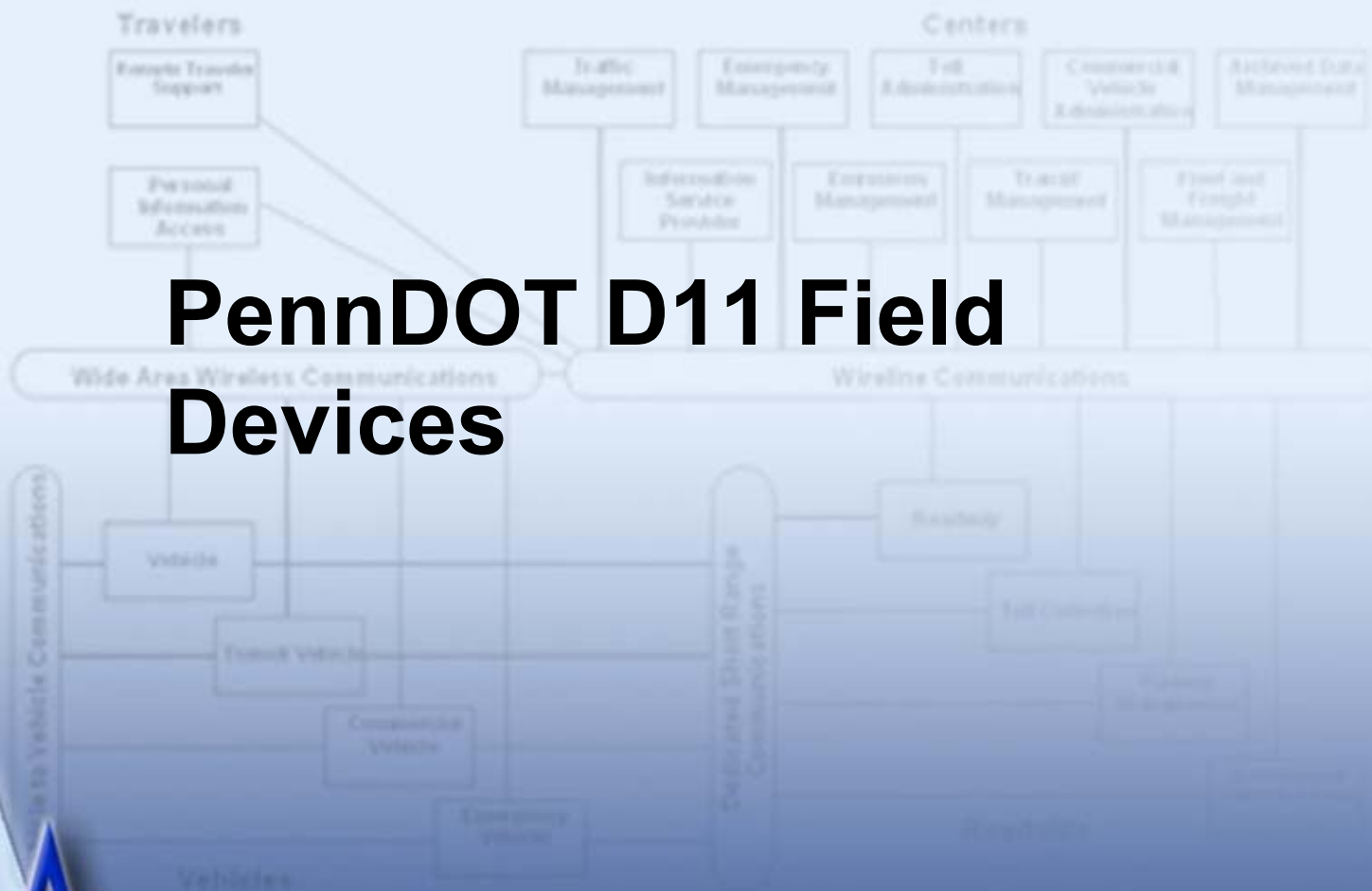


———— Existing  
- - - - - Planned



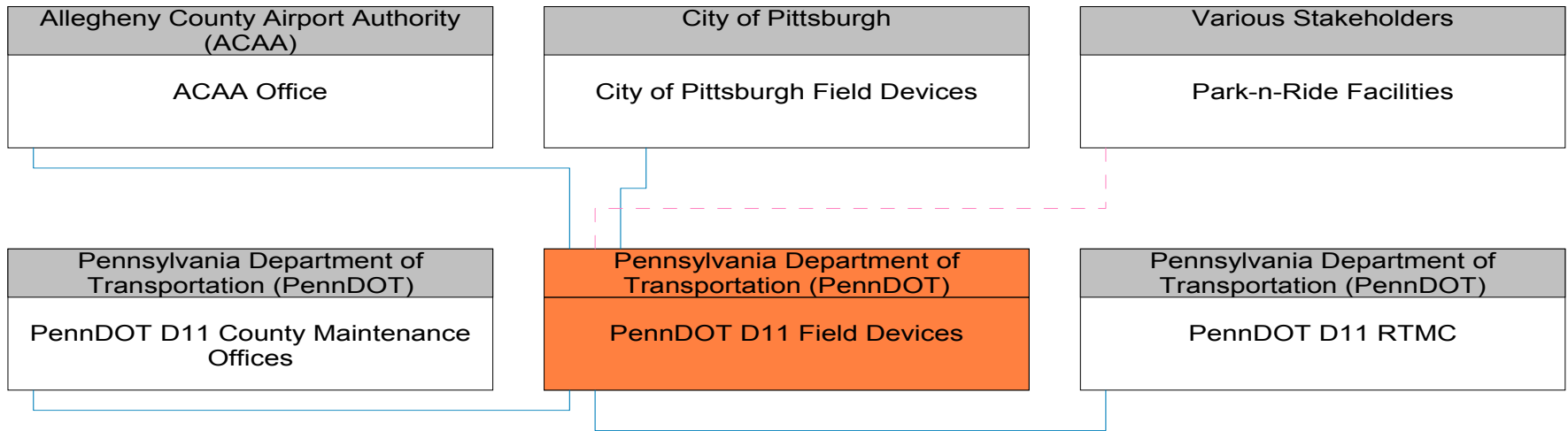
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----- Planned

# PennDOT D11 Field Devices

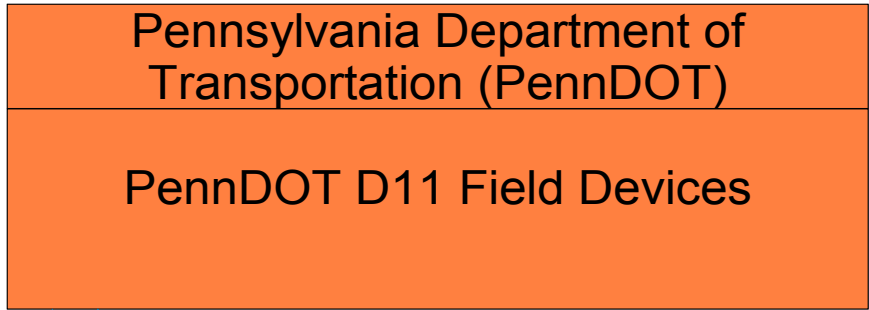


PA

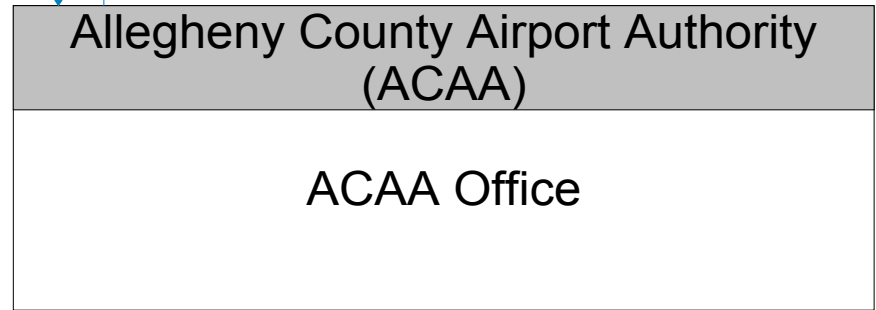
# PennDOT D11 Field Devices Interconnect Diagram



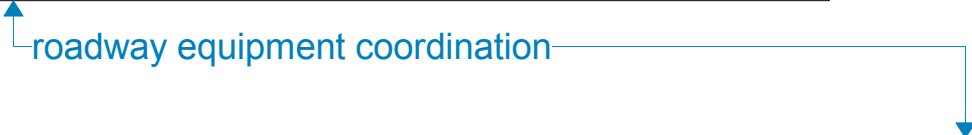
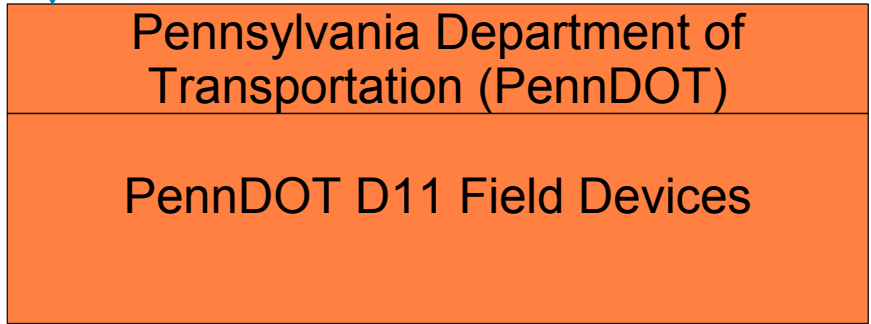
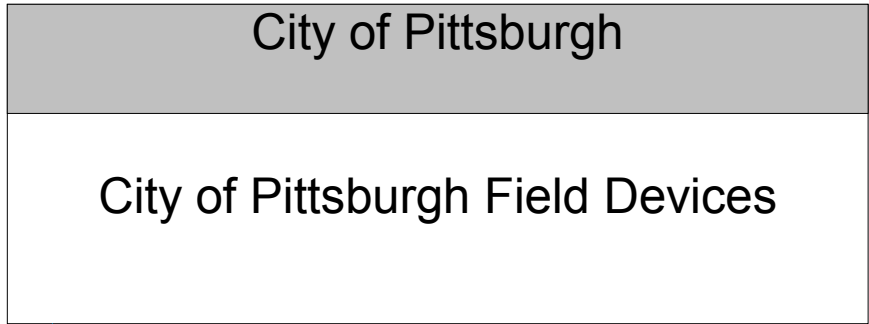
— Existing  
- - - Planned



roadway information system data  
roadway information system status

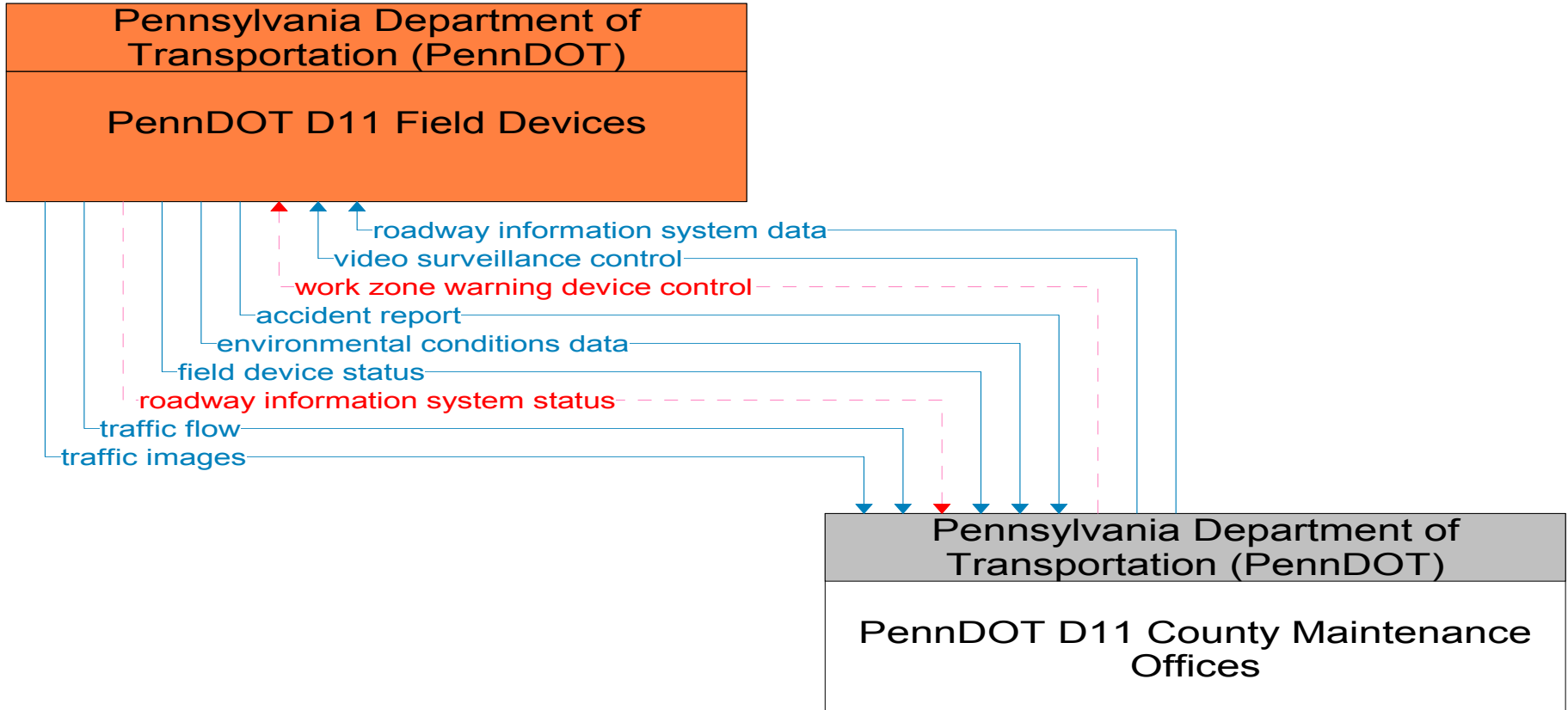


Existing  
Planned

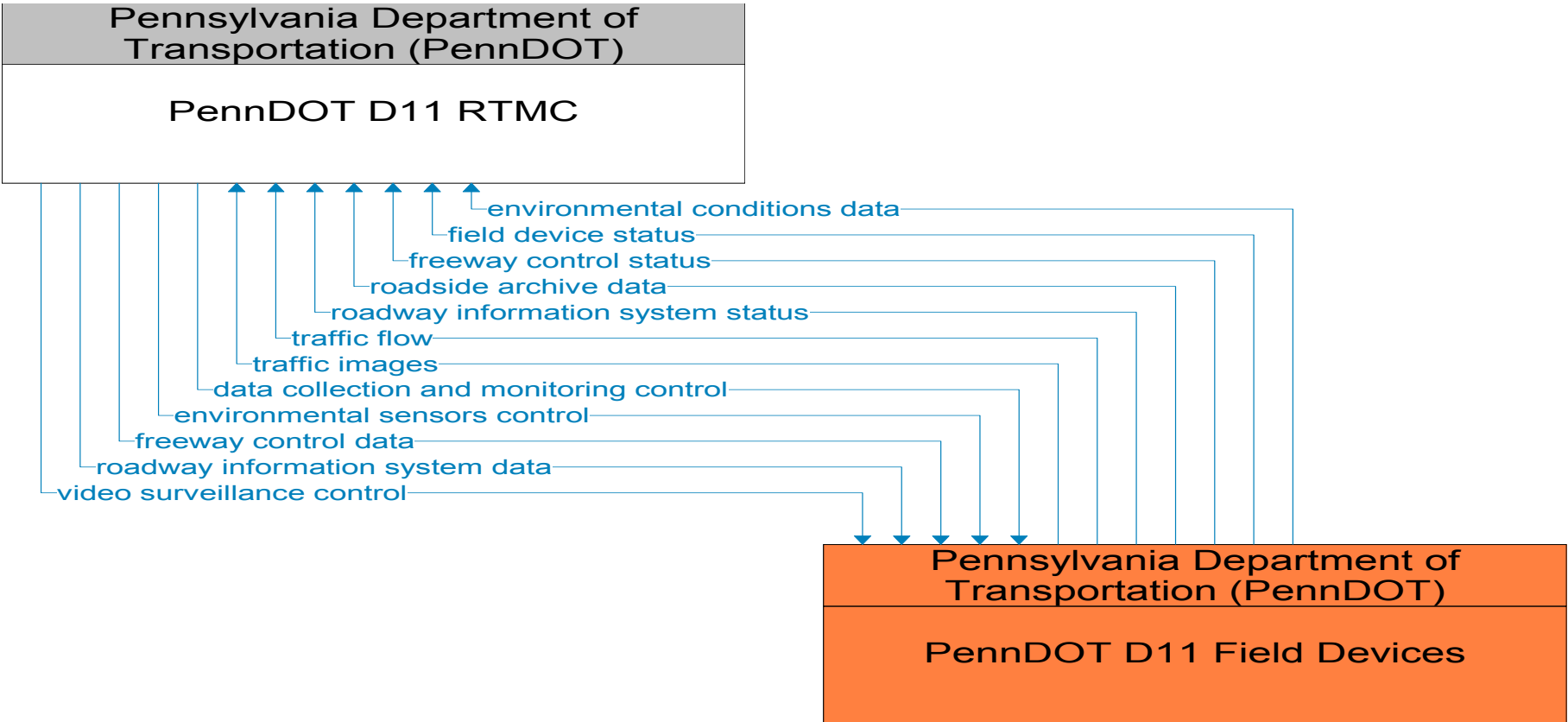


———— Existing  
----- Planned

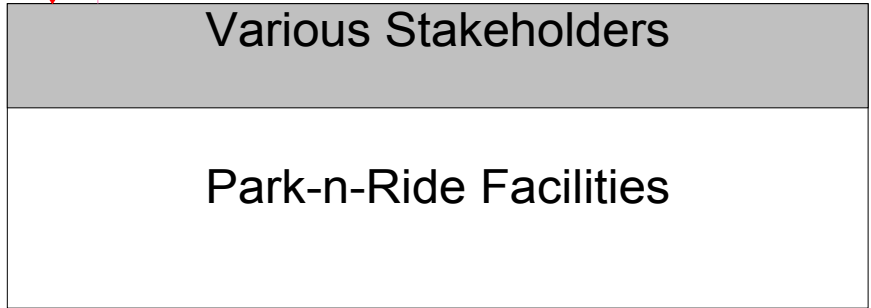
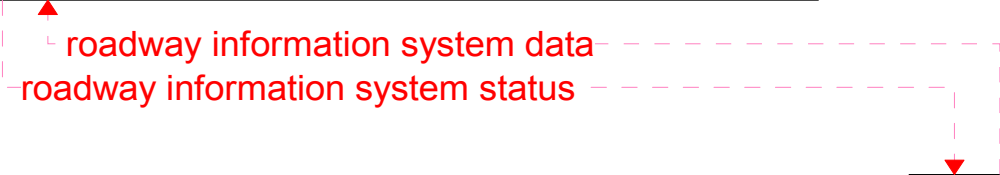
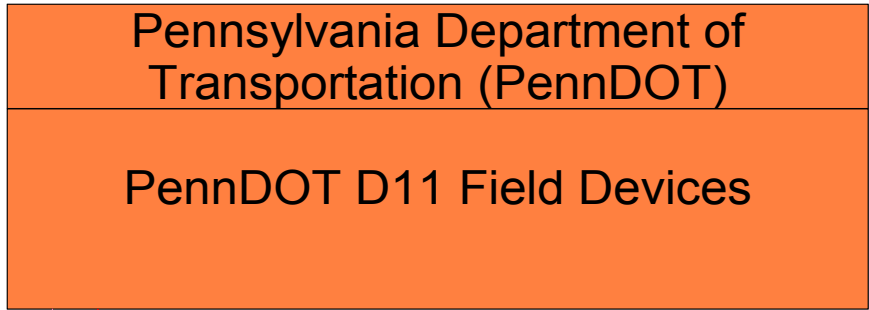




———— Existing  
- - - - - Planned

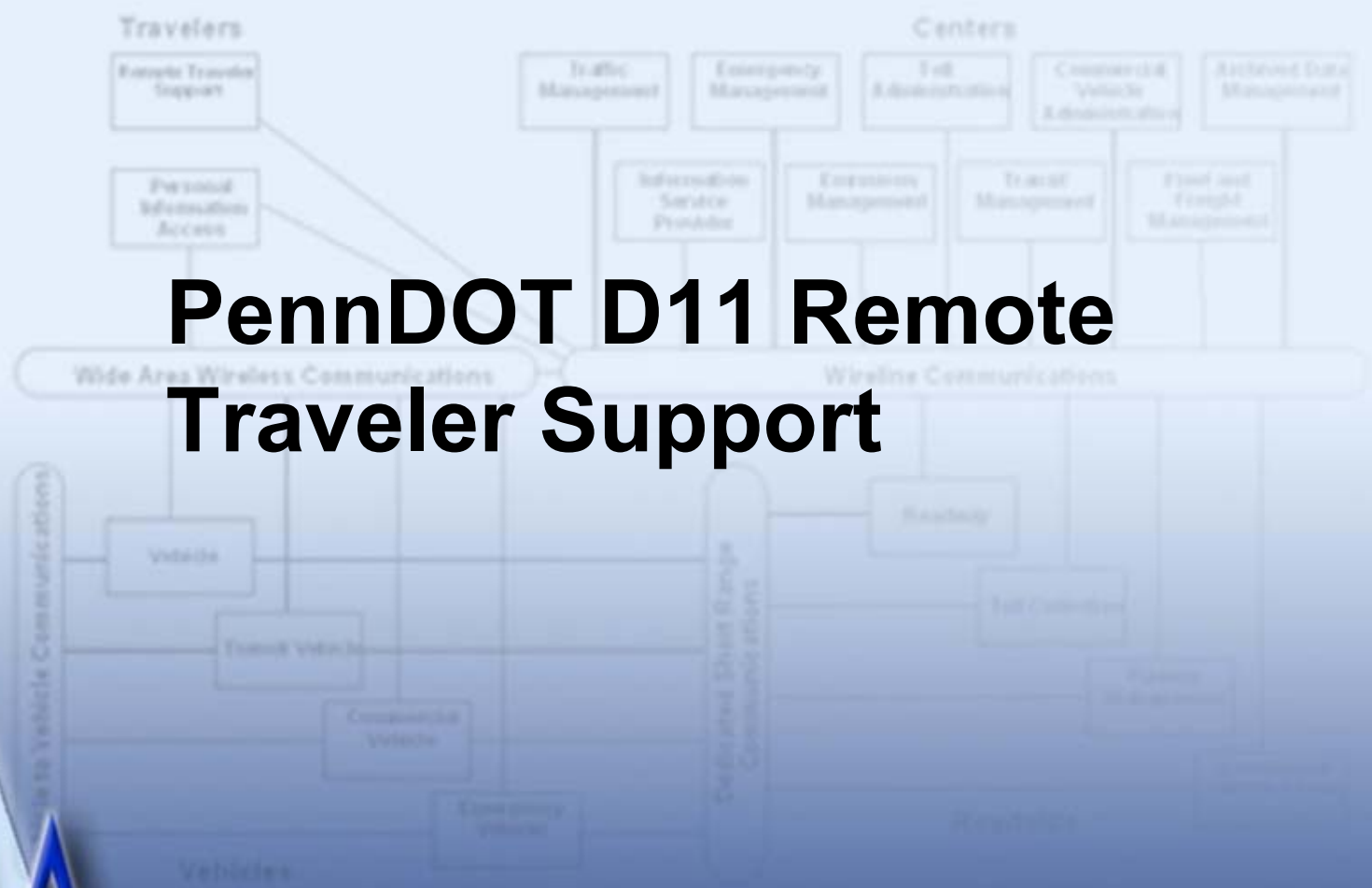


———— Existing  
- - - - - Planned

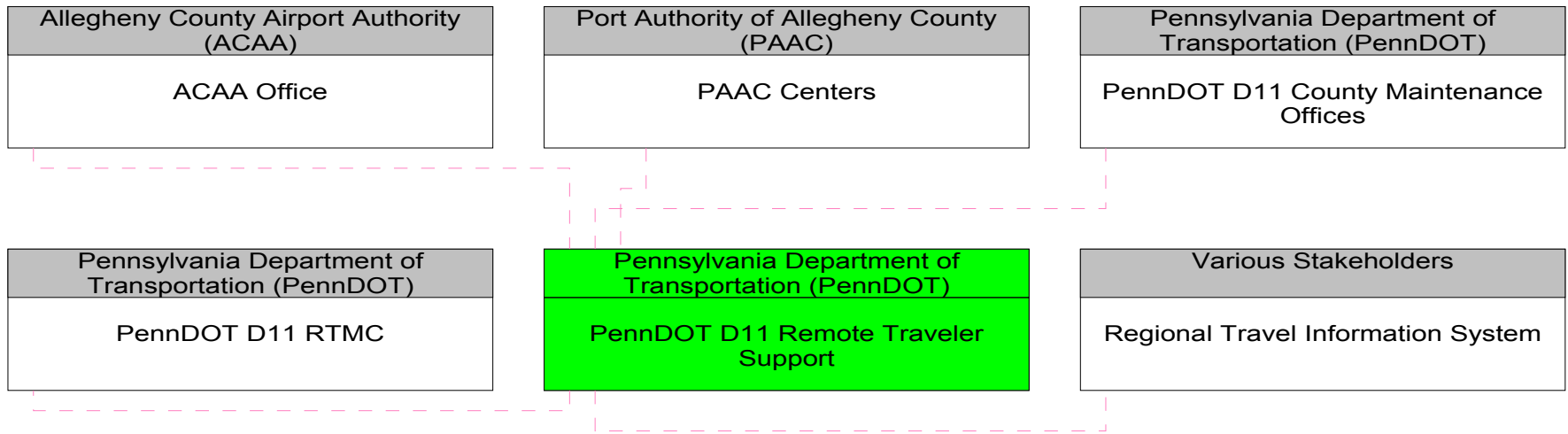


———— Existing  
- - - - - Planned

# PennDOT D11 Remote Traveler Support



# PennDOT D11 Remote Traveler Support Interconnect Diagram



Existing  
Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 Remote Traveler  
Support



broadcast information

Allegheny County Airport Authority  
(ACAA)

ACAA Office

Existing  
Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 Remote Traveler  
Support



broadcast information

Port Authority of Allegheny County  
(PAAC)

PAAC Centers

Existing  
Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 Remote Traveler  
Support



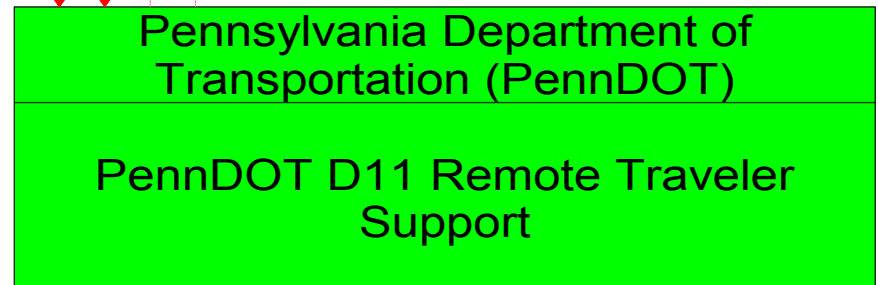
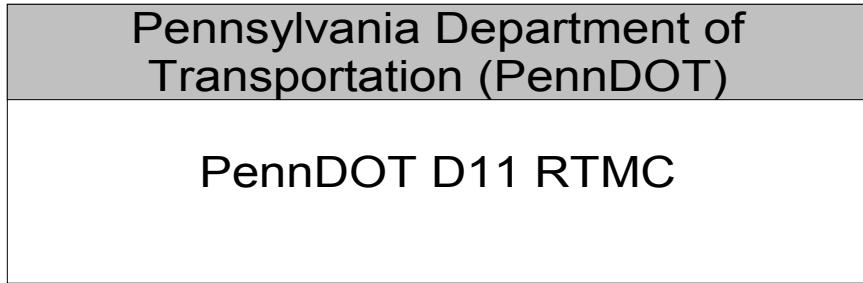
broadcast information

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 County Maintenance  
Offices

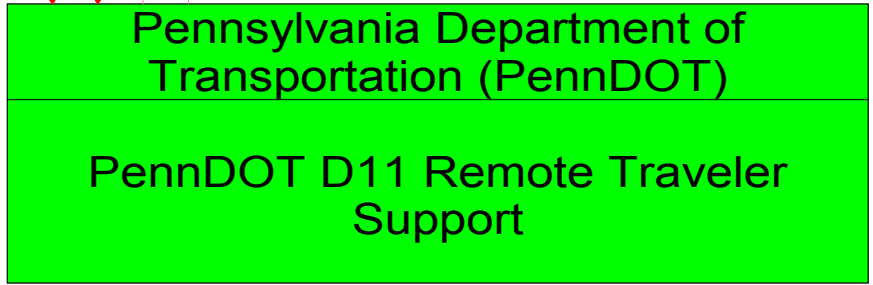
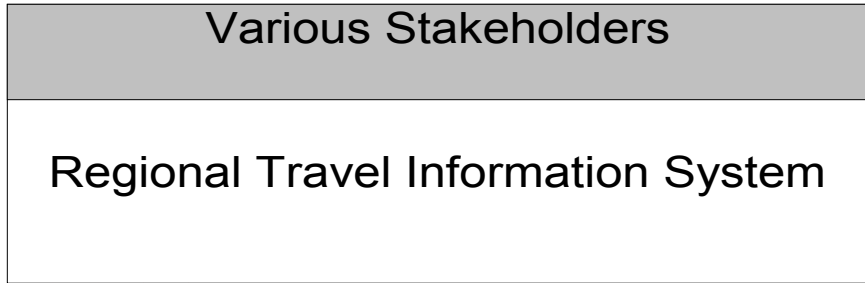
Existing  
Planned





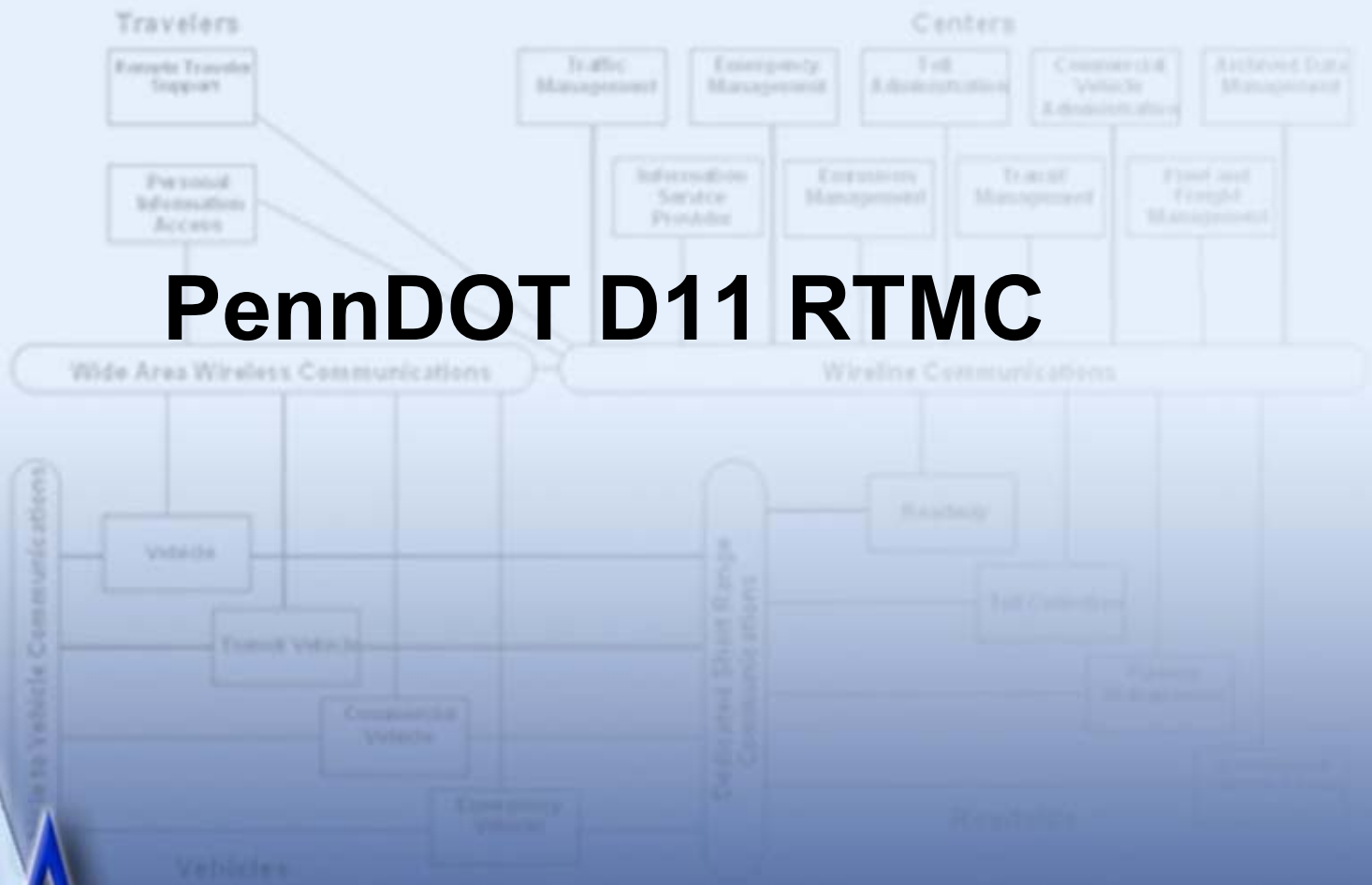
- trip confirmation -
- trip request -
- broadcast information -
- trip plan -

———— Existing  
- - - - - Planned



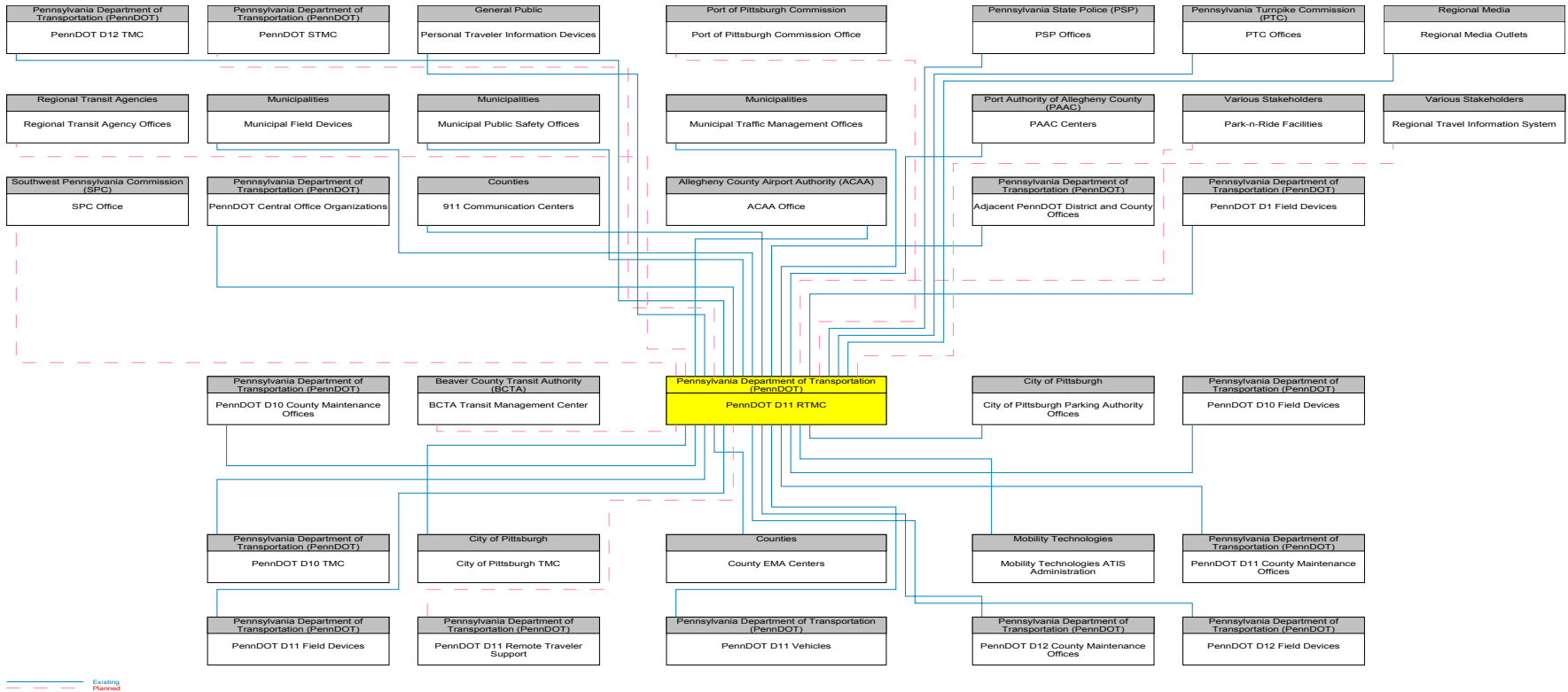
———— Existing  
- - - - - Planned

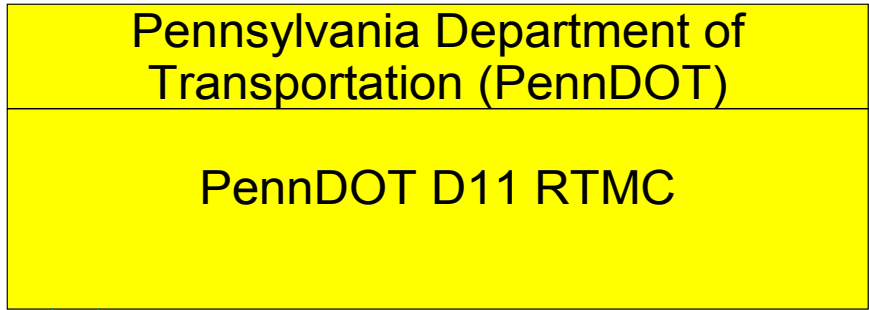
# PennDOT D11 RTMC



PA

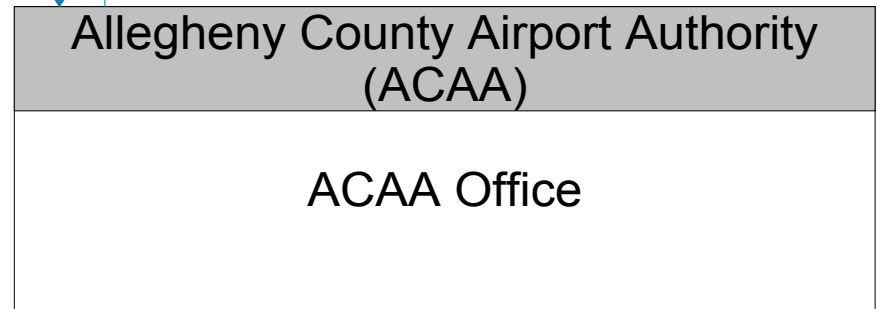
# PennDOT D11 RTMC Interconnect Diagram





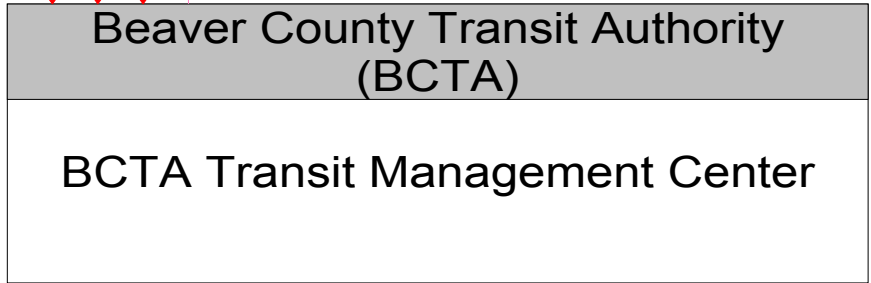
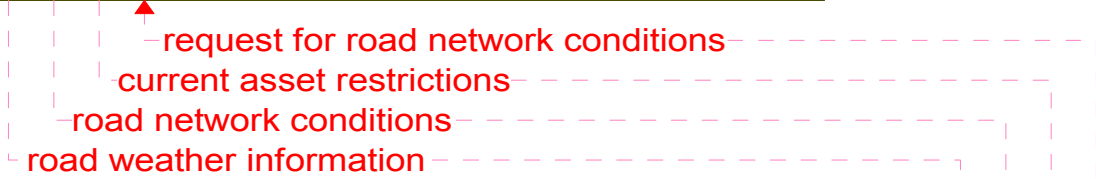
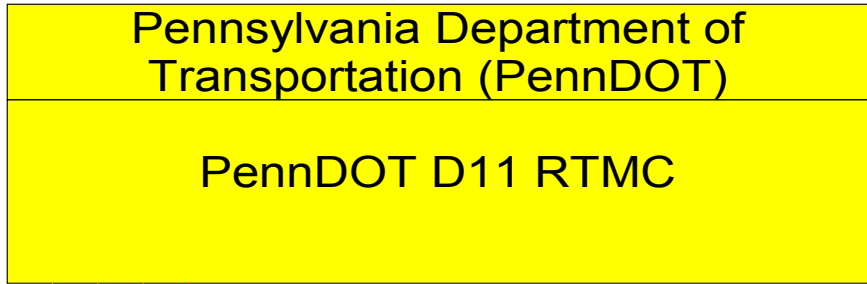
traffic control coordination

traffic information coordination

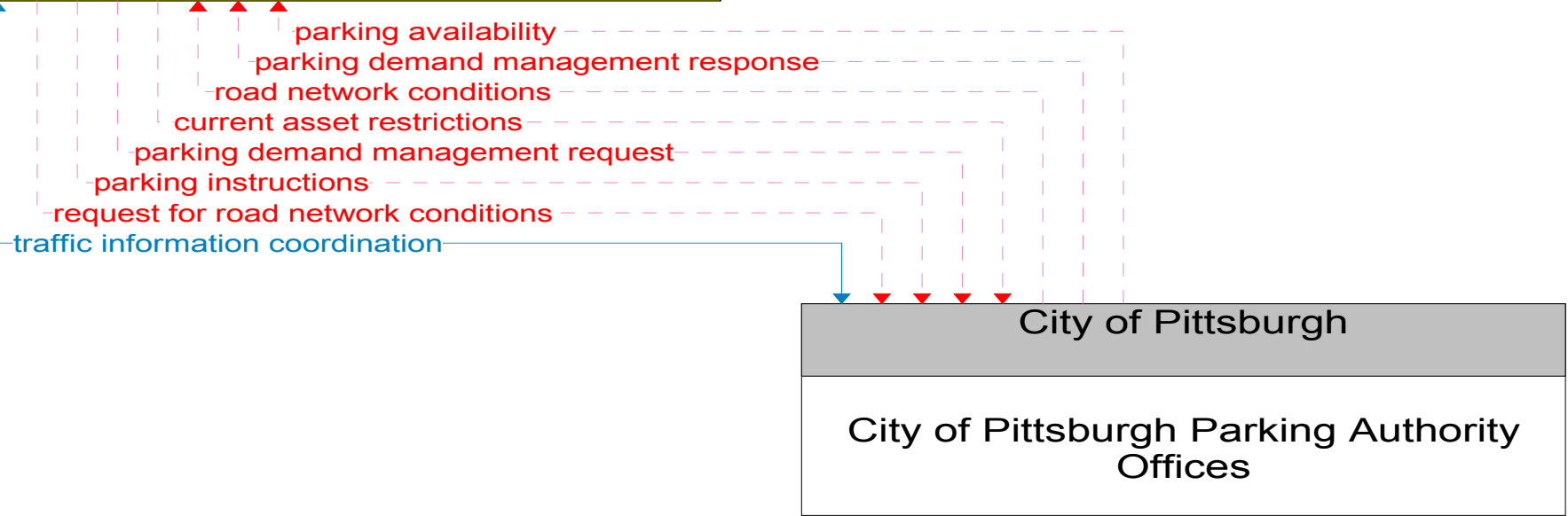
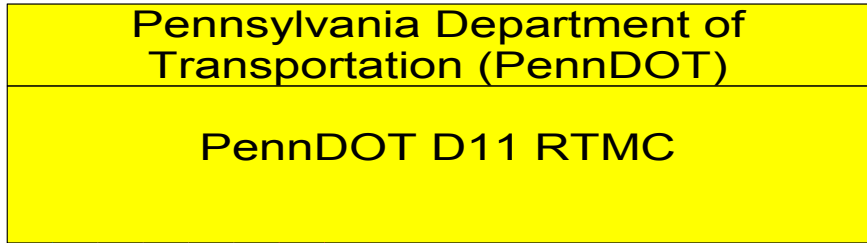


Existing

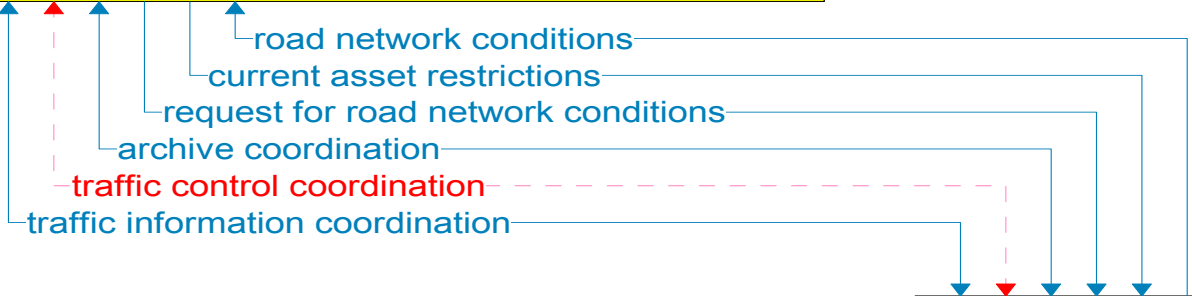
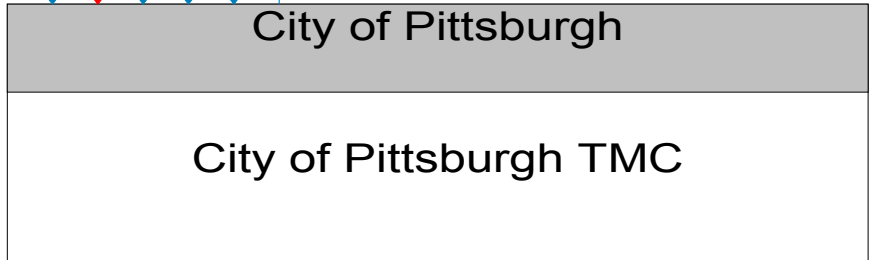
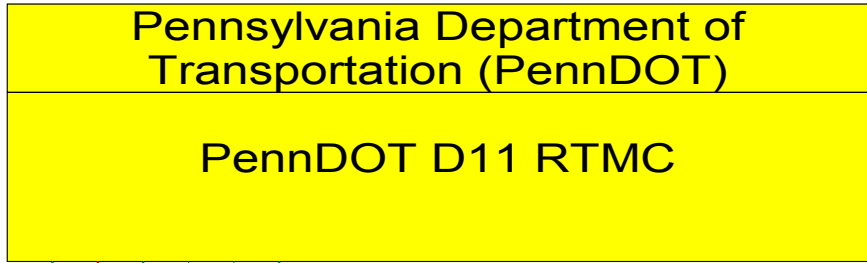
Planned



Existing  
Planned

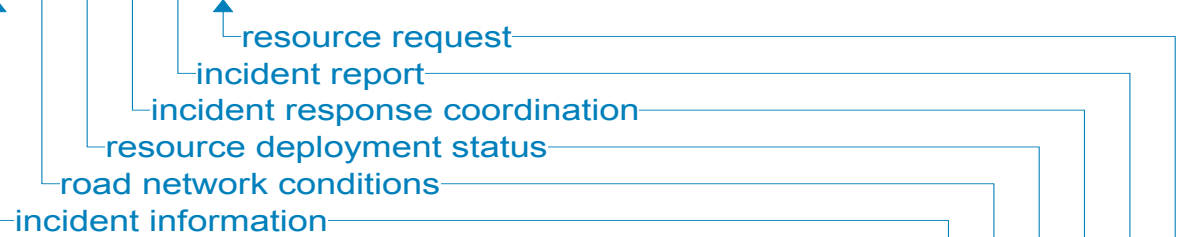
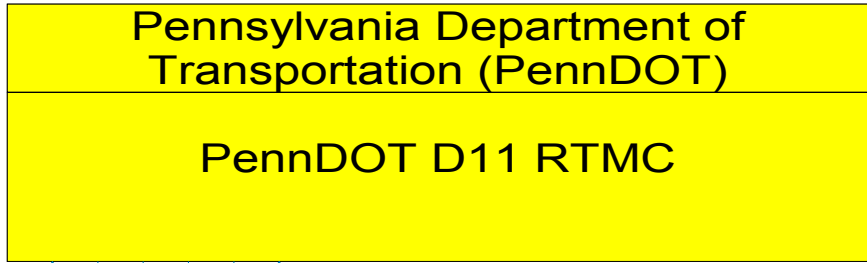


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Planned



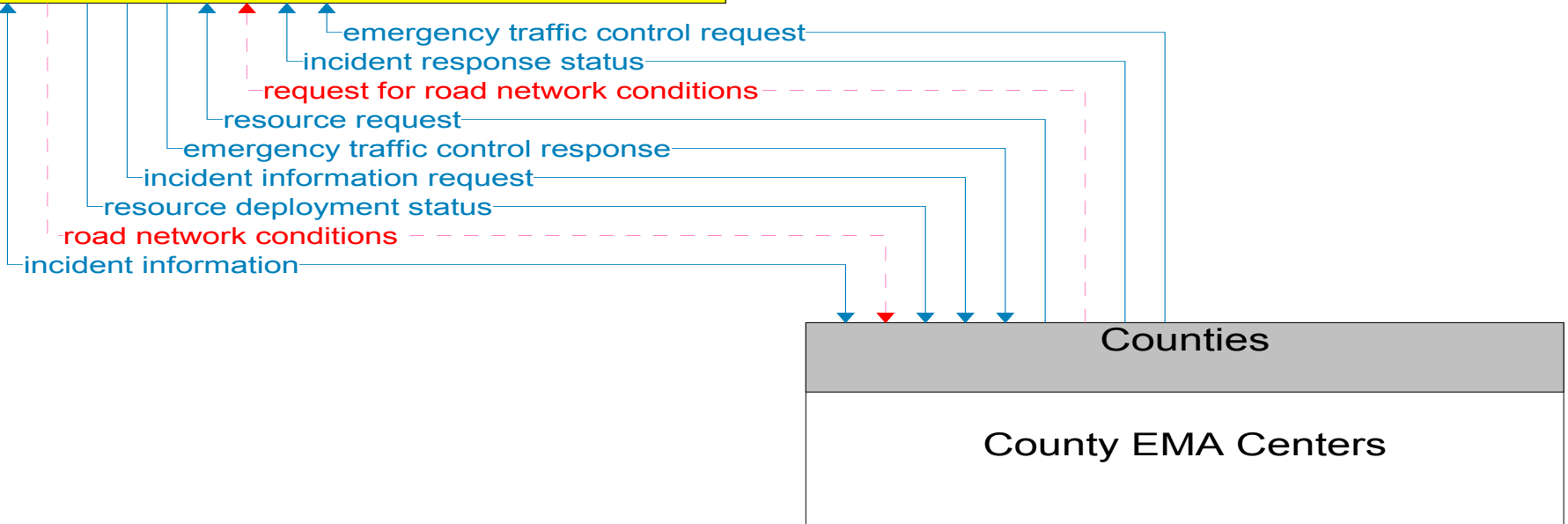
Existing  
Planned



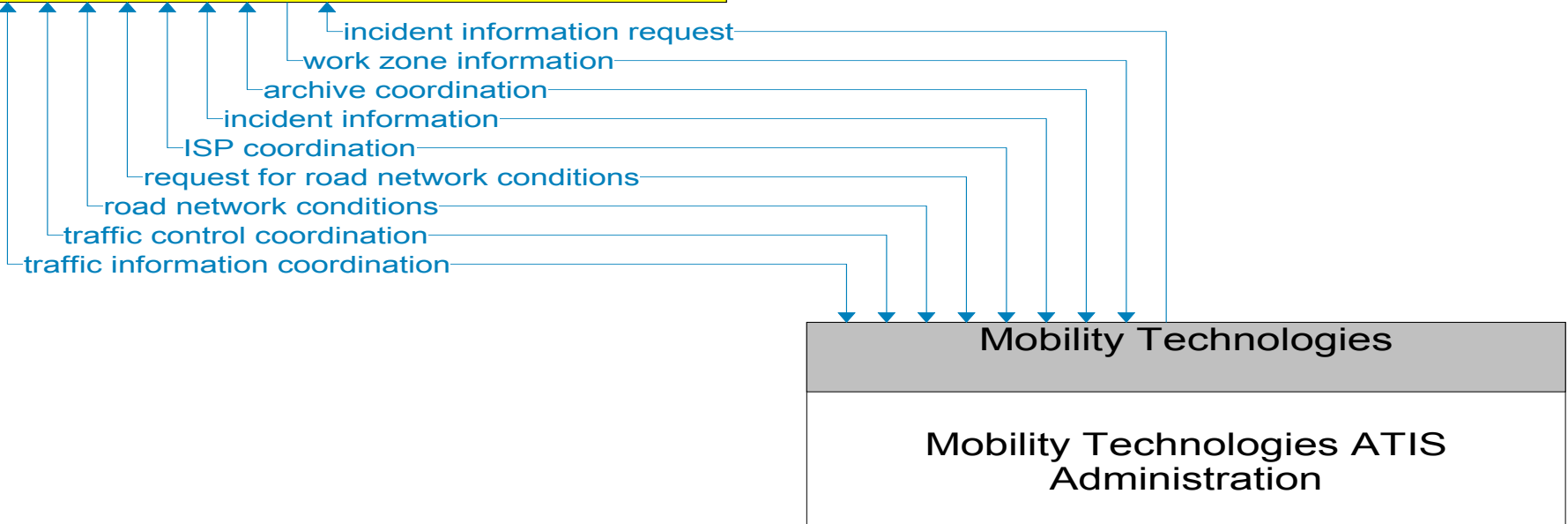
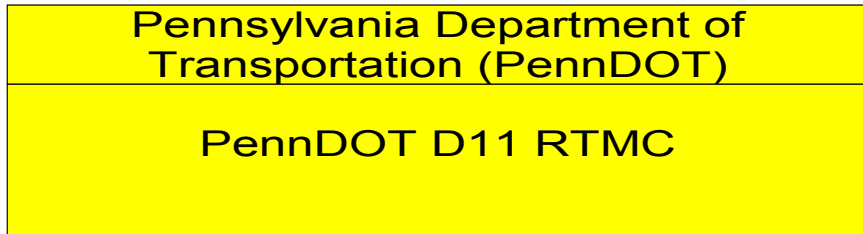


Pennsylvania Department of  
Transportation (PennDOT)

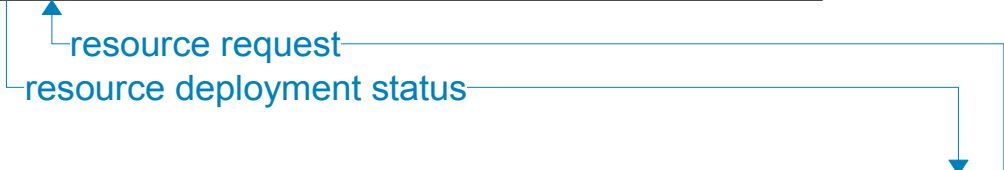
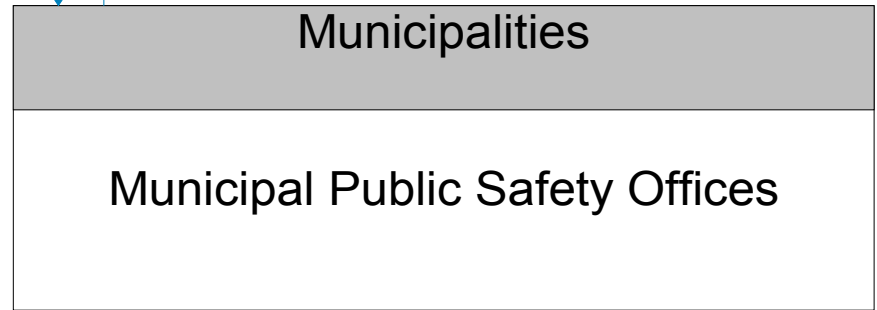
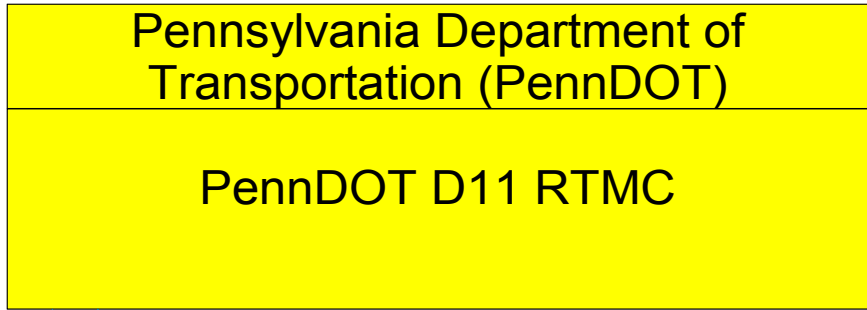
PennDOT D11 RTMC



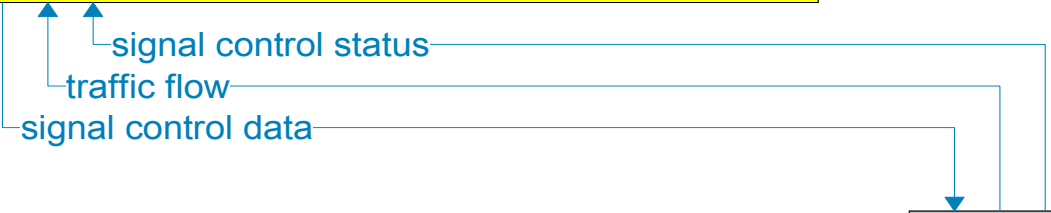
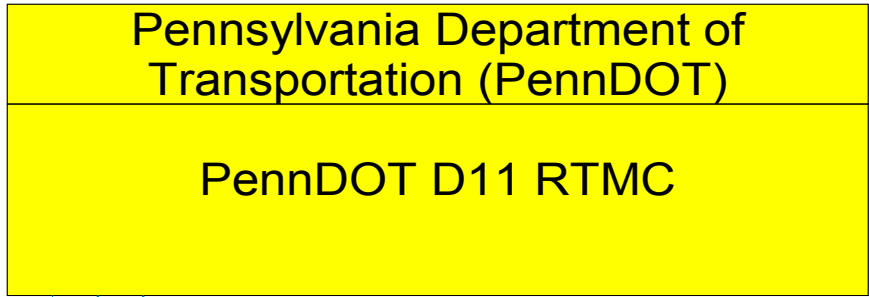
———— Existing  
- - - - - Planned

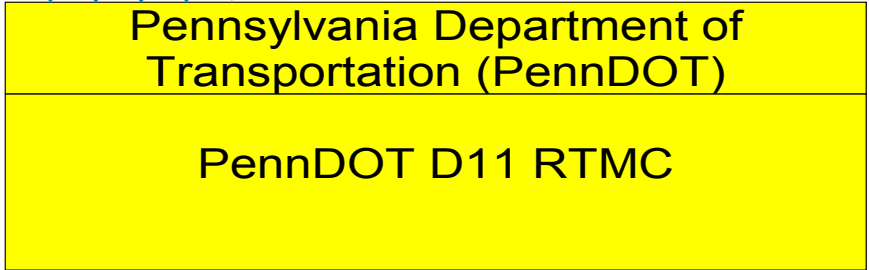
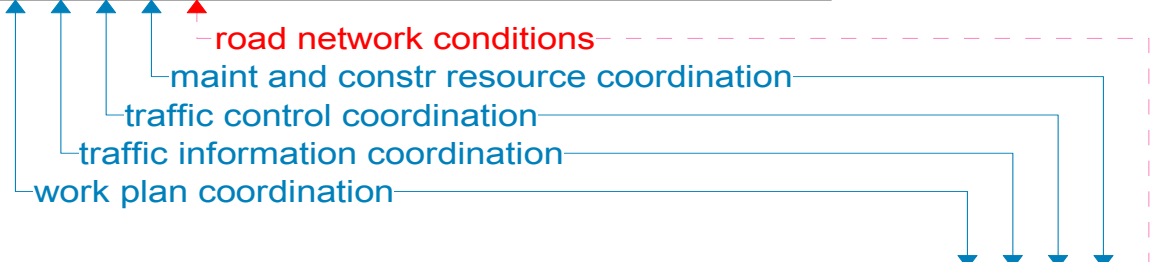


Existing  
Planned

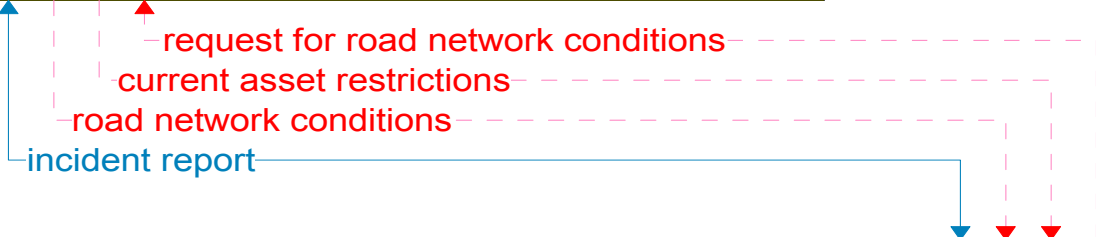
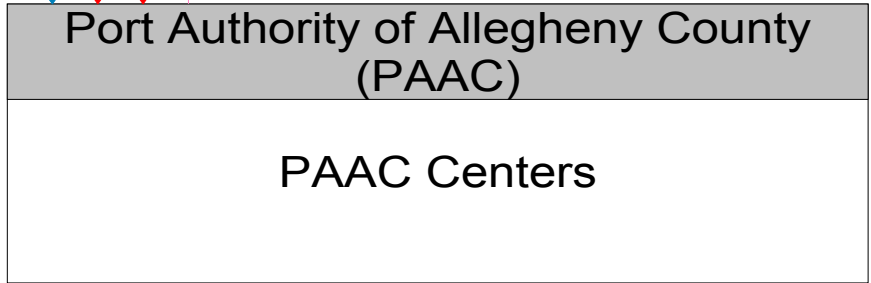
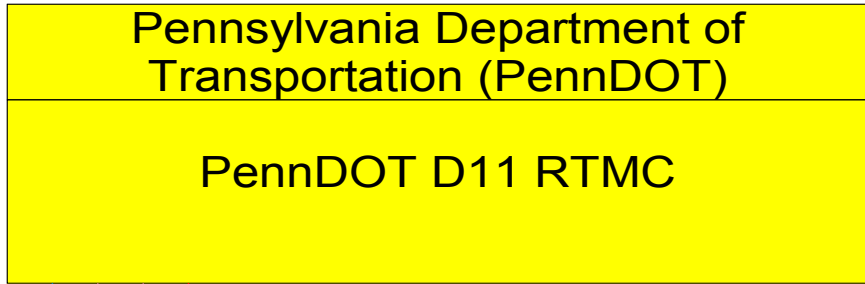


———— Existing  
----- Planned





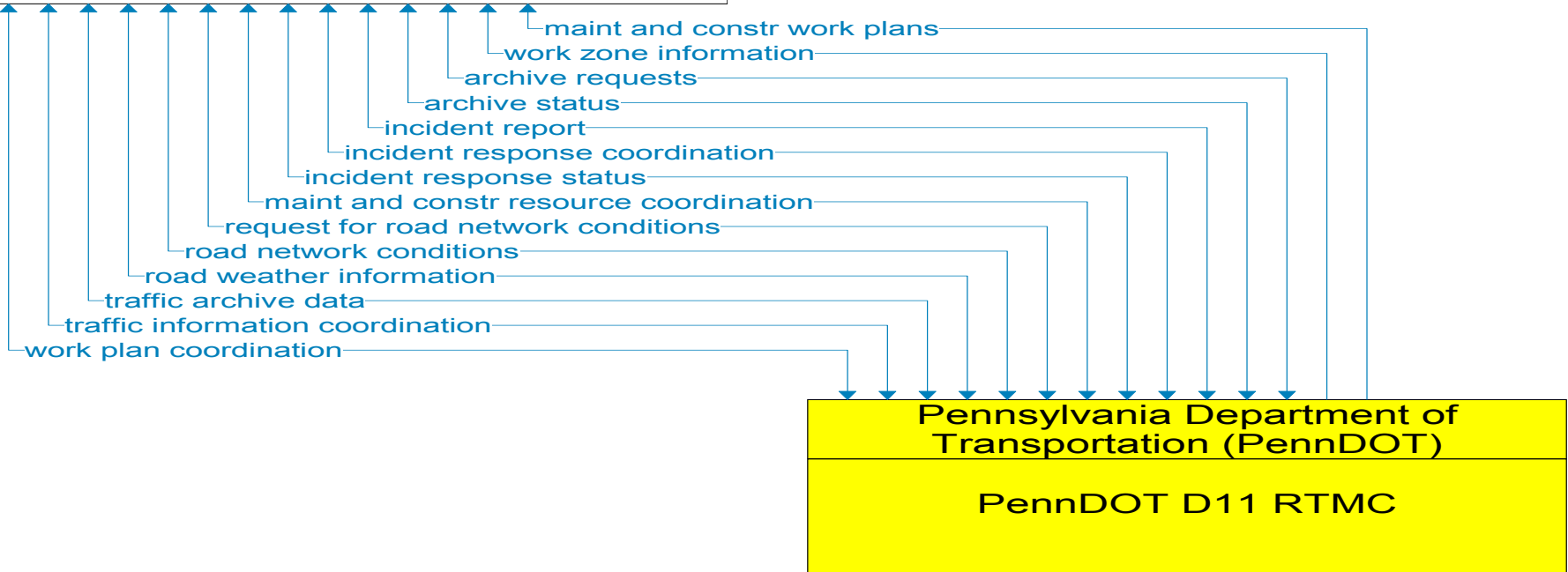
Existing  
Planned



Existing  
Planned

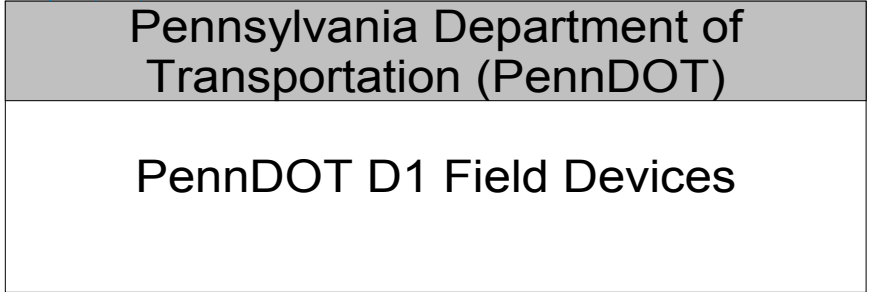
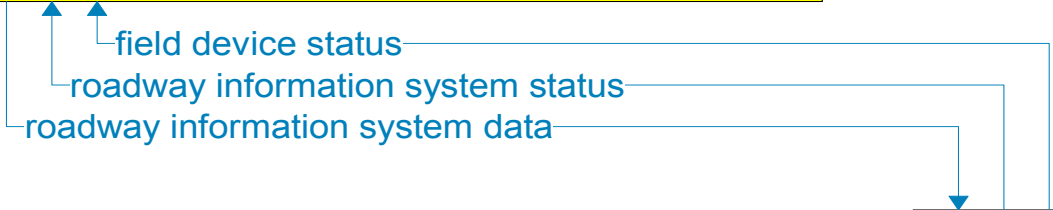
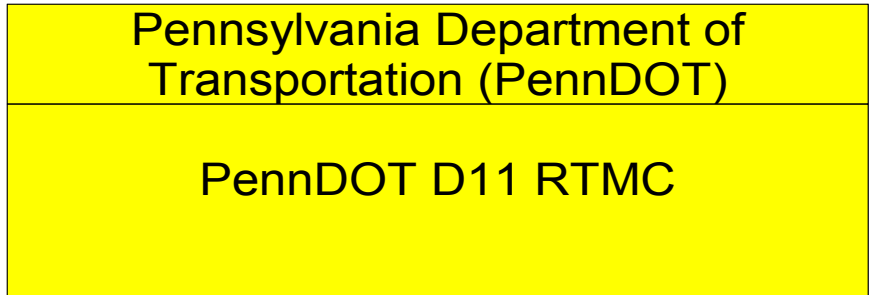
**Pennsylvania Department of Transportation (PennDOT)**

**PennDOT Central Office Organizations**

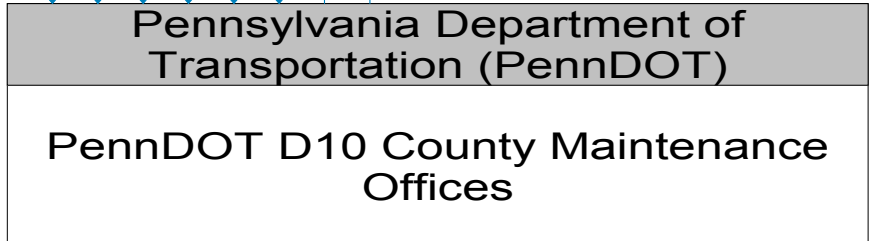
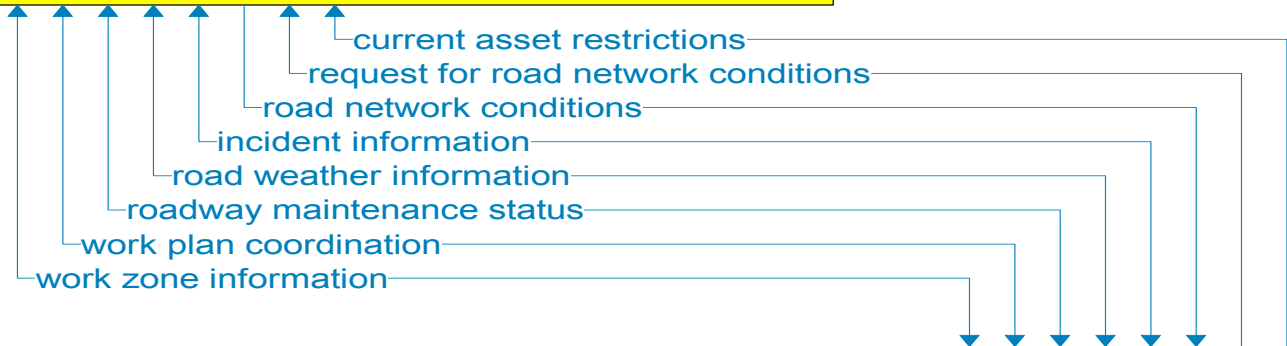
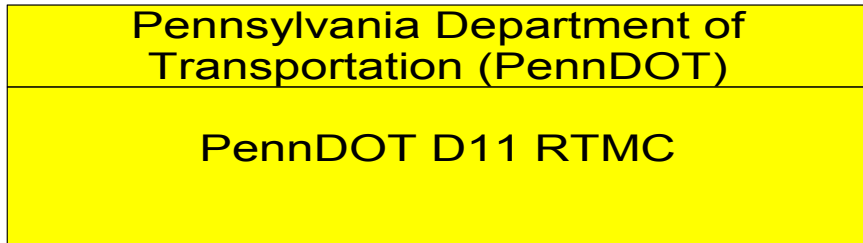


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- - - - - Planned

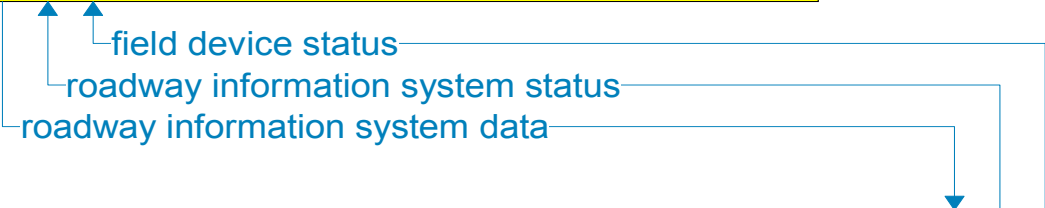
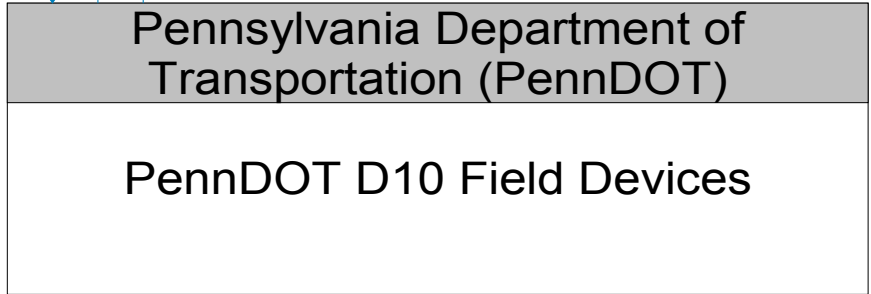
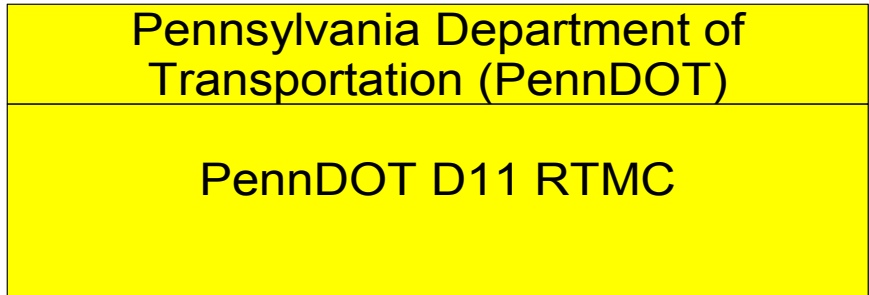




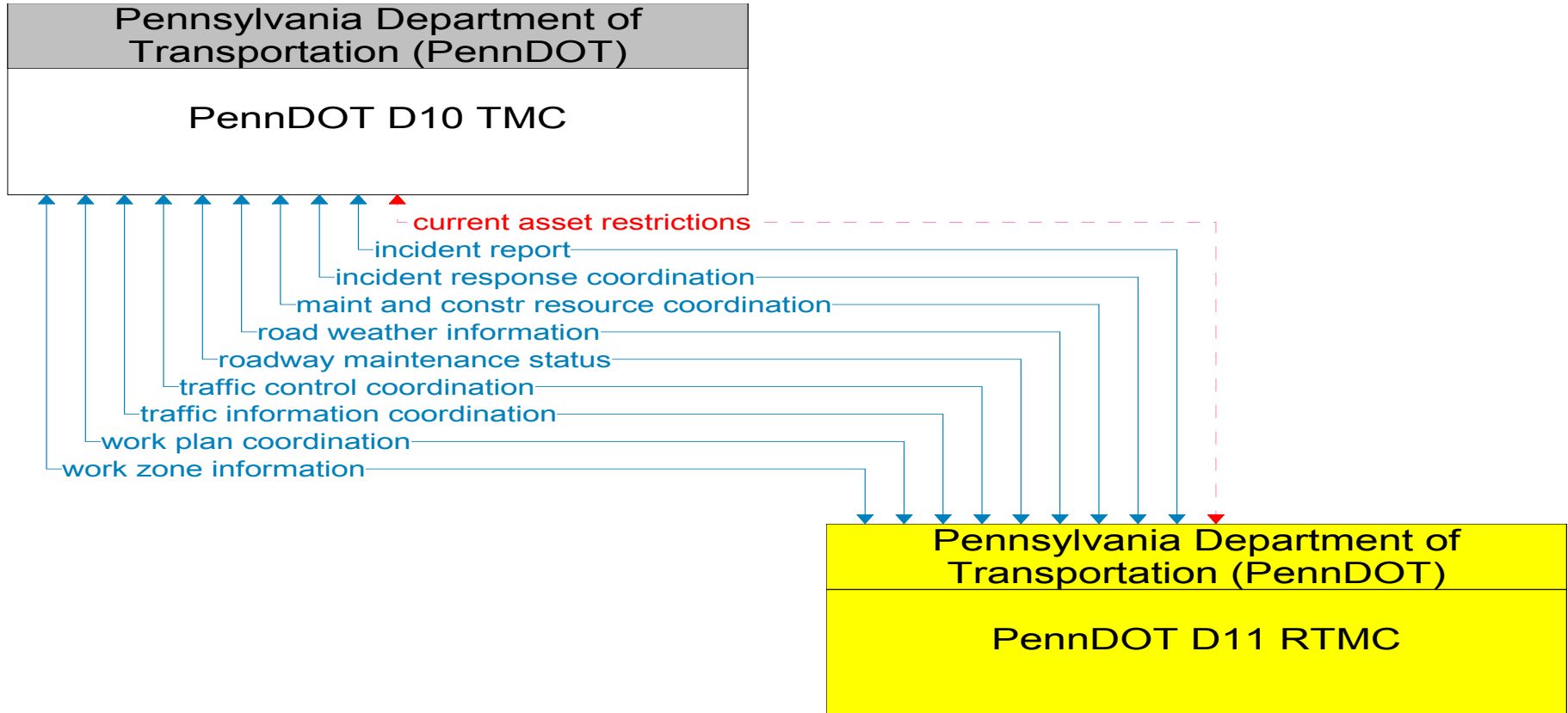
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- - - - - Planned



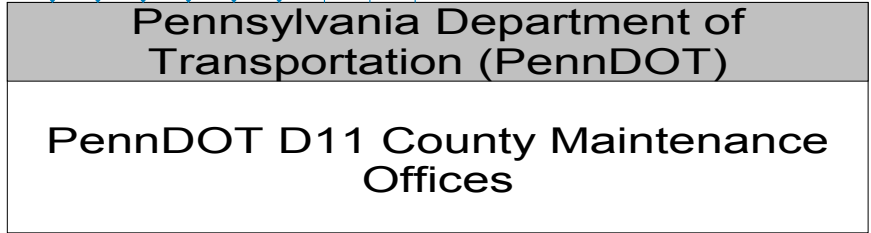
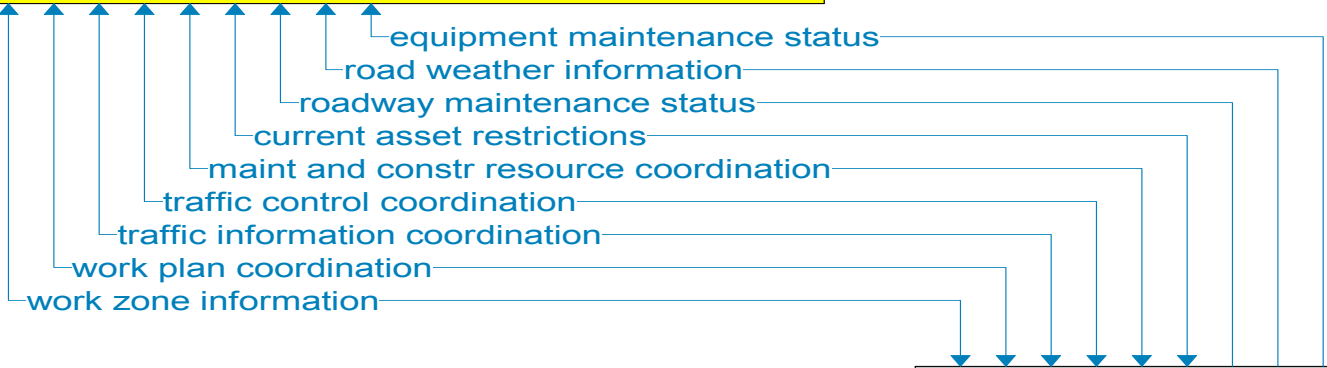
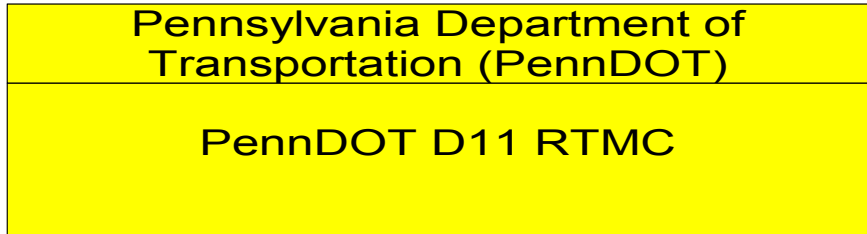
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- - - - - Planned



Existing  
Planned

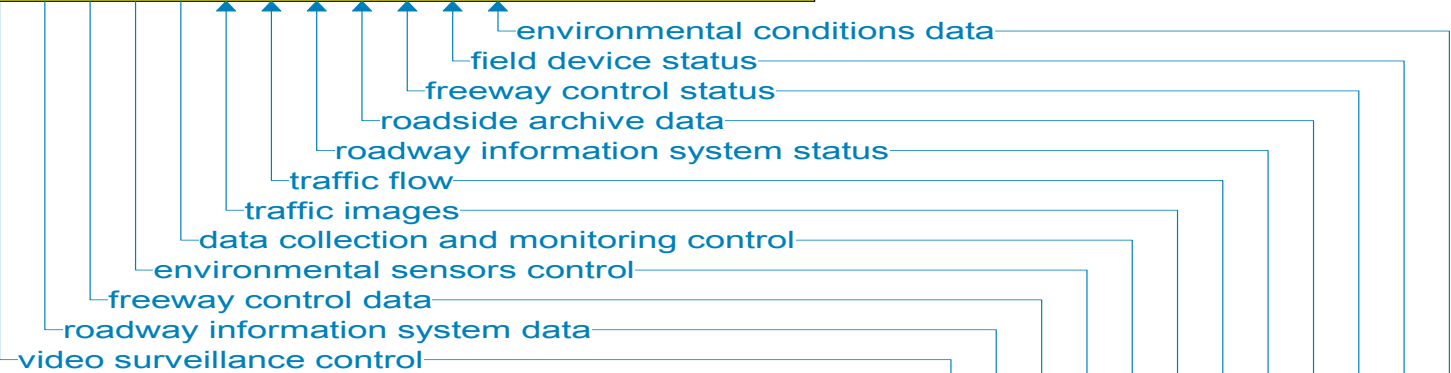


———— Existing  
- - - - - Planned



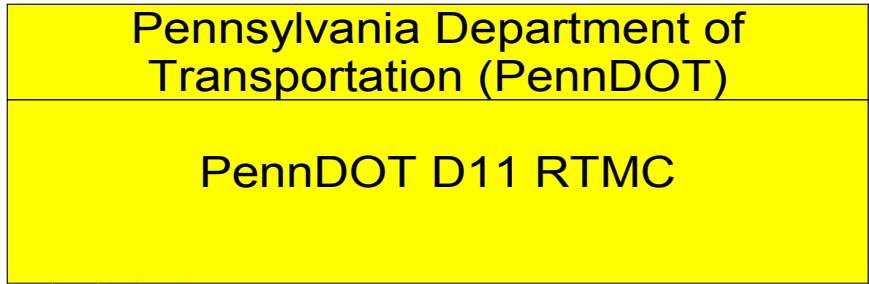
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- - - - - Planned

**Pennsylvania Department of Transportation (PennDOT)**  
**PennDOT D11 RTMC**

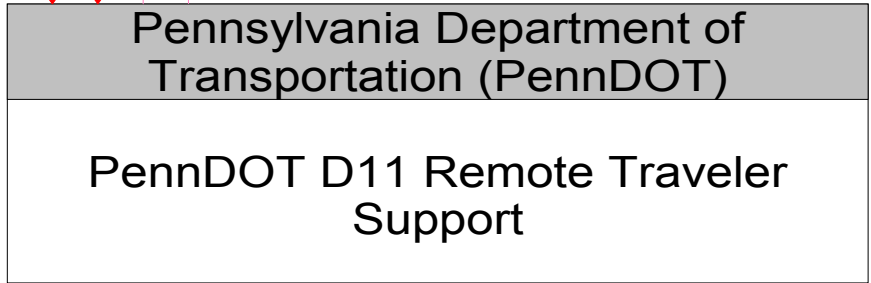


**Pennsylvania Department of Transportation (PennDOT)**  
**PennDOT D11 Field Devices**

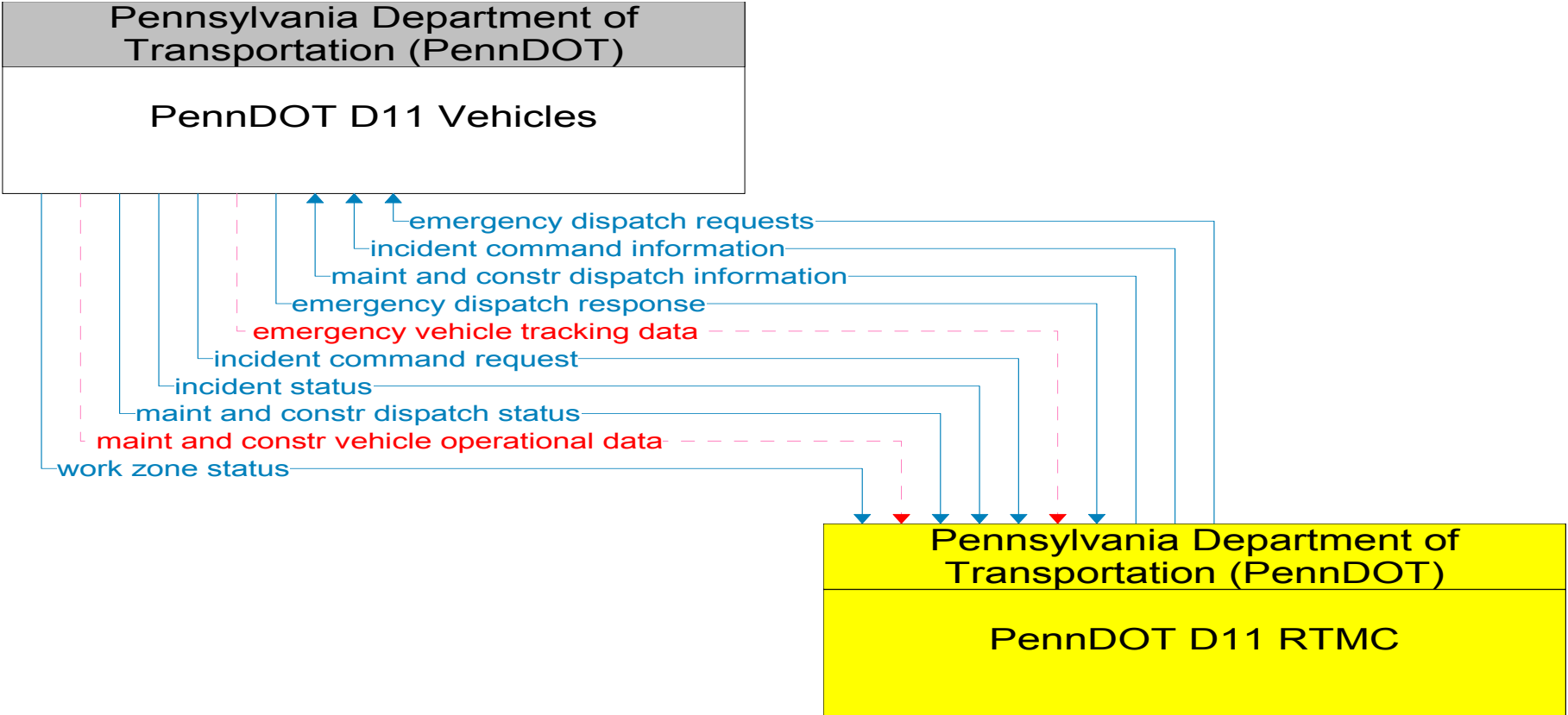
———— Existing  
- - - - - Planned



- trip confirmation
- trip request
- broadcast information
- trip plan



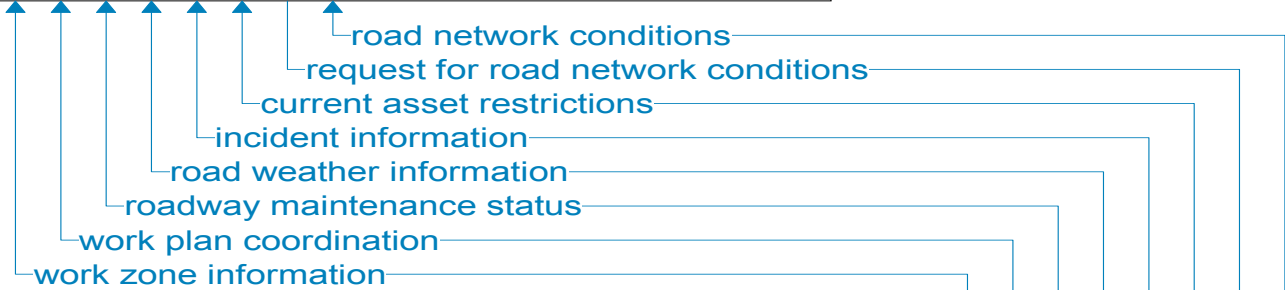
———— Existing  
- - - - - Planned





Pennsylvania Department of  
Transportation (PennDOT)

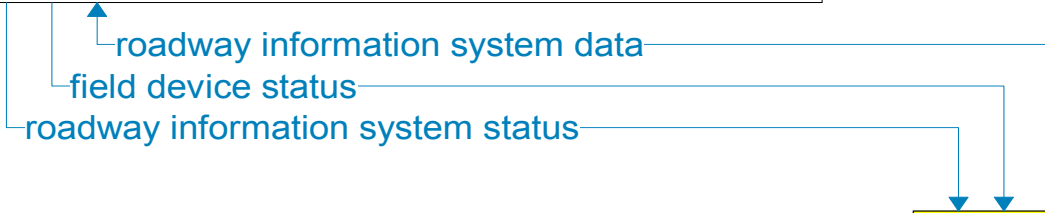
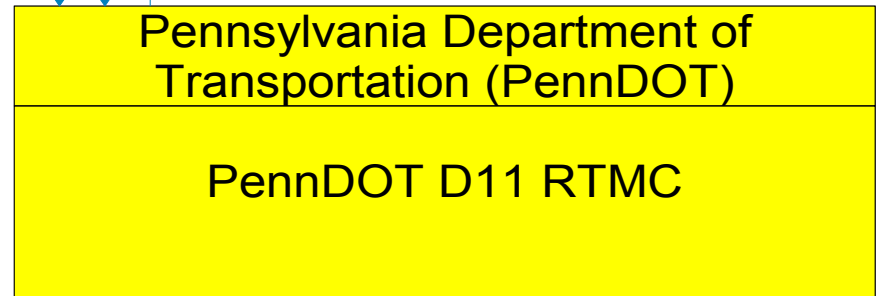
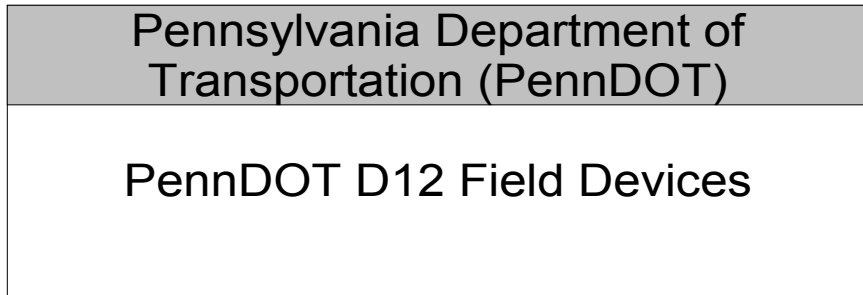
PennDOT D12 County Maintenance  
Offices



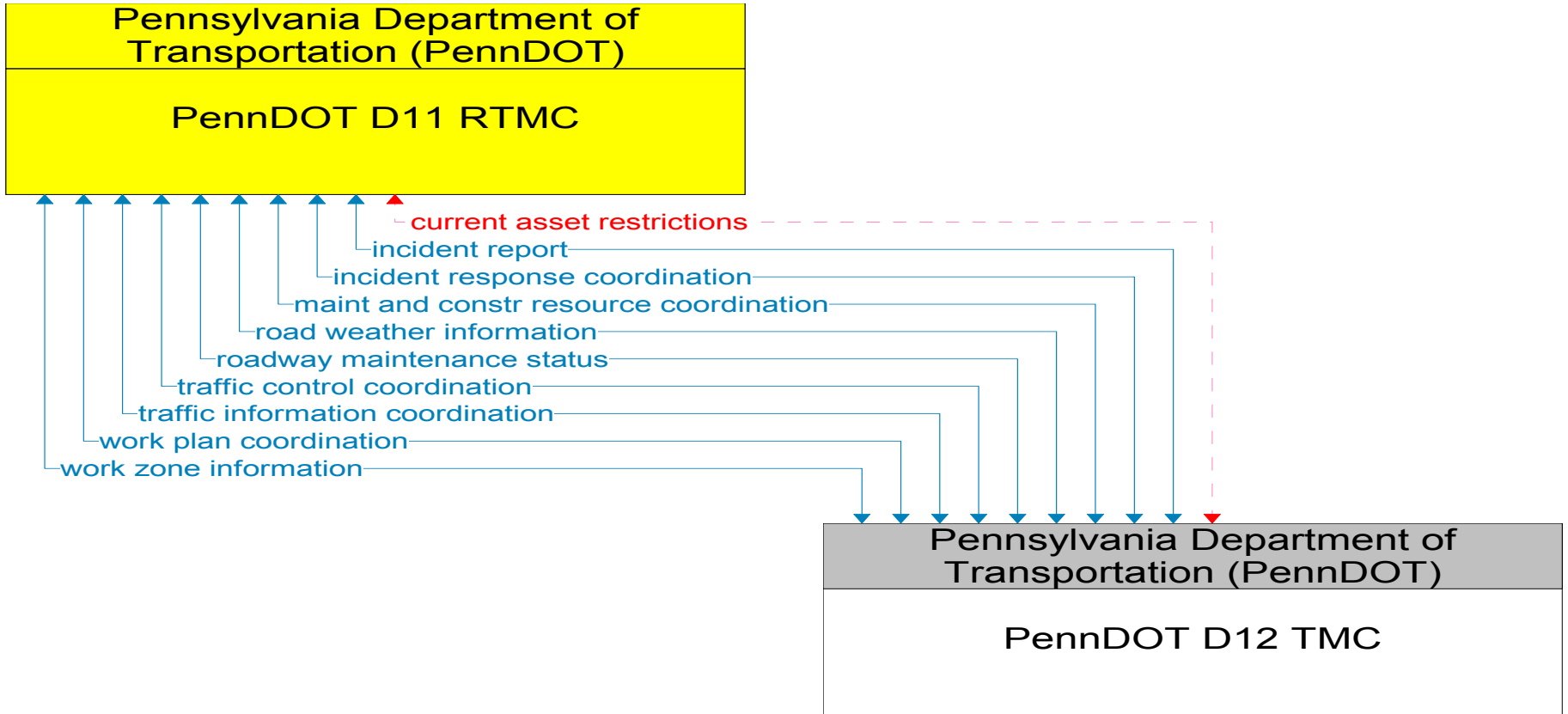
Pennsylvania Department of  
Transportation (PennDOT)

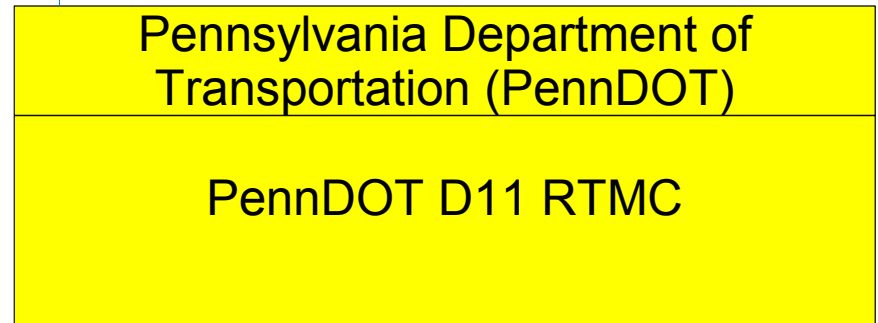
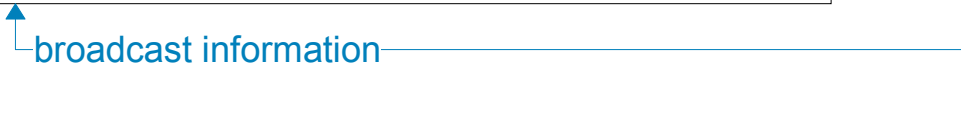
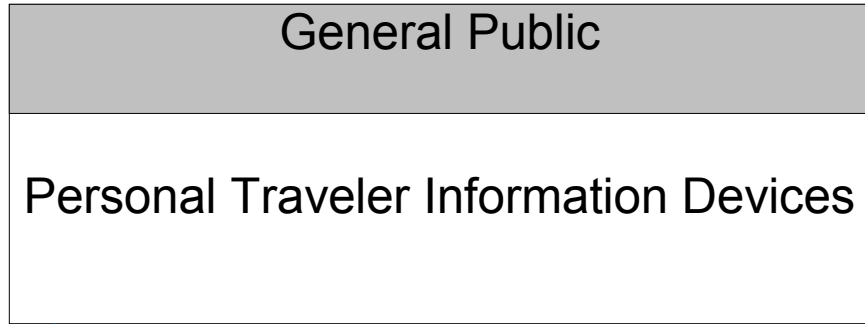
PennDOT D11 RTMC

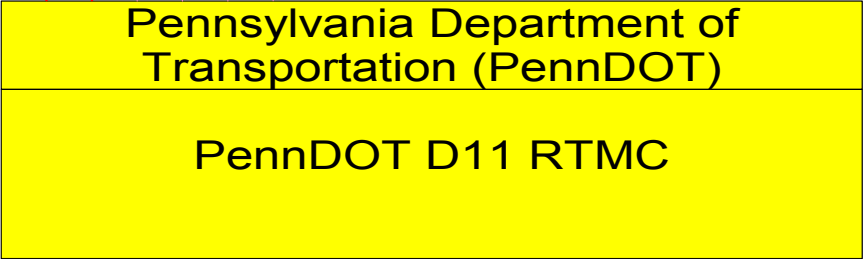
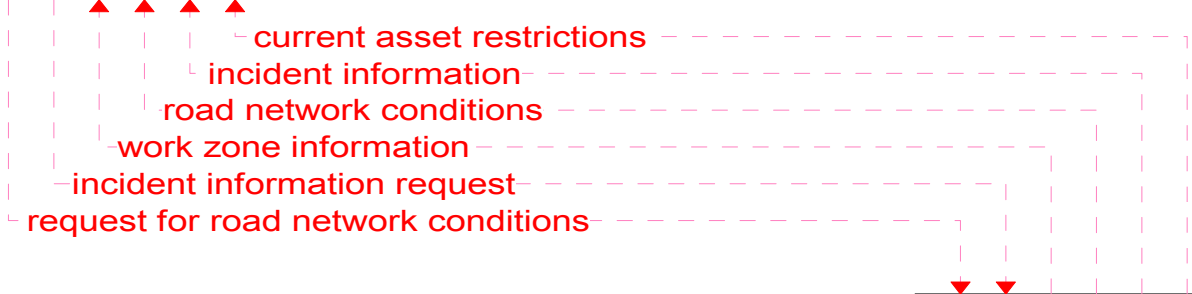
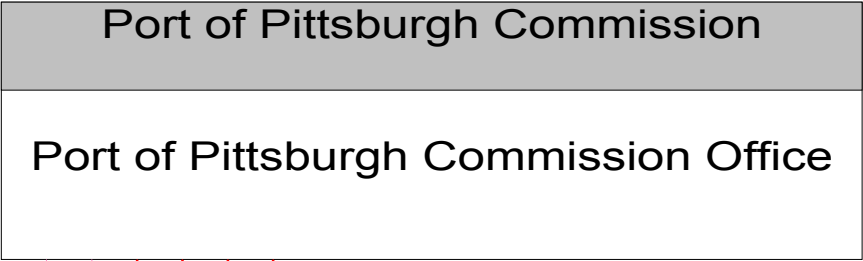
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- - - - - Planned



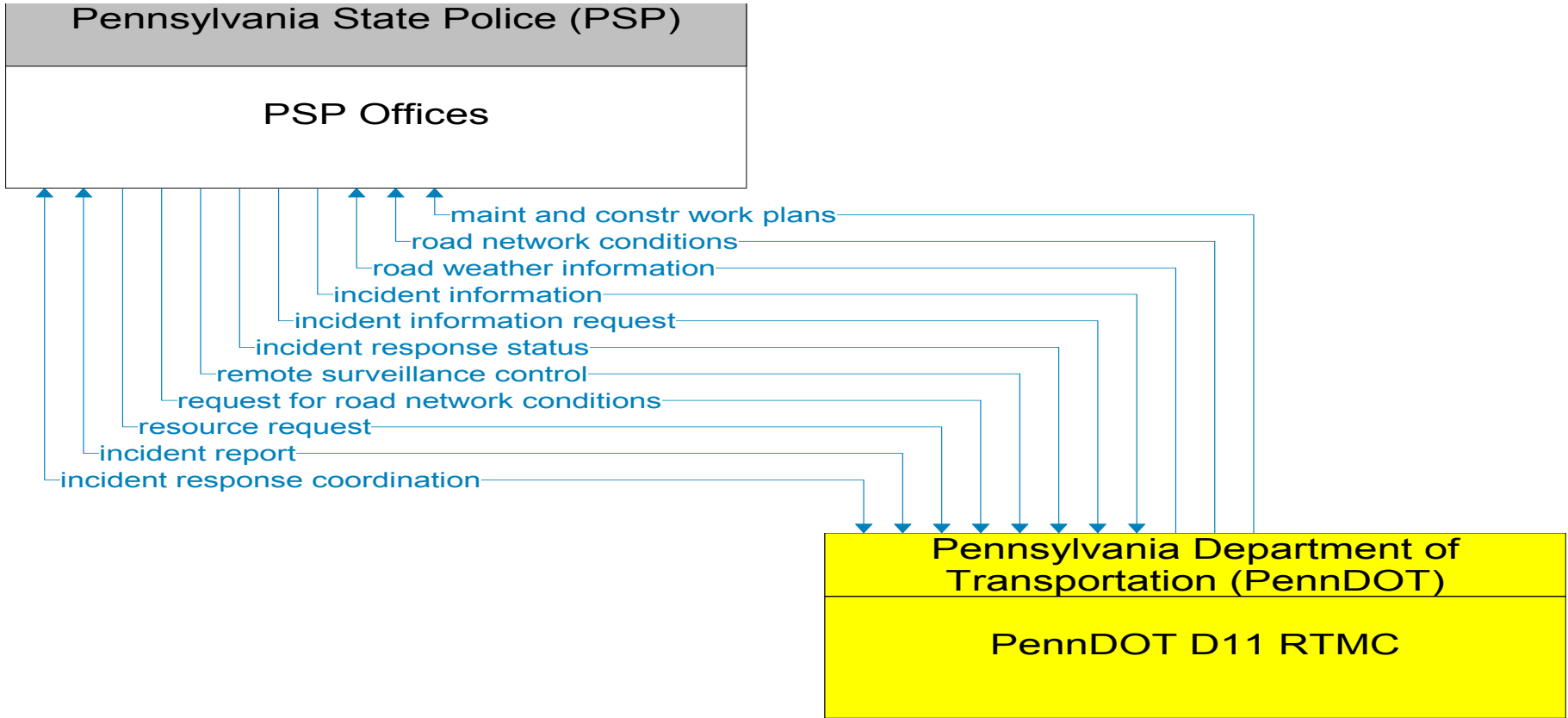
Existing  
Planned





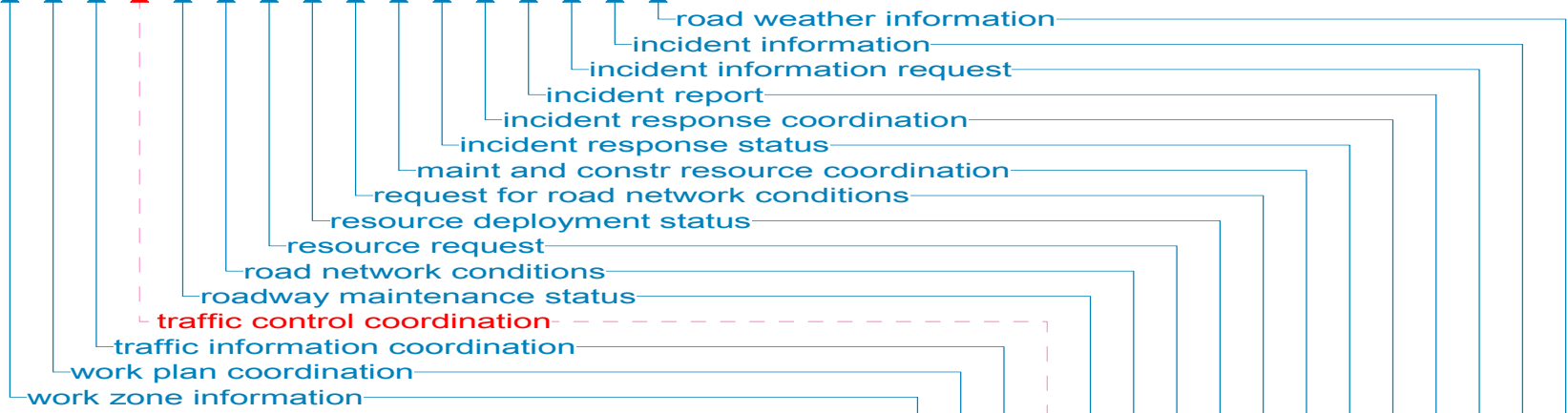


———— Existing  
- - - - - Planned

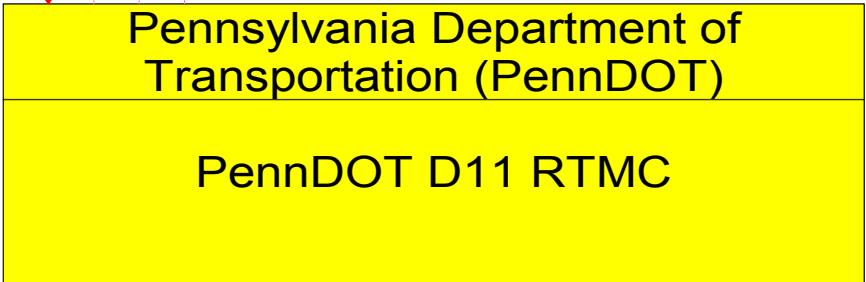
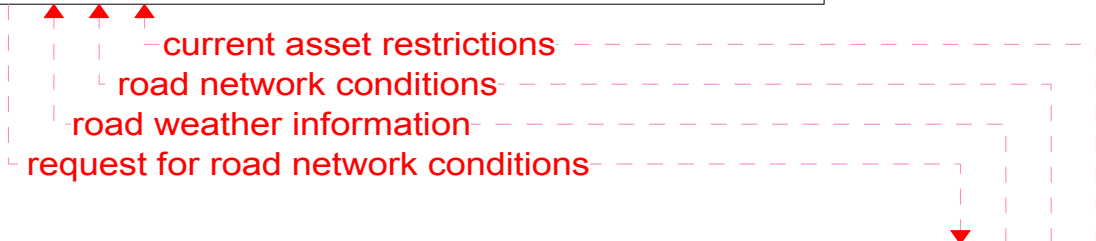
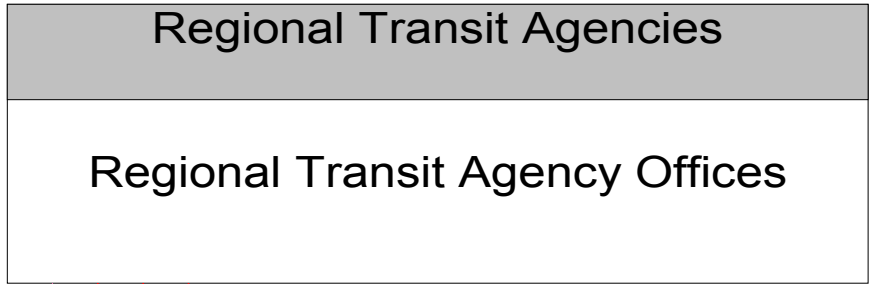


**Pennsylvania Turnpike Commission (PTC)**  
PTC Offices

**Pennsylvania Department of Transportation (PennDOT)**  
PennDOT D11 RTMC



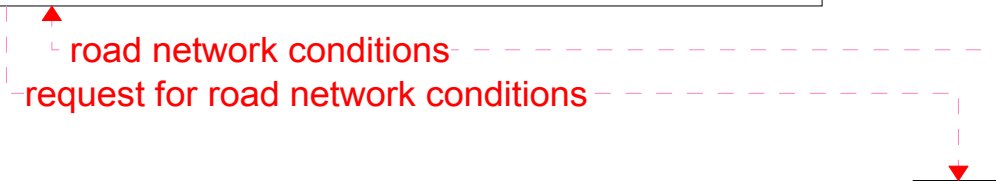
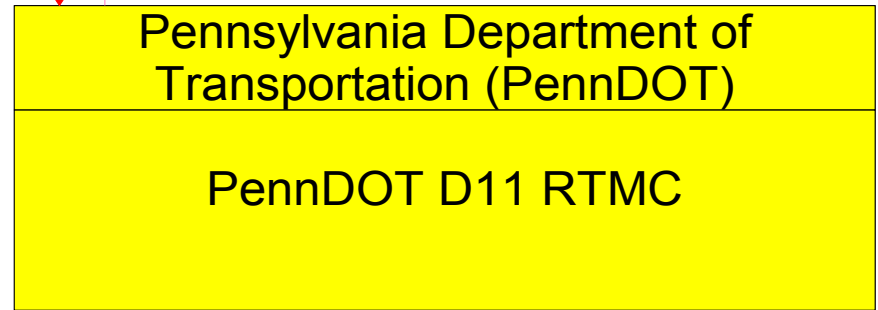
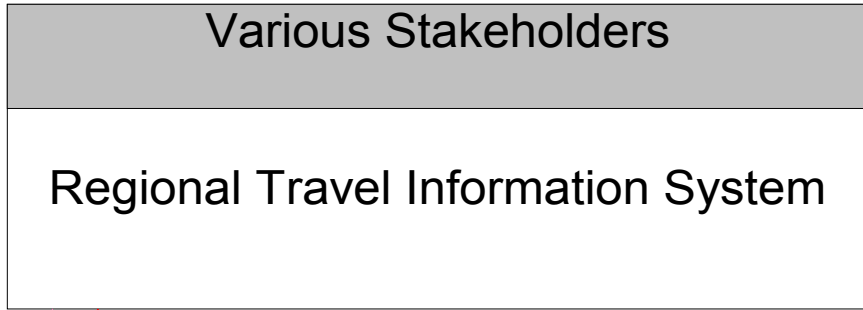
———— Existing  
- - - - - Planned



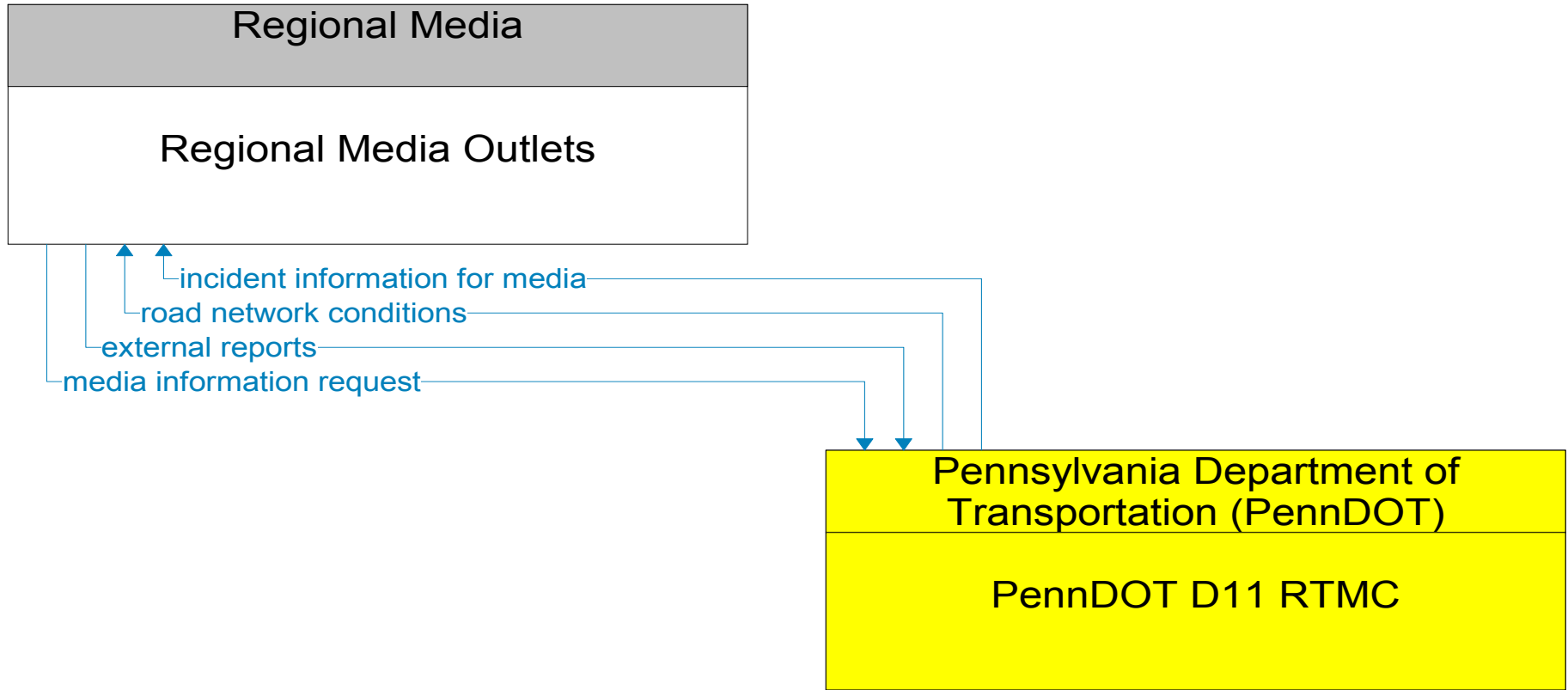
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- - - - - Planned





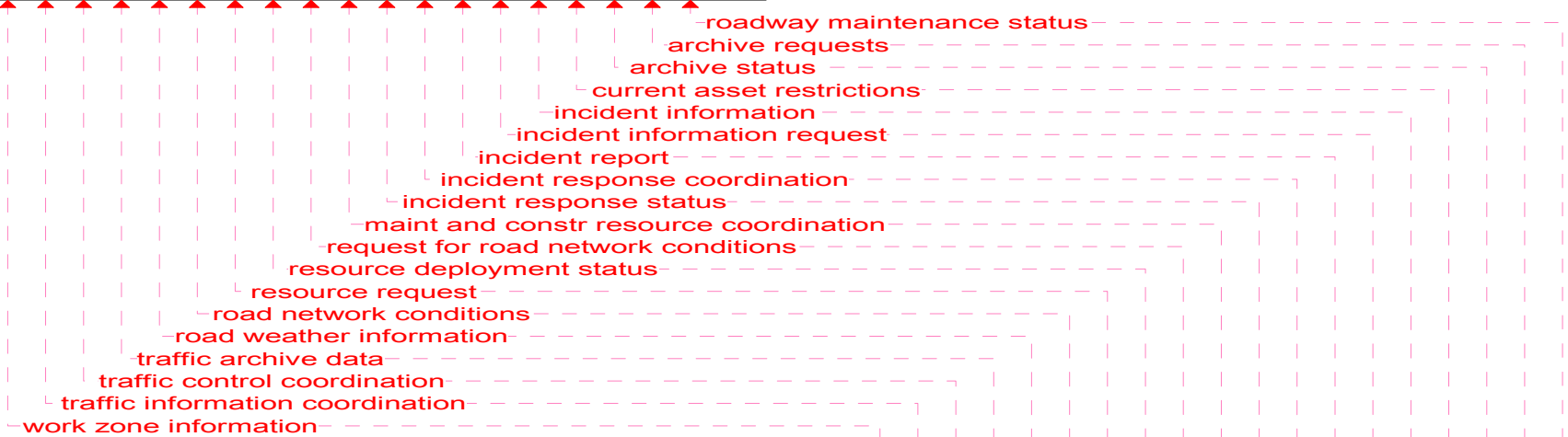
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----- Planned



Existing  
Planned

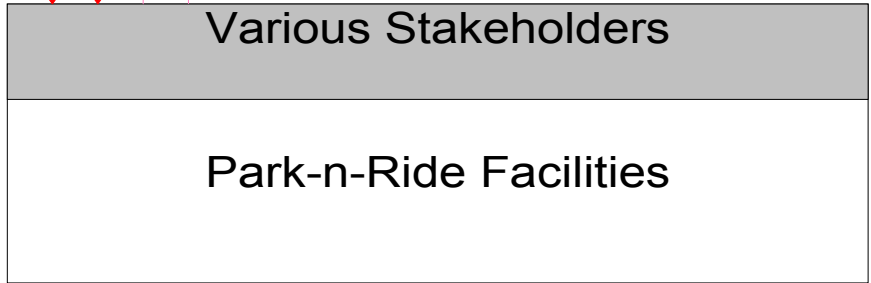
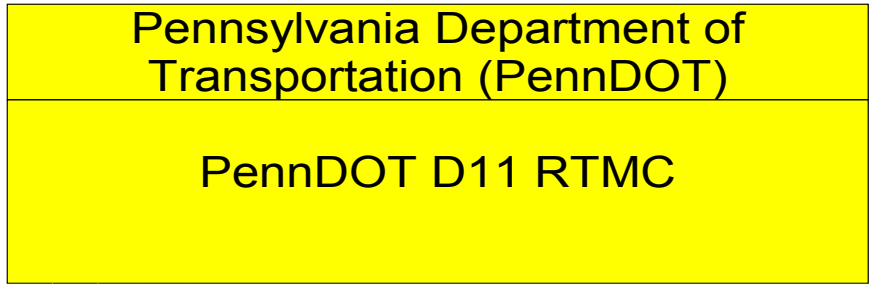


Pennsylvania Department of Transportation  
(PennDOT)  
PennDOT STMC

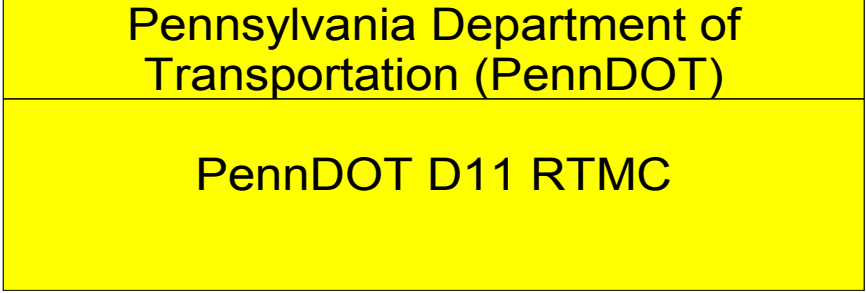
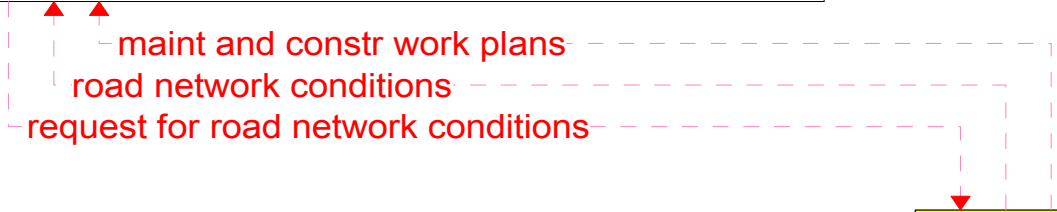
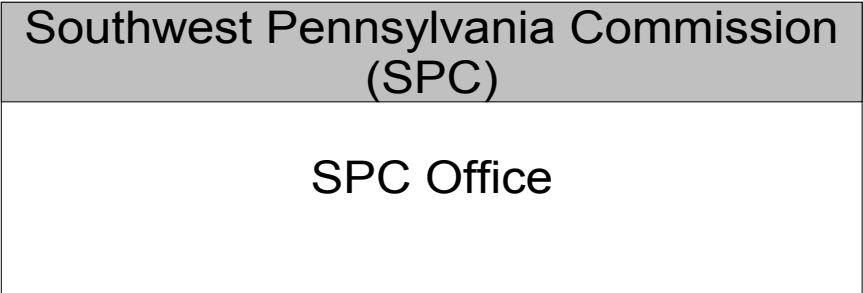


Pennsylvania Department of Transportation  
(PennDOT)  
PennDOT D11 RTMC

Existing  
Planned



———— Existing  
- - - - - Planned

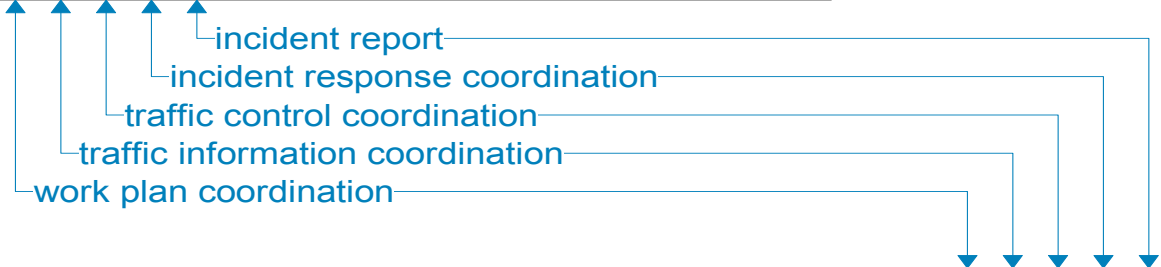


———— Existing

- - - - - Planned

Pennsylvania Department of  
Transportation (PennDOT)

Adjacent PennDOT District and County  
Offices

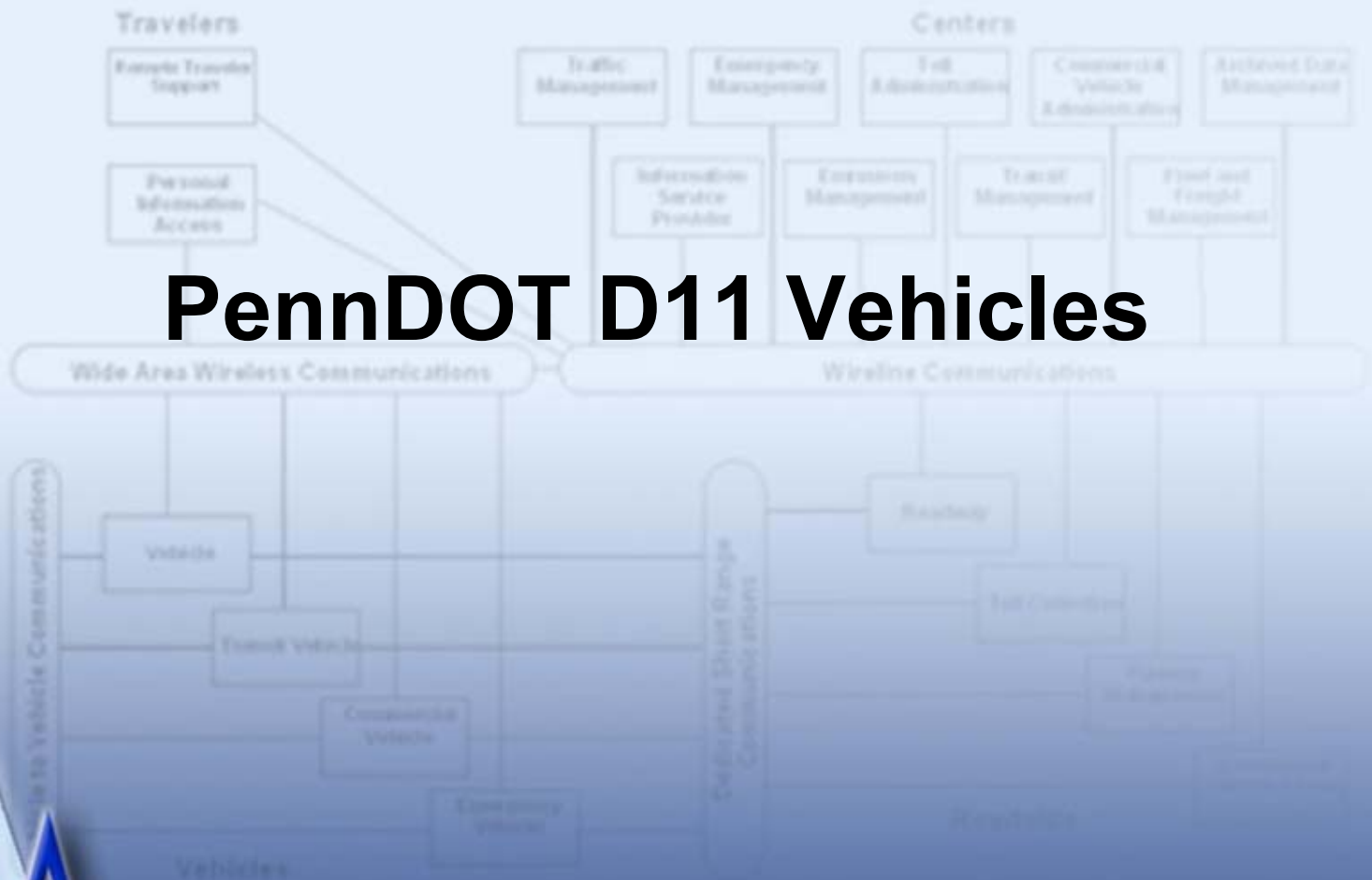


Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 RTMC

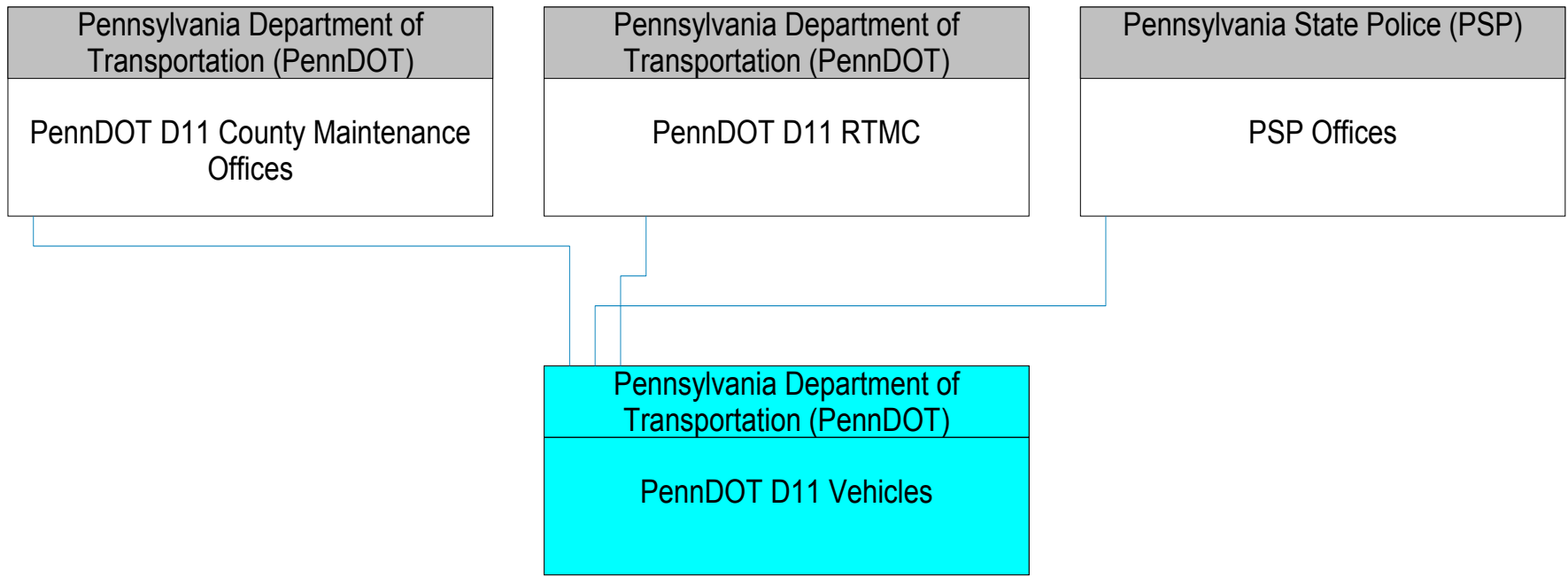
Existing  
Planned

# PennDOT D11 Vehicles



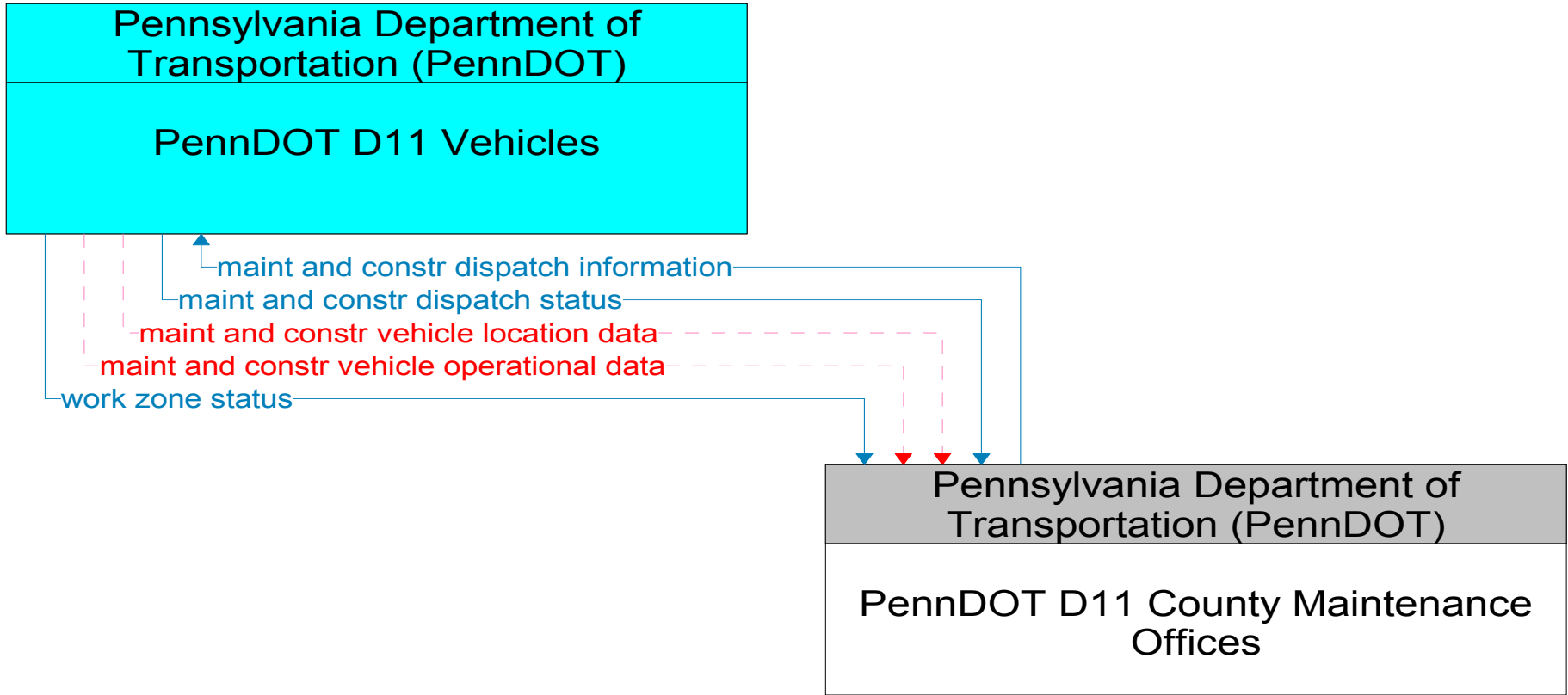
PA

# PennDOT D11 Vehicles Interconnect Diagram

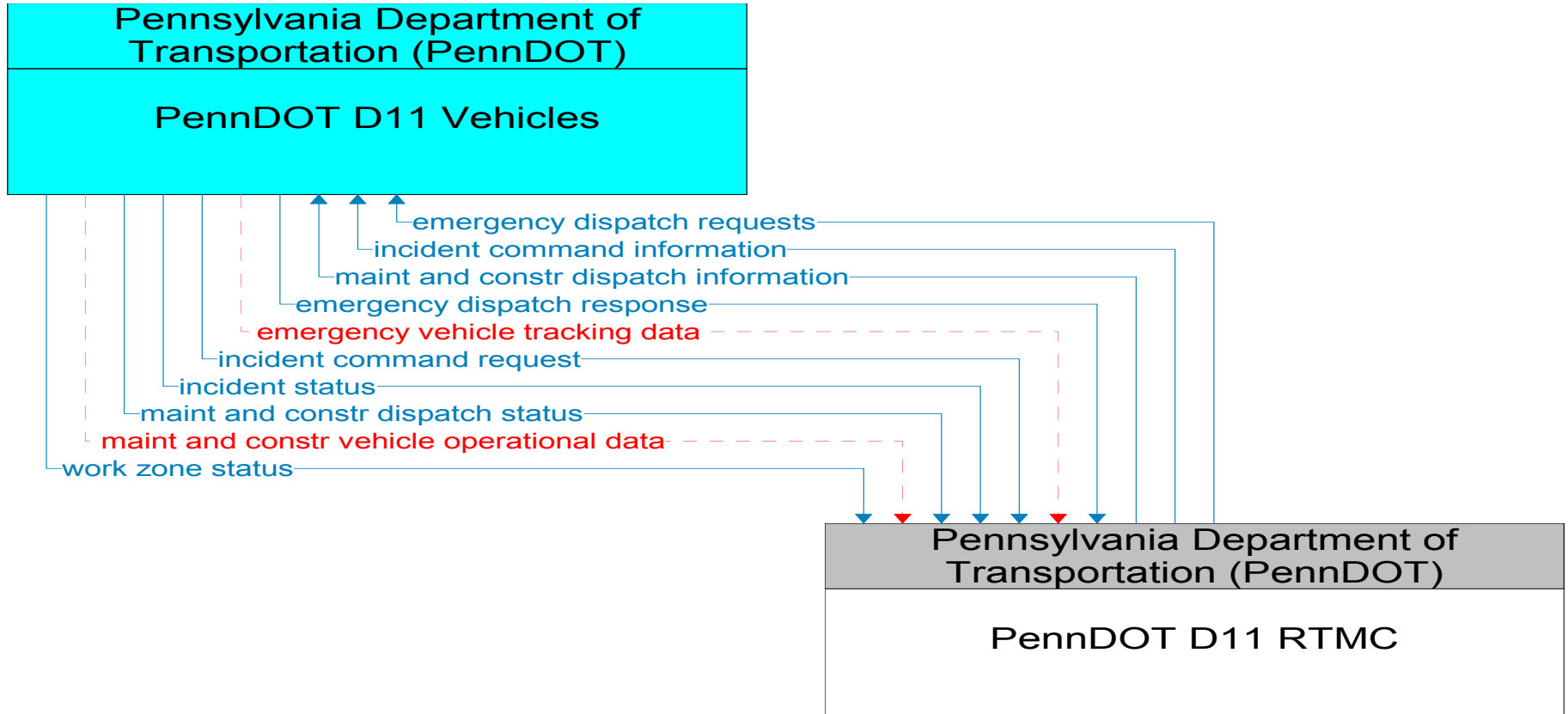


— Existing  
- - - Planned

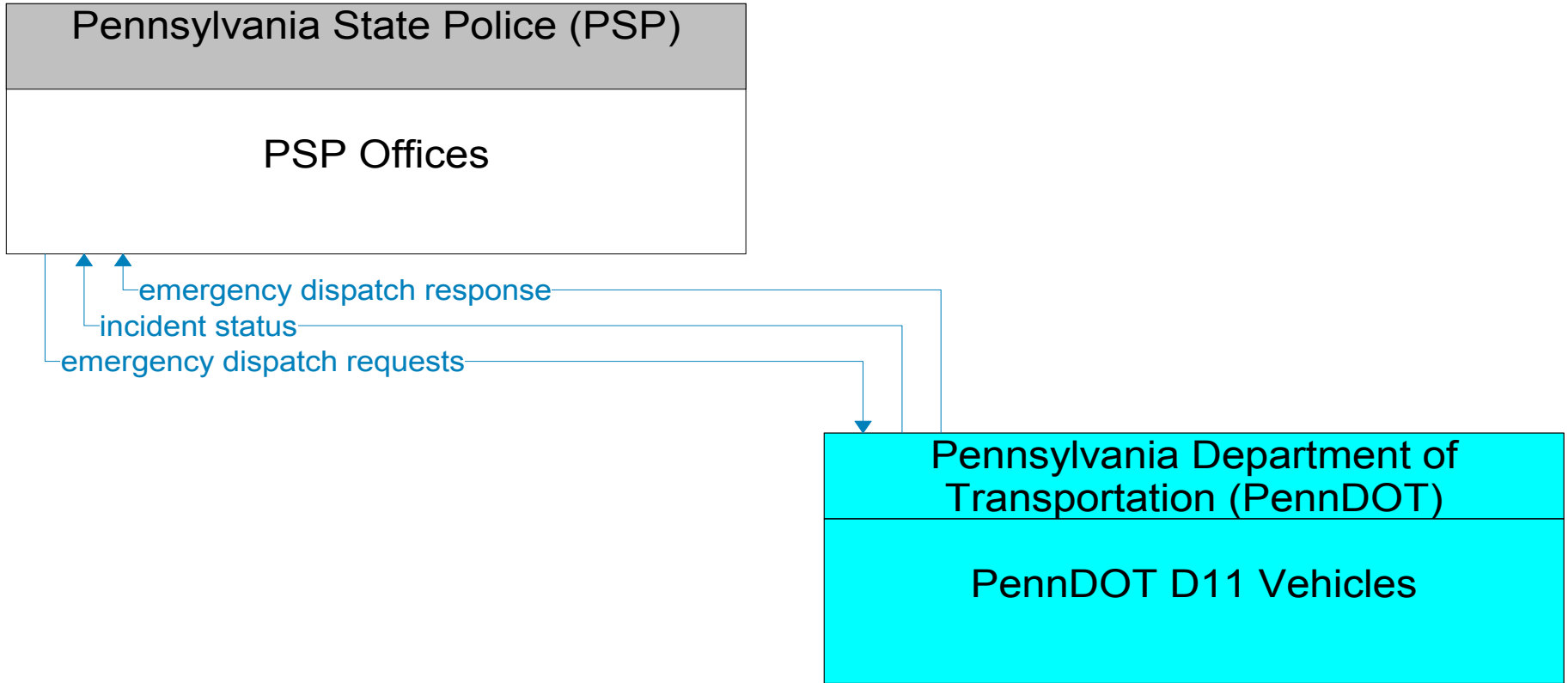




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- - - - - Planned

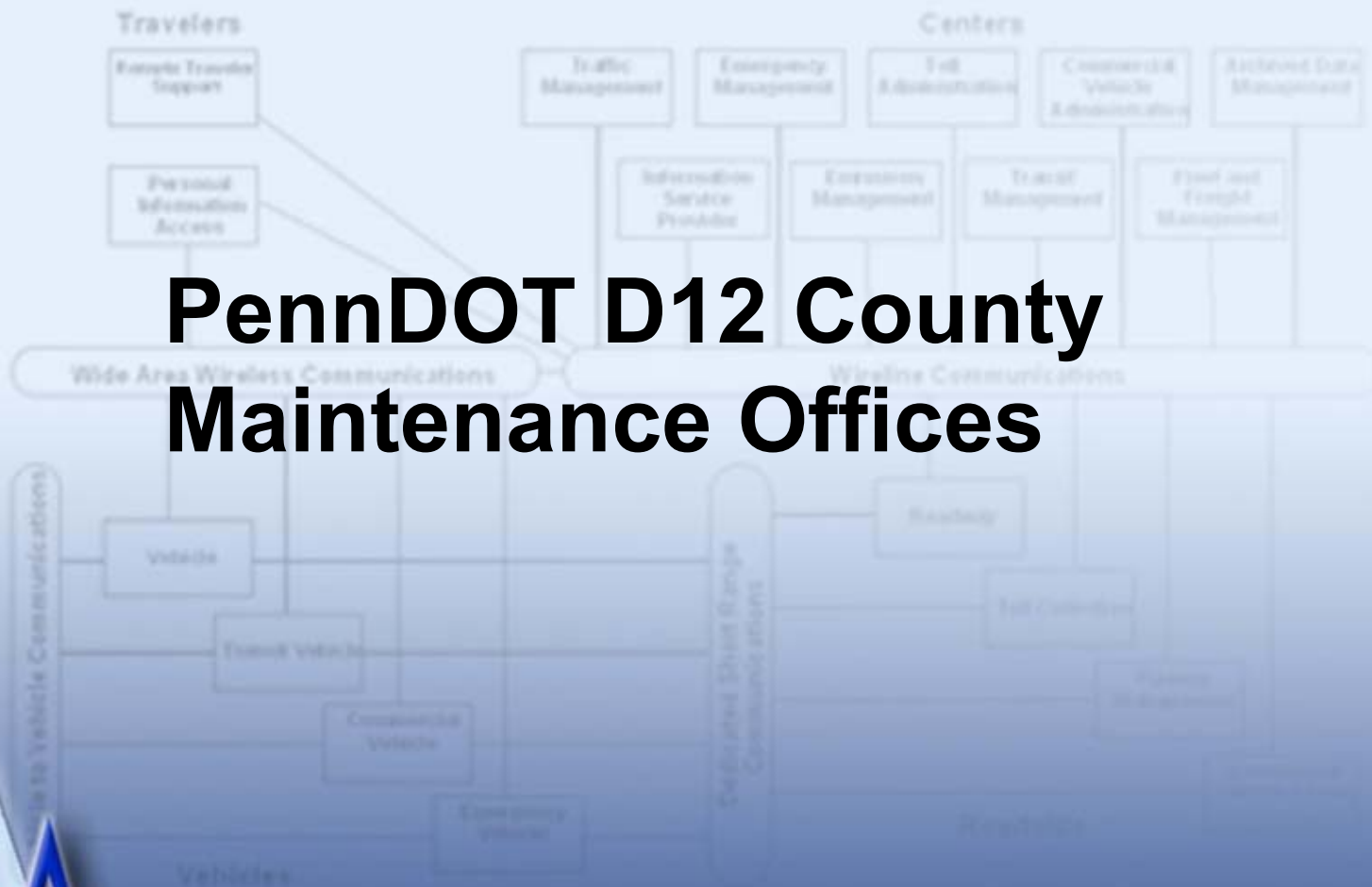


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———— Existing  
----- Planned

# PennDOT D12 County Maintenance Offices

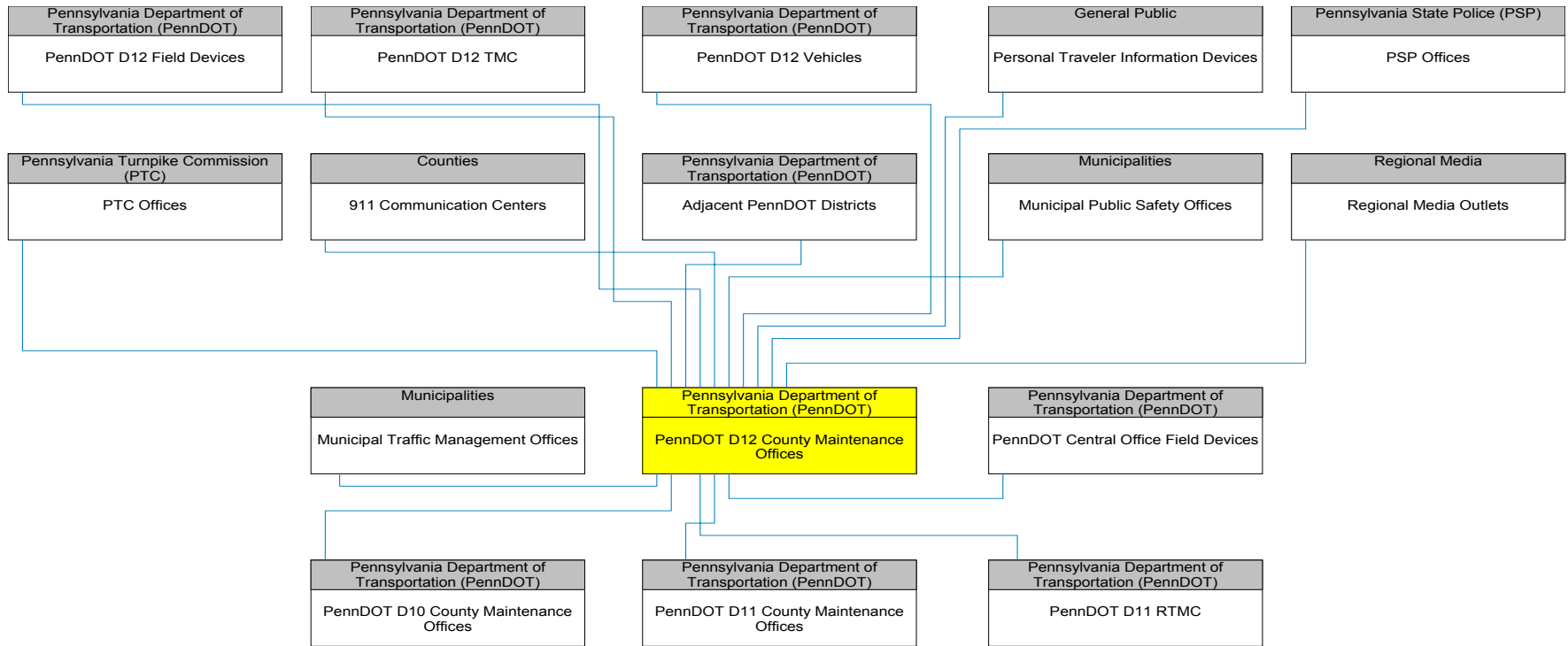


621

architecture

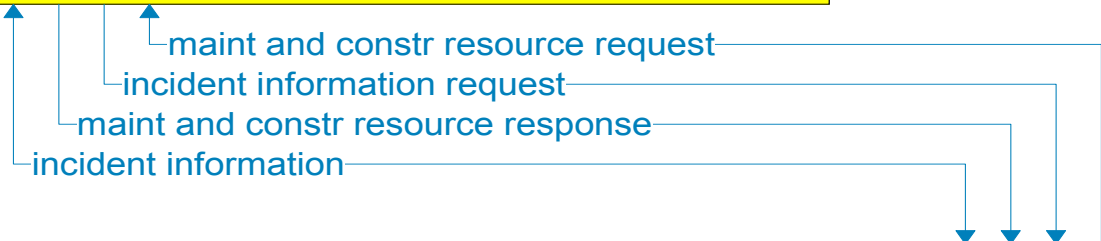


# PennDOT D12 County Maintenance Offices Interconnect Diagram



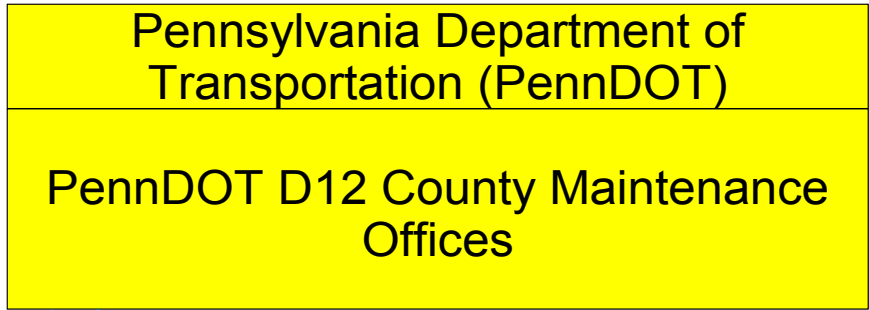
— Existing  
- - - Planned

Pennsylvania Department of Transportation (PennDOT)  
PennDOT D12 County Maintenance Offices

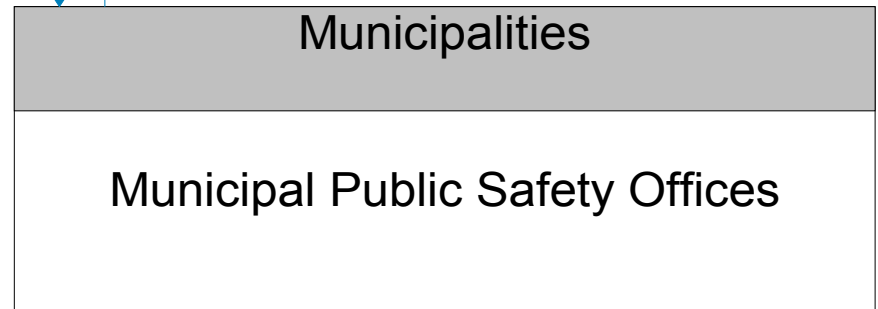


Counties  
911 Communication Centers

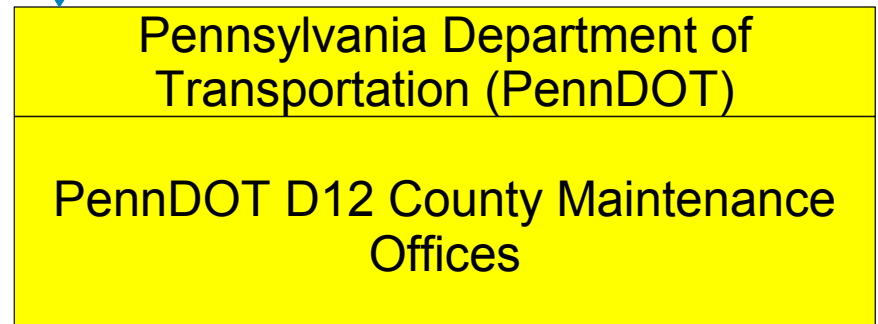
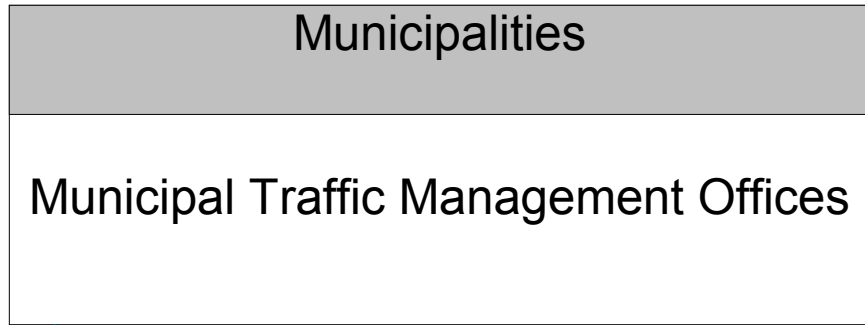
———— Existing  
- - - - - Planned



maint and constr resource request  
maint and constr resource response



———— Existing  
- - - - - Planned

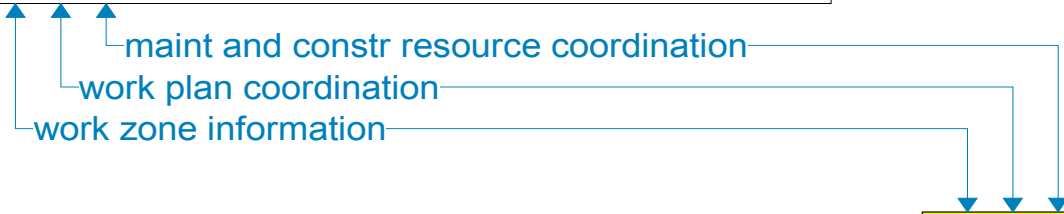


———— Existing  
- - - - - Planned



Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D10 County Maintenance  
Offices



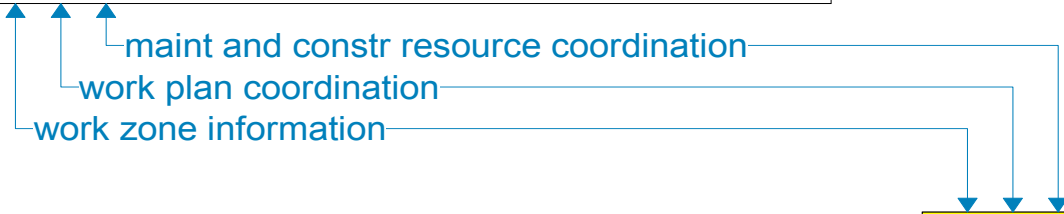
Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D12 County Maintenance  
Offices

———— Existing  
- - - - - Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 County Maintenance  
Offices



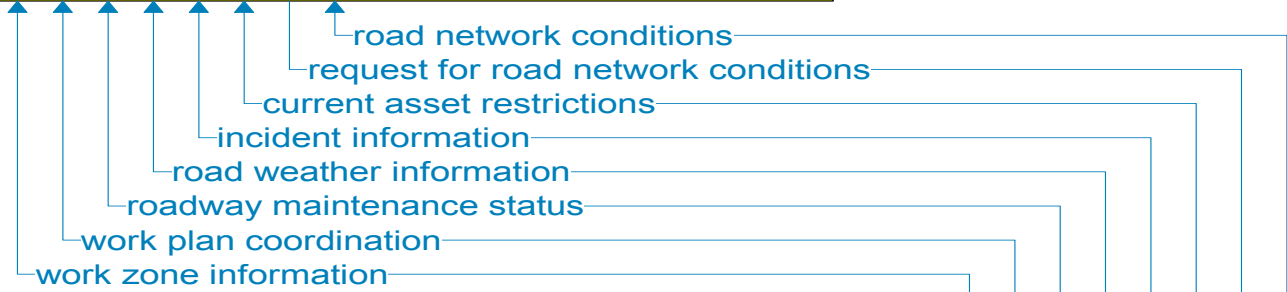
Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D12 County Maintenance  
Offices

———— Existing  
- - - - - Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D12 County Maintenance  
Offices

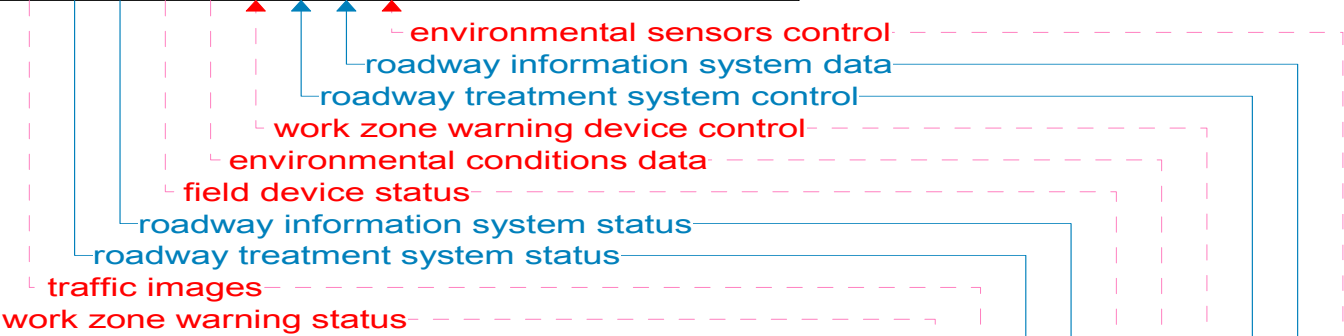


Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 RTMC

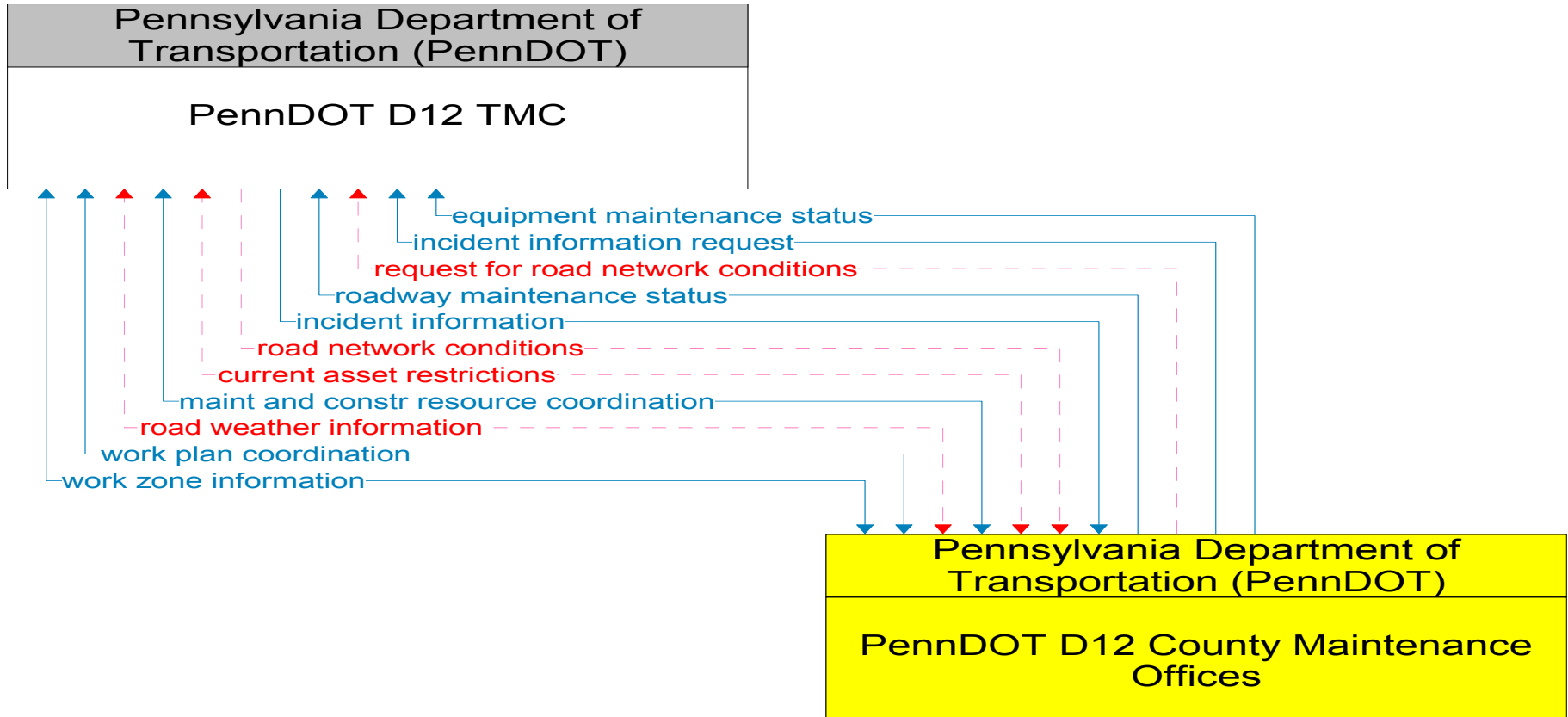
———— Existing  
- - - - - Planned

Pennsylvania Department of Transportation (PennDOT)  
PennDOT D12 Field Devices

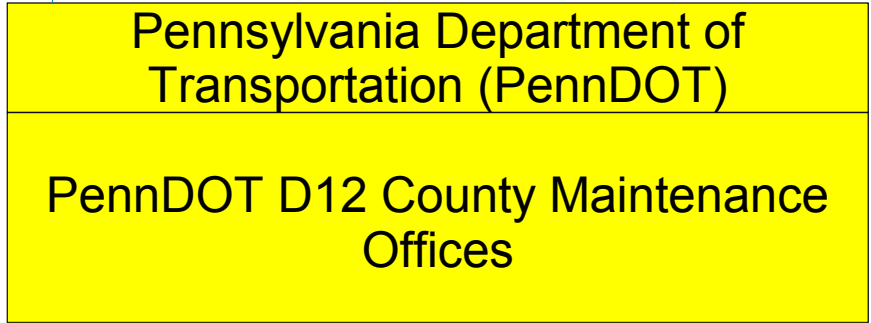
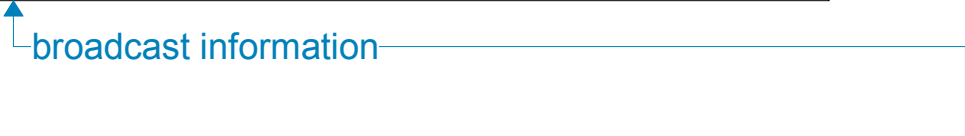
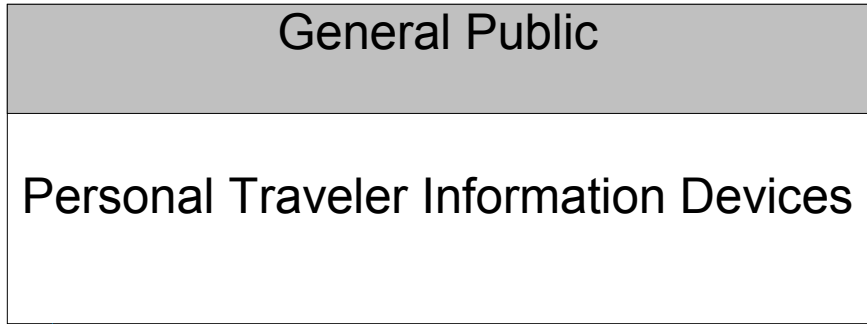


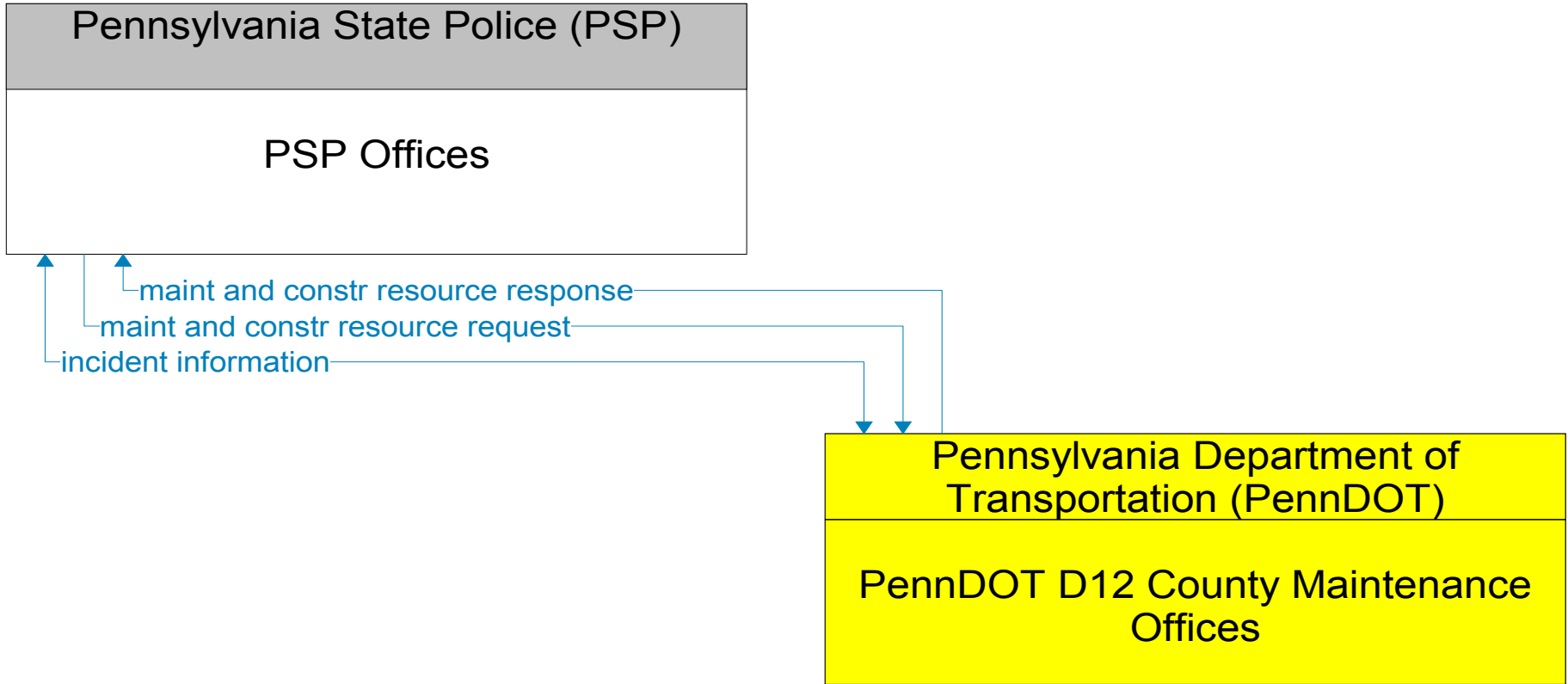
Pennsylvania Department of Transportation (PennDOT)  
PennDOT D12 County Maintenance Offices

———— Existing  
- - - - - Planned

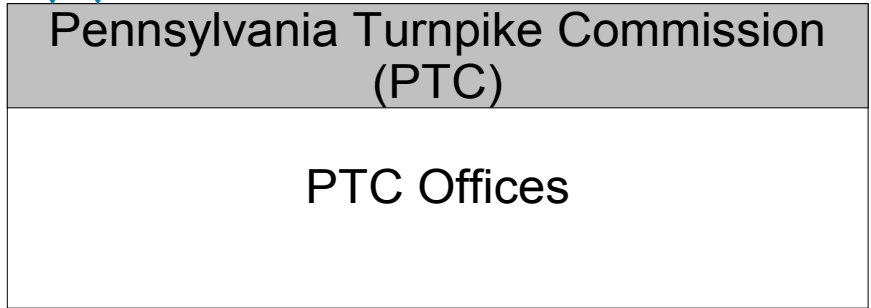
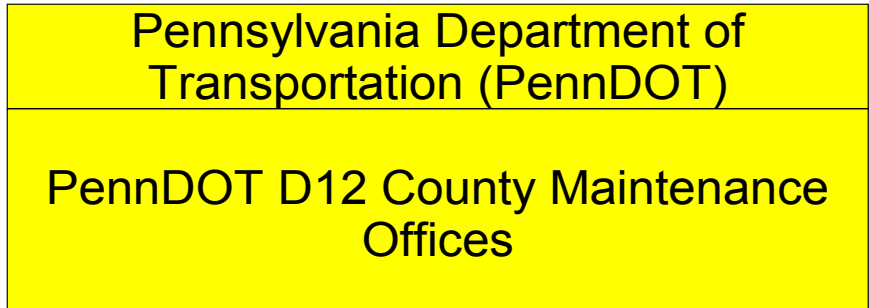


———— Existing  
- - - - - Planned



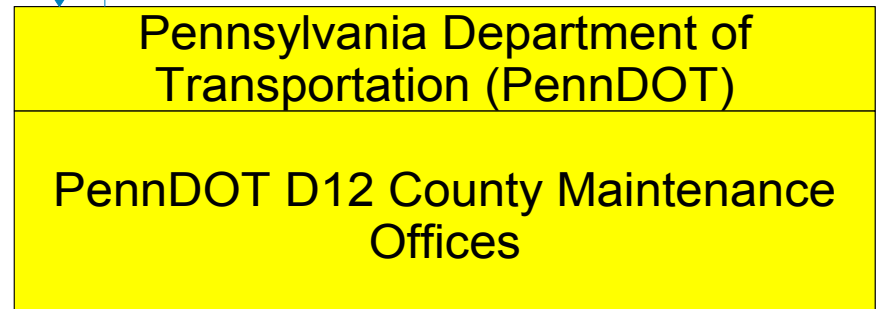
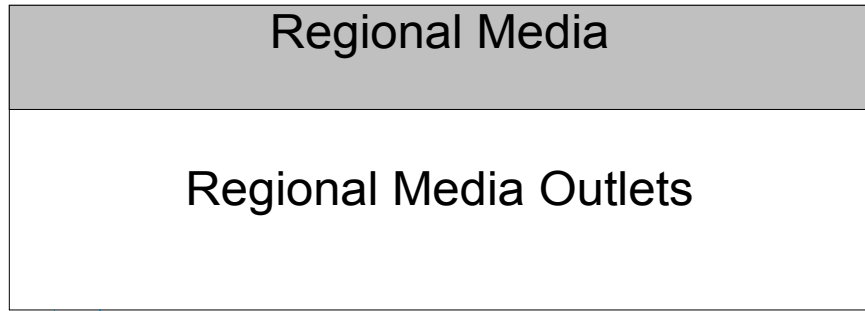


———— Existing  
- - - - - Planned



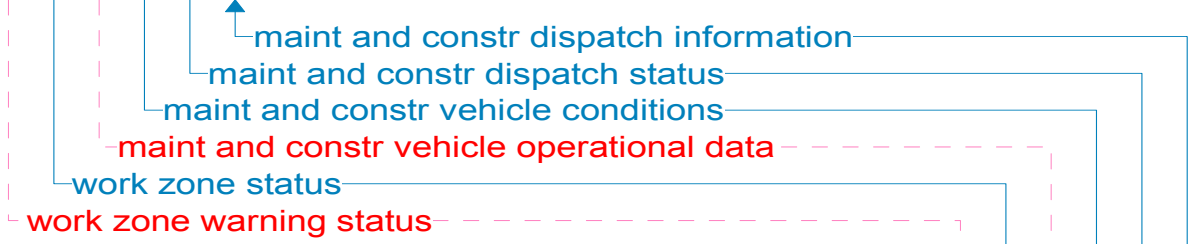
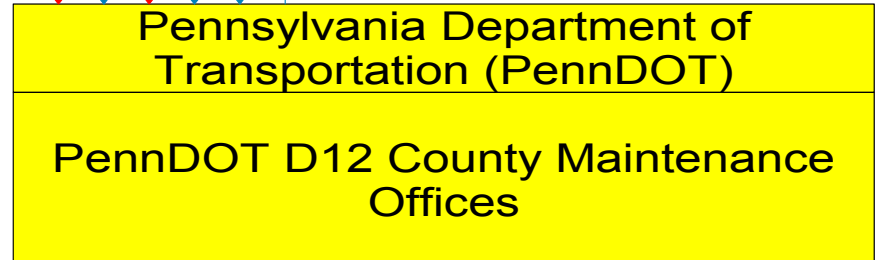
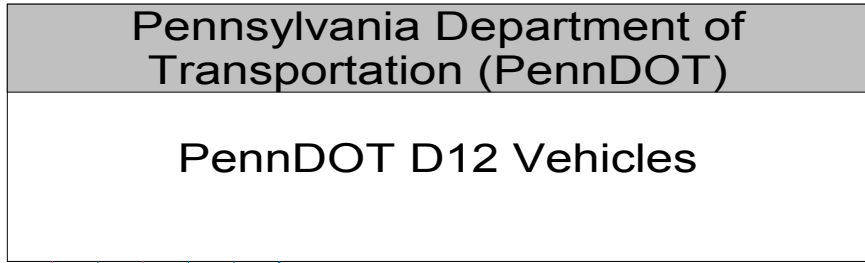
———— Existing  
----- Planned





maint and constr work plans  
media information request

Existing  
Planned



Existing  
Planned

Pennsylvania Department of  
Transportation (PennDOT)

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PennDOT D12 County Maintenance  
Offices

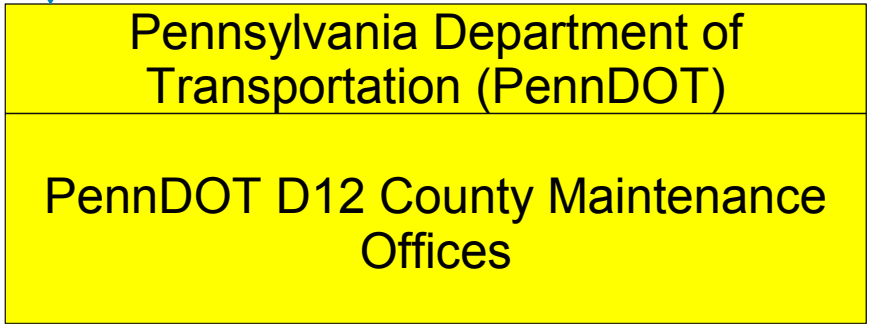
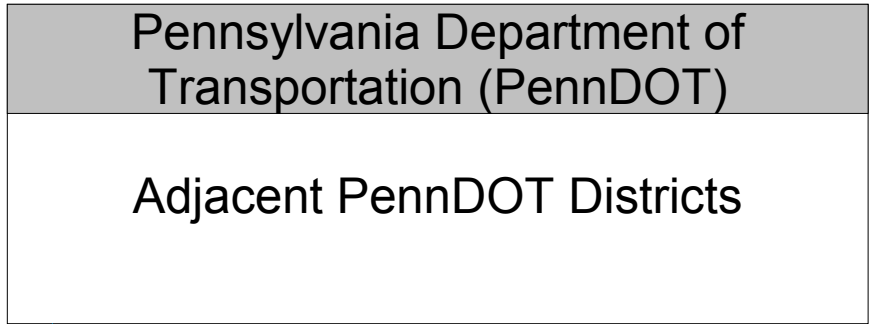
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Pennsylvania Department of  
Transportation (PennDOT)

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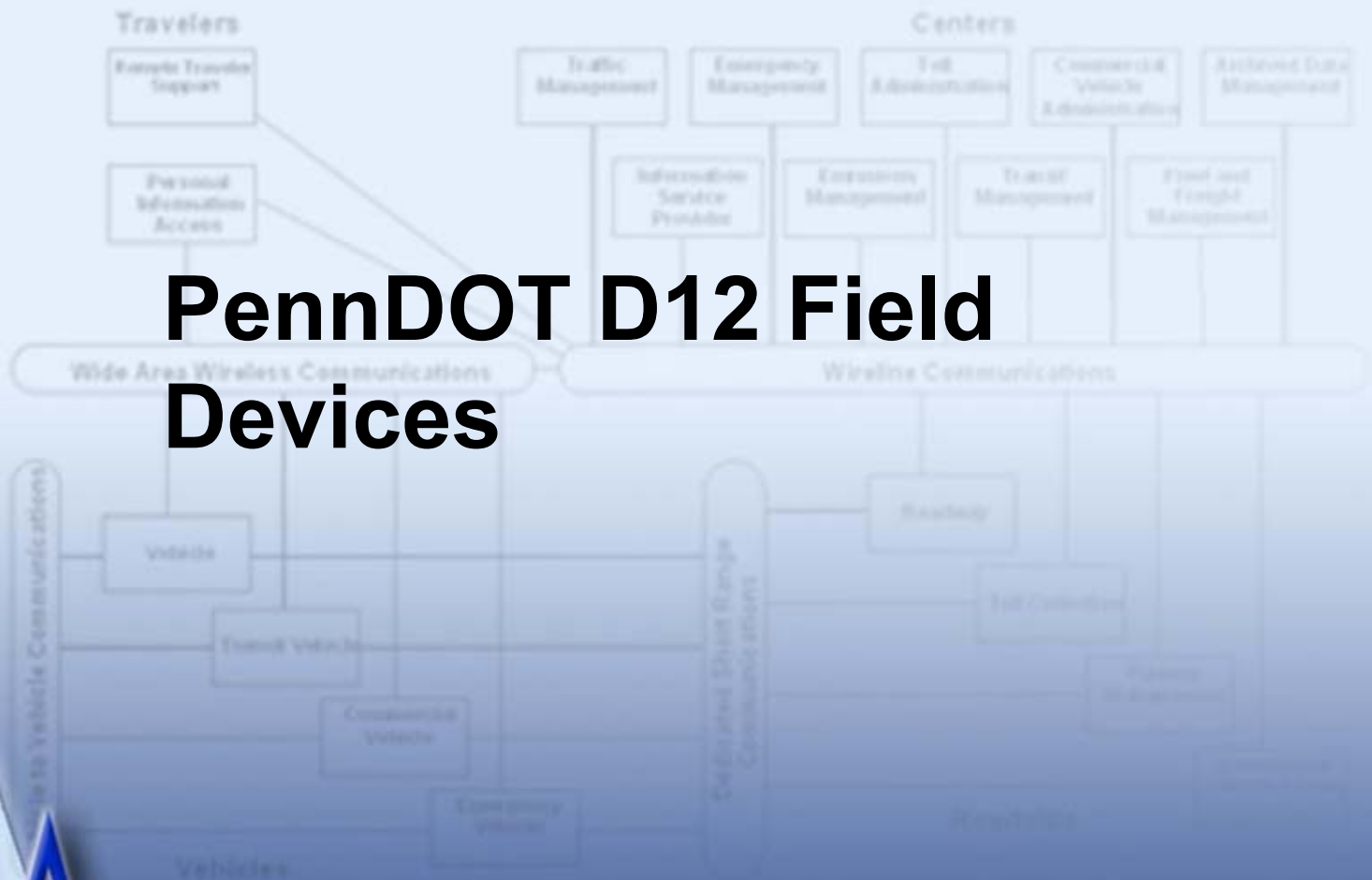
PennDOT Central Office Field Devices

———— Existing  
- - - - - Planned

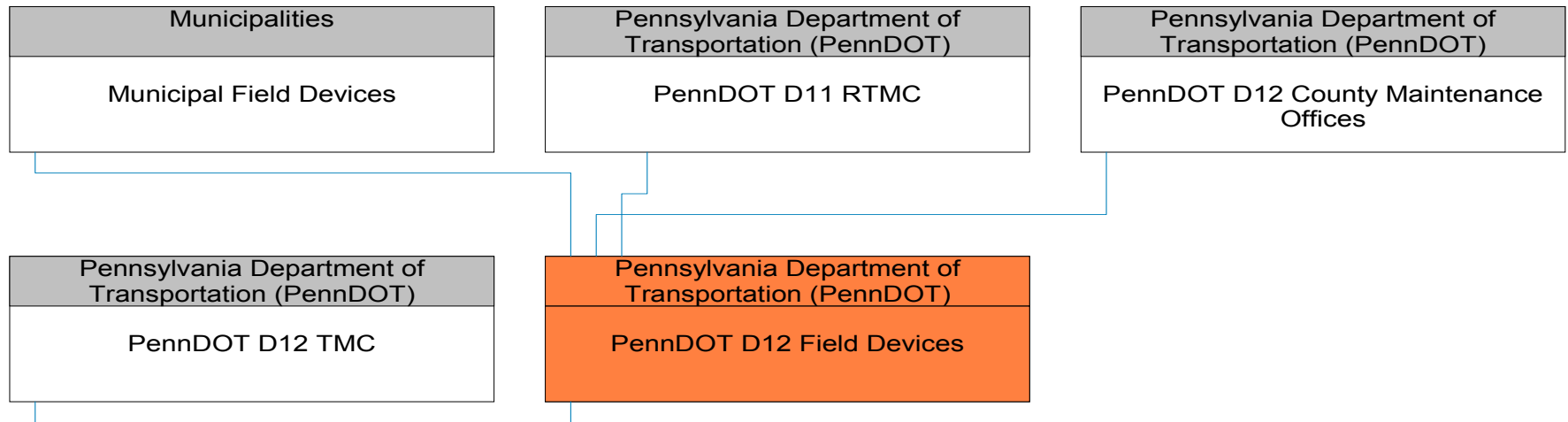


———— Existing  
- - - - - Planned

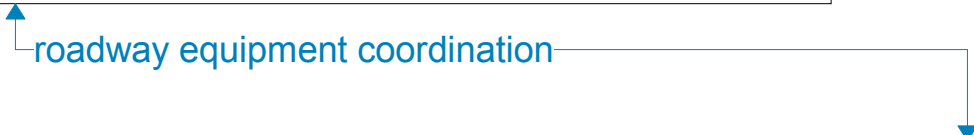
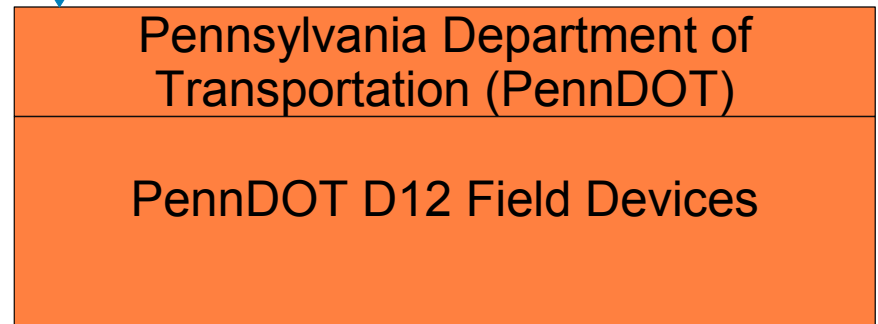
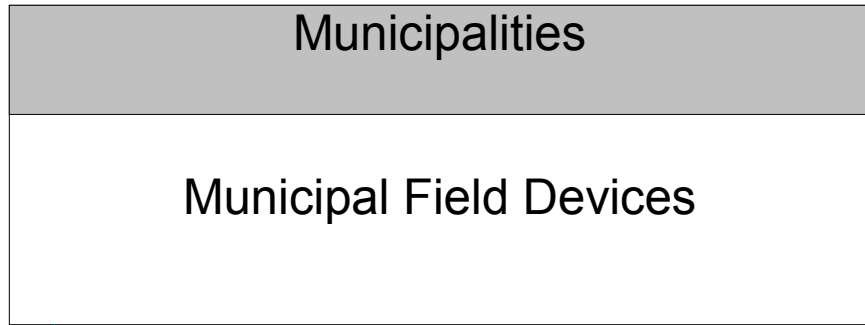
# PennDOT D12 Field Devices



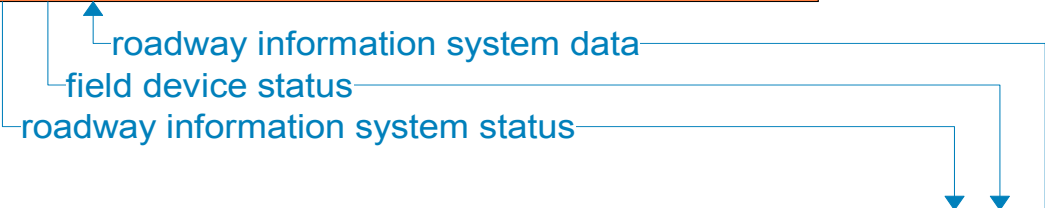
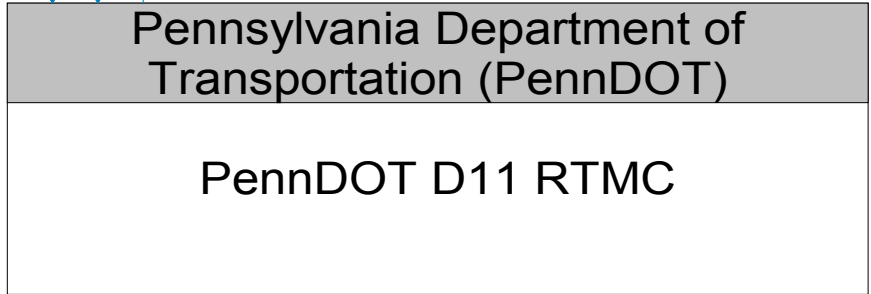
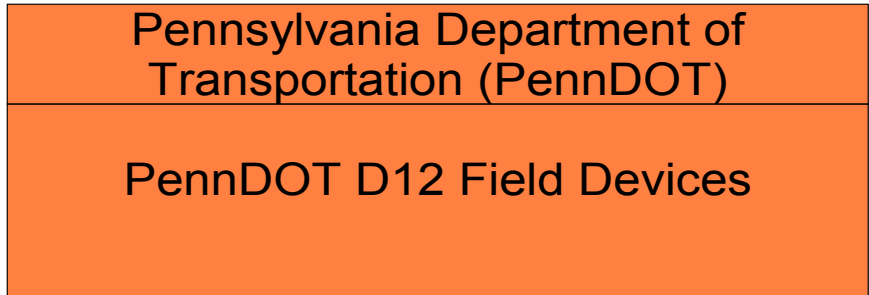
# PennDOT D12 Field Devices Interconnect Diagram



— Existing  
- - - Planned

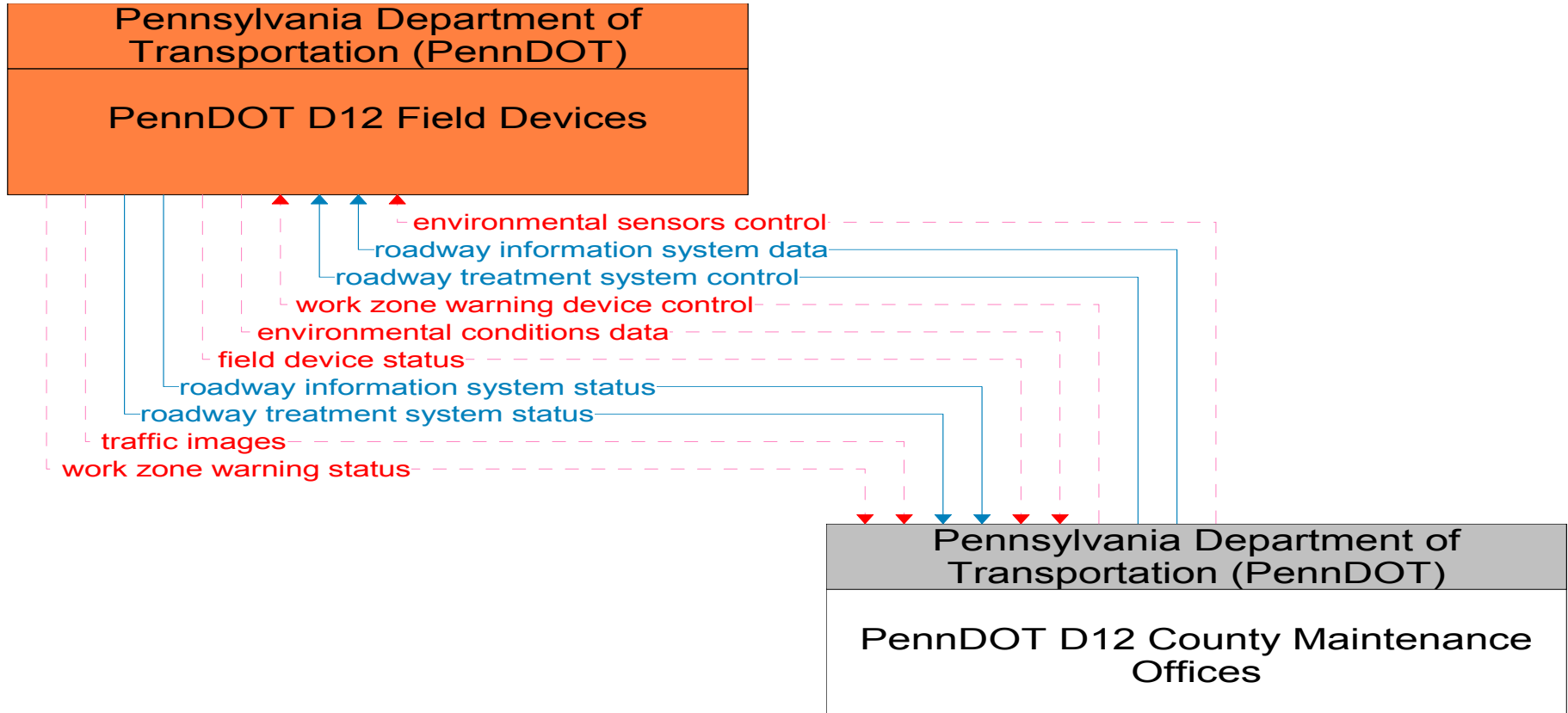


Existing  
Planned

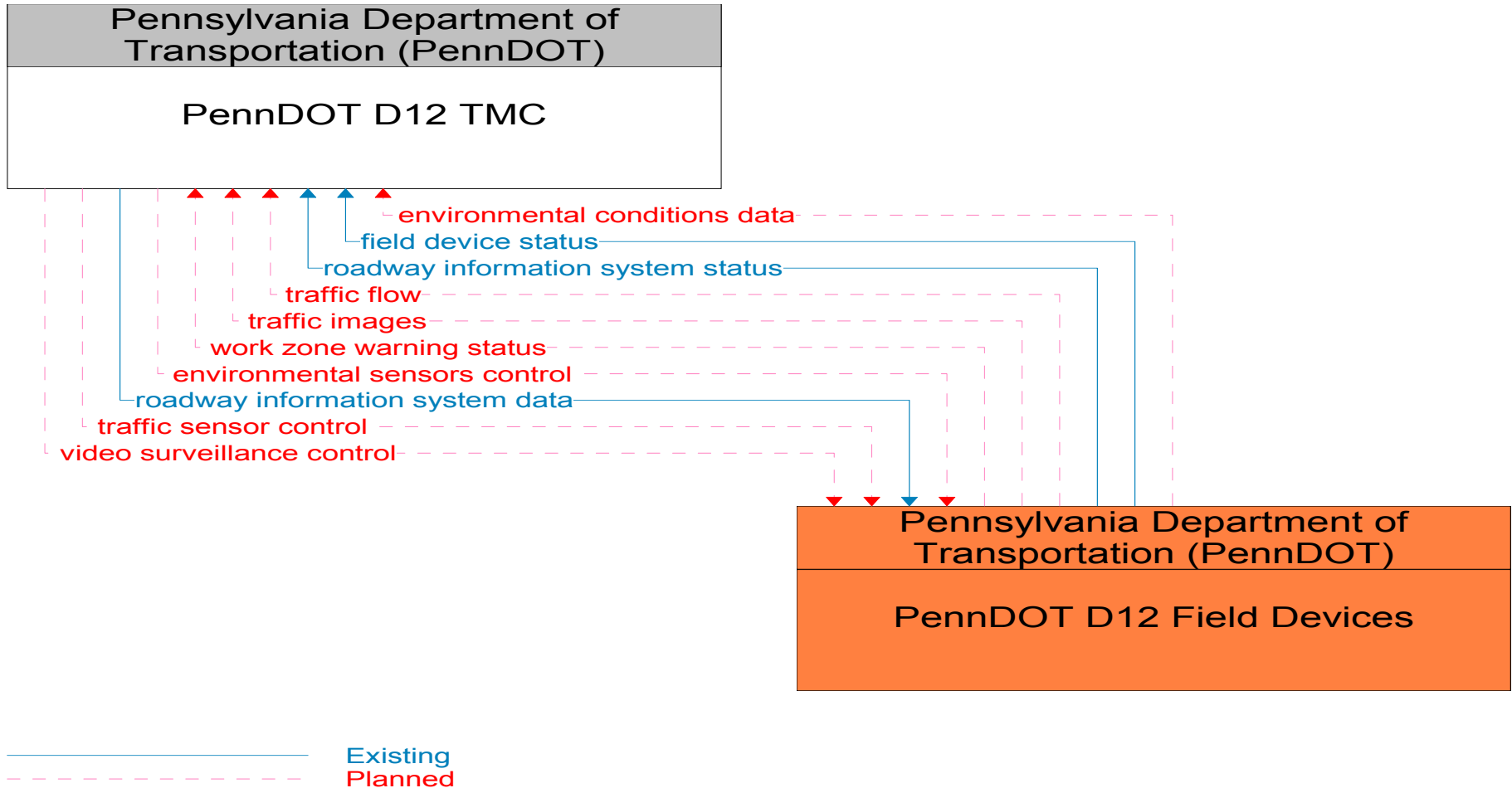


Existing  
Planned

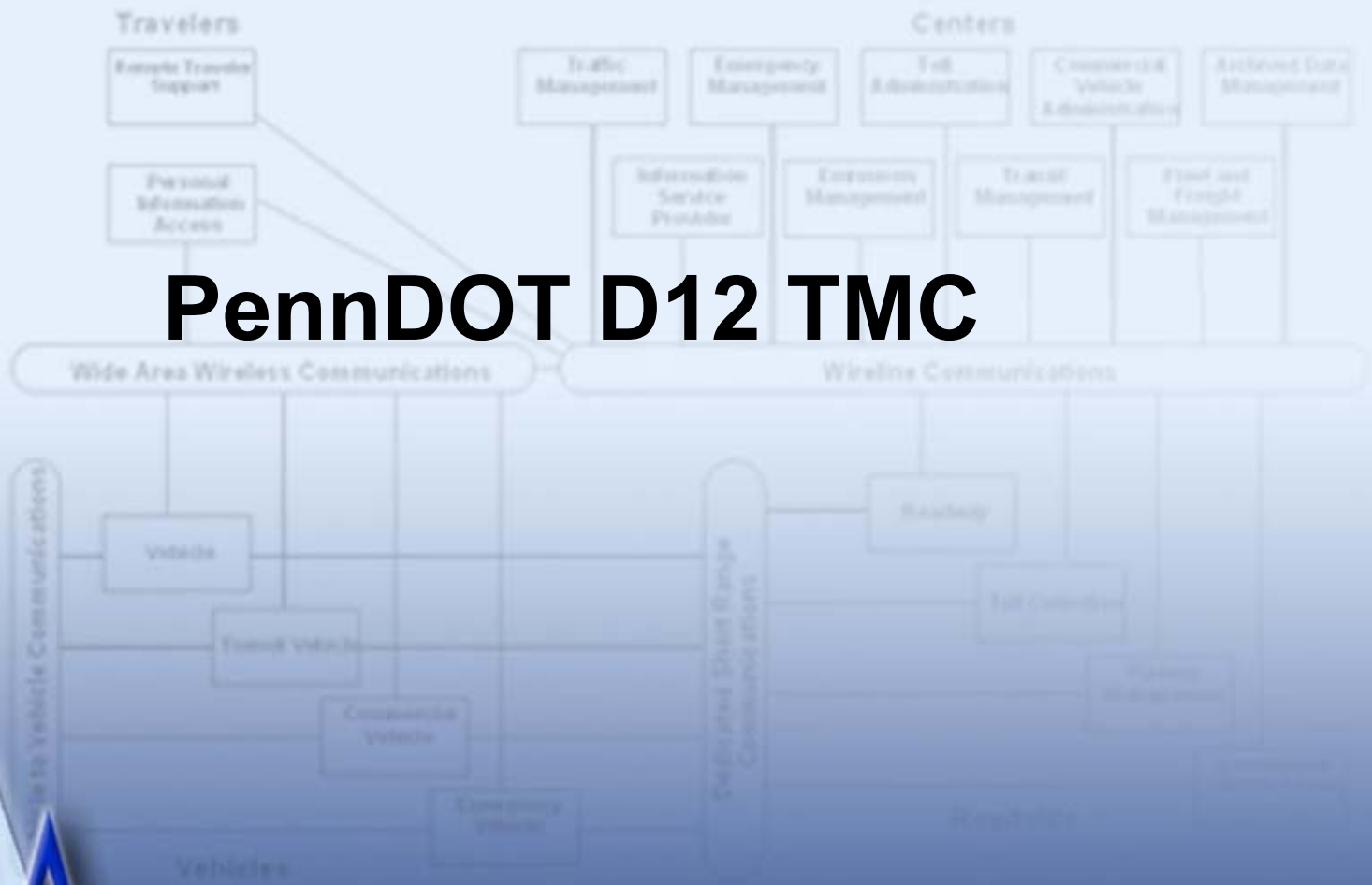




———— Existing  
- - - - - Planned

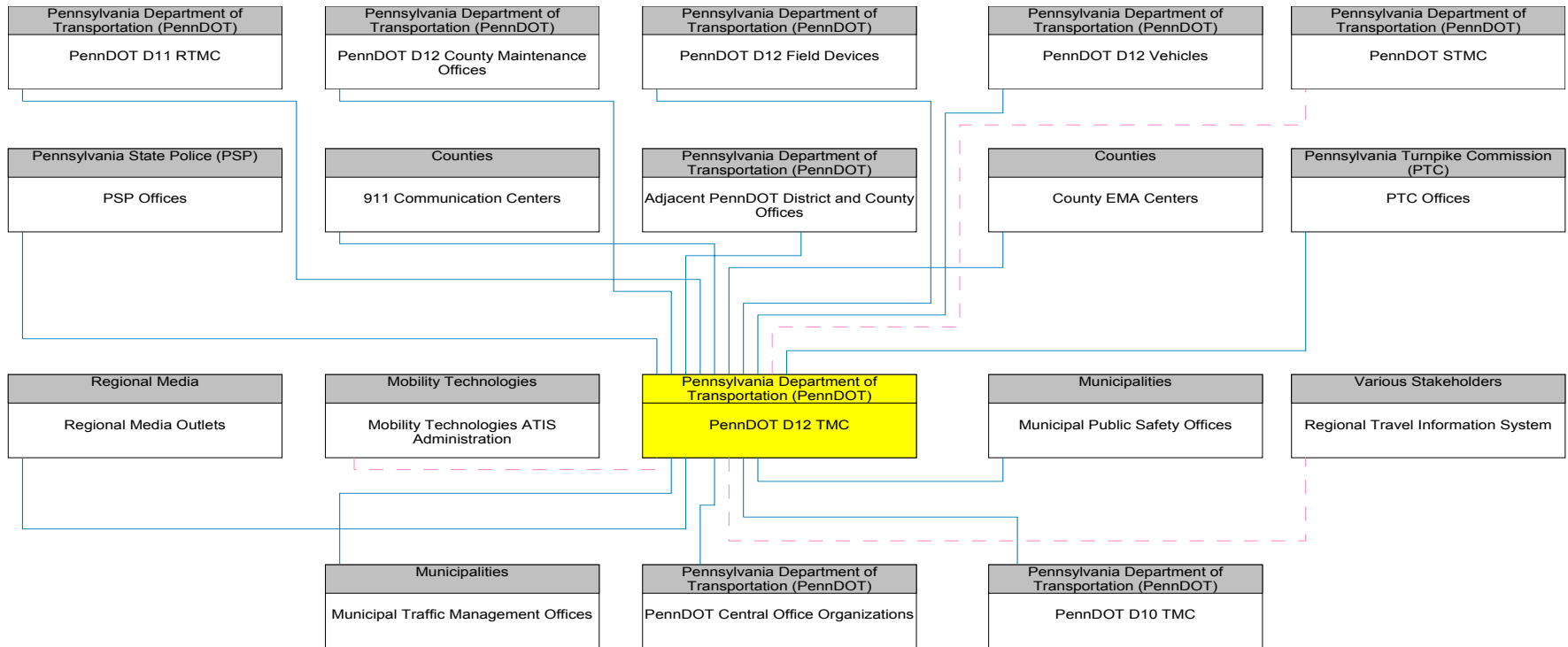


# PennDOT D12 TMC

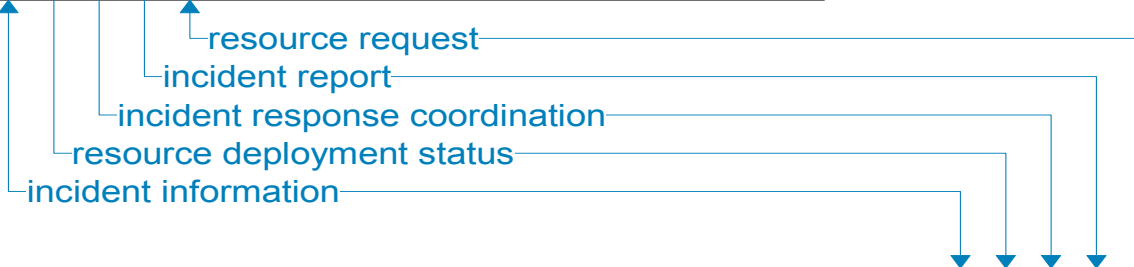
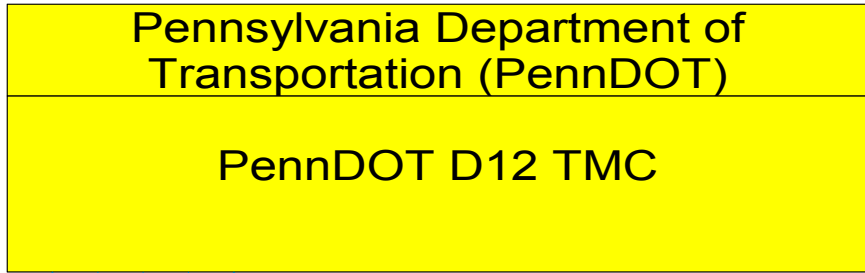


PA

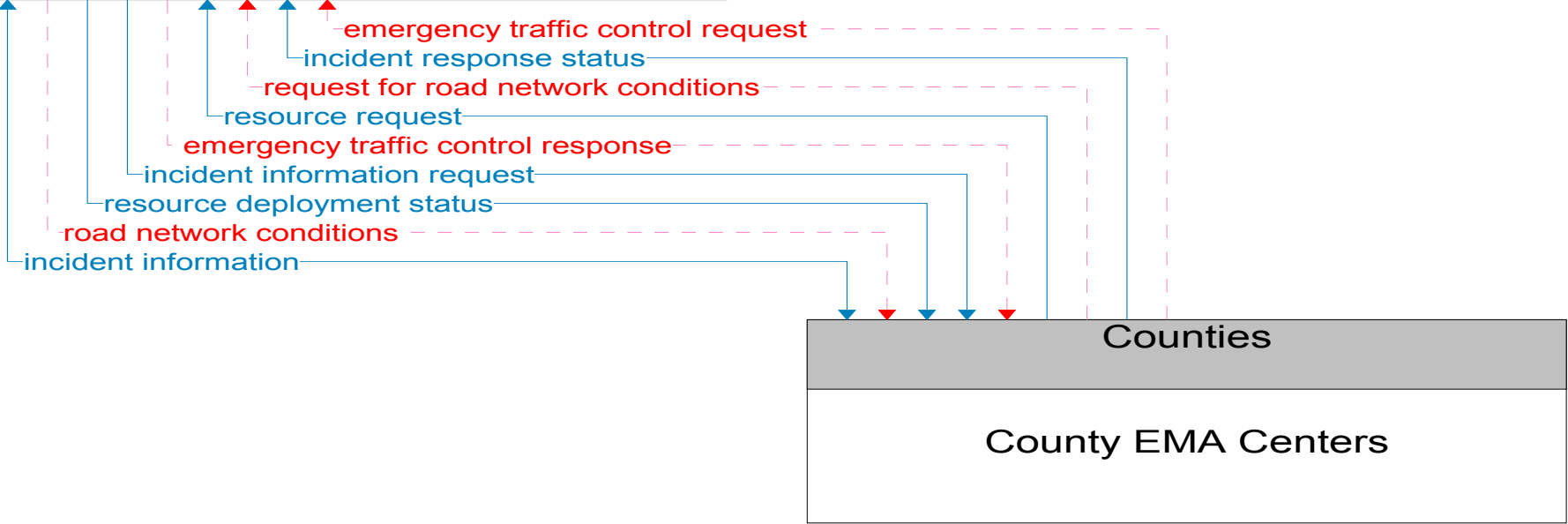
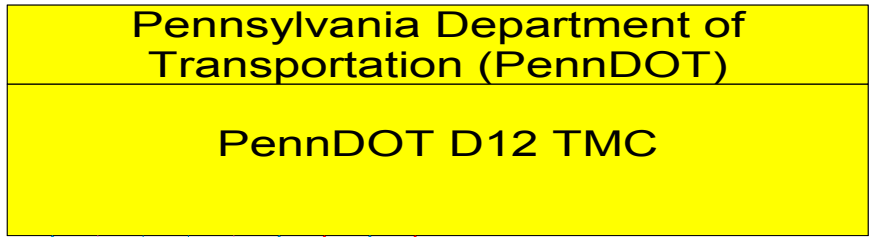
# PennDOT D12 TMC Interconnect Diagram

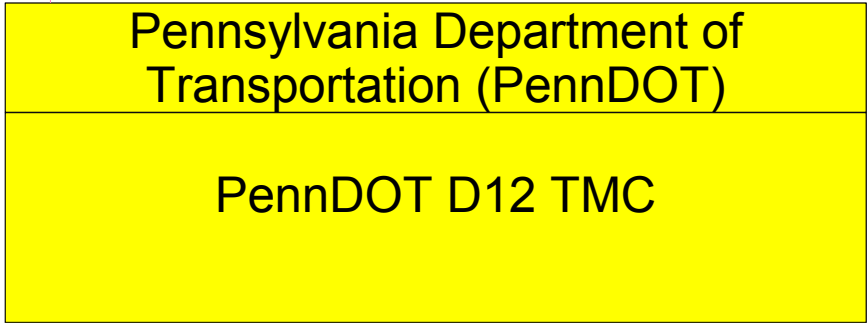
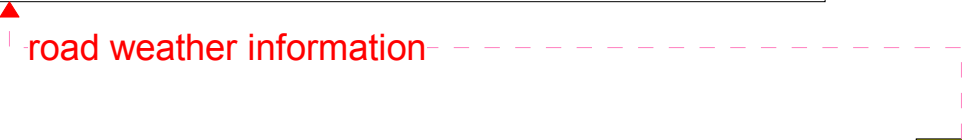
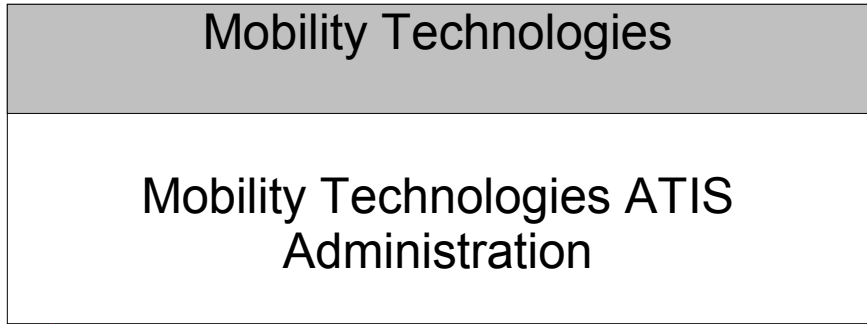


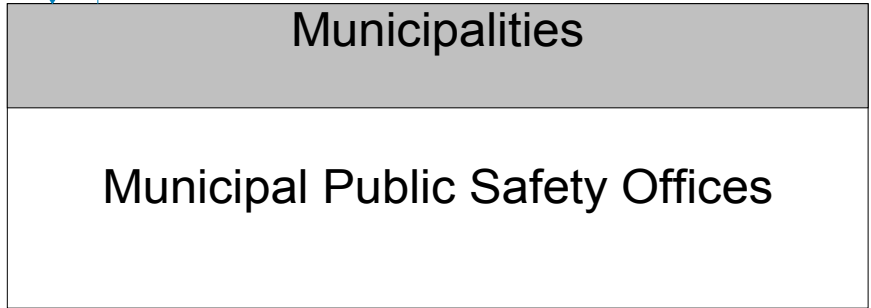
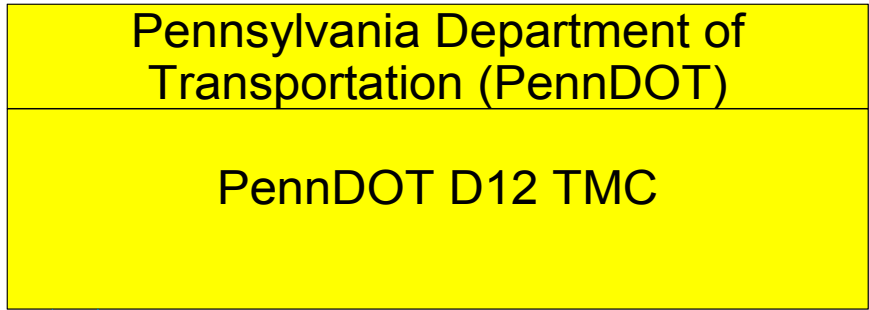
— Existing  
- - - Planned



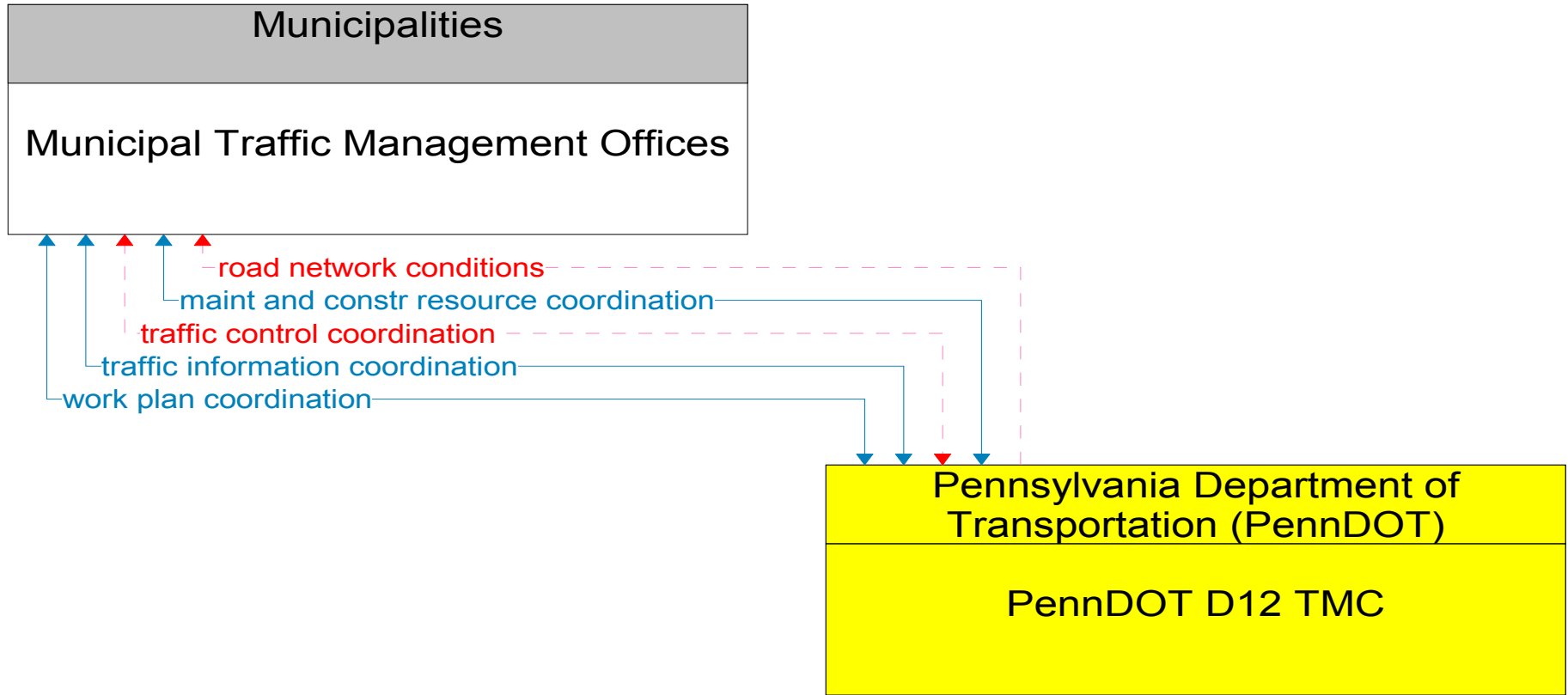
Existing  
Planned





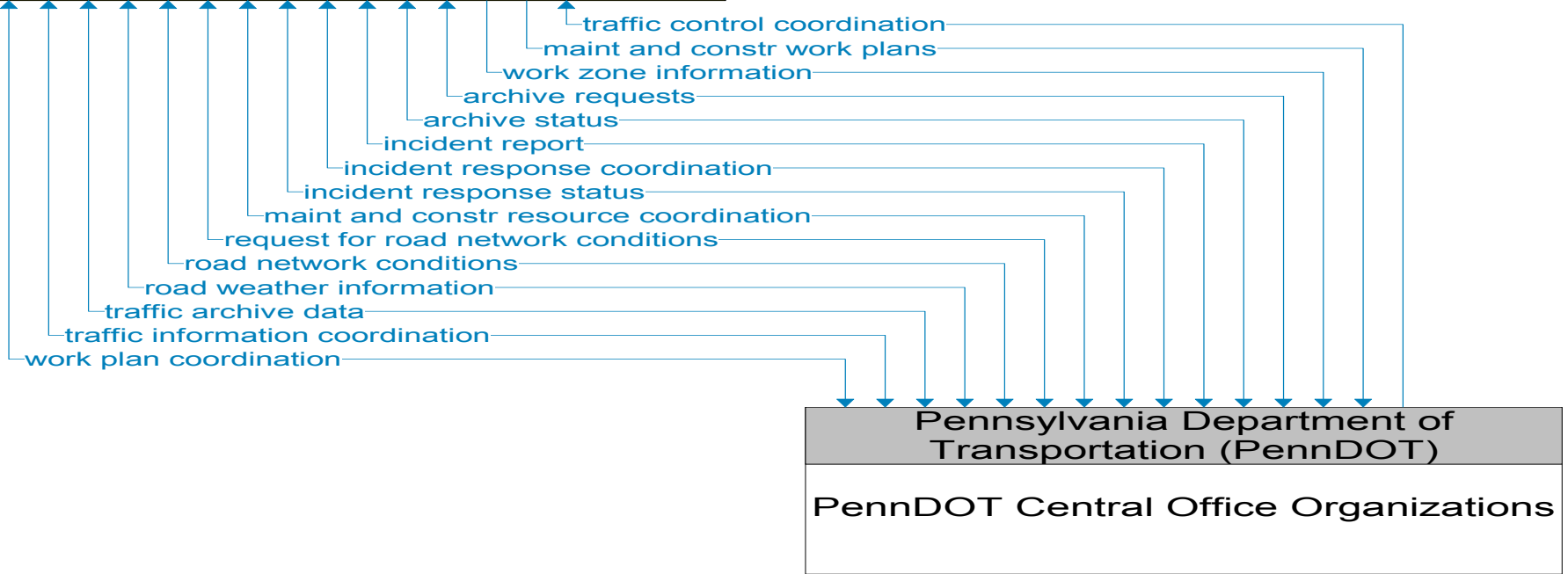




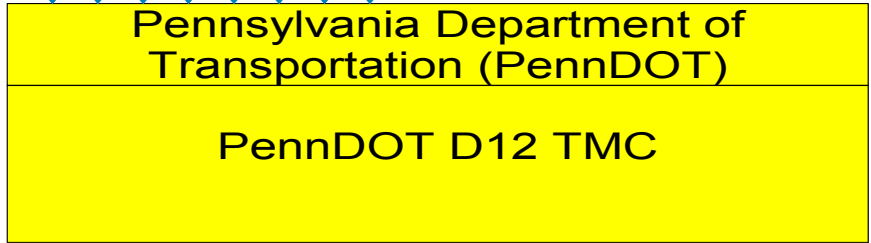
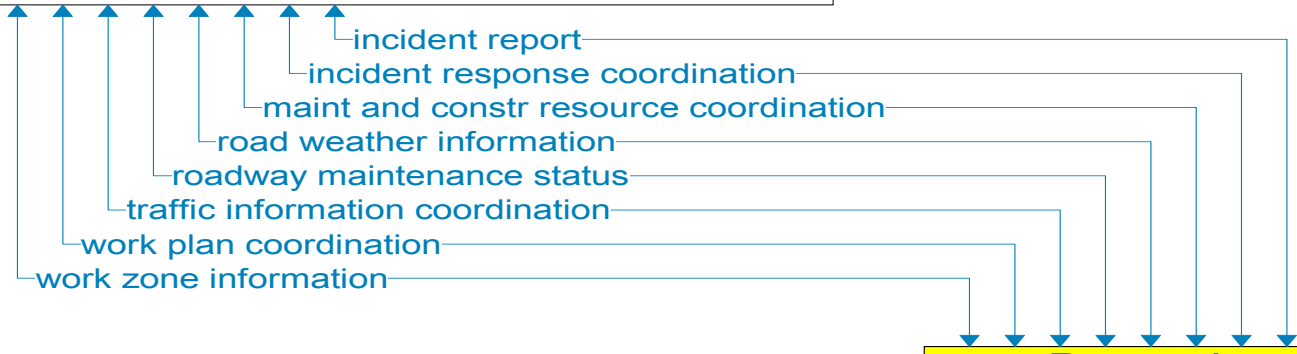
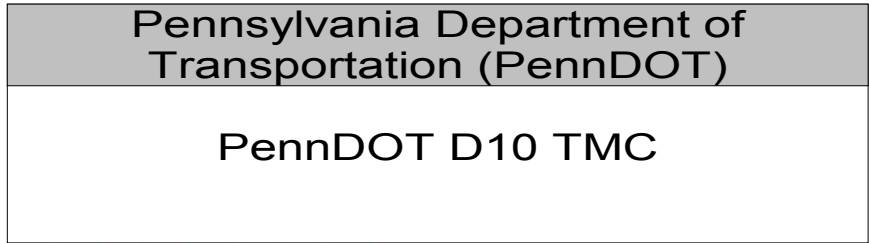


Existing  
Planned

Pennsylvania Department of Transportation (PennDOT)  
PennDOT D12 TMC

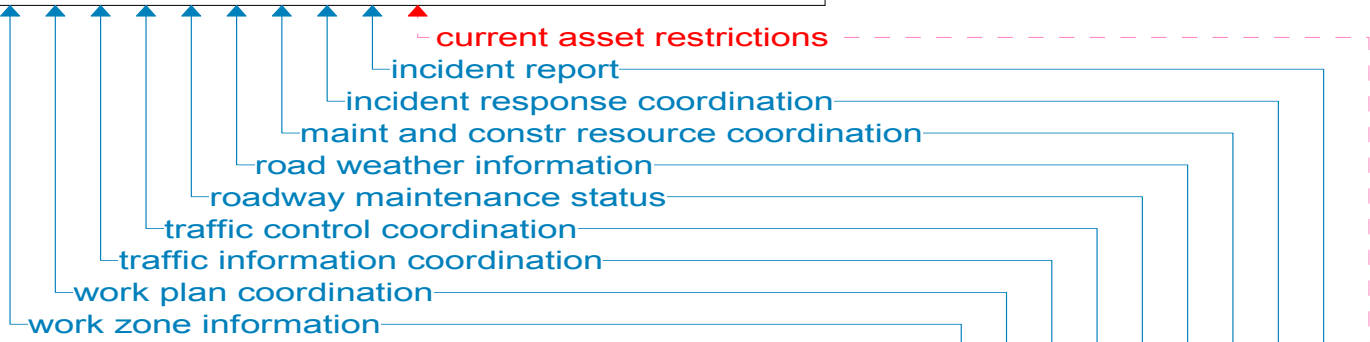


———— Existing  
- - - - - Planned



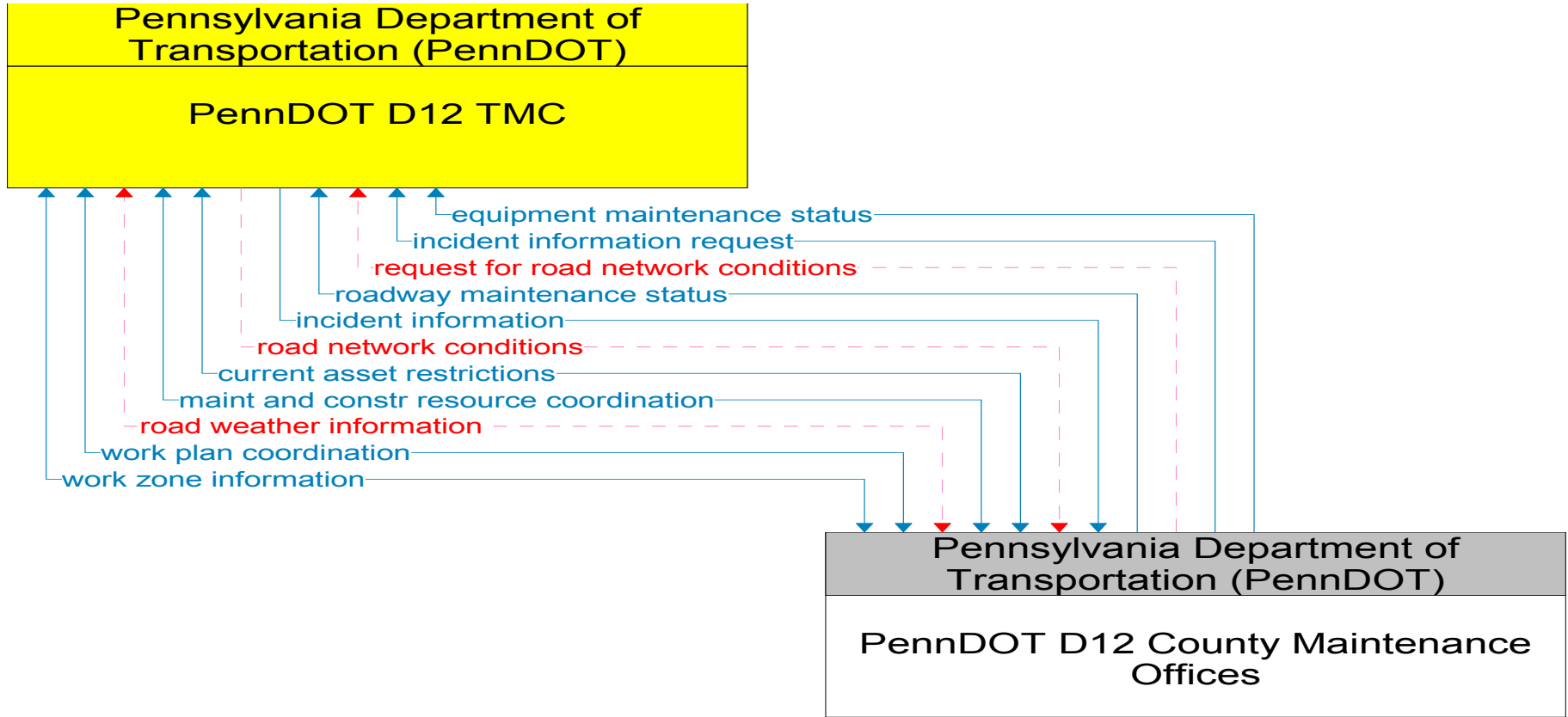
———— Existing  
- - - - - Planned

Pennsylvania Department of Transportation (PennDOT)  
PennDOT D11 RTMC

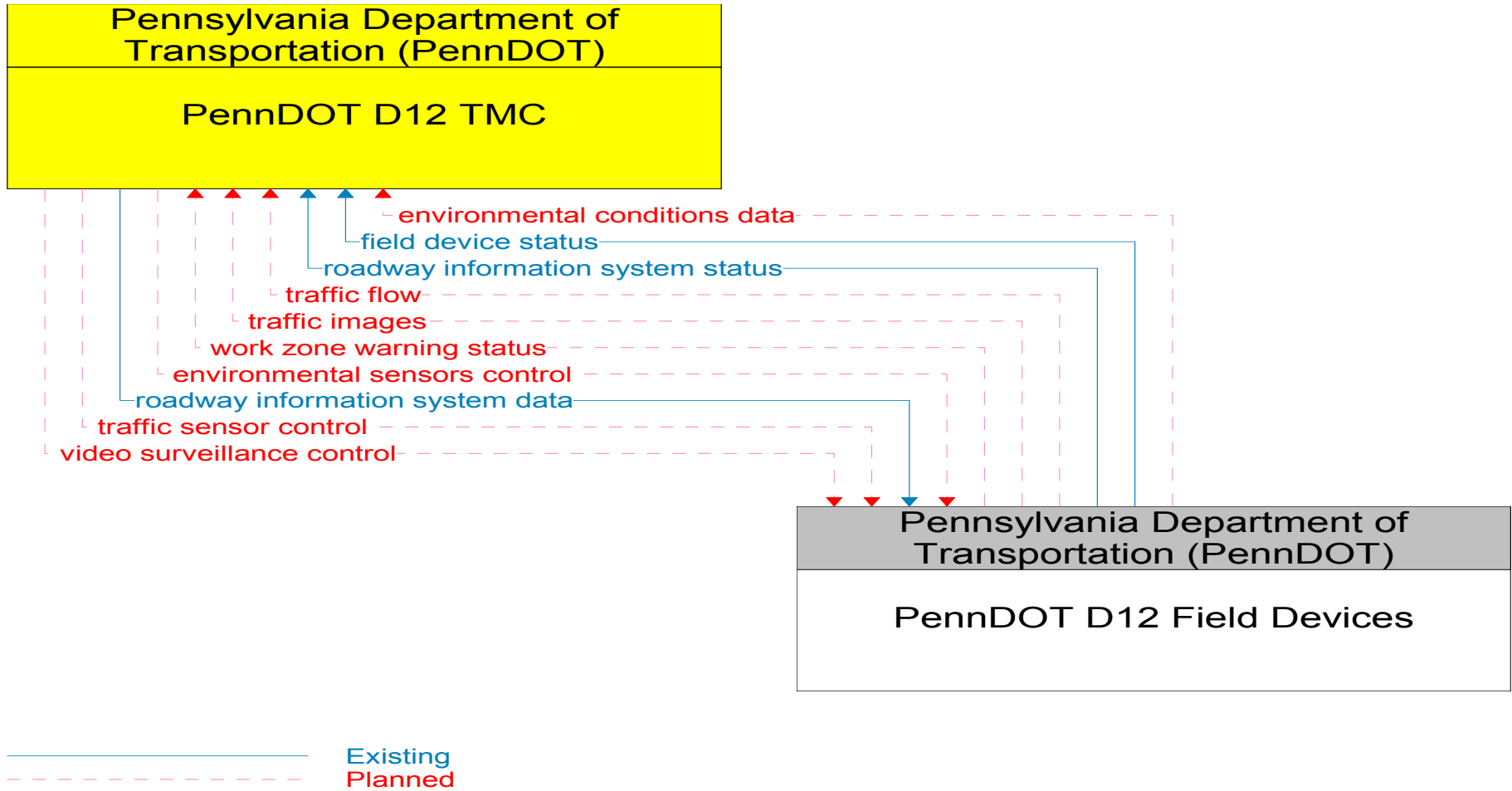


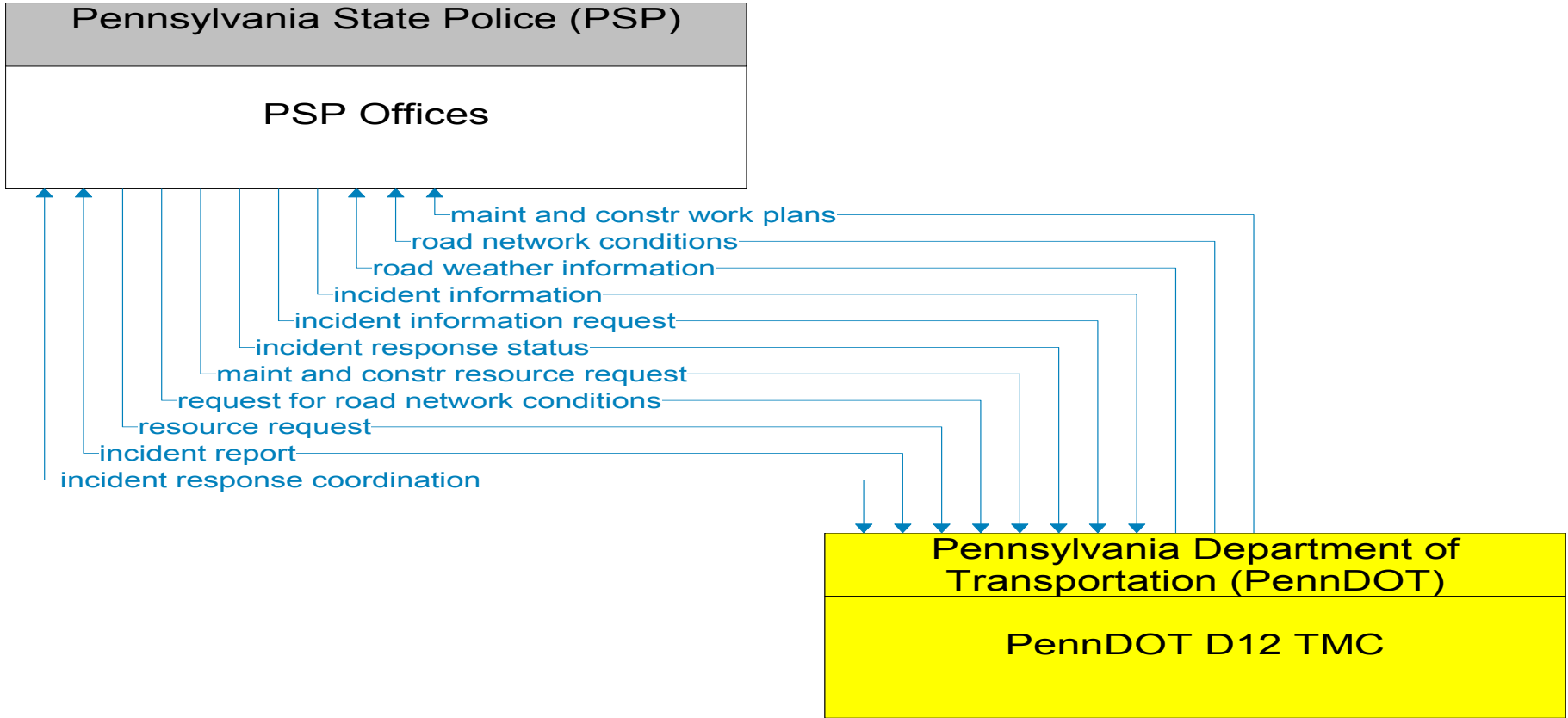
Pennsylvania Department of Transportation (PennDOT)  
PennDOT D12 TMC

———— Existing  
- - - - - Planned



———— Existing  
- - - - - Planned

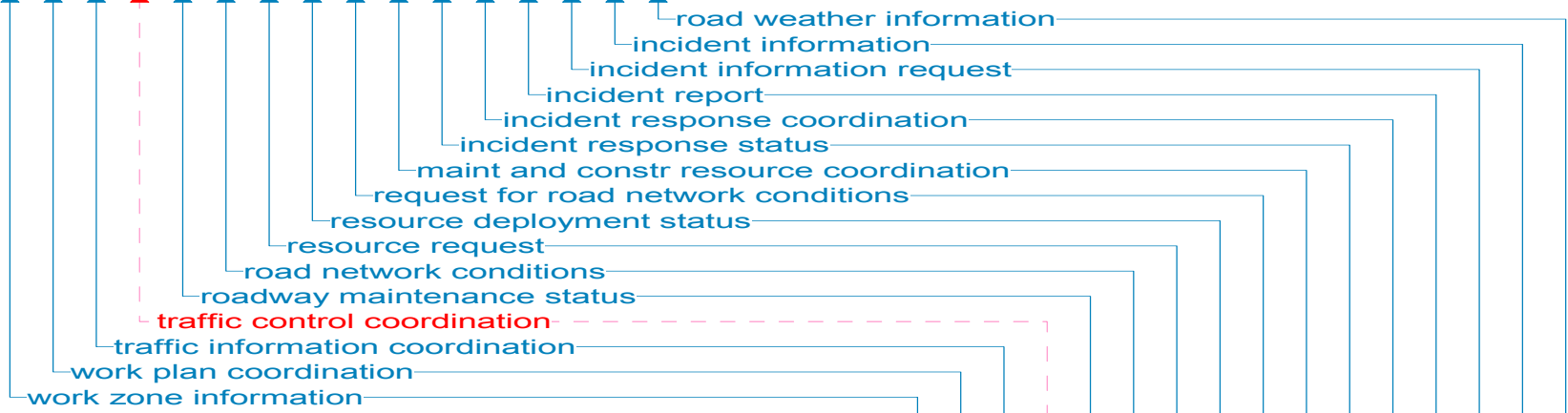




———— Existing  
- - - - - Planned

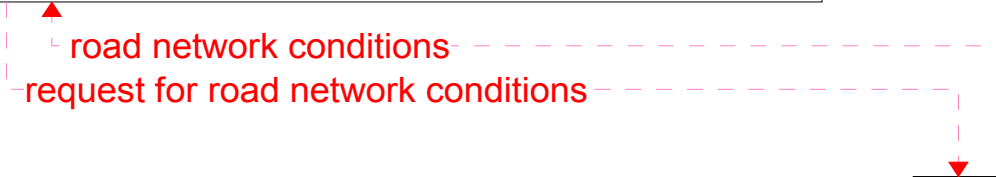
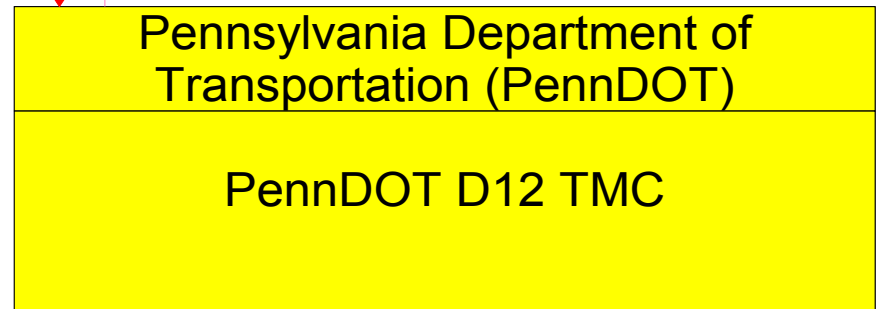
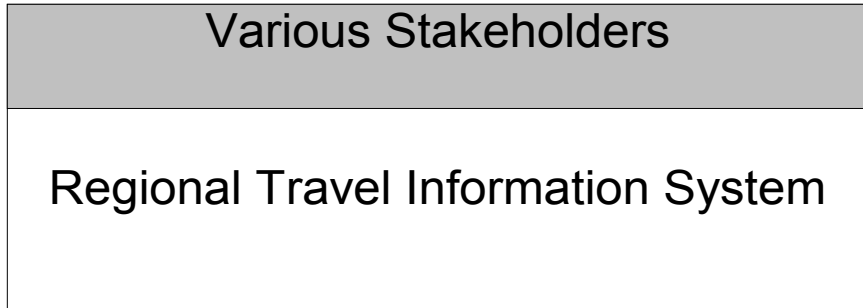
**Pennsylvania Turnpike Commission (PTC)**  
PTC Offices

**Pennsylvania Department of Transportation (PennDOT)**  
PennDOT D12 TMC

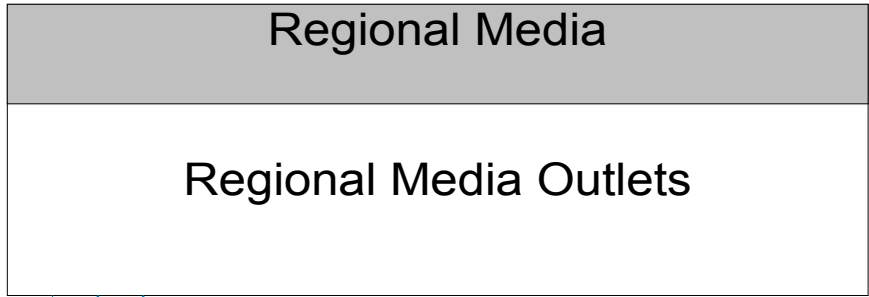


———— Existing  
- - - - - Planned

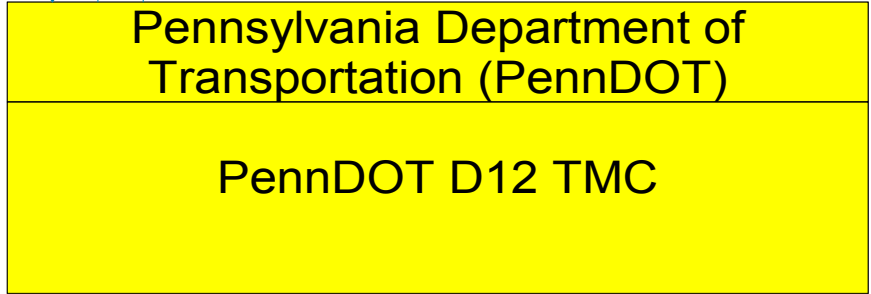




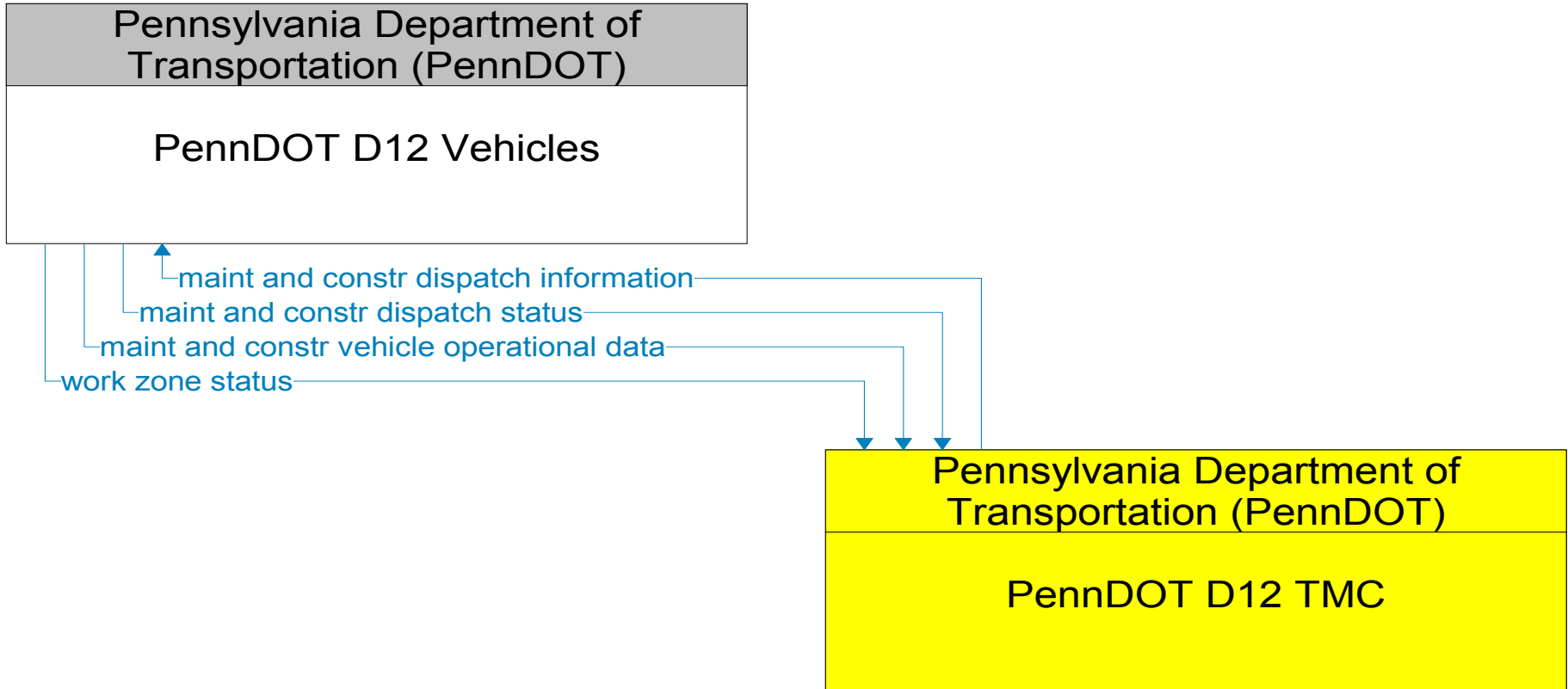
———— Existing  
- - - - - Planned



incident information for media  
road network conditions  
media information request

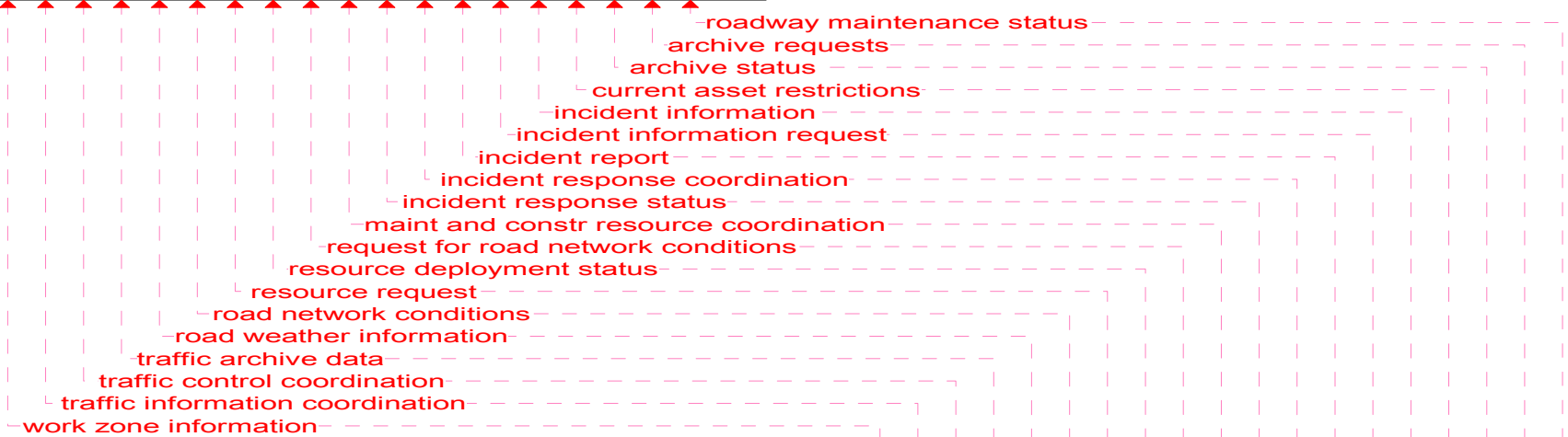


Existing  
Planned



———— Existing  
- - - - - Planned

Pennsylvania Department of Transportation  
(PennDOT)  
PennDOT STMC

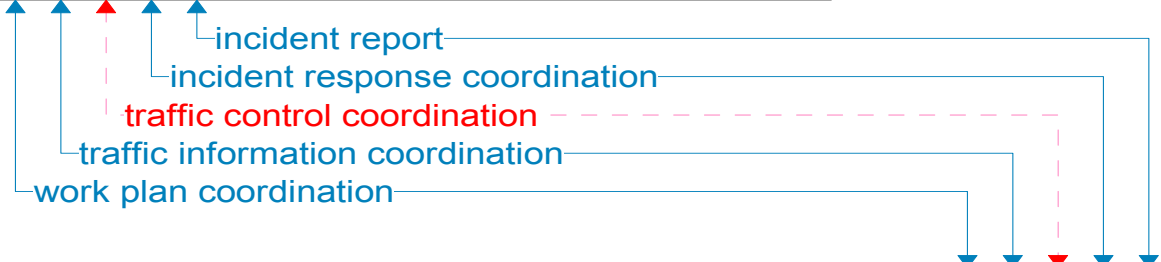


Pennsylvania Department of Transportation  
(PennDOT)  
PennDOT D12 TMC

———— Existing  
- - - - - Planned

Pennsylvania Department of  
Transportation (PennDOT)

Adjacent PennDOT District and County  
Offices

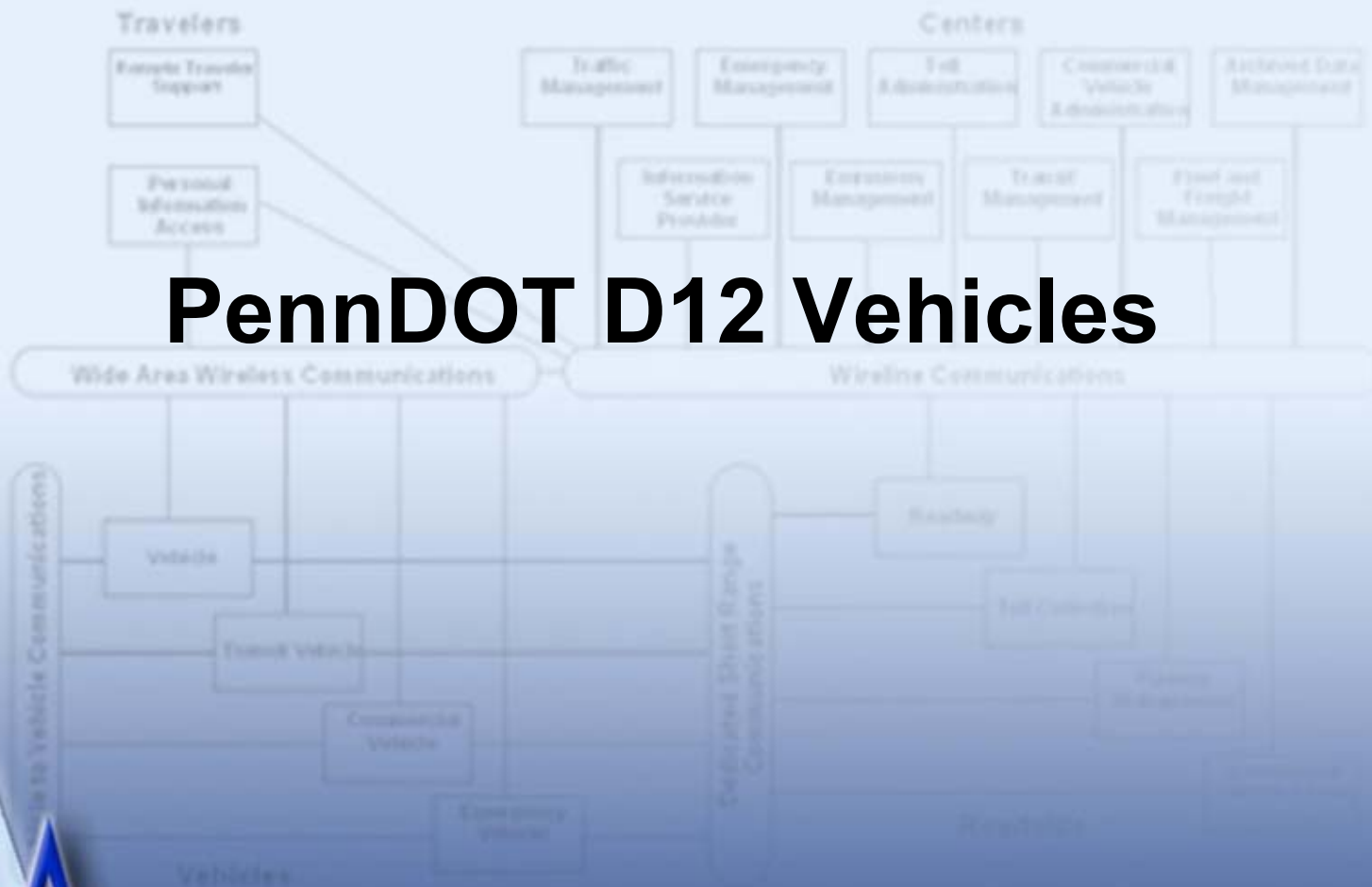


Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D12 TMC

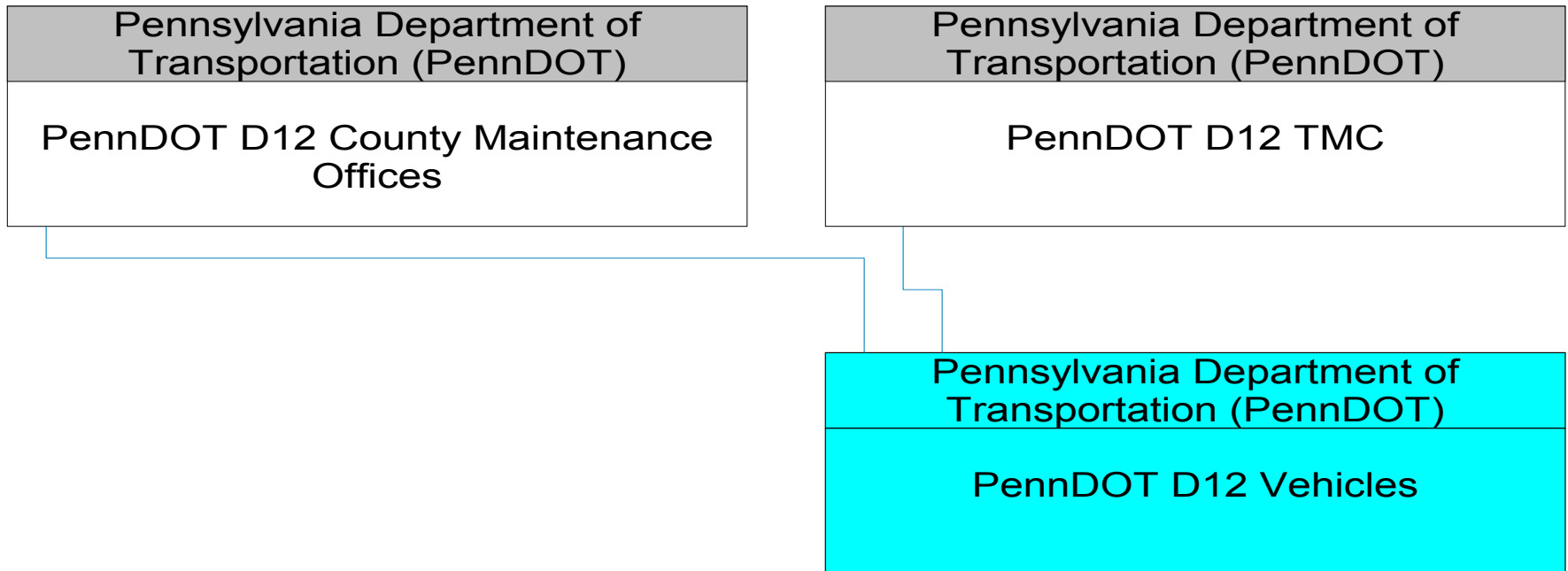
Existing  
Planned

# PennDOT D12 Vehicles

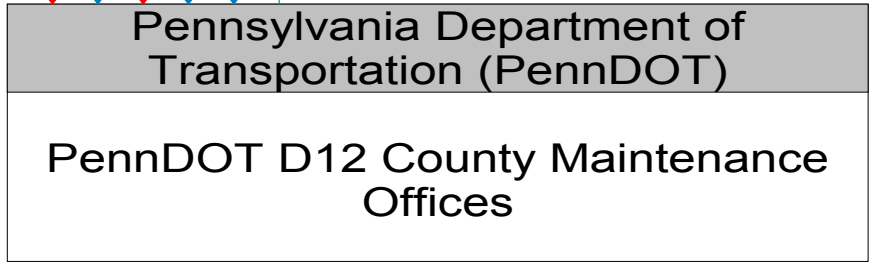
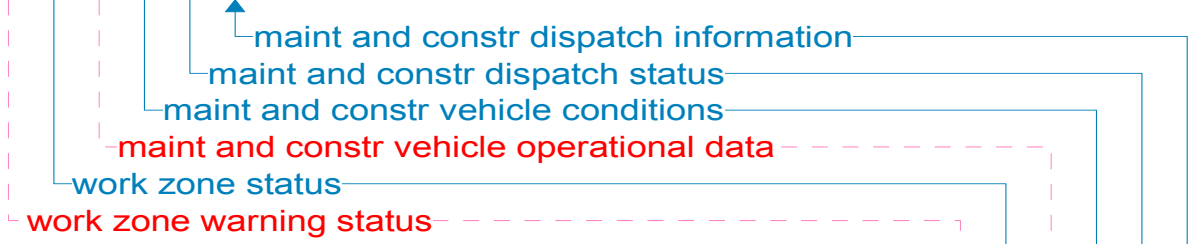
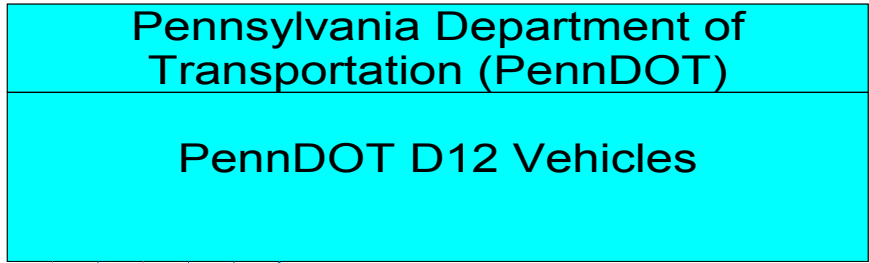


PA

# PennDOT D12 Vehicles Interconnect Diagram

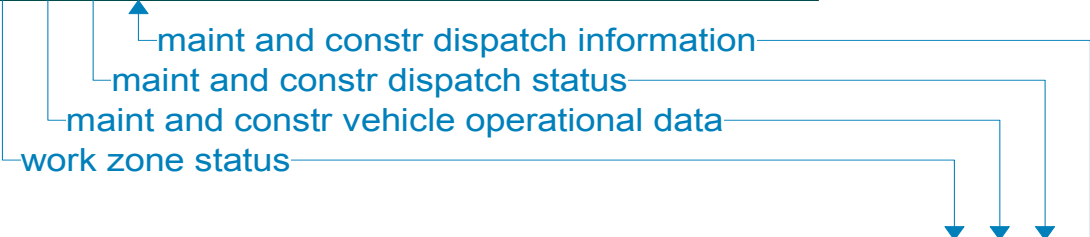
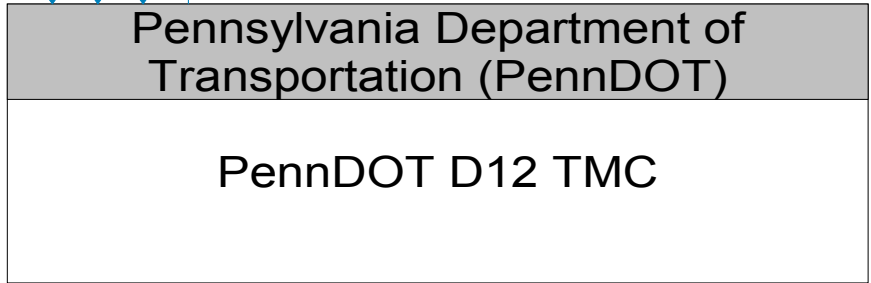
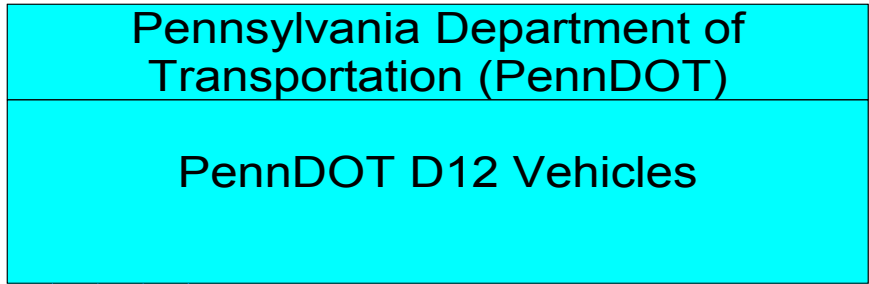


———— Existing  
----- Planned



Existing  
Planned

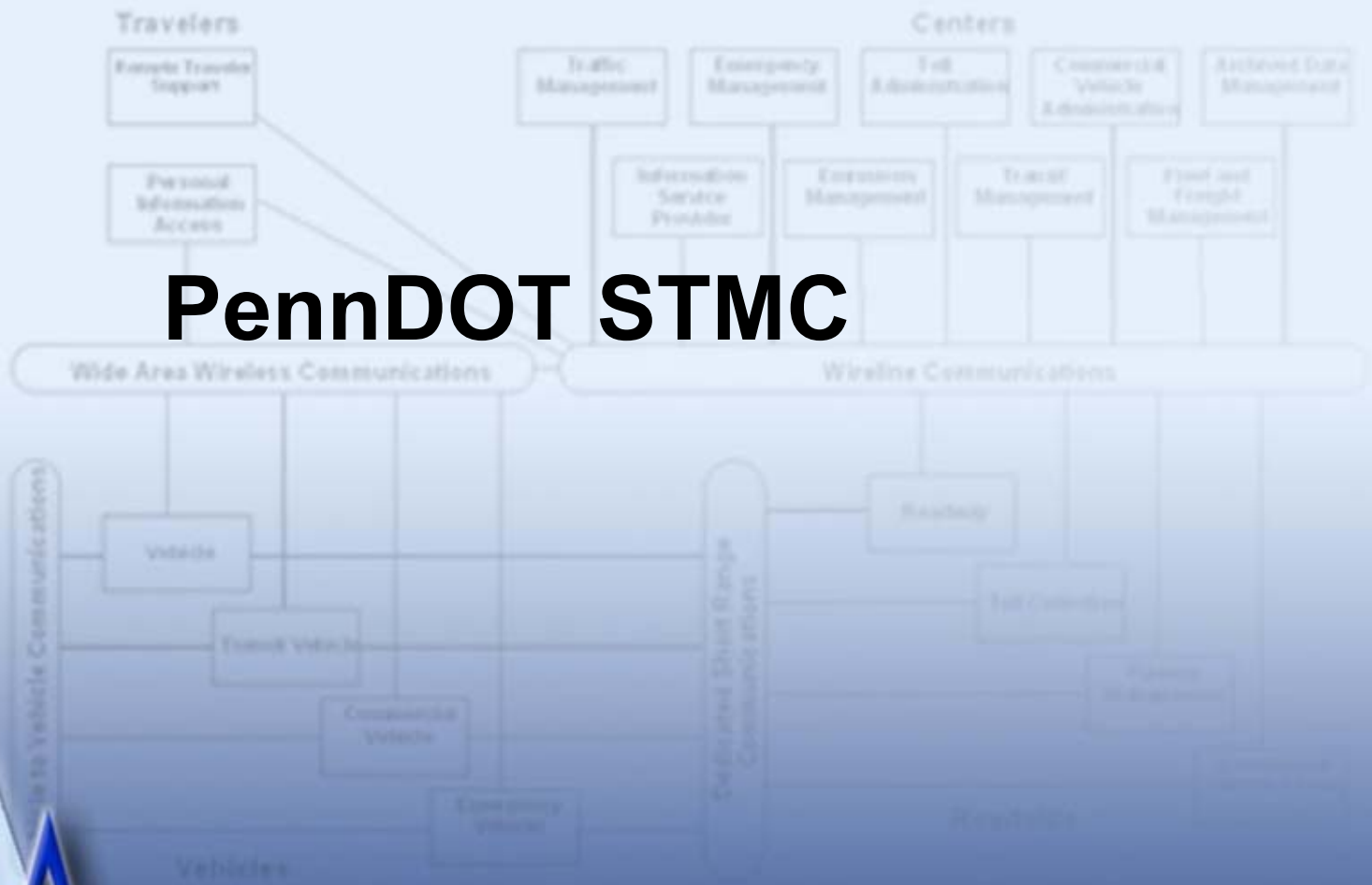




———— Existing

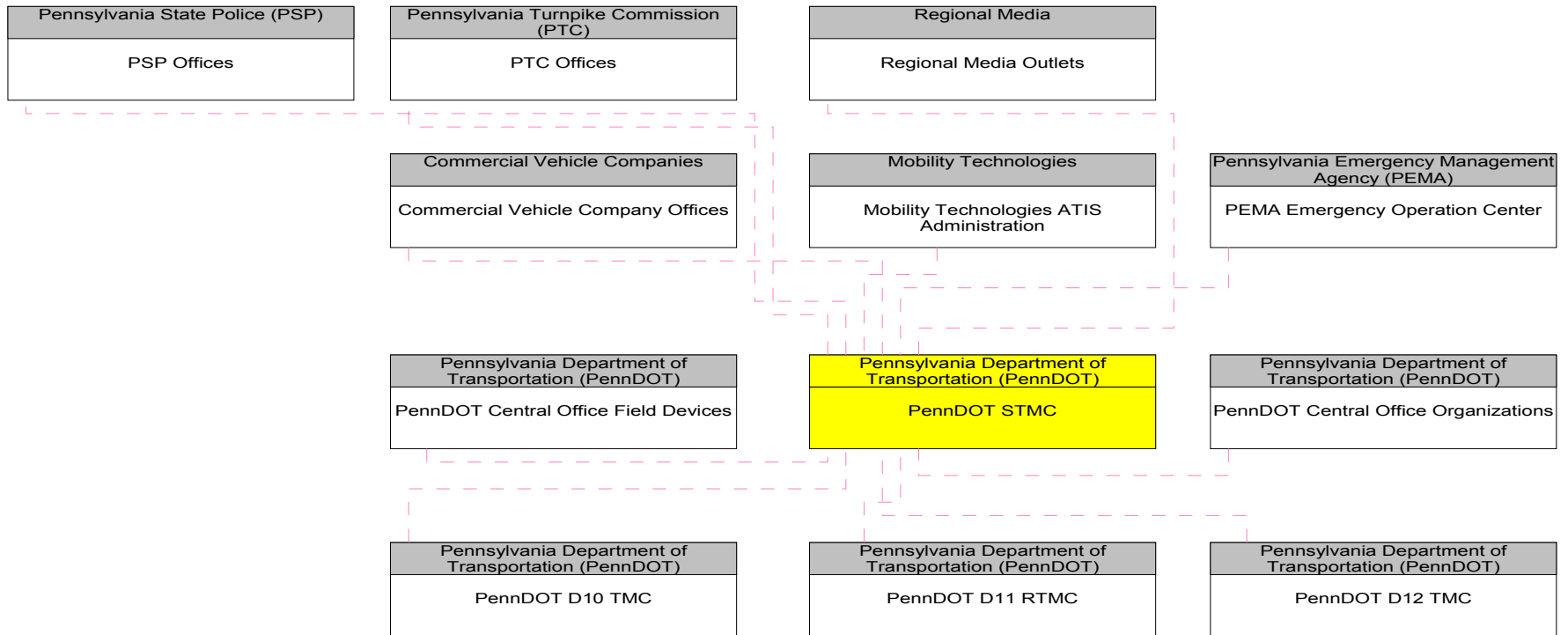
- - - - - Planned

# PennDOT STMC

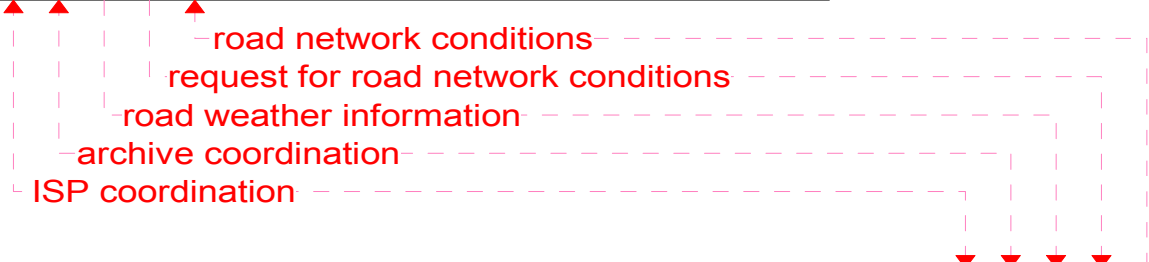
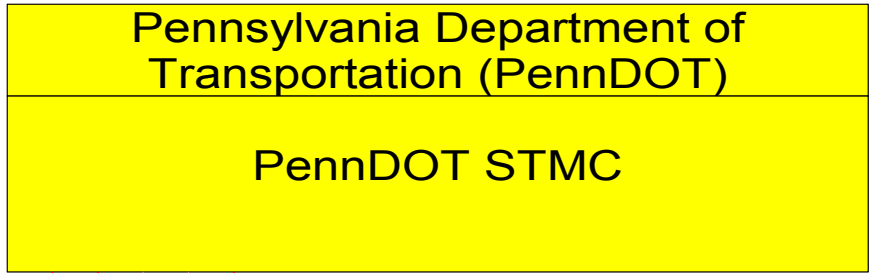


PA

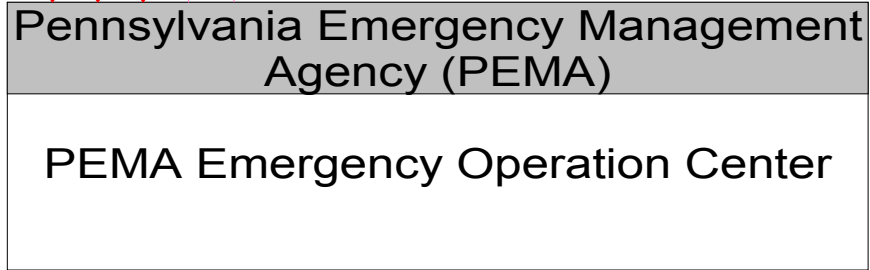
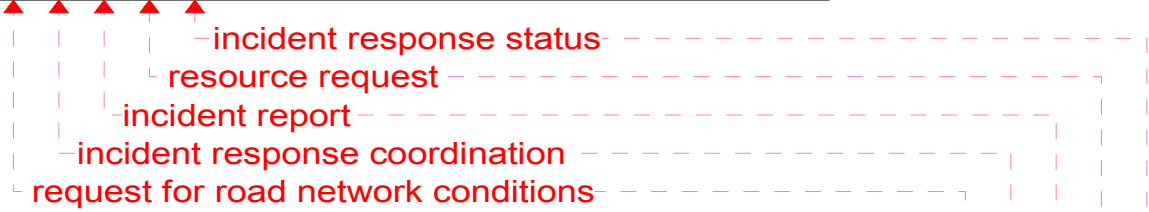
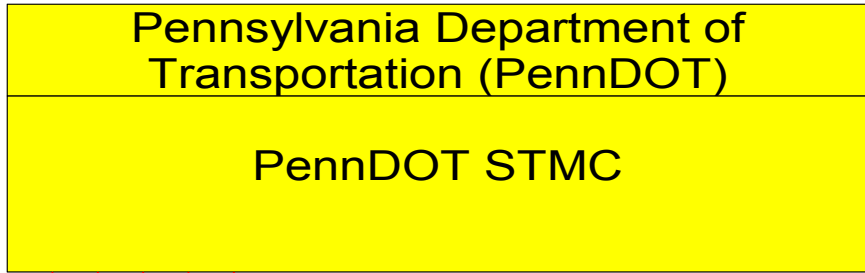
# PennDOT STMC Interconnect Diagram



— Existing  
- - - Planned



———— Existing  
- - - - - Planned

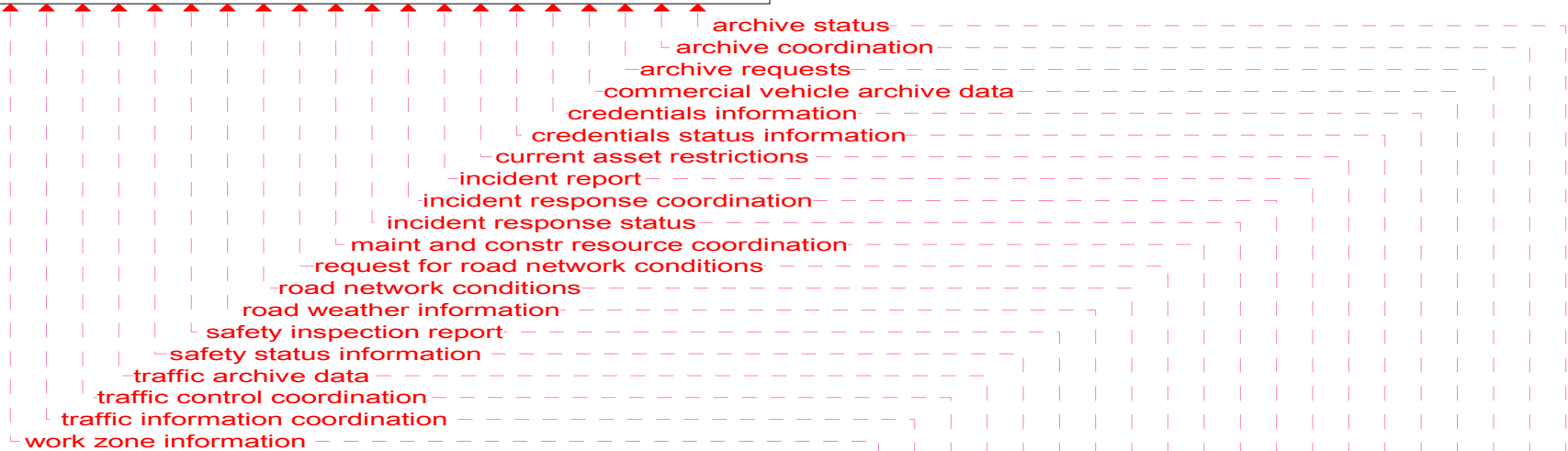


———— Existing  
- - - - - Planned



**Pennsylvania Department of Transportation  
(PennDOT)**

**PennDOT Central Office Organizations**



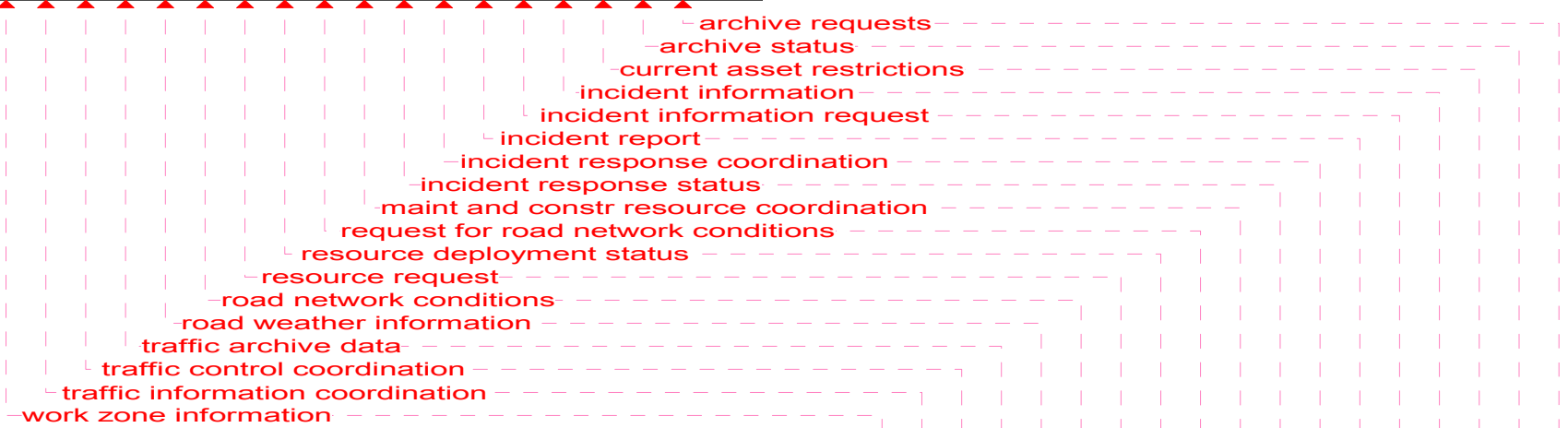
**Pennsylvania Department of Transportation  
(PennDOT)**

**PennDOT STMC**

———— Existing  
 - - - - - Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D10 TMC

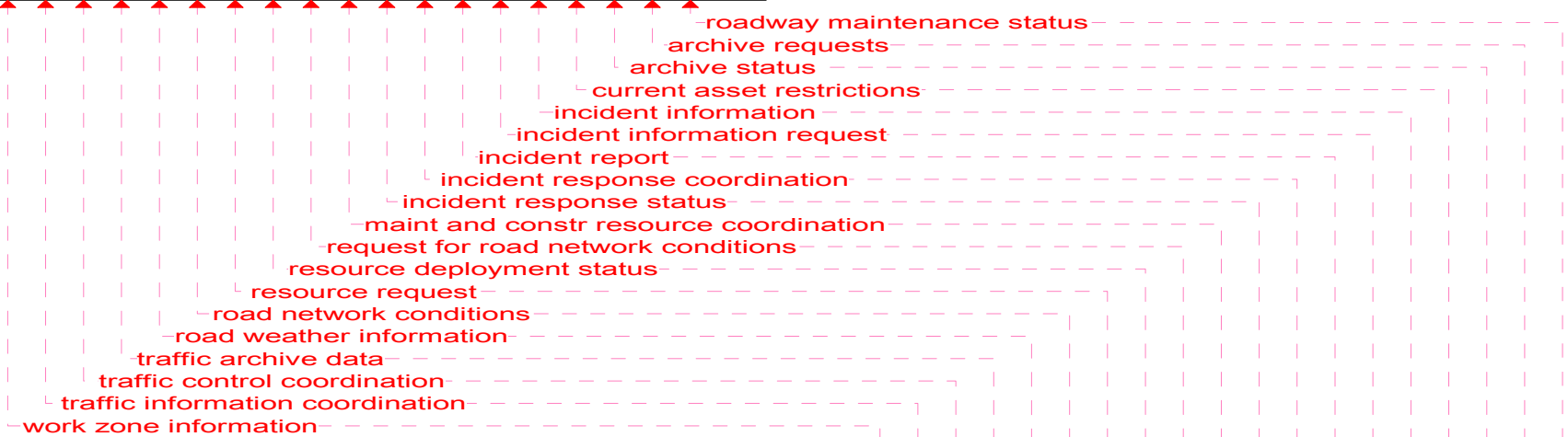


Pennsylvania Department of  
Transportation (PennDOT)

PennDOT STMC

Existing  
Planned

Pennsylvania Department of Transportation  
(PennDOT)  
PennDOT STMC



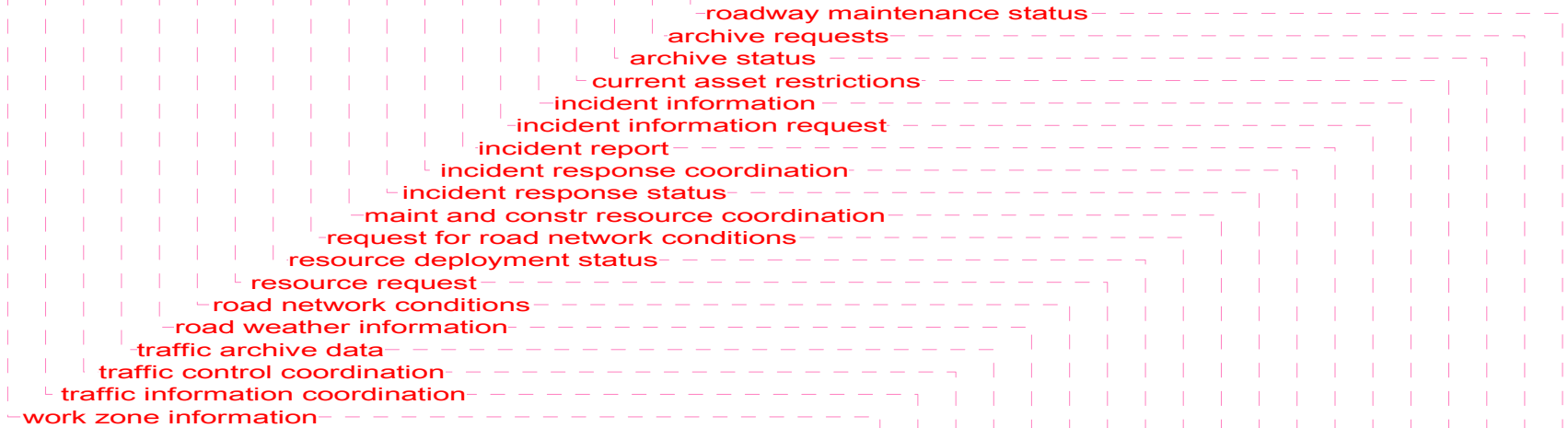
Pennsylvania Department of Transportation  
(PennDOT)  
PennDOT D11 RTMC

Existing  
Planned



**Pennsylvania Department of Transportation  
(PennDOT)**

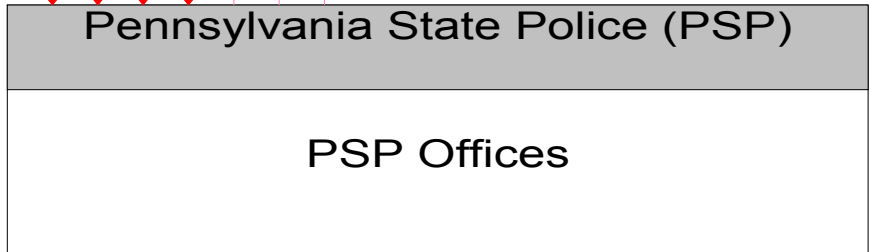
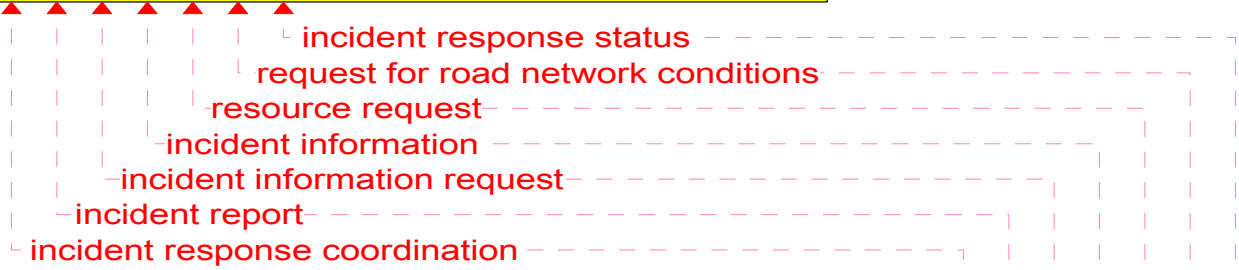
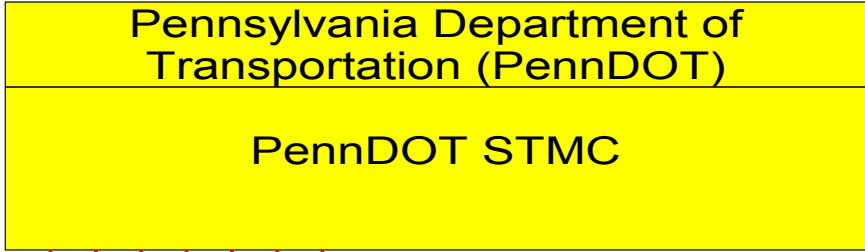
**PennDOT STMC**



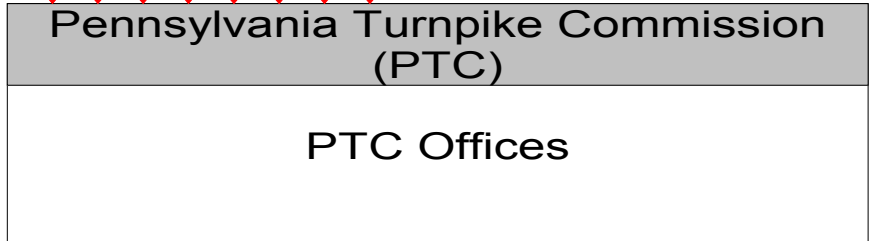
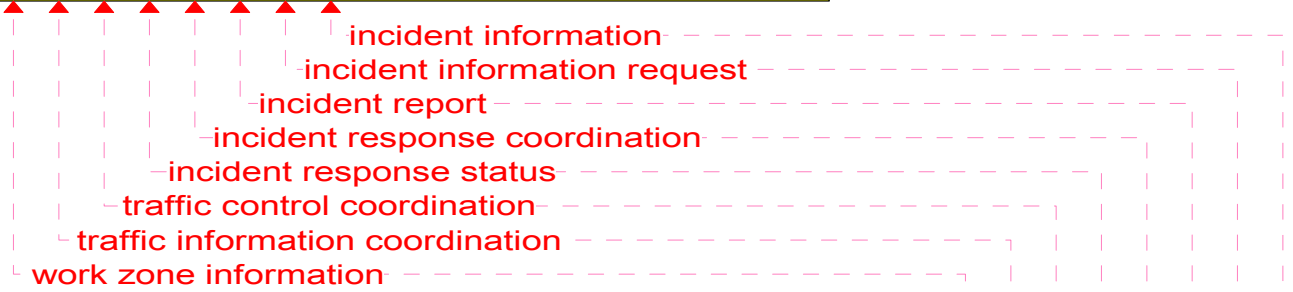
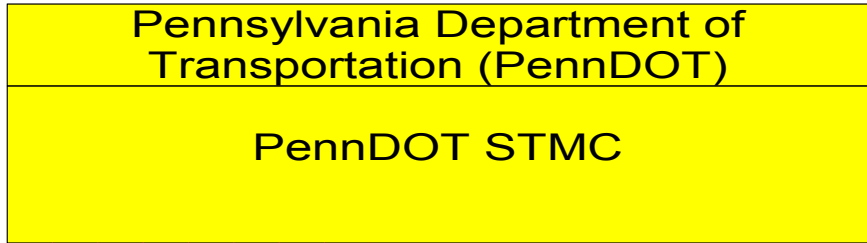
**Pennsylvania Department of Transportation  
(PennDOT)**

**PennDOT D12 TMC**

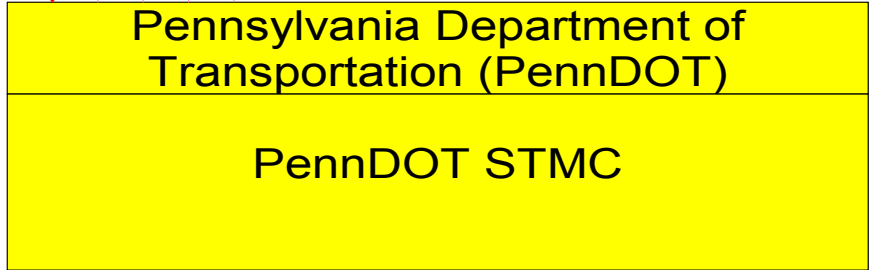
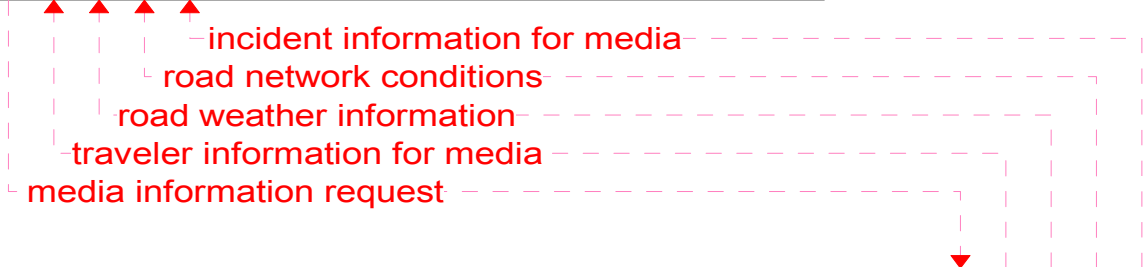
———— Existing  
- - - - - Planned



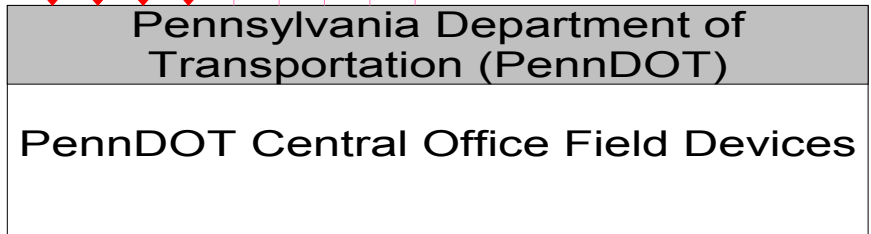
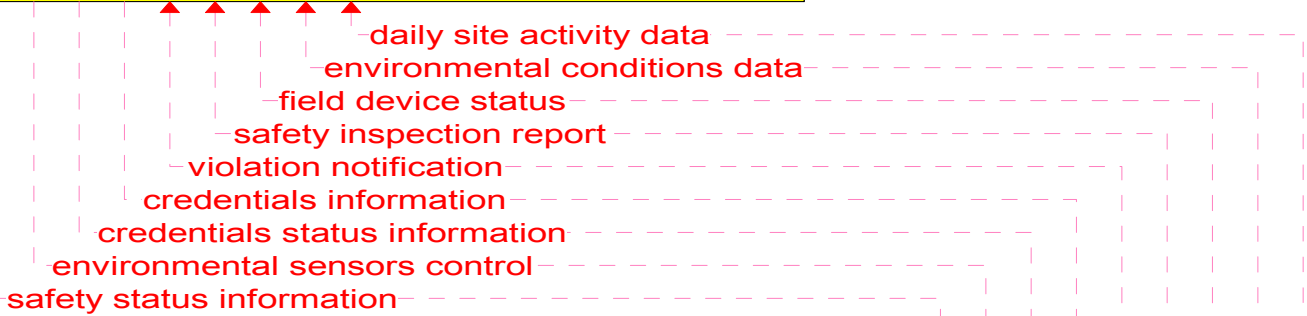
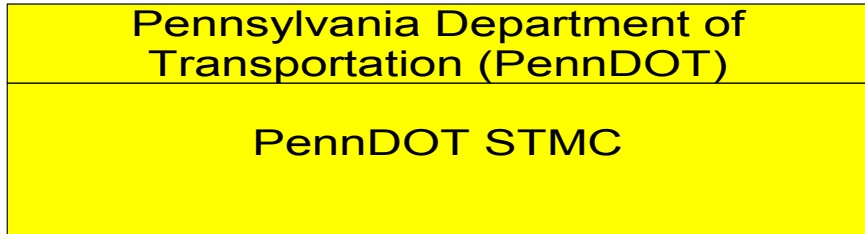
Existing  
Planned



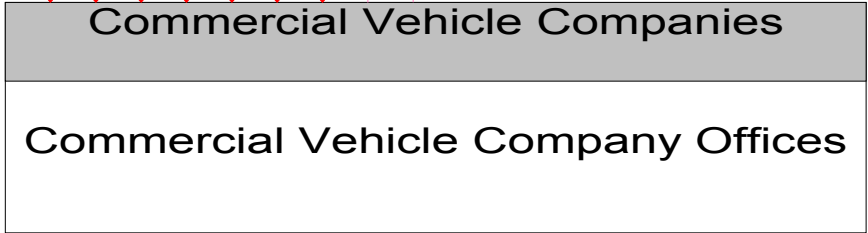
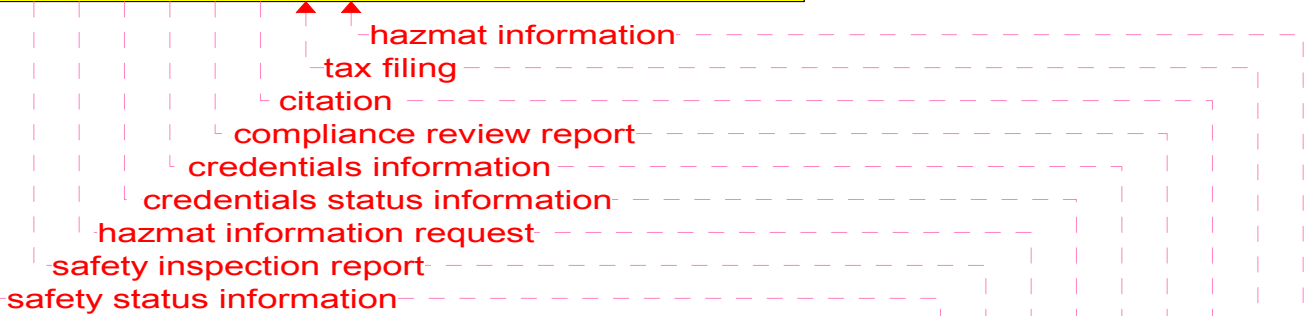
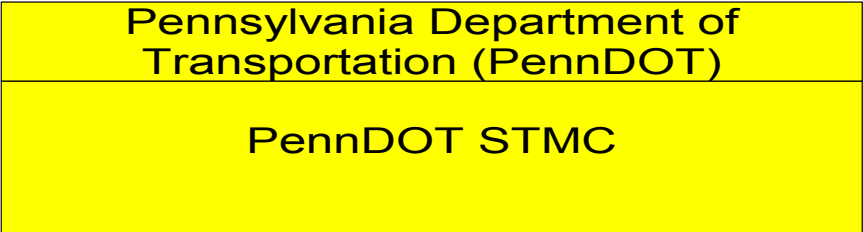
———— Existing  
- - - - - Planned



———— Existing  
- - - - - Planned



———— Existing  
- - - - - Planned



———— Existing  
- - - - - Planned

# Pennsylvania Office of Homeland Security



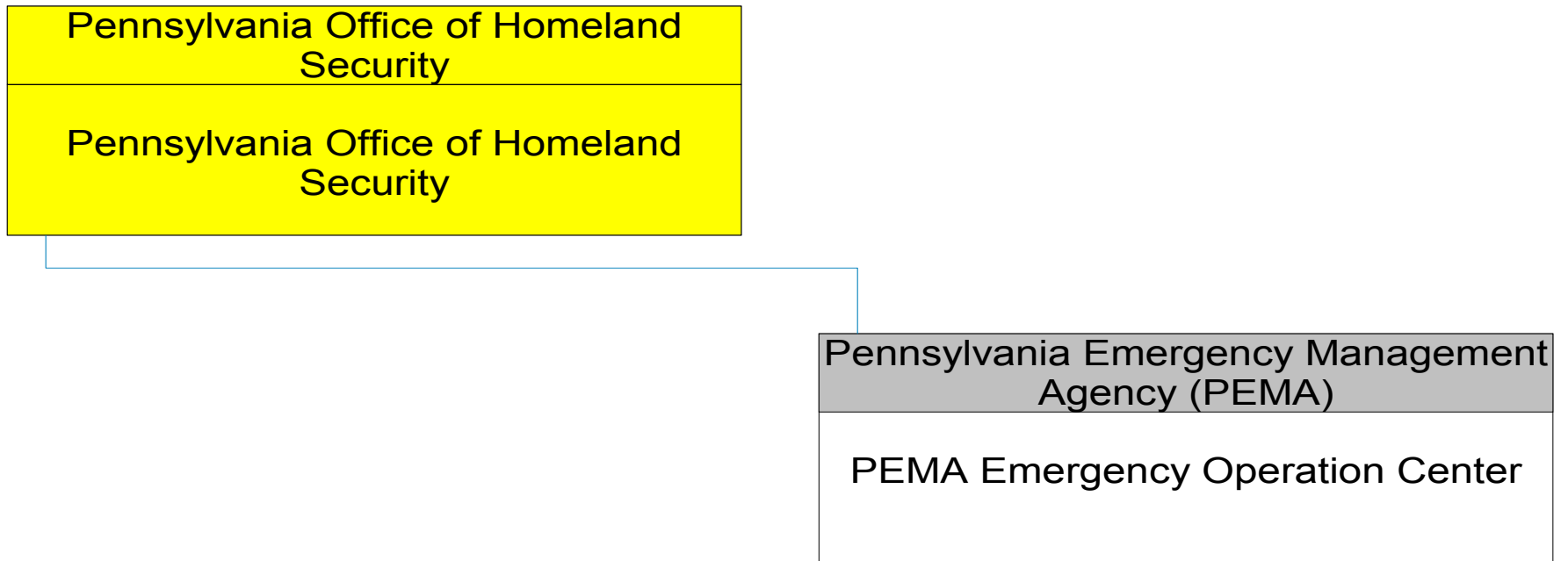
PA

680

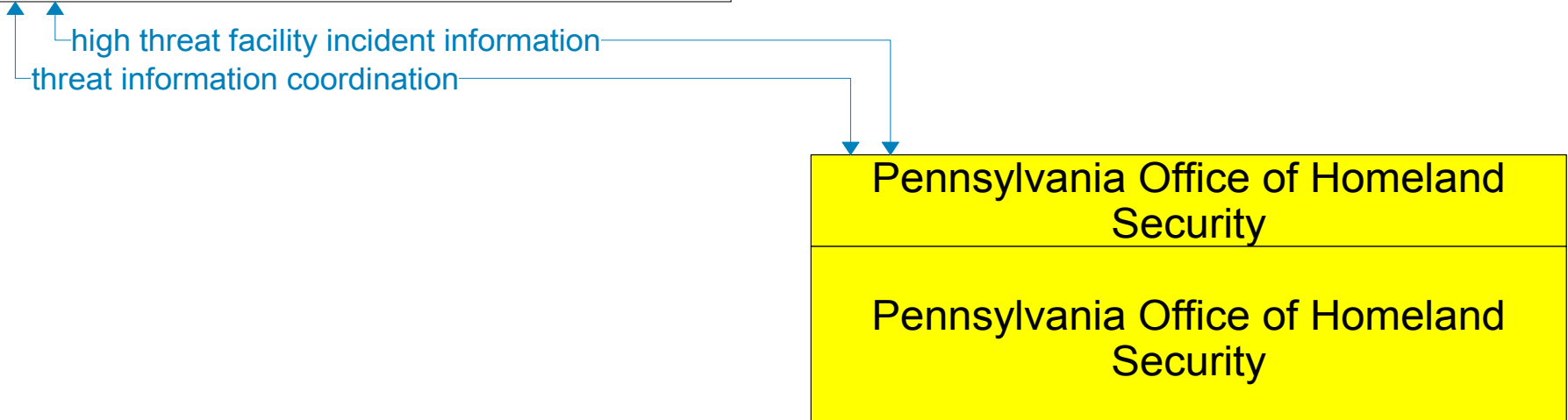
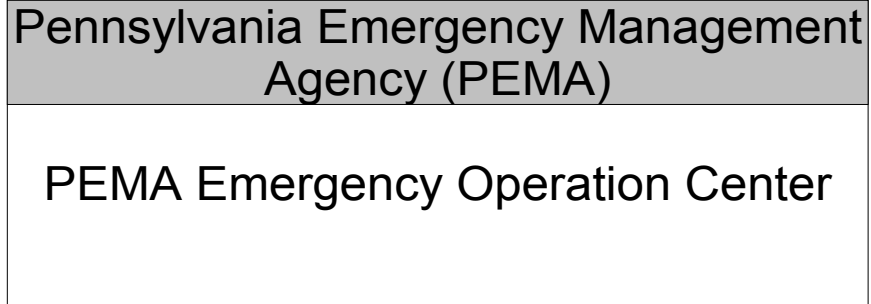
architecture



# Pennsylvania Office of Homeland Security Interconnect Diagram

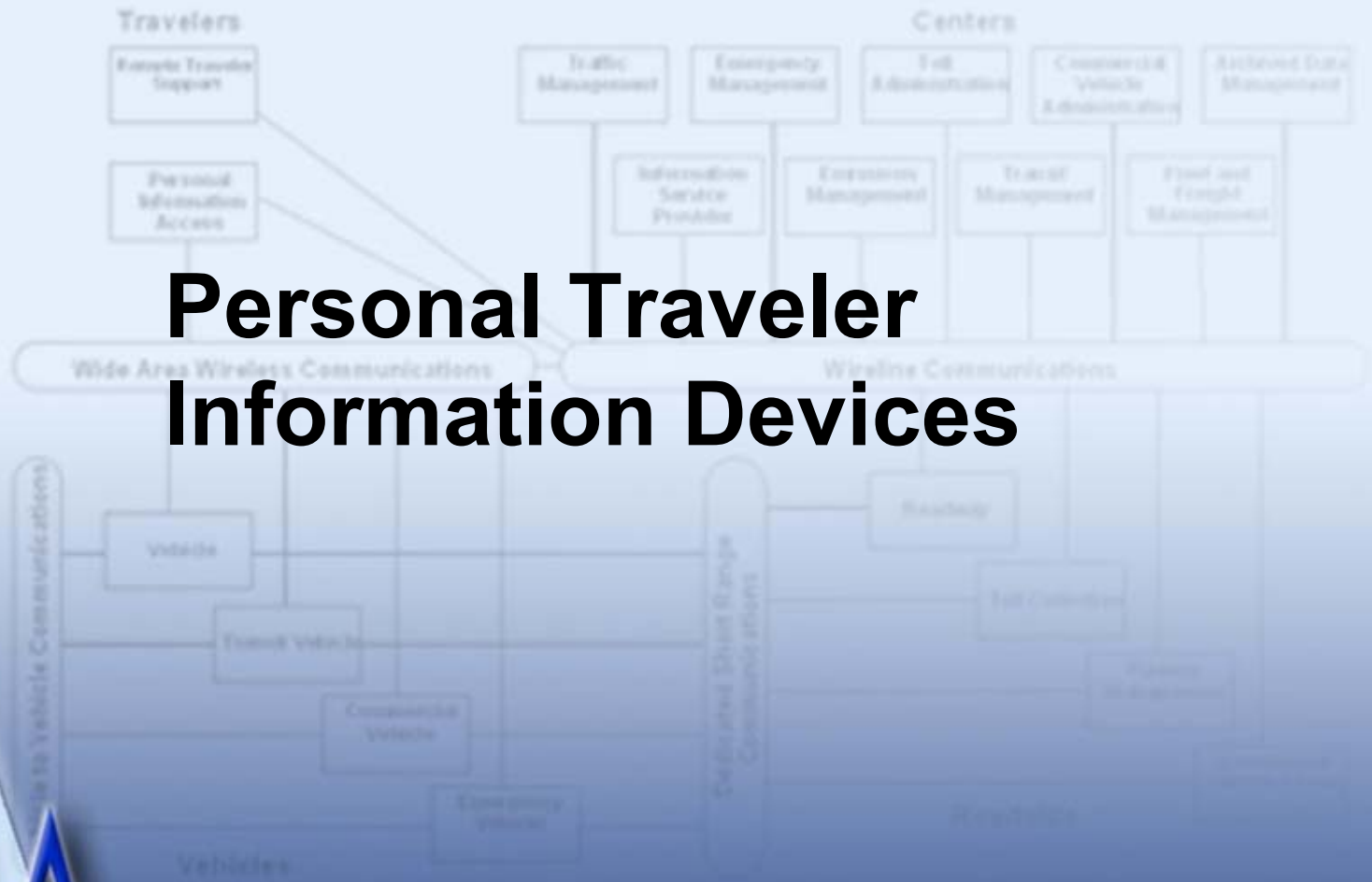






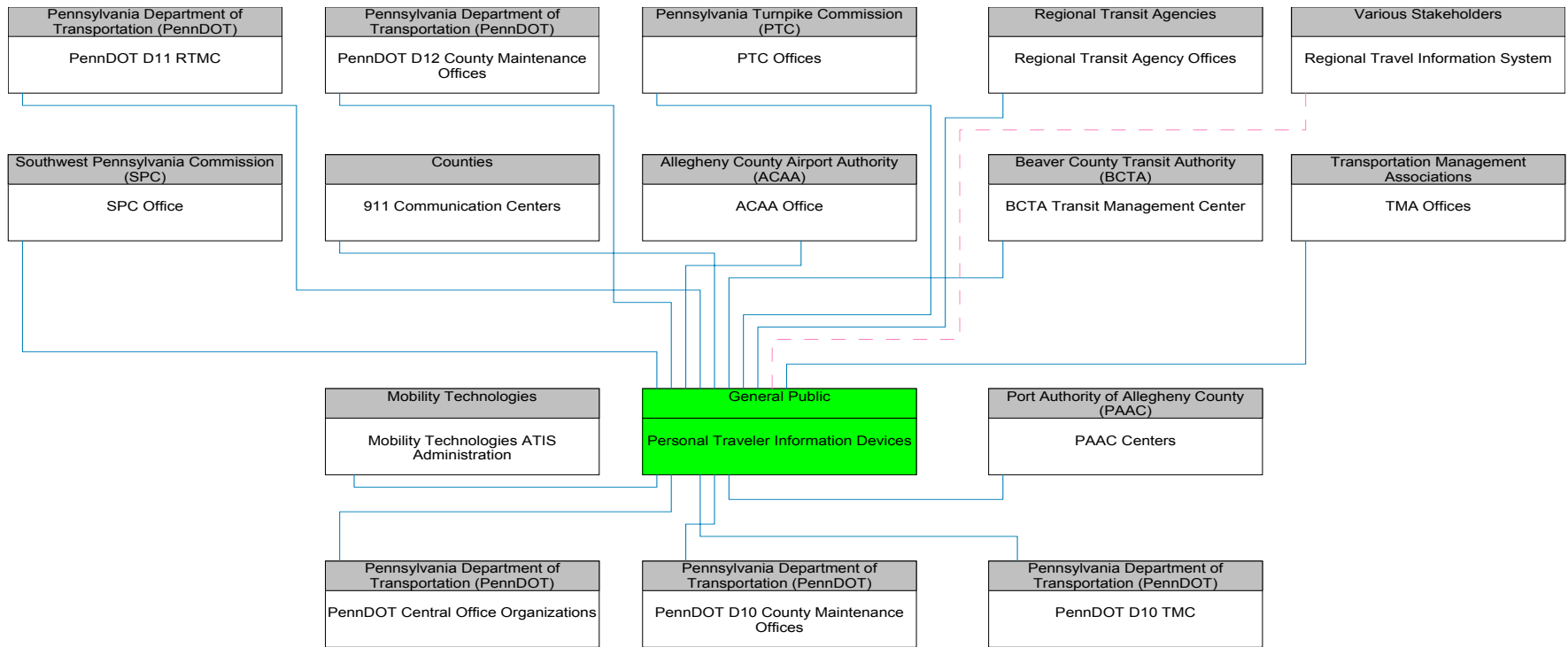
———— Existing  
----- Planned

# Personal Traveler Information Devices

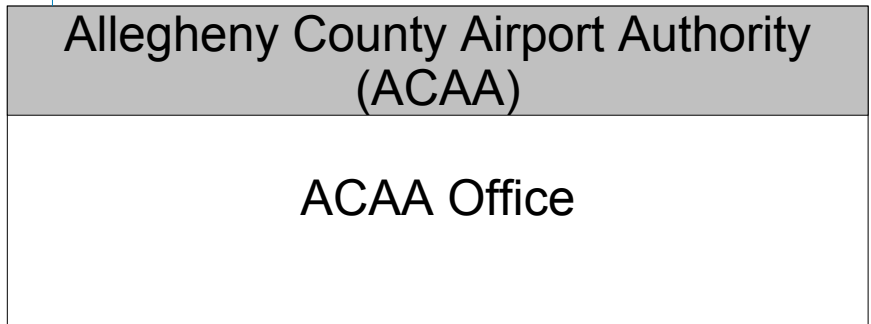
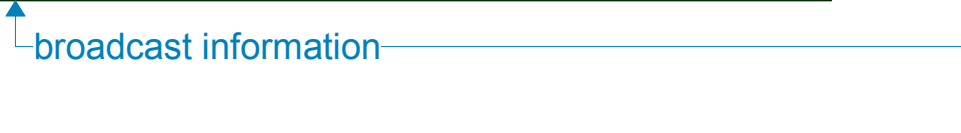
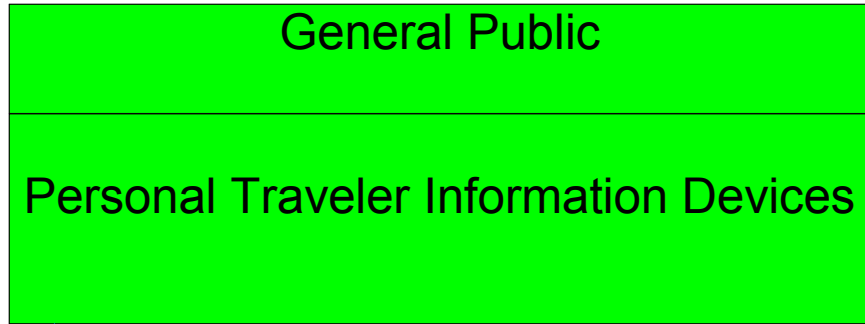


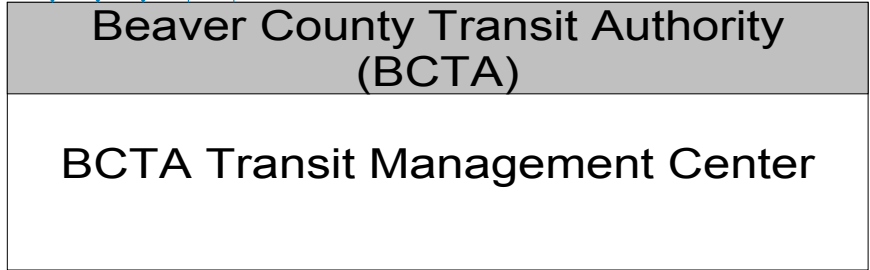
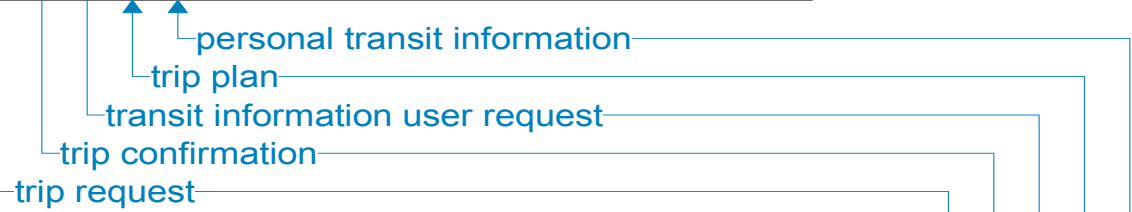
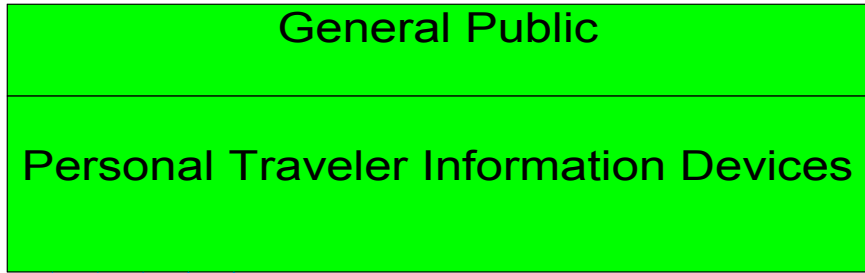
**PA**

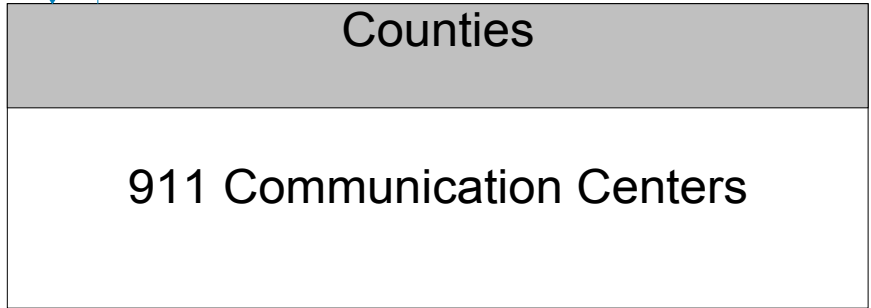
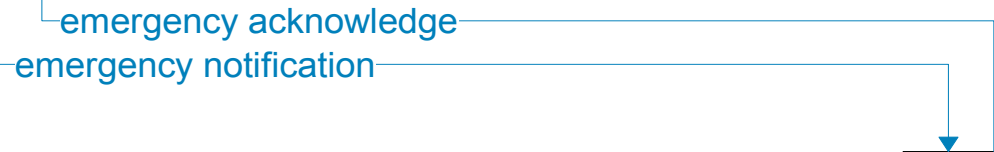
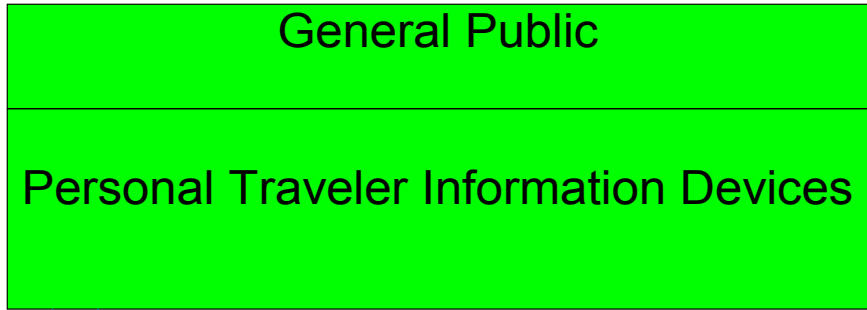
# Personal Traveler Information Devices Interconnect Diagram



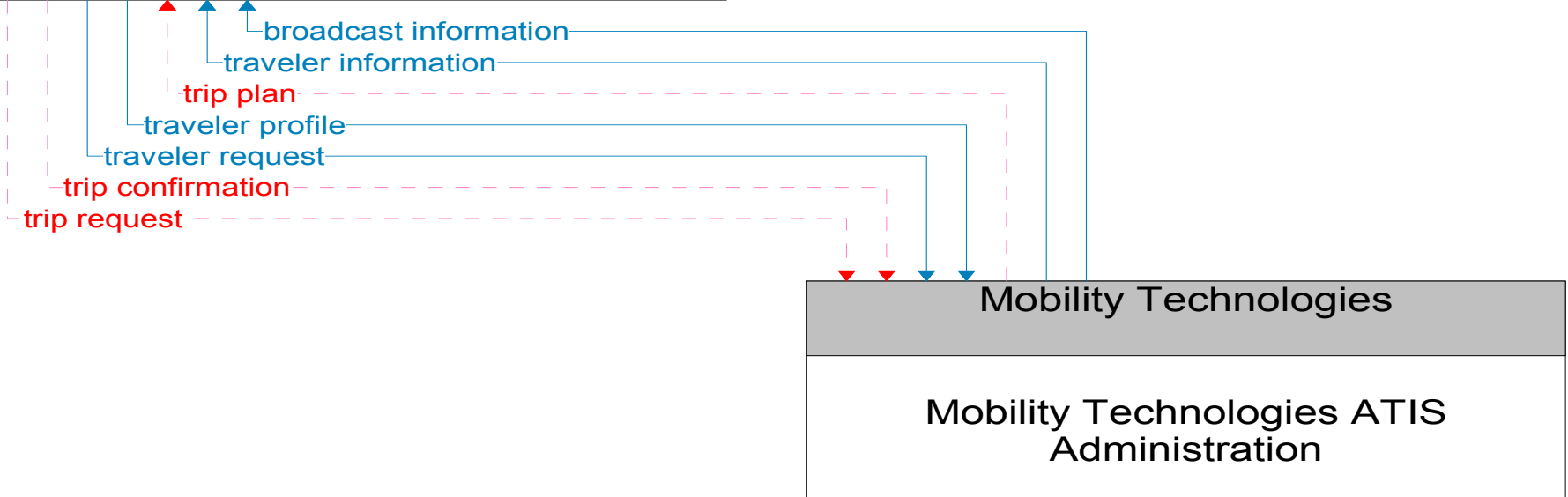
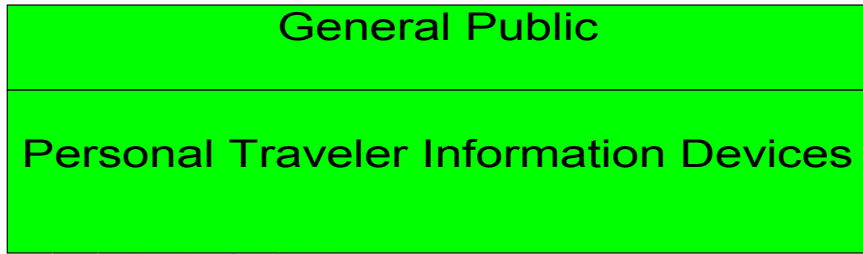
— Existing  
- - - Planned

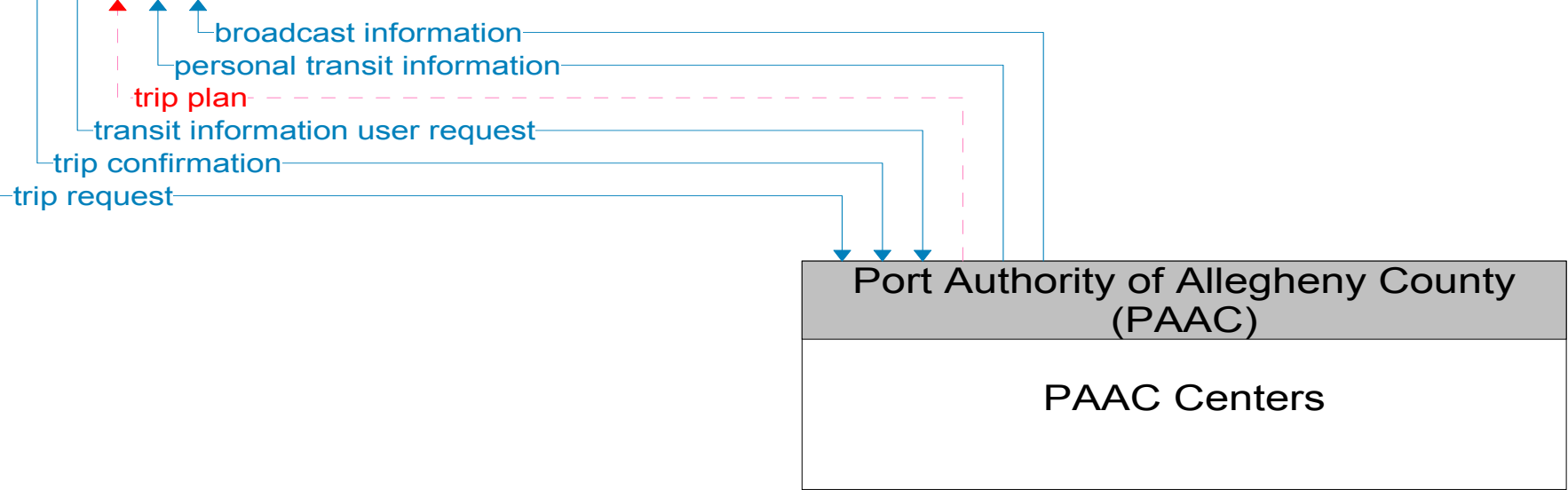
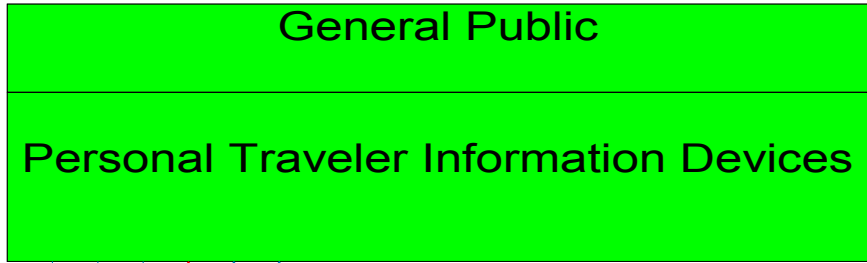






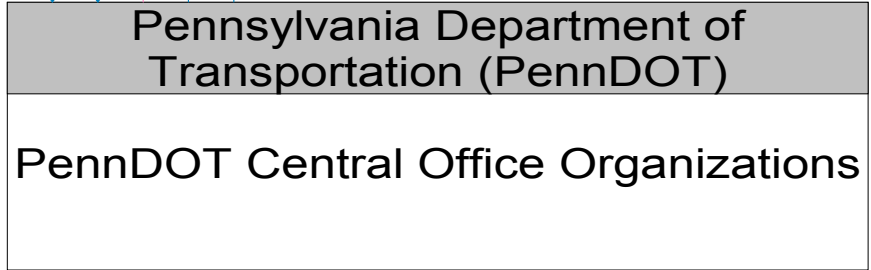
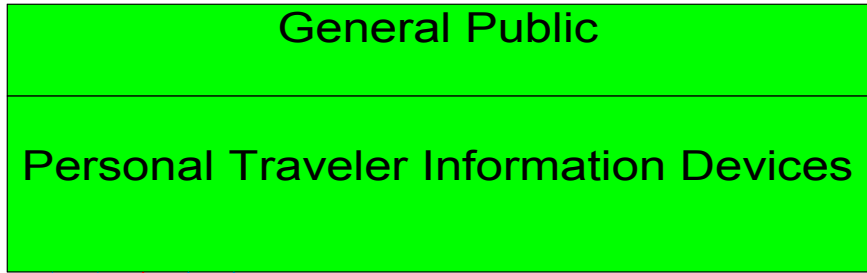
———— Existing  
----- Planned



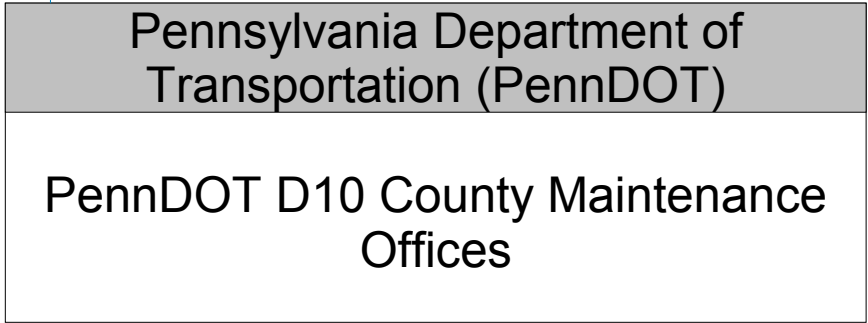
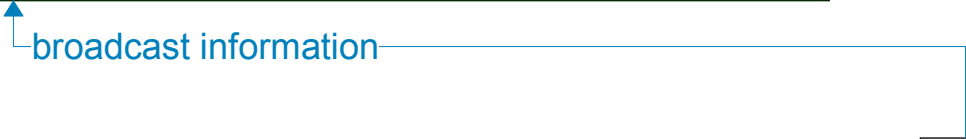
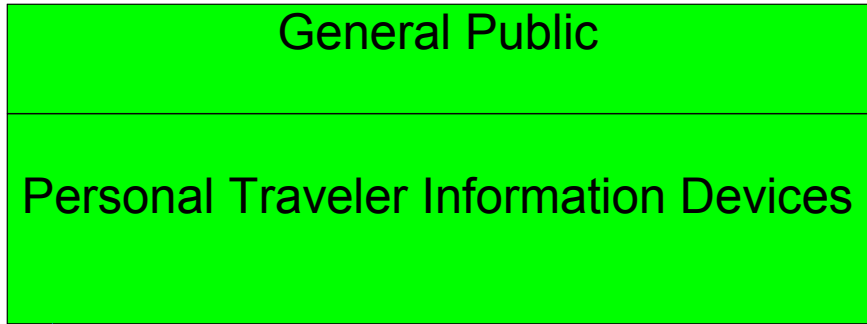


Existing  
Planned

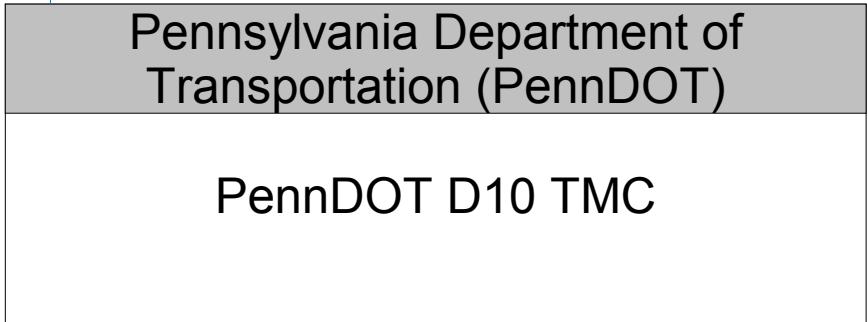
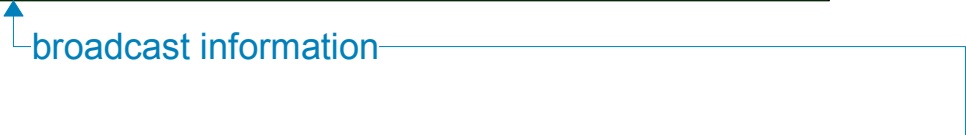
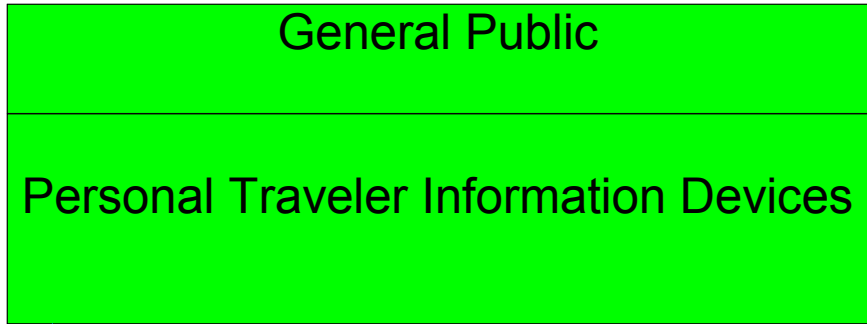


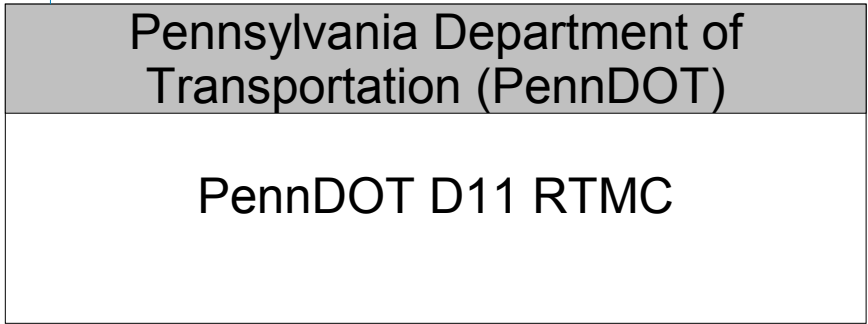
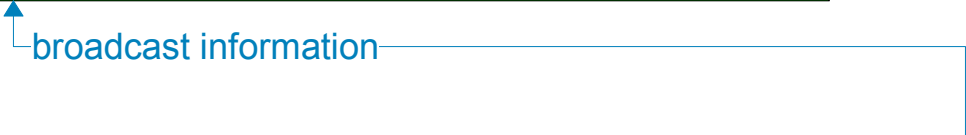
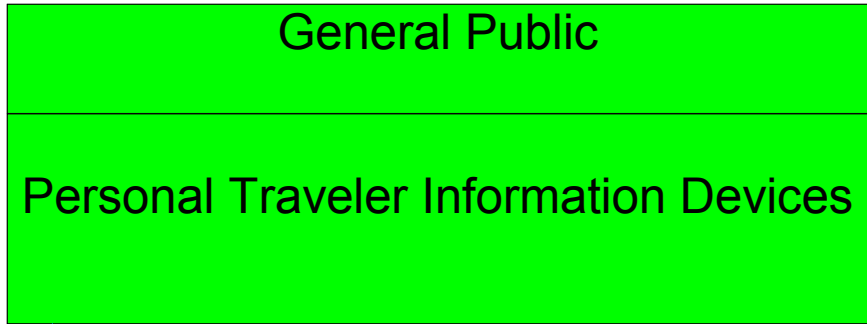


———— Existing  
- - - - - Planned

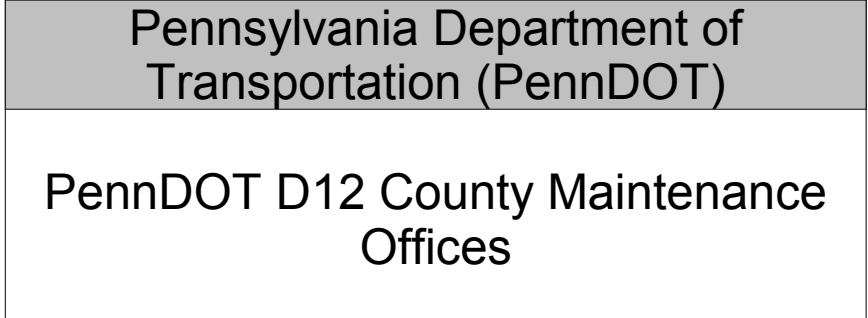
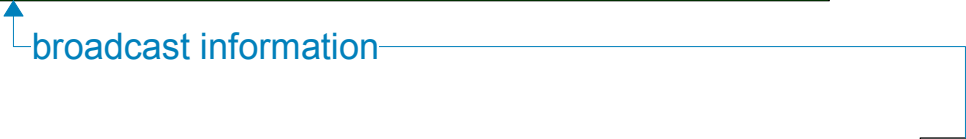
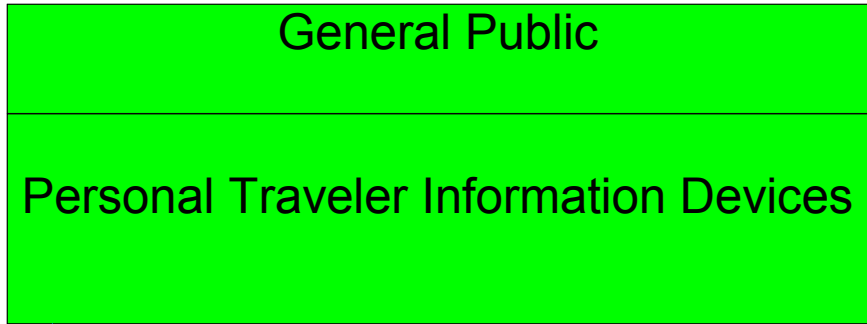


———— Existing  
- - - - - Planned

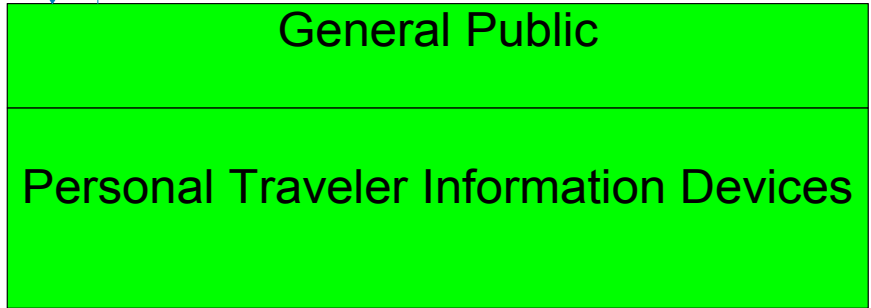
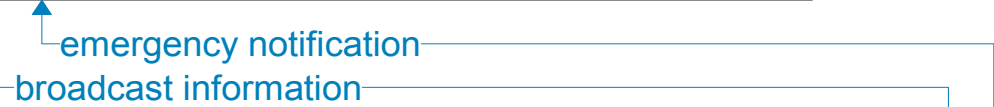
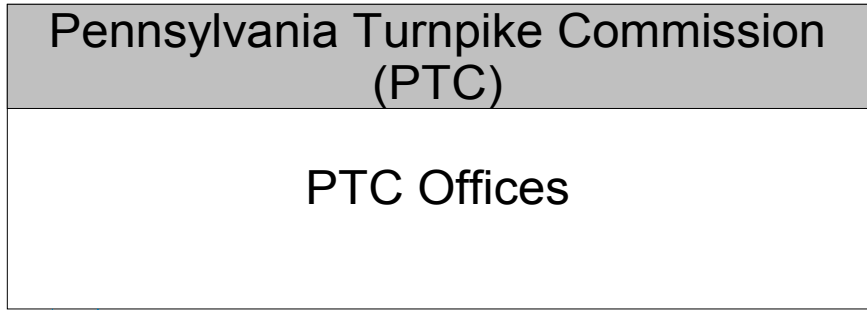


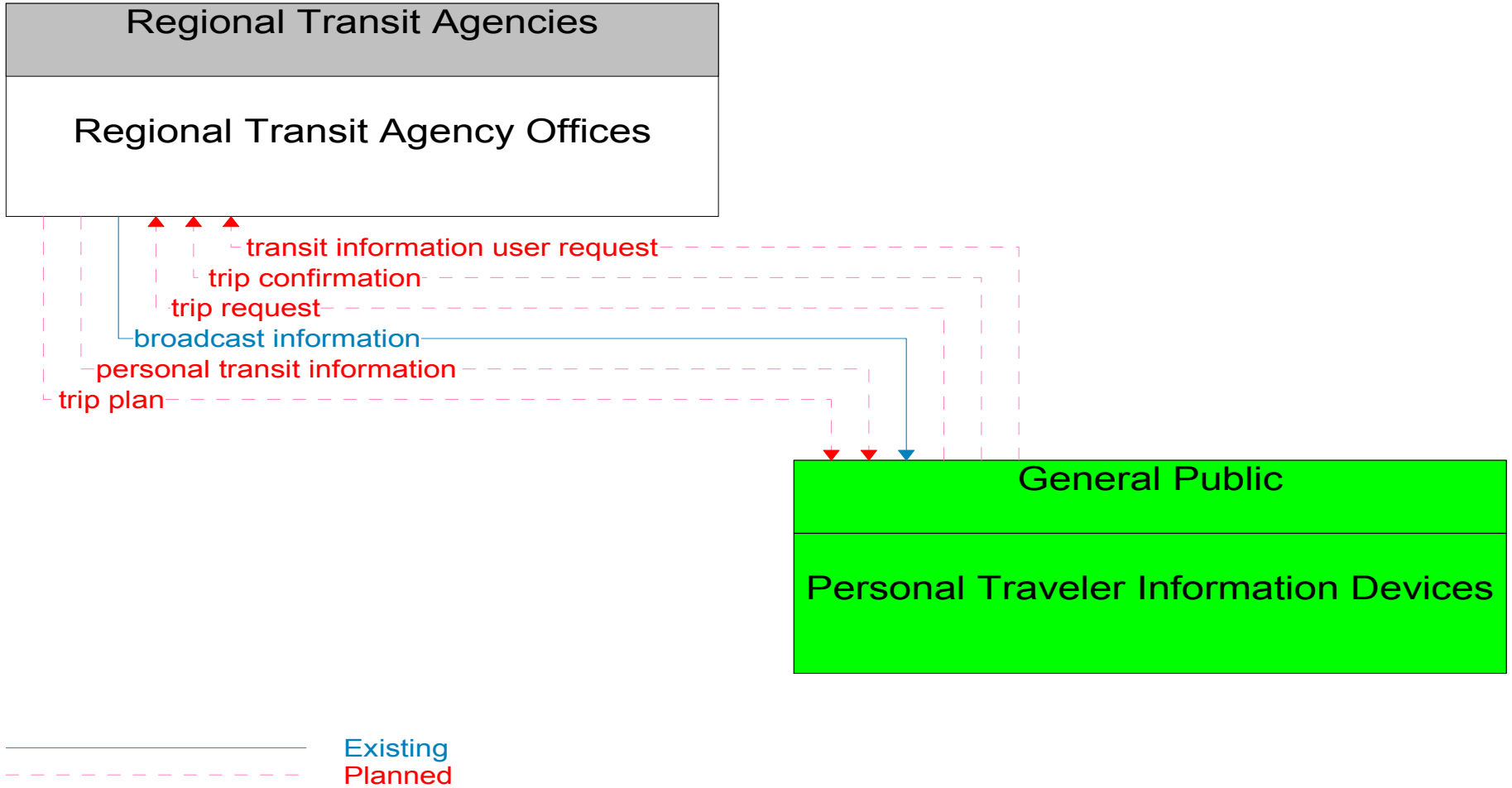


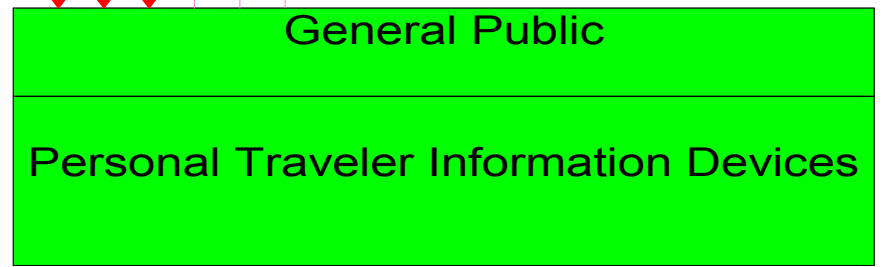
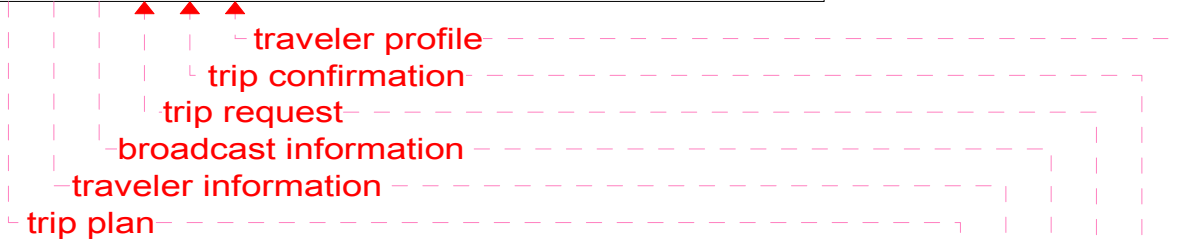
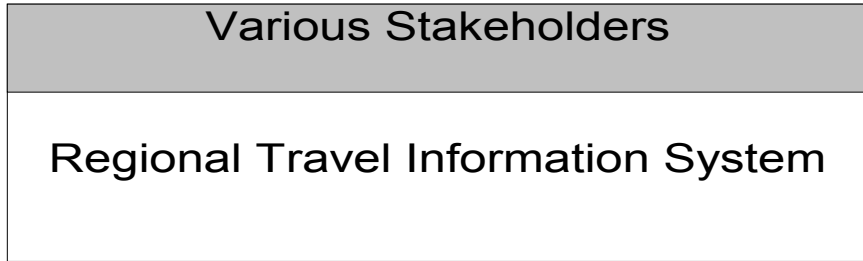
———— Existing  
- - - - - Planned



———— Existing  
- - - - - Planned

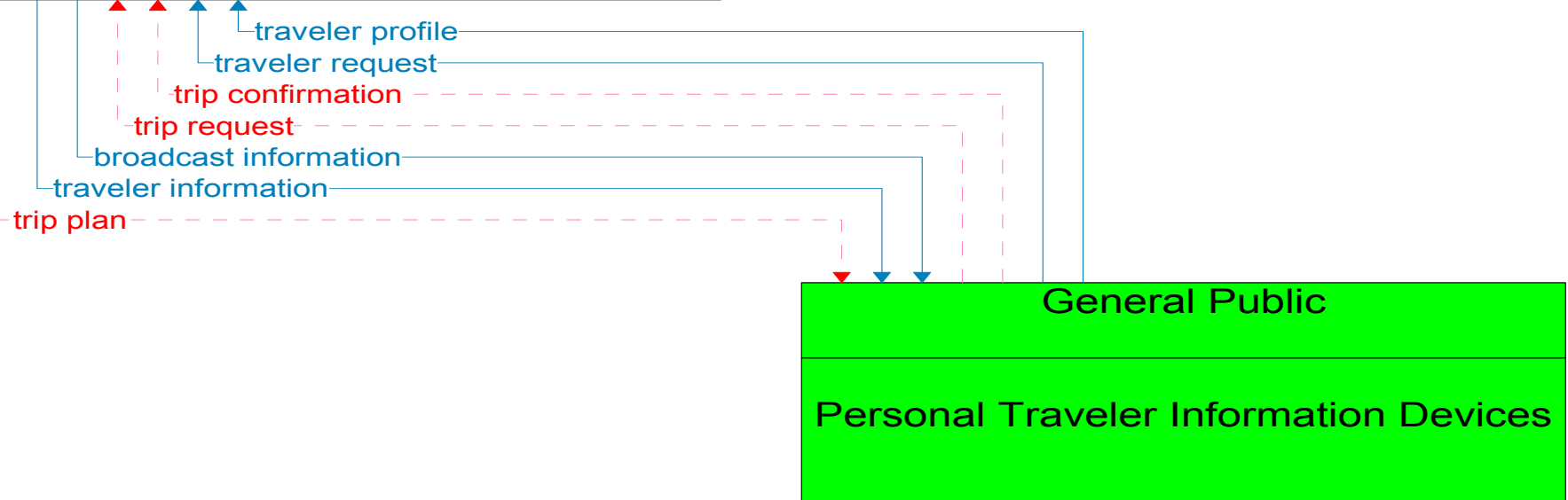
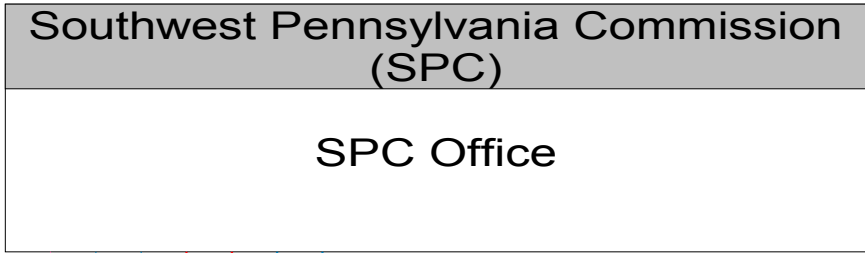




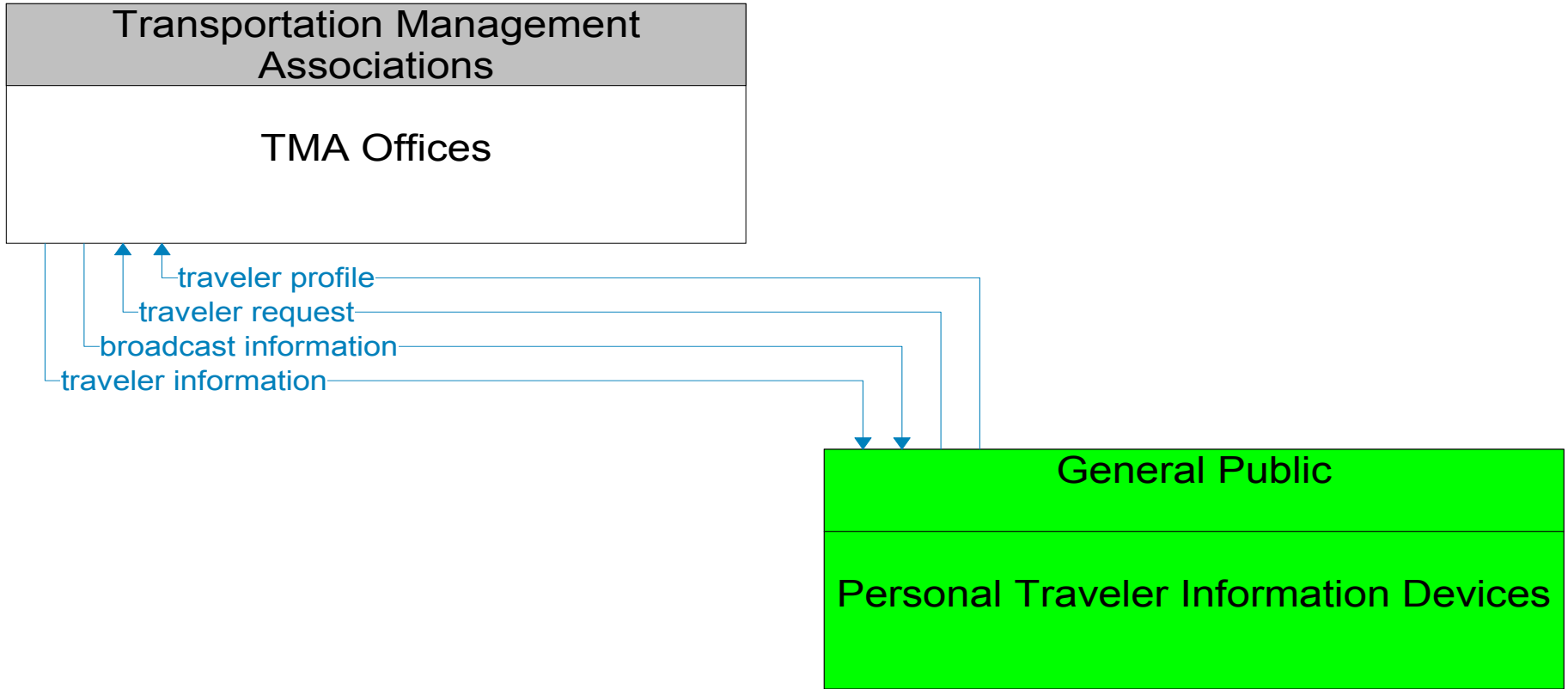


Existing  
Planned



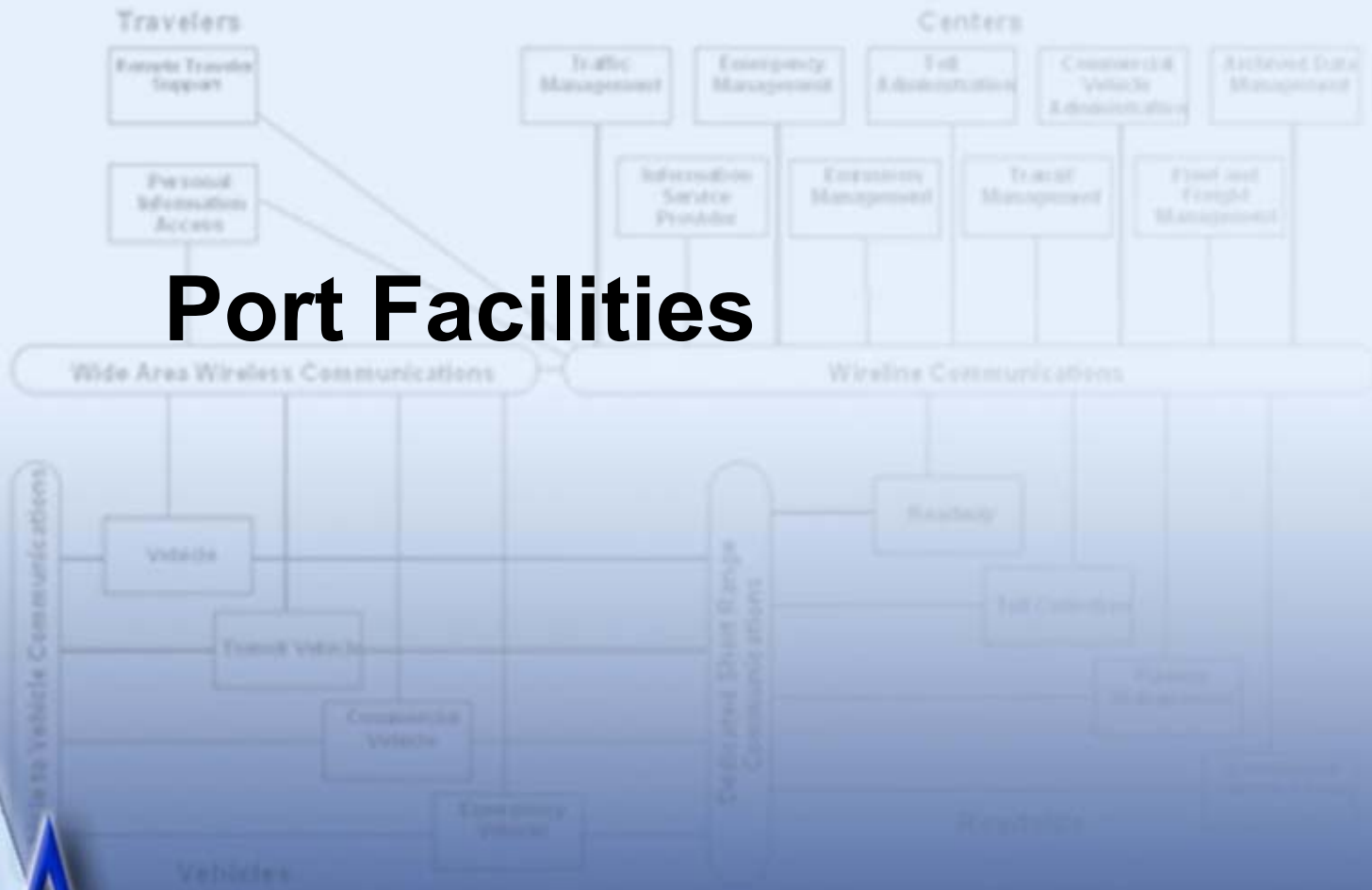


Existing  
Planned



———— Existing  
----- Planned

# Port Facilities

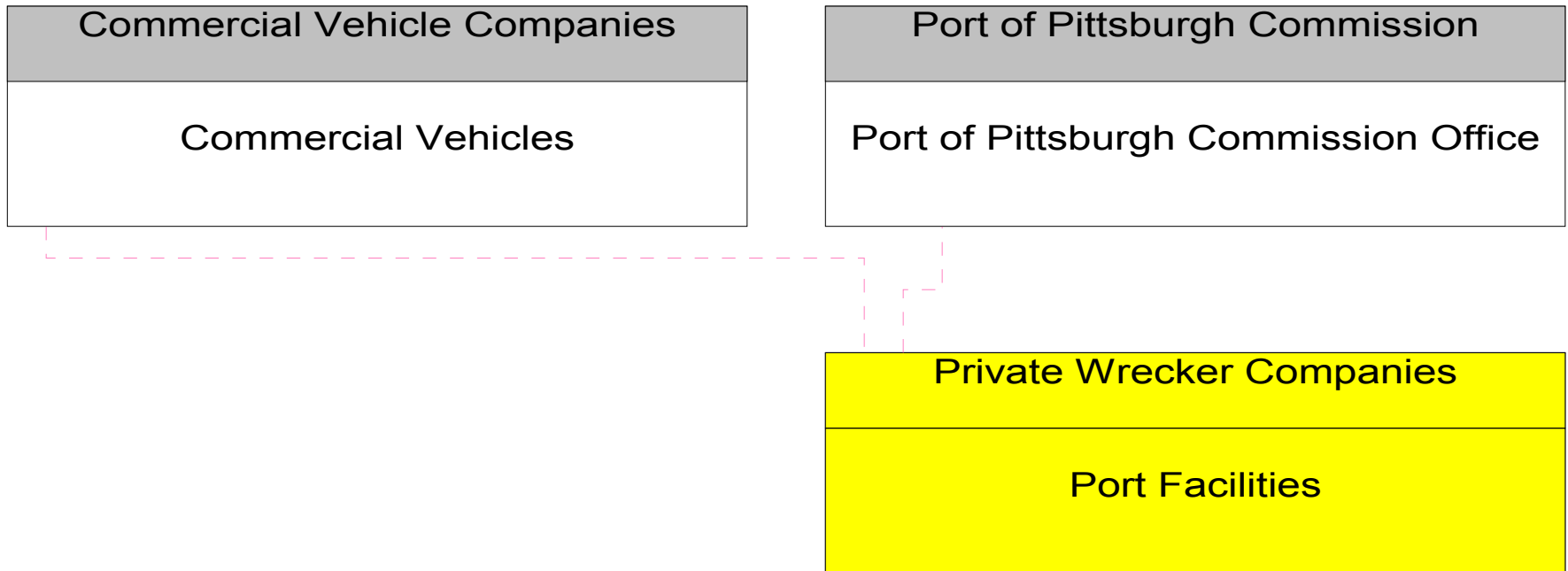


PA

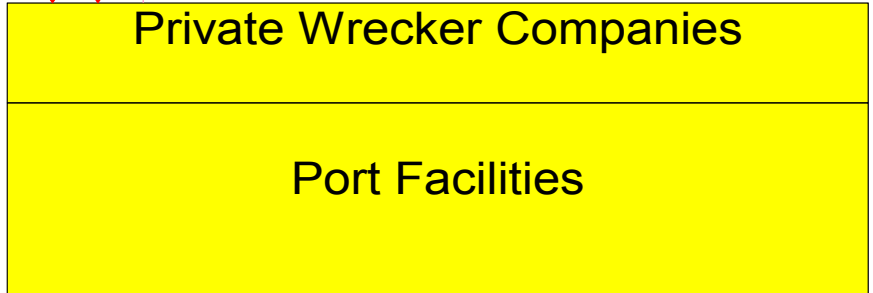
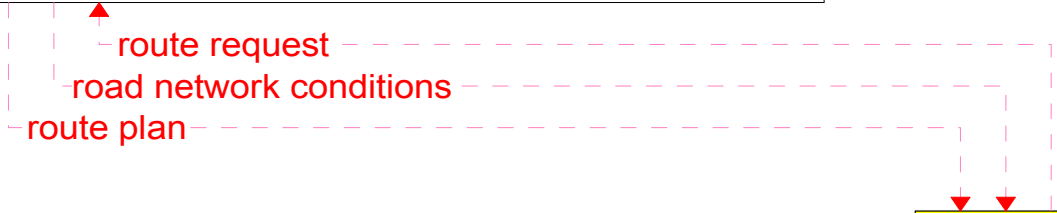
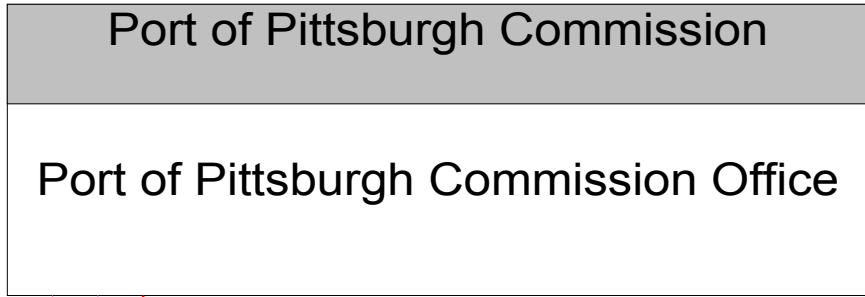
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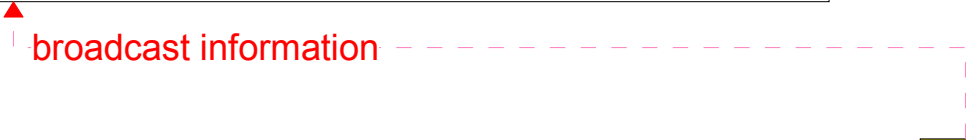
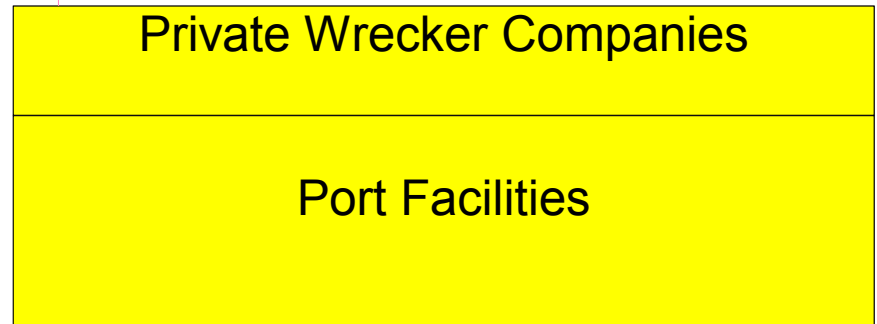
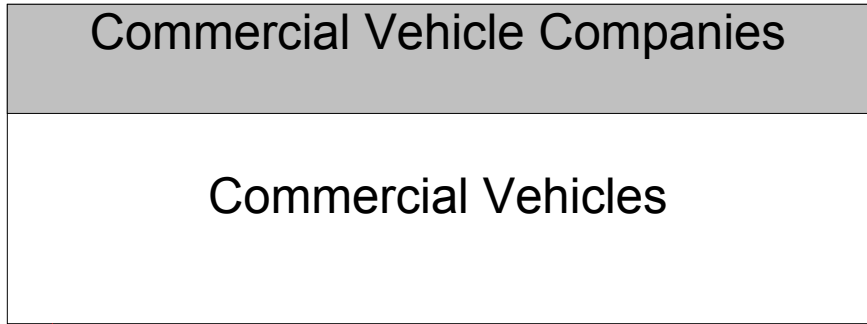
architecture

# Port Facilities Interconnect Diagram



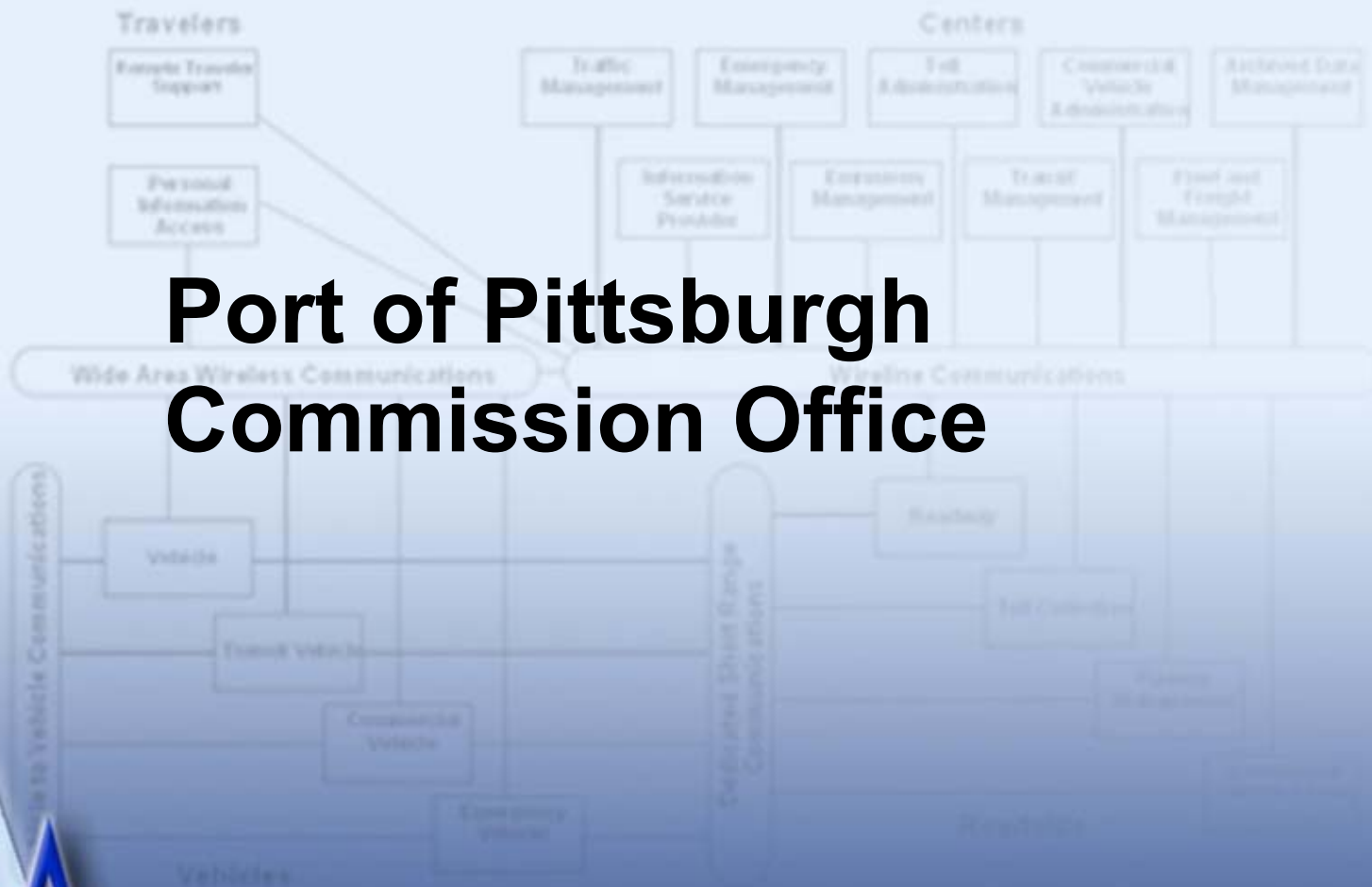
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- - - - - Planned





———— Existing  
- - - - - Planned

# Port of Pittsburgh Commission Office

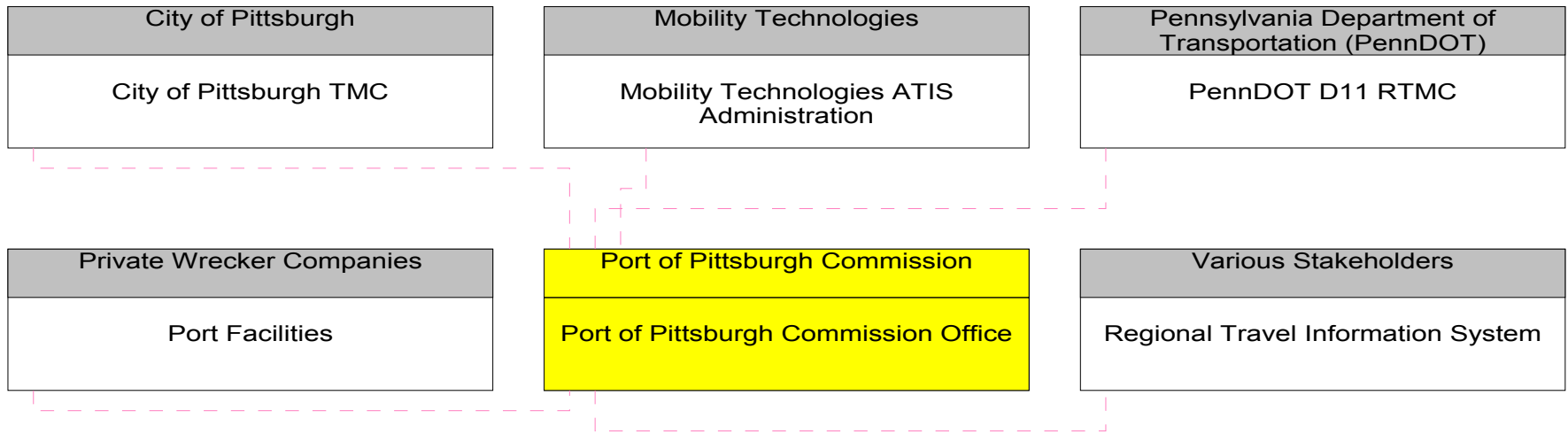


704

architecture

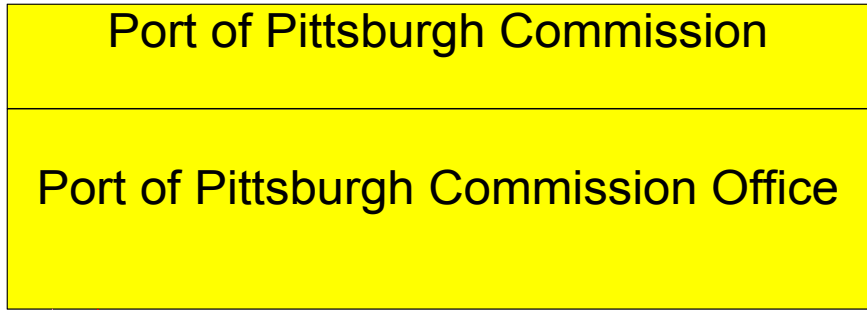


# Port of Pittsburgh Commission Office Interconnect Diagram

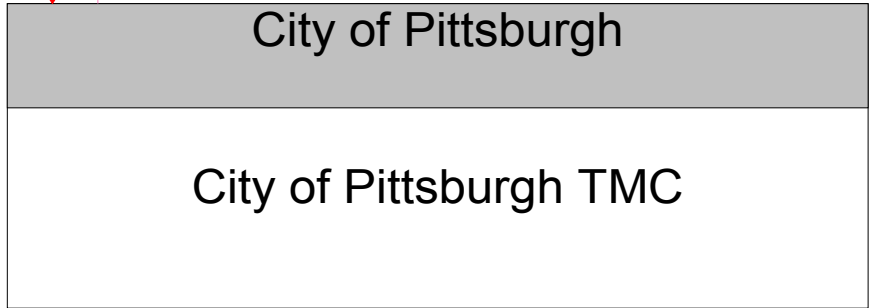


Existing  
Planned

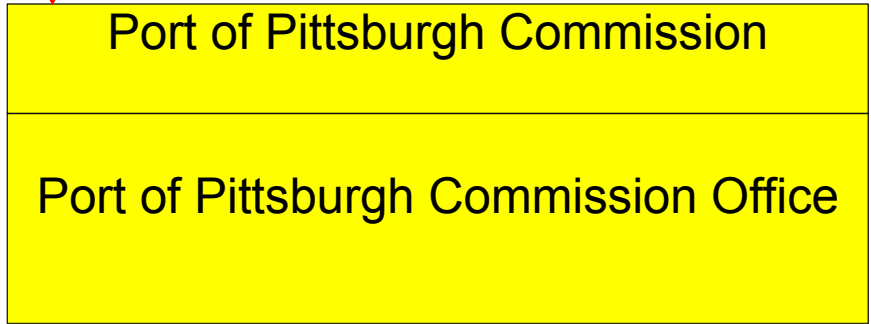
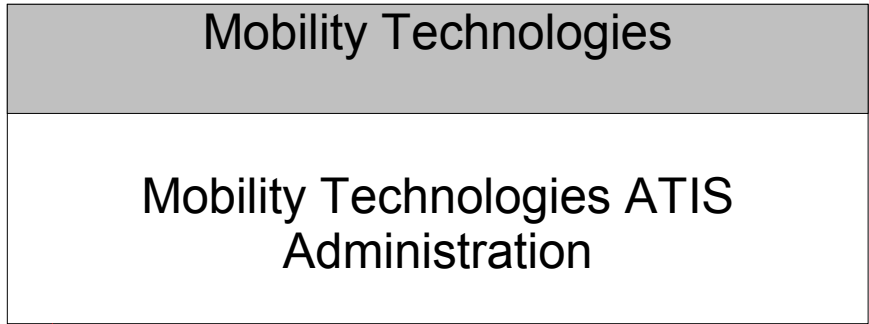




road network conditions  
request for road network conditions

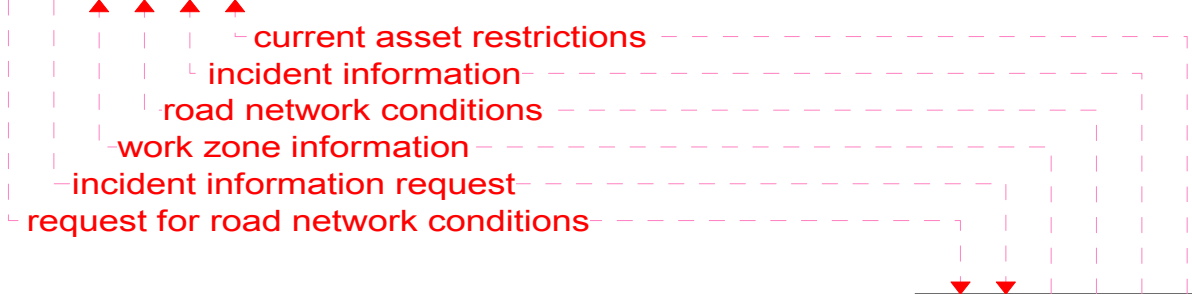


Existing  
Planned



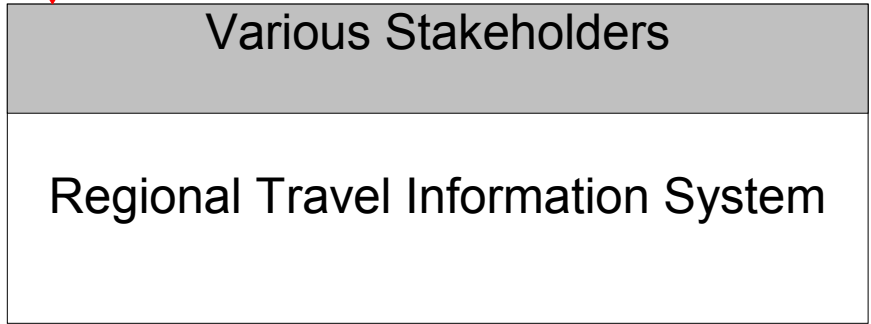
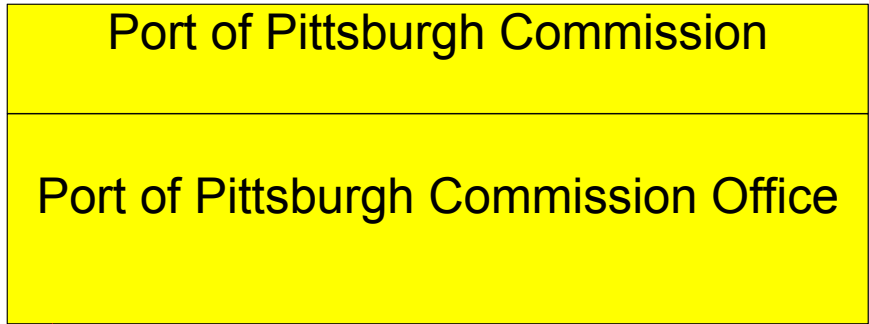
———— Existing  
- - - - - Planned

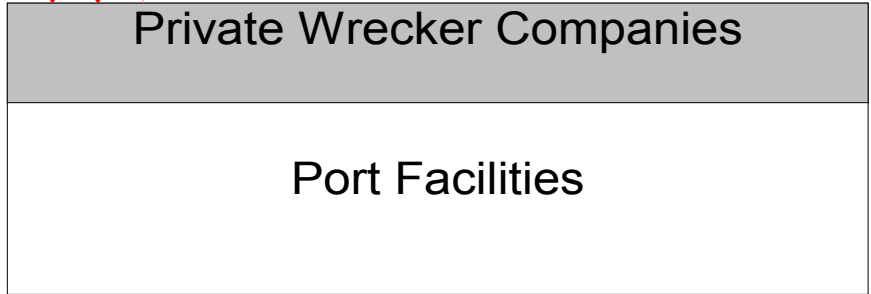
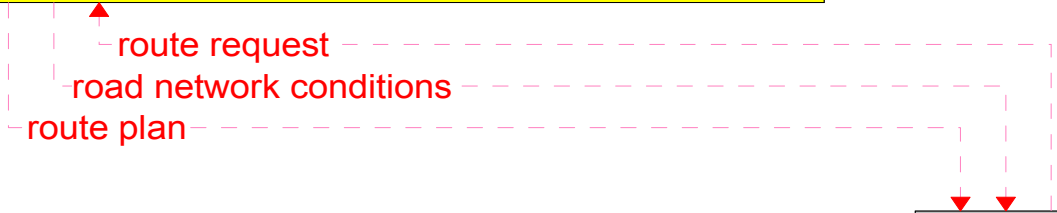
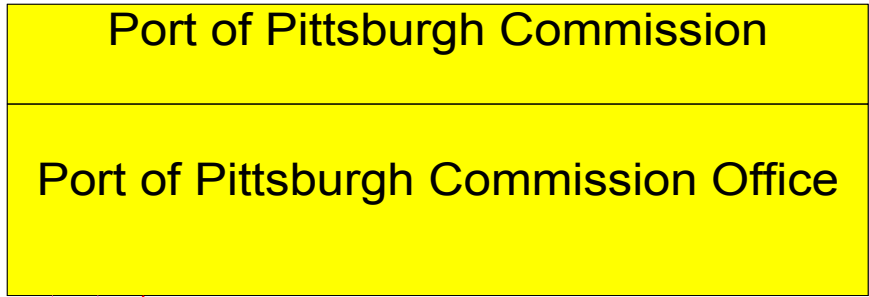
Port of Pittsburgh Commission  
Port of Pittsburgh Commission Office



Pennsylvania Department of Transportation (PennDOT)  
PennDOT D11 RTMC

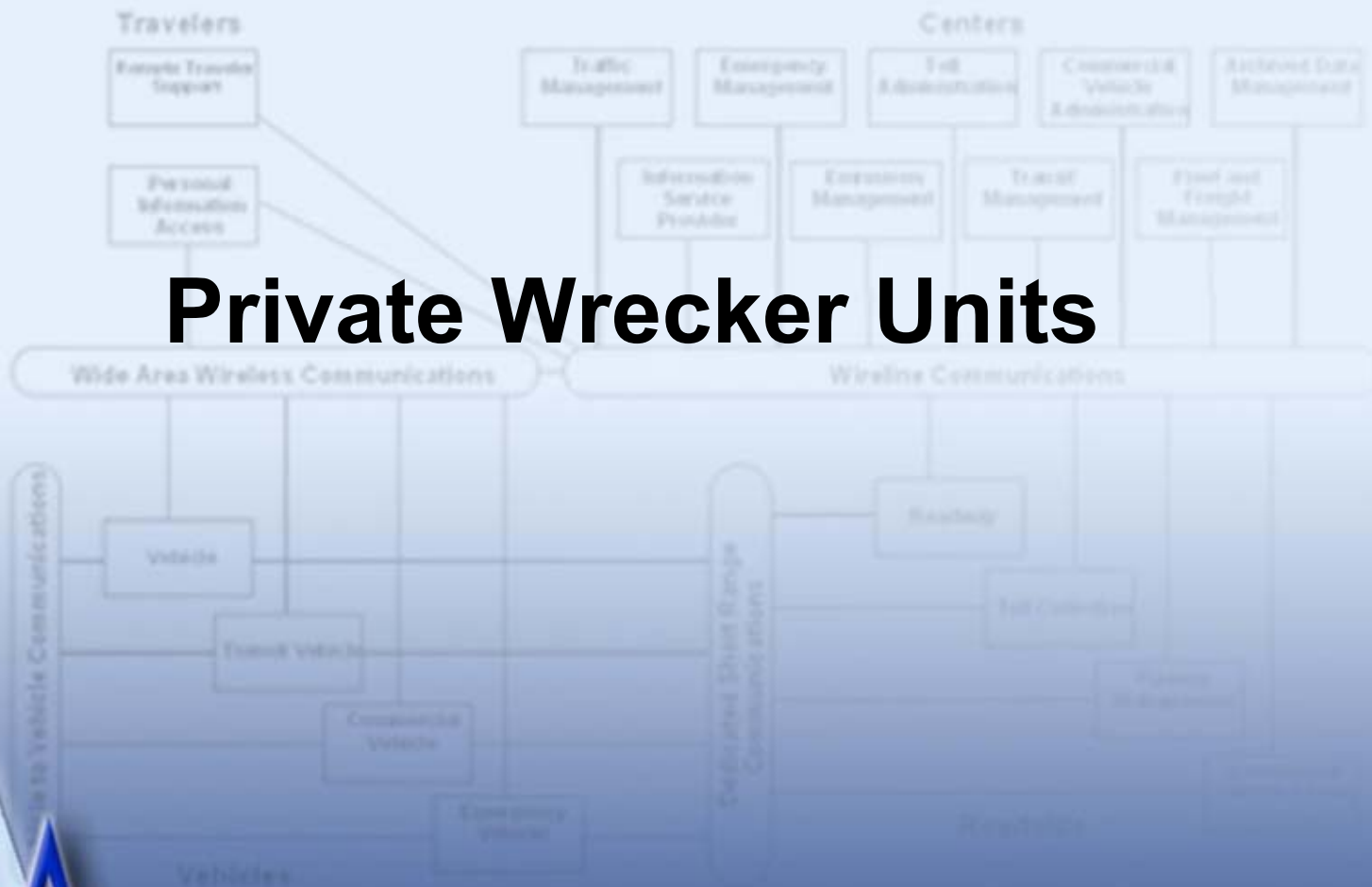
———— Existing  
- - - - - Planned





Existing  
Planned

# Private Wrecker Units

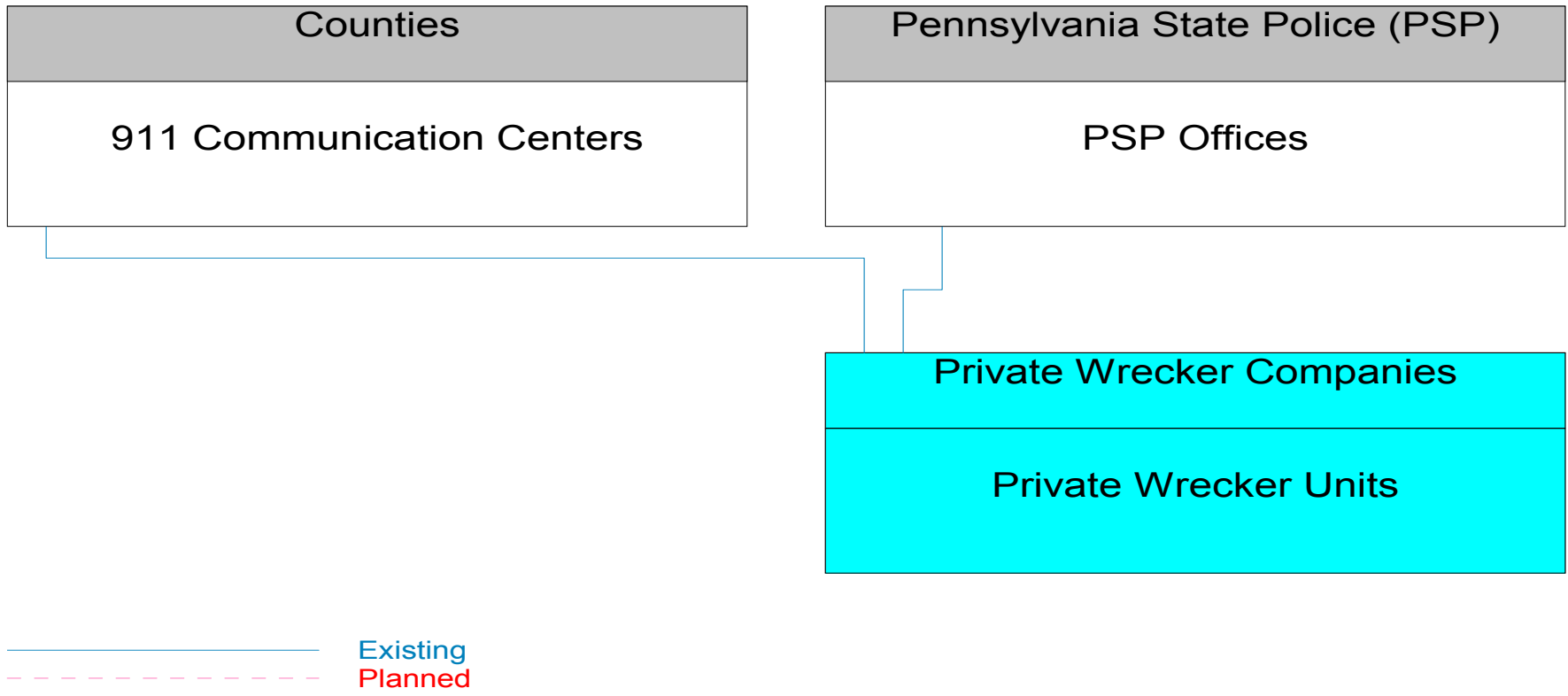


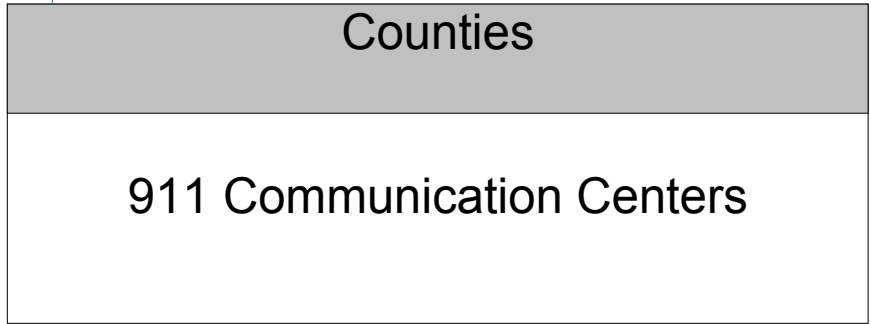
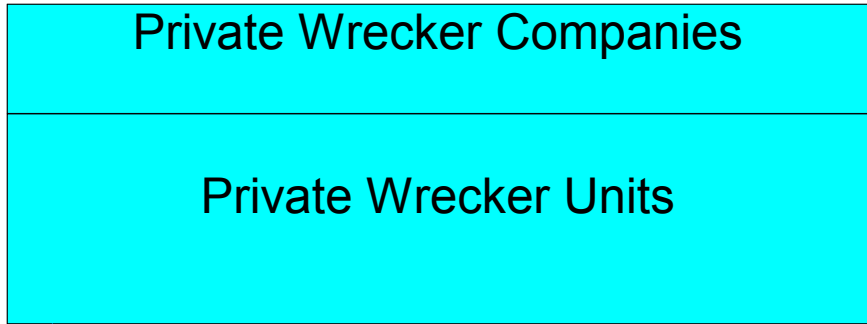
711

architecture



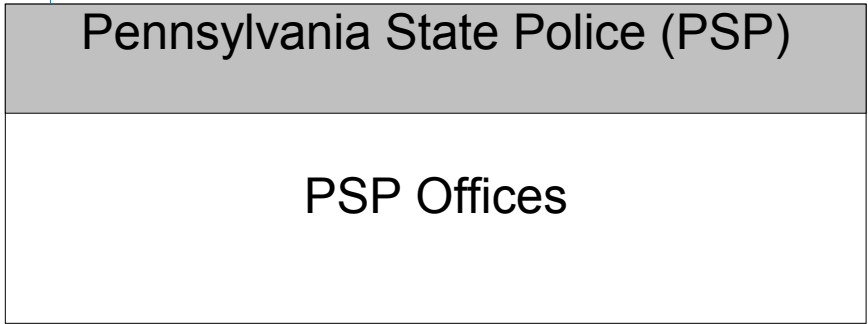
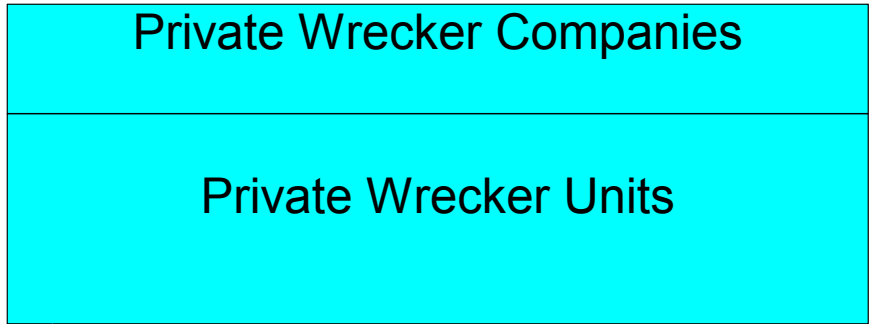
# Private Wrecker Units Interconnect Diagram





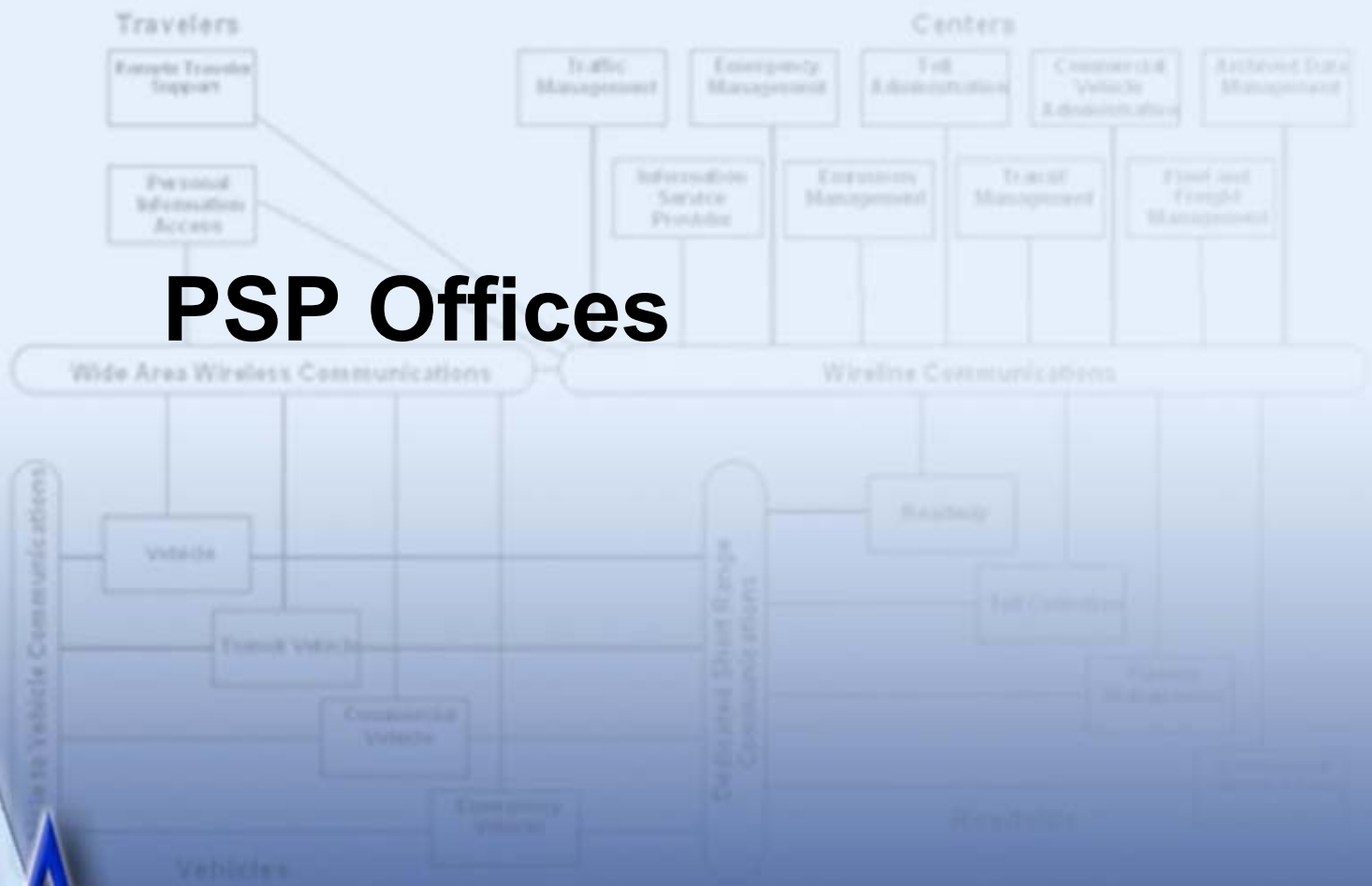
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----- Planned





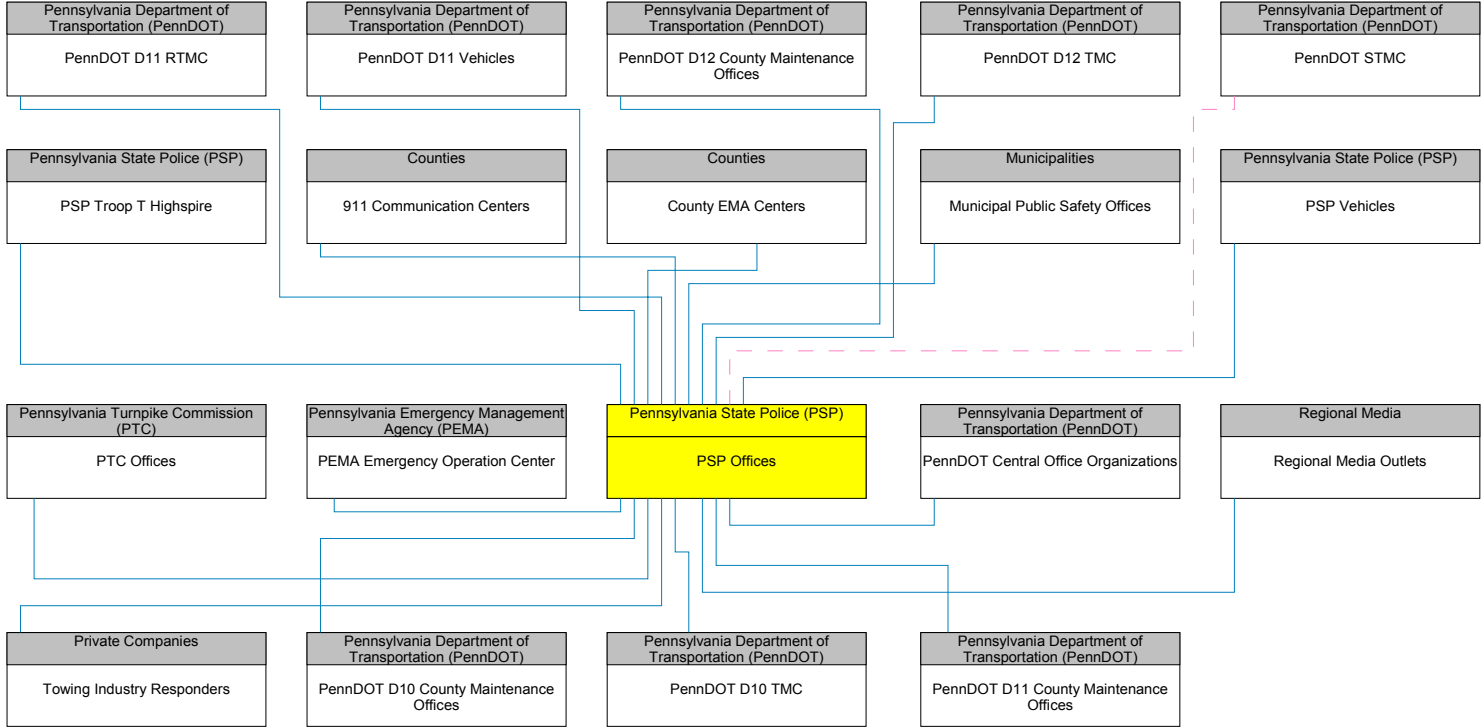
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# PSP Offices

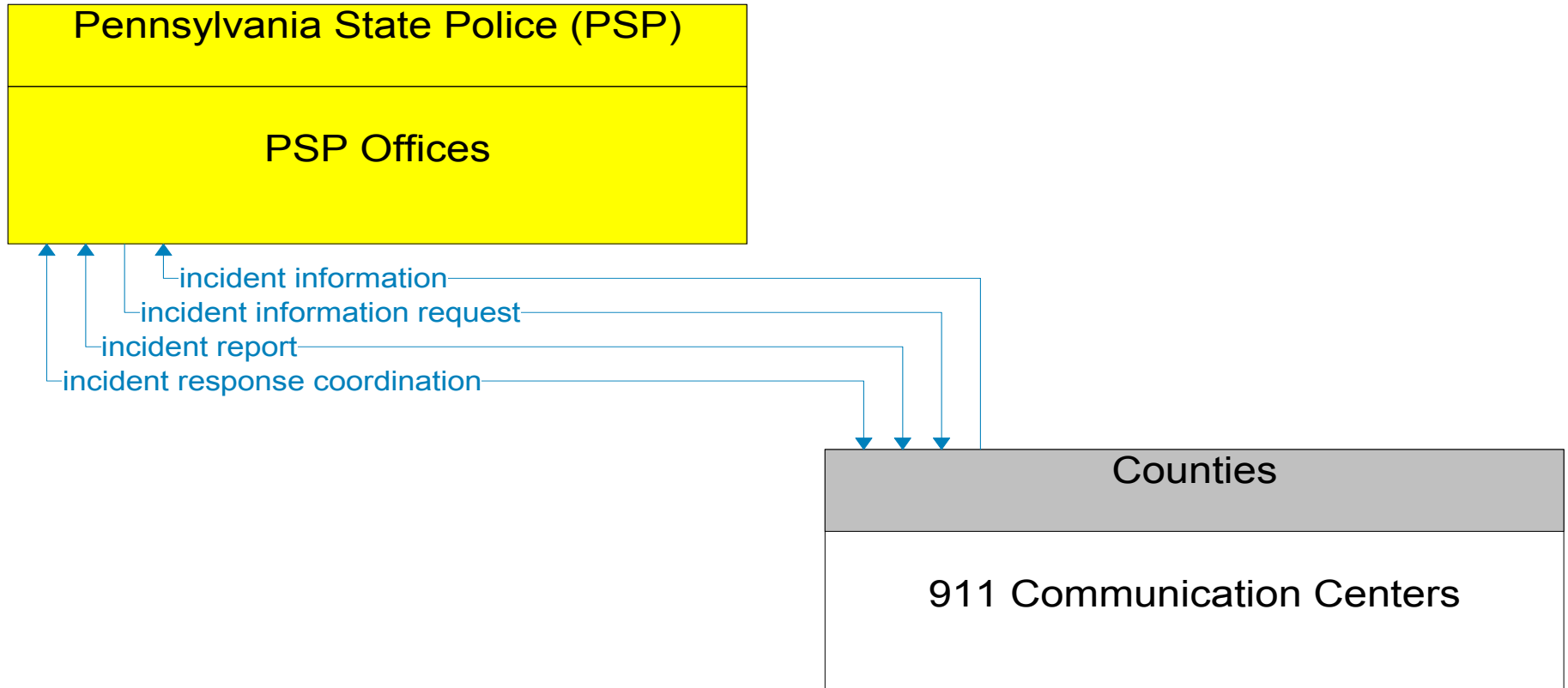


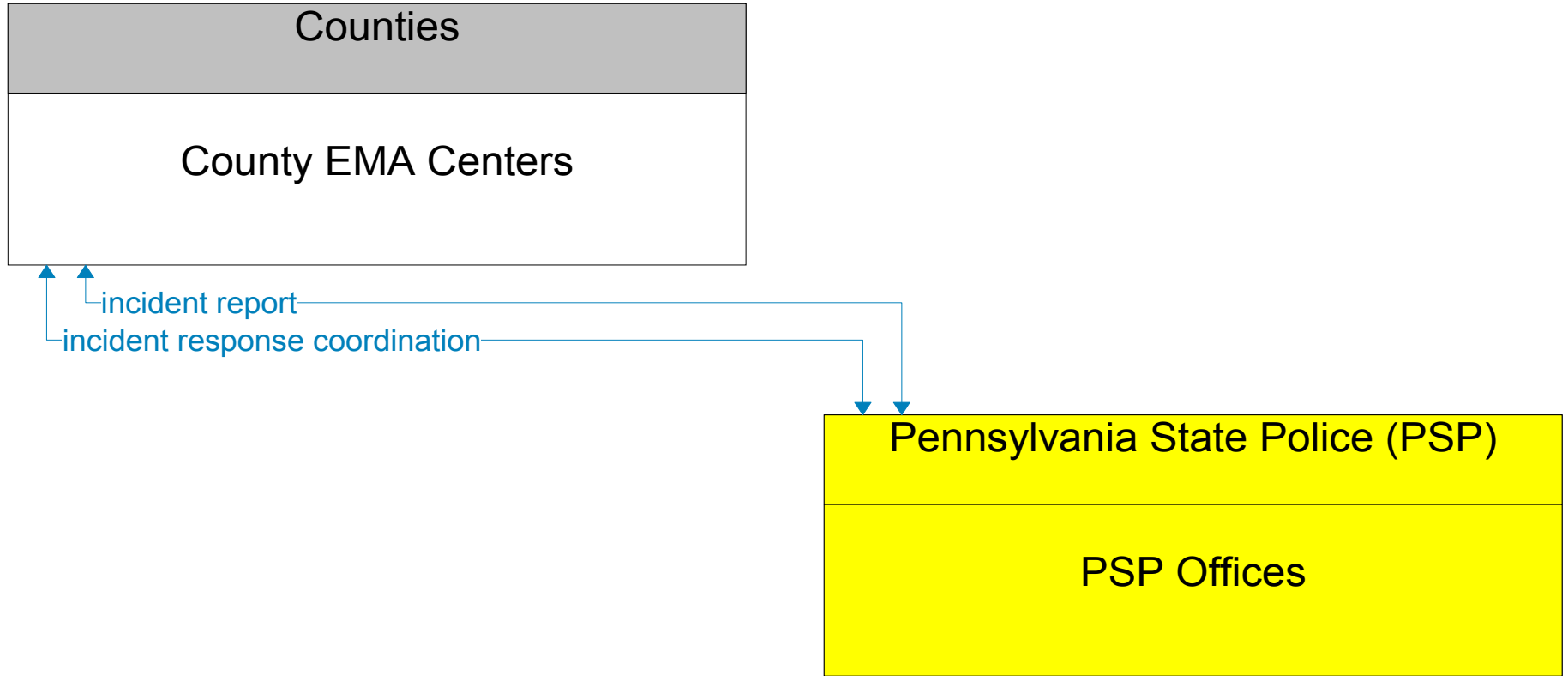
PA

# PSP Offices Interconnect Diagram

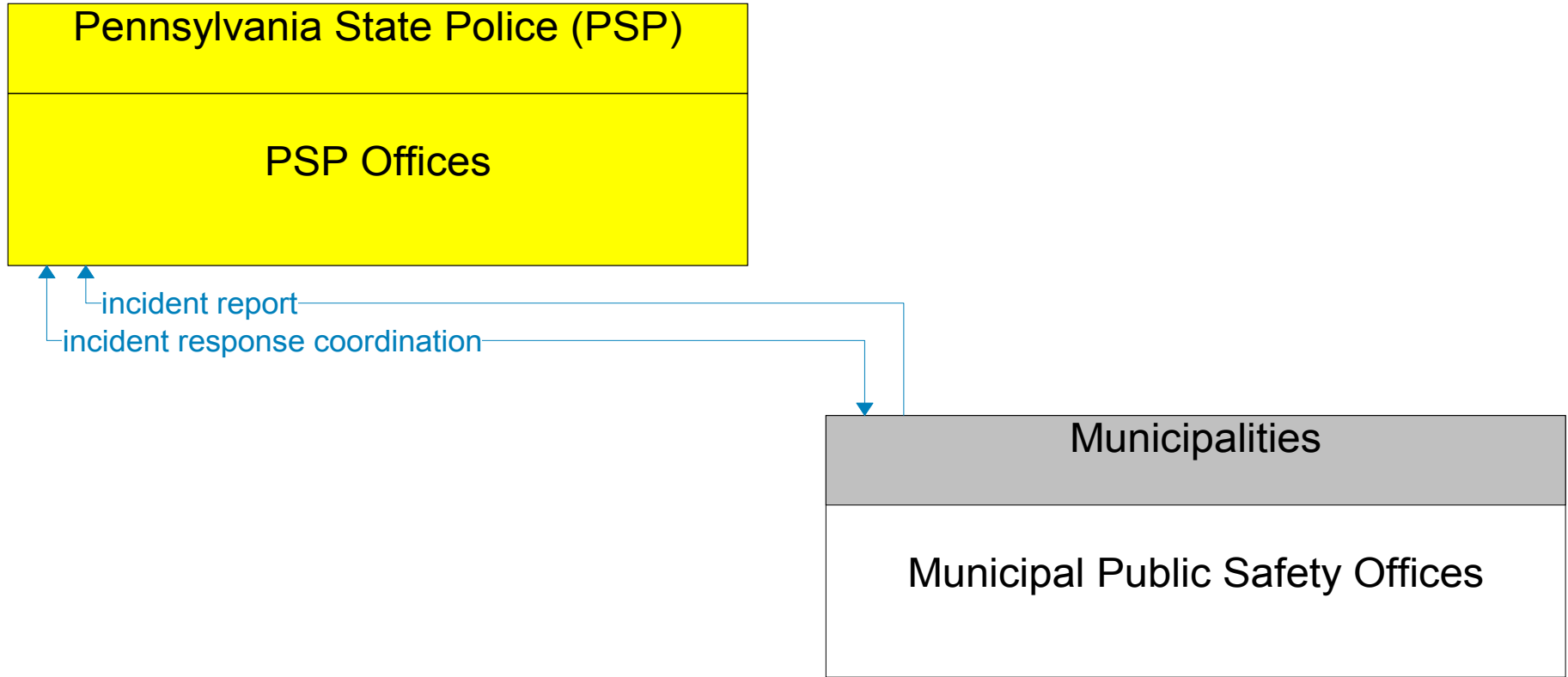


— Existing  
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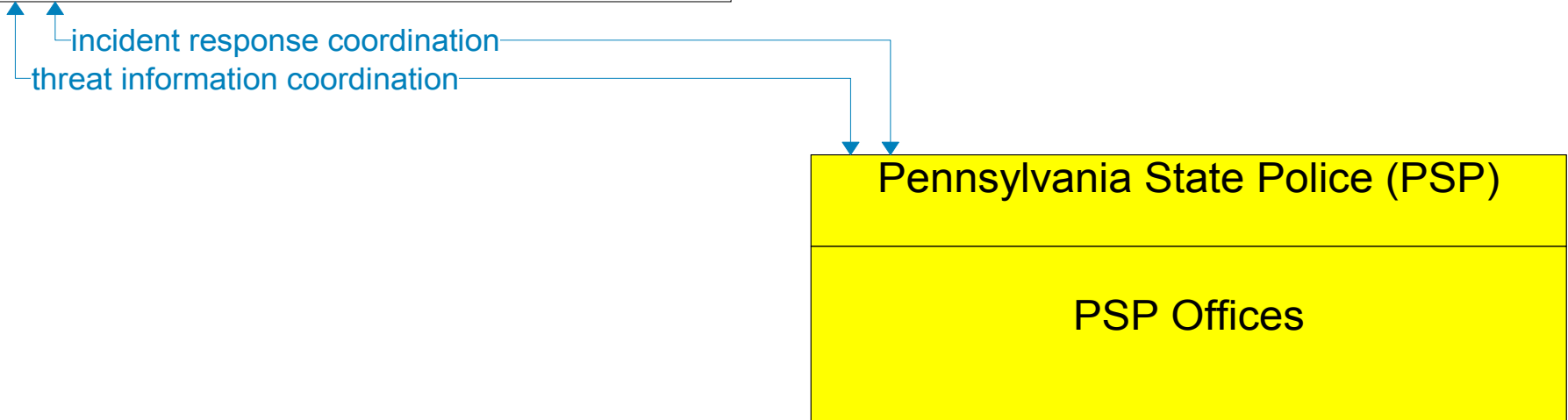
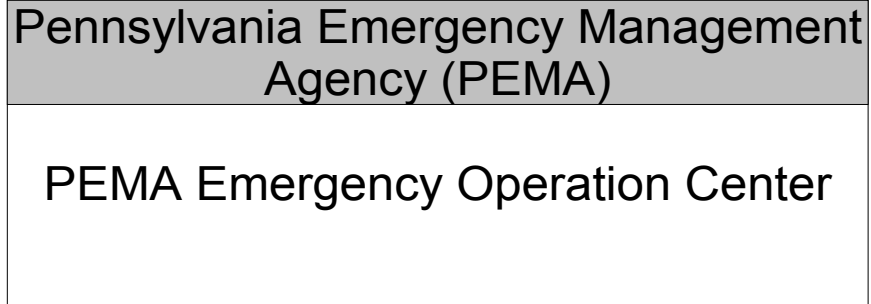




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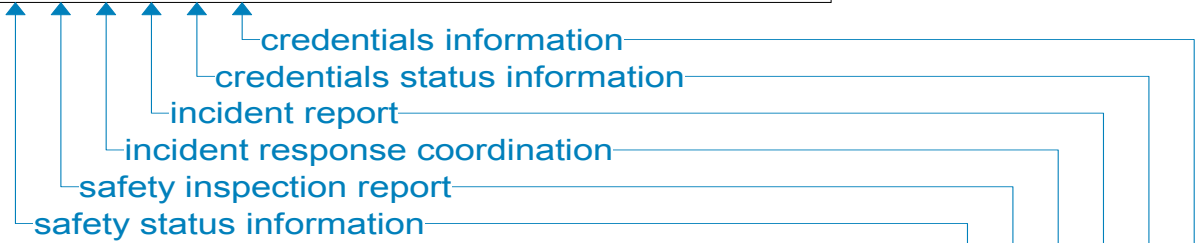
———— Existing  
- - - - - Planned



Existing  
Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT Central Office Organizations

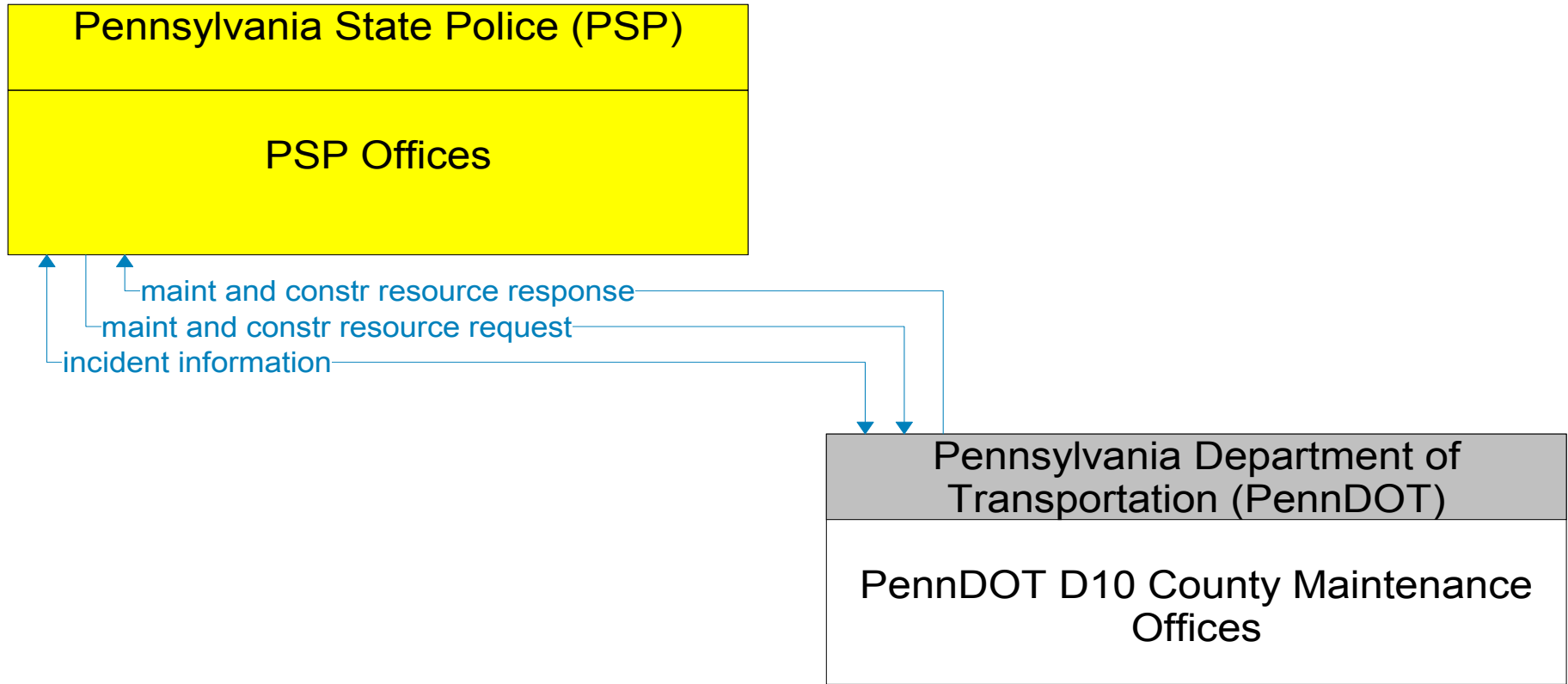


Pennsylvania State Police (PSP)

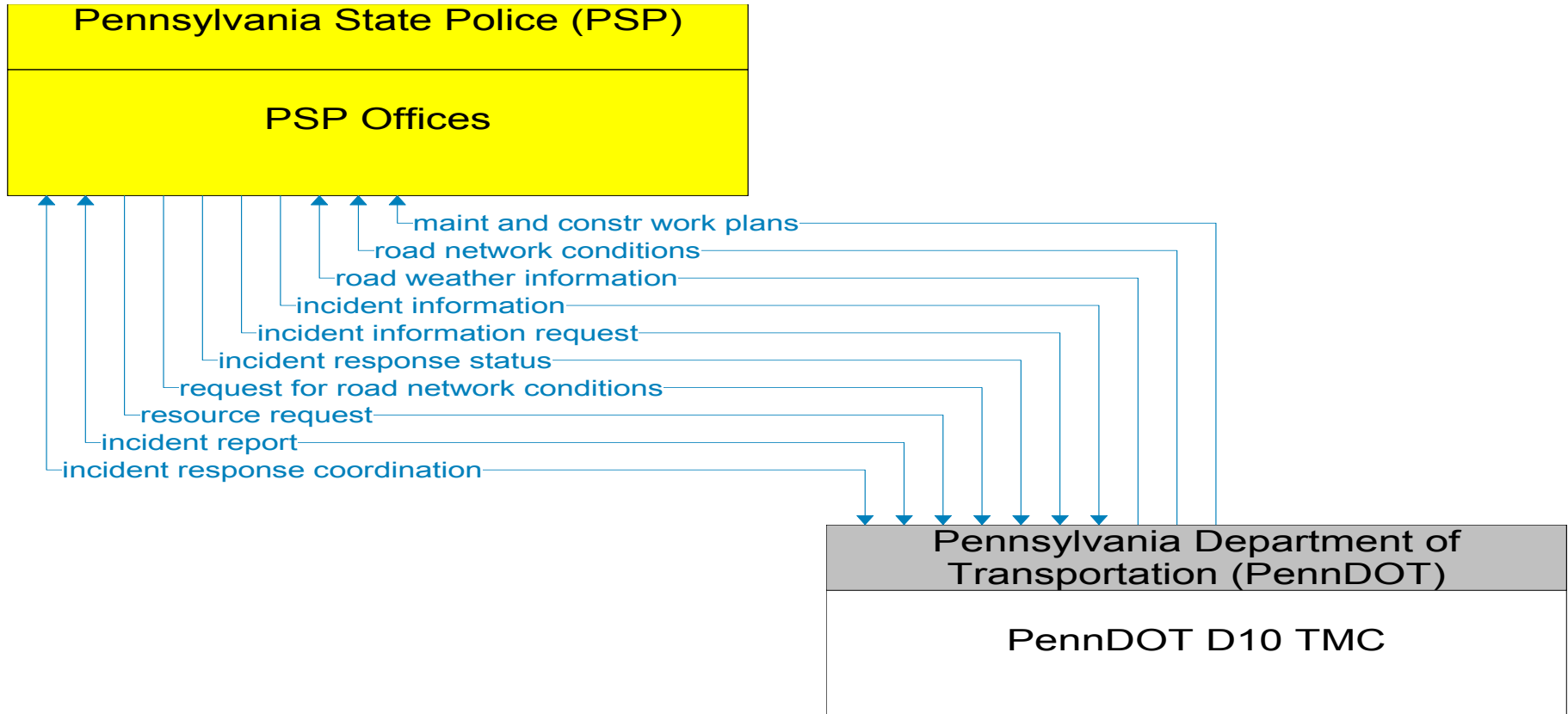
PSP Offices

Existing  
Planned

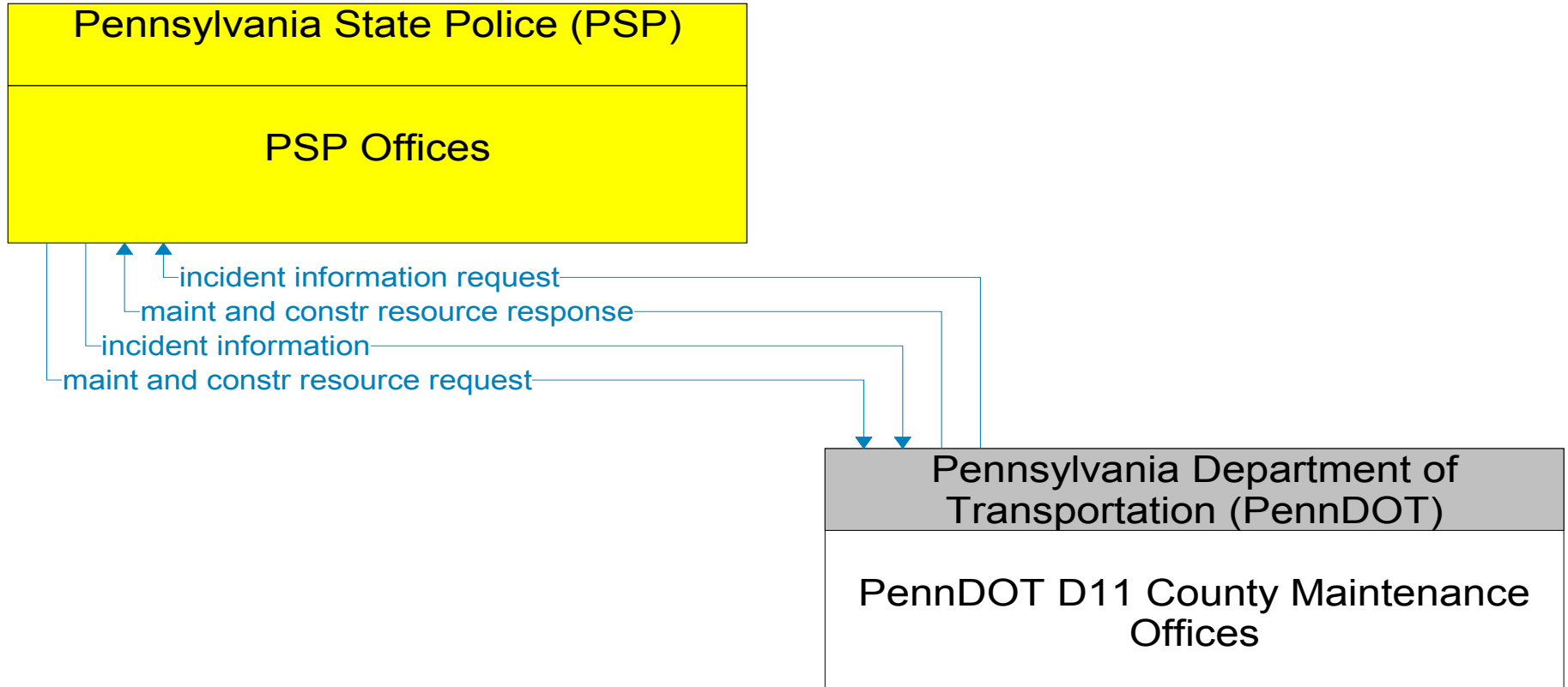




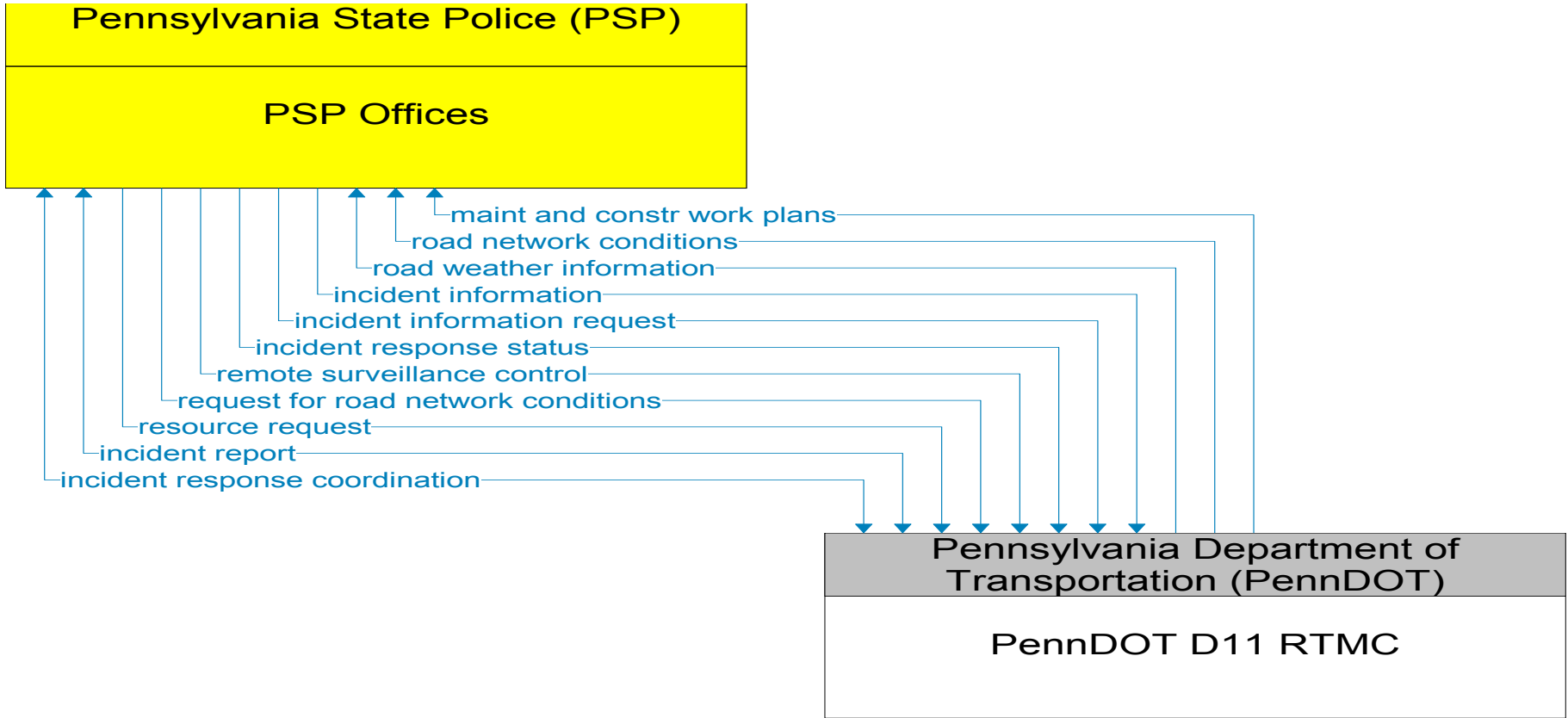
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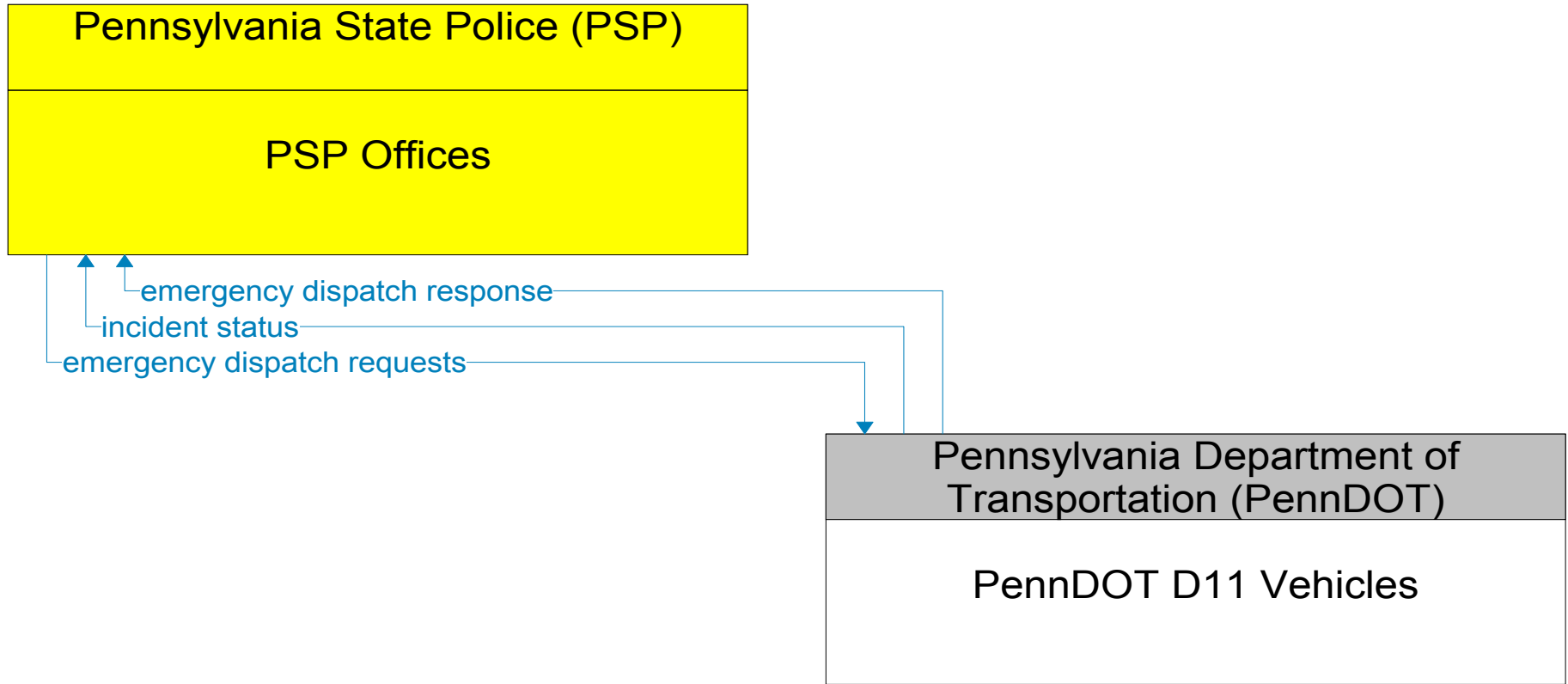
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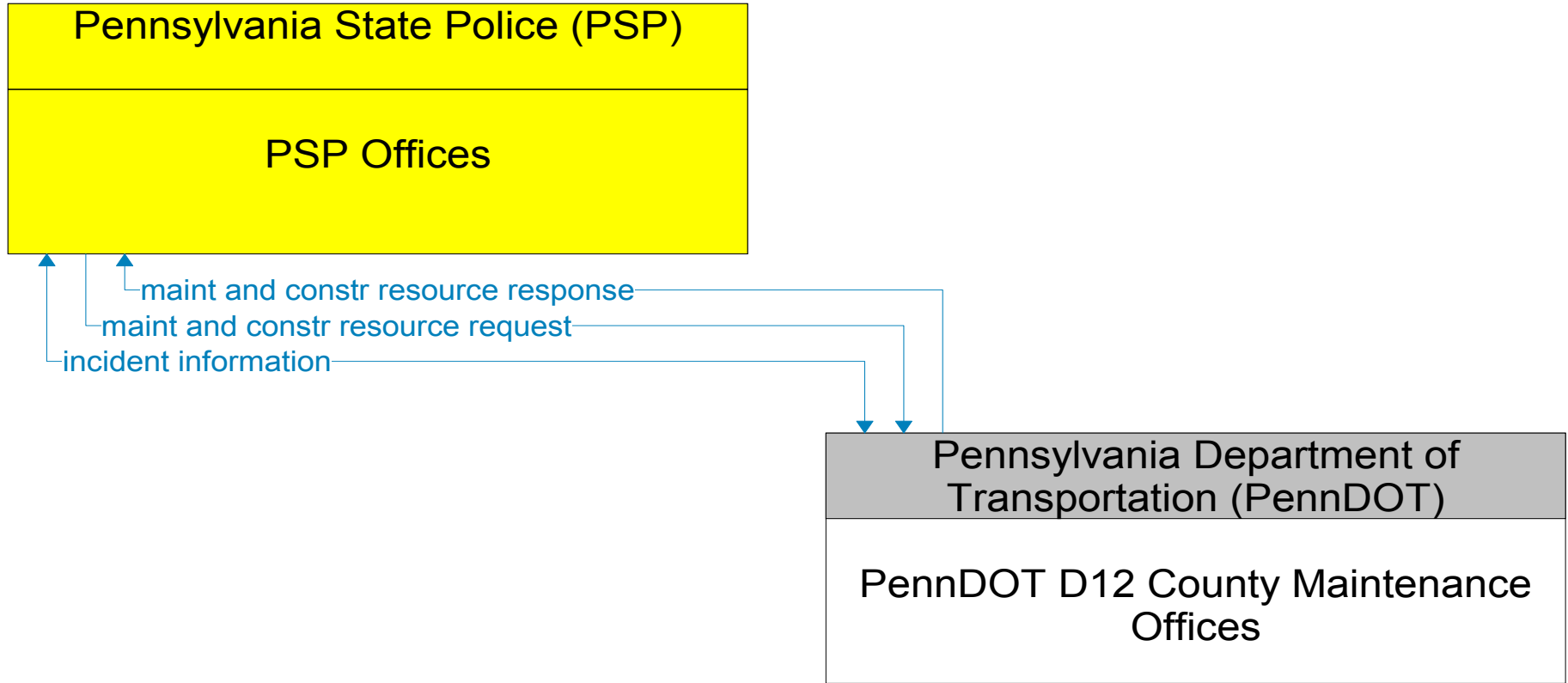
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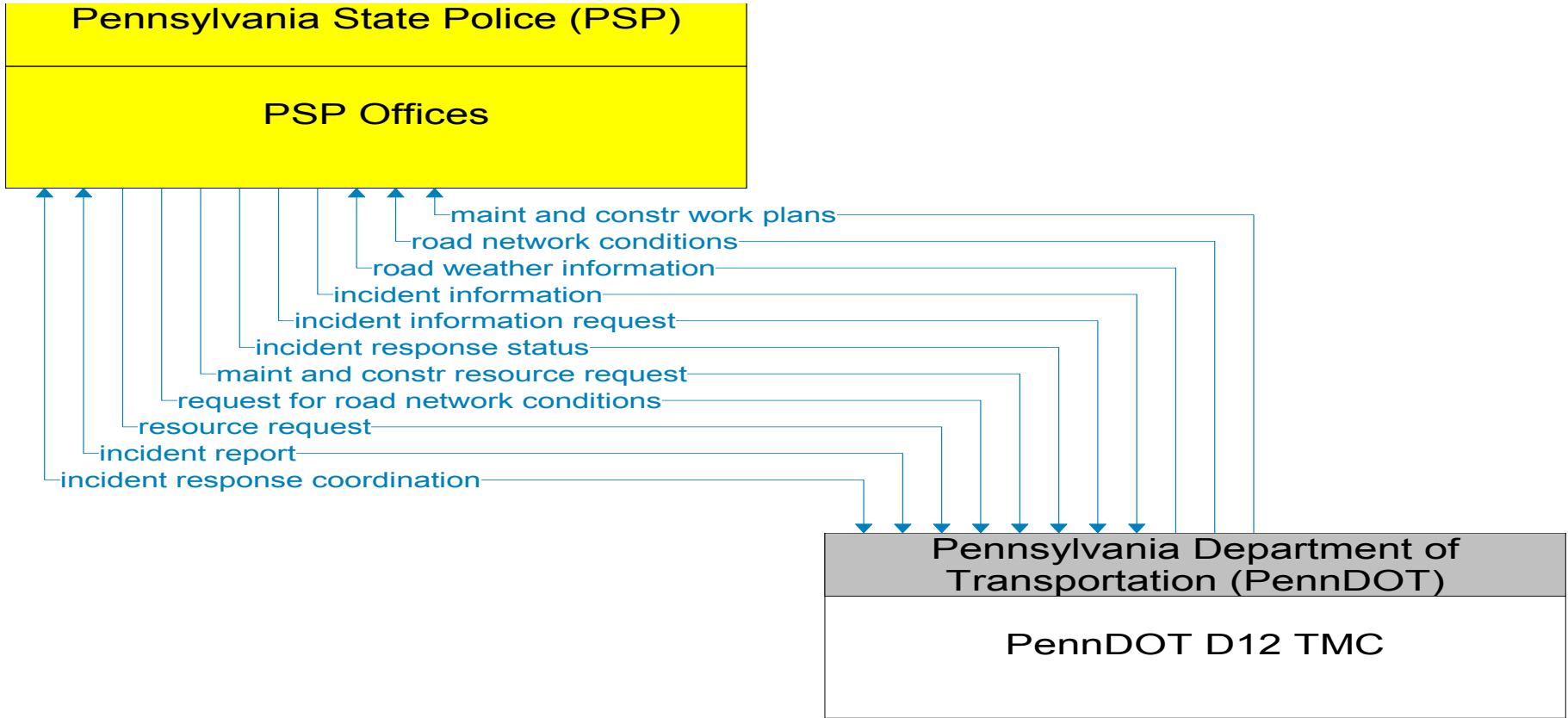
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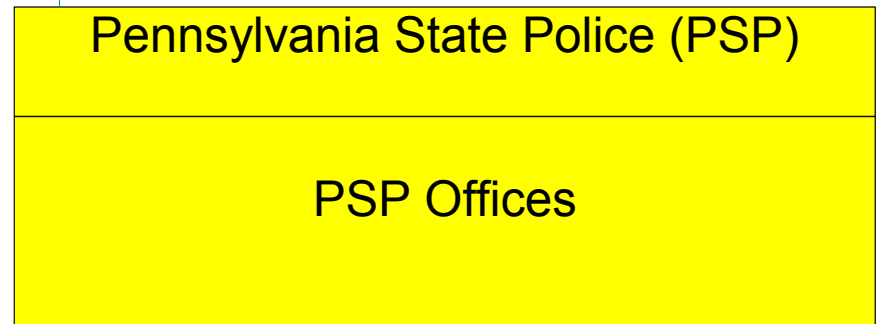
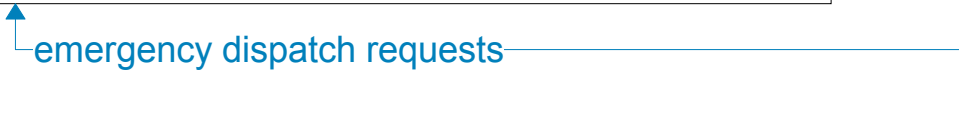
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———— Existing  
- - - - - Planned



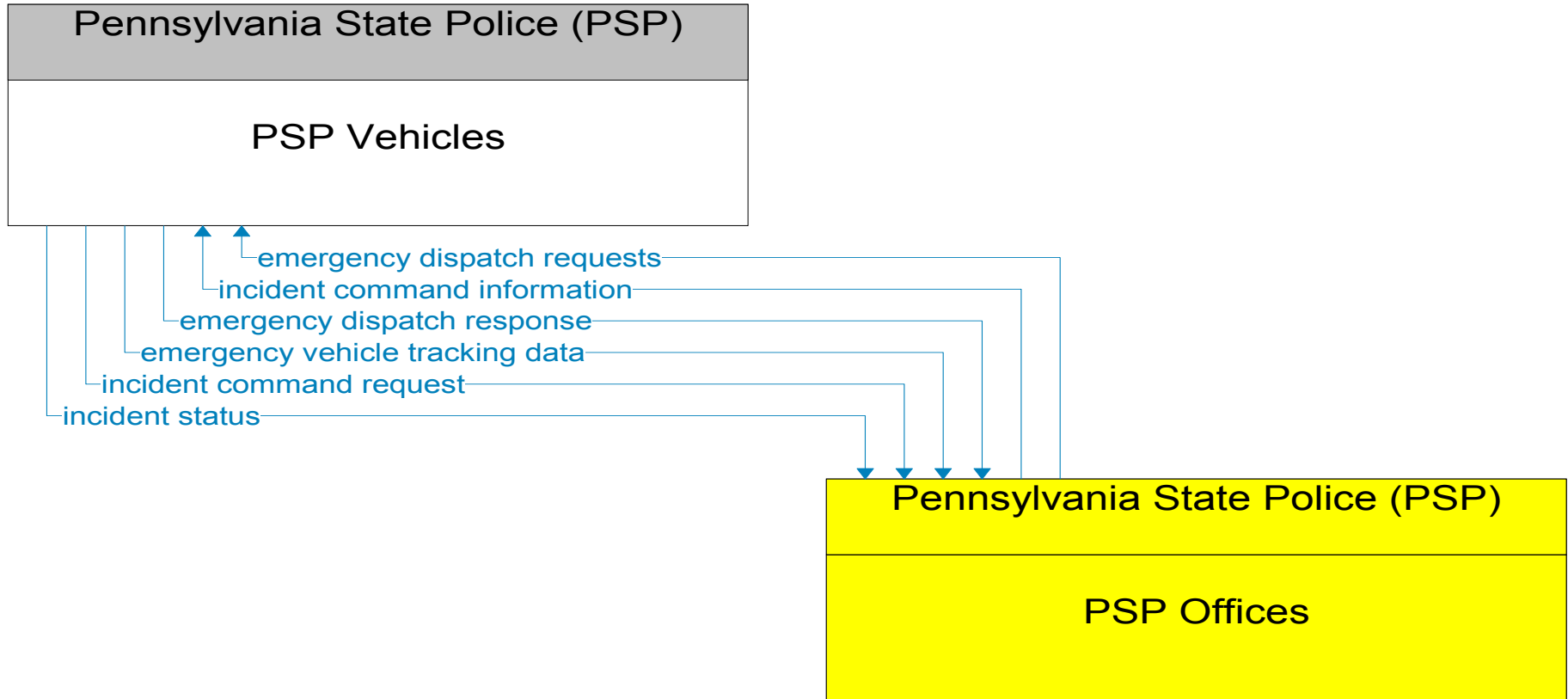
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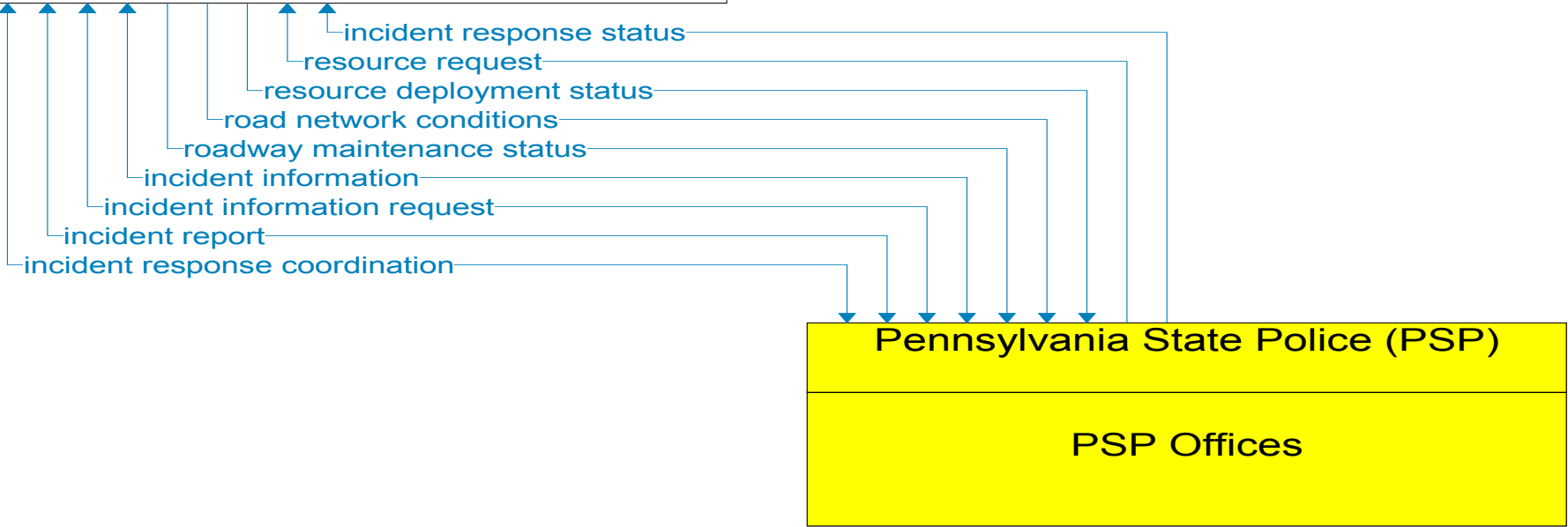
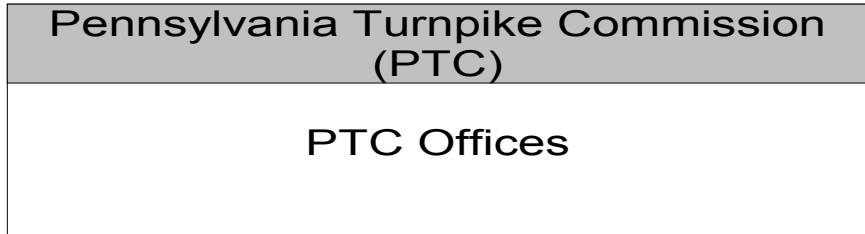
Existing  
Planned

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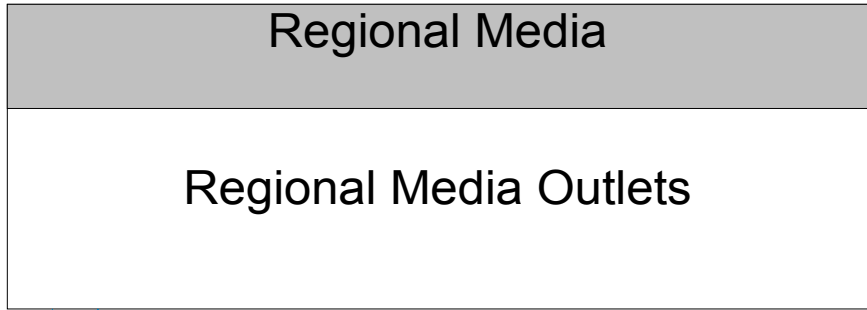




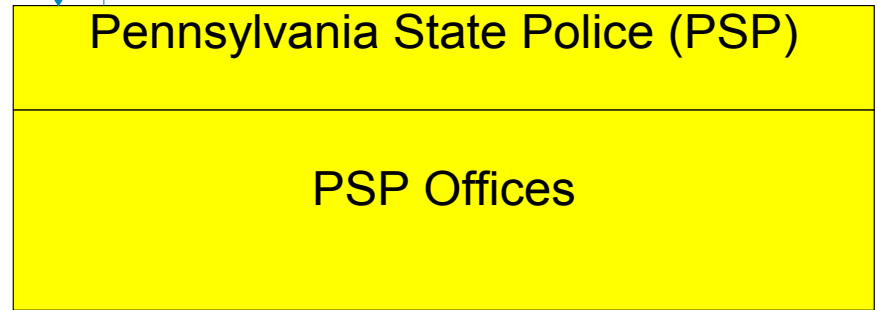
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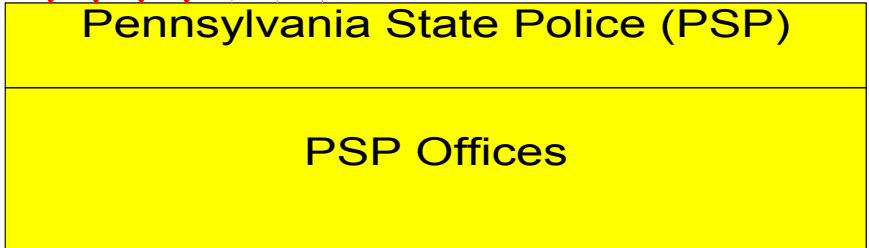
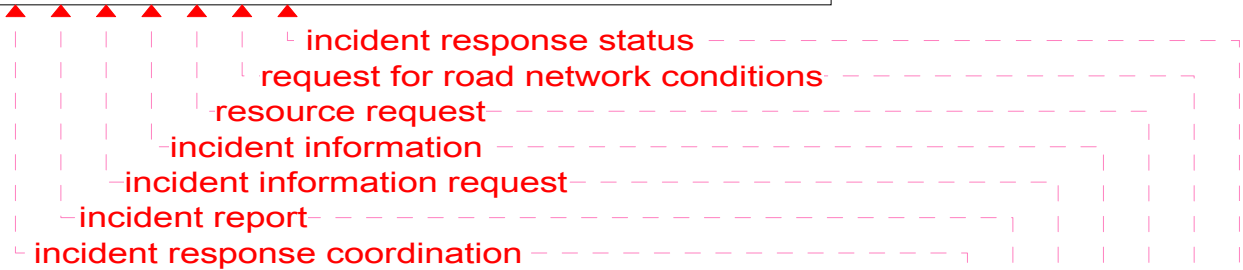
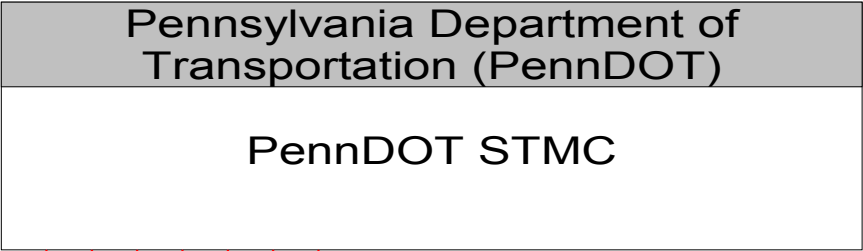
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- - - - - Planned



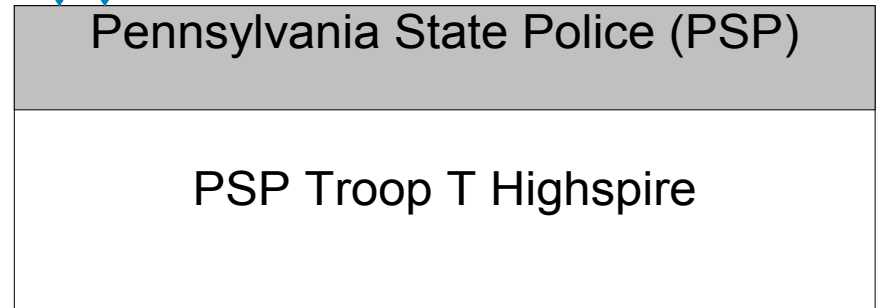
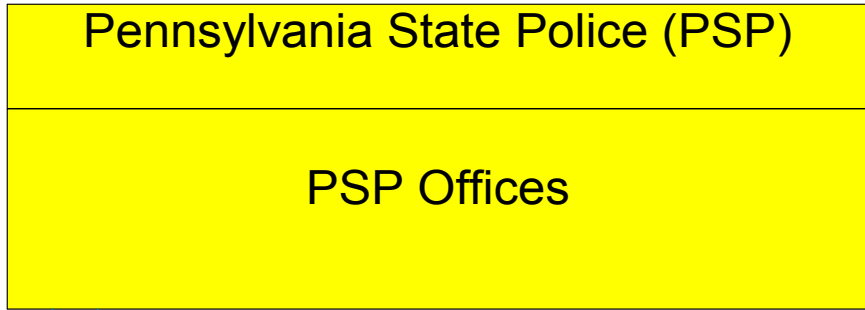
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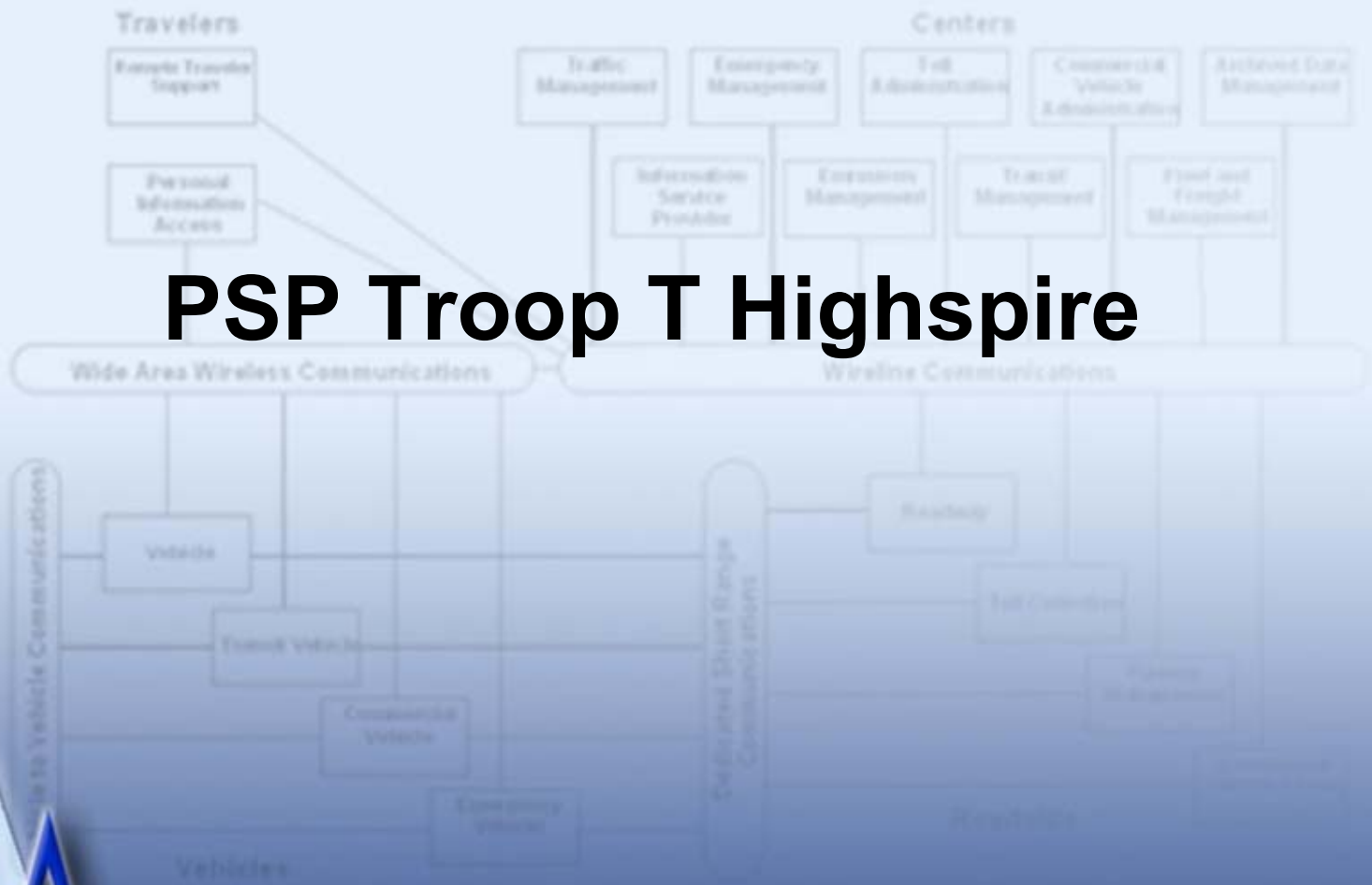
Existing  
Planned



———— Existing  
- - - - - Planned



# PSP Troop T Highspire



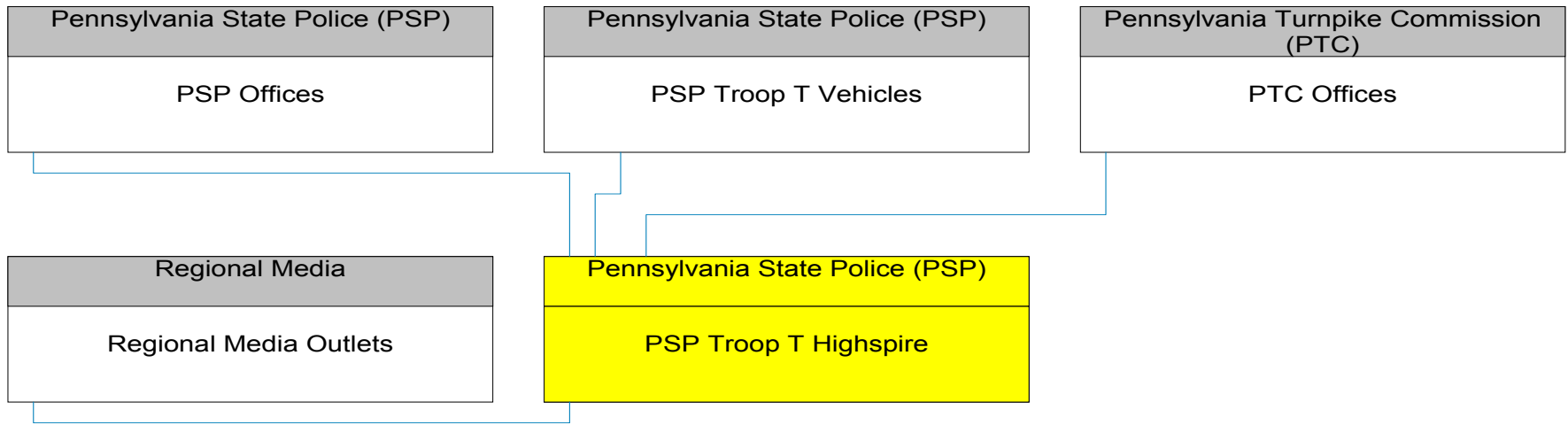
**PA**

735

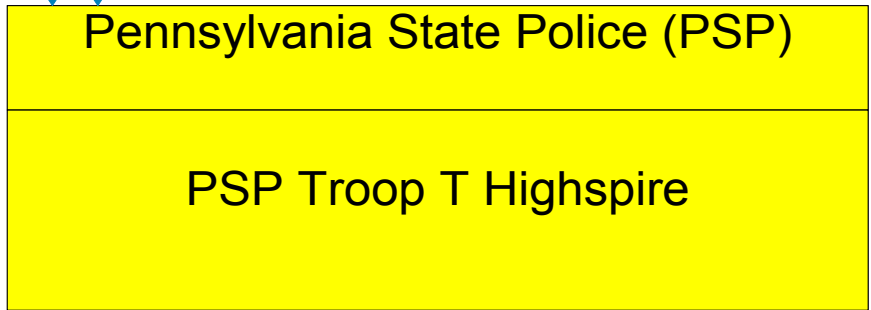
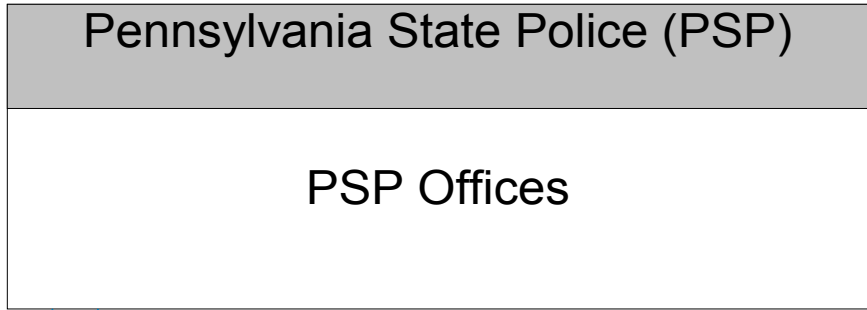
architecture



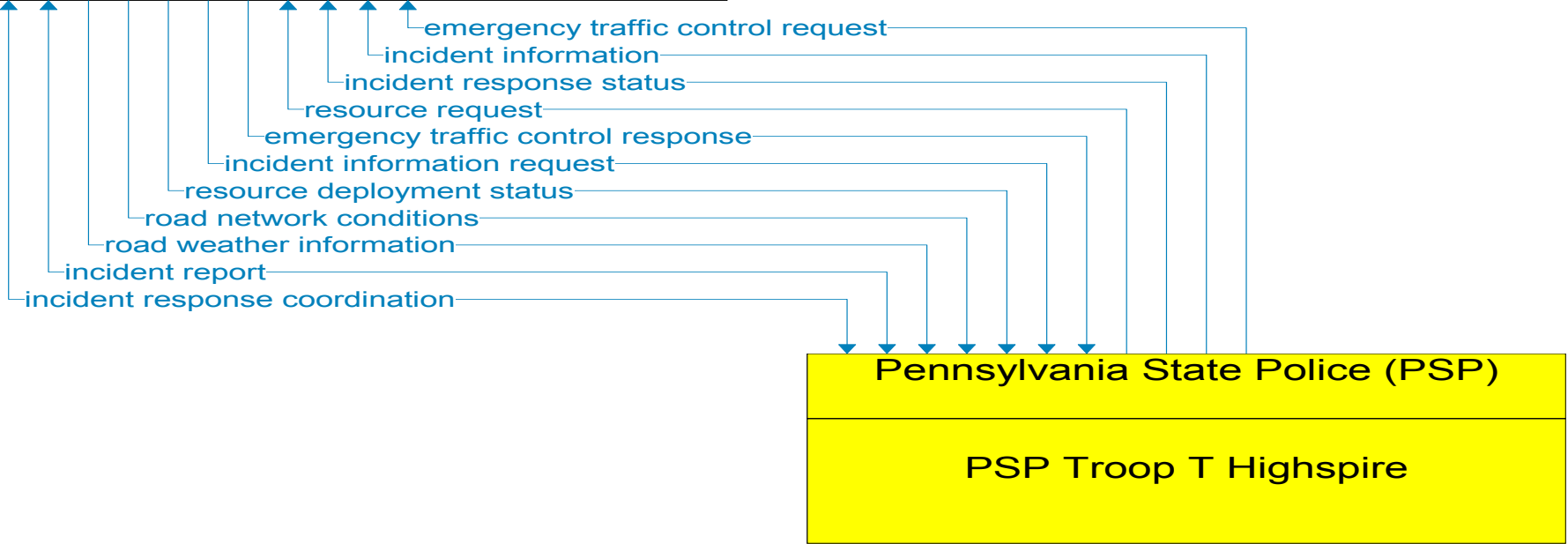
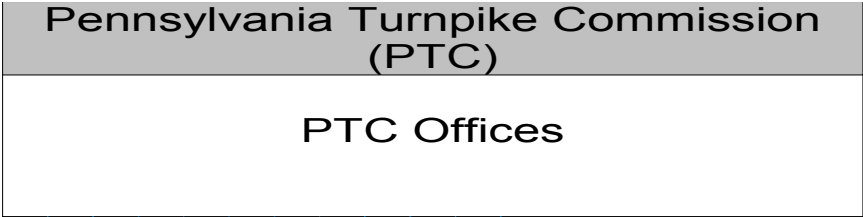
# PSP Troop T Highspire Interconnect Diagram

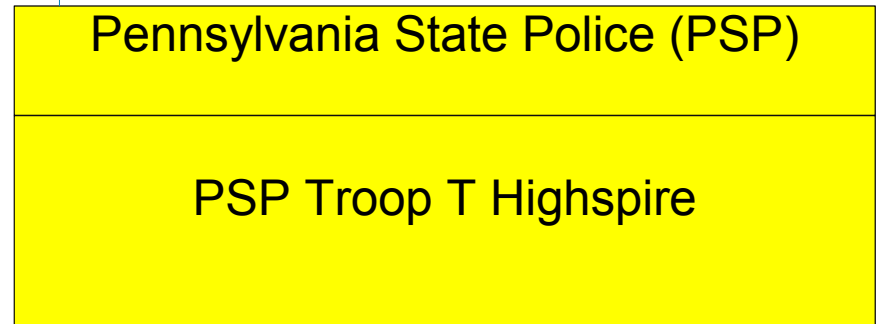
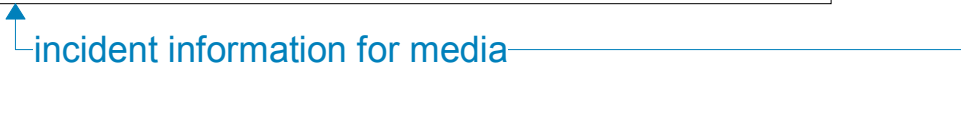
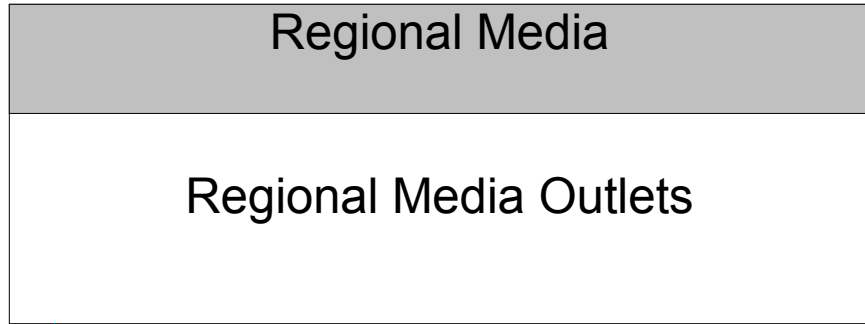


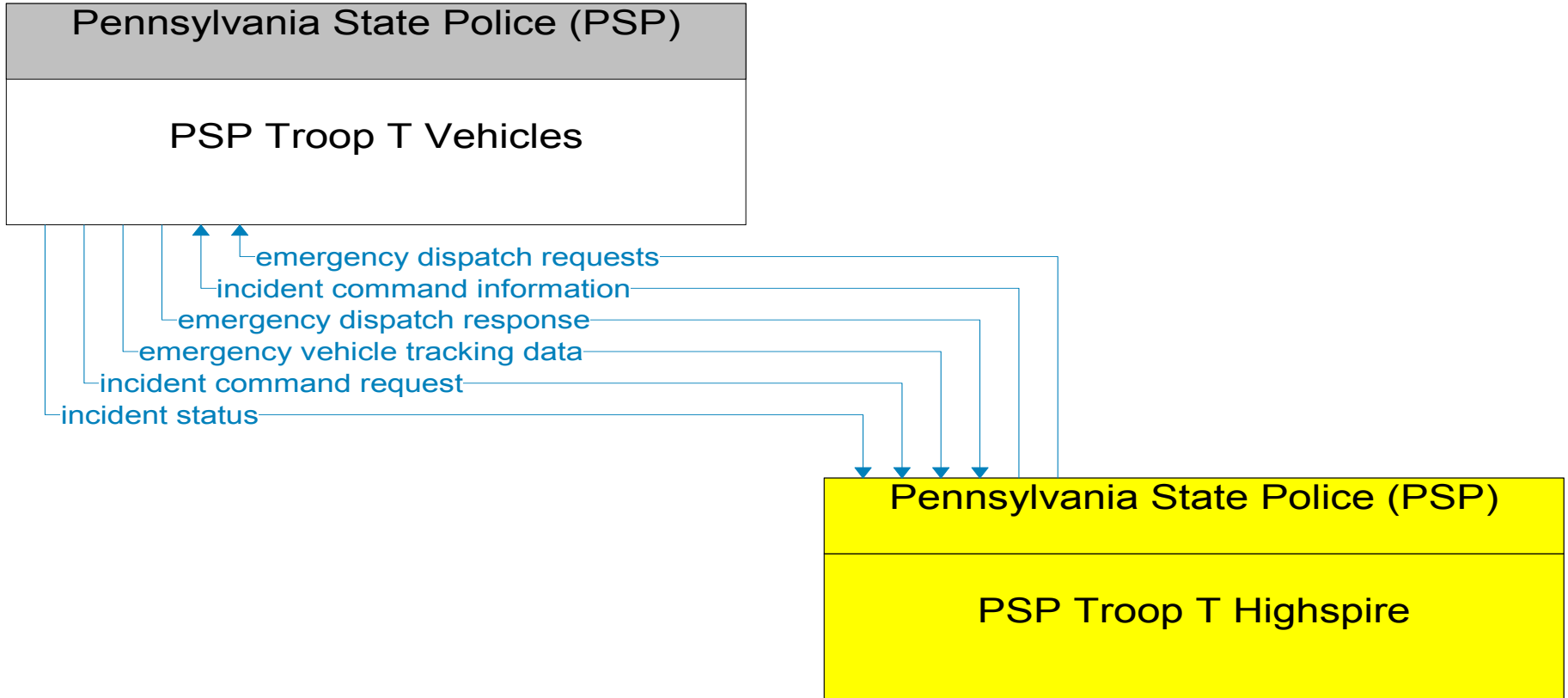
— Existing  
- - - Planned





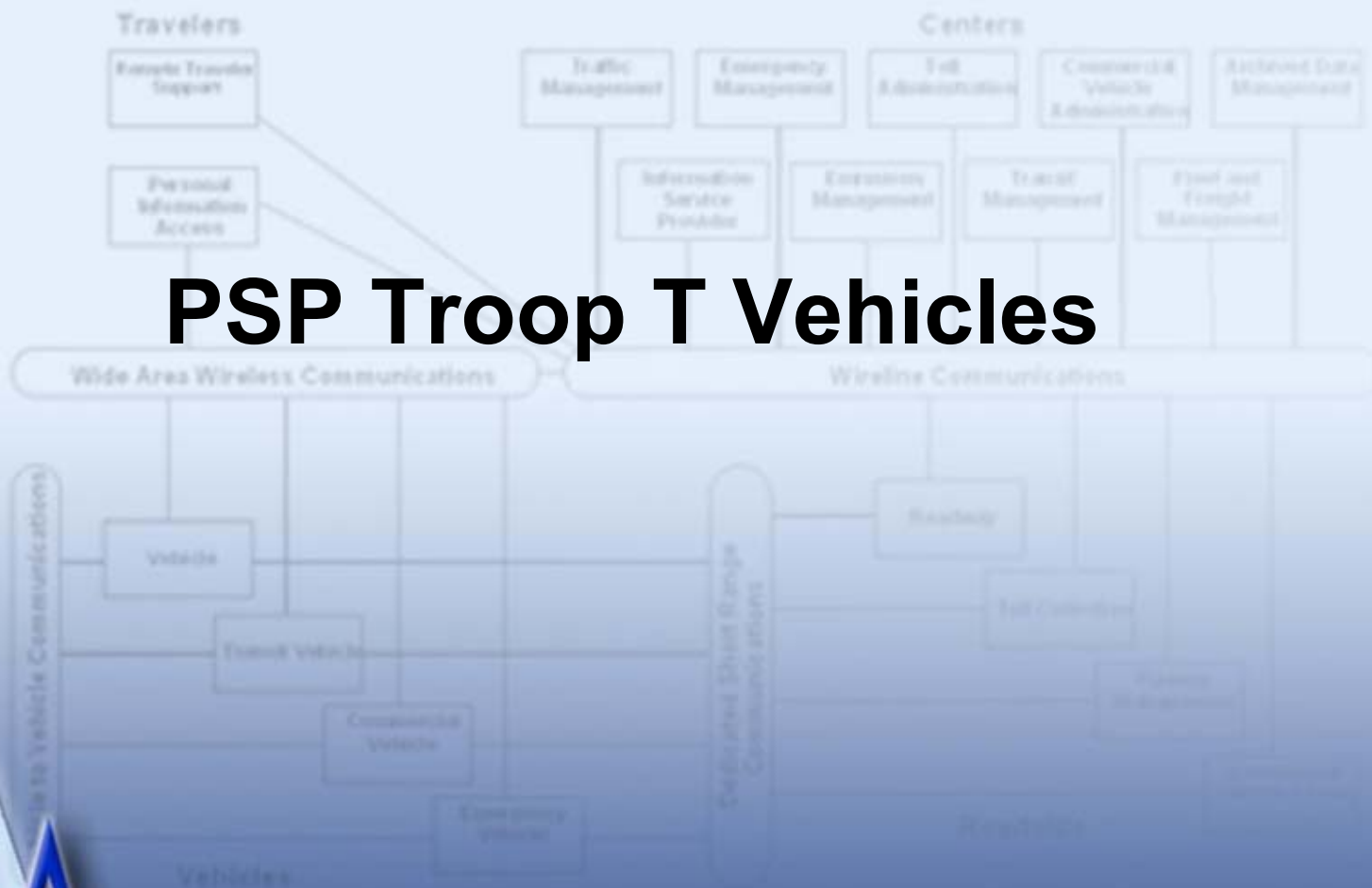






———— Existing  
- - - - - Planned

# PSP Troop T Vehicles

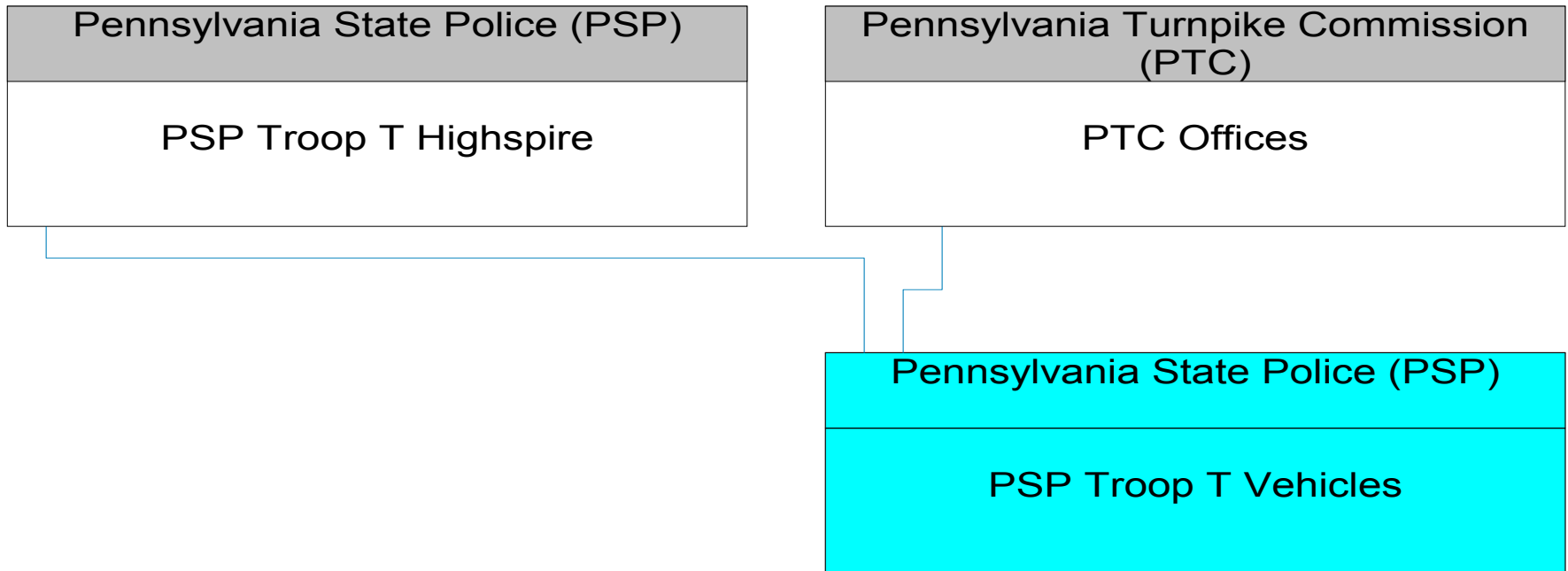


741

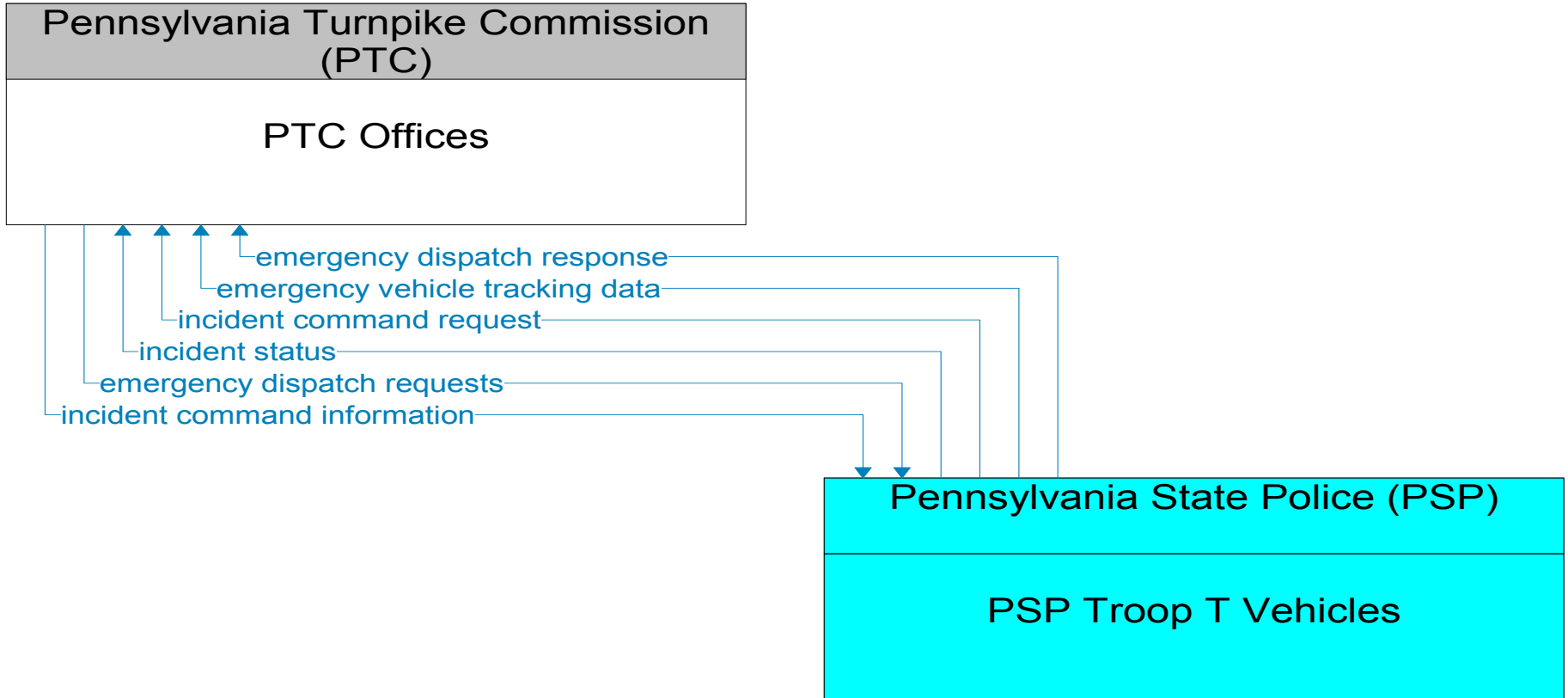
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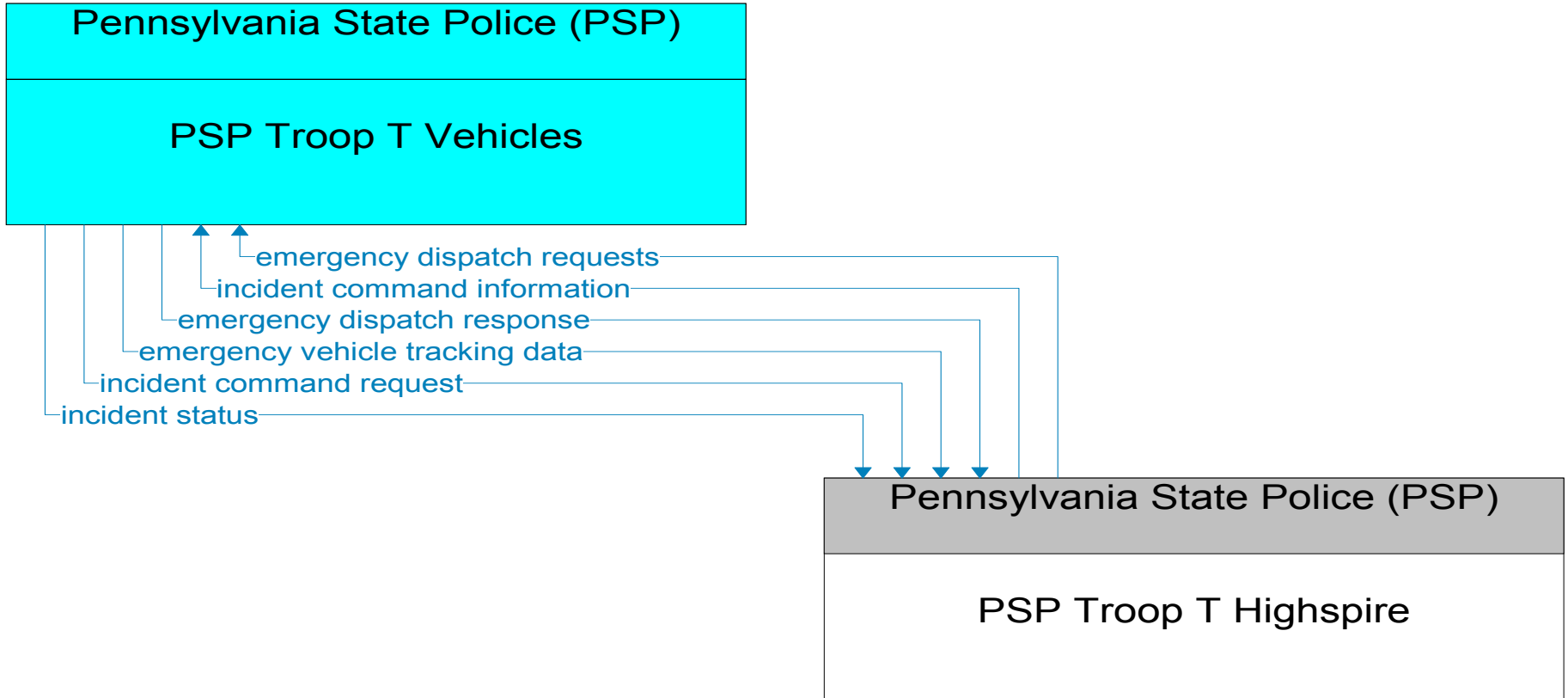
# PSP Troop T Vehicles Interconnect Diagram



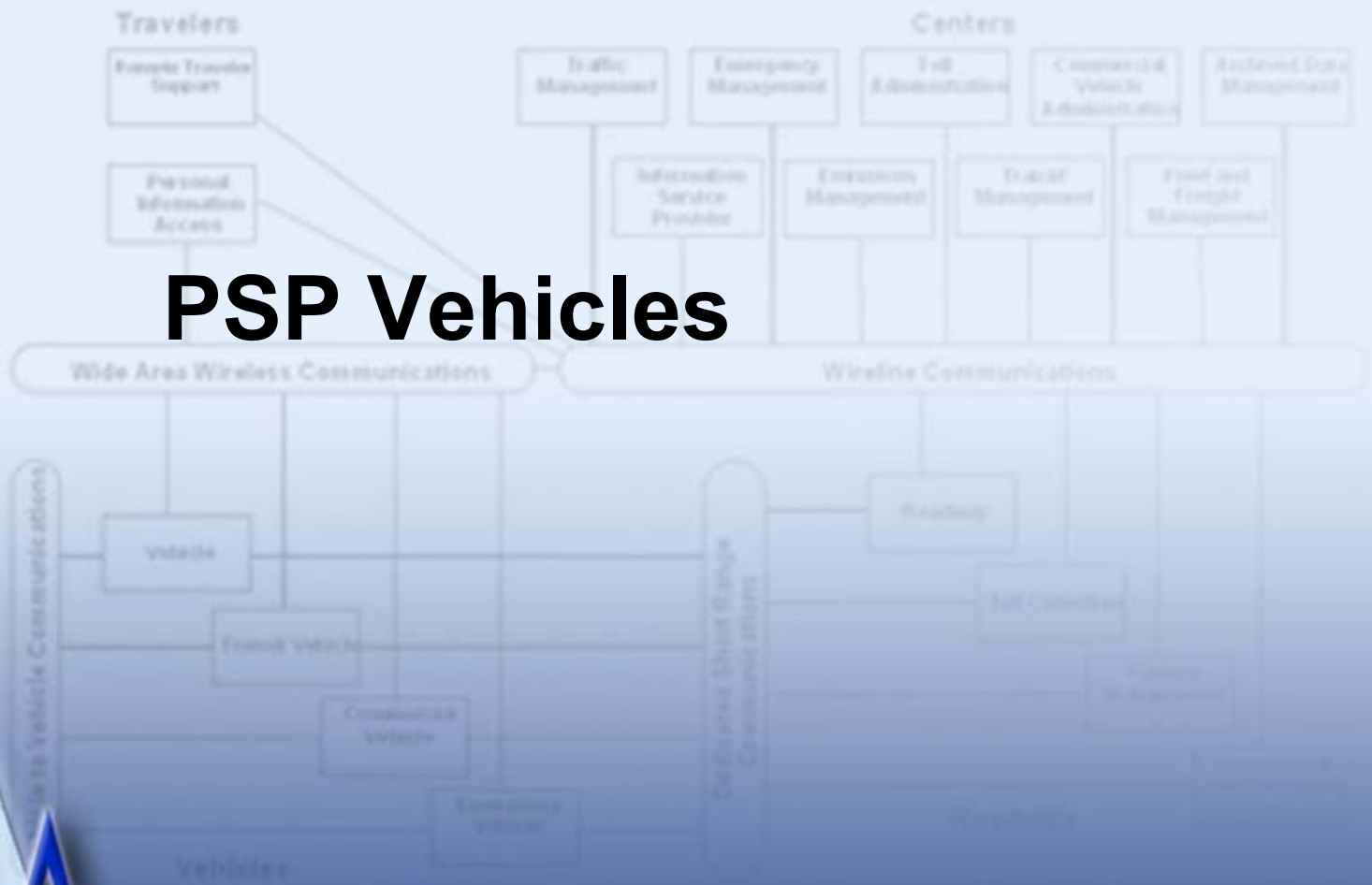
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———— Existing  
- - - - - Planned



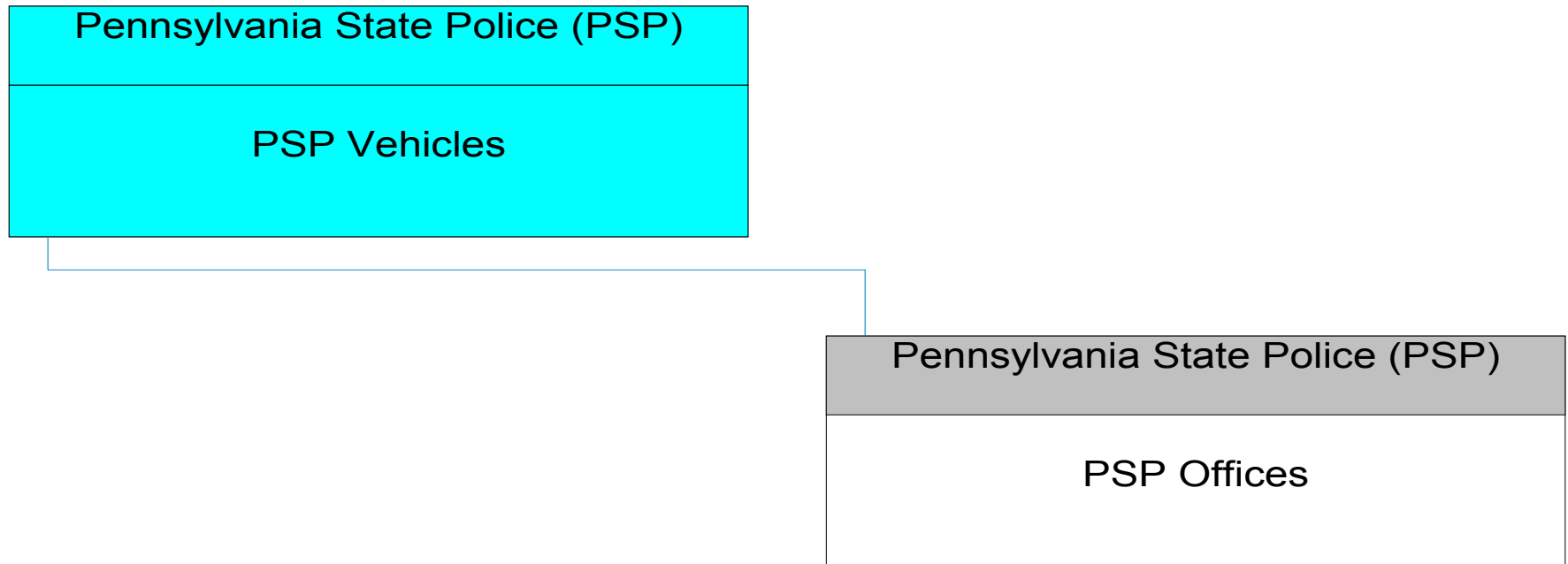
# PSP Vehicles



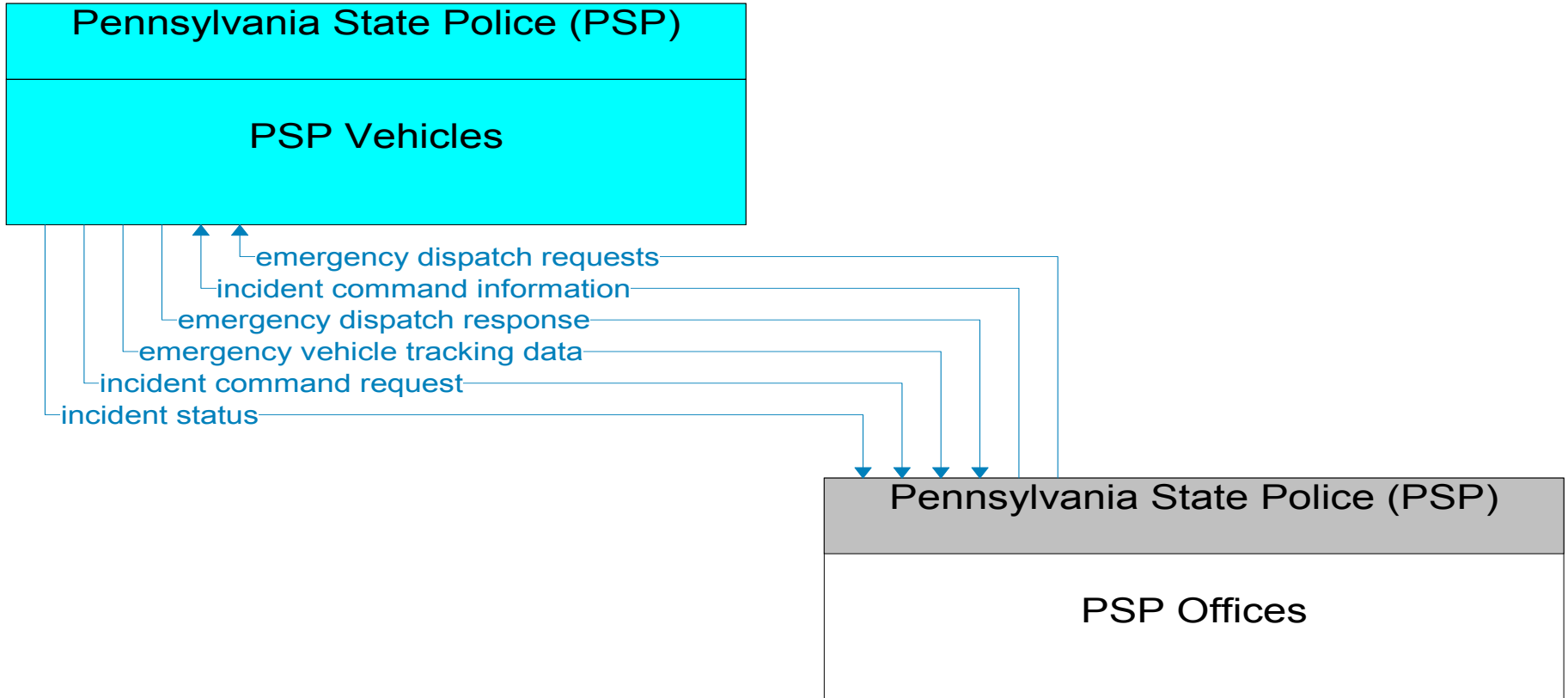
PA



# PSP Vehicles Interconnect Diagram

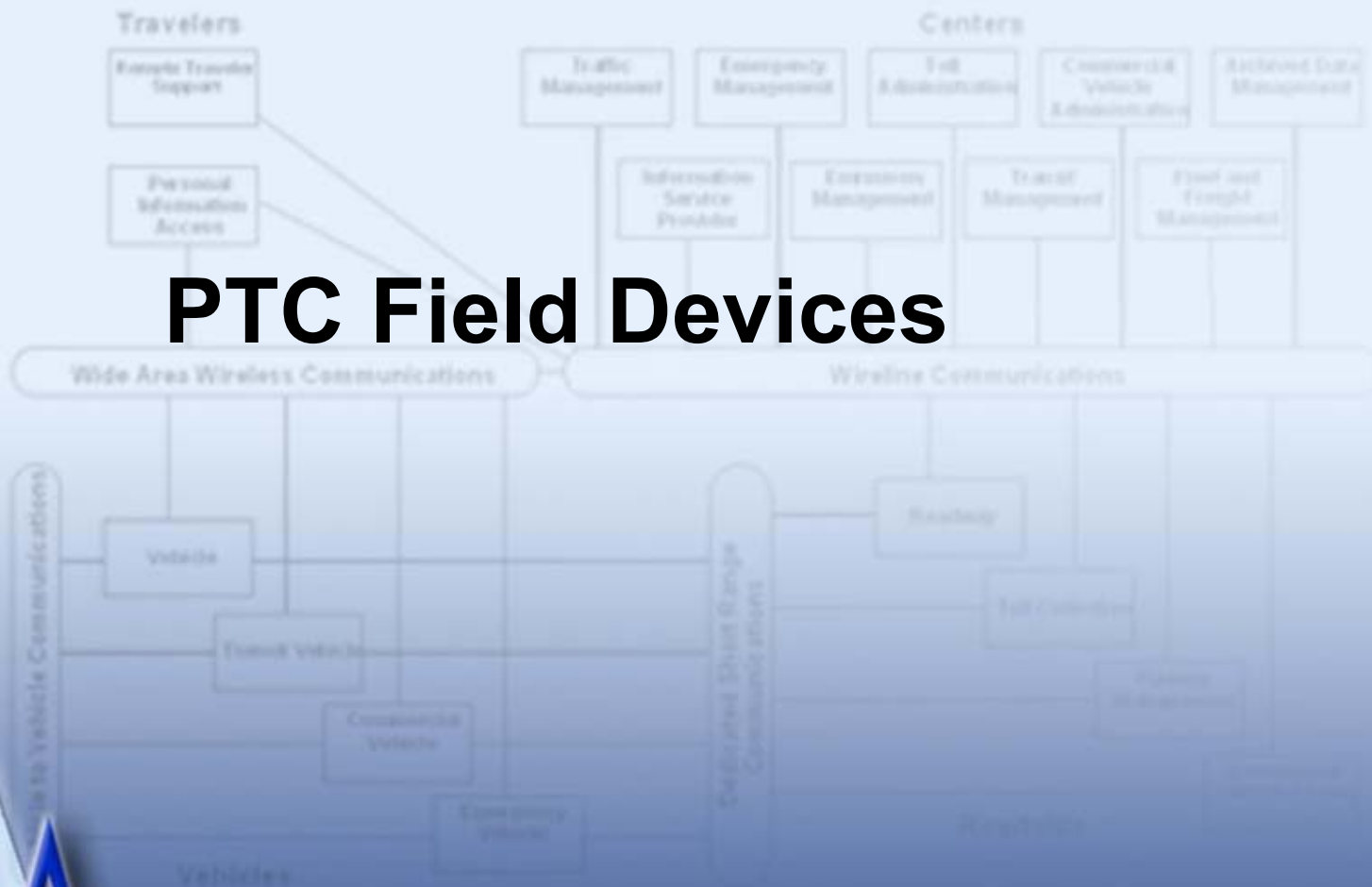


———— Existing  
----- Planned



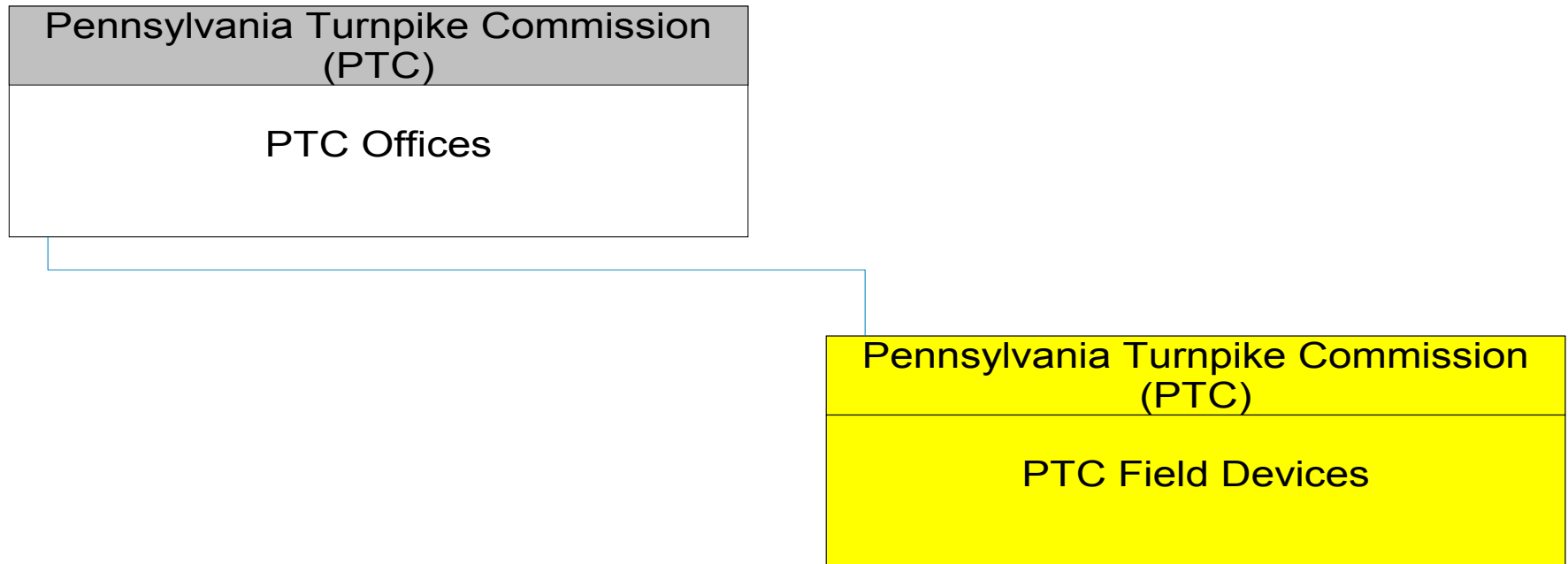
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# PTC Field Devices

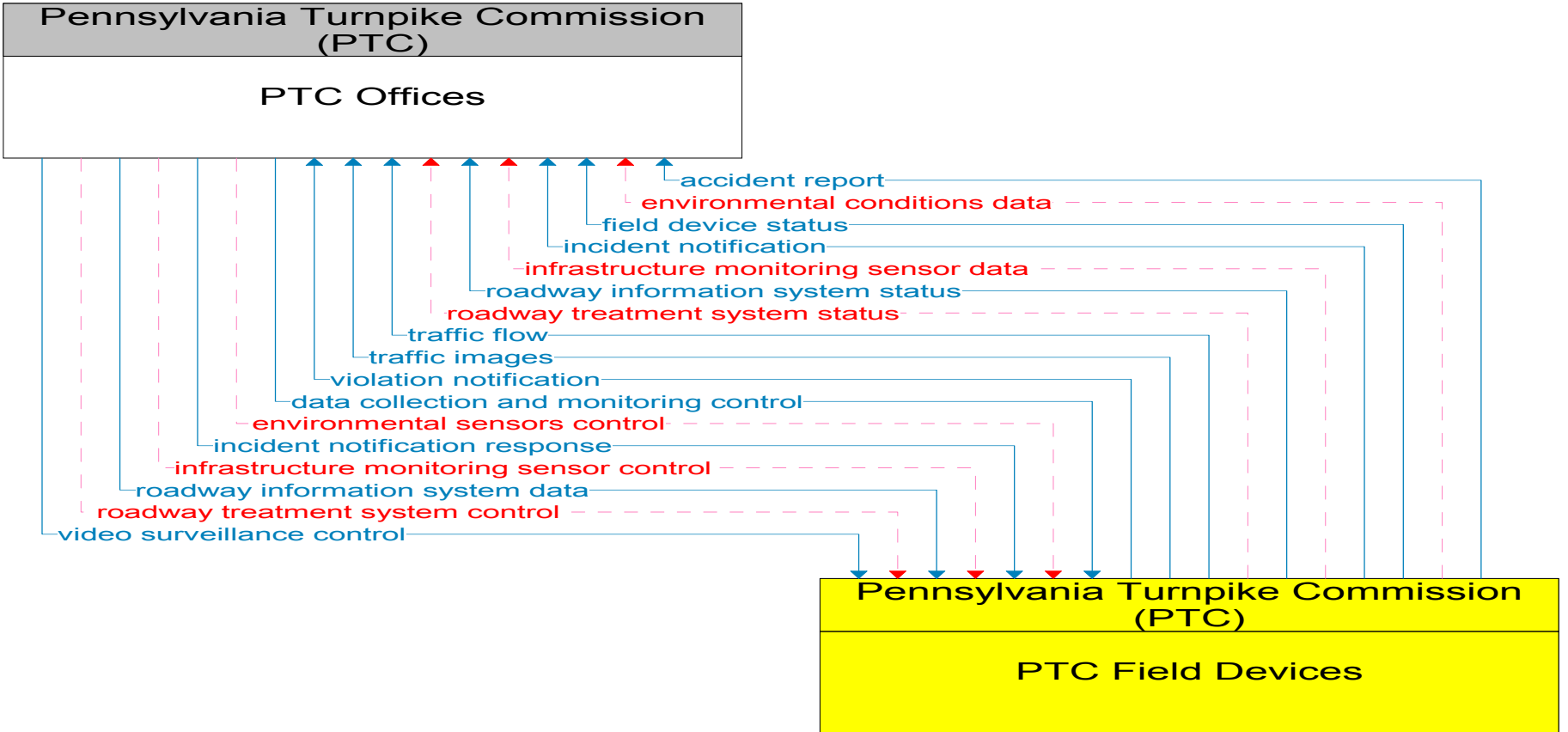


PA

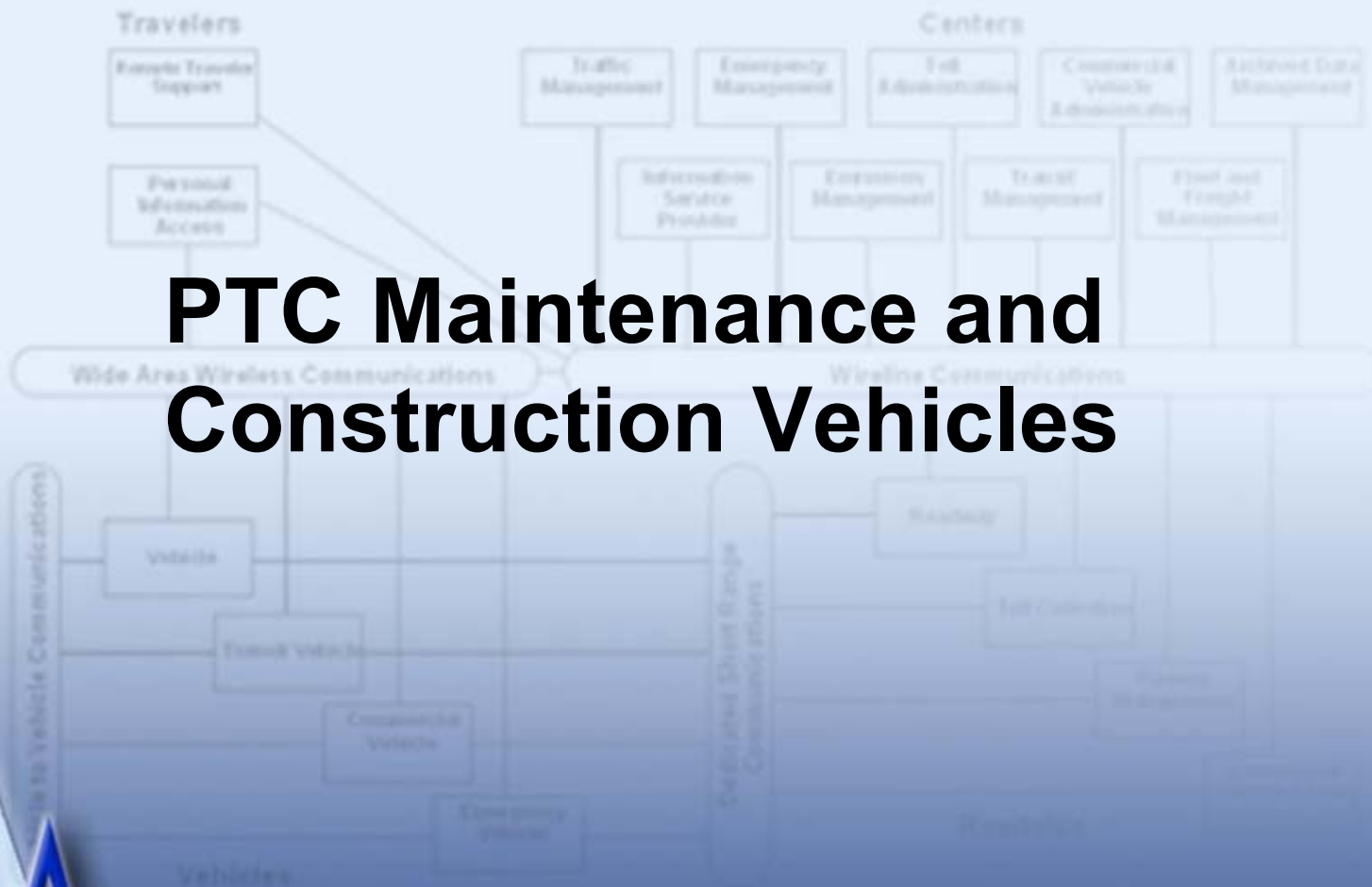
# PTC Field Devices Interconnect Diagram



———— Existing  
----- Planned



# PTC Maintenance and Construction Vehicles

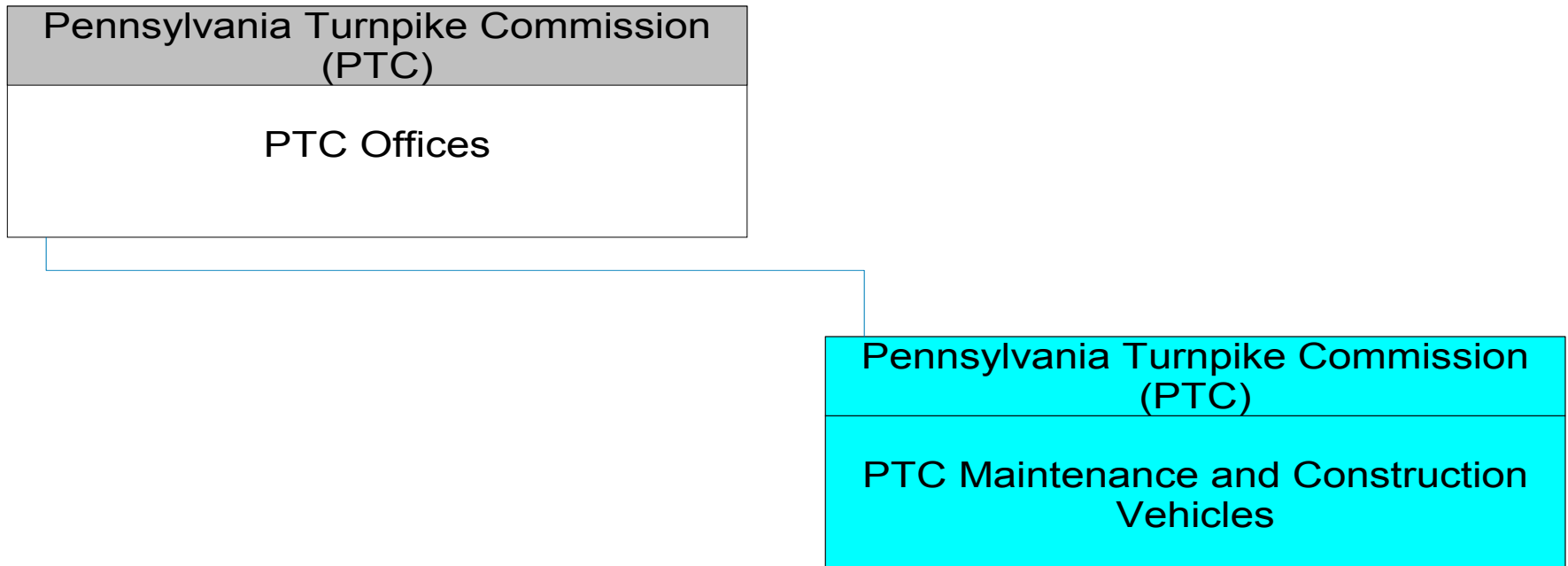


751

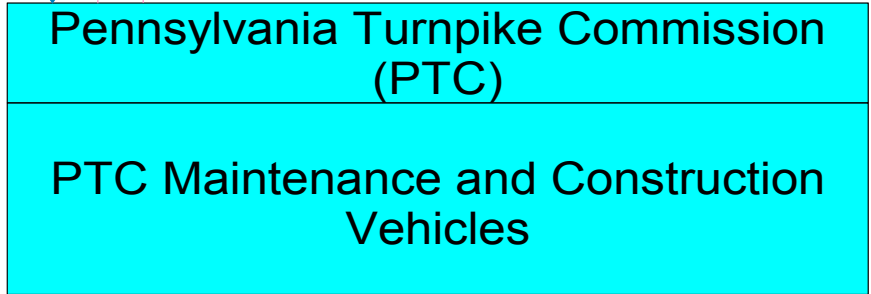
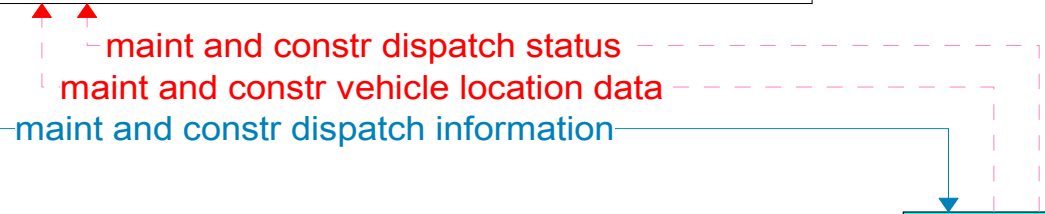
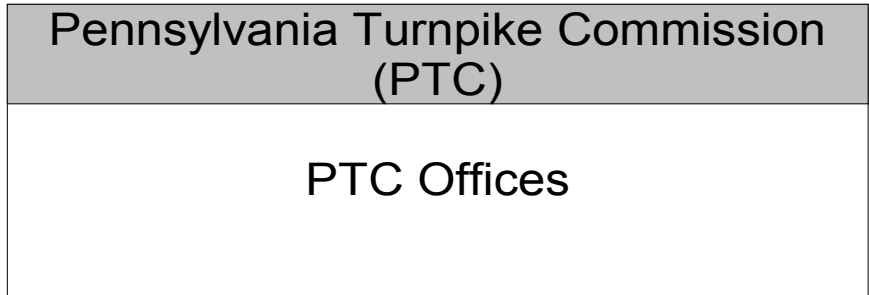
architecture



# PTC Maintenance and Construction Vehicles Interconnect Diagram



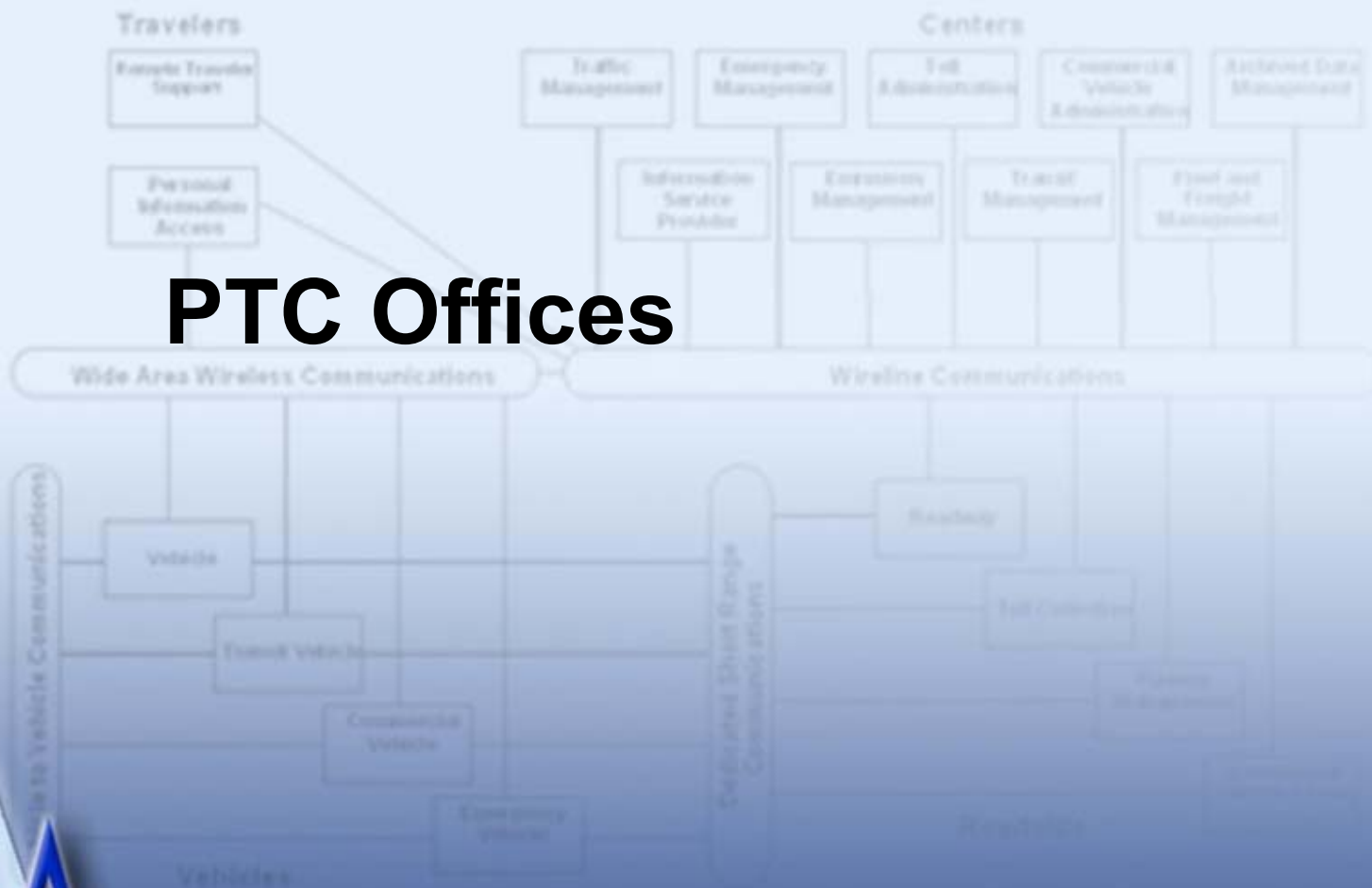
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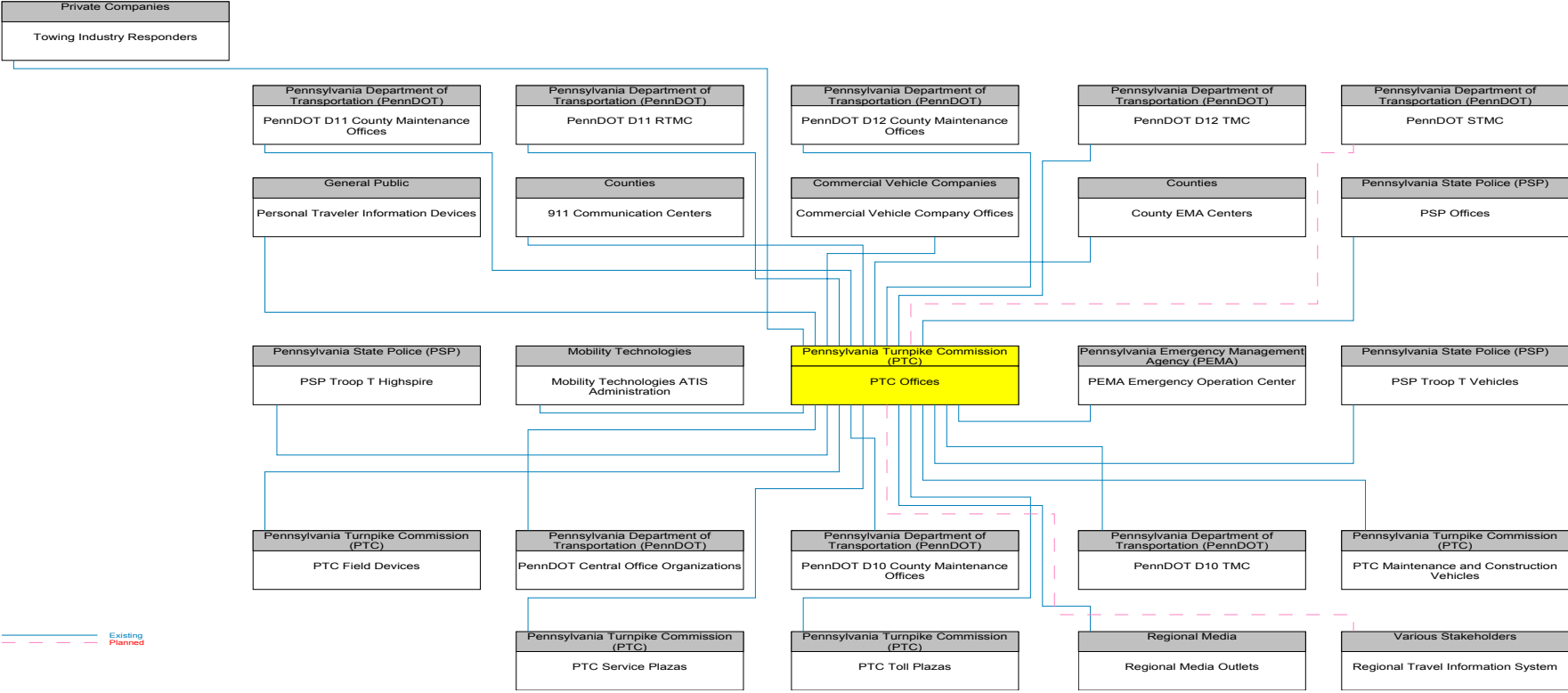
Existing  
Planned

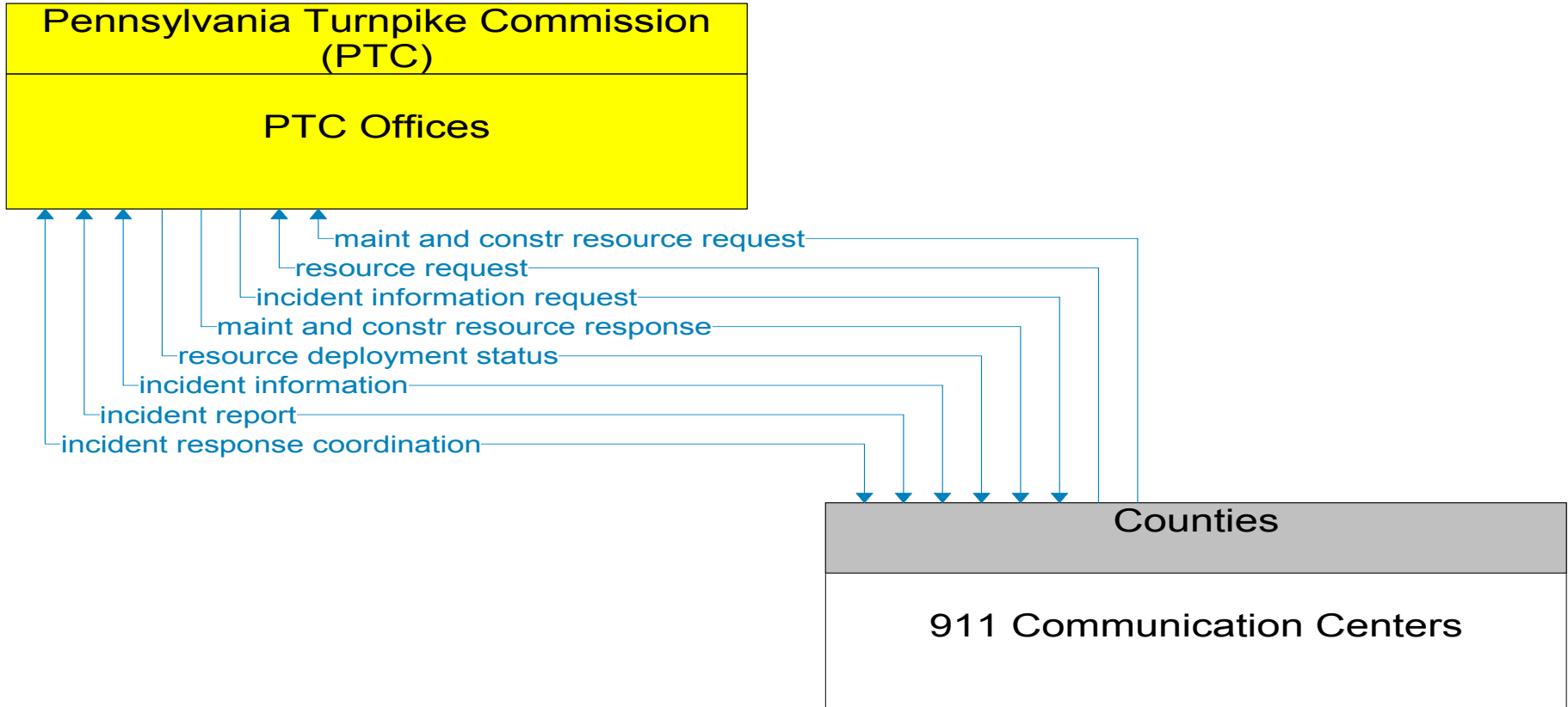


# PTC Offices

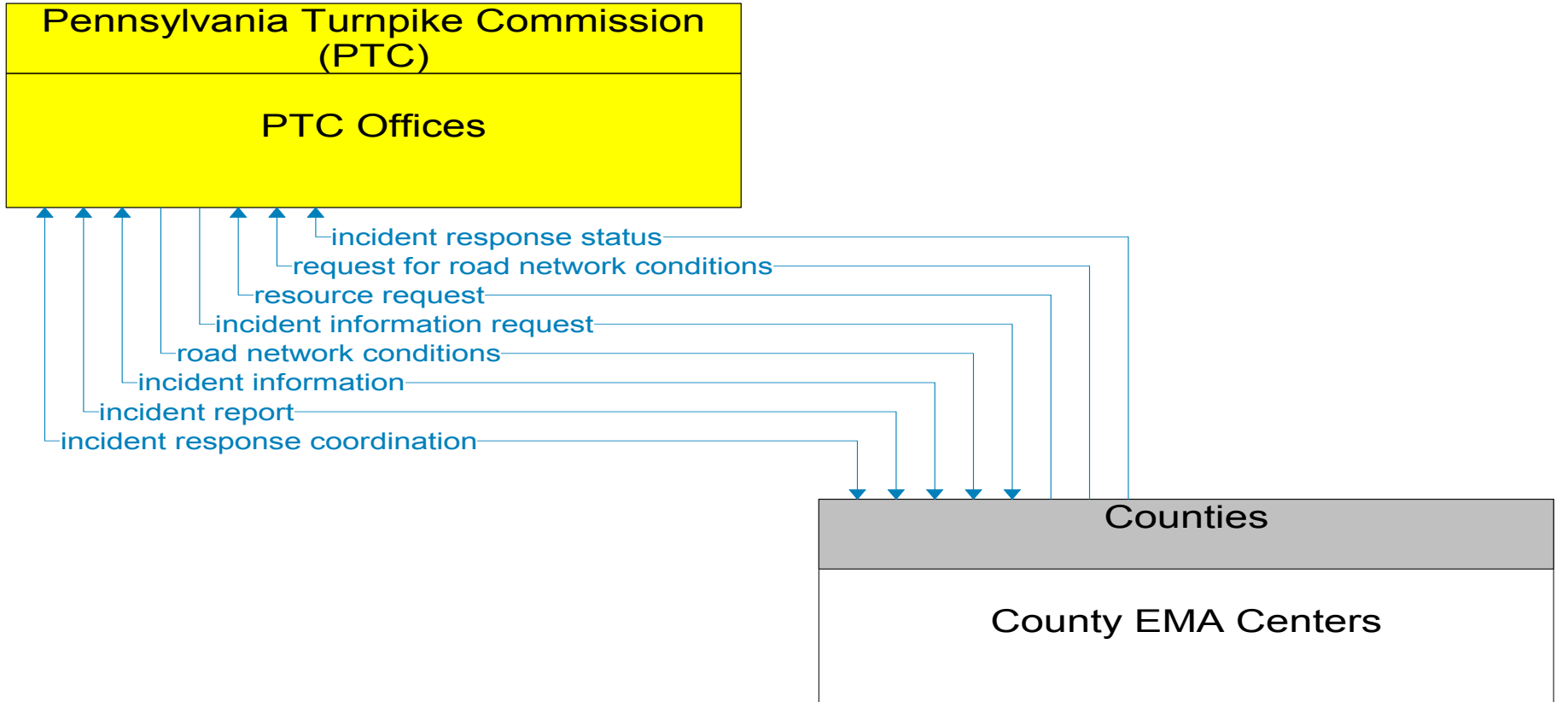


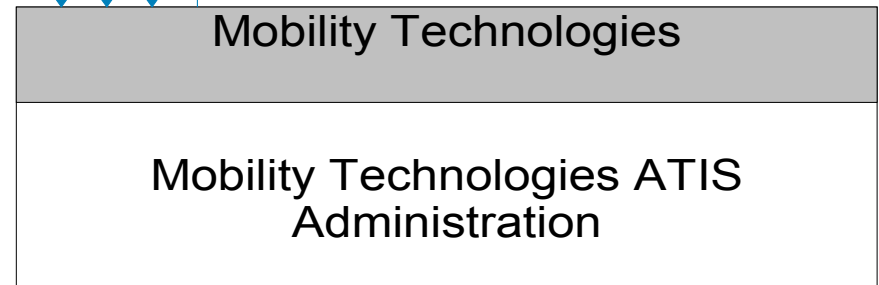
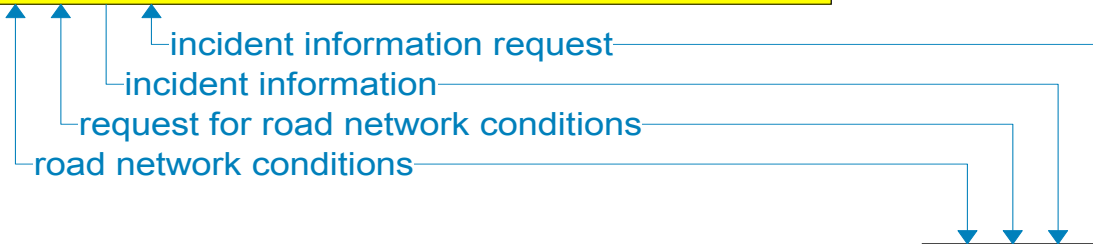
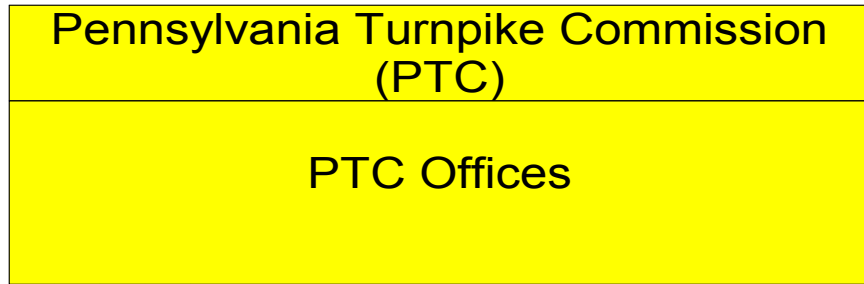
# PTC Offices Interconnect Diagram



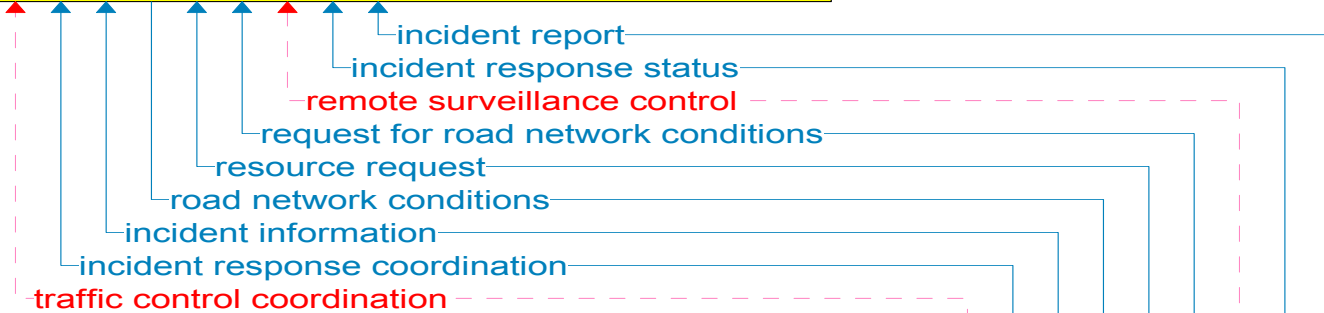
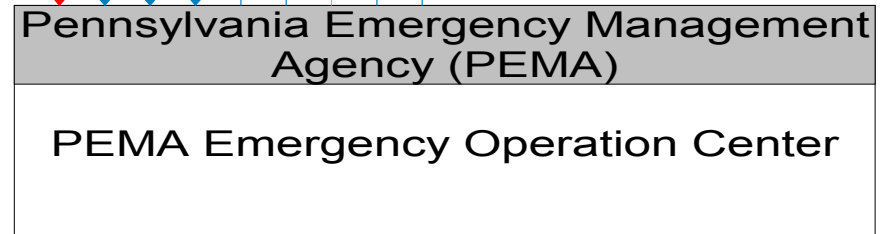
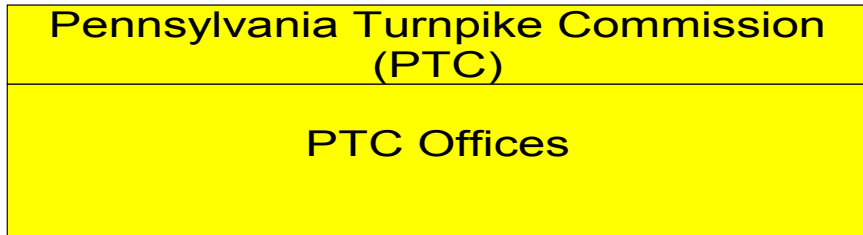


———— Existing  
----- Planned

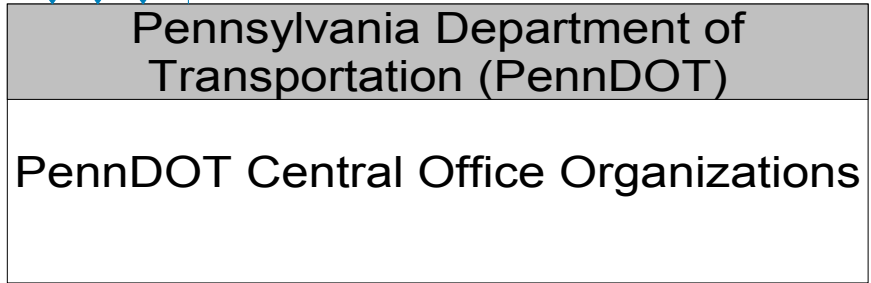
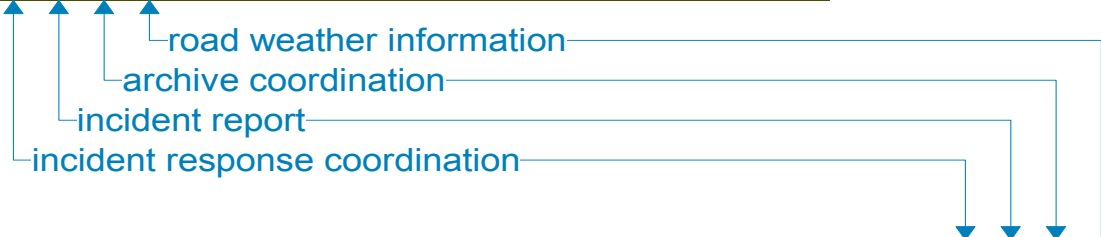
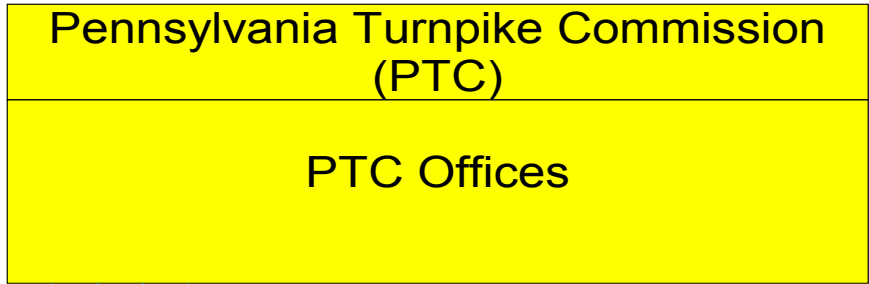




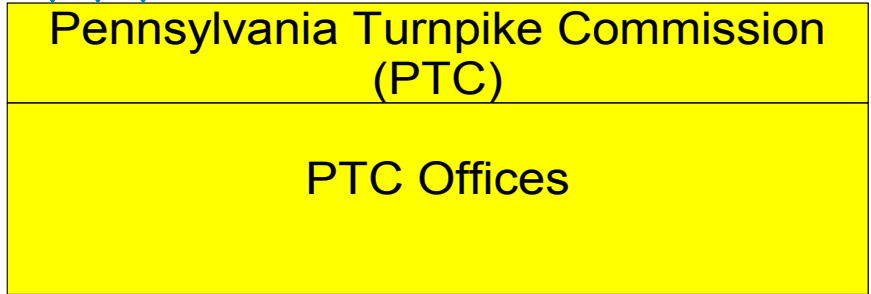
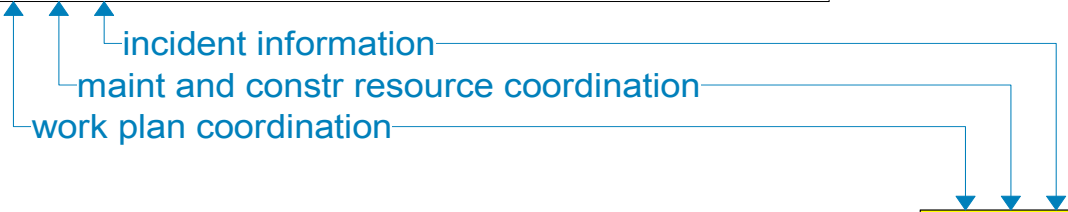
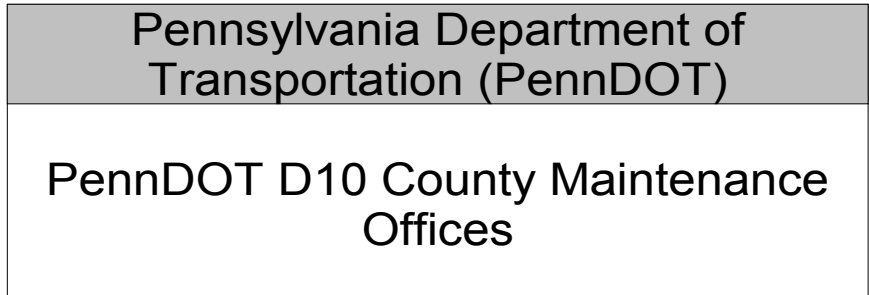
Existing  
Planned



Existing  
Planned

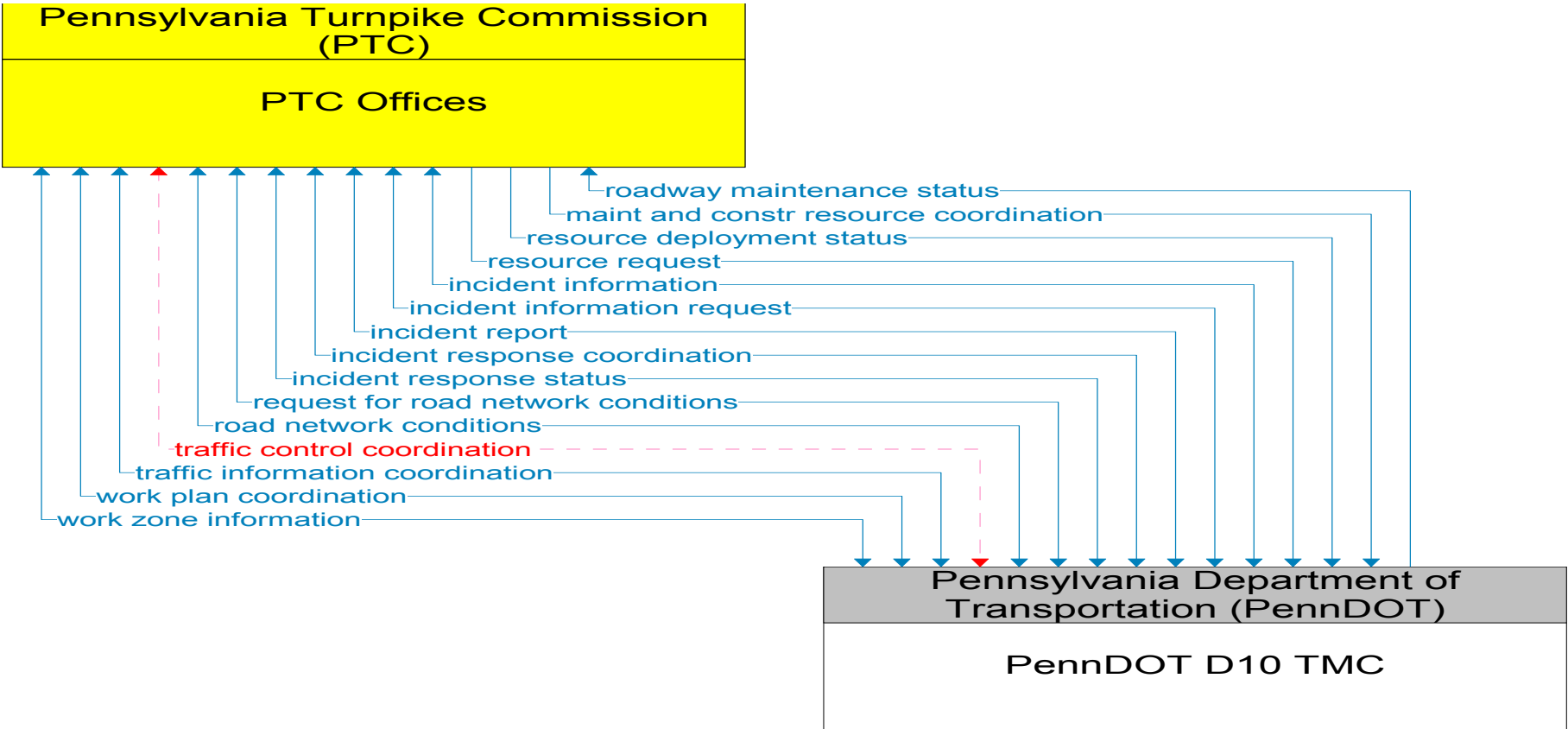


———— Existing  
----- Planned



Existing  
Planned





Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D11 County Maintenance  
Offices

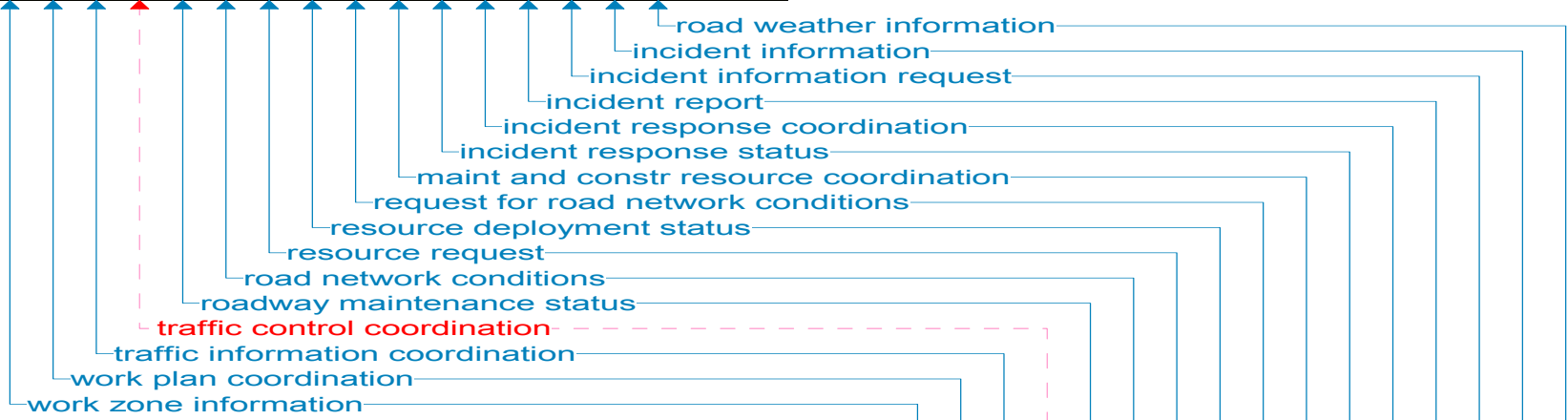
Pennsylvania Turnpike Commission  
(PTC)

PTC Offices



———— Existing  
----- Planned

**Pennsylvania Turnpike Commission (PTC)**  
**PTC Offices**



**Pennsylvania Department of Transportation (PennDOT)**  
**PennDOT D11 RTMC**

———— Existing  
- - - - - Planned

Pennsylvania Department of  
Transportation (PennDOT)

PennDOT D12 County Maintenance  
Offices

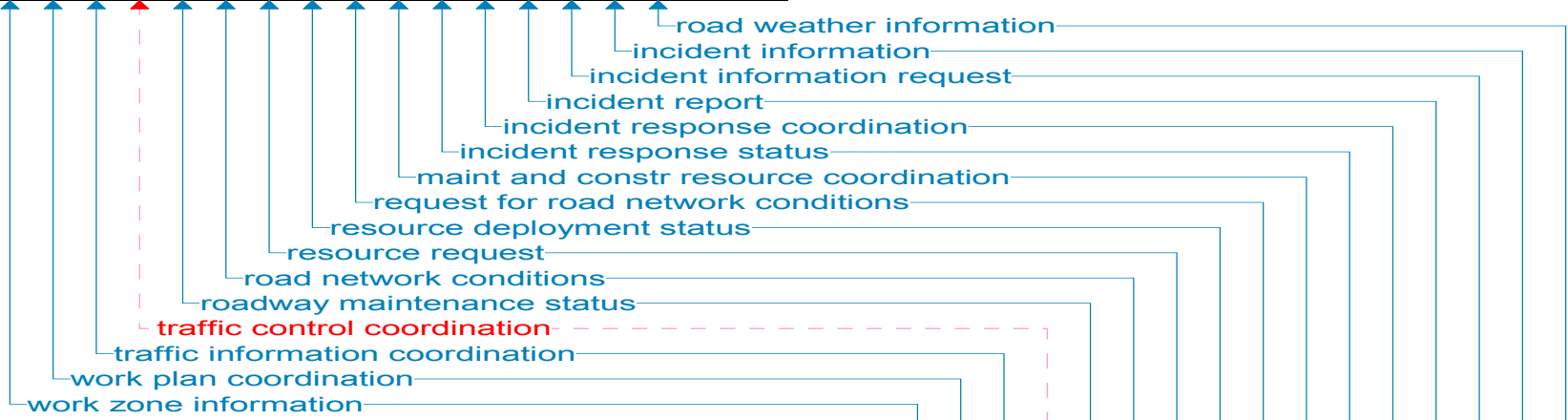
↑↑  
↑ maint and constr resource coordination  
↑ work plan coordination

Pennsylvania Turnpike Commission  
(PTC)

PTC Offices

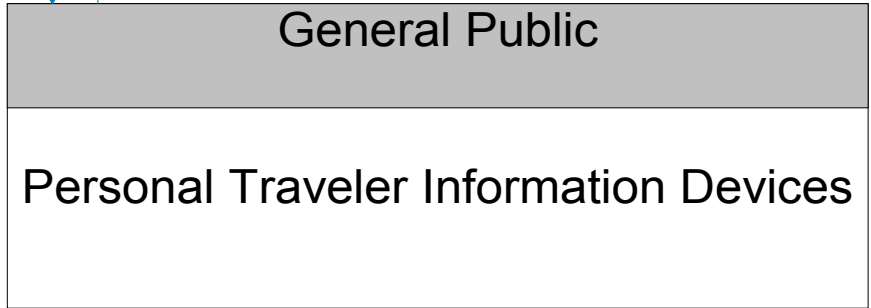
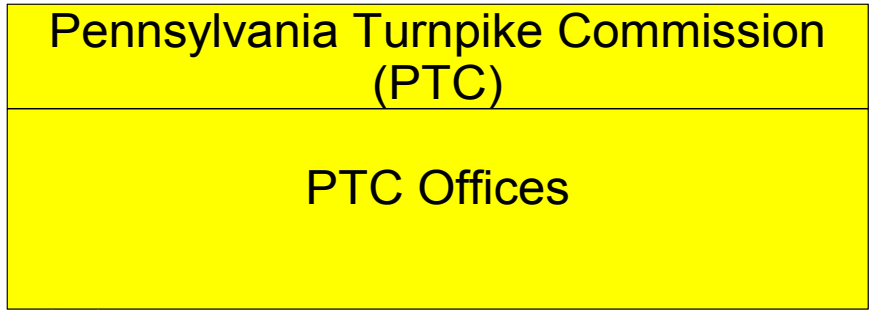
———— Existing  
- - - - - Planned

**Pennsylvania Turnpike Commission (PTC)**  
**PTC Offices**



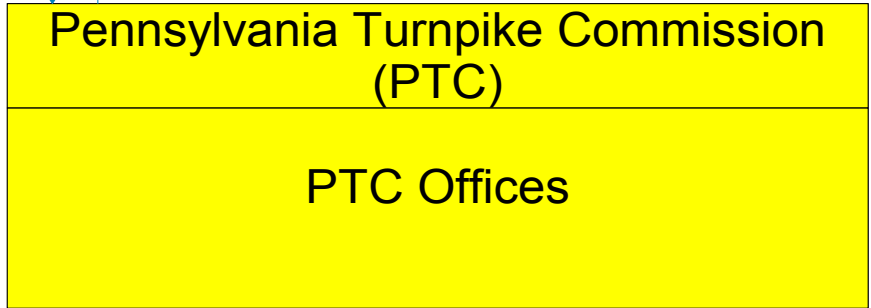
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**PennDOT D12 TMC**

Existing  
Planned

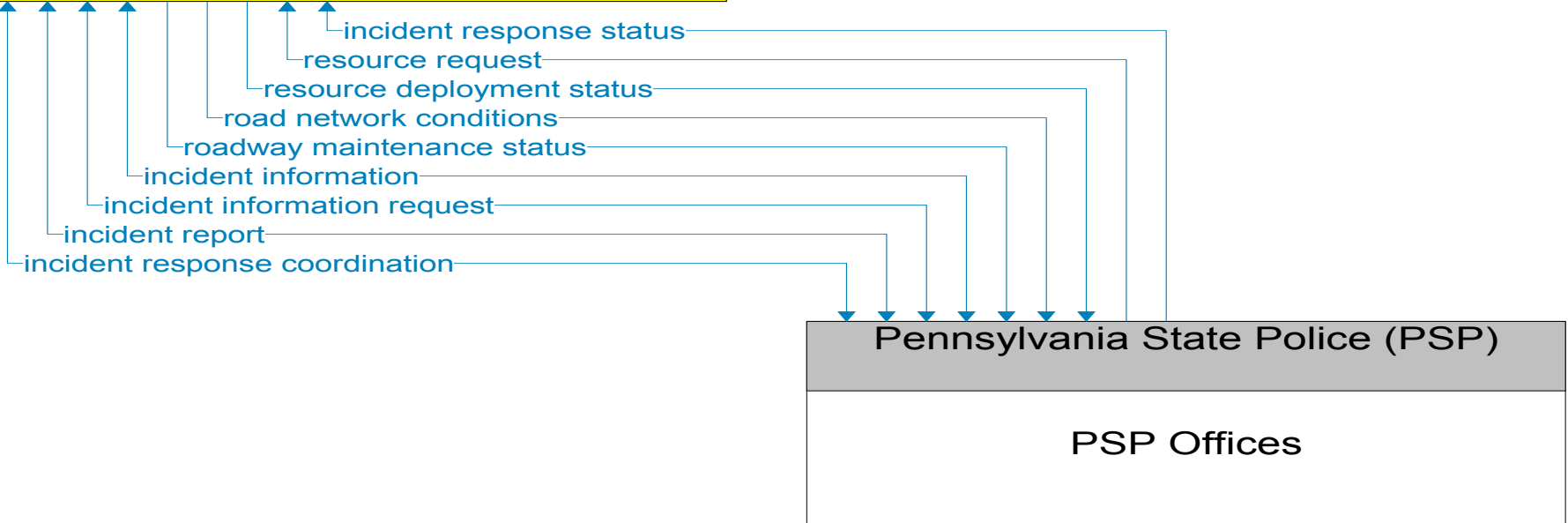
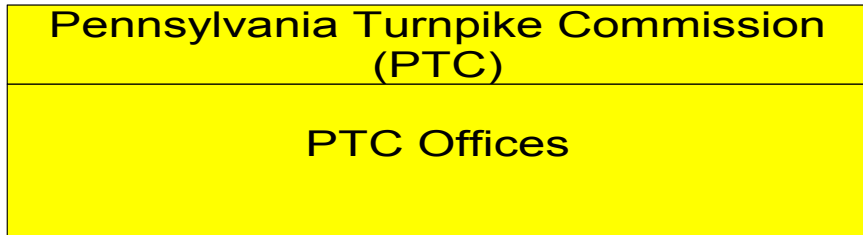


emergency notification  
broadcast information

Existing  
Planned

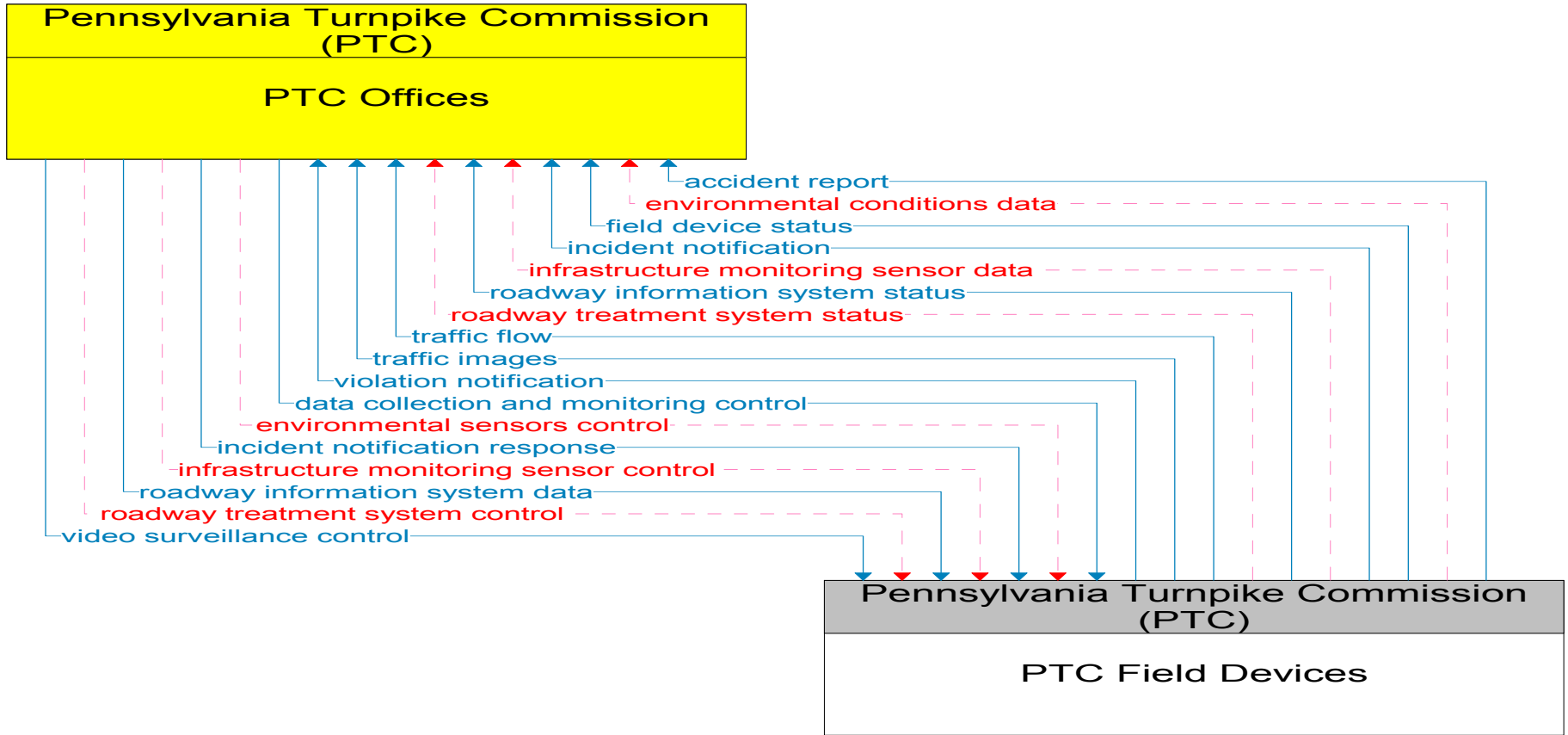


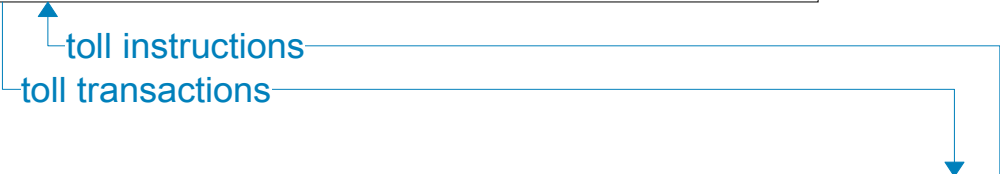
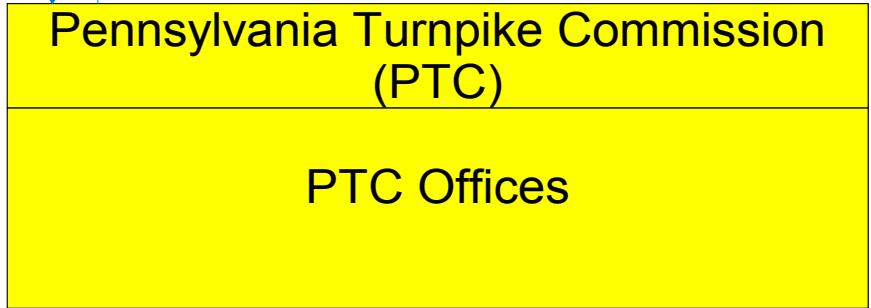
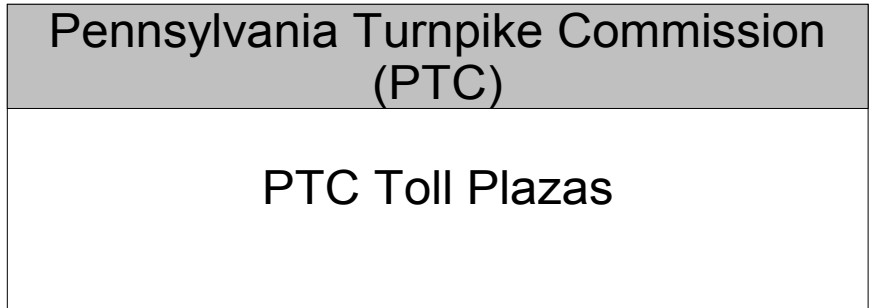
Existing  
Planned



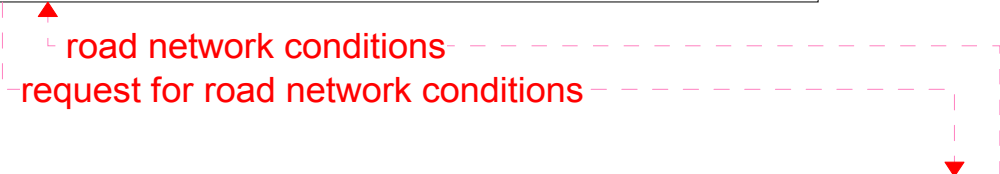
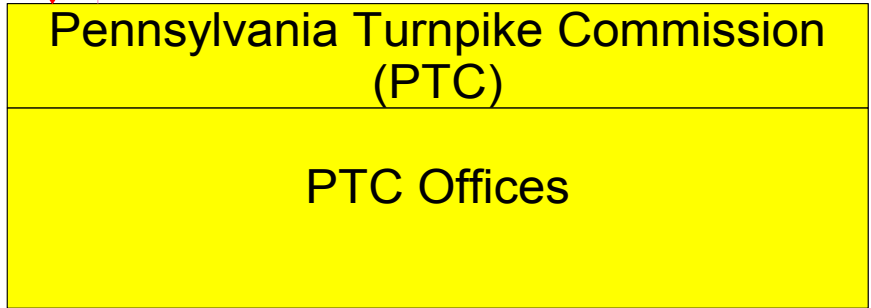
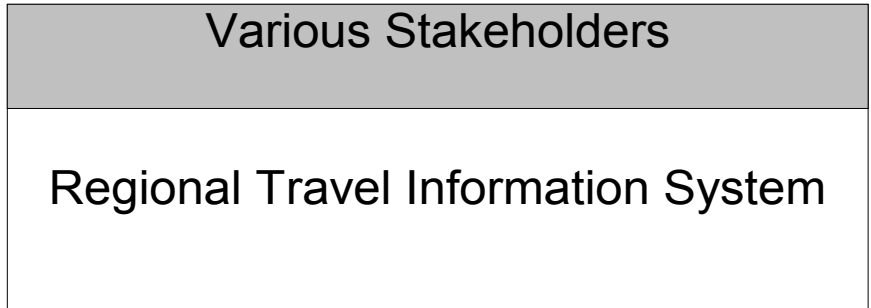
Existing  
Planned



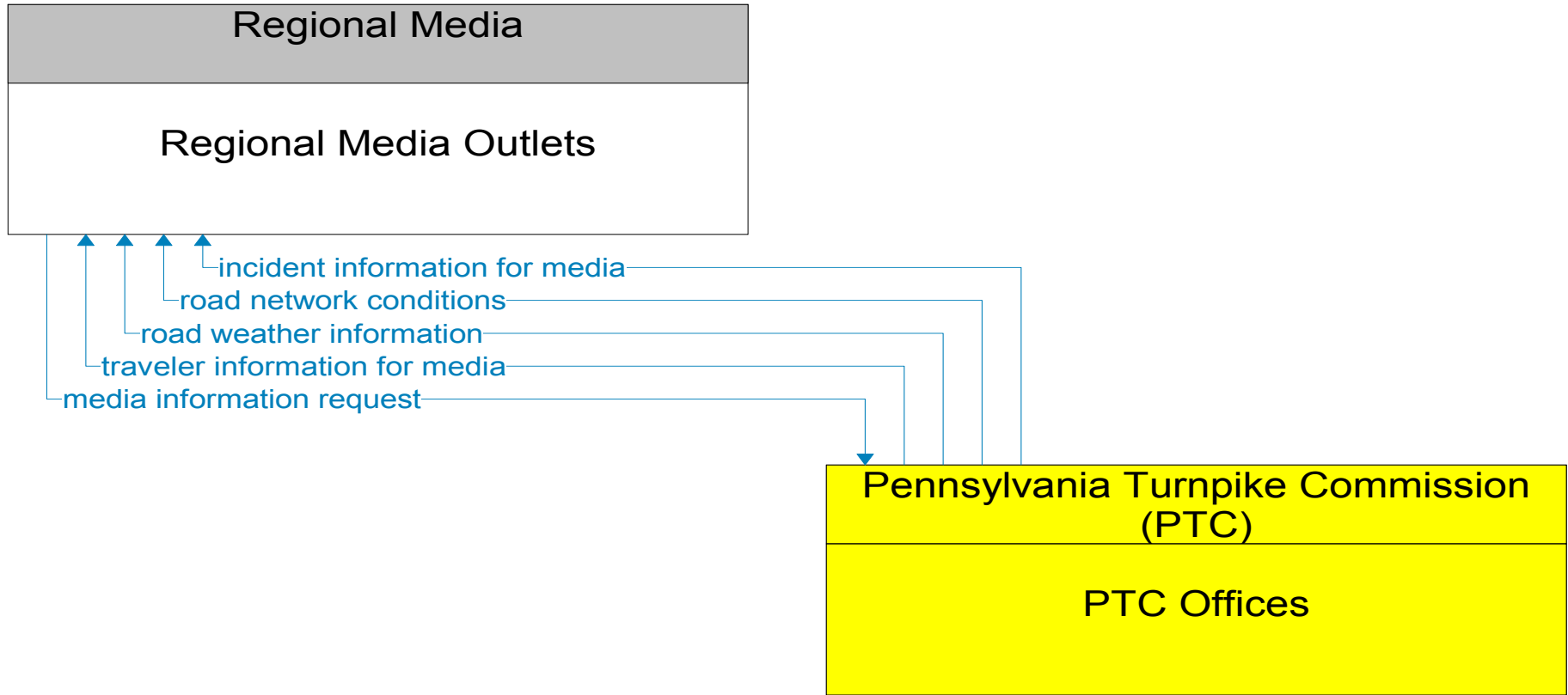


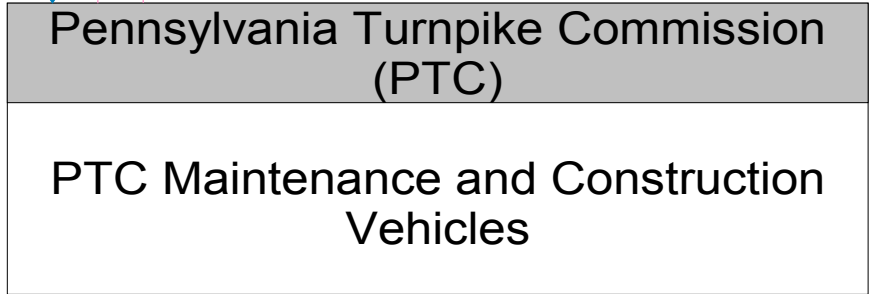
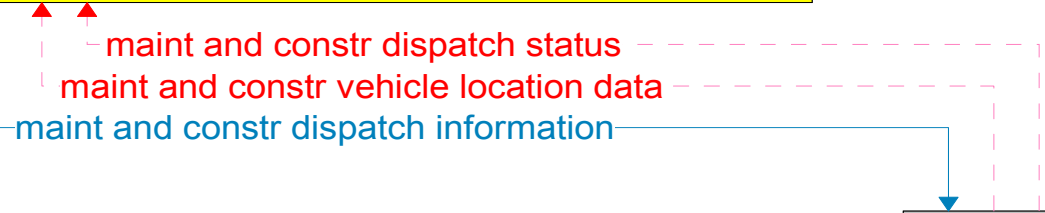
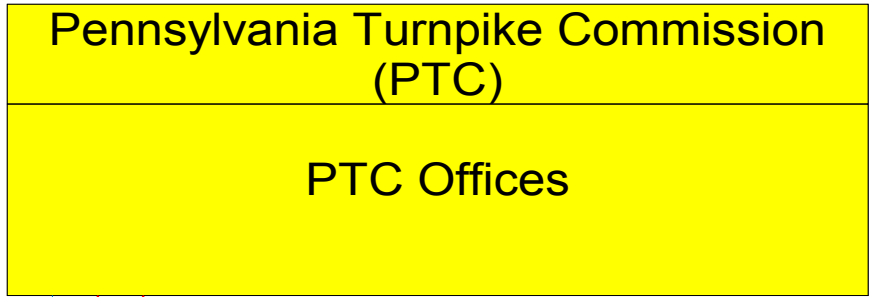


———— Existing  
----- Planned

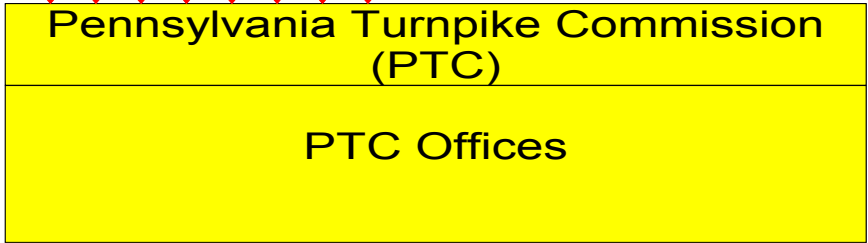
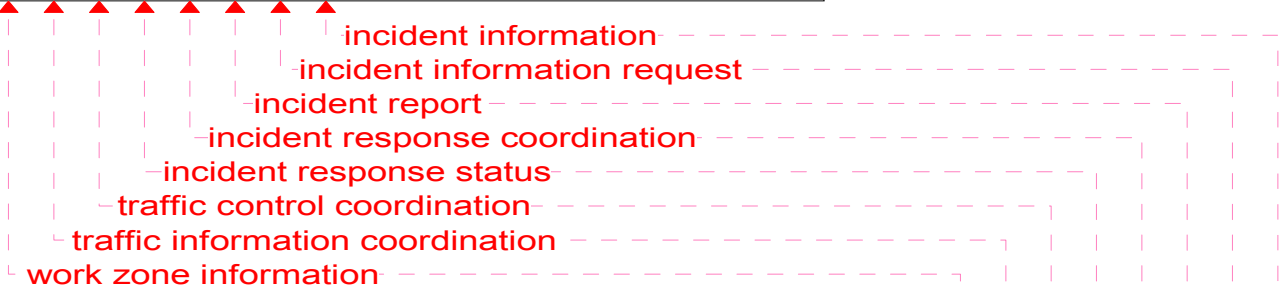
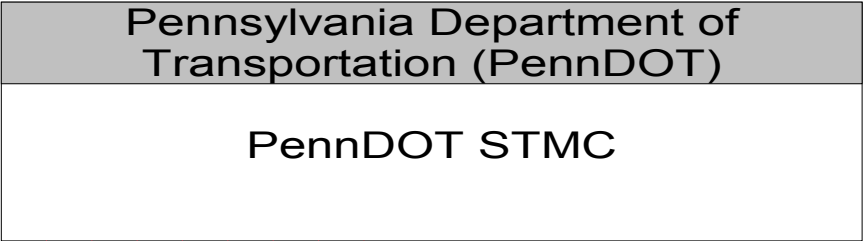


Existing  
Planned

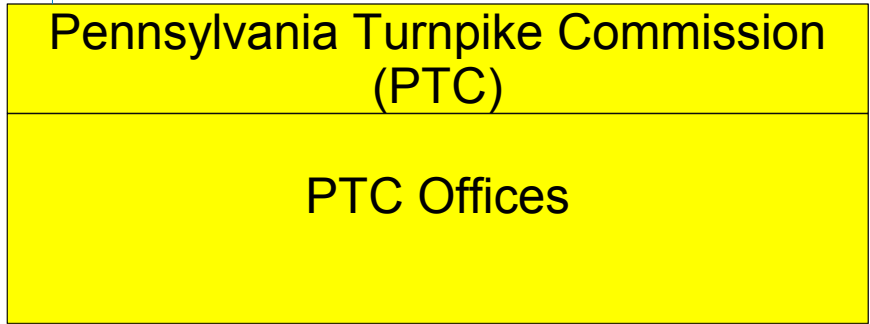
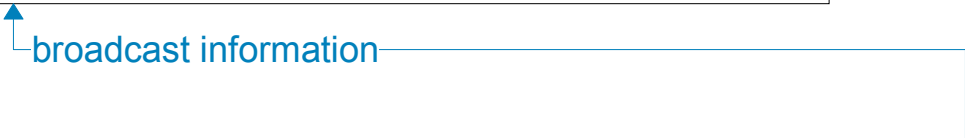
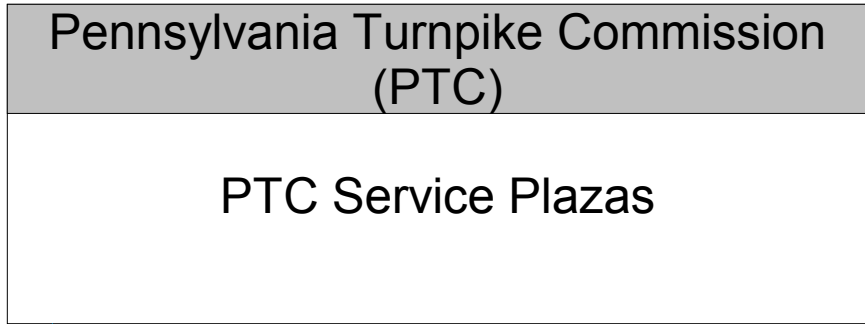


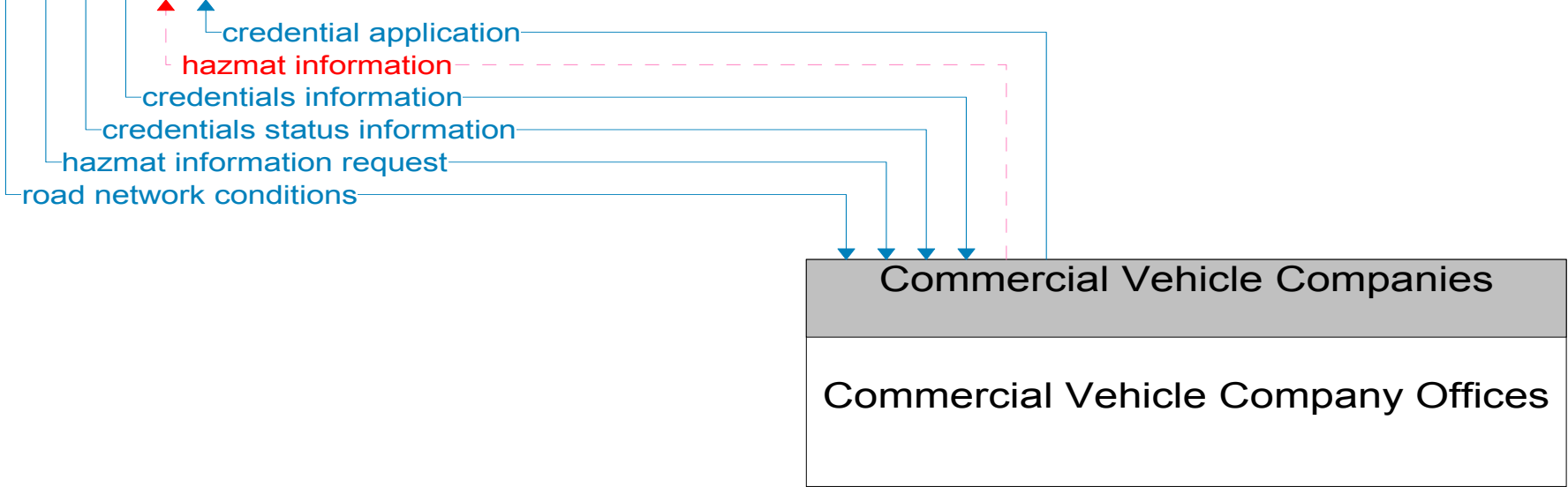
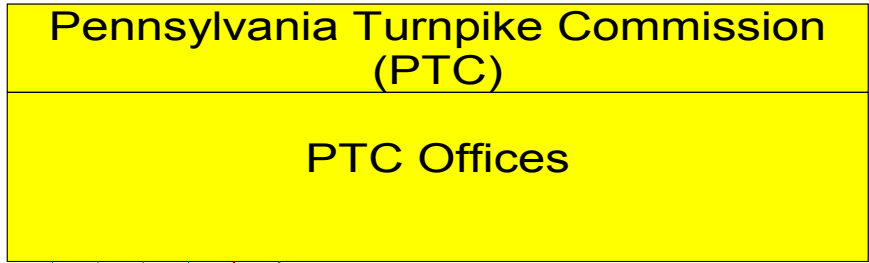


Existing  
Planned



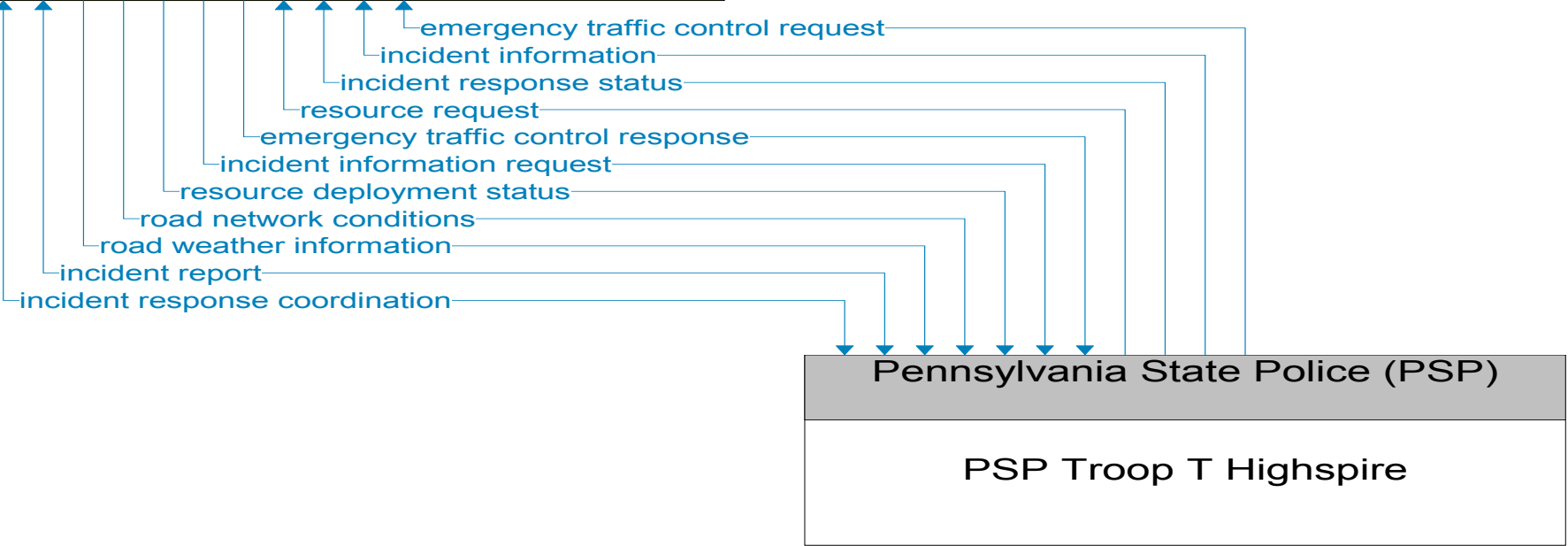
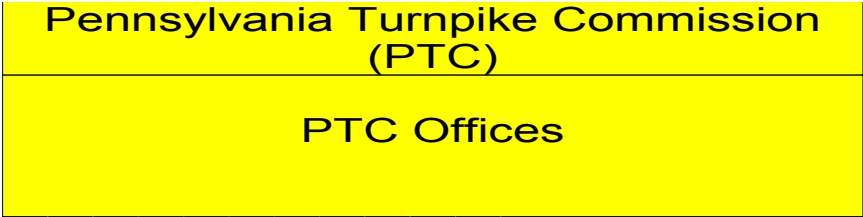
———— Existing  
- - - - - Planned



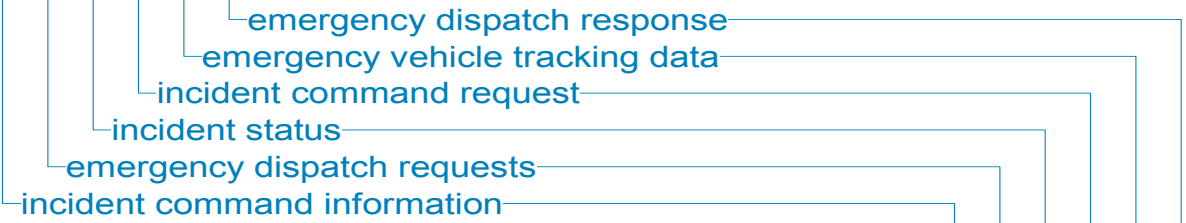
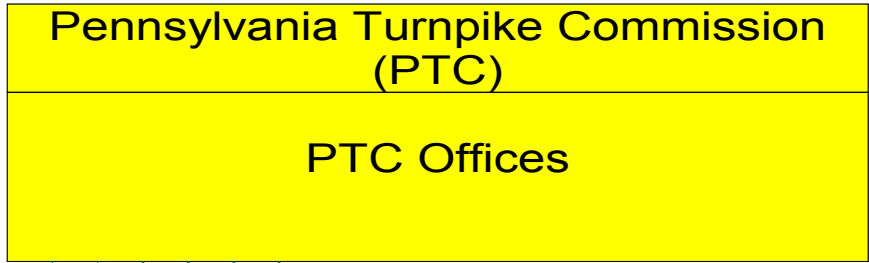


Existing  
Planned



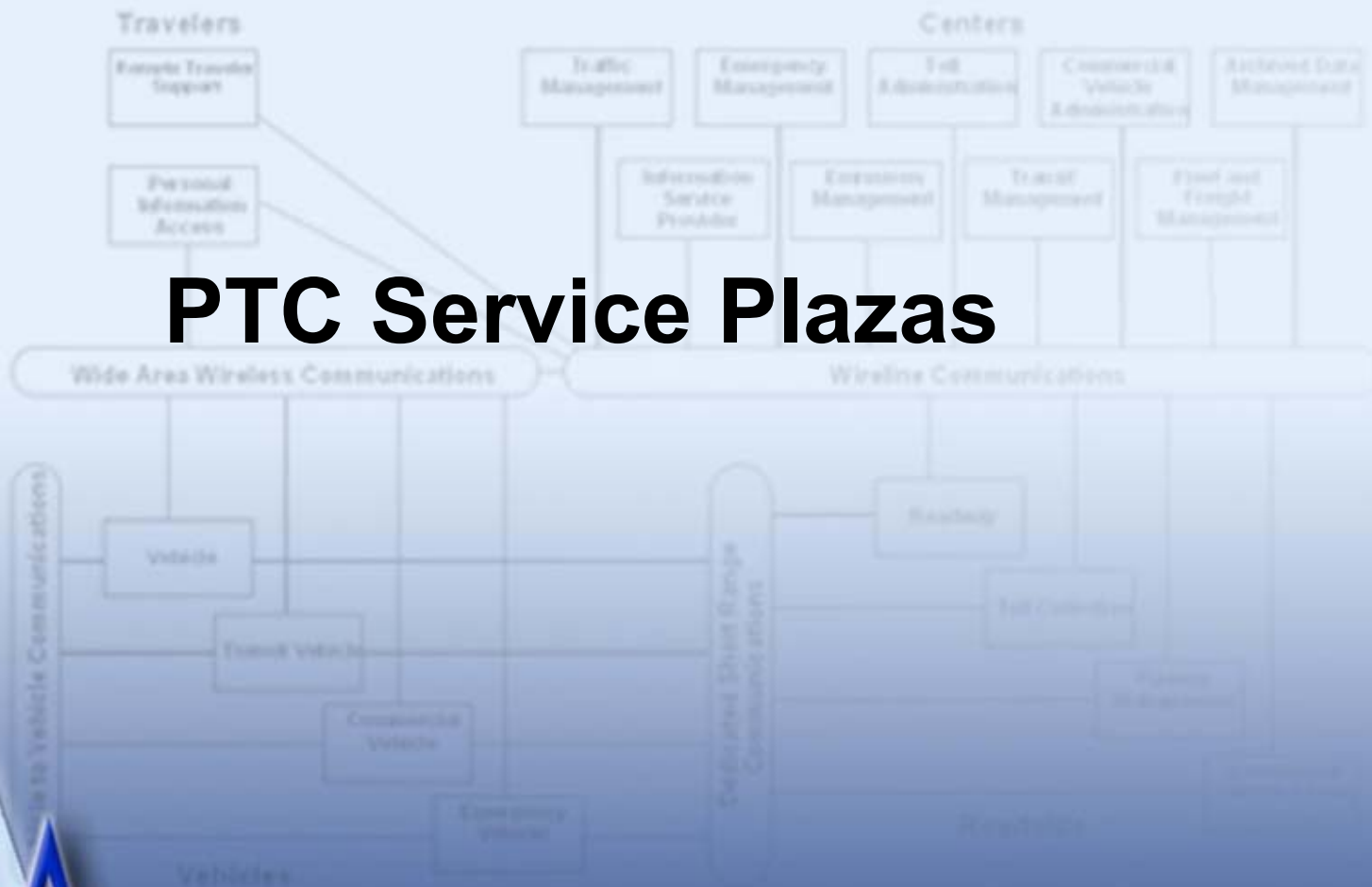


— Existing  
- - - Planned



Existing  
Planned

# PTC Service Plazas

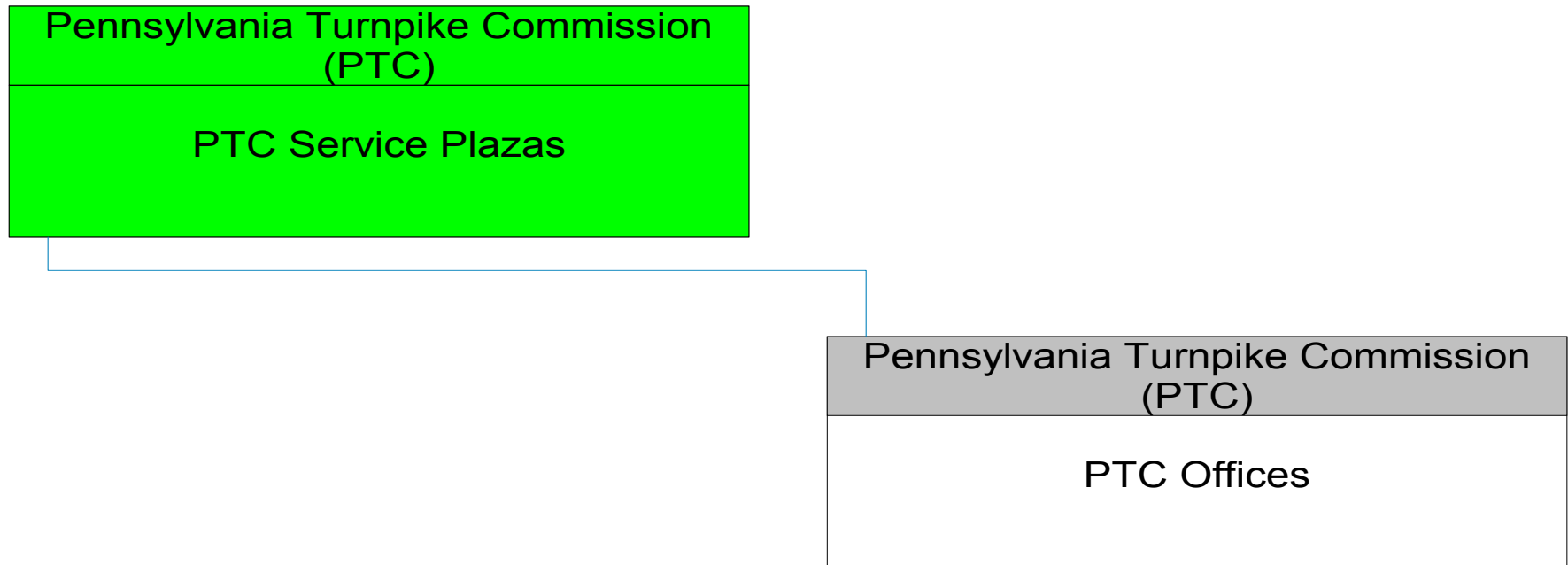


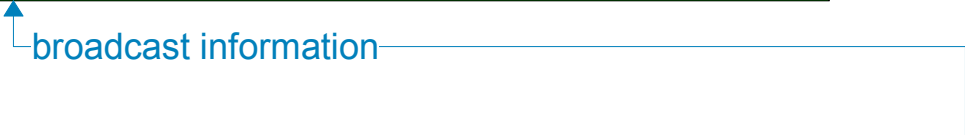
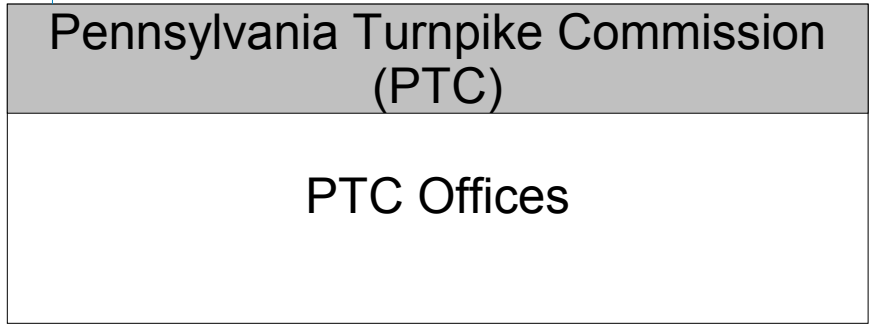
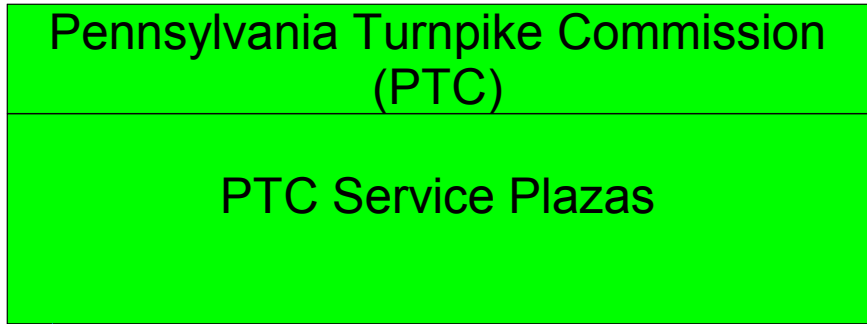
PA

780

architecture

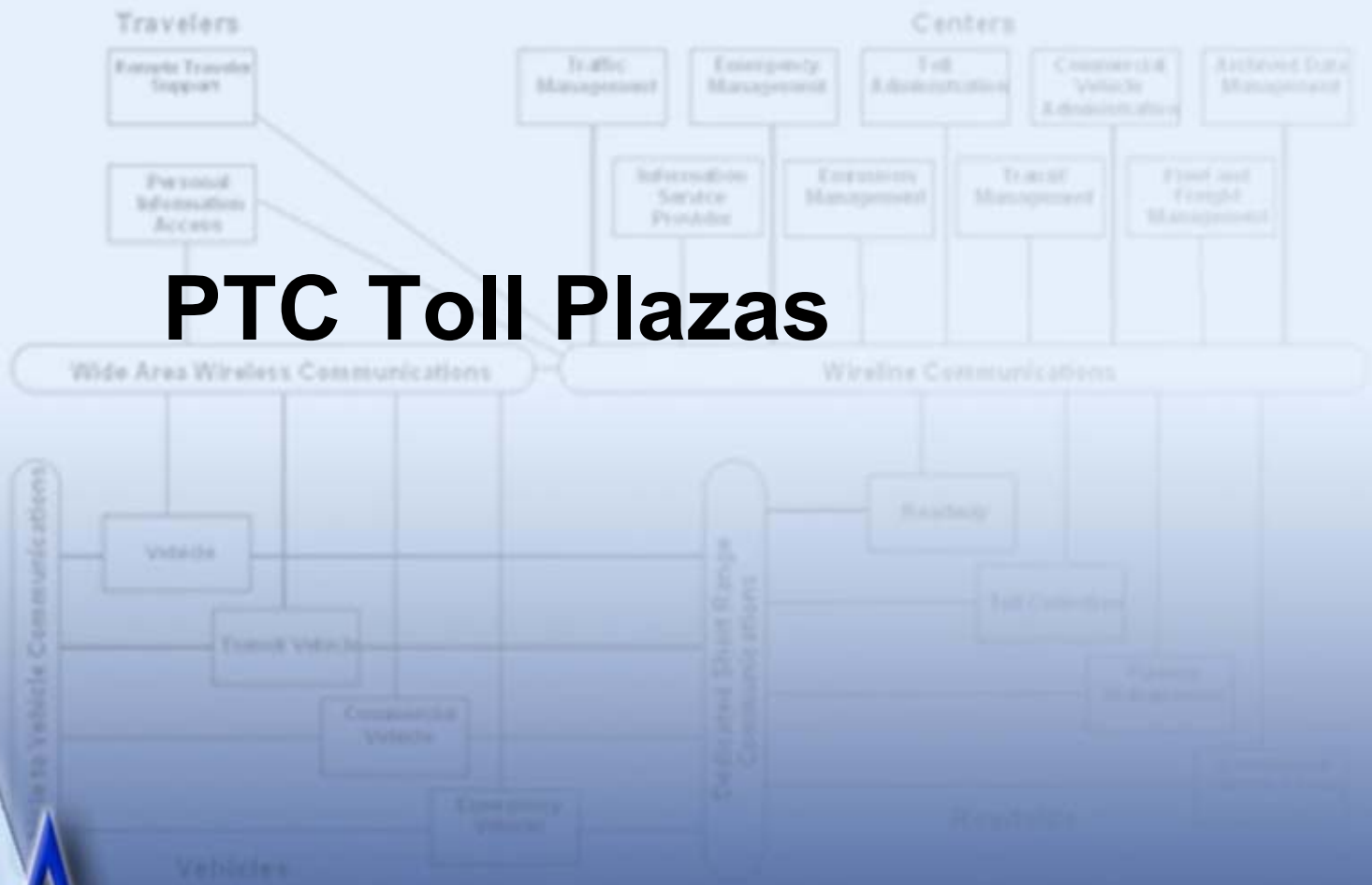
# PTC Service Plazas Interconnect Diagram





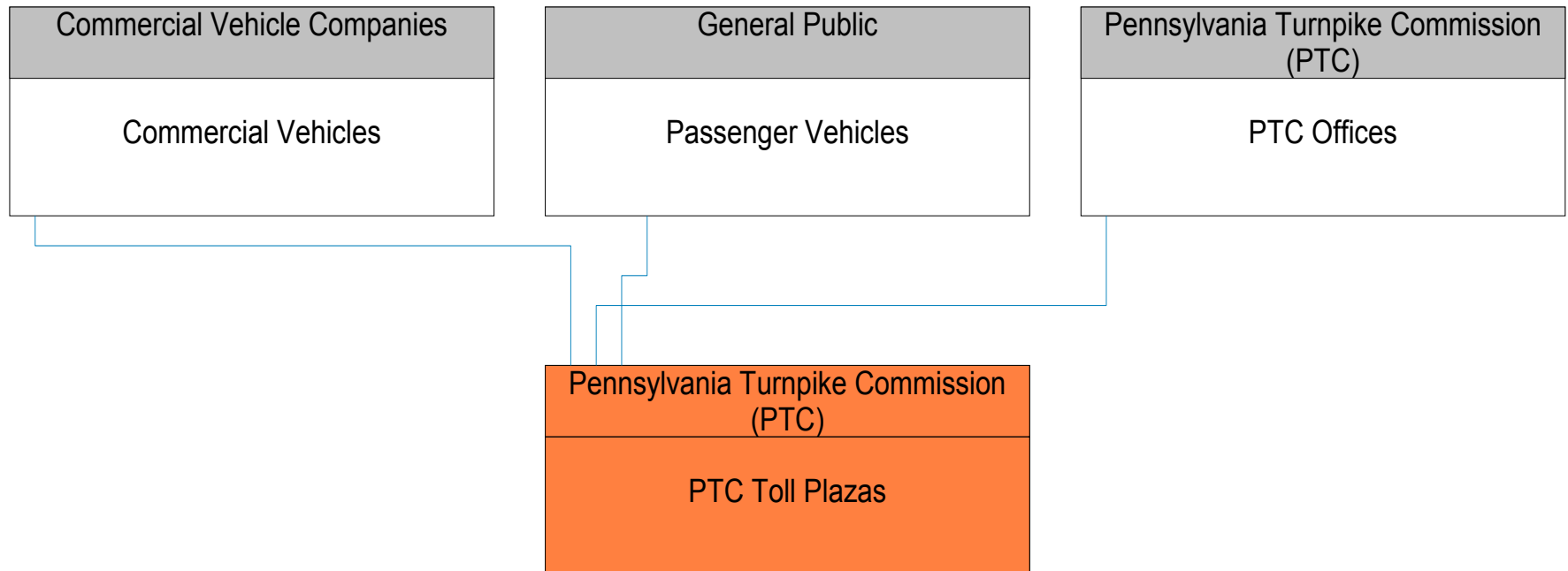
———— Existing  
- - - - - Planned

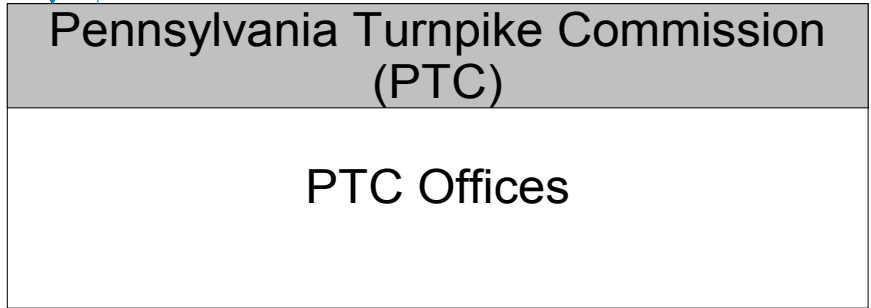
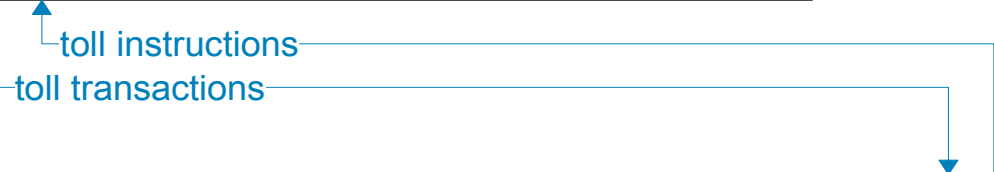
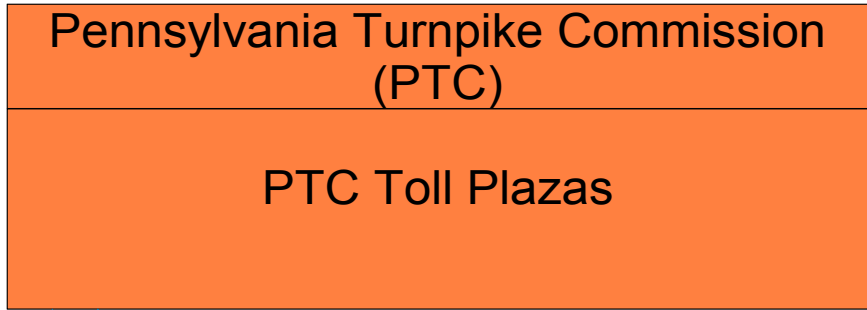
# PTC Toll Plazas



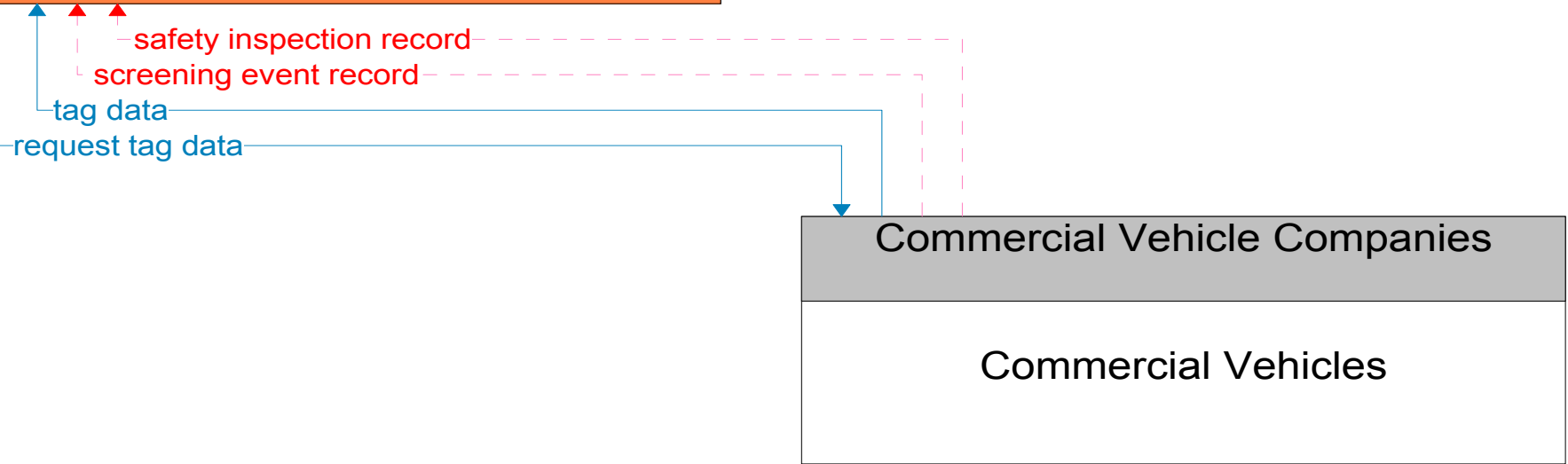
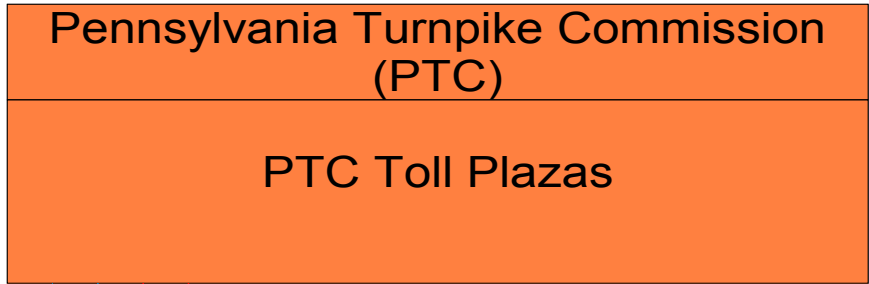
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# PTC Toll Plazas Interconnect Diagram

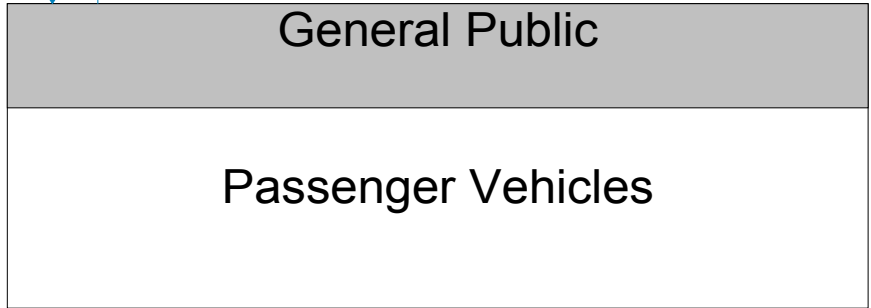
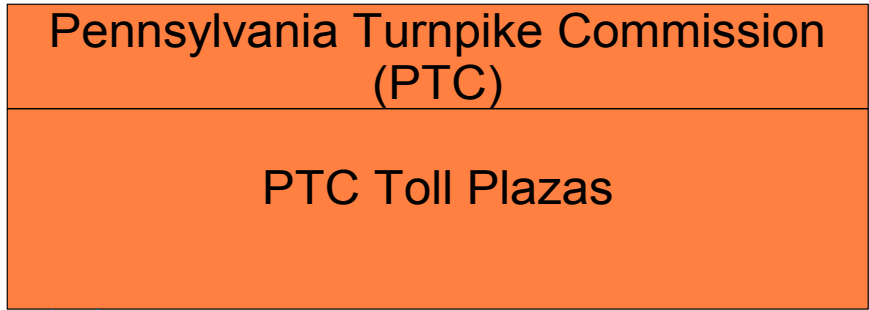








Existing  
Planned



tag data

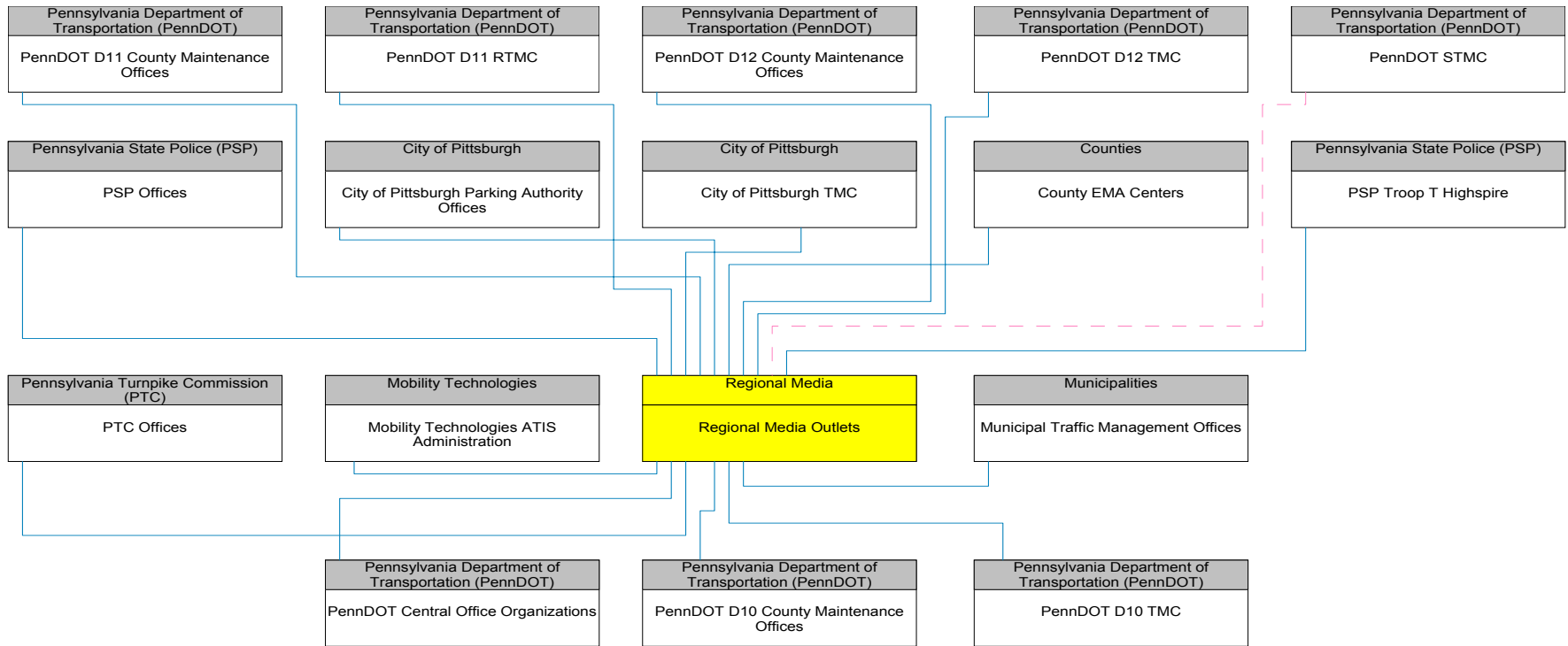
request tag data

Existing  
Planned

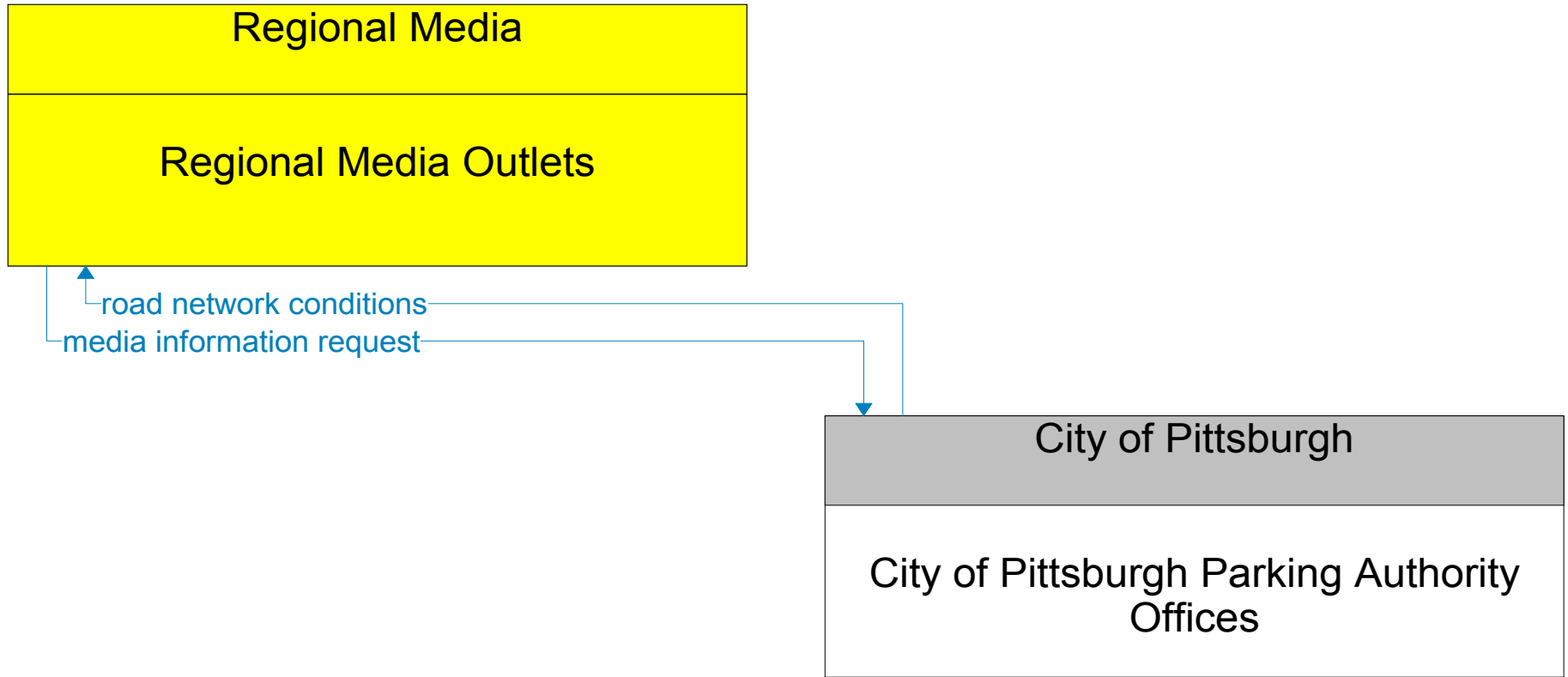
# Regional Media Outlets



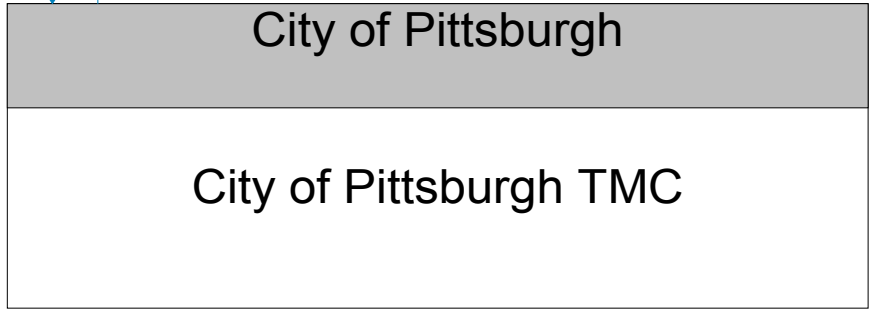
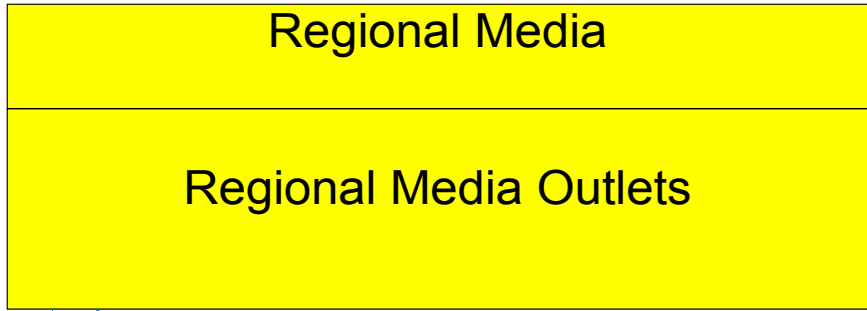
# Regional Media Outlets Interconnect Diagram



— Existing  
- - - Planned

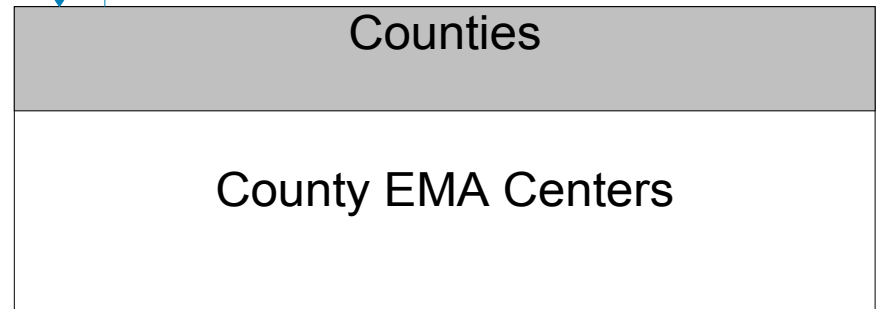


———— Existing  
- - - - - Planned





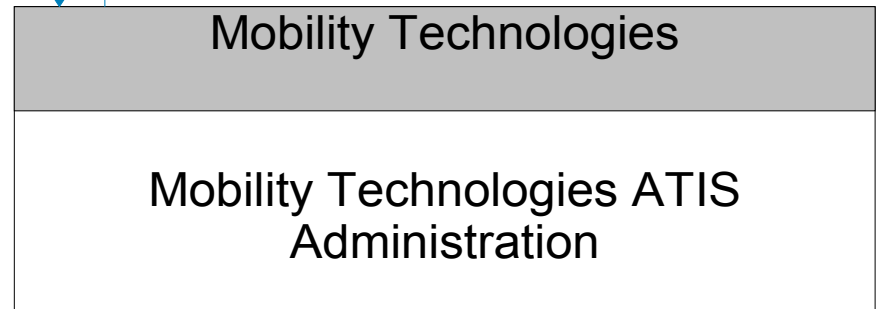
incident information for media  
media information request



Existing  
Planned

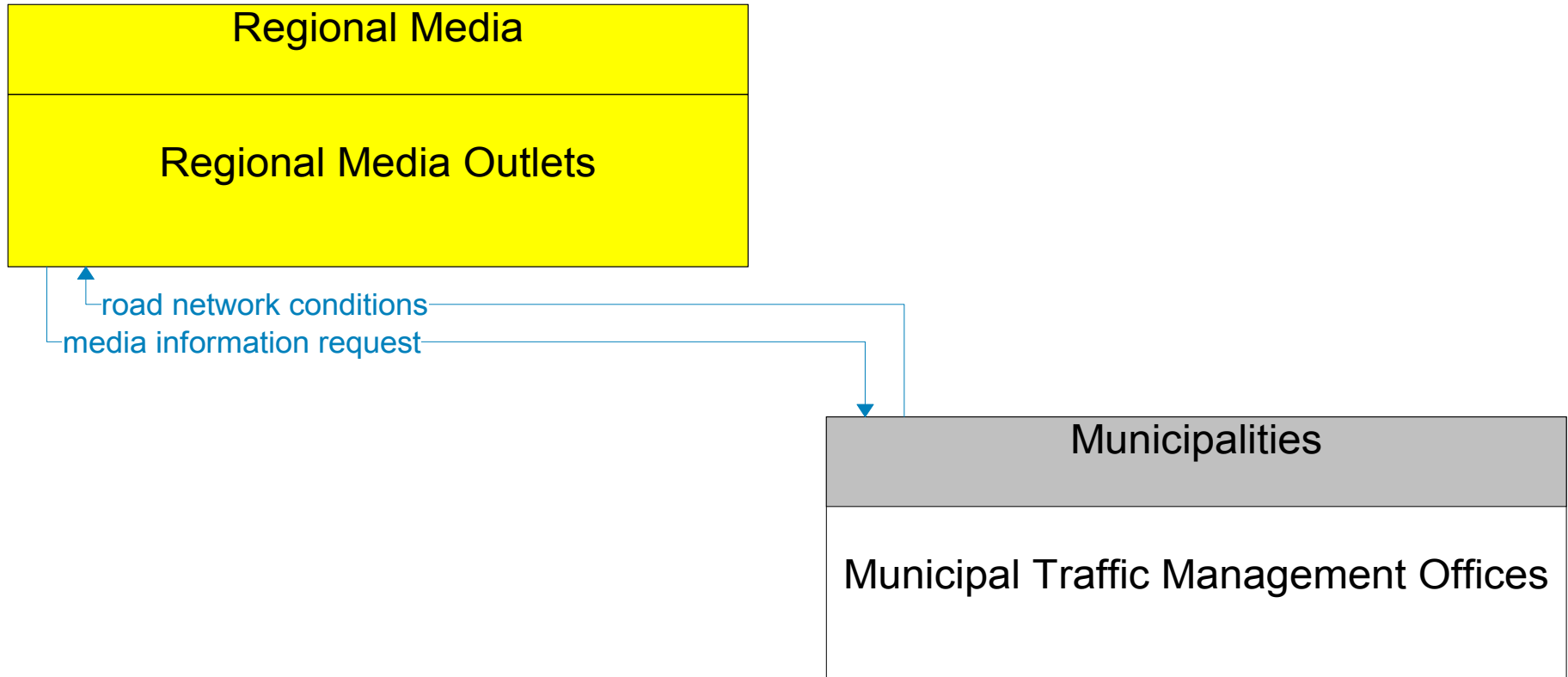


traveler information for media  
external reports

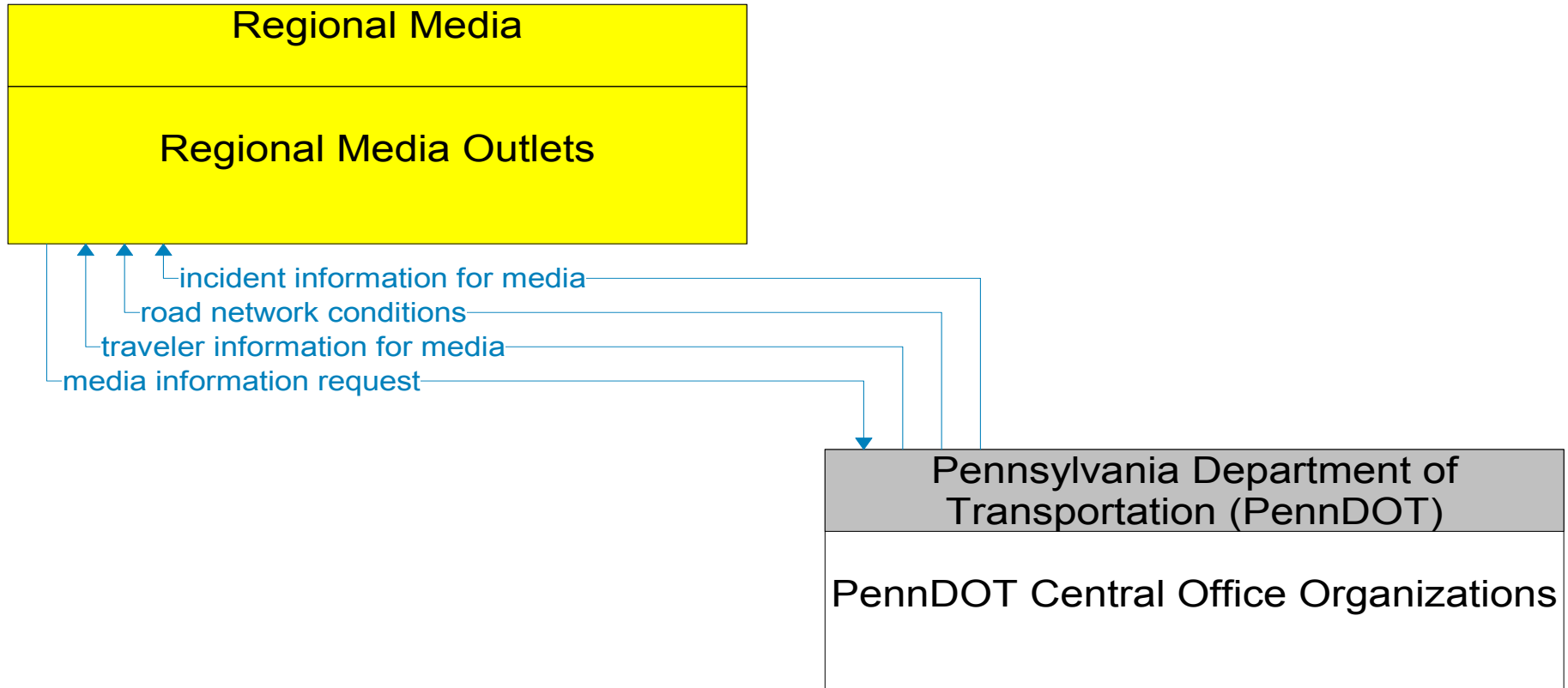


Existing  
Planned

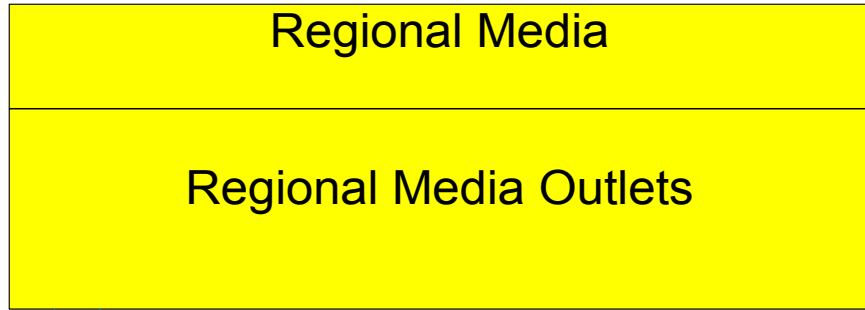




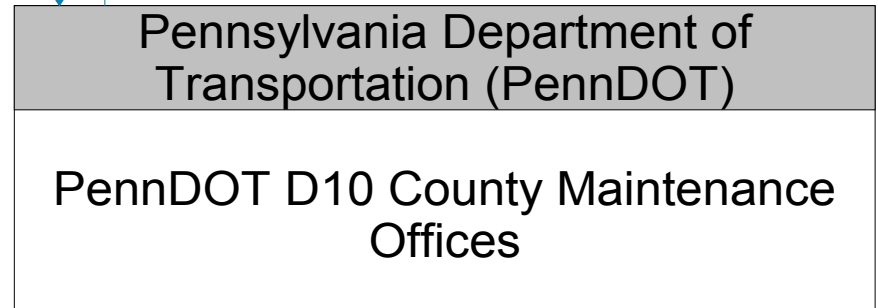
———— Existing  
----- Planned



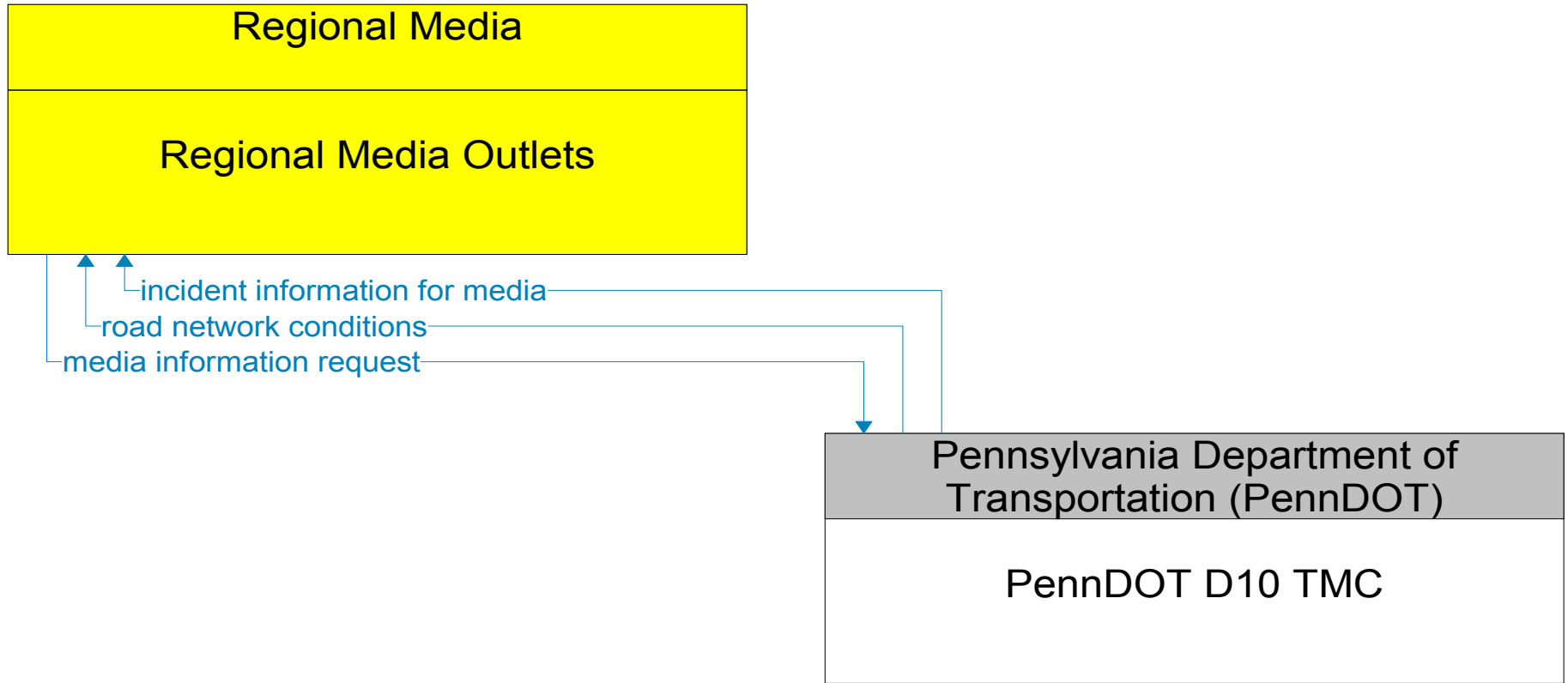
———— Existing  
- - - - - Planned



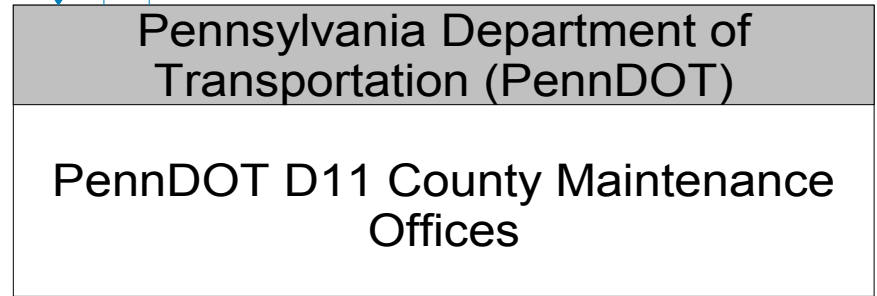
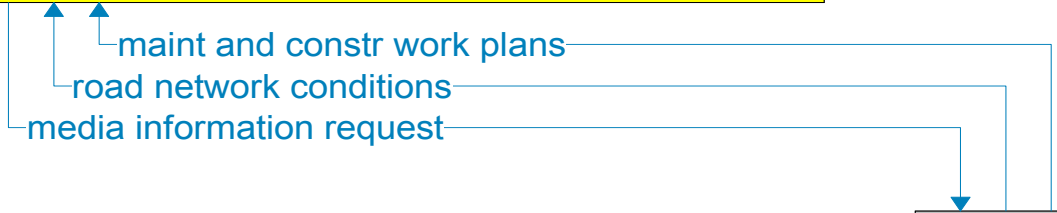
maint and constr work plans  
media information request



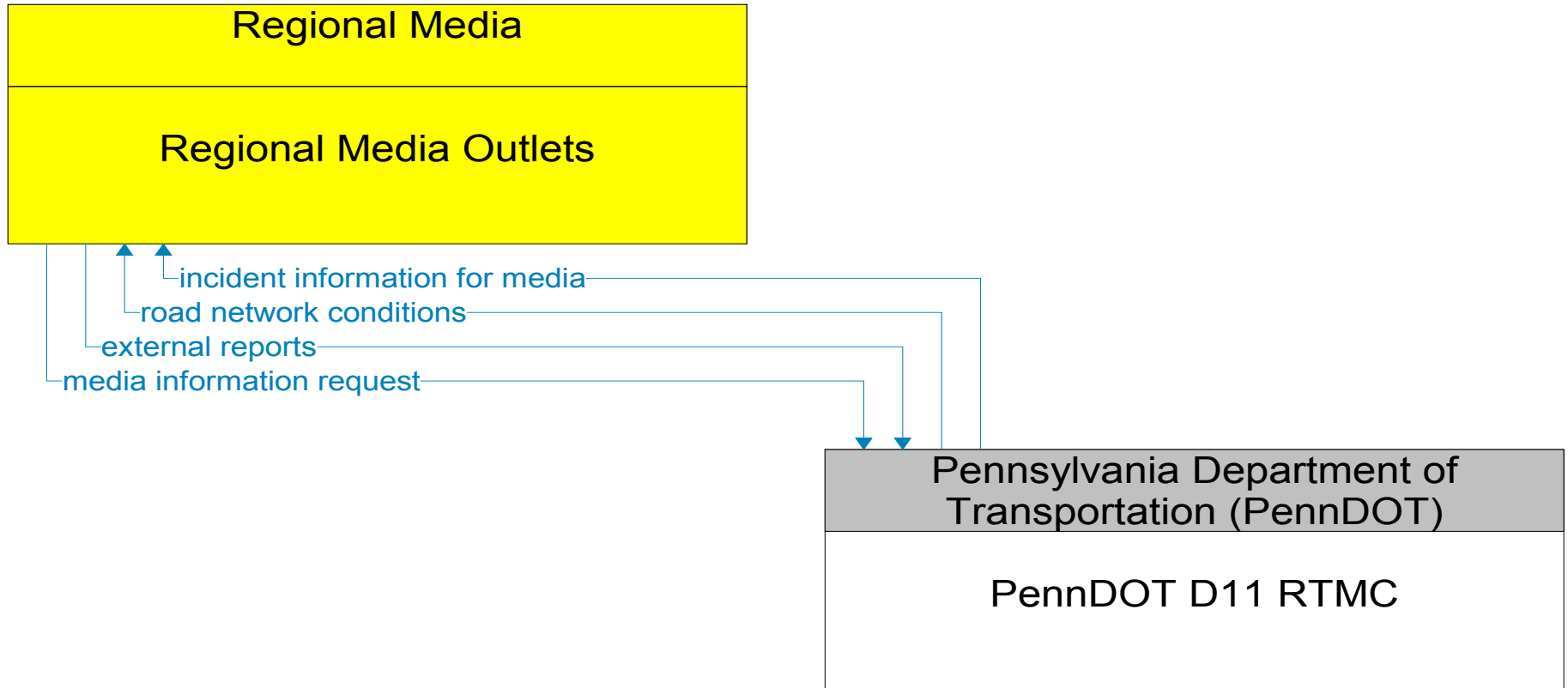
Existing  
Planned



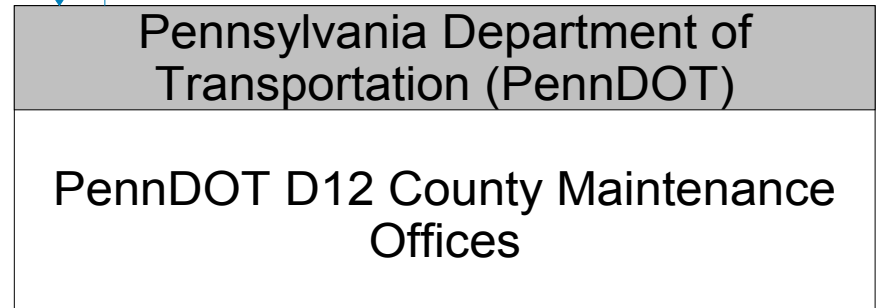
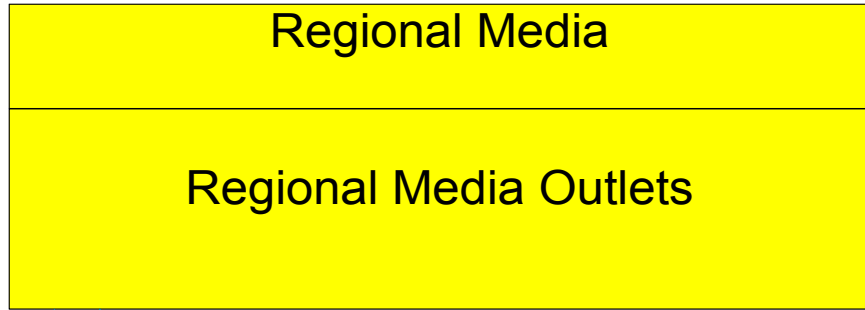
———— Existing  
----- Planned



Existing  
Planned

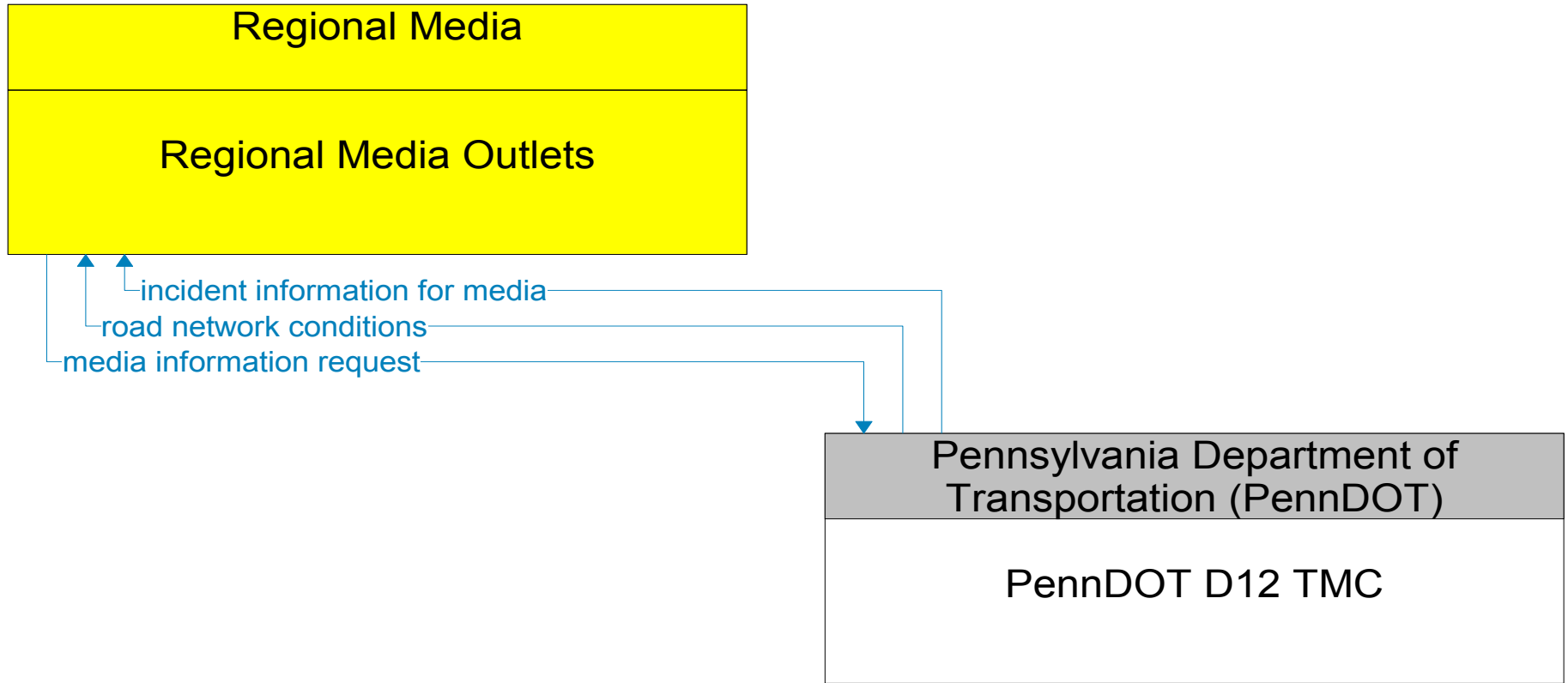


Existing  
Planned

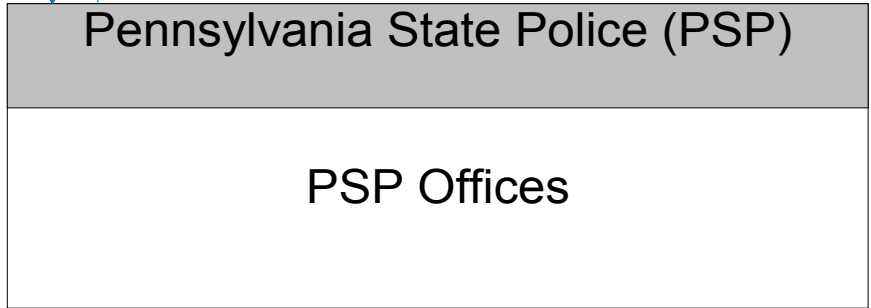
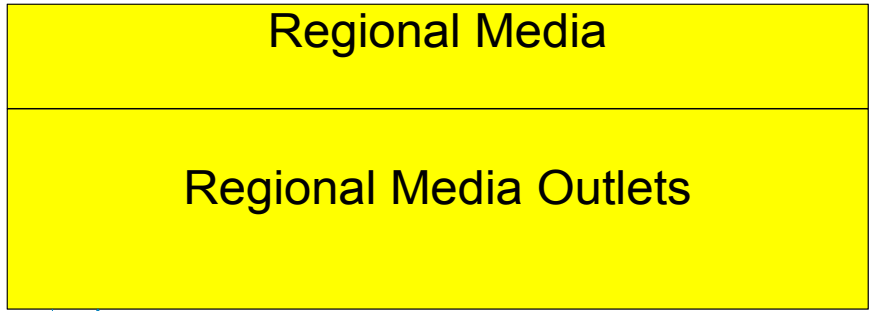


maint and constr work plans  
media information request

Existing  
Planned





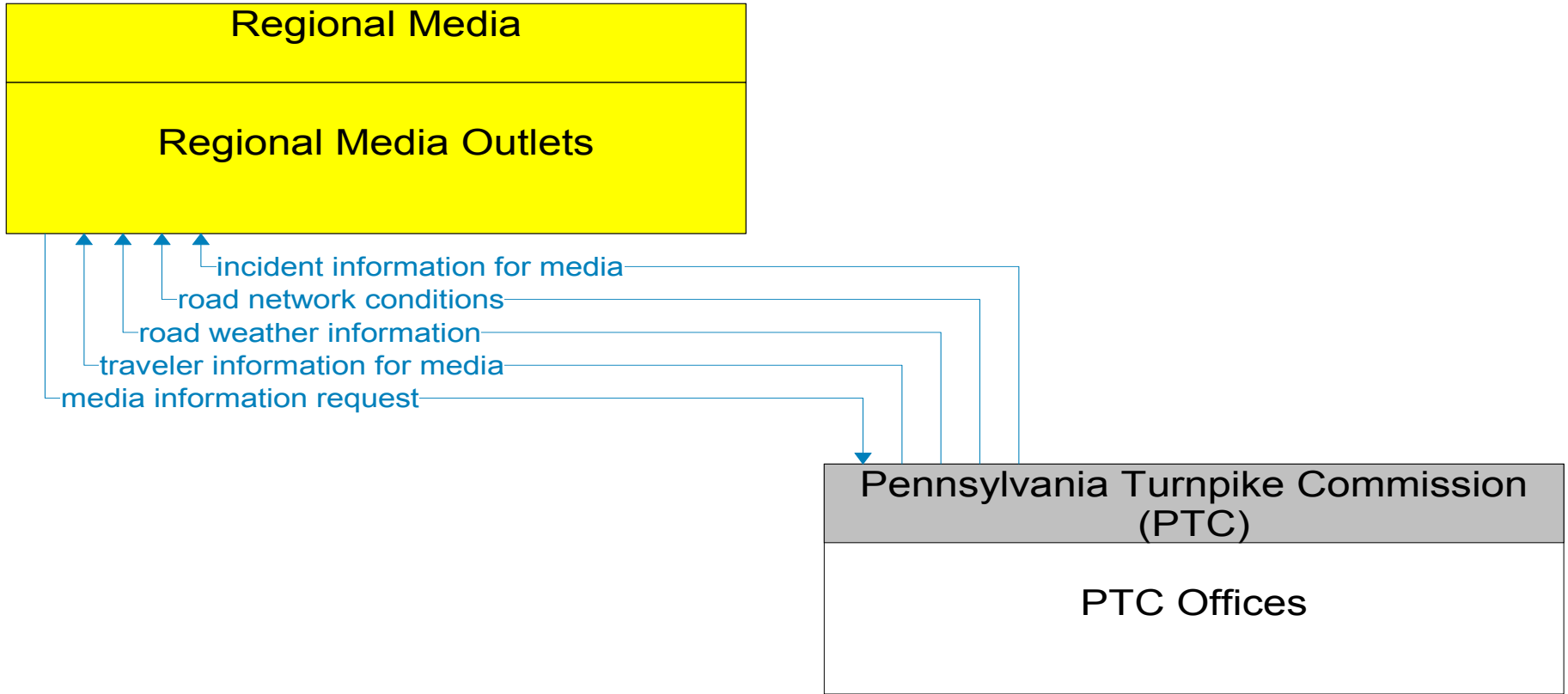


incident information for media

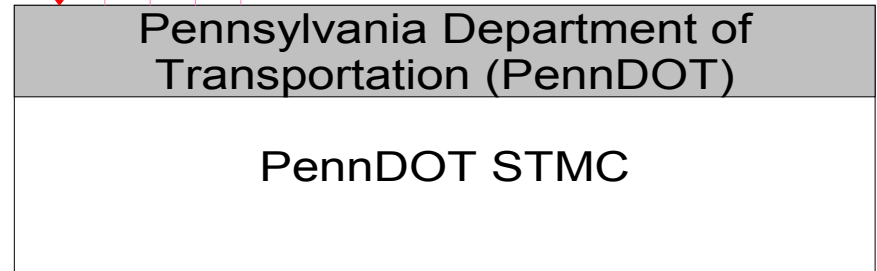
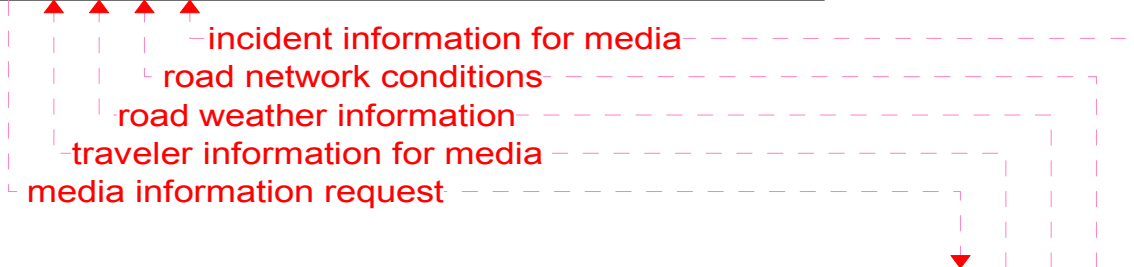
media information request

Existing

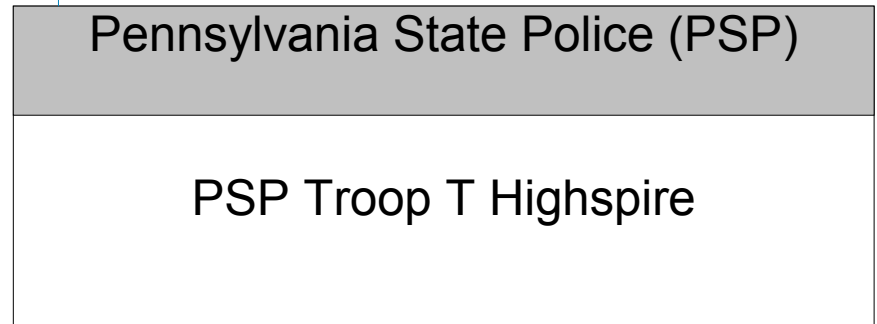
Planned



———— Existing  
- - - - - Planned



———— Existing  
- - - - - Planned



# Regional Personal Traveler Cards



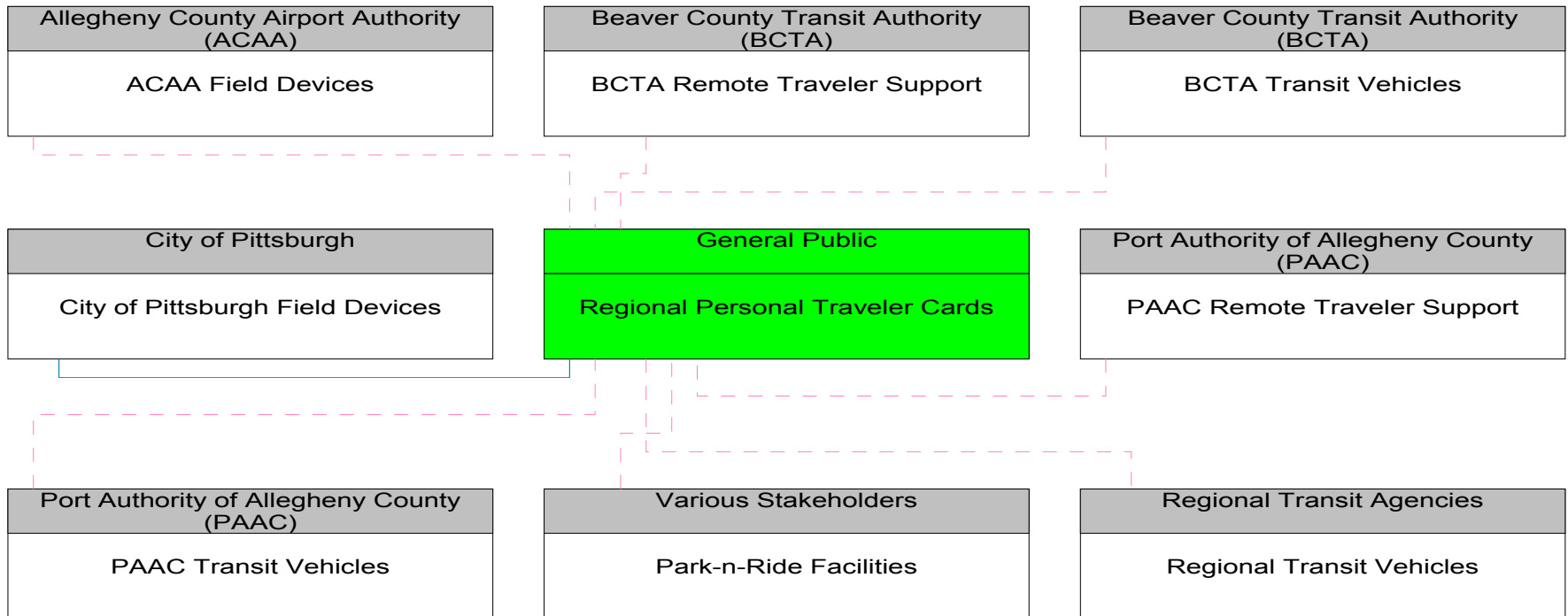
PA

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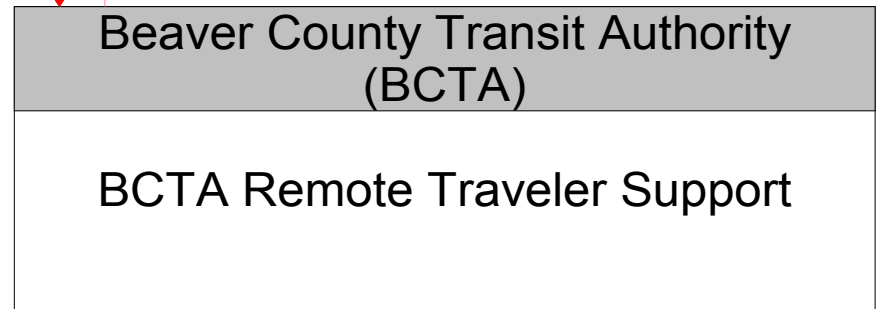
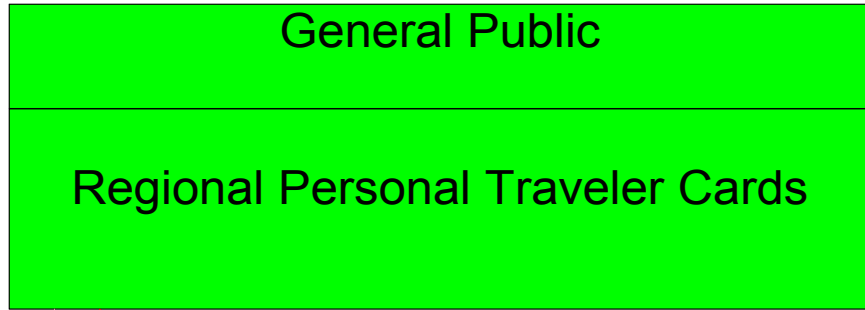
architecture



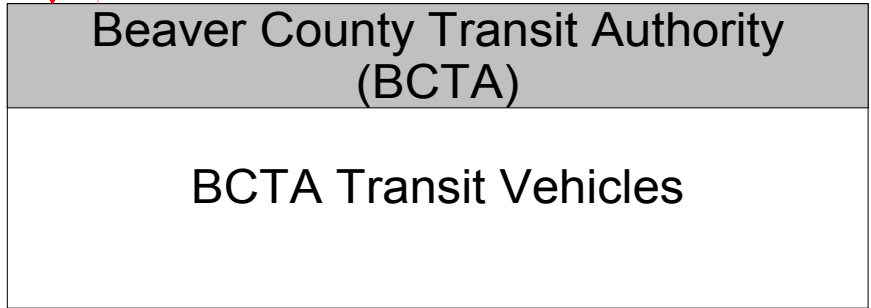
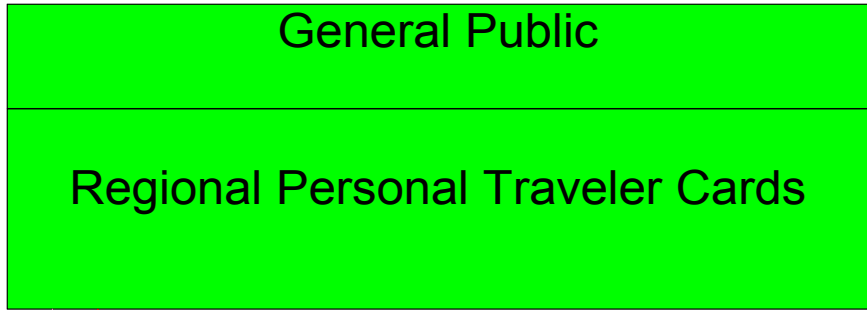
# Regional Personal Traveler Cards Interconnect Diagram



————— Existing  
- - - - - Planned

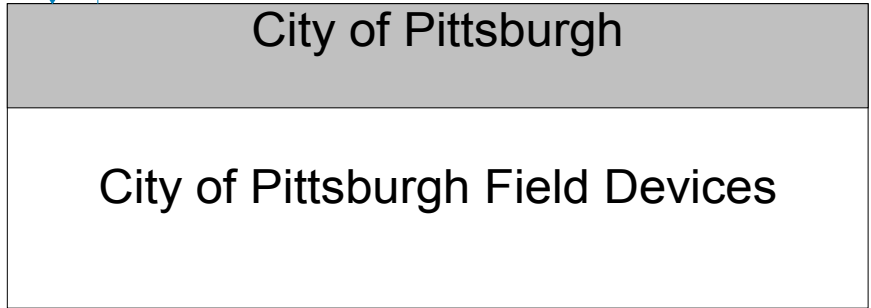
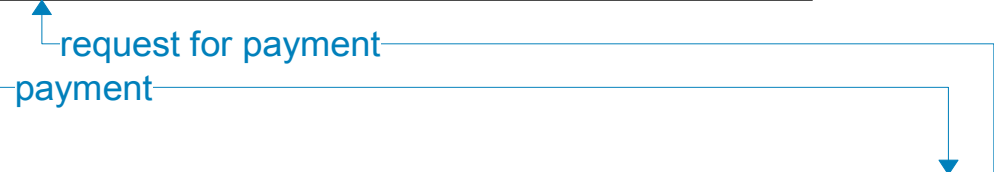
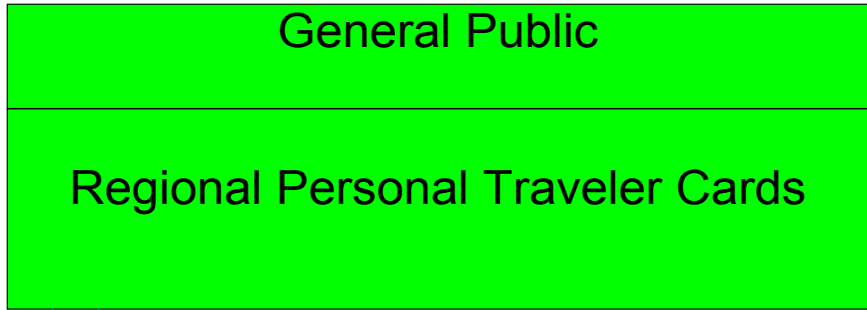


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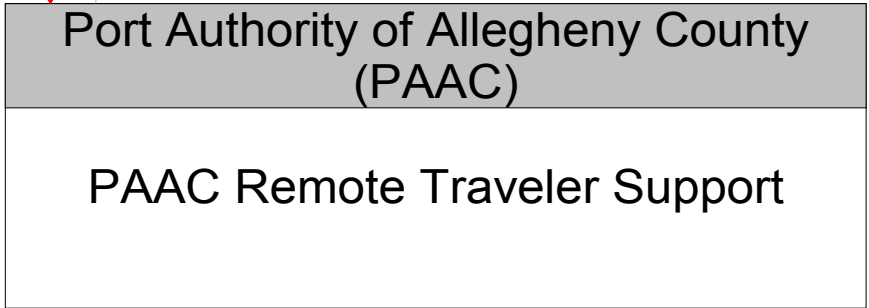
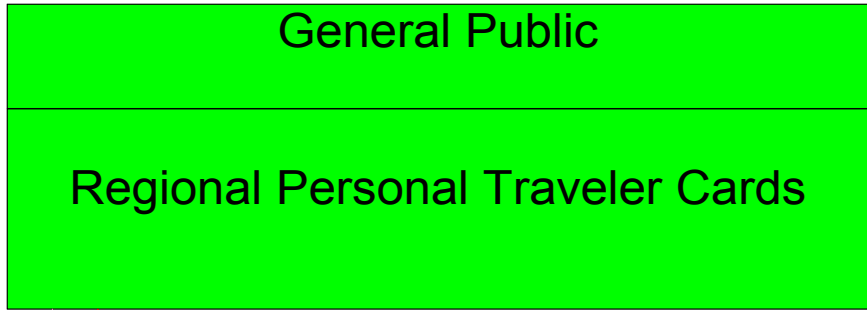


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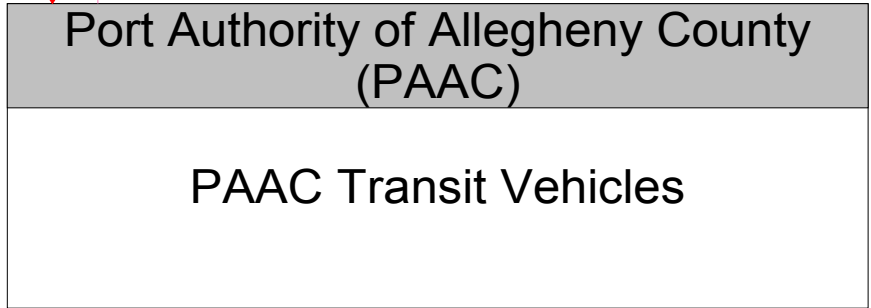
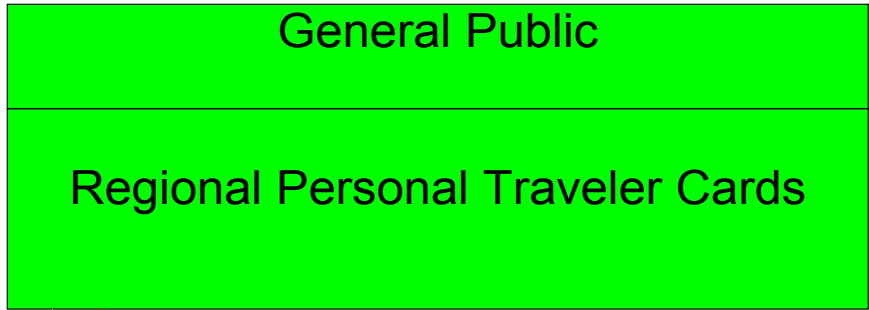




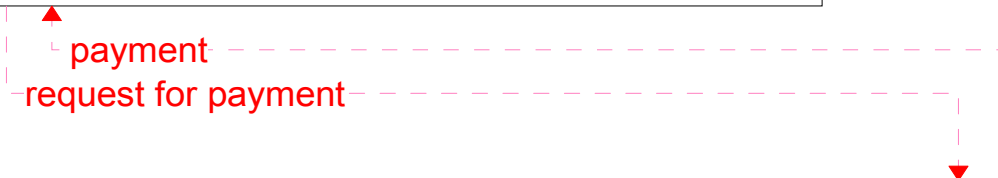
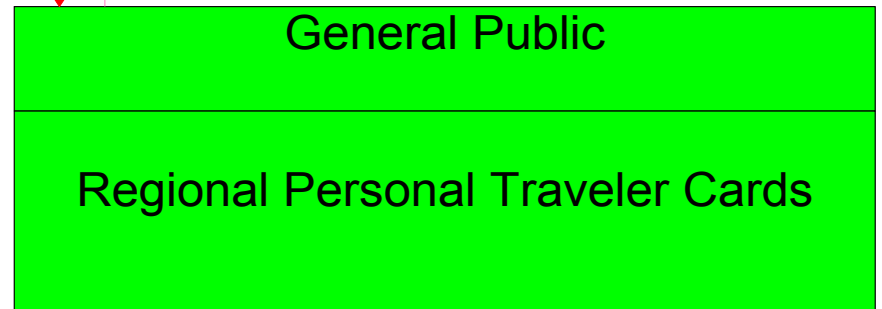
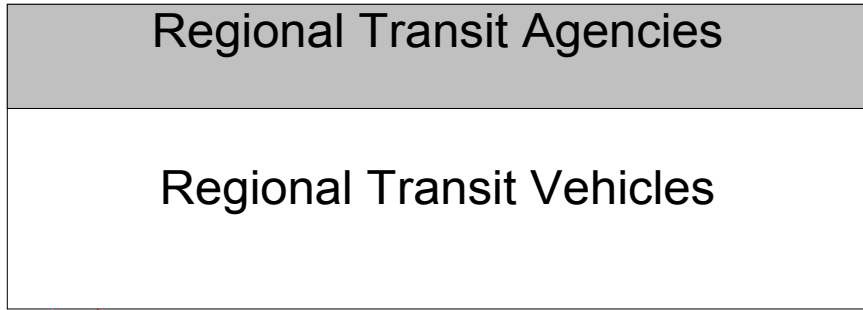
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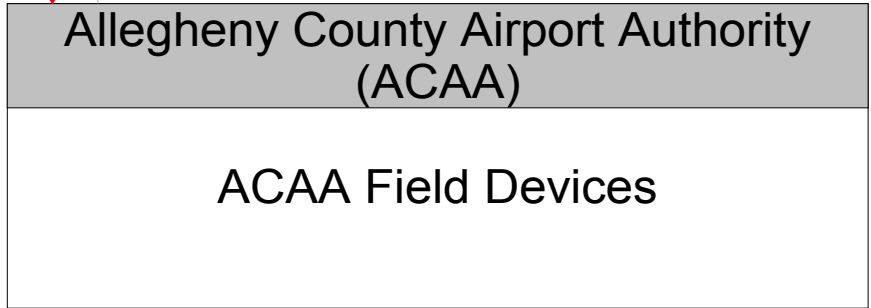
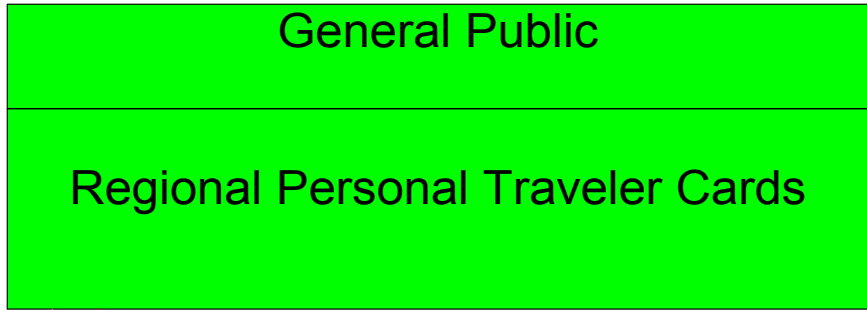
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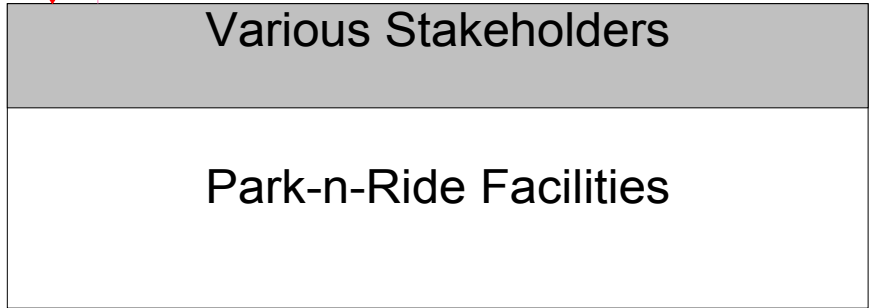
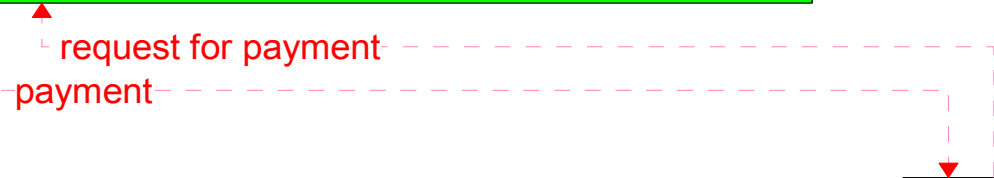
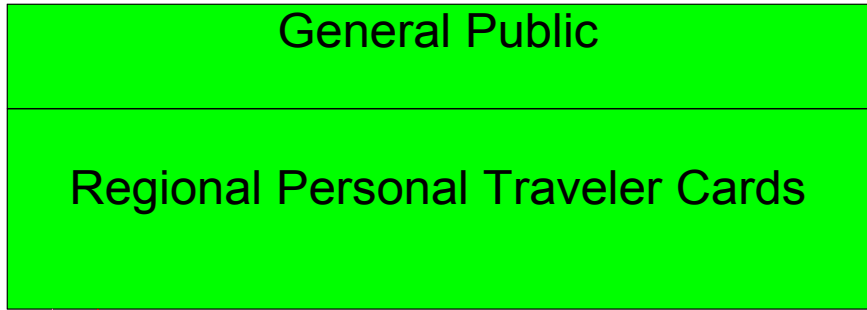
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Existing  
Planned



———— Existing  
- - - - - Planned

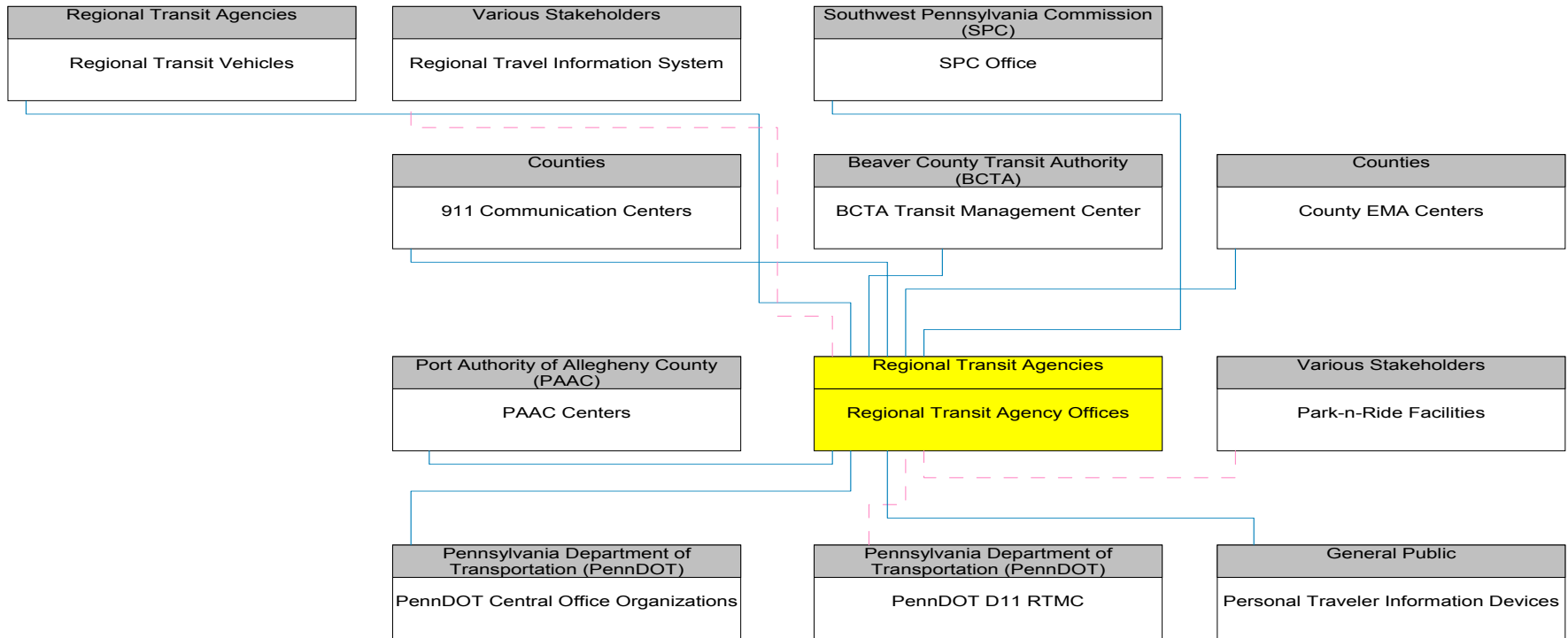


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# Regional Transit Agency Offices

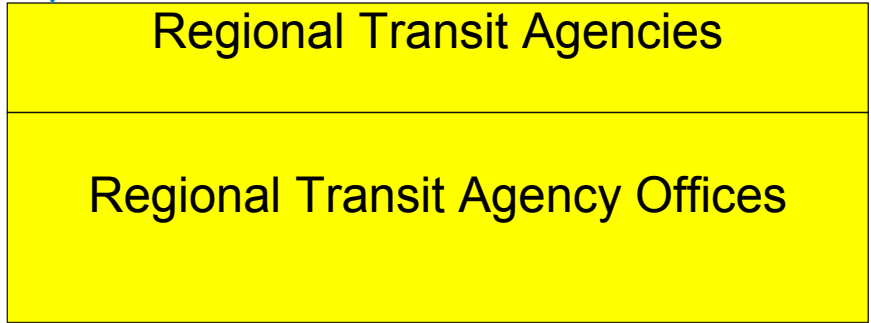
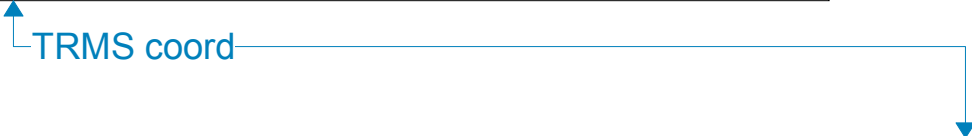
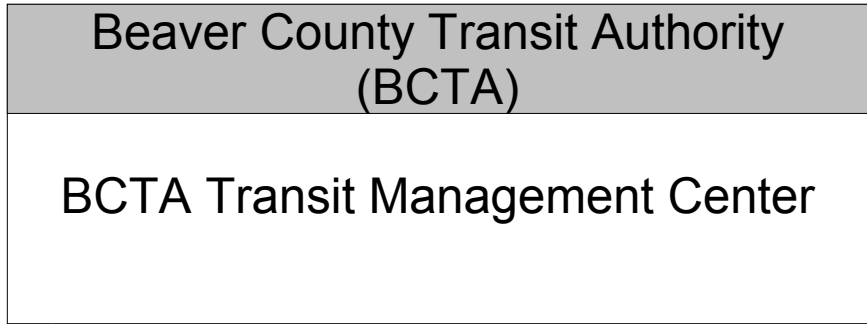


# Regional Transit Agency Offices Interconnect Diagram

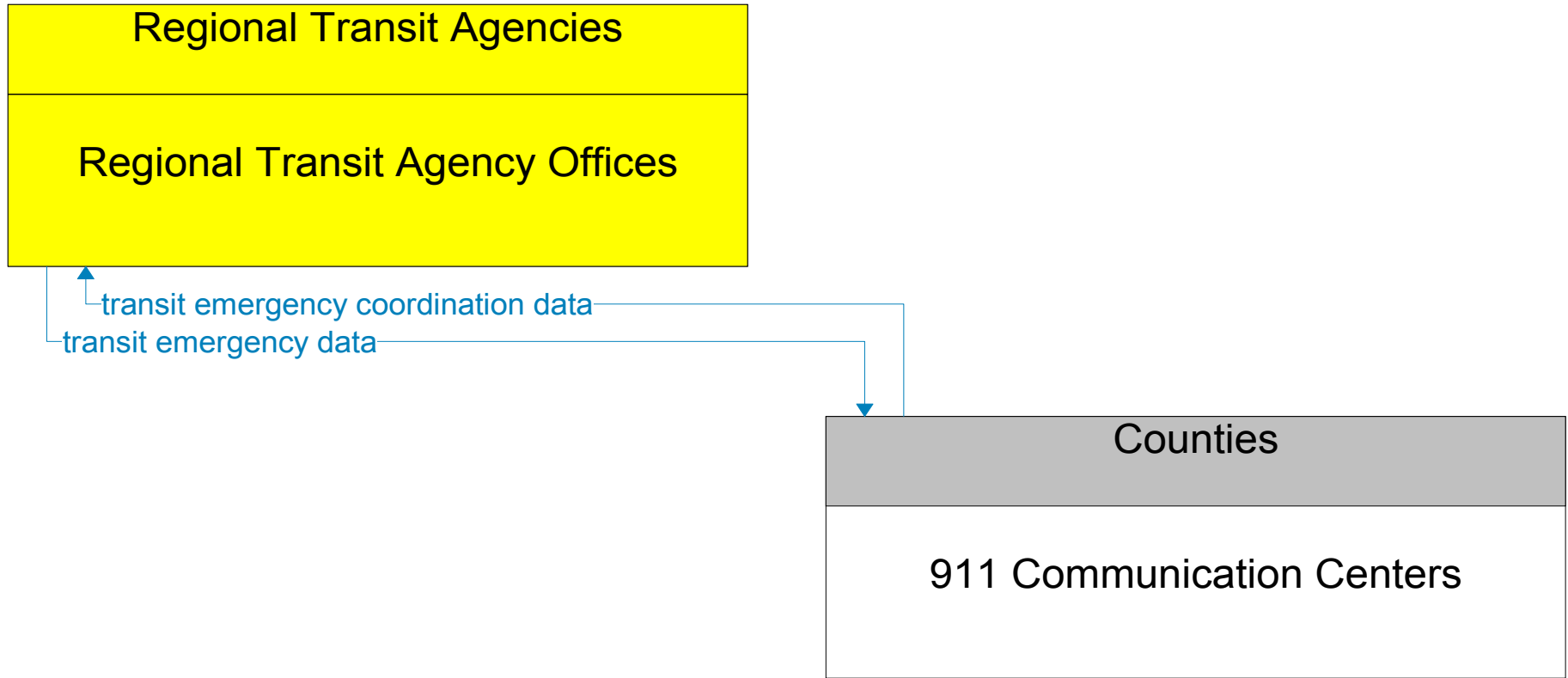


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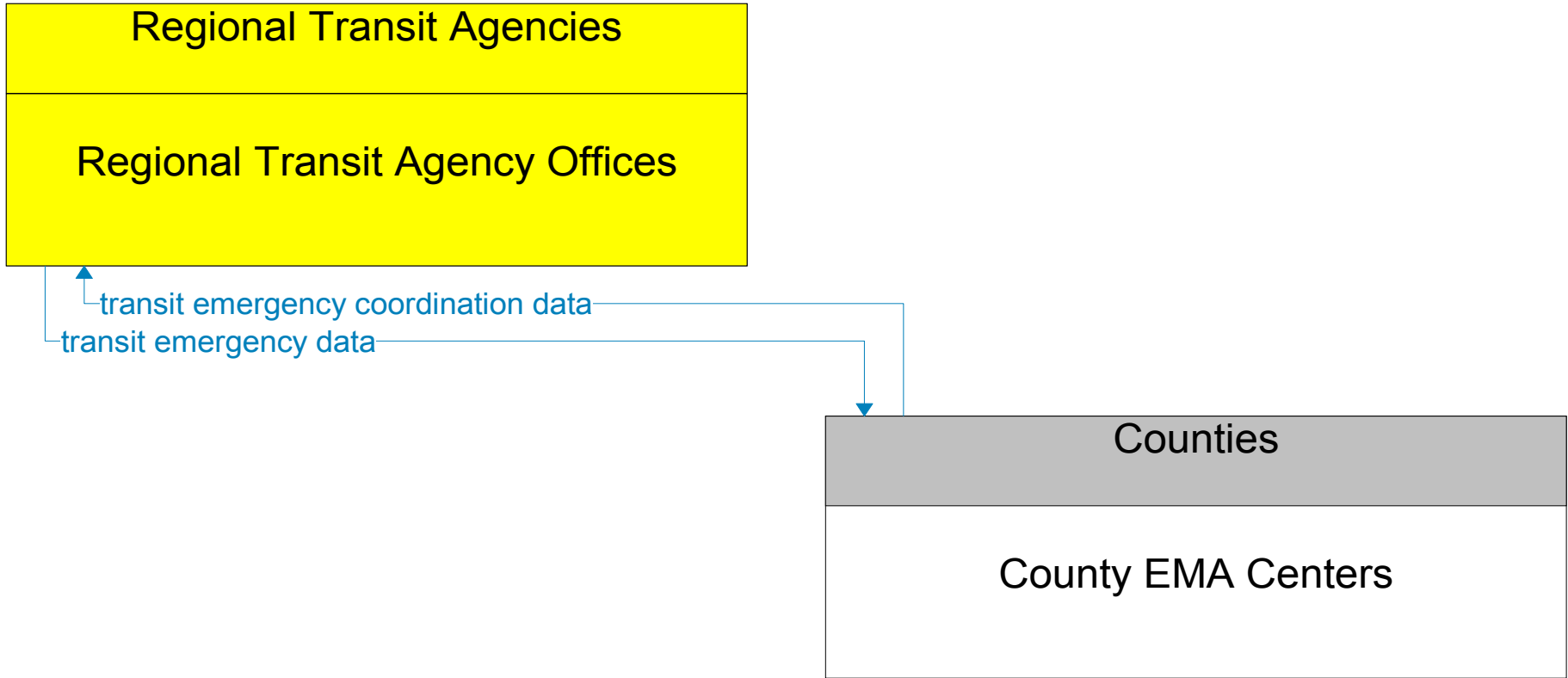




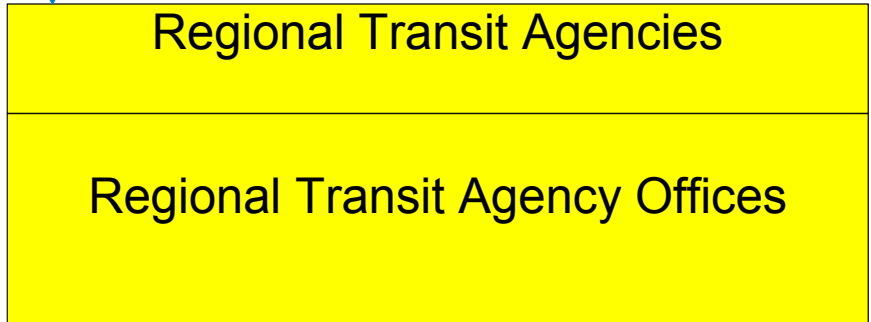
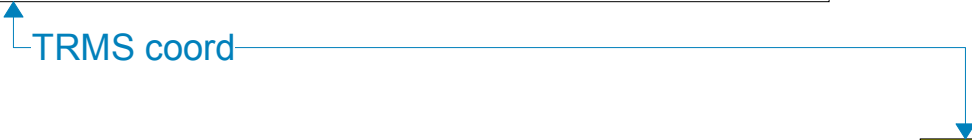
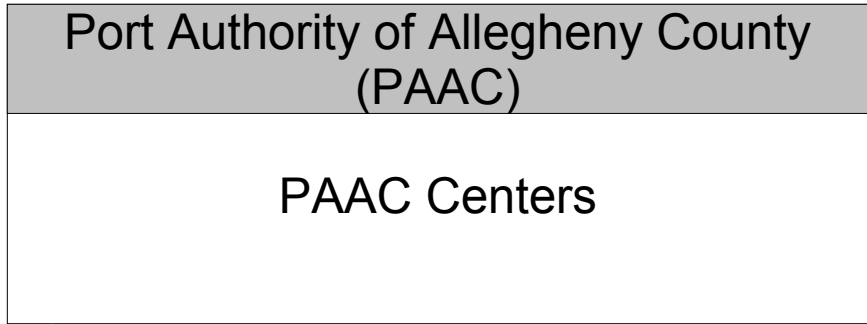
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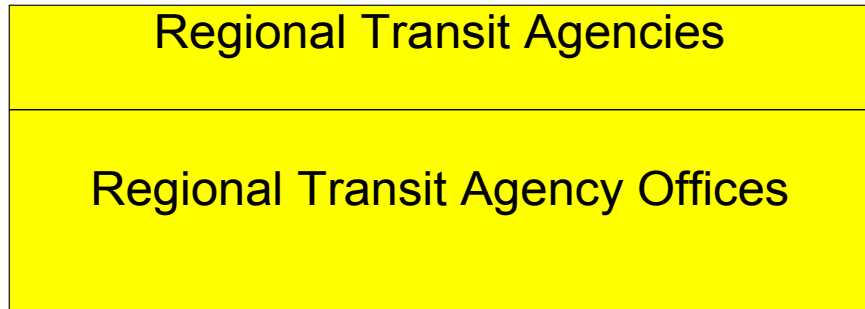


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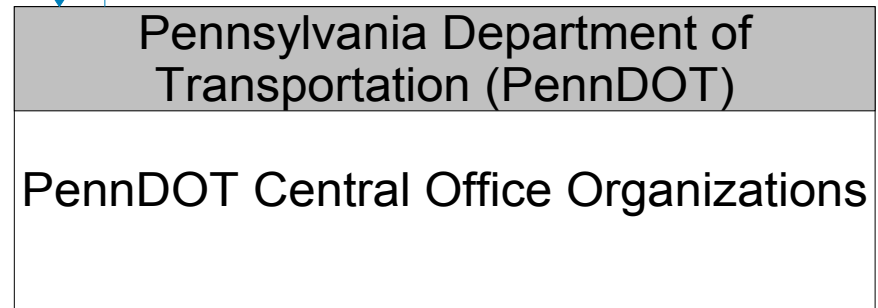


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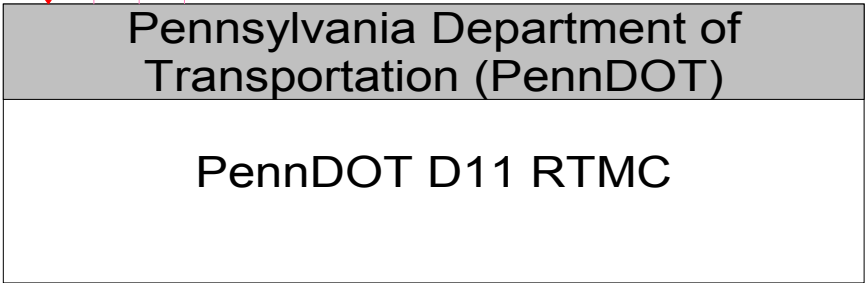
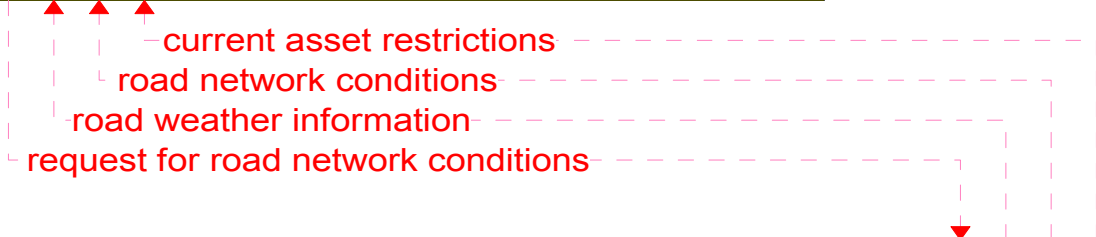
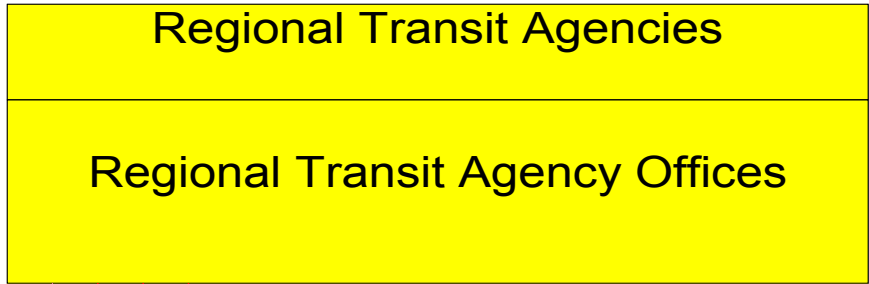




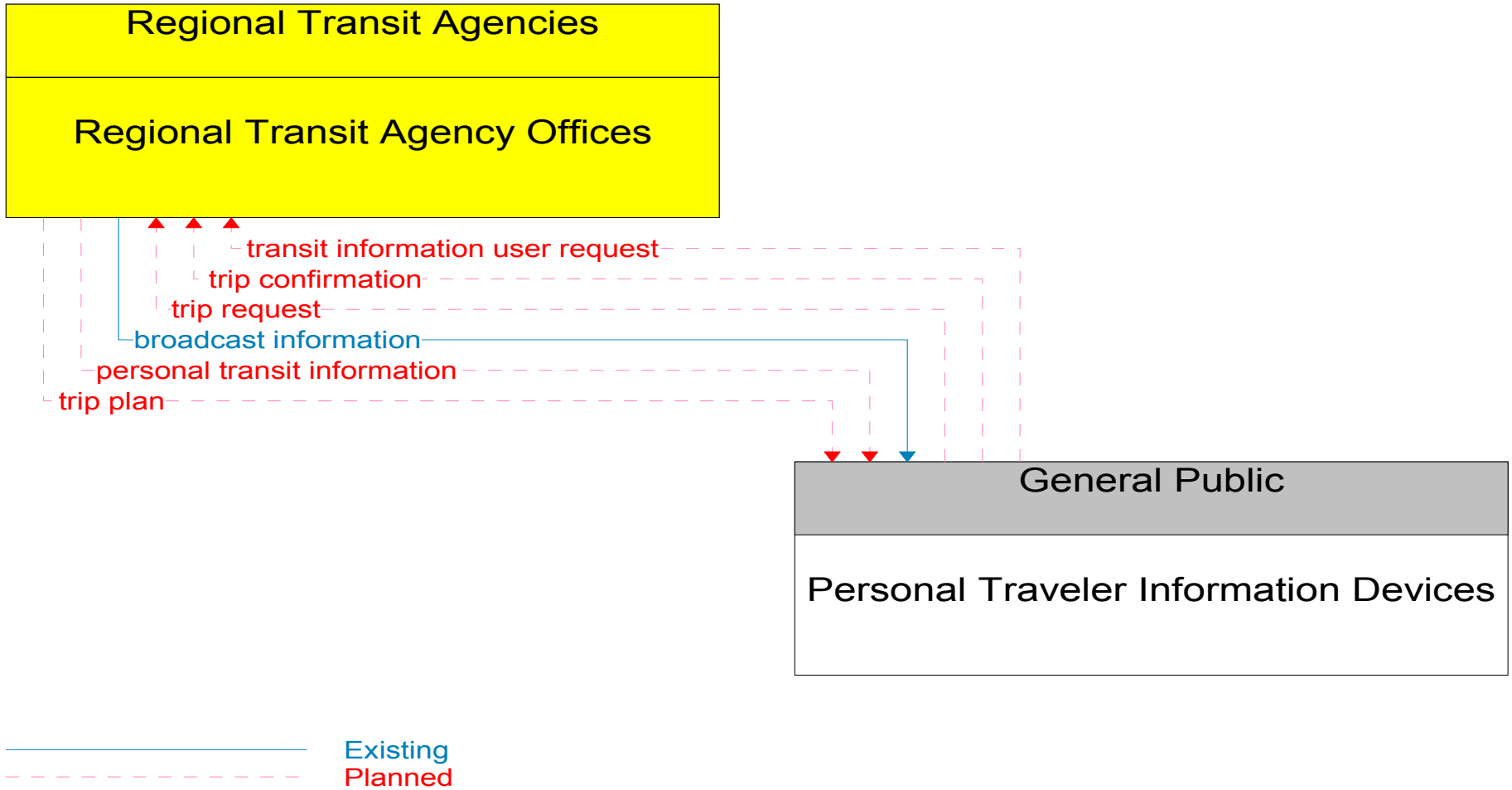
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transit archive data

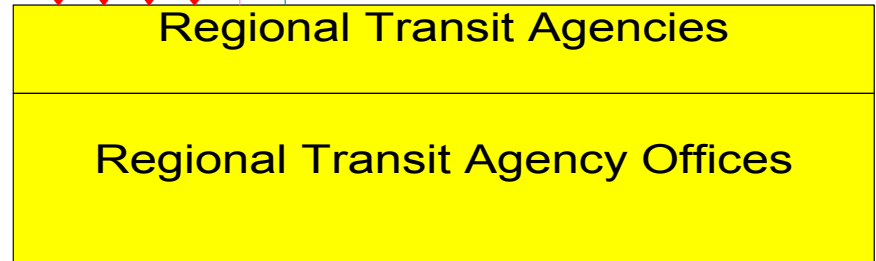
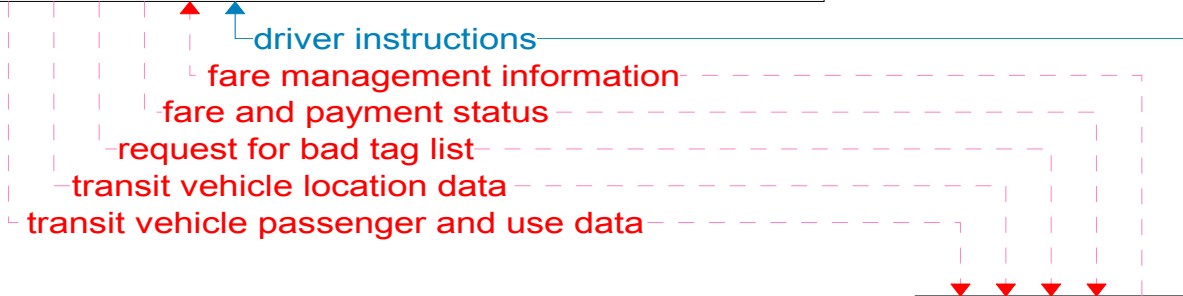
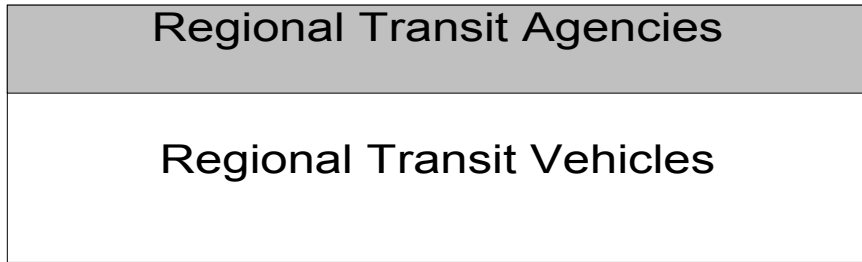


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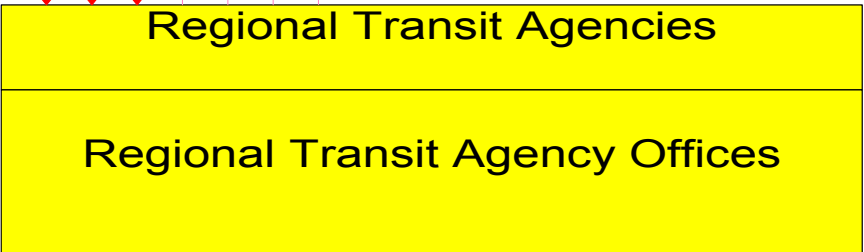
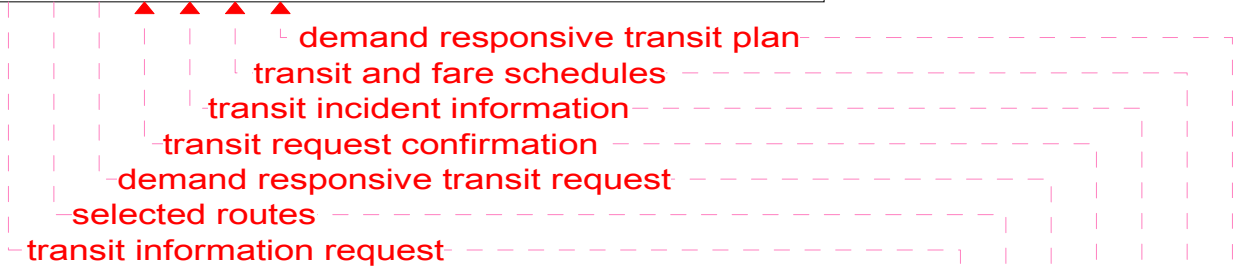
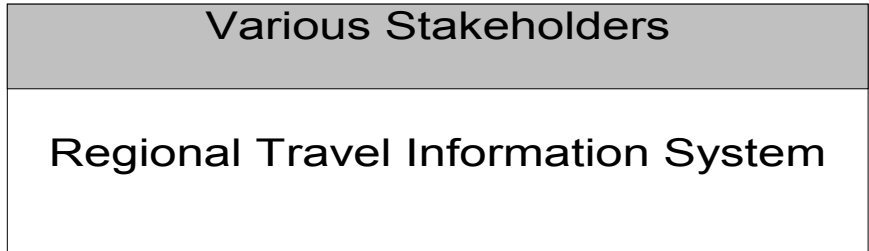
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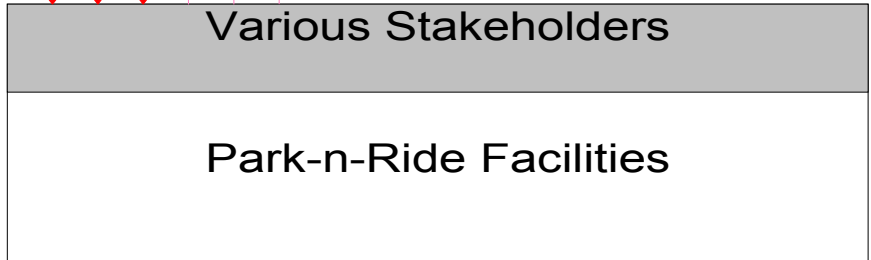
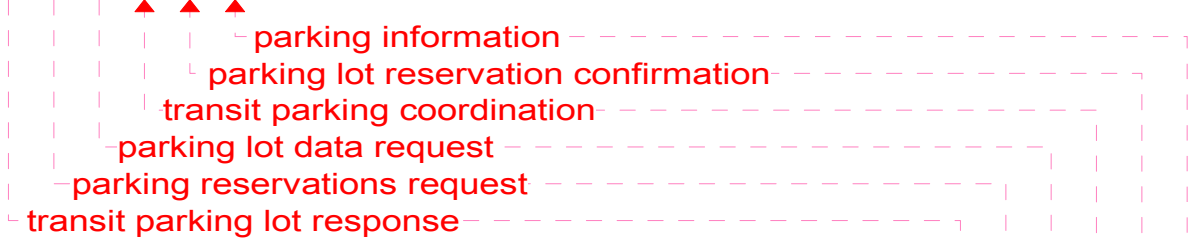
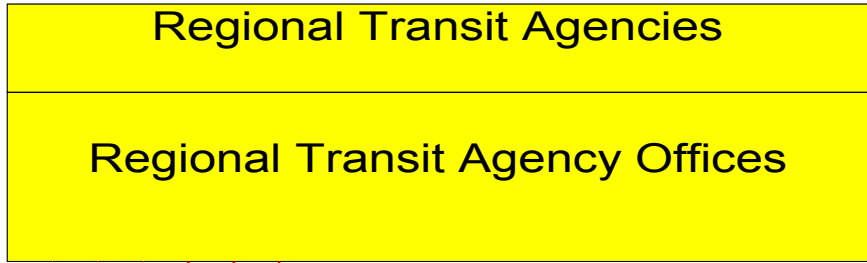


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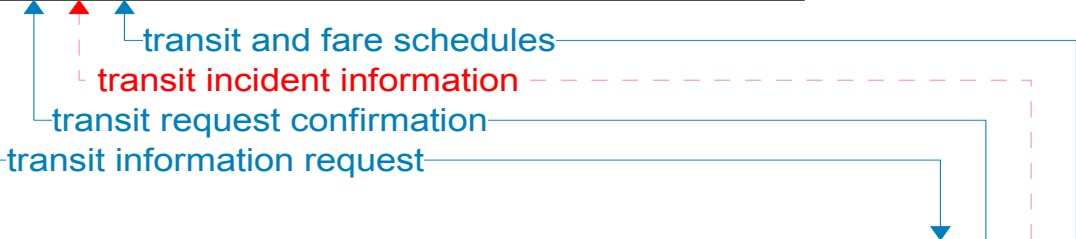
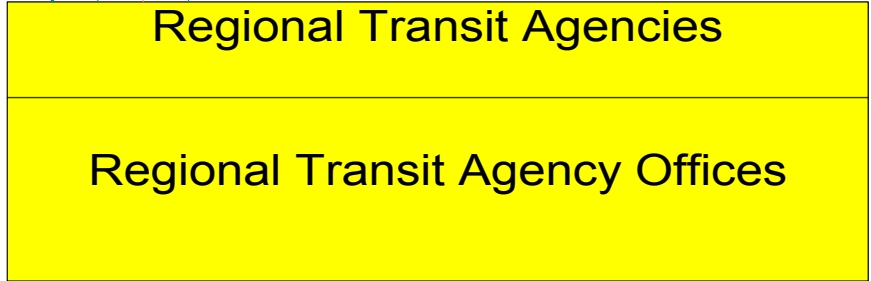




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- - - - - Planned

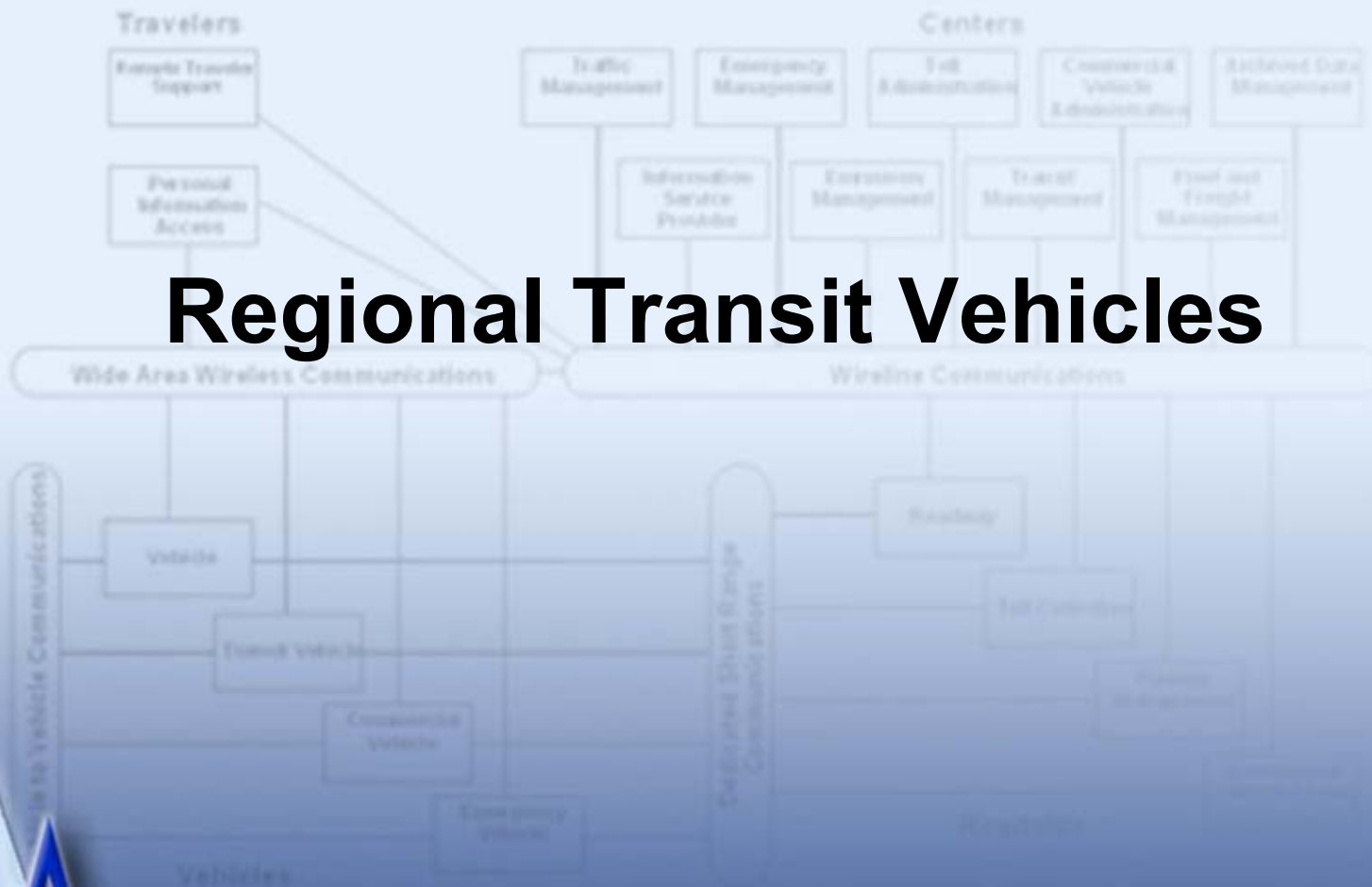


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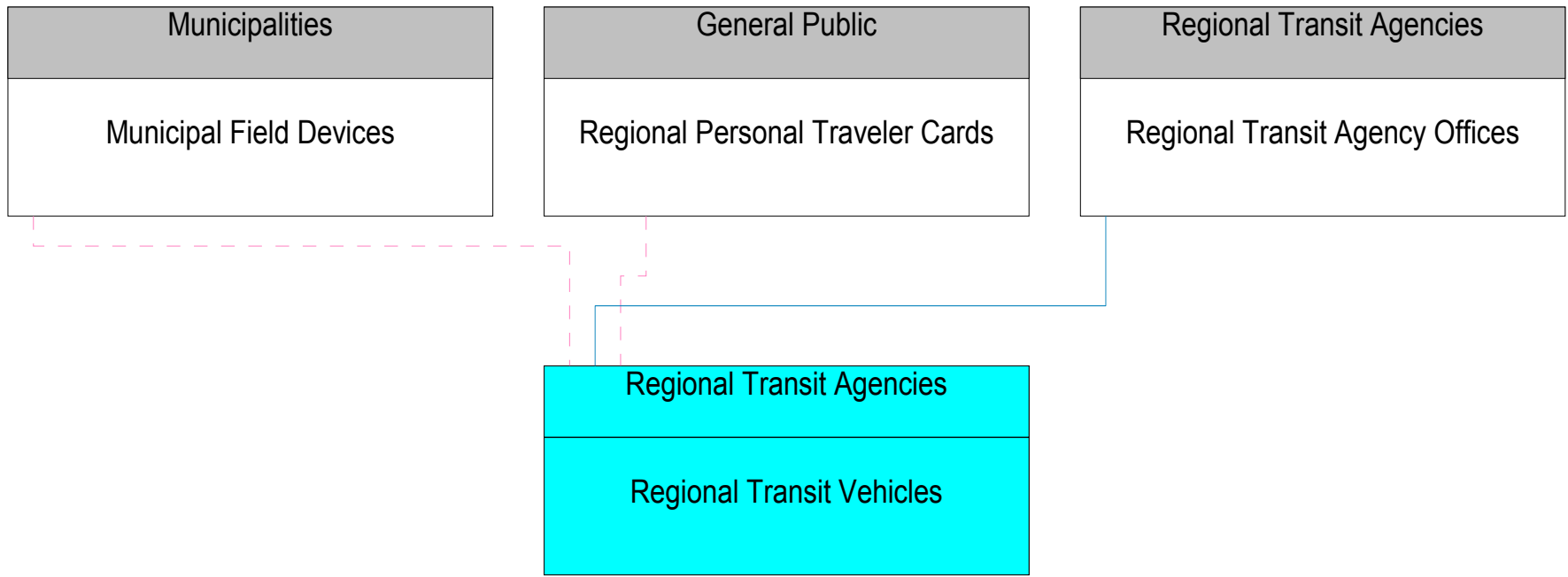


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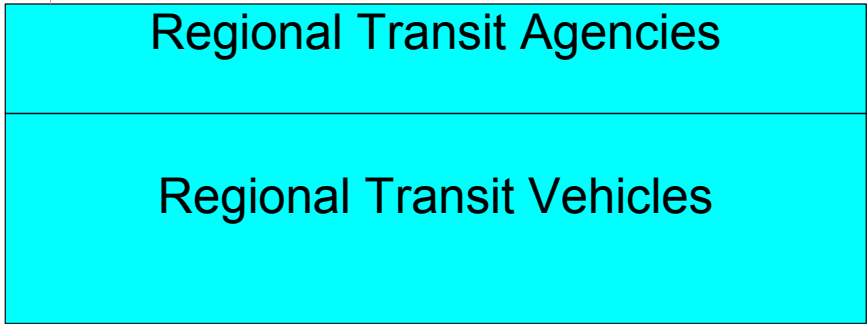
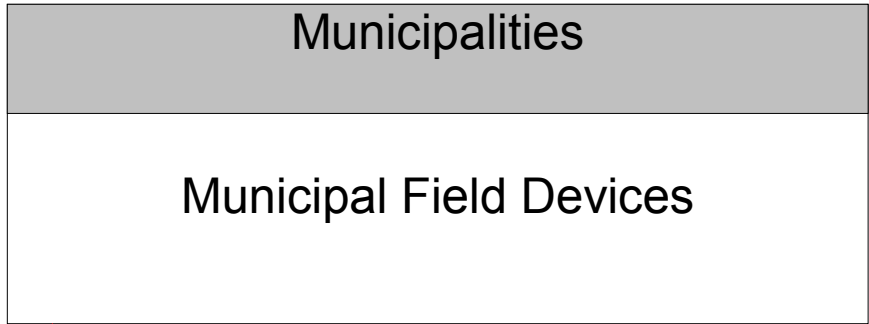
# Regional Transit Vehicles



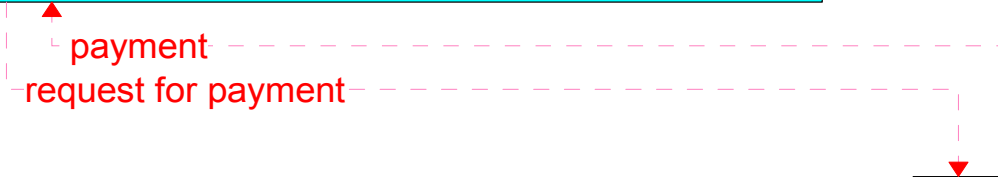
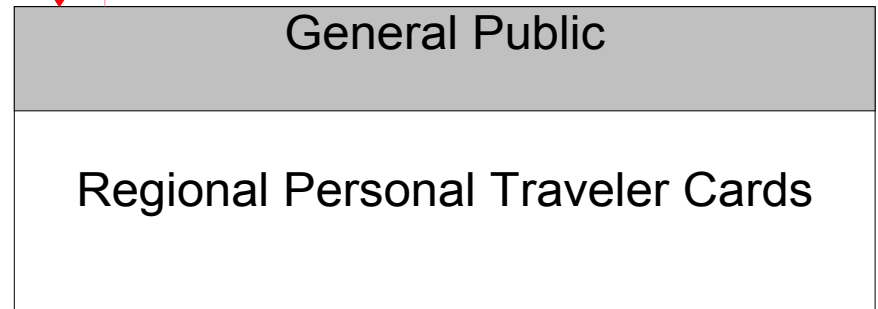
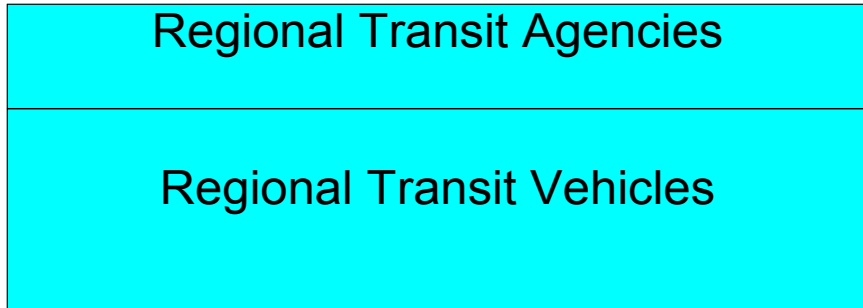
# Regional Transit Vehicles Interconnect Diagram



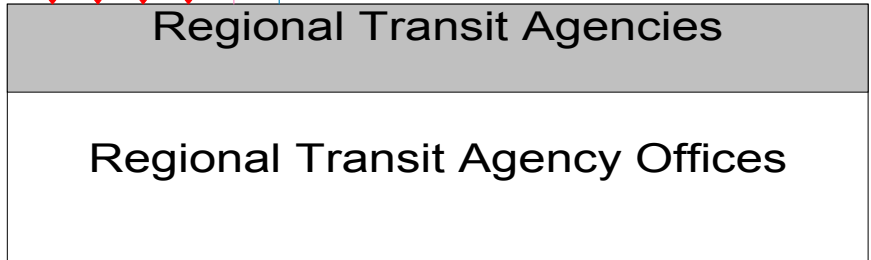
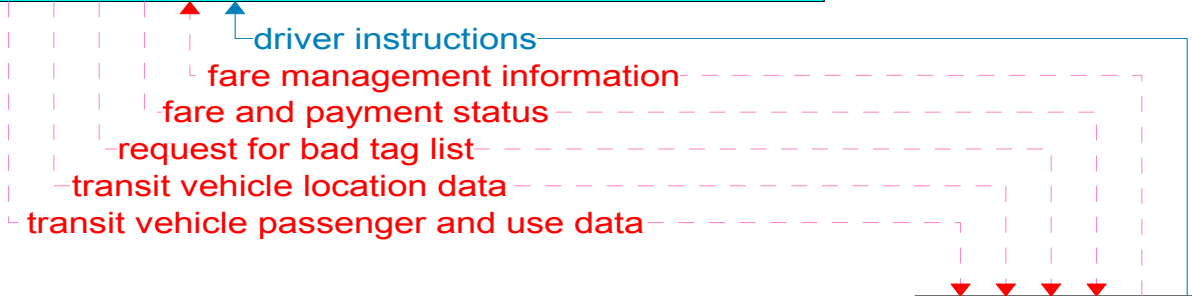
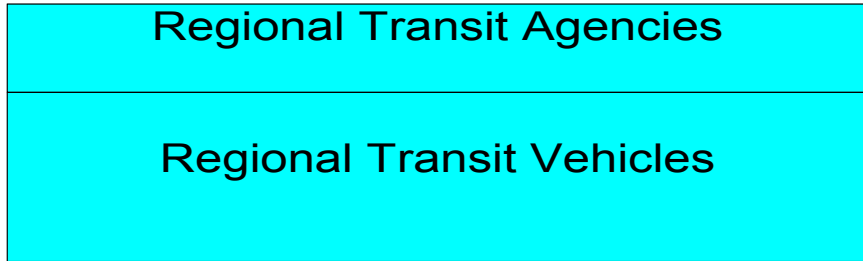
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- - - Planned



Existing  
Planned



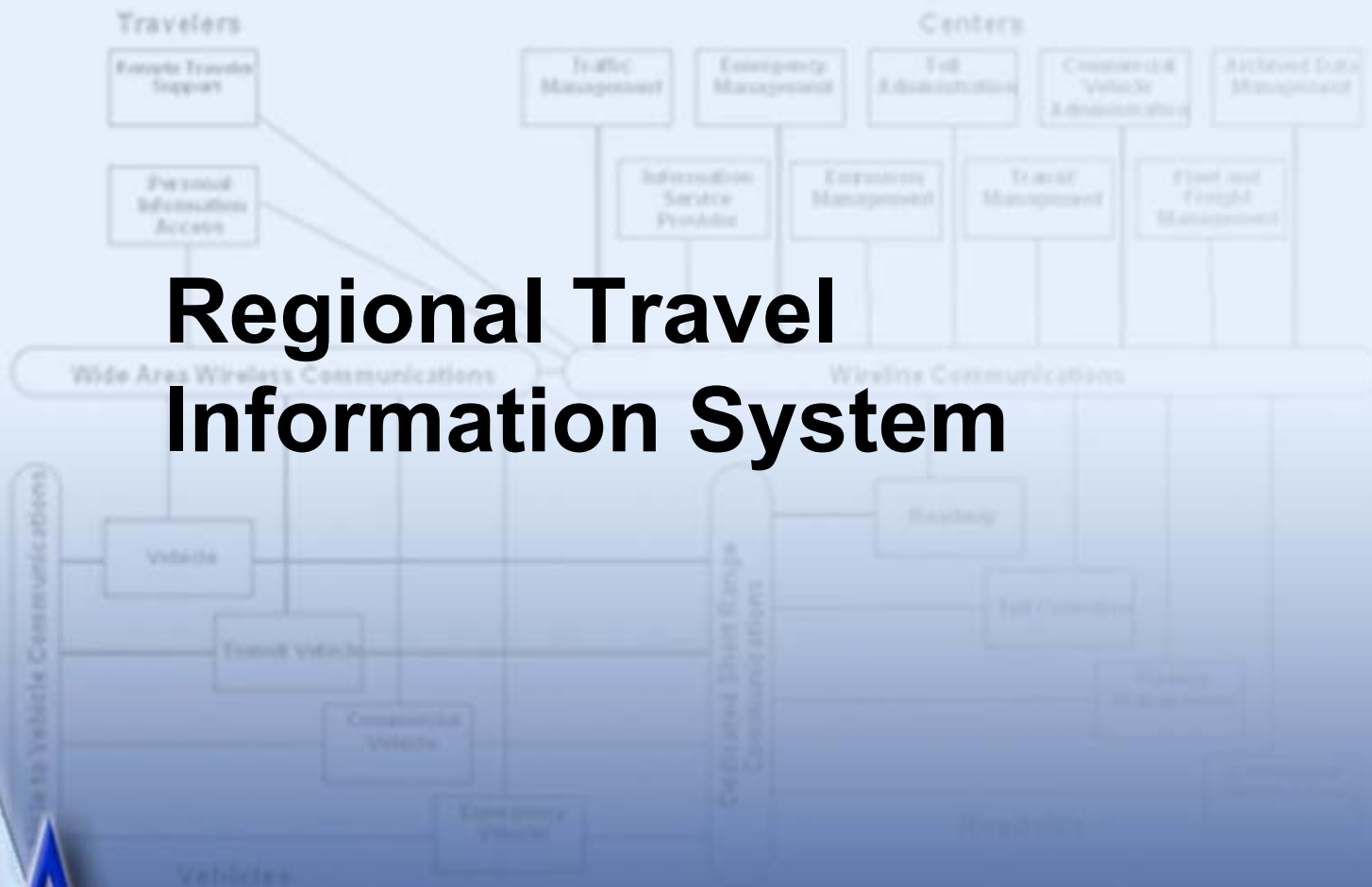
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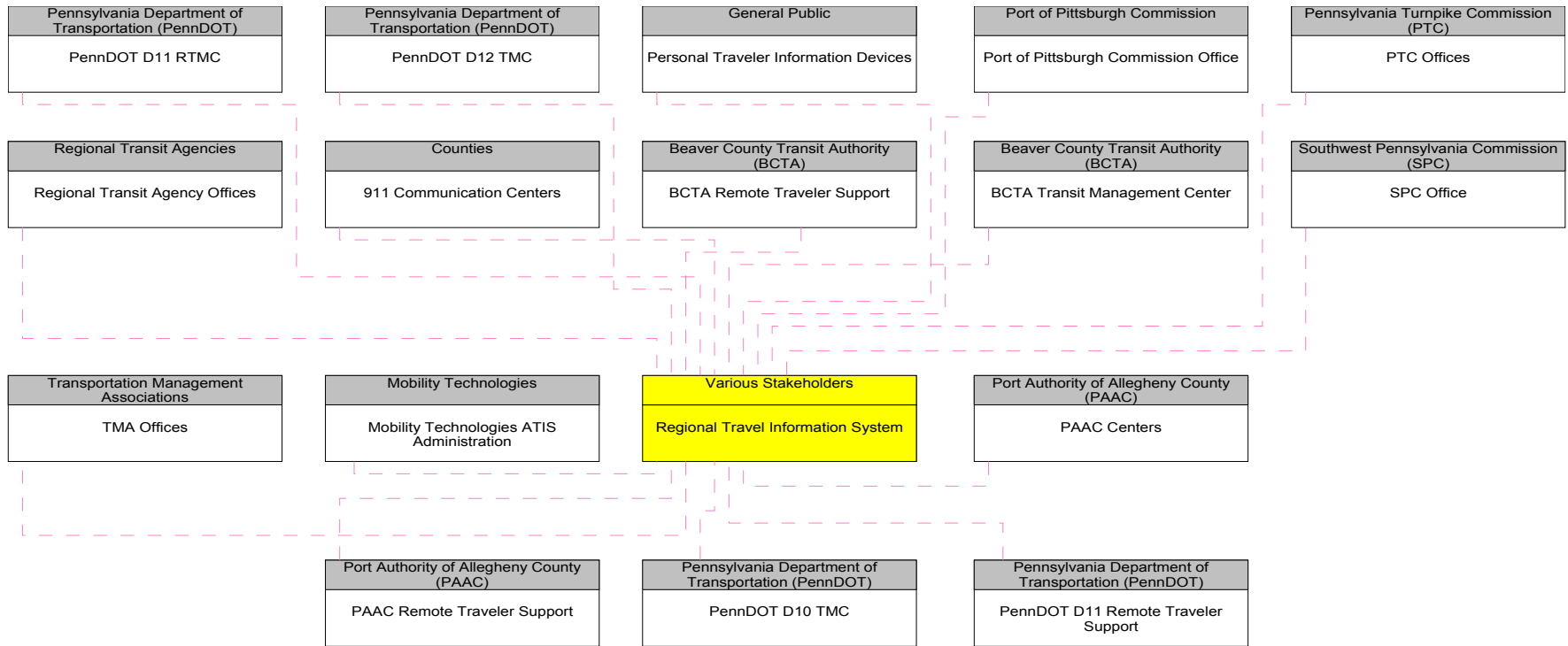
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- - - - - Planned

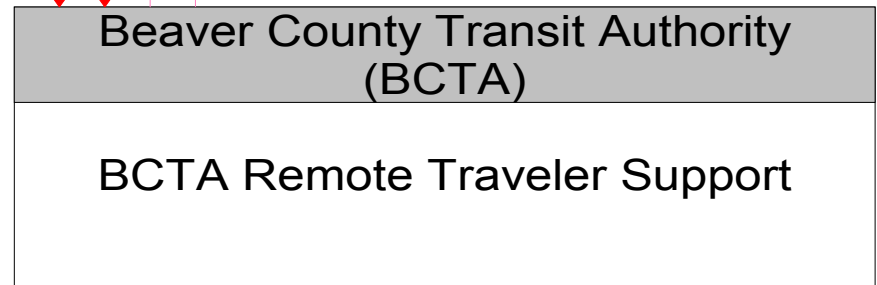
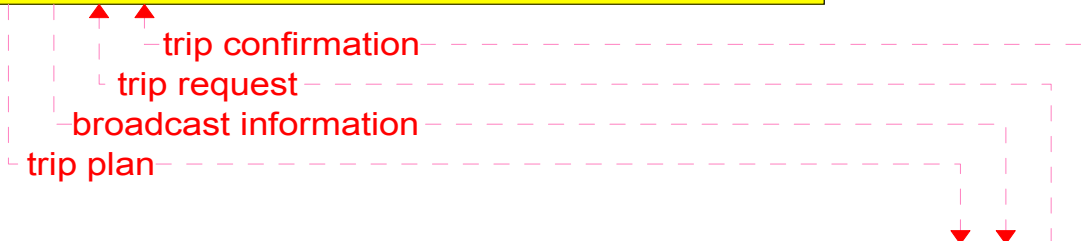
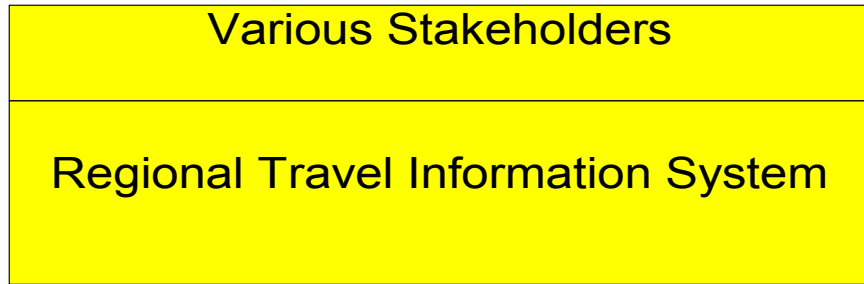


# Regional Travel Information System

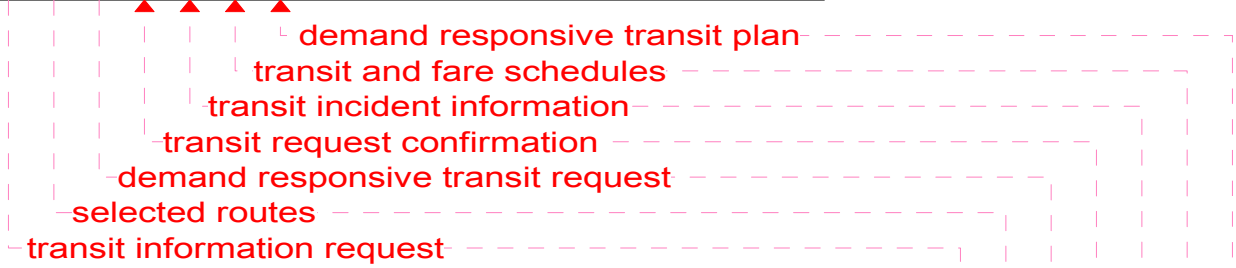
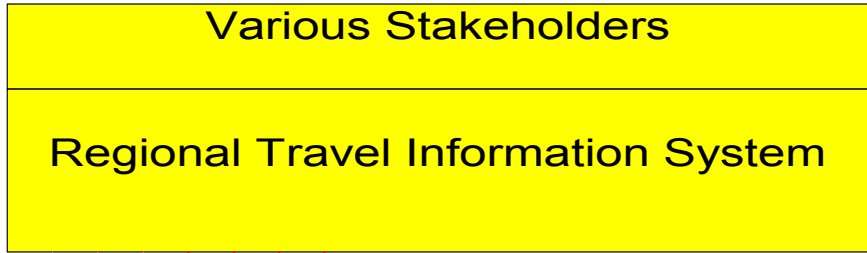


# Regional Travel Information System Interconnect Diagram

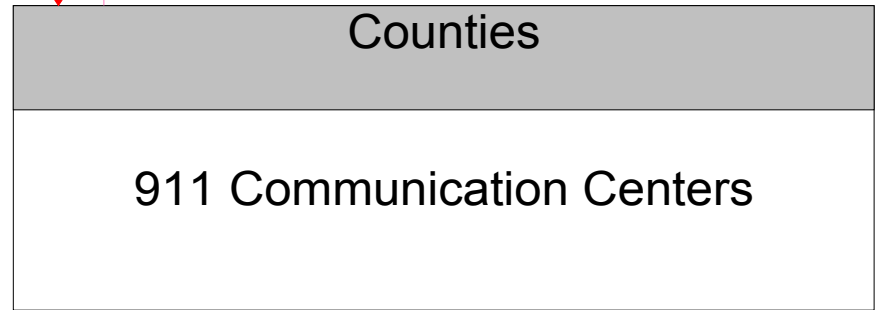
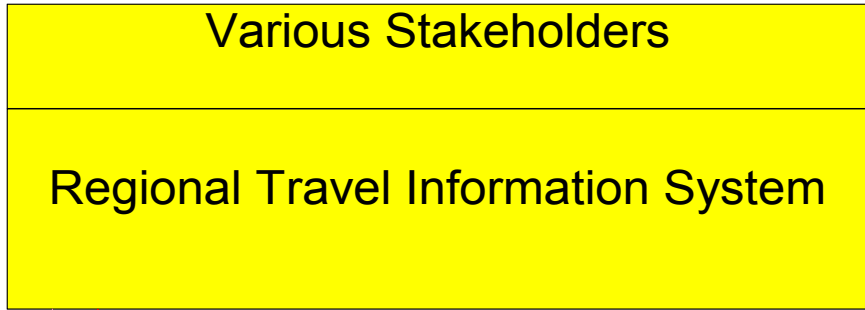




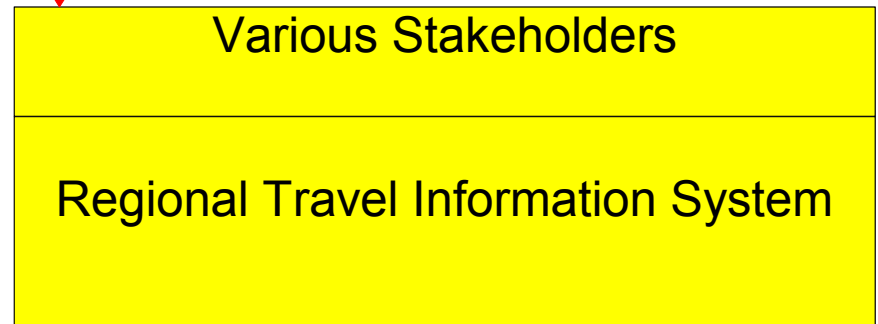
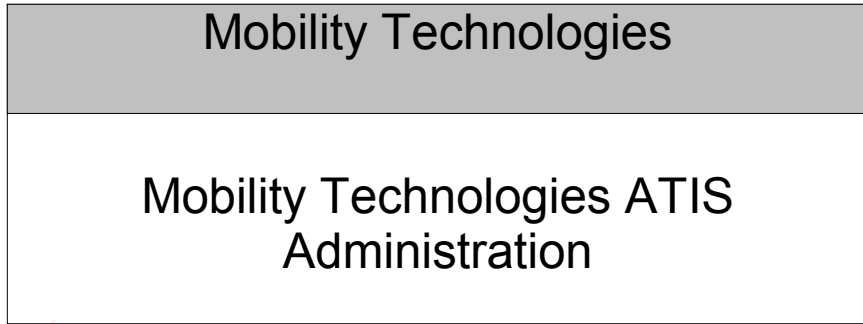
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- - - - - Planned

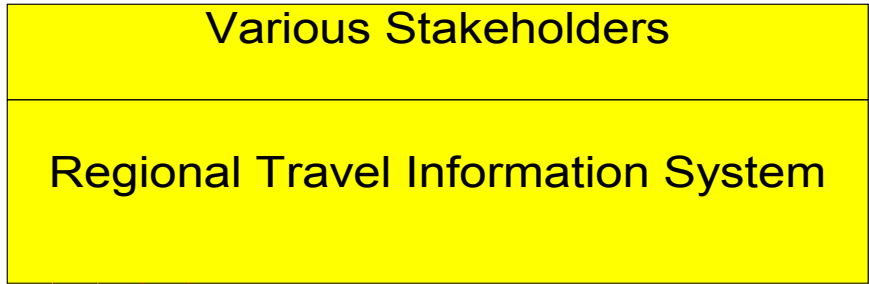


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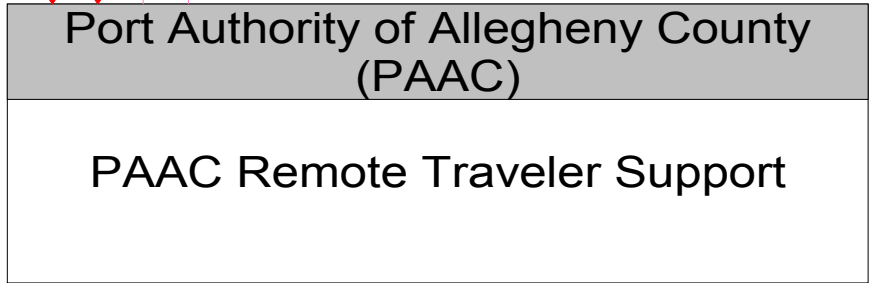


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- - - - - Planned

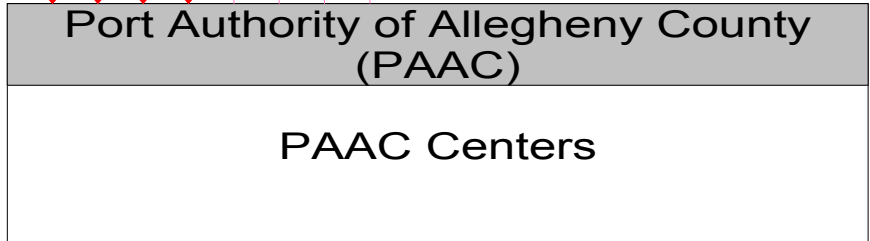
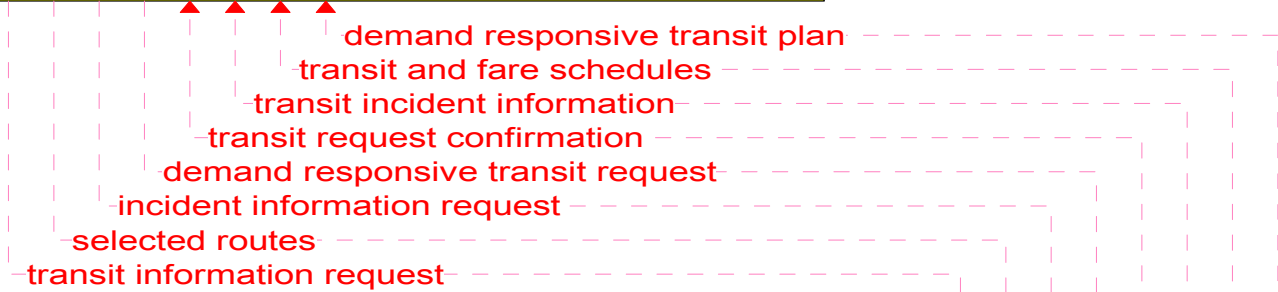
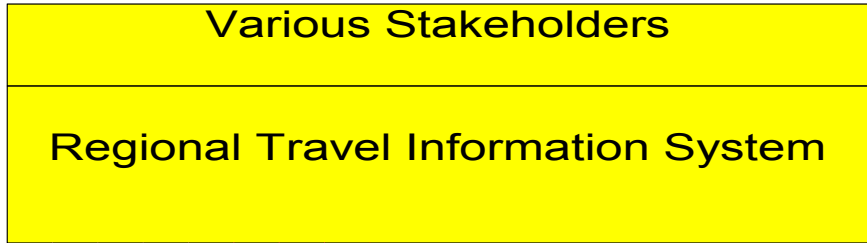




- trip confirmation
- trip request
- broadcast information
- trip plan

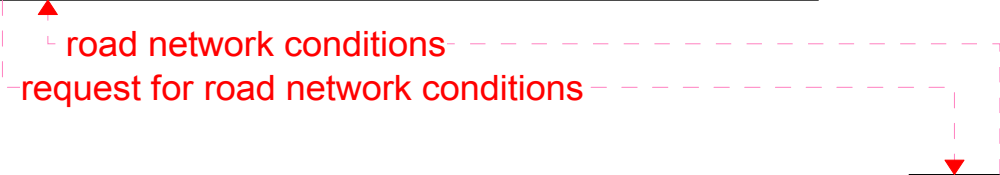
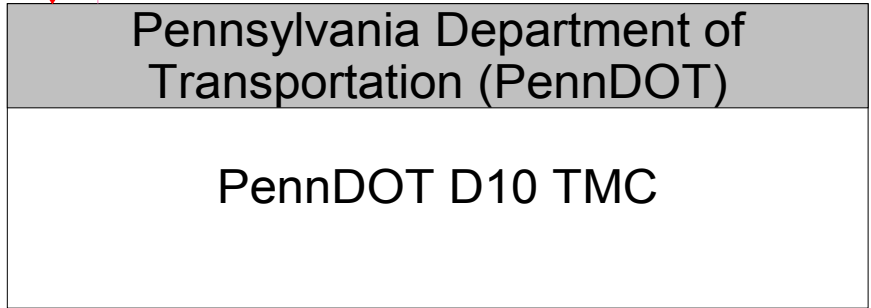
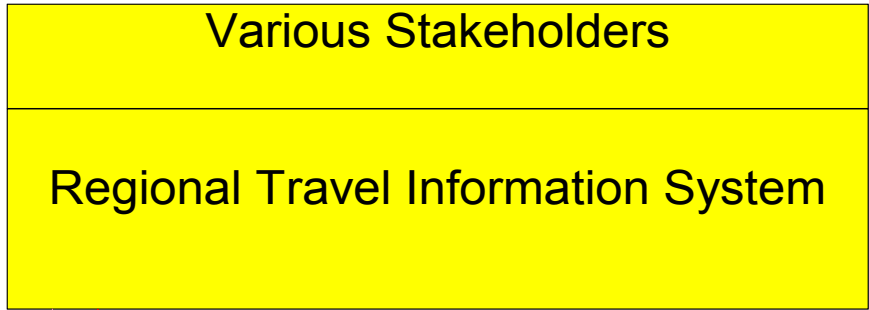


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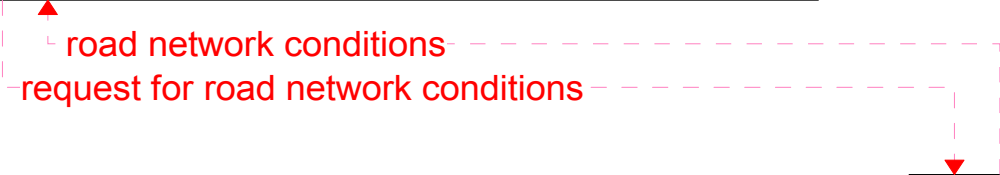
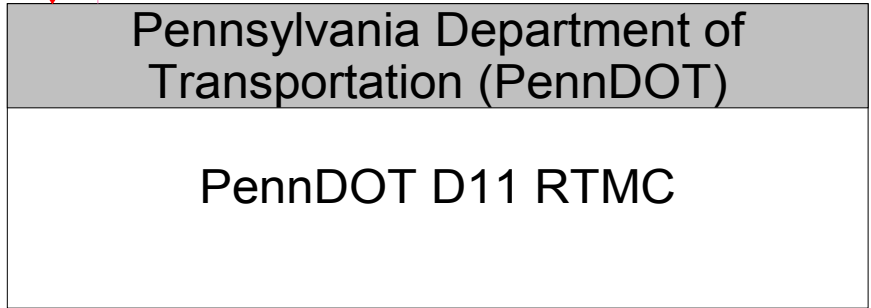
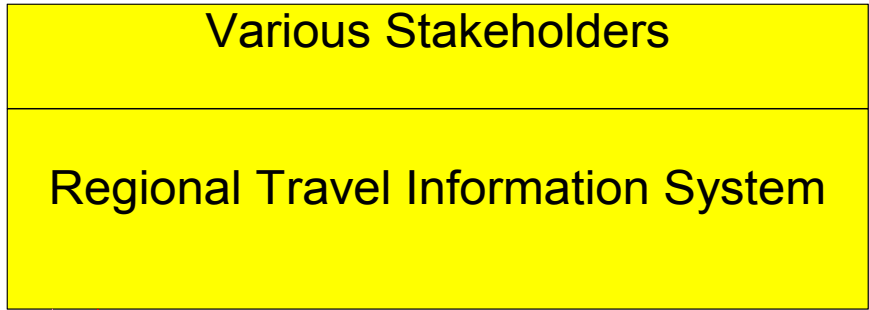


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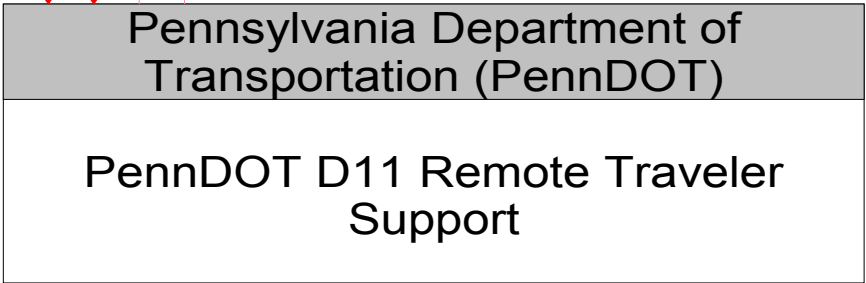
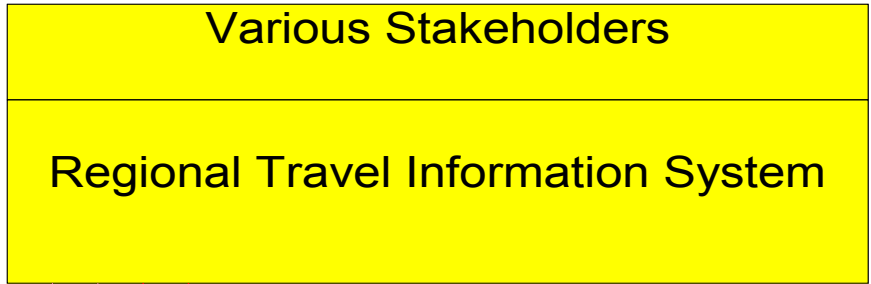




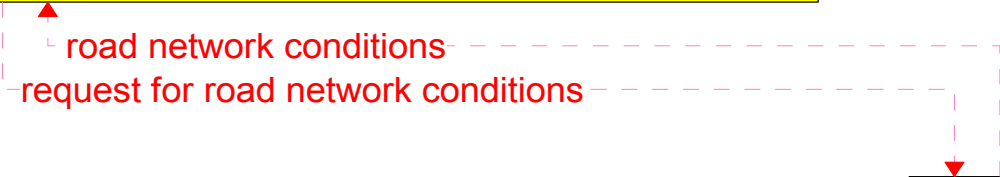
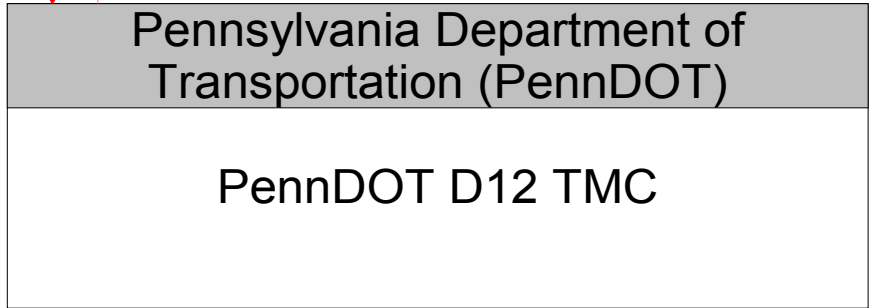
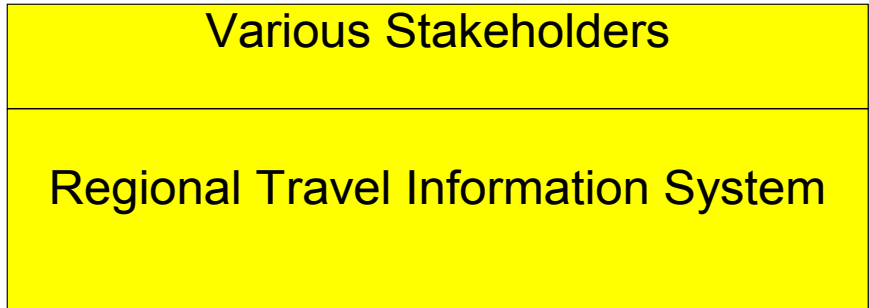
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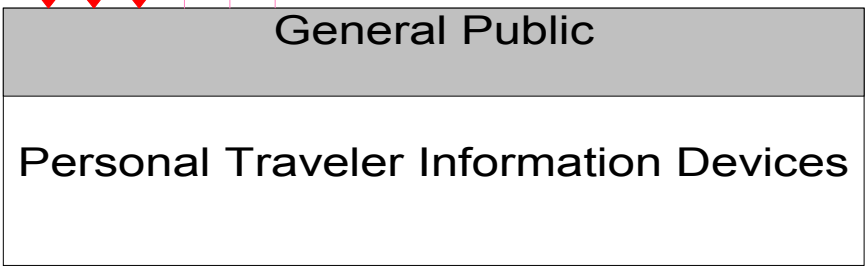
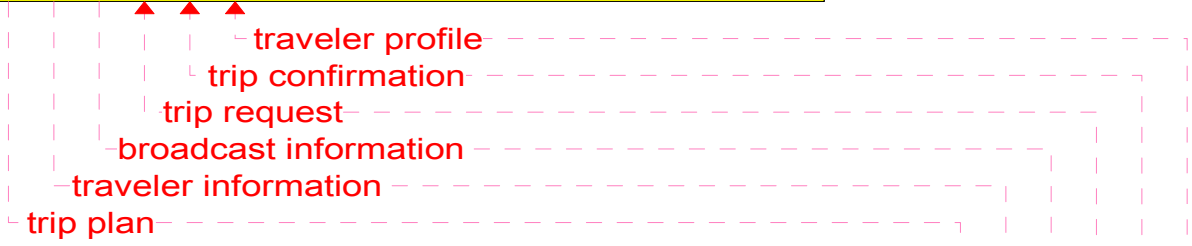
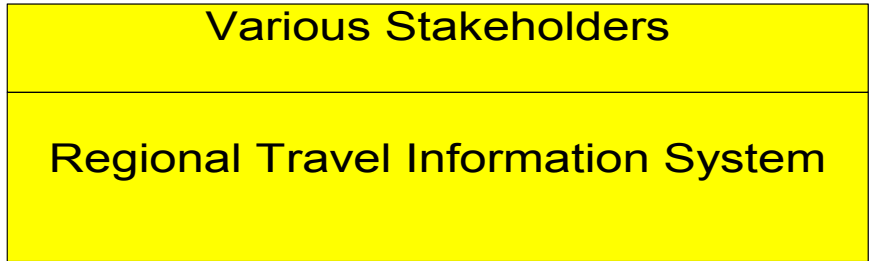
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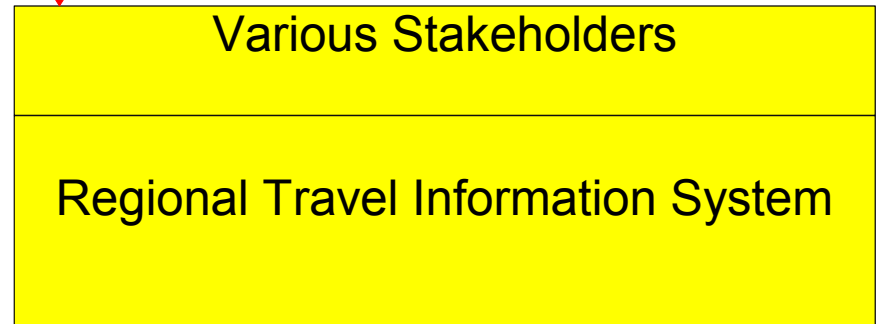
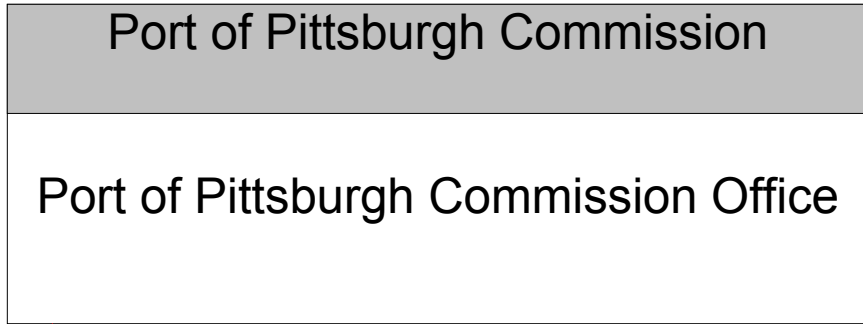
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- - - - - Planned

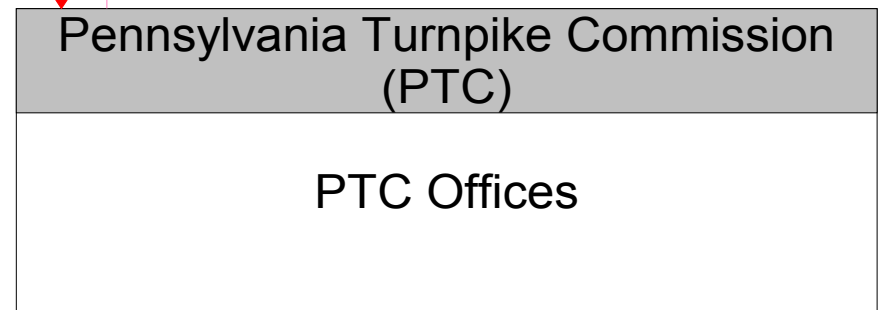
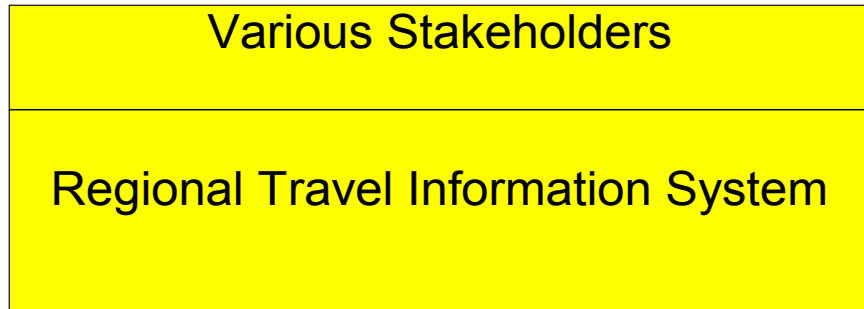


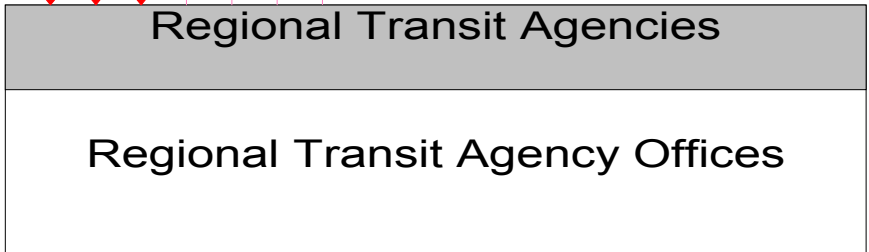
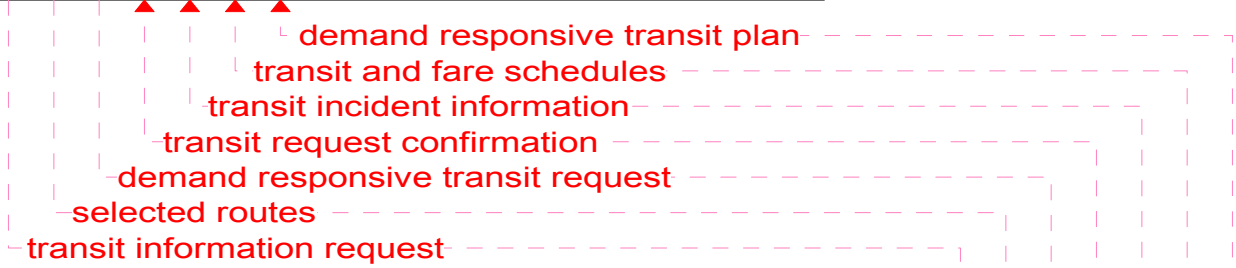
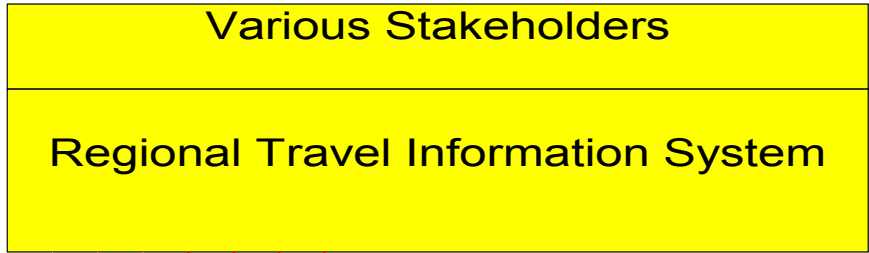
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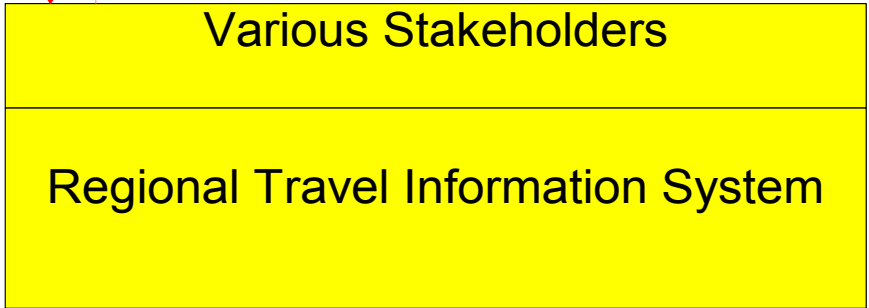
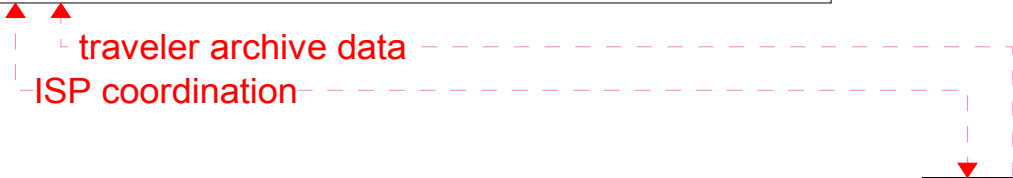
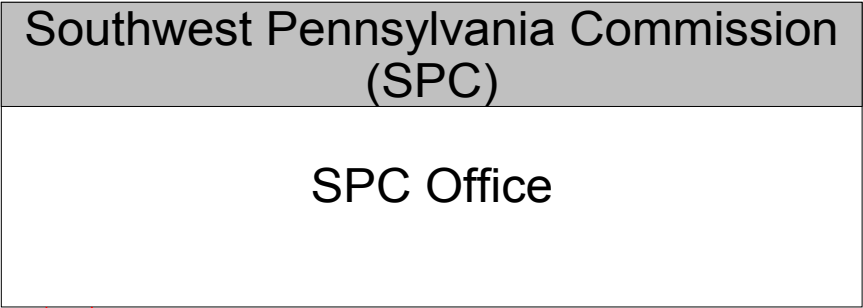




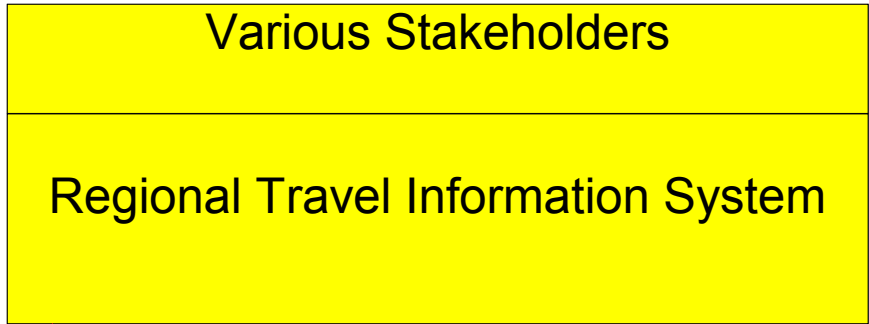


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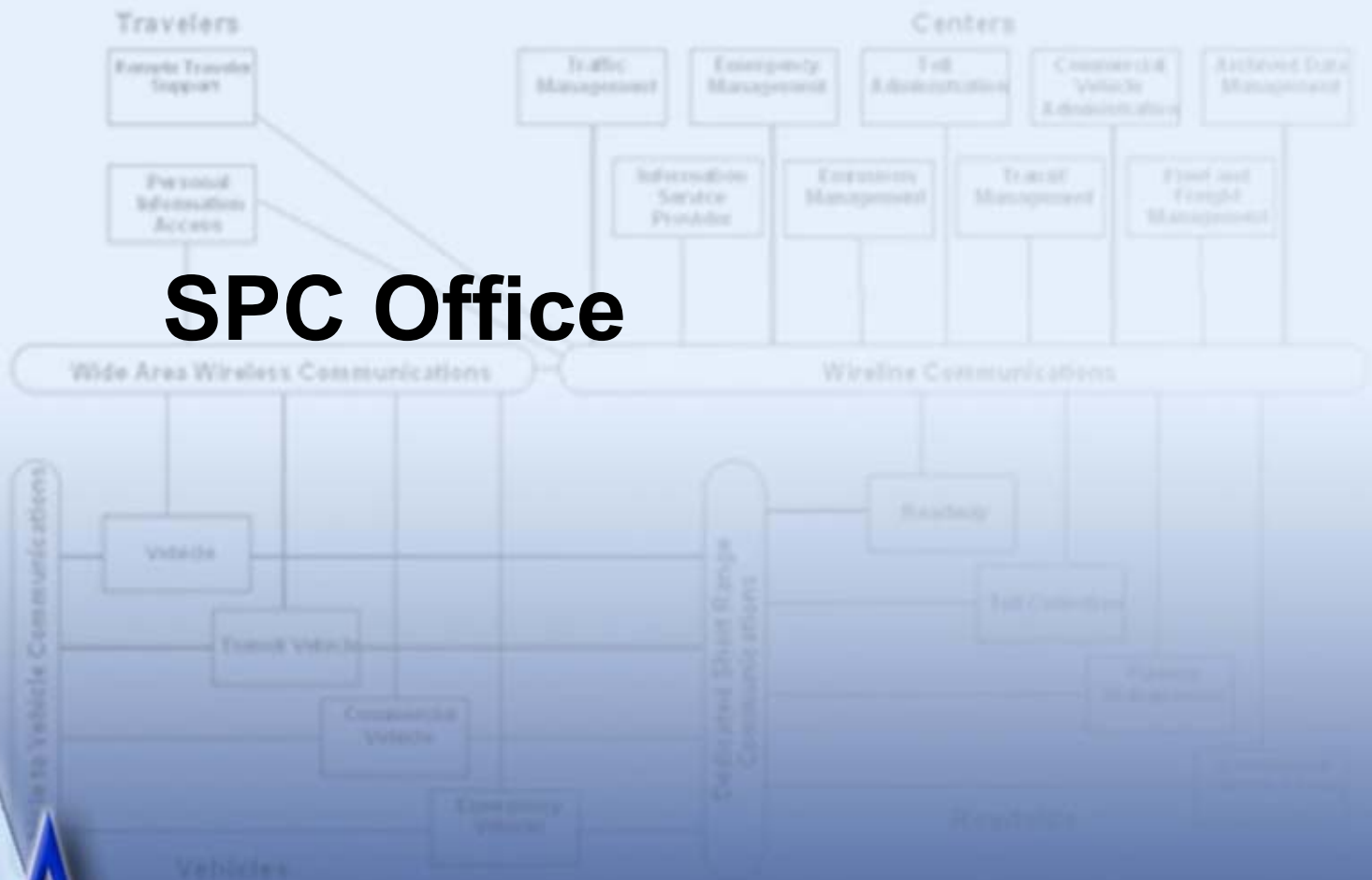




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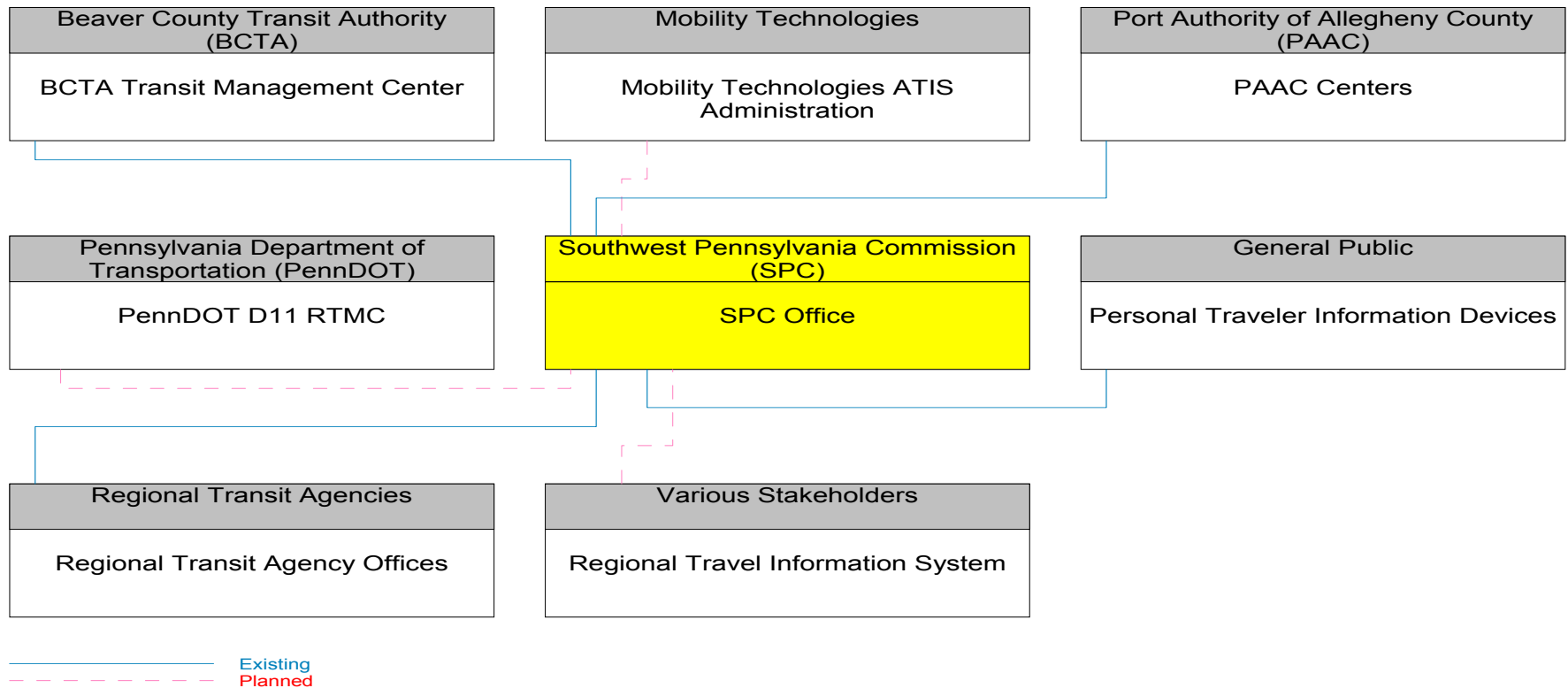


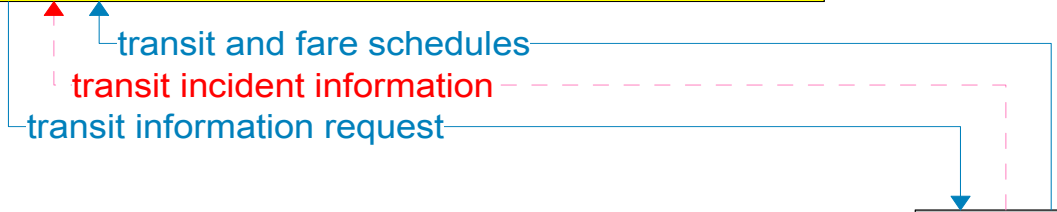
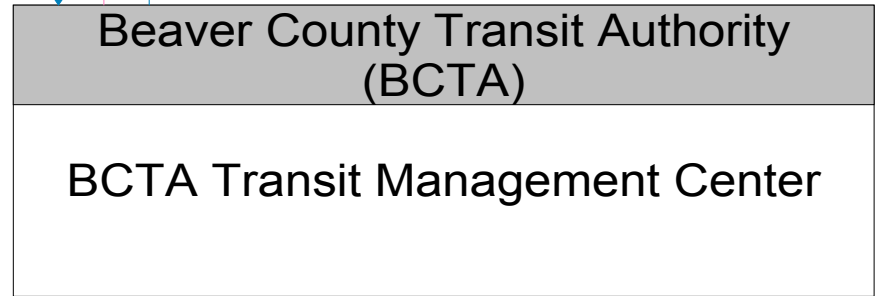
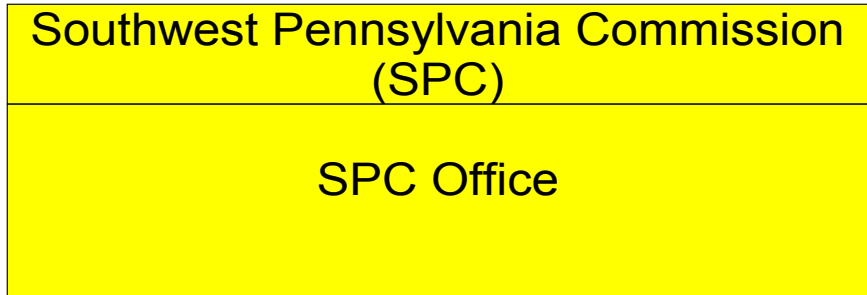
# SPC Office



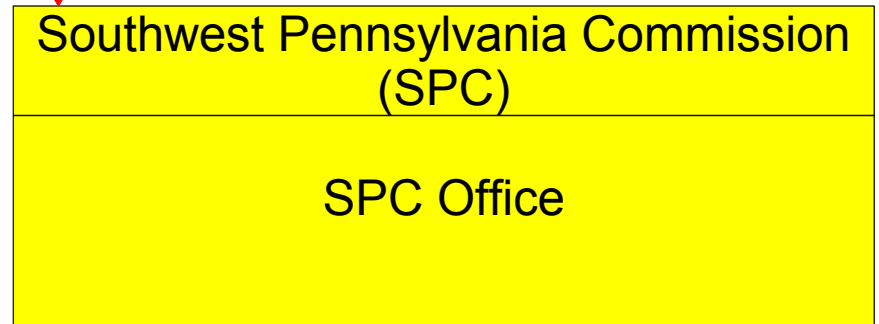
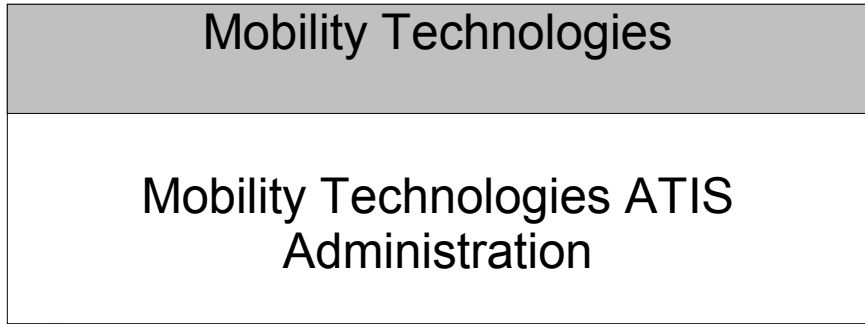
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# SPC Office Interconnect Diagram

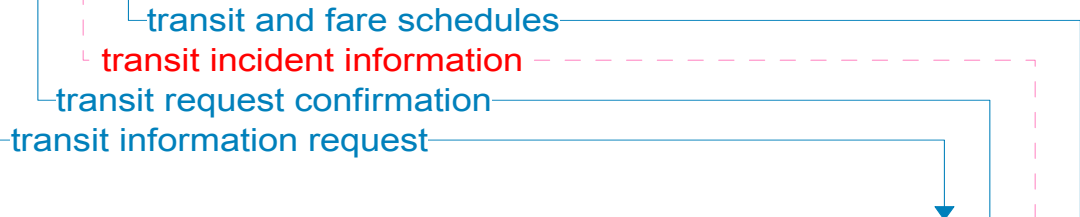
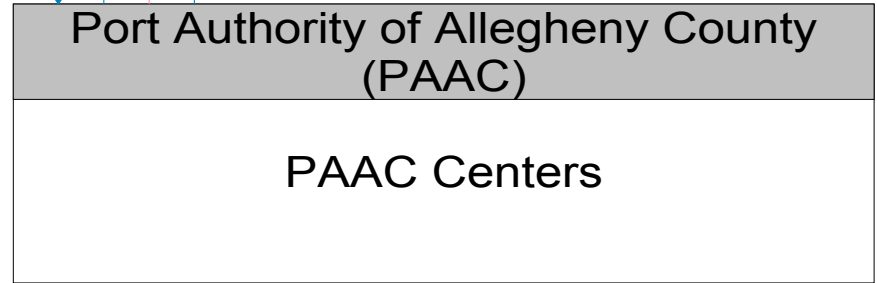
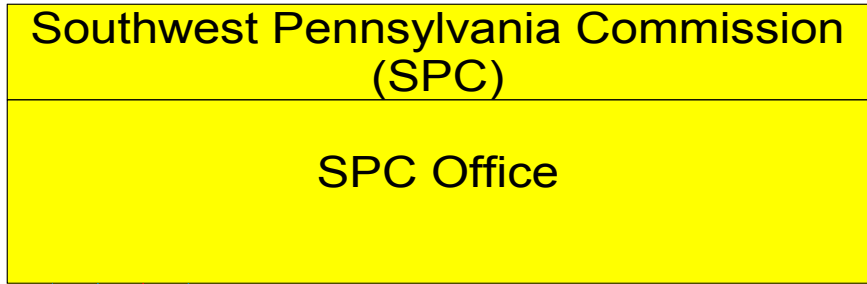




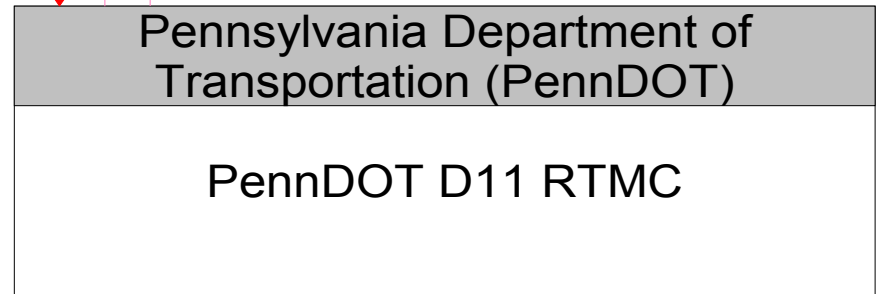
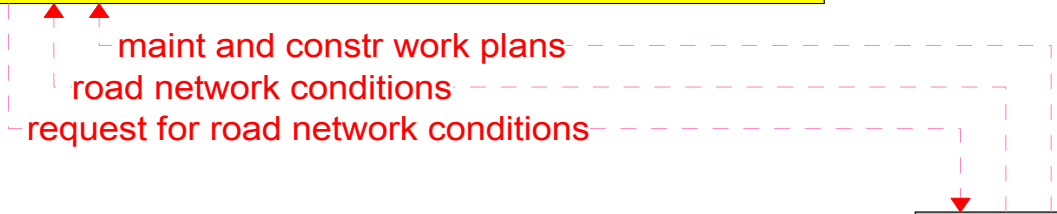
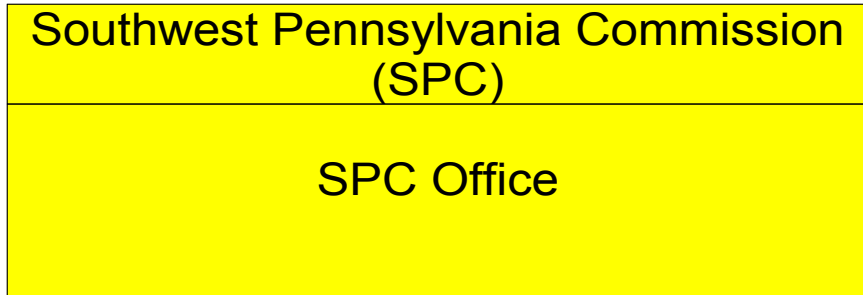
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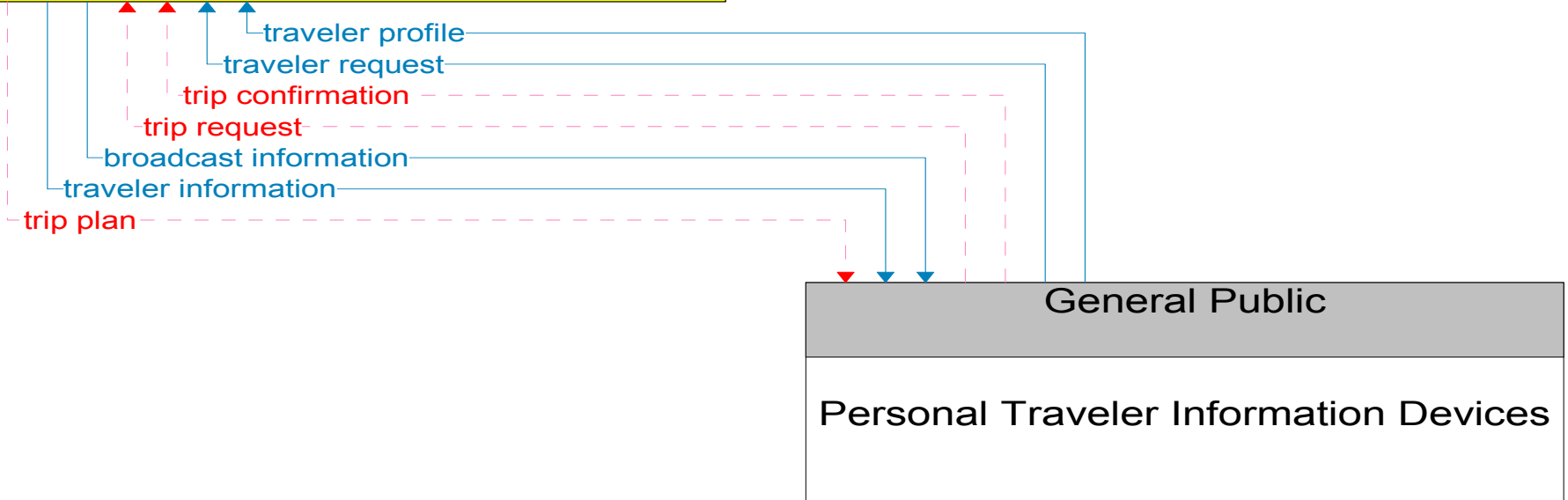
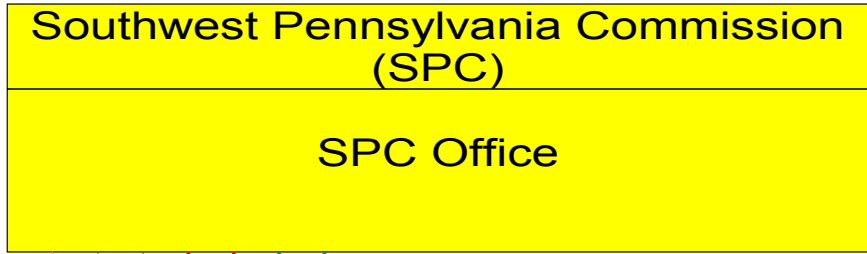


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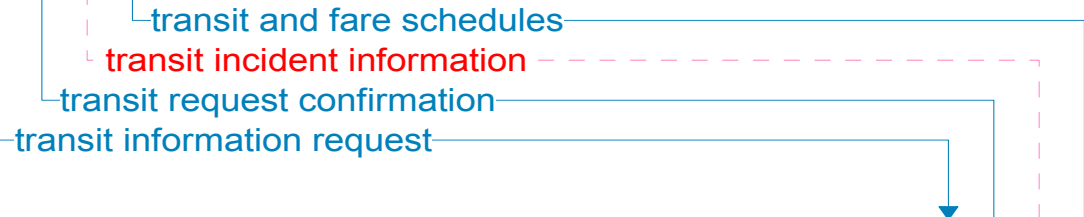
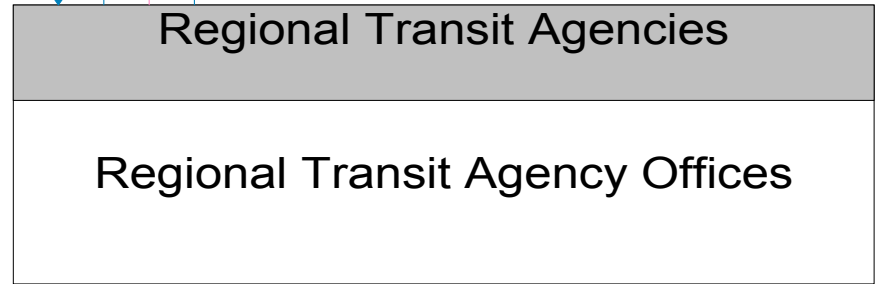
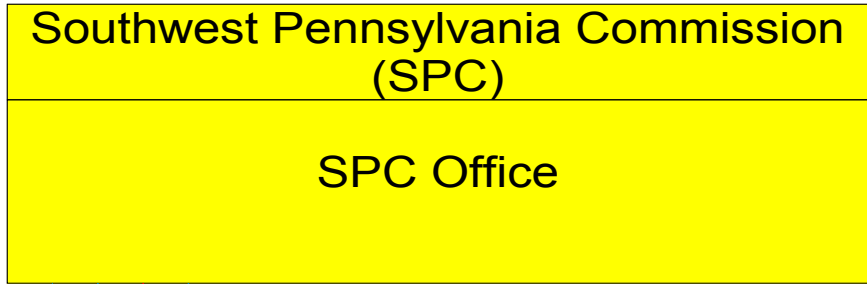


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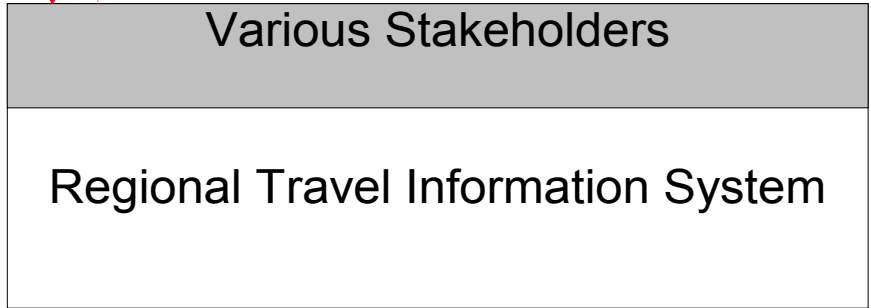
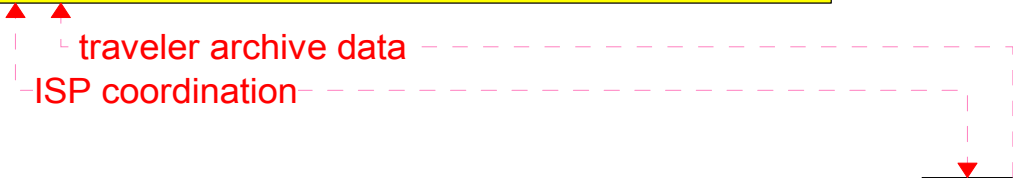
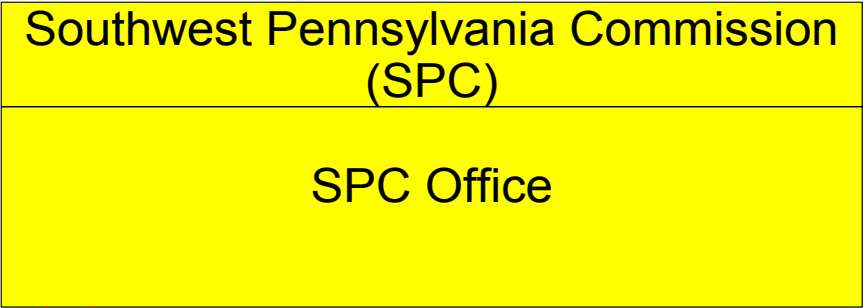




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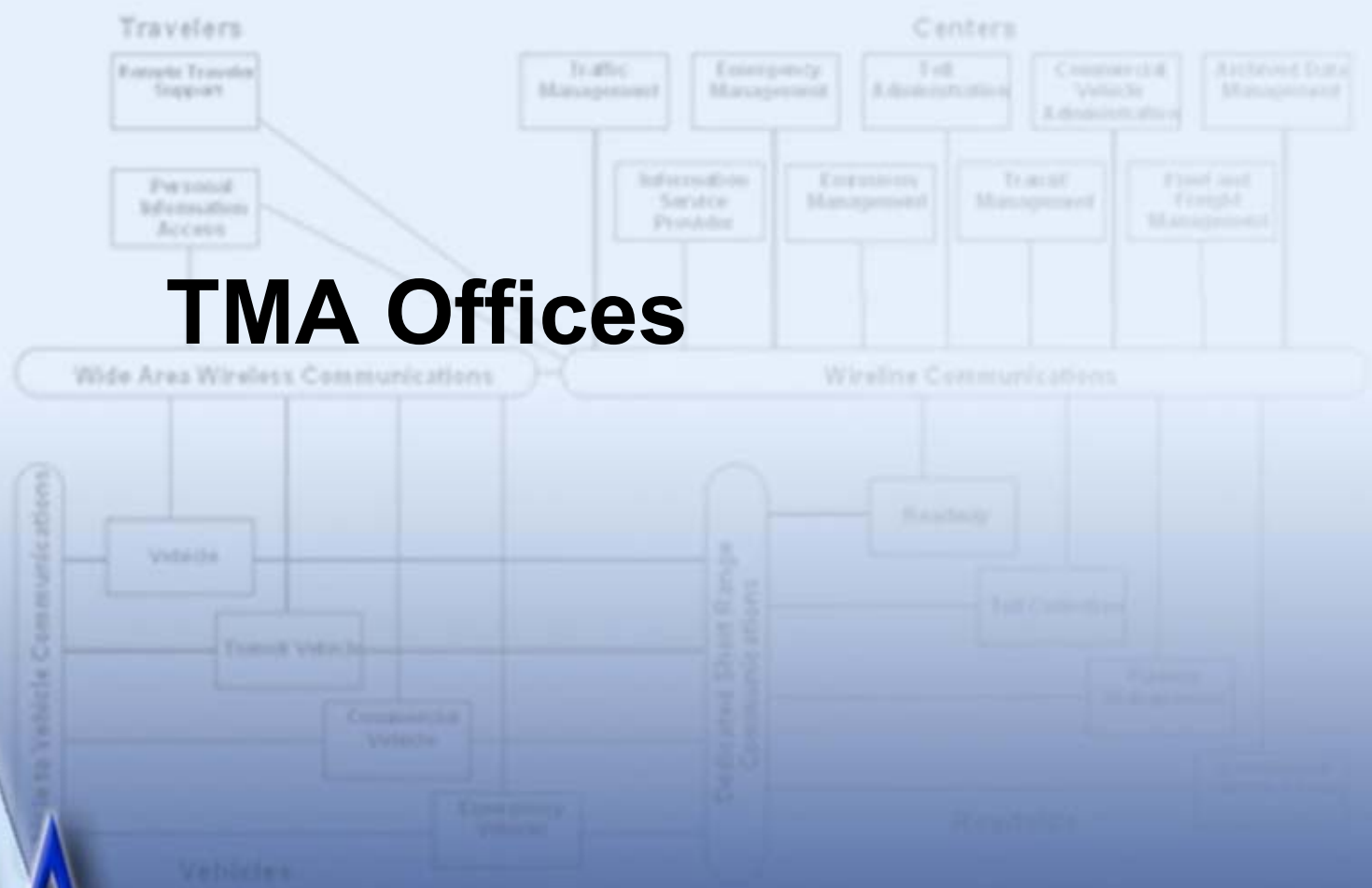


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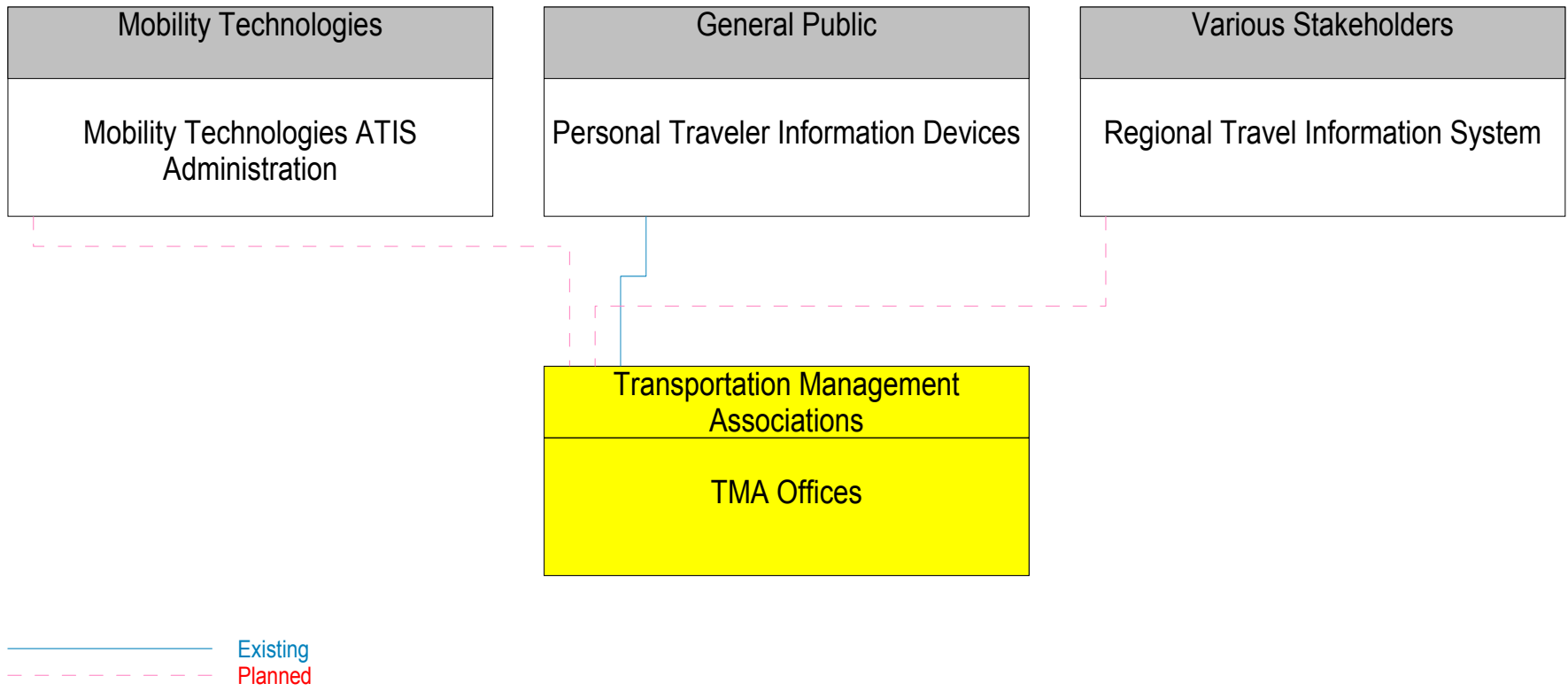


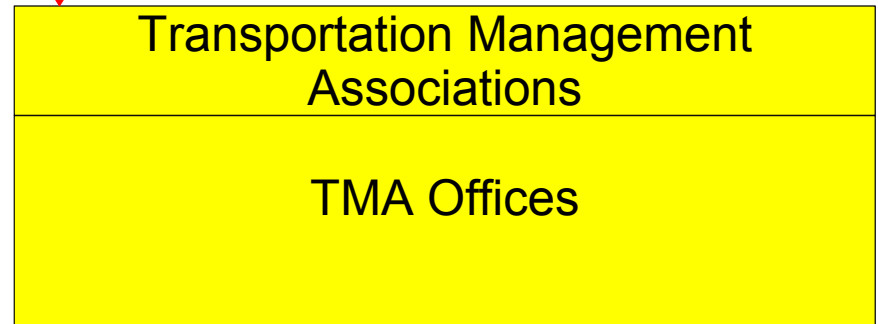
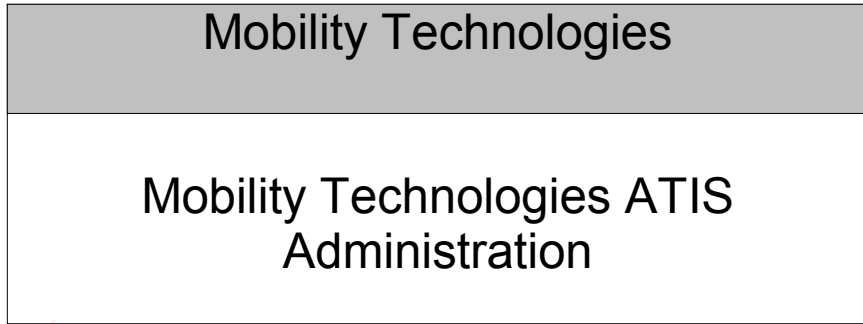
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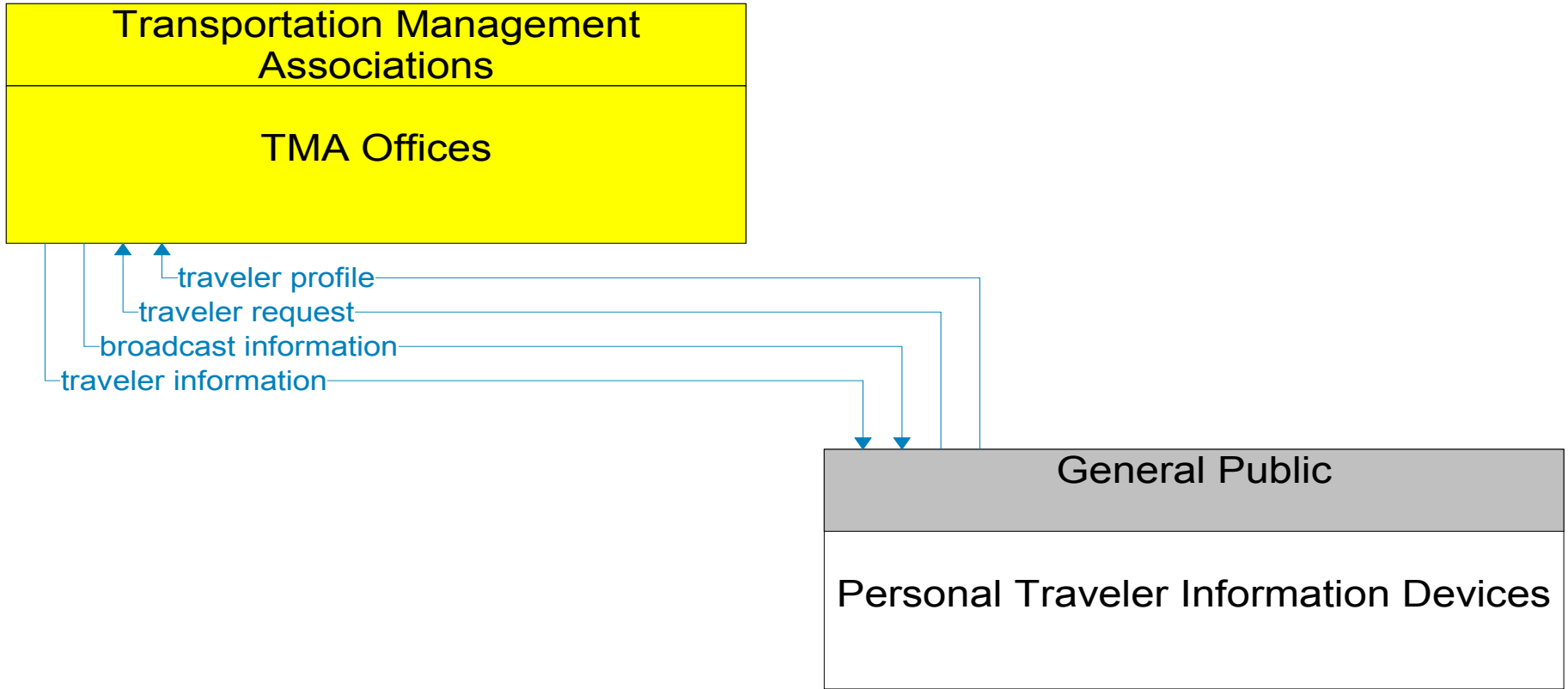


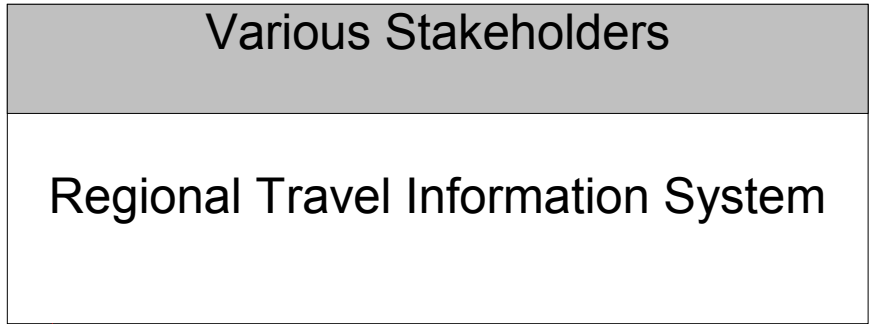
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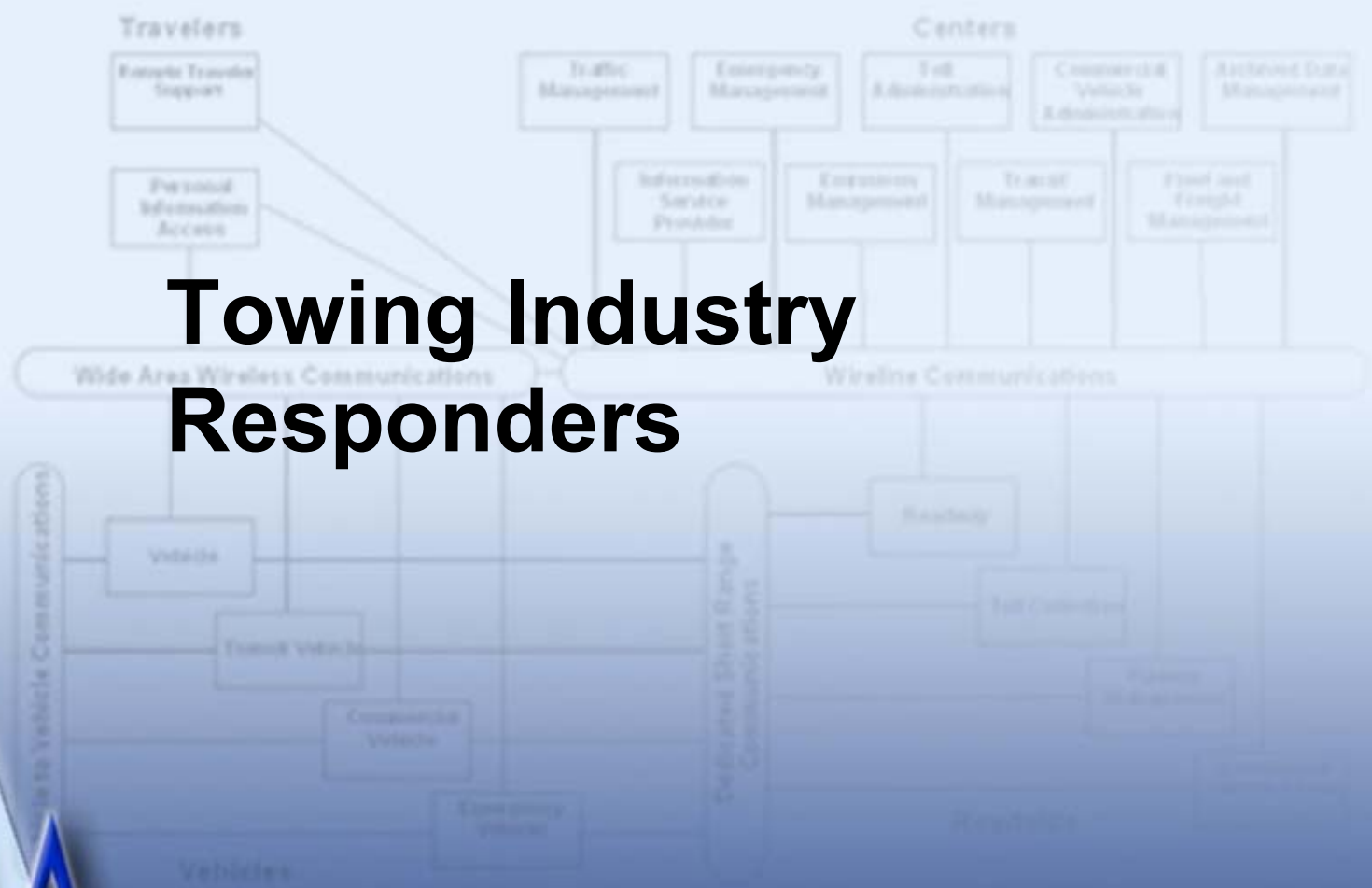
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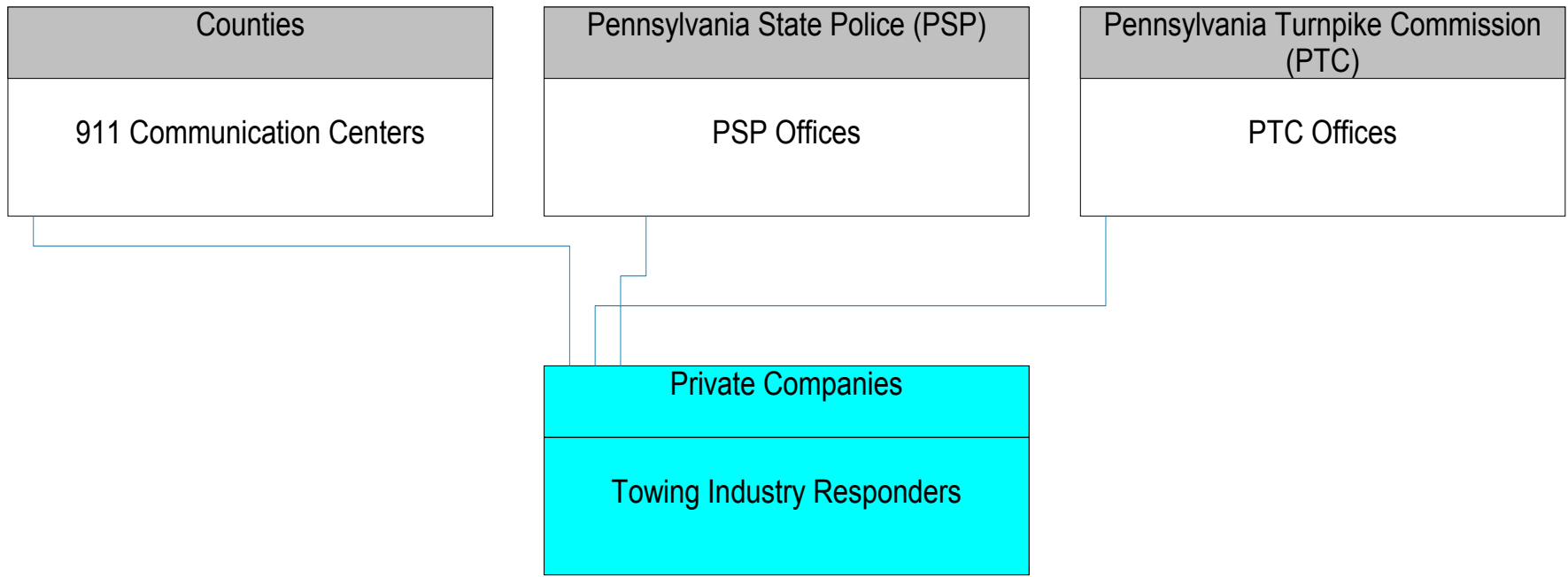


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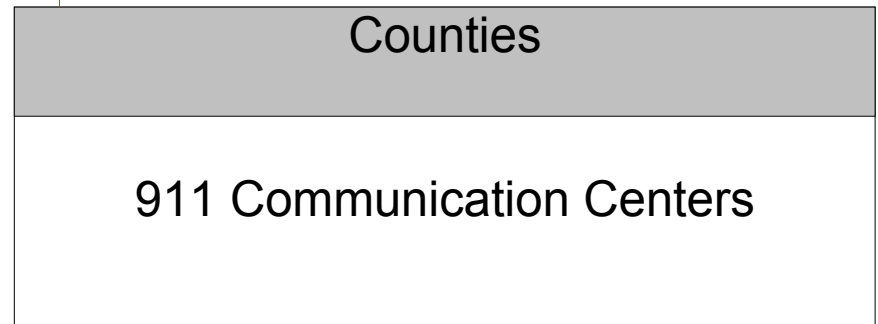
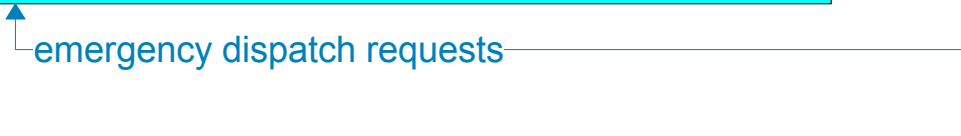
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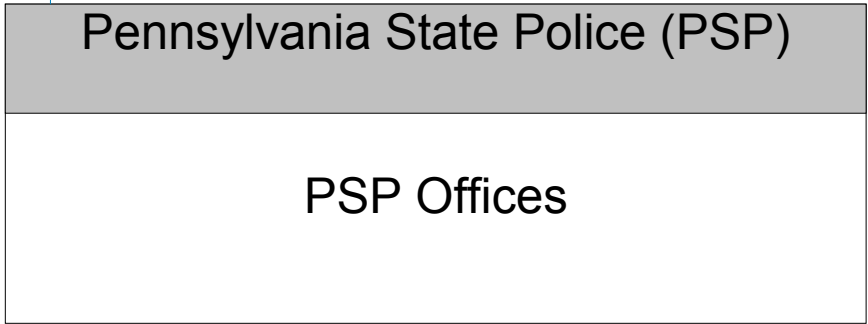


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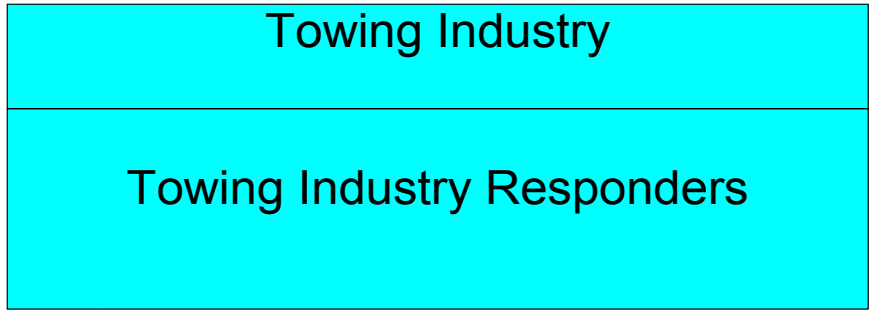


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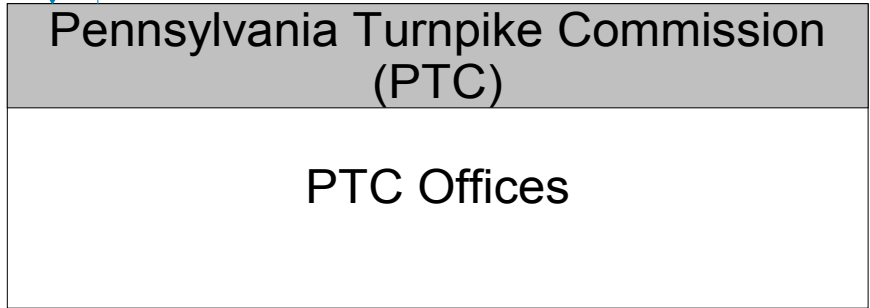


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emergency dispatch requests

emergency dispatch response



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## References

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- *DVRPC Regional ITS Architecture – Version 1.0.* Delaware Valley Regional Planning Commission, Philadelphia, PA, March 2001.
- *National ITS Architecture – Version 4.0.* <http://itsarch.iteris.com/itsarch> Last viewed, April 2004.
- *United States Census Bureau.* <http://www.census.gov> Last viewed, April 2004.
- *Pennsylvania ITS Architecture Phase I – Final Report,* PennDOT, February 2003.

## Appendix A: Acronyms

AAA	American Automobile Association
AASHTO	American Association of State Highway and Transportation Officials
ACAA	Allegheny County Airport Authority
ADA	Americans with Disabilities Act
AHS	Automated Highway System
ANSI	American National Standards Institute
ASTM	American Society of Testing and Materials
ATIS	Advanced Traveler Information System
ATR	Automatic Traffic Recorders
AVL	Automatic Vehicle Location
BCTA	Beaver County Transit Authority
BHSTE	Bureau of Highway Safety and Traffic Engineering
BOMO	Bureau of Maintenance and Operations
BPR	Bureau of Planning and Research
BRT	Bus Rapid Transit
BTCTMTA	Butler Township-City Joint Municipal Transit Authority
CC	Control Center
CCTV	Closed Circuit Television
CDC	Consolidated Dispatch Centers
CDL	Commercial Drivers License
CPT	Common Public Transportation
CVC	Commercial Vehicle Check
CVISN	Commercial Vehicle Information Systems and Networks
CVO	Commercial Vehicle Operations
DARC	Data Radio Channel
DMS	Dynamic Message Signs
DSRC	Designated Short Range Communication
DMV	Department of Motor Vehicles
DVMT	Daily Vehicle Miles Traveled
DOT	Department of Transportation
EMA	Emergency Management Agency
EMS	Emergency Medical Services
ESP	Emergency Service Patrol
ETC	Electronic Toll Collection
E-Z Pass	Electronic toll collection system used by a consortium of toll authorities in northeast United States
FACT	Fayette Area Coordinated Transportation
FC	Fare Collection
FCC	Federal Communication Commission
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GIS	Geographic Information System
GPS	Global Positioning System

HAR	Highway Advisory Radio
HAT	Highway Advisory Telephone System
Hazmat	Hazardous Materials
HOV	High Occupancy Vehicle
HRI	Highway Rail Intersection
IEEE	Institute of Electrical and Electronics Engineers
IEN	Information Exchange Network
IIMS	Incident Information Management System
IMMS	Incident Management Message Sets
IM	Incident Management
IndiGo	Indiana County Transit
ISP	Information Service Provider
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation System
MCSAP	Motor Carrier Safety Assistance Program
MMVTA	Mid-Mon Valley Transit Authority
MOE	Measures of Effectiveness
MOU	Memorandum of Understanding
m.p.	Milepost
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
NEMA	National Electrical Manufacturers Association
NHI	National Highway Institute
NTA	New Castle Area Transit Authority
NTCIP	National Transportation Communications for ITS Protocols
NWS	National Weather Service
OB	Onboard
OER	Octet Encoding Rules
O&M	Operations and Maintenance
OEM	Office of Emergency Management
PAAC	Port Authority of Allegheny County
PDA	Personal Digital Assistant
PEIRS	Pennsylvania Emergency Information Reporting System
PEMA	Pennsylvania Emergency Management Agency
PennDOT	Pennsylvania Department of Transportation
PRISM	Performance and Registration Information Systems Management
PSAP	Public Safety Answering Point
PSP	Pennsylvania State Police
PTC	Pennsylvania Turnpike Commission
RAP	Regional Advisory Panel
ROCC	Rail Operations Control Center (operated by PAAC)
RPO	Rural Planning Organization
RTMC	Regional Transportation Management Center
RWIS	Road Weather Information System
SAE	Society of Automotive Engineers
SAFER	Safety and Fitness Electronic Record
SATIN	Service Area Travelers Interactive Network
SCADA	Supervisory Control and Data Acquisition



SCH	Scheduling/Run cutting
SDO	Standards Develop Organization
SFA	Strategic Focus Area
SP	Spatial Representation
SPC	Southwest (Pennsylvania) Planning Commission
STIC	Sub carrier Traffic Information Channel
STMC	Statewide Transportation Management Center
STMF	Simple Transportation Management Framework
SWG	Statewide Working Group
T-1	High Bandwidth Telephone Line
TACT	Town and Country Transit
TMDD	Traffic Management Data Dictionary
TIP	Transportation Improvement Plan
TMC	Transportation Management Center
USDOT	United States Department of Transportation
WCTA	Westmoreland County Transit Authority
WIM	Weigh-in-Motion

## Appendix B: ITS Definitions

(Source: DVRPC Regional ITS Architecture)

The following definitions for ITS terms may or may not apply specifically to the Region. They are provided as reference material to support ITS terminology found in and outside of this report.

**Automatic Vehicle Location:** This technology is used by various agencies, including transit and emergency management agencies, to constantly monitor the location of their vehicles. Transit agencies utilize AVL as a management tool to track the progress of buses and to determine when remedial action is required if buses are not adhering to schedule. Emergency dispatchers rely upon AVL to help guide their selection of which vehicle to dispatch to a call. AVL technology relies upon GPS or triangulation as the mechanism for locating vehicles.

**Cellular Phone Number for Incident Reporting:** Several toll authorities have reserved cellular phone numbers, such as \*11 for the Pennsylvania Turnpike, for use by motorists to report disabled vehicles or incidents while en-route. The numbers are usually toll-free and go directly to the agency's operations center. Several highway departments have posted signs directing motorists to dial cellular 911 to report incidents.

**Closed Circuit Television:** CCTV is real-time video surveillance equipment, monitored and manipulated by operations personnel. For highways, CCTV's are installed at locations where accident rates and/or congestion levels are known to be high. The cameras dispatch real-time video images to the traffic operation centers so that in emergency situations a quicker response can be provided. Transit agencies deploy CCTV cameras to observe transit passengers for transit management (crowding levels), fare collection, and security purposes.

**Closed Loop Traffic Signal System:** For this system, traffic signals are interconnected along specified corridors to provide for ease in traffic flow. The signals may be monitored by detectors and adjusted according to current traffic conditions, or preprogrammed with a number of signal timing plans that vary by time of day and day of week.

**Commercial Vehicle Electronic Administration Processes:** This process allows commercial vehicle operators to obtain necessary permits via computer and supports the exchange of safety and credentials data among multiple jurisdictions and between agencies within a single jurisdiction.

**Dynamic Message Sign:** The purpose of the DMS's is to provide real-time en-route travel advisories to travelers. For highways, the DMS signs are either centered over travel lanes or placed alongside the roadway. Messages on permanent DMS signs typically originate from a traffic control center. For transit systems, DMS's take the form

of dynamic message boards located in waiting areas and/or platforms to provide information on train arrivals, departures, and platform locations.

**Emergency Call Boxes:** Emergency call boxes permit travelers who do not have cellular phones a mechanism to report accidents and other emergency situations. They are used by both highway and transit travelers. Call boxes are typically located along the side of an expressway at mile or half mile intervals. Transit agencies place them in waiting areas and on platforms to improve the security of passengers.

**E-Z Pass:** E-Z Pass is an electronic toll collection system developed by a consortium of toll agencies located in the northeast United States. When a vehicle passes through an E-Z Pass designated toll lane, an electronic tag, in the form of a small box mounted on a vehicle windshield, is detected by an antenna and the appropriate toll is deducted from the customer's prepaid E-Z Pass account. Because of the alliance, E-Z Pass will eventually be employed on all toll bridges and roads in the region.

**Highway Advisory Radio:** HAR provides travelers with real-time roadway information, including weather information, agency hotline numbers, incident information, and roadway construction advisories, directly over their car radio. The FCC reserves certain AM and FM frequencies specific to whatever jurisdiction in which they are located for public agencies to broadcast these special travel advisories.

**Kiosks:** A number of organizations have plans to install travel information kiosks at tourist centers, government buildings, and highway service areas. Travelers will be able to obtain current traffic and transit information, information about places to visit, route planning information, and hotel reservations. Generally kiosks will be more interactive and offer more choices than the static traveler information services currently available.

**Management Center:** Management centers are the focal point and communications hub of an agency's operation. Almost all transit, highway and bridge agencies in the region have their own control centers. These facilities monitor and control an agency's highway or transit network and are responsible for incident management. While the equipment in each operating center varies by agency, the typical control center consists of any number of computer workstations, radio scanners, TV monitors, audio text recording booths to record HAR messages, and fax machines for broadcasting information to other agencies. Depending on agency needs, a highway control center can include capabilities to operate computerized traffic signal systems, Dynamic message signs and highway advisory radios, monitor CCTV's, manage emergency service patrols, and coordinate incident management response teams. Composition of transit operation centers vary based upon whether rail or bus operations are involved.

**Ramp Metering:** Ramp metering is designed to control the rate of traffic entering a freeway. The objective is to maintain a predetermined level of service on the freeway by adjusting the on-ramp traffic volume with a traffic control signal. Typical waiting times at ramp metering signals are between 5 to 6 seconds per vehicle.

**Road Weather Information System:** RWIS are typically installed at locations that experience a higher-than-average number of accidents attributable to fog, snow or icy conditions. Sensor information can be used to more effectively deploy road maintenance resources, issue weather-specific warnings to drivers and general advisories to motorists. Weather sensors are connected to remote processing units located in the field which measure, collect, and pre-process environmental data and then transmit the information to an operations center where staff can act on the information.

**Signal Priority:** This technology allows transit vehicles to send direct control requests to signalized intersections. These messages result in preemption of the current signal control plan and grants right-of-way to the requesting transit and emergency vehicles.

**Service Patrols:** The Service Patrol program is designed to improve the efficiency of the highway system through the quick resolution of minor incidents, including disabled vehicles, vehicles out of gas, and minor accidents that impact traffic flow. Service Patrol vans patrol along highways and provide assistance to disabled vehicles. Service Patrol operators are equipped to perform minor repairs such as changing a flat tire or providing gasoline. When major repairs are needed, Service Patrol operators can assist the motorist in contacting a towing company to remove the disabled vehicle. Service Patrol's also reduce the risk of secondary accidents by deploying appropriate warning devices.

**Traveler Cards:** This technology provides the capability for the traveler to use a common fare instrument for all surface transportation services (i.e., multiple transit agencies, parking facilities, toll roads), to pay without stopping, and have the payment media automatically identified as invalid or its eligibility verified. In addition, smart cards have the capability to provide expansion into other uses as payment for retail purchases, telephone services and for off-line billing for fares paid to agencies.

**Traveler Information Website:** This type of website is used to access traveler information prior to starting a trip. Currently, most of the existing travel websites in the region offer only construction or special event information. Eventually, real-time, route-specific travel reports will be found on the websites. SmartRoute, under contract to PennDOT, provides real-time travel information on selected highways and transit facilities in the region.

**Weigh-In-Motion Station:** Weight measuring equipment, including fixed sensors embedded in the pavement, can ascertain the weight of a commercial vehicle at highway speeds to ensure the vehicle is operating within legal weight limits. Ultimately, WIM stations will be utilized to assess motor vehicle taxes on commercial carriers.

## Appendix C: Subsystem and Terminator Definitions

(Source: National ITS Architecture)

Appendix C contains the subsystems and terminators from the National ITS Architecture exclusive to the Regional ITS Architecture:

**Archived Data Management:** The Archived Data Management Subsystem collects, archives, manages, and distributes data generated from ITS sources for use in transportation administration, policy evaluation, safety, planning, performance monitoring, program assessment, operations, and research applications. The data received is formatted, tagged with attributes that define the data source, conditions under which it was collected, data transformations, and other information (i.e. meta data) necessary to interpret the data. The subsystem can fuse ITS generated data with data from non-ITS sources and other archives to generate information products utilizing data from multiple functional areas, modes, and jurisdictions. The subsystem prepares data products that can serve as inputs to Federal, State, and local data reporting systems. This subsystem may be implemented in many different ways. It may reside within an operational center and provide focused access to a particular agency's data archives. Alternatively, it may operate as a distinct center that collects data from multiple agencies and sources and provides a general data warehouse service for a region.

**Archived Data User Systems:** This terminator represents the systems users employ to access archived data. The general interface provided from this terminator allows a broad range of users (e.g. planners, researchers, analysts, operators) and their systems (e.g. databases, models, analytical tools, user interface devices) to acquire data and analyses results from the archive.

**Commercial Vehicle Administration:** The Commercial Vehicle Administration Subsystem will operate at one or more fixed locations within a region. This subsystem performs administrative functions supporting credentials, tax, and safety regulations. It issues credentials, collects fees and taxes, and supports enforcement of credential requirements. This subsystem communicates with the Fleet Management Subsystems associated with the motor carriers to process credentials applications and collect fuel taxes, weight/distance taxes, and other taxes and fees associated with commercial vehicle operations. The subsystem also receives applications for, and issues special Oversize/Overweight and hazmat permits in coordination with other cognizant authorities. The subsystem coordinates with other Commercial Vehicle Administration Subsystems (in other states/regions) to support nationwide access to credentials and safety information for administration and enforcement functions. This subsystem supports communications with Commercial Vehicle Check Subsystems operating at the roadside to enable credential checking and safety information collection. The collected safety information is processed, stored, and made available to qualified stakeholders to identify carriers and drivers that operate unsafely.

**Commercial Vehicle Check:** The Commercial Vehicle Check Subsystem supports automated vehicle identification at mainline speeds for credential checking, roadside safety inspections, and weigh-in-motion using two-way data exchange. These capabilities include providing warnings to the commercial vehicle drivers, their fleet managers, and proper authorities of any safety problems that have been identified, accessing and examining historical safety data, and automatically deciding whether to allow the vehicle to pass or require it to stop with operator manual override. The Commercial Vehicle Check Subsystem also provides supplemental inspection services to current capabilities by supporting expedited brake inspections, the use of operator hand-held devices, on-board safety database access, and the enrollment of vehicles and carriers in electronic clearance.

**Commercial Vehicle Subsystem:** This subsystem resides in a commercial vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient commercial vehicle operations. The Commercial Vehicle Subsystem provides two-way communications between the commercial vehicle drivers, their fleet managers, and roadside officials, and provides hazmat response teams with timely and accurate cargo contents information after a vehicle incident. This subsystem provides the capability to collect and process vehicle, cargo, and driver safety data and status and alert the driver whenever there is a potential safety problem. Basic identification and safety status data are supplied to inspection facilities at mainline speeds.

**Emergency Management:** The Emergency Management Subsystem represents public safety and other allied agency systems that support coordinated traffic incident management and emergency response. The subsystem includes the functions associated with fixed and mobile public safety communications centers includes various public safety call taker and dispatch centers operated by police, fire, and emergency medical services. This subsystem also represents other allied systems including centers associated with towing and recovery, freeway service patrols, hazmat response teams, mayday service providers, and security/surveillance services that improve traveler security in public areas. This subsystem interfaces with other Emergency Management Subsystems to support coordinated emergency response involving multiple agencies. The subsystem creates, stores, and utilizes emergency response plans to facilitate coordinated response. The subsystem tracks and manages emergency vehicle fleets using automated vehicle location technology and two way communications with the vehicle fleet. Real-time traffic information received from the other center subsystems is used to further aide the emergency dispatcher in selecting the emergency vehicle(s) and routes that will provide the timeliest response. Interface with the Traffic Management Subsystem allows strategic coordination in tailoring traffic control to support en-route emergency vehicles. Interface with the Transit Management Subsystem allows coordinated use of transit vehicles to facilitate response to major emergencies.

**Emergency Telecommunications System:** This terminator represents the telecommunications systems that connect a caller with a Public Safety Answering Point (PSAP). These systems transparently support priority wireline and wireless caller access to the PSAP through 9-1-1 and other access mechanisms like 7 digit local

access numbers, and motorist aid call boxes. The calls are routed to the appropriate PSAP, based on caller location when this information is available.

**Emergency Vehicle:** This subsystem resides in an emergency vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient incident response. The subsystem represents a range of vehicles including those operated by police, fire, and emergency medical services. In addition, this subsystem represents other incident response vehicles including towing and recovery vehicles and freeway service patrols. The Emergency Vehicle Subsystem includes two-way communications to support coordinated response to emergencies in accordance with an associated Emergency Management Subsystem. Emergency vehicles are equipped with automated vehicle location capability for monitoring by vehicle tracking and fleet management functions in the Emergency Management Subsystem. Using these capabilities, the appropriate emergency vehicle to respond to each emergency is determined. Route guidance capabilities within the vehicle enable safe and efficient routing to the emergency. In addition, the emergency vehicle may be equipped to support signal preemption through communications with the Roadway Subsystem.

**Fleet and Freight Management:** The Fleet and Freight Management Subsystem provides the capability for commercial drivers and dispatchers to receive real-time routing information and access databases containing vehicle and cargo locations as well as carrier, vehicle, cargo and driver information. In addition, the capability to purchase credentials electronically shall also be provided, with automated and efficient connections to financial institutions and regulatory agencies, along with post-trip automated mileage and fuel usage reporting. The Fleet Management Subsystem also provides the capability for fleet managers to monitor the safety of their commercial vehicle drivers and fleet. The subsystem also supports application for hazmat credentials and makes information about hazmat cargo available to agencies as required. Within this subsystem lies all the functionality associated with subsystems and components necessary to enroll and participate in international goods movement programs aimed at enhancing trade and transportation safety.

**Information Service Provider:** This subsystem collects, processes, stores, and disseminates transportation information to system operators and the traveling public. The subsystem can play several different roles in an integrated ITS. In one role, the ISP provides a general data warehousing function, collecting information from transportation system operators and redistributing this information to other system operators in the region and other ISPs. In this information redistribution role, the ISP provides a bridge between the various transportation systems that produce the information and the other ISPs and their subscribers that use the information. The second role of an ISP is focused on delivery of traveler information to subscribers and the public at large. Information provided includes basic advisories, traffic and road conditions, transit schedule information, yellow pages information, ride matching information, and parking information. The subsystem also provides the capability to provide specific directions to travelers by receiving origin and destination requests from travelers, generating route plans, and returning the calculated plans to the users. In addition to general route planning for travelers, the ISP also supports specialized route

planning for vehicle fleets. In this third role, the ISP function may be dedicated to, or even embedded within, the dispatch system. Reservation services are also provided in advanced implementations. The information is provided to the traveler through the Personal Information Access Subsystem, Remote Traveler Support Subsystem, and various Vehicle Subsystems through available communications links. Both basic one-way (broadcast) and personalized two-way information provision is supported. The subsystem provides the capability for an informational infrastructure to connect providers and consumers, and gather that market information needed to assist in the planning of service improvements and in maintenance of operations.

**Maintenance and Construction Management:** The Maintenance and Construction Management Subsystem monitors and manages roadway infrastructure construction and maintenance activities. Representing both public agencies and private contractors that provide these functions, this subsystem manages fleets of maintenance, construction, or special service vehicles (e.g., snow and ice control equipment). The subsystem receives a wide range of status information from these vehicles and performs vehicle dispatch, routing, and resource management for the vehicle fleets and associated equipment. The subsystem participates in incident response by deploying maintenance and construction resources to an incident scene, in coordination with other center subsystems. The subsystem manages equipment at the roadside, including environmental sensors and automated systems that monitor and mitigate adverse road and surface weather conditions. The subsystem manages the repair and maintenance of both non-ITS and ITS equipment including the traffic controllers, detectors, dynamic message signs, signals, and other equipment associated with the roadway infrastructure. Additional interfaces to weather information providers (the weather service and surface transportation weather service providers) provide current and forecast weather information that can be fused with other data sources and used to support advanced decision support systems that increase the efficiency and effectiveness of maintenance and construction operations.

The subsystem remotely monitors and manages ITS capabilities in work zones, gathering, storing, and disseminating work zone information to other systems. It manages traffic in the vicinity of the work zone and advises drivers of work zone status (either directly at the roadside or through an interface with the Information Service Provider or Traffic Management subsystems.) It schedules and manages the location and usage of maintenance assets (such as portable dynamic message signs). Construction and maintenance activities are tracked and coordinated with other systems, improving the quality and accuracy of information available regarding closures and other roadway construction and maintenance activities.

**Maintenance and Construction Vehicle:** This subsystem resides in maintenance, construction, or other specialized service vehicles or equipment and provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction. All types of maintenance and construction vehicles are covered, including heavy equipment and supervisory vehicles. The subsystem provides two-way communications between drivers/operators and dispatchers and maintains and communicates current location and status information. A wide range of operational status is monitored, measured, and made



available, depending on the specific type of vehicle or equipment. For example, for a snow plow, the information would include whether the plow is up or down and material usage information. The subsystem may also contain capabilities to monitor vehicle systems to support maintenance of the vehicle itself and other sensors that monitor environmental conditions including the road condition and surface weather information. This subsystem can represent a diverse set of mobile environmental sensing platforms, including wheeled vehicles and any other vehicle that collects and reports environmental information.

**Media:** This terminator represents the information systems that provide traffic reports, travel conditions, and other transportation-related news services to the traveling public through radio, TV, and other media. Traffic and travel advisory information that are collected by ITS are provided to this terminator. It is also a source for traffic flow information, incident and special event information, and other events which may have implications for the transportation system.

**Parking Management:** The Parking Management Subsystem provides electronic monitoring and management of parking facilities. It supports a DSRC communications link to the Vehicle Subsystem that allows electronic collection of parking fees. It also includes the instrumentation, signs, and other infrastructure that monitors parking lot usage and provides local information about parking availability and other general parking information. This portion of the subsystem functionality must be located in the parking facility where it can monitor, classify, and share information with customers and their vehicles. The subsystem also interfaces with the financial infrastructure and broadly disseminates parking information to other operational centers in the region. Note that the latter functionality may be located in a back office, remote from the parking facility.

**Personal Information Access:** This subsystem provides the capability for travelers to receive formatted traffic advisories from their homes, place of work, major trip generation sites, personal portable devices, and over multiple types of electronic media. These capabilities shall also provide basic routing information and allow users to select those transportation modes that allow them to avoid congestion, or more advanced capabilities to allow users to specify those transportation parameters that are unique to their individual needs and receive travel information. This subsystem shall provide capabilities to receive route planning from the infrastructure at fixed locations such as in their homes, their place of work, and at mobile locations such as from personal portable devices and in the vehicle or perform the route planning process at a mobile information access location. In addition to end user devices, this subsystem may also represent a device that is used by a merchant or other service provider to receive traveler information and relay important information to their customers. This subsystem shall also provide the capability to initiate a distress signal and cancel a prior issued manual request for help.

**Remote Traveler Support:** This subsystem provides access to traveler information at transit stations, transit stops, other fixed sites along travel routes (e.g., rest stops, merchant locations), and at major trip generation locations such as special event centers, hotels, office complexes, amusement parks, and theaters. Traveler information

access points include kiosks and informational displays supporting varied levels of interaction and information access. At transit stops, simple displays providing schedule information and imminent arrival signals can be provided. This basic information may be extended to include multi-modal information including traffic conditions and transit schedules along with yellow pages information to support mode and route selection at major trip generation sites. Personalized route planning and route guidance information can also be provided based on criteria supplied by the traveler. In addition to traveler information provision, this subsystem also supports public safety monitoring using CCTV cameras or other surveillance equipment and emergency notification within these public areas. Fare card maintenance, and other features which enhance traveler convenience may also be provided at the discretion of the deploying agency.

**Roadway:** This subsystem includes the equipment distributed on and along the roadway which monitors and controls traffic and monitors and manages the roadway itself. Equipment includes traffic detectors, environmental sensors, traffic signals, highway advisory radios, dynamic message signs, CCTV cameras and video image processing systems, grade crossing warning systems, and freeway ramp metering systems. HOV lane management and reversible lane management functions are also available. This subsystem also provides the capability for environmental monitoring including sensors that measure road conditions, surface weather, and vehicle emissions. In adverse conditions, automated systems can be used to apply anti-icing materials, disperse fog, etc. Work zone systems including work zone surveillance, traffic control, driver warning, and work crew safety systems are also included. In advanced implementations, this subsystem supports automated vehicle safety systems by safely controlling access to and egress from an Automated Highway System through monitoring of, and communications with, AHS vehicles. Intersection collision avoidance functions are provided by determining the probability of a collision in the intersection and sending appropriate warnings and/or control actions to the approaching vehicles.

**Toll Administration:** The Toll Administration Subsystem provides general payment administration capabilities and supports the electronic transfer of authenticated funds from the customer to the transportation system operator. This subsystem supports traveler enrollment and collection of both pre-payment and post-payment transportation fees in coordination with the existing, and evolving financial infrastructure supporting electronic payment transactions. The system may establish and administer escrow accounts depending on the clearinghouse scheme and the type of payments involved. This subsystem posts a transaction to the customer account and generates a bill (for post-payment accounts), debits an escrow account, or interfaces to the financial infrastructure to debit a customer designated account. It supports communications with the Toll Collection Subsystem to support fee collection operations. The subsystem also sets and administers the pricing structures and includes the capability to implement road pricing policies in coordination with the Traffic Management Subsystem. The electronic financial transactions in which this subsystem is an intermediary between the customer and the financial infrastructure shall be cryptographically protected and authenticated to preserve privacy and ensure authenticity and auditability.

**Toll Collection:** The Toll Collection Subsystem provides the capability for vehicle operators to pay tolls without stopping their vehicles using locally determined pricing structures and including the capability to implement various variable road pricing policies. Each transaction is accompanied by feedback to the customer who indicates the general status of the customer account. A record of the transactions is provided to the Toll Administration subsystem for reconciliation.

**Traffic Management:** The Traffic Management Subsystem operates within a traffic management center or other fixed location. This subsystem communicates with the Roadway Subsystem to monitor and manage traffic flow. Incidents are detected and verified and incident information is provided to the Emergency Management Subsystem, travelers (through Roadway Subsystem Highway Advisory Radio and Dynamic Message Signs), and to third party providers. The subsystem supports HOV lane management and coordination, road pricing, and other demand management policies that can alleviate congestion and influence mode selection. The subsystem monitors and manages maintenance work and disseminates maintenance work schedules and road closures. The subsystem also manages reversible lane facilities, and processes probe vehicle information. The subsystem communicates with other Traffic Management Subsystems to coordinate traffic information and control strategies neighboring jurisdictions. It also coordinates with rail operations to support safer and more efficient highway traffic management at highway-rail intersections. Finally, the Traffic Management Subsystem provides the capabilities to exercise control over those devices utilized for AHS traffic and vehicle control.

**Transit Management:** The transit management subsystem manages transit vehicle fleets and coordinates with other modes and transportation services. It provides operations, maintenance, customer information, planning, and management functions for the transit property. It spans distinct central dispatch and garage management systems and supports the spectrum of fixed route, flexible route, paratransit services, and bus rapid transit (BRT) service. The subsystem's interfaces allow for communication between transit departments and with other operating entities such as emergency response services and traffic management systems. This subsystem receives special event and real-time incident data from the traffic management subsystem. It provides current transit operations data to other center subsystems. The Transit Management Subsystem collects and stores accurate ridership levels and implements corresponding fare structures. It collects operational and maintenance data from transit vehicles, manages vehicle service histories, and assigns drivers and maintenance personnel to vehicles and routes. The Transit Management Subsystem also provides the capability for automated planning and scheduling of public transit operations. It furnishes travelers with real-time travel information, continuously updated schedules, schedule adherence information, transfer options, and transit routes and fares. In addition, the monitoring of key transit locations with both video and audio systems is provided with automatic alerting of operators and police of potential incidents including support for traveler activated alarms.

**Transit Vehicle:** This subsystem resides in a transit vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient movement of passengers. The Transit Vehicle Subsystem collects

accurate ridership levels and supports electronic fare collection. An optional traffic signal prioritization function communicates with the roadside subsystem to improve on-schedule performance. Automated vehicle location functions enhance the information available to the Transit Management Subsystem enabling more efficient operations. On-board sensors support transit vehicle maintenance. The Transit Vehicle Subsystem also furnishes travelers with real-time travel information, continuously updated schedules, transfer options, routes, and fares.

**Traveler Card:** This terminator represents the entity that enables the actual transfer of electronic information from the user of a service (i.e. a traveler) to the provider of the service. This may include the transfer of funds through means of an electronic payment instrument. The device, like a smart card, may also hold and update the traveler's information such as personal profiles or trip histories.

**Vehicle:** This subsystem provides the sensory, processing, storage, and communications functions necessary to support efficient, safe, and convenient travel. These functions reside in general vehicles including personal automobiles, commercial vehicles, emergency vehicles, transit vehicles, or other vehicle types. Information services provide the driver with current travel conditions and the availability of services along the route and at the destination. Both one-way and two-way communications options support a spectrum of information services from low-cost broadcast services to advanced, pay for use personalized information services. Route guidance capabilities assist in formulation of an optimal route and step by step guidance along the travel route. Advanced sensors, processors, enhanced driver interfaces, and actuators complement the driver information services so that, in addition to making informed mode and route selections, the driver travels these routes in a safer and more consistent manner. Initial collision avoidance functions provide "vigilant co-pilot" driver warning capabilities. More advanced functions assume limited control of the vehicle to maintain safe headway. Ultimately, this subsystem supports completely automated vehicle operation through advanced communications with other vehicles in the vicinity and in coordination with supporting infrastructure subsystems. Pre-crash safety systems are deployed and emergency notification messages are issued when unavoidable collisions do occur.

## Appendix D: Architecture Flow Definitions

(Source: National ITS Architecture)

Appendix D contains the architecture flow definitions from the National ITS Architecture exclusive to the Regional ITS Architecture:

**accident report:** Report of commercial vehicle safety accident. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.

**archive analysis requests:** A user request that initiates data mining, analytical processing, aggregation or summarization, report formulation, or other advanced processing and analysis of archived data.

**archive analysis results:** Processed information products, supporting meta data, and any associated transaction information resulting from data mining, analytical processing, aggregation or summarization, report formulation, or other on-line processing and analysis of archived data.

**archive coordination:** Catalog data, meta data, published data, and other information exchanged between archives to support data synchronization and satisfy user data requests.

**archive requests:** A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request.

**archive status:** Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.

**audit data:** Information to support a tax audit.

**broadcast information :** General broadcast information that contains link travel times, incidents, advisories, transit services and a myriad of other traveler information.

**citation:** Report of commercial vehicle citation. The citation includes references to the statute(s) that was (were) violated. It includes information on the violator and the officer issuing the citation.

**commercial vehicle archive data:** Information describing commercial vehicle travel and commodity flow characteristics. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

**compliance review report:** Report containing results of carrier compliance review, including concomitant out-of-service notifications, carrier warnings/notifications. The information may be provided as a response to a real-time query or proactively by the source.

**credential application:** Application for commercial vehicle credentials. Authorization for payment is included.

**credentials information:** Response containing full credentials information. "Response" may be provided in reaction to a real-time query or a standing request for updated information. The query flow is not explicitly shown.

**credentials status information:** Credentials information such as registration, licensing, insurance, check flags, and electronic screening enrollment data. A unique identifier is included. Corresponds to the credentials portion of CVISN "snapshots."

**current asset restrictions:** Restrictions levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions.

**daily site activity data:** Record of daily activities at commercial vehicle check stations including summaries of screening events and inspections.

**data collection and monitoring control:** Information used to configure and control data collection and monitoring systems.

**demand responsive transit plan:** Plan regarding overall demand responsive transit schedules and deployment.

**demand responsive transit request:** Request for paratransit support.

**driver instructions:** Transit service instructions, traffic information, road conditions, and other information for both transit and paratransit drivers.

**driver to fleet request:** Requests from the driver and vehicle for routing, payment, and enrollment information.

**emergency acknowledge:** Acknowledge request for emergency assistance and provide additional details regarding actions and verification requirements.

**emergency dispatch requests:** Emergency vehicle dispatch instructions including incident location and available information concerning the incident.

**emergency dispatch response:** Request for additional emergency dispatch information (e.g., a suggested route) and provision of en route status.

**emergency notification:** An emergency request for assistance originated by a traveler using an in-vehicle, public access, or personal device.

**emergency traffic control request:** Special request to preempt the current traffic control strategy in effect at one or more signalized intersections or highway segments. For example, this flow can request all signals to red-flash, request a progression of traffic control preemptions.

**emergency traffic control response:** Status of the special traffic signal control strategy implemented in response to the emergency traffic control request.

**emergency vehicle tracking data:** The current location and operating status of the emergency vehicle.

**environmental conditions data:** Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) as measured and reported by environmental sensors.

**environmental sensors control:** Data used to configure and control environmental sensors.

**equipment maintenance status:** Current status of field equipment maintenance actions.

**external reports:** Traffic and incident information that is collected by the media through a variety of mechanisms (e.g., radio station call-in programs, air surveillance).

**fare and payment status:** Current fare collection information including the operational status of the fare collection equipment and financial payment transaction data.

**fare management information:** Transit fare information and transaction data used to manage transit fare processing on the transit vehicle.

**field device status:** Reports from field equipment (sensors, signals, signs, controllers, etc.) which indicate current operational status.

**fleet to driver update:** Updated instructions to the driver including dispatch, routing, and special instructions.

**freeway control data:** Control commands and operating parameters for ramp meters, mainline metering/lane controls and other systems associated with freeway operations.

**freeway control status:** Current operational status and operating parameters for ramp meters, mainline metering/lane controls and other control equipment associated with freeway operations.

**hazmat information:** Information about a particular hazmat load including nature of the load and unloading instructions. May also include hazmat vehicle route and route update information.

**hazmat information request:** Request for information about a particular hazmat load.

**high threat facility incident information:** Threats regarding transportation infrastructure, facilities, or systems detected by a variety of methods (sensors, surveillance, threat analysis of advisories from outside agencies, etc).

**incident command information:** Information that supports local management of an incident. It includes resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information.

**incident command request:** Request for resources, commands for relay to other allied response agencies, and other requests that reflect local command of an evolving incident response.

**incident information:** Notification of existence of incident and expected severity, location, time and nature of incident.

**incident information for media:** Report of current desensitized incident information prepared for public dissemination through the media.

**incident information request:** Request for incident information, clearing time, severity. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

**incident notification:** The notification of an incident including its nature, severity, and location.

**incident notification response:** Interactive acknowledgement and verification of the incident information received, requests for additional information, and general information on incident response status.

**incident report** : Report of an identified incident including incident location, type, severity and other information necessary to initiate an appropriate incident response.

**incident response coordination:** Incident response procedures, resource coordination, and current incident response status that are shared between allied response agencies to support a coordinated response to incidents.



**incident response status:** Status of the current incident response including traffic management strategies implemented at the site (e.g., closures, diversions, traffic signal control overrides).

**incident status Information:** gathered at the incident site that more completely characterizes the incident and provides current incident response status.

**infrastructure monitoring sensor control:** Data used to configure and control infrastructure monitoring sensors.

**infrastructure monitoring sensor data:** Data read from infrastructure-based sensors that monitor the condition of pavement, bridges, culverts, signs, and other roadway infrastructure.

**ISP coordination:** Coordination and exchange of transportation information between centers. This flow allows a broad range of transportation information collected by one ISP to be redistributed to many other ISPs and their clients.

**local signal preemption request:** Direct control signal or message to a signalized intersection that results in preemption of the current control plan and grants right-of-way to the requesting vehicle.

**local signal priority request:** Request from a vehicle to a signalized intersection for priority at that intersection.

**maint and constr dispatch information:** Information used to dispatch maintenance and construction vehicles, equipment, and crews. This information includes routing information, traffic information, road restrictions, incident information, environmental information, decision support information.

**maint and constr dispatch status:** Current maintenance and construction status including work data, operator status, crew status, and equipment status.

**maint and constr resource coordination:** Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response.

**maint and constr resource request:** Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response.

**maint and constr resource response:** Current status of maintenance and construction resources including availability and deployment status.

**maint and constr vehicle conditions:** Vehicle diagnostics information that is collected, filtered, and selectively reported by a maintenance and construction vehicle. The information includes engine temperature, mileage, tire wear, brake wear, belt wear, and any warnings or alarms.

**maint and constr vehicle location data:** The current location and related status (e.g., direction and speed) of the maintenance/construction vehicle.

**maint and constr vehicle operational data:** Data that describes the maintenance and construction activity performed by the vehicle. Operational data includes materials usage (amount stored and current application rate), operational state of the maintenance equipment (e.g., blade up/down, spreader).

**maint and constr work plans:** Future construction and maintenance work schedules and activities including anticipated closures with anticipated impact to the roadway, alternate routes, anticipated delays, closure times, and durations.

**media information request:** Request from the media for current transportation information.

**on-board safety data:** Safety data measured by on-board sensors. Includes information about the vehicle, vehicle components, cargo, and driver.

**on-board safety request:** Request for on-board vehicle safety data by the roadside equipment.

**on-board vehicle data:** Information about the commercial vehicle stored on-board (for maintenance purposes, gate access, cargo status, lock status, etc.).

**on-board vehicle request:** Request for on-board vehicle data.

**parking availability:** Current parking lot occupancy, parking availability, and cost information.

**parking coordination:** Information that enables parking management activities to be coordinated between different parking operators or systems in a region.

**parking demand management request:** Request to change the demand for parking facility use through pricing or other mechanisms.

**parking demand management response:** Response to parking demand management change requests indicating level of compliance with request.

**parking information:** General parking information and current parking availability.

**parking instructions:** Information that allows local parking facilities to be managed to support regional traffic management objectives.

**parking lot data request:** Request for parking lot occupancy, fares, and availability. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

**parking lot reservation confirmation:** Confirmation for parking lot reservation.

**parking reservations request:** Reservation request for parking lot.

**payment:** Payment of some kind (e.g., toll, parking, fare) by traveler which, in most cases, can be related to a credit account.

**personal transit information:** General and personalized transit information for a particular fixed route, flexible route, or paratransit system.

**remote surveillance control:** The control commands used to remotely operate another center's sensors or surveillance equipment so that roadside surveillance assets can be shared by more than one agency.

**request for bad tag list:** Request for list of bad vehicle tag IDs.

**request for payment:** Request to deduct cost of service from user's payment account.

**request for road network conditions:** Request for traffic information, road conditions, surface weather conditions, incident information, and other road network status. The request specifies the region/route of interest, the desired effective time period, and other parameters.

**request tag data:** Request for tag information including credit identity, stored value card cash, etc.

**resource deployment status:** Status of traffic management center resource deployment identifying the resources available and their current deployment status.

**resource request:** A request for traffic management resources to implement special traffic control measures, assist in clean up, verify an incident, etc.

**road network conditions:** Current and forecasted traffic information, road and weather conditions, incident information, and other road network status. Either raw data, processed data, or some combination of both may be provided by this architecture flow.

**road weather information:** Road conditions and weather information that are made available by road maintenance operations to other transportation system operators.

**roadside archive data** : A broad set of data derived from roadside sensors that include current traffic conditions, environmental conditions, and any other data that can be directly collected by roadside sensors.

**roadway equipment coordination:** The direct flow of information between field equipment. This includes transfer of information between sensors and driver information systems or control devices (traffic signals, ramp meters, etc.), direct coordination between adjacent control devices.

**roadway information system data:** Information used to initialize, configure, and control roadside systems that provide driver information (e.g., dynamic message signs, highway advisory radio, beacon systems).

**roadway information system status:** Current operating status of dynamic message signs, highway advisory radios, beacon systems, or other configurable field equipment that provides dynamic information to the driver.

**roadway maintenance status:** Summary of maintenance fleet operations affecting the road network. This includes the status of winter maintenance (snow plow schedule and current status).

**roadway treatment system control:** Control data for remotely located, automated devices that affect the roadway surface (e.g. de-icing applications).

**roadway treatment system status:** Current operational status of automated roadway treatment devices (e.g., anti-icing systems).

**route plan:** Tailored route provided by ISP in response to a specific request.

**route request:** Request for a tailored route based on given constraints.

**safety inspection record:** Record containing results of commercial vehicle safety inspection.

**safety inspection report:** Report containing results of commercial vehicle safety inspection. The information may be provided as a response to a real-time query or proactively by the source. The query flow is not explicitly shown.

**safety status information:** Safety information such as safety ratings, inspection summaries, and violation summaries. A unique identifier is included. Corresponds to the safety portion of CVISN "snapshots." The status information may be provided as a response to a real-time query.

**screening event record:** Results of CVO electronic screening activity.

**secure area monitoring support:** Commands that control surveillance equipment and security sensors that monitor secure public transportation areas. Also includes

information for general advisories and alerts intended for general dissemination in these same public areas.

**secure area surveillance data:** Data collected from surveillance systems used to monitor secure areas. Includes video, audio, and other security sensor outputs.

**selected routes:** Routes selected based on route request criteria.

**signal control data:** Information used to configure and control traffic signal systems.

**signal control status:** Status of surface street signal controls.

**speed monitoring information :** System status including current operational state and logged information including measured speeds, warning messages displayed, and violation records.

**suggested route:** Suggested route for a dispatched emergency or maintenance vehicle that may reflect current network conditions and the additional routing options available to en route emergency or maintenance vehicles that are not available to the general public.

**tag data:** Unique tag ID and related vehicle information.

**tax filing:** Commercial vehicle tax filing data. Authorization for payment is included.

**threat information coordination:** Sensor, surveillance, and threat data including raw and processed data that is collected by sensor and surveillance equipment located in secure areas.

**toll instructions:** Demand management toll pricing information based on current congestion.

**toll transactions:** Detailed list of transactions from a toll station.

**traffic archive data:** Information describing the use and vehicle composition on transportation facilities and the traffic control strategies employed. Content may include a catalog of available information, the actual information to be archived, and associated meta data.

**traffic control coordination:** Information transfers that enable remote monitoring and control of traffic management devices. This flow is intended to allow cooperative access to, and control of, field equipment during incidents and special events and during day-to-day operations.

**traffic flow:** Raw and/or processed traffic detector data which allows derivation of traffic flow variables (e.g., speed, volume, and density measures) and associated information (e.g., congestion, potential incidents).

**traffic images:** High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications. This flow includes the images and the operational status of the surveillance system.

**traffic information coordination:** Traffic information exchanged between TMC's. Normally would include incidents, congestion data, traffic data, signal timing plans, and real-time signal control information.

**traffic sensor control:** Information used to configure and control traffic sensor systems.

**transit and fare schedules:** Specific transit and fare schedule information including schedule adherence.

**transit archive data:** Data used to describe and monitor transit demand, fares, operations, and system performance. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.

**transit emergency coordination data:** Data exchanged between centers dealing with a transit-related incident.

**transit emergency data:** Initial notification of transit emergency at a transit stop or on transit vehicles and further coordination as additional details become available and the response is coordinated.

**transit fare payment requests:** Information provided from the transit user location that supports fare payments and associated record-keeping.

**transit fare payment responses:** Information provided by transit management that supports a fare payment transaction.

**transit incident information:** Information on transit incidents that impact transit services for public dissemination.

**transit information request:** Request for transit operations information including schedule and fare information. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.

**transit information user request:** Request for special transit routing, real-time schedule information, and availability information.

**transit parking coordination:** Request for coordinated fare payment and parking lot price data.

**transit parking lot response:** Response to transit occupancy inquiries and coordination with parking lots.

**transit request confirmation:** Confirmation of a request for transit information or service.

**transit schedule information:** Current and projected transit schedule adherence.

**transit traveler information:** Transit information prepared to support transit users and other travelers. It contains transit schedules, real-time arrival information, fare schedules, and general transit service information.

**transit vehicle conditions:** Operating conditions of transit vehicle (e.g., mileage).

**transit vehicle location data:** Current transit vehicle location and related operational conditions data provided by a transit vehicle.

**transit vehicle passenger and use data:** Data collected on board the transit vehicle pertaining to availability and/or passenger count.

**transit vehicle schedule performance:** Estimated times of arrival and anticipated schedule deviations reported by a transit vehicle.

**traveler archive data:** Data associated with traveler information services including service requests, facility usage, rideshare, routing, and traveler payment transaction data. Content may include a catalog of available information, the actual information to be archived.

**traveler information:** Traveler information comprised of traffic status, advisories, incidents, payment information and many other travel-related data updates and confirmations.

**traveler information for media** : General traveler information regarding incidents, unusual traffic conditions, transit issues, or other advisory information that has been desensitized and provided to the media.

**traveler profile:** Information about a traveler including equipment capabilities, personal preferences and recurring trip characteristics.

**traveler request:** Request by a traveler to summon assistance, request information, make a reservation, or initiate any other traveler service.

**trip confirmation:** Acknowledgement by the driver/traveler of acceptance of a route.

**trip identification number:** The unique trip load number for a specific cross-border shipment.

**trip log:** Driver's daily log, vehicle location, mileage, and trip activity (includes screening, inspection and border clearance event data as well as fare payments).

**trip log request:** Request for trip log.

**trip plan:** A sequence of links and special instructions comprising of a trip plan indicating efficient routes for navigating the links. Normally coordinated with traffic conditions, other incidents, preemption and prioritization plans.

**trip request:** Request by a driver/traveler for special routing.

**TRMS coord:** Coordination information between local/regional transit organizations including schedule, on-time information, incident information, and ridership.

**video surveillance control:** Information used to configure and control video surveillance systems.

**violation notification:** Notification to enforcement agency of a violation. The violation notification flow describes the statute or regulation that was violated and how it was violated (e. g., overweight on specific axle by xxx pounds or which brake was out of adjustment).

**work plan coordination:** Coordination of work plan schedules and activities between maintenance and construction organizations or systems. This information includes the work plan schedules and comments and suggested changes that are exchanged as work plans are coordinated.

**work zone information :** Summary of maintenance and construction work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays.

**work zone status:** Current work zone status including current location (and future locations for moving work zones), impact to the roadway, required lane shifts, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits.

**work zone warning device control:** Data used to configure and control work zone safety monitoring and warning devices.

**work zone warning status:** Status of a work zone safety monitoring and warning devices. This flow documents system activations and includes additional supporting information (e.g., an image) that allows verification of the alarm.



## Appendix E: Operations Coverage

The following table summarizes the operations on key highway facilities within the Region. Operations centers, whether they are a personal computer or an entire building, accommodate the intelligence for the majority of ITS applications. The location and operation of the TMC's within the Commonwealth of Pennsylvania are currently being explored through other statewide efforts. This section takes roadways of regional significance developed by the RAP in each work plan (prior project working document) and assigns ITS operations coverage for the primary and secondary role. This section although useful for other Statewide ITS effort, was not needed for the creation of the Regional ITS Architecture.

<b>County</b>	<b>Highway Corridor</b>	<b>Primary Operations</b>	<b>Secondary Operations</b>
Allegheny	I-76	Pennsylvania Turnpike Commission	
	I-79	PennDOT District 11-0	
	US-22	PennDOT District 11-0	
	US-30	PennDOT District 11-0	
	I-376	PennDOT District 11-0	
	PA-8	PennDOT District 11-0	
	PA-28	PennDOT District 11-0	
	PA-60	PennDOT District 11-0	
	I-579	PennDOT District 11-0	
	PA-88	Pennsylvania Turnpike Commission	
	I-279	PennDOT District 11-0	
Armstrong	US-422	PennDOT District 10-0	
	PA-28	PennDOT District 10-0	
Beaver	I-76	Pennsylvania Turnpike Commission	
	US-30	PennDOT District 11-0	
	PA-60	PennDOT District 11-0	
Butler	I-76	Pennsylvania Turnpike Commission	
	I-79	PennDOT District 11-0	PennDOT District 10-0

<b>County</b>	<b>Highway Corridor</b>	<b>Primary Operations</b>	<b>Secondary Operations</b>
	I-80	PennDOT District 10-0	PennDOT District 2-0
	PA-8	PennDOT District 10-0	
	US-422	PennDOT District 10-0	
Fayette	US-40	PennDOT District 12-0	
	US-119	PennDOT District 12-0	
	PA-88	Pennsylvania Turnpike Commission	
Greene	I-79	PennDOT District 12-0	
	PA-88	PennDOT District 11-0	
Indiana	US-22	PennDOT District 10-0	
	US-119	PennDOT District 10-0	
	US-422	PennDOT District 10-0	
Lawrence	I-76	Pennsylvania Turnpike Commission	
	I-79	PennDOT District 11-0	
	PA-60	Pennsylvania Turnpike Commission	
	US-422	PennDOT District 11-0	
Mercer	I-79	PennDOT District 11-0	PennDOT District 1-0
	I-80	PennDOT District 11-0	PennDOT District 1-0
Washington	I-70	PennDOT District 12-0	
	I-79	PennDOT District 12-0	
	US-40	PennDOT District 12-0	
	PA-88	Pennsylvania Turnpike Commission	
	US-22	PennDOT District 12-0	
Westmoreland	I-70	PennDOT District 12-0	
	I-70/76	Pennsylvania Turnpike Commission	
	US-22	PennDOT District 12-0	
	US-30	PennDOT District 12-0	
	US-119	PennDOT District 12-0	

<b>County</b>	<b>Highway Corridor</b>	<b>Primary Operations</b>	<b>Secondary Operations</b>
	I-76	Pennsylvania Turnpike Commission	

## Appendix F: Bookend I Meeting Minutes

Date: Thursday, June 3, 2003

Meeting of: Southwestern Stakeholders' Meeting – First Regional Meeting

Location: Holiday Inn – Monroeville, PA

### Presentation

- Chuck DiPietro, Transportation Director of the Southwest Planning Commission, began the presentation with a welcome. He identified some of the agencies that would be involved in the process. Chuck explained the regional significance of the ITS Architecture and its impact on transportation of goods and people. Chuck said that they will not be able to build their way out of the congestion problem. This was a running theme throughout the presentation as it was reiterated by various speakers. He said that the stakeholders are here at the meeting because of their involvement with aspects of transportation such as planning, operation, and policy. Finally, the stakeholders were told what is needed from them. This includes going to the validation meetings and championing ITS.
- Michael Harris from PB Farradyne continued the presentation with a few slides explaining what ITS is and gave examples of ITS. Then, Mike defined ITS Architecture and presented two slides putting ITS Architecture in the context of the planning process and systems engineering process. In the following slides, the benefits of ITS Architecture as well as the need to conform to the federal mandate was explained.
- Dennis Lebo from PennDOT Central Office – Center for Program Development and Management, gave a statewide overview of ITS Architecture. He talked about the history of transportation, the current transportation problem, and how ITS Architecture will be part of the solution. Then, maps were presented to show that the Regional Architecture boundaries will closely follow the PennDOT district map while taking the planning organizations into consideration. Subsequent slides identified the objectives and scope of the ITS Architecture program. Also, Dennis Lebo helped to answer questions such as “How will this be used?” and “What will we need to do?” in the slides. Dennis talked about how ITS Architecture will help determine what investments would be made in transportation. PennDOT will need to produce a statewide ITS strategic plan and regional ITS implementation plan.
- Dominic Munizza, Manager at the Pittsburgh Regional Transportation Management Center (TMC), gave specific examples of ITS in this region. He gave details about the functions of the Pittsburgh Regional TMC. Then, he outlined the congestion problem in the area by providing traffic volumes on the

major parkways. ITS solutions include dynamic message signs, closed circuit TV, highway advisory radios, and parkway service patrol vehicles.

- Jeff Arch of PB Farradyne talked about the validation outreach process. The effort consists of 2 stakeholder meetings and several validation meetings in each region. Jeff explained what the validation packets are that each stakeholder has received. Each customized packet contains information about the specific validation process in which they will be involved. Jeff also explained the “sausage diagrams” that are contained in each of the validation packets. Finally, the dates of the validation meetings for the southwest region are given.

### **Questions and Answers**

Nick Bosonette from the Allegheny County Department of Economic Development asked about elements that weren’t mentioned, such as parking management and CVO?

- Dennis Lebo said that some elements of the ITS Architecture, such as CVO and the PA Turnpike, will be replicated throughout the state since these are statewide elements.
- Mike Harris told the stakeholders that the Architecture is on the web at [www.paits.org](http://www.paits.org)
- Chucks added that the draft is very comprehensive. The first 25-50 pages provide a good overview, and the rest of the draft contains sausage diagrams.

Ken Flack from the SPC asked whether or not there are links to other states, such as West Virginia and Ohio.

- Jeff Arch answered that there are currently no links to other states. However, it is likely that they will pursue that since there are other districts, such as District 9, that also border on other states.
- Ray DeMichiei from the City of Pittsburgh – EMA, emphasized the importance of what PennDOT is doing. If the roads do not work, then neither do they (e.g., 9/11). He thanked PennDOT for their work.

Chuck Thompson from PennDOT asked about interstate coordination with Ohio, Maryland, and West Virginia.

- Jeff Arch answered that the Ohio ITS program is organized differently. One of the concerns is I-80. How will they coordinate with these roadways?
- Mike Harris said that they will be working with the statewide working group on these issues. Ohio is in the same position as PennDOT in that it is also working on an ITS Architecture. The Central Office in PennDOT will need to

communicate with Central Office in Ohio DOT. In future ITS Task Force Meetings, perhaps West Virginia and Ohio will be able to join them.

- Dennis Lebo said that regarding contacts for adjoining states, the eastern half of the state has better organization due to linkages from participation in the I-95 Corridor Coalition. For instance, on 9/11 they were able to put up signs to avoid New York. However, the organization does not include Ohio and West Virginia, and they will have to work to get those contacts.
- Dominic said that when the Morganstown area was closed, Metro and Mobility Technologies were able to get wind of that information and use DMS to inform people. Communication is still needed with other states.
- Tim Baughman of Western Regional Pennsylvania – EMA said that ITS works well, such as PSP and County 911 center. Shut down notifications and advisory are sent to different entities, such as trucking organizations. Information on how ITS works and how ITS improves coordination should be spread from the municipal through the county level, which is the organizational structure of the region. He was disheartened that more people did not know about ITS as a resource.

Roger Westman from the Allegheny County Health Department said that PennDOT needs to remember air quality in this process. Due to emissions, Pittsburgh will be non-attainment as of this summer. The solutions include having smarter communities where there is less driving, alternative to the private vehicle (e.g., transit), and/or cleaner vehicles.

- Dominic commented that there are ozone alerts on DMS's. They hope to get the word out to motorists to help them be multimodal.
- Chuck DiPietro said that 1) there is a need to effectively use CMAQ fund and programming; and 2) there is a statewide air quality working group, which includes the EPA, FHWA, and PennDOT air quality experts. There is quite a challenge ahead of them because there is more intense scrutiny than before. There are timelines depending on how bad the air quality is. The situation is not so much that the air is getting worse but the standards require more response because there is more knowledge now about health impacts.
- Dennis Lebo said that they are aware of the air quality of issues, and the 22 planning regions (with the exception of 2) do transportation analysis to manage capacity and reduce demand.

**List of Attendees**

<b>Last Name</b>	<b>First Name</b>	<b>Agency</b>	<b>Email</b>	<b>Phone</b>
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# Pennsylvania Intelligent Transportation Systems (ITS) Architecture

Southwest Region  
First Regional Meeting  
June 3, 2004



## Welcome

Chuck DiPietro  
Transportation Planning Director  
Southwestern Planning Commission



## Agenda

- **Chuck DiPietro**, SPC - Welcome and Regional Significance
- **Michael Harris**, PB – ITS Background
- **Dennis Lebo**, PennDOT Central Office - Center for Program Development and Management
- **Dominic Munizza**, PennDOT District 11-0
- **Jeff Arch**, PB - Validation Outreach
- Discussion



## Welcome

- PennDOT
- PTC
- Airport
- Transit
- Counties
- Cities
- Emergency Management Agencies
- SPC
- Planning Offices
- Townships
- Partnership Organizations
- Enforcement Community
- Policy



## Southwestern Pennsylvania

- Safe, Secure and Reliable Transportation System
- Movement of People and Goods
- Building Capacity *and/or* Managing Capacity



## Southwestern Pennsylvania

- Southwestern Pennsylvania Commission
  - 10-County Region
  - Regional Long-Range Transportation Plan
    - ITS Section in Long-Range Plan
    - ITS Architecture is needed to meet Federal Mandate if region is to use Federal Funds for ITS
  - Regional Transportation Improvement Program
  - Region and State both responsible for the ITS Architecture

[www.spcregion.org](http://www.spcregion.org)



## You are here because...

- Your knowledge is needed to validate information we have begun to compile
- Your regional perspectives is valued
- You are involved in operating a piece of the transportation system
- You are involved in planning and programming for regional transportation
- You are involved in setting transportation policy in the region
- You are creating the regional ITS forum for the future



## What we need from you ...

- Attend meetings on this effort
- Validate the work presented to you
- Champion ITS
- Outreach Connection to others about ITS
- Continue ITS regional dialog beyond this effort



## Background

Michael Harris, PB Farradyne



## ITS?

Intelligent Transportation Systems (ITS) is simply technology being used in the transportation environment

ITS:

- Improve Safety
- Maximize Mobility
- Fulfill Traveler Needs
- Support Enhanced Security
- Manage Capacity



## Types of ITS

- Freeway
  - Highway Advisory Radio
  - Dynamic Message Signs
  - 511
  - CCTV
  - HOV
  - Freeway Service Patrol
- Arterial
  - Advanced Signal Systems
- Transit
  - Advanced Vehicle Location
  - Automated Dispatching



## Types of ITS

- Emergency
  - Incident Management
  - E911
- Road Weather Information
- Electronic Payment
  - EZPass
  - Smart Cards



## Architecture?

Architecture – the *plan* for design and construction

Deploying ITS technology is good, but we need to do it efficiently through better *planning*, coordination, and integration



## In context

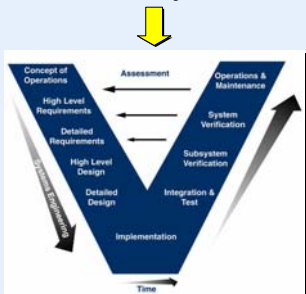


↓  
Projects



## In context

### ITS Project



## At Issue ...

- ITS investments are made before plans are set
- Lack of interoperability of ITS systems
- Limited forum for regional agencies to plan for ITS capital and ITS Operations and Maintenance
- Federal mandate



## An Opportunity ...

- Conduct Regional ITS Architectures to:
  - Provide a framework for regional integration
  - Create a forum for stakeholders to address ITS operations and functions to validate how operations will interconnect and why
  - Allow integration options to be considered before investment decisions are made
  - Conform to Federal mandate



## The Federal Mandate

Regional ITS Architectures must be completed in partnership with the State and regional planning partners by April 8, 2005 for use of Federal funds for ITS



## The Expectation ...

- The State and metropolitan planning organizations are ultimately responsible for ensuring that the mandates' conditions are met
- A process must be put in place for initial Architecture development and for revisiting and updating the regional Architecture as necessary



## Regional Benefits

- Ensures institutional agreement among ITS stakeholder agencies.
- Implements a process for planning ITS integration.
- Enhances interoperability.



## Regional Benefits

- Allows integration options to be considered before investments are made.
- Ensures that ITS activities are consistent with State and metropolitan planning processes.
- Establishes a common framework for future ITS operations across the Region & State.



## PennDOT

Dennis Lebo

PennDOT Central Office  
Center for Program Development  
and Management



## Transportation

- Industry evolution
  - Build
  - Build and Maintain
  - Build, Maintain and Operate
- Efficiency is required for economic vitality
  - Results focused transportation operations



## Transportation Operations

- Safety
- Security
- Mobility (Congestion)

*All are challenges for today and the  
foreseeable future*



## Congestion Solution

- Comprehensive, coordinated and long-term commitment to balanced investment in:
  - Building Capacity
  - Better Managing Capacity
  - Reducing Demand, through modal alternatives and changes in land-use patterns

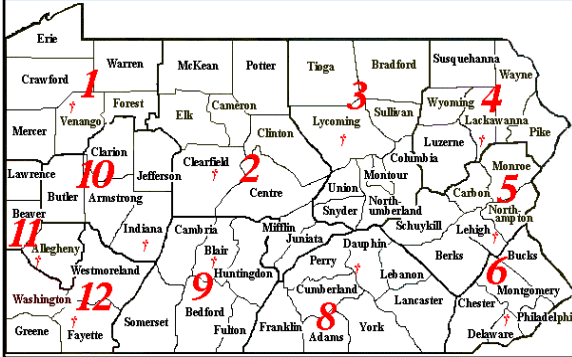


## Regional Tool

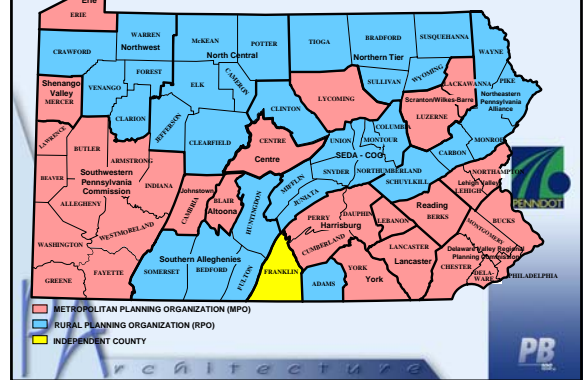
- Regional ITS Architectures
  - Form the building blocks of transportation operations
  - ITS supports managing capacity and improves safety and security
  - Supports a balanced look at congestion improvement investments



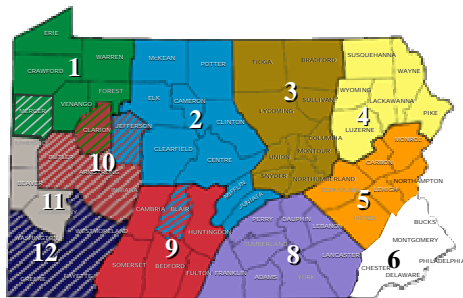
## PennDOT District Map



## PENNSYLVANIA'S TRANSPORTATION PLANNING ORGANIZATIONS



## Regional Architecture Boundaries



## Project Objective

Complete regional ITS Architectures in partnership with planning organizations throughout the State to meet the Federal mandate by April 8, 2005 for use of Federal funds for ITS operations





## Opportunities

- Create a framework for regional and statewide integration
- Establish a basis for sound investments
- Create a regional forum for stakeholders to address ITS/Operational issues
- Advance the use of ITS to better manage our transportation system



## Scope of Work

- Champions
- Regional Advisory Panels
- "Strawman"
- Validation
- Regional Meetings
- Finalize



## Project Organization

- Guided by a Statewide Working Group
- Each Region is led by a Regional Advisor Panel
- Each Region has identified ITS Architecture Champions



## How will the Architecture be used?

- Provides a foundation for future ITS investment discussions among stakeholders
- Provide a State business case for ITS investment in:
  - Long range plans
  - Transportation improvement programs
  - Annual work programs



## What we will have ...

- Validated, accepted ITS Architecture for every region in the State
- List of projects for each region
- Working groups/stakeholders discussing ITS per region
- ITS champions in every region
- PennDOT Statewide Operations Framework Vision
- Federal Partnership



## What we will need to do ...

- Statewide ITS Strategic Plan
- Regional ITS Implementation Plans
  - Project priority
  - Cost analysis for Business Planning
  - Actions to program on TIPs and Plans



## PennDOT

Dominic Munizza, P.E.  
Manager

Pittsburgh Regional Traffic Management Center



## Regional ITS

### Pittsburgh Regional Traffic Management Center



Staffing  
Monday thru Friday  
5AM - 8PM

- 5200 Square Foot Building
- Fully Integrated Centralized Software System
- 6 Operator Workstations
- Media Partner Room
- CCTV Monitors (18 total)
- Rear Screen Projection Screen
- Real Time Traffic Condition Map
- Un Interruptable Power Supply



## Regional ITS

### Pittsburgh Regional Traffic Management Center

#### Functions:

- Incident Detection & Verification via Microwave Detectors and Closed Circuit Television Camera's (CCTV)
- "Real Time" Traveler Information via Dynamic Message Signs (DMS's), Highway Advisory Radio's (HAR's), Fax and Pager Bulletins
- Coordinated Deployment of Freeway Service Patrols



## Regional ITS

### The Congestion Problem

	I-279 Penn Lincoln Parkway West	I-279 North Hills Expressway	I-376 Penn Lincoln Parkway East
Average Daily Traffic	145,000	102,000	100,000
Morning Inbound Peak Hour	6,000	6,000	5,500
Evening Outbound Peak Hour	5,000	6,100	4,000



## Regional ITS

### ITS System Initiatives

- **I-279 Parkway West Corridor**  
- from Robinson Town Center to Downtown
- **I-376 Parkway East Corridor**  
- from Downtown to Rodi Road
- **I-279 Parkway North Corridor and HOV Lanes**  
- from North Shore (PNC Park) to Camp Horne Road
- **I-79 Corridor**  
- from I-70 in Washington County to I-80 in Mercer County



## Regional ITS

### Dynamic Message Signs



- "Real Time" Traffic Messages
- Travel Time Forecasts
- Construction / Detour Alerts
- Stadium and Special Events
- Amber Alerts



## Regional ITS

### Closed Circuit Television

- Incident Verification
- Preset Views
- "Real Time", Color Video Images
- PennDOT Website Snapshots



## Regional ITS

### Highway Advisory Radio's

- "Real Time" Traffic Alert Messages
- Broadcast Range of up to 5 miles
- Flashing Beacon for Emergency Messages



## Regional ITS

### Parkway Service Patrol Vehicles

- Incident Management
- Public Service
  - 5 Patrol Vehicles
  - Patrols Interstates I-279, I-579 and I-376
  - Began Sept 30, 1996
  - 6AM-9 AM, 3 PM-6 PM



## Regional ITS

### Total ITS Deployment

- 40+ miles fiber optic cable
- 83 CCTV Cameras
- 8 Highway Advisory Radio Sites
- 76 Microwave Vehicle Detectors
- 22 Dynamic Message Signs
- 5 Service Patrol Vehicles
- 2 Weather Monitoring Stations



Penn Lincoln Parkway Patrol Summary			
Improving Operations - Pittsburgh, PA			
Reference: PennDOT, September 19, 1996 and October 16, 1996			
Vehicle Class:		Device Type:	
Abandoned	3553 67.0%	Control System	1074 13.2%
Accident (Signal, etc.)	2465 45.0%	Detector	1407 17.0%
Blind Interchange	23 0.0%	Flow Control	628 7.8%
Clear Area (Signal, etc.)	1459 27.0%	Message Sign	2075 25.9%
Clear Area (Signal, etc.)	2266 42.0%	Other	735 9.1%
Control (Signal, etc.)	56 0.0%	Variable	1341 16.5%
Other	869 16.0%	Time	1245 15.5%
Patrol	64 0.0%	Video	905 11.3%
Point-to-Point (Signal, etc.)	14 0.0%	Total Devices:	11435
Variable (Signal, etc.)	14465 27.0%		
Variable (Signal, etc.)	15 0.0%		
Total Devices:	22410		
Vehicle Type:		Device or Vehicle Type:	
Bus	401 0.0%	1992	1993
Commercial Truck	307 0.0%	1992	1993
Motor Vehicle	4641 20.0%	1992	1993
Motorcycle	63 0.0%	1992	1993
No. Vehicles Involved	1921 8.0%	1992	1993
Other	292 1.0%	1992	1993
Package	1174 5.0%	1992	1993
Pickup Truck	306 1.0%	1992	1993
Single Unit Truck	85 0.0%	1992	1993
Total Vehicles:	22410		
Incidents by Date and Device			
10/19/96	88	Control System	4334
10/20/96	28	Control System	3669
10/21/96	48	Control System	3654
10/22/96	109	Control System	3573
10/23/96	10	Control System	3521
10/24/96	109	Control System	3554
Total Incidents:	22410		



## Validation Outreach

Jeff Arch, PB Farradyne



## Outreach Effort

- Two large stakeholder meetings
  - One at the front end of the effort (June 3)
  - One at the back end of the effort (October 8 est.)
- Validation meetings by functional areas



## Validation

- "Bite Size Pieces"
- Reviewed by experts in each area
- Validate Interconnects
  - Operations connected to other operations
- Validate Architecture flows
  - Data and Information passing from one operation to another



### PA SW Regional ITS Architecture

June 2004

#### Stakeholder Validation

Contact Name : Jeff Arch

Agency : PAAC

Address : \_\_\_\_\_

Phone : \_\_\_\_\_

Email : \_\_\_\_\_

Architecture Elements PAAC Centers

To Review: PAAC Transit Vehicles



#### Architecture Element

#### PAAC Centers

#### Element Description

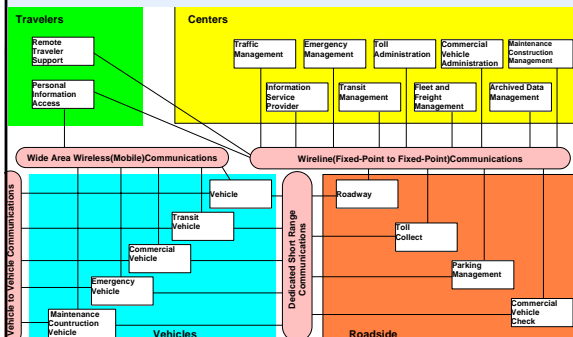
Port Authority of Allegheny County-operated centers, garages and offices. Includes systems and personnel located at the TMC and Rail Operations Control Center (ROCC) located at South Hills Village; various PAAC vehicle garages and Port Authority Police and Security Services Department office locations; the PAAC administrative headquarters downtown; as well as dispatching offices for contracted Access Transportation Systems Inc. demand response transit operations. The PAAC TMC manages surface street transit vehicles. PAAC headquarters provides control of website through PAAC Technology Center. PAAC garages operate automated vehicle diagnostics that are used for downloading information from vehicles. The ROCC manages rail transit vehicles and existing/future in-vehicle systems, as well as controls signals, traffic systems, SCADA, tunnel controls, and radio communications. ROCC has and monitors CCTV camera images, archives ridership data, tracks rail vehicle locations, and receives emergency signal information from rail vehicles.

#### Stakeholder

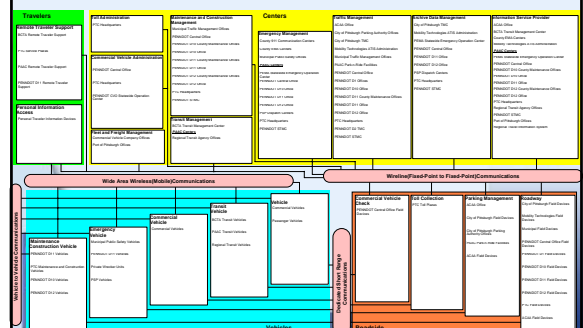
Port Authority of Allegheny County



## PA Southwest Regional ITS Architecture Framework



## PA Southwest Regional ITS Architecture - PAAC





## Regional Next Steps

- Continue ITS regional dialog beyond this effort
- Develop Regional ITS Implementation Plan



## Contacts

- **Chuck DiPietro, SPC**  
Phone: 412 391-5590 x 310  
Email: [dipietro@spc9.org](mailto:dipietro@spc9.org)
- **Jeff Arch, Parsons Brinckerhoff Farradyne**  
Phone: 301 816-1859  
Email: [arch@pbworld.com](mailto:arch@pbworld.com)



## Discussion



## Appendix G: Validation Meeting Minutes

**Date:** June 24, 2004

**Location:** Southwestern Pennsylvania Commission (SPC) Office; Pittsburgh, PA

**Attendees:**

Jon Smith, A/C Transit Council  
Ken Flack, SPC  
Tom Rosso, City of McKeesport  
Lucinda Beattie, Pittsburgh DT Partnership  
Mike Schneider, Cranberry Township  
Clay Fulton, City of Pittsburgh  
Frank Cippel, PennDOT  
James MacKay, PennDOT  
Dom D'Andrea, Port Authority of Allegheny County  
Steve Kimble, PB Farradyne  
J.D. Schneeberger, PB Farradyne  
Doug Smith, SPC

**Minutes Prepared By:** J.D. Schneeberger, PB Farradyne

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A meeting was held on June 24, 2004 between 10:00 AM and noon at the Southwestern Pennsylvania Commission Office to validate the following elements in the Southwest Pennsylvania Regional ITS Architecture:

- City of Pittsburgh TMC
- City of Pittsburgh Field Devices
- Municipal Field Devices
- Municipal Traffic Management Offices

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the Regional Architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Pennsylvania Southwest Regional ITS Architecture Framework – a copy of the National ITS Architecture “Sausage Diagram”.
- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.

- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the Southwest Pennsylvania Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the Regional Architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we’re provided at the meeting. Comments are organized around additions and deletions by element, as well as general discussion items.

### **City of Pittsburgh TMC**

#### Additions

1. Include City of Pittsburgh Maintenance Office in the element description
2. Interconnect and associated flows to/from Regional Media Outlets
3. ‘road network conditions flow’ (planned) to BCTA Transit Management Center
4. Construction, road network conditions, resource request, and incident flows to/from PAAC Centers (Steve Kimble and Dom D’Andrea to look into this)

#### Deletions

1. Interconnect and flows to/from County 911 Communication Centers

#### Changes

1. All information flows to/from Mobility Technologies ATIS Administration – existing
2. All flows to/from PEMA Statewide Emergency Operation Center – planned
3. Incident and road network condition flows to/from PennDOT D11 Office – existing

#### Comments

1. Verify Interconnect and information flows to/from County EMA Centers



## City of Pittsburgh Field Devices

### Additions

1. Include parking garage systems in the description of the element

### Changes

1. 'local signal priority request' information flow to PAAC Transit Vehicles – planned

## Municipal Field Devices

### Additions

1. Video monitoring flows to/from Municipal Offices – existing
2. Interconnect and information flows to/from PennDOT D10 Office (interconnects and information flows should be identical to the flows to/from PennDOT D11 Office)

### Changes

1. 'Traffic flow' information flow from Municipal Offices – existing (Municipal Offices currently get volume data)
1. 'Traffic flow' information flow from PennDOT D11 Office

## Municipal Traffic Management Offices

### Additions

1. Interconnects and information flows to/from PennDOT D12 Office (flows should be identical to those shown to/from PennDOT D10 Office element)
2. Media information to Regional Media Outlets. Municipal Offices also make a proactive request for media information.

### Deletions

1. Delete interconnects and information flows to/from PennDOT Central Office

### Changes

1. Add stakeholder names to element boxes

## General Discussion

1. City of Pittsburgh Parking Authority Offices – include interconnect and parking information flows to/from Regional Media Outlets and Information Service Providers

2. Include Municipal-to-Municipal interconnects. Create a terminator to show these connections in the Architecture.
3. Consider pulling out the larger Municipalities (i.e. Cranberry) as their own elements.

**Attachments:** Arterial Management Validation Meeting Handout

**Date:** June 23, 2004

**Location:** PennDOT District 11-0 Office; Bridgeville, PA

**Attendees:**

Lisa Kay Schweyer, SPC CommuteInfo  
Kimberly Showman, ACTA  
Dominic Munizza, PennDOT 11-0  
Mike Brinza, Port of Pittsburgh  
Tricia Smith, Mobility Technologies  
Jeff Arch, PB Farradyne  
Steve Kimble, PB Farradyne

**Minutes Prepared By:** Steve Kimble, PB Farradyne

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A meeting was held on June 17, 2004 between 10:00 AM and Noon at the PennDOT District 11-0 TMC conference room to validate the following elements in the Southwest Pennsylvania Regional ITS Architecture:

- City of Pittsburgh Parking Authority Offices
- Mobility Technologies ATIS Administration
- Personal Traveler Information Devices
- Port of Pittsburgh Offices
- Regional Personal Traveler Cards
- Regional Travel Information System
- Regional Media Outlets
- Mobility Technologies Field Devices

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the Regional Architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Pennsylvania Southwest Regional ITS Architecture Framework – a copy of the National ITS Architecture “Sausage Diagram”.
- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.

- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the Southwest Pennsylvania Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the Regional Architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we’re provided at the meeting. Comments are organized around additions and deletions by element, as well as general discussion items.

### **Mobility Technologies ATIS Administration**

#### Additions

1. Flows for status report and current accidents from County 911 Centers – existing.
2. Flows for weather data to PAAC Centers – planned.
3. Flows for archived data to PennDOT Central Office – existing (only going to PennDOT, not coordinated).
4. Interconnects with TMA’s and SPC office to exchange traveler information.

#### Changes

1. Interconnects with BCTA Transit Management Center and PAAC Centers – existing.
2. Interconnect with Municipal Traffic Management Offices – planned.
3. Archive Coordination flow to/from PennDOT D11 office – existing.
4. Incident Information Request, Request for Road Network Conditions, and Road Network Conditions to/from PTC Headquarters – existing.

### **Mobility Technologies Field Devices**

#### Additions

1. Narrative for four existing CCTV cameras to Element description.

### **Personal Traveler Information Devices**

#### Additions

1. Narrative for \*911 service to report traffic accidents to Element description – existing.

#### Deletions

1. Broadcast Information to PennDOT D12 County Maintenance Offices.
2. Traveler Information and Traveler Request flows to/from PennDOT D12 Office.

### **Port of Pittsburgh Offices**

#### Deletions

1. Interconnect with Commercial Vehicles – privately operated ports will distribute information to commercial vehicle drivers.

#### Changes

1. Element description narrative to relay that ports are run privately and Port of Pittsburgh is a single administrative office.

### **Regional Media Outlets**

#### Additions

1. Narrative for news papers, rideshare info, TMA-related information, and public service announcements to Element description.
2. Flow for media information from County EMA Centers, Municipal Traffic Management Offices – existing.
3. External Reports flow to PennDOT D11 Office – existing.

### **Regional Personal Traveler Cards**

#### Additions

1. Narrative for City of Pittsburgh parking meters to Element description – existing.

### **Regional Travel Information System**

#### Additions

1. Interconnects with TMA (broadcast information), SPC (rideshare information), County 911 Centers (incident reporting), Mobility Technologies, and Port of Pittsburgh.

### **General Discussion**

1. Mobility Technologies interested in putting detectors on PA Turnpike in future.
2. Port of Pittsburgh does not operate the ports. Consider adding element for private entities that run each port and distribute the information from Port of Pittsburgh Office onto commercial vehicle drivers.
3. SPC office is currently developing GIS-based software for mapping rideshare services (carpooling). In general “rideshare” services include: carpooling, vanpooling, bike, transit, and pedestrian information.
4. Consider adding element for private vanpooling, rideshare, and paratransit services.
5. Future Mobility Technologies systems will provide call-in system (511?) able to reply to requested route with current travel conditions.
6. Currently, all subscribers to Mobility Technologies service can get archived detector data.
7. SPC rideshare system currently has traveler profile information (archived data), which may be beneficial to transit agencies for determining where people are traveling and where new service lines are in order.
8. SPC currently broadcasts rideshare and transit conditions to newspapers, and acts as broker for rideshare services, as well as operate some vehicles.
9. Consider adding Element for Regional TMA’s (i.e., Downtown Partnership). ACTA (Airport Corridor Transportation Authority) is currently broadcasting travel information to businesses and personal subscribers via fax/email.
10. Mobility technologies currently alerts business and other subscribers to route-specific information.

**Attachments:** ATIS Validation Meeting Handout

**Date:** June 10, 2004

**Location:** PennDOT District 10-0 Office; Indiana, PA

**Attendees:**

Mike Shanshala, PennDOT District 10-0  
Scott Snyder, PennDOT District 10-0  
Timothy Pieples, PennDOT District 10-0  
Jeff Arch, PB Farradyne  
J.D. Schneeberger, PB Farradyne

**Minutes Prepared By:** J.D. Schneeberger, PB Farradyne

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A meeting was held on June 10, 2004 between 8:30 AM and 11:00AM at the PennDOT District 10-0 Office Conference Room to validate the following elements in the Southwest Pennsylvania Regional ITS Architecture:

- PennDOT District 10-0 County Maintenance Offices
- PennDOT District 10-0 Field Devices
- PennDOT District 10-0 Office
- PennDOT District 2-0 TMC
- PennDOT District 10-0 Vehicles

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the Regional Architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Pennsylvania Southwest Regional ITS Architecture Framework – a copy of the National ITS Architecture “Sausage Diagram”.
- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the Southwest Pennsylvania Regional ITS Architecture.

- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the Regional Architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we're provided at the meeting. Comments are organized around additions and deletions by element, as well as general discussion items.

### **PennDOT District 10-0 County Maintenance Offices**

#### Additions

1. Traffic and incident coordination flows to/from the PTC Headquarters
2. Media information to the Regional Media Outlets
3. Incident, road network condition, resource deployment status, asset restrictions, and maintenance flows to/from County 911 Communication Centers
4. Interconnect and information flows (currently between PennDOT D10 Office and Municipal Public Safety Offices) to/from Municipal Public Safety Offices
5. Interconnect and information flows (currently between PennDOT D10 Office and Municipal Public Safety Offices) to/from a new element, 'Municipal Public Utility Offices'

#### Deletions

1. Flows to/from PennDOT Central Office in reference to work plans, work zones, and resource coordination

#### Changes

1. Road network conditions to/from PennDOT D10 Office -- existing
2. Incident and work zone information between PSP Dispatch Centers should be both ways
3. Maintenance and construction vehicle operational data to/from PennDOT D10 Vehicles - existing (the vehicles have computers that talk to the County Offices for removal and sprayer information)
4. Ensure that flows to/from STMC are same as those to/from Central Office, but shown as planned



## **PennDOT District 10-0 Field Devices**

### Additions

1. Interconnect and flows to/from PennDOT D11 TMC controlling field devices (flows should be similar to those to/from PennDOT D2 TMC)
2. Interconnect and flows to/from PennDOT STMC controlling field devices (assuming STMC will actually control the devices)

### Deletions

1. Roadway treatment flows to/from PennDOT D11 Office (sprayers will not be operated by District 11-0)

### Changes

1. Revise element description to include CCTV and rural crash avoidance systems (system includes loop detectors based on travel times & speeds and DMS)
2. Field device status and roadway information flows to/from PennDOT D10 Office - existing (D10 currently has DMS on I-79)

## **PennDOT District 10-0 Office**

### Additions

1. Planned interconnects to/from PennDOT D1 TMC, PennDOT D9 TMC, PennDOT D2 TMC
2. Traffic control coordination flows to/from PennDOT D12 Office – existing (coordination on Route 22)
3. Interconnect and flows (currently shown between PennDOT D10 Office and PennDOT D12 Office) to/from PennDOT D9 TMC

### Deletions

1. Interconnect and flows to/from County 911 Communication Centers
2. Interconnect and flows to/from County EMA Centers
3. Interconnect and flows to/from Municipal Public Safety Offices

### Changes

1. Refer to PennDOT D10 Office as 'PennDOT D10 TMC'
2. Traffic control coordination to/from Municipal Traffic Management Offices – existing

3. Traffic control coordination flow to/from PTC Headquarters – existing
4. Information flows to/from Regional Media Outlets – existing
5. Check to make sure PennDOT Central Office and STMC flows are consistent

### **PennDOT District 10-0 Vehicles**

#### Changes

1. Maintenance and construction operational data to/from PennDOT D10 County Maintenance Offices - existing

### **General Discussion**

1. Include Regional Offices in PEMA element description
2. Add 'PennDOT Stockpiles' element. Stockpiles should be connected to the PennDOT D10 Office, PennDOT D10 County Maintenance Offices, and PennDOT D10 Vehicles. Stockpiles receive RWIS information and coordinate snow removals with the aforementioned agencies.
3. District 10-0 will have the capability to control District 2-0 devices on I-80. This needs to be reflected in the Architecture.

**Attachments:** PennDOT District 10-0 Validation Meeting Handout

**Date:** June 9, 2004

**Location:** PennDOT District 11-0 Office; Bridgeville, PA

**Attendees:**

Frank Cippel, PennDOT District 11-0  
Dominic Munizza, PennDOT District 11-0  
Tom McClelland, PennDOT District 1-0  
Jeff Arch, PB Farradyne  
J.D. Schneeberger, PB Farradyne  
Steve Kimble, PB Farradyne

**Minutes Prepared By:** Steve Kimble, PB Farradyne

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A meeting was held on June 9, 2004 between 10:00 AM and Noon at the PennDOT District 11-0 TMC Conference Room to validate the following elements in the Southwest Pennsylvania Regional ITS Architecture:

- PennDOT District 11-0 County Maintenance Offices
- PennDOT District 11-0 Field Devices
- PennDOT District 11-0 Office
- PennDOT District 11-0 Vehicles
- PennDOT District 11-0 Remote Traveler Support
- PennDOT District 1-0 Field Devices
- PennDOT District 1-0 Offices

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the Regional Architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Pennsylvania Southwest Regional ITS Architecture Framework – a copy of the National ITS Architecture “Sausage Diagram”.
- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the

National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the Southwest Pennsylvania Regional ITS Architecture.

- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the Regional Architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we're provided at the meeting. Comments are organized around additions and deletions by element, as well as general discussion items.

### **PennDOT District 11-0 County Maintenance Offices**

#### Additions

1. Interconnect between adjacent PennDOT District county maintenance offices for coordinating incident/emergency response and maintenance operations at/near county lines.
2. Information flows for posting HAR/DMS messages – planned
3. Information flows for overheight detection alert – existing

#### Deletions

1. All flows to/from PennDOT Central Office excluding “road weather information”

#### Changes

1. Change element description to have future control of D11 information system field devices
2. Road network conditions to County EMA Centers – existing
3. Roadway Information System information flows to/from D11 Field Devices – planned
4. Video surveillance information flows to/from D11 Field Devices – existing

### **PennDOT District 11-0 Field Devices**

#### Additions

1. Broadcast information flows from ACAA offices (about airport announcements) – existing

Deletions

1. Environmental Sensors Control information flows to/from D11 County Maintenance Offices
2. Environmental Probe Data information flow to D11 Office.
3. Signal Control Data from D11 Office.

**PennDOT District 11-0 Office**

Additions

1. Traffic Information Coordination information flow to/from City of Pittsburgh Parking Management Offices – existing.
2. Traffic archive data information flows to/from PennDOT Central Office – existing.
3. Incident Information and Road Network Conditions information flows to PennDOT D10 County Maintenance Offices – existing.
4. Environmental device (RWIS) information flows to/from D11 Field Devices – existing.
5. Current Asset Restrictions information flow from D12 County Maintenance Offices – existing.
6. Remote Surveillance Control information flow from PSP Dispatch Centers – existing.
7. Incident Command Requests and Incident Status information flows from PSP Vehicles – planned.
8. External Reports information flow from Regional Media Outlets – existing.

Deletions

1. Roadway treatment System Status, Work Zone Warning Status, Roadway Treatment System Control, and Work Zone Warning Device Control information flows to/from PennDOT D10 Field Devices
2. Archive data information flows to/from D11 County Maintenance Offices.
3. Environmental Probe Data and Signal Control Data information flow to/from D11 Field Devices
4. Interconnect with Towing Industry Responders.

5. Emergency Vehicle Tracking Data and Environmental Probe Data information flows from PSP Vehicles.

#### Changes

1. Road Network Conditions information flow to County 911 Centers – existing
2. Request for Road Network Conditions information flow from County EMA Centers – planned
3. Road Network Conditions information flow to Municipal Public Safety Offices – existing
4. Move all planned information flows in PennDOT Central Office diagrams to PennDOT STMC
5. Assure consistency between information flows D10 Field Devices and D12 Field Devices where applicable.
6. All information flows to/from PSP Vehicles is planned.

#### **PennDOT District 11-0 Vehicles**

##### Additions

1. Incident Status information flow to County 911 Centers – existing.

##### Deletions

1. Maintenance and Construction Vehicle Conditions information flow to D11 County Maintenance Offices

#### **PennDOT District 11-0 Remote Traveler Support**

##### Additions

1. Broadcast Traveler Information flow from D11 County Maintenance Offices – future.

##### Deletions

1. Trip Plan, Trip Confirmation, Trip Request information flows to/from ACAA Office.

#### **PennDOT District 1-0 Field Devices**

##### Additions

1. Bridge sprayers to element description
2. HAR to element description

3. Narrative to element description that only includes field devices in Mercer County
4. Information flow for devices status to D1 offices – planned.

Deletions

1. Delete RWIS from element description

**PennDOT District 1-0 Offices**

Additions

1. Interconnect between adjacent PennDOT District county maintenance offices for coordinating incident/emergency response and maintenance operations at/near county lines.
2. Add that bridge sprayers to element description
3. Narrative to element description that only includes operations in Mercer County
4. Capitalize “Mercer County”

**General Discussion**

1. There is a need for an overall regional traveler information system where information will be collected and distributed from a common location, in a standardized format.
2. Three possible options for the administrative body to own/manage future regional traveler information system include: 1) a council of representatives (likely headed by SPC) from broad range of public/private agencies/stakeholders, all with one vote; 2) private entity, such as Mobility Technologies; and 3) Single public agency champion, such as Southwest Pennsylvania Commission (SPC), PennDOT, or Port Authority of Allegheny County.

**Attachments:** PennDOT District 11-0 Validation Meeting Handout

**Date:** June 10, 2004

**Location:** PennDOT District 12-0 Office; Uniontown, PA

**Attendees:**

Brian Hart, PennDOT District 12-0  
Jonathan Balko, PennDOT District 12-0  
Jeff Arch, PB Farradyne  
J.D. Schneeberger, PB Farradyne

**Minutes Prepared By:** J.D. Schneeberger, PB Farradyne

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A meeting was held on June 10, 2004 between 1:00 PM and 3:00PM at the PennDOT District 12-0 Office Conference Room to validate the following elements in the Southwest Pennsylvania Regional ITS Architecture:

- PennDOT District 12-0 County Maintenance Offices
- PennDOT District 12-0 Field Devices
- PennDOT District 12-0 Office
- PennDOT District 10-0 Vehicles

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the Regional Architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Pennsylvania Southwest Regional ITS Architecture Framework – a copy of the National ITS Architecture “Sausage Diagram”.
- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the Southwest Pennsylvania Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the Regional Architecture were provided.



- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we've provided at the meeting. Comments are organized around additions and deletions by element, as well as general discussion items.

### **PennDOT District 12-0 County Maintenance Offices**

#### Additions

1. Interconnect and incident response information flows to/from PSP Dispatch Centers
2. County Maintenance Offices are responsible for detour information. Include incident and traffic coordination flows to/from Municipal Traffic Management Offices
3. HAR related flows to/from PennDOT D12 Field Devices
4. Traffic information to Regional Media Outlets

#### Changes

1. Only archived data and weather information is shared with PennDOT Central Office
2. All flows to/from PennDOT D11 Office need to be two-way flows
3. Road treatment and environmental flows flow to/from PennDOT D12 Field Devices – existing (1 sprayer is currently operational)
4. 'Current asset restrictions' to/from PennDOT D12 Office – existing
5. Weather related flows to/from PennDOT D12 Office – existing
6. 'Broadcast information' flow should be one way to Personal Traveler Information Devices
7. Maintenance and Construction dispatch flows to PennDOT D12 Vehicles – existing

### **PennDOT District 12-0 Field Devices**

#### Additions

1. CCTV, RWIS, and fog detection to the element description

### Changes

1. Interconnect to/from PennDOT D12 County Maintenance Offices – existing
2. 'traffic flow' information flow to PennDOT D12 Office – existing

### **PennDOT District 12-0 Office**

#### Additions

1. Interconnect and information flows (traffic coordination, incident information, and maintenance) to/from PennDOT D9 Office (flows should be the same as shown to/from PennDOT D10 Office)

#### Deletions

1. Road network conditions to PennDOT D11 Office
2. Traveler information flows to/from Personal Traveler Information Devices
3. PSP Dispatch Centers do not interact with the PennDOT D12 Office, rather the County Maintenance Offices. Reconfigure interconnects/flows to show this interaction (flows are the same that are shown to/from PSP Dispatch Centers for the D12 Office).
4. 'Road network conditions' to Regional Media Outlets

### Changes

1. Interconnect to/from Regional Media Outlets – existing
2. Resource request from County 911 Communication Centers – existing
3. 'Traffic control coordination' to/from Municipal Traffic Management Offices – existing
4. Weather information from PennDOT D10 Office – existing
5. 'Road maintenance status' to/from PennDOT D11 Office – existing
6. 'Current asset restrictions' and weather related information flows to/from PennDOT D12 County Maintenance Offices – existing
7. 'Traffic control coordination' to/from PTC Headquarters – existing
8. Media related flows to/from Regional Media Outlets – existing

### **General Discussion**

1. Ensure flows to/from Central Office and STMC are consistent (Central Office flows should be existing. STMC flows should be planned)

**Attachments:** PennDOT District 12-0 Validation Meeting Handout

**Date:** July 7<sup>th</sup>, 2004

**Meeting:** Southwest PA ITS Architecture Emergency Management Validation

**Location:** Allegheny County Department of Emergency Services; Pittsburgh, PA

**Attendees:**

Steve Williamson, Allegheny County EMA  
Jeff Parish, Lawrence County 911  
Michael Lupinacci, Allegheny County 911  
Tricia Smith, Mobility Technologies  
Tim Baughman, PEMA  
Robin Mungo, PA State Police  
Jay Bonderenka, PA State Police  
Arthur George, Region 13  
Jeff Arch, PB Farradyne  
Steve Kimble, PB Farradyne

**Minutes Prepared By:** Steve Kimble, PB Farradyne

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A meeting was held on July 1, 2004 between 9:30 AM and Noon at the Allegheny County Department of Emergency Services to validate the following elements in the Southwest Pennsylvania Regional ITS Architecture:

- ACAA Office
- ACAA Field Devices
- County 911 Communication Centers
- County EMA Centers
- Municipal Public Safety Offices
- Municipal Public Safety Vehicles
- Towing Industry Responders
- PSP Dispatch Centers
- PSP Vehicles

Due to a PEMA representative being unable to make the 7/1/04 meeting, an additional discussion was held with Tim Baughman on 7/29/04 to discuss the following element in the Southwest Pennsylvania Regional ITS Architecture:

- PEMA Statewide Emergency Operations Center

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the Regional Architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Pennsylvania Southwest Regional ITS Architecture Framework – a copy of the National ITS Architecture “Sausage Diagram”.
- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the Southwest Pennsylvania Regional ITS Architecture.
- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the Regional Architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we’ve provided at the meeting. Comments are organized around additions and deletions by element, as well as general discussion items.

### **County 911 Communication Centers**

#### Additions

2. Maintenance and Construction Resource Request flow to PennDOT Offices – existing.

#### Deletions

1. Transit Emergency Coordination Data to BCTA TMC (information back to BCTA will come from local responders / PSP).
2. Road Network Conditions from PennDOT D10 Office.
3. Interconnect with PennDOT D11 Vehicles since they only coordinate resource requests with PSP along Parkways.

4. Interconnect with Personal Traveler Information Devices – not needed.
5. All flows to/from Towing Industry Responders except Emergency Dispatch Request to Towing Industry Responders.
6. Interconnect with PSP Vehicles – almost always through PSP Dispatch Centers.
7. Interconnect with Commercial Vehicle Company Offices.

#### Changes

1. Make flows to / from PAAC Office same as BCTA TMC.
2. Incident Information flow to Mobility Technologies Administration – planned.

#### **County EMA Centers**

##### Additions

1. Narrative on operating at regional level (Region 13 out of Allegheny County Emergency Services Office) to Element description.
2. Some of same narrative in Element description from PSP Dispatch Centers about specific operations (excluding security monitoring).
3. Incident Response Coordination flow to and from ACAA Office – existing.

##### Deletions

1. Road Network Conditions flow from ACAA Office.
2. Interconnect with Commercial Vehicle Company Offices.

##### Changes

1. Incident Information flow from ACAA Office – planned.
2. Incident Information to and from Mobility Technologies Administration – planned.

#### **Municipal Public Safety Offices**

##### Deletions

1. Interconnect with PEMA.

#### **PSP Dispatch Centers**

##### Additions

1. Incident Response Coordination flow to Municipal Public Safety Offices – existing.

2. Incident Dispatch Request flow from and Emergency Dispatch Request to PennDOT D11 Vehicles (not always through D11 office) – existing.

#### Deletions

1. Interconnect with PEMA (goes through County EMA Centers).
2. Interconnect with PennDOT Central Office.
3. Work Zone Information flow from PennDOT District and County Offices.
4. All flows to/from Towing Industry Responders except Emergency Dispatch Request and Emergency Dispatch Response (no updates since comes from field trooper at scene).
5. Interconnect with Commercial Vehicle Company Offices.

#### **PSP Vehicles**

##### Additions

1. Narrative on MDT system being integrated with some State agencies now (e.g., PEMA), and local agencies in future.

##### Deletions

1. Interconnect with PennDOT D11 Office (go through PSP Dispatch).

#### **PEMA Statewide Emergency Operations Center (Discussed 7/29/04 with PEMA)**

##### Additions

1. Narrative to Element description about PEMA Western Regional Office is a “regional operational arm of the SEOC” in Harrisburg.
2. ‘Remote Surveillance Control’ and ‘Road Network Conditions’ flows to/from PTC – planned. This CCTV sharing project has been discussed by both agencies.

##### Deletions

1. Interconnects between Municipal Public Safety Offices, Municipal Traffic Management Offices, and City of Pittsburgh TMC – coordination should go through County EMA Centers or county 911 dispatch.
2. Interconnects between PennDOT District Offices – coordination should go through PennDOT Central Office and future STMC.
3. Interconnect between PSP Dispatch Centers – coordination should go through PSP Headquarters (assuming PSP Headquarters in Harrisburg is not part of PSP Dispatch Centers Element description for SW Region).

**General Discussion (items 18 through 21 are from 7/29/04 discussion with PEMA)**

1. There is a need for Allegheny County 911 Center operators to have current traffic conditions / flows from City of Pittsburgh TMC and PennDOT D11
2. There is a need for County EMA to have coordination / control of City of Pittsburgh traffic signal system.
3. County 911 Centers often operate on behalf of the County EMA Centers since EMA centers are not always activated. For example, submits reports on PEMA PIERS reporting system.
4. PEMA gets involved in incidents if involves more than one County EMA's, or multiple types of responding agencies.
5. Incident information along roadways will almost always come from PSP or local Police rather than PennDOT. Only real information from PennDOT is construction coordination and any major problems with road / tunnels / bridges.
6. Coordination between PennDOT District Offices and Municipal Public Safety Offices rarely happens, and if so, almost always through the County 911 Centers.
7. Coordination between PSP Dispatch Centers and PennDOT County Maintenance Offices or District Offices happens for requesting salt, and other maintenance operations.
8. PSP Dispatch Centers coordinate with PennDOT D11 Tunnel Division Office for traffic control, debris clearing, move cameras, and major accidents/emergencies.
9. PSP Dispatch Centers talk to PennDOT D11 Parkway Service Patrol directly. Service Patrols let PSP Dispatch know if incidents are cleared, and will call in to request resources.
10. Currently issues with PSP Troop T communication system and other PSP dispatch radio. Field Troopers typically have to go through central dispatch to talk to one another.
11. PSP Dispatch Centers talk to local media through news release (typically faxes).
12. PSP has need to tie directly into 911 dispatch systems since currently all calls along interstates and rural areas have to be forwarded to their system.
13. Need for 1/10 mile markers along all interstates and major arterials for caller location identification.
14. Future state interoperable radio system will have geo-location hardware in units.
15. Future PSP Mobile Data Terminals (MDT's) will be integrated into multiple systems.



16. Need for geo-location and interoperable voice/data communication system to be all in one project – region-wide. Otherwise, systems will likely not be compatible.
17. Need for regional system to notify multiple agencies about closings and other multi-jurisdictional/agency incidents/emergencies/events.
18. The PEMA Regional Offices handle entire PEMA response for some incidents within its region with only informing the SEOC in Harrisburg. Will only get SEOC involved if regional incident requires statewide resources that SEOC has access to (including physical resources, and personnel from other agencies).
19. PEMA interaction with PennDOT Central Offices is through Graham Hess – the PennDOT Emergency Preparedness Liaison Officer (EPLO). EPLO has username/password and separate computer with secure communications to PEMA response systems and communication mediums. Protocol is for PEMA to contact EPLO, who will then contact and request/dispatch any PennDOT resources throughout the state.
20. PEMA has capability and contacts to communicate directly with PennDOT District offices for time-sensitive resource request, but this is typically not how it is supposed to work. Rather, supposed to go through PennDOT Central Office EPLO.
21. PEMA communications with municipalities should go through County EMA/911 Dispatch. Direct communications can occur if time sensitive, but protocol is set up to go through the command structure hierarchy, with county-level agency between state and municipal levels.

**Attachments:** Emergency Management Validation Meeting Handout

**Date:** June 30<sup>th</sup>, 2004

**Location:** PennDOT Central Office; Harrisburg, PA

**Attendees:**

Brenda Murphy, PennDOT BHSTE  
Graham Hess, PennDOT BHSTE  
Matt Weaver, PennDOT BHSTE  
Dan Smyser, PennDOT  
Jeff Arch, PB Farradyne  
Mike Harris, PB Farradyne  
Vijay Varadarajan, PB Farradyne  
Noah Goodall, PB Farradyne  
Steve Kimble, PB Farradyne

**Minutes Prepared By:** Steve Kimble, PB Farradyne

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A meeting was held on June 30<sup>th</sup>, 2004 between 1:00 PM and 3:00 PM at the PennDOT Central Office to validate the following elements in the Southwest Pennsylvania Regional ITS Architecture:

- PennDOT Central Office
- PennDOT Central Office Field Devices
- PennDOT CVO Statewide Operation Center
- PennDOT STMC
- Commercial Vehicle Company Offices
- Commercial Vehicles

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the Regional Architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Pennsylvania Southwest Regional ITS Architecture Framework – a copy of the National ITS Architecture “Sausage Diagram”.
- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework

to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided to show the relationship (i.e., interconnects) between the subject element and other elements in the Southwest Pennsylvania Regional ITS Architecture.

- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the Regional Architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we're provided at the meeting. Comments are organized around additions and deletions by element, as well as general discussion items.

### **PennDOT Central Office**

#### Additions

1. Bureau of Licensing and Motor Vehicles to Element description.

#### Deletions

1. Interconnect between Municipal Traffic Management Offices.
2. Interconnect between PSP Dispatch Centers (goes through PEMA).
3. All flows to/from PennDOT D10, 11, and 12 County Offices except Road Weather Information for RWIS.

#### Changes

8. Delete most (unless otherwise noted herein) planned interconnects/flows, and move to STMC.
9. Move Road Network Conditions and Road Weather Information flows from Mobility Technologies Administration to STMC – planned.
10. Archive Coordination flow should be changed to only receiving archived data from Mobility Technologies ATIS.

### **PennDOT Central Office Field Devices**

#### Additions

1. Credentials Information and Credentials Status Information from PennDOT STMC – planned.

## **PennDOT STMC**

### Additions

1. Flows for CVO safety and credentialing in to/out of PennDOT STMC.
2. CVO operations to Element Description.
3. Interconnects and Flows from PennDOT Statewide CVO Operation Center.
4. Most planned and existing (consistency) interconnects/flows from PennDOT Central Office Element.
5. Road Network Conditions and Road Weather Information flows from Mobility Technologies Administration – planned.
6. Interconnects/flows for hazmat tracking coordination; automated credentialing collection and distribution (non-automated credentialing, licensing, and permits will continue to be done by Central Office); oversize vehicle tracking; and CVO safety tracking.

## **PennDOT Statewide CVO Operation Center**

### Changes

1. Delete element and move most flows/interconnects to PennDOT STMC, with exception of mentioned future operations that will stay in Central Office.

## **Commercial Vehicles**

### Changes

1. Screening Event Record flow to PennDOT CO Field Devices – planned

## **Commercial Vehicle Company Offices**

### Changes

1. Audit Data and Credential Application flows to PennDOT CVO Statewide Operation Center to PennDOT Central Office – planned.
2. Remainder of flows to PennDOT STMC – planned.

## **General Discussion**

1. Unsure where hazmat tracking information will be collected from Commercial Vehicle Companies in future. Possibly all responding agencies will do separately (ask EM), or possibly collected centrally by PEMA (who likely can't depend on

- other's system) and future PennDOT STMC, and then distributed out to others who want.
2. Audit Data and Credential Application flows from Commercial Vehicle Companies will continue to be part of Central Office Bureau of Licensing and Motor Vehicles operations in future (not part of future STMC).
  3. Have new PennDOT CVISN Plan. Identifies Weigh in Motion (WIM) system archived data being used for planning and other services. Currently WIM are standalone systems, and archived data is not used.
  4. Delete planned PennDOT Statewide CVO Operation Center, and move all operations to PennDOT STMC.
  5. PennDOT Central Office will coordinate large incidents/emergencies directly with PTC HQ, but mostly done through PEMA.
  6. PennDOT Central Office will coordinate with Regional Media Outlets during large emergencies/incidents.
  7. In the future, control of RWIS stations may go through local District/County Office rather than back to Central Office.
  8. Questionable if there will be future interconnect between County EMA Centers and PennDOT STMC since indirect interaction will go through local PennDOT District Office. However, there may be coordinated incident/emergency information through PEMA VOIS system. Ask PEMA and Steve Koser to verify.
  9. In general, the future flows for the STMC are fine since much of this is yet to be determined. Current diagrams seem to be a good start for defining STMC operations, so leave most as are.
  10. PSP will coordinate with both the STMC and Central Office in the future (STMC won't take over all operations).

**Attachments:** PennDOT Central Office Validation Meeting Handout

**Date:** June 30<sup>th</sup>, 2004

**Location:** PB Farradyne Office; Mechanicsburg, PA

**Attendees:**

Lou Cortelazzi, PTC  
Jeff Arch, PB Farradyne  
Mike Harris, PB Farradyne  
Vijay Varadarajan, PB Farradyne  
Noah Goodall, PB Farradyne  
Steve Kimble, PB Farradyne

**Minutes Prepared By:** Steve Kimble, PB Farradyne

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A meeting was held on June 30<sup>th</sup>, 2004 between 1:00 PM and 3:00 PM at the PennDOT Central Office to validate the following elements in the Southwest Pennsylvania Regional ITS Architecture:

- PTC Field Devices
- PTC Headquarters
- PTC Maintenance and Construction Vehicles
- PTC Toll Plazas
- PTC Service Plazas
- Passenger Vehicles

A “package” was developed for each of the above elements in order to portray how an element (i.e., the “subject” element) fits into the Regional Architecture. The packages were then combined into a MS PowerPoint presentation and reviewed with the stakeholders in attendance. Copies of each element package are attached with these minutes. Specifically, the element packages consisted of:

- Pennsylvania Southwest Regional ITS Architecture Framework – a copy of the National ITS Architecture “Sausage Diagram”.
- Element Cover Sheets – The name, description and stakeholder of the subject element as defined in the DRAFT Regional ITS Architecture.
- “Sausage Diagrams” showing the context of the subject element and the relationship between other elements in the DRAFT Regional ITS Architecture – the subject element was shown alone within the “Sausage Diagram” framework to provide a sense of context as to where that particular element fits within the National ITS Architecture framework. In addition, a second drawing was provided

to show the relationship (i.e., interconnects) between the subject element and other elements in the Southwest Pennsylvania Regional ITS Architecture.

- Interconnect Diagram – An Interconnect Diagram showing existing and planned interconnects between the subject element and other elements in the Regional Architecture were provided.
- Information Flow Diagrams – Existing and planned information flows by direction were shown on drawings for the subject element and each of the elements it interconnects with.
- Appendices – Definitions for the elements and architecture flows were provided.

The following is a list of comments that we've provided at the meeting. Comments are organized around additions and deletions by element, as well as general discussion items.

### **PTC Field Devices**

#### Additions

1. Element only includes field devices in SW Region to description.
2. Flows for call boxes (existing), and truck rollover warning system (TRWS) (likely to be integrated into PTC Headquarters system - planned), as well as narrative in Element description.

#### Deletions

1. Roadside Archived Data flow to PTC Headquarters.

#### Changes

1. Over height vehicle detection systems flows and Element description – planned.
2. Signal Control Status flow – planned (for signals feeding turnpike, e.g., Lancaster, Somerset)
3. Environmental Conditions Data flow – planned.

### **PTC Headquarters**

#### Additions

1. Change PTC Headquarters Element name to PTC, and add PTC regional offices and maintenance offices to Element Description
2. Flows for maintenance and construction, incident information request, and resource requests from 911 Centers – existing.

3. Road Network Conditions to County EMA Centers.
4. Flow for CCTV images & DMS Control to PEMA – planned.
5. Flows for PEMA operational system compute in PTC Headquarters – planned.
6. Work Plan Coordination flow to and from PennDOT County Maintenance Offices.
7. Flows for maintenance and construction resource coordination to and from PennDOT County Maintenance Offices – existing.
8. Emergency Notification flow from Personal Traveler Information Devices (\*11 system) – existing.
9. Flows for real-time E-Z Pass data, toll archived data, and E-Z Pass violation camera images from PTC Toll Plazas – existing.
10. Flows for PTC ENS information to Commercial Vehicle Company Offices since some subscribe.
11. Flows for travel time and road network conditions to Commercial Vehicle Company Offices – existing.
12. Flows for resource request, incident response status, resource deployment status, and road network conditions to and from PSP Troop T – existing.
13. Flows for archived data, and regulatory (toll violation) data from PTC Toll Plazas – existing.

#### Deletions

1. All flows to/from PennDOT Central office aside from Incident Report and Incident Response Coordination flows, as well as flows dealing with archived data exchange, planning/coordinating the design of roads, and RWIS information – existing.
2. Toll data to Mobility Technologies ATIS Administration

#### Changes

2. Interconnect with other PSP Dispatch Centers to information exchange with PSP Troop T vehicles and personnel located in PTC Headquarters only.
3. Road Weather Information flow to Regional Media Outlets – existing (ENS system).
4. Maintenance and Construction Vehicle System Control and Maintenance and Construction Vehicle Location Data flows to/from PTC Maintenance and Construction Vehicles – planned.



5. hazmat information from Commercial Vehicle Company Offices – existing.

### **PTC Maintenance and Construction Vehicles**

Changes (see PTC Headquarters comments)

### **PTC Toll Plazas**

Additions

1. Flows for CVO credentialing system information to/from Commercial Vehicles – planned (before they get on turnpike, system checks credentials of vehicle/carrier/driver/etc).

Changes

1. Correct Element description to “E-Z Pass”, and include narrative on ticketed systems, archived data maintenance, and E-Z Pass video enforcement systems.

### **Passenger Vehicles**

Deletions

1. Tag Update flow from PTC Toll Plazas.

### **General Discussion**

1. E-Z Pass tags only provide the system with an ID of particular vehicles. Rest of operations are within the system using ID.
2. Tolling system keeps track of vehicle class for E-Z Pass subscribers.
3. Future plans for the PTC West Regional Office (WRO) to be acting as backup TOC in Region, including Mon Fayette and Greensburg.
4. Add PTC “\*11” & 511 (future) operations to Personal Traveler Information Devices Element description.
5. PTC coordinates with County 911, PSP, and County EMA.
6. PTC-owned dispatch system dispatches PSP Troop T vehicles directly.
7. PTC Emergency Notification System (ENS) Web-based currently provides travel times and road weather information to users, including PennDOT, PSP, and PEMA.
8. PTC shares archived data on vehicle classifications and counts with others, mostly for planning.
9. Not planning on ramp meter systems.

10. Currently have video sharing policy in Philadelphia area with PennDOT. Future SW Region video sharing could involve PEMA, PSP, and PennDOT.
11. Future field device control coordination (e.g., DMS & CCTV) with PennDOT in SW Region should be planned.
12. Future sharing of RWIS and traffic flow data should be planned in SW Region with PennDOT.
13. Future project for 511 system should be programmed as joint effort between PennDOT and PTC.
14. PTC system currently tracks commercial vehicle credentialing data.
15. Include an element for PSP Troop T. Show the existing flows from PTC HQ to PSP Dispatch Centers as from PTC HQ to PSP Troop T. Include another interconnect from PSP Troop T to PSP Dispatch Centers.

**Attachments:** Pennsylvania Turnpike Commission Validation Meeting Handout

## Appendix H: Bookend II Meeting Minutes

Date: Friday, November 5, 2004

Meeting of: PennDOT Southwestern Region – Second Regional Meeting

Location: Mars, PA

### Presentation

- Chuck DiPietro, SPC, welcomed everyone to the meeting. Mr. DiPietro explained that this meeting is the final regional stakeholder meeting of the ITS Architecture effort. The first regional meeting was held in June 2004; it was followed by a series of smaller working meetings in June and July 2004. Material from the first regional meeting is available upon request, or via the web at [www.paits.org](http://www.paits.org). Mr. DiPietro added the purposes of the meeting includes concluding the ITS Architecture effort, meeting the federal mandate for architecture conformity, discussing next steps, and discussing continuing regional operations dialogue stressing that the ITS Architecture is a living document. He reviewed the agenda for the meeting including, Jeff Arch from PB would give an overview of the ITS Architecture; Noah Goodall, also from PB, would describe the website and how users would access information and provide input for updating the architecture; Dennis Lebo from PennDOT would talk about next steps; Mr. DiPietro, would then explain the role of the SPC region; and Brenda Murphy from PennDOT would facilitate discussion at the end.
- Jeff Arch, from PB, began his section on ITS Architecture by showing an outline of some of the questions that he would be answering during his part of the presentation. The first slide listed the needs for a South Central PA Regional ITS Architecture. Mr. Arch explained that a regional ITS Architecture would provide structure for ITS planning and deployment. Additionally, the architecture establishes an institutional mechanism that promotes development and deployment of ITS and Interoperability is promoted and efficient investment is encouraged. Furthermore, the federal mandate which states “Regional architecture must be completed in partnership with the state and regional planning partners, including regional stakeholders by April 8, 2005 for use of Federal funds for ITS,” must be satisfied. The mandate for conformity is reflected in this statement “The Intelligent Transportation System Architecture and Standards final rule issued by the Federal Highway Administration (FHWA), USDOT, Section: 940.5 (and 49 CFR Part 613 and 621) has been met for this region in Pennsylvania”. This means that federal rules from FTA and FHWA have been met. The federal funds can continue to be used for ITS projects in the South Central Region because the regional ITS Architecture has been successfully completed. Mr. Arch then explained the process for creating the ITS Architecture. He started with the Regional boundaries through presenting a map with nine PennDOT regions and identifying the boundaries of the South West Region. The process for developing the regional ITS Architecture

involved the following steps: identifying District champions; formulating a regional advisory panel (RAP); developing a “strawman” architecture based on RAP inputs; validating the “strawman” architecture through validation meetings; and finalization of the ITS Architecture based on validation meeting inputs. The ITS Architecture will be finalized later this month. Currently, this region has an ITS architecture that can support regional stakeholder planning for ITS projects and funding, regional and statewide planning processes, and regional and statewide ITS project development and design. Additionally, it can support ITS integration, interoperability of ITS systems, and architecture updates. Finally it can provide a forum for regional agencies to collaborate on ITS capital, operations, and maintenance.

- Mr. Arch highlighted the chapters in the South West PA Regional ITS Architecture Document noting the newest sections – Using the Architecture Document; ITS Standards; Utility of the Architecture; Maintenance of the Architecture; and Moving Forward – Institutionalizing ITS. The first chapter introduces the architecture development process and gives instructions on how to use the document. This chapter states that the architecture will be maintained by PennDOT Central Office and Regional Stakeholder Participation. Recurring and long-term effort will require familiarity with national ITS architecture and knowledge of turbo architecture software tool. The architecture will be updated every 4 years. The planning for the update should begin one year prior to the update. The first update is scheduled for Fall 2008. Elements that will be maintained include the following: a description of the region, stakeholders, ITS architecture elements, system inventory, needs and services, interconnect diagrams, architecture flows, and applicable ITS standards. The ITS Architecture will be maintained through the website. To move forward and institutionalize ITS, the regional stakeholders and PennDOT Central Office ITS Partnership will work together. They will work to get transportation technology issues in front of decision makers, incorporate ITS in long range plans, modify TIP project selection criteria to more fairly evaluate technology and ITS, give regular updates to elected officials, and set up regional ITS/Operations Coordination Committees. Furthermore, educational training courses may be provided to introduce practitioners to systems engineering, ITS procurement, and managing traffic incidents for roadway emergencies. A helpful website for the training is [www.nhi.fhwa.dot.gov](http://www.nhi.fhwa.dot.gov). Educational scanning tours may also be provided to county commissioners, executive boards, managers, operations staff, and public safety officials.
- Chapter 2 of the ITS Architecture document summarizes the scope and magnitude of the architecture. Stakeholders and projects are identified in this chapter. Chapter 3 titled “Regional Systems, Inventory, Needs and Services” contains the “building blocks” of the architecture, and defines the elements, systems inventory and links elements, stakeholders and project, needs and services that establish architecture flows among elements. Chapter 4 contains a graphical display of the architectures, which includes the regional interconnect diagrams, and the architecture flows. Mr. Arch explained the ITS architecture using an example of an interconnect diagram and architecture

- flows in the following slide. Furthermore, ITS Standards are industry consensus standards that define the operations of the system components within a consistent framework. Interoperability is promoted, and participating standards development organizations include AASHTO, ANSI, ASTM, IEEE, ITE, NEMA, and SAE.
- Noah Goodall of PB provided a demonstration for using the website to update the ITS Architecture. The website will become the historical library and also will provide forms for filling out new information on stakeholder and project updates. Noah used a sample scenario to demonstrate the use of the website through a deployment project to explain how the Architecture website can be used to identify the stakeholders who might be interested in the project, identify the information flows among the interested stakeholders, and identify the ITS standards applicable to the information flows. He also explained the process of updating the architecture website using the “Architecture Update Form”.
  - Mr. Arch continued his presentation to help the participants understand where the effort goes from this point, how best to get ITS in front of decision-makers, integrated into TIPs and STIPs, and compete for funding.
  - Dennis Lebo from the PennDOT Central Office, Center for Program Development and Management talked about next steps. He began with a picture identifying the various planning bodies within Pennsylvania. Then, he explained the role of ITS Architecture in the context of planning. For regional next steps, he suggested that each MPO/RPO in the region needs to formally adopt the ITS Architecture. The region needs to prioritize projects documented in the architecture, and incorporate projects into regional long range plans and the transportation improvement program. For PennDOT, the next step is to develop a Statewide Mobility Plan (SMP). The SMP will focus mainly on mobility. Developing a Transportation System Operations Plan (TSOP) is one of the components of the SMP. Prioritized statewide PennDOT projects are focused in incident management, telecommunications, ITS and operations. The draft of the TSOP may be available as early as May 2005. A regional outreach on this plan is proposed to identify the Statewide priorities.
  - Chuck DiPietro, continued the discussion about the Role of the Regional Planning Bodies. To move forward, the region must adopt the ITS architecture and incorporate it into their long range plan. The region needs to support the ITS/Operations project in the TIP and the PennDOT statewide TSOP. The region should continue the RAP meetings and evolve to address ITS/operations at the regional level. A meeting is scheduled for November 18<sup>th</sup>, 2004 to ask the Technical Committee to critique the architecture and then they will bring it back to the Commission on December 6<sup>th</sup>, 2004. Mr. DiPietro stressed the importance of making sure the proper state and regional planning processes are followed and coordinated noting that soon the state will be conducting Mobility Plan meetings – a two-day event – in each of the regions. Additionally, the SPC Region will be starting their Long Range Planning.

- Brenda Murphy, PennDOT, facilitated the open discussion thanking the participants for helping the team to successfully complete the Regional ITS Architecture as well as congratulating them on their important accomplishment. Ms. Murphy emphasized the themes that the ITS Architecture document is a living document, and it needs everyone's support in the region. One participant asked how this effort trickles down to the various state employee levels and Ms. Murphy noted the importance of each participant acting as liaison to their respective agencies and peers as well as continuing the dialogues started through this effort. Jeff Arch added that the SPC is also a good place to begin developing planned projects and prioritization for funding and then work it through to the TIP. He also noted the option of utilizing arterial committees and sharing projects and operational resources/responsibilities among municipalities citing an example in which a number of municipalities have invited vendors to make presentations on technologies of interest. Lastly, Mr. Arch noted the importance of educating decision-makers and promoted the use of Best Practices documents and scanning opportunities as recourses with which to help educate.

**List of Attendees**

<b>Last Name</b>	<b>First Name</b>	<b>Agency</b>	<b>Email</b>	<b>Phone</b>
Baughman	Tim	Western Region Pennsylvania Emergency Management Agency	<a href="mailto:tbaughman@state.pa.us">tbaughman@state.pa.us</a>	(724) 357-2990
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Camp	James	Beaver County Public Works		
Cippel	Frank	PennDOT District 11-0	<a href="mailto:fcippel@state.pa.us">fcippel@state.pa.us</a>	(412) 429-4986
DiPietro	Chuck	Southwest Pennsylvania Commission	<a href="mailto:dipietro@spc9.org">dipietro@spc9.org</a>	
Gringas	Frank	Lawrence Co Planning Office		
Herceg	Denise	Scott Township	<a href="mailto:dherceg@scotttownship.com">dherceg@scotttownship.com</a>	(412) 276-5300
Kravits	Todd	PennDOT District 11-0		
Lattner	Thomas	Allegheny County Health Department		
Lebo	Dennis	PennDOT Central Office	<a href="mailto:dlebo@state.pa.us">dlebo@state.pa.us</a>	(717) 787-5246
Manion	Lynn	Airport Corridor Transportation Association		

Last Name	First Name	Agency	Email	Phone
McClelland	Tom	PennDOT District 1-0		
Morandini	Mary Jo	Beaver County Transit Authority	<a href="mailto:maryjom@bcta.com">maryjom@bcta.com</a>	(724) 728-4255
Munizza	Dominic	PennDOT District 11-0	<a href="mailto:dmunizza@state.pa.us">dmunizza@state.pa.us</a>	(412) 429-6034
Murphy	Brenda	PennDOT Central Office	<a href="mailto:bremurphy@state.pa.us">bremurphy@state.pa.us</a>	(412) 429-6038
Packer	Rick	Beaver County Planning Commission	<a href="mailto:rpacker@co.beaver.pa.us">rpacker@co.beaver.pa.us</a>	(724) 728-3934
Paul	John	Butler Township-City Joint Municipal Transit Authority		
Rudman	Michael	Mt. Lebanon	<a href="mailto:mrudman@mtlbanon.org">mrudman@mtlbanon.org</a>	(412) 343-3869
Scheider	Mike	Cranberry Township		
Shanshala	Mike	PennDOT District 10-0	<a href="mailto:mshanshala@state.pa.us">mshanshala@state.pa.us</a>	(724) 357-2845
Skolnick	Marilyn	Sierra Club	<a href="mailto:emkhs@concentric.net">emkhs@concentric.net</a>	(412) 373-7714
Smith	Tricia	Mobility Technologies		
Szewcow	Mark	Transportation Associations		



# Pennsylvania ITS Architecture - Update and Moving Forward

## Southwest Region

Second Regional Meeting  
November 5, 2004



## Welcome

Chuck DiPietro, SPC



## Meeting Series

- This is the final regional stakeholder meeting of the ITS Architecture effort
  - First Regional stakeholder meeting was held in June 2004
  - Followed by a series of smaller working meetings in June and July 2004
- Material from the first regional meeting is available upon request or via the web at: [www.paits.org](http://www.paits.org)



## Agenda

- **Chuck DiPietro**, SPC - Welcome
- **Jeff Arch**, PB – ITS Architecture
  - Web Site – **Noah Goodall**, PB
- **Dennis Lebo**, PennDOT – Next Steps
- **Chuck DiPietro**, SPC – Role of the SPC Region
- **Brenda Murphy**, PennDOT – Discussion Facilitator



## Welcome

- Elected Officials
- PennDOT
- PTC
- Airport
- Transit
- Counties
- Cities
- Emergency Management Agencies
- SPC
- Townships
- Partnership Organizations
- Enforcement Community



## Meeting Purpose

- Conclude the ITS Architecture effort
- Meet the Federal Mandate for Architecture Conformity
- Discuss Next Steps
- Discuss continuing regional operations dialog at policy and technical levels



## ITS Architecture

Jeff Arch, PB



PB

## The Federal Mandate

Regional ITS Architectures must be completed in partnership with the State and regional planning partners, including regional stakeholders by April 8, 2005 for use of Federal funds for ITS



PB

## Mandate Conformity

### Conformity Statement

The Intelligent Transportation System Architecture and Standards final rule issued by the Federal Highway Administration (FHWA), USDOT, Section: 940.5 (and 49 CFR Part 613 and 621) has been met for this region in Pennsylvania.



PB

## Meaning

- Federal rules from FTA and FHWA have been met
- Federal funds can continue to be used for ITS projects in this region
- The region has been successful



PB

## Regional Map



PB

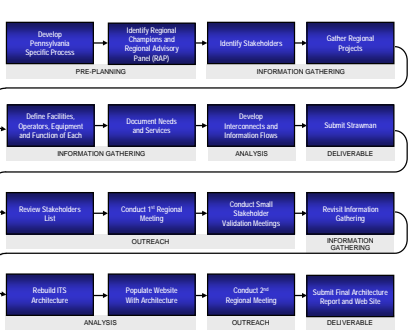
## Highlights

- Process
- Overview of new sections
- Regional Interconnects
- Usage
- Maintenance and Update



PB

## Process



## Overview of New Sections



TABLE OF CONTENTS	
<b>1 INTRODUCTION</b>	3
1.1 Introduction Purpose	4
1.2 Goals and Objectives	5
<b>2 ARCHITECTURE SCOPE</b>	10
2.1 Scope or Services	10
2.2 Stakeholder Services	10
2.3 Description of the Region	10
2.4 Regional Stakeholders	17
2.5 Regional ITS Projects	21
<b>3 REGIONAL SYSTEMS INVENTORY, NEEDS, AND SERVICES</b>	34
3.1 System Descriptions	34
3.2 System Inventory	41
3.3 Needs	121
3.4 Services	146
<b>4 REGIONAL ITS ARCHITECTURE</b>	179
4.1 Executive Introduction Overview	180
4.2 Regional Executive Introduction Diagram and Key Elements	182
4.3 Interoperable Model	184
4.4 ITS Architecture	184
4.5 ITS Description	185
<b>5 DISCUSSION OF THE ARCHITECTURE</b>	209
5.1 Utility of the Architecture	209
5.2 Maintaining the Architecture	214
5.3 Moving Forward: Institutionalizing ITS	216
<b>REFERENCES</b>	246
<b>APPENDIX A ACRONYMS</b>	247



## New Sections

- Using the Architecture Document
- ITS Standards
- Utility of the Architecture
- Maintenance of the Architecture
- Moving Forward – Institutionalizing ITS



## Using the Architecture Document



## Using It

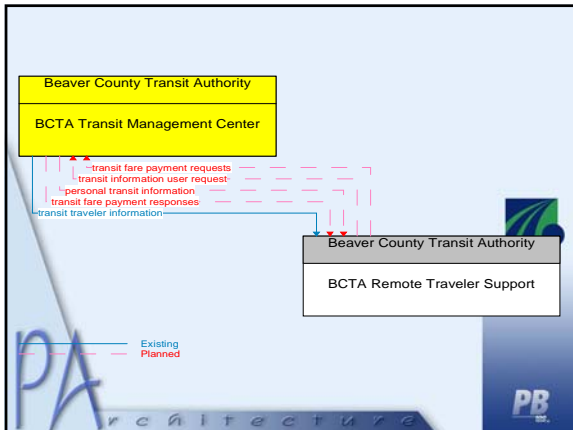
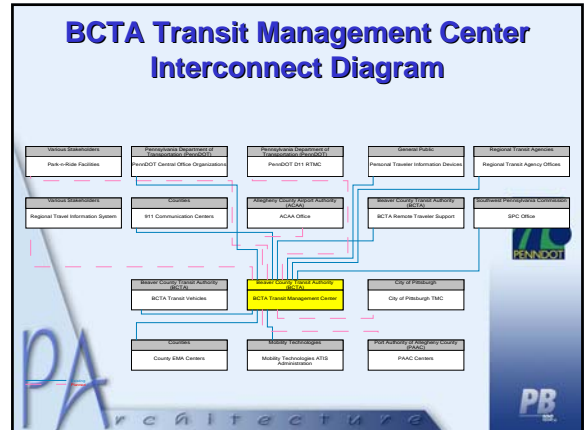
- Architecture Scope Section
  - Summarizes the Scope and Magnitude of the Architecture
  - Defines Stakeholders
  - Lists Projects



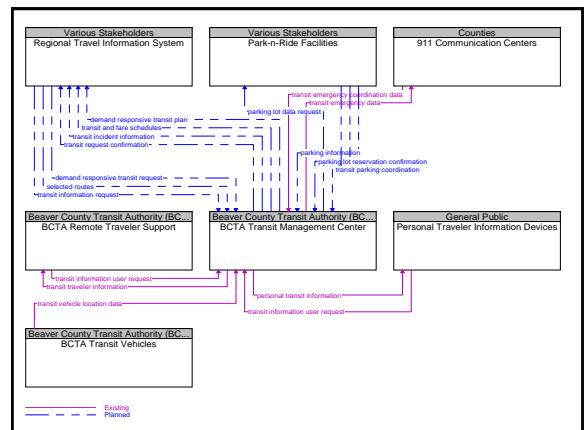
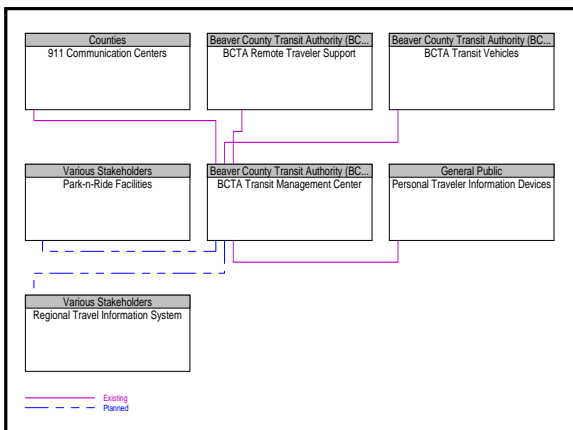


**Southwest PA Interconnect Matrix**

	911 Communication Centers	Adjacent PennDOT Districts	BCTA Remote Traveler Support	BCTA Transit Management Center	BCTA Transit Vehicles
Municipal Public Safety Offices					
Municipal Field Devices					
Mobility Technologies ATIS					
County EMA Centers	X				
Commercial Vehicles					
City of Pittsburgh TMC					
City of Pittsburgh Field Devices					
BCTA Transit Vehicles					
BCTA TMC			X		
BCTA Remote Traveler Support			X		
Adjacent PennDOT Districts					
911 Communication Centers	X				



- ### Sample Scenario
- Scenario: BCTA deploys an automatic vehicle location (AVL) system on its buses
  - Range of stakeholders interested in the AVL data and transit information
    - 911 Communication Centers
    - Park-n-Ride Facilities
    - Regional Travel Information System
    - Personal Traveler Information Devices



## Sample Scenario ITS Standards

Lead SDO	Standard Name	Document ID
AASHTO/ITENEMA	TCP – Common Public Transportation (CPT) Business Area	NTCIP 1401
AASHTO/ITENEMA	TCP – Incident Management (IM) Business Area Standard	NTCIP 1402
AASHTO/ITENEMA	TCP – Passenger Information (PI) Business Area Standard	NTCIP 1403
AASHTO/ITENEMA	TCP – Scheduling/Rerouting (SCHA) Business Area Standard	NTCIP 1404
AASHTO/ITENEMA	TCP – Spatial Representation (SP) Business Area Standard	NTCIP 1405
AASHTO/ITENEMA	TCP – Onboard (OB) Business Area Standard	NTCIP 1406
AASHTO/ITENEMA	TCP – Control Center (CC) Business Area Standard	NTCIP 1407
IEEE	Standard for Emergency Management Data Dictionary	IEEE P1512.a
IEEE	Standard for Common Incident Management Message Sets (IMMS) for use by EMCs	IEEE P1512.b
ITE	Standard for Functional Level Traffic Management Data Dictionary (TMDD)	ITE TM 1.03
ITE	Message Sets for External TMC Communication (MSETMCC)	ITE TM 2.01
ITE	TCP – Traffic Management™ Business Area Standard	ITE TS 3.TM
SAE	ISP – Vehicle Location Referencing Standard	SAE J1746
SAE	Data Dictionary for Advanced Traveler Information System (ATIS)	SAE J2353
SAE	Message Set for Advanced Traveler Information System (ATIS)	SAE J2354
SAE	Rules for Standardizing Street Names and Route IDs	SAE J2529
SAE	Message for Handling Strings and Look-up Tables in ATIS Standards	SAE J2540

## Sample Scenario

- Benefits
  - Identifies project stakeholders, and allows decision-makers to discuss and decide on operational needs before deployment
  - Existing and planned information exchanges can quickly be grasped
  - Uses nationally consistent planning language and design requirements
  - Identify design standards that can be used by all stakeholders - promoting interoperability

## ITS Standards

- ITS Standards
  - Industry Consensus Standards
  - Define How System Components Operate within a Consistent Framework
  - Promote Interoperability
  - Participating Standards Development Organizations Include AASHTO, ANSI, ASTM, IEEE, ITE, NEMA, SAE
  - 58 Standards for the Southwestern Pennsylvania Regional ITS Architecture

## Utility of the Architecture

## Utility of the Architecture

- The Southwest Regional ITS Architecture:
  - Provides Structure for ITS Planning and Deployment
  - Establishes an Institutional Mechanism That Promotes Development and Deployment of ITS
  - Promotes Interoperability
  - Encourages Efficient Investment
  - Satisfies the Federal Mandate

## Maintenance of the Architecture



PB

## ITS Architecture Maintenance

- ITS Architecture to be updated every four (4) years, next one should be updated by Fall 2008
- ITS Architecture updates most likely will be led by PennDOT Central office for statewide consistency



PB

## Maintenance of the Architecture (Cont.)

- What Will be Maintained?
  - Description of the Region
  - Stakeholders
  - Elements
  - System Inventory
  - Needs and Services
  - Interconnect Diagrams
  - Architecture Flows
  - Applicable ITS Standards



PB

## We now have:

- A conforming regional ITS Architecture that can support:
  - Regional stakeholder planning for ITS projects and funding
  - Regional and Statewide planning processes
  - Regional and Statewide ITS project development and design
  - ITS integration
  - Interoperability of ITS systems
  - Architecture updates as necessary
- A forum for regional agencies to collaborate on ITS capital, operations and maintenance



PB

## Web Site

[www.paits.org/sw](http://www.paits.org/sw)



PB

## Usage

- Web based
- Easy to use
- Form for new information
  - Stakeholder updates
  - Project updates
- Web site will become the historical library



PB

PA Regional ITS Architectures | SW | Home - Microsoft Internet Explorer

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Address C:\www.patts.org\sw\index.htm

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## Southwestern Regional ITS Architecture

Home Using the Architecture Definitions and Acronyms Architecture Update Form

Southwestern Region

Elements

Stakeholders

Regional Subsystem Interconnect Diagram

Full Architecture Document

National ITS Architecture

### Regional Description

This Region, in the southwestern part of the state, encompasses PennDOT Engineering Districts 11-0 and 12-0, and part of District 10-0. The region is comprised of 10 counties:

- Lawrence
- Butler
- Armstrong
- Indiana
- Beaver
- Allegheny
- Westmoreland
- Washington
- Greene
- Fayette

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Southwestern Region

Elements

Stakeholders

Regional Subsystem Interconnect Diagram

Full Architecture Document

National ITS Architecture

### Elements

Elements refer to organizational entities that operate in the transportation environment and are stakeholders in the effort. Elements also include planning agencies that are involved in the "business" of programming ITS into the mainstream project planning process. Element descriptions are furnished below to document the groups that operate in the transportation environment as related to ITS. These elements are described in terms of their mission and relationship to the Regional ITS Architecture.

- B11 Communication Centers
- ACAA Field Devicez
- ACAA Office
- Adjacent PennDOT Districts
- BCTA Remote Traveler Support
- BCTA Transit Management Center
- BCTA Transit Vehicles

PA Regional ITS Architectures | SW | BCTA Remote Traveler Support - Microsoft Internet Explorer

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Elements

Stakeholders

Regional Subsystem Interconnect Diagram

Full Architecture Document

National ITS Architecture

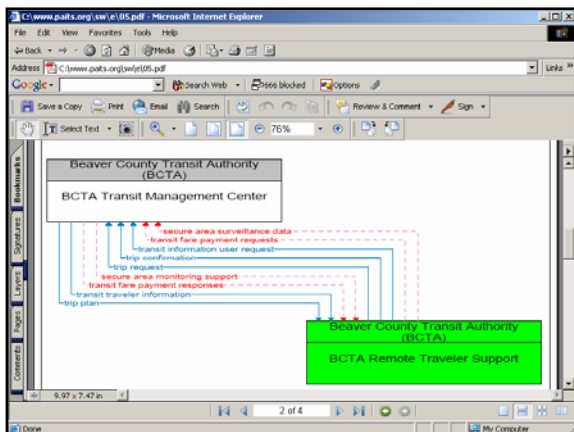
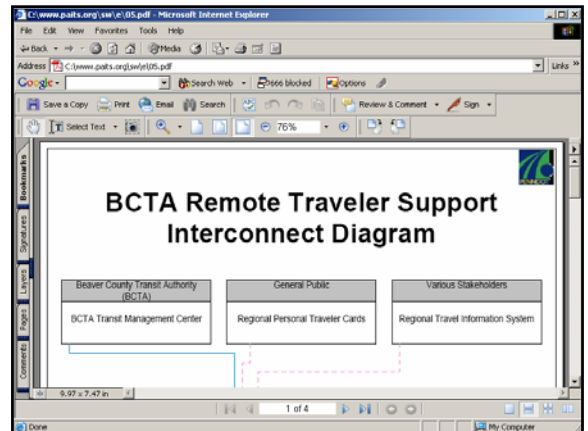
### BCTA Remote Traveler Support

This element consists of Beaver County Transit Authority-operated remote traveler information and support systems and includes existing/future electronic displays with dynamic traveler information at bus stops as well as kiosks for transit information and fare payment or debit increase using electronic fare cards.

**BCTA Remote Traveler Support Element Architecture (25 KB PDF)\***

[Flow definitions](#) - General definitions of the architecture flows used in the document

\*Viewing the architecture flows requires Adobe Reader, a free software for downloading PDF documents. [Click here](#) to download Adobe Reader.



PA Regional ITS Architectures | SW | Stakeholders - Microsoft Internet Explorer

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Stakeholders

Regional Subsystem Interconnect Diagram

Full Architecture Document

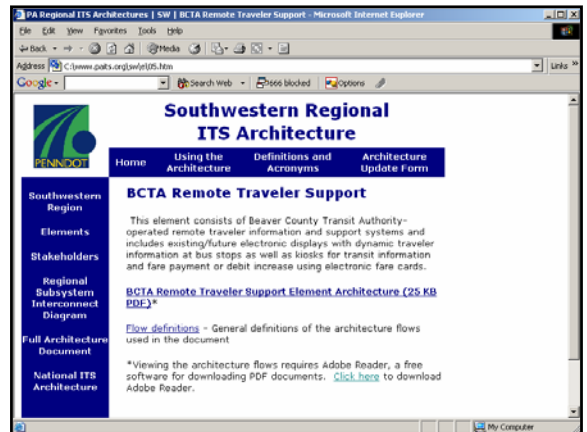
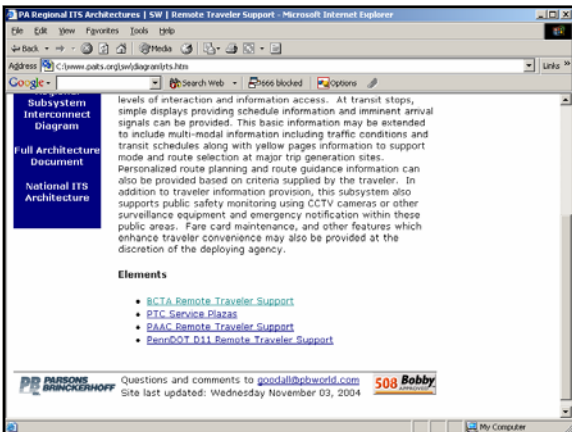
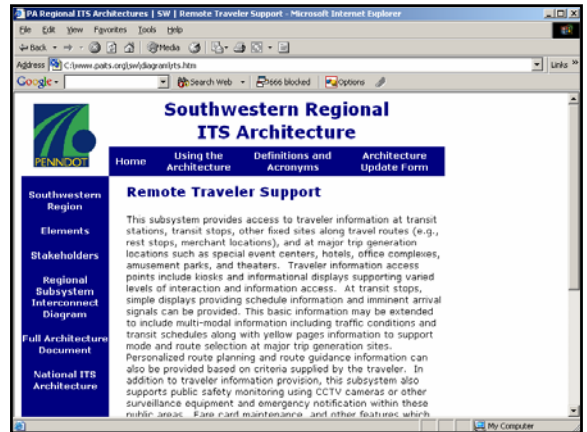
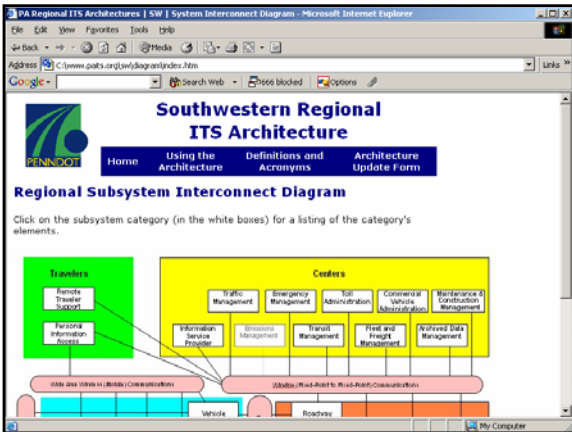
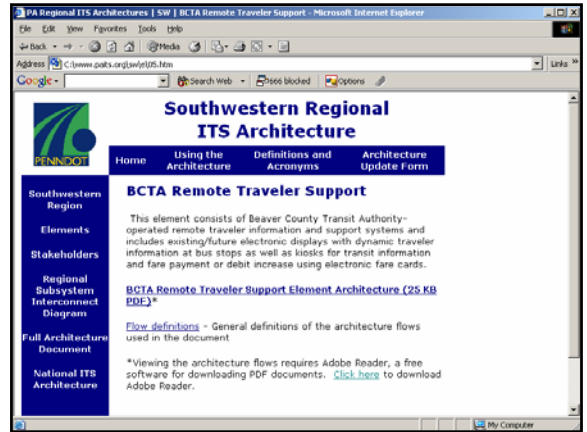
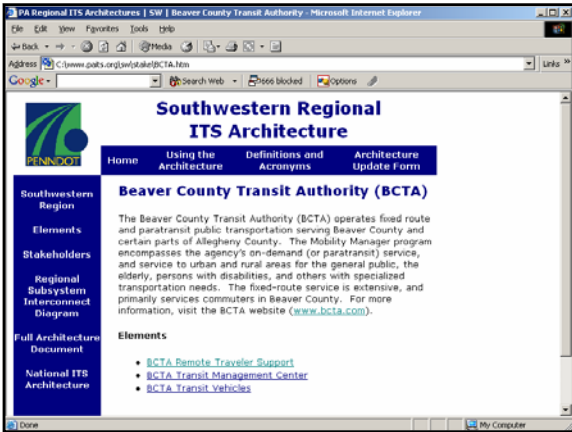
National ITS Architecture

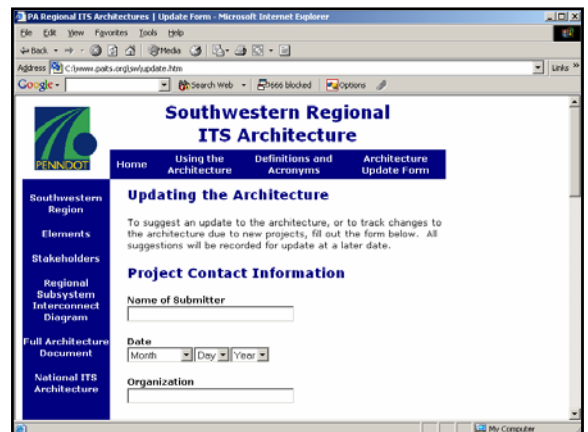
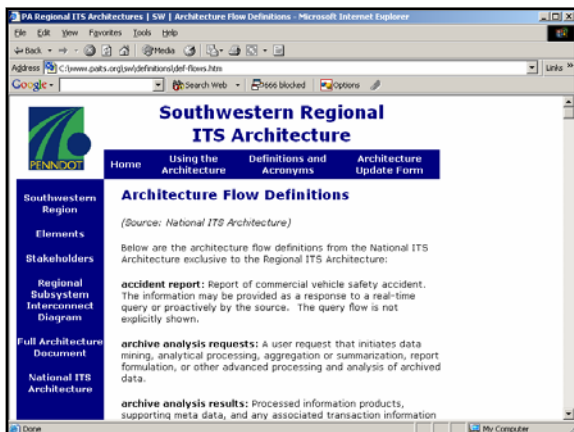
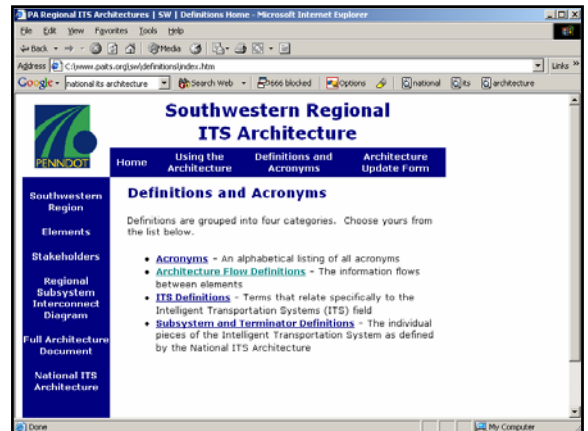
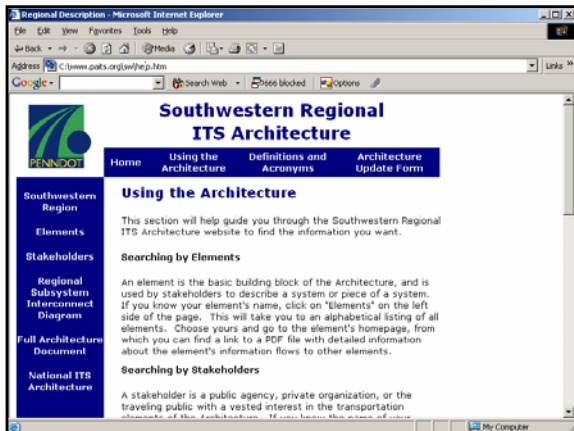
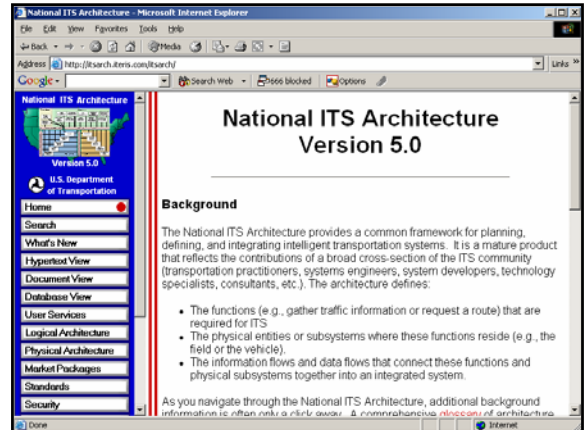
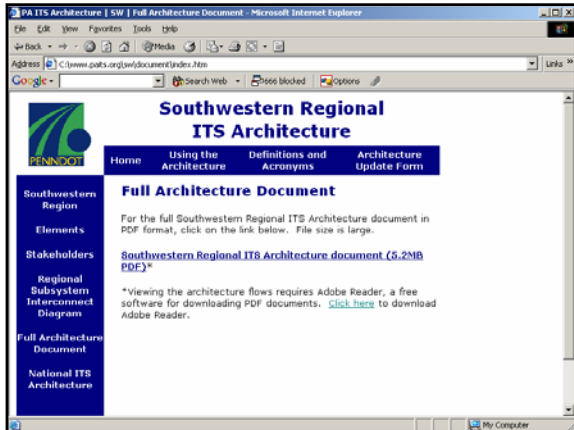
### Stakeholders

Stakeholders are mainly identified as agencies and then individuals responsible in those agencies for policy and operations.

- Allegheny County Airport Authority (ACAA)
- Beaver County Transit Authority (BCTA)
- City of Pittsburgh
- Commercial Vehicle Companies
- Counties
- General Public
- Mobility Technologies
- Municipalities
- Port Authority of Allegheny County (PAAC)
- Pennsylvania Department of Transportation (PennDOT)
- Pennsylvania Emergency Management Agency (PEMA)







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Address: C:\www.pats.org\swupdate.htm

**Project Information**

Project Name:

Project Description:

Funding:

- Local
- State
- Federal

Project Stakeholders:

Affected Stakeholders:

Location:

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Federal

Project Stakeholders:

Affected Stakeholders:

Location:

Other Information:

Submit Reset

PennDOT Home Using the Architecture Definitions and Acronyms Architecture Update Form

**Background of the Architecture**

The Pennsylvania Department of Transportation (PennDOT) and regional stakeholders from around the State are addressing the application of current and future technology applications to transportation systems. The integration and operation of these technology applications and systems is an important issue regionally and statewide. This project, called the *Pennsylvania Intelligent Transportation Systems (ITS) Architecture*, addresses the planning and operations issue of ITS.

Select your region from the map

PA Regional ITS Architectures | Update Form - Microsoft Internet Explorer

Address: G:\Project Files\PENNDOT ITS Architecture\Client Sites\PAITS\Index.htm

Select your region from the map

**Moving Forward – Mainstreaming and Institutionalizing ITS**

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**Mainstreaming ITS**

- Regional Stakeholders and PennDOT Central Office ITS Partnership – Working Together
  - Get Transportation Technology Issues in Front of Decision Makers
  - ITS in Long Range Plans
  - Modify TIP Project Selection Criteria to More Fairly Evaluate Technology and ITS
  - Regular Updates to Elected Officials
  - Regional ITS / Operations Coordination Committees

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## PennDOT Next Steps

- Statewide Mobility Plan (SMP)
  - One of these components of the SMP is the Transportation Systems Operations Plan (TSOP)
    - Prioritized statewide PennDOT projects focused in:
      - Incident Management
      - Telecommunications
      - ITS and Operations
    - Regional outreach on this plan is proposed
  - Draft TSOP by May 2005



## Role of the SPC Region

**Chuck DiPietro, SPC**



## To move forward ...

- Region must adopt the ITS Architecture
- Incorporate Architecture into long-range plan
- Support ITS/Operations projects in TIP
- Support the PennDOT TSOP as needed
- Continue policy body for ITS/operations under existing regional body
- Continue technical issues group for ITS/operations under existing regional body



## Discussion

Facilitated by:

**Brenda Murphy, PennDOT**

