Regional ITS Architecture

Southwestern ITS Architecture Region

November 2004
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Southwestern Pennsylvania Commission – Metropolitan Planning Organization
Adopted on December 6, 2004
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Major contributions from the Statewide Working Group, Regional Advisory Panel, and Parsons Brinckerhoff made the development of the Southwestern Regional ITS Architecture possible.

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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Mike Herron – Federal Highway Administration (FHWA)

Karen Russell – PennDOT Central Office, Program Development Division

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.

Jonathon Balko – PennDOT District 12-0
Tim Baughman – Pennsylvania Emergency Management Agency (PEMA)
Maureen Bertocci – Port Authority of Allegheny County (PAAC)
Nicolas Bosonetto – Allegheny County Department of Economic Development
Mike Brinza – Port of Pittsburgh Commission
Frank Cippel – PennDOT District 11-0
Victor Defazio – PennDOT District 11-0
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Rich Feder – Port Authority of Allegheny County (PAAC)

Clay Fulton – City of Pittsburgh
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Dominic Munizza – PennDOT District 11-0
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Scott Snyder – PennDOT District 10-0
Ann Holtz – Port Authority of Allegheny County (PAAC)

Parsons Brinckerhoff

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

Mike Harris – PB Farradyne – Project Manager
Joel Ticatch – PB Farradyne – Assistant Project Manager
JD Schneeberger – PB Farradyne – Turbo

Noah Goodall – PB Farradyne – Web
Jeff Arch – PB Farradyne – Southwestern Region Lead
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](image-url)
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:

![Schematic Diagram]

**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 to 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:
From the Southwestern Regional ITS Architecture Homepage (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 or 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:


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 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) 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) 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://paits.org/sw/update.htm.
Southwestern ITS Architecture Maintenance Form

**Contact Information**

<table>
<thead>
<tr>
<th>Name of Submitter:</th>
<th>Submission Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization:</td>
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<tr>
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**New ITS Project**

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>Stakeholders:</th>
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<tbody>
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<tr>
<td>Local Funding</td>
<td>State Funding</td>
</tr>
<tr>
<td>Federal Funding</td>
<td></td>
</tr>
<tr>
<td>Details:</td>
<td></td>
</tr>
<tr>
<td>Location:</td>
<td>Deployment Date:</td>
</tr>
<tr>
<td>Project Description:</td>
<td></td>
</tr>
</tbody>
</table>

**New Stakeholder**

<table>
<thead>
<tr>
<th>Stakeholder Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status: Existing</td>
</tr>
<tr>
<td>Stakeholder Description:</td>
</tr>
</tbody>
</table>

**New Element**

<table>
<thead>
<tr>
<th>Element Name:</th>
<th>Stakeholder:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status: Existing</td>
<td>Planned</td>
</tr>
<tr>
<td>Element Description:</td>
<td></td>
</tr>
</tbody>
</table>

**Other Changes**

<table>
<thead>
<tr>
<th>Other Changes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact the PAITS Webmaster with questions and comments.</td>
</tr>
</tbody>
</table>
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.
Regional ITS Architecture
PennDOT Southwestern ITS Architecture Region

Figure 1-4: PennDOT District Map

Figure 1-5: Pennsylvania MPO/RPO Map

Legend:

- Metropolitan Planning
- Rural Planning
- Independent

Note: Figures 1-4 and 1-5 provide maps of the PennDOT district and the Pennsylvania MPO/RPO regions, respectively.
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:

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

<table>
<thead>
<tr>
<th>Key Task To Complete</th>
<th>Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)</th>
<th>Considerations and Conformity &amp; Validation Checks (Did we consider and address?)</th>
</tr>
</thead>
</table>
| **Define the Regional Architecture Scope** | ✓ Description-of-region map and text, that includes:  
✓ Geographic area (Districts, Counties, Cities, Corridors)  
✓ Service boundaries, major roadway systems  
✓ Relationship among jurisdictions within Region  
✓ Relationship to adjacent Regions and jurisdictions  
✓ Existing projects matrix (key projects only), that includes:  
✓ Project description  
✓ Impacts on Region  
✓ ITS components  
✓ Timetables  
✓ Scope of services summary (If Not Previously Developed), that includes:  
✓ Regional stakeholders list  
✓ Owners and operators of ITS systems in Region  
✓ Entities with stake or interest in Regional transportation issues  
✓ Conformity requirements matrix | ✓ Has a Regional Champion been identified?  
✓ Have traditional, existing, transportation planning documentation been reviewed?  
✓ Is there consistency between regional scope and transportation plans?  
✓ Is there consistency between Regional scope and National ITS Architecture |

### Checklist Table #2

<table>
<thead>
<tr>
<th>Key Task to Complete</th>
<th>Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)</th>
<th>Considerations and Conformity &amp; Validation Checks (Did we consider and address?)</th>
</tr>
</thead>
</table>
| **Develop an Inventory of Regional Systems & Define Regional Needs, Services, and Operational Concept** | ✓ System inventory, that includes:  
✓ System name(s)  
✓ Descriptions  
✓ Status (existing or planned)  
✓ Associated subsystems/terminators in National ITS Architecture  
✓ System owner/operator (stakeholders and system elements)  
✓ Needs and services summary, that includes:  
✓ Regional needs  
✓ ITS services (planned or implemented)  
✓ Operations coverage that includes:  
✓ Operational roadways.  
✓ Assignment of operational coverage | ✓ Is there completeness and consistency of the inventory among stakeholders?  
✓ Is the conformity to and compatibility with the Architecture?  
✓ Has the Region considered the following:  
✓ System operations that extend beyond Regional boundaries  
✓ Impacts on contiguous Regions or jurisdictions  
✓ Operational characteristics along corridors and at local levels  
✓ Locations and operational characteristics of planned traffic operations centers (TMC)  
✓ Working relationship among stakeholder organizations |
### Checklist Table #3

<table>
<thead>
<tr>
<th>Key Task to Complete</th>
<th>Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)</th>
<th>Considerations and Conformity &amp; Validation Checks (Did we consider and address?)</th>
</tr>
</thead>
</table>
| Generate Strawman (Rough Draft) Architecture | ✔ Develop a Regional systems interconnect summary, that includes:  
✔ Diagram of actual and potential connections between subsystems  
✔ Connection status (existing or planned) for each connection  
✔ Develop Regional information flow diagrams, that include:  
✔ Descriptive name for the information  
✔ Information flow status (existing or planned)  
✔ Direction of information flow  
✔ Develop a Regional Strawman Architecture, that includes:  
✔ Architecture approach  
✔ Needs & services  
✔ Systems inventory  
✔ Interconnects  
✔ Information flows | ✔ Have the interconnections and information exchanges across Regional boundaries been identified?  
✔ Has the ability of the communications infrastructure to support the proposed interconnections been addressed at a high-level?  
✔ Is there completeness and consistency in the interconnects summary?  
✔ Is there completeness and consistency among the information flow diagrams?  
✔ Is there consistency and compatibility with the completed or evolving Architectures in other Regions in the state?  
✔ Is there conformity and compatibility with the National ITS Architecture? |

### Checklist Table #4

<table>
<thead>
<tr>
<th>Key Task to Complete</th>
<th>Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)</th>
<th>Considerations and Conformity &amp; Validation Checks (Did we consider and address?)</th>
</tr>
</thead>
</table>
| Conduct Outreach to Validate Architecture | ✔ Develop Stakeholders’ guide to Regional Architecture, that could include:  
✔ Background on Regional Architecture project  
✔ Stakeholder review and validation process  
✔ Glossary of technical terms  
✔ Documentation of stakeholder inputs  
✔ Refined and validated Architecture | ✔ Have real-world and program issues been considered?  
✔ Have any unusual institutional Issues been identified?  
✔ Have any specialized data-sharing requirements been identified?  
✔ Have political considerations been identified?  
✔ Have any other unique conditions, circumstances, or issues in the Region been identified?  
✔ Have Stakeholders from areas contiguous to the Region been involved?  
✔ Is there conformity with FHWA Regional ITS Architecture Assessment Criteria? |
Checklist Table #5

<table>
<thead>
<tr>
<th>Key Task to Complete</th>
<th>Key Outputs from Task to Include in Regional ITS Architecture (Do we have?)</th>
<th>Considerations and Conformity &amp; Validation Checks (Did we consider and address?)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Finalize the Regional Architecture</strong></td>
<td>✓ Final Regional ITS Architecture Document ✓ Statewide Operations Framework Input ✓ Regional Architecture overview ✓ High-level Regional operations summary ✓ Relationship between Region and State</td>
<td>✓ Is there consistency and compatibility among the Regional ITS Architectures?</td>
</tr>
</tbody>
</table>

### 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](image)

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

<table>
<thead>
<tr>
<th>County</th>
<th>% Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allegheny</td>
<td>48%</td>
</tr>
<tr>
<td>Armstrong</td>
<td>3%</td>
</tr>
<tr>
<td>Beaver</td>
<td>7%</td>
</tr>
<tr>
<td>Butler</td>
<td>7%</td>
</tr>
<tr>
<td>Fayette</td>
<td>6%</td>
</tr>
<tr>
<td>Greene</td>
<td>2%</td>
</tr>
<tr>
<td>Indiana</td>
<td>3%</td>
</tr>
<tr>
<td>Lawrence</td>
<td>4%</td>
</tr>
<tr>
<td>Washington</td>
<td>8%</td>
</tr>
<tr>
<td>Westmoreland</td>
<td>14%</td>
</tr>
</tbody>
</table>

Total Population in the SW Region 2,656,007

(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

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

(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**

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

(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**

<table>
<thead>
<tr>
<th>County</th>
<th>PennDOT Linear Miles</th>
<th>Total Linear Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allegheny</td>
<td>1,176.2</td>
<td>5,713.9</td>
</tr>
<tr>
<td>Armstrong</td>
<td>658.0</td>
<td>1,809.9</td>
</tr>
<tr>
<td>Beaver</td>
<td>604.7</td>
<td>1,674.3</td>
</tr>
<tr>
<td>Butler</td>
<td>655.4</td>
<td>2,266.5</td>
</tr>
<tr>
<td>Fayette</td>
<td>756.9</td>
<td>2,081.8</td>
</tr>
<tr>
<td>Greene</td>
<td>576.3</td>
<td>1,520.8</td>
</tr>
<tr>
<td>Indiana</td>
<td>801.0</td>
<td>2,066.2</td>
</tr>
<tr>
<td>Lawrence</td>
<td>387.1</td>
<td>1,194.1</td>
</tr>
<tr>
<td>Washington</td>
<td>1,095.9</td>
<td>2,852.2</td>
</tr>
<tr>
<td>Westmoreland</td>
<td>1,200.9</td>
<td>3,641.7</td>
</tr>
<tr>
<td>Regional Total</td>
<td>7,912.4</td>
<td>24,821.4</td>
</tr>
<tr>
<td>Statewide Total</td>
<td>39,905.5</td>
<td>120,297.7</td>
</tr>
</tbody>
</table>
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>
<thead>
<tr>
<th>County</th>
<th>PennDOT DVMT</th>
<th>Total DVMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allegheny</td>
<td>16,830,482</td>
<td>25,432,182</td>
</tr>
<tr>
<td>Armstrong</td>
<td>1,507,004</td>
<td>1,717,505</td>
</tr>
<tr>
<td>Beaver</td>
<td>2,967,899</td>
<td>4,032,559</td>
</tr>
<tr>
<td>Butler</td>
<td>3,901,583</td>
<td>4,654,156</td>
</tr>
<tr>
<td>Fayette</td>
<td>2,327,852</td>
<td>2,761,666</td>
</tr>
<tr>
<td>Greene</td>
<td>1,023,766</td>
<td>1,170,828</td>
</tr>
<tr>
<td>Indiana</td>
<td>1,911,484</td>
<td>2,202,912</td>
</tr>
<tr>
<td>Lawrence</td>
<td>1,572,405</td>
<td>2,152,817</td>
</tr>
<tr>
<td>Washington</td>
<td>5,423,279</td>
<td>6,238,771</td>
</tr>
<tr>
<td>Westmoreland</td>
<td>6,470,258</td>
<td>9,822,056</td>
</tr>
<tr>
<td>Regional Total</td>
<td>43,936,012</td>
<td>60,185,452</td>
</tr>
<tr>
<td>Statewide</td>
<td>217,331,036</td>
<td>287,203,348</td>
</tr>
</tbody>
</table>

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

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

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.paturnpike.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**

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Project</th>
<th>Status</th>
<th>Project Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allegheny County Airport Authority</td>
<td>ACAA Dynamic Message Signs</td>
<td>Planned 1</td>
<td>This project will include installation of ACAA-operated DMS’s on approach roads to Pittsburgh International Airport.</td>
</tr>
<tr>
<td>Allegheny County Airport Authority</td>
<td>ACAA Parking Management</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>Beaver County Transit Authority</td>
<td>BCTA Automated Reservation System</td>
<td>Existing</td>
<td>Beaver County Transit Authority provides an automated phone system that allows users to call and make reservations for the DART (on-demand paratransit) vehicles.</td>
</tr>
<tr>
<td>Beaver County Transit Authority</td>
<td>BCTA AVL</td>
<td>Planned 1</td>
<td>Installation of Automated Vehicle Location (AVL) in all vehicles for tracking and schedule adherence monitoring.</td>
</tr>
<tr>
<td>Beaver County Transit Authority</td>
<td>BCTA Central Dispatch Software</td>
<td>Planned 2</td>
<td>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.</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Project</td>
<td>Status</td>
<td>Project Description</td>
</tr>
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</tr>
<tr>
<td>Beaver County Transit Authority</td>
<td>BCTA Electronic Fare Collection</td>
<td>Existing</td>
<td>BCTA has electronic fare collection that allows transit users to carry a &quot;smart&quot; card to increase user ease of payment and agency tracking of these payments.</td>
</tr>
<tr>
<td>Beaver County Transit Authority</td>
<td>BCTA Remote Traveler Information Systems</td>
<td>Planned 1</td>
<td>Beaver County Transit Authority remote traveler support includes real-time schedule adherence through a traveler information website, electronic signs at major stops and kiosks.</td>
</tr>
<tr>
<td>Beaver County Transit Authority</td>
<td>BCTA Traffic Signal Priority</td>
<td>Planned 1</td>
<td>A signal priority system between BCTA and local municipalities would give transit vehicles priority through intersections helping them to run on schedule.</td>
</tr>
<tr>
<td>City of Pittsburgh</td>
<td>City of Pittsburgh Traffic Management System</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>City of Pittsburgh Parking Authority</td>
<td>City of Pittsburgh Downtown Parking Management</td>
<td>Planned 2</td>
<td>Future automated collection of parking fees, and distribution of parking information to vehicles using downtown business parking garages/lots.</td>
</tr>
<tr>
<td>City of Pittsburgh Parking Authority</td>
<td>Automated Payment Parking Meters</td>
<td>Existing</td>
<td>Use card readers to collect automated payment for parking along metered sections of downtown business area.</td>
</tr>
<tr>
<td>Commercial Vehicle Companies</td>
<td>Private Carrier Commercial Vehicle Tracking System</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Project</td>
<td>Status</td>
<td>Project Description</td>
</tr>
<tr>
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<td>---------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Commercial Vehicle Companies</strong></td>
<td>Private Carrier Fleet Maintenance Management</td>
<td>Existing</td>
<td>This program provides capabilities to administer preventive maintenance schedules.</td>
</tr>
<tr>
<td><strong>Commercial Vehicle Companies</strong></td>
<td>FHWA Carrier Compliance Review</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>Counties</td>
<td>County Emergency Operation Centers</td>
<td>Existing</td>
<td>Countywide emergency operations centers that can be activated to coordinate response agencies for various levels of emergency events.</td>
</tr>
<tr>
<td>Counties</td>
<td>County / Municipal PSAP/911 Centers</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>Fayette County Coordinated Transit</td>
<td>FCCT On-demand AVL</td>
<td>Existing</td>
<td>AVL systems in on-demand vehicles used for tracking through dispatch center.</td>
</tr>
<tr>
<td>Mobility Technologies</td>
<td>Mobility Technologies Information Collection/Distribution</td>
<td>Existing</td>
<td>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</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Project</td>
<td>Status</td>
<td>Project Description</td>
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</tr>
<tr>
<td>Mobility Technologies</td>
<td>Mobility Technologies Traffic Monitoring</td>
<td>Existing</td>
<td>Mobility Technologies identifies incidents and locations, monitors roadways using CCTV, and measures travel speeds and times, as well as vehicle classifications.</td>
</tr>
<tr>
<td>Municipalities</td>
<td>Remote Traffic Signal Control and Monitoring Systems</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>Municipalities</td>
<td>Emergency Vehicle Traffic Signal Preemption</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>Municipalities</td>
<td>Transit Vehicle Traffic Signal Priority</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>General Public</td>
<td>E-Z Pass Toll Collection</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>General Public</td>
<td>Personal Traveler Information Devices</td>
<td>Existing</td>
<td>Includes personal computers, PDA’s, cell phones, etc. that allow users to access transportation related information.</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Project</td>
<td>Status</td>
<td>Project Description</td>
</tr>
<tr>
<td>-------------</td>
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</tr>
<tr>
<td>PennDOT (Central Office)</td>
<td>Winter Road Condition Hotline for Interstate Highways</td>
<td>Existing</td>
<td>A hotline phone service that disseminates seasonal statewide road conditions including road closures, detours, alternative routes, work zone/ construction events, and road surface conditions.</td>
</tr>
<tr>
<td>PennDOT (Central Office)</td>
<td>Roadway Weather Information System (RWIS)</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>PennDOT (Central Office)</td>
<td>PennDOT Performance and Registration Information Systems Management (PRISM)</td>
<td>Existing</td>
<td>This project began as an effort to explore the potential of linking the Commercial Vehicle registration process to motor carrier safety.</td>
</tr>
<tr>
<td>PennDOT (Central Office)</td>
<td>PennDOT Safety and Fitness Electronic Record (SAFER)</td>
<td>Planned 1</td>
<td>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.</td>
</tr>
<tr>
<td>PennDOT (Central Office)</td>
<td>PennDOT Transportation Management Centers (TMC’s)</td>
<td>Planned 2</td>
<td>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.</td>
</tr>
<tr>
<td>PennDOT (Central Office)</td>
<td>PennDOT “Wizard” Work Zone Alert Radio</td>
<td>Planned 1</td>
<td>The alert radio alerts truck drivers to work zone conditions.</td>
</tr>
<tr>
<td>PennDOT (Central Office)</td>
<td>Statewide Telecommunication</td>
<td>Planned 2</td>
<td>This project would develop a statewide telecommunication system</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Project</td>
<td>Status</td>
<td>Project Description</td>
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</tr>
<tr>
<td>PennDOT (Central Office)</td>
<td>Construction Projects (current and future)</td>
<td>Existing</td>
<td>This project allows for road closure, work zone and construction information dissemination through PennDOT website.</td>
</tr>
<tr>
<td>PennDOT (Central Office)</td>
<td>Central Repository</td>
<td>Planned 2</td>
<td>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.</td>
</tr>
<tr>
<td>PennDOT (Central Office)</td>
<td>Real-time Traffic Information Website</td>
<td>Planned 2</td>
<td>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.</td>
</tr>
<tr>
<td>PennDOT (Central Office)</td>
<td>Statewide GIS based Incident Detour Map</td>
<td>Planned 2</td>
<td>This project would develop a statewide GIS based incident detour map for various major interstate routes.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>The statewide GIS based data would be consistent with the Counties’ GIS data.</td>
</tr>
<tr>
<td>PennDOT (Central Office)</td>
<td>Video Sharing</td>
<td>Planned 2</td>
<td>This project would involve sharing of video images among various PennDOT Districts, PSP, PEMA, and other coordinating agencies.</td>
</tr>
<tr>
<td>PennDOT (Central Office)</td>
<td>Web site Portal for Assisting Commercial Vehicle Operators</td>
<td>Planned 2</td>
<td>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.</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Project</td>
<td>Status</td>
<td>Project Description</td>
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</tr>
<tr>
<td><strong>Pennsylvania Department of Transportation (PennDOT)</strong></td>
<td>PennDOT Regional Mile-post Marker Installation</td>
<td>Planned 2</td>
<td>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)</td>
</tr>
<tr>
<td><strong>PennDOT (District 10)</strong></td>
<td>D10 Traveler Information</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td><strong>PennDOT (District 10)</strong></td>
<td>D10 Collision Avoidance System</td>
<td>Existing</td>
<td>Detects speed of vehicles approaching intersection and warns drivers of hazards using DMS.</td>
</tr>
<tr>
<td><strong>PennDOT (District 10)</strong></td>
<td>D10 Traffic Management Center (TMC)</td>
<td>Planned 2</td>
<td>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.</td>
</tr>
<tr>
<td><strong>PennDOT (District 11)</strong></td>
<td>D11 Camera Image Sharing</td>
<td>Existing</td>
<td>D11 TMC shares CCTV camera images with: Pennsylvania State Police (Pittsburgh Barracks), WTAE (TV), KDKA (TV), WPXI (TV), and Clear Channel Communications.</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Project</td>
<td>Status</td>
<td>Project Description</td>
</tr>
<tr>
<td>---------------</td>
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</tr>
<tr>
<td>PennDOT</td>
<td>D11 Camera Image Sharing Expansion</td>
<td>Planned 1</td>
<td>D11 TMC will share CCTV images with various agencies, including Allegheny County EMS, Mobility Technologies, BCTA, and PAAC.</td>
</tr>
<tr>
<td>(District 11)</td>
<td>D11 Roadway Weather Monitoring</td>
<td>Existing</td>
<td>RWIS stations collect information regarding temperature, water/ice presence, wind speed and direction and snow and rain precipitation.</td>
</tr>
<tr>
<td>PennDOT</td>
<td>D11 Traffic Monitoring</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>(District 11)</td>
<td>D11 Traveler Information</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>PennDOT</td>
<td>D11 Pittsburgh Regional Traffic Management Center (RTMC)</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>(District 11)</td>
<td>D11 Regional Service Patrols</td>
<td>Existing</td>
<td>Regional service patrol vehicles travel along freeways to aid motorists with minor vehicle problems and request additional response resources when needed.</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Project</td>
<td>Status</td>
<td>Project Description</td>
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</tr>
<tr>
<td>PennDOT (District 12)</td>
<td>D12 Bridge De-icing</td>
<td>Existing</td>
<td>Currently bridges are equipped with technology to detect the presence of a freezing on a bridge and automatically anti-icing materials.</td>
</tr>
<tr>
<td>PennDOT (District 12)</td>
<td>D12 Traveler Information</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>PennDOT (District 12)</td>
<td>D12 Collision Avoidance Signal Preemption System</td>
<td>Existing</td>
<td>Detects trucks traveling at high speeds toward intersection and communicates with municipally-operated traffic signal to provide extended green if warranted.</td>
</tr>
<tr>
<td>PennDOT (District 12)</td>
<td>D12 Traffic Management Center (TMC)</td>
<td>Planned 2</td>
<td>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.</td>
</tr>
<tr>
<td>Pennsylvania Emergency Management Agency (PEMA)</td>
<td>PEMA Emergency Operation Center</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>Pennsylvania Emergency Management Agency (PEMA)</td>
<td>PEMA Truck</td>
<td>Existing</td>
<td>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 a major incident.</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Project</td>
<td>Status</td>
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<tr>
<td><strong>Pennsylvania State Police (PSP)</strong></td>
<td>Incident Information Management System (IIMS)</td>
<td>Existing</td>
<td>The Incident Information Management System is a database used to provide PSP vehicles incident reporting and dispatching capabilities.</td>
</tr>
<tr>
<td><strong>Pennsylvania State Police (PSP)</strong></td>
<td>PSP Dispatch Centers</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td><strong>Pennsylvania State Police (PSP)</strong></td>
<td>PSP Consolidated Dispatch Center</td>
<td>Planned 1</td>
<td>PSP Consolidated Dispatch Centers will provide consolidated dispatch and management of PSP resources for incident/emergency operations throughout the coverage area.</td>
</tr>
<tr>
<td><strong>Pennsylvania State Police (PSP)</strong></td>
<td>Mobile Data Terminals (MDT’s)</td>
<td>Existing and Planned 1</td>
<td>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.</td>
</tr>
<tr>
<td><strong>Pennsylvania Turnpike Commission (PTC)</strong></td>
<td>Pennsylvania Turnpike Field Devices</td>
<td>Existing and Planned 1</td>
<td>Pennsylvania Turnpike Commission existing and planned field devices including: DMS, RWIS, HAR, CCTV, CADS, and TRWS.</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Project</td>
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<tr>
<td>Pennsylvania Turnpike Commission (PTC)</td>
<td>PTC ATIS Integration Project</td>
<td>Planned 1</td>
<td>The PTC will integrate DMS, RWIS, HAR, CCTV, and CADS sub-systems into an integrated traffic management system.</td>
</tr>
<tr>
<td></td>
<td>PTC *11 Phone Service</td>
<td>Existing</td>
<td>The PTC *11 Phone Service allows motorists to notify the PTC of incidents and emergencies on the Pennsylvania Turnpike.</td>
</tr>
<tr>
<td></td>
<td>PTC E-Z Pass Toll Collection System</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>PTC Service Plazas</td>
<td>Existing</td>
<td>PTC Service Plazas serve as a center for traveler information. Service plazas utilize scrolling message boards to broadcast weather and lodging information.</td>
</tr>
<tr>
<td></td>
<td>PTC Traffic Operation Center (TOC)</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>Port Authority of Allegheny County</td>
<td>PAAC Central Dispatch Software</td>
<td>Planned 1</td>
<td>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.</td>
</tr>
<tr>
<td>Port Authority of Allegheny County</td>
<td>PAAC Interactive Trip Planning</td>
<td>Planned 1</td>
<td>A voice response system will allow users to plan trips, check schedules or have basic questions answered regarding the transit system.</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Project</td>
<td>Status</td>
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<tr>
<td>Port Authority of Allegheny County</td>
<td>PAAC Remote Traveler Information Systems</td>
<td>Planned 1</td>
<td>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.</td>
</tr>
<tr>
<td>Port Authority of Allegheny County</td>
<td>PAAC Vehicle Tracking</td>
<td>Planned 1</td>
<td>Use of AVL in transit vehicles for tracking and for dispatchers to have information regarding schedule and route adherence vehicles.</td>
</tr>
<tr>
<td>Port Authority of Allegheny County</td>
<td>Port Authority of Allegheny County Park-n-Ride Lot Operations</td>
<td>Planned 2</td>
<td>Future management of parking facilities and distribution of parking information to vehicles approaching park-n-ride facilities.</td>
</tr>
<tr>
<td>Port of Pittsburgh Commission</td>
<td>Port of Pittsburgh Travel Information Distribution</td>
<td>Planned 2</td>
<td>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.</td>
</tr>
<tr>
<td>Regional Transit Agencies</td>
<td>Regional Transit Electronic Fare Collection</td>
<td>Planned 2</td>
<td>Regional transit agencies would jointly run an automated payment system that would be compatible on all systems.</td>
</tr>
<tr>
<td>Southwest Pennsylvania Commission (SPC)</td>
<td>Regional Ridesharing Coordination</td>
<td>Existing</td>
<td>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.</td>
</tr>
<tr>
<td>Southwest Pennsylvania Commission (SPC)</td>
<td>Regional Transit Schedule Coordination</td>
<td>Planned 2</td>
<td>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.</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>Project</td>
<td>Status</td>
<td>Project Description</td>
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</tr>
<tr>
<td>Various Stakeholders</td>
<td>800 MHz Statewide Communication System</td>
<td>Existing</td>
<td>This project involves the deployment of a statewide 800 MHz wireless communication system for state agencies.</td>
</tr>
<tr>
<td>Various Stakeholders</td>
<td>800 MHz Statewide Communication System Regional Expansion</td>
<td>Planned 2</td>
<td>This project involves the deployment of 800 MHz wireless communications system for county and municipal agencies within the Region.</td>
</tr>
<tr>
<td>Various Stakeholders</td>
<td>Regional Traveler Information System</td>
<td>Planned 2</td>
<td>Future project to be deployed by a yet-to-be determined agency, or group of agencies within the Region. The deployed system will provide &quot;one stop trip planning&quot; 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.</td>
</tr>
<tr>
<td>Various Stakeholders</td>
<td>511 Traveler Information Phone System</td>
<td>Planned 2</td>
<td>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.</td>
</tr>
<tr>
<td>Various Stakeholders</td>
<td>AMBER Alert Coordination</td>
<td>Existing</td>
<td>AMBER alert coordination between PennDOT Central Office, PEMA, PennDOT District Offices, and PSP.</td>
</tr>
</tbody>
</table>
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: Steve-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 ACAAA 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

<table>
<thead>
<tr>
<th>Element</th>
<th>Stakeholder</th>
<th>Functionality</th>
<th>Status</th>
<th>Associated Project(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>911 Communication Centers</td>
<td>Counties</td>
<td>The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers</td>
<td>Planned 1</td>
<td>• 800 MHz Statewide Communication System Regional Expansion</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• County/Municipal PSAP/911 Centers</td>
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<tr>
<td></td>
<td></td>
<td>PTC plans to share CCTV camera images with D11, State Police, emergency management, and others</td>
<td>Planned 2</td>
<td>• District 11 Camera Image Sharing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Allegheny County 911 and EMA have need for current traffic information and flow from City of Pittsburgh and PennDOT D11 RTMC</td>
<td>Planned 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Allegheny County EMA will eventually get video from D11 RTMC, maybe control</td>
<td>Planned 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>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</td>
<td>Existing</td>
<td></td>
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<td></td>
<td></td>
<td>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</td>
<td>Planned 1</td>
<td></td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td>911 communication centers</td>
<td></td>
<td>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</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>County/Municipal 911 centers</td>
<td></td>
<td>County/Municipal 911 centers are contacted by field command to dispatch specialty services and vehicles, such as wreckers and hazmat teams</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>Allegheny County</td>
<td></td>
<td>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</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>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</td>
<td>Planned 2</td>
<td></td>
</tr>
<tr>
<td>County 911 centers</td>
<td>Allegheny County</td>
<td>County 911 centers archive voice and CAD system communications and provide voice archives for municipal ring down centers</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>ACAA Field Devices</td>
<td>Allegheny County</td>
<td>ACAA plans to install DMS for traveler information</td>
<td>Planned 1</td>
<td>ACAA Parking</td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<td></td>
<td></td>
<td>Airport Authority</td>
<td></td>
<td>Management</td>
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<tr>
<td></td>
<td></td>
<td>ACAA airport parking lots will have automated payment collection from vehicle tags or traveler cards</td>
<td>Planned 2</td>
<td>• ACAA Dynamic Message Signs</td>
</tr>
</tbody>
</table>
| ACAA Office                  | Allegheny County Airport Authority   | Allegheny County Airport Association manages parking facilities at the Pittsburgh International Airport | Existing   | • ACAA Dynamic Message Signs  
|                              |                                     | BCTA plans on coordinating airport parking data                               | Planned 2  | • ACAA Parking Management                                                              |
|                              |                                     | 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   | • District 11 Pittsburgh Regional Traffic Management Center (RTMC)  
<p>|                              |                                     | PennDOT D10 currently coordinates operations with D9, D2, D1, D11, and D12 offices | Existing   | • District 12 Traffic Management Center (TMC)                                        |</p>
<table>
<thead>
<tr>
<th>Element</th>
<th>Stakeholder</th>
<th>Functionality</th>
<th>Status</th>
<th>Associated Project(s)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Assumes control of adjacent District ITS devices during off-peak periods</td>
<td>Planned 1</td>
<td>District 10 Traffic Management Center (TMC)</td>
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<tr>
<td></td>
<td></td>
<td>Proactive incident/congestion management (24x7 operations)</td>
<td>Planned 2</td>
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<td>PennDOT D12 Office currently coordinates incident and traffic management</td>
<td>Existing</td>
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<td></td>
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<td>operations with adjacent PennDOT D11, D12, and D9 offices, as well as county</td>
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<td></td>
<td></td>
<td>maintenance offices in adjacent PennDOT Districts</td>
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<td></td>
<td></td>
<td>PennDOT D2 RTMC to control field devices in PennDOT D10 counties along I-80</td>
<td>Planned 1</td>
<td></td>
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<tr>
<td>BCTA Remote Traveler Support</td>
<td>Beaver County Transit Authority (BCTA)</td>
<td>BCTA plans to deploy security monitoring cameras at bus stops and other</td>
<td>Planned 1</td>
<td>BCTA Remote Traveler Information Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BCTA-operated facilities</td>
<td></td>
<td>Regional Transit Electronic Fare Collection</td>
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<tr>
<td></td>
<td></td>
<td>BCTA has major bus stops that electronically display dynamic traveler</td>
<td>Existing</td>
<td>Regional Transit Schedule Coordination</td>
</tr>
<tr>
<td></td>
<td></td>
<td>information</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Plans for transit fare payment or debit increase at kiosks using regional</td>
<td>Planned 2</td>
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<td></td>
<td></td>
<td>fare cards</td>
<td></td>
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<tr>
<td>BCTA Transit</td>
<td>Beaver County Transit</td>
<td>Paratransit vehicles that operate under CAD</td>
<td>Existing</td>
<td>Regional Transit Schedule</td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td>Management Center</td>
<td>Authority (BCTA)</td>
<td>BTCA installation of county-wide GIS map and vehicle tracking</td>
<td>Planned 1</td>
<td>Coordination</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BCTA would like to tie into D11 system for traffic, weather, flow speeds,</td>
<td>Planned 2</td>
<td>Regional Transit Electronic Fare Collection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>conditions</td>
<td></td>
<td>Regional Traveler Information System</td>
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<tr>
<td></td>
<td></td>
<td>BCTA will provide real-time schedule adherence and arrival/ departure time</td>
<td>Planned 1</td>
<td>District 11 Camera Image Sharing Expansion</td>
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<tr>
<td></td>
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<td>information through web sites, kiosks, email and out of vehicle DMS at stops</td>
<td></td>
<td>BCTA AVL</td>
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<tr>
<td></td>
<td></td>
<td>BCTA operators or dispatchers report transit vehicle and general traffic</td>
<td>Existing</td>
<td>BCTA Central Dispatch Software</td>
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<tr>
<td></td>
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<td>incidents, as reported by drivers.</td>
<td></td>
<td>BCTA Automated Reservation System</td>
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<tr>
<td></td>
<td></td>
<td>BCTA has some real-time monitoring of vehicles</td>
<td>Existing</td>
<td>BCTA Remote Traveler Information Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BCTA has paratransit scheduling software</td>
<td>Existing</td>
<td></td>
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<td></td>
<td></td>
<td>BCTA has a need for coordinating bus adherence with other agencies at multi-</td>
<td>Planned 2</td>
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<td></td>
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<td>carrier transfers</td>
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<td>BCTA use of database with storage of data and support of the Passenger</td>
<td>Planned 1</td>
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<td>Information System</td>
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<td></td>
<td>The BCTA ATIS will eventually include multi-modal/multi-carrier information</td>
<td>Planned 2</td>
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<td></td>
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<td>from other transit operators, as well as current highway information</td>
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<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td></td>
<td>The PAAC and BCTA transit management offices have need for traffic flow and</td>
<td>Traffic flow and road information from the City of Pittsburgh TMC</td>
<td>Planned 2</td>
<td></td>
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<td></td>
<td>BCTA use of Real-Time Traveler Information Services</td>
<td>Planned 1</td>
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<td>BCTA collection of automated driver logs</td>
<td>Planned 1</td>
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<td></td>
<td>BCTA vehicle safety monitoring through surveillance, communications, and</td>
<td>Planned 1</td>
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<td>silent alarms, images go to dispatch</td>
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<td>BCTA use of Real-Time Fleet Monitoring</td>
<td>Planned 1</td>
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<td></td>
<td>BCTA use of Computer Aided Dispatch and Scheduling</td>
<td>Planned 1</td>
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<td></td>
<td>BCTA workstations will monitor AVL for schedule adherence, voice and data</td>
<td>Planned 1</td>
<td></td>
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<td></td>
<td>communication</td>
<td></td>
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<td></td>
<td>BCTA automated phone system for reservations</td>
<td>Existing</td>
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<td></td>
<td>Existing Beaver County Traveler Information System (BCTIS)</td>
<td>Existing</td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<td>Communications within Mobility Manager: vehicle location and speed, passenger</td>
<td>Planned 1</td>
<td></td>
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<td></td>
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<td>count, fare transactions, unscheduled stop reporting, silent alarm, next stop</td>
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<td>data</td>
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<td></td>
<td>BCTA plans on coordinating airport parking data</td>
<td>Planned 2</td>
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<td></td>
<td></td>
<td>BCTA has a static estimated trip planner</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>Garages currently downloading maintenance records, diagnostics, and schedules</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>from vehicles</td>
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<td>BCTA plans to deploy security monitoring cameras at bus stops and other BCTA-</td>
<td>Planned</td>
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<td></td>
<td></td>
<td>operated facilities</td>
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<td></td>
<td>BCTA Transit drivers provide emergency notification to BCTA transit management</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>operators</td>
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<td>BCTA incident reporting: from driver to dispatch to employee of authority and</td>
<td>Existing</td>
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<tr>
<td></td>
<td></td>
<td>911 dispatch</td>
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<tr>
<td>BCTA Transit Vehicles</td>
<td>Beaver County Transit Authority</td>
<td>BCTA operators or dispatchers report transit vehicle and general traffic</td>
<td>Existing</td>
<td>Transit Vehicle Traffic Signal Priority</td>
</tr>
<tr>
<td></td>
<td>(BCTA)</td>
<td>incidents, as reported by drivers</td>
<td></td>
<td>Regional Transit Electronic Fare Collection</td>
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<tr>
<td></td>
<td></td>
<td>BCTA has vehicles with magnetic stripe readers for fare payment</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td></td>
<td>BCTA has vehicles with AVL</td>
<td>Existing</td>
<td>• BCTA Electronic Fare Collection</td>
<td></td>
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<tr>
<td></td>
<td>BCTA has vehicles with Automatic Passenger Counters</td>
<td>Existing</td>
<td>• BCTA Traffic Signal Priority</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Garages currently downloading maintenance records, diagnostics, and schedules from vehicles</td>
<td>Existing</td>
<td>• BCTA AVL</td>
<td></td>
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<tr>
<td></td>
<td>BCTA use of van shuttles with advance and real-time reservations</td>
<td>Planned 1</td>
<td></td>
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<tr>
<td></td>
<td>BCTA plans to have vehicles with traffic signal priority</td>
<td>Planned 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BCTA will provide real-time schedule adherence and arrival/ departure time information through automated telephone system, in-vehicle DMS and audible enunciators</td>
<td>Planned 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BCTA has vehicles with automated dispatching or control software</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td>BCTA workstations monitor AVL for schedule adherence, voice and data communication</td>
<td>Planned 1</td>
<td></td>
<td></td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td>BCTA Transit drivers provide emergency notification to BCTA transit management operators</td>
<td></td>
<td>Existing</td>
<td></td>
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<tr>
<td>BCTA has vehicles equipped with mobile data terminals</td>
<td></td>
<td>Existing</td>
<td></td>
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<tr>
<td>BCTA plans to have vehicles with smart card readers</td>
<td></td>
<td>Planned 1</td>
<td></td>
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<tr>
<td>Fixed route transit vehicles with AVL</td>
<td></td>
<td>Existing</td>
<td></td>
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<tr>
<td>Paratransit vehicles that operate under CAD</td>
<td></td>
<td>Existing</td>
<td></td>
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<tr>
<td>BCTA use of In-Vehicle Route Guidance</td>
<td></td>
<td>Planned 1</td>
<td></td>
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<tr>
<td>BCTA Electronic Fare Collection, &quot;smart&quot; cards</td>
<td></td>
<td>Planned 1</td>
<td></td>
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<tr>
<td>Fixed route buses accepting electronic payment, single use card that is discarded when value is used</td>
<td></td>
<td>Existing</td>
<td></td>
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</tr>
<tr>
<td>City of Pittsburgh Field Devices</td>
<td>City of Pittsburgh</td>
<td>There is the potential for the city of Pittsburgh Parking Management to communicate with city owned devices to relay current parking conditions</td>
<td>Planned 2</td>
<td>- Automated Payment Parking Meters</td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<td></td>
<td></td>
<td>There is a need to have City of Pittsburgh signal priority for PAAC buses</td>
<td>Planned 2</td>
<td>• Emergency Vehicle Traffic Signal Preemption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The city allows for signal priority for transit vehicles at some intersections</td>
<td>Existing</td>
<td>• Transit Vehicle Traffic Signal Priority</td>
</tr>
<tr>
<td></td>
<td></td>
<td>City of Pittsburgh Parking Authority has parking meters that accept payment via payment card</td>
<td>Existing</td>
<td>• BCTA Traffic Signal Priority</td>
</tr>
<tr>
<td></td>
<td></td>
<td>City of Pittsburgh traffic office plans on CCTV surveillance of roads</td>
<td>Planned 2</td>
<td>• City of Pittsburgh Traffic Management System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The city operates signals under closed or central loop control</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>PennDOT D11 HOV devices automatically notify city of Pittsburgh signal devices when HOV lanes are opened. This causes signal timing patterns to adjust.</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>City of Pittsburgh Parking Authority Offices</td>
<td>City of Pittsburgh</td>
<td>There is the potential for the city of Pittsburgh Parking Management to communicate with city owned devices to relay current parking conditions</td>
<td>Planned 2</td>
<td>• Regional Traveler Information System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Possible City of Pittsburgh Parking Management as stakeholder in the regional smart card initiative</td>
<td>Planned 2</td>
<td>• City of Pittsburgh Downtown Parking Management</td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td>City of Pittsburgh Parking Administration currently coordinates event and parking operations with PennDOT D11 RTMC</td>
<td></td>
<td>Existing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>City of Pittsburgh Parking Authority Offices provide traffic and event information to local media and other information service providers</td>
<td></td>
<td>Existing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic count information from arterial street locations</td>
<td>City of Pittsburgh</td>
<td>Planned 1</td>
<td>District 11 Camera Image Sharing, City of Pittsburgh Traffic Management System</td>
<td></td>
</tr>
<tr>
<td>The city coordinates changes to timing plans with other agencies</td>
<td></td>
<td>Existing</td>
<td></td>
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<tr>
<td>Signalized intersections under centralized or closed loop control</td>
<td></td>
<td>Existing</td>
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<tr>
<td>City of Pittsburgh traffic office plans on CCTV surveillance of roads</td>
<td></td>
<td>Planned 2</td>
<td></td>
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<tr>
<td>The PAAC and BCTA transit management offices have need for traffic flow and road information from the City of Pittsburgh TMC</td>
<td></td>
<td>Planned 2</td>
<td></td>
<td></td>
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<tr>
<td>Allegheny County 911 and EMA have need for current traffic information and flow from City of Pittsburgh and PennDOT D11 RTMC</td>
<td></td>
<td>Planned 2</td>
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<td></td>
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<td>Stakeholder</td>
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<td></td>
<td>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</td>
<td>Planned 2</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>City of Pittsburgh traffic office provides information to local media about traffic, maintenance, and construction events</td>
<td>Existing</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>The city plans to have electronic data collection capabilities at intersections, using loop detectors</td>
<td>Planned 1</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>City of Pittsburgh receives archived data from Mobility Technologies</td>
<td>Existing</td>
<td></td>
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<tr>
<td>Commercial Vehicle Company Offices</td>
<td>Commercial Vehicle Companies</td>
<td>Provides the PennDOT Motor Carrier Division with appropriate credentials, registration, and title fees</td>
<td>Existing</td>
<td>• Private Carrier Commercial Vehicle Tracking System</td>
</tr>
<tr>
<td>Commercial Vehicle Company Offices</td>
<td>Commercial Vehicle Companies</td>
<td>Provides vehicle tracking of Commercial Vehicles</td>
<td>Existing</td>
<td>• Private Carrier Fleet Maintenance Management</td>
</tr>
<tr>
<td>Commercial Vehicle Company Offices</td>
<td>Commercial Vehicle Companies</td>
<td>Provides capabilities to track cargo and freight</td>
<td>Existing</td>
<td>• FHWA Carrier Compliance Review</td>
</tr>
<tr>
<td>Commercial Vehicle Company Offices</td>
<td>Commercial Vehicle Companies</td>
<td>Provides capabilities to generate preventative maintenance schedule based on the vehicle miles traveled determined using vehicle tracking</td>
<td>Existing</td>
<td></td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td>Commercial Vehicles</td>
<td>Commercial Vehicle Companies</td>
<td>Provides appropriate transportation and emergency agencies with hazmat and emergency information</td>
<td>Existing</td>
<td></td>
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<td></td>
<td></td>
<td>Monitors adherence to the PennDOT Motor Carrier Division weight and safety enforcement activities</td>
<td>Existing</td>
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<tr>
<td></td>
<td></td>
<td>Supports devices to communicate with Commercial Vehicle Company Offices. May include the addition of a cell-based radio and equipment</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>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</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>County EMA Centers</td>
<td>Counties</td>
<td>The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers</td>
<td>Planned 1</td>
<td>• District 11 Camera Image Sharing</td>
</tr>
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<td></td>
<td></td>
<td>PennDOT BHSTE coordinates with PEMA and other agencies (PennDOT Districts, PSP, County EMA’s, etc.) in case of major incidents</td>
<td>Existing</td>
<td>• Regional Traveler Information System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEMA gathers/provides specific incident information from/to County EMA’s, PA State Police, PennDOT, and PTC</td>
<td>Existing</td>
<td>• 800 MHz Statewide Communication System Regional Expansion</td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td>County EMA Centers contact PSP when incidents occur on state roadways</td>
<td>County EMA centers contact PSP when incidents occur on state roadways</td>
<td>County EMA Centers contact PSP when incidents occur on state roadways.</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>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</td>
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<td>Planned 1</td>
<td></td>
</tr>
<tr>
<td>Allegheny County 911 and EMA have need for current traffic information and flow from City of Pittsburgh and PennDOT D11 RTMC</td>
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<td>Allegheny County 911 and EMA have need for current traffic information and flow from City of Pittsburgh and PennDOT D11 RTMC.</td>
<td>Planned 2</td>
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</tr>
<tr>
<td>Any PEMA contact with on-site field officers is through the County EMA’s</td>
<td>Any PEMA contact with on-site field officers is through the County EMA’s</td>
<td>Any PEMA contact with on-site field officers is through the County EMA’s.</td>
<td>Existing</td>
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<tr>
<td>Allegheny County EMA will eventually get video from D11 RTMC, maybe control</td>
<td>Allegheny County EMA will eventually get video from D11 RTMC, maybe control</td>
<td>Allegheny County EMA will eventually get video from D11 RTMC, maybe control.</td>
<td>Planned 1</td>
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<td>PTC may contact the County EMA if they receive the initial call and dispatch of municipality public service vehicles is needed</td>
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<td>PTC may contact the County EMA if they receive the initial call and dispatch of municipality public service vehicles is needed.</td>
<td>Existing</td>
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</tr>
<tr>
<td>County EMA centers contact PennDOT District offices for some incidents along state roadways</td>
<td>County EMA centers contact PennDOT District offices for some incidents along state roadways</td>
<td>County EMA centers contact PennDOT District offices for some incidents along state roadways.</td>
<td>Existing</td>
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<tr>
<td>PTC plans to share CCTV camera images with D11, State Police, various emergency management agencies, and others</td>
<td></td>
<td>Planned 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Threat Facilities</td>
<td>Various Stakeholders</td>
<td>Major facilities that require special security and/or emergency response coordination</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>Report high threat facility information to 911 Communication and EMA Centers</td>
<td></td>
<td>Existing</td>
<td></td>
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</tr>
</tbody>
</table>
| 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 | • Regional Traveler Information System  
• Mobility Technologies Traffic Monitoring  
• Mobility Technologies Traveler Information Collection/Distribution  
• District 11 Camera Image Sharing Expansion |
<p>| 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 | | |</p>
<table>
<thead>
<tr>
<th>Element</th>
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<th>Functionality</th>
<th>Status</th>
<th>Associated Project(s)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Mobility Technologies is currently collecting and distributing CCTV images from their devices. These are distributed to media.</td>
<td>Existing</td>
<td></td>
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<td></td>
<td></td>
<td>District 11-0 Traffic Office currently uses Mobility Technologies’ archived traffic detection data for planning and other purposes</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>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.</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Mobility Technologies may be interested in collecting and distributing roadway weather information</td>
<td>Planned 2</td>
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<tr>
<td></td>
<td></td>
<td>Archives detector data extensively</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Mobility Technologies wants D11 RTMC camera images</td>
<td>Planned 2</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>TV stations get current traffic flow info from web-based service</td>
<td>Existing</td>
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<td><strong>Element</strong></td>
<td><strong>Stakeholder</strong></td>
<td><strong>Functionality</strong></td>
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<tr>
<td></td>
<td>Mobility Technologies Field Devices</td>
<td>Mobility Technologies raw traffic data will be sent to D11 RTMC to be used in incident detection algorithms</td>
<td>Planned 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mobility Technologies</td>
<td>Web-based “traffic pulse network” map provides color indicating traffic flows</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td>Mobility Technologies</td>
<td>Information is sent to radio stations from Mobility Technologies</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td>Mobility Technologies</td>
<td>Mobility Technologies will likely have need for detailed/advanced construction information from D11 in future</td>
<td>Planned 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mobility Technologies</td>
<td>MT provides travel times along parkways into city</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td>Mobility Technologies</td>
<td>Plans to exchange raw traffic data between Mobility Technologies and D11</td>
<td>Planned 1</td>
<td></td>
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<tr>
<td></td>
<td>Mobility Technologies</td>
<td>Mobility Technologies may be interested in collecting and distributing roadway weather information</td>
<td>Planned 2</td>
<td>Mobility Technologies Traffic Monitoring</td>
</tr>
<tr>
<td></td>
<td>Mobility Technologies</td>
<td>Mobility Technologies has ISO detectors in field that are supposed to comply with ITS Architecture</td>
<td>Existing</td>
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</table>
### Regional ITS Architecture

#### PennDOT Southwestern ITS Architecture Region

<table>
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<tr>
<th>Element</th>
<th>Stakeholder</th>
<th>Functionality</th>
<th>Status</th>
<th>Associated Project(s)</th>
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<tbody>
<tr>
<td>Municipal Field Devices</td>
<td>Municipalities</td>
<td>Mobility Technologies is currently collecting and distributing CCTV images from their devices. These are distributed to media.</td>
<td>Existing</td>
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<tr>
<td></td>
<td></td>
<td>Some municipalities can communicate with field devices via dial-up connection</td>
<td>Existing</td>
<td>• Remote Traffic Signal Control and Monitoring Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emergency vehicle preemption exists in some municipalities as vehicle to field device communication</td>
<td>Existing</td>
<td>• BCTA Traffic Signal Priority</td>
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<td></td>
<td>Consideration is given to the concept of a &quot;central command post&quot; for regional municipal systems to remotely monitor devices and change timings</td>
<td>Planned 2</td>
<td>• Emergency Vehicle Traffic Signal Preemption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BCTA plans to have vehicles with traffic signal priority</td>
<td>Planned 1</td>
<td>• Transit Vehicle Traffic Signal Priority</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PennDOT D11 traffic office has communication capability with municipal traffic control devices, which is used almost exclusively for monitoring purposes</td>
<td>Existing</td>
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<tr>
<td></td>
<td></td>
<td>Butler County and other Regional Transit Agencies plan on deploying transit signal priority systems in near to far future</td>
<td>Planned</td>
<td></td>
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<td>Element</td>
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<td></td>
<td>Cranberry Township currently monitors intersections using video detection cameras</td>
<td>Existing</td>
<td></td>
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<td></td>
<td>Local municipalities are currently archiving traffic data from field devices for things like volume and flow</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>Municipalities generally have operations including basic device monitoring for maintenance purposes, “resetting” of controllers, verification of malfunction reports, and any timing changes</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Municipalities</td>
<td>The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers</td>
<td>Planned 1</td>
<td>• 800 MHz Statewide Communication System Regional Expansion</td>
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<tr>
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<td></td>
<td>PFD dispatch center distributes road closures to vehicles</td>
<td>Existing</td>
<td></td>
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<td></td>
<td></td>
<td>PFD dispatch has a direct contact with PSP</td>
<td>Existing</td>
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<td></td>
<td>Dispatch for local public vehicles goes from the County/Municipal EMA center directly to the local municipality vehicles</td>
<td>Existing</td>
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<td>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.</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>PHPD shares real-time traffic incident information with other law enforcement agencies and fire and rescue agencies</td>
<td>Existing</td>
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<tr>
<td></td>
<td></td>
<td>PAAC police force coordinates with State Police and local emergency management</td>
<td>Existing</td>
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<tr>
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<td></td>
<td>PFD shares real-time traffic incident information with other fire/rescue agencies and local law enforcement agencies</td>
<td>Existing</td>
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<td>PennDOT District offices will coordinate event traffic operations with local police</td>
<td>Existing</td>
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<tr>
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<td>Regarding incident management, 911 calls are taken at the County EMA who dispatches state and local police</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>PTC may contact the County EMA if they receive the initial call and dispatch of municipality public service vehicles is needed</td>
<td>Existing</td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
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<tr>
<td>Municipal Public Safety Vehicles</td>
<td>Municipalities</td>
<td>County 911 centers archive voice and CAD system communications and provide voice archives for municipal ring down centers</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PFD distributes major event notification to PEMA</td>
<td>Existing</td>
<td></td>
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<td></td>
<td></td>
<td>Allegheny County Police patrol airport parking facilities</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>Municipal Public Safety Vehicles</td>
<td>Municipalities</td>
<td>PFD has vehicles with traffic signal system communication</td>
<td>Existing</td>
<td>• 800 MHz Statewide Communication System Regional Expansion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The City of Pittsburgh public safety plans to have newly installed MDT’s in vehicles</td>
<td>Planned 1</td>
<td>• Emergency Vehicle Traffic Signal Preemption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dispatch for local public vehicles goes from the County/Municipal EMA center directly to the local municipality vehicles</td>
<td>Existing</td>
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<tr>
<td></td>
<td></td>
<td>Emergency management vehicles under CAD</td>
<td>Existing</td>
<td></td>
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<tr>
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<td></td>
<td>Emergency vehicle preemption exists in some municipalities as vehicle to field device communication</td>
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<td>The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers</td>
<td>Planned 1</td>
<td></td>
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<td></td>
<td></td>
<td>PHFD has vehicles that operate under a CAD system</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>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.</td>
<td>Planned 1</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td>PennDOT County Maintenance Offices coordinate with local police in field for scene traffic management</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Emergency management vehicles with on-vehicle navigation capabilities</td>
<td>Planned 2</td>
<td></td>
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<td></td>
<td></td>
<td>PFD dispatch center distributes road closures to vehicles</td>
<td>Existing</td>
<td></td>
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<td></td>
<td></td>
<td>Any PEMA contact with on-site field officers is through the County EMA’s</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>PPD has vehicles that operate under a CAD system</td>
<td>Existing</td>
<td></td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td>Municipal Traffic Management Offices</td>
<td>Municipalities</td>
<td>Some municipalities can communicate with field devices via dial-up connection</td>
<td>Existing</td>
<td>• Remote Traffic Signal Control and Monitoring Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cranberry Township currently monitors intersections using video detection cameras</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consideration is given to the concept of a &quot;central command post&quot; for regional municipal systems to remotely monitor devices and change timings.</td>
<td>Planned 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Municipalities generally have operations including basic device monitoring for maintenance purposes, &quot;resetting&quot; of controllers, verification of malfunction reports, and any timing changes</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td>There is a general need for</td>
<td></td>
<td>coordinating PennDOT detour routes and timing plans with municipalities</td>
<td>Planned 2</td>
<td>• Port Authority of Allegheny County Interactive Trip Planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Local municipalities are currently archiving traffic data from field devices</td>
<td>Existing</td>
<td>• Regional Transit Schedule Coordination</td>
</tr>
<tr>
<td>PAAC Centers</td>
<td>Port Authority of Allegheny County</td>
<td>Rail OCC controls signals, traffic system, SCADA, tunnel controls and radio</td>
<td>Existing</td>
<td>• Regional Traveler Information System</td>
</tr>
<tr>
<td>(PAAC)</td>
<td></td>
<td>PAAC would like to station an employee at the PennDOT D11 RTMC, similar to</td>
<td>Planned 2</td>
<td>• District 11 Camera Image Sharing Expansion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the MT positions</td>
<td></td>
<td>• Regional Transit Electronic Fare Collection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PAAC would like to display travel times of highway vs. transit on PennDOT D11</td>
<td>Planned 2</td>
<td>• Port Authority of Allegheny County Remote Traveler Information Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DMS</td>
<td></td>
<td>• Port Authority of Allegheny</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PAAC has installed some new &quot;IVAN&quot; boxes the performs in-vehicle diagnostics</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>and information is downloaded at the garages</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>CCTV surveillance of transit facilities</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>BCTA, PAAC and Westmoreland would have need for regional fare card</td>
<td>Planned 2</td>
<td></td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<td>---------------------------------------------</td>
</tr>
<tr>
<td>ROCC</td>
<td>PAAC</td>
<td>ROCC currently receives emergency signal from subway vehicles</td>
<td>Existing</td>
<td>County Vehicle Tracking</td>
</tr>
<tr>
<td></td>
<td>PAAC Garages</td>
<td>PAAC Garages plan to download fare and passenger count data from vehicles</td>
<td>Existing</td>
<td>Port Authority of Allegheny County Central Dispatch Software</td>
</tr>
<tr>
<td></td>
<td>PAAC</td>
<td>PAAC archives ridership data</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAAC TCC</td>
<td>PAAC TCC will coordinate parking and traffic management with Park-n-Ride lots</td>
<td>Planned 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>County</td>
<td>Improve interactive voice response system to better recognize non-native</td>
<td>Planned 1</td>
<td></td>
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<tr>
<td></td>
<td>Vehicle</td>
<td>speakers and the elderly</td>
<td></td>
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<tr>
<td></td>
<td>Tracking</td>
<td>Pager/ PDA messaging to provide users with bus or train arrival time or more</td>
<td>Planned 1</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>advanced GPS location determination and automated fare payment</td>
<td></td>
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<tr>
<td></td>
<td>Software</td>
<td>PAAC rail stations have and monitor CCTV cameras</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAAC garages</td>
<td>PAAC garages house police centers where CCTV cameras are monitored from</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>operators</td>
<td>PAAC operators or dispatchers report traffic incidents</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or dispatchers</td>
<td></td>
<td></td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
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<td>Associated Project(s)</td>
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<tr>
<td></td>
<td>PAAC police force coordinates with State Police and local emergency management</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td>PAAC archives ridership data</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td>Internet availability of bus schedules, route information and multiple ride ticket sales</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td>The PAAC and BCTA transit management offices have need for traffic flow and road information from the City of Pittsburgh TMC</td>
<td>Planned 2</td>
<td></td>
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<tr>
<td></td>
<td>PAAC Rail Operations Center tracks all rail vehicles with AVL</td>
<td>Existing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAAC Remote Traveler Support</td>
<td>Port Authority of Allegheny County (PAAC)</td>
<td>Use kiosks for fare card value increases</td>
<td>Planned 1</td>
<td>Port Authority of Allegheny County Remote Traveler Information Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PAAC plans light rail stations with magnetic stripe card readers and smart card readers</td>
<td>Planned 1</td>
<td>Regional Traveler Information System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PAAC would like to develop and maintain a kiosk network between for transit, D11 and the airport as a regional traveler information clearinghouse</td>
<td>Planned 2</td>
<td>Regional Transit Electronic Fare Collection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plans for transit fare payment or debit increase at kiosks using regional fare cards</td>
<td>Planned 1</td>
<td>Regional Transit Schedule Coordination</td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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</tbody>
</table>
| PAAC Transit Vehicles        | Port Authority of Allegheny County (PAAC)       | PAAC Rail Operations Center tracks all rail vehicles with AVL                 | Existing   | - Port Authority of Allegheny County Vehicle Tracking  
<p>|                              |                                                  | PAAC has buses with traffic signal priority                                   |            | - Transit Vehicle Traffic Signal Priority                                                                                                           |
|                              |                                                  | 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  |                                                                                                                                                      |</p>
<table>
<thead>
<tr>
<th>Element</th>
<th>Stakeholder</th>
<th>Functionality</th>
<th>Status</th>
<th>Associated Project(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Smart-card fare system planned fare boxes for Port Authority buses and trolleys</td>
<td>Planned 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AVL/ GPS system for buses</td>
<td>Planned 1</td>
<td></td>
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<td></td>
<td></td>
<td>Demand responsive scheduling and reservation system</td>
<td>Planned 1</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>PAAC has installed some new &quot;IVAN&quot; boxes the performs in-vehicle diagnostics and information is downloaded at the garages</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PAAC ROCC is currently tracking location of subway trains.</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Widespread traffic signal prioritization for bus lines</td>
<td>Planned 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>There is a need to have City of Pittsburgh signal priority for PAAC buses.</td>
<td>Planned 2</td>
<td></td>
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<td></td>
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<td>Transit in-vehicle video surveillance</td>
<td>Planned 1</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Install automatic passenger counters in buses and rail cars</td>
<td>Planned 1</td>
<td></td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
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</tr>
<tr>
<td>Park-n-Ride Facilities</td>
<td>Various Stakeholders</td>
<td>ROCC currently receives emergency signal from subway vehicles</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Transit in-vehicle computer unit containing GPS receiver, interfaced with mobile radio unit</td>
<td>Planned 1</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>PAAC TCC will coordinate parking and traffic management with Park-n-Ride lots</td>
<td>Planned 2</td>
<td>• Port Authority of Allegheny County Remote Traveler Information Systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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</td>
<td>Existing</td>
<td>• Port Authority of Allegheny County Park-n-Ride Lot Operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PAAC Park-n-ride lots could be controlling D11 DMS signs to post current parking conditions</td>
<td>Planned 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PAAC Park-n-Ride Lots will be collecting automatic payment from vehicle tags or traveler cards in future</td>
<td>Planned 2</td>
<td></td>
</tr>
<tr>
<td>Passenger Vehicles</td>
<td>General Public</td>
<td>Provides the capability for vehicle operators to pay toll without stopping</td>
<td>Existing</td>
<td>• Pennsylvania Turnpike E-Z Pass Toll System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PAAC Park-n-Ride Lots will be collecting automatic payment from vehicle tags or traveler cards in future</td>
<td>Planned 2</td>
<td>• ACAA Parking Management</td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td>Regional ITS Architecture</td>
<td>PENNDOT Southwestern ITS Architecture Region</td>
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<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
</tr>
<tr>
<td>PEMA Emergency Operation Center</td>
<td>Pennsylvania Emergency Management Agency (PEMA)</td>
<td>ACAA airport parking lots will have automated payment collection from vehicle tags or traveler cards</td>
<td>Planned 1</td>
<td>- City of Pittsburgh Downtown Parking Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Notifies appropriate transportation and emergency agencies of any major disasters</td>
<td>Existing</td>
<td>- Regional Transit Electronic Fare Collection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coordinates with cooperating agencies in case of major disasters</td>
<td>Existing</td>
<td></td>
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<td></td>
<td></td>
<td>Runs a statewide electronic database, Pennsylvania Emergency Information Reporting System (PEIRS) that collects information from all state agencies responding to incidents/emergencies statewide</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEMA gathers/provides specific incident information from/to County Emus, Pennsylvania State Police, PennDOT, and PTC</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gathers current and forecast road conditions and surface weather information from a variety of sources to monitor major natural disasters</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Disseminates disaster information to the public</td>
<td>Existing</td>
<td></td>
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<td>Stakeholder</td>
<td>Functionality</td>
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<td>Associated Project(s)</td>
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<tr>
<td>Monitors alerting and advisory systems reported by other emergency agencies</td>
<td></td>
<td>Existing</td>
<td></td>
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<tr>
<td>Develops and stores emergency evacuation plans</td>
<td></td>
<td>Existing</td>
<td></td>
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<tr>
<td>Serves as one-point contact for all the coordinating agencies during emergencies</td>
<td></td>
<td>Existing</td>
<td></td>
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<tr>
<td>Provides incident command in case of a major event</td>
<td></td>
<td>Existing</td>
<td></td>
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<tr>
<td>Contacts on-site field officers through the County EMA agencies</td>
<td></td>
<td>Existing</td>
<td></td>
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</tr>
<tr>
<td>Plans to control PTC DMS during emergencies</td>
<td></td>
<td>Planned 2</td>
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</tbody>
</table>
| 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 | • Roadway Weather Information System (RWIS)  
• PennDOT Commercial Vehicle Information Systems and Networks (CVISN) Project |
<p>| | | 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 | • PennDOT Transportation Management Centers |</p>
<table>
<thead>
<tr>
<th>Element</th>
<th>Stakeholder</th>
<th>Functionality</th>
<th>Status</th>
<th>Associated Project(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PennDOT)</td>
<td>The PennDOT Central Office Press Office communicates traffic-related information to Regional Media Outlets</td>
<td>Existing</td>
<td>(TMC’s)</td>
<td></td>
</tr>
<tr>
<td>PennDOT (Motor Carrier Division)</td>
<td>maintains commercial vehicle registrations</td>
<td>Existing</td>
<td>Winter Road Condition Hotline for Interstate Highways</td>
<td></td>
</tr>
<tr>
<td>CVO</td>
<td>Supports the exchange of safety credential information across the jurisdictions</td>
<td>Existing</td>
<td>Roadway Weather Information System (RWIS)</td>
<td></td>
</tr>
<tr>
<td>CVO</td>
<td>Supports the collection and review of carrier safety data and determines the carrier safety rating</td>
<td>Planned 1</td>
<td>PennDOT Commercial Vehicle Information Systems and Networks (CVISN) Project</td>
<td></td>
</tr>
<tr>
<td>PennDOT Motor Carrier Division</td>
<td>conducts roadside commercial vehicle inspections</td>
<td>Existing</td>
<td>PennDOT Performance and Registration Information Systems Management (PRISM)</td>
<td></td>
</tr>
<tr>
<td>PennDOT Motor Carrier Division</td>
<td>provides appropriate credentials to motor carriers as well as collecting necessary registration and title fees</td>
<td>Existing</td>
<td>PennDOT Safety and Fitness Electronic Record (SAFER)</td>
<td></td>
</tr>
<tr>
<td>PennDOT Motor Carrier Division</td>
<td>conducts weight enforcement activities</td>
<td>Existing</td>
<td>PennDOT ITS Transportation Management Approach</td>
<td></td>
</tr>
<tr>
<td>PennDOT Bureau of Planning and Research</td>
<td>owns and maintains Automatic Traffic Recorders throughout the state</td>
<td>Existing</td>
<td>Construction Projects (current and future)</td>
<td></td>
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<td>Central Repository</td>
<td></td>
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<td>Real-time Traffic Information Website</td>
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<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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</tbody>
</table>
| RWIS data flows from the RWIS site to Central Office (BOMO) to a public website | | Existing | | • Statewide GIS based Incident Detour Map  
• Video Sharing  
• Web site Portal for Assisting Commercial Vehicle Operators  
• Statewide Telecommunication |
<p>| 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 | • District 11 Pittsburgh Regional Traffic Management Center (RTMC) |
| PennDOT D10 County Maintenance Offices | Pennsylvania Department of Transportation (PennDOT) | PennDOT D11 Office coordinates operations with District 10 and 12 County Maintenance Offices | Existing | • District 10 Traveler Information |
| Coordination between PSP Dispatch Centers and PennDOT County Maintenance Offices or District Offices happens for requesting salt, and other maintenance operations | | Existing | | |</p>
<table>
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<tr>
<th>Element</th>
<th>Stakeholder</th>
<th>Functionality</th>
<th>Status</th>
<th>Associated Project(s)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>PennDOT D10 County Maintenance Offices provide construction and maintenance information on their websites</td>
<td>Existing</td>
<td></td>
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<td></td>
<td></td>
<td>Recommends maintenance courses of action based on current and forecast environmental and road conditions</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Receives environmental conditions information from various weather sources to aid in scheduling routine maintenance activities</td>
<td>Existing</td>
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<td>PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>PennDOT stockpile locations receive RWIS data for road maintenance operations, as well as coordinate snow removal operations with PennDOT District and County Maintenance Offices</td>
<td>Existing</td>
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<tr>
<td></td>
<td></td>
<td>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</td>
<td>Existing</td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td>PennDOT D10 Field Devices</td>
<td>Pennsylvania</td>
<td>Manages winter maintenance including snow plow operations</td>
<td>Existing</td>
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<td></td>
<td>Department of</td>
<td>PennDOT District Offices and/or County Maintenance Offices exchange maintenance</td>
<td>Existing</td>
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<td>information directly to maintenance vehicles</td>
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<td></td>
<td>PennDOT County Maintenance Offices provide information about maintenance</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>activities to local media</td>
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<td>PennDOT D10 vehicles have computers that talk to the County Offices for snow</td>
<td>Existing</td>
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<td></td>
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<td>removal and sprayer information</td>
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<td></td>
<td></td>
<td>Monitors vehicle and equipment conditions, tracks maintenance history, and</td>
<td>Existing</td>
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<td></td>
<td>schedules routine and corrective maintenance</td>
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<td>Provides overall management and support for routine maintenance on a roadway</td>
<td>Existing</td>
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<td>system or right-of-way</td>
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<td></td>
<td>District 10 Traveler</td>
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- District 10 Traveler
<table>
<thead>
<tr>
<th>Element</th>
<th>Stakeholder</th>
<th>Functionality</th>
<th>Status</th>
<th>Associated Project(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PennDOT Central Office Bureau downloads data from traffic counters in the field throughout the Region</td>
<td>PennDOT Central Office Bureau</td>
<td>Existing</td>
<td>Information</td>
<td></td>
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<tr>
<td>Other pavement loop detectors in D10</td>
<td>Other pavement loop detectors in D10</td>
<td>Existing</td>
<td>• District 10 Collision Avoidance System</td>
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<tr>
<td>PennDOT District RWIS Stations currently transmit snapshot images of road conditions to PennDOT Central Office BOMO</td>
<td>PennDOT District RWIS Stations</td>
<td>Existing</td>
<td>• District 10 Traffic Management Center (TMC)</td>
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<tr>
<td>I-79 HAR and DMS in D10</td>
<td>I-79 HAR and DMS in D10</td>
<td>Existing</td>
<td></td>
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<tr>
<td>Automatic traffic recorders in D10</td>
<td>Automatic traffic recorders in D10</td>
<td>Existing</td>
<td></td>
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<tr>
<td>D11 Tunnels County Maintenance Division monitors CCTV cameras in tunnels</td>
<td>D11 Tunnels County Maintenance Division</td>
<td>Existing</td>
<td></td>
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<tr>
<td>Complete truck inspection while in motion</td>
<td>Complete truck inspection while in motion</td>
<td>Planned 2</td>
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<tr>
<td>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</td>
<td>Pennsylvania Department of Transportation (PennDOT)</td>
<td>Existing</td>
<td>• District 10 Traveler Information</td>
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<td></td>
<td></td>
<td>• Regional Traveler Information System</td>
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<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<td></td>
<td>PennDOT District offices will coordinate event traffic operations with local police</td>
<td>Existing</td>
<td>AMBER Alert Coordination</td>
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<tr>
<td></td>
<td></td>
<td>PennDOT BHSTE coordinates with PEMA and other agencies (PennDOT Districts, PSP, County EMA’s, etc.) in case of major incidents</td>
<td>Existing</td>
<td>District 10 Traffic Management Center (TMC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>County EMA centers contact PennDOT District offices for some incidents along state roadways</td>
<td>Existing</td>
<td>District 11 Pittsburgh Regional Traffic Management Center (RTMC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PennDOT D12 and D10 Offices coordinate incident response and other operations along Route 22</td>
<td>Existing</td>
<td></td>
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<td></td>
<td>PennDOT Districts Offices 10, 11, and 12 provide maintenance and construction information to local media outlets</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>Plans to archive traffic and other data</td>
<td>Planned 1</td>
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<td></td>
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<td>PSP get work zone coverage plans and requests for troopers to work overtime shifts to cover work zones from PennDOT District Offices</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>The PennDOT D10 office has a dial-up connection to RWIS information collected by BOMO</td>
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<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
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<td>There is a general need for coordinating PennDOT detour routes and timing plans with municipalities</td>
<td>Planned 2</td>
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<td></td>
<td></td>
<td>PennDOT D12 Office, PennDOT D11 Office, and PennDOT D10 Office currently coordinate AMBER alert operations.</td>
<td>Existing</td>
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<td></td>
<td>PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles</td>
<td>Existing</td>
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<tr>
<td></td>
<td></td>
<td>Coordination between PSP Dispatch Centers and PennDOT County Maintenance Offices or District Offices happens for requesting salt, and other maintenance operations</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>PennDOT D10 currently coordinates operations with D9, D2, D1, D11, and D12 offices</td>
<td>Existing</td>
<td></td>
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<td></td>
<td></td>
<td>PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices</td>
<td>Existing</td>
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</table>
## Regional ITS Architecture

### PennDOT Southwestern ITS Architecture Region

<table>
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<tr>
<th>Element</th>
<th>Stakeholder</th>
<th>Functionality</th>
<th>Status</th>
<th>Associated Project(s)</th>
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</thead>
<tbody>
<tr>
<td>911 communication centers</td>
<td></td>
<td>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</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>PennDOT D10 Vehicles</td>
<td>Pennsylvania Department of Transportation (PennDOT)</td>
<td>PennDOT County Maintenance Offices coordinate with local police in field for scene traffic management</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>PennDOT D10 vehicles have computers that talk to the County Offices for snow removal and sprayer information</td>
<td>Existing</td>
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<td></td>
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<td>PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles</td>
<td>Existing</td>
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<tr>
<td>PennDOT D11 County Maintenance Offices</td>
<td>Pennsylvania Department of Transportation (PennDOT)</td>
<td>PennDOT D11 County Maintenance Offices will have control of DMS and HAR messages in future</td>
<td>Planned 1</td>
<td>District 11 Regional Service Patrols</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PennDOT County Maintenance Offices provide information about maintenance activities to local media</td>
<td>Existing</td>
<td>District 11 Roadway Weather Monitoring</td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<td>Provides overall management and support for routine maintenance on a roadway system or right-of-way</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>In future, PennDOT County Maintenance Offices may post information to ATIS systems because they are staffed 24/7</td>
<td>Planned 2</td>
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<tr>
<td></td>
<td></td>
<td>PSP Dispatch Centers coordinate with PennDOT D11 Tunnel Division Office for traffic control, debris clearing, move cameras, and major accidents/emergencies</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coordination between PSP Dispatch Centers and PennDOT County Maintenance Offices or District Offices happens for requesting salt, and other maintenance operations</td>
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<td>D11 Tunnels County Maintenance Division monitors CCTV cameras in tunnels</td>
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<td>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.</td>
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<td></td>
<td>PennDOT District Offices and/or County Maintenance Offices</td>
<td>exchange maintenance information directly to maintenance vehicles</td>
<td>Existing</td>
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<td></td>
<td>Receives environmental conditions information from various weather sources to aid in scheduling routine maintenance activities</td>
<td></td>
<td>Existing</td>
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<td></td>
<td>Monitors vehicle and equipment conditions, tracks maintenance history, and schedules routine and corrective maintenance</td>
<td></td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td>Manages winter maintenance including snow plow operations</td>
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<td>Existing</td>
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<td>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</td>
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<td>Existing</td>
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<td>PennDOT stockpile locations receive RWIS data for road maintenance operations, as well as coordinate snow removal operations with PennDOT District and County Maintenance Offices</td>
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<td>Existing</td>
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<td></td>
<td>PennDOT D11 County offices have remote access to control DMS signs</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices</td>
<td>Existing</td>
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<tr>
<td></td>
<td></td>
<td>Recommends maintenance courses of action based on current and forecast environmental and road conditions</td>
<td>Existing</td>
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<td></td>
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<td>PennDOT D11 has over height vehicle detection devices that automatically alert D11 Tunnel County Maintenance office if there is approaching over height vehicle</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>PennDOT D11 Field Devices</td>
<td>Pennsylvania Department of Transportation (PennDOT)</td>
<td>PennDOT has permanent and portable CMS on freeways</td>
<td>Existing</td>
<td>• Port Authority of Allegheny County Park-n-Ride Lot Operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PennDOT D11 has over height vehicle detection devices that automatically alert D11 Tunnel County Maintenance office if there is approaching over height vehicle</td>
<td>Existing</td>
<td>• District 11 Roadway Weather Monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PennDOT D11 County Maintenance Offices will have control of DMS and HAR messages in future</td>
<td>Planned 1</td>
<td>• District 11 Pittsburgh Regional Traffic Management Center (RTMC)</td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<td>PennDOT collects and archives traffic volumes, speeds, lane occupancy and vehicle classification</td>
<td>Existing</td>
<td>• District 11 Traffic Monitoring</td>
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<tr>
<td></td>
<td></td>
<td>Install fog detection system in D11</td>
<td>Planned 1</td>
<td>• District 11 Traveler Information</td>
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<tr>
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<td>Freeway with surveillance cameras</td>
<td>Existing</td>
<td>• ACAA Parking Management</td>
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<td>PennDOT D11 HOV devices automatically notify city of Pittsburgh signal devices when HOV lanes are opened. This causes signal timing patterns to adjust</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>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.</td>
<td>Existing</td>
<td></td>
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<td></td>
<td></td>
<td>PennDOT District RWIS Stations currently transmit snapshot images of road conditions to PennDOT Central Office BOMO</td>
<td>Existing</td>
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<td>Automatic traffic recorders in D11</td>
<td>Existing</td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
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<td>PennDOT D11 RTMC has a direct connection to 2 RWIS stations. The remainder of information is gathered from a web connection to BOMO data</td>
<td>Existing</td>
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<tr>
<td></td>
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<td>PennDOT D11 County Offices have remote access to control DMS signs</td>
<td>Existing</td>
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<td>PennDOT Central Office Bureau downloads data from traffic counters in the field throughout the Region</td>
<td>Existing</td>
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<td></td>
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<td>D11 RTMC currently controls gates for HOV</td>
<td>Existing</td>
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<td>ACAA communicates directly with PennDOT D11 HAR device</td>
<td>Existing</td>
<td></td>
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<td>PAAC Park-n-ride lots could be controlling D11 DMS signs to post current parking conditions</td>
<td>Planned 2</td>
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<td>Implement pre-planned detour routes in D11 for use during incidents, construction or special events</td>
<td>Planned 1</td>
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<td>Highway sensors and signs to alert drivers of dangerous conditions</td>
<td>Planned 1</td>
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<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td>PennDOT D11 Remote Traveler</td>
<td>Pennsylvania Department of</td>
<td>D11 is interested in placing kiosks in various public places with currently</td>
<td>Planned</td>
<td>• Regional Traveler Information System</td>
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<td>Support</td>
<td>Transportation (PennDOT)</td>
<td>available traveler information (e.g., camera images)</td>
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<td>In future, PennDOT County Maintenance Offices may post information to ATIS</td>
<td>Planned</td>
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<td>systems because they are staffed 24/7</td>
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<tr>
<td>PennDOT D11 RTMC</td>
<td>Pennsylvania Department of</td>
<td>There is a general need for coordinating PennDOT detour routes and timing</td>
<td>Planned</td>
<td>• District 11 Pittsburgh Regional Traffic Management Center (RTMC)</td>
</tr>
<tr>
<td></td>
<td>Transportation (PennDOT)</td>
<td>plans with municipalities</td>
<td>2</td>
<td>• AMBER Alert Coordination</td>
</tr>
<tr>
<td></td>
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<td>Port of Pittsburgh would be interested in acting as a hub for collecting and</td>
<td>Planned</td>
<td>• District 11 Camera Image Sharing</td>
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<td>distributing current roadway conditions (for arterials, state roads, and</td>
<td>2</td>
<td>• District 11 Traveler Information</td>
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<td>turnpike) to freight drivers leaving various privately owned port facilities</td>
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<td>• Regional Traveler Information System</td>
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<td>along rivers</td>
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<td>• District 11 Traffic Monitoring</td>
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<td>PennDOT uses pagers and fax services to distribute freeway travel times,</td>
<td>Existing</td>
<td>• District 11 Roadway Weather Monitoring</td>
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<tr>
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<td>travel speeds and incident information</td>
<td></td>
<td>• District 11 Camera Image</td>
</tr>
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<td>PennDOT D11 traffic office has communication capability with municipal</td>
<td>Existing</td>
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<td>traffic control devices, which is used almost exclusively for monitoring</td>
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<td>purposes</td>
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<td>Amber Alert operations</td>
<td>Existing</td>
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<td>D11 currently provides email updates to Mobility Technologies on construction activity</td>
<td>Existing</td>
<td>Sharing Expansion</td>
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<td>D11 currently has an incident detection algorithm in its software system</td>
<td>Existing</td>
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<td></td>
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<td>Allegheny County 911 and EMA have need for current traffic information and flow from City of Pittsburgh and PennDOT D11 RTMC</td>
<td>Planned 2</td>
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<td></td>
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<td>Coordination between PSP Dispatch Centers and PennDOT County Maintenance Offices or District Offices happens for requesting salt, and other maintenance operations</td>
<td>Existing</td>
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<td></td>
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<td>PTC would like 24/7 capabilities to coordinate traffic and incident management with D11 PennDOT staff</td>
<td>Planned 2</td>
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<td></td>
<td></td>
<td>D11 Parkway Service Patrol vehicles may be dispatched by State Police or D11 RTMC operators</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>PEMA gathers/provides specific incident information from/to County EMA's, PA State Police, PennDOT, and PTC</td>
<td>Existing</td>
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<tr>
<td></td>
<td></td>
<td>County EMA centers contact PennDOT District offices for some incidents along state roadways</td>
<td>Existing</td>
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<tr>
<td></td>
<td></td>
<td>• ACAA Parking Management</td>
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<td><strong>Element</strong></td>
<td><strong>Stakeholder</strong></td>
<td><strong>Functionality</strong></td>
<td><strong>Status</strong></td>
<td><strong>Associated Project(s)</strong></td>
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<td></td>
<td>A PennDOT radio link allows for voice communications between State Police, Parkway Service Patrols, and the RTMC</td>
<td>Existing</td>
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<td></td>
<td>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</td>
<td>Existing</td>
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<td></td>
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<td>PTC would like D11 RTMC to have full control of field devices within PTC Mon/Fayette</td>
<td>Planned 2</td>
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<td>PAAC would like to display travel times of highway vs. transit on PennDOT D11 DMS</td>
<td>Planned 2</td>
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<td></td>
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<td>D11 currently contacts PA State Police if it detects incidents</td>
<td>Existing</td>
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<td>D11 currently contacts PTC if it detects major incidents that will affect traffic on PA turnpike</td>
<td>Existing</td>
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<td></td>
<td>Allegheny County EMA will eventually get video from D11 RTMC, maybe control</td>
<td>Planned 1</td>
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<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
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<td>PTC plans to share CCTV camera images with D11, State Police, various emergency management agencies, and others</td>
<td>Planned 1</td>
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<td></td>
<td>PennDOT D12 Office, PennDOT D11 Office, and PennDOT D10 Office currently coordinate AMBER alert operations</td>
<td>Existing</td>
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<td></td>
<td>City of Pittsburgh Parking Administration currently coordinates event and parking operations with PennDOT D11 RTMC</td>
<td>Existing</td>
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<tr>
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<td></td>
<td>PennDOT has a maintenance program for system maintenance concept and requirements, CMS, CCTV, Comm. network, detectors and HOV system</td>
<td>Existing</td>
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<td>Beaver County Traveler Information System to integrate with PennDOT’s Freeway Management System and Pittsburgh’s ATMS</td>
<td>Planned 2</td>
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<td></td>
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<td>D11 provides CCTV and control to PA State Police Pittsburgh Barracks</td>
<td>Existing</td>
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<td></td>
<td>PennDOT D11 shares incident information with public safety agencies</td>
<td>Existing</td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
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<td>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.</td>
<td>Existing</td>
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<td></td>
<td>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</td>
<td>Existing</td>
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<td>D11 is interested in placing kiosks in various public places with currently available traveler information (e.g., camera images)</td>
<td>Planned 2</td>
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<td></td>
<td>Plans to exchange raw traffic data between Mobility Technologies and D11</td>
<td>Planned 1</td>
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<td>Mobility Technologies will likely have need for detailed/advanced construction information from D11 in future</td>
<td>Planned 2</td>
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<td>D11 RTMC currently controls gates for HOV</td>
<td>Existing</td>
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<td>Element</td>
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<td>Functionality</td>
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<td>Mobility Technologies wants D11 RTMC camera images</td>
<td>Planned 2</td>
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<td>PennDOT District offices will coordinate event traffic operations with local police</td>
<td>Existing</td>
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<td>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</td>
<td>Planned 2</td>
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<td>Proactive incident/congestion management (24x7 operations)</td>
<td>Planned 2</td>
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<td>PennDOT has an Archived Data Management System (ADMS)</td>
<td>Existing</td>
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<td></td>
<td>Mobility Technologies raw traffic data will be sent to D11 RTMC to be used in incident detection algorithms</td>
<td>Planned 1</td>
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<td>T.V. Stations currently get camera images from D11</td>
<td>Existing</td>
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<td></td>
<td>D11 currently give press releases for DMS messages within work zones</td>
<td>Existing</td>
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<td>Functionality</td>
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<td>D10 and D12 operate as ITS satellite offices to D11 RTMC and most functions are carried out in D11</td>
<td>Existing</td>
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<td></td>
<td>PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices</td>
<td>Existing</td>
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<td>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</td>
<td>Existing</td>
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<td></td>
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<td>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</td>
<td>Planned 2</td>
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<td>Assumes control of adjacent District ITS devices during off-peak periods</td>
<td>Planned 1</td>
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<td>BCTA would like to tie into D11 system for traffic, weather, flow speeds, conditions</td>
<td>Planned 2</td>
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<td>Functionality</td>
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<td>The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers</td>
<td>Planned 2</td>
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<td>PennDOT shares real-time traffic incident information with state law enforcement</td>
<td>Existing</td>
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<td>Freeway incident detection algorithms</td>
<td>Existing</td>
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<td></td>
<td>PAAC would like to station an employee at the PennDOT D11 RTMC, similar to the MT positions</td>
<td>Planned 2</td>
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<td></td>
<td>PSP get work zone coverage plans and requests for troopers to work overtime shifts to cover work zones from PennDOT District Offices</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>D11 has need for better verifying incidents picked up by its incident detection algorithm</td>
<td>Planned 2</td>
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<td>PennDOT BHSTE coordinates with PEMA and other agencies (PennDOT Districts, PSP, County EMA's, etc.) in case of major incidents</td>
<td>Existing</td>
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<td></td>
<td>PennDOT Districts Offices 10, 11, and 12 provide maintenance and construction information to local media outlets</td>
<td>Existing</td>
<td></td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
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<td></td>
<td>PennDOT D11 Office coordinates operations with District 10 and 12 County Maintenance Offices</td>
<td>Existing</td>
<td></td>
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<td></td>
<td></td>
<td>D11 traffic office currently uses Mobility Technologies’ archived traffic detection data for planning and other purposes</td>
<td>Existing</td>
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<td></td>
<td>PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles</td>
<td>Existing</td>
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<td></td>
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<td>PennDOT D11 RTMC has a direct connection to 2 RWIS stations. The remainder of information is gathered from a web connection to BOMO data</td>
<td>Existing</td>
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<td>D11 has need for pre-developed traffic management action scenarios to be displayed to operators at workstations once incidents are detected and verified</td>
<td>Planned 2</td>
<td></td>
</tr>
<tr>
<td>PennDOT D11 Vehicles</td>
<td>Pennsylvania Department of Transportation (PennDOT)</td>
<td>PennDOT has freeway service patrols</td>
<td>Existing</td>
<td>• District 11 Regional Service Patrols</td>
</tr>
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<td></td>
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<td>PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles</td>
<td>Existing</td>
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<td>Element</td>
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<td>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.</td>
<td>Existing</td>
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<td></td>
<td>The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers</td>
<td>Planned 2</td>
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<td></td>
<td>PennDOT County Maintenance Offices coordinate with local police in field for scene traffic management</td>
<td>Existing</td>
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<td></td>
<td>D11 Parkway Service Patrol vehicles may be dispatched by State Police or D11 RTMC operators</td>
<td>Existing</td>
<td></td>
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<tr>
<td>D12 County Maintenance Offices</td>
<td>Pennsylvania Department of Transportation (PennDOT)</td>
<td>A PennDOT radio link allows for voice communications between State Police, Parkway Service Patrols, and the RTMC</td>
<td>Existing</td>
<td>• District 12 Traveler Information</td>
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</tbody>
</table>

PennDOT D11 Parkway Service Patrols may be dispatched by State Police or D11 RTMC operators.
<table>
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<tr>
<th>Element</th>
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<th>Associated Project(s)</th>
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<tr>
<td></td>
<td></td>
<td>PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices</td>
<td>Existing</td>
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<td></td>
<td>Recommends maintenance courses of action based on current and forecast environmental and road conditions</td>
<td>Existing</td>
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<td>PennDOT stockpile locations receive RWIS data for road maintenance operations, as well as coordinate snow removal operations with PennDOT District and County Maintenance Offices</td>
<td>Existing</td>
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<td></td>
<td>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.</td>
<td>Existing</td>
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<td></td>
<td>PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles</td>
<td>Existing</td>
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<td></td>
<td></td>
<td>PennDOT County Maintenance Offices provide information about maintenance activities to local media</td>
<td>Existing</td>
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<td>Element</td>
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<td>Functionality</td>
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<td></td>
<td>PennDOT D11 Office coordinates operations with District 10 and 12 County Maintenance Offices</td>
<td>Existing</td>
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<td></td>
<td>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</td>
<td>Existing</td>
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<td></td>
<td>PennDOT D12-0 County Maintenance Offices Provides roadwork advisories on its website</td>
<td>Existing</td>
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<td></td>
<td>PennDOT D12 County Maintenance Offices currently control anti-icing bridge sprayers remotely</td>
<td>Existing</td>
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<td></td>
<td>Monitors vehicle and equipment conditions, tracks maintenance history, and schedules routine and corrective maintenance</td>
<td>Existing</td>
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<td></td>
<td>Receives environmental conditions information from various weather sources to aid in scheduling routine maintenance activities</td>
<td>Existing</td>
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<td>Manages winter maintenance including snow plow operations</td>
<td>Existing</td>
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<td>PennDOT D12 County Maintenance offices post travel advisories and construction information on a district-wide website</td>
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<td>Existing</td>
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<td>PennDOT D12 County Maintenance offices can post messages on D12 HAR</td>
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<td>Existing</td>
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<td>Provides overall management and support for routine maintenance on a roadway system or right-of-way</td>
<td></td>
<td>Existing</td>
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</tbody>
</table>
| PennDOT D12 Field Devices | Pennsylvania Department of Transportation (PennDOT) | Truck Rollover Warning System | Existing | • District 12 Traveler Information  
• District 12 Bridge De-icing  
• District 12 Collision Avoidance Signal Preemption System  
• District 12 Traffic Management Center (TMC) |
<p>| 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 | |  |</p>
<table>
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</table>
| PennDOT D12 TMC | Pennsylvania Department of Transportation (PennDOT) | PennDOT D12 Office, PennDOT D11 Office, and PennDOT D10 Office currently coordinate AMBER alert operations | Existing | • District 12 Traffic Management Center (TMC)  
• AMBER Alert Coordination  
• District 11 Pittsburgh Regional Traffic Management Center (RTMC)  
• District 12 Bridge De-icing  
• Regional Traveler Information System |
<p>|          |             | 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 | |</p>
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<td>PennDOT County Maintenance Offices coordinate construction and maintenance activities with PennDOT District Offices, and Municipal Traffic Management Offices</td>
<td>Existing</td>
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<td>Central software system to manage and operate all existing systems in D12</td>
<td>Planned 2</td>
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<td>The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers</td>
<td>Planned 2</td>
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<td>PennDOT Districts Offices 10, 11, and 12 provide maintenance and construction information to local media outlets</td>
<td>Existing</td>
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<td>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</td>
<td>Existing</td>
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<td>There is a general need for coordinating PennDOT detour routes and timing plans with municipalities</td>
<td>Planned 2</td>
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<td>PSP</td>
<td></td>
<td>PSP get work zone coverage plans and requests for troopers to work overtime shifts to cover work zones from PennDOT District Offices</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>County EMA centers</td>
<td></td>
<td>County EMA centers contact PennDOT District offices for some incidents along state roadways</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>D12</td>
<td></td>
<td>D12 access to D11 images adjacent to their jurisdiction</td>
<td>Planned 2</td>
<td></td>
</tr>
<tr>
<td>PennDOT D12 Office</td>
<td></td>
<td>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</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>PEMA</td>
<td></td>
<td>PEMA gathers/provides specific incident information from/to County EMA’s, PA State Police, PennDOT, and PTC</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>PennDOT District offices</td>
<td></td>
<td>PennDOT District offices will coordinate event traffic operations with local police</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>PennDOT District Offices</td>
<td></td>
<td>PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td>PennDOT D12 Vehicles</td>
<td>Pennsylvania Department of Transportation (PennDOT)</td>
<td>PennDOT District Offices and/or County Maintenance Offices exchange maintenance information directly to maintenance vehicles</td>
<td>Existing</td>
<td>• (Not Applicable)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PennDOT County Maintenance Offices coordinate with local police in field for scene traffic management</td>
<td>Existing</td>
<td></td>
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<tr>
<td>PennDOT STMC</td>
<td>Pennsylvania Department of Transportation (PennDOT)</td>
<td>Could potentially serve as back-up operations management to PennDOT RTMC’s</td>
<td>Planned 2</td>
<td>• PennDOT Transportation Management Centers (TMC’s)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May support ATIS systems</td>
<td>Planned 2</td>
<td>• Winter Road Condition Hotline for Interstate Highways</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May coordinate statewide operations (among districts and other states) and other state agencies (PSP, PTC, PEMA)</td>
<td>Planned 2</td>
<td>• Roadway Weather Information System (RWIS)</td>
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<td>• PennDOT Commercial</td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<td></td>
<td></td>
<td>May perform political and public relations on behalf of PennDOT</td>
<td>Planned 2</td>
<td>Vehicle Information Systems and Networks (CVISN) Project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May coordinate weather events throughout PennDOT</td>
<td>Planned 2</td>
<td>• PennDOT Performance and Registration Information Systems Management (PRISM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May coordinate incident, emergency, and inter/intra-state events</td>
<td>Planned 2</td>
<td>• PennDOT Safety and Fitness Electronic Record (SAFER)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May act as central data repository</td>
<td>Planned 2</td>
<td>• PennDOT ITS Transportation Management Approach</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May coordinate Amber Alert for PennDOT</td>
<td>Planned 2</td>
<td>• Construction Projects (current and future)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May be responsible for maintaining commercial vehicle registrations and credentials</td>
<td>Planned 2</td>
<td>• Central Repository</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May be responsible for maintaining the state’s Motor Carrier Safety Assistance Program (MCSAP) files</td>
<td>Planned 2</td>
<td>• Real-time Traffic Information Website</td>
</tr>
<tr>
<td></td>
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<td>May be responsible for conducting roadside inspections</td>
<td>Planned 2</td>
<td>• Statewide GIS based Incident Detour Map</td>
</tr>
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<td></td>
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<td>May be responsible for conducting weight enforcement activities</td>
<td>Planned 2</td>
<td>• Video Sharing</td>
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<td></td>
<td>• Web site Portal for Assisting Commercial Vehicle Operators</td>
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<td>• Statewide Telecommunication</td>
</tr>
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<td><strong>Element</strong></td>
<td><strong>Stakeholder</strong></td>
<td><strong>Functionality</strong></td>
<td><strong>Status</strong></td>
<td><strong>Associated Project(s)</strong></td>
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<tr>
<td>Pennsylvania Office of Homeland Security</td>
<td>Pennsylvania Office of Homeland Security</td>
<td>Coordinates homeland security activities within the Commonwealth, both with local and county officials and with the federal Department of Homeland Security</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>Personal Traveler Information Devices</td>
<td>General Public</td>
<td>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</td>
<td>Planned 2</td>
<td>• BCTA Remote Traveler Information Systems</td>
</tr>
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<td></td>
<td></td>
<td>progressbar</td>
<td>Planned 2</td>
<td>• PTC *11 Phone Service</td>
</tr>
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<td></td>
<td></td>
<td>SPC plans to manage regional transit information, as well as ridesharing and other demand management through ATIS deployments</td>
<td>Existing</td>
<td>• 511 Traveler Information Phone System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RWIS data flows from the RWIS site to Central Office (BOMO) to a public website</td>
<td>Existing</td>
<td>• BCTA Automated Reservation System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PennDOT uses pagers and fax services to distribute freeway travel times, travel speeds and incident information</td>
<td>Existing</td>
<td>• County/Municipal PSAP/911 Centers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PennDOT D12-0 County Maintenance Offices Provides roadwork advisories on its website</td>
<td>Existing</td>
<td>• District 11 Pittsburgh Regional Traffic Management Center (RTMC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PennDOT D12 County Maintenance offices post travel advisories and construction information on a district-wide Website</td>
<td>Existing</td>
<td>• Mobility Technologies Traveler Information Collection/Distribution</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Port Authority of Allegheny County Interactive Trip Planning</td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td></td>
<td></td>
<td>PennDOT D10 County Maintenance Offices provide construction and maintenance information on their websites</td>
<td>Existing</td>
<td>• Regional Traveler Information System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BCTA transit users call a phone reservation system for paratransit service</td>
<td>Existing</td>
<td>• Regional Transit Schedule Coordination</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regional transit agencies provide schedules via their own dedicated websites</td>
<td>Existing</td>
<td>• Regional Ridesharing Coordination</td>
</tr>
<tr>
<td>Port Facilities</td>
<td>Private Companies</td>
<td>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</td>
<td>Planned</td>
<td>• Port of Pittsburgh Travel Information Distribution</td>
</tr>
<tr>
<td>Port of Pittsburgh Commission Office</td>
<td>Port of Pittsburgh Commission</td>
<td>PTC plans to share CCTV camera images with D11, State Police, various emergency management agencies, and others</td>
<td>Planned</td>
<td>• Port of Pittsburgh Travel Information Distribution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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</td>
<td>Planned</td>
<td>• Regional Traveler Information System</td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
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<td>Associated Project(s)</td>
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</tbody>
</table>
| 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 | • District 11 Camera Image Sharing  
• Pennsylvania State Police Dispatch Centers  
• Incident Information Management System (IIMS)  
• Pennsylvania State Police Consolidated Dispatch Center  
• 800 MHz Statewide Communication System  
• AMBER Alert Coordination |
<p>|               |                                    | 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 |                                                                                                                                         |</p>
<table>
<thead>
<tr>
<th>Element</th>
<th>Stakeholder</th>
<th>Functionality</th>
<th>Status</th>
<th>Associated Project(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PFD dispatch has a direct contact with PSP</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>PennDOT BHSTE coordinates with PEMA and other agencies (PennDOT Districts, PSP, County EMA’s, etc.) in case of major incidents</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>D11 Parkway Service Patrol vehicles may be dispatched by State Police or D11 RTMC operators</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEMA gathers/provides specific incident information from/to County EMA’s, PA State Police, PennDOT, and PTC</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>The 800 MHz radio is planned for the entire region. This will create interoperability for all public service vehicles and centers</td>
<td>Planned 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>D11 provides CCTV and control to PA State Police Pittsburgh Barracks</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>PSP Dispatch Centers coordinate with PennDOT D11 Tunnel Division Office for traffic control, debris clearing, move cameras, and major accidents/emergencies</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Radio stations currently get incident information from State Police</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td><strong>Element</strong></td>
<td><strong>Stakeholder</strong></td>
<td><strong>Functionality</strong></td>
<td><strong>Status</strong></td>
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<tr>
<td></td>
<td></td>
<td>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</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coordinates between PSP Dispatch Centers and PennDOT County Maintenance Offices or District Offices happens for requesting salt, and other maintenance operations</td>
<td>Existing</td>
<td></td>
</tr>
</tbody>
</table>
| PSP Troop T | 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 | • Pennsylvania State Police Dispatch Centers  
• Incident Information Management System (IIMS)  
• Pennsylvania State Police Consolidated Dispatch Center  
• 800 MHz Statewide Communication System  
• AMBER Alert Coordination |
<p>| Highspire   |                | Acts as first-responders 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 |  |</p>
<table>
<thead>
<tr>
<th>Element</th>
<th>Stakeholder</th>
<th>Functionality</th>
<th>Status</th>
<th>Associated Project(s)</th>
</tr>
</thead>
</table>
| PSP Troop T Vehicles     | Pennsylvania State Police (PSP)            | PSP Troop T Vehicles are dispatched from PTC Offices and PSP Troop T Dispatch Centers | Existing   | • 800 MHz Statewide Communication System  
• Emergency Vehicle Traffic Signal Preemption  
• Mobile Data Terminals (MDT’s)                                                                  |
|                          |                                            | Responds to incidents of the Pennsylvania Turnpike                           | Existing   |                                                                                        |
| PSP Vehicles             | Pennsylvania State Police (PSP)            | Receives incident and dispatch information from PSP Offices                    | Existing   | • 800 MHz Statewide Communication System  
• Emergency Vehicle Traffic Signal Preemption  
• Mobile Data Terminals (MDT’s)                                                                  |
|                          |                                            | 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   | • Pennsylvania Turnpike Field Devices  
• PTC ATIS Integration Project                                                                    |
<p>|                          |                                            | 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   |                                                                                        |</p>
<table>
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<tr>
<th><strong>Element</strong></th>
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<th><strong>Functionality</strong></th>
<th><strong>Status</strong></th>
<th><strong>Associated Project(s)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pennsylvania Turnpike Commission (PTC)</td>
<td>Monitors roadway weather conditions using RWIS that measures temperature, humidity, wind speed and direction, and rain and snow precipitation</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>PTC Offices</td>
<td></td>
<td>Coordinates traffic and emergency operations with agencies throughout the state</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Provides support for special event traffic management</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Provides freeway management including integration of surveillance information for the purpose of information sharing</td>
<td>Planned 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitors alerts and advisory systems reported by other agencies</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plans to share CCTV camera images with PennDOT Districts, PSP, various emergency management agencies, and others.</td>
<td>Planned 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides 24x7 capabilities to coordinate traffic and incident management with PennDOT staff</td>
<td>Planned 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides incident management services including the dispatch of emergency and service vehicles and coordinates with appropriate agencies</td>
<td>Existing</td>
<td></td>
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<td></td>
<td>PTC *11 Phone Service</td>
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<td></td>
<td>PTC ATIS Integration Project</td>
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<td></td>
<td>PTC Traffic Operation Center (TOC)</td>
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<td></td>
<td>PTC E-Z Pass Toll Collection System</td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<td></td>
<td>Detects and verifies incidents. PTC uses a free cell phone service for incident detection</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides dispatch of emergency and service vehicles</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Tracks PTC emergency service vehicles</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Provides detour routes in case of incidents and shares this information with PennDOT and other transportation agencies</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Provides capabilities to be contacted by PennDOT Districts in case of major incidents that may affect traffic on Pennsylvania Turnpike</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shares real-time incident information with other transportation agencies, local and state law enforcement and fire and rescue agencies</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provides traffic and incident information to freeway and arterial management agencies, public transit, and safety agencies</td>
<td>Existing</td>
<td></td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<td>Distributes real-time traffic information to the public through dedicated, automated phone service, websites, email and cell phone/automated voice methods</td>
<td>Existing</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Distributes information regarding freeway travel times and speeds, incident information, special events, work zones, weather and road conditions</td>
<td>Existing</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>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</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PTC collects traffic volume, vehicle classification, road conditions, weather conditions and video surveillance information</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PTC collects route designations, current work zones, emergency/evacuation routes and procedures and incident information from other agencies</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collects toll collection fees and supports electronic toll collection using E-Z Pass</td>
<td>Existing</td>
<td></td>
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<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
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<tr>
<td>Collects and stores toll information for operational analysis and determining pricing structure</td>
<td></td>
<td>Existing</td>
<td></td>
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</tr>
<tr>
<td>Monitors current and forecasted weather conditions for issuing general travel advisories</td>
<td></td>
<td>Existing</td>
<td></td>
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</tr>
<tr>
<td>Coordinates with PennDOT County Maintenance Offices to reduce the impact of traffic during work zone activities</td>
<td></td>
<td>Existing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provides monitoring and remote diagnostics of field equipment failures, issues problem reports, and tracks the repairs or replacement of the failed equipment</td>
<td></td>
<td>Existing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTC Maintenance and Construction Vehicles</td>
<td>Pennsylvania Turnpike Commission (PTC)</td>
<td>Provide on-board systems that support routine winter maintenance on a roadway system</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>PTC Service Plazas</td>
<td>Pennsylvania Turnpike Commission (PTC)</td>
<td>Provides traffic information on the Pennsylvania Turnpike</td>
<td>Planned 1</td>
<td>• PTC Service Plazas</td>
</tr>
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<td></td>
<td></td>
<td>Provides traveler information, weather information centers, and lodging call centers, using scrolling message boards</td>
<td>Existing and Planned 1</td>
<td></td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
</tr>
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</tr>
<tr>
<td>PTC Toll Plazas</td>
<td>Pennsylvania Turnpike Commission (PTC)</td>
<td>Provides capability to automatically identify the vehicle type using tag reader and automatically perform toll collection</td>
<td>Existing</td>
<td>• PTC E-Z Pass Toll Collection System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Serve as electronic screening and safety inspection stations for the Pennsylvania Turnpike</td>
<td>Planned 2</td>
<td></td>
</tr>
<tr>
<td>Regional Media</td>
<td>Regional Media</td>
<td>PennDOT Districts Offices 10, 11, and 12 provide maintenance and construction information to local media outlets</td>
<td>Existing</td>
<td>• Mobility Technologies Traveler Information Collection/Distribution</td>
</tr>
<tr>
<td>Outlets</td>
<td></td>
<td>PennDOT County Maintenance Offices provide information about maintenance activities to local media</td>
<td>Existing</td>
<td>• Regional Traveler Information System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Radio stations currently get incident information from State Police</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mobility Technologies currently provides traffic flow and incident data to radio stations--Clear Channel</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>City of Pittsburgh traffic office provides information to local media about traffic, maintenance, and construction events</td>
<td>Existing</td>
<td></td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td>Mobility Technologies is currently collecting and distributing CCTV images from their devices. These are distributed to media</td>
<td></td>
<td>Existing</td>
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<tr>
<td>City of Pittsburgh Parking Authority Offices provide traffic and event information to local media and other information service providers</td>
<td></td>
<td>Existing</td>
<td></td>
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<td>“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”</td>
<td></td>
<td>Existing</td>
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<td>Regional Personal Traveler Cards</td>
<td>General Public</td>
<td>City of Pittsburgh Parking Authority has parking meters that accept payment via payment card</td>
<td>Existing</td>
<td>• Regional Transit Electronic Fare Collection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BCTA, PAAC and Westmoreland would have need for regional fare card</td>
<td>Planned 2</td>
<td>• City of Pittsburgh Downtown Parking Management</td>
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<tr>
<td></td>
<td></td>
<td>Plans for transit fare payment or debit increase at kiosks using regional fare cards</td>
<td>Planned 1</td>
<td>• ACAA Parking Management</td>
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<td></td>
<td></td>
<td>PAAC Park-n-Ride Lots will be collecting automatic payment from vehicle tags or traveler cards in future</td>
<td>Planned 2</td>
<td>• BCTA Electronic Fare Collection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Automated Payment</td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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<tr>
<td></td>
<td></td>
<td>ACAA airport parking lots will have automated payment collection from vehicle tags or traveler cards</td>
<td>Planned 1</td>
<td>Parking Meters</td>
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<td></td>
<td></td>
<td>Use of new fare boxes in transit vehicles able to automatically count money and accept &quot;smart&quot; fare cards</td>
<td>Planned 1</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Fixed route buses accepting electronic payment, single use card that is discarded when value is used</td>
<td>Existing</td>
<td></td>
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</tbody>
</table>
| 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     | • Regional Traveler Information System  
• Fayette County Coordinated Transit On-demand AVL  
• Regional Transit Schedule Coordination |
<p>|                               |                                       | 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   |                               |</p>
<table>
<thead>
<tr>
<th>Element</th>
<th>Stakeholder</th>
<th>Functionality</th>
<th>Status</th>
<th>Associated Project(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Transit Vehicles</td>
<td>Regional Transit Agencies</td>
<td>FCCT looking at new technologies for collecting passenger data in vehicle fare boxes</td>
<td>Planned 2</td>
<td>• Regional Transit Electronic Fare Collection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FCCT has 3 AVL for on-demand system buses</td>
<td>Existing</td>
<td>• Transit Vehicle Traffic Signal Priority</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Butler County and other Regional Transit Agencies plan on deploying transit signal priority systems in near to far future</td>
<td>Planned 1</td>
<td>• Fayette County Coordinated Transit On-demand AVL</td>
</tr>
<tr>
<td>Regional Travel Information System</td>
<td>Various Stakeholders</td>
<td>SPC plans to manage regional transit information, as well as ridesharing and other demand management through ATIS deployments</td>
<td>Planned 2</td>
<td>• Regional Traveler Information System</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• 511 Traveler Information Phone System</td>
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<td></td>
<td></td>
<td></td>
<td>• Regional Ridesharing Coordination</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• Regional Transit Schedule Coordination</td>
</tr>
<tr>
<td>SPC Office</td>
<td>Southwest Pennsylvania Commission (SPC)</td>
<td>SPC currently operates a ride-share system that matches user needs with other travelers' needs</td>
<td>Existing</td>
<td>• Regional Traveler Information System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPC is interested in collecting transit information from agencies throughout region and distribute on its ride-share website</td>
<td>Planned 2</td>
<td>• Regional Ridesharing Coordination</td>
</tr>
<tr>
<td>Element</td>
<td>Stakeholder</td>
<td>Functionality</td>
<td>Status</td>
<td>Associated Project(s)</td>
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</tr>
</tbody>
</table>
| 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  | • Regional Traveler Information System  
• Mobility Technologies Traveler Information Collection/Distribution |
| TMA Offices              | 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

<table>
<thead>
<tr>
<th>Element</th>
<th>Need (operation/data inputs from others)</th>
<th>Status</th>
<th>Origin Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>911 Communication Centers</td>
<td>Incident notification and information</td>
<td>Existing</td>
<td>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</td>
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<tr>
<td></td>
<td>Planned 2 Mobility Technologies ATIS Administration</td>
<td></td>
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<tr>
<td>Resource dispatch requests</td>
<td>Existing Municipal Public Safety Vehicles, PSP Offices, PTC Offices, PEMA Emergency Operation Center, County EMA Centers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicle tracking data</td>
<td>Planned 2 Municipal Public Safety Vehicles</td>
<td></td>
<td></td>
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<tr>
<td>Roadway conditions</td>
<td>Existing PennDOT D11 RTMC</td>
<td></td>
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<tr>
<td></td>
<td>Planned 1 PennDOT D10 TMC, PennDOT D12 TMC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACAA Field Devices</td>
<td>Parking lot status and travel advisory DMS messages</td>
<td>Planned 1</td>
<td>ACAA Office</td>
</tr>
<tr>
<td>ACAA Office</td>
<td>Payment information</td>
<td>Planned 2</td>
<td>Regional Personal Traveler Cards, Passenger Vehicles</td>
</tr>
<tr>
<td></td>
<td>Large-scale emergency notification and coordination</td>
<td>Existing</td>
<td>County EMA Centers</td>
</tr>
<tr>
<td>Element</td>
<td>Need (operation/data inputs from others)</td>
<td>Status</td>
<td>Origin Element</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Parking information and coordination</td>
<td></td>
<td>Existing</td>
<td>ACAA Field Devices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Planned 1</td>
<td>Park-n-Ride Facilities</td>
</tr>
<tr>
<td>Traffic information</td>
<td></td>
<td>Existing</td>
<td>PennDOT D11 RTMC</td>
</tr>
<tr>
<td>Adjacent PennDOT District and County Offices</td>
<td>Maintenance and construction coordination</td>
<td>Existing</td>
<td>PennDOT D11 County Maintenance Offices, PennDOT D10 County Maintenance Offices, PennDOT D12 County Maintenance Offices, PennDOT D11 RTMC, PennDOT D10 TMC, PennDOT D12 TMC</td>
</tr>
<tr>
<td></td>
<td>Incident response coordination</td>
<td>Existing</td>
<td>PennDOT D11 RTMC, PennDOT D10 TMC, PennDOT D12 TMC</td>
</tr>
<tr>
<td></td>
<td>Device control coordination</td>
<td>Existing</td>
<td>PennDOT D11 RTMC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Planned 2</td>
<td>PennDOT D10 TMC, PennDOT D12 TMC</td>
</tr>
<tr>
<td>BCTA Remote Traveler Support</td>
<td>Schedule adherence and arrival/ departure information</td>
<td>Existing</td>
<td>BCTA Transit Management Center</td>
</tr>
<tr>
<td></td>
<td>Trip plan</td>
<td>Planned 1</td>
<td>BCTA Transit Management Center</td>
</tr>
<tr>
<td></td>
<td>Regional traveler information</td>
<td>Planned 2</td>
<td>Regional Travel Information System</td>
</tr>
<tr>
<td></td>
<td>Payment information</td>
<td>Planned 1</td>
<td>Regional Personal Traveler Cards</td>
</tr>
<tr>
<td>BCTA Transit Management Center</td>
<td>Coordinating bus schedule adherence and transit traveler information with other transit agencies for customer transfers</td>
<td>Planned 2</td>
<td>PAAC Centers, Regional Transit Agency Offices</td>
</tr>
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<td></td>
<td>Surveillance images</td>
<td>Planned 1</td>
<td>BCTA Remote Traveler Support</td>
</tr>
<tr>
<td></td>
<td>Parking coordination</td>
<td>Planned 2</td>
<td>ACAA Office</td>
</tr>
<tr>
<td>Element</td>
<td>Need (operation/data inputs from others)</td>
<td>Status</td>
<td>Origin Element</td>
</tr>
<tr>
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</tr>
<tr>
<td>BCTA Transit Vehicles</td>
<td>Vehicle speed, fare transactions, silent alarm, and passenger count</td>
<td>Planned 1</td>
<td>BCTA Transit Vehicles</td>
</tr>
<tr>
<td></td>
<td>Vehicle location, next stop, unscheduled stop information</td>
<td>Existing</td>
<td>BCTA Transit Vehicles</td>
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<td>Roadway incident reporting from drivers to center</td>
<td>Existing</td>
<td>BCTA Transit Vehicles</td>
</tr>
<tr>
<td></td>
<td>Traffic, weather, road conditions, and incident information</td>
<td>Planned 2</td>
<td>PennDOT D11 RTMC, City of Pittsburgh TMC, Mobility Technologies ATIS Administration</td>
</tr>
<tr>
<td></td>
<td>Incident and emergency coordination</td>
<td>Existing</td>
<td>County EMA Centers, 911 Communication Centers</td>
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<td>Parking coordination</td>
<td>Planned 1</td>
<td>Park-n-Ride Facilities</td>
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<td>Passenger count, automated driver logs, and fare payment information from vehicles</td>
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<td>Vehicle diagnostics and maintenance information</td>
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<td>BCTA Transit Vehicles</td>
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<td>City of Pittsburgh Field Devices</td>
<td>Paratransit real-time scheduling and route information</td>
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<td>Payment information from BCTA traveler cards</td>
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<td>Regional Personal Traveler Cards</td>
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<td>Signal system timing changes</td>
<td>Existing</td>
<td>City of Pittsburgh TMC</td>
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<td>Location signals from transit vehicles for signal priority</td>
<td>Existing</td>
<td>PAAC Transit Vehicles, BCTA Transit Vehicles</td>
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<td>Traffic management messages for DMS</td>
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<td>City of Pittsburgh Parking Authority Offices, City of Pittsburgh TMC</td>
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<td>Camera control</td>
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<td>HOV gate device coordination with traffic signals</td>
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<td>Origin Element</td>
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<td>Parking meter or lot payment information</td>
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<td>Personal Traveler Cards, Passenger Vehicle</td>
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<td>Location from public safety vehicles for</td>
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<td>City of Pittsburgh TMC</td>
<td>Traffic information coordination</td>
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<td>PennDOT D11 RTMC, Municipal Traffic Management Offices</td>
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<td>Planned 1 City of Pittsburgh Parking Authority Offices</td>
<td>Planned 1</td>
<td>City of Pittsburgh Parking Authority Offices</td>
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<td>Signal timing change coordination with</td>
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<td>other jurisdictions</td>
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<td>Existing</td>
<td>PTC Offices</td>
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<td>Relaying information from emergency</td>
<td>Existing PTC Offices, PennDOT D5 TMC, PSP Offices</td>
<td>Existing</td>
<td>operations to trucking companies</td>
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<td>operations to trucking companies</td>
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<td>On-board safety information</td>
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<td>Trip log and identification information</td>
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<td>Commercial Vehicle Company Offices</td>
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<td>County EMA Centers</td>
<td>Real-time roadway traffic and incident information</td>
<td>Planned 2</td>
<td>Mobility Technologies ATIS Administration, PennDOT D11 RTMC, PennDOT D10 TMC, PennDOT D12 TMC, PTC Offices, City of Pittsburgh TMC, Municipal Traffic Management Offices</td>
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<tr>
<td>CCTV images</td>
<td></td>
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<td>PennDOT D11 RTMC, PTC Offices</td>
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<td>PennDOT D11 County Maintenance Offices</td>
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<td>Existing</td>
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<td></td>
<td>Incident and emergency coordination</td>
<td>Existing</td>
<td>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</td>
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<td>High Threat Facilities</td>
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<td>N/A</td>
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<td>Mobility Technologies Field Devices, PennDOT D11 RTMC, City of Pittsburgh TMC, PTC Offices</td>
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<td>Administration</td>
<td>Traffic conditions</td>
<td>Existing</td>
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<td>Need (operation/data inputs from others)</td>
<td>Status</td>
<td>Origin Element</td>
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<td>PennDOT Motor Carrier Division conducts weight enforcement activities</td>
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<td>Dispatch information</td>
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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

<table>
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<th>Service (operation/data outputs to others)</th>
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<td></td>
<td>Planned 2</td>
<td>Regional Travel Information System</td>
<td></td>
</tr>
<tr>
<td>Trip planning</td>
<td>Planned 2</td>
<td>Personal Traveler Information Devices</td>
<td></td>
</tr>
<tr>
<td>Regional Transit Agency Offices</td>
<td>Driver dispatch and management information</td>
<td>Existing</td>
<td>Regional Transit Vehicles</td>
</tr>
<tr>
<td>Location from transit vehicles for signal priority</td>
<td>Planned 2</td>
<td>Municipal Field Devices</td>
<td></td>
</tr>
<tr>
<td>Request for payment</td>
<td>Existing</td>
<td>Regional Personal Traveler Cards</td>
<td></td>
</tr>
<tr>
<td>Passenger count, automated driver logs, and fare payment information from vehicles</td>
<td>Planned 2</td>
<td>Regional Transit Agency Offices</td>
<td></td>
</tr>
<tr>
<td>Vehicle diagnostics and maintenance information</td>
<td>Planned 1</td>
<td>Regional Transit Agency Offices</td>
<td></td>
</tr>
<tr>
<td>Fare payment information</td>
<td>Planned 2</td>
<td>Regional Transit Agency Offices</td>
<td></td>
</tr>
<tr>
<td>Vehicle location data</td>
<td>Planned 1</td>
<td>Regional Transit Agency Offices</td>
<td></td>
</tr>
<tr>
<td>Element</td>
<td>Service (operation/data outputs to others)</td>
<td>Status</td>
<td>Destination Element</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>------------------------------------------------------</td>
<td>-----------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Regional Travel Information System</td>
<td>Travel information distribution coordination</td>
<td>Planned 2</td>
<td>Mobility Technologies ATIS Administration, SPC Office, TMA Offices, Port of Pittsburgh Commission Office</td>
</tr>
<tr>
<td>Regional traveler information</td>
<td>Planned 2</td>
<td></td>
<td>PAAC Remote Traveler Support, BCTA Remote Traveler Support</td>
</tr>
<tr>
<td>Current traveler information for public kiosks</td>
<td>Planned 2</td>
<td></td>
<td>PennDOT D11 Remote Traveler Support</td>
</tr>
<tr>
<td>Broadcasted road and travel conditions</td>
<td>Planned 2</td>
<td></td>
<td>Personal Traveler Information Devices</td>
</tr>
<tr>
<td>Trip planning</td>
<td>Planned 2</td>
<td></td>
<td>Personal Traveler Information Devices</td>
</tr>
<tr>
<td>Traveler archived data</td>
<td>Planned 2</td>
<td></td>
<td>SPC Office</td>
</tr>
<tr>
<td>SPC Office</td>
<td>Travel information coordination</td>
<td>Planned 2</td>
<td>Mobility Technologies ATIS Administration, Regional Travel Information System</td>
</tr>
<tr>
<td>Trip planning</td>
<td>Planned 1</td>
<td></td>
<td>Personal Traveler Information Devices</td>
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<td>Rideshare information</td>
<td>Existing</td>
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<td>Traveler archived data</td>
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<td>Regional Travel Information System</td>
</tr>
<tr>
<td>TMA Offices</td>
<td>Travel information coordination</td>
<td>Planned 2</td>
<td>Mobility Technologies ATIS Administration, Regional Travel Information System</td>
</tr>
<tr>
<td>Element</td>
<td>Service (operation/data outputs to others)</td>
<td>Status</td>
<td>Destination Element</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------------------------------------------</td>
<td>---------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>Broadcasted road and travel conditions</td>
<td>Existing</td>
<td></td>
<td>Personal Traveler Information Devices</td>
</tr>
<tr>
<td>Towing Industry Responders</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
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</table>
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>
<thead>
<tr>
<th>Element</th>
<th>Subsystem/Terminator mapped to:</th>
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<tbody>
<tr>
<td>911 Communication Centers</td>
<td>Emergency Management</td>
</tr>
<tr>
<td>ACAA Field Devices</td>
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<tr>
<td></td>
<td>Roadway</td>
</tr>
<tr>
<td>ACAA Office</td>
<td>Information Service Provider</td>
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<td>Parking Management</td>
</tr>
<tr>
<td></td>
<td>Traffic Management</td>
</tr>
<tr>
<td>Adjacent PennDOT District and County Offices</td>
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<tr>
<td></td>
<td>Maintenance and Construction Management</td>
</tr>
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<td>Traffic Management</td>
</tr>
<tr>
<td>BCTA Remote Traveler Support</td>
<td>Remote Traveler Support</td>
</tr>
<tr>
<td>BCTA Transit Management Center</td>
<td>Information Service Provider</td>
</tr>
<tr>
<td></td>
<td>Transit Management</td>
</tr>
<tr>
<td>BCTA Transit Vehicles</td>
<td>Transit Vehicle</td>
</tr>
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<td>City of Pittsburgh Field Devices</td>
<td>Parking Management</td>
</tr>
<tr>
<td></td>
<td>Roadway</td>
</tr>
<tr>
<td>City of Pittsburgh Parking Authority Offices</td>
<td>Parking Management</td>
</tr>
<tr>
<td></td>
<td>Traffic Management</td>
</tr>
<tr>
<td>City of Pittsburgh TMC</td>
<td>Archived Data Management</td>
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<td></td>
<td>Archived Data User</td>
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<tr>
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<td>Maintenance and Construction Management</td>
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<td>Traffic Management</td>
</tr>
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<td>Commercial Vehicle Company Offices</td>
<td>Fleet and Freight Management</td>
</tr>
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<td></td>
<td>Information Service Provider</td>
</tr>
<tr>
<td>High Threat Facilities</td>
<td>Emergency Management</td>
</tr>
<tr>
<td>Mobility Technologies ATIS Administration</td>
<td>Archived Data Management</td>
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<tr>
<td></td>
<td>Archived Data User</td>
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<td>Information Service Provider</td>
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<td>Traffic Management</td>
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<tr>
<td>Mobility Technologies Field Devices</td>
<td>Roadway</td>
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<td>Municipal Field Devices</td>
<td>Roadway</td>
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<td><strong>Element</strong></td>
<td><strong>Subsystem/Terminator mapped to:</strong></td>
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<td>-------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------</td>
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<td>Municipal Public Safety Offices</td>
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</tr>
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<td>Park-n-Ride Facilities</td>
<td>Parking Management Traffic Management</td>
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<tr>
<td>Passenger Vehicles</td>
<td>Vehicle</td>
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<td>Archived Data Management Emergency Management Information Service Provider</td>
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<td>Commercial Vehicle Check Roadway</td>
</tr>
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<td>PennDOT Central Office Organizations</td>
<td>Archived Data Management Archived Data User Commercial Vehicle Administration Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management</td>
</tr>
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<td>PennDOT D1 Field Devices</td>
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</tr>
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<td>Archived Data User Information Service Provider Maintenance and Construction Management</td>
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<td>PennDOT D10 Field Devices</td>
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</tr>
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<td>PennDOT D10 TMC</td>
<td>Archived Data Management Archived Data User Emergency Management Information Service Provider Maintenance and Construction Management</td>
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<td><strong>Element</strong></td>
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<td>Traffic Management</td>
</tr>
<tr>
<td>PennDOT D11 County Maintenance Offices</td>
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</tr>
<tr>
<td>PennDOT D11 Field Devices</td>
<td>Roadway</td>
</tr>
<tr>
<td>PennDOT D11 Remote Traveler Support</td>
<td>Remote Traveler Support</td>
</tr>
<tr>
<td>PennDOT D11 RTMC</td>
<td>Archived Data Management&lt;br&gt;Emergency Management&lt;br&gt;Information Service Provider&lt;br&gt;Maintenance and Construction Management&lt;br&gt;Traffic Management</td>
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</tr>
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<td>Archived Data User&lt;br&gt;Information Service Provider&lt;br&gt;Maintenance and Construction Management</td>
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<td>PSP Troop T Highspire</td>
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<tr>
<td>Towing Industry Responders</td>
<td>Emergency Vehicle</td>
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### 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.
ACAA Office

BCTA Transit Management
Center
X

County EMA Centers
X

High Threat Facilities
X

ACAA Field Devices

X

BCTA Transit Vehicles

City of Pittsburgh TMC

X

911 Communication Centers

X

BCTA Remote Traveler
Support

X

City of Pittsburgh Field
Devices

City of Pittsburgh Parking
Authority Offices

X

X

X
X

X

X

X

X

Commercial Vehicles

Commercial Vehicle
Company Offices
X

X

X

Mobility Technologies ATIS Administration

X
X
X

X

X
X

X

X
X
X

Municipal Public Safety Vehicles

X
X

X

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Adjacent PennDOT District
and County Offices

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SPC Office
TMA Offices
Towing Industry Responders

Regional Travel Information System

Regional Transit Vehicles

Regional Transit Agency Offices

Regional Personal Traveler Cards

Regional Media Outlets

PTC Toll Plazas

PTC Service Plazas

PTC Offices

PTC Maintenance and Construction

PTC Field Devices

PSP Vehicles

PSP Troop T Vehicles

PSP Troop T Highspire

PSP Offices

Port of Pittsburgh Commission Office

Port Facilities

Personal Traveler Information Devices

Pennsylvania Office of Homeland Security

PennDOT STMC

PennDOT D12 Vehicles

PennDOT D12 TMC

PennDOT D12 Field Devices

PennDOT D12 County Maintenance

PennDOT D11 Vehicles

PennDOT D11 RTMC

PennDOT D11 Remote Traveler Support

PennDOT D11 Field Devices

PennDOT D11 County Maintenance

PennDOT D10 Vehicles

PennDOT D10 TMC

PennDOT D10 Field Devices

PennDOT D10 County Maintenance

PennDOT D1 Field Devices

PennDOT Central Office Organizations

PennDOT Central Office Field Devices

PEMA Emergency Operation Center

Passenger Vehicles

Park-n-Ride Facilities

PAAC Transit Vehicles

PAAC Remote Traveler Support

PAAC Centers

Municipal Traffic Management Offices

Municipal Public Safety Offices

Municipal Field Devices

Mobility Technologies Field Devices

High Threat Facilities

X

County EMA Centers

Commercial Vehicles

Commercial Vehicle Company Offices

City of Pittsburgh TMC

City of Pittsburgh Parking Authority Offices

City of Pittsburgh Field Devices

BCTA Transit Vehicles

BCTA Transit Management Center

BCTA Remote Traveler Support

Adjacent PennDOT District and County

ACAA Office

ACAA Field Devices

911 Communication Centers

Regional ITS Architecture
PennDOT Southwestern ITS Architecture Region

Table 4-2: Regional Interconnect Matrix

X
X

X

X

X
X
X


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<tr>
<th>Region</th>
<th>Mobile Technologies ATIS Administration</th>
<th>Mobility Technologies Field Devices</th>
<th>Municipal Public Safety Office</th>
<th>Municipal Public Safety Vehicles</th>
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<th>PAAC Centers</th>
<th>PAAC Remote Traveler Support</th>
<th>PAAC Transit Vehicles</th>
<th>Park-n-Ride Facilities</th>
<th>Passenger Vehicles</th>
<th>PEMA Emergency Operation Center</th>
<th>PennDOT Central Office Field Devices</th>
<th>PennDOT Central Office Organizations</th>
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<tr>
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**Port Facilities**
- **Port of Pittsburgh Commission Office**
- **PSP Offices**
- **PSP Troop T Highspire**
- **PSP Troop T Vehicles**
- **PSP Vehicles**

**PTC Field Devices**
- **PTC Offices**
- **PTC Service Plazas**
- **PTC Toll Plazas**

**Regional Media Outlets**
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Regional ITS Architecture
PennDOT Southwestern ITS Architecture Region
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
Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

transit emergency coordination data

transit emergency data

Counts

911 Communication Centers

Existing

Planned
Counties

911 Communication Centers

incident report
incident response coordination

Counties

County EMA Centers

Existing
Planned
Counties

911 Communication Centers

incident information

Mobility Technologies

Mobility Technologies ATIS Administration

Existing
Planned
Counties

911 Communication Centers

- incident report
- incident response coordination

Municipalities

Municipal Public Safety Offices

Existing
Planned
Counties

911 Communication Centers

Municipalities

Municipal Public Safety Vehicles

- emergency dispatch requests
- incident command information
- emergency dispatch response
- emergency vehicle tracking data
- incident command request
- incident status
Port Authority of Allegheny County (PAAC)

PAAC Centers

- transit emergency coordination data
- transit emergency data

Counts

911 Communication Centers

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 County Maintenance Offices

- maint and constr resource request
- incident information request
- maint and constr resource response
- incident information

911 Communication Centers
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Resource request
Incident report
Incident response coordination
Resource deployment status
Incident information

Counties

911 Communication Centers

Existing
Planned
General Public

Personal Traveler Information Devices

Counties

911 Communication Centers

Existing

Planned

emergency acknowledge

emergency notification
Counties

911 Communication Centers

Private Wrecker Companies

Private Wrecker Units

emergency dispatch requests

Existing

Planned
Pennsylvania State Police (PSP)

PSP Offices

- Incident information
- Incident information request
- Incident report
- Incident response coordination

Counties

911 Communication Centers

Existing
Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

- maintain and construct resource request
- resource request
- incident information request
- maintain and construct resource response
- resource deployment status
- incident information
- incident report
- incident response coordination

Counties

911 Communication Centers

Existing
Planned
Regional Transit Agencies

Regional Transit Agency Offices

transit emergency coordination data
transit emergency data

Counts

911 Communication Centers

Existing
Planned
Various Stakeholders

Regional Travel Information System

- incident information
- incident information request

Counties

911 Communication Centers

Existing
Planned
Various Stakeholders

High Threat Facilities

- high threat facility incident information
- incident report
- incident response coordination

Counties

911 Communication Centers

Existing
Planned
ACAA Field Devices
ACAA Field Devices Interconnect Diagram

- Allegheny County Airport Authority (ACAA)
  - ACAA Office

- General Public
  - Passenger Vehicles

- General Public
  - Regional Personal Traveler Cards

- Allegheny County Airport Authority (ACAA)
  - ACAA Field Devices

Existing
Planned
General Public

Regional Personal Traveler Cards

Allegheny County Airport Authority (ACAA)

ACAA Field Devices

Existing

Planned
Allegheny County Airport Authority (ACAA)

ACAA Field Devices

General Public

Passenger Vehicles

request tag data

tag data

Existing

Planned
ACAA Office
Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

parking information
parking lot data request

Allegheny County Airport Authority (ACAA)

ACAA Office

Existing
Planned
Allegheny County Airport Authority (ACAA)

ACAA Office

Counties

County EMA Centers

Existing

Planned

resource deployment status
resource request
incident information
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Allegheny County Airport Authority (ACAA)

ACAA Office

Existing

Planned

traffic control coordination

traffic information coordination
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Remote Traveler Support

broadcast information

Allegheny County Airport Authority (ACAA)

ACAA Office

Existing

Planned
General Public

Personal Traveler Information Devices

broadcast information

Allegheny County Airport Authority (ACAA)

ACAA Office

Existing
Planned
Allegheny County Airport Authority (ACAA)

ACAA Office

- parking information
- roadway information system status
- parking lot data request
- roadway information system data
- parking coordination

Allegheny County Airport Authority (ACAA)

ACAA Field Devices

Existing

Planned
Allegheny County Airport Authority (ACAA)

ACAA Office

Various Stakeholders

Park-n-Ride Facilities
Adjacent PennDOT Districts
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 Field Devices

- roadway information system data
- roadway information system status

Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT Districts

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT Districts

incident report
incident response coordination
traffic control coordination
traffic information coordination
work plan coordination

Existing
Planned

PennDOT D10 TMC
Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT Districts

PennDOT D11 County Maintenance Offices

Maint and constr resource coordination

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT Districts

incident report
incident response coordination
traffic control coordination
traffic information coordination
work plan coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT Districts

PennDOT D12 County Maintenance Offices

maint and constr resource coordination
Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT Districts

- incident report
- incident response coordination
- traffic control coordination
- traffic information coordination
- work plan coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Existing
Planned
BCTA Remote Traveler Support
BCTA Remote Traveler Support Interconnect Diagram

- **Beaver County Transit Authority (BCTA)**
  - BCTA Transit Management Center

- **General Public**
  - Regional Personal Traveler Cards

- **Various Stakeholders**
  - Regional Travel Information System

---

Existing

Planned
Beaver County Transit Authority (BCTA)

BCTA Remote Traveler Support

Regional Personal Traveler Cards

General Public

request for payment

payment

Existing

Planned
Various Stakeholders

Regional Travel Information System

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

Beaver County Transit Authority (BCTA)

BCTA Remote Traveler Support

Existing
Planned
BCTA Transit Management Center
BCTA Transit Management Center Interconnect Diagram
Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

- secure area surveillance data
- transit fare payment requests
- transit information user request
- trip confirmation
- trip request
- secure area monitoring support
- transit fare payment responses
- transit traveler information
- trip plan

Existing

Planned
Beaver County Transit Authority (BCTA)

BCTA Transit Vehicles

- Driver instructions
- Emergency acknowledge
- Fare management information
- Emergency notification
- Fare and payment status
- Request for bad tag list
- Transit vehicle conditions
- Transit vehicle location data
- Transit vehicle passenger and use data
- Transit vehicle schedule performance

Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Existing
Planned
City of Pittsburgh

City of Pittsburgh TMC

request for road network conditions
road network conditions

Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Existing
Planned
Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Counties

County EMA Centers

Existing

Planned
Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Port Authority of Allegheny County (PAAC)

PAAC Centers

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
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

|request for road network conditions|
|--current asset restrictions--|
|--road network conditions--|
|--road weather information--|

Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Existing

Planned
Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

General Public

Personal Traveler Information Devices

- personal transit information
- trip plan
- transit information user request
- trip confirmation
- trip request

Existing

Planned
Regional Transit Agencies

Regional Transit Agency Offices

Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

TRMS coord
Various Stakeholders

Regional Travel Information System

- demand responsive transit plan
- transit and fare schedules
- transit incident information
- transit request confirmation
- demand responsive transit request
- selected routes
- transit information request

Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Existing

Planned
Various Stakeholders

Park-n-Ride Facilities

- parking lot data request
- parking reservations request
- transit parking lot response
- parking information
- parking lot reservation confirmation
- transit parking coordination

Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Existing
Planned
Southwest Pennsylvania Commission (SPC)

SPC Office

Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

- transit and fare schedules
- transit incident information
- transit information request

Existing
Planned
BCTA Transit Vehicle
BCTA Transit Vehicles Interconnect Diagram

- Beaver County Transit Authority (BCTA)
  - BCTA Transit Management Center
- City of Pittsburgh
  - City of Pittsburgh Field Devices
- Municipalities
  - Municipal Field Devices
- General Public
  - Regional Personal Traveler Cards
- Beaver County Transit Authority (BCTA)
  - BCTA Transit Vehicles

Existing and Planned

283
Beaver County Transit Authority (BCTA)

BCTA Transit Vehicles
City of Pittsburgh Field Devices
City of Pittsburgh Field Devices
Interconnect Diagram

Beaver County Transit Authority (BCTA)
- BCTA Transit Vehicles

City of Pittsburgh
- City of Pittsburgh Parking Authority Offices

City of Pittsburgh
- City of Pittsburgh TMC

General Public
- Regional Personal Traveler Cards

Municipalities
- Municipal Field Devices

City of Pittsburgh Field Devices

Municipalities
- Municipal Public Safety Vehicles

Port Authority of Allegheny County (PAAC)
- PAAC Transit Vehicles

General Public
- Passenger Vehicles

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

Existing
Planned
Beaver County Transit Authority (BCTA)

BCTA Transit Vehicles

City of Pittsburgh

City of Pittsburgh Field Devices

local signal priority request

Existing
Planned
City of Pittsburgh

City of Pittsburgh Parking Authority Offices

- roadway information system status
- roadway information system data

City of Pittsburgh Field Devices

Existing
Planned
City of Pittsburgh

City of Pittsburgh TMC

Existing

Planned

roadway information system status
- signal control status
- traffic flow
- traffic images
- roadway information system data
- signal control data
- video surveillance control
City of Pittsburgh

City of Pittsburgh Field Devices

local signal preemption request

Municipalities

Municipal Public Safety Vehicles

Existing

Planned
City of Pittsburgh

City of Pittsburgh Field Devices

Port Authority of Allegheny County (PAAC)

PAAC Transit Vehicles

local signal priority request
General Public

Regional Personal Traveler Cards

City of Pittsburgh

City of Pittsburgh Field Devices

Existing

Planned

297
General Public

Passenger Vehicles

City of Pittsburgh

City of Pittsburgh Field Devices

request tag data

tag data

Existing

Planned
City of Pittsburgh
Parking Authority Offices
City of Pittsburgh Parking Authority Offices Interconnect Diagram

City of Pittsburgh
- City of Pittsburgh Field Devices

City of Pittsburgh
- City of Pittsburgh TMC

Pennsylvania Department of Transportation (PennDOT)
- PennDOT D11 RTMC

Regional Media
- Regional Media Outlets

City of Pittsburgh
- City of Pittsburgh Parking Authority Offices
City of Pittsburgh

City of Pittsburgh Parking Authority Offices

roadway information system status
roadway information system data

Existing
Planned

City of Pittsburgh

City of Pittsburgh Field Devices
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

- parking availability
- parking demand management response
- road network conditions
- current asset restrictions
- parking demand management request
- parking instructions
- request for road network conditions
- traffic information coordination

City of Pittsburgh

City of Pittsburgh Parking Authority Offices

Existing
Planned
City of Pittsburgh TMC
City of Pittsburgh TMC Interconnect Diagram
City of Pittsburgh

City of Pittsburgh TMC

request for road network conditions
road network conditions

Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Existing
Planned
City of Pittsburgh

City of Pittsburgh TMC

roadway information system status
signal control status
traffic flow
traffic images
roadway information system data
signal control data
video surveillance control

City of Pittsburgh

City of Pittsburgh Field Devices

Existing
Planned
Counties

County EMA Centers

- emergency traffic control response
- incident information request
- resource deployment status
- road network conditions
- emergency traffic control request
- request for road network conditions
- resource request
- incident information

City of Pittsburgh

City of Pittsburgh TMC

Existing
Planned
Mobility Technologies

Mobility Technologies ATIS Administration

- archive analysis requests
- road network conditions
- archive analysis results
- request for road network conditions

City of Pittsburgh

City of Pittsburgh TMC

Existing

Planned
Municipalities

Municipal Traffic Management Offices

City of Pittsburgh

City of Pittsburgh TMC

Existing

Planned

- traffic control coordination
- traffic information coordination
- work plan coordination
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

- road network conditions
- current asset restrictions
- request for road network conditions
- archive coordination
- traffic control coordination
- traffic information coordination

City of Pittsburgh

City of Pittsburgh TMC

Existing

Planned
Port of Pittsburgh Commission

Port of Pittsburgh Commission Office

road network conditions
request for road network conditions

City of Pittsburgh

City of Pittsburgh TMC

Existing
Planned
Regional Media

Regional Media Outlets

- road network conditions
- media information request

City of Pittsburgh

City of Pittsburgh TMC

Existing
Planned
Commercial Vehicle Company Offices
Commercial Vehicle Company Offices Interconnect Diagram

Commercial Vehicle Companies
- Commercial Vehicles

Pennsylvania Emergency Management Agency (PEMA)
- PEMA Emergency Operation Center

Pennsylvania Department of Transportation (PennDOT)
- PennDOT Central Office Organizations

Pennsylvania Department of Transportation (PennDOT)
- PennDOT STMC

Commercial Vehicle Companies
- Commercial Vehicle Company Offices

Pennsylvania Turnpike Commission (PTC)
- PTC Offices

318
Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Commercial Vehicle Companies

Commercial Vehicle Company Offices

Existing

Planned

hazmat information
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

- audit data
- credential application

Commercial Vehicle Companies

Commercial Vehicle Company Offices

Existing

Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

credential application
hazmat information
credentials information
credentials status information
hazmat information request
road network conditions

Commercial Vehicle Companies

Commercial Vehicle Company Offices

---
Existing
Planned
Commercial Vehicle Companies

Commercial Vehicles

- fleet to driver update
- on-board safety request
- on-board vehicle request
- trip identification number
- trip log request
- driver to fleet request
- on-board safety data
- on-board vehicle data
- trip log

Existing
Planned

Commercial Vehicle Companies
Commercial Vehicle Company Offices
Commercial Vehicles
# Commercial Vehicles Interconnect Diagram

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Existing Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Field Devices

Commercial Vehicle Companies

Commercial Vehicles

Existing
Planned

- Safety inspection record
- Screening event record
- Tag data
Commercial Vehicle Companies

Commercial Vehicles

- fleet to driver update
- on-board safety request
- on-board vehicle request
- trip identification number
- trip log request
- driver to fleet request
- on-board safety data
- on-board vehicle data
- trip log

Commercial Vehicle Companies

Commercial Vehicle Company Offices

Existing
Planned
County EMA Centers
County EMA Centers Interconnect Diagram
Allegheny County Airport Authority (ACAA)

ACAA Office

Counties

County EMA Centers

- resource deployment status
- resource request
- incident information

Existing
Planned
Counties

911 Communication Centers

incident report
incident response coordination

Existing
Planned

Counties

County EMA Centers
Mobility Technologies

Mobility Technologies ATIS Administration

Counties

County EMA Centers

incident information

Existing
Planned
Counties

County EMA Centers

incident report
incident response coordination

Municipalities

Municipal Public Safety Offices

Existing
Planned
Port Authority of Allegheny County (PAAC)

PAAC Centers

- Transit emergency coordination data
- Incident response coordination
- Transit emergency data

Counties

County EMA Centers

Existing
Planned
Counties

County EMA Centers

incident report
incident response coordination

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 County Maintenance Offices

- request for road network conditions
- resource request
- incident information request
- resource deployment status
- road network conditions
- incident information

Counties

County EMA Centers

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

- emergency traffic control request
- incident response status
- request for road network conditions
- resource request
- emergency traffic control response
- incident information request
- resource deployment status
- road network conditions
- incident information

Counties

County EMA Centers

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

- emergency traffic control request
- incident response status
- request for road network conditions
- resource request
- emergency traffic control response
- incident information request
- resource deployment status
- road network conditions
- incident information

Existing

Planned

Counties

County EMA Centers
Regional Transit Agencies

Regional Transit Agency Offices

transit emergency coordination data
transit emergency data

Counties

County EMA Centers

Existing
Planned
Regional Media

Regional Media Outlets

incident information for media
media information request

Counties

County EMA Centers

Existing
Planned
Various Stakeholders

High Threat Facilities

- high threat facility incident information
- incident information request
- incident information
- incident report
- incident response coordination

Counties

County EMA Centers

Existing

Planned
High Threat Facilities
High Threat Facilities Interconnect Diagram

- Counties
  - 911 Communication Centers

- Counties
  - County EMA Centers

Various Stakeholders
  - High Threat Facilities
Various Stakeholders

High Threat Facilities

- High threat facility incident information
- Incident report
- Incident response coordination

Counties

911 Communication Centers

---

Existing

Planned
Various Stakeholders

High Threat Facilities

- High threat facility incident information
- Incident information request
- Incident information
- Incident report
- Incident response coordination

Counties

County EMA Centers

Existing
Planned
Mobility Technologies ATIS Administration Interconnect Diagram
Mobility Technologies

Mobility Technologies ATIS Administration

request for road network conditions
road network conditions

Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Existing
Planned
Mobility Technologies

Mobility Technologies ATIS Administration

City of Pittsburgh

City of Pittsburgh TMC

- archive analysis requests
- road network conditions
- archive analysis results
- request for road network conditions

Existing

Planned
Counties

County EMA Centers

incident information

Mobility Technologies

Mobility Technologies ATIS Administration

Existing

Planned
Municipalities

Municipal Traffic Management Offices

request for road network conditions
road network conditions

Existing
Planned

Mobility Technologies

Mobility Technologies ATIS Administration
Mobility Technologies

Mobility Technologies ATIS Administration

road weather information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Existing

Planned
General Public

Personal Traveler Information Devices

Mobility Technologies

Mobility Technologies ATIS Administration

Existing
Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

- incident information request
- incident information
- request for road network conditions
- road network conditions

Mobility Technologies

Mobility Technologies ATIS Administration

Existing

Planned
Various Stakeholders

Mobility Technologies

Mobility Technologies ATIS Administration

ISP coordination

Regional Travel Information System

Existing

Planned
Regional Media

Regional Media Outlets

traveler information for media
external reports

Existing
Planned

Mobility Technologies

Mobility Technologies ATIS Administration
Mobility Technologies

Mobility Technologies Field Devices

- environmental sensors control
- traffic sensor control
- video surveillance control
- environmental conditions data
- speed monitoring information
- traffic flow
- traffic images

Existing

Planned

Mobility Technologies

Mobility Technologies ATIS Administration
Mobility Technologies

Mobility Technologies ATIS Administration

ISP coordination

Transportation Management Associations

TMA Offices

Existing

Planned
Mobility Technologies
Field Devices
Mobility Technologies Field Devices

Interconnect Diagram

Mobility Technologies

Mobility Technologies Field Devices

Mobility Technologies

Mobility Technologies ATIS Administration

Existing
Planned
Municipal Field Devices
Municipal Field Devices Interconnect Diagram

- Beaver County Transit Authority (BCTA)
  - BCTA Transit Vehicles

- City of Pittsburgh
  - City of Pittsburgh Field Devices

- Municipalities

- Municipal Traffic Management Offices

- Municipalities
  - Municipal Field Devices

- Port Authority of Allegheny County (PAAC)
  - PAAC Transit Vehicles

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

- Pennsylvania Department of Transportation (PennDOT)
  - PennDOT D12 Field Devices

- Regional Transit Agencies
  - Regional Transit Vehicles
Beaver County Transit Authority (BCTA)

BCTA Transit Vehicles
Municipalities

Municipal Field Devices

City of Pittsburgh

City of Pittsburgh Field Devices

roadway equipment coordination

Existing

Planned
Municipalities

Municipal Field Devices

local signal preemption request

Municipalities

Municipal Public Safety Vehicles

Existing
Planned
Municipalities

Municipal Traffic Management Offices

- field device status
- signal control status
- traffic flow
- traffic images
- signal control data

Existing

Planned

Municipal Field Devices
Port Authority of Allegheny County (PAAC)

PAAC Transit Vehicles

Municipalities

Municipal Field Devices

local signal priority request

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

- Signal control status
- Traffic flow
- Signal control data

Municipalities

Municipal Field Devices

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

Municipalities

Municipal Field Devices

Existing
Planned

roadway equipment coordination

PennDOT D12 Field Devices
Municipalities

Municipal Field Devices

Regional Transit Agencies

Regional Transit Vehicles

---

local signal priority request
Municipal Public Safety Offices
Municipal Public Safety Offices Interconnect Diagram
Counties

911 Communication Centers

incident report
incident response coordination

Municipalities

Municipal Public Safety Offices

Existing
Planned
Counties

County EMA Centers

Municipalities

Municipal Public Safety Offices

incident report
incident response coordination

Existing
Planned
Municipalities

Municipal Public Safety Vehicles

- emergency dispatch requests
- incident command information
- emergency dispatch response
- emergency vehicle tracking data
- incident command request
- incident status

Existing
Planned
Port Authority of Allegheny County (PAAC)

Municipalities

Municipal Public Safety Offices

incident report
incident response coordination

Existing
Planned

PAAC Centers
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 County Maintenance Offices

- maint and constr resource request
- maint and constr resource response

Existing

Planned

Municipalities

Municipal Public Safety Offices
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Resource request
Resource deployment status

Municipalities

Municipal Public Safety Offices

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

 existing

planned

municipalities

municipal public safety offices

maint and constr resource request

maint and constr resource response
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Municipalities

Municipal Public Safety Offices

Existing

Planned

resource request
resource deployment status
Pennsylvania State Police (PSP)

PSP Offices

- incident report
- incident response coordination

Municipalities

Municipal Public Safety Offices

Existing

Planned
Municipal Public Safety Vehicles
Municipal Public Safety Vehicles Interconnect Diagram

- Counties
  - 911 Communication Centers

- City of Pittsburgh
  - City of Pittsburgh Field Devices

- Municipalities
  - Municipal Field Devices

- Municipalities
  - Municipal Public Safety Offices
  - Municipal Public Safety Vehicles

Existing
Planned
Municipalities

Municipal Public Safety Vehicles

City of Pittsburgh

City of Pittsburgh Field Devices

local signal preemption request

Existing

Planned
Counties

911 Communication Centers

Existing

Planned

Municipalities

Municipal Public Safety Vehicles

- emergency dispatch requests
- incident command information
- emergency dispatch response
- emergency vehicle tracking data
- incident command request
- incident status
Municipalities

Municipal Public Safety Vehicles

- emergency dispatch requests
- incident command information
- emergency dispatch response
- emergency vehicle tracking data
- incident command request
- incident status

Existing

Planned

Municipal Public Safety Offices
Municipal Traffic Management Offices
Municipal Traffic Management Offices Interconnect Diagram

- Pennsylvania Department of Transportation (PennDOT)
  - PennDOT D12 County Maintenance Offices
  - PennDOT D12 TMC
  - City of Pittsburgh
    - City of Pittsburgh TMC
  - Municipalities
    - Municipal Field Devices
    - Municipal Traffic Management Offices
    - PennDOT D10 TMC
  - PennDOT D10 County Maintenance Offices
  - PennDOT D11 County Maintenance Offices
  - PennDOT D11 RTMC
- Regional Media
  - Regional Media Outlets
- Counties
  - County EMA Centers
- Mobility Technologies
  - Mobility Technologies ATIS Administration
- PennDOT D10 TMC
- PennDOT D11 TMC
City of Pittsburgh

City of Pittsburgh TMC

Existing

Planned

Municipalities

Municipal Traffic Management Offices

- traffic control coordination
- traffic information coordination
- work plan coordination
Municipalities

Municipal Traffic Management Offices

- request for road network conditions
- road network conditions

Mobility Technologies

Mobility Technologies ATIS Administration

Existing
Planned
Municipalities

Municipal Traffic Management Offices

field device status
signal control status
traffic flow
traffic images
signal control data

Municipalities

Municipal Field Devices

Existing
Planned
Municipalities

Municipal Traffic Management Offices

maint and constr resource coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 County Maintenance Offices

Existing

Planned
Municipalities

Municipal Traffic Management Offices

- road network conditions
- maint and constr resource coordination
- traffic control coordination
- traffic information coordination
- work plan coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC
Municipalities

Municipal Traffic Management Offices

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

maint and constr resource coordination

Existing

Planned
Municipalities

Municipal Traffic Management Offices

- Road network conditions
- Maint and constr resource coordination
- Traffic control coordination
- Traffic information coordination
- Work plan coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Existing
Planned
Regional Media

Regional Media Outlets

- road network conditions
- media information request

Municipalities

Municipal Traffic Management Offices

Existing
Planned
PAAC Centers
Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Port Authority of Allegheny County (PAAC)

PAAC Centers

Existing
Planned
Port Authority of Allegheny County (PAAC)

PAAC Centers

road network conditions
request for road network conditions

City of Pittsburgh

City of Pittsburgh TMC

Existing
Planned
Port Authority of Allegheny County (PAAC)

PAAC Centers

transit emergency coordination data
transit emergency data

Counties

911 Communication Centers

Existing
Planned
Port Authority of Allegheny County (PAAC)

PAAC Centers

- transit emergency coordination data
- incident response coordination
- transit emergency data

Counties

County EMA Centers
Port Authority of Allegheny County (PAAC)

PAAC Centers

Mobility Technologies

Mobility Technologies ATIS Administration

Existing

Planned

road network conditions
request for road network conditions
Port Authority of Allegheny County (PAAC)

PAAC Remote Traveler Support

- Personal transit information
- Secure area monitoring support
- Transit fare payment responses
- Transit traveler information
- Trip plan
- Secure area surveillance data
- Transit fare payment requests
- Transit information user request
- Trip confirmation
- Trip request

Port Authority of Allegheny County (PAAC)

PAAC Centers

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## Port Authority of Allegheny County (PAAC)

### PAAC Transit Vehicles

- Driver instructions
- Emergency acknowledge
- Fare management information
- Transit schedule information
- Fare and payment status
- Transit vehicle conditions
- Transit vehicle location data
- Transit vehicle passenger and use data
- Transit vehicle schedule performance

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### Existing

### Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

- transit archive data
- archive requests

Port Authority of Allegheny County (PAAC)

PAAC Centers

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

- request for road network conditions
- current asset restrictions
- road network conditions
- incident report

Port Authority of Allegheny County (PAAC)

PAAC Centers

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Remote Traveler Support

Port Authority of Allegheny County (PAAC)

PAAC Centers

broadcast information

Existing

Planned
General Public

Personal Traveler Information Devices

Port Authority of Allegheny County (PAAC)

PAAC Centers

- broadcast information
- personal transit information
- trip plan
- transit information user request
- trip confirmation
- trip request

Existing

Planned
Regional Transit Agencies

Port Authority of Allegheny County (PAAC)

PAAC Centers

Regional Transit Agency Offices

TRMS coord

Existing

Planned
Various Stakeholders

Regional Travel Information System

- demand responsive transit plan
- transit and fare schedules
- transit incident information
- transit request confirmation
- demand responsive transit request
- incident information request
- selected routes
- transit information request

Port Authority of Allegheny County (PAAC)

PAAC Centers

Existing
Planned
Various Stakeholders

Park-n-Ride Facilities

- parking lot data request
- parking reservations request
- transit parking lot response
- parking information
- parking lot reservation confirmation
- transit parking coordination

Port Authority of Allegheny County (PAAC)

PAAC Centers

Existing
Planned
Southwest Pennsylvania Commission (SPC)

SPC Office

Port Authority of Allegheny County (PAAC)

PAAC Centers

- transit and fare schedules
- transit incident information
- transit request confirmation
- transit information request

Existing
Planned
PAAC Remote Traveler Support
## PAAC Remote Traveler Support Interconnect Diagram

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- **General Public**: Regional Personal Traveler Cards
- **Various Stakeholders**: Regional Travel Information System

- **Existing**
- **Planned**
Port Authority of Allegheny County (PAAC)

PAAC Remote Traveler Support

- personal transit information
- secure area monitoring support
- transit fare payment responses
- transit traveler information
- trip plan
- secure area surveillance data
- transit fare payment requests
- transit information user request
- trip confirmation
- trip request

Port Authority of Allegheny County (PAAC)

PAAC Centers

Existing
 Planned
General Public

Regional Personal Traveler Cards

Port Authority of Allegheny County (PAAC)

PAAC Remote Traveler Support

Existing
Planned

request for payment
payment
Various Stakeholders

Regional Travel Information System

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

Port Authority of Allegheny County (PAAC)

PAAC Remote Traveler Support
PAAC Transit Vehicles
PAAC Transit Vehicles Interconnect Diagram

City of Pittsburgh
City of Pittsburgh Field Devices

Municipalities
Municipal Field Devices

Port Authority of Allegheny County (PAAC)
PAAC Centers

General Public
Regional Personal Traveler Cards

Port Authority of Allegheny County (PAAC)
PAAC Transit Vehicles

Existing
Planned
City of Pittsburgh

City of Pittsburgh Field Devices

Port Authority of Allegheny County (PAAC)

PAAC Transit Vehicles

local signal priority request

Existing

Planned
Municipalities

Municipal Field Devices

Port Authority of Allegheny County (PAAC)

PAAC Transit Vehicles

local signal priority request

Existing

Planned
Port Authority of Allegheny County (PAAC)

PAAC Transit Vehicles

- Driver instructions
- Emergency acknowledge
- Fare management information
- Transit schedule information
- Fare and payment status
- Transit vehicle conditions
- Transit vehicle location data
- Transit vehicle passenger and use data
- Transit vehicle schedule performance

Port Authority of Allegheny County (PAAC)

PAAC Centers

Existing
Planned
General Public

Regional Personal Traveler Cards

Port Authority of Allegheny County (PAAC)

PAAC Transit Vehicles

Existing
Planned

request for payment
payment
Park-n-Ride Facilities
Park-n-Ride Facilities Interconnect Diagram

- Allegheny County Airport Authority (ACAA)
  - ACAA Office

- Beaver County Transit Authority (BCTA)
  - BCTA Transit Management Center

- Port Authority of Allegheny County (PAAC)
  - PAAC Centers

- General Public
  - Passenger Vehicles

- Various Stakeholders
  - Park-n-Ride Facilities

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

- General Public
  - Regional Personal Traveler Cards

- Regional Transit Agencies
  - Regional Transit Agency Offices

Existing
Planned
Various Stakeholders

Park-n-Ride Facilities

Allegheny County Airport Authority (ACAA)

ACAA Office

parking coordination

Existing
Planned
Various Stakeholders

Park-n-Ride Facilities

- parking lot data request
- parking reservations request
- transit parking lot response
- parking information
- parking lot reservation confirmation
- transit parking coordination

Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Field Devices

roadway information system data
roadway information system status

Various Stakeholders

Park-n-Ride Facilities

Existing
Planned
Various Stakeholders

Park-n-Ride Facilities

Regional Personal Traveler Cards

request for payment

Existing

Planned
Various Stakeholders

Regional Transit Agencies

Regional Transit Agency Offices

parking information
parking lot reservation confirmation
transit parking coordination
parking lot data request
parking reservations request
transit parking lot response

Existing
Planned

Park-n-Ride Facilities
Various Stakeholders

Park-n-Ride Facilities

General Public

Passenger Vehicles

request tag data

tag data

Existing

Planned
Passenger Vehicles
Passenger Vehicles Interconnect Diagram

- Allegheny County Airport Authority (ACAA)
  - ACAA Field Devices

- City of Pittsburgh
  - City of Pittsburgh Field Devices

- Various Stakeholders
  - Park-n-Ride Facilities

- Pennsylvania Turnpike Commission (PTC)
  - PTC Toll Plazas

- General Public
  - Passenger Vehicles
City of Pittsburgh

City of Pittsburgh Field Devices

General Public

Passenger Vehicles

request tag data

tag data

Existing

Planned
Pennsylvania Turnpike Commission (PTC)

PTC Toll Plazas

tag data
request tag data

General Public
Passenger Vehicles

Existing
Planned
General Public

Passenger Vehicles

Allegheny County Airport Authority (ACAA)

ACAA Field Devices

Existing

Planned
Various Stakeholders

Park-n-Ride Facilities

General Public

Passenger Vehicles

request tag data

tag data

Existing
Planned
PEMA Emergency Operation Center
PEMA Emergency Operation Center Interconnect Diagram

Counties
- 911 Communication Centers

Commercial Vehicle Companies
- Commercial Vehicle Company Offices

Counties
- County EMA Centers

Pennsylvania Department of Transportation (PennDOT)
- PennDOT Central Office Organizations

Pennsylvania Emergency Management Agency (PEMA)
- PEMA Emergency Operation Center

Pennsylvania Department of Transportation (PennDOT)
- PennDOT STMC

Pennsylvania Office of Homeland Security
- Pennsylvania Office of Homeland Security

Pennsylvania State Police (PSP)
- PSP Offices

Pennsylvania Turnpike Commission (PTC)
- PTC Offices
Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Counties

911 Communication Centers

incident report
incident response coordination

Existing
Planned
Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Counties

County EMA Centers

incident report
incident response coordination

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

incident response status
incident report
incident response coordination

Existing
Planned
Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

incident response coordination
threat information coordination

Growing

Pennsylvania State Police (PSP)

PSP Offices

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC

- incident response status
- resource request
- incident report
- incident response coordination
- request for road network conditions

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing

Planned
Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Commercial Vehicle Companies

Commercial Vehicle Company Offices

Existing

Planned

hazmat information
PennDOT Central Office
Field Devices
PennDOT Central Office Field Devices Interconnect Diagram

- Commercial Vehicle Companies
  - Commercial Vehicles

- Pennsylvania Department of Transportation (PennDOT)
  - PennDOT Central Office Organizations

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

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

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

- Pennsylvania Department of Transportation (PennDOT)
  - PennDOT STMC

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

daily site activity data
environmental conditions data
field device status
safety inspection report
violation notification
environmental sensors control

existing
planned

Pennsylvania Department of Transportation (PennDOT)

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

PennDOT D10 County Maintenance Offices

PennDOT Central Office Field Devices

environmental conditions data

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 County Maintenance Offices

evironmental conditions data

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Field Devices

Existing Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

environmental conditions data

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Field Devices

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Field Devices

- safety inspection record
- screening event record
- tag data

Commercial Vehicle Companies

Commercial Vehicles

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC

daily site activity data
- environmental conditions data
- field device status
- safety inspection report
- violation notification
- credentials information
- credentials status information
- environmental sensors control
- safety status information

Existing

Planned

Pennsylvania Department of Transportation (PennDOT)

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

PennDOT Central Office Organizations

- maint and constr work plans
- work zone information
- archive requests
- archive status
- incident report
- incident response coordination
- incident response status
- maint and constr resource coordination
- request for road network conditions
- road network conditions
- road weather information
- traffic archive data
- traffic information coordination
- work plan coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC

Existing

Planned
PennDOT D12 TMC

- Traffic control coordination
- Maintenance and construction work plans
- Work zone information
- Archive requests
- Archive status
- Incident report
- Incident response coordination
- Incident response status
- Maintenance and construction resource coordination
- Request for road network conditions
- Road network conditions
- Road weather information
- Traffic archive data
- Traffic information coordination
- Work plan coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

Personal Traveler Information Devices

- broadcast information
- traveler information
- trip plan
- emergency notification
- traveler request

General Public

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

- credentials information
- credentials status information
- incident report
- incident response coordination
- safety inspection report
- safety status information

Pennsylvania State Police (PSP)

PSP Offices

Existing
Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

- road weather information
- archive coordination
- incident report
- incident response coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

Regional Transit Agencies

Regional Transit Agency Offices

archive requests
transit archive data

Existing
Planned

PennDOT Central Office Organizations
Regional Media

Regional Media Outlets

incident information for media
road network conditions
traveler information for media
media information request

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

daily site activity data
environmental conditions data
field device status
safety inspection report
violation notification
environmental sensors control

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Field Devices

Existing
Planned
Commercial Vehicle Companies
Commercial Vehicle Company Offices

PennDOT Central Office Organizations
Pennsylvania Department of Transportation (PennDOT)

Existing
Planned

audit data
credential application
PennDOT D1 Field Devices
PennDOT D1 Field Devices Interconnect Diagram

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Pennsylvania Department of Transportation (PennDOT)

PennDOT D1 Field Devices
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

- field device status
- roadway information system status
- roadway information system data

Pennsylvania Department of Transportation (PennDOT)

PennDOT D1 Field Devices

Existing

Planned
PennDOT D10 County Maintenance Offices
PennDOT D10 County Maintenance Offices Interconnect Diagram

Pennsylvania Department of Transportation (PennDOT)

- PennDOT D11 County Maintenance Offices
- PennDOT D11 RTMC

Pennsylvania Turnpike Commission (PTC)

- PTC Offices

Counties

- 911 Communication Centers

Pennsylvania Department of Transportation (PennDOT)

- PennDOT D12 County Maintenance Offices
- Adjacent PennDOT Districts

Municipalities

- Municipal Traffic Management Offices

Pennsylvania Department of Transportation (PennDOT)

- PennDOT D10 County Maintenance Offices
- PennDOT D10 Field Devices
- PennDOT D10 TMC
- PennDOT D10 Vehicles

General Public

- Personal Traveler Information Devices

Pennsylvania State Police (PSP)

- PSP Offices

Pennsylvania Department of Transportation (PennDOT)

- PennDOT Central Office Field Devices

Regional Media

- Regional Media Outlets

Regional Media

- Municipal Public Safety Offices
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 County Maintenance Offices

maint and constr resource request
maint and constr resource response

Municipalities

Municipal Public Safety Offices

Existing
Planned
Municipalities

Municipal Traffic Management Offices

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 County Maintenance Offices

maint and constr resource coordination

Existing

Planned
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

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 County Maintenance Offices

- maint and constr resource coordination
- work plan coordination
- work zone information

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Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

Existing
Planned
General Public

Personal Traveler Information Devices

broadcast information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 County Maintenance Offices

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 County Maintenance Offices

Pennsylvania Turnpike Commission (PTC)

PTC Offices

incident information
maint and constr resource coordination
work plan coordination

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 County Maintenance Offices

Regional Media

Regional Media Outlets

maint and constr work plans
media information request

Existing
Planned
PennDOT D10 County Maintenance Offices

PennDOT D10 Vehicles

- maint and constr dispatch information
- maint and constr dispatch status
- maint and constr vehicle conditions
- maint and constr vehicle operational data
- work zone status

Pennsylvania Department of Transportation (PennDOT)
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 County Maintenance Offices

PennDOT Central Office Field Devices

environmental conditions data

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT Districts

PennDOT D10 County Maintenance Offices

maint and constr resource coordination

Existing
Planned
PennDOT D10 Field Devices
PennDOT D10 Field Devices
Interconnect Diagram

Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT Districts

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 County Maintenance Offices

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 Field Devices

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

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)

PennDOT D10 County Maintenance Offices

Existing
Planned
PennDOT D10 TMC

existing
planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

- field device status
- roadway information system status
- roadway information system data

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 Field Devices

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 Field Devices

roadway information system data
roadway information system status

Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT Districts

Existing
Planned
PennDOT D10 TMC
PennDOT D10 TMC Interconnect Diagram
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC

- resource request
- incident report
- incident response coordination
- resource deployment status
- incident information

Counties

911 Communication Centers

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC

- emergency traffic control request
- incident response status
- request for road network conditions
- resource request
- emergency traffic control response
- incident information request
- resource deployment status
- road network conditions
- incident information

Counties

County EMA Centers

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC

- work plan coordination
- road network conditions
- maint and constr resource coordination
- traffic control coordination
- traffic information coordination

Existing

Planned

Municipalities

Municipal Traffic Management Offices
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

- maint and constr work plans
- work zone information
- archive requests
- archive status
- incident report
- incident response coordination
- incident response status
- maint and constr resource coordination
- request for road network conditions
- road network conditions
- road weather information
- traffic archive data
- traffic information coordination
- work plan coordination

Existing

Planned

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC

- equipment maintenance status
- incident information request
- request for road network conditions
- incident information
- road network conditions
- current asset restrictions
- maint and constr resource coordination
- road weather information
- roadway maintenance status
- work plan coordination
- work zone information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 County Maintenance Offices

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Existing
---
Planned
General Public

Personal Traveler Information Devices

broadcast information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC

Existing
Planned
Pennsylvania State Police (PSP)

PSP Offices

- Maintain and constr work plans
- Road network conditions
- Road weather information
- Incident information
- Incident information request
- Incident response status
- Request for road network conditions
- Resource request
- Incident report
- Incident response coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC

Existing

Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

- roadway maintenance status
- maint and constr resource coordination
- resource deployment status
- resource request
- incident information
- incident information request
- incident report
- incident response coordination
- incident response status
- request for road network conditions
- road network conditions
- traffic control coordination
- traffic information coordination
- work plan coordination
- work zone information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC

Existing

Planned
Various Stakeholders

Regional Travel Information System

- road network conditions
- request for road network conditions

- Existing
- Planned

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC
Regional Media

Regional Media Outlets

incident information for media
road network conditions
media information request

Pennsylvania Department of Transportation (PennDOT)
PennDOT D10 TMC

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Existing
Planned
PennDOT D10 Vehicles
PennDOT D10 Vehicles Interconnect Diagram

Pennsylvania Department of Transportation (PennDOT)

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Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 Vehicles

- maint and constr dispatch information
- maint and constr dispatch status
- maint and constr vehicle conditions
- maint and constr vehicle operational data
- work zone status

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 County Maintenance Offices

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 Vehicles

- maint and constr dispatch information
- maint and constr dispatch status
- maint and constr vehicle operational data
- work zone status

Existing

Planned

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC
PennDOT D11 County Maintenance Offices
PennDOT D11 County Maintenance Offices Interconnect Diagram
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 County Maintenance Offices

request for road network conditions
resource request
incident information request
resource deployment status
road network conditions
incident information

Existing
Planned

Counties

County EMA Centers
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 County Maintenance Offices

Municipalities

Municipal Traffic Management Offices

maint and constr resource coordination
PennDOT D11 County Maintenance Offices

Existing
Planned

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Field Devices

roadway information system data
video surveillance control
work zone warning device control
accident report
environmental conditions data
field device status
roadway information system status
traffic flow
traffic images
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

current asset restrictions
equipment maintenance status
road weather information
roadway maintenance status
maint and constr resource coordination
traffic control coordination
traffic information coordination
work plan coordination
work zone information

Existing
Planned

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 County Maintenance Offices
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- broadcast information

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</tbody>
</table>

- Existing
- Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 County Maintenance Offices

- maint and constr resource coordination
- work plan coordination
- work zone information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices
PennDOT D11 Field Devices
PennDOT D11 Field Devices
Interconnect Diagram

- Allegheny County Airport Authority (ACAA)
  - ACAA Office

- City of Pittsburgh
  - City of Pittsburgh Field Devices

- Various Stakeholders
  - Park-n-Ride Facilities

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

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

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

 Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Field Devices

roadway information system data
roadway information system status

Allegheny County Airport Authority (ACAA)

ACAA Office

Existing
Planned
City of Pittsburgh Field Devices

roadway equipment coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Field Devices

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Field Devices

- roadway information system data
- video surveillance control
- work zone warning device control
- accident report
- environmental conditions data
- field device status
- roadway information system status
- traffic flow
- traffic images

Existing

Planned
PennDOT D11 RTMC

- Environmental conditions data
- Field device status
- Freeway control status
- Roadside archive data
- Roadway information system status
- Traffic flow
- Traffic images
- Data collection and monitoring control
- Environmental sensors control
- Freeway control data
- Roadway information system data
- Video surveillance control

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Field Devices

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Field Devices

roadway information system data
roadway information system status

Various Stakeholders

Park-n-Ride Facilities

Existing
Planned
PennDOT D11 Remote Traveler Support
PennDOT D11 Remote Traveler Support Interconnect Diagram
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

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 County Maintenance Offices

Existing

Planned
Various Stakeholders

Regional Travel Information System

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

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Remote Traveler Support

Existing
Planned
PennDOT D11 RTMC
Allegheny County Airport Authority (ACAA)

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Existing

Planned

traffic control coordination
traffic information coordination
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

- request for road network conditions
- current asset restrictions
- road network conditions
- road weather information

Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

City of Pittsburgh

City of Pittsburgh Parking Authority Offices

Existing

Planned

- parking availability
- parking demand management response
- road network conditions
- current asset restrictions
- parking demand management request
- parking instructions
- request for road network conditions

traffic information coordination
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

- resource request
- incident report
- incident response coordination
- resource deployment status
- road network conditions
- incident information

Counties

911 Communication Centers
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

- emergency traffic control request
- incident response status
- request for road network conditions
- resource request
- emergency traffic control response
- incident information request
- resource deployment status
- road network conditions
- incident information

Counties

County EMA Centers

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

resource request
resource deployment status

Municipalities

Municipal Public Safety Offices

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

- Signal control status
- Traffic flow
- Signal control data

Municipalities

Municipal Field Devices
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Municipalities

Municipal Traffic Management Offices

- road network conditions
- maint and constr resource coordination
- traffic control coordination
- traffic information coordination
- work plan coordination

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Port Authority of Allegheny County (PAAC)

PAAC Centers

- request for road network conditions
- current asset restrictions
- road network conditions

incident report

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

- Existing
- Planned

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

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

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Remote Traveler Support

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

- road network conditions
- request for road network conditions
- current asset restrictions
- incident information
- road weather information
- roadway maintenance status
- work plan coordination
- work zone information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 Field Devices

roadway information system data
field device status
roadway information system status

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

- current asset restrictions
- incident report
- incident response coordination
- maint and constr resource coordination
- road weather information
- roadway maintenance status
- traffic control coordination
- traffic information coordination
- work plan coordination
- work zone information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Existing

Planned
Various Stakeholders

Regional Travel Information System

- road network conditions
- request for road network conditions

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Existing
Planned
Various Stakeholders

Park-n-Ride Facilities

- parking availability
- parking demand management response
- parking demand management request
- parking instructions

Existing
Planned
Southwest Pennsylvania Commission (SPC)

SPC Office

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Existing

Planned

- maint and constr work plans
- road network conditions
- request for road network conditions
Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT District and County Offices

incident report
incident response coordination
traffic control coordination
traffic information coordination
work plan coordination

Existing
Planned

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC
PennDOT D11 Vehicles
PennDOT D11 Vehicles Interconnect Diagram

Pennsylvania Department of Transportation (PennDOT)

- PennDOT D11 County Maintenance Offices
- PennDOT D11 RTMC
- PennDOT D11 Vehicles

Pennsylvania State Police (PSP)

- PSP Offices

Existing
Planned
Pennsylvania State Police (PSP)

PSP Offices

eergency dispatch response
incident status
emergency dispatch requests

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Vehicles

Existing
Planned
PennDOT D12 County Maintenance Offices
PennDOT D12 County Maintenance Offices Interconnect Diagram
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

- maint and constr resource request
- incident information request
- maint and constr resource response
- incident information

Counties

911 Communication Centers

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

maint and constr resource request
maint and constr resource response

Municipalities

Municipal Public Safety Offices

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

Municipalities

Municipal Traffic Management Offices

maint and constr resource coordination
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 County Maintenance Offices

- maint and constr resource coordination
- work plan coordination
- work zone information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

Existing

Planned
PennDOT D12 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

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 Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

Regional Media

Regional Media Outlets

maint and constr work plans
media information request

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 Vehicles

- Maintain and constr dispatch information
- Maintain and constr dispatch status
- Maintain and constr vehicle conditions
- Maintain and constr vehicle operational data
- Work zone status
- Work zone warning status

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

Existing - Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

environmental conditions data

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Field Devices

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT Districts

PennDOT D12 County Maintenance Offices

maint and constr resource coordination

Existing
Planned
PennDOT D12 Field Devices
PennDOT D12 Field Devices Interconnect Diagram

Municipalities
- Municipal Field Devices

Pennsylvania Department of Transportation (PennDOT)
- PennDOT D11 RTMC
- PennDOT D12 TMC
- PennDOT D12 Field Devices

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

Existing
Planned
Municipalities

Municipal Field Devices

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 Field Devices

roadway equipment coordination

Existing
Planned

640
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 Field Devices

roadway information system data
field device status
roadway information system status

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

- environmental conditions data
- field device status
- roadway information system status
- traffic flow
- traffic images
- work zone warning status
- environmental sensors control
- roadway information system data
- traffic sensor control
- video surveillance control

Existing

Planned

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 Field Devices
PennDOT D12 TMC
PennDOT D12 TMC Interconnect Diagram
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

- resource request
- incident report
- incident response coordination
- resource deployment status
- incident information

Counties

911 Communication Centers

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

County EMA Centers

Existing

Planned
Mobility Technologies

Mobility Technologies ATIS Administration

road weather information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

resource request
resource deployment status

Municipalities

Municipal Public Safety Offices

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Existing
Planned

Municipalities

Municipal Traffic Management Offices

- road network conditions
- maint and constr resource coordination
- traffic control coordination
- traffic information coordination
- work plan coordination
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

- Traffic control coordination
- Traffic archive data
- Traffic information coordination
- Work plan coordination
- Incident report
- Incident response status
- Incident response coordination
- Maintain and construct resource coordination
- Road network conditions
- Road weather information
- Archive requests
- Archive status
- Incident report
- Incident response status
- Maintain and construct work plans
- Work zone information
- Road network conditions

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

Existing

Planned

651
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC

incident report
incident response coordination
maint and constr resource coordination
road weather information
roadway maintenance status
traffic information coordination
work plan coordination
work zone information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

- current asset restrictions
- incident report
- incident response coordination
- maint and constr resource coordination
- road weather information
- roadway maintenance status
- traffic control coordination
- traffic information coordination
- work plan coordination
- work zone information

Existing

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

- environmental conditions data
- field device status
- roadway information system status
- traffic flow
- traffic images
- work zone warning status
- environmental sensors control
- roadway information system data
- traffic sensor control
- video surveillance control

Existing
- Planned

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 Field Devices
Pennsylvania Department of Transportation (PennDOT)  
PennDOT D12 TMC

Pennsylvania State Police (PSP)  
PSP Offices

Maint and constr work plans  
Road network conditions  
Road weather information  
Incident information  
Incident information request  
Incident response status  
Maint and constr resource request  
Resource request  
Incident report  
Incident response coordination

Existing  
Planned
Various Stakeholders

Regional Travel Information System

- road network conditions
- request for road network conditions

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Existing
Planned
Regional Media

Regional Media Outlets

incident information for media
road network conditions
media information request

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 Vehicles

- maintain and constr dispatch information
- maintain and constr dispatch status
- maintain and constr vehicle operational data
- work zone status

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Existing
Planned
<table>
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<td>traffic information coordination</td>
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<td>work zone information</td>
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| Pennsylvania Department of Transportation (PennDOT) | PennDOT D12 TMC |

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

Adjacent PennDOT District and County Offices

- incident report
- incident response coordination
- traffic control coordination
- traffic information coordination
- work plan coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Existing

Planned
PennDOT D12 Vehicles
PennDOT D12 Vehicles Interconnect Diagram

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

PennDOT D12 TMC

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 Vehicles

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 Vehicles

- maint and constr dispatch information
- maint and constr dispatch status
- maint and constr vehicle conditions
- maint and constr vehicle operational data
- work zone status
- work zone warning status

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 Vehicles

- maint and constr dispatch information
- maint and constr dispatch status
- maint and constr vehicle operational data
- work zone status

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Existing
Planned
PennDOT STMC
Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC

- road network conditions
- request for road network conditions
- road weather information
- archive coordination
- ISP coordination

Mobility Technologies

Mobility Technologies ATIS Administration

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC

- incident response status
- resource request
- incident report
- incident response coordination
- request for road network conditions

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

- Archive status
- Archive coordination
- Archive requests
- Commercial vehicle archive data
- Credentials information
- Credentials status information
- Current asset restrictions
- Incident report
- Incident response coordination
- Incident response status
- Maint and constr resource coordination
- Request for road network conditions
- Road network conditions
- Road weather information
- Safety inspection report
- Safety status information
- Traffic archive data
- Traffic control coordination
- Traffic information coordination
- Work zone information

Existing
Planned

Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC
Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC

- incident response status
- request for road network conditions
- resource request
- incident information
- incident information request
- incident report
- incident response coordination

Pennsylvania State Police (PSP)

PSP Offices

Existing
Planned
Regional Media

Regional Media Outlets

- incident information for media
- road network conditions
- road weather information
- traveler information for media
- media information request

Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC

- daily site activity data
- environmental conditions data
- field device status
- safety inspection report
- violation notification
- credentials information
- credentials status information
- environmental sensors control
- safety status information

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Field Devices

Existing
Planned
Pennsylvania Office of Homeland Security
Pennsylvania Office of Homeland Security Interconnect Diagram

Pennsylvania Office of Homeland Security

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing
Planned
Pennsylvania Office of Homeland Security

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

- high threat facility incident information
- threat information coordination

Existing

Planned
Personal Traveler
Information Devices
Personal Traveler Information Devices Interconnect Diagram
Allegheny County Airport Authority (ACAA)

ACAA Office

General Public

Personal Traveler Information Devices

broadcast information

Existing

Planned
Beaver County Transit Authority
(BCTA)

BCTA Transit Management Center

General Public

Personal Traveler Information Devices

- personal transit information
- trip plan
- transit information user request
- trip confirmation
- trip request

Existing

Planned
General Public

Personal Traveler Information Devices

Counts

911 Communication Centers

emergency acknowledge
emergency notification
General Public

Personal Traveler Information Devices

- broadcast information
- personal transit information
- trip plan
- transit information user request
- trip confirmation
- trip request

Port Authority of Allegheny County (PAAC)

PAAC Centers

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 County Maintenance Offices

broadcast information

General Public

Personal Traveler Information Devices

Existing

Planned
General Public

Personal Traveler Information Devices

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC

- broadcast information

Existing

Planned
General Public

Personal Traveler Information Devices

broadcast information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Existing

Planned
General Public

Personal Traveler Information Devices

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

Existing

Planned

broadcast information
Pennsylvania Turnpike Commission (PTC)

PTC Offices

General Public

Personal Traveler Information Devices

emergency notification
broadcast information

Existing
Planned
Regional Transit Agencies

Regional Transit Agency Offices

- transit information user request
- trip confirmation
- trip request
- broadcast information
- personal transit information
- trip plan

General Public

Personal Traveler Information Devices

Existing
Planned
Various Stakeholders

Regional Travel Information System

- traveler profile
- trip confirmation
- trip request
- broadcast information
- traveler information
- trip plan

General Public

Personal Traveler Information Devices

Existing

Planned
Transportation Management Associations

TMA Offices

General Public

Personal Traveler Information Devices

traveler profile
traveler request
broadcast information
traveler information

Existing
Planned
Port Facilities Interconnect Diagram

- **Commercial Vehicle Companies**
  - Commercial Vehicles

- **Port of Pittsburgh Commission**
  - Port of Pittsburgh Commission Office

- **Private Wrecker Companies**
  - Port Facilities

Existing
Planned
Private Wrecker Companies

Port Facilities

Port of Pittsburgh Commission

Port of Pittsburgh Commission Office

route request
road network conditions
route plan

Existing
Planned
Commercial Vehicle Companies

Commercial Vehicles

Private Wrecker Companies

Port Facilities

broadcast information

Existing
Planned
Port of Pittsburgh Commission Office
Port of Pittsburgh Commission Office Interconnect Diagram

City of Pittsburgh
- City of Pittsburgh TMC

Mobility Technologies
- Mobility Technologies ATIS Administration

Pennsylvania Department of Transportation (PennDOT)
- PennDOT D11 RTMC

Private Wrecker Companies
- Port Facilities

Port of Pittsburgh Commission
- Port of Pittsburgh Commission Office

Various Stakeholders
- Regional Travel Information System

Existing
Planned
Port of Pittsburgh Commission

Port of Pittsburgh Commission Office

road network conditions
request for road network conditions

City of Pittsburgh

City of Pittsburgh TMC

Existing
Planned
Various Stakeholders

Regional Travel Information System

Port of Pittsburgh Commission

Port of Pittsburgh Commission Office

ISP coordination

Existing

Planned
Port of Pittsburgh Commission

Port of Pittsburgh Commission Office

- route request
- road network conditions
- route plan

Private Wrecker Companies

Port Facilities

Existing
Planned
Private Wrecker Units
Private Wrecker Units Interconnect Diagram

Counties

911 Communication Centers

Pennsylvania State Police (PSP)

PSP Offices

Private Wrecker Companies

Private Wrecker Units

Existing
Planned
Private Wrecker Companies

Private Wrecker Units

Counties

911 Communication Centers

emergency dispatch requests

Existing

Planned
Pennsylvania State Police (PSP)

Private Wrecker Companies

Private Wrecker Units

eMERGENCY DISPATCH REQUESTS

Existing

Planned

PSP Offices
PSP Offices
Pennsylvania State Police (PSP)

PSP Offices

incident information
incident information request
incident report
incident response coordination

Counties

911 Communication Centers

Existing
Planned
Pennsylvania State Police (PSP)

County EMA Centers

incidents report
incident response coordination

Existing
Planned

PSP Offices
Pennsylvania State Police (PSP)

PSP Offices

incident report
incident response coordination

Municipalities

Municipal Public Safety Offices

Existing
Planned
Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

incident response coordination
threat information coordination

Pennsylvania State Police (PSP)

PSP Offices

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

- credentials information
- credentials status information
- incident report
- incident response coordination
- safety inspection report
- safety status information

Pennsylvania State Police (PSP)

PSP Offices

Existing

Planned
Pennsylvania State Police (PSP)

PSP Offices

incident information request
maint and constr resource request
incident information
maint and constr resource response

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 County Maintenance Offices

Existing
Planned
Pennsylvania State Police (PSP)

PSP Offices

- maint and constr work plans
- road network conditions
- road weather information
- incident information
- incident information request
- incident response status
- remote surveillance control
- request for road network conditions
- resource request
- incident report
- incident response coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Existing
Planned
Pennsylvania State Police (PSP)

PSP Offices

- Emergency dispatch response
- Incident status
- Emergency dispatch requests

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Vehicles

Existing
Planned
Private Companies

Towing Industry Responders

Pennsylvania State Police (PSP)

PSP Offices

emergency dispatch requests

Existing

Planned
Pennsylvania State Police (PSP)

PSP Vehicles

- emergency dispatch requests
- incident command information
- emergency dispatch response
- emergency vehicle tracking data
- incident command request
- incident status

Pennsylvania State Police (PSP)

PSP Offices

Existing
Planned
Pennsylvania State Police (PSP)

Regional Media

Regional Media Outlets

incident information for media
media information request

Pennsylvania State Police (PSP)

PSP Offices

Existing
Planned
PSP Troop T Highspire
PSP Troop T Highspire Interconnect Diagram

Pennsylvania State Police (PSP)
- PSP Offices
- Regional Media
  - Regional Media Outlets

Pennsylvania State Police (PSP)
- PSP Troop T Vehicles

Pennsylvania Turnpike Commission (PTC)
- PTC Offices

Existing

Planned
Pennsylvania State Police (PSP)

PSP Troop T Vehicles

- emergency dispatch requests
- incident command information
- emergency dispatch response
- emergency vehicle tracking data
- incident command request
- incident status

Pennsylvania State Police (PSP)

PSP Troop T Highspire

Existing

Planned
PSP Troop T Vehicles
PSP Troop T Vehicles Interconnect Diagram
PSP Vehicles
PSP Vehicles Interconnect Diagram

Pennsylvania State Police (PSP)

PSP Vehicles

Pennsylvania State Police (PSP)

PSP Offices

Existing
Planned
PTC Field Devices
PTC Field Devices Interconnect

Diagram

Pennsylvania Turnpike Commission (PTC)

PTC Offices

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Existing
Planned

Pennsylvania Turnpike Commission (PTC)

PTC Field Devices
Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing
Planned

- accident report
- environmental conditions data
- field device status
- incident notification
- infrastructure monitoring sensor data
- roadway information system status
- roadway treatment system status
- traffic flow
- traffic images
- violation notification
- data collection and monitoring control
- environmental sensors control
- incident notification response
- infrastructure monitoring sensor control
- roadway information system data
- roadway treatment system control
- video surveillance control

Pennsylvania Turnpike Commission (PTC)

PTC Field Devices
PTC Maintenance and Construction Vehicles
PTC Maintenance and Construction Vehicles Interconnect Diagram

Pennsylvania Turnpike Commission (PTC)

PTC Offices

existing

planned

Pennsylvania Turnpike Commission (PTC)

PTC Maintenance and Construction Vehicles
PTC Offices
Pennsylvania Turnpike Commission (PTC)

PTC Offices

- maint and constr resource request
- resource request
- incident information request
- maint and constr resource response
- resource deployment status
- incident information
- incident report
- incident response coordination

Counties

911 Communication Centers

Existing
Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

incident information request
incident information
request for road network conditions
road network conditions

Mobility Technologies ATIS Administration

Existing
Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

- incident report
- incident response status
- remote surveillance control
- request for road network conditions
- resource request
- road network conditions
- incident information
- incident response coordination
- traffic control coordination

Pennsylvania Emergency Management Agency (PEMA)

PEMA Emergency Operation Center

Existing
Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

- road weather information
- archive coordination
- incident report
- incident response coordination

Pennsylvania Department of Transportation (PennDOT)

PennDOT Central Office Organizations

Existing

- Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 County Maintenance Offices

incident information
maint and constr resource coordination
work plan coordination

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 County Maintenance Offices

maintenance and construction resource coordination
work plan coordination

Pennsylvania Turnpike Commission (PTC)

PTC Offices
Pennsylvania Turnpike Commission (PTC)

PTC Offices

- road weather information
- incident information
- incident information request
- incident report
- incident response coordination
- incident response status
- maint and constr resource coordination
- request for road network conditions
- resource deployment status
- resource request
- road network conditions
- roadway maintenance status
- traffic control coordination
- traffic information coordination
- work plan coordination
- work zone information

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Existing
Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

Pennsylvania Department of Transportation (PennDOT)

Existing
Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

emergency notification
broadcast information

General Public

Personal Traveler Information Devices

Existing
Planned
Private Companies

Towing Industry Responders

eastern dispatch requests
incident command request

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing
Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

accident report
environmental conditions data
field device status
incident notification
infrastructure monitoring sensor data
roadway information system status
roadway treatment system status
traffic flow
traffic images
violation notification
data collection and monitoring control
environmental sensors control
incident notification response
infrastructure monitoring sensor control
roadway information system data
roadway treatment system control
video surveillance control

Existing
Planned

Pennsylvania Turnpike Commission (PTC)

PTC Field Devices
Various Stakeholders

Regional Travel Information System

- road network conditions
- request for road network conditions

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing
Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

Regional Media

Regional Media Outlets

incident information for media
road network conditions
road weather information
traveler information for media
media information request

Existing
Planned
Pennsylvania Turnpike Commission (PTC)

PTC Service Plazas

broadcast information

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing

Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

Pennsylvania State Police (PSP)

PSP Troop T Vehicles

- emergency dispatch response
- emergency vehicle tracking data
- incident command request
- incident status
- emergency dispatch requests
- incident command information

Existing

Planned
PTC Service Plazas
PTC Service Plazas Interconnect Diagram

Pennsylvania Turnpike Commission (PTC)

PTC Service Plazas

Existing

Planned

Pennsylvania Turnpike Commission (PTC)

PTC Offices
Pennsylvania Turnpike Commission (PTC)

PTC Service Plazas

broadcast information

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing

Planned
PTC Toll Plazas
PTC Toll Plazas Interconnect Diagram

Commercial Vehicle Companies
- Commercial Vehicles

General Public
- Passenger Vehicles

Pennsylvania Turnpike Commission (PTC)
- PTC Offices

Pennsylvania Turnpike Commission (PTC)
- PTC Toll Plazas

Existing
Planned
Pennsylvania Turnpike Commission (PTC)

PTC Toll Plazas

- safety inspection record
- screening event record
- tag data
- request tag data

Commercial Vehicle Companies

Commercial Vehicles

Existing

Planned
Pennsylvania Turnpike Commission (PTC)

PTC Toll Plazas

tag data
request tag data

General Public

Passenger Vehicles

Existing
Planned
Regional Media Outlets
Regional Media Outlets Interconnect Diagram
Regional Media

Regional Media Outlets

City of Pittsburgh

City of Pittsburgh TMC

road network conditions
media information request

Existing
Planned
Regional Media

Regional Media Outlets

incident information for media
media information request

Counties

County EMA Centers

Existing
Planned
Regional Media

Regional Media Outlets

- traveler information for media
- external reports

Mobility Technologies

Mobility Technologies ATIS Administration

Existing
- Planned
Municipalities

Municipal Traffic Management Offices

Regional Media

Regional Media Outlets

road network conditions
media information request

Existing
Planned
<table>
<thead>
<tr>
<th>Pennsylvania Department of Transportation (PennDOT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PennDOT D10 County Maintenance Offices</td>
</tr>
</tbody>
</table>

Regional Media

Regional Media Outlets

- maint and constr work plans
- media information request

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC

Regional Media

Regional Media Outlets

incident information for media
road network conditions
media information request

Existing
Planned
Regional Media
Regional Media Outlets

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

- maint and constr work plans
- road network conditions
- media information request

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 County Maintenance Offices

Regional Media

Regional Media Outlets

maint and constr work plans
media information request

Existing
Planned
Regional Media

Regional Media Outlets

- incident information for media
- road network conditions
- road weather information
- traveler information for media
- media information request

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing
Planned
Pennsylvania Department of Transportation (PennDOT)

PennDOT STMC

Regional Media

Regional Media Outlets

- Incident information for media
- Road network conditions
- Road weather information
- Traveler information for media
- Media information request

Existing

Planned
Regional Media

Regional Media Outlets

incident information for media

Pennsylvania State Police (PSP)

PSP Troop T Highspire

Existing

Planned
Regional Personal Traveler Cards
Regional Personal Traveler Cards
Interconnect Diagram

- Allegheny County Airport Authority (ACAA)
  - ACAA Field Devices

- Beaver County Transit Authority (BCTA)
  - BCTA Remote Traveler Support
  - BCTA Transit Vehicles

- City of Pittsburgh
  - City of Pittsburgh Field Devices

- General Public
  - Regional Personal Traveler Cards

- Port Authority of Allegheny County (PAAC)
  - PAAC Transit Vehicles
  - PAAC Remote Traveler Support

- Various Stakeholders
  - Park-n-Ride Facilities

- Regional Transit Agencies
  - Regional Transit Vehicles

Existing/Planned
General Public

Regional Personal Traveler Cards

request for payment

Beaver County Transit Authority (BCTA)

BCTA Remote Traveler Support

Existing

Planned
Beaver County Transit Authority (BCTA)

BCTA Transit Vehicles

General Public

Regional Personal Traveler Cards

request for payment

Existing

Planned
General Public

Regional Personal Traveler Cards

request for payment

City of Pittsburgh

City of Pittsburgh Field Devices

Existing

Planned
Port Authority of Allegheny County (PAAC)

PAAC Remote Traveler Support

General Public

Regional Personal Traveler Cards
Port Authority of Allegheny County (PAAC)

PAAC Transit Vehicles

General Public

Regional Personal Traveler Cards

request for payment

payment

Existing

Planned
Regional Transit Agencies

Regional Transit Vehicles

payment
request for payment

General Public

Regional Personal Traveler Cards

Existing
Planned
General Public

Regional Personal Traveler Cards

Allegheny County Airport Authority (ACAA)

ACAA Field Devices

Existing

Planned
Various Stakeholders

Park-n-Ride Facilities

Regional Personal Traveler Cards

General Public

Existing

Planned

request for payment

payment
Regional Transit Agency Offices
Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Regional Transit Agencies

Regional Transit Agency Offices

Existing

Planned

TRMS coord
Regional Transit Agencies

Regional Transit Agency Offices

transit emergency coordination data
transit emergency data

Counties

911 Communication Centers

Existing
Planned
Regional Transit Agencies

Regional Transit Agency Offices

transit emergency coordination data

transit emergency data

Counties

County EMA Centers

Existing

Planned
Port Authority of Allegheny County (PAAC)

PAAC Centers

Regional Transit Agencies

Regional Transit Agency Offices

Existing

Planned
Pennsylvania Department of Transportation (PennDOT)

Regional Transit Agencies

Regional Transit Agency Offices

archive requests
transit archive data

Existing
Planned

PennDOT Central Office Organizations
Pennsylvania Department of Transportation (PennDOT)

Regional Transit Agencies
Regional Transit Agency Offices

- current asset restrictions
- road network conditions
- road weather information
- request for road network conditions

PennDOT D11 RTMC

Existing
Planned
Regional Transit Agencies

Regional Transit Agency Offices

- transit information user request
- trip confirmation
- trip request
- broadcast information
- personal transit information
- trip plan

General Public

Personal Traveler Information Devices

Existing
Planned
Various Stakeholders

Regional Transit Agencies

Regional Transit Agency Offices

Parking information
Parking lot reservation confirmation
Transit parking coordination
Parking lot data request
Parking reservations request
Transit parking lot response

Existing
Planned

Park-n-Ride Facilities
Southwest Pennsylvania Commission (SPC)

SPC Office

- transit and fare schedules
- transit incident information
- transit request confirmation
- transit information request

Regional Transit Agencies

Regional Transit Agency Offices

Existing
Planned
Regional Transit Vehicles
Regional Transit Agencies

Regional Transit Vehicles

Municipalities

Municipal Field Devices

local signal priority request

Existing
Planned
Regional Transit Agencies

Regional Transit Vehicles

General Public

Regional Personal Traveler Cards

Existing
Planned
Regional Travel Information System
Regional Travel Information System
Interconnect Diagram
Various Stakeholders

Regional Travel Information System

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

Beaver County Transit Authority (BCTA)

BCTA Remote Traveler Support
Various Stakeholders

Regional Travel Information System

- demand responsive transit plan
- transit and fare schedules
- transit incident information
- transit request confirmation
- demand responsive transit request
- selected routes
- transit information request

Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Existing
Planned
Various Stakeholders

Regional Travel Information System

incident information
incident information request

Counties

911 Communication Centers

Existing
Planned
Various Stakeholders

Regional Travel Information System

Mobility Technologies

Mobility Technologies ATIS Administration

ISP coordination
Various Stakeholders

Regional Travel Information System

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

Port Authority of Allegheny County (PAAC)

PAAC Remote Traveler Support

Existing
Planned
Various Stakeholders

Regional Travel Information System

demand responsive transit plan
-transit and fare schedules
-transit incident information
-transit request confirmation
-demand responsive transit request
-incident information request
-selected routes
-transit information request

Port Authority of Allegheny County (PAAC)

PAAC Centers

Existing
Planned
Various Stakeholders

Regional Travel Information System

road network conditions
request for road network conditions

Pennsylvania Department of Transportation (PennDOT)

PennDOT D10 TMC

Existing
Planned

842
Various Stakeholders

Regional Travel Information System

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 RTMC

Existing

Planned
Various Stakeholders

Regional Travel Information System

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

Pennsylvania Department of Transportation (PennDOT)

PennDOT D11 Remote Traveler Support

Existing
Planned
Various Stakeholders

Regional Travel Information System

- road network conditions
- request for road network conditions

Pennsylvania Department of Transportation (PennDOT)

PennDOT D12 TMC

Existing

Planned
Various Stakeholders

Regional Travel Information System

road network conditions
request for road network conditions

Pennsylvania Turnpike Commission (PTC)

PTC Offices

Existing
Planned
Various Stakeholders

Regional Travel Information System

- demand responsive transit plan
- transit and fare schedules
- transit incident information
- transit request confirmation
- demand responsive transit request
- selected routes
- transit information request

Regional Transit Agencies

Regional Transit Agency Offices

Existing

Planned
Southwest Pennsylvania Commission (SPC)

SPC Office

Various Stakeholders

Regional Travel Information System

- traveler archive data
- ISP coordination

Existing
Planned
Various Stakeholders

Regional Travel Information System

ISP coordination

Transportation Management Associations

TMA Offices

Existing

Planned
SPC Office
SPC Office Interconnect Diagram

Beaver County Transit Authority (BCTA)
BCTA Transit Management Center

Mobility Technologies
Mobility Technologies ATIS Administration

Port Authority of Allegheny County (PAAC)
PAAC Centers

Pennsylvania Department of Transportation (PennDOT)
PennDOT D11 RTMC

Southwest Pennsylvania Commission (SPC)
SPC Office

General Public
Personal Traveler Information Devices

Regional Transit Agencies
Regional Transit Agency Offices

Various Stakeholders
Regional Travel Information System

Existing
Planned
Southwest Pennsylvania Commission (SPC)

SPC Office

Beaver County Transit Authority (BCTA)

BCTA Transit Management Center

Existing

Planned

transit and fare schedules
transit incident information
transit information request
Southwest Pennsylvania Commission (SPC)

SPC Office

Port Authority of Allegheny County (PAAC)

PAAC Centers

Existing

Planned

transit and fare schedules
transit incident information
transit request confirmation
transit information request
Southwest Pennsylvania Commission (SPC)

SPC Office

- traveler profile
- traveler request
- trip confirmation
- trip request
- broadcast information
- traveler information
- trip plan

General Public

Personal Traveler Information Devices

Existing

Planned
Southwest Pennsylvania Commission (SPC)

SPC Office

Regional Transit Agencies

Regional Transit Agency Offices

Existing

Planned

- transit and fare schedules
- transit incident information
- transit request confirmation
- transit information request
Southwest Pennsylvania Commission (SPC)

SPC Office
	raveler archive data
ISP coordination

Various Stakeholders

Regional Travel Information System

Existing
Planned
TMA Offices
TMA Offices Interconnect Diagram

- Mobility Technologies
  - Mobility Technologies ATIS Administration
- General Public
  - Personal Traveler Information Devices
- Various Stakeholders
  - Regional Travel Information System

Transportation Management Associations

TMA Offices
Mobility Technologies

Mobility Technologies ATIS Administration

ISP coordination

Transportation Management Associations

TMA Offices

Existing

Planned
Transportation Management Associations

TMA Offices

- traveler profile
- traveler request
- broadcast information
- traveler information

General Public

Personal Traveler Information Devices

Existing

Planned
Various Stakeholders

Regional Travel Information System

ISP coordination

Transportation Management Associations

TMA Offices

Existing

Planned
Towing Industry Responders
Towing Industry Responders Interconnect Diagram

- Counties
  - 911 Communication Centers
- Pennsylvania State Police (PSP)
  - PSP Offices
- Pennsylvania Turnpike Commission (PTC)
  - PTC Offices

Private Companies

Towing Industry Responders

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Existing
Planned
Private Companies

Towing Industry Responders

emergency dispatch requests

Counties

911 Communication Centers

Existing

Planned
Pennsylvania State Police (PSP)

Private Companies

Towing Industry Responders

emergency dispatch requests

Pennsylvania State Police (PSP)

PSP Offices

Existing

Planned
Pennsylvania Turnpike Commission (PTC)

PTC Offices

Towing Industry

Towing Industry Responders

emergency dispatch requests

emergency dispatch response

Existing

Planned
References

The following references were utilized in the development of the Southwestern Regional ITS Architecture:


Appendix A: Acronyms

AAA      American Automobile Association
AASHTO  American Association of State Highway and Transportation Officials
ACAAA    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
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>HAR</td>
<td>Highway Advisory Radio</td>
</tr>
<tr>
<td>HAT</td>
<td>Highway Advisory Telephone System</td>
</tr>
<tr>
<td>Hazmat</td>
<td>Hazardous Materials</td>
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<tr>
<td>HOV</td>
<td>High Occupancy Vehicle</td>
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<tr>
<td>HRI</td>
<td>Highway Rail Intersection</td>
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<tr>
<td>IEEE</td>
<td>Institute of Electrical and Electronics Engineers</td>
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<tr>
<td>IEN</td>
<td>Information Exchange Network</td>
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<tr>
<td>IIMS</td>
<td>Incident Information Management System</td>
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<tr>
<td>IMMS</td>
<td>Incident Management Message Sets</td>
</tr>
<tr>
<td>IM</td>
<td>Incident Management</td>
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<tr>
<td>IndiGo</td>
<td>Indiana County Transit</td>
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<tr>
<td>ISP</td>
<td>Information Service Provider</td>
</tr>
<tr>
<td>ITE</td>
<td>Institute of Transportation Engineers</td>
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<tr>
<td>ITS</td>
<td>Intelligent Transportation System</td>
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<tr>
<td>MCSAP</td>
<td>Motor Carrier Safety Assistance Program</td>
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<tr>
<td>MMVTA</td>
<td>Mid-Mon Valley Transit Authority</td>
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<tr>
<td>MOE</td>
<td>Measures of Effectiveness</td>
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<tr>
<td>MOU</td>
<td>Memorandum of Understanding</td>
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<tr>
<td>m.p.</td>
<td>Milepost</td>
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<tr>
<td>MPO</td>
<td>Metropolitan Planning Organization</td>
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<tr>
<td>MSA</td>
<td>Metropolitan Statistical Area</td>
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<tr>
<td>NEMA</td>
<td>National Electrical Manufacturers Association</td>
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<tr>
<td>NHII</td>
<td>National Highway Institute</td>
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<tr>
<td>NTA</td>
<td>New Castle Area Transit Authority</td>
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<tr>
<td>NTCIP</td>
<td>National Transportation Communications for ITS Protocols</td>
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<tr>
<td>NWS</td>
<td>National Weather Service</td>
</tr>
<tr>
<td>OB</td>
<td>Onboard</td>
</tr>
<tr>
<td>OER</td>
<td>Octet Encoding Rules</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operations and Maintenance</td>
</tr>
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<td>OEM</td>
<td>Office of Emergency Management</td>
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<tr>
<td>PAAC</td>
<td>Port Authority of Allegheny County</td>
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<td>PDA</td>
<td>Personal Digital Assistant</td>
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<tr>
<td>PEIRS</td>
<td>Pennsylvania Emergency Information Reporting System</td>
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<td>PEMA</td>
<td>Pennsylvania Emergency Management Agency</td>
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<tr>
<td>PennDOT</td>
<td>Pennsylvania Department of Transportation</td>
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<tr>
<td>PRISM</td>
<td>Performance and Registration Information Systems Management</td>
</tr>
<tr>
<td>PSAP</td>
<td>Public Safety Answering Point</td>
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<tr>
<td>PSP</td>
<td>Pennsylvania State Police</td>
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<tr>
<td>PTC</td>
<td>Pennsylvania Turnpike Commission</td>
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<tr>
<td>RAP</td>
<td>Regional Advisory Panel</td>
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<tr>
<td>ROCC</td>
<td>Rail Operations Control Center (operated by PAAC)</td>
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<tr>
<td>RPO</td>
<td>Rural Planning Organization</td>
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<tr>
<td>RTMC</td>
<td>Regional Transportation Management Center</td>
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<tr>
<td>RWIS</td>
<td>Road Weather Information System</td>
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<tr>
<td>SAE</td>
<td>Society of Automotive Engineers</td>
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<tr>
<td>SAFER</td>
<td>Safety and Fitness Electronic Record</td>
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<tr>
<td>SATIN</td>
<td>Service Area Travelers Interactive Network</td>
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<tr>
<td>SCADA</td>
<td>Supervisory Control and Data Acquisition</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<td>--------------</td>
<td>------------------------------------------</td>
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<tr>
<td>SCH</td>
<td>Scheduling/Run cutting</td>
</tr>
<tr>
<td>SDO</td>
<td>Standards Develop Organization</td>
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<tr>
<td>SFA</td>
<td>Strategic Focus Area</td>
</tr>
<tr>
<td>SP</td>
<td>Spatial Representation</td>
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<tr>
<td>SPC</td>
<td>Southwest (Pennsylvania) Planning Commission</td>
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<tr>
<td>STIC</td>
<td>Sub carrier Traffic Information Channel</td>
</tr>
<tr>
<td>STMC</td>
<td>Statewide Transportation Management Center</td>
</tr>
<tr>
<td>STMF</td>
<td>Simple Transportation Management Framework</td>
</tr>
<tr>
<td>SWG</td>
<td>Statewide Working Group</td>
</tr>
<tr>
<td>T-1</td>
<td>High Bandwidth Telephone Line</td>
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<tr>
<td>TACT</td>
<td>Town and Country Transit</td>
</tr>
<tr>
<td>TMDD</td>
<td>Traffic Management Data Dictionary</td>
</tr>
<tr>
<td>TIP</td>
<td>Transportation Improvement Plan</td>
</tr>
<tr>
<td>TMC</td>
<td>Transportation Management Center</td>
</tr>
<tr>
<td>USDOT</td>
<td>United States Department of Transportation</td>
</tr>
<tr>
<td>WCTA</td>
<td>Westmoreland County Transit Authority</td>
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<tr>
<td>WIM</td>
<td>Weigh–in-Motion</td>
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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. metadata) 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 of 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 device. 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.

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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

- 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

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<td>Andersen*</td>
<td>Mike</td>
<td>United States Coast Guard</td>
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</table>
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

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
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

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

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 - 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
- Uninterruptable Power Supply

Regional ITS 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

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Regional ITS ITS System Initiatives
• I-279 Parkway West Corridor
  - from Robinson Town Center to Downtown
• I-376 Parkway East Corridor
  - from Downtown to Robinson Road
• I-279 Parkway North Corridor and HOV Lanes
  - from North Shore (PNC Park) to Camp Horne Road
• I-76 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
  - 6 AM-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

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
**PAAC Centers Interconnect Diagram**

**PA Southwest Regional ITS Architecture – PAAC Interconnect**

**Validation Meeting Schedule**
- June 9th – PennDOT D11-0
- June 10th – PennDOT D12-0 & D10-0
- June 16th – Transit
- June 17th – Traveler Information
- June 23rd – Emergency Management
- June 24th – Arterial Management
- June 30th – PTC and PennDOT Central Office

**Project Moving Forward**
- Incorporate validation meeting comments
- Resolve conflicts with the Regional Advisory Panel
- Final Stakeholder meeting (10/8)
- Final report issued, Fall 2004

**Planned SPC Actions**
- Input to support SPC Adoption
  - Technical Committee – November (Tentative)
  - Commission – December (Tentative)
- Continue to advance ITS element of SPC Regional Long Range Plan
- Continue ITS regional dialog beyond this effort
Regional Next Steps

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

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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

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)
2. ‘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
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:

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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

A meeting was held on June 10, 2004 between 8:30 AM and 11:00 AM 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
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.
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


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

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’re 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 7th, 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

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 7/2/04 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’re provided at the meeting. Comments are organized around additions and deletions by element, as well as general discussion items.

**County 911 Communication Centers**

**Additions**


**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.

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
A meeting was held on June 30th, 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
A meeting was held on June 30th, 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’re 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)


**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.


10. Flows for PTC ENS information to Commercial Vehicle Company Offices since some subscribe.


12. Flows for resource request, incident response status, resource deployment status, and road network conditions to and from PSP Troop T – 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).

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. 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. 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 18th, 2004 to ask the Technical Committee to critique the architecture and then they will bring it back to the Commission on December 6th, 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

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<td>Szewcow</td>
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Pennsylvania ITS Architecture - Update and Moving Forward

Southwest Region
Second Regional Meeting
November 5, 2004

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

Welcome
- Elected Officials
- PennDOT
- PTC
- Airport
- Transit
- Counties
- Cities
- Emergency Management Agencies
- SPC
- Townships
- Partnership Organizations
- Enforcement Community

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

Agenda

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
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.

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.

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

Regional Map

Highlights
• Process
• Overview of new sections
• Regional Interconnects
• Usage
• Maintenance and Update
Process

ANALYSIS
OUTREACH
DELIVERABLE
INFORMATION
GATHERING

PRE-PLANNING
INFORMATION GATHERING

Define Facilities, Operators, Equipment
and Function of Each

Document Needs
and Services

Develop Interconnects and Information Flows

Submit Strawman

Review Stakeholders

List

Conduct 1st Regional Meeting

Conduct Small Stakeholder Validation Meetings

Revisit Information Gathering

Rebuild ITS Architecture

Populate Website With Architecture

Submit Final Architecture Report and Website

Conduct 2nd Regional Meeting

Identify Regional Champions and Regional Advisory Panel (RAP)

Develop Pennsylvania Specific Process

Identify Stakeholders

Gather Regional Projects

Overview of New Sections

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
Using It

- Systems Inventory, Needs and Services Section
- Contains the “Building Blocks” of the Architecture
  - Defines Elements
  - Defines Systems Inventory and Links Elements, Stakeholder and Projects
  - Defines Needs and Services that Establish Architecture Flows Among Elements

Systems Inventory

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Needs

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Services

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Using It

- Regional Architecture Section
  - Graphical Display of the Architecture
  - Regional Interconnect Matrix
  - Interconnect Diagrams
  - Architecture Flows
Southwest PA Interconnect Matrix

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<th>BCTA Transit Management Center</th>
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<td>BCTA Remote Traveler Support</td>
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<td></td>
</tr>
<tr>
<td>BCTA Transit Management Center</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCTA Transit Vehicles</td>
<td>X</td>
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</tr>
</tbody>
</table>

**BCTA Transit Management Center Interconnect Diagram**

**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

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Document ID</th>
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<tr>
<td>AASHTO/ITE/NEMA</td>
<td>TCIP – Common Public Transportation (CPT) Business Area Standard</td>
<td>NTCIP 1401</td>
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<td>AASHTO/ITE/NEMA</td>
<td>TCIP – Incident Management (IM) Business Area Standard</td>
<td>NTCIP 1402</td>
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<td>TCIP – Passenger Information (PI) Business Area Standard</td>
<td>NTCIP 1403</td>
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<td>TCIP – Scheduling/Runcutting (SCHA) Business Area Standard</td>
<td>NTCIP 1404</td>
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<td>AASHTO/ITE/NEMA</td>
<td>TCIP – Spatial Representation (SP) Business Area Standard</td>
<td>NTCIP 1405</td>
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<td>AASHTO/ITE/NEMA</td>
<td>TCIP – Onboard (OB) Business Area Standard</td>
<td>NTCIP 1406</td>
</tr>
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<td>TCIP – Control Center (CC) Business Area Standard</td>
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<td>Standard for Functional Level Traffic Management Data Dictionary (TMDD)</td>
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<td>Message Sets for External TMC Communication (MS/ETMCC)</td>
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<td>SAE</td>
<td>ISP – Vehicle Location Referencing Standard</td>
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<td>Data Dictionary for Advanced Traveler Information System (ATIS)</td>
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<td>SAE</td>
<td>Message for Handling Strings and Look-up Tables in ATIS Standards</td>
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</table>

## 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

• 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

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

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

Web Site

www.paits.org/sw

Usage

• Web based
• Easy to use
• Form for new information
  • Stakeholder updates
  • Project updates
• Web site will become the historical library
Moving Forward – Mainstreaming and Institutionalizing ITS

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
Mainstreaming ITS (Cont.)

- Educational Training Courses (e.g., National Highway Institute Training Courses)
  - Introduction to Systems Engineering
  - ITS Procurement
  - Managing Traffic Incidents for Roadway Emergencies
  - Others
- www.nhi.fhwa.dot.gov

Mainstreaming ITS (Cont.)

- Educational Scanning Tours
  - County Commissioners
  - Executive Boards
  - Managers
  - Operations Staff
  - Public Safety Officials
  - Others

Moving Forward – Next Steps

Dennis Lebo

PennDOT Central Office
Center for Program Development and Management

Business Context

Projects

Regional Next Steps

- Regionally prioritize projects documented in Architecture
- Incorporate into regional long range plans
- Incorporate into regional transportation improvement programs (TIP)
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