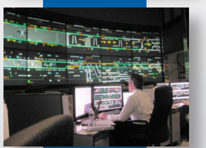
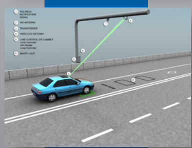
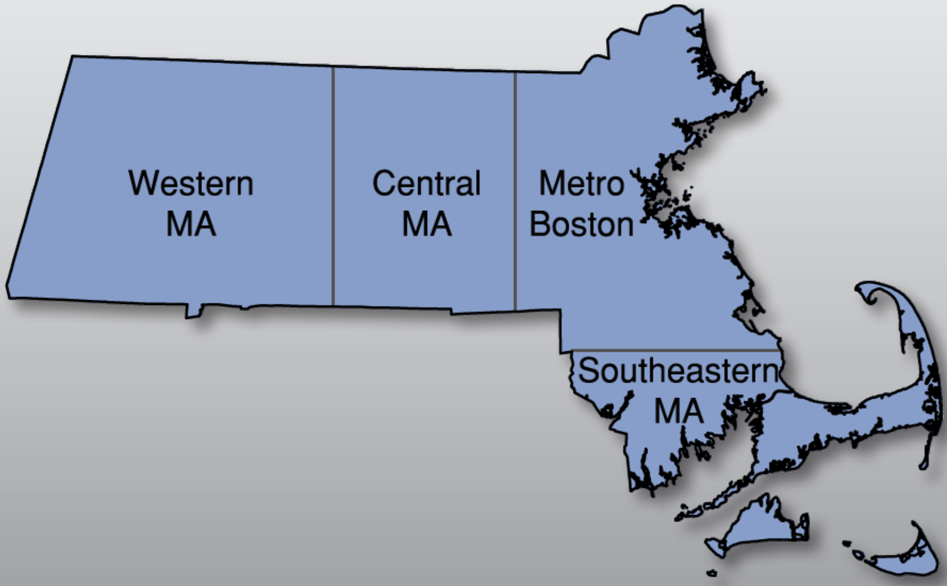




Commonwealth of Massachusetts

REGIONAL ITS ARCHITECTURES FOR THE COMMONWEALTH OF MASSACHUSETTS



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EXECUTIVE SUMMARY

December 2011

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

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16. Abstract

This Executive Summary describes the Regional Intelligent Transportation System (ITS) Architectures for the Commonwealth of Massachusetts. The four regions for which ITS Architectures exist are: Metropolitan Boston, Central Massachusetts, Southeastern Massachusetts, and Western Massachusetts. These ITS Architectures were initially developed in 2005 to meet federal regulatory requirements. This Executive Summary describes the process and outcomes of a periodic formal update to the Architectures, as defined by each Architecture's required ongoing maintenance process. The discussion provides background information on ITS and ITS architectures, explains the collaborative process used in each region of the state to update its Architecture, and presents the important outcomes of this initiative.

Intelligent Transportation Systems (ITS) encompass a broad range of advanced technologies in the field of transportation. ITS improves transportation safety, enhances productivity, and increases personal mobility through the integrated application of these technologies. To fully maximize the potential of ITS technologies, ITS deployment requires an approach to planning, implementation, and operations that emphasizes collaboration between relevant entities and compatibility/interoperability of individual systems. At the core of this process is an architecture that provides overall guidance to ensure coordination and integration of individual ITS deployment projects, without limiting stakeholder design options.

Key transportation stakeholders in each region provided extensive input in the update process. Their involvement included participating in meetings, reviewing project deliverables, and providing comments. Stakeholders identified several key changes to each of the ITS Architectures, including: changes reflecting the reorganization of state agencies into the Massachusetts Department of Transportation, changes to the National ITS Architecture, the addition of new stakeholders and initiatives, and changes reflecting evolving transportation needs and priorities. Out of this process, with the help of these stakeholders, came up-to-date Regional ITS Architectures that represent a vision of an advanced and integrated transportation system for each of the four regions. These Regional ITS Architectures are available on the Commonwealth's website at http://www.mass.gov/RegionalITSArchitecture.

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The Project Team would like to acknowledge the efforts of the regional stakeholders and thank them for their ongoing support and participation throughout the architecture update process. With the many agencies represented at project meetings, this endeavor demonstrated the regions' overwhelming commitment to improving transportation coordination. The Project Team greatly appreciates the work that was involved in updating the Regional ITS Architectures to ensure their continued relevance and usefulness.

Disclaimer

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the Massachusetts Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

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EXECUTIVE SUMMARY

Introduction

This document describes the Regional Intelligent Transportation System (ITS) Architectures for the Commonwealth of Massachusetts. The four regions for which ITS Architectures exist are: Metropolitan Boston, Central Massachusetts, Southeastern Massachusetts, and Western Massachusetts. These ITS Architectures were initially developed in 2005 to meet federal regulatory requirements. This Executive Summary describes the process and outcomes of a periodic formal update to these Architectures, as defined by each Architecture's required ongoing maintenance process. The discussion provides background information on ITS and ITS architectures, explains the collaborative process used in each region of the state to update its Architecture, and presents the important outcomes of this initiative.

Intelligent Transportation Systems (ITS) encompass a broad range of advanced technologies in the field of transportation. ITS improves transportation safety, enhances productivity, and increases personal mobility through the integrated application of these technologies. Consistent with MassDOT's GreenDOT policy directive, ITS can also play an important role in fostering sustainability, by collecting the data necessary to inform transportation decision-making. To fully maximize the potential of ITS technologies, ITS deployment requires an approach to planning, implementation, and operations that emphasizes collaboration between relevant entities and compatibility and interoperability of individual systems. At the core of this process is an architecture that provides overall guidance to ensure coordination and integration of individual ITS deployment projects, without limiting stakeholder design options. Each Regional ITS Architecture is a framework that defines the component systems and their interconnections. In addition, developing an ITS architecture offers three important benefits to a region: improved interagency coordination, cost savings for transportation operations, and better services to the traveling public.

The Commonwealth of Massachusetts, through the Massachusetts Department of Transportation (MassDOT), Office of Transportation Planning, has undertaken the development and maintenance of the Regional ITS Architectures. The Project Team for this effort included the Office of Transportation Planning (OTP) assisted by its consultant, IBI Group.

Key transportation stakeholders in each region provided extensive input in the update process. Their involvement included participating in meetings, reviewing project deliverables, and providing comments. Many of these stakeholders also served on the Regional ITS Planning and Coordination Committees, established at the start of this project. Stakeholders identified several key changes to the architectures, including: changes reflecting the reorganization of state agencies into the Massachusetts Department of Transportation, changes to the National ITS Architecture, the addition of new stakeholders and initiatives, and changes reflecting evolving transportation needs and priorities. Out of this process, with the help of these stakeholders, came up-to-date architectures that represent visions of an advanced and integrated transportation system for each of the four regions. These Regional ITS Architectures are available on the Commonwealth's website at http://www.mass.gov/RegionalITSArchitecture.

Background

Technology has influenced almost every facet of modern living, and transportation is no exception. By now, most drivers have seen electronic tolling that allows appropriately equipped vehicles to speed through toll plazas instead of waiting in line to collect a ticket or pay a toll. Drivers are also familiar with electronic signs on highways that provide information, such as warnings of accidents and delays. In many areas, travelers are able to obtain information on traffic conditions and transit operations via the internet or by phone.

These are just a few examples of what are referred to as *Intelligent Transportation Systems*, or *ITS*. Other examples of ITS are less obvious to the everyday commuter: Traffic signal operators, transit authorities, and public safety agencies have agreed to deploy compatible equipment so that buses and emergency vehicles can have priority when approaching a signalized intersection. Transit and other vehicles are equipped with Global Positioning Systems (GPS) so that their location can be known at all times. Some roadways have sensors installed so that potential icy conditions can be detected by a centralized monitoring system and appropriate measures can be implemented. All of these various examples have one thing in common: the use of technology to enhance productivity.

With the enactment of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), there was a policy shift from building roadways to seeking multimodal solutions to congestion and other problems. ISTEA specifically promoted ITS as a tool in the transportation planning toolbox. By 1998, however, when ISTEA was to be reauthorized, there was a concern that the deployment of ITS initiatives lacked coordination, leading to the duplication of efforts and incompatibility of systems. The new law, the Transportation Equity Act for the 21st Century (TEA-21), included a provision that called for the coordination of ITS investments.

In 2001, the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) issued guidance on how this federal law was to be implemented across the country. FHWA's rule, "Intelligent Transportation System Architecture and Standards" and FTA's "National ITS Architecture Policy on Transit Projects" established that any ITS project funded by the Highway Trust Fund, including the Mass Transit Account, has to be consistent with a *Regional ITS Architecture*, which is to be adapted from a national template.

In this context, the word "architecture" refers not to a plan of physical construction, such as the architecture of a building or city, but instead to the relationship between transportation-related systems and institutions. An ITS architecture covers how systems interface and interact, as well as the institutional relationships that are required to support these interfaces. A regional ITS architecture, therefore, describes how a set of stakeholders will share responsibility and information for the vast array of technologies and systems deployed in a region.

As an example, a traffic signal may be owned and maintained by the municipality in which it is located, but it may be operated by a state highway department if it is adjacent to a roadway in the state's jurisdiction. At the same time, the municipality may agree to allow fire trucks, police cars, ambulances, or transit vehicles to use technology that enables such vehicles to trigger a green light at the appropriate time. Quickly, one can see that the technical and institutional issues surrounding this single traffic signal involve a variety of interfaces, interactions, and responsibilities. Should the signal happen to be on or near the boundary with another municipality, it is easy to see how the complexity would increase dramatically. Regional ITS architectures are intended to help all of these institutions collaborate on the deployment and management of these systems.

Since 2001, the United States Department of Transportation (USDOT) has continued to provide guidance on the use and maintenance of Regional ITS Architectures and the application of systems engineering practices to transportation projects. Additionally, the Safe, Accountable, Flexible and Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU), signed in 2005, further supported ITS and ITS coordination through an emphasis on real-time systems management, surface transportation congestion relief, expansion of the Commercial Vehicle Information Systems and Network (CVISN) program, and extension of the Intelligent Transportation Infrastructure Program (ITIP). Given the investment in transportation technology and the benefits of coordination, maintaining and improving the Regional ITS Architectures remains a priority for local, state and federal transportation agencies.

Architecture Development and Update

As the traffic signal example illustrates, the architecture of a single element or system can be quite complex, and this complexity quickly escalates when all systems within a region are considered. To address this challenge, the USDOT created the *National ITS Architecture* as a resource for ITS planning and implementation. The FHWA Rule and FTA Policy requires the use of the National ITS Architecture as a template in the development of Regional ITS Architectures.

The National ITS Architecture is not a system design or a plan for deployment; instead it is a model that provides a framework for ITS planning and integration. The building block of the National Architecture is a *market package*, which includes the set of components related to a specific function or "market," such as work zone management, parking facility management, demand-responsive transit operations, or emergency routing. For each of these market packages, the National Architecture includes all of the interagency linkages, or *interfaces*, considered likely. Because the National Architecture was designed to be comprehensive, a regional architecture should be a subset, including only those market packages and interfaces relevant to that region.

CONSTRUCTING THE ARCHITECTURE

Developing a regional ITS architecture begins by customizing the National ITS Architecture to reflect regional circumstances. This includes generating an inventory of local ITS elements, both existing and planned, and identifying relevant market packages and interfaces. In Massachusetts, the process also requires addressing the complex question: what is *regional*? As Exhibit 1 illustrates, in 2005 the Commonwealth's 13 Metropolitan Planning Organization (MPO) planning areas were grouped into four regions for the purpose of creating regional ITS architectures.

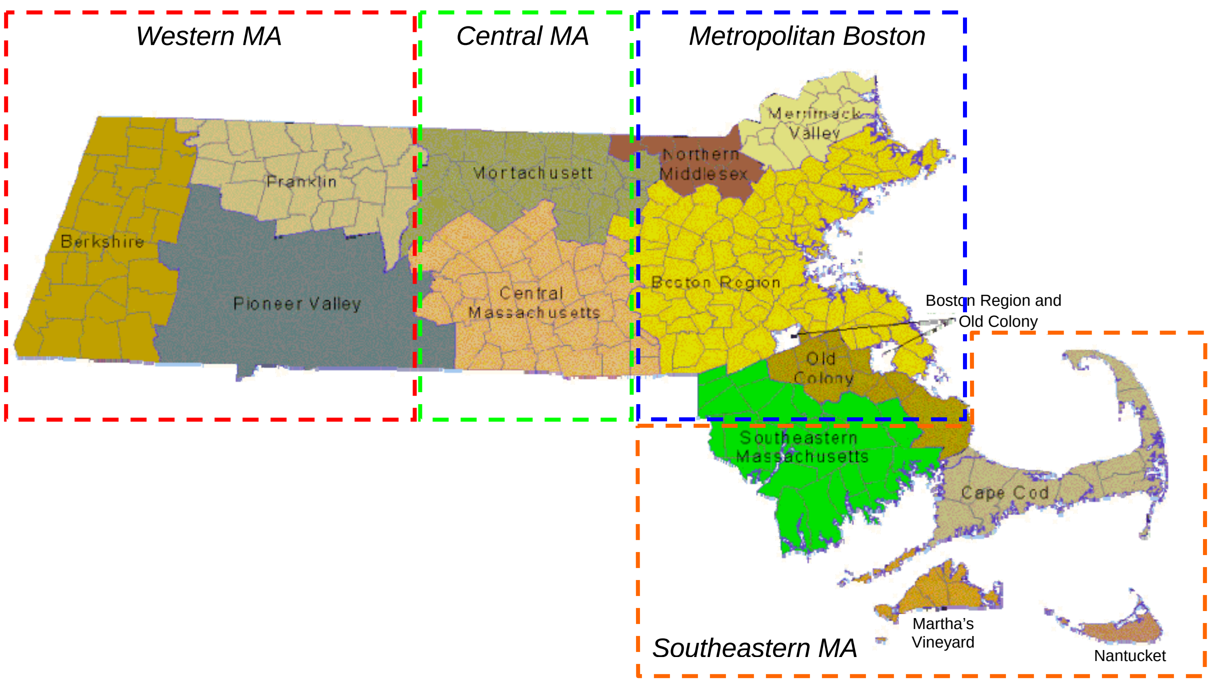

Exhibit 1: Study Regions

The regions are defined as follows:

- Metropolitan Boston: The area generally within I-495, Boston's outer circumferential highway. Covering approximately 2,000 square miles, the region includes the Boston, Northern Middlesex, and Merrimack Valley MPO planning areas, as well as portions of the Old Colony and Southeastern Massachusetts MPO planning areas.

- Central Massachusetts: Includes both the Central Massachusetts and Montachusett MPO planning areas.

- Southeastern Massachusetts: Includes the Cape Cod, Martha's Vineyard and Nantucket MPO planning areas, as well as portions of the Old Colony and Southeastern Massachusetts MPO planning areas.

- Western Massachusetts: Includes the Berkshire, Franklin, and Pioneer Valley MPO planning areas.

In all four regions, regional transportation stakeholders collaborated in 2005 to simultaneously develop four Regional ITS Architectures encompassing the entire state. In each region, stakeholders provided extensive input in identifying regional transportation needs, creating an inventory of existing and planned ITS elements, assembling relevant market packages and interfaces, and customizing the National ITS Architecture to fit the regional context. This information was then assembled into architectures and made accessible via an interactive website. Thanks to stakeholder participation, each Regional ITS Architecture reflected the unique characteristics of its region and stakeholders.

In order to maintain the currency and relevance of the Regional ITS Architectures, OTP and project stakeholders also developed an architecture maintenance plan. This maintenance plan identified methods for making minor interim modifications to the architectures to reflect evolving ITS implementation efforts. The maintenance plan also specified the need for periodic formal updates of the architecture. These maintenance procedures are described in greater detail in the "Working with the Architectures" section.

UPDATING THE ARCHITECTURE

In 2010, as part of its federally required ongoing maintenance process, OTP initiated its formal periodic update of the Regional ITS Architectures for all four regions. This formal update entailed a comprehensive review of the existing architecture and identification of the updates necessary to reflect changes in the National ITS Architecture, the reorganization of transportation agencies in Massachusetts, updated Regional Transportation Plans (RTPs), Transportation Improvement Programs (TIPs), and new transportation projects, plans, policies, procedures, and infrastructure implemented since 2005.

Expanding on the inclusiveness of the original architecture development process, the architecture update process invited additional stakeholders to participate in this effort. The Project Team also solicited the support and input of the recently established Regional ITS Planning and Coordination Committees. These regional transportation stakeholders were invited to participate by providing input, reviewing documents created by the Project Team, and providing guidance on the necessary updates to the architecture.

Numerous transportation stakeholders were invited to participate in the update to the Regional ITS Architectures. These included regional planning agencies, regional transit authorities from the MassDOT – Rail and Transit Division, as well as other municipal, regional, state and federal agencies. These stakeholders are listed in Exhibit 2. In this report, the transit authorities from the MassDOT – Rail and Transit Division are referred to individually.

Exhibit 2: Regional ITS Architecture Stakeholders

Regional Planning Agencies

- Berkshire Regional Planning Commission (BRPC)
- Cape Cod Commission
- Central Massachusetts Regional Planning Commission (CMRPC)
- Franklin Regional Council of Governments (FRCOG)
- Martha’s Vineyard Commission
- Merrimack Valley Planning Commission (MVPC)
- Metropolitan Area Planning Council (MAPC)
- Montachusett Regional Planning Commission (MRPC)
- Nantucket Planning and Economic Development Commission (NP&EDC)
- Northern Middlesex Council of Governments (NMCOG)
- Old Colony Planning Council (OCPC)
- Pioneer Valley Planning Commission (PVPC)
- Southeastern Regional Planning & Economic Development District (SRPEDD)

State Agencies

- Department of Conservation and Recreation (DCR)
- Massachusetts Department of Transportation (MassDOT)
- Massachusetts Emergency Management Agency (MEMA)
- MassDOT – Highway Division
- Massachusetts Port Authority (Massport)
- Massachusetts State Police (MSP)
- MassDOT - Registry of Motor Vehicles (RMV)

MassDOT Rail and Transit Division – Regional Transit Authorities

- Berkshire Regional Transit Authority (BRTA)
- Brockton Area Transit (BAT)
- Cape Ann Transportation Authority (CATA)
- Cape Cod Regional Transit Authority (CCRTA)
- Franklin Regional Transit Authority (FRTA)
- Greater Attleboro-Taunton Regional Transit Authority (GATRA)
- Lowell Regional Transit Authority (LRTA)
- Martha’s Vineyard Regional Transit Authority (VTA)
- Massachusetts Bay Transportation Authority (MBTA)
- Merrimack Valley Regional Transit Authority (MVRTA)
- MetroWest Regional Transit Authority (MWRTA)
- Montachusett Regional Transit Authority (MART)
- Nantucket Regional Transit Authority (NRTA)
- Pioneer Valley Transit Authority (PVTA)
- Southeastern Regional Transit Authority (SRTA)
- Worcester Regional Transit Authority (WRTA)

Federal Agencies

- Army Corps of Engineers
- National Park Service
- Federal Highway Administration (FHWA)
- Federal Transit Administration (FTA)
- Federal Motor Carrier Safety Administration (FMCSA)
- United States Coast Guard

Municipal/Regional Agencies, Authorities, Commissions, and Organizations	Municipal/Regional Agencies, Authorities, Commissions, and Organizations (cont'd)
▪ Barnstable County Regional Emergency Planning Committee ▪ Barnstable Municipal Airport ▪ Boston Emergency Management Agency (BEMA) ▪ Boston Region Metropolitan Planning Organization (MPO) ▪ Boston Transportation Department (BTD) ▪ City of Boston ▪ City of Brockton ▪ City of Brookline ▪ City of Cambridge ▪ City of Fitchburg ▪ City of Gardner ▪ City of Leominster ▪ City of New Bedford Harbor Development Commission ▪ City of Newton ▪ City of Northampton ▪ City of Pittsfield ▪ City of Springfield ▪ City of Worcester	▪ Fitchburg and Lunenburg Local Emergency Planning Committee ▪ Martha's Vineyard Airport Commission ▪ Massachusetts Bus Association ▪ Nantucket Memorial Airport ▪ New Bedford Regional Airport ▪ Provincetown Municipal Airport Commission ▪ Southeastern Massachusetts Private Motor Carrier Association ▪ Steamship Authority ▪ Town of Amherst ▪ Town of Auburn ▪ Town of Barnstable ▪ Town of Framingham ▪ Town of Great Barrington ▪ Town of Greenfield ▪ Town of Lunenburg ▪ Town of Shrewsbury ▪ University of Massachusetts ▪ Western Regional Homeland Security Advisory Council

As part of the update process, the latest version of each MPO's RTP and TIP was reviewed and changes to the Regional ITS Architectures identified. A series of meetings were held to allow stakeholders for each region to comprehensively update their region's ITS inventory, identifying the ITS-related initiatives that have already been deployed, those ready for implementation, and those still in the planning stages. A list of individuals who participated in these meetings in each region is provided in Appendix C. During this needs analysis step, stakeholders also re-examined the broad transportation needs and priorities for their region.

Based on this input, the Project Team began assembling recommended updates to the regions' ITS elements and relevant market packages, and began customizing the latest version of the National ITS Architectures to regional circumstances. These recommended updates were reviewed at meetings with regional transportation stakeholders that included discussion of how input from the previous meetings had been distilled into the recommended updates. This prompted extensive feedback from project stakeholders, both at meetings and during the subsequent review period. The Project Team incorporated stakeholder comments into a finalized set of recommended updates to the Regional ITS Architectures. These updates were then implemented both to the architectures and to the interactive website for all four Regional ITS Architectures. Final Reports for the updated Regional ITS Architectures were also developed. This formal update was completed in Fall 2011.

The most significant changes that resulted from the comprehensive review of the 2005 architectures reflect the following:

- **Changes to the National ITS Architecture and Turbo Architecture**
  Since 2005, the National ITS Architecture has been updated to Version 6.1. This includes changes to existing market packages and information flows, new market packages and information flows, as well as a new version of the Turbo Architecture software (Version 5.0). For

example, new market packages that are included in the updated Regional ITS Architectures include the following:

- APTS09 - Transit Signal Priority
- APTS10 - Transit Passenger Counting
- MC12 - Infrastructure Monitoring

Further information on the National ITS Architecture and its requirements is available online from the FHWA's ITS Architecture Implementation Program, which is located at http://www.ops.fhwa.dot.gov/its_arch_imp/index.htm.

- **The Creation of MassDOT**
  In 2009, Governor Deval Patrick signed a bill to create the new Massachusetts Department of Transportation (MassDOT) to consolidate and oversee the former highway, mass transit, aeronautics, and Registry of Motor Vehicles agencies. Because of the institutional reorganization, many elements of the regional architectures have been combined and renamed. For example, the MassHighway Traffic Operations Center (TOC) and the MassPike Operations Control Center (OCC) have been combined and renamed the MassDOT – Highway Division Highway Operations Center (HOC).

- **Addition of Stakeholders**
  Building on the group of stakeholders involved in the original architecture development process, the update process also invited additional stakeholders to participate in this effort. For example, MetroWest Regional Transit Authority (MWRTA), which was established in 2006, has been added as a new stakeholder in the Metropolitan Boston Regional ITS Architecture. The support and input of the recently established Regional ITS Planning and Coordination Committees for each region was also solicited. These regional transportation stakeholders provided input, reviewed documents, and provided guidance on the necessary updates to the architecture.

- **Refined Needs**
  The Needs Analyses, which identified the regional ITS-related projects and needs, were revisited to ensure that the updated architectures would remain consistent with the evolving needs and priorities of the regions. Planning documents from the regions, including RTPs and TIPs, were reviewed as part of the needs analyses. Further information was obtained through a series of meetings with regional transportation stakeholders.

- **Additional ITS Information**
  Updates to the architecture reflect information gathered from research on documents such as RTPs and TIPs, and stakeholder input on new transportation projects, plans, policies, procedures, and infrastructure implemented since 2005. Several additional market packages were also identified for inclusion in the Regional ITS Architectures, including:

  - CVO06 - Weigh-In-Motion
  - CVO07 - Roadside CVO Safety
  - EM05 - Transportation Infrastructure Protection

Stakeholder participation was critical in identifying updates. Initial drafts of recommended updates to the architectures were developed based on revised inventories of ITS elements and from stakeholder input at project meetings. These recommendations were reviewed at meetings with regional transportation stakeholders, prompting extensive feedback that was incorporated into a finalized set of recommended updates to the Regional ITS Architectures.

The Final Reports for each region include a chapter on an updated Operational Concept for the regions reflecting changes in interagency interfaces. The Implementation Plan chapter in each region's Final Report have also been updated to reflect the current status of planned ITS initiatives. The architectures and the Final Reports will continue to serve as important inputs into future regional and statewide ITS strategic planning efforts.

Throughout this update process, transportation stakeholders have focused on producing ITS architectures that accurately reflect regional needs and priorities. For ease of use and reference, the Regional ITS Architectures have been made available in an interactive format on the internet. The interface allows a user to view the architectures in multiple ways and varying levels of detail. The architectures are available on the Commonwealth's website at http://www.mass.gov/RegionalITSArchitecture.

BUILDING ON THE ARCHITECTURE

The Regional ITS Architectures were constructed with extensive input from stakeholders throughout the Commonwealth. Having an architecture, however, is often only the first step in planning, deploying and coordinating regional ITS initiatives. Building on the architectures, regional stakeholders have also developed *Operational Concepts* and *Implementation Plans.*

Operational Concept

An Operational Concept describes the institutional relationships that must be established in order to address the interagency interfaces defined in the architectures. The purpose of the Operational Concept is to define the roles and responsibilities of stakeholders in the implementation and operation of component systems of the architectures. Each region's Operational Concept details the requirements of each interagency interface defined in the architectures, addressing the information to be exchanged, the roles of interfacing stakeholders, and the operational agreements that will be required.

Each region's Final Report presents the Operational Concept as an inventory of all the interagency interfaces in the region. Because there are hundreds of interfaces, the inventories are organized by function, such as roadway management or emergency management. The Operational Concept chapters of the Final Reports also include an analysis of current and future interagency relationships that might benefit from formalization through interagency agreements.

Implementation Plan

An Implementation Plan provides a strategy for achieving the integrated transportation system envisioned by the architecture. An Implementation Plan addresses the planned components of an architecture, identifying a series of initiatives that can be undertaken to implement these components. An Implementation Plan also considers prioritization of identified multi-agency initiatives, identifying candidates for near-term and longer-term implementation. This prioritization is based on the needs analysis, the input received from the stakeholders throughout the architecture development process, and interdependencies among the initiatives.

In 2005, stakeholders identified several near-term initiatives for implementation for each region. Since 2005, some of these regional initiatives have already been implemented or have seen significant progress. The need for some of these recommended near-term initiatives has also changed since 2005. For example, the interface between the MassHighway and MassPike Operations Centers is no longer necessary since these two control centers have since been combined into the consolidated MassDOT – Highway Division Highway Operations Center (HOC). The Implementation Plan chapters of the Final Reports update the current status of these recommended initiatives. As stated, above, these updated Regional ITS Architectures will also serve as important inputs into future regional and statewide ITS strategic planning efforts.

WORKING WITH THE ARCHITECTURES

The FHWA Rule and FTA Policy include two important provisions that focus on how ITS and the Regional ITS Architectures can be integrated into the mainstream transportation planning process. First, the FHWA Rule and FTA Policy state that federal approval and funding cannot be given to a project with ITS elements unless it is consistent with its regional architecture. Second, the FHWA Rule and FTA Policy require that before an architecture is completed, there must be a process put in place for maintaining the architecture in the future, as needs evolve and implementation continues. To address these requirements, plans for ensuring project consistency and for maintaining the architectures have been developed.

Consistency

The United States Department of Transportation is responsible for ensuring that federal transportation dollars are used in a manner that is consistent with federal laws and regulations, including the Clean Air Act, the Americans with Disabilities Act, and others. As stated in the 2001 FHWA Rule and FTA Policy:

> "The final design of all ITS projects funded with highway trust funds shall accommodate the interface requirements and information exchanges as specified in the regional ITS architecture. If the final design of the ITS project is inconsistent with the regional ITS architecture, then the regional ITS architecture shall be updated."[1]

In plain terms, this regulatory language means that if a stakeholder makes a commitment in the regional architecture, such as sharing the data generated by a system it plans to deploy in the future, then when it actually begins developing that element as a part of a project, the project should be consistent with the architecture. Consistency may be a matter of technical design or a matter of institutional coordination, but the requirement essentially says that commitments should be honored. The language is very clear, however, that if there is a conflict, the regional architecture should be updated to accommodate the project.

Based on the FHWA Rule and FTA Policy, the Project Team and project stakeholders developed a process for ensuring that consistency between projects with ITS elements and the Regional ITS Architectures would be addressed in the course of the existing regional transportation planning process. This process reflects the intent of the FHWA Rule and FTA Policy that the relationship between a project and the regional architecture should be considered early and often and that collaboration and cooperation among partners should be maximized.

As noted, a major objective in addressing the consistency requirement was to develop a process that could be integrated seamlessly into the mainstream transportation planning process. As such, the process relies on existing collaborative relationships between each MPO and its local planning partners. This approach ensures that before a project reaches the TIP, the FHWA Rule and FTA Policy's intent of examining consistency early and often and maximizing collaboration will be fulfilled. In turn, when each MPO submits its TIP to the Massachusetts Department of Transportation and when MassDOT submits the Statewide TIP to FHWA and FTA, all parties will be comfortable that the consistency requirement has been addressed.

In addition to this initial review in the early stages of the project development process, consistency with the regional architecture must be revisited as a project develops further in order to ensure that it has not been affected by changes to the scope of the project. Moreover, as a project progresses into the design stage, it must undergo a systems engineering analysis, as is typical of ITS projects and as is required by the FHWA Rule and FTA Policy.

[1] Federal Highway Administration "Intelligent Transportation System Architecture and Standards; Final Rule" and Federal Transit Administration "National ITS Architecture Policy on Transit Projects; Notice" in Federal Register volume 66 number 5, Monday, January 8, 2001.

The bottom line is that by examining consistency early and often during the planning process and by maximizing collaboration and cooperation – all within the context of existing practices – a region can avoid any delays to federal funding and approval.

Maintenance

The Regional ITS Architectures are visions of the future transportation system, documented at one point in time. The architectures, like an MPO's RTP, reflect the region's current situation and documents planned changes or investments. However, in order to remain relevant, the architectures have to be maintained. As regional needs evolve, as planned elements are deployed, and as other changes occur, the architectures must be updated to reflect those developments. Maintenance of the four Regional ITS Architectures is also motivated by federal requirements that require consistency between all federally funded projects with ITS elements and the applicable Regional ITS Architectures.

The OTP is responsible for the maintenance of the architectures. However, other stakeholders continue to be involved, as they have been throughout the development process. The maintenance strategy relies on two elements:

- Periodic Architecture Updates

  The maintenance strategy calls for the Regional ITS Architectures to be formally assessed at the same frequency as an MPO's RTP (currently a four-year cycle). Since the RTPs will provide valuable input to the architectures, assessing the architectures will be staggered to occur after the RTP update. In this way, it is expected that the assessment of the architecture can incorporate new ideas and/or projects that are included in an updated RTP.

  The OTP will formally assess the Regional ITS Architectures to determine whether significant changes in ITS deployment in a region merit a formal update to the architecture. Based on this assessment, OTP may initiate a formal update to an architecture with a request for information from stakeholders in the region regarding new ITS-related projects, initiatives, or needs. OTP may also gather information from the stakeholders in order to evaluate the status of an architecture's implementation, identifying, for example, ITS elements or interfaces that have evolved from "planned" to "existing" or that are no longer relevant and should be removed.

  Based on the information gathered through this process, OTP will generate a draft list of architecture modifications and distribute it to the stakeholders for review. OTP can then call a stakeholder meeting for the region to review the draft list. This meeting can also provide an opportunity to discuss emerging ITS issues. After the stakeholder review of the draft list, OTP will make any modifications necessary and release the updated architecture. It was as part of this periodic update process that the Regional ITS Architectures were formally updated.

- Interim Architecture Modifications

  The strategy also calls for interim architecture modifications that may occur at any point in the update cycle, outside of the periodic update process. Just as project developments necessitate TIP amendments, it is anticipated that some modifications to the architectures will be needed during the interval between periodic updates. Therefore, on the basis of project developments or other circumstances that require modifications, the project proponent will be responsible for drafting an architecture modification proposal and submitting it to OTP. The proposal will then be circulated to affected stakeholders for their review. It is expected that most architecture modifications, whether periodic or interim, will involve adding new ideas, dimensions, or stakeholders to existing market packages, interfaces, or functions.

Conclusion

The Regional ITS Architectures are the result of the significant efforts and contributions of the participants in the process. The updated architectures provide a strong foundation and opportunity for moving forward with ITS planning, implementation, and coordination, both regionally and statewide. The process of developing and updating the architectures was motivated by federal requirements and by the benefits of having regional ITS architectures.

The first of these benefits is improved interagency coordination. The architecture development process represents a significant step towards coordinating ITS planning in the regions by bringing together diverse stakeholder groups. The subsequent architecture update stakeholder meetings and the recent establishment of the Regional ITS Planning and Coordination Committees have continued to demonstrate the benefits of interagency information exchange regarding ongoing ITS initiatives occurring throughout the Commonwealth.

The second benefit is cost savings. For example, coordination of investments and consideration of standards for interagency interfaces offer opportunities for cost savings, especially in terms of long-term maintenance and operational costs.

The third benefit is better services for the traveling public. The public has the potential to benefit from this process, as the architectures address needs and priorities that cut across jurisdictional lines and that are not able to be addressed through single-agency initiatives. The framework outlined by the architectures is for regional transportation systems that can provide the public with a seamless and consistent travel experience across multiple jurisdictions.

To fully maximize the benefits of the Regional ITS Architectures, the architectures must remain current, relevant, and useful to transportation stakeholders.

RECOMMENDATIONS

Through the process of updating the Regional ITS Architectures, a number of recommendations should be considered as each region continues to move forward with deployment of ITS:

- The stakeholder organizations that are represented in the Regional ITS Planning and Coordination Committees, as well as other relevant ITS stakeholders, should continue to meet and remain involved, not only in the maintenance of the architectures, but also in planning and coordinating ITS in the regions. The benefits that these groups have realized in working together on the architectures should be built upon and expanded to other regional and statewide ITS planning and coordination efforts.

- The Regional ITS Architectures should continue to be regularly updated to reflect the changing needs and priorities of the regions. Because the initial architectures were forward-looking, few interim changes were necessary between 2005 and 2011. However, cumulative changes at the local, state, and national level have required a significant level of effort to be expended in formally updating the architectures. To make this work with the existing transportation planning process, it is recommended that the architectures be regularly assessed to determine if a formal update is necessary to reflect the needs identified in RTPs in the regions. In addition, informal updates to ensure consistency with newly proposed projects should be done on an as-needed basis.

- Many of the multi-agency ITS initiatives identified by regional stakeholders in 2005 have progressed, while others are no longer relevant. The Regional ITS Architectures should serve as important inputs to future local, regional, and statewide ITS strategic planning efforts. In particular, the architectures should be used to help identify multi-agency ITS initiatives that reflect the current needs and priorities of the regions.

- Transportation stakeholders should continue to be trained and educated regarding ITS architecture consistency. While the understanding of and familiarity with the architectures has grown considerably in recent years, new transportation stakeholders and changes in organizational personnel necessitate ongoing education and outreach efforts. The Regional ITS Planning and Coordination Committees may be able to assist in identifying areas of education and outreach that should be pursued. This education and outreach effort will help further mainstream ITS architecture consistency into the existing MPO transportation planning process.

- Formal agreements should be established for the existing and planned interagency interfaces identified in the architectures. Existing informal agreements should be formalized in order to ensure that their benefits are maintained. Operational agreements for new interfaces should be drawn up as these new interfaces are established. Additionally, existing operational agreements should be reexamined in light of the reorganization of state transportation agencies to ensure that these agreements remain relevant. Proper documentation of interagency agreements helps facilitate interagency coordination and the successful long term operation of the transportation network.

APPENDIX A

GLOSSARY OF ITS ARCHITECTURE TERMS

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Glossary of Architecture Terms from the National ITS Architecture

Full glossary available online at:
http://itsarch.iteris.com/itsarch/html/glossary/glossary.htm

Architecture	A framework within which a system can be built. Requirements dictate what functionality the architecture must satisfy. An architecture functionally defines what the pieces of the system are and the information that is exchanged between them. An architecture is functionally oriented and not technology-specific which allows the architecture to remain effective over time. It defines “what must be done,” not “how it will be done.”
Architecture Flow	Information that is exchanged between subsystems and terminators in the physical architecture view of the National ITS Architecture. Architecture flows are the primary tool that is used to define the Regional ITS Architecture interfaces. These architecture flows and their communication requirements define the interfaces which form the basis for much of the ongoing standards work in the national ITS program. The terms “information flow” and “architecture flow” are used interchangeably.
Element	This is the basic building block of Regional ITS Architectures and Project ITS Architectures. It is the name used by stakeholders to describe a system or piece of a system.
Equipment Package	Equipment packages are the building blocks of the physical architecture subsystems. Equipment Packages group similar processes of a particular subsystem together into an “implementable” package. The grouping also takes into account the user services and the need to accommodate various levels of functionality.
Information Flow	Information that is exchanged between subsystems and terminators in the physical architecture view of the National ITS Architecture. These information flows are normally identical to the architecture flows in the National ITS Architecture. The terms “information flow” and “architecture flow” are used interchangeably.
Intelligent Transportation System	The system defined as the electronics, communications or information processing used singly or integrated to improve the efficiency or safety of surface transportation.
Inventory	See *System Inventory*.
ITS Architecture	Defines an architecture of interrelated systems that work together to deliver transportation services. An ITS architecture defines how systems functionally operate and the interconnection of information exchanges that must take place between these systems to accomplish transportation services.
ITS Project	Any project that in whole or in part funds the acquisition of technologies or systems of technologies that provide or significantly contribute to the provision of one or more ITS user services.
Logical Architecture	The logical architecture view of the National ITS Architecture defines what has to be done to support the ITS user services. It defines the processes that perform ITS functions and the information or data flows that are shared between these processes.
Market Package	The market packages provide an accessible, service-oriented perspective to the National ITS Architecture. They are tailored to fit, separately or in combination, real world transportation problems and needs. Market packages collect together one or more equipment packages that must work together to deliver a given transportation service and the architecture flows that connect them and other important external systems. In other words, they identify the pieces of the physical architecture that are required to implement a particular transportation service.

National ITS Architecture	A common, established framework for developing integrated transportation systems. The National ITS Architecture is comprised of the logical architecture and the physical architecture, which satisfy a defined set of user service requirements. The National ITS Architecture is maintained by the United States Department of Transportation (USDOT).
Physical Architecture	The physical architecture is the part of the National ITS Architecture that provides agencies with a physical representation (though not a detailed design) of the important ITS interfaces and major system components. It provides a high-level structure around the processes and data flows defined in the logical architecture. The principal elements in the physical architecture are the subsystems and architecture flows that connect these subsystems and terminators into an overall structure. The physical architecture takes the processes identified in the logical architecture and assigns them to subsystems. In addition, the data flows (also from the logical architecture) are grouped together into architecture flows. These architecture flows and their communication requirements define the interfaces required between subsystems, which form the basis for much of the ongoing standards work in the ITS program.
Project ITS Architecture	A framework that identifies the institutional agreement and technical integration necessary to interface a major ITS project with other ITS projects and systems.
Region	The geographical area that identifies the boundaries of the Regional ITS Architecture and is defined by and based on the needs of the participating agencies and other stakeholders. In metropolitan areas, a region should be no less than the boundaries of the metropolitan planning area.
Regional ITS Architecture	A specific, tailored framework for ensuring institutional agreement and technical integration for the implementation of ITS projects or groups of projects in a particular region. It functionally defines what pieces of the system are linked to others and what information is exchanged between them.
Stakeholders	A widely used term that notates a public agency, private organization or the traveling public with a vested interest, or a "stake" in one or more transportation elements within a Regional ITS Architecture.
Standards	Documented technical specifications sponsored by a Standards Development Organization (SDO) to be used consistently as rules, guidelines, or definitions of characteristics for the interchange of data. A broad array of ITS standards is currently under development that will specifically define the interfaces identified in the National ITS Architecture.
Subsystem	The principle structural element of the physical architecture view of the National ITS Architecture. Subsystems are individual pieces of the Intelligent Transportation System defined by the National ITS Architecture. Subsystems are grouped into four classes: Centers, Field, Vehicles, and Travelers. Example subsystems are the Traffic Management Subsystem, the Vehicle Subsystem, and the Roadway Subsystem. These correspond to the physical world: respectively traffic operations centers, automobiles, and roadside signal controllers. Due to this close correspondence between the physical world and the subsystems, the subsystem interfaces are prime candidates for standardization.
System	A collection of hardware, software, data, processes, and people that work together to achieve a common goal. Note the scope of a "system" depends on one's viewpoint. To a sign manufacturer, a dynamic message sign is a "system." To a state DOT, the same sign is only a component of a larger Freeway Management "System." In a Regional ITS Architecture, a Freeway Management System is a part of the overall surface transportation "system" for the region.
System Inventory	The collection of all ITS-related elements in a Regional ITS Architecture.

Terminator	Terminators define the boundary of an architecture. The National ITS Architecture terminators represent the people, systems, and general environment that interface to ITS. The interfaces between terminators and the subsystems and processes within the National ITS Architecture are defined, but no functional requirements are allocated to terminators. The logical architecture and physical architecture views of the National ITS Architecture both have exactly the same set of terminators. The only difference is that logical architecture processes communicate with terminators using data flows, while physical architecture subsystems use architecture flows.
Turbo Architecture	An automated software tool used to input and manage system inventory, market packages, architecture flows and interconnects with regard to a Regional ITS Architecture and/or multiple Project ITS Architectures.
User Services	User services document what ITS should do from the user's perspective. A broad range of users are considered, including the traveling public as well as many different types of system operators. User services, including the corresponding user service requirements, form the basis for the National ITS Architecture development effort. The initial user services were jointly defined by USDOT and ITS America with significant stakeholder input and documented in the National Program Plan. The concept of user services allows system or project definition to begin by establishing the high level services that will be provided to address identified problems and needs. New or updated user services have been and will continue to be satisfied by the National ITS Architecture over time.

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APPENDIX B

ARCHITECTURE RELATED ACRONYMS

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Architecture Related Acronyms

ACRONYM DEFINITIONS (NON-ORGANIZATIONAL)

Acronyms	Definition
AD	Archived Data Management
AFC	Automatic Fare Collection
APC	Automatic Passenger Counter
APTS	Advanced Public Transportation System
ATIS	Advanced Traveler Information System
ATMS	Advanced Traffic Management System
AVA	Automatic Voice Annunciation
AVAS	Automated Voice Announcement System
AVI	Automatic Vehicle Identification
AVL	Automatic Vehicle Location
AVS	Advanced Vehicle Safety Systems
CA/T	Central Artery/Tunnel
CATS	Consequences Assessment Tool Set
C2C	Center to Center
CAD	Computer Aided Dispatch
CCTV	Closed Circuit Television
CV	Commercial Vehicle
CVAS	Other Commercial Vehicle Administration Services
CVIEW	Commercial Vehicle Information Exchange Window
CVISN	Commercial Vehicle Information Systems and Networks
CVO	Commercial Vehicle Operations
e-DEP	Electronic Department of Environmental Protection
DTOC	District Traffic Operations Center
EFP	Electronic Fare Payment
EM	Emergency Management
EMC	Emergency Management Center
EOC	Emergency Operations Center
ERS	Event Reporting System
ETC	Electronic Toll Collection
GPS	Global Positioning System
HAR	Highway Advisory Radio
HOC	Highway Operations Center
HPAC	Hazard Prediction and Assessment Capability

ICS	Incident Command System
IFTA	International Fuel Tax Agreement
IPCS	Integrated Project Control System
IRIS	Incident Reporting Information System
IRP	International Registration Plan
ISP	Internet Service Provider
ISTEA	Intermodal Surface Transportation Efficiency Act
ITIP	Intelligent Transportation Infrastructure Program
ITS	Intelligent Transportation Systems
IVR	Interactive Voice Response
MassTERS	Massachusetts Traffic and Emergency Response System
MC	Maintenance and Construction
MCRS	Maintenance Control and Reporting System
MDT	Mobile Data Terminals
METFON	Metropolitan Emergency & Transportation Fiber Optic Network
M-ITS	MART Integrated Traveler Services
MIVIS	Massachusetts Interagency Video Information System
MOU	Memorandum of Understanding
NHS	National Highway System
NTCIP	National Transportation Communication for ITS Protocol
OCC	Operations Control Center
OS/OW	Oversize and Overweight
PA	Public Address
PDF	Portable Document Format
PIF	Project Initiation Form
RTIC	Regional Traveler Information Center
RTP	Regional Transportation Plans
RWIS	Road Weather Information System
RSS	Really Simple Syndication
SAFETEA-LU	Safe, Accountable, Flexible and Efficient Transportation Equity Act – A Legacy for Users
SCADA	Supervisory Control and Data Acquisition
SOA	Service Oriented Architecture
STIP	State Transportation Improvement Program
TEA-21	Transportation Equity Act for the 21st Century
TIP	Transportation Improvement Program
TMC	Traffic Management Center
TOC	Traffic Operations Center
TSP	Transit Signal Priority

URM	Unified Response Manual
UWR	United We Ride
VIS	Video Integration System
VMS	Variable Message Sign
WAN	Wide Area Network
WiFi	Wireless Fidelity
WIM	Weigh-In-Motion
XML	eXtensible Markup Language

ACRONYM DEFINITIONS (AGENCIES & ORGANIZATIONS)

Acronyms	**Definition**
AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
BAT	Brockton Area Transit
BEMA	Boston Emergency Management Agency
BFD	Boston Fire Department
BPWD	Boston Public Works Department
BRPC	Berkshire Regional Planning Commission
BRTA	Berkshire Regional Transit Authority
BTD	Boston Transportation Department
CATA	Cape Ann Transportation Authority
CCC	Cape Cod Commission
CCRTA	Cape Cod Regional Transit Authority
CMRPC	Central Massachusetts Regional Planning Commission
CTPS	Central Transportation Planning Staff
DCR	Department of Conservation & Recreation
DPW	Department of Public Works
EOT	Executive Office of Transportation
EPA	United States Environmental Protection Agency
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRCOG	Franklin Regional Council of Governments
FRTA	Franklin Regional Transit Authority
FTA	Federal Transit Administration
GATRA	Greater Attleboro-Taunton Regional Transit Authority
GMTA	Greenfield-Montague Transportation Area
IAG	E-Z Pass Inter-Agency Group
IEEE	Institute of Electrical and Electronics Engineers
ITE	Institute of Transportation Engineers
LRTA	Lowell Regional Transit Authority
MAPC	Metropolitan Area Planning Council
MART	Montachusett Regional Transit Authority
MARTA	Massachusetts Association of Regional Transit Authorities
MassDEP	Massachusetts Department of Environmental Protection
MassDOT	Massachusetts Department of Transportation

MBI	Massachusetts Broadband Institute
MBTA	Massachusetts Bay Transportation Authority
MCCA	Massachusetts Convention Center Authority
MDC	Metropolitan District Commission
MEMA	Massachusetts Emergency Management Agency
MPO	Metropolitan Planning Organization
MRPC	Montachusett Regional Planning Commission
MSP	Massachusetts State Police
MVC	Martha’s Vineyard Commission
MVPC	Merrimack Valley Planning Commission
MVRTA	Merrimack Valley Regional Transit Authority
MWRTA	MetroWest Regional Transit Authority
NEMA	National Electrical Manufacturers Association
NMCOG	Northern Middlesex Council of Governments
NOAA	National Oceanic and Atmospheric Administration
NP&EDC	Nantucket Planning and Economic Development Commission
NRTA	Nantucket Regional Transit Authority
OCPC	Old Colony Planning Council
OTP	Office of Transportation Planning
PVPC	Pioneer Valley Planning Commission
PVTA	Pioneer Valley Transit Authority
RMV	Registry of Motor Vehicles
RPA	Regional Planning Authority
RTA	Regional Transit Authority
SAE	Society of Automotive Engineers
SRPEDD	Southeastern Regional Planning and Economic Development District
SRTA	Southeastern Regional Transit Authority
SDO	Standards Development Organization
TMA	Transportation Management Associations
USDOT	United States Department of Transportation
VTA	Martha’s Vineyard Transportation Authority
WRTA	Worcester Regional Transit Authority

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APPENDIX C

COMPILED LISTS OF MEETING PARTICIPANTS

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Compiled Lists of Meeting Participants by Region

METROPOLITAN BOSTON MEETING PARTICIPANTS

Organization	Name
Boston Region MPO	Eric Howard Anne McGraham Efi Pagitsas Pam Wolfe
Brockton Area Transit	Kathy Riddell
City of Boston	Bill Oates
City of Boston – Transportation Department	Don Burgess Jim Gillooly
City of Cambridge	Jeff Parenti
Federal Highway Administration	Tim White
Federal Transit Administration	Bill Gordon
IBI Group	Rebecca Morgan Carl-Henry Piel James Sorensen Tegin Teich
Lowell Regional Transit Authority	Tom Henderson
Massachusetts Bay Transportation Authority	Dave Barker Gary Foster Adam Veneziano
Massachusetts Emergency Management Agency	Jeffrey Trask
Massachusetts Department of Transportation	Chris Dempsey Joshua Robins
Massachusetts Department of Transportation – Office of Transportation Planning	Ned Codd Patrick McMahon Steve Pepin Peter Sutton
Massachusetts Department of Transportation – Highway Division	Phyllis Hassiotou Thomas Loughlin Michelle Maffeo Frank Spada Leonard Walsh

Organization	Name
Massachusetts Department of Transportation – Registry of Motor Vehicles	Matt Poirer
Massachusetts Port Authority	Lorenco Danzas
Massachusetts State Police	Jim Hanlon Mark Horgan
Merrimack Valley Planning Commission	Jim Terlizzi
Merrimack Valley Regional Transit Authority	Joe Costanzo John Whittaker
Metropolitan Area Planning Council	Jim Gallagher
MetroWest Regional Transit Authority	Daniel Fitch
New Hampshire Department of Transportation	James Knowlton Steve Lemuire
Northern Middlesex Council of Governments	Justin Howard
Old Colony Planning Council	Bill McNulty
Southeastern Regional Planning & Economic Development District	Christopher Cardaci
Transystems	Carol Schweiger

CENTRAL MASSACHUSETTS MEETING PARTICIPANTS

Organization	Name
Central Massachusetts Regional Planning Commission	Larry Adams Mary Ellen Blunt James Hanna Shalini Sen
City of Worcester	Joe Borbone
Federal Transit Administration	William Gordon
IBI Group	James Sorensen Tegin Teich
Massachusetts Emergency Management Agency	Allen Phillips
MassDOT – Highway Division	Bryan Slack
MassDOT – Office of Transportation	Patrick McMahon Steve Pepin Peter Sutton

Organization	Name
Massachusetts State Police	Robert McGrath
Massport	Paul Christner Andy Davis
Montachusett Regional Planning Commission	Brian Doherty Brad Harris
Montachusett Regional Transit Authority	Bonnie Mahoney
Town of Auburn	Bill Coyle
Worcester Regional Transit Authority	Stephen O'Neil

SOUTHEASTERN MASSACHUSETTS MEETING PARTICIPANTS

Organization	Name
Brockton Area Transit	Kelly Corbett Kathy Riddell
Cape Cod Commission	Clay Schofield
Cape Cod Regional Transit Authority/Geolab	Larry Harman Daniel Fitch
Federal Highway Administration	Tim White
Greater Attleboro-Taunton Regional Transit Authority	Jennifer Chaves
IBI Group	James Sorensen Tegin Teich
Martha's Vineyard Commission	Michael Mauro
Massachusetts Emergency Management Agency	Allen Phillips
Massachusetts State Police	Robert Horman

Organization	Name
MassDOT – Highway Division	Timothy Kochan
MassDOT – Registry of Motor Vehicles	Matthew Poirier
MassDOT –Office of Transportation Planning	Patrick McMahon Steve Pepin Peter Sutton
Plymouth and Brockton State Railway Co.	Chris Anzuoni
Southeastern Regional Planning and Economic Development District	Christopher Cardaci Jennifer Chaves Adam Recchia Stacy Sousa
Southeastern Regional Transit Authority	Joseph L. Cosentino
The Steamship Authority	Mary T. H. Claffey
Volpe Center	Ingrid Bartinique

WESTERN MASSACHUSETTS MEETING PARTICIPANTS

Organization	Name
Berkshire Regional Planning Commission (BRPC)	Dave Daskal
City of Pittsfield	Matthew Billeter
City of Springfield	Al Chwalek Bob Houldson John Rooney
Franklin Regional Council of Governments (FRCOG)	Maureen Mullaney
Franklin Regional Transit Authority	Jake Toomey
IBI Group	James Sorensen Tegin Teich
Massachusetts Emergency Management Agency	Jeffrey Trask

Organization	Name
MassDOT - Highway Division	Al Stegemann Laurie Scarbrough Meryl Mandell Peter Frieri
MassDOT - Office of Transportation	Patrick McMahon Peter Sutton Steve Pepin
Massachusetts State Police	Leonard Von Flatern
NYS Thruway Authority	Chris Jones Dean Kennedy
Pioneer Valley Planning Commission (PVPC)	Gary Roux
Pioneer Valley Transit Authority (PVTA)	Carolyn Hart-Lucien Mary Macinnes
University of Massachusetts	Adam Sherson Al Byam James Schleicher John Collura Paul Shuldiner