

Chittenden County Transportation Authority, Vermont  
Multimodal Passenger Information, Transit Signal Priority  
and ITS System Planning  
Local Evaluation Report

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Intelligent Transportation Systems Integration Program  
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# **State of Vermont Multimodal Passenger Information, Transit Signal Priority and ITS System Planning – Local Evaluation Report**

## **Preface**

This report presents a project overview, summary of evaluation strategy and findings, discussion of institutional issues, and lessons learned regarding Intelligent Transportation Systems (ITS) integration efforts at the Chittenden County Transportation Authority (CCTA) funded with United States Department of Transportation (USDOT) ITS Integration Program grant funds. The official name of the project is the “State of Vermont Multimodal Passenger Information, Transit Signal Priority and ITS System Planning” project.

This assessment has been prepared following the guidelines for ITS Self-Evaluations provided by USDOT on the ITS Integration Self-Evaluation Program website, [www.itsevaluation.net](http://www.itsevaluation.net).

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## **1. Acronyms**

CATMA	Campus Area Transportation Management Association
CCMPO	Chittenden County Metropolitan Planning Organization
CCTA	Chittenden County Transportation Authority
DMS	Dynamic Message Sign
GIS	Geographic Information System
GPS	Global Positioning System
ITS	Intelligent Transportation Systems
TSP	Transit Signal Priority
USDOT	United States Department of Transportation
UVM	University of Vermont
VTrans	Vermont Agency of Transportation

## **2. Executive Summary**

The Chittenden County Transportation Authority (CCTA) was founded in 1973 by the Vermont Legislature and provides transit services in northwestern Vermont. CCTA is a full service public transportation provider, offering services including fixed route bus service, parking lot and supermarket shuttles, neighborhood service, a statewide ridesharing program, transportation for Medicaid recipients and contracted paratransit service for people who cannot use the bus.

In August 2003, CCTA applied for a grant for ITS integration funds through the USDOT ITS Integration Program. The purpose of this grant was to implement and integrate ITS technologies in the CCTA service area. In the grant application, CCTA stated that it would use ITS to improve the on-time performance and reliability of services, provide improved safety and security, increase the lifespan of capital equipment through monitoring, and provide improved passenger information systems. The proposed ITS integration project is being driven by 1) the need for more real-time passenger information, 2) transit center site and cost restrictions; 3) the need for a means to more quickly and effectively schedule vehicle operations and driver duties; and 4) the need to centralize data related to transit operations and planning.

In its August 2003 grant application, CCTA proposed using the ITS integration funds for several purposes:

- An initial high priority project that will provide enhanced multimodal passenger information for transit, ferry, and rail service at the new multimodal transit center.
- Fixed route scheduling software, which will serve as a data warehouse, allowing CCTA to share data with its regional partners and implement service changes more effectively.
- Transit signal priority on several important corridors in collaboration with the City of Burlington Department of Public Works, State DOT, CCMPO and other municipalities
- The design of a mobile data communications system. The mobile data system will allow CCTA to implement an AVL location and schedule adherence monitoring, which will be integrated into the operations system to enable real-time updates to the passenger information.

To date, CCTA has made progress all three of the areas of ITS integration that were identified as top priorities in its August 2003 grant application:

- The multimodal passenger information Dynamic Message Sign (DMS) project is well underway. A Request for Proposals (RFP) was issued on April 1, 2006, to select a vendor to procure, install and integrate the displays at the existing CCTA Cherry Street transfer area. In a parallel effort, the City of Burlington issued an RFP on March 17, 2006, for architectural and engineering services for the development of the new Downtown Transit Center. It is expected that the new passenger information DMS system will produce significant benefits in both customer convenience and operations. Coupled with the planned Downtown

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Transit Center, the two initiatives will substantially improve the attractiveness and effectiveness of transit in Burlington and Chittenden County.

- The implementation of fixed-route scheduling software as envisioned in CCTA's August 2003 grant application is now complete. An RFP to procure and integrate the fixed-route scheduling software package was issued in 2003. Through a competitive bidding process, GIRO, Inc. was selected as the software vendor in June 2005. The first driver schedules were produced with the new software in February 2006, and the first passenger schedules were produced with the new software in March 2006. The HASTUS software has led to more effective schedule development, improved operational efficiency, and better interlining leading to increased driver alertness.
- The Transit Signal Priority (TSP) efforts planned in CCTA's grant application are well underway. A TSP standard for the region has recently been completed and CCMPO staff are in the process of working with the municipalities to validate the standard. CCTA has proposed a TSP pilot project on a corridor within the City of Burlington and discussions on the project are proceeding. It is expected that the new TSP standard will result a consensus that will help CCTA and the municipalities implement TSP in Chittenden County in the coming years, and the proposed demonstration project may be in place sooner. TSP would yield significant benefits in terms of reduced transit travel times, improved schedule adherence, and ultimately improved attractiveness of transit in Burlington and Chittenden County.
- In addition to the efforts related to the three specific ITS activities summarized above, CCTA has been a key partner in the regional ITS architecture and Vermont statewide ITS architecture efforts, helping to raise the profile of transit in ITS planning efforts and educate stakeholders about important topics such as multimodal passenger information and Transit Signal Priority.

The following is a summary of lessons learned over the course of CCTA's ITS Integration Program grant. Most of these lessons apply to each of the ITS initiatives that CCTA has pursued over the past few years.

- It is important to gain the interest of stakeholders both internally and externally.
- Educating stakeholders on the benefits of ITS is key.
- Working with others on their projects can produce benefits for an agency's ITS integration plans.
- Persistence is very important.
- Frequent communication and collaboration is vital.

### **3. Background and Project Description**

#### **3.1 The Chittenden County Transportation Authority**

The Chittenden County Transportation Authority (CCTA) was founded in 1973 by the Vermont Legislature and provides transit services in northwestern Vermont. CCTA is a full service public transportation provider, offering services including fixed route bus service, parking lot and supermarket shuttles, neighborhood service, a statewide ridesharing program, transportation for Medicaid recipients and contracted paratransit service for people who cannot use the bus. CCTA is governed by a ten member Board of Commissioners.

CCTA operates eleven regular routes, as well as the Downtown PARC and CATMA shuttles which transport employees from satellite parking on Pine Street to downtown Burlington and hill institutions and businesses, conserving scarce parking downtown parking for shoppers and visitors. CCTA also provides shuttles from senior housing complexes to local supermarkets and neighborhood specials for student transportation to Burlington schools. As well CCTA operates three LINK routes that provide interregional service for commuters to three adjacent counties, thereby offering important access to jobs, education, health care, and other services. These LINK routes help mitigate traffic congestion, lower the environmental impact of long distance commuting, and provide a safe alternative means of travel during common winter road conditions. Weekday ridership on CCTA fixed route services in 2005 averaged 6,615 unlinked trips per day, totaling 1,887,104 for the year.

In compliance with the federal Americans with Disabilities Act (ADA), CCTA provides complementary paratransit transportation services for those who are unable to use bus service. Through a contract with the Special Services Transportation Agency (SSTA), van service is provided within three-quarter mile zones adjacent to the CCTA fixed routes. In FY2005, SSTA provided about 32,000 rides to people who could not use the bus.

#### **3.2 Background and Need**

The CCTA has demonstrated the ongoing ability to effectively grow and change to accommodate the needs of its member communities. Two major and recent examples of this change include CCTA's work with area campuses and with extending service into central Vermont:

- The Campus Area Transportation Management Association (CATMA), which includes the University of Vermont, Fletcher Allen Medical Center, and the American Red Cross, partnered with CCTA and the City of Burlington to develop remote parking shuttles to serve a growing need for off-site parking for these institutions.
- CCTA was recently asked by the state of Vermont to institute transit service in Central Vermont after the existing service provider filed for bankruptcy. Despite

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having no facility, rolling stock, management staff or even complete route descriptions, CCTA implemented service 18 days after receiving a verbal request to operate service in the community and five days after receiving a written contract to operate the service.

CCTA has implemented the following technologies in the recent past: a) system-wide timepoint analysis using Geographic Information System (GIS) and an on-bus Global Positioning System (GPS) receiver; b) in house GIS system; c) database and GIS based ridership data collection using handheld data collection devices; d) farebox system modifications (both on-bus physical hardware and software as well as back end operations center data system) to read University of Vermont (UVM) and other card media and track ridership by person, time, and route under a special billing arrangement; e) upgraded accounting system and rideshare database; f) placed all schedules on web site ([www.cctaride.org](http://www.cctaride.org)) which will be upgraded to allow data from the scheduling software acquired in this grant to flow directly into the web site and thus eliminate duplicate data entry.

In 2001, CCTA began a study of on-time performance using a GIS (ArcInfo) and handheld GPS receivers. This project collects on-time performance data for very low cost, using a GPS unit that CCTA rotated among different driver assignments to sample all runs on all routes over the course of a month. CCTA changed timepoints on all routes to reflect actual running times.

### **3.3 ITS Integration Efforts**

In August 2003, CCTA applied for a grant for ITS integration funds through the USDOT ITS Integration Program. The purpose of this grant was to implement and integrate ITS technologies in the CCTA service area. In the grant application, CCTA stated that it would use ITS to improve the on-time performance and reliability of services, provide improved safety and security, increase the lifespan of capital equipment through monitoring, and provide improved passenger information systems. The proposed ITS integration project is being driven by 1) the need for more real-time passenger information, 2) transit center site and cost restrictions; 3) the need for a means to more quickly and effectively schedule vehicle operations and driver duties; and 4) the need to centralize data related to transit operations and planning.

In its August 2003 grant application, CCTA proposed using the ITS integration funds for several purposes:

- An initial high priority project that will provide enhanced multimodal passenger information for transit, ferry, and rail service at the new multimodal transit center, in collaboration with the Lake Champlain Transportation Company (ferries), Vermont Railway (seasonal rail), and Amtrak departures from Essex and potential future rail in Burlington). CCTA has three routes which meet up at the Essex Amtrak station and recently partnered with the Village of Essex Junction to upgrade the Amtrak station to include a large covered bus waiting area capable of serving all three routes at once.



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- Fixed route scheduling software, which will serve as a data warehouse, allowing CCTA to share data with its regional partners and implement service changes more effectively. This scheduling software will be integrated with the monitoring and control software for the multimodal signs, which will collectively serve as the multimodal signs operations system.
- Transit signal priority on several important corridors in collaboration with the City of Burlington Department of Public Works, State DOT, CCMPO and other municipalities.
- The design of a mobile data communications system. The mobile data system will allow CCTA to implement an AVL location and schedule adherence monitoring, which will be integrated into the operations system to enable real-time updates to the passenger information.

This project was undertaken to enable more integrated planning and operations with a wide range of different regional partners, including:

- Lake Champlain Transportation Company (ferry operator);
- Vermont Railway (seasonal rail operator);
- Amtrak (departures from Essex and potential future rail to Burlington);
- City of Burlington Department of Public Works;
- Chittenden County Metropolitan Planning Organization;
- Vermont Agency of Transportation; and
- Vermont Department of Public Safety – AMBER Alert Program.

In the August 2003 grant application, CCTA identified the following systems to initially be integrated through this project:

- Displays at the new downtown transit center, to provide information to travelers about the bays assigned to incoming buses and the time until the next bus, as well as similar information about ferry and rail departures. These signs will also incorporate a messages area that will be used as part of the Vermont AMBER alert program. Monitoring and control software will operate these signs, involving the integration of schedule information from CCTA and the operators of the ferry and rail services.
- Scheduling software for general public fixed route services, including integration with the monitoring and control software for the multimodal transit center signs system.
- Transit signal priority on several corridors.

The implementation sequence envisioned for the overall CCTA transit ITS program in the grant application is as follows:

- Phase 1
  - Fixed route scheduling software, including integration with the multimodal signs monitoring and control software for the transit center
  - Multimodal Dynamic Message Signs at transit center, including monitoring and control software that integrates schedule data from CCTA and the other ferry and rail operators

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- Transit signal priority (for selected CCTA travel corridors)
- Ridecheck software, using handheld computers
- Engineering for radio system upgrade to support mobile data communications
- Phase 2
  - Telephone passenger information system, with automated access to schedule information
  - Internet passenger information systems through websites, with access to schedule information, a trip itinerary planner, downloads for schedule files to handheld computers and links to traffic information from the CCMPO and VTrans websites. Access to schedules and trip itineraries would also be provided through kiosks in the multimodal transit center
  - Radio communications system enhancements (addressing the coverage requirements of both CCTA and GMTA as well as the data capacity needed for the ITS projects contemplated in this project)
  - AVL and other on-board “smart bus” systems for CCTA, including:
    - dispatch-driver text messaging
    - on-board next stop announcements
    - Automatic Passenger Counting (data to be integrated at the back end with any data that is collected using the ridecheck software installed in Phase 1)
    - single-point for driver data entry
    - vehicle diagnostics/monitoring
    - covert driver alarm with covert microphone monitoring
    - digital video recording
    - accident reconstruction data recording
    - keyless ignition/drivetrain locking
  - Provide predicted next stop times to passengers using dynamic message signs at major CCTA stops; also provide this information, together with perhaps fleet locations, through the telephone and Internet passenger information systems
  - Expand transit signal priority to additional Chittenden County corridors
  - Expand AVL system and driver security monitoring features to encompass GMTA

## **4. Evaluation Plan**

### **4.1 Goals and Objectives**

CCTA expects the following impacts from the eventual more comprehensive ITS integration project that will be developed on the foundation of the initial fixed route scheduling system, passenger information system, and transit signal priority project:

- Provide data that will be helpful for highway, arterial management and emergency management to VTrans, the CCTA member municipalities, and public safety agencies respectively, using regional ITS architecture-based protocols.
- Providing additional and more accurate information on routes, trip itinerary planning and next bus arrival times. This information, provided to riders before they arrive at CCTA facilities and while waiting, will make transit more accessible and less stressful to use.
- Substantially better headway/schedule control of all revenue vehicles.
- Improved data on incidents and schedule adherence to support daily dispatch operations management.
- Improved on-time performance tracking, for better feedback to drivers.
- Improved feedback information to scheduling, for more realistic run cutting (better adherence to schedules leads to more trust in the system and more ridership).
- Better and more consistent on-bus audio stop announcements, as well as on-bus visual stop announcements for those with hearing impairment.
- Less expensive, more frequent, and more accurate ridership and on-time performance data, for ongoing use in planning and scheduling.
- Text communication with drivers, for increased safety (for emergency situations as well as avoiding the need for drivers to answer radios while driving).
- Better dynamic scheduling of paratransit service (real-time knowledge of bus locations can free up capacity for additional service without increasing fleet size).
- Move towards a paperless office/bus in paper intensive paratransit, with manifests and data entry using the MDTs.
- Better protection of passengers and CCTA through using on-bus digital video recording to document passenger and driver actions. This will also serve as a crime and vandalism deterrent.
- Detailed bus operational data collected, for use in accident reconstruction.
- Fewer bus road calls, due to improving the information provided to maintenance in advance of critical component failures. This will also reduce maintenance cost since a bus power plant/transmission often costs \$25,000.

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## **4.2 Evaluation Strategy**

In order to successfully fulfill the local evaluation reporting requirements of the ITS Integration grant, CCTA proposed to: 1) form an evaluation team prior to project implementation consisting of the project oversight committee that meets quarterly; 2) develop the evaluation strategy based on project goals; 3) develop the self-evaluation plan; 4) collect and analyze project performance and cost information; 5) produce the self-evaluation report in accordance with the ITS Integration Self-Evaluation Guidelines.

CCTA retained the services of TranSystems, consultants who are experienced with ITS Evaluation and have in-depth knowledge of the project through their ongoing role in developing the project. TranSystems took the lead in preparing this Local Evaluation Report as well as in preparing the required cost data submittals via the ITS Integration Self-Evaluation Program website.

## **4.3 Additional Elective Activities Being Performed**

In addition to preparation of the Local Evaluation Report, during the grant application process CCTA agreed to perform two elective evaluation activities:

- Evaluating the institutional issues associated with achieving cooperation among public sector agencies, and documenting how they were overcome.
- Providing a brief lessons learned writeup on the technical and institutional issues encountered in integrating ITS components.

The results of these additional elective evaluation activities are documented in Sections 5.2 and 5.3 of this report.

## **5. Evaluation Findings**

### **5.1 Project Accomplishments and Status**

To date, CCTA has made progress all three of the areas of ITS integration that were identified as top priorities in its August 2003 grant application. The following is a summary of accomplishments and the status of activities in the three key areas – multimodal passenger information displays, fixed-route scheduling software, and transit signal priority – as well as overall efforts related to ITS integration in Chittenden County.

#### Multimodal Passenger Information Displays

The multimodal passenger information Dynamic Message Sign (DMS) project is well underway. The following is a summary of the status of this effort:

- Specifications for an extensive passenger information DMS system were developed in late 2003 consistent with the then-current plans for a multimodal transit center at Main and Battery Streets in downtown Burlington;
- As a result of factors unrelated to the ITS integration project, plans for the multimodal transit center were put on hold;
- Specifications for a passenger information DMS system were developed in 2005 for the existing CCTA downtown transfer area on Cherry Street; this system is smaller than the system associated with the originally proposed multimodal transit center, but leaves room for expansion and relocation to the new Downtown Transit Center which is planned for Cherry Street;
- A Request for Proposals (RFP) was issued on April 1, 2006, to select a vendor to procure, install and integrate the displays at the existing CCTA Cherry Street transfer area. Alpine Systems was selected as the systems integrator in June 2006, and implementation will occur later in 2006 at a contract price of about \$55,000;
- In a parallel effort, the City of Burlington issued an RFP on March 17, 2006, for architectural and engineering services for the development of the new Downtown Transit Center.

It is expected that the new passenger information DMS system will produce significant benefits in both customer convenience and operations. Coupled with the planned Downtown Transit Center, the two initiatives will substantially improve the attractiveness and effectiveness of transit in Burlington and Chittenden County.

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### Fixed-Route Scheduling Software

The implementation of fixed-route scheduling software as envisioned in CCTA's August 2003 grant application is now complete. The following is a summary of the key milestones in this effort:

- Specifications for an automated fixed-route scheduling system, including route definition, blocking, run-cutting, and rostering capabilities were developed in 2003;
- An RFP to procure and integrate the fixed-route scheduling software package was issued in 2003;
- Through a competitive bidding process, GIRO, Inc. was selected as the software vendor in June 2005; the procurement included HASTUS-VEHICLE, HASTUS-CREW, CrewOpt, and HASTUS-ROSTER; the total system price for these components, setup and training services, and the first three years of annual maintenance was approximately \$280,000;
- Installation and training on the HASTUS software began in July 2005;
- The first driver schedules were produced with the new software in February 2006;
- The first passenger schedules were produced with the new software in March 2006.

While the new HASTUS software package has only recently been implemented, CCTA has seen several improvements with the new scheduling process already:

- The HASTUS software allowed CCTA to integrate the driver bidding process (the process by which drivers pick work assignments when a schedule change is implemented); the development of driver paddles (daily work assignments), and the development of passenger schedules. Previously these processes had been accomplished in a series of spreadsheets which could be difficult to manage.
- The new software also allowed CCTA to improve operational efficiency by more effectively interlining routes.
- The better interlining process has had an important side benefit of making driver schedules more varied. This appears to have increased driver alertness which contributes to safety on the system.

It is expected that over time, continued improvements in the scheduling process, operational efficiency, and driver alertness and safety will be experienced as a result of the new HASTUS software.

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## Transit Signal Priority

The Transit Signal Priority (TSP) efforts planned in CCTA's grant application are well underway. The following is a summary of the status of this effort:

- CCTA, together with the Chittenden County Metropolitan Planning Organization (CCMPO), began efforts to promote TSP on corridors in Chittenden County in 2003;
- Early efforts to identify a standard for TSP in the County were slowed by the discovery that two different technologies were being used for signal priority and pre-emption in the CCTA service area at the time;
- A number of meetings were held to discuss the issue and the need to adopt a common TSP standard; CCTA helped spearhead this process and educate the involved stakeholders;
- The CCMPO retained a consultant, IBI Group, to develop a TSP priority standard for Chittenden County; this work has recently been completed and CCMPO staff are in the process of working with the municipalities to validate the standard; technically involved individuals at CCMPO, CCTA, VTrans and the municipalities have agreed to the standard;
- CCTA has proposed a TSP pilot project on a corridor within the City of Burlington and discussions on the project are proceeding; in a related move, the City of Burlington has installed receivers on some new traffic signal controllers that are capable of accommodating TSP;
- Plans for the proposed South End Neighborhood Transit Center (SENTC) in the City of Burlington have been developed to include TSP at two intersections near the project site. The SENTC is a separate project sponsored by the City, the Campus Area Transportation Management Association (CATMA), and the CCTA that would provide an expanded park-and-ride facility to intercept drivers approaching Burlington from the south.

It is expected that the new TSP standard will result in a consensus that will help CCTA and the municipalities implement TSP in Chittenden County in the coming years, and the proposed demonstration project may be in place sooner. TSP would yield significant benefits in terms of reduced transit travel times, improved schedule adherence, and ultimately improved attractiveness of transit in Burlington and Chittenden County.

In addition to the efforts related to the three specific ITS activities summarized above, it is also worthwhile to note that since CCTA prepared its ITS Integration grant application, a CCMPO regional ITS architecture has been completed, and progress has been made on a Vermont statewide ITS strategic plan. CCTA was a key partner in both of these efforts, helping to raise the profile of transit in ITS planning efforts and educate stakeholders about important topics such as multimodal passenger information and Transit Signal Priority.

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## 5.2 Institutional Issues

The following is a summary of institutional issues that have arisen over the course of CCTA's ITS Integration Program grant, and how they have been resolved or are being addressed. The issues are organized by the different ITS initiatives CCTA has pursued over the past few years.

- **Fixed-Route Scheduling Software:** Institutional issues were not really a factor in the implementation of the fixed-route scheduling system at CCTA. This is natural because the procurement and implementation mainly involved only the single agency.
- **Multimodal Passenger Information Displays:** Institutional issues have been one of the factors that have led to the delay in the deployment of the DMS system. The City of Burlington, local interests, advocacy groups were not able to agree on the location and design of the Multimodal Transit Center at Main and Battery, which led to the project being put on hold and then scaled back and relocated. At the same time, CCTA has grown substantially, taking over the operations of three other transit systems, and CCTA has had a limited capacity to implement multiple ITS projects at one time. At the same time, CCTA has participated in both the Statewide and Regional ITS Architecture which took up a lot of capacity in the area. However, the downtown transit center project, including the initial DMS system, is now advancing through coordination between the City of Burlington, CCTA, and other stakeholders.
- **Transit Signal Priority:** Institutional issues have been a significant factor in the pace of progress on TSP in Chittenden County. The fact that five of the municipalities had adopted one technology but one had adopted a different technology slowed down the process and led to a need for dialogue and discussion about standards-setting. The institutional issues are being resolved through persistence, education, and collaboration by the parties involved. Technically involved individuals at CCMPO, CCTA, VTrans, and municipalities have agreed to a standard with the following elements:
  - All new equipment purchases will use the technology adopted by the five municipalities;
  - New equipment will not use coded emitters (which would allow the receiver at the signal controller to identify authorized emitters by the signal coding) or recording (which would allow the signal controller to automatically log the emitter codes received and action taken) yet because the stakeholders do not see an immediate need;
  - The one municipality that uses a different technology will be reimbursed for the cost of implementing compatible replacement equipment if this is necessary; and
  - The issue of whether coded emitter or recording capabilities are required, and associated funding issues, will be revisited within five years.
- **ITS Architecture Development:** The development of the ITS Architecture for Chittenden County and the ITS strategic plan for the State of Vermont has generally been a positive experience with regard to institutional coordination. The state's small size and the relatively small number of stakeholders involved in



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the architecture development process has allowed CCTA to have a key role and ensure that transit is considered prominently in the new ITS architecture.

### 5.3 Lessons Learned

The following is a summary of lessons learned over the course of CCTA's ITS Integration Program grant. Most of these lessons apply to each of the ITS initiatives that CCTA has pursued over the past few years.

- **It is important to gain the interest of stakeholders both internally and externally.** As an example, implementation of DMS and TSP both became CCTA Board goals in the past year, which has helped greatly.
- **Educating stakeholders on the benefits of ITS is key.** CCTA's Operations Manager has a background in the airline industry and has helped educate others on the importance of good passenger information and customer service in attracting ridership and making transit viable in Chittenden County.
- **Working with others on their projects can produce benefits for an agency's ITS integration plans.** For example, CCTA's work with VTrans and CCMPO on the regional ITS architecture and statewide ITS strategic plan projects has helped improve coordination on CCTA's ITS initiatives.
- **Persistence is very important.** On the DMS system project, as an example, CCTA could have abandoned the idea of including DMS signs in the downtown area after the Multimodal Transit Center project got put on hold, but instead it shifted its focus to the planned Downtown Transit Center, with the benefit of continued progress towards its goal on Dynamic Message Signs.
- **Frequent communication and collaboration is vital.** In Vermont this is aided by the small size of the state, but in other areas this may be more challenging, and therefore it becomes even more important.