Overview of ITS Plan Presentation

• What is Intelligent Transportation Systems (ITS)?
• Project Objectives & Outcomes
• ITS Architecture & Importance
• ITS Plan Update Process
• Strategic Deployment Plan
• Moving Forward - Incorporating ITS into the Regional Transportation Planning Process
ITS is a national program that promotes the use of advance technology (sensors, electronics, and communications) in an integrated manner to facilitate travel that is safer, faster and more efficient.
ITS Application – Traffic Control

Intelligent traffic control systems help reduce time spent stopped at red lights

• Signal Phase and Timing based on real-time traffic information
• Optimization and Coordination of Signals
• Reliable Vehicle Detection System
• Adaptive Signal Control
• Transit Signal Priority (TSP)
ITS Application – Traveler Information

Provide current information on travel conditions allowing drivers to make smarter choices about how, when and where to travel

- Real-time traffic monitoring system
- Monitor travel times along major corridors
- Provide information to drivers through messaging system for making travel plans
ITS Application – Road Weather Information Systems (RWIS)

- Detect hazardous road surface conditions such as snow, ice
- Disseminate information to various agencies for appropriate action
- Inform the public
  - Variable Message Signs
  - Weather Alerts
Advanced transit systems help transit agencies increase ridership and operate more efficiently

• Real time information to riders makes using transit easier and more attractive.
• Transit Signal Priority (TSP) reduces travel times
• Information Boards
ITS Plan Project Objectives

• Last ITS Plan developed in 2005
• Develop a **Framework** for coordinated planning and deployment of ITS in Chittenden County
  - Evaluate existing **ITS Services** and identify Gaps and assess Needs
  - Identify proposed **ITS Services** through a Gaps and Needs Analysis
  - Identify and update **Operations, Standards and Service Packages** based on the National ITS Architecture
  - Develop a project-based ITS Deployment Plan
National ITS Architecture

• **What is it?**
  Structured approach to describing ITS in a region or a project.

• **Why is it important?**
  An ITS Architecture must be completed in order to receive federal funding for regionally significant ITS projects - FHWA Final Rule 940
Other ITS Architecture Benefits

• Opportunity to identify **regional transportation and emergency management system** needs
• Opportunity to expand **stakeholder** outreach
• Promotes discussion of **new technologies** and how they can meet regional gaps and needs
• Identify specific **operational/ITS projects and strategies**
• Encourages improved **data and information sharing** among agencies
ITS Plan Process

Determine Status of the System

- Stakeholders
- Inventory
  - Traffic Signals
  - Beacons
  - Cameras
  - Transit Routes
  - Other ITS
- Current ITS Architecture

Update Current Architecture
## ITS Plan Process

### Gaps and Needs

- **Project**
- **Gap**
- **Description**
- **Proposed Action(s)**
- **Next Steps**
- **Performance Measures**
- **ITS Architecture Services**

<table>
<thead>
<tr>
<th>Project</th>
<th>Gap/Need</th>
<th>Information/Description</th>
<th>Proposed Action</th>
<th>Next Steps</th>
<th>Performance Measures</th>
<th>Architecture Services</th>
</tr>
</thead>
</table>
| 01 - VTrans ATMS Adoption | Lack of traffic coordination within region. | VTrans has recently implemented an Advanced Transportation Management System (ATMS) project to manage the State's freeway system. However, the structure of the ATMS allows the inclusion of local signal programs. | Adopt the Vermont ATMS to manage control system for the region. The ATMS can incorporate State and local signal systems and bike/pedestrian facilities. | Start dialogue with VTrans and different stakeholders to evaluate and determine how local authorities can be incorporated in the VTrans ATMS system. VTrans signalized corridors are being incorporated into the ATMS. Local signals can be incorporated as well. GIS files or other location data need to supplied along with phasing and timing information. | • Travel Time  
• User delay  
• Volumes  
• Level of service  
• Vehicle Miles Traveled (VMT)  
Data required for benefit/cost analysis and evaluation:  
• Cost of ATMS  
• Regional daily VHT | ATMS01 – Network Surveillance  
ATMS07 – Regional Traffic Management  
ATMS08 – Traffic Incident Management System  
ATMS09 – Transportation Decision Support and Demand Management |
Gaps and Needs

- Stakeholders and Focus Group Involvement
- Highway/Arterial Projects
- Transit Projects
- Non-Motorized Modes of Transportation Projects
- Data Management Projects
- Emergency/Weather Management Projects
- Vanguard Projects
Highway and Arterial Projects

- Advanced Transportation Management System (ATMS)
- Adaptive Signal Control
- Signal Timing Optimization Program
- Real Time Traffic Monitoring
- Permanent Variable Message Signs (VMS)
- Parking Management System
Transit Projects

• Transit Signal Priority (TSP) Implementation
• Automated Vehicle Locator (AVL) on Transit Corridors
• Transit Computer Aided Dispatcher (CAD)
• Fixed Information Signs for Transit Users
• Smart Cards
• Automatic Passenger Counters
• Transit Networking and Communications
• Transit Reporting and Data Management
Other Projects

• Weigh-in-Motion (permanent stations around the state for vehicle classification)
• Airport Real-Time Information
• Plow Technology
• Data Management
  o Regional Data Warehouse
  o Web-Based Data Portal
• Emergency/Weather Management Projects
  o RWIS Expansion
  o NWS Coordination
  o Vermont Alert and 511
  o UVM Medical Center Information Coordination
• Vanguard Projects
  o Connected Vehicle – V2V and V2I
  o Unmanned Aerial Vehicle
# Strategic Deployment Plan

## Short Term 0 – 3 Years

<table>
<thead>
<tr>
<th>Project Number</th>
<th>Project Name</th>
<th>Capital Costs</th>
<th>O&amp;M Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VTrans Advance Transportation Management System Adoption</td>
<td>$118,000</td>
<td>$169,000</td>
</tr>
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<td>2</td>
<td>Adaptive Signal Control on Selected Corridors</td>
<td>$340,000</td>
<td>$55,000</td>
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<tr>
<td>4</td>
<td>Real Time Traffic Monitoring System</td>
<td>$1,227,225</td>
<td>$-</td>
</tr>
<tr>
<td>5</td>
<td>5 Corners Intersection Signal Timing</td>
<td>$-</td>
<td>$-</td>
</tr>
<tr>
<td>7</td>
<td>Permanent Variable Message Sign (VMS)</td>
<td>$280,000</td>
<td>$8,000</td>
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<tr>
<td>11</td>
<td>AVL on Transit Vehicles</td>
<td>$75,000</td>
<td>$6,000</td>
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<tr>
<td>12</td>
<td>Transit CAD</td>
<td>$150,000</td>
<td>$22,500</td>
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<tr>
<td>13</td>
<td>Fixed Information Signs for Transit</td>
<td>$16,000</td>
<td>$640</td>
</tr>
<tr>
<td>23</td>
<td>Chittenden County Regional Data Warehouse</td>
<td>$4,600</td>
<td>$40,000</td>
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<tr>
<td>26</td>
<td>National Weather Service</td>
<td>$120,000</td>
<td>$20,000</td>
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<tr>
<td>27</td>
<td>Vermont Alert and 511</td>
<td>$110,000</td>
<td>$40,000</td>
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</table>

**Bold** = Unit Cost
# Strategic Deployment Plan

## Medium Term 4 – 7 Years

<table>
<thead>
<tr>
<th>Project Number</th>
<th>Project Name</th>
<th>Capital Costs</th>
<th>O&amp;M Costs</th>
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</thead>
<tbody>
<tr>
<td>3</td>
<td>Updating Signal Timings</td>
<td>$200,000</td>
<td>$-</td>
</tr>
<tr>
<td>6</td>
<td>CCTV Implementation</td>
<td>$96,000</td>
<td>$8,000</td>
</tr>
<tr>
<td>8</td>
<td>Parking Management System</td>
<td>$90,000</td>
<td>$10,000</td>
</tr>
<tr>
<td>9</td>
<td>Transit Signal Priority Implementation</td>
<td>$1,375,000</td>
<td>$-</td>
</tr>
<tr>
<td>14</td>
<td>Smart Cards</td>
<td>$193,500</td>
<td>$9,600</td>
</tr>
<tr>
<td>15</td>
<td>Automatic Passenger Counters</td>
<td>$125,000</td>
<td>$5,000</td>
</tr>
<tr>
<td>16</td>
<td>Transit Networking and Communication</td>
<td>$17,500</td>
<td>$25,000</td>
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<tr>
<td>24</td>
<td>Web-based Data Portal</td>
<td>$-</td>
<td>$40,000</td>
</tr>
<tr>
<td>25</td>
<td>Road Weather Information Station (RWIS)</td>
<td><strong>$50,000</strong></td>
<td>$1,000</td>
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<tr>
<td>28</td>
<td>University of Vermont Medical Center</td>
<td>$22,500</td>
<td>$1,800</td>
</tr>
<tr>
<td>29</td>
<td>Connected Vehicles</td>
<td>$-</td>
<td>$-</td>
</tr>
</tbody>
</table>

**Bold** = Unit Cost
## Strategic Deployment Plan

- **Long Term 8+ Years**

<table>
<thead>
<tr>
<th>Project Number</th>
<th>Project Name</th>
<th>Capital Costs</th>
<th>O&amp;M Costs</th>
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</thead>
<tbody>
<tr>
<td>10</td>
<td>Transit Signal Priority Implementation in Tertiary Corridors</td>
<td>$1,375,000</td>
<td>$-</td>
</tr>
<tr>
<td>17</td>
<td>Transit Reporting/Data Management</td>
<td>$-</td>
<td>$-</td>
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<tr>
<td>18</td>
<td>Transit Security</td>
<td>$133,000</td>
<td>$160,000</td>
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<tr>
<td>19</td>
<td>Improve Paratransit Services</td>
<td>$22,500</td>
<td>$900</td>
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<tr>
<td>20</td>
<td>Weigh-In-Motion</td>
<td>$95,000</td>
<td>$-</td>
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<tr>
<td>21</td>
<td>Airport Real-Time Information</td>
<td>$75,000</td>
<td>$4,000</td>
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<td>22</td>
<td>Plow Services</td>
<td>$57,500</td>
<td>$300</td>
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<tr>
<td>30</td>
<td>Unmanned Aerial Vehicles</td>
<td>$-</td>
<td>$-</td>
</tr>
</tbody>
</table>

**Bold** = Unit Cost
Real Time Traffic Monitoring Project Using Bluetooth

- Monitor Corridor level Traffic Travel Times
- Average vehicle speeds
- Provide information to travelers/commuters through various sources (Message Signs, Web App, Phone App)

<table>
<thead>
<tr>
<th>Corridor Number</th>
<th>Municipality</th>
<th>Route</th>
<th>AADT (Vehicles per day)</th>
<th>Commuter/Retail</th>
<th>High Crash Location(s)</th>
<th>Planned Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>South Burlington</td>
<td>I-89 Exit 14, US 2</td>
<td>40,500</td>
<td>C/R</td>
<td>Yes</td>
<td>N</td>
</tr>
<tr>
<td>2</td>
<td>Essex</td>
<td>VT 289, Susie Wilson Rd. &amp; VT 15</td>
<td>21,000</td>
<td>C</td>
<td>Yes</td>
<td>Y</td>
</tr>
<tr>
<td>3</td>
<td>Williston</td>
<td>I-89 Exit 12, US 2/VT 2A</td>
<td>26,700</td>
<td>C/R</td>
<td>Yes</td>
<td>Y</td>
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<tr>
<td>4</td>
<td>Colchester</td>
<td>I-89 Exit 17</td>
<td>14,400</td>
<td>C</td>
<td>Yes</td>
<td>Y</td>
</tr>
<tr>
<td>5</td>
<td>Colchester</td>
<td>I-89 Exit 16, US 2</td>
<td>22,700</td>
<td>C/R</td>
<td>Yes</td>
<td>Y</td>
</tr>
</tbody>
</table>
Study Corridors
Benefits of Real-Time Traffic Monitoring Project

• Travel Time Measurements
  – Help motorists to choose a route and make informed decision in planning a trip.

• Incident Alert
  – Early detection of an incident can significantly reduce delays along a corridor.

• Early notification to drivers about current travel conditions including travel times (through message signs) can significantly mitigate congestion and delays.
Adaptive Signal Control Feasibility Study

Upper Main Street to Union Street
- 14 signals – 11 are interconnected
- Conduit from Prospect to Union
- Complex Jug Handle
- 13 signals are in Burlington

Dorset Street
- 7 signals – all connected to a master which broadcasts TOD
- Coordinated (except for last)

Dorset Street/Kennedy Drive
- 4 separate 1-way phases

Williston Road to Hinesburg Road
- 6 signals – fully actuated
- No left turn lanes
- First 2 signals are tightly coupled (coming off interstate ramp)

Future City Center Site
Benefits of Adaptive Signal Control Study

• Continuously distribute green light time equitably for all traffic movements.
• Improve travel time reliability by progressively moving vehicles through green lights.
• Reduce congestion by creating smoother flow.
• Prolong the effectiveness of traffic signal timing.
• Reduction in emissions of hydrocarbons and carbon monoxide.

ITS Plan Next Steps

- Incorporate short-term, high priority projects into TIP
- Incorporate ITS/Operations into Long Range Plan
- Consider incorporation of Operational/ITS strategies into capital projects
  - View ITS Plan project list as “toolbox” of strategies
  - Analytical tools for benefit/cost evaluation (TOPS-BC)
  - When systems projects are being implemented refer to architecture for agency linkages and information exchanges
- Provide input to VTrans ITS Architecture and Plan
- Update ITS architecture when new projects are implemented
ITS Plan Next Steps

• Questions to Ask for Mainstreaming ITS into the Regional Transportation Planning and Project Development Process..
  – Can ITS address this transportation need?
  – Is there a potential for an ITS element in this project?
  – How can we leverage the ITS investments taking place in the State and other neighboring regions?
  – Is there an ITS alternative/complement to this conventional transportation investment?
Questions?

Thank You
ITS Plan Project Outcomes

- **ITS Plan Final Report**
  - Stakeholders
  - Gaps and Needs Assessment
  - Operational Concept and Information Flow
  - Service Packages and Standards

- **ITS Strategic Deployment Plan**
  - Project based Short, Medium and Long Term Deployment Plan

- **Updated Regional ITS Plan 2015**
  - ITS Plan Website
  - Electronic database – Turbo Architecture