Using ITS Knowledge Resources: Benefits, Costs, and Lessons Learned for Rural ITS Implementations

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ITS Strategic Plan - Evaluation

- One of six Cross-Cutting ITS JPO Programs
- The objective of the ITS Evaluation program is to determine the effectiveness and benefits of deployed ITS, and the value of ITS program investments.
- How to measure the impacts of deployments locally and nationally.
  - Conduct independent evaluations of ITS Program research activities.
  - Develop deployment tracking surveys and analyze the results.
  - Evaluate deployments conducted outside of the ITS Research Program.
  - Evaluate the overall effectiveness of the ITS Program.
  - Analyze information and findings.
  - Report research, deployment, and program evaluation results and implications to stakeholders both internal and external to ITS.
Introduction

- ITS JPO of the USDOT has developed online ITS Knowledge Resources for decision making support.
- JPO website: http://www.its.dot.gov/index.htm
- The ITS Knowledge resources include:
  - ITS Benefits Database
  - ITS Costs Database
  - ITS Lessons Learned Knowledge Resource
  - ITS Applications Overview
  - ITS Deployment Statistics

Purpose of the Knowledge Resources: Support ITS related decision making by transportation professionals
Framework for Development of ITS Knowledge Resources

<table>
<thead>
<tr>
<th>Gather ITS Experiences</th>
<th>Analyze ITS Information</th>
<th>Generate ITS Knowledge Resources</th>
<th>Synthesize &amp; Disseminate ITS Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost / Benefits Data</td>
<td>Analyze ITS Sources</td>
<td>Benefits</td>
<td>LOTM, BOTM</td>
</tr>
<tr>
<td>Field Operational Tests</td>
<td>Assess Costs &amp; Benefits</td>
<td>Costs</td>
<td>14,000 Visits/Month</td>
</tr>
<tr>
<td>Earmark Evaluations</td>
<td>Identify Lessons Learned</td>
<td>Lessons Learned</td>
<td>Syntheses of Lessons, Policy Analyses</td>
</tr>
<tr>
<td>Research Results</td>
<td></td>
<td>USDOT ITS Knowledge Resources Website</td>
<td>Proceedings, Publications, RSS channels</td>
</tr>
<tr>
<td>Cross-Cutting Studies</td>
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</tr>
</tbody>
</table>

Benefits
- Improved Planning
- Informed Decisions
- Reduced Costs
- Realized Benefits

Data → Information → Knowledge
Questions – How many of you…

▪ Have used one or more of these databases? If so, …
  □ What for?
  □ Did you find what you needed?
  □ What else would have been helpful to you?
▪ Have contributed data?
  □ Benefits
  □ Costs
  □ Lessons learned
▪ Are a point-of-contact for a lesson?
▪ Have worked on projects profiled in the benefits, costs or lessons learned databases?
Introduction to Resources: ITS Benefits Database

- **Objective**
  - Analyze and document ITS benefits
  - Disseminate information about ITS benefits

- **Content**
  - Articles: 572 benefit entries as of July 12, 2010
    - 17 Application categories
    - Goal areas
    - Geography

[www.itsbenefits.its.dot.gov](http://www.itsbenefits.its.dot.gov)
Benefits Highlights

- Benefit Entries
  - Provide summary of source document
  - Provide methodology
  - Provide results, findings, performance impacts, conclusions, etc.
    - Quantitative
    - Qualitative
  - Direct link to source document

- Search Options
  - Search by Application Area
  - Search by Classification
  - Search using Keywords
  - Search using Menu Tabs
Introduction to Resources: ITS Costs Database

- **Objective**
  - Analyze and document the costs of deploying ITS
  - Disseminate information about ITS costs

- **Content**
  - 195 system costs entries as of July 12, 2010
  - Capital and maintenance costs
  - Unit costs and system costs

www.itscosts.its.dot.gov
Costs Database Highlights

- Costs Summary
  - Unit Costs
    - Cost associated with an individual ITS element
  - System Costs
    - Multiple ITS elements and typically represents the total project cost
  - Costs summaries provide same level of detail as Benefit and Lessons Learned summaries

- Search Options
  - Menu Tabs
  - Search by Application Area
  - Search by Keyword
Introduction to Resources: ITS Lessons Learned Knowledge Resource

- **Objective**
  - Gather and disseminate lessons learned from the experience of past ITS deployments

- **Content**
  - Over 455 articles
    - Crosscutting categories
    - 17 Application areas
    - Goal areas
    - Geography
  - Synthesis; Lesson of the Month

[www.itslessons.its.dot.gov](http://www.itslessons.its.dot.gov)
Lessons Learned Highlights

- Lessons Learned Entry
  - Provide summary of source document
  - Provide Lessons for practitioners to consider when deploying projects
  - Direct link to source document
  - Provide contact information

- Search Options
  - Menu Tabs
  - Search by Application Area
  - Search by Lesson Category
  - Search by Classification
  - Search by Keyword
Introduction to Resources: ITS Deployment Statistics

- How much ITS has been deployed in cities and states across the U.S.
  - 108 metropolitan areas
  - All 50 states
  - Data since 1997, collected through surveys annually or biannually
    - New survey planned for Summer 2010

www.itsdeployment.its.dot.gov
Exercise

- **Safety Challenge:** Crashes due to unsafe speeds in curves
- **Strategies:**
  - Dynamic Speed Warning Devices
  - Curve Warning Systems
  - Variable speed limits during inclement weather
  - Truck Rollover Warning systems

*Source: Low-Cost Treatments for Horizontal Curve Safety, December 2006. Picture courtesy of Caltrans*
Exercise

- Search for Benefits, System Costs and Lessons Learned of ITS strategies that could help with your safety problem.

- Search Options
  - Search by Application
  - Search by State
  - Keyword Search
    - Speed Warning
    - Variable Speed Limit
    - Warning systems

**Tools**

Benefits Web site: [www.itsbenefits.its.dot.gov](http://www.itsbenefits.its.dot.gov/)

Costs Web site: [www.itscosts.its.dot.gov](http://www.itscosts.its.dot.gov/)

Lessons Learned Web site [www.itslessons.its.dot.gov](http://www.itslessons.its.dot.gov)
Example Users of Knowledge Resources

- State DOTs
- VDOT - ITS Decision Support Tool (http://www.vdot-itsdst.com)
- ODOT
- NCDOT

- Academic Institutions
- Professional Organizations
- Public Officials
- Consultants
Welcome to the VDOT Northern Region Operations' (NRO) Intelligent Transportation Systems (ITS) Decision Support Tool!

With increased congestion and smaller budgets, VDOT finds itself challenged to make its surface transportation system function more effectively. No longer does the department have the luxury of undertaking massive new road-building and expansion projects on a statewide basis. Instead the department needs to look at bolder, more innovative approaches must be employed to maximize capacity of the existing transportation infrastructure and achieve heightened operational efficiencies. This includes ITS Solutions targeted at improving mobility, safety, and security.

The ITS Decision Support Tool is a web-based application developed to assist transportation professionals in identifying ITS Solutions. Beginning with a problem, users can answer a series of questions that will lead them to a list of potential ITS solutions that may be able to solve the problem. Once a solution is identified, the user is provided with a detailed ITS Solution report providing:

- A description of the ITS Solution;
- Equipment and supporting infrastructure to deploy the ITS Solution;
- Traceability to the National ITS Architecture;
- Benefits of the ITS Solution; and
- Cost information.

The ITS Decision Support Tool is a high-level planning tool. It is a mechanism for transportation professionals to brainstorm potential ideas. Users should exercise their professional engineering judgment to ensure that the proposed ITS Solution is in fact the best approach for addressing the problem. Additionally, before the implementation of the ITS Solution users should follow the Systems Engineering Process to ensure the successful deployment of the ITS project.

For more information, please contact J.D. Schneeberger with VDOT Northern Region Operations.
Contributing Data

- We are always looking for new data for the Knowledge Resources
- Current cost information request
- Links on each Knowledge Resource Home Page for data contribution
NEW FEATURES
Unit Costs Database

- Prototype log in
- Adjusted Costs Page
- Subsystem Page
New Feature for Costs Database

UNIT COSTS (ADJUSTED) - VIEW BY SUBSYSTEM

Roadside Telecommunications (RS-TC)
Roadside Detection (RS-D)
Roadside Control (RS-C)
Roadside Information (RS-I)
Roadside Rail Crossing (RS-RC)
Toll Plaza (TP)
Parking Management (PM)
Remote Location (RM)
Emergency Response Center (ER)
Emergency Vehicle On-Board (EV)
Information Service Provider (ISP)
Transportation Management Center (TM)
Transit Management Center (TR)
Toll Administration (TA)
Transit Vehicle On-Board (TV)
Commercial Vehicle Electronic Credentialing (EC) Administration
Commercial Vehicle Safety Information Exchange (SIE)
Commercial Vehicle Electronic Screening (ES) (Pre-clearance)
Commercial Vehicle On-Board (CV)
## Roadside Telecommunications (RS-TC)

(85 unique unit cost component summaries found)

### Download Unit Cost Components to Excel

<table>
<thead>
<tr>
<th>Unit Cost Component</th>
<th>Description</th>
<th>Unit</th>
<th>Reported Units</th>
<th>Capital Cost Per Unit</th>
<th>O&amp;M Cost Per Unit</th>
<th>Cost Type</th>
<th>Year (Dollars)</th>
<th>City</th>
<th>State</th>
<th>Country</th>
<th>Lifetime (Years)</th>
<th>Data Date</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>ESS radio transmitter, cabinet, and omnidirectional antenna</td>
<td>Furnish and install radio transmitter, Each 1 cabinet, and omnidirectional antenna - Keysers Ridge</td>
<td></td>
<td></td>
<td>$5,000.00</td>
<td></td>
<td>Actual</td>
<td>2003</td>
<td>Keysers Ridge</td>
<td>Maryland</td>
<td>USA</td>
<td>2003</td>
<td>Duplicate</td>
<td></td>
</tr>
<tr>
<td>ESS radio transmitter, cabinet, and omnidirectional antenna</td>
<td>Furnish and install radio transmitter, Each 1 cabinet, and omnidirectional antenna - Friendsville</td>
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<td>Telephone Drop</td>
<td>Standard telephone drop.</td>
<td>Each (EA)</td>
<td>$100.00</td>
<td></td>
<td>Actual</td>
<td>2003</td>
<td>Anchorage</td>
<td>Alaska</td>
<td>USA</td>
<td>20</td>
<td>2003</td>
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<tr>
<td>Telephone Drop</td>
<td>Standard telephone drop.</td>
<td>Per Year</td>
<td>$360.00</td>
<td></td>
<td>Actual</td>
<td>2003</td>
<td>Anchorage</td>
<td>Alaska</td>
<td>USA</td>
<td>20</td>
<td>2003</td>
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<tr>
<td>Telephone Drop Line Extention to Terminal</td>
<td>Line extention to terminal.</td>
<td>Each (EA)</td>
<td>$150.00</td>
<td>Actual</td>
<td>2003 Anchorage Alaska USA 20 2003</td>
<td>Range reported $150-$175</td>
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<tr>
<td>Telephone Drop Line Extention to Terminal</td>
<td>Line extention to terminal.</td>
<td>Each (EA)</td>
<td>$175.00</td>
<td>Actual</td>
<td>2003 Anchorage Alaska USA 20</td>
<td>Range reported $150-$175</td>
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<tr>
<td>900 MHz Spread Spectrum Radio</td>
<td>900 MHz spread spectrum radio device.</td>
<td>Each (EA)</td>
<td>$2,000.00</td>
<td>Actual</td>
<td>2003 Anchorage Alaska USA 7 2003</td>
<td>900 MHz Spread Spectrum Radio was connected to the closest phone line to access the State WAN. Some sites also required a modem ($250 per modem) and/or a</td>
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<td>Modem</td>
<td>Modem to connect phone line to State WAN.</td>
<td>Each (EA)</td>
<td>$250.00</td>
<td>Actual</td>
<td>2003 Anchorage Alaska USA 2003</td>
<td>The portserver allowed for a local connection without having to pay for long</td>
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<tr>
<td>Portserver</td>
<td>Portserver to connect phone line to State WAN.</td>
<td>Each (EA)</td>
<td>$638.00</td>
<td>Actual</td>
<td>2003 Anchorage Alaska USA 2003</td>
<td>The portserver allowed for a local connection without having to pay for long</td>
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<td>Standard telephone drop.</td>
<td>Each (EA)</td>
<td>$100.00</td>
<td>Actual</td>
<td>2004 Anchorage Alaska USA 20</td>
<td>System used ACS &amp; GCI and several small telephone carriers throughout Alaska.</td>
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</tr>
<tr>
<td>Telephone Drop</td>
<td>Monthly charges. Local calls for one environmental sensing station (ESS) cost approx. $18 - $70 per month. Long distance calls for one ESS cost approx. $400 - $1000 per month.</td>
<td>Per Year</td>
<td>$12,840.00</td>
<td>Actual</td>
<td>2004 Anchorage Alaska USA 20</td>
<td>System used ACS &amp; GCI and several small telephone carriers throughout Alaska.</td>
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</tr>
<tr>
<td>Telephone Drop</td>
<td>Monthly charges. Local calls for one environmental sensing station (ESS) cost approx. $15 - $70 per month. Long distance calls for one ESS cost approx. $400 - $1000 per month.</td>
<td>Per Year</td>
<td>$5,016.00</td>
<td>Actual</td>
<td>2004 Anchorage Alaska USA 20</td>
<td>Spread spectrum technology replaced cellular at three environmental sensing stations (ESS). M&amp;O costs virtually nothing. Very</td>
<td></td>
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<td>2004 Anchorage Alaska USA 7</td>
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<tr>
<td>DS0 Communication Line</td>
<td>DS0 communications.</td>
<td>Per Year</td>
<td>$700.00</td>
<td>Estimated</td>
<td>2003 Anchorage Alaska USA 10</td>
<td>2003</td>
<td>Approximately 5.7 miles cost $20,000.</td>
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</tr>
<tr>
<td>Conduit Design and Installation - Corridor</td>
<td>Ground installation.</td>
<td>Per Mile</td>
<td>5.7</td>
<td>$37,000.00</td>
<td>Actual</td>
<td>2003 Raleigh North Carolina USA 20</td>
<td>2003</td>
<td>Approximately 5.7 miles cost $20,000.</td>
<td></td>
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</tr>
</tbody>
</table>
ITS Knowledge Resources

Welcome to the ITS Knowledge Resources Portal
The Intelligent Transportation Systems (ITS) Joint Program Office (JPO) of the U.S. Department of Transportation (USDOT) has been collecting the benefits, costs, lessons learned, and deployment status information of ITS. Such information, intended to assist ITS stakeholders in their planning, design, and deployment of ITS, is available through the following Web based knowledge resources.

Latest News
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Benefits
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Costs
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Lessons Learned
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Deployment Statistics
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Any Questions?