Case Study Evaluation of the Virginia Department of Transportation's I-81 ITS Program

Prepared by Stephanie Baker
Virginia Tech Transportation Institute
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This past September the people involved in this Program lost a dear colleague, mentor, and friend, Dr. Richard Worrall, to cancer. He was an intelligent, creative, and energetic man, always ready to help and to challenge those around him to succeed. He is greatly missed by those who knew him and came to appreciate how much he shared his life with others.

Executive Summary

Purpose

The primary goal of this report is to provide information to the Sponsors, Policy Committee, and Management of the I-81 ITS Program that may improve the Program. In order to do this, the report focuses on the development of the Program and the lessons learned. Through lessons learned, recommendations are made about how the Program can be improved.

The evaluation covers the period from November 1999 through September 2001. The period of performance for the conduct and writing of the evaluation was September 2001 through March 2002.

There are three sections to this report. The first is a background description of the I-81 ITS Program, including a discussion of other ITS projects that may have influenced the Program. The second is an analysis of steps taken to develop the Program, and the third is a list of barriers the Program is facing and recommendations for how to overcome these challenges and improve the Program.

Approach

A case study approach was used for this evaluation. The major issues were explored through a combination of document analysis and targeted interviews. The document analysis and interviews focused on discovering information about several key issues of the Program including:

- Historical development
- Goals and objectives
- Organizational structure
- Program management
- Critical resources
- Desired outcomes
- Program barriers and successes

By covering all of these issues in the document analysis and interviews, the intent was to come to an understanding of how the Program is developing and make recommendations about how to improve the Program.

Several sources were reviewed in the document analysis including:

- VTTI's Proposal for Program Management, June 2000
- I-81 ITS Program Brief & Project Book, December 2000
- Policy and Technical Committee Contact Lists
- I-81 ITS Program Fact Sheet, September 2001

The analysis looked at these and other documents for insight into the issue areas mentioned above. For example, the analysis of VTTI's proposal provided information about the management structure established through the contracts VDOT set up with VTTI, and the Committee Contacts provided a list of the stakeholders who were invited to take part in the Program.

In order to understand the development of the Program and to make recommendations, it was critical to involve key stakeholders in the evaluation. These stakeholders included the Program

Sponsor, the Program Manager, a Policy Committee Member, and Program Participants. In-depth interviews were conducted in order to capture the perspective of these participants. The interviews covered each of the issue areas underlined above. Interviews were divided into individual and group sessions based on who was being interviewed.

Individual interviews were conducted with the Program Sponsor, the Program Manager, and a Policy Committee member. A master interview instrument was used that included open-ended questions focusing on the key issues underlined above. These interview questions are shown in Appendix A.

Group interviews were conducted in five locations and involved Program participants. The locations of the interviews included: Blacksburg (VTTI), Richmond, and the Staunton, Salem, and Bristol VDOT Districts. Work Group leaders and members were drawn for the interview from VDOT, VSP, DMV, VTTI, VTRC, and ITS Consultants who were involved in the Program. The group interview tool used is shown in Appendix A and the list of participants invited is found in Appendix B.

As participants arrived to their group sessions, they filled out a survey that included open and closed ended questions targeted at the key issues mentioned earlier. After the surveys were completed, a standard set of interview questions was used across all of the groups. Each interview took roughly two hours.

The survey was a useful way of collecting each individual's thoughts and opinions, and the group interviews were a good way to discuss problems and brainstorm recommendations. Throughout the report, comments from the individual and group sessions are included to highlight the points being made. The participants' creative and thoughtful ideas are what make this report robust and realistic.

The interviews were a success because participants were honest and open and had a genuine concern that the information they provided be used to improve the Program. One participant from Bristol specifically requested that his comments be used only to make the Program a success, not used to tear it down. As the evaluator, I hope that this report is a reflection of that request.

The report is broken down into three major sections: Program Background, the Process for Establishing the I-81 ITS Program, and the Barriers and Recommendations. Below is a brief description of each section.

Section I: Program Background
The I-81 ITS Program was officially started in June 2000 although discussions about the need for such a program began in November 1999. This section of the report describes the origins of the Program and other ITS efforts on the I-81 Corridor that influenced its development.

Section II: Process Establishing the I-81 ITS Program
The process establishing the I-81 ITS Program is documented in this report in basically chronological order from the time the Program was conceived in the autumn of 1999, through when this evaluation began in September 2001. Although steps overlap, the general order in which they occurred is described in Section II. Below is a list of the steps:

1. Responding to Environmental Influences
2. Strategic Planning

3. Asserting Leadership
4. Selecting a Management Team
5. Involving Stakeholders
6. Securing Funding
7. Evaluating Progress

Section III: Barriers and Recommendations
The final section of this report covers the major barriers identified in this evaluation for which recommendations are being made. Each barrier is described in detail in the follow paragraphs.

Barrier 1: Unclear Organizational Structure
The first barrier identified was the unclear organizational structure of the Program. The barrier was a problem in both the first and second year of the Program, but for different reasons. The first year's organizational struggles were due to a complex structure that required too much time of participants to maintain. Organizational struggles in the second year were due to a lack of communication with participants about changes in the Program.

Barrier 2: Unclear Leadership & Direction
The second barrier identified was the perception that there was an absence of clear leadership and direction for the Program. Participants in the second year of the Program were unsure where the Program was heading and who was in charge. This barrier was linked to a combination of delays in program funding, changes in management, and organizational restructuring. Leadership and direction were not necessarily lost; participants were just not informed about what was happening.

Barrier 3: Lack of Communication
The final barrier addressed in the evaluation is the lack of communication across Working Groups, between groups and management, and between the Program and other efforts on the I-81 Corridor. Communication was a factor to some extent in all of the barriers mentioned in the report.

For each barrier, a recommendation is made for how to overcome it. The recommendations are described below.

Recommendation 1: Clearly Define and Implement Functional Area Structure
The organizational problems currently facing the Program can be addressed if the Functional Area organizational structure approved by the Policy Committee is implemented fully and communicated clearly to participants.

Recommendation 2: Hold Planning Sessions
The current perception among program participants that leadership and direction are unclear can be addressed if a series of planning sessions are held with the Policy Committee and Functional Area Chairs to bring participants up to speed about what is happening and firmly establish the vision and organizational structure of the Program.

Recommendation 3: Hire a Full-Time I-81 ITS Program Coordinator
All of the barriers mentioned that are currently facing the Program can be alleviated if VDOT hires a full-time I-81 ITS Program Coordinator who is responsible and accountable for ensuring communication remains a priority.

The barriers and recommendations are the heart of the evaluation because they indicate how the I-81 ITS Program may move forward in a positive and productive manner.

The I-81 ITS Program has been evolving for over three years. What is contained in this report is an overview of what has occurred and recommendations for the future of the Program. For this report to become meaningful, next steps need to be developed from this document by the I-81 ITS Policy Committee and the VDOT ITS Division.

Acronyms

Throughout this report numerous organizations are discussed as well as technologies. Many of these organizations and technologies have acronyms assigned to them. Below is a list of all those that appear in this report.

Advanced Traveler Information Service	**ATIS**
Commercial Vehicle Operations	**CVO**
Concept of Operations	**COO**
Intelligent Transportation Systems	**ITS**
Parsons B Farradyne	**PBF**
Principle Engineering	**PE**
Six-Year Improvement Plan ***Now called the Transportation Development Plan (TDP)***	**SYIP**
Traffic Engineering	**TE**
Transportation Development Plan	**TDP**
University of Virginia	**UVA**
Virginia Department of Motor Vehicles	**DMV**
Virginia Department of Transportation	**VDOT**
Virginia State Police	**VSP**
Virginia Transportation Research Council	**VTRC**
Virginia Tech Transportation Institute	**VTTI**

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Section I: Program Background

Origins

The I-81 ITS Program is a framework for on-going coordination, planning, design, and implementation of ITS investments along the 325-mile length of the I-81 Corridor in Virginia. Numerous stakeholders are involved in the Program including the Virginia Department of Transportation (VDOT), who sponsors the Program, the Virginia State Police (VSP), the Department of Motor Vehicles (DMV), the Virginia Tech Transportation Institute (VTTI), and ITS Consultants working on the Corridor. The Program officially kicked off in June of 2000, although discussions about the need for the Program began much earlier.

The Program traces its roots to a meeting in Salem, Virginia on November 15, 1999. The meeting involved senior representatives from the VDOT Staunton, Salem, and Bristol Districts, along with staff from the VDOT Central Office. The meeting focused on the need for efficient and effective planning and implementation of ITS investments in the I-81 Corridor. Staff members from VTTI were present at this meeting to facilitate the discussions.

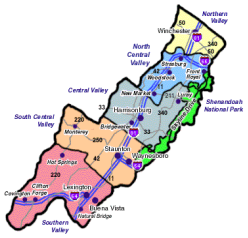
Over the period from November 1999 to March 2000, the objectives for the Program were refined and recommendations were made by VDOT on how the Program should be carried out. One recommendation was that VTTI should submit a proposal to manage the Program. In June 2000, the proposal was accepted and work began on the I-81 ITS Program.

ITS Environment

The I-81 ITS Program is unique in its focus on planning and implementing ITS in a rural corridor through coordination and cooperation across districts, agencies, and sectors. Yet, the I-81 ITS Program is not the first such cooperative and coordinated ITS effort along the I-81 Corridor. I-81, particularly along the Northern Shenandoah Valley, has been a test bed for rural ITS development and investment. Some examples of ITS planning and investments along I-81 include the VTTI's Travel Shenandoah Project, the University of Virginia Health Sciences Center's Pegasus Real Time Video Project, and the Staunton District's Concept of Operations.

Travel Shenandoah

Travel Shenandoah is an integrated traveler information service, providing comprehensive, timely, and accurate information on traffic and travel conditions, traveler services, tourist destinations, and emergency services to travelers. Data for the system comes from two main sources: the Virginia State Police's Computer Aided Dispatch (CAD) system and VDOT's Virginia Operational Information System (VOIS). The delivery mechanisms for this information include the World Wide Web, cellular phones, PCS/digital wireless phones, and cable TV. The Travel Shenandoah logo is shown on the right.



Over three years in development, Travel Shenandoah has been structured as a public-private partnership including, among others, VDOT, VTTI, SHENTEL Service Company and its affiliates (providing telephone, cable, wireless, internet and pager services), VSP, the Virginia Tourism Corporation (VTC), the Northern Shenandoah Valley Regional Commission, the Shenandoah National Park, and the Shenandoah Valley Travel Association (SVTA). Travel Shenandoah went live in April of 2000, and was formally introduced to the public in late July 2000. The system is currently

undergoing a name change to 511Virginia.org in order to capture the benefits of the system's connection to Virginia's new traveler information number, 511.

The Travel Shenandoah Service was significant to the development of the I-81 ITS Program because, as one participant from the I-81 ITS Program stated, "Travel Shenandoah has had an enormous impact on this corridor and planning for this corridor. Travel Shenandoah is a public-private partnership, and more so than just in name or in spirit. It is the basis for attempting to provide traveler information along this corridor, and to the extent that that model has been relatively successful to date, it is influencing the decisions being made about how to partner with the medical community and private providers of technology in this whole public safety arena." In essence, Travel Shenandoah has helped lay the groundwork for the development of public-private partnerships and the use of advanced technologies to address issues such as traveler information along I-81.

Truck Fleet Alert and Support Service

An offshoot of Travel Shenandoah, funded through an FHWA earmark, was the Truck Fleet Alert and Support Service project. The service, under development since 1999, was created as a way to serve a specific segment of the traveling public with information from Travel Shenandoah. While much of the Travel Shenandoah information is useful for commercial vehicle operations, the Truck Fleet Support program has been designed specifically for commercial vehicle operators traveling on I-81. By taking the Truck Fleet project under the I-81 ITS Program umbrella, the Program gained the interest of a critical stakeholder group in the Corridor, commercial vehicle operators, and associations who support their work.

Pegasus Real Time Video Project

The Pegasus Real Time Video Project **(**image to the right) is investigating the feasibility of providing real-time video from local rescue squads to the UVA Health Science Center's Pegasus Medivac Helicopter. Local rescue squads from the I-81 Corridor between Lexington and Harrisonburg are being selected to participate in this project, which uses ITS to improve emergency response on I-81 (Cross, 2001). This project, started prior to the I-81 ITS Program, was placed under the umbrella of the Program through the I-81 ITS Public Safety Working Group. This was done so that it could receive the financial and stakeholder support the
I-81 ITS Program offers ITS innovators.

Staunton Concept of Operations

The Staunton Concept of Operations was a report developed in the autumn of 2000, which set forth a formal plan to fully realize the benefits of ITS in the Staunton District. The report, written by PB Farradyne, was undertaken to ensure that the District's ITS Program had a clear direction and to support the procurement of devices and software that are of value to VDOT. The concept of operations identifies 'who, what, when, and how' of ITS operations in the District (PB Farradyne and Iteris, 2001).

This effort was important to the development of the I-81 ITS Program in that, through the Program, a Corridor Concept of Operations (COO) is being developed and is linked to the development of COOs in each District. Staunton was the first to develop a COO, but through the I-81 ITS Program each District is developing its own. The hope is that if these Concepts are created through the Program and

linked to a Corridor COO, that ITS will serve not only the needs of each District but will be coordinated across the Corridor to provide a seamless service to the public. These COOs are an example of the type of cooperation and coordination that the I-81 ITS Program is trying to encourage and support.

Smart Travel Program

The I-81 ITS Program also falls under the umbrella of VDOT's Smart Travel Program, which focuses on the effective integration of ITS technologies into all aspects of its highway construction, operation, and maintenance programs. VDOT's ITS Division in Richmond has played a key role in ITS development in the I-81 Corridor. VDOT has invested time and funding into numerous projects including those mentioned above and the I-81 ITS Program itself. This provision of seed resources for the development and implementation of ITS on I-81 has been critical to the projects successes and is likely to continue to be important until ITS is an accepted and established part of VDOT's Transportation Planning Process.

The atmosphere of interest and investment in ITS products and services, particularly those that improve public safety and traveler information, has supported innovative technology solutions to problems on I-81 and facilitated the development of the I-81 ITS Program. The next section provides a step-by-step analysis of how the Program was initiated, developed, and evaluated.

Section II: Process Establishing the I-81 ITS Program

The process establishing this I-81 ITS Program is documented below in basically chronological order from the time the Program was conceived in the autumn of 1999, through when this evaluation began in September 2001. Although steps overlap, this is the general order in which they occurred.

These steps were identified through the literature review, key document analysis, and the transcript analysis. After the steps are a short-list of barriers faced and recommendations for how to overcome them. Below is a list of the steps identified through the analysis.

Steps in the I-81 ITS Program Development Process:

1. Responding to Environmental Influences
2. Strategic Planning
3. Asserting Leadership
4. Selecting a Management Team
5. Involving Stakeholders
6. Securing Funding
7. Evaluating Progress

Throughout the discussion of the steps, applicable literature is cited as well as input from the individual and group interviews. Whenever a quote from an interview is noted, it will reference either the individual person interviewed or the site where the group interview took place. For example, (M) signifies a quote from the interview with the Program Manager and (SM) signifies a quote from the group interview in Salem. The codes listed below are used throughout the report.

Individual Interview:

- Policy (P)
- Sponsor (S)

- Manager (M)

Group Interview:
- Bristol District (B)
- Salem District (SM)
- Staunton District (ST)
- Richmond (R)
- Virginia Tech Transportation Institute (V)

A complete list of who was at each of these interviews, both group and individual, is noted in Appendix B.

Step 1: Responding to Environmental Influences
In the autumn of 1999, several circumstances came together that made the I-81 ITS Program ripe for creation. These circumstances were both internal to VDOT and within VDOT's external environment. Some of these circumstances included:
- Public perception that I-81 was a safety hazard.
- Numerous construction contracts on I-81 going over-budget and over-time.
- Districts starting ITS efforts that were not coordinated across the corridor.
- ITS recognized as a division yet not fully integrated into VDOT's planning process.
- ITS seen by some as an application of traffic engineering, not a discipline unto itself.

These circumstances became triggers for possible changes in the way VDOT does business on the I-81 Corridor in general and in relation to ITS specifically. The I-81 ITS Program was, in many ways, a response to these internal and external triggers that demanded change.

The interviews support this idea that internal and external triggers were opening the door for such a Program on I-81. For example, public perception about I-81 being a hazard was a major reason for exploring ways to show the public that VDOT was making an effort to improve their travel.

Public Perception

"External influences, the problems on the corridor (i.e. tractor trailer accidents, bad press) led people to start thinking along the same lines, the problems led to concern and action." (R)

"All of the publicity about unsafe I-81, there was a lot of negative publicity." (S)

"There was significant sentiment in the communities along I-81 that the roadway was unsafe." (M)

Reconstruction was mentioned in the interviews as an issue in that ITS is often an afterthought instead of being integrated into the construction process. It was time for some effort, such as the I-81 ITS Program, to look at how technology could be integrated into the planning process before reconstruction is underway in earnest along the entire corridor. It was also a good time to consider how technology could improve public perception and the reconstruction process by providing such things as enhanced traveler information and coordinated incident response.

Reconstruction

"81 reconstruction legitimately gave us the opportunity to propose doing it (I-81 ITS Program)." (S)

Organizational behavior literature shows that organizations do not change unless there are triggers, such as those mentioned above, indicating change is needed. However, not all trigger events lead to organizational change. In many cases, there is organizational and individual resistance to change in technical, political, and cultural systems (Tichy and Ulrich, 1984). Individual and organizational resistance to change in these three systems must be overcome if meaningful and lasting change is to occur.

Overcoming resistance to change requires transformational leadership, not managers who are in search of a quick fix solution. Transformational leaders need to avoid "the trap of simple, quick-fix solutions to major organizational problems" (Tichy and Ulrich, 1984). Fortunately in this case, organizational leaders in VDOT did respond to the triggers and initiated a lasting change at a strategic planning session held in Salem, Virginia in November of 1999.

Step 2: Strategic Planning

A strategic planning session was held at the Salem Civic Center in November 1999 that focused on the need for efficient and effective planning and implementation of ITS investments along the I-81 Corridor. These discussions led to the creation of the I-81 ITS Program.

At the meeting in November, a charge was crafted for the I-81 ITS Program along with an organizational structure and a list of roles and responsibilities. The structure and charge outlined by the Founders of the Program was critical to this Program getting off the ground. Below is a summary of that meeting, highlighted in green, and the resulting recommendations that were approved by the VDOT Executive Team.

> ***Summary of Strategic Planning Session***
>
> A one-day I-81 ITS Planning Meeting was held at the Salem Civic Center on Tuesday, November 30, 1999 involving representatives of the VDOT Staunton, Salem, and Bristol Districts and staff from the VDOT Central Office. The Virginia Tech Transportation Institute (VTI) provided technical and facilitation support for the meeting.
>
> Gary Allen, representing the Assistant Commissioner for Planning, Research and Technology, Director of the ITS Division J. R. Robinson, and District Administrators Dennis Morrison, Fred Altizer, and Dan Marston met on December 14 to review the recommendations from that meeting. That review and discussion resulted in the consensus that the following recommendations should be presented to the VDOT Executive Team.
>
> Gary Allen presented the proposal to the Executive Team in February 2000, and the recommendation was adopted with minor modifications.
>
> ***Next Steps***
>
> A two-tier organizational structure will be established to oversee the ongoing and future ITS investment in the I-81 Corridor. That investment program should be fully integrated with all other VDOT activities in the Corridor. The two-tier organizational structure will include:

- A senior I-81 ITS Leadership and Oversight Team to set overall policy and approve specific ITS investments, and
- An I-81 ITS Technical Planning and Implementation Team, reporting to the senior team, to coordinate detailed ITS planning, design, construction, operation, and maintenance within the Corridor.

The I-81 ITS Leadership and Oversight Team will be staffed by the ITS Division and include:

- Chair, Assistant Commissioner for Technology and Research
- Staunton, Salem and Bristol VDOT District Administrators
- VDOT Chief Engineer
- VDOT Assistant Commissioner for Operations
- VDOT Assistant Commissioner for Finance
- VA State Police Director Bureau of Field Operations

The Leadership and Oversight Team will meet as necessary to set overall policy, oversee the work of the Technical Planning and Implementation Team, review specific proposals, and approve funding priorities. The I-81 ITS Technical Planning and Implementation Team will include:

- ITS Division
- Designated representation from each District
- Traffic Engineering Division - TMS Design
- Location and Design Division
- Maintenance Division - Special Operations and TEOC
- Transportation Planning Division
- Research Council
- Programming and Scheduling Division
- Financial Planning and Debt Management Division
- Lt. or 1st Sgt. from each of the appropriate State Police Divisions

The Technical Planning and Implementation Team will meet monthly. VTTI will serve as the facilitator and staff for this group. Funding for this support will come initially from the existing ITS PE SYIP projects and ITS Research Implementation Center funds.

Additional working groups will be assembled to undertake specific tasks. Each such group will include at least one member of the Technical Planning and Implementation Team plus others as appropriate.

Prior to the first Oversight and Leadership Committee meeting in the Fall 2000, the Technical Planning and Implementation Team is charged with:

- Developing an overall vision and strategy for ITS investment in the Corridor,
- Preparing a recommended short-term action plan and set of projects for inclusion in VDOT's Year 2002 budget cycle,
- Developing a "return on investment" analysis for ITS investments
- Developing a wireless resource sharing plan for the corridor
- Identifying necessary implementation and policy actions (Robinson, 2000).

The Founders' structure and charge were detailed in the management proposal VTTI presented to VDOT in June 2000. Although the structure did change over time the important thing to note is that VDOT's leadership did respond to the triggers for change in its environment in a meaningful way, not with a quick-fix solution. While responding to the triggers for change in this manner was a positive step, the Program may have ended there if not for the transformational leadership of the VDOT ITS Division head, Mr. J.R. Robinson, and the I-81 ITS Policy Committee members who made a commitment to support the Program.

Step 3: Asserting Leadership
The response from VDOT's leadership to the call for change on I-81 through the planning strategic session in Salem was critical to the I-81 ITS Program getting off the ground. Yet the structure and charge would not have become a reality had it not been for the leadership of Mr. Robinson and the I-81 ITS Policy Committee members, who carried it forward and made sure it was implemented.

Transformational leaders are distinguished by the ability to bring about change, innovation, and entrepreneurship. Such leaders motivate followers to not just follow them personally but to recognize the need for change, to sign on for the new vision, and to help institutionalize a new organizational process (Daft, 1995).

Mr. Robinson and the Policy Committee members acted as leaders by having a vision, mobilizing commitment, and institutionalizing change. During the individual and group interviews, it became very apparent that Mr. Robinson and the Policy Committee were recognized as leaders of ITS in Virginia and this I-81 ITS Program. Below is a description of the steps associated with transformational leadership and the participants' thoughts on how these steps were carried out.

Having a Vision
A transformational leader provides the organization with a "vision of a desired future state. While this task may be shared with other members of the organization, the vision remains the core responsibility of the transformational leader. The long-term challenge to organizational revitalization is not 'how' the visions are created, but the extent to which the visions correctly respond to environmental pressures and transitions within the organization" (Tichy and Ulrich, 1984).

Having a Vision

"I liked the Policy Committee idea, that there was a group overall that led the direction." (V)

"JR has the big picture." (ST)

"JR thinks outside the box and it is absolutely wonderful to have that ability. There needs to be more of that in the department, more independent thought needs to be promoted." (SM)

The vision for ITS is based on the Founders' charge and can be broken into two parts. The first is to integrate ITS vertically into VDOT's planning process so that ITS is considered a part of the process instead of an added, or altogether separate, part. The second is to coordinate ITS planning and investment horizontally across agencies, departments, divisions, and districts so that travelers on a corridor such as I-81 experience seamless service, and divisions and agencies can utilize resources effectively. This vision is simple yet bold considering the inter-agency and intra-agency institutional issues confronting Mr. Robinson and the Policy Committee. This vision would have remained merely an idea if these leaders had not made the effort to mobilize commitment at the state and district levels.

Mobilizing Commitment
A transformational leader is one who is able to win acceptance of a vision from at least a few key players and they begin to make it happen. The process of developing commitment and support requires a great deal of dialogue and exchange (Tichy and Ulrich, 1984). Mr. Robinson and the Policy Committee members championed the vision for the Program in their various realms of influence and

thus mobilized support for the Program. The commitment the Program had from upper management (i.e. VDOT Executive Team and the Policy Committee) was critical because it opened the door for involvement from mid-level personnel in each represented organization (i.e. VDOT, VSP, DMV).

Mobilizing Commitment

"We had tremendous leadership from the Policy Committee." (M)

"Through the Policy Committee we had upper management support. I don't think very much would have come out of this without their support. We have been trying to do this off and on in different parts of the state before, and what we were missing was this recognition and participation by upper management." (S)

"You need to have someone that is going to be champion in your district and within the department. If you don't have that than it is not going to happen. JR has been a champion. Without JR we wouldn't be where we are today." (P)

"JR was integral. He got people there and made the meeting credible." (V)

"JR helped us get to where we are with ITS" (SM)

"JR was the champion within VDOT to get the third floor of VDOT interested." (R)

"JR did a lot of outreach on what the program objectives would be and what was needed." (R)

After transformational leaders create a vision and mobilize commitment, they must next determine how to institutionalize the vision.

Institutionalizing the Change

Organizations will not change unless new patterns of behavior within the organization are adopted. Transformational leaders must "transmit their vision into reality, their mission into action, their philosophy into practice. Alterations in communication, decision-making, and problem-solving systems are tools through which transitions are shared so that visions become reality" (Tichy and Ulrich, 1984).

The I-81 ITS Program is bringing about changes by altering communication and decision-making processes. For example, change is being accomplished when people are brought together from different agencies, districts, and divisions to work on problems of joint concern through the creation of projects. The I-81 ITS Program is potentially a vehicle for making the Program vision a reality if support for the Program continues and these changes become institutionalized.

Step 4: Selecting a Management Team

The Founders of the Program recommended that a Leadership and Oversight Team, later called the Policy Committee, be created as part of the original structure along with a Technical Planning and Implementation Team, later called the Technical Committee. VTTI was to serve as facilitator and staff for the Technical Committee; however, the role of facilitator and staff developed into Program Management when VTTI was given the contract to run the I-81 ITS Program.

VTTI's role evolved into Program Management for several reasons beyond the obvious fact that they were awarded the contract to do so by VDOT. The first reason is that the late Dr. Richard Worrall, one

of the individuals at the original meeting in November 1999, was working for VTTI and was prepared for VTTI to take on Program Management responsibility. Dr. Worrall had in-depth knowledge and experience in running this type of complex Program and readily stepped up to the management plate. As one participant said, "he was the glue that held the Program together."

It is also likely that the management function was increased in preparation for the proposed monthly meetings of the Technical Committee and Working Groups. These Working Groups were created to deal with high priority issues such as safety, commercial vehicle operations, incident management, construction, and traveler information. Most of these critical areas were turned into Working Groups under the Technical Committee and were managed by VTTI.

Dr. Worrall's interest and capabilities and the work necessary to manage multiple groups led to the creation of a strong management function. VTTI managed from June 2000 to June 2001 with Dr. Worrall as the Program Chair and Stephanie Baker as administrative support and facilitator. Wayne Spaulding of PB Farradyne was hired to sub-contract with VTTI, and served as Program Manager.

Management took responsibility for organizing participants, developing work plans, and managing project proposals. In the first year, the Program Manager and Assistant spent a good deal of time making sure these tasks were covered and participants recognized the importance of this support.

Administrative Support

"I would recommend to others having a Program management function with administrative support to have things lined up. We had similar meetings on 81 that didn't go anywhere because there was not any way to follow up on what came out of the meetings and so you just had a meeting and then a year later you'd have the same meeting and do the same things. If there is nobody to do the work then nothing happens because everybody is too busy." (S)

"VTTI's Administrative Function coordinated management of the proposal process." (V)

"(Program Assistant) informed us about what was going on." (ST)

"Background work was very valuable (prepared minutes, made ideas concise & simple)." (SM)

One participant said it was useful for him to get out of his district office onto neutral territory at the VTTI facility and to have a facilitator who did not work for VDOT guiding the discussion. These two factors, the neutral territory and the use of a facilitator, created a more level playing field on which participants could discuss their project ideas.

Facilitation

"The facilitator was a catalyst to all of the communication. That is what isn't there now. The facilitator made the process flow." (V)

"The facilitator is a third party capable of communicating with all of the stakeholders." (V)

"Having a facilitating party is important. VTTI worked just fine. In other states, if they have a similar institution near-by they should use it. The facilitator doesn't need to be a technical person, just someone who is able to draw ideas out of people." (SM)

"The facilitator helps a meeting because it takes someone who is passionate about a subject out of control of the meeting." (B)

"Facilitators are beneficial because they make a summary of the meeting, that is helpful especially when we lack of manpower and resources. Having the facilitator serve also as staff is very beneficial because they make sure everyone is fed back information and is clear as to what went on." (B)

In June 2001, Mr. Spaulding and PB Farradyne took control of overall management, and VTTI was no longer responsible for staffing functions. The decision to change the management team was made by the VDOT ITS Division when the Program Chair, Dr. Worrall, informed VDOT that he needed to reduce his time commitment to the Program. Mr. Spaulding had been the Program Manager for close to a year and was ready and willing to continue in his management role.

This change in management coincided with VDOT's yearly submission of requests for funding which included the I-81 ITS Program and its projects. Typically funding requests are submitted in May and approved in July as part of the Transportation Development Plan (TDP). In this case, the funding was not approved until December 2001. This situation caused a six-month delay in the funding process for the Program's projects and strained the resources available for managing the program.

Because the management change and funding delay occurred simultaneously, the Program Chair role and much of the administrative support and facilitation could not be replaced. As Mr. Spaulding commented, "the chaos in funding stole our momentum." Participants noticed the change from a team management structure to only a Program Manager, although they may not have been aware that it was largely due to the funding delays. They believe the team approach is important to re-institute.

Management Team

"The Overall Program Management Team has to be full-time plus, my understanding is that it is part-time at best and there are too many things not being addressed. Work Groups can be part-time, not Program management." (R)

Another issue that came to the forefront in the analysis of management was the absence of a full-time VDOT manager. Mr. Robinson had other responsibilities and could not devote a consistent and substantial portion of his time to the Program. As a result the management team was, over time, a combination of VTTI and PBF personnel working under contract. This was a fragile management

situation because when funding problems arose, contract management tasks were limited. While it was appropriate for VDOT to contract certain tasks such as facilitation, it is not recommended that it contract out overall management in the future.

It is up to the Policy Committee and those who will decide where the Program goes from here what type of function will be put in place to manage and coordinate the Program. In the next section of this report on barriers and recommendations, a suggestion is made concerning this issue.

Step 5: Involving Stakeholders

Stakeholder involvement is key to the I-81 ITS Program. Participants were drawn from the districts, divisions, and agencies dealing with issues on I-81 including, among others: VDOT Bristol, Salem, and Staunton Districts, VDOT Central Office, VSP, the DMV, and various ITS consultants working on I-81. A list of these stakeholders can be found in Appendix C.

A great deal of preparation went into the Policy Committee, Technical Committee, and Working Group meetings to ensure that stakeholders were involved. All participants were contacted either by e-mail or via phone prior to meetings. If key players could not attend a meeting, management and sponsors decided whether the meeting should be rescheduled. Participants noted that involving key stakeholders was one of the strengths of the Program.

Stakeholder Participation

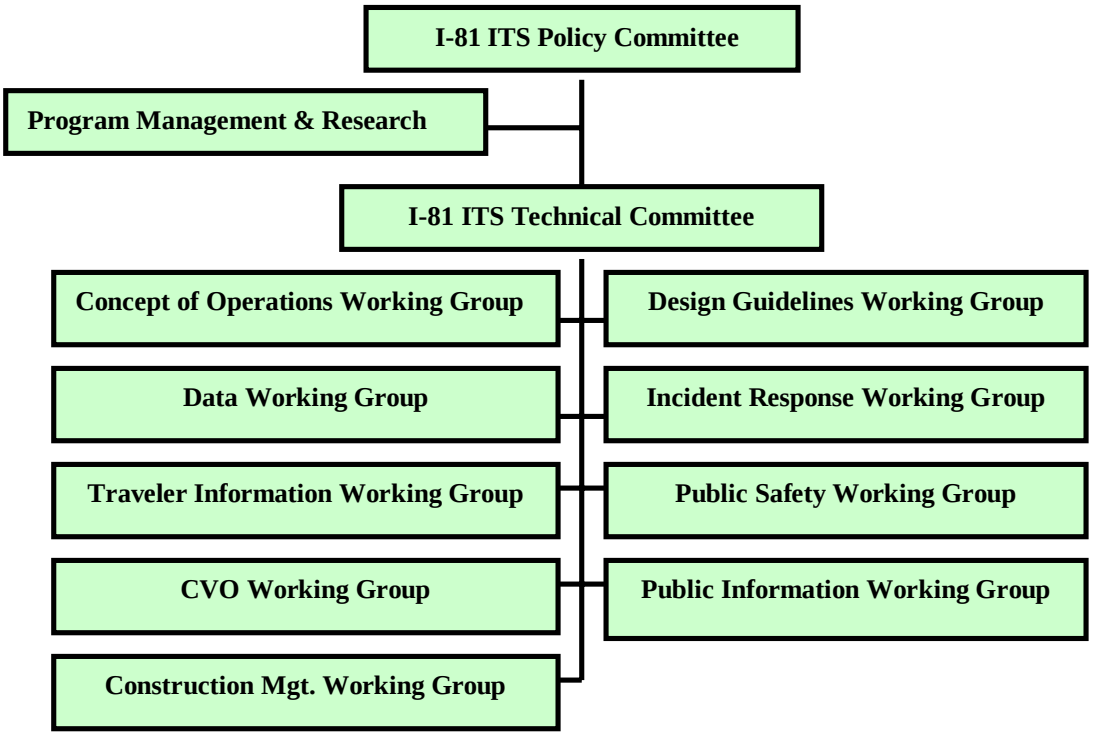
"We had participation from key people, but if your key people can't come to the meetings don't keep your process going because you are not accomplishing anything. We changed meeting dates and we worked around it to make sure that the key people were there. There is a mistake people make, if the key people can't participate they just keep going. Well you don't accomplish anything if you do that. We started with a basic list and then we made sure they were available before we committed to anything. Then once we had them we invited everyone else and they came it they could." (S)

"It is valuable to have everyone in one place, the big meetings may not have been productive in terms of getting a project statement written, but it gave us an opportunity to find out what was going on." (V)

"When we held regular meetings with all of Work Groups it was good. We had the big group together and broke off into Work Groups and you would come back together and share what you had done and everyone would hear it. There used to be meetings where everyone showed up." (SM)

The organizational structure through which participants were involved has changed over time. During the first year, there were nine Working Groups, a Technical Committee, which was the sum of the Working Groups, and a Policy Committee. This structure served the Program well in its first year because it enabled the generation of project ideas for all of the critical areas identified by the Founders of the Program. The organizational chart used through the first year of the Program is shown on the next page.

First Year Organizational Structure



The kick-off meeting for the I-81 ITS Program took place in May 2000. During the first meeting, most of the Working Groups were formed, although several including Public Safety and Construction Management were added on later in the year. Furthermore, one group, Short Term Safety, was disbanded because it was a crosscutting issue that several groups needed to address.

Several meetings were held from May until the Policy Committees first met in December 2000. At these meetings, stakeholders spent mornings discussing issues in a large group session. The session would break at lunch into Working Groups to focus on particular issues of importance to the Corridor such as incident management. At the end of the day, groups came back together and shared what they had discussed in their sessions.

In between these larger meetings, Working Groups met to refine their project ideas and put them into the nine-step proposal format found in Appendix D. Project ideas were given to management to be placed into a project book that was presented to the Policy Committee for approval. The work plan that guided this process from kick-off meeting to policy committee approval is found in Appendix E.

The process created a level playing field with numerous avenues for involvement. Each person was a part of a Working Group that had its own mission or charge; these charges are found in Appendix F. People knew if they wanted their ideas in the project book seen by the Policy Committee, they had to get involved. If coordination across districts, divisions, and agencies was ever going to take place, it needed to begin with the people working together. The creation of projects brought all of these various stakeholders to the table.

Organizational Structure

"At that activities level, I think that original organizational structure was just what we needed for where we were. And within that the stuff that you guys at Tech came up with seemed to have provided a structure that the groups needed. I mean it worked—you got reasonable projects out the other end that could be done." (M)

To encourage coordination, the first step was to get people to sit down and work together. Participants said that the Work Group structure was beneficial because they could focus on an issue in a smaller group setting. The larger group meetings, involving all of the Working Groups, seemed to be more useful for information sharing across groups and networking.

Work Groups

"It is the right process to have a group designating what is needed and taking it to higher management to see how we would fund it, I liked the process." (P)

"I think it (Work Groups) gave the projects that came forward more credibility because they came from the process rather than from individuals." (S)

"I liked last year, how we all came up with a program and everybody got a bit of funding and it all moved forward." (V)

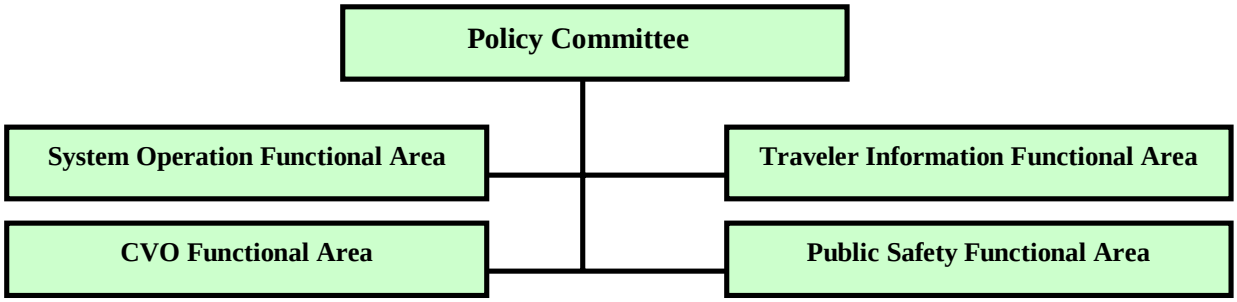
"Work Groups were a good structure, it took a large problem of how to improve things on I-81 and broke things down into what people could tackle based on what people knew." (ST)

In September 2001, the organizational structure of the I-81 ITS Program shifted from one of Working Groups to Functional Areas. Materials put out by the management team at PB Farradyne stated that this change in structure was due to the success of the Working Group approach, which provided full-funding for the I-81 Short Term Action Program, and due to the re-orientation from Projects to Programs. The Working Groups, as mentioned above, were an excellent way to generate project ideas and bring stakeholders to the table to work together. Yet once the projects were submitted and funding was pending, the role of the Working Groups became unclear.

Mr. Robinson made a decision in September 2001 to cluster the nine Working Groups and the projects they produced into four Functional Areas. The evolution to Functional Areas had been taking place for quite some time because there were so many interdependencies between Working Group projects. These interdependencies were potential problems if they led to duplication or conflicting efforts.

Due to these interdependencies, Mr. Robinson proposed to the Policy Committee that a new Functional Area structure be created that clustered Working Group projects together. In this way the focus would shift off of individual projects to programmatic areas where project interdependencies could be considered and addressed. Working Groups may be organized again in the future to deal with specific tasks, but they will be formed under the Functional Areas. The new structure is illustrated in the figure on the following page.

I-81 Functional Organization



Each of the projects created through the former Working Groups and funded are clustered under the new Functional Areas.

Functional Area: Systems Operations

- Corridor Concept of Operations
- District Concept of Operations
- Design and Implementation of Database Management System
- ITS Design Guidelines
- ITS Assets and Wireless (GIS) Inventory for I-81 Corridor

Functional Area: I-81 Traveler Information

- Travel Shenandoah
- I-81 Virginia Rural 511 Traveler Information Service

Functional Area: Public Safety

- Shenandoah Valley Integrated ITS-Public Safety System
- Pegasus Real Time Video Program (UVA Health Science Center)

Functional Area: Commercial Vehicle Operations

- Truck Fleet Alert and Support Service

As other projects receive funding through the Program, they will be included under their appropriate Functional Area so that they can be developed, coordinated, and monitored.

The Program is also trying to bring projects under Functional Area umbrellas that were not created through the Program, but which need to be coordinated with the Program.

Functional Area: Systems Operations

- Interim Operations Center (VTTI)

Functional Area: Public Safety

- Northern Shenandoah Valley ITS—Public Safety Initiative PDA Trial
- Northern Shenandoah Valley ITS—Public Mobility Program

It is a major coordination and communication task to keep abreast of not only Program projects but other efforts that need to be integrated with the Program in order to have a seamless ITS throughout the Corridor.

This new structure is a departure from the original structure crafted by the Founders, but it is a natural way to transition from a project focus to a program orientation and ensures that whatever comes out of the I-81 ITS Program is coordinated. The purpose and composition of each Functional Area has yet to be defined. Involving key stakeholders in the definition of these Functional Areas will be critical to participant buy-in.

The Policy Committee has remained a constant and has been critical to the success of this Program. Participants recognize the importance of the Policy Committee and the role it plays. Without their support in moving projects forward for possible funding, the Program would not have been nearly as successful. The presence of an Oversight Committee consisting of leadership across division and agencies also gave credibility to the process.

Policy Committee

"The Policy Committee rationalized the funding process. People came up with ideas, delivered them to the Policy Committee who could give them the o.k., and then the money flowed." (V)

"The Policy Committee should call the shots. They can make decisions about funding and timing." (SM)

"The oversight committee is the right approach. Use us (Policy Committee) for consistency, to gain resources, and to see that resources are used to meet our goals." (P)

The Policy Committee has representation from VDOT, VSP, and DMV, agencies that all have responsibility for the efficient and effective operation of I-81. Keeping this group of stakeholders engaged and involved in the I-81 ITS Program will be critical as the Program moves forward.

Stakeholder involvement at each level of the I-81 ITS Program organizational structure is important and has to be looked at critically to determine who needs to be involved, why they need to be involved, and what responsibilities they have. In the Recommendations Section there is a discussion of the roles and responsibilities of stakeholders. This is imperative so that stakeholders are used wisely and not left out of the process or asked to spend time on efforts that do not utilize them appropriately. Stakeholders have limited time and resources and must be tapped wisely.

Step 6: Securing Funding

One major lesson learned from this evaluation is that it is critical to have funding in order to gain interest from participants. Asking stakeholders to spend their limited time generating project ideas only to find no money is available can be deadly for moral and, in turn, involvement. It was important that Mr. Robinson and others were able to pull together various funding sources at the onset in order to get the Program rolling.

Seed Funding

"When ITS got money and could assign it to areas, it got more people interested." (SM)

"It is hard to keep momentum if there is no money and people don't see their efforts turning into concrete results. There has to be some funding to put towards the recommendations to keep the momentum going." (R)

"Need money up front to get people to the table." (R)

"It goes back to the question how is your program going to be successful? You have to commit resources up front to get it started. It is a lessons learned at all levels, not just the Central Office but along the Corridor." (B)

"We had ITS Earmark funds to do some things. If you started this with no funds whatsoever, I think it may never get started. You need some funds lined up before hand even if it is not very much, just do something and show progress. Otherwise you just have meetings for the sake of meetings." (S)

"Virginia has been very effective in getting funding sources. It says something for JR's leadership obviously if we have been successful in getting those funding sources." (B)

Seed funding was critical to the Program's initial success and came from a mix of sources including ITS Earmark, Transportation Development Plan (TDP), Maintenance, ITS Division State Funds, and some private sector funds. As was noted earlier in step four, once this seed funding ran out, the Program had to wait on the TDP for the majority of its resources. Though delays in TDP were beyond the control of the VDOT ITS Division, Policy Committee, and Management, lessons were learned about what functions should not be dependent upon the yearly funding cycle.

Lessons have been learned throughout this funding process about the importance of seed funding for start-up and the importance of stable funding for key functions such as Program Management. To view the status of the FY02 budget, see Appendix G. The issue now is how to establish a stable funding source for on-going operation of such a cross-district and agency Program. Numerous ideas for future funding were suggested in the interviews.

On-going Funding Source

"The three districts need to go together and say this is our priority and we are going to go to the six-year plan with this priority this year." (S)

"We tapped a Federal grant, so we could keep going with the Feds. Congressmen Wolf and Goodlatte see the need to enhance safety of I-81 and they see that high-tech is the way to go, so I think we should continue to tap the feds for that." (P)

"When we start doing construction projects we should include ITS in our construction projects so that when improvements are made we can get ITS in there with that." (P)

It is labor intensive to continue to piece together funding; thus, it is the hope of the management and sponsors to make the funding more reliable in the future. The current Program Manager, Wayne Spaulding, commented that, "chasing funds does not provide predictability. If you have something that needs a one shot hit then it is exciting to go out and find a different source. But if you are producing something that requires long-term funding because it has an operations base or maintenance cost, funding on a one shot deal puts the Program at risk because you add a new cost without identifying any new revenue to offset it." Setting aside funding for ITS is a relatively new concept, and finding a way to do so successfully, consistently, substantially and in a Corridor-fashion (as opposed to District by District) is critical to this I-81 ITS Program and others like it.

Step 7: Evaluating Progress

As the final step, the evaluation was simple in some respects because stakeholders were so willing to participate, yet difficult in others because no clear outcomes for the Program were established against which achievement could be measured. Because no outcomes were established, this document is more of a history, lessons learned, and recommendations report than a true evaluation.

This lack of clear outcomes and achievement measures is understandable due to the fact that the project was in a pilot phase. Now however, clearer goals, objectives, and expected outcomes need to be set in place, and work plans need to be created to reach them. As one participant in Bristol said, now it is time to "plan the work and work the plan."

In the future, it is recommended that a series of objectives be created from the Program's goals that are outcome oriented and linked to a work plan. These objectives should specify what the Program is trying to achieve in measurable ways. Although this type of planning program may not address typical VDOT questions such as "what was the percentage decrease in side-swipe accidents as a result of this intervention," other things can still be measured including whether "the intervention successful in securing involvement from each district and agency identified as critical to ITS implementation." These stakeholder involvement and planning-type questions can be measured qualitatively and quantitatively through the use of tools such as periodic stakeholder questionnaires or interviews.

Even though management never clearly described how success would be measured, participants believe the objectives of the Program are being achieved on some level. As mentioned in the Approach Section of the Executive Summary, an entrance survey was given to participants during the group interviews in order to determine if Program objectives were, from the participant's perspective, being achieved.

Participants were given a survey of roughly 20 questions. Ten of these were open-ended questions and 10 were designed in the form of a Likert scale so that some level of quantitative measure could be achieved. Four of the closed ended questions were focused on how well the Program had achieved its objectives. Each of the four objectives was listed as a statement, such as "the I-81 ITS Program has helped to identify areas where ITS can address needs on I-81." Participants were asked to state their level of agreement with each statement and were not told these were objective statements. In this way it could be determined if participants perceived that Program objectives were or were not being achieved. Twenty-one Work Group participants filled out the survey. The picture on the following page shows participants from the Salem VDOT District filling out the entrance survey prior to their interview.

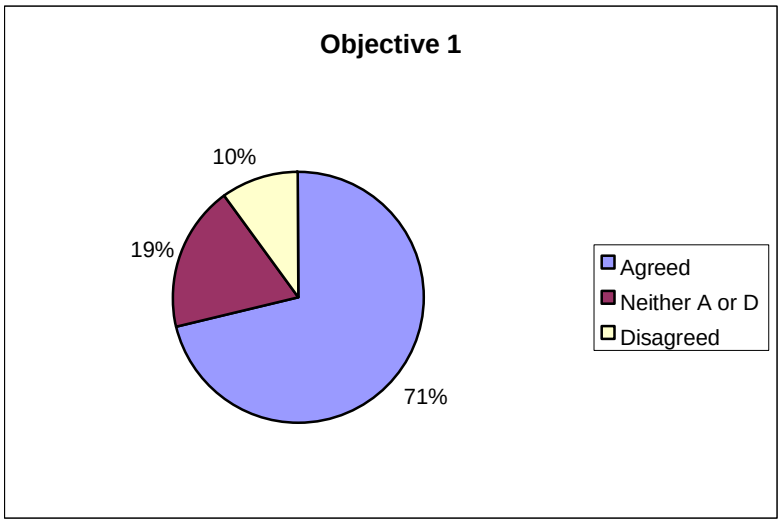
Salem VDOT District Group Interview

In the charts on the next page, each objective is stated and the level of agreement with the statement is shown in the corresponding pie chart. As the results show, participants tended to agree that objectives had been achieved. Results would have been even more useful if this exercise had taken place when the Program was initiated so that results could be compared over time.

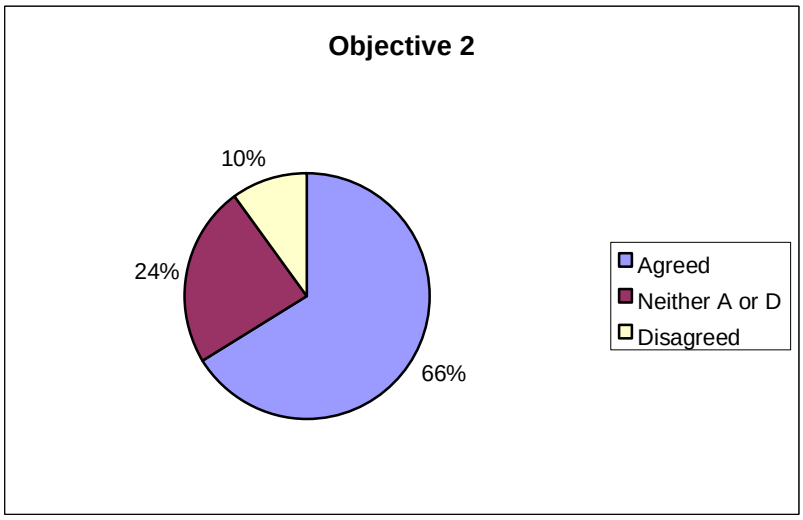
Results

Agreement was strongest on Objectives 1 and 2 likely because, in the first year of the Program, Work Groups met regularly to discuss areas where ITS could address specific issues on I-81 and to determine who would need to be involved in specific projects in order to do so. These discussions appear to have increased the participants' levels of agreement with the following objective statements.

Objective 1: The I-81 ITS Program has helped to identify areas where ITS can address needs on I-81.

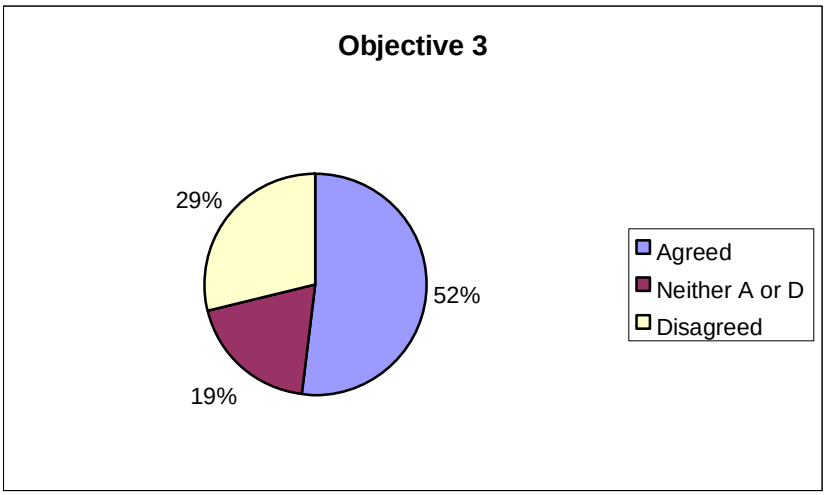


Objective 2: The I-81 ITS Program has helped to identify where ITS can generate the greatest potential benefits, particularly partnering opportunities.



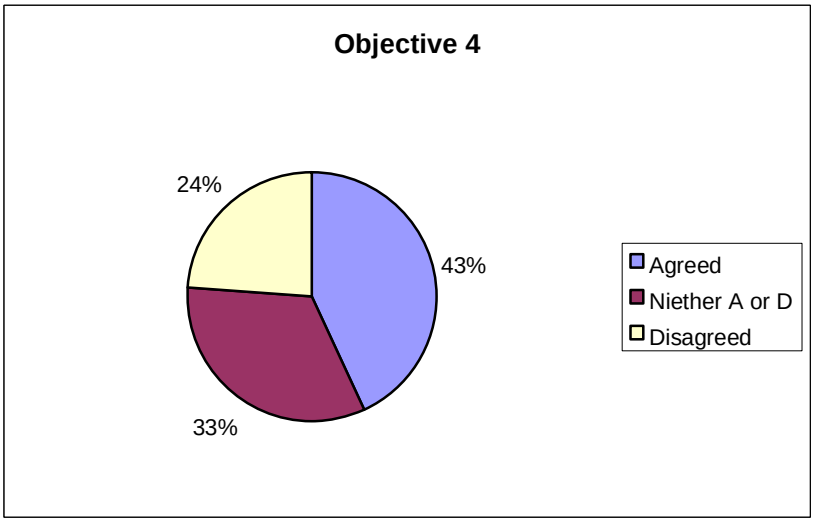
Roughly half of the participants agreed that Objective 3 was being achieved. This is likely due to the fact that the structure of the Working Groups brought people together to coordinate and communicate ideas.

Objective 3: The I-81 ITS Program has improved the coordination of ITS planning and operations over the length of the corridor.



The final objective secured the least agreement. This could have been due to the fact that, as mentioned in the section on Transformational Leadership, Mr. Robinson and others in leadership positions are still trying to institutionalize the changes that have been envisioned for the way VDOT does business when it comes to ITS planning and implementation.

Objective 4: The I-81 ITS Program has helped integrate ITS investment into VDOT's Construction Program.



The integration of ITS investment into VDOT's Construction Program is now being discussed, which is a first step towards turning this final objective statement into a reality. The Program will be able to improve on all four of these objectives in the future if action plans are put into place. Crafting action plans to achieve each of these objectives, and having a mechanism for measuring progress, is strongly recommended. These action plans should have timelines and leadership roles attached so that accountability is written into the process. This is just one recommendation; the next section of the report is dedicated entirely to recommendations for the future of the I-81 ITS Program.

Section III: Barriers and Recommendations

This section of the report covers the three major barriers identified in this evaluation for which recommendations are being made. The barriers include:

- Barrier 1: Unclear Organizational Structure
- Barrier 2: Unclear Leadership & Direction
- Barrier 3: Lack of Communication

For each barrier, a recommendation is made for how to overcome it.

Barrier 1: Unclear Organizational Structure

The first barrier identified through this evaluation was the unclear organizational structure of the Program. Although this issue has become more apparent in the second year of the Program, the first year also experienced organizational challenges. It is worth discussing the issues faced in each year of the Program for the benefit of those who may implement similar programs.

In the first year, participants struggled with the size of the Program. At one time, nine Working Groups were in place and participants were often asked to participate on multiple groups. Several participants noted that this was a problem because they did not have time on top of their normal jobs to attend all the meetings.

First Year Structural Problems

"There were too many groups with unstable numbers." (V)

"Inadequate staffing, Work Group members had multiple duties." (ST)

"We have other responsibilities so I didn't have the time to spend that I would've liked. If we had an ITS person we could make it clear that this is their job and they are the one to go after grants, attend meetings, read through information and status reports, and sit on committees. The person would have the full view of ITS, now we are only getting partial views." (B)

In the second year of the Program, the problems that were identified were a lack of structure and communication. At the start of the second year, management shifted from VTTI to PBF and the organizational structure was changed from nine Working Groups to four Functional Areas.

These changes took place in a short period of time with little communication with participants from management or the ITS Division. Participants wondered who decided that the changes would take place, why they were not alerted for months, how it would affect the projects they had proposed for funding, and if it would alter their role in the Program. To the defense of management, it was difficult to transition from VTTI to PB smoothly amidst funding delays; previous functions carried out by the joint VTTI and PB team were difficult to maintain. The new structure and unclear roles and responsibilities left participants wondering where they fit in and what was expected of them.

Second Year Structural Problems

"We used to have I-81 meetings that included all Working Groups and status was provided. We have not had one in a long time." (R)

"Lack of direction after project initiation, not sure of group role." (V)

"Lack of organization, started off well, but no follow-up or direction." (ST)

"Confused organization chart, unclear responsibilities." (B)

"Lack of structure, it has to be more than an organization chart there has to be structure for who is going to be responsible for carrying things through." (R)

It was very clear from the interviews that the I-81 ITS Program needs to consider the confusion and concerns among its participants, who are the heart of the Program, and address them promptly. It is time to clarify not only the organizational structure of the Program but also the roles and responsibilities of the participants within each level of the organization.

Recommendation 1: Clearly Define and Implement Functional Area Structure
The VDOT ITS Division, through the creation of the new Functional Area structure, is dealing with the barriers mentioned above. The new structure will decrease the number of meetings participants need to attend and the time required, which was a problem in the first year of the Program under the original structure.

The organizational structure proposed by management and sponsors is simple, straightforward, and has been approved by the Policy Committee. Though it has been approved, the new organizational structure has yet to be executed. Below is a general recommendation for how the new organizational structure for the I-81 ITS Program may be executed as well as roles and responsibilities at each of its levels.

Policy Committee
The organizational structure should give the most power and responsibility to the Policy Committee. As originally conceived, the Policy Committee was to provide leadership over the Program as a Board of Directors would for a non-profit or business. The Policy Committee should set overall policy and direction for the Program, identify Functional Area Chairs, oversee the work of the Functional Areas, review proposals, and approve funding priorities. This recommendation for a strong Policy Committee is in line with what participants say they want.

A barrier identified in the interviews and mentioned earlier was ongoing funding. The Policy Committee should tackle the funding problems and create a strategy for handing them as one of their first orders of business. The Program Coordinator, mentioned below, will be responsible for making sure the funds for the Program are spent responsibly to the achievement of Program goals and objectives; however, it is the role of the Policy Committee to advocate for and locate on-going funding. The Policy Committee has up to this point played a strong advocacy role for the Program; this role should continue and be strengthened.

Functional Areas
The main role of the Functional Areas, which have yet to be composed and implemented, should be for developing strategies and plans to achieve the overall policies set forth by the Policy Committee for their particular area, and then implementing those plans. Each Functional Area should, among other things:

- Identify Functional Area members.
- Establish a mission or charge for the Area.
- Oversee projects currently underway that fall within the Area's scope.
- Set up regular meetings to address issues particular to their focus on the corridor.
- Coordinate with other Functional Areas when issues overlap.
- Form and lead Working Groups to address particular issues and develop projects.
- Submit requests for funding each fiscal year to the Policy Committee for new initiatives.

The Functional Areas Chairs should work closely with the I-81 ITS Program Coordinator mentioned below to ensure that their efforts mesh with those of the other Functional Areas and to ensure that they are meeting the necessary deadlines for submitting projects to the Policy Committee.

It is recommended that the composition of each Functional Area roughly match that of the Policy Committee, including representatives from the VDOT Districts, the VSP Divisions, the DMV and possibly other agencies that operate on I-81 such as Emergency Services. It is not recommended that consultants sit on the Functional Areas; rather they should be called upon to serve on Working Groups for specific tasks or projects. Program participants are hopeful that the new Functional Areas will provide the structure the Program needs while demanding less of time of participants.

Functional Areas

"Before there were too many committees, hopefully the new structure will be easier to handle if it fleshed out and described and we all buy into it." (SM)

Working Groups
The role of the Working Groups is not clearly defined in the Founders' original charge because the groups were not considered permanent fixtures. The Working Groups were to be created around specific issues and then disbanded when the issues had been addressed. During the first year of the I-81 ITS Program, nine Working Groups were created to tackle specific areas and to create projects for submission to the Policy Committee for funding. The structure was clear, though often demanding of the participants' time. Working groups met regularly, worked through the nine-step proposal development process, and then were disbanded without any word of what happened with their projects or what their future role might be in the Program.

Under the new Functional Area structure, Working Groups should be organized at appropriate times in the funding cycle to assist in the development of projects. After the project development cycle is completed, groups should be disbanded. What should change is that participants should be told their group is to be disbanded and they should not have to find out after the fact that their group no longer exists. This is something that has left many participants feeling a loss of ownership in the process and in their particular projects. Participants should also receive regular updates via an I-81 ITS Program newsletter or website about their projects and the Program in general.

The membership of the Working Groups thus far has been drawn from state agency personnel, universities, hospitals, and private and non-profit sectors. The Functional Areas should continue to draw on these stakeholders for the Working Groups. Yet, it is important for the government agencies serving on the Functional Areas to understand their goals, objectives, and desired outcomes clearly before soliciting the support of outside entities so that the mission of the Functional Area is not transformed to meet other agendas.

Program Coordination

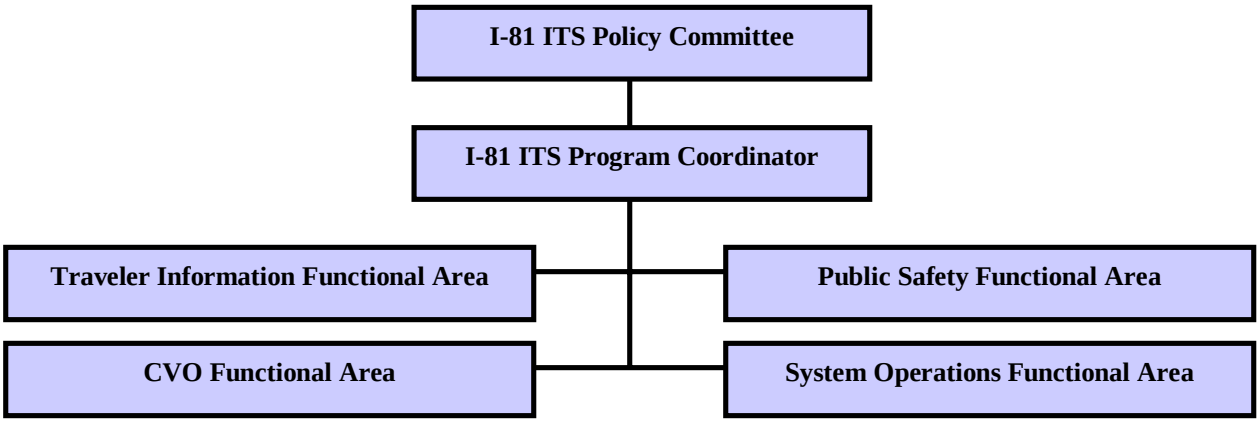
It is essential to have a strong Program Coordination function. As is mentioned throughout this report, it is recommended that the Program Coordinator be a member of the VDOT Central Office ITS Division so that he or she has the authority to make decisions for the Program and is not as vulnerable to funding delays and reductions. The Coordinator will serve the entire I-81 Corridor, work with each of the Functional Areas, and report to the Policy Committee. Among other things, the Program Coordinator will be responsible for:

- Working with each Functional Area to identify needs on the Corridor and to draft and carry out plans to address those needs (includes helping organize working groups).
- Meeting with the Policy Committee to receive Policy Direction, Report Progress, and Present Proposals for Funding from each Functional Area.
- Identifying where Coordination needs to take place across Functional Areas and across other efforts on the Corridor, such as the I-81 Steering Committee.
- Managing the Overall Plan for the I-81 ITS Program.
- Keeping the Program on track, on budget, and on time.

The Program Coordinator should be the glue that keeps everyone together from top to bottom. The Coordinator will have the challenge of utilizing staff and budgets appropriately and holding together a complex organizational structure with multiple stakeholders. Working closely with the Functional Area Chairs and staff on the Corridor will be important. The Coordinator should have a staff to assist in setting agendas, organizing meetings, moderating meetings, recording minutes, communicating between meetings, producing newsletters or other reports on progress. More on the role of the Coordinator is found in Recommendation 3.

The Program needs a framework through which participants understand how to operate; this organizational structure is ideal when considering the current circumstances and evolution of the Program. Working groups have served their purpose, and will be created again in the future by Functional Area Chairs for project development and other tasks. Now, the structure needs to be simplified into Functional Areas that serve as forums through which planning related to priorities on the I-81 Corridor can occur (i.e., Traveler Information, Public Safety, CVO, System Operations).

Recommended I-81 ITS Program Organizational Structure



In summary, for the structure that will be implemented, the Policy Committee should function as a Board of Directors and set overall Policy for the Program and locate funding. The Functional Area Chairs with the assistance of Working Groups should craft charges, action plans, and projects. The Program Coordinator should work with each Functional Area to help them accomplish their goals and objectives and make sure they are all working together and meeting deadlines.

Barrier 2: Unclear Leadership & Direction

The next barrier identified through the document analysis and interviews was the absence of clear leadership and direction for the Program. Participants said they wanted to know who was in charge and who was deciding where the Program was heading.

Lack of Leadership

"There is no vision in the leadership now. Maybe when it was originally set up there was ownership because they helped develop the vision for the Program and had this image in their head of what needed to be done and how and where it needed to go. That started in 1999 and probably ended in 2000. In the entire 2001 there hasn't been any new breath coming in and saying 'hey I know what is going on' and taking charge and telling everyone what they need to do. There is no direction." (R)

"There is a lack of Program leadership, vision, and initiative to make things happen." (R)

"Uncertain decision-making authority and leadership (is a barrier). Who is in charge." (SM)

Closely related to the issue of unclear leadership (i.e., who is directing the Program) is the lack of direction or vision (i.e., where the Program is going) for the I-81 ITS Program to which goals, objectives, and desired outcomes can be attached. Participants want to know where the Program is going and what the leadership is trying to achieve through the Program.

Lack of Direction

"No vision." (SM)

"Lack of marching orders." (ST)

"Vague goals and objectives, we didn't have anything specific or outcome oriented." (B)

"I know my Work Group has been disbanded but I don't know where the money is going to come from for the recommendations we made that were accepted. So where are we now? And where we are going?" (R)

This perception about a lack of leadership and direction should be addressed so that participants understand the direction of the Program and know whom they need to hold accountable when that direction becomes unclear.

Recommendation 2: Hold Planning Sessions

As has been mentioned throughout the document, in the summer of 2001 three events simultaneously took place that affected the momentum of the Program (change in management from VTTI to PB, delays in funding, and a new organizational structure). These changes took place in the absence of communication with participants leading, in large part, to the perception that Program leadership and vision were fading. In fact, the leadership of the VDOT ITS Division and the Policy Committee was never lost, it was just not communicated to participants. It was the responsibility of the VDOT ITS Division to relay these changes and their implications for the Program to participants. In the future, it is recommended that they do so through a Program Coordinator, discussed in Recommendations 1 and 3.

To address this barrier, it is important now to execute the new Functional Area structure, inform participants about all of the changes taking place, and secure buy-in at every level. One suggestion for accomplishing these three objectives is to hold a short planning session like the one that took place in November 1999. The work Mr. Robinson and the Policy Committee have done to bring the Founders' vision to the forefront has been important to the initial successes of the I-81 ITS Program, but now the Policy Committee and ITS Division need to consider how to take the new structure and vision for the Program forward.

At the first planning session, the Policy Committee should take a hard look at their priorities for the Program and what they want to achieve. The Policy Committee should revisit the vision, revise the vision if necessary, and provide overall Policy Direction for both the Program and the Functional Areas. The Policy Committee should also clarify the roles, responsibilities, and interrelations of the Policy Committee, the Functional Areas, and the Program Coordinator.

Once the Policy Committee shares the vision, policy direction, and general roles and responsibilities, the Functional Areas should hold their own planning sessions. These sessions should focus on creating charges and action plans. Functional Area roles and responsibilities can be further developed during these sessions. The I-81 Program Coordinator should run the sessions with the support of his or her staff.

Currently, participants do not know where the Program is going and what changes have taken place. Taking this planning step is essential for maintaining participant commitment. Participants want to know all their hard work and time is a part of a larger picture and directed towards some desired end.

Barrier 3: Lack of Communication

The final barrier addressed is the lack of communication, mentioned throughout the report. Communication problems were noted across Working Groups, between groups and management, and between the Program and other efforts such as the I-81 Steering Committee.

From the beginning, maintaining these lines of communication was a challenge. During the joint meetings, where all the Working Groups met together, communication appeared to be strong because everyone was in the same location and results were communicated in a set of minutes. Yet when groups met on their own, communication across groups broke down. While these individual group sessions were essential for getting work done, one element missing was that minutes were not shared across groups and so little if any communication occurred. Because the groups' charges overlapped so much in scope, what one group decided was often of great relevance to other groups.

It was also a challenge to keep communications sustained between the I-81 ITS Program and other efforts such as the I-81 Steering Committee. Success in gaining cooperation between the two efforts is important because the Steering Committee deals with reconstruction on I-81 and addresses Design, Environmental, and Construction issues. Working closely with this Committee may be one way to place ITS at the planning table along with the other divisions in VDOT.

After the first year of the Program, communication was an even greater challenge because, due to delays in funding, the Management Team went from a Program Chair, Manager, and Assistant down to a part-time Program Manager and Assistant. Maintaining the level of communication necessary for a complex Program is difficult with a part-time management team, and this was apparent throughout the interviews as communication was high on participants' lists of concerns.

Lack of Communication

"There is no communication with management or understanding of how fit with all the groups."(V)

"Lack of communication about changing structure and resources." (ST)

"Misunderstanding of what resources are available and who the players are and their function." (SM)

"We need to know what our progress is. We have spent a lot of money meeting over the past few years, so what do we get? Let us know." (R)

"Unclear communication of work plan and goals." (B)

Recommendation 3: Hire a Full-Time I-81 ITS Program Coordinator

The final recommendation is to hire a full-time I-81 ITS Program Coordinator from VDOT's ITS Division who has at least one staff person located on the Corridor for support. This Coordinator role was mentioned in Recommendations 1 and 2 because the establishment of such a person would support the accomplishment of all of the suggestions made in this report. The role of the Program Coordinator

is noted in particular here, as maintaining the communication demands of this Program internally and externally will be among his or her major responsibilities.

The Program Coordinator should be a member of VDOT's ITS Division assigned to the I-81 ITS Program. While VTTI and PBF played an important role in managing the I-81 ITS Program up to this point, a VDOT staff person is more appropriate for the Program Coordinator role. A VDOT staff person, unlike university personnel or a consultant, will have the authority and accountability necessary to make decisions for the Program and will not be as vulnerable to delays in funding as someone under contract. Other Program functions, such as facilitation and evaluation, are more appropriate for university personnel or consultants to handle because they require a neutral third party who can moderate and critique the process.

The Program Coordinator must try to create a neutral playing field for discussion among all participants. This is important so that stakeholder opinions and ideas are shared at the table, and the stakeholders leave knowing their voices were heard. Participants are much more likely to return to the table if they believe they will be heard. The Coordinator can do this by having a facilitator moderate and manage the meetings to ensure discussions are open. One participant stated that having a facilitator was important because the facilitator "takes someone who is passionate about a subject out of control of the meeting." The facilitator can ensure communication is free around the table and no one person controls the discussion.

The Coordinator must make sure meeting agendas, records, and progress reports are communicated. Currently, participants are concerned that they do not know what is going on that may affect their work, and have no record of what their own group accomplished to share with others or to remind them of progress made. One participant stated "having the facilitator serve also as staff is very beneficial because they make sure everyone is fed back information and is clear as to what went on." It is not critical who serves in this feedback role, it may be the facilitator or someone on the Coordinator's staff, what is critical is that feedback is timely, accurate, and consistent.

Putting in place a strong Coordinator to work with the Policy Committee and Functional Areas is a way to address this communication barrier. The Coordinator can ensure that solid agendas are formed for each meeting, key issues are addressed, appropriate stakeholders are invited to the table, the meetings run smoothly, and minutes are shared across groups. This will become even more important as the Public Relations arm of the Program begins to build information they wish to share with the public. The Coordinator should liaison with public relations staff to ensure projects that have implications for the public are shared in a timely fashion.

The I-81 ITS Program Coordinator role will be demanding but it is essential for the development and survival of this Program. Someone needs to take it upon him or herself to make sure things happen and to hold others accountable. This person will need their own staff and the commitment and support of the Functional Area Chairs, the Policy Committee, and the VDOT ITS Division to make this work.

In closing, all three barriers focus on addressing institutional issues through the clarification and institutionalization of the organizational structure, roles and responsibilities, policy and functional area directions, and communication. The barriers can be dealt with if the organizational structure is simplified, if leadership roles and responsibilities are defined and accepted at each level, if a policy direction is provided, if the Functional Areas are constituted, and if a Program Coordinator is hired. These are not the only ways forward, but they are ones that can best address the institutional issues

currently holding the Program back and keeping it from accomplishing all that it can for ITS implementation and planning on I-81.

The I-81 ITS Program has had many successes in its first two years and many lessons have been learned. The barriers that have been mentioned are not major problems; rather, they are institutional issues that can be overcome through the suggestions made above. If the leadership that has been shown by the Policy Committee, Mr. Robinson, and the ITS Division continues, this program has the support and guidance it needs to achieve its goals and objectives. And if the interest and commitment participants have shown through their involvement and shared during the interviews continues, the I-81 ITS Program will continue to succeed.

Appendix A: Interview Instruments and Group Entrance Survey

Below is the interview instrument used for the Policy Committee interview and is basically the same format that was used for the Management and Policy Interviews. The instrument varied slightly by who was being interviewed. The entrance survey and instrument used for the group interviews follows.

Interview Instrument (Individual)

Introduction
1. Why do you think the I-81 ITS Program is important?
2. Are any stakeholders missing that should be brought into the Program?

ITS Environment
3. How do you think other ITS efforts, such as Travel Shenandoah and the Staunton COO, have affected the development of the I-81 ITS Program?

Goals & Objectives
4. What are the goals and objectives of the I-81 ITS Program?
5. Do you feel these goals are being met?
6. What types of people/staff will be needed to reach these goals?
7. What are your goals for the Program in the future?

Organization
8. What role does the Policy Committee play in this Program? What are your main responsibilities?
9. Do you think that any group or person is missing from the Policy Committee?

Program Management
10. What role do you feel Program Management has played in this Program?
11. Do you have any suggestions for Management going forward?

Resources
12. What role do you play in the funding process after projects are approved?
13. What other sources of funding should be tapped for ITS Projects on I-81?
14. What other resources, other than funding, have helped to support this Program?

Outcomes
15. What are some of the short-term outcomes of the Program?
16. What do you think the long-term results of this Program are going to be?

Program Successes & Barriers
17. What factors such as people or activities have contributed to the Program's success?
18. What factors have been barriers to the Program's success?
19. What lessons have you learned through the course of your involvement in this Program?
20. What recommendations can you offer to others who might want to start such a Program?

Work Group Entrance Survey

Background Information
1. What organization do you work for? (Specify District, Central Office, etc)
2. What is your role in the Program? Work Group Leader ☐ Work Group Member ☐

Goals
3. What are the goals of the I-81 ITS Program?
4. Are these goals being met? If so, how? If not, why do you think they are not being met?

Organization
5. Describe your role in the Program?
6. What role does VDOT Central Office ITS Division play in this Program?
7. What role does Program Management play in this Program?

Program Outcomes
8. What are the short-term outcomes of the Program?
9. What do you think will be the long-term effects of the Program?

Program Barriers & Successes
10. What factors (such as people, activities, etc) have contributed to the Program's success?
11. What factors have been barriers to the Program's success?
12. What lessons have you learned throughout your involvement in this Program?
13. What recommendations can you offer Program Management & Sponsors to improve the Program?
14. What recommendations can you offer to others who might want to initiate such a Program?

Rating
Beside the statements presented below, please indicate with a check mark whether you Agree Strongly, Agree, Neither Agree or Disagree, Disagree, or Disagree Strongly with the statement.

15. I have a clear understanding of the goals and objectives of the I-81 ITS Program.
Agree Strongly ____
Agree ____
Neither Agree or Disagree ____
Disagree____
Disagree Strongly____

16. I have a clear understanding of how the I-81 ITS Program is organized.
Agree Strongly ____
Agree ____
Neither Agree or Disagree ____
Disagree____
Disagree Strongly____

17. I have a clear understanding of how projects are funded through the I-81 ITS Program.
Agree Strongly ____
Agree ____
Neither Agree or Disagree ____
Disagree____
Disagree Strongly____

18. The I-81 ITS Program has helped to identify areas where ITS can address needs on I-81.
Agree Strongly ____
Agree ____

Neither Agree or Disagree ____
Disagree____
Disagree Strongly____

19. The I-81 ITS Program has helped to identify where ITS can generate the greatest potential benefits, particularly partnering opportunities.
Agree Strongly ____
Agree ____
Neither Agree or Disagree ____
Disagree____
Disagree Strongly____

20. The I-81 ITS Program has improved the coordination of ITS planning and operations over the length of the corridor?
Agree Strongly ____
Agree ____
Neither Agree or Disagree ____
Disagree____
Disagree Strongly____

21. The I-81 ITS Program has helped integrate ITS investment into VDOT's Construction Program.
Agree Strongly ____
Agree ____
Neither Agree or Disagree ____
Disagree____
Disagree Strongly____

Interview Guide (Group)

10:00-10:15: ENTRANCE SURVEY

10:15 Introductions

- Thank everyone for taking the survey, as it will provide useful data across groups.
- Ask each person to say their name and Work Group they were leading or a member of.

10:20 Stakeholders Exercise

- Ask each person to write on a sheet of paper the major stakeholders involved in the Program.
- In a Round Robin fashion collect the names and list them on flip charts.
- Keep going around the circle until everyone's lists are exhausted.
- Ask if any stakeholder group is missing that should be involved moving forward? –why?

10:25 Goal Exercise

- Ask each person to write a Program goal.
- Go around circle and ask for goals and write on flip charts.
- Ask participants if we are reaching these goals?
- If so, how—for each goal list activities?
- If not, why not—what activities might be beneficial towards reaching goals?

10:35 Organization Exercise

- Ask participants to sketch the organization chart for the Program (general)
- Go around and ask each person to describe their chart
- Discuss differences
- Show the old chart and the new chart.
- Discuss strengths and weaknesses of each.

10:45: 5 Minute Break

10:50 Program Management Exercise

- Ask participants if they have any recommendations for Program Management going forward

11:00 Program Barriers & Successes Exercise

- Ask participants to take sheets of paper and write down three to five barriers to the Program's success and three factors that contributed to Program success (people, activities).
- Collect them and put them on the wall in sections—Facilitators to Success & Barriers to Success
- Clarify/Discuss them
- Group & Label them into general categories.
- Ask if there was any person in particular that was critical to Program success.

11:10 Lessons Learned Exercise

Open discussion about what lessons have been learning. What has/is really working and what is not?

11:20 Recommendation Exercise

Open discussion on recommendations. What would you recommend to others starting such a Program?

11:30 Closing . . . any other comments?

Appendix B: Interviewee List & Logistics

Below is a matrix listing the participants invited to take part in interviews as well as the interview logistics.

Stakeholder Type	Name	Organization	Date	Location	Confirm
Sponsor	JR Robinson	VDOT-C	10/24/01	Richmond	Y
Management	W. Spaulding	PBF	10/30/01	Staunton	Y
Policy Member	D. Morrison	VDOT-D	10/30/01	Staunton	Y

Location: VTTI (Pilot Interview) Date: October 26 Time: 9-10:30

Stakeholder Type	Name	Organization	Location	Confirm
W.G. Leader	A. Schroeder	VTTI	B'burg	Y
W.G. Member	K. Laskowski	VTTI	B'burg	Y
W.G. Member	N. Swan	VTTI	B'burg	Y

Location: Staunton VDOT District Date: November 6 Time: 10:30-12:00

Stakeholder Type	Name	Organization	Location	Confirm
W.G. Leader	S. Myers	VDOT-D	Staunton	Y
W.G. Member	J. Diamond	VDOT-D	Staunton	Y
W.G. Member	B. Guill	VDOT-D	Staunton	Y
W.G. Member	R. Slocum	VDOT-D	Staunton	Y
W.G. Member	C. McGhee	VTRC	Charlottesville	Y
W.G. Member	Lt. O'Neil	VSP	Appomattox	Y
W.G. Member	Sgt. Rader	VSP	Augusta	Y

Location: Salem VDOT District Date: November 9 Time: 10-11:30

Stakeholder Type	Name	Organization	Location	Confirm
W.G. Leader	C. McDonald	VDOT-D	Salem	Y
W.G. Member	B. Yates	VDOT-D	Salem	Y
W.G. Member	M. Azar	VDOT-D	Salem	Y
W.G. Member	D. Lee	VDOT-D/C	Salem/Rich	Y
W.G. Member	L. Bullock	VDOT-D	Salem	Y

Location: Richmond Date: November 14 Time: 10-12:00

Stakeholder Type	Name	Organization	Location	Confirm
W.G. Leader	K. Rusak	VDOT-C	Richmond	Y
W.G. Member	J. DuFresne	VDOT-C	Richmond	Y
W.G. Member	K. Earnest	VDOT-C	Richmond	Y
W.G. Member	S. VanCleef	VDOT-C	Richmond	Y
W.G. Leader	S. Shergold	VTRC	Richmond	Y
W.G. Leader	K. Jennings	DMV	Richmond	N
W.G. Member	M. Morecock	Iteris	Richmond	Y
W.G. Member	N. Magorka	Arinc	Richmond	N

Location: Bristol VDOT District Date: November 27 Time: 10-12:00

Stakeholder Type	Name	Organization	Location	Confirm
W.G. Member	R. Hubble	VDOT-D	Bristol	Y
W.G. Leader	D. Necessary	VDOT-D	Bristol	Y
W.G. Member	B. Waters	VDOT-D	Bristol	Y

D=District
C=Central Office

Appendix C: Policy and Technical Committee Invite Lists

Below are the Policy Committee and Technical Committee Invite Lists. These lists have changed over time as the Program has evolved.

I-81 ITS Program Policy Committee Members

Name	Organization	Title
Andy Bailey, Chair	VDOT	Assistant Commissioner for Operations
Gary Allen	VDOT	Acting Assistant Commissioner for Research & Technology
Tom Boyd	VDOT	Assistant Commissioner for Finance
Col. John Scott	VSP	Director Bureau of Field Operations
Daniel Marston	VDOT	Bristol District Administrator
Fred Altizer	VDOT	Salem District Administrator
Dennis Morrison	VDOT	Staunton District Administrator
Lynwood Butner	DMV	Assistant Commissioner Motor Carrier Services

I-81 ITS Technical Working Group Contact List (June 2001)

Below is the list of members involved in the Working Groups.

Work Group Leaders & Numbers (WG#)

1. COO (Robinson & Spaulding)
2. Incident Response (DuFresne & Tyler)
3. ITS Guidelines (Rusak & Shergold)
4. Data Req. & Mgt. (Schroeder & Caldwell)
5. Public Info & Marketing (Myers & Baker)
6. Traffic & Travel Info (Worrall & Kell)
7. Public Safety (Spaulding)
8. CV Safety & Ops (Jennings & Bergoffen)
9. Construction
10. Safety (Necessary & McDonald)

Name	Organization	Location	Title	WG#
JR Robinson	**VDOT**	**Richmond**	**Director, ITS**	**1**
Wayne Spaulding	**PBF**	**Delaware**	**I-81 ITS Program Manager**	**1**
Ronnie Hubble	VDOT	Bristol	DTE	1
Bob Yates	VDOT	Salem	DTE	1
Rob Slocum	VDOT	Staunton	TE (ITS)	1
Lt. John O'Neil	VSP	Appomattox	Lt.	1
First Sgt. Joe Rader	VSP	Augusta	First Sgt.	1
Jeff Cutright	VDOT	Richmond	L&D	1
Mshadoni Smith	FHWA	Richmond	ITS Specialist	1
Martha Morecock	Iteris	Richmond	ITS Program Manager	1
Suzette M. Valentine	SMA	VA Beach	Dir. Deployment Services	1
Jon DuFresne	**VDOT**	**Richmond**	**ITS Division**	**2**
CD Tyler	**PB**	**Maryland**	**ITS Consultant**	**2**
Mike Azar	VDOT	Salem	TE	2
Leon Sheets	VDOT	Staunton	TE	2
Tammy Thomas	VDOT	Richmond	VOIS/EOC Ops Mgr.	2
Alejandra Medina	VTTI	Blacksburg	Senior Research Associate	2
Steve VanCleef	VDOT	Richmond	L&D	2
Lt. J. W. Snow	VSP	Salem		2
Lt. Gary Taylor	VSP	Wythville		2
Karen Rusak	**VDOT**	**Richmond**	**TE, Design**	**3**
Steve Shergold	**VDOT**	**Richmond**	**ITS Division**	**3**
Stephen Brich	VDOT	Richmond	Assistant State TE	3
Jim Diamond	VDOT	Staunton	DTE	3
Omar Necko	VDOT	Richmond	ITS Division	3
Kenneth Earnest	VDOT	Richmond	ITS Division	3
Cathy McGhee	VDOT	C'ville	SR Research Scientist	3
Larry Caldwell	**VDOT**	**Richmond**	**Data Mgt./TE**	**4**
Aaron Schroeder	**VTTI**	**Blacksburg**	**Head Info Applications**	**4**
Dan Widner	VDOT	Richmond	Data Mgt.	4
Gene Martin	VDOT	Richmond	ITS Division	4
Fred Kiiffner	VDOT	Richmond	L&D	4
Don Wells	VDOT	Richmond	Transp. Planning	4
Walter Pribble	VDOT	Richmond	Transp. Planning	4
David T Lee	VDOT	Rich/Salem	Materials	4
Lt. Steve Adams	VSP	Culpeper		4
Nick Magorka	Arinc	Richmond	Sen. Prin. Engineer	4
Dan Papiernik	Transcore	Vienna	Area Manager	4
Michelle Griffith	Transcore	Vienna	Program Manager	4
Sandy Myers	**VDOT**	**Staunton**	**PA**	**5**
Stephanie Baker	**VTTI**	**Blacksburg**	**Research Associate**	**5**
Eric J. Gorton	VDOT	Staunton	PA Specialist	5
Brenda Waters	VDOT	Bristol	PA	5
Laura Bullock	VDOT	Salem	PA	5
Jason Bond	VDOT	Salem	PA	5
Mike Stater	VSP	Div. VI	PA. VSP	5
Pam Goheen	DMV	Richmond	P.A. DMV	5
Scott Cowherd	SHENTEL	Edinburg	Travel Shen. Project Mgr	5
Greg Cross	LFPDC	Woodstock	ITS Consultant	5
Kevin Barron	VDOT	Richmond	**ITS Division**	5
Todd Kell	**VDOT**	**Richmond**	**ITS Division**	**6**
Dick Worrall	**VTTI**	**NOVA**	**University Research Fellow**	**6**
David Ferguson	SHENTEL	Edinburg	VP Customer Service	6
Nicole Swan	VTTI	Blacksburg	Travel Shen. Project Mgr	6
Scott Cowherd	SHENTEL	Edinburg	Travel Shen. Project Mgr	6
Greg Cross	**VDOT**	**Woodstock**	**Consultant**	**7**
Marsha Scherr	**Comcare**	**DC**	**Executive Director**	**7**
Cheryl Lynn	VTRC	C'ville	Senior Research Scientist	7
Dr. Debra Perina	UVA	C'ville	Pegasus Flight Program	7

Dr. Jack Potter	Physician	Winchester	Dir. Emergency Med. Services	7
Carol Gilbert	Carillion	Roanoke	Director of Trauma	7
Ken Jennings	**DMV**	**Richmond**	**Director Motor Carrier**	**8**
Gene Bergoffen	**Mainway Services**	**DC**	**Principal**	**8**
Dale Bennet	VA Trucking Assoc.	Richmond	Ex. Vice President	8
Roger Cole	Hwy Serv. Venture	Richmond	President	8
Cyndi Ward	VDOT	Richmond	Maint., Special Ops	8
Dewey Clower	NATSO			8
Scot Imus	NATSO			8
Herb Bridges	VSP	Chesterfield		8
Vince Burgess	DMV	Richmond	Motor Carrier Division	8
Donny Necessary	**VDOT**	**Bristol**	**TE**	**9**
Chris McDonald	**VDOT**	**Salem**	**TE**	**9**
David Rush	VDOT	Richmond	TE	9
Reggie Moseley	VDOT	Richmond	TE	9
Ben Cottrell	VTRC	C'ville	Research Scientist	9
Leon Sheets	VDOT	Staunton	TE	9
Donnie Robertson	VDOT	Salem	Safety Officer	9
Lt. Gary Taylor	VSP	Wythville	Lt.	9
1st Sgt. Ed Johnson	VSP	Bristol	First Sgt.	9
Mike Frye	VDOT	Bristol	Safety Officer	9
Steve VanCleef	VDOT	Richmond	L&D	9

Appendix D: Nine-Step Project Development Process

Below is the outline, developed by Dr. Richard Worrall in the autumn of 2000, which was given to each of the Working Groups to guide them in developing their ideas into project proposals. Program staff developed the final proposals using the information produced by the Working Groups. The nine-step format was a simple way to ensure that each group knew what was needed from them in order to draft a proposal, and this assisted the management team in preparing projects for submission to the Policy Committee.

Nine-Step Project Development Process

1. Develop a two to three paragraph project scope of work.
2. List the tasks that should be part of the project.
3. Identify the deliverables, who would use them, and how they would be used.
4. Estimate the duration of the project.
5. Estimate the budget for the project. Provide some breakdown of the budget details, including what will be required in terms of equipment, software, and personnel-hours.
6. Suggest what agency (and what part of the agency) should be the lead for contracting and managing the project. Suggest an individual who could serve as project manager.
7. Identify any comparable projects completed, presently underway, or being procured.
8. List the anticipated benefits of each project, and who will experience the benefits. This list should include the cost savings that might be generated, even in other areas of activity. This will be used to create a return on investment justification for the project.
9. Recommend what type of organization should do the work (agency, university, consultant, contractor, etc.), along with staffing and other necessary resources.

Appendix E: I-81 ITS Program Work Plan

Below is an example of a work plan that was used to take the Program from kick-off meeting to Policy Committee approval. The process was broken into three major steps, the dates listed below next to the steps are not what actually occurred the first year, but what was determined after the first year as the ideal cycle for the following year:

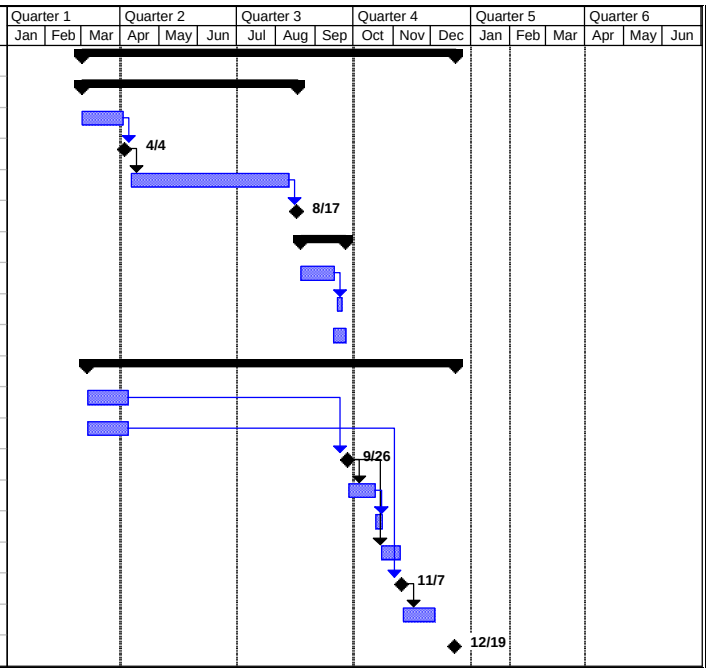
Step 1: Project Development (*March through August*)
- Organizing the Working Groups,
- Generating project ideas,
- Submitting project ideas to the Management Team.

Step 2: Assembling the Project Book (*late August through September*)
- Assembling the project ideas from the Working Groups into a Project Book,
- Distributing the Project Book to Core Technical Team (CTT), the amalgam of the Working Groups, for review and comment.

Step 3: Review and Approval (*late September through December*)
- Editing the Project Book based on CTT review,
- Submitting the ideas to the Policy Committee for approval.
- Revising the final Project Book based on Policy Committee review.

Each step is shown below in the work plan.

ID	Task Name
1	**Program Development FY 03**
2	**Project Development**
3	Planning Kick-Off Meeting
4	Kick-Off Meeting
5	Working Group Meetings
6	Projects to Project Team
7	**Assemblying Project Book**
8	Assemble and Edit
9	Distribute Project Book
10	Prepare Presentation Materials
11	**Review & Approval**
12	Plan CTT & Working Group Review
13	Plan Policy Committee Review
14	Conduct CTT/Working Group Review
15	Revise Project Book
16	Submit Project Book to Policy Com.
17	Revise Presentation Materials
18	Conduct Policy Com. Review
19	Revise and Re-Submit to Policy Com.
20	Final Approval of Projects



As is mentioned above, this cycle is not what occurred the first year. The first year the Program did not get started in earnest until August 2000, leaving little time to develop projects in time for amble review. Lessons were learned about how much time is required for each step and from these lessons a new timeline was created that worked backwards from the date of Policy Committee approval. This work plan will be likely altered in the future as the new Functional Area model is implemented.

Appendix F: Standing Technical Working Group Charges

Below is a list of the working groups in existence as of January 2001 and their charges.

I-81 Corridor ITS Concept of Operations

The focus of the I-81 ITS Concept of Operations Standing Technical Working Group shall be on developing an overall, operational concept to guide the future, and coordinating deployment of ITS technologies over the entire length of the I-81 Corridor in Virginia, with particular emphasis on the most effective use of such technologies to improve operational efficiency and enhance safety.

I-81 Incident Response and Clearance

The focus of the I-81 Incident Response & Clearance Standing Technical Working Group shall be on the development and implementation of procedures to improve coordinated response to incidents within the I-81 Corridor, with particular emphasis on the management of operations at the incident site and the timely and effective clearance of the site to permit resumption of traffic operations.

ITS Design Guidelines

The focus of the ITS Design Guidelines Standing Technical Working Group shall be on development of a set of ITS Design Guidelines for use by VDOT in the planning, design, procurement, construction, operation, and management of ITS facilities and infrastructure initially on the I-81 Corridor and eventually across the state.

I-81 ITS Data Requirements, Communications & Management Systems

The focus of the I-81 ITS Data Requirements, Communications, & Management Systems Standing Technical Working Group shall be on the development and implementation of an integrated ITS database and set of associated management systems and necessary communications infrastructure to support the on-going planning, design, deployment, and effective operation of ITS technologies in the I-81 Corridor.

I-81 ITS Public Information & Marketing

The focus of the I-81 ITS Public Information & Marketing Standing Technical Working Group shall be on the provision of a continuing flow of easily accessible, useful information to the traveling public relating to their understanding and use of evolving ITS technologies along the I-81 Corridor. (The Program shall be closely coordinated with other, similar VDOT initiatives relating to the reconstruction of I-81, VSP Public Information Programs, and other activities.)

I-81 Traveler & Traffic Information Services

The focus of the I-81 Traveler & Traffic Information Standing Technical Working Group shall be on the provision of a continuing flow of readily available, easily accessible, useful information to the traveling public relating to current traffic and travel conditions, and traveler services and tourism along the entire length of the I-81 Corridor, based on the extension of the successful Travel Shenandoah Program south to Bristol, Va.

I-81 ITS Public Safety

The focus of the I-81 ITS Public Safety Technical Working Group shall be on studying, tracking, and analyzing the electronic movement of patient data to help protect and save lives. This will include evaluating communication flows, privacy issues, and the impact on incident management sites.

I-81 ITS Commercial Vehicle Safety & Operations

The focus of the I-81 ITS Commercial Vehicle Safety and Operations Standing Technical Working Group shall be on assessing the safety and operational problems posed by the unusually large volume of truck traffic using I-81, recommending ITS initiatives to help address these problems, and implementing pilot projects based on these initiatives.

I-81 ITS Construction Safety & Congestion Management

The focus of the I-81 ITS Construction Safety & Congestion Management Standing Technical Working Group shall be on assessing the safety and congestion management issues associated with major construction activities within the I-81 corridor, identifying ways in which ITS technologies might be utilized to help address these issues, and on developing a recommended series of annual investment projects designed to achieve those ends. The group will also focus on providing on-going technical oversight of the conduct of any such projects and coordinate subsequent implementation of their results in the field.

Appendix G: Status Report FY 2002 I-81 ITS Program Funding

Functional Area	Project	FY 02	FY 03	FY-04	Funding Source/Comments
System Operations	Project Management	$137,000	**$150,000**		ITS Division FY-03 TDP
	I-81 Corridor COO	$50,000			FY-02 TDP
	Salem & Bristol COO	$300,000			FY-02 TDP
	Inventory of ITS Field Assets, Communication & Infrastructure	$113,208 $25,000			FY-02 TDP ITS Division
	System Integrator	$250,000	**TBD by Districts**	**TBD by Districts**	FY-02 TDP Future TDP
	Interim Operations Center	$250,000	$250,000		State Maintenance funds
	Develop ITS Design Guidelines	$124,005 $25,000	**$25,000**		**FY-02 TDP** ITS Division FY –03 TDP
	Incident Management	$471,000			FY-02 TDP
	Incident Response & Clearance Program	TBD	TDB		Will fund development after 1/10 Mile Markers fully funded.
	1/10 Mile Markers	TBD			Need final estimate
	I-81 ITS Communications Program	unknown	TBD		I-81 PE
	Data Base Mgt. System Design & Implementation	$180,000 $100,000			FFY 2001 ITS Earmark Match by VTTI
Traveler Information	Travel Shenandoah Demo Phase III	$217,000 $150,000	$262,000 **$573,000**	**$935,000**	SPR FFY 2001 Earmark Maintenance or TDP
	Travel Shenandoah Ext. South to Bristol	$300,000 $315,000			FFY 2001 Earmark SHENTEL In-kind
	511 Signage	$55,000			FY-02 TDP
	511 Travel Shenandoah Pilot	$270,000 $220,000			FFY 2001 Earmark FY-02 TDP
	Truck/Fleet Alert Pilot	$100,000			FFY 2001 Earmark
Public Safety	Pegasus Phase II	$150,000			FFY 2001 Earmark
	ITS-Public Safety Initiative	$1,000,000 $1,000,000 +			FFY2001 Earmark TDP & Private match

Functional Area	Project	FY 02	FY 03	FY-04	Funding Source/Comments
CVO	Targeted Countermeasures for Truck-Related Hazard Locations	0	**$60,000**		**FY-03 TDP -** ITS counter measures targeted to the highest hazard locations for commercial vehicles.
	Truck Parking Availability Real-time Messaging	0	**$125,000**		**FY-03 TDP -** Joint effort to make truck parking information available in Real-Time.
	Intensified Safety Outreach through Share the Road/No Zone	0	**$40,000**		**FY-03 TDP -** Increasing driver awareness of commercial vehicle operating limits using existing outreach programs.
University "support"		$572,380			**FFY 2001 Earmark**

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Contact Information

If you have any questions or comments concerning this report please feel free to contact Stephanie Baker at the Virginia Tech Transportation Institute.

Stephanie Baker
Project Analyst
Virginia Tech Transportation Institute
3500 Transportation Research Plaza
Blacksburg, VA 24061
540-231-1524
Steph@ctr.vt.edu