Historical Development of the Travel Shenandoah Pilot Service

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Acronyms

Advanced Traveler Information System	ATIS
Changeable Message Signs	CMS
Computer Aided Dispatch	CAD
Federal Highway Administration	FHWA
Highway Advisory Radio	HAR
Intelligent Transportation Systems	ITS
Intelligent Transportation Society of America	ITSA
Lord Fairfax Planning District Commission *(now the Northern Shenandoah Valley Regional Commission)*	LFPDC
Shenandoah National Park	SNP
Shenandoah Telecommunications Company	SHENTEL
Shenandoah Valley Travel Association	SVTA
Virginia Department of Transportation	VDOT
Virginia Operational Information System	VOIS
Virginia State Police	VSP
Virginia Tourism Corporation	VTC
Virginia Tech Transportation Institute (Originally the Center for Transportation Research (CTR))	VTTI
Voice Extensible Markup Language	VXML

Introduction

The purpose of this report is to document the historical development of the Travel Shenandoah pilot project. This report will not attempt to describe in detail the entire five-year history; rather it will focus on the major events that helped evolve the program into what it is now. The history covers the period from pre-deployment in 1997, through the evolution of the service into 511 Virginia in February 2002.

By analyzing past documents, a history has been developed and is presented in chronological format in this report. This history will become the background for a formal evaluation of the new 511 Virginia service, formerly Travel Shenandoah.

There are three sections to this report. The first section is a summary of the original pilot Travel Shenandoah Service. The second is a history from 1997 to 2002, including a brief description of the new 511 Virginia service. The final section is a discussion of the evolution of the Travel Shenandoah business model.

Section I. Summary of the Travel Shenandoah Pilot Service

The Travel Shenandoah pilot service was a real-time traffic, travel condition, and tourism information service for Virginia's Shenandoah Valley. The development of the pilot service began in the summer of 1997 and went live on April 26, 2000. The pilot service ran from April 2000 through February 2002. In February 2002, Travel Shenandoah's name and logo were changed to 511 Virginia, as Travel Shenandoah became Virginia's first 511 service providing traveler information along the I-81 Corridor. The development of the service from 1997 to 2002 is discussed in the history section of this report.

Pilot Coverage Area

The area covered by the pilot service, as seen in Figure 1, stretched roughly 150 miles north to south, straddling the I-81 Corridor from the Virginia/West Virginia line in the north to the city of Lexington, VA in the south. From east to west, the coverage area was roughly 50 miles wide at its greatest point, stretching from the West Virginia border to the eastern border of the Shenandoah National Park (SNP). The area covered SNP, 14 counties, roughly 250 miles of three major Interstate routes, and some 500 miles of state primary routes (Worrall, Birdsall, and Laskowski, 2000).

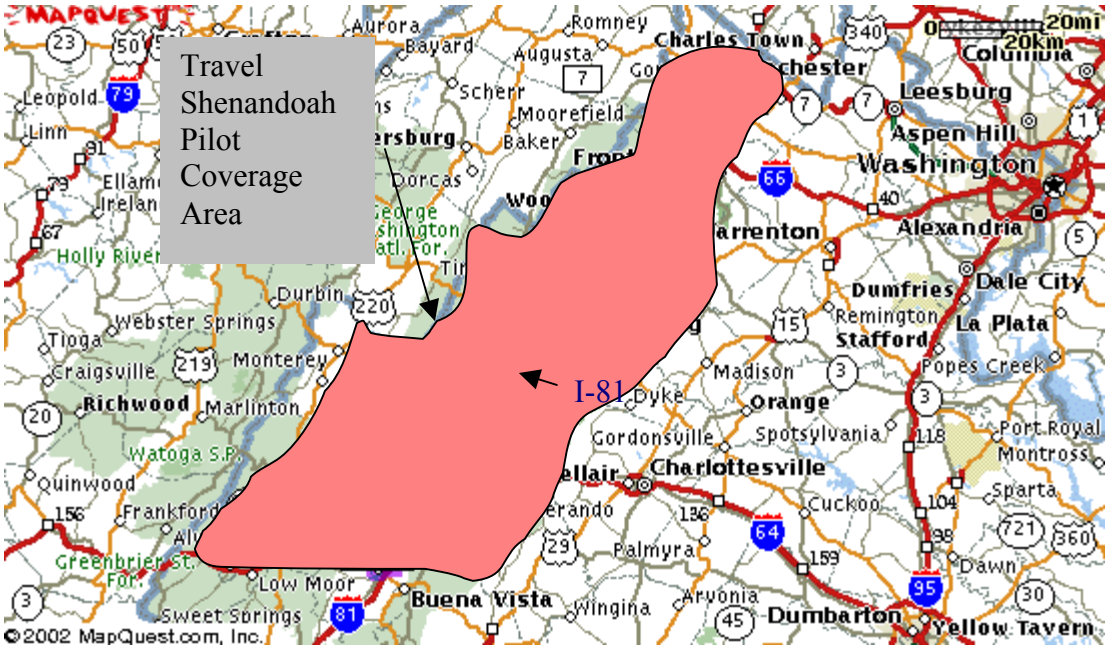

Figure 1: Map of Coverage Area

Over the course of the pilot, proposals were submitted to extend the service south to the Tennessee/Virginia line in Bristol, Virginia and north to Chambersburg, Pennsylvania. These extensions would ensure seamless service to travelers along the entire I-81 Corridor.

A proposal was also submitted during the pilot phase to extend the traveler services statewide; this proposal was called Travel Virginia. While this concept is still viable, it is on hold until the current 511 service can prove to run effectively for the entire I-81 Corridor, something that is well on its way to becoming a reality.

Sponsorship

The service was originally developed as a rural ITS operational test, sponsored by the Virginia Department of Transportation (VDOT). It was designed and developed by the Virginia Tech Transportation Institute (VTTI) and the Shenandoah Telecommunications Company (SHENTEL) as a public-private partnership. This partnership operated the service during its initial demonstration period. Slightly less than 50 percent of the total cost of the development and demonstration of the service was contributed by VDOT. The balance came from other sources, including major in-kind contributions from SHENTEL. This service also received free access to various Virginia Tourism Corporation (VTC) and Virginia State Police (VSP) databases (Worrall, Birdsall, and Laskowski, 2000).

Funding Overview of Travel Shenandoah

During the pilot, Travel Shenandoah funding flowed from both Federal and State resources through VDOT to VTTI, and then a portion flowed to the private partner, SHENTEL. As the prime contractor to VDOT for Travel Shenandoah, VTTI received 100 percent of the funding. SHENTEL, as a subcontractor to VTTI, received approximately 37 percent of the overall funding. Although no formal contract was written to determine how revenue would be handled,

Dr. Worrall of VTTI and Mr. French of SHENTEL agreed in an unofficial letter that revenues from advertising would flow to SHENTEL until December 31, 2002 or until SHENTEL had recovered its initial costs, whichever came first (C.E. French, personal communication, February 6, 2001 and R.D. Worrall, personal communication, January 9, 2001). The revenues generated through March 2002 were equal to approximately 0.6 percent of the total funding for the project. Figure 2 is a graphical representation of the overall flow of funding for the Travel Shenandoah Project from February 1999 through June 2002.

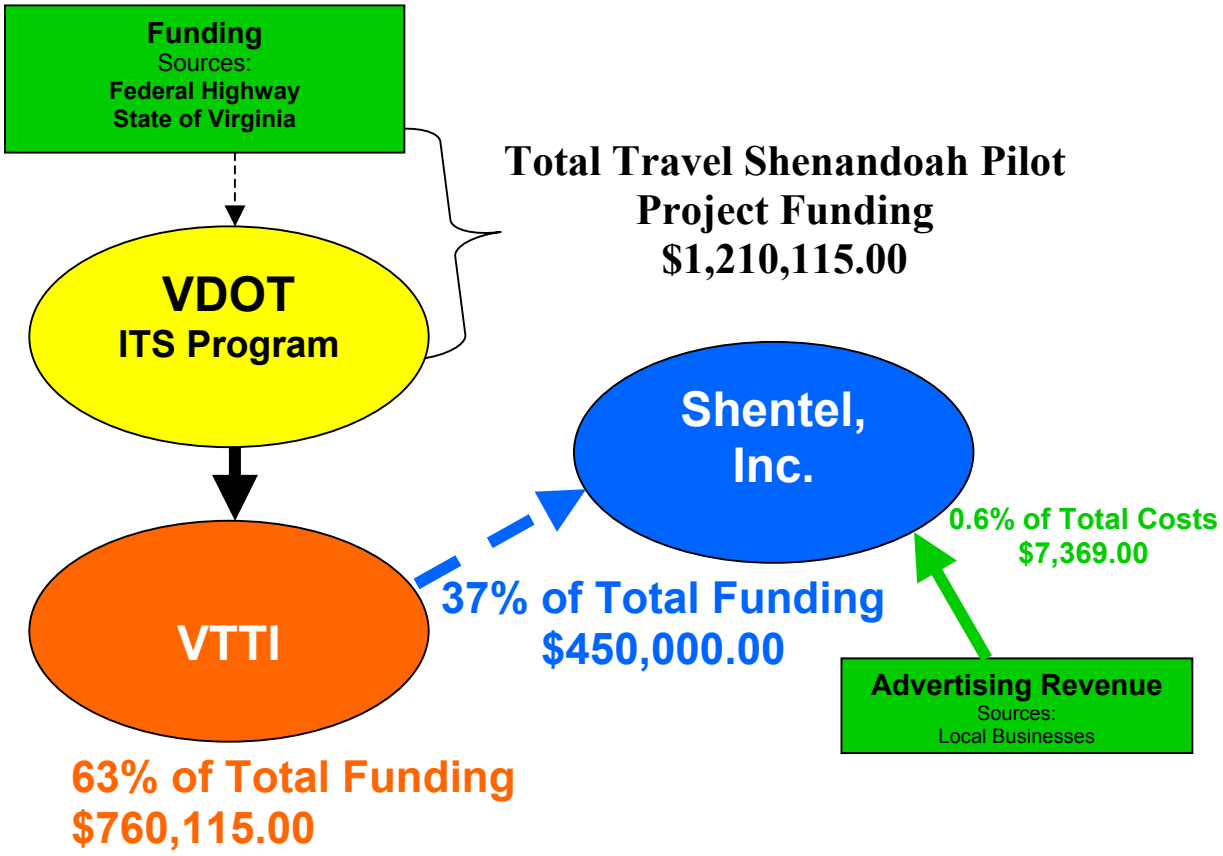

Figure 2: Overview of Travel Shenandoah Project Life Cycle Funding

Management

Overall management of the Travel Shenandoah pilot project has rested with VDOT. VDOT contracted with VTTI for day-to-day management of the Program and for specific tasks such as stakeholder and system development. In turn, VTTI sub-contracted to the private sector partner, SHENTEL, for management of sales and for the use of their infrastructure for various dissemination modes such as pagers and cable television. A diagram of this management structure is shown in Figure 3.

The management structure was developed so that when the project expanded, new sub-contractors similar to SHENTEL could be hired to sell the service in their local areas. SHENTEL operated as more than a subcontractor during the development stages of this project because it not only managed sales but also was involved in the creation of dissemination modes. Being a

telecommunications company, SHENTEL was able to work with VTTI and VDOT to test the use of pagers, phones, and cable television as potential modes of disseminating traveler information. For this reason, the initial management structure was often called a partnership, even though VTTI was the prime contractor and SHENTEL the sub-contractor. The two organizations, under the oversight of VDOT, shared responsibility for the completion of most pilot tasks.

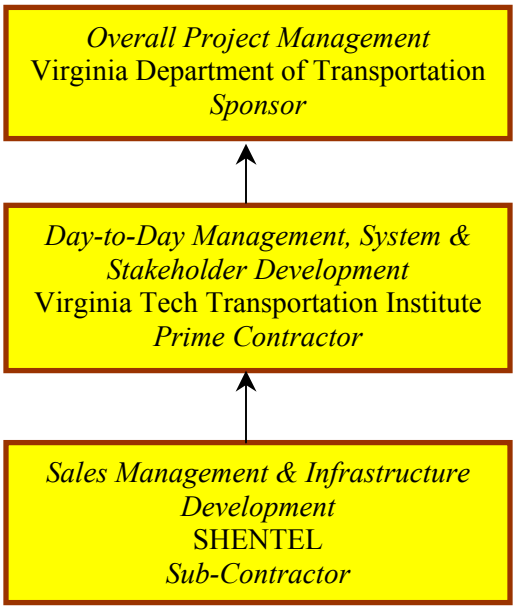

Figure 3: Travel Shenandoah Management Structure

System Inputs

System inputs were critical to the success of the Travel Shenandoah service. In order to establish a pilot traveler information service that was attractive and useful for consumers, both within the Shenandoah region and beyond its borders, the service needed to provide salient private and public information to users. In order to provide this type of content reliably and accurately, the system had two levels of collection: a regional provider (e.g. SHENTEL) collecting the private level information, and a clearinghouse (e.g. VTTI) collecting and coordinating the public information. SHENTEL added value by collecting local information on services such as gas stations, hotels, and shopping centers, and VTTI added value by collecting public data on information such as incidents, weather, and construction and merging all of the information into a data clearinghouse (Schroeder, Worrall, and Herbert, 1998). Together, SHENTEL and VTTI packaged and disseminated data that was a service to the public as well as a potentially viable product.

Figure 4 shows the data flows or inputs into the Travel Shenandoah clearinghouse. The clearinghouse was the system that received, verified, cleaned, and updated information inputs, which could then be transferred via various delivery modes to the public. The inputs were divided up by how time sensitive the information was, and thus how often it needed to be updated in the clearinghouse in order to remain accurate. Below each system input are the sources of the information. All of the time sensitive information came from VDOT (i.e., Virginia Operational Information System (VOIS), weekly updates, and traffic emails) and the VSP (i.e., Computer Aided Dispatch System (CADS)). The less time sensitive information came from a variety of sources including SHENTEL (i.e., Electronic Yellow Pages, local area phone books),

the Shenandoah Valley Travel Association (SVTA) (i.e., Regional Information), and the Shenandoah National Park (i.e., Parks and Attractions).

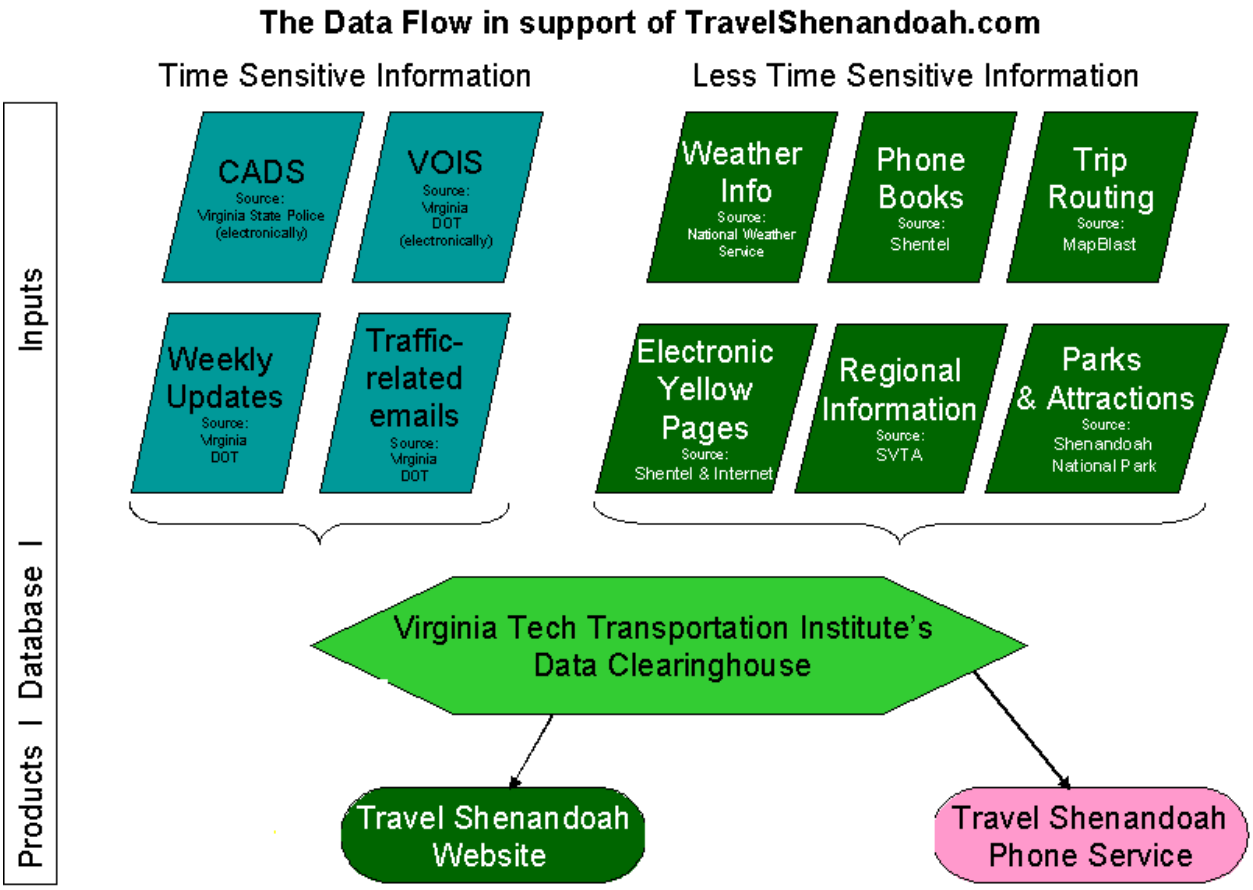

Figure 4: Overview of Data Flow through VTTI's Data Clearinghouse

User Services

The result of these inputs was a robust clearinghouse that could be used to provide tourists, prospective visitors, travelers, truckers, and local residents with easily accessible, up-to-date information on current road and traffic conditions, tourist attractions, food and lodging, traveler and emergency services, and trip routing within the pilot coverage area. Information was accessible via the Internet, voice actuated mobile or landline phones, and cable television. Plans were made during the pilot phase to extend the delivery modes to include automated links to VDOT Changeable Message Signs (CMS), cooperative Highway Advisory Radio (HAR) services, and counter-top terminals and kiosks (Schroeder, Worrall, and Herbert, 1998).

Users were able to access information on request over the phone and the Internet, or via Travel Alerts, which were designed to warn travelers of accidents or other hazardous conditions as they occurred. These alerts were provided continuously and at no charge to the user via the Internet, wireless telephones, and Shenandoah County cable television (Schroeder, Worrall, and Herbert, 1998).

The combination of user services ensured that most travelers could access the information before they traveled or while en-route. This was done to help them make better, safer, decisions about their travel, and to provide them with information on hotels and other businesses, thus supporting economic development in the pilot region. Figures 5, 6, and 7 illustrate the information on the website that was most often sought out by users.

Figure 5 graphs the unique hits on the website from its roll-out in April 2000 through March 2002. The website hits tended to ramp up in the summer, and then drop off in September before reaching an annual peak in October, which is the peak tourism season in the Shenandoah Valley.

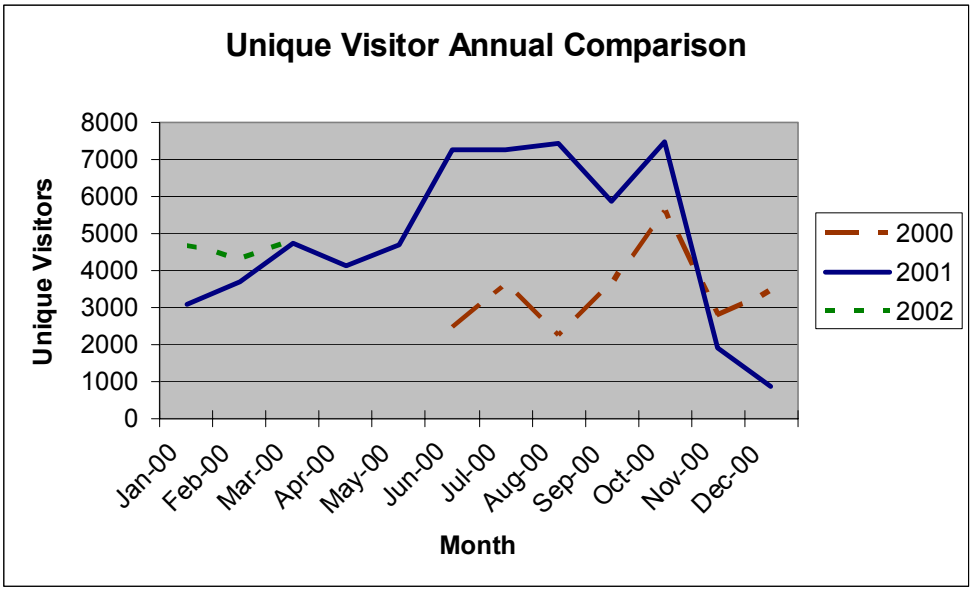

Figure 5: Unique Visitors by Year to TravelShenandaoh.com

Through tracking the usage of the website, two trends in the transportation and tourism industries for the Shenandoah Valley became apparent. Figure 6 shows these two trends: traffic and tourism. If this tracking data continues to be applied, it could be helpful in further refining the phone-tree and website structure, thus allowing the most in-demand content to be safe and easy to access. The phone system did not track the routing of users.

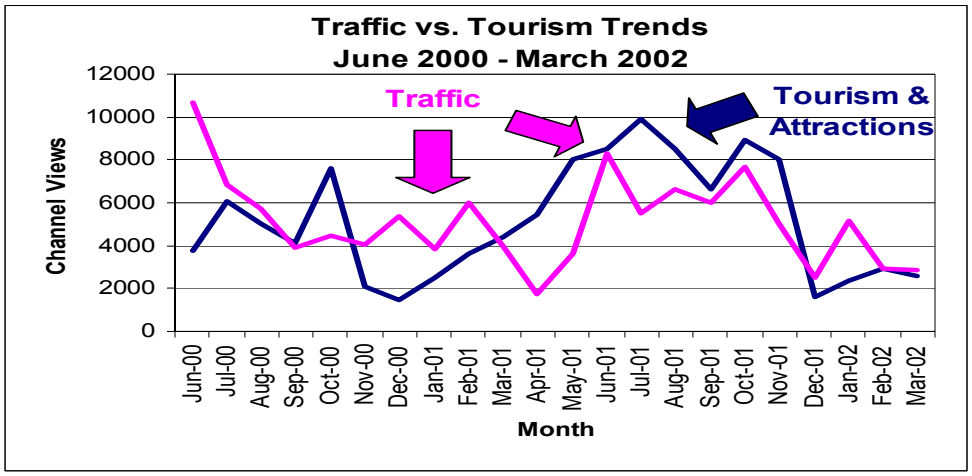

Figure 6: Tourism vs. Traffic Trends on Travel Shenandoah.com

The two trends are mutually beneficial since the peak in different months, leveling the use of the system over the year. A comparison of the peaks of the website trends and the use of the phone system has provided an interesting insight. In 2001 (the only year which has an entire year's worth of data), the phone system showed the most use in February, June, August, and November. The traffic trend on the website peaked in February, June, August, and October. Based on these loose correlations, it can be tentatively said that, historically, the phone system usage tended to follow the traffic and emergency service trend, rather than the tourism trend. This can be used in further developing the 511 phone-tree, to make it quicker and safer to use. Figure 7 graphs Travel Shenandoah's phone system calls prior to the roll-out of 511. The 511 roll-out call volume is included at the end of the history section.

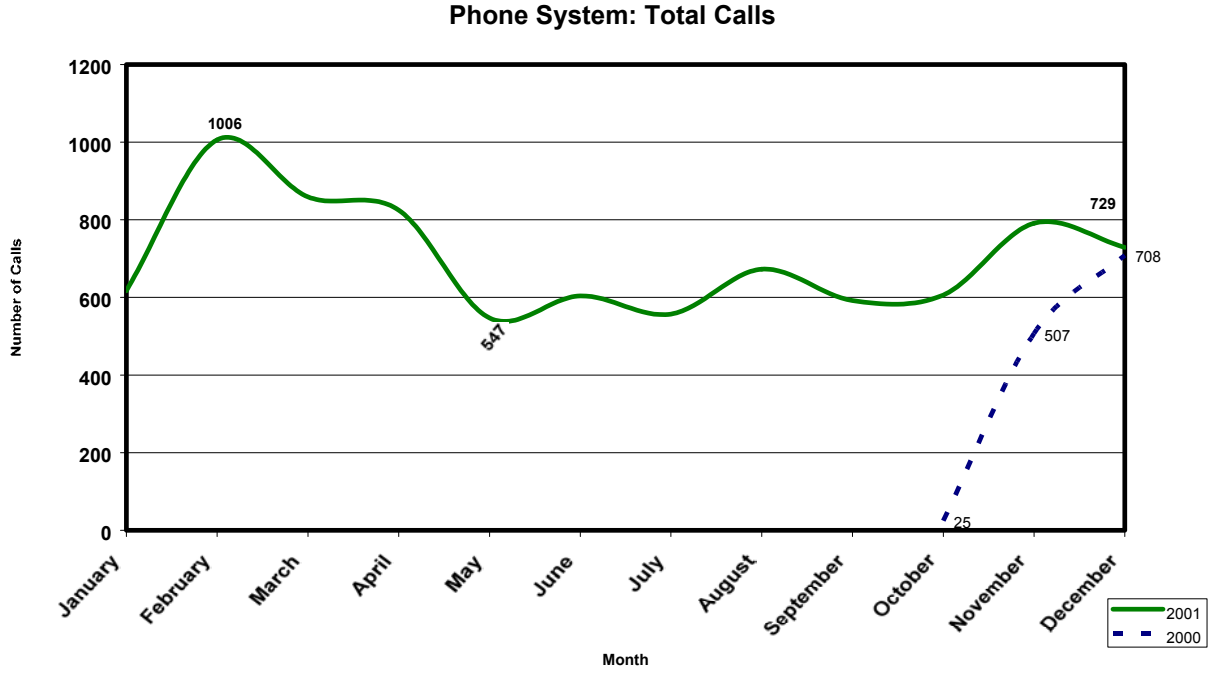

Figure 7: Total Calls to the VODAVI Phone System

In the pilot phase, Travel Shenandoah was a service that proved to be an important source of traveler information along the I-81 Corridor. With the advent of 511 Virginia, the primary improvement was a change from a hard-to-remember eleven digit phone number to a much simpler three digit number. With 511 Virginia, there is an even greater opportunity for it to expand and reach the traveling public with up-to-date, salient information that will improve their traveling experience throughout Virginia. For example, the phone system peaked at 1,006 calls in February 2001. In the first month alone, February 2002, 511 Virginia generated 6,337 calls, almost more than all of the calls in a year to the previous system. This shows not only how much the 511 Virginia system has evolved and improved upon Travel Shenandoah, but it also shows how much the public needs such a system. The next section describes the history of how the Travel Shenandoah pilot developed and evolved into what is now 511 Virginia.

Section II. Historical Development of Travel Shenandoah as a Project

The development of Travel Shenandoah pilot spans roughly five years, from when the pre-deployment study began in 1997 to when the new 511 Virginia service was initiated in 2002. This section on the background of the Travel Shenandoah pilot is written chronologically, as there is a great deal of history to document that could be helpful to others starting such programs and to those who will evaluate 511 Virginia. Each year of the program, the major events that took place, and the changes that occurred are described here.

1997: Pre-Deployment Study
At the time of the project's initiation, the summer of 1997, there was potential for traveler information services to address traveler information needs along the I-81 Corridor in the Shenandoah Valley. Interstate I-81, which passes north-south through the entire western portion of Virginia, was about to begin the addition of a third lane to both the northbound and southbound lanes of traffic. The predicted traffic congestion to result from the construction was high as there were few alternate routes. This was especially true in the region where construction was to begin first, the Shenandoah Valley, one of Virginia's top tourist areas.

In light of the construction plans, the VDOT Intelligent Transportation Systems (ITS) Division wanted to provide information on all current road activities and conditions quickly and effectively to the traveling public. VDOT saw private sector involvement as a possible way to minimize the cost of distributing the information through dynamic means such as the Internet, cell phones, and variable message signs. In the autumn of 1997, VDOT approached VTTI for support in determining who should be involved in creating an Advanced Traveler Information Service (ATIS) in the Northern Shenandoah Valley.

In the autumn of 1997, a pre-deployment study was initiated to determine the potential for ATIS to improve traveler information in the Northern Shenandoah Valley. The Lord Fairfax Planning District Commission (LFPDC) and VTTI were the leads on this study and reported to VDOT. VTTI and LFPDC worked together to pull the appropriate people and organizations together to create a traveler information system that would distribute salient and current road conditions to as many people as possible, by as many modes as possible, and at minimal cost to VDOT.

VDOT also requested that VTTI explore, in particular, how an implementation network of public and private sector entities could be created to work toward the common end of developing a

robust traveler information system that would include not only road conditions but tourism information. VDOT wanted to find out if a public-private partnership could work to the benefit of everyone involved, especially the traveling public.

VTTI's study found there was a need for improved traveler information in the Shenandoah Valley and that developing an ATIS was an avenue for addressing that need (Schroeder, Worrall, and Herbert, 1998). The study also found that involving the private sector would be beneficial and feasible, and a potential private sector partner was identified. The next step was to determine exactly who to involve in the creation of this ATIS and develop a plan to make it happen.

1998: Strategic Planning & Pilot Proposal

In April 1998, VTTI and LFPDC presented their findings from the pre-deployment study to VDOT and SHENTEL, the private sector stakeholder identified in the study as the prime candidate for involvement. The ideal platform for such a demonstration ATIS project was provided through SHENTEL's Internet service, Shenandoah.com. SHENTEL was an appropriate private sector partner for this model for these reasons: (1) it already supported various types of telecommunication vehicles in the region under consideration for the pilot, (2) it was a rural telecommunications company interested in finding ways to better serve customers, and (3) it could potentially support an ATIS that was financially and technically viable.

It was the hope of VTTI, LFPDC, and VDOT that SHENTEL would become a willing private sector participant in helping to develop and deploy an actual ATIS in the Northern Shenandoah Valley region. SHENTEL accepted the invitation to become involved; and indicated that it would move forward in partnership with VDOT and VTTI to create a web-based ATIS if stakeholder commitment and cooperation could be secured throughout the region (Schroeder, Worrall, and Herbert, 1998). VDOT supported the idea and agreed to sponsor the pilot effort.

The next step in developing the pilot project was to create a vision for the ATIS service answered such questions as: (1) what information the service would provide, (2) who would gather the information, (3) how the information would be maintained, and (4) how the information would be disseminated. VTTI offered to hold a strategic planning session to develop the vision. VTTI worked with VDOT to identify the primary stakeholders whose investment would be essential in the planning session. This group would become the Advisory Board for the pilot.

After careful consideration, policy and program representatives from VDOT, VTTI, SHENTEL, LFPDC, and the VTC were invited to the planning session. VDOT was invited for obvious reasons, being the initiator and sponsor of the project as well as the entity that would provide the critical construction and road condition information into the system. SHENTEL was the private partner, LFPDC had been involved in the pre-deployment study and would continue to help in the identification and development of regional stakeholders, VTC was the state tourism entity that could help develop the tourism side of the system, and VTTI would facilitate the whole process, including data and project management.

The only primary stakeholder missing at this point in the process was VSP. While later into the project VSP would become a primary stakeholder, at this point in the project it was believed that

VDOT would be able to provide all of the incident information that was necessary for the system.

In June 1998, a two-day strategic planning session took place in Blacksburg, Virginia. During this session, the concept of a statewide ATIS was discussed as well as how a demonstration project in the Northern Shenandoah Valley would fit into a statewide traveler information framework. VDOT did not want to create a system that would conflict or clash with other traveler information systems being created in Washington, DC and Hampton Roads. This was a rural traveler information system, the first of its kind in Virginia and one of a few being developed across the nation and it needed to be integrated statewide. Figure 8 provides a clear overview of the statewide concept that was developed at the planning session.

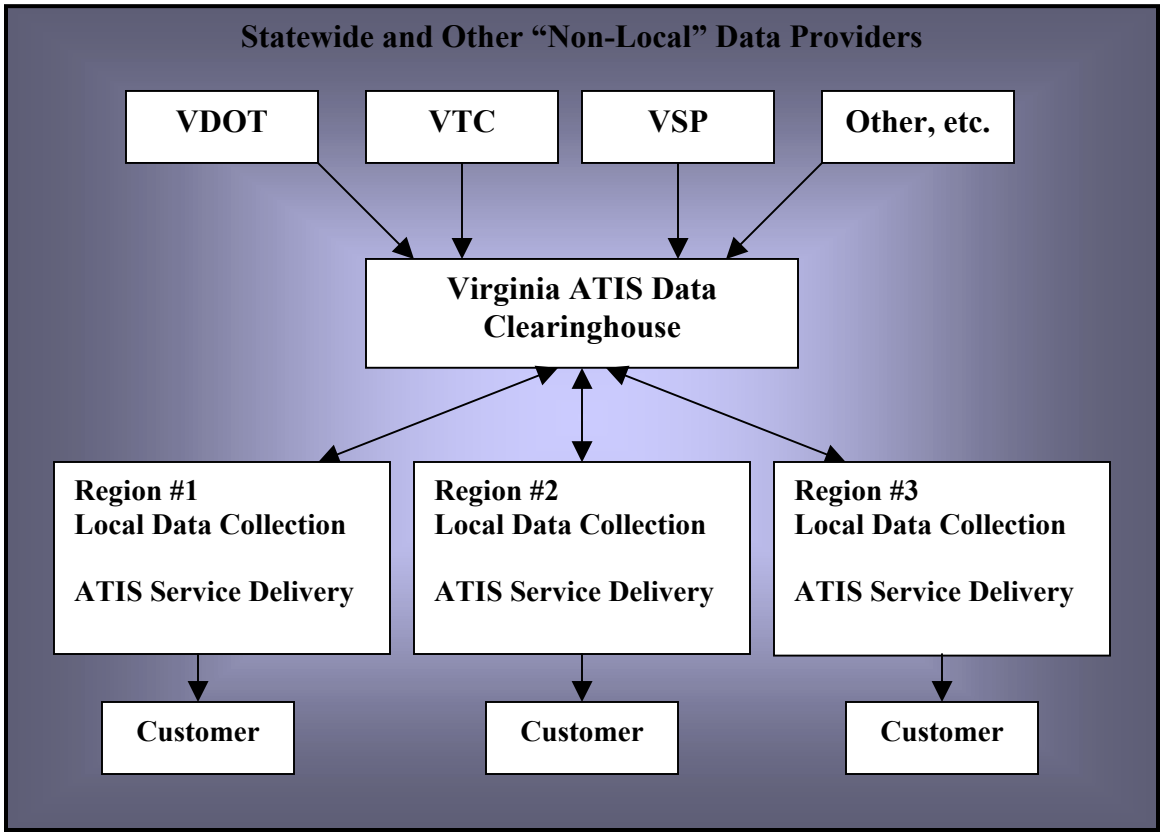

Figure 8: Statewide ATIS Franchise Model

The statewide ATIS concept centered upon the creation of a clearinghouse of salient information collected from non-local information providers (e.g. VDOT, VTC, and VSP), which could then be tapped and enhanced by local information providers (e.g. SHENTEL). In this model, each regional franchise would collect salient local data (such as information on hotels and eateries) of use to other regions in return for receiving information from the clearinghouse that they could provide to their customers. The clearinghouse would collect salient information (such as incidents and road conditions) from state entities such as VDOT, VSP, and VTC. The clearinghouse would pull together all local and state information into one master database that all the franchises and state agencies could tap into and use.

The pilot project was to serve as a model for how to deploy an ATIS in rural areas within the context of a statewide framework. Figure 9 shows how the statewide concept could be broken down for the pilot. In this figure the regional service provider role was fulfilled by SHENTEL, which was chosen for its substantial existing investment in community information provision in the Northern Shenandoah Valley. VDOT, VTC, and VSP were to fulfill the role of non-local information providers, and VTTI was to fulfill the role of information clearinghouse, acting as the go-between in establishing the inter-institutional relationships (strategic partnerships, contracts, information protocols, etc.) necessary for system success. Again, at this point in time (i.e., strategic planning session) VSP was not included; they are shown here because they soon became critical to the process as information providers.

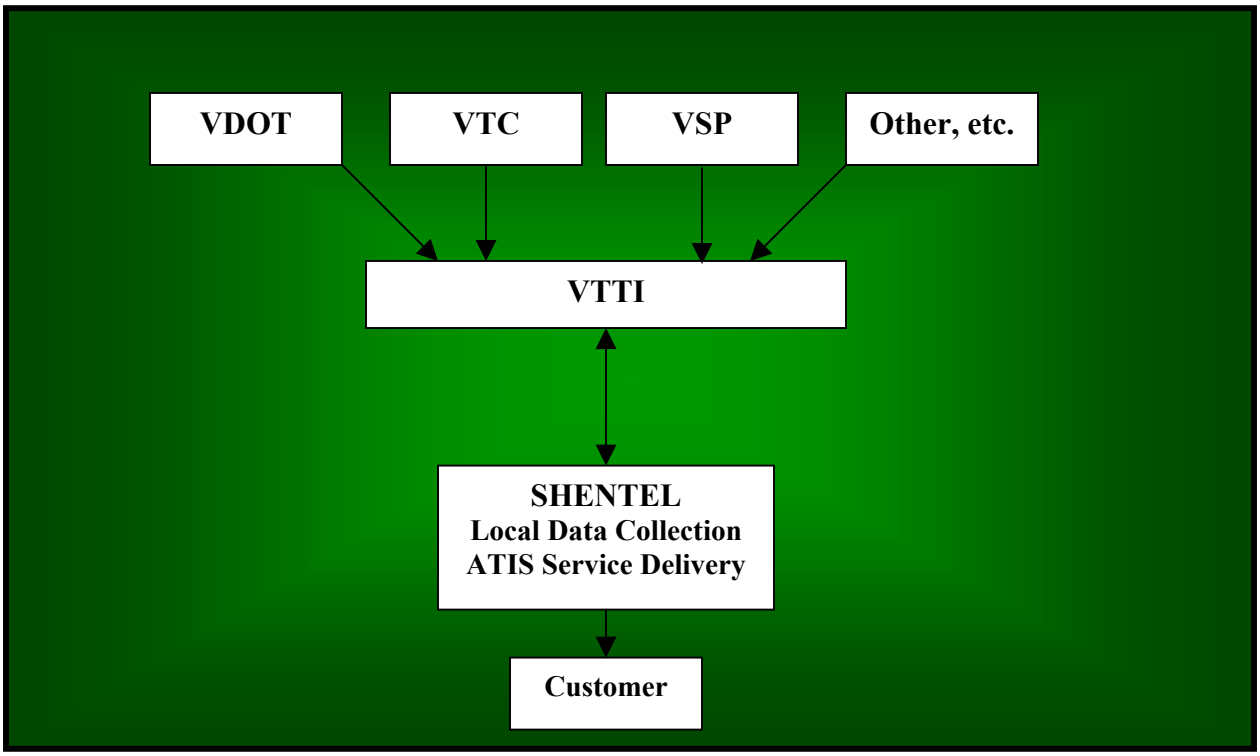

Figure 9: Pilot Project ATIS Model

Immediately following the strategic planning session, VTTI and SHENTEL presented a proposal to VDOT for the creation of an ATIS in the Northern Shenandoah Valley. The Travel Shenandoah pilot project concept was thus created during the two-day strategic planning session in June 1998. The pilot was named Travel Shenandoah after Virginia's Shenandoah Valley.

The Travel Shenandoah pilot was discussed in the strategic planning session as the beginning of a larger statewide vision for traveler information. The results of the strategic planning session, along with discussions with VDOT and SHENTEL, provided the framework for the subsequent Travel Shenandoah and Travel Virginia project proposals submitted by VTTI to VDOT. The Travel Virginia project was an attempt to test the feasibility of the vision for a statewide system that would support regional systems such as Travel Shenandoah.

VTTI's proposal for managing the Travel Shenandoah pilot project included the support of SHENTEL as a partner and subcontractor. The proposal had five specific objectives:

1. Demonstrate the feasibility of implementing an ATIS in a rural area through a public-private partnership model.
2. Incorporate capacity for growth as demand/usage evolves and technologies change.
3. Include a carefully thought-out marketing approach to maximize user awareness.
4. Leverage a functional design capable of accepting high data input loads and providing a streamlined user interface.
5. Serve as a functional model for the design and implementation of similar systems.

VDOT accepted VTTI's proposal for the pilot project and work began in earnest in January 1999.

1998 was a year of stakeholder identification and concept development. The next year of the pilot project focused on building stakeholder relationships, identifying content for the service, and developing the systems that would collect, manage, and disseminate the information. Regular meetings between VTTI and SHENTEL took place, and the basic issues of what should be in the system, who could provide it, and who should collect it were addressed. These discussions led to the involvement of, among others, VSP, SVTA, and SNP.

1999: Stakeholder, Content, and System Development

In this pivotal year, the first step for the VTTI/SHENTEL partnership was to determine what content needed to be in the system. The pre-deployment study generated a list of the key services that travelers desire. The list was developed from a Federal Highway Administration (FHWA) study of traveler wants and needs as well as interviews conducted throughout the Northern Shenandoah Valley with Chambers of Commerce and Tourism Agencies. The list of key sources included: Travel Alerts, Traffic, Travel Conditions, Travel Services, and Tourism. From this list of services, actual types of content had to be fleshed out. For instance, Travel Services had to be broken down into categories such as hotels, motels, restaurants, and gas stations.

To secure data for each type of service and to manage it appropriately, relationships had to be facilitated and services bartered. It was VTTI's job to make sure that content providers understood the benefits they would receive from a system that would eventually reach a large number of travelers. VTTI was successful in securing all of the critical relationships and thus the sources of content. The most critical of these was access to the VSP CADS. CADS provides the most up-to-date incident and accident information, as VSP are typically the first responders to an accident.

Once the relationships were formed and agreements to share data were secured, VTTI had to ensure that the information would be managed at the level of timeliness required. The guiding principle for all of the data was that it needed to be salient, accurate, and timely. VTTI had to be sure that each content supplier could provide data in an appropriate and timely manner. In the case of tourism information, the content providers were VTC, SVTA, and SNP. This information did not need to be updated constantly, only periodically. In the case of travel information, the content provider was SHENTEL. As a telecommunications company, SHENTEL had access to the electronic yellow pages and could regularly input and update basic yellow page information

on hotels, gas stations, and other businesses along the corridor that catered to travelers. In the case of traffic and incident information, the content providers were VDOT and VSP. The information they provided had to be as up to date as was technologically possible.

The relationship between VDOT and VSP was critical to the success of the clearinghouse concept and, in turn, Travel Shenandoah, because travelers perceive incident information as the most critical and salient. If the incident information could not be kept up-to-date then the system would not be an improvement over other tourism sites already available to travelers in Virginia. Travel Shenandoah was unique was that it combined traffic and tourism sources of information into a user-friendly format that could be accessed in numerous ways for both pre-trip and en-route planning.

While all the relationships were being facilitated to secure the content for the system, the clearinghouse and delivery modes were being developed and enhanced. The technology for the clearinghouse was largely done in-house at VTTI. The technology work on the delivery modes was done by VTTI and SHENTEL in partnership, and the lead was taken depending on the mode being developed.

1999 was a year of building the foundations of partnerships, content, and systems. Travel Shenandoah was taking shape as critical partners agreed to become involved, and ways to capture and disseminate their information were being identified. The next year would be critical for testing and rolling out the system to the traveling public.

2000: System Testing and Roll-out

During the first three months of 2000, the partners were focused on preparing for the roll-out of Travel Shenandoah, including the web and phone delivery modes. Preparations were also made to bring the Travel Shenandoah Operations Center online, which included hiring dispatchers to man the Operations Center at VTTI during working hours. Having an Operations Center helped to ensure that information was properly cleaned and posted on the site on a regular basis.

In early 2000, the clearinghouse began to receive VOIS emails and VTTI's staff of dispatchers began to make periodic phone calls to VSP to check on incidents and accidents on the corridor. Once these data sources were in place, the system had been tested, and dispatchers were on hand during working hours, Travel Shenandoah was ready for roll-out. VDOT, VTC, SHENTEL, and VTTI organized a ribbon cutting ceremony at James Madison University that was followed by speeches and a formal demonstration. As a result of the partners' hard work and commitment over the three previous years, the service went live to the public at the roll-out on April 26, 2000.

After the service went live, the focus shifted from system preparation, testing, and roll-out, to determining rights over the system. A formal contract was never established dealing with these issues, only a letter between Mr. Christopher French, President of SHENTEL, and Dr. Richard Worrall of VTTI. The letter dealt with ownership rights over the clearinghouse and software developed by VTTI, as well as the licensing fees others would be charged who used the software. The letter was a guide to the partners in the absence of a formal contract.

In September 2000, VTTI submitted the Travel Virginia Final Report to VDOT. The report summarized the results of a study to assess the feasibility of expanding Travel Shenandoah from a pilot rural ATIS service in the Northern Shenandoah Valley into a comprehensive statewide service covering the entire Commonwealth of Virginia. The report concluded that the concept of a statewide service was both feasible and potentially of considerable value to the traveling public and to Virginia. A series of recommended Travel Virginia regions were described in the report along with discussions of the major functional, technical, and institutional issues associated with the implementation of a comprehensive statewide service. A four-year implementation program for Travel Virginia was outlined in the conclusion of the report. Though Travel Virginia has not been implemented, the content of the report is comprehensive and may be useful in the future if the service expands across the state (Worrall, Birdsall, and Laskowski, 2000).

In October of 2000, Travel Shenandoah was brought under the umbrella of the I-81 ITS Program. The I-81 ITS Program is a framework for ongoing coordination, planning, design, and implementation of ITS Investments along the I-81 Corridor in Virginia. Numerous stakeholders are involved in the Program including VDOT, VSP, DMV, VTTI, and ITS Consultants working on the Corridor. VDOT and VTTI wanted to bring Travel Shenandoah into the Program because it represented a good example of how stakeholders from the public and private sectors could work together to plan and implement ITS projects along the I-81 Corridor.

In the I-81 ITS Program forum, discussions began about 511, the new national traveler information number. A project was submitted through the I-81 ITS Program funding process entitled "Travel Shenandoah: 511 Pilot Implementation." The purpose of the project was to plan, implement, and assess a pilot 511 telephone-based traffic and travel conditions service for the I-81 Corridor, fully integrated as part of an expanded Travel Shenandoah service. The project was presented to the I-81 ITS Program's Policy Committee in December 2000 and approved for funding (Worrall, Spaulding, and Herbert, 2000).

2000 was a year of testing for the initial pilot Travel Shenandoah while preparing for its future expansions. The leadership of Travel Shenandoah never ceased looking for opportunities for new partnerships, content, funding sources, or services to the public. Creativity and flexibility kept the project moving forward.

2001: System Operations

In 2001, the pilot was operational and relationships were solidified. The Clearinghouse established its first automatic access to VSP CADS. The data provided through CADS was essential to the success of Travel Shenandoah because it was the most accurate and timely of any accident data available.

In 2001, the Clearinghouse was given direct access to VDOT's VOIS information. This access was important because VDOT supplied VTTI with information on construction and road conditions. Though the data had been coming in via e-mail to VTTI, having a direct VOIS connection made the information flow in an even more timely manner than before.

SHENTEL also made significant progress, lining up the wireless and wire line providers in preparation for the shift to offering 511, the new national traveler information number. This was

critical to the success of 511 Virginia and to the projects' ability to secure ongoing funding. SHENTEL's work was part of a feasibility report to show that it was possible to implement 511 along the Corridor. SHENTEL's work to secure the commitment of the wireless and wire line providers was essential to this feasibility report and, in turn, 511 Virginia.

Another critical aspect of the feasibility report was VTTI's ability to line up the appropriate technology resources and secure a relationship with TellMe, Inc. The company TellMe, Inc. allows others to use their infrastructure to quickly deploy sophisticated voice applications without having to purchase their own additional infrastructure (TellMe Inc., 2002). In order to take advantage of the VXML software TellMe uses, VTTI's programmer, Brian Daily, undertook training and became proficient in VXML. Using the voice application network TellMe offered, VTTI began building and preparing for deployment of Virginia 511.

In preparation for 511, Travel Shenandoah began to provide traffic information to the entire I-81 corridor in Virginia. Tourism information was not yet populated in the clearinghouse, but traffic, incidents, and weather were available. VDOT wanted 511 to be rolled-out for the whole corridor; thus, VTTI and SHENTEL made sure traffic information was available for the entire corridor in October.

In November, the 511 feasibility report was completed by VTTI and SHENTEL. Soon after the release of the report, on November 16, 2001, the VDOT Commissioner approved the development of the current Travel Shenandoah system into 511. Verizon was the only company of the fourteen wire line companies that did not sign on.

In December, the official roll-out date was chosen and the service was re-named 511 Virginia. The URL http://www.511Virginia.org/ was chosen. This URL currently points to: http://travel.vtti.vt.edu/travelvirginia/production/, as the production URL for the site. SHENTEL wisely purchased the 511Virginia.org URL in July 2001, believing it might be needed once the feasibility report was completed. SHENTEL and VDOT agreed that VDOT could purchase the URL back from SHENTEL after their two-year contract expires. In December, the VDOT sign for 511 was finalized and production of the 511 signs began.

Also during 2001, VTTI's Human Factors group published a usability report of findings on the Travel Shenandoah website and the phone system. The report detailed the aspects of the service that users found difficult to use and those they found helpful and easy to use. The report led to numerous improvements in the phone and web systems, which will need to be repeated now that the system has been altered to ensure it continues to be easily accessible.

2001 was a year of operation and preparation for the change to 511 Virginia. The VDOT, VTTI, and SHENTEL team's flexibility enabled them to take advantage of the opportunities and not balk at the changes needed to further evolve the program. Dr. Worrall's leadership and creativity over the previous years enabled the Travel Shenandoah team to be in position to take advantage of the opportunities presented by 511.

2002: 511 Virginia

2002 is the advent of 511 Virginia and should prove to be a year full of opportunity and continued success and progress. Several major events have already taken place.

In January 2002, VTTI's Operations Center began running 24 hours a day, 7 days a week. Having a 24/7 Operations Center was a huge step for VTTI as it ensured constant updating of the clearinghouse feeding 511. In January, the VXML software development was also completed, and funding was received for the pilot phase of 511. Appendix B shows a diagram of the routing of a call for the 511 Virginia System. Appendix C is a summary of the recommendations from the Human Factors Group Usability Reports. Appendix D lists all of the personnel who have worked on the Travel Shenandoah Pilot.

On February 15, Travel Shenandoah officially became "511 Virginia" at a roll-out held in Roanoke, Virginia. Secretary of Transportation Whitt Clement made the first official call on the system and it was a success. Subsequent expansions of the service after the 511 roll-out will not be included in this pilot history, but will be recorded in the evaluation of 511.

Although the 511 roll-out marked the end of the Travel Shenandoah pilot project, it by no means ended the story. It is the hope of all those involved in the project that 511 Virginia will continue to take advantage of opportunities to grow and improve the system into the future. The evaluation of 511 should help to assess if it is in fact successful.

Figure 10 presents a graphical a summary of the first quarter of phone calls into 511 Virginia. Already in the first three months after the roll-out, the 511 system has exceeded a year's of use of the previous phone system.

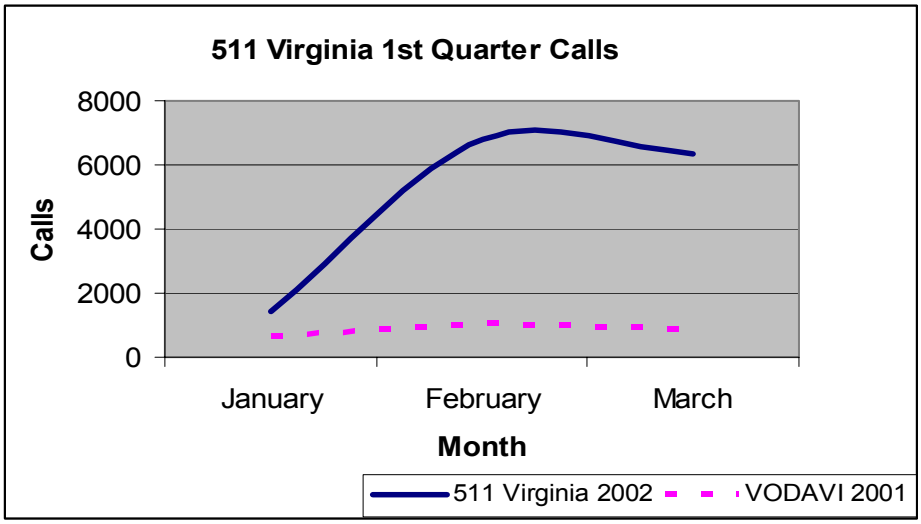

Figure 10: First Quarter Calls to 511 Virginia

Section III. The Travel Shenandoah Business Model

The business model has been in constant transition as the partners in the Travel Shenandoah Project dealt with dramatic changes in the economy at large, as well as the varied perceptions about the role Internet advertising would play as the medium matured. The Travel Shenandoah Project, seen in the judicious light of a historical record, was bold in its estimations of what the possible revenues could be. However, the revenue estimates made in 1998 were in keeping with the industry forecasts of the dot com era. In 2002, however, the same revenue estimates (in the stark light of a more realistic economy) seem far more enthusiastic than realistic. One of the goals of the project was to adapt with technological changes, which is a difficult challenge for any company. Travel Shenandoah did this by adjusting its business model. It has slowly transformed to reflect the changes in the national economy, the medium it operates in, and in its revenue expectations. This section gives a closer look at the different aspects of the business model and how it has evolved to reflect these changes. Figures 11 and 12 graphically represent the initial and revised Travel Shenandoah business models.

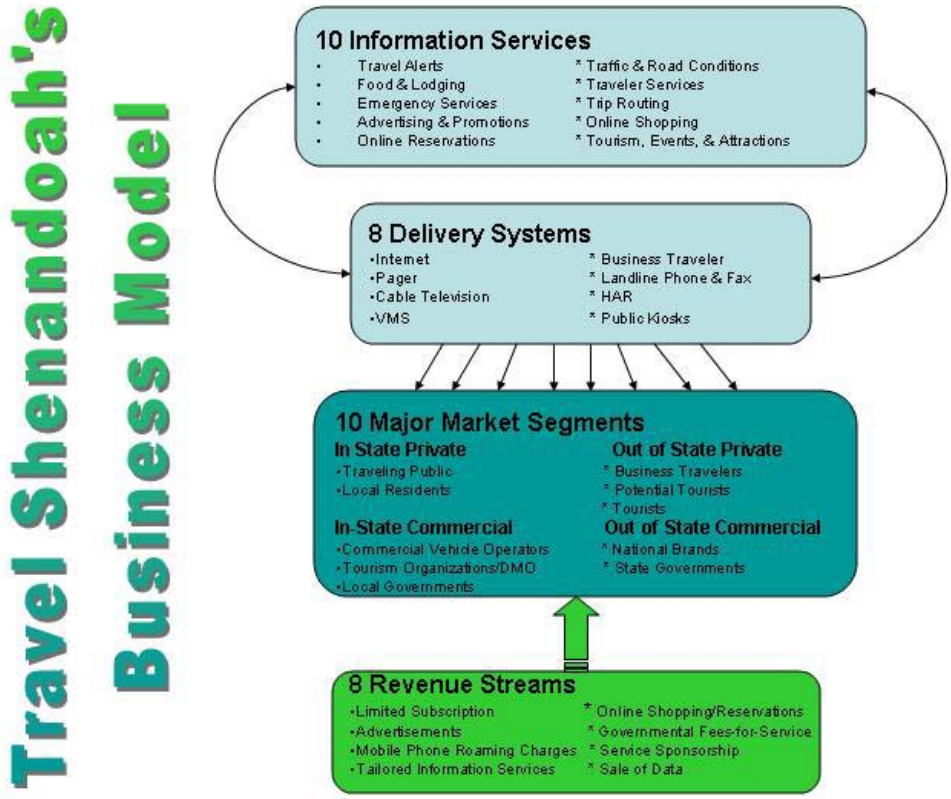

Figure 11: Initial Travel Shenandoah Business Model

Information Sources

The information sources have remained relatively constant, despite changes in all of the other areas of the business model. This is due to the fact that the users' needs were well researched and the information provided to the public has remained of value. With the exception of online shopping, all of the proposed information services have become a part of the current working

business model for Travel Shenandoah, with more innovative services being developed based on user demand.

Delivery Methods

Unlike the information sources, the delivery methods have undergone multiple changes due to the short life cycles of the different technologies. The pager is a prime example. It is no longer considered a delivery method for Travel Shenandoah due to the increased use of text capable cell phones and the decreased public usage as the product reached obsolescence. Also, due to a saturation of website offerings from tourism businesses and organizations, online reservations and shopping through Travel Shenandoah's website were also abandoned as delivery methods. The website usage also showed that these were not services users wanted from a service like Travel Shenandoah. The Internet, landline and cell phone, VMS signs, and cable television delivery methods are all a part of the current service, and efforts are continuing to develop the public kiosks. The most noticeable change in delivery methods was the shift from being a primarily web-based service to a 511 Virginia phone-based service.

Market Segments

The market segments remain intact; these segments have always included all travelers, and access for these travelers has increased as cell phone and Internet use has become more prevalent throughout the population. However, neither the initial nor the revised business model have attempted to segment and target particular markets. As the system changes to being more phone-based, and information continues to be collected about how users use the website and the phone, a clearer target market can be defined, and a clearer marketing plan can be implemented.

Revenue Streams

Rather than rely on a single source of revenue, the initial business model specifically called for several different delivery systems, which in turn generated several different revenue streams. This has remained the greatest strength of the Travel Shenandoah business model. As of the writing of this history, both the subscription model and the advertising model have proven to be inadequate means of generating sufficient revenue to fully sustain an ATIS project. Also, the possibility of generating revenue through mobile phone roaming (or pay-per-call) charges has dissipated as the cell phone market has matured, and the National 511 Policy Committee has decided that the 511 call should cost "no more than the cost of a local call to the user" (511 Deployment Coalition, 10). The model of generating revenue from a monthly surcharge to every consumer's telephone bill is not an option for funding phone systems like 511 and Travel Shenandoah (511 Deployment Coalition, 9).

A 2001 Gallup Poll completed for the Intelligent Transportation Society of America, and distributed in an ITSA brochure called, "Market Research: Here's What Consumers Wants", shows that an ATIS phone service is seen as public service, which the public is not willing to pay for on a per-use basis. In fact, the 511 Deployment Coalition has gone so far as to remind states considering building a system like Travel Shenandoah/511 Virginia that, "in order to provide at least the basic level of service desired, the public sector must expect to fully pay most or all costs. All business models, including those expected to generate their own revenue will require some level of funding from the public sector" (511 Deployment Coalition, 7).

On the web, online shopping was eliminated as an offering due to a lack of hits and public interest in the selection offered. The only initial revenue streams that remain viable are tailored information, wholesale of the data, and large corporate sponsorships. The current level of advertising revenue has increased with the roll-out of the 511 Virginia phone system, but is still less than 1 percent of costs. However, due to currently being too small to attract regional or national sponsorships, Travel Shenandoah pursued only local sales of advertising, and as such, the sponsorship and multiple revenue source portion of the business model remains untested, and the business model as a whole remains untested. Growth will be required to truly test a hybrid advertising/sponsorship and data sale model. It is the 511 Deployment Coalition's opinion that in order to be successful enough to sustain operations of an ATIS business model like Travel Shenandoah/511 Virginia, a regional or national footprint with significant usage will be required to ask the required sponsorship rates needed to fully support the system. (511 Deployment Coalition, 14) Figure 12 shows the revised business model for Travel Shenandoah.

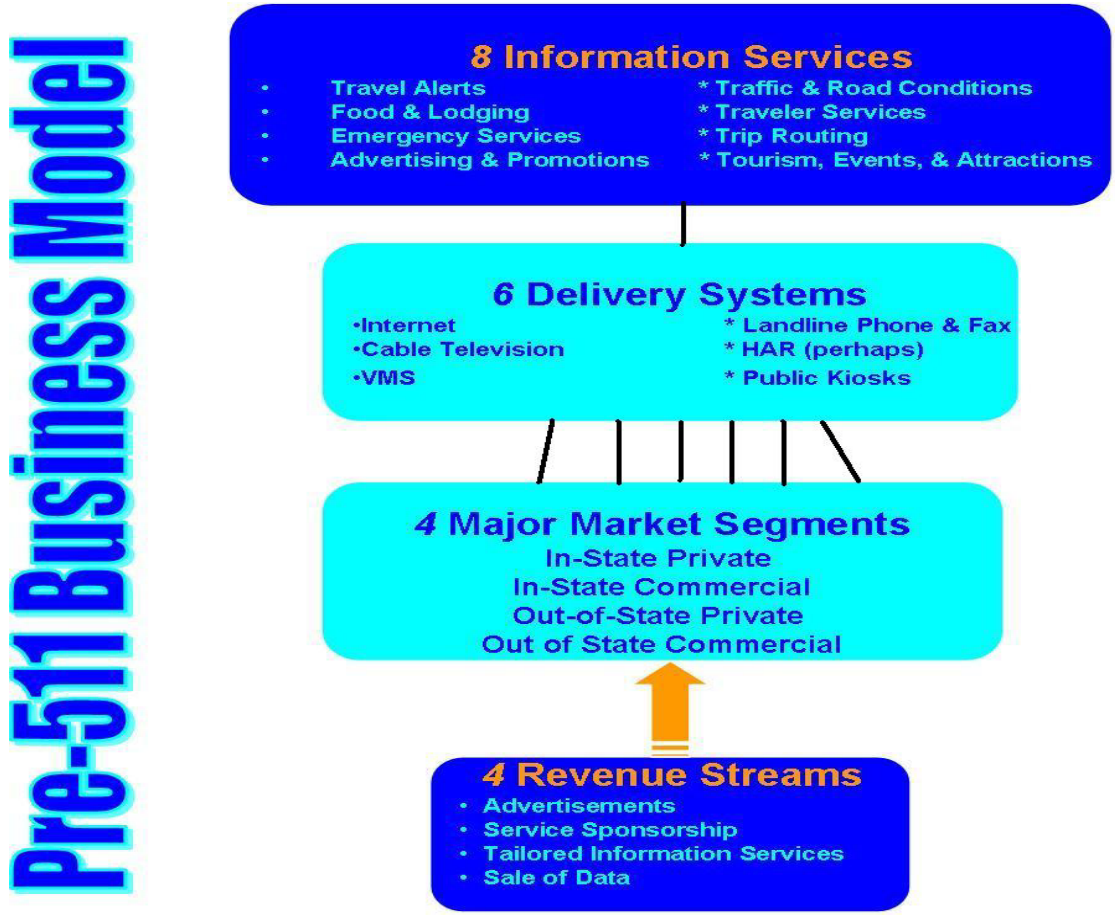

Figure 12: Revised Travel Shenandoah Business Model

In order to better understand the actual flow of funding required to develop an ATIS system like Travel Shenandoah, it might be helpful to consider the cumulative effect of the funding flows. Table 1 lists the funding inputs received from VDOT for the Travel Shenandoah Project beginning in February 1999 and ending in June 2002. The black blocks indicate the duration for which the funding was intended to last. There is some overlap between funding because the

development of the later phases occurred in conjunction with previous phases, or the costs of development exceeded that of a single phase's funding and more funding was requested. Immediately following it is Figure 13, which shows the cumulative affect of these in-flows and their consequent depletion.

Table 1: Travel Shenandoah Funding Inputs by Phase

Cumulative	February 1999	October 1999	July 2000	July 2001	September 2001	June 2002
Phase 1a	$84,465.00					
Phase 1b	$330,000.00					
Phase 2		$645,650.00				
Phase 3					$150,000.00	

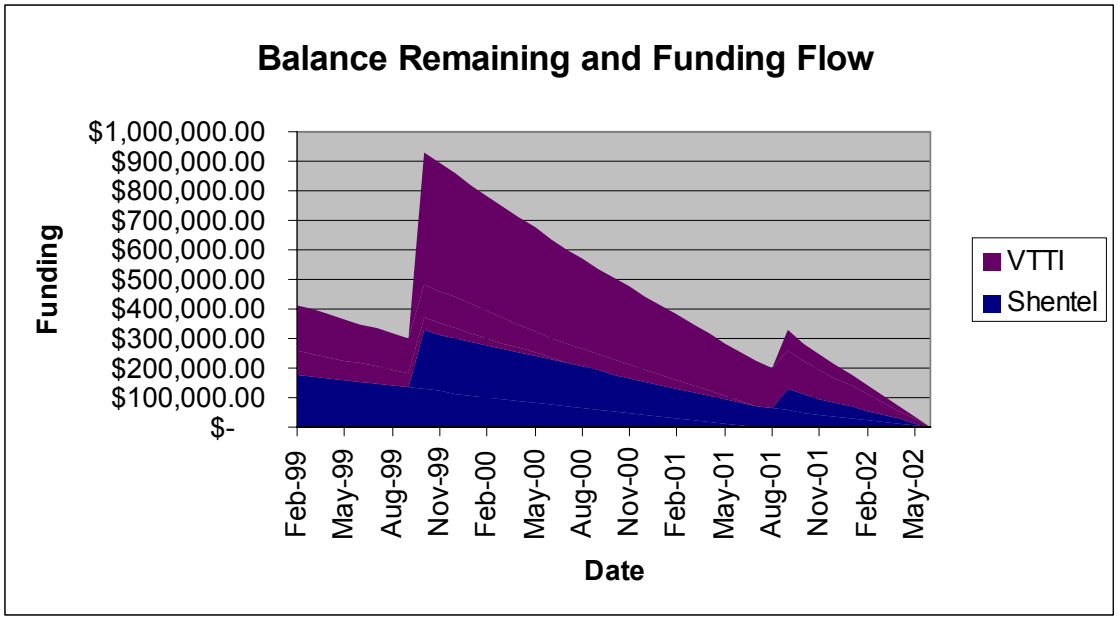

Figure 13: Balance Remaining and Funding Flow for Travel Shenandoah Project

Table 1 and Figure 13 show the costs of developing an ATIS model like Travel Shenandoah. However, one of the goals of the project was to attempt to build a self-sustaining business model. Currently, only the sale of advertising space in the Shenandoah Valley and the southern expansion has been undertaken. To date, the revenues generated have flowed only to SHENTEL, as per the unofficial personal communication between Mr. Worrall and Mr. French, and have yet to show potential to sustain the costs of the required sales force. Figure 14 graphs all revenue generated by sales of ad space on Travel Shenandoah's website. The data is summarized through June 2001 and recorded monthly thereafter.

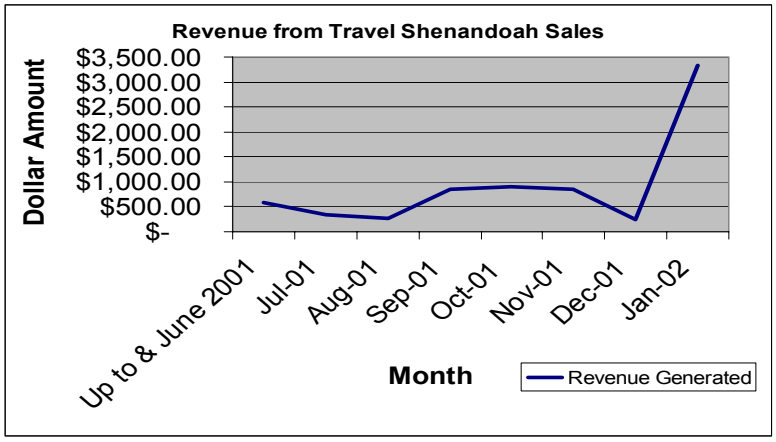

Figure 14: Revenue Generated by Advertising Sales for Travel Shenandoah.com and 511 Virginia

The spike in January 2002 is due to the rollout of 511 Virginia's phone system. SHENTEL's sales force closed sales based on a February 2002 roll-out of 511 Virginia. However, at this rate and taking into account the costs of sustaining a sales force, SHENTEL may never completely recover their costs.

The business model has been revised to reflect the changes in the environment and user demands, but more growth will be required in order to test the initial vision of the hybrid advertising/sponsorship model. Eventually, with a more defined business model that reflects the shift of emphasis to the phone system and user needs, the hybrid advertising/sponsorship model may yet prove to be the most successful of all business models tested in ATIS programs.

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Appendix A: Travel Shenandoah Timeline

August 1997-March 1998

- Pre-deployment Study with LFPDC to determine what private partner should be involved and what issues were most critical to potential users of an ATIS. Focus groups and interviews were conducted with representatives from the SVTA, George Washington National Forest, Luray Caverns, SNP, Clark County, Shenandoah County, and Virginia Inland Port, among others.

April 1998

- VTTI and LFPDC present findings from pre-deployment study to VDOT and to the private sector stakeholder identified in the study, SHENTEL.

May 1998

- Identification of participants to invite to a Strategic Planning Session concerning ATIS.

June 1998

- Strategic Planning Session conducted to create the conceptual framework for Travel Shenandoah. Participants included: Greg Cross, LFPDC; David Ferguson and Hank Zimmerman, SHENTEL; JR. Robinson and Dennis Morrison, VDOT; Dick Worrall, VTTI; Pat McMahon and Meriweather German; VTC. Aaron Schroeder and Stephanie Baker of VTTI facilitated the session.
- Travel Shenandoah Phase I proposal submitted to VDOT.

July 1998

- Proposal "Extension of the Shenandoah Valley ATIS Demonstration Project to Chambersburg, PA" submitted to I-95 Corridor Coalition for funding.

September 1998

- VTC agrees to participate in the project and estimated that contribution of access to their web-site data (http://www.virginia.org) along with the staff and resources necessary to support the site was approximately $275,000 annually.

October 1998

- Development of mock website began and was done to demonstrate the system concept.
- First meeting with Andy Dawson of the SVTA. Andy agreed to represent SVTA on the Advisory Board.

November 1998

- First meeting with Lyn Rothgeb of the SNP. Ms. Rothgeb agreed to represent SNP on the Advisory Board.

December 1998

- Shenandoah Valley ATIS Advisory Committee meeting in Edinburgh, Virginia at SHENTEL's offices. The mock website was demonstrated and the system concept

discussed. The invitation list for this meeting included representatives from: Central Shenandoah PDC, SNP, SHENTEL, VTTI, VDOT, VTC, LFPDC, SVTA, VSP, VT Public Service Programs, and FHWA (December 10, 1998).
- Travel Virginia proposal submitted to VDOT.
- Travel Shenandoah Phase II proposal submitted to VDOT.

February 1999
- First Travel Shenandoah Project Team Operations meeting held. Discussion of steps in building clearinghouse.

March 1999
- Developed Content Gathering Strategy and Initiated Content Gathering.
- SHENTEL began building yellow pages listing for database.
- SHENTEL agreed to designate cable television station for traffic updates, local flavor information, and adverts by sponsors.
- Eighty percent of non-dynamic web data complete.

April 1999
- Business Model Revenue Structure completed.
- Existing VOIS database in place at VTTI.

May 1999
- Purchase of http://www.travelshenandoah.com by SHENTEL
- Released informational number 1-888-889-4001.

May-January 2000
- Testing website.

October 1999
- SHENTEL decides to retain ownership rights to VODAVI software purchased under subcontract to VTTI.

January – April 2000
- Preparing for roll-out of Travel Shenandoah.

March 2000
- Clearinghouse begins manning by dispatchers during working hours.
- Clearinghouse begins receiving VOIS emails and begins placing periodic calls to the Virginia State Police.

April 2000
- Travel Shenandoah service goes live (April 26, 2000).

July 2000

- SHENTEL acknowledges an agreement to have a share in the rights to the Clearinghouse concept and software developed by VTTI and held by Virginia Tech Intellectual Properties (VTIP). It was set at 10 percent ownership rights, with a one time licensing fee of $50,000 for the use of the software by users other than VDOT and SHENTEL.

September 2000

- Final Travel Virginia Report submitted by VTTI, VDOT, and SHENTEL (September 5, 2000).

December 2000

- VDOT I-81 ITS Policy Committee approves six new projects related to Travel Shenandoah, five of which involve both SHENTEL and VTTI, for a total of $1,510,000 (December 20, 2000).

January 2001

- VDOT publishes future funding intentions for Travel Shenandoah (January 9, 2001).

February 2001

- First automatic access to the Virginia State Police's CADS system is established (February 6, 2001).
- SHENTEL is extended in a subcontract with VTTI for the 24 month VDOT funding period.
- The formation of a Travel Shenandoah Board is recommended.

March 2001

- Completion gathering initial Forest Service Information.

April 2001

- Usability Reports completed by VTTI Human Factors Group for the Travel Shenandoah website and phone system.

May 2001

- Implementation of new weather information.
- Completion of automating CAD connection software programming.

June 2001

- Clearinghouse begins providing direct VOIS information.
- Completion of Travel Shenandoah Business Plan.
- Completion of map to include southern expansion in traffic and travel information
- Meeting between VTTI & the VDOT Public Relations Group to discuss a Public Relations Plan to roll out the expanded Travel Shenandoah.

July 2001

- Decision is made to eliminate the pager delivery method for private users. It is retained as a possibility for Truck Fleet users.
- Focus Groups conducted in VDOT Bristol and Salem Districts to determine individual preferences for 511 signage, and to generate possible names for the expanded Travel Shenandoah service.
- Proposal for Phase II funding submitted.
- Completion of gathering non-profit related information, latitude and longitude mapping data, and information from state parks for the Travel Shenandoah system from the I-81 Virginia/West Virginia border down to Bristol, Virginia.
- VDOT's Public Relations Group and VTTI begin to coordinate a rollout of the southern expansion of Travel Shenandoah.
- Shop Shenandoah is eliminated as a category for Travel Shenandoah.
- Privacy Policy added to Travel Shenandoah webpage.
- HitBox service is activated to begin more in-depth tracking of traffic to the website.

August 2001

- Receipt of Part II of Phase III Funding
- Receipt of Proposed Trial Contract with TellMe, Inc.
- Travel Shenandoah has two Graduate Assistants to help with programming (web and phone) for 100 percent of their time.

September 2001

- Eleven of 15 wireless and 8 of 17 wire line providers are signed onto 511 by SHENTEL.
- VXML programmer, Brian Daily, attends one week of training with Nuance, Inc. in San Jose, CA to further develop VXML programming skills to develop the IVR system, which will replace the original VODAVI system.
- SHENTEL begins its sales efforts in the Roanoke Valley.

October 2001

- Website rolls out to cover all of I-81 in Virginia.
- Virginia Tech MBA class begins competitive analysis of the Travel Shenandoah website.
- Subcontract with SHENTEL initiated for southern extension.
- Begin three week internal testing period for VXML programmed IVR system.
- 13 of 14 wireline and 21 of 22 wireless carriers sign on with SHENTEL to transfer 511 calls.
- 1-800 number activated for internal use in programming and internal testing.

November 2001

- Night Supervisor hired for Clearinghouse.
- Verizon is the only remaining wire line company which has not agreed to transfer 511 calls.
- Seven wireless and 7 wire line carriers activated to route 511 calls to TellMe's 1-800 number.

- Proposal submitted for VDOT approval for implementation of 511.
- Final conversion of TellMe's 1-866-233-8355 programming number to accept 511 calls.
- Travel Shenandoah goes live on the website with the southern expansion to Bristol, VA (November 12, 2001).
- Feasibility Report for 511 completed.
- 511 approved for I-81 corridor by VDOT Commissioner (November 16, 2001).

December 2001

- Presentation by VT MBA class regarding competitiveness of the Travel Shenandoah website.
- Planning begins, in coordination with VDOT's Public Relations Group, for a February 15, 2002 roll out of the 511 phone system.
- TellMe explains what a future contract's conditions would be (December 6, 2001).
- 511 Virginia Signage design decided upon (December 7, 2001).

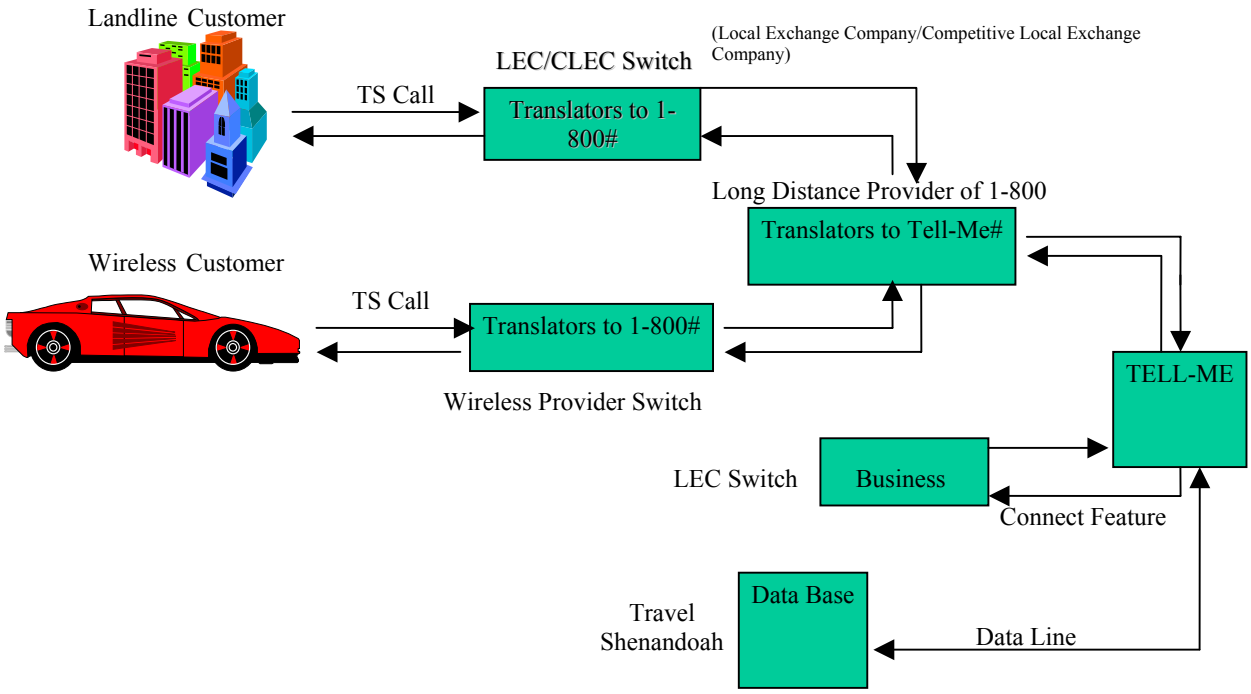
January 2002

- Final decision is made to change the name of the system to "511 Virginia," and change the URL for the website to http://www.511Virgnia.org, which is owned by SHENTEL until July 2003. VDOT has reserved the right to purchase the URL in 2003.
- New website rolled out with new traffic and travel conditions map and functionality.
- Completion of the 511 VXML Voice System accessible from 511 or 1-800-578-4111 (the original Travel Shenandoah phone number).
- Funding received for Pilot Phase of 511.
- Subcontract initiated for SHENTEL on 511 Pilot Fund.
- Clearinghouse begins operating 24 hours a day, seven days a week (January 2, 2002).
- Official beginning of free six-month trial period of the TellMe platform initiated (January 15, 2002 through July 15, 2002).

February 2002

- "511 Virginia" is rolled out, as a phone system ("511" or 1-800-578-4111) and a web page (http://www.511Virginia.org) (February 15, 2002).

Appendix B: Travel Shenandoah (TS) Call Flow



Appendix C: Summary of the VTTI Human Factors Group Usability Report

U S E R ' S I N P U T ON THE WEBSITE

* Use one map for construction zones/weather alerts/traffic incidents
* Make legend icons clickable
* If no events are in that area (i.e. no construction zones at present), do not have them as an option in the legend or as symbols on the map
* Enlarge the map
* Space clickable locations as far apart as possible
* Provide feedback on the page after a selection is clicked, as to which area had been selected from the map (in case they accidentally clicked on something near what they wanted instead)
* Provide a search engine on every page
* Move "More Events" to the menu item (and out of the advertisements section)
* Change "More Events" to "Events by Month" (or "Calendar of Events" (my own input))
* Avoid overwhelming list returns (possibly through further categorization)
* Make the "Valley Traffic Alert" Window more conspicuous
  - Move to a more prominent position in the navigator window
  - Use more vibrant colors for the lettering and images
  - Perhaps red flashing lettering for the title "Valley Traffic Alerts" (my own input: focus groups thought of red first when asked about warnings)
* Move "Valley Traffic Alert" window to the left or right side of the screen (on the Valley Traffic Alerts Window, with the Valley Traffic Map)
* Change "Valley Traffic Alerts" to "Current Traffic Alerts", and it should be in the same style/font as the wording on the map

COMPLETED: Develop a zoom in feature on the map

* Make I-81 and Route 11 more distinguishable on the map

COMPLETED: Add additional instructions on the map page

* Provide feedback on the which search list results were returned in case the user made a mistake (i.e. Staunton Lodging at the top of the list)
* Change the logo into only an image, or add "Home Page" to it to highlight its use as a navigation tool
* Increase the usefulness of the home page (only the search engine is currently unique to it)
* Re-design the Zoom In/Zoom Out feature on the directional map to be more like Map Quest's or Yahoo! Maps
* Have the cursor automatically locate in the Origin address field for trip routing
* Eliminate predefined text in the Destination field box of the trip router
* Relocate the "Trip Route Me" shortcut to the "Directions" section of the

"Service Description" under the "More Info" page
* Make sure items necessary for the navigation of the webpage are located near the top of the page- since most users did not scroll far enough down to see it
* Make the channels featured at the top of the page look more like buttons
COMPLETED: Move Antiques, Golf Ranges, and Riding Stables to more specific categories

U S E R S ' I N P U T ON THE PHONE SYSTEM

* Reduce the systems sensitivity to external noises
* Allow the touchpad as an alternate answering mode
* Fix the recognition sensitivity for the following words:
  South (to a lesser degree East, West, North)
  Food, Fast Food
  No (particularly at the option to hear the traffic alert menu)
  Staunton, Lexington
  81, 66, 64
  Mile markers 2, 215
  Hotels, Motels
  Attractions
  Services
* Increase sensitivity to navigational keywords at ALL times ("category", "repeat", "main menu")
  The system needs to be able to respond to these keywords at all times to help users recover from errors
* Consider four possible re-organizations to the information to reduce info input and selection errors:

1.) Direction < _____Regional < Services

Lodging ---------->Town

_____ Interstate < Services

Lodging ---------->Town

2.) Eliminate Interstate altogether or have it as an option under regional

3.) Eliminate Regional altogether, and use Mile marker, City, and Interstate instead

4.) Organize it like 411. Give City and State then follow with categories

* Instead of Mile marker as a category heading, use Town (since mile marker is

only useful for breakdowns)
* Move weather to Regional
* List Bed & Breakfasts under both regional and interstate (if keeping them)
* Slow the automated voice down and automatically repeat essential info (like telephone number)
* Verify the accuracy of the data (at least one case of very out of date data)
* Increase system's sensitivity to the command "repeat"
* Repeat should mean repeat only the previously listed item rather then the entire list from the top
* Include a short definition of what "Traffic Alerts" means
* Be more specific, or change the wording of "Detailed Traffic Info" and the meaning behind "Number of Current Traffic Alerts"
* When no alerts are available, skip that interstate (don't waste their time by saying it)

E X P E R T ' S I N P U T ON THE PHONE SYSTEM

* Change "Main Menu" to take the user back to the point where they choose traffic alerts/traveler services/instructions - rather then whether or not the user wants
instructions.
* Make the "Category" and " Menu" voice commands recognizable anywhere in the hierarchy
* Develop a "Go Back" command as a navigation tool rather then "Category" or "Main Menu", after the category has been accessed (further down in the hierarchy)
* Develop a navigation tool (maybe "Go Back" or "Redo") which allows the user to return only one step in the hierarchy
* Present three options initially: Instructions, Traffic Alerts, and Traveler Services. (Eliminate Interstate and Regional categories)
* Reduce the number of steps wherever possible - aim for the shallowest hierarchy possible
* Provide more feedback to the user about current location in the hierarchy
* Develop richer options and menus
* Give more information in the intro and outline the hierarchy at the beginning

Appendix D: Historical List of Personnel

Policy Level Participants

James R. Robinson
Director
Intelligent Transportation System (ITS) Programs
Virginia Department of Transportation

As the Director of Intelligent Transportation System (ITS) Programs for the Virginia Department of Transportation,Jim (JR) Robinson is responsible for the planning, development and implementation of VDOT's statewide ITS program, also know as the Smart Travel program. Jim has been involved in the Travel Shenandoah project since its inception in 1997. His leadership, direction, and vision for the program have been critical to the project's development and success.

Prior to joining VDOT in January 1995, Jim was employed by the Federal Highway Administration for over 26 years. At FHWA he had assignments throughout the United States in state and regional offices as well as the Washington, D.C. headquarters office.

Jim is a native of Oklahoma and a graduate of the University of Oklahoma. He is a member of numerous professional organizations.

Dr. Richard Worrall
Senior Transportation Research Fellow
Virginia Tech Transportation Institute
Virginia Tech

Dr. Worrall was a Senior Transportation Research Fellow at VTTI and a principal investigator on the Travel Shenandoah project. He provided leadership to the Travel Shenandoah project since it began in 1997. In the autumn of 2002, Dr. Worrall passed away. His expertise, creativity, and energy are greatly missed by all who worked with him. He brought 40 years of experience in the application of operations research and related techniques to transportation planning and management problems. He consulted widely on these topics in the U.S. and overseas, and taught and conducted research in these areas at three universities.

Dr. Worrall was the President and CEO of COMSIS Corporation, a $12 million/year transportation and information technology consulting firm, that has consulted to public- and private-sector transportation clients on transportation planning, management, and technology issues. He also served as Vice President of Science Applications International Corporation (1994-1996), directly managing the transportation business unit, and Chief Operating Officer of JHK & Associates (1991-1994).

For 23 years, Dr. Worrall served as a transportation consultant for KPMG Peat Marwick, consulting to public-and private-sector clients in the U.S. and overseas on business

strategy/change management, information technology, and transportation issues. Dr. Worrall retired from KPMG as a senior partner in 1991.

Dr. Aaron Schroeder
Senior Research Associate
Virginia Tech Transportation Institute
Virginia Tech

Dr. Aaron Schroeder is currently the Leader of the Information Applications & Policy Group at the Virginia Tech Transportation Institute. The mission of the Information Applications & Policy Group is to utilize information technology and inter-institutional (e.g. public-private) partnerships to develop and deploy new or enhanced public services.

Responsibilities include the management of existing program development and deployment projects, procurement of all program funding, management of program relationships with private and public-sector personnel and political representatives, and coordinating with other Institute research programs.

The Information Applications & Policy Group was founded in 1998 and has quickly grown to become the single largest research group at the Institute. Dr. Schroeder and the Information Applications and Policy Group has been involved in a number of projects, including: Travel Shenandoah, Travel Virginia, 511, ACCESS to Rides, I-81 Intelligent Transportation Systems, and the Enhancement of Night Visibility. Dr. Schroeder worked on the Travel Shenandoah project from inception to its transition to 511.

Dr. Schroeder holds a Bachelor's degree in Psychology from the University of Delaware, a Master's degree in Public Administration from James Madison University, and a Ph.D. in Public Administration and Policy from Virginia Tech.

David Ferguson
Vice President Operations
Shenandoah Cable Television Company
SHENTEL, Inc.

David Ferguson was born and raised in the Shenandoah Valley of Virginia. Upon completion of high school in 1964, he joined the United States Army Signal Corp. He served in Korea with the 1st Target Acquisition Battalion and in Vietnam with the 83rd Artillery. While in Vietnam, he was responsible for the installation and maintenance of rapid deployment communications sites.

When discharged in 1967, he was employed by the Shenandoah Telephone Company. During his employment he has held positions of lineman, installer/repairman, engineering assistant, cable supervisor, and plant manager. In 1982 he was promoted to Vice President of Customer Service for SHENTEL. He currently holds the positions of Vice President of Operations for the

company's cellular and cable subsidiaries. Mr. Ferguson has been involved and provided leadership in Travel Shenandoah since it began.

Mr. Ferguson is also actively involved in social and community organizations. His list of offices held includes such organizations as the Woodstock Rotary Club of which he has been past president and the recipient of the Paul Harris Fellow Award, the Edinburg Lions Club, past district chairman of the Boy Scouts of America, and the Virginia Savings Bank advisory board. In addition, he has been extremely active in local, state, and national organizations relative to the telephone company and its affiliate companies.

Program Level Participants

W. Todd Kell
Senior Policy Analyst
Intelligent Transportation Systems (ITS) Programs
Virginia Department of Transportation

Todd Kell is the Senior Policy Analyst for the Intelligent Transportation Systems Division at the Virginia Department of Transportation. He is responsible for developing ITS-related policies, managing the three advanced traveler information system (ATIS) projects across the state, and leading VDOT's effort to implement and deploy 511 as a statewide service. Mr. Kell joined the Travel Shenandoah project in 1999.

Before joining VDOT, Mr. Kell was a Senior Transportation Planner with TransCore/SAIC in Alexandria, Virginia where his duties included multi-modal corridor planning, transit systems analysis and design, and ITS planning.

He holds a Master of City Planning from Georgia Tech and a B.S. from James Madison University.

Nicole Swan
Project Manager
Virginia Tech Transportation Institute
Virginia Tech

Nicole Swan, an MBA graduate from Claremont Graduate University with an emphasis in Strategic Management, was manager of Travel Shenandoah and 511. Nicole has taken our currently operating 511 service from conceptualization to full deployment since her time here at Virginia Tech. Her responsibilities included coordinating with the other partners, both public and private, to ensure tasks were met and that issues were resolved in a timely manner, managing budgets and subcontractor relationships, and the production of a feasibility report. She directly oversaw the technical development of the 511 system. Nicole is also managing the Truck Fleet Alert System, a traveler information system geared toward Commercial Vehicle Operators.

Nicole brings a background in financial management and education to the project team. Ms. Swan began managing Travel Shenandoah in 2000.

Kathy Laskowski
Management Analyst
Virginia Tech Transportation Institute
Virginia Tech

Kathy Laskowski is a management analyst in the Information Application Group at the Virginia Tech Transportation Institute. She received a Bachelor's degree in Natural Resources Management from the University of Rhode Island, and a Masters of Public Administration from Virginia Tech.

Kathy joined the Institute in May of 1999. Her responsibilities include acting as co-PI for the development, operation and coordination of the I81 data clearinghouse and the I81 Interim Data Operations Center. The goal of these two projects is the collection and dissemination of real time traffic and travel data that is an essential element for the successful deployment of several VTTI projects including 511 Virginia and Truck Fleet Services. The data center operates 24/7 and is in continuous contact with project partners including VDOT, VSP, and numerous other emergency operations organization. Kathy's central role in fostering and development of the partnerships between organizations has been a key element to the successful implementation of the data center. Ms. Laskowski has worked on Travel Shenandoah from 1999-2000.

Before coming to VTTI Kathy was the manager of a transgenic plant biotech firm currently located in the Virginia Tech Corporate Research Center.

Scott Cowherd
Project Manager
SHENTEL, Inc.
Scott Cowherd is the SHENTEL Project Manager for the 511 Virginia Project. He is responsible for developing and implementing the 511 business and marketing plan, coordinator of the 31 wireless and wireline telecommunication companies which provide 511 service throughout the 31 counties surrounding the Virginia I-81 corridor. Scott manages the sales effort that is responsible for website and the phone service advertising. Scott also manages the staff that develops and maintains the real time data for over 13,000 businesses along the corridor.

Scott holds an MBA and Masters of Human Resource Management from Troy State University and a Bachelor's degree in Business Management with a concentration in Finance.

Operational Level Participants

Brian Daily
Research Associate
Virginia Tech Transportation Institute
Virginia Tech

Brian Daily received him B.S. in Electrical Engineering, along with a minor in Computer Science, from Virginia Tech in 1992. He most recently has built our current 511 VXML system from the ground up, and has a strong background in working with voice applications, working with them since 1995. Brian has 10 years of professional software development experience. He is a certified 5.0 Cold Fusion developer and has worked with Cold Fusion for 4 years. Brian is proficient in SQL, Cold Fusion and VXML and has attended Nuance training in VXML and speech application development. Additionally, Brian has experience in integrating distributed data sources. Mr. Daily has worked on Travel Shenandoah since its inception.

Stephanie Baker
Project Manager
Virginia Tech Transportation Institute
Virginia Tech

Stephanie Baker is currently a Project Manager and Information Applications Group member at the Virginia Tech Transportation Institute. Ms. Baker's specialties and responsibilities are in the areas of Stakeholder Development and Involvement, Meeting Facilitation, and Evaluation of Rural Advanced Traveler Information Systems projects. Ms. Baker was involved in Stakeholder Development for Virginia's Travel Shenandoah system, now 511, from 1997-1999. She also managed the writing of this Travel Shenandoah History in 2002. Before coming to VTTI, Ms. Baker conducted research and published three reports on Community Involvement in Rural Transportation Provision and Tourism Development for the Central Research Unit of the Scottish Office in Edinburgh.

Ms. Baker currently holds a Master's Degree in Public Administration from the University of Georgia. At the Institute for Community and Area Development in Georgia, where Ms. Baker was a graduate assistant, she was trained in Community Development Facilitation and has since facilitated numerous meetings, strategic planning sessions, and focus groups. She also attended several National Issues Forum workshops and has been trained as a moderator.

Rewa C. Hintz
Business Analyst
Virginia Tech Transportation Institute
Virginia Tech

Rewa Hintz is currently a Business Analyst for the Information Applications Group in the Virginia Tech Transportation Institute (VTTI). Ms. Hintz's specialty is financial analysis, developing marketing plans for high technology products, and developing electronic commerce solutions. She has been assisting Ms. Swan in the development of a revised business model for the expanded 511 service. Ms. Hintz has brought a business and financial perspective to the development of 511. Ms. Hintz has worked on Travel Shenandoah since 2001.

Ms. Hintz received her Master's Degree in Business Administration from Virginia Tech, and worked with Virginia Tech's Center for Wireless Technology to develop a business and marketing strategy for a new wireless system, Local Multipoint Distribution System (LMDS), in two rural counties in Southwest Virginia. She also participated in an International Business Consulting Study Abroad in Slovenia, where she worked with a team of from Virginia Tech to develop a business strategy for a multi-national temporary hire agency expanding to Slovenia.

Hank Zimmerman
Project Manager
Shenandoah.com
SHENTEL, Inc.

Hank Zimmerman joined Shentel in 1997 with a mission to develop a community portal web site that would serve the northern Shenandoah Valley. Shenandoah.com became the first web site in the area to feature daily Shenandoah Valley newspaper news online.

He began his career in radio, but was soon swept up in the microcomputer revolution of the 1980s. In 1992 he co-founded a retail local computer support and sales outlet in Shenandoah County that, in 1994, featured the first in-house training center for end-user Internet education. During the mid 1990s Zimmerman was a consulting project manager for The Northern Virginia Daily newspaper. He led an effort that resulted in a fully-computerized, prepress pagination/publishing system, a major technical upgrade for the company.

After joining Shentel, and as the Shenandoah.com community information service was developed, Zimmerman played an initial role in the creation of the Travel Shenandoah/Travel Virginia project, which ultimately became Virginia 511. Zimmerman has lived in and raised a family in Shenandoah County for over 20 years. His degree is in Communications/Journalism with an emphasis in broadcasting. Mr. Zimmerman worked on Travel Shenandoah from 1998-2000.

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