



511

America's Travel Information Number

Implementation and Operational Guidelines for 511 Services



Version 2.0
September 2003

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American Association of
State Highway and
Transportation Officials

September 2003

Dear Colleagues:

On behalf of the organizations and volunteers of the 511 Deployment Coalition, we are pleased to publish Version 2.0 of the "Implementation and Operational Guidelines for 511 Services."

These updated guidelines are a product of a collective effort from 511 deployers and Coalition volunteers. Version 2.0 of the guidelines incorporates many practical examples from the current 511 deployments as well as knowledge gained in the Deployment Assistance Reports.

If you are planning, designing, implementing or supporting 511 services, we strongly urge you to thoroughly review and incorporate the recommendations in this document into your plans. Each recommendation contained in this report is the result of thoughtful deliberation and hands-on experience and is included because of its value and importance.

"Implementation and Operational Guidelines for 511 Services" was specifically designed to support the establishment and ongoing operations of 511 services. Even the most advanced 511 systems technologically and economically possible today, will likely need improvements and expansion to meet the long-range vision for 511 contained within.

If you have questions regarding the guidelines, please contact Jim Wright, 511 Deployment Coalition Staff Director at 651-582-1349 or jim.wright@dot.state.mn.us.

Sincerely,

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Executive Summary

On March 8, 1999, the U.S. Department of Transportation (USDOT) petitioned the Federal Communications Commission (FCC) to designate a nationwide three-digit telephone number for traveler information. On July 21, 2000, the FCC designated 511 as the national traveler information number.

The FCC ruling leaves nearly all implementation issues and schedules to state and local agencies and telecommunications carriers. There are no federal requirements and no mandated way to pay for 511. Consistent with the national designation of 511, the FCC expects that the transportation industry will provide the traveling public with a quality service that has a degree of uniformity across the country. Finally, the FCC stated that it would review progress in implementing 511 in five years, making the date for review July 2005.

In early 2001, mindful of both the opportunity and challenge that 511 presents, the American Association of State Highway and Transportation Officials (AASHTO), in conjunction with many other organizations including the American Public Transportation Association (APTA) and the Intelligent Transportation Society of America (ITS America), with the support of the USDOT, established a 511 Deployment Coalition (Coalition). An executive-level Policy Committee and a supporting Working Group were established to conduct the work of the Coalition. Membership of the Coalition draws from all levels and types of government agencies, various segments of the telecommunications industry and the fields of consulting, system integration and information service provision. The goal of the Coalition is that 511 will be a customer driven multi-modal traveler information service, available across the United States, accessed via telephones and other personal communications devices, realized through locally deployed interoperable systems, enabling a safer, more reliable and efficient transportation system.

The Coalition recognizes that 511 services will be developed in a bottom-up fashion with state and local transportation agencies establishing services in areas and timeframes determined by them. The Coalition has developed this document, *511 Implementation and Operational Guidelines Version 2.0*, to assist implementers in their efforts to develop quality systems and to increase the level of operational knowledge throughout the 511 community. The document, which is an update to the *Implementation Guidelines for Launching 511 Services – Version 1.1*, improves on the foundation set by the Coalition for ultimately helping to establish a consistent nationwide 511 service. The document also includes information beyond guidelines and is designed to give future and existing deployers insight into key issues.

As of July 2003, more than halfway to the FCC's July 2005 review date, nineteen 511 services around the country are operational, serving a resident population of over 50 million. Eight of the services have been in operation for over a year, with Cincinnati/ Northern Kentucky's system having two years of operational experience. The "early deployers" mentioned in this document refers to those systems that have been operational since early 2003.

The individuals and organizations, both public and private sector, that are making 511 a reality are directly responsible for the success to date and the future of delivering 511 services to the traveling public across the county.

What's new for Version 2.0?

This document provides updated guidelines on content, cross-cutting issues and lessons learned, an overview of key national policy issues and informational resources available to support existing and future 511 deployers. Specific information new to Version 2.0 includes the following:

National Vision for 511 – the creation and adoption of a national vision by the 511 Deployment Coalition is a major step in creating a sustainable service to assist travelers across the country. The national vision for 511 states that:

511 will be a customer driven multi-modal traveler information service, available across the United States, accessed via telephones and other personal communications devices, realized through locally deployed interoperable systems, enabling a safer, more reliable and efficient transportation system.

The goals of the vision include the following:

By 2005:

- 511 will be operating in 25 or more of the states.
- At least 30 of the top 60 major metropolitan and more than 50% of the nation's population areas will have access to 511.
- More than 25% of the nation's population will be aware of 511.
- More than 90% of 511 users will be satisfied with the service provided.

By 2010:

- 511 will be operating throughout the United States.
- Over 90% of the nation's population will be aware of 511.
- All of the users will be satisfied with the service provided.
- 511 systems will receive more than 40 million calls per year.
- Road information on major road systems and metro areas will include travel time, events and weather.
- Transit information will be available on most systems.
- Individual systems will be linked together into an integrated, seamless network.
- There will be a sustainable business model – public sector supported with funds to enhance and grow.

Additional Guidelines for Roadway Content – including the addition of regional overviews or summaries as a selectable option for the caller.

Guidelines for Transit Information – increased understanding of how 511 services should work in conjunction with transit call centers.

Weather Information in the Basic Service – adding significant travel-impacting weather information to a 511 service.

Examples and Lessons Learned – these important pieces of knowledge and experiences from the early deployers can be found throughout the document, including information on:

- Optional content
- Additional uses for 511
- Phone-related issues
- Business models
- Marketing and branding
- Event driven call volumes

Usage Monitoring Guidelines – the purpose of measuring a customer-oriented system’s usage and performance, and how this will assist in tracking the development of 511.

What Early Deployers Have Taught Us

After more than two years since the first 511 system was deployed, the early deployers have taught the Coalition and others much about implementing 511 services. The most important nationally relevant findings are listed below:

- Key agencies (i.e., DOTs, MPOs, transit providers) must make a commitment to 511 as a service for its customers.
- Seamless and reliable call routing is crucial – the call must go through.
 - Carrier coordination is very time consuming and can be difficult.
 - Wireless coverage areas may extend into adjacent states or jurisdictions.
 - Interoperability issues with adjacent systems/states are increasing.
- A quality and robust interactive telephone system is needed – the call must get answered.
 - Off-premise phone systems can handle usage spikes better.
 - Voice interfaces work, but need to be carefully designed.
- Timely, accurate, reliable and meaningful content is available – the information is useful.
 - Content is generally not geared for daily use.
 - Systems geared for regular use experience the highest usage.
 - Most systems experience exception usage.
 - There is a relationship to the quality of content and the relevance of usage.
- A funded and sustainable business plan is necessary – the service should not disappear.
 - Sustained public sector funding is needed for the foreseeable future.
 - Cost “rules of thumb” are difficult to normalize.
 - Non-recurring and per call costs can be minimized with proper planning and execution.
 - Revenue-supporting opportunities have not emerged.
- Focused and on-going marketing is needed – people learn about the service.

- Marketing strongly correlates with usage.
- Roadside signage works.
- Good opportunity for co-branding with other public services (e.g., websites).

Additional Resources

Information on the 511 Deployment Coalition, including Deployment Assistance Reports, educational materials, a marketing toolkit and supporting resource materials, as well as additional useful references for 511 implementers may be found at the following websites:

- www.deploy511.org
- www.its.dot.gov/511/511.htm
- www.itsa.org/511.html

Deploying 19 services across the county in three years is a significant achievement. A review of these 511 systems shows that the services in operation are not designed to deliver the same content (due to local options in some cases), in the same manner and are certainly experiencing differing results in system usage. Currently, the majority of the systems use voice recognition software (12), and concatenated speech (10) to interact with the caller. All systems currently provide roadway content, which typically includes information for Interstate and US designated routes. In addition, the majority (16) of deployers have recognized the benefit of the 511 “brand,” and have launched a co-branded 511 website to serve their customers through additional delivery devices, typically personal computers.

These summary statistics suggest that most 511 systems are similar; however there can be great differences. Currently, only eight services provide transit information, about half use roadside signs to promote awareness of a system, seven have touchtone-only commands and one system is bi-lingual.

Appendix B shows a more detailed overview of how existing systems are delivering content, type of content available, data found within roadway content, and how some elements of user awareness are approached. The local and toll-free numbers (where available) for the systems are listed for your convenience and you are urged to use them to familiarize yourself with the types of services / interfaces currently utilized. Any department or agency planning or enhancing a 511 service should take the time to hear what their neighboring states, comparative metropolitan areas across the country and systems that seem to fit your agency’s vision of a 511 service are currently delivering.

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I. Introduction

On March 8, 1999, the U.S. Department of Transportation (USDOT) petitioned the Federal Communications Commission (FCC) to designate a nationwide three-digit telephone number for traveler information. On July 21, 2000, the FCC designated 511 as the national traveler information number.

The FCC ruling leaves nearly all implementation issues and schedules to state and local agencies and telecommunications carriers. There are no federal requirements and no mandated way to pay for 511. Consistent with the national designation of 511, the FCC expects that the transportation industry will provide the traveling public with a quality service that has a degree of uniformity across the country. Finally, the FCC stated that it would review progress in implementing 511 in five years, making the date for review July 2005.

While the flexibility provided in the FCC ruling is highly desirable, it also presents a challenge. Although there is a great deal of interest in using 511 throughout the U.S., if not thoughtfully planned, 511 services could devolve into an inconsistent set of services widely varying in type, quality and cost.

As of July 2003, more than halfway to the FCC's July 2005 review date, nineteen 511 services around the country are operational, with nine of the services in operation for over a year and Cincinnati with two years of operational experience. Forty-four states have requested and received 511 planning and deployment grant funds from USDOT. The individuals and organizations of both the public and private sector that are making 511 a reality are directly responsible for the success to date and the future of delivering 511 to the traveling public across the country.

A. 511 Deployment Coalition Program

In early 2001, mindful of both the opportunity and challenge that 511 presents, the American Association of State Highway and Transportation Officials (AASHTO), in conjunction with many other organizations including the American Public Transportation Association (APTA) and the Intelligent Transportation Society of America (ITS America), with the support of the USDOT, established a 511 Deployment Coalition (Coalition).

The goal of the 511 Deployment Coalition is “the timely establishment of a national 511 traveler information service available to a majority of Americans by 2005 that is sustainable and provides value to users.” The intent is to implement 511 nationally using a bottom-up approach facilitated by information sharing and a cooperative dialogue through the organizations represented on the Policy Committee, the governing body of this program. The mission of the Policy Committee is to provide guidance on how to achieve this goal.

A Working Group of managers involved in 511 and traveler information service delivery has been supporting the Policy Committee. The Working Group has extensively studied existing 511

and other telephone-based traveler information systems and the experienced and projected technological, political and economic environments in the near future to develop recommendations for guidelines (see <http://www.deploy511.org/> for materials developed or used by the Working Group and Policy Committee in its deliberations, as well as the rosters of the Policy Committee and the Working Group).

This document is one of many products developed by the Coalition to support those deploying and considering 511 systems. The Coalition recognizes the efforts of all its volunteers on both the Policy Committee and Working Group without whom the national 511 program would not be where it is today. A special acknowledgment is due to Dr. Chris Hill of Mixon / Hill, Inc. for circulating a draft of this version of the Guidelines to ITS America's Rural Special Interest Group for their comments.

B. Purpose of the Guidelines

The 511 Deployment Coalition recognizes that 511 services have, and will continue to be, developed in a bottom-up fashion with state and local transportation agencies – with the close collaboration of the private sector – establishing services in areas and timeframes determined by them. The positive benefits of this approach are that it enables resources from many organizations to be harnessed to deploy 511 as well as providing many opportunities for innovation in 511 service delivery. A potential negative consequence of simultaneous independent actions is that the resulting services do not, from a caller's or national policy perspective, resemble a well-planned consistent service.

To reduce the chances of service confusion and inconsistency, the 511 Deployment Coalition is enhancing the established guidelines in the areas of content and consistency, as well as providing additional assistance in other areas deployers should be concerned with. ***511 service consistency will be established through implementers continuing to follow these guidelines, and, as an increasing number of services are established, a national 511 service will emerge.***

The 511 Deployment Coalition is cognizant that the quality of systems developed has varied in content and consistency, mostly due to the availability of information / data and financial constraints. Although 19 systems have been implemented across the country, there is still the possibility that if quality systems do not become commonplace, the transportation industry may lose the privilege of the exclusive use of the 511 number. On the other hand, if guidelines suggest services that are cost-prohibitive and unsupportable, the result could be an invisible cap in the number of operating systems, also leading to losing the privilege of the number. Thus, these guidelines are designed from a customer-centric viewpoint while being sensitive to the issues of those agencies that must gather and prepare information and manage information service provision.

The transportation industry has been afforded a tremendous opportunity to better serve its customers. As with Version 1.1 of the Guidelines, the purpose of Version 2.0 is to assist transportation agencies in establishing this customer service in the best possible manner. The Coalition and its member organizations strongly recommend that implementers carefully review and consider these guidelines in their implementation planning.

C. Evolution of Guidelines

The Guidelines document has evolved from a group of “best guesses” and suggestions on what was needed to launch a successful 511 service to a document for those planning, and already operating, 511 services. This change is also reflected in the name of the document, from *Implementation Guidelines for Launching 511 Services Version 1.1*, to *511 Implementation and Operational Guidelines Version 2.0*. The document now provides additional information and background, as well as operational examples and experiences. Any future versions of this document will provide additional specific information, parameters and recommendations as services gain valuable operational experience within their states and / or metropolitan areas.

D. How to Use this Document

This document is intended to serve multiple purposes and audiences, which include distributing the updated content guidelines, serving as a basis for developing and planning a 511 system and as a resource document for existing deployers that wish to begin focusing on enhancements, evaluations and other activities that may not have been obvious or possible when 511 systems were first launched.

The primary purpose of the document is to distribute the updated guidelines, Version 2.0, as they have evolved since Version 1.1 was released. These updates are for both potential deployers and those with operating 511 systems. The document is also intended to be a reference guide highlighting critical issues and noting successes achieved.

For those new to 511 and in the process of deploying, Version 2.0 should serve as the basis for developing and deploying a 511 system. After reviewing the document a potential deployer should know: who the key participants in the 511 field are; the difference between Basic and Optional content; the business environment most deployers are operating in; and the importance that consumer research, marketing and national consistency play in developing a customer-oriented service. While a potential deployer will not find all of the information they need to develop a 511 system, the document offers an opportunity to learn from two years of deployment experience and provides additional insight that the early 511 deployers did not have the benefit of.

For those organizations and / or individuals that have already deployed a 511 system, the document offers information on some areas that were commonly overlooked or not fully addressed by the initial wave of deployers. This includes, but is not limited to: the elevation of weather information (both forecasted and observed); the addition of regional overviews to quickly disseminate important, top-level, information; experiences with payphone operators; and standards that all deployers should be using.

Finally, the document is designed to help make the 511 Vision (discussed in the next section) a reality. If implementers have suggestions for improvements to the Guidelines or 511 services in general, please provide this information electronically to 511feedback@aaashto.org.

II. 511 Vision: An Essential and Sustainable Service by 2010

The creation and adoption of a national vision by the 511 Deployment Coalition is a major step in creating a sustainable service to assist travelers across the country. The Vision helps to focus the Coalition's and deployer's goals, and establishes key milestones for the creation and adoption of a service that may one day become as widely known and commonly used as 411 or the Internet. Attainment of the Vision will help carry 511 from an unknown and misunderstood "frill" or option in a few locations to a mature necessity adopted by the general public.

A. Why Do 511?

In 1999, the USDOT envisioned using an abbreviated N11 (phone number where N is a digit from 0 – 9) dialing code to provide a simple, easy to remember and use telephone number to disseminate multi-modal travel information to the public. It was clear to those in the traveler information sector of the transportation industry that there were too many sources of information for travelers, each having its own ten-digit telephone number. The casual user rarely knew these telephone numbers and often there were multiple numbers for one metropolitan area or state. The N11 solution was viewed as a way to cut through all of the clutter, and provide one source of information on a multi-jurisdictional or regional basis. In this regard, 511 has been, and continues to be, a success. Unlike many intelligent transportation system (ITS) technologies, 511 is easy to understand and provides a direct service to its users. To provide quality customer service, 511 brings ITS, traffic and incident management, public transportation and weather information all together under one umbrella.

B. 511 Vision

The national vision for 511 adopted by the Coalition consists of a Vision Statement and specific elements and milestones to ensure its attainment.

i. Vision Statement

With more than a year of operational experience by late 2002, and after considering a full range of consumer, business, technical and policy issues associated with 511, the Coalition established a national vision for 511 which states that:

511 will be a customer driven multi-modal traveler information service, available across the United States, accessed via telephones and other personal communications devices, realized through locally deployed interoperable systems, enabling a safer, more reliable and efficient transportation system.

ii. Vision Elements

The elements of the Vision can be separated in the three parts: the characteristics of 511 services, specific coverage and operational goals for 2005 and a significant increase in adoption and continued focus on improving customer service by 2010.

The key characteristics of 511 services are:

- Have a customer focus
- Serve local users, visitors and through travelers
- Have ubiquitous brand awareness and coverage
- Provide timely, accurate and reliable information
- Be consistent in content, interface and quality of service
- Be mission critical to travelers / users, transportation system operators, emergency and homeland security providers and the information services industry
- Have a mix of “public good” and “value added” information
- Be sustainable and permanent
- Be continually improving
- Strive for complete customer satisfaction
- Be nationally interoperable

By 2005:

- 511 will be operating in 25 or more of the states.
- At least 30 of the top 60 major metropolitan areas and more than 50% of the nation’s population areas will have access to 511.
- More than 25% of the nation’s population will be aware of 511.
- More than 90% of 511 users will be satisfied with the service provided.

By 2010:

- 511 will be operating throughout the United States.
- Over 90% of the nation’s population will be aware of 511.
- All of the users will be satisfied with the service provided.
- 511 systems will receive more than 40 million calls per year.
- Road information on major road systems and metro areas will include travel time, events and weather.
- Transit information will be available on most systems.
- Individual systems will be linked together into an integrated, seamless network.
- There will be a sustainable business model – public sector supported with funds to enhance and grow.

Continued leadership and active participation from the Associations involved in Advanced Traveler Information Systems (ATIS), the USDOT, state, regional and local government agencies and private firms will be essential in making the vision a reality.

III. Guidelines

This section of the document is the most extensive, and thus, the most important for potential and current deployers. Potential deployers should pay close attention to the Basic content, as well as the lessons learned throughout the section, especially those that relate to phone systems, call routing and interoperability. Current deployers will notice some changes to the Basic content and new information in most areas, such as standards, business case studies and evaluations.

Several categories of information, or “content”, are candidates to be provided via a 511 service. Some of these content categories are typical of what is offered through phone systems in operation today. Other categories are extensions into additional public sector services, while yet others are the likely domains of private service providers. All of these content categories have been examined and considered in developing the guidelines.

The overriding philosophy of the content guidelines is that there are two types of content levels:

1. *Basic Content – Content That Every 511 System Should Have.* Basic content is the focus of these guidelines.
2. *Optional Content – Additional Content Beyond Basic Content Provided by a 511 Service.* Optional content is up to the discretion of the system implementers and can include additional content supported by the public sector and / or private sector-supported services. Section III, B, ii provides a summary of some possible optional content categories and an example of what some deployers have chosen to provide.

In addition, the guidelines include “implementation recommendations” addressing content topics that have been demonstrated to provide value to callers, but are recognized as difficult to uniformly implement. Therefore, while not explicitly part of the basic content package, these levels of content are recommended as part of 511 systems as they are developed and designed, if possible. Further recommendations about specific content may be found in the Deployment Assistance Reports (DAR).

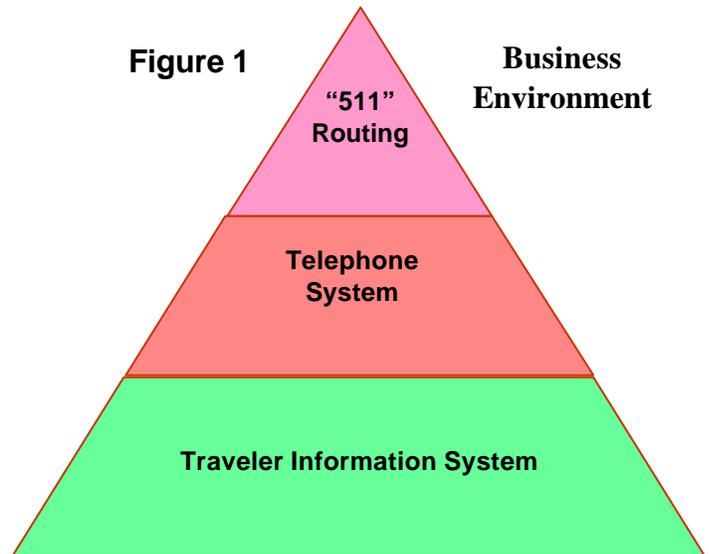
These guidelines recommend that every 511 system deployed in the U.S. should provide, at minimum, the basic content as defined in this document. It is this basic content that consumers will associate as the core of 511.

A. 511 is Part of Traveler Information

While planning and developing a 511 service, it is important to remember that 511 is a speed dial or short cut to a telephone system, which has a large base of information available. In the hierarchy of travel information, 511 is the “cherry on top,” as depicted in Figure 1. Future deployers should also know that a 511 service does not “create” its own information for callers, and that a service cannot be deployed without first developing a source of information, as well as a robust telephone system.

The majority of operational 511 services with high call volumes are part of a larger ATIS that provides information to travelers via multiple media. The dissemination tools can include websites, television stations and push technologies such as customizable reports via email or pagers. Examples of these comprehensive ATIS systems include Southeast Florida, San Francisco Bay Area, Cincinnati / Northern Kentucky and Montana.

To achieve a useful and comprehensive 511 service, as with a full ATIS, deployers need be concerned with data acquisition: where will the data come from; data quality – is the data timely, accurate and useful; and system integration – how will 511 deliver information from unlinked systems or systems that another agency operates? Each of these elements is extremely important in achieving the “Traveler Information System” layer of the pyramid in Figure 1. If there is no traveler information, as created through addressing data and integration issues, then there is no need to continue up the pyramid to develop a telephone system or 511 routing.



Deployers must recognize that 511 is a service and that it operates in an overall business environment created by the travel information market and the lead coordinating, or facilitating, agency.

B. Information Content Guidelines

Information content can be broken down into two main types, Basic and Optional. This section discusses the principles, guidelines and recommendations of those two main types, as well as highlighting the key categories of information a 511 service should provide.

i. Basic Content

Basic content comes in three general categories:

1. *Roadway (Highway and Arterials)* – Information associated with particular roadways in a 511 service area.
2. *Transit or Public Transportation* – Information associated with transit services (bus, rail, etc.) in a 511 service area.
3. *Weather* – Information associated with observed and forecasted weather and road surface conditions that may impact travel in the 511 service area.

In each of these content categories, the guidelines provide general principles or philosophies and specific guidance on the type of information that should be provided to callers. Note that a key concept in 511 service planning is that 511 systems must be designed to provide information

beyond a single agency, mode or content type. While content is organized in different types and categories, one principal carries throughout all content:

- *Provide Sufficient “Context” for an Unfamiliar User of the Service* – If one asked for information from one 511 system to another, would that service provide sufficient “context” for the information to an unfamiliar user of the service? Are there transportation terms and locations such as “The Mixing Bowl” in Northern Virginia and “The Stack” in Phoenix that an unfamiliar user would not recognize? If so, have alternate designations available that would make sense to unfamiliar travelers. This would also be the case on your 511 system if there are “locals” and through travelers accessing the system.

Roadway Content (Highways and Arterials)

As the primary means of travel in the United States, roadways (highways and arterials) and information about major roadways should be a principal part of a 511 system. The core of many existing telephone-based traveler information services is highway conditions reporting. As these systems migrate to 511 access and new systems are established, the following guidance should be considered.

Principles

There are five key principles associated with roadway content:

1. *Regional Overviews or Summaries* – regional overviews or summaries that allow users to get important information quickly, (i.e., incidents or service disruptions that may impact one’s trip) without having to go through the menu system. Upon hearing the overview, the caller would be able to select the specific route or segment to obtain detailed information. Thresholds for determining what content is placed in a regional overview should be determined regionally.
2. *Content is Route / Corridor-based* – 511 services should provide information that is retrievable by route number and / or name. In certain circumstances, if one or more principal roads run parallel, it may be acceptable to provide information on a corridor-basis. However, providing information on major roadways on a broad geographic basis (e.g. “roads in the Northwest portion of the state will be...”) is not recommended. When a route / corridor is operated by multiple agencies, these agencies should work together to provide an integrated description of conditions.
3. *Limited Access Roadways and the National Highway System Should Be Covered by the Basic 511 Highway / Roadway-related Content* – With 40% of the nation’s travel, including 75% of truck traffic and 90% of tourist traffic, the 160,000 mile National Highway System should be the focus of basic 511 content. Limited access roadways that are not part of the NHS, likely to exist in urban areas, should also be part of the basic content. State-by-state maps of the National Highway System can be found at:
<http://www.fhwa.dot.gov/hep10/nhs/index.html#maps>
4. *More Detail Needed in Urban Areas* – Given the increased traffic volumes and congestion levels in urban areas, even minor events could have large impacts on travel. Thus, greater content detail is recommended in urban areas.

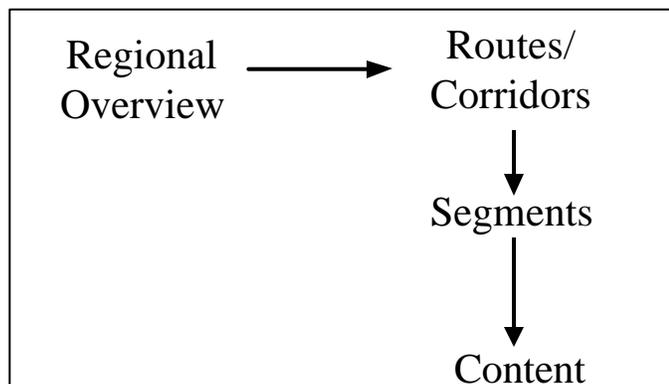
5. *Content is Automated* – Whether the information provided to the caller is a human recorded message, synthesized or digitized speech, this information should be stored and automatically provided to callers. There need not be any direct contact between callers and human operators to provide basic highway content.

Guidelines

The fundamental structure of a telephone system design matches highways very well. Telephone systems are usually accessed through a “menu tree” that is navigated by voice commands or by touching a phone’s keypad. Eventually, a caller reaches their desired destination in the system and either gets a recorded or digitized voice message. When seeking highway information, a caller will first find the specific highway or corridor for which they desire information, unless a regional overview is available and selected. The caller will then find the specific segment of highway or corridor that they are interested in, especially if it is a lengthy road.

Segment specification is left to the implementer, but should follow logic with segments defined between major towns, landmarks, roadways or by climatological differences (see *DAR #6: Weather and Environmental Content on 511 Services*, for more detailed information on weather information provision). In urban areas, segments should be defined between major interchanges and will generally be smaller in length than non-urban segments. Once the 511 service knows the specific section of highway that the caller is interested in, it then provides the caller a report of the relevant basic content. This process is graphically illustrated in Figure 2, with “Regional Overview,” “Routes,” “Segments” and “Content” serving as the key descriptors of the content guidelines.

Figure 2



1. *Regional Overview* – while not applicable in all areas, regional overviews can provide the caller with a general, high-level of information on a region, helping to determine if they should seek additional detailed information by going to the routes / corridor and continuing through to the content.
2. *Routes / Corridors* – Information on all National Highway System facilities / corridors should be available to callers. In urban areas, information on all non-NHS limited access highways should also be available to callers.
3. *Segments* – In non-urban areas, long routes should be sub-divided into segments. Segment specification is left to the implementer, but should follow logic with segments defined between major towns, landmarks or roadways and factor in climatological differences. In urban areas, segments should be defined between major interchanges and will generally be smaller in length than non-urban segments.
4. *Content* – For each segment, specific types of content should be provided. These should include:

- *Construction / Maintenance Projects* – Current information on active projects along the route segment that may affect traffic flow and / or restrict lanes.
- *Road Closures and Major Delays* – Unplanned events, major incidents or congestion that shut down or significantly restrict traffic for an extended period. In urban areas, information on all incidents and accidents, both major and minor, and congestion information along each route should also be provided.
- *Major Special Events* – Transportation-related information associated with significant special events (fairs, sporting events, etc.).
- *Weather and Road Surface Conditions* – Weather or road surface conditions that could impact travel along the route segment.

For each of these highway content types, it is necessary to provide details that enable callers to assess travel conditions and make travel decisions associated with a route segment. Table 1 illustrates the detailed information needed for each content type.

- *Location* – The location or portion of route segment where a reported item is occurring, related to mileposts, interchange(s) and / or common landmark(s). If there are dual routes in your region, identify both routes. Also note if the information is for a location out of the service area, North Carolina reports an incident on I-95 in Virginia.
- *Direction of Travel* – The direction of travel where a reported item is occurring.
- *General Description and Impact* – A brief account and impact of the reported item.
- *Days / Hours and / or Duration* – The period in which the reported item is “active” and possibly affecting travel.
- *Travel Time or Delay* – The duration of traveling from point A to point B, a segment or a trip expressed in time (or delay a traveler will experience).
- *Detours / Restrictions / Routing Advice* – As appropriate, summaries of required detours, suggested alternate routes or modes and restrictions associated with a reported item.
- *Forecasted Weather and Road Surface Conditions* – Near-term forecasted weather and pavement conditions along the route segment.
- *Current Observed Weather and Road Surface Conditions* – Conditions known to be in existence that impact travel along the route segment.

Table 1 – Basic Content Detail Needed for Each Highway Content Type

Content Type	Geography		Content Detail							
	Non-urban	Urban	Location	Direction of travel	General description and Impact	Days / Hours and / or duration	Travel time or delay ¹	Detours / Restrictions / Routing advice	Forecasted weather and road surface conditions	Current observed weather and road surface conditions
Construction / Maintenance	✓	✓	✓	✓	✓	✓	✓	✓		
Road Closures / Major Delays	✓	✓	✓	✓	✓	✓	✓	✓		✓
Major Special Events	✓	✓	✓			✓	✓	✓		
Weather and Road Conditions	✓	✓	✓		✓				✓	✓
Incidents / Accidents (Minor)*		✓	✓	✓	✓					
Congestion Information*		✓	✓	✓	✓		✓			

* Major congestion information and incident / accidents are considered part of the “Road Closures / Major Delays” content type

1 – Desirable if the deployer has the capabilities to include this information as part of the service

Implementation Recommendations

The following “implementation recommendations” address content topics that have been demonstrated to provide value to callers, but are recognized as difficult to uniformly implement. Thus, providing the following content is recommended to be included when launching services if possible, but not explicitly part of the basic content package for highways. As services improve and evolve towards the long-range vision, these items should be incorporated into the service if not done so at the outset.

- *Segment Travel Times or Delay* – Particularly in urban areas, estimated travel times across a route segment have proven highly desirable by callers. Travel times could be provided each in absolute terms (“segment travel time is 24 minutes”) or in terms of delay from normal conditions (“segment travel time is delayed 5 minutes”). In the case of absolute travel times, it is recommended that travel times given do not exceed the speed limit travel time. In urban areas, multi-segment or corridor travel times would also be acceptable. Segmented travel times offer an opportunity for the private sector to serve as a data provider. For example, the Tampa, Florida area plans to purchase data from a private entity to provide travel time to the public, which still leaves personalized travel information as a potential premium service for the private sector.
- *Observed Weather and Road Surface Conditions* – Observed or measured weather information may, when combined and processed with other road and weather data, form the basis in predicting and providing callers with segment or route-specific weather-related travel conditions.

Transit Content

Regardless of the size and nature of a 511 service area, there are likely to be one or more public transportation service providers in operation. In many cases, these public transportation operators already have established methods of communicating to the public about their services, including websites and customer service centers accessible by telephone. If properly utilized and coordinated with these existing communications methods, 511 can assist public transportation operators in better serving their customers and even attract new customers. The following guidelines should be considered when developing the public transportation information component of a 511 service.

There are many different approaches that public transportation operators could take to implement their portion of 511 services. These guidelines are intended to maintain this implementation flexibility.

Principles

Information access via telephone has proven to be extremely important in transit customer service. The principal purposes for these services are for general agency and service information, communicating service disruptions and changes and trip planning. At the basic content level, 511 should assist in providing callers with general agency and service information and communicating service disruptions and changes. Also, callers could be directed to where they can obtain more detailed information and trip planning.

The following five basic principles should be followed:

- *Information on All Transit Agencies in the Area Should Be Available* – Often, one or two dominant public transportation agencies exist in an area, but many more exist that collectively provide a region’s public transportation system. All of these operators should be accessible via 511. In complex or large geographic areas, it may be necessary to subdivide areas before identifying specific agencies.
 - The San Francisco Bay Area does not use sub-regions, which is one of the benefits of having a voice recognition system. Their system asks callers to say the name of the transit agency that they want and if they do not know, then the system asks them to say the name of the city or county in which they are traveling. The 511 system returns with the agencies serving that city / county. If the caller still does not know which agency to say, the system takes the caller to the menu of the predominant local transit agency for the selected city or county.
- *511 Works in Conjunction with Transit Customer Service Centers* – 511 is not intended to replace these operations, but to provide compatible and supplemental information, usually in the form of recorded scripts. Further, the vision is that callers would have direct access to customer service centers via 511 and how this occurs is an agency decision.
- *511 Should Minimize Additional Customer Service Center Overload Via Automated Messages* – Collective wisdom is that 511 access could increase the number of callers seeking public transportation information. If 511 were merely designed as a shorter number

to access the service center, this could significantly increase total calls to the customer service center. However, 511 systems can and should be designed to provide automated messages described in these guidelines that will answer many callers' questions prior to seeking assistance from customer service center operators. Ideally, thoughtful design will reduce the number of calls to be fielded by operators thereby allowing them to handle only the calls that require their expertise and increasing the total number of calls successfully managed. 511 services must work in concert with the existing transit information call centers for it to be useful to the operating agencies.

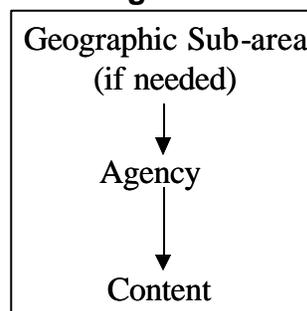
- *Each Agency Responsible for Their Information* – To ensure information quality and agency autonomy, any information provided via 511 for a particular public transportation operator must be provided or quality-checked by that operator. Callers will perceive agency specific information as coming from that agency, thus the agency must either directly provide or ensure the accuracy of the information.

Guidelines

The fundamental structure of a 511 telephone system design matches public transportation operations. Telephone systems are usually accessed through a “menu tree” that is navigated by voice commands or by touching a phone’s keypad. Eventually, a caller reaches their desired destination in the system and gets either a recorded or digitized voice message or possibly a live operator. In complex or large areas, the 511 service area may be segmented in sub-areas to simplify agency identification. Sub-areas may be dealt with by using voice recognition as described in San Francisco above.

Once the 511 service knows the specific public transportation agency that the caller is interested in, it then provides the caller a report of the relevant basic content. This process is graphically illustrated in Figure 3, with “Geographic Sub-area,” “Agency” and “Content” serving as the three key descriptors of the content guidelines.

Figure 3



- *Geographic Sub-area* – In large or complex 511 service areas, the service area can be subdivided for navigating and providing transit reports. This subdivision should be developed locally and represent a logical characterization of the service area, such as by travel corridor, geography (e.g., “The Northwest Suburbs,” the “Southeastern Part of the State,” etc.) or common name or nickname of a given sub-region (e.g., “Long Island”). Of course, 511 services that utilize sub-areas in their menu will require callers to make at least two navigating commands to select their agency, thus care should be taken so callers can reach their desired report as swiftly as possible.
- *Agency* – Each agency that provides public transportation services in the 511 service area or sub-area should be accessible. A single report for each agency is the basic guideline. Agencies have the option to add more layers and depth to their content. For public transportation agencies with large or complex operations, a single automated report may

either be too long and cumbersome or potentially confusing for callers. Therefore, basic content as described in the following section should be provided in a logically segmented fashion (e.g., by mode or by region).

- *Content* – For each public transportation agency, the 511 system should have at least a single automated report that provides:
 - *A Brief Description of the Agency’s Operations* – Quickly address the type of transportation services provided and the geographic area served by the system. For example, “XYZ Transit agency, providing bus service in the greater ACME region.” This element must be brief to minimize caller wait time.
 - *Major Service Disruptions, Changes or Additions* – Provide information on temporary changes in services (specific routes, vehicles or access), alerts and / or summaries of scheduled service changes and details of extra services being used for current or upcoming special events.
 - *Where Appropriate, an Option to be Transferred to the Agency’s Customer Service Center.*
 - Convey the hours of operation of a customer service center before transferring a caller to it, since it may not be operational at the time.
 - It is recommended that direct transfer options be established so that callers will directly transfer to an agency’s customer service center without hanging up, essentially creating a seamless system from the caller’s perspective. (Note: Care should be taken to understand the call volume of the centers to which the 511 system will transfer calls. It may be necessary to segregate outbound lines that the 511 system will use for this purpose and allocate unique outbound lines for each center. This will help avoid the traffic destined to one call center from saturating the capacity of the 511 system and therefore blocking any additional calls from being directly transferred to other centers.)
 - *Other “Broadcast” Information at Discretion of Agency* – Static information such as fare and pass information, real-time parking availability information, and the agency’s Internet address are a few of the examples of the information an agency could provide via automated messages on 511.
 - *Agencies may add More “Layers” to Reports at their Option*
- *Weather and Road Surface Conditions* – Weather or road surface conditions that could impact travel along the route segment.

Implementation Recommendation

The following implementation recommendation addresses a content topic that has been demonstrated to provide value to callers, but is recognized as difficult to uniformly implement. Thus, providing the following content is recommended if possible, but not explicitly part of the basic content package for public transportation.

- *Regional or Corridor Specific Transit Information* – The basic content guideline for public transportation indicates that each public transportation agency should have automated reports. As technical capabilities and information collection techniques improve, it is desirable in areas served by multiple public transportation providers to

allow 511 callers to request information based on location, instead of by public transportation provider. Infrequent users may not be familiar with the transit properties that serve their area and allowing them to request the availability and status of services based on location would permit them to make wiser travel choices. In addition, frequent users may be able to access status information about their usual routes more quickly than hearing a report for the entire transit property.

- Where multiple agencies operate, enable search / sort by region or corridor in addition to by agency.
- In complex areas, callers may not know what agency they are seeking information from.
- This may result in additional complexity to the 511 system in some regions.
- *Observed Weather and Road Surface Conditions* – Observed or measured weather information may, when combined and processed with other road and weather data, form the basis in predicting and providing callers with segment or route-specific weather-related travel conditions

Weather

The Coalition's *Implementation Guidelines for Launching 511 Services – Version 1.1*, succinctly states what information, or “content,” should be provided by a basic 511 service and the degree of uniformity and consistency of each service across the country. However, weather information was not described as an integral part of a 511 service or included in the basic level of content that all services should provide across the country.

With a Task Force formed in 2002, the Coalition focused on the guidelines associated with weather content, especially on the impact of weather conditions for travelers. In this section, weather content overall and weather-related principles and quality are covered.

Since traffic, road conditions and weather information are intertwined, and weather conditions and forecasts likely to impact the ability to travel are desired by the 511 callers, the Coalition has included additional guidance and information on weather, which stems from *DAR #6: Weather and Environmental Content on 511 Services*.

Principles

The overriding basic principle for providing weather information is simple: if weather will impact a person's trip, then they should be alerted to that actuality or possibility. Weather information is a basic component of 511 information provision and it is recommended that deployers provide travelers whatever weather information is available to them that may affect travel. This includes weather information provided by the National Weather Service and private sector value-added meteorologists, as well as roadway weather or surface conditions, both observations and forecasts, which can be provided by mobile and stationary sensor data information gathered by maintenance and operations personnel.

Ideally, if one is traveling from Point A to Point B, it is recommended that deployers provide the most appropriate transportation information in the shortest amount of time. Travelers need

prioritized hazard information for the impacts of both current and changing weather conditions, and if there is weather forecasted along the route that will impact travel. These reports should be segmented by route or trip where appropriate.

It is recommended that 511 services provide information on current and changing travel conditions and forecasts for upcoming weather phenomena that are likely to impact the ability to travel. This also includes the weather impacts on transit operations – on guideways, railways, pathways – and related passenger information such as wind chill effects on those waiting at bus stops. Deployers may look to various market packages in the National ITS Architecture for the origins for this type of information including: Environment Information Collection; Weather Information Processing and Distribution; Winter Maintenance; Maintenance and Construction Vehicle Tracking; Roadway Automated Treatment; and Maintenance and Construction Activity Coordination.

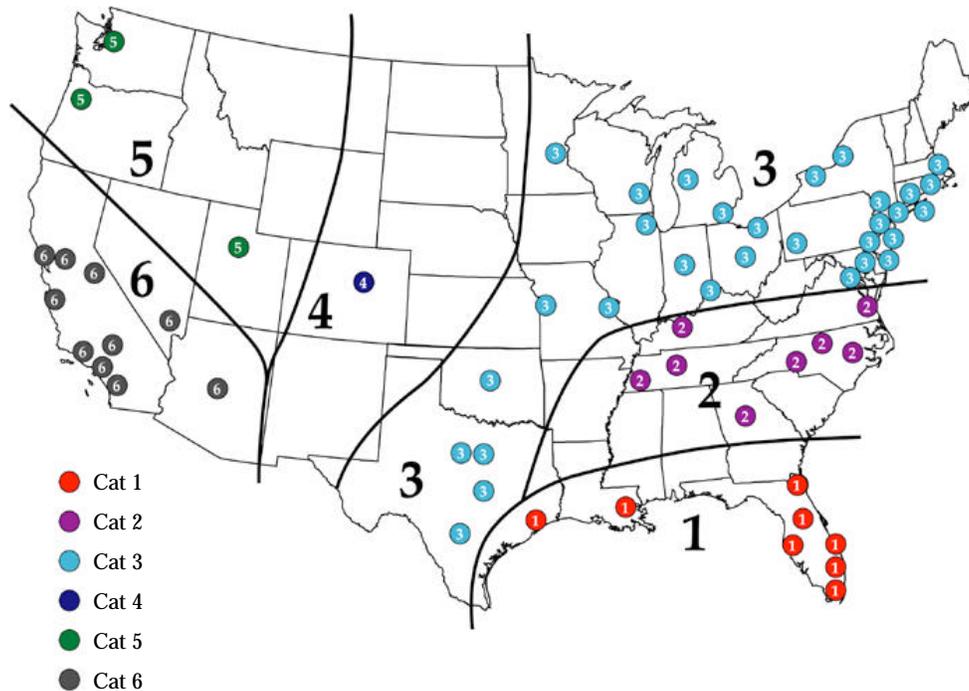
The gathering of weather data for maintenance efforts can be a prime source of information to be shared with travelers via 511.

As part of an effort to determine road weather observing needs, the FHWA's Road Weather Management Program has stratified the country for weather conditions and by season. Some 511 deployers may believe that there is no "weather" in their area and its impact on travel is not uniform across the country, but indeed there is "weather" in each area of the country. Weather impacts are different in the summer and winter months and a new realization on weather's regional impacts is arising.

The FHWA worked to divide the country by the effects of summer and winter weather by looking at a handful of weather elements within the top 61 metropolitan areas. Summer and winter indices were developed for each and the cities were then ranked. Based on the rankings, the country divided up into categories – 5 for winter and 6 for summer. These categories are shown in the figures below with Category 1 being those areas where weather events are likely to have a more pronounced impact on travel. The categories give deployers a good idea as to the priority that weather information should take on their 511 system depending upon their location in the country.

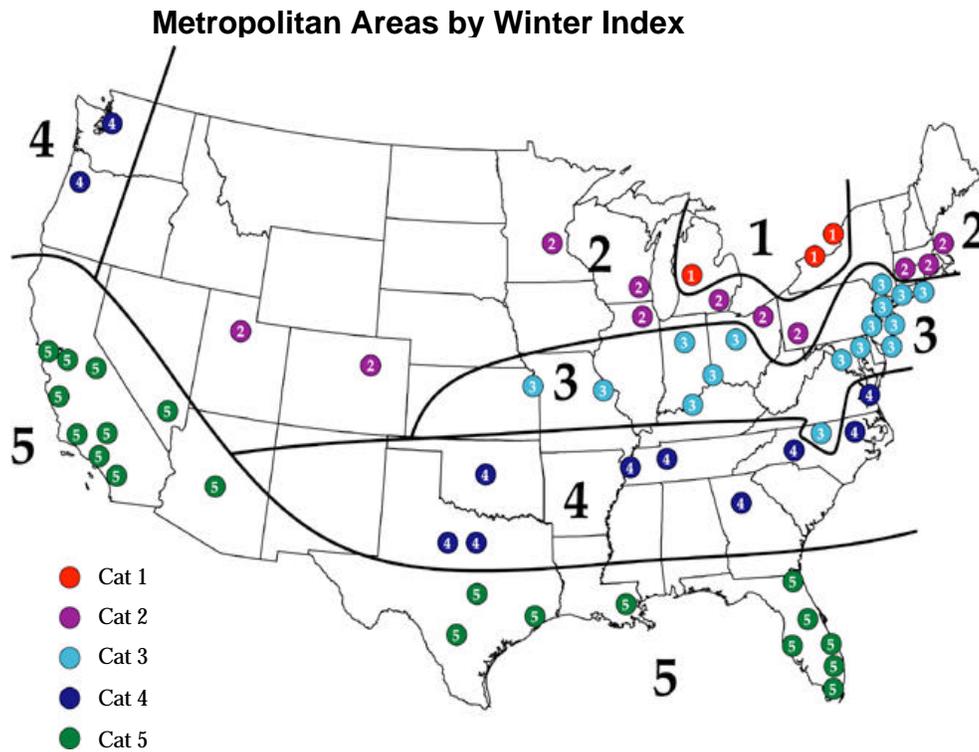
These figures and categories are not finalized as the FHWA continues to revise this effort with its completion later in 2003, but this does give 511 deployers insight as to the necessity of weather information on their system. 511 systems in a Category 1 area of the country will need more detailed, comprehensive weather information provided on a consistent level as weather has a greater impact on travel than those in Category 5. But, weather is also a factor in a Category 5 area, at times, as El Nino rains in Los Angeles provide just as great of an impact on travel as winter storm conditions do in the Midwest.

Metropolitan Areas by Summer Index



- Summer index is a function:
 - Days with measurable **precipitation** (summer)
 - Average number of days with **thunder** (summer)
 - Average amount of liquid **precipitation** (annual)
 - Probability of any named **tropical cyclone** (hurricane or tropical storm)
 - Average number of days with **heavy rain** ($\Rightarrow 2''$) (summer)
 - Average number of days with large **hail** (annual)

Because of the highly localized nature of fog and other factors affecting visibility, the factor analysis used to develop the indices was unable to incorporate visibility data.



- Winter index is a function of:
 - Average number of days the daily **temperature** falls to or below freezing (annual)
 - Average number of days where measurable **precipitation** occurs (winter)
 - Average amount of **snow** (annual)
 - Average number of times peak **wind** speeds were > 50 mph (annual)
 - Average number of hours that **ice** occurred per year

There may be specific geographic or climatological locations within these stratification categories where weather events have more pronounced or seasonal impacts, such as mountain passes in the winter months. In these cases, it is recommended that the 511 system serving those areas devote particular attention to these localized areas and conditions.

Guidelines

Weather information on a 511 system can range from a regional alert (hurricane, winter storm, etc.) to a route specific observation or alert (low visibility, icy pavement, high winds, etc.). Deployers should include any available weather-related information that could impact a person's travel and attempt to package and deliver the information in a consistent manner. The two keys to weather are relaying impacts and providing navigational references to aid the traveler.

- *Weather Related Impacts* - When weather conditions are a cause of accidents, incidents and delays, it is recommended that this be noted on 511. For example, there is a ten-minute delay at the bridge crossing due to high winds. This is at the heart of weather information provided

on 511. In other words, it is not direct weather that is important to 511, it is the related impact that is important. This is why future generations of 511 will include weather in the context of travel rather than simply providing the “data.”

- *Navigation Reference* - Weather information should be presented with a navigation reference such as: road segment; cities / towns; milepost; exits; major intersection / interchange to major intersection / interchange; landmarks; and rest areas.

Implementation Recommendations

The following recommendations address a content topic that has been demonstrated to provide value to callers, but is recognized as difficult to uniformly implement, and may vary slightly based on local or seasonal need. Thus, providing the following content is recommended for inclusion in the launch of a service if possible. As services improve and evolve towards the long-range vision, these items should be incorporated into the service. It is recommended that 511 weather information be assembled and presented through a 511 system in the following manner:

- *Format for Depicting Road Condition* - The Society of Automotive Engineers (SAE) ATIS standard / message sets are appropriate for the sharing and presenting of weather information on 511. The ATIS and Traffic Management Data Dictionary (TMDD) – standards for center-to-center communication – committees are coordinating message set structures and coding to ensure commonality.

The most current draft of the ATIS message set that deals with weather and links in both Abstract Syntax Notation number One (ASN.1) and eXtensible Markup Language (XML) is available in DAR #6 at <http://www.deploy511.org/docs/511-dar6weatheenviroservices.doc>. Many of the elements come from National Transportation Communications for ITS Protocol (NTCIP) - Environmental Sensor Stations (ESS) or from TMDD when they do not come directly from the ATIS standard. Still to be worked on as of this document’s publication date by the SAE ATIS standards team are more “forecast” type messages to deal with predicted weather conditions.

- *Observed vs. Forecasted* - 511 users want to get more timely, accurate and relevant (e.g., location- or route-specific) forecasted information than they might on the nightly news or radio. There is a need for route-specific weather forecasts and the operational weather community is working on providing this data. It is recommended that a 511 deployer include weather conditions and forecasts likely to impact the ability to travel. One way to accomplish this is through “Nowcasting”- a zero to three-hour statement of what is happening and the changing conditions that are important to travelers.
- *Short, Live Update Frequently* - It is recommended that weather condition information on 511 be updated frequently so that the information presented is the best available at the time. Weather forecasts and current conditions are available through a variety of means (RWIS, radar, etc.) and in a number of time frames. Weather conditions may be slow, moderate or fast changing and a 511 deployer needs to convey the impact of these changes to travelers.

Thus, 511 deployers need to be cognizant of the time frame that weather conditions and forecasts may be ascertained and the resultant impact on travelers.

- *Road Surface Conditions* - Road conditions can change swiftly. Atmospheric and pavement sensor data can provide indications of conditions affecting traffic flow and roadway safety (e.g., low visibility, slippery pavement). Environmental sensor station (ESS) data are typically collected by Road Weather Information Systems (RWIS) deployed by maintenance managers. These managers can supplement observed data from ESS with information on maintenance operations (e.g., snow plowed, sand applied) to provide data on actual surface conditions. Route-specific road condition data are currently provided, through traveler information websites, by 39 state agencies. Deployers of 511 systems should coordinate with state and local agencies to access existing data from advanced road condition reporting systems.
- *Metropolitan / Rural Differences* - In non-urban areas, it is important to provide weather information on road segments before logical decision points along a route. If there is snow in the pass and chains are required, this needs to be conveyed to travelers well in advance so that they may put on chains, use an alternate route or delay passage. In urban areas, segments are more proximate to other areas and there is more information available on many segments that are relatively close to one another.

ii. Optional Content

As stated in Version 1.1 of the Guidelines, the Coalition recognizes that additional content beyond the basic content described in the previous section could be provided by a 511 service. In fact, so long as quality basic content is being provided, the Coalition encourages that 511 implementers consider providing optional content that will benefit callers.

Again, this optional content is up to the discretion of the system implementers and can include additional content supported by the public sector and / or private sector supported services. Based on local demographics or geography, some of these optional content categories would be expected by local callers. Implementers should factor in these expectations into their service planning process.

In providing additional content implementers have essentially two choices:

1. *Go Deeper* – A richer set of basic services could be provided via 511. For example, information on more highway routes, such as major arterials, could be added to the basic system. Or more detailed content could be provided on public transportation services (e.g., detailed choices for automated messages could be provided – service disruptions may be a different selection than parking availability at a rail station for instance – as opposed to a single automated message). Another possibility is that an agency or region could choose to greatly improve the accuracy, timeliness or availability of their information, improving its quality but not adding further content.
2. *Go Broader* – Many additional content categories have been considered for inclusion in 511 services, but are not part of the basic content package.

The following list is representative, but not complete, of the possible optional content categories. Implementers may choose to implement these and other types of content (*Please note that the Coalition is not assessing the merits of each of these content options, merely providing them for deployer's consideration*):

- *Tourist Information* – Specific information about local tourist attractions, tourist information centers, convention and visitors bureaus, etc. Could be recorded messages or connections to live operators.
- *Special Events* – Information pertaining to major special events occurring in a service area. The information may go beyond transportation-related information to include event-related information such as times, locations, event descriptions, etc.
- *Parking* – Parking location and possibly parking lot status information.
- *Local Information / Points of Interest* – Information such as restaurant locations, gas stations, taxis, etc. Could be extended to include reservation services.
- *Interregional Information* – Information pertaining to transportation conditions in other, perhaps adjacent, regions. Examples include extension of an interstate travel corridor, a major city in an adjacent state and multi-state hurricane evacuations. Depending on how your “region” is defined, this may be “basic” content accomplished by a call or data transfer.
- *Driving Directions* – In a voice-activated 511 service, callers can provide their location and their desired destination and obtain driving directions. These directions could be based upon real-time conditions and / or can include estimated trip travel time if such information is available.
- *Public Transportation Trip Itinerary Planning* – In either a voice activated or operator-assisted environment, callers can obtain transit trip plans that could include routes, transfers, costs and trip times.
- *Multimodal Routing and Trip Planning* – Integrating information from multiple modes (highways, transit, rail, air, etc.), callers can obtain a complete trip itinerary that is as efficient as possible, regardless of mode.
- *Incident Reporting* – 511 is intended primarily as an information source for callers. However, systems can be designed such that callers could report incidents through 511 as well, either by communicating directly with an operator or by leaving a voice message.
- *Local Transportation Facilities Information* – Callers can obtain information about major transportation facilities in the 511 service area, including airports, train stations, ferry, freight, and cruise ports. Information could include parking and traffic conditions associated with the facilities.
- *Local Transportation Services Information* – Callers can obtain information on transportation programs in the 511 service area, such as carpools and vanpools.
- *Concierge Services* – Operators can provide any of the above information to callers. These operators could also handle additional services, such as reservations and purchases.
- *Personalized Services* – Callers can provide profiles of their normal travel patterns and the system, by recognizing the phone number of the caller, or some other method, can provide a complete report along the caller's route (e.g., the conditions on a

- commuter's complete normal route), without requiring callers to locate and review reports on multiple route / corridor segments.
- *Customer Feedback* – Callers can select a menu item that allows them to provide comments on the service, or can be used by the deployer as a surveying tool.
 - *Caller Reports* – Callers can report conditions that require a response by the transportation agency, such as hazardous road conditions, dead animals or potholes.

In examining the addition of optional content, system implementers should be careful to design a system that complements – rather than diminishes – the impact of the basic content services. Also, each of the options listed above may require extra and complex interactions to provide via 511. As these are intended to be illustrative examples, assessments of the relative practicality or merits of each optional content category are not provided

Across the country, optional content has been limited in its use, to date. The first 511 service to provide optional tourism and travel-related services was the I-81 Region 511 service in Virginia. The service includes information on lodging, restaurants and “things to do” in the 35 county coverage area. On average, 8% of the callers each month access the available travel services section of the menu, with approximately 90% of those callers selecting lodging, which users can be automatically connected to without dialing an additional phone number. The Auto Connect feature is dual purposed: safety and convenience. This system uses voice recognition for the queries and is fully automated using both text to speech and recorded messages.

The Metropolitan Transportation Commission (MTC), operator of the 511 service for the San Francisco Bay Area, has included optional services that are expected by their callers. Those optional services include information on bicycling and carpools / vanpools. The carpool / vanpool information is provided via a call transfer to a regional or local rideshare operator, depending on the jurisdiction the caller is interested in.

By December 2003, Kentucky also plans to make travel and tourism information available. The Southern and Eastern Kentucky Tourism Development Association (SEKTDA), is designing a service so callers will be able to speak to a live agent. Each agent will have access to a large database of specific information relating to the amenities, attractions, events and other activities found in the 42 county Southern and Eastern Kentucky region.

Other states, such as North Carolina, have a strong desire to provide tourism-related information through their 511 services. Many states see the solution being a call transfer from the 511 service to an existing statewide tourism call center, thus eliminating the need to incorporate outside data feeds or upgrade databases.

iii. Issues for Content Quality and Consistency Across Systems

The accuracy, timeliness and reliability of information on 511 is an important issue for the 511 community and users as well. In an increasingly advanced information society, callers are generally accustomed to high quality information. 511 content must be no different. In 2001, ITS America, in its national consumer research on 511, determined that “those surveyed said that

if they used 511 and found the information to be inaccurate in their first few uses, they would be unlikely to give the service another chance.”

Therefore, 511 implementers must focus on the following five quality parameters:

- *Accuracy* – Reports are recommended to contain information that matches actual conditions. If the system reports construction events that are not occurring (or worse, does not report a construction event that is occurring) or a road closure is not reported, callers will come to distrust the information provided. If inaccuracies persist, callers will discontinue their use of 511.
- *Timeliness* – Closely related to accuracy, information provided by 511 is recommended to be timely to the greatest extent possible in accordance with the speed of changing conditions. While it is recognized that non-urban areas may have more difficulty collecting, inserting and updating information quickly, is recommended that every attempt be made in both urban and non-urban areas to update information as soon as there is a known deviation from the current route segment or service report. Thus, the timeliest reports are based on changing conditions and not on regular interval updates.
- *Reliability* – Often, transportation management systems are staffed during limited working hours. But travelers use highways 24 hours a day, 7 days a week. In fact, often the most challenging travel conditions are at nighttime and on weekends. Methods must be developed to provide callers with a reliable stream of information 24 / 7.
- *Consistency of Presentation* – It is recommended that reports use the same, or similar, terminology to describe conditions. Lack of consistent terminology leads to misunderstanding and confusion amongst callers and consistent terminology will make the system more usable as users move from system to system. The use of existing and evolving standards, such as the TMDD and SAE J2354, for messages enable this consistency.
- *Relevancy* – The information that is provided needs to be relevant to the caller given their location, modal choice and / or actions that they may need to take as a consequence of weather, road conditions or service disruptions.

Information quality is a major concern of the Coalition. The quality of basic content information will largely determine the success of 511. This is why the information is recommended to be tailored to the travelers’ needs along their route. It is recommended that 511 services give callers the ability to gauge the quality of the reported information to enable them to properly weigh the information in their decision-making (e.g. “There is a report of an avalanche...” vs. “An avalanche has occurred...”). However, the Coalition has not included specific quality parameters as part of this version of the guidelines. This is for two reasons:

1. More collective deployment experience and user feedback and objective analysis of travelers’ information needs / requirements is needed prior to determining optimal quality parameters.
2. The Coalition hopes that a special focus on information quality by implementers will lead to quality services.

The Need for Increased Data Collection

Many of the individuals and agencies early in their 511 development and deployment process found that there was a large misunderstanding common throughout the country – that transportation departments and agencies already possessed all of the data and information necessary to provide a quality 511 service. While the concept of dialing an easy to remember telephone number and providing quality decision-level information to the traveling public was easy to grasp, the complexities of the systems behind the service, or the total lack of relevant technologies to assist in providing the service, were not.

The USDOT “Infostructure” or Integrated Network of Transportation Information (INTI) initiative has a clear tie to providing quality information to travelers be it through 511, ATIS or ATMS (Advanced Traffic Management Systems). The deployment of roadside detectors, wireless communication devices and other systems is key to the development of a nationwide 511 service. In fact, many states are presenting 511 as the “face of ITS” to elected officials and the public, and are using 511 as a way to increase the coverage area of detection and systems. The more detection and base-level of technological investment there is, the better the 511 service, and the more consistent the level of information provided can be. If every state or region has a similar level of detection and integrated networks for collection of information, then the products could also be similar.

Emergency Alerts / Broadcast Messages (Evacuations, Major Incidents, Homeland Security, AMBER Alerts)

Since the early deployers launched their 511 services in 2001 and 2002, most have found additional ways to use this valuable resource. Some of these ways include broadcast messages in emergency situations, working in conjunction with traffic and incident management and supplementing AMBER Alerts. 511 is also seen as an additional dissemination tool for Homeland Security needs, although no system has been specifically designed for it.

Broadcast, or “floodgate” messages, can be a critical tool for disseminating information to the traveling public during a major incident, be it weather, event or security-related. Broadcast messages can be implemented in various ways, but the two basic types are uninterruptible and interruptible – meaning a caller can override or terminate the message.

In times of emergencies, uninterruptible broadcast messages can deliver a brief, important message at / or after the greeting of a 511 service and terminate the call, thus creating a 511 system that has short call durations and is able to disseminate the most critical information to all callers and nothing else. This will alleviate some of the peak capacity issues that deployers are experiencing. The uninterruptible message relating to a lesser service disruption with a large impact requires a caller to hear the whole message before they may continue to additional, selectable information. Other forms of the message type are broadcast by service, mode or geographic area. Interruptible messages can be placed in the same areas of the system, but are typically used for less important information.

Virginia DOT (VDOT) found that 511 is a welcome asset during incident and traffic management situations. The 511 service is being used in conjunction with permanent and portable changeable message signs (CMS) to relay critical information to travelers during major

incidents, typically hazardous material spills that can close an Interstate. Because CMS are limited to three lines of text on three panels, multiple detour listings and describing complex situations is generally not possible. The CMS convey the necessary information as they normally would in these situations, but they also prompt travelers to dial 511 for additional information. In one situation, VDOT used CMS up to 100 miles from an incident to alert drivers to dial 511 where they received information on up to three detours depending on their desired destination. VDOT has documented that by using the CMS and 511 together, call volumes to the service doubled almost immediately.

The AMBER Alert is a child abduction response system that uses radio, television, changeable message signs and emergency broadcast systems to disseminate information about kidnapping suspects and victims soon after the crime is committed. The system is designed to solicit aid from the public to look for victims by providing known details such as descriptions of vehicles and individuals. In recent months, 511 services have become an additional tool for disseminating AMBER Alert information quickly and completely. In fact, many states have realized a significant increase in unsafe driving from the amount of information displayed on the message boards, which seems to be supported by University of Minnesota research that recommended changes to the Minnesota AMBER Alert messages on CMS, including referring drivers to other information sources to retrieve more detailed information. As a solution, Utah DOT is using less detailed AMBER Alert messages on its CMS and prompting drivers to dial 511 where they can receive accurate detailed information about the situation. This process was recognized by the AMBER Alert representatives in Utah with the designation of the 511 system as a “certified” source of AMBER Alert information.

Timestamping

Caller expectations are for timely information. Providing a time / date identifier to provide callers with a sense of reliability and accuracy of the information provided is desired by some deployers and some customers. If a 511 system provides basic content quality as defined in the guidelines, then time stamping the information is unnecessary and undesirable. If a system knowingly provides information that is updated not as conditions change, but based upon a periodic schedule, then the schedule should be communicated to callers in association with the particular message.

Tailoring Content to Telephonic Media

The tailoring of content to telephonic media poses some issues. Often, the data available for inclusion in a 511 service is from a traffic management center software package or data available on an agency website. Reading information on a website or looking at a graphical user interface (GUI) is a much different experience than listening to the same information over the telephone.

To convert these types of data into usable information for dissemination through the telephone, a deployer should try to eliminate the use of free form text. This may require a database modification forcing operators to use pull-down menus where blank text boxes were formerly used. Since most operational 511 services deliver information using concatenated speech or text to speech technologies, Voice eXtensible Markup Language (VXML) has become the de facto standard for interpreting and delivering the information. This means that most data feeds to 511 are being provided in an XML format.

Another way that deployers have provided content via telephone is to treat the medium as if it were an on-demand radio report, complete with recordings made by professional voice talent. The Central Florida 511 service covering I-4 disseminates its information in this manner. Most travelers are accustomed to hearing radio-style traffic reports and have made the system one of the most heavily used in the country.

The design of the system and how the caller will interact with the menu options must also be taken into consideration. This issue should not be taken lightly, for a poorly designed system will lead to unhappy users and a decline in usage. A quality design is best achieved by using experienced personnel and thorough system testing. It is difficult to design a comprehensive, easy to use automated phone system, however, it can be achieved.

Recognition of Regional Variation

Striving for a consistent 511 service across the United States is very important to the Coalition and was also clearly stated in the FCC report and order designating 511 for travel information. While consistency is vital, meeting a travelers' needs should always be the top priority. However, those needs change from place to place and from caller to caller. Variations in systems are shown in the Attributes of Existing 511 Services table in Appendix B. Sometimes variations are by a deployer's choice and other times are due to a lack of quality information or resources available.

Another reason why variations exist, or why information need varies, is that the same caller may have completely different needs depending on the trip type, season or geography.

For example, Joe, a daily commuter in the San Francisco Bay area may dial 511 regularly to check on his commuting routes to and from work. On the weekend he may need to know information on available transit service to Pac Bell Stadium. The following week, while driving through northern Arizona on vacation, Joe may be most interested in the weather-related road conditions. While daily commuting and transit service to a baseball stadium may not be relevant in northern Arizona, early-spring road conditions are.

iv. Content Examples

Many deployers are in the process of adding additional content to their existing systems, or plan to improve the quality of content that they already have. Arizona and Florida, both recipients of separate competitive funding awards from USDOT, are expanding the depth and breadth of the information available to their users.

In Arizona, ADOT, under the 511 Model Deployment, is adding the following new content elements, or enhancements:

- *Regional "Quick Reports"* – will include high-level headlines for the six regions of the Phoenix metro area.
- *Segmented Road Information* – ADOT has decided how segments will be combined, split or overlapped to best meet the caller's needs.

- *Travel Time Information for Key Major Arterials in the Phoenix Area* – data will be collected through a license plate reading and matching system. This information will allow users to determine if non-interstate alternate routes are a viable choice.

Florida DOT (FDOT), through iFlorida, the Surface Transportation Security and Reliability Information System Model Deployment project, is enhancing the content of the existing Central Florida 511 service that covers I-4 through Orlando to points east. The primary change is the addition of travel times or delay information on all of the limited access highways and most of the major arterials in Central Florida. FDOT will achieve this by using toll tag readers on the limited access highways in the region and also by deploying license plate readers to provide segment travel times for about 128 miles of seven principal arterials.

The iFlorida project will also provide current weather information and time-slice (starting and ending time) forecasts for defined road segments. This will be achieved by deploying additional roadway weather information systems (RWIS) and incorporating current and forecast information from private partner Meteorlogix. Projected conditions from 15 minutes to two or three days out will be provided for each identified roadway segment.

C. Phone System Guidelines

Telecommunication systems are the access and delivery points of all 511 services. Guidelines for these systems are more general than the content guidelines, since each telecommunication system can be established differently behind-the-scenes and still deliver identical information in a near identical manner to the user. These guidelines tend to be more “rules of thumb” for now, but will likely evolve based on additional customer and user input over time.

i. Phone System Elements

The key telecommunication elements of a 511 service allows the system to accept calls, interact with the users, process queries and commands and provide useful information back to the callers. Each of these system elements must be properly planned and must function consistently to have a successful 511 service.

Accepting Calls

The service should be capable of accepting calls from both wireless and landline phones, and do so without extensive delay to the caller. The call should go through and be routed to the proper answering point, be it a local or toll-free number. See additional related information on System Access Quality and Call Routing in later sections.

User Interface

To most callers, the user interface is the system. For most 511 services today, the interface is a voice recognition system, ideally with a touchtone back up. If the interface does not work properly (does not recognize commands), consistently or is cumbersome to use, then the 511 service is not meeting the needs of the caller, no matter how good the underlying information is. The User Interface Guidelines can be found in section C.ii below.

Data Storage / Management and System Logic – Processing Commands

Data for 511 systems is typically stored in one or more computer servers, which can be located on-site at the implementing agency or off-site with a contractor. Both system arrangements have proven to work effectively. Currently, there is no specific guideline for how data is stored or how commands should be processed. However, the system should be designed to minimize the delay in processing the command to reduce the amount of time the caller is required to stay on the phone. Most of the systems deployed today typically process a command within one to three seconds. Any delay longer than ten seconds is noticeable to the user and may prompt them to terminate the call.

Output – Providing Information

Information should be provided in a succinct message, which conveys all the necessary information to allow the caller to determine if an action needs to be taken on the caller's part to improve the quality of their trip (reduce delay, avoid hazardous conditions, etc.). The result of the command, or query, should be delivered in a consistent voice and manner and should be of high-quality.

ii. User Interface Guidelines

Based on consumer focus groups around the country, the initial greeting should be very short, such as "Welcome to (metro area's, state's, or program's name) 511 for Travel Information." Customers expect a short verification that they dialed correctly, but comment that they do not want a lengthy introduction or long formal enunciation of agency names. Supplemental information such as website addresses or complete help instructions should not be included in the initial greeting, but provided through menu selections. Some services name the sponsoring departments or agencies to add credence to the information being distributed. In the cases of major emergencies, an uninterruptible emergency message may be provided prior to, in place of or just after the normal initial greeting.

It is recommended that implementers use voice recognition as the primary user interface. For voice activated systems, the following top-level commands should be used when a system has the relevant information available: "Highway Information", "Transit Information", "Airport Information", "Rail Station Information," "Ferry Information" and "Help." Top-level menu commands beyond the basic services are acceptable. Care should be taken when adding additional top-level commands to select descriptive terms and not to conflict with the basic terms noted here. It is possible that the specific top-level menu commands may change in future updates of the guidelines based on information collected through user input and system evaluations.

Although discouraged as a primary user interface means, systems that utilize keypad entry for navigation should use the following top-level menu tree: 1 for "highway information", 2 for "transit information" and 9 for "help using the system". Although not defined as part of the basic content package, 3 should be reserved for "airport and other major terminal and transportation facility information." Systems that use both keypad entry and voice activation should allow callers to press or say the top-level number ("press or say 2 for transit information").

Overly complicated menu trees should be avoided. Systems should not require the user to make more than 3 entries or replies before providing the desired information. At each level, no more than 6 options should be listed. Systems should allow users to request that messages be repeated and to “go back” in the menu tree.

“Shortcuts” are used often by repeat callers who know what element of information they are seeking. The use of shortcuts is encouraged and has been employed in many systems. It is possible that a future update of these guidelines could include specific guidance on shortcut methods if some are clearly better than others.

iii. Service Quality Guidelines

The quality and availability of the 511 service is important to attracting and retaining users. Users receive no benefit from a service that contains accurate, timely and relevant content, but is inaccessible. These guidelines address the system access quality and the hours of operation of a 511 service.

System Access Quality

In order for the telephone system to have the ability to reliably and quickly answer calls, a 511 service should be sized to accept all calls for the 90th percentile peak hour load¹. If live operators are utilized, or connected to, as part of a 511 service, the 90th percentile wait time should not exceed 90 seconds and callers should receive indications that they are on hold. 511 services should have an availability to callers of 99.8%. This translates to the system being out of service less than 18 hours a year.

System performance against these parameters should be measured and monitored. Most implementers are meeting these guidelines by employing an application service provider (ASP) that operates the telephone answering ports (phone lines) and uses a voice recognition software package, which is all located off-site (even across the country in some cases). By contracting this portion of the 511 service, or all of it, an implementer can benefit from the ASP’s existing infrastructure, allowing the system to easily handle enormous peaks in call volumes.

Most deployers have seen a 300 – 500% increase in call volumes simply by converting an existing 7 or 10-digit travel information line to 511. For example, Southeast Florida experienced a significant increase in call volumes by converting an existing travel information phone number to 511. The system used to receive 15,000 calls per month, however, with 511 as the access number, the system now receives more than 100,000 calls per month – an increase of over 650%. For some 511 systems, major events (weather, incidents, etc.), especially in conjunction with peak travel times, can cause call volumes in a single day to exceed the call volumes of an average month.

¹ 90% of the time (21.6 hours of the day, 7884 hours of the year, etc.), a 511 system should have the system capacity to handle 100% of incoming calls. This guideline recognizes that extreme conditions will occur periodically that will increase demand well beyond “normal peak” calling. In those circumstances, it is not unreasonable to ask callers to re-dial to access the service.

Hours of Operation

511 services should be available to travelers 24 hours a day, 7 days a week. It is recognized that systems will not always be “operated” 24 / 7. In instances when the system is providing static, pre-recorded messages, systems should inform the caller that it is outside normal operating hours.

In the mid and late 1990s, consumer research and anecdotal information showed that traveler information systems solely designed for the weekday commuter and only operated during specific business hours were found to have limited use and applicability. Travel information is just as important, or possibly more so, to someone traveling late at night or during the weekend than to a daily commuter. With an automated system, receiving inputs from multiple sources and using non-recorded messages, a 511 service can operate around-the-clock. To date, all 511 services deployed are accessible 24 hours a day.

iv. Usage Monitoring Guidelines

The 511 Deployment Coalition asks that 511 deployers report usage statistics from their system each month. This usage information is valuable to the Coalition, other deployers and in marketing and outreach activities. As part of its National 511 Performance Measures, the Coalition reports on: 511 coverage for states, Top 60 metropolitan areas and population, quarterly total 511 usage and for systems operational for more than one year. These, and other, usage statistics help deployers gauge the consumer response to their service and enable comparisons between like systems.

The list of statistics tracked were developed by querying deployers, the 511 Working Group and telecom providers which statistics were being, and should be, tracked. All deployers should forward usage data via email to Pete Costello at petecostello@pbsj.com. The usage statistics that are tracked by the Coalition on a monthly basis are:

- Calls per month
- Peak call day
- Peak call count
- Peak call day reason (i.e., major storm, holiday travel, incident)
- Peak call hour
- Peak call count
- Peak call hour date
- Peak call hour reason
- Capacity utilization
- # of Dropped Calls
- Average call length (seconds)
- Total minutes per month
- % Wireless
- % Wireline
- % Category
 - Traffic
 - Transit

- Weather
- Construction
- Ferry
- Services
- Road Conditions
- No Selection
- Airports
- Bicycling
- Commuter Incentives
- Paratransit
- Carpooling / Vanpooling
- Spare the Air
- Transfers

Currently, all 511 deployments report usage information to the Coalition. Only a few are able to report all the information desired above and with the release of this version of the Guidelines more of this information should be available in the future. The following describes the type of information needed and a rationale for providing it:

- *Calls Per Month* – the total number of calls to the 511 system. This information is gathered as of the date of the launch of 511 services by the deployer. Some systems have an official public launch ceremony while others choose to slowly roll out the service as carriers reprogram switches.
- *Peak Call Day, Count and Reason* – the day of the month that the system received the most total calls, the number of calls received that day and the reason for the influx of calls. Over time, the peak call day usually has been caused by a major incident or weather phenomena.
- *Peak Call Hour, Count, Date and Reason* – the hour of the month that the system received the most total calls, the number of calls received, the date and the reason for the influx of calls. Over time, the peak call hour usually has been caused by a major incident or weather phenomena, but it is not necessarily on the peak call day.
- *Capacity Utilization* – this is determined by the peak number of simultaneous calls divided by the maximum number of simultaneous calls. In some cases, capacity utilization can exceed the maximum number of simultaneous calls especially when using a shared off-premise facility. Capacity utilization can assist a deployer in making decisions to expand or contract the maximum number of simultaneous calls.
- *# of Dropped Calls* – the total number of calls to 511 that do not receive information or make a menu choice. A large number of dropped calls may indicate problems with a switch, carrier or port(s) / line(s).
- *Average Call Length (Seconds)* – the total length of all calls in seconds divided by the total number of calls to 511. An increasing average call length may indicate that consumers are

having problems accessing information. Deployers usually see their average call length decrease when switching to a voice response system and as users become familiar with the menu structure and shortcuts.

- *Total Minutes per Month* – the total number of minutes that calls to 511 were connected to the system. The rationale for total minutes per month is similar to average call length above.
- *% Wireless and Wireline* – the number of calls received via wireless and wireline calls divided by the total number of calls. These percentages are useful in determining the effectiveness of 511 marketing campaigns as new billboards and road signs should see an increase in wireless usage and bill inserts may increase wireline usage. A decrease in wireless usage may indicate that there is a problem with switch programming or call routing.
- *% Category* – the Coalition currently asks deployers the percentage of calls to the following categories: Traffic, Transit, Weather, Construction, Ferry, Services, Road Conditions, No Selection, Airports, Bicycling, Commuter Incentives, Paratransit, Carpooling / Vanpooling, Spare the Air and Transfers. These categories are based on actual menu choices for systems around the country and enable comparisons between like systems. An increase in the No Selection category may indicate the same problems as the # of dropped calls above.

Additionally, some deployers like the I-81 Region in Virginia, are able to track where users' telephones are registered giving VDOT a monthly snapshot of where its users live (by area code or state). This is very useful information for VDOT, but is also useful for the private companies who have advertised with the 511 Virginia service. If a deployer plans to include travel services, tourism and / or premium services for its users, it should have the ability to track this useful information.

Deployers should report their usage statistics to the Coalition no later than the 15th of the subsequent month, e.g., July's statistics should be transmitted by August 15. This will allow for the Coalition to continue to track usage statistics as they are of interest to many 511 stakeholders. In the future, the Coalition may request that deployers gather additional statistics based on changing needs.

v. Call Transfer Guidelines

Call transfers can play an important role in providing a comprehensive and useful 511 service. There are multiple reasons to provide such transfers, including cell tower and switch location issues, cross-border travel and services not typically provided by the implementing department or agency. For example, a state DOT may be the lead developer and operator of a 511 service and desire to provide information on city-based transit systems, coastal ferries or tourism information. Instead of adding functionalities to the DOT database, the callers requesting such information can be transferred to the responsible agency or service provider capable of maintaining accurate and timely information. MTC is operating this type of service in the San Francisco Bay Area.

911 Linkage

While it is technically feasible to transfer a 511 call to a 911 call center, implementers should examine a number of key issues that must be considered before choosing to do so. Any region considering this capability must research the liability and privacy issues associated with 911 call processing. The liability protection currently offered the telecommunications industry and 911 call centers does not apply to transportation agencies or their contractors. Also, there would be both non-recurring and recurring costs to the implementer for this capability. To date, no 511 services offer a direct linkage or call transfer capability to any 911 call centers. The DAR on this topic may be found at: <http://www.its.dot.gov/511/511to911.htm>

Bordering 511 Systems

Transferring calls across regional coverage areas or state lines between 511 services is one way to offer callers additional relevant information. Some states have chosen to eliminate the issue entirely by banding with bordering states and seeking a single service provider. This allows the call to be transferred internally within the structure of the overall, multi-state service. However, other states, especially some of the earliest deployers, are working with bordering states to determine the best way to handle call transfers. This issue is further addressed later in III.F.i Call and Data Transfer Issues

Other Call Centers / Services

Having the ability to transfer to other call centers or service providers is important in providing a comprehensive 511 service and meeting user's needs. These transfers can be to other modal agencies, tourism centers or enhanced or premium services.

Recommendation

Deployers should use call transfers to provide a comprehensive 511 service when appropriate and / or necessary either functionally or financially. When transferring the caller out of the 511 service, either to another state's service or a call center or some type, the caller should be notified that they will not be able to return to the 511 service. As an option, the system could be designed so that the caller can be transferred back from the receiving service's menu tree. This applies to transfers across borders or between modal systems and service providers.

For example, because North Carolina DOT and VDOT share a long contiguous border and have multiple wireless carriers with switch and cell tower location issues, the two states have agreed to offer their 511 callers the opportunity to transfer to the neighboring state's 511 service. Virginia will be a menu option in the NCDOT 511 service and North Carolina will be a menu option in the existing Virginia service and eventual statewide service.

D. Call Routing Guidelines

A successful 511 service has seamless and reliable call routing and these should go virtually unnoticed by the user. Simply put, the call goes through and the call gets answered. The early deployers have taught the rest of the country that call routing and carrier coordination is not a trivial matter, be it for wireline or wireless carriers.

i. 511 Call Routing Basics

The routing of the 511 dialing code is completed in two basic ways – wireline and wireless. When 511 is dialed on a wireline phone, the call is received by the telephone company central office and translated into a 7 or 10-digit number, where the call is answered by an automated 511 system.

For wireless calls when 511 is dialed at the handset, the call is received by a cellular tower and carried to a switch where the 511 code is translated into a 7 or 10-digit number, where the call is answered by an automated 511 system. Each of these routings have various cost implications associated with them.

In either of the above cases, the translation should be seamless to the caller. The caller dials 511 and the call is routed to whatever number will take the call to the information service.

Routing charges associated with translating one phone number to another for the purposes of connecting a call to the 511 service generally come in two varieties:

- **511 Translation to the Designated 7 or 10-digit Number.** This translation must occur, as all systems will reside on the phone network as a “regular” phone number.
- **Toll-free Translation to the Designated 7 or 10-digit Number.** This translation occurs for each call made via a toll-free system. For instance, 511 calls in a rural portion of a state are routed to a toll-free number that is then translated to a local number in the urban area where the 511 system resides. This approach is common as it enables the call to be free to the caller and minimizes the cost of the call to the 511 service provider.

ii. Call Routing Coordination

Call routing coordination primarily consists of number allocation and service coordination. Implementing the 511 dialing code is based on negotiations with the local carriers and, as necessary, the Public Utilities Commission (PUC) or Public Service Commission (PSC). Costs for “turning on” a 511 code are highly variable and depend on, amongst other things: whether there is a tariff in place for 511; the implementer’s use of a local number, a toll-free number or both; the implementer’s ability to work with local wireless carriers to match landline carriers in implementing the 511 code; and, perhaps, using a separate “back-door” number for wireless calls in order to avoid any toll-free or tariff charges based on the configuration deployed².

The PUC or PSC in your state can be a tremendous asset when planning a 511 service. The Commission can assist the deployer in identifying all of the carriers in the state and is typically knowledgeable on what role they play in delivering 511. However, 511 deployers have experienced a wide range of interest from Commissions ranging from interested observer or

² The use of a Back-Door number is only beneficial when a wireless carrier’s calling plans allow for local calling over a wider area than a landline carriers. For example: In the San Francisco Bay Area, landline calls from Oakland to San Francisco are considered toll calls. For wireless callers, however, these calls and those for a considerably wider area as well, are considered local calls and no toll charges apply. Using a Back Door number for wireless can thus alleviate some of the local 511 tariff (per call) charges, as well as any toll-free charges that might apply.

advisor to an active partner in the process characterized by attending meetings with carriers and reviewing telecommunication-related materials.

The Commission can also determine if: any formal documents need to be filed; the 511 number has to be officially assigned to a particular state agency; or the FCC order is sufficient. The early deployers experienced all of these extremes.

Contacting all of the wireline and wireless carriers within a state is a large undertaking. The deployer should be prepared to communicate directly with three individuals per carrier to reach the appropriate person to provide the call translation. An average state may have 40 wireline and wireless carriers. The number of payphone operators in a state can be in the hundreds. See Section III, D, iii below for additional discussion.

Carrier coordination is one area where most deployers experience their biggest delays in developing a 511 service. Many deployers discovered that a carrier can require up to six months to complete the necessary discussions, paperwork and perform the required programming to properly route calls. Some deployers have been forced to launch systems without having all major carriers on-board. While business decisions made by some carriers have impacted access timelines, deployers have also run into issues due to underestimating the time and level of effort required to incorporate all carriers into the 511 service.

Another element to the number allocation process is determining if any entity or business is already using the 511 code, typically through a wireless provider. If the deployer discovers that the 511 code is being used, then the entity must be allowed an appropriate amount of time (typically 6 months, as allowed by the FCC) to migrate to a new number.

While most deployers have not run into this issue, the Southeast Florida 511 service did. During the planning stages it was determined that the 511 code was being used by a dating service in the Miami area. In addition, the 511 number in Louisiana is currently being used by an ambulance service. Instead of asking the company to vacate the number, Louisiana Department of Transportation and Development (LaDOTD) is researching the possibility of allowing the company to remain as a menu choice on 511 – in effect, sharing the number.

iii. 511 Service Access

Access to a 511 service is made through a telephone of some type – wireline, wireless, Private Branch Exchange (PBX) or payphone. For many potential users, access to 511 can depend on how the deployer addresses key regulatory issues, including access for those with disabilities, limited English skills and environmental justice principles. All of these access-related decisions need to be considered in the planning stage and implemented when and where appropriate.

Types of Phones – Wireline, Wireless, PBX, Payphone

Wireline and wireless phone services are the primary access points to 511 systems and will continue to be for the foreseeable future. Deployers should also be prepared to handle issues specific to PBX and payphones.

Most deployers assume that their 511 service will be used primarily by people on the move utilizing wireless phones. In reality, the limited data available shows the contrary, therefore making access via wireline phones very important. The ARTIMIS system in Cincinnati / Northern Kentucky and 511 Virginia consistently report the percentage of calls made from wireline and wireless phones by month to the Coalition. Even though ARTIMIS is an urban, commuter-focused system and 511 Virginia is a 35-county regional system running through a predominantly rural corridor, both services consistently report that calls from wireline phones make up about 55% of the calls each month. Based on this limited data, a deployer should recognize that choosing to launch a wireless-only service will greatly reduce the utilization of the system and, if left in that access mode too long, may discourage people in the future from placing a wireline call to the system once the system can receive those calls. Engaging both wireline and wireless carriers as early as possible in the planning process is critical.

Many businesses, and some home offices, have their own telephone systems or PBX. These systems switch calls between internal users and external telephone lines and are very common. Implementers have taken various strategies in handling PBX systems, which are often require the caller to dial an access code (typically a "9" or "8") to reach an outside line. For callers to dial 511 directly, without entering the access code, a change must be made in the PBX's dialing rules. Since 511 is a new service, it is to be expected that some businesses will need time to enable 511 calls to be made directly by their employees. In the meantime, callers may still dial 511 or the 800 number, if available and published, after entering their access code. While the reprogramming of a PBX is an issue, most implementers have not addressed it in a formal manner. As an option, some have placed programming information on a 511-related website while most others have addressed PBX questions as they arise.

To date, most 511 services have not aggressively pursued payphone providers to translate the 511 dialing code to a 7 or 10-digit number. The main reasons for this are: the unknown return on investment and the sheer number of providers in any given state. In the telecommunications industry, payphones are a dying breed. There was a time, only 10 years ago, when payphones were seen as the primary way to keep in contact while away from the home and office or a way to link to family and services in case of an emergency.

Today, due to the ubiquitous availability of cellular phones across all socioeconomic groups, many payphones are being removed from public places. However, just because they are being removed does not mean that there are not numerous providers. For example, Kentucky determined that there are over 350 registered payphone operators in the state. After having its 511 services operational, the Kentucky Transportation Cabinet (KYTC) sent a letter to all of the payphone operators in the state, which produced mixed success. Some carriers agreed to perform the call translation for free (just dial 511) while others still require the caller to deposit \$0.50, thus causing a consistency issue. To date, KYTC is unable to determine how many calls are made from payphones, but believes the number is minimal. Additional ways to reach payphone providers may be through a statewide association, having the dominant Incumbent Local

Exchange Carrier (ILEC) for the region provide 511-related information to staff who deals directly with payphone providers or having ILECs send informational letters to the payphone operators they serve.

Given the issues, most deployers are spending their time and resources on working with the wireline and wireless carriers first.

ADA, Multi-lingual, Environmental Justice Guidelines

When designing a service for the general public, the lead agency must be cognizant of the various federal and state legislative mandates and requirements to ensure access to transportation information by all citizens. This includes reviewing any legislation or policies (some are departmental) that will impact the service's architecture and design. Such consideration should include, but not be limited to the Americans with Disabilities Act (ADA), multi-lingual needs and environmental justice issues.

To comply with accessibility laws and regulations, implementers need to consider that under Section 255 of the Telecommunications Act of 1996, carriers and equipment manufacturers must provide access to, and make their services and products usable by, individuals with disabilities "if readily achievable." Title II of the Americans with Disabilities Act prohibits public entities (states, local governments and any department, agency or other instrumentality of state or local government) from discriminating against those with disabilities in all services that they provide to the public. 511 implementers should include in their design plans how they intend to provide access to these services to the disabled community, such as through the carriers' existing Telecommunications Relay Service (TRS) or Telecommunications Device for the Deaf (TDD) capabilities. In many states, this means making the public aware that they can access the travel information service by dialing 711 for text relay and ask to be connected to 511.

To address ADA-related concerns in developing the 511 service and co-branded website for the San Francisco Bay Area, MTC hired an ADA consultant and used input from its Elderly and Disabled Advisory Committee (EDAC), staffed by volunteer citizens. MTC was able to make some enhancements to the system while still in development, but plans on making additional improvements and system modifications based on additional comments received by EDAC members.

Deployers must be mindful of not only the ADA requirements, but also of how those with disabilities are impacted by the design of a 511 system. This includes using the appropriate tones, voices that are easier to hear and building in an allowable delay for those using text relay services. These issues are being explored and will be addressed by the Coalition in a subsequent document.

Access to 511 services for Limited English Proficient (LEP) callers should be considered when planning a system. 511 implementers should review Executive Order 13166, signed by President Clinton on August 11, 2000 and the supporting "Guidance to Recipients on Special Language Service to LEP Beneficiaries" issued by U.S. DOT on January 22, 2001 to determine its applicability. To date, the only service that is bi-lingual is the Southeast Florida service. Smart Route Systems, which operates the service in this region, achieves this by providing instructions to the users in English or Spanish, then subsequently provides recorded messages for key routes, selectable via touchtone, in the selected language.

Regarding environmental justice, the Civil Rights Act of 1964 and a 1994 Presidential Executive Order address the Federal government's responsibilities to assure that programs or activities receiving federal financial assistance adhere to environmental justice principles that prevent discrimination against minority and low-income populations. 511 services that use Federal funds must adhere to these rules.

E. Business Environment Guidelines

The business environment that was developed for Version 1.1 of the Guidelines remains intact. Basic services should be no more than the cost of a local call and the deploying agencies should expect to fully fund the 511 service and its level of information for the foreseeable future. Advertising and sponsorship are acceptable, as long as they do not interfere with the user's primary intent for calling the service. Fee-generating premium or enhanced services are also acceptable, though a market for these services has not been established yet.

i. Basic Services Charges

In 2001, the Coalition established the guideline that when accessing the basic services of a 511 system, the call should be no more than the cost of a local call. This does not mean that the call is "free." Instead, this means that a caller would pay exactly what they would normally pay to make a local call in that area. For example, if one was calling from home on a landline phone then the call would be included in the monthly local phone bill, typically a monthly fee or message unit. If it were a person from out of state calling 511 on their wireless phone, but physically in the local area when placing the call, then the time of the call would be applied to their monthly calling plan (typically deducted from a large number of minutes) and roaming charges may apply depending on the service plan and / or the carrier.

Most importantly, for the user, there is a consistent business environment for the basic services available from 511 whether it is in Miami or Nebraska and that there is no "cost" (additional per usage fee like 411) to use the 511 service.

The implementing agency (or agencies) should expect to cover the full cost delivering the basic level of service on a 511 system. Historically, ATIS-based revenue sharing models and other creative funding approaches have not been successful. *DAR #1: Business Models and Cost Considerations*, covers issues salient for migrating a planned or existing traveler information service to utilize the 511 dialing code, including a review of business models and cost recovery, and is available at http://www.its.dot.gov/511/511_Costs.htm.

ii. Advertising and Sponsorship

Commercial advertising and sponsorship of 511 services, either in an initial greeting or in conjunction with a specific element, such as a message or content category heading, of a 511 service is acceptable. However, care should be given to ensure that the length of advertising messages does not overly inconvenience callers and that the content of these messages is consistent with the public service nature of 511. This guidance applies to the initial greeting and messages prior to the caller getting the information that they are seeking.

As of August 2003, the only 511 service collecting any revenue from advertising or sponsorships is the I-81 Region in Virginia. Virginia has not placed advertisements or sponsorships in the initial greeting or in category headings. Instead, advertising revenue is generated from listings, by location and category, under the Travel Services menu choice of individual listings of commercial establishments. The keys to being able to provide this type of a service are having a field staff establishing contacts within the business community, making sales, and having the systems in place to track usage of the 511 service down to the lowest sub-level data request, as well as being able to perform all necessary accounting activities. In Virginia's case, these activities are all performed under contract. See the sections below for additional details on Virginia's business model.

iii. Fee-generating Premium Services

Fee-generating premium services are allowed and can be a way to provide additional services for the caller and possibly off-set costs for the deployer. As of August 2003, a premium service market has not been clearly identified or established and no 511 system has implemented premium services.

In the fall of 2002, Minnesota DOT (MnDOT) asked 511 users to rank five fee-based services that they would be interested in having on 511. Minnesota's 511 users top 3 choices were: driving directions to a specified location; information about local tourist attractions, tourist centers or visitors bureaus; and personalized travel reports for problems on the usual route of travel.

iv. Business Model Case Studies

The majority of 511 services across the country operate under one of three general business arrangements: operated in-house; fee for service contract; or a blend of the two – some features and services performed in-house and some contracted. However, there are two 511 systems that operate, or plan to, under some slightly different business rules.

VDOT has entered into a fee for service contract to provide 511. Virginia's 511 system is unique in that it offers businesses the opportunity to be listed under specific travel service categories (e.g., lodging and restaurants) and by location (city and / or exit number). To be listed, these businesses pay the prime contractor, Shenandoah Telecommunications (ShenTel), as they would pay to be listed in the Yellow Pages. There are no more than six entries listed under a service category for a given city or exit and entities listed at the top pay more than those below it.

The contract between VDOT and ShenTel was structured such that VDOT has committed to funding the full operation of the service for the period of performance. However, the contract also provides for a split of the monthly revenue collected (80% VDOT, 20% ShenTel). The VDOT share is used to reduce the known cost of the monthly invoice from ShenTel, thus reducing the full contract amount to VDOT each month. As an incentive, ShenTel keeps their 20%. The contract is structured so that VDOT will never profit from the system, but should enough revenues be collected each month, it has the contractual feasibility to operate at no cost to the public. This arrangement does create some unique customer dynamics: VDOT is focused

on the end user; and ShenTel is concerned with VDOT, the end user and advertisers who continuously provide feedback about the performance and structure of the system.

F. Overarching Guidelines

The 511 Deployment Coalition considers many issues surrounding the successful development, deployment and operation of a 511 service to be important. However, there are six overarching guidelines that each deployer must give serious attention to: system interoperability, privacy, system architecture, standards, evaluation and customer satisfaction and awareness.

i. 511 System Interoperability – Call vs. Data Transfer

Interoperability deals with how 511 services with adjacent operating borders interrelate to give callers seamless information. This issue is relevant primarily to roadway and weather content as it is not uncommon for callers to seek information on what is happening over a state border on a certain roadway. Without either being able to incorporate information on those roadways or transferring the caller to the neighboring state's 511 service, the caller is essentially "traveling blind." Without system interoperability there is merely a patchwork of unconnected 511 systems scattered around the country and this is not what the FCC envisioned and it does not meet the national vision for 511.

N11 systems, by design, are not national in scope. Only 411 gives the appearance of being national in scope and that is accomplished with an integrated database behind the systems which its business model supports. With the overlap and varied boundaries of agencies, regions, travel patterns and the unknowns of cellular routing, 511 deployers need to look beyond their borders to make 511 a success with the traveling public. If 511 developers, deployers and operators accomplish regional interoperability through data sharing, then we may achieve national interoperability ultimately as well. This national interoperability may ultimately yield a 511 system where the caller may be asked, "City and state, please," like the 411 system. *DAR #4 - 511 Regional Interoperability Issues* addressing this issue may be found at <http://www.its.dot.gov/511/511inter.htm>.

Many factors must be addressed when dealing with the issue of interoperability and determining which type of transfer best fits the needs of a particular 511 service. Most of these factors determine how a system would work and / or which standards are in use or available to make the transfer seamless to the user.

Below is a list of recommendations for the implementers that include the following general system design considerations:

- Identify travel corridors, other regions and neighbors and consider how to include their information for callers to your system either through data sharing or call transfer.
- Recognize that your neighbors are also dealing with this issue and engage them in a two-way, or in some cases, multi-way dialogue.
- Use the SAE ATIS (J2354) standard when developing and upgrading information databases and system communications to facilitate the exchange of information.

- Examine and understand wireless calling areas at the boundaries of your system and develop a plan for dealing with misrouted calls. Especially be mindful of the placement of signage near a border which may lead to someone calling 511 and not getting through because they are being handled by a switch where 511 is inactive or are routed to another state's 511 system.

More specific recommendations include the following factors relating to call transfers and data sharing need to be considered:

- Arrangements for handling requests for your information from a neighbor system – data or call transfer.
- The estimated number of callers to need “outside” information and what the nature of that information will be.
- The number of “outside” information sources to be incorporated based on logical travel patterns in the region.
- Availability of data from these “outside sources” to be incorporated into your own system.
- Effort required to integrate data from “outside sources” into your system.
- Existence of 511 and other “outside” telephone systems for calls to be transferred to and the suitability of those systems to accept and handle transfers.
- The cost of call transfers to the outside sources in terms of the number of calls and cost per call.
- Likelihood and acceptability of “dead-end” calls that result from call transfers.

If an implementer determines data sharing is preferred, then the following items need to be considered:

- Use the SAE ATIS (J2354) standard.
- Recognize the need to parse and size information to match your system.
- Be careful in menu design not to overload your system with “outside” focus.

If an implementer determines that call transfers are preferred, then the following items need to be considered:

- Address “dead-ends” and inform a caller when they will occur.
- Estimate call transfers costs, who will pay them and how to minimize such costs, possibly through existing state contracts.
- Consider only transferring calls to bordering states with 511 systems.

ii. Privacy

In the United States, state and national legislators have heard the complaints of individuals who are tired of their privacy being invaded without their knowledge or permission. Evidence of this is the recent establishment of the national “Do Not Call List” that has prompted millions of Americans to submit their name and telephone number in hopes of reducing the number of telemarketing telephone calls, typically to their residence.

People calling a 511 service are accessing the system, typically, through a home or office wireline phone or a wireless phone. It is the duty of the implementing agency(ies) to protect this newly created database of information. Callers using a 511 service expect the deploying entities to protect their individual privacy. If their privacy is invaded, or even perceived to be, the users' confidence in, and comfort with, using the service will wane and the overall usage will drop.

To prevent any privacy issues from arising, 511 services should adhere to ITS America's Fair Information and Privacy Principles, which can be found on the ITS America website at <http://www.itsa.org/committe.nsf/0/82d672ca035826558525620e006901c4?OpenDocument>. Some states have included the statement via a link on their co-branded 511 website.

iii. National ITS Architecture

The National ITS Architecture is the framework for deploying an integrated Intelligent Transportation System. This framework identifies the stakeholders and interrelationships involved in ITS, the activities or functions required to deliver the ITS User Services, and the interdependencies between different systems – the interfaces. In support of 511 and the advent of sophisticated voice portals, the traveler information portion of the National ITS Architecture has been updated to include a new entity, the Telecommunications System for Traveler Information (TSTI) and connecting information flows.

This entity represents the caller interface and voice processing (voice recognition / synthesis) that supports voice-enabled telephone traveler information systems. It lays on the boundary of the National ITS Architecture where a call is received and processed. Implementations of this TSTI could include voice portal capabilities in scenarios where a distinct voice portal exists between ITS Centers and telecommunications provider(s) and uses this information to support voice-based interactions with the traveler. The TSTI also supports voice-based alert notification to the traveling public regarding major emergencies such as natural or man-made disasters, civil emergencies, severe weather or child abduction. These capabilities are reflected in two market packages: Interactive Traveler Information and Wide-Area Alert.

The new TSTI entity and voice-based architecture flows can be used in regional or project ITS architectures to represent the 511 voice system interface to the transportation information service provider (ISP). Additional details on the TSTI, the corresponding information flows and market packages can be found on the National ITS Architecture website at <http://www.its.dot.gov/arch/arch.htm>, click on "National ITS Architecture".

iv. Standards

Significant resources have been invested to develop ITS standards that will simplify and expedite the deployment of interoperable systems. 511 implementers should review the full range of standards available and consider using those that will aid in cost-effective system development and / or inter-system interoperability. The ITS-related national standards are designed to facilitate the efficient exchange of information and, as a result, have developed standard data elements and standard messages.

Some of these standards, consistent with the national ITS architecture, are quite beneficial to system implementers in reducing the time and resources required to share information between

transportation management systems and the 511 support systems. Existing standards that should be examined include:

- ATIS and ATMS data dictionaries and several “business area standards” from the Transit Communications Interface Profiles (TCIP) family of standards. An example of how these standards can help is the ATIS produced International Traveler Information Interchange Standard Data Dictionary standard, which includes textual phrases and binary codes for over 1,500 types of highway event “descriptors.” These codes should be programmed into both the management systems and 511 equipment and only binary codes would need to be transferred between systems to provide information necessary to create route-segment reports. This also has the benefit of largely standardizing the reports that callers hear and aiding their understanding of reported information. The central focal point for learning about ITS standards information is <http://www.its-standards.net/>.
- The primary standard for exchanging traveler information between various systems and users is the J2354 ATIS message set standard developed by the Society of Automotive Engineers (SAE). The messages of this standard are implemented in both ASN.1 and in eXtensible Markup Language (XML) and include formats for various events, incidents and weather occurrences.

The SAE ATIS (J2354) standard has many other important components for 511 systems, including transit information and vehicle routing. Implementing agencies should provide their data sets in the SAE ATIS (J2354) message sets, available at:

<http://www.sae.org/technicalcommittees/atishome.htm>. To obtain the latest draft version of the standard from the SAE ATIS committee contact Joel Markowitz (JMarkowitz@mtc.ca.gov) or committee consultant David Kelley (davidkelley@ITSware.Net). The Institute of Transportation Engineers (ITE) outreach and training program can provide a day long summary of the ATIS standard and how to use it along with various support materials developed for system builders.

- Current 511 systems receive data from traffic management centers (TMCs) in a standard format developed by the AASHTO / ITE Traffic Management Data Dictionary (TMDD) Committee. "Message Sets for External Traffic Management Center Communications" (MS/ETMCC) is the exact name of the approved Abstract Syntax Notation number One (ASN.1) message sets which are currently being updated in an "Expedited" standards process. The TMDD Committee has agreed to publish XML versions of its messages alongside ASN.1 in future releases.
- Regional systems employing incident management systems may be using the message set standards of the Institute of Electrical and Electronic Engineers (IEEE) Incident Management 1512 family of standards. These standards allow for multi-agency conduction of incident events and express public summaries of these events using the same formats developed in the SAE ATIS J2354 work. Regional deployment using this set of standards can receive data in this format using either the ASN.1 or XML formats which are provided.

- All of these message set standards re-use many of the same data elements in defining their component parts to increase the coordination between them and leverage the development investment. One key data dictionary in this effort is the TMDD data dictionary that was produced by the AASHTO / ITE TMDD Committee.

Not all of these standards have been fully tested in the field and some may experience changes in the future. However, increasingly more transportation agencies are choosing to use these standards in 511 systems. An example of a system using multiple standards is the San Francisco Bay Area, which uses TMDD, MS/ETMCC and ATIS XML in various places within the overall system.

v. Evaluating Systems

In order for 511 to be a “customer driven multi-modal traveler information service,” as stated in the national vision, implementers will need to periodically evaluate their systems. Users’ expectations may change over time, much like they have for cellular phones and the Internet. Evaluations will help deployers meet their customer’s needs and determine how successful and useful the service is to the callers.

To date, only a handful of systems have completed or are performing evaluations. These services include Minnesota, Virginia, Arizona, San Francisco Bay Area and Montana. These deployers are using various techniques to evaluate their systems, including: on-line surveys; phone surveys; adding questions to statewide quality of life or similar “omnibus” surveys; and convening consumer focus groups.

Arizona was awarded 511 Model Deployment funds by the USDOT to enhance its existing 511 service. The enhancements will be evaluated to determine their benefits and the evaluation will focus on system performance, usage, customer satisfaction and institutional and technical issues.

System performance will include:

- Assessing incremental improvements in content
- Capacity and utilization of phone lines – dropped calls and system outages

The Usage portion will focus on:

- Call volumes
- Tracking source of call – wireless, landline, geographic area
- Tracking of average calls – duration, menu choices, time of day, transfers
- Data and correlation with incidents, weather, events

Customer satisfaction will be documented through:

- Call intercept surveys
- Focus groups
- Customer comments through feedback menu option on phone system

Technical and institutional issues addressed include:

- Costs
- Schedule
- Technical issues
- Cross-modal issues
- Cross-state issues
- Phone companies

Additional information on 511 evaluations, as well as agency contacts, can be found at <http://www.deploy511.org/docs/511-deployevalstatoc2002.xls>.

vi. Customer Satisfaction and Awareness

The vision for 511 services has clear goals related to Customer Satisfaction and Awareness:

By 2005...

- More than 25% of the nation's population will be aware of 511
- More than 90% of 511 users will be satisfied with the service provided

By 2010...

- Over 90% of the nation's population will be aware of 511
- All 511 users will be satisfied with the service provided

The awareness of 511 was first measured in the ITS America consumer research conducted by the Gallup Organization in the fall of 2001. Deployers also should gauge awareness of 511 when doing surveys and evaluations locally by asking:

- Have Consumers Heard of 511? – To gauge overall awareness.
- What Do They Think 511 Is? – To see if consumer know that 511 delivers transportation information.
- Have They Used the Service? – To determine if awareness leads to usage.

Minnesota in the summer of 2002, determined:

- *Statewide Awareness*
 - *13% Initially and 25% AFTER MARKETING CAMPAIGN*
- *Metropolitan Area Awareness*
 - *11% Initially and 28% AFTER MARKETING CAMPAIGN*

To date, gauging Customer Satisfaction has not been an activity that many deployers have undertaken. Part of the Arizona 511 Model Deployment evaluation effort includes the creation of an evaluation template or survey questions that all implementers can use in their evaluations. By providing the template of questions and procedures, USDOT and the Coalition hope to

collect similar data across the country regardless of the 511 system or content available. This will allow the Coalition to better monitor the progress of deployments and the overall customer satisfaction and acceptance. Version 1.0 of the Core Survey Questions can be found in Appendix D. The draft questions cover the following areas:

- Satisfaction with Information
- Satisfaction with User Experience
- Overall Satisfaction with Service

The questions will be piloted in Orlando in the fall of 2003 and then used in the Arizona evaluation. The 5-point scales used will allow satisfaction to be compared from service to service on an “apples to apples” basis. Deployers are encouraged to assess Customer Satisfaction and Awareness, in the manner above, with their deployments and report the findings to the Coalition.

IV. Cross-cutting Issues and Lessons Learned

Many of the 19 operational 511 services have learned valuable lessons on deploying and operating systems. Some lessons take a year to learn, while others are immediate and obvious. While not all lessons are applicable to all existing and future implementers, all of the key lessons are important and this section discusses the major cross-cutting issues.

A. Successful Systems are Customer and Market-driven

A 511 service needs to be thought of as an evolving product designed to attract and retain users. Telematics is to the automobile industry as 511 is to transportation operating agencies. Both are based on customer relationship management (CRM) which entails all aspects of interaction that a company (or agency) has with its customer, whether it be sales or service related. Both also provide users with features and services that are focused on safety and convenience.

Automobile manufacturers offer optional telematics packages in the hope of learning more about their customer throughout the life of the vehicle. It gives the automaker a window into what is important to their customer, as well as a direct link to the buyer to enhance his or her experience with the vehicle and company. The buyer expects quality service and assistance (of various types) from the telematics system.

The most successful 511 services are, and will be, the ones that listen to their customers and predict, or react to, their needs. One way of offering this interaction opportunity regularly is by having a comment line on the 511 menu tree. A standard customer feedback mechanism allows the deployer to track user's needs regularly, instead of only through irregular, but necessary, evaluations, which may include various survey methods.

B. Marketing and Branding is Critical

In the mid-1990s, ATIS projects were developed around the country with the goal of providing travelers with information that would assist them in their daily travels. For most of these systems, the focus was on using new technologies and hoping that the users would discover the service and continue to use it after some initial marketing efforts. Typically, as discovered by TravInfo in the San Francisco Bay Area, about 10% of the area residents knew about the service and fewer used it. The ITS America consumer research conducted by the Gallup Organization also found that about 10% of the nation had heard of 511. In a survey by Penn State University, only 13% of the respondents had heard of the SmarTraveler telephone and website ATIS services in Philadelphia.

Part of the issue for ATIS deployers was creating a brand awareness and while the names of the services and corresponding logos were always carefully selected, often the message was not simple or short enough to remember. With the abbreviated dialing code of 511, the brand awareness is built in by association (a phone number like 411 or 911) and the marketing message is simple, easy to remember and is similar, or the same, across the country.

Because the brand is the same – 511 – deployers can easily benefit from each others’ marketing campaigns and materials. An example of this is the incorporation of the national logo into the roadside signs to create awareness. Roadside sign design specifications and siting policies were shared by deployers through the Coalition. Interim system evaluation results from Virginia show that roadside signs work in generating 511 usage and are how most users found out about the service. Research performed by the Virginia Tech Transportation Institute in 2003 as part of the 511 Virginia evaluation revealed the following results for brand awareness and usage:

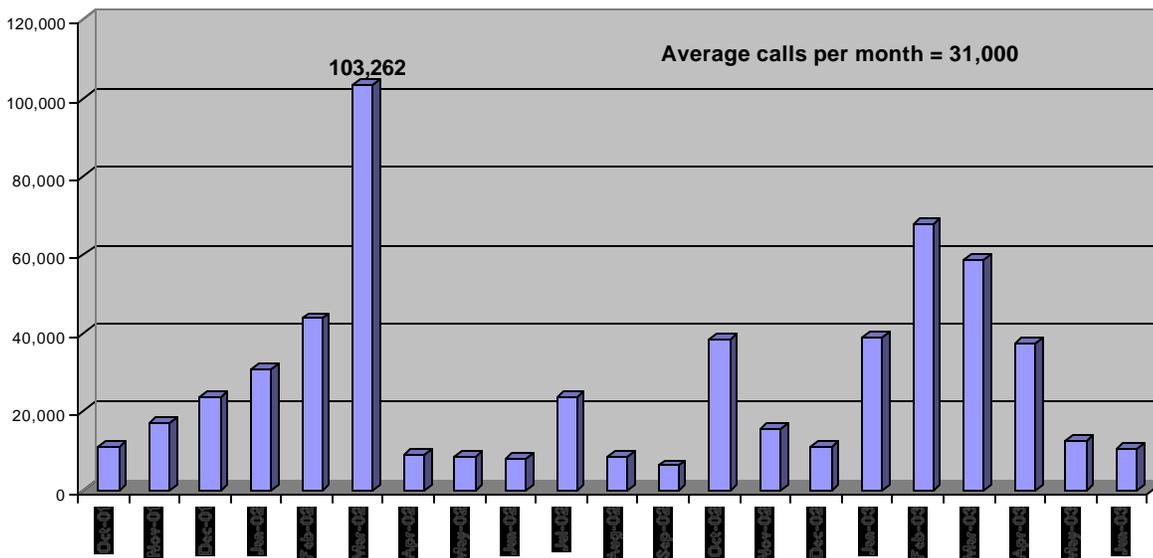
- Statewide – 13% aware of 511 Virginia; 7% used it
- Coverage area – 19% aware of 511 Virginia; 8% used it

By using a consistent brand and offering the same access methodology to the service everywhere, a South Dakota resident traveling in Washington State would know the basic information available on 511 by seeing the familiar logo and phone number on a roadside sign.

Marketing assistance can be found at <http://www.deploy511.org/marketing.htm>. The website offers deployers examples of marketing and awareness tools used across the country, including billboards, rack cards, posters, decals and launch materials.

C. Usage is Event-driven

Figure 4
Nebraska 511: Call Volume by Month



The majority of 511 services across the country experience usage driven by specific events. These events can be weather-related, incidents or special events. As evidenced in the Figure 4 below, highlighting call volumes in Nebraska, the increase in calls related to an event or series of events can be dramatic.

For the first five months of operation, the Nebraska 511 system, which replaced the existing #SAFE number and is focused on weather-related roadway information, experienced a steady growth in usage as the winter of 2001-02 progressed. From October 2001 through February 2002, the system averaged 25,000 calls per month. However, March brought significant snow storms to the entire state and the system recorded over 103,000 calls, a 400% increase over the monthly average. For the next 15 months, the system never had to meet that demand again, but due to careful planning; the system has proven itself capable of handling extremely large call volumes.

In December 2002, the Arizona 511 system experienced an enormous growth in calls due to specific events. Early in December, severe winter storms began to affect the northern part of the state and calls to 511 increased. The trend of spikes continued throughout the remainder of the month, with each major increase in calls being directly related to weather not regular use. For the month, ADOT received almost 5 times its average monthly call volume to that point, with slightly over 100,000 calls received. The ADOT system continues to experience similar event-related spikes.

D. Consumer Research Results

The Coalition and implementers have invested significant resources to determine what customers want from 511 services. While 511 services are still relatively new to consumers, several clear trends are emerging.

In late 2001, ITS America conducted the first national 511 market research, through a nationwide telephone survey and multiple focus groups across the country. At the time, there was only one operational 511 service – in Cincinnati / Northern Kentucky – so the findings can be considered a “before” baseline. These baseline results included the following item:

- About 10% of those surveyed had heard of 511
- 78 % said weather-related and road surface condition information was critical or useful for 511 systems to provide
- 75 % thought that road incident reports were critical or useful
- Respondents from the Midwest were most concerned with weather
- Respondents from the Northeast reported their greatest need to be accident or incident reports
- For transit riders, information on delays was most critical followed by travel time estimates
- Roadside signs and other marketing materials should avoid using the word “traveler.” The focus groups felt the word connotes a tourist or others unfamiliar with the area. “Travel Information” was the preferred phrase

The results of this research effort are often echoed in local research efforts and are reflected in the design of many of the systems in operation.

Some implementers have performed their own consumer research to determine: what potential users want in a 511 service; how the users will react to the service; and what benefits people expect to get out of the service. Consumer research is most effective when performed during the planning stage, once a demonstration system is available or six months to one year after the service is implemented and then every 12 to 18 months.

An early example of consumer research can be attributed to Utah DOT, which held focus groups to gauge consumer reaction to the system that UDOT envisioned. One of the strongest reactions that the focus group provided was to the thought of using an automated system. The majority of the participants thought the only way to deliver the information in a quality, easy to use manner would be through live operators. However, after hearing a demonstration of what a voice activated system with concatenated speech outputs would sound like, the participants found it more than acceptable and were surprised at the system's quality and ease of use. This is the type of system that Utah has in place today.

Virginia DOT, primarily through the Virginia Tech Transportation Institute, has incorporated consumer research into the development of the system and its enhancements. Before the 511 system was implemented, potential users were asked to review and rank a series of potential 511 road signs. The signs had various layouts (horizontal vs. vertical) and contained slightly different phrases in an attempt to display what potential callers would see on the highways. By far, the focus groups across the state recommended using: a vertical sign alignment; the word "travel" instead of "traveler," and "dial" instead of "call" or other variations. The results reinforced the ITS America-led research effort discussed above and the roadway signs located in Virginia's 511 service coverage area reflect this direct consumer input.

E. Exact Deployment Costs Will Vary

Deployment costs are variable and are based on the: size of the system; the number of calls estimated or received; the duration of the call; number of transfers made between answering points (e.g., transit, tourism call centers); and routing of calls. Some general costs for various types of 511 services are listed below:

- *Telecommunications Costs:* A good rule of thumb is \$0.25 per call, though of course it varies based on implementation, mix of calls, etc. However, the costs of any physical telephone lines, central office or switch translations are not included in these costs. These are a mix of one time and recurring costs and vary based on the carrier and the number of central offices and switches in the coverage area.

Plus:

- *Highly Automated, Limited or No Human Involvement in Operation:* These are the least costly systems to establish and to operate. In Arizona, such a system was created for roughly \$100,000, maintenance costs are minimal (roughly \$10,000 annually) and telecommunication costs are under \$50,000 per year. These costs will increase with the Model Deployment enhancements though.
- *Automated System, with Human Recorded Information:* These systems are typical of the metropolitan traffic / multi-modal services. To establish such a service could cost \$500,000

to \$1 million. A rule of thumb for system operations would be \$1 million annually, with that figure varying due to many factors including size of region, hours of operations, etc.

- *Human Operator-based System*: Typical of transit information services, these systems are the most costly, as many full time staff are required to provide the service. Many services are paying in the millions to create a trip itinerary planning system that operators can use to more quickly and accurately respond to caller inquiries. An annual operating budget for a large transit information center can exceed \$4 million.

Non-recurring and per call costs can be minimized with proper planning and execution.

The Coalition recognizes the need to normalize the costs to assist future deployers and plans to undertake this activity in a future Deployment Assistance Report.

F. 511 As a Tool in Major Events

As shown in Section IV, C, 511 is a capable tool in assisting in the management of major events. While most major events around the country tend to be weather-related, or incident related, some are planned events, like the Winter Olympics held in Salt Lake City, Utah in 2002.

Utah DOT developed the 511 service with special content features designed specifically for the Olympics. These features included driving directions to venues, event schedules and tips for commuters. The service also offered a link to transit services and provided roadway conditions for the area. In all, the Olympics were a significant and immediate successful test for the system.

Major events, such as bridge collapses that completely shut down roadways, also offer an opportunity to use 511 in conjunction with traffic and incident management tools familiar to DOTs.

As discussed in *DAR #3 – 511 and Homeland Security*, 511 systems offer the potential to become a valuable medium to provide travel information in support of homeland security emergency management. This potential is likely to increase in the coming years as more systems are deployed and familiarity with such systems continues to grow across the nation. Put simply, 511 has the potential to be a national asset in the event of homeland security emergencies. While the text below is not a “lesson learned,” the integrity of the 511 service during a homeland security event will require a deployer to consider the following.

Guidelines for 511 operation during a national security event include:

- *Message Content* – during major emergencies, a floodgate message may be provided prior to, just after or in place of the normal initial greeting. Under these circumstances, callers will be provided with immediate information related to the emergency without having to navigate any menus. In order to meet unusual levels of demand, this may be the only message that callers hear before the call is automatically terminated. Depending on the details of the proposed National Threat Alert System, it may be appropriate, e.g. at intermediate levels of threat alert, to implement a combination of an emergency interrupt message with limited navigation of menus.

Accuracy, Timeliness and Reliability of Travel Information – 511 system operators must consider: what additional sources of information they may need to access; how they will validate the information they receive; and the frequency of posting updates. 511 system designers and operators should take all possible precautions to protect data and telephony systems from hacking and terrorism and develop recovery plans in the event that data is corrupted.

- *Focus of Travel Information* – 511 system operators must consider the broader impacts of the emergency on travel options. This may require wider coordination with other agencies to determine “safe” escape routes to locations where travel options are less disrupted and a thorough interpretation of available options including alternative means, e.g. ferry, walking, etc. This, in turn, requires 511 system operators to have a regional and multi-modal knowledge of transportation systems in their area.

G. Interoperability is Becoming an Important Issue

As the number of 511 services available increase in many areas of the country, it is believed that users will have an expectation that information relating to areas outside of their region will be available in a single call. In years past, calling Directory Assistance (411) allowed telephone users to access only local directory information. As the Information Age has matured, users dialing 411 are now able to request information for any city and state in the country. It is believed by some that this type of expectation may pervade 511 services as well.

A growing number of 511 systems share boundaries and / or have significant travel between them. This is also true along major travel corridors throughout the country. Callers in one metropolitan area may wish to dial 511 to find information not just for their local travels, but for their entire trip, which might include traveling through other metropolitan areas or regions and crossing state borders.

Currently, interoperability is being approached in different ways by deployers. This will help provide the 511 services still in the planning stage with insight and lessons as to the best, most applicable solution given a certain set of technical and financial circumstances.

Since interoperability is such an important issue to the Coalition, *DAR #4 - 511 Regional Interoperability Issues*, was published in July 2003 and can be found at <http://www.its.dot.gov/511/511inter.htm>.

This topic is also addressed in Section III, F, i.

H. On-going Financial Support Critical to System Success

The financial commitment that a lead agency makes to a 511 service is critical to the continued success of the system. For this reason, the department or agency must not rely on costs being significantly offset or wholly absorbed by the private sector or through revenue sharing partnerships. While those business models have had some limited success in the past, the majority have failed, leaving the lead agency unprepared to accept the additional financial

burden of operating a system (historically a metropolitan area ATIS). This has resulted in the service reducing its content, hours of operation or even completely shutting down, as with the Partners In Motion ATIS for the Washington, DC region.

The lead agency also should recognize that, much like providing transit service, 511 does not get cheaper with more usage unless costs are being significantly offset by revenue sharing. While a significant usage increase may reduce the cost per call or per minute, the overall cost of providing the service should be expected to rise.

Along with providing quality, timely, decision-level content, 511 services, like any customer service, need to be reliable and consistent. Consistency and reliability begin with a financially sound, multi-year funding program.

I. Performance Measures

Since 511 is a collective product of many separate services, national performance measures are needed to gain an understanding nationally of the full scope, impact and effectiveness of 511. Recently the Coalition has focused on the establishment and monitoring of a few key measures, so that the Policy Committee and Working Group can assess the nation's overall progress towards meeting the 511 Vision described previously in this document. The Coalition has chosen to focus on Coverage, Usage, Awareness and Customer Satisfaction as national measures and is currently developing a process to collect and present the necessary data. Many of the specific elements are discussed earlier in the Usage Monitoring Guidelines (Section III, C, iv).

Although performance measures need to be compiled on a national level, the collection will be a bottom-up effort. Each local 511 deployer will assist in the process of collecting and providing the relevant information. While some of the information is fairly easy to collect and can be achieved through the proper design of a telephone dissemination system, other collection efforts will be more sporadic and more dependent on funding.

For example, of the services in operation today, four deployers have designed and employed a comprehensive evaluation of the service. The evaluations typically cover topics such as awareness, customer satisfaction, applicability of service and other elements critical to providing a customer-oriented service. However, due to the complexity of the evaluations and the financial commitment that they take, many deployers envision only being able to perform such evaluations every two to three years.

On the national level, additional information on awareness and customer satisfaction may be collected through national surveys and techniques, like those used in 2001 by the Gallup Organization for ITS America.

V. National Policy Issues

One of the main functions of the Coalition is to address the national policy issues surrounding the deployment of a nationwide 511 service. The key policy issues that implementers currently address are the availability of resources, primarily funding to deploy and operate a quality 511 service, and the associated funding issues to instrumenting the coverage area to meet the customers' data / information needs. Other policy issues facing deployers and the Coalition are interoperability and deployer support, assistance and networking.

A. Resources

Given the current status of most transportation agencies' funding sources, there are some uncertainties surrounding future 511 deployments. Many state DOTs are scrambling to cover operating and maintenance costs, let alone funding new construction and services, and additional funding concerns are tied to the next round of federal transportation legislation. While Coalition members pushed to include 511 as a worthwhile and successful ITS effort, the amount and timing of any funds available under the new legislation are unknown.

Agencies with a strong desire to improve customer service will continue to find the funds to support 511. There will also be a group of potential deployers who recognize that spending some of the known, limited funds on a useful, and much appreciated, service can help span the gap between larger transportation projects that will now have to wait years to receive their proper level of funding.

The Coalition will continue to look for creative ways to fund 511 services and expand the 511 footprint to achieve the goals set in the national vision.

B. Interoperability

Outside of locating the funding to develop and deploy 511 services, interoperability is the most important and potentially complex issue implementers, and the Coalition, face. As stated in Section IV, G, as the number of 511 systems grows, services are beginning to border one another. These border systems are discovering the need for interoperability between adjacent systems, either by sharing information behind the scenes, so that a caller in one service area can learn about conditions over the border or along a travel corridor outside their service's coverage area or by transferring calls between systems. Issues associated with call routing are also being explored, particularly calls placed from wireless phones at coverage boundaries. *DAR #4: Regional Interoperability Issues* was developed by the Coalition to aid implementers in understanding and addressing these issues.

The Coalition will track the various methods that deployers are using to address this issue and expects to provide more precise recommendations in future updates to the Guidelines.

C. Deployer Support, Assistance and Networking

The ITS Joint Program Office, the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) have been tremendous supporters of 511. Beginning with the original petition to the FCC for a three digit phone number, USDOT has contributed significant staff expertise and resources to 511. In addition to being principal financiers and active participants of the Coalition, USDOT's contributions to, in the FCC's words, "to facilitate ubiquitous deployment of 511," have included state planning grants, a National 511 Model Deployment Initiative and research and technical assistance.

In July 2001, FHWA established a 511 Planning Assistance Program to provide states up to \$100,000 each to work with the appropriate public sector agencies to develop a 511 implementation plan, or if such a plan already exists, to assist with the implementation of the plan. Through July 2003, 43 states and the District of Columbia have received assistance.

Above all, the networking and information exchange opportunities borne out of the Coalition have led to the largest advances in the rapid deployment of 511 systems. Without Coalition leadership and countless public and private sector members volunteering their time and expertise and support staff, every state desiring to deploy a 511 service would have to perform and / or fund their own research to determine the "How To's" and would do so in a vacuum with no guidelines or levels of consistency to strive for.

VI. Resources

Since the completion of the Version 1.1 of the Guidelines, several new reports and resources have been published by the Coalition or its sponsoring organizations. This section identifies key items that can be used as resources by implementers.

A. National 511 Deployment Coalition

The establishment of the Coalition and the activity of its volunteer members have led to the development of a very important national resource. The Coalition members are the best source for 511 planning, deployment, operation, marketing, and evaluation information and experience. The Coalition continues to provide a venue for all parties, public and private, interested in providing 511 services to share information and exchange experiences, ideas and foster the promotion and growth of this important service.

B. Deployment Assistance Reports

The Coalition has published seven DARs:

- DAR #1: 511 Business Models and Costs Considerations (January 2002)
- DAR #2: Transfer of 511 Calls to 911 (March 2002)
- DAR #3: 511 and Homeland Security (June 2002)
- DAR #4: 511 Regional Interoperability Issues (March 2003)
- DAR #5: Public Transportation Content on 511 (June 2003)
- DAR #6: Weather and Environmental Content on 511 Services (June 2003)
- DAR #7: Roadway Content Quality on 511 Services (June 2003)

These reports resulted from focused efforts of Coalition volunteers from both the public and private sector. The reports attempt to address the most pressing issues that Coalition members have dealt with, and are dealing with, in their effort to develop and deploy quality 511 services around the country. Each volunteer effort has concluded its activity by electronically publishing an information report available online at www.deploy511.org, which is the most comprehensive source of information for active and potential 511 deployers. Additional online sites are referenced below.

C. Educational Materials

In March 2002, the 511 Deployment Coalition sponsored a national 511 deployment conference entitled *Answering America's Call for Travel Information*. The conference provided implementers the opportunity to learn about the Coalition's progress as well as share implementation experience. The conference began with a four-hour 511 "101" introductory session. In addition, proceedings of the conference have been published electronically that include links to the presentations provided at the conference. The USDOT and ITS America sites referenced below have links to the 511 "101" charts and the conference proceedings at <http://www.its.dot.gov/511/PDF/511intro.ppt> and

[http://www.itsa.org/resources.nsf/Files/511%20Deployment%20Conference%20Proceedings/\\$file/511ConferenceProceedings.doc](http://www.itsa.org/resources.nsf/Files/511%20Deployment%20Conference%20Proceedings/$file/511ConferenceProceedings.doc) respectively.

D. 511 Marketing Toolkit

Effective marketing of 511 is an essential element to successful 511 deployment. To assist implementers with this task, the Coalition's Marketing and Outreach Committee has made available a toolkit of resources that will help implementers plan more effective and efficient marketing programs while promoting a "national brand" image for 511.

The following marketing tools are currently available:

- 511 Logo and Logo Guidelines
- 511 Deployment Coalition Brochure
- 511 Illustration Artwork
- 511 Exhibits
- Background Materials
- Frequently Asked Questions (FAQs)
- Sample Press Releases
- Sample Radio Public Service Announcements
- Talking Points
- 511 Adhesive Stickers

In addition to providing marketing tools, the Coalition's Marketing and Outreach Committee supports implementers by promoting communication and networking. Through workshops and conference sessions, e-mail networks and conference calls, the Committee brings together the public information officers who are working to make the public aware of 511 service.

The toolkit can be accessed at <http://www.deploy511.org/marketingtools.htm>.

E. Operating 511 Systems Local Numbers and Website

Below is a list of the 18 operating 511 services across the country and the local or toll-free access numbers, as well as related or co-branded websites.

Table 2. 511 Systems Local Numbers and Websites

City / Region / State	Telephone Number	Related or Co-branded Website
Cincinnati / No. Kentucky	513-333-3333	www.artimis.org
Nebraska	800-906-9069	www.safetravelusa.com
Utah	866-511-UTAH	www.commuterlink.utah.gov
I-81 Region in Virginia	800-578-4111	www.511Virginia.org
Central Florida (I-4)	866-510-1930	www.trafficinfo.org
Arizona	888-411-ROAD	www.AZ511.com
Minnesota	800-542-0220	www.511MN.org
Southeast Florida	866-914-3838	www.smartraveler.com
Washington	360-570-2301	www.wsdot.wa.gov/traffic/511/
Iowa	800-288-1047	www.511IA.org
South Dakota	866-MY SD 511	www.safetravelusa.com
Kentucky – statewide	866-RDREPORT	www.511.KY.gov
San Francisco / Oakland	866-736-7433	www.511.org
Montana	800-226-7623	www.safetravelusa.com
North Dakota	866-MY ND 511	www.safetravelusa.com
Alaska	866-292-7577	http://511.alaska.gov
Maine	866-282-7578	www.511Maine.gov
New Hampshire	866-282-7579	www.511NH.com
Vermont	800-ICY-ROAD	www.511vt.com

F. Internet Resources

Information on the Coalition, its supporting resource materials and additional useful references for 511 implementers may be found in Table 3.

Table 3. 511 Internet Resources

Host Agency / Organization	Internet address (URL)
511 Deployment Coalition	http://www.deploy511.org/
U.S. Department of Transportation	
ITS Joint Program Office Federal Highway Admin.	http://www.its.dot.gov/511/511.htm http://www.fhwa.dot.gov/trafficinfo/511.htm
Intelligent Transportation Society of America (ITS America)	http://www.itsa.org/511.html
American Public Transportation Association (APTA)	http://www.apta.com/services (Forwards to deploy511.org)
American Association of State Highway and Transportation Officials (AASHTO)	http://511.transportation.org (Forwards to deploy511.org)

G. Continued Development

The Coalition will continue to monitor the issue of the implementation and operation of 511 services. If implementers have suggestions for improvements to the Guidelines or 511 services in general, please provide this information electronically to 511feedback@aaashto.org.

Appendix A – List of Acronyms

List of Acronyms

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ADOT	Arizona Department of Transportation
APTA	American Public Transportation Association
ARTIMIS	Advanced Regional Traffic Interactive Management & Information System for the Cincinnati-Northern Kentucky Region
ASN.1	Abstract Syntax Notation Number One
ATIS	Advanced Traveler Information Systems
ATMS	Advanced Traffic Management System
CMS	Changeable Message Signs
CRM	Customer Relationship Management
DAR	Deployment Assistance Report
EDAC	Elderly and Disabled Advisory Committee of MTC
ERM	Event Report Message
ESS	Environmental Sensor Stations
FCC	Federal Communications Commission
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GUI	Graphical User Interface
IEEE	Institute of Electrical and Electronic Engineers
INTI	Integrated Network of Transportation Information
ISP	Information Service Provider
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation Systems
ITS America	Intelligent Transportation Society of America
KYTC	Kentucky Transportation Cabinet
LaDOTD	Louisiana Department of Transportation and Development
LEP	Limited English Proficient

MPO	Metropolitan Planning Organization
MS/ETMCC	Message Sets for External Traffic Management Center Communications
MTC	Metropolitan Transportation Commission (San Francisco Bay Area)
NCDOT	North Carolina Department of Transportation
NHS	National Highway System
NTCIP	National Transportation Communications for ITS Protocol
PBX	Private Branch Exchanges
PSC	Public Service Commission
PUC	Public Utilities Commission
RWIS	Roadway Weather Information Systems
SAE	Society of Automotive Engineers
SEKTDA	Southern and Eastern Kentucky Tourism Development Association
TCIP	Transit Communications Interface Profiles
TMC	Traffic Management Centers
TMDD	Traffic Management Data Dictionary
TSTI	Telecommunications System for Traveler Information
UDOT	Utah Department of Transportation
USDOT	United States Department of Transportation
USGS	U.S. Department of the Interior, Geologic Survey
VDOT	Virginia Department of Transportation
VXML	Voice eXtensible Markup Language
XML	eXtensible Markup Language

Appendix B – Attributes of Existing 511 Services

The table below is a summary of all existing 511 services as of August 1, 2003. To date, most operating 511 systems have undergone at least minor enhancements in the first year of service. Therefore, the information in the table likely to change.

Please make use of the toll-free or “back door” phone numbers. At a minimum, this will provide a feel for the introduction, menu and system interface. If you wish to “test” a system further, a caller unfamiliar with the service’s coverage area (state or metro) will find that having a map of the area accessible generally provides key landmarks and roadways, thus allowing you to explore the system to its fullest extent.

Appendix F contains the available contact information for each of the 511 deployers.

Attributes of Existing 511 Services (As of August 1, 2003)

System	Vitals		User Interface						Type of Content						Type of Roads Covered					Type of Data						Awareness						Notes			
	Date Operational	"Back Door" Number	Commands ¹			Messages			Roadway	Transit	Ferries	Car /van pool	Tourism	"Ports"	Interstate	Other Ltd Access	US Routes	State Routes	Weather	Road Conditions	Construction	Incidents	Congestion	Travel Times	Roadside signs	VMS/CMS	511 website	Market Research	Evaluation	Other Advertising	Other				
			Touchtone	Voice	Bi-lingual	Text to Speech	Concatenated	Recorded																									Bi-lingual		
Statewide																																			
Nebraska	10/01	800-906-9069	X			X								X		X	X		X	X					X						X	CO, WY, IA interstate corridors			
Utah	12/01	866-511-UTAH		X			X		X	X	X	X		X		X	X		X	X	X	X		X		X	X				X	SLC Main Arterials			
Arizona	3/02	888-411-ROAD	X	X		X			X	X				X	X	X	X		X	X	X	X				X					X				
Minnesota	7/02	800-542-0220	X	X			X		X	X				X	X	X	X		X	X	X	X		X		X	X	X	X			X			
Washington	9/02	360-570-2301		X					X	X	X			X	X	X	X		X	X	X	X											Phased launch		
Iowa	11/02	800-288-1047	X	X			X		X					X		X	some		X	X	X	X				X						X			
South Dakota	11/02	866-MY SD 511	X			X	X		X					X		X	X		X	X	X			X		X						X	ND, SD, NE, MT, MN		
Kentucky	11/02	866-RDREPORT		X			X		X					X	X	X			X	X	X	X				X						X			
Montana	1/03	800-226-ROAD	X				X		X					X	NA	X	X		X	X	X	X		X		X						X	ND, SD		
North Dakota	2/03	866-MY ND 511	X				X		X					X		X	X		X	X	X					X						X	SD, MT, MN		
Alaska	4/03	866-282-7577		X			X		X					X		X			X	X	X	X				X									
Maine	5/03	866-282-7578		X			X		X	X				X		X			X	X	X	X		X		X									
New Hampshire	5/03	866-282-7579		X			X		X	X				X		X			X	X	X	X													
Vermont		800-ICY ROAD		X			X		X	X				X		X			X	X	X	X													
Metro Area																																			
Cincinnati / Northern Kentucky	6/01	513-333-3333	X			X		X						X	X	few	few				X	X	X	X	X	X	X					X	transfer to statewide Kentucky services		
Central Florida (Orlando and points east along I-4)	6/02	866-510-1930		X			X		X					I-4 only							X	X	X	D	X							X	May cover information on other roadways, but only selected via I-4 commands		
SE Florida	7/02	866-914-3838	X		X			X	X				X	X	X	X				X	X	X	X				X						X		
San Fran/Oakland	12/02	866-736-7433	X	X			X		X	X	X	X		X	X					X	X	X					X	X	X	X				X	
Corridor																																			
I-81 (Virginia)	2/02	800-578-4111		X		X		X				X		X	X	X	X		X	X	X	X	X		X	X	X	X	X	X				X	
Total	Out of 19 services		10	12	1	5	13	3	1	19	10	3	2	1	2	19	8	18	12	15	15	18	16	8	3	9	1	16	4	5	14				

Notes and definitions:

1 - when a system has both command types, touchtone is typically a backup interface command mode or for speech impaired

Text to Speech - uses software to convert typed text into audible words

Concatenated - the method of parsing previously recorded words or phrases, pieced together to produce sentences.

Recorded - audio recordings performed in a studio or on a computer. Often done by audio professionals.

Other Ltd. Access - limited access highways not designated as Interstates, US Routes, or State Routes

Weather - forecasted

Road Conditions - observed road weather (typically snow, ice, flooding)

Construction - planned or existing

Congestion - observed congestion without travel time or delay information

D = Delay

VMS / CMS - variable or changeable message signs used for general awareness (i.e., peak travel holidays, weekends, etc.) or incident management-related

511 website - this can be a co-branded website like, Virginia and San Fran / Oakland, or a website with much of the same information available on the phone system, like Commut erLink in Utah.

Other Advertising - Public Service Announcements, TV, print, billboards, etc.

Appendix C – Frequently Asked Questions

Frequently Asked Questions	Section of Document
Why do 511?	II. Vision
Should 511 link to 911?	III. Guidelines
What is regional interoperability?	IV and V. Cross-cutting Issues & National Policy Issues
What are the benefits to transit providers?	III. Guidelines
Will 511 significantly increase call volumes to transit customer service centers?	III. Guidelines
What type weather information should be included?	III. Guidelines
Is there a 511 logo?	VI. Resources
How have other deployers marketed their 511 systems?	VI. Resources
Do any 511 services have “other” information?	III. Guidelines
Has any deployer provided Premium Services yet?	III. Guidelines
Are deployers using 511 with AMBER Alerts?	III. Guidelines
Is Homeland Security an issue?	IV. Cross-cutting Issues
Are any systems bi- or multi-lingual?	Appendix B
How do I contact a deployer?	Appendix F

Many general answers of the FAQs can be found in Appendix B in the System Attributes Chart.

Appendix D – Core Survey Questions - Version 1.0

Core Survey Questions - Version 1.0

Deployers should consistently use the following core survey questions when collecting information about the usage, customer preferences and satisfaction of a 511 system.

About your use of 511:

1. ***How did you hear about 511?*** (Don't prompt) *saw highway sign, from friend / coworker, newspaper, TV, radio, DOT website, transit signage or pass, billboard, fliers, phone bill insert, employer program, etc.*
2. ***Do you know where 511 is available?*** (Don't prompt) *"in this area," "statewide," "nationwide"*
3. ***When did you first call 511?*** *This is first time, in the past 3 months, between 3 and 6 months ago, between 6 and 12 months ago, 1 to 2 years ago, I can't remember*

If Q.3 indicates that the respondent is not a first-time caller:

4. ***How many times have you called 511 in the past 4 weeks?***
5. ***Have you ever called 511 in a different state or metro area?*** {*"don't know" and "can't remember" are OK responses for these questions*}

For the specific trip that you were calling 511 about this / that time: [questions 4, 8, and 9 require administering the survey with a follow-on call, rather than via an intercept at the beginning of the user's call]

1. ***What was the purpose of this trip?*** *Commuting to / from work or school, other work-related travel, personal appointments, visiting friends and relatives, driving children to / from school or activities, shopping, travel to / from airport, recreation, vacation*
2. (If necessary, follow up with) ***Were you making this trip as the driver of a commercial vehicle? What kind of commercial vehicle was this?*** *Truck, taxi, limousine, etc. (check FMCSA categories)*

[Use answers to questions 1 and 2 as basis for skip patterns later]

3. ***What kind of information were you looking for when you called 511?*** *Roadway-related weather conditions, traffic congestion, road construction schedules, public transit information, airport information, pedestrian / bike information, food / lodging / gasoline, shopping, tourism, emergency services, border crossing, CVO information, parking availability*
4. ***And how satisfied were you with the information you got?*** *5-point scale*
5. ***From what kind of telephone did you call 511?*** *Cellular phone, landline phone*

6. ***Where were you when you called 511?*** Home, workplace, in car, in transit vehicle, along the wayside, other place
7. ***Did you make your call just prior to setting out, once you were already en route, or were you calling well in advance to plan a future trip?*** Just prior, en route, in advance
8. ***Did you consult any other sources when planning or taking this trip?*** If yes, probe for sources: radio, TV, dedicated cable TV channel, website, transit schedules, friends and relatives, travel guide, travel agent, atlas / maps, commercial vehicle fleet office or dispatcher, other telephone-based service
9. ***Did you make any change to your travel plans as a result of the information you got from 511?*** Decided to leave earlier; decided to leave later; chose to travel by a different means; decided to take a different route; chose to make stops on the way that you wouldn't otherwise have made; slowed down / changed speed; stopped along the way and waited, or waited overnight

About your satisfaction with 511:

1. ***On a scale from [...] to [...], how satisfied are you with 511's available information about...*** (using a 5-point scale)

[Adjust these questions based on the specifics of the deployment and include a "don't use this" or "no opinion" option]

[For traffic info users]: weather-related roadway conditions, traffic incidents and accidents, traffic congestion, parking availability, roadway construction projects, route planning

[For public transit info users]: schedules, fares and passes, planning an itinerary, "how to ride," real-time operations updates, accessible transit / paratransit, park-and-ride, rideshare services, vanpools, airport transportation options, weather-related changes to transit operations

[For commercial vehicle operators]: weather-related roadway conditions, traffic incidents and accidents, traffic congestion, truck parking availability, inspection and weighing posts, roadway construction projects

[For all]: food, lodging, and gasoline; shopping; tourism; emergency services; special events; border crossings; pedestrian & bike travel; information about 511 itself

2. ***Please rate your level of agreement to each statement on 5-point scale***

[For traffic info users]:

- *The traffic information I get from 511 is accurate and timely*
- *511 covers the areas and routes I'm interested in*
- *Calling 511 helps me figure out if the weather will affect my travel plans*
- *Information on traffic delays and incidents is provided in sufficient detail to be useful to me*

- *I trust the traffic information I get from 511 more than what I get from traffic reports on the radio*
- *Information from 511 helps reduce the stress of driving in this area*

[For public transit info users]:

- *The transit timetables on 511 are more likely to be up-to-date than the printed schedules*
- *I only check 511 if I suspect that services are not operating normally*
- *511 covers all of the transit services I'm interested in*
- *511 makes it more convenient for me to take transit*
- *Getting transit information from 511 is easier than any other way*

[Additional transit statements, as applicable for the deployment]:

- *I'd like to be able to order transit tickets / passes over the phone via 511*
- *I can quickly get through to a live operator to help plan my trip*
- *I'd like to be able to just give my starting and ending points and have the system work out which buses / trains I should take to get there*
- *I'd like to be able to get real-time updates on the status of my bus or train*

[For all users]:

- *It is easy to navigate through the 511 menu to get the information I need*
- *I can easily understand the information on 511*
- *Calling 511 helps me decide what mode (bus, subway, car, bicycle, etc.) to take for my trip*
- *I call 511 most often when the weather is bad*
- *I'd like to be able to customize 511 to my particular routes and trips*
- *The information I obtain from 511 is useful to me*
- *I am able to get the kind of information I am looking for*
- *Plus deployment-specific questions about way information is presented*

3. ***What do you like best and least about 511?*** *Open-ended*
4. ***All in all, how would you rate your satisfaction with 511?*** *5-point scale*
5. ***Are you likely to phone 511 again? Yes / no If not, why not?*** *Open response or pre-codes such as: too costly, not useful, not accurate, not current, not specific enough, doesn't cover my routes / modes, I'm no longer traveling, just don't need it*
6. ***Would you recommend 511 to a friend?*** *Yes / no*
7. ***What benefits, if any, did you obtain from 511?*** *(Prompt?) Open response or pre-codes such as: reduced travel time, on-time arrival, improved safety, peace of mind / reduced stress, avoid problems, better informed travel decision (mode, route, timing), ability to inform someone of late arrival, saved money*

About the improvements you'd like to see to 511: *[these will vary a lot by deployment, but could look something like this]*

1. ***If you could improve or add new features to 511, which would you find most useful? Rank order 1 through 3: speech recognition, touchtone shortcuts, adding coverage of a certain route, more transit coverage, etc.***

About you and your travel patterns :

1. ***Are you... male / female (record without asking)***
2. ***How old were you on your last birthday? __ years***
3. ***What is the zip code where you currently reside?***
4. ***What was the last level of school or college that you completed? Grade school (through grade 8), some high school (no degree), high school graduate or GED, technical or vocational school graduate, some college or junior college graduate, college graduate, postgraduate degree***
5. ***In [last calendar year] what was the total annual income of your household, before taxes or other deductions from pay? Less than \$10,000, 10-15k, 15-25, 25-35k, 35-50k, 50-75k, 75-100k, 100-150k, 150-200k, 200k+, can't say; household members don't share income***
6. ***Do you personally use the Internet at work or school at least once a week, on average? (If the respondent goes to a workplace or school at all, that is)***
7. ***Do you personally use the Internet at home at least once a week, on average? If yes, Is that home Internet connection via a phone line, or is it via a high-speed connection such as DSL or cable? Dial-up, high speed, both***
8. ***Which of the following devices do you carry with you at least 10 times a month, on average? Which do you use to obtain travel information while traveling in a vehicle? Mobile phone; two-way pager / PDA / Blackberry; laptop computer with wireless communications; none of these***
9. ***[For each trip type] Have you made a trip of this type in the past 4 weeks? Did you use 511 for most, some, or none of your trips of that type? Commuting and other work-related travel; medical and other personal appointments; shopping; visiting friends and relatives / recreation / dining; driving children to /from school or activities***
10. ***(If Q.9 indicates commute trips are taken): What modes of travel do you use for your commute trips in a typical week?***
11. ***(For trips other than commuting,) what modes of travel do you use in a typical week?***

Appendix E – Deployment Assistance Report Overviews

The Coalition has published seven DARs since early 2002. Below is a brief overview of each document:

DAR #1: 511 Business Models and Costs Considerations (January 2002)

http://www.its.dot.gov/511/511_Costs.htm

The Business Models and Cost Subcommittee prepared this document to educate the other members of the 511 Working Group and the members of the 511 Policy Committee on issues salient for migrating a planned or existing traveler information service to utilize the 511 dialing code. In addition, it is understood that this document may be used to educate other entities (public and private) interested in deploying the 511 dialing code for ATIS.

In March 2001 a 511 Policy Committee Retreat took place in Palm Harbor, Florida where the Policy Committee directed the 511 Working Group to investigate plausible business models and the appropriateness of their application to 511. It was agreed that attempts would be made to bring public and private enterprise together to work cooperatively on 511 solutions. It was also agreed that **a basic 511 service should be available to the end user at no more than the cost of a local call** and that an extended 511 service could be available typically through the private sector, at an additional cost to the consumer. It is these underlying principles that are incorporated into exploration of the business models and cost considerations for enabling these partnerships and creating the recommendations herein.

Business models and cost recovery are the critical factors for determining the sustainability of a traveler information service and 511. In the context of 511, the service will be regarded as new from the perspective of callers who previously have not been exposed to traveler information services. With this in mind, it is important that 511 be sustainable for the long term so that market acceptance and usage can be assured.

DAR #2: Transfer of 511 Calls to 911 (March 2002)

<http://www.its.dot.gov/511/511to911.htm>

Introduction

There has been considerable discussion about the desirability and implications of 511 traveler information systems having the ability to transfer true emergency calls made to 511 in error. In order to implement this call transfer requires that certain capabilities exist within the 511 system. This DAR defines: how such a call could be transferred; the technical and cost implications of this implementation; and the potential legal issues that might be involved.

Summary

The transfer of 511 calls to 911 is not a difficult technical problem. However, there are legal issues that must be overcome in the areas of liability protection for the 511 center operator and privacy considerations. There is no question that a 511 center that implements the ability to transfer calls to 911 will incur liability for the successful completion of that call. Even if the center only recommends that the caller hang up and dial 911, there is potential liability. It is clear that state and local governments that wish to explore this transfer must seek legal counsel to examine the local laws pertaining to their liability exposure and governing the use of caller

identification information from the landline carriers for 911 purposes. The wireless carriers are governed by a different set of laws and, in general, view that caller location is private information which is not available to anyone but a 911 center. Therefore, it will be a challenge to obtain the caller's location from the wireless carriers to enable the transfer to 911.

To effect the transfer, the telephone equipment in the 511 center must be upgraded to perform the necessary functions. In addition, the 511 center must have special lines to support the transfer that are usually leased from the local wireline carrier. The cost for these features is estimated to be a one-time charge of about \$150,000. Also, there will be monthly charges of about \$15,000 plus a charge of about \$0.40 per emergency call to be transferred.

The task force attempted to determine how frequently such erroneous calls might be received by a 511 call center. However, there is no data from the other N11 numbers that would indicate how many people might dial 511 when intending to dial 911. Further, no other N11 service currently routes misdialed calls to 911. Should the subject of transferring errant 911 calls arise, this document will provide a starting place for that discussion.

The Problem

A concern has been voiced that there will be times when a caller intending to call 911 will inadvertently call 511. The 911 community has done an excellent job of educating the public. Their recent "Report Card To The Nation" indicates that 99% of the public understands what 911 is intended for. However, it will take time for the 511 community to reach a similar level of awareness with the public.

However, it is unclear how many errant calls might be captured by a model 511 system. There is not a reliable source of empirical data that would support a finding that the calls would be substantial or negligible. The lack of data suggests that planners of 511 systems should not assume that there will be a large volume of calls to 511 that should have been placed to 911 as no historical data currently exist that suggest this to be the case. However, there is a foreseeable possibility that there will be some degree of misplaced calls to 511 that should be placed into the 911 system.

Conclusion

While it is technically feasible to transfer a call made to 511 to a 911 call center, there are a number of key issues that must be considered before proceeding down that path.

Any region considering this capability must research the liability and privacy issues associated with 911 call processing. The liability protection currently offered the telecommunications industry and 911 call center operators does not apply to transportation agencies or their contractors. Thus, each state and region should consider these issues. The actual implementation of the transfer of calls is technically straightforward and there would be both non-recurring and recurring costs to the implementer of this capability.

DAR #3: 511 and Homeland Security (June 2002)

<http://www.its.dot.gov/511/511secur.htm>

Prior to September 11, the U.S. homeland had been mostly spared from terrorist attacks. Now, transportation agencies are beginning to address the need for threat and vulnerability assessments and re-examine how existing emergency management plans will be implemented during a homeland security emergency or alert. Travel information is an important component of emergency management and the telephone is one of many delivery mechanisms. As 511 systems become more widely deployed, it is reasonable to ask – what role should 511 systems play during homeland security emergencies and alerts and what are the organizational, technical, cost and other impacts of doing so?

This DAR discusses the challenges and opportunities for 511 systems, their designers and operators, arising from the September 11, 2001 terrorist attacks on the World Trade Center and the Pentagon. Neither location had a 511 system, but relevant lessons were learned. While it does not provide the solutions, this DAR highlights the issues and suggests related guidelines.

Linkage Between 511 and Homeland Security

It is important to acknowledge the existing relationships between the transportation and emergency management communities with regard to major incident response. These relationships formed the basis for the responses to the September 11 attacks. Among the many stories of human tragedy and heroism on September 11, transportation agency staff guided hundreds of thousands of travelers to safety in the minutes and hours following the attacks. Given the disruption caused by the attacks, this effort continued for days and weeks. Providing accurate, timely information to travelers was critical to safety and mobility, not just in the New York and Washington D.C. regions but also throughout the eastern seaboard.

How Can 511 Support Emergency Management?

Under “normal” conditions there are multiple media for dissemination of information to travelers. However, on September 11, the need for a rapid exodus on foot from the affected areas precluded the options to use the Internet, television or even radio. For many, cell phones became the primary means of communication in the hours following the attacks. Just as transportation agencies responded to that need, it is apparent that had a 511 system been available it too would have contributed to support emergency management and evacuation.

As the number of 511 systems multiplies in the years ahead, familiarity with 511 as the telephone number for travel information may become as commonplace as 911 is today for emergencies. People from a city, region or state with 511 systems may not hesitate to dial 511 for travel information when traveling on business or visiting unfamiliar locations, including for homeland security emergencies.

Are There Homeland Security Considerations for 511 Systems?

While a homeland security emergency has many parallels to a major incident in terms of detection, response and recovery, there are differences as well. Perhaps the most troubling is the combination of:

- The potential for large numbers of people to be the target of an attack, or to be impacted by its immediate aftermath, creating a spike in demand for travel information or related news.
- Transportation infrastructure itself may be the target of an attack, e.g. bridges or railway stations, or be indirectly impacted, e.g. closure of surface streets due to exclusion zones around sensitive buildings or facilities, highlighting the need for accurate travel information in a dynamically changing environment.
- Communications infrastructure may be the target of an attack, e.g. communications hubs, or be indirectly impacted, e.g. collateral damage to fiber optic cables, highlighting the need for communications network redundancy.
- An attack could occur at any time, with or without warning, when available response resources are insufficient.
- The nature of an attack could be outside the envelope of knowledge and experience of transportation operations staff, e.g. weapons of mass destruction, delaying an accurate assessment of need and appropriate response.
- An attack could comprise multiple primary and secondary events over a short period of time, designed to create confusion and lure emergency responders and civilians into a “trap,” this highlights the need for accurate travel information in a dynamically changing environment.

This combination of circumstances leads to challenges for a broad spectrum of emergency responders, law enforcement and transportation agencies. This, in turn, will impact how travel information is gathered and disseminated. Where 511 systems exist, or are planned, it appears prudent that their designers and operators take account of such challenges.

A recurring theme throughout the DAR is that many issues apply to traveler information systems in general, of which 511 systems are but one delivery medium.

DAR #4: 511 Regional Interoperability Issues (March 2003)

<http://www.its.dot.gov/511/511secur.htm>

The purpose of DAR #4 is to offer 511 implementers technical advice on how to deal with callers who logically want information on transportation facilities and services outside of the area served by your 511 system. Callers to 511 may not know which jurisdiction they are in nor where the boundary for the next jurisdiction is – they just want information about the travel conditions ahead of them. This is an issue of interoperability between state borders and within states where there may be a metropolitan 511 system(s) and a statewide system as well.

A real world example: since December 2002, the metropolitan Cincinnati system (ARTIMIS) has been successfully passing Kentucky suburban incident information into the Kentucky statewide Condition Acquisition Reporting System (CARS-511) using Traffic Management Data Dictionary (TMDD) ITS standards, implemented in Traveler Information Markup Language (TIML) / eXtensible Markup Language (XML). Kentucky traffic events reported in ARTIMIS

are imported to the CARS-511 system for fully automated reporting without any manual data re-entry. Although the two 511 systems were developed at different times and independently, the standards are allowing seamless data exchange as no call transfers or manual processing are necessary. This DAR will provide information on how you may also achieve this kind of interoperability.

N11 systems, by design, are not national in scope. Only 411 gives the appearance of being national in scope and that is accomplished with an integrated database behind the systems which its business model supports. With the overlap and varied boundaries of agencies, regions, travel patterns and the unknowns of cellular routing, 511 deployers need to look beyond their borders to make 511 a success with the traveling public. If 511 developers, deployers and operators accomplish regional interoperability through data sharing, then we may achieve national interoperability ultimately as well. This national interoperability may ultimately yield a 511 system where the caller may be asked, "City and state, please."

DAR #4 addresses many technical topics, including:

Data Transfer / Sharing Issues -

- *What Data or Information Should Be Shared?*
- *Over How Wide an Area Should Data / Information Be Shared?*
- *Incorporating Outside Agency Data*

Call Transfer Issues -

- *Transferring to a Limited Number of Systems*
- *Technical Aspects of Call Transfer*
- *Technical and Financial Impact of Call Transfer*
- *Charges for a Call Transfer*
- *Special Consideration for "Misplaced" Wireless Calls*

The DAR also investigates many factors that must be addressed when dealing with the issue of interoperability and determining which type of transfer best fits the needs of a particular 511 service. Most of these factors determine how a system would work and / or which standards are in use or available to make the transfer seamless to the user.

Finally, the document offers a list of recommendations for implementers that include the following general system design considerations:

- Identify travel corridors, other regions and neighbors and consider how to include their information for callers to your system either through data sharing or call transfer.
- Recognize that your neighbors are also dealing with this issue and engage them in a two-way, or in some cases, multi-way dialogue.
- Use the SAE ATIS (J2354) standard when developing and upgrading information databases and system communications to facilitate the exchange of information.

- Examine and understand wireless calling areas at the boundaries of your system and develop a plan for dealing with misrouted calls. Especially be mindful of the placement of signage near a border which may lead to someone calling 511 and not getting through because they are being handled by a switch where 511 is inactive or are routed to another state's 511 system

More specific recommendations include the following factors relating to call transfers and data sharing need to be considered:

- Arrangements for handling requests for your information from a neighbor system – data or call transfer.
- The estimated number of callers to need “outside” information and what the nature of that information will be.
- The number of “outside” information sources to be incorporated based on logical travel patterns in the region.
- Availability of data from these “outside sources” to be incorporated into your own system.
- Effort required to integrate data from “outside sources” into your system.
- Existence of 511 and other telephone “outside” systems for calls to be transferred to and the suitability of those systems to accept and handle transfers.
- The cost of call transfers to the outside sources in terms of the number of calls and cost per call.
- Likelihood and acceptability of “dead end” calls that result from call transfers.

If an implementer determines data sharing is preferred, then the following items need to be considered:

- Use the SAE ATIS (J2354) standard.
- Recognize the need to parse and size information to match your system.
- Be careful in menu design not to overload your system with “outside” focus.

If an implementer determines that call transfers are preferred, then the following items need to be considered:

- Address “dead ends” and inform a caller when they will occur.
- Estimate call transfers costs, who will pay them and how to minimize such costs, possibly through existing state contracts.

DAR #5: Public Transportation Content on 511 (June 2003)

<http://www.deploy511.org/docs/511-darspubtransservices.doc>

The Coalition recognizes that 511 services will be developed in a bottom-up fashion with state and local transportation agencies – with the close collaboration of the private sector – establishing services in areas and timeframes determined by them.

The purpose of this DAR is to share information regarding the types of public transportation data that can be provided via 511 and the issues associated with this provision. This DAR's main audience is the transit community, 511 planners and implementers.

The rationale for this DAR is to produce a "511 basics" guide for transit agencies to both address getting started with 511 and also planning for enhancing basic services as experience and demand warrant. It is about providing the public with information about your agency and its services so that travelers may make informed decisions as they travel through the transportation system.

The transit community is very interested in playing an important role in 511 without increasing the number of calls to already busy customer service centers. There may be some misconceptions about what 511 has to be to be considered "successful." Some agencies may believe that if they cannot provide certain types of information, then they cannot participate in 511. 511 and the provision of public transportation information on it is *not* only about real-time information.

There is hope of reducing the number of calls to transit customer service centers and 511 is another outlet for the information required by those callers. 511 may not reduce the number of calls to customer service centers overall, but it may enable transit agencies to provide their public transportation information to a new audience. With the increasing coverage of 511 systems, more sophisticated marketing, growing brand awareness and continually improving content, overall usage of 511 is likely to soar in the future.

DAR #6: Weather and Environmental Content on 511 Services (June 2003)

<http://www.deploy511.org/docs/511-dar6weatheenviroservices.doc>

The purpose of this DAR is to share information regarding the types of weather and environmental information that can be provided via 511 and the issues associated with this provision. This DAR's main audience is the public and private providers of weather data, 511 planners and implementers. The term "weather" is used in a variety of means throughout this report, at times we are referring: to atmospheric information; to road weather (e.g., a pavement temperature forecast); or to road conditions (e.g., icy). The term "data" is used throughout as that data that weather and environmental systems generate, while the term "information" is meant as that information created from the weather and environmental systems data.

The rationale for this DAR is to produce a recommendation to deployers on "basic" 511 weather and environmental content and to provide for "consistency" of weather and environmental information content and presentation across 511 systems. The Task Force feels that exception reporting is what 511 callers want – travel conditions are good *except* for black ice between mileposts 10 and 14 as an example. It is recommended that the 511 weather and environmental information provided be actionable, so that travelers will slow to 20 miles per hour due to icy conditions if pavement temperature readings report this.

A recent analysis of weather impacts by Mitretek shows that an average of 6,500 fatalities and 450,000 injury accidents occurred annually during adverse weather between 1995 and 2001.

There have been activities in the road weather arena for many years trying to reduce the above impacts and provision of weather information to travelers via 511 is another means of accomplishing this.

The Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM) produced the Weather Information for Surface Transportation (WIST) National Needs Assessment Report, which examines weather information needs for roadways, railways, transit, marine transportation, pipelines and airport ground operations. The Federal Highway Administration (FHWA) has prepared: a Weather-Responsive Traffic Management Concept of Operations that begins to define the needs and activities of freeway and arterial transportation managers and how these needs change or differ during adverse weather; the Maintenance Decision Support System (MDSS) project, which is a multi-year effort to prototype and field test advanced decision support components for winter road maintenance; and the Weather in the Infostructure white paper that discusses the fundamental data needs of the weather Infostructure component and provides an estimated aggregate cost for national deployment of road weather data collection systems.

There were also many activities throughout the years by the private sector as well in this area. One of note is the Advanced Traveler Weather Information System (ATWIS), developed by the University of North Dakota from 1995 to the present. ATWIS resulted in the #SAFE (the number to dial on cellular phones for this information) technologies that have been successfully deployed in several statewide 511 systems.

The Task Force has a vision that all segments used to provide information to the public via 511 would have sufficient climatological and meteorological homogeneity. Practically, this type of segmentation would prove to be a daunting task for 511 deployers today. The Task Force realizes this and therefore encourages deployers to determine their segments with sufficient climatological and meteorological homogeneity, but understands that this may not be possible.

Traffic, road conditions and weather information are intertwined – weather restrictions affect traffic and determination of road conditions depends on weather information. There are different requirements for different segment definitions, such as local vs. long distance travel or synoptic scale vs. micro scale in meteorological terms.

Weather conditions may change dramatically with fog, storm, wind, etc. and it is recommended that consumers be provided with options before encountering these hazards. The quality and utility of weather information provided to callers is critical if we are to continue to provide a valuable service via 511.

DAR #7: Roadway Content Quality on 511 Services (June 2003)

<http://www.deploy511.org/docs/511-dar7Roadway.doc>

The first 511 service became operational in the Cincinnati / Northern Kentucky area in July 2001. Every service in operation provides some form of information associated with roadway conditions. And while early feedback from 511 users has been positive, there is recognition

within the Coalition that the ultimate quality and utility of information provided via 511 is a critical part of providing a valuable service to callers.

With many of the services likely to have their preponderance of callers interested in roadway conditions, the quality of roadway-related content will in many cases dictate overall satisfaction with 511. The 511 roadway quality “levels” discussed in this DAR are for the basic 511 telephone travel information service. Roadway data quality needs vary greatly by application: traffic incident detection; long range system-wide planning / modeling; oversize truck permit routing; construction project report analysis; long range impacts of suburban development; etc. It is understood that all of these activities may need different levels of data disaggregation and quality.

The purpose of this DAR is to provide, in a single document, the most up-to-date information on guidelines, state-of-the-practice, state-of-the-art, implementation experience and lessons learned related to gathering and providing quality roadway content over 511 services.

Appendix F – Deployer Contacts

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