

Western States One-Stop Shop for Rural Traveler Information

System Concept Document

By

David Veneziano, Ph.D.
Research Scientist

and

Douglas Galarus
Program Manager
Systems Engineering and Development Integration

Western Transportation Institute
College of Engineering
Montana State University

Prepared for the
Federal Highway Administration
United States Department of Transportation
Washington, D.C.

November, 2010

DISCLAIMER

The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of the Federal Highway Administration, United States Department of Transportation or Montana State University. Alternative accessible formats of this document will be provided upon request. Persons with disabilities who need an alternative accessible format of this information, or who require some other reasonable accommodation to participate, should contact Kate Heidkamp, Assistant Director for Communications and Information Systems, Western Transportation Institute, Montana State University, PO Box 174250, Bozeman, MT 59717-4250, telephone number 406-994-7018, e-mail: KateL@coe.montana.edu.

ACKNOWLEDGEMENTS

The authors wish to thank the Federal Highway Administration for its financial support of this work. They also thank the Western States Rural Transportation Consortium for its contributions to the scope of this project. Finally, the authors thank Sean Campbell, Ian Turnbull, Ed and Lamkin of Caltrans, Galen McGill of the Oregon Department of Transportation, Ted Bailey of the Washington Department of Transportation and Denise Inda of the Nevada Department of Transportation for their support of this work.

TABLE OF CONTENTS

1. Introduction	1
1.1. Background	1
1.2. Project Motivation.....	2
1.3. Document Organization	2
2. Users	4
2.1. Long-Distance Travelers	4
2.2. Local Travelers.....	5
2.3. Goods Movement	6
2.4. DOT Personnel.....	7
3. Data and Components.....	8
3.1. Data Elements and Sources	8
3.2. Website Functions	9
3.3. Functional Requirements.....	10
4. Implementation Plan.....	11
4.1. Implementation and Deployment Steps	11
5. Conclusion.....	13
6. References	14

LIST OF TABLES

Table 3-1: Data elements, description and sources..... 8

LIST OF FIGURES

Figure 3-1: Expected appearance of system data presentation 10
Figure 4-1: Steps in development of the system..... 11

Revision History

Version	Description	Date
1.0	Draft	November, 2010
2.0	Revised Draft	December 2010
3.0	Finalized	January 2011

EXECUTIVE SUMMARY

One of the primary items of interest to travelers on the nation's roads, particularly those who will be traveling long distances, is the weather they will encounter en-route. While existing real-time traveler information services provide some weather and other information to travelers, the breadth and depth of useful information currently offered is limited. Existing systems are typically designed to conform to specific jurisdictional lines, such as state boundaries, whereas many trips will span multiple such jurisdictions. While many entities have sought to provide traveler information via the Internet, the result has been considerable variation in the level of detail provided. This is particularly true of weather information, which is often provided only for major routes in a manner that may not be decipherable to the average traveler.

To address the shortcomings of current web-based weather information sources for travelers (and DOT personnel), this project has been undertaken to develop a website displaying multi-state Clarus ESS data, along with other information streams as available, such as DOT Intelligent Transportation System (ITS) field elements, CCTV, planned and active closures, incidents, weather sensor readings from non-DOT sources, National Weather Service forecast information, etc. The objective of this project, therefore, is to integrate a variety of real-time information together in a single web-based location and in a user-friendly format. The region covered will include all of California, Oregon, Washington and Nevada. The developed product will display weather information for this region in a manner that would be easily accessed and understood by users. In addition to weather information, the product will display other data streams, as available. As a result of this work, the use and presentation of Clarus data across multiple states in conjunction with other traveler information streams will be demonstrated and travelers and agency personnel with a useful planning and management mechanism.

This document presents a system concept from a high-level, user-oriented perspective on how the Western States One-Stop Shop for Rural Traveler Information. The system concept serves as an important guiding piece of documentation because it assists the research team in prioritizing which data elements are most important to include, and how the user interface should be structured to maximize user convenience. This system concept document is based on knowledge obtained with respect to users and data streams from projects such as WeatherShare, the Integrated Corridor Management Clearinghouse and One-Stop Shop. Agency responsibilities with respect to sustaining the system are not discussed in great detail because the system will primarily use existing information sources rather than generate new ones, which would require greater agency involvement beyond the scope of this project.

1. INTRODUCTION

One of the primary items of interest to travelers on the nation's roads, particularly those who will be traveling long distances, is the weather they will encounter en-route. While existing real-time traveler information services provide some weather and other information to travelers, the breadth and depth of useful information currently offered is limited. Existing systems are typically designed to conform to specific jurisdictional lines, such as state boundaries, whereas many trips will span multiple such jurisdictions. While many entities have sought to provide traveler information via the Internet, the result has been considerable variation in the level of detail provided. This is particularly true of weather information, which is often provided only for major routes in a manner that may not be decipherable to the average traveler.

Real-time traveler weather information is a valuable tool in maintaining and enhancing both traveler safety and mobility. From a safety perspective, it is important for travelers to know before a trip about potential challenges that may impact their travel, including snow, ice, high winds, fires and other hazards that may degrade mobility. While such information may currently be available through a variety of sources, there is inconsistency in the types and quality of information available. In addition, the information is generally scattered over numerous web-based (and sometimes non-web-based) sources, meaning travelers must spend significant amounts of time assembling this information before making a trip. As a result of the effort involved with compiling this information, many travelers do not seek out all the information they need, if they even choose to seek that information at all. This may result in increased delays and diminished safety for the traveler.

1.1. Background

Previous work completed by the Western Transportation Institute explored the acquisition and dissemination of various traveler information elements at various spatial levels. This includes the provision of weather and traveler data through different website platforms. One such source is WeatherShare (1), which aggregates available road weather data from various sources in California, including Road Weather Information System (RWIS) Environmental Sensing Station (ESS) data, and presents it in a map-based format¹. Additionally, the Integrated Corridor Management Clearinghouse (2) and One-Stop Shop for Rural Traveler Information (3) platforms employ this same weather data, along with other traveler information streams (CCTV, chain controls, etc.) to provide a map-based display of conditions throughout northern California. In all cases, these platforms combine weather data from various sources to provide detailed information in a comprehensible format regarding current and forecast conditions. When combined with multiple data streams such as closed circuit television cameras (CCTV), this weather information provides Department of Transportation (DOT) personnel and travelers with a more complete picture of data at a route-specific level.

While the previous efforts have led to the development of systems that provide more useful information to travelers and agency personnel at a route level, little work has been performed to extend these systems to cover broad regions (i.e., multiple states). Even at a local level, many

¹ WeatherShare is not a primary source of weather data. Rather, it aggregates weather data from a number of different primary sources and provides that information in a single, consistent interface.

travelers are making trips that cross jurisdictional boundaries, requiring them to visit multiple web pages to obtain critical trip-planning information, particularly weather data and forecasts. Similarly, DOT personnel along state borders often need to know what conditions are outside of their jurisdiction in order to manage operations. At a national level, other groups, specifically truck drivers, are making long-distance trips where weather information would be useful, but is difficult to obtain. In short, the current approach to providing weather information to these user communities often does not meet their primary needs.

1.2. Project Motivation

Real-time traveler information is a valuable tool in maintaining and enhancing both traveler safety and mobility. One of the key aspects of such traveler information is current and forecasted weather. From a safety perspective, it is important for rural travelers to know before a trip about potential challenges that may impact their trip, including snow, ice, high winds, fires and other hazards. These same challenges also typically degrade traveler mobility. While weather and other traveler information may currently be available through a variety of sources, there is inconsistency in the types and quality of information available. In addition, the information is generally scattered over numerous web-based (and sometimes non-web-based) sources, meaning travelers must spend significant amounts of time assembling this information before making a trip. As a result of the effort involved with putting this information together, many rural travelers do not seek out all the information they need, if they even choose to at all. This may result in increased delays and degraded safety for the traveler, particularly during inclement weather conditions.

To address the shortcomings of current web-based weather information sources for travelers (and DOT personnel), this project will develop a website displaying multi-state Clarus ESS data, along with other information streams as available, such as DOT Intelligent Transportation System (ITS) field elements, CCTV, planned and active closures, incidents, weather sensor readings from non-DOT sources, National Weather Service forecast information, etc. The objective of this project, therefore, is to integrate a variety of real-time information together in a single web-based location and in a user-friendly format. The work would build upon the previously cited efforts, particularly One-Stop Shop, which has laid the technological foundations for how such information is acquired and displayed. The region covered will include all of California, Oregon, Washington and Nevada. The developed product will display weather information for this region in a manner that would be easily accessed and understood by users. In addition to weather information, the product will display other data streams, as available. As a result of this work, the use and presentation of Clarus data across multiple states in conjunction with other traveler information streams will be demonstrated and travelers and agency personnel with a useful planning and management mechanism.

1.3. Document Organization

This document presents a system concept from a high-level, user-oriented perspective on how the Western States One-Stop Shop for Rural Traveler Information (referenced as the system from now on) website will work. The system concept serves as an important guiding piece of documentation because it assists the research team in prioritizing which data elements are most important to include, and how the user interface should be structured to maximize user convenience. Agency responsibilities with respect to sustaining the system will not be discussed

in great detail because the system will primarily use existing information sources rather than generate new ones, which would require greater agency involvement beyond the scope of this project. It will, however, add value to those data sources by presenting them in a single, consistent interface, and in conjunction with the road network.

Typically, a survey of potential users might be conducted prior to the development of a document such as this. However, given the previous development of a prototype One Stop Shop web-based traveler information platform (3), a foundation for the overall function and presentation of the proposed website had already been established. Therefore, this system concept document is based on knowledge obtained with respect to users and data streams from projects such as WeatherShare, the Integrated Corridor Management Clearinghouse and One-Stop Shop.

The system concept document consists of five chapters. Chapter 2 will discuss the intended users of the system. Chapter 3 will examine the data and components employed in developing the website. Chapter 4 will present an implementation plan for the development and deployment of the prototype website to be developed during subsequent portions of this project. Finally, Chapter 5 will present conclusions based on the materials presented in the previous chapters.

2. USERS

As stated in the prior chapter, the needs of travelers with respect to the provision of traveler information are often limited and localized in nature. However, many travelers move over longer distances and, therefore, because road conditions are likely to vary as a function of distance, have a more acute need for traveler information. Yet the provision, through one location, of concise information concerning multi-regional areas is non-existent, either because the data is not available or because it is provided by multiple agencies through multiple locations (websites).

In order to develop a system concept, to address these concerns, it is necessary to understand who will be using the website and how they will be accessing it. The following sections detail the major anticipated users of the system. Should the system move toward a more wide-scale deployment, new groups of users not discussed in the following sections may emerge.

2.1. Long-Distance Travelers

The primary user group that the system will serve is long-distance travelers seeking real-time and near real-time information as they travel on weather, road conditions, etc. Specifically, this group includes motorists who are making journeys over a relatively substantial distance (as opposed to traveling locally). Note that this group does not include goods movement operators (truck drivers), as their traveler information needs are different (this group is discussed in a later section).

Long-distance travelers may include users who have employed a route before, or who are using a route for the first time (vacationers, business travelers, etc.). The information required by this group is varied, but typically will include the need for timely weather (current and forecast), roadway conditions (construction activities, incidents, closures, chain requirements, etc.), and additional information such as the location of rest areas. In addition, imagery from CCTV cameras may also be of use to such travelers, as it provides a visual indication of what the area looks like (particularly with respect to weather).

While a number of states do provide pieces of this information to varying extents in rural areas, no existing website brings all of these elements together for a multi-state region in a seamless platform, particularly at the route-level. Rather, long-distance travelers are required to identify the routes and information that are pertinent to their trip through what is akin to a “hit-or-miss” approach. This is particularly problematic for long-distance travelers, as this group may not be familiar with the state, area or routes. Since this group is not provided with a comprehensive source for all available information, they are required to search (often extensively) for information that may be of use to their trip. Thus, travelers are required to expend a considerable amount of time and energy (and patience), and may still come away with less information than they desire, assuming they put the time and effort into finding that information to begin with.

This group is expected to access web-based traveler information both before their trip, as well as during their trip. Information accessed before the trip would be obtained for the purposes of planning the journey (route planning, familiarization, etc.). Information accessed during the trip (either before beginning travel for that day or while traveling), would be used for obtaining more up-to-date information regarding their present or upcoming travel segment. Information accessed during the trip would be obtained through the use of smartphones, wireless web access at rest areas, and so forth.

To address the needs of this user group, the system will attempt to provide a number of different elements of traveler information of interest from California, Oregon, Washington and Nevada (as available), including:

- Weather conditions (current and forecast),
 - Temperature, wind speed, relative humidity, precipitation and other data as deemed appropriate,
- Planned and active closures (construction),
- Incidents,
- CCTV imagery,
- Changeable Message Sign (CMS) messages,
- Chain requirements,
- Route profiles/summits.

For long-distance travelers on vacation, additional information may be provided (as available) for from each state, including:

- Rest area locations,
- Scenic overviews and vistas,
- Other places of interest.

Note that information related to commercial services (gas stations, lodging, etc.) will not be provided by the system as that information is constantly changing, and, as a federally-sponsored project, commercial provider information should not be included on the website to avoid issues related to favoritism and conflict of interest.

2.2. Local Travelers

Local travelers are those motorists whose trips are likely to be a shorter distance, typically between towns in a rural area. While their trips are characterized as local, the nature of such trips are similar to long distance trips. In a rural environment, particularly many of those found throughout the states of interest in this work, trips between towns can exceed 20 miles or more. In some cases routes cross mountain passes and traverse other roadway segments where weather conditions can vary greatly. Consequently, local travelers may need only a limited amount and range of information, such as weather, chain requirements (during the winter), CCTV imagery, planned and active closures, and incidents.

In general, this group is more familiar with the area and thus less concerned with route-planning. Rather, these travelers are more interested in learning from the system what they will face during their trip, such as weather/roadway conditions construction zones, and road incidents. Such information could be used to determine whether to take a trip and/or whether an alternate route should be used. Weather would be a particular concern during winter months, as many of the short-distance trips may pass through varying terrain where roadway conditions can differ significantly over even a short distance. Providing near real-time, reliable information in such cases will enhance safety for local travelers.

To address the needs of this user group, the system will attempt to provide elements of traveler information of interest to local travelers (as available), including:

- Weather conditions (current and forecast),
- Planned and active closures (construction),
- Incidents,
- CCTV imagery,
- Changeable Message Sign (CMS) messages,
- Chain requirements,
- Route profiles/summits.

2.3. Goods Movement

The goods movement industry relies on truck drivers, company dispatchers and other parties who may provide drivers with routing for a particular shipment. This group is focused on the efficient routing of goods in transit, ensuring a timely delivery. Goods movement trips are typically long distance and multi-regional, although short trips may also be common, and timeliness is the primary concern.

While the goods movement industry is composed of primarily long-distance travelers (truck drivers), the information needs of this group differ from other long-distance travelers (vacationers, etc.). This group is primarily concerned with information necessary to avoid delays. Information is needed by this group both pre-trip and during the trip. Pre-trip information would inform route planning and help in understanding the general conditions that may be encountered (e.g., forecast weather, construction zones, etc.). In addition, the location of rest areas and inspection facilities/weigh stations would also be employed in planning a trip. Information obtained during the trip consists of the same information as that employed pre-trip (as well as current weather) to determine what conditions would be encountered along particular segments. Pre-trip information would be obtained by goods movement personnel through traditional means (Internet access from a personal computer or company workstation), while mobile/en-route information would be obtained via supplemental means (smartphone, web access at lodgings, wireless availability at restaurants and rest areas, etc.).

The information needs of this group are straightforward and include weather (current and forecast), planned and active closures, incidents, and chain requirements. CCTV imagery may also be accessed in the case of inclement weather to determine roadway conditions at certain points. Finally, information regarding the location of safety rest areas and the location of commercial vehicle enforcement facilities/weigh stations is also desirable from a goods movement perspective.

To address the needs of this user group, the system will provide elements of traveler information of interest to the goods movement industry (as available), including:

- Weather conditions (current and forecast),
- Planned and active closures (construction),
- Incidents,

- CCTV imagery,
- Chain requirements,
- Route profiles/summits,
- Changeable Message Sign (CMS) messages,
- General information:
 - Safety rest areas,
 - Commercial vehicle enforcement facilities,

2.4. DOT Personnel

While not the primary target of the traveler information provided by the system, DOT personnel, including management, operations and maintenance, may also be users of the website, particularly given its strong weather information component. These are the groups responsible for managing traffic and maintaining roadways. In this capacity, they also represent the foremost providers of data to support the system. Through their various capacities, this group provides timely data, such as Changeable Message Sign (CMS) messages, chain control status, etc., for the various electronic databases that will ultimately serve as inputs to the system. However, in the course of their responsibilities, this group may also employ the data provided by the system.

Anticipated data needs for these users are centered upon information that can assist with their typical responsibilities of management, operations, maintenance, etc. This information includes current and forecast weather, planned and active closures (construction), incidents, chain requirements (during winter) and CCTV imagery. All of these elements are items that are constantly changing and need to be continually tracked by transportation agencies. This user group is expected to access information from office workstations, as well as in the field via an aircard, smartphone, and other available means.

As the system is to provide both route-specific information and a region-wide information view, DOT personnel are likely to find utility in the website. Of particular interest to this group would be the initial, region-wide view of traveler information. The utility of this feature could be as simple as observing current weather conditions over a specific area during a winter storm or using the website as a traditional traveler to access route information before heading out into the field for work. In light of these potential uses, the information that will be provided by the system to meet the needs of DOT personnel includes all items discussed in previous sections of this chapter.

3. DATA AND COMPONENTS

As discussed in Chapter 2, the traveler information required by the anticipated user groups varies considerably. To a large extent, most of the anticipated data needs identified for each group may be met through existing sources. In some cases, field element data streams are may not necessarily be available for the entire region of interest (namely CMS message text). The following sections discuss the data to be employed and displayed in the system, as well as an overview of the components and functions of the website.

3.1. Data Elements and Sources

Several unique data elements are available for inclusion and display in the system. Data streams and their sources recommended for use in the system are described in Table 3-1. Note that a more in-depth discussion of the specific data elements and their sources will be presented in the System Requirements document subsequent to this document. The information provided in the table below is provided for reader familiarization purposes.

Table 3-1: Data elements, description and sources

Data Item	Description	Source	Meets data needs of:			
			Long Distance	Short Distance	Goods Movement	DOT Personnel
Weather	Current and forecasted weather conditions	Clarus, National Weather Service, other	√	√	√	√
CMS messages	Text of currently displayed CMS messages	Caltrans, ODOT, Nevada TBD, WSDOT	√	√	√	√
CCTV images	Recent images from CCTV cameras	Caltrans, ODOT, NDOT TBD, WSDOT TBD	√	√	√	√
Chain requirements	Current chain requirements for specific vehicles	Caltrans, ODOT, NDOT TBD, WSDOT TBD	√	√	√	√
Planned and active closures	Current road construction, maintenance and similar activities	Caltrans, ODOT, NDOT TBD, WSDOT	√	√	√	√
Incidents	Current state police-reported crashes	California Highway Patrol, ODOT, NDOT TBD, WSDOT	√	√	√	√
Safety roadside rest areas	Location of highway rest areas	Caltrans, ODOT, Nevada TBD, WSDOT	√		√	
Features of Interest	Points of interest to travelers	Caltrans, Oregon TBD, Nevada TBD, WSDOT TBD	√			
Commercial vehicle enforcement sites	Locations of commercial enforcement facilities	Caltrans, Oregon TBD, Nevada TBD, WSDOT			√	
Summits	Location of summits along state highways	Caltrans, Oregon TBD, Nevada TBD, WSDOT	√	√	√	
Caltrans - California Department of Transportation						
ODOT - Oregon Department of Transportation						
NDOT - Nevada Department of Transportation						
WSDOT - Washington Department of Transportation						

As the table indicates, data for the system would be acquired from a variety of sources. Most information would be acquired from state DOT sources, although some specific streams (weather, incidents), would come from outside sources including Clarus, the National Weather Service, and state police departments. Again, a detailed discussion of the various data sources will be presented in the subsequent Requirements Document, which builds upon the information presented here.

While this list is not comprehensive (further data streams may be added as needed), it meets the various needs of the different user groups previously discussed. In most cases, a data element fulfills the needs of multiple groups. In only limited cases is a specific data item targeted to the needs of only one group (features of interest, rest areas and commercial enforcement sites).

Overall, the data presented in the table somewhat extends beyond that traditionally offered by DOT traveler information websites. Certainly the approach to presenting this data is a departure from the norm (multi-state regional and route-specific). In presenting route-specific information via the “trip planner” to be developed, the provision of comprehensive data to travelers will be enhanced, as data from other routes that is not of interest may be excluded.

3.2. Website Functions

The objective of the system is to move from an approach whereby the user/traveler is required to scan a website or multiple websites to identify traveler information of relevance to their trip. Instead, system users will enter their origin and destination via a “trip planner” and will be presented with all available information for that route. The following paragraphs provide a high-level discussion and description of the anticipated functions of the system.

When initially entering the website, the user will be presented with a region-wide viewing pane presenting traveler information. They will also be presented the capability to enter an origin and destination to obtain route specific information. For the purpose of simplification, origin and destination will refer simply to the communities that the traveler wishes to travel between. For example, an origin might be Seattle and a destination may be Portland. Upon entering this information, the website would then access Google’s algorithm to generate a route between these two points. Google Maps will be used in development to simplify mapping and routing tasks.

Using the Google-generated route as a reference, the system would access the database, whose elements are listed in Table 3-1, and extract all relevant information pertaining to the route. This information, along with a map of the designated route, would then be displayed on the primary pane of the webpage. A secondary pane along the bottom of the webpage would present the route in profile, presenting terrain and weather information.

Initially, users will be presented with a Google map containing icons representing all available information for the specified route. An example of how this map may appear is presented in Figure 3-1. After being presented with all available information for the region, users will have the option to toggle specific data icons/streams on and off, viewing only the information of interest to them. For example, vacationers may only be interested in the location of scenic points or rest areas along their route. In such a case, they would specify that only the icons displaying this information be presented.

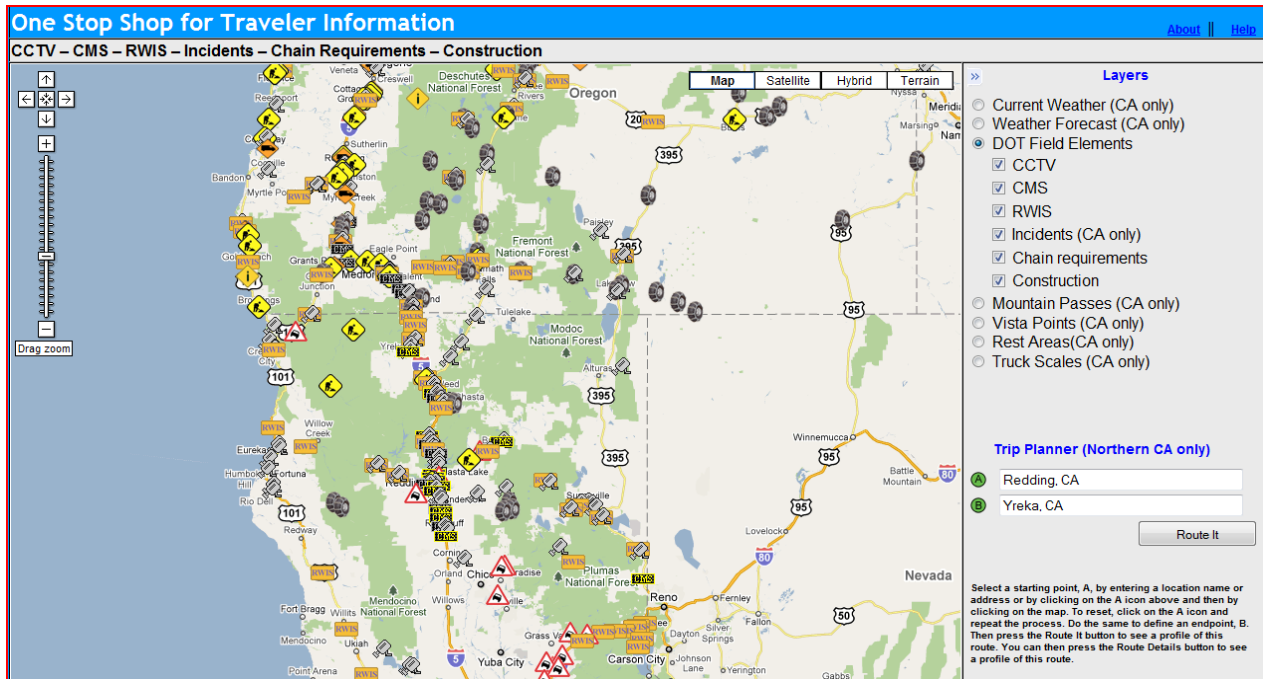


Figure 3-1: Expected appearance of system data presentation

In addition to the route generated by Google’s algorithm, the user will have the option to choose other routes using nearby roadways. While customizing their routing, they will still be able to obtain available traveler information for their new route. When a new route is specified, only the available information for the newly selected route will be highlighted.

This is the broad overview of how the system will function. More specific functions will be detailed in a separate requirements document. An overview of that document is presented in the following section.

3.3. Functional Requirements

In order to create the website described in prior sections, a requirements document is necessary. This document serves as a rough blueprint for the development of the proposed website, detailing its data streams, presentation formats, and similar information. The requirements document provides greater detail on the technical aspects of the system and is a stand-alone document which complements the system concept presented here.

The requirements document details what will be necessary to develop the system with respect to data sets and their formats, the requirements of the various user groups (also discussed in Chapter 2 of this document), performance requirements, website display, formats and standards, and enabling requirements. Performance requirements refer to measurable system capabilities. Website requirements focus on how the website will run, how information will be displayed to the user and so forth. Enabling requirements relate to aspects of the website whose functions enable it to properly fulfill its purpose.

4. IMPLEMENTATION PLAN

The overall objective of this project is to provide for a new approach in presenting a variety of traveler information, including Clarus ESS data. Transitioning the developed product to a publicly accessible tool will require discussion between the project sponsor and research team. However, upon completion of this project, the research team envisions that a business case will have been established regarding the potential effectiveness and benefits associated with the system. Based on the business case, a larger website deployment may be justified and pursued in the future pending availability of funds to support it. In order to reach this point, the actual system must be first developed, tested, evaluated by a small-scale public test, and then revised as necessary. The following sections discuss the high-level implementation and deployment plan that is envisioned to complete the development and preliminary public presentation and feedback portions of this research.

4.1. Implementation and Deployment Steps

From a high level, a series of steps are required to complete the research discussed here. These steps are presented in Figure 4-1. As indicated, multiple steps are required throughout the course of the project in order to both develop and revise the system.

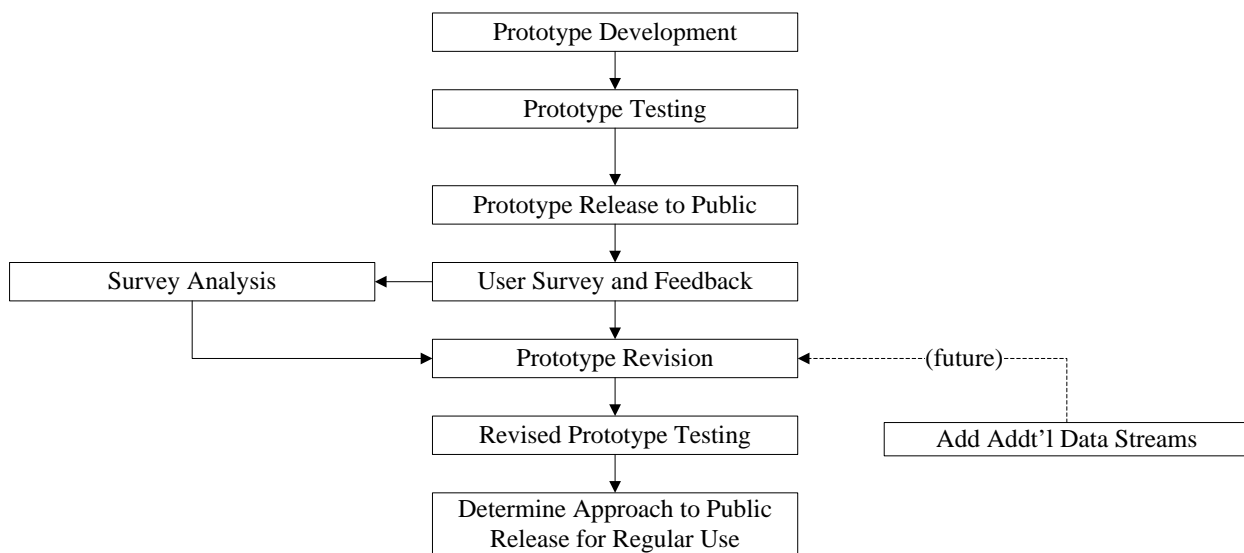


Figure 4-1: Steps in development of the system

Based on the system concept presented in this document, the first step is the initial development of the website. The envisioned appearance and functions of this prototype have been discussed here and developed during parallel efforts previously completed. These details will be developed and presented in the requirements document to be compiled following this system concept document. During and following the development of the prototype website, extensive testing and quality control checks will be made to ensure that the website is functioning as the requirements document specifies. This work will be performed internally by the WTI research team, as well as through preliminary reviews by the project sponsor and state DOT partners.

Once the prototype has been deemed satisfactory for public demonstration, the next step will be to release it on a limited scale so that users may test it. This testing period will allow travelers to familiarize themselves with the website's functions, capabilities, and the data being presented.

The intent is that the test release will be publically accessible. However, it may be deemed necessary to require a password for access in the event that an excessive number of users access the system and degrade its performance. Further, a usage disclaimer will be developed and displayed on the website to users to indicate the equivalent of “use at your own risk”. During this testing period, users will be presented with a brief feedback survey (anticipated to be web-based). This survey will provide the opportunity to comment on the website, recommend improvements, changes, etc. It will be used to obtain overall user thoughts and impressions regarding the system and the system concept. The research team has conducted similar surveys for past development projects, and will employ and build upon their established pool of survey questions in completing the survey task for this project.

The user survey, comments and feedback will be analyzed to determine what improvements should be made to the system. They will also provide the researchers with a clearer picture of intended uses of the developed website by travelers, as well as what additional data or features those travelers expect from the website. Following this step, the actual revisions will be made to the prototype, with additional testing by the research team.

At this point, the website will be near completion and approaches to full-scale deployment will be compiled as part of the project final report. This will include a brief discussion of the potential deployment approach(es) employed, expected operations costs, and future maintenance requirements. The final report will also address suggested next steps to ensure scalability for full public deployment.

5. CONCLUSION

While states do provide travelers with pieces of information (weather, CCTV images, etc.), it is often provided on scattered webpages or websites, or on a limited scale. Additionally, even when data is provided in one location, users are still required to determine what routes are relevant to their trip in order to acquire the available data. This approach places the responsibility for data identification squarely on the shoulders of the user, rather than providing a conveniently automated process.

In light of these shortcomings, the project discussed in this document has been undertaken to provide travelers with timely, accurate and reliable traveler information, with a focus on weather conditions, through a more direct approach. Users will provide the proposed website with their origin and destination within the project area (California, Oregon, Washington and Nevada) and be provided a map displaying a route as well as all available traveler information for that route. This will eliminate the need for users to seek available data for their trip through the traditional manual search approach. In addition, it will eliminate the requirement of users to visit multiple webpages and websites to obtain all available information of interest.

Given the availability of various traveler information data elements (presented in Chapter 3) from Clarus, the California Department of Transportation, the Oregon Department of Transportation, the Washington Department of Transportation and the Nevada Department of Transportation, as well as other agencies (ex state police), it is now possible to develop a one stop-shop for traveler information for the Western States region. This website will provide the most up-to-date traveler information available, with the website itself checking for updates from the data sources at regular intervals.

The system concept discussed in this document relates to a one-stop shop for traveler information, with a focus on weather data that will be developed and tested by the researchers. A preliminary, small-scale public release will be made of the developed website to collect comment and feedback through user surveys. This release will not be significantly advertised in order to prevent the prototype system from being overwhelmed by users. Based on the user survey feedback collected, the website will be revised and further tested, with a final report compiled to discuss the overall project effort and future directions.

6. REFERENCES

1 Western Transportation Institute. “WeatherShare Phase 2 Demonstration,” April 2010.

Available at: <http://www.weathershare.org/>.

2 Western Transportation Institute. “Integrated Corridor Management Clearinghouse,” April

2010. Available at: <http://www.weathershare.org/ICM/>.

3 Western Transportation Institute. “One Stop Shop for Traveler Information,” April 2010.

Available at: <http://oss.weathershare.org/>.