Websites for Regional ITS Architectures

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ABSTRACT

Since the development, use, and maintenance of regional ITS architectures generally involve many stakeholders and is a living document itself, the ease of use, familiarity of the web medium by stakeholders, and ease of access to the Internet, make a website an ideal, efficient medium for sharing regional ITS architecture resources among stakeholders. During the development of regional ITS architectures, a website can be used to solicit stakeholder participation and review, for the posting of project information and notes, and to encourage stakeholder comment. Once the regional ITS architecture has been developed, the website can continue to be used to solicit change requests. Additionally, the website is a tool to assist stakeholders in using the regional ITS architecture, whether it is to update transportation plans or for project development.

KEYWORDS
Regional ITS architecture, websites

Introduction

With the proliferation of the Internet, particularly with the use of graphical browsers, websites have become a major medium for distributing information and as a collaboration tool. The ease of use and accessibility of a website allow multiple users to look for and review the most current information at their convenience, whether it is late at night or away from their office. From a project management standpoint, websites can be used as a tool for developing, reviewing and tracking projects, soliciting comments, and extracting the most current information. One such use of a website is for the development and maintenance of regional ITS architectures.

Regional ITS architectures inherently involve many participants or stakeholders in a region. Regional ITS architectures represent a shared vision of how transportation systems from different agencies or companies may work together to share information and resources to provide a safer, more efficient, and more effective transportation system for travelers. First and foremost the regional ITS architectures define integration opportunities between transportation systems and identifies how cooperation between these agencies and companies in the deployment of ITS systems can be used to satisfy transportation needs. Because of the involvement of multiple agencies, the detailed information that comprises a regional ITS architecture and the dynamic

nature of a regional ITS architecture make websites an ideal medium for their development and maintenance.

This paper summarizes the ways a website can help the development, maintenance and use of regional ITS architectures to:

- Stimulate stakeholder participation

- Encourage sharing of stakeholder comments

- Make easily accessible the draft regional ITS architecture under development

- Maintain an existing regional ITS architecture

- Use of the regional ITS architecture in the planning process

- Use of the regional ITS architecture to develop projects and write project specifications.

Developing Regional ITS Architectures

While developing a regional ITS architecture, it is vital that all stakeholders stay involved throughout the process. A stakeholder is defined as an agency, company or group that operates or maintains transportation systems or is a provider of transportation services. A website detailing the regional ITS architecture development process and the decisions made throughout the development process is a simple but effective means to keep stakeholders that are unable to participate in all the stakeholder meetings informed and involved. The website provides an easy to use, highly accessible view of the entire regional ITS architecture development cycle.

There are a number of ways to convey information about the progress in development of a regional ITS architecture to interested parties. Through a website, interested parties can check at their convenience for up-to-date information and progress. The website can also serve as a clearinghouse for meeting minutes, draft regional ITS architectures and deployment plans, presentation materials, proposals, documents, and stakeholder comments with associated status and resolutions (See Figure 1). Through e-mail and other correspondence, the website becomes a common repository for regional ITS architecture information to reinforce the importance and progress of the work.

Figure 1 – Project Documents

Perhaps the greatest advantage of the website is how it involves stakeholders and interested parties. Through a web browser the different, but various related pieces of information that comprise a regional ITS architecture can be hyperlinked making the body of work easy to navigate. This allows users to drill down to more specific information from a higher level view of the regional ITS architecture information. It also allows users to quickly search for those parts of the regional ITS architecture that directly affect them or are of interest to them. Using the hyperlinks that are generally embedded in a website, a stakeholder may find a website much easier to navigate and search for specific pieces of information, such as a specific information flow or ITS system, as opposed to searching through a hardcopy volume of the regional ITS architecture. It should allow users to rapidly, easily and more economically find those parts of the regional ITS architecture, and if required, print and download only those pages or views that are of relevance to the stakeholder.

For example, a well-designed ITS architecture website will allow users to search for information by stakeholder, ITS element, or architecture flow. In particular, allowing a stakeholder to identify for example all the ITS elements associated with a stakeholder, or all the market packages associated with a stakeholder, enables them to quickly identify those portions that the stakeholder has a role in, and therefore they can focus their limited review time on those portions (See Figure 2). The ability to save this information in a universally recognized format, such as in .pdf (portable document format), will allow users to easily save, distribute, and print this relevant information also.

Figure 2 – Inventory by Stakeholder

A good website also provides the ability to gather feedback and capture responses from stakeholders and interested parties. For example, comments and thoughts that are stimulated during the review of the draft regional ITS architecture should be prepared with a minimum of stakeholder effort and then automatically logged and distributed to the developers and program managers by e-mail. This is a crucial element of the regional ITS architecture development process as stakeholder feedback is necessary to develop a CONSENSUS regional ITS architecture.

By providing hyperlinks for feedback on each and every webpage, users can quickly jot down their thoughts with minimal effort. Those thoughts can then be prefaced (automatically) with information indicating the webpage a stakeholder was reviewing, and then with a click, e-mailed to a list of developers or maintainers of the regional ITS architecture, as shown in Figure 3 (the *Send Your Comments* button in the lower left of the figure). This process allows developers or maintainers to quickly refer to the webpage the user was viewing and commenting on, and the commenter can send his thoughts with minimal effort.
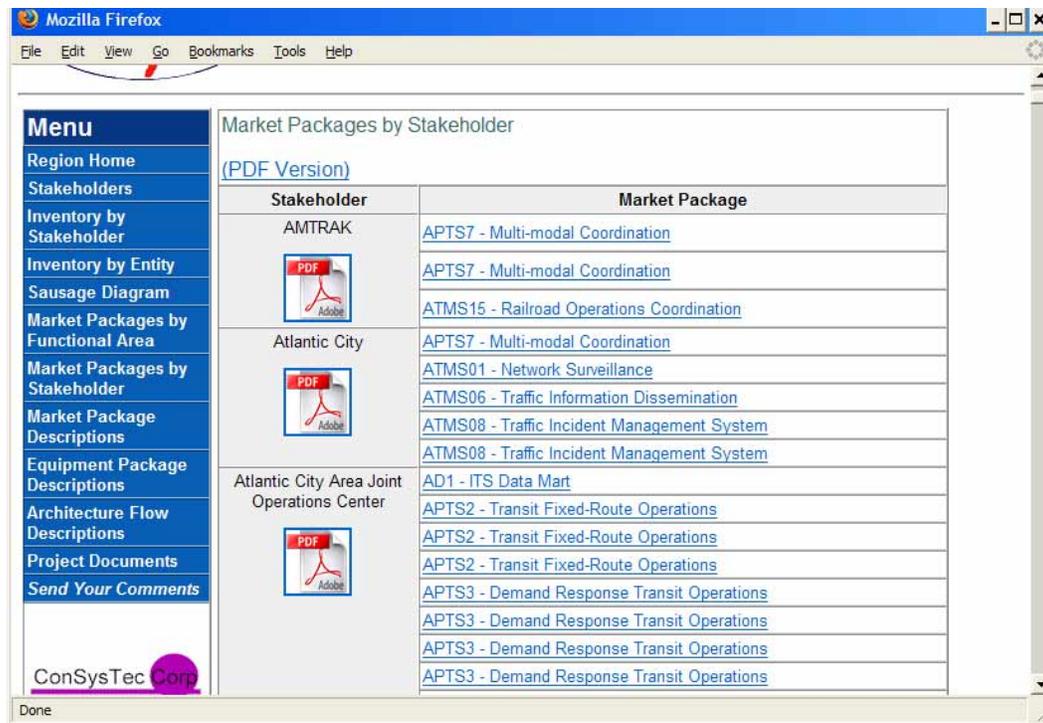
Figure 3 – Sending Comments

Configuration management of the regional ITS architecture also becomes much easier. All comments sent via the website can be addressed to a mailing list, and thus can be tracked in a database. Information that can be tracked includes what part of the regional ITS architecture was being reviewed, by whom, and when, and how comments were disposed of.

For US regional ITS architectures, the website can be designed in a manner to clearly indicate how a regional ITS architecture satisfies the 9 required components specified in the FHWA/FTA Rule 940/FTA Policy on "Intelligent Transportation Systems (ITS) Architecture and Standards." For example, the website can provide tools and links to allow easy access to a description of the region, a list of stakeholders, and the inventory of ITS systems. With market package diagrams on the web pages, the ITS architecture can graphically illustrate the operational concept, selected functional requirements, and interfaces. Detailed information about the regional ITS architecture can also be provided, such as architecture flow definitions, user services, selected equipment packages, and relevant standards.

Maintaining ITS Architectures

Regional ITS architectures are a blueprint for the deployment of ITS systems in a region over a defined period of time. However, ITS architectures are not a static product nor set of outputs. It is very important that the ITS architecture be kept up-to-date so that project managers using the regional ITS architecture to define projects have the most accurate information available.

The regional ITS architecture will change as new priorities and strategies emerge through changes in the regional transportation plans and policies, as ITS projects are implemented, and as new ITS needs and services evolve in the region. The regional ITS architecture will need to be updated to properly reflect these changes. Most regions will have a change management process to keep the regional ITS architecture current to reflect the region's existing ITS capabilities, projects, plans and policies. The change management process will provide formal change control of the regional ITS architecture.

A website can be used as a tool to assist with change management process to update the regional ITS architecture. A change management process usually consists of several basic steps:

- **Submission of proposed changes to the architecture** - A website can be setup with hyperlinks on each webpage for submitting changes. The website may also have forms for users to complete to submit proposed changes or for download.

- **Tracking proposed changes** – As proposed changes are received from users, the information can be parsed and automatically stored into a database. The proposed changes can be assigned a tracking number. An e-mail can be sent back to the person sending the comment to confirm receipt of his comments, and with the tracking number so the person can check the status of his comment in the future. Proposed changes and the comments database may also be accessible via the website so users may view all the proposed changes to the regional ITS architecture, see which changes were accepted for incorporation into the regional ITS architecture, and in what version (See Figure 4).

- **Review of a proposed changes by a group of users or stakeholders** – As proposed changes are received from users via the website, the proposed changes can automatically be forwarded to a group of users responsible for reviewing and possibly approving proposed to changes to the regional ITS architecture.

- **Updating the architecture if the change is approved** – Once proposed updates to the regional ITS architecture are made, reviewed, and approved in accordance with the change management procedures established, the website can be updated and reviewed by interested parties or stakeholders, and comments made as necessary.

- **Informing users of the proposed changes** – With each update of the website, interested parties can be informed automatically via e-mail or other electronic means. Websites may have hyperlinks allowing interested parties to receive e-mail updates.

Figure 4 – Change Request Forms

Using Regional ITS Architectures

A good regional ITS architecture provides a wealth of information that can assist project managers in the deployment of ITS projects in the region. Recalling that a regional ITS architecture represents a shared vision of how intelligent transportation systems in a region may work together to efficiently provide transportation services, the regional ITS architecture can be used to develop ITS projects. To support the vision, a regional ITS architecture may contain operational concepts between various stakeholders, data flows between various ITS systems, indicate what ITS standards may support those data flows, and provide high level functional requirements. All this information may be included on a website hosting a regional ITS architecture.

Thus, a website can be an invaluable tool when it is time to develop an ITS project. First, the contents of the regional ITS architecture can be easily found and accessed by stakeholders using modern search engines. The regional ITS architecture on a website is always available for stakeholders to access and use, particularly when compared to a regional ITS architecture that is only on a CD-ROM or in a binder. In addition, if the regional ITS architecture website is updated, the most current version of the ITS architecture can be maintained on the website providing a single point of entry for regional ITS architecture information. This will eliminate stakeholder concerns about whether they are viewing the latest regional ITS architecture, and no need to worry whether their CD-ROM or hardcopy is outdated.

Second, these websites can be used to derive ITS project architectures. Using the website, users can select the subsystems that may be included in an ITS project. This can be performed by

examining the inventory of ITS elements in the ITS architecture. Using hyperlinks, further detailed information about each ITS element can be extracted from the website (See Figure 5). This may include operational concepts (roles and responsibilities of stakeholders), interconnects and information flows with other ITS systems (See Figure 6).

Other information in the ITS architecture that can be used to develop the project architecture, and ultimately, the project scope, includes the user services, functional requirements (See Figure 7), equipment packages (See Figure 8) and relevant ITS standards (See Figure 9).

Figure 5 – ITS Element Detailed Information

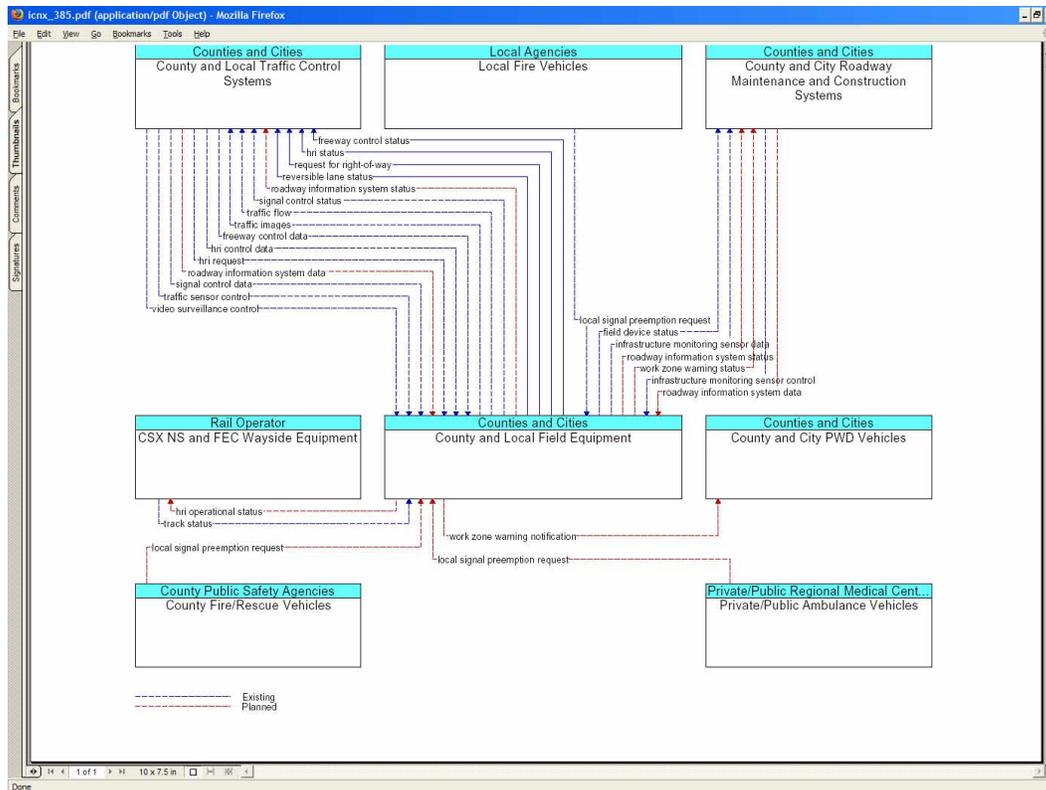**Figure 6 – Interfaces With Other Systems**
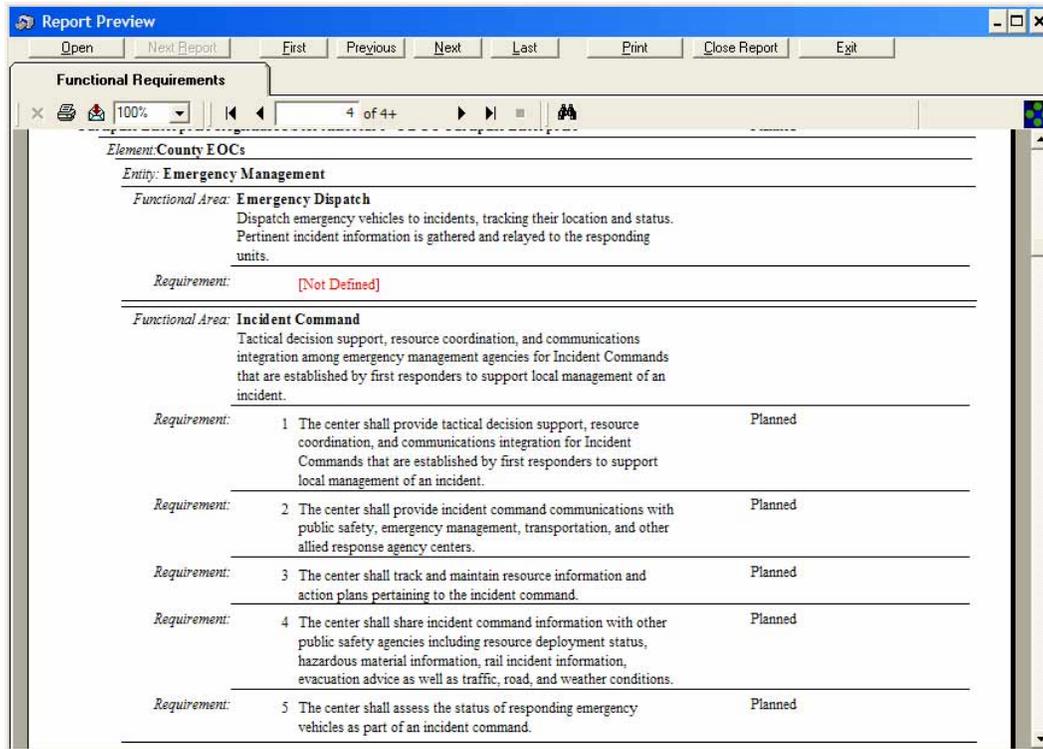
Figure 7 – Functional Requirements

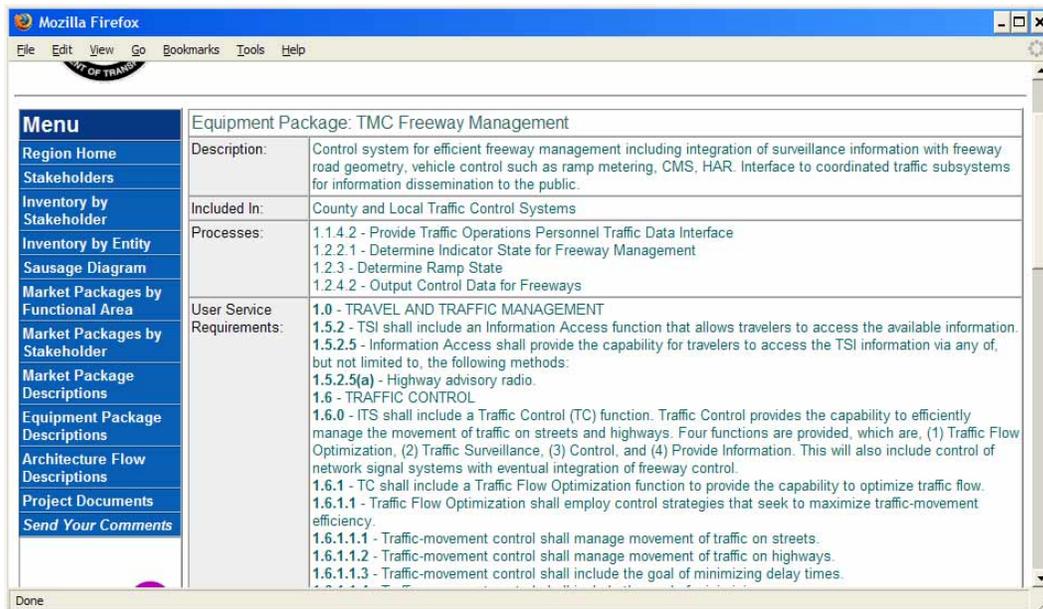**Figure 8 – Equipment Package Descriptions**

Figure 9 – Relevant ITS Standards for Data Flows

Summary

We have identified the benefits that regional agencies, planning organizations, and stakeholders derive by creating a website for hosting their regional ITS architectures. With relatively little investment, a website becomes a powerful tool for developing, using and maintaining a regional ITS architectures. During the development of the regional ITS architecture, the website serves as a tool to solicit comments and participation from stakeholders. Once the regional ITS architecture is developed, the website becomes an easily accessible resource for stakeholders to view the most current version of the regional ITS architecture. Finally, the website can serve as a tool to maintain and use the regional ITS architecture. Through links and forms, information and feedback can be exchanged between the maintainers of the regional ITS architecture and the stakeholder users.