6. Real-Time Display, Notifications Systems, and CRM

Real-time transit service information is becoming available to transit agencies around the world. One of the primary uses is to provide customer information, often via Web sites. Early transit vehicle location systems were based on milepost-based infrastructure, such as those implemented in Kansas City, Missouri, Seattle, Washington, and London, England. These systems are now being supplemented and/or replaced by systems utilizing the Global Positioning System (GPS). One advantage of GPS-based vehicle tracking is that position data is typically more accurate and more reliably converted into useful customer information.

Several case studies in Section 6 will focus on using real-time vehicle location data to provide customer information services on transit Web sites. One case study explores NextBus, Inc., a leading private sector initiative that provides real-time transit customer information.

As described in Section 5, other agencies already have or are considering, in some cases very cautiously, adding real-time information and/or customer notification systems and possibly CRM features to their Web sites. Several agencies are listed below as examples:

- San Francisco MTC – real-time information integrated into its IP system, notification;
- VCTC – real-time information and notification; and
- WMATA – real-time information and notification;

Note that the transit agency representatives who participated in the telephone surveys have differing opinions regarding the value and application of real-time information on their Web sites. This issue will be discussed further below.

Several of the case studies in Section 6 will also explore transit agency use of e-mail or other customer notification systems based on Web site registration. These information services have become available to transit agencies through the development of Internet, information technology, and communications technologies. A fundamental issue is whether customer notification systems incorporate real-time status information or not.

Finally, several case studies will examine the incorporation of CRM functionality. The project team was surprised to find two robust CRM Web sites, one implemented by the Utah Transit Authority and the other by New Jersey Transit. Both offer personalized information services to their customers.

The case studies presented in this section, along with the primary focus of each, are listed below:

- The Washington State Ferry System (WSF, real-time information and e-mail notification);
- Cape Cod Regional Transit Authority (CCRTA, real-time information);
- The Virginia Railway Express (VRE, real-time information and e-mail notification);
- Tri-County Commuter Rail Authority, Florida (Tri-Rail, real-time information);
- King County Metro, Seattle (KC Metro, real-time information and e-mail notification);

- NextBus Information Systems, Inc. (NextBus, real-time information);
- New Jersey Transit Corporation (NJT, CRM and e-mail notification); and
- Utah Transit Authority (UTA, CRM and e-mail notification).

The case studies are organized into the following sections:

- System Design and Functionality;
- Project Objectives;
- Implementation Issues;
- Outcomes/Benefits; and
- Planned Improvements.

6.1 Washington State Ferries

Washington State Ferries (WSF), operated by the Washing State Department of Transportation (WSDOT), provides transportation for more than 75,000 customers each day. The agency has a real-time customer information Web page called *Vessel Watch.* It also has a system that provides e-mail notification of service conditions. With ferry operations, many factors, such as other vessels or weather, can cause route delays, either for a customer's arrival or departure. Delays can affect other parts of WSF customers' journeys, which is one reason to provide real-time information.

The advanced Web page features were added about two years ago, when the WSF Web site was redesigned in December of 2000. At present, the agency does not have any CRM features or an AIP system. However, WSF has installed a feature not covered in this report. Its *FerryCams* video cameras, located at many WSF docks, enable customers to see still video images of traffic, boarding conditions, and approach roads that allow them to use alternate routes.

6.1.1 System Design and Functionality

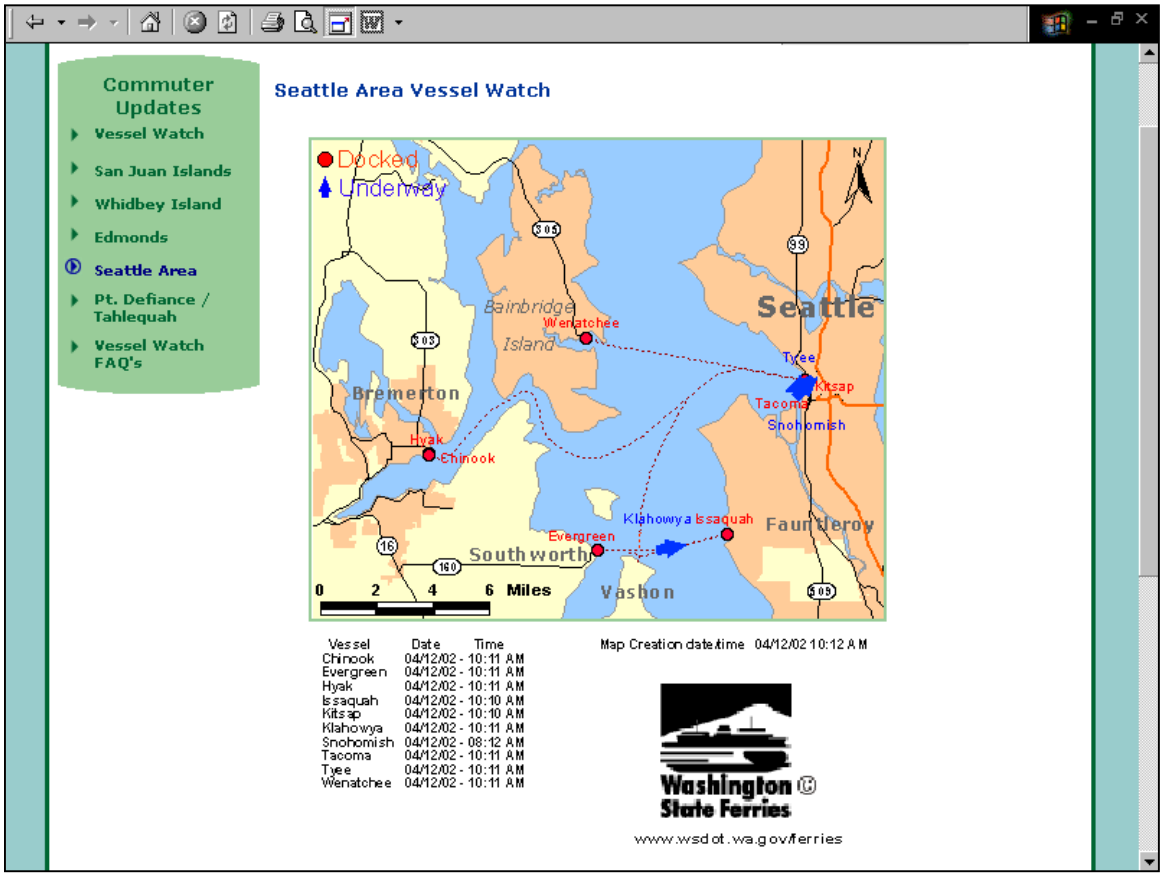
Vessel Watch

Vessel Watch was designed to let customers to see where vessels are located so they can estimate when to leave their homes or work locations. The opening *Vessel Watch* Web page is shown in Figure 6.1. It is the starting point for customers to find the route for which they want real-time information.[39] With crossing times of 30 minutes or longer and relatively long headways, *Vessel Watch* helps customers plan when they should arrive at one of the terminals. WSF provides five different map views covering different WSF routes and service areas. The Seattle area page is shown in Figure 6.2. As the Figure illustrates, each vessel is labeled with its name and the table below the map shows the date and time of each ferries' last recorded location. Docked vessels are shown as red dots and moving vessels are shown as thick blue arrows. For a more thorough description of how to interpret the map, see "Understanding This Image"

[39] The start page for *Vessel Watch* is at http://www.wsdot.wa.gov/ferries/commuter_updates/vesselwatch/. From this point, one can access individual maps for each ferry service.

Figure 6.1: WSF *Vessel Watch* Start Page

Figure 6.2: WSF Seattle Area *Vessel Watch*



at the bottom of any WSF *Vessel Watch* page. (Click on Figure 6.2 to access the page on the Web and scroll to the bottom.)

The *Vessel Watch* maps are updated every three minutes to keep down the cost of providing the information to customer using the Web page. It is important to note, however, that the page automatically updates itself so that customers do not have to manually refresh the image with their Web browser, which is how some other real-time displays are designed. (See the topic Data Push/Pull in Section 7.2 for a description of this process.)

The *Vessel Watch* system is made possible by a GPS-based vehicle location system mounted on each of WSF's ferries.[40] Each WSF vessel sends its current position information calculated by the GPS receiver via VHF radio modems to a central server in Kent, WA. The raw GPS information is then loaded onto the agency's GIS maps and exported as an image for the Web site.

E-mail Notification

WSF currently has approximately 8,600 customers registered for e-mail notification. Although this seems like only a small portion of their total customer base (given that WSF transport approximately 75,00 customers daily), only 53% of these customers are commuters, and since only commuters would likely sign up for the e-mail service, the number of registered customers is about 21% of the agency's commuter base. The telephone interview indicated that this number of subscribers is good considering WSF does not market its advanced customer information features due to budget constraints.

The e-mail notification system is partially manual and partially automated. WSF must manually type service disruption or other messages. Once completed, the notification is e-mailed to everyone in the subscriber database created when individuals sign up for the service. Figure 6.3 shows the e-mail subscriber page on the WSF Web site.

WSF's current policy for sending out e-mails is when a vessel is delayed 20 minutes or more. E-mails are also broadcast if a major mechanical problem occurs or a run is cancelled. The agency also sends out information on ADA problems (e.g., a wheelchair lift is out of service).

WSF identified the need for *Vessel Watch* from customer feedback. WSF has two primary markets: commuters and tourists. The real-time information on *Vessel Watch* and the e-mail notification is geared towards the commuters. Another impetus for developing Web-based customer information was to reduce the work load on customer service agents. At the time when the tools were developed, WSF had 18 agents answering phones, and it was concerned about obtaining funding for additional phone agents. In addition to answering telephone inquiries, the agents were also answering about 1,600 e-mails per month.

All of the elements of the WSF Web-based customer information program are important for their own reasons. The e-mail notifications and real-time location of ferries allow customers to make alternate plans if delays or other system disruptions occur.

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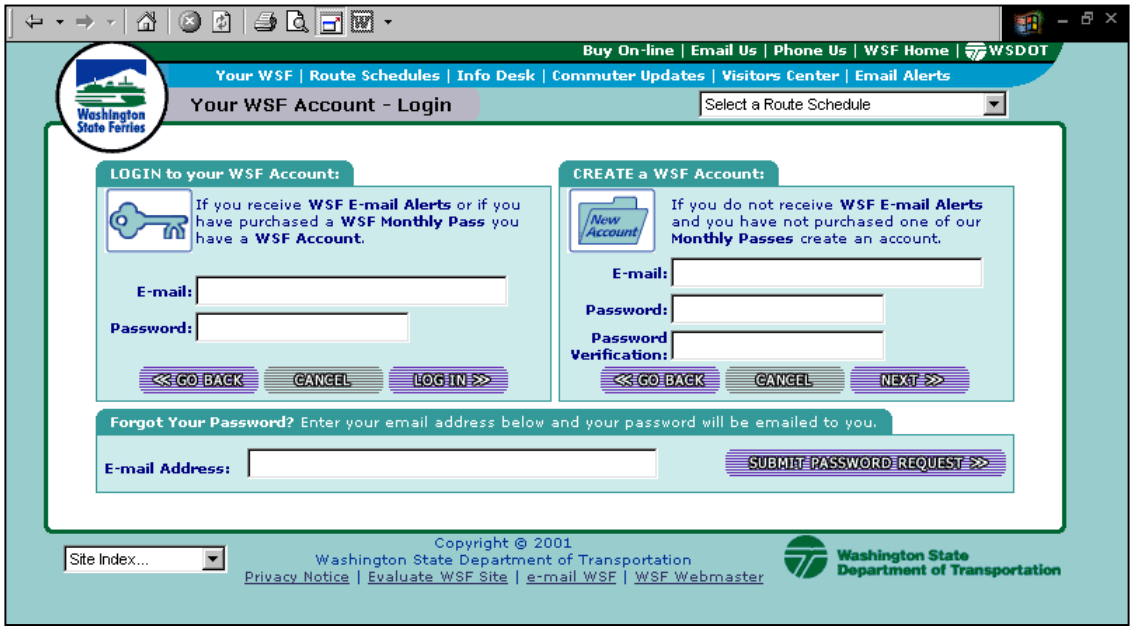
[40] The GPS system and *Vessel Watch* were implemented with cooperation from Washington State Ferries, Smart Trek, Parsons Brinckerhoff Quade & Douglas, Meteor Communications, and WSDOT's own Internet Services Group.

Figure 6.3: WSF E-mail Subscriber Page



The *FerryCam* camera shots, although not directly related to *Vessel Watch* or e-mail notification, allow customers to use alternate routes if their normal route is backed up. An example of *FerryCam* is shown in Figure 6.4.

6.1.2 Implementation Issues

Designing the System

Vessel Watch was added first and the e-mail notification system was added slightly later. *Vessel Watch* was developed as "a bonus application" from a fleet management system that WSF installed to help operate its fleet. The agency test marketed the advanced information feature with focus groups using a beta version of the service, and then made some improvements based on the feedback it obtained.

WSF uses a technique it calls Interval Static Mapping (ISM) to produce the near real-time map images. This process reduces the frequency of updating map images on the *Vessel Watch* pages, and was selected based on cost-benefit analysis that showed WSF could provide good information at fraction of the cost of implementing fully dynamic maps. The agency would have to invest considerably in new computer hardware to provide fully real-time, dynamic map displays.[41]

The e-mail notification system was designed to use an Internet e-mail program called a "listserv." Once staff have created the e-mail text, the program allows WSF to send the e-mails to all subscribers at the same time without any additional effort.[42]

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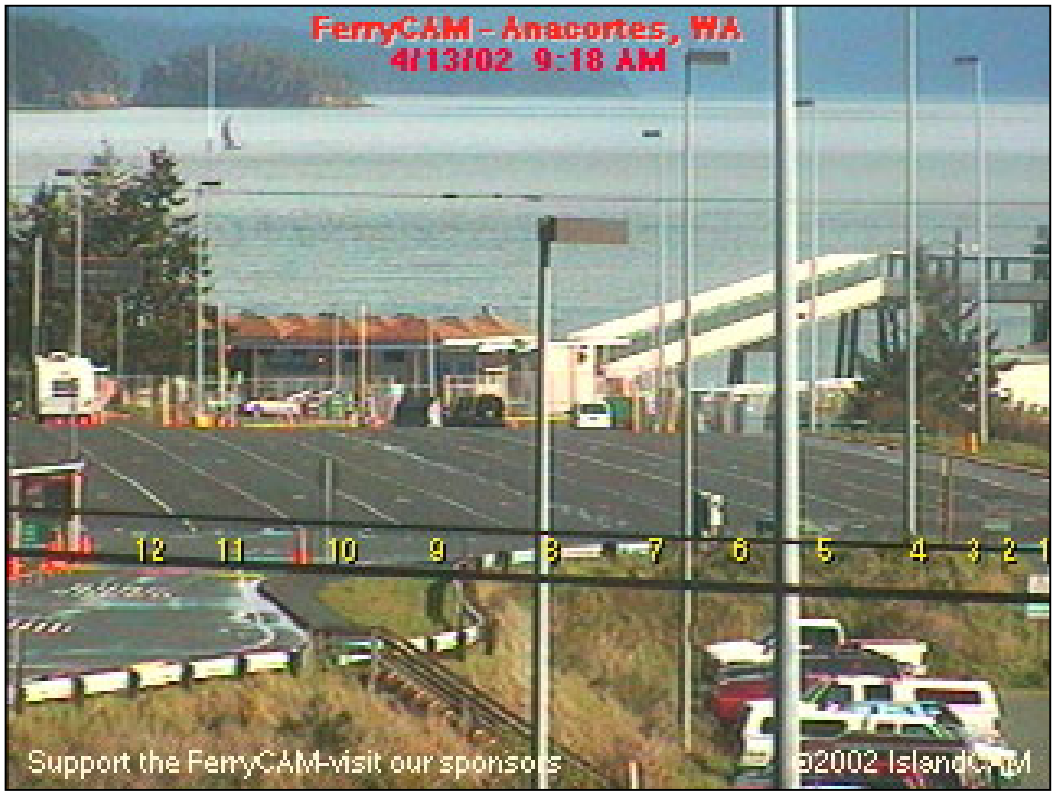
[41] Quoted from WSF's *Vessel Watch* FAQ sheet at http://www.wsdot.wa.gov/ferries/commuter_updates/vesselwatch/index.cfm/vesselwatch_ind/Faq

[42] For a definition of listserv, go to the Whatis.com Web site at http://searchvb.techtarget.com/sDefinition/0,,sid8_gci212488,00.html

Figure 6.4: Example of WSF *FerryCam* Project Objectives



<u>*Costs*</u>

WSF was able to create *Vessel Watch* internally using the fleet management technology with about 40 hours of staff time. The agency is currently soliciting proposals to redesign the e-mail notification system, which is expected to cost about $30,000.

6.1.3 Outcomes/Benefits

Customers are very pleased with the customer information system, which the telephone interview indicated has improved customer satisfaction. *Vessel Watch* and e-mail notification improves WSF's public image. Customers have been known to tell staff that the information services are very helpful. Between 1998 and 2000, the agency reduced its call center phone bills by $62,000 and lessened the number of incoming e-mail inquiries by 30%.

Not only does *Vessel Watch* provide customer information, it is useful for operations staff, who can use the information to assign ferries to slips, thus helping get boats underway efficiently.

<u>*Usage Patterns*</u>

WSF uses *WebTrends* software to produce monthly usage reports. Staff analyze the most popular pages, days of the week when Web site traffic is heaviest, and other statistics. Usage is tracked based on the number of visitor sessions or hits, metrics for which the software automatically tracks and produces graphics.

Recent statistics show that the *Vessel Watch* start page (shown in Figure 6.1, where customers choose the route for which they want information) is the eighth most popular page on the entire Web site. Two of the individual *Vessel Watch* map pages (the Seattle Area page, shown in Figure 6.2 and the San Juan Island page) rank among the top 15 most popular on the Web site, suggesting that individual vessel pages are one of the more popular features. Figure 6.5 shows an increase of 21% in Web site hits between 1998 and 2000.

Impact on Call Centers

The benefits of the Web site customer information programs are dramatic, and have been quantified by WSF. Figure 6.6 shows a 14% decrease in call center calls between 1999 and 2000. In addition, WSF showed a 640% increase in on-line reservations between 1999 and 2000 and a 155% increase in e-mail notification registration during the same period. Both changes almost certainly have a positive impact on the call center.

6.1.4 Planned Improvements

When fully implemented, the fleet management system will allow WSF to automatically calculate schedule deviations and loading queue lengths at docks. This information may be added to *Vessel Watch* in the future. Moreover, WSF is currently developing a new program that will allow measurement of on-time performance, another feature the agency would like to add to the Web site.

WSF is constantly getting requests from customers about wanting the ability to download schedules to their Personal Digital Assistants (PDAs), and the agency is in the process of developing this service. WSF also get requests to make the e-mail notifications more specific. Currently, subscribers can select the routes for which they would like to receive information, but cannot specify their preferences further. For example, customers complain that they do not want to receive ADA information, but there is no option to specify this. The agency would like to work on making the e-mails more specific than they are currently.

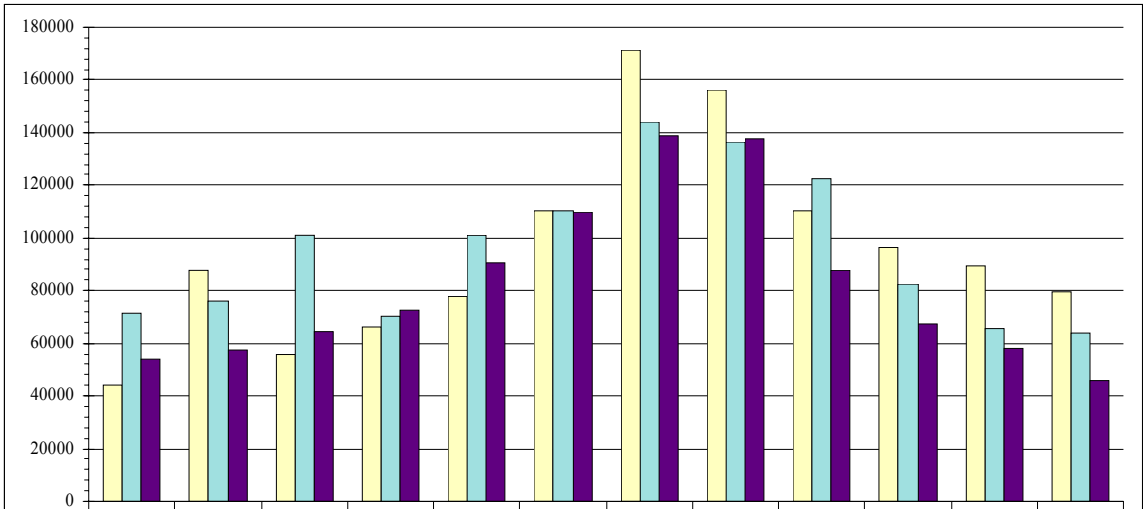
Finally, WSF is moving towards CRM features to allow customer to personalize the Web experience. Currently, customers who purchase tickets on-line have an on-line account that allows them to buy ferry passes, permits (for carpools, vanpools, and bikes) and merchandise. The information gathered from customer accounts is not used for any other purpose at this time. WSF is planning to develop more customization features so that its customers' preferences, such as which Web pages they would like quick access to, would be stored in the information system.

WSF has considered adding an AIP system, but it would most likely be a *MapQuest* type system since most of its customers do not access the ferry using transit.

6.2 Cape Cod Regional Transit Authority

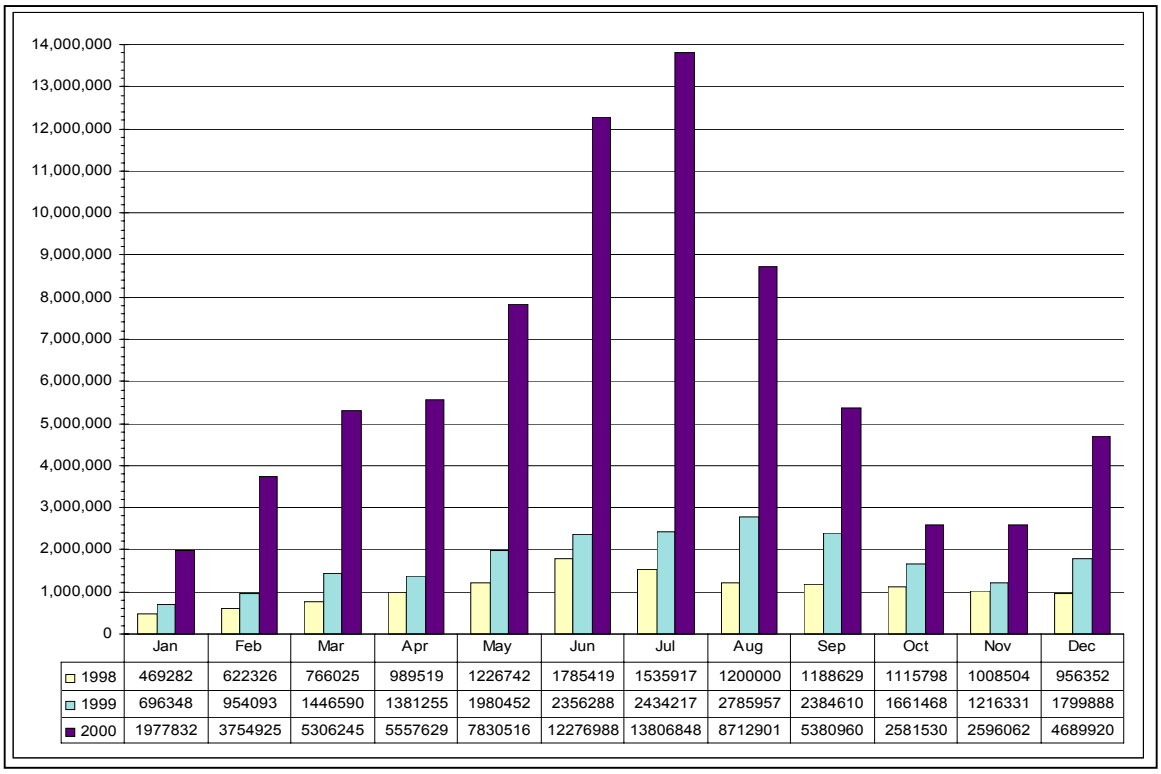
The Cape Cod Regional Transit Authority's (CRTA's) Web-based real-time customer information project was included in this study because of the rural characteristic of the CCRTA's service area. The agency's widely spaced routes and relatively long headways encouraged the project team to include it because under those conditions, real-time location information could be particularly useful for transit customers. CCRTA first

Figure 6.5: WSF Growth in Web Hits 1998 - 2000[43]



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	44332	87900	55610	66219	77796	110284	171467	156240	110063	96207	89620	79326
1999	71185	75865	101285	70419	101152	110312	144054	136529	122712	82374	65651	63911
2000	54085	57332	64472	72500	90608	109903	138801	137789	87481	67203	57859	45726

Figure 6.6: WSF Reduction in Call Center Activity 1998 - 2000



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1998	469282	622326	766025	989519	1226742	1785419	1535917	1200000	1188629	1115798	1008504	956352
1999	696348	954093	1446590	1381255	1980452	2356288	2434217	2785957	2384610	1661468	1216331	1799888
2000	1977832	3754925	5306245	5557629	7830516	12276988	13806848	8712901	5380960	2581530	2596062	4689920

[43] Figures 6.5 and 6.6 taken from a PowerPoint presentation provided by WSF staff titled, "WSF Web Site: Keeping: in Touch with our Customers" and are not live links.

provided real-time maps on its Web site in 1999, most likely one of the first rural transit agencies to provide such a service. Originally, the real-time maps simply showed the latest recorded position of its vehicles, which customers could use to judge when the bus would arrive at their origin. The older CCRTA Web page is shown in Figure 6.7.

6.2.1 System Design and Functionality

Real-time Vehicle Location

Since 1999, the real-time maps have been upgraded considerably, not only in presentation but also in functionality and technology. Figure 6.8 presents the newly designed map, while Figure 6.9 shows the other user option available at the bottom of the main Web page. Note that not all of the symbols in the map legend are visible at this resolution (e.g., the bus stops). While the earlier version was simply a static representation, the new maps are dynamic and interactive. The map is designed to only show certain objects at particular resolutions (e.g., Zoom In or Zoom Out settings). Customers can use four different tools to adjust the map presentation, which are shown left of the map in

Figure 6.9. Drawn directly from the *Instructions*[44] link at the top of Figure 6.9, the tools on the Web page allow the customer to:

- *Pan:* "Use the navigation buttons to pan (slide the map) in any of the eight directions";
- *Zoom In:* "To zoom in to a specific area, select the "Zoom In" tool on the left side of the map and click the center of the area you are interested in";
- *Zoom Out:* "To zoom out, select the "Zoom Out" tool and click on the map where you want the center of your new view to be"; and
- *Info:* "To see what features are at a point on the map, select the "Info" tool, and click the point on the map that you're interested in. An "Info" window will appear. The top pane of this window shows the names of all the features that are at the point you clicked. (For instance, you might see bus route names, stop names, and street names.) Click on the name of a feature to see a description of the feature in the bottom pane."

The program does not pretend to provide predicted delays, nor does it compare the actual performance of the vehicle against the scheduled operation. Rather, it simply informs the customer of the location of the bus, and the customer makes his/her decisions based on their experience with the system. The agency believes that real-time information is important because customers want to know where the bus is so that they can time their departure appropriately.

The real-time information also allows the customer to see individual routes, which is a useful feature. One design element is particularly worth highlighting. When a customer first starts to access the real-time page, they first receive map setting options, which are shown in Figure 6.10. Allowing the customer to select the map size and low bandwidth (i.e., a dial-up Internet connection) or high bandwidth (i.e., cable modem, DSL, or local

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[44] Open the full list of *Instructions* on the CCRTA Web site at http://www.e-transit.org/cape_cod/instructions.asp or click on Figure 6.9 to see descriptions of all the functions.

Figure 6.7: Original CCRTA Real-Time Web Page Display

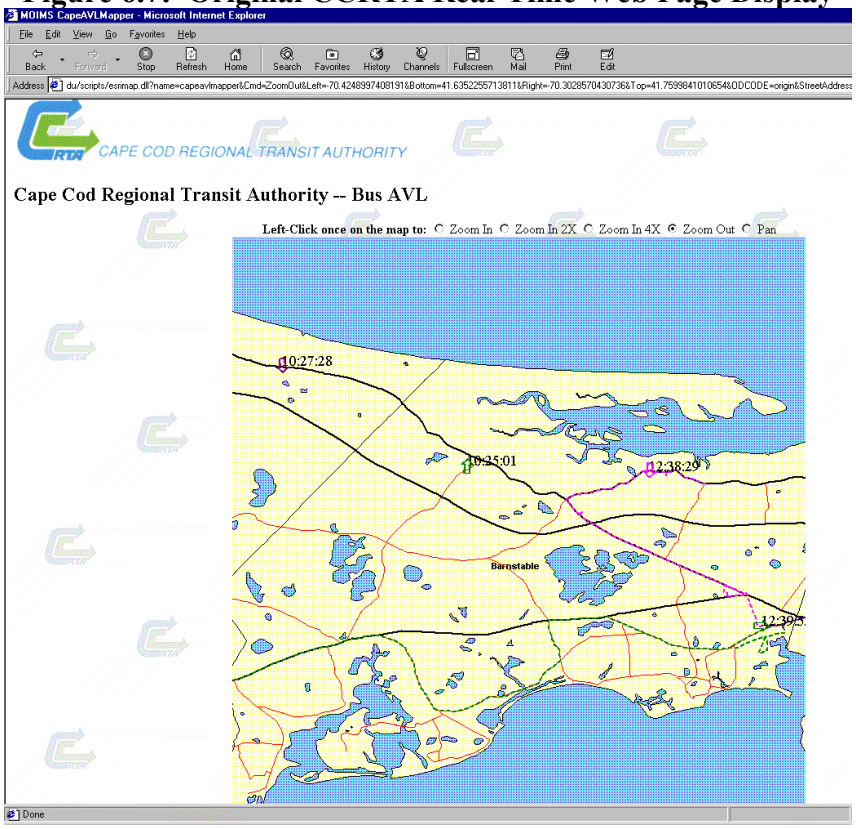
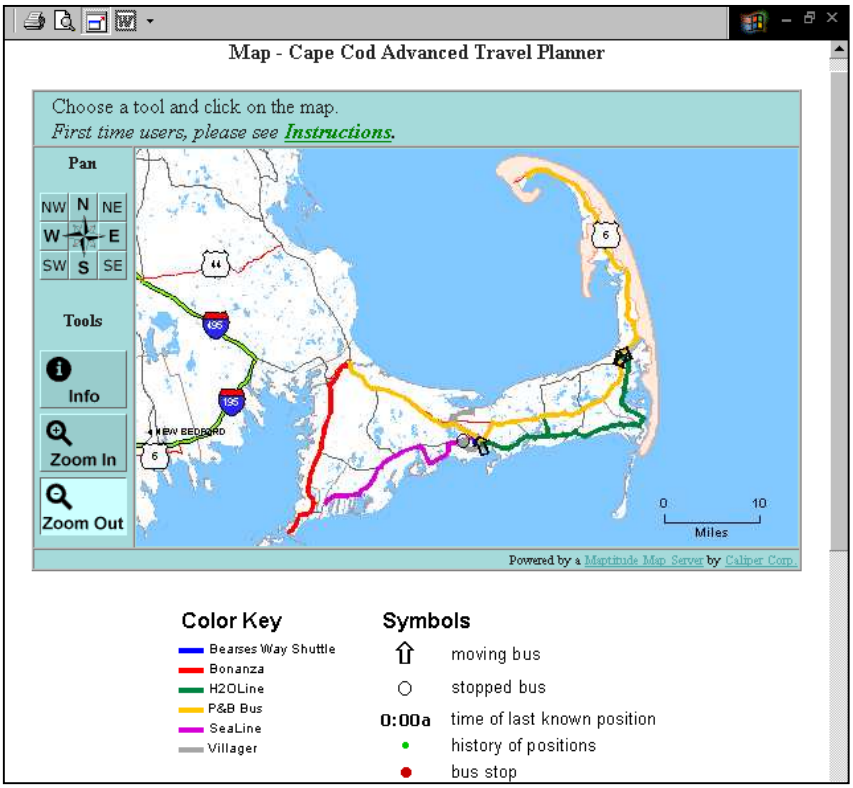


Figure 6.8: New CCRTA Real-Time Web Page Display



(Note: Figure may not load correctly from hyperlink because it is part of an active server page (ASP))

Figure 6.9: CCRTA Main Mapping Page Options

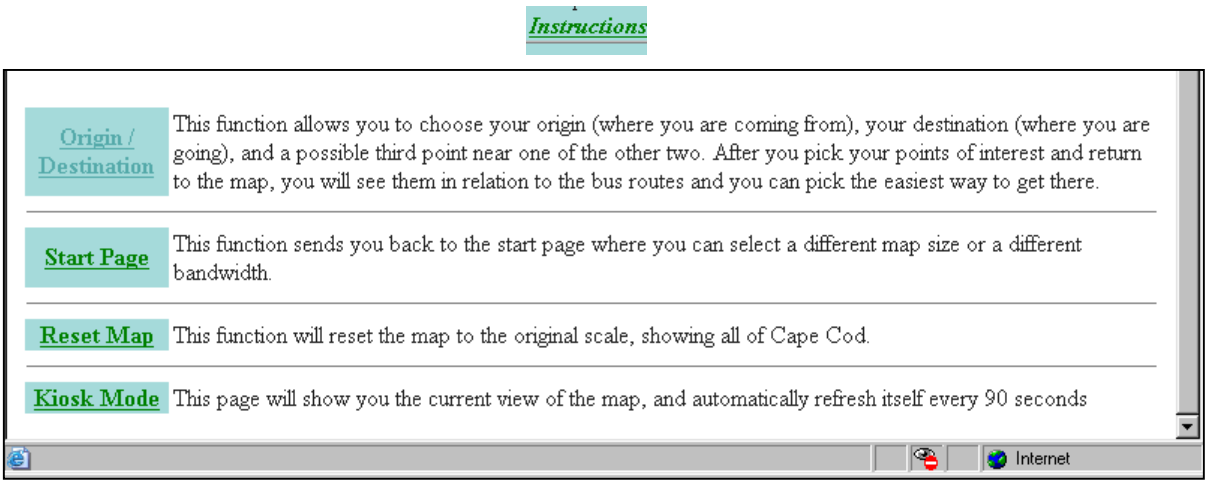
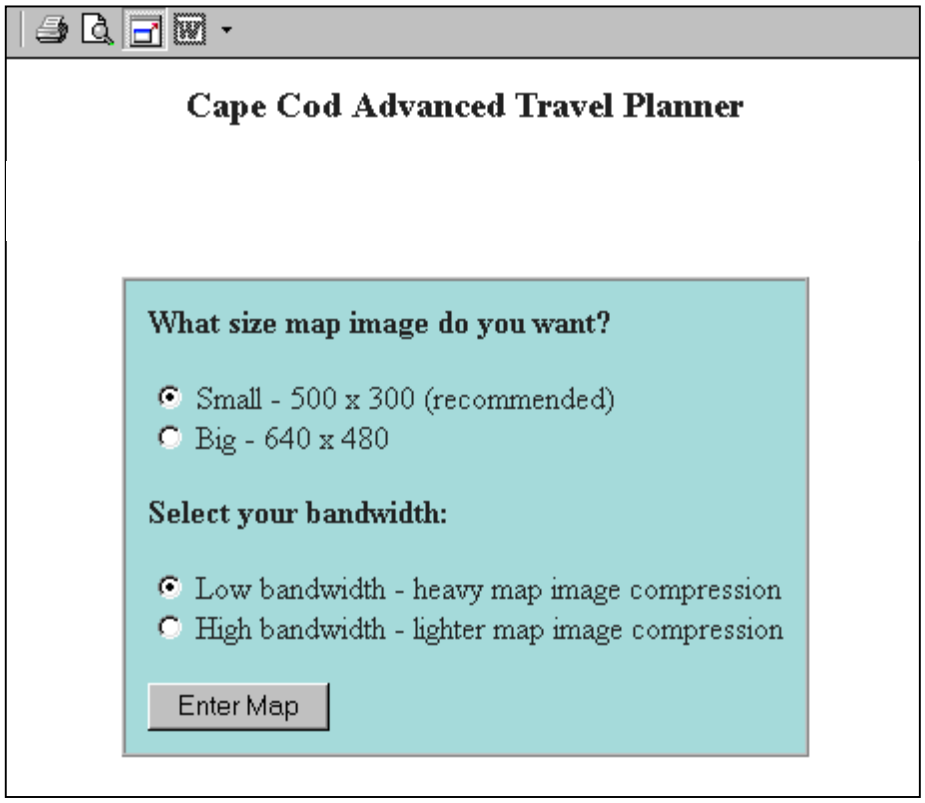


Figure 6.10: CCRTA Map Setting Interface



area network connection to the Internet) optimizes the processing required on both the customer's Web browser and on the CCRTA map server.

The CCRTA's system also includes an automatic refreshing program, called *kiosk* mode. This feature – which was a Bridgewater State student's idea – was added in anticipation of adding kiosks at major stops, such as the shopping center. The basic idea is that the map refreshes at whatever interval the AVL data is being refreshed (right now it's 60 seconds) so that a customer standing at the kiosk would have the most updated view.

Now the feature has been adapted to the Web page so it can also be used on a customer's computer.

Trip Planner

CCRTA's real-time vehicle location display doubles as a trip planner, albeit one that has limited functionality when compared to AIP systems discussed in Section 5. This IP was added in 2000 and became fully functional in 2001. An interesting aspect is that the systems was developed and is managed at the GeoGraphics Lab at Bridgewater State College.[45]

The jointly managed site takes a simplified and cost effective approach to IP on a system with only a few routes. The CCRTA transit system has relatively few transfer points and most areas are only served by one route. The customer then has a real-time basis upon which to decide if the trip can be made by transit. In effect, it is an address location function as much as an itinerary planning function. By clicking on the selected bus stop of origin, the schedules for that line appear interactively.

The trip planner was actually added after the real-time information, as part of a welfare-to-work project. The idea was to give job counselors a tool for planning transportation for clients. The program allows a third point to be added, in addition to the origin and the destination of the trip. The idea behind adding a third point option was to provide daycare center locations, which are often a necessary stop for welfare clients. Unfortunately, the agency found that counselors were not using the trip planner very much (even though they were trained in how to use it) since scheduling transportation for their clients is not their top priority. However, the trip planner was also designed so that it is easy to use by the general public.

CCRTA has found that the usage of the real-time information feature follows the seasonal usage of their system, so it gets used much more in the summer months. Last year the agency tied the trip planner into a CMAQ-funded electronic fare payment demonstration. Electronic fare cards were distributed to tourists by hotels – at the same time, the hotels showed customers the Automated Trip Planning system, so naturally usage during those months was very high.

System Architecture

The real-time information system obtains its information from AVL/GPS equipment mounted on each vehicle. Each vehicle sends its location information via the radio system to a radio tower, where it is then transferred via microwave to an operations center. From there, the data is sent by dial-up modem to a communications server. Then, vehicle location data is relayed to an application server, where the data is processed. After initial processing, the information is networked to a database server. (See Section 7.1, Application Design, Development, and Performance Issues, for a discussion about system architectures.)

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[45] The GeoGraphics Laboratory is part of the J. Joseph Moakley Center for Technological Applications at Bridgewater State College, Bridgewater, MA. The Web site address is http://geolab.bridgew.edu/home/.

6.2.2 Project Objectives

CCRTA has two primary markets for its Web-based customer information services. The first is regular riders, year-round residents of the Cape. The second market is tourists in the summer months. According to the telephone interview with CCRTA staff, the agency added the real-time information feature because they wanted to provide up-to-date information for their customers. The origin-destination option was developed specifically for a statewide welfare-to-work project but can be used by anyone.

6.2.3 Implementation Issues

Although the project team did not explore the working relationship between CCRTA, Bridgewater State, and the GIS provider, the fact that such a partnership was used to create the advanced Web site features may prove useful to other transit agencies.

CCRTA visited other real-time transit information sites, but found them more complicated and expensive-looking than what was required. Instead, the agency designed a system that fits the size of its operation but still offers customers information in a user-friendly format. CCRTA wanted to purchase an off-the shelf product that would require minimal customization, but nothing was available in the agency's price range. This led to their working with Bridgewater State, who developed the product based on CCRTA's specifications.

The telephone interview revealed that CCRTA believes showing the vehicle locations on a map is the best way to display real-time information, and has decided not to attempt providing estimated arrival times. Bridgewater State has tried to develop some algorithms to predict arrival time, but CCRTA is not ready to implement or provide such information to its customers.

Costs

The real-time information system is actually maintained on the Bridgewater State Web server for free. The overall CCRTA Web site is hosted by a local ISP, who provides the service at no cost as a public service. Development of the Web site was federally-funded by CMAQ monies, so CCRTA did not have any out-of-pocket expenses. The cost of developing the entire CCRTA Web site was approximately $37,000, so the relative cost of the real-time information was likely low.

Communications

CCRTA has had to confront the complexity in establishing a data link between its Web server and the Bridgewater State network. CCRTA is confined to dial-up Internet access because a T1 line would be too expensive, and high-speed cable modem or DSL access is not available.[46] Therefore, connection speed can prove to be a bottleneck that slows down the Web site performance.

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[46] See the Webopedia.com Web site for definitions of dial-up access (http://www.pcwebopaedia.com/TERM/D/dial_up_access.html), T-1 lines, (http://www.pcwebopaedia.com/TERM/T/T_1_carrier.html), cable modems (http://www.pcwebopaedia.com/TERM/c/cable_modem.html), and DSL (http://www.pcwebopaedia.com/TERM/x/xDSL.html).

6.2.4 Outcomes/Benefits

The CCRTA's objective in adding real-time information was to increase customer awareness of the system, and the agency thinks the system has done this well. The application is especially interesting since real-time information display is an advanced Web site feature that not many other agencies have, even much larger ones that have substantial information technology and customer service budgets.

The real-time information has been a good business investment because it allows customers to feel more comfortable with the system by giving them more control over their trip (because they know where the buses are). This is especially important since the system does not have many bus shelters, and having real-time customer information minimizes the time people have to wait outdoors. In the short term, the cost of developing the system is likely greater than the benefit, but in the long term the investment will pay off.

The CCRTA believes that the real-time information feature is providing the information that customers want, but still is not reaching as big of a customer base as they would like. Because they are in a rural setting, people are very auto-oriented, and it is difficult to get them to try transit. However, CCRTA thinks that the real-time information is getting used regularly by their steady riders.

6.2.5 Planned Improvements

CCRTA is planning to convert its real-time information system to a more sophisticated GIS engine to improve the user interface. This change is expected to improve the quality of the Web-based RTD display.

The agency has the capability of allowing its customers to superimpose aerial photos on the real-time vehicle location map. This could be a good addition to its RTD feature since it would provide a better context for customers to do travel planning. However, CCRTA is concerned about the expense of the aerial photos and what they might do to the connection speed for customers.

CCRTA is not really planning to develop an e-mail notification feature or adding customization to RTD because the agency wants to keep its customer information services simple. It believes the RTD and trip planner already provide sufficient customer information on the Web.

6.3 The Virginia Railway Express

The Virginia Railway Express (VRE) Web site provides customers with a real-time information service called *Train Brain.* The tool shows the location of VRE trains in a user-friendly format. The agency also provides an e-mail notification service for its customers, called *Train Talk,* which can include both generic communications and information about significant service disruptions. According to the project telephone interview, *Train Brain* was put on the VRE Web site in July 2000, while the *Train Talk* system was implemented much earlier, in 1996. VRE representatives stated in the project telephone interview that the agency was a pioneer in offering e-mail notification to its customers.

6.3.1 System Design and Functionality

Train Brain

The real-time vehicle tracking system that provides the information needed for *Train Brain* was developed and implemented by Orbital TMS, one of the major AVL/CAD vendors.[47] The customer interface was created by a separate software company, which designed the software used for the Web-based version.[48] The software designer, Reynolds Software of California, worked with the AVL vendor to integrate the vehicle location information into the *Train Brain* Web page, which is presented in Figure 6.11.

What the customer sees when accessing *Train Brain* on the Web page is a Java applet – a small program that is automatically downloaded into a customer's Web browser. (Use of Java applets for real-time information is discussed further in Section 6.5 below.) Once loaded, VRE's Web server periodically sends information to the Java applet to update the actual location of VRE's trains. Customers can obtain several types of information from the *Train Brain* Web page. Most importantly, customers can hold their computer cursors over any VRE train icon and get its most recently recorded real-time status. (Customers can do the same with Amtrak icons, although the information is clearly shown to be scheduled not real-time information.) In addition, as the Web page instructs, customers can also click on any station icon to get schedule information for that line (not station specific), station amenities, Park & Ride, local bus connections, and location information. Figure 6.12 presents one of the maps showing location directions for each station.

E-mail Notification

VRE provides the *Train Talk* e-mail news service for its customers. The subscription page, which contains the agency's description of the service, is shown in Figure 6.13. Approximately once per week, the agency sends out an e-mail to all subscribers that contains important service information. *Train Talk* is targeted at customers who want the latest information on schedule changes, service disruptions, seat notices, and other news. VRE also uses *Train Talk* to send out press releases, announcements, and other general agency information. Everyone signed up for e-mail alerts gets the same message.

Similar to Washington State Ferries' e-mail service, the program is not fully automated. Each message is typed up by staff, and then a listserv program is used to broadcast it to all subscribers at once. VRE does not want to automate the creation of e-mail content because its customers like the personalized messages.

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[47] Visit the Orbital TMS public transit Web page at http://www.orbital.com/TMS/PublicTransit/index.html.

[48] For a brief definition of Java Applets, see the Webopedia.com Web site at http://www.pcwebopaedia.com/TERM/J/Java_applet.html.

Figure 6.11: VRE *Train Brain* Web Display

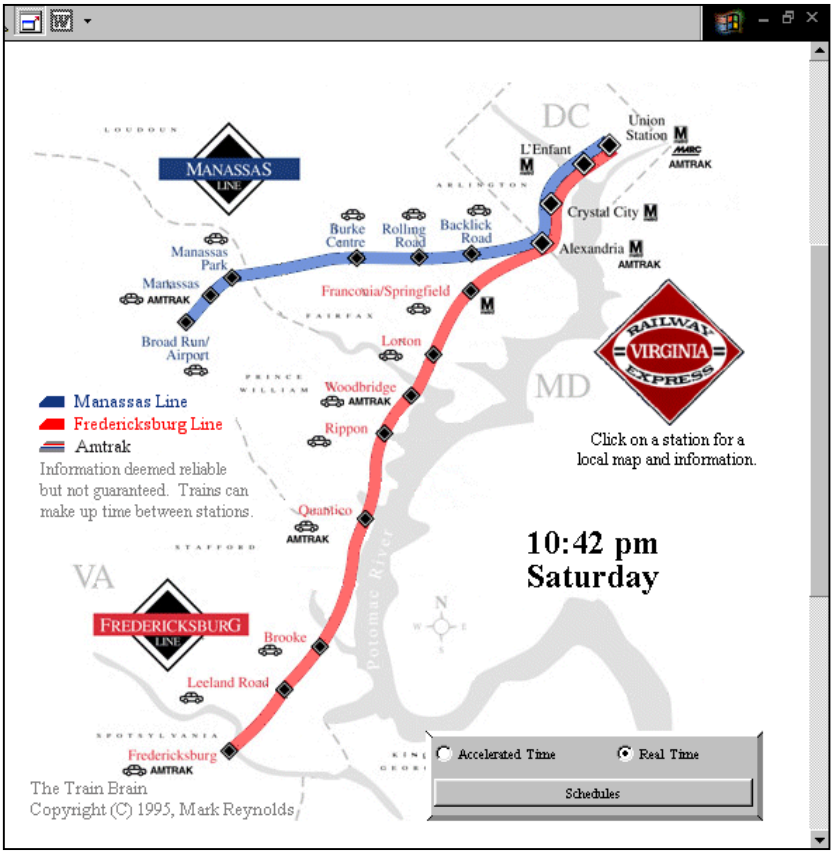


Figure 6.12: VRE Local Directions for Station Access

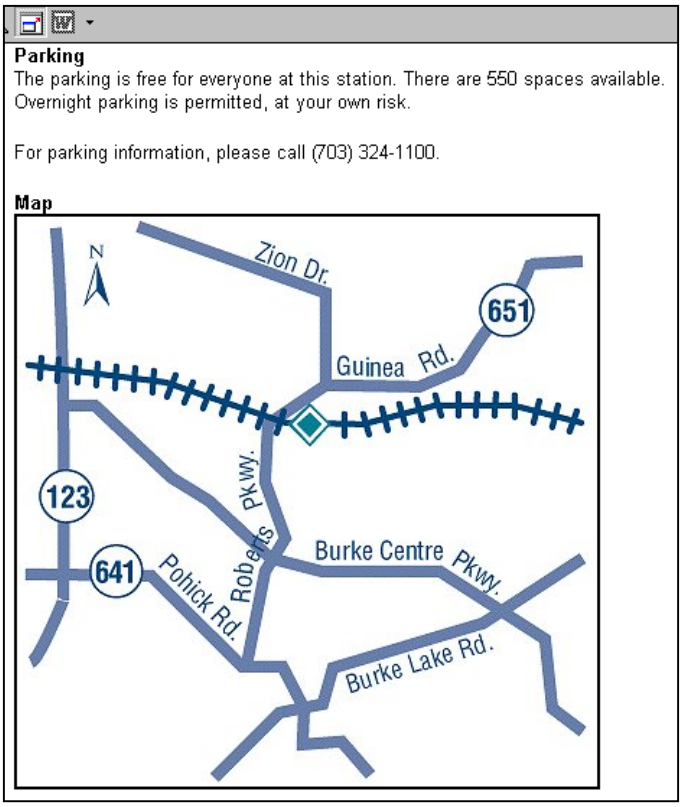
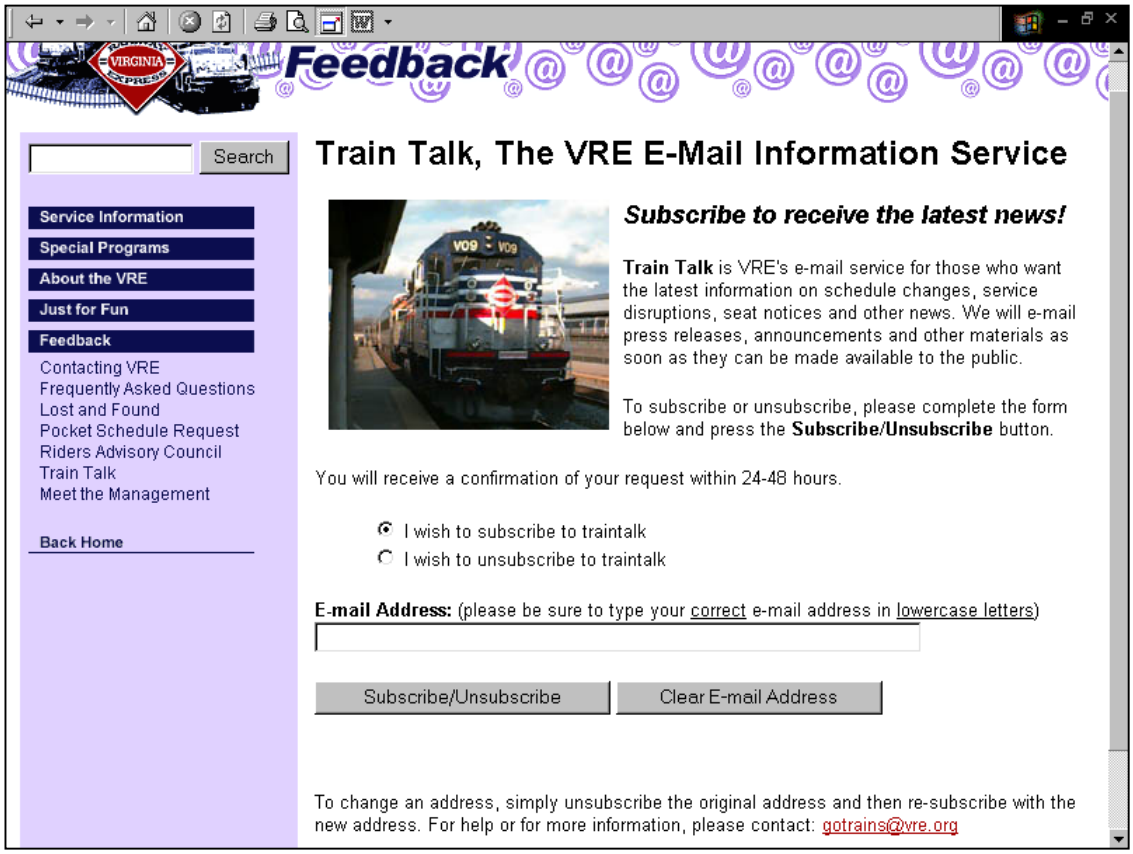


Figure 6.13: VRE Train Talk Subscription Page



6.3.2 Project Objectives

According to the project telephone interview, VRE's general objective is to provide as much information as possible to customers, in a way they can access it at any time. Since more than 80% of its customers walk to the VRE train stations, including those using the Park & Ride lots, *Train Brain* can be used to check the status of the trains before leaving the house (or office). Looking at the Web site gives customers the opportunity to know if the train is delayed before they actually get to the station. This information helps them make better travel decisions, including whether they need to find an alternative form of transportation (e.g., if there is a significant delay).

VRE representatives noted that *Train Talk* could be used to make mode choice decisions, if a customer can find out in advance that a train is delayed. Such information is probably more useful to *Train Talk* customers at the start of their commutes since once a customer takes the train to work, he/she is somewhat committed to take VRE home from work, unless the customer qualifies for the agency's guaranteed ride home program.[49]

According to agency mangers, both the *Train Brain* real-time information system and the *Train Talk* e-mail notification service are important for the three different markets the

[49] Review the GRH rules at http://www.vre.org/programs/comcon.htm.

agency serves. The Web-based information is geared towards all three groups, albeit in different ways:

- *Existing riders* – VRE wanted to provide information that would be accessible to this group whenever they wanted it. By doing this, they could reduce the number of calls to their call center.
- *Potential riders* – by providing readily accessible information, they might get these people to try their service.
- *Tourists* – VRE thinks tourists probably use the real-time information on the Web as well. Their tourist market has been increasing steadily. Feedback collected from tourists showed that the majority told two or more people to try VRE for sightseeing when they visit the Washington DC area.

VRE also knows that other transportation agencies visit the Web site and even sign up for the e-mail notification to see what VRE has accomplished.

6.3.3 Implementation Issues

At present, the *Train Brain* does not predict when a train will arrive at stations. At this time, the real-time information supplied by the vehicle location system is not precise enough to provide the accuracy customers would need.

Initially, the time displayed by *Train Brain* was taken from the internal clock on customers' computer. However, VRE decided that since these times would vary from one customer computer to another, it decided use the time on the Web server instead.

Costs

The AVL/CAD system cost about $1.5 million, and VRE is planning to make some significant improvements to it. Developing the Java applet for the Web-based system cost $8,000. VRE also pays the software developer a yearly license fee of $5,000 (i.e., VRE leases the application) and a software maintenance fee of $4,000 year.

Real-time Information for Operations

VRE's two rail lines, Manassas and Fredericksburg, are operated by Amtrak on track owned by CSX and Norfolk Southern (NS). Since VRE leases track time from the two companies, Amtrak has to coordinate VRE operations with the other rail dispatchers. Amtrak uses the same real-time information the VRE collects to monitor operations and communicate with CSX and NS.

6.3.4 Outcomes/Benefits

VRE believes that with *Train Brain* and *Train Talk* it gives its customers as much useful information as the agency can. *Train Brain* and the AVL/CAD system are probably part of the reason that VRE guarantees its on-time performance with a "Free Ride Certificate" if a train enters a station 30 minutes or more behind schedule.[50]

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[50] Review the full details of VRE's on-time guarantee program at http://www.vre.org/programs/freeride.htm.

Usage Patterns

VRE representatives reported that the *Train Brain* is the second most popular page on its Web site, following the VRE home page. *Train Brain* is also the second most bookmarked page.

The VRE Web site is integral in how customers learn about the agency and its services. Use of VRE Web site continues to increase, and the agency attributes this to three factors:

- More and better information;
- Increased Internet access among its customers, estimated to be 75% currently; and
- New Web site features, such as the *Train Brain* real-time information.

Impact on Call Centers

VRE originally thought that *Train Talk* and *Train Brain* would reduce telephone inquiries at the call center. However, the agency has experienced such dramatic ridership increases that it cannot determine whether the Web services have actually reduced calls.

6.3.5 Planned Improvements

VRE's main planned improvement concerns the AVL/CAD system. The agency is making the improvements because of *Train Brain.* If the accuracy of the real-time vehicle location data improves, VRE may consider developing train arrival predictions.

Customers have asked if real-time information could be sent to pagers. Customers have also asked for more customized information from *Train Talk,* such as the status for specific trains they use, and VRE is testing this improvement.

One other improvement would be to provide space availability information for the Park & Ride lots at each VRE station, similar to what is currently provided at Baltimore-Washington International Airport. The agency is researching systems that would collect accurate lot information and then may consider providing this information on the Web page.

6.4 Tri-County Commuter Rail Authority

The Tri-Rail 71-mile, 18 station commuter rail system serves the Fort Lauderdale/Miami region in South Florida, including Palm Beach, Broward, and Miami/Dade Counties. Started in January 1989 as part of a major traffic mitigation effort during construction and expansion of the I-95 expressway, the transit system operates seven days per week. It not only connects directly to Miami-Dade Transit's Metrorail rapid transit system, Tri-Rail also serves three airports - Miami International Airport, Ft. Lauderdale/Hollywood International Airport, and Palm Beach International Airport.[51]

The agency has developed a low cost, Web-based real-time information page for its customers. The real-time customer information feature was implemented in 2001, using a vehicle tracking system already in use for operational purposes. Given Tri-Rail's

[51] Information adapted from "Trail Facts" at http://www.tri-rail.com/Information/generalinfo.htm.

integration with other area transit services and airports, real-time customer information would seem especially important.

6.4.1 System Design and Functionality

The project telephone interview explained that the real-time customer information display is based on the GeoFocus, GPS-based vehicle location system.[52] The system consists of GPS transponders installed on trains, which communicate their real-time locations to a central server that then plots the location of trains on a GIS representation of the tracks. Tri-Rail had installed this system for operational purposes, but its customer service agents also had access to it so that they could answer customer calls concerning the location and status of a particular train.[53]

In the fall of 2001, the agency's Executive Director announced in public that within two years Tri-Rail would have a Web-based real-time display of train activity. The agency's information technology staff realized that this could be accomplished easily for low cost. The agency bought a simple shareware program designed to take computer screen shots to create images of what operating personnel saw with the GeoFocus *TrainTrac* system. The software is programmed to take a screen shot every three to five minutes and save the image to the agency's computer network. A file transfer protocol (FTP) program then transfers the screen shot to the Tri-Rail Web server hosted at BellSouth, where it is automatically displayed.[54]

In practice, the project team would not classify this as true "real-time" information, because of the intervals between screen shots. This is not meant to judge the Tri-Rail system, however, since the project team has found similar "real-time" displays during its research. Nevertheless, agency staff felt that customers accessing the information on its Web site only needed to see whether the train was on time or not, not necessarily the actual location of the train. This solution seems to provide information that customers want, particularly because the service is geared towards the everyday commuter. See Figure 6.14 to see the train status display. Note in the bottom page the instructions for interpreting the information.

6.4.2 Project Objectives

Tri-Rail's advanced real-time information display was designed to enable customers to access the Tri-Rail Web site and determine approximately when they should arrive at the station. The system was meant to provide information similar to what a customer would obtain by calling the agency. Tri-Rail also expects to use the RTD when construction that might affect train operations and/or schedules is planned, and to post that information with the Web display so that customers can take the construction into account when planning their travel.

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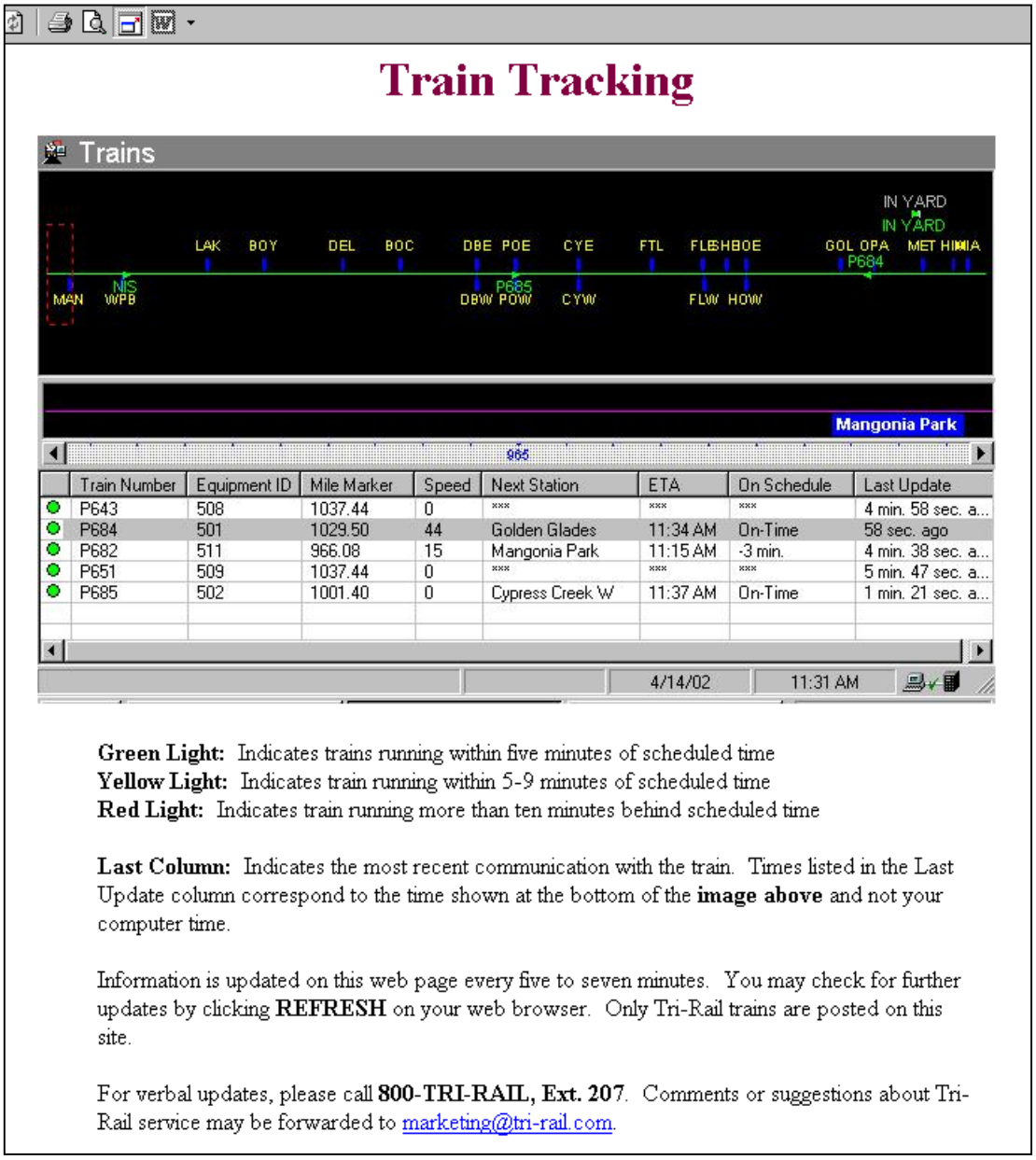
[52] See the GeoFocus vehicle location product Web page at http://www.geofocus.com/products.html. The GeoFocus system was also installed at another transit agency described in this study, UTA.

[53] For additional information regarding the GIS component of the Tri-Rail *Train Trac* system, visit the ESRI Web site http://www.esri.com/industries/transport/tri-rail.html. ESRI is GeoFocus business partner.

[54] For a definition of FTP and FTP programs, visit the Whatis.com Web page at http://searchnetworking.techtarget.com/sDefinition/0,,sid7_gci213976,00.html.

Figure 6.14: Tri-Rail Train Tracking Display



6.4.3 Implementation Issues

Design of the System

Tri-Rail has been sensitive to how customers interpret the "real-time" information displayed on its Web site, because trains can make up time between stations. Although the agency does not want to give its customers inaccurate information, management feels that a certain amount of deviation is a small concern with its commuter rail operation.

This is partly due to the train's relatively long headways (as compared to local bus services) and schedules that are built with an inherent amount of slack time.

The software used to take screen shots of the GeoFocus operational displays is called CapturePro, a shareware program that cost about $30 at the time Tri-Rail purchased it.[55] Programming it and the FTP software to place the images shown in Figure 6.14 onto the agency's Web page was done in-house. The GeoFocus system, which was implemented for operational purposes and not the Web page, cost around $1 million. The cost for GeoFocus included everything from real-time message signs on station platforms to audio and visual ADA compliance components. Tri-Rail did discuss whether GeoFocus could put the real-time information on the Web site, but the price quoted for this add-on was very high.

Quality Control

When Tri-Rail first hatched its scheme for providing real-time information on its Web page, the agency tested it in advance by running it on another server before implementing it on the Tri-Rail Web page. The testing only required a few weeks, allowing them to take care of some bugs in the GeoFocus system.

6.4.4 Outcomes/Benefits

The project telephone interview indicated that Tri-Rail believes the Web feature adds considerable value to the organization. Previously, its Web site only offered static travel information, but now it provides dynamic, real-time information. The train tracking Web page is therefore helping the agency to provide better information to its customers. Some Tri-rail staff were amazed the information technology staff were able to implement the application so quickly and at such a low cost.

Impact on Call Centers

Tri-Rail was not sure if the Web information was having any impact on its call center. Staff reports that it is difficult to isolate changes in call center activity that result from the real-time information because there are many factors that affect the number of customer calls received. Call center agents still have to give instructions about how to connect with various bus routes and the Metrorail system or provide directions to Tri-rail stations and parking.

6.4.5 Planned Improvements

Tri-Rail is considering development of an e-mail notification system. The agency's complaint department collects name and address information when a customer sends in a complaint (via the Web page), and staff is looking at how to modify the feedback system so it collects more information, such as the routes involved. Tri-rail anticipates that it will be able to build a database for an e-mail notification system from the information being collected from complaints. Ideally, the agency would like to develop a more automated system that would allow customers to subscribe on the agency Web page and designate specific rail stations for which to receive information.

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[55] See more information, including technical information, about CapturePro at the Pegasustools.com Web site at http://www.pegasustools.com/products/capturepro_info.htm. View a definition of shareware at the Webopedia.com Web site at http://www.pcwebopaedia.com/TERM/s/shareware.html.

Similar to reports from other agencies, Tri-Rail would like to make the information on its Web site available via PDA, cell phone, or other mobile device – within the next couple of months. Customers have specifically asked for the ability to download train schedules to handheld devices, a project on which Tri-Rail is working. No AIP system is planned because Tri-Rail is only responsible for the commuter rail system, but not connections to other modes.

6.5 King County Metro

Transit riders in the Seattle area are offered a wide range of traveler information services, thanks to a tradition of innovation in local, regional, and state institutions. Residents of the region now enjoy Web access to automated itinerary planning, real-time vehicle location information, and automatic e-mail notification. This case study focuses on the real-time displays and the e-mail notification.[56]

6.5.1 System Design and Functionality

This Section is divided into three parts, each one representing a separate KC Metro advanced transit Web site feature. These features include:

- *MyBus*, which shows predicted bus arrival times at various time points;
- *BusView*, which provides an on-line map of bus locations; and
- *Transit Alerts!*, which provides e-mail (and text pager) notifications.

All three systems are aimed at regular customers, who tend to check the status of buses from work and from home. On the other hand, KC Metro's new trip itinerary planner is geared more towards tourists who may not know how to get around the Seattle area

The MyBus Program

MyBus was initially developed at the University of Washington, with funding partially provided by the federally-sponsored "SmarTrek" Metropolitan Model Deployment Initiative project.[57] It is not currently maintained by KC Metro, but the agency is planning to take over the operation and maintenance of *MyBus* in 2003.

The Web service was initially developed to provide real-time predictions of bus arrival and departure times at eight key transfer points in the KC Metro transit network, particularly selected transit centers an/or Park & Ride lots. The original system even showed the customer which bus bay each route was arriving at or departing from, as shown in Figure 6.15. *MyBus* has now been expanded to so many locations that a map of the region broken into smaller zones is provided, as shown in Figure 6.16, to help customers find the desired *MyBus* transit node. Note that customers can bookmark any *MyBus* location once they have found the ones that interest them.

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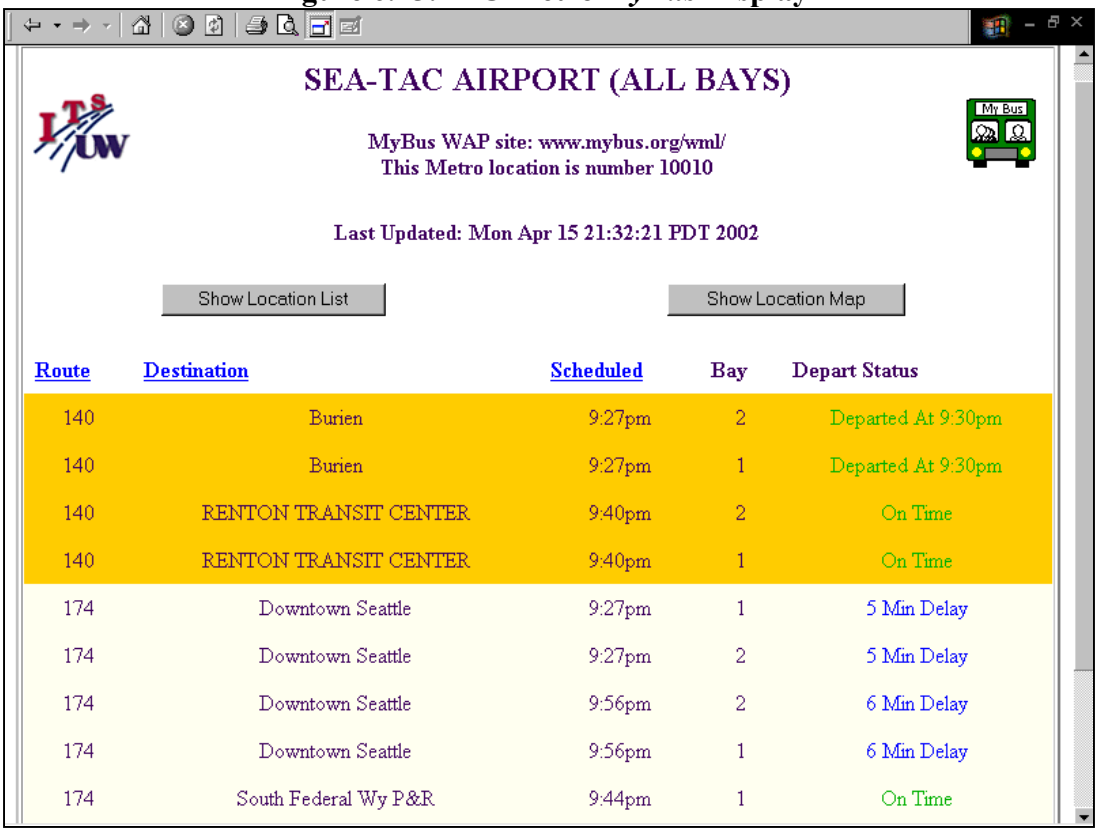
[56] Note that although *MyBus* and *BusView* were developed as a cooperative effort by a variety of institutions, and in fact reside on other organizations' servers, for simplicity's sake the project team will identify them as KC Metro applications.

[57] See a full list of projects at the University of Washington's ITS Research Program, College of Engineering, at http://www.its.washington.edu.

Figure 6.15: KC Metro *MyBus* Display



SEA-TAC AIRPORT (ALL BAYS)

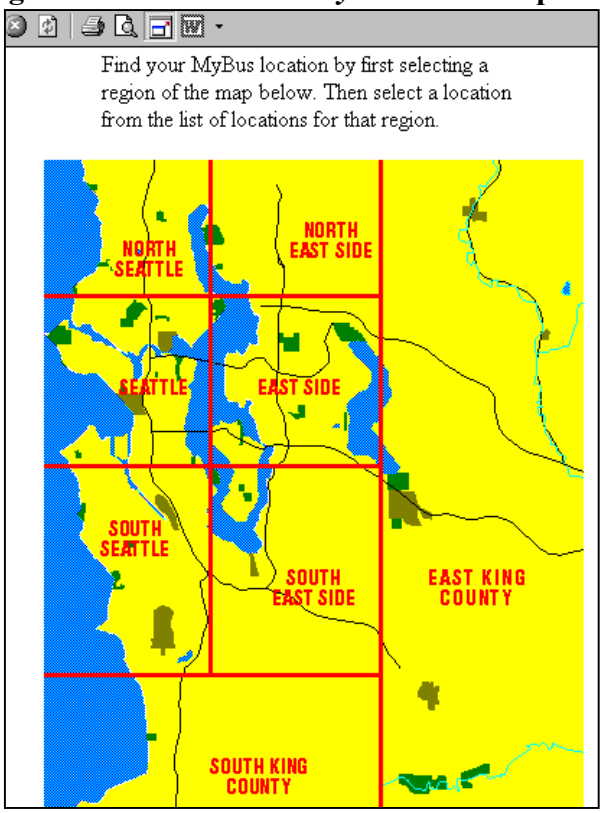
MyBus WAP site: www.mybus.org/wml/
This Metro location is number 10010

Last Updated: Mon Apr 15 21:32:21 PDT 2002

Show Location List | Show Location Map

Route	Destination	Scheduled	Bay	Depart Status
140	Burien	9:27pm	2	Departed At 9:30pm
140	Burien	9:27pm	1	Departed At 9:30pm
140	RENTON TRANSIT CENTER	9:40pm	2	On Time
140	RENTON TRANSIT CENTER	9:40pm	1	On Time
174	Downtown Seattle	9:27pm	1	5 Min Delay
174	Downtown Seattle	9:27pm	2	5 Min Delay
174	Downtown Seattle	9:56pm	2	6 Min Delay
174	Downtown Seattle	9:56pm	1	6 Min Delay
174	South Federal Wy P&R	9:44pm	1	On Time

Figure 6.16: KC Metro *MyBus* Zone Map



MyBus uses information from KC Metro's AVL system and the prediction algorithm developed by the University of Washington to make its arrival and departure estimates.[58] Readers may want to note that the vehicle location information comes from a signpost-based AVL system.

Another recent development is that *MyBus* information can be accessed by WAP-enabled cell telephones or networked Palm Pilot PDAs.[59] This option has been available for about a year. The information is edited and formatted differently for these devices than for PC Web browsers. Figure 6.17 shows an example screen for WAP-based information, while Figure 6.18 shows the information displayed on a Palm Pilot.

BusView

Like *MyBus*, *BusView* was initially developed at the University of Washington, with funding partially provided by the federally-sponsored "SmarTrek" Metropolitan Model Deployment Initiative project. Instead of providing predicted arrival times at particular points, *BusView* allows customers to focus on areas of bus operations in pre-defined or customer-defined areas. Figure 6.19 shows the default start-up screen. The square icons shown in the Figure represent individual buses, and are labeled with the bus route and time the vehicle last reported its location. The purple "HUB" icons show locations of *MyBus.* The reader should be aware that, although streets are not labeled in the default view, holding the cursor over an intersection gives the name of the two streets at that location.

In addition to showing bus locations for an entire area, *BusView* has a feature that allows customers to track the progress of a single bus and set an alarm to notify them that a bus is approaching their location.[60] This is presented in Figure 6.20.

The Transit Alert Program

King County Metro's *Transit Alert!* notification project is an ambitious effort to send e-mail and pager notifications to subscribers. As noted on KC Metro's Web page: "*Transit Alert!* will send you messages about Metro Transit service disruptions during certain types of declared emergencies." The registration page for *Transit Alert!,* shown in Figure 6.21, allows the customer to select from three different types of alerts:

- General Alerts with no route-specific information;
- Lite Alerts regarding specific bus routes; or
- Detailed Alerts regarding specific bus routes. [61]

The project telephone interview showed that severe limitations in staff time and other resources have seriously curtailed the agency's ability to send out notifications of any type.

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[58] Readers interested in a detailed description of the prediction algorithms should read the article at http://www.its.washington.edu/pubs/itsc_2000.pdf.

[59] Visit Webopedia.com for a definition of WAP at http://www.pcwebopaedia.com/TERM/W/WAP.html.

[60] For a complete overview of *BusView* capabilities, see *BusView Help* at http://busview.its.washington.edu/busview_help.html,

[61] See the *Transit Alert!* sign-up page for more information about the types of alerts and subscribing to pager notifcation, at http://www.metrokc.gov/comments/alerts/transit/pubsubscribe.cfm.

Figure 6.17: Example of *MyBus* Information on a WAP-enabled Cell Phone

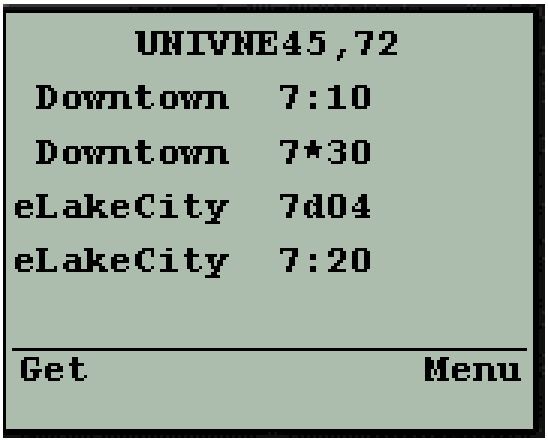


Figure 6.18: Example of *MyBus* Information Displayed on a Palm OS Device

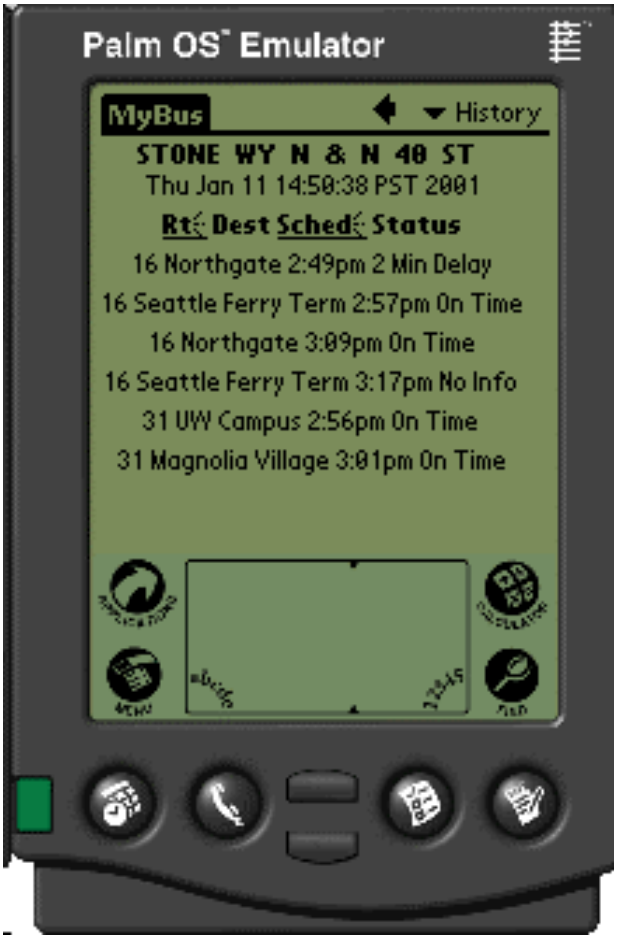
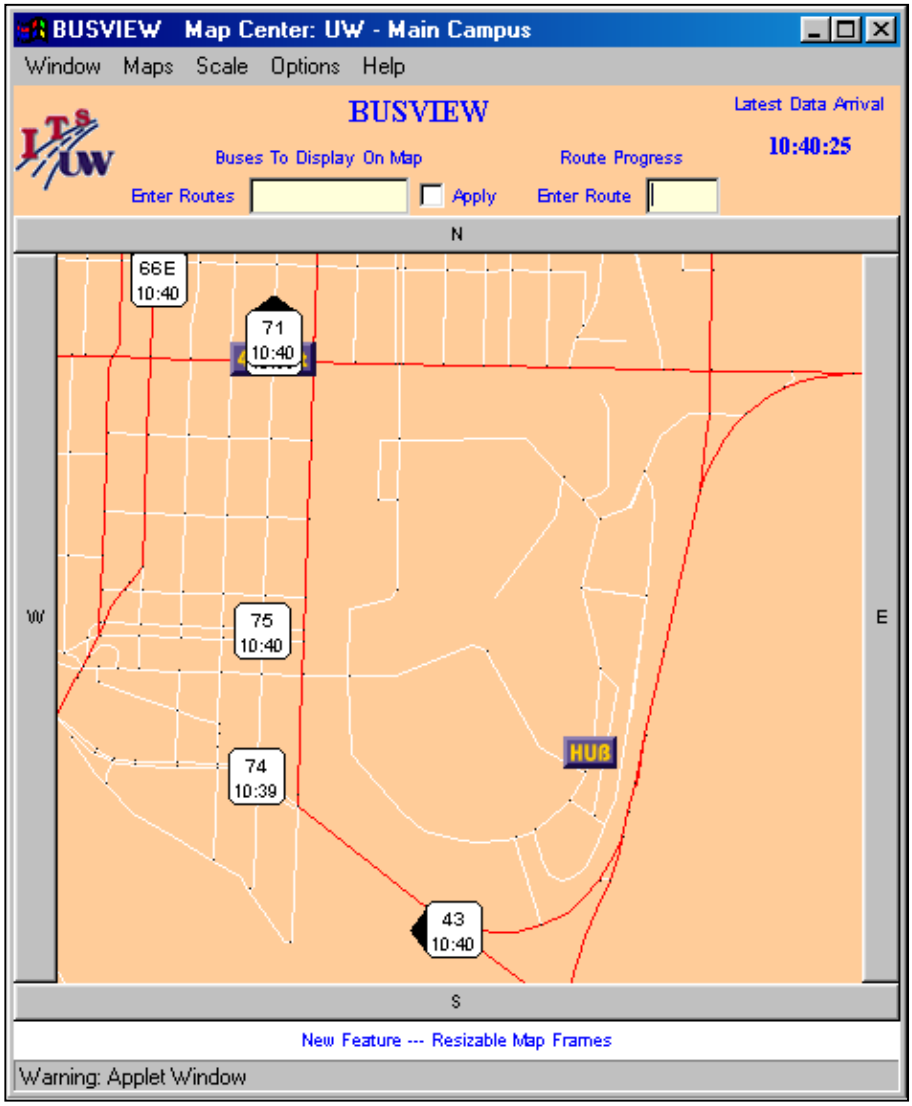
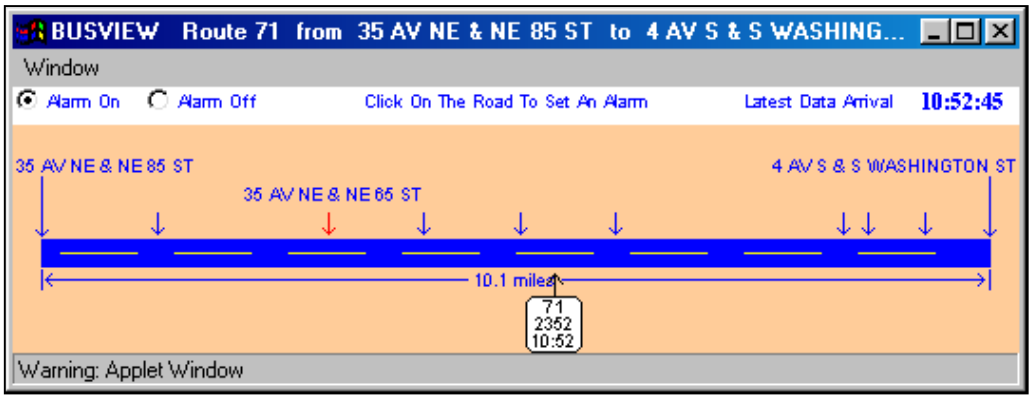


Figure 6.19: *BusView* Start-up Screen



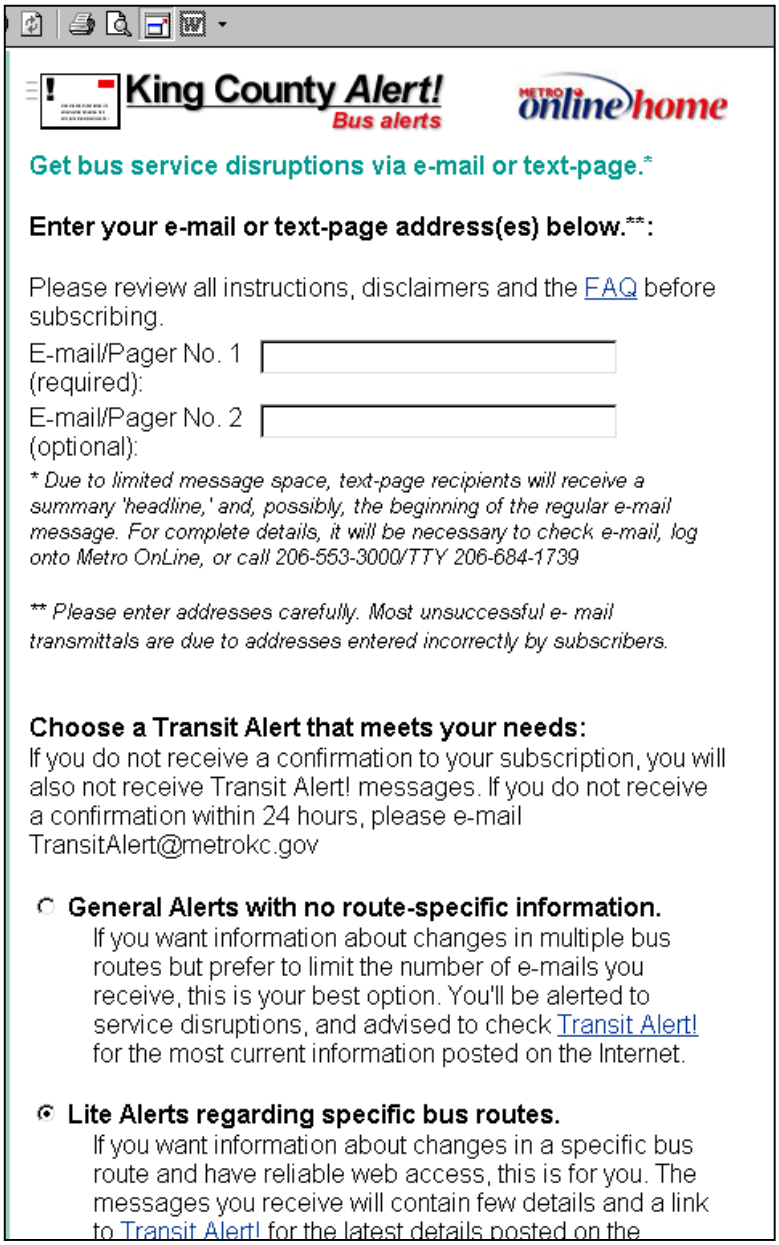
(This figure cannot be hyperlinked because it is a Java Applet)

Figure 6.20: *BusView* Route Tracking and Alarm Window



(This figure cannot be hyperlinked because it is a Java Applet)

Figure 6.21: *Transit Alert!* Subscription Page



King County Alert!
Bus alerts

METRO online home

Get bus service disruptions via e-mail or text-page.*

Enter your e-mail or text-page address(es) below.:**

Please review all instructions, disclaimers and the FAQ before subscribing.

E-mail/Pager No. 1 (required):

E-mail/Pager No. 2 (optional):

** Due to limited message space, text-page recipients will receive a summary 'headline,' and, possibly, the beginning of the regular e-mail message. For complete details, it will be necessary to check e-mail, log onto Metro OnLine, or call 206-553-3000/TTY 206-684-1739*

*** Please enter addresses carefully. Most unsuccessful e- mail transmittals are due to addresses entered incorrectly by subscribers.*

Choose a Transit Alert that meets your needs:
If you do not receive a confirmation to your subscription, you will also not receive Transit Alert! messages. If you do not receive a confirmation within 24 hours, please e-mail TransitAlert@metrokc.gov

General Alerts with no route-specific information.
If you want information about changes in multiple bus routes but prefer to limit the number of e-mails you receive, this is your best option. You'll be alerted to service disruptions, and advised to check Transit Alert! for the most current information posted on the Internet.

Lite Alerts regarding specific bus routes.
If you want information about changes in a specific bus route and have reliable web access, this is for you. The messages you receive will contain few details and a link to Transit Alert! for the latest details posted on the

6.5.2 Project Objectives

During the project telephone interview, a KC Metro representative explained that a major objective of the advanced Web site features is to limit the uncertainty transit customers often report. From this perspective, the *MyBus* and *BusView* real-time information displays could be a good tool for retaining new riders who might otherwise revert to other modes because of uncertainty about bus service.

6.5.3 Implementation Issues

Design of the System

Around 1998, the real-time bus location program was initiated by researchers at the University of Washington (UW), who knew that KC Metro had AVL data available to work with. UW had started developing the applications when they caught on as an element of the SmarTrek MMDI project, which provided additional funding. After years of development, UW is now considering marketing the products nationwide. KC Metro staff believe that one reason *MyBus* is popular stems from its similarity to airport arrival and departure monitors. Indeed, a close look at Figure 6.15 shows that the information is almost identical to an airport system.

Keeping the System Up-to-Date

The agency updates its bus schedules every two weeks. Unfortunately, KC Metro does not have a defined process for entering these changes into the real-time system. Thus, the bi-weekly service updates often are not implemented in the system. However, since the schedule adjustments are usually minor, they have limited impact on *MyBus.* When the agency makes major service changes, they are implemented by University staff using new schedule and GIS data provided by KC Metro.

MyBus Prediction Algorithms

To achieve these primary objectives, KC Metro and the University of Washington continue to refine the algorithms used by *MyBus* to improve the reliability of the arrival predictions. The telephone interview suggested that predictions for *MyBus* have always been an operational issue. The project team assumes that the signpost-based AVL may have played a role in complicating the prediction algorithms.

6.5.4 Outcomes/Benefits

KC Metro staff expressed that the agency's Web-based advanced features give people a convenient tool for obtaining accurate system information. These advanced Web site features also help improve the agency's public image by demonstrating it can use state-of-the-art technologies to provide customer information. All three applications help remove some of the uncertainty often associated with riding transit. Customers have found that the real-time information from *MyBus* and *BusView* is especially useful during the off-peak when headways are less frequent.

MyBus vs. BusView

Both *MyBus* and *BusView* have useful features. *BusView*, in either of the views presented in Figures 6.19 and 6.20, shows customers the approximate locations of buses, but then leaves the decision of what to do with the information up to the customer. Naturally, customers learn how to use and interpret the *BusView* information based on what they have seen in the past. As noted earlier, *BusView's* alarm feature also enables a customer to notify himself/herself when the bus they want to take approaches the location where they want to board it.

Customers who feel comfortable with *MyBus*, on the other hand, tend to like it because of the similarity to airport displays. However, late running buses can make up time. This could lead to situations where customers use the Web service to determine that that their

bus is 10 minutes late, and therefore leave 10 minutes later than normal. If the bus makes up all the time, customers could actually miss the bus if it ends up arriving on time. KC Metro did not specifically report complaints to this affect, and under certain conditions such as frequent headways, it would be possible for such a reporting error to have a material impact on a customer.

Some current *MyBus* and *BusView* features were not originally available. For example, the alarm feature in *BusView* was implemented several years ago. The ability to scale maps was another added feature. Originally, *MyBus* only offered estimates for eight important transfer locations, and now the schedule, arrival, and departure information is provided at many time points on the KC Metro bus system.

6.5.5 Planned Improvements

Although *MyBus* and *BusView* are still run at UW, KC Metro is planning to bring the applications in-house in the near future. Along with this move, several improvements are planned. One is adding more personalization features, so that a customer could save preferences, a component of a CRM system The agency would also like to integrate the two systems (so perhaps the HUBS icons shown in *BusView* would actually be links to *MyBus).*

KC Metro managers suggested that the agency would continue to create programs consistent with the CRM concepts. Already, individual routes can be bookmarked in *MyBus* so that customers select them immediately. Similarly, *BusView* customers can create a bookmark to a certain area of the bus system for which they regularly need information. Finally, the selections for the *Transit Alert!* notification system, displayed in Figure 6.21, record customer preferences in much the same manner as a CRM system might.

The project team suggests a fundamental improvement to all of the advanced Web site features discussed in this Section. During its on-line review the features, the project team had a great deal of trouble finding *MyBus, BusView,* and *Transit Alerts!.* None of these features were specifically mentioned on the KC Metro home page. Without getting into the details about how difficult it can be to find these important customer information features, the project team believes that KC Metro should make the their existence as prominent as the *Trip Planner* on the KC Metro home page.

6.6 NextBus

NextBus is a private company that provides GPS-based vehicle location systems designed to communicate real-time bus arrival information at bus stops and similar information on its Web site. Perhaps the unique characteristic of NextBus is that, as a private service provider, any transit agency can readily obtain the real-time services the firm provides.

Figures 6.22 and 6.23 show the two ways information is displayed. Figure 6.22 allows customers to select specific routes and stops for which to display the real-time information. When Figure 6.23 is launched from Figure 6.22, it automatically shows the same route that the customer had selected. Note in Figure 6.23 the pop-up message containing vehicle schedule information, which was activated when the computer cursor

Figure 6.22: NextBus Stop Information Display

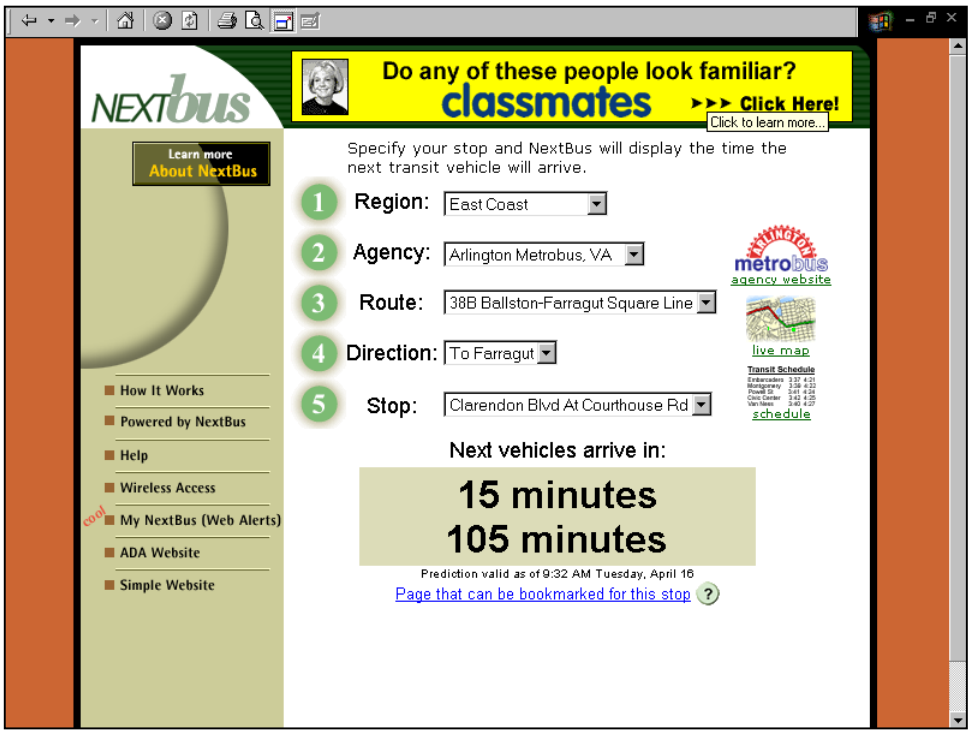
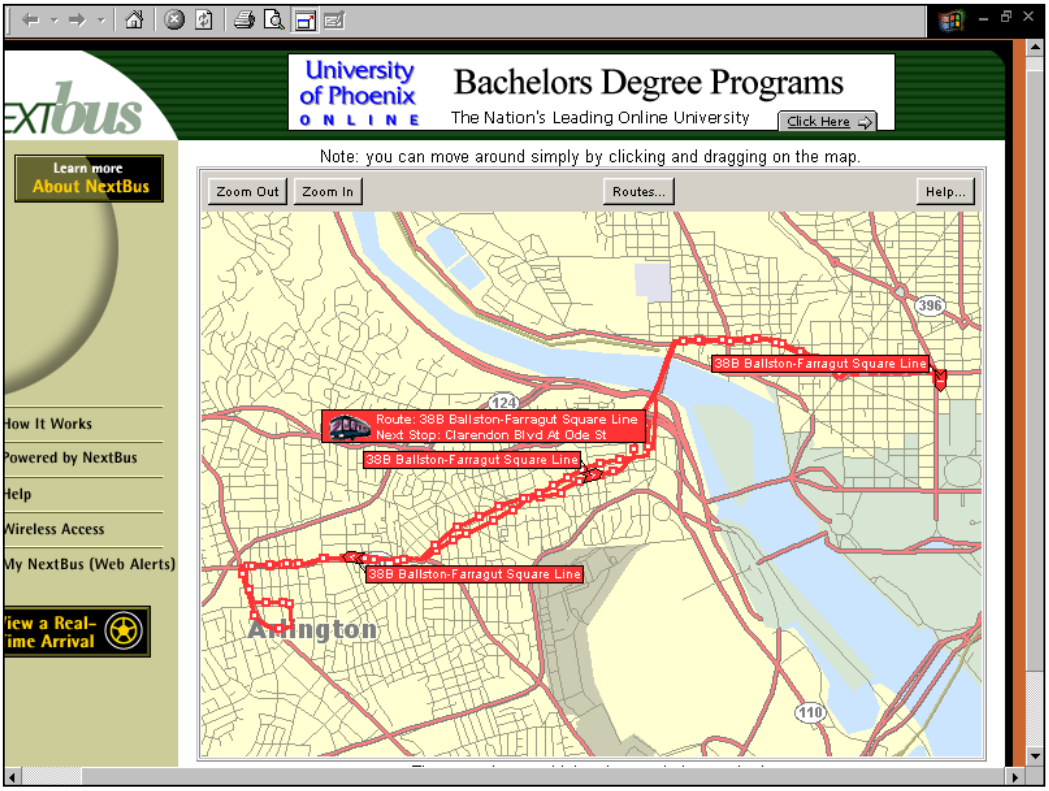


Figure 6.23: NextBus Route Specific Map Display



was held over the vehicle icon. NextBus also offers the *My NextBus* Web notification feature and also offers wireless access to the real-time information.[62]

NextBus provides a "one size fits all" product that can be adapted to different agency needs and sizes. Several of the transit agencies covered in this report have contracted with NextBus to implement its real-time system. The Ventura County Transportation Commission has signed a contract with NextBus to install the system throughout the county. VCTC is embarking on this project so that it will not need to develop a traditional AVL/CAD system. San Francisco MUNI and AC Transit, two of the MTC's member agencies, have contracted with NextBus to outfit their entire fleets. WMATA is currently testing the system on one of its Northern Virginia routes.

A NextBus representative reported that the company's business plan call for a variety of system improvements. The most notable improvement reported by NextBus is its continuing development of back-end features that will enable transit agencies to get many of the same benefits of a traditional AVL/CAD system. The company already provides an operations computer that can access NextBus features intended for operations and not the general public. Lessees can already generate several operational reports. One component that has yet to be developed is automatic Web site usage tracking, so that a transit agency can evaluate how the system is being used and which parts of its transit network are viewed most frequently.

6.7 New Jersey Transit Corporation

The New Jersey Transit Corporation (NJT) offers a variety of Web-based features, including automated itinerary trip planning and electronic notifications accessible via their Web site. This case study focuses primarily on the agency's advanced registration feature, *My Transit,* a form of CRM, which allows customers to personalize their experience on the NJT Web site. The agency has also developed a highly sophisticated passenger notification system for express service delays of 30 minutes or longer.

My Transit was added to the NJT Web site in July 2001. The agency operated the system on its intranet for about six months before deployment so that employees could use and test it, to ensure that the feature worked correctly.

6.7.1 System Design and Functionality

My Transit

In the words of NJT, "*My Transit* allows you to develop your own customized transit schedule for all NJ TRANSIT Rail, Bus and Light Rail services. Using the customized schedule, you can receive free instant transit service alerts about delays of 30 minutes or more. In addition, you can quickly view and print your schedule(s), participate in quick surveys that help NJ TRANSIT address your travel needs and choose links to your favorite transportation Web sites."[63] The welcome page for *My Transit* is shown in Figure 6.24.

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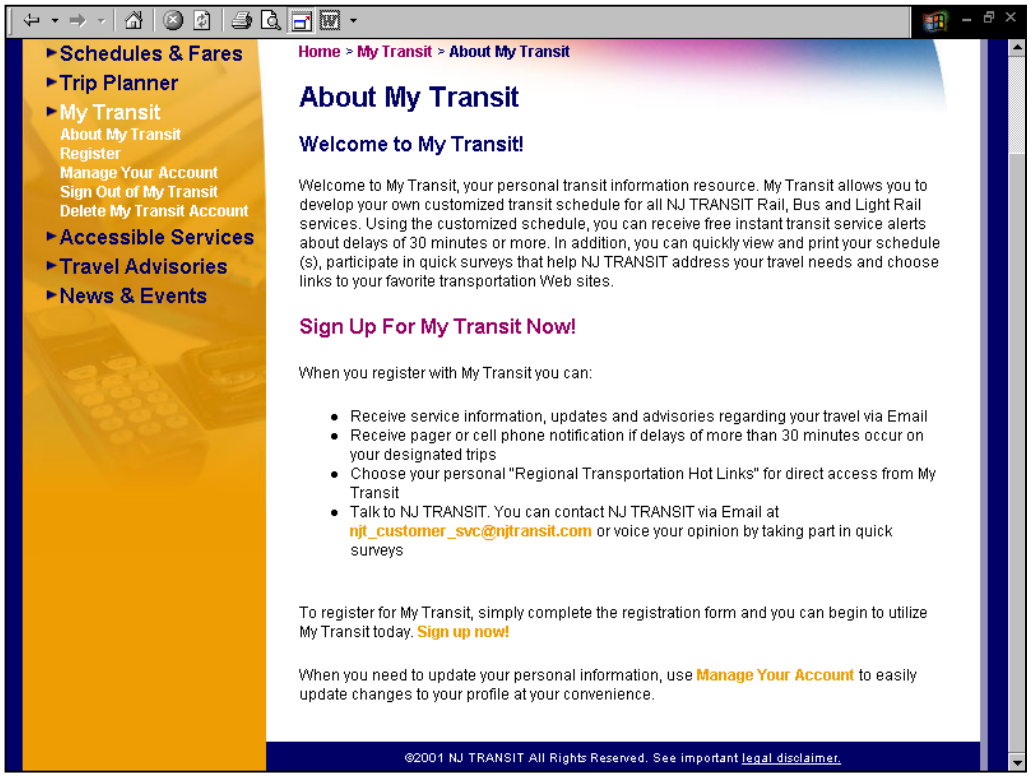
[62] For the full list of wireless devices supported by NextBus, see http://www.nextbus.com/wirelessConfig/index.htm.

[63] Visit NJT's Web site at http://www.njtransit.com/.

Figure 6.24: NJT's *My Transit* Welcome Page



My Transit allows the customer to:

- Receive service information, updates and advisories regarding their travel via e-mail;
- Receive pager or cell phone notification if delays of more than 30 minutes occur on the customer's designated trips; and
- Choose their personal "Regional Transportation Hot Links" for direct access from the *My Transit* page.

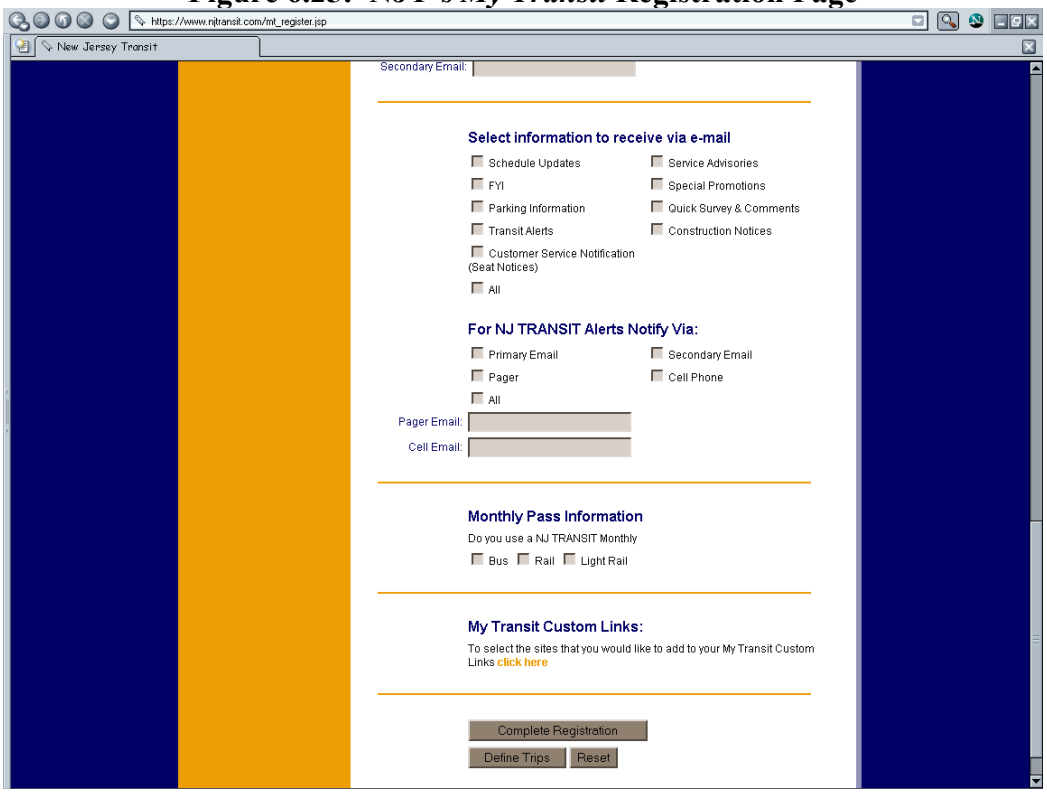
These features are described in more detail in the following paragraphs.

E-mail and pager alerts are available during the peak period (from 5am to 10am and from 2:30pm to 7:30pm, Monday through Friday). Information is only available for trains and express buses (not for local bus service). In fact, the customer will only receive information for the specific train number they are registered for unless there is a disruption affecting the entire line. The agency also posts alerts on their travel advisory Web page.

Because many wireless devices have character limitations, customers who receive pager and cell phone notifications receive a shortened version of the messages received by e-mail customers. Additionally, pager notification subscribers may not get all of the messages received by e-mail recipients. For example, the agency does not send construction notices out to pagers.

As shown in Figure 6.25, when a customer signs up for *My Transit*, he/she can select a number of different types of alerts to receive (such as parking information, special

Figure 6.25: NJT's *My Transit* Registration Page



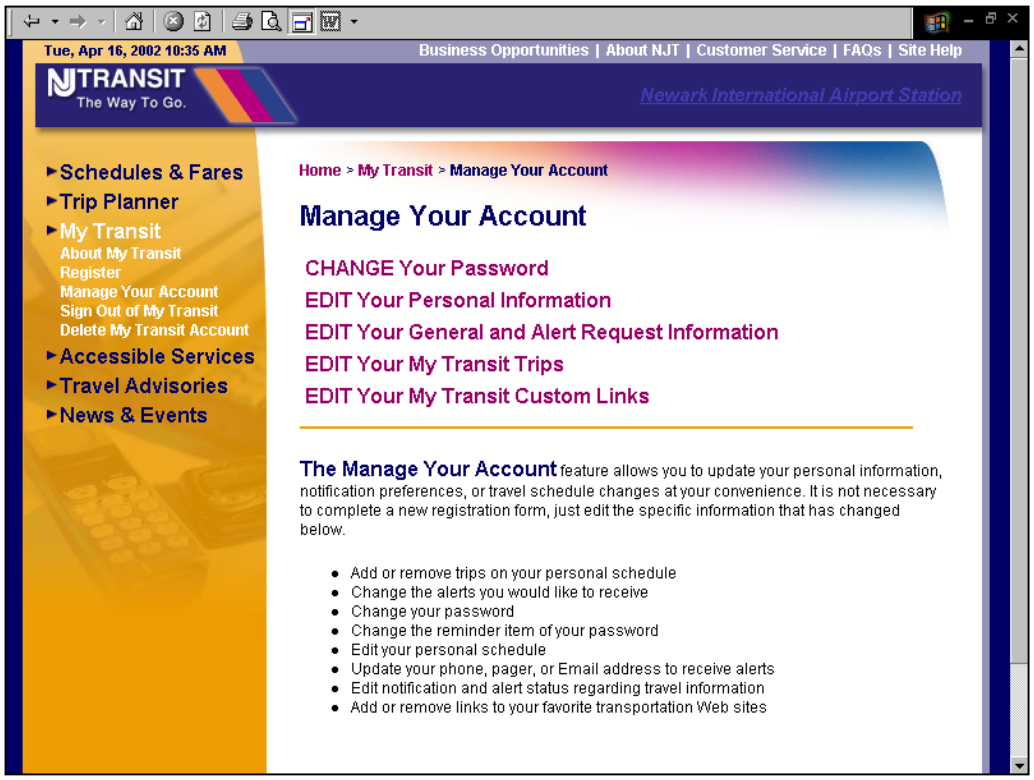
(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

promotions, etc.) However, as of the time of the interview, many of these were not yet available; the full set of features was scheduled for implementation during the spring of 2002. Nonetheless, NJT had people sign up for these features because the agency expected them to be implemented in the near term.

Figure 6.26 displays the Account management page for *My Transit*, which allows customers to configure their own account. An example of this is provided in Figure 6.27, which shows how a user would begin to add a new trip to his/her personal schedule. First, the My Transit customer enters in his/her desired day of travel, mode of preference, and route/line desired. Once these parameters have been entered, the screen shown in Figure 6.28 asks for more specific information, such as origin and destination stop/station and time of travel. Finally, using the screen shown in Figure 6.29, the customer selects the exact trip desired and adds it to his/her personalized Web page, as shown in Figure 6.30.

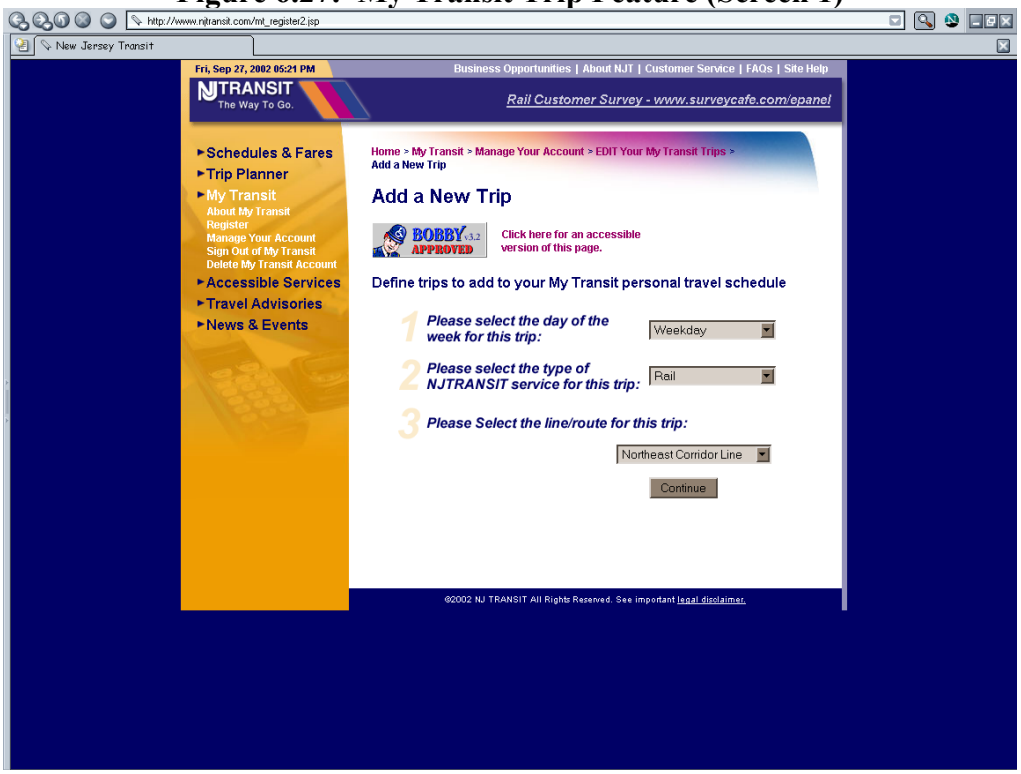
In a highly unusual feature, the *My Transit* page can also be linked to the Web sites of other transportation service providers, as shown in Figure 6.31. NJT recognizes that their customers may be riding other services, and wanted to make the search for transportation information as seamless as possible. Additionally, NJT has integrated other agencies' schedules into their trip planner, including PATH, SEPTA, and Amtrak. NJT staff are in constant contact with the planning departments of these operators in order to ensure that they remain abreast of schedule changes.

Figure 6.26: NJT's *My Transit* Account Management Page



(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

Figure 6.27: My Transit Trip Feature (Screen 1)

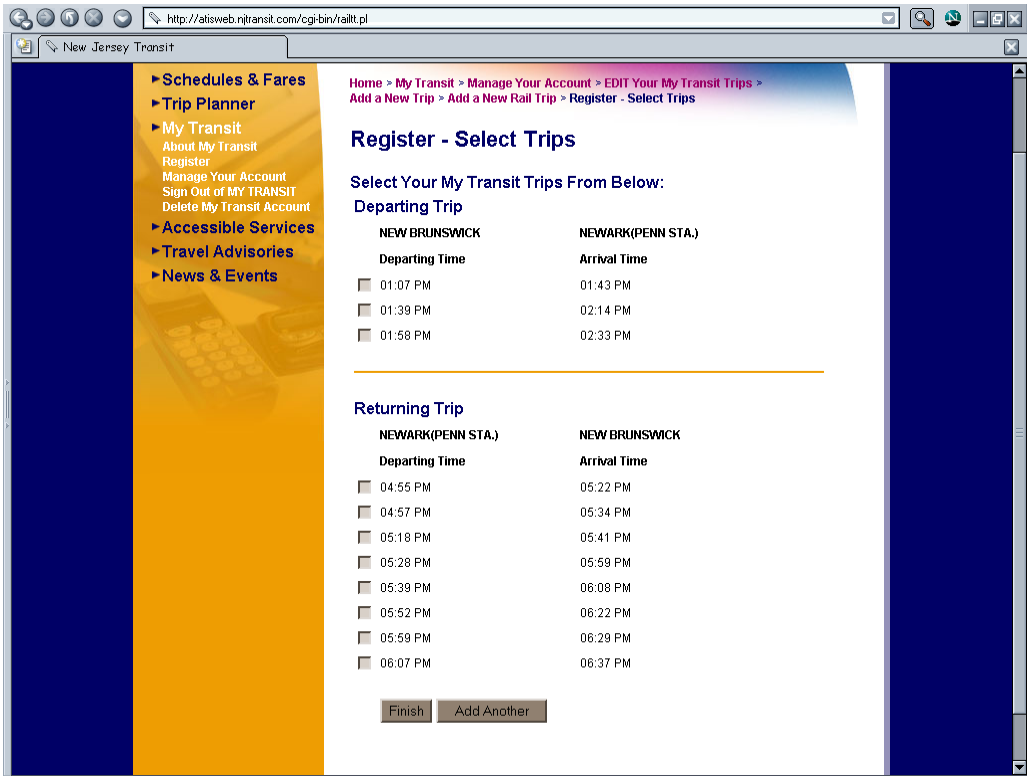


(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

Figure 6.28: My Transit Trip Feature (Screen 2)

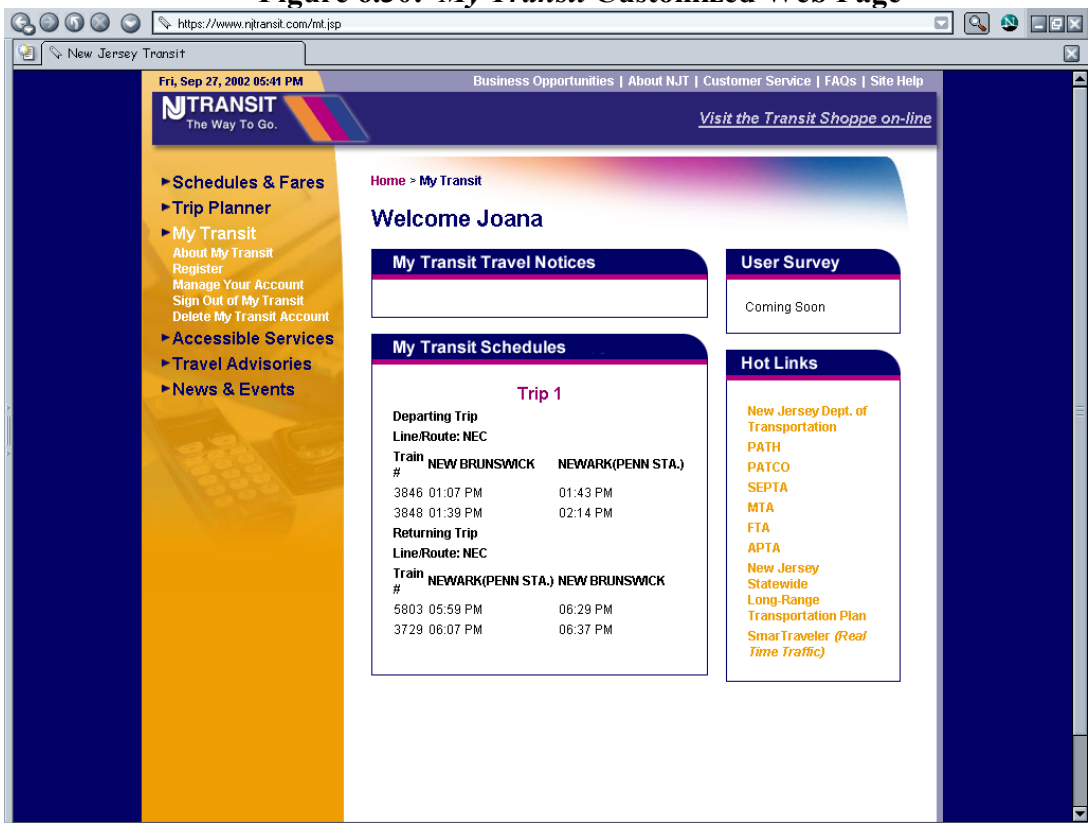
(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

Figure 6.29: My Transit Trip Feature (Screen 3)



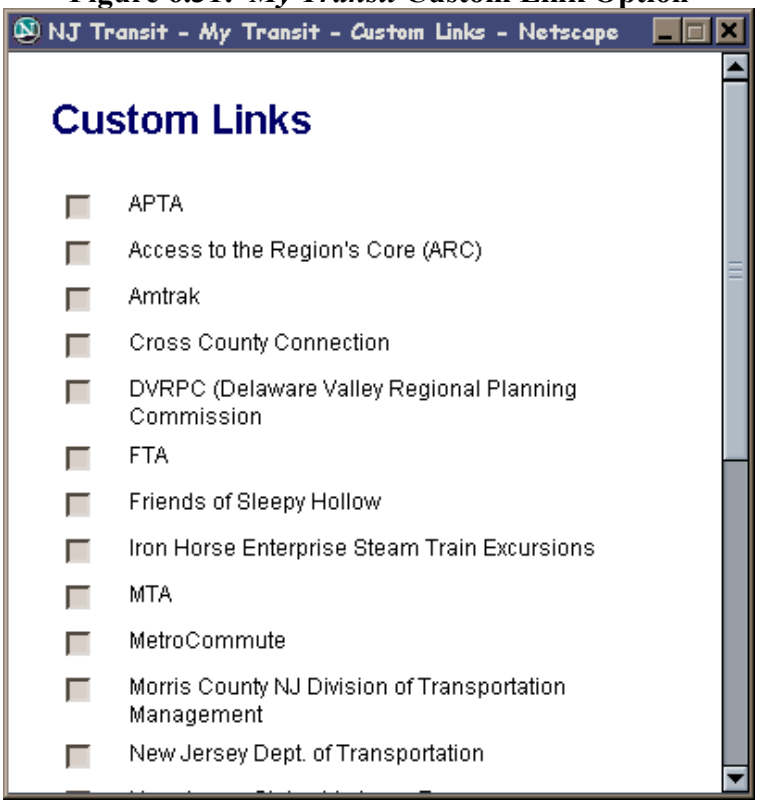
(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

Figure 6.30: *My Transit* Customized Web Page



(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

Figure 6.31: *My Transit* Custom Link Option



(Note: This figure is not hyperlinked.)

6.7.2 Project Objectives

When asked how to define Customer Relationship Management, the NJT representative responded that it is "doing things for the customer, based on customer feedback". The agency expects that their Web site will continue to evolve in this way, as long as what customers ask for is not cost-prohibitive. The agency is committed to making their site more customer-focused and providing customers with better information.

While both the itinerary planner and the *My Transit* service are linked to the agency's ATIS, the way the information is presented and the interface are different since the tools are targeted to different user groups. Whereas the trip planner is meant more for newer riders and tourists, the *My Transit* feature is geared towards regular riders. The agency would expect, for example, that someone might first plan a trip on the trip planner and then sign up for My Transit to get more detailed up-to-date information on their routes.

6.7.3 Implementation Issues

Design of the System

NJT hired the Princeton Internet Group to design the *Web* features, giving them "the agency's vision and desire to redirect its services towards being more personalized to address the needs of its customers and to promote NJT as a more 'personal' transit system as compared to the traditional mindset of "mass" transit." In the words of the consultant, they provided application development in "e-commerce purchase transactions, content management systems, interactive itinerary planning and schedules, a wireless travelers advisory notification feature and a personalized traveler information center known as *My Transit*."

Market Research for Site Design

When NJT decided to upgrade their Web site, they talked with their customer service agents to see what customers called and asked for the most. They also looked at a number of other sites, including other transit agencies (WMATA, Minneapolis, San Francisco, VRE) and private sites (airlines, MSNBC). However, they saw bits and pieces (styles, looks, functionality) that they liked from different sites – no one site stood out to them on the whole as exactly what they wanted. The agency also performed a Discovery Report, in which they met with representatives from individual departments at the agency to see what those departments wanted out of the site. The marketing department then spoke with their existing vendor, Mantech, to see what it would take to put the trip planner on the Internet. The agency did not do much formal market research in designing the site, except for bringing in some customers early on in the process to give them some initial feedback.

Keeping the System Up-to-Date

NJT outsources their data management to Mantech, a strategy which they claim is relatively cost-effective. When changes are made to a schedule, they are sent to Mantech, which in turn makes changes to the database. At one point, the vendor attempted to receive schedule changes electronically to make the process more automated, but there are so few schedule changes that they found it easier to just make them by hand.

The Content Management System

NJT has developed a Content Management System (CMS), which allows people from various parts of the organization to change content on the Web site and/or send out e-mails. Only employees who have browser and security clearance have access to CMS. By allowing people in different departments to have access to the system, information can be disseminated to the customer in a more timely manner. In addition, CMS gives different parts of the agency responsibility for maintaining the information.

Quality Control

Staff at the transit information center test the data, particularly when changes are made. In addition, the original system design required Mantech to include a snapshot capability for the transit information center agents. This snapshot capability allows the agents to takes a snapshot of the screen when something does not look correct. The software will then send a 1-2 line message with the picture to Mantech so they can determine what the problem is.

6.7.4 Outcomes/Benefits

Usage Patterns

NJT currently has about 10,000 people enrolled in *My Transit* – all of these are also enrolled for e-mail notifications.

Impact on Call Centers

The customer service department had initially hoped that they would reduce the number of telephone inquiries with their new Web-based features. What they have done is reduced the number of busy signals and reduced their lost call rate (down from an average of 7 – 12% to 2% or less). Therefore,, they have not necessarily reduced call volumes, but rather have allowed more people to have access to their phone representatives. They have also found that the nature of calls and the call duration has increased because now they are not getting as many of the quick "What's doing on with my train?" calls, but rather the more complicated calls. In addition, their callers tend to be people who are not as knowledgeable about transit and/or about computers.

The ATIS (which is used by the transit information center operators) also now has access to the Web site so that customer information specialists can see travel alerts and thus provide better information to customers. In addition, if people call in with questions about the Web site, agents can go in and look at the site with them to better answer their questions.

Use of Information Collected from Customers

NJT has not yet utilized data collected via the *My Transit* feature for service and other management planning, but they imagine they might eventually do some demographic analysis with this information. They believe it is possible that they could use this information for service planning in some way. They do have a strict confidentiality policy about not sharing this information with third parties. In fact, they had some companies approach them initially offering to help with the *My Transit* portion of the Web site, but they turned down these offers because the companies wanted ownership of the information gathered.

Additionally, the agency has the capability of undertaking customer surveys via their Web site, but have not done used this tool. They try to be very careful about not sending out anything that *My Transit* customers did not specifically ask for, so as to be as non-intrusive as possible.

6.7.5 Planned Improvements

NJT recently installed a block/GPS vehicle location system for their trains, and it is possible that this could feed the customer information systems. In fact, the vehicle location system was designed with the interfaces to feed into several of their customer information systems. Their train control system is T-Mac, and the real-time information will most definitely feed this system. It will also feed their PENTA system, which converts text messages into voice announcements.

The agency is planning to add monthly pass purchase capability to their Web site. They envision that in order for a person to purchase fare media on-line, they will first have to register for *My Transit*. They will likely be permitting purchase by credit card only, and this information will be collected into the same database as the *My Transit* information. They also think it might be of interest to send people e-mail reminders about pass purchase every month.

Additionally, customers have asked for downloadable schedules for Personal Digital Assistants (PDAs), and the agency is planning to implement this feature in the near future.

6.8 Utah Transit Authority

The Utah Transit Authority (UTA) is included in the study because of its highly innovative program to personalize information to its customers, based on their individual needs. UTA's Web site includes an innovative feature called *UTA My Way*, which allows customers to personalize the page based on their specified preferences. The page includes a section that provides information about the status of transit routes selected by the customer. Additionally, *UTA My Way* customers can enroll in the e-mail notification system, which will send them updates regarding service disruptions for user-specified routes. While the agency does not send out "real-time" information *per se,* its notification programs are based on the tracking and monitoring of system conditions.

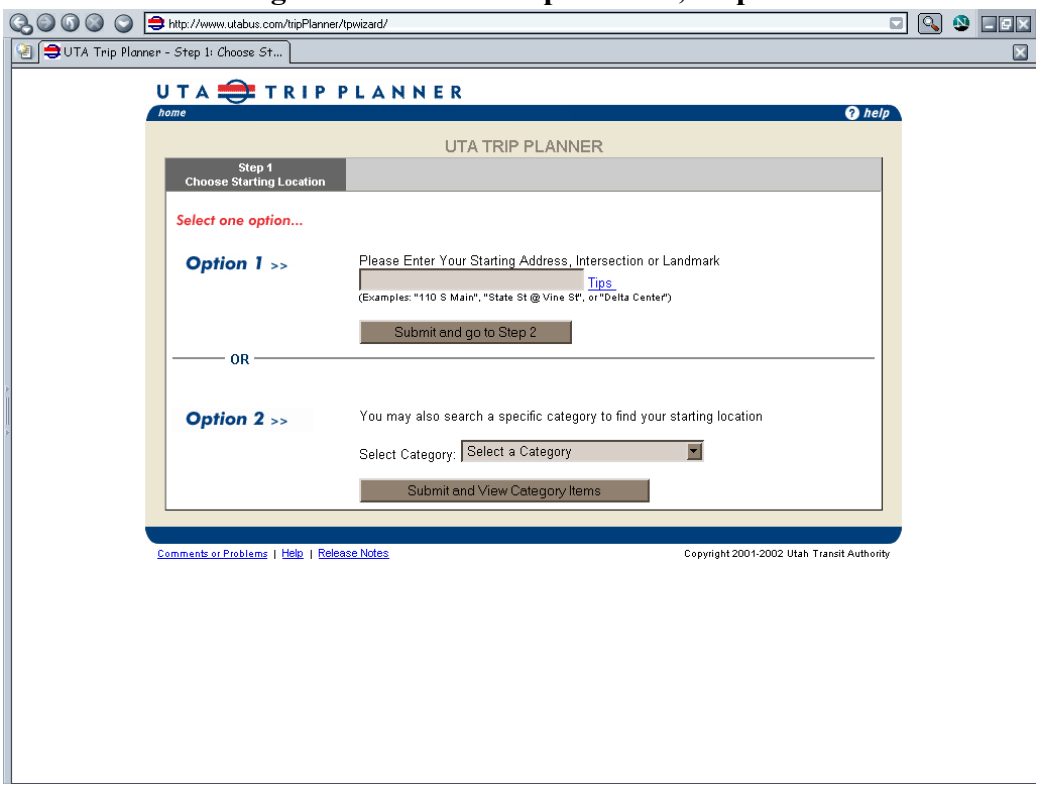
In addition, UTA's Web site includes an automated itinerary trip planner. The trip *UTA My Way* feature was added in 2000, while the trip planner was implemented in 2002. Before this time, UTA did have an e-mail notification program, but it did not allow the customer to receive notifications about specific routes (i.e. only general, system-wide notifications were available), and thus was not as personalized as the system is today.

6.8.1 System Design and Functionality

Trip Planner

The UTA Trip Planner has a user-friendly customer interface, which allows the customer to enter information in three steps (similar to WMATA's trip planner, seen in the previous section). In the first step, the customer enters in the desired origin location. As shown in Figure 6.32, origins can be defined in terms of a) addresses, b) intersections, c)

Figure 6.32: UTA Trip Planner, Step 1

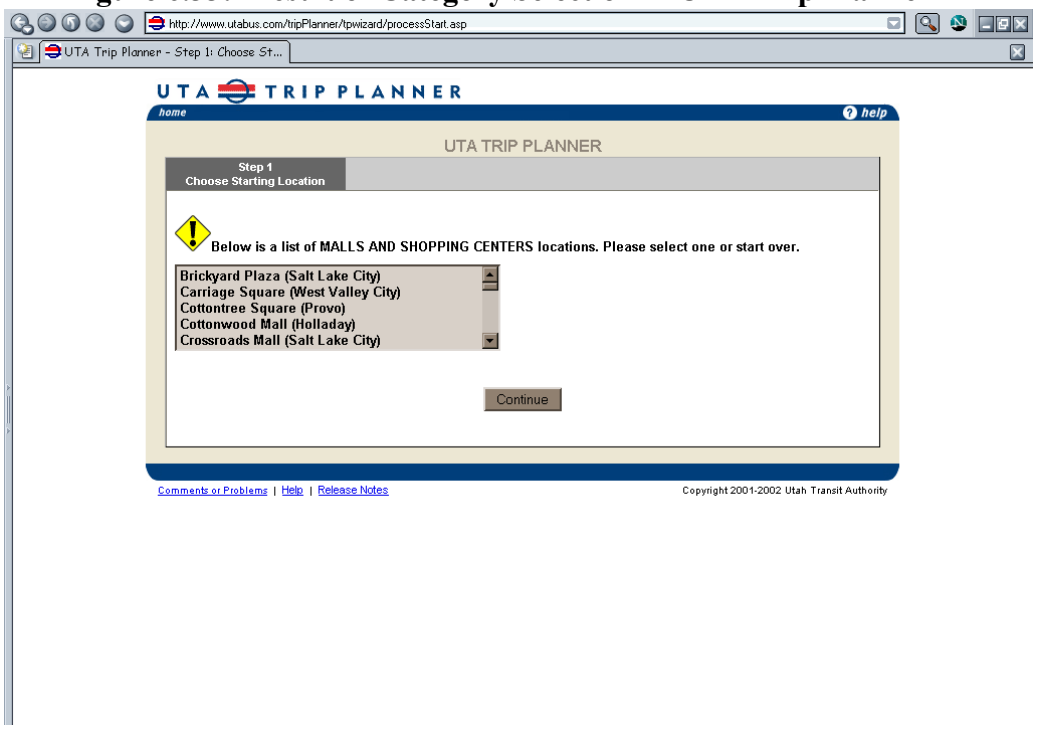


landmarks, and d) categories of places. If the customer chooses to search by place category, a screen such as that shown in Figure 6.33 appears, allowing him/her to select a specific location. In this case, the category selected is "Malls and Shopping Centers", and a number of different options are provided.

In the second step, the customer enters the desired destination in a similar manner to that available for origin entry. As shown in Figure 6.34, once a customer has used the system for the first time, locations are stored for future reference. Thus, since "Brickyard Plaza" was selected as the origin in Step 1, the shopping center is now available in the user's address history. Step 3 of the trip planner asks the customer to enter the desired time and date of travel, as displayed in Figure 6.35. The customer can choose to produce itineraries either by departure or arrival time. The date is either entered by use of a calendar for quick entry, or by selecting from a scroll-down menu of dates in the near future.

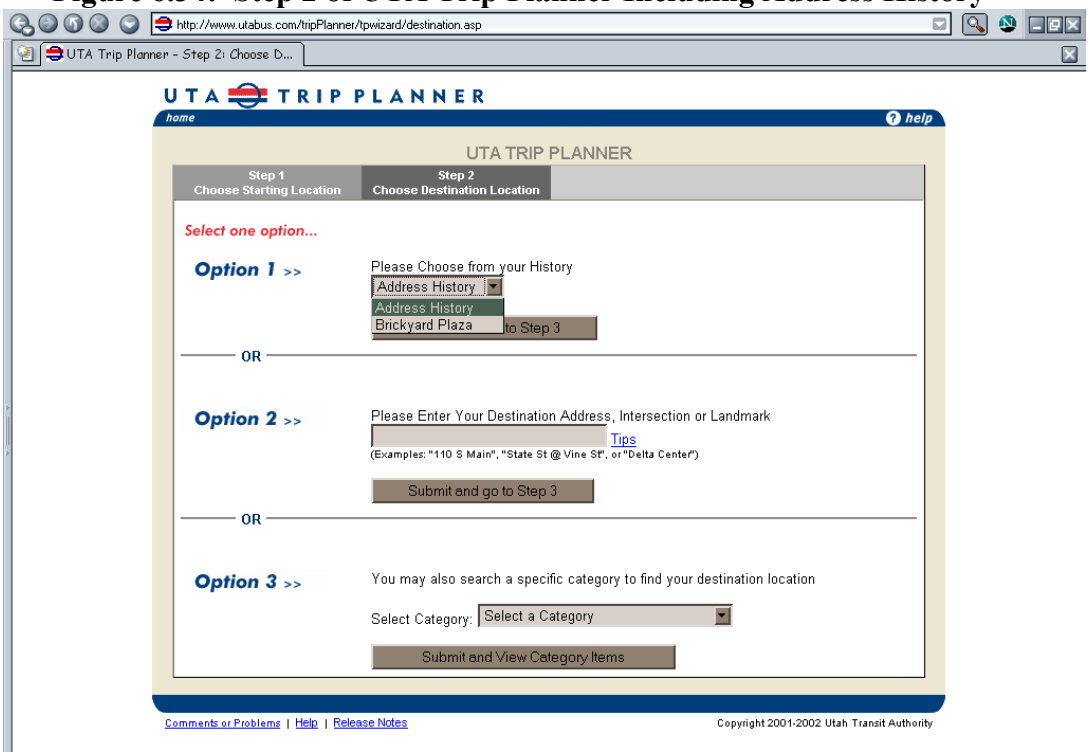
Figure 6.36 shows the output produced by UTA's trip planner. Multiple itineraries are provided, allowing the customer to select the one he/she likes best. Each itinerary includes the total fare, total number of transfers, total travel time, and approximate walking distance. Additionally, links to relevant transit schedules are included. An interesting feature of UTA's trip planner (and one that was not seen on any other trip planner) is the e-mail feature shown in Figure 6.37. With this feature, the user can e-mail the selected itinerary to a friend. This feature is becoming popular on many commercial Web sites.

Figure 6.33: Result of Category Selection in UTA Trip Planner



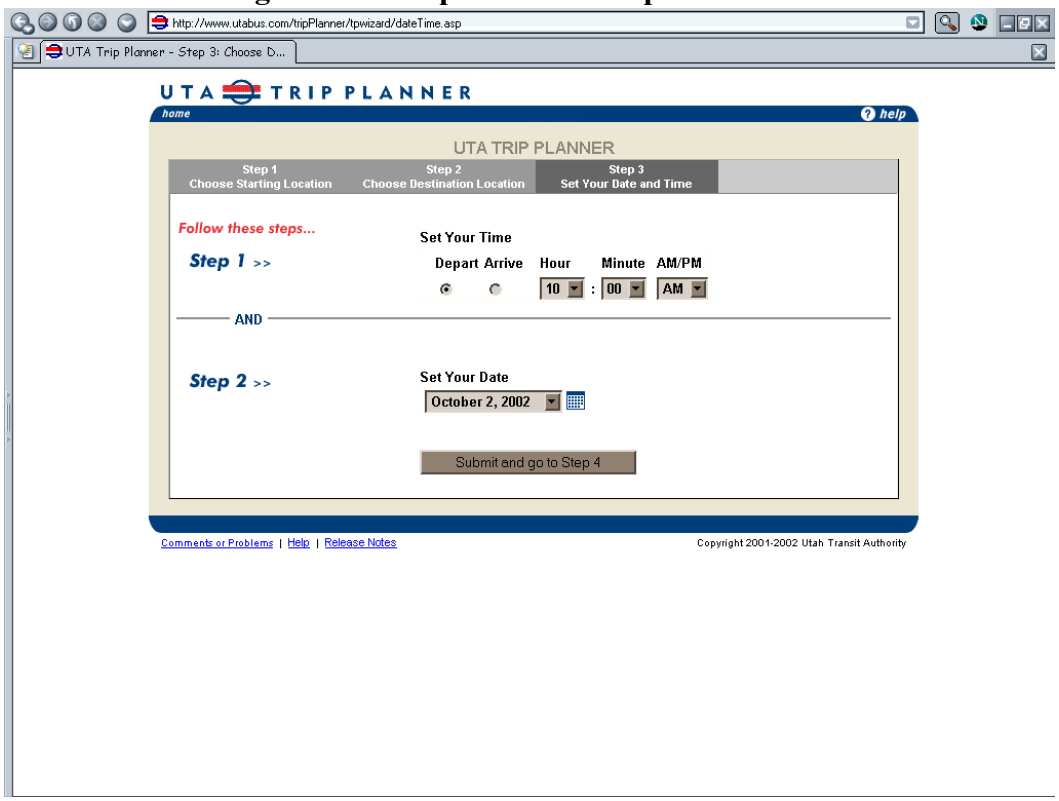
(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

Figure 6.34: Step 2 of UTA Trip Planner Including Address History



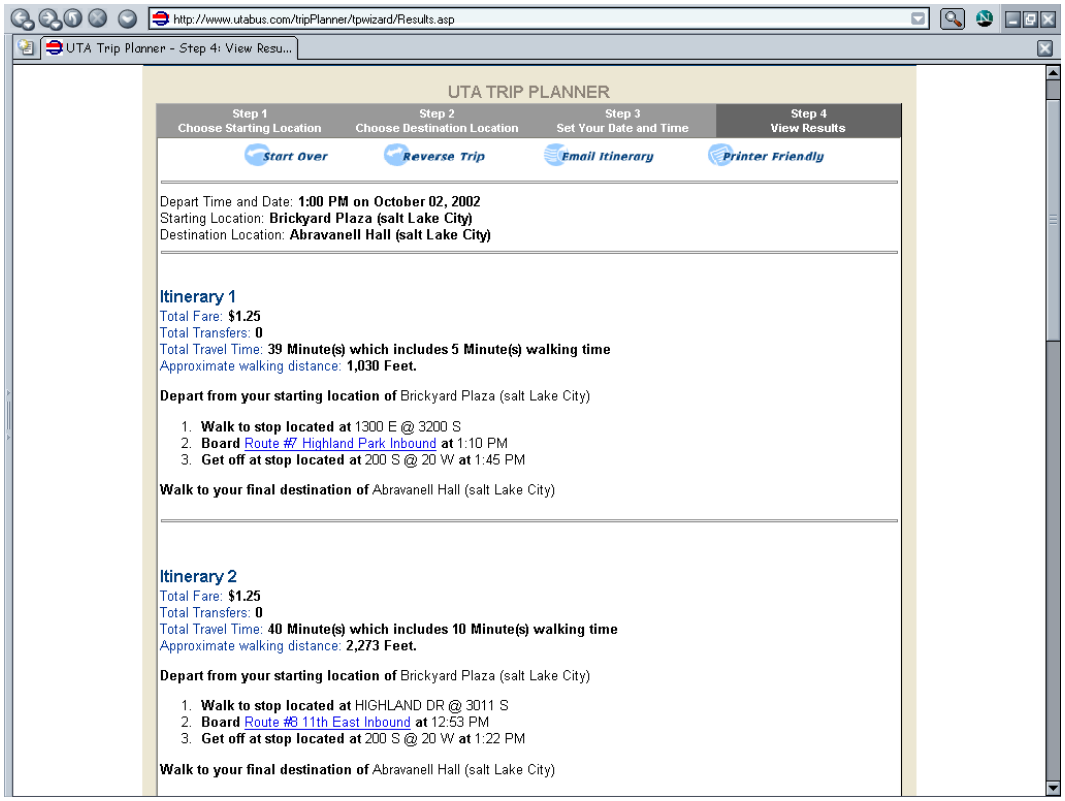
(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

Figure 6.35 Step 3 of UTA Trip Planner



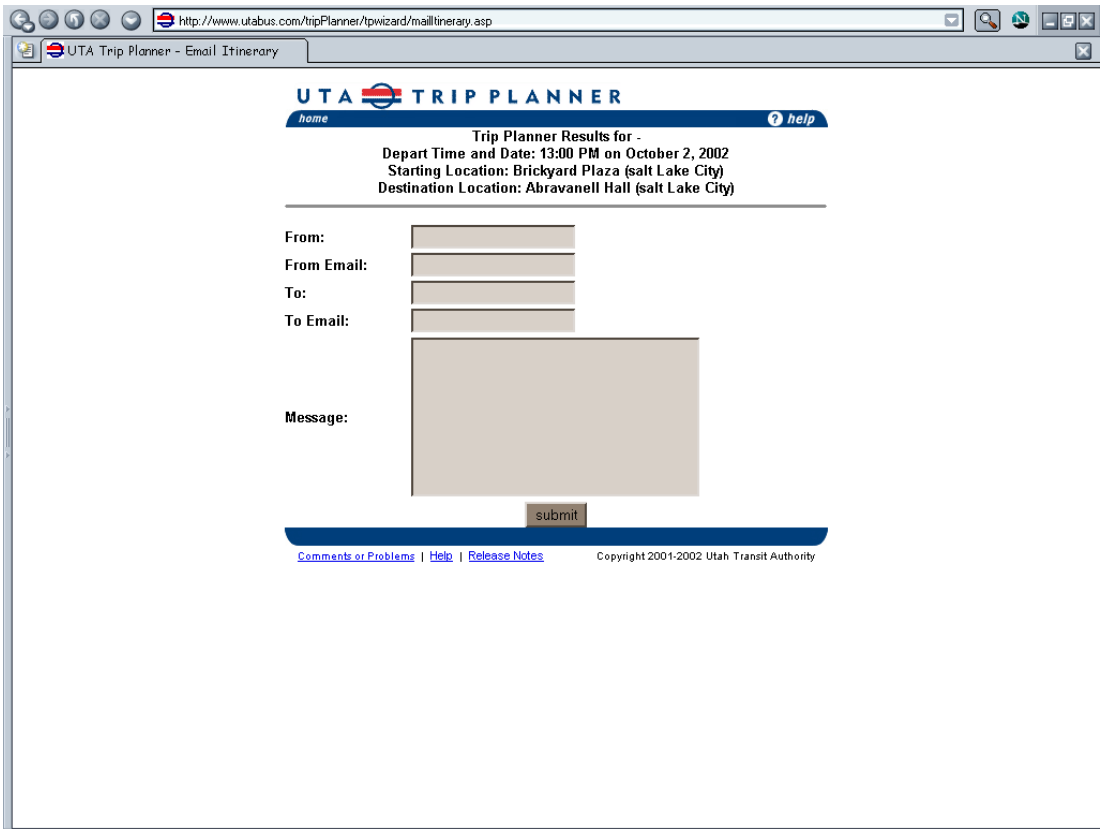
(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

Figure 6.36 Itineraries Produced Using UTA Trip Planner



(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

Figure 6.37 Trip Planner E-Mail Feature



(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

For example, sites for newspapers (such as the New York Times) allow the reader to forward articles to friends by entering their e-mail addresses into a form much like the one shown in the figure. UTA's trip planner illustrates an interesting use of the concept in a transit context.

UTA My Way

UTA has taken the transference of private sector concepts yet a step further with its implementation of *UTA My Way*. This feature allows users to customize the UTA Web page to their preferences, by enrolling with a username and password, as shown in Figure 6.38. The customer then logs in every time he/she enters the Web site, using the form shown in Figure 6.39. The personalized *UTA My Way* Web page is shown in Figures 6.40 and 6.41, and Figure 6.42 displays the screen used to customize the page. Through *UTA My Way*, customers can also receive e-mail notifications about the routes they have specified.

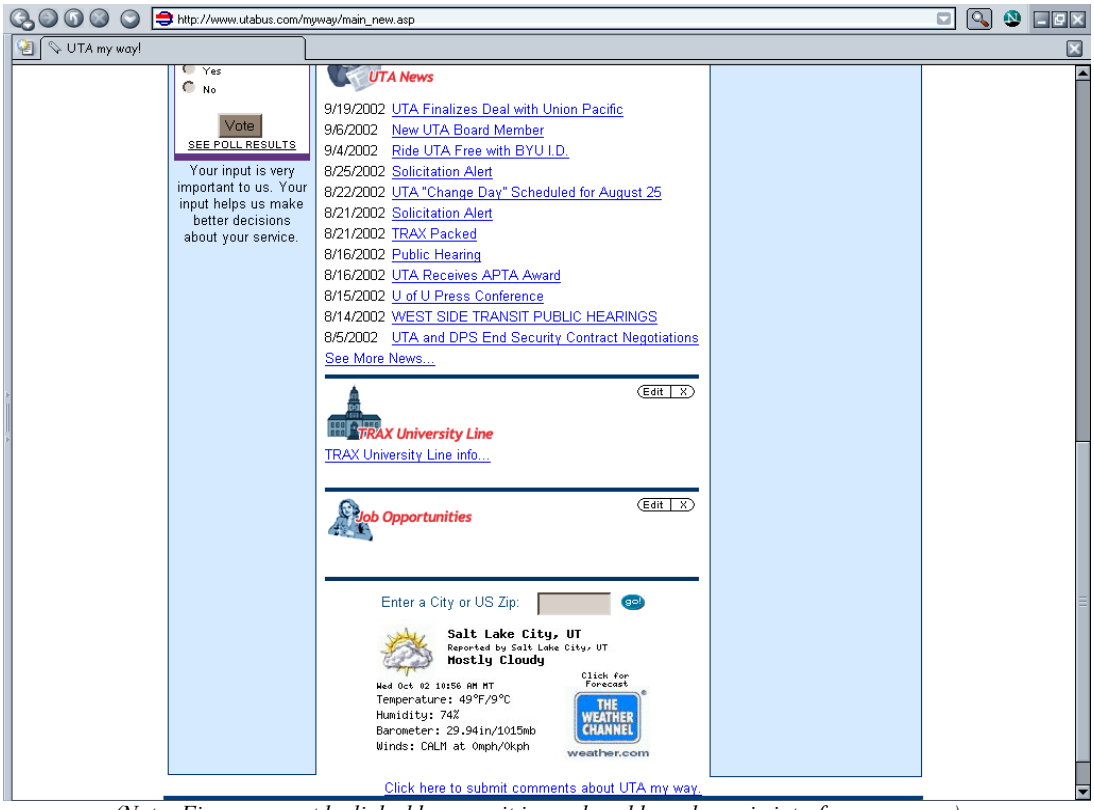
Figure 6.38: *UTA My Way* Registration Page

Figure 6.39: *UTA My Way* Logon Page

Figure 6.40: *UTA My Way*, Part 1

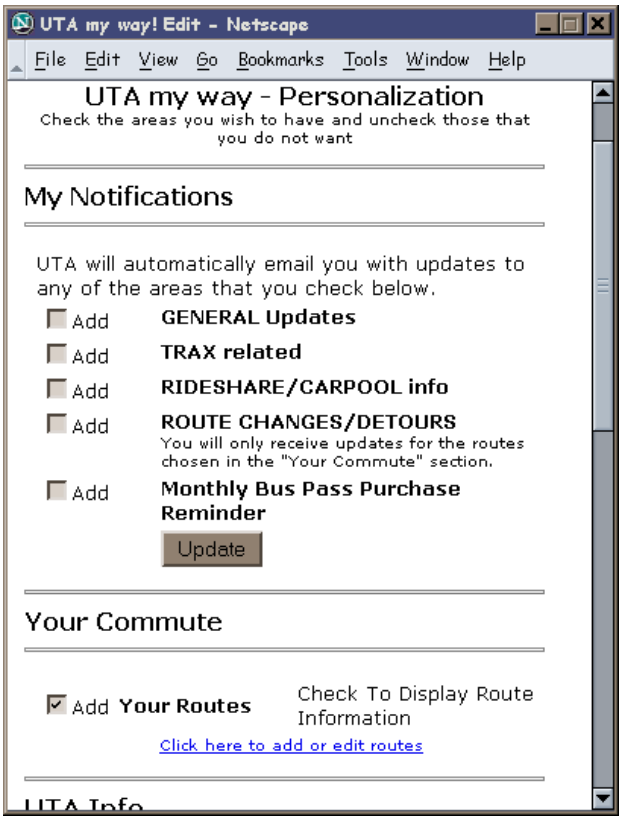
(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

Figure 6.41: *UTA My Way*, Part 2



(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

Figure 6.42: *UTA My Way* Personalization Screen



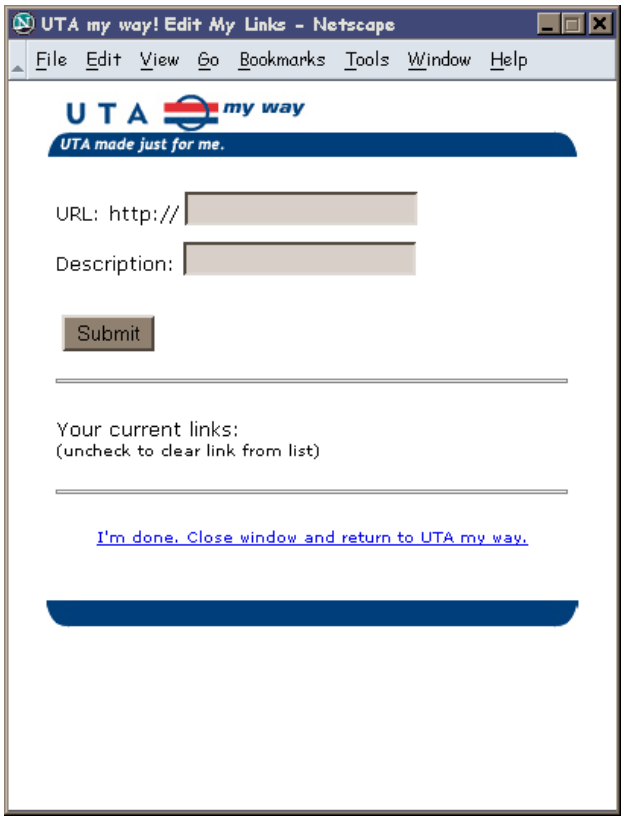
(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

Each customer's *UTA My Way* personalized page consists of the following:

- A "Bulletin" area for information about user-specified routes;
- Links to schedules and maps for user-specified routes;
- The ability to order passes on-line;
- A link to the trip planner;
- Sections for UTA news, TRAX information, and job opportunities;
- A link to the Weather Channel's site, allowing the customer to retrieve their local weather report; and
- A link that can be used to submit comments about *UTA My Way*.

UTA My Way also includes a couple of other interesting features. The first is a feature that allows the customer to add personalized links to the *UTA My Way* page, as shown in Figure 6.43. Thus, *UTA My Way* users can essentially use the page as their Web portal. The second interesting feature is the use of on-line surveys for *UTA My Way* users. The tool is often used as a means of collecting information from frequent riders, as well as for testing new concepts. For example, UTA's trip planner was initially provided only to *UTA My Way* users, who helped tremendously in testing the Beta version of the software. In fact, UTA even brought some of their *UTA My Way* customers into the agency offices so that staff could observe them using the trip planner, and use this information to make usability changes to the feature. The trip planner ultimately was made available on the

Figure 6.43: *UTA My Way* Link Editor



(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

general UTA Web site during the week of February 2, 2002 (just before the Olympics began).

UTA *My Way* customers also get first access to all promotions. For example, in 2001 UTA completed a free ride campaign, and the catalyst for this promotion was *UTA My Way* customers. The idea was to increase new ridership by encouraging existing riders to recommend UTA to a friend – if friends called in they were issued a pass for five free rides. As part of the promotion, UTA sent new customers schedules for routes within ½ mile of their home, along with their free ride pass. *UTA My Way* customers were told about the promotion a week before it went on the general site. Friends could either register for the free rides on the Web site or by calling in. In the end, 55% of participants used the Web site and approximately 40,000 households participated in the promotion.

UTA On the Go

UTA *On the Go* is a service that allows customers to synchronize between their personal digital assistants (PDAs) and their desktops to download schedule information. Customers can download schedules to any handheld device. Ideally, UTA would like to have a push-pull system, in which the agency would have account information for an individual, allowing them to send information to the handheld device (the "push" aspect). In addition, the customer would be able to "pull" data directly from UTA's Web site. However, currently the system offers only "pull" capability. *UTA My Way* allows customers to define their own personal schedules, as shown in Figure 6.44. For each route selected, the customer can choose specific stops, which will then be placed into

Figure 6.44 Personalized Schedule from UTA My Way (part 1)

http://www.utabus.com/schedules/viewSchedule.aspx?abbreviation=3&dir=0&service=4&signup=33

Route 3, 3RD AVENUE

Weekday OUTBOUND

Detour Information

Show all checked stops FROM: 4:00 AM TO: 3:00 AM

400 SOUTH & 65 W	055 SOUTH & STATE STREET	SOUTH TEMPLE & E ST.	3RD AVENUE & VIRGINIA ST	100 SOUTH & NORTH CAMPUS DR	UNIVERSITY HOSPITAL	UNIVERSITY BUSINESS BLDG	STADIUM TRAX STATION	VETERANS HOSPITAL
05:30 AM	05:36 AM	05:40 AM	05:46 AM	05:50 AM	05:54 AM	06:00 AM	06:03 AM	06:13 AM
06:00 AM	06:06 AM	06:10 AM	06:16 AM	06:20 AM	06:24 AM	06:30 AM	06:33 AM	06:43 AM
06:30 AM	06:36 AM	06:40 AM	06:46 AM	06:50 AM	06:54 AM	07:00 AM	07:03 AM	07:13 AM
07:00 AM	07:06 AM	07:10 AM	07:16 AM	07:20 AM	07:24 AM	07:30 AM	07:33 AM	07:43 AM
07:30 AM	07:36 AM	07:40 AM	07:46 AM	07:50 AM	07:54 AM	08:00 AM	08:03 AM	08:13 AM
08:00 AM	08:06 AM	08:10 AM	08:16 AM	08:20 AM	08:24 AM	08:30 AM	08:33 AM	08:43 AM
08:30 AM	08:36 AM	08:40 AM	08:46 AM	08:50 AM	08:54 AM	09:00 AM	09:03 AM	09:13 AM
09:00 AM	09:06 AM	09:10 AM	09:16 AM	09:20 AM	09:24 AM	09:30 AM	09:33 AM	09:43 AM
09:30 AM	09:36 AM	09:40 AM	09:46 AM	09:50 AM	09:54 AM	10:00 AM	10:03 AM	10:13 AM
10:00 AM	10:06 AM	10:10 AM	10:16 AM	10:20 AM	10:24 AM	10:30 AM	10:33 AM	10:43 AM
10:30 AM	10:36 AM	10:40 AM	10:46 AM	10:50 AM	10:54 AM	11:00 AM	11:03 AM	11:13 AM
11:00 AM	11:06 AM	11:10 AM	11:16 AM	11:20 AM	11:24 AM	11:30 AM	11:33 AM	11:43 AM
11:30 AM	11:36 AM	11:40 AM	11:46 AM	11:50 AM	11:54 AM	12:00 PM	12:03 PM	12:13 PM
12:00 PM	12:06 PM	12:10 PM	12:16 PM	12:20 PM	12:24 PM	12:30 PM	12:33 PM	12:43 PM
12:30 PM	12:36 PM	12:40 PM	12:46 PM	12:50 PM	12:54 PM	01:00 PM	01:03 PM	01:13 PM
01:00 PM	01:06 PM	01:10 PM	01:16 PM	01:20 PM	01:24 PM	01:30 PM	01:33 PM	01:43 PM
01:30 PM	01:36 PM	01:40 PM	01:46 PM	01:50 PM	01:54 PM	02:00 PM	02:03 PM	02:13 PM
02:00 PM	02:06 PM	02:10 PM	02:16 PM	02:20 PM	02:24 PM	02:30 PM	02:33 PM	02:43 PM
02:30 PM	02:36 PM	02:40 PM	02:46 PM	02:50 PM	02:54 PM	03:00 PM	03:03 PM	03:13 PM
03:00 PM	03:06 PM	03:10 PM	03:16 PM	03:20 PM	03:24 PM	03:30 PM	03:33 PM	03:43 PM
03:30 PM	03:36 PM	03:40 PM	03:46 PM	03:50 PM	03:54 PM	04:00 PM	04:03 PM	04:13 PM
04:00 PM	04:06 PM	04:10 PM	04:16 PM	04:20 PM	04:24 PM	04:30 PM	04:33 PM	04:43 PM
04:30 PM	04:36 PM	04:40 PM	04:46 PM	04:50 PM	04:54 PM	05:00 PM	05:03 PM	05:13 PM
05:00 PM	05:06 PM	05:10 PM	05:16 PM	05:20 PM	05:24 PM	05:30 PM	05:33 PM	05:43 PM
05:30 PM	05:36 PM	05:40 PM	05:46 PM	05:50 PM	05:54 PM	06:00 PM	06:03 PM	06:13 PM

(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

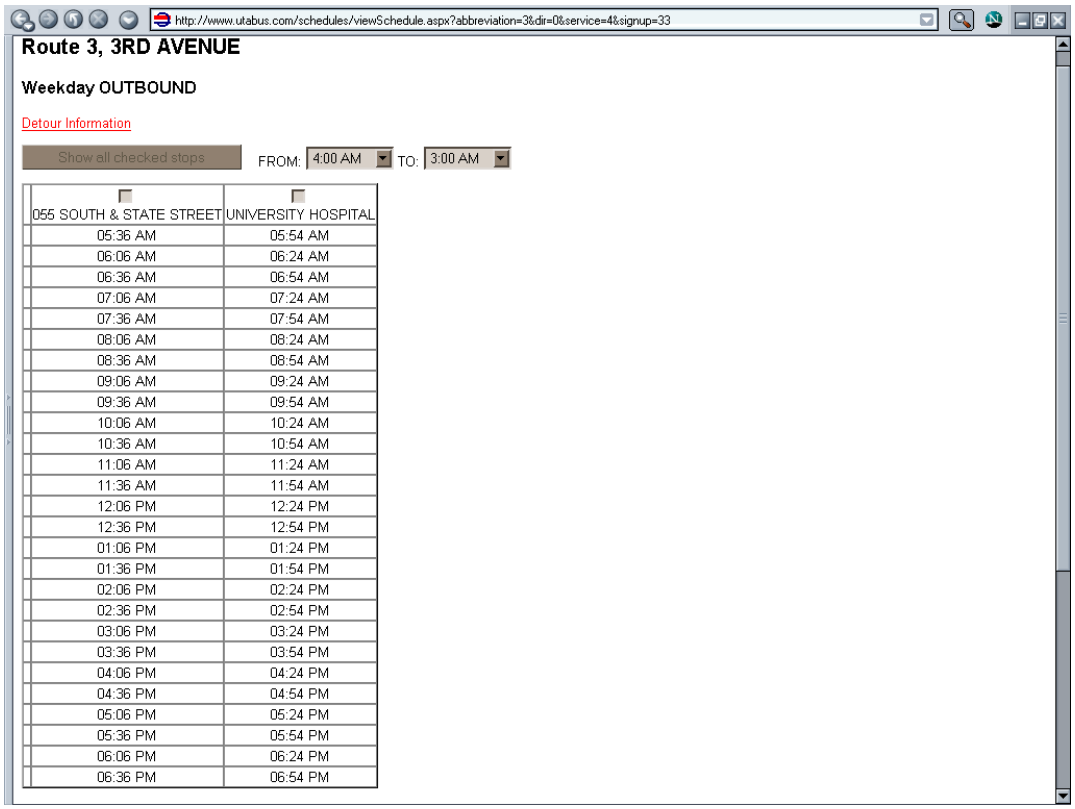
their personalized schedule, as illustrated in Figure 6.45. *UTA On the Go* can then be used to download these personalized schedules to a PDA. Currently, UTA is working towards developing a "push-pull" system.

UTA is currently using a vendor, AvantGo, to help them in providing the UTA *On the Go* service. The agency chose to use the vendor because they did not want to deal with the technical challenge of making the tool work for different operating systems and different devices - AvantGo dealt with these issues. *On the Go* was added in June 2000. Presently, UTA is not tracking usage (they are not paying AvantGo Go to do this), but the agency thinks many people have signed up for the service.

Nature of Major Use / Customer Needs

UTA My Way and *UTA On the Go* are clearly geared more towards regular customers, while the trip planner serves both regular and infrequent riders. As mentioned previously, the trip planner was originally offered only on UTA My Way. However, the agency has found that requiring people to register on the site discouraged them from using services such as the trip planner. Thus, they ultimately decided to include the trip planner on the general Web site in order to increase accessibility of the system for non-transit riders. When the tool was included on the general site, usage of the trip planner jumped by 1,000 hits in the first week. As of August 2002, the trip planner was being used to plan 1,000 trips per day.

Figure 6.45 Personalized Schedule from UTA My Way (part 2)



055 SOUTH & STATE STREET	UNIVERSITY HOSPITAL
05:36 AM	05:54 AM
06:06 AM	06:24 AM
06:36 AM	06:54 AM
07:06 AM	07:24 AM
07:36 AM	07:54 AM
08:06 AM	08:24 AM
08:36 AM	08:54 AM
09:06 AM	09:24 AM
09:36 AM	09:54 AM
10:06 AM	10:24 AM
10:36 AM	10:54 AM
11:06 AM	11:24 AM
11:36 AM	11:54 AM
12:06 PM	12:24 PM
12:36 PM	12:54 PM
01:06 PM	01:24 PM
01:36 PM	01:54 PM
02:06 PM	02:24 PM
02:36 PM	02:54 PM
03:06 PM	03:24 PM
03:36 PM	03:54 PM
04:06 PM	04:24 PM
04:36 PM	04:54 PM
05:06 PM	05:24 PM
05:36 PM	05:54 PM
06:06 PM	06:24 PM
06:36 PM	06:54 PM

(Note: Figure cannot be linked because it is produced by a dynamic interface program.)

6.8.2 Project Objectives

The telephone interview indicated that UTA's primary goal in implementing the advanced features on its Web site was to reposition itself in the community and to be actively involved in making a better environment for the community. The Web-based customer information allows the agency to develop a good relationship with their customers. Their charter has been to make public transportation more convenient and to have a friendly interface so that people are not afraid to ride transit.

6.8.3 Implementation Issues

Design of the System

Prior to developing the Web-based trip planner, UTA's customer service agents were already using Trapeze's trip planning system. UTA hired Trapeze to build the queries of schedule data for formulating the itineraries on the Web. They then used a Web development and communications company called Digital Options to design the Web interface. The agency had already been using this company for Web-related work for about five years, and thus already had an established relationship with the firm.

Costs

UTA's annual budget for the Web site is approximately $46,000 per year. The on-line trip planner cost about $40,000 to develop, since the basic software was already being used by the customer service agents. UTA paid Digital Options approximately $20,000 to develop UTA My Way; the tool was funded through grant money. Although much of

the system is automated (like the e-mails), many of the functions that are not automated are not updated as often as they should. However, since implementation of the Web-based features, the agency has hired one person to help with Web-related functions.

E-Commerce

Initially, fare media could only be purchased by people who were registered with *UTA My Way*. This restriction was in effect because the agency was concerned about the security aspects of e-commerce. By only allowing customers registered with UTA My Way to purchase passes on-line, the agency was assured that they had the customer's contact information in case there was a problem. However, concern has since decreased and the pass purchase option went live on the public site within 6 months. However, customers who do purchase passes through can receive e-mail reminders when it is time to purchase a pass. The e-mail includes a link to the e-commerce site.

6.8.4 Outcomes/Benefits

UTA believes that the trip planner is a visible project that will ultimately have quantifiable impacts, such as reducing the number of calls to the call center. However, they have not yet figured out what statistics they are going to use to quantify the positive impacts of their Web-based features. While they recognize the importance of tracking and showing the benefits, they also realize the difficulty of this task since much of the benefit is not quantifiable. Rather, the benefit is largely about customer perception and the agency being customer-focused.

Usage Patterns

As of August 2002, UTA had about 12,000 people registered for *UTA My Way*, which is a relatively small number compared to the number of people that use the Web site overall. In comparison, they normally have 65 – 75,000 user sessions per month on the general Web site (although at the time of the interview they were getting on the order of 145,000 per month on account of the Olympics. The e-mail features have not yet been marketed aggressively to riders. Of course, many of the UTA *My Way* customers receive information via e-mail, so there is a good chance that they rarely have to visit the Web site to get information. When they do access the site, UTA believes that this group probably makes fewer page views than the average customer does.

Impact on Call Centers

As with most other agencies, UTA has had difficulty quantifying the benefits of improving the Web-based customer information. In the past few years, they have been able to hold off on hiring two full-time telephone agents because of the increase in usage of their Web site (the agency has been able to correlate the increase in Internet usage with the decrease in calls). The decrease in calls to the call center has been an important impetus in getting funding for the Web page. During the first week that the trip planner was available on the general Web-site, the number of calls to the call center decreased by 1,000 per day.

In addition, the customer service agents are now using the Web-based trip planner, which they access via the Internet. The primary reason for this is consistency of information - if a person calls in to plan a trip, he/she will receive the same itinerary as if he/she had used the Web-based tool. For a while, UTA was considering changing this practice to allow

customer service agents access to the trip planner via their Intranet so that their tracking statistics are clearer. However, they resolved this issue by creating a re-direct page for customer service agents so that their usage could be tracked separately.

Use of Information Collected from Customers

Perhaps one of the most remarkable aspects of UTA's Web-based features is the way in which the agency is using the information collected via the Web page. The information that they gather about their regular customers via *UTA My Way* is used to learn more about their customer base and is provided to the service development department for service planning purposes. UTA believes that this information really opens up the dialogue between the marketing department and the service development department.

The marketing department believes that *UTA My Way* is extremely important in helping the agency make service changes. When the agency is considering a service change, it can send out targeted e-mails to customers who they know use that service (since customers specify which routes they use when they register on *UTA My Way*). They also ask *UTA My Way* customers and users of their rideshare site to participate in surveys (they use My Computer.com to perform these on-line surveys). The agency feels that this is a good approach because they know these people use the system, so their opinions are the ones that matter. They think it is better than having a random sample because they want to target current customers.

As stated previously, the service-planning department actually uses the data from *UTA My Way* to plan service. For example, since they know people's origins and destinations, as well as which routes they are riding, the department can see whether the routes are efficient and where they should make changes. They are also able to do cross-sectional studies and learn how people are using transfers so that they can develop services that are more efficient.

6.8.5 Planned Improvements

UTA managers have thought about adding real-time information, but have made a conscious decision not to. Because they have a GPS system, the bus drivers know when they are not on time and often try to make up time to get back on schedule. Therefore, there was a concern that if customers were provided with information telling them that the bus was 10 minutes late, for example, the bus might make up the time and then the person might miss their bus. This was a concern that was also mentioned in some of the other case studies.

However, UTA provides customers with as much incident information as possible, both through e-mail notifications and by posting information on the Web site. In fact, when there is a serious disruption the customer service department essentially takes over the first page of the Web site. Making this work takes a significant amount of coordination between the marketing department and the customer service department. To date, these departments have managed to communicate very well, possibly because they work under the same Director.

Improvements to the Trip Planner

UTA hopes to expand the UTA On the Go tool to allow customers to put itineraries from the trip planner onto a Palm Pilot or other handheld device. In regard to the trip planner,

UTA initially thought of having a more map-based approach to the tool, but found this to be an expensive option. They were going to add mapping capabilities in a MapQuest environment by contracting the mapping service out. The cost would have been $40,000 for start-up and then $60,000 for up to one million geocodes (additional geocodes would cost 40 cents each). However, since their customer service agents were using the Web-based system, they knew they would undoubtedly exceed the one million limit, making the option much too costly. However, developing a more map-based program is still a potential improvement to the trip planner in the future. They would also like to add walking directions to the itineraries.

Wireless Applications

As mentioned earlier, UTA would like to have UTA *On the GO!* be a push-pull system rather than just a pull system. In addition, they are working to provide information via Web-enabled (WAP) phones. Digital Options is currently working on a wireless application (which includes a specially-formatted Web page) that will allow customers to access the Web page from a phone or other wireless handheld device. These applications are being Beta tested by the *UTA My Way* users.

Overall Site Design

UTA is planning on doing on overall re-design of the site because they feel it is starting to get "jumpy" and needs to be more streamlined. Before making these changes, they plan on doing an extensive survey asking customers about the site design. The agency also hopes to increase marketing and promotion of their Web site in the future.

More CRM

UTA is planning to implement something similar to what Disney's Web site has for calls into customer service. The tool would integrate a customer's Web experience with calls into customer service by allowing the customer to push a button on the Web site that would either place a call directly into the call center or enter into a chat session. In this way, the customer service agent would have information about the person calling and could better understand the customer's profile.