Maintenance Update to the Transit Element of the Treasure Valley Regional ITS Architecture

Prepared for:

Community Planning Association of Southwest Idaho

And

VRT VALLEY REGIONAL TRANSIT

And

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A. Introduction

A.1 Background

Intelligent transportation systems (ITS) in the Treasure Valley have proven successful toward improved transportation management, better traveler information, and enhanced traffic safety and emergency response. While most deployments do not focus on transit operations, recent activity in this area is showing promise toward improvements here as well. In most cases, federal funding has provided critical assistance in deploying these advanced technologies. The federal funds have been provided through the Federal Highway Administration in the case of many traffic related technologies and through the Federal Transit Administration for public transportation initiatives. Both of these agencies have adopted the *ITS Architecture and Standards Final Rule* published January 8, 2001 requiring conformance to the National ITS Architecture.

Planning requirements of the final rule and National ITS Architecture dictate that a Regional ITS Architecture be developed and maintained to guide the deployments and ensure interoperability of systems. This is in an effort to maximize efficiency and cost-effectiveness of systems deployments amidst the rapidly advancing flurry of technology. Broadly stated the "baseline" requirements of a regional ITS architecture include:

1. *A description of the region*
2. *Identification of participating agencies and stakeholders*
3. *An operational concept that identifies the roles and responsibilities of participating agencies and stakeholders in the operation and implementation of the systems included in the regional ITS architecture*
4. *Any agreements (existing or new) required for operations, including at a minimum those affecting integration of ITS projects; interoperability of different ITS technologies, utilization of ITS-related standards, and the operation of the projects identified in the regional ITS architecture*
5. *System functional requirements*
6. *Interface requirements and information exchanges with planned and existing systems and subsystems (for example, subsystems and architecture flows as defined in the National ITS Architecture)*
7. *Identification of ITS standards supporting regional and national interoperability*
8. *The sequence of projects required for implementation of the regional ITS architecture.*

ITS deployments to date in the Treasure Valley have met these requirements even as the standards of the National ITS Architecture have evolved and in many cases anticipated steps in that evolution. The ITS Architecture and Standards Final Rule also states, *"The agencies and other stakeholders participating in the development of the regional ITS architecture shall develop and implement procedures and responsibilities for maintaining the regional ITS architecture, as needs evolve within the region."*

In September 1999, the original Treasure Valley ITS Plan was published through an effort led by Ada Planning Association (APA), which has since reorganized to include a greater geographic extent of the Treasure Valley and been renamed Community Planning Association of Southwest

Idaho (COMPASS). While the initial Treasure Valley plan predated the final rule, many of the requirements and essential groundwork were included, particularly the focus on the concept of systems interoperability. Subsequent growth in the Treasure Valley, ongoing ITS deployments and advancing technology generated a need for an ITS plan update that was completed in September 2006. This updated plan, titled Treasure Valley ITS Strategic Plan, was developed well after the final rule was established and provided all of the requisite components including the procedures and responsibilities for maintenance.

The maintenance procedures included in the approved 2006 plan update preliminarily identified COMPASS as the agency charged with leading the effort to maintain the Treasure Valley Regional ITS Architecture. As such, COMPASS, on behalf of VRT, initiated an ITS planning activity resulting in this update, which was conducted at a level closely aligned with the ITS architecture maintenance discussion in the 2006 plan update. Only a few of the required elements of the final rule have been modified as the remaining elements are still current.

Transit projects identified in the 2006 ITS plan update included an early project to conduct more thorough and detailed transit ITS planning. Subsequent transit projects identified in the plan were not particularly specific regarding the APTS technologies and left this determination up to the transit focused ITS planning. This document is intended to meet the ITS architecture maintenance commitment by addressing the immediate transit technology needs. The update is focused on transit activities and, in particular, those technologies being planned by Valley Regional Transit (VRT) and, to a lesser degree, Commuteride.

A.2 Goal, Purpose & Need

Advanced public transportation systems (APTS) deployments can help to improve operational efficiency, financial planning, management and customer service. In particular, customer service is a central focus for both VRT and Commuteride and the agency coordination fostered by this activity and future ongoing technology integration is a significant element in improving customer service. Because past transit technology deployments, while beneficial in their focused application, have not always been thoroughly considered from a more comprehensive systems integration and cost-effectiveness standpoint, VRT has identified the need for better APTS technology planning. The purpose of this APTS plan is to provide useable, comprehensive and functional documentation focused on a cost-effective integration approach that aligns with federal requirements surrounding the National ITS Architecture. Such documentation is intended to primarily provide utility toward decision making for VRT regarding future technology implementations.

A.3 Plan Update Overview

This document is intended to provide the basic discussion supporting transit related architecture changes constituting a maintenance-level revision to the Treasure Valley Regional ITS Architecture. Only a few of the baseline elements of the architecture are being modified. The update does not revisit the description of the region or the list of stakeholder agencies. In addition, the operational concepts, represented as agency roles and responsibilities in the 2006 documentation, have not been revised. Roles and responsibilities relative to VRT were reviewed but revisions were not required because no architecture-related changes have taken place.

Similarly, no changes or updates to existing agreements related to transit operations have been implemented and no new agreements are deemed necessary at this time. It was also found that changes are not necessary regarding the systems functional requirements or applicable ITS standards.

The update does provide new information regarding specific interface requirements and information exchanges between existing and planned systems. The project sequencing has also been addressed but represents only transit related projects identifying estimated time frames for deployment of each.

A.4 Plan Update Development

This plan update was developed within a limited scope focused on public transportation and is intended to satisfy an ITS architecture maintenance need. The update was conducted in the following steps:

1. Establish a Goal, Purpose and Need statement for APTS deployments
2. Understand the existing APTS deployment and how they fit into the ITS architecture
3. Discuss the APTS technologies newly planned for deployment
4. Document the planned projects, associated time frames and estimated costs
5. Update the APTS element of the Treasure Valley ITS Architecture
6. Document the process clearly defining the plan for deployment projects

In addition to this introduction, the document provides the following sections:

- Existing APTS Technologies
- Planned APTS Technologies
- Transit Update to the Treasure Valley ITS Architecture
- Next Steps

B. Existing APTS Technologies

A number of APTS technologies have already been deployed and play a role in the Treasure Valley ITS architecture. Each technology is noted in Table 1 to briefly explain its function. Table 1 also provides an assessment of the degree to which each technology has been implemented and identifies the associated market package(s) from the National ITS Architecture. The market package information is used to develop the customized ITS architecture identifying the interconnects and information flows.

VRT also employs several technologies that fall outside the National ITS Architecture and are not included in the regional ITS architecture. These technologies are noted and may generate integration needs or opportunities, but are not within the systems interoperability context of ITS architecture. They include:

- Radio communications on buses
- Hand-held scanners for inventory, work orders, etc.
- Fuel management system
- Customer service call tracking software
- Web-accessible instructional videos

Table 1: Existing APTS Technologies in the Treasure Valley

Technology	Description and Status in Current TV ITS Architecture	Degree of Implementation	National ITS Architecture Market Package
AVL - GPS tracking on buses	Global positioning systems equipment coupled with communications radios have been installed in VRT buses to provide automated vehicle location. The in-vehicle equipment collects GPS location data and transmits it along with vehicle identification data to a central dispatch facility. The centrally located tracking system receives the data and runs software that displays map based vehicle identification and location on a computer monitor. The information is updated on a cycle ranging from 2 to 4 minutes with a moderate delay and is used to monitor bus progress and expedite response to a problem associated with the bus.	• Existing • Fully Implemented All VRT vehicles including some service vehicles have GPS equipped radios. In addition, VRT has several portable hand held radios.	APTS01
Fleet-Net® Transit Software	This software is a public transportation data management tool made up of numerous modules built around a central MicroSoft® Access database. These modules provide tools to coordinate information for accounting, maintenance, operations and National Transit Database (NTD) reporting using an integrated data management approach. This software also allows direct import of data collected on the buses by the automated fare boxes and data collected during fueling through the fuel management system as well as other systems. The automation of these data collection and coordination tasks provides both improved efficiency and reduced errors associated with data entry.	• Existing • Partially Implemented VRT has many of the modules and continues to expand the use of existing modules and upgrade some to more current, MS Windows based versions.	APTS06
Electronic fare boxes	Electronic fare boxes are currently in use on all VRT buses and allow payment by cash, fare card or smart card. The fare boxes collect information on boardings based on fare payment and the type of fare payment used. Cash payment in excess of the fare results in issuing a stored-value fare card with a balance to the rider which can be used on future trips. The electronic fare box provides data to the fare box reporting software.	• Existing • Fully Implemented All VRT buses have electronic fare boxes.	N/A Custom data flows

Technology	Description and Status in Current TV ITS Architecture	Degree of Implementation	National ITS Architecture Market Package
GFI software/fare box reporting	This software is integrated with fare boxes and tracks a variety of fare collection metrics during bus operation. The data collected can later be manipulated to facilitate reporting to the NTD via Fleet-Net® and to aid in operational improvements. Smart card use generates data in the GFI system that is associated with the specific user allowing richer reporting capabilities.	• Existing • Fully Implemented All VRT buses have fare GFI software and can export data to Fleet-Net.	APTS04
Electronic fare media, including SmartCards	System users can purchase fare cards that offer a savings over cash fare and simplify fare payment. Both stored-value and calendar period based (31 day, 3 month, 6 month) cards are available. Riders applying for special use rates such as students or Medicare recipients are issued a smart card encoded with information about the user allowing automation. Smart cards are also issued for 1 year passes. Both fare cards and smart cards can be recharged either manually or automatically via association with an account provided by the user. The smart cards allow a much greater level of information tracking so that data regarding special user groups such as Medicare riders or students can be properly collected and reported to the NTD. All of the electronic fare media data collected at the fare boxes is imported into Fleet-Net® and used to enhance the data management tasks.	• Existing • Fully Implemented Electronic fare media are readily available to the public at select outlets identified on the ValleyRide web site.	N/A Custom data flows
Digital header boards on buses	Front and side mounted LED display signs on the exterior of buses are changeable by the driver from inside the bus and display route and destination information to system users waiting at the stops.	• Existing • Fully Implemented Digital header boards are in place and operational on all VRT buses.	APTS08

C. Planned APTS Technologies

VRT has begun to consider additional APTS technologies beyond those listed above. In addition, the Ada County Highway District's (ACHD) Commuteride program management is also considering the use of select APTS technologies. Table 2 shows the list of planned technologies at each agency however, the technologies may ultimately be deployed by either agency or implemented by a project sponsored by an outside agency. Table 2 also provides an explanation of each planned technology, associates a priority with each, identifies the appropriate market package(s), and provides rough, order-of-magnitude capital and operating cost estimates. The cost estimates were developed inclusive of both dispatch level implementations such as software and vehicle based components such as mobile data terminals as appropriate. Each of these technologies translates to an implementation project which, with further, more refined planning, will likely be divided into phases for manageable deployment.

As shown in Table 2, many of the technologies fall within the market packages included in the 2006 Treasure Valley regional ITS architecture. In one case the associated market package was not available within the National ITS Architecture at the time. This is a prime example of the kinds of changes that are occurring on an ongoing basis at the national level to reflect new and advancing technologies. This further demonstrates the need for ongoing maintenance of the regional ITS architecture to accommodate new technologies as they become available.

Some planned transit technologies were being implemented as this architecture document was being developed. The web-based route and trip planner, the web-based transit traveler information, and the personalized push-based transit traveler information are in various stages of development and deployment. These projects are being conducted as part of the enhancements to the statewide traveler information or 511 system. They are shown herein as planned, but are expected to begin to be deployed soon after this plan is completed.

Lastly, VRT is planning to implement several technologies that fall outside the National ITS Architecture and are not within the systems interoperability context of ITS architecture. They, therefore, do not need to be included in the Treasure Valley Regional ITS Architecture. These technologies are important to note and may generate future integration needs or opportunities.

> ***Customer Service Call Tracking System*** – While VRT currently tracks customer service calls, further automation of the call tracking would provide significant improvement in the management of VRT's customer service. Such a system would not only allow customer service agents to more efficiently document customer service calls, but also allow managers to review agent performance and take action to improve overall efficiency and effectiveness.
>
> ***Remote Access to Customer Service Systems*** – VRT would like to allow customer service representatives more flexibility surrounding work locations including allowing representatives to work at home. This will require access via the Internet to VRT customer service systems and the capability to effectively forward incoming calls to the representatives.

Bus Drive Cameras – These front-of-the-vehicle mounted cameras will allow video recording of bus route for use later in safety training.

In-vehicle WiFi – This technology is of interest to both VRT and Commuteride. Because some passengers on the bus need access to the Internet, this strategy would deploy wireless connectivity on the buses creating a mobile WiFi hot spot. This technology has a direct connection to traveler information if properly configured to promote the use of planned transit traveler information systems. Commuteride in particular sees this as a means to attract greater ridership.

In-vehicle TV Monitors – Video monitors deployed in buses would allow riders to view important transit travel information and there by conduct better trip planning.

Table 2: Planned APTS Technologies in the Treasure Valley

Agency Priority	Technology	Description and Status of Associated Market Packages in 2006 TV ITS Architecture (2006 Regional Architecture used version 5.1 of the National ITS Architecture)	Market Package(s)	Estimated Deployment Cost		Annual Operational Cost
				High	Low	
VRT Short Term	Surveillance cameras on buses and other transit facilities	While security issues on buses occur only rarely, video monitoring systems can provide a significant measure of safety for passengers and drivers as well as support to law enforcement and emergency responders. The systems being considered and planned consist of CCTV cameras and communications links to allow remote monitoring of buses and bus facilities. Once deployed, the cameras will provide real-time video images to dispatchers who could then initiate a response to any security related issues. The market package for this technology was identified in the 2006 architecture as planned.	APTS05	$5,000 Per camera	$2,000 Per camera	$250 Per camera
VRT Short Term	Web-based route/trip planner	This technology allows transit users to effectively plan transit trips via Internet-based applications that couple users needs with available services. When users input trip related needs, the system works with stored data to select the appropriate route and timing. The output is then presented to the user for on-screen viewing or printing and can include route designations, stop locations, required fares, transfer information, walking times or distances, and overall transit time estimates. The market packages for this technology were identified in the 2006 architecture as existing.	APTS08	$80K	$40K	$4000

Agency Priority	Technology	Description and Status of Associated Market Packages in 2006 TV ITS Architecture (2006 Regional Architecture used version 5.1 of the National ITS Architecture)	Market Package(s)	Estimated Deployment Cost		Annual Operational Cost
				High	Low	
VRT Short Term	Web-based transit traveler information	Closely associated with trip planning technology, traveler information is provided to on-line customers from a combination of static data and real-time information. Users are able to more effectively consider transit options for future trips or to assess immediate transportation options and scheduling. The real-time information will include detour routing and relies on integration of automatic vehicle location data. It will provide users with up-to-the-minute delays and schedule adjustments based on incoming bus location data from the AVL system. The preliminary phases of this project are underway. The market package for this technology was identified in the 2006 architecture as existing.	APTS08	$180K	$140K	$3000
VRT Short Term	Personalized push-based transit traveler information	With this technology in place users can sign up for transit information and news. The information can be prioritized and the system can be configured so users can select a level of priority for which they would like to get messages. These systems can allow service area based messaging, route level based messaging or both depending on the robustness of system and data collection and the needs of users. The market package for this technology was identified in the 2006 architecture as existing.	APTS08	$150K Total	$90K Total	$3000

Agency Priority	Technology	Description and Status of Associated Market Packages in 2006 TV ITS Architecture (2006 Regional Architecture used version 5.1 of the National ITS Architecture)	Market Package(s)	Estimated Deployment Cost		Annual Operational Cost
				High	Low	
VRT Short Term	Automatic stop annunciators	Stops are announced on buses in accordance with ADA requirements. Announcements can be made manually by the operator or automated to varying degrees – via push button, GPS trigger, transponder, etc. This technology will deploy automatic stop annunciators on VRT buses to integrate with the AVL/GPS system. Stops will be automatically announced based on GPS information as compared with the next stop location without input from the operator. The market package for this technology was identified in the 2006 architecture as existing.	APTS08	$8,600 per veh. + $12K system	$2,300 per veh. + $10.5K system	$150-800 per veh + $600-1000 Per system
VRT Short Term	Trip Scheduling and Mobile Data Terminals (MDT) for Demand Response Service	Combined with advanced paratransit and flex service scheduling software, in-vehicle mobile data terminals (MDT) can use cellular communications to provide connectivity to dispatch centers allowing real-time or near-real-time schedule updates for paratransit and flexible services. This technology also allows communication of a variety of other data to enhance service and security. VRT plans to deploy MDT technology to improve service and efficiency of service of paratransit vehicles. The market package for this technology was identified in the 2006 architecture as existing.	APTS03	$50k For software MDTs $2500 Per veh.	$10k for software MDTs $2000 Per veh.	20% of the capital cost per year $500 Per veh.

Agency / Priority	Technology	Description and Status of Associated Market Packages in 2006 TV ITS Architecture (2006 Regional Architecture used version 5.1 of the National ITS Architecture)	Market Package(s)	Estimated Deployment Cost		Annual Operational Cost
				High	Low	
VRT / Medium Term	Automatic passenger counters	Several technologies exist to count passengers boarding and alighting from buses. Most use either infrared or optical scanning technologies. Automated passenger counters can provide a useful means of more accurately reporting ridership data to the NTD and provide better data for effective transit systems operational refinements. The market package for this technology was not identified in the 2006 architecture because it was not available in version 5.1 of the National ITS Architecture.	APTS10	$2,500 Per veh.	$1000 Per veh.	$250 Per veh.
VRT / Medium Term	Real-time information displays at select bus stops	Transit travelers often need transit related information while at a bus stop or transit center. Information displays such as video monitors and reader boards can help to provide real-time information to users helping them to assess delays and estimated arrival times. This technology would be deployed at select locations where large numbers of users access transit and utilities are available. The market package for this technology was identified in the 2006 architecture as existing.	APTS08	$10K Per sign + $6K per route for data service	$3,300 Per sign + $6K per route for data service	$170-$1K per sign

Agency Priority	Technology	Description and Status of Associated Market Packages in 2006 TV ITS Architecture (2006 Regional Architecture used version 5.1 of the National ITS Architecture)	Market Package(s)	Estimated Deployment Cost		Annual Operational Cost
				High	Low	
ACHD Short Term	Vanpool management software	Commuteride currently uses an ACHD resident system to manage some of the business elements such as financial and maintenance recording. However, management of vanpool operations is currently being done using a Microsoft Access database developed in house. A more robust and comprehensive system would greatly streamline the vanpool management and improve the accuracy, reporting and efficiency of the vanpool management activity. Several options are envisioned to meet this need. 1. Purchase an off the shelf system and tailor to Commuteride's needs 2. Contract to have a system built from scratch 3. Contract to build upon and expand the capabilities of the existing Access system The market package for this technology was identified in the 2006 architecture as existing.	ATIS08	$60K System developed from scratch	$15K To rework Access DB	20% of the capital cost per year

Agency Priority	Technology	Description and Status of Associated Market Packages in 2006 TV ITS Architecture (2006 Regional Architecture used version 5.1 of the National ITS Architecture)	Market Package(s)	Estimated Deployment Cost		Annual Operational Cost
				High	Low	
ACHD Short Term	Park-n-Ride lot security surveillance	Commuteride manages a number of park and ride lots and uses them to arrange ride sharing. Many of the lots are remote and used during early morning and late evening hours. Users have expressed concerns regarding both personal safety and vehicle security at the lots. This technology would install CCTV cameras at park and ride lots to enhance security. These cameras could be made accessible to Commuteride operations personnel, State EMS Communications Center, ITD, ISP or others as deemed appropriate and could be configured to record video for playback if needed. The market package for this technology was identified in the 2006 architecture as existing.	APTS05	$12K per camera	$7,000 per camera	$300

Agency Priority	Technology	Description and Status of Associated Market Packages in 2006 TV ITS Architecture (2006 Regional Architecture used version 5.1 of the National ITS Architecture)	Market Package(s)	Estimated Deployment Cost		Annual Operational Cost
				High	Low	
ACHD Short Term	In-vehicle safety technologies	Currently, Commuteride does not provide communications for vanpool vans. The drivers are volunteers and are allowed to carry their own personal cellular devices. However, a more focused approach deploying in-vehicle equipment such as an MDT or palmtop device for the purpose of providing drivers access to the ITD 511 system and other weather and road condition reports will add significantly to the safety of vanpool trips. This technology could also be combined with GPS capabilities for the purpose of incident response. Because of the nature of vanpool operations AVL for dispatch is unnecessary but the use of GPS and communications for response to incidents involving a vanpool van such as a crash or disabled vehicle will greatly enhance overall safety. The market package ATIS02 for this technology was identified in the 2006 architecture as existing. The market package EM03 was shown as not planned, however, it is now planned for this project.	ATIS02 EM03	$3,000 per vehicle (MDT) $750 per vehicle (palm-top device)	$600 per vehicle (MDT) $300 per vehicle (palm-top device)	$300-$500 per vehicle for maintenance and airtime

Agency Priority	Technology	Description and Status of Associated Market Packages in 2006 TV ITS Architecture (2006 Regional Architecture used version 5.1 of the National ITS Architecture)	Market Package(s)	Estimated Deployment Cost		Annual Operational Cost
				High	Low	
ACHD Medium Term	Dynamic rideshare matching enhancements	Commuteride currently provides ridesharing services and has programs in place to help users with rideshare matching for carpools. The application was developed for the King County Washington region and is not entirely effective for the Treasure Valley needs. In addition, the current service is not set up to work for the vanpool services and does not yet meet the near-real-time measure for dynamic ridesharing. This effort will implement a solution that meets both the carpool ride matching and vanpool ride matching needs as well as providing a near-real-time service via the internet. The market package for this technology was identified in the 2006 architecture as existing.	ATIS08	$80K This would include van-pool match	$25K	20% of the capital cost per year

D. Transit Update to the Treasure Valley ITS Architecture

The concepts encompassing intelligent transportation systems architecture are explained in the 2006 Treasure Valley ITS Strategic Plan and the reader is referred to that document for a comprehensive overview.

D.1 Review of the National ITS Architecture

The 2006 Treasure Valley Regional ITS Architecture was developed in Architecture 5.0. Since then, the National ITS Architecture has been revised and is currently in Version 6.1. There have been two significant changes to the Architecture that impact the way VRT ITS is represented. Two Market Packages have been added to Advanced Public Transportation Systems (APTS). They are Transit Signal Priority (APTS09) and Transit Passenger Counting (APTS10).

Although it is not part of the ITS Architecture for the Treasure Valley, the Market Package for Transit Signal Priority has also been changed. Previously, Transit Signal Priority was depicted within Multi-modal Coordination (APTS07). However, APTS07 now addresses other coordination and sharing of information between transit management centers and other centers to improve transit service. APTS09 is a dedicated package for providing transit signal priority to vehicles at intersections.

Previously, APTS04 was named Transit Passenger and Fare Management. It has been renamed Transit Fare Collection Management, and the passenger counting functionality it contained has become the Transit Passenger Counting (APTS10) Market Package. APTS4 now only addresses fare collection and management while passenger counting functionality is now in APTS10. A likely reason for this change in the National ITS Architecture is because the services of fare collection management and passenger counting are often not related deployments.

D.2 Market Packages Addressed

The changes discussed here impact the market packages relative to Public Transportation only even though other service areas are included. Table 3 below shows the affected market packages and their status in the Treasure Valley as updated by this revision.

Table 3: Transit Related Market Packages for the Treasure Valley

Market Packages		Existing	Planned	Not Planned
PUBLIC TRANSPORTATION *Advanced Public Transportation Systems (APTS)*				
APTS1	Transit Vehicle Tracking	X	X	
APTS2	Transit Fixed-Route Operations	X		
APTS3	Demand Response Transit Operations	X		
APTS4	Transit Fare Collection Management	X	X	
APTS5	Transit Security		X	
APTS6	Transit Fleet Management			X
APTS7	Multi-modal Coordination		X	
APTS8	Transit Traveler Information	X		
APTS9	Transit Signal Priority			X
APTS10	Transit Passenger Counting		X	
ATIS02	Interactive Traveler Information		X	
ATIS08	Dynamic Ridesharing		X	
EM03	Mayday and Alarms Support		X	

Market Packages for Transit Vehicle Tracking (APTS1) and Transit Fare Collection Management (APTS4) were planned during the development of the Treasure Valley Regional ITS Architecture in 2006. They are now represented in the table as existing because VRT has implemented automated vehicle location and electronic fareboxes on its vehicles.

Planned VRT and Commuteride projects will add three Market Packages beyond those for Advanced Public Transportation Systems. They are Interactive Traveler Information (ATIS02) for the dissemination of transit information through ITD's 511 system, Dynamic Ridesharing (ATIS08) for coordinating ridesharing and vanpooling through ACHD, and Mayday and Alarms Support (EM03) for reporting the location of Commuteride vans during crashes.

D.3 Architecture Outputs

Turbo Architecture (Turbo) is a software application that supports development of regional and project-level ITS architectures using the National ITS Architecture as a starting point. It uses a Microsoft Access database application as the underlying foundation. Turbo version 4.0 coincides with the National ITS Architecture version 6, and was used to develop the VRT ITS Architecture. The elements identified in the 2006 Treasure Valley ITS Architecture were updated to National Architecture version 6, and all new projects were developed in version 6.

Using Turbo Architecture, involves entering information using either an interview or tabular forms. The interview guides the user through a series of questions and options that result in the creation of an ITS inventory and a set of services. The user may also go directly to the tabular forms to create this inventory and set of services. In either case, this information is the basis for the architecture development.

Once the initial data input is complete, Turbo provides powerful customization tools that allow the user to customize the architecture to match their specific requirements. Many reports and diagrams are available for display, print, or publication in other documents. They include:

- Project descriptions
- Market Package summaries and descriptions
- Functional Requirements by ITS element
- Interconnect and flow diagrams
- Applicable standards

The user can extend the National ITS Architecture by adding their own information flows and transportation elements for those areas not covered by the National ITS Architecture. This is the process used to customize the original Treasure Valley ITS Architecture and to update and revise the Architecture as part of this transit related maintenance action.

E. Next Steps

E.1 Further Planning

While this planning effort focused on ensuring that the Treasure Valley ITS Architecture was up to date regarding planned transit technologies, the next planning efforts should match needed technologies to available funding within more refined time frames. More detailed cost estimates should also be developed by determining the variables that contribute to the ranges in cost identified here. One of the key planning steps relative to the specific projects is programming of the projects to provide for appropriate funding levels and timing - refined cost estimates can be helpful to this programming step. Project level planning will also help to define procurement approaches for each technology; determine whether off-the-shelf systems are readily available; and define warranty, maintenance and technical support issues.

The more detailed planning will be needed to further explore the specific needs and define the associated projects to deploy planned technologies identified in this document. These planning steps offer opportunity to further define systems integration options and should include development of a concept of operations for each system. In addition, focused project planning will help to maximize the cost effectiveness of the various deployments by determining implementation strategies that take advantage of available information and automate much of the dissemination of information.

E.2 Deployment Project Sequencing

Timing and sequencing of the deployment projects needed to implement the technologies identified are critical to effective systems function and integration. Currently VRT is moving ahead with implementation of the web-based traveler information and the associated integration of the automatic vehicle location system. These technology deployments are being conducted in cooperation with ITD and enhancements to the statewide 511 system and will pave the way for both a web-based route trip planning feature and the personalized push-based traveler information system. Further integration opportunities include:

- AVL with information displays at bus stops – arrival information displayed at bus stops is updated in real-time based on AVL data merged with past performance data

- AVL with stop annunciators – system relies on relationship between bus stop geocoordinates and other stop data to announce the stop in a timely fashion
- AVL with passenger counters – system stores data regarding boarding and alighting passenger counts in relation to specific locations and times
- AVL with MDTs in demand response vehicles – systems integration allows near-real-time dispatching decisions as ride requests are received

Sequencing of projects needs to be based as much on these systems integration strategies as the priority of the needs generating them. Many of the projects build naturally upon the existing technologies and the integration with these systems is assumed to be a driving element behind the interest in planning them.

The sequencing strategy for the VRT projects follows the order in which they were presented in Section C above and shown below:

1. Surveillance cameras on buses
2. Web-based Route/Trip Planner
3. Web-based traveler Information (including AVL integration)
4. Personalized push-based traveler information
5. Automatic stop annunciators
6. Paratransit Scheduling and Mobile Data Terminals (MDT) for Demand Response Service
7. Automatic passenger counters
8. Real-time information displays at select bus stops

The sequencing strategy for the Commuteride projects also follows the order in which they were presented in Section C above and shown below:

1. Vanpool management software
2. Park-n-Ride lot security surveillance
3. In-vehicle safety technologies
4. Dynamic rideshare matching enhancements

E.3 Project Execution

Subsequent to project level planning, initiating these technology deployment projects will require development of system specifications and a procurement package, selection of a vendor/contractor, and management of the work including acceptance testing. This entire process should be completed using a systems engineering approach to ensure that the deployment(s) meet the identified requirements and specifications. In addition, the project execution should include provisions for long term maintenance and operations as the costs associated with these elements need to be included in the budgeting process.

The project execution steps are outlined below:

1. Project level planning and programming
2. Feasibility study/concept of operations
3. Define system requirements/develop specifications

4. Procurement, installation and testing
5. System commissioning
6. Operations and maintenance

F. Attachments

1. Transit ITS Architecture - Turbo Architecture Output
   - Market Packages and Functional Requirements
   - Information Flows Diagrams
   - Project Sequencing Output
2. Completed maintenance change form from 2006 TV ITS Architecture

Attachment 1

Transit ITS Architecture

Turbo Architecture Output

Market Packages

And

Functional Requirements

Market Package **Element(s)**

Market Packages (Transportation Services)

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Transit Vehicle Tracking

This market package monitors current transit vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system's schedule in real-time. Vehicle position may be determined either by the vehicle (e.g., through GPS) and relayed to the infrastructure or may be determined directly by the communications infrastructure. A two-way wireless communication link with the Transit Management Subsystem is used for relaying vehicle position and control measures. Fixed route transit systems may also employ beacons along the route to enable position determination and facilitate communications with each vehicle at fixed intervals. The Transit Management Subsystem processes this information, updates the transit schedule and makes real-time schedule information available to the Information Service Provider.

Valley Regional Transit Center
Valley Regional Transit Vehicles

Transit Fare Collection Management (VRT) [Instance] (APTS04) -- Existing

This market package manages transit fare collection on-board transit vehicles and at transit stops using electronic means. It allows transit users to use a traveler card or other electronic payment device. Readers located either in the infrastructure or on-board the transit vehicle allow electronic fare payment. Data is processed, stored, and displayed on the transit vehicle and communicated as needed to the Transit Management Subsystem. Two other market packages, ATMS10: Electronic Toll Collection and ATMS16: Parking Facility Management also provide electronic payment services. These three market packages in combination provide an integrated electronic payment system for transportation services.

Valley Regional Transit Center
Valley Regional Transit Vehicles

Transit Fleet Management

This market package supports automatic transit maintenance scheduling and monitoring. On-board condition sensors monitor system status and transmit critical status information to the Transit Management Subsystem. Hardware and software in the Transit Management Subsystem processes this data and schedules preventative and corrective maintenance. The market package also supports the day to day management of the transit fleet inventory, including the assignment of specific transit vehicles to blocks.

Valley Regional Transit Center
Valley Regional Transit Vehicles

Functional Requirements
VRT Transit - 2009
7/9/2009 2:02:33PM

Architecture		Status
VRT Transit - 2009		Existing
Element: **Valley Regional Transit Center**		
Entity: **Transit Management**		
Functional Area: **Transit Center Vehicle Tracking** Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.		
Requirement:	1 The center shall monitor the locations of all transit vehicles within its network.	Existing
Requirement:	3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	Existing
Functional Area: **Transit Garage Maintenance** Collect operational and maintenance data from transit vehicles, manage vehicle service histories, automatically generate preventative maintenance schedules, and provide information to service personnel.		
Requirement:	1 The center shall collect operational and maintenance data from transit vehicles.	Existing
Requirement:	2 The center shall monitor the condition of a transit vehicle to analyze brake, drive train, sensors, fuel, steering, tire, processor, communications equipment, and transit vehicle mileage to identify mileage based maintenance, out-of-specification or imminent failure conditions.	Existing
Requirement:	3 The center shall generate transit vehicle maintenance schedules that identify the maintenance or repair to be performed and when the work is to be done.	Existing
Requirement:	4 The center shall generate transit vehicle availability listings, current and forecast, to support transit vehicle assignment planning based, in part, on the transit vehicle maintenance schedule.	Existing
Requirement:	5 The center shall assign technicians to a transit vehicle maintenance schedule, based upon such factors as personnel eligibility, work assignments, preferences and seniority.	Existing
Requirement:	6 The center shall verify that the transit vehicle maintenance activities were performed correctly, using the transit vehicle's status, the maintenance personnel's work assignment, and the transit maintenance schedules.	Existing
Requirement:	7 The center shall generate a time-stamped maintenance log of all maintenance activities performed on a transit vehicle.	Existing
Requirement:	8 The center shall provide transit operations personnel with the capability to update transit vehicle maintenance information and receive reports on all transit vehicle operations data.	Existing
Element: **Valley Regional Transit Vehicles**		
Entity: **Transit Vehicle Subsystem**		

Architecture		Status
VRT Transit - 2009		Existing
Element: **Valley Regional Transit Vehicles**		
Entity: **Transit Vehicle Subsystem**		
Functional Area: **On-board Transit Trip Monitoring** Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.		
Requirement:	1 The transit vehicle shall compute the location of the transit vehicle based on inputs from a vehicle location determination function.	Existing
Requirement:	5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.	Existing
Functional Area: **On-board Transit Fare Management** On-board systems provide fare collection using a travelers non-monetary fare medium. Collected fare data are made available to the center.		
Requirement:	1 The transit vehicle shall read data from the traveler card / payment instrument presented by boarding passengers.	Existing
Requirement:	7 The transit vehicle shall include a database on-board the transit vehicle for use in fare processing from which the fares for all possible trips within the transit operational network can be determined.	Existing
Requirement:	10 The transit vehicle shall provide fare statistics data to the center.	Existing
Functional Area: **On-board Transit Information Services** On-board systems to furnish next-stop annunciation as well as interactive travel-related information, including routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, non-motorized transportation services, and special events.		
Requirement:	1 The transit vehicle shall enable traffic and travel advisory information to be requested and output to the traveler. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Existing

Market Package **Element(s)**

Market Packages (Transportation Services)

7/8/2009 10:34:04AM

Transit Security

This market package provides for the physical security of transit passengers and transit vehicle operators. On-board equipment is deployed to perform surveillance and sensor monitoring in order to warn of potentially hazardous situations. The surveillance equipment includes video (e.g., CCTV cameras), audio systems and/or event recorder systems. The sensor equipment includes threat sensors (e.g., chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors (e.g., metal detectors). Transit user or transit vehicle operator activated alarms are provided on-board. Public areas (e.g., transit stops, park and ride lots, stations) are also monitored with similar surveillance and sensor equipment and provided with transit user activated alarms. In addition this market package provides surveillance and sensor monitoring of non-public areas of transit facilities (e.g., transit yards) and transit infrastructure such as bridges, tunnels, and transit railways or bus rapid transit (BRT) guideways. The surveillance equipment includes video and/or audio systems. The sensor equipment includes threat sensors and object detection sensors as described above as well as, intrusion or motion detection sensors and infrastructure integrity monitoring (e.g., rail track continuity checking or bridge structural integrity monitoring).

The surveillance and sensor information is transmitted to the Emergency Management Subsystem, as are transit user activated alarms in public secure areas. On-board alarms, activated by transit users or transit vehicle operators are transmitted to both the Emergency Management Subsystem and the Transit Management Subsystem, indicating two possible approaches to implementing this market package.

In addition the market package supports remote transit vehicle disabling by the Transit Management Subsystem and transit vehicle operator authentication.

Valley Regional Transit Center
Valley Regional Transit Vehicles

Functional Requirements
VRT On-board Surveillance
7/9/2009 2:00:49PM

Architecture			Status
VRT On-board Surveillance			Short-term
Element: **Valley Regional Transit Center**			
Entity: **Emergency Management**			
Functional Area: **Center Secure Area Surveillance** Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.			
Requirement:	3	The center shall remotely monitor video images and audio surveillance data collected on-board transit vehicles. The data may be raw or pre-processed in the field.	Short-term
Requirement:	9	The center shall remotely control security surveillance devices on-board transit vehicles.	Short-term
Requirement:	13	The center shall monitor maintenance status of the security sensor field equipment.	Short-term
Element: **Valley Regional Transit Vehicles**			
Entity: **Transit Vehicle Subsystem**			
Functional Area: **On-board Transit Security** On-board video/audio surveillance systems, threat sensors, and object detection sensors to enhance security and safety on-board a transit vehicles. Also includes silent alarms activated by transit user or vehicle operator, operator authentication, and remote vehicle disabling.			
Requirement:	1	The transit vehicle shall perform video and audio surveillance inside of transit vehicles and output raw video or audio data for either local monitoring (for processing or direct output to the transit vehicle operator), remote monitoring or for local storage (e.g., in an event recorder).	Short-term
Requirement:	8	The transit vehicle shall monitor and output surveillance and sensor equipment status and fault indications.	Short-term
Requirement:	10	The transit vehicle shall output reported emergencies to the center.	Short-term
Requirement:	11	The transit vehicle shall receive acknowledgments of the emergency request from the center and output this acknowledgment to the transit vehicle operator or to the travelers.	Short-term

Market Packages for Project VRT Web-based Route/Trip Planning

Market Package **Element(s)**

Market Packages (Transportation Services)

7/8/2009 10:40:37AM

Transit Traveler Information (Trip Planning) [Instance] (APTS08) -- Short-term

This market package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this market package.

Google Transit
ITD 511
User Personal Computing Devices
Valley Regional Transit Center
Valley Regional Transit Center_Kiosks

Interactive Traveler Information (Trip Planning) [Instance] (ATIS02) -- Short-term

This market package provides tailored information in response to a traveler request. Both real-time interactive request/response systems and information systems that "push" a tailored stream of information to the traveler based on a submitted profile are supported. The traveler can obtain current information regarding traffic conditions, roadway maintenance and construction, transit services, ride share/ride match, parking management, detours and pricing information. Although the Internet is the predominate network used for traveler information dissemination, a range of two-way wide-area wireless and fixed-point to fixed-point communications systems may be used to support the required data communications between the traveler and Information Service Provider. A variety of interactive devices may be used by the traveler to access information prior to a trip or en route including phone via a 511-like portal and web pages via kiosk, personal digital assistant, personal computer, and a variety of in-vehicle devices. This market package also allows value-added resellers to collect transportation information that can be aggregated and be available to their personal devices or remote traveler systems to better inform their customers of transportation conditions. Successful deployment of this market package relies on availability of real-time transportation data from roadway instrumentation, transit, probe vehicles or other means. A traveler may also input personal preferences and identification information via a “traveler card” that can convey information to the system about the traveler as well as receive updates from the system so the card can be updated over time.

Google Transit	-- Not Selected
ITD 511	
User Personal Computing Devices	
Valley Regional Transit Center	-- Not Selected
Valley Regional Transit Center_Kiosks	

Functional Requirements
VRT Web-based Route/Trip Planning
7/9/2009 2:02:58PM

Architecture			Status
VRT Web-based Route/Trip Planning			Short-term
Element: **ITD 511**			
Entity: **Information Service Provider**			
Functional Area: **Basic Information Broadcast** Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.			
Requirement:	3	The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.	Short-term
Requirement:	10	The center shall provide the capability for a system operator to control the type and update frequency of broadcast traveler information.	Short-term
Functional Area: **Interactive Infrastructure Information** Personalized dissemination of traffic, transit, maintenance and construction, multimodal, event, and weather information to traveler interface systems and vehicles, upon request.			
Requirement:	3	The center shall disseminate customized transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers upon request.	Short-term
Requirement:	10	The center shall provide all traveler information based on the traveler's current location or a specific location identified by the traveler, and filter or customize the provided information accordingly.	Short-term
Element: **User Personal Computing Devices**			
Entity: **Personal Information Access**			
Functional Area: **Personal Trip Planning and Route Guidance** Personal traveler interface that coordinates with a traveler information center to provide a trip plan that is tailored to the traveler's preferences. During the trip, the route plan can be modified to account for new information. Devices include desktop computers at home, work, or at major trip generation sites, plus personal portable devices such as PDAs and pagers.			
Requirement:	1	The personal traveler interface shall provide the capability for a traveler to request and confirm multi-modal route guidance from a specified source to a destination.	Short-term
Requirement:	2	The personal traveler interface shall forward the request for route guidance to a traveler information center for route calculation.	Short-term
Requirement:	3	The personal traveler interface shall forward user preferences, background information, constraints, and payment information to the supplying traveler information center.	Short-term
Requirement:	5	The personal traveler interface shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used for route guidance displays.	Short-term
Element: **Valley Regional Transit Center**			
Entity: **Transit Management**			

Architecture		Status
VRT Web-based Route/Trip Planning		Short-term
Element: **Valley Regional Transit Center**		
Entity: **Transit Management**		
Functional Area: **Transit Center Information Services** Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.		
Requirement:	1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Short-term
Requirement:	2 The center shall provide transit information to the media including details of deviations from schedule of regular transit services.	Short-term
Requirement:	3 The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.	Short-term
Requirement:	4 The center shall provide transit service information to traveler information service providers including routes, schedules, schedule adherence, and fare information as well as transit service information during evacuation.	Short-term
Element: **Valley Regional Transit Center_Kiosks**		
Entity: **Remote Traveler Support**		
Functional Area: **Remote Interactive Information Reception** Public traveler interface, such as a kiosk, that provides traffic, transit, yellow pages, special event, and other personalized traveler information services upon request.		
Requirement:	2 The public interface for travelers shall receive transit information from a center and present it to the traveler upon request.	Short-term
Requirement:	10 The public interface for travelers shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	Short-term
Requirement:	11 The public interface for travelers shall provide digitized map data to act as the background to the information presented to the traveler.	Short-term

Market Packages for Project VRT Web-based Traveler Information

Market Package **Element(s)**

Market Packages (Transportation Services)

7/8/2009 1:34:33PM

Transit Traveler Information (Instance 2) [Instance] (APTS08) -- Short-term

This market package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this market package.

ITD 511
User Personal Computing Devices
Valley Regional Transit Center
Valley Regional Transit Center_Kiosks

Functional Requirements
VRT Web-based Traveler Information
7/9/2009 2:03:22PM

Architecture		Status
VRT Web-based Traveler Information		Short-term
Element: **ITD 511**		
Entity: **Information Service Provider**		
Functional Area: **Basic Information Broadcast** Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.		
Requirement:	3 The center shall disseminate transit routes and schedules, transit transfer options, transit fares, and real-time schedule adherence information to travelers.	Short-term
Element: **User Personal Computing Devices**		
Entity: **Personal Information Access**		
Functional Area: **Personal Basic Information Reception** Personal traveler interface that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts. Devices include personal computers and personal portable devices such as PDAs and pagers.		
Requirement:	1 The personal traveler interface shall receive traffic information from a center and present it to the traveler.	Short-term
Requirement:	2 The personal traveler interface shall receive transit information from a center and present it to the traveler.	Short-term
Requirement:	3 The personal traveler interface shall receive event information from a center and present it to the traveler.	Short-term
Requirement:	6 The personal traveler interface shall provide the capability for digitized map data to act as the background to the information presented to the traveler.	Short-term
Element: **Valley Regional Transit Center**		
Entity: **Transit Management**		
Functional Area: **Transit Center Information Services** Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.		
Requirement:	1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Short-term
Requirement:	3 The center shall exchange transit schedules, real-time arrival information, fare schedules, and general transit service information with other transit organizations to support transit traveler information systems.	Short-term
Element: **Valley Regional Transit Center_Kiosks**		
Entity: **Remote Traveler Support**		
Functional Area: **Remote Transit Information Services**		

Architecture		Status
VRT Web-based Traveler Information		Short-term
Element: **Valley Regional Transit Center_Kiosks**		
Entity: **Remote Traveler Support**		
Functional Area:	**Remote Transit Information Services** Public traveler interface that provides real-time travel-related information at transit stops and multi-modal transfer points, including general annunciation, display of imminent arrival information, the latest available information on transit routes, schedules, transfer options, available services, fares, and real-time schedule adherence.	
Requirement:	1 The public interface for travelers shall collect and provide real-time travel-related information at transit stops, multi-modal transfer points, and other public transportation areas.	Short-term
Requirement:	2 The public interface for travelers shall collect and present to the transit traveler information on transit routes, schedules, and real-time schedule adherence.	Short-term
Requirement:	3 The public interface for travelers shall provide support for general annunciation and/or display of imminent arrival information and other information of general interest to transit users.	Short-term

Market Packages for Project VRT Personalized Push-based Traveler Information

Market Package **Element(s)**

Market Packages (Transportation Services)

7/8/2009 10:36:00AM

Transit Traveler Information (Push-based) [Instance] (APTS08) -- Short-term

This market package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this market package.

User Personal Computing Devices
Valley Regional Transit Center

Functional Requirements
VRT Personalized Push-based Traveler Information
7/9/2009 2:01:45PM

Architecture			Status
VRT Personalized Push-based Traveler Information			Short-term
Element: **User Personal Computing Devices**			
Entity: **Personal Information Access**			
Functional Area:	**Personal Interactive Information Reception** Personal traveler interface that provides traffic, transit, yellow pages, event, and trip planning information, and other personalized traveler information services upon request. Devices include personal computers and personal portable devices such as PDAs.		
Requirement:	2	The personal traveler interface shall receive transit information from a center and present it to the traveler upon request.	Short-term
Requirement:	10	The personal traveler interface shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	Short-term
Requirement:	11	The personal traveler interface shall provide digitized map data to act as the background to the information presented to the traveler.	Short-term
Element: **Valley Regional Transit Center**			
Entity: **Transit Management**			
Functional Area:	**Transit Center Information Services** Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.		
Requirement:	1	The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Short-term
Requirement:	6	The center shall broadcast transit advisory data, including alerts and advisories pertaining to major emergencies, or man made disasters.	Short-term

Market Packages for Project VRT - Automated Stop Annunciators

Market Package **Element(s)**

Market Packages (Transportation Services)

7/8/2009 10:32:31AM

Transit Traveler Information (Stop Annunciators) [Instance] (APTS08) -- Short-term

This market package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this market package.

Valley Regional Transit Vehicles

Functional Requirements
VRT - Automated Stop Annunciators
7/9/2009 1:57:42PM

Architecture		Status
VRT - Automated Stop Annunciators		Short-term
Element: **Valley Regional Transit Vehicles**		
Entity: **Transit Vehicle Subsystem**		
Functional Area:	**On-board Transit Information Services** On-board systems to furnish next-stop annunciation as well as interactive travel-related information, including routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, non-motorized transportation services, and special events.	
Requirement:	3 The transit vehicle shall broadcast advisories about the imminent arrival of the transit vehicle at the next stop via an on-board automated annunciation system.	Short-term
Requirement:	4 The transit vehicle shall support input and output forms that are suitable for travelers with physical disabilities.	Short-term
Requirement:	6 The transit vehicle shall tailor the output of the request traveler information based on the current location of the transit vehicle.	Short-term

Market Packages for Project VRT Paratransit Operations

Market Package **Element(s)**

Market Packages (Transportation Services)

7/8/2009 10:35:03AM

Transit Vehicle Tracking (Paratransit) [Instance] (APTS01) -- Short-term

This market package monitors current transit vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system's schedule in real-time. Vehicle position may be determined either by the vehicle (e.g., through GPS) and relayed to the infrastructure or may be determined directly by the communications infrastructure. A two-way wireless communication link with the Transit Management Subsystem is used for relaying vehicle position and control measures. Fixed route transit systems may also employ beacons along the route to enable position determination and facilitate communications with each vehicle at fixed intervals. The Transit Management Subsystem processes this information, updates the transit schedule and makes real-time schedule information available to the Information Service Provider.

Valley Regional Transit Center
Valley Regional Transit Paratransit Vehicles

Demand Response Transit Operations (Instance 1) [Instance] (APTS03) -- Short-term

This market package performs automated dispatch and system monitoring for demand responsive transit services. This service performs scheduling activities as well as operator assignment. In addition, this market package performs similar functions to support dynamic features of flexible-route transit services. This package monitors the current status of the transit fleet and supports allocation of these fleet resources to service incoming requests for transit service while also considering traffic conditions. The Transit Management Subsystem provides the necessary data processing and information display to assist the transit operator in making optimal use of the transit fleet. This service includes the capability for a traveler request for personalized transit services to be made through the Information Service Provider (ISP) Subsystem. The ISP may either be operated by a transit management center or be independently owned and operated by a separate service provider. In the first scenario, the traveler makes a direct request to a specific paratransit service. In the second scenario, a third party service provider determines that the paratransit service is a viable means of satisfying a traveler request and makes a reservation for the traveler.

Valley Regional Transit Center
Valley Regional Transit Paratransit Vehicle Operator -- Not Selected
Valley Regional Transit Paratransit Vehicles

Functional Requirements
VRT Paratransit Operations
7/9/2009 2:01:17PM

Architecture		Status
VRT Paratransit Operations		Short-term
Element: **Valley Regional Transit Center**		
Entity: **Transit Management**		
Functional Area: **Transit Center Vehicle Tracking** Monitoring transit vehicle locations via interactions with on-board systems. Furnish users with real-time transit schedule information and maintain interface with digital map providers.		
Requirement:	1 The center shall monitor the locations of all transit vehicles within its network.	Existing
Requirement:	2 The center shall determine adherence of transit vehicles to their assigned schedule.	Short-term
Requirement:	3 The center shall support an interface with a map update provider, or other appropriate data sources, through which updates of digitized map data can be obtained and used as a background for transit tracking and dispatch.	Existing
Functional Area: **Transit Center Paratransit Operations** Management of demand response transit services, including paratransit. Planning and scheduling of these services. Supports automated vehicle dispatch and automatically updates customer service operator systems.		
Requirement:	1 The center shall process trip requests for demand responsive transit services, i.e. paratransit. Sources of the requests may include traveler information service providers.	Short-term
Requirement:	2 The center shall monitor the operational status of the demand response vehicles including status of passenger pick-up and drop-off.	Short-term
Requirement:	3 The center shall generate demand response transit (including paratransit) routes and schedules based on such factors as parameters input by the system operator, what other demand responsive transit schedules have been planned, the availability and location of vehicles, the relevance of any fixed transit routes and schedules, and road network information.	Short-term
Requirement:	5 The center shall dispatch demand response (paratransit) transit vehicles.	Short-term
Requirement:	8 The center shall collect the log of passenger boardings and alightings from the paratransit vehicles.	Short-term
Functional Area: **Transit Vehicle Operator Assignment** Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.		

Architecture		Status
VRT Paratransit Operations		Short-term
Element: **Valley Regional Transit Center**		
Entity: **Transit Management**		
Functional Area: **Transit Vehicle Operator Assignment** Assignment of transit operators to runs in a fair manner while minimizing labor and overtime services, considering operator preferences, qualifications, accumulated work hours, and other information about each operator.		
Requirement:	1 The center shall maintain records of a transit vehicle operator's performance. This may be done utilizing standardized performance evaluation criteria set forth by governmental regulations and transit operating company policies, assessing the transit vehicle operator's driving history, and assessing comments from the transit vehicle operator's supervisor(s) as well as noting any moving violations or accidents, supervisor comments, government regulations, and company policies.	Short-term
Requirement:	2 The center shall assess the transit vehicle operator's availability based on previous work assignments, accumulated hours, plus health and vacation commitments.	Short-term
Requirement:	3 The center shall assign transit vehicle operators to transit schedules based on their eligibility, route preferences, seniority, and transit vehicle availability.	Short-term
Requirement:	4 The center shall provide an interface through which the transit vehicle operator information can be maintained - either from the transit vehicle operator, center personnel, or other functions.	Short-term
Requirement:	5 The center shall generate supplemental vehicle operator assignments as required due to change events that occur during the operating day.	Short-term
Element: **Valley Regional Transit Paratransit Vehicles**		
Entity: **Transit Vehicle Subsystem**		
Functional Area: **On-board Transit Trip Monitoring** Support fleet management with automatic vehicle location (AVL) and automated mileage and fuel reporting and auditing.		
Requirement:	1 The transit vehicle shall compute the location of the transit vehicle based on inputs from a vehicle location determination function.	Short-term
Requirement:	3 The transit vehicle shall record transit trip monitoring data including vehicle mileage and fuel usage.	Short-term
Requirement:	5 The transit vehicle shall send the transit vehicle trip monitoring data to center-based trip monitoring functions.	Short-term
Functional Area: **On-board Schedule Management** Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.		
Requirement:	1 The transit vehicle shall receive a vehicle assignment including transit route information, transit service instructions, traffic information, road conditions, and other information for the operator.	Short-term
Requirement:	2 The transit vehicle shall use the route information and its current location to determine the deviation from the predetermined schedule.	Short-term

Architecture		Status
VRT Paratransit Operations		Short-term
Element: **Valley Regional Transit Paratransit Vehicles**		
Entity: **Transit Vehicle Subsystem**		
Functional Area: **On-board Schedule Management** Collecting of data for schedule generation and adjustment on-board a transit vehicle. Supports communication between the vehicle, operator, and center.		
Requirement:	3 The transit vehicle shall calculate the estimated times of arrival (ETA) at transit stops.	Short-term
Requirement:	5 The transit vehicle shall provide the schedule deviations and instructions for schedule corrections to the transit vehicle operator if the deviation is small, or the transit vehicle is operating in an urban area.	Short-term
Requirement:	6 The transit vehicle shall send the schedule deviation and estimated arrival time information to the center.	Short-term
Requirement:	7 The transit vehicle shall support the operations of a flexible route service. This may include requests for route deviations that would then lead to schedule corrective actions.	Short-term
Functional Area: **On-board Paratransit Operations** On-board systems to manage paratransit and flexible-route dispatch requests, including multi-stop runs. Passenger data is collected and provided to the		
Requirement:	2 The transit vehicle shall receive the status of demand responsive or flexible-route transit schedules and passenger loading from the transit vehicle operator.	Short-term
Requirement:	3 The transit vehicle shall provide the transit vehicle operator instructions about the demand responsive or flexible-route transit schedule that has been confirmed from the center.	Short-term
Requirement:	4 The transit vehicle shall provide the capability to log passenger boardings and alightings and make passenger use data available to the transit center.	Short-term

Market Packages for Project VRT- Automated Passenger Counters

Market Package **Element(s)**

Market Packages (Transportation Services)

7/8/2009 10:33:27AM

Transit Passenger Counting

This market package counts the number of passengers entering and exiting a transit vehicle using sensors mounted on the vehicle and communicates the collected passenger data back to the management center. The collected data can be used to calculate reliable ridership figures and measure passenger load information at particular stops.

Valley Regional Transit Center
Valley Regional Transit Vehicles

Functional Requirements
VRT- Automated Passenger Counters
7/9/2009 2:00:18PM

Architecture		Status
VRT- Automated Passenger Counters		Medium-Term
Element: **Valley Regional Transit Center**		
Entity: **Transit Management**		
Functional Area: **Transit Center Passenger Counting** Receives and processes transit vehicle loading data using two-way communications from equipped transit vehicles.		
Requirement:	1 The center shall collect passenger count information from each transit vehicle.	Medium-Term
Requirement:	2 The center shall calculate transit ridership data by route, route segment, transit stop, time of day, and day of week based on the collected passenger count information.	Medium-Term
Requirement:	3 The center shall make the compiled ridership data available to the system operator and other applications.	Medium-Term
Element: **Valley Regional Transit Vehicles**		
Entity: **Transit Vehicle Subsystem**		
Functional Area: **On-board Passenger Counting** On-board systems collect transit vehicle loading data and make it available to the center.		
Requirement:	1 The transit vehicle shall count passengers boarding and alighting.	Medium-Term
Requirement:	2 The passenger counts shall be related to location to support association of passenger counts with routes, route segments, or bus stops.	Medium-Term
Requirement:	3 The passenger counts shall be timestamped so that ridership can be measured by time of day and day of week.	Medium-Term
Requirement:	4 The transit vehicle shall send the collected passenger count information to the transit center.	Medium-Term

Market Packages for Project VRT- Real-time Bus Stop Displays

Market Package **Element(s)**

Market Packages (Transportation Services)

7/8/2009 10:36:41AM

Transit Traveler Information (Real-time bus stop displays) [Instance] (APTS08) -- Medium-Term

This market package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this market package.

Valley Regional Transit Center
Valley Regional Transit Facilities

Functional Requirements
VRT- Real-time Bus Stop Displays
7/9/2009 2:02:10PM

Architecture		Status
VRT- Real-time Bus Stop Displays		Medium-Term
Element: **Valley Regional Transit Center**		
Entity: **Transit Management**		
Functional Area: **Transit Center Information Services** Provide interactive traveler information to travelers (on-board transit vehicles, at stops/stations, using personal devices), traveler information service providers, media, and other transit organizations. Includes routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, yellow pages, and special events.		
Requirement:	1 The center shall provide travelers using public transportation with traffic and advisory information upon request. Such information may include transit routes, schedules, transfer options, fares, real-time schedule adherence, current incidents, weather conditions, and special events.	Medium-Term
Element: **Valley Regional Transit Facilities**		
Entity: **Remote Traveler Support**		
Functional Area: **Remote Basic Information Reception** Public traveler interface, such as a kiosk, that provides formatted traffic advisories, transit, event, and other traveler information, as well as broadcast alerts.		
Requirement:	2 The public interface for travelers shall receive transit information from a center and present it to the traveler.	Medium-Term
Requirement:	8 The public interface for travelers shall present information to the traveler in audible or visual forms consistent with a kiosk, including those that are suitable for travelers with hearing or vision physical disabilities.	Medium-Term

Market Packages for Project Commuteride Vanpool Management

Market Package **Element(s)**

Market Packages (Transportation Services)

7/8/2009 10:30:49AM

Dynamic Ridesharing (Vanpool) [Instance] (ATIS08) -- Short-term

This market package provides dynamic ridesharing/ride matching services to travelers. This service could allow near real time ridesharing reservations to be made through the same basic user equipment used for Interactive Traveler Information. This ridesharing/ride matching capability also includes arranging connections to transit or other multimodal services.

Commuteride Vanpool System
User Personal Computing Devices

Functional Requirements
Commuteride Vanpool Management
7/9/2009 1:57:17PM

Architecture			Status
Commuteride Vanpool Management			Short-term
Element: **Commuteride Vanpool System**			
Entity: **Information Service Provider**			
Functional Area: **Infrastructure Provided Dynamic Ridesharing** Dynamic rideshare matching, including traveler eligibility, preference information, connections to transit or other multimodal services, confirmation, and payment of rideshare matching services.			
Requirement:	1	The center shall accept requests from traveler interface systems for ridesharing as part of a trip plan request.	Short-term
Requirement:	2	The center shall provide a rideshare match based on origin and destination of the traveler's proposed trip, any routing constraints, preferences specified by the traveler, compatibility of this rideshare with rideshares confirmed by other travelers, the requesting traveler's eligibility data, and traffic data.	Short-term
Requirement:	3	The center shall process rideshare requests by balancing the relative benefits of the rideshare to each rideshare participant.	Short-term
Requirement:	6	The center shall store all rideshare matches and traveler eligibility data.	Short-term
Element: **User Personal Computing Devices**			
Entity: **Personal Information Access**			
Functional Area: **Personal Interactive Information Reception** Personal traveler interface that provides traffic, transit, yellow pages, event, and trip planning information, and other personalized traveler information services upon request. Devices include personal computers and personal portable devices such as PDAs.			
Requirement:	7	The personal traveler interface shall accept reservations for confirmed trip plans.	Short-term
Requirement:	10	The personal traveler interface shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	Short-term

Market Package **Element(s)**

Market Packages (Transportation Services)

7/8/2009 10:30:11AM

Transit Security (Instance 1) [Instance] (APTS05) -- Short-term

This market package provides for the physical security of transit passengers and transit vehicle operators. On-board equipment is deployed to perform surveillance and sensor monitoring in order to warn of potentially hazardous situations. The surveillance equipment includes video (e.g., CCTV cameras), audio systems and/or event recorder systems. The sensor equipment includes threat sensors (e.g., chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors (e.g., metal detectors). Transit user or transit vehicle operator activated alarms are provided on-board. Public areas (e.g., transit stops, park and ride lots, stations) are also monitored with similar surveillance and sensor equipment and provided with transit user activated alarms. In addition this market package provides surveillance and sensor monitoring of non-public areas of transit facilities (e.g., transit yards) and transit infrastructure such as bridges, tunnels, and transit railways or bus rapid transit (BRT) guideways. The surveillance equipment includes video and/or audio systems. The sensor equipment includes threat sensors and object detection sensors as described above as well as, intrusion or motion detection sensors and infrastructure integrity monitoring (e.g., rail track continuity checking or bridge structural integrity monitoring).

The surveillance and sensor information is transmitted to the Emergency Management Subsystem, as are transit user activated alarms in public secure areas. On-board alarms, activated by transit users or transit vehicle operators are transmitted to both the Emergency Management Subsystem and the Transit Management Subsystem, indicating two possible approaches to implementing this market package.

In addition the market package supports remote transit vehicle disabling by the Transit Management Subsystem and transit vehicle operator authentication.

ACHD Traffic Management Center
Commuteride Park and Ride Facilities

Functional Requirements
Commuteride Park and Ride Surveillance

7/9/2009 1:56:52PM

Architecture		Status
Commuteride Park and Ride Surveillance		Short-term
Element: **ACHD Traffic Management Center**		
Entity: **Emergency Management**		
Functional Area: **Center Secure Area Surveillance** Management of security surveillance devices and analysis of that data to detect potential threats. Areas under surveillance may include transit stops, transit stations, rest areas, park and ride lots, modal interchange facilities, on-board a transit vehicle, etc.		
Requirement:	2 The center shall remotely monitor video images and audio surveillance data collected in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers). The data may be raw or pre-processed in the field.	Short-term
Requirement:	8 The center shall remotely control security surveillance devices in traveler secure areas, which include transit stations, transit stops, rest areas, park and ride lots, and other fixed sites along travel routes (e.g., emergency pull-off areas and travel information centers).	Short-term
Element: **Commuteride Park and Ride Facilities**		
Entity: **Security Monitoring Subsystem**		
Functional Area: **Field Secure Area Surveillance** Security surveillance devices (audio/video) that monitor facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, and transit railways or guideways).		
Requirement:	1 The field element shall include video and/or audio surveillance of secure areas including facilities (e.g. transit yards) and transportation infrastructure (e.g. bridges, tunnels, interchanges, roadway infrastructure, and transit railways or guideways).	Short-term
Requirement:	2 The field element shall be remotely controlled by a center.	Short-term
Requirement:	3 The field element shall provide equipment status and fault indication of surveillance equipment to a center.	Short-term
Requirement:	4 The field element shall provide raw video or audio data.	Short-term

Market Packages for Project Commuteride in-vehicle Safety

Market Package **Element(s)**

Market Packages (Transportation Services)

7/8/2009 10:27:13AM

Interactive Traveler Information (commuterride) [Instance] (ATIS02) -- Short-term

This market package provides tailored information in response to a traveler request. Both real-time interactive request/response systems and information systems that "push" a tailored stream of information to the traveler based on a submitted profile are supported. The traveler can obtain current information regarding traffic conditions, roadway maintenance and construction, transit services, ride share/ride match, parking management, detours and pricing information. Although the Internet is the predominate network used for traveler information dissemination, a range of two-way wide-area wireless and fixed-point to fixed-point communications systems may be used to support the required data communications between the traveler and Information Service Provider. A variety of interactive devices may be used by the traveler to access information prior to a trip or en route including phone via a 511-like portal and web pages via kiosk, personal digital assistant, personal computer, and a variety of in-vehicle devices. This market package also allows value-added resellers to collect transportation information that can be aggregated and be available to their personal devices or remote traveler systems to better inform their customers of transportation conditions. Successful deployment of this market package relies on availability of real-time transportation data from roadway instrumentation, transit, probe vehicles or other means. A traveler may also input personal preferences and identification information via a “traveler card” that can convey information to the system about the traveler as well as receive updates from the system so the card can be updated over time.

Ada County 911 Emergency Call Center	-- Not Selected
Canyon County 911 Center	-- Not Selected
Commuteride Vehicles	
ITD 511	

Mayday and Alarms Support

This market package allows the user (driver or non-driver) to initiate a request for emergency assistance and enables the Emergency Management Subsystem to locate the user, gather information about the incident, and determine the appropriate response. The request for assistance may be manually initiated or automated and linked to vehicle sensors. This market package also includes general surveillance capabilities that enable the Emergency Management Subsystem to remotely monitor public areas (e.g., rest stops, parking lots) to improve security in these areas. The Emergency Management Subsystem may be operated by the public sector or by a private sector telematics service provider.

Ada County 911 Emergency Call Center
Canyon County 911 Center
Commuteride Vehicles

Functional Requirements
Commuteride in-vehicle Safety
7/9/2009 1:56:22PM

Architecture		Status
Commuteride in-vehicle Safety		Short-term
Element: **Ada County 911 Emergency Call Center**		
Entity: **Emergency Management**		
Functional Area: **Emergency Call-Taking** Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.		
Requirement:	4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Short-term
Element: **Canyon County 911 Center**		
Entity: **Emergency Management**		
Functional Area: **Emergency Call-Taking** Provides interface to the emergency call-taking systems such as the Emergency Telecommunications System (e.g., 911) that correlate call information with emergencies reported by transit agencies, commercial vehicle operators, or other public safety agencies. Allows the operator to verify the incident and forward the information to the responding agencies.		
Requirement:	4 The center shall receive emergency call information from mayday service providers and present the possible incident information to the emergency system operator.	Short-term
Element: **Commuteride Vehicles**		
Entity: **Vehicle**		
Functional Area: **Vehicle Mayday I/F** In-vehicle capability for drivers or collision detection sensors onboard a vehicle to report an emergency and summon assistance.		
Requirement:	1 The vehicle shall provide the capability for a driver to report an emergency and summon assistance.	Short-term
Requirement:	2 The vehicle shall provide the capability to accept input from a driver via a panic button or some other functionally similar form of input device provided as part of the in-vehicle equipment.	Short-term
Requirement:	3 The vehicle shall provide the capability to automatically identify that a collision has occurred using equipment such as collision detection sensors with an interface to mayday type equipment that would automatically detect vehicle problems and send appropriate distress signals to a center.	Short-term
Requirement:	4 The vehicle shall forward a request for assistance to a center containing the driver's current location, its identity and basic vehicle data relevant to its current condition, as well as any other data, such as personal medical history, vehicle orientation, etc., that may be developed in-vehicle by other systems.	Short-term
Requirement:	5 The vehicle shall acknowledge the driver's request for emergency assistance.	Short-term

Architecture		Status
Commuteride in-vehicle Safety		Short-term
Element: **Commuteride Vehicles**		
Entity: **Vehicle**		
Functional Area: **Vehicle Mayday I/F** In-vehicle capability for drivers or collision detection sensors onboard a vehicle to report an emergency and summon assistance.		
Requirement:	6 The vehicle shall provide further details about the emergency to the center upon request from that function.	Short-term
Element: **ITD 511**		
Entity: **Information Service Provider**		
Functional Area: **Basic Information Broadcast** Broadcast dissemination of traffic, transit, maintenance and construction, event, and weather information to traveler interface systems and vehicles.		
Requirement:	1 The center shall disseminate traffic and highway condition information to travelers, including incident information, detours and road closures, event information, recommended routes, and current speeds on specific routes.	Short-term
Requirement:	2 The center shall disseminate maintenance and construction information to travelers, including scheduled maintenance and construction work activities and work zone activities.	Short-term
Requirement:	4 The center shall disseminate parking information to travelers, including location, availability, and fees.	Short-term
Requirement:	6 The center shall disseminate weather information to travelers.	Short-term
Requirement:	7 The center shall disseminate event information to travelers.	Short-term

Market Package **Element(s)**

Market Packages (Transportation Services)

7/8/2009 10:26:05AM

Dynamic Ridesharing

This market package provides dynamic ridesharing/ride matching services to travelers. This service could allow near real time ridesharing reservations to be made through the same basic user equipment used for Interactive Traveler Information. This ridesharing/ride matching capability also includes arranging connections to transit or other multimodal services.

Commuteride Ridesharing
User Personal Computing Devices

Functional Requirements
Commuteride Dynamic Rideshare Matching
7/9/2009 1:55:29PM

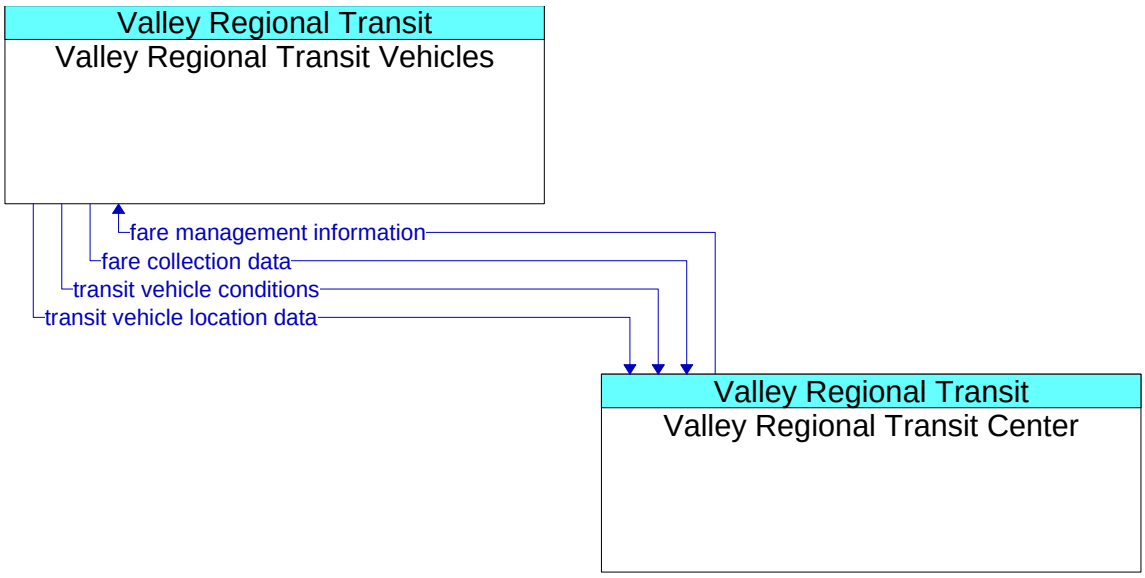
Architecture		Status
Commuteride Dynamic Rideshare Matching		Medium-Term
Element: **Commuteride Ridesharing**		
Entity: **Information Service Provider**		
Functional Area: **Infrastructure Provided Dynamic Ridesharing** Dynamic rideshare matching, including traveler eligibility, preference information, connections to transit or other multimodal services, confirmation, and payment of rideshare matching services.		
Requirement:	1 The center shall accept requests from traveler interface systems for ridesharing as part of a trip plan request.	Medium-Term
Requirement:	2 The center shall provide a rideshare match based on origin and destination of the traveler's proposed trip, any routing constraints, preferences specified by the traveler, compatibility of this rideshare with rideshares confirmed by other travelers, the requesting traveler's eligibility data, and traffic data.	Medium-Term
Requirement:	3 The center shall process rideshare requests by balancing the relative benefits of the rideshare to each rideshare participant.	Medium-Term
Requirement:	5 The center shall provide a confirmation of the traveler's rideshare match and provide the capability to support a payment transaction for the rideshare service.	Medium-Term
Requirement:	6 The center shall store all rideshare matches and traveler eligibility data.	Medium-Term
Element: **User Personal Computing Devices**		
Entity: **Personal Information Access**		
Functional Area: **Personal Interactive Information Reception** Personal traveler interface that provides traffic, transit, yellow pages, event, and trip planning information, and other personalized traveler information services upon request. Devices include personal computers and personal portable devices such as PDAs.		
Requirement:	2 The personal traveler interface shall receive transit information from a center and present it to the traveler upon request.	Medium-Term
Requirement:	7 The personal traveler interface shall accept reservations for confirmed trip plans.	Medium-Term
Requirement:	10 The personal traveler interface shall base requests from the traveler on the traveler's current location or a specific location identified by the traveler, and filter the provided information accordingly.	Medium-Term
Requirement:	14 The personal traveler interface shall be able to store frequently requested or used data, including the traveler's identity, home and work locations, etc.	Medium-Term

Information

Flow Diagrams

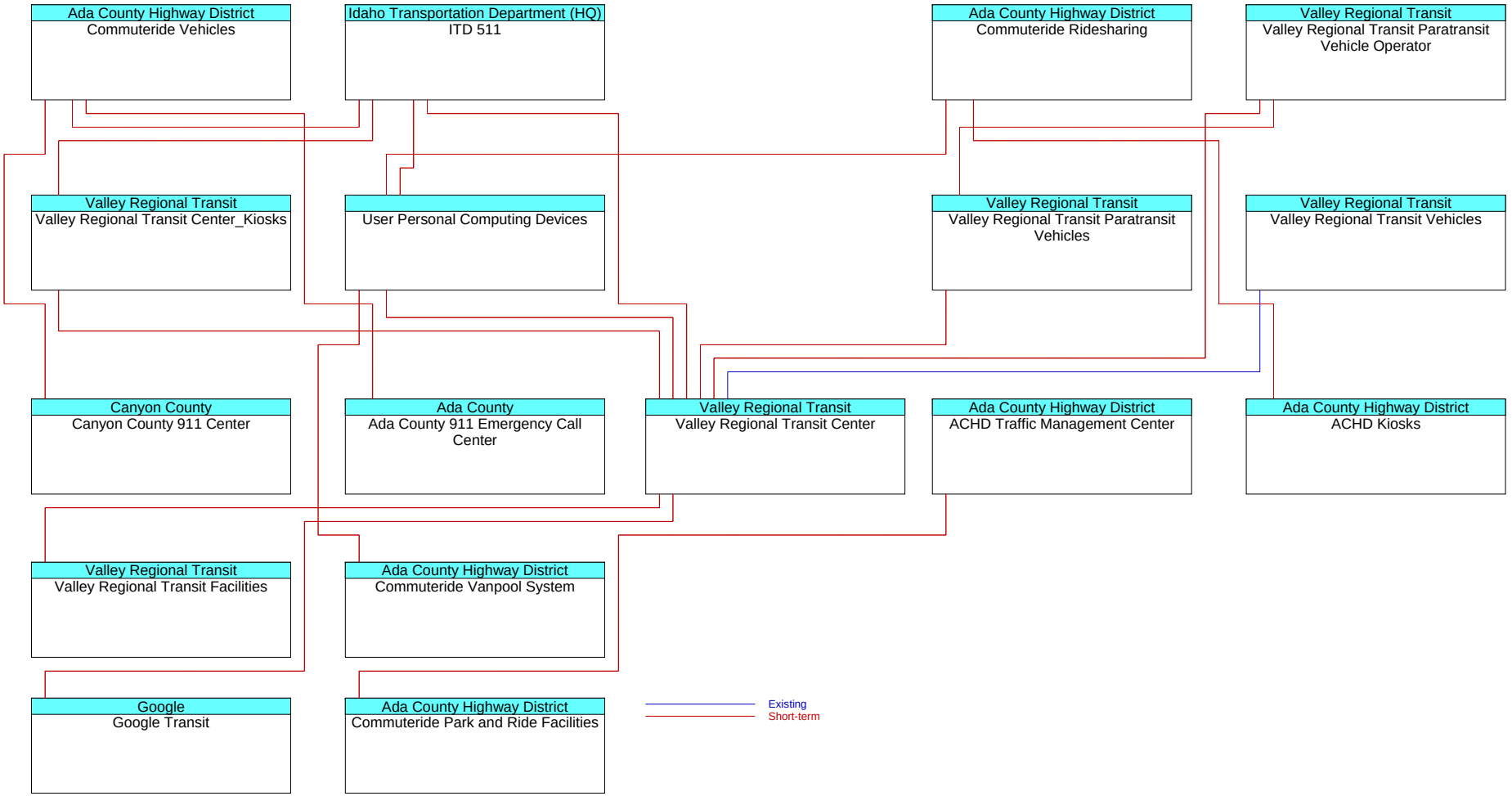
Flow Diagrams Report

VRT Existing Systems Flow Diagram:

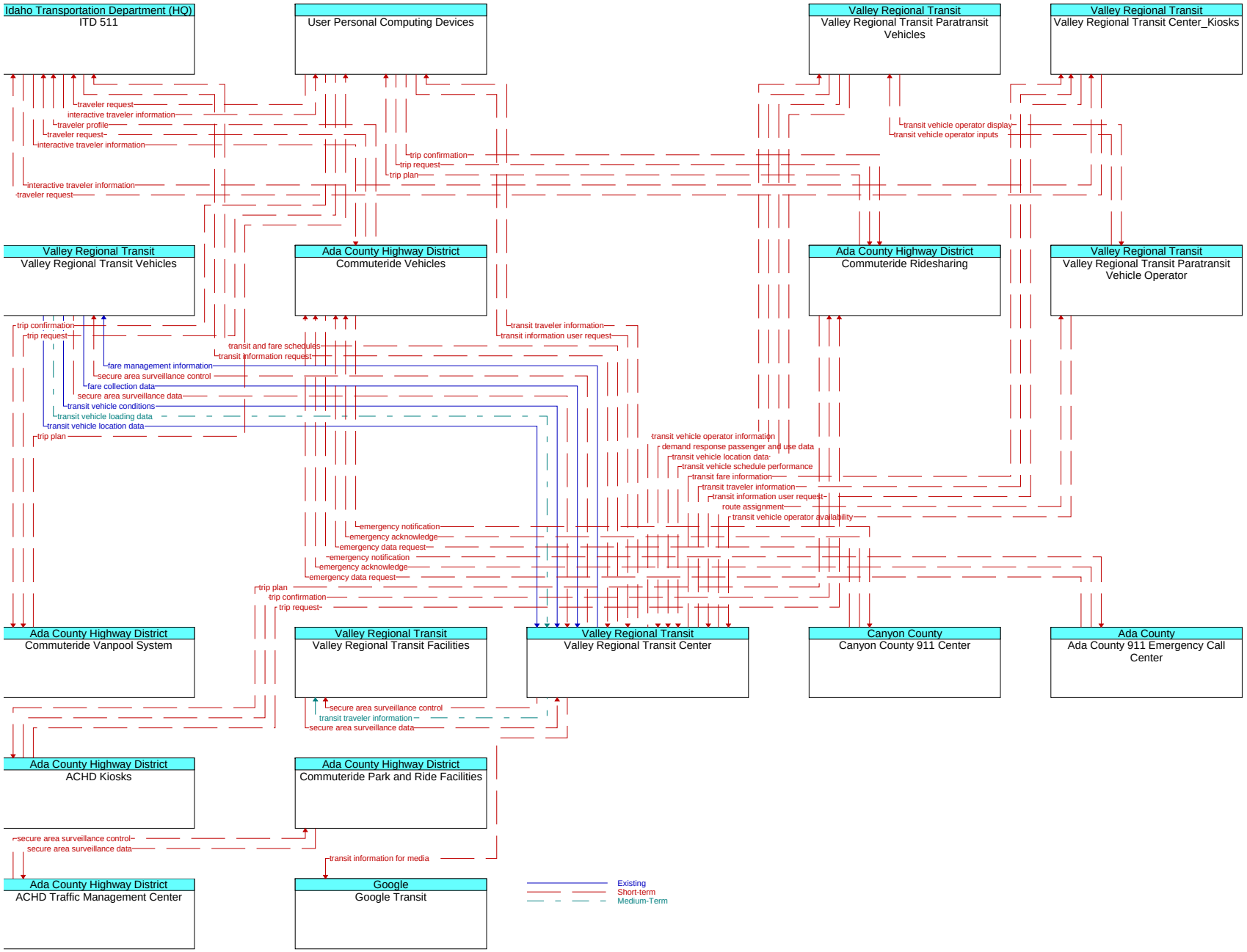


Existing

All Systems Interconnect Diagram

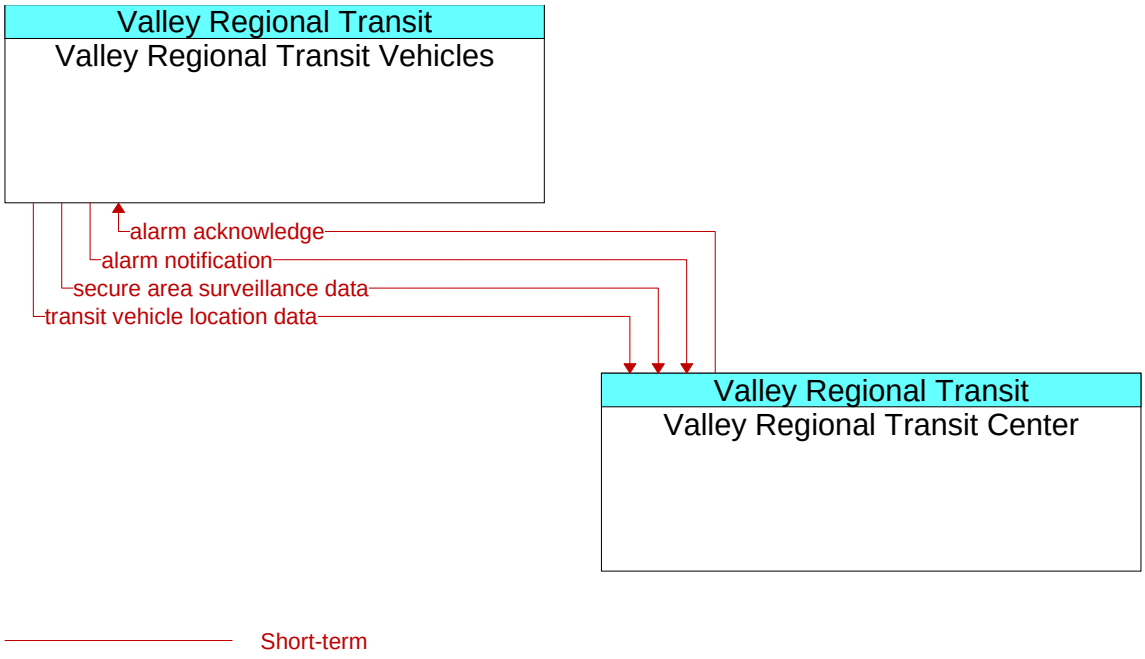


All Systems Flow Diagram



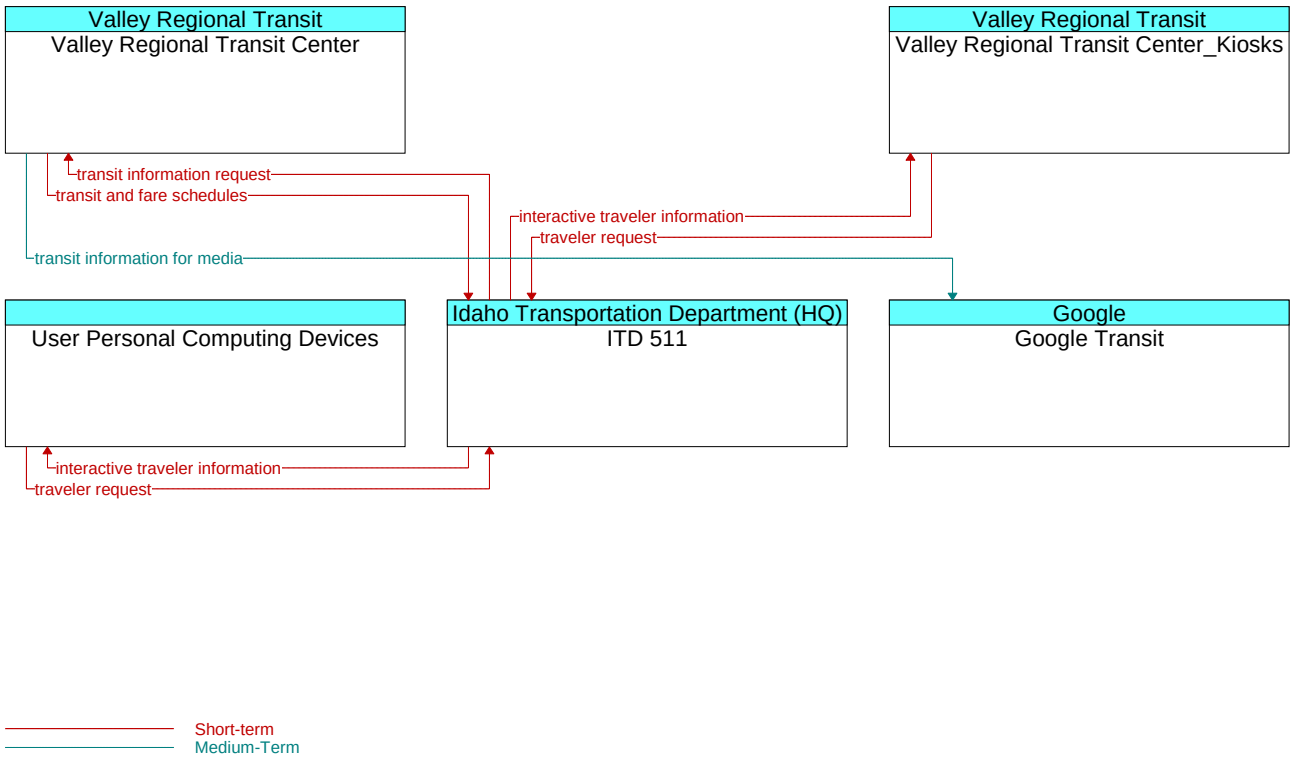
Project: Surveillance cameras on buses

Flow Diagram:



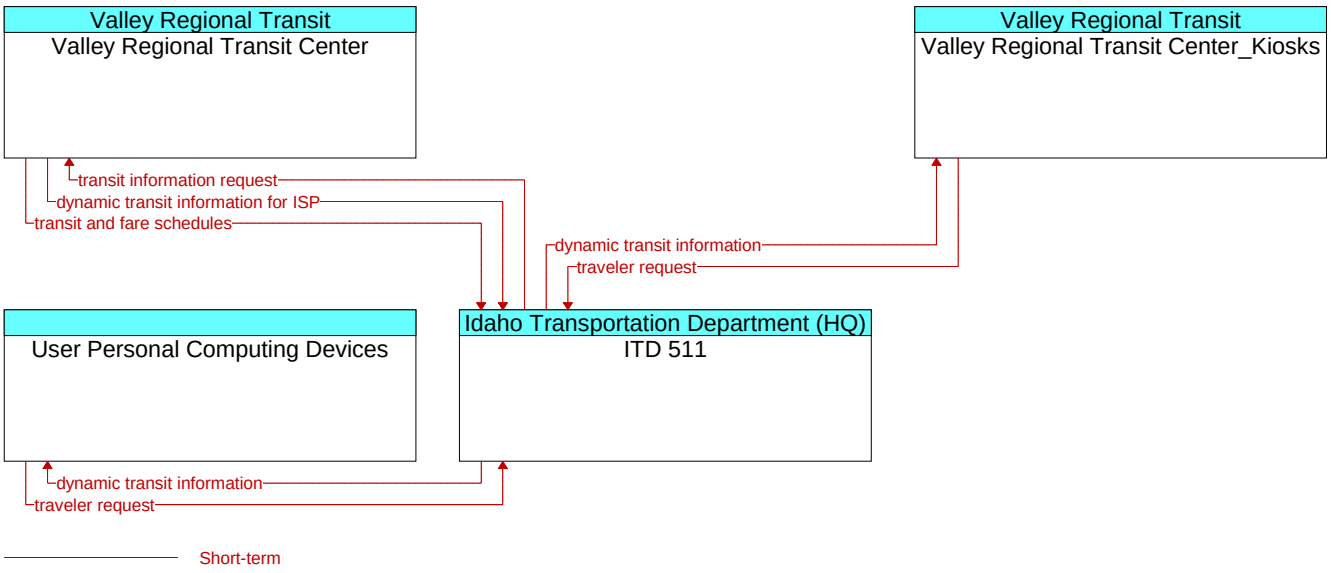
Project: Web-based route/trip planner

Flow Diagram:



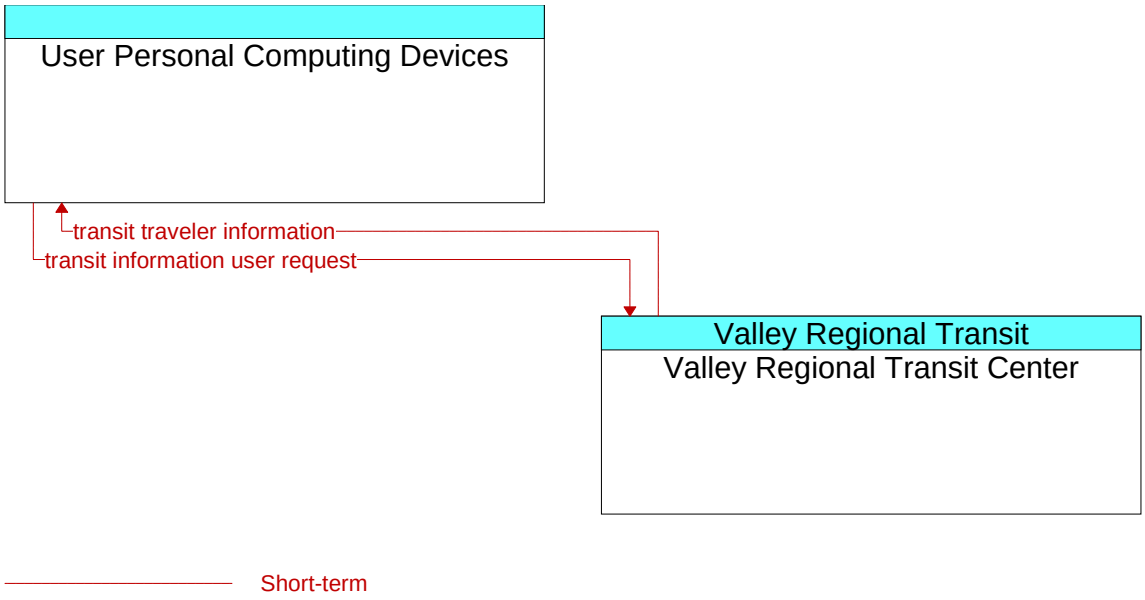
Project: Web-based traveler information

Flow Diagram:



Project: Personalized push-based traveler information

Flow Diagram:



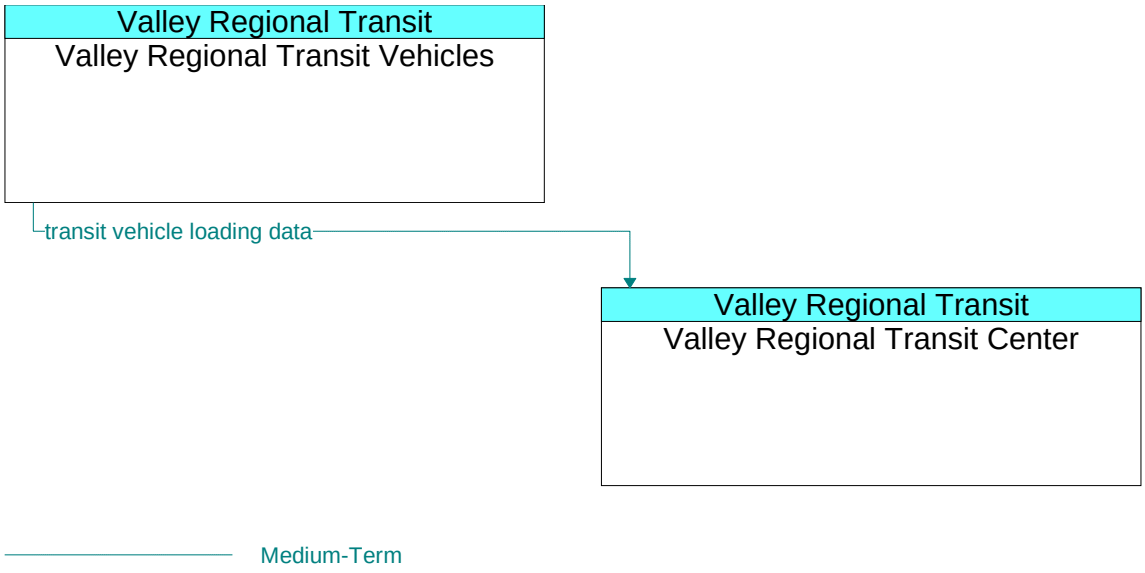
Project: Automatic stop annunciators

Flow Diagram:

No Flow Diagram for Automatic stop annunciators – all data management completed within the bus.

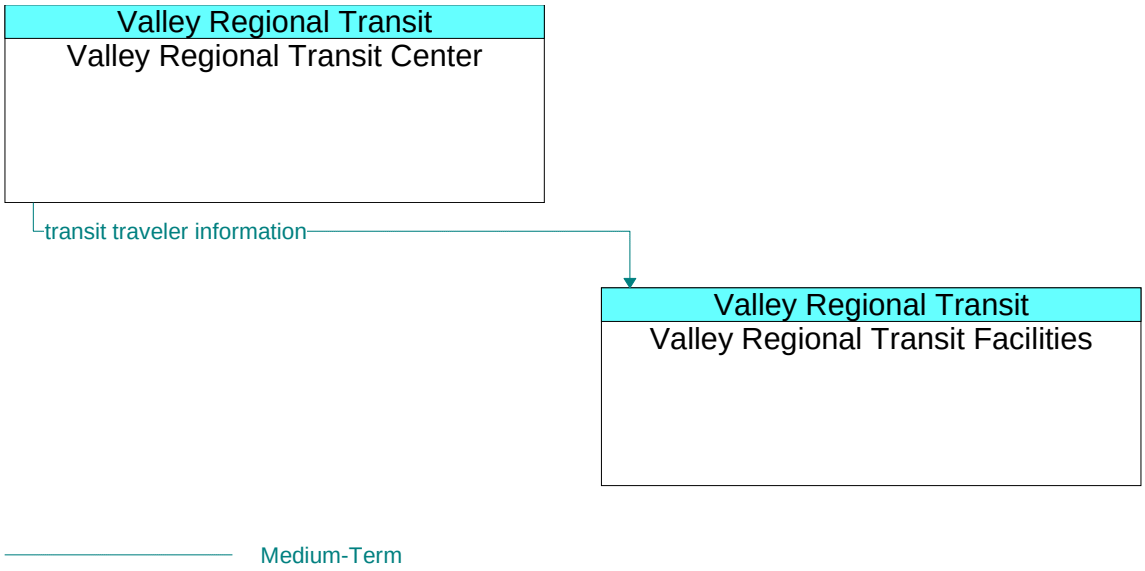
Project: Automatic passenger counters

Flow Diagram:



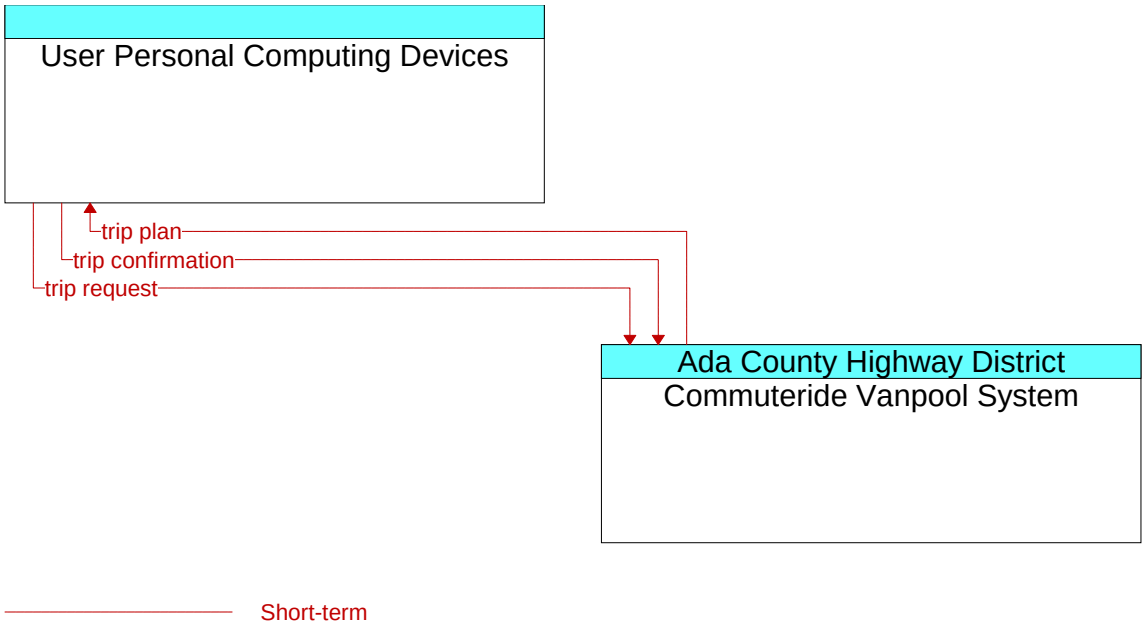
Project: Real-time information displays at select bus stops

Flow Diagram:



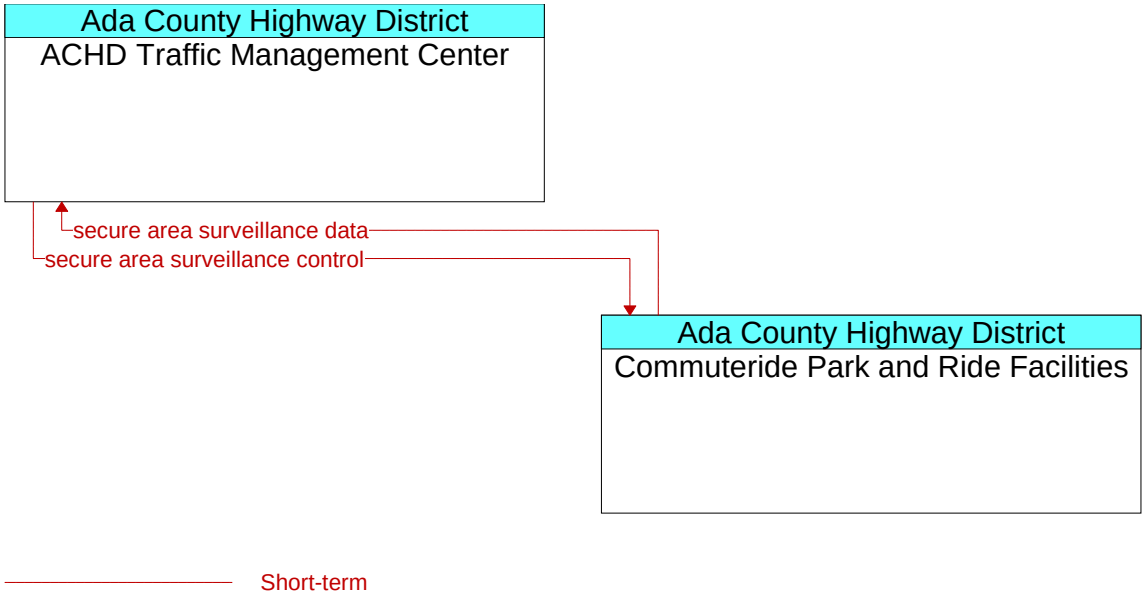
Project: Vanpool management software

Flow Diagram:



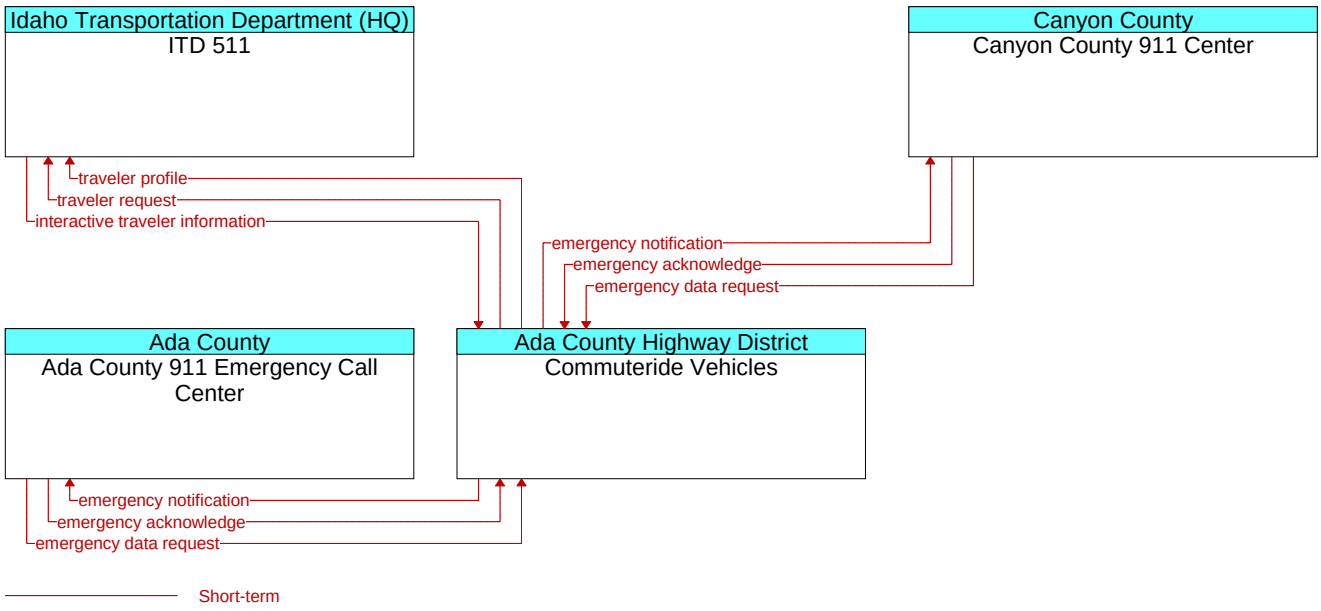
Project: Park-n-Ride lot security surveillance

Flow Diagram:



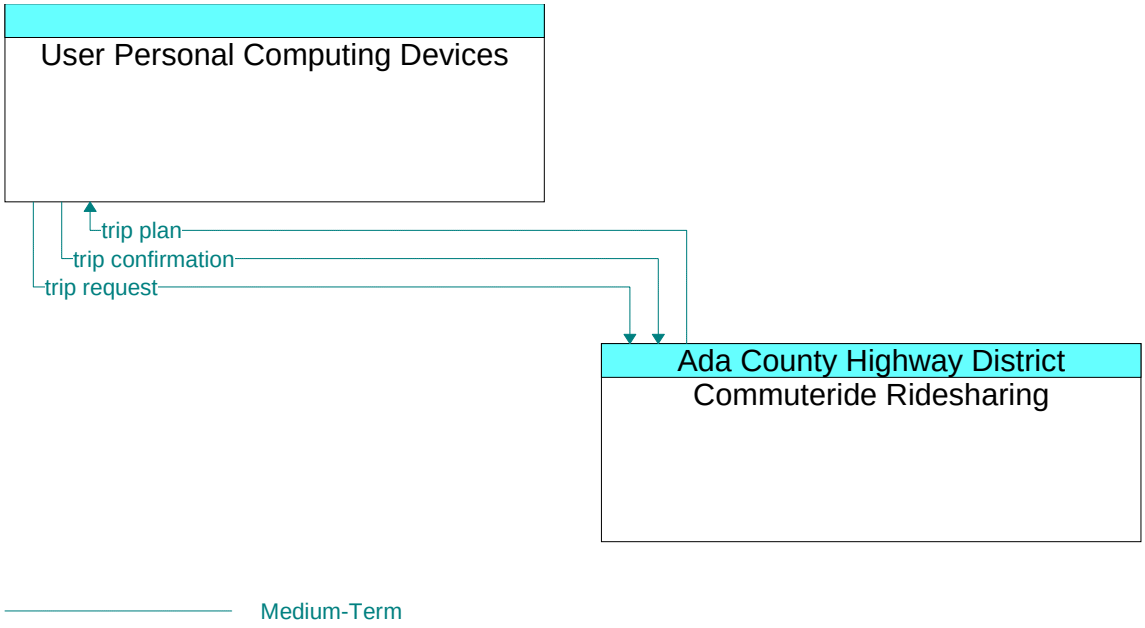
Project: In-vehicle safety technologies

Flow Diagram:



Project: Dynamic rideshare matching enhancements

Flow Diagram:



Project Sequencing Output

Project Name **Timeframe**

VRT Project Sequencing

by Timeframe

7/8/2009 9:41:05AM

VRT Transit - 2009

Description: The existing ITS deployed for transit in 2009

Status: Existing

Commuteride in-vehicle Safety

Description: In-vehicle safety technologies Currently, Commuteride does not provide communications for vanpool vans. The drivers are volunteers and are allowed to carry their own personal cellular devices. However, a more focused approach deploying in-vehicle equipment such as an MDT or palmtop device for the purpose of providing drivers access to the ITD 511 system and other weather and road condition reports will add significantly to the safety of vanpool trips. This technology could also be combined with GPS capabilities for the purpose of incident response. Because of the nature of vanpool operations AVL for dispatch is unnecessary but the use of GPS and communications for response to incidents involving a vanpool van such as a crash or disabled vehicle will greatly enhance overall safety.

Status: Short-term

Commuteride Park and Ride Surveillance

Description: Commuteride manages a number of park and ride lots and uses them to arrange ride sharing. Many of the lots are remote and used during early morning and late evening hours. Users have expressed concerns regarding both personal safety and vehicle security at the lots. This technology would install CCTV cameras at park and ride lots to enhance security. These cameras could be made accessible to Commuteride operations personnel, State EMS Communications Center, ITD, ISP or others as deemed appropriate and could be configured to record video for playback if needed.

Status: Short-term

Commuteride Vanpool Management

Description: Commuteride currently uses an ACHD resident system to manage some of the business elements such as financial and maintenance recording. However, management of vanpool operations is currently being done using a Microsoft Access database developed in house. A more robust and comprehensive system would greatly streamline the vanpool management and improve the accuracy, reporting and efficiency of the vanpool management activity.

Several options are envisioned to meet this need.
1. Purchase an off the shelf system and tailor to Commuteride's needs
2. Contract to have a system built from scratch
3. Contract to build upon and expand the capabilities of the existing Access system

Status: Short-term

VRT - Automated Stop Annunciators

Description: Stops are announced on buses in accordance with ADA requirements. Announcements can be made manually by the operator or automated to varying degrees - via push button, GPS trigger, transponder, etc. This technology will deploy automatic stop annunciators on VRT buses to integrate with the AVL/GPS system. Stops will be automatically announced based on GPS information as compared with the next stop location without input from the operator.

The market package for this technology was identified in the 2006 architecture as existing.

Status: Short-term

VRT On-board Surveillance

Description: While security issues on busses occur only rarely, video monitoring systems can provide a significant measure of safety for passengers and drivers as well as support to law enforcement and emergency responders. The systems being considered and planned consist of CCTV cameras and communications links to allow remote monitoring of busses and bus facilities. Once deployed, the cameras will provide real time video images to dispatchers who could then initiate a response to any security related issues.

The market package for this technology was identified in the 2006 architecture as planned.

Project Name **Timeframe**

Status: Short-term

VRT Personalized Push-based Traveler Information

Description: With this technology in place users can sign up for transit information and news. The information can be prioritized and the system can be configured so users can select a level of priority for which they would like to get messages. These systems can allow service area based messaging, route level based messaging or both depending on the robustness of system and data collection and the needs of users.

The market package for this technology was identified in the 2006 architecture as existing.

Status: Short-term

VRT Web-based Route/Trip Planning

Description: Closely associated with trip planning technology, traveler information is provided to on-line customers from a combination of static data and real-time information. Users are able to more effectively consider transit options for future trips or to assess immediate transportation options and scheduling. The real-time information relies on automatic vehicle location and can provide users with up-to-the-minute delays and schedule adjustments.

The market package for this technology was identified in the 2006 architecture as existing.

Status: Short-term

VRT Web-based Traveler Information

Description: This technology allows transit users to effectively plan transit trips via Internet-based applications that couple users needs with available services. When users input trip related needs, the system works with stored data to select the appropriate route and timing. The output is then presented to the user for on-screen viewing or printing and can include route designations, stop locations, required fares, transfer information, walking times or distances, and overall transit time estimates.

The market packages for this technology were identified in the 2006 architecture as existing.

Status: Short-term

Commuteride Dynamic Rideshare Matching

Description: Commuteride currently provides ridesharing services and has programs in place to help users with rideshare matching for carpools. The application was developed for the King County Washington region and is not entirely effective for the Treasure Valley needs. In addition, the current service is not set up to work for the vanpool services and does not yet meet the near real time measure for dynamic ridesharing. This effort will implement a solution that meets both the carpool ride matching and vanpool ride matching needs as well as providing a near real time service via the internet.

Status: Medium-Term

VRT- Real-time Bus Stop Displays

Description: Transit travelers often need transit related information while at a bus stop or transit center. Information displays such as video monitors and reader boards can help to provide real-time information to users helping them to assess delays and estimated arrival times. This technology would be deployed at select locations where large numbers of users access transit and utilities are available.

The market package for this technology was identified in the 2006 architecture as existing.

Status: Medium-Term

VRT- Automated Passenger Counters

Description: Several technologies exist to count passengers boarding and alighting from buses. Most use either infrared or optical scanning technologies. Automated passenger counters can provide a useful means of more accurately reporting ridership data to the NTD and provide better data for effective transit systems operational refinements.

The market package for this technology was not identified in the 2006 architecture because it was not available in version 5.1 of the National ITS Architecture.

Status: Medium-Term

Project Name **Timeframe**

Status Value Legend

Name	Description
Existing	
Short-term	zero to five years
Long-term	ten years and beyond
Medium-Term	five to ten years
Not Planned	

Attachment 2

Treasure Valley Architecture

Change Form

Completed
July 2009

Change Title:	***Transit Additions Architecture Maintenance***	Date of Origination:	***April 2009***
Description of Suggested Change:	***Both Valley Regional Transit and Ada County Highway District Commuteride have developed plans to deploy transit technologies that will connect to other systems in the architecture. These projects are planned for the near term and will constitute revisions to the ITS Architecture.***		
Rationale for Change:	***The Treasure Valley Architecture developed in 2006 does not show the projects that will need to be completed in order to deploy the planned technologies. The deployments will change the Market Packages included in the architecture and include new flows not previously identified.***		
Request Originator Name: Phone Number: Email:	***Valley Regional Transit*** ***Kelli Fairless*** ***208-846-8547*** ***kfairless@valleyride.org***		
To Be Filled Out By Maintaining Organization			
Change #:	***2009 – 01***		
Change Disposition:	Accept ✓	Reject	Defer
Baseline Affected:	***This change will add transit projects to the list of planned deployments with identified time frames and estimated costs. The Market Packages and Information Flows of the architecture will be changed.***		
Disposition Comments:	***This request was accepted by COMPASS to facilitate improved transit service in the Treasure Valley. The changes are recognized as beneficial to interoperability of transit systems and constitute advancements in the state of the technology being used to provide transit services.***		
Disposition Date:	***August 2009***		