



Pomona Valley ITS Project

Project Deliverable 5.7.2 **Advanced Traveler Information System (ATIS) User and Functional Requirements**

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PROJECT DESCRIPTION

The County of Los Angeles, in cooperation with the cities within the Pomona Valley, has determined that development of an Intelligent Transportation System (ITS) in the Pomona Valley would help to reduce congestion, enhance mobility, provide traveler information during non-recurring and event traffic congestion, and manage event traffic. The Pomona Valley Intelligent Transportation Systems (PVITS) project was conceived as a recommendation from the Pomona Valley ITS Feasibility Study completed by the LACMTA in 1995. The ultimate objectives of the Project are to:

- Improve mobility by optimizing traffic management on arterials and freeways;
- Enhance Route 60 capacity by better coordinating freeway traffic with parallel arterials;
- Improve agency efficiency by coordinating management of operations and maintenance efforts among and between agencies; and
- Increase agency staff productivity by providing low-maintenance, high-quality communications and computational tools to assist in daily management and coordination activities.

Phase 1 of the PVITS project is the development of a conceptual design that defines solutions to enhance capacity, reduce congestion, and improve traveler information in the Pomona Valley.

1.0 BACKGROUND

1.1 Purpose of Report

An Advanced Traveler Information System (ATIS) is a key component of the PVITS project because sharing information among agencies and with travelers about current roadway and transit conditions is an important part of managing the transportation network. ATIS relies on information from freeway and arterial management systems, multimodal transportation management systems, and incident management agencies. PVITS is focused on improving local and regional traffic management and traveler information, including: event traffic management near the Fairplex; sharing information among jurisdictions about conditions, incidents, and closures; and providing real-time information to travelers to allow them to make more informed decisions.

This document defines the user and functional requirements for the PVITS ATIS. Recommended integration strategies also are included to ensure that traveler information is coordinated with other key functions of PVITS and with other ATIS in the region. The focus of this task is to identify the user requirements and functional requirements for the ATIS component of the PVITS. These requirements will guide the ATIS system design, implementation and integration efforts during later phases of the PVITS project.

For the purposes of these requirements, and in all future phases of PVITS (i.e., PS&E, development, operations) the PVITS ATIS components to be considered part of the ATIS include pre-trip traveler information system components such as the internet, dial-in telephone service (511), kiosks, community access television (CATV), and links to media, ISPs, and other ATIS. Highway Advisory Radio (HAR) will also be controlled via an automated portion of the ATIS. The en-route components (including Dynamic Message Signs (DMS) and Trailblazers) will be considered part of the ATMS subsystem, due primarily to the operations, security, access, and liability issues related to these components.

1.2 Overview of Advanced Traveler Information Systems

ATIS is a broad term that refers to information about road and transit conditions that is relayed to travelers either pre-trip or en-route, to help them make informed decisions about their route, mode, or even time of travel. Traveler information is usually focused on real-time road conditions and congestion levels, incidents, closures, hazardous weather affecting travel, event traffic information, multimodal information (such as routes and schedules for transit and other public transportation), parking, and non-motorized transportation information.

Pre-trip traveler information is typically disseminated via television news or radio broadcasts, dial-in phone services, the Internet, kiosks, CATV, and wireless devices. En-route information can be relayed to travelers via DMS, HAR, television news or radio broadcasts, mobile and other wireless devices, and in-vehicle navigation systems. Most en-route information will be disseminated via the ATMS (i.e., DMS and Trailblazers).

ATIS consists of three major components:

- Data collection

- Data consolidation
- Information dissemination

Data collection includes information that is automatically as well as manually collected. Data about volumes and occupancy of arterials will be gathered via detectors. These can be in-pavement (loops) or non-intrusive technologies, such as video image detection (VID) or acoustic detectors. Data about surface street conditions can also include incident information and construction and maintenance information (closures, lane restrictions), which are manually input. Multi-modal data can be static (routes, schedules, fares) or dynamic (real-time bus/ train status and schedule). Views from CCTV cameras are also considered to be data for ATIS purposes. Links to freeway data should also be included to provide travelers with a better picture of the overall network.

Data consolidation is the backbone of a regional ATIS. Fusing the data from various sources requires a system that will process the automatic and manually generated data, and provide it in a format that can be distributed to the public.

A key component of the architecture for the Pomona Valley is the Information Exchange Network (IEN). The IEN is a county-wide communication network that has been designed by LA County as a part of the San Gabriel Valley pilot project. The IEN will act as the primary communication network for exchange of data between systems (center-to-center) and sharing of monitoring and potential sharing of control of field devices. Since the IEN has not been designed to carry video (this functionality may be designed into the IEN in the future) a second communication network is designed into the architecture that will allow the agencies to share video center-to-center.

Links will be possible for sharing data directly with other ATIS. Cities will have center-to-center links for the ATMS through the IEN to share data. Likewise, commercial news and radio broadcasters and ISPs can establish links through the Internet or establish links to raw data (such as direct video feeds) through the ATMS where access can be closely monitored and controlled.

The PVITS ATIS will be arterial-based, extracting data from sensors on arterials and processing that data into an understandable and useful picture of the arterial traffic conditions for travelers. It will also contain links to other systems to display data such as freeway data from Caltrans in order to provide a broader, more useful picture of the road and transit conditions to travelers. Many of the ATIS examples in place today are freeway-based ATIS that utilize aggregated real-time speeds to convey level of service. In an arterial based system, most arterials have only advance and presence detection. As such, the traffic signal cycles greatly impact the speeds that are calculated based on data from these detectors. Therefore, in order to provide a more accurate picture of the actual traffic flow conditions, it would be desirable to install mid-block detection. TravelTIP, in Orange County, is an example of an arterial-based ATIS. TravelTIP utilizes average travel speeds and average travel time on segments (e.g., Southbound Brookhurst Street between McFadden Avenue and I-405). The colorized graphical map depicts “congestion” using heavy, moderate, and light designations (red, yellow and green respectively). Another option for processing arterial-based data is to collect volume at the intersections from vehicle detectors and compare it with pre-defined volume thresholds to relate to heavy, moderate, or light congestion.

1.3 Methodology

In order to develop user requirements that accurately reflect the needs of agencies in the Pomona Valley, a survey including ATIS questions was distributed to each of the following jurisdictions in February 2001:

- City of Claremont
- City of Diamond Bar
- City of Industry
- City of Pomona
- City of La Verne
- City of San Dimas
- City of Walnut
- Los Angeles County

The ATIS portion of the survey asked each of the agencies about any existing ATIS needs, plans, system constraints and operational issues. The survey also focused on other system areas, including Traffic Signal Control Systems, Communications Systems, Surveillance, and a Traffic Management Center. Because ATIS relies on data and operational functions of several different systems (arterial management, incident management, event management, etc.), information from these other areas must be considered as part of the ATIS user and functional requirements.

Follow-up interviews were conducted with some of the agencies to further discuss their responses to the survey, and to identify any additional user needs. The results of the surveys and interviews and the objectives of the local agencies are summarized in the individual agency reports prepared as part of Task 4.1.3. **Deliverable 4.1.2 - Stakeholder Operational Objectives Report** .

The following secondary stakeholders were also consulted, and their objectives were also reported in **Deliverable 4.1.1: Stakeholders Objective Report**

- Fairplex;
- Alameda Corridor East Construction Authority (ACE);
- Cal Poly Pomona University;
- Foothill Transit;
- Los Angeles County Metropolitan Transit Authority (MTA);
- Mount San Antonio College;
- Raging Waters; and
- California Department of Transportation (Caltrans).

The Fairplex Traffic Management Plan and the Route 60 Feasibility Study reports completed as part of this project recommend significant traveler information components that must be considered as part of the PVITS Advanced Traveler Information System.

The objectives of all stakeholders were carefully considered in generating the user and functional requirements for the ATIS.



2.0 EXISTING CONDITIONS AND USER NEEDS

2.1 Current ATIS Infrastructure and Uses in the Pomona Valley

There is limited ITS and ATIS deployment in the Pomona Valley, but several agencies have expressed an interest in ATIS technologies to help improve mobility, reduce congestion, and improve safety on the region's streets and highways. The following is a summary of current ATIS in the Pomona Valley:

- The Cities of Claremont, San Dimas, and Pomona have vehicle detection deployed at the majority of their intersections, and Pomona also uses Video Image Detection at seven intersections. These data and images could be relayed to a regional ATIS to provide arterial volume and congestion information.
- The City of Pomona has a kiosk in the City Hall lobby that provides information on city services.
- The Pomona Valley is served by Foothill Transit, MTA, and Metrolink transit services. These agencies provide multimodal traveler information via their web sites, dial-up phone service, and kiosks.
 - Foothill Transit (www.foothilltransit.org) provides a link to the on-line TranStar Trip Planning program.
 - MTA (www.mta.net) and Metrolink (www.metrolinktrains.com) offer similar on-line trip planning tools for bus and rail services.
 - Operator assisted traveler information, including basic information about routes, schedules, fares, services and trip planning is available through customer service lines at all three agencies.
 - Foothill Transit kiosks are currently located in the City of Claremont.
- Caltrans operates eight CCTV, two DMS and traffic monitoring stations along Route 60 in the Pomona Valley, which are connected to Caltrans District 7 Headquarters in downtown Los Angeles.

As part of the Route 60 Feasibility Study, several ATIS needs were raised.

High priority ATIS recommendations for the corridor included:

- Display of real-time travel speeds for Route 60 on the internet
- Trailblazer signs on arterials
- DMS
- Internet site for the Corridor/Forum

Recommendations for potential future expansion of the ATIS included:

- Dial-in telephone service (511), unless it become part of a wider regional (Southern California or Countywide) system. The reasons for this decision being the expected user and data needs for a telephone advisory systems.
- Community access television. The reason for this elimination being the expected customers it would serve versus capital investment required



2.2 Planned ATIS Infrastructure

- Foothill Transit is developing a “next bus” arrival time program, which would utilize global positioning system/ automatic vehicle location (GPS/AVL) systems installed on buses in the fleet to provide real-time bus arrival information. This information will be provided on Foothill Transit kiosks located at transit centers, college campuses, and other locations.
- The Alameda Corridor East Transportation Authority is developing a train detection and information dissemination pilot program in Pomona, called the Intelligent Roadway/Rail Interface System (IR/RIS). This system will include warnings and notification of train arrival times at roadway/rail intersections via DMS and a web site. Intersections would be monitored remotely via CCTV. The system will also have a TMC facility at the Pomona Transportation Center.
- The Fairplex is planning to install CCTV cameras at several entrance gates. These cameras could be linked to the ATIS for display via the Internet-based services.
- Metrolink is developing a traveler information system that would provide real-time train arrival information at kiosks located at their train stations.

2.3 User Surveys and Results

The following is a summary of the ATIS needs expressed by agencies surveyed and interviewed as part of this project. The results of these surveys form the basis for the user requirements, which are included in **Section 3**. Operators, used in the context of this report, refers to agencies with the operational responsibility and authority for control and operation of the ATIS and related components in the Pomona Valley. Users refers to any end users of the system.

- All of the jurisdictions surveyed are generally in favor of ITS and ATIS in the Pomona Valley to improve traffic management, information sharing, and incident and event management.
- All agencies that were interviewed stated that they would not be able to allocate additional staff or funding to implement, operate and maintain the ATIS.
- DMS were viewed as a more effective technology than highway advisory radio, but La Verne cited concerns over the aesthetic impact of DMS on arterials. La Verne also indicated that Planning Commission approval would be required for DMS.
- Sharing data within jurisdictions as well as across jurisdictions was cited as a high priority need. (This need will be addressed primarily by the ATMS center-to-center IEN links.)
- Agencies in the Pomona Valley support development of a subregional TMC, and see a need for a centralized location where data can be routed, consolidated and processed for ATIS activities.
- Pomona, San Dimas, and Claremont would like to have kiosks equipped with high-speed access at major retail centers, civic centers, academic centers, and other highly visible areas. It is envisioned that these kiosks would provide real-time traffic conditions, congestion, incidents, events, and multimodal information. (A low-cost alternative to providing a full kiosk system, would be to provide large displays in these locations of dedicated information (via the Internet) such as a real-time map, scrolling messages along the bottom displaying event, construction, congestion, and incident information, and “tours” of several CCTV video feeds or snapshots.)
- Claremont has a Municipal-Area Network (MAN) connecting City Hall to the Police Department. The City would like to share ATIS information with Claremont planning



personnel, local transit operators, emergency services agencies, and the Claremont Police Department.

- San Dimas would like to share ATIS data with their police, fire, and maintenance departments.
- All agencies support providing information to travelers via the Internet.
- Cal Poly Pomona would like to improve coordination of campus events with the City of Pomona and Pomona Police Department. The University suggests that the PVITS project may want to implement remote monitoring and control capabilities of specific traffic signals to allow the City of Pomona and the Pomona Police Department to better manage traffic impacts during large campus events, such as graduation ceremonies.
- San Dimas would like to see information kiosks at locations such as major retail stores, the City library, City Hall, and the police station.

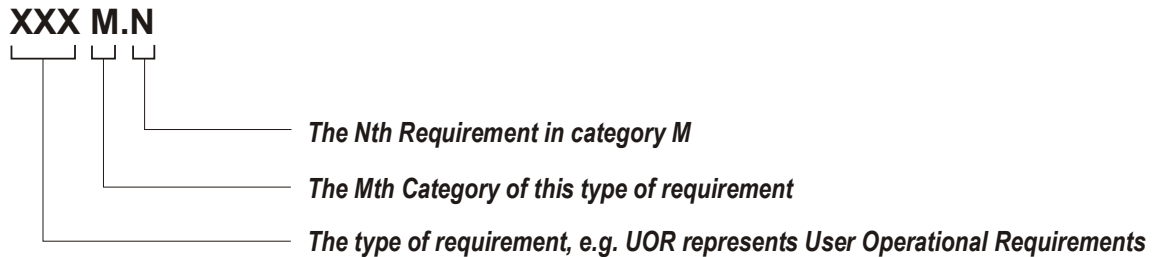


3.0 ATIS USER REQUIREMENTS

User requirements represent the needs of the system from the operators’ and users’ perspectives; these requirements outline the basic ATIS functionality, operational requirements, data needs, information-sharing capabilities, and other needed operational features. User requirements for the Pomona ATIS can be defined in terms of the following requirements:

- User Operational Requirements (UOR)
- User Data Requirements (UDR)
- User Accessibility Requirements (UAR)
- User Operational Mode Requirements (UMR)
- User Security Requirements (USR)
- User Staffing and Training Requirements (UTR)
- User Cost Requirements (UCR)
- User Public Relations and Political Requirements (UPR)

These requirements are uniquely numbered so that they can be tracked during all phases of the project. Requirements tracking is necessary because it is anticipated that the user requirements for the Pomona ATIS will continue to evolve during the course of the project. Changes in user requirements can be caused by many factors, such as the user need for additional system capabilities based on new information that had not come to light during an earlier stage of the project, or perhaps the recognition that satisfying a particular requirement is not technically feasible. In addition, requirement identification numbers allow other documents to reference any user requirements defined in this document. The following numbering convention is adopted in this project with regards to the requirement numbers:



For example, UOR 1.3 represents the 3rd requirement in category 1 of the User Operational Requirements.

The ATIS user requirements do not have categories and as such are numbered by the same convention: XXX N. The user requirements are expressed as “shall” and “will” statements that describe the system functionality. “Shall” statements represent the needs of the Pomona Valley ATIS users/ operators, and the “will” statements articulate the functions ATIS needs to support in order to meet the user needs as well as the overall project objective.

3.1 User Operational Requirements

UOR 1.1 The ATIS shall provide accurate, reliable, real-time and non-real-time multimodal traveler information.



UOR 1.2 The ATIS shall support pre-trip information dissemination functions (see **Section 3.3**).

UOR 1.3 Information available from the ATIS shall include:

- Arterial traffic conditions
- Video snapshots and streaming views
- Incidents
- Special event information, traffic conditions, and suggested alternate routing
- Road construction and maintenance
- Road closures and restrictions
- Suggested alternate routes (if applicable)
- Multimodal information (transit, train)

UOR 1.4 The ATIS shall provide information based on current conditions and verified incidents/non-recurring congestion to allow travelers in the Pomona Valley to make informed decisions about routes, modes, and travel times.

3.2 User Data Requirements

UDR 1.1 The ATIS shall collect and process real-time and non-real-time data for dissemination.

UDR 1.2 The ATIS shall be capable of collecting data from local and regional systems in the Pomona Valley, including, but not limited to:

- Claremont
- Diamond Bar
- Industry
- Pomona
- La Verne
- San Dimas
- Walnut
- LA County
- Caltrans
- ACE
- Fairplex
- Cal Poly Pomona University
- Foothill Transit
- Mount San Antonio College
- Raging Waters
- LA/ Ventura ATIS



UDR 1.3 The ATIS shall be capable of receiving, consolidating, and distributing multiple types of real-time data from systems and agencies in the Pomona Valley, including, but not limited to:

- Arterial vehicle detection data
- Incident data (arterials)
- Real-time multimodal status information
- Real-time rail/intersection data (train arrival)
- Real-time device status data

UDR 1.4 The ATIS shall be capable of receiving, consolidating, and distributing multiple types of non-real-time data (manually generated) from systems and agencies in the Pomona Valley, including, but not limited to:

- Incident data/details
- Static multimodal information
- Special event traffic information
- Planned closures and restrictions

UDR 1.5 Data for the ATIS shall conform to pre-defined quality levels and national ITS standards as determined and agreed upon by the agencies in the Pomona Valley Forum.

UDR 1.6 Data shall conform to data update frequency and reliability standards as determined and agreed upon by the agencies in the Pomona Valley Forum.

UDR 1.7 The ATIS shall be capable of receiving and distributing video images received from arterial CCTV cameras and video detectors (both streaming video and snapshots).

UDR 1.8 The ATIS shall make CCTV images available (both streaming video and snapshots) for traveler information via Internet, kiosk, and television broadcasts (network and CATV).

UDR 1.9 The ATIS shall be capable of consolidating and displaying traffic volume, speeds, incident, closure, special event, and other relevant information on color-coded maps with easily identifiable icons and graphics.

3.3 User Accessibility Requirements

UAR 1.1 ATIS information shall be accessible via:

- Internet
- Dial-in Telephone Service (511)
- Kiosks
- CATV
- Television/news broadcasts



3.4 User Operational Modes

UMR 1.1 The ATIS shall be operational 24 hours per day, 7 days per week.

UMR 1.2 The ATIS shall operate from a centralized subregional TMC.

UMR 1.3 The ATIS will be capable of automatically collecting data from devices and systems through wireline and wireless communications.

UMR 1.4 The ATIS will be capable of receiving data manually via data entry, operator-assisted uploading of information, or through a web-based interface.

UMR 1.5 The ATIS will provide functions allowing operators to control the dissemination device mode of operation such as highway advisory radio, dial-in telephone service (511), kiosks, Internet, and CATV.

UMR 1.6 The ATIS shall allow for scheduling the display/broadcasting of messages ahead of time.

3.5 User Security Requirements

USR 1.1 The ATIS shall have security control protocols and policies in place to prevent any unauthorized user access to the system.

USR 1.2 The ATIS shall be equipped with a firewall to permit access only to authorized ATIS information by outside agencies or private entities.

USR 1.3 The ATIS shall allow for multiple levels of security and access. Different operators shall be allowed access to different functions based on User Rights that are defined and agreed upon by the Agencies.

USR 1.4 The ATIS shall allow only the System Administrator to assign User Rights.

USR 1.5 The ATIS will provide functions allowing operators to administer security and access to the system.

USR 1.6 The ATIS shall allow operators to shut off individual video feeds or snapshots from dissemination as needed.

3.6 User Staffing and Training Requirements

UTR 1.1 The ATIS will be operated by subregional TMC operators.

UTR 1.2 The ATIS will be primarily an automated system, capable of operating without manual input from operators.

UTR 1.3 Agency staff shall receive appropriate training to operate and troubleshoot ATIS system components.



3.7 User Cost Requirements

UCR 1.1 The ATIS shall make use of existing and planned ATMS detection and communication devices.

UCR 1.2 Plans for implementing and expanding ATIS in the Pomona Valley shall be included in available capital budgets.

UCR 1.3 ATIS elements shall be considered, where practical and feasible, as part of other local and regional capital improvements to mainstream implementation costs.

3.8 User Public Relations and Political Requirements

UPR 1.1 Policies shall be developed for video dissemination to ensure that citizen and traveler privacy is protected.

UPR 1.2 Policies shall be developed and distributed regarding ATIS privacy issues, and terms of use for ATIS information (via the Internet).



4.0 ATIS FUNCTIONAL REQUIREMENTS

This section presents a set of ATIS functional requirements that are based on the user requirements outlined in **Section 3**. These are high-level requirements that do not prescribe specific devices or technologies; rather they are to be used in the design process to ensure that the required functionality is included in the Pomona Valley ATIS. Functional requirements were developed by category, and the categories represent major functional groups of requirements that must be considered when moving forward with more detailed design of the ATIS.

Requirement Category	Functional Category	Functional Requirements
SFR 1	System Performance The system's performance should be measurable.	<p>SFR 1.1. The ATIS shall provide accurate traveler information that reflects current conditions in the Pomona Valley.</p> <p>SFR 1.2. The ATIS shall provide information at a local, subregional, and regional level.</p> <p>SFR 1.3. The ATIS shall update information as conditions change to reflect current conditions.</p> <p>SFR 1.4. The ATIS shall include features for automatic update and clearing of information governed by the policies of the responsible agency(s).</p> <p>SFR 1.5. The ATIS shall include features for manual update, confirmation and clearing of information governed by the policies of the responsible agency(s).</p> <p>SFR 1.6. The ATIS shall provide traveler information through all relevant and available public information dissemination devices.</p> <p>SFR 1.7. The ATIS shall be capable of providing information to private entities (media and ISPs) for dissemination via web-based, phone-based and telematics devices.</p> <p>SFR 1.8. The ATIS shall include a usage tracking function capable of generating usage levels by devices, types of information accessed, and other queries to support ATIS evaluation.</p>



Requirement Category	Functional Category	Functional Requirements
SFR 2	<p>Equipment and Technology</p> <p>The equipment and technology that could be used to support the ATIS system.</p>	<p>SFR 2.1. The ATIS shall interface with legacy and new information devices and systems, including the traffic control system devices. This may include, but is not limited to, traffic detection devices, ATMS, ATIS, Dial-in Telephone Service (511), Kiosks, Internet, CCTV, and multimodal AVL systems.</p> <p>SFR 2.2. The ATIS data consolidation system shall be based on an open architecture, and shall include all necessary information processing algorithms.</p> <p>SFR 2.3. Maximum use shall be made of existing communications infrastructure and ITS standards (e.g. NTCIP).</p> <p>SFR 2.4. The ATIS shall include a graphical user interface for operations.</p>
SFR 3	<p>Data Management</p> <p>Data collection, consolidation, and dissemination functions of the ATIS.</p>	<p>SFR 3.1. The ATIS shall be capable of automatically collecting data generated by field devices.</p> <p>SFR 3.2. The ATIS shall be capable of receiving information from local city ATMS' (local city control sites) and the subregional TMC.</p> <p>SFR 3.3. The ATIS shall be capable of receiving information from other stakeholders.</p> <p>SFR 3.4. The ATIS shall use pre-set ITS standards-based message headers to identify data types, sources, and output formats.</p> <p>SFR 3.5. The ATIS shall consolidate data and information from public and private entities in a central ATIS server platform.</p> <p>SFR 3.6. The central ATIS server platform shall be capable of disseminating information.</p> <p>SFR 3.7. The ATIS shall use data quality standards, parameters, and aggregate levels established by local agencies.</p> <p>SFR 3.8. The ATIS shall support a data archiving function so that historical ATIS information can be used by planning, research, and other public and private entities.</p>
SFR 4	<p>Availability of Technology</p> <p>The availability of technologies to support the ATIS system.</p>	<p>SFR 4.1. The ATIS shall utilize accepted hardware platforms and software, maximizing the use of Commercial Off The Shelf (COTS) software where possible.</p> <p>SFR 4.2. The ATIS shall be capable of interfacing to competing and complementary technologies from a variety of vendors using ITS standards.</p>



Requirement Category	Functional Category	Functional Requirements
		SFR 4.3. The ATIS shall be designed using the most current and proven technology releases or versions.
SFR 5	Adaptability Ability of the ATIS to incorporate new sources of information as they become available.	SFR 5.1. The ATIS shall be capable of incorporating new sources of information as they become available. Logic and algorithms shall be modifiable based on new information sources. SFR 5.2. The ATIS shall be capable of interfacing with new traffic collection and dissemination devices as they are deployed. SFR 5.3. ATIS software shall be modular and upgradeable.
SFR 6	Interoperability The ability of the ATIS to interface and accept information from other systems; relative measure of its compliance with existing and emerging standards.	SFR 6.1. The ATIS shall be interoperable with other local and regional systems including the LA/Ventura ATIS. SFR 6.2. The ATIS shall use adopted industry standards, or the most recent version of ITS standards in development, as appropriate. This may be waived for interfaces to legacy devices.
SFR 7	Implementation Costs Costs to establish a functional system.	SFR 7.1. The ATIS shall support the most cost-effective approach to interfacing with legacy systems and equipment. SFR 7.2. The ATIS shall maximize use of existing data collection, information dissemination, and communications infrastructure.
SFR 8	Operational Considerations Ability of the system to carry out day to day operations of the ATIS system.	SFR 8.1. The automated portion of the ATIS shall operate 24 hours a day, 7 days a week. The automated portion includes the collection of data from ATMS in the Pomona Valley, processing of the data, and dissemination; any function of the system that does not require operator interaction (such as manual input of data). SFR 8.2. The ATIS shall include security and firewall capabilities to control access to all functions within an agency, between agencies, and from outside entities such as private ISPs and the media. SFR 8.3. Security and access shall be password based and defined by roles. SFR 8.4. Parameters for access levels shall be set by user (agency).
SFR 9	Maintenance Impacts	SFR 9.1. The ATIS shall include automatic



Requirement Category	Functional Category	Functional Requirements
	Relative effort to maintain the ATIS system.	malfunction detection capabilities and alarms. SFR 9.2. The ATIS shall include a fault reporting system capable of exporting all reports to a standard database or spreadsheet file.
SFR 10	System Interface Identification of those systems with which the ATIS must interface.	SFR 10.1. The ATIS shall be designed to interface to the LA/Ventura ATIS via the IEN. SFR 10.3. The ATIS shall interface to the LA County Information Exchange Network (IEN). SFR 10.4. The ATIS shall be capable of interfacing with Caltrans for video exchange.
SFR 11	Existing Infrastructure Ability of the system to take advantage of existing infrastructure.	SFR 11.1. The ATIS shall maximize use of existing data collection information dissemination and communications infrastructure. SFR 11.2. The ATIS shall use shared infrastructure where possible (e.g., communications) with other devices.
SFR 12	Reliability Tolerance for system availability, i.e., system must be available 99% of the time.	SFR 12.1. Data shall be fused 24-hours a day, 365 days per year. SFR 12.2. Mean time between failures shall not be less than 12,000 hours. SFR 12.3. A failure is defined as any event that reduces overall system capacity by more than 20%. SFR 12.4. Mean time between failures shall be not less than 6000 continuous hours, for any individual element of the data fusion system. SFR 12.5. When a failure occurs, the mean time to repair shall be not greater than 4 hours. Repair time is the time between the occurrence of an error and the correction of the error. SFR 12.6. ATIS field devices shall include the capability of blanking or reverting to default messages if an update or central system connection relay is not detected in a prescribed time. SFR 12.7. The ATIS shall include a backup server to provide for automatic transition of system operations in the event of a malfunction of the primary server.



Requirement Category	Functional Category	Functional Requirements
SFR 13	Flexibility	<p>SFR 13.1. The ATIS shall have the capability to interface with all existing and proposed ATIS equipment.</p> <p>SFR 13.2. The performance and operation of the ATIS system shall not be impacted by the malfunction, removal, or addition of devices.</p>
SFR 14	<p>Expandability/ Scalability</p> <p>Ability of the system to physically expand without changing logical basis (i.e., 10 CCTV vs. 3 CCTV).</p>	<p>SFR 14.1. The ATIS shall be scalable to allow for new devices and new interfaces.</p> <p>SFR 14.2. The ATIS system communications infrastructure shall be designed to accommodate a minimum 50% increase in the number of devices.</p>



LIST OF ACRONYMS

ACE	Alameda Corridor East Construction Authority
ATIS	Advanced Traveler Information System
ATMS	Advanced Traffic Management System
Caltrans	California Department of Transportation
CAMS/IEN	Los Angeles County Countywide Arterial Management System/ Information Exchange Network
CATV	Community Access Television
CCTV	Closed Circuit Television
DMS	Dynamic Message Sign
HAR	Highway Advisory Radio
ISP	Information Service Provider
ITS	Intelligent Transportation System(s)
LA	Los Angeles
LACDPW	Los Angeles County Department of Public Works
LACMTA	Los Angeles County Metropolitan Transportation Authority
MOU	Memorandum Of Understanding
NTCIP	National Transportation Communications for ITS Protocol
O&M	Operations and Maintenance
PC	Personal Computer
PTZ	Pan, Tilt and Zoom
PVITS	Pomona Valley Intelligent Transportation System
TMC	Traffic Management Center
TOD	Time-of-Day
UFR	User Functional Requirements
UIR	User Interjurisdictional Requirements
UOR	User Operational Requirements
USR	User Supplementary Requirements
WWV	National Institute of Standards and Technology Time & Frequency shortwave radio station that broadcast accurate real time