



INTELLIGENT TRANSPORTATION SYSTEMS (ITS) PLAN FOR THE KERN REGION

DELIVERABLE NO. 5

ITS VISION, GOALS, OBJECTIVES AND USER NEEDS REPORT

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1.0 INTRODUCTION

The Intelligent Transportation Systems (ITS) Plan for the Kern Region is a critical component in addressing the transportation needs of the region. As travel demand on the freeway and arterial system increases, there is an increasing need to improve the system through better management of existing capacity. In recognition of this, the Kern Council of Governments (Kern COG) and the local communities in the region continue to invest in ITS. The ITS Plan will ensure that these investments address the important needs in the region and bring the maximum benefit to travelers. The ITS Plan will include a specific implementation plan that reflects the changes in technology since the 1997 ITS Early Deployment Plan (EDP) was completed.

1.1 PROJECT BACKGROUND

The EDP was developed for the Kern region in 1997, led by Kern COG. The EDP was developed in consultation with local Kern County agencies, and reflected the input and priorities of the local agencies. Subsequently, the San Joaquin Valley ITS Strategic Deployment Plan (SDP) was developed for the eight counties of the San Joaquin Valley: Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare. The 1997 EDP and the 2001 SDP documents are consistent with one another with regards to the Kern regions' inputs, needs, and plans.

A comprehensive update of the countywide EDP has not been completed since 1997. In the interim, Kern metropolitan area agencies have made significant investments in the planning, design, and implementation of ITS for the surface transportation and transit networks. There is an expectation, documented in the 1997 EDP and Architecture, that investment in ITS strategies will continue with a focus at the local level. At the same time, it's important that investments be made in reliable technologies that deliver proven benefit in a cost effective manner. Toward this end, Kern COG is leading this countywide ITS Plan to direct ITS investments throughout the county over the next twenty years and beyond.

Concurrently, Kern COG is in the process of updating the Regional Transportation Plan (RTP) for 2018, including the development of an updated project list for implementation using local and federal funding. ITS strategies, particularly those related to operational improvements to the arterial street system, and to enhancing transit service are important elements of the RTP and can provide improvements that lend to the Sustainable Community Strategies (SCS). Updating the ITS Plan will provide timely input to the RTP and the SCS, and will improve consistency among the three planning documents.

1.2 ITS PLANNING PROCESS

The ITS planning process is much like any other transportation planning activity, with the primary difference being the focus on technological solutions. One of the primary areas of emphasis of ITS planning is the extensive involvement and participation by the stakeholders of the region. This is especially important to ensure interagency systems integration, address potential institutional issues early, and to provide the necessary education and awareness of advanced technology transportation solutions.

Using the federal ITS planning process as a guideline, the overall approach to achieving the stated project goals will be performance of the following tasks (the **bolded text** indicates the current task and/or deliverable):

Task 1: Project Initiation

Deliverable 1: Project Plan

- The Project Plan will incorporate the Stakeholder Engagement Plan, the stakeholder governance structure, and the detailed master project schedule.

Task 2: Data Gathering

Deliverable 2: Existing Data Report

- The report identifies the ITS elements within the Kern region, existing and planned policies/projects combined with an understanding of the region's users to fully recognize the various opportunities and constraints.

Task 3: Assessment of the 1997 ITS Early Deployment Plan (EDP) and the Kern portion of the 2001 San Joaquin Valley ITS Strategic Deployment Plan (SDP)

Deliverable 3: Report assessing the 1997 EDP and the Kern portion of the 2001 SDP

- The report documents the findings of the assessment of the 1997 EDP and the 2001 SDP with the lessons learned in the interviews with project stakeholders.

Task 4: Update Regional ITS Inventories

Deliverable 4: System Inventory Summary Report

- The report presents a summary of the findings from the Inventory Survey forms from various Stakeholders identifying existing and planned ITS elements within each jurisdiction.

Task 5: Stakeholder Consultation/Identification of ITS Needs, Vision, Goals, and Objectives

Deliverable 5: Vision, Goals, Objectives and Needs Technical Report

- **The report will identify an ITS vision for the Kern region, set of goals and objectives, and identify ITS needs after various exercises with Stakeholders.**

Task 6: Develop Key Regional ITS Strategies

Deliverable 6: Regional ITS Strategies Report

- The report will refine and present a range of Intelligent Transportation Systems (ITS) components for inclusion in the ITS Plan.

Task 7: Determine Specific Needs, ITS Service Packages and Elements Based on Strategies

Deliverable 7: Regional Consolidated Needs Assessment Summary Technical Report

- The report will translate generic ITS needs into the National ITS Architecture framework. ITS Elements will also be identified as part of the process of identifying and selecting Service Packages for the region.

Task 8: Define Operational Roles and Responsibilities Consistent with Regional Vision, Goals, Objectives, and Strategies

Deliverable 8: Regional ITS Operational Roles and Responsibilities Technical Report

- The report will identify Operational Roles and Responsibilities that are consistent with the Vision Statement and the Goals and Objectives identified and developed in Task 5 and will also be based on the Strategies development in Task 6.

Task 9: Determine the Functional Requirements

Deliverable 9: Functional Requirements Report

- The report will identify Functional Requirements for ITS Architecture for the Kern region based on Federal Highway Administration's (FHWA) guidance

Task 10: Prepare Regional ITS Architecture

Deliverable 10: Draft and Final Electronic Copy of the Turbo Architecture Database

- The electronic Turbo Architecture database will be developed consistent with Version 7.1 of the National ITS Architecture, FHWA Rule 940.9, and Part V of the Federal Transit Administration (FTA) National ITS Architecture Policy for Transit Projects and provided to Kern COG.

Task 11: Develop an Architecture Maintenance Plan

Deliverable 11: Architecture Maintenance Plan

- The report will develop an Architecture Maintenance Plan that will describe how to use the Architecture. The Report will provide project planning, project programming, project design, and maintenance procedures.

Task 12: Develop Kern Region ITS Plan

Deliverable 12: Kern Region ITS Plan

- The report will take all of the inputs from Tasks 2 through 11 and meld them together into a cohesive and comprehensive ITS Plan Report and Phasing Plan for Kern County.

Task 13: ITS Website for Regional Stakeholders

Deliverable 13: Draft and Final Website

- The Kern COG website ITS webpage will provide background on the project, the deliverables, and links to meeting agendas and material during Draft ITS Plan development. The Final webpage will include the Final ITS Plan.

1.3 STAKEHOLDER PARTICIPANTS

The success of a regional ITS architecture depends on participation by a diverse set of regional Stakeholders. **Table 1-1** lists the agencies/organizations of approximately 28 key stakeholders that will be engaged to provide input for the ITS Plan. Input from the Stakeholders as well as others, will be instrumental in the development of the information presented in the final ITS Plan. These

stakeholders, and any others that join the project along the way, will be instrumental to the development of the regional ITS architecture. The stakeholder list will be updated periodically throughout the life of the project.

Table 1-1. ITS Plan for the Kern Region Stakeholder List

Amtrak	City of Taft
Bureau of Land Management	City of Tehachapi
Burlington Northern Santa Fe Railroad	City of Wasco
Caltrans District 6	CommuteKern (Kern COG)
Caltrans District 9	County of Kern
Caltrans Headquarters	Delano Area Rapid Transit
City of Arvin	Federal Highway Administration California Division
City of Bakersfield	Federal Transit Administration Region 9
City of California City	Golden Empire Transit District (GET)
City of Delano	Kern Council of Governments (Kern COG)
City of Maricopa	Kern Motorist Aid Authority (Kern COG)
City of McFarland	Kern Transit
City of Ridgecrest	Tejon Indian Tribe
City of Shafter	Union Pacific Railroad

1.4 RELATIONSHIP TO 1997 EDP

As noted in Section 1.1, the ITS Early Deployment Plan (EDP) was completed for Kern County in 1997. That plan was comprehensive, in terms of both needs assessment and the development of recommendations. For this ITS Plan update, the 1997 EDP was reviewed and assessed in Task 3. This assessment will provide some insight and guidance in the project process when considering project and program prioritization, which will also be influenced to varying degrees by the changes in technology since 1997. The assessment will provide a look back at prior ITS planning and implementation efforts and lessons learned from those efforts while moving forward with this most current ITS planning and implementation effort.

1.5 PURPOSE OF ITS VISION, GOALS, OBJECTIVES AND USER NEEDS REPORT

The purpose of the ITS Vision, Goals, Objectives and User Needs Report is to identify an ITS vision for the Kern Region, a set of supporting goals and objectives, and to identify and document ITS User Needs with input primarily from the project Stakeholders. The ITS vision and goals from the San Joaquin Valley ITS Strategic Deployment Plan (September 2001) as well as the 2014 Kern County Regional Transportation Plan were used as a starting point for the development of the vision and goals and objectives for this Plan update. This report summarizes the results from the Vision, Goals and Objectives, and Needs Assessment exercises conducted at the February 2017 Stakeholder workshops. Exercise worksheets were posted to the Kern COG ITS website and therefore the report reflects responses received after the workshops via email as well.

The ITS Vision, Goals, and Objectives bring focus and structure to the ITS planning process. The project vision statement allows the region to work through the Plan update process with an “end state” in mind.

Identification and prioritization of ITS User Needs also brings focus and structure to the ITS planning process. This exercise helps to identify which ITS needs are currently being met, which ITS needs will be addressed in the near future with planned ITS, and which ITS needs are not being met at all. This information is used in later steps of the Plan and architecture development to determine interconnections and information exchange between systems and agencies.

2.0 VISION STATEMENT

2.1 ITS KERN VISION STATEMENT

The development of a project vision statement is important for bringing focus and structure to the ITS planning process. The project vision statement features a picture of what the regional ITS program can become in the future and is an important tool for communicating to agency management and staff, the public, and the funding decision makers the intent of the ITS plan.

The ITS objectives from the 2001 SDP were reviewed at stakeholder workshops in order to obtain input from the stakeholder group. There were 43 participants representing 18 agencies at the workshops. The statement reflects the work, input, and local knowledge of the group, and represents a common view of the role of ITS in addressing transportation issues in Kern Region.

During the first set of stakeholder workshops, the project stakeholders were presented the vision statement from the 2001 SDP and the 2015-2019 USDOT ITS Strategic Plan and asked to provide input on creating a vision statement. The following input was provided:

- Centralized and accurate real-time data source
- Ease of obtaining information while mobile
- Inter- and intra-region coordination and connectivity
- Transportation system must accommodate the three distinct geographies in the Kern region
- Integrate regional and local transit
- Explore shared mobility solutions
- Public/Private coordination throughout all phases of project delivery or emergency management through improved communication
- Sustainability
- Identify funding for ITS investment

The project vision statement reads:

“Through community ITS investment, coordination and data sharing between transportation agencies, travel in Kern is safe and efficient.”

2.2 VISION ELEMENTS

The Vision Elements presented in the following paragraphs are based on vision statements developed in the 2001 SDP. By their very nature, these Vision Elements are future-based and are meant to provide direction to the Kern Region ITS stakeholder group. The Vision Elements remain somewhat generalized, and high-level, though some examples are provided where pertinent

systems or capabilities exist in the Kern Region. The stakeholder group is invited to review the current state of ITS in the Kern Region, and the direction in which the stakeholders would like to see ITS progress.

2.2.1 Freeway Management

Caltrans has deployed multi-faceted freeway management systems in Kern County. These systems provide the ability to quickly identify traffic accidents and other incidents, and adverse weather and pavement conditions, and convey this information to travelers and other transportation agencies. The vision for freeway management is to share traffic data with other freeway management centers or arterial management centers as well as enhance the Caltrans Central Valley Transportation Management Center by adding and upgrading equipment and capabilities.

2.2.2 Arterial Management

Caltrans, the City of Bakersfield and the County of Kern all have signal preemption for emergency vehicles. Caltrans, the City of Bakersfield, and the County of Kern previous efforts have focused on signal system improvements and/or traffic surveillance. This focus is expected to continue, but with a growing emphasis on other local traffic management technologies as well.

2.2.3 Incident Management

The incident management vision for the County is to enhance interagency incident response and coordination through the application of ITS technologies, and the continuance of the County Emergency Operations Center. This vision also includes the promotion of real-time data sharing to improve all aspects of incident management. Quick and accurate verification followed by rapid dissemination of motorist information by ITS means will prevent secondary collisions, improve traffic flow, and reduce emissions.

2.2.4 Public Transportation

The transit ITS vision for the area focuses around increasing the capabilities and scope of the existing technology deployments at Golden Empire Transit District, Delano Area Rapid Transit and Kern Transit while building a simple, effective system for smaller fixed route properties and dial-a-ride operations. The goal is to maximize compatibility between urban and rural systems throughout the valley. This vision also incorporates enhanced cooperation and coordination between local transit agencies, which includes the potential for consolidated transit services.

2.2.5 Traveler Information

The vision for traveler information in the area is to provide information based on the existing and expanding capabilities of the existing and planned transportation management systems. At the same time, prepare for statewide transportation information deployment efforts. Traveler information must be timely and useful, providing traffic and weather conditions for commuters, commercial vehicles and visitors to the region. Kern 511 is a free traveler information service that gives traffic conditions, transit information and roadwork information in the Kern County area via a toll-free phone number and website. People can call 511 or visit kern511.org to check real time traffic speeds, find traffic alerts, plan a trip on a bus or train, and even find a carpool or vanpool partner.

2.2.6 Agency Coordination and Systems Integration

The systems integration vision for the area is based on previous successes. The concept is to utilize the national and statewide architectures as a basis, and then provide for coordinated deployments and standards within the County.

2.2.7 Commercial Operations

In coordination with national and regional initiatives, commercial carriers will be able to drive along the I-5, SR 58, and SR 99 corridors with minimal delays at weigh and inspection stations. Systems will electronically weigh and inspect commercial vehicles, and collect other motor carrier information. Other systems will enable the electronic issuance and monitoring of permits from regulatory agencies. Commercial carriers will have access to traveler information systems that can assist with routing, scheduling and dispatching optimization, as well as guidance to available parking areas.

2.2.8 Travel Demand

CommuteKern provides a free rideshare matching service. Users who wish to rideshare can immediately determine potential candidates and dynamically create carpools via online registration to help reduce the number of vehicles on the roadway. ITS technologies will allow for detailed traffic data collection and analysis. This information can support demand management techniques.

2.2.9 Emergency Management

ITS infrastructure, along with companion decision support systems, have the capability of notifying authorities of the need to dispatch emergency vehicles and other resources to the site of collisions or incidents. The ITS infrastructure is supplemented by information from the public, as well as agency staff monitoring decision support systems and traffic management systems. Systems will coordinate the response from fire, police and medical agencies for fast response in the most appropriate manner. Other systems will coordinate the removal of incidents to promote the timely return of the travel network to optimal performance.

2.2.10 Air Quality

Air quality will be improved through the increased efficiency and use of transportation systems including demand management strategies. Dynamic ride sharing systems will encourage the use of high occupancy vehicles. Traveler information systems will decrease the amount of vehicle miles traveled through better trip and travel planning. Public transportation systems have improved the availability of information to transit riders, and enhances the visibility and flexibility of transit, thereby increasing the use of transit. Traffic management systems smooth the flow of vehicles and reduce vehicle emissions due to inefficient traffic flow. Detection systems will monitor vehicle emissions and support inspection/maintenance efforts.

2.2.11 Intermodal and Multi-modal Cooperation

The future of the Kern Region starts with the mutual cooperation between transportation agencies. All agencies and transportation providers will work together to promote and encourage safe and efficient operation of the transportation network. These agencies/providers will work together to plan, design, implement and operate ITS systems.

3.0 GOALS AND OBJECTIVES

This section provides an overview of the development of the ITS Kern goals and objectives, and presents those goals and objectives.

3.1 METHODOLOGY TO DEVELOP GOALS AND OBJECTIVES

Prior to identifying goals and objectives to guide the ITS Plan effort and the ITS activities that will follow, goals and objectives from other California ITS plans and the 2014 Kern County Regional Transportation Plan were reviewed. Two distinct approaches were identified. The first approach is to identify broad, high-level goals and objectives such as “reduce traffic congestion”. The second approach is to directly incorporate goals and objectives from other relevant local and regional sources, such as a regional transportation plan.

The Stakeholders determined the goals for the ITS Plan. The goals and objectives are expressed in a way that the general public could relate to and that would underscore that ITS will solve specific, real transportation problems. Each identified goal was followed by objective statements that focused on different aspects of the same overall issue or concern. A number of the transportation problems were combined into single objectives, and in a few cases a single problem was listed slightly differently under multiple goals. Stakeholders were given the opportunity to Keep, Delete, or Edit the suggested objectives as well as provide new objectives. The full list of objectives can be found in **Appendix A**.

3.2 ITS GOALS AND OBJECTIVES

To support the ITS vision the Stakeholders have reviewed and accepted a series of supporting ITS goals. Objectives were assigned to the seven overarching goals listed below.

Goal #1: Reduce Traffic Congestion

Supporting Objectives:

- Reduce the number and duration of accidents and incidents
- Minimize the congestion and delays imposed by slow moving vehicles on other traffic
- Provide local and long-distance travelers with real-time traffic and weather information they need to avoid congestion, or to anticipate it
- Reduce the delays and congestion at railroad crossings, especially for emergency vehicles
- Improve the management of traffic at incident scenes, including incident-related traffic diversions
- Increase system efficiency and throughput to maximize existing capacity, by identifying and correcting existing bottlenecks
- Support the deployment of emerging autonomous and connected vehicle technologies that have the potential to increase system efficiency and safety

Goal #2: Reduce the Number, Severity and Duration of Accidents and Incidents**Supporting Objectives:**

- Reduce the number and severity of accidents and incidents:
 - Due to weather conditions,
 - Between trucks and autos
 - Involving agricultural vehicles,
 - Involving pedestrians and bicycles
- Improve setting, monitoring, and enforcement of speed limits
- Improve red light running monitoring and enforcement
- Provide local and long-distance travelers with the information they need to avoid adverse weather conditions, or to anticipate them
- Improve the ability to quickly locate incident scenes, especially in rural areas
- Minimize the safety concerns associated with outdated roadway design
- Improve coordination among Caltrans, CHP and emergency responders to reduce the time needed for incident detection, verification and dispatch
- Improve the ability of travelers to find help quickly in highway emergencies
- Deploy detection technologies that could increase the visibility of bicycles and pedestrians

Goal #3: Improve Transportation and Transit Planning and Operations**Supporting Objectives:**

- Promote coordination of transit services among providers to improve network connectivity
- Promote coordination of traffic management among jurisdictions, including traffic signals, construction management and incident management
- Increase the amount, accessibility and quality of data for planning and analysis, and develop new tools and applications that leverages the data that can be shared
- Improve the operation of existing traveler information systems that increases the breadth and reliability of data provided for various modes
- Promote interagency data sharing
- Support the operation of transit priority systems across jurisdictional boundaries

- Promote the usage of open standards to make technologies interoperable

Goal #4: Promote the Efficiency, Safety, Convenience, and Use of Alternative Travel Modes**Supporting Objectives:**

- Establish common fare for trips requiring transfers between transit services, including local and intercity or regional, and between fixed-route and demand-responsive service
- Improve the quality, availability and utilization of fixed-route and demand-responsive transit service
- Provide traveler information services such as mobile apps that promotes usage of pedestrian, bicycle and ridesharing facilities and services
- Improve the safety and security on transit vehicles and at stations and stops
- Increase the availability, quality and ease-of-use of transit route and schedule information
- Improve transit on-time performance
- Support the provision of the multi-modal amenities that are necessary to attract riders who have other options

Goal #5: Improve the Safety and Efficiency of Goods Movement and Reduce the Impacts of Commercial Vehicles on other Traffic and Roadways**Supporting Objectives:**

- Improve truck routing and enforcement to minimize damage to roadways
- Improve the availability and awareness of truck parking
- Improve the availability and promote the awareness and use of information for truckers on traffic and weather conditions, truck routes, and other services
- Reduce delays at commercial vehicle facilities, such as weigh stations
- Support future deployment of zero emission freight technology
- Provide freight focused traveler information

Goal #6: Minimize the Environmental Impacts of Transportation**Supporting Objectives:**

- Reduce transportation-related air pollution, including greenhouse gas (GHG) emissions.
- Reduce need for roadway capacity expansion by maximizing throughput of existing transportation systems

- Promote and facilitate transportation demand management strategies to reduce vehicle miles traveled by single occupancy vehicle modes
- Promote alternative fuel vehicles and equipment use; provide necessary infrastructure and technology

Goal #7: Improve the mobility of people and freight; Maximize the efficiency and cost effectiveness of the existing and future transportation system.

Supporting Objectives:

- Support more efficient use of the transportation system through the implementation of Intelligent Transportation Systems technology
- Build upon the momentum and stakeholder coalition generated through the San Joaquin Valley Goods Movement Strategy studies to pursue ITS commercial vehicle projects.
- Investigate how ITS can support efforts to improve travel between the inland areas and coastal communities.
- Build upon ITS planning efforts in the San Joaquin Valley in conjunction with federal rules (ITS architecture and standards conformity and statewide and metropolitan planning) to expand ITS actions.
- Build upon the existing Caltrans District 6 Traffic Management Systems to fill gaps and complete coverage on major facilities, including expansion of their highway closures and restrictions database, to include other agencies.
- Capitalize on the extensive ITS technology testing and standards development conducted by Caltrans by using, where appropriate, Caltrans approaches for local traffic management systems.
- Build upon best practices from past and current transit ITS deployment experiences in the State of California.
- Build upon Caltrans District 6 experience with sharing facilities, equipment, and information between traffic management and California Highway Patrol staff.
- Provide traveler information for commercial vehicle operators at truck rest stops.
- Improve visibility and access to existing Caltrans' valley-wide alternate route plans.
- Coordinate the Bakersfield area Transportation Operations Center with Caltrans' District 6 Transportation Management Center via satellite.
- Integrate the ITS capabilities being implemented at Golden Empire Transit (GET) with Bakersfield's traffic management system, including sharing information between the two centers during emergencies.

- Facilitate the transfer of lessons learned from GET ITS deployment to other area transit operators, and look for opportunities for those agencies to better coordinate with GET using its ITS capabilities.
- Expand the accident reduction campaigns on Kern's rural highways and County roads.

4.0 ITS USER NEEDS ASSESSMENT

The process of collecting ITS inventory for Kern Region has begun. ITS Inventory forms have been distributed to Kern Region stakeholders, with some already completed and returned. The countywide ITS inventory consists of existing and planned (near term) systems owned and/or operated by Kern Region ITS stakeholders. The next step in the process of developing a Regional ITS Architecture and Plan is determining the User Needs of the stakeholders in the region. The User Needs are then compared to the inventory to determine which needs are currently being met with existing ITS, which needs will be met in the near future with planned ITS, or which ITS needs are not being met at all. This comparison is also used in later steps of the Plan and architecture development to determine interconnections and information exchange between systems and agencies. It is also used to select and / or determine the status of Service Packages – a concept from the National ITS Architecture – and to develop projects in the strategic deployment portion of the Plan.

The following two subsections describe the process of data gathering and results for the ITS User Needs Assessment.

4.1 METHODOLOGY

The process of collecting direct stakeholder input on ITS Needs was carried out with the help of a comprehensive “strawman” list of ITS Needs. The strawman list of ITS Needs, which can be found in **Appendix B**, was used as a starting point to prompt input from the stakeholder group, rather than starting out with a blank sheet of paper. The strawman list was developed based on knowledge of the Kern Region, as well as experience in developing Regional ITS Architectures in other similar regions. Understanding documented long-term policies and goals, where they were available, was helpful in executing a sound needs analysis.

The ITS User Needs on the strawman list were broken into categories consistent with the National ITS Architecture service areas of:

- Archived Data Management
- Public Transportation
- Traveler Information
- Traffic Management
- Vehicle Safety
- Commercial Vehicle Operations
- Emergency Management
- Maintenance and Construction Management

In a workshop setting, project stakeholders were asked to provide their priority rankings on a series of wall charts that contained the strawman list. Stakeholders were given a set of color coded

adhesive dots that they then placed on the wall charts. The different colored adhesive dots corresponded to different point values. Red dots were assigned a point value of 5; yellow dots were assigned a point value of 3; green dots were assigned a point value of 1; and blue dots were assigned a point value of 0 (zero), which also corresponded to a more subjective “not needed” category. Stakeholders were also given the opportunity to provide verbal input, as well as written input after the February 2017 workshops concluded. This exercise provided an objective scoring and ranking of ITS User Needs for the Kern Region.

The scores from the above described ranking process were tallied and an initial ranking of ITS User Needs was developed. During the review period for Draft Deliverable No. 5, stakeholders were given an opportunity to provide additional input. The additional input may result in some manual adjustments to the ranking of ITS User Needs. The employment of this secondary, subjective ranking opportunity ensures that the User Needs Assessment truly reflects the needs of the regional stakeholders.

In addition, a similar process will be undertaken with a focused group of Public Safety representatives from around Kern County. That process will take place after release of this draft deliverable so the ITS Needs results contained in this draft deliverable do not yet reflect the ITS Needs of the public safety community. However, the results of that process will be discussed in upcoming stakeholder correspondence and may be captured in the final version of this deliverable or in the final ITS Plan.

Ultimately, regardless of the numerical ranking in this prioritization process, the ITS User Needs rankings, and other subsequent prioritization efforts on this project, will be assigned a priority ranking either, “High,” “Medium,” or “Low.” This grouping of priorities takes away the discrete numerical rankings and places the ITS User Needs into more relative priority categories.

4.2 ITS USER NEEDS ASSESSMENT RESULTS

Table 4-1 (a series of tables) shows the scoring results of the initial prioritization for the ITS User Needs Assessment. Table 4-1 is organized by the ITS categories in the bullet list shown above (in section 4.1). This presentation of the ITS User Needs Assessment Results shows the highest scoring ITS Needs within each of the ITS categories, and includes all ITS Needs in the strawman list, including those that received no points.

Table 4-2 (a single table) is a listing of all the ITS Needs in the strawman list that received at least 1 point. Table 4-2 is sorted by Total Points so that the ITS Needs appear in order from most Total Points to least (non-zero) Total Points. This presentation of the ITS User Needs Assessment Results shows the highest scoring ITS Needs regardless of the ITS categories.

Table 4-1 and Table 4-2 essentially show the same information, organized in two different ways.

Table 4-1: ITS User Needs Assessment Results (by ITS Category)

Arterial Management Needs	Priority				Total
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	
Improve signal timing/coordination	18	9	1		118
Staffing	6	12	5	2	71
Improve/implement ability to remotely modify signal timing	10	8	5	1	79
Provide/enhance speed enforcement at high risk locations	11	11	2		90
Implement/expand dynamic message sign (DMS) installations on arterials	5	6	11	1	54
Upgrade signal hardware	8	13	3		82
Coordinate arterial and freeway management strategies	10	9	3	1	80
Reduce traffic congestion during incidents	11	9	3		85
Reduce recurring traffic congestion	17	7	1		107
Implement intersection collision warning/avoidance systems	6	13	4		73
Implement advanced parking management systems		3	15	2	24
Implement/improve inter-jurisdictional signal coordination	6	5	8	2	53
Improve data collection capabilities	8	6	7	1	65
Expand CCTV camera coverage on arterials	7	9	7		69
Develop/implement system-wide arterial management strategies	7	10	3		68
Reduce vehicle delays at rail grade crossings	6	9	6	1	63
Monitor/collect air quality data	8	7	7	2	68
Implement red-light-running technology	8	7	7	1	68
Provide health monitoring of traffic signal equipment at intersections and rail crossings	3	9	10		52

Freeway Management Needs	Priority				
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	Total
Improve data collection on freeways/expressways	6	7	6	1	57
Improve ramp metering operations	4	5	9	2	44
Improve/expand vehicle detection coverage on freeways/expressways	4	9	4	2	51
Reduce recurring traffic congestion	16	5	1	1	96
Expand CCTV coverage on freeways/expressways	6	8	5	1	59
Reduce traffic congestion during incidents	9	12		2	81
Monitor/collect air quality data	6	6	9	3	57
Expand highway advisory radio (HAR) coverage on freeways/expressways	4	6	7	3	45
Provide/enhance speed enforcement at high risk locations	11	7	4	1	80
Expand freeway/expressway dynamic message signs (DMS)	4	12	5	1	61
Monitor queue lengths at ramp locations	2	12	3	3	49
Implement/improve incident detection capabilities	5	14	2	2	69
Implement automated/remote control gate systems		2	12	6	18
Implement/upgrade computer aided dispatch (CAD) system for freeway service patrol	6	5	8	3	53
Install/upgrade automatic vehicle location (AVL) on freeway service patrol vehicles	6	7	5	3	56
Implement variable speed limits	2	11	7	2	50

Transit Management Needs	Priority				
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	Total
Expand/enhance/upgrade automatic vehicle location (AVL) system	8	11	3	1	76
Coordinate timed transfers between routes, providers and modes	13	6	5		88
Implement/enhance web-based trip planner	10	10	1	2	81
Implement regional smart card for transit fare payment	14	4	4	1	86
Implement/enhance remote monitoring of transit vehicle mechanical condition	5	13	4	1	68
Provide real-time transit arrival/departure information on web site	11	7	3	3	79
Provide real-time transit arrival/departure information at bus stops	9	9	3	3	75
Expand security cameras on transit vehicles, at transit stations/stops and park-and-ride facilities	10	7	4	1	75
Provide on-board automated enunciators	8	7	3	4	64
Provide on-line reservation system for demand-responsive transit services	5	12	5	1	66
Provide transit information using social media	13	5	5	1	85
Implement transit signal priority technology	7	11	6	1	74
Receive roadway incident information	8	13	4		83
Expand/upgrade automated passenger counters	4	10	9	1	59
Develop mobile apps to provide static and real-time transit information	11	9	5		87
Expand/enhance/upgrade computer aided dispatch (CAD) system	12	7	5		86
Receive roadway construction/closure/detour information	12	11	2	1	95
Receive real-time roadway congestion information	13	9	4		96
Improve ridesharing program/website	6	12	5	2	71

Traveler Information Needs	Priority				Total
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	
Provide more timely incident information to travelers	11	12	3		94
Provide/enhance congestion information to travelers	12	11	3	1	96
Provide freeway/expressway travel times	9	9	3	5	75
Improve quality, consistency and thoroughness of traveler information	12	11	2		95
Use social media for traveler information dissemination	12	8	5	1	89
Provide incident information to travelers	12	13	1	1	100
Provide roadway closure/restriction information	20	5	1		116
Provide/enhance road weather conditions information to travelers	21	5	2		122
Provide information on roadway construction and maintenance activities	13	8	4	1	93
Provide routing (detour) information to travelers during incident, construction, weather events, special events, etc.	22	6	1		129
Provide travel times/delays through work zones	12	8	5	2	89
Provide information on planned special events	4	13	7	3	66
Send email alerts of major incidents to major employers	8	12	9		85
Provide directions to parking facilities	4	8	13	3	57
Improve 511 system/web site	9	13	5		89
Enhance freeway/expressway traffic map	6	10	9	2	69
Enhance arterial traffic map	6	10	10	1	70
Provide arterial travel times (on major arterials)	6	12	8	2	74
Provide information on parking availability		10	15	2	45
Conduct outreach/education activities to promote awareness of traveler information services	8	13	6	1	85
Provide information on available truck parking facilities	3	9	11	3	53
Enhance 511 to provide static and real-time transit information	9	11	6		84

Road Weather Needs	Priority				Total
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	
Implement Smart Work Zone technology	6	12	3	1	69
Warn work crews of errant vehicles	16	7	1	1	102
Coordinate construction and maintenance project schedules within and between agencies	17	9	1		113
Expand coverage of environmental/weather/road conditions detection/monitoring systems	7	17	2		88
Monitor queue lengths in/near work zones	6	11	7	1	70
Provide curve speed warning	7	8	7		66
Provide roadway flood warnings	12	7	5		86
Provide vehicle-over-height detection/warnings	5	10	6	1	61
Provide advisory to warn traffic of a stopped queue in/near work zones	14	6	5		93
Provide/enhance enforcement in work zones	12	9	4		91
Monitor transportation infrastructure	11	11	3		91
Warn travelers about trucks entering/existing work zones	4	7	10	4	51
Track locations of maintenance fleet	1	10	8	6	43

Data Management and Sharing Needs	Priority				
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	Total
Improve information exchange between Caltrans and local transportation agencies	20	5	1		116
Improve data collection and archiving	12	10	2		92
Share incident information with other agencies	8	13	2	1	81
Improve information exchange between transportation and transit agencies	13	9	3		95
Share public safety/computer aided dispatch (CAD) data with transportation agencies	10	12	3		89
Share congestion information with other agencies	14	9	2	1	99
Provide incident information to emergency management agencies	14	8	3		97
Implement a central information/data clearinghouse	10	10	4	1	84
Share surveillance video and data with PSAPs/emergency responders	7	10	6	2	71
Use archived data for planning, modeling, analysis and traffic management strategy development	13	9	3		95

Emergency Management Needs	Priority				
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	Total
Improve incident response	13	8	2		91
Provide real-time traffic information to emergency responders	18	4	1		103
Improve incident detection	13	8	2		91
Improve communications in rural areas	16	4	3		95
Reduce incident clearance time	16	5	2		97
Improve a multi-agency, system-coordinated response to major incidents	17	4	2		99
Improve incident notification to agencies	15	5	3		93
Improve response to HAZMAT incidents	15	5	3		93
Expand emergency vehicle preemption	12	6	4		82
Improve interagency communications	15	6	2		95
Enhance computer aided dispatch (CAD) systems	12	7	3	1	84
Provide/enhance automatic vehicle location (AVL) for emergency vehicles	9	8	3	2	72
Provide/enhance mobile data terminals for emergency vehicles	11	7	2	2	78

Commercial Vehicle Operations Needs	Priority				
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	Total
Provide information on truck parking and availability	3	9	8	2	50
Reduce commercial vehicle weight, width and height violations	7	6	6	2	59
Provide interstate/inter-regional traveler information for commercial vehicles	5	7	8	1	54
Provide information on commercial vehicle operations (CVO) permit restrictions	5	9	6	1	58
Provide tracking of HAZMAT vehicles	10	5	7	1	72
Provide better vehicle restrictions and roadway closure information to commercial vehicles	8	11	2		75
Deploy weigh-in-motion/mobile weigh enforcement technology	2	11	9		52
Provide target enforcement at locations with history of violations	6	11	6		69

Table 4-2: ITS User Needs Assessment Results (sorted by Total Points)

Need	Priority					Total	Category/Service Area
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed			
Provide routing (detour) information to travelers during incident, construction, weather events, special events, etc.	22	6	1			129	Traveler Information
Provide/enhance road weather conditions information to travelers	21	5	2			122	Traveler Information
Improve signal timing/coordination	18	9	1			118	Arterial Management
Provide roadway closure/restriction information	20	5	1			116	Traveler Information
Improve information exchange between Caltrans and local transportation agencies	20	5	1			116	Data Management and Sharing
Coordinate construction and maintenance project schedules within and between agencies	17	9	1			113	Road Weather
Reduce recurring traffic congestion	17	7	1			107	Arterial Management
Provide real-time traffic information to emergency responders	18	4	1			103	Emergency Management
Warn work crews of errant vehicles	16	7	1	1		102	Road Weather
Provide incident information to travelers	12	13	1	1		100	Traveler Information
Share congestion information with other agencies	14	9	2	1		99	Data Management and Sharing
Improve a multi-agency, system-coordinated response to major incidents	17	4	2			99	Emergency Management
Provide incident information to emergency management agencies	14	8	3			97	Data Management and Sharing
Reduce incident clearance time	16	5	2			97	Emergency Management
Reduce recurring traffic congestion	16	5	1	1		96	Freeway Management
Receive real-time roadway congestion information	13	9	4			96	Transit Management

Need	Priority					Category/Service Area
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	Total	
Provide/enhance congestion information to travelers	12	11	3	1	96	Traveler Information
Receive roadway construction/closure/detour information	12	11	2	1	95	Transit Management
Improve quality, consistency and thoroughness of traveler information	12	11	2		95	Traveler Information
Improve information exchange between transportation and transit agencies	13	9	3		95	Data Management and Sharing
Use archived data for planning, modeling, analysis and traffic management strategy development	13	9	3		95	Data Management and Sharing
Improve communications in rural areas	16	4	3		95	Emergency Management
Improve interagency communications	15	6	2		95	Emergency Management
Provide more timely incident information to travelers	11	12	3		94	Traveler Information
Provide information on roadway construction and maintenance activities	13	8	4	1	93	Traveler Information
Provide advisory to warn traffic of a stopped queue in/near work zones	14	6	5		93	Road Weather
Improve incident notification to agencies	15	5	3		93	Emergency Management
Improve response to HAZMAT incidents	15	5	3		93	Emergency Management
Improve data collection and archiving	12	10	2		92	Data Management and Sharing
Provide/enhance enforcement in work zones	12	9	4		91	Road Weather
Monitor transportation infrastructure	11	11	3		91	Road Weather
Improve incident response	13	8	2		91	Emergency Management
Improve incident detection	13	8	2		91	Emergency Management
Provide/enhance speed enforcement at high risk locations	11	11	2		90	Arterial Management
Use social media for traveler information dissemination	12	8	5	1	89	Traveler Information
Provide travel times/delays through work zones	12	8	5	2	89	Traveler Information
Improve 511 system/web site	9	13	5		89	Traveler Information

Need	Priority					Category/Service Area
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	Total	
Share public safety/computer aided dispatch (CAD) data with transportation agencies	10	12	3		89	Data Management and Sharing
Coordinate timed transfers between routes, providers and modes	13	6	5		88	Transit Management
Expand coverage of environmental/weather/road conditions detection/monitoring systems	7	17	2		88	Road Weather
Develop mobile apps to provide static and real-time transit information	11	9	5		87	Transit Management
Implement regional smart card for transit fare payment	14	4	4	1	86	Transit Management
Expand/enhance/upgrade computer aided dispatch (CAD) system	12	7	5		86	Transit Management
Provide roadway flood warnings	12	7	5		86	Road Weather
Reduce traffic congestion during incidents	11	9	3		85	Arterial Management
Provide transit information using social media	13	5	5	1	85	Transit Management
Send email alerts of major incidents to major employers	8	12	9		85	Traveler Information
Conduct outreach/education activities to promote awareness of traveler information services	8	13	6	1	85	Traveler Information
Enhance 511 to provide static and real-time transit information	9	11	6		84	Traveler Information
Implement a central information/data clearinghouse	10	10	4	1	84	Data Management and Sharing
Enhance computer aided dispatch (CAD) systems	12	7	3	1	84	Emergency Management
Receive roadway incident information	8	13	4		83	Transit Management
Upgrade signal hardware	8	13	3		82	Arterial Management
Expand emergency vehicle preemption	12	6	4		82	Emergency Management
Reduce traffic congestion during incidents	9	12		2	81	Freeway Management
Implement/enhance web-based trip planner	10	10	1	2	81	Transit Management
Share incident information with other agencies	8	13	2	1	81	Data Management and Sharing

Need	Priority					Category/Service Area
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	Total	
Coordinate arterial and freeway management strategies	10	9	3	1	80	Arterial Management
Provide/enhance speed enforcement at high risk locations	11	7	4	1	80	Freeway Management
Improve/implement ability to remotely modify signal timing	10	8	5	1	79	Arterial Management
Provide real-time transit arrival/departure information on web site	11	7	3	3	79	Transit Management
Provide/enhance mobile data terminals for emergency vehicles	11	7	2	2	78	Emergency Management
Expand/enhance/upgrade automatic vehicle location (AVL) system	8	11	3	1	76	Transit Management
Provide real-time transit arrival/departure information at bus stops	9	9	3	3	75	Transit Management
Expand security cameras on transit vehicles, at transit stations/stops and park-and-ride facilities	10	7	4	1	75	Transit Management
Provide freeway/expressway travel times	9	9	3	5	75	Traveler Information
Provide better vehicle restrictions and roadway closure information to commercial vehicles	8	11	2		75	Commercial Vehicle Operations
Implement transit signal priority technology	7	11	6	1	74	Transit Management
Provide arterial travel times (on major arterials)	6	12	8	2	74	Traveler Information
Implement intersection collision warning/avoidance systems	6	13	4		73	Arterial Management
Provide/enhance automatic vehicle location (AVL) for emergency vehicles	9	8	3	2	72	Emergency Management
Provide tracking of HAZMAT vehicles	10	5	7	1	72	Commercial Vehicle Operations
Staffing	6	12	5	2	71	Arterial Management
Improve ridesharing program/website	6	12	5	2	71	Transit Management
Share surveillance video and data with PSAPs/emergency responders	7	10	6	2	71	Data Management and Sharing

Need	Priority					Category/Service Area
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	Total	
Share surveillance video and data with PSAPs/emergency responders	7	10	6	2	71	Data Management and Sharing
Enhance arterial traffic map	6	10	10	1	70	Traveler Information
Monitor queue lengths in/near work zones	6	11	7	1	70	Road Weather
Expand CCTV camera coverage on arterials	7	9	7		69	Arterial Management
Implement/improve incident detection capabilities	5	14	2	2	69	Freeway Management
Enhance freeway/expressway traffic map	6	10	9	2	69	Traveler Information
Implement Smart Work Zone technology	6	12	3	1	69	Road Weather
Provide target enforcement at locations with history of violations	6	11	6		69	Commercial Vehicle Operations
Develop/implement system-wide arterial management strategies	7	10	3		68	Arterial Management
Monitor/collect air quality data	8	7	7	2	68	Arterial Management
Implement red-light-running technology	8	7	7	1	68	Arterial Management
Implement/enhance remote monitoring of transit vehicle mechanical condition	5	13	4	1	68	Transit Management
Provide on-line reservation system for demand-responsive transit services	5	12	5	1	66	Transit Management
Provide information on planned special events	4	13	7	3	66	Traveler Information
Provide curve speed warning	7	8	7		66	Road Weather
Improve data collection capabilities	8	6	7	1	65	Arterial Management
Provide on-board automated enunciators	8	7	3	4	64	Transit Management
Reduce vehicle delays at rail grade crossings	6	9	6	1	63	Arterial Management
Expand freeway/expressway dynamic message signs (DMS)	4	12	5	1	61	Freeway Management
Provide vehicle-over-height detection/warnings	5	10	6	1	61	Road Weather
Expand CCTV coverage on freeways/expressways	6	8	5	1	59	Freeway Management

Need	Priority					Category/Service Area
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	Total	
Expand/upgrade automated passenger counters	4	10	9	1	59	Transit Management
Reduce commercial vehicle weight, width and height violations	7	6	6	2	59	Commercial Vehicle Operations
Provide information on commercial vehicle operations (CVO) permit restrictions	5	9	6	1	58	Commercial Vehicle Operations
Improve data collection on freeways/expressways	6	7	6	1	57	Freeway Management
Monitor/collect air quality data	6	6	9	3	57	Freeway Management
Provide directions to parking facilities	4	8	13	3	57	Traveler Information
Install/upgrade automatic vehicle location (AVL) on freeway service patrol vehicles	6	7	5	3	56	Freeway Management
Implement/expand dynamic message sign (DMS) installations on arterials	5	6	11	1	54	Arterial Management
Provide interstate/inter-regional traveler information for commercial vehicles	5	7	8	1	54	Commercial Vehicle Operations
Implement/improve inter-jurisdictional signal coordination	6	5	8	2	53	Arterial Management
Implement/upgrade computer aided dispatch (CAD) system for freeway service patrol	6	5	8	3	53	Freeway Management
Provide information on available truck parking facilities	3	9	11	3	53	Traveler Information
Provide health monitoring of traffic signal equipment at intersections and rail crossings	3	9	10		52	Arterial Management
Deploy weigh-in-motion/mobile weigh enforcement technology	2	11	9		52	Commercial Vehicle Operations
Improve/expand vehicle detection coverage on freeways/expressways	4	9	4	2	51	Freeway Management
Warn travelers about trucks entering/existing work zones	4	7	10	4	51	Road Weather
Implement variable speed limits	2	11	7	2	50	Freeway Management

Need	Priority					Category/Service Area
	Red High (5)	Green Medium (3)	Yellow Low (1)	Blue Not Needed	Total	
Provide information on truck parking and availability	3	9	8	2	50	Commercial Vehicle Operations
Monitor queue lengths at ramp locations	2	12	3	3	49	Freeway Management
Expand highway advisory radio (HAR) coverage on freeways/expressways	4	6	7	3	45	Freeway Management
Provide information on parking availability		10	15	2	45	Traveler Information
Improve ramp metering operations	4	5	9	2	44	Freeway Management
Track locations of maintenance fleet	1	10	8	6	43	Road Weather
Implement advanced parking management systems		3	15	2	24	Arterial Management
Implement automated/remote control gate systems		2	12	6	18	Freeway Management

4.3 COMPARISON OF 1997 ITS PLAN ITS USER NEEDS ASSESSMENT TO THE 2018 ITS PLAN USER NEEDS ASSESSMENT

Strictly for historical perspective, the tables below provide a comparison of the results of a similar ITS Needs assessment performed in 1996 for the 1997 EDP with the results of the ITS Needs Assessment performed for the 2018 Plan. **Table 4-3** shows the Top 10 results of the ITS Needs Assessment from the 1997 EDP. **Table 4-4** shows the Top 10 results of the ITS Needs Assessment currently under evaluation for the 2018 Plan. The terminology is somewhat different between the two sets of ITS Needs, but most of the concepts are the same, or substantially similar.

The shading in Table 4-4 and Table 4-5 show commonalities between the results of the two Needs Assessments performed approximately 20 years apart. Moving forward, the project team will attempt to ascertain whether these are as yet unmet needs, or if they have been addressed but they simply continue to be high priorities for the Kern Region's transportation management agencies. It is likely that some of the ITS Needs are currently being met through existing systems and agency practices, but that the ITS Needs continue to be a high priority. It is also likely that some or all of these ITS Needs continue to require some attention in the form of new or updated system(s) or agency practices.

The areas in which ITS Needs continue to rank as high priority to the Kern Region's transportation management agencies can be summarized in the following bullet points:

- Information exchange between Caltrans and local agencies
- Signal timing/coordination
- Timely incident information to travelers
- Incident response and management

Table 4-3: 1997 ITS EDP Needs Assessment Results

ITS Need	Score
Safety	2.4
Information sharing between agencies	2.4
Signal coordination and timing	2.1
Improved incident management	2.1
Information sources	2.0
Transit	1.7
Operating procedures and agreements	1.5
Information dissemination	1.5
Trucking and goods movement	1.4
Air quality	1.1

Table 4-4: Initial Results of the 2018 ITS Plan Needs Assessment

ITS Need	Score
Provide routing (detour) information to travelers during incident, construction, weather events, special events, etc.	129
Provide/enhance road weather conditions information to travelers	122
Improve signal timing/coordination	118
Provide roadway closure/restriction information	116
Improve information exchange between Caltrans and local transportation agencies	116
Coordinate construction and maintenance project schedules within and between agencies	113
Reduce recurring traffic congestion	107
Provide real-time traffic information to emergency responders	103
Warn work crews of errant vehicles	102
Provide incident information to travelers	100

4.4 USE OF THE ITS USER NEEDS ASSESSMENT

Now that in an initial ranking of ITS User Needs has been completed, the project team can now begin the process of identifying ITS Strategies for the Kern Region that are pertinent to the ITS stakeholders and transportation managers around the county. The ITS Strategies will be used in part to guide development of the Regional ITS Architecture for the Kern Region; and will also be used in part to guide the Final Plan.

One of the next steps in the overall project is development of the Regional ITS Architecture for the Kern Region. The relative priorities of the ITS User Needs will be used in part to guide development of the Regional ITS Architecture. This will be done in the form of selection of pertinent Service Packages to be included in the Regional ITS Architecture. Service Packages are an element of the National ITS Architecture. Service Packages represent components of the National ITS Architecture that address specific services, such as surface street control. They collect together several different subsystems, equipment packages, terminators, and architecture flows that provide the desired service. But most importantly, they are project oriented. Service Packages have common, understandable names like Transit Vehicle Tracking, Traffic Signal Control, and Broadcast Traveler Information.

Service Packages in the National ITS Architecture are organized into eight service areas, which are as follows:

- Archived Data Management
- Public Transportation
- Traveler Information
- Traffic Management
- Vehicle Safety
- Commercial Vehicle Operations
- Emergency Management
- Maintenance and Construction Management

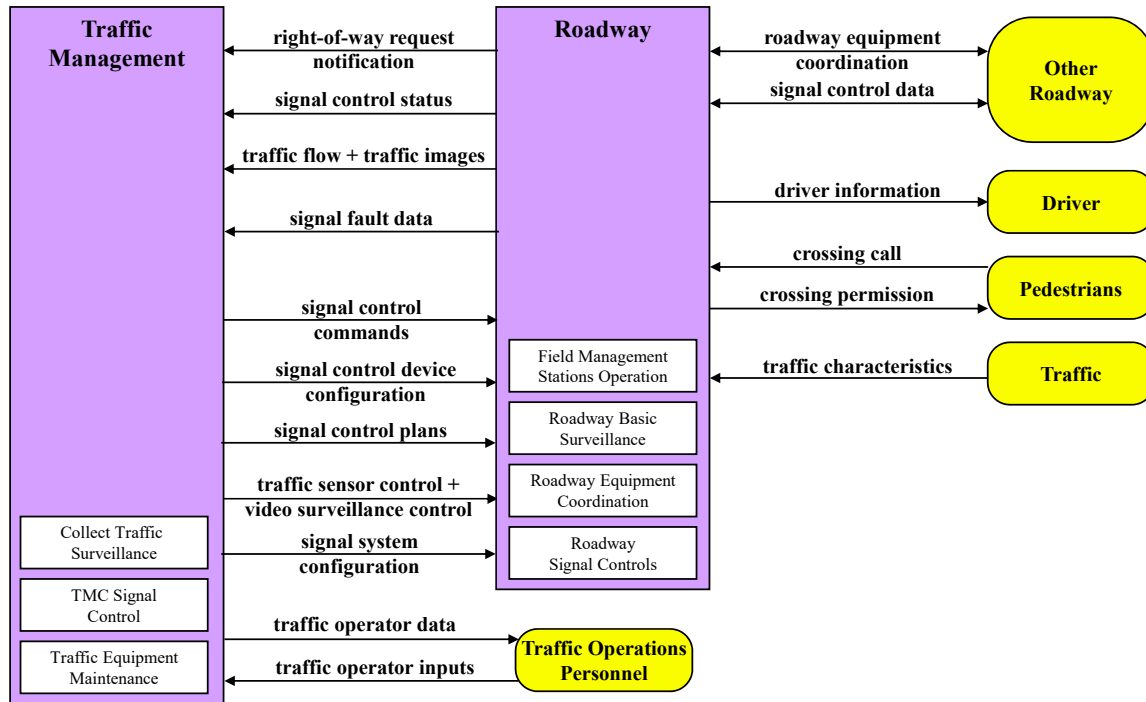
The strawman list of ITS User Needs used to prioritize ITS User Needs was organized by the same eight service areas. Therefore, the results of the ITS User Needs Assessment generally translates into a prioritization, or ranking, of needed Service Packages for the Kern Region.

Figure 4-1 is a diagram of a Service Package as taken from the National ITS Architecture. The “Traffic Management” and “Roadway” boxes represent Traffic Management and Roadway Subsystems in the National ITS Architecture. The boxes within the Traffic Management and Roadway Subsystems are Equipment Packages from the National ITS Architecture. Equipment packages group similar processes of a particular subsystem together into an implementable package. The yellow boxes with the rounded corners are Terminators in the National ITS

Architecture. Terminators represent the people, systems, and general environment that interface to ITS. Terminators are identified in the National ITS Architecture, but do not have Functional Requirements defined within the National ITS Architecture.

Figure 4-1: Traffic Signal Control Service Package

ATMS03 – Traffic Signal Control



4.5 MAPPING ITS USER NEEDS TO ITS SERVICE PACKAGES

Since the ITS User Needs Assessment was organized consistent with the National ITS Architecture Service Packages, it is a relatively straight forward process to “map” the ITS User Needs to the Service Packages in the National ITS Architecture. This “mapping” of ITS User Needs to the Service Packages will assist in identifying priority ITS Strategies for Kern, as well as priority Service Packages within the Regional ITS Architecture. Ultimately, this structure will help in leading to a logical sequencing of projects in the Final Plan.

Table 4-5 is a matrix that maps the ITS User Needs to the National ITS Architecture Service Packages. The ITS User Needs are listed in the left most column in the order of their ranking from the ITS User Needs Assessment shown in Table 4-2. Table 4-5 will be used to refine ITS User Need rankings with the Kern Region stakeholder group. It will also be used to discuss development of ITS Strategies, selection of Service Packages, and development of ITS projects for the Kern Region.

5.0 NEXT STEPS

The next step in the overall project is to conduct a focused ITS User Needs discussion with the public safety community from the Kern Region, including the California Highway Patrol, local police and fire departments, the sheriff's office, and other emergency management personnel. The results of that discussion will be incorporated into the results of the ITS User Needs Assessment documented in this deliverable. Then, working with the ITS Inventory collected over the past few months, as well as the results of the ITS User Needs Assessments, the Project Team will begin developing ITS Strategies and projects for review and approval by the stakeholder group.

Appendix A: “Goals and Objectives Worksheet”

Goals and Objectives 2018 ITS Plan for the Kern Region

Goals and Objectives support the ITS Vision and provide the means to determine where the region is today and where it wants to be with respect to the envisioned benefits and effects of technology on transportation. As part of the visioning process, stakeholders are asked to review the following list of high-level goals and supporting objectives; the goals and objectives will guide the development of the ITS Strategic Deployment Plan in a way that reflects stakeholder needs and priorities. Please check the box to **Keep, Delete, or Edit** the comment. Write your edits on the objective. New Objectives may be written in the comment box.

Goal #1: Reduce Traffic Congestion

Supporting Objectives:

K D E

- Reduce the number and duration of accidents and incidents
- Minimize the congestion and delays imposed by trucks on other traffic
- Reduce the congestion and delays associated with agricultural vehicles
- Reduce the congestion and delays associated with vehicles searching for parking in central business areas
- Reduce delays along arterial corridors via improved traffic signal coordination, especially across jurisdictions
- Provide local and long-distance travelers with the traffic and weather information they need to avoid congestion, or to anticipate it
- Reduce the delays and congestion at railroad crossings, especially for emergency vehicles
- Improve the management of traffic at incident scenes, including incident-related traffic diversions
- Increase system efficiency and throughput to maximize existing capacity
- Support the deployment of emerging autonomous and Connected Vehicle technologies that have the potential to increase system efficiency and safety

Comments:

Goal #2: Reduce the Number, Severity and Duration of Accidents and Incidents

Supporting Objectives:

K D E

- Reduce the number and severity of accidents and incidents:
 - Due to weather conditions,
 - Between trucks and autos
 - Involving agricultural vehicles,
 - Involving pedestrians and bicycles

- Improve monitoring and enforcement of speed limits
- Improve red light running monitoring and enforcement
- Provide local and long-distance travelers with the information they need to avoid adverse weather conditions, or to anticipate them
- Improve the ability to quickly locate incident scenes, especially in rural areas
- Minimize the safety concerns associated with outdated roadway design
- Improve coordination among Caltrans, CHP and emergency responders to reduce the time needed for incident detection, verification and dispatch
- Improve the ability of travelers to find help quickly in highway emergencies
- Deploy detection technologies that could increase the visibility of bicycles and pedestrians

Comments:

Goal #3: Improve Transportation and Transit Planning and Operations

Supporting Objectives:

K D E

- Promote coordination of transit services among providers
- Promote coordination of traffic management among jurisdictions, including traffic signals, construction management and incident management
- Increase the amount, accessibility and quality of data for planning and analysis, and develop new tools and applications that leverages the data
- Improve the operation of existing traveler information systems that increases the breadth and reliability of data provided for various modes
- Promote interagency data sharing
- Support the operation of transit priority systems across jurisdictional boundaries
- Promote the usage of open standards to make technologies interoperable

Comments:

Goal #4: Promote the Efficiency, Safety, Convenience and Use of Alternative Travel Modes

Supporting Objectives:

K D E

- Facilitate trips requiring transfers between transit services, including local and intercity or regional, and between fixed-route and demand-responsive service
- Improve the quality, availability and utilization of fixed-route and demand-responsive transit service
- Provide traveler information services such as mobile apps that promotes usage of pedestrian, bicycle and ridesharing facilities and services
- Improve the safety and security on transit vehicles and at stations and stops
- Increase the availability, quality and ease-of-use of transit route and schedule information
- Improve transit on-time performance
- Support the provision of the transit amenities that are necessary to attract riders who have other options

Comments:

Goal #5: Improve the Safety and Efficiency of Goods Movement and Reduce the Impacts of Commercial Vehicles on other Traffic and Roadways

Supporting Objectives:

K D E

- Improve truck routing and enforcement to minimize damage to roadways
- Improve the availability and awareness of truck parking
- Improve the availability and promote the awareness and use of information for truckers on traffic and weather conditions, truck routes, and other services
- Reduce delays at commercial vehicle facilities, such as weigh stations
- Support future deployment of zero emission freight technology
- Provide freight focused traveler information

Comments:

Goal #6: Minimize the Environmental Impacts of Transportation

Supporting Objectives:

K D E

- Reduce transportation-related air pollution, including greenhouse gas (GHG) emissions.
- Reduce need for roadway capacity expansion by maximizing throughput of existing transportation systems
- Promote transportation demand management strategies to reduce vehicle miles traveled by single occupancy vehicle modes

Comments

Goal #7: Improve the mobility of people and freight; Maximize the efficiency and cost effectiveness of the existing and future transportation system.

Supporting Objectives:

K D E

- Support more efficient use of the transportation system through the implementation of Intelligent Transportation Systems technology
- Build upon the momentum and stakeholder coalition generated through the San Joaquin Valley Goods Movement Study to pursue ITS commercial vehicle projects.
- Investigate how ITS can support efforts to improve east/west travel between the inland areas and coastal communities.
- Use momentum from the valley-wide ITS planning effort in conjunction with federal rules (ITS architecture and standards conformity and statewide and metropolitan planning) to expand ITS actions.
- Build upon the existing Caltrans District 6 Traffic Management Systems to fill gaps and complete coverage on major facilities, including expansion of their highway closures and restrictions database, to include other agencies.
- Capitalize on the extensive ITS technology testing and standards development conducted by Caltrans by using, where appropriate, Caltrans approaches for local traffic management systems.
- Build upon lessons learned from past and current transit ITS deployment experience in the San Joaquin Valley (Fresno Area Express, Golden Empire Transit, and San Joaquin Regional Transit).
- Build upon Caltrans District 6 experience with sharing facilities, equipment, and information between traffic management and California Highway Patrol staff.
- Provide traveler information for commercial vehicle operators at truck rest stops.
- Improve visibility and access to existing Caltrans' valley-wide alternate route plans.
- Coordinate the Bakersfield area Transportation Management Center with Caltrans' District 6 Transportation Management Center via satellite.
- Integrate the ITS capabilities being implemented at Golden Empire Transit (GET) with Bakersfield's traffic management system, including sharing information between the two centers during emergencies.
- Facilitate the transfer of lessons learned from GET ITS deployment to other area transit operators, and look for opportunities for those agencies to better coordinate with GET using its ITS capabilities.

Goal #7: Improve the mobility of people and freight; Maximize the efficiency and cost effectiveness of the existing and future transportation system. (continued)

Supporting Objectives:

K D E

Expand the accident reduction campaigns on Kern’s rural highways.

Comments

Appendix B: “Strawman” List of ITS User Needs Spreadsheets



INTELLIGENT TRANSPORTATION SYSTEMS (ITS) PLAN FOR THE KERN



ITS Needs Assessment

General Agency Information and Respondent Identification

The following information will allow us to understand your perspective and to contact you if we need to better understand the information you provide.

Organization _____
Name _____
Title _____
Telephone _____
Fax _____
E-mail _____

Instructions

On the following tabs, please indicate priority needs for your agency. Place an "X" in the appropriate field to rank the needs as either "high," "medium," or "low."

ID	Arterial Management Needs	Priority			
		High	Medium	Low	Not Needed
AM1	Improve signal timing/coordination				
AM2	Staffing				
AM3	Improve/implement ability to remotely modify signal timing				
AM4	Provide/enhance speed enforcement at high risk locations				
AM5	Implement/expand dynamic message sign (DMS) installations on arterials				
AM6	Upgrade signal hardware				
AM7	Coordinate arterial and freeway management strategies				
AM8	Reduce traffic congestion during incidents				
AM9	Reduce recurring traffic congestion				
AM10	Implement intersection collision warning/avoidance systems				
AM11	Implement advanced parking management systems				
AM12	Implement/improve inter-jurisdictional signal coordination				
AM13	Improve data collection capabilities				
AM14	Expand CCTV camera coverage on arterials				
AM15	Develop/implement system-wide arterial management strategies				
AM16	Reduce vehicle delays at rail grade crossings				
AM17	Monitor/collect air quality data				
AM18	Implement red-light-running technology				
AM19	Provide health monitoring of traffic signal equipment at intersections and rail crossings				

ID	Freeway Management Needs	Priority			
		High	Medium	Low	Not Needed
FM1	Improve data collection on freeways/expressways				
FM2	Improve ramp metering operations				
FM3	Improve/expand vehicle detection coverage on freeways/expressways				
FM4	Reduce recurring traffic congestion				
FM5	Expand CCTV coverage on freeways/expressways				
FM6	Reduce traffic congestion during incidents				
FM7	Monitor/collect air quality data				
FM8	Expand highway advisory radio (HAR) coverage on freeways/expressways				
FM9	Provide/enhance speed enforcement at high risk locations				
FM10	Expand freeway/expressway dynamic message signs (DMS)				
FM11	Monitor queue lengths at ramp locations				
FM12	Implement/improve incident detection capabilities				
FM13	Implement automated/remote control gate systems				
FM14	Implement/upgrade computer aided dispatch (CAD) system for freeway service patrol				
FM15	Install/upgrade automatic vehicle location (AVL) on freeway service patrol vehicles				
FM16	Implement variable speed limits				

ID	Transit Management Needs	Priority			
		High	Medium	Low	Not Needed
TM1	Expand/enhance/upgrade automatic vehicle location (AVL) system				
TM2	Coordinate timed transfers between routes, providers and modes				
TM3	Implement/enhance web-based trip planner				
TM4	Implement regional smart card for transit fare payment				
TM5	Implement/enhance remote monitoring of transit vehicle mechanical condition				
TM6	Provide real-time transit arrival/departure information on web site				
TM7	Provide real-time transit arrival/departure information at bus stops				
TM8	Expand security cameras on transit vehicles, at transit stations/stops and park-and-ride facilities				
TM9	Provide on-board automated enunciators				
TM10	Provide on-line reservation system for demand-responsive transit services				
TM11	Provide transit information using social media				
TM12	Implement transit signal priority technology				
TM13	Receive roadway incident information				
TM14	Expand/upgrade automated passenger counters				
TM15	Develop mobile apps to provide static and real-time transit information				
TM16	Expand/enhance/upgrade computer aided dispatch (CAD) system				
TM17	Receive roadway construction/closure/detour information				
TM18	Receive real-time roadway congestion information				
TM19	Improve ridesharing program/website				

ID	Traveler Information Needs	Priority			
		High	Medium	Low	Not Needed
TI1	Provide more timely incident information to travelers				
TI2	Provide/enhance congestion information to travelers				
TI3	Provide freeway/expressway travel times				
TI4	Improve quality, consistency and thoroughness of traveler information				
TI5	Use social media for traveler information dissemination				
TI6	Provide incident information to travelers				
TI7	Provide roadway closure/restriction information				
TI8	Provide/enhance road weather conditions information to travelers				
TI9	Provide information on roadway construction and maintenance activities				
TI10	Provide routing (detour) information to travelers during incident, construction, weather events, special events, etc.				
TI11	Provide travel times/delays through work zones				
TI12	Provide information on planned special events				
TI13	Send email alerts of major incidents to major employers				
TI14	Provide directions to parking facilities				
TI15	Improve 511 system/web site				
TI16	Enhance freeway/expressway traffic map				
TI17	Enhance arterial traffic map				
TI18	Provide arterial travel times (on major arterials)				
TI19	Provide information on parking availability				
TI20	Conduct outreach/education activities to promote awareness of traveler information services				
TI21	Provide information on available truck parking facilities				
TI22	Enhance 511 to provide static and real-time transit information				

ID	Road Weather Needs	Priority			
		High	Medium	Low	Not Needed
RW1	Implement Smart Work Zone technology				
RW2	Warn work crews of errant vehicles				
RW3	Coordinate construction and maintenance project schedules within and between agencies				
RW4	Expand coverage of environmental/weather/road conditions detection/monitoring systems				
RW5	Monitor queue lengths in/near work zones				
RW6	Provide curve speed warning				
RW7	Provide roadway flood warnings				
RW8	Provide vehicle-over-height detection/warnings				
RW9	Provide advisory to warn traffic of a stopped queue in/near work zones				
RW10	Provide/enhance enforcement in work zones				
RW11	Monitor transportation infrastructure				
RW12	Warn travelers about trucks entering/existing work zones				
RW13	Track locations of maintenance fleet				

ID	Data Management and Sharing Needs	Priority			
		High	Medium	Low	Not Needed
DM1	Improve information exchange between Caltrans and local transportation agencies				
DM2	Improve data collection and archiving				
DM3	Share incident information with other agencies				
DM4	Improve information exchange between transportation and transit agencies				
DM5	Share public safety/computer aided dispatch (CAD) data with transportation agencies				
DM6	Share congestion information with other agencies				
DM7	Provide incident information to emergency management agencies				
DM8	Implement a central information/data clearinghouse				
DM9	Share surveillance video and data with PSAPs/emergency responders				
DM10	Use archived data for planning, modeling, analysis and traffic management strategy development				

ID	Emergency Management Needs	Priority			
		High	Medium	Low	Not Needed
EM1	Improve incident response				
EM2	Provide real-time traffic information to emergency responders				
EM3	Improve incident detection				
EM4	Improve communications in rural areas				
EM5	Reduce incident clearance time				
EM6	Improve a multi-agency, system-coordinated response to major incidents				
EM7	Improve incident notification to agencies				
EM8	Improve response to HAZMAT incidents				
EM9	Expand emergency vehicle preemption				
EM10	Improve interagency communications				
EM11	Enhance computer aided dispatch (CAD) systems				
EM12	Provide/enhance automatic vehicle location (AVL) for emergency vehicles				
EM13	Provide/enhance mobile data terminals for emergency vehicles				

ID	Commercial Vehicle Operations Needs	Priority			
		High	Medium	Low	Not Needed
CV1	Provide information on truck parking and availability				
CV2	Reduce commercial vehicle weight, width and height violations				
CV3	Provide interstate/inter-regional traveler information for commercial vehicles				
CV4	Provide information on commercial vehicle operations (CVO) permit restrictions				
CV5	Provide tracking of HAZMAT vehicles				
CV6	Provide better vehicle restrictions and roadway closure information to commercial vehicles				
CV7	Deploy weigh-in-motion/mobile weigh enforcement technology				
CV8	Provide target enforcement at locations with history of violations				