



# INTELLIGENT TRANSPORTATION SYSTEMS (ITS) PLAN FOR THE KERN REGION

## DRAFT DELIVERABLE NO. 3

### ASSESSMENT OF 1997 EARLY DEPLOYMENT PLAN (EDP) REPORT

SEPTEMBER 2017



Kern Council of Governments  
1401 19<sup>th</sup> Street, Suite 300  
Bakersfield, CA 93301  
www.kerncog.org  
661-635-2900  
Fax 661-324-8215

<http://www.kerncog.org/category/docs/its/>

## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 INTRODUCTION .....	1-1
1.1 PROJECT BACKGROUND .....	1-1
1.2 ITS PLANNING PROCESS .....	1-1
1.3 STAKEHOLDER PARTICIPANTS .....	1-3
1.4 RELATIONSHIP TO 1997 EDP .....	1-4
1.5 PURPOSE OF ASSESSMENT OF THE 1997 EDP .....	1-4
2.0 OVERVIEW OF THE 1997 EDP .....	2-1
3.0 ITS VISION, GOALS, OBJECTIVES AND USER NEEDS ASSESSMENT .....	3-1
3.1 VISION .....	3-1
3.2 STAKEHOLDER INPUT .....	3-1
3.3 ITS GOALS AND OBJECTIVES .....	3-2
3.4 PLAN STEERING COMMITTEE .....	3-2
3.5 USER NEEDS .....	3-2
4.0 SERVICE PACKAGE ASSESSMENT .....	4-1
5.0 DEPLOYMENT PLAN ASSESSMENT .....	5-1
6.0 NEXT STEPS .....	6-1

### TABLES

TABLE 1-1. ITS PLAN FOR THE KERN REGION STAKEHOLDER LIST .....	1-4
TABLE 3-1. ITS PLAN FOR THE KERN REGION STAKEHOLDER LIST .....	3-2
TABLE 3-2. ITS USER SERVICES .....	3-3
TABLE 4-1. ITS SERVICE PACKAGES .....	4-2
TABLE 5-1. ITS PROJECT IMPLEMENTATION STATUS .....	5-2

## **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: Assessment of 1997 Early Deployment Plan (EDP) Report**

- **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 will be reviewed and assessed. 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 ASSESSMENT OF THE 1997 EDP

In the 20 years since the 1997 EDP was completed, many ITS projects have been deployed in the region, while others that were planned did not come to fruition. During that timeframe, stakeholder priorities and needs have changed along with new advances in technology. The purpose of this report is to assess the 1997 EDP to determine gaps, omissions, or major changes. The findings in this assessment will help focus discussion for future deliverables for developing the 2018 ITS Plan.

The Assessment addresses the planning, technical, deployment, and implementation portions of the 1997 EDP. The 2001 San Joaquin Valley ITS Strategic Deployment Plan (SDP) was reviewed and the result is that the 1997 EDP elements were identical in the 2001 SDP. Moving forward, the 2018 ITS Plan will serve as a living document to guide future investments.

---

## 2.0 OVERVIEW OF THE 1997 EDP

In the late 1990s, Kern COG embarked on an outreach effort to develop an ITS Early Deployment Plan (EDP) to guide the planning and deployment of ITS in the region. Completed in 1997, the plan was developed as a reference document for ITS projects and was used as a “how to” for technology. When the plan was developed, ITS was still new to many jurisdictions. Signal systems and detection systems were not necessarily viewed as ITS.

The 1997 EDP was a collaborative effort with stakeholders throughout the Kern region. California Department of Transportation (Caltrans) District 6 and 9, Caltrans New Technology and Research Program, the County of Kern, and major cities and transportation agencies within the Kern region all assisted in developing the needs, goals and objectives of the plan. These stakeholders provided input throughout the process as part of a steering committee to provide guidance on the direction and content of the plan including prioritizing transportation challenges and solutions in the region.

The goals of the ITS Plan:

- Identify the transportation needs of Kern County that have the potential to be addressed by ITS technologies
- Develop a multi-year (short, medium, and long term) ITS strategic deployment plan which will result in a well-balanced, integrated, intermodal transportation system

The program areas detailed in the 1997 EDP included:

- Communication Network Development Program
- Traffic and Incident Management Program
- Kern Traveler Safety Program
- Kern Informed Traveler Program
- Kern Smart Transit Program
- Enhanced Emergency Response Program

The prioritized projects, along with budgets, deployment schedule, and benefits were detailed to provide a complete deployment package. The 1997 EDP also covered funding mechanisms, governance, and operations and maintenance.

The 1997 EDP was a detailed assessment of the ITS in the region at that time. Due to major advances in technology and the latest revision to the National ITS Architecture, significant updating to the ITS Plan for the Kern region is warranted. The following sections contain details of the necessary updates.

## **3.0 ITS VISION, GOALS, OBJECTIVES AND USER NEEDS ASSESSMENT**

### **3.1 VISION**

The stakeholders involved with the development of the 1997 EDP did not define a vision for the plan; however, the primary focus was the maximization of traffic flow, safety, and efficiency in both the rural and urban areas of Kern County.

The stakeholders involved with the development of the 2001 San Joaquin Valley Intelligent Transportation Systems Strategic Deployment Plan defined the vision as: *“The ITS vision for San Joaquin Valley is to enhance the quality of life, mobility and the environment through coordination, communication and the integration of ITS technologies into the Valley’s transportation systems.”*

The vision for the ITS Plan as developed by current stakeholders is part of Deliverable 5: ITS Vision, Goals, Objectives and User Needs Report.

### **3.2 STAKEHOLDER INPUT**

Several stakeholders provided their input during the first set of stakeholder workshops held in 2017. The objective was to gather insight and guidance to focus this update effort to address user needs and project priorities as they have evolved since 1997 along with technology advancements. The following summarizes the input and comments gathered from 2017 stakeholders:

- 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



### 3.3 ITS GOALS AND OBJECTIVES

The 1997 EDP included a description of the major goals of ITS as defined by FHWA and lists the objectives which would collectively accomplish the larger goal. The goals included:

- Improved safety
- Improved service level (efficiency)
- Reduced energy and environmental impacts
- Enhanced productivity
- Improved mobility, convenience, and comfort

### 3.4 EDP STEERING COMMITTEE

**Table 3-1** lists the steering committee that participated in the development of the 1997 EDP. It is anticipated that the regional and local agencies listed would participate in the current update effort.

**Table 3-1. ITS EDP for the Kern Region Stakeholder List**

Bakersfield City School District	City of Taft
Caltrans District 6	County of Kern
Caltrans District 9	Fresno Council of Governments (Fresno COG)
Caltrans New Technology & Research Program	Golden Empire Transit District (GET)
Chamber of Commerce	High School District
City of Bakersfield	Kern Council of Governments (Kern COG)
City of Ridgecrest	

### 3.5 USER NEEDS

The 1997 EDP addressed the following issues:

- Improved information sharing among agencies
- Improved traffic progression across jurisdictional boundaries
- Reduction in delays due to incidents
- More informed traveler decision making through improved traveler information systems
- Improved data collection through expanded coverage of information sources

- Increase transit ridership
- Enhance transit coverage and efficiency
- Improved air quality analysis
- Improved commercial vehicle operations

**Table 3-2** lists the ITS Service Packages and associated user services identified by the stakeholders for the 1997 EDP. The user services address regional needs and are used to define ITS projects.

**Table 3-2. ITS User Services**

Service Bundle	User Services
Travel and Transportation Management	<ul style="list-style-type: none"> <li>• En-Route Driver Information</li> <li>• Route Guidance</li> <li>• Traveler Services Information</li> <li>• Traffic Control</li> <li>• Incident Management</li> <li>• Emissions Testing and Mitigation</li> </ul>
Travel Demand Management	<ul style="list-style-type: none"> <li>• Pre-Trip Travel Information</li> <li>• Ride Matching and Reservation</li> <li>• Demand Management and Operations</li> </ul>
Public Transportation Operations	<ul style="list-style-type: none"> <li>• Public Transportation Management</li> <li>• En-Route Transit Information</li> <li>• Personalized Public Transit</li> <li>• Public Travel Security</li> </ul>
Electronic Payment	<ul style="list-style-type: none"> <li>• Electronic Payment Services</li> </ul>
Commercial Vehicle Operations	<ul style="list-style-type: none"> <li>• Commercial Vehicle Electronic Clearance</li> <li>• Automated Roadside Safety Inspection</li> <li>• On-board Safety Monitoring</li> <li>• Commercial Vehicle Administrative Processes</li> <li>• Hazardous Materials Incident Response</li> <li>• Commercial Fleet Management</li> </ul>
Emergency Management	<ul style="list-style-type: none"> <li>• Emergency Notification and Personal Security</li> <li>• Emergency Vehicle Management</li> </ul>
Advanced Vehicle Control and Safety Systems	<ul style="list-style-type: none"> <li>• Longitudinal Collision Avoidance</li> <li>• Lateral Collision Avoidance</li> <li>• Intersection Collision Avoidance</li> <li>• Vision Enhancement for Crash Avoidance</li> <li>• Safety Readiness</li> <li>• Pre-Crash Restraint Deployment</li> <li>• Automated Highway System</li> </ul>

As part of Task 6, the ITS Strategies Report will be drafted with input from the stakeholders since transportation policies and objectives for the region have evolved since 1997. The stakeholders provided input and the results are included in Deliverable 5: ITS Vision, Goals, Objectives and User Needs Report. Based on updated needs and priorities, ITS projects should be reviewed and revised as needed.

## 4.0 SERVICE PACKAGE ASSESSMENT

The stakeholders in the 1997 EDP effort identified priority user services and project concepts. The twenty years since the 1997 EDP was completed represents a long period of ITS development that has seen the introduction of new technologies and applications for traffic management, operations and communications. The National ITS Architecture has been updated to Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT) Version 8.0 with new and updated Service Packages to support user services from new ITS developments and technologies.

The 1997 EDP included a description of all 53 service packages (formerly named “market packages”) available at the time. Each market package consists of several subsystems, technology packages within the subsystem, and data flows which define the information exchanged among subsystems. The 1997 EDP identified which market packages were relevant to the projects in the Kern region in two implementation stages: core architecture and incremental buildout. The Core Kern ITS Architecture satisfies the high priority user services for the Kern region. The following market packages comprise the Core Functional Architecture for the 1997 EDP:

- Network Surveillance
- Surface Street Control
- Freeway Control
- Traffic Information Dissemination
- Regional Traffic Control
- Incident Management System
- Transit Vehicle Tracking
- Transit Fixed-Route Operations
- Demand Response Transit Operations
- Interactive Traveler Information
- Emergency Response
- Emergency Routing

**Table 4-1** shows how the National ITS Architecture service packages trace to ARC-IT.

**Table 4-1. ITS Service Packages**

<b>Short Name</b>	<b>National ITS Architecture Service Package</b>	<b>Short Name</b>	<b>ARC-IT 8.0 Service Package</b>
ATMS01	Network Surveillance	TM01	Infrastructure-Based Traffic Surveillance
ATMS03	Surface Street Control	TM03	Traffic Signal Control
ATMS04	Freeway Control	TM05	Traffic Metering
ATMS06	Traffic Information Dissemination	TM06	Traffic Information Dissemination
ATMS07	Regional Traffic Control	TM07	Regional Traffic Management
ATMS08	Incident Management System	TM08	Incident Management System
APTS01	Transit Vehicle Tracking	PT01	Transit Vehicle Tracking
APTS02	Transit Fixed-Route Operations	PT02	Transit Fixed-Route Operations
APTS03	Demand Response Transit Operations	PT03	Dynamic Transit Operations
ATIS02	Interactive Traveler Information	TI02	Personalized Traveler Information
EM01	Emergency Response	PS01	Emergency Call-Taking and Dispatch
EM02	Emergency Routing	PS02	Routing support for Emergency Responders
EM02	Emergency Routing	PS03	Emergency Vehicle Preemption
EM02	Emergency Routing	VS04	V2V Special Vehicle Alert

The newly identified service packages will be reviewed as part of Task 6 and 7 of the ITS Plan in development. The service packages selected will be compared to those identified in the 1997 EDP.

## 5.0 DEPLOYMENT PLAN ASSESSMENT

The final chapter of the Kern ITS EDP describes the planned deployment of ITS technologies for the Kern region. The 1997 EDP listed the following program areas:

- Communication Network Development Program
- Traffic and Incident Management Program
- Kern Traveler Safety Program
- Kern Informed Traveler Program
- Kern Smart Transit Program
- Enhanced Emergency Response Program

These program areas are still relevant today; however, the titles must be updated to be consistent with the transition from the National ITS Architecture 7.1 to Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT) Version 8.0. There are new program areas not considered in the 1997 EDP.

**Table 5-1** lists the ITS projects identified by the stakeholders for the 1997 EDP and their implementation status. The status is simply yes if the project has been implemented or no if the project has not. There is a project identified as “unk” which has an unknown status because public safety stakeholders have not yet provided input for the current ITS Plan effort underway. The ITS projects identified for the Kern region will be revisited in the development of future deliverables.

Table 5-1. ITS Project Implementation Status

<b>Communication Network Development Program</b>	
no	Communication Links with Bakersfield SONET Network
no	Smart Call Boxes for Communication
no	Links to Other Regions
<b>Traffic and Incident Management Program</b>	
yes	Census Stations, System Detectors and Incident Detection
no	Decision Support System (DSS) Shared among All Agencies
unk	Coordinated Incident Management Procedures
yes	Urban Smart Corridors for Bakersfield [signal synchronization, cameras]
yes	Freeway Field Elements [Changeable Message Signs (CMS), Highway Advisory Radio(HAR), Closed Circuit Television (CCTV) Cameras]
<b>Kern Traveler Safety Program</b>	
yes	Weather Stations
yes	Photo Radar for Red Light Enforcement
no	RR Grade Crossing Technology
no	Road Closure Enforcement during Flooding
no	Smart Studs
no	Rockfall Detection System
<b>Kern Informed Traveler Program</b>	
yes	Development of an Advanced Traveler Information System (ATIS)
no	Workstations for Traveler Information
yes	Upgrade of Bakersfield TOC
yes	Interactive and Commuter Kiosks
yes	Live Video Feeds to the Media
yes	Community Access Television (CATV)
yes	Highway Advisory Telephone (HAT)
yes	WWWSite
<b>Transit Operation Program</b>	
yes	Upgrade of Golden Empire Transit (GET) and Kern Regional Transit
yes	Demand Responsive Service for GET (Kern Smart Shuttles)
no	Coordination of GET and Kern Regional Transit Schedules
<b>Enhanced Emergency Response Program</b>	
no	Traveler Information Workstations for Emergency Response Providers
yes	Establishment of Emergency Corridor Routes [ <i>signal pre-emption</i> ]

## **6.0 NEXT STEPS**

The Project Team collected ITS inventories from ITS stakeholders as part of Task 4. The Project Team worked on an ITS user needs survey, in which stakeholders were asked to identify their own ITS needs, and to assist with prioritization of those ITS needs in Task 5. One of the activities related to ITS user needs yet to be initiated is coordination with public safety stakeholders on their own unique ITS user needs. The Consultant Team will help to connect with public safety stakeholders. These tasks and activities will further lead into development of the Regional ITS Architecture and Strategic Deployment Plan.