

# CENTRAL COAST ITS

## INTELLIGENT TRANSPORTATION SYSTEMS

### What is ITS?

Intelligent Transportation Systems (ITS) involve the use of advanced computer, electronic, and communication technologies to increase the safety and efficiency of the entire surface transportation system.

### Central Coast ITS Strategic Deployment Plan

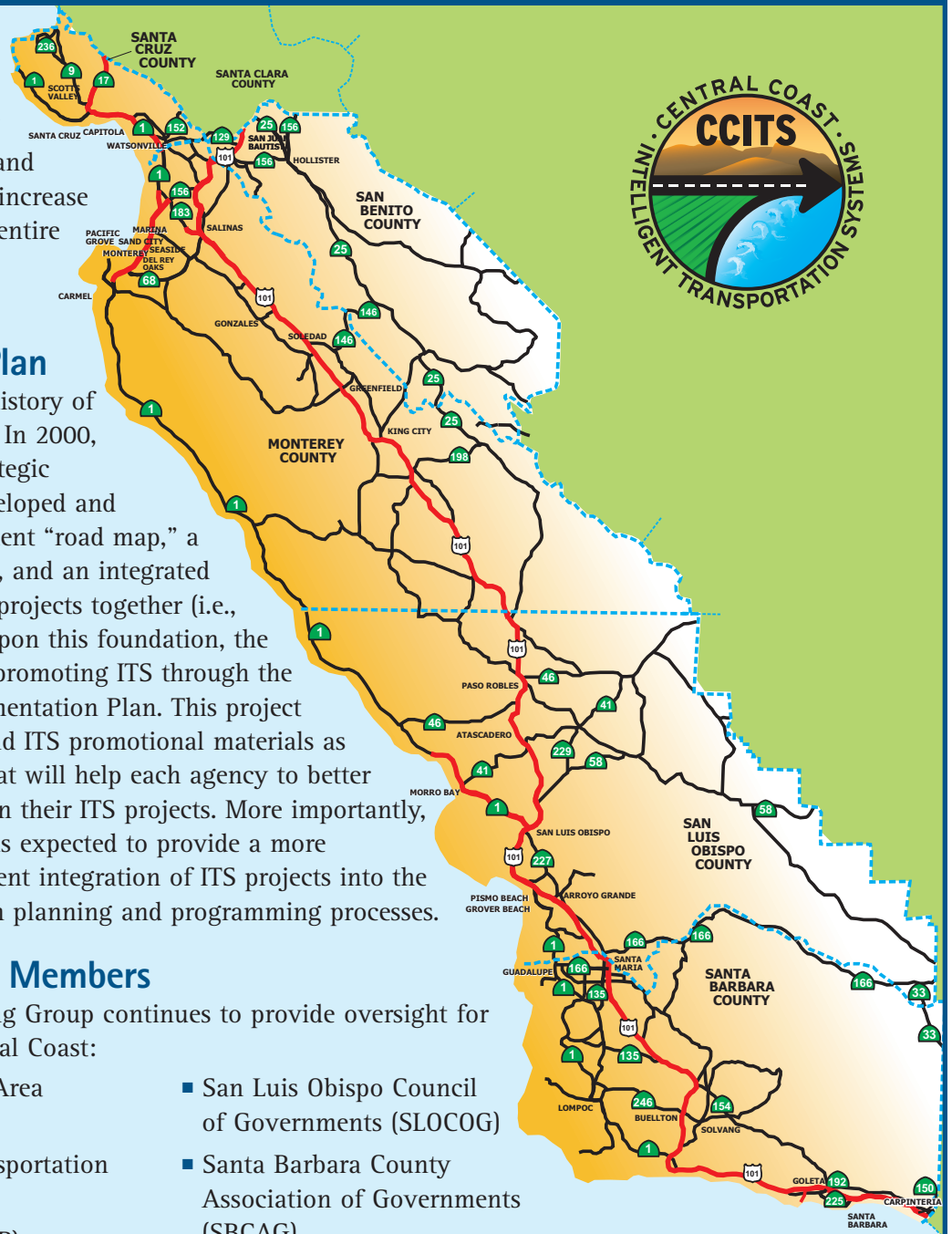
The Central Coast region has a history of planning and implementing ITS. In 2000, the initial Central Coast ITS Strategic Deployment Plan (SDP) was developed and provided an ITS project deployment “road map,” a phased implementation schedule, and an integrated framework to “connect” the ITS projects together (i.e., the ITS Architecture). Building upon this foundation, the region is further deploying and promoting ITS through the current Central Coast ITS Implementation Plan. This project will update the Strategic Plan and ITS promotional materials as well as develop new products that will help each agency to better implement, operate, and maintain their ITS projects. More importantly, the CCITS Implementation Plan is expected to provide a more expeditious, unified, and consistent integration of ITS projects into the State and regional transportation planning and programming processes.

### ITS Coordinating Group Members

A multi-Agency ITS Coordinating Group continues to provide oversight for ITS implementation in the Central Coast:

- Association of Monterey Bay Area Governments (AMBAG)
- California Department of Transportation (Caltrans)
- California Highway Patrol (CHP)
- Council of San Benito County Governments (SBCOG)
- Federal Highway Administration (FHWA)
- Federal Transit Administration (FTA)
- Monterey-Salinas Transit (MST)
- San Luis Obispo Council of Governments (SLOCOG)
- Santa Barbara County Association of Governments (SBCAG)
- Santa Barbara Metropolitan Transit District (SBMTD)
- Santa Cruz County Regional Transportation Commission (SCCRTC)
- Santa Cruz Metropolitan Transit District (SCMTD)
- Transportation Agency for Monterey County (TAMC)

The CCITS Coordinating Group exemplifies the region’s commitment to ITS. They meet on a quarterly basis and direct ITS activities to improve mobility, safety, and economic competitiveness in the Central Coast.



# What We Are Doing

## Central Coast ITS Strategic Direction

“Building blocks” for a regionally-integrated ITS in the Central Coast are already in place. Existing ITS applications and ITS projects from the 2000 CCITS SDP provide critical functionality to our regional transportation system. Key to this success is the Caltrans District 5 Transportation Management Center (TMC). Operational since October 2001, the Caltrans District 5 TMC is located in San Luis Obispo, managed by Caltrans and the CHP, and coordinates/supports the following ITS activities:

- **Use of detectors/sensors to monitor traffic flow and roadway conditions**
  - Now: Programmed detection devices along US 101 in Santa Barbara and San Luis Obispo
  - Next: Additional detection devices deployed throughout the Central Coast (US 101, SR 1, SR 17, and SR 46)
- **Control ramp meters to improve traffic flow**
  - Now: Existing ramp meters located at the US 101 and SR 156 interchange in Monterey County, and existing southbound (SB) ramp meter at the US 101 and Garden Street interchange within the City of Santa Barbara
  - Next: Install ramp meters at key locations along US 101 (Santa Barbara and San Luis Obispo) and SR 1 (Monterey and Santa Cruz)

In addition to the Caltrans D5 TMC, the Central Coast is forwarding a host of other significant ITS projects:

- **Traffic Control Systems (TCS)**
  - Now: Interconnected signal systems along arterial roadways (multiple Cities)
  - Next: Improved traffic flow along arterial roadways through signal upgrades and further coordination strategies (multiple Cities)
- **Traffic Signal Priority**
  - Now: Signal priority for emergency vehicles (multiple Cities)
  - Next: Signal priority for transit buses (MST, SBMTD, and SCMTD)

### ■ CCTV

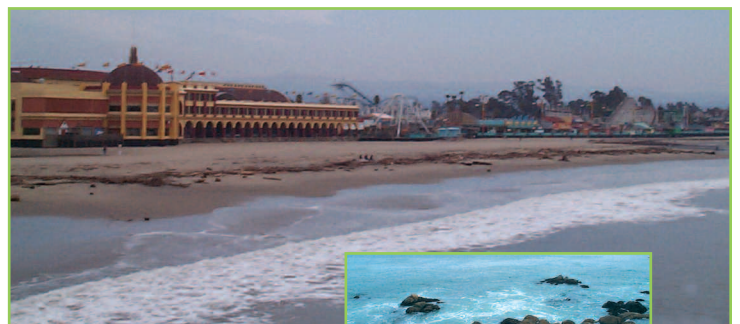
- Now: Monitor and control closed circuit television cameras (CCTV) along US 101 (San Luis Obispo)
- Next: Install CCTV cameras at key locations throughout the Central Coast (US 101, SR 1, SR 17, and SR 46) and hook-up to the TMC

### ■ Increase the availability and quality of Regional multi-modal traveler information

- Now: Existing Changeable Message Signs (CMS) along SR 1 and SR 17 in Santa Cruz County and CMS programmed for the US 101 and SR 154 interchange in Santa Barbara County (north and south junctures)
- Next: Post roadway conditions on additional CMSs (US 101 and SR 1), Highway Advisory Radios (HAR) (US 101 and SR 1), and the Internet

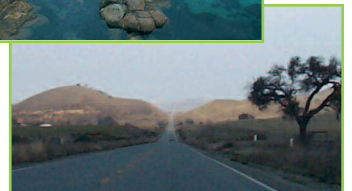
### ■ Improve coordination between agencies within and outside the Central Coast region

- Now: Provide joint CHP/Caltrans dispatching and incident management activities
- Next: Connections between the Caltrans D5 TMC and the Caltrans D4 TMC (San Francisco), Caltrans D6 TMC (Fresno), and Caltrans D7 TMC (Los Angeles) for information sharing purposes



### ■ Call Boxes

- Now: Roadside motorist aid call boxes installed in Monterey, San Benito, Santa Cruz, San Luis Obispo, and Santa Barbara Counties
- Next: Deployment of “smart” call boxes in some counties



## ■ Communications and Radio Systems

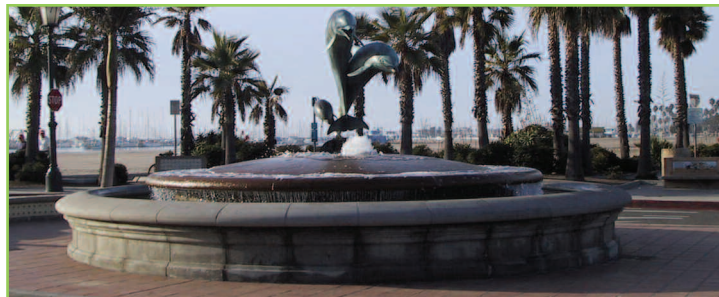
- Now: CHP radio system and private sector cellular service (throughout the Central Coast)
- Next: Enhance/coordinate CHP and emergency response radio systems, and expand cellular phone coverage (throughout the Central Coast)

## ■ Transit Applications

- Now: Improved schedule adherence using an Automated Vehicle Location (AVL) system (MST)
- Next: Provide a consistent “smart” card approach for transit, parking, and toll system use (throughout the Central Coast)

## ■ Safety Applications

- Now: Dynamic Speed/Curve Warning system along SR 17 including detection stations, CCTV, and CMS (Santa Cruz)
- Next: Advanced crosswalks (San Luis Obispo)



# Additional Information

## Central Coast ITS Architecture—How Projects Fit Together

- What Is It? It is a framework or “blueprint” that guides ITS implementation so that projects are compatible, systems are connected, and operations are coordinated. It consists of a series of diagrams and reports that show the relationships between ITS projects, systems, and responsible agencies.
- Why Is It Useful? The Regional ITS Architecture developed for the Central Coast will ensure that ITS projects are coordinated with other systems and that they are eligible for Federal funding.



## Project Implementation: How Will We Get There?

- Why Is Implementation Important? The full benefit of ITS is realized when a project or system is actually deployed and day-to-day operations, maintenance, and management activities are successfully provided.
- How Will Implementation Be Accomplished? Implementation of ITS projects will occur to the extent that lead agencies take the initiative to develop, procure, deploy, and fund specific initiatives. In order to accomplish this, project sponsors need a set of guidelines to follow that instruct them on the technical, institutional, and financial steps to take in the successful execution of an ITS project—the 2000 Central Coast ITS Strategic Plan was the first step. The Central Coast ITS Implementation Plan was initiated in 2004 to continue to promote and deploy ITS in the Central Coast.



## How Can I Get More Information?

For more information about ITS in your County, please call an ITS Coordinator at:

- Santa Cruz (831) 460-3200
- San Benito (831) 637-7665
- Monterey (831) 775-0903
- San Luis Obispo (805) 781-4219
- Santa Barbara (805) 961-8900

For more information about ITS in the Central Coast Region, please call:

- AMBAG (831) 883-3750
- Caltrans District 5 (805) 549-3130
- CHP (916) 657-7222
- FHWA (916) 498-5005





# Why ITS Is Important— to California and the Central Coast

## How Can ITS Help?

As transportation funds become more limited and travel demands increase, we need to find ways of maximizing the use of our existing transportation system. Wise use of ITS technologies will help us to more efficiently use our initial transportation investment.

## What are Existing and Future Challenges?

ITS offers the potential to address many of the region's existing and future transportation challenges. Some of the challenges that were identified by representatives of the various affected agencies include:

- Further enhancing roadway and motorist safety
- Providing real-time information to travelers
- Better managing traffic safety along congested roadways
- Better coordinating incident/emergency response activities
- Increasing transit system efficiency and accessibility
- Enhancing and upgrading the communications network

## ITS Benefits and Successes— What Can We Expect?

Implementation of ITS will lead to significant benefits such as:

- Travel time savings
- Accident rate reduction
- Improved transit customer services
- Increased roadway capacity
- Reductions in vehicle emissions and fuel consumption

The actual benefits achieved by the Central Coast will depend on a number of factors, such as congestion levels, the extent of ITS system deployment, and system operations.

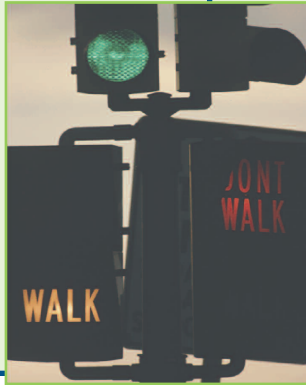


# Recommended Projects

## Traffic Signal Control on Surface Streets

### Description

- Provides the ability to modify signal timings at surface street intersections in response to changing roadway conditions
- Advanced applications include interconnected or synchronized signals along a roadway
- Central control systems include upgraded signal controllers and advanced system monitoring and control capabilities
- Other applications include signal priority (for transit and emergency vehicles) and advanced crosswalks



### Benefits

- Travel time reductions from 8% to 20%
- Delay reductions from 15% to 44%
- Emission reductions
  - Carbon Monoxide (CO) (5% to 13%)
  - Hydrocarbon (HC) (4% to 10%)
- Fuel consumption reductions from 6% to 12%
- Vehicle stop reductions from 22% to 41%
- Travel speed increases from 14% to 22%

### Sample Locations

- Major surface streets and highways (Central Coast)
- Santa Barbara County:
  - State Street and Hollister Avenue
  - Cities of Santa Barbara and Goleta
- Monterey County:
  - SR 183 (Salinas)
  - Cities of Monterey and Salinas
- San Benito County:
  - SR 25 and SR 156 (near Hollister)
- Santa Cruz County:
  - SR 152 (near Watsonville)
  - City of Santa Cruz
- San Luis Obispo County:
  - SR 227
  - SR 1

## Ramp Metering on Freeways

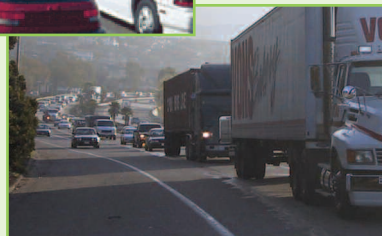
### Description

- Traffic signals located upstream from the merge point of an on-ramp with a freeway, which control the flow of vehicles onto the freeway
- Typically involves the use of roadway sensors and software programs to balance the number of vehicles allowed onto the freeway versus the number of vehicles already on the freeway



### Benefits

- Travel time reductions from 20% to 48%
- Capacity increases from 3% to 5%
- Accident rate reductions from 15% to 50%
- Fuel consumption reductions approximately 41%
- Travel speed increases from 8% to 60%



### Sample Locations

- Existing applications:
  - US 101 at SR 156 (Monterey County)
  - US 101 at Garden Street (Santa Barbara County)
  - Programmed for US 101 at Carrillo Street (City of Santa Barbara)
- Planned applications:
  - US 101 (Santa Barbara and Santa Maria areas in Santa Barbara County)
  - US 101 (San Luis Obispo area in San Luis Obispo County)
  - US 101 (Salinas area) and SR 1 (Monterey area) in Monterey County
  - SR 1 (Santa Cruz area in Santa Cruz County)

# Recommended Projects

## Motorist Aid Call Boxes

### Description

- Call boxes help motorists-in-distress by providing a direct connection to a CHP communications center
- The California Call Box Program is a motorist-aid system operating along major roadways throughout the State

- The programs are administered at the county level by local Service Authorities for Freeways and Emergencies (SAFEs)



### Benefits

- Improves traveler safety and security (i.e., motorists in distress can receive roadside help in a more timely manner)
- Motorists can report various types of incidents more quickly (e.g., accidents, car breakdowns, roadside hazards, etc.)
- Improves emergency and incident response activities



### Sample Locations

- Existing installations:

Santa Cruz County:

- SR 1, SR 9, SR 17, SR 129, and SR 152

San Luis Obispo County:

- US 101, SR 1, SR 41, SR 46, and SR 166

Santa Barbara County:

- US 101, SR 1, SR 154, SR 166, and SR 246

Monterey County:

- US 101, SR 1, SR 68, and SR 156

San Benito County:

- US 101, SR 25, and SR 156



## Network Surveillance (CCTV, Sensors, and Smart Call Boxes)

### Description

- System of detection and/or surveillance devices that monitor roadway conditions to assist in operational and management decisions
- Common elements:
  - CCTV (Closed Circuit Television) cameras that provide video images of the roadway
  - Roadway sensors that measure traffic volumes, occupancy, speed, etc.
  - Smart Call Boxes use existing call boxes equipped with roadway and/or weather detection devices



### Benefits

- Improves the ability to monitor/collect roadway conditions (i.e., more accurate, reliable, and timely data/information)
- Improves ability to identify and/or verify incidents
- Helps an agency operator better manage the roadway
- Serves as the foundation to provide traveler information to the public
- Improves emergency and incident response activities
- Reductions in response times
- Improves ability to identify incident locations

### Sample Locations

- CCTV

Existing installations:

- Cities of Capitola, Santa Cruz, and Santa Barbara as well as Santa Cruz County
- Caltrans (SR 17 and US 101 at SR 156)

Planned installations:

- Central Coast Agencies (along major roadways)

- Roadway Detectors (Planned):

- Central Coast Agencies (along major roadways)

- Smart Call Boxes (Planned):

- Central Coast Agencies (at select county call box locations)



# Recommended Projects

## En-Route Traveler Information Systems (CMS and HAR)

### Description

Roadside devices that provide en-route traveler information to passing motorists at key decision points.

Common elements:

- CMS (Changeable Message Signs) are electronic message boards at strategic locations that display dynamic information in an illuminated manner
- HAR (Highway Advisory Radio) involves the broadcast of location-specific information via the car radio (typically on AM with a 1-mile range)



### Benefits

- Improves ability to provide traveler information to the public (i.e., more accurate, reliable, and timely)
- Improves ability to notify and “re-route” travelers around upcoming roadway incidents (e.g., congestion, accidents, roadway closures, etc.)
- Travel time reductions of approximately 17 minutes in incident conditions
- Fuel consumption reductions from 6% to 12%
- Delay reductions up to 1,900 vehicle hours per incident
- Hydrocarbon (HC) emission reductions of approximately 33%



### Sample Locations

#### ■ CMS

Existing installations:

- Santa Cruz County (SR 1 and SR 17)
- City of Monterey (Washington St. and Del Monte Ave.)
- Santa Barbara County (Programmed for the US 101 and SR 154 interchange’s north and south junctures)

Planned installations:

- Monterey and San Luis Obispo Counties

#### ■ HAR

Existing installations:

- Cities of Santa Cruz and Monterey

Planned installations:

- Santa Barbara, Monterey, and San Luis Obispo Counties

## Interactive Traveler Information Systems (Internet, Kiosks, and Telephone Call-In Systems)

### Description

- Interactive devices providing access to traveler information (typically used before a trip is taken)

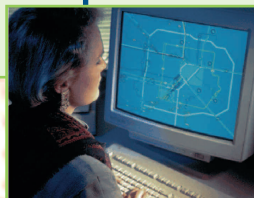
#### ■ Common elements

- Internet Websites
- Kiosks at strategic locations (e.g., rest areas, transit terminals, hotels, etc.) that can be accessed through keyboard or touchscreen user inputs and the Internet
- Telephone call-in systems that provide menu-based options based on caller inputs (i.e., “punch-in” specific numbers on phone)



### Benefits

- Improves provision of traveler information to the public (i.e., more accurate, reliable, and timely)
- Improves ability to notify and “re-route” travelers around roadway incidents
- Improves ability to better plan trips (i.e., route, mode, and time choices)
- Travel time reductions of approximately 17 minutes in incident conditions
- Fuel consumption reductions from 6% to 12%
- Delay reductions up to 1,900 vehicle hours per incident
- Hydrocarbon (HC) emission reductions of approximately 33%



### Sample Locations

#### ■ Internet Websites

Existing installations

- Caltrans
- CHP
- San Luis Obispo County

#### ■ Kiosks

Existing installations

- Santa Barbara MTD

#### ■ Telephone call-in systems:

Existing installations:

- Caltrans 1-800-427-ROAD

# Recommended Projects

## Transit Management Systems (AVL, Smart Cards, and Maintenance Systems)

### Description

- Applications to increase transit safety, efficiency, ridership, and performance
- Elements include:
  - AVL (Automated Vehicle Location) systems that track a vehicle's location in real-time and compare against schedule/route
  - Smart Cards (a form of electronic fare payment e.g., debit, credit, etc.)
  - System maintenance applications that use on-board sensors to monitor vehicle diagnostics, etc.



### Benefits

- Improves:
  - Transit system efficiency through better schedule adherence
  - Ability to provide riders with real-time transit information
  - Ability to manage fare collection and financial accounting systems
  - Transit system reliability and maintenance efficiencies
- Travel time reductions from 15% to 18%
- Service reliability increases from 12% to 23%
- Security improvements—incident response time reduced to 1 minute

### Sample Locations

- AVL Systems (Existing):
  - Monterey-Salinas Transit (MST)
- AVL Systems (Planned):
  - Santa Cruz MTD
  - Santa Barbara MTD
  - San Luis Obispo Regional Transit Authority (SLORTA)
  - Other Transit Agencies (Long-term)
- Smart Cards (Planned):
  - Santa Barbara MTD
  - SLORTA
  - Other Transit Agencies (Long-term)
- System Maintenance (Existing):
  - Monterey-Salinas Transit (MST)
- System Maintenance (Planned):
  - Other Transit Agencies (Long-term)

## Central Coast Regional Transportation Management Center (TMC)

### Description

- TMC (Transportation Management Center) is a physical building/facility that provides a framework to coordinate transportation-related data collection, processing, control, and information dissemination activities
- The focus of the TMC will be on operational and informational decision-making for the region's roadways
- TMC would coordinate the ITS systems and activities (described previously) such as traffic signal control, ramp meters, CCTV, etc.



### Benefits

- Provides a focal point for roadway operations and incident management activities in the Central Coast region
- Serves as a clearinghouse to provide real-time traveler information to the public (i.e., congestion and incident locations, alternate routes, roadway closures, etc.)
- Travel time reductions from 10% to 42% (due to incident management)
- Fatality reductions of approximately 10% in urban areas (due to incident management)
- Incident response time reductions from 5 to 7 minutes



### Sample Locations

- The Caltrans D5 TMC serves the entire Central Coast region
  - Located in San Luis Obispo
  - Jointly operated by Caltrans and the CHP
  - Other Central Coast agencies would be connected to the Caltrans D5 TMC and have various monitoring and control capabilities and functions
- Connections to the Caltrans D4 TMC (San Francisco), Caltrans D6 TMC (Fresno), and Caltrans D7 TMC (Los Angeles)
- County of Santa Barbara "satellite" TMC (Programmed)
- City of Santa Maria TMC (Planned)