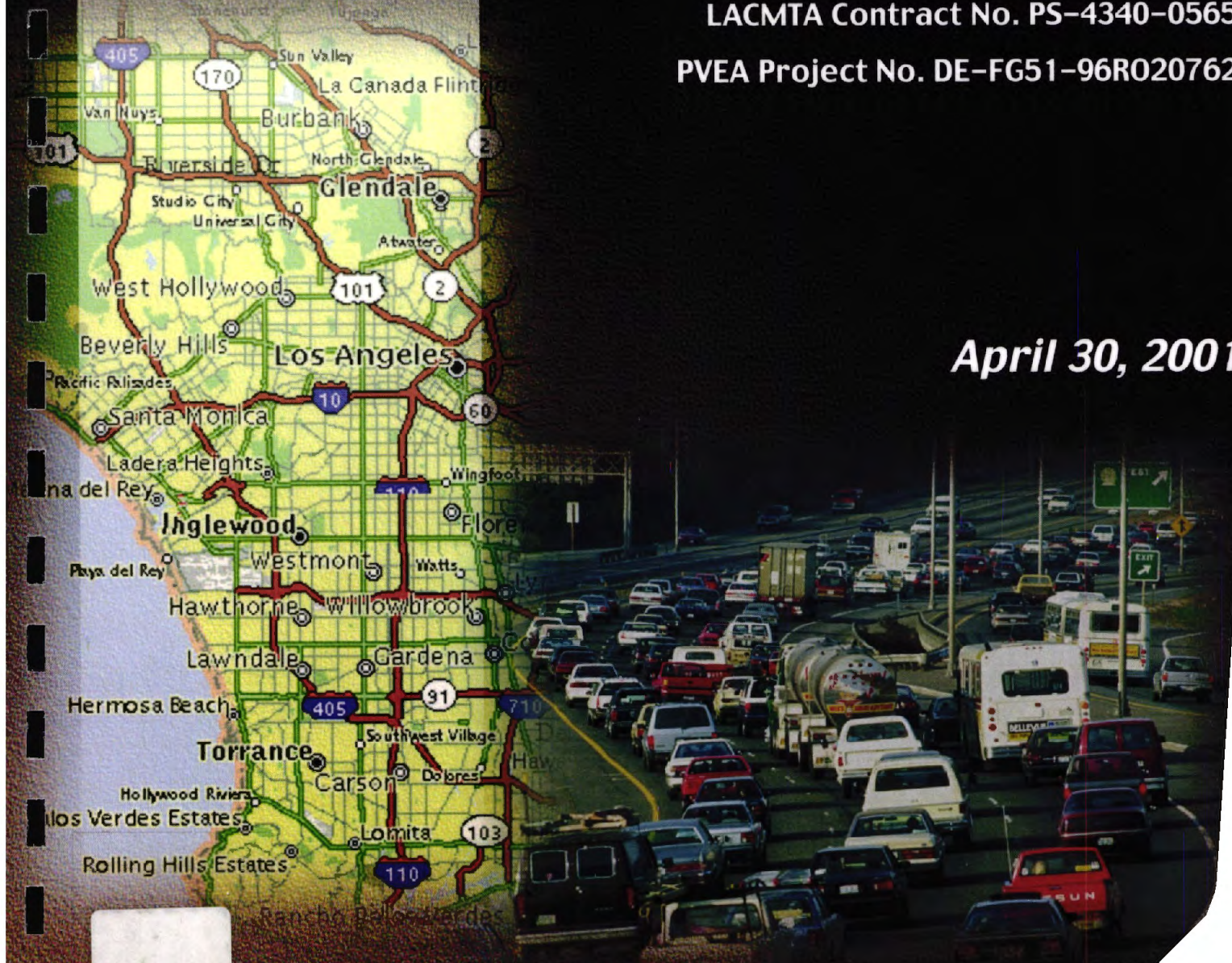
SANTA MONICA FREEWAY SMART CORRIDOR SYSTEM FINAL EVALUATION REPORT

EXECUTIVE SUMMARY

LACMTA Contract No. PS-4340-0565

PVEA Project No. DE-FG51-96R020762

April 30, 2001



BOOZ·ALLEN & HAMILTON
In Association with
The Robert Group
Minagar & Associates

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PREPARED FOR
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ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

BACKGROUND

This evaluation report provides a description of the findings of an evaluation of the Santa Monica Freeway Smart Corridor system. A previous evaluation summarized the lessons learned during the development, deployment, and operation of Smart Corridor. This evaluation investigates the operational impact of Smart Corridor in more detail, and updates the evaluation of its institutional and system related impacts.

The key project stakeholders are the California Department of Transportation (Caltrans), California Highway Patrol (CHP), Los Angeles County Metropolitan Transportation Authority (LACMTA), and the Los Angeles Department of Transportation (LADOT).

The origins of Smart Corridor can be traced back to the mid-1960s and 1970s, when Caltrans began to develop freeway surveillance and control systems in the Los Angeles region. During the 1980s, LADOT began to develop automated traffic control systems for arterial streets. In 1987, in response to concerns about increasing traffic congestion and energy consumption, and compliance with air quality standards, Assembly Bill #457 specified the elements of a Smart Corridor Telecommunications Demonstration Project. The demonstration was to be conducted on a portion of the Santa Monica Freeway, taking advantage of the computerized traffic control equipment already in place. The project was to be coordinated by the Los Angeles County Transportation Commission (later to become LACMTA), which in turn was required to consult with local and state traffic and law enforcement agencies to coordinate the project with existing plans and programs.

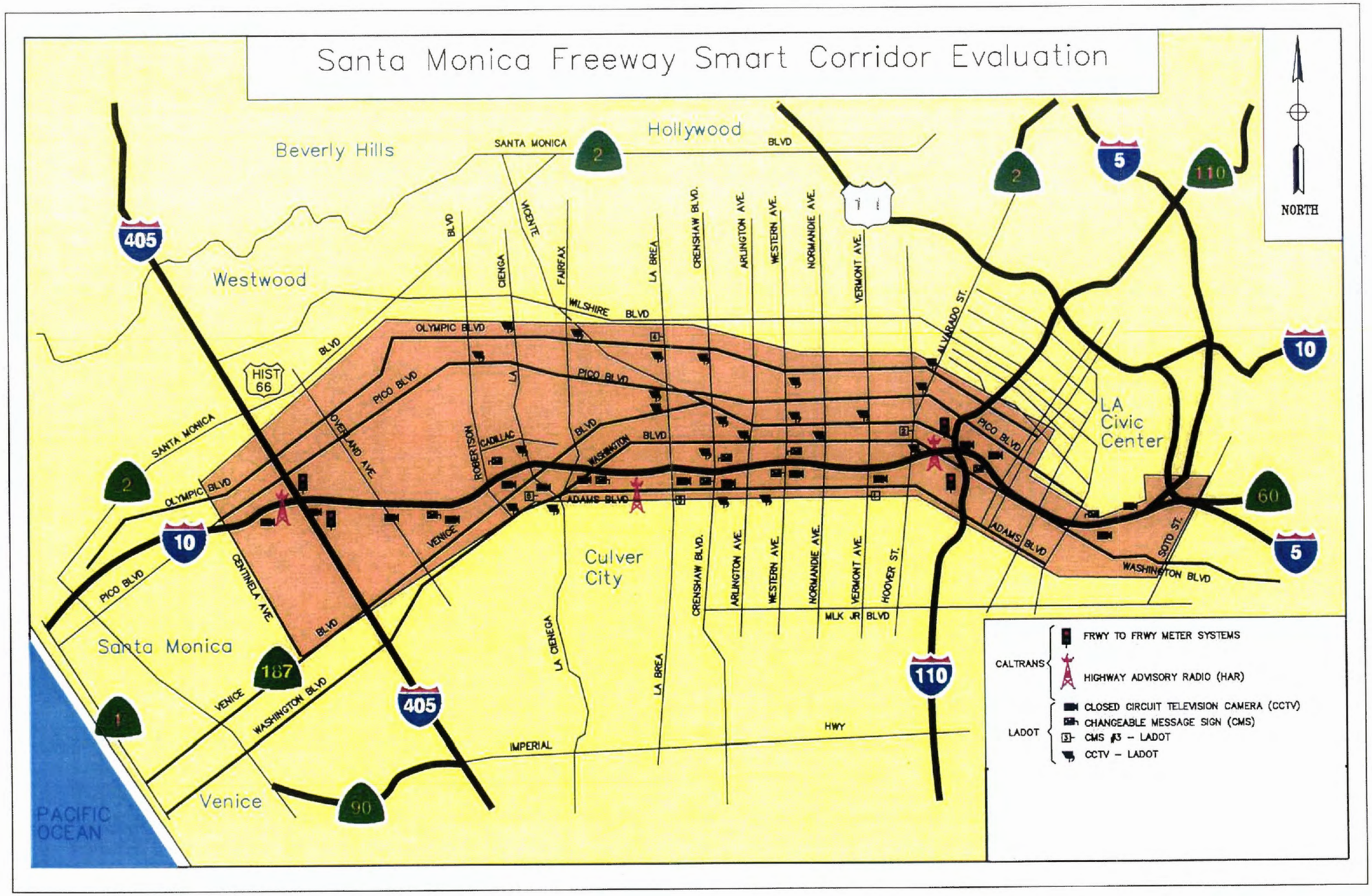
When it became operational in 1993, the Smart Corridor project was unique in a number of ways. Most significantly, it was the one of the first corridor management projects of its kind launched in the country. One of the most notable uses of Smart Corridor occurred during the aftermath of the January 17, 1994, Northridge Earthquake.

SYSTEM DESCRIPTION

The Santa Monica Freeway Smart Corridor system study area comprises an approximately 11-mile section of Santa Monica Freeway (I-10), between the Harbor Freeway (I-110) and San Diego (I-405) Freeway (see Exhibit 1). Within this area are five major parallel arterials: Adams, Venice, Washington, Pico, and Olympic Boulevards.

The overall goal of Smart Corridor was to improve traffic operations within the corridor. Providing congestion relief during incidents, minimizing the propensity for secondary accidents, reducing fuel consumption, and improving air quality were perceived as candidate benefits for deploying Smart Corridor system. These benefits were to be attained through the application of advanced technologies that would enable system operators to more effectively detect traffic incidents, direct travelers to alternate bypass routes, and respond to associated shifts in traffic patterns within the corridor.

Exhibit ES-1: Santa Monica Freeway Smart Corridor Area Of Operations And ITS Infrastructure



Smart Corridor used three components to achieve this goal:

- To coordinate and maximize the efficiency of existing real time monitoring and control systems of the participating agencies.
- To provide dynamic, real time traffic information to motorists in the corridor.
- To provide timely and effective accident/incident management within the corridor.

The Smart Corridor project comprised a mix of Intelligent Transportation Systems (ITS) technologies that support real time traffic monitoring, control strategies, and information dissemination. Of particular importance was the wide range of agencies that participated in Smart Corridor, and the extent to which inter-agency coordination impacted the performance of Smart Corridor.

EVALUATION APPROACH

After a decade of development, deployment, operations, and maintenance of the current system, this evaluation provides an independent and objective assessment of Smart Corridor's performance, impacts, successes, and lessons. This evaluation assesses the system's overall performance in response to study area freeway and arterial incidents (defined as any unusual occurrence causing significant delay within the corridor), focusing on the following six evaluation areas:

- Operational performance,
- Institutional coordination,
- System benefits assessment,
- System user assessment,
- Emissions and energy impacts,
- Costs.

Evaluation goals and objectives were developed for each of the six evaluation areas. The evaluation goals are summarized below.

Goal 1 – Assess the operational performance of the Smart Corridor system in the study area.

Goal 2 – Assess the extent of institutional coordination associated with the Smart Corridor system.

Goal 3 – Assess the system benefits arising from operational coordination arrangements associated with Smart Corridor.

Goal 4 – Assess the transportation system impacts arising from Smart Corridor.

Goal 5 – Assess the emissions and energy impacts associated with the operational performance of the Smart Corridor system in the study area.

Goal 6 – Document costs associated with the Smart Corridor system.

Evaluation goals 1 and 5 investigated the impacts of the Smart Corridor system on the transportation network (freeway and arterial) in the study area, including emissions and energy. This part of the evaluation was based on an analysis of data provided by Caltrans and LADOT related to 3 freeway and 4 arterial incidents that occurred in November and December 1999.

Evaluation goals 2, 3, and 4 investigated the working relationships established as a result of the Smart Corridor system, and their operational impact on the subject incidents, operational arrangements for using the Smart Corridor system, and perceived impacts of the Smart Corridor system on travelers. This part of the evaluation was based on structured interviews with operational, technical, and managerial staff, individually and in one or more groups, and with representative groups that provided the perceptions of travelers.

Evaluation goal 6 estimated the costs associated with developing, installing, operating and maintaining the Smart Corridor system.

CONCLUSIONS

Overall, the Smart Corridor system positively impacted traffic conditions during the 7 sample incidents. While the improvements for individual incidents were small, the potential impacts across the Los Angeles area are enormous, given the third of a million freeway incidents that occur across the region each year. As the Smart Corridor concept is expanded across the region, it will be an appropriate tool to mitigate the impacts of such incidents, and provide overall congestion relief.

It is important to keep in mind that any incident, freeway or arterial, in a corridor such as this study area is highly likely to lead to deterioration in transportation system performance. This is especially true with major incidents, when freeway traffic will likely spill over onto the arterial network. Smart Corridor provided the means to proactively manage such conditions. For the evaluation of the operational performance of Smart Corridor, 11 measures of effectiveness (MOEs) were identified, e.g., change in average speed, change in total travel time, and change in fuel consumed. The impact of Smart Corridor on each of these 11 MOEs was simulated using the computer based Synchro Plus traffic model. It is particularly interesting to note that, of the 11 MOEs considered in each of the 7 incidents evaluated, 68 percent improved, 14 percent remained unchanged, and 18 percent worsened. Put simply, there are very strong indications that for the subject incidents, Smart Corridor control improved conditions compared to no Smart Corridor control.

For Smart Corridor to succeed, new institutional relationships were needed. Not only were these relationships developed during development of Smart Corridor, the strengthened institutional relationships ultimately outlived the Smart Corridor system. Subsequent deployments of ITS type projects in the region have undoubtedly benefited from this.

From an operational standpoint, Smart Corridor showed that a centralized database was appropriate to this pilot effort covering an 11-mile section of the Santa Monica freeway.

However, it became apparent that this was not a viable avenue to explore for future expansion across the more than 400 miles of freeway in the Los Angeles region. Distributed systems where local jurisdictions retain responsibility for their respective systems are considered more practical. One local example of this concept is the ongoing Southern California Priority Corridor ITS Network, which conforms to the National ITS Architecture (see http://www.odetics.com/itsarch), and is expected to become partially operational during 2001. Further, integrated solutions, and not standalone systems such as Smart Corridor, are preferred to maximize resource efficiency; e.g., operators should work using the minimum number of workstations

LEGACY

The Smart Corridor system was intended to be a demonstration of the integration of multi-jurisdictional transportation management and information systems, using real time advanced technologies. By the end of the 1990s, technology advances had overtaken Smart Corridor, and other ITS initiatives in the region had moved ahead. While the centralized database of the Smart Corridor system closed in 1999, most of the infrastructure installed as part of Smart Corridor remains in use today.

In addition to the infrastructure legacy of Smart Corridor, there is also a strong institutional legacy. The main project stakeholders, Caltrans, CHP, LADOT, and LACMTA, have indicated a strong willingness to move forward together on similar initiatives. All four are key stakeholders working together to expand the Smart Corridor concept, and deploy other ITS infrastructure and technologies throughout the region.

LACMTA continues to encourage deployment of Smart Corridor concepts using a funding mechanism referred to as Proposition C. Proposition C was approved in 1990 to increase the Los Angeles County sales tax by a ½ cent, of which 25 percent has been designated for transit related highway improvements. Since Proposition C became effective in 1992, approximately $375 million has been programmed by LACMTA for the implementation of signal synchronization, bus priority, Smart Corridor and ITS projects along the regionally significant arterials identified by sub-regional Traffic Forums. With the lessons learned from Santa Monica Freeway Smart Corridor Demonstration Project, LACMTA is leading the county to further advance system integration among all modes of transportation.