



Caltrans Division of Research,  
Innovation and System Information

# Research



# Results

Planning, Policy  
and  
Programming

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**Project Title:**

Promoting Intermodal Connectivity at California's High Speed Rail Stations

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## Intermodal Connectivity at California's High Speed Rail Stations

The research will draw from best practices of blended High Speed Rail systems around the world to identify appropriate types of station infrastructure and services that will improve intermodal connectivity and offer optimal travel experience for California's HSR passengers.

### WHAT IS THE NEED?

High-speed rail (HSR) has emerged as one of the most revolutionary and transformative transportation technologies, having a profound impact on urban-regional accessibility and inter-city travel across Europe, Japan, and more recently China and other Asian countries. One of HSR's biggest advantages over air travel is that it offers passengers a one-seat ride into the center of major cities, eliminating time-consuming airport transfers and wait times, and providing ample opportunities for intermodal transfers at these locales. Thus, HSR passengers are typically able to arrive at stations that are only a short walk away from Central Business Districts and major tourist attractions, without experiencing any of the stress that car drivers often experience in negotiating such highly congested environments.

In their 2012 Revised Business Plan, the California High-Speed Rail Authority (CAHSRA) confirmed their commitment to a better incorporation of new high-speed infrastructure with existing services. The CAHSRA expects that a blended system will be more cost-efficient. In addition, and as consultants found in previous research, a number of station cities would favor the share-track approach, because they believe it would have less impact on their urban form and require fewer property acquisitions. On the other hand, opposition to the blended approach has come from those who believe that the train's speed would be significantly compromised. It is clear that such an approach required a higher level of coordination and planning of the infrastructural and spatial aspects of the HSR service, which was the focus of this research effort.



Caltrans provides a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

## WHAT WAS OUR GOAL?

The goal was to produce an accessible, employable set of guidelines with best practices for intermodality and blended service for the benefit of transit operators, high-speed rail planners, and station-cities in California.

## WHAT DID WE DO?

The consultants began with background research and a systematic review of the planning and transportation engineering literatures about intermodal connectivity and complementarity in the context of high-speed rail. The goal was to identify what these literatures tell us about the opportunities and challenges of blended service and blended systems in regards to the passengers' door-to-door travel experience, including access, station-area parking, ticketing, station wayfinding, etc.

Additionally, the consultants utilized a group of 26 international experts on HSR systems from Germany, Spain, France, UK, the Netherlands, and Italy and asked them to respond to a web-based survey about blended systems. Experts were asked to identify challenges and issues related to different blended systems and to pinpoint examples of corridors and stations where in their view the blended system works the best, and others where it does not work well.

Additionally, the consultants undertook in-depth case studies of the German and Spanish HSR system to understand how their blended systems operate, and what lessons can be extracted for California. They also examined in detail six HSR stations in Germany and six in Spain, considered as exemplary models of HSR station intermodality. The purpose of these case studies, which utilized a number of interviews with local station managers and transit officials, was to extract lessons and

best practices applicable to California.

The consultants also conducted two case studies of multi-modal transit stations -- the Downtown Burbank (Metrolink) Station and Union Station in Los Angeles. The purpose was to understand current capacities, operations, and challenges that these two intermodal transit interchanges are experiencing and to compare and contrast the U.S. context with the Spanish and German contexts.

## WHAT WAS THE OUTCOME?

The findings from the literature review, expert survey, and station case studies of multimodal facilities in Germany, Spain, and the U.S. were compiled to identify the best practices in terms of ensuring seamless intermodal connectivity and blended service. The consultants found that integrating HSR with conventional rail in a blended system sharing the same tracks offers the advantages of higher connectivity as well as potentially decreased capital costs and decreased adverse environmental and urban form impacts. However, a blended approach is more challenging in terms of management and operations and requires careful pre-planning to achieve a high degree of coordination in operations and passenger services. It also requires significant infrastructure planning and coordination as well as station infrastructure that accommodates smooth transitions among the different modes.

Connectivity and intermodality with other transportation modes offer seamless travel and mobility benefits. The German and Spanish case studies are exemplary in their achieved levels of intra-city and inter-city connectivity. They also have found ways to integrate local and regional railway services, buses, and even airline services in ways that complement rather than compete with one another. This entails both an operational aspect involving coordinated scheduling of different modes for easy links and short transfer

times, as well as a spatial aspect-easy physical access from one mode to the other.

### WHAT IS THE BENEFIT?

The benefit from the research was the compilation of recommendations about both operational and spatial issues of how to best ensure seamless intermodal connectivity and blended service. These recommendations covered four spatial zones: the station, the station neighborhood, the municipality, and the region at large. They should be useful for Caltrans, the California High Speed Rail Authority as well as California municipalities that will host high-speed rail stations.

### LEARN MORE

<http://transweb.sjsu.edu/PDFs/research/1209-promoting-intermodal-connectivity-atcalif-high-speed-rail-stations.pdf>

### IMAGES



Central station in Dresden, Germany