

High-Speed Rail: A National Perspective

High-Speed Rail Experience in the United States

A report prepared for
National Railroad Passenger Corporation

December 2008



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**final
report**

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Cambridge Systematics, Inc.

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Executive Summary

■ ES.1 Introduction and Context

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) established a process for designating U.S. high-speed rail (HSR) corridors. Since that time, a total of 11 HSR corridors have been designated, but none has yet approached the operational status of high-speed rail as originally envisioned. In spite of slower than anticipated progress, the desire for high-speed rail has remained present in the national consciousness, particularly within Congress. Seventeen years following the passage of ISTEA, Congressional complaints about America's failure to match foreign progress in high-speed rail are more than mere envy of the successes achieved in those countries. They represent frustration that the national vision implicit in ISTEA – that the United States would be making progress toward bringing about European style high-speed rail – has failed to fully take hold.

Amtrak commissioned this study to help identify the trends and prospects for improved service – in terms of operating speeds, frequency, and reliability – in rail corridors around the country. The goal of the study was to produce a summary of the lessons learned from the corridor improvement projects across the country and to develop criteria that might describe corridors most likely to succeed with high-speed rail improvements. This report examines progress being made in 11 HSR **corridors**, including the Northeast Corridor (NEC) from Boston to Washington, D.C., and presents **evaluation criteria** to measure relative progress being made in various corridors. The report also provides an in-depth profile of each designated corridor in Appendix A, which consists of **fact sheets** that contain a description of each corridor, a summary based on stakeholder and agency interviews, and the application of evaluation criteria to each corridor.

The report offers a synthesis of observations and recommendations, which have applications for future legislative efforts to advance high-speed rail and for future study. A series of observations describe **key findings** about factors that inhibit high-speed rail development, benefits that would accrue if high-speed were developed, common elements necessary for high-speed rail corridors, and overall lessons from corridors that are making progress. These observations inform recommendations to Federal and state governments about **action items** necessary to bring about high-speed rail.

In this report, “high-speed rail” refers to a variety of system technologies, rolling stock, and operating speeds, depending on the aspirations in the various designated corridors. Each increment of speed – from 90 mph to 110 mph, from 110 mph to 125 mph, and over 125 mph – brings significant costs. For this reason, many of the states pursuing high-speed rail in their designated corridors pointed to 90 mph to 110 mph and 110 mph to 125 mph as their major objectives, as breaking the 110 mph barrier requires advanced train

control systems on all locomotives operating in the corridor (freight and passenger), and breaking the 125 mph barrier requires different standards for rolling stock, track standards, and grade separations. For this reason, this report uses the term “high-speed rail” to refer to the class of aspirational services, generally 90 mph to 125 mph, but also including the 150 mph and above speeds associated with the Northeast Corridor (NEC) Mainline and HSR plans in California.

■ ES.2 Corridors and Evaluation

The Federally designated HSR corridors, plus the NEC Mainline, are the focus of study in this report. **Section 2** of the report offers a description on each corridor, including the designation process. More detailed information about the location, history, and other information about each corridor is included in the **fact sheets** in Appendix A. Figure ES.1 provides a conceptual illustration of the 11 Federal corridors evaluated in this report.

In addition to gathering web-based and published information, the research effort also included interviews with Amtrak staff and external stakeholders regarding the status of U.S. high-speed rail development. Initial interviews were conducted with Federal Rail Administration (FRA) and Amtrak personnel in March and April 2008.¹ External stakeholder interviewees were selected based on their experience with the planning and development of specific HSR corridors. After participants were invited by Amtrak to participate in the study, a structured set of questions were transmitted in advance of the interview session.

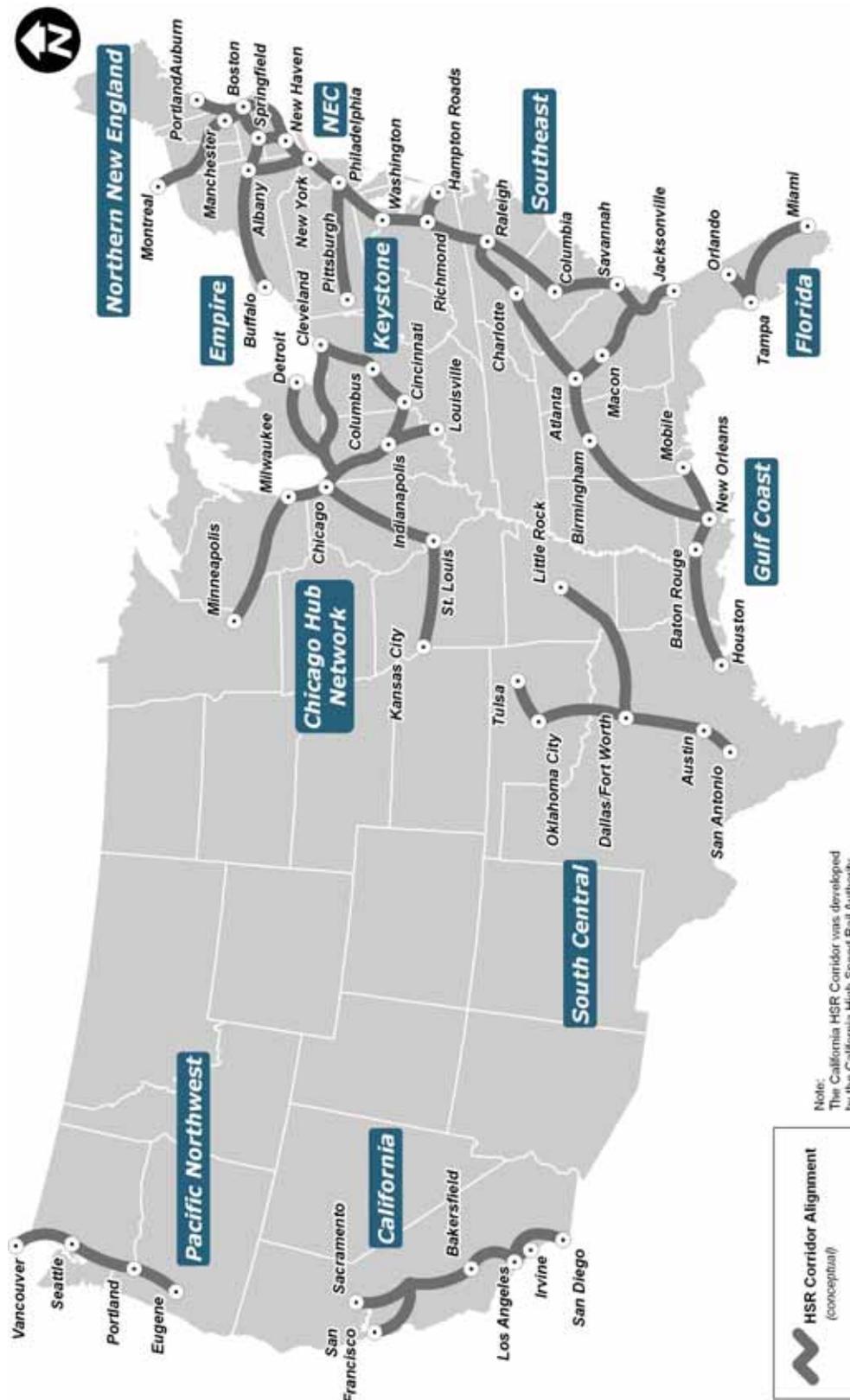
Information gained in these interviews described and explained the uneven progress of HSR development in the United States, and is summarized in **Section 3** of the report. Some of the designated HSR corridors are actively moving towards, or have already implemented, higher speed services on specific segments of the corridor. Others have been unable to forge the needed leadership or funding commitments to improve the corridor. Yet others are experiencing resistance from the host railroads.

To compare the corridors on an “apples to apples” basis, an evaluation matrix was crafted using indicators formulated under the following broad-based categories:

- Corridor descriptions;
- Corridor challenges; and
- Corridor benefits.

¹ These interviews occurred before the recent enactment of the Passenger Rail Investment and Improvement Act of 2008 (signed into law on October 16, 2008), which authorized Federal funding programs for HSR and corridor development as suggested by many of the interviewees.

Figure ES.1 U.S. DOT Designated High-Speed Rail Corridors



The indicators used to evaluate each corridor are presented in Table ES.1. A more detailed application of these criteria can be found in **Section 4** of the report.

Table ES.1 Evaluation Criteria Applied to Corridors

Corridor Descriptions	
How have services been improved?	Has rail market share increased?
Preparations for 125+ mph service?	Have state funds been used in corridor?
Progress of environmental clearance?	Clear purpose and planning for corridor?
How sustained a corridor effort?	Is there uniformity of effort across the corridor?
Corridor Challenges	
Availability of passenger equipment?	Federal funds applied to corridor?
Experimenting with PTC ² Systems?	Relative freight/passenger activity in corridor?
Plans for private sector involvement?	New right-of-way needed?
Leadership by DOT/Elected Officials?	Corridors connect to transit/aviation systems?
Corridor Benefits	
HSR effects on highway/air congestion?	Will HSR offer trip time savings to motorists?
Is HSR expected to reduce emissions?	Will HSR stations attract economic activity?
Will HSR offer corridor economic impacts?	

An alignment “stoplight” color-coding system was developed to graphically illustrate the progress of each HSR corridor, with the color dark green representing operational HSR and, at the opposite end of the spectrum, the color red representing minimal progress towards HSR. The colors yellow, orange, and light green represent intermediate levels of HSR progress. The chosen color represents an overall evaluation of HSR progress throughout the entire corridor, with the alignment for each corridor displayed in the selected color.

Application of the evaluation criteria allowed the study team to classify each of the 11 corridors as follows:

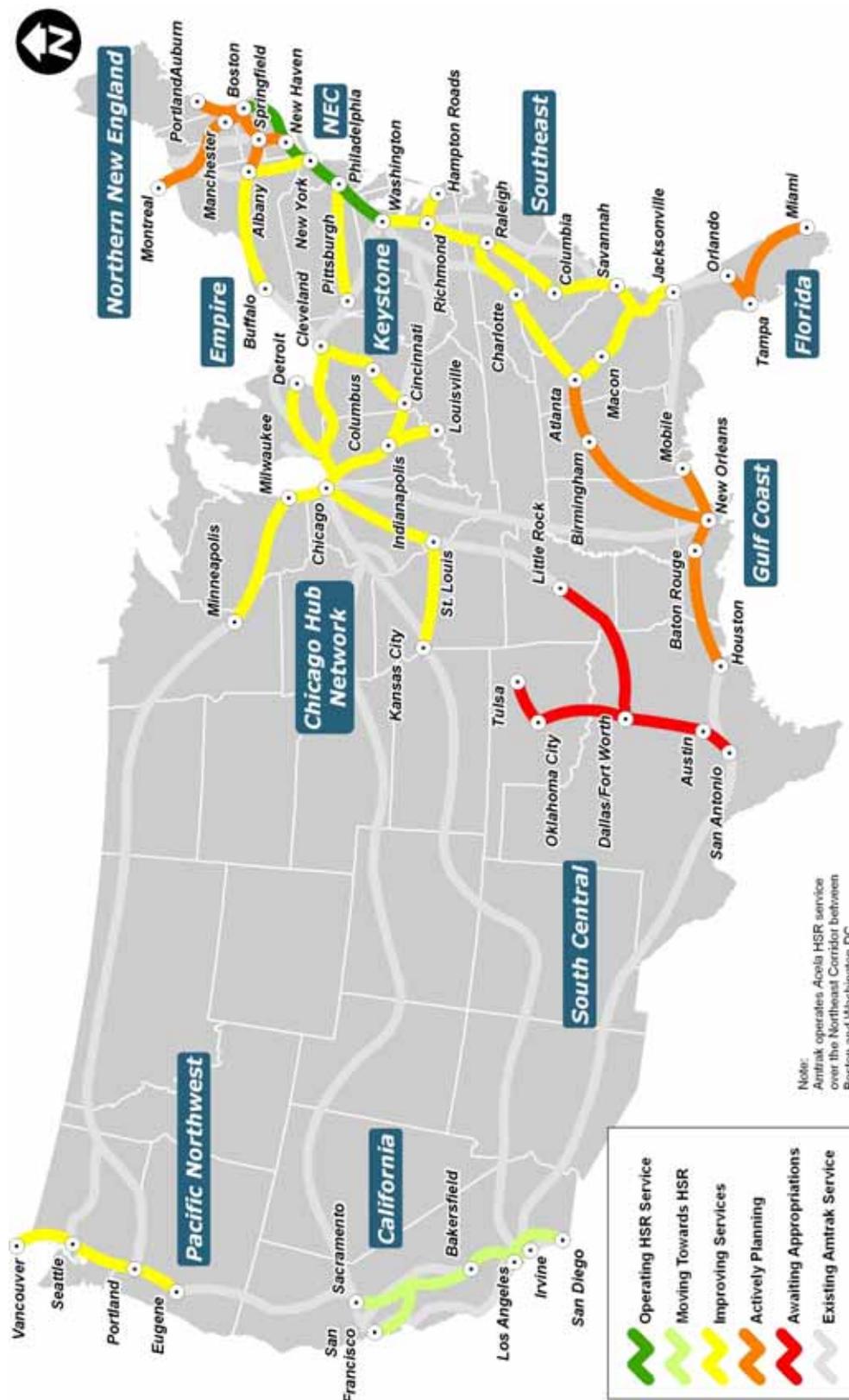
- **Operating High-Speed Service** – Rail service currently operates over 125 mph along the corridor. Only one corridor, the NEC Mainline alignment, is color coded dark green to signify its status as an operational U.S. HSR corridor.
- **Moving Toward HSR** – Planned rail services over 125 mph along corridor. The California HSR project falls into this category and is color coded light green.

² PTC stands for “Positive Train Control” systems, which refer to a variety of systems that seek to avoid train-to-train collisions, over speed derailments, and injuries to railway workers working within their limits of authority.

- **Improving Services** – Corridor is making incremental improvements and planning for 110 mph service along corridor. The Empire, Keystone, Southeast, Midwest, and Pacific Northwest corridors fall into this category and are color coded yellow.
- **Actively Planning** – Corridor planning efforts underway for 79 mph or more along corridor, but no HSR service improvements achieved. The Northern New England, Florida, and Gulf Coast corridors fall into this category and are color coded orange.
- **Awaiting Appropriations** – Corridor planning efforts for HSR have not advanced. These corridors are color coded red, as in the case of the South Central corridor, where minimal progress has been made since its designation.

The current status of each Federally designated HSR corridor is highlighted in Figure ES.2. Individual segments, or branches of a corridor that demonstrate different characteristics than the overall corridor, are described in the report. Detailed corridor information is included in the Appendix A **fact sheets**, which combine corridor descriptions, history, status of planning and implementation, technology considered, issues raised in interviews, and evaluation criteria.

Figure ES.2 Status of U.S. High-Speed Rail Development



■ ES.3 Key Findings

After consideration and synthesis, a number of common themes are evident. **Section 5** of the report offers a series of findings and lessons that can be applied to future efforts to propel corridor activities into achievement of high-speed rail service. The key findings can be categorized as follows:

Factors Inhibiting HSR Development. Answering the question of why the United States does not have high-speed rail begins with the identification of impediments, several of which will require legislative changes.

- **Financial** – The biggest factors separating the Congressional intention for high-speed rail first made manifest in 1991 from its accomplishment has been the failure of the legislative branch to allocate the substantial resources necessary to make high-speed rail attainable in the designated corridors (or for the executive branch to propose such investments).
- **Leadership** – Visible, sustained leadership at high levels by elected and appointed officials is a feature of those corridors which are making progress. In the remaining corridors, the absence of strong leadership poses a serious obstacle to high-speed rail advancement.
- **Infrastructure** – Passenger services that operate outside Amtrak-owned corridors (the Northeast Corridor, Keystone Corridor to Harrisburg, and portions of the Chicago-Detroit corridor) do so on property owned and operated by private freight rail companies. A national rail policy will need to do more than force passenger trains onto a constrained freight rail network; it will need to expand capacity of infrastructure and systems of that network as well.
- **Regulations** – Federal and state laws for railroad safety, property rights and environmental reviews, and tort liability all pose challenges for increasing frequency and reducing trip times for high-speed rail services.
 - Current Federal rail safety regulations are concerned with survivability of the passenger equipment in crashes with heavy freight trains. Many of those interviewed in this study suggested that the Federal safety policy be concerned more with crash avoidance than crash survivability.
 - If freight rights-of-way need to be expanded to accommodate passenger train traffic, or if new corridors need to be created for high-speed rail, then these public sector necessities will have to be managed through existing Federal and state laws governing protection of private property rights and of the environment.
 - Freight railroads have concerns about the tort liability exposure associated with adding new or enhanced passenger services on existing freight railroad-owned lines.

Delineation of HSR Benefits. Delivering high-speed rail service that links major urban areas in corridors throughout the nation will bring significant benefits. The original Congressional intention for high-speed rail discussed in the first section of this report was conceived to achieve transportation improvements, which have direct and indirect effects on communities and regions. The benefits of HSR include:

- Economic efficiency;
- Compact land use patterns; and
- Environmental enhancement.

Corridor Successes. Examination of those corridors in which progress is being made (as evidenced by the evaluation criteria applied in this report) yields a set of judgments about what distinguishes these corridors from others. The success factors, including those described in **Section 3**, form a description of corridors in which high-speed rail can be developed. Lessons from each corridor experience offer pragmatic advice on how high-speed rail can be achieved in future corridors.

- **General Investment in Rail Development Pays Dividends.** Interviews confirmed published materials that indicated that investment in rail improvements – meaning all rail improvements, not necessarily improvements targeted specifically to HSR – have been paying off.
- **Market-Driven, Performance-Based Service Design.** Several participants noted that the development of high-speed rail infrastructure and services should be approached as market driven, rather than speed driven.
- **Continued Progress towards Milestones.** FRA, Amtrak, and most of the HSR corridor officials noted that, in addition to comprehensive efforts in California, incremental milestones are often viewed positively as part of the continuous progression towards the definition, design, and ultimate funding of HSR service.
- **Freight Cooperation is Critical.** United States passenger railroads generally operate on rights-of-way owned by freight railroads. Experts noted that United States freight railroads have demonstrated mixed reactions to proposed public investment in freight-owned infrastructure.
- **States are Moving Ahead without Waiting for a Federal HSR Program.** Successful HSR corridors, such as in California, have been making progress without waiting for a Federal HSR program. Several states have done more than leverage limited Federal funding through studies and planning; they have invested in infrastructure improvements and operating subsidies for more passenger service.

■ ES.4 Action Items

This report sought information to answer the question discussed in the opening section, “why doesn’t the United States have high-speed rail?” In **Section 6** of the report, a related question will be answered, “what steps would be required to bring about high-speed rail in the United States?” This section outlines a series of actions necessary to address impediments listed in this report and to take advantage of positive lessons learned.

Create a Federal Funding Program for HSR. High-speed rail will not simply evolve out of the collective wishes and plans of elected officials and corridor planners; rather, it requires a break with the unfunded intentions of the past. If Congress really wants high-speed rail service in the United States, then it must provide needed funding to support such a program. This report recommends that Federal high-speed rail funding legislation includes the following elements, some of which have been authorized in the recently enacted Passenger Rail Investment and Improvement Act of 2008 (PRIIA):

- **Comparable Matching Funds for Infrastructure and Equipment.** In order to encourage states to more carefully and flexibly apply their transportation dollars among modes (a subsequent action step), Federal high-speed rail funding programs should be similar to other Federal transportation programs.
- **Substantial, Sustainable Funding.** Authorizations for high-speed rail programs should cover multiple years and be followed by appropriations that regularly meet authorized funding levels.
- **Grants Allocated According to Expected Performance Criteria.** If a Federal program delegates grant administration to the Secretary of Transportation, then the application process for such grants should be based on consistent performance-based criteria.
- **Neutrality with Respect to Speeds and Technology.** Since corridors studied in this report have a variety of approaches to types of services that best serve their markets, any Federal funding program would be most effective if it did not limit funding to high-speed rail over 125 mph.
- **Clear, Consistent Provision of Operating Support.** Federal funding legislation should also provide matching funds for states to cover high-speed rail operating costs, particularly those costs associated with using existing freight rail lines.
- **Provide Role for Private Sector.** States may find private partners willing to deliver infrastructure projects or to manufacture and maintain rolling stock through design-build or design-build-maintain contracts. Federal funding programs should encourage flexibility for states commensurate with the private sector’s willingness to take project-related risks.

Resolve Impediments. This report identifies a number of issues that need to be resolved before high-speed rail can make sustained progress in multiple corridors.

- **Positive Train Control.** PTC not only has the potential of increasing the safety of rail operations, it also has the potential of increasing the effective capacity of rail lines, allowing more trains of different lengths and different speeds to operate in closer proximity to each other due to the systems' safety improvements. A national approach to PTC development, begun with the requirements of the recently enacted Rail Safety Improvement Act of 2008, may facilitate efforts to develop high-speed service.
- **Crash Worthiness and Crash Avoidance.** Since many corridors involve high-speed trains operating in freight rail corridors, FRA safety rules for passenger cars and locomotives could adapt to permit lighter weight construction and advanced crash energy management systems as more PTC systems become available and ubiquitous, reducing some of the primary passenger safety risks.
- **Multistate Coalitions.** A majority of the corridors studied in this report involve multiple states, and many of these states have shared funding for planning efforts and applied state resources to capital projects within their states. Future progress on many of these corridors will require state and Federal legislative and administrative acceptance of pooled state funds and state allocations of Federal funds for use in projects outside any given state's boundaries.
- **Public/Private Benefit Considerations.** States and railroads might benefit from standard guidelines for considering public and private benefits for high-speed rail projects on railroad rights-of-way.
- **Mediation of Access to Railroad Rights-of-Way.** Understanding the financial pressures facing freight railroads and their unique business model, the Surface Transportation Board (STB) is well qualified to mediate requests for access to freight rail lines for high-speed rail purposes and to determine how much such access would cost.

Equip and Prepare States for HSR Projects. The report has outlined the case for Congressional and Federal actions to advance high-speed rail; however, states must prepare to effectively deliver and manage high-speed rail projects. The recently enacted PRIIA requires extensive planning and administrative efforts from states. This report also recommends a series of actions for states to undertake once a Federal program is funded and administered:

- **Careful Planning.** States in designated corridors should continue their planning efforts in order to identify the kinds of services that would best service their needs. Federal high-speed rail funding programs can encourage careful planning, similar to Federal highway and transit capital programs that require such efforts.
- **Performance-Based State Fund Allocation.** If the Federal government creates a high-speed rail funding program and creates a more level playing field among modal funding programs, then states need to be prepared to make transportation investments based on performance benefits, rather than through traditional modal silos.

- **HSR Performance Objectives.** High-speed rail system performance objectives should be a product of the careful state planning discussed above. If states are clear in defining their objectives for high-speed rail projects, these objectives, schedules and performance metrics can have a wide range of applications.
- **State Skills and Competencies.** As states plan for high-speed rail projects, they should not neglect the important work of internal organizational development to effectively deliver these major projects in a timely and cost-effective manner.

1.0 Introduction

■ 1.1 Context for the Study

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) was ground breaking in many ways, including its vision for a post-Interstate Surface Transportation System. One of the law's many innovative features was a process by which the Secretary of Transportation could designate corridors to be considered for high-speed rail (HSR) service. When the law was passed, three separate efforts were underway in the country to consider high-speed rail through independent state authorities in California-Nevada, Texas, and Florida. ISTEA set forth a formal designation process for the ongoing expansion of high-speed rail projects.

None of the three projects in the early 1990s proved successful. Still, the desire for and expectation of high-speed rail has persisted in the national consciousness, particularly within Congress. Seventeen years following the passage of ISTEA, Congressional complaints about America's failure to match foreign progress in high-speed rail are more than mere envy of the successes achieved in those countries. They represent frustration that the national vision implicit in ISTEA – that the United States would be making progress toward bringing about European style high-speed rail – has failed to fully take hold.

This frustration was evident in the summer of 2007, when Amtrak President Alex Kummant went before the Subcommittee on Railroads, Pipelines, and Hazardous Materials of the House Committee on Transportation and Infrastructure to testify at a hearing that was called to discuss Amtrak's capital needs. However, in this setting, the perceived unfulfilled promise of high-speed rail dominated the discussion, as Committee members repeatedly questioned Mr. Kummant about what he and Amtrak planned to do to more aggressively pursue high-speed rail development.

Consequently, Amtrak commissioned this study to help identify the trends and prospects for improved service – in terms of speeds, frequency, and reliability – in intercity corridors around the country. The goal was to produce a summary of the lessons learned from the corridor improvement projects across the country and to develop criteria that might describe corridors most likely to succeed with high-speed rail improvements. The Government Accountability Office (GAO) also launched a study in March 2008 on prospects for high-speed rail (including corridor progress and international experience), just as Amtrak's high-speed rail study was beginning. Both studies sought to answer the questions posed by Members of Congress last summer concerning why the United States has not yet fully realized the vision of ISTEA with respect to implementation of high-speed rail service.

■ 1.2 Key Players

A number of interrelated parties affect the pursuit of high-speed rail:

- **Congress** – Congress set the overall high-speed rail agenda through the authorization of corridor designations in 1991, and subsequent amendments in 1997, by adding new corridors and adding to previously designated corridors. Congress appropriates Federal resources to leverage state funds in developing corridor services. In 2008, Congress appropriated \$30 million to advance state corridors and enacted the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) that authorized Federal funding programs for high-speed rail and rail corridor development projects across the country.
- **Federal Railroad Administration** – The Federal Railroad Administration (FRA) is the agency within the U.S. Department of Transportation (DOT) responsible for recommending corridor designations to the Secretary, administering Federal funding to corridor projects through the Next Generation High-Speed Rail program, coordinating and monitoring corridor development efforts, overseeing National Environmental Policy Act (NEPA) evaluation of proposed high-speed rail projects, and considering safety implications of higher speed passenger rail operations. In 1997, the FRA issued a report, *High-Speed Ground Transportation in America*, which summarized the potential for high-speed rail in designated corridors.
- **Amtrak** – The National Rail Passenger Corporation (Amtrak) currently operates the only passenger rail service exceeding 125 mph in the United States, its Acela service on the Northeast Corridor between Boston and Washington, D.C. Moreover, Amtrak’s organizing statute renders it the only passenger rail carrier with the right to operate over freight rail lines. Given that many states are looking to add higher speed service on or along existing rail lines, corridor service is likely to involve both Amtrak’s operating rights along the freight rail network, as well as its operating expertise. Amtrak also has served as an essential resource for many states in their corridor planning work.
- **States** – Most of the efforts for advancing high-speed rail service and expanding incremental passenger rail service are being accomplished at the state level. Many of the corridors studied in this report involve more than a single state, and many of these states have coordinated their development processes through multistate organizations. States have invested in infrastructure improvements or increased operating subsidies to expand passenger rail service to build momentum toward future higher speed services.

■ 1.3 Process and Products of This Report

This report will examine the progress being made in 11 HSR **corridors** designated by the U.S. DOT under authority granted by Congress. High-speed passenger transportation proposals have been and are being advanced outside of these designated corridors,

including high-speed rail projects (Texas, Colorado, and California-Nevada) and magnetic levitation passenger systems (Baltimore-Washington, D.C., Pittsburgh, Atlanta-Chattanooga, Southern California). The officially designated corridors represent the most sustained efforts with the most available data, and should provide lessons equally applicable to HSR pursuits in other regions.

The report presents **evaluation criteria** by which to measure relative progress being made in various corridors. This process allows relative assessments of corridor status with a common set of measurements so that corridors characterized by different geographies, different technologies, and different levels of activity can be compared reasonably. Appendix B describes this criteria in greater detail.

The report organizes details about each designated corridor in Appendix A, which consists of **fact sheets** that provide descriptive details on each corridor and list the evaluation criteria applied to each corridor. This information was collected from publicly available sources and from interviews with governmental representatives from each designated corridor. This collection of information should prove useful to those interested in learning about and from these corridor efforts.

Finally, the report offers an analysis synthesizing all this information into two sets of observations and recommendations, which have applications for future legislative efforts to advance high-speed rail and for future study. A series of observations describe **key findings** about factors that inhibit high-speed rail development, benefits that would accrue if high-speed rail were developed, common elements necessary for high-speed rail corridors, and overall lessons from corridors that are achieving progress. These observations inform recommendations to Federal and state governments about **action items** necessary to bring about high-speed rail. More specifically, this report makes recommendations regarding Federal funding for high-speed rail, Federal resolution of impediments, and future state actions to build upon the progress already being made.

■ 1.4 A Word about Definitions

In this report, “high-speed rail” refers to a number of types of system technologies, rolling stock, and operating speeds depending on the aspirations of the different parties in the various designated corridors. High-speed rail can encompass speeds ranging from 90 mph to more than 200 mph. Before discussing why a single term is being used to describe such a broad set of options in this report, consider some of the other definitions used to describe high-speed rail.

The International Union of Railways (UIC) has a series of definitions for high-speed rail, informed in part by European Union Directive 96/48, depending on the infrastructure, rolling stock, and operating conditions in question. Generally, UIC makes a distinction between infrastructure and rolling stock (specifically constructed for high-speed operations) capable of operating at speeds in excess of 250 kmh (approximately 150 mph) and

infrastructure upgrades to permit operations in excess of 200 kmh (approximately 125 mph). There are further distinctions among these systems:

- High-speed and conventional trains operating on separate networks (Japan);
- High-speed trains operating on conventional networks (France);
- Conventional trains operating on high-speed networks (Spain); and
- High-speed and conventional trains operating on all networks (Germany and Italy).

Because of this international demarcation at the 125 mph level, Federal law ties a definition of high-speed rail to this speed. 49 U.S. Code Section 12105 defines high-speed rail as:

“All forms of nonhighway ground transportation that run on rails or electromagnetic guideways providing transportation service which is:

- (a) Reasonably expected to reach sustained speeds of more than 125 miles per hour; and
- (b) Made available to members of the general public as passengers, but does not include rapid transit operations within an urban area that are not connected to the general rail system of transportation.”

In the 1997 FRA study, high-speed ground transportation is defined as “self-guided inter-city passenger ground transportation – by steel-wheel railroad or magnetic levitation (Maglev) – that is time-competitive with air and/or auto for travel markets in the approximate range of 100 to 500 miles.” This market driven definition has encouraged most states in the designated corridors studied in this report to seek the kind of service that provides competitive trip times for auto travel in city pairs, rather than focusing on achieving a certain speed.

FRA safety rules also make distinctions between the levels of safety regulations that apply to incremental increases in operating speeds.

- **80 to 90 mph** – Track Class 5, cab signals or train control systems;
- **91 to 110 mph** – Track Class 6, cab signals/train control, instrumented testing for new vehicle certifications, certification of maintenance personnel, advanced bridge design;
- **111 to 125 mph** – Track Class 7, advanced civil speed enforcement systems, track geometry (gauge restraint) measurement systems, ballast deck bridges, advanced technology grade crossing protection;
- **Over 125 mph** – Track Class 8, full grade separation, Gauge Restraint Measurement System (GRMS) capability on instrumented rail cars, separate Tier II vehicle safety standards; and
- **Over 150 mph** – Typically involves electrification, track Class 9, and a special Order of Particular Applicability that governs all operating systems.

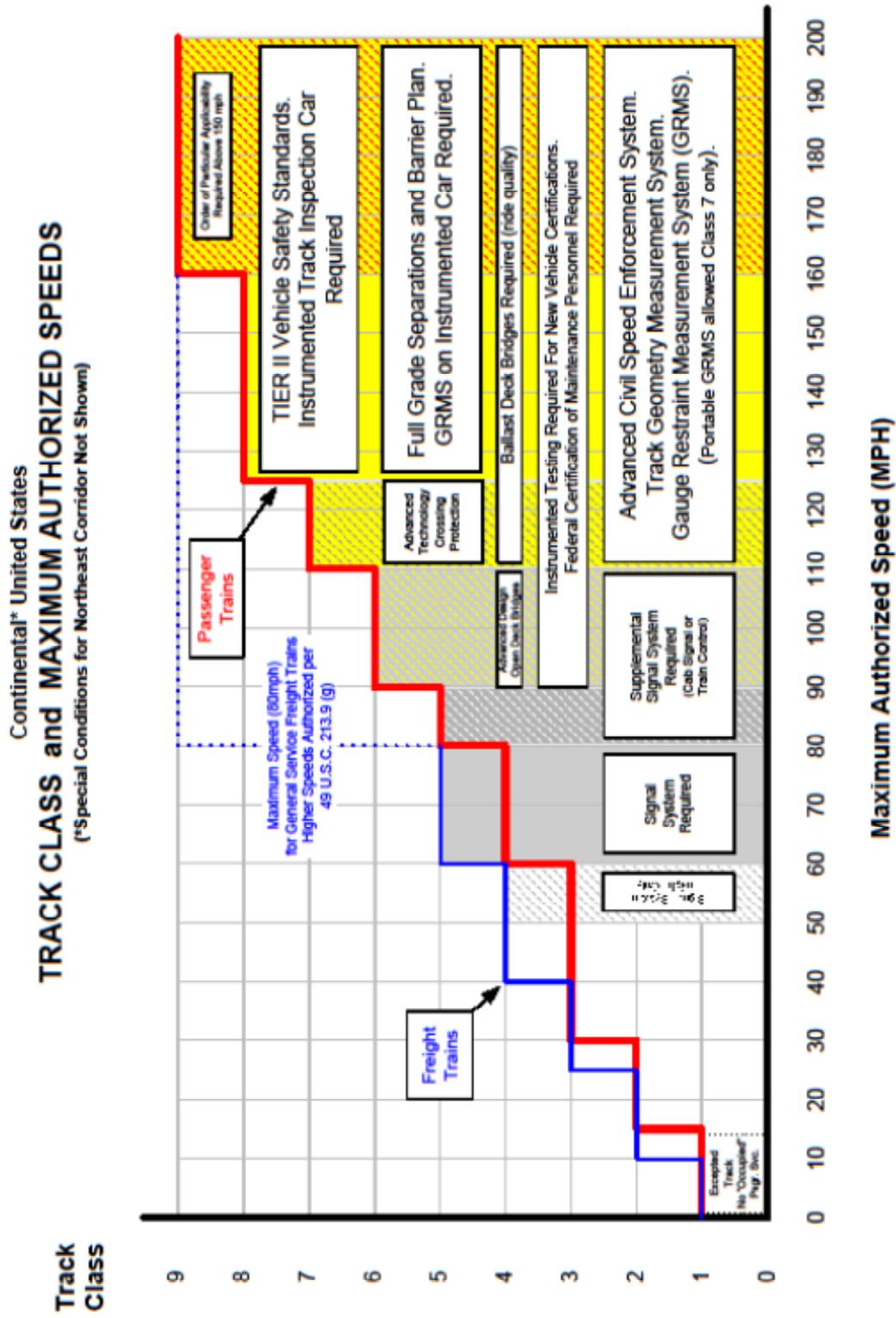
Each increment of speed carries with it significant costs. For this reason, many of the states pursuing high-speed rail in their designated corridors pointed to 90 mph to 110 mph and 110 to 125 mph as their major objectives, as breaking the 110 mph barrier requires different train control systems on all locomotives operating in the corridor (freight and passenger), and breaking the 125 mph barrier requires different standards for rolling stock, track standards, and grade separations.

The most recent congressional definition of high-speed rail in the new High-Speed Rail Corridor Development program created by PRIIA seems to reflect these current corridor plans, as 49 U.S. Code Section 26106(b)(4) states:

The term “high-speed rail” means intercity passenger rail service that is reasonably expected to reach speeds of at least 110 miles per hour.

For these reasons, this report uses the term “high-speed rail” to refer to the class of aspirational services, generally 90 mph to 125 mph, but also including the 150 mph and above speeds associated with HSR plans in California. The following Amtrak graphic summarizes the track standards and other safety regulations that increase the overall capital and operating expenses associated with each increment in speed.

Figure 1.1 Amtrak Track Standards and Safety Regulations Summary



Speed and TR Class Chart 11.3503.vpsd
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Amtrak Transportation Planning Department

2.0 Description of Corridors Studied

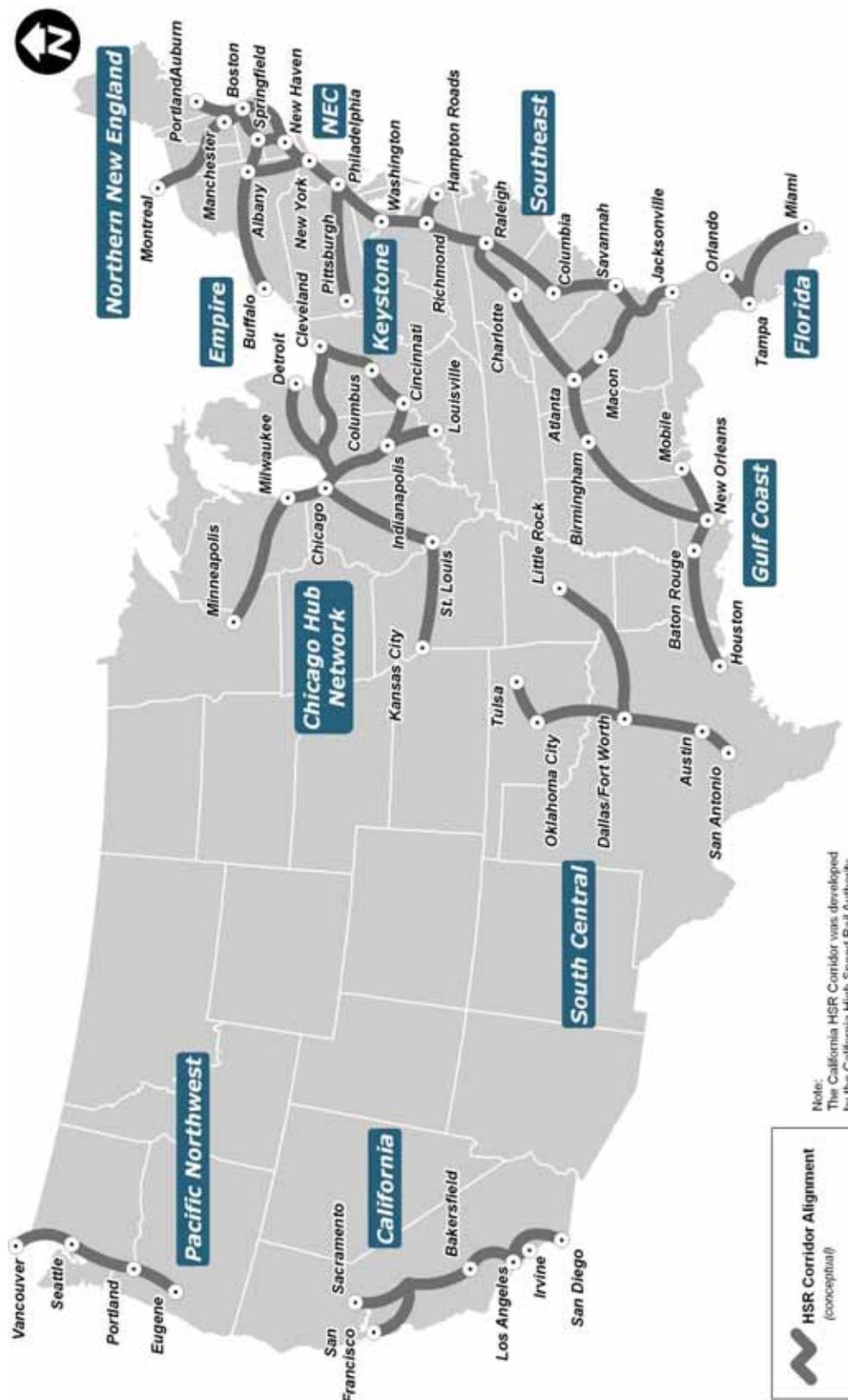
This section briefly outlines the Federal designation process for the high-speed rail (HSR) corridors that were evaluated for this report, and offers an introductory description of each corridor. More in-depth information about the geography, history, status, and other details about each corridor gathered through research and agency interviews is included in the **Fact Sheets** in Appendix A. Figure 2.1 provides a conceptual illustration of the 11 Federal corridors evaluated in this report.

■ 2.1 The Federal HSR Designation Process

High-speed rail corridors have been designated through a series of Federal actions. Several corridors also have been extended or revised since the initial designation. A synopsis of the Federal corridor designation process is as follows:

- Section 1010 of the 1991 ISTEA legislation called for the designation of not more than five high-speed rail corridors. The Midwest (later renamed Chicago Hub), Florida, California, Southeast, and Pacific Northwest corridors were designated in 1992. The Southeast Corridor was initially extended in 1995.
- In 1998, Section 1103(c) of TEA-21 authorized a total of 11 corridor designations. Additions to the original five at this time included the Gulf Coast, Keystone, and Empire corridors. In 1998/1999, the Midwest corridor was renamed the Chicago Hub Network and extended twice. The Southeast corridor was also extended again during this period.
- In 2000, the Northern New England and South Central corridors were designated. In addition, extensions to the Southeast, Gulf Coast, Keystone, Chicago Hub, and California corridors were designated. The Chicago Hub Network was expanded in 2001.
- Most recently, in 2004, an extension to the Northern New England corridor was designated.

Figure 2.1 U.S. DOT Designated High-Speed Rail Corridors



■ 2.2 Northern New England HSR Corridor

The Northern New England Corridor initially consisted of two corridors, with North Station in Boston, Massachusetts serving as the hub on both segments. Regional population centers served (not including the termini) along the corridor include Manchester, New Hampshire and Burlington, Vermont.

The eastern corridor is approximately 150 miles in length, running between Boston and Portland, Maine on tracks owned by the Massachusetts Bay Transportation Authority (MBTA) and Pan Am Railways (Pan Am). The western segment is approximately 340 miles in length running between Boston and Montreal, Canada on tracks owned by the Canadian National Railroad (CN), New England Central Railroad (NECR)(including some abandoned segments), Pan Am, the State of New Hampshire, and the MBTA.

In 2004, Congress directed an extension of the corridor, including the 200-mile corridor between Boston; Springfield, Massachusetts; and Albany, New York along tracks owned by CSX, Amtrak, MBTA, and the Massachusetts Turnpike Authority, and the 61-mile Amtrak-owned corridor between Springfield; Hartford, Connecticut; and New Haven, Connecticut.

■ 2.3 Empire HSR Corridor

New York's Empire Corridor extends from New York City to Buffalo via Albany. The corridor is commonly referred to as two segments with Albany serving as the common hub between the two corridors. Regional population centers served (not including the termini) along the corridor include Poughkeepsie, Syracuse, and Rochester.

The South Corridor running between New York City and Albany is 140 miles in length and contains segments that are owned by Amtrak, Metro-North Railroad, and CSX. The West Corridor, running between Albany to Buffalo, is approximately 320 miles in length. Amtrak owns a small segment in Schenectady. The remainder of the corridor is owned by CSX.

■ 2.4 Northeast Corridor Mainline

The Northeast Corridor mainline (NEC) spans approximately 460 miles between Boston's South Station and Union Station in Washington, D.C. The NEC serves the entire Boston-Washington Megalopolis Corridor.

Amtrak is the majority owner of the corridor, owning roughly 80 percent. Metro-North, Connecticut Department of Transportation (DOT), and the Commonwealth of

Massachusetts own the remaining pieces of the corridor. The NEC is the busiest railroad corridor in the United States and one of the top 10 busiest railroad corridors in the world.

■ 2.5 Keystone HSR Corridor

The Keystone Corridor extends from 30th Street Station in Philadelphia to Pittsburgh via Harrisburg, Pennsylvania. Regional population centers served (not including the termini) along the corridor include Lancaster and Altoona.

The Harrisburg to Philadelphia segment spans 104 miles between the Harrisburg Transportation Center and Philadelphia's 30th Street Station. This segment of the corridor is owned by Amtrak and is electrified. The Harrisburg to Pittsburgh segment spans 245 miles between the Harrisburg Transportation Center and Pittsburgh. This segment of the corridor is owned by Norfolk Southern (NS) and remains unelectrified.

■ 2.6 Southeast HSR Corridor

The core segment of the Southeast Corridor extends from Washington, D.C. to Charlotte, North Carolina. The corridor has been expanded three times and now travels through South Carolina, Georgia, and Florida. Regional population centers served (not including the termini) include Richmond, Virginia; Raleigh, North Carolina; and Jacksonville, Florida. The Southeast Corridor roughly parallels I-85 and I-95. The majority of the corridor is owned by CSX and the North Carolina Railroad (NCRR) (with NS operating and maintaining the NCRR under a contract with the State of North Carolina).

■ 2.7 Florida HSR Corridor

The 360-mile Florida Corridor covers the routes under consideration for high-speed rail in 1991, Miami to West Palm Beach to Orlando and then to Tampa, Florida. The corridor parallels the South Florida Rail Corridor from Miami to West Palm Beach, CSX rail lines to the Orlando area, and then along the I-4 right-of-way between Orlando and Tampa.

■ 2.8 Gulf Coast HSR Corridor

The 1,022-mile Gulf Coast Corridor links major cities in five states. The proposed corridor can be divided into three major segments connecting Houston, Texas to New Orleans,

Louisiana along BNSF Railway Company (BNSF) and/or Kansas City Southern (KCS) and Canadian National (CN) lines; New Orleans, Louisiana to Mobile, Alabama along CSX lines; and New Orleans, Louisiana to Atlanta, Georgia along NS lines. Other regional population centers along the corridor include Birmingham, Alabama; Meridian, Mississippi; and Baton Rouge, Louisiana.

■ 2.9 South Central HSR Corridor

The South Central Corridor primarily follows existing Amtrak Service – namely, 672 miles along the Texas Eagle route from San Antonio, Texas to Little Rock, Arkansas along Union Pacific (UP) rail lines and BNSF lines, and 322 miles along the state-supported Heartland Flyer Route from Fort Worth, Texas to Oklahoma City, Oklahoma, with proposed extension to Tulsa, Oklahoma along BNSF lines. The corridor also serves population centers of Austin, Waco, and Dallas, Texas.

■ 2.10 Chicago Hub Network HSR Corridor

This Chicago Hub Network Corridor combines hub routes from Chicago, Illinois, known as the Midwest Regional Rail Initiative (MWRRI), and routes in Ohio, known as the Ohio and Lake Erie Regional Rail System (Ohio Hub). The total corridor serves nine states over a 3,000-mile network radiating from Chicago. The core system of five corridors serves major cities in Illinois, Indiana, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. Additional lower speed corridors and extensions serve other cities in Illinois, Iowa, and Missouri.

■ 2.11 Pacific Northwest HSR Corridor

The Pacific Northwest Corridor consists of a 310-mile section from Eugene, Oregon to Seattle, Washington (along UP and BNSF lines), and 156 miles from Seattle to Vancouver, British Columbia (along BNSF). The corridor also serves Portland, Oregon and Tacoma, Washington.

■ 2.12 California HSR Corridor

The California Corridor, developed by the California High-Speed Rail Authority (CHSRA), differs slightly from the conceptual alignment designated by the FRA. When fully built out, the proposed California high-speed rail “network” will span roughly 800 route miles from Southern California to San Francisco, and Bakersfield and Sacramento via California’s inland Central Valley. With the exception of some of the inner urban segments, the entire corridor will be grade-separated and capable of operating at speeds over 220 mph.

3.0 Information Collection

■ 3.1 FRA and Amtrak Interview Sessions

In addition to gathering web-based and published information, the research effort also included interview sessions with Amtrak staff and external stakeholders regarding the status of high-speed rail development in the United States. Initially, interviews were conducted with Federal Railroad Administration (FRA) and Amtrak personnel. This process also identified primary contacts for each corridor, selected based on their knowledge of and experience with specific high-speed rail corridors. The following staff members were interviewed in March and April 2008:

- **Federal Railroad Administration:**
 - Mark Yachmetz, Associate Administrator, FRA.
- **Amtrak Corporate:**
 - Alex Kummant, President and CEO;
 - Richard Phelps, Vice President, Transportation;
 - John Bennett, Assistant Vice President, Policy, Standards and Business Integration;
 - Yana Hudson, Principal Officer, Planning;
 - Richard Slattery, Senior Principal, Policy Development/Support;
 - Edgar Courtemanch, Senior Director, Service Planning;
 - Ray Lang, Senior Director, Government Affairs;
 - Christopher Jagodzinski, Senior Director, System Operations.
- **Amtrak Strategic Partnerships-Central:**
 - Michael Franke, Assistant Vice President, State and Commuter Partnerships-Central;
 - Bruce Hillblom, Senior Director, State Partnerships;
 - Dick Hoffman, Principal Officer, Infrastructure Planning.
- **Amtrak Strategic Partnerships-East:**
 - Drew Galloway, Assistant Vice President, State and Commuter Partnerships-East;
 - John Conlow, Senior Director, Corridor Infrastructure Planning;
 - Jeff Mann, Senior Director, Off-Corridor Partnerships.

- **Amtrak Strategic Partnerships-West:**
 - Adrienne Taylor, Senior Principal, Commuter Partnerships;
 - Jay Commer, Senior Principal Officer, State Partnerships.

■ 3.2 Corridor Stakeholder Interview Sessions

An additional critical portion of the research efforts consisted of interview sessions with high-speed rail corridor stakeholders. Interviewees were selected based on their experience with the planning and development of specific HSR corridors. Participants were invited by Amtrak to participate in the study. A structured set of questions was then transmitted to the stakeholders in advance of the interview session. The following HSR corridor stakeholders were interviewed in April and May 2008:

- Nazih Haddad, Florida Department of Transportation (DOT);
- Jennifer Moczygemba, Texas DOT;
- Karen Parsons, New Orleans Regional Planning Council, Col. Tom Atkinson, Louisiana Department of Transportation and Development, John Robert Smith, Mayor, Meridian, Mississippi;
- Randy Wade, Wisconsin DOT;
- Ken Uznanski, Washington DOT;
- Ron Roy and Tracy Perez, Maine DOT;
- Charlie Miller, Vermont Agency of Transportation;
- Karen Rae, Deputy Commissioner, New York State DOT;
- Rick Peltz, PennDOT Passenger Rail Manager during the Keystone Improvement Program;
- Pat Simmons and David Foster, North Carolina DOT;
- Mehdi Morshed, California High-Speed Rail Authority.

■ 3.3 Corridor Success Elements from Amtrak Interviews

Interviews with Amtrak planners yielded a number of factors these experts believed are common to corridors enjoying success and that would be most common to successful

high-speed rail corridors in the future. None of these factors is a stand-alone measure of future success, but taken in total would point to corridors likely to succeed. The factors for prospective high-speed rail corridors include:

- **City Pair Distance** – The optimal distance between markets will depend on the trip times of proposed high-speed rail service and those of competing modes, particularly auto trips. The 1997 FRA study reported that the Federal Aviation Administration (FAA) considered corridors of 75 to 500 miles to be most competitive to short-haul air travel.
- **Population Density** – Corridors that connect high-population areas are more likely to succeed. This includes intermediate markets as well; Northeast Corridor (NEC) service from Washington, D.C. to New York attracts more riders, captures more air travelers, and raises more revenues by serving Philadelphia, Baltimore, and Newark instead of serving only the outside city pairs. Similarly, a Southeastern Corridor would service Washington, D.C.-Richmond; Washington, D.C.-Charlotte; and Charlotte-Atlanta markets, not just Washington, D.C. and Atlanta.
- **Ridership Potential** – This is related to population and congestion, but begins with an understanding of the intercity travel patterns in the market, peak-periods, trip times, mode shares, and trip purposes. This also is affected by frequencies and reliability of the high-speed rail services being planned.
- **Multimodal Congestion in Corridor** – If highway congestion is both chronic and acute (high congestion marked by unpredictable crippling incidents), and if the air travel market is crowded and unreliable, then high-speed rail has greater potential to offer comparable trip times and improved reliability.
- **Excellence in Rail Operations** – On time performance is critical for high-speed rail success, a particularly important consideration in corridors in which passenger trains run on freight rail lines. Capacity improvements are important (technical planning listed below), but high-speed rail also will require careful coordination of passenger rolling stock maintenance, levels and scheduling of track maintenance, and expertise of freight rail dispatchers.
- **Competitive Rail Alignments** – High-speed rail operations on freight lines will be most successful in corridors with other parallel or adjacent freight rail capacity. Not only will this allow higher freight volumes on these other lines, but it will provide redundant capacity that will be managed by freight dispatchers to balance freight and passenger trains.
- **Money to Improve Services** – Sufficient, flexible, and predictable capital and operating funding must precede planning and execution of high-speed rail projects.
- **Local Political Climate That Supports Rail Development** – Local, regional, and state political leaders are needed to advocate funding, but also to focus on the project objectives, so that inevitable conflicts can be resolved: 1) between project sponsors and

affected communities; 2) between passenger and freight rail operations; and 3) between projects and affected, adjacent neighborhoods.

- **Excellence in Technical Planning** – Beginning with an understanding of current and future freight train patterns, planners need to identify track and signal improvements that will increase capacity, improve travel speed, and improve overall performance.
- **Business Plan** – Corridor advocates must estimate passenger and ancillary revenues, and identify sources of capital and train operations funding (including sources beyond passenger revenues). Comprehensive business planning is not only necessary for delivery of a project, but also is an effective tool for attracting public and private sector funding for the project.
- **Sustained Leadership** – While the same individuals need not be involved over the long period of planning and delivery of high-speed rail projects, successful corridors will have project champions that advocate for the project, communicate project objectives and benefits, and engage other leaders to take up the cause.

■ 3.4 Corridor Development Factors Highlighted in Interviews

Both sets of interviews, conducted with a common instrument, produced similar comments and opinions that can be summarized by the following themes and factors that distinguish successful corridors in high-speed rail efforts to date.

General Investment in Rail Development Pays Dividends. Interviews confirmed published materials that indicated that investment in rail improvements – meaning all rail improvements, not necessarily improvements targeted specifically to high-speed rail – have been paying off. Investments in incremental rail improvements have provided, and will continue to provide, significant benefits to both passenger and freight rail services in the United States in terms of important indicators, such as reduced or more consistent travel time, increased line capacity and throughput, superior dispatching, successful mixing of passenger and freight trains, better on-time performance, and higher passenger ridership. Interviewed officials noted that states already have invested roughly \$2 billion in incremental improvements to rail infrastructure and rolling stock for intercity rail services.³

Most of the state-level high-speed rail corridor stakeholders, with the notable exception of the California High-Speed Rail Authority (CHSRA), also viewed incremental,

³ Intercity and high-speed rail improvements have not had an FTA or FHWA-style matching grant program. FRA has recently awarded grants from a \$30 million federal intercity rail matching grant program, and the recently enacted PRIIA authorizes (subject to future appropriations) federal matching programs for high-speed rail and corridor development.

infrastructure, and service improvements as necessary and important steps towards their eventual goal of higher-speed service or very high-speed service. Stakeholders noted, for example, the importance of gaining experience in the design and implementation of infrastructure projects and the need to build credibility with local communities as important stepping stones towards high-speed rail.

Market-Driven, Performance-Based Service Design. Several participants noted that the development of high-speed rail infrastructure and services should be approached as market driven, rather than speed driven. Participants noted that intercity passenger rail service that provides multiple round trips with auto-comparable travel times may be more effective in gaining ridership than higher-speed services that provide faster travel times but less frequent service. Recent increases in ridership, greater than would be normally anticipated, have resulted from improvements in intercity rail service frequency in Amtrak services in the Chicago Hub Network, Northern New England, and Southeast HSR corridors.

Several experts noted that a set of performance metrics focused on attributes beyond top speeds should be applied to the development of U.S. high-speed rail service, and noted that Congressional direction about the development of high-speed rail services should seek rail performance objectives.

There was a difference of expert opinion regarding high-speed rail and the air travel market. Some participants felt that high-speed rail service should be designed with stations at major airports, essentially positioning high-speed rail as a feeder to air services. Other participants noted that the short-haul aviation market would be an appropriate market niche for high-speed rail, and that adoption of this niche would be likely to be welcomed by the airlines, since it will free them to concentrate on the more cost-effective long-haul air travel market. Many participants noted that planners need a better understanding and consideration of air/rail market possibilities.

Experts noted that introduction of high-speed rail among connected metropolitan areas, such as those along the Northeast Corridor, would yield very different markets compared to corridors with less intermediate population densities, such as the Chicago Hub Network. It also was noted that certain combinations of urban form elements – such as a string of cities separated by open country – would provide an ideal corridor of higher population density combined with exurban high-speed rail, with Florida and Texas cited as examples of this type of urban form.

Continued Progress towards Milestones. FRA, Amtrak, and most of the corridor officials noted that aside from comprehensive efforts in California, incremental milestones are often viewed as part of the continuous progression towards the definition, design, and ultimate funding of high-speed rail service. Examples of such milestones included environmental clearances, breakthroughs in value engineering or cost reductions, securing dedicated funding sources for system construction, improved rail corridor conditions, implementation of new rail services, or the creation of broad-based political and public support for system implementation. Participants noted that a variety of additional milestone criteria could be identified that will allow identification of factors contributing to more rapid and continuous progress towards improved intercity rail service.

Although Amtrak's Northeast Corridor currently operates at high speeds, along with portions of the Keystone, Empire, and Chicago Hub Network corridors, the case history for high-speed rail in the United States is limited. Even the flagship Northeast Corridor is limited to slower speeds in some portion of the corridor due to the limitations of the current infrastructure. Although California is currently developing a high-speed rail network, states that have attempted grade-separated high-speed rail service in the past have seen their efforts stall, or have had their funding cut, essentially shutting the project down. Florida, for example, has failed in attempts to deliver grade-separated high-speed rail service since the 1970s. Florida is now planning for incrementally higher-speed rail improvements between Tampa and Orlando, and Orlando and Miami.

With Multistate HSR Corridors, One State Often Shoulders the Lead Role. In the Pacific Northwest High-Speed Rail Corridor, the State of Washington has spearheaded high-speed rail development with support from Oregon, British Columbia's Ministry of Transportation, Amtrak, and BNSF Railway Company. Infrastructure investments have been undertaken and passenger rail services have been expanded. With a waiver from the FRA, the Pacific Northwest corridor also is demonstrating the operating capabilities of high-speed Talgo tilt train sets. In the Chicago Hub corridor, the member states select one representative to serve as the chair and to represent the multistate Midwest Regional Rail Coalition. The position is currently held by Randy Wade of Wisconsin DOT.

Freight Cooperation is Critical. United States passenger railroads generally operate on right-of-way owned by freight railroads. Even if the right-of-way is owned by the passenger authority, there is often a significant freight railroad presence. Even the Northeast Corridor, the busiest railroad corridor in the United States, hosts an intricate mix of high-speed, intercity, commuter, and freight rail service. This typical United States model of "mixed operation" creates substantial challenges that must be overcome for the operation of any passenger rail service, and poses particularly difficult challenges for high-speed service. Experts noted that United States freight railroads have demonstrated mixed reactions to proposed public investment in freight-owned infrastructure, with concerns about proven benefits of proposed investments, fears of potential reregulation, and aversion to sharing trackage with passenger service.

States are Moving Ahead without Waiting for a Federal HSR Program. Although there has been some Federal funding of grade crossing improvements and rail research and development, successful high-speed rail corridors have been making progress without waiting for a Federal program. For example, North Carolina has taken the lead role developing the Southeast High-Speed Rail (SEHSR) corridor. Aside from modest Federal funding to advance grade crossing safety, the project has been funded using state dollars. Under the improvements prescribed in the SEHSR plan, travel times from Raleigh to Charlotte will be reduced from about four hours to about three hours, offering an auto-competitive travel time between the two cities.

Outside of the current Federally designated corridors, additional high-speed rail development work also is occurring. The Desert Express, conceived as operating between Palmdale and Las Vegas, is moving ahead with private funding, including the undertaking of environmental clearance studies. With primary funding from Colorado

DOT, the Rocky Mountain Rail Authority has now begun a high-speed rail feasibility study to assess the potential for 90+ mph rail corridors in the vicinity of Colorado's I-70 and I-25.

Experts welcomed the prospect of a Federal rail development program, and felt that the most useful Federal program would provide matching grants in a fashion similar to DOT's Federal Transit Administration (FTA) program for commuter rail and transit projects. Interviewees noted the need for qualitative assessment of potential high-speed projects similar to the current FTA process, but felt that FTA-like program development requirements would present too many hurdles for high-speed rail programs. Experts also noted that states should not be limited only to "high-speed" projects, but should be free to choose the development of "intercity" or "high-speed" projects at each state's discretion.

4.0 Corridor Evaluation

■ 4.1 Evaluation Metrics

Given the factors identified in Section 3.4, the uneven progress of high-speed rail (HSR) development in the United States is not surprising. Some of the designated high-speed rail corridors are actively moving towards, or already have implemented, higher speed services on specific segments of the corridor. Others have been unable to create the leadership needed or funding commitment necessary to improve the corridor. The remainder are experiencing resistance from the host railroads.

To compare the corridors on an “apples to apples” basis, an evaluation matrix was crafted using indicators formulated under the following broad-based categories:

- Corridor descriptions;
- Corridor challenges; and
- Corridor benefits.

The indicators used to evaluate the corridors are presented in Table 4.1. Tables comparing the 11 Federally designated corridors with these criteria follow.

Table 4.1 Evaluation Criteria Applied to Corridors

Corridor Descriptions	
How have services been improved?	Has rail market share increased?
Preparations for 125+ mph service?	Have state funds been used in corridor?
Progress of environmental clearance?	Clear purpose and planning for corridor?
How sustained a corridor effort?	Is there uniformity of effort across the corridor?
Corridor Challenges	
Availability of passenger equipment?	Federal funds applied to corridor?
Experimenting with PTC Systems?	Relative freight/passenger activity in corridor?
Plans for private sector involvement?	New right-of-way needed?
Leadership by DOT/Elected Officials?	Corridors connect to transit/aviation systems?
Corridor Benefits	
HSR effects on highway/air congestion?	Will HSR offer trip time savings to motorists?
Is HSR expected to reduce emissions?	Will HSR stations attract economic activity?
Will HSR offer corridor economic impacts?	

Corridor Description Evaluation Criteria	Northeast Mainline	California (HSR)	Chicago Hub Network	Southeast	Pacific Northwest	Keystone
How have services been improved?	Frequency, Travel Time, Equipment, Stations, Reliability	Not Implemented	Frequency, Travel Time	Travel Time, Equipment, Stations	Frequency, Travel Time, Equipment, Stations	Frequency, Travel Time, Equipment
Preparations for 125+ mph service?	Yes 125+ already	Yes (220+)	No	No	No	No
Progress of environmental clearance?	No Program EIS (Master Plan)	Program EIS	No Program EIS	Project EIS Underway	Program EIS Complete	No EIS Needed
How sustained a corridor effort?	High	High (11/08 Bond)	High	High	High	High
Has rail market share increased?	Yes 49% NY-BOS 62% NY-DC	No (New ROW)	Yes	Yes	Yes	Yes
Have state funds been used in corridor?	Yes Multistate Agreements	Yes	Yes	Yes	Yes	Yes
Clear purpose and planning for corridor?	High	High	High	High (NC, VA)	High	High
Is there uniformity of effort across the corridor?	High (Master Plan)	High (CASHRA)	Medium	Medium	Medium	Medium

Corridor Description Evaluation Criteria	Empire	Northern New England	Gulf Coast	Florida	South Central
How have services been improved?	Travel Time, Equipment	Downeaster initiated	N/A	No Erosion of Service	No Erosion of Service
Preparations for 125+ mph service?	Yes (South Corridor only)	No	No	Three Past Attempts; Currently No	No
Progress of environmental clearance?	Planning/ Feasibility only	Feasibility only	Feasibility only	Final EIS on Orlando-Tampa	No Program EIS
How sustained a corridor effort?	High (NYS/Amtrak)	Medium	High	High	Low
Has rail market share increased?	Yes	Yes	No	No	No
Have state funds been used in corridor?	Yes	Yes	No	Yes	No
Clear purpose and planning for corridor?	High	Medium	Medium	Medium	Low
Is there uniformity of effort across the corridor?	High	Low	Medium	Medium	Low

Corridor Challenges Evaluation Criteria	Northeast Mainline	California (HSR)	Chicago Hub Network	Southeast	Pacific Northwest	Keystone
Availability of passenger equipment?	High	Medium	Medium	Medium	High	High
Experimenting with PTC systems?	Yes	Yes	Yes	No	No	No
Plans for private sector involvement?	No	Yes (One-Third Public Private Partnership)	Yes	Yes	No	No
Leadership by DOT/elected officials?	High	High	High	High	High	High
Federal funds applied to corridor?	Yes	Yes	Yes	Yes	Yes	Yes
Relative freight/passenger activity in corridor?	Passenger-dominated	Passenger Only (Exclusive ROW)	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
New right-of-way needed?	No	Yes	Portions	Portions	Portions	No
Corridors connect to transit, aviation systems?	Yes (BWI, EWR, Commuter Rail)	Yes (ONT, SFO, CalTrain)	Yes (MKE, CTA, Metra)	Yes (VA, NC)	Yes (TriMet, Metro, Sound)	Yes (SEPTA)

Corridor Challenges Evaluation Criteria	Empire	Northern New England	Gulf Coast	Florida	South Central
Availability of passenger equipment?	Medium	Medium	Low	Low	Low
Experimenting with PTC systems?	Yes	No	No	No	No
Plans for private sector involvement?	No	No	No	No	No
Leadership by DOT/ elected officials?	High (NYSDOT, Sen. Bruno)	Medium	Medium	Medium	Low
Federal funds applied to corridor?	Yes	Yes (Downeaster)	Yes	Yes	Yes (recent earmark)
Relative freight/passenger activity in corridor?	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
New right-of-way needed?	No	Portions	No	Portions	No
Do corridors connect to transit/aviation systems?	Yes (MTA)	Yes (MBTA, NEC)	No	No	Yes (DART, T, Capital Metro, VIA)

Corridor Benefits Evaluation Criteria	Northeast Mainline	California (HSR)	Chicago Hub Network	Southeast	Pacific Northwest	Keystone
HSR effects on highway/air congestion?	Realized	Estimated	Estimated	Estimated	Estimated	Realized
Is HSR expected to reduce emissions?	Estimated	Estimated	Estimated	Estimated	Expected	Realized
Will HSR offer corridor economic impacts?	Realized	Estimated	Estimated	Estimated	Expected	Expected
Will HSR offer trip time savings to motorists?	Realized	Estimated	Estimated	Estimated	Estimated	Realized
Will HSR stations attract economic activity?	Realized	Estimated	Estimated	Expected	Expected	Expected

Corridor Benefits Evaluation Criteria	Empire	Northern New England	Gulf Coast	Florida	South Central
HSR effects on highway/air congestion?	Estimated	Estimated	Expected	Estimated	Expected
Is HSR expected to reduce emissions?	Estimated	Realized	Expected	Expected	Expected
Will HSR offer corridor economic impacts?	Realized	Realized	Estimated	Expected	Expected
Will HSR offer trip time savings to motorists?	Realized	Realized	Estimated	Estimated	Expected
Will HSR stations attract economic activity?	Realized	Realized	Expected	Expected	Expected

■ 4.2 HSR Corridor Evaluation Coding

An alignment color-coding system was developed to graphically illustrate the progress of each of the U.S. high-speed rail corridors. A “stoplight” color coding system was selected, with the color dark green representing operational high-speed rail and, at the opposite end of spectrum, the color red representing minimal progress towards high-speed rail. The colors yellow, orange, and light green represent intermediate levels of progress. The alignment for each corridor is displayed in the selected color.

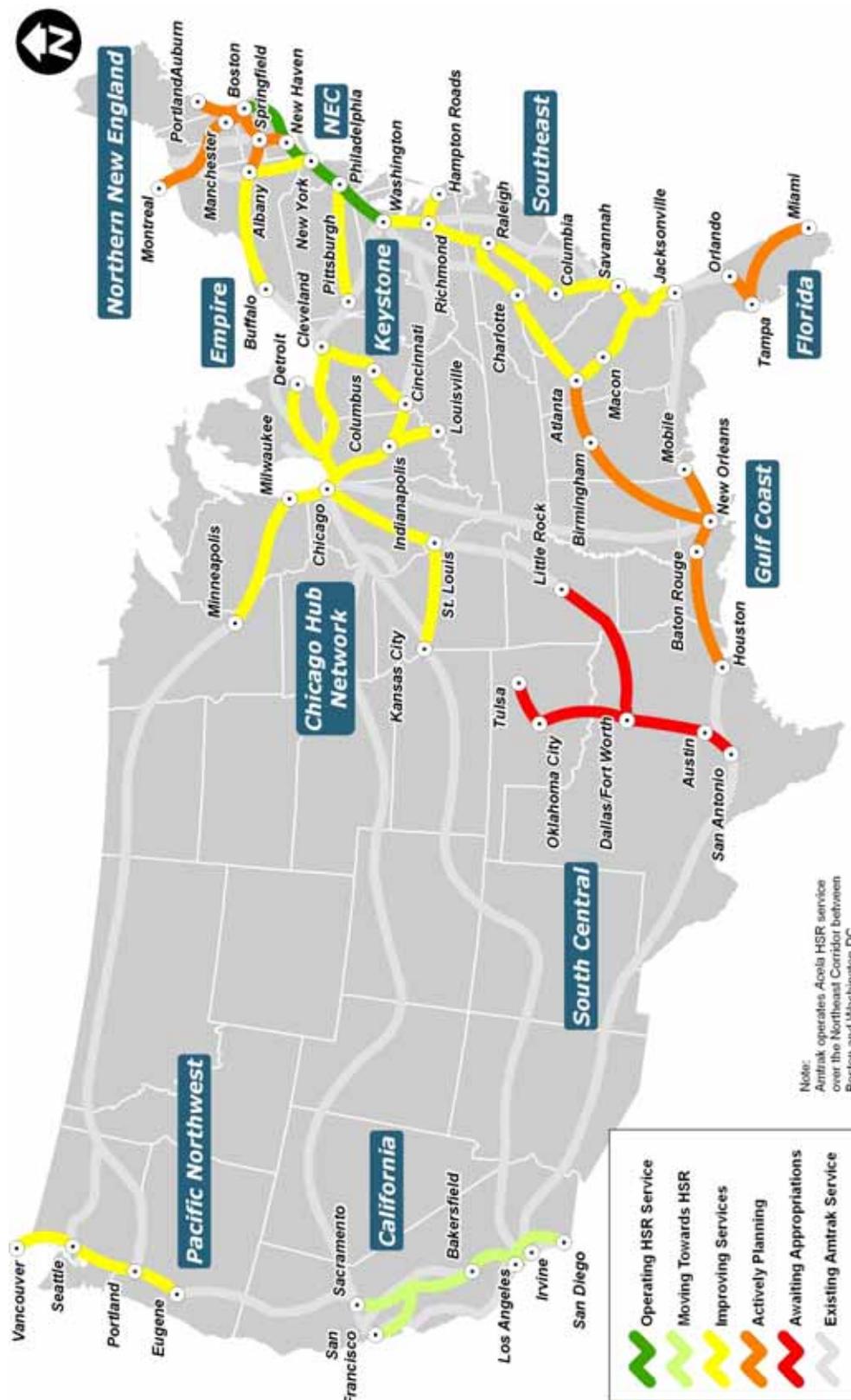
It should be noted that the chosen color represents an overall evaluation of progress throughout the entire corridor. Application of these evaluation criteria allowed the study team to measure how each corridor has advanced since its FRA designation. The 11 designated corridors are classified by one of five broad categories of current high-speed rail status:

- **Operating High-Speed Service.** Rail service currently operates over 125 mph along corridor. Only one corridor, the Northeast Corridor (NEC) Mainline alignment, is color coded dark green to signify its status as an operational U.S. high-speed rail corridor.
- **Moving Toward HSR.** Planned rail services over 125 mph along corridor. The California high-speed rail project falls into this category and is color coded light green.
- **Improving Services.** Corridor is making incremental improvements and planning for 110 mph service along corridor. The Empire, Keystone, Southeast, Chicago Hub Network, and Pacific Northwest corridors fall into this category and are color coded yellow.
- **Actively Planning.** Corridor planning efforts underway for 79 mph or more along corridor, but no high-speed rail service improvements achieved. The Northern New England, Florida, and Gulf Coast corridors fall into this category and are color coded orange.
- **Awaiting Appropriations.** Corridor planning efforts for high-speed rail have not advanced. These corridors are color coded red, as in the case of the South Central corridor where minimal progress has been made since its designation.

The current status of each Federally designated high-speed rail corridor is highlighted in Figure 4.1. The status classification was applied to the designated corridor as a whole, not by individual route segments. For example, the Northern New England Corridor operates intercity service between Portland, Maine and Boston’s North Station. This segment of the corridor might be upgraded from Actively Planning to Improving Services since: a) service currently operates over the corridor; and b) service continues to improve in the form of increased frequencies and trip times. However, the segment between Montreal, Canada and Boston has witnessed only planning and engineering activity since the original feasibility study was released.

Individual segments, or branches of a corridor that demonstrate different characteristics than the overall corridor, are described in Figure 4.1. This report also includes more detailed information on each corridor in Fact Sheets in Appendix A, which combines corridor descriptions, history, status of planning and implementation, technology considered, issues raised in interviews, and evaluation criteria.

Figure 4.1 Status of U.S. High-Speed Rail Development



■ 4.3 Individual HSR Corridor Assessments

4.3.1 Operating High-Speed Service

Northeast Corridor Mainline

The NEC is the host corridor to Amtrak's Acela Express service and is the only corridor operating high-speed rail service in the United States today. The 457-mile corridor between Boston and Washington, D.C. is primarily owned by Amtrak, and has more than a dozen passenger and freight railroads operating on the corridor daily. In recent years, significant strides have been made in improving the corridor, resulting in unprecedented ridership and improvements to quality of service.

Amtrak, in conjunction with the other NEC passenger and freight operating agencies, has begun a comprehensive capital improvement and master plan program that will identify and address necessary capital improvements while continuing to improve levels of service to meet the forecasted increases in demand.

The NEC is a vital piece of transportation infrastructure in the most densely populated section of the United States. Passenger rail service on the NEC is an important transportation alternative throughout the Boston/Washington, D.C. megalopolis and provides "downtown to downtown" connectivity to the major cities of New England and the Mid-Atlantic United States. Amtrak's NEC rail services continue to increase in air-rail market share, capturing 49 percent of the travelers between New York and Boston, and 62 percent between New York and Washington, D.C. The NEC also provides connections to the major airports in the Northeast, including Baltimore-Washington Thurgood Marshall International and Newark Liberty International Airport.

Figure 4.2 The NECHSR Corridor



4.3.2 Moving toward HSR

California High-Speed Rail Corridor

The proposed high-speed rail network under development by the California High-Speed Rail Authority (CHSRA) is the only currently proposed corridor in the United States that consists primarily of new, grade-separated high-speed rail guideway capable of maximum speeds over 150 mph. The system will link San Francisco and Los Angeles in less than three hours. The California Corridor will serve passenger traffic only and would connect the four largest metropolitan areas in California. The California Corridor also will provide direct connections to Ontario Airport and San Francisco Airport, as well as Metrolink and CalTrain commuter rail services.

State support for the development of the corridor is increasing and is already strong in urban areas and in the private sector. The California Congressional delegation has supported development of the corridor, believing that the state could serve as a national showcase should the Federal government develop a national high-speed rail program. Over 70 private companies have responded to a request for expression of interest (RFEI) for design, construction, and operation issued by the CHSRA in March 2008.

A \$10 billion ballot measure to provide state funding for the network was approved in November 2008. As a result, the state will provide one-third of the funding for the entire 800-mile network. It is anticipated that the remaining funding will come from the Federal government (one-third) and private sector.

CHSRA has completed statewide program environmental documents and is working towards the completion of project-level documents for the four operating segments (Sacramento to Bakersfield, Bakersfield to Los Angeles, Los Angeles to San Diego, and Bay Area to Merced).

Figure 4.3 The California HSR Corridor Conceptual Alignment



4.3.3 Improving Services

Chicago Hub Network Corridor⁴

The Chicago Hub Network involves nine Midwestern states, regional freight and commuter rail operators, and Amtrak. A feasibility study and business plan calling for incremental rail improvements to the roughly 3,000-mile network radiating from and extending to Missouri, Minnesota, and Wisconsin has been prepared for the Chicago Hub Network corridor. Incremental improvements for 110 mph service, including track work and signal system upgrades, are proposed for the rail corridors connecting major city pairs such as Chicago and Milwaukee. Upgrades to achieve 79 mph and 90 mph service are planned for regional city pair connections within the corridor. Amtrak already is running 95 mph service between Niles, Michigan and Kalamazoo, Michigan on the Amtrak-owned line utilized by Amtrak's Wolverine and Blue Water services. A service level of 110 mph is expected soon.

Figure 4.4 The Chicago Hub Network HSR Corridor



The Chicago Hub Network also would provide direct access to Milwaukee's General Mitchell International Airport, using the recently opened airport station completed by Amtrak and the State of Wisconsin. Wisconsin also has completed the environmental work and preliminary engineering needed to construct an 80-mile extension of Amtrak's Hiawatha service from Milwaukee to Madison. Construction for the extension is awaiting Federal appropriations.

⁴ The Midwest Regional Rail Initiative network links with the Ohio and Lake Erie Regional Rail System (Ohio Hub). These systems together comprise the full Chicago Hub Network designated by the Federal Railroad Administration (with some undesigned additions).

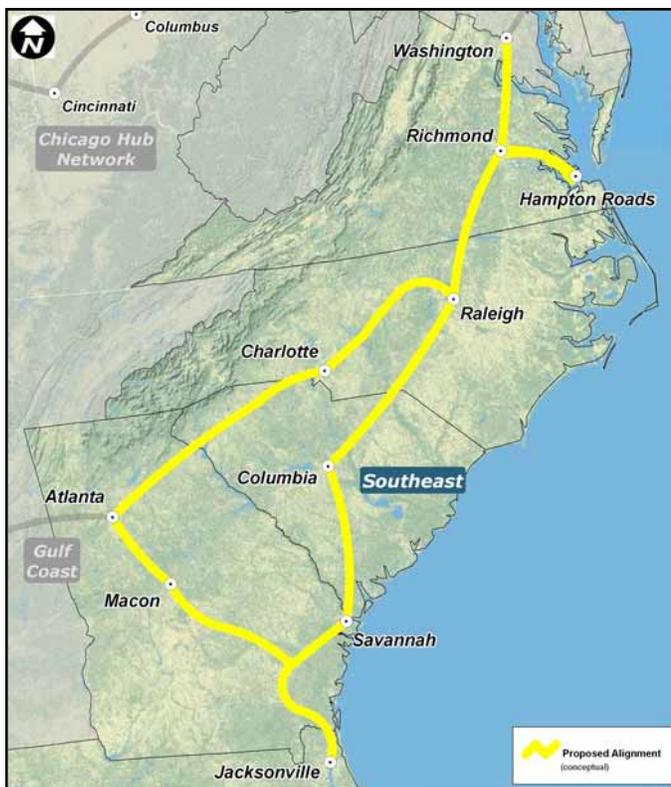
Southeast High-Speed Rail Corridor

The Southeast High-Speed Rail Corridor (SEHSR) is a collaborative planning effort involving five states, from Virginia to Florida. North Carolina is the state lead, providing political and legislative support, as well as funding for North Carolina Department of Transportation (NCDOT) rail programs and studies, infrastructure investment, and services. North Carolina also provides leadership in the Southeast High-Speed Rail Authority, one of the more formalized multistate rail authorities in the United States. The proposed SEHSR corridor would utilize existing rights-of-way, and would reestablish service on an abandoned rail line in Virginia and North Carolina.

The SEHSR development approach emphasizes incremental improvements designed to provide for 110 mph diesel service (average speeds of 85 mph to 87 mph) throughout the corridor. The first phase would build ridership and market share within the core segment (Washington, D.C. to Charlotte, North Carolina) before expanding further south, eventually to Atlanta, Georgia; Columbia, South Carolina; and Jacksonville, Florida. Depending on funding availability, passenger service between Washington, D.C. and Charlotte, North Carolina could begin as soon as 2015.

Planning and environmental documents, including a programmatic EIS and a 2002 Record of Decision, have been prepared for the Washington, D.C. to Charlotte, North Carolina corridor. The Richmond, Virginia to Hampton Roads, Virginia EIS is being revised per FRA comments. Public hearings will be scheduled after completion of the EIS. A project EIS for the Richmond to Raleigh, North Carolina segment is expected to be ready for public comment in 2009. Preliminary planning studies for extensions of the corridor from Charlotte, North Carolina to Macon, Georgia are underway.

Figure 4.5 The SEHSR Corridor



Pacific Northwest Rail Corridor

The development of the Pacific Northwest High-Speed Rail Corridor (PNWRC) is a collaborative planning effort among three states and provinces in the Pacific Northwest United States and Canada. The Washington Department of Transportation (WSDOT) is the state lead, having contributed roughly \$120 million in track and infrastructure investments, as well as \$175 million in equipment and operating subsidies. The PNWRC would utilize existing rights-of-way owned by BNSF Railway Company (BNSF) and Union Pacific, improving on Amtrak's successful Cascades service between Eugene, Oregon; Seattle, Washington; and Vancouver, British Columbia.

The PNWRC development approach emphasizes incremental improvements to both infrastructure and signal systems that are designed to improve travel times, as well as provide for 110 mph service. Amtrak's Cascades service utilizes unique push-pull, passive-tilt Talgo trainsets that are capable of operating at maximum speeds of 124 mph. However, current track configurations limit speeds to 79 mph. Even so, use of the tilting trains has accomplished travel times that have allowed train service in the corridor to capture a significant percentage of the air-rail market between Portland and Seattle.

Washington State plans to invest an additional \$250 million in track and other infrastructure improvements. Incremental upgrades already are underway, including projects in Vancouver, Washington; Bellingham, Washington; and Portland, Oregon. To date, these improvements have been able to increase the number of round-trips on the corridor, reducing trip times without increasing operating speeds. Trip times between Seattle and Portland have been reduced from 4 hours 45 minutes to 3 hours 30 minutes. WSDOT believes that a trip time of 2 hours 30 minutes is achievable using 110 service characteristics. Like SEHSR, freight railroads have collaborated in the development of the corridor and have realized improved service levels for freight operations.

Figure 4.6 The PNWHSR Corridor



Keystone Corridor

A \$145.5 million joint capital improvement effort by Amtrak, The Pennsylvania Department of Transportation (PennDOT), and SEPTA provided significant incremental upgrades to the Keystone Corridor between Harrisburg and Philadelphia, Pennsylvania. The improvements now permit operating speeds of up to 110 mph, and 95-minute express service for the 105-mile segment between Harrisburg and Philadelphia. Incremental improvements to the corridor included full electrification, upgraded trackage and signalization, and structural improvements, providing mutual benefits to all users of the corridor. Amtrak's Keystone service now operates 14 daily trains between Harrisburg and New York City. Since 2005, the service has attracted over one million riders per year. A second phase of the Keystone Corridor improvement project will provide upgrades to track sections east of Paoli.

Figure 4.7 The Keystone HSR Corridor



The Norfolk Southern-owned segment between Harrisburg and Pittsburgh is not electrified and is not currently capable of operating high-speed rail service. Amtrak's Pennsylvanian travels the 245-mile segment in roughly 5 hours 30 minutes.

Empire Corridor

Similar to the Keystone Corridor, improvement efforts on the Empire Corridor have largely been concentrated on the segment connecting to the NEC. The South Corridor, operating between Albany and New York City, New York, is jointly owned by Amtrak, Metro-North, and CSX and operates up to 95 mph service between Spuyten Duyvil and Stuyvesant, and up to 110 mph service between Stuyvesant and Schenectady. Amtrak and New York State Department of Transportation (NYSDOT) have jointly invested in infrastructure improvement projects along the southern corridor. New York State invested \$100 million (statewide) as part of its five-year Rail Freight and Passenger Assistance Program. At the recommendation of the New York State Senate High-Speed Rail Task Force, \$22 million was appropriated to NYSDOT for FY 2006-07 for investment in the Empire Corridor, and NYSDOT has plans for operation of express trains between Albany and New York within five years.

Figure 4.8 The Empire HSR Corridor



The New York State Senate High-Speed Rail Task Force, led by Senate Majority Leader Joseph Bruno, endorsed the development of the Empire Corridor as a means to efficiently move goods and people throughout the State. Short-term improvements to the corridor are designed to improve on-time performance and increase operating capacity. Longer-term improvements include higher speeds and capacity, and an eventual shift to grade-separated guideways.

4.3.4 Actively Planning

Northern New England High-Speed Rail Corridor

The Northern New England High-Speed Rail Corridor extends approximately 750 miles along four segments, spanning the United States and Canada. Amtrak's Downeaster service provides inter-city rail service between Boston, Massachusetts (North Station) and Portland, Maine. Amtrak also serves the Boston-Albany and Springfield-New Haven segments designated in 2004. The Boston-Montréal High-Speed Rail Corridor (BMHSR) is in the early planning stages and currently used for freight services only. A feasibility study for the BMHSR corridor was completed in 2003; however, there has been little activity since the completion of the study.

Activity among the five states and Canada is vastly different. Maine is the most proactive state and is actively improving the Downeaster service. The Maine Department of Transportation (DOT) is planning for an extension of Downeaster service to Brunswick in 2009, as well as securing equipment and infrastructure for additional round trips. The State also wishes to provide a connection to the NEC, either via Boston or Worcester, in order to expand the State's economy. The Vermont Agency of Transportation is studying the possibility for increased quality of service on the Amtrak's Vermonter service, and is exploring the possibility of connecting the service to the proposed BMHSR corridor. New Hampshire has shown little interest in developing the BMHSR Corridor since the completion of the 2003 study.

Figure 4.9 The NNEHSR Corridor



Gulf Coast High-Speed Rail Corridor

Development plans for the Gulf Coast High-Speed Rail Corridor call for DMU service with maximum operating speeds of 110 mph. The roughly 1,000-mile corridor would connect major southern cities in the Gulf Coast United States, including Houston, Texas; New Orleans, Louisiana; and Atlanta, Georgia. Development of the corridor is authorized by the Southern High-Speed Rail Commission (SHSRC, formerly the Southern Rapid Rail Transit Commission). Staffing and support is led by the New Orleans Regional Planning Council, making the Gulf Coast Corridor the only corridor to have an MPO as a lead agency.

Although the SHSRC was established in 1984 and has completed a number of planning and feasibility studies for segments of the corridor, no environmental documents have been produced, and improvements on the corridor have been minimal. Despite these setbacks, the SHSRC enjoys strong support from the state levels of government through which the corridor runs. Recent planning and development efforts by the SHSRC have centered on the segment between Houston and New Orleans with extensions to Baton Rouge, Louisiana and Meridian, Mississippi with an emphasis on improving travel times, not necessarily the implementation of high-speed rail service. An extension of the corridor to Atlanta has not been studied with the same emphasis.

Figure 4.10 The Gulf Coast HSR Corridor



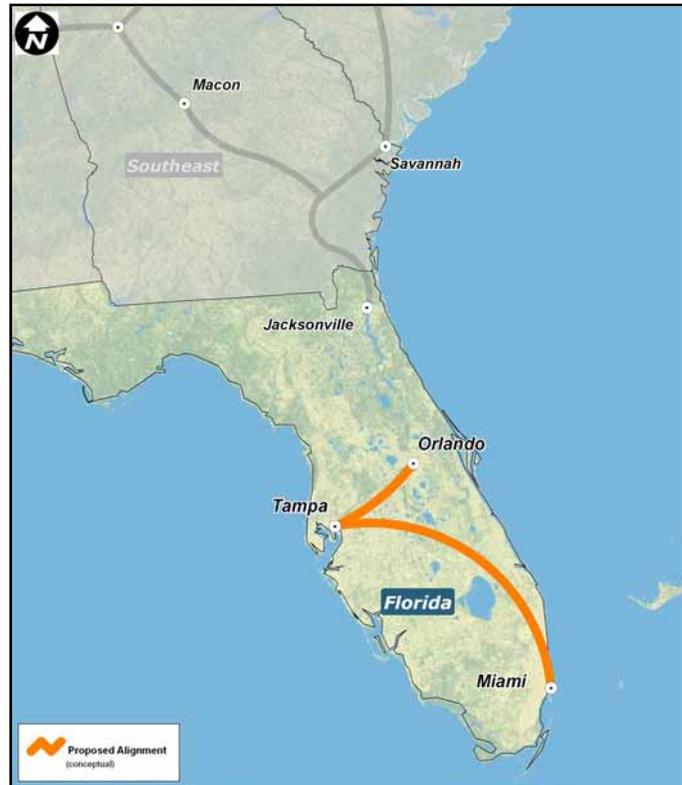
The Florida High-Speed Rail Corridor

After three previous failed attempts at implementing a 200+ mph HSR network dating back to 1976, the Florida Department of Transportation (FDOT) has shifted its focus to an incremental approach at the corridor level, with top operating speeds of 110 mph to 125 mph grade-separated service.

Florida no longer provides financial support to the Florida High-Speed Rail Authority (FHSRA). The State is currently focusing its planning and development of general passenger rail efforts on two segments, between Tampa and Orlando (90 miles), and between Orlando and Miami (264 miles).

No environmental documents have been issued under the revised approach from FDOT. A draft intercity rail plan was produced in 2006; however, the plan looks at the entire State, not just the two segments described above.

Figure 4.11 The Florida HSR Corridor



4.3.5 Awaiting Appropriations

South Central Rail Corridor

The South Central Rail corridor has seen very little development since its designation in October 2000. Texas DOT (TxDOT) has taken lead responsibility for the corridor and is planning for incremental improvements over its 672-mile length. Progress on the corridor is constrained by the lack of cooperation from neighboring states. Most work to date is a result of Section 1103c grade crossing hazard elimination program.

TxDOT has recently received a \$455,000 earmark to advance planning between Dallas and Texarkana and a branch in Shreveport along the Union Pacific tracks. The earmark is intended to improve capacity along existing lines to achieve higher speeds, add trackage in existing right-of-way, or consider totally new right-of-way.

The Texas High-Speed Rail Corporation, working separately from TxDOT, is planning for grade-separated high-speed rail service using foreign firms and manufacturers. This group is planning a route from San Antonio to Dallas/Fort Worth through Austin and Temple/Killeen, with a connecting route from Killeen to Houston through College Station.

Figure 4.12 The South Central HSR Corridor



5.0 Key Findings

After considering the information collected from an examination of officially designated high-speed rail corridors, and the facts and opinions from Amtrak staff and state stakeholders, a number of common themes emerge. This section offers a series of research findings and lessons that can be applied to future efforts to propel corridor activities into achievement of high-speed rail service:

- **Factors Inhibiting HSR Development.** Answering the question of why the United States has not yet attained a level of high-speed rail service envisioned 17 years ago through ISTEA begins with an examination of factors that have served as obstacles or barriers to more rapid and successful development. A broad set of factors must first be confronted and resolved to provide a greater possibility of success of high-speed rail service.
- **Delineation of HSR Benefits.** Delivering high-speed rail service that links major urban areas in corridors throughout the nation will bring significant benefits. The original Congressional intention for high-speed rail discussed in the first section of this report was conceived to achieve transportation improvements, which have direct and indirect effects on communities and regions.
- **Corridor Successes.** Examination of those corridors in which progress is being made (as evidenced by the evaluation criteria applied in this report) yields a set of judgments about what distinguishes these corridors from others. The success factors form a description of corridors in which high-speed rail is attainable. Lessons learned in less successful corridors have pragmatic application on how high-speed rail can be achieved in the future.

■ 5.1 Impediments to HSR Development

Conversations with state officials tasked with administering intercity passenger rail programs leading to high-speed rail usually included a discussion of the issues that complicate, thwart, and impede their progress. The issues listed in this subsection are not merely complaints, but rather elements that call for future resolution. Therefore, if the nation expects more progress in achieving high-speed rail, then these impediments would need to be confronted and managed:

- Financial;
- Leadership and support;

- Infrastructure; and
- Regulations.

5.1.1 Financial

One major element that separates the intentional from the actual is the decision to allocate resources to execute that which is planned. The biggest factor separating the Congressional intention for high-speed rail first made manifest in 1991 from its accomplishment has been the failure of the legislative branch to allocate the substantial resources necessary to make high-speed rail attainable in the designated corridors (or for the executive branch to propose such investments).

High-speed rail services available in foreign countries are the result of those national governments setting aside substantial resources to support the services. Many of these countries freed reformed railway operators to operate regional and high-speed rail routes by assuming the debts of legacy national rail carriers. According to a 2006 Government Accountability Office (GAO) Report GAO-07-015, these one-time transfers ranged from \$18 billion (France) to \$38 billion (Germany) to \$176 billion (Japan). Germany provides \$8 billion in annual operating subsidies for its regional passenger rail systems, and \$5 billion per year for infrastructure improvements. France provides \$9.6 billion in annual operating subsidies and \$2.4 billion per year for new lines.

The progress being made to date in the United States, leveraging modest Federal appropriations for the Next Generation High-Speed Rail Program and state funds, is remarkable considering the absence of a dependable, multiyear Federal funding program for high-speed rail (The recently enacted PRIIA authorizes such a program; the level of funding it will receive is subject to future appropriations). The substantial capital costs for infrastructure and rolling stock necessary to improve trip times and increase service frequency, and the extent to which such corridor services will rarely produce sufficient revenues to cover operating and maintenance expenses, provide evidence against a bottom-up, state-by-state funding approach.

States asking for a Federal high-speed rail funding program, in light of long-standing Federal funding programs for other transportation modes, do so not only based on equity issues. Every fiscal year, state transportation resources tend to be applied in highway, transit, or aviation capital programs where state funds are multiplied by Federal matching funds by factors of four or five to one. Without an adequately and dependably funded Federal matching program, high-speed rail is unlikely to compete for limited state transportation revenues if those state dollars can be more effectively leveraged in other programs.

The scale and scope of high-speed rail, particularly for projects offering services in excess of 150 mph, will strain the funding and organizational capacity of single states. In 2006, the California High-Speed Rail Authority (CHSRA) estimated the cost of California's HSR system at about \$45 billion, with two thirds of that capital cost expected from nonstate sources. In multistate corridors, such as the Southeast and Midwest, projects of such scale

can strain the effectiveness of typical multistate institutional arrangements such as compacts or multilateral agreements. States are unlikely to set aside state resources in a pooled approach to infrastructure improvements unless a Federal program provides sufficient incentives for them to do so.

Some congressional proposals for high-speed rail funding expect significant private sector investments to leverage public funds. Setting aside the wide differences between private sector involvement in monetizing existing assets and in developing greenfield projects, the more fundamental question is whether high-speed rail projects can create revenue streams sufficient to attract private investment. Accounting system differences notwithstanding, none of the current European or Asian high-speed rail projects would have been possible or sustained without the significant and continuous governmental contributions described above. The private sector may have a valuable part to play in delivering infrastructure or equipment through design-build approaches or operations through transforming governmental operating subsidies into availability payments. Yet, the involvement of the Federal government remains an important element to the delivery of high-speed rail projects.

5.1.2 Leadership and Support

The concept of leadership will be mentioned throughout the remainder of this report, as this was identified throughout interviews and research as one of the major factors impeding corridor achievement of full high-speed rail potential. Visible, sustained leadership at high levels by elected and appointed officials is a feature of corridors marked by progress, and its absence is a serious obstacle to high-speed rail advancement. The need for funding and resolution of other obstacles listed in this section will require political champions at all levels of government. The problems and needs are too great to be resolved within a single election cycle or without strong individuals ready to tackle protracted, difficult negotiations.

The leadership problem is complicated by the lack of a coherent national transportation policy that clarifies expectations and goals for freight and passenger rail. Many states are making progress, but must address issues of funding, costs of access to freight rail networks, and availability of equipment on an ad hoc basis. As Congress considers the calls of many organizations to fundamentally reassess national goals in authorizing a surface transportation policy for the future, such a policy needs to identify the national interests in how passenger and freight rail services can be expanded.

The absence of a national rail policy or funding program also has created a vacuum of leadership within the U.S. DOT. The Federal Railroad Administration's (FRA) primary mission, and its Federal appropriations, are focused on improving railroad safety. The FRA administers the Federal subsidies for Amtrak (only recently through the discipline of a grant administration process) and the modest programs for designated corridors, but the agency does not (or is not enabled to) perform an advocacy function for the interests of passenger and freight rail in the national transportation system. Even acknowledging the philosophical conflicts between administration and advocacy at the Federal Highway

Administration (FHWA), Federal Transit Administration (FTA), or Federal Aviation Administration (FAA), it is difficult to imagine that the U.S. Senate would require nominees for the Administrator positions at those agencies to maintain ambivalence about the role their mode plays in the national transportation system. The recently enacted PRIIA creates an increased role for the FRA within the U.S. DOT, which will be necessary not only to administer an expanded program but to be the voice within the executive branch for the sustenance of the program.

5.1.3 Infrastructure

Passenger services that operate outside Amtrak-owned corridors (the Northeast Corridor, Keystone Corridor to Harrisburg, and portions of the Chicago-Detroit corridor) do so on property owned and operated by private freight rail companies. Amtrak's statutory rights of access to operate over such properties do not automatically create uniform acceptance or accommodation of passenger services by all freight railroads. The speed differences of high-speed passenger trains create dispatching issues for freight rail owners. These differences also create requirements for additional sidings, different kinds of switches, run-through tracks through major classification yards, and other infrastructure issues. As passenger train speeds increase, regulatory requirements for cab-based train control systems pose additional challenges. Not only do the requirements presuppose the existence of workable systems by a variety of vendors (not the current experience), such systems would need to be installed on all locomotives operating in the higher speed corridor.

Federal funding programs and national rail policy need to be cognizant of these infrastructure constraints, which are obstacles to achievement of high-speed rail objectives. The Rail Passenger Service Act, as modified by PRIIA, attempts to resolve some of these access issues through determination by the Surface Transportation Board (STB) of the costs of Amtrak access and enforcement of performance standards for Amtrak services on freight lines. A national rail policy will need to do more than give passenger trains legal right to operate over the freight rail network; it will need to expand capacity of infrastructure and systems of that network as well.

5.1.4 Regulations

Federal and state laws for railroad safety, property rights and environmental reviews, and tort liability all pose challenges for increasing frequency and reducing trip times for high-speed rail services.

- **Safety Regulations.** Current Federal rail safety regulations are concerned with survivability of the passenger equipment in crashes with heavy freight trains. The result is that United States passenger rolling stock is significantly heavier than foreign equipment, which increases the cost of manufacturing and adds to vehicle-track interaction forces that increase track maintenance requirements and costs, and increases operating costs for these trains. Many of those interviewed in this study suggested that the Federal safety policy be concerned more with crash avoidance than crash

survivability, in contrast with FRA's current policy. In the words of one state corridor program manager, the current regulations have led to passenger equipment that seem to be "tanks on rails." This change in focus would balance equipment standards with other safety systems, such as train control and signaling systems. The FRA is conducting research on different mechanical methods of managing and absorbing crash energy which might lead to increased acceptance of lower weight or monocoque⁵ exteriors for passenger equipment. This change in outlook also presupposes the market adoption of positive train control (PTC) systems that would work for passenger and freight rail equipment, as well some sort of Federal role in investing in the significant costs of such systems.

- **Right-of-Way Issues.** If freight rights-of-way need to be expanded to accommodate passenger train traffic or new corridors created for high-speed rail, these public sector necessities will have to be managed through existing Federal and state laws governing protection of private property rights and of the environment. Given the extent to which private properties and structures abut freight rail lines in urban and suburban areas, the legal process of adding tracks or sidings is likely to be time-consuming at best (thus increasing the effects of inflation on construction and equipment costs) and certainly controversial. The investment of Federal funds in passenger services that significantly increase train frequencies, noise and vibration, or land impacts may require extensive environmental reviews that balance the impacts of the services on the physical environment immediate to the rail lines against other environmental benefits that accrue from increased transportation choices that may reduce congestion and vehicle emissions.
- **Legal Issues.** Freight railroads have significant concerns about the tort liability exposure associated with adding new or enhanced passenger services on existing freight railroad-owned lines. Issues involving liability allocation and costs have thwarted or delayed a number of projects involving new or enhanced passenger rail services, and have required passenger rail operators to bear significant liability and insurance costs. Some of those interviewed have suggested addressing these concerns through enactment of additional legislation that sets reasonable limits on liability exposure in the event of an accident involving a passenger or high-speed train. By reducing the insurance and litigation costs currently borne by passenger rail operators, such legislation also would ensure that funding made available for passenger rail is applied to investments that will improve the services provided to the traveling public.

⁵ The term "monocoque" comes from the French words "mono" (single) and "coque" (shell) and refers to a construction technique, used in aircraft and rocket assembly, in which the outer shell bears all or most of the stresses on the body.

■ 5.2 Delineation of HSR Benefits

If high-speed rail is to secure the attention of Federal policy-makers to resolve the outstanding technical, legal, and financial issues, high-speed rail supporters need to be able to articulate the range of public benefits that can be expected to accrue as high-speed rail is implemented:

- Economic efficiency;
- Compact land use patterns; and
- Environmental enhancement.

5.2.1 Economic Efficiency

Creation of a high-speed rail system with trip times comparable to auto travel times will create benefits for rail system users and other nonusers. If the high-speed rail service offers reliable service, auto-comparable trip times, and sufficient service frequencies, then the rail passenger can be expected to enjoy travel time savings. In this case, the rail passenger is not subject to the disruptions and unpredictability of highway congestion. The rail passenger also gains more productive use of travel time from being able to work comfortably on-board, connected to wireless telecommunications services. To the extent that auto travelers are diverted to high-speed rail, congestion on parallel roadway facilities is likely to decline, bringing about benefits for other highway users.

5.2.2 Compact Land Development Patterns

A growing body of work is detailing the practical benefits of transit-oriented development, the practice of community planning in which higher density land uses are focused on transit stations. High-speed rail connections into multimodal transit stations in city centers can have significant positive effects on urban development, particularly for commercial purposes. Both Wisconsin and North Carolina reported positive real estate development resulting from improvements in service frequency and in station amenities for their corridor services. This effect has historical precedent: development of air rights around train stations has been a feature of urban development going back to the experience around Grand Central Station at the turn of the 20th century.

5.2.3 Environmental Enhancement

Passenger rail travel, even using diesel locomotives, is more energy efficient than automobile or airplane travel, according to the National Transportation Statistics report prepared by the Bureau of Transportation Statistics (BTS) at the U.S. DOT's Research and Technology Administration. In 2006, the last date for which Amtrak statistics were

available, Amtrak reported energy use of 2,650 Btu per passenger-mile, while domestic commercial air travel consumed 3,228 Btu per passenger-mile, and passenger cars consumed 3,512 Btu per passenger-mile. Environmental documents for the California High-Speed Rail project report that energy use for electrified 200+ mph travel will be 1,200 Btu per passenger-mile. This data shows that passenger rail service is very energy efficient, particularly if electrified.

The air quality effects of high-speed rail will depend on a number of factors, including the number of auto trips diverted to rail, the motive power for passenger rail service, and expected passenger rail volumes. Conventional diesel locomotives are currently cleaner than diesel engines for commercial trucks, 1.0 grams of hydrocarbons per brake-horsepower-hour (bhph) versus 1.3 grams per bhph. Direct comparisons among modes are difficult because of different measurements for pollutants. National air quality standards mandate decreased engine emissions. Diverting auto trips to rail would further reduce auto emissions.

■ 5.3 Characteristics of Successful Corridors

This report intended to identify the factors common to corridors that are making progress toward high-speed rail, and this section lists these factors. The following issues are common to those corridors identified by the report's evaluation criteria as improving rail services, planning for high-speed rail, and doing so with a sustained effort:

- **Focused, Sustained Leadership at the Top.** Most states that are making progress credited leadership from the top of state government, either the Governor or the head of the Department of Transportation. This high-level leadership was crucial in securing funding from state appropriators, defending plans to cautious freight line owners, and persevering in delivering long-range plans. Many states reported that delivering on early plans to expand passenger services demonstrated credibility for the corridor managers and facilitated explanations of corridor programs to new leaders as they came into office. Given the absence of clear Federal leadership in setting national rail policy or creating a rail funding program, state leadership is one of the more critical elements for states achieving measures of success toward their high-speed rail goals.
- **Achievable Goals.** Contrary to the high-speed rail aspirations of some passenger rail proponents, most of the states making measurable strides in their corridor plans have more modest goals than implementing 150+ mph high-speed rail service found in other countries, such as Japan and Germany. Many of these states are bringing about passenger rail ridership expansion through a focus on trip times and frequencies, not necessarily train speeds. In most corridors, this approach also is driven by the sharing of track and right-of-way with freight rail traffic. Moving beyond 110 mph in freight corridors will require higher track standards, grade crossing improvements, and advanced train control systems for all locomotives in the corridor, all of which impose

increased operating costs for freight rail owners as well as higher capital costs for public sector sponsors. For this reason, most states believe that the optimal interval to bring about trip time improvements is between speeds of 90 mph and 110 mph.

Furthermore, many of these states are seeking to divert auto travelers, not lure airline customers. Attracting auto travelers from congested, unreliable highway corridors can be achieved with trip time improvements aimed at auto travel times between city pairs. Not only are these travel times more comparably achieved by high-speed rail less than 125 mph, there is a larger market of auto travelers to divert than airline customers in most markets. Automobile travel remains the predominant choice for intercity travel over 50 miles in length. The 2001 National Household Travel Survey, summarized in the BTS National Transportation Statistics report, reports that 89.3 percent of person-trips over 50 miles are made by personal automobile, with trips under 300 miles comprising 65.1 percent of total person-trips. Many corridor plans are aimed at trip time savings and reliability improvements for these auto travelers, which require investments in rolling stock and infrastructure and disciplined dispatching from freight rail companies.

Diversion of airline customers is possible even at more modest train operating speeds, even if it is not the primary focus of many high-speed rail corridors. Amtrak's 62 percent market share of the air-rail market in the Washington, D.C.-New York corridor results from operating speeds, frequencies, on-time performance, and trip times between city centers. Air travelers can be won, but are not the biggest market for new high-speed rail corridors.

- **Coordination with Freight Operators.** Since the majority of corridors studied in this report will be making use of existing freight rail rights-of-way (with the exception of the Northeast Corridor (NEC), owned by Amtrak, and the California HSR project, using new rights-of-way in most cases), high-speed rail success will depend on constructive, cooperative relationships with freight railroads. Many of the corridor managers reported three areas which required special attention:
 - **Modest Traffic Levels** – Many corridors adding passenger service on existing lines are doing so on lines with modest freight volumes. These lower freight train frequencies lead to different kinds of infrastructure investments and easier insertion of faster passenger trains. An exception to this rule is the Pacific Northwest corridor on a BNSF line with 40 to 50 trains a day. There, additional tracks and sidings and careful dispatching have led to an environment in which freight trains and passenger trains both operate more efficiently. Federal efforts to increase passenger rail service will have to include programs to expand freight rail capacity so that certain intercity routes can run a majority of faster passenger trains.
 - **Disciplined Dispatching** – Rail dispatchers have a challenging job orchestrating train movements over main lines and sidings, balancing trains moving in opposing directions of different speeds and lengths. Passenger trains, particularly at increased speeds, add to this challenge. Some freight railroads have found that training and retaining dispatchers for a particular corridor allows the dispatcher to understand the track, grades, and traffic mix, and use the movement of passenger

trains as a means of enforcing discipline on all movements in the corridor. Without the cooperation of these dispatchers, passenger trains will wait on freight train, and the resulting poor on-time performance will reduce total ridership and financial performance.

- **Maintenance Practices** – Railroad owners are required to maintain their infrastructure to ensure safe and reliable operations, which means that they must juggle continued traffic across lines that need maintaining. In many areas of the country, this maintenance is seasonal in nature, offering narrower windows for certain kinds of activities. Just as dispatching has to balance freight and passenger train movements, maintenance activities on passenger rail lines have to be timed and managed so that on-time performance is not adversely affected. Many corridors adding passenger train frequencies also find the need to coordinate maintenance plans carefully. This may mean shorter maintenance windows in off-peak hours; but this change, in practice, also may lead to better operating performance for freight trains in these corridors.
- **State Commitment.** Another major element in corridor advancement is the extent to which state governments are applying state funds to bringing about more passenger rail service. This means more than leveraging limited Federal funding through studies and planning; it involves investing in infrastructure improvements and operating subsidies for more passenger service. Many of these states are not waiting for a Federal program; they are moving forward to reduce trip times, to improve service, and to grow ridership. Those corridors waiting on a Federal program have little progress to show for such a strategy.

6.0 Action Items

This report has sought information to answer the question discussed in the opening section, “why has the United States not been able to fully realize the vision of ISTEA with respect to implementation of high-speed rail service?” In this section, information will be provided that answers a related question, “what steps would be required to augment emerging efforts to bring about high-speed rail in the United States?” This section will outline a series of actions necessary to address impediments listed in this report and to take advantage of positive lessons learned. These actions are listed in three sets, grouped according to the actors involved:

- Federal funding for high-speed rail;
- Federal government-led resolution of various impediments; and
- State government activities necessary to implement high-speed rail.

■ 6.1 Federal Funding for HSR

High-speed rail will not simply evolve from the collective wishes and plans of elected officials and corridor planners; rather, it requires a break with the unfunded intentions of the past. If Congress truly wants high-speed rail service in the United States, then it must appropriate considerable levels of funding needed to implement such service. This report recommends funding that includes the following elements, some of which are reflected in the yet-to-be-funded corridor development and high-speed rail programs authorized in the 2008 Passenger Rail Investment and Improvement Act (PRIIA):

- **Comparable Matching Funds for Infrastructure and Equipment.** Establishing and funding an 80 percent Federal and 20 percent state and local matching program would be the most comparable approach to other Federal transportation funding programs. The Bush Administration’s 2005 passenger rail legislative proposal suggested higher matching fund percentages following enactment of legislation, and no more than 50 percent matching funds in later years. Lower Federal matching levels would more effectively leverage Federal funding into more projects, but creating different funding conditions for high-speed rail would only continue the current inequities that encourage states to allocate their transportation dollars to programs with higher Federal matching rates. In order to encourage states to more carefully and flexibly apply their transportation dollars among modes (a subsequent action step), Federal high-speed rail funding programs should be similar to other Federal transportation programs.

- **Substantial, Sustainable Funding.** Authorizations for high-speed rail programs should cover multiple years and be followed by appropriations that regularly meet authorized funding levels. If states are going to effectively plan for long-term, complex projects, the Federal program should be dependable rather than episodic.
- **Grants Allocated According to Expected Performance Criteria.** To the extent that a Federal program delegates grant administration to the Secretary of Transportation, the grant application process should be based on consistent performance-based criteria. States should be encouraged to plan for projects that maximize ridership and congestion relief and other goals in a cost-effective manner. The application process, like the funding it allocates, should be predictable and not subject to swings in varying interpretations by different administrations. Similarly, Congress should delegate project selection to the executive branch and hold administrators accountable for the project selection decisions they make.
- **Neutrality with Respect to Speeds and Technology.** Since corridors studied in this report have a variety of approaches to types of services that best serve their markets, any Federal funding program would be most effective if it did not limit funding to high-speed rail over 125 mph. Many states are seeking to grow markets for passenger rail travel to build to higher rather than high-speed speed services, and those deliberate approaches ought not be penalized in favor of more ambitious plans. Funding projects with a variety of top speeds also would make Federal funds available to more projects than would funding a few, very expensive projects.
- **Clear, Consistent Provision of Operating Support.** Some states suggested that Federal funding should not solely focus on capital funding for infrastructure and rolling stock. Only a few high-speed rail projects are likely to generate sufficient revenues to offset operating and maintenance expenses, much less generate reserve funds for major infrastructure or equipment replacement over the life of the project. For this reason, Federal funding legislation also should provide matching funds for states to cover high-speed rail operating costs, particularly those costs associated with using existing freight rail lines. Since Federal highway and transit programs do not generally fund operating expenses, Federal high-speed rail operating assistance could be limited to a certain percentage, so that states also are committed to operating support.
- **Provide Role for Private Sector.** Public-private partnerships continue to flourish in surface transportation modes in terms of contracting mechanisms, funding sources and structures, and risk sharing methods. Since very few high-speed rail systems in the world generate positive revenue streams (considering the high capital costs), turn-key provision of privately funded high-speed rail services by private sector operators may be unlikely without capital and/or operating subsidies. However, states may find private partners willing to deliver infrastructure projects or manufacture and maintain rolling stock through design-build or design-build-maintain contracts. Federal funding programs should encourage flexibility for states to commensurate with the private sector's willingness to take project-related risks.

■ 6.2 Resolve Impediments

This report has identified a number of issues that need to be resolved before high-speed rail can make sustained progress in multiple corridors. These problems require Federal-level resolution for at least two reasons. First, many of the matters are complicated enough to need national solutions, and state-by-state experimentation or improvisation would not necessarily produce a superior solution. Second, some problems need a consistent solution so that states are ensured that they will be treated equally, rather than negotiating each deal ad hoc with national firms or Federal agencies.

The following issues need to be solved at the Federal level.

Positive Train Control. Positive train control (PTC) systems refer to a variety of systems that seek to avoid train-to-train collisions, over speed derailments, and injuries to railway workers working within their limits of authority. The National Transportation Safety Board (NTSB) has long listed PTC as one of its most wanted safety improvements. PTC has the potential of correcting a number of potential crashes caused by human factors such as fatigue or inattention.

PTC not only has the potential of increasing the safety of rail operations, it has the potential of increasing the effective capacity of rail lines, allowing more trains of different lengths and different speeds to operate in closer proximity to each other due to the systems' safety improvements. This is particularly true as passenger speeds increase on existing freight rights-of-way.

Given the importance of PTC to higher speed rail operations, Amtrak has participated in three different system tests – along the Northeast Corridor, in Michigan, and in Illinois. Since the FRA adopted performance-based safety regulations for new PTC applications in 2005, more freight and commuter operations are testing PTC systems nationwide. As of 2008, FRA reports that there are 11 PTC projects in some stage of development or deployment, involving 16 different states, 9 different railroads, and 4,000 track miles. Successful outcomes of existing tests of PTC applications are critical to ensure that passenger and freight operators have choices of systems and vendors that provide dependable applications in harsh railroad operating environments.

One of the challenges of implementing these PTC test systems on certain segments of track is that all locomotives operating in the territory must be equipped with interoperable PTC equipment, not just the locomotives of the host railroad in the corridor. In many corridors planned for high-speed rail in freight rail rights-of-way, these freight lines serve a number of interstate movements. This will complicate the implementation of PTC on existing rail lines.

Indeed, the Rail Safety Improvement Act of 2008 creates a \$50 million annual authorization for a grant program for deployment of PTC and other new or novel safety technologies in projects that have a public benefit of improved safety and network

efficiency. Specifically, the legislation requires implementation of PTC by 2015 on all Class I railroad main lines:

- Over which intercity passenger rail train service or commuter rail passenger train service is regularly provided; or
- Over which poison- or toxic-by-inhalation hazardous materials are transported.

Crashworthiness and Crash Avoidance. FRA's safety regulation and enforcement activities for freight railroads focus extensively on crash avoidance. In-depth data analysis and research point out factors leading to train crashes and employee casualties, and enforcement and rule-making is aimed at reducing the safety risks associated with those factors. FRA's performance and accountability measures also point to reducing the frequency, severity, and rates of train crashes and injuries. Many recent FRA safety rules are becoming more oriented to risk-based analysis and performance standards (train horn rule and the above-mentioned PTC rule), rather than prescriptive regulations.

However, FRA continues to pay careful attention to survivability and crashworthiness of rolling stock with people on-board – locomotives and passenger cars. The increasing loads on freight trains lead to substantial crash forces that are studied, tested, and modeled extensively, so that locomotives and passenger cars survive those forces and protect the people on-board from serious injury. Since most passenger trains operate in corridors with some level of freight traffic (even the NEC has freight movements), FRA's philosophy has been to ensure that passengers in passenger cars survive impacts with freight trains. This means that United States passenger cars and locomotives are generally heavier than European and Asian counterparts.

Many high-speed rail projects in European and Asian countries are being constructed and operated on special purpose tracks maintained to higher standards and controlled and managed by advanced signal and train control systems. These comprehensive safety and operating systems are put in place so that crash avoidance is the primary focus of safety planning. As a result, these high-speed rail systems have passenger cars and power cars constructed with lighter weight exteriors and lighter body construction. Similarly designed rolling stock, albeit not for 150 mph speeds, if operated in the United States, would be more fuel efficient to operate, and might be easier and less expensive to procure than the limited market offerings for rolling stock that complies with FRA rules.

The FRA has anticipated this systems approach for 150+ mph systems like California, and plans on adopting safety rules of particular applicability in cases where high-speed trains operate on track separate from the freight rail network and controlled by comprehensive safety systems. In other areas where high-speed trains will operate in freight rail corridors, perhaps FRA rules for passenger cars and locomotives could adapt to permit lighter weight construction and advanced crash energy management systems as more PTC systems become available and ubiquitous, reducing some of the primary passenger safety risks. These kinds of considerations would be necessary as states and Amtrak consider new equipment procurements funded by new Federal high-speed rail funding programs. Congressional encouragement of pooled equipment purchases (such as provisions

included in PRIIA), informed by collaborative safety regulatory revisions, also would be helpful in moving passenger equipment safety concerns to crash avoidance.

Multistate Coalitions. A majority of the corridors studied in this report involve multiple states, and many of these states have shared funding for planning efforts and applied state resources to capital projects within their boundaries. Future progress on many of these corridors, even including the Northeast Corridor (NEC), will require capital projects that may be unevenly distributed among states, but that directly benefit the high-speed rail services operated across states. This will require state and Federal legislative and administrative acceptance of pooling state funds, and state allocations of Federal funds for use in projects outside any given state's boundaries.

States may have difficulties pooling resources for projects. Such pooling exists in special purpose regional governments like toll authorities (among projects), transit authorities (for projects in multiple jurisdictions), and multimodal authorities (for toll bridges, transit, and airport facilities). The relative distances between subsidized projects in these cases is 50 to 100 miles at most. What may be required in a NEC or Southeastern high-speed rail corridor, and other linear corridors across state boundaries, is the pooling of one state's resources for a project two states away. Similarly, a Midwest corridor that has Chicago as a hub will require other states to help fund projects that connect their state spokes into the hub in another state.

Federal laws, regulations, and customs need to be flexible enough to accommodate these multistate arrangements. Further, Federal high-speed rail funding programs should clearly encourage these kinds of multistate coalitions. States are unlikely to support Federal efforts to prescribe what legal forms these coalitions will take, as many states objected to the compact construct outlined in the 2005 Bush Administration passenger rail bill proposal. Federal interests in accountability and financial transparency can be accomplished without necessarily requiring a single type of multistate legal arrangement.

Public/Private Benefit Considerations. As the public sector has invested in freight rail properties for projects like the Alameda Corridor in Southern California or the Chicago Region Environmental and Transportation Efficiency Program (CREATE), the public agencies and private companies have carefully assessed the range of costs and which parties would gain which benefits. Railroad movements before and after the capital improvements were modeled to quantify how much the railroads would benefit from improved rail mobility. This information was then used to determine how much the public and private sector parties would contribute to the projects.

In other corridors, public agencies worked with railroad owners to identify the capital improvements necessary to accommodate passenger trains. These capital improvements sometimes will also have operational benefits to freight operations, particularly during times when passenger trains are not operating or doing so less frequently. In many cases, the public agencies and railroads must negotiate which operational models to use, what benefits accrue to which parties, and how to share costs of construction and maintenance.

States and railroads might benefit from standard guidelines for considering public and private benefits for high-speed rail projects on railroad rights-of-way. Such guidelines

would ensure that railroads do not lose capacity, would properly account for the incremental costs of passenger traffic, and would still reflect unique local characteristics. Neither states or railroads should negotiate these matters anew in each corridor under consideration. To accomplish this, the FRA and Surface Transportation Board (STB) could jointly convene a working group of interested parties to develop the guidelines. This would have applications for high-speed rail improvements, as well as public investments in freight-related railroad improvements.

Determination of Access to Railroad Rights of Way. Many public officials see railroad lines as linear corridors useful for transit or intercity rail, sometimes forgetting that the railroads are private property. Officials from most Class 1 freight railroads can tell stories of public officials seeking to add passenger trains or commuter rail to certain freight rail segments with little or no funding for capacity improvements. Many public agency officials can tell stories of meeting with railroads to discuss passenger trains and being met with exceptional estimates of capital improvements, maintenance expenses, and liability protection.

Understanding the financial pressures facing freight railroads and their unique business model, the STB is well qualified to determine access to freight rail lines for high-speed rail purposes and how much such access would cost. Congress could equip the STB with resources to develop access pricing methods and to apply such methods to discussions between the public and private sector.

■ 6.3 Equip and Prepare States for HSR Projects

The preceding sections have outlined the case for Congressional and Federal actions to advance high-speed rail; however, states must prepare to effectively deliver and manage high-speed rail projects, as required by PRIIA. This report recommends a series of actions that states can take in anticipation of an active, funded Federal program.

Careful Planning. States in designated corridors should continue their planning efforts in order to identify the kinds of services that would best service their needs. This planning also should identify how to implement these services in phases and through prioritization of trip time improvements, train frequencies, and station improvements. States should develop corridor business plans that outline financial sources and uses of funds, including careful life-cycle financial analysis of capital and operating costs over the operating life of the project. Federal high-speed rail funding programs can encourage careful planning, much as Federal highway and transit capital programs require it. PRIIA requires careful project planning, state-level rail planning, and connection of these plans to other Federally required transportation planning efforts.

Performance-Based State Fund Allocation. If the Federal government funds high-speed rail projects, and subsequently authorizes surface transportation programs with fewer program set-asides as is recommended by the National Surface Transportation Policy and Revenue Commission, then states are going to be challenged to take advantage of the

funding flexibility offered to them. If Congress creates a more even playing field among modal funding programs, then states need to be prepared to make transportation investments based on performance benefits, rather than through traditional modal silos. This may require state legislative changes to flexibly apply Federal transportation funding among modes. It also will require many states to incorporate performance standards, goals, and measurements into state transportation plans, so that high-speed rail investments can be effectively compared to other transportation system investments.

HSR Performance Objectives. High-speed rail system performance objectives should be a product of the careful state planning discussed above. If states are careful about defining what objectives they have for their high-speed rail projects, these objectives, schedules, and performance metrics can have a wide range of applications. Not only will these objectives point to the nature, scope, and timing of infrastructure improvements, the performance standards will be critical to effective rolling stock procurement. Finally, the standards also will be powerful provisions in operating agreements with railroads and in contracts with firms operating the high-speed rail services for states.

State Skills and Competencies. Many states have built internal organizations with rail-related experience and understanding of passenger and freight railroad issues. These rail organizations will need additional skills in comprehensive planning, project administration and construction management, financial planning and reporting, and consultant contract management. Congress has decreased the cost threshold for requiring major project plans and finance plans for major highway projects, acknowledging the need for special care with very large, expensive projects. As states plan for high-speed rail projects, they should not neglect the important work of internal organizational development to effectively deliver these major projects in a timely and cost-effective manner. PRIIA requires state grant applicants to demonstrate project management capabilities and systems.

■ 6.4 Comparison of Action Items to PRIIA

The report has referenced the newly enacted Passenger Rail Improvement and Investment Act of 2008 (PRIIA) is discussing Key Findings and Action Items. This report concludes with Table 6.1, which summarizes the Action Items detailed in this Section 6.0 and compares them to provisions of PRIIA.

Table 6.1 Comparison of Action Steps to PRIIA

Action Items	PRIIA Provisions
Federal Funding for High-Speed Rail	
Grants: Create comparable Federal funding program	Creates 80/20 capital grant programs for intercity service (\$1.9 billion) and high-speed rail service (\$1.5 billion)
Continuity: Substantial, sustained funding	Multiyear authorizations No appropriations yet
Standards: Grants allocated by performance criteria	Both intercity and high-speed rail programs are competitive programs with performance measures Elsewhere, DOT/FRA are required to work together to establish standard performance metrics for all Amtrak Services
Technology: Funding program should be neutral about speed	Intercity corridor program created without speed restrictions High-speed rail program requires service of at least 110 mph; many states are aiming for 90+ mph service
O&M: Program should be clear about operating support	No operating support provided for intercity corridor or high-speed rail programs 50% of operating costs can count toward local matching fund requirements for intercity program in early funding agreements
Private Participation: Specify a private sector role commensurate with their willingness to take risks	Both intercity and high-speed rail programs authorize participation by freight rail operators Both intercity and high-speed rail programs authorize competitive selection of operators Creates RFP process for private high-speed rail proposals
Resolve Impediments	
PTC: Implement workable PTC system	Rail Safety Improvement Act of 2008 requires PTC on main lines with passenger trains Authorizes grants for PTC implementation and for other safety technologies
Safety: Consider change in FRA equipment safety regulations	Statute creates Next Generation Equipment Pool Engages FRA, Amtrak, states in setting specifications for new equipment No specific instructions on new safety considerations (crash avoidance rather than crash survivability)

Table 6.1 Comparison of Action Steps to PRIIA

Action Items	PRIIA Provisions
Resolve Impediments (continued)	
Coalitions: Encourage multistate coalitions for passenger rail implementation	Cooperative agreements for implementation authorized, not necessarily encouraged Other Federal transportation funds can be used for matching funds
Benefits: Consider guidelines for public and private benefits in high-speed rail capital programs	Both intercity and high-speed rail programs authorize freight railroad financial participation “commensurate with the benefit expected to their operations” State rail plan requirement defines public and private benefits and authorizes the Secretary of Transportation to seek advice on further definition of the terms
Access: STB determination of access issues on freight rail lines	Intercity and high-speed rail programs require grantees to secure agreements with freight rail operators as a grant condition
Equip and Prepare States for High-Speed Rail Projects	
Plans: States should identify phases through corridor planning	State rail plans require identification of projects, linkage with other Federally required plans Intercity and high-speed rail programs require projects to be included in state rail plans
Multimodal: Invest state funds flexibly, not through program silos	No specific flexibility granted in intercity or HSR programs State rail plans require financial plans, which may encourage flexible use of state funds
Objectives: Clarify performance expectations of infrastructure, operators and equipment	State rail plans and program grant applications include performance-based infrastructure improvements Next Generation Equipment Pool would allow for performance-based decisions
Staff: Develop organizational capacity to administer and manage new programs	Intercity program specifically requires project management plans by states, high-speed rail program does not

Appendix A

Fact Sheets



PART 1: CORRIDOR DESCRIPTION

Responsible Agencies/Authorities

- California High-Speed Rail Authority (CAHSRA): governed by a Board of nine members (five appointed by the Governor, two appointed by the Senate Rules Committee, and two by the Speaker of the Assembly). The Authority is responsible for planning, designing, constructing and operating a statewide 220 mph service and has the full range of powers needed, including eminent domain and entering into public-private partnerships. The Authority has been funded by annual legislative appropriations for the last dozen years.

Geographic Description

- An 800-mile high-speed rail (HSR) network is envisioned to link Sacramento and San Francisco with Los Angeles, Irvine, and San Diego through the San Joaquin Valley. (See map at right).
- A Final Programmatic Environmental Impact Report/Statement (EIR/S) for the project was certified in 2005, and most of the alignment and station location decisions were made at that time. The connection between the Bay Area and the Central Valley was left open, and a second programmatic EIR/S was undertaken. The Authority decided on the main HSR crossing via the Pacheco Pass in July 2008.
- Most of the alignment would be in existing transportation corridors, with two sections sharing upgraded facilities with regional services: San Jose to San Francisco on the Caltrain corridor, and Irvine to the Los Angeles Union Passenger Terminal (LAUPT) on the Metrolink/BNSF Railway Company (BNSF) corridor. Local governments have shown interest in the development of the station locations (local investments).



Technology Considered

- Higher speed 90 mph service from Los Angeles to San Diego dates back to the mid-20th century. The Federal Railroad Administration (FRA) Commercial Feasibility Study found that all options for the full California North/South corridor, from incremental to Maglev would have excellent potential.
- The Authority made a thorough study of Maglev and steel-wheel on steel-rail technology and explicitly chose HSR in 1999. The HSR system will be fully grade-separated, use state-of-the-art safety, signaling, and automated control systems, and electrically powered, high-speed, steel-wheel-on-steel-rail rolling stock based on either European or Asian HSR examples, modified as required by Federal and California safety oversight agencies (primarily FRA and California Public Utilities Commission).

Corridor Status

- Governor's budget for 2008-2009 included \$42 million for HSR.
- A \$9.95 billion bond measure on the November 2008 ballot passed, with \$9 billion for implementing high-speed rail and \$950 million for improvements for connecting transit and intercity rail services (with appropriate matching agreements). There are no limits on the right of way (ROW) and construction. Governor Schwarzenegger included it in the priority infrastructure package that was part of his January 2008 budget message.
- Bond language was amended to widen geographical scope, and to incorporate language on funding segments desired by the Governor. CA will continue to advance project-level environmental work, necessary Record of Decision (ROD), design-build or design-build-operate-maintain (DB/DBOM) contracts, and preparation of bid packages.
- Financing/Funding: Preliminary financial plans (in 2006 dollars) completed by IMG/Lehman Bros. Initial phase selected by the Authority for San Francisco to Anaheim:
 - Capital cost approximately \$45 billion (2006 estimate by CAHSRA) for the entire planned system. The core system from San Francisco to Los Angeles/Anaheim is estimated at \$33 billion.
 - Cambridge Systematics forecasts 94 million riders in year 2030 and \$2.3 billion in revenue.
 - Operating cost of \$1.1 billion, net operating surplus of \$1.2 billion.
 - Plan anticipates approximately one-third each in capital from Federal, state, and private sources.
 - Requests for Expressions of Interest (RFEI) sent (in February 2008) to interested construction companies (70 major companies as of yet), infrastructure investment groups, operators, and rolling stock/systems suppliers; Explanatory meeting in Sacramento took place in March. More activity on private involvement likely with passage of bond issue.
 - CAHSRA financial consultants show that private investments are possible, but exact form to be determined.
- Anticipated Service Characteristics
 - Top speed: Design speed of 220 miles per hour, with an express trip time from San Francisco to Los Angeles in 2 hours, 38 minutes.
 - Full system ridership via Pacheco at fare levels roughly half of airfare between Los Angeles and San Francisco, and scaled by distance. Between 93.9 million and 117 million passengers per year depending on the level of auto and air costs assumed (2004 levels to + 50 percent), and annual revenue of between \$3.1 billion and \$3.9 billion by the year 2030.
 - Congestion benefits: Anticipated to be able to divert 5 to 10 percent of auto congestion, which would be a major reduction in traffic.
- Authority continues to advance project implementation
 - Revise Project Financial Plan, work on Federal legislation coalition.
 - Continue preliminary engineering and design, project-level environmental studies (five regional teams, sixth to be added by end of 2008 for Bay Area – Central Valley).
 - Begin ROW preservation in 2009.
- Freight railroads: Contacts made with BNSF and Union Pacific (UP) railroads. BNSF is cooperative, participating in monthly update/issue meetings for LA – Anaheim, and Central Valley. UP has indicated that it does not want to have its operating ROW used, nor have its operations disrupted.



Corridor History

- Following approval of a 1990 bond program, Caltrans began exploring HSR alignments for crossing the Tehachapi Mountains between the San Joaquin Valley and Los Angeles.
- Federally designated as a high-speed corridor in 1992, updated designation in 2000.
- In 1993, the Legislature directed Caltrans to prepare a 20-year high-speed intercity ground transportation plan and called for construction “to commence on a Los Angeles to San Francisco Bay Area High-Speed Ground Transportation Corridor by the year 2000,” with the system linking Sacramento, Orange County, San Diego and San Bernardino/Riverside by 2020.
- The California High-Speed Rail Act of 1996 established the Authority.

Political and Public Perception

- **Feasibility:** Political support has steadily grown at the state level. Strong support from Bay Area institutions, southern San Joaquin entities, statewide business and environmental groups. Endorsements from Mayors of Los Angeles, San Francisco, San Jose, Anaheim and many others. Silicon Valley Leadership Council endorsed, with Southwest Airlines abstaining. No concerted opposition, except that Bay Area – Central Valley route selection via Pacheco has upset northern San Joaquin/Sacramento entities, but Authority is working to develop funding for the alternative Altamont corridor to strengthen coalition.
- **Public Context:** Increasing gasoline prices, global warming concerns contribute to the growing perception that HSR would be a good solution; recession and year-to-year budget shortfalls amplify concerns over high price. (Same increase in capacity in highways and air facilities would cost three times as much per Programmatic EIR/S.) Independent campaign committee established by private sector groups (led by Association for California High-Speed Trains) supported passage of successful November 2008 bond election.

PART 2: AGENCY DISCUSSIONS

- Elements that will contribute to project success
 - Realize California’s potential for economic growth.
 - Anticipated combined Federal, state, and private support and financing of proposed system.
 - With passage of ballot issue in November 2008, California will demonstrate the need for a Federal funding commitment to accompany the authorizations in the Passenger Rail Improvement and Investment Act (PRIIA).
 - California plans to start with manageable segments and build in phases.
 - Building support in a grass-roots fashion.
 - Making sure California High-Speed Rail (CA HSR) is integrated with other transit modes (station locations, airport feeder service, international travel hubs, etc)
- Issues and concerns
 - Consideration of statewide multimodal transportation solutions, including the HSR/air travel market niches.
 - Further definition/commitment of Federal and private sector support for the CA HSR program
 - The Authority expects that the public sector will shoulder the early steps– regulatory approval, environmental clearance, permitting, financial planning, and will pay for approximately two-thirds of the capital cost. After this is in place, the private sector is expected to shoulder risks related to timely construction, technology performance, some of the construction cost risk, and perhaps some of the revenue risk. The state may have to guarantee revenue for some period of time.

Fact Sheet

California High-Speed Rail Corridor

PART 3: EVALUATION CRITERIA

California (HSR)

Corridor Descriptions

How have services been improved?	Not implemented
Preparations for 125+ mph service?	Yes (220+)
Progress of environmental clearance?	Program EIS
How sustained a corridor effort?	High (11/08 Bond)
Has rail market share increased?	No (New ROW)
Have state funds been used in corridor?	Yes
Clear purpose and planning for corridor?	High
Is there uniformity of effort across the corridor?	High (CAHSRA)

Corridor Challenges

Availability of passenger equipment?	Medium
Experimenting with PTC Systems?	Yes
Plans for private sector involvement?	Yes (one-third public-private partnerships)
Leadership by DOT/Elected Officials?	High ¹
Federal funds applied to corridor?	Yes
Relative freight/passenger activity in corridor?	Passenger only (Exclusive ROW)
New right of way needed?	Yes
Do corridors connect to transit/aviation systems?	Yes (ONT, SFO, CalTrain)

Corridor Benefits

HSR effects on highway/air congestion?	Estimated
Is HSR expected to reduce emissions?	Estimated
Will HSR offer corridor economic impacts?	Estimated
Will HSR offer trip time savings to motorists?	Estimated
Will HSR stations attract economic activity?	Estimated

Sources:

1. Web site: <http://www.cahighspeedrail.ca.gov>.
2. CAHSRA published materials.
3. Interview with Medhi Morshed, Executive Director, CAHSRA, May 2008.

¹ CAHSRA is a separate cabinet agency from Caltrans.



Chicago Hub Network High-Speed Rail Corridor



PART 1: CORRIDOR DESCRIPTION

Responsible Agencies/Authorities

- Chicago HUB Network involves two coalitions:
- Midwest Regional Rail Initiative (MWRRI):
 - Illinois DOT.
 - Indiana Department of Transportation.
 - Iowa Department of Transportation.
 - Michigan Department of Transportation.
 - Minnesota Department of Transportation.
 - Missouri Department of Transportation.
 - Nebraska Department of Roads.
 - Ohio Rail Development Commission.
 - Wisconsin Department of Transportation.
 - Amtrak.
- Ohio and Lake Erie Regional Rail System (Ohio Hub):
 - Ohio Rail Development Commission.
 - Indiana Department of Transportation.
 - Michigan Department of Transportation.
 - New York Department of Transportation.
 - Pennsylvania Department of Transportation.
 - Amtrak.
 - VIA Rail.



Additional Details:

The MWRRI is guided by a steering committee of Amtrak and nine states, with project leadership by the Wisconsin Department of Transportation (WisDOT). The MWRRI links with the Ohio Hub, which is guided by a steering committee of Amtrak, VIA Rail, Canada, and five states, with project leadership by the Ohio Rail Development Commission (ORDC). Because these systems together comprise the full Chicago Hub Network designated by the USDOT, this fact sheet covers both projects.²

Geographic Description

- The MWRRI serves nine states over a 3,000-mile network radiating from Chicago. The core system of five corridors serves major cities in Illinois, Indiana, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. Additional lower speed corridors and extensions serve other cities in Illinois, Iowa, and Missouri.
- The Ohio Hub serves portions of five states over a 1,200-mile network radiating from Cleveland. The system includes the “3-C” corridor between Cleveland, Columbus, and Cincinnati.
- The combined 2000 population of the metropolitan areas served by the MWRRI and the Ohio Hub systems is more than 44 million.³

² Note that the Indianapolis-Louisville segment, designated in 2000, is not included in the current MWRRI business plan.

³ Based on 2000 Census metropolitan statistical area (MSA) population of regions with central cities served by proposed rail stations.

Chicago Hub Network High-Speed Rail Corridor



Technology Considered

- The Chicago Hub Network systems are proposed to operate primarily on upgraded track in existing freight railroad corridors at speeds of up to 110 mph.
- The system is proposed to use diesel-powered trains, such as diesel multiple unit⁴ (DMU) vehicles or locomotive-hauled coaches with tilt technology. The Talgo train, as operated on the Amtrak Cascades service in the Pacific Northwest, is used as a generic example for costing purposes in the feasibility studies.

Corridor Status

- Feasibility studies have been completed for both systems. The MWRRI business plan was prepared in 2004, including an assessment of track improvement needs, development of operating plans, evaluation of station locations, preliminary capital and operating cost estimates, ridership and revenue forecasts, implementation phasing plan, financial cash flow analysis, and an assessment of economic benefits. A similar study for the Ohio Hub was completed in 2007. Both studies were conducted by a consulting team comprised of Transportation Economics and Management Systems, Inc. (TEMS) and HNTB Corporation; therefore, there is some consistency in technical and policy assumptions.
- Project design:
 - Engineering has been completed at a conceptual level, including field studies of existing track conditions and passenger facilities. Conceptual cost estimates have been prepared for track upgrades, curve reduction, grade separation and crossing protection, signal systems, and passenger facilities. Preliminary operating plans have been developed and evaluated using rail traffic simulation software to estimate freight impacts, infrastructure needs, travel times, and rolling stock requirements. Vehicle technology options have been evaluated, but no decision has been made on rolling stock.
 - More detailed work is expected to be conducted in a future Programmatic Environmental Impact Statement (PEIS) phase.
- Financing/funding:
 - The total capital cost of the MWRRI is estimated to be \$7.7 billion (2002 dollars). The total capital cost of the Ohio Hub system is estimated to be \$4.7 billion (2002 dollars).
 - The business plans assume that each state will implement their portions of the systems, with Federal funding expected to cover up to 80 percent of the capital costs.
- Anticipated service characteristics:
 - Core corridors (routes on map above) up to 110 mph, other corridors at 79 mph or 90 mph.
 - Train capacity is 300 seated passengers.
- Economic benefits:
 - The MWRRI system is forecast to generate 57,450 permanent jobs. The Ohio Hub system is forecast to generate 16,700 permanent jobs.
 - The MWRRI is forecast to stimulate up to \$4.9 billion (2002 dollars) of station-area development. The Ohio Hub system is forecast to stimulate up to \$2.9 billion (2005 dollars) of station-area development.
 - Both systems yield benefit/cost ratios greater than 1.4, including benefits to users of the system and other modes, operators of other modes, and emissions reductions.

⁴ Diesel multiple unit refers to a train with train cars powered by one or more on-board diesel engines.

Chicago Hub Network High-Speed Rail Corridor



Corridor History

- The Midwest corridor was the first of the original five high-speed rail corridors designated under the Intermodal Surface Transportation Efficiency Act (ISTEA), designated on October 15, 1992. The original corridor definition included three spokes from Chicago to Detroit, Milwaukee, and St. Louis.
- The Transportation Equity Act for the 21st Century (TEA-21) extended the Milwaukee segment to Minneapolis-St. Paul, which was officially designated on December 11, 1998.
- The Chicago-Indianapolis-Cincinnati spoke was added to the Midwest corridor on January 28, 1999.
- The Chicago-Toledo-Cleveland spoke and the Cleveland-Columbus-Cincinnati (“3-C”) corridor were added on October 11, 2000. The Indianapolis-Louisville link was also added on this date.
- The St. Louis spoke was extended to Kansas City on January 19, 2001.

Implementation Activities:

Since its designation in the early 1990s and subsequent periodic expansion, the member states have conducted feasibility studies, prepared environmental documentation, and made investments in the corridor, including:

- The MWRRI plan has developed through a series of feasibility studies, including studies of individual segments, an initial system assessment in 1998, a business plan in 2000, an updated business plan in 2004, and an economic impact analysis in 2006.
- The Ohio Hub plan has developed through the Cleveland-Columbus-Cincinnati High-Speed Rail Study in 2001, a system study in 2004, a business plan in 2007, and two independent economic impact analyses in 2007.
- Wisconsin has developed an environmental impact statement (EIS) for the Milwaukee-Madison segment, which involves a major upgrade of existing track. The National Environmental Policy Act (NEPA) process was completed with a Finding of No Significant Impact (FONSI) in 2004.
- Illinois funded the addition of four-quadrant gates, upgraded to a Federal Railroad Administration (FRA) Class VI track, and currently is installing a conventional cab signal system along 120 miles of the Chicago-St. Louis spoke to permit 110 mph operation.
- Amtrak has installed the Incremental Train Control System (ITCS) along 80 miles of the Chicago-Detroit spoke to eventually allow for 110 mph operation (currently 95 mph).

Political and Public Perception

- The project is generally perceived as a means to better unify the Midwest economic region and provide a viable alternative to highway, rail, and air travel, especially between cities less than 300 miles apart.
- There is widespread political and public support for the system. Several states, notably Wisconsin, Illinois, and Michigan, have used their own resources to begin making rail infrastructure upgrades. Dozens of communities have sent letters or passed resolutions in support of the MWRRI or the Ohio Hub.
- However, progress is expected to be slow until a Federal rail investment program emerges.

PART 2: AGENCY DISCUSSIONS

- Elements that will contribute to project success:
 - New stations being added and rehabilitated are leading to increased passenger rail ridership. The new rail station on the grounds of the Milwaukee’s General Mitchell Airport is also a boon for the Midwest network.
 - Ridership success is driven by more train frequencies, good on-time performance, provision of choice for consumers facing rising gas costs and highway congestion.

Fact Sheet

Chicago Hub Network High-Speed Rail Corridor

- Much of the market for high-speed rail (HSR) in this corridor will be auto travelers. However, connections to airports may allow for HSR to collect and distribute passengers, lessening short-haul trips taking up runway space.
- Issues and concerns:
 - Need for a workable, practical Positive Train Control (PTC) system to enable operations at 110 mph.
 - HSR corridors need assistance in calculating public and private benefits from public investments in freight rail lines.

PART 3: EVALUATION CRITERIA

Chicago Hub Network

Corridor Descriptions

How have services been improved?	Frequency, travel time
Preparations for 125+ mph service?	No
Progress of environmental clearance?	No Program EIS
How sustained a corridor effort?	High
Has rail market share increased?	Yes
Have state funds been used in corridor?	Yes
Clear purpose and planning for corridor?	High
Is there uniformity of effort across the corridor?	Medium

Corridor Challenges

Availability of passenger equipment?	Medium
Experimenting with PTC Systems?	Yes
Plans for private sector involvement?	Yes
Leadership by DOT/Elected Officials?	High
Federal funds applied to corridor?	Yes
Relative freight/passenger activity in corridor?	Mixed Traffic
New right of way needed?	Portions
Do corridors connect to transit/aviation systems?	Yes (MKE, CTA, Metra)

Corridor Benefits

HSR effects on highway/air congestion?	Estimated
Is HSR expected to reduce emissions?	Estimated
Will HSR offer corridor economic impacts?	Estimated
Will HSR offer trip time savings to motorists?	Estimated
Will HSR stations attract economic activity?	Estimated

Sources:

1. Midwest Regional Rail Initiative. *Project Notebook*. June 2004.
2. Ohio and Lake Erie Regional Rail Ohio Hub Study. *Technical Memorandum and Business Plan*. July 2007.
3. Midwest Regional Rail Initiative. *Benefit/Cost and Economic Analysis*. TEMS, Inc., November 2006.
4. Ohio Rail Development Commission. *Ohio Hub Passenger Rail Economic Impact Study*. TEMS, Inc., May 2007.
5. Ohio Rail Development Commission. *Ohio Hub Economic Impact Analysis*. GEM Public Sector Services, September 2007. Documents 1-5 available at <http://www.dot.state.oh.us/ohiorail/Ohio%20Hub/Website/ordc/theproject.html>.
6. United States Department of Transportation. *High-Speed Rail: Corridor Chronology*. Available at <http://www.fra.dot.gov/us/content/1272>.
7. Interview with Randy Wade, Wisconsin DOT, April 2008.





PART 1: CORRIDOR DESCRIPTION

Responsible Agencies/Authorities

- New York State Senate High-Speed Rail Task Force plays leadership role.
- Participating stakeholders include Amtrak, Capital District Transportation Authority (CDTA), CSXT, and New York State Department of Transportation (NYSDOT).

Geographic Description

- West Corridor: Buffalo to Albany (319 miles).
- South Corridor: Albany to New York City (141 miles).
- Major population centers served, in addition to termini: Rochester, Syracuse, Utica.

Technology Considered

- Incremental high-speed rail improvements in five phases over 10-year period. New High Speed Ground Transportation (HSGT) fixed guideway or Maglev service envisioned after 2025.

Corridor Status

- Feasibility:
 - Short- and mid-term improvements (2006-2015):
 - New operating agreements with CSXT and Amtrak.
 - Increased capacity (signals, track, and increased frequency of service).
 - 95 percent on-time performance (OTP) b/w NYC and Albany, and 90 percent OTP b/w Albany and Buffalo by 2015.
 - Very High Speed Rail (VHSR)/Maglev service implemented after 2025.⁵
- Percent Design:
 - Planning stages only with aggressive action plan.
 - Conceptual improvement plans.
- Estimated costs:
 - South Corridor: \$1.18 billion.
 - West Corridor: \$613 million.
 - VHSR/Maglev: \$8 to 10 billion.
- Roughly 3 million annual riders by 2015:
 - 160 percent increase over existing (2006) ridership levels.
- Funding:
 - Over \$300 million in the last 10 years.



⁵ Phased program is pending available funding.

Fact Sheet

Empire High-Speed Rail Corridor

- \$22 million in HSR (NYC Task Force through NYSDOT appropriations) funding in 2006-2007.
- Five-year, \$100 million Rail Freight and Passenger Rail Assistance Program (Statewide).
- Over \$3 million for new 2-hour Albany-New York Express service. Currently investigating Albany-Buffalo.
- A permanent funding mechanism/strategy (capital and operations) has not been developed.
- Federal funding is critical, more than the current \$30 million program with a 50 percent match. There is a need for a sound analysis such as a Statewide Transportation Improvement Program (STIP)⁶.
- Anticipated Service Characteristics:
 - Top speed: 110 mph.
 - Trip times (estimated 2015):
 - South Corridor: 1 hour, 55 minutes.
 - West Corridor: 5 hours, 10 minutes.
 - Trips:
 - Albany-New York: 2 million trips.
 - Albany-Buffalo: 500,000 trips.
- Economic Benefits:
 - State economic output would increase by roughly \$4 billion.
 - Household income would increase by over \$1 billion over 20 years.
- Environmental Benefits:
 - By 2015: 545.4 tons of reduced emissions.
 - Maglev/VHSR: 2,158.1 tons of reduced emissions.
 - Other associated air quality benefits commensurate with increased use of passenger rail service.

Corridor History

- Officially designated as HSR corridor under the Transportation Equity Act for the 21st Century (TEA-21).
- 110 mph service already operating along segments between Schenectady and New York.



⁶ The Passenger Rail Investment and Improvement Act (PRIIA) requires state rail planning to be integrated with statewide transportation planning.



Political and Public Perception

- Strong state-level support:
 - Recommended creation of new State Railway Authority to manage program.
- Significant planning and investment by NYSDOT for decades.
- New York's plan envisions a longer-term integrated rail network that covers much of the State.

PART 2: AGENCY DISCUSSIONS

- Corridor success elements:
 - Determining factors, in order of importance, are: 1) population; 2) trip-making purposes; 3) city pair distances (such as 141 miles for New York-Albany); 4) multimodal congestion, significant automobile congestion; 5) competitive railroad alignments; 6) excellence in engineering and operations, reliability to keep costs down; 7) development and execution of sound business plan (cost-effective and incremental improvement plan); 8) leadership; 9) finances.
 - Project provides relief to aviation industry; short flights were responsible for 42 percent of the State's airport capacity.
- Corridor challenges:
 - No Federal intercity rail grant program until recent authorization; funding required as well.



PART 3: EVALUATION CRITERIA

Empire

Corridor Descriptions

How have services been improved?	Travel time, equipment
Preparations for 125+ mph service?	Yes (South Corridor only)
Progress of environmental clearance?	Planning/Feasibility only
How sustained a corridor effort?	High (NYS/Amtrak)
Has rail market share increased?	Yes
Have state funds been used in corridor?	Yes
Clear purpose and planning for corridor?	High
Is there uniformity of effort across the corridor?	High

Corridor Challenges

Availability of passenger equipment?	Medium
Experimenting with PTC Systems?	Yes
Plans for private sector involvement?	No
Leadership by DOT/Elected Officials?	High (NYSDOT, Sen. Bruno)
Federal funds applied to corridor?	Yes
Relative freight/passenger activity in corridor?	Mixed Traffic
New right of way needed?	No
Do corridors connect to transit/aviation systems?	Yes (MTA)

Corridor Benefits

HSR effects on highway/air congestion?	Estimated
Is HSR expected to reduce emissions?	Estimated
Will HSR offer corridor economic impacts?	Realized
Will HSR offer trip time savings to motorists?	Realized
Will HSR stations attract economic activity?	Realized

Sources:

1. Interview with Karen Rae, NYS DOT, April 2008.
2. New York Senate High-Speed Rail Task Force Action Program, 2006.
3. Mineta Transportation Institute. *High-Speed Rail Projects in the United States: Identifying the Elements for Success.* October 2005.



PART 1: CORRIDOR DESCRIPTION

Responsible Agencies/Authorities

- Florida Department of Transportation (FDOT).
- Florida High-Speed Rail Authority (FHSRA), which is legally intact, but unfunded and inactive.

Geographic Description

- Corridor designation identifies Miami to West Palm Beach to Orlando, and then to Lakeland and Tampa.
- Current FDOT “Vision Plan” identifies two intercity passenger routes: Coastal Route, from Miami to Jacksonville along the Florida East Coast Railway (FEC) with new location from Cocoa to Tampa; and the Inland Route along CSX lines.
- 11.7 million people live within 50 miles of designated corridor.

Technology Considered

- FHSRA was considering a private sector proposal for Bombardier gas turbine locomotives at 120 mph and Acela-type trainsets.
- Previous private proposals had contemplated more traditional TGV equipment.
- FDOT is currently looking at 125 mph grade-separated service in the Orlando-Tampa corridor studied by FHSRA, and 110 mph and 79 mph services in other corridors.



Corridor Status

- A draft 2006 FDOT Report⁷ reported that 2020 system route revenues covered operating expenses (operating ratio of between 1.34 and 1.38, and a benefit/cost ratio of 1.5 to 1.8).
- Capital costs for Phase 3 implementation range from \$3.5 to \$4.7 billion.
- No formal engineering studies have been completed, although the Tampa to Orlando route for HSR along the IH 4 ROW has received a final Environmental Impact Statement (EIS), but not a Record of Decision (ROD), in 2005.
- \$18 million in state and Federal funds have been invested in the FHSRA effort prior to its demise in 2005. No other state rail funding programs have been identified.
- New trainsets operating on 110/125 mph tracks are proposed for 2020 system, with 5 to 8 daily frequencies between major city pairs.
- Total annual passengers in 2020 range from 4.4 to 5.7 million, producing \$175 to \$211 million revenues.
- Economic Benefits:

⁷ Florida Intercity Passenger Rail “Vision Plan” Prepared for Florida Department of Transportation, 2006 Draft.

Fact Sheet

Florida High-Speed Rail Corridor

- 2006 study estimates that 2020 system would produce 2,000 rail-related jobs, 30,000 other new jobs, \$800 million in increased personal income, and \$3.5 billion in station-related development.

Corridor History

- Earliest HSR studies date back to 1976.
- Tampa-Orlando-Miami corridor included in the original five high-speed corridors designated by the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1992.
- In 2000, Florida voters approved an amendment to the State Constitution that mandates the construction of a high-speed transportation system for the State:
 - Amendment requires the use of train technologies operating at 120+ mph on dedicated right-of-way (ROW).
- Amendment repealed in 2004 referendum:
 - FHSRA is still in effect, pending any action that the Florida Legislature may choose to take in the future (none to date).
- FDOT incremental Vision Plan Report produced in 2006.

Political and Public Perception

- Project sponsors in 2000 secured popular vote to mandate construction of high-speed rail. FHSRA maintained momentum and state funding for four years, until new Governor took office.
- State funding for FHSRA plans cut in 2004:
 - Coincides with 2004 repeal of 2000 Constitutional Amendment.

PART 2: AGENCY DISCUSSIONS

- Elements that will contribute to project success:
 - Link major population centers at a distance of 250 to 400 miles, if 98 percent of intercity Florida trips over 70 miles are made by auto. Diverting 8 to 10 percent of those auto trips would provide a steady income stream for high-speed rail.
 - Trip times need to be comparable to divert auto travel, but frequency and reliability of passenger rail service is critical to keep the market.
 - High-speed rail needs to connect to intermodal centers with rental cars and urban transit services to collect and deliver passengers.
- Issues and concerns:
 - Federal funding partner is very important; long-term development of high-speed rail too difficult to sustain and fund in state political environment.
 - Freight rail owners are unlikely to share rail lines with passenger trains as their own networks become more crowded; liability issues with freight rail owners have to be addressed instead of through project by project negotiations.
 - Many states have created high-speed rail authorities to overcome DOT resistance, inaction, or inattention.

Florida Intercity Rail: Inland Route



Fact Sheet

Florida High-Speed Rail Corridor



PART 3: EVALUATION CRITERIA

Florida

Corridor Descriptions

How have services been improved?	No erosion of service
Preparations for 125+ mph service?	3 past attempts; currently no
Progress of environmental clearance?	Final EIS on Orlando-Tampa
How sustained a corridor effort?	High
Has rail market share increased?	No
Have state funds been used in corridor?	Yes
Clear purpose and planning for corridor?	Medium
Is there uniformity of effort across the corridor?	Medium

Corridor Challenges

Availability of passenger equipment?	Low
Experimenting with PTC Systems?	No
Plans for private sector involvement?	No
Leadership by DOT/Elected Officials?	Medium
Federal funds applied to corridor?	Yes
Relative freight/passenger activity in corridor?	Mixed traffic
New right of way needed?	Portions
Do corridors connect to transit/aviation systems?	No

Corridor Benefits

HSR effects on highway/air congestion?	Estimated
Is HSR expected to reduce emissions?	Expected
Will HSR offer corridor economic impacts?	Expected
Will HSR offer trip time savings to motorists?	Estimated
Will HSR stations attract economic activity?	Expected

Sources:

1. U.S. DOT *High-Speed Ground Transportation for America*, 1997.
2. Mineta Transportation Institute. *High Speed Rail Projects in the United States: Identifying the Elements for Success*. October 2005.
3. Florida DOT. *Florida Intercity Passenger Rail "Vision Plan"* August 2006.
4. Florida DOT. *2006 Florida Freight and Passenger Rail Program*. February 2007.
5. Interview with Nazih Haddad, Florida DOT, April 2008.



Gulf Coast High-Speed Rail Corridor



PART 1: CORRIDOR DESCRIPTION

Responsible Agencies/Authorities

- Southern High-Speed Rail Commission (formerly Southern Rapid Rail Transportation Commission) representing three states:
 - Alabama
 - Mississippi
 - Louisiana
 - Staffed by the New Orleans Regional Planning Commission

Additional Details:

- The Southern High-Speed Rail Commission (SHSRC) was formed to study the feasibility of rapid rail transit service between the states of Alabama, Louisiana, and Mississippi.
- SHSRC membership consists of the Governor of each party state; one representative from the Louisiana DOT, Mississippi DOT, and Alabama DOT; and five other citizens of each party state appointed by state Governors.
- Any state contiguous to any member state may become a party to this compact, subject to approval by the legislature of each of the member states.



Geographic Description

- The 1,022-mile Gulf Coast High-Speed Rail Corridor links major cities in five states. The proposed corridor can be divided into three major segments connecting: Houston, TX to New Orleans, LA along BNSF Railway Company (BNSF) and/or Kansas City Southern (KCS) and Canadian National Railway (CN); New Orleans, LA to Mobile, AL along CSX; and New Orleans, LA to Atlanta, GA along Norfolk Southern (NS).
- 17.1 million people live within 50 miles of the designated corridor.

Technology Considered

- The Gulf Coast High-Speed Corridor is proposed to operate primarily on upgraded track in existing railroad corridors at speeds of up to 110 mph.
- Non-electric trains, such as Diesel Multiple Units⁸ (DMU), have been proposed for use in the corridor.

Corridor Status

- Existing service in the Gulf Coast High-Speed Rail Corridor includes two long-distance Amtrak routes, the Crescent and the Sunset Limited. The Crescent provides daily round trips between New Orleans and New York. The Sunset Limited provides tri-weekly round trips between Los Angeles and Orlando via Texas and

⁸ Diesel multiple unit refers to a train with train cars powered by one or more on-board diesel engines.

Gulf Coast High-Speed Rail Corridor

along the Gulf Coast, though service east of New Orleans has been suspended since Hurricane Katrina. In addition, Amtrak's City Of New Orleans trains #58 and #59 provide daily service between New Orleans and Chicago via Jackson and Memphis, MS.

- Corridor development plans are conducted in phases according to available funding. Phase I, covering the segment between New Orleans, LA to Meridian, MS was completed, focusing on speed and capacity improvements. Phase II, covering the segment between New Orleans, LA and Mobile, AL was completed in late 2006 and is currently under review. Additional funding has been requested for Phase III from Lake Charles, LA to Meridian, MS and future phases extending from Houston, TX to Atlanta, GA.
- Phases I and II of the Gulf Coast Corridor Development Plan identified \$114 million to implement the segment from New Orleans, LA to Meridian, MS and \$260 million to \$450 million for the segment between New Orleans, LA and Mobile, AL. In addition, the proposed new service between New Orleans and Baton Rouge, LA will require \$55 million capital investment.⁹
- Incremental improvements are, not advanced technologies, are being advanced in the corridor.

Corridor History

- Public Law 97-213 passed in June 1982 enabled the formation of the Louisiana-Mississippi-Alabama Rapid Rail Transit Commission, now the SHSRC.
- The Gulf Coast High-Speed Rail Corridor was officially recognized as a Federal high-speed rail corridor under the Transportation Equity Act for the 21st Century (TEA-21) in 1998.

Additional Details:

- Federal appropriation requests have been submitted for capital improvement projects in Mississippi, Louisiana, and Alabama. Intercity passenger rail is proposed between Baton Rouge and New Orleans, LA to facilitate travel by individuals displaced by Hurricane Katrina. In Mississippi and Alabama, appropriations have been requested for grade separation projects.

Political and Public Perception

- Relative to other high-speed rail corridors, ridership projections are low and interviewees feel it has been difficult to obtain Amtrak support to increase service in the corridor.
- Limited information about the corridor available electronically.

PART 2: AGENCY DISCUSSIONS

- Elements that will contribute to project success:
 - Sustained level of effort from SHSRC member states to support planning work over an extended period of time; Governors have appointed active members (business community, not rail fans) to Commission.
 - HSR is best to connect major population centers, not necessarily create a national connectivity system.
 - HSR rail advocates need to prepare the following kinds of information to advance projects:
 - Corridor studies that identify ranges of investments necessary to reduce trip times, increase frequencies and reliability of service.
 - Studies that demonstrate specific economic benefits accruing from high-speed rail, particularly job creation and property values.

⁹ *Gulf Coast High-Speed Rail Corridor Congressional Briefing Information.* Southern Rail Rapid Transit Commission, March 2007.

Fact Sheet

Gulf Coast High-Speed Rail Corridor



- Business plan to describe how the high-speed rail service will be operated.
- Issues and concerns:
 - Freight railroads will be difficult to convince to share rail lines with passenger trains. SHSRC members contend that Federal investment programs for freight rail capacity should be conditioned on allowing passenger service on improved facilities.
 - A new national transportation policy is needed that focuses on intermodal transportation and integrated land use considerations.
 - A Federal HSR funding program is necessary, with matching funds comparable to other Federal programs, so that states will be able to leverage state dollars in HSR projects.

PART 3: EVALUATION CRITERIA

Gulf Coast

Corridor Descriptions

How have services been improved?	N/A
Preparations for 125+ mph service?	No
Progress of environmental clearance?	Feasibility only
How sustained a corridor effort?	High
Has rail market share increased?	No
Have state funds been used in corridor?	No
Clear purpose and planning for corridor?	Medium
Is there uniformity of effort across the corridor?	Medium

Corridor Challenges

Availability of passenger equipment?	Low
Experimenting with PTC Systems?	No
Plans for private sector involvement?	No
Leadership by DOT/Elected Officials?	Medium
Federal funds applied to corridor?	Yes
Relative freight/passenger activity in corridor?	Mixed traffic
New right of way needed?	No
Do corridors connect to transit/aviation systems?	No

Corridor Benefits

HSR effects on highway/air congestion?	Expected
Is HSR expected to reduce emissions?	Expected
Will HSR offer corridor economic impacts?	Estimated
Will HSR offer trip time savings to motorists?	Estimated
Will HSR stations attract economic activity?	Expected

Sources:

1. U.S. DOT *High-Speed Ground Transportation for America*, 1997.
2. Gulf Coast High-Speed Rail Corridor Congressional Briefing Information. SRRTC, March 2007.
3. Interview with Karen Parsons, SHSRC Executive Director, Hon. John Robert Smith, Col. Tom Atkinson SHSRC Board Members, April 2008.





PART 1: CORRIDOR DESCRIPTION

Responsible Agencies/Authorities

- Pennsylvania Department of Transportation (PennDOT) and State of Pennsylvania, Federal Railroad Administration (FRA)/Federal Highway Administration (FHWA).
- Amtrak: Line owner and operator for Harrisburg to Philadelphia segment.
- Norfolk Southern (NS): Line owner and operator for Pittsburgh to Harrisburg segment.

Additional Details:

- Southeastern Pennsylvania Transportation Authority (SEPTA) Regional Rail operates on the Keystone Corridor between 30th Street Station and Thorndale, Pennsylvania.
- NS operates local freight service on the corridor.
- Current Amtrak service:
 - Keystone: Harrisburg to New York.
 - Pennsylvanian: Pittsburgh to New York.



Geographic Description

- Electrified along 104 miles between Harrisburg and Philadelphia.
- Direct track access to Center City Philadelphia and to Midtown Manhattan via the Northeast Corridor (NEC) Main Line.
- Major population centers served, in addition to termini: Lancaster, Altoona, and multiple suburban Philadelphia communities.

Technology Considered

- Incremental improvements over existing rights of way (ROW):
 - Improvements to track and ties, bridges, upgrade of catenary, improvements to pedestrian underpasses and ROW retaining walls, installation of continuous welded rail, and upgraded communications and signals equipment.
- ROW electrification, operation of AEM7 electric locomotives in push-pull configuration with rebuilt Metroliner cab cars for Keystone service.

Corridor Status

- Completion of these upgrades, the first of these systems in over 70 years, caps an extensive effort by the Federal agencies, Amtrak, State of Pennsylvania, SEPTA, and NS. The upgrade marks a return of electric service to the line. A follow-up program, Keystone II, is currently being planned.
- Financing/funding:
 - Costs (Harrisburg to Philadelphia): \$145.5 million:
 - Funding split between Amtrak and PennDOT.
- Service characteristics:
 - 95-minute express trains between Harrisburg, Lancaster, and Philadelphia, a 30-minute improvement.
 - Local service improved to 105 minutes between Harrisburg and Philadelphia:
 - 110 mph top speed on Harrisburg to Philadelphia segment.
 - Auto and cost-competitive at 2 hours.
 - Work underway to implement a sealed corridor (only three crossings to close between Harrisburg and Philadelphia.).
- Economic benefits:
 - Philadelphia 30th Street Station serves more than 3.5 million riders annually. Modern transportation infrastructure in the busy, congested area of southeastern Pennsylvania both supports economic development and improves quality of life.
- Environmental benefits:
 - The operation of emission-free (electric) trains linking Harrisburg with the urban centers of Philadelphia and New York.

Corridor History

- Philadelphia to Harrisburg designated as HSR corridor under the Transportation Equity Act for the 21st Century (TEA-21). Harrisburg to Pittsburgh extension designated in 2000.
- The line was originally part of Pennsylvania Railroad's main line:
 - In 1968, Pennsylvania Railroad merged with New York Central to become Penn Central.
 - In 1970, Penn Central declared bankruptcy.
 - In 1976, Amtrak took ownership of the Harrisburg-New York route.

Political and Public Perception

- The 104-mile Keystone Corridor is one of Amtrak's most popular routes. This route draws a million riders a year.
- 2007 saw a 20-percent increase in ridership on trains along the Keystone Corridor.

PART 2: AGENCY DISCUSSIONS

- Corridor success elements:
 - Latest rail plan was February 2003, but it is being updated every six months. To advance towards becoming a high-speed rail corridor, 150 mph capable equipment was installed.
 - Local hands-on leadership, state access to the DOT Secretary and FRA to provide continuity, and interest from Amtrak, are key.

Keystone High-Speed Rail Corridor



- True high-speed rail is a closed corridor, connecting intercity points with few freight interactions. The speed is a minimum of 90 mph (electric), allowing it to be highly competitive with other modes of transportation.
- HSR project increases ridership, reduces congestion, provides economic development opportunities, contributes to improved land use planning (houses, businesses, central communities).
- Use interstate right-of-way where possible, as well as Maglev system; begin creating high platforms.
- Create energy and public transportation legislation (energy transmission corridors).
- Top items important to developing high-speed rail services are 1) trip-making purposes; 2) railroad alignments reasonably suitable for high-speed running; 3) excellence in engineering, operations, reliability; 4) hopeless automobile congestion; and 5) finances.
- Corridor challenges:
 - Elected leaders are not sufficiently educated regarding high-speed rail. Most are not rail-oriented and are not familiar with Maglev technology; some are not aware of existing Amtrak train service in the Keystone corridor.
 - There has been no large commitment to public works since the Eisenhower Administration's focus on the interstate highway system. There is a need to make public works a priority, to maintain what we have, and to still rebuild this nation (sewers, bridges, and high-speed rail).
 - The FRA needs to broaden its focus from a largely safety-related orientation.
 - Need a Federal/state partnership of 80/20 or 90/10. The Passenger Rail Investment and Improvement Act (PRIIA) created an 80-20 program, subject to future funding.
 - Longevity and expertise of assigned staff is very important.
 - More than \$9 billion in Federal funding is needed for national corridors.



PART 3: EVALUATION CRITERIA

Keystone

Corridor Descriptions

How have services been improved?	Frequency, travel time, equipment
Preparations for 125+ mph service?	No
Progress of environmental clearance?	No EIS Needed
How sustained a corridor effort?	High
Has rail market share increased?	Yes
Have state funds been used in corridor?	Yes
Clear purpose and planning for corridor?	High
Is there uniformity of effort across the corridor?	Medium

Corridor Challenges

Availability of passenger equipment?	High
Experimenting with PTC Systems?	No
Plans for private sector involvement?	No
Leadership by DOT/Elected Officials?	High
Federal funds applied to corridor?	Yes
Relative freight/passenger activity in corridor?	Mixed Traffic
New right of way needed?	No
Do corridors connect to transit/aviation systems?	Yes (SEPTA)

Corridor Benefits

HSR effects on highway/air congestion?	Realized
Is HSR expected to reduce emissions?	Realized
Will HSR offer corridor economic impacts?	Expected
Will HSR offer trip time savings to motorists?	Realized
Will HSR stations attract economic activity?	Expected

Sources:

1. Stakeholder Interview, April 2008.
2. FRA: <http://www.fra.dot.gov/us/content/652>.
3. Pennsylvania Governor's Office. *Governor Rendell, Amtrak President Gunn Announce Keystone Corridor Improvement Plan*, July 2004. <http://www.state.pa.us/papower/cwp/view.asp?A=11&Q=437482>.
4. Mineta Transportation Institute. *High-Speed Rail Projects in the United States: Identifying the Elements for Success*. October 2005.



PART 1: CORRIDOR DESCRIPTION

Responsible Agencies/Authorities

- Amtrak owns 363 route miles of the 457-mile Northeast Corridor (NEC) Main Line and operates along its entire length. The balance is owned by the Connecticut DOT (46 route miles), Metro-North Railroad (10 route miles), and the Commonwealth of Massachusetts (38 route miles).

Additional Details:

The Federal Railroad Administration (FRA) has an oversight role. Ten commuter authorities and five freight railroads also operate on the line.

Geographic Description

- The NEC Main Line extends from Washington, D.C. to Boston via Philadelphia and New York City, as shown here.
- The NEC is the busiest railroad corridor in the U.S., and one of the 10 busiest railroad corridors in the world (235 million passengers and 14 million freight car miles).
- The NEC forms the eastern backbone of the U.S. rail network, roughly paralleling Interstate 95.



Technology Considered

- Amtrak and the FRA have made substantial incremental high-speed rail (HSR) improvements to the NEC, including track and right-of-way (ROW) improvements and the purchase of high-speed rolling stock.
- Amtrak operates Acela Express high-speed trainsets between Boston and Washington, D.C.
- There is continuing U.S. legislative interest in attaining higher technology, higher speed service on the NEC.

Corridor Status

- Finance/funding:
 - Boston-New York HSR: In 1994, FRA recommended \$3.1 billion be invested to achieve three-hour trip time between Boston and New York, in addition to other goals. Amtrak subsequently invested about \$2.6 billion in new trainsets, facilities, and electrification between New Haven and Boston, but other infrastructure needs for reliability, speed, and capacity were never implemented. Amtrak express service today operates at 3-hour 30-minutes between Boston and New York.
 - New York-Washington, D.C. HSR: In 2000, Amtrak recommended that \$12 billion be invested to achieve 2-hour 15-minute trip times between New York and Washington, D.C., in addition to meeting other goals. However, there has been only minimal investment in speed and other improvements. Amtrak is running at 2-hour 45-minute trip times between New York and Washington, D.C..

Fact Sheet

Northeast Corridor Main Line

- Service Characteristics: Amtrak's NEC routes now handle 62 percent of the New York-Washington, D.C. air-rail travel market and 49 percent of the New York to Boston air-rail travel market.

Corridor History

- The NEC hosts a complex mix of high-speed rail, intercity rail, commuter rail, and freight service. No other railroad corridor in the world provides such a variety of rail services over the same infrastructure.
- Federal legislation in the 1970s conveyed most of the NEC to Amtrak. At the time of the transfer, the infrastructure was in extremely poor condition. Congress funded the 1976 NEC Improvement Project (NECIP), which established the goal of high-speed service between Washington, D.C. and Boston. NECIP funding was reduced in the early 1980s. The subsequent NEC High-Speed Rail Improvement Project (NHRIP) funded additional infrastructure improvements and Acela's high-speed rolling stock.
- States and railroads have also invested in the NEC. Although all investments have improved the condition of NEC infrastructure, there has never been sufficient funding to return the entire NEC to a state of good repair. Reliability has been further challenged by increased numbers of trains.



Additional Details:

The NEC railroads and agencies, plus the FRA, are currently working together on an Infrastructure Master Plan. Although legislators, states, and railroads are calling for greatly expanded rail services, the NEC is not poised to accommodate future growth. Substantial investment is needed to ensure a vigorous future for the NEC.

Political and Public Perception

- The NEC is a critical national resource and is of vital political and public interest:
 - The NEC is the flagship U.S. rail corridor.
- There is legislative dissatisfaction with current incremental NEC HSR approach.

PART 2: AGENCY DISCUSSIONS

- There is a need for a Federal/state partnership of 50 percent or higher Federal share for capital projects (80-20 program created by the Passenger Rail Investment and Improvement Act, or PRIIA).
- "True" high-speed rail for the NEC would need to be both desired and funded by Congress.
- Current rail operating density is very high on the NEC, so joint use with true HSR is impractical under current infrastructure conditions.
- Currently, there is no footprint available for separate HSR in the NEC. Additional right-of-way (ROW) would need to be purchased, or two-track HSR right-of-way would need to be constructed, above the existing NEC. Both are very difficult propositions.
- Compared to Europe's investment rail as a portion of GDP, the U.S. would need a \$9 billion investment level to reach parity.
- The U.S. needs a better public capital formation model. Currently proposed private investment in the NEC must also include investor stake in NEC. A new investment model might potentially include a middle and upper investment in trip time and capacity to attract private investors.





PART 3: EVALUATION CRITERIA

Northeast Mainline

Corridor Descriptions

How have services been improved?	Frequency, travel time, vehicles, stations, reliability
Preparations for 125+ mph service?	Yes, 125+ already
Progress of environmental clearance?	No Program EIS (Master Plan)
How sustained a corridor effort?	High
Has rail market share increased?	49% NY-BOS; 62% NY-DC
Have state funds been used in corridor?	Yes; multistate agreements
Clear purpose and planning for corridor?	High
Is there uniformity of effort across the corridor?	High (Master Plan)

Corridor Challenges

Availability of passenger equipment?	High
Experimenting with PTC Systems?	Yes
Plans for private sector involvement?	No
Leadership by DOT/Elected Officials?	High
Federal funds applied to corridor?	Yes
Relative freight/passenger activity in corridor?	Passenger dominated
New right of way needed?	No
Do corridors connect to transit/aviation systems?	Yes (BWI, EWR, Commuter Rail)

Corridor Benefits

HSR effects on highway/air congestion?	Realized
Is HSR expected to reduce emissions?	Estimated
Will HSR offer corridor economic impacts?	Realized
Will HSR offer trip time savings to motorists?	Realized
Will HSR stations attract economic activity?	Realized

Northern New England High-Speed Rail Corridor



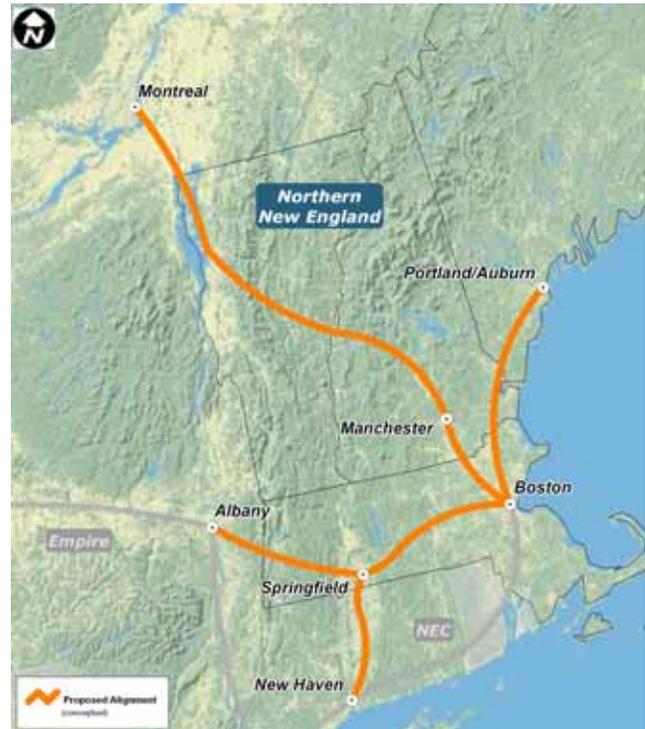
PART 1: CORRIDOR DESCRIPTION

Responsible Agencies/Authorities

- Maine DOT, Vermont Agency of Transportation (Vermont AOT), Massachusetts DOT, New Hampshire DOT, New York State DOT
- Northern New England Passenger Rail Authority.

Additional Details:

- The Boston, MA to Portland, ME corridor is owned by the Massachusetts Bay Transportation Authority (MBTA) and Pan Am Railway.
- Boston to Montreal, Canada corridor is owned by the Canadian National Railroad (CN), New England Central Railroad (NECR), State of New Hampshire, Pan Am Railway, and the MBTA.
- The 200 mile corridor between Boston, Springfield, Massachusetts and Albany, New York, is owned by CSX, Amtrak, MBTA and the Massachusetts Turnpike Authority.
- The 61 mile between Springfield, Hartford, Connecticut and New Haven, Connecticut is owned by Amtrak.



Geographic Description

- Designated corridors:
 - Boston to Montreal (339 miles).
 - Boston to Portland/Auburn, ME (150 miles).
 - Boston to Albany, NY (200 miles)
 - Springfield, MA to New Haven, CT (61 miles)
- Major population centers served (in addition to termini):
 - Boston to Portland: Dover, NH, Old Orchard Beach, ME.
 - Boston to Montreal: Nashua, NH, White River Junction, VT, Burlington, VT.
 - Boston to Albany: Worcester, MA
 - Springfield to New Haven: Hartford, CT
- The Boston to Portland corridor also functions as a feeder line to the North East Corridor (NEC) main line, although there are two separate stations in Boston.

Technology Considered

- Incremental high-speed rail (HSR) would be advanced in order to accommodate both freight and passenger rail operation. Passive-tilt style consists may be considered.

Fact Sheet

Northern New England High-Speed Rail Corridor



Corridor Status

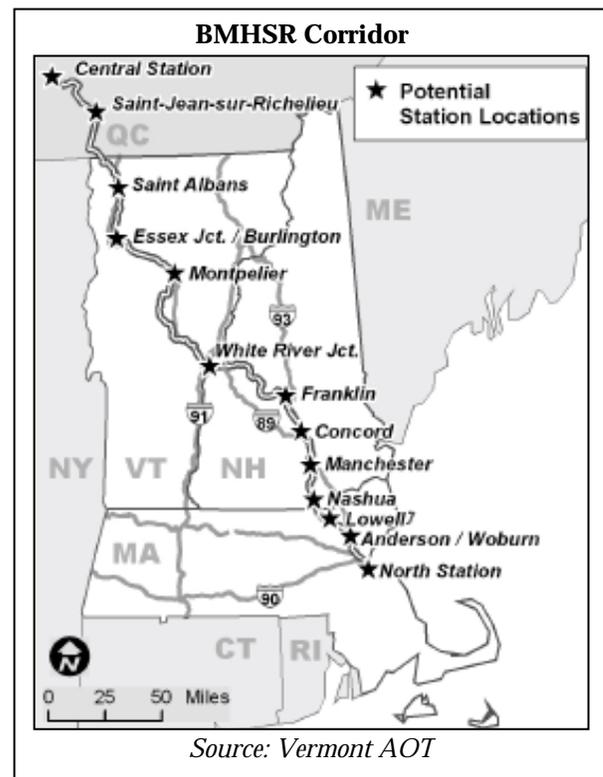
- Feasibility:
 - Amtrak's Downeaster service operates daily from Boston to Portland.
 - The Boston-Montreal HSR (BMHSR) Phase II study will evaluate engineering issues along the corridor.
- Percent design:
 - BMHSR: Planning/feasibility and preliminary engineering levels.
- Financing/funding:
 - Federal Congestion Mitigation and Air Quality (CMAQ) Improvement Program funding for Boston to Portland is set to expire at the end of 2008. Maine plans to continue covering operating costs.
 - Massachusetts and New Hampshire do not fund operating costs, yet are served by the Downeaster.
- Anticipated service characteristics:
 - Top speed: 110 mph (both segments).
 - BMHSR projected ridership (2025): 683, 667.¹⁰
- Economic benefits:
 - Construction/rehabilitation of the BMHSR corridor will benefit other agencies, including Amtrak and MBTA.
- Environmental benefits:
 - Benefits commensurate with increased use of passenger rail service.
- Connections: Rockland-Brunswick branch is currently running freight and excursion trains; some excursions have operated on the Brunswick-Augusta corridor.

Technological Breakthroughs

- Passive-tilt trainsets were identified for the BMHSR.

Corridor History

- Officially designated as HSR corridor in October 2000.
- Amtrak Downeaster service began in 2001, extending from Boston to Portland, ME.
- Vermont's Champlain Flyer (Burlington Commuter Service) was started, but has been discontinued.
- Plans for Amtrak's Vermonter to be replaced and service frequency increased using a Diesel Multiple Unit¹¹ (DMU) shuttle.



¹⁰ Assumes mid-speed scenario (max. 110 mph, slower through curves) and lowest fare rate (\$0.20 per passenger-mile).

¹¹ Diesel multiple unit refers to a train with train cars powered by one or more on-board diesel engines.

Northern New England High-Speed Rail Corridor



Political and Public Perception

- Maine and Vermont continue to develop passenger rail:
 - Recent improvements on Boston to Portland corridor reduced trip time to 2 hours, 25 minutes.
 - A fifth Downeaster round trip was added in August 2007.
- Maine is currently developing a statewide rail plan and anticipates that additional funding sources for planned improvements would likely be needed in 2009.
- Passenger rail in general, rather than HSR, is the current priority.

PART 2: AGENCY DISCUSSIONS

- Maine's concerns to date have been focused on making improvements towards Downeaster frequency and higher speeds. Downeaster extension is another goal – Maine legislature just passed funding that will allow Maine to work on Brunswick extension.
- Continued Downeaster ridership underscores need for increased frequency of service. Additional equipment is needed to handle additional round trips. A 5th round trip was recently added, and improvements will be made in order to reach the 6th round trip. More frequent service becomes more attractive and allows for service to be expanded (temporally and geographically) with less opposition. True Downeaster connection to the NEC is ultimate goal, either via Boston or Worcester.
- An HSR agenda will be part of Maine's forthcoming rail plan:
 - Guidance from Amtrak regarding distance and speeds is an important element to making HSR successful. Achieving HSR status does not drive demand for continued Downeaster service:
 - Consistent 79 mph would be great level of speed for Portland-Boston.
 - Competitive speed with highway system.
 - New HSR plan in Maine will include both passenger and freight high-speed rail; will have improved connection into NEC (at 79 mph); and will connect the NEC via Worcester at speeds above 79 mph (not through Boston).
 - Progress has been made in laying groundwork for passenger rail expansion in Maine. Total of 300 miles of right-of-way are owned by state, though mostly abandoned. Easy to purchase once abandoned.
 - Ideal HSR will have limited stops, a speed that cuts automobile time by one hour.
 - Important elements to developing high-speed rail include: 1) excellence in engineering and operations, reliability; 2) leadership; 3) finances; and 4) trip-making purposes (i.e., work versus recreational).

Challenges to implementing New England HSR are as follows:

- Need connectivity to the NEC.
- Canadians have their own set of rules, so it may be challenging complying with both countries' requirements.
- It will be difficult to achieve true HSR until there is a national policy set in place to support it:
 - Independent management of aircrafts and rail transportation is an issue. For example, why are small aircraft operating between Washington, D.C. and NY when the Acela can provide better service?
 - The states cannot direct many of the success factors leading to HSR in the U.S., but can make efforts such as small improvements, maintenance of current equipment that maximizes its use, and perform planning activities, until a national policy is crafted.

Fact Sheet

Northern New England High-Speed Rail Corridor



- Amtrak should be looked at as a “big brother” – enthusiastic, visionary, and proactive in advancing new equipment,
- Need to gain support for intercity rail and show that there is not much of a distinction between intercity and commuter rail. Difficult to get excited about HSR when fleet is in poor shape, and additional equipment is needed.

PART 3: EVALUATION CRITERIA

Northern New England

Corridor Descriptions

How have services been improved?	Downeaster initiated
Preparations for 125+ mph service?	No
Progress of environmental clearance?	Feasibility only
How sustained a corridor effort?	Medium
Has rail market share increased?	Yes
Have state funds been used in corridor?	Yes
Clear purpose and planning for corridor?	Medium
Is there uniformity of effort across the corridor?	Low

Corridor Challenges

Availability of passenger equipment?	Medium
Experimenting with PTC Systems?	No
Plans for private sector involvement?	No
Leadership by DOT/Elected Officials?	Medium
Federal funds applied to corridor?	Yes (Downeaster)
Relative freight/passenger activity in corridor?	Mixed Traffic
New right of way needed?	Portions
Do corridors connect to transit/aviation systems?	Yes (MBTA, NEC)

Corridor Benefits

HSR effects on highway/air congestion?	Estimated
Is HSR expected to reduce emissions?	Realized
Will HSR offer corridor economic impacts?	Realized
Will HSR offer trip time savings to motorists?	Realized
Will HSR stations attract economic activity?	Realized

Sources:

1. Maine Dot and Vermont AOT stakeholder interviews, April 2008.
2. Vermont Agency of Transportation, New Hampshire Department of Transportation, and Massachusetts Executive Office of Transportation and Construction. *Boston to Montreal High-Speed Rail Planning and Feasibility Study, Phase I*. April 2003.





PART 1: CORRIDOR DESCRIPTION

Responsible Agencies/Authorities

- Oregon DOT (ODOT), Washington DOT (WSDOT), British Columbia (BC) Ministry of Transportation.
- Amtrak, Federal Railroad Administration (FRA), Federal Highway Administration (FHWA), Sound Transit, BNSF Railway Company (BNSF).

Additional Details:

The Pacific Northwest High Speed Rail Corridor (PNW) right of way (ROW) is owned by BNSF from Portland, Oregon to Vancouver, BC, and by Union Pacific (UP) from Eugene, Oregon to Portland. Sound Transit operates commuter rail service between Tacoma-Seattle-Everett.

Geographic Description

- Existing Amtrak Cascades route.
- Two segments:
 - Seattle, WA to Vancouver, BC: 156 miles.
 - Seattle, WA to Eugene, OR: 310 miles.
- Major population centers served (not including termini):
 - Tacoma, Portland
- 7.6 million people live within 50 miles of designated corridor.



Technology Considered

- Incremental station, high-speed, and rail improvements designed to increase speed and capacity underway:
 - Planned to use Global Positioning System (GPS)-based signal and monitoring system.
- Unique push-pull and passive tilt TALGO trains sets used for Amtrak's Cascades Service:
 - Originally two sets leased in 1995.
 - Currently, three sets owned by Washington State and two by Amtrak.
 - Washington State received FRA waivers to allow non-FRA compliant equipment to be operated, subject to 79 mph limits.

Corridor Status

- Feasibility:
 - Differing levels of detail between state/province plans:
 - ODOT 2001 Oregon Rail Plan outlined benefit/cost deficiencies in implementing true HSR.
 - WSDOT sees HSR rail as vital component to multimodal transportation vision.
- Planned incremental improvements.

Fact Sheet

Pacific Northwest High-Speed Rail Corridor

- Funding/financing:
 - Estimated cost (1997 dollars) is roughly \$1.9 billion (*Estimate based on WSDOT figures*).
- Anticipated service characteristics:
 - Top speed: 110 mph.
 - Current Cascades maximum speed is 79 mph.
- Projected ridership (2023):
 - Seattle to Vancouver, BC: 945,700.
 - Seattle to Portland: 1,916,400.
 - Portland to Seattle: 133,200.
- Travel time goals (2017-2020):
 - Portland to Seattle: 2 hours, 30 minutes.
 - Seattle to Vancouver, BC: 2 hours, 57 minutes.
- Economic benefits:
 - Not estimated to date.
- Environmental benefits:
 - Benefits commensurate with increased use of passenger rail service.

Corridor History

- PNW included in the original five high-speed corridors designated by the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1992.
- All-time ridership record set on Cascades service in 2007 (676,670).

Additional Details:

- Significant infrastructure investments for Tacoma-Everett due to initiation/expansion of Sound Transit Service.
- 2005 Washington State Transportation Tax Package provided roughly \$95 million for eight projects.
- Selected planned improvements within corridor:
 - Centralia siding extension.
 - Vancouver yard upgrades (construction scheduled to begin in 2008).
 - Stanwood siding extension.
 - Point Defiance Bypass (90 percent design stage).

Political and Public Perception

- Varying degrees of state/province support:
 - Institutional support in Washington State only.
 - State Capital Investment Contributions:
 - Oregon: \$13.7 million.
 - Washington: \$120 million.
- Lack of Federal funding has delayed expansion of service.





PART 2: AGENCY DISCUSSIONS

- Elements that will contribute to project success:
 - 110 mph service is less expensive than 150+ mph high-speed rail, and should sufficiently drive down trip times to offer attractive alternatives for auto travelers.
 - Washington has very positive working relationship with BNSF, and both parties believe improvements in infrastructure have resulted not only in improved passenger train performance but in better freight service and business.
- Issues and concerns:
 - FRA should focus on crash avoidance, not crash survivability; would result in lighter equipment that is cheaper to operate.
 - National interest in shared rolling stock procurement, just not one size fits all. Washington State wants single-level, tilting equipment, not bi-level cars.
 - High-speed rail will depend on design and manufacturing of lighter weight, higher speed, nonelectric locomotive for use in nonelectrified corridors.
 - Federal funding program needs to be created so that state investments in high-speed rail could be leveraged similarly to other transportation programs.



PART 3: EVALUATION CRITERIA

Pacific Northwest

Corridor Descriptions

How have services been improved?	Frequency, travel time, vehicles, stations
Preparations for 125+ mph service?	No
Progress of environmental clearance?	Program EIS Complete
How sustained a corridor effort?	High
Has rail market share increased?	Yes
Have state funds been used in corridor?	Yes
Clear purpose and planning for corridor?	High
Is there uniformity of effort across the corridor?	Medium

Corridor Challenges

Availability of passenger equipment?	High
Experimenting with PTC Systems?	No
Plans for private sector involvement?	No
Leadership by DOT/Elected Officials?	High
Federal funds applied to corridor?	Yes
Relative freight/passenger activity in corridor?	Mixed Traffic
New right of way needed?	Portions
Do corridors connect to transit/aviation systems?	Yes (TriMet, Metro, Sound Transit)

Corridor Benefits

HSR effects on highway/air congestion?	Estimated
Is HSR expected to reduce emissions?	Expected
Will HSR offer corridor economic impacts?	Expected
Will HSR offer trip time savings to motorists?	Estimated
Will HSR stations attract economic activity?	Expected

Sources:

1. U.S. General Accounting Office. *Surface Infrastructure. High-Speed Rail Projects in the United States.* January 1999.
2. Mineta Transportation Institute. *High-Speed Rail Projects in the United States: Identifying the Elements for Success.* October 2005.
3. Washington State Department of Transportation. *Long-Range Plan for Amtrak Cascades.* February 2006.
4. Washington State Department of Transportation. *Revised Executive Summary for the Intercity Passenger Rail Plan for Washington State, 1998-2018.* December 1998.
5. Interview with Ken Uznanski, Washington DOT State Rail and Marine Division, April 2008.



PART 1: CORRIDOR DESCRIPTION

Responsible Agencies/Authorities

- Texas Department of Transportation (TxDOT), Transportation Planning Division.
- Oklahoma Department of Transportation (ODOT), Rail Programs Division.
- Arkansas State Highway and Transportation Department (AHTD), Planning and Research Division.

Geographic Description

- Corridor follows existing Amtrak Service: 672 miles along Texas Eagle route from San Antonio to Little Rock (Union Pacific and BNSF Railway Company; UP and BNSF, respectively), and 322 miles along the state-supported Heartland Flyer Route from Fort Worth to Oklahoma City (OKC), with proposed extension to Tulsa (BNSF).
- Connects San Antonio, Austin, Dallas/Fort Worth, Oklahoma City, Tulsa, Texarkana, Little Rock.
- San Antonio to OKC parallels I-35, OKC to Tulsa along I-44, Dallas to Little Rock along I-30.



Technology Considered

- No active planning underway.
- Incremental high-speed rail (HSR) along existing rail right of way (ROW).

Corridor Status

- No feasibility work or design has taken place.
- In 2008, a \$455,000 Federal earmark was appropriated to study planning between Dallas and Texarkana, and a connection between Marshall, TX and Shreveport, LA. This will be the first major study effort by TxDOT in the corridor since its designation.
- The Federal Railroad Administration (FRA) and ODOT cooperated in digital mapping on Fort Worth-OKC-Tulsa corridor; State of Texas also recently began providing funding.
- ODOT has supported Heartland Flyer service through state-supported service program, and TxDOT has recently begun state funding support.

Fact Sheet

South Central High-Speed Corridor

- ODOT published Economic Benefit Study on Heartland Flyer service in 2005, covering the 1999-2004 history of subsidized service:¹²
 - \$11.4 million in direct spending since 1999 (including \$5.3 million in Federally funded depot renovations) yielded \$23.1 million in economic activity for Oklahoma.
 - Economic activity includes \$6.9 million in earnings, 349 jobs, and \$.7 million in state and local taxes.

Corridor History

- In 1989, Texas Legislature created the Texas High-Speed Rail Authority to consider awarding a franchise to a private sector operator of high-speed rail in the “Texas Triangle” linking San Antonio, Houston, and Dallas/Fort Worth:
 - Followed a favorable feasibility study conducted by the Texas Turnpike Authority in 1988.
 - Agency awarded franchise in 1990 to Texas TGV group. Executed franchise agreement in 1991, began public meetings for FRA Environmental Impact Statement (EIS) in 1991.
 - Franchisee failed to meet equity financing milestone in 1992, franchise rescinded in 1993.
- Section 1103(c) of the Transportation Equity Act for the 21st Century, or TEA-21, (PL 105-278) authorized an additional six corridor designations. The South Central High-Speed Corridor was designated by Transportation Secretary Rodney Slater on October 11, 2000.
- Designation of the corridor was advocated by passenger rail advocates in support of existing Texas Eagle and Heartland Flyer routes, such as Texas Rail Advocates and Northern Flyer Alliance.
- Another group, the Texas High-Speed Rail and Transportation Corporation (THSRTC), is currently active in advocating a high-speed rail route from San Antonio to DFW, with a leg from Temple to Houston, called the “Texas T-Bone.”
 - The THSRTC includes elected officials from along the route.
 - TxDOT submitted a THSRTC-supported request for expansion of the South Central Corridor by adding the Temple-Houston route, but the request was denied by the FRA in June 2003.

Political and Public Perception

- Future service improvements are advocated by a range of public advocacy groups and local elected officials along the route.
- Apart from the Heartland Flyer subsidies, the three states along the South Central corridor have not invested in passenger service analyses to the same extent as other states.
- Future progress on incremental service improvements or the renewed Texas high-speed rail (HSR) effort will depend on Federal funding assistance.

PART 2: AGENCY DISCUSSIONS

- Elements that will contribute to project success:
 - Corridors need to demonstrate that HSR will affect statewide transportation performance issues.
 - HSR routes could assist in military troop movements from major Texas military bases.
 - Can high-speed rail serve short-haul markets for hub and spoke carriers at DFW and Houston? Would airlines and airport owners be receptive to high-speed rail, particularly if it had stops at or near the airports?
 - Can high-speed rail linking smaller urban areas replace evaporating commercial air services?

¹²The Heartland Flyer: Oklahoma’s Passenger Rail Service Economic Benefit Report, report prepared for the ODOT Rail Programs Division by Carter & Burgess, April 2005.



South Central High-Speed Corridor



- Advocates need to quantify how high-speed rail can address national transportation issues:
 - Environmental concerns about greenhouse gas emissions.
 - Energy use impacts, rising motor fuel costs.
 - Aging population that will value mobility, but may not be able to drive between cities.
- Issues and concerns:
 - Federal funding program would need to address how to create multistate coalitions for corridors, including how to encourage states to cooperate on pooling funding for studies and construction.
 - Property rights issues a major concern in Texas – it affected the original Texas TGV plans on new right-of-way, it is affecting TxDOT’s Trans-Texas Corridor concepts, and it could affect high-speed rail along new right-of-way if proposed.
 - Freight rail network very constrained, particularly along UP routes under consideration.



PART 3: EVALUATION CRITERIA

South Central

Corridor Descriptions

How have services been improved?	No erosion of service
Preparations for 125+ mph service?	No
Progress of environmental clearance?	No Program EIS
How sustained a corridor effort?	Low
Has rail market share increased?	No
Have state funds been used in corridor?	No
Clear purpose and planning for corridor?	Low
Is there uniformity of effort across the corridor?	Low

Corridor Challenges

Availability of passenger equipment?	Low
Experimenting with PTC Systems?	No
Plans for private sector involvement?	No
Leadership by DOT/Elected Officials?	Low
Federal funds applied to corridor?	Yes (recent earmark)
Relative freight/passenger activity in corridor?	Mixed traffic
New right of way needed?	No
Do corridors connect to transit/aviation systems?	Yes (DART, T, Capitol Metro, VIA)

Corridor Benefits

HSR effects on highway/air congestion?	Expected
Is HSR expected to reduce emissions?	Expected
Will HSR offer corridor economic impacts?	Expected
Will HSR offer trip time savings to motorists?	Expected
Will HSR stations attract economic activity?	Expected

Sources:

1. U.S. DOT. *High-Speed Ground Transportation for America*, 1997.
2. *The Heartland Flyer: Oklahoma's Passenger Rail Service Economic Benefit Report*, report prepared for the Oklahoma DOT Rail Programs Division by Carter & Burgess, April 2005.
3. Interview with Jennifer Moczygemba, Texas DOT, April 2008.



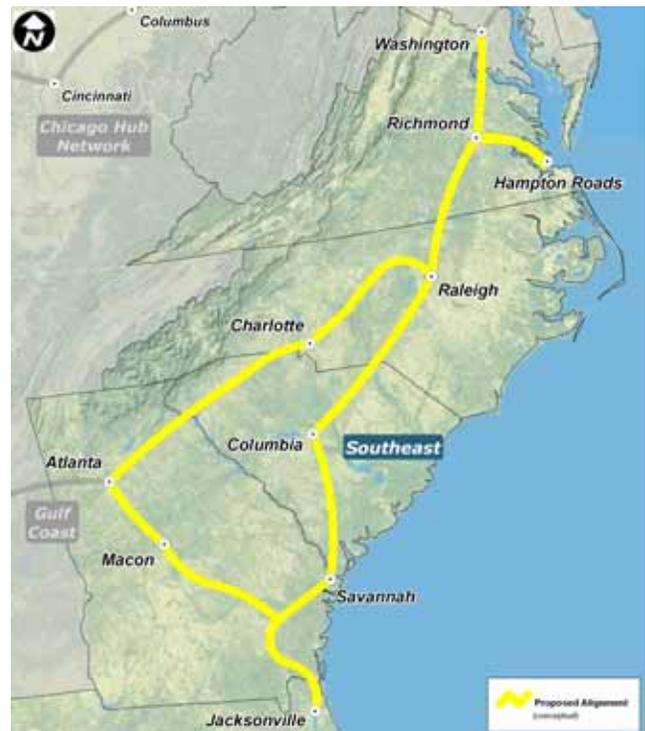
PART 1: CORRIDOR DESCRIPTION

Responsible Agencies/Authorities

- North Carolina Department of Transportation (NCDOT) and Virginia Department of Rail and Public Transportation (DRPT), South Carolina Department of Transportation (SCDOT), Georgia Department of Transportation (GADOT).
- Federal Railroad Administration (FRA), Federal Highway Administration (FHWA).
- North Carolina (NC) has been the lead state, working with host railroads and partner states to develop higher speed rail passenger service.

Geographic Description

- Core segment is Washington, D.C. to Charlotte, NC, with connection to Northeast Corridor (NEC):
 - Expanded segments traversing South Carolina, Georgia, and Florida.
- Major population centers served (in addition to termini):
 - Richmond, Petersburg, Hampton Roads, VA; Raleigh, NC; Columbia, SC; Atlanta, GA; Jacksonville, FL.
- Parallels I-85 and I-95.



Technology Considered

- Incremental improvements over existing rail rights of way (ROW):
 - Crossings, extended sidings, and adding or restoring track.
- Engineering for a maximum speed of 110, with average speeds of 85 to 87 mph.
- Diesel locomotives, passenger coaches, café lounge car.

Corridor Status

- Feasibility:
 - Southeast High-Speed Rail Corridor (SHSRC) could generate \$2.54 in benefits for every dollar spent.
- Design:
 - Tier I Environmental Impact Statement (EIS) design level is 10 percent.
 - More detailed environmental studies are progressing as part of the Tier II Draft Environmental Impact Statement (DEIS).
- Financing/funding:
 - Estimated construction costs (Washington, D.C. to Charlotte, NC): \$2.6 billion (2000 dollars).
 - Estimated passenger costs (Washington, D.C. to Charlotte, NC): \$0.20 to \$0.22 per mile.

Fact Sheet

Southeast High-Speed Rail Corridor

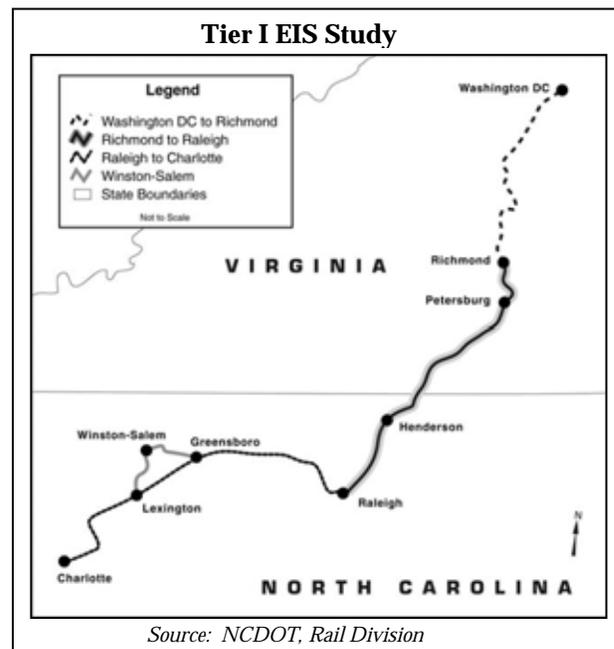
- Federal funding/grants, state funding and matching commitments and capital investment contributions are necessary to develop a high-speed rail (HSR) program.
- Anticipated service characteristics:
 - Top speed: 110 mph (Tier II) in more than five states.
 - Roughly 1.8 million passengers annually by 2025.
 - Travel times (Washington, D.C. to Charlotte, NC):
 - Existing: 9 hours, 15 minutes.
 - Proposed: 6 to 7 hours.
 - Would reestablish service on CSX's abandoned "S Line" in Virginia and North Carolina.
 - Travel times (Raleigh to Charlotte, NC):
 - Intercity Passenger Service from 4 hours, 5 minutes down to 3 hours, 9 minutes.
 - Proposed freight increase from 79 mph to 90 mph, with Tier II design.
- Economic Benefits:¹³
 - 19,000 permanent full-time jobs, 31,400 construction-related jobs.
 - Roughly \$700 million in new tax revenue.
- Environmental benefits:
 - Analyzed during the Tier II phase.

Corridor History

- Core segment part of original five high-speed corridors designated by the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1992.
- Expanded segments through South Carolina, Georgia, and Florida designated by the Transportation Equity Act for the 21st Century (TEA-21) in 1998.
- Expansion of Gulf Coast Corridor connection approved in 2000, Hampton Roads Segment added in 2005.

Additional Details:

- Service on core segment is expected to begin between 2013-2015 (pending funding availability).
- Record of Decision (ROD) for Tier I EIS issued in October 2002.
- A Tier IIA EIS is underway (February 2008) for the portion of the preferred corridor between Richmond, VA and Raleigh, NC.
- Richmond to Hampton Roads Passenger Rail Study (R2HR) Tier I is undergoing modifications based on FRA comments.
- Georgia, South Carolina, and North Carolina Departments of Transportation are continuing to evaluate the overall suitability and costs of developing high-speed service between Charlotte, NC and Macon, GA.



¹³ Economic benefits for North Carolina only.

Southeast High-Speed Rail Corridor



Political and Public Perception

- Project has the support of the states, as well as the FRA and FHWA.
- Of the 661 public comments to the Tier I DEIS, 650 were supportive of the project.

PART 2: AGENCY DISCUSSIONS

- Elements contributing, or expected to contribute, to project success:
 - Commitment by North Carolina State (political and legislative support, funding of NCDOT rail program staff and studies, investment in infrastructure and services).
 - HSR development is focused on an incremental approach; namely, upgrading to moderate speeds of 110 mph, building ridership and market. SEHSR is learning lessons, earning credibility and maintaining relationship with local communities.
 - Freight railroads have been brought in as a partner, and planning has used maximum freight standards, rather than high-speed unbalance, for infrastructure development.
 - SEHSR has focused on building a network that is focused on mobility, freight, and automobile competitiveness, not just speed or technology.
 - SEHSR planning and design has considered many elements including travel intercept surveys, rising gas prices, infrastructure improvements, rebuilding of car fleet and stations.
 - Analysis indicates that the corridor will benefit economically in terms of jobs created, enhancements to tax rolls, transition from sprawl to neotraditional development, and investments to facilitate urban living.
- Issues and concerns:
 - Availability of significant Federal funding.



PART 3: EVALUATION CRITERIA

Southeast

Corridor Descriptions

How have services been improved?	Travel time, equipment, and stations
Preparations for 125+ mph service?	No
Progress of environmental clearance?	Project EIS Underway
How sustained a corridor effort?	High
Has rail market share increased?	Yes
Have state funds been used in corridor?	Yes
Clear purpose and planning for corridor?	High (NC, VA)
Is there uniformity of effort across the corridor?	Medium

Corridor Challenges

Availability of passenger equipment?	Medium
Experimenting with PTC Systems?	No
Plans for private sector involvement?	Yes
Leadership by DOT/Elected Officials?	High
Federal funds applied to corridor?	Yes
Relative freight/passenger activity in corridor?	Mixed Traffic
New right of way needed?	Portions
Do corridors connect to transit/aviation systems?	Yes (VA, NC)

Corridor Benefits

HSR effects on highway/air congestion?	Estimated
Is HSR expected to reduce emissions?	Estimated
Will HSR offer corridor economic impacts?	Estimated
Will HSR offer trip time savings to motorists?	Estimated
Will HSR stations attract economic activity?	Expected

Sources:

1. Interview with Pat Simmons, NCDOT, April 2008.
2. U.S. DOT. *High-Speed Ground Transportation for America*, 1997.
3. FHWA. *Record of Decision for the Tier I Southeast High-Speed Rail Project*, 2002.
4. *Southeast High-Speed Rail Corridor. SEHSR Draft Implementation Plan*. October 2002.
5. Web resources: <http://www.sehsr.org> and bytrain.org.