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High-Speed Rail Projects in the U.S.: Identifying the Elements for Success

Interim Report – Preliminary Review of Cases and Recommendations for Phase 2

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EXECUTIVE SUMMARY

The goal of this study is to identify lessons learned for successfully developing and implementing HSR in the United States. There are very few broad statements that can be made of HGST in the United States. However, two points are clear: (1) with the exception of the Northeast Corridor there has been relatively little forward movement if one looks at the number of years spent on many of these projects; and, (2) the Federal government has played and continues to play a minimal role in HGST, generally restricting its efforts to funding pilot studies and technological research. Thus, given the early stages of these projects, "success" cannot be based on implementation. Instead, it is defined in terms of whether a given HSR project is still actively pursuing development and/or funding.

Proceeding in two phases, Phase 1 constitutes a literature review following two parallel tracks: (1) an assessment of federal (and where warranted, state) legislation to determine what was intended in terms of objectives and criteria identified in the legislation; and, (2) a broader literature review that briefly assesses all HSR efforts in the United States since 1980 to determine their history and current status. This interim report is intended to outline the information collected from the second track of Phase I and to provide recommendations on which cases should be more closely examined.

Methodology

The first step was to identify as many cases of high speed ground transportation efforts in the country since 1980 as possible. An extensive review revealed 19 such cases. Together, the cases offer a complex array of examples with differences in a number of areas, including but not limited to: the type of HGST being pursued; whether the project exists entirely in one state or spans several; the way funding is being sought, both in terms of partnerships and the actual funding mechanisms; whether the public is involved through voting and/or legislation; and the role of freight rail. In many cases, early feasibility studies and environmental impact studies have been or are being developed, but often on only a portion of an entire project, leading to a document trail that often has to be pieced together.

The 19 projects were then differentiated according to the type of system proposed:

- incremental high speed rail (accelerail), which generally utilizes existing technologies and rights-of-way, but makes improvements to allow for speeds up to 150 miles per hour (mph) (though in the United States, most projects are aiming for 110 mph) using either electrified or non-electrified systems;
- new high speed rail (HSR), which requires new rights-of-way and imported technologies currently utilized in Asia or Europe, that typically would allow for speeds of just over 200 mph; and,
- magnetic levitation (Maglev) which, by doing away with steel-wheel-on-steel-rail, would allow speeds in excess of 300 mph.

Because Maglev utilizes a completely different technology as well as different sources of federal funding, it is unclear whether the lessons learned from these examples would prove as helpful for other HSR efforts. Given the scope of and resources for this project, a decision was made not to include Maglev projects in the remainder of the study.

The final 15 projects – 3 new HSR and 12 accelerail – were then all briefly assessed in terms of their history and current status. Given that only three to four projects at most can be pursued in Phase II, those most interesting in terms of potential lessons were selected out for further review.

Recommendations

Within the new HSR cases, the Texas Triangle has already been documented and lessons can be drawn from previous discussions to add to any lessons found in Phase II of this study. Florida and California offer interesting counterpoints – both have voters heavily involved and governors and/or legislatures that

are opposed. To date, California is still on track and Florida is looking more like a failed story. Thus, both of these are being proposed for further study under Phase II of this effort.

With respect to acclerail, 5 of the 12 cases – Gulf Coast Corridor, Northern New England Corridor, South Central Corridor, Southeast Corridor, and Southeastern High Speed Rail – are still in their infancies, and little to be gained by including them in Phase II of the current study. Among the remaining 7 cases, the Northeastern Corridor and Ohio and Lake Erie Regional Network have been documented previously to some degree and lessons can again be drawn from earlier work to supplement new information found as a result of this study. Of the 5 cases left, the Pacific Northwest is most clearly still moving ahead and is recommended for further study in Phase II. Should information prove elusive, the Empire Corridor (which is a mixed success/failure) and the Chicago Hub Network should be reevaluated for inclusion in Phase II.

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I. INTRODUCTION

Since the 1960s, high-speed ground transportation (HSGT) has held out the promise of fast, convenient, and environmentally sound travel within the United States for distances of between 40 and 600 miles.[1] Congress first authorized studies aimed at deploying HSGT with the High Speed Ground Transportation Act of 1965 and within a few years, a number of States had begun their own HSGT initiatives. Since 1980, nineteen projects have been identified at some point, utilizing one of three types of HSGT:

- incremental high speed rail (accelerail), which generally utilizes existing technologies and rights-of-way, but makes improvements to allow for speeds up to 150 miles per hour (mph) (though in the United States, most projects are aiming for 110 mph) using either electrified or non-electrified systems;[2]
- new high speed rail (HSR),[3] which requires new rights-of-way and imported technologies currently utilized in Asia or Europe, that typically would allow for speeds of just over 200 mph; and,
- magnetic levitation (Maglev) which, by doing away with steel-wheel-on-steel-rail, would allow speeds in excess of 300 mph.

However, despite numerous efforts by States and the Federal government, nearly all US high-speed rail projects have failed to progress significantly and none have come close to matching the performance levels of Asian and European systems. Unlike its European and Asian counterparts, which made high-speed intercity rail a national priority once it became clear that railroads were either in or headed for decline, the US government has been reluctant to develop such projects. Indeed, the one intercity rail effort moved forward by the federal government beyond only pilot studies and technological research has been Amtrak. Ironically, the creation of Amtrak led to a stalemate regarding intercity passenger rail's relationship with other transportation modes and with government, characterized in part by a division between passenger and freight rail and the isolation of the former from earmarked tax returns and cooperative planning and management.[4] Both of these issues also plague high-speed rail efforts along with other political and financial difficulties.

The goal of this study is to identify lessons learned for successfully developing and implementing HSR in the United States. Given the early stages of these projects, "success" cannot be based on implementation, but is based upon whether a given HSR project is still actively pursuing development and/or funding. Proceeding in two phases, Phase 1 constitutes a literature review following two parallel tracks: (1) an assessment of federal (and where warranted, state) legislation to determine what was intended in terms of objectives and criteria identified in the legislation; and, (2) a broader literature review that briefly assesses all HSR efforts in the United States since 1980 to determine their history and current status.

This interim report is intended to outline the information collected from the second track of Phase I and to provide recommendations on which cases should be more closely examined.

II. High Speed Ground Transportation Projects in the United States since 1980

As noted in the previous section, there have been 19 projects identified since 1980 that aim at instituting high speed ground transportation in one form or another. Some of these projects have been formally designated as federal high speed rail (HSR) corridors or have been formally identified under the Federal

[1] For high speed rail, the distance is generally cited as 100-500 miles; for Maglev it is generally assumed to be 40-600 miles.
[2] What constitutes high speed rail in this first category (accelerail) is of some debate. While some experts point to speeds of at least 125 mph, the U.S. Department of Transportation considers 90 mph to be the low end of high speed rail. Others have preferred to identify high speed rail based on trip times and market penetration rather than on top speed alone. Given that most U.S. projects do not approach 125 mph, for the purposes of this study, the 90 mph and above mark will be utilized.
[3] Note that in regular usage, HSR is written both as "high speed rail" and as "high-speed rail." Throughout the report, the phrase will be utilized without the hyphen unless the hyphen was used as part of a title or organization name.
[4] Anthony Perl, *New Departures: Rethinking Rail Passenger Policy in the Twenty-First Century* (Lexington: The University Press of Kentucky, 2002), p. 78.

Railroad Administration's (FRA) Maglev program. In both cases, such identification opens the door for federal funding that might not otherwise be available. Other projects have been pursued without federal designation, though several (like that of Nevada) are hoping to achieve this status. Complicating the situation is the fact that in some cases, states or groups of states have been pursuing HGST systems that either include all or part of federally designated corridors, but which expand upon them by adding additional linkages. Table 1 provides a listing of those projects identified, along with the type of HGST being pursued and their status relative to federal designation or identification.

Table 1. Identified U.S. High Speed Ground Transportation Projects as of March 2004

Project/Corridor	Federally Designated	Date of Initial Designation	HGST Type Being Pursued
Atlanta – Chattanooga	no	--	maglev
Baltimore, MD – Washington, DC	Maglev Deployment Program	1/18/01	maglev
California Corridor	yes	10/19/92	new hsr
Chicago Hub Network Midwest Regional Rail Initiative	yes no, but includes above	10/15/92 --	accelerail
Empire Corridor	yes	10/10/98	accelerail
Florida Corridor	yes	10/16/92	new hsr
Gulf Coast Corridor	yes	11/18/98	accelerail
Keystone Corridor	yes	10/10/98	accelerail
Nevada – Southern California	no	--	maglev
Northeast Corridor	no	--	accelerail
Northern New England Corridor	yes	10/11/00	accelerail
Ohio & Lake Erie Regional Rail Network	no, parts in Chicago Hub	--	accelerail
Pacific Northwest Corridor	yes	10/20/92	accelerail
Pittsburgh	Maglev Deployment Program	1/18/01	maglev
South Central Corridor	yes	10/11/00	accelerail
Southeast Corridor Southeastern High Speed Rail	yes no, but includes above	10/20/92 --	accelerail
Texas Triangle	no, part in South Central Corridor	--	new hsr

While accelrail and HSR projects differ in several ways, the basic technologies are similar as are the markets they would serve. Maglev is fundamentally different, utilizing a different technology altogether and offering competitive service at a broader set of distances (40-600 miles versus 100-500 miles). Furthermore, the federal funding sources for HSR and Maglev are different. Given these differences and the scope of and resources for the current study, the Maglev cases will not be discussed further. Instead, accelerail and new HSR options will provide the basis for the remainder of the discussion.

High Speed Rail Projects in the United States[5]

Section 1010 of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) called for the selection and designation of five high-speed rail corridors around the United States. In October 1992, U.S. Secretary of Transportation Andrew Card, Jr. announced the designations of the following high-speed rail corridors: Midwest (renamed the Chicago Hub), Florida, California, Southeast, and the Pacific Northwest. Seven years later, Section 1103(c) of the Transportation Equity Act for the 21st Century (TEA-21) authorized six additional corridor designations, though to date only five additional designations have been made, including the following: Gulf Coast; Keystone; Empire State; South Central; and Northern New England.

[5] Unless otherwise noted, all corridor maps/pictures are from the specific corridor descriptions on FRA's website.

Below are brief descriptions and the status of each of the federally designated corridors as well as several non-federally designated corridors. In cases where federally designated and non-federally designated systems overlap, they are discussed together if warranted. At the end of each description is some thoughts and a recommendation are provided regarding whether the particular example warrants further study in Phase II of the current effort.

California Corridor

The California HSR corridor, which was federally designated on October 19, 1992, initially linked San Diego, Los Angeles, Fresno, Stockton, and Sacramento. On October 11, 2000, that designation was formally expanded by U.S. DOT to link the San Francisco Bay Area without a specific route identified. Current plans cover a network of some 700 miles. Since 1996, California has been pursuing HSR on two parallel tracks – one that aims at incremental upgrades of existing facilities and services and the other that seeks to develop new HSR. Additionally, the Southern California Association of Governments (SCAG) is seeking to develop a Maglev route between Los Angeles International Airport and Union Station.

In 1993, the California Senate created the Intercity High Speed Rail Commission to assess alternatives for intercity rail travel for distances beyond 100 miles and with trains of 200 mph or more. The resulting study indicated that European and Japanese technologies could be safely and reliably utilized in California and would have a market. The estimated cost for implementation was estimated at between $20 and $30 billion.[6] The Commission's report led to Senate Bill 1420 in 1996, which created the California High-Speed Rail Authority (CHSRA), and charged it with developing a business plan as well as with obtaining financing, designing, constructing, and operating an HSR system with trains at speeds of at least 200 mph. The plan, released in June 2000, again concluded that HSR was feasible and marketable, and recommended that the first phase of construction focus on the Los Angeles-San Francisco segment, which has the highest ridership potential.[7]

In May 2001, work began on a draft environmental impact report/environmental impact statement (EIR/EIS) that would identify alternative modes and routes as well as positive and negative impacts of HSR in California. The draft EIR/EIS was released in January 2004 by the CHSRA and FRA.[8] Public hearings are currently under way and the Safe, Reliable, High-Speed Train Bond Act of the 21st Century is on a statewide ballot for November 2004. If approved, it would authorize $9.9 billion in general obligation bonds to begin construction of that first segment. Matching funding is being sought from the federal government and is part of the Railroad Infrastructure Development and Expansion Act for the 21st Century (RIDE) bill introduced in the House. While Governor Schwarzenegger has proposed removing the Act from the ballot, it currently remains and according to a recent opinion poll by the Public Policy Institute of California, 65% of voters said they would vote for the measure.[9] Pending funding, current plans are to make a decision on which technology to utilize by March 2005 and begin construction shortly thereafter.

Thoughts and Recommendation: Plans for the California Corridor are still underway and as such, the project would be defined as a success for the purposes of this report. As one of the few examples of new HSR around the country, it is worthy of further exploration. The draft EIR/EIS would form the basis for further exploration, along with interviews with key officials working on the project. Thus, this case could provide an excellent opportunity to add to the analytic and practical literature and should be included in Phase II.

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[6] John Fowler, "The Fast Train Dilemma: Why the High Speed Rail Authority Chose the More Expensive Interstate 15 Route," *San Diego Metropolitan*, http://www.sandiegometro.com/1999/sep/transportation.html.
[7] Leslie Stewart, "Oncoming Train: High Speed Rail," *Bay Area Monitor* (December 2003/January 2004), http://www.bayareamonitor.org/dec03/rail.html.
[8] For highlights, see CHSRA and FRA, "A Plan to Fly California…Without Ever Leaving the Ground." http://www.cahighspeedrail.ca.gov/eir/default.asp.
[9] "California Crawls toward Fast Trains," *Destination: Freedom Newsletter* (February 16, 2004), http://www.nationalcorridors.org/df/df02162004.shtml.

Chicago Hub Network and the Midwest Regional Rail Initiative (2 projects/1 inclusive of the other)
In 1990, the states of Illinois, Minnesota, and Wisconsin signed a Memorandum of Understanding aimed at evaluating the potential for a high speed rail corridor linking Chicago, Milwaukee, and Minneapolis-St. Paul. One year later, TMS/Benesch High Speed Rail Consultants presented their report, "Tri-State High Speed Rail Study: Chicago-Milwaukee-Twin Cities Corridor," to the Departments of Transportation of the three states. The purpose of the report was "to investigate the economic and financial potential for constructing and operating a high speed rail system in one of two corridors…between Chicago and Minneapolis-St. Paul."[10] The two corridors examined were a southern corridor linking Chicago, Milwaukee, and the Twin Cities via Madison, and a northern corridor linking Chicago, Milwaukee, and the Twin Cities via Green Bay. Among the conclusions of the study, the southern corridor appeared "very promising in terms of ridership, revenues, financial, and economic benefits."[11] Further, the report recommended utilizing existing rights of way and targeting 125 mph service.

Formally designated a federal high-speed rail corridor on October 15, 1992, the Chicago Hub (formerly named the Midwest High-Speed Rail Corridor) initially included links between Chicago and Detroit, Chicago and St. Louis, and Chicago and Milwaukee. In subsequent years, additional linkages were added for a total of 8 linkages covering some 2,313 miles (Table 2).

Table 2. Chicago Hub Links

City Linkages – Federally Designated	Distance (miles)	Goal (mph)	Date Designated
Chicago, IL – Detroit, MI	279	110	10/15/92
Chicago, IL – St. Louis, MO	282	110	10/15/92
Chicago, IL – Milwaukee, WI – extension to Minneapolis-St. Paul, MN	445	110	10/15/92 12/11/98
Chicago, IL – Indianapolis, IN – Cincinnati, OH	319	110	1/28/99
Chicago, IL – Toledo, OH – Cleveland, OH	341	110	10/11/00
Cleveland, OH – Columbus, OH – Cincinnati, OH (3C)	254	110	10/11/00
Indianapolis, IN – Louisville, KY	111	79	10/11/00
St. Louis, MO – Kansas City, MO	282	90	1/19/01

From: US DOT, Federal Railroad Administration, "Chicago Hub Network," www.fra.dot.gov/Content3.asp?P=648 and "Corridor Chronology," www.fra.dot.gov/Content3.asp?P=1272.

By 1994, Illinois planners had completed a study of 125 mph service for the Chicago-St. Louis spoke and the second phase of a study focused on the Chicago-Milwaukee spoke was recommending incremental non-electric high speed rail at 125 mph.[12]

In April 1997, Illinois entered into a cooperative agreement (DTFRDV-96-H-60006) with the U.S. Department of Transportation for the purposes of performing a Tier I environmental impact study (EIS) of the Chicago – St. Louis spoke of the Chicago Hub Network. The total cost for the EIS was $4.469 million over seven years. US DOT FRA contributed $2.8 million ($2.5 million of which was provided in the first fiscal year of the study). This was matched state funds totaling $1.66 million ($1.5 million from general revenues and the remainder from state planning funds, of which 80% is derived from the Federal Highway Administration.)[13] The final EIS was released in January 2003 and proposed that HSR

[10] TMS/Benesch High Speed Rail Consultants, "Tri-State High Speed Rail Study: Chicago-Milwaukee-Twin Cities Corridor," Prepared for Illinois, Minnesota, and Wisconsin Departments of Transportation (May 1991), http://ntl.bts.gov/data/819.pdf, p. 1-3.
[11] Ibid., p. vi.
[12] Midwestern Office of The Council of State Governments, *Firstline Midwest* 4, 2 (March 1997): 2
[13] Merrill Travis, Consultant for the City of Chicago Department of Transportation, Personal Communication, 3/2/04.

passenger service between Chicago and St. Louis be implemented with a maximum operating speed of 110 mph on the section south of Dwight and ongoing speeds of 79 mph north of Dwight. Three different alignments were identified for the north of Dwight portion of the line, but a formal recommendation for that portion of the line was not made due to funding constraints.[14]

Work has already begun along the Chicago – St. Louis spoke of the Hub Network. In 1999, Illinois voters approved $70M for HSR infrastructure and grade crossing improvements along the Chicago – St. Louis spoke.[15] A number of improvements have been made to upgrade the tracks to allow for 110 mph speeds on the south of Dwight – Springfield portion of the spoke. Also, a Positive Train Control system[16] demonstration is underway along that same spoke. To date, the FRA reports that grants totaling $28 million have been made to Illinois through fiscal year 2002 under FRA's Next Generation High-Speed Rail Program.[17]

Running parallel to the EIS efforts, nine Midwestern states (Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin) joined to form the Midwest Regional Rail Initiative (MWRRI) in 1996. The goal was to develop an implementation plan for a much more extensive HSR centered around the Chicago Hub. Totaling 3,000 miles, the MWRRI includes the federally designated corridors in the Chicago Hub Network, but adds a number of additional passenger rail links at various speeds above and below 110 mph (Table 3) as well as several feeder bus service links.

Working together with Amtrak and the FRA, the MWRRI developed a report assessing the Hub approach to the region. They issued their report, "Midwest Regional Rail System: A Transportation Network for the 21st Century," in February 2000, which concluded that completing the system envisioned would require a decade and approximately $4 billion in infrastructure upgrades and new equipment.[18] The proposed Midwest regional rail system includes the Chicago Hub Network as designated by the FRA, but expands upon it to include

Table 3. Midwest Regional Rail System –City Links not Federally Designated

City Linkages – Non-Federally Designated
Milwaukee, WI – Green Bay, WI
Chicago, IL – Quincy, IL
Chicago, IL – Iowa City, IA – Des Moines, IA – Omaha, NE
Chicago, IL – Carbondale, MO
Kalamazoo, MI – Grand Rapids, MI – Holland, MI
Kalamazoo, MI – Lansing, MI – Port Huron, MI
Detroit, MI – Pontiac, MI

From: Transportation Economics & Management Systems, Inc., "Midwest Regional Rail System: A Transportation Network for the 21st Century – Executive Report," (February 2000), p. 5.

In 1998, the Midwestern Legislative Conference formed a High Speed Rail Task Force. Out of that Task Force, the Midwest Interstate Passenger Rail Commission (MIPRC) was formed via compact in 2000. The MIPRC works together with the MWRRI, providing an advocacy arm for HSR in the region.

[14] U.S. DOT, FHWA and FRA, and the Illinois Department of Transportation, *Final Environmental Impact Statement: Chicago – St. Louis High-Speed Rail Project* (January 2003), http://www.dot.state.il.us/hsrail/pdf.
[15] Amtrak, "Amtrak's Vision for America's High Speed Rail Program" (Spring 2002), http://www.amtrak.com/about/government-hsr-index.html.
[16] Positive Train Control systems are command, control, communications, and information (C^3I) systems that control train movement. They aim at improving railroad safety by reducing accidents.
[17] http://www.fra.dot.gov/Content3.asp?P=648.
[18] Transportation Economics & Management Systems, Inc., "Midwest Regional Rail System: A Transportation Network for the 21st Century – Executive Report," Prepared for the Departments of Transportation of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, and Wisconsin, the Nebraska Department of Roads, the Ohio Rail Development Commission, and Amtrak (February 2000).

In 2002, Amtrak and the States of Illinois and Wisconsin began reviewing proposals for 110 mph tilting HSR trains. Lack of federal funding was cited as the reason for the delay in concluding procurement.[19] According to Amtrak, the State of Michigan, Amtrak, and the FRA have developed a state-of-the-art Incremental Train Control system that permits passenger train operations on the existing rights-of-way at speeds up to 110 mph. The first phase of the system (up to 90 mph on 45 miles of track) was successfully implemented in January 2002. After that, work began to extend the system an additional 20 miles and to seek approval for speeds in excess of 90mph operations.[20] They have since been increased to 110 mph on this section.[21]

With respect to the other spokes of the Hub, Indiana has completed a series of high-speed rail public outreach meetings to define the state's interest and participation in the MWRRI. Indiana is working with Amtrak, the States of Illinois and Michigan, and freight railroads on the "South of the Lake Corridor Study" to identify the best way to route passenger trains through Southern Chicago and Northwest Indiana.[22] Minnesota is pursuing a $10 million capital budget request for preliminary engineering and environmental documentation for the Minnesota portion of the Chicago – Minneapolis/St. Paul Corridor.

Thoughts and Recommendation: Given the definition of success this study is using, the Chicago Hub Network provides a success story of an accelerail project (or series of projects in this case). Some work has already occurred and the project is still being actively pursued, both substantively and financially. The Chicago Hub Network provides a complex picture of federally designated and non-federally designated corridors. Further, there is a strong rail component as the State of Illinois pursues its CREATE project in tandem with HSR efforts. Indeed, Union Pacific, which now owns several of the key lines, is very willing to work together to implement HSR in the region. As such it is a particularly interesting case in which one can look to how the various components interrelate and how such an approach has helped or hindered progress. However, given the scope of and resources for this study, fully exploring this case might not prove feasible. Thus, it is not being recommended at this time as there is a better fit with the Pacific Northwest case. Nevertheless, if additional information on the latter should prove elusive, the Chicago Hub Network should be reevaluated for inclusion in Phase II.

Empire Corridor

Designated in December 1998 as a federal HSR, the Empire Corridor connects New York City with Albany and Buffalo, for a total of 439 miles running through New York State. New York State has been running 110 mph passenger rail service on portions of the Albany-New York City stretch of the Empire Corridor route since the 1970s.[23] (The improvements along the line which allowed higher speeds were largely financed through the 1974 Rail Bond Act.) However, partly because of the shared right-of-way (with the Metropolitan Transportation Authority south of Poughkeepsie, and with CSX for most of the corridor between Poughkeepsie and Buffalo), speeds along the rest of the corridor are limited to 90 mph at most.

In September 1998, a memorandum of understanding was signed by New York State Department of Transportation and Amtrak that committed the former to rebuilding several old Turboliners and the latter to track improvements that would allow speeds of up to 125 mph on the section between New York City and Schenectady. The estimated cost of the plan was $185 million but travel times were expected to be reduced significantly throughout the corridor. However, in January 2004, Amtrak announced their intention to withdraw, citing delays and increased costs.[24] In the meantime, three Turboliners have already been delivered to Amtrak and two are in regular service at this time.

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[19] Amtrak, http://www.amtrak.com/about/government-hsr-index.html.
[20] Amtrak, http://www.amtrak.com/about/government-hsr-index.html.
[21] Richard Hazlett, Chicago of Transportation, Personal Communication, 3/2/04.
[22] Amtrak, http://www.amtrak.com/about/government-hsr-index.html.
[23] http://www.fra.dot.gov/Content3.asp?P=653 and Stephen Slavick, Acting Director Freight & Economic Development, NY State Department of Transportation, Personal Communication, 3/2/04.
[24] "Amtrak leaving New York Deal," *Destination: Freedom Newsletter* (January 5, 2004), http://www.nationalcorridors.org/df/df01052004.shtml.

Thoughts and Recommendation: One of the few corridors in the country where speeds of 110 mph are already being achieved in places, the Empire Corridor is an interesting case and is considered by some to already be a success story for accelerail. However, with the recent Amtrak announcement and the likelihood that the goal of 125 mph will not be reached any time soon, nor on a good portion of the Corridor, it is unclear at this point whether to consider this as a success or failure so the recommendation is to table this case for the moment. If the picture becomes clearer before the completion of Phase II and if the researchers are unable to gather substantial information and data on one of the other success stories recommended, then it should be reassessed.

Florida Corridor[25]

Florida's experience with high-speed rail has had a number of starts and stops over the years. In 1976, the Florida Transit Corridor Study was mandated by the Florida legislature. It looked at the feasibility of HSR between Daytona Beach and St. Petersburg and concluded that, if implemented in stages and used existing highway corridors, HSR would be marketable in Florida. Several years later, in 1982, the Florida High Speed Rail Committee (FHSRC) was instituted by Governor Graham after he visited Japan and saw the *shinkansen*.

In 1984, the Committee released the "Florida Future Advanced Transportation Report," which concluded that Florida's transportation infrastructure would not be able to accommodate future growth and that an advanced HSR system was necessary to maintaining mobility in the state. The report recommended developing public-private partnerships and using existing publicly-owned rights-of-way. During that same year, Florida's legislature enacted the Florida High Speed Rail Transportation Commission Act, which created the Florida High Speed Rail Commission (FHSRC) and charged it with implementation of HSR.

In 1986, the HSR Commission released its own study by Barton Aschman Associates that recommended proceeding with a 356-mile HSR system connecting Miami, Orlando, and Tampa. Requests for proposals were issued and two were received in 1988 – one from Florida TGV Inc. and one from Florida High Speed Rail Corporation. When it was clear that there would be no support for public funding, the former withdrew. In 1991, Governor Chiles rejected Florida High Speed Rail Corporation's proposal and one year later, a new High Speed Rail Act was enacted by the legislature, transferring the FHSRC's responsibilities to Florida Department of Transportation (FDOT).

The corridor recommended by the HSR Commission was federally designated on October 16, 1992. Between 1992 and 1994, corridor studies were conducted by FDOT, and in 1995 FDOT announced its commitment to fund HSR. Again, requests for proposals were issued and a number of proposals were received and reviewed.

In 1996, FDOT selected Florida Overland Express (FOX) Consortium, which proposed to build and operate a new grade separated, fully dedicated HSR between the three cities at an estimated cost of $6.1 billion. Franchise and pre-certification agreements were executed in 1997, with the understanding that FDOT would provide $70 million/year for 40 years and that FOX would contribute $350 million in equity funds over the life of construction period. The remainder would be financed through debt financing and bonds, repaid by revenues and a portion of the annual state contributions, though federal funds were also sought. FOX began its preliminary engineering and environmental work in 1998 but upon taking office in January 1999, Governor Bush terminated funding, citing environmental and financial concerns.

In 2000, Amtrak and FDOT issued a joint "Intercity Passenger Rail Vision Plan," again touting the importance of HSR to the region. That same year, the Florida legislature authorized another feasibility study and asked voters to decide on a constitutional amendment that directed the legislature to develop and operate a high speed ground transportation system with speeds above 120 mph and with construction beginning on or before November 1, 2003. The amendment was approved later that year

[25] Much of the information for this section was taken from the Florida Bullet Train website, http://floridabullettrain.com.

with 53% of the vote[26] and in 2001, the legislature enacted the Florida High Speed Rail Authority Act, creating the Florida High Speed Rail Authority (FHSRA) in June 2001 and charging it with planning, administering, and managing the preliminary engineering and assessment of HSR in the state. The FHSRA was composed of a 9-member board, with 3 appointees each from the Governor, the Senate and the House.

The first report of the FHSRA to the governor was made in 2002 and later that year, the FHSRA released its Orlando-Miami Planning Level Study which outlined potential routes, technological options, and estimated costs and ridership levels. Another request for proposals was issued just as the draft EIS for the Tampa – Orlando line was issued (August 2003).

To date, the Florida legislature had authorized $14 million for the HSR project, but at the end of 2003, Governor Bush vetoed $5 million of those funds[27] and has clearly stated he will not support further HSR efforts. Nevertheless, the FHSRA continues to move ahead; it selected Fluor Bombardier from the proposal received in 2003 and has since signed a contract and it continues to finalize the Tampa – Orlando EIS.

Thoughts and Recommendation: Florida offers a good counterpoint to California. They both aim to develop new HSR; both have gone to the voters for support; and both are not supported by key political officials. While California may still be deemed a success, Florida is looking more like a failure since the FHSRA has made it clear that additional state funds are needed and the governor is unwilling to allow this. Of particular interest in this case will be the legal issues regarding the Constitutional amendment and the governor's continued stance. Thus, the recommendation is to include this Corridor for further study in Phase II.

Gulf Coast Corridor

Formally designated as a federal HSR corridor in November 1998, with extensions approved in October 2000, the Gulf Coast Corridor covers a total of 1,022 miles and connects cities in Texas (Houston), Louisiana (New Orleans), Alabama (Mobile and Birmingham), and Mississippi (Meridian), and Georgia (Atlanta).[28] The goal is to run HSR at speeds of 110 mph. Louisiana received a $1 million earmark in Fiscal Year 1999 and $1.85 million was provided under TEA-21 for elimination of at grade crossings. The le ad for planning of the corridor is the Southern Rapid Rail Transportation Commission (SRRTC), which includes representatives from all four of the states involved.

In September 2002, the SRRTC was awarded a cooperative agreement by the FRA for Phase I of the Deep South HSR Corridor Study. This phase of the study includes the identification of institutional issues, service projections, information gathering, and development of a rail operations plan. A specific strategy for implementation will form the basis for Phase II.

Thoughts and Recommendation: Given that the funding for the study was scheduled to last through September 2004, it is likely that the study is not yet completed. According to the FRA, there are physical constraints along the CSX lines between New Orleans and Mobile that are likely to prevent HSR for much of this distance. Since the plans for this corridor appear to be in the initial stages and that there are other examples of accelerail which are or have been further along (the Chicago Hub Network and the Empire Corridor for example), the recommendation is not to include this case for further review at this time.

Keystone Corridor

The Keystone Corridor was designated as a federal HSR corridor in December 1998. (For map, see Empire Corridor picture on page 6.) Now consisting of 349 miles, the initial designation linked

[26] Joe Follick, "Bids Show High-Speed Rail Could Cost up to $2.7 billion," *Tampa Tribune* (11 February 2003): 1, Lexis-Nexis Academic, Online, Accessed 1/22/04.
[27] Florida High Speed Rail Authority, *2004 Report to the Governor and Legislature* (January 2004), http://mercurio.iet.unipi.it/tgv/fox.html.
[28] This last segment, from Birmingham to Atlanta links the Gulf Coast Corridor with the Southeast Corridor.

Philadelphia and Harrisburg, with an extension to Pittsburgh approved by US DOT in 2000. Amtrak owns the roughly 100 miles of track between Philadelphia and Harrisburg where current efforts are focused.

In November 1999, Amtrak and the State of Pennsylvania entered into a memorandum of understanding and announced a joint $140 million infrastructure and equipment upgrade program on the Philadelphia – Harrisburg segment of the line, to reduce trip times to 90 minutes by 2004, to enhance stations and improve reliability.[29] In October 2003, Governor Rendell announced another $3 million for passenger rail service between Harrisburg and Philadelphia as part of a $125 million capital budget aimed at improving public transportation.[30] Work continues on the line, though more slowly than anticipated. Roughly $20 million has been expended to date, with an anticipated $30 million in total by the end of 2004.[31] Recent discussions with Amtrak have resulted in a verbal agreement that remaining funding will be redeployed in light of a reassessment of needs on this segment of the Corridor. However, the project is expected to continue, with a completion date of December 2006.

Thoughts and Recommendation: Another example of an accelerail project within one state, efforts continue on this line though it appears to be having some difficulties similar to the Empire Corridor in terms of Amtrak's role. The recommendation is not to include this Corridor in Phase II of the current study unless the Pacific Northwest Case does not proceed.

Northeast Corridor

Not formally designated as a federal corridor, the Northeast Corridor is nonetheless one of the few success stories in HSR around the country, though it is important to point out that its key successes in terms of speed came by the early 1970s and little movement has been seen since. (For map, see Empire Corridor picture on page 6.) As Perl notes, however, while HSR in the Northeast Corridor did not keep pace with the speed and reliability of European and Asian HSR efforts, it did keep pace with respect to commercial performance by covering costs and generating and operating profit.[32]

In 1967, following the High Speed Ground Transportation Act two years prior, the Office of HGST at U.S. DOT, committed $6.7 million to support Pennsylvania Railroad's acquisition of new passenger cars that could attain speeds up to 160 mph.[33] The goal was to shorten the trip between New York City and Washington, DC to less than three hours. What made the Northeast Corridor so marketable was a combination of economic and geographic circumstances. Unlike other areas around the country, the North East Corridor lacked the space to add that amount of highway and air capacity needed to match growing travel demands. Thus, it was a good candidate for enhancing already existing infrastructure. The Corridor already had a well-developed and modern rail infrastructure at the time the decision was made and Pennsylvania Railroad, which owned and operated the line between New York City and Washington, DC, was willing to work with the government on the initiative. [34]

A true private-public enterprise, private partners injected approximately $860 million into the project, matched only by about $13 million from government sources. The key manufacturing companies – GE, Westinghouse, and the Budd Company – were all U.S. based companies. Together, the partners managed to have the Metroliner HSR system up and running within four years. However, because the long-term goal of upgrading the tracks to accommodate the higher speeds was not yet met, the trains could only run at speeds as high as 120 mph.

The partnership ended when Penn Central filed for bankruptcy in 1970, with others following soon after. Amtrak took over operation of the Metroliner between New York City and Washington, DC. Between 1978

[29] Amtrak, http://www.amtrak.com/about/government-hsr-index.html and Amtrak, "Atlantic Coast High Speed Rail Corridor," http://www.amtrak.com/press/HSR-atlanticcoast.html. Also see CONEG Policy Research, Inc. "Intercity Passenger Rail," *Getting There from Here* 1 (March 2001), http://www.coneg.org/reports/gt/go01-03.htm. The figure cited in the latter two is $140 million; on the more general Amtrak page, it is cited at $150 million.
[30] Pennsylvania Department of Transportation, "Governor Rendell Announces $125 Million for Public Transportation Improvements," 10 October 2003, http://www.dot.state.pa.us/internet/secinet.nsf.
[31] Joseph Daversa, Director, Bureau of Public Transportation, Pennsylvania DOT, Personal Communication, 3/3/04.
[32] Perl, *New Directions*, p. 140.
[33] Ibid, p. 141.
[34] Ibid.

and 1999, FRA invested roughly $3.7 billion in preserving and upgrading the Corridor. In 1992, Amtrak initiated the Acela HSR program and has invested $1.8 billion to date in support of a system that could run at speeds of 150 mph. Work was especially focused on the New York City – Boston segment of the corridor, rebuilding infrastructure and extending full electrification through New Haven, CT.[35]

Revenue service of the Acela began in December 2000 and trains now operate between 110 mph and 150 mph on portions of the Corridor. However, in over thirty years, except for the introduction of the Acela, little has changed on the southern section of the Corridor in terms of speed and number of trains making the trip on a daily basis, even as the airlines have modified their schedules to accommodate more passengers and more trips.

Thoughts and Recommendation: Considered a success since the system has been operating at HSR speeds for several decades (even though the ultimate goal remains to be achieved on much of the line). The Northeast Corridor story has been documented elsewhere before and in the interest of adding value through the current study, the preference is to explore new cases. Nevertheless, any lessons gleaned from the literature regarding this example, will be included in the final report at the end of Phase II.

Northern New England Corridor

One of the newest of the federally designated corridors, the Northern New England Corridor was formally designated in October 2000. (For map, see Empire Corridor picture on page 6.) Shaped like a lopsided V, the Corridor connects Boston with Portland and Auburn, ME on one side and connects Boston with Montreal, Canada on the other, totaling some 489 miles. Current speeds on the section from Boston to Portland (which only began being serviced by Amtrak in December 2001) average only 59 mph. In January 2002, a meeting was held in Nashua, NH to begin a Boston-Montreal high-speed rail feasibility study, jointly funded by the FRA, and the Departments of Transportation of Massachusetts, Vermont, and New Hampshire. The study's first phase, which focuses on ridership forecasts, infrastructure, public participation and institutional issues, was scheduled for completion in September 2002, but has not yet been released.

Thoughts and Recommendation: The Northern New England Corridor is in its infancy in terms of planning and strategy and would not offer sufficient data and information to draw conclusions at this point. Thus, it is not recommended as a case for further study at this time.

Ohio and Lake Erie Regional Rail Network

In 1975, the Ohio Rail Transportation Authority (ORTA) was created and charged with creating a plan for an intrastate passenger rail system that could be brought to the voters for support and with promoting a sound and efficient freight rail system. In 1979, ORTA recommended accelerail as the most viable option because it could be implemented up to speeds of 150 mph in a relatively short period of time. However, within a few years, they had shifted to advocating a new HSR system, thinking that construction of such a system would also help generate jobs in a state experiencing an economic downturn. In 1982, the ORTA proposal was defeated at the pools and ORTA.

Ohio & Lake Erie Regional Rail Cleveland Hub

From Ohio Rail Development Commission website, http://www.dot.state.oh.us/ohiorail/Cleve-Hub%20Map.htm.

ORTA's responsibilities were shifted to the Ohio Department of Transportation's (ODOT) Rail Division in 1983 and an Oho High Speed Rail Authority was created in 1985 to assist in development of a state-wide rail plan, including HSR. Again, the latter was terminated in 1989. Five years later, the Ohio Rail Development Commission (ORDC) was established by the legislature as part of ODOT. Consistent with earlier Ohio policy on rail, ORDC was also charged with addressing all rail issues, including passenger and freight.

[35] Amtrak, "Atlantic Coast High Speed Rail Corridor," http://www.amtrak.com/press/HSR-atlanticcoast.html and "Amtrak's Vision for America's High Speed Rail Program, http://www.amtrak.com/about/government-hsr-index.html.

In 1997, the ORDC began another serious look at HSR. They actively pursued federal designation of the 3-Cs (Cleveland-Columbus-Cincinnati) Corridor as part of the Chicago Hub Network and actively participated in the Midwest Regional Rail System. Moving beyond, however, the ORDC and ODOT identified several other corridors for further investigation (Table 4) and they continue to seek federal HSR designation.

In 2001, ORDC requested funds from the state for a study of the Detroit – Pittsburgh section of what they are terming the Cleveland Hub. ODOT and FHWA approved funding, though at the time of this report it appears that study is not yet completed. ODOT has also been working on a study with the Michigan Department of Transportation (MDOT) on the Detroit – Toledo line. The remainder of the corridors remain unassessed with respect to their feasibility for HSR.

Table 4. Non-Federally Designated Priority Corridors for ORDC[36]

Segment
Toledo, OH – Detroit, MI
Cleveland, OH – Pittsburgh, PA
Cleveland, OH – Erie, NY – Buffalo, NY – Niagara Falls, NY – Toronto, Canada
Toledo, OH – Columbus, OH
Chicago, IL – Ft. Wayne, IN – Lima, OH – Columbus, OH
Columbus, OH – Pittsburgh, PA

Thoughts and Recommendation: The Ohio Case is not being recommended for further study in Phase II for two reasons. First, the key line (the 3 Cs Corridor) is already included in the Chicago Hub Network, which is being recommended as one of the cases for Phase II so part of the discussion will already be covered. Second, the earlier history of Ohio's HSR efforts has already been documented.

Pacific Northwest Corridor

Covering roughly 466 miles, the Pacific Northwest Corridor connects Eugene, OR with Vancouver, British Columbia, with links along the way at Salem and Portland, OR and Tacoma and Seattle, WA. Designated a federal HSR Corridor in October 1992, a number of steps have already been taken to increase speeds on various parts of the route. In 1994, Washington State Department of Transportation began demonstrating Spanish-built TALGO trains, placing them into revenue service (operated by Amtrak) shortly thereafter.

In 1997 the FRA's Commercial Feasibility Study concluded that several options utilizing accelerail ranging from 95 mph – 125 mph service would be viable in the Corridor. One year later, after reviewing the results of the TALGO trains, it was clear that both ridership and revenues had increased dramatically, and Washington State took delivery of 2 custom built TALGO trains. Amtrak also purchased 2 similar trains for its route from Seattle to Vancouver, and Oregon leased one for use between Eugene and Seattle.[37] The leased train was recently put up for sale and Washington State Department of Transportation purchased it in November 2003.

Beyond using the TALGOs, Washington State and Amtrak have been working closely with the freight railroads (Burlington Northern Santa Fe and Union Pacific) to make track improvements, eliminate grade crossings, add high speed crossovers (to allow passenger trains to move around slower freight trains) and implement positive train separation in an effort to achieve 110 mph service along the distance of the Corridor. In September 2003, the FRA designated an additional $1million for grade crossing improvements along portions of the Corridor.[38]

[36] Ohio Rail Development Commission, "Ohio & Lake Erie Regional Rail Cleveland Hub Study," http://www.dot.state.oh.us/ohiorai/passenger_rail.htm.
[37] USDOT, FRA, "Pacific Northwest Corridor," http://www.fra.dot.gov/Content/3.asp?P=645.
[38] Washington State Department of Transportation, "WSDOT Receives $1 million from Federal Railroad Administration," http://www.wsdot.wa.gov/news/PTR/09_24_03_WSDOT_receives_funds.cfm.

Thoughts and Recommendation: Plans for the Pacific Northwest Corridor continue to move ahead and, as such, it is defined for the purposes of this report as a success story. There is certainly interest beyond the state governments as evidenced by the *I-5 Rail Capacity Study* released in February 2003 by the I-5 Transportation and Trade Partnership. Among other things, the report calls for active collaboration among private and public sector leaders to further HSR in the region.[39] Given the relatively short period of time involved in making progress, and the positive interaction with the freight railroads this is a particularly interesting case and is being recommended for inclusion in Phase II of the study.

South Central Corridor

The South Central Corridor was designated a federal corridor in October 2000. Shaped like a Y, it connects San Antonio, TX to Tulsa, OK, via Austin Dallas/Ft. Worth and Oklahoma City on one fork and San Antonio, TX to Little Rock, AK via Austin, Dallas/Ft. Worth and Texarcana on the other. Together, the entire system covers some 994 miles.

Thoughts and Recommendation: No further information was easily available, likely because the corridor is relatively new. Thus, this case is not recommended for further study at this time.

Southeast Corridor and Southeastern High Speed Rail (2 projects/1 inclusive of the other)

Designated as a federal corridor in October 1992, the initial Southeast Corridor linked Washington, DC to Richmond, VA. In 1995 an extension was approved to Hampton Roads, VA, with additional extensions approved in December 1998 and October 2000. The current Corridor links Washington, DC with 5 states as well as the Gulf Coast Corridor (Table 5).

Table 5. Southeast Corridor Segments

Segment
Washington, DC – Richmond, VA
Richmond, VA – Hampton Roads, VA
Richmond, VA – Raleigh, NC – Greensboro, NC – Charlotte, NC
Raleigh, NC – Columbia, SC – Savannah, GA – Jacksonville, FL
Atlanta, GA – Macon, GA
Charlotte, NC – Atlanta, GA

Southeastern High Speed Rail includes the federally designated corridor, but further extends the links to include the segment to Birmingham, AL covered by the Gulf Coast federally designated corridor and an additional segment to Chattanooga, TN and Nashville, TN.[40]

A report issued in 1997 by the U.S. Department of Transportation identified the Southeast Corridor as the most economically viable of all the proposed HSR projects.[41] One year later, the Virginia Department of Rail and Public Transport, North Carolina's Department of Transportation, the FRA, and the Federal Highway Administration (FHWA) signed a Memorandum of Understanding to jointly develop environmental documentation related to implementation of HSR on the portions of the Corridor in Virginia and North Carolina. A Tier I EIS followed in 1999, focused on the Washington, DC – Charlotte segments of the Corridor. The Tier I EIS was completed in 2002 and a Record of Decision

[39] HDR, *I-5 Rail Capacity Study*, prepared for the I-5 Transportation and Trade Partnership (February 2003)), http://www.odot.state.or.us/rail/PDFfiles/I-5%20RAIL%20CAPACITY%20FINAL%20REPORT%20ALL.pdf.

[40] The Southeast High Speed Rail Corridor website only shows the corridor to Chattanooga, but Tennessee DOT describes the corridor through to Nashville. See Larry Bivins, "State Says High-Speed Rail to Atlanta is the Ticket for Savings," *Gannett News Service* (23 December 2003), Lexis Nexis Academic, Online, Accessed 1/22/04.

[41] Southeast High Speed Rail Corridor, www.sehsr.org/projdesc.html.

on the proposed route was issued by FRA and FHWA, allowing the Tier II EIS to begin. The proposed date of completion is 2004.

Thoughts and Recommendation: Though efforts along the Southeast Corridor and the more extensive Southeastern High Speed Rail system appear to still be underway, there are other accelerail examples (most notably Chicago Hub Network, the Empire Corridor, and the Pacific Northwest Corridor) which are likely to provide more information pertinent to the goals of this study. Therefore, the recommendation is not to include either of these cases in Phase II.

Texas Triangle

Linking the cities of Dallas and Houston, Dallas and San Antonio, and San Antonio and Houston, the Texas Triangle is not a federally designated Corridor, though parts of it are included in the federally designated South Central Corridor. Efforts began in 1987 when the Texas legislature directed the Texas Turnpike Authority to study the feasibility of HSR in the Texas Triangle. In 1989, a report was made to the legislature concluding that under certain assumptions HSR would be feasible. In May that same year the Texas High-Speed Rail Act created the Texas High-Speed Rail Authority (THSRA), composed of 11 members and charged with determining whether HSR was in the public interest and, if so, then to award a franchise to develop and operate it. In 1990, requests for letters of intent and then a request for proposal were issued, with proposals received the following year from the Texas High-Speed Rail Joint Venture (later Texas FasTrac) and the Texas TGV Consortium. The latter was selected and awarded the franchise to build, operate, and maintain an HSR system in the Triangle.

Initially, the Texas TGV Consortium expected a more streamlined process with fewer constraints since there was to be no public funding for the project. However, It quickly became clear that there were going to be some major hurdles to overcome. In the franchise agreement, Texas TGV agreed to pay for THSRA's ongoing operating budget. In addition, it would have to obtain $170 million in equity financing by the end of 1992. Finally, because of new safety regulations under the FRA, a complete EIS would need to be prepared, including public hearings, all at Texas TGV's expense.[42]

The initial 1992 deadline was missed and extended for an additional year. However, the financing deadline was missed again in 1993 and by 1994 the contract had been terminated. Part of the difficulty in obtaining funding was directly related to Southwest Airlines' aggressive counter campaign, which launched several lawsuits during this period and allied with key partners to block congressional funding in an effort to stop what they saw as a competitor for their customers.

Texas TGV's investors lost roughly $40 million by the end of the process.[43] More importantly, according to Perl, "The Texas TGV's failure was a delegitimizing event for the proponents of market-led rail passenger renewal."[44]

Thoughts and Recommendation: The Texas Triangle is a clear example of a failure to progress efforts on new HSR. However, the case has been previously documented in Anthony Perl's book, *New Departures: Rethinking Rail Passenger Policy in the Twenty-First Century*. To add value with the current study, it is preferable to document a new case, though the lessons pointed to in Perl's book would be added to the final conclusions of the Phase II report. Thus, this case is not recommended for further review in Phase II.

III. SUMMARY AND CONCLUSIONS

[42] Perl, *New Departures*, p. 164.
[43] Ibid., p. 170.
[44] Ibid.

Of the 19 identified HSGT projects, 4 are Maglev and are thus not selected for further exploration under this study. Of the 15 projects remaining, 3 offer cases of new HSR – California, Florida, and the Texas Triangle – and 12 offer cases of accelerail.

Within the new HSR cases, the Texas Triangle has already been documented and lessons can be drawn from previous discussions to add to any lessons found in Phase II of this study. Florida and California offer interesting counterpoints – both have voters heavily involved and governors and/or legislatures that are opposed. To date, California is still on track and Florida is looking more like a failed story. Thus, both of these are being proposed for further study under Phase II of this effort.

With respect to acclerail, 5 of the 12 cases – Gulf Coast Corridor, Northern New England Corridor, South Central Corridor, Southeast Corridor, and Southeastern High Speed Rail – are still very much in their infancies, and there is little to be gained by including them at this point in Phase II of the study. Among the remaining 7 cases, the Northeastern Corridor and Ohio and Lake Erie Regional Network have all been documented previously to some degree and lessons can again be drawn from earlier work to supplement new information found as a result of this study. Of the 5 cases left, the Pacific Northwest is most clearly still moving ahead and is recommended for further study in Phase II. Should information prove elusive, the Empire Corridor (which is a mixed success/failure) and the Chicago Hub Network should be reevaluated for inclusion in Phase II.

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