

HIGH-SPEED INTERCITY PASSENGER RAIL

SPEEDLINES

MARCH 2014
ISSUE #11

PHILADELPHIA WELCOMES THE ACS-64



» p.10

Vice President **BIDEN**

All Aboard! US Vice President Biden Welcomes First Siemens-built Amtrak Locomotive Entering Passenger Service.

CONTENTS

SPEEDLINES MAGAZINE



Amtrak President-CEO Joe Boardman, Federal Railroad Administrator Joseph Szabo traveled to the U.S Department of Transportation (DOT) Transportation Technology Center (TTC) facility in Pueblo, Colorado to get an update on the testing program and to observe a testing demonstration.

CHAIR: DAVID KUTROSKY
VICE CHAIR: PETER GERTLER
SECRETARY: AL ENGEL
OFFICER AT LARGE: NORMAN FORDE
IMMEDIATE PAST-CHAIR: JOLENE MOLITORIS

EDITOR: WENDY WENNER
PUBLISHER: AL ENGEL
ASSOCIATE PUBLISHER: KENNETH SISLAK

LAYOUT DESIGNER: WENDY WENNER

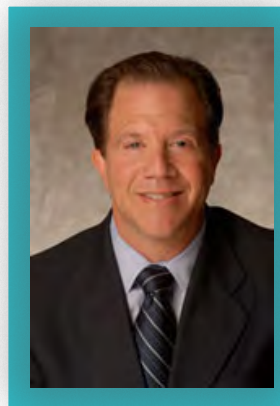
SPEEDLINES is published by the HS&IPR Committee in cooperation with:

American Public Transportation Association
 1666 K Street NW
 Washington, DC 20006

© 2011-2014 APTA - ALL RIGHTS RESERVED

- 3 CHAIRMAN'S MESSAGE
- 5 HSIPR COMMITTEE
- 6 LEGISLATIVE UPDATE
- 9 NY EMPIRE CORRIDOR
- 10 VP BIDEN VISITS PHILADELPHIA
- 12 AMTRAK'S NEW WORKHORSE
- 15 TRANSCONTINENTAL RR
- 16 WORLD-CLASS PASSENGER RAIL
- 18 IN THE SPOTLIGHT
- 19 NEC FUTURE PLANNING
- 21 HSR IN TURKEY
- 23 FUTURE DESIGNS: HSR IN THE USA
- 25 ENGINEERING HSR
 - ▶ VIII INTERNATIONAL CONFERENCE / CORDOBA, SPAIN
- 26 TEXAS - AN HSR CONTENDER

We are seeking no less than \$50 billion over the next six years to develop the high-speed intercity passenger rail system that would connect with Amtrak, commuter rail and transit systems.



FROM THE DESK OF DAVID KUTROSKY ■ ■ ■

Welcome to the APTA Legislative Conference. As you know, 2014 is going to be a pivotal year for transportation as funding issues and several other legislative initiatives work their way through Congress. You will be able to learn about the current political scene and get insight on the legislative agenda for the 113th Congress from Charlie Cook, editor and publisher of The Cook Political Report and columnist for the National Journal at the "Welcome to Washington" session on Sunday evening after all of the APTA committee meetings have concluded. The keynote speaker for the Opening General Session on Monday is USDOT Secretary Anthony Foxx, who will take questions from the audience! We will also hear directly from key congressional staff on how Congress is working on addressing issues facing public transportation and intercity passenger rail. I find these legislative discussions at this conference sometimes sobering but always informative.

What are some of the issues facing intercity passenger and high-speed rail? It is all about sustainable funding. This includes reauthorization of MAP-21, which expires at the end of September 2014 and reauthorization of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA), which expired last year. As is common today in Washington DC, the picture is not clear. Will PRIIA legislation continue to be a separate bill or be part of the larger reauthorization efforts for the current MAP-21 surface transportation bill? Amtrak President and Chief Executive Officer Joseph Boardman recently said that the September 30th expiration of MAP-21 provides an opportunity for Congress to create a new federal surface transportation investment program that focuses on national priorities, connectivity and economic growth. These challenges to reauthorizing the federal surface transportation programs also provide opportunities for the nation's intercity passenger rail network.

The APTA High-Speed Intercity Passenger Rail Committee has been active in seeking the reauthorization of PRIIA through either a standalone bill or as a separate rail title to the surface transportation reauthorization legislation. Our Legislative Principles for a Federal High-Speed and Intercity Passenger Rail (HSIPR) Program seeks to provide a balanced national transportation policy framework and funding that fosters a robust, healthy, improved high-speed/intercity passenger rail network, which would consist of high-speed passenger rail corridors, higher speed train services, and conventional intercity passenger trains. The principles also include opening up competition in providing intercity passenger rail services, restraining costs, and streamlining

project delivery. But we are seeking no less than \$50 billion over the next six years to develop the high-speed and intercity passenger rail system that would connect with Amtrak, commuter rail and transit systems. APTA has adopted and includes our committee's HSIPR legislative program proposal in the APTA's report on reauthorization recommendations released this past December 2013. You can read more about the legislative proposals in this issue of SPEEDLINES.

This issue of SPEEDLINES also includes articles providing a broad spectrum of what's happening in the continuing development of intercity passenger and high-speed rail programs throughout the United States and from around the world. Ken Prendergast, Executive Director of All Aboard Ohio, provides a refreshing perspective on high-speed rail development in the United States. Of particular interest to me are updates on the Northeast Corridor Futures, Texas high-speed rail programs and the Empire Corridor in New York State. The article from Ken Sislak on high-speed rail development in Turkey should encourage all of us to think big. If Turkey can invest \$50 billion in high-speed rail over the next ten years, why can't we?

The APTA High-Speed Intercity Passenger Rail Committee is continuing to seek funds from members and friends to match funds provided by APTA and other agencies and HSIPR supporters to advance the Return on Investment (ROI) Benefits Analyses study for HSIPR investment and then release the RFP. Read more about the status of this Committee initiative in this issue of SPEEDLINES.

I look forward to seeing you at the High-Speed Intercity Passenger Rail Committee meeting on Sunday, March 9th at 8 a.m. at the JW Marriott in Washington, DC during the APTA Legislative Conference. Our next meeting will be at the APTA Rail Conference in Montreal, Quebec-Canada this coming June. If I missed seeing you here in Washington, then safe travels and I hope to see you in Montreal.

David B. Kutrosky

Chairman APTA High-Speed Intercity Passenger Rail Committee

The Passenger Rail Investment and Improvement Act of 2008 (PRIIA) reauthorizes the National Railroad Passenger Corporation, better known as Amtrak, and strengthens the US passenger rail network by tasking Amtrak, the U.S. Department of Transportation (US DOT), Federal Railroad Administration (FRA), states, and other stakeholders in improving service, operations, and facilities. PRIIA focuses on intercity passenger rail, including Amtrak's long-distance routes and the Northeast Corridor (NEC), state-sponsored corridors throughout the Nation, and the development of high-speed rail corridors.

MAP-21 is a milestone for the U.S. economy and the Nation's surface transportation program. By transforming the policy and programmatic framework for investments to guide the system's growth and development, MAP-21 creates a streamlined and performance-based surface transportation program and builds on many of the highway, transit, bike, and pedestrian programs and policies established in 1991.

HS&IPR COMMITTEE

ROI STUDY UPDATE

At the annual meeting of the APTA Business Member Board of Governors (BMBG) on January 23, 2014, a full agenda of industry and legislative issues and priorities was discussed. With respect to the nascent national high-speed and intercity passenger rail program, it was agreed additional communication tools were required to overcome the conservative resistance to the President's initiative. A resolution to financially support a seminal study on the return on investment in intercity passenger rail passed unanimously.

The APTA High-Speed & Intercity Passenger Rail (HS&IPR) Committee of APTA has launched its fund raising effort to raise \$450,000 from APTA members and other interested parties for this study to make the case for rail reauthorization and future investment in HS&IPR projects. APTA is contributing \$50,000 from its operating budget and now the BMBG has committed \$25,000. David Kutrosky, Chairman of the HS&IPR Committee and chief executive of the Capital Corridor service, has arranged for The Capitol Corridor Joint Powers Authority to make a substantial financial commitment and there are several companies active in APTA that already have made preliminary commitments

to support this effort.

The Committee leadership and APTA staff seek to engage a highly credible, independent study to quantify the total benefits flowing from HS&IPR projects such as the Northeast Corridor, California High-Speed Rail, Midwest Regional Rail Initiative, Southeast Corridor, and others. The objective is to capture the "true" return on investment" (ROI) for these projects not just the classical benefit/cost ratio. To supplement the analytical work on US corridors, the actual economic and societal results of HS&IPR investments in other industrialized nations will be documented. This study will also be transformational in that it will demonstrate how HS&IPR projects put money back into the economy.

The goals of the study are to produce a document that:

- monetizes social and economic benefits that accrue to the public "but for" the construction of HS&IPR in terms of ROI,
- provides indisputable evidence that the investment in HS&IPR yields returns well beyond the investment and any operating subsidies,
- is independent and unbiased and can receive acceptance from both political persuasions that a national policy and

dedicated investment program for HS&IPR is needed.

The Regional Plan Association (RPA) has been working hard over the last decade to advance the case for investment in high-speed rail both in the NEC and nationally through its affiliate "America 2050". RPA has agreed to collaborate with APTA in the development of this study and Dr. Bob Yaro, President of RPA and Adjunct Professor at University of Pennsylvania, will serve on the steering committee for the study. The HS&IPR Committee leadership is delighted that Dr. Yaro will be lending his wealth of knowledge and expertise to this effort.

The HS&IPR committee is aspiring to achieve broad support for this ROI Study. The objective is to complete the fund drive in the next month or so and get the study underway during the second quarter of 2014. Results are wanted in time to inform the Congressional debates for the authorization of a new surface transportation bill which includes a Rail Title.

Anyone interested in being a study sponsor should contact Art Guzzetti or KellyAnne Gallagher of APTA.

LEGISLATIVE OUTLOOK

Contributed by Peter A. Peyser, Peyser Associates LLC



In recent years, Congress has become notorious for its legislative cliffhangers. Appropriations for government agencies get stuck with regularity and included in “continuing resolutions” of various lengths. Government agencies shut down for lack of appropriations. The national debt limit is debated under threat of a national default. The highway trust fund is insolvent absent annual infusions of general fund money.

While those who observe all of this legislative suspense are understandably weary, rail advocates can be forgiven for wishing that the lapsing of the nation’s rail legislation would produce the same level of concern in Washington as those other events. As our readers undoubtedly know, the Passenger Rail Investment and Improvement Act of 2008 expired on September 30, 2013. Amtrak and Federal Railroad Administration programs are operating now because appropriations bill language allows it. However, there is no long-term policy direction or reliable funding for these important programs.

This situation is, of course, familiar. From 2002 until 2008, Amtrak and the other rail programs also operated without authorizing legislation. Will Congress and the Administration allow this situation to recur for another six years?

Current signs indicate that momentum behind enacting new rail legislation is minimal. The leadership of the House Committee on

Transportation and Infrastructure (T&I) indicated last summer they would introduce a bipartisan bill in the fall, but that did not occur. Discussions surrounding the legislation have slowed as the committee has turned its attention to the approaching expiration of highway and transit programs.

On the Senate side, there has been some discussion among staff members at the Senate Committee on Commerce, Science and Transportation about rail legislation, but they are waiting to see action on the House side before stepping up their efforts. This is understandable given that in 2012, the commerce committee developed a rail title to the MAP-21 legislation only to see it dropped from the House-Senate conference committee on that bill because the House did not have companion provisions.

By contrast, legislation to reauthorize federal highway and transit programs has a much better chance of enactment this year and rail advocates are wisely using that fact as a way to raise their issues to a higher visibility.

As noted above, the House T&I Committee has started its legislative process with hearings on the need for reauthorizing the current “MAP-21” legislation and finding an answer for the revenue shortfalls in the highway trust fund. Likewise, the Senate Committee on Environment and Public Works (EPW) has held a hearing and its leadership has announced the intention to introduce a “policy bill”

(i.e. not dealing with the revenue shortfall problem) in April

In both the House and the Senate the revenue raising committees, Ways and Means in the House and Finance in the Senate, must act to extend the current federal gas tax and find additional funds to support the surface transportation programs.

The difficulty of a tax increase in this election year makes the prospects for a five or six year reauthorization bill for surface transportation dubious at best. There is a strong likelihood, Congress will settle for another two-year “patch” on the trust fund as they did in 2012.

Into this context come rail advocates who are seeking access to trust fund support for Amtrak and high-speed rail initiatives in the states. Led





by Amtrak CEO Joe Boardman, who has been tireless in pushing this concept, rail advocates have stepped up their efforts to make the case that intercity passenger rail is deserving of support from a dedicated trust fund because rail is an integral part of the national network of surface transportation facilities.

While this is an argument that may be difficult to win, the fact that it is being made puts rail issues into a discussion that is front and center right now – the future of the Highway Trust Fund. From that point of view, rail advocates are well advised not to let the opportunity to be part of the national transportation conversation pass them by.

Another way to be in the conversation surrounding the reauthorization of surface transportation legislation would be to renew discussion of the issue of allowing states the flexibility to use formula dollars allocated to them from the Highway Trust Fund for intercity rail passenger projects. This concept was included in the Senate version of the ISTEA legislation in 1991, but dropped in the House-Senate conference. Allowing this flexibility would be a continuation of a long evolution

in transportation policy that began when transit projects first got access to highway trust fund support in the 1970's. Given the appetite for studying and developing high-speed rail in the states, this idea could generate more support now than it did in the '90s.

The Spring of this year will be an active time in Washington on transportation issues. While enactment of rail legislation per se might not rise to the top of the agenda, the discussion over surface transportation programs – and the revenues needed to support them – create an excellent opportunity for rail advocates to make their case. Upcoming issues of SPEEDLINES will track the debate in Washington.

●●●●●● APTA PROPOSED PASSENGER RAIL LEGISLATION

APTA supports the creation of an integrated network of passenger rail services, including high-speed rail where appropriate, that connects with the existing Amtrak system, and with commuter rail, transit operations and other intermodal connections. APTA supports dedicated revenues for such a

program, other than those currently supporting the Highway Trust Fund.

A streamlined NEPA review process for projects is advocated along with a policy where both private and public sector participation should be considered in the development of new rail service. It is APTA's position that an expansion and improvement of the US current intercity passenger rail system will require a commitment of federal, state, local and private resources – a combination of funding AND financing strategies that will not only pay for projects, but also speed their planning, design and construction.

APTA recommends an authorization of \$50 billion over six years to facilitate the development of a HSIPR system, funded by a dedicated and indexed federal revenue source, and complemented by the use of public private partnerships.

APTA calls for reauthorization of the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) through standalone legislation or as a separate rail title to surface transportation authorization.

APTA's Legislative Committee adopted a set of principles on June 2, 2013 which provides further guidance on the industry's policies regarding investment in intercity passenger rail which are available on the APTA public website.



“ Every man has a train of thought on which he travels when he is alone. The dignity and nobility of his life, as well as his happiness, depends on the direction in which that train is going, the baggage it carries and the scenery through which it travels.

-Unknown Author

EMPIRE CORRIDOR

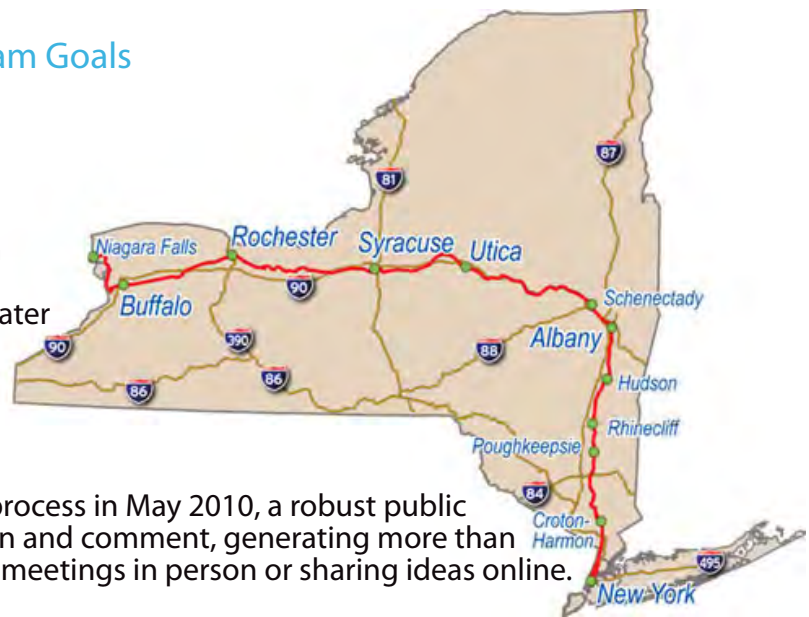
OPPORTUNITY FOR HIGH-SPEED RAIL IN NEW YORK

Contributed by Elizabeth Rao, HNTB

The Empire Corridor runs through the population and economic spine of New York State, connecting all major metropolitan areas. Eighty percent, or roughly 15.5 million, of New York's residents live within 30 miles of the Empire Corridor. With the need to better serve these residents, the New York State Department of Transportation (NYSDOT) in cooperation with the Federal Railroad Administration (FRA), has released the High-Speed Rail Empire Corridor Tier 1 Draft Environmental Impact Statement (DEIS). This is a detailed environmental analysis of potential improvement to passenger rail service along the Empire Corridor, the 463-mile rail corridor between New York City's Pennsylvania Station and Niagara Falls Station, New York.

High-Speed Rail Empire Corridor Program Goals

- Increase travel choices and mobility
- Attract additional ridership
- Improve economic vitality and livability
- Increase access to jobs and work force
- Expand economic development and tourism
- Attain environmental sustainability
- Improve on-time performance to 90% or greater



Ten Alternatives Were Considered

Since the start of the environmental review process in May 2010, a robust public outreach program invited public participation and comment, generating more than 100 ideas from the public attending scoping meetings in person or sharing ideas online.

Ten alternatives were considered following public scoping sessions in 2010, and five were eliminated after initial analysis, as they did not meet program goals established in the scoping process. Factors evaluated include the ability to generate ridership, improve travel times and increase on-time performance, along with considerations of environmental impacts and costs. Three alternatives were not advanced because they did not improve speed, service, or operational expenses; two very high-speed alternatives were eliminated because of cost and high environmental impacts. Five feasible alternatives remain, each with the potential to impact the future of mobility and drive economic growth across New York State.

BIDEN SUPPORTS ACS-64

TRANSIT INSIDER

The Cities Sprinter electric locomotives for Amtrak are based on Siemens' Eurosprinter and Vectron models. They are equipped to operate on the three line voltages 25 kV, 12.5 kV and 12 kV and develop an output rating of up to 6.4 MW. Consequently, they can reach a substantially higher performance level than the predecessor models. By operating trains up to 18 cars long at a top speed of 200 km/h (about 125 mph), Amtrak will now be able to run trains at closer headways and carry a considerably higher number of passengers on the same route.

When Amtrak Northeast Regional #171 departed Boston on Feb. 7, a new era of mobility began as the first of 70 new advanced technology electric locomotives entered revenue service. The modern equipment provides more reliable and efficient service for passengers, and will power the Northeast region's economic growth and continued prosperity.

"Amtrak is integral to the daily life of the Northeast and the new locomotives will continue keep the people and businesses of the region connected and on the move," said Amtrak President and CEO Joe Boardman. "New equipment ensures Amtrak can deliver the reliable service the region depends on and supports the growth of the region as America's economic powerhouse."

"Beyond improved reliability of service, the new locomotives represent a prudent business decision to invest in the future of the Northeast region and better position Amtrak to support ridership growth in the coming years," said Amtrak Chairman Tony Coscia.

The new locomotives will serve as the strong workhorses of Amtrak Northeast Corridor operations,

powering all Northeast Regional and long-distance trains between Washington, New York and Boston, and match existing trip-times at speeds up to 125 mph. Eventually, they also will operate on the Keystone Service between New York, Philadelphia and Harrisburg, PA.

The Siemens-built electric locomotives, known as the Amtrak Cities Sprinter, are assembled at its solar-powered rail manufacturing plant in Sacramento, CA. The equipment includes parts built from Siemens plants in Norwood, OH, Alpharetta, GA., and Richland, Mi., and nearly 70 other suppliers, representing more than 60 cities and 23 states.

"We are extremely proud to serve as a rail technology partner for Amtrak," said Michael Cahill, President of Siemens Rail Systems in the U.S. "Through our teamwork with Amtrak, we are not only delivering improved performance, we're boosting American manufacturing. Our innovation, expertise and proven technology are helping transportation operators across the country keep the economy moving."

The new locomotives are designed for improved reliability and easier maintenance leading to faster turnaround times and increased availability for service. A state-of-the-art microprocessor system performs

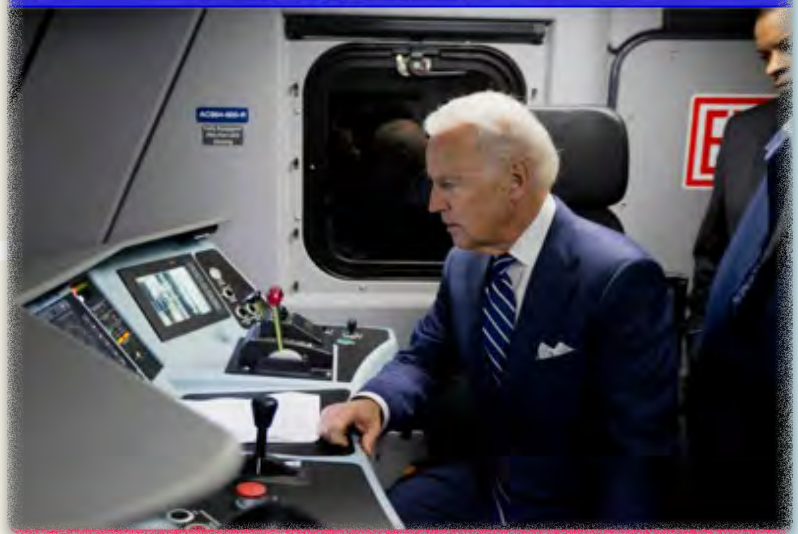
self-diagnosis of technical issues, takes self-corrective action and notifies the locomotive engineer. In addition, there are redundant systems to ensure power is maintained to the passenger cars to keep heating and cooling systems working, the lights on and the doors operational. The locomotives also meet the latest federal rail safety regulations, including crash energy management components. Furthermore, the locomotives are energy efficient and use a regenerative braking system to feed energy back into the power grid. Together, the 70 locomotives could save over 3 billion-kilowatt hours of energy and could result in more than \$300 million in savings over 20 years.

The new locomotives will replace older equipment that have between 25 and 35 years of service and average mileage of more than 3.5 million miles traveled with some approaching 4.5 million miles. Amtrak expects to have several more new locomotives which are set to enter revenue service shortly, with the remaining delivery of the remaining units throughout 2015.

Amtrak is a vital player in the Northeast economy and transportation system, connecting major business, financial, political, cultural, medical and educational centers. Today, Amtrak carries three passengers for every one airline passenger between Washington and New York, and moves more passengers between New York and Boston than all the airlines combined.

Vice President Joe Biden (pictured right with Transportation Secretary Anthony Foxx)—an ardent Amtrak supporter who during his days as a US Senator from Delaware logged more than 8,000 Amtrak round-trips commuting between his Wilmington, DE, home and his Washington office—helped unveil the ACS-64 at a Feb. 6th event at Philadelphia's 30th Street Station.

The new locomotives will operate on Northeast Regional trains at speeds up to 125 mph on the Northeast Corridor (NEC) along the Washington – New York – Boston route and on Keystone Service trains at speeds up to 110 mph on the Keystone Corridor from Philadelphia to Harrisburg, PA. In addition, the new locomotives will power all long-distance trains operating on the NEC.



Vice President, Joe Biden traveled to Philadelphia, PA to deliver his remarks highlighting the need for an infrastructure investment to advance the technology that keeps regions connected and on the move. This new era of mobility of the rail system's Cities Sprinter electric engine, which will power trains along the Northeast Corridor between Boston, NYC and Washington, DC,

Also in attendance were Secretary of Transportation Anthony Foxx and Congressman Chaka Fattah to help with the unveiling of Amtrak's new Cities Sprinter electric locomotive at the 30th Street Station in Philadelphia, PA.

AMTRAK'S NEW WORKHORSE

REPORTS FOR DUTY

Contributed by William F. Durham, ACS-64 Project Team Leader, AMTRAK

The veteran AEM-7s have served Amtrak well. Delivered between 1979 and 1988 and later supplemented by the HHP-8s in 2000, these locomotives have been the mainstay of Northeast Corridor and Keystone Corridor service. In fact some AEM-7s have accumulated average mileages in excess of 3.5 million miles with some approaching 4.5 million miles.

As of February 7, 2014, a new era has dawned for Amtrak with the introduction of the Amtrak Cities Sprinter (ACS-64) into revenue service. Once deliveries are complete in 2015, Amtrak will for the first time in its history operate one class of electric locomotive in which it initiated the purchase. The ACS-64 will serve as the strong workhorses of the Amtrak Northeast Corridor operations, power all Northeast Regional and long-distance trains between DC, New York and Boston, and match existing trip times at speeds up to 125 mph. Eventually, they also will operate on the Keystone Service between New York, Philadelphia and Harrisburg, PA.

This project is a team effort between Siemens Rail Systems, and Amtrak (the Rolling Stock Engineering / Capital Acquisitions Group of the Amtrak Mechanical Department) and a multitude of suppliers in the United States and other countries around the world. It was a collaborative effort from the very start and

involved 61 design review meetings conducted in Philadelphia, PA; Munich, Germany; and Sacramento, CA.

The 70 new locomotives are financed by a \$466 million a Federal Railroad Administration (FRA) Railroad Rehabilitation and Improvement Financing Program (RRIF) loan. They are based on proven technologies and designed to deliver improved performance, reliability, maintainability and availability.

The Amtrak locomotives are being assembled at the Siemens Sacramento, CA, rail manufacturing plant powered by renewable energy with parts from other Siemens plants including traction converters from Alpharetta, GA, traction motors and gear units from Norwood, OH and surge arresters from Richland, MS. Overall, parts are provided by 69 suppliers, representing more than 61 cities and 23 states. The locomotives are being built in excess of Amtrak's Buy American standards which require 51% of components come from "local" or US suppliers.

After completion of the Technical Specification, the Request for Proposal (RFP) was issued in June 2009. With the team established months beforehand in anticipation, Amtrak went to work in the "War Room" reviewing the proposals for compliance to the technical specification. There were several rounds of

questions and answers with the prospective builders. Ultimately, Siemens was selected as the builder of choice. When the contract was awarded in October 2010, both teams went to work to develop and design an electric locomotive that would meet the technical specifications and the demanding operating environment of the Northeast Corridor.

The design is based on Siemens' successful EuroSprinter and the Vectron platforms. The body is a monocoque structure with integral frames and sidewalls. The Amtrak-specific design meets the latest Federal Railroad Administration (FRA) safety requirements including crash energy management components like front-end strength and a crumple zone for collision with large objects, in addition to an enhanced safety cage, push back couplers and anti-climber functionality. Amtrak applied for and received permission from the FRA for alternative crashworthiness using crash energy management in lieu of AAR S-580 Locomotive Crashworthiness Requirements. The design also incorporates a push-back coupler with deformation tube to absorb energy in the event of a collision.

The ACS-64 uses Alternating Current (AC) Propulsion, Insulated Gate Bipolar Transistor (IGBT) and regenerative braking technologies. The 70 new locomotives are equipped with regenerative braking, which allows energy to be fed into the power system for use by other trains. The manufacturer estimates that

when fully deployed and operated as designed, the regenerative braking feature may result in the generation of 3 billion kilowatt hours of energy. At an estimated 10 cents per kilowatt hour, the energy generated equals \$300 million in electricity being returned to the power system for use by other trains. This is compared to locomotives that do not have this state-of-the-art regenerative capability.

The locomotive weighs in at just over 216,000 lbs. and is 68 feet long. It has four (4) axles that are individually controlled and the locomotive offers a short term power rating of 6.4 megawatts, hence the "64" in ACS-64. The ACS-64 locomotive will have a peak of 8,600 horsepower (6.4 MW) with excellent acceleration capabilities to attain revenue service speeds of 125 mph pulling up to 18 Amfleet coach cars, while at the same time providing up to 1,000 kVA (1MVA) of head-end power for auxiliary train equipment such as interior lights, electrical outlets and air conditioning and heating for passengers. Redundant Head End Power (up to 1,000 kW) ensures our passengers remain comfortable. There are three (3) inverters. Two (2) of the inverters power the traction motors; the third unit supplies Head End Power (HEP) and auxiliary power. The HEP/auxiliary inverters are dual-redundant and identical allowing the locomotive to remain in service should one inverter fail en route. On board diagnostics and other protections ensure the locomotive can complete its mission.

The state-of-the-art microprocessor system installed in the locomotive allows for self-diagnosis of technical issues. The on-board computer system can notify the engineer and operator of any maintenance issues and can take self-corrective action to maintain operation of the locomotive and

ensure safety. For example, the computer may identify a technical issue and can automatically notify the engineer, switch to a back-up or redundant system or decrease speed and operation performance if necessary.

The ACS-64s include such features as dew point monitoring for the air brake system as well as bright, distinctive LED headlights, marker lights, ditch lights and number board lights. In fact, all lighting on the ACS-64 including the cab, machinery room and maintenance lighting is all LED.

All major components with the exception of the fabricated steel truck frames and the transformers are made in the United States. With three (3) voltage systems (12 kV 25 Hz, 12.5 kV 60 Hz, 25 kV 60 Hz), the transformer for the ACS-64 is the second largest transformer produced by Siemens. The ACS-64 has a design speed of 135 mph with a service speed of 125 mph. Friction braking is accomplished by cheek mounted disc brakes on each wheel. It has a pinion hollow shaft drive with partially suspended gearboxes.

A partnering charter with a formal mission statement and eight (8) objectives was crafted by both teams and adhered to throughout the duration of the project. From the time of the kick-off of the project, stakeholders were invited to share their input including: Electric Traction; Clearance, Inspection and Test; Procurement; Government Affairs and Corporate Communications; and in particular the Transportation Department and the Brotherhood of Locomotive Engineers and Trainmen (BLET). These last two groups sent the General Road Foreman, Assistant General Road Foreman and five qualified locomotive engineers to participate in the

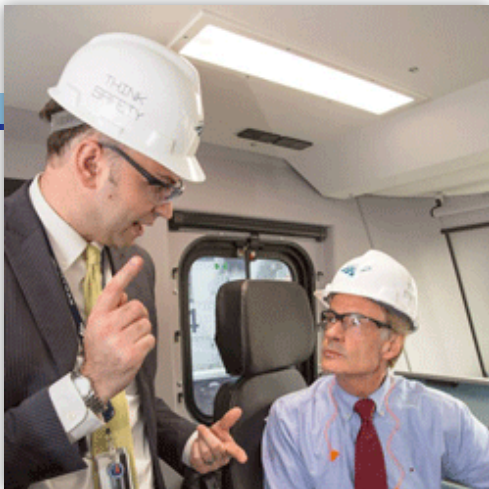
mock-up review of the cab. They were actively involved in selecting the seat and the cab layout of switches and controls on the console.

During 2011 and into 2012, design review meetings were conducted in three phases; preliminary (30%), in-process (60%) and final (95%), all the time refining the locomotive's design to meet Amtrak's expectations. Under a Master Service Agreement, Amtrak was supported by CH2M Hill, a professional engineering firm, in areas such as carbody design, propulsion, vehicle track dynamics, trucks, brakes, HVAC and safety certification matters. At times European and U.S. standards clashed and so did the teams, but everyone had the same goal in the end; designing a safe, reliable and energy efficient product.

After design reviews concluded, approximately 113 First Article Inspections of each "first piece" commenced in 2012. The project team, consisting of the Project Team Leader, the Fleet Director, mechanical and electrical engineers, attended 33 of these and were supported by the Standards and Compliance group through all of them. FAls were conducted in United States and Europe.

Progress review meetings were held on a quarterly basis to assess project status and a total of 25 safety certification meetings were held monthly.

Communication has been the key to the success on the project. A standing Engineering Conference Call is held every Tuesday morning at 9:00 a.m. since the project's inception. This required participants from three time zones in Philadelphia / Wilmington, California and Germany. A weekly Project Management call is held every Thursday at 11:00 a.m.



US Senator Tom Carper toured the Cities Sprinter Locomotive with Amtrak representative, Vice President Stephen Gardner in Wilmington, DE.



Pictured Above: FRA Administrator Szabo / "Safety is our No. 1 priority," Szabo said. "Today's testing regime demonstrates the extraordinary safety standards FRA requires manufacturers and railroads to meet when building passenger rail equipment."

The roof-mounted HVAC unit was tested in Hornell, NY. inside a climatic test chamber to test the unit in extreme heat and cold conditions. Truck frames underwent 14,000,000 cycles of static fatigue testing. The carbody underwent an 800,000 lbs. buff load test, better known as the "squeeze test." The cab underwent a floor fire test as well as noise and vibration testing.

The first two locomotives (#600 & #601) were shipped to the US Department of Transportation's Transportation Technology Center, Inc. (TTCI) test track in Pueblo, CO, in June 2013 with qualification testing continuing through November 2013. The testing included maximum speed runs, acceleration and braking, and the overall performance capabilities of the locomotive. The two units accumulated over 13,500 miles on the 13.5 mile loop track. Locomotive #602 arrived in Wilmington, DE, just before July 4, 2013. By September 2013, #602 performed Instrumented Wheel Set

testing for 125 mph qualification and ride quality performance on the Northeast Corridor with FRA officials witnessing these tests. There were a myriad of propulsion, braking and electro-magnetic compatibility tests performed on specific sections of track with specific characteristics.

Several locomotives have already run comprehensive field tests on the Northeast Corridor. These field tests will continue on the east coast—including the Keystone Corridor – as the production schedule ramps up for the locomotives. By early 2014, several locomotives are expected to be in some phase of the testing and commissioning process.

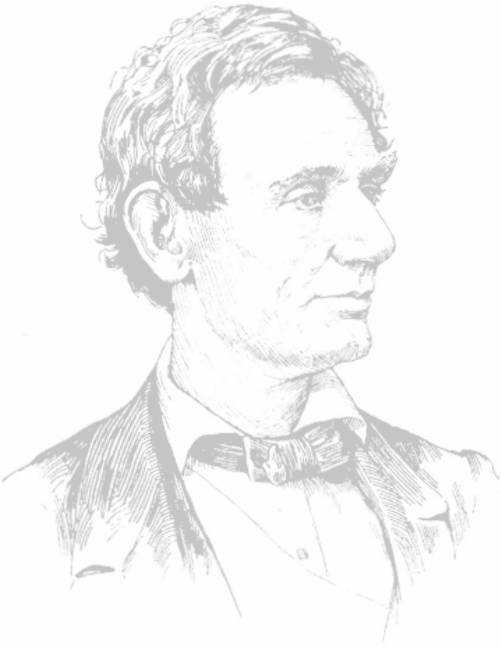
To ensure the locomotive engineers and mechanics are properly trained, Siemens and Amtrak have developed a multi-pronged approach that includes classroom and instructional time, software-based training and simulation, and hands-on training in

the field at Washington, Wilmington, Philadelphia, New York, New Haven, Boston and Harrisburg. With more than 2,000 course hours slated as part of the program, Siemens and Amtrak began training on the electric locomotives in Spring 2013. This will continue through 2014 and as Siemens completes delivery in 2015.

With the first locomotive now in revenue service, production of the remaining units will subsequently ramp up a scheduled delivery of approximately two locomotives per month through 2014, and moving to three units per month through 2015 with a general warranty of three years on each locomotive with the exceptions being fifteen years on the carbody and blower pedestals, nine years on the trucks and five years on the transformers.

Next time take more than a glance at the locomotive pulling your train. You may be surprised!

Contributed by Wendy Wenner, AMTRAK



Lincoln.

The First Transcontinental Railroad allowed for railroad movement from the East Coast to West Coast of the United States. This link had been a dream almost since the steam locomotive made its first appearance in the early 1830s and was dramatized by the discovery of gold in California in 1848. At that time only two routes to the West were available: by wagon across the plains or by ship around South America. This mode of travel could take four months or more to complete and trains provided faster, safer and cheaper transit. In addition to passenger service, things like mail, supplies, and trade goods could also be shipped across the country in a matter of days.

One of the biggest and first transcontinental railroad advocates was a New York merchant named Asa Whitney. In 1845, Asa devised the first concrete plan for funding of the railroad,

by government land grants to construction companies willing to lay the tracks. He presented this information to Congress, but the plan was rejected. The discovery of gold in Oregon Territory followed by the California Gold Rush and the Nevada Silver Rush dramatically increased westward expansion in the 1850s.

By the 1860s, Theodore Judah created a construction plan for the potential railroad's path through the Sierra Nevada Mountains and began to lobby. At that time there were two rail routes up for consideration. The first route was named the central route and followed a similar path to the Oregon Trail beginning in Omaha, Nebraska and ending in Sacramento, California. The other route was a southern route which would stretch across Texas, New Mexico, and end up in Los Angeles, California; with the central route chosen by Congress. Theodore pushed for completion of the project and found investors to support it. After contractual and financial disputes with the investors, Judah left to find new investors, but became sick and died.

In 1862, President Abraham Lincoln signed the Pacific Railroad Act into law. The Act said that there were two main railroad lines, the Central Pacific Railroad would come from California and the Union Pacific Railroad would come from the Midwest and the two met somewhere in the middle. This Act gave the railroad companies land where they could build the railroad and paid them for each mile that they built. Notably, they were paid more money for miles of track built in the mountains versus miles of track built on the flat plains.

Construction of the railroad presented a daunting task requiring the laying of over 2,000 miles of track that stretched through some of the most forbidding landscape on the continent.

Tunnels would have to be blasted out of the Sierra Nevada Mountains, rivers bridged and wilderness needed to be tamed. Two railroad companies took up the challenge. The Union Pacific began laying track from Omaha to the west while the Central Pacific headed east from Sacramento.

While the Central Pacific Railroad had to deal with mountains and snow, the Union Pacific Railroad had to deal with Native Americans. As the Native Americans came to realize the threat to their way of life that the "Iron Horse" was going to bring, they began to raid the railroad work sites. Also, a lot of the land that was "granted" to the railroad by the government was actually Native American land.

Progress was slow initially, but the pace quickened with the end of the Civil War. The majority of the workers on the Union Pacific Railroad were Irish laborers, many who had served in both the Union and the Confederate armies. In Utah, a lot of the track was built by Mormon workers with most of the Central Pacific Railroad being built by Chinese immigrants. Finally the two sets of railroad tracks were paired and the continent united with an elaborate Golden Spike Ceremony at Promontory, Utah on May 10, 1869.

The impact was immediate and dramatic. Travel time between America's east and west coasts was radically reduced from months to less than a week. During this ceremony, Leland Stanford, Governor of California and President of the Central Pacific Railroad drove the final spike into the ground, signifying the completion of the first transcontinental railroad. The spike used for the ceremony was a golden spike and coined the event name. Amazingly, the ceremony may have been the first broadcast media event, as telegraph stations aired each hammer strike to follow with eruptions of joy upon receiving the confirmed message.



PASSENGER RAIL

EVOLVING OUR WAY TO BEING WORLD-CLASS

Contributed by Ken Prendergast

Ken Prendergast is Executive Director of All Aboard Ohio, a statewide nonprofit organization that advocates for passenger rail and public transportation improvements. He has worked in various paid and volunteer positions at All Aboard Ohio and its predecessor organization, the Ohio Association of Railroad Passengers, since 1984. Prendergast also is a freelance journalist whose regular clients include Sun Newspapers in Cleveland where he previously worked for 15 years as a full-time staff writer.

When President-elect Barack Obama paused his inaugural train to pick up then-Senator Joe Biden in January 2009, many rail advocates had visions of TGVs or ICEs zipping across the American landscape within a few years.

But a friend of mine from Mr. Obama's hometown of Chicago offered me a word of caution. He did so even as other rail advocates applauded President-elect Obama and Vice President-elect Biden for symbolically arriving in Washington, DC by train for the inaugural ceremonies. But many overlooked the intended symbolism. It wasn't a nod to the future but to the past by retracing the route of President Abraham Lincoln's arrival in Washington.

"Rule 27 of the Consolidated Code of Operating Rules reads: 'A [railroad] signal imperfectly displayed...must be regarded as the most restrictive indication that can be displayed by that signal...'" wrote Fritz Plous of Corridor Capital LLC to me in January 2009. "The Obama inaugural train is not a clear signal giving a green light to a new federal transportation policy."

Five years later, those who pictured TGVs and ICEs appearing by now in some of America's busiest travel corridors are surely disappointed. So we as Americans anger or depress ourselves by comparing our nation's passenger rail system with those of Europe or the Pacific Rim. It's certainly appropriate to demand that America be competitive on the global stage. But perhaps we might first compare our rail services and policies of today to a more relevant sample – with what came before them.

Why? Because most change is based on what came before. Change typically happens through evolution, not revolution.

Foremost, consider that the United States had no multi-year, federal-state matching capital improvement program for intercity passenger rail for 177 years. That span began when America's first powered railroad train was pulled forth by the steam locomotive deWitt Clinton on August 9, 1831. It thankfully ended October 16, 2008 when President George W. Bush signed the Passenger Rail Investment Improvement Act into

law. The new law contained a federal funding authorization (i.e. a framework) of \$7.2 billion over five years. It didn't include appropriations (actual money). So there was still much work to do.

The federal government neglected to capitalize Amtrak after taking on the responsibility of owning America's passenger rail system in 1971. From 1971 to 2001, Amtrak received a mere \$9.8 billion in total federal capital funds (including funds for the Northeast Corridor Improvement Project and general nationwide improvements), according to the US Department of Transportation. States kicked in capital funding too, with California's \$1.9 billion contribution in the 1990s far ahead of any other state's.

Five months after President Bush created the funding framework, incoming President Obama poured in the funding in quantities not seen by any president before him. Indeed, every US president preceding President Obama, regardless of party, sought or implemented Amtrak service cuts, including the Mercer Report-induced cuts under President Clinton. So, the 2009

USA

world-class passenger and freight rail system would bring about much needed balance to America's transportation matrix and, with essential policy adjustment, improve train offerings to passengers, taxpayers, and business partners.



federal stimulus law included \$9.3 billion (\$8 billion for the High-Speed and Intercity Passenger Rail [HSIPR] program plus \$1.3 billion in capital for Amtrak). Thus in one year the federal government nearly equaled the combined passenger rail capital investment it made in Amtrak's first 30 years.

The feds weren't done. A year later, Congress and Mr. Obama followed with another \$2.5 billion for the HSIPR program. Unlike the 100 percent federal stimulus grants, this round was awarded on an 80/20 federal/state matching basis, requiring states to chip in at least \$500 million to leverage the federal funds. The state matches brought the 2010 HSIPR total to \$3 billion.

Some states were ready to invest much more than that. California voters in 2008 approved a \$10 billion bond issue for high speed rail. Meanwhile, the \$1.5 billion privately financed All Aboard Florida project moved forward, as did the \$10 billion Texas Central High-Speed Railway. And there is still hope for the \$6.9 billion Las Vegas-Victorville Desert Xpress.

The Federal Railroad Administration distributed \$10.1

billion in federal funds to projects in 33 states, bringing 100+ mph passenger trains to states like Illinois and Michigan and faster trains to many other places. Although three Tea Party governors refused federal grants, two of them (Florida's Rick Scott and Wisconsin's Scott Walker) kept other federal passenger rail funding. In the Sunshine State, this meant total investments of \$3 billion for SunRail in Central Florida and the Miami Intermodal Center.

Ideological shifts in Congress meant a lack of additional funding for the HSIPR program after 2010. But many critics who lament the lack of federal commitment seem to forget that federal HSIPR appropriations of \$10.5 billion actually exceeded PRIIA's \$7.2 billion five-year authorization.

And that hasn't stopped more federal funding from pouring into passenger rail improvements from other sources. Ever since it started in 2009, the Transportation Investment Generating Economic Recovery (TIGER) Program has pumped anywhere from one-fourth to one-sixth of its roughly half-billion dollars of annual grant awards into projects benefiting

passenger rail. Even Congress has shown to be generous to Amtrak in recent years, awarding \$1 billion to \$2 billion per year to Amtrak's capital improvement program.

All told, \$29 billion in public sector funding has poured into passenger rail development projects from state and federal governments since President Bush signed PRIIA into law in 2008. Another \$18.4 billion in private-sector funding is starting to pour in, too, as the private credit markets continue to recover from the recession. Public and private funds coming together total \$47.4 billion over the past five years – or four times more than was invested in passenger rail during Amtrak's first 30 years.

If change continues to evolve based on what has come before, then the overdue reauthorization of PRIIA should build on the federal leadership role that has triggered larger sums of state and private investment. That's positive momentum to which this Congress should accelerate.

SPOTLIGHT

YOU SHOULD GET TO KNOW US



PAUL NISSENBAUM
ASSOCIATE ADMINISTRATOR

"The President has proposed a bold, 4-year surface transportation authorization that for the first time would provide dedicated, predictable, multi-year funding for rail programs.

More than \$19 billion will be invested in eliminating the backlog of infrastructure, equipment, and station state-of-good repair needs throughout the country; maintaining and enhancing existing assets and operations; and making market-based investments that will position rail to meet the Nation's changing transportation needs."

**FEDERAL
RAILROAD
ADMINISTRATION**

Railroad Policy and
Development



ANDREW WOOD
CHIEF, NEXT-GEN INTEGRATION

"The need for new high-speed trains on the NEC has never been stronger, with demand growth, outstripping our supply every day. Everything in this high-speed rail trainset procurement is designed to speed delivery, by using the best the world can offer in service proven equipment and building it in America."

AMTRAK

NEC Infrastructure
and Investment
Development



RUBY SIEGEL
VICE PRESIDENT, SR. PROJECT MANAGER

"The FRA NEC FUTURE program is a once in a lifetime assignment that challenges me and our entire team – FRA and its consultants – to do our best thinking, be innovative and provide a solid, fact-based foundation for future decisions."

AECOM

North America
Transportation
Planning Services

NEC FUTURE

PLANNING UPDATE

Contributed by Pam Lebaux and David Carol, Parsons Brinckerhoff



The Federal Railroad Administration (FRA) continues to advance the planning and environmental review process for NEC FUTURE, a program to develop a long-term vision and phased improvements for the Northeast Corridor (NEC) from Washington, DC to Boston. By defining an investment program to improve the capacity, operations and reliability of NEC rail service for both commuter and intercity trips, NEC FUTURE aims to enhance the region's mobility options, serve new markets, and provide a foundation for rail service in 2040 and beyond. A Tier 1 Environmental Impact Statement (EIS) and Service Development Plan (SDP) will be completed as part of NEC FUTURE.

NEC FUTURE began in 2012 with a stakeholder and public outreach process and an analysis of the region's travel markets to define future service needs. Starting from a list of nearly 100 alternatives that represented an array of operating market scenarios, in 2013 the FRA developed a set of 15 Preliminary Alternatives that reflect a range of possible futures for the NEC. Over the past year, the FRA team further defined the Preliminary Alternatives with service plans and infrastructure at a conceptual level, and began an in-depth evaluation to select alternatives for study in the program's Tier 1 (programmatic) EIS. The technical

tools informing this evaluation are currently being enhanced with additional data. Throughout the alternatives development process, the FRA has worked closely with the NEC railroad operators, federal and state agencies and other stakeholders, as well as reaching out to the public through regional workshops and outreach to riders at 16 NEC stations last spring.

Preparations are now underway for the Tier 1 EIS, including the development of methodologies for effects assessments and an analysis of existing environmental conditions within the Study Area. The Tier 1 EIS and a SDP for the NEC—to be completed in 2016—will frame future investments in the corridor, while allowing flexibility for decisions on the specific projects that will implement the vision.

Key questions to be considered as the program proceeds include how markets for NEC rail service will grow and change by 2040, how much new capacity will be needed, how service should be provided, and the overall role passenger rail should play within the region's multimodal transportation system. Some of the alternatives now being analyzed focus on achieving the full potential of the existing NEC. These would include strategic investments—primarily within the existing right-of-way—to enable high-capacity operations. Others would involve construction of a “second spine” to support high-speed rail service. The Preliminary Alternatives incorporate four representative

routes for a potential second spine which are currently being evaluated.

The NEC FUTURE alternatives are also structured to test new types of service and changes in the way the NEC is operated to allow more efficient use of rail infrastructure. This could include expanded service options to fill the significant gaps between today's intercity and commuter markets, better use of the existing railroad, and potential changes to scheduling, ticketing, and fleet management to provide greater convenience to travelers. For example, new train types might include high-speed express trains to a broader range of markets or metropolitan service to better connect smaller stations across the NEC.

Each Tier 1 EIS alternative will be defined to include a common set of initial projects that would take place as funding becomes available and a recommended phasing approach. These projects will address the most immediate needs of the NEC. The common projects are expected to include two new Hudson River tunnels, modernization of infrastructure, replacement or rehabilitation of major tunnels and bridges, track improvements, and terminal improvements at each end of the corridor.

For more information on the program and the alternatives development process, or to sign up for e-mail updates, visit www.necfuture.com.



The Northeast region is facing serious mobility challenges, which, if left unaddressed, will have far reaching repercussions on the regional and national economy. The region is served by an extensive passenger and freight transportation system of highways, airports, ports, and rail. That transportation system has outdated technology and lacks sufficient capacity, connectivity and redundancy to support local and inter-regional mobility needs, resulting in major congestion and delays.

NEC FUTURE is a roadmap for future investments in an integrated passenger rail transportation system necessary to sustain and advance economic growth.

Moreover, regional population and economic growth will require investment in this transportation infrastructure to provide businesses with access to a growing workforce and resources and to provide residents with safe, reliable and convenient travel options. Highway, airport, and rail networks all face substantial challenges to meet their share of growing travel demand and each mode requires investment to address capacity and deteriorating conditions. The Northeast rail system has and will continue to play a critical role in shaping and supporting the development of the Northeast. Upgrades to that system are essential for connecting commuters and travelers with growing downtown business centers. A well defined and planned role for investment in passenger rail is required to improve the region's multimodal transportation network and its ability to support population and economic growth along the NEC.



Turkey's high-speed railway (YHT) line between Istanbul and Ankara will quadruple Turkey's high-speed railway passenger numbers, according to Transport Minister Lütfi Elvan.

"2014 will be the year of records for the YHT," he told Anadolu Agency on January 12, while discussing the 2013 performance of the much-anticipated lines.



HSR IN TURKEY

CHINESE FIRM TO CONSTRUCT

Contributed by Kenneth Sislak, AECOM



The Turkish State Railways (The Turkish State Railways (TCDD)) is getting ready to open the final section of a high-speed rail line linking the capitol of Ankara to Istanbul. The original section of the line, between Ankara and Eskişehir, was completed in March 2009. China Railway Construction Corporation Limited (CRCC) completed the extension project from Eskişehir to Istanbul in January 2014. Service between Ankara and Istanbul, Turkey's largest city, is due to open in February 2014. A fleet of 250km/h EMUs supplied by CAF for Turkey's first two high-speed lines linking Ankara with Eskişehir and Konya will provide the initial service. TCDD wants to achieve a scheduled journey time of less than 3-hours for the approximately 331 mile trip. For comparison, the distance between Chicago and Cleveland is approximately 345 miles.

The Ankara-Istanbul high-speed rail line also will be linked to the Marmaray, Istanbul's massive rail tunnel project that was opened in October 2013 and carries passengers under the Bosphorus, through the Pendik suburban train station. This link will enable an unbroken journey from Asia to Europe.

Ankara's population is about 3.8 million while the population of

Istanbul is about 10.3 million, which is roughly the equivalent of Northeast Ohio and Chicago respectively. Turkey's population is 76 million with a population density of 259 people per square mile. For comparison, Ohio, Indiana and Illinois have a combined population of nearly 31 million people in an area approximately one-third the size of Turkey. Population density in Ohio is 257 people per square mile and for the three states it is 222 per square mile. GDP for the three states is \$1.5 trillion making GDP per capita over \$48,500. Turkey's GDP is \$1.3 trillion or only \$18,348 per capita.

The Turkish government plans to construct new high-speed and normal railway lines in 15 cities, where a majority of the population lives. Turkey plans to invest a total of \$45 billion in high-speed rail systems targeting a 1,500 km (932 miles) network by 2014 and a 10,000 km (6,213 miles) network by the year 2023. By 2015, the first phase of the high-speed network will be complete with trains running to Izmir and east from a new high-speed station in Ankara to Sivas and Erzincan.

To achieve faster scheduled journey times, TCDD awarded a contract last summer to Siemens for seven 300km/h (186 mph) trains for operation on its growing high-speed rail network. The contract is worth

€285 million (\$374.1 million) including maintenance. Delivery is due to start in 2016. The 200m-long eight-car trains will accommodate more than 500 passengers, and are based on the Velaro-D trains which Siemens is currently building for German Rail (DB) and will replace the CAF trains on the Ankara – Istanbul route.

If Turkey can afford to build high-speed rail, maintain a military and build a tunnel under the Bosphorus Strait, why can't we build high-speed rail in the United States and especially in the Chicago – Cleveland Corridor now that United Airlines has eliminated its air service hub in Cleveland?



“Man's mind, once stretched by a new idea, never regains its original dimensions.”

- Oliver Wendell Holmes Sr.

FUTURE DESIGNS HSR IN USA



AN INDUSTRIAL DESIGNER'S VANTAGE POINT

Contributed by Cesar Vergara

Cesar has 25 Years of experience in the RR industry served as Chief designer of the National RR of Mexico, Amtrak and NJT, as well as 8 years as National Principal of Design in Jacobs engineering NYC. US Liaison in the Watford Group of Architects and designers, organizers of the Brunel Award. Active participant in APTA, PRIIA, NGEN, COMTO and UIC. Vergarastudio proudly celebrating its fifth anniversary serving the mass transportation industry globally. www.vergarastudio.com

A special challenge of designing for the future is that by the time you finish building and implementing it, the plans you made are already well in the past. This is particularly true in megaprojects such as high-speed rail, from the architecture to infrastructure to rolling stock and all interconnected elements, the process will take well beyond a decade from concept to ribbon cutting. Architects, urban planners, industrial designers and engineers need to understand that the aesthetic impact the system will have will be profound: it will endure for decades, extend over vast real estate and serve many generations.

For these reasons, inventing the future sometimes requires looking into the past, not to copy the architectural styles or technologies of bygone eras, but rather to evaluate the processes that yielded infrastructure, stations and rolling stock that were not only welcomed when put into service, but aged to become

functional entities, avoiding transformation into urban blight and in some cases even becoming landmarks.

But how can a design team achieve this goal in an ever faster moving target of technologies and demographics? Is there a formula that can help us establish a viable approach?

Not exactly a formula, but I can offer some suggestions:

Infrastructure, make every inch a beauty: HSR competes head to head with airlines in city pairs approximately 300 to 600 km apart. Planes need attractive airports and access roads, however, there is no infrastructure physically linking the two. Rail is very different, there is a substantial presence that never leaves the ground, an obvious but often ignored aspect is that of the visual and physical effect of the rail infrastructure in the route traversed.

This constitutes an opportunity to enhance the cityscape or

landscape when appropriate, and demands extreme aesthetic scrutiny in implementing it in high value natural, historical and urban areas. From bridges to switch boxes, in a manner of speaking, it constitutes a way of ensuring that both sides of the bridge are the right side of the bridge

Go well beyond ecology, apply biophilic design:

"Design is a healing art that provides the opportunity to enhance peoples living using elements of nature as a gift."

-- Clodagh

Biophilic Design is an emerging science that attempts to impart inherent human affinity with natural systems and processes. A current book on the subject "Biophilic Design the theory and practice of bringing buildings to life". (ISBN 978-0-470-16334-4) a book co-authored by Stephen Kellert,

outlines a roadmap for sustainability and ecological approaches to design, and most importantly, from an ID point of view; it provides a formula for creating buildings and infrastructure with increasing and lasting aesthetic longevity. Is a station a transportation hub or a shopping center, or both?

In Europe and Asia, where HSR has been in service for decades, there is a lively and ongoing debate as to the role stations should play in the service. The obvious fact is that these are arrival and departure hubs serving tens of thousands of passengers daily, located in both historical centers as well as in newly created suburbs spurned by their very existence. Both scenarios highlight extraordinary opportunities for retail and commerce.

The important thing is to reconcile the core transportation function with the commercial ones. A train station where an able bodied or physically disadvantaged passenger, cannot find the ticket or information counter or an intuitive path to the platforms and train is simply not a good station. On the other hand, a station that does not offer amenities required and expected by the modern commuter is lacking in service.

This is one of the archetypical challenges of transportation design waiting to be solved, however: To solve this problem there will be no one size fits all approach, as each and every instance will demand a unique solution.

HS trainsets are high tech, safe and fast, they should appear high

tech, safe and fast, the trainset has to convey the sum and effort spent in putting together the entire system, not just the train. Industrial design is not a last layer applied to the surface as it if were make up on an artist; rather it is the last visible layer representing billions spent on infrastructure, rolling stock and technology to deliver this service. It also happens to be a de-facto coat of arms for the state or region deploying it, don't be tempted by the apparent ease of copying the great ideas of others, as Daniel Burnham, pronounced "Make no little plans, they have no magic to stir peoples blood."

Comfort: The level of comfort afforded to the passengers has to be tailored to the service. Customer focus groups should be conducted to ascertain the likes and dislikes of initial prospective passengers, assumptions by any department, are usually incorrect. In any new high-speed train, there exists no small insignificant details, there are however, large number of details adding up to a coherent, attractive and functional entity. Charles and Ray Eames, powerhouse design couple of the 1950's, stated eloquently that "The details are not the details, they are the project."

Safety: The cornerstone of rail transportation, no exception in HSR, ID plays a critical role in supporting engineering to generate interiors that are safe by meeting and exceeding all applicable standards. As part of the engineering team, ID contributes innovation in structural areas including that of crash energy management.

Accessibility: Newly graduated from ID school in Stockholm Sweden, I worked in an ID consulting firm with

SJ (Swedish RR) as a customer. Those days SJ's motto was: "What is necessary to a few is convenient for all", needless to say this was thinking well ahead of its time, and preceded ADA by decades. This lesson served me well during my years in Amtrak as part of the team working to implement the first installment of the ADA. In my experience, complying with ADA is complex, but the result is simple: It's an excellent excuse and opportunity to make the trains and stations better for every passenger, disabled or able bodied.

Intermodality: A sound approach to HSR design requires selection of good transfer points and seamless interface for all connecting transportation modes. In designing a high-speed rail system, the idea should never be to beat or eliminate other modes of transportation, but to help them achieve their logical potential of increasing the mobility and safety of all citizens.

Reliability: No transportation service ever was successful if the reliability left something to be desired. Ideally, in a new service the passengers will be able to set their clocks by the trains departure and arrival, but good design can take the edge off eventual shortcomings in the schedule, particularly in the critical months after establishing the service. This is precisely what transpired in the early 90's in Denmark with a new train designed by the late Jens Nielsen.

Architects and designers; the challenge of Designing the US High-Speed Rail Environment of the Future is very clear, but certainly not the solution; this remains wide open and yours to solve.



ENGINEERING HSR



VIII INTERNATIONAL CONFERENCE

Contributed by Eduardo Romo



Once again the International Conference on Engineering for High Speed Railways will take place in Cordoba, Spain, June 25-27. It is the eighth such conference and this is a very special year as it is the 50th anniversary of high-speed passenger rail. Organized by the Fundación Caminos de Hierro, a Spanish non-profit railways expertise center (active member of APTA and UIC), it will be held at the Palacio de Congresos in the historical city of Córdoba, the core of the high speed network in the South of Spain.

Last year (the seventh conference also held in June) the theme of the Conference was "Different International Experiences of a Technology with a Future" and it was again the opportunity for transportation and railways professional and experts coming from different countries (Japan, France, India, USA, Germany, Spain, etc.) to meet and discuss on different points of successful transportation modes.

The opening keynote speakers were Rod Diridon (Exec. Director Mineta Transportation Institute, USA) who brought to the audience a bright speech updating the challenging California High-Speed Program and Luis López

(ADIF, Spain) who presented an overview of the current status of the Spanish high-speed system, the largest in terms of length with the Chinese one.

They were followed by a lively discussion along the Round Table about "Advantages and Main Features of an Infrastructure for the next Hundred Years" with the contribution of Iñaki Barrón (Passengers and High-Speed Director, UIC), Rosa Arce (Univ. Politécnica de Madrid, Spain) and José Luis Alfaro (European Inv. Bank, Luxemburg).

The second day was devoted to "International Experiences and Results of High-Speed Technologies". In the first session different experts tackled lines with consolidated services: Michel Leboeuf (SNCF, France) about the French operation and services increasing evolution; Drew Galloway (AMTRAK, USA) talking on the success and challenges of the Acela line; Wolfgang Jakob (UNIFE, Germany) presenting the new concepts for the European Technical Standards on traffic control equipment and María Luisa Domínguez (ADIF, Spain) bringing the design methodologies of the Spanish infrastructure.

Experts from Japan Railways, Takumi Ishii; ADIF (Spain), Eduardo Molina, César López and Rafael Ozaeta; THALES, Luis Fernández shared their point of view regarding lines with technical singularities as different track gauges, undersea conditions or desert environments.

The third session, on "Large Networks Planning" included an overview of main projects under development by international well known experts. The ambitious American long term program, with Al Engel (USA), the future network in India, currently under assessment, with Mukul Mathur (Govt. of India) and a worldwide outlook by Iñaki Barrón (UIC).

The final session dealt with projects having unusual challenges such as construction and operation in desert areas along the Mecca-Medina line with experts from main industrial companies as INDRA (Javier Rivilla, Spain) and SIEMENS (David Sanz, Spain).

As High-Speed Rail is synonymous with innovative technologies, the last day centered around Research, Development and Technological Innovation. Two sessions, on "Railways Innovation Programs, Tools and Trends" and "Technologies and Innovation Projects in Progress" were dedicated to discuss on different improvements involving infrastructure, track and modern monitoring techniques.

To take part in the Eighth conference June 25-27, 2014, contact Eduardo Romo at eromo@fundacioncdh.com

TEXAS

A CONTENDER IN THE RACE

By Jennifer Moczygamba, Texas DOT

In the tale of high-speed rail, there may just be a surprise. Texas is rarely talked about, however, as important studies are being completed with funding from the High-Speed and Intercity Passenger Rail (HSIPR) program, Texas should definitely be considered a contender.

The Texas High-Speed Rail Authority, working with Texas TGV, started with promise, but failed. Factors including competition from airlines, land needs and lack of public funding and demand are potential reasons for the failure. So when the Passenger Rail Investment and Improvement Act (PRIIA) established passenger rail programs, and when the American Recovery and Reinvestment Act (ARRA) dropped \$8 billion for state programs out of the sky, was Texas ready to enter the race? Texas, who enjoys being the leader in many things and strives to be best-in-class, was behind California, the Northeast Corridor, Florida, Washington, the mid-western states and North Carolina, just to name a few. Texas, whose population has been one of the fastest-growing in the country, is the second most populous state, with the third-, fourth- and seventh-largest cities in the country each located approximately 300 miles apart over flat terrain. This is the same Texas, which has consistently had one of the best state economies and fosters business and job growth to maintain that

healthy economy -- all factors which lend themselves to a promising high-speed rail system for Texas.

With the release of PRIIA and funding through ARRA, did Texas even want to be in the high-speed rail race? Texas had focused more recently on the movement of goods, rather than people, by rail. With millions of tons of chemicals, crude oil, agricultural products and consumer goods needing to be moved to, from and through the state, that was a logical focus and provided fuel to keep the economic fire burning. However, as business grows, so does the population, adding additional strain to already congested roadways. Consideration for passenger rail as an alternative means of travel for both business and leisure seemed necessary.

While Texas didn't have a passenger rail plan, and the money that was first made available through the HSIPR program was not for planning, Texas was successful. In spite of not having a cohesive plan, the Texas Department of Transportation (TxDOT) partnered with the freight railroads and received grant funding for a couple of small, but very important projects to improve speeds and rail movements around the Dallas-Fort Worth Metroplex.

Within Texas there were many, MANY ideas of what could be done with passenger rail. Routes of all shapes and sizes were discussed, representing about every letter in the alphabet. While multiple states in other regions of the United States had

formed coalitions for promoting a singular passenger rail vision in the region, Texas had many visions for passenger rail in Texas. But to re-enter the race, Texas needed a plan. Work was started on the Texas Rail Plan, in the spirit of PRIIA, in late 2009, and was one of the first post-PRIIA rail plans completed in 2010. With far-reaching stakeholder and public involvement, the state established a vision for both passenger and freight rail.

While the state is not interested in direct ownership or operations of a high-speed or intercity passenger rail system, it is interested in nurturing the possibility of a system through the development of information and reduction of risk. Studies to determine the public needs, potential ridership and costs for appropriate levels of service, project level environmental evaluation and coordination with federal and state agencies are all services that the state can contribute. This information could be used by private developers to develop a good understanding of the needs and to reduce risk.

With that direction in mind, when the FY2010 appropriations made funding available for planning, Texas was prepared to really enter the race. A research study by Texas A&M Transportation Institute had just been completed which determined the best city pairs in terms of intercity travel (car, air, auto). The results showed that the Dallas/Fort Worth-to-San Antonio and

implemented now.

The Oklahoma City-to-South Texas Corridor included the Dallas/Fort Worth-to-San Antonio segment as well as the existing state-supported Amtrak service between Oklahoma City and Dallas/Fort Worth. The study, now ongoing and renamed the Texas-Oklahoma Passenger Rail Study (TOPRS), has evaluated service alternatives and has presented those to the public through a series of meetings along the corridor. One of the more interesting parts of this study is the opportunity to evaluate the corridor potential between San Antonio and Monterrey, Mexico as a potential cross-border service. This city pair has received great interest. The result of the TOPRS study will be a blueprint for the future development of the corridor and will provide much-needed data for prospective private sector developers. There are lessons to be learned from the California High-Speed Rail Authority, the front runners: developing their plans for high-speed rail, passing nearly \$10 billion in state bonds, then questions about environmental and land impacts, coordination with railroads, questions with the cost and financing. Now, the plan has been revised to be a "blended system." Less high-speed and more connectivity.

In the Dallas/Fort Worth-to-Houston corridor, there is great potential. In fact, this corridor looks so good that it has attracted the attention of private investors. Texas Central High-Speed Railway (TCR) is interested in bringing the JR Central's proven, energy-efficient N700-based Bullet system to

safely move people between Dallas and Houston in about 90 minutes. Texas is fostering the development of this corridor with a blend of both private investment, in a for-profit-operation, with a public investment in arterial and feeder roads and systems, which meets the mobility needs of people in the Dallas/Fort Worth Metroplex. The project-level environmental clearance by 2017 could quickly move Texas forward to final design, construction and implementation of high-speed rail. There are lessons learned from Express West (formerly Desert Express): FRA safety compliance, STB involvement, federal dollars equals federal strings, such as Buy America. How does a privately funded project fit within the federal processes?

Even within the Dallas/Fort Worth Metroplex, TxDOT and the FRA are leading a separate project-level environmental review of what could be a very efficient and heavily used high-speed rail system connecting Fort Worth, the Arlington area and Dallas. Potentially connecting with the privately developed Dallas-to-Houston project, this public effort has strong backing from TxDOT and local leaders, and could play an important role in connecting the state's growing metro areas.

So, the race continues to implement true high-speed rail in the United States, even as the industry celebrates the 50-year anniversary of the Japanese system. Texas is not usually in the list of front-runners: Northeast Corridor, California and Florida. But as with the story of the tortoise and the hare, Texas may just be the tortoise in the high-speed rail race.



the Dallas/Fort Worth-to-Houston Corridors were the best performers. TxDOT applied for and received a planning grant for the Oklahoma City-to-South Texas Corridor and a project level PE/NEPA grant for the DFW/Houston corridor. These grants are in the process of being

