HIGH SPEED RAIL IN THE US:

FROM CONCEPT TO REALITY

FRANCIS MILLER, PE

TranSystems

HIGH SPEED RAIL IN THE US

FROM CONCEPT TO REALITY

FRANCIS MILLER, PE

TranSystems

PAINTING A PICTURE

Imagine traveling from Washington, DC, to New York in 90 minutes or Los Angeles to San Francisco in less than three hours. **Imagine** having the freedom to get up and move around, operate electronic devices with Internet access, or use mobile phones at any time to continue productive communication. **Imagine** arriving at your destination relaxed and on-time - 99 percent of the time. **IMAGINE...**

Overseas, passengers travel 360 miles from Barcelona to Madrid in two hours and 40 minutes, and 250 miles from Paris to Lyon in two hours while passengers in the Northeast US spend more than five hours traveling roughly 320 miles from Boston to Philadelphia at an on-time performance of 80 percent.

In the US, flying is currently the quickest form of long-distance travel. But, thinking about your last flight - how long did it take you to get through security? Once in your seat on the Boeing-737, did you feel cramped with your seatbelt securely fastened? Did you perhaps forget to send out that one last important e-mail, and with the lack of Internet access on planes, were unable to complete that task? Is flying really as quick and convenient as we need it to be? These are the questions people start to ask themselves when it's time for change. How do we make the concept of high speed rail in the US a reality?

European and Asian nations continue to expand and accelerate construction of high speed rail networks, even amid the current economic crisis. In the case of Spain, with almost 20 percent unemployment and reductions in government spending, government officials plan to spend more than $150 billion within the next 10 years - half of their national transportation budget - on high speed rail. By 2020, Spain's goal is to provide access to 90 percent of the population within 30 miles of a high speed station. Can the US make high speed rail a priority?

21st Century Transportation - America's Future

High speed trains are transforming Europe and Asia, bringing cities and countries within a few hours of each other. Towns and industries have come alive with new jobs and economies being created and with air travel becoming more obsolete, air pollution is being drastically cut. Why are other countries building new or expanding existing systems while the US in the past has been sitting on the sidelines?

Could high speed rail be in America's transportation future? Or, as in the past, will the enthusiasm wane falling victim to the typical arguments? In January 2010, the Obama Administration awarded $8 billion in American Recovery and Reinvestment Act (ARRA) funds to stimulate high speed projects on 13 corridors in 31 states. An additional $5 billion is budgeted over the next five years. High speed rail could be to the 21st Century what the Interstate Highway system was to the last century. High speed rail has the potential for producing a host of economic benefits equal with or exceeding those created by President Eisenhower with the advent of the highway system. His vision of a national network of highways resulted in regional connections and quicker, more efficient movement of goods and military personnel and equipment strengthening our country and expanding the reach of our economy. For high speed rail to have the same result, it will take both dedicated funding and political support.

The current administration's *Vision for High Speed Rail in America*, as presented by President Obama, would encompass approximately 15,500 route miles reaching 163 of the largest 250 metropolitan areas in the US and serve to connect a number of small- and medium-sized communities.

In support of the economy, a recent Duke University report estimated that 24,000

High speed rail could be to the 21st Century what the Interstate Highway system was to the last century.

Did you know...

Americans lose more than $87 billion a year stuck in gridlock while driving their cars - approximately $760 for every traveler. Additionally, we waste more than 2.8 billion gallons of gas, a staggering three week's worth per traveler. Our time wasted in traffic equates to 4.2 billion hours or one workweek per traveler.

construction jobs would be created per $1 billion of capital investment in rail and 41,000 operational and maintenance jobs would be created per $1 billion in operational investment - an important investment in sustaining our economic livelihood.

Making an investment

According to the International Union of Railways (UIC), the average costs in Europe to construct one mile of high speed rail range between $24 and $60 million, not including maintenance costs and cost for rolling stock.

There are many success stories in Spain and France. The AVE (Alta Velocidad Espanola) and TGV Train a Grand Vitesse) high speed rail lines have spurred economic growth and contributed to a better quality of life. Bedroom communities have cropped up with people choosing to live in quiet rural areas making the 90- to 100-mile commute to their office in Paris or Madrid in 40 minutes.

If Spain, a country roughly the size of California can spend $150 billion over the next 10 years than why can't the US make the same investment?

China is investing more than $300 billion to build more than 16,000 miles of high speed track by 2020.

In the US, the transportation system has become inefficient and outdated. The roads and airports are overcrowded; daily commuting has become wasteful and slow.

"In the US, the transportation system has become inefficient and outdated."

Some say we can't afford to fund and build high speed rail. Do we really have a choice?
In the 2009 Urban Mobility report issued by the Texas Transportation Institute, it states that in 2007, in 439 of American's urban areas, Americans lost more than $87 billion (delay and fuel costs) a year driving their cars, stuck in gridlock; which equals approximately $760 per traveler. In addition, the time wasted in traffic was listed at 4.2 billion hours equalling an annual delay of 36 hours for the average peak period traveler - or almost a week's worth of vacation.

Both transit professionals and politicians believe now is the time. Momentum and support to build high speed rail have never been greater.

According to a 2008 Joint Economic Committee of Congress analysis, the cost of air-traffic delays is as much as $41 billion

annually plus another $12 billion worth of lost passenger time.

The advantages of high speed rail include, but are not limited to:

- increased transport capacity and mobility
- economic development
- reduced traffic and urban sprawl
- transit-oriented development and communities
- energy efficiency

Making it happen

Both transit professionals and politicians believe now is the time. Momentum and support to build high speed rail have never been greater. With traffic congestion increasing and reduced funding available to maintain wear and tear on the highway systems, taking passenger automobiles off the roads to allow trucks more capacity just might be the right solution, right now. From 1980 to 2006, the number of miles travelled by car and truck increased by 95 percent and 106 percent respectively while lane expansion grew only 4.4 percent. There is no more room to build more roads, and building or adding more lanes to our congested (Level of Service F) roads does not solve the problem. Likewise, the nations skyways have reached capacity.

Another issue of concern is the price and dependency on foreign oil. According to *Environment America*, high speed rail uses one-third less energy per mile than auto or air travel. A national high speed rail system could reduce oil use by 125 million barrels a year. High speed rail could change the face of the US' transportation industry. Transportation investments such as these routinely attract bright and knowledgeable individuals with a passion for their work. Key to rebuilding the workforce of the future, these individuals - as demonstrated by the workforce in Europe - are young and attracted to high speed rail for its technology driven system. In addition to young people developing the system, they are also an elemental demographic in system use. Polls show the next generation of young professionals want intercity and high speed rail. They appreciate and understand its role in the larger transportation system.

"Intercity and high speed rail corridors can provide the kind of transportation choices that Americans want while simultaneously addressing present and future energy needs and increasing productivity."

High speed rail should not be viewed as competition to airlines or cars but as a complement to those modes locally.

High speed rail systems have the potential to bring high-paying jobs to inner cities and markets increasing household income and property values. According to the report, "The Economic Impact of High Speed Trains for Orange County" developed by the Orange County Business Council in October 2008, the economic impacts of high speed include growing the tourism industry and increasing density around the train station to shrink a region's developed footprint.

Major cities and regions benefit from transit-oriented communities. As mentioned above in the examples from France and Spain, new stations will attract commercial and residential development. Intercity and high speed rail corridors can provide the kind of transportation choices that Americans want while simultaneously addressing present and future energy needs and increasing productivity. High speed rail offers its customers speed, frequency, accessibility, comfort and freedom, reliable and safe service, and affordability. Due to high speed rails large transport capacity, the land needed to carry large traffic volumes is significantly reduced when compared to highways.

Given all of the benefits, the system will not work unless high speed rail is connected or linked with local and regional transit who will serve as a link transporting passengers from rail stations to their homes, businesses, and other destinations. High speed rail works best when integrated with other transit modes - light rail, heavy rail, buses, bikes, and automobiles - the Interstate highway system, and air travel network. High speed rail should not be viewed as competition to airlines or cars but as a complement to those modes locally.

Ideally, high speed rail should link large cities or regions approximately 300 to 400 miles apart with a travel time of two to three hours between stations as compared to six hours door-to-door by car or three hours by plane at a cost that is approximately 50 percent of an airline ticket.

The building of high speed rail with the inherent capacity it would add to the national transportation system would strengthen the overall multimodal network increasing the efficiency of the other dominant modes, especially the US highways and airports.

Dollars and sense

Implementation of high speed rail will have to be done in small steps. While high speed rail in Europe has successfully linked neighboring countries over time. Linking mega regions in the US will take time and lots of money - approximately $500 billion to $1 trillion over the next 40 years.

A dedicated, continual funding schedule is imperative to advancing and developing a national multimodal transportation system. The Federal Rail Administration (FRA) grants were the first step towards enabling the nation's first high speed trains to be operational by 2015; however, without a sustainable funding source we will lose the momentum and excitement generated during the past year. The Highway Trust Fund is insolvent due to reductions in fixed motor fuel tax resources and truck-related user fee receipts. The federal gas tax has not been increased since 1993 nor adjusted for inflation. Congress needs to consider permanent and sustainable funding similar to the Highway Trust Fund.

Some ways to pay for high-speed rail include: vehicle miles travelled (VMT) fees; gas or sales taxes on trucks, cars and tires; increasing the vehicle heavy use tax; highway tolls, regional payroll taxes, freight or driver-related fees, rail-passenger surcharges, or duties or tariffs on imported oil. Regardless of the funding mechanism(s) utilized, they must be indexed and adjusted for inflation to meet future rising ridership levels and maintenance needs.

In Europe, most of the infrastructure management such as the capital investment for infrastructure and maintenance are made by public companies or national government, while the operational investments are made by railway companies or in some instances private companies on a non-subsidized basis.

Sponsorship at the national, state, and local levels is absolutely critical to the success of high-speed rail in the US. In addition to the federal transportation reauthorization bill, alternative and innovative funding sources will need to be considered such as state and local investments and in some cases, public-private partnerships, similar to those utilized in the Netherlands, Portugal, and for the link between Spain and France. China and Taiwan are utilizing Build-Operate-Transfer (BOT) methods combining public and private resources. It must be emphasized that attracting private investment will require offering investors long-term support and stability.

The next federal transportation authorization bill will need to answer the question: **how do we fund high speed rail?**

Congress needs to consider permanent and sustainable funding similar to the Highway Trust Fund.

European and Asian Experience

The lesson learned from Europe and Asia is this – high speed trains have changed the nature of travel and the way people live.

The first high speed train placed in operation was the Japanese Shinkansen in 1964 traveling at a speed of 130 mph between Tokyo and Osaka. The first high speed system in Europe was the TGV in France in 1981 between Paris and Lyon operating at 160 mph. During subsequent years, many European countries (Germany, Italy, Spain, and Belgium) started with operations at 150 mph or more. Europe's success led to the extension of national systems and later to the concept of an interoperable European high speed network.

Twelve countries, including France, Spain, Germany and Italy have high speed rail systems that have become the preferred mode of transportation for the target "sweet-spot" of 100 to 600 miles. China, Turkey, and the Netherlands have systems under construction while Brazil, Argentina, India, and Morocco are just some of the countries that have systems under development.

The Tokaido Shinkansen from Tokyo to Osaka is the busiest high speed line in the world, carrying more than 360,000 passengers every weekday. In France, 1.4 billion passengers have travelled on TGV trains for more than 26 years. When presented with the option of traveling from Paris to London by train or plane, 81 percent take Eurostar trains. Similarly, 50 percent of passengers traveling from Paris to Brussels use Thalys services.

In thinking about the US, one of the challenges that will be necessary to overcome is that high-speed rail is not seen as a product. Most Americans do not understand high speed rail as we have no true system to reference with the exception of Amtrak's Acela service on the Northeast Corridor. Until the first system is built and successfully in operation, the American public and politicians alike will be skeptical, holding true to the adage that - "seeing is believing." The fate of US high speed rail may rest on the success or failure of the proposed systems in Florida, California, or the Midwest.

Spotlight on Safety

In Japan, after 46 years of operation and four billion passengers, there have been no passenger injuries due to train accidents.

Where are we Today?

The federal government has designated 10 corridors for high-speed rail development, not including the Northeast Corridor. Most of these corridors share freight or commuter tracks and will require incremental steps to increase service. These corridors could eventually be upgraded to attain true high speed service (150 mph) with separate tracks (dedicated rights-of-way), and state-of-the-art signal and traction power systems. The current proposed corridors in Florida and California are the exception. Some of the corridors that received significant ARRA funding include:

FLORIDA

Proposed as a true high-speed rail corridor, with 168 mph trains operating between Tampa and Orlando (84 miles), with a proposed extension planned to Miami (230 miles). The estimated cost is $3.2 billion for the Tampa to Orlando leg and $11.5 billion for the entire project. Florida received $1.25 billion for the project from the Obama administration's $8 billion stimulus funds. The state had been acquiring land for the project for many years and a large portion of the alignment would be constructed in the center median of I-4.

CHICAGO HUB OR MIDWEST HIGH-SPEED RAIL NETWORK

Current plans call for incrementally upgrading existing service from Chicago to Milwaukee (110 mph), Madison, Wis. (79 mph), St. Louis, Mo. (110 mph), and Detroit (station renovations and other corridor improvements), including extension of the route from Wisconsin to Minneapolis-St. Paul, Minn., and Cleveland, Columbus, and Cincinnati, Ohio (3C Corridor). Projects in the corridor received $2.6 billion of the stimulus funds.

The fate of US high speed rail may rest on the success or failure of the proposed systems in Florida, California, or the Midwest.

SOUTHEAST

The corridor is designated as Washington-Richmond-Raleigh-Charlotte (79 mph). The corridor received $620 million in stimulus funds.

CALIFORNIA

Proposed as another true high speed corridor, with 220 mph service between Los Angeles and San Francisco at an estimated cost of $45 billion. Planned extensions would include San Diego, San Jose, Sacramento, and Las Vegas. California received $2.5 billion of the stimulus funds. That grant requires the state to begin construction on the project by late 2012 and to have at least one segment running by 2017. California voters approved $9.9 billion for the project in 2008. In May, the California High Speed Rail Authority appointed Roelof Van Ark as its new chief executive. Van Ark formerly was president of Alstom Transportation, the North American subsidiary of the French manufacturer of the TGV and AGV high speed trains. And just recently, ground was broken on what's being referred to as the nation's first high speed rail terminal - San Francisco's Transbay Transit Center, which will be the northern terminus of California's high speed rail system, fully integrated with local transit.

With no homegrown high-speed rail technology available yet the US will most likely have to partner with and rely on European and Asian builders, suppliers, and operators. However, we can't simply implement high speed rail based on the European or Asian experience. While the technology is basically the same, the customers in Europe and Asia are different from customers in America and our needs are different. It cannot be assumed that what worked in France or Japan will work for the US. According to Robert Doty, the Peninsula Rail Program Director for the California High Speed Rail Authority, "we must present high speed rail to the American public as Madison Avenue would present a new car or any other type of product. High speed rail is a consumer product which needs to be tailored to its target audience." If successful, the demand for more high-speed rail could take-off as it has in Europe and Asia.

"High speed rail... 'needs to be tailored to its target audience'

– the American Public."

To learn more about high speed rail, contact:

TranSystems
Frank Miller, PE
(215) 752-2206

TranSystems®

EXPERIENCE | Transportation