

High-Speed Intercity Passenger Rail

SPEEDLINES

August 2020
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**CalTrain
doubledecker EMU
on Test Track ...**

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On the front cover:

THE BAY AREA'S CALTRAIN HAS BEGUN TESTING ITS FIRST STADLER EMU (ELECTRIC MULTIPLE-UNIT) TRAINSET ON THE MANUFACTURER'S 25KV-ELECTRIFIED TEST TRACK IN SALT LAKE CITY. THE TRAINSET WILL UNDERGO HIGH-VOLTAGE POWER, LOW-SPEED ACCELERATION AND BRAKE, AND FUNCTIONAL SYSTEMS TESTS BEFORE TRAVELING TO PUEBLO, COLORADO FOR HIGHER-SPEED TESTING AT THE TRANSPORTATION TECHNOLOGY CENTER, INC. (TTCI).

ABOVE: Although the virus risk had deterred passenger usage, Deutsche Bahn was running its long-distance passenger trains about 75% of its typically-scheduled long-distance trains, and about 65% of normal for short-distance services — something very similar to their weekend schedule.

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HS&IPR

Committee & Friends

As officials and business leaders in public transit, rail and transportation, we've been faced with unprecedented challenges by the COVID-19 pandemic over the past few months. We've been forced to innovate and evolve in ways we could have never imagined. In the months and years ahead, as our country continues to recover and reinvent, our voice will be more important than ever in helping advance high-speed rail in America.

As your incoming Chair, I look forward to picking up where Chairman Al Engel left off and building on the solid foundation he and others have assembled. We have a dynamic and motivated leadership team ready to get to work, which includes incoming Officer-at-large Karen Philbrick (Executive Director for the Mineta Transportation Institute) and current Vice Chair Chris Brady and Secretary Melanie Johnson.

You may not know this, but I was very involved with several members of our group when I was desperately trying to get funding for high-speed rail in Florida. (There are several members of that Administration that I remain indebted to for their support in sending money to Florida.) It was during that struggle that I took time to tour the high-speed service from London to Paris, as well as Spain, to see their progress. Many of us welcomed the change in attitudes and support in this country, as the nation started to embrace new high-speed lines and now several high-speed commuter lines.

I agree with Al, high-speed rail is at a "tipping point." Now, more than ever, policymakers are starting to understand we must change the way we do business.

In Connecticut, our Hartford Line is changing hearts and minds on high-speed rail. Additional "Proof of concept" projects, like the Hartford Line, across the country can advance the industry in the right direction—but as we all know, it won't be easy. We must continue to hold the line and "show, not tell" where high-speed rail can take this country and our economy in the right direction. We exceeded expectations on this line and now are recipients of an FRA investment into adding more trains.

The Hartford Line had strong support, not only our delegation in Connecticut, but also several members of Congress from Massachusetts. They successfully argued that we are at a pivotal point for invest in high-speed rail to advance our transportation infrastructure.

The coronavirus was a wake-up call and the impacts of climate change are knocking at our door. We must tackle major challenges, including rebuilding the U.S. economy and climate change with innovative solutions like high-speed rail. We can't make this the argument as to whether more money should be spent on highways rail or airlines. We need to establish the criteria that assesses what each region needs and provide the support and funding and private investments to get it done.

If you're like me—someone who appreciates face-to-face meetings and in-person conferences—going virtual during the pandemic has been an adaptive change. It really is helping bridge people and information in new and welcoming ways. I encourage everyone to attend the APTA Mobility & Rail NOW! Virtual Event on August 12-13, 2020, especially the "Thinking Beyond the Plane: High-Speed Rail and a New Era of Inter-regional Transportation" session. And by the time April 7-9, 2021 comes around, I welcome the opportunity to seeing you all in-person in Philadelphia for the APTA High-Speed Rail Conference!

Ours is an industry that has the talent and expertise in both the private and public sectors to meet these challenges. Thank you for your confidence in me and our new leadership team. I can assure you we're geared up for lots of learning, growth, and a couple of laughs for the next two years. Let's get to work!

Virtual meetings till we can meet face to face!



A LETTER FROM OUR IMMEDIATE PAST CHAIR:

AL ENGEL

It would have been nice to greet you all in San Francisco at the June Rail Conference but because of Covid-19 we had to make alternate plans. So we held our first virtual committee meeting and biennial election of officers on June 16. Joe Giulietti, Transportation Commissioner for Connecticut was elected as the incoming Chair and Karen Philbrick, Executive Director for the Mineta Transportation Institute as Officer-at-large. Chris Brady and Melanie Johnson remain in their current positions of Vice-Chair and Secretary respectively. With this team for 2021-2023 we continue the tradition of alternating leadership between the public and private sectors. It's a dynamite team and I congratulate them all on their commitment to advancing this important mission.

It was an honor and a pleasure to serve as your chair for the last two years. I was fortunate to have a terrific and high powered team to work with. There were a few unexpected challenges both personal and public that complicated life, but as a team we were able to power on in delivering on our mission. While we may not have reached the tipping point for a robust national high-performance intercity passenger rail program, I believe we advanced the ball toward the goal line. There are encouraging project and public policy developments which give hope that we may follow the example of most industrialized countries who use a more balanced transportation investment approach that takes full advantage of technology developments in passenger rail. There may even be a silver lining associated with the pandemic calamity as the populous may see a health and safety advantage with intercity passenger rail. There is evidence in Europe that where riders have a choice, there is a shift to high-speed rail over regional aviation.

At our June 16 meeting it was inspiring to hear Congressman Seth Moulton, our special guest, speak so passionately about the need for an American High-Speed Program to rebuild the U.S. Economy. His funding proposal calls for an investment of \$205 billion over ten years which compares more favorably with our economic competitors such as China and Europe. The recent INVEST proposal by T&I Chair Peter A. DeFazio and bills introduced by Congressman Jim Costa and Senator Edward J. Markey are also encouraging with more robust investment proposals. You can read more about these in this issue.

Our committee can draw satisfaction from its accomplishments over the last couple years and its ability to influence some of these developments. It was heartening to see direct excerpts from our ROI study and Legislative proposal in Rep. Moulton's white paper, "American High-Speed Rail". (If you haven't read it, I encourage you to do so!). We have brought thought leaders, Congressional staffers, business executives and various other stakeholders together at HSR Policy Forums in order to educate and inspire. Responding to the demand from State passenger rail operators, we are now embarking on Phase II of the ROI study which will produce a methodology for calculating total return on intercity passenger rail investments. The SPEEDLINES publication continues to inform our members and collaborators on domestic and international high-speed rail happenings along with reports on legislative and policy developments.

Because the topic is so broad and the interest so great, in 2019 we started the planning for a full APTA High-Speed Rail Conference. It is scheduled for April 7-9, 2021 in Philadelphia at the Marriott Hotel. We are collaborating with various associations and other entities with whom we have shared interests on transportation, economic development, climate change and other policy imperatives. Our affiliation with the Union of International Railways (UIC) will facilitate quality international content on best practices and lessons learned. We are very enthusiastic about this new element of the work program and the membership development potential it has for APTA. Make sure to hold the date in your calendar.

While the U.S. path to a higher performance national passenger rail system has been lumpy and arduous, I am confident we will get there. Winston Churchill, is alleged to have once remarked: "The United States can always be relied upon to do the right thing — having first exhausted all possible alternatives." I believe we are approaching a tipping point now where politicians realize that new mobility solutions are necessary to address capacity and climate change issues. High-speed rail is very much a part of moving to electrified, renewable fuel transportation. My best wishes for every success to the new leadership team for getting us to the tipping point.

UPCOMING EVENTS

mark your calendars

APTA Mobility & Rail - AUGUST 12-13, 2020 (Virtual) - **NOW!**

This two-day event brings Q&A with presenters and the inside track on the latest insights, trends, and best practices impacting mobility and rail. One of the sessions is entitled 'Thinking Beyond the Plane: High-Speed Rail and a New Era of Inter-regional Transportation.' The session explains how the current pandemic has underscored the need for a transportation network that is resilient and has a balance of travel options that will keep America's economic regions connected and thriving. Leaders of two of high-speed rail projects will talk about how their projects will serve as critical additions to the national network. Plus, 'Future of Transit' sessions explore what the industry will look like in the post-pandemic world. For more information click: <https://www.apta.com/conferences-events/mobility-and-rail-now/>

APTAtech (Virtual) - SEPTEMBER 9-10, 2020

APTAtech explores how the public can use innovative technologies to better navigate transit including emerging technologies in Fare Payment, Connected and Autonomous Vehicles, Cybersecurity, Artificial Intelligence, Mobility-as-a-Service, the Internet of Things (IoT), and Big Data.

This virtual event will provide a focused perspective at the nexus of mobility and technology, and address the ways in which technology is prompting a monumental paradigm shift for transit—impacting everything associated with the rider experience, users expectations of convenience and data availability, fare collection and revenue management, route optimization, transit workforce needs, and more. The APTAtech Conference will also address newly emerging challenges related to COVID-19 and help the transit industry consider how it might leverage opportunities in innovation to surmount this unprecedented challenge and to maximize the future of the public transportation industry in response and recovery. <https://www.apta.com/conferences-events/aptatech/>

APTA TRANSform Conference & EXPO - MARCH 14-17, 2021; ANAHEIM, CALIFORNIA

Held once every three years, APTA's TRANSform Conference & EXPO is public transit's premier showcase of technology, products, and services in the Americas. With attendees and exhibitors from around the globe, APTA's TRANSform Conference & EXPO plays a pivotal role in connecting the industry to what's now and what's next in public transportation. APTA's TRANSform Conference will provide the ideas, insights, and connections to help you manage the changing mobility environment and the future of public transportation. For more information and registration information click: <https://www.aptaexpo.com/apta2020/public/enter.aspx> Transport, Interiors and Tunnel Construction, InnoTrans occupies all 41 halls of the Berlin Exhibition Center. The InnoTrans Convention, the event's top-notch supporting program, complements the show. For further information click: <http://www.innotrans.de/>

HIGHLIGHTS

THE VIRTUAL HIGH-SPEED AND INTERCITY PASSENGER RAIL COMMITTEE MEETING

Contributed By: Kenneth Sislak



Speakers



Guest

Rep. Seth Moulton, (D-MA) and Brian Kelly, Executive Director of the California High-Speed Rail Authority, were featured speakers at the High-Speed and Intercity Passenger Rail Committee online meeting that took place on June 16. They were introduced by Committee Vice Chair Chris Brady and Committee Chair Al Engel respectively.

Rep. Moulton discussed his proposal for investing \$240 billion in a nationwide high-speed rail network. The plan would create an estimated 2.6 million jobs

over the span of five years. The project would result in a wide number of benefits, with the plan drawing from global examples, including China. China currently has roughly 24,000 miles of high-speed lines and is expected to invest an additional \$46 billion in high-speed rail over the coming decade.

He also pointed to the lack of train options as a major competitive disadvantage for the U.S. at a moment when other nations are investing heavily in high-speed rail. For example, in China, business travelers regularly use high-speed lines that cover the equivalent distance from Chicago to Atlanta. Major stops along a Chicago to Atlanta high-speed line would include Indianapolis, Louisville, Nashville and Chattanooga, offering an hourly service.

Rep. Moulton noted that the cost of the US status quo, where cars and airplanes monopolize funding, add hundreds of billions of dollars of costs to our economy—from lost time and business due to historic traffic congestion, to environmental degradation and land waste on a massive scale—as well as hundreds of billions in lost economic opportunity.

Development of the proposal began prior to the current COVID-19 crisis, but Moulton outlined that the pandemic is “a moment to rethink the status quo of transportation and development dominated by the car. Why not more bike lanes? Why not more scooters? Why not high-speed rail?”

Expanding economic opportunities and networks across the nation is a major theme of the plan. It emphasizes connectivity and accessibility. “Consider how the Houston – Dallas market would expand if you could get downtown-to-downtown in 90 minutes, every fifteen minutes. Or what New York – Chicago

travel would look like without weather delays, ever. Or how much more connected Tulsa and Oklahoma City would be on a high-speed line with hourly service between Dallas and Kansas City.”

Moulton said there is a reason why nearly every other developed country in the world—and several developing ones—consistently choose high-speed rail over highway and airport investments for corridors of 750 miles or less, which accounts for most major city pairs throughout the United States. It’s about economic efficiency.

The Moulton plan believes we cannot continue “to rely on the technologies of the past. In the 1950s, we didn’t just add lanes to our state highways or make dirt runways longer; we built interstates and international airports. Today, relying solely on highways while the rest of the world speeds past us in high-speed trains would be akin to investing billions in laying more copper telephone lines while the rest of the world installs fiber optics.” The full white paper is available for download on Moulton’s website at the following link: <https://moulton.house.gov/imo/media/doc/American%20High%20Speed%20Rail%20and%20Rebuilding%20the%20US%20Economy%20-%20202.pdf>

Brian Kelly briefed the committee on the progress being made on construction of the high-speed train network in California. He reiterated the mission of the Authority is to initiate the construction of a high-speed train system that utilizes an alignment and technology capable of sustained speeds of 200 miles per hour or greater. Three principles guide Authority decisions:

- 1) Initiate high-speed rail service in California as soon as possible.
- 2) Make strategic, concurrent investments that will be linked over time and provide mobility, economic and environmental benefits at the earliest possible time.
- 3) Position the Authority to construct additional segments as funding becomes available.

Currently there is over 350 miles of electrified high-speed rail under construction in California. This

includes the 51 miles of electrification of the Caltrain Peninsula commuter rail line, which Authority high-speed trains will share, 171 miles of high-speed track in the Central Valley from Merced to Bakersfield and 130 miles of high-speed track being constructed by Virgin Trains USA from Victorville to Las Vegas. The full Phase 1 California system has been environmentally cleared from San Francisco to Anaheim. And from Palmdale to Victorville allowing Virgin Trains to share tracks with Authority and Metrolink trains into Los Angeles Union Station.

The estimated cost to construct the California high-speed rail system is approximately \$80 billion, with an estimated range of costs between \$63 to \$98 billion. The comparable cost to construct highway and air capacity is approximately \$153 billion with an estimated range of costs between \$122 - \$199 billion.

The economic impact of the California high-speed rail system was highlighted. Over 44,700 – 50,500 job years would be provided by constructing and operating the system. Job years are the equivalent number of one-year-long, full-time jobs supported by the project. For example, in 2019 the estimated employment was 7,500 job years. The economic impact would be over \$131 billion generating significantly more economic benefit than cost to construct.

Not unlike other capital programs across the country, the California high-speed rail project is being impacted by the COVID-19 pandemic. The Authority is taking action to mitigate these impacts by

- Deferring adoption of the 2020 Business Plan,
- Extending the RFP response period for Track and Systems procurement,
- Extending the Public Comment periods for two environmental documents.

Project funding has been impacted. The Authority is seeking additional financial assistance from a variety of sources.



BRIGHTLINE

THE LATEST NEWS

AS THIS EDITION OF SPEEDLINES WAS BEING PUT TO PRESS, A BRIGHTLINE FINANCIAL REPORT RELEASED LATE LAST WEEK NOTED THAT “WE (BRIGHTLINE) WILL NO LONGER USE THE VIRGIN BRAND FOLLOWING OUR PARENT’S TERMINATION OF ITS LICENSING AGREEMENT WITH VIRGIN ENTERPRISES LIMITED [TOGETHER WITH ITS AFFILIATES, “VIRGIN”].” NO FURTHER DETAILS WERE RELEASED BUT IT APPEARS THAT THE TWO YEAR RELATIONSHIP BETWEEN THE ENTITIES HAS COME TO AN END. THE REBRANDING EFFORT HAD BEEN MOVING SLOWLY SINCE THE APRIL 2018 ANNOUNCEMENT OF VIRGIN TRAINS USA. BRIGHTLINE IS STILL MOVING FORWARD WITH THE EXPANSION TO ORLANDO INTERNATIONAL AIRPORT AND THE LAS VEGAS SERVICE.



Contributed by: David C. Wilcock, VHB



On March 25, Brightline suspended all operations along its West Palm Beach – Miami route due to the developing COVID-19 pandemic. In a parallel move, most of the Brightline staff was let go. There has been no indication when service will resume for the only privately-operated intercity service in the US.

Brightline continues with construction on the West Palm Beach – Orlando International Airport (MCO) extension. The tentative date for service along the MCO extension is expected to start sometime in 2022. In related news, Brightline announced that a \$120 million deal has been reached with Wabtec for the implementation of positive train control (PTC). The system will be installed in two phases: the first phase will be along the 67-mile Miami – West Palm Beach segment and the second along the MCO extension.

In a bit of a surprising move, Brightline submitted an unsolicited proposal to Miami-Dade County for the use of the Florida East Coast Corridor to host commuter rail service. The County Board of Commissioners accepted Brightline’s proposal and entered a memorandum of

understanding on June 2. The MOU provides for a 90-day negotiating period and 180 days to reach a final agreement. The county will be negotiating with Brightline for the operation of commuter service by either Brightline itself or a third-party contractor. The service is envisioned to fulfill the county’s goal of transit service in the northeast corridor of the Strategic Miami Area Rapid Transit Plan. Up to seven commuter rail stations in Miami-Dade County would be developed as part of the Phase 1 service plans. Service would operate into the Miami Central Station currently under construction. One of the proposed stations would be near the Broward County line to help facilitate connections to Broward County buses. Future phases could include development of a maintenance of equipment facility and other infrastructure improvements that would support 20-minute headway service.

Moving west, Brightline (formerly VTUSA) announced on April 14 that the state of California had authorized a \$600 million private activity bond allocation for construction of the \$5 billion Southern California to Las Vegas high-speed line. With the bond approval, they can raise up to \$2.4 billion for the project. The state of Nevada is considering a similar action to authorize \$200M in private activity bonds that could generate up to \$800 million. The USDOT previously provisionally authorized \$1 billion in private activity bonds for the project. These three authorizations bring the financing to within \$800 million of the \$5 billion required for construction. With the California announcement, Brightline indicated that groundbreaking could take place before the end of the year. Construction is expected to take about three years to complete.

AMTRAK

READY FOR OUR CUSTOMERS AND PLANNING FOR THE FUTURE

Contributed By: Mariah Morales, AMTRAK

COVID-19 has changed a lot – but it has not changed Amtrak's job as America's railroad.

Throughout the current pandemic, we have continued to provide essential service to those who need it most. As a company, we are committed to doing the right thing, and to putting customers first. These values guide every decision we make – and they have informed every part of our response to COVID-19.

CLEANING PROCEDURES

To protect our customers' health, we have enhanced our cleaning procedures, both on board and in stations.

Amtrak has long performed daily disinfections; now, we are doing more.

We have:

- Expanded our ability to clean trains en route—in some cases, on an hourly basis.
- Increased our use of a powerful, medical-grade virucide;
- Widely adopted a new "misting" technique;
- Devoted special attention to high-risk touch points;
- Worked to make sanitizers and disinfectants widely available to our customers and employees.
- Followed the lead of the Centers for Disease Control (CDC) recommendations and made sure all our customer-facing employees wear masks.



- Required our passengers to wear facial coverings whenever they are not physically distant from other customers and employees.

NO-CONTACT TRAVEL

We have worked hard to make social distancing easier, and Amtrak offers a seamless, no-contact travel experience. Some examples include:

- Placing reminders in our stations and trains to maintain physical distance;
- Limiting ticket sales for reserved train services; and
- Encouraging greater use of touch-free eTickets.

We have tested new arrival and boarding procedures designed to minimize crowding, and we have enabled customers at many stations to receive gate



and track information remotely (via Amtrak's "All Aboard" mobile application).

Temporarily, we have also switched to cashless-only payments and suspended communal on-board dining.

Finally, because, these are uncertain times, Amtrak has sought to give our customers as much flexibility as possible in making their travel plans. We are waiving all change and cancellation fees for reservations booked by August 31 (including those booked with points). We also extended many customer benefits: earned coupons and points, for example, will not expire through September 25. Similarly, Amtrak Guest Rewards members who have earned Tier status will continue to enjoy that status through February 2022.

These measures have enabled Amtrak to continue delivering the safe, reliable, high-quality service that our passengers expect and deserve – and as the nation recovers, we will build on that foundation. We continue to adjust service in response to demand. In June, we resumed some Acela frequencies and expanded Northeast Regional service on the Northeast Corridor. Together with state partners like Pennsylvania and Wisconsin, we have begun to restore several state-supported routes: the Chicago-to-Milwaukee Hiawatha Service, the New York/Philadelphia-to-Harrisburg Keystone Service, and the New York-to-Pittsburgh Pennsylvanian are once again riding the rails. Over time, more routes will follow.

Nothing is more important than our passengers' health, safety, and well-being. As service is restored and reevaluated over the coming months, we are committed to ensuring that our passengers feel as comfortable and confident about their decision to travel as we can. In 2019, we served more than 32 million trips – and, while things are difficult today and likely for some time to come, we are planning for an even stronger post-COVID Amtrak. Today, we're working with Congress to ensure that Amtrak's critical infrastructure needs are part of the country's recovery in the years to come. From rolling stock to bridges and tunnels, we are focused on the future as



we navigate through the difficulties we face today. In the meantime, we will continue to pursue short-term service changes to reflect current demand for passenger trains and focus our resources on investing in the passenger rail network America deserves.

To keep up to date regarding our policies throughout this crisis please visit us at [Amtrak.com](https://www.amtrak.com).

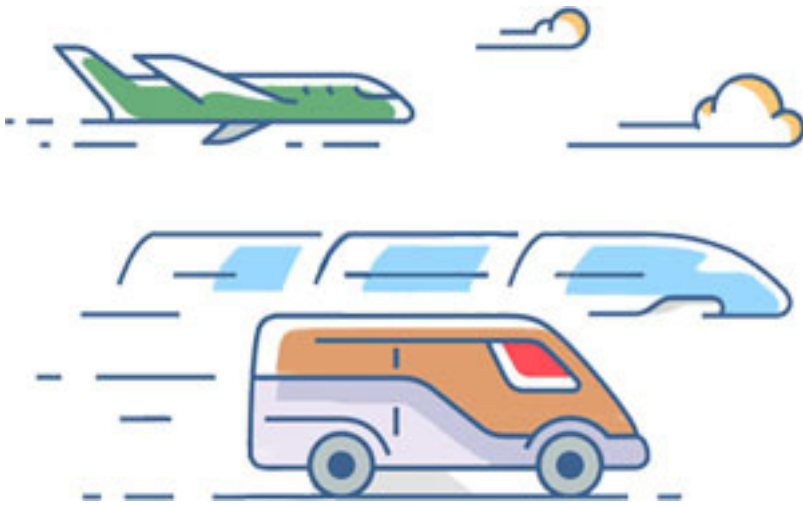
You will find our recent letter to Congress regarding our FY21 funding needs, found by clicking: <https://media.amtrak.com/wp-content/uploads/2020/05/Amtrak-Supplemental-FY21-Funding-Letter-to-Congress-Final-Signed-5.25.20.pdf>



"TOO LONG TO DRIVE, TOO SHORT TO FLY"

PROPOSAL TO REMAKE THE AMERICAN TRANSPORTATION NETWORK

Contributed By: Karen Hedlund, Former Deputy Administrator, Federal Railroad Administration



In a recent article in *The Atlantic*, James Fallows predicted that "Air Travel is Going to be Very Bad for a Very Long Time." Fallows comments that due to scarcity, low demand and public health risks air travel could become "unbearable." In the face of this grim prospect, could high-speed rail lines provide a more efficient and feasible alternative for some of our busiest travel corridors?

It has long been said that the "sweet spot" for high-speed passenger rail are routes that are "too long to drive, too short to fly" – corridors of up to 750 miles. Examples include New York to Washington DC and Boston; Chicago to St. Louis, Detroit and Milwaukee; Miami to Orlando and Tampa; Los Angeles to San Diego, San Francisco and Las Vegas; and Seattle to Vancouver and Portland. For these shorter trips high-speed rail could be highly competitive with air travel, especially considering travel time to airports on congested free-ways, and unproductive time spent at the airports lining up for check-in, security screenings and boarding. For

just such reasons, even today Amtrak trains carry more than twice as many passengers as the airlines between New York and Washington, DC.

Before the COVID-19 emergency decimated air travel, US airlines were flying thousands of daily flights on these relatively short hops. The air shed between LA and San Francisco was the most congested in the nation. Flights left and returned to SEA-TAC from Vancouver 17 times per day and to and from Portland 24 times per day. Even between O'Hare and Milwaukee's Mitchell Field United and American were flying 13 flights per day mostly to accommodate passengers connecting through O'Hare.

Ironically, for air carriers these air trips are far more costly per passenger mile than longer-distance flights. A typical Boeing 737 consumes 20 percent of its fuel taking off and reaching cruising altitude only to shortly head into the approach pattern to the nearby hub.

So how will these economic factors play into the efforts by air carriers to recover from the devastation wrought by the COVID-19 emergency? The federal government has already provided \$58 billion in emergency relief to companies in the air travel sector to help them avoid crippling bankruptcy procedures, avoid laying off thousands of employees, and continue to serve small remote airports, at least over the short term. But the outlook for the industry remains extremely bleak. Until an effective vaccine is available, passengers will no doubt view air travel in a constrained cabin environment as highly risky. Business meetings will continue take place online. Vacationers will likely choose to drive rather than fly.

How long the collapse in air travel will last is not clear. Fallows predicts “a very long time.” In the meantime, what strategies can the airline industry adopt to return to profitability notwithstanding substantially lower load factors?

One obvious remedy would be for the US government to continue to subsidize the airlines through loans or stock purchases until such time that they recover their pre-COVID-19 passenger business. But is there another approach that would help the airlines restructure their offerings around their most potentially profitable long-distance routes, while encouraging alternative investments in the shorter corridors? Instead of pouring billions into propping up a legacy air travel network, why not take the opportunity to invest in a more future-oriented solution that would benefit both travel providers and their customers?

The Europeans have already demonstrated what we need to do.

Lufthansa's Rail and Fly program promotes single-ticket travel across Germany by high-speed passenger rail to connections with international flights at Frankfurt International Airport. This has allowed the airline to discontinue less-profitable domestic routes, such as the roughly 90-mile flight from Frankfurt to Cologne. Dutch airline KLM recently announced plans to partner with European train companies Thalys and NS to replace one of its five daily flights between Amsterdam and Brussels with a high-speed rail service. The Brussels-Schiphol route is used by passengers who catch connecting flights to intercontinental destinations at Amsterdam Airport Schiphol. Eurostar announced in 2019 that its London-Paris HSR route has more than halved air travel demand between the two cities. And in response to COVID-19, France has conditioned its support of Air France on the airline's agreement not to compete with existing rail lines on flights of less than 1 hour and 50 minutes.

China, which had the opportunity to build out a modern internal transportation network from scratch has chosen to invest billions in high speed rail networks rather than massively expand its internal air and highway networks. Chinese travelers have shifted modes on twenty-four shorter routes, with high-speed rail's ridership doubling that of domestic flights, while the Shanghai Maglev connects the Pudong International Airport to the metro system serving

Shanghai, thus making the airport more accessible from the city center.

The impact of prospective growth of passenger rail on the airline business in Europe and China has been extensively examined in a recent UBS research report titled, “By train or by plane? The traveler's dilemma after COVID-19 amid climate change concerns.” UBS surveyed more than 1,000 people in China and Europe and discussed how soon a shift by Chinese and European consumers away from air to rail could happen. UBS predicts that within Europe, growth of air traffic could stagnate or even fall. It highlights the impact rail has already had on the London-Paris, Madrid-Barcelona and Munich-Berlin routes, as well as planned routes like Paris-Toulouse and Berlin-Cologne. UBS predicts that a wider and more efficient rail network could push airlines to focus more on long-haul services and short-haul flights that fall outside the four-hour rail window or serve areas not accessible to high-speed trains. UBS also observes that as a side benefit, the airline industry might then have a better shot at meeting self-imposed emissions-cutting targets that are currently out of reach.

In an interview about the study, one of the authors, Celine Fenaro, even suggested a new business model for the airlines:

“An airline in Europe could develop business relationships with railway operators (as in Germany) and working with them would enable the airlines to streamline their domestic network which today is actually not very profitable for any of these airlines with domestic routes. They could even benefit from highly lucrative railway operator revenues especially on business trunks like Paris-Frankfurt.”

One obstacle to the US undertaking such a transformative approach to future transportation is that it has limited governmental mechanisms for implementing such changes nationally and across separate modes. European and other nations employ integrated national transportation policies that avoid stove-piped approaches to funding transportation. (For example, Sweden conditioned an expansion of Arlanda international airport on the construction of a high-speed rail connection from the airport to central Stockholm.

But in the US, domestic air travel has long been

deregulated except with respect to requirements to provide “essential air service” to remote areas of the country. Airports are locally owned and controlled, and funded with airline landing fees and federal capital grants. For the nation’s intercity passenger rail sector, federal funding has been limited mostly to maintaining the Amtrak long-distance network that suffers from poor on-time performance due partly to freight train interference on the lines it uses. States provide support for separate in-state rail services. While high-speed passenger rail and improvements to existing conventional lines benefitted from \$9 billion in grants under the 2009 Recovery Act, Congress has appropriated only limited amounts for passenger rail since that time. Even the initial segment of California’s high-speed system is being constructed with over 85% state funding.

However, the COVID disruption may give the nation an unprecedented, “once-in-our-lifetime” opportunity to develop an entirely new paradigm for passenger travel – one that is more economic, more efficient and environmentally far more sustainable. Over the next several months Congress will be considering several massive high-speed rail investment proposals that could be included as part of a COVID stimulus bill. In February, Rep. Jim Costa (D-CA), a staunch advocate for California’s high-speed rail project, introduced a \$32 billion bill to fund high speed such projects around the country through 2024. In the Senate, Ed Markey (D-MA) has introduced a bill to provide a \$5 billion annual investment in high performance rail. Dubbed the BRAIN TRAIN Act, he noted it could provide funding to link Boston to Springfield and western Massachusetts with communities stretching from New Haven to Buffalo. An even more ambitious proposal is being launched by Rep. Seth Moulton (D-MA) for a \$205 billion, 5-year high-speed passenger rail plan. Moulton proposes that this be part of a “coordinated, competitive national transportation strategy” that would allow all modes to grow and concentrate where they hold a competitive advantage. A lengthy White Paper prepared by his office in support the proposal observes:

“As a result of incomplete transportation investment analyses, aviation has filled the gap caused by under-investing in our passenger rail network, even when less profitable and less efficient. For transportation corridors up to 750 miles, high-speed rail offers better journey times than aviation, including less

time wasted in terminals or security, and fewer emissions. But far from simply stealing business from the airlines, high-speed rail can help airports and airlines increase profits by reserving runways and gates for high-margin, longer distance flights.”

But how do we ensure that such new funding is invested in a way that will, in fact, achieve an efficient new national passenger transportation network? Could such a plan be developed with the active support of both airline and rail sectors? What role should the states play? Here are a few ideas based on international models discussed above:

1. Prioritize federal investment in passenger rail to routes that link nearby metropolitan areas. Such routes should connect to local international airports as well as city centers.
2. Current airport agreements with their airlines require that “airport revenues” be used solely to support airport operations. Federal regulations governing the use of federally-authorized “passenger facility charges” (PFCs) likewise restrict their use to on-airport purposes. Such local agreements and federal requirements could be changed to permit and encourage airport revenues and PFCs also to be used for high-speed rail connections to city centers. Following the Stockholm airport model, federal grants for expansion of hub airports could be conditioned on building such connections.
3. As France has done, future financial subsidies to airlines could also require their withdrawal from routes that compete with high-speed rail lines as they come into service.
4. The federal government should administer air/rail programs through a new division within USDOT, an Office of Air/Rail Inter-modalism, headed by the Administrators of the Federal Aviation Administration, Federal Railroad Administration and the Federal Transit Administration, who are directed to develop coordinated policies.

As Chicago’s former Mayor Rahm Emmanuel famously remarked “Never fail to take advantage of a crisis.” The COVID-19 crisis presents an opportunity to remake our national transportation network to the benefit of both the nation’s airlines and the traveling public.

OHIO'S HYPERLOOP RACE

MIDWEST CONNECT - COLUMBUS, CHICAGO AND PITTSBURGH

By: Peter J. Voorhees, AICP; AECOM

Ohio, a state with among the fewest intercity surface transportation options per capita in the US, is in a hyperloop race with itself. A handful of hyperloop technology developers are working to deliver the same general concept: ultra-high-speed transport via magnetic levitation in a semi-vacuum tube.

This began in May 2016 when Hyperloop One, a Los Angeles-based hyperloop technology developer, launched a global challenge to identify partners for commercial corridor development. The Mid-Ohio Regional Planning Commission (MORPC), which is the Metropolitan Planning Organization (MPO) for greater Columbus, Ohio, submitted an entry. MORPC had already coordinated with partners in Ohio and Indiana for a feasibility study of conventional intercity passenger rail linking Columbus to Chicago. The MORPC Global Challenge submittal, titled "Midwest Connect," built upon the rail study by proposing a parallel hyperloop corridor between the cities with a further extension to Pittsburgh. One of the motivations behind the Pittsburgh extension is a railroad corridor, known as the Panhandle Line, connecting Columbus to western PA and in 50-percent state ownership. The proposal asked the question: can the railroad also host hyperloop along part of its right-of-way? The fact that the corridor linked downtown Columbus to the John Glenn Columbus International Airport vicinity was intriguing.

Hyperloop One ultimately formed a partnership with Richard Branson's Virgin companies and become Virgin Hyperloop One (VHO). In September 2017, VHO selected MORPC's Midwest Connect corridor as a challenge finalist. This provided MORPC the opportunity to coordinate with VHO on corridor development. The Global Challenge selection led MORPC to conduct two intercity transportation studies as part of its Rapid Speed Transportation Initiative: hyperloop feasibility and

further analysis of conventional intercity passenger rail. WSP was selected to prepare the conventional speed passenger rail feasibility study. AECOM was selected for the associated Hyperloop Feasibility Study.

Meanwhile, another Ohio urban region elected to explore hyperloop in a similar corridor, with a competing technology developer. In January 2017, the Northeast Ohio Area Coordinating Agency (NOACA), MPO for Cleveland and its surrounding counties, entered a Public Private Partnership (P3) with Hyperloop Transportation Technologies, Inc. (HTT) to explore and potentially develop a Chicago-Cleveland-Youngstown corridor (which later included Pittsburgh in its analysis). HTT, with offices in LA, Brazil, Europe and Dubai, was seeking partners for its first full-scale implementation and ultimate commercial deployment. HTT's technology is explained at <https://www.hyperlooptt.com/technology>. The P3 included selection of the specific analysis corridor, coalition building, and a feasibility study. NOACA noted that its proposed corridor matches the convergence of Interstate highways I-80 and I-90 between Cleveland and Chicago, one of North America's busiest road freight and surface transportation corridors. Transportation Economics & Management Systems, Inc. (TEMS) was selected to perform the feasibility study.

With two competing hyperloop studies underway simultaneously, the Ohio hyperloop race was on. An introduction to the particular technology MORPC is coordinating with is available at https://www.youtube.com/watch?v=LAWEOwDDt_Y.

NOACA released its hyperloop feasibility study in December 2019. Key findings from the study include:

- The implementation appears technically feasible should funding be secured,



- 60-minutes vehicle travel time between Chicago and Pittsburgh, for passengers or cargo,
- \$24B - \$30B capital costs to construct (a low estimated cost per mile compared to other hyperloop studies, with geography and constraints not being the determining factors),
- Potentially creates 40,000 jobs,
- Could generate over \$2B in new local taxes and nearly \$1.3B in property taxes over a 25-year period,

MORPC released its hyperloop feasibility study in May 2020.

Key findings from the study include:

- The implementation appears technically feasible should funding be secured,
- 60-minute vehicle travel time between Chicago and Pittsburgh, for passenger or cargo, with main line cruising speeds of approximately 500 mph,
- 50% increase in passenger travel between the corridor metro areas,
- Hundreds of billions in anticipated wider economic benefits over a 30-year period,
- No capital costs were provided, though a benefit-cost analysis is mentioned in the report.

As reported in SPEEDLINES last fall, the Pennsylvania Turnpike Commission began an analysis of hyperloop in

the Pennsylvania context in 2019, which included considerations for extensions to neighboring states. This study, also performed by AECOM, was completed in April and its public release is immanent. The study will provide a demand and economic analysis hyperloop linking Chicago to Pittsburgh via either of the Ohio corridors, and then extending the conceptual corridor across Pennsylvania to East Coast markets. The study's findings are expected to be similar to those from other analyses:

- Hyperloop technology, in a conceptual commercial application for moving passenger and freight, performs most cost-effectively over long distances (1000 miles or more) connecting major markets. In theory, the technology can outperform air travel over these distances for door-to-door travel times.,
- The technology is expected to offer a green alternative to air travel and shipments.,
- The anticipated economic benefits of interstate hyperloop are measured in hundreds of billions of dollars,
- While the technology is expected to be profitable once major interstate markets are linked, public commitments would be required to realize the infrastructure investment,
- The anticipated capital cost for hyperloop appears comparable to international standard high-speed rail projects.

SPEEDLINES will continue to follow the Ohio hyperloop race, and the findings of the Pennsylvania Turnpike hyperloop study. One specific subject to follow is MORPC's pursuit of a Virgin Hyperloop One test corridor and certification facility in central Ohio.

WHEN WILL HYPERLOOP BE READY?

DEVELOPERS DISPUTE STUDY THAT SAYS SYSTEMS WON'T LAUNCH UNTIL 2040

By: Ed Blazina, Pittsburgh Post-Gazette Journalist
Reprinted with permission.

Developers of proposed hyperloop systems with ties to Pittsburgh strongly dispute an international research firm's conclusion that the lack of government regulations and financing difficulties will delay the first travel through high-speed, low-pressure tubes until at least 2040.

Lux Research Inc., based in Boston and with offices in three other countries, released a report last week that concluded developers of the innovative system are far too optimistic in predicting commercial operation by 2030. Their researchers say the technology is available to move passengers at up to 700 miles an hour in pods, but the lack of a certified test facility for government regulation and the high cost will delay development of the systems.

"Lux has found that, while the Hyperloop concept is technically feasible, it will require significant development to become cost-effective," the company said in a news release. "As proposed Hyperloop projects are seeing increasingly large estimates in cost per mile, and key variables in operating costs are unknown, Hyperloop projects are a long way from proving economic feasibility."

"Important indicators to watch for are development of high-speed and full-scale test tracks and government support, both financially and in developing

hyperloop regulations."

The 2030 date would be for a partial opening, as the track will be laid in sections from west to east.

Developers and proponents of proposed hyperloop routes from Pittsburgh to Chicago, one by way of Cleveland and the other through Columbus, say they believe the first system will operate at least 10 years earlier than the study suggests.

"We are moving ahead on a much more aggressive time frame," said Rob Miller, chief marketing officer for Hyperloop Transportation Technologies Inc., the firm working with the Northeast Ohio Areawide Coordinating Agency on the route through Cleveland.

Mr. Miller said the firm already is working with private investors and hopes to break ground early next year for a 5-kilometer facility in Abu Dhabi that would begin moving passengers between two stations in 2022. The hope is the company can use a successful operation there to satisfy U.S. regulators.

A study by consultant Transportation Economics and Management Systems released in December said the system passing through Cleveland would cost about

\$40 billion but would generate a profit of about \$30 billion over 25 years. The study assumed a public-private partnership with government providing rights of way and stations.

The study estimated it would take three to four years to conduct an environmental impact study and six years for construction.

The other area project, proposed by the Columbus-based Mid-Ohio Regional Planning Commission and Virgin Hyperloop One, is taking a different approach. Virgin expects to build a system in Mumbai, India, before 2030, but it is looking to build a government test facility in the U.S. to set industry standards before building here.

"By 2025 to 2030, we want hyperloop operating somewhere in the world," said Ryan Kelly, Virgin's head of marketing and communications. "We still feel very bullish that 2040 isn't going to be the number."

Thea Walsh, director of transportation and funding for MORPC, said the Lux study would be a reasonable time frame for many major transportation projects, but hyperloop is different because of the great interest in the new technology.

"If there's motivation to get this done, it will get done faster than [2040]," she said.

A study by Mid-Ohio last fall estimated the route via Columbus would-be built-in sections from over the next 30 years with a ridership cost comparable to airfare. Both systems propose trips from Pittsburgh to Chicago in less than an hour.

In the U.S., Virgin first wants to build a government certification facility, which could cost several hundred million dollars and create several hundred jobs, to set industry standards and ease the regulation process once a project begins. It has been reviewing proposals from across the country and has whittled the field down to about 10, including one north of Columbus and another in West Virginia led by West Virginia University.

Mr. Kelly said Virgin hasn't decided whether it should locate the facility in the same area as a hyperloop proposal such as near Columbus or go to a

completely separate site in an economically needy area like West Virginia. The company expects to decide early next year.

"The proposals are all coming in different shapes and sizes," he said. "Really, the states are a huge factor in how much interest they are showing in this."

Ms. Walsh said the test facility is a big step regardless of whether it's near Columbus, an area that already features a government testing facility for the automobile industry that has drawn multiple other businesses to the area. The facility could open by 2025.

"A project like the test facility would take this to another level," she said. "If we can't be part of the implementation now, we can be part of the implementation process."

Another factor that could lead to quicker implementation of hyperloop projects is the current downturn in the U.S economy due to the COVID-19 virus. In addition to the benefits of cleaner air around cities such as Los Angeles, the crisis could lead to a long-discussed government infrastructure construction program that could include non-polluting hyperloop transportation.

"We think we'll be in a period where we'll see an acceleration in public infrastructure projects," Mr. Miller said. "We see it really as an opportunity. We're ready."



ON-TIME PERFORMANCE

NOTICE OF PROPOSED RULEMAKING

Co-authored By: Ken Sislak and Wendy Wenner

In March 2020, the Federal Railroad Administration (FRA) published in the Federal Register a new set of proposed metrics and standards for judging Amtrak's on-time performance and other factors.

Comments on the proposed metrics were due by June 1, 2020. This new FRA rulemaking was the result of the Supreme Court's decision in June 2019 that denied the Association of American Railroads' (AAR) petition for a writ of certiorari. The AAR asked the Supreme Court to review the D.C. Court of Appeals' July 2018 decision that would grant Amtrak and the FRA the ability to determine on-time performance metrics and standards for passenger trains.

The Supreme Court's decision to let this case end removes the final hurdle to Amtrak and the FRA working together to restore on-time performance standards that were vacated by previous lower and court rulings. The practical effect of the Supreme Court's denial of AAR's petition is that the D.C. Appeals Court's 2-1 ruling in summer 2018 now stands in favor of Amtrak and the FRA, and ends a decade of litigation, briefs, filings, letters, claims and counterclaims between AAR and Amtrak.

With on-time performance today at record lows, American passengers have been waiting for years for the courts to step in. The highest court in the land has spoken and FRA and Amtrak worked together to craft metrics and standards that will measure the performance and service quality of intercity passenger train operations. The new rules would define how to measure Amtrak intercity passenger train on-time performance and would set forth – on average – a minimum on-time

performance standard of 80%. The proposed performance and service quality metrics would give customers, Amtrak, its service providers, FRA and others a common tool to help objectively gauge service quality of intercity passenger train travel.

As part of this effort, FRA and Amtrak consulted with many stakeholders, including each of the Class I railroads that host Amtrak trains, states, Amtrak employee labor organizations, an advocacy group representing Amtrak passengers, and the Surface Transportation Board. This rule proposes additional measurements for evaluating how well Amtrak serves the public, including financial performance and customer service metrics.

Trains that reliably arrive and depart on-time according to published schedules are the hallmark of an efficient and well-managed passenger rail transportation system. European, Japanese and British passenger trains are well known for their punctuality in both arrivals and departures. In other countries, passenger trains are operating on their own networks under centralized control of the passenger operator. Amtrak, however, mostly relies upon freight railroads to dispatch and control rail traffic on tracks the freight railroads own, which heavily influences passenger train on-time performance. It is no wonder that the on-time performance for Amtrak trains is highly variable and subject to changing priorities in the freight rail industry.

Americans have a right to expect better, more reliable and on-time passenger rail service than they are getting today, and Amtrak, was and is - willing to continue striving to achieve it.

IN THE SPOTLIGHT

YOU SHOULD GET TO KNOW US



ANDY COOK

CHIEF-OFFICE OF PLANNING & OPERATIONS

"California is making significant, integrated rail and transit investments over the next decade to reverse inequities in transportation and provide high quality, reliable access from homes to jobs, schools, family, friends, and other resources – especially for those who need it most."

DIVISION OF
RAIL & MASS
TRANSPORTATION



DARRELL J. SMITH

SENIOR TRANSIT PLANNER

"The states have taken the lead in developing the next generation of higher speed intercity corridors throughout the US. To date, the states have made targeted, incremental improvements to specific corridors connecting their key population centers. We are now seeing more ambitious programs that will lead to transformational travel alternatives. Establishing independent state authorities to deliver these investments is the emerging form of governance."

VANASSE HANGEN
BRUSTLIN,
INC. (VHB)



NATASHA VIDANGOS, PH.D.

VICE PRESIDENT, RESEARCH & ANALYSIS

"Rail is consistently one of the most energy-efficient modes of travel, and it has an important role as we consider a future with climate change, local economic development, and vibrant communities."

ALLIANCE TO
SAVE ENERGY

LEGISLATIVE OUTLOOK

Co-authored By: APTA / Ken Sislak

There are several proposals winding their way through Congress that add to the growing possibilities for transformative investments in high-speed and intercity passenger rail service and the reimagining of the U.S. transportation system.

On July 1, the House of Representatives approved a \$1.5 trillion “Moving Forward Act” (H.R. 2) on a mostly party line vote of 233-188. The bill was anchored by the \$494 billion surface transportation reauthorization bill (INVEST Act) that was approved in the House Transportation and Infrastructure Committee on June 19.

The INVEST Act makes critical investments for surface transportation infrastructure, including \$105 billion for public transportation and \$60 billion for commuter rail, Amtrak and high-performance rail. The bill also addresses dozens of other key APTA Recommendations.



“Coming together is a beginning. Keeping together is progress. Working together is Success.”

- Henry Ford

The INVEST Act takes a transformational approach to rail investment, offering a few innovative solutions to the problems highlighted by APTA such as funding for credit risk premiums and advanced acquisition of right of way. The bill includes a rail title, the “Transforming Rail by Accelerating Investment Nationwide (TRAIN) Act”, authorizing \$60 billion to address rail infrastructure needs, expand intercity passenger rail routes, and provide enhanced availability of funding to commuter rail agencies. It provides \$15.7 billion for the national network and \$13.1 billion for the Northeast Corridor (NEC) over five years.

H.R. 2 includes \$19 billion for a new competitive grant passenger rail program, the “Passenger Rail Modernization and Expansion (PRIME)” program. PRIME will provide funding for state of good repair, operational performance, or growth of intercity passenger rail. High-speed rail projects are eligible for funding under this program. The program gives priority to projects that incorporate regional planning, support from multiple states, and environmental benefits. The PRIME program includes two set asides: 40 percent for NEC investment plan projects and 40 percent for high-speed rail projects on the national network and establishment of new high-speed rail corridors not on the NEC.

Action on Infrastructure in the Senate remains unclear, but H.R. 2 will likely not be considered on its own in the Senate. While the Senate Environment

and Public Works Committee passed its \$287 billion transportation bill last June, other Senate Committees also need to act before consideration by the full Senate. However, the White House, through the Office of Management and Budget, issued a veto threat for H.R. 2.

Other bills addressing high-speed rail have been introduced in both the House and Senate. Representative Jim Costa (CA-16) introduced the “High-Speed Rail Corridor Development Act of 2020” (H.R. 5805), which would authorize \$32 billion in annual spending on high-speed rail through 2024, with a focus on electrified trains. This would benefit current high-speed rail projects in California, Nevada, Texas and the NEC.

On the Senate side, Senator Edward J. Markey (D-MA), a member of the Senate Commerce, Science, and Transportation Committee and the Environment and Public Works Committee, introduced legislation named “Building Rail Across Intercity Networks To Ride Around Interior of the Nation (BRAIN TRAIN)” Act. This legislation authorizes \$5 billion annually, for a total of \$25 billion over five years, to invest in “high-performance” intercity passenger rail service that will connect communities within a state, across state lines, and around the country. Chairman Richard E. Neal (MA-01) is expected to introduce companion legislation in the House.

Regulations News

US Access Board:

Advanced Notice of Rulemaking for Accessibility in New Rail Vehicles. Comment period closes July 14, 2020. Docket number ATBCB-2020-0002. More info at the following link.

<https://www.access-board.gov/guidelines-and-standards/transportation/vehicles/update-of-the-guidelines-for-transportation-vehicles/advance-notice-of-proposed-rulemaking?highlight=WyJyYWlslwiwcmFpbHMiLCJyYWlSaW5ncylsInJhaWxpbmciLCJ2ZWhpY2xlcylsInZlaGljbGUiLCJ2ZWhpY2xIJ3MiLCJyYWlslHJlaGljbGVzIl0=>

Federal Railroad Administration:

Part 270 Passenger System Safety Rule; passenger railroads and agencies must complete their good-faith consultations with labor organizations by December 3, 2020. System Safety Plans must be submitted to FRA by May 4, 2021 or at least 90 days before the start of new passenger service.

Notice of Proposed Rulemaking for Metrics and Performance of Amtrak Trains. Public comments were due by June 1, 2020 but additional information may be submitted at any time in writing at www.regulations.gov citing the Docket No. FRA-2019-0069

Applications for State-of-Good Repair funding grants are due July 27, 2020. More info at this link:

<https://www.federalregister.gov/documents/2020/06/10/2020-12542/notice-of-funding-opportunity-for-the-federal-state-partnership-for-state-of-good-repair-program>

In another action that portends well for the future of high-speed rail in America, Representative Seth Moulton (D-MA) rolled out a national plan that would invest \$205 billion over five years to build a national high-speed rail network. If Congress passed the plan, the most conservative estimates show it will create more than 2.6 million direct jobs over five years across the country and make high-speed rail a competitive option against road and air travel, modes that Congress heavily subsidizes. Rep. Moulton released the plan in a 30-page white paper, the American High-Speed Rail and Rebuilding the US Economy, which includes legislative provisions to modernize the nation’s transportation laws. It is the only comprehensive legislative plan to scale high-speed rail at a national level. See the story about Rep. Moulton’s plan on page 7. The full white paper is available for download on Rep. Moulton’s website.

PASSENGER RAIL AUTHORITIES

THE NEXT WAVE IN OVERSIGHT AND MANAGEMENT?

Contributed by: Darrell Smith, Senior Transit Planner, VHB



Before retiring from Caltrans at the end of 2013, Bill Bronte, in his farewell address as Chairman of the Next Generation Equipment Committee, predicted that the independent authority model to manage intercity passenger rail corridors then being implemented in California would become the model adopted by other states supporting intercity passenger rail. At the time, the Capitol Corridor Joint Powers Authority (CCJPA) and Northern New England Passenger Rail Authority (NNEPRA) were well established

and two new California authorities, the Los Angeles-San Diego Joint Powers Authority (LOS-SAN) and the San Joaquin Joint Powers Authority (SJJPA) were coming into being to respectively manage the Amtrak-operated Pacific Surfliner and San Joaquin intercity passenger rail corridors.

Now, more than six years later, Virginia is establishing the fifth such authority with this year's passage of House of Delegates bill 1414 that includes provisions for the Virginia Passenger Rail Authority. While each of the authorities has unique characteristics in terms of their responsibilities and structure, they each are designed to play a closer managerial role for offering passenger rail service in their respective states that goes beyond the traditional role the state department of transportation may typically undertake. They are unique from even statewide transit or commuter rail authorities in that they do not directly operate service or directly sell tickets. However, they may own or lease rolling stock, stations, or maintenance facilities. Virginia's proposed authority has a scope that goes beyond that of the preceding four authorities in that it will not be limited to managing intercity passenger rail, but also separately operated and governed commuter rail. In each case, these authorities are established by their state legislatures and are governed by an independent board. While their missions may vary somewhat as provided in the accompanying table, based on the four established authorities their functional responsibilities include train timetable development, fare policy, station development, fleet planning, quality assurance, infrastructure improvement planning and design, and financial administration.

Authority	CCJPA	NNEPRA	LOSSAN	SJJPA	VAPRA
State	California	Maine	California	California	Virginia
Year Established	1998	1995	2012	2012	2020
Rail Service	Capitol Corridor	Amtrak Downeaster	Pacific Surfliner	San Joaquin	Statewide passenger rail (Amtrak Virginia, VRE)
Purpose / Mission	The CCJPA's primary focus is the continuous improvement of the train service through effective cost management, gaining share in the travel market, and delivering a customer-focused, safe, frequent, reliable, and sustainable transportation alternative to the congested I-80, I-680, and I-880 highway corridors.	NNEPRA is a public transportation authority created in 1995 by the Maine State Legislature to develop and provide passenger rail service between Maine and Boston and points within Maine.	If the secretary determines that transferring responsibility for intercity passenger rail service in a particular corridor or corridors to a statutorily created joint powers agency would result in administrative or operating cost reductions, the secretary may authorize the Department of Transportation to enter into an interagency transfer agreement to effect a transfer of those administrative functions...	If the secretary determines that transferring responsibility for intercity passenger rail service in a particular corridor or corridors to a statutorily created joint powers agency would result in administrative or operating cost reductions, the secretary may authorize the Department of Transportation to enter into an interagency transfer agreement to effect a transfer of those administrative functions...	The purpose of the Authority shall be to promote, sustain, and expand the availability of passenger and commuter rail service in the Commonwealth and to increase ridership of such service by connecting population centers with passenger and commuter rail service and increasing availability of such service.
Source:	Capitol Corridor Intercity Passenger Rail Service Draft Annual Business Plan FY20-21 – FY21-22, January 2020, p. i	About, Mission Statement, www.NNEPRA.com	California Intercity Passenger Rail Act of 2012, Section 2(b)(2)	California Intercity Passenger Rail Act of 2012, Section 2(b)(2)	Virginia House Bill 1414, Article 6, § 33.2-288, C., Feb. 5, 2020



To-date, the four existing authorities have a focus on a single intercity passenger rail corridor. The VPRA will be more expansive, covering any passenger and commuter rail service within the Commonwealth of Virginia that currently includes two Virginia Railway Express (VRE) commuter rail lines and four Amtrak Virginia-supported routes (Washington-Roanoke, Washington-Norfolk, Washington-Newport News and Washington-Richmond). HB 1414 also granted the VPRA relatively broad authority to borrow money or issue bonds to finance rail facilities and to design, build, operate and maintain rail facilities. Note that the VPRA's focus will be on providing passenger rail facilities, including track, structures, and stations, whereas the existing four au-

thorities have more of a focus on managing the operation of intercity passenger rail service.

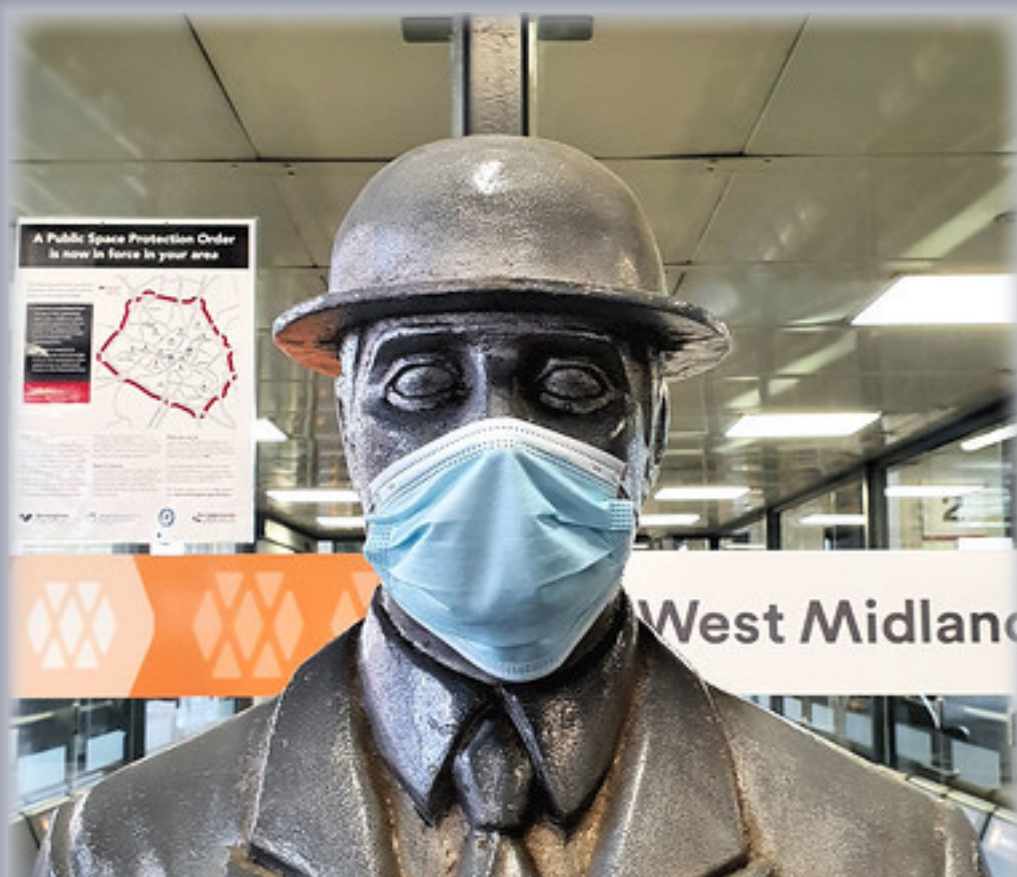
The existing authorities use a number of different approaches to provide for passenger rail facilities, from funding Amtrak to arrange for improvements to direct contractual arrangements with the host railroads, which is exemplified by the improvements NNEPRA has funded and partnered with the Pan Am Southern. Virginia, in its recent agreement with CSX, will be acquiring railroad right of way and improving track capacity, and will own these assets. This model more closely resembles the State of Michigan's acquisition of the Kalamazoo-Detroit segment of the Michigan Line from Norfolk Southern in order to improve the Amtrak Wolverine service. This model does not necessarily mean that VPRA will directly maintain these facilities, as the current models include contracts with Amtrak or with third parties.

Unlike the model emerging in other states, the Virginia Passenger Rail Authority does not address ownership of passenger rail rolling stock. In California, Caltrans owns most of the locomotives and passenger cars used in intercity passenger service, and leases them to the three JPAs. NNEPRA, while it owns the maintenance of equipment facility in Brunswick, ME, continues to utilize Amtrak-owned rolling stock. As Virginia plans to continue to expand intercity passenger rail service with hourly trains between Washington and Richmond and a new east-west service extending from Norfolk to Roanoke, it will have to expand the fleet beyond what is currently being provided by Amtrak. It is also worth noting that Virginia constructed and owns the Norfolk maintenance of equipment/

layover facility and is planning to construct a new facility for its Newport News service.



Therefore, Virginia is heading to introduce a new model of passenger rail authority unique from the four existing intercity passenger rail authorities. The future will likely bring about future evolutions to each of these authorities as demand for passenger rail continues to grow. Which model other states decide to follow, if any, is yet to be determined.



Intercity Passenger Rail Covid Experience in Asia and Europe

By: Eric Peterson

Yogi Berra would be right at home in these times. His aphorisms would be appropriate no matter the setting because of the uncertainty and lack of clarity of each moment.

Since the beginning of 2020, analysts and strategists have been scrambling to figure out what the condition and prospects for improvement are for intercity passenger rail travel in the United States and in other regions of the world.

An April article in the publication "Diplomat Intelligence Risk" (<https://thedi diplomat.com/2020/04/covid-19-in-asia-a-country-by-country-guide/#!/%23China>), highlighted the "Good," "Bad," and the "Ugly" of passenger rail travel throughout Asia. From any perspective, given the constant challenges presented by Covid 19, it's all UGLY.

Some have postulated that the world's current health condition points toward the return of European-style train passenger cars with individual compartments. For its part, Amtrak has begun touting its overnight sleeping car accommodations, along with strategies to socially distance passengers in its currently operating passenger cars, including on its state-sponsored, regional NEC, Acela and Auto Train services (<https://thepointsguy.com/reviews/amtrak-auto-train/>).

Like all other modes of the transportation and the world-wide travel industry, intercity passenger and commuter rail in the U.S. are taking big hits that will limit investment in new rolling stock design, service frequency and reliability; challenges that will probably only be overcome with the discovery and widespread use of an effective Covid vaccine.

"It ain't over till it's over."

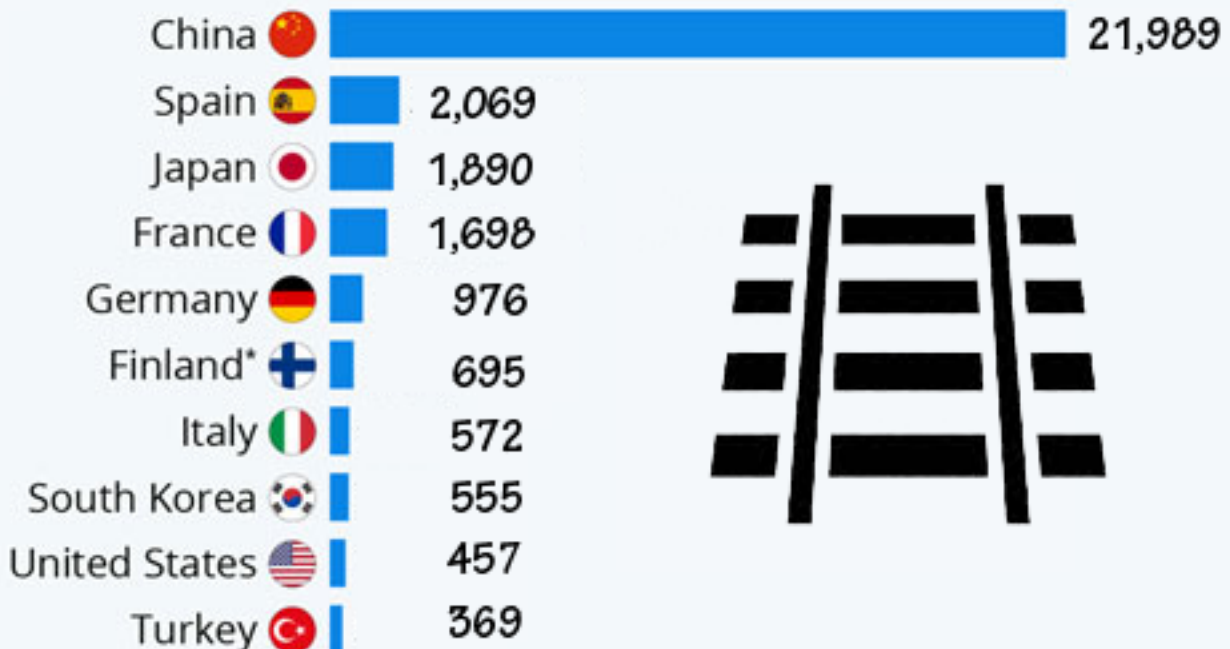


High-speed rail is a catchall term with several definitions. The Federal Railroad Administration says it starts at a hundred and ten m.p.h., while the International Union of Railways says a hundred and fifty-five. But whichever definition one favors, the rails themselves must be carefully designed to handle the physical forces imposed upon them by multi-ton trains moving at high velocity.



The World's Longest High-Speed Rail Networks

Miles of high-speed rail track in operation by country (Feb. 2020)



PUBLIC TRANSIT

RESTORING TRAVELER CONFIDENCE

By: Kenneth Sislak

Empty trains are a common sight throughout the world as a result of the COVID-19 pandemic and government-imposed lockdowns. But even as economies are re-opening, passenger traffic is significantly below the record levels posted in 2019 by Deutsche Bahn (DB), Amtrak and other passenger rail carriers. Last year for example, DB had a record volume of more than 150 million passengers on its intercity and ICE long-distance trains, an annual gain of 2.8 million. Long-distance and regional passenger train passenger volumes slumped to around 15 percent of normal demand during the coronavirus restrictions in Germany. And in the US Amtrak carried a record 32.5 million passengers in 2019—the highest in the system's history—and the ninth consecutive year Amtrak carried more than 30 million passengers. Amtrak reported a 95 percent reduction in ridership across all routes because of fear of traveling, lockdown measures and the need for social distancing.

What are the passenger railroads doing to restore confidence to people who fear becoming infected with the highly contagious COVID-19? (See Amtrak's COVID-19 response on page 9). Each country and rail service provider reacted to the pandemic in their own unique way guided by the World Health Organization and Centers for Disease Control public health guidance. In response to the sharp decline in passenger volumes, Amtrak and VIA reduced services significantly and eliminated trains on several routes during the lockdown period. In Europe, long-distance international trains were curtailed, especially services to Italy where the COVID-19 outbreak was widespread and serious.

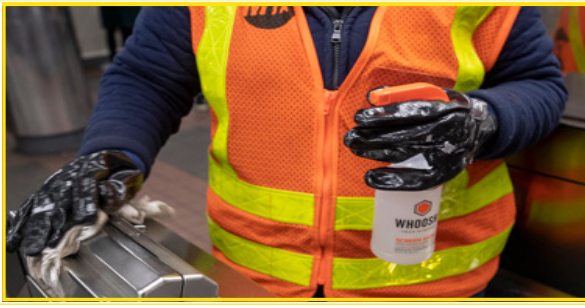
In March, Italy introduced stringent restrictions on travel with passengers required to complete a government form to justify their need to travel. Both Trenitalia and NTV-Italo cut the frequency of their high-speed services. Both operators closed their passenger lounges at stations, suspended at-seat service and were trying to maintain a 3-meter distance between passengers inside trains. Trenitalia installed hand sanitizers on trains and both operators stepped up train cleaning. NTV-Italo issued train staff with specific instructions as well as protective equipment such as masks, disposable gloves

and hand sanitizer. Thello suspended both its overnight sleeper service between Venice, Milan and Paris, and its day trains linking Milan, Nice and Marseille until through April 3. The EuroCity service linking Munich, Innsbruck and cities in northern Italy, operated jointly by DB and Austrian Federal Railways (ÖBB), was suspended south of Innsbruck.

But in contrast, DB kept most of its passenger services running. The long-distance passenger trains were running at about 75 percent of its typical weekday schedules, and about 65 percent of normal weekday schedules for short-distance services — something very similar to their weekend schedules. The goal behind this was to ensure that trains were available for the few people who still needed them and when they needed them. Stability in services was an essential element of the programmed response to the reduction in demand.

Danish State Railways (DSB) introduced a range of measures in March to mitigate the spread of COVID-19 including running longer trains during off-peak periods to allow passengers to sit further apart from one another, making all tickets refundable at no charge and eliminating cash fare payments onboard trains. Thalys suspended operations until June and are now running about 20 percent of their scheduled trips. And Brightline in the US suspended operations between West Palm Beach and Miami and has no plans to re-start operations until the extension to Orlando International Airport is completed. As the economy re-opens, Amtrak and VIA have restored some of the curtailed services. But Amtrak has proposed cutting its long-distance train service from daily departures to three times a week, a 58 percent reduction in long distance train departures. This proposal has angered many rail passenger service advocates and others who believe this is an attempt to eliminate the long-distance network by making the service unreliable and inconvenient resulting in a serious decline in passenger ridership and demand.

Eurostar instituted a series of measures to protect the health of its passengers and limit the spread of COVID-19. Measures include the deep cleaning of each train before the beginning of every trip, a new queuing system to



ensure physical distancing and asking passengers to wear face coverings during the trip.

The International Union of Railways (UIC) has prepared a report recommending coronavirus mitigation measures for its member passenger railway service providers. A summary of those mitigation measures is provided below. The full UIC report can be found at the following link: https://uic.org/IMG/pdf/railsilience__how_the_rail_sector_fought_covid-19_during_lockdowns.pdf

- **Cleaning** - The UIC recommended improving cleaning protocols and increasing the frequency and thoroughness of cleaning and use of appropriate viricide disinfectant on surfaces that are touched frequently.
- **Hand sanitizer** - Hand sanitizer gel has been made available for staff and public use. Initially, the supply of sanitizer gel was in short supply because higher priority was given to medical facilities. The supply of this product to agencies outside the medical community has been increasing.
- **Temperature screening** - Temperature screening has been employed by several passenger rail service providers to screen employees and, in some cases, passengers at stations. The screenings are used to identify people with suspected illness if the temperature is above the normal range for adults, which is 97.8°F to 99°F (36.5°C and 37.2°C). UIC suggested 37.3°C and 37.8°C (99.1°F to 100°F), which reflects a variance in average temperatures for adults across the globe. For children, the temperatures are slightly higher.
- **Personal protection equipment** - The use of personal protective equipment (PPE) such as face masks is highly desirable but can be difficult to institute because of cultural differences. In Asia, the use of masks is widespread and has been for years due to the high incidence of seasonal flu. This has not been the case in Europe or the US where use of masks has not been widespread outside of hospitals. However, making PPE available for operating personnel is a priority and is mandatory for some passenger service providers. Very few rail passenger service providers mandated use of masks for its customers, but this is changing as the countries move from lockdown

to re-opening. As noted by Amtrak, all its customer-facing employees are required to wear masks and is requiring passengers to wear facial coverings whenever they are not physically distant from other customers and employees. Airlines are requiring passengers to wear masks to reduce the spread of the contagion.

- **Social distancing** – Some rail passenger service providers are reducing the capacities of trains and changing reservation systems to provide for more distance between passengers. Currently, low demand is making this relatively easy to institute depending on the seating arrangements and configuration of train consists. But most railways rely on the common sense and courtesy of their customers to practice social distancing.

The American Public Transportation Association (APTA) has developed recommended industry guidance for cleaning and disinfecting public transit vehicles and facilities in response to the COVID-19 pandemic. The paper was developed by APTA's Technical Advisory Group of industry representatives and LTK Engineering & Restoration Task Force. The APTA Cleaning and Disinfecting Guidance, which draws from proven best practices, CDC guidelines, and public health experts, is designed to aid all passenger service providers in developing maintenance, cleaning, and disinfecting programs for their vehicles and facilities. Many of the ideas discussed in the document are currently being implemented in the public transportation and rail passenger service industries and related sectors that are working to mitigate the transmission of the coronavirus. The APTA guidance can be found at this link: https://www.apta.com/wp-content/uploads/APTA_WP_Cleaning_and_Disinfecting_Transit_Vehicles_and_Facilities_During_a_Contagious_Virus_Pandemic_FINAL_6-22-2020.pdf

When will the rail passenger industry return to normal pre-pandemic schedules and practices? No one knows. But, nearly 40 percent of those who responded to a recent on-line poll agreed it will take over a year for business travel to return to its pre-pandemic volumes. Nearly 15 percent believe that such travel will never return to normal. Rail passenger service providers need to rebuild traveler confidence by convincing them rail travel is safe, stable and reliable. This means clean, frequent and on-time service. Life will return to normal someday. And trains are and will continue to be the safe choice for travel.

VISION IN THE TIME OF A PANDEMIC

CALTRANS DIVISION OF RAIL & MASS TRANSPORTATION

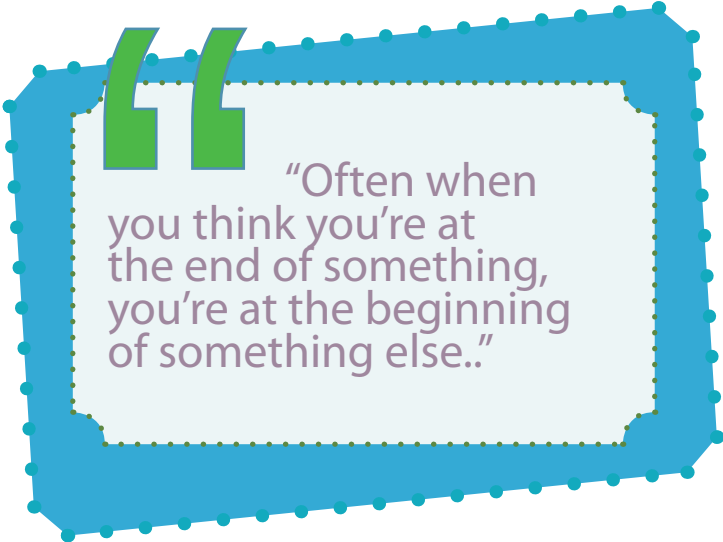
By: Anthony Serna, CALTRANS, Transportation Planner

THE VISION OF THE CALTRANS' DIVISION OF RAIL AND MASS TRANSPORTATION (DRMT) IS TO MAKE PUBLIC TRANSPORTATION A VIABLE OPTION FOR ALL. OUR MISSION IS TO PROVIDE MEASURABLE IMPROVEMENTS TO CALIFORNIA'S INTEGRATED AND SUSTAINABLE PUBLIC TRANSPORTATION SYSTEM.

California's commitment to building a high-performance statewide transportation system is well known. Guided by the vision articulated in the California State Rail Plan (Rail Plan), continued investment in commuter, intercity, and high-speed passenger rail systems is central to the California Department of Transportation (Caltrans) and the state's overall strategy for developing a world-class transportation system that provide options for travel while meeting state greenhouse gas (GHG) emissions and vehicle miles traveled (VMT) reduction goals. The statewide system must also extend opportunity and provide equitable access to all Californians.

The Rail Plan outlines the state's framework for investing in and integrating California's rail network in the short-term, mid-term and long-term to ensure development of an integrated state network and a viable, convenient travel option for local, regional and inter-regional trips. By leveraging ongoing and future investments in California High-Speed Rail (HSR), integrating intercity and regional services will provide connections that can deliver auto and air competitive door-to-door trips using coordinated schedules and connectivity hubs to create a truly integrated network.

Two of the key strategies for implementing the Rail Plan are delivering an integrated network developed through iterative and coordinated service planning; and standing up the California Integrated Travel Project (Cal-ITP). The Rail Plan details a network integration framework that guides planning and investments for these two foundational projects and others. The network integration planning process included a market analysis using California High-Speed Rail Authority modeling resources, a review and analysis of the state's infrastructure and constraints, and an operational analysis of a network based on synchronized schedules between services allowing for fast, convenient transfers at hub stations on a network. In addition, various, more specific, network integration studies have been funded and are ongoing throughout the State. The purpose of these studies is to support a seamless travel experience on the state rail and transit network by eliminating points of friction during a public transportation journey. The goal is to produce a truly integrated network and provide customers easy access across different forms of transportation, including rail, buses, bicycles, and ferries. Areas of focus for these studies include but are not limited to: universal trip-planning information; unified payment system; seamless physical connections between modes; and coordinated schedules between providers.



“Often when you think you’re at the end of something, you’re at the beginning of something else..”

For example, one project that is progressing, funded using state resources, is being led by the Solano Transportation Authority (STA) in the Bay Area. Features of the study include schedule coordination with the Capitol Corridor service, which is operated by Amtrak, to improve connections between intercity rail service and local transit. The goal is for local services to match the Capitol Corridor schedule to establish seamless connections for customers. Additionally, network integration planning will identify opportunities for Solano Transportation Authority to serve markets currently unserved by California rail and thruway bus services. Included in the study is focused service planning for locating the Solano County connectivity hub to best serve the I-80 and 680 bus corridors as well as the regional rail connections with Capitol Corridor and future east-west Sonoma-Marín Area Rail Transit (SMART) service. This will include coordination with Napa County for Napa service and selecting a preferred option to serve a population center in Vallejo. Integrated hubs improve connectivity and ensure more access points along the system to thoughtfully coordinate land use development and transportation planning.

The California Integrated Travel Project (Cal-ITP) was awarded TIRCP funding in 2018 and is an innovative project established to help California deliver on statewide goals of increasing transit ridership, reaching environmental targets, lowering transportation-related costs for public transit agencies and the traveling public, improving the customer experience of

travel, and promoting equity throughout California’s vast transportation network.

Three key issues have emerged that Cal-ITP seeks to address: the lack of reliable transit information; frictions in payment; and complex processes for transit riders to verify their eligibility for discounted fares. Generally, Cal-ITP aims to tackle these issues through several initiatives, including:

1. Ensuring standardized statewide access to reliable transit information. To provide reliable and valuable information for transit riders, Cal-ITP encourages implementing GTFS real-time, a transit information standard used worldwide, for all fixed route bus and rail transportation services in the state. This data should include transit schedules, routes, stations and stops; trip costs for every route, starting with the standard/base fare; and real-time vehicle location and arrival information, and any deviations from schedule. The proposed guidelines for Cal-ITP can be found at [\[insert link on DRMT website\]](#).

2. Create a standardized statewide fare payment system. At least one single payment method must be accepted across the whole state complementing existing payment options. Cal-ITP proposes to standardize payment around the EMV contactless standard. This can take the form of a contactless bank-issued payment card, a closed loop transit agency-issued payment card, or a mobile wallet. Cal-ITP also proposes issuing closed loop transit cards statewide for the unbanked, underbanked and customers whose transit fares are funded by a third party. Additionally, to improve the negotiating position of transit operators in California, Cal-ITP proposes to close a merchant services agreement on behalf of all the transit agencies in the state. This would maximize the purchasing power of the State and lower costs borne by operators that currently negotiate digital payment contracts on their own for a relatively small number of annual transactions with a low total dollar amount which leads to more costly processing.

3. Create a statewide eligibility verification program for transit riders with discounted fares. Cal-ITP suggests introducing a centralized eligibility verification

system that can accommodate the benefits of all special groups and discounts. In short, Cal-ITP could leverage statewide data resources to create for a one-stop-shop for accessing any eligible transit benefits for any transit system statewide.

Together, these initiatives will significantly reduce barriers for customers, develop a more integrated network, and lead to increased ridership across California's vast public transportation network. For more information on Cal-ITP, including a Market Sound Report and Feasibility Study, please visit: <https://dot.ca.gov/cal-itp>

To advance the vision articulated in the Rail Plan, California directs significant resources to critical rail and transit projects via several funding programs, including the Solutions for Congested Corridors Program (SCCP), the Trade Corridor Enhancement Program (TCEP), State Rail Assistance (SRA) Program, and the Transit and Intercity Rail Capital Program (TIRCP), among others. These various funding programs provide crucial resources towards implementing the vision. In particular, the TIRCP, which on April 21, 2020 awarded \$500 million to 17 rail and transit projects throughout California, has been foundational in advancing many high-priority projects throughout the state. In the four cycles of TIRCP since it began in 2015, over \$5.4 billion in funding has been awarded to 73 projects, with an emphasis on selecting projects that directly support the Rail Plan vision. These vital resources have also allowed California to build and leverage mutually beneficial partnerships to deliver priority projects with significant service improvements. For example, the Caltrans Division of Rail and Mass Transportation (DRMT), in collaboration with BNSF Railway and the Los Angeles County Metropolitan Transportation Authority (LA Metro), and Metrolink are closely coordinating efforts in Southern California to fund and implement a suite of rail projects between Los Angeles and Fullerton. These efforts will deliver significant, integrated express and regional service improvements and includes the Link Union Station run-through tracks project, which will have initial operations by 2026 in advance of the 2028 Olympic Games. All told, the improvements represent significant progress towards initiating statewide pulse-hub operations on at least a bi-hourly basis by 2027,

with hourly and half-hourly service on high-demand corridors.

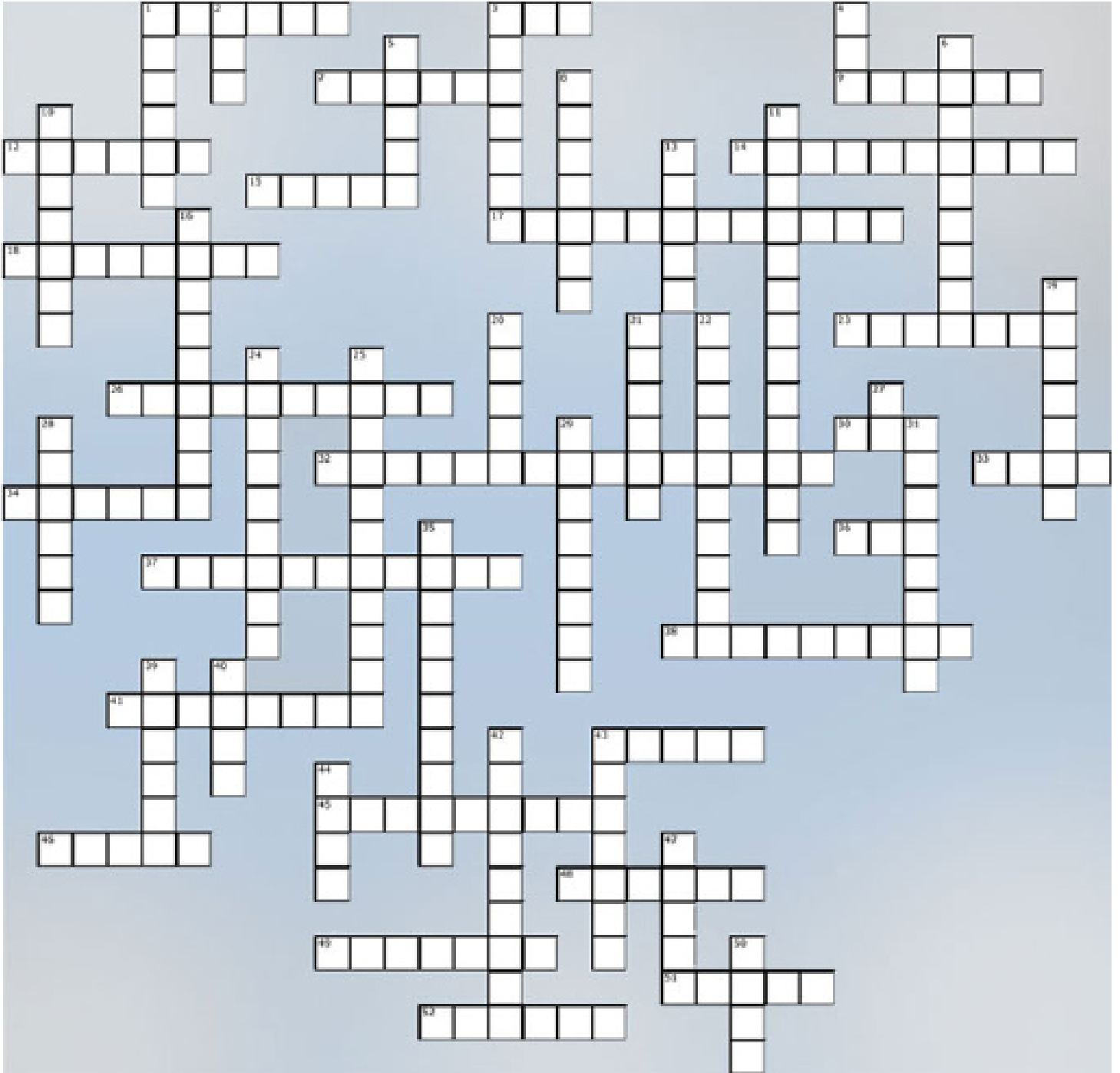
The Rail Plan, network integration initiatives, and the TIRCP and various funding programs, take on an even greater importance as California and the rest of the country grapples with charting a path forward in a post COVID-19 world. The State's Vision for rail and transit will do more than prioritize significant capital investments, but provide a framework for establishing the core, essential services needed to maintain statewide connectivity, as well as a path for rebuilding services around an integrated service plan that is tied to analysis and research of market demand coming out of the COVID crisis. Essential service planning represents a foundation from which California can accelerate the implementation of the State's integrated service concepts and improve the efficiency and effectiveness of rail and transit with a longer-term network understanding and service goals in mind. In the face of the unprecedented economic impacts to transit agencies, California is doubling down and committing to strengthening partnerships and reinvesting in rail and transit to meet the state's ambitious climate, mobility, and equity goals. Although the ongoing pandemic is putting tremendous stress on transit agencies, the State is committed to delivering the various improvements underway and supporting the rail and transit funding programs to be administered in the years to come and will help support the economic recovery in the years ahead.

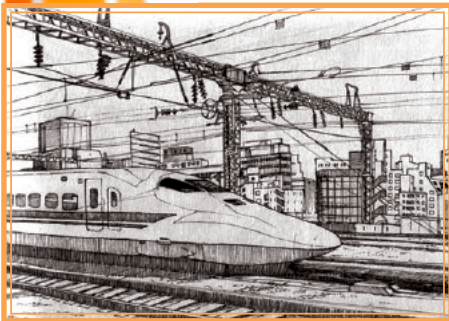


NAVIGATING THE RAILS

CHALLENGE YOURSELF ON THE HISTORY AND OPERATIONS OF TRAINS

By: Wendy Wenner





Grab your pencil, a cup of Joe, and a magnifying glass ...

HAPPY PUZZLING!

Across

- 1 the train that first ran on the world's first intercity rail line
- 3 First common carrier and oldest U.S. Railroad
- 7 locomotives first developed in Europe after WW 1
- 9 built the first Eurostar fleet
- 12 Designed and constructed the first U.S. steam engine
- 14 the spacing of rails (2 words.)
- 15 wheelsets are mounted on these
- 17 rail device with electrical voltage (2 words)
- 18 had land grants issued to this state in 1851 & 1857
- 23 Railcard or 16-17 saver
- 26 where the Central Pacific began
- 30 locomotive No. 999 exceeds 100 in 1893
- 32 meeting place of Union Pacific and Central Pacific (2 words)
- 33 Lt. Col. and Chief Engineer surveyed routes
- 34 cleans light rail trains and railcars
- 36 the chief promoter of Transcontinental _____ Whitney
- 37 longer routes providing vital connections coast to coast (3 words)
- 38 electrified rails often found in subways (2 words)
- 41 world's longest rail tunnel
- 43 steamliner example _____ Chief
- 45 a system of smaller railroads
- 46 world's largest HSR network
- 48 1830's domestic locomotive _____ Clinton
- 49 Montreson's _____ built by British engineers near Niagara River
- 51 replaced iron rails
- 52 _____ and Hudson



Down

- 1 1929 Complete Consolidation Plan
- 2 the trains that climb steep hills and mountains
- 3 loose gravel under the ties
- 4 governs U.S. railroads
- 5 Iberian Peninsula Operator
- 6 America's oldest continually operating shortline
- 8 this city has elevated tracks
- 10 what Eli H. Janney contributed
- 11 Italy's Silver Arrow
- 13 a spike driven west of this Texas river completed Second Continental Railroad across TX
- 16 Harriet Tubman's job on the underground railroad
- 19 Country where many steam engines were imported from
- 20 the country that first built high-speed rail trains
- 21 takes a trip through the Rockies
- 22 captures electrical current
- 24 wooden railroad 1720's
- 25 union soldiers seized control of the General (2 words)
- 27 Historic RR Company in U.S. Late 19th century (abbr.)
- 28 the code for Canada
- 29 1829 Steam Locomotive (2 words)
- 31 first high speed rail in the Middle East
- 35 first railroad manufacturing facility in the U.S. (2 words)
- 39 where the first underground railway was built in 1863
- 40 Railway signaling can do this to trains
- 42 was used to control train movement
- 43 considered the Father of America's Railroads
- 44 temporary management during WW1
- 47 by 1850, more than 9,000 miles of these were built
- 50 Conrail was the successor of _____ Central