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THE HISTORICAL RELATIVISM OF HIGH SPEED

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About 3 years ago, I started thinking about high speed trains, which led to a question that I now pose to this audience: *when were high speed trains first developed, either in the U.S. or elsewhere?* Is it in the recent era, when Japan's *bullet train* and the Pennsylvania Railroad's *Metroliner* reached top speeds above 150 miles per hour (mph), followed by the *Train à Grande Vitesse (TGV)* in France, with top speed of 186 mph in the 1980's (now 220 mph)? What about the era of American *streamliners*, such as the *Rocket*, the *Eagle*, and others, that hit maximum speeds of 120 mph in the 1930's, 40's and 50's? People lined rail tracks and watched in awe as *streamliners* sped through their cities, and they were described in the press at the time as "high speed." What about the very first passenger trains in England and France, in the 1830's and 40's—could they even be examples of high speed trains? While they could only run at maximum speeds of 30 mph, they were 100-200 percent faster than their predecessors, the stagecoach and walking, and they were described in the press at the time as "high speed."

I argue, from a cultural-historical perspective, that trains in each of these historical periods ran at "high speed" because speed is not an absolute rate of movement, not a fixed, mathematical number or threshold that must be exceeded to be considered "high." Instead, high speed, as well as time and spatial distance, which are directly related to speed, are historically relative constructs that are defined partly by mass media, partly through subjective perception, and partly in relation to previous rates of movement. I also argue, based on economic and financial data, that high speed and profit on railways are related because trains operated profitably when they were perceived and constructed as high speed.

Finally, I suggest that speed is instrinsically dialectical in nature, and that this has implications for railway transport. Stephen Kern states in his book on <u>The Culture of Time and Space:</u>

"If a man travels to work on a horse (or stagecoach) for 20 years and then (the train) is invented and he travels in (the train), the effect is both an acceleration and a slowing. The new journey (by train) is faster, and the man's sense of it is as such. But that very acceleration transforms (the horse and stagecoach)…into something it had never been—slow—whereas before it was the fastest way to go."[1]

[1] S. Kern, *The Culture of Time and Space* (Cambridge, MA.: Harvard University Press, 1983).

In other words, fastness and slowness always co-exist. Therefore, just as high speed creates the potential for profit, so too does slowness, as with City Night Line trains in Europe.

In short, high speed is multi-dimensional: intrinsically dialectical in nature; subjectively perceived and socially constructed; and objectively measurable in relation to previous rates of movement.

PERIODS OF HIGH SPEED IN RAIL HISTORY

The earliest period of high speed on passenger railways occurs in the 1830's, after the invention of the steam locomotive. To learn about speed on these early trains, I use documentary sources, such as books, newspapers, and periodicals—as opposed to timetables. Because standardized time was not implemented until after the middle of the 19th century, timetables are not generally available through which to measure speed, time, and distance on an intercity rail line. Furthermore, until the 1860's, technology to measure rate of locomotive movement ("speedometers") had not yet been developed.[2] Speed was measured by recording the departure and arrival time, then dividing distance by time of trip. Based on this type of information, George Stephenson's *Rocket*, the first steam locomotive used in passenger service, is said to have run at a top speed of 29.1 mph in a time trial in England in 1829,[3] and at 30 mph in 1831 on the Baltimore and Ohio Railroad.[4] Average intercity speed was, no doubt, significantly lower, probably in the range of 15-20 mph, due to gaining speed and braking at beginning and end of journey, and at intermediate station stops.[5] Nonetheless, both the top and average running speed of the earliest trains was significantly higher than that of stagecoaches, which ran at top speeds of only 7-10 mph, and even slower average speed.[6]

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[2] Anonymous, "Speed of railway trains," *Railway Times* 1865, 17, 25.
[3] J. Marshall, *Rail: the records* (Enfield, England: Guiness Superlatives, 1985). 156.
[4] Ibid., 17.
[5] W. Schivelbusch, *Railway journey:the industrialization of time and space in the 19th century* (Berkeley: University of California Press, 1986). 33-34.
[6] Ibid.

After standardized time is introduced in the mid-to-late 19th century, data on trip times and intercity distances is published in national timetables in both France and the U.S. To measure speed between two cities, I divide distance travelled in miles by duration of that trip in minutes. Fastest commercial speed is shortest trip time between two cities.[7] I collate this data for the period 1890-1990, on three corridors which have been the locus of historically significant high speed initiatives in the U.S. and France: first, for the U.S., for New York to Washington, D.C. (part of the Northeast Corridor or NEC), where some of the earliest American railroads operated; where *streamliners* ran in the 1930's, and where the recent era of very high speed service was initiated in the 1960's, with *Metroliners;* also, the Dallas-Ft. Worth to Houston corridor, where *streamliners* ran in the 1930's, 40's and 50's, and where a public-private initiative for very high speed rail is currently in the planning stage; and, finally, the San Francisco (S.F.) to Los Angeles (L.A.) corridor, an early West Coast rail route; a *streamliner* route in the 1930's-1950's; and, at this moment, site of a high speed rail project which is approaching construction. For France, I look at the Paris-Lyon corridor, where rail companies have run high speed trains since the mid-19th century and which is where the French National Railway Company, SNCF, ran its first *Train à Grande Vitesse (TGV),* starting in 1981.

Timetable data in Table I show that, although speed increased generally in small increments between 1890 and 1990,[8] significant increases occurred in three historical moments, as follows: first, for the NEC, a 17.4% increase in the decade between 1890 and 1900, which came about

[7] This is the standard formula: rate times time = distance. An alternative approach would be to look at the average speed of all trips between city pairs, but this was not feasible because it would require an inordinate amount of data collection. Or one could examine the fastest speed actually attained by trains at any point along their intercity routes. For the latter, see: Steffee, D. "Annual Speed Survey." *Railroad Stories* (1936-1952; "Annual Speed Survey." *Trains* (1954-1973). Because this paper is about relationships between speed and finance, my objectives are best served by looking at fastest commercial speed.

[8] Table 1 also shows that speed declines at various points in time, such as after World War 1 (1920), after infrastructure and rolling stock had deteriorated. Because the focus of this report is on increases in speed and attainment of high speed, not on the overall history of changes in rail speed, I do not explain the reasons why speed declines at various points between 1890 and 1990.

TABLE I PASSENGER TRAIN SPEEDS, 3 CORRIDORS: 1890-1990 in miles per hour (mph)						
	NYC -	-	DALLAS/FT WORTH -	-	S.F. -	
YEARS	D.C.	-	HOUSTON	-	L.A.	
	(226.6 miles)	% Change	(265 miles)	% Change	(475 miles)	% Change
1890	38.6 mph		25.4		21.3mph	
1900	45.3	17.4%	28.1	10.6%	24.6	15.5%
1910	46.2	2.0%	35.3	18.5%	38.6	56.9%
1920	48.4	4.7%	31.4	-11.1%	37.4	-3.1%
1930	49.3	1.9%	40.7	15.3% (1)	34.4	-8.0%
1940	60.4	22.4%	55.6/60 (2)	36.6%/47.4%	48.2	40.1%
1950	63.2	4.6%	62.4	12.2% (3)	41.6	13.7%
1960	63.2	no change	61.1	-2.1%	39.9	-4.1%
1970	80	26.6%	discontinued		42	5.3%
1980	61.7	-22.9%	discontinued		Service to Bakersfield (5)	
1990	87.7	9.6% (4)	43.1	-29.5%	Service to Bakersfield (5)	

(1) Increase over 1910 rate of speed.

(2) TNO RR timetable shows 60 mph. (https://american-rails.com, n.d., "Sunbeam")

(3) Increase over 55.6 mph.

(4) Increase over 1970 rate of speed.

(5) Train stops at Bakersfield; bus from there to Los Angeles (112 miles).

largely because the Pennsylvania Railroad (PRR) introduced more powerful locomotives; second, an increase of 22.4% from 1930 to 1940, after PRR introduced *streamliners* built of lightweight stainless steel that were pulled by high-powered locomotives (also the NEC was electrified by this time, which contributed to higher speed); third, a 26.6% increase between

1960 and 1970, resulting from the development of high technology *Metroliners*, which operated with newly designed, powerful electric locomotives and relatively lightweight rolling stock.[9]

Similarly, for the Dallas/Ft. Worth to Houston and for the L.A. to S.F. corridors, Table 1 shows significant increases in speed between 1890 and 1910, due to improvements in infrastructure and increasingly powerful steam locomotives; and again in the 1930's, after the introduction of *streamliners* and infrastructure improvements. For the Dallas/Ft. Worth to Houston corridor, train speeds increase dramatically in the 1930's, from just over 40 mph in 1930, to either 55.6mph (a 36.6% increase), or 60 mph (a 47.4% increase), in 1940, depending on the timetable source. In California, commercial speed in the 1940 is not as high (48.2 mph), but the percentage increase over 1930 is very large, 40.1%. In the 1960's, however, speed does not increase on either corridor, because by this point in its history, the Southern Pacific was disinvesting from, and phasing out of passenger service, which is why commercial speed data in Table I shows a decrease from 1950 to 1960, and only returns to its 1950 level by 1970. Similarly, the Texas and New Orleans Railway (TNORR) discontinued passenger service entirely in 1967, and service only resumes under Amtrak in the 1980's.

The speed data in Table 2 supports generally similar findings for France. Speed increases on the Paris-Lyon corridor in small increments between 1890 and 1990, except for significant leaps forward between 1900 and 1910, 1950 and 1960, and 1980 and 1990. The 23.4% increase from 1900 to 1910 results from more powerful locomotives. The 27.8% increase in 1960 results from electrification, more powerful locomotives and lightweight equipment.

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[9] National Railway Publication Company, *Intercity Timetables*, Monthly vols., Official Guide of the Railways and Steam Navigation Lines of the U.S.,Puerto Rico, Canada, Mexico and Cuba
(New York: National Railway Publication Company, 1868-1995); Livret-Chaix, "Guide Officiel des Voyageurs," (Paris, France: Chaix, 1890-1990).

TABLE 2 PASSENGER TRAIN SPEED: PARIS TO LYON, 1890 - 1980 (318 miles)		
Year	**Speed mph**	**Change in Speed**
1890	**38.1**	
1900	**41.5**	**8.9%**
1910	**51.2**	**23.4%**
1920	**53.5**	**4.5%**
1930	**53.0**	**-0.1%**
1940	**62.5**	**16.8%**
1950	**62.2**	**-0.1%**
1960	**79.5**	**27.8%**
1970	**67.4**	**-15.2%**
1980	**82.2**	**3.4%**
1990	**112.2**	**36.5%**

The largest absolute and relative change in commercial speed in the 100 year period comes between 1980 and 1990, an increase from 82.2 to 112.1 miles per hour (mph), or 36.5%, with the introduction of the *TGV*. However, this is not qualitatively different from previous increases in speed on this corridor. Increases in speed included leaps forward of 23.4% and 27.8% between 1890 and 1960. The reason for the 36.5% leap forward after 1980 is that the *TGV* runs on grade-separated track that allows top speeds up to 186 mph. But, neither the technology of the *TGV*, or its speed, was a radical break with the past. Technically, the *TGV* included improvements in signaling, in the bogies, and in transmission of electricity through improved catenary lines; but, these were incremental changes, not qualitative breaks with the past.[10]

SOCIAL CONSTRUCTION OF HIGH SPEED

While speed on French and U.S. railways American increased mostly in small increments from the early 19th century to the present, at four points in time major increases in speed occurred. Each time this happened, rail companies and mass media promoted and advertised the increase as a special, even unique, so that trains in each of those eras came to be called "high speed." This characterization was absorbed into both individual and collective consciousness. High speed, in other words, was socially constructed.

*** This section will provide evidence concerning the social construction of "high speed" in each of the four historical periods. While text of this section not yet finished, it will be available at the T2M Conference, and will be included in my panel presentation. ***

HIGH SPEED AND RAIL FINANCE

The social construction of speed has major implications for rail operating and capital finances. On the operating side, numerous studies have shown that increases in speed increase the number of passengers who travel on a train line, so "high speed" at any historical moment is more likely to attract higher ridership and lead to profitable rail operations. Increases in speed also improve the ability of trains to compete with other modes of transport. And, to the extent that high speed improves ridership and potential for profit, the more likely it becomes that a railway can attract private and public investment in the construction of new rail lines, or in the improvement of

[10] J. Meunier, *On the Fast Track: French Railway Modernization and the Origins of the TGV, 1944-1983* (Westport, CT.: Greenwood 2002). C. Lamming, *Cinquante Ans de traction à la SNCF*, (Paris, France: CNRS Editions, 1997).

existing infrastructure. In short, routes on which trains can run at high speed are more likely to attract both increased ridership and capital investment and, therefore, to operate profitably.

Developments in passenger rail in the era of the 1930's, 40's, and 50's supports these propositions.[11] Although railroads were in serious financial trouble in the 1930's because of competition from highway-based traffic, they responded by developing a new class of more modern, high speed trains.[12] In the U.S., these were called *streamliners,* which included air conditioned rolling stock, constructed from lightweight stainless steel, sleekly designed to connote speed;[13] some of which were pulled by steam locomotives; most by new technology diesel-electric engines.[14] *Streamliners* allowed railroads to offer much faster intercity passenger service. For example, the Southern Pacific Railroad's *Daylight Streamliner* began service in May, 1937, on the San Francisco to Los Angeles corridor, ran at a commercial speed of approximately 50 mph (see Table 1), which dramatically reduced travel time, from approximately 13 hours to under 10 hours.[15] A year later, the Texas and New Orleans Railroad introduced the *Sunbeam* on the Dallas-Ft. Worth to Houston corridor, which ran even faster, at around 60 mph (see Table 1), again reducing travel time significantly.[16] And on the Northeast

[11] In future extensions of this research, these comparisons will be extended both further back in time, from the inception of railroads, and up to the present day, as well as to multiple corridors in both France and the U.S. Time and resources did not allow such a comprehensive approach for this phase of my research.

[12] After the end of World War 1, in the U.S., the number of automobiles increased from 8.1 million to 23 million, and trucks from 1.1 million to 3.5 million, and in France, the number of motor vehicles increased from 95,000, just before the war, to 1.460 million at the end of the 1920's. Railway operating losses increased dramatically threatening the ability of railways to pay their debt service obligations. Both the American and French governments made loans and gave loan guarantees to private railroads, which was successful in avoiding widespread industry bankruptcy. (cf: H. Mertins, *National Transportation Policy in Transition* (Toronto: D.C. Heath 1972). 15. For the U.S. For France, see: K. Doukas, *French railroads and the state* (New York: Columbia University Press, 1945). 215. Note also that, as a result of financial problems that began after World War 1, the five private railroads that formed the so-called "grand réseaux" (broad network) in France were nationalized in late 1937s, but remained under private ownership in the U.S. until 1971.

[13] Raymond Loewy, internationally renowned industrial designer, was responsible for the art deco style of many of the newly designed streamlined trains. See http://obviousmag.org/en/archives/, "the wondrous locomotives of raymond loewy."

[14] J. Stover, *American railroads* (Chicago: University of Chicago Press, 1961). 226.

[15] D. Hofsommer, *The Southern Pacific, 1901-1985* (College Station, Texas: Texas A & M University Press, 1986). 136.

[16] G. Werner, "Railroads," *Handbook of Texas Online*(2012), http://www.tshaonline.org/handbook/online/articles/eqr01. 5.

Corridor, the Pennsylvania Railroad introduced *Streamliners* from its "*Fleet of Modernism*,"[17] that averaged over 60 mph, commercial speed (Table 1), on the New York City to Washington line, the fastest of the trains on these three corridors. Though they were not explicitly called *streamliners,* trains based on similar improvements were also introduced in France in the 1930's. On the Paris-Lyon corridor, the first such trains were termed "aerodynamique," to connote that they were similar airplanes, which were the most modern and fastest form of travel in this period. Speed on the Paris-Lyon route increased by 16.8% (see Table 2) between 1930 and 1940. Then, in 1950, a new high speed train, *Le Mistral (*"Mediterranean wind"), was introduced, to which lightweight stainless steel cars were added in 1956. As result, train speed increased by 27.8% between 1950 and 1960 (see Table 2). In short, in both France and the U.S., new trains were developed in the 1930's, 40's, and 50's, whose speed jumped significantly beyond previous generations of trains.

Various secondary sources suggest that the introduction of these high speed trains had a positive effect on rail industry finances. In 1968, the Director General of SNCF claimed that *Le Mistral* was "very largely (profitable). The receipts of the train cover(ed) twice the expenses."[18] Similarly, for the United States, the well known rail historian Donald Hofsommer states that Southern Pacific's *Daylight streamliner* was an "instant and profitable…(train)."[19] He implies the same result for the Sunbeam streamliner on the Dallas-Houston corridor.[20] Albert Churella, the pre-eminent historian of the Pennsylvania Railroad (PRR), makes a similar claim when discussing PRR's New York to Washington, D.C. trains.[21] Concerning the introduction of *streamliners* throughout the United States, Middleton and Reutter state: "(b)uilding a margin of time savings over automobiles and buses, the(se) trains attracted standing-room-only crowds and

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[17] These trains were designed by Raymond Loewy, a world-famous industrial designer of this period.

[18] B. Porcher, ""Du P1, Cote d'Azur Pullman Express, au train 1, Le Mistral"," *Révue de l'association des amis des chemins de fer* (1968): 198.

[19] Hofsommer, *The Southern Pacific, 1901-1985*.

[20] D. Hofsommer, "Texas Railroads," in *Texas: A Sesquicentennial Celebration* ed. D. Whisenhunt (Austin, Texas: Eakin Press, 1984), 249-50.

[21] Personal communication, 2013.

returned solid earning to their owners…(E)very minute saved in transit was likely to generate 1 per cent more traffic (and, thereby, higher earnings)"[22]

To confirm the validity of these assertions, I looked for primary data on *streamliner* finances. The key indicator in this regard is a railroad's operating ratio, which measures revenues relative to expenses, and, thereby, profitability. When a ratio is greater than 1.0, expenses are greater than revenues and the company is losing money; and vice-versa, when the ratio is less than 1.0, the company is earning a profit. Table 3 specifies operating ratios for the Pennsylvania Railroad, the Southern Pacific Railway, and Texas and New Orleans Railroad, which operated *streamliners* on the 3 corridors which are the focus of this research.

TABLE 3
OPERATING RATIOS, PASSENGER SERVICE: 1889-1949
(Ratio = revenues divided by expenses)

	PENN RAILROAD (1) Northeast Corridor	TEXAS (2) Entire State	S'ERN P'FIC RR All RR Operations (3)
1889 (actual)	0.64	N.A.	0.81
1895 (est'd)	0.81	0.64	0.83
1907 (est'd)	0.7	N.A.	0.6
1920 (est'd)	0.7	N.A.	0.81
1928(est'd)	0.72	N.A.	0.7
1932 (actual)	1	144	110
1940 (actual)	104	N.A.	117
1949 (actual)	115	N.A.	141

Sources: Interstate Commerce Commission, "Statistics of railways in the United States," ed. Bureau of Statistics (Government Printing Office, 1942). United States Interstate Commerce Commission (ICC), "Annual report of the statistics of railways," 1889 (v 2); 1895 (v8). (Washington, D.C.: US Government Printing Office). ICC, "Preliminary report of the income account of railways in the U.S., 1907. ICC, Bureau of Statistics, "Operating revenues and expenses of large steam roads, by calendar years, 1915-1920 and by months, January to December, 1919 and 1920;" same source for 1928-1929. ICC, Bureau of Statistics, "Operating revenues and expenses, by class of service, for the year ended December 31, 1932." 1940-1949.

[22] W. Middleton and M. Reutter, "Fast trains and faster," *Railroad History* 31, no. Spring-Summer (2007): 35.

(1): Pennsylvania Railroad.
(2): 1895 - Houston and Texas Central Railroad; 1932 – 1949 – Texas and New Orleans Railroad.
(3): Southern Pacific Railroad

This table indicates that, after 1930, railroads began losing money on their passenger operations (the operating ratios rise above 1.0). Yet, this was exactly the period when *Streamliners* were introduced, and secondary sources, cited above, indicate that *Streamliners* were profitable. This apparent contradiction is resolved by noting that the operating ratios in Table 3 are for overall company operations, not for operations on specific corridors or routes. High speed trains running on specific routes were profitable, but overall company passenger operations were not. Regrettably, after extensive searching, I determined that operating ratio data does not exist for specific routes or specific named or numbered trains.[23] That notwithstanding, I am arguing that the secondary evidence is persuasive; that, supported by government loans, private railroad companies engaged in counter cyclical investment during the 1930's to develop high speed *streamliners* in the U.S., and aerodynamic trains in France. These faster trains attracted increased ridership for *streamliners* on 3 high speed routes in the U.S., and for the Paris-Lyon route in France. High speed produced profitable passenger train operations.

Further evidence about relationships between speed and finance comes from the period after the Japanese inaugurated their "bullet train" between Tokyo and Osaka in 1964. In France, SNCF began developing a new, "very high speed" rail line between Paris and Lyon, in the 1970's, which began commercial operations in 1981, running at top speed of 186 mph.[24] Within 9 years this line was earning more revenue than it expended on daily operations and, even more

[23] I searched many archives to find operating ratio data for three specific high speed corridors in the U.S., including the National Archives (Archive 2) in Rockville, Maryland; the Library of Congress rail collection and National Transportation Library in Washington, D.C.; the Hagley Museum rail archive in Wilmington, Delaware; and the Barringer Railroad Archive in St. Louis, Missouri. I also consulted with rail historians who have studied other aspects of the railroads and corridors that I focus on in this research, such as Gregory Thompson (California) and Albert Churella (Northeast corridor). They did not think that operating ration data by route or specific train was likely to be available in archives.

[24] In the U.S., soon after Japan introduced its high speed train, the Pennsylvania Railroad (PRR) developed *Metroliners*, trains with powerful electric and gas turbine locomotives, which tested at speeds as high as 164 mph. But, the PRR was unable to operate *Metroliners* in commercial service at high speed due to deteriorated infrastructure on the Northeast Corridor, including problems with catenary wires.

impressive, had paid off the debt service on its construction costs.[25] In short, just as with *Streamliners* three decades earlier, high speed trains in the contemporary era, at least in France, have shown that they can operate profitably.

Because the nature of speed is intrinsically dialectical, slowness as well as high speed has utility in rail transport. City Night Line is a subsidiary of Deutsche Bahn (German National Railway Company). Examples of City Night Line routes include Paris to Rome, Amsterdam to Munich, and Berlin to Vienna. Trains leave their origin cities in the evening and arrive at their destination cities in the early morning, running on conventional track. Deutsche Bahn deliberately runs these trains at low commercial speeds, averaging 40-50 mph, so the traveler, leaving at night, arrives at his/her destination in the early morning. Slowness is also a deliberate policy on many freight rail lines, but that takes us beyond the boundaries of this paper. My point is this: both high speed and slowness can be used to operate trains profitably.

CONCLUSIONS AND POLICY IMPLICATIONS

In conclusion, this paper shows that high speed trains are not just a contemporary phenomenon; they date back to the early 19th century, when rail speed increased by 100-200% over travel by stagecoach. Train speeds continued to improve incrementally over the next 170 years, with significant leaps forward at the turn of the 20th century, in the 1930's, and in the contemporary era. Each time speed lept forward, the rail industry, films, and mass media promoted and advertised trains as "high speed," and that characterization became part of collective, social consciousness. For example, in recent decades, SNCF, the French National Railway Company, has developed *TGV* lines throughout that country, and promotes the *TGV* as "very high speed" transport. Since the *TGV* is objectively much faster than previous French trains, those earlier trains are now considered relatively slow, which reveals the intrinsically dialectical nature of speed. Thus, speed and its correlates, time and spatial distance, are not objective mathematical

[25] T. Gourvish, "The high speed rail revolution: history and prospects," ed. Ministry of Transport (London, England2009). A. Perl, Gilbert, R., *Transport Revolutions* (Vancouver, British Columbia: New Society Publishers, 2012).

units. They are socially constructed phenomenon, dependent partly on speed in previous periods, and partly on subjective perception.[26]

In each era when it occurred, high speed was attractive to travelers, increasing ridership and, thereby, producing profitable operations. Just as *Streamliners* quickly became profitable on many of their routes, and the *TGV* on some of its routes, so too can new rail lines, or new services on existing lines, have profit potential when they are perceived by riders as "high speed," fast enough to both induce new riders and draw riders away from other modal choices.

For example, in France, a private consortium of rail developers, LISEA, has deemed the performance of the new generation of very high speed *TGV* trains sufficiently competitive with alternative transport modes, that they have signed a contract with the French government to design, build, operate, and maintain a new line between Tours and Bordeaux.[27] LISEA is betting that this new line will draw sufficient ridership to operate at a profit. Similarly, in the U.S, two private consortia are considering operation of passenger rail service on, respectively, the Dallas-Houston and Orlando-Miami corridors. While the Dallas-Houston proposal involves grade-separated, very high speed trains, in Florida, trains would operate at top speeds of only 125 mph. The Florida developer, East Coast Railways, believes that, through effective public relations, it will convince enough people to ride their trains so as to generate a profit.[28] These three new rail projects support my conclusion that absolute rate of speed, in and of itself, is not the key criterion for the future economic and financial viability of passenger rail. Instead, the key criteria are perceptions of speed relative to previous travel experience, and relative to alternative modal choices, as well as the effectiveness of promoting any given rail line. In short, the historical

[26] As is well known to transport researchers, perceptions will not be based solely on absolute speed, maximum speed, or travel times shown in timetables, but rather on overall trip duration, meaning travel time door to door, home to destination. And overall time will depend on the ways in which road and air congestion can extend a trip, plus the time it takes to get from home to rail station or airport at the beginning of a trip, and to city center or business district at the end of a trip. Population densities as well as the potential for inducing new travelers on any particular travel corridor will also affect ridership and, as a result, potential profitability.

[27] Since this line will not be operational until 2017, it remains to be seen whether the LISEA partners will profit from their risk-taking investment.

[28] Real estate development will also contribute greatly to profitability of this line.

contingency and social construction of speed are still important considerations to keep in mind when assessing the potential viability of passenger railways.

REFERENCES

Anonymous. "Speed of Railway Trains." *Railway Times*, 1865.

Company, National Railway Publication. *Intercity Timetables*. Official Guide of the Railways and Steam Navigation Lines of the U.S.,Puerto Rico, Canada, Mexico and Cuba

Monthly vols New York: National Railway Publication Company, 1868-1995.

Doukas, K. *French Railroads and the State*. New York: Columbia University Press, 1945.

Gourvish, T. "The High Speed Rail Revolution: History and Prospects." edited by Ministry of Transport. London, England, 2009.

Hofsommer, D. *The Southern Pacific, 1901-1985*. College Station, Texas: Texas A & M University Press, 1986.

———. "Texas Railroads." In *Texas: A Sesquicentennial Celebration* edited by D. Whisenhunt. Austin, Texas: Eakin Press, 1984.

http://obviousmag.org/en/archives/. "The Wondrous Locomotives of Raymond Loewy."

Kern, S. *The Culture of Time and Space*. Cambridge, MA.: Harvard University Press, 1983.

Lamming, C. *Cinquante Ans De Traction À La Sncf*. . Paris, France: CNRS Editions, 1997.

Livret-Chaix. "Guide Officiel Des Voyageurs." Paris, France: Chaix, 1890-1990.

Marshall, J. *Rail: The Records*. Enfield, England: Guiness Superlatives, 1985.

Mertins, H. *National Transportation Policy in Transition*. Toronto: D.C. Heath 1972.

Meunier, J. *On the Fast Track: French Railway Modernization and the Origins of the Tgv, 1944-1983*. Westport, CT.: Greenwood 2002.

Middleton, W. , and M. Reutter. "Fast Trains and Faster." *Railroad History* 31, no. Spring-Summer (2007): 22-41.

Perl, A., Gilbert, R. *Transport Revolutions*. Vancouver, British Columbia: New Society Publishers, 2012.

Porcher, B. ""Du P1, Cote D'azur Pullman Express, Au Train 1, Le Mistral"." *Révue de l'association des amis des chemins de fer* (1968): 193-2234.

Schivelbusch, W. *Railway Journey:The Industrialization of Time and Space in the 19th Century*. Berkeley: University of California Press, 1986.

Stover, J. *American Railroads*. Chicago: University of Chicago Press, 1961.

Werner, G. "Railroads." In, *Handbook of Texas Online* (2012). http://www.tshaonline.org/handbook/online/articles/eqr01.