William W. Hay Railroad Engineering Seminar

Speaker #1 *"Shared-use Passenger Corridors in California: HSR and the Peninsula Corridor"*

Sam Levy - Massachusetts Institute of Technology

#2 *"Capacity Allocation in Vertically Integrated Railway Systems: A Sequential Bargaining Game Approach"*

Ahmadreza Talebian - University of Illinois at Chicago

Date: Friday, April 17, 2015
Time: Seminar Begins 12:20

Location: Newmark Lab, Yeh Center, Room 2311
University of Illinois at Urbana-Champaign

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Shared Use Passenger Corridors in California:

High-speed Rail and the San Francisco Peninsula Corridor

Sam Levy

M.S. Transportation, 2015

Professor Joseph Sussman

JR East Professor of Civil and Environmental Engineering and Engineering Systems

2015 Hay Seminar Series

April 17th, 2015

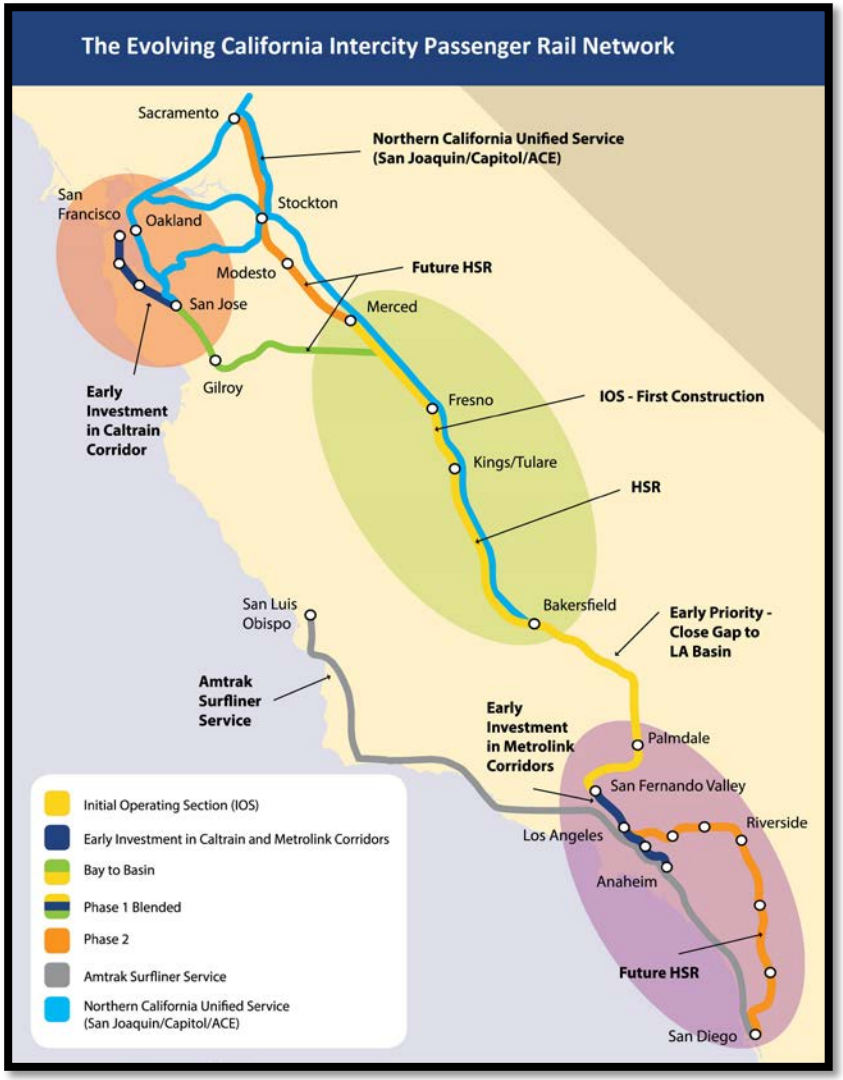
Massachusetts Institute of Technology

Today's Presentation

- California and HSR Update
- Research Motivation & Research Questions
- Overview the San Francisco Peninsula Corridor
- What does "Blended System" mean?
- California's "Rail Wishlist"
- The network impact of local decisions

California HSR Overview

- Total Cost: $68B
  - Initial Operating Section (IOS) complete in 2022 at cost of $31B (350 miles)
  - "Bay to Basin" complete by 2026 at $20B by private investment
  - Phase 1 complete by 2028 at $17B
- Total Committed Funding: $12.5B
  - $9.95B from Proposition 1A
  - $2.5B from ARRA
  - $250M from CA GHG cap and trade funds
- $950M dedicated to "connectivity funding"



California HSR Update

- CHSRA awarded contract for next 65-miles to Flatiron-Dragados-Shimmick (94 miles under construction in total) in November
- Ribbon-cutting in January
- Demolition
- Slow property acquisition
- On-going drought

"I'll be 92 in 2030. I'm working out, I'm eating my vegetables. I want to be around to see this. I'm not sure where the hell we're going to get the rest of the money. But don't worry, we're going to get it."

--Jerry Brown (1/6/2015)

Research Motivation

- Improve capacity management in California
  - San Francisco-San Jose Peninsula Corridor
  - Southern California rail network
- Understand impact on system optimal when designing for the local optimal
  - How permanent is the local gain?
  - What is the cost to California?

Research Questions

1. How do decisions on the Peninsula affect the rest of the state?
2. How can local California rail agencies best prepare themselves for a capacity-constrained future with blended high-speed rail?
3. What challenges stand in the way of implementing not just a HSR line, but also a fully-functioning California rail network?

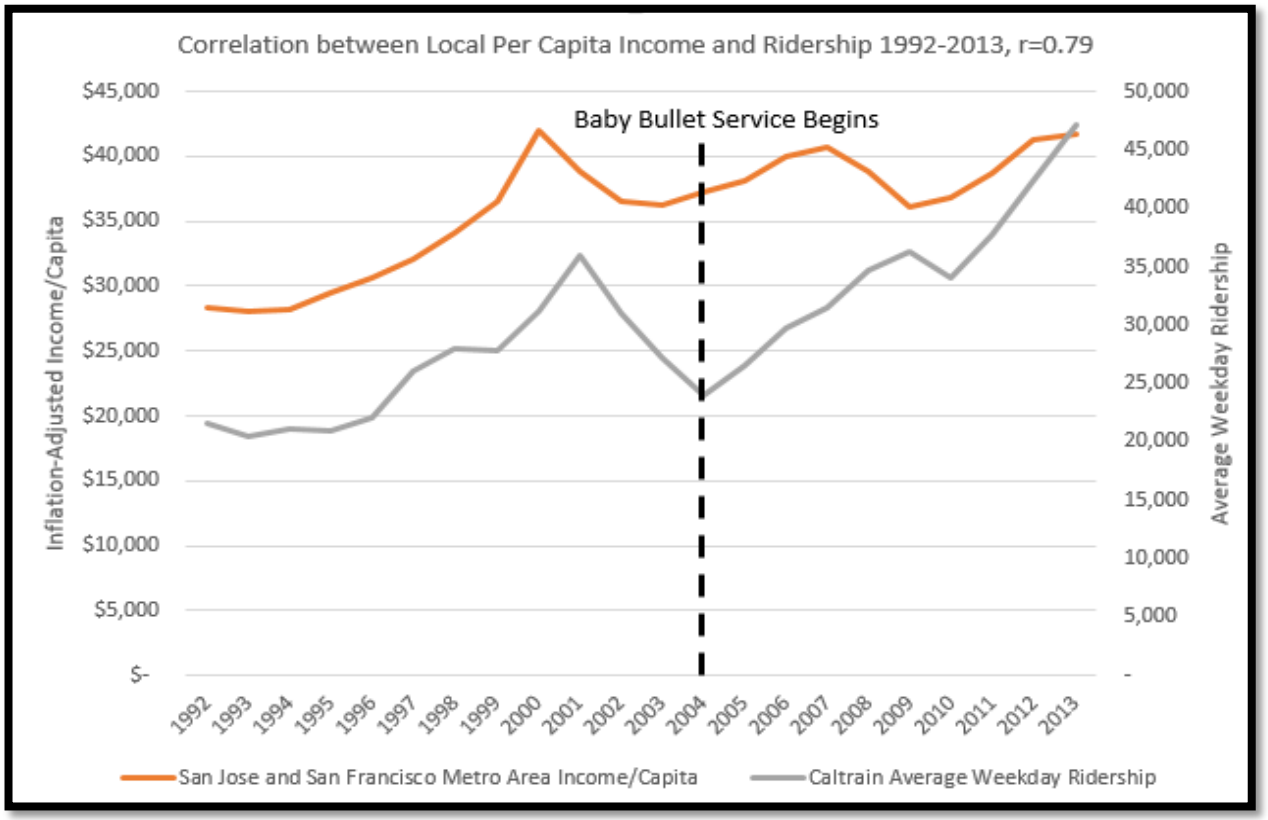
Peninsula Corridor Overview

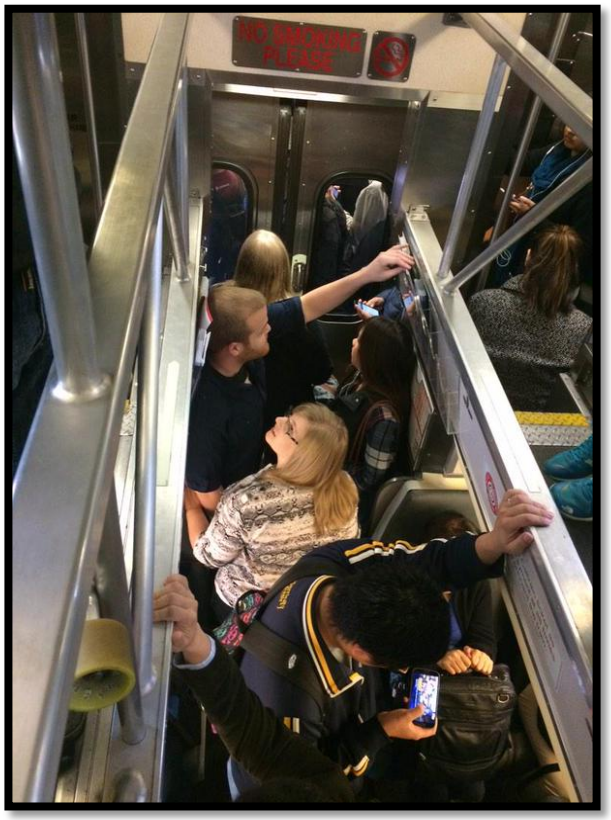
- Caltrain operates 92 trains per day including 22 Baby Bullet expresses

- To be extended into downtown SF (2024)

Soaring Caltrain Demand

- Over 60,000 riders/day with 60/40 commute split
- Largest bike ridership in country



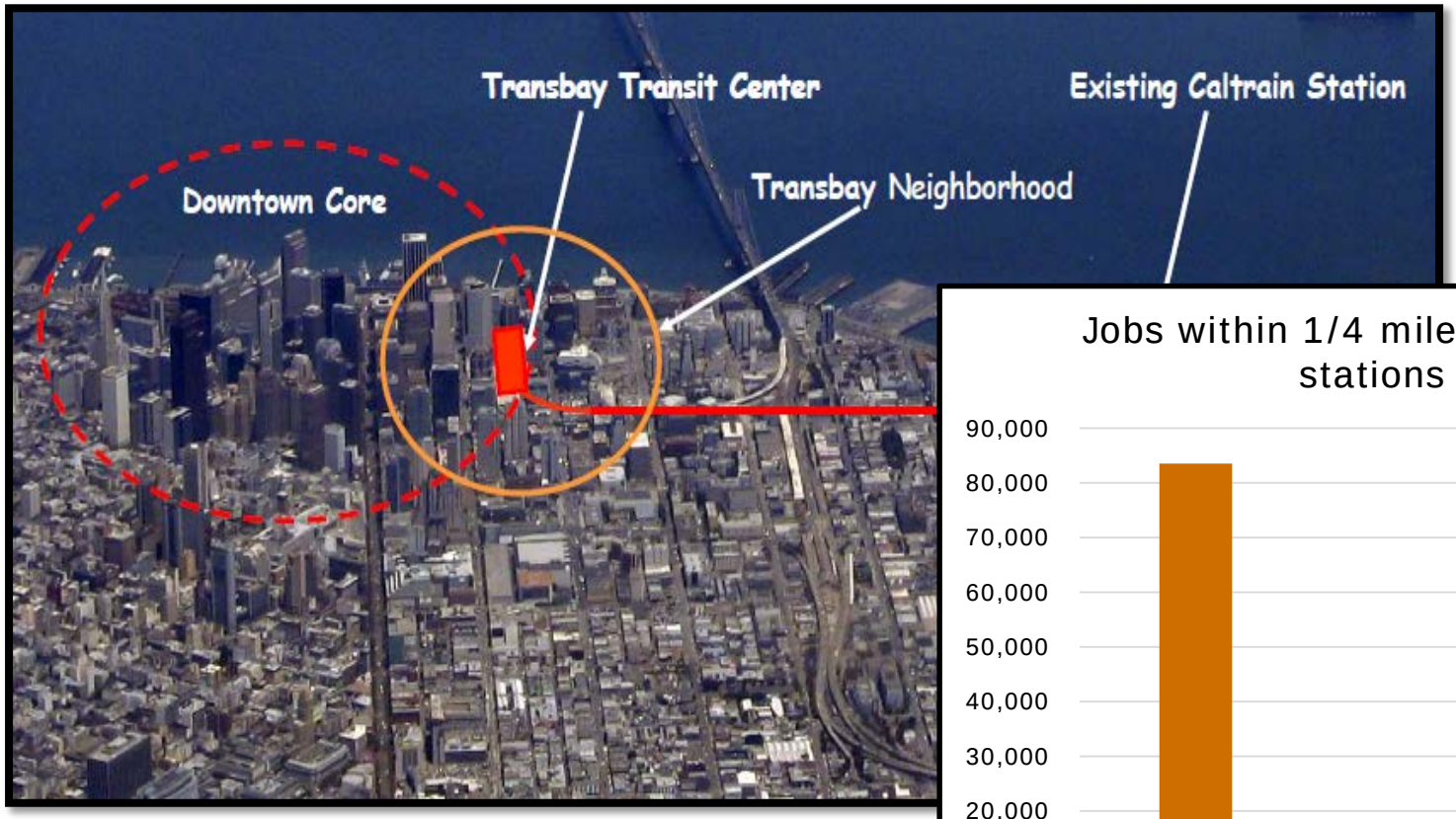


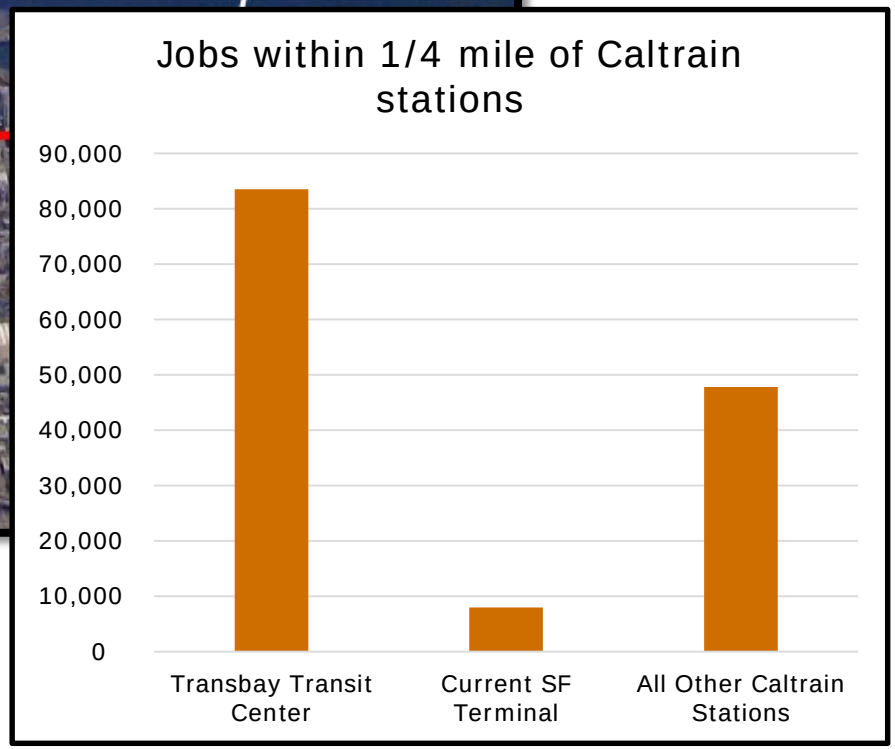
Electrification

- Allows for faster acceleration and deceleration
- More local station stops
- Increase service level to 6 tphpd (from 5)
- Projected ridership gain of 27%

Planned Electrification Service Impacts			
	Daily Trains	Daily Trains Post-Project	Percentage Change
Baby Bullet Stations	710	942 (+232 vs 2014)	+33%
Other Stations	**730**	**1096 (+366 vs 2014)**	**+50%**

Downtown Extension (DTX)



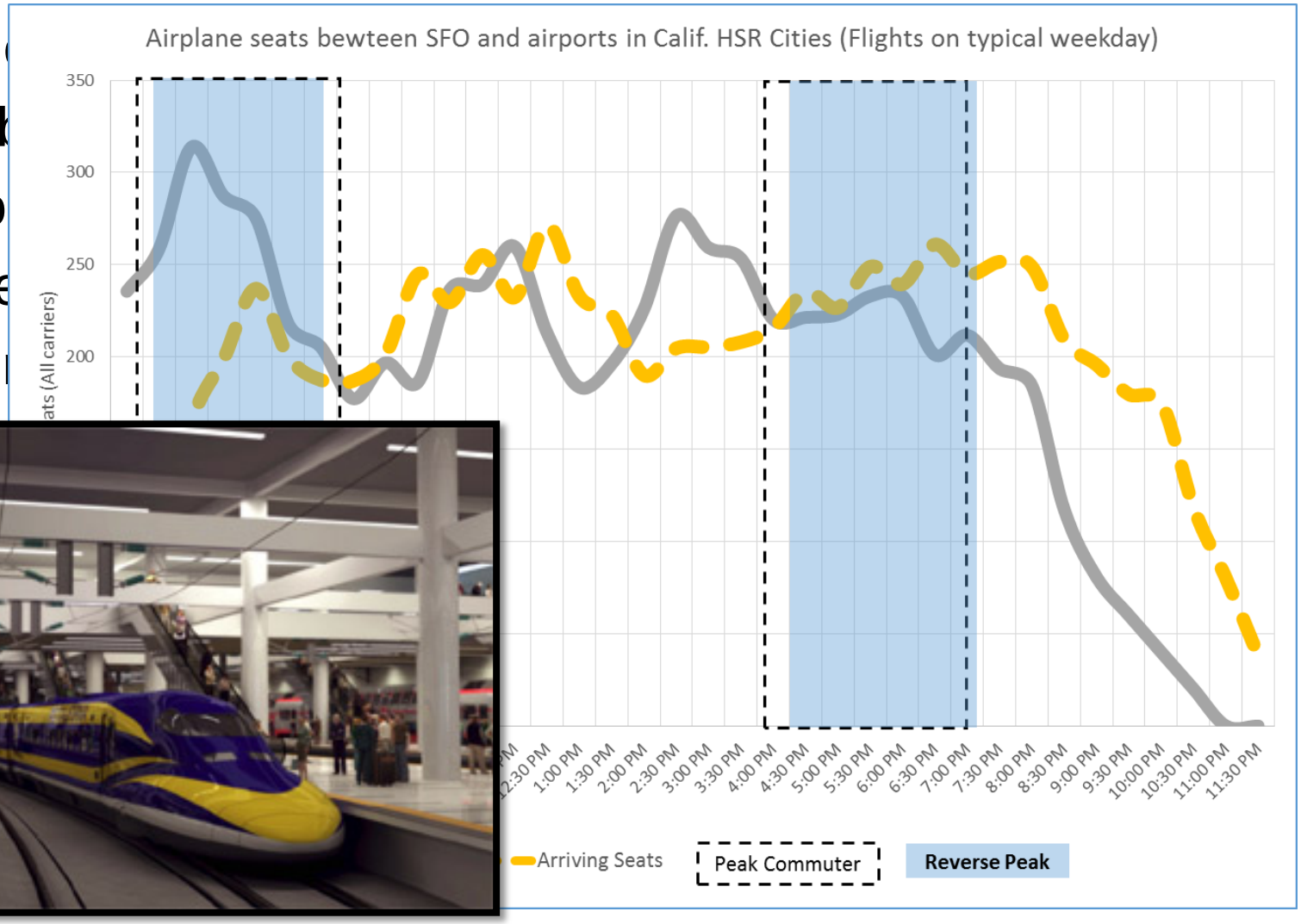


Adding HSR on the corridor

- Originally called for expanding corridor to four tracks via a series of trenches and viaducts
- Local opposition and growing costs lead to creation of blended system in 2012
- Important Proposition 1A Requirements at risk
  - Revenue-neutral requirement
  - 30-minute San Francisco to San Jose travel time
  - Capable of 5-minute headways

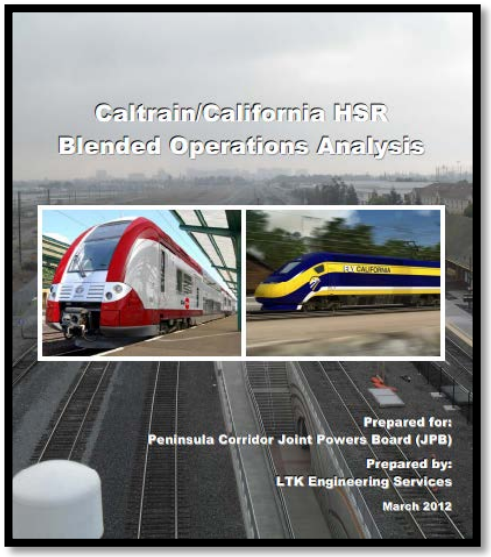
Criticality of San Francisco to HSR

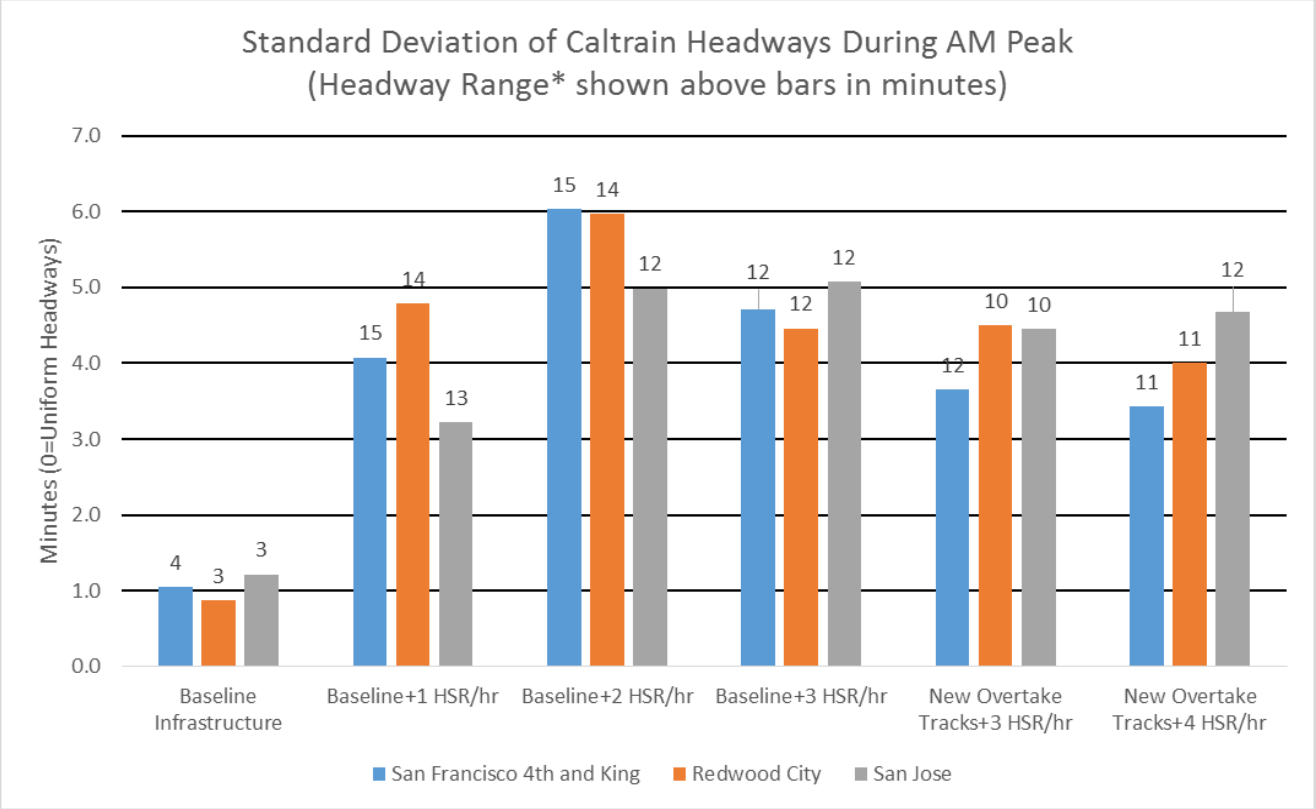
- Gr
- Job
- Co
- Fre
- La



What does blended system mean?

- 2 Caltrain tphpd to downtown S.F. during peak—is that enough?
- Caltrain owns the corridor—how does HSR change service levels?
- Accommodate freight and other tenant railroads?

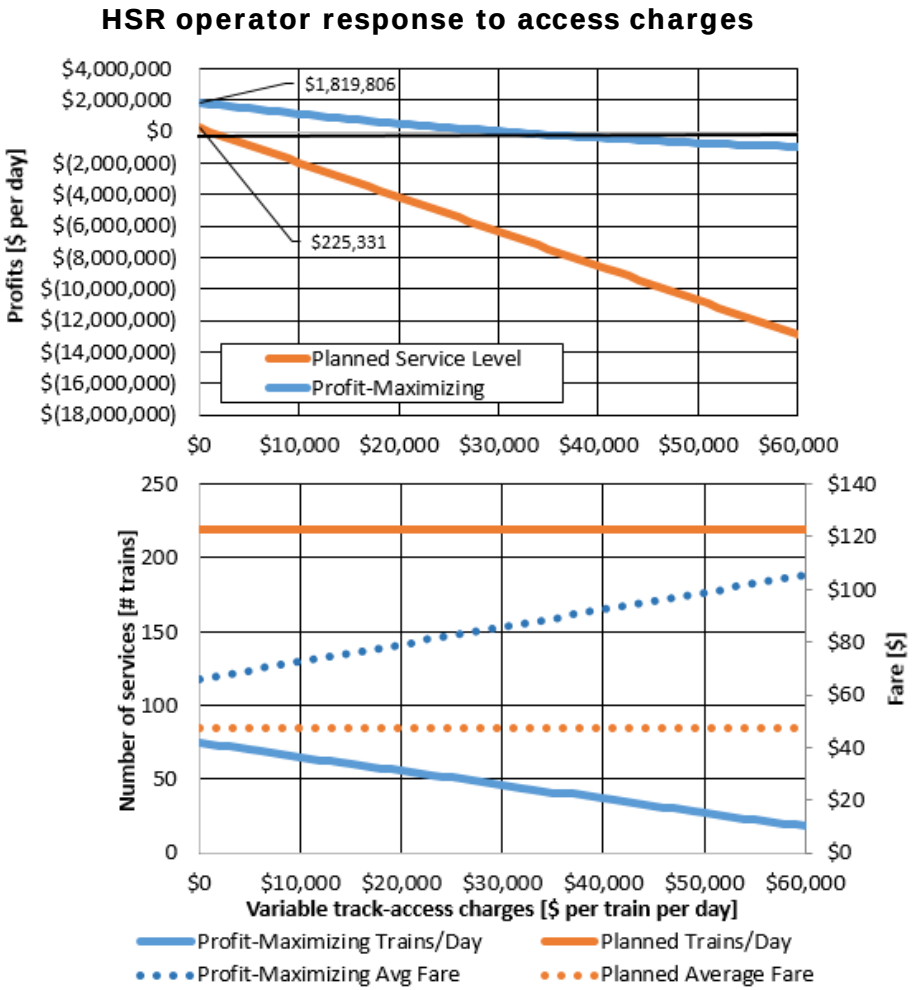




Operators' willingness to pay for Transbay

- Used train operator cost model developed from TRB paper
- Challenge of subsidized operator (Caltrain) competing against for-profit entity (HSR)
- Messiness of a capacity allocation procedure
- 1.3 miles of 800-mile system

Negotiation most likely outcome



The Southern Blend

- 100 miles from Burbank to Anaheim
- Shared with Pacific Surfliner, Metrolink, and freight
- Burbank as a transfer point from 2022-2028
- No electrification or shared station plans yet
- Early planning stages=lots of opportunity

UP, Amtrak California, and Metrolink at Burbank Station

Los Angeles Union Station

- Fifth-busiest Amtrak station in U.S.
- Strong transit presence—good for HSR
- Run-through track project (SCRIP)
  - Operational flexibility for Metrolink
  - High-speed rail
  - Four tracks of 14 to “run through”

California's Rail "Wishlist"

1. Level boarding and interoperability
2. Ability to adjust service
3. XpressWest shared corridor
4. Integrated SoCal regional rail network
5. High-frequency, uniform-headway HSR and commuter service
6. Satisfy 2008 bond measure requirements
7. Minimize costs and timeline across network

Upcoming local decisions

A. Inclusion of parties on platform height discussion
   1. All parties act alone
   2. Caltrain/HSR only
   3. Caltrain/HSR/SoCal RRs
   4. Caltrain/HSR/Socal RRs/SFMTA

B. Capacity Allocation Strategy
   1. Do not develop a capacity allocation strategy
   2. Create a codified capacity allocation strategy
   3. Negotiate capacity

C. Electrification of commuters on shared corridor in SoCal
   1. Maintain conventional service
   2. Electrify part of Southern California regional rail network

D. Two-Track Peninsula
   1. Keep the corridor as is
   2. Expand the corridor to include passing tracks
   3. Revert to the four-track options

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2. Ability to add service
3. XpressWest shared corridor
4. Integrated SoCal regional rail network
5. High-frequency, uniform-headway HSR and commuter service
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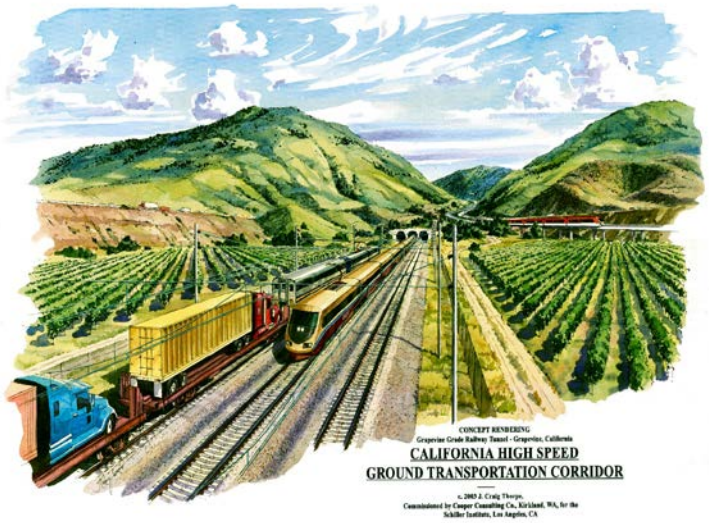
Conclusions

- Decisions made on the Peninsula can create capacity bottlenecks that will affect the amount of L.A.-S.F. trains
- The blended service decisions made on the Peninsula set a precedent for Southern California
- A potential HSR operator will demand a risk premium if capacity issues are not resolved prior to bid submission
- Truly integrated operations can have a profound effect on the California Rail Network and provide critical feeder services to the HSR trunk line
- Service planning should drive infrastructure decisions, not vice versa



Thank you!