

A Case for Interoperability

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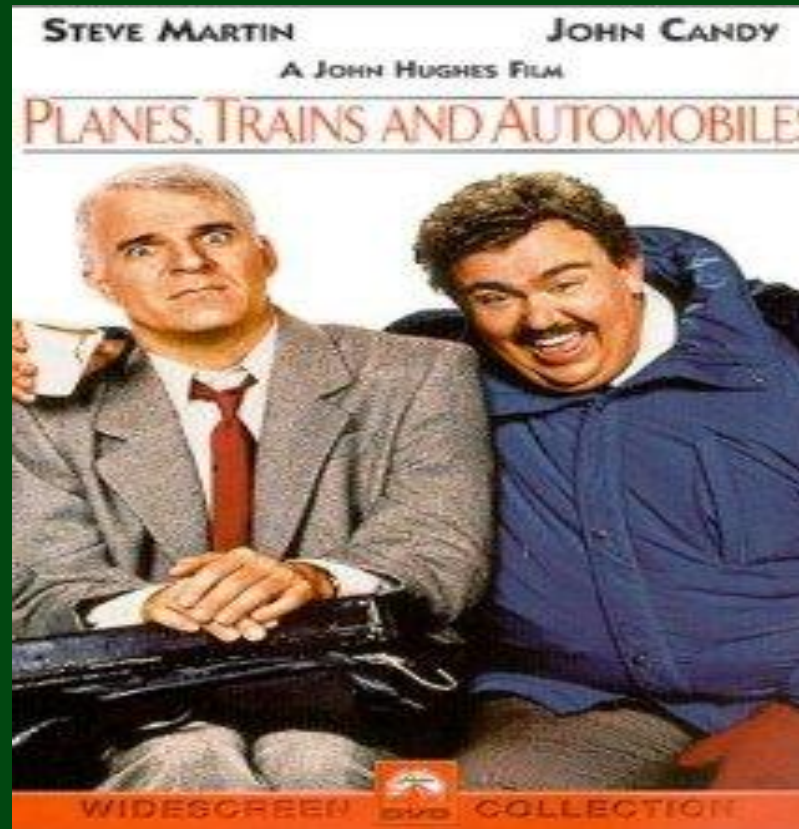
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2011 Rail Conference

Planes, Trains and Automobiles



Planes, Trains and Automobiles

Optimal Travel Distance:

Planes	600+ miles
HSR Trains	100 to 500 miles
Commuter / Intercity	10 to 100 miles
Automobiles	WYBCS

Planes, Trains and Automobiles

It is not a matter of IF we spend money on improving transportation systems

It is a matter of WHAT we build!

Planes, ~~Trains~~ and Automobiles

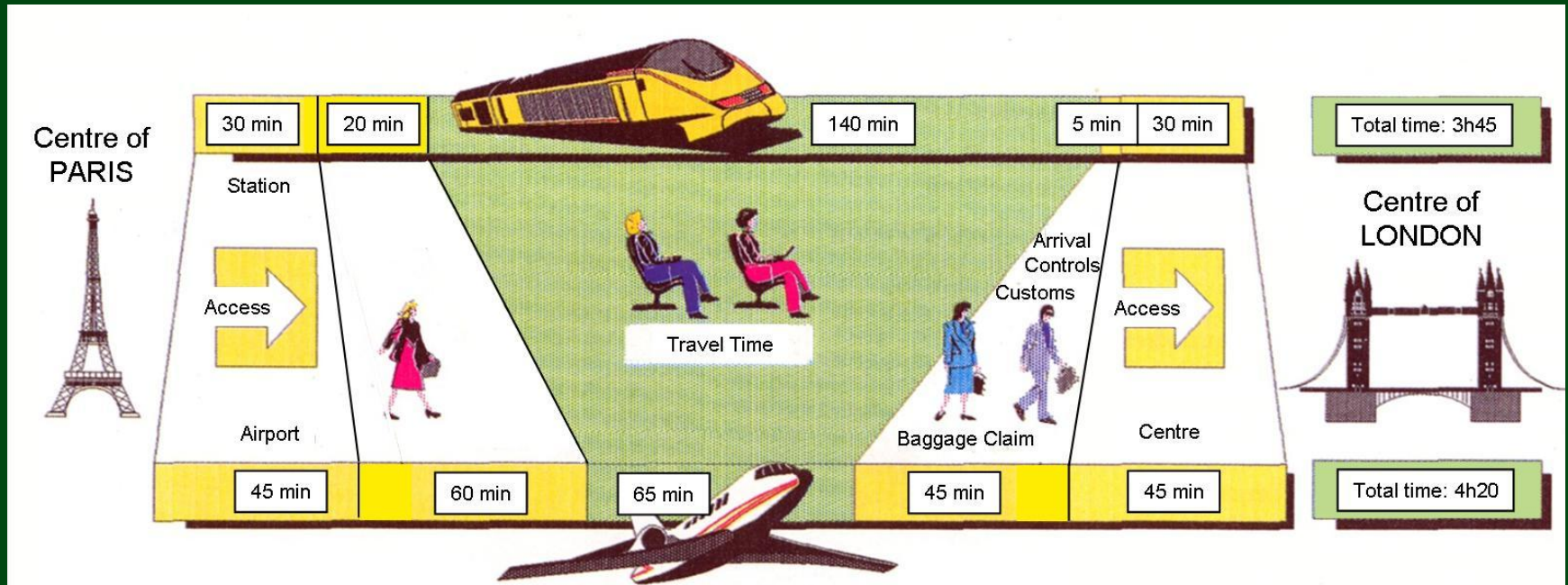
Highways and Airports have reached a point of saturation and congestion that requires either a significant expansion or an alternative mode.

Trains

A high speed rail network offers

- **Optimal trip time with the highest reliability and safety**
- **Favorable and competitive trip costs**
- **Portal to portal service**
- **Improved regional service and ridership**
- **Interoperability with compatible systems**

Trains



A Case for Interoperability

Two environments:

- **Dedicated HSR corridor
(220 mph max)**
- **Shared corridor with regional network
(125 mph max)**

Comparison of Requirements

	HSR Dedicated ROW	Shared ROW
Max Allowable Speed	220 mph	125 mph
Axle Load	22 tons	36+ tons
Super elevation	4" to 7"	5"
Gradient	To 3.5%	(Freight Limit) to 2%
Signal System	(UIC) ERTMS	PTC
Platform Height	48 – 54 inches	8 inches plus
Throughput	Minimum stops	Frequent Stops w/ reduces trip time
Freight operations	N/A	Yes

Impact to high speed rail infrastructure

Compliant equipment at reduced operations speeds and higher axle loads

Considerable wear on rail and points

Increased maintenance costs

Adds access complications

Significant impact to throughput

Absorbs capacity

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Mixed Traffic Case Study

Regional Network

**Cost / benefit analysis of operating UIC
Equipment on traditional infrastructure.**

Comparative fleet requirements

**Operating and maintenance costs
vs fare revenue**

Regional Equipment Options

Diesel & Electric Locomotive – US Compliant

- **One motor unit / 8 trailers**
- **Train length affects performance (acceleration and braking)**

Electric Multiple Unit – UIC (European Compliant)

- **Every unit self-propelled**
- **Performance not affected by length**
- **Unaffected by increased (>2%) gradients**

“US Compliant” refers to the Federal Railroad Administration (FRA) required buff strengths, maintenance practices and operating protocols

Test Requirements

- **Improve system performance**
 - **Minimize infrastructure changes**
- **Maintain express service at < 60 minutes**
- **Stop at all stations every 30 minutes with a maximum travel time of 70 minutes**
- **Minimize equipment and operating cost**

Comparative Statistics

<i>Service Type</i>	<i>Diesel</i>	<i>Electric</i>	<i>EMU</i>
<i>Per Train:</i>			
Station Stops (peak)	13	17	21
End-to-end Runtime	<i>81 min</i>	<i>74 min</i>	<i>70 min</i>
<i>Per peak hour</i>			
Train-sets	30	26	24
Station Stops	<i>260</i>	<i>340</i>	<i>420</i>

Electrified System Requirements

Safety & Operational Improvements

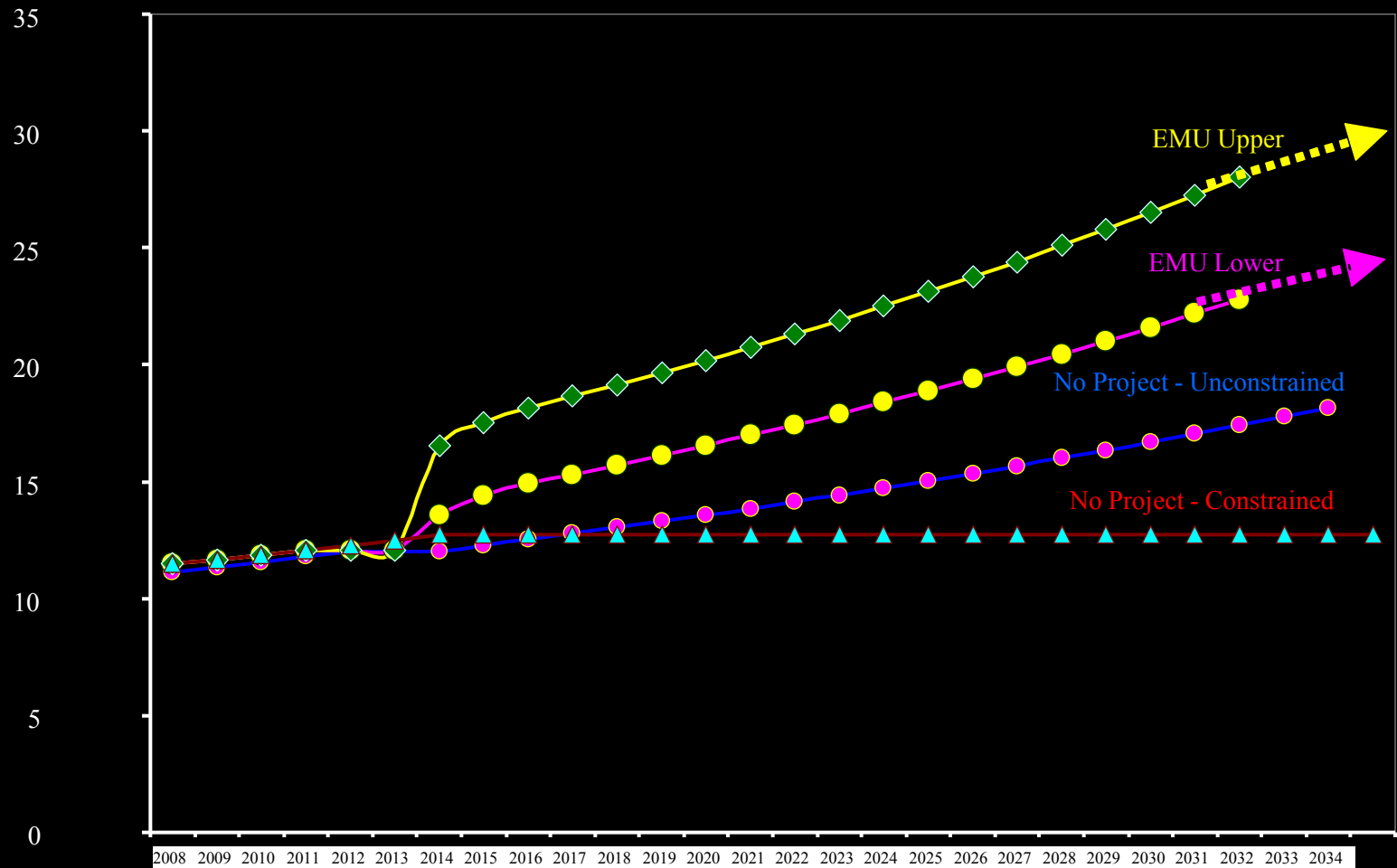


Signal system
for 5-minute
headways

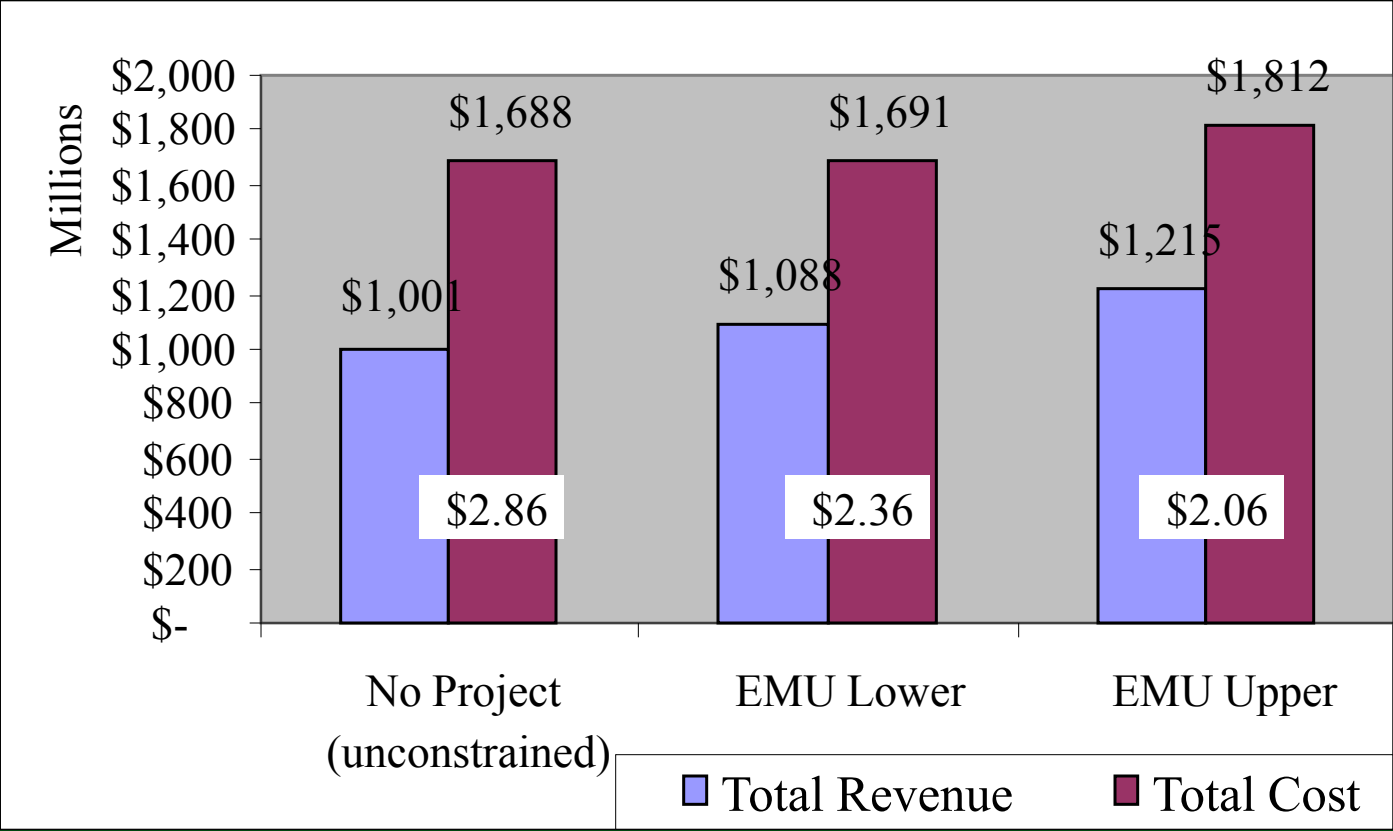


Improved grade crossings
safety or separate

Projected Annual Ridership



Net Operating and Maintenance Costs vs. Fare Revenue



Program Benefits

- **Adaptable to need**
- **Best return on investment**
- **Ease of Implementation**
- **HSR network compatible**

Program Benefits



Rapid Transit Service

On a Commuter Rail Infrastructure

High Speed Train Compatibility



Potential Network



NETWORK CRITERIA

Regional Network

Shared use

Fare Box ratio 75%+

Single ticket

Coordinated transfers

Interoperable on both systems

THE INFRASTRUCTURE OWNERS

aka The Freights

In the business of making money

High speed rail is profitable throughout the world

Improve asset value from increased utility

THE INFRASTRUCTURE OWNERS

aka The Freights

In the business of making money

Seeks Corridor capacity improvement

Passenger traffic moved to dedicated ROW

THE INFRASTRUCTURE OWNERS

aka The Freights

In the business of making money

Corridor capacity improvement

Focus on most profitable operations

Local or short haul freight most expensive

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New business opportunities



It's About Business

