



# IPRO-307

Intermodal Container Transport System Solutions for the Chicago Region

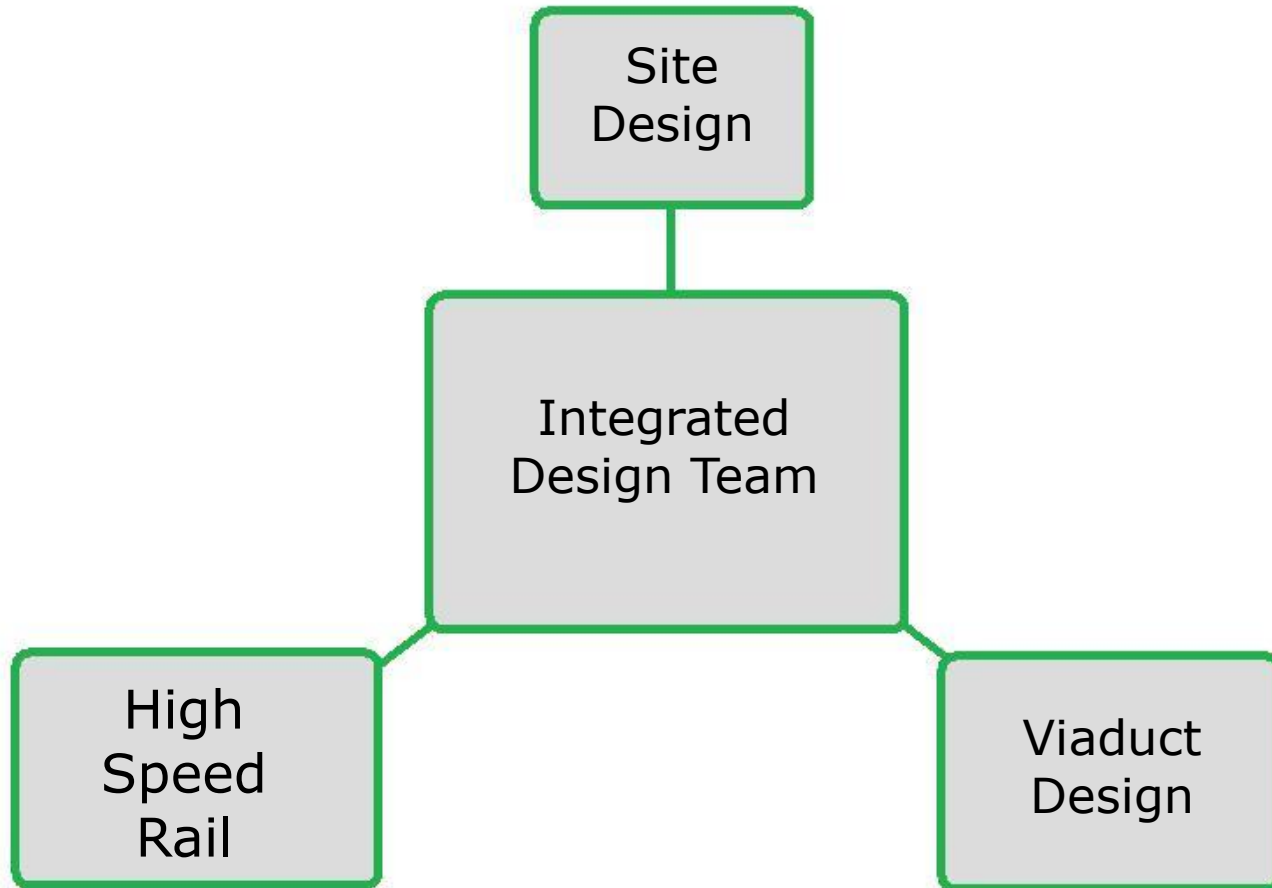
Illinois Institute of Technology  
Fall 2010

Presented by Gabriel Williams and John Allen

Sponsored by Mi-Jack

- To integrate High Speed Rail and Intermodal Freight systems
- To design a space in Crete, Illinois, that would support an Intermodal Freight rail yard that will undergo one million lifts per year
- To design a viaduct system that stacks and includes three different modes of transport (high speed passenger rail, freight rail, and automobile highway)
- To incorporate these three preceding objectives in order to create a newer and more efficient mode of transporting and shipping using an ATMS system

## Objectives



## Team Structure



**Viaduct Design**



**Site Design**

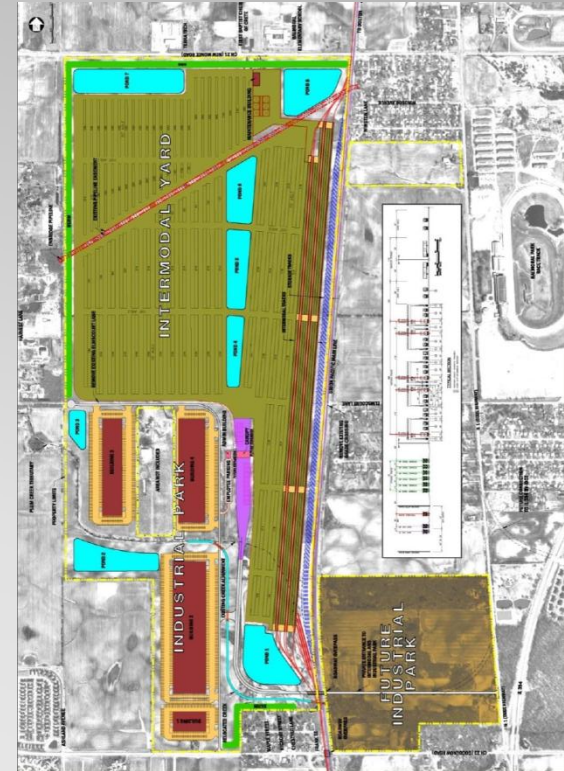
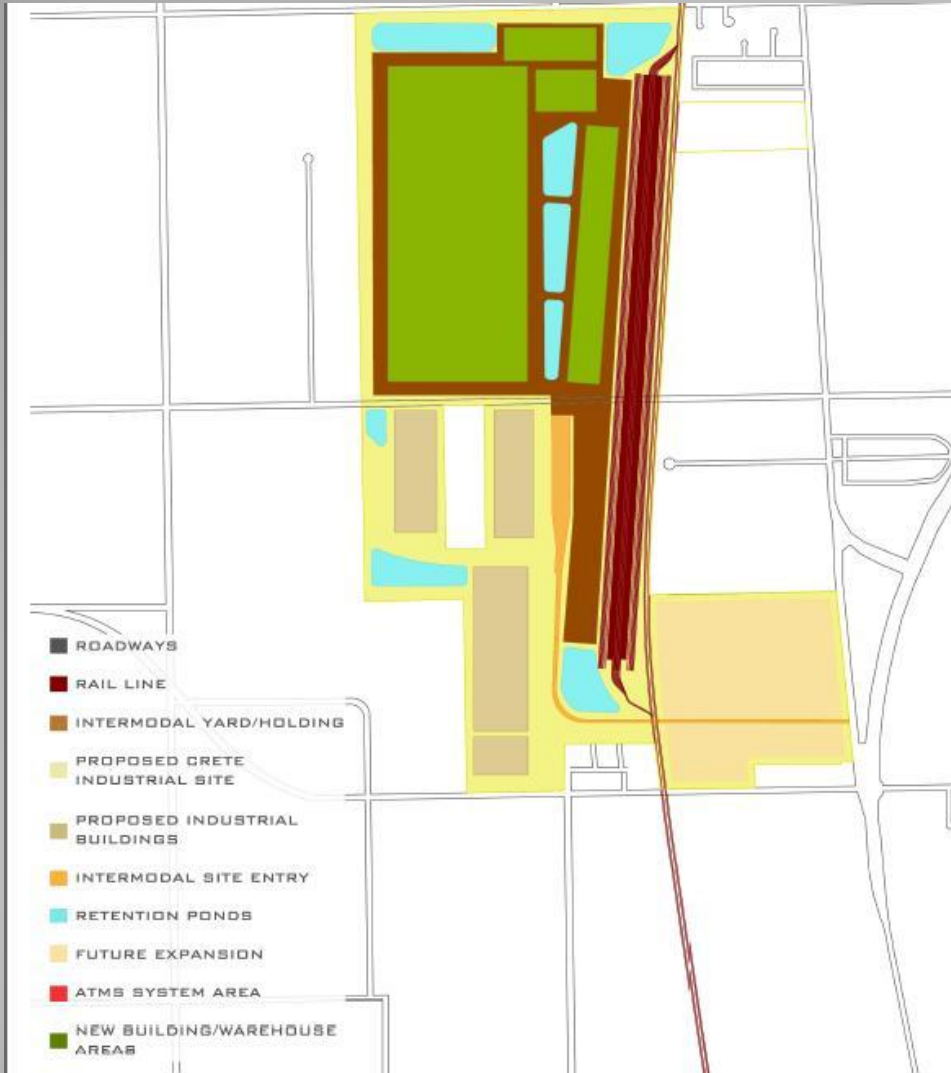


**High Speed**

# **Team Structure**

- ATMS utilizes a crane that spans over 4 lanes of track
- Lining the 4 lanes of track are container storage racks that stack 2 high like the trains
- ATMS reduces inefficiencies in crane lifting by making sure each lift has a container
- Reduces footprint of unloading and storage areas for containers waiting to be picked up
- Reduces confusion in finding your container to pick up and speeds up the process of dropping a new container off

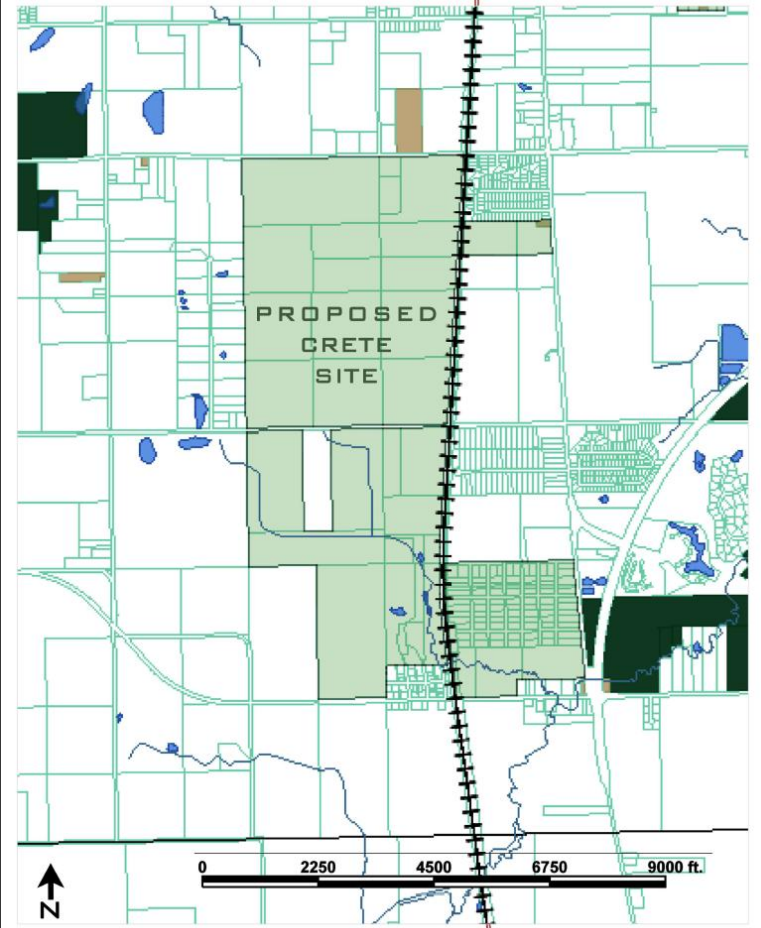
## **ATMS Information**



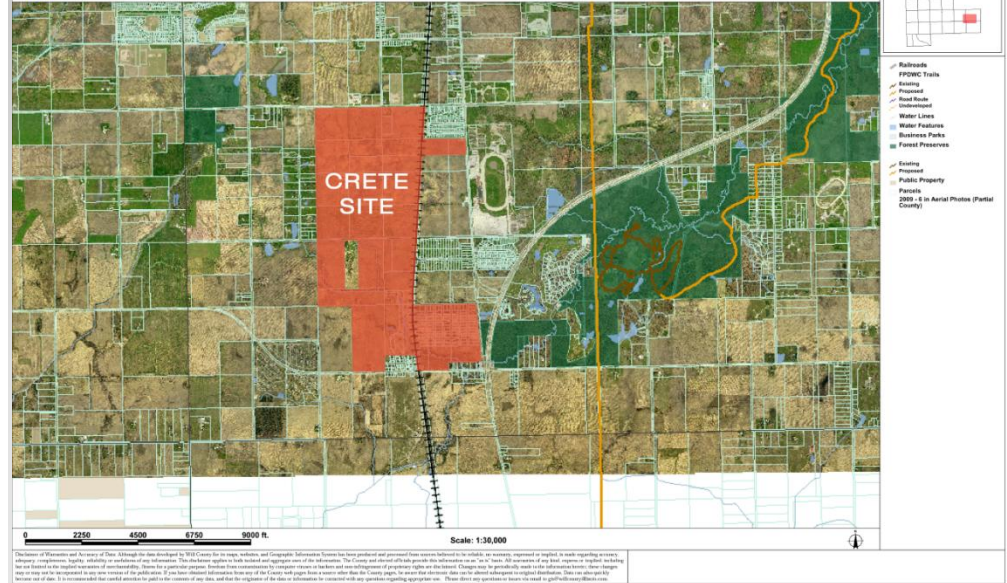
Old 2008 Site

# Site Redesigned With ATMS

RELATIONSHIP OF SURROUNDING CONTEXT TO INITIAL SITE PROPOSAL



aerial plan view with context

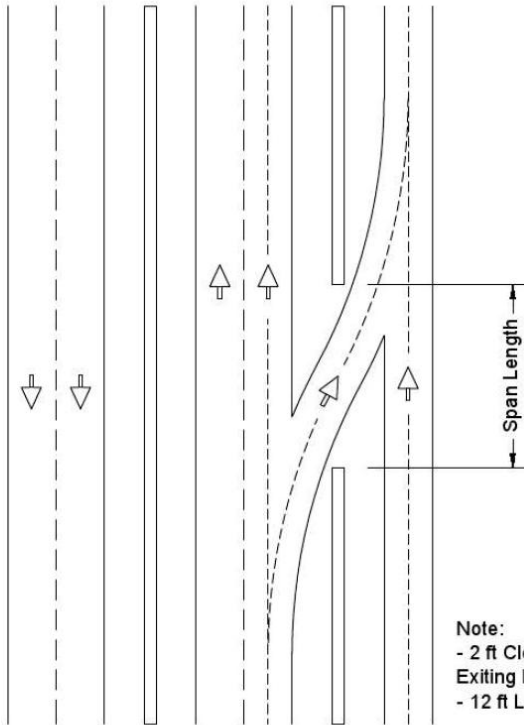


# Area Around Site

External Highway

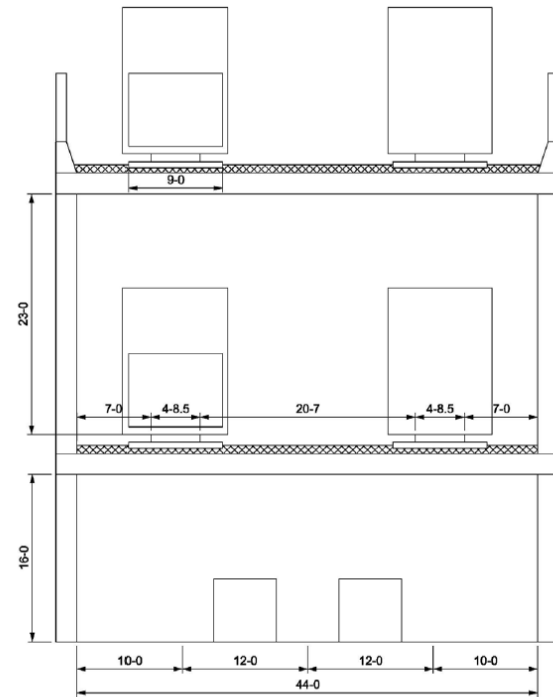
2-Lane Viaduct

Access Road



Note:  
- 2 ft Clearance on  
Exiting Lane  
- 12 ft Lanes

Viaduct Preliminary Design



# Preliminary Viaduct Design



### Square Foot Cost Estimate Report

Estimate Name: **Crete site**

Building Type: **Factory with Concrete Block / Bearing Walls**

Location: **CRETE, IL**

Story Count: **3**

Story Height (L.F.): **24**

Floor Area (S.F.): **45000**

Labor Type: **Union**

Basement Included: **No**

Data Release: **Year 2010 Quarter 3**

Costs are derived from a building model with basic components.

Cost Per Square Foot: **\$107.24**

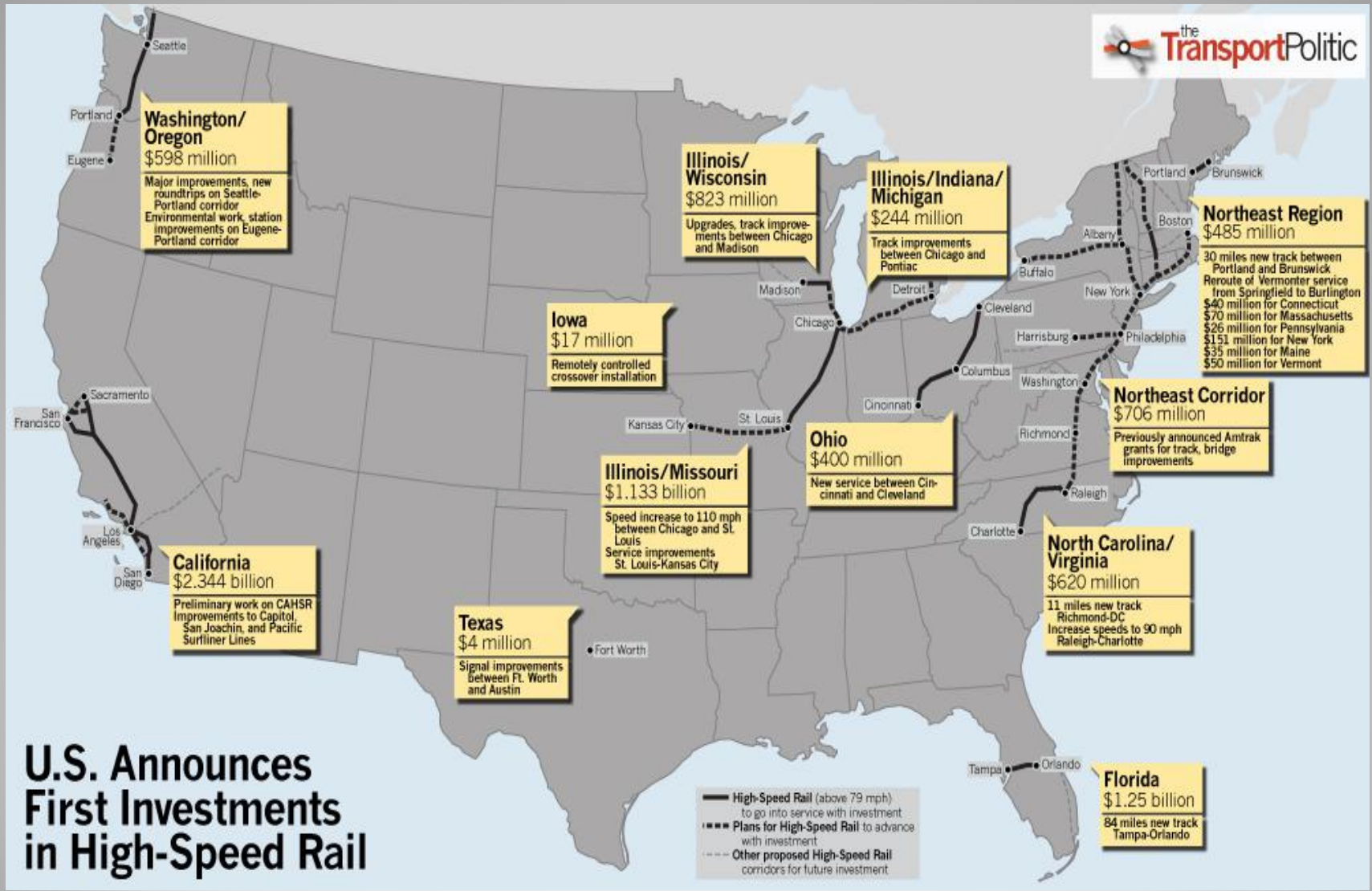
Scope differences and market conditions can cause costs to vary significantly.

Building Cost: **\$4,826,000**

Parameters are not within the ranges recommended by RSMeans.

	% of Total	Cost Per S.F.	Cost
A Substructure	12.00%	\$9.60	\$432,000
B Shell	36.80%	\$29.54	\$1,329,500
C Interiors	14.80%	\$11.83	\$532,500
D Services	31.60%	\$25.37	\$1,141,500
E Equipment & Furnishings	4.80%	\$3.84	\$173,000
SubTotal	100%	\$80.19	\$3,608,500
Contractor Fees (General Conditions,Overhead,Profit)	25.00%	\$20.04	\$902,000
Architectural Fees	7.00%	\$7.01	\$315,500
User Fees	0.00%	\$0.00	\$0
<b>Total Building Cost</b>		<b>\$107.24</b>	<b>\$4,826,000</b>

# Factory Cost Estimate



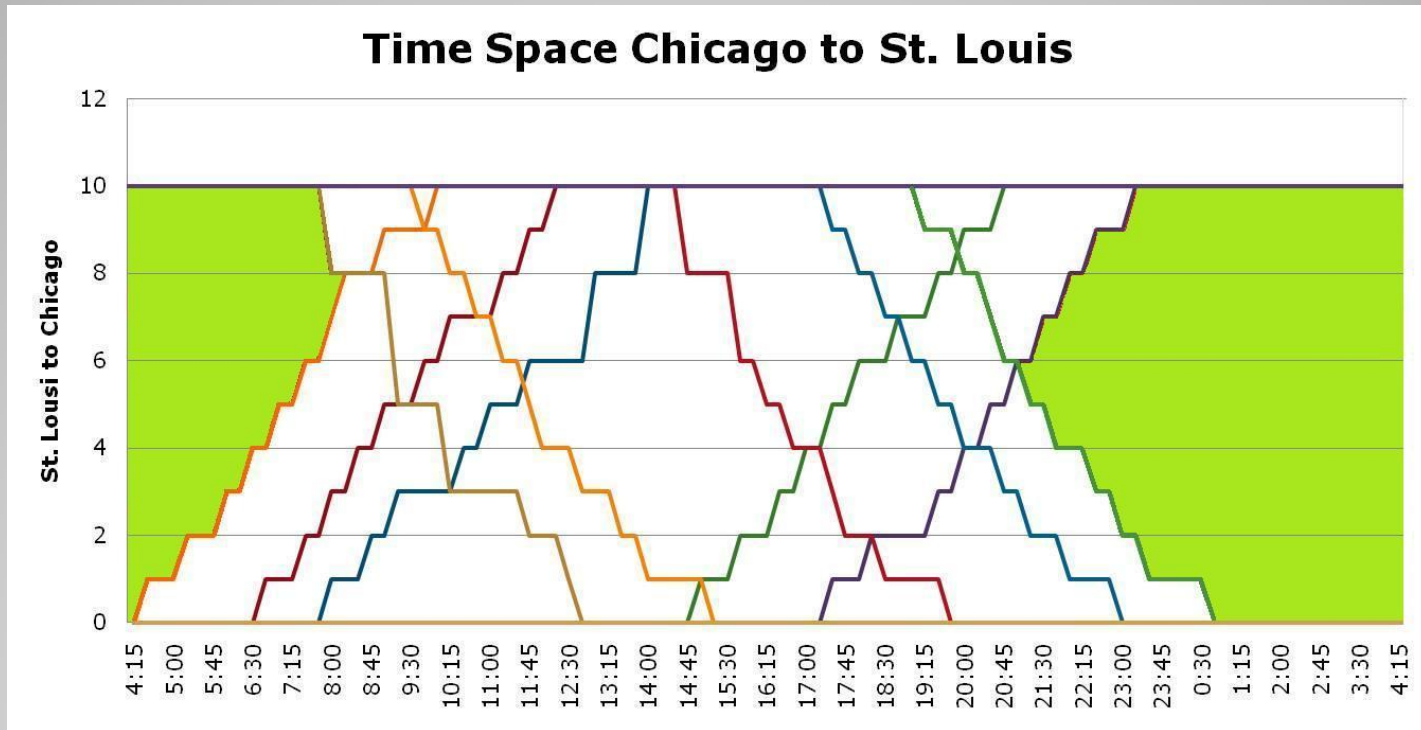
# U.S. Announces First Investments in High-Speed Rail

## High Speed Rail Routes and Funds Allocated

- Double stacked containers In HSR (Intermodal)
- Wrapping double stacks (reducing drag)
- Modeling is a bit more complex than anticipated
- Inter-car aerodynamic relationship
- Aerodynamics of crosswinds
- Both passenger and freight specifications are difficult to pinpoint in U.S.
- Track spacing for HSR needs to be sufficient to prevent turbulence
- Time/Space and String diagrams need to be produced

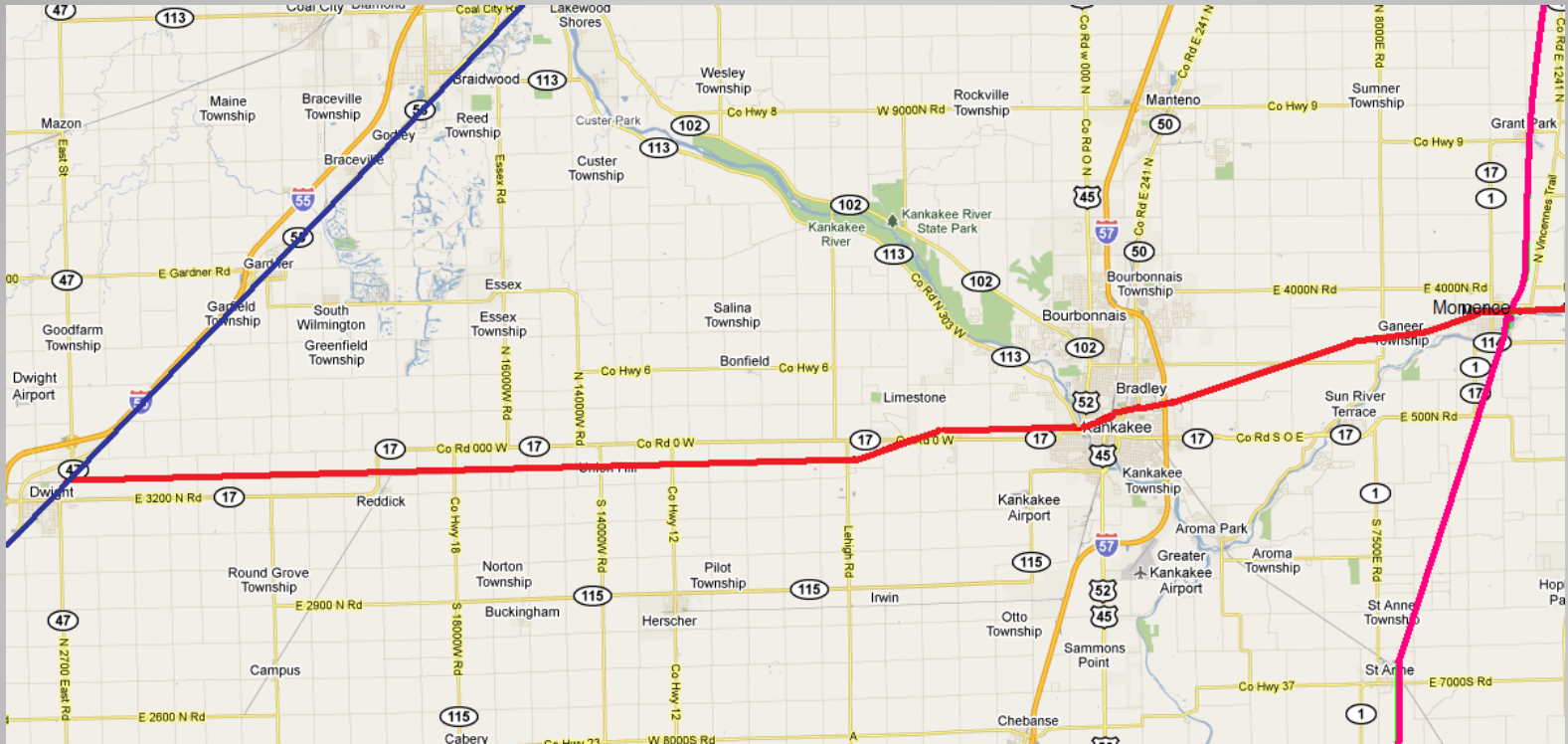
## **Issues in High Speed Rail**

- Adding Intermodal Freight routes to Amtrak Illinois/Missouri Corridor route at times when no trains are in use



**Novel Ideas**

- Using Kankakee Beltline rail to connect Amtrak IL-MO corridor and Crete Intermodal site (CenterPoint)



**Novel Ideas**

- Use of new composite beams in viaduct
- Use of interiorly modulated buildings that allow for ease of retrofitting
- Wind breaker wall in viaduct
- Consider site expansion for 2020-2030

**Novel Ideas**

- What is ATMS? What does it stand for?
- Could you explain the innovative composite beam in more detail?
- How are we going to research in order to make sure that each design task will integrate and work smoothly?
- How much of this design and information is from the previous IPROs?

## Questions Asked