Transrapid Maglev System

Transrapid International-USA, Inc.
A joint company of
Siemens and ThyssenKrupp



Sandhouse Gang – Northwestern University Transportation Center

March 28, 2007

Reed Tanger, Transrapid International-USA, Inc.

Presentation Contents

Transrapid International-USA, Inc.
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- **Technology and System**
- **Transrapid Freight & Cargo**
- **Shanghai Airport Connection**
- **Munich Airport Connection**
- **U.S. Projects**



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Technology and System



Transrapid Maglev System

Overview

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- Decades of technology development with support of German government & parent companies
- Test facility operations in Germany since 1984
- Revenue operations in Shanghai since 2003
- Additional projects in development in China, Germany and the U.S.

Transrapid Maglev System

Overview

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Technology Advantages

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Contact-Free Design Results in:

- High Design Speeds (310 miles per hour)
- Efficient Acceleration and Braking
- Low Maintenance
- Safe Dedicated Right-of-Way
- Environmentally Friendly
  - No Direct Emissions
  - Low Noise
  - Low Energy Consumption



Transrapid Maglev System
Vehicle Development

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HMB2 (1976)



TR05 (1979)



TR06 (1984)



TR07 (1989)



TR08 (1999)



TR SHA (2002)



TR09 (2007)



Technology Applications

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Medium and
Long-distance Routes

Regional Network

Airport Link



Technology and Airport Integration

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- **Enhancement to Current Air Travel System**
- **Substitute for Short-Haul Flights**
- **Congestion Relief**
- **Direct Connections to City-Centers**

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Transrapid Freight & Cargo



Transrapid Freight & Cargo

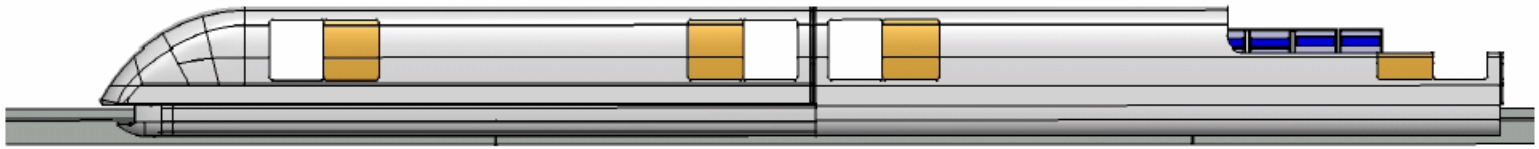
Current Vehicle Options

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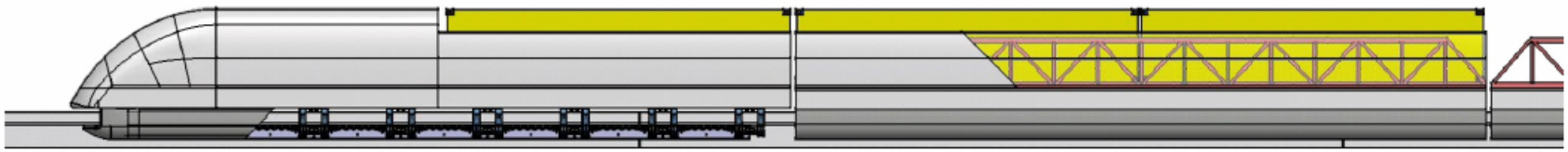
TR09: Passenger (Regional, Airport Connector)



TR09 / G: Cargo



Freight ("Freightrapid") - Concept

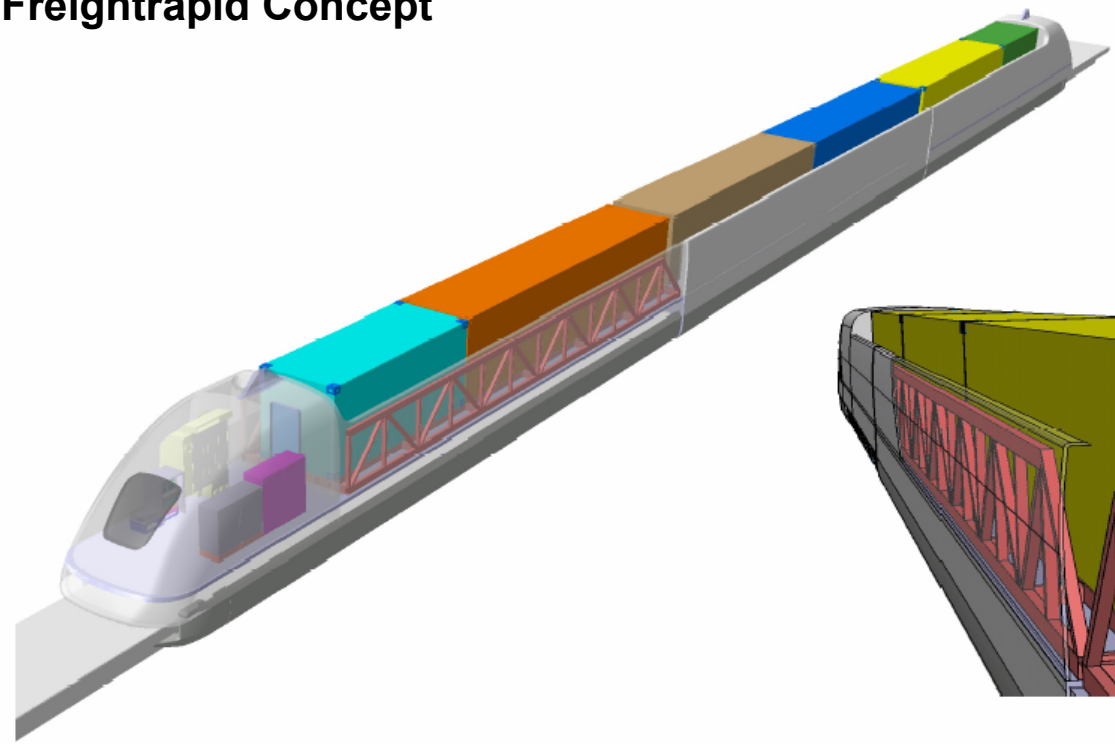


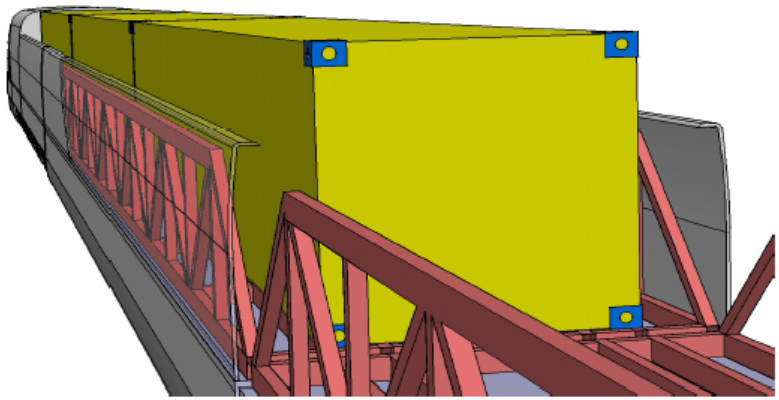
Transrapid Freight & Cargo

Seaborne Containers / Heavy Cargo

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Freightrapid Concept



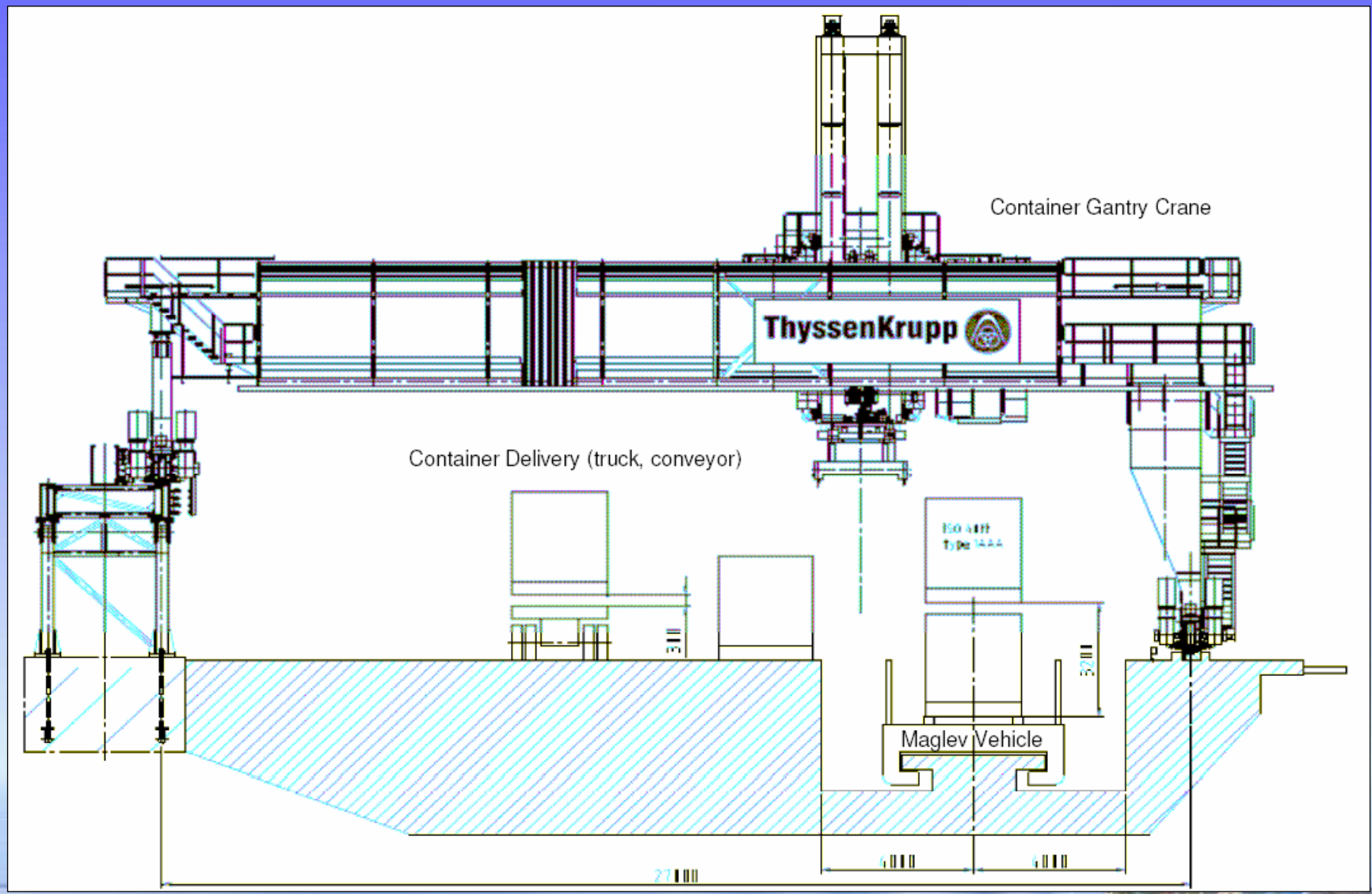


Speed (max.):		180 km/h / 112 mph
Payload (max.)	middle section:	61 t (two 40 ft containers)
	end section:	46 t (one 40 ft container, one 20 ft container)
	20-section train:	78 TEU or 1226 t / 2,697,200 lb

Transrapid Freight & Cargo

Port Loading

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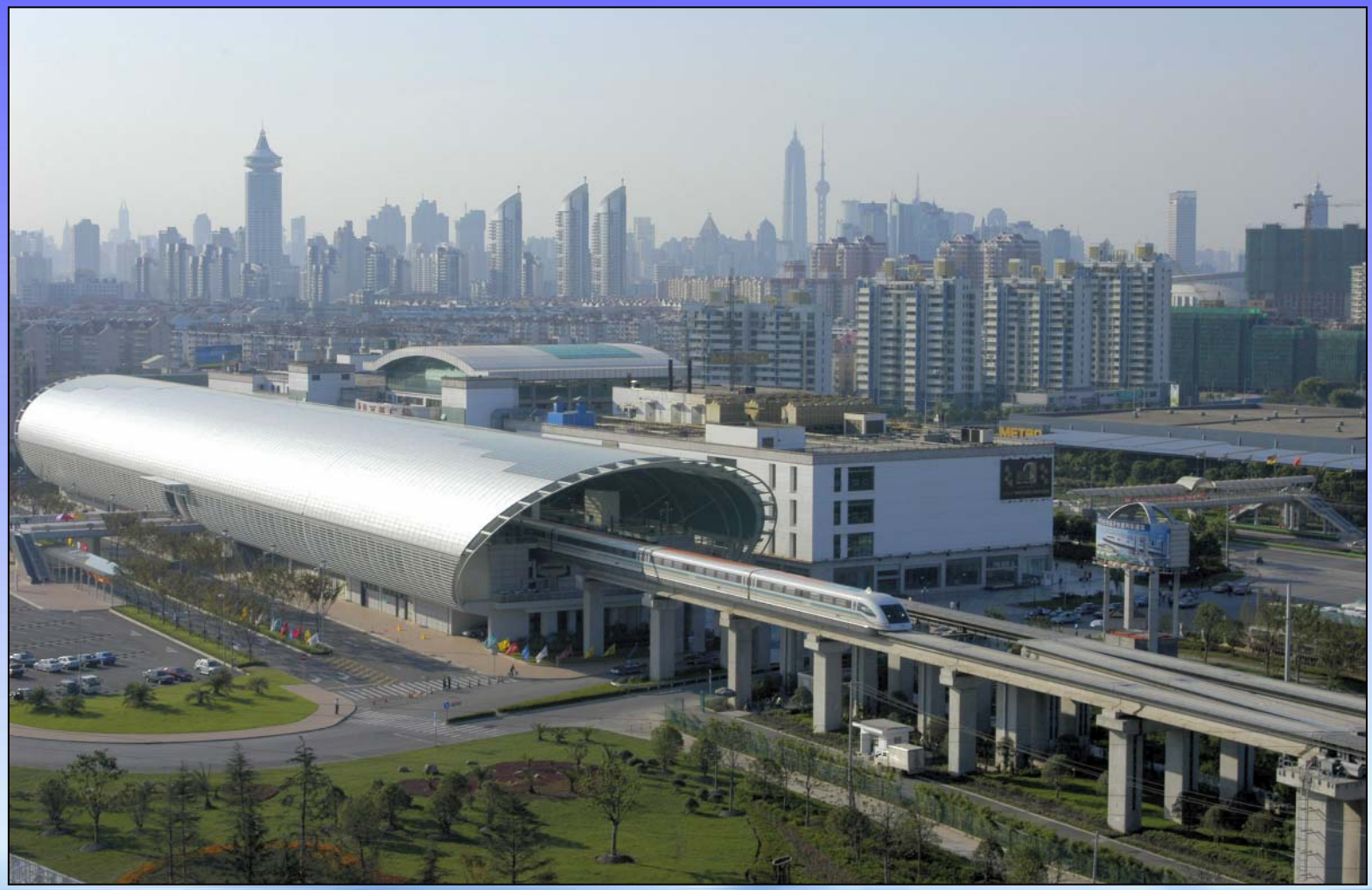
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Transrapid Project Shanghai



Transrapid Project Shanghai

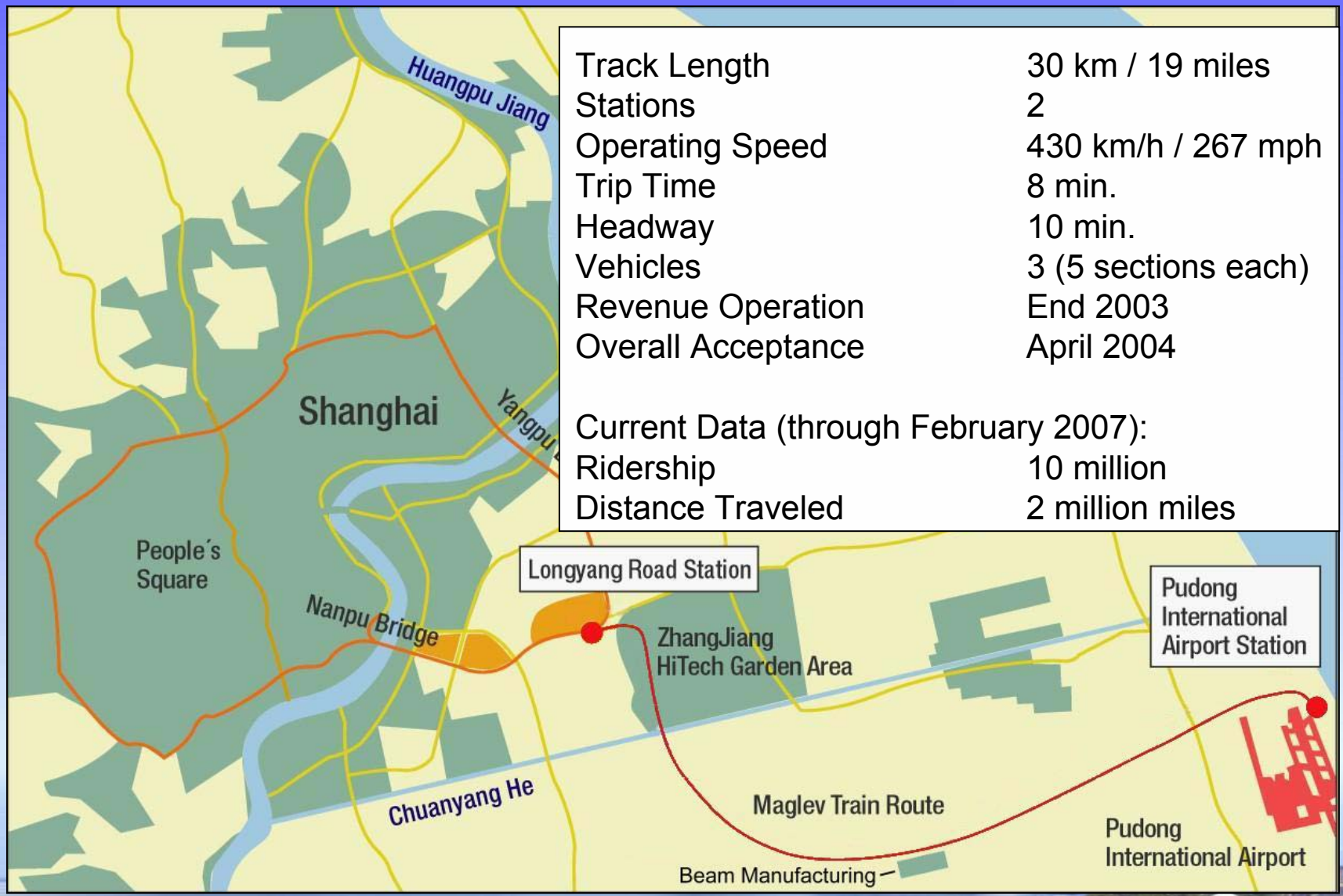
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Transrapid Project Shanghai

Route

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Track Length	30 km / 19 miles
Stations	2
Operating Speed	430 km/h / 267 mph
Trip Time	8 min.
Headway	10 min.
Vehicles	3 (5 sections each)
Revenue Operation	End 2003
Overall Acceptance	April 2004

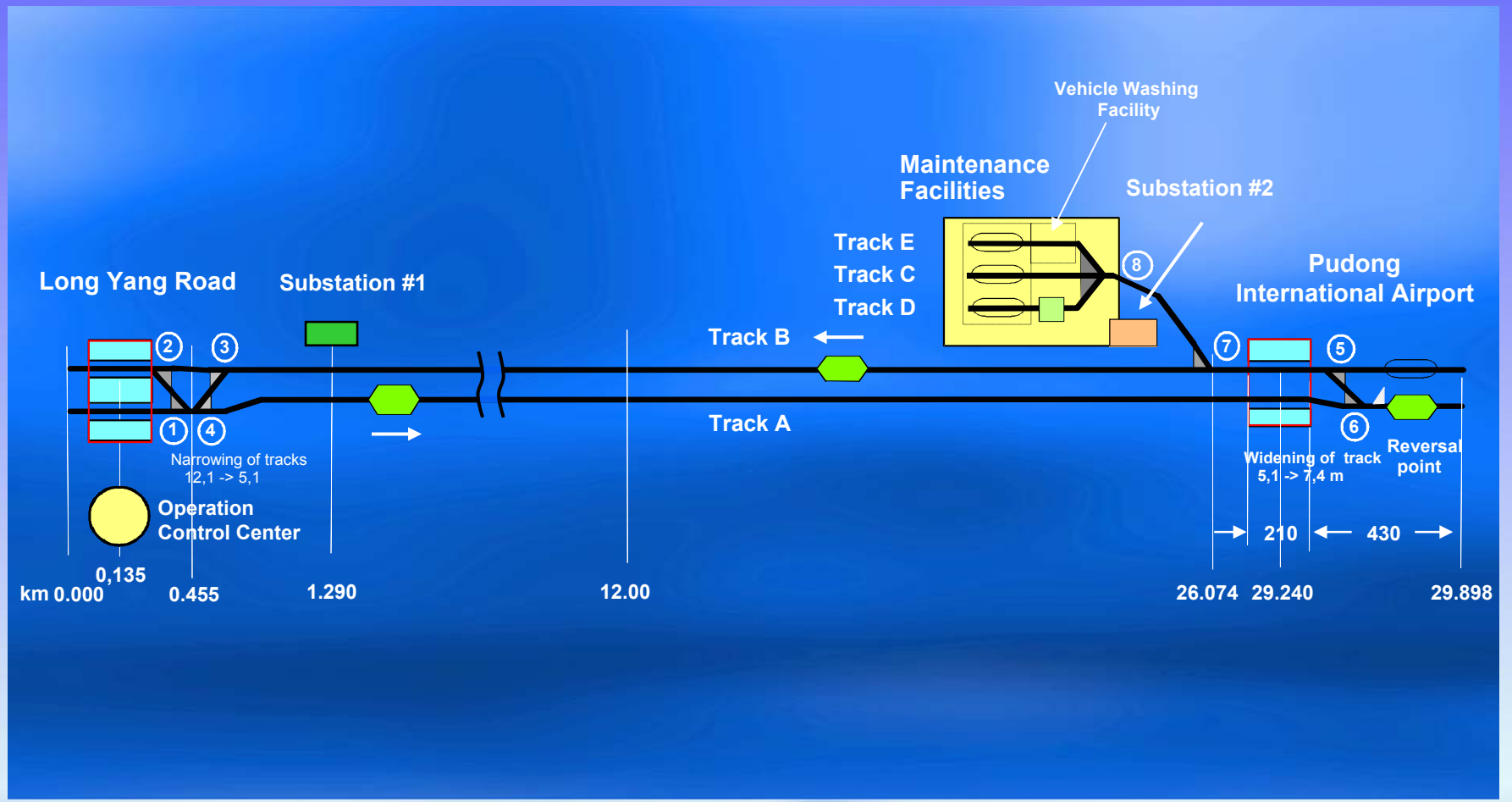
Current Data (through February 2007):

Ridership	10 million
Distance Traveled	2 million miles

Transrapid Project Shanghai

Track Layout

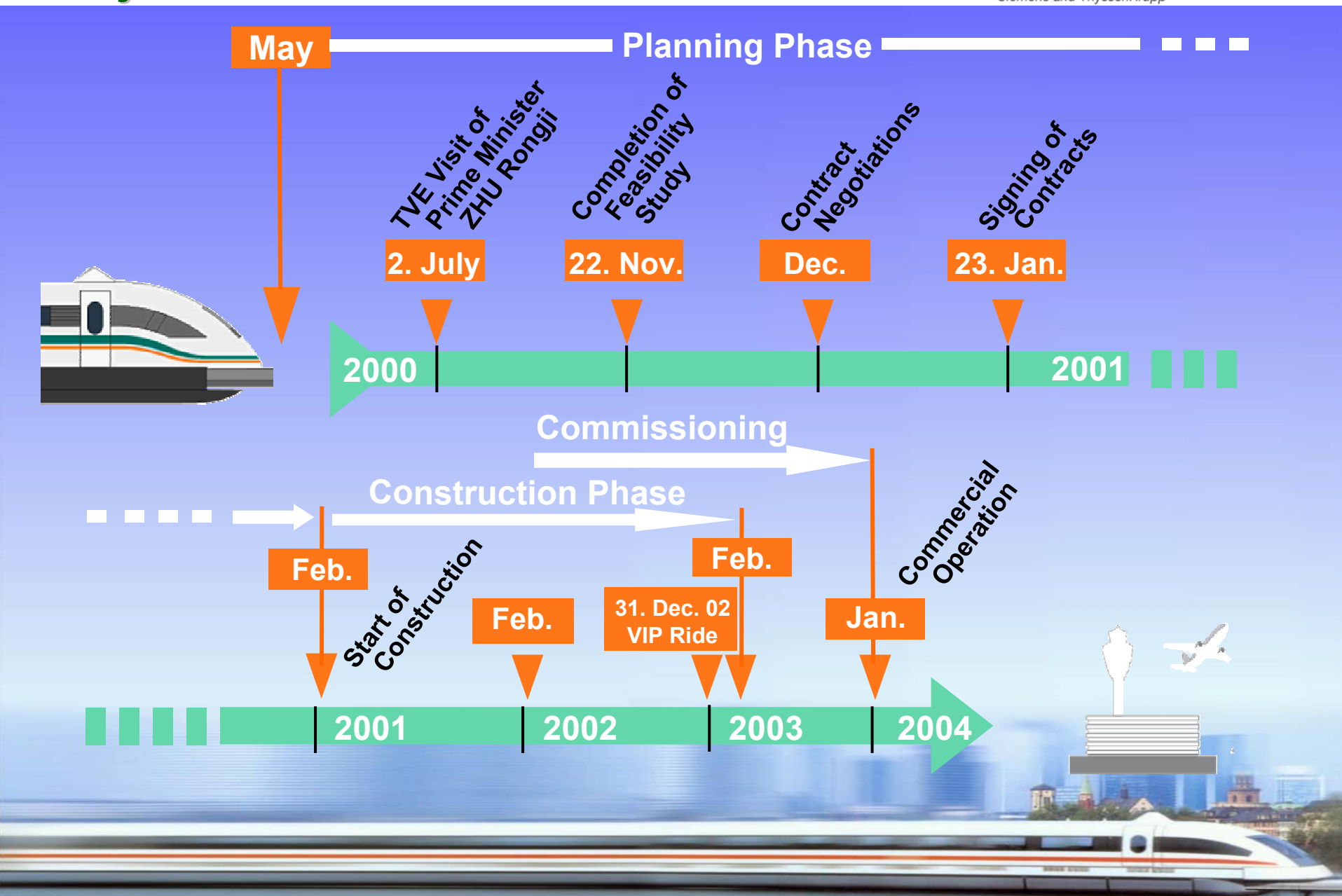
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Transrapid Project Shanghai

Project Schedule

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Shanghai Airport Connection

Longyang Road Station

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Elevated Guideway

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Use of Highway Corridor

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Pudong Airport Station

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Transrapid Project Shanghai

Aerial View of Facilities

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Munich Airport Connection



Transrapid Project Munich

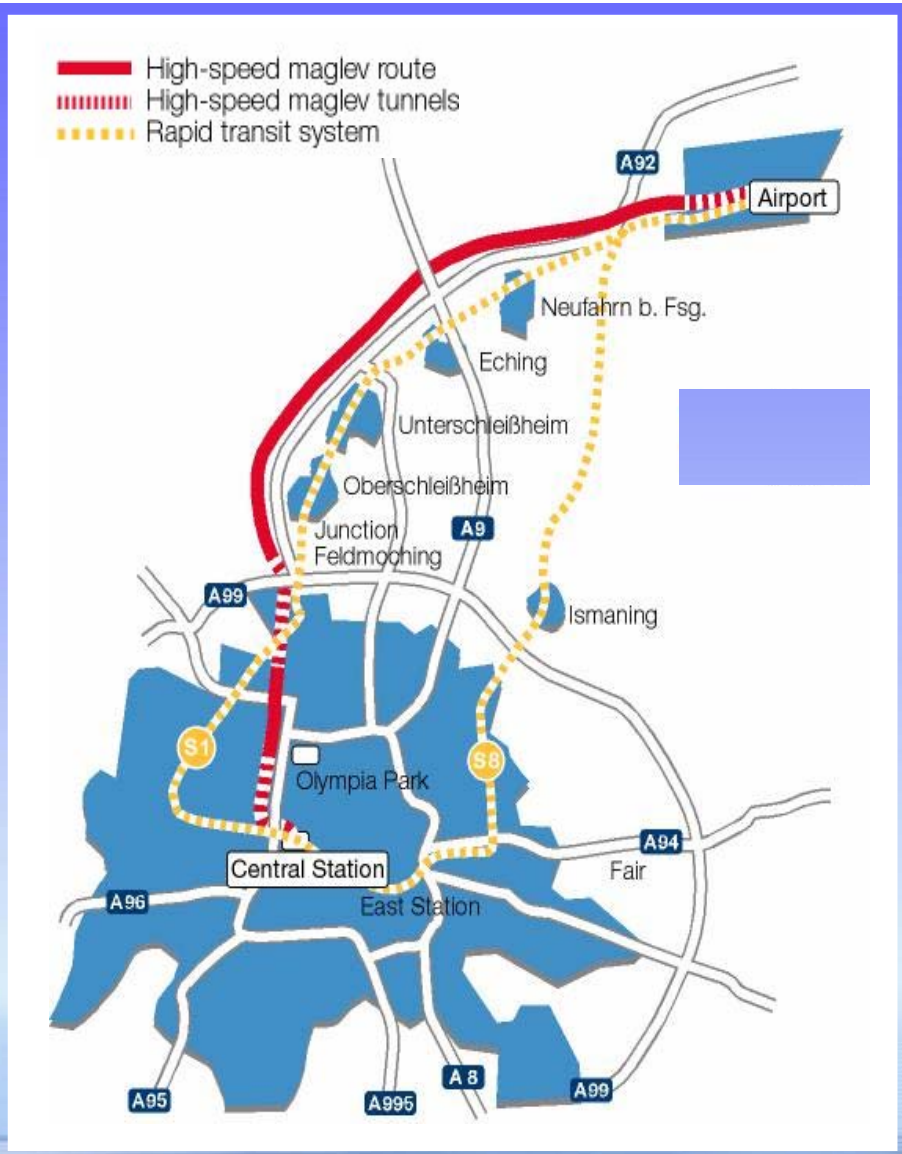
Airport Connection

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Airport Connection

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Track Length	37.4 km / 23.3 miles
Stations	2
Operating Speed	350 km/h / 217 mph
Trip Time	10 min
Headway	10 min
Vehicles	5 (3 sections each)
Ridership	7.9 mill./year
Legal Planning Start	June 2005
Construction Start	2007-2008
Revenue Operation	2011

Transrapid Project Munich
Further Development Program (2002 – 2007)

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Goals of the Further Development Program

- adapt the system for regional transportation / airport connector applications
- reduce investment costs based on a Life Cycle Cost evaluation
- ensure the results are available for the Munich Project (construction begin 2007)

Major Contents of Program

- Update Transrapid system and subsystem specifications
- Design and build Munich Project prototype vehicle (TR09): optimize for regional transit / airport connector use
- Design and build non-contact external power supply for vehicle (IPS): replace power rails
- Design and build new propulsion converter and control system: improve functionality, incorporate recent technology advances
- Design and build cost-optimized guideway beam(s): 20% lower investment cost
- Tunnel Aerodynamic and Vibration Compensation: reduce tunnel cross-section, investment costs

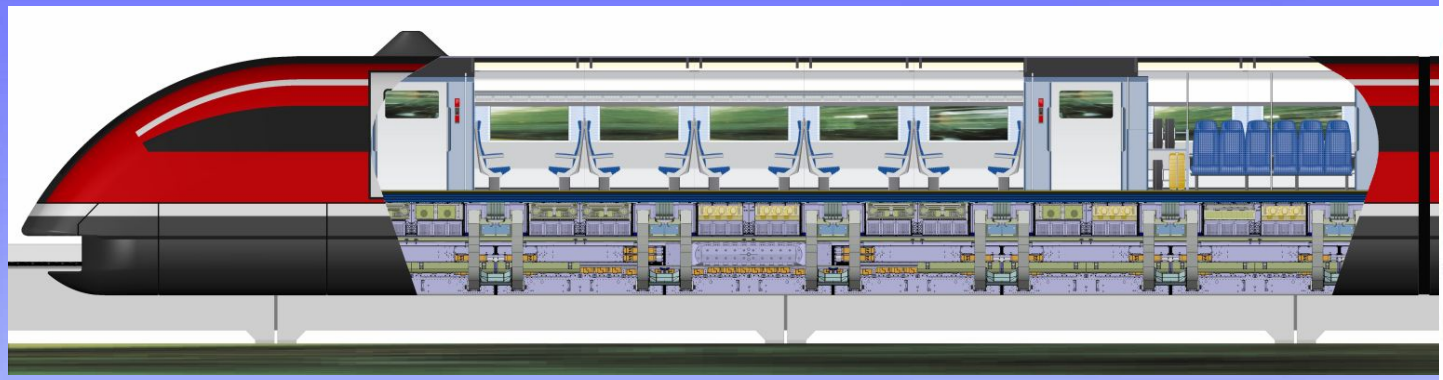
Total Program Cost: 151 million Euros / $ 181 million

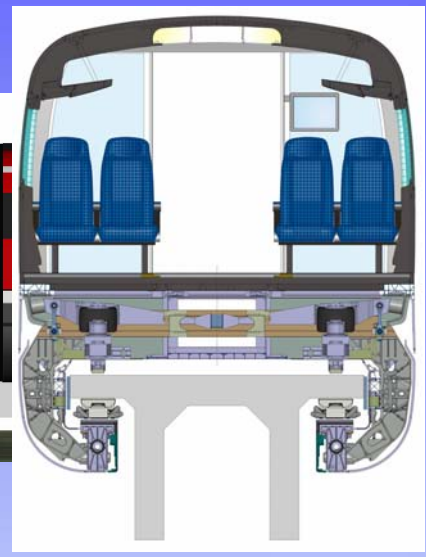


Transrapid Project Munich
Airport Connection

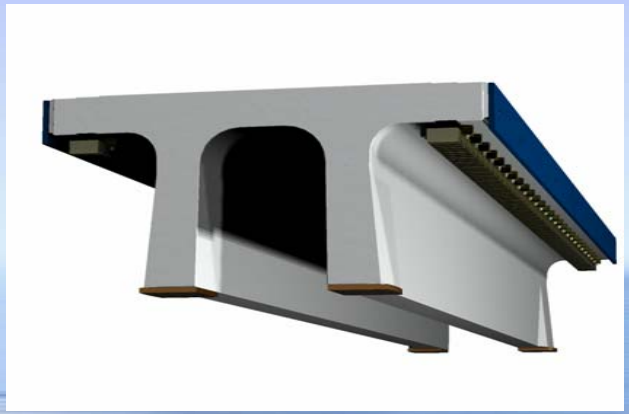
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Transrapid 09 Vehicle (Munich Project)





Concrete At-grade Guideway (Boegl, 2005)





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U.S. Projects



U.S. Maglev Deployment Program

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U.S. Department of Transportation
Federal Railroad Administration

Sec. 1218 of TEA-21 created the Magnetic Levitation Transportation Technology Deployment Program

Purpose: To build a high-speed (240+ mph) maglev project in the U.S.

Program: FRA makes grants to states for feasibility studies; requires 1/3 funding match

FRA selects a project for construction based on statutory evaluation criteria

Funding: $55 million contract authority over 3 years for planning & pre-construction activities

$950 million authorized over 4 years for construction



Transrapid U.S. Projects

Planning & Development

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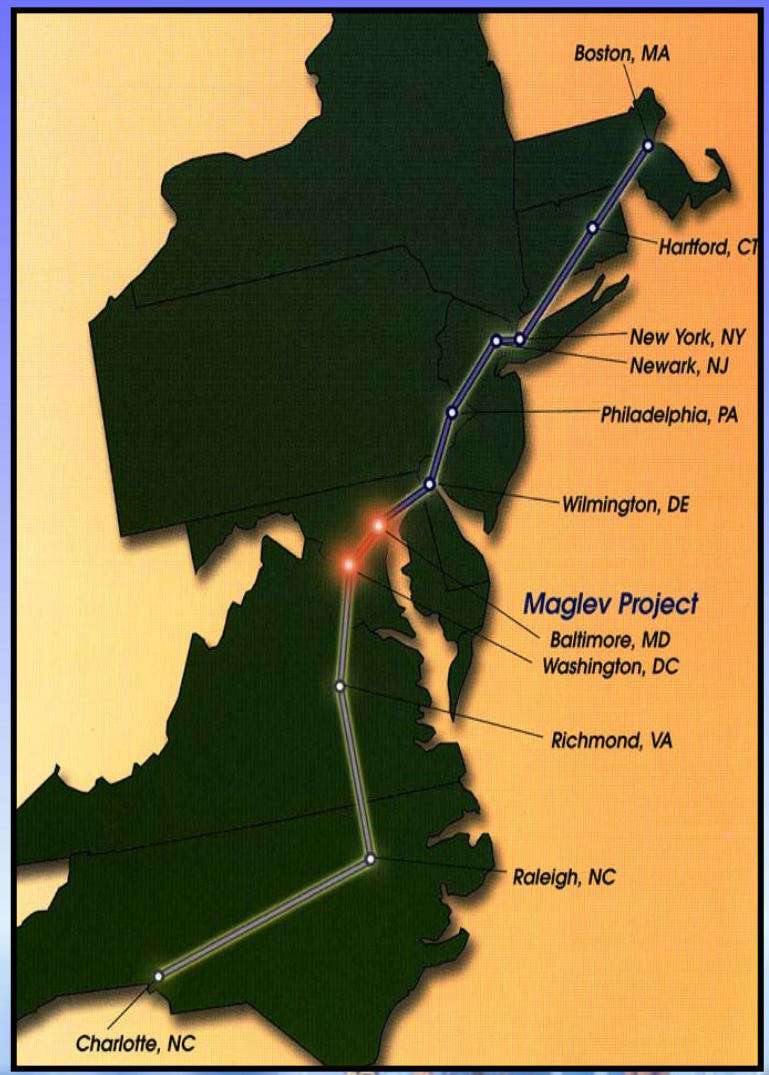
Baltimore-Washington Project

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Maglev has the potential to connect cities along the Eastern Seaboard, including:

- **Boston**
- **Hartford**
- **New York**
- **Newark**
- **Philadelphia**
- **Wilmington**
- **Baltimore**
- **Washington, DC**
- **Richmond**
- **Raleigh**
- **Charlotte**

Connecting 800 miles and 9 states



MTA Maryland

Baltimore to Washington D.C. (initial segment)	
Route length	62.8 km / 39.0 miles
Stations	3
Trip time	18.5 minutes
Vehicles	7 (3 sections each)
Invest cost	$ 3.7 billion *(2002)*

Pennsylvania Project

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Begin in Pennsylvania and Spread Across the Nation

Pittsburgh International Airport to Greensburg
(initial segment)

Route length	86.9 km / 54.3 miles	Vehicles	8 (3 sections each)
Station	5	Invest cost	$ 3.7 billion *(2002)*
Trip time	35 minutes		

California-Nevada Project

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AMERICAN MAGLINE GROUP
AMG

Las Vegas to Primm
(initial segment)

Route length	56 km / 35 miles
Trip time	11 minutes
Top Speed	500 kph (310 mph)
Investment cost	$ 1.3 billion *(2000)*

Las Vegas to Barstow

Route length	248 km / 154 miles
Trip time	45 minutes
Top Speed	500 kph (310 mph)

Las Vegas to Anaheim

Route length	434 km / 269 miles
Trip time (est.)	1 hour 35 minutes
Top Speed	500 kph (310 mph)

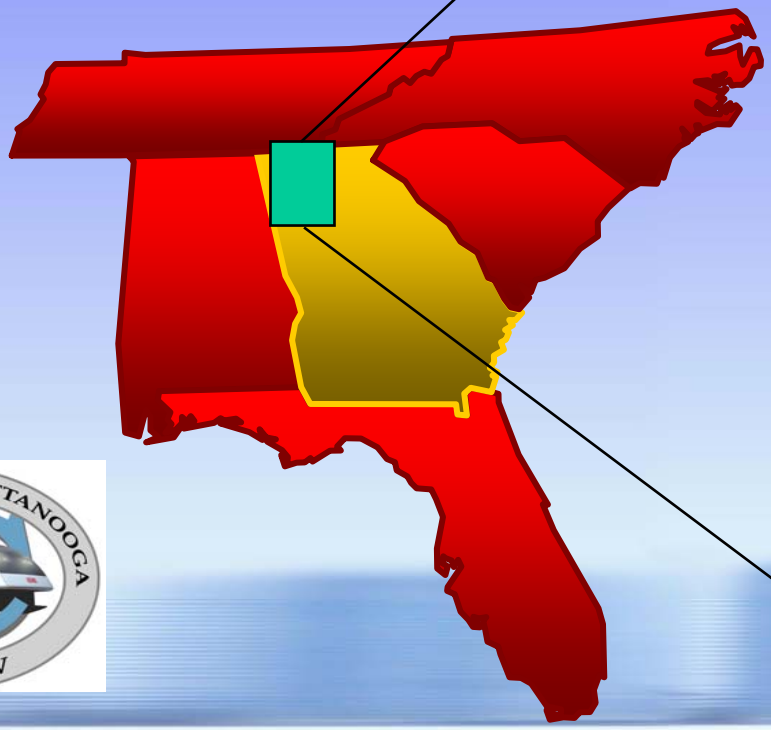


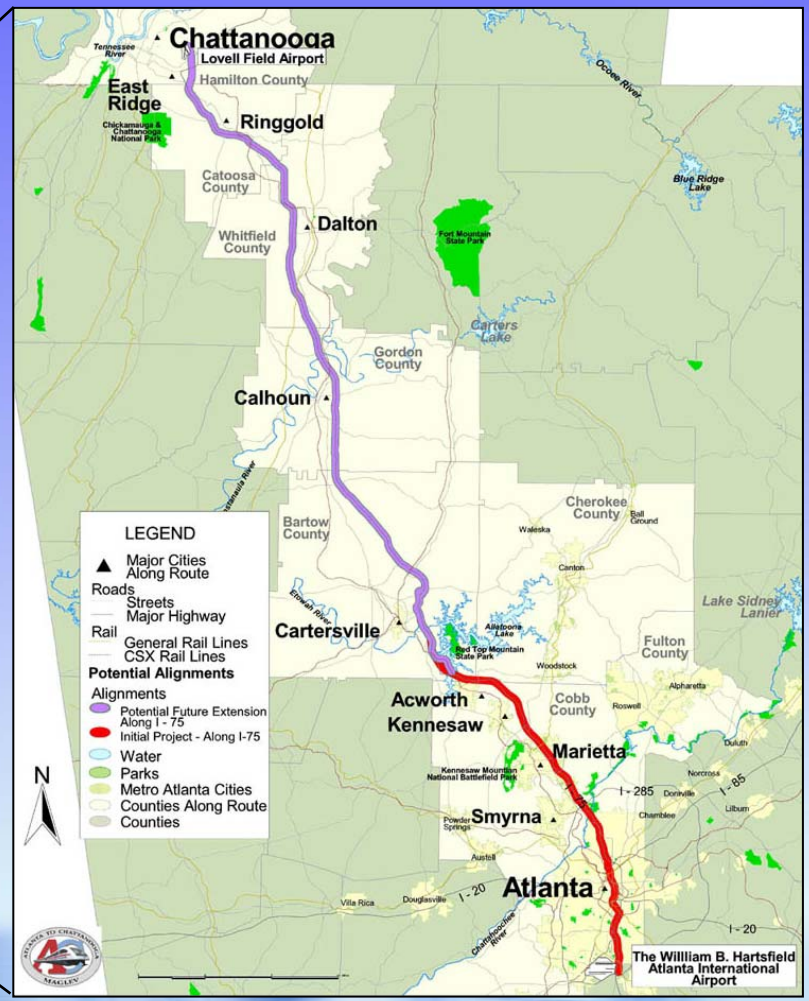
Atlanta-Chattanooga MDP Project

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Atlanta to Chattanooga

End Stations	Hartsfield Int'l Airport (Atlanta) Lovell Field (Chattanooga)
Route length	
Initial Segment	50 km / 31 mi (Hartsfield-Town Center)
Entire Corridor	188 km / 117 mi
Top Operating Speed	255 mph





ATLANTA TO CHATTANOOGA MAGLEV

Southern California Project

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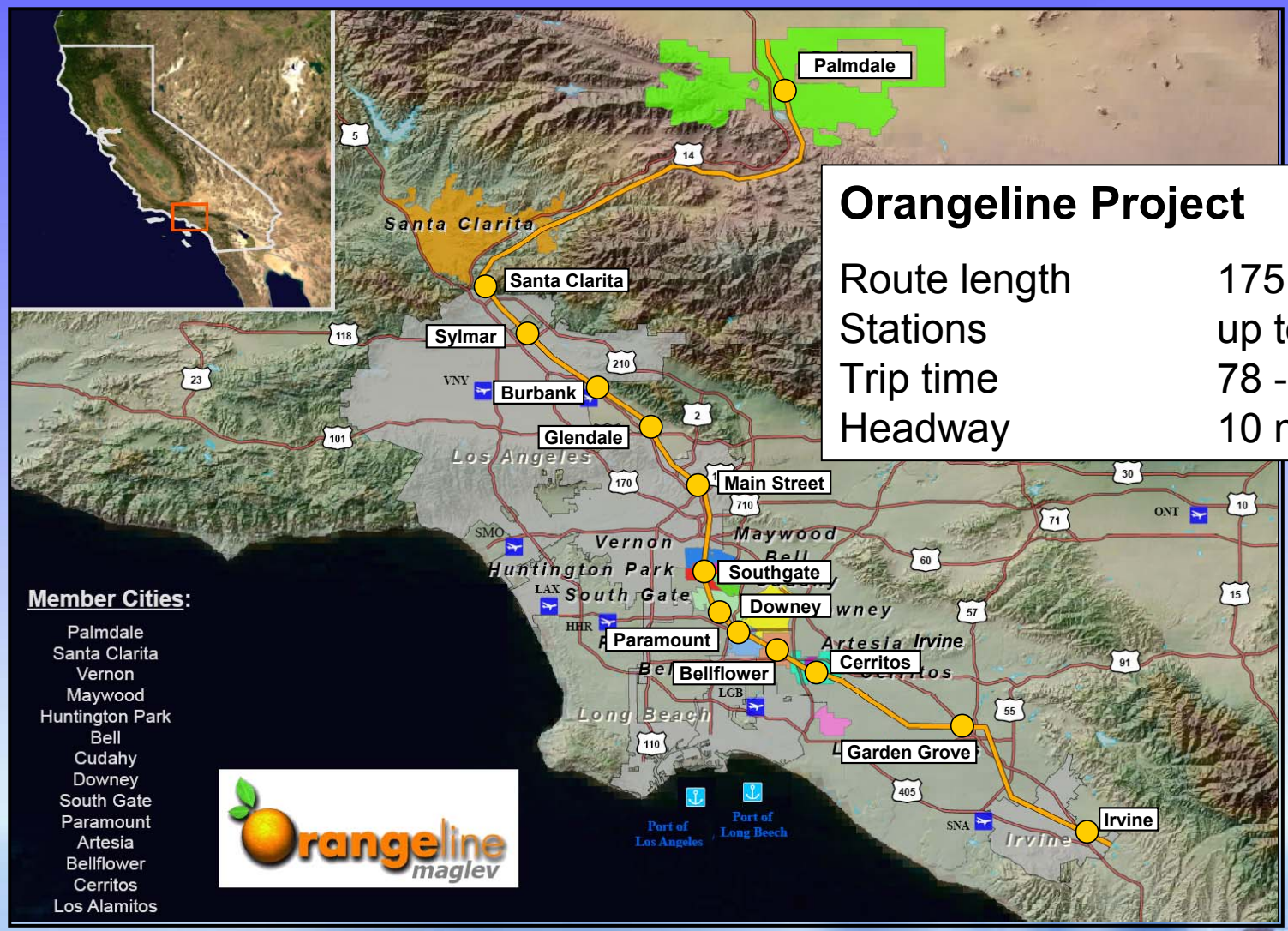


SCAG Initial Operating Segment (IOS)

Route length	87 km / 54 miles
Stations	4
Trip time	31.5 minutes
Headway	10 minutes
Ridership	20.8 million/year
Vehicles	10 (8 sections each)

Orangeline Maglev Project

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Orangeline Project

Route length	175 km / 109 miles
Stations	up to 18
Trip time	78 - 95 minutes
Headway	10 minutes

Member Cities:

Palmdale
Santa Clarita
Vernon
Maywood
Huntington Park
Bell
Cudahy
Downey
South Gate
Paramount
Artesia
Bellflower
Cerritos
Los Alamitos

orangeline maglev

Southern California Network

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