Presentation Contents

• Technology and System
• Transrapid Freight & Cargo
• Shanghai Airport Connection
• Munich Airport Connection
• U.S. Projects
Technology and System
Transrapid Maglev System
Overview

- 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
Technology Advantages

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

HMB2 (1976)

TR05 (1979)

TR06 (1984)

TR07 (1989)

TR08 (1999)

TR SHA (2002)

TR09 (2007)
Technology Applications

Medium and Long-distance Routes

Regional Network

Airport Link
Technology and Airport Integration

- Enhancement to Current Air Travel System
- Substitute for Short-Haul Flights
- Congestion Relief
- Direct Connections to City-Centers
Transrapid Freight & Cargo
Transrapid Freight & Cargo
Current Vehicle Options

TR09: Passenger (Regional, Airport Connector)

TR09 / G: Cargo

Freight ("Freightrapid") - Concept
Transrapid Freight & Cargo
Seaborne Containers / Heavy Cargo

Freightrand 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

Container Gantry Crane

Container Delivery (truck, conveyor)

Maglev Vehicle
Transrapid Project Shanghai
Transrapid Project Shanghai
### Transrapid Project Shanghai

#### Route

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Track Length</td>
<td>30 km / 19 miles</td>
</tr>
<tr>
<td>Stations</td>
<td>2</td>
</tr>
<tr>
<td>Operating Speed</td>
<td>430 km/h / 267 mph</td>
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<tr>
<td>Trip Time</td>
<td>8 min.</td>
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<tr>
<td>Headway</td>
<td>10 min.</td>
</tr>
<tr>
<td>Vehicles</td>
<td>3 (5 sections each)</td>
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<tr>
<td>Revenue Operation</td>
<td>End 2003</td>
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<tr>
<td>Overall Acceptance</td>
<td>April 2004</td>
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</tbody>
</table>

Current Data (through February 2007):
- Ridership: 10 million
- Distance Traveled: 2 million miles

![Map of Transrapid Project Shanghai route](image-url)
Transrapid Project Shanghai
Track Layout

- Maintenance Facilities
- Substation #2
- Vehicle Washing Facility
- Track E
- Track C
- Track D
- Operation Control Center
- Substation #1
- Long Yang Road
- Pudong International Airport
- Track A
- Track B
- Widening of track 5.1 -> 7.4 m
- Reversal point
- Narrowing of tracks 12.1 -> 5.1
- 0.135
- 0.455
- 1.290
- 12.00
- 26.074
- 29.240
- 29.898
- 210
- 430
- km 0.000
- 0.455
- 1.290
- 12.00
Transrapid Project Shanghai
Project Schedule

Planning Phase

- May
  - TIE Visit of Prime Minister ZHU Rongji: 2. July
  - Completion of Feasibility Study: 22. Nov.

Commissioning

Construction Phase

- Feb.
  - Start of Construction
  - VIP Ride: 31. Dec. 02
- Feb.
  - Commercial Operation: Jan.

2000 | 2001 | 2002 | 2003 | 2004
Shanghai Airport Connection
Longyang Road Station
Transrapid Project Shanghai
Elevated Guideway
Transrapid Project Shanghai
Use of Highway Corridor
Transrapid Project Munich
Airport Connection
### Transrapid Project Munich

#### Airport Connection

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

Transrapid 09 Vehicle (Munich Project)

Concrete At-grade Guideway (Boegl, 2005)
U.S. Projects
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
Maglev has the potential to connect cities along the Eastern Seaboard, including:

- Boston
- Hartford
- New York
- Newark
- Philadelphia
- Wilmington

Connecting 800 miles and 9 states

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

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
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

**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
Southern California Project

**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

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

Orangeline Project

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

[Image of a map showing the Southern California Network, including major cities and stations, with a legend indicating different project areas.]