

# Eurailspeed

Parallel Session E.1

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## The Transrapid Maglev System

- a necessity for the growing mobility market
- a necessity for trackbound High Speed Systems

## Current Situation – further planning



- **The Transrapid Maglev System ? fit for applications such as**
  - very fast point to point connections ? „multi city concept“
  - back bone net ? feeder lines with fast rail systems
  - very fast airport connectors ? premium lines
- **The Transrapid Maglev System ? opens up the technical and economical limits of HSR, such as**
  - wear and tear for wheel and rail increase strongly with speed and axle load
  - installed propulsion power in a train increases with the cube of speed ? means more weight, more wear and tear
  - increasing speed means more and more difficulties with the transmission of tractive forces
  - noise emission of the wheels increase with the cube of speed
  - increasing speed means strongly intensified safety measures (for ex. cross winds)

## Transrapid System Characteristics – System Advantages

- **Operational Speed – acceleration – climbing ability**
- **Environmentally friendly**
  - favourable land consumption ? at-grade or elevated
  - flexible alignment parameters with regard to curves, gradients, route configuration, good collocation with highways and railways
- **Favourable life cycle cost**
  - energy consumption (at comparable speeds)
  - fully automated system ? less operation personal
  - guideway maintenance costs ? independable of speed (about 30 % of high speed rail tracks)
- **Safety**
  - no derailment
  - failure tolerant ? redundant concepts for safety critical subsystems
  - cross winds ? to a high degree intensitive
  - fully automatic transportation system

## Levels of Automation

### Railway System ↔ Transrapid System

#### ETCS = European Train Control System

- necessary for interoperability and standardization of train control systems in Europe
- 3 application / automation levels 1, 2, 3
- **level 3** will be the highest automation level = full automation

#### Comparison of ETCS level 3 with Transrapid Operation Control System (OCS)

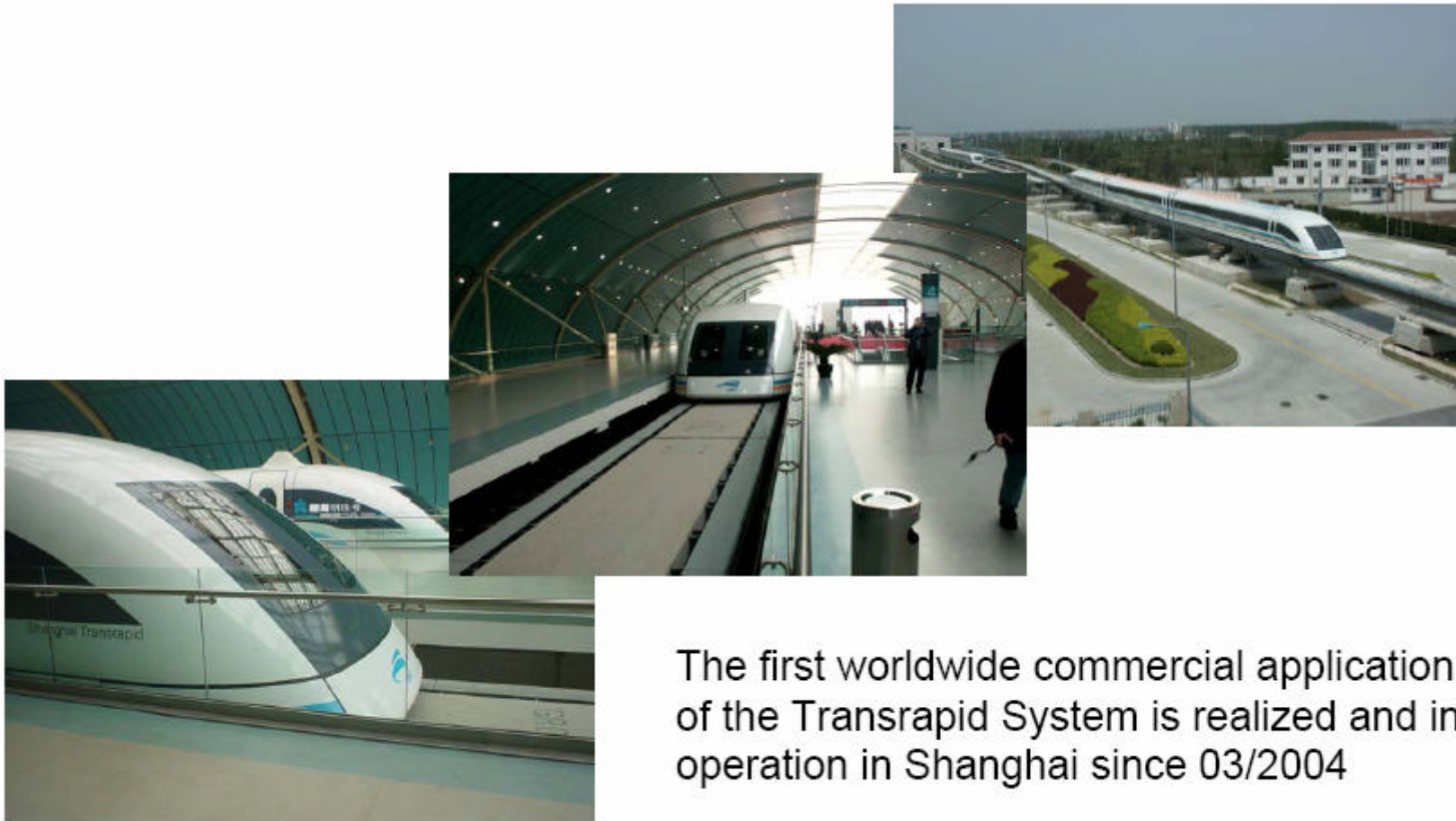
##### ETCS Level 3

- Balises for locating functions
- Interlocking systems
- radio system GSM - R
- Speed profile from interlocking system
- no signals anymore
- **when reality? No forecast possible!**

Level 2 right now in a certain  
introduction phase

##### Transrapid OCS

- Inkrefa for locating function
- Decentralized control systems (DCS)
- radio system 38 Ghz or below
- Speed profile from DCS
- no signals
- **it is reality!**



The first worldwide commercial application of the Transrapid System is realized and in operation in Shanghai since 03/2004

## Transrapid Project Shanghai

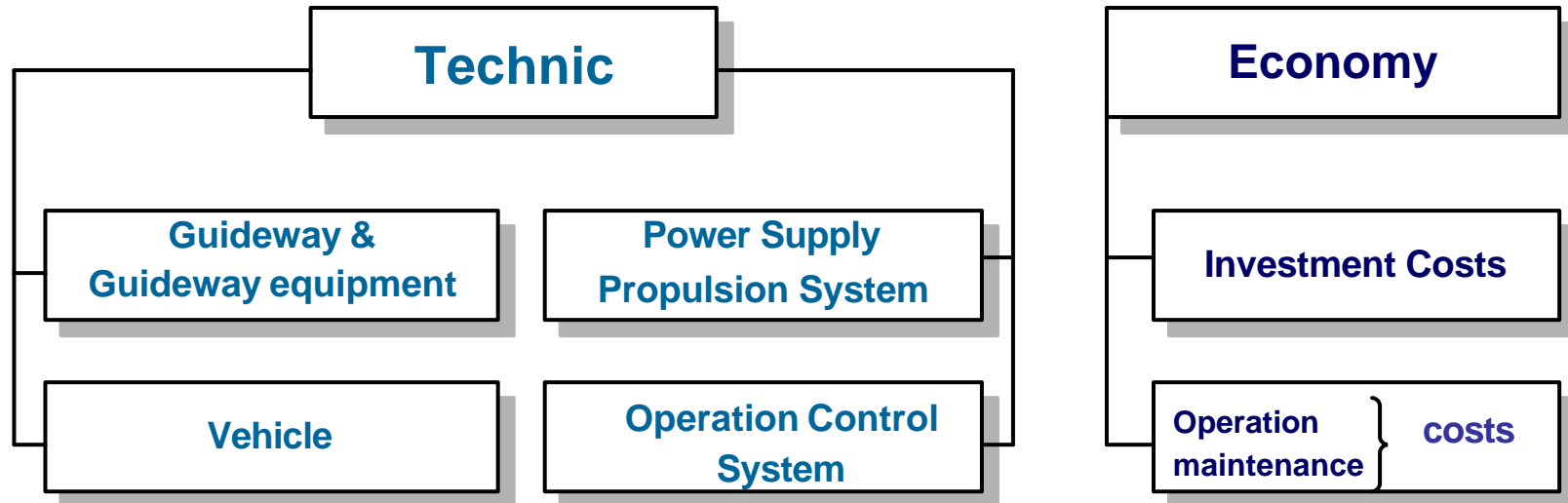
very fast airport connector  
demonstration line:  
Maglev technology for China

### Operational and technical data (status 10/05)

- Till now about 5 Mio passengers – without any accident – about 1.9 Mio km are driven with all 3 vehicles
- Fully automatic operation without any restriction in shuttle as well as circular operation
- Technical availability of the system since months over 99.85 % in relation to 9h operation and disturbances = 5 min.
- Proof has been furnished for the total functionality and technical and operational safety of the system
  - Complete successful safety assessment
  - Proof for less operation personal
  - full operation during a near-by typhoon (wind forces  $\approx$  9 to 10)

Program for the near and medium future:

## Technical and Economical Optimization of the Overall System



by means of:

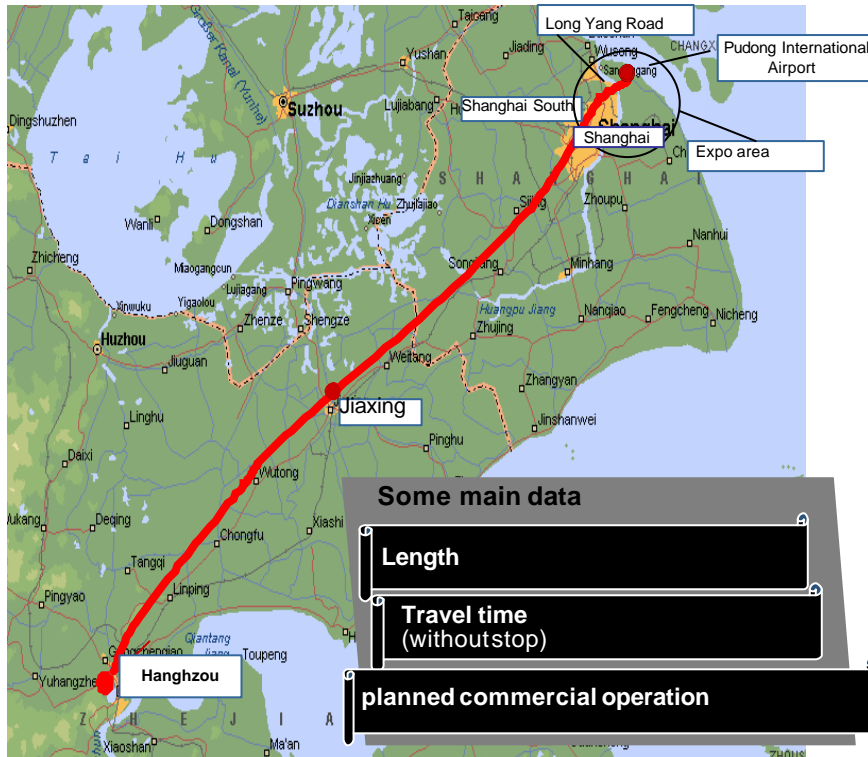
- Further development by using new technical components and possibilities
- Technical up-date by application of experience and knowledge gained
- Use of components from other transportation and technical systems
- consistent application of the RAMS / LCC systematic
- Standardization and simplification wherever possible

## Next most possible projects:

- **very fast airport connector for Munich/ Germany**
  - ? Main railway station to the airport — 37 km
  - ? Planning process is in work for government approval (i.e. environmental impact study)
  
- **worldwide first long distance line Shanghai-Hangzhou/ China**
  - ? about 180 km track length
  - ? planning process is in work for government approval

# Project Shanghai – Hangzhou

## Overview



- **First line to build up a network in the Yangtze-Delta (high traffic load and commercial efficiency)**
- **Chinese government demonstration line for the long distance traffic**
  - full usability for long distance with all necessary features

## **Growing economy, national prosperity ? precondition: efficient and optimal solutions for the rising transportation problems**

- **Track-bound High Speed transportation systems are playing an important role**
- **The Transrapid Maglev System with its possibilities and advantages can take an important and competitive part in solving transport problems**
  - Transrapid - a real completion for rail systems within the track bound traffic
  - A system which helps definitely to reduce domestic flights
- **We should stop the opposition and the „philosophical conflict“ between Rail and Maglev**
  - The Maglev System has to be integrated into the track-bound traffic system without the still existing reservations
  - Maglev Systems still have a great development potential
- **Lead function in track-bound technologies means to be more open, more farsighted, more decisive in relation to the maglev technology**
  - Lead function in development means also lead function in application!