

**MAGLEV 2011**

# **Keynote Speech 3**

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**Status of Maglev Projects in the USA**

# Status of Maglev Projects in the USA

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## Systems of Interest

- ▶ **High-speed maglev**
  - Intercity passengers
- ▶ **Low-speed maglev**
  - Urban passengers
- ▶ **Other systems:**
  - Emerging system in Colorado
  - Research project at Old Dominion Univ.
  - Innovative approaches

## Summary

- ▶ High-speed maglev projects are awaiting funding or slowly drifting away; Colo. is new
- ▶ Low-speed technologies remain under study, but construction projects are elusive
- ▶ Innovative approaches are always active
- ▶ 2008 - 2011 has been a waiting game
  - U.S. Administration is negative toward maglev compared with conventional high-speed rail (using incremental upgrades)
- ▶ Near-term economic conditions are challenging

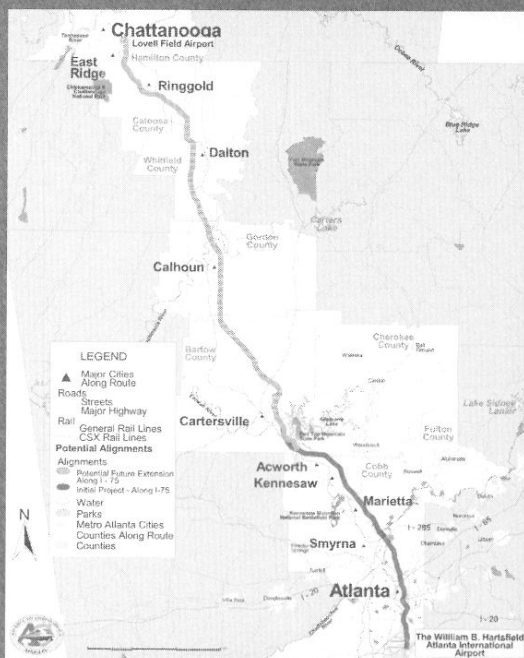
## High-speed Maglevs

- **Transrapid (Germany)**
- **Superconducting Maglev (Japan)**

# Transrapid

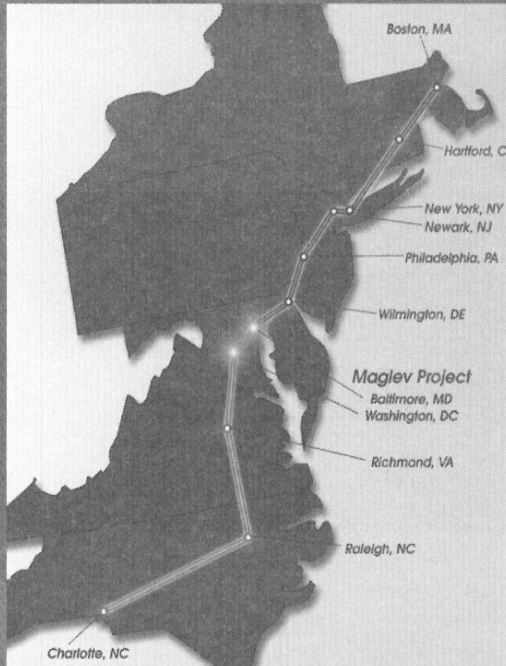
- ▶ Technology deployed in Shanghai in 2004
- ▶ Maglev Deployment Program (MDP):
  - Atlanta, GA – Chattanooga, TN
  - Baltimore, MD – Washington, DC
  - Las Vegas, NV – Anaheim, CA
  - Los Angeles, CA
  - Pittsburgh, PA
- ▶ Other project areas:
  - Chattanooga – Nashville, TN
  - Orange County, CA
- ▶ US\$90M planned in 2008 never appeared
- ▶ Awaiting a go-ahead on any project

## Atlanta - Chattanooga



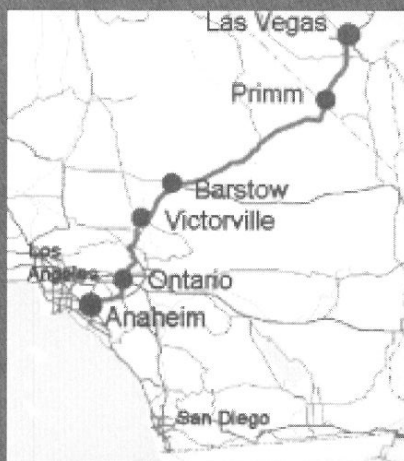
- ▶ MDP pre-construction planning in 2000-2002
- ▶ Tier I EIS begun in 2008
- ▶ GDOT/AECOM lead
- ▶ Tier II EIS funds awarded
- ▶ Technology selection to occur during Tier II EIS
- ▶ Significant new funding expected in 2012
- ▶ Active

## Baltimore - Washington



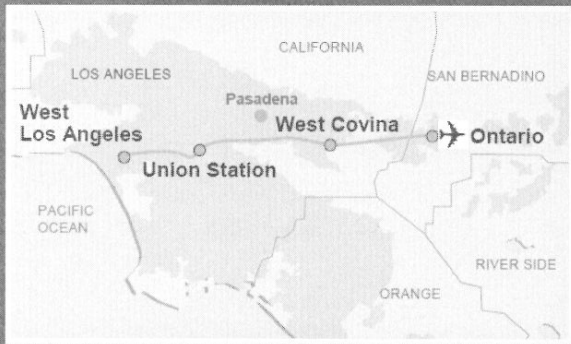
- ▶ MDP pre-construction planning in 2000
- ▶ DEIS in 2003, draft FEIS submitted 2007
- ▶ MTA/KCI-PB team lead
- ▶ Opportunity for new federal funds in 2012
- ▶ Original study inactive

## Las Vegas - Anaheim



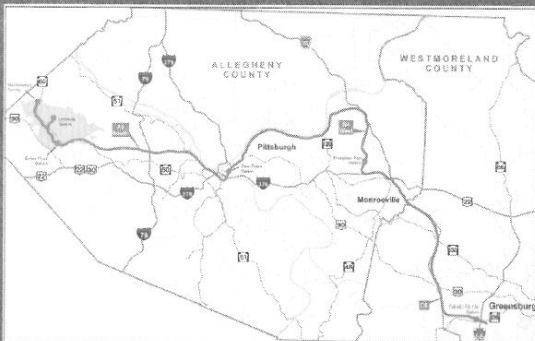
- ▶ MDP pre-construction planning 1999-2003
- ▶ EIS work: 2003-2007
- ▶ CNSSTC, American Magline Group lead
- ▶ Owed US\$45M from \$90M funds...Awaiting contract
- ▶ Current plan:
  - IOS starts in either NV or CA
  - Tech transfer, construction funding agreements in place with Chinese, German and U.S. firms
- ▶ Active

## Southern California Association of Governments (SCAG), Los Angeles



- ▶ MDP planning in 2000
- ▶ Initial engineering, EIS work completed
- ▶ SCAG analysis in 2009: technology-neutral, "High-speed Regional Transport" project
- ▶ Duplicates CA HSR
- ▶ Not funded
- ▶ Pending

## Pittsburgh, PA

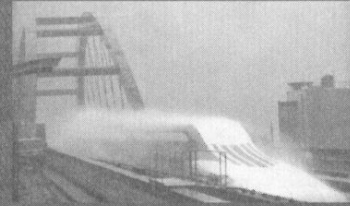


- ▶ MDP planning in 2000
- ▶ DEIS, FEIS approved in 2007-09
- ▶ PennDOT, PAAC, Maglev Inc. lead
- ▶ Project oriented as industrial development vs. transport project
- ▶ July, 2011: MLI declared bankruptcy
- ▶ Inactive



## Superconducting Maglev (SCM)

- ▶ Central Japan Railway (JRC): SCM a "revolutionary concept," should be promoted internationally
- ▶ 2009: U.S.-Japan Maglev office formed to assess int'l markets
- ▶ CFS from 1997: Maglev in the Northeast Corridor has best performance and economics
- ▶ Keys to success: Public-private partnerships, financing and U.S. government approvals
- ▶ Active



SC Maglev @ 500 km/h  
Typhoon Roke,  
September 21, 2011

## Low-speed Maglevs

- ▶ **AMT**
- ▶ **General Atomics**
- ▶ **HSST/Linimo**
- ▶ **Maglev 2000**
- ▶ **MagneMotion**
- ▶ **Magplane**



## American Maglev Technology

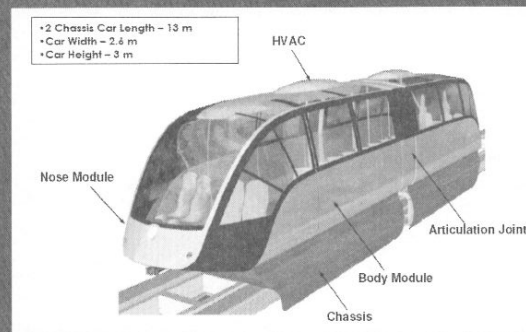
- ▶ EMS Suspension, LIM
- ▶ Cargo and passenger
- ▶ Undergoing full-scale tests on 600-m track
- ▶ Promoting projects in Brazil, Canada, India, Mexico, Puerto Rico, Spain and the U.S.
- ▶ Active



Test facility near Atlanta, GA

## General Atomics Urban Maglev

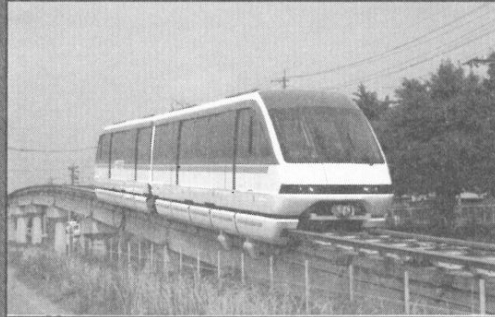
- ▶ Halbach array (PM) suspension, LSM
- ▶ 4.5-mile (7.2-km) "CALU" campus shuttle:
  - Technical feasibility verified
  - Initial EIS completed
- ▶ Completed all federal technical objectives
- ▶ Ready for demonstration and deployment
- ▶ Active



Target speed: 100 mph/160+ km/h  
Max. Acceleration: 1.6 m/sec<sup>2</sup> (.16 g)  
Max. Gradient: 7% in CALU application

## HSST / Linimo Urban Maglev

- ▶ Most mature system
- ▶ Operational in Nagoya since 2005
- ▶ EMS Suspension, LIM propulsion
- ▶ Analyzed for use in Colorado, Hawaii
- ▶ No U.S. projects
- ▶ Inactive



### Federal Urban Maglev Goals

Top speed: 100 mph/160+ km/h  
Max. Acceleration: 1.6 m/sec<sup>2</sup>  
Max. Braking: 3.6 m/sec<sup>2</sup>  
Max. Gradient: 10%  
Max. Noise Level: 70 dBA

## Maglev 2000

- ▶ 2<sup>nd</sup> generation system
  - HTS magnets
  - EDS suspension
  - LSM propulsion
  - High-speed electronic switching
- ▶ Florida MDP project
- ▶ Needs a full-scale testing facility
- ▶ Active

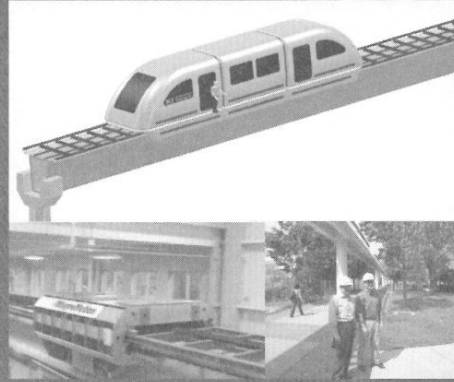


### Vision: National Maglev Network

- Covers 28.8K miles/46.3K km
- Connects 174 metro areas
- Serves 230+ million people within 15 miles of a station

## MagneMotion

- ▶ Permanent Magnet EMS
- ▶ High-efficiency, large-gap suspension
- ▶ FTA-supported since 2001
- ▶ Testing underway at full-scale 50-m test track in Devens, MA
- ▶ Nov., 2011: Begin tests on outdoor 75-m track at ODU, Norfolk VA
- ▶ Active



Target speeds:  
Urban: 160 km/h (100 mph)  
Intercity: 430 km/h (267 mph)

## Magplane

- ▶ Common track for single urban, intercity vehicles
- ▶ EDS PM suspension, LSM mounted in track
- ▶ Planned 19-mile (30-km) route for Beijing
- ▶ Mining application in construction, Inner Mongolia
- ▶ No U.S. projects
- ▶ Inactive

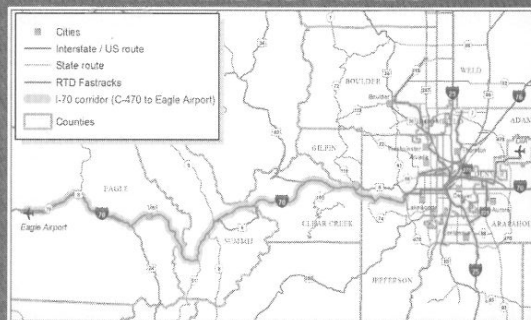


Top speed: 60 -300 mph  
Banking: +/- 10°  
Passive or mechanical switching

# Other Systems

- ▶ **Emerging project in Colorado**
- ▶ **Research project at Old Dominion University**
- ▶ **Innovative approaches**

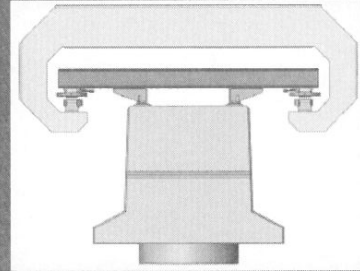
## “Advanced Guideway System” in Colorado



- ▶ **US\$2.3M, 18-month feasibility study for the I-70 Mountain Corridor (190km/120mi west of Denver)**
  - Purpose: Identify alignments, stations and technologies to implement an AGS system – “a high-speed monorail or maglev”
  - Procurement expected in November, 2011

## Old Dominion University

- ▶ Research opportunity following stalled AMT campus shuttle in 2003
- ▶ MagneMotion joint venture: multiple test vehicles at full speeds on existing guideway
- ▶ US\$8M for hardware development & testing
- ▶ Active

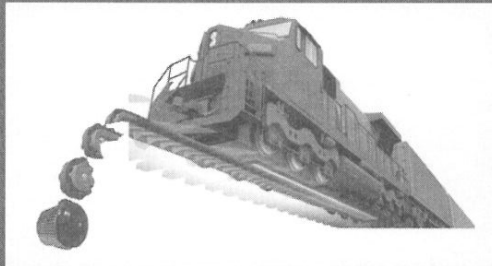


Planned MM bogie and LSM stators mounted on ODU girder

Speed goal: 40 mph / 64 km/h

## Innovative Approaches

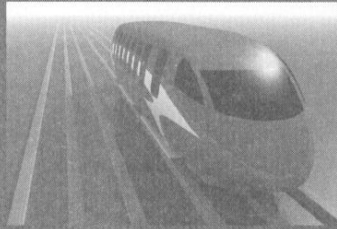
- ▶ Maglev subsystems can be adapted to conventional rail applications
  - Maglev 2000/MERRI, Fastransit, MagneMotion
  - Shapery Enterprises:



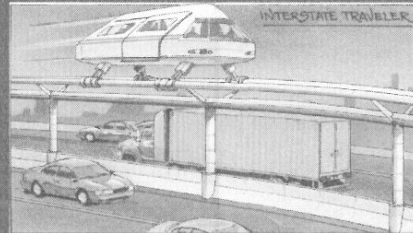
LSM propulsion technology can be used to propel conventional vehicles suspended by wheels, such as intercity rail, commuter rail, light rail and monorail systems.

## Innovative Approaches (cont'd)

- ▶ Personal Rapid Transit, Group Rapid Transit concepts w/ maglev technologies



Fastransit



Interstate Traveler



SkyTran

## Summary

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- ▶ 2008 - 2011 has been a waiting game
  - U.S. Administration is negative toward maglev compared with conventional high-speed rail
- ▶ Near-term economic conditions are challenging