

FTA's UMTD program

In the US, the Federal Transit Administration (FTA) Urban Maglev Technology Demonstration program has funded the design of several low-speed urban maglev demonstration projects. It has assessed HSST for the Maryland Department of Transportation and maglev technology for the Colorado Department of Transportation. The FTA has also funded work by General Atomics at California University of Pennsylvania to demonstrate new maglev designs, the MagneMotion M3 and of the Maglev2000 of Florida superconducting EDS system. Other US urban maglev demonstration projects of note are the LEVX in Washington State and the Massachusetts-based Magplane.

Southwest Jiaotong University, China

On 31 December 2000, the first crewed high-temperature superconducting maglev was tested successfully at Southwest Jiaotong University, Chengdu, China. This system is based on the principle that bulk high-temperature superconductors can be levitated or suspended stably above or below a permanent magnet. The load was over 530 kg (1166 lb) and the levitation gap over 20 mm (0.79 in). The system uses liquid nitrogen, which is very cheap, to cool the superconductor.

Linimo (Tobu Kyuryo Line, Japan)

The commercial automated "Urban Maglev" system commenced operation in March 2005 in Aichi, Japan. This is the nine-station 8.9 km long Tobu-kyuryo Line, otherwise known as the Linimo. The line has a minimum operating radius of 75 m and a maximum gradient of 6%. The linear-motor magnetic-levitated train has a top speed of 100 kilometers per hour (62.1 mph). The line serves the local community as well as the Expo 2005 fair site. The trains were designed by the Chubu HSST Development Corporation, which also operates a test track in Nagoya.

Shanghai Maglev Train

Transrapid, in Germany, constructed the first operational high-speed conventional maglev railway in the world, the Shanghai Maglev Train from downtown Shanghai (Shanghai Metro) to the Pudong International Airport. It was inaugurated in 2002. The highest speed achieved on the Shanghai track has been 501 km/h (311 mph), over a track length of 30 km. Despite the speeds, the maglev has been criticised as having few stops and a questionable commercial success. Construction of an extension to Hangzhou was planned to be finished in 2010, but has been postponed in favour of a conventional high speed railway running at 350 km/h. The Shanghai municipal government was considering building the maglev line extension underground to allay the public's fears of electromagnetic pollution; this same report states that the final decision has to be approved by the National Development and Reform Commission.

Daejeon, South Korea

The first maglev utilizing electromagnetic suspension opened to public was HML-03, which was made by Hyundai Heavy Industries, for Daejeon Expo in 1993 after five years of research and manufacturing two prototypes; HML-01 and HML-02. Research for urban maglev using electromagnetic suspension began in 1994 by the government. The first urban maglev opened to public was UTM-02 in Daejeon on 21 April 2008 after 14 years of development and building one prototype; UTM-01. The urban maglev runs on 1 km track between Expo Park and National Science Museum. Meanwhile UTM-02 remarked an innovation by conducting the world's first ever maglev simulation. However UTM-02 is still the second prototype of a final model. The final UTM model of Rotem's urban maglev, UTM-03, is scheduled to debut at the end of 2012 in Incheon's Yeongjong island where Incheon International Airport is located. *continued on next page...*

Melbourne Maglev Proposal

In late 2008, a proposal was put forward to the Government of Victoria to build a privately funded and operated Maglev line to service the Greater Melbourne metropolitan area in response to the Eddington Transport Report which neglected to investigate above ground transport options. The Maglev would service a population of over 4 million and the proposal was costed at A\$8 billion. However despite relentless road congestion and the highest roadspace per capita Australia, the government quickly dismissed the proposal in favour of road expansion including an A\$8.5 billion road tunnel, \$6 billion extension of the Eastlink to the Western Ring Road and a \$700 million Frankston Bypass.

United Kingdom

London – Glasgow: A maglev line was recently proposed in the United Kingdom from London to Glasgow with several route options through the Midlands, Northwest and Northeast of England and was reported to be under favourable consideration by the government. But the technology was rejected for future planning in the Government White Paper Delivering a Sustainable Railway published on 24 July 2007. Another high speed link is being planned between Glasgow and Edinburgh but there is no settled technology for it.

Iran

Iran and a German company have reached an agreement on using maglev trains to link the cities of Tehran and Mashhad. The agreement was signed at the Mashhad International Fair site between Iranian Ministry of Roads and Transportation and the German company. Maglev trains can reduce the 900 km travel time between Tehran and Mashhad to about 2.5 hours. Munich-based Schlegel Consulting Engineers said they had signed the contract with the Iranian ministry of transport and the governor of Mashad. "We have been mandated to lead a German consortium in this project," a spokesman said. "We are in a preparatory phase." The next step will be assemble a consortium, a process that is expected to take place "in the coming months," the spokesman said. The project could be worth between 10 billion and 12 billion euros, the Schlegel spokesman said. Siemens and ThyssenKrupp, the developers of a high-speed maglev train, called the Transrapid, both said they were unaware of the proposal. The Schlegel spokesman said Siemens and ThyssenKrupp were currently "not involved." in the consortium

Japan

Tokyo — Nagoya — Osaka

The plan for the Chūō Shinkansen bullet train system was finalized based on the Law for Construction of Countrywide Shinkansen. The Linear Chuo Shinkansen Project aims to realize this plan using the Superconductive Magnetically

Levitated Train, which connects Tokyo and Osaka by way of Nagoya, the capital city of Aichi, in approximately one hour at a speed of 500 km/h. In April 2007, JR Central President Masayuki Matsumoto said that JR Central aims to begin commercial maglev service between Tokyo and Nagoya in the year 2025.

Venezuela

Caracas – La Guaira

A maglev train (TELMAGV) has been proposed to connect the capital city Caracas to the main port town of La Guaira and Simón Bolívar International Airport. No budget has been allocated, pending definition of the route, although a route of between six and nine kilometres has been suggested. The proposal envisages that, initially, a full-sized prototype train would be built with about one kilometre of test track. In proposing a maglev system, its improved life and performance over mechanical engines were cited as important factors, as well as improving comfort, safety, economics and environmental impact over conventional rail. *continued on next page...*

Baltimore-Washington D.C. Maglev: A 39.75 mi (64 km) project has been proposed linking Camden Yards in Baltimore and Baltimore-Washington D.C. Maglev: A 39.75 mi (64 km) project has been proposed linking Camden Yards in Baltimore and Baltimore-Washington International (BWI) Airport to Union Station in Washington, D.C. It is said to be in demand for the area due to its current traffic/congestion problems.

The Pennsylvania Project: The Pennsylvania High-Speed Maglev Project corridor extends from the Pittsburgh International Airport to Greensburg, with intermediate stops in Downtown Pittsburgh and Monroeville. This initial project will serve a population of approximately 2.4 million people in the Pittsburgh metropolitan area. The Baltimore proposal is competing with the Pittsburgh proposal for a \$90 million federal grant. The purpose of the project is to see if the maglev system can function properly in a U.S. city environment.

San Diego-Imperial County airport: In 2006 San Diego commissioned a study for a maglev line to a proposed airport located in Imperial County. SANDAG says that the concept would be an "airports without terminals", allowing passengers to check in at a terminal in San Diego ("satellite terminals") and take the maglev to Imperial airport and board the airplane there as if they went directly through the terminal in the Imperial location. In addition, the maglev would have the potential to carry high priority freight. Further studies have been requested although no funding has yet been agreed.

Atlanta – Chattanooga: The proposed maglev route would run from Hartsfield-Jackson Atlanta International Airport, run through Atlanta, continue to the northern suburbs of Atlanta, and possibly even extend to Chattanooga, Tennessee. If built, the maglev line would rival Atlanta's current subway system, the Metropolitan Atlanta Rapid Transit Authority (MARTA), the rail system of which includes a major branch running from downtown Atlanta to Hartsfield-Jackson airport.

Germany

On 25 September 2007, Bavaria announced it would build a high-speed maglev-rail service from the city of Munich to its airport. The Bavarian government signed contracts with Deutsche Bahn and Transrapid with Siemens and ThyssenKrupp for the 1.85 billion euro project.

On 27 March 2008, the German Transport minister announced the project had been cancelled due to rising costs associated with constructing the track. A new estimate put the project between 3.2 and 3.4 billion euros.

Switzerland

SwissRapide: The SwissRapide AG together with the SwissRapide Consortium is planning and developing the first Maglev monorail system for intercity traffic between major cities in the country. The SwissRapide Express® is an innovative solution for the coming transportation challenges in Switzerland. As pioneer for large infrastructure projects, SwissRapide is to be financed to 100% by private investors.

In the long-term, the SwissRapide Express® is to connect the major cities north of the Alps between Geneva and St. Gallen, including Lucerne and Basel. The first projects currently in planning are Berne – Zurich, Lausanne – Geneva as well as Zurich – Winterthur. The first line (Lausanne – Geneva or Zurich – Winterthur) could go into service as early as 2020.

Swissmetro: An earlier project, Swissmetro, has previously attempted to provide a solution for the transportation challenges in the country. The Swissmetro AG had the technically challenging vision of constructing an underground Maglev rail system, which would have been in a partial vacuum in order to reduce air friction at high speeds. As with SwissRapide, Swissmetro envisioned connecting the major cities in Switzerland with one another. In 2011, Swissmetro AG was dissolved and the IPRs from the organisation were passed onto the EPFL in Lausanne.

Indonesia

There are plans to build a 683 km long maglev rail service between Jakarta and Surabaya. This maglev will have 7 stations including Semarang. PT Maglev Indonesia working together with SNCF, Transrapid Deutschland, and other corporations will begin this construction around 2010.

Old Dominion University

Track of less than a mile in length has been constructed at Old Dominion University in Norfolk, Virginia, USA. Although the system was initially built by AMT, problems caused the company to abandon the project and turn it over to the University. This system uses a "smart train, dumb track" that involves most of the sensors, magnets, and computation occurring on the train rather than the track. This system will cost less to build per mile than existing systems. The \$14 million originally planned did not allow for completion. The system is currently not operational, but research has proved useful. In October 2006, the research team performed an unscheduled test of the car that went smoothly. The whole system, unfortunately, was removed from the power grid for nearby construction. In February 2009, the team was able to retest the sled, or bogie, and was again successful despite power outages on campus. Tests will continue, increasing both speed and distance. Meanwhile, ODU has partnered with a Massachusetts-based company to test another maglev train on its campus. MagneMotion Inc. is expected to bring its prototype maglev vehicle, which is about the size of a van, to the campus to test in early 2010.

AMT Test Track - Powder Springs, Georgia

The same principle is involved in the construction of a second prototype system in Powder Springs, Georgia, USA, by American Maglev Technology, Inc.

Applied Levitation/Fastransit Test Track - Santa Barbara, California

Applied Levitation, Inc. has built a levitating prototype on a short indoor track, and is now planning a quarter-mile outdoor track, with switches, in or near Santa Barbara.

Beijing S1 Line

The Beijing municipal government is building China's first low-speed maglev line using technology developed by Defense Technology University. This is the 10.2 km long S1-West commuter rail line, which, together with seven other conventional lines, saw construction began on Feb. 28, 2011. Top speed will be 105 km/h. It is scheduled to be completed in two years.

Proposed systems

Many maglev systems have been proposed in various nations of North America, Asia, and Europe. Many are still in the early planning stages, or even mere speculation, as with the transatlantic tunnel. But a few of the following examples have progressed beyond that point.

Sydney-Illawarra Maglev Proposal

There is a current proposal for a Maglev route between Sydney and Wollongong.

The proposal came to prominence in the mid-1990s. The Sydney - Wollongong commuter corridor is the largest in Australia, with upwards of 20,000 people commuting from the Illawarra to Sydney for work each day. Current trains crawl along the dated Illawarra line, between the cliff face of the Illawarra escarpment and the Pacific Ocean, with travel times about two hours between Wollongong Station and Central. The proposed Maglev would cut travel times to 20 minutes. *continued on next page . . .*

China

Shanghai – Hangzhou

China is planning to extend the existing Shanghai Maglev Train, initially by some 35 kilometers to Shanghai Hongqiao Airport and then 200 kilometers to the city of Hangzhou (Shanghai-Hangzhou Maglev Train). If built, this would be the first inter-city maglev rail line in commercial service.

The project has been controversial and repeatedly delayed. In May 2007 the project was suspended by officials due to concerns about radiation from the maglev system. In January and February 2008 hundreds of residents demonstrated in downtown Shanghai against the line being built too close to their homes, citing concerns about sickness due to exposure to the strong magnetic field, noise, pollution and devaluation of property near to the lines. Final approval to build the line was granted on 18 August 2008. Originally scheduled to be ready by Expo 2010, current plans call for construction to start in 2010 for completion by 2014. The Shanghai municipal government has considered multiple options, including building the line underground to allay the public's fear of electromagnetic pollution. This same report states that the final decision has to be approved by the National Development and Reform Commission.

The Shanghai municipal government may also build a factory in Nanhui district to produce low-speed maglev trains for urban use.

India

Mumbai – Delhi

A maglev line project was presented to the Indian railway minister (Lalu Prasad Yadav) by an American company. A line was proposed to serve between the cities of Mumbai and Delhi, the Prime Minister Manmohan Singh said that if the line project is successful the Indian government would build lines between other cities and also between Mumbai centre and Chhatrapati Shivaji International Airport.

The State of Maharashtra has also approved a feasibility study for a Maglev train between Mumbai (the commercial capital of India as well as the State government capital) and Nagpur (the second State capital) about 1000 km away. It plans to connect the regions of Mumbai and Pune with Nagpur via less developed hinterland (via Ahmednagar, Beed, Latur, Nanded and Yavatmal).

United States

Union Pacific Freight Conveyor: Plans are under way by American rail road operator Union Pacific to build a 4.9 mi (8 km) container shuttle between the ports of Los Angeles and Long Beach, with UP's Intermodal Container Transfer Facility. The system would be based on "passive" technology, especially well suited to freight transfer as no power is needed on-board, simply a chassis which glides to its destination. The system is being designed by General Atomics. California-Nevada Interstate Maglev: High-speed maglev lines between major cities of southern California and Las Vegas are also being studied via the California-Nevada Interstate Maglev Project. This plan was originally supposed to be part of an I-5 or I-15 expansion plan, but the federal government has ruled it must be separated from interstate public work projects.

Since the federal government decision, private groups from Nevada have proposed a line running from Las Vegas to Los Angeles with stops in Primm, Nevada; Baker, California; and points throughout San Bernardino County into Los Angeles. Southern California politicians have not been receptive to these proposals; many are concerned that a high speed rail line out of state would drive out dollars that would be spent in state "on a rail" to Nevada.

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