



## Speed

The maglev train is the future of twenty-first-century transit. Why won't we see it in the U.S. anytime soon?

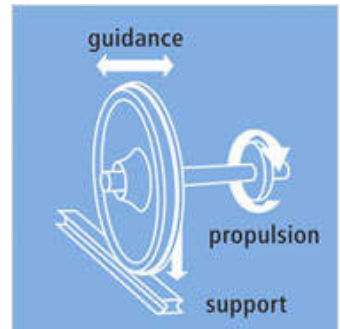
By Peter Hall  
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It's eight o'clock on a crisp morning in New York. You settle into a large reclining seat inside a spacious cabin resembling an aircraft interior. The cabin makes a slight shudder to indicate that it has assumed a traveling position a fraction of an inch above a steel guideway, then begins a rapid acceleration, easing into a comfortable glide at 270 mph. An hour later you pull into Union Station in Washington. By noon you are walking through downtown Atlanta, 870 miles away--and your feet haven't left the ground.

This is not science fiction: magnetic levitation, or "maglev," trains are running tests as we speak, in Germany and Japan, and most recently in China, where the first commercial route is expected to begin full operation this month. But in the United States supporters of maglev can still only speak wistfully of a day when high-speed tracks will stitch together the country, when journey times between cities shrink dramatically and travel becomes calm, even fun, again. No lurking paranoia of a terrorist hijacking; commuting will be an effortless transition between city centers, all achieved without burning fossil fuels midair. "It's a spectacular form of transportation," says Alex Washburn, principal at New York--based W Architecture, who rode the maglev Transrapid in Lathen, Germany, in 2000. "There are no pollutants, and it's low maintenance because there are few moving parts. In terms of post-9/11 concerns, it's safer as it cannot become a missile."

Ironically maglev is one of those technologies that was pioneered in the United States and then unceremoniously dropped. In 1968 researchers at the Brookhaven National Laboratory, in Long Island, New York, developed the idea of using electromagnetic propulsion to lift and move a train along a guideway, thereby overcoming the speed limitations of wheel-based transit. After a brief bout of government enthusiasm, including construction of a test track in Colorado, the project was abandoned for two decades. Working prototypes were subsequently built in Japan and Germany. The German "electromagnetic suspension" method (also used in China) requires the bottom of the train to be wrapped around a steel-and-concrete guideway, with electromagnets on the undercarriage directed up toward the guideway, raising the train by a third of an inch. The vehicle is propelled along the guideway by electromagnetic waves, eliminating the need for a fuel tank or a drive motor, which reduces weight and increases efficiency.

In 1998 the U.S. maglev dream was revived when Congress passed a transportation "equity" act, making available up to \$950 million for construction of a maglev track. Seven competing projects were selected to take part in a preconstruction planning phase, and in January 2001 the Department of Transportation (DOT) picked two finalists: a 47-mile link between downtown Pittsburgh and the airport, and a 40-mile route between Baltimore and Washington. But the same year the economy went sour and administrations changed. The selection of a winner has been "indefinitely postponed," according to Warren Flatau, a DOT spokesman. "Given the fiscal situation in Washington, it's not clear whether Congress will appropriate the \$950 million. We believe that magnetic levitation technology still holds some potential as an efficient alternative high-speed ground transportation system...[but] this type of development is captive to the political process." The concern among some maglev proponents is that selecting one winner would reduce maglev's support in Washington. "It comes down to how many supporters you have in Congress," says Suhair



In the first radical redefinition of railroad technology since its invention 200 years ago, electromagnetic levitation (above) replaces mechanical combustion and electricity. Support magnets pull the train up the guideway, while guidance magnets--attached to the vehicle--direct the train forward, levitating 3/8 of an inch above the guideway.



U.S. promoters of the maglev hope that the success of Shanghai's new 19-mile Transrapid maglev--linking the Pudong airport and commercial district--will encourage support for the proposed route between Baltimore and Washington.  
AP Photo/Xinhua, Li Jiangsong



Alkhatib, an engineer and project manager for the Baltimore-Washington project. "You need more than just two senators and a few congressmen for a project of this magnitude to happen."

Alkhatib was one of the U.S. officials who traveled to China last fall to ride the new \$1.2 billion Transrapid maglev between Shanghai's financial district and its international airport. The 19-mile route was built in just 22 months. Alkhatib describes the system as offering a "very roomy" train interior split into first- and economy-class--the former offering wider leather upholstered seats--and a smooth, quiet ride. "There was a little bit of a hum, not total quietness, but definitely smoother and quieter than a train. No jerking, you don't feel the switches or crossovers, and none of that mechanical contact noise." However, a few kinks have to be ironed out. Alkhatib noticed that some of the required precision was lacking. The guideway sections for the system must be rigid and aligned precisely, or the train will tend to "bounce" a little to the side. Precision engineering adds to capital costs but is crucial to maglev's uniqueness. "The whole system is built on the concept of ride comfort and smoothness. If you lose that edge, you lose the edge that maglev provides."

The troubled Baltimore-Washington run has somewhat larger issues to overcome. Aside from the funding challenge, there is the problem of where to put the 40-mile track for the proposed seven-train service from Downtown Baltimore to Washington's Union Station. A provision was made by maglev's great champion Senator Daniel Patrick Moynihan to allow the guideway right-of-way along interstate medians. However, a maglev train runs at its optimum speed on a straight track. Engineers design interstates with curves to slow motorists down and keep them awake. "Highways are designed for 75 mph," Alkhatib says. "This train is designed for 240 mph, but for that you need a straight shot." In China the government controls all the land and can build where it likes. But owners of the million-dollar homes in the maglev "flight path" between D.C. and Baltimore are none too happy about the proposed intrusion of 16-foot-high concrete pylons and an overhead track.

Maglev's U.S. supporters are hoping that the success of the Chinese route will goad officials here into action. Baltimore and Pittsburgh are doggedly pursuing environmental-impact studies; and at least five other schemes are hoping for at least token federal funding to develop maglev routes in California, Nevada, Georgia, Tennessee, Florida, and Louisiana. Meanwhile, planners in Germany and China have discussed extending the Shanghai route to Nanjing in the north and Hangzhou in the south, covering 180 miles. A more accelerated U.S. push to adopt the technology may come as a "panicked response" to what's happened overseas, says Washburn, who formerly worked in Moynihan's office. "My fear is that it will be too late since the early adopters are the ones who get to set the standards." But a high-speed maglev network interconnecting the East Coast would link Boston to Atlanta in a "chain of industry. We're talking about the future of a region."

Critics of maglev argue that taxpayers' money would be spent more responsibly on improving the existing infrastructure of roads and regional airports, which already provide cheap transportation better suited to the geographically dispersed population of the United States. "I'm not a big fan of trains in North America in general, and even if they did make economic sense, maglev is bound to be extremely expensive," says James E. Moore, professor of public policy and civil engineering at University of Southern California. "We won't defeat the economic forces of decentralization by building rail systems and underfunding roads."

China's maglev system cost an estimated \$60 million per mile, whereas widening a highway costs less than \$20 million a mile. But as any alternative-transportation advocate will point out, decades of government investment in roads and airports have also left us with highway congestion and a costly dependence on oil. To build a feasible high-speed alternative to road and air travel would take a considerable amount of planning and public funding. But the ultimate question is whether a new technology can lure

Americans out of their cars.

Maglev certainly has futuristic appeal. It embodies that exquisite whoosh: that fleeting moment during which time appears to stand still as we flit effortlessly from city to city, shaking off the shackles of time and distance as though we were beams of light or speeding bits of data. And those who have had the pleasure of maglev's acquaintance seem to emerge from the experience as if from an epiphany. "Once you ride it you understand that it's the next form of transportation," Washburn says. "It has the speed and power of a plane but the point precision and stopping power of a subway." He adds, as if consciously furnishing some future advertising agency with a slogan, "To ride it is to believe it." The catch-22 is that until America believes in it, maglev cannot be built.

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