A Catalyst to the Future

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Snarled traffic is costing the average urban traveler 46 hours a year, totaling 3.5 billion hours a year, a 187% increase from two decades ago, according to the Texas Transportation Institute's latest *Urban Mobility Report* released in September. And it's no better in the air. The number of people traveling by air is on the increase as well, with projections showing significant increase in travel delays over the next ten years due in part to capacity constraints and security delays. So what is the solution?

The answer may be a high-speed, high-tech ride of the future. While high speed trains have been operating in Europe and Asia for decades, and Amtrack's Acela on the Northeast Corridor for several years, they have wheels and tracks and seldom sustain speeds of 150 mph. .Although interest is continuing to grow in many states throughout the country as plans for high speed rail corridors are planned; high-speed trains are if anything a short term solution. Their speed is not great enough to lure passengers from air travel, or attract new commuters. As a result, the Europeans and Japanese have been developing maglev systems, short for magnetic levitation, capable of reaching speeds in excess of 300 mph., addressing a possible long term solution to ever increasing gridlock. Maglevis an entirely different form of transportation than most Americans are familiar with.

Maglev trains operate under the ancient principals of physics that opposites attract — opposite poles of two magnets attract and similar poles repel — using electromagnetic fields to propel the cars along a friction-free guideway at very high speeds. The maglev system is made up of dual guideways providing service in each direction. In 1968, an American team was granted a patent for a maglev design but when federal funding dried up in 1975, Japan and Germany leaped ahead in pursuit of this high-speed technology.

Thirty years after the American team began its research, Congress passed the "Transportation Equity Act for the 21st Century" which established the Magnetic Levitation Deployment Program to be administered by the Federal Railroad Administration (FRA). The intent of the program is to promote the development and construction of an alternative transportation system that utilizes magnetic levitation technology, at speeds in excess of 250 mph and a project at least 40 miles in length, so that it can be considered for implementation in a longer-distance corridor.

Seven sites were originally selected to submit proposals to the FRA for Maglev funding. In 2001, the FRA narrowed the competition to two finalists, Pennsylvania and Baltimore/Washington High-speed Maglev Projects, to build the first high-speed maglev transportation system in the United States. The remaining participants were encouraged to continue planning their projects and to pursue funding from other sources.

The PA High-speed Maglev Project is a Public/Private partnership between the Port Authority of Allegheny County (PAAC), Pennsylvania Department of Transportation (PennDOT), MAGLEV, Inc., and in cooperation with the FRA.

The 54 mile PA-Project links Pittsburgh International Airport with Greensburg in less than 35 minutes including stops in downtown Pittsburgh and Penn Hills/Monroeville with future extensions envisioned to reach throughout the state and eventually to the populous northeast corridor. The project will provide an excellent evaluation of the planning, design, building and operation of the high-speed maglev technology in the United States, as well as being the best location from which to deploy maglev across the nation.

Maglev Technology

The maglev technology of choice is the German Transrapid System, developed by Transrapid International. Transrapid is proven technology and has been under research and development since 1969. A test track has been in operation in Germany for over 20 years and reaches speeds in excess of 280 mph. Transrapid describes the Maglev as "the first fundamental innovation in the field of railway technology since the invention of the railroad".

Many see maglev as the only practical means for resolving current traffic congestion problems and meeting growing travel demands. Its supporters claim that maglev technology offers many advantages over traditional high-speed railways:

Reliability — The technology has proven to be extremely reliable. Because maglev vehicles are elevated and do not touch the guideways and there are no moving parts, there is little wear and tear and few opportunities for mechanical breakdowns and all controls and power systems have redundancy. Maglev is less susceptible to weather delays than flying or driving; it's relatively quiet and has low vibration levels.

Performance — Speed counts. Ridership on ground transportation systems increases markedly with speed. With maglev capable of reaching speeds in excess of 300 mph, it can be competitive with short airline trips, especially when factoring in the ability to provide origins/destinations of center city to center city.

A trip from Pittsburgh to Philadelphia would take less than 2 hours.

Safety — The maglev units wrap around the guideways which makes derailments impossible. The system runs on energized blocks that are only activated for the passing vehicle. The guideways between trains are deactivated preventing a collision. The elevated guideway eliminates grade crossings, removing the possibility of collisions with other modes.

Efficiency — Because there are no moving mechanical parts in the drive system and the vehicle floats above the guideway, there is no friction and therefore excellent energy efficiency.

Economics — When viewed in the context of airport expansion, high-speed rail, and major freeway widening, maglev is cost competitive. Maglev has the advantage of more flexibility and the ability to integrate with other modes of travel.

Maglev is suitable for transporting goods as well. For high-speed cargo transport, special cargo sections can be combined with passenger sections or assembled to/ from dedicated cargo trains. As the propulsion system is in the guideway, neither the length of the vehicle nor the payload affect the acceleration power.

Ride comfort — The ride is very smooth, also because there is no contact with the guideway. The system achieves rapid acceleration and deceleration and the guideway is designed (horizontal and vertical curves) for passenger comfort.

Environment — Approximately 96% of the alignment is proposed to be elevated thereby minimizing impacts to natural resources. The elevated guideway will also allow for the land beneath the guideway to continue to be used for such activities as farming. Maglev can move as many people as a 6 to 10 lane highway, which in urban areas would result in significantly less environmental impacts.

Why Pittsburgh

Investments in economic development are the future of this region. Therefore, it is important to look at the entire picture, envisioning what kind of transportation systems are needed to work together for the long term and, asking what investments should we be prioritizing over the next 20 years to make up this transit blueprint.

Pittsburgh is an ideal location for the first deployment of maglev technology in the United States. Pittsburgh's topography consisting of hills, valleys, rivers, along with its changing seasons provides the opportunity to fully assess maglev's ability to operate anywhere in the United States. This topography has also shaped Pittsburgh's transportation network. Because of the region's terrain, the transportation network relies on numerous tunnels and bridges which restrict traffic flow. Pittsburgh's major east-west access is the Parkway East (I-376) and the Parkway West (I-279) with traffic flow on these major highways restricted by the Squirrel Hill tunnel, the Fort Pitt Bridge and Fort Pitt Tunnel. With dense development adjacent to these highways, substantial widening to handle the current congestion is impractical. This highly congested east-west corridor provides the ideal opportunity to attract present auto users to a fast and reliable alternative transportation mode. The elevated guideway maglev system with its dedicated right-of-way would be ideal technology to help alleviate Pittsburgh's traffic problems.

Pittsburgh has the necessary technical and manufacturing expertise to "Americanize" the maglev system for U.S. application. The steel guideways are a crucial element to the system and involve an ultra precision manufacturing process. MAGLEV, Inc. has devoted years to developing a precision steel fabrication process for steel guideway beams. MAGLEV, Inc., under contract to the U.S. Department of Navy, has been working on the development of technology that would produce precision fabrication of hulls for Navy ships. This same technology could be applied to the precision fabrication of steel guideway beams for the maglev system. This, coupled with Pittsburgh's strong industrial background in the manufacturing and fabrication of steel, its technical expertise in software development, and other technical manufacturing skills in the region, make Pittsburgh a logical place for the fabrication of maglev technology.

The system will also create the start of an expanding regional system that will bring economic industrial growth and jobs to the region while serving as the impetus for revitalization of the area. The Pennsylvania Project is estimated to generate up to 10,000 temporary construction jobs in the region and 1,200 permanent jobs. These estimates do not include spin-off jobs from enhanced tourism and an enhanced business climate in southwestern Pennsylvania. Many of these will be manufacturing and fabrication jobs, related to an anticipated need for 200,000 tons of U.S. produced plate steel required to build the guideway. Western Pennsylvania could become the center for maglev technology and manufacturing in the U.S., recapturing the image of the City as a Leader of Industry.

The Future

An Environmental Impact Statement (EIS) for the Pennsylvania project is currently being prepared by the MSM Group (a joint venture of three locals firms – Maguire Group Inc., Skelly & Loy Inc., and McCormick Taylor Associates). Public hearings are expected to be held shortly, followed by the FEIS and a Record of Decision anticipated for mid 2005.

The future demands that some new solutions be implemented. The Chinese have leaped ahead with the first commercially operated maglev system connecting Shanghai's financial district with Pudong International Airport. In the United States, the race to the future is on. The federal government must remain an active partner working with private industry to develop and deploy a maglev system. Deployment of one or two maglev projects is needed to convince the nation that the technology is practical and to identify areas for improvement. It will also allow private industry to establish the production of maglev technology in the United States and Pittsburgh can be in the forefront of this new industry.

Where the high-speed train may take us depends on our vision for transportation and our communities in the future. Maglev is a new mode of transportation that will provide speed, frequency, and reliability that ultimately can change the travel patterns of Americans. Critics, stating the huge investment in the system will never pay off, may be missing the point. Yes, the system will cost billions of dollars to build, but the ride from the past into the future may be well worth it.