Long lines at the airport. Delayed flights and trains and highway gridlock. Pollution, congestion, noise, exorbitant costs, and loss of valuable time and money. It’s all to be expected when traveling throughout the United States, but what can be done to combat these problems short of building more airports, rail lines and roads?

Old Dominion University researchers, along with American Maglev Technology, think they have the solution in the form of magnetically levitated and propelled vehicles. The only passenger carrying maglev transportation system in the United States plans to debut at Old Dominion later this year, whisking students and visitors around campus at 40 miles per hour. The system uses a specially designed vehicle that glides on an electromagnetic cushion atop an elevated guideway. Old Dominion partnered with American Maglev Technology, Dominion Virginia Power and Lockheed Martin to launch the innovative $14 million system, which will run back and forth along the east-west spine of campus. Old Dominion’s maglev consists of one vehicle, approximately 45 feet long, with a capacity of 100 passengers. The 3,200-foot-long elevated guideway is supported by concrete columns four feet in diameter and spaced 140 feet apart.

Although maglev may look like a ride out of Walt Disney World’s Tomorrowland, these magnetically levitated propulsion vehicles have been around since the early 20th century. A patent for a magnetically levitated vehicle was issued in 1912. Experiments were performed in the 1930s, and a superconducting system was proposed in the 1940s. But it wasn’t until the oil shortages, traffic congestion and noise pollution of the 1970s that maglev technology was aggressively pursued. Since then, various countries have developed the commercialization of maglev, including Germany and Japan, which are operating successful test tracks.

This is revolutionary stuff for Old Dominion, where only 70 years ago students rode streetcars to campus. But according to Wayne Talley, Frederick Beazley professor and eminent scholar of economics, the university is on the vanguard of a mode of transportation that will have implications for the way the United States travels in the 21st century. A transportation economist, Talley is working with other Old Dominion faculty, American Maglev Technology, Dominion Virginia Power and other organizations to establish a National Maglev Technology Deployment Center at Old Dominion. The

**THE NEWEST COG IN THE NATION’S TRANSPORTATION INFRASTRUCTURE**

*BY ELIZABETH O. COOPER*
center would offer magnetic levitation technology development, systems engineering studies and deployment services to inject commercial maglev systems into the nation’s transportation system.

ENVIRONMENTALLY FRIENDLY

There’s quite a case to be made for both the center and maglev itself, according to Talley, who notes that the system could meet a variety of regional, state and national needs. “Maglev is quiet and environmentally friendly,” Talley says. “It uses electric power and doesn’t burn fossil fuels. It also uses very little land. Being elevated, you don’t have to dig up streets. It can run right over streets.”

He adds that the quality of transportation service is measured in terms of speed, frequency of service, accessibility, reliability and safety. To succeed, maglev must be superior to the competition in meeting some or all of these factors. According to Talley, most experts are not convinced maglev can compete. That’s why demonstration projects such as the one at Old Dominion are so vital.

In Hampton Roads, where light rail has been discussed for more than two decades, maglev is already raising eyebrows. “Maglev is quieter and takes up less space. A number of cities that would have put in light rail may go with maglev,” Talley notes. “The Old Dominion track could be extended to downtown Norfolk or the Naval Base.” It would also be a more comfortable ride because there’s no friction on maglev. There are no wheels to ride on the guideway, unlike light and heavy rail systems.

But maglev’s implications go far beyond local travel. Intercity travel is a big business in this country, and maglev could cut into portions already allotted to planes and automobiles. These modes of transportation, once considered virtually unstoppable, are encountering more and more limitations, especially congestion.

AIR TRAVEL ALTERNATIVE

“In transportation you have two prices, a money price and a time price,” Talley notes. “Passengers pay a fare and incur a time price in taking a plane trip. The time price is the cost of your time. The higher your income, the greater the time price. The big advantage of air travel is in time savings. But now these savings have declined. You lose time in airports because of security checks and in travel to and from airports on congested highways. Maglev is a viable alternative for air travelers in markets served by both modes.”

Only one new airport has been built in the United States in the last 30 years, and many others have reached capacity, leading to even longer lines and more delays. And, airports that have undertaken expansion projects have incurred expenses of millions of dollars to do so. “Construction cost is a big factor in building new airports,” Talley says. “There are also environmental concerns, noise pollution and highway infrastructures.”

Maglev would not have to contend with those problems. Stations could be constructed that are accessible to airports. “They wouldn’t take up as much room, and maglev gets to 300 mph quickly,” Talley notes.

Automobile travel also encounters numerous obstacles, including congested highways, major expenditures for highway maintenance (some localities spend more to maintain roads than to build new ones), prohibitive costs of road expansion and opposition to the construction of major new arteries from environmental and civic groups. Those odds could be in maglev’s favor, Talley says.

GROUND TRAFFIC RELIEF

“Highway departments in states with a lot of urban areas are looking for alternatives to highways. The concern is whether we can keep on building more and more roads. If people’s time costs go up on highways, they will look for something else. What happens is that roads become so congested, so the comparative advantage of automobiles in terms of travel and time erodes. That explains why people in Washington, D.C., use the Metro. We can’t keep on building more and more roads. That’s why other alternatives come into play.”

Talley adds that many businesses sending employees on business travel tell them to drive rather than fly if the trip is less than 500 miles. “When the quality of air travel declines, maglev’s comparative advantage relative to air travel improves. Maglev could then charge higher fares for the better service.”

Maglev also would have a speed advantage over Amtrak. “It takes four hours to go from Newport News to Washington, D.C.,” Talley says. “Maglev could do it in two hours. If maglev is a viable alternative, Amtrak would probably be done away with.” American Maglev Technology is already moving in that direction. The company’s goal is to connect Hampton Roads with Washington, D.C., by the 400th anniversary of the founding of Jamestown in 2007.
FREIGHT MOVER

But maglev isn’t just a high-speed people mover. It can also be used to move freight, including ocean containers, many of which come into the Port of Hampton Roads. Maglev could handle up to 70 tons of cargo per maglev unit or “car.” Using maglev to transport freight containers and truck trailers would allow their contents to reach their destinations quicker and with less pollution than by traditional train and truck services, while eliminating a major source of congestion (tractor-trailer trucks and trains) in and around ports like Hampton Roads.

“Trains take containers to the Virginia Port Authority’s inland port in Warren County, Va., from Norfolk International Terminals each day. Maglev could do it faster,” Talley says. The National Maglev Technology Deployment Center would investigate the efficiency of using maglev in this manner. Also to be addressed would be right-of-way, ownership of the system, construction responsibility, government’s role, environmental impacts, finance, new legislation and benefits to the state and the Port of Hampton Roads.

Talley estimates that it will take about two years of operating Old Dominion’s maglev to adequately assess maglev’s feasibility. How do its costs compare to those of its competition? Will passengers, shippers and government be attracted to its speed, accessibility and environmental advantages? “Preliminary evidence suggests that maglev’s future looks brighter than ever before,” Talley says.

“MAGLEV IS A Viable ALTERNATIVE FOR AIR TRAVELERS IN MARKETS SERVED BY BOTH MODES.”
—WAYNE TALLEY