Testimony to

The Highways, Transit and Pipelines Subcommittee

Of the

House Transportation and Infrastructure Committee

Hearing on "Intermodalism"

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Room 2167 Rayburn House Office Building

By David Roberts, Sr. Vice President, General Atomics

On

"Potential Role of Maglev in Intermodal Movement of Freight"

Mr. Chairman, Honorable Members, ladies and gentlemen, I am Dave Roberts, Senior Vice President at General Atomics and it is my honor to testify before you today on the contributions that transportation systems using Magnetic Levitation (Maglev), used in an intermodal manner, may bring to freight movement from ports. Your Committee has supported Maglev for many years and I believe that such systems can substantially reduce congestion and improve air quality while increasing the movement of goods through the densely populated urban areas that typically surround ports. Specifically, I am referring to all-electric systems that utilize electromagnetic components to provide propulsion, guidance and levitation. These systems would be built on elevated grade-separated fixed guide-way systems. They would be quiet, safe, efficient, and environmentally friendly.

General Atomics and a number of its affiliate companies are headquartered in San Diego, California. For over 50 years GA has been an industry leader in creating high technology systems with applications for defense, energy research and transportation. General Atomics' Aeronautical Systems affiliate produces the Predator family of Unmanned Aerial Vehicle systems, which has achieved remarkable success in the war against terror. GA is the sole source provider for developing electromagnetic aircraft launch and recovery systems, soon to be deployed on U.S. Navy aircraft carriers, and is at the forefront of developing magnetic levitation systems for cargo and passenger transportation.

As indicated above, sea ports are typically surrounded by major metropolitan areas, which require movement of the resulting container traffic through those areas which places unwelcome strains on the existing infrastructure. Cases in point are the Ports of Los Angeles and Long Beach (LA/LB), the nation's largest and most important ports through which almost half of all imports to our country pass (Aschemeyer, 2005).

Growth of the Ports of LA/LB is essential both to accommodate the increasing freight demand as well as to continue to provide jobs and economic benefit within the region. A recent study shows that newly created logistics jobs have, in fact, more than made up for manufacturing jobs lost due to industry moving from Southern California, and they are higher paying than manufacturing jobs requiring similar skills (Husing, 2005). Supplies for military sustainment have historically passed through the port, and military planners need to continue to be able to count on the port as a means of shipping supplies to military depots overseas. An increase in the physical size of the ports is becoming more difficult; there clearly is not enough room to expand. To meet the projected container volumes in the future which are expected to more than double by the year 2020, the ports throughput must be increased dramatically on similar sized footprints.

One of the greatest sources of congestion around the Ports of LA/LB is the high volume of truck traffic - currently, 80% of container traffic leaves the port by truck (the remaining 20% moves by on-dock rail), with significant increases projected for the future. 11 $Billion/year in productivity losses in Los Angeles and Orange counties, due to freeway congestion have been projected (Schrank, 2005). Adding more containers from the Ports of LA/LB year after year will exacerbate local congestion and its

associated pollution burdens. The Nation, the local communities and the Ports have, of course, made major investments in the Alameda Rail Corridor, as others, here, have testified. However it remains necessary to get more of the containers from the port to a point where this Corridor can be accessed via additional intermodal transfer facilities. Our preliminary studies suggest that providing such intermodal connection via a Maglev system should provide a container movement approach capable of high throughput but with a smaller footprint and a significantly lower pollution burden than alternatives.

With respect to pollution, many stationary sources, such as electrical power plants have made great strides in reducing air pollution, and automobiles have continued improving over the years; air quality for the Southern California region has markedly improved as a result. One pollutant, however, remains problematic: Diesel Particulate Emissions or DPE. This pollutant is different from gaseous pollutants in that it is localized to areas where diesel engines operate such as the port, truck/train intermodals, and along freeway and rail corridors. The effects of DPE are reported to be very serious. More than 30 human epidemiological studies have found that diesel exhaust increases cancer risks, and a 1999 California study found that diesel exhaust is responsible for 70 percent of the cancer risk from air pollution (Bailey, 2005). The danger of having homes and schools close to sources of DPE is increasingly recognized. Figure 1 shows an Air Quality Management District (AQMD) (MATES II, 2000) study of how DPE is concentrated around the port and transport paths. To alleviate the severity of the DPE problem for the entire community, a container movement approach should exploit fixed power sources that produce minimal pollution.

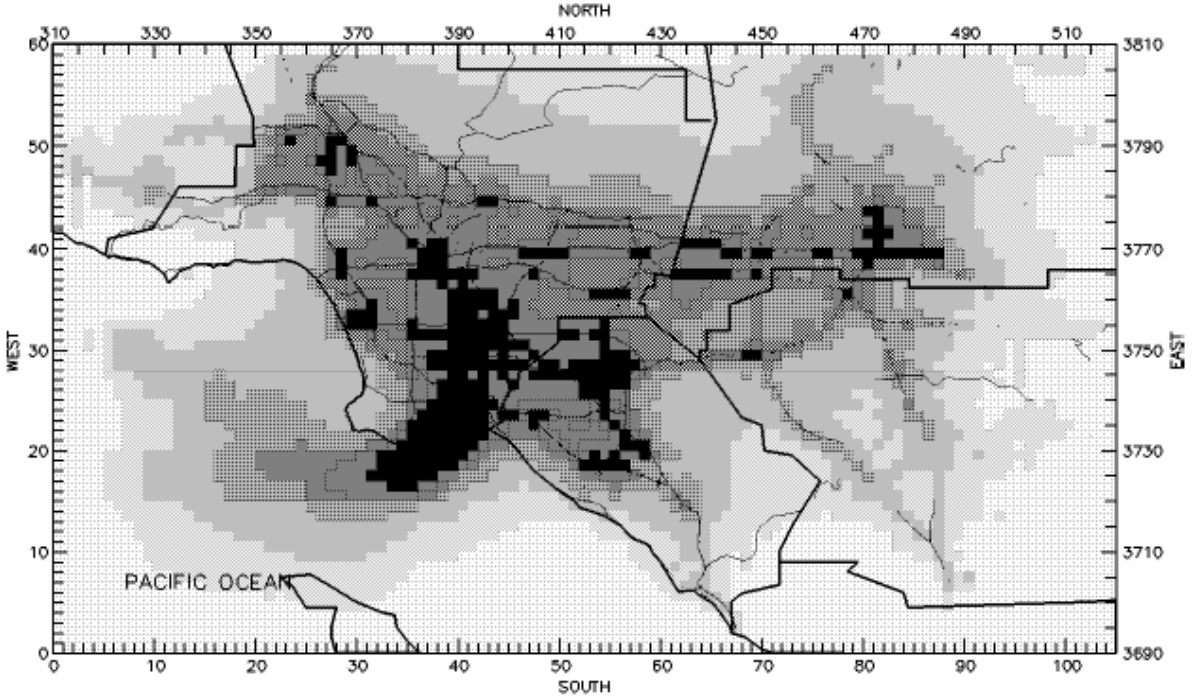
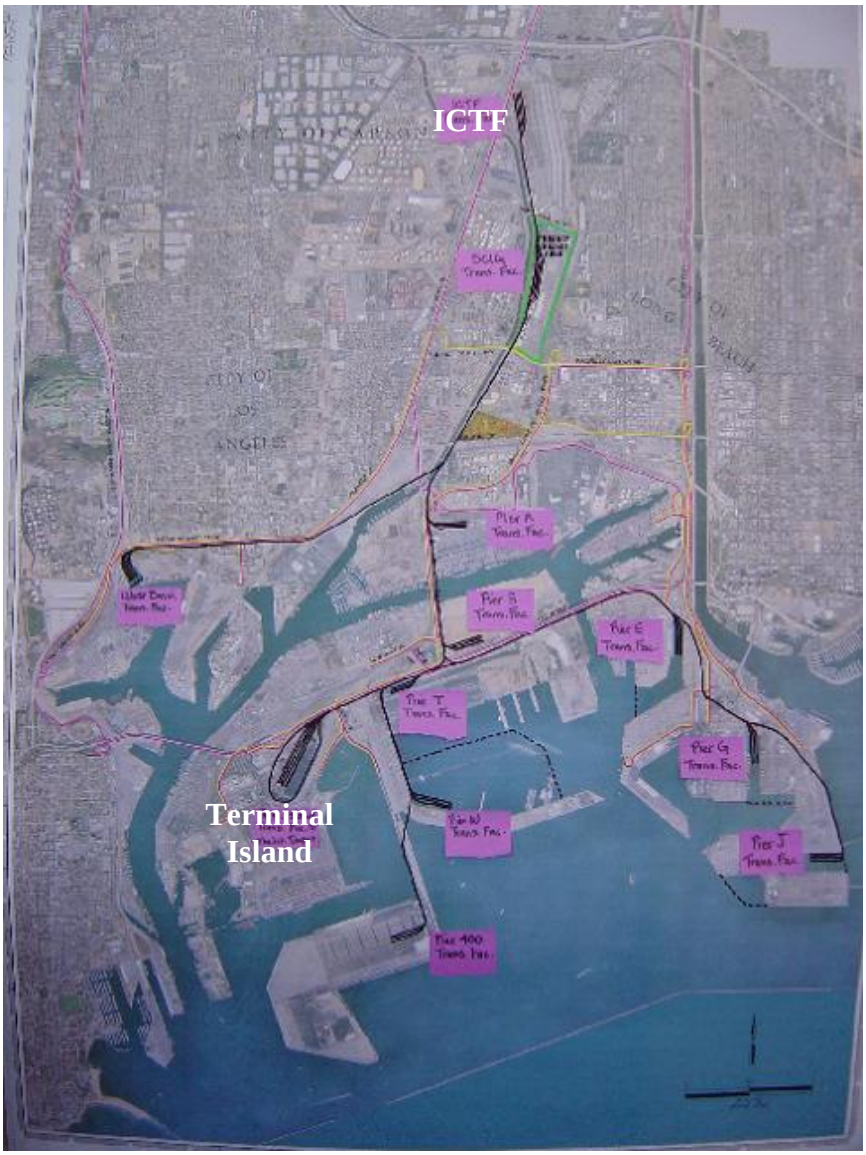


Figure 1 Concentration of DPE in Southern California

The aforementioned economic, congestion and pollution issues facing urban freight movement from the Port are producing conflicting constraints to balancing Southern California's economic future with the region's quality of life. The international trade industry (ships, trucks and trains) has been identified as a major source of pollution due to the heavy use of diesel power. As a result Port expansion plans have run into a community resistance. Responding to community pressures, some elected officials are discussing "caps" on port emissions, which would also serve to cap port growth. California state legislators have placed a number of bills aimed at regulating and changing the way goods are handled, workers are compensated, and pollution is curbed at California ports and transportation hubs. Several of these bills add constraints to operations while others add costs to the movement of containers both within and beyond the port region. From an economic perspective, these bills impact the economies of the ports and cargo movement and therefore affect costs of doing business. Maglev presents a "win-win" solution of moving containers in sufficient number and speed to allow continued economic growth, while alleviating congestion and pollution throughout the Southern California basin.

General Atomics and California State University Long Beach/CCDoTT have been evaluating the feasibility of a Maglev cargo system under a study contract with the Port of Los Angeles. The Maglev network envisioned by the Port, shown below, depicts a system which connects the main terminals with the International Cargo Transfer Facility (ICTF) at the terminus of the Alameda corridor. The ICTF is the distribution center for long distance trucking and also the gateway to the Alameda corridor which distributes cargo by rail from the port to locations within the country. A Maglev network operating within the Port, removes from the roads a projected 1 million truck trips per year, just between Terminal Island and the ICTF. In addition, a Maglev network at the port, when extended to an inland distribution facility, has the potential to remove up to 50% of truck traffic from local roads.



A Maglev network within the LA/LB Ports will reduce congestion, and pollution.

Maglev is not new; it has been developed over the past 30 years and has recently been deployed in passenger revenue service in both China and Japan. Even though freight transportation requirements, in terms of weight capacity and throughput, are different than those for passenger service, the components of Maglev technology can be readily adapted to handle freight. The many advantages of the Maglev system include:

- It provides dedicated movement of freight with a very high throughput which will greatly reduce traffic congestion,
- It will move freight safely and efficiently on grade-separated, elevated guide-way structure, greatly improving efficiency,
- Its all-electric propulsion eliminates local sources of emissions and reduces emissions overall,

- It operates quietly since it is contact-free which furthermore greatly reduces maintenance costs,
- It can accommodate steep grades in all-weather conditions allowing the guide-way to be routed where it best serves the need.
- It allows port throughput growth, supporting continued economic growth
- It will provide intermodal connection while relieving serious highway congestion.

One of the innovations being developed by the GA team is a totally passive permanent magnet, large-air-gap Maglev system, which results in lighter vehicles, reduced energy consumption and more-streamlined, less costly guide-way structures. This particular Americanized technology, which has been under development for several years under the sponsorship of the Federal Transit Administration, the Pennsylvania Department of Transportation and private industry, was originally invented by the Department of Energy's Lawrence Livermore National Laboratory (LLNL) and is being developed for deployment by GA under a license agreement with LLNL.

In September 2004, we completed development of a 400-foot long test track in San Diego, California. We are presently in the process of perfecting the system controls and optimizing components to improve performance and reduce costs. Examples of system optimization include: new hybrid guide-way with fiber reinforced concrete to reduce capital costs, optimizing magnetic arrangements and track improvements to reduce operating cost, and more. We have recently incorporated a 1 TEU cargo container unto our test chassis as shown below. This represents the world's first cargo Maglev test vehicle. We are currently evaluating its performance at speeds up to 22 mph, with plans to increase to 90 mph if implemented at the Port. We would welcome members and their staffs to come to our test facility in San Diego to witness a demonstration of this exciting technology.

Figure 2. The world's first cargo Maglev system – the "Electric Cargo Conveyor" or ECCO undergoing testing at the GA test track in San Diego, CA.

The capital cost for Maglev systems vary widely depending on the terrain and the required throughput. For equivalent routes and throughput requirements, Maglev will be very competitive with highway transportation while offering all-electric operation with many environmental and efficiency benefits. Another key advantage of the system over conventional wheeled systems is its quiet operation, eliminating the need to go underground for noise abatement. This benefit greatly reduces construction cost and schedule. Operation and maintenance costs are also greatly reduced since the system is levitated contact-free resulting in reduced maintenance and life-cycle cost.

With regard to a potential construction schedule, preliminary estimates indicate that an initial 5-mile long segment providing a vital link from the port to the ICTF would require about 3 years to construct. Future expansion could be accomplished at a much faster pace.

Overall, I believe that Maglev technology is a 21st Century solution that could help optimize the effectiveness of intermodal transfer facilities for ports to reduce pollution and congestion, and increase the capacity of ports to meet the projected growth of our nation in the 21st Century. Specifically, I would encourage you to include Maglev in future legislation actions as a viable technology for freight system improvements to enhance the ability to move goods.

Thank you for the opportunity to participate in these hearings and I welcome any questions you may have.

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