

ELECTRIC CARGO CONVEYOR (ECCO) SYSTEM



- Environmentally friendly
 - All-electric operation
 - Quiet
 - Safe, wrap-around design
- Tight turning radius
- Steep-grade capability
- All-weather operation



World's first cargo maglev test vehicle on 400-ft-long test track in San Diego, CA



Potential maglev network envisioned by the Port of Los Angeles

SYSTEM PARAMETER	VALUE
Throughput Capacity	5,000 40-ft containers per day
Weather	All-weather operation
Levitation	Permanent magnet Halbach array, passive
Propulsion	Linear Synchronous Motor (LSM)
Operation	Fully automatic train control (driverless)
Safety	Automatic control, wraparound feature of the design, and restricted access to elevated guideway
Speed, maximum operational	145 km/hr (90 mph)
Vehicle size	13.7 m (45 ft) long x 2.6 m (9 ft) wide
Grade, operating capability	10%
Turn radius, design minimum	100 m (328 ft)
Size of vehicle (container capacity)	40 ft, 67,200 lb
Aesthetics philosophy	Guideway will blend with and enhance the environment

The Electric Cargo Conveyor (ECCO) is an all-electric, environmentally friendly system that can efficiently and quietly move containers. General Atomics and its team members are developing the ECCO system. It is based on a totally passive permanent-magnet, large-air-gap maglev system, which results in lighter vehicles, reduced energy consumption and more-streamlined, less costly guideway structures. A linear synchronous motor housed in the guideway provides propulsion. The system uses neodymium-iron-boron permanent magnets placed in a configuration called a Halbach array. This yields a very high lift-to-drag ratio and leads to an efficient levitation and propulsion system.

One of ECCO's most significant attributes is its quiet, all-electric, environmentally friendly operation. The system can also maneuver tight turns, climb steep grades, has low maintenance costs due to fewer moving parts, and is reliable in all weather conditions.

Work is already underway in testing the maglev approach in Southern California. In 2004 we completed the development of a 400-foot-long test track in

San Diego, California. In 2006, we installed a 20-foot, 1 TEU (twenty-foot equivalent unit) container on the maglev chassis and successfully demonstrated cargo-carrying capability. This represents the world's first cargo maglev test vehicle.

The Port of Los Angeles is funding a study to evaluate a 5-mile demonstration system connecting Terminal Island with the Southern California International Gateway (SCIG) facility. GA team members participating in this project include California State University Long Beach, Hall Industries, Lawrence Livermore National Laboratory, Mackin Engineering Company, and Union Switch and Signal.

General Atomics and Lawrence Livermore National Laboratory were recognized by R&D Magazine for innovative research and development of the maglev system as one of the top 100 most technologically significant new products in the nation for 2004.

ECCO is a 21st century technology providing an environmentally friendly solution for meeting future demands for container shipping.

Dr. Sam Gurol – Urban Maglev Program Manager
 Telephone: (858) 455-4113 E-mail: sam.gurol@gat.com