SCMAGLEV: The Japanese Technology That Will Revolutionize Intercity Transport

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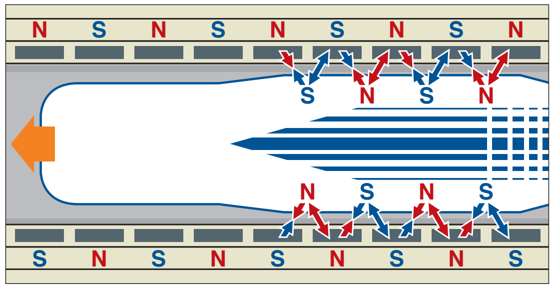
In 2027, Japan plans to open the world's first superconducting magnetic levitation (SCMAGLEV) passenger train line, the Chuo Shinkansen, connecting Tokyo and Nagoya. SCMAGLEV is a unique transportation technology developed in Japan. When materials are cooled to temperatures below a certain level, their electrical resistance approaches zero; this is the phenomenon of superconductivity. Small but powerful superconducting magnets allow trains to levitate 10 cm (4 inches) above the tracks and reach top speeds of 500 km/h (310 mph). "The maglev technology developed outside Japan uses larger, non-superconducting coils, so it can only levitate the train 1 cm [0.4 inch] and reach speeds of 430 km/h [267 mph]. Japan's technology is fundamentally different." explains Noriyuki Shirakuni, a senior corporate executive officer at Central Japan Railway Company (JR Central), the developer of SCMAGLEV. An SCMAGLEV train can travel at super-high speeds, and because it uses only half the energy that air travel requires and emits just a third of the CO_2 per passenger seat, this form of transport is also superior from an environmental perspective.

Japan began researching maglev technology in 1962. One particular focus of the research program was improving the durability of the superconducting magnets. The technology has been developed into its current shape on the Yamanashi Maglev Line, which was completed in 1997 north of Mount Fuji. Trains have been run past each other at a relative speed of 1,026 km/h (637 mph) and operated for up to 4,064 km (2,525 miles) per day, well over the anticipated workload for passenger service. And in April 2015 the current world speed record of 603 km/h (375 mph) was attained.

Foreign dignitaries have been invited to view the running operations, and applicants from the general public have been taken on rides to promote wider understanding of the technology. Construction work on the Chuo Shinkansen section between Tokyo and Nagoya is already underway based on authorization received in October 2014 from the national government. "The safety and comfort of SCMAGLEV are based on the philosophy behind the Shinkansen bullet train, one of Japan's proudest achievements," says Shirakuni. "This major transportation system, including implementation of SCMAGLEV, could not be realized without Japan's advanced industrial capabilities."

JR Central is also working closely with The Northeast Maglev (TNEM), a U.S. marketing firm, to promote the adoption of an SCMAGLEV system for a line from Washington DC to Baltimore to be built as a joint project of the Japanese and U.S. governments. This is part of a larger plan for the construction of an SCMAGLEV passenger line in the section of the Northeast Corridor from Washington DC to New York. The first steps toward implementation of the project have already been taken, with the U.S. government agreeing to grant the state of Maryland USD 27.8 million to fund its research on the proposed Washington-Baltimore link. Shirakuni's outlook on the project is hopeful. "As we can see from the U.S. government's decision to provide a grant, understanding of SCMAGLEV is progressing within the United States, and momentum towards implementation of the project appears to be building," he says. "We look forward to contributing our technology to America as a symbol of U.S.-Japan friendship. I have high hopes that both the U.S. and Japanese governments will continue exploring ways to bring this plan to fruition."

Photo: Central Japan Railway Company



SCMAGLEV uses liquid helium to cool the coils to minus 269°C (minus 516°F), making them superconductive. When electricity is passed through the propulsion coils on the guideways, the forces of magnetic attraction between them and the superconducting magnets on the train itself propel the train forward. The train runs on rubber tires at first, beginning to levitate at approximately 160 km/h (100 mph).

An L0 Series train running on the Yamanashi SCMAGLEV Line. Rides are offered regularly, with passengers drawn by lot.

Bringing the World's Fastest Train to America's Northeast Corridor

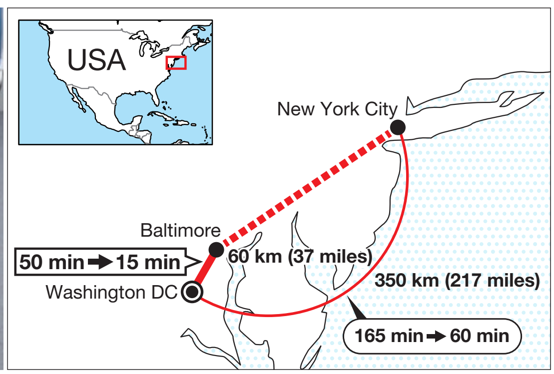
The Northeast Corridor is home to nearly 50 million people and growing. While only occupying 2% of the United States' landmass, it produces 20% of America's GDP. Unfortunately, its infrastructure is in a terrible state. In the past two decades, traffic delays have increased over 60%, and 70% of national air traffic delays emanate from our airports. The current railways need over USD 40 billion just to keep them in a state of good repair. We have to do something. And 86% of people polled support building a new ultra-high speed SCMAGLEV train system.

Construction of the first leg of the project, Washington to Baltimore, will create 205,000 jobs and increase GDP by USD 22.5 billion. Once it is operating, we will see about USD 600 million a year in increased GDP, and a 2 million ton reduction in greenhouse gases—and that is only the first leg!

Through cooperation between Japan and the United States, the fastest train in the world can be brought to the Northeast Corridor. I don't think there is anything that we could do that would be a bigger symbol of Japan-U.S. friendship than completing this transformational project.

Wayne Rogers

Chairman and CEO
The Northeast Maglev, LLC (TNEM)



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1. Former U.S. Ambassador Caroline Kennedy took a ride on the SCMAGLEV train with Prime Minister Shinzo Abe. She highly praised the comfortable ride and the technology, and said she hoped that the United States will benefit from SCMAGLEV.
2. The Northeast Corridor SCMAGLEV project aims to connect Washington DC and New York in about an hour—a trip that currently takes two hours and 45 minutes on an Amtrak Acela train. In addition to slashing travel times, the proposed service will help improve the quality of life in the region by reducing traffic congestion.