

December 2019

Travel beyond 2020 Hyperloop

Key themes

- Promising high-speed travel in futuristic transportation pods, Hyperloop may join boats, trains, motor vehicles and airplanes as the fifth mode of transport.
- It promises a faster, cheaper and cleaner alternative to rail and air travel—a boon for managed travel programs, sustainability initiatives and company bottom lines.
- Full-scale testing is underway, with commercial services an estimated few years away.

The idea of passengers traveling in pods at high speed in sealed transportation tubes may seem to be straight out of a science fiction novel. It's not. It's an idea-turned concept inspired by technologist billionaire Elon Musk in 2012.

Seven years later, Hyperloop transportation systems are nearing full-scale testing, with the first commercial operations ready perhaps within a few years.

If it delivers what's been promised, Hyperloop could transform short-haul travel, offering business travelers and their companies a sustainable travel option and untold cost and productivity savings.





What is Hyperloop?

Another idea from Elon Musk

Tesla Motors and SpaceX CEO Elon Musk first coined the term Hyperloop in 2012, using it to describe a “fifth mode of transport”—the others being boats, trains, motor vehicles and airplanes. Likened by Musk to a “cross between a Concorde and a railgun and an air hockey table,”¹ Hyperloop would transport people and goods via aluminum pods traveling through elevated, low-friction tubes at speeds up to 700 to 800 miles per hour (mph) (1,130-1,300 kilometers per hour- kph).² It will take existing mag-lev (magnetic levitation) systems to an extremely powerful (and fast) new level.³

The idea was a response to Musk’s dissatisfaction with plans for a high-speed rail link between Los Angeles and San Francisco, which looked to be both more expensive and slower than air travel. Using the Hyperloop system, Musk believed the journey could be made in just 30 minutes. Similarly, it could reduce the journey time between Pittsburgh and Chicago to just 45 minutes.

The new high-speed transportation would be:

- Weatherproof
- Collision free
- Twice as fast as an airliner
- A low-power consumer, directly emitting no carbon
- Capable of energy storage for 24-hour operations

Experts claimed in 2016 that Hyperloop was at least a decade away from being commercially viable.⁴ The reality is much closer. After the initial hype created by Musk, teams of scientists and investors around the world began working to solve the problem.

¹[All Things Digital](#), May 30, 2013

²[Phocuswire](#), Aug. 13, 2013

³[Phocuswire](#), Nov. 9, 2016

⁴[Phocuswire](#), May. 9, 2016

How Hyperloop works

Current mag-lev high-speed trains—primarily operating in China and Japan—rely on magnetic repulsion and propulsion by a linear motor. They are expensive, requiring long stretches of copper coil and power supply stations along the length of the route network.⁵ Hyperloop needs less infrastructure as the train/vehicle sits inside a low-pressure tube and is propelled by magnets. The lack of air resistance allows the vehicle to travel at high speeds with minimal energy requirements. No power stations are needed, and aluminum is used instead of copper.

Supporters of Hyperloop claim the technology is more energy efficient than air and rail travel. Leading developer Virgin Hyperloop One claims its system will be 10 times more energy-efficient than an airliner and four times more efficient than a train.

Hyperloop is not without its challenges

Hyperloop systems still need physical infrastructure. Developers would need permission to erect pylon-mounted tubes across already congested cities. This was one of the reasons why the Los Angeles-San Francisco development proved to be a non-starter.



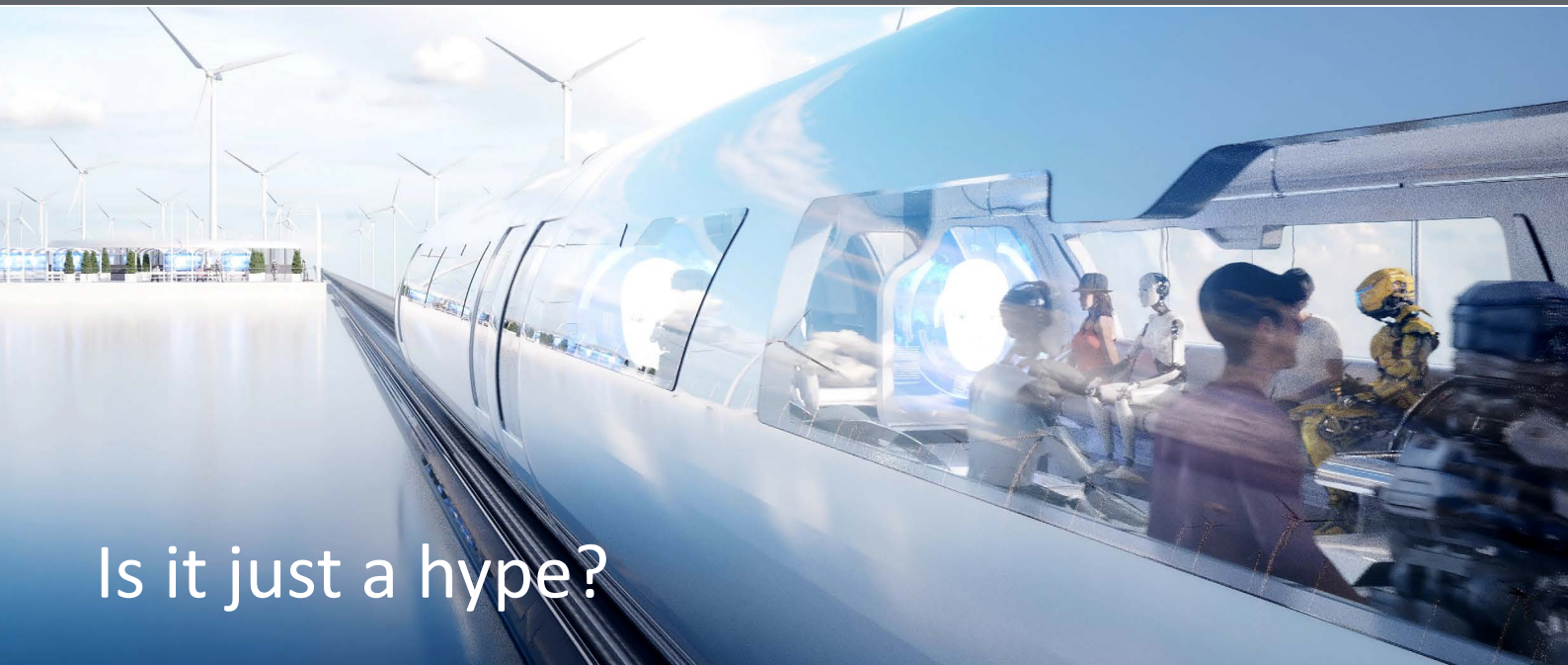
There also remain many technical challenges to overcome, such as building the pods and air bearings capable of propelling them at near transonic speed. And as the drain from the Hyperloop's electric propulsion system is likely to exceed the energy that solar panels along the length of the tube could provide, extra carbon-based energy will be needed. Hyperloop is not yet a carbon-free transportation solution.

Hyperloop has its limits

According to Elon Musk, Hyperloop is most suited to high traffic city pairs less than 900 miles (1,450 km) apart.⁶ Beyond that point, supersonic air travel would be the faster and cheaper option.

⁵Phocuswire, Nov. 9, 2016

⁶Skift, Apr. 10, 2010



Is it just a hype?

Building on Musk's original idea, companies have been busy pursuing their own visions of low-friction travel. Some are now close to testing full-scale Hyperloop systems. Some are collaborating in an attempt to standardize technology across the Hyperloop industry—something that will help establish it as a global transportation system.

Virgin Hyperloop One

Formerly known as Hyperloop One and Hyperloop Technologies, Virgin Hyperloop One is one of the companies leading the race to launch the first commercial hyperloop.

After abandoning an initial proposal to build a new line between Los Angeles and Las Vegas, it will now focus on freight with a high-speed “cargoloop” over land or underwater. The company conducted its first full-scale test in 2017, reaching a top speed of only 240 mph (390 kph).⁷ Virgin Hyperloop One is targeting a top speed of 670 mph (1,078 kph).

Virgin Hyperloop One has feasibility studies under way in a number of countries, including the U.S., U.K., U.A.E., Russia, Sweden, Finland, the Netherlands and Finland. Projects in some countries show particular commercial promise:

- In November 2016, Dubai's Road and Transport Authority announced plans to evaluate a Hyperloop connection with Abu Dhabi, which would cut journey times between the two emirates by 78 minutes. Virgin is working with Dubai ports operator DP World on the project.

- After signing a development partnership with Saudi Arabia's Economic City Authority in 2019, Virgin Hyperloop One will build a 22-mile (35 km) test and certification travel in King Abdullah Economic City.⁸ The aim is to develop commercial and scalable Hyperloop technology. Saudi Arabia may provide the financial muscle needed to make Hyperloop a reality.
- Virgin Hyperloop One is reported to be in advanced talks to build a Hyperloop system covering the 75-mile (120 km) stretch between Mumbai and Pune in India.⁹ It would reduce the journey time from a 3.5-hour road trip to less than 35 minutes. Approximately 75 million people travel between the two cities each year, so the potential demand for Hyperloop is huge. Virgin will start with a 7.5-mile (12 km) demonstration track. If successful, a second phase would link Mumbai and Pune and may even include a stop at Navi Mumbai International Airport, integrating air and hyperloop travel. Work could start as early as 2020.

⁷Motor Authority, Dec. 21, 2017

⁸Breaking Travel News, July 23, 2019

⁹Motor Authority, Oct. 2, 2019

The Boring Co.

Musk-backed The Boring Co. has scaled down plans for an underground Hyperloop between Washington, D.C. and New York City to a connection between the capital and Baltimore. A proposal to build two 18-mile (29 km) tunnels between Chicago's downtown and O'Hare Airport is also now in doubt, while plans for a high-speed tunnel in West Los Angeles have been scrapped. The company has shifted away from Hyperloop to focus more on autonomous electric vehicles transporting passengers in underground tunnels.

Hardt Hyperloop

Dutch company Hardt Hyperloop wants to connect cities across Europe with a high-speed transport system.¹⁰ It's building an "open ecosystem," partnering with major companies like German rail operator Deutsche Bahn and India's Tata Steel. It has already built a test track in Delft in the Netherlands and aims to have a testing center capable of transporting passengers and cargo up and running by 2021.

Unique to Hardt is its lane-switching technology, enabling its pods to switch lanes. It hopes to be able to launch commercial operations in 2028.

Hyper Poland

Hyper Poland is developing a commercial magnetic railway capable of speeds up to 190 mph (305 kph).¹¹ It has secured funding for a 528-yard (500-meter) test track. Rather than have capsules travel in low-pressure tubes, it will adapt existing railway tracks for levitating, magnetic trains. This means conventional trains and super-fast magnetic trains can interchange in existing railway corridors. Infrastructure investment will be much lower than with conventional Hyperloop approaches.

Hyperloop Transportation Technologies

This company has an ambitious roadmap, with commercial Hyperloop operations planned for 2022.¹² Travelers prepared to sign a waiver might even get to try out Hyperloop in 2020, when the first parts of a project in the U.A.E. become operational.

Transpod

Toronto-based start-up TransPod is developing affordable and sustainable ultra-speed transportation for a fossil fuel-free future.¹³ Founded in 2015, it brings together expertise from industrial partners from the aerospace, space, rail and infrastructure sectors. For example, Blackshape Aircraft is developing the passenger pod. The pod's interior resembles an airplane fuselage, with rows of passenger seats.

TransPod envisages a system powered by sustainable solar energy, magnetically propelled pods and services every 80 seconds. It aims to build its first test track so that high-speed testing can start in 2020. It's also working on a feasibility study for the TransPod Line, a Hyperloop line in Thailand linking Bangkok to Chiang Mai.¹⁴

Zeleros

Spanish concern Zeleros works with a range of organizations to develop their Hyperloop concept. Crucially, Zeleros includes Renfe, Spain's state-owned rail company, among its partners.¹⁵ It has also added a partnership with German engineering company Siemens, which will provide technology advice.

Zeleros plans a system with autonomous capsules capable of transporting 40-50 passengers, with departures every two or three minutes. In 2020, Zeleros aims to develop a 6-mile (10 km) test track, allowing it to test its system at scale.

¹⁰CNBC, July 26, 2019

¹¹Science in Poland, May 22, 2019

¹²CNBC, July 26, 2019

¹³The Burn-in, May 8, 2019

¹⁴TransPod, Apr. 2, 2019

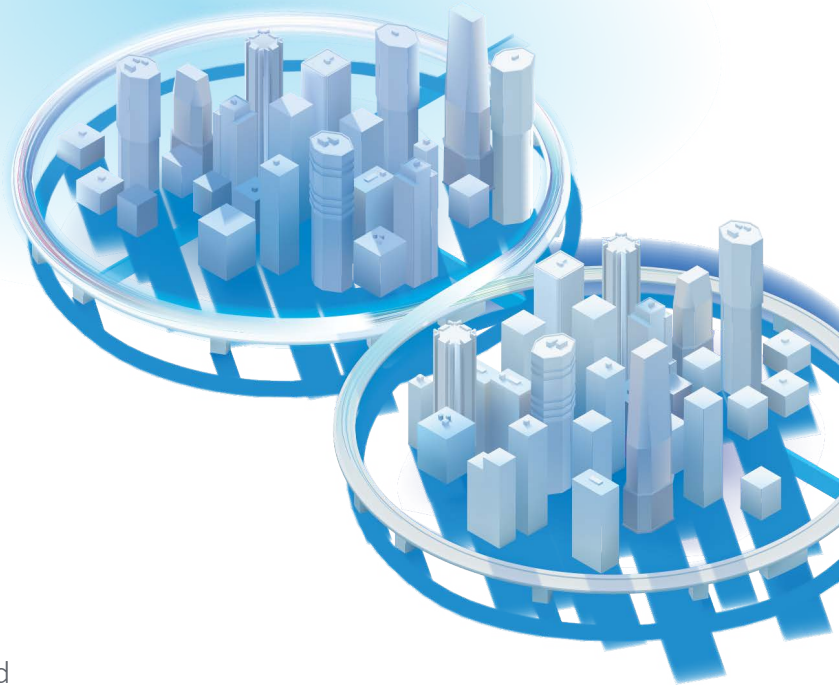
¹⁵In the Loop, Mar. 4, 2019

Integrating with air travel

While Hyperloop presents a realistic alternative to air travel over relatively short distances, it can also integrate with air travel to offer a seamless experience for longer journeys.

British Airways sees passengers arriving at the airport via Hyperloop, with personal pods slotting into an assigned space on the aircraft.¹⁶ On the way to the airport, the passenger's Hyperloop compartment will automatically enable safety and security screenings. Their luggage could also come to the airport via Hyperloop.

In the U.A.E., Hyperloop is already being considered as the basis of a lightning-speed transit system, enabling connections as quick as six minutes between Abu Dhabi and Dubai airports.¹⁷ The exact value of linking the hubs of Gulf carriers Emirates and Etihad Airways is not quite clear, but the principle would be interesting in major cities with more than one airport—such as Shanghai and Sao Paulo—particularly where one airport is dedicated to domestic services.



Do you have questions or comments regarding this report? Please email [Mike Eggleton](mailto:mike.eggleton@bcdtravel.com) to share your thoughts.

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¹⁶[Phocuswire](#), July 31, 2019

¹⁷[Breaking Travel News](#), Apr. 24, 2018