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Hyperloop TT
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Hyperloop Transportation Technologies

Technology Takes the Wheel
University of Toledo
Transport Evolution.
Transport Revolution.

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Hyperloop Transportation Technologies
What defines the next era of human mobility?
HIGH-SPEED
EFFICIENT
SAFE
SUSTAINABLE
FRICIONLESS
PROFITABLE
TRANSPORTATION

HYPERLOOP TT
Fully sustainable transportation system

https://www.hyperlooptt.com/technology/
The first transportation breakthrough in a century

**SUSTAINABILITY**
- Energy efficient
- Carbon-free operations

**TECHNOLOGY**
- Safe by design
- High-speed travel

**EXPERIENCE**
- Fully connected
- Frictionless ecosystem

**ECONOMICS**
- Subsidy free
- Increased GDP
How it works

Levitated capsule reduces friction, increases efficiency

Electromagnetic propulsion enables emission-free transport

Fully enclosed environment protects from weather and traffic crossing

Alternative energy and system automation minimizes operational costs

Confidential and Proprietary
Full-scale passenger capsule

- 105 ft length
- 20 tons weight
- 8.7 ft height

- Passive magnetic levitation
- Electromagnetic propulsion

- 760 MPH Maximum speed
- 28-50 Passenger capacity
- 160,000 Passengers daily
- 4,000 Cargo loads daily
Passive magnetic levitation

- Proprietary Inductrack™ passive magnetic levitation
- Capsules levitate over an unpowered, conductive track
- Energy-efficient solution tested and validated on a full-scale passive levitation track
Elevated system

- Low pressure environment < 100 Pa
- Powered by alternative energy sources
- Elevated on pylons, height depending on terrain
- 13 ft diameter
- 100 ft wide
- Seismic isolation technology
Adaptable infrastructure

Ground level

Elevated cross section with solar panels

Elevated urban cross section with walkways and solar panels

Cut and cover cross section with 13 ft diameter tubes

Bored tunnel cross section with 16 ft sealed tunnel
Multi-modal station

- Energy net positive
- Terminal station
- Community & transit hub
- On-demand boarding system

3,600 PAX/H During peak hours
40 SEC Adaptive departure rate
0.1 G Acceleration
Airplane speed on the ground

- Chicago to Cleveland: 47 min
- Cleveland to Pittsburgh: 24 min
- Chicago to Pittsburgh:
  - 6 h 5 min
  - 1 h 8 min
- Cleveland to Pittsburgh:
  - 3 h 11 min
  - 3 h 15 min (1 stop)

741 km | 461 miles
Sustainable mobility

Solar

Regenerative braking

Geothermal

Wind
Low environmental impact
Net zero carbon operations

The HyperloopTT system is among the lowest emissions transport options available, with under 20 g CO\textsubscript{2}/pkm\textsuperscript{1}.

Hyperloop has minimal environmental impact and is net zero operating emissions\textsuperscript{2}.

Comprehensive factors are being considered from design and manufacturing through construction and operation.

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\textsuperscript{1} HyperloopTT system carbon footprint model based the Great Lakes Hyperloop feasibility study and other high-speed systems globally

\textsuperscript{2} Based on operation scope 1 and scope 2 emissions

Best safety standards and new technologies

First company able to offer an insurable and viable regulatory solution for a commercial system.

01 Enclosed environment
02 Smart sensors in capsules and tubes
03 Immune to weather conditions
04 Passive magnetic levitation
05 No grade crossings with traffic
06 Quiet and clean electric propulsion

Leverage latest technologies and innovations
Sensors, magnetics, green technologies, biometrics, etc.

Develop new materials
Vibranium™ capsule shield
The journey begins with the health of all passengers.

**Biometric sensors | Realtime monitoring**

**Advanced air purification | Air purifier**

**Minimal passenger to passenger contact**

<table>
<thead>
<tr>
<th>Mode of transport</th>
<th>Passenger number per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Vehicle</td>
<td>Up to 7</td>
</tr>
<tr>
<td>Hyperloop</td>
<td>28-50</td>
</tr>
<tr>
<td>Bus</td>
<td>40-80</td>
</tr>
<tr>
<td>Train (per vehicle)</td>
<td>100</td>
</tr>
<tr>
<td>Airplane (mid-size)</td>
<td>150-200</td>
</tr>
<tr>
<td>Subway (per vehicle)</td>
<td>&gt;200</td>
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</tbody>
</table>

**Contactless travel | Automated ticketing & security**

**Rapid disinfecting cleaning | UV-C tech**
Reimagined passenger experience

- Human-centric design
- Immersive environment
- Access to personalized experiences
Profitability from infrastructure, to operation, to economic impact

**Infrastructure**
- **Low** construction cost
- **Low** operational cost
- **Low** maintenance cost

**Income**
- **Dynamic** ticket pricing
- **On-demand** mobility
- **High** throughput

**Socio-economics**
- **Positive** benefit-cost ratio
- **Competitive** ROI
- **Zero** operating subsidies

*Based on the Great Lakes Hyperloop Feasibility Study*
Development projects

R&D Center
Toulouse, France
- Testing & certification
- Ongoing integration and optimization
- Co-developed certification guidelines

Commercial Prototype
Abu Dhabi, UAE
- Located close to Expo and airport
- Concept design completed
- 3-5 km passenger hyperloop

Cargo Prototype
Port of Hamburg, Germany
- Joint Venture with HHLA
- Integrating with port automation
- Sustainable plug-and-play solution
Passenger-ready timeline

320 m full-scale infrastructure  320 m full-scale integration  3-5 km commercial prototype  Commercial line

2019  2020  2021  2024

TESTING  IMPLEMENTATION  PASSENGER READY

CERTIFICATION

Continued testing for incremental technology development and certification with strategic partners
Industry advancements

Insurance framework

Certification guidelines

Government guidance
## HyperloopTT snapshot

<table>
<thead>
<tr>
<th>Feature</th>
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</thead>
<tbody>
<tr>
<td>Full-scale system &amp; passenger capsule</td>
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<tr>
<td>Insurance &amp; regulatory framework</td>
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<tr>
<td>Proprietary passive magnetic levitation</td>
</tr>
<tr>
<td>10+ global agreements</td>
</tr>
<tr>
<td>800+ experts &amp; 50+ partners</td>
</tr>
<tr>
<td>45+ patents &amp; 60+ trademarks</td>
</tr>
<tr>
<td>Scalable organizational model</td>
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<tr>
<td>Asset-light licensing business model</td>
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<tr>
<td>Commercial readiness</td>
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</table>
The future is now boarding

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HYPERLOOP TT
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