Moving Freight by Hyperloop

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Transportation Revolutions Change the World

On-demand, Hyperloop transport networks will kick-off next phase of global value creation

1804
Industrial revolution

1886
Personal mobility & city expansion

1903
Global connections & commerce

2021
On-demand transport
Hyper-connected mega regions
The first several pages will attempt to describe the design in everyday language, keeping numbers to a minimum and avoiding formulas and jargon. I apologize in advance for my loose use of language and imperfect analogies.

The second section is for those with a technical background. There are no doubt errors of various kinds and superior optimizations for elements of the system. Feedback would be most welcome - please send to hyperloop@spacex.com or hyperloop@teslamotors.com. I would like to thank my excellent compadres at both companies for their help in putting this together.

Elon Musk
Our technology has world-changing implications
At 1080 km/h, Hyperloop One is Redefining Speed

- Weatherproof
- Unrestricted ROW
- Low Carbon
- Cost-Effective
- Ultra Safe
- High Speed
- Energy Efficient
- On-Demand
Eliminating The Barriers Of Distance And Time

New York  
Origin

Total Transit Time: 58 mins (28 mins in-vehicle)
364 km

Washington D.C.  
Destination

3 hr 25 m

4 hr 5 m

4 hr 28 m

4 hr 30 m
We Turn Cities into Metro Stops
Creating hyper-connected mega regions

Urban Area Today
30 min. radius

New York
Boston
Washington D.C.

New Urban Area
30 mins. radius

Washington D.C.
Boston
New York
The New Broadband
Hyperloop speeds connectivity and sharing of knowledge, labor, investment

Regional vitality & virtual density

Job growth & productivity

Business innovation hubs

Improved access to talent & customers

New Urban Area
30 min radius

Washington D.C.

Boston

New York
6 Potential Use Cases Defined by Market Interest

- **People**
  - **Short Distance** (< 100 km)
    - Metro or Airport Connector
      - e.g. Netherlands: Schiphol Link
  - **Medium Distance** (100 – 300 km)
    - Intercity Connector
      - e.g. Abu Dhabi to Dubai
  - **Long Distance** (> 300 km)
    - Regional Networks
      - e.g. Stockholm to Helsinki

- **Cargo**
  - **Short Distance** (< 100 km)
    - Port Off-Loader
      - Intermodal FEU
      - e.g. Port of LA/LB
  - **Medium Distance** (100 – 300 km)
    - Medium Freight Networks
      - Small Freight, Parcels
      - e.g. Same Day Delivery
  - **Long Distance** (> 300 km)
    - Large Freight Networks
      - Time sensitive, Perishable
      - e.g. LA to Chicago
Today’s Manufacturing & Supply Chains Are Inefficient

**MANUFACTURING**
- Inefficient supply chain
- Small labor pools limited to local geography
- High land costs near metro areas

**INVENTORY**
- Hundreds of warehouses required for same day delivery
- Inventory tied up due to long lead times, excessive warehouses

**DISTRIBUTION**
- Unreliable, slow deliveries subject to traffic congestion, weather, drivers
- Typical order to delivery time is several days
Radically Efficient Manufacturing & Supply Chains

Physical separation of supply chain & city

Mega manufacturing & warehousing parks

Inland distribution centers:
Automated, on-demand logistics, intermodal connections

Expanded port capacity & automated cross-docs
MANUFACTURING

• Enable just-in-time, agile manufacturing
• Efficient mega-manufacturing hubs with synergies of scale
• Access 10X larger labor pool with the same commute
• Up to 80% savings on real estate costs outside metros
INVENTORY MANAGEMENT

• Shortens lead times across value chain
• Reduce finished goods inventory by 25%
• Slash warehouse space & costs by 25%
DISTRIBUTION

• On-demand delivery—hours vs. days
• Real-time visibility
• No impact from congestion, weather, or other external factors
• Enables automated cross-docking
• Autonomous last-mile distribution
DISTRIBUTION: PORTS
• Expand port capacity
• Improve capacity & throughput
• Shorten truck turns, reduce costs
• Enable automated cross-docking
• Reduce congestion, pollution, accidents & noise by removing freight traffic from roadways
Port of LA/LB $\rightarrow$ San Bernardino

- **25% Increase in Capacity**
- **$1.5B Annual Benefits** for Southern California

Leverages existing right-of-way.
COSTS
• Reduce truck costs $368M per year
• Lower spending on highway maintenance $84M/year

CONGESTION
• Eliminates 167M vehicle miles
• Saves 15+ min per trip
• Reduces accidents by 4% by separating freight traffic

POLLUTION
• Eliminates 284K metric tons of greenhouse gases
• Reduce noise and vibration impacts
HYPERLOOP 
3 hrs 30 mins

AIRPLANE 
3 hrs 45 mins

RAIL 
2 days 23 hrs

TRUCK 
1.5-3 days

SPEED OF AIR, BUT A FRACTION OF THE COST

DRAMATICALLY REDUCE LEAD TIMES AND INVENTORY HOLDING COSTS

GROWTH OF LOGISTICS CITIES WITHIN HYPERLOOP NETWORK
**COSTS**
- Allow express shipping of high-value goods (e.g. 2-Day shipping) for fraction of current cost
  - Estimated per unit cost is 25% of air
- $1B in warehouse and inventory holding cost savings compared to rail

**CONGESTION**
- Eliminates billions of vehicle miles
- Alleviates costly bottlenecks in supply chain

**POLLUTION**
- Carbon-friendly solution for the ~5.4M ton of cargo currently carried by more pollutive modes
OUR TEAM
300+

INNOVATION CAMPUS
LOS ANGELES