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Could HYPERLOOP enhance the Physical Internet's efficiency ?

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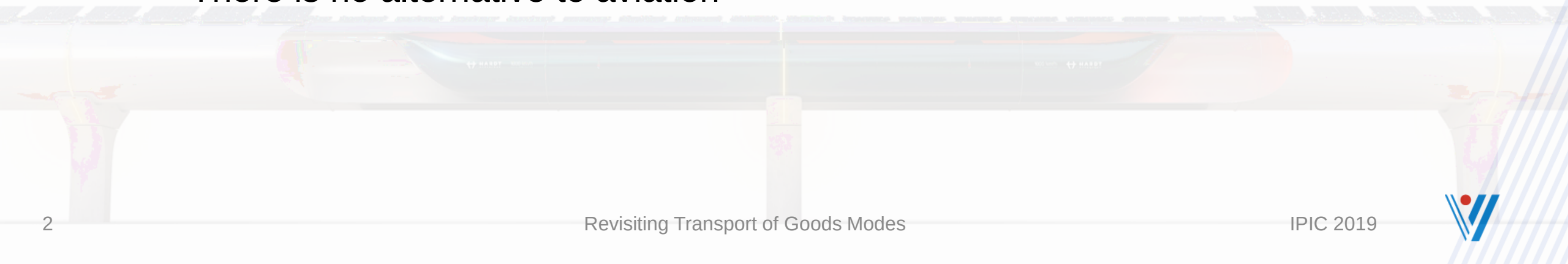
- IPIC 2019, London, 9th July 2019

FUNDAMENTAL PROBLEMS

TRENDS AND DRIVERS in the growing demand for transportation that need to be addressed by fundamental shared solutions

- Increased stress and congestion on existing infrastructure
- Shift towards sustainability
  - Transportation sector believed to consume more than half of petroleum and produce almost a quart of global greenhouse gas emissions
  - There is no alternative to aviation



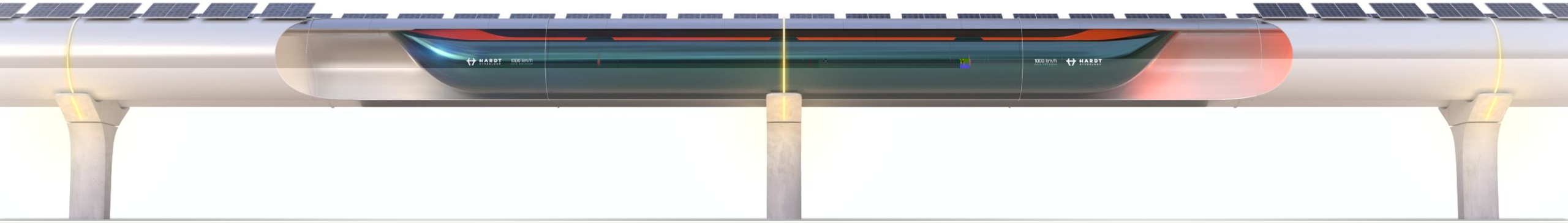
“5TH MODE OF TRANSPORT”

- History:
  - 2013: Elon Musk – “Hyperloop Alpha concept”
    (L.A. – San Francisco: 560 km in 35 min)
  - Space X (Elon Musk) test track 1,6 km (1mile) California
  - 2015 – Hyperloop Pod Competition:
    University teams developing the best “vehicle”

- Different European initiatives:
  Poland (HyperPoland), Spain (Zeleros), France and Italy (TransPod)
- Global research & development:
  India, Helsinki-Stockholm (business case), feasibility study DP World Dubai (containers), Russia, Paris-Amsterdam, Amsterdam-Frankfurt (Hardt), Toronto-Montreal (TransPod), California (Hyper Chariot), …

WHAT IS THE HYPERLOOP

TRANSPORT INSIDE A LOW-PRESSURIZED TUBE. THE IDEAL CONDITIONS FOR FAST AND LOW-ENERGY TRAVEL



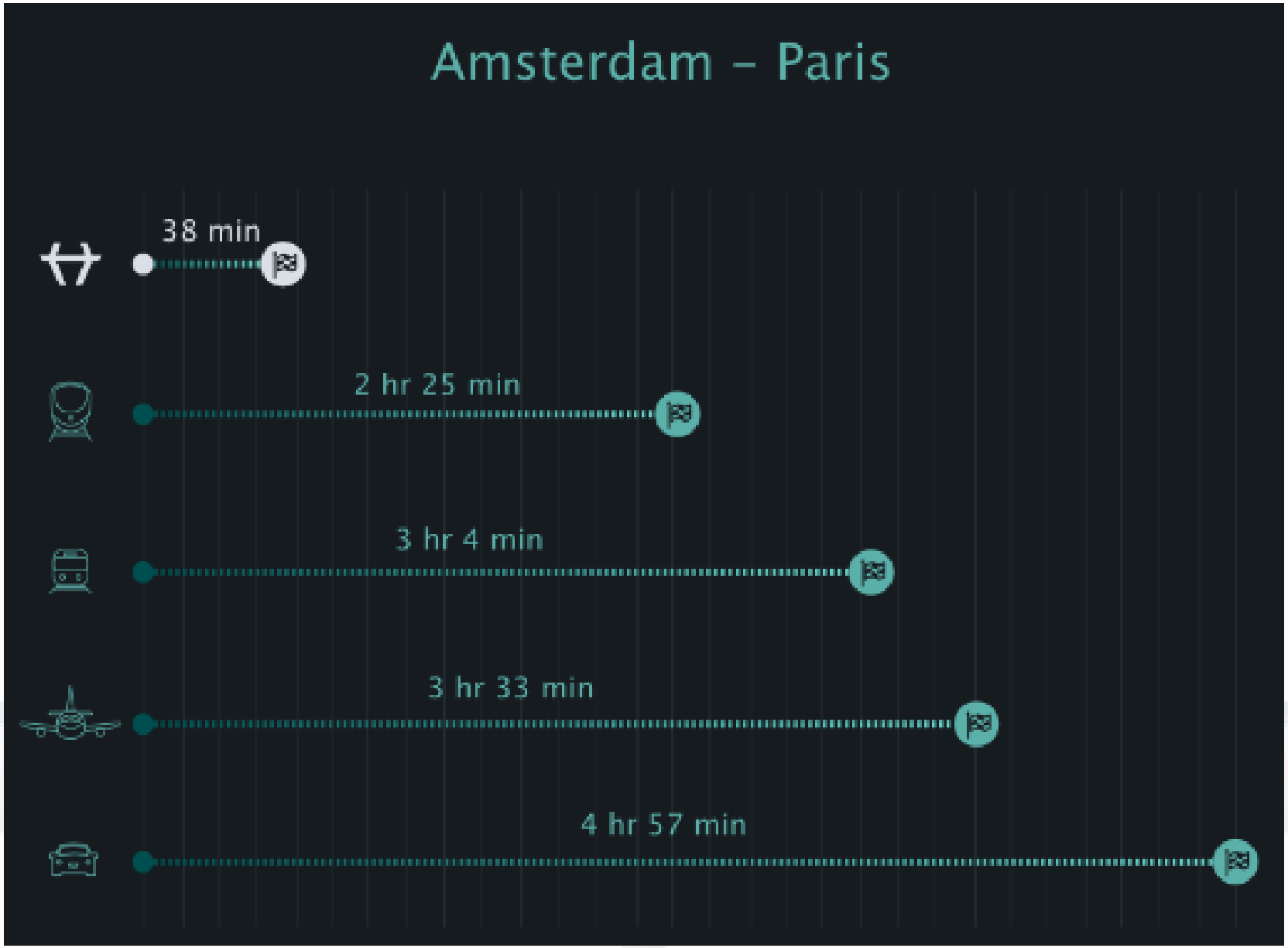
Specifications

Max cruise speed	**1000 km/h**	Capacity	**60 PAX**
Longitudinal acceleration	**0.15G**	Length	**32M**
Lateral acceleration	**0.1G**	Diameter (Excluding Bogie)	**2.7M**

WHY ?

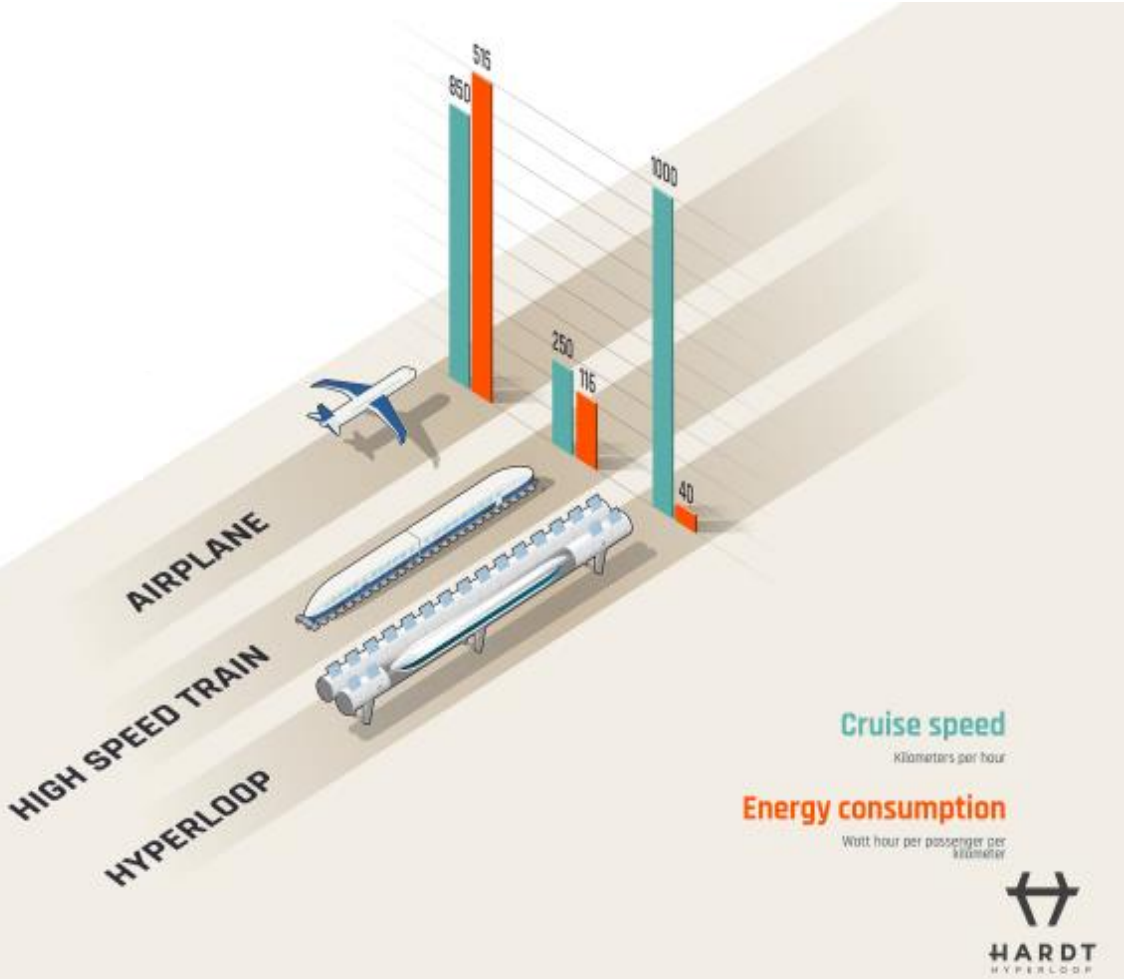
- Solves a fundamental problem
- Proposes a disruptive solution
- Uses breakthrough technology
- Boosts competitiveness of the economy
- Shared collaboration between Government, Industry, research institutions and universities

SPEED


Amsterdam – Paris
38 min
2 hr 25 min
3 hr 4 min
3 hr 33 min
4 hr 57 min

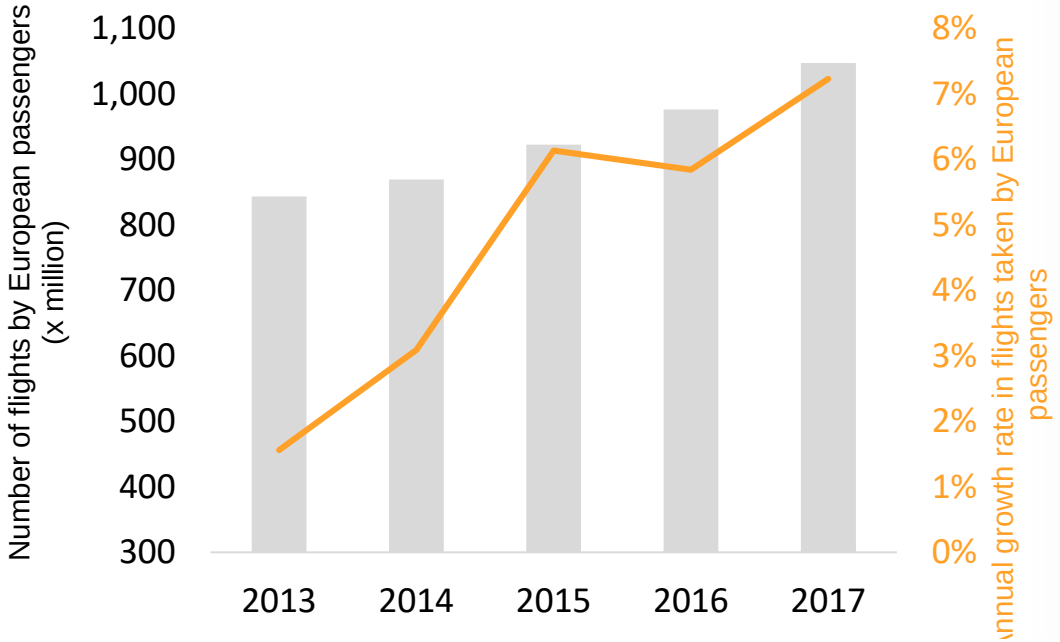
FOCUS

- Hyperloop as a disruptive, sustainable and competitive alternative for air travel/air cargo
  - Within Europe
  - Passenger and cargo traffic to, from and between airports and city centres
  - Direct connections, simple lane switches and diversions and high frequency



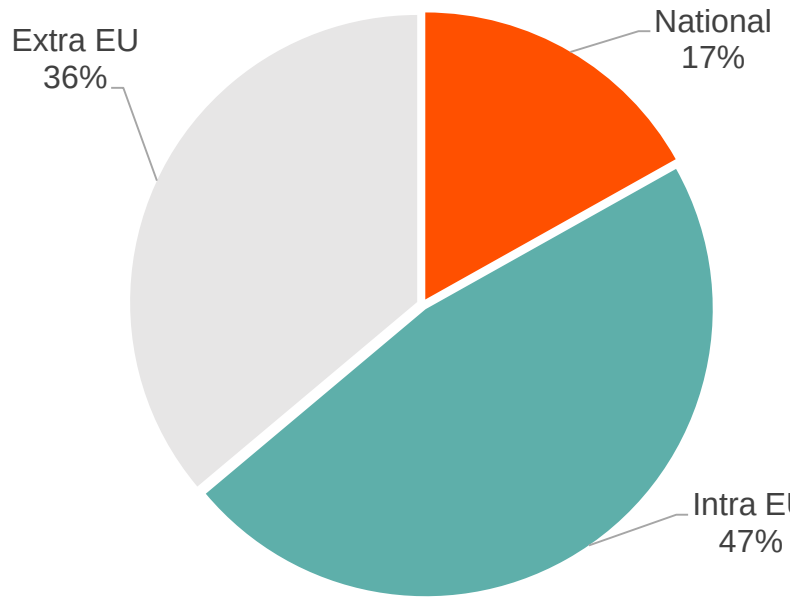
FOCUS ON PASSENGERS

Aviation demand has grown substantially to more than 1 billion of annual flights[1]



1 Source: Eurostat (avia_paoc)

64% of all flights are within EU boundaries



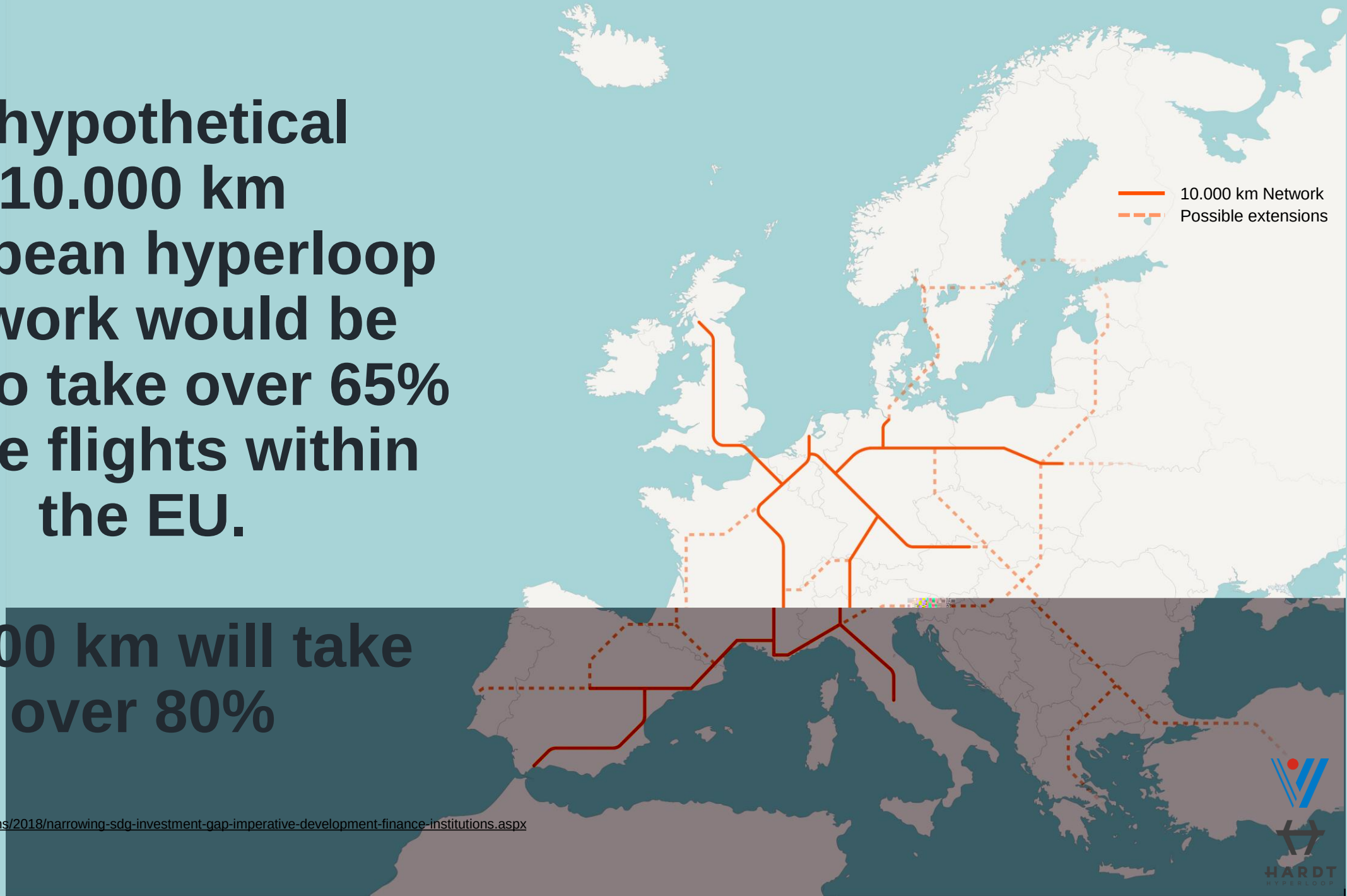
HARDT HYPERLOOP

FOCUS ON FREIGHT

- 35 % of global trade by value = air freight
- Market driver: e-commerce
- About 50% of air cargo is ‘belly freight’
- Transition of connected flows

A hypothetical 10.000 km European hyperloop network would be able to take over 65% of the flights within the EU.

20.000 km will take over 80%

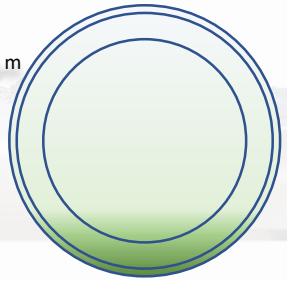


1. https://www.bcg.com/publications/2018/narrowing-sdg-investment-gap-imperative-development-finance-institutions.aspx

TO BE AND NOT TO BE

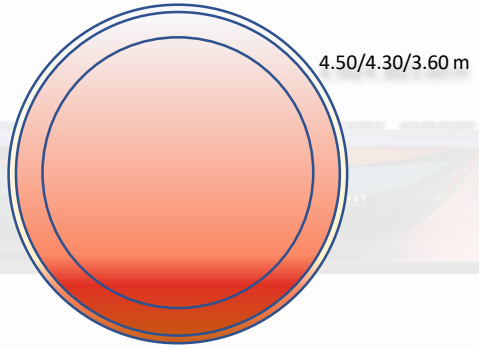
TO BE

- Augment existing infrastructure where possible, underground where necessary
- One (1) standard + international regulation



NOT TO BE

- Underground pipelines (ind. *3)
- Multiple standards



TO BE AND NOT TO BE

TO BE

- Maximal flexibility by direct connections, diversions and high frequency
- Network deployable for passengers AND cargo

NOT TO BE

- A patchwork of A to B lanes
- Individual lanes for EITHER passengers OR freight

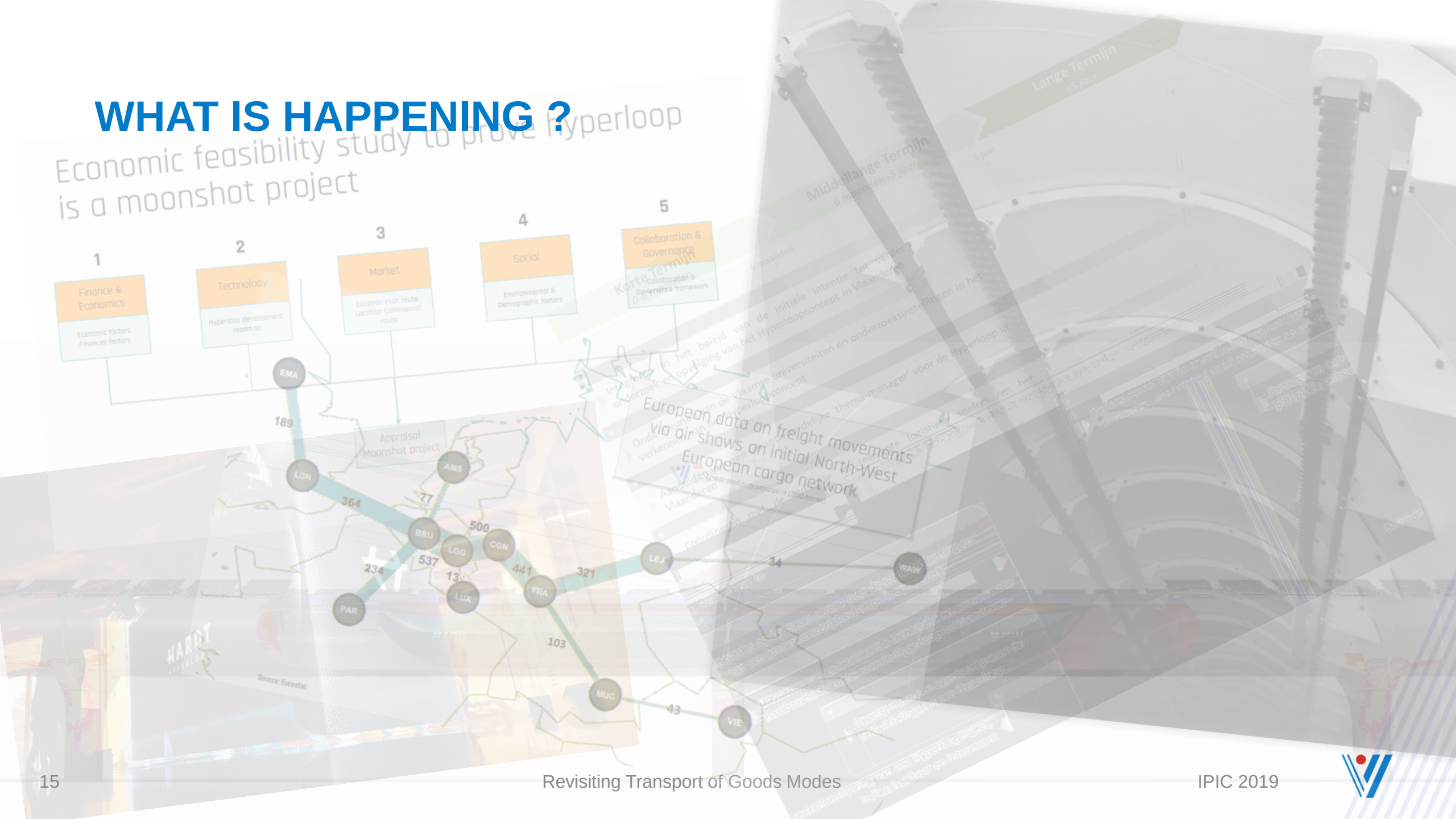
RELEVANCE FOR PHYSICAL INTERNET

- Misconception of the relevance of speed for the physical internet
  - As fast as required – ‘good enough’
- Physical Internet is a living and connected network
- Hyperloop is a connected network
- Hyperloop could be a future ‘bedfellow’ to aviation fulfilling the same (and new) needs as aviation today
- Hyperloop clicks into that part of the supply chain and economy that fulfils the on-demand need

PRE-REQUISITES: EUROPEAN PERSPECTIVE

- Additional research, development and testing
- Standardisation
- Legislative, regulatory and liability frameworks
- Governance models
- Routes and Acceptance
- Investment

WHAT IS HAPPENING ?



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