

HYPERNEX



HYPERNEX Final Conference

Technical Specifications

Stefano Ricci

23 February 2022

Objectives

Gather technical information available to depict scenarios for Hyperloop start-up process

Focus on key safety and operational issues:

- a) Acceptability and adaptability of concepts from rail knowledge
- b) Common technical core and challenges for freight and passengers interoperability
- c) Convergence with ongoing programs on hazards analysis, functional and operational standardization

Tasks

- 1) Innovative concepts for guided transport modes
- 2) Hazard identification and Safety Case analysis
- 3) Technical components of Hyperloop architecture
- 4) Hyperloop operation concept

Deliverable 3.1 - Technical definitions

First submission (September 2021) - Revised version (February 2022)

1) Innovative concepts for guided transport modes

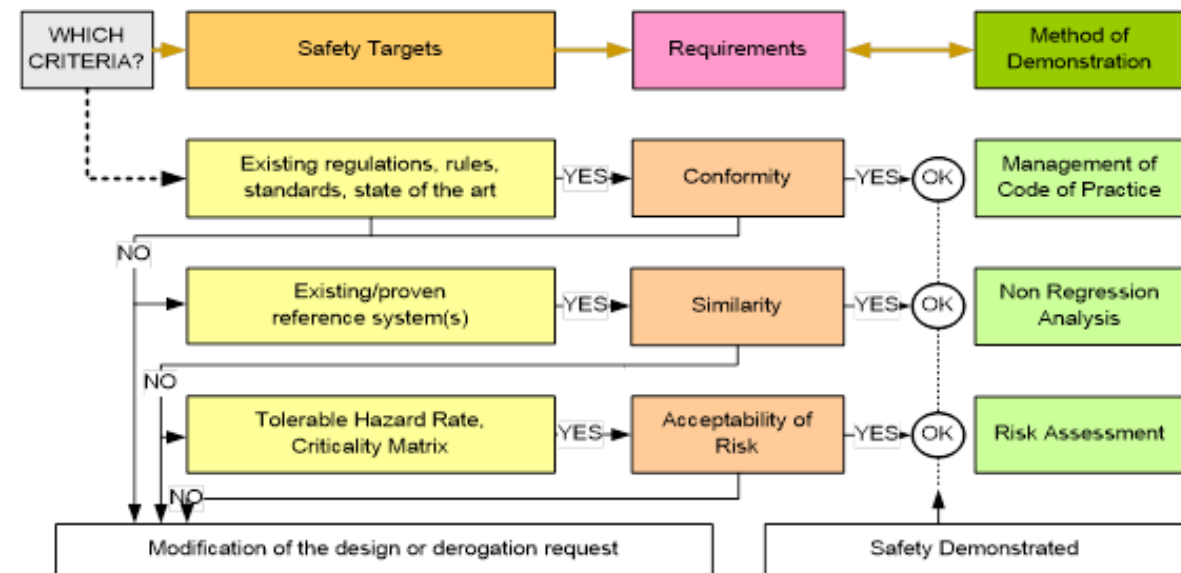
Innovative concepts - Analysis of concepts - Roadmap of transport innovations - Standardization



Implementation roadmap of hyperloop innovations

2) Hazard identification and safety case analysis

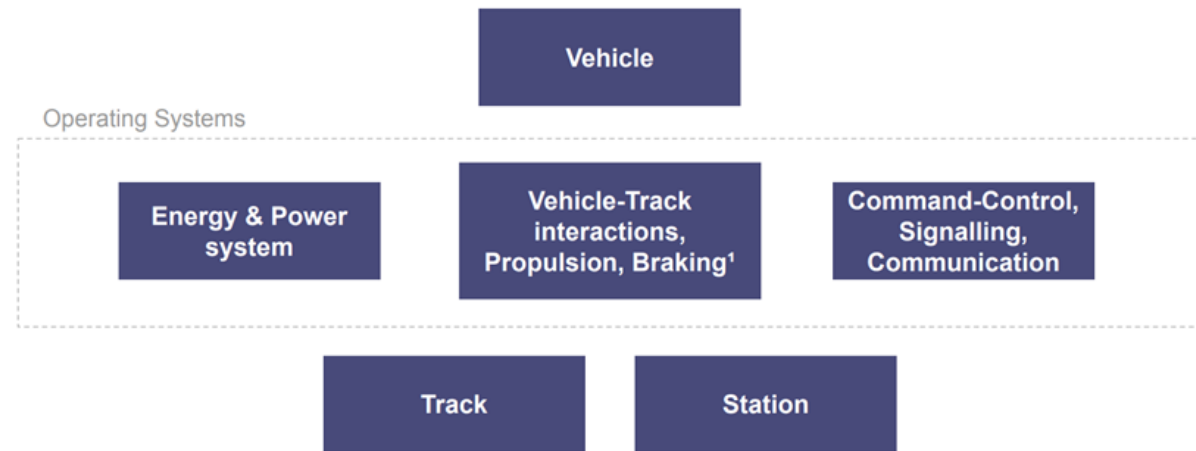
Regulatory and voluntary European railway standards - EN 50126 - EU 402 - Market acceptance under safety conditions - Methodology proposal for HYPERNEX - Studied systems of the Hyperloop - Hazard log - Guidance - Power Supply - Communication - Interface - Control-command - Pod - Infrastructure - Terminal and station - Signalling - Future research - Interlocking - Environment - Evacuation - Future Research



Methodology for hazard and safety case analyses

3) Technical components of hyperloop architecture

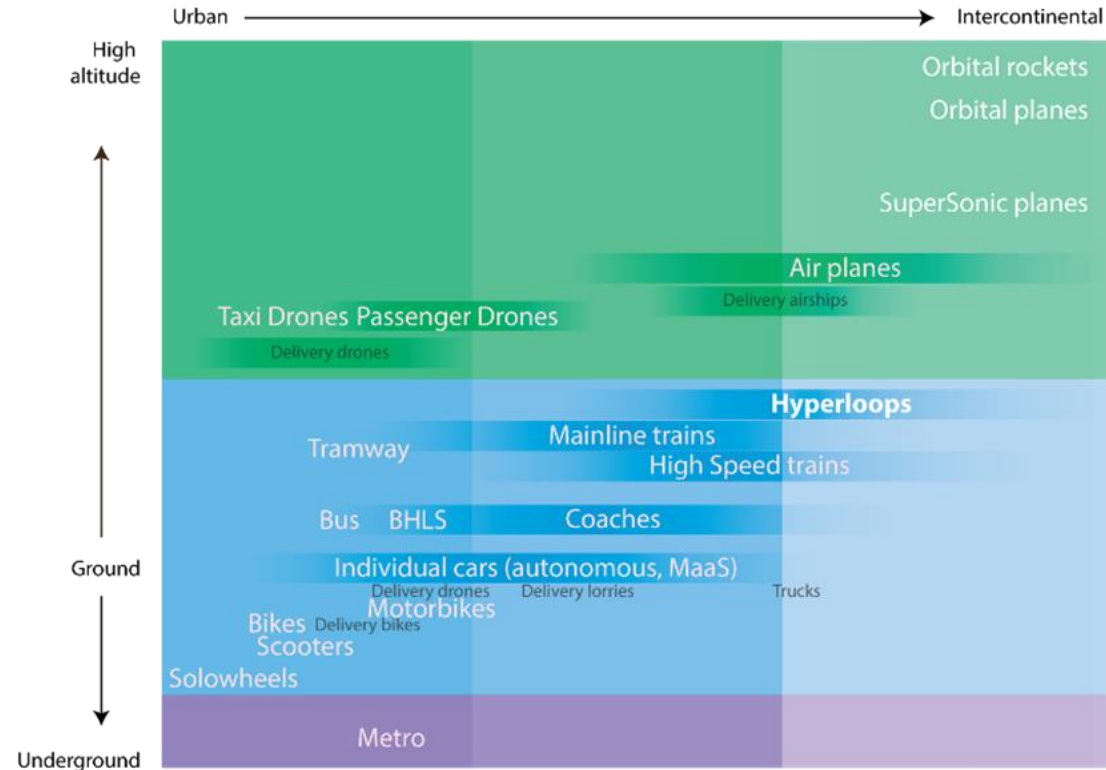
Hyperloop infrastructure compared to other transport modes - System Architecture - Infrastructure - Vehicle - Dynamic control and operation - Propulsion - Communication - Energy consumptions - Innovative concepts - Power electronics



Hyperloop reference architecture currently under development at CEN/CENELEC JTC20

4) Hyperloop operation concepts

Operational concept - Risk management - Post-operation reviews - Decommissioning - Impacts



Potential transportation modes in the future

Conclusions on main achievements

- 1) Exploration of high-speed transport modes (Hyperloop, Maglev, Aviation and High-Speed Rail): architectural, functional and legal aspects in freight and passengers use cases
- 2) Safety approaches from Safety Common Methods and EN 50126 for hazard logs, safety integration, operational performances and evacuation for generic Hyperloop systems
- 3) Analyses of technical elements of Hyperloop not consolidated architecture, components, promising concepts and research areas for integration in freight and passengers networks
- 4) Concept of operations for freight and passengers intermodal connections, minimization of environmental impacts, cost-effective maintenance and decommissioning procedures



This project has received funding from the Shift2Rail Joint Undertaking (JU) under grant agreement No 101015145. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Shift2Rail JU members other than the Union