

HYPERNEX Final Conference: Boosting the European Hyperloop Ecosystem

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Hyperloop standardízatíon: a booster to overcome challenges

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## **Opportunities:**

- A transport slot for Hyperloop: Continental displacements (persons & goods)
  - Promotes mobility
  - Friendly with environment (no emissions)
  - > Technology available (magnetic levitation and traction systems, vacuum control)
  - Helps the decongestion of other transport infrastructures (roads & airports)
  - Interoperability and highest safety promote industry development (ERTMS case)

#### **Challenges:**

- Convergence of technologies in use and different levels of implementation
  - Safety (Common risk identification and Hazard's control)
  - Interoperability (Pod infrastructure within the European frame)
  - Infrastructure design for speeds of 1.000 Km/H and comfortable accelerations (0,1 g) (curve's radius and slope transitions; need of safe control of pod's speed & position)
  - Power supply to pod at 1.000 Km/H
  - > Intercontinental competition (need of European approach; Hyperloop developers consortium)
  - Time to operation and need of human and economical resources (15 years?)

## Standardízatíon work helps to overcome the challenges





### **REQUIREMENTS TO OVERCOME THE HYPERLOOP CHALLENGES:**

- Safety first:
- Requirement SIL 4 for Hyperloop systems
- Common risk identification: From system conception to system application:
- Risk analysis in the feasibility studies: Identification & sharing of risks

#### Requires the engagement all Hyperloop developers & industry

- Interoperability: At least in the continental frame; Two aspects: Technical:
  - Technology is available: Levitation, Traction, Communications and Control of Tube pressure
  - Need of convergence between different technological approaches
  - Different status of development: From applied research to feasibility projects at real scale

#### Requires the engagement all Hyperloop developers & industry

#### **Operational:**

## **Requires the engagement of Infrastructure Managers & Operators**

**Time frame:** 15 years time to operation?

**Requires support with human and economical resources** 





## Standardízatíon process provídes the requíred engagement of resources

- > CENELEC Hyperloop Joint Technical Committee (JTC20 Hyperloop Systems) already settled
- > Technical structure for standardization processes approved by the CENELEC Technical Board
- > Two first standardization Working Groups already approved by the CENELEC Technical Board :
  - WG1: Operations & Services
  - WG2: Transport Systems and Requirements
- > Convenors for both Working Groups elected:
  - o WG1: Juan de Dios Sanz Bobi (PhD Politecnical University of Madrid / NEN member)
  - o WG2: Fabien Letourneaux (PhD SNCF, Innovation & Research)
- > Experts engaged (human resources available and working):
  - WG1; 52 experts (3 operators / 17 Hyperloop developers / 6 industries)
  - WG2; 56 experts (4 operators / 16 Hyperloop developers / 13 industries)

Five Work Items already running:	WG2:
WG1:	WI Ref.: JT020003 Reference Architecture
T.R. WI Ref.: JT020001 Operations and services	P WI Ref.: JT020004 General Requirements
WI Ref.: JT020002 Standards Inventory Road Map	P WI Ref.: JT020005 Vocabulary & Definitions





TRANSPOD

- Seven Hyperloop developers engaged:
  - Hyperloop Transportation Technologies (HTT);

 $\circ$  Hyperpodx;



- $\circ$  Hyper Poland;
- $\circ$  Swisspod



- Transpod;
- Virgin Hyperloop One;

o Zeleros;



Institutions interested on Hyperloop are invited to join the JTC20 Hyperloop plenary meetings (EC DG MOVE, UIC, S2R, EIM, RUS, ERFA)







### Structure of CENELEC Hyperloop Joint Technical Committee (JTC20 Hyperloop Systems)







# THANKS FOR YOUR ATTENTION