OUR MISSION
To develop and test products, services, new technologies and new methods to bring the hyperloop to commercialization as a safe and sustainable low-emission method of transport for people and goods.

SDGs FOCUS

AN EU BASED PUBLIC-PRIVATE PARTNERSHIP
• Entails equal participation
• Supports sharing knowledge and expertise
• Enforces a transparent and competitive environment

20+ PUBLIC, PRIVATE AND RESEARCH PARTIES WORK TOGETHER
ADSE, Nevomo, Royal BAM Group, Tata Steel, POSCO, Royal IHC, Vattenfall, Balance, NS, Recaro, Schweizer Design Consulting, IGIEL, EuroTube, Hochschule Emden/Leer, Delft Hyperloop, Hardt, Royal Schiphol Group, Ministry I&W, Ministry EZK, Prov. Groningen, TÜV Rheinland

2020 - 2023
Phase II European Hyperloop Center Groningen

2020-2023
Phase II European Hyperloop Center Groningen

3 RESEARCH PILLARS
FEASIBILITY
To prove the feasibility of hyperloop as a safe and sustainable low-emission method of transport of people and/or goods.

REALIZATION
To demonstrate in the European Hyperloop Center Groningen that the technology works as intended (designed) and can be operated safely.

MARKETABILITY
To identify the future prospects and opportunities for industry and stakeholders clustered around the center of excellence of hyperloop.

4 WORK GROUPS
Cargo, Passenger
European Hyperloop Center Groningen
Future prospects

7 RESEARCH ASPECTS
Safety
Technology
Standards
Public adoption
Ecosystem
Integration
Socio-/Economic costs & benefits

2023+
Phase III Cargo demo route and Passenger test facility
With the speed of an aircraft and lower energy consumption than a train, hyperloop provides a solution to sustainably improving global mobility.

Key to the high standard of modern living is the availability of excellent transport infrastructure. It grants access to goods, services, employment, recreation, and generally allows for freedom of movement. All these factors make compelling transport infrastructure a magnet for inward investment and human talent, and a key factor in a competitive market economy.

Transport is one of the largest energy consumers and polluters, responsible for about 25% of the global CO₂ emissions. The anticipated population growth requires more frequent and faster connections while reducing emissions. Without further actions, we will fall dramatically short of the Paris Agreement goal of limiting global warming to well below 2°C.

One of the most promising new solutions that has received extensive attention as a sustainable mode of high-speed transportation is the hyperloop.

The hyperloop is part of the national goals for emission-free transport in 2050, as described in Mission D ‘Emission-free mobility for people and goods in 2050’ in the ‘Emissions for the Top Sectors and Innovation Policy’ dated 26-4-2019, and aligns with the EU goals for emission-free transport in 2050 in the European Commission Communication ‘A Clean Planet for
what is hyperloop?

Hyperloop is a transportation system via tubes, deriving from the vactrain concept and based on known and proven technologies. Instead of rail technologies, the system uses magnetic forces for levitation, guidance and propulsion which enables a non-friction suspension with minimal maintenance. The vehicles are accelerated by an external linear induction motor, providing periodic boosts to maintain operational speeds. The vehicles can reach maximum speeds up to 1000km/h. The hyperloop technology enables different transport services for both passengers and goods.

- **Hyperloop** – refers to the generic mode of transport, regardless of the type of transport services.
- **Cargo system** – hyperloop transport service for cargo. Cargo hyperloop is characterized by a smaller pipe, suitable for vehicles transporting pallets of goods through the Cargo hyperloop network. Cargo hyperloop pipes and vehicles are smaller compared to vehicles suited for passenger transportation.
- **Passenger system** – refers to hyperloop transport services for passengers. In this application, the pipe is sized to accommodate vehicles of 3.5 m diameter. Passenger vehicles will move through a network of routes, connecting cities for passenger transport.

Between 2017-2020 a vibrant ecosystem started around hyperloop, consisting of 20 industry parties from The Netherlands and EU with an actively engaged public sector and total investments of 6.2 million EURO.
In the upcoming phase 2 (2020-2023) the European Hyperloop Center in Groningen will advance hyperloop research and innovation and enable commercialization for a multi-billion industry.

Safety requirements, technological concepts and public views are to be challenged by doing research, testing products, services, and new methods to bring a safe and sustainable hyperloop to operation. In the European Hyperloop Center a system standardization of the European hyperloop infrastructure and -technology is to be developed. Future prospects are investigated to develop a roadmap for implementation and exploitation.

The HDP is focusing on seven themes that are interconnected and crucial to develop a safe, reliable, and sustainable hyperloop system:

1. **Safety**: The acceptable level of safety needs to be defined in line with the zero-accidents ambition.
2. **Standards**: Standards are key to create a certified, sustainable, interoperable system and transport network with the appropriate level for safety.
3. **Integration**: Hyperloop needs to be integrated into the physical domain as well as into the mobility system for passengers or the logistics system for goods.
4. **Socio-economic costs/benefits**: Hyperloop routes need to have a positive business case in social, economic, financial and environmental terms to be implemented.
5. **Public adoption**: The needs and wishes of end-users will be incorporated in the adoption roadmap.
6. **Ecosystem**: The global opportunity of hyperloop implementation and the role that the partners in the ecosystem can play need to be assessed.
7. **Technology**: A test facility and learning center is required to test all the facets for safe operation of hyperloop and to provide answers to questions.

"De komst van het EHC sluit naadloos aan bij onze ambities in innovatie en duurzaamheid. Bedrijven, kennisinstellingen en overheden werken in Groningen nauw samen aan de ontwikkeling van slimme en groene mobiliteit. De hyperloop testbaan is daar een prachtige aanvulling op. Het EHC zal Groningen internationaal op de kaart zetten als proeftuin voor slim en groen vervoer. Daarbij zorgt het ook voor meer werkgelegenheid in onze regio."

– Mirjam Wulfse, Gedeputeerde Provincie Groningen
The HDP phase 2 is executed following an integrated approach with three pillars - feasibility, realization, marketability - and four working groups. An approach suggested earlier in the 2017 Hyperloop in The Netherlands report:

“We suggest that the Dutch government, through a Hyperloop Innovation Program, (1) partly invests in the test track (financially as well as by providing land and resources), (2) organizes the EU-certification and (3) facilitates the market development, e.g. by taking away legal boundaries and designing an innovative contracting strategy for partners in a possible extension of the track.”

The feasibility pillar further develops the hyperloop concept (Working Group Cargo + Working Group Passengers), the realization pillar tests and demonstrates the hyperloop technology in the European Hyperloop Center in Groningen, and the marketability pillar discovers the hyperloop market opportunities for partners and stakeholders in the program.

**WORKING GROUP CARGO (WG-F1)**

The main goal of the Working Group Cargo is to assess the feasibility of a Cargo system on safety, standards, public adoption, social cost-benefit and integration. The activities of this working group should prepare for the decision on a potential first application for a demo route by:

- Establishing overall concept approval of hyperloop Cargo
- Develop a safety concept and approval framework-means of compliance of Cargo hyperloop
- Establish the regulatory framework and standardization roadmap
- Positive results on the pre-project feasibility study of a demo route
- To design and validate all the sub-systems and components required for the hyperloop for Cargo to be tested in the European Hyperloop Center in Groningen

**WORKING GROUP PASSENGERS (WG-F2)**

**PARTNERS INVOLVED**

NS, Recaro, Schweizer Design Consulting, ADSE, Tata Steel, POSCO, Royal Schiphol Group, Hardt, NEN

The Working Group Passengers will focus on the feasibility of a Passenger system regarding safety, standards, public adoption, social cost-benefit and integration by:

- Establish an overall concept approval of hyperloop for passengers
- Develop the safety concept and approval framework-means of compliance for passengers
- Establish regulatory framework and standardization roadmap
- Prove pre-project feasibility in the context of a demo route
- Establish program framework for development and approvals for passenger system
- Identify concepts to test and prove technical feasibility for passenger scale to TRL-6 in EHC
- Deliver preliminary overview of requirements and specifications of a passenger test facility

**WORKING GROUP EUROPEAN HYPERLOOP CENTER (WG-R1)**

**PARTNERS INVOLVED**

Province Groningen, Gemeente Groningen, Stichting EHC

The Working Group EHC will deliver all activities for the realization and operation of the European Hyperloop Center with the sub goals to:

- Realize a hyperloop laboratory and high-speed test track functioning as a regional ecosystem
- Prove technical feasibility and achieve Quality stage 3 cargo functionality approval
- Prove technical feasibility of concepts for passenger scale to TRL-6
- Translate the cargo tests in EHC into an overview of requirements and specifications of a cargo demo line
The Working Group Future Prospects will focus on the following key objectives:

- Identify global opportunity of hyperloop implementation
- Map opportunities for industry clustered around Hyperloop Ecosystem
- Establish implementation roadmap for hyperloop after phase 2
- Establish process for selecting suitable location for passenger-scale test facility in phase 3
- Prepare hyperloop student competitions in the EHC

Total funds to make significant progress in the HDP are estimated at 30 million EURO consisting out of contributions from industry, research partners and the public sector.

The Hyperloop Development Program lays the foundation for hyperloop to become a safe, clean, and reliable mode of transport in the years ahead. Partnerships, co-development and public-private collaboration are essential elements to spark the development of this breakthrough transportation system, where the Government and Industry can take the leading role.