Versie 2022.01

Smart Mobility
meet our community

We invite you to meet our community and discover our success story!

In Brabant, a number of key ingredients have been fruitfully mixed together, creating one of the strongest smart mobility regions in the world. In 1975, Volvo Car took over the passenger car branche of DAF. Even now, its location in Helmond still forms the central point of the Brabant auto industry. Industry, knowledge institutes and government work together to think of new impulses for the regional automotive cluster in Brabant, which is already at the forefront of ‘smart mobility’ and 'green mobility’, with various companies and institutes developing low-emission and zero-emission propulsion systems and fuels, as well as the required infrastructure.

BRABANT
IS BRIGHT

BRABANT IS BRIGHT

100 years of **HTSM innovation**

HISTORY

1891

In Brabant a number of key ingredients have been fruitfully mixed together, creating one of the strongest smart mobility regions in the world. In 1975, Volvo Car takes over the passenger car branch of DAF. Even now, its location in Helmond still forms the central point of the Brabant auto industry. Until the late seventies, Volvo Cars produces DAF-models with a Volvo name tag on it. In 1991 NedCar is founded, a joint venture between Mitsubishi Motors Corporation, Volvo Car Corporation and the Dutch government. Eventually, industry, knowledge institutes and government worked together to think of new impulses for the regional automotive cluster in Brabant.

TODAY

2022

Brabant is already at the forefront of what is called ‘smart mobility’, the combination of vehicle development and autonomous navigation. NXP, TomTom, NXP, TNO, HERE, DAF Trucks, and many other large and small specialists lead the way in this respect. Moreover, Brabant plays an important role in 'green mobility’, with various companies and institutes developing low-emission and zero-emission propulsion systems and fuels, as well as the required infrastructure. These include DIFFER, Holst Centre, DAF Trucks, NXP, TNO, Ricardo, Lightyear, Rolande LNG, LIQAL, Leyden-Jar Technologies, and LionVolt. Smart mobility is divided into four subthemes; cooperative driving, automation, connectivity, and smart mobility services.

BRABANT IS BRIGHT

Why Brabant excels in Smart Mobility?

INDUSTRY BASED ECOSYSTEM

The Brabant **automotive HTSM cluster** can invent, design, engineer, assemble, manufacture, commercialize, install, and maintain probably any component and/or system related to smart and connected mobility and sustainable or green mobility.

DEVELOPED KNOWLEDGE INFRASTRUCTURE

Highly innovative **universities and research institutes,** such as High Tech Campus Eindhoven, Automotive Campus Helmond, University of Technology, contribute to a unique ecosystem, home to innovators, researchers, engineers that create business of tomorrow.

ADAPTIVE COLLABORATIVE CULTURE

The people in Brabant have an adaptive and collaborative culture. People are used to change and are working in a highly international environment for innovative OEM's, SME's, startups, scale-ups and knowledge and educational institutes.

LEADING COMPANIES AND A FULL HIGH TECH SUPPLY CHAIN

Brabant is home to **DAF Trucks** and a perfectly woven network of knowledge institutes (University of Technology, TNO, TASS), specialized high tech suppliers such as Altran, NTS Group and VDL, and other partners has evolved in the region.

BRABANT IS BRIGHT

Our Ecosystem

World Class Research

Within a radius of 150 km around Brabant, there are 27 universities in three countries: a total of 605,340 students, 255,680 of which in the field of nature, health or technology. These are the leading research institutes for Smart and Green Mobility.

WORLD CLASS RESEARCH

1. **Eindhoven University of Technology (TU/e)** is a research university specializing in engineering science & technology.
2. **EAISI Institute - TU/e (Eindhoven)** is an AI community at TU/e. EASI has various research labs in cooperation with partners in the fields of mobility, robotics and high tech systems.
3. **Fontys University of Applied Sciences (Eindhoven)** offers High Tech Systems & Materials programs and a dedicated program on automotive engineering.
4. **TNO Automotive** TNO has unique automotive expertise, tools and facilities for the development of high level and low level control software for safety related applications
5. **Summa College:** vocational educational institute with dedicated focus on automotive, located at the Automotive Campus.
6. **TASS International** has the **mission** to support the transportation industry with development methodologies, services and solutions that lead to safer, greener and smarter vehicles.
7. **Holst Centre:** innovation helps the automotive industry in a wide range of areas, from smart interior surfaces and non-contact monitoring of drivers to power source and battery management.

BRABANT IS BRIGHT

Our **Ecosystem**

Leading companies

Brabant accounts for 15,560 companies in its HTSM-cluster, that represent more than 40% of the total Dutch production volume. These are the leading companies in the field of Smart and Green Mobility.

LEADING COMPANIES

1. **VDL Bus & Coach**, headquartered in Eindhoven, is a Netherlands based bus manufacturer, including electric powertrains.
2. **PACCAR** designs, manufactures and services trucks under the brand names of DAF and others.
3. **NXP is** a Dutch semiconductor designer and manufacturer and the co-inventor of near field communication (NFC) technology.
4. **TomTom** is a developer and creator of location technology and consumer electronics, providing geolocation technology for drivers, carmakers, enterprises and developers.
5. **HERE Technologies** is a multinational group dealing with mapping, location data and related automotive services to individuals and companies.
6. **NavInfo** is a location service and smart mobility solution provider with core businesses in digital map, autonomous driving and connected vehicles.
7. **Heliox** provides rapid charging solutions, serving e-bus and e-truck fleets and passenger vehicles.
8. **LightYear** is a Netherlands-based solar electric car company that develops an ultra-energy-efficient automotive platform.

BRABANT IS BRIGHT

State-of-the-art facilities

High Tech Campus Eindhoven

Often recognized as the smartest square km in Europe, the HTCE campus is built around an ecosystem of 235 companies with a range of application fields. Home to over 12,000 innovators, researchers, engineers that create the technologies and business of tomorrow.

OBJECTIVES

High Tech Campus is Eindhoven, the smartest km^2 in Europe is an ecosystem of 235 high tech companies. It's home to more than 12,000 innovators, researchers and engineers. Each company at High Tech Campus Eindhoven shares a common goal: developing new technologies and applications that help solve social problems and challenges, and successfully bringing these to the market.

LEADING COMPANIES

- Multinationals such as Philips Healthcare, Teleledyne Dalsa, NXP and Intel
- Research institutes like the Holst Centre, Philips Research and Innovation lab
- Scale ups and startups like Usono, Lifesense Group, Bambibelt, GTX medical and Sirius Medical

KEY CHARACTERISTICS

- 42% of all patent applications in the NL come from the Campus
- >85 nationalities
- AI innovation Centre
- 12,500 Smart People
- Total 350,000 m^2
- 25,000 sqm R&D facilities
- 1 billion private R&D
- Top 7 incubator for start-ups

APPLICATION AREAS

HTCE is a global hotspot in the areas of Health & Vitality, Sustainability, Applied Intelligence, Smart Environments & Connectivity and Software & Platforms.

HIGH TECH CAMPUS EINDHOVEN

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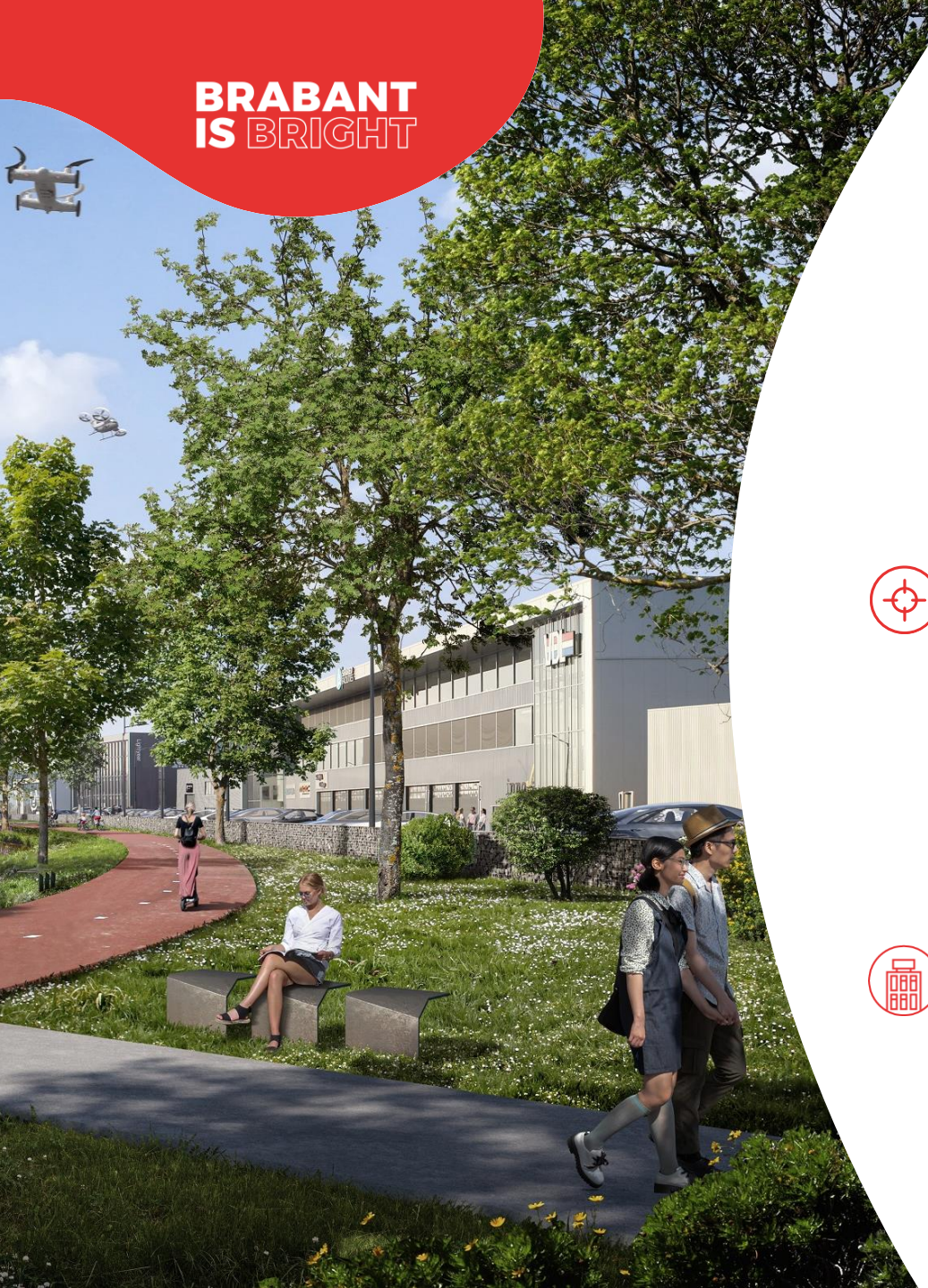

State-of-the-art facilities

Automotive Campus Brainport Eindhoven - The hart of Green & Smart Mobility

The Automotive Campus is the Dutch center of gravity in the field of automotive technology and smart and green mobility. It offers an attractive learning and working environment, state-of-the-art technological (test) facilities and flexible accommodation concepts. The Automotive Campus has become a hotspot where businesses, knowledge institutes, and student teams find one another and form partnerships in the spirt of open innovation.

OBJECTIVES

The Automotive Campus is the mobility ecosystem of 65 high tech companies. It's home to more than 1250 innovators, researchers and engineers. Each company at Automotive Campus shares a common goal: developing new technologies and applications that help solve social problems and challenges, and successfully bringing these to the market in the area of new mobility.

KEY FIGURES

- 65 companies & Organisations
- >25 nationalities
- 25 labs and test facilities
- 1250 Smart People 500 Students
- Total 30,000 m^2 of witch half to be constructed
- 100 events / year
- 10.000 Visitors
- Incubator for start-ups

LEADING COMPANIES

- Multinationals such as Siems-Tass international, Altran / Capgemini, Delta Electronics, VDL-ETS Durapower FEV
- Research institutes like the TNO, Rijkswaterstaat innovatie Centrale
- Scale ups and startups like Lightyear, Eleo, DENS, Nimbus

APPLICATION AREAS

AMC is a global hotspot in the areas of Smart & Green mobility, Sustainability, Applied Intelligence, Decarbonisation Digitalisation, & Connectivity.

AUTOMOTIVE CAMPUS

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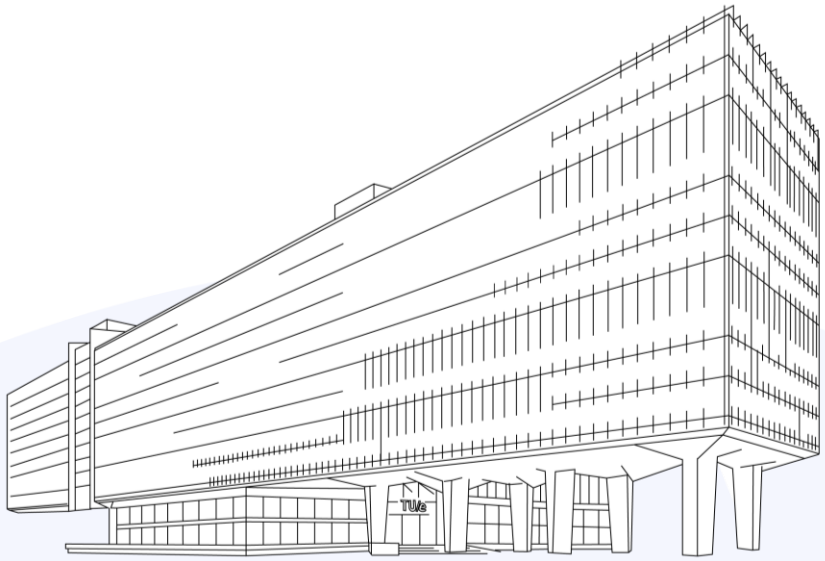
Key Research Institutes

Eindhoven University of Technology



COLLABORATION

A spirit of collaboration is at the heart of the university community. Globally, the university stands out when it comes to collaborating with advanced industries, as it has done with Royal Philips since its inception. Academic education is driven by both fundamental and applied research. The TU/e Campus is in the centre of one of the most powerful technology hubs in the world, Brainport Eindhoven.

The Bachelor's program of Automotive Technology is a unique program in the Netherlands that only TU/e offers. A large part of the automotive industry in the Netherlands is located in the Brainport Region Eindhoven. These employers have a high demand for highly qualified engineers. The Netherlands has a good reputation when it comes to the automotive industry. Many businesses are market leaders in Europe and even globally. TU/e works closely together with these businesses, both national and international.

Eindhoven University of Technology in numbers

SCIENTIFIC PUBLICATIONS
3,000

PHD-AWARDS
140

PATENTS EVERY YEAR
40

BACHELOR COLLEGE WITH
15 DIFFERENT MAJORS

MASTER PROGRAMS IN THE FIELDS OF:
- ARTIFICIAL INTELLIGENCE
- ENGINEERING & HEALTH
- HUMANS AND TECHNOLOGY
- SMART CITIES
- SMART MOBILITY
- SUSTAINABLE ENERGY

DEPARTMENT OF MECHANICAL ENGINEERING

Research Groep
- Control systems technology
- Dynamics and control
- Energy technology
- Polymer technology
- Power & flow

DEPARTMENT OF ELECTRICAL ENGINEERING

Research Groep
- Center for wireless technology Eindhoven (CWTE)
- Advanced network management and control
- Control systems
- Electromagnetics
- Electronic systems
- Photonic integration

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

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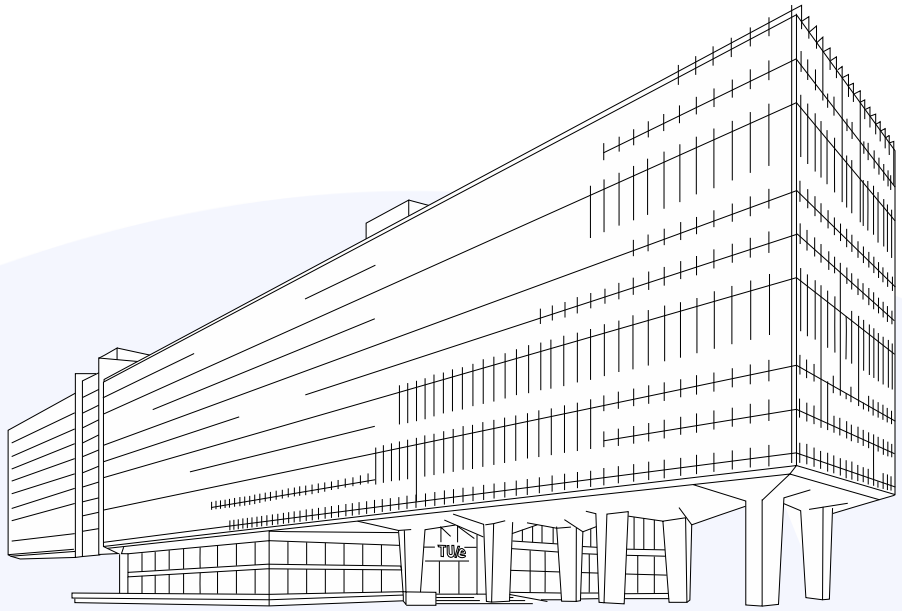
Key Research Institutes

EASI Institute

World class Research: The Eindhoven Artificial Intelligence Systems Institute (EAISI) is the new institute of Eindhoven University of Technology in the field of artificial intelligence (AI).



OBJECTIVES

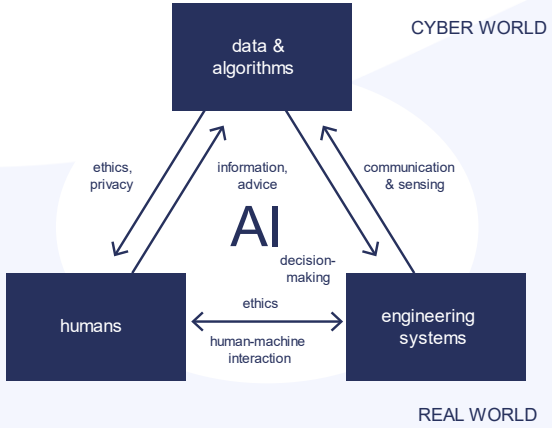
The Eindhoven AI Systems Institute combines all TU/e Artificial Intelligence activities. Top researchers from various research groups work together to create new and exciting AI methodologies and applications with a direct impact on the real world. TU/e has been active in the field of AI for many years, which gives the new institute an excellent starting position to build upon.

COLLABORATION WITH INDUSTRY

Building on the traditionally close ties of TU/e with industry, EAISI is partnering with several leading companies and organizations, both at a regional, national and European level. These include: ASML Philips Healthcare, NXP Brainport Eindhoven AI NL Coalition 4TU.Federation EuroTech.

KEY DOMAINS

An integrated system view of AI will be developed in this multidisciplinary institute, with key contributions from three key domains:



EASI Institute

"EASI IS WORKING ON THE MOONSHOT PROJECT "HEALTHCARE ANYWHERE." WITH GROUND-BREAKING PROJECTS LIKE ARTIFICIAL INTELLIGENCE FOR MEDICAL IMAGE REGISTRATION OR ASSISTING MEDICAL DECISION WITH EXPLAINABLE AI."

EAISI
EINDHOVEN AI SYSTEMS INSTITUTE

TU/e

BRABANT IS BRIGHT

Quality research institutes

Holst Centre

Independent and open innovation R&D centre in Eindhoven, with special focus on wireless autonomous sensor technologies and flexible electronics. Holst is jointly set-up and operated by IMEC and TNO.

Holst Centre innovation helps the automotive industry in a wide range of areas, from smart interior surfaces and non-contact monitoring of drivers to power source and battery management. At the same time our microelectronics enable the transition to Industry 5.0, for instance with UWB and Bluetooth micro-location technologies for safe and secure logistics.

OBJECTIVES

- Being an independent research and innovation center that focuses on innovations for improving health and wellbeing and on guaranteeing sustainable environments
- Improving quality of life while controlling healthcare spending

KEY FIGURES

- Over 40 international renown partners.
- 200 employees from 28 nations
- Located at High Tech Campus Eindhoven

FACILITIES

- R&D prototyping in an open innovation setting,
- Circuit design to reduce power consumption
- Printed and flexible electronics lowers manufacturing costs and increases user comfort

APPLICATION AREAS

- Human Machine Interface
- Ultra-wideband technology
- Bluetooth secure proximity
- Driver monitoring

Holst Centre
Open Innovation by imec and TNO

Quality Research Institutes

TNO

Automotive Battery Technology Center
Applied knowledge on powertrains by TNO.

In Helmond TNO develops control strategies for:

- CR dosing, flex-fuel engine, battery management systems and predictive energy management.
- TNO provides ultimate system validation. This is performed on in state-of-the-art experimental facilities:
- Unique Climatic Altitude Chamber for Engines vehicle testing at temperatures from –45 to +55 ºC and up to an altitude of 4000m
- 4 transient engine test benches equipped with Extensive state-of-the art measurement equipment for emissions and GHG: NOx, NO, CO, THC, CO2, O2 (CH4, EGR CO2)
- Portable Emission Measurement Systems (PEMS) for real world measurements
- Automated test benches for battery cell, module, pack and vehicle testing with thermal conditioning
- Extensive fuel infrastructure for liquid (diesel, petrol) and gaseous types (LPG,NG) as well as biofuels
- Fuel Cell test and validation facilities (under development)
- Fully configurable Truck- and Car-Labs (combustion, hybrid, fuel cell) for real-world on-road experiments

TNO innovation for life

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Key Research Institutes

Fontys

OBJECTIVES

Fontys is one of the largest universities of applied sciences in the Netherlands and located in the most innovative region of our country and perhaps the whole of Europe. It is the most exciting possible place to be for anyone with an interest in technology, entrepreneurship and creativity. Students of more than 100 nationalities study at one of our campuses.

AUTOMOTIVE FUNDAMENTS

- A good mix between theory (knowledge) and practice.
- (Corporate) assignments and projects.
- Skills: you learn to design, collaborate, work systematically and think creatively.
- Subjects: mechanics, thermodynamics, electrical engineering, measurement and control technology, engine dynamics, vehicle dynamics, vehicle electrical engineering, materials knowledge and engine management systems.

EDUCATION

Technical developments are moving fast, certainly in the field of mobility. This means that as an automotive engineer you must have creative insight and be able to switch quickly. The Automotive course teaches you to design, manufacture and test vehicles in a rapidly changing and demanding world.

The automotive engineer of the future is a systems thinker who can connect complex and different disciplines. We train you to be such a systems thinker. After your studies you will be able to understand, interpret, connect and integrate the complex challenges in transport concepts, sustainability and technology.

Fontys

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Key Research Institutes

RDW (Dutch National vehicle authority)

RDW'S ROLE

Based on the need for a type-approval for components and technical units or for systems and vehicles, RDW can guide you through the entire type-approval process. Tests can be performed in their Test Centre Lelystad, under the supervision of theTesting department or can be conducted by technical services. RDW works closely together with a wide range of technical services all over the world.

Because the RDW also takes part in the development of national and international legislation under the auspices of the Dutch government, they keep close track of technical developments. They can also exercise an influence on legislation and regulations and their interpretation.

When a vehicle is first registered in an EU Member State (also in the Netherlands, therefore), that vehicle must have a European type-approval. The RDW issues these type-approvals.

If you have a vehicle without a type-approval or with just a partial type-approval, you can have it tested and type-approved by the RDW so that it can be licensed for use on the roads. You can also ask the RDW to issue a type-approval for vehicle parts (components or technical units) so that you can then supply/sell them to the motor industry.

FIRST TYPE-APPROVAL, THEN SALE

The type-approval for a vehicle is the binding element between the certification, registration and sale of products. A vehicle or component that is presented for type-approval must have been produced by a certified manufacturer whose production process has been approved by the RDW. The RDW issues certificates for this purpose to the manufacturers of vehicles or components.

RDW

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Key Research Institutes

South Netherlands Regional Traffic Control Centre

The traffic management centre regulates the traffic on all national roads in the region and takes care of incident reports on the provincial roads. Also, the centre remotely operates and monitors tunnels and bridges.

CONTROL CENTRE

The control centre plays a leading role in road works, traffic jams and traffic incidents. The center can have roads closed, divert traffic and inform road users via the dynamic route information panels above the road. The traffic control center also manages the road inspectors.

INNOVATION

The South Netherlands Regional Traffic Control Centre also has an innovation room with two operator desks. This is a test environment that Rijkswaterstaat, together with private parties, government agencies and knowledge institutions, uses to work on smart traffic management solutions.

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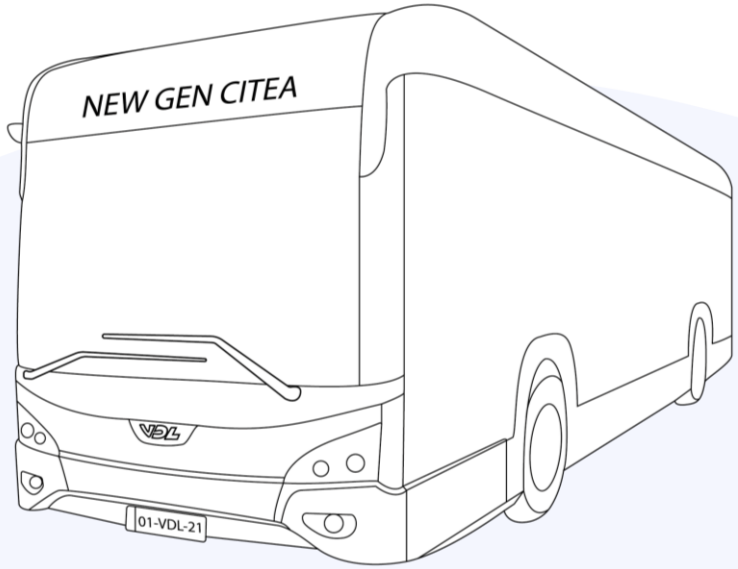
Key Research Institutes

Battery Competence Center

The Battery Competence Center is an innovation program where companies, knowledge institutions and public organizations work together to accelerate the transition to electric vehicles and vessels.



GOALS

The goal is to build expertise and knowledge on a national level around battery technology and its applications in various heavy-duty and industrial markets. By developing this knowledge and combining existing knowledge by working together in projects, companies and organizations will continue to differentiate and maintain and strengthen their competitive position in leading industries.

PROGRAM

The Battery Competence Center is the program where companies, knowledge institutions and organizations join forces to build knowledge and competencies in the field of battery technology. The battery, transport and shipping industry of the Netherlands comes together here.

MISSION AND AMBITION

The mission is to develop unique battery competencies and knowledge within the ecosystem and make it accessible for Dutch industry. The ambition is to become a leading center of expertise on application-driven battery technology development. This will lead to:

- Technological lead and improved competitive position
- Reduction of procurement costs and decrease of (international) dependency
- Creation of added value in the Netherlands
- Preservation and growth of employment

Partners

Founding fathers of the Battery Competence Center are Brainport Development, RAI Automotive Industry NL, VDL Groep, DAF Trucks, Damen Shipyards, ELEO, NMT, TU Eindhoven and TNO.

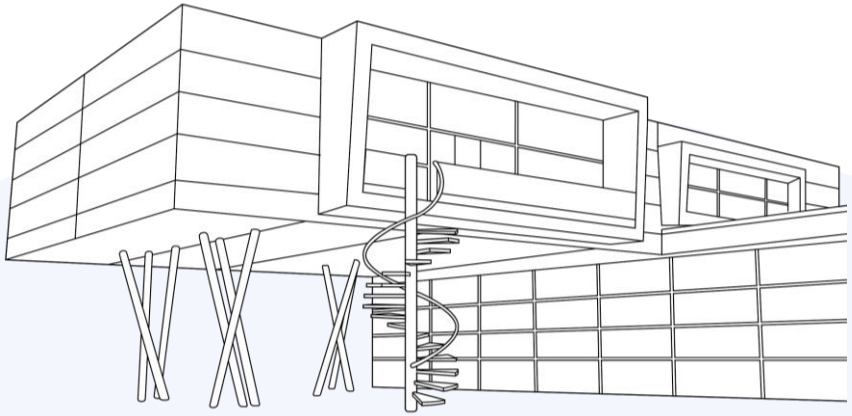
Battery Competence Center

BRABANT IS BRIGHT

Key Research Institutes

High Tech Systems Center

HTSC of Eindhoven University of Technology groups its research activities in the domain of complex high tech mechatronic systems into a one top level research center.



FUNDAMENTAL RESEARCH

At the TU/e High Tech Systems Center (HTSC), fundamental research and design around new concepts and prototypes takes place while focusing on the needs of the industry. Using systems design paradigms forms a central part of the program and challenges within HTSC.

FOUR DEPARTMENTS

By combining the expertise from four departments: Mechanical Engineering, Electrical Engineering, Mathematics and Computer Sciences and Applied Physics, the HTSC addresses the complexity problem of future high tech systems design in a multi-disciplinary way, with strong emphasis on System Engineering. The High Tech Systems Center performs fundamental research and design of new concepts and prototypes, and understands the needs of the industry.

FOCUS AREAS

The seven focus areas of HTSC are innovative and will continue to develop complex engineering: Robotics, Digital Engineering, Industrial Internet of Things, Scientific Instrumentation and Metrology, Optomechatronics, Artificial Intelligence and Contamination Control.

Currently HTCS had more than:

T-shaped engineers

150

Working on projects related to our center's focus

Of which PhD students

80%

And PFEng trainees

20%

HTSC HIGH TECH SYSTEMS CENTER TU/e

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Showcase

Lightyear

MISSION

Lightyear's mission is to make clean mobility available to everyone, anywhere in the world. Lightyear develops electric cars with an energy-efficient design and integrated solar panels, allowing drivers to drive on sunlight for up to 20,000 kilometers a year, depending on the local climate.

DESIGN

Lightyear One has been designed from a radically new perspective. This ensured that we had a strong focus on optimizing the efficiency and safety. The design of Lightyear One started with a blank sheet of paper. So we have not been guided by conventions in car design, but by the laws of physics alone.

LIGHTYEAR ONE

The Lightyear One is ultra-efficient, allowing the user to drive an unprecedented distance of 725 kilometers with a relatively small battery. In addition, the battery charges itself using solar energy, which can charge for up to 20,000 kilometers a year.

“Our entire team is specialized in optimizing the performance of a car.”

LEX HOEFSLOOT
CEO