Turning ideas into reality:

5 years of innovation at KPN Fieldlabs

April 2023

Foreword

We are excited to share this KPN Fieldlabs 5-year anniversary booklet, celebrating our continuous journey of pushing the boundaries of technology & innovation, and expanding them where necessary. In the past five years, we have achieved remarkable milestones that have been instrumental in developing new products and services that enable the digital highways of tomorrow.

As a firm believer that innovation does not happen by chance, we have invested our time, resources, and energy to create an ecosystem where creativity, ideas, flexibility, and discipline thrive. KPN Fieldlabs is where we turn our ideas into reality, and where we work alongside our technology partners, customers, and suppliers to put technology into practice; converting concepts into concrete products or services.

In this booklet, we share with you some of the past and present use cases of KPN Fieldlabs, and how we have collaborated with our partners from different sectors to co-create and develop innovative solutions. From autonomous driving to precision agriculture, from virtual reality to smart antennas in urban areas. We have explored different sectors and technologies, always with a hands-on and value-driven mindset and driven by the needs of our customers.

As we celebrate our 5-year anniversary, we also look forward to the next years to come. We are excited about the possibilities and opportunities that lie ahead, and we are committed to continue accelerating innovation, strengthening the ecosystem, and pushing the boundaries of technology to create innovative solutions that make a difference and support the mission of KPN: we go all out to connect everyone in the Netherlands to a sustainable future.

Thank you for joining us on this journey and setting up the ecosystem with us. We hope this booklet will inspire you as much as it has inspired us.

Let's accelerate innovation, together!

KPN Fieldlabs

Contents

Purpose KPN Fieldlabs

KPN Fieldlabs: A crucial tool to set up ecosystems, accelerate innovations and inspire customers.

Why:

Innovation with new technologies can be done best in a contained environment, outside KPN's production network with customers and partners.

How:

1. **Discover.** We utilize the latest technology has to offer by conducting proof-of-concepts in real-life settings.

2. **Stimulate.** We create innovation hotspots where technology meets real-life use cases.

3. **Inspire.** We inspire our customers with innovative new ideas.

4. **Test.** We test our innovations with customers (through co-creation) by building ecosystems of partners that can leverage the value of our network.

5. **Share.** We share inspiring videos and publications to showcase our technologies and inspire others.

MVP/POC in Fieldlabs

Reinforce KPN as frontrunner

Create ecosystems with partners and customers

Inspire and help digitize society

Influence standardization and regulation

Discover & test new technologies (with partners)


Brainport Industries Campus
ENTREE BIC 1
LIFT
AIRPORT
PARKING


kpn


Niels Hoffmann
KPN


B2
EHBO
ELIOT

KPN Fieldlab locations

Fieldlab Johan Cruijff Arena (Amsterdam)

Focus: Urban

The biggest 5G indoor location in the Netherlands, where KPN tested urban use cases like crowd control, fan experiences at events and priority for pin terminals. One of the key questions was: can 5G enable the critical communications to establish a digital perimeter?

Fieldlab Shell Pernis (Rotterdam)

Focus: Industry 4.0

Together with Shell, KPN investigated the relevance of 5G applications in plants and factories within three areas:

1. Process Automation,
2. Human Machine Interfaces (HMIs) and Production IT,
3. Monitoring & Maintenance.

Fieldlab Valthermond (Drenthe)

Focus: Agriculture

How can 5G help with shortening agricultural processes? Our initial focus was on precision-farming. In this Fieldlab, sustainability is top of mind, reducing the amount of weedkillers needed by real-time and precise use. ‘Dag Onkruid’.

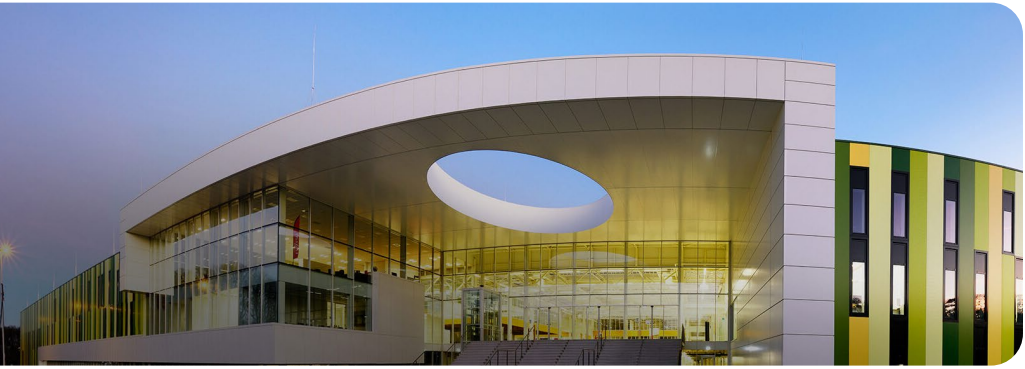
Fieldlab Automotive Campus (Helmond and Vlissingen)

Focus: Mobility

In the Fieldlab in Helmond, we focus together with partners on communication between cars and between cars and their environment. Preparing for an era where cars are driven in an automated mode and depend on mobile communications. Think, for example, of smarter traffic lights. This makes traffic safer through the use of 5G.

Fieldlab Brainport (Eindhoven)

Focus: Industry 4.0



Ultra-Reliability and Low Latency Communication (URLLC) is essential for the Industry 4.0 transformation. At Brainport Industries Campus (BIC) in Eindhoven, KPN has setup an industrial Fieldlab together with business partners from the industrial sector based on 5G SA (Standalone Architecture) indoor network and Edge on customer premise technology.

Innovation Playground (Rotterdam)

Focus: Hyperconnected cities

The Innovation Playground is the technology hub of KPN with the aim of connecting new technologies with the products and services of customers. In an inspiring and cutting-edge environment, makers and developers can conceive and test new services on the KPN network with the security solutions that KPN provides.

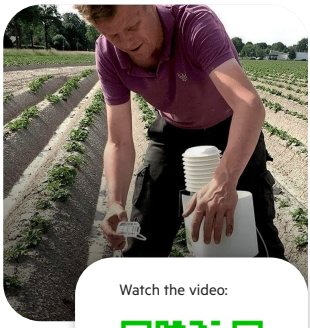
Fieldlab use cases 2018

April 12th 2018: The start of KPN Fieldlabs

Read more about the launch of KPN Fieldlabs:

Together with customers, tech partners, telecom, and IT service providers, KPN has launched four different 5G Fieldlabs in the course of 2018 to explore the value of 5G applications.

Precision agriculture with drones



Watch the video:

“Smart farming” enables control over every square meter of land with the help of IoT. Data is collected via cameras, drones, and/or soil sensors, which is subsequently aggregated and analyzed by artificial intelligence. This use case required KPN’s fast and stable 5G connectivity for real-time pest and soil control.

Location: Fieldlab Valthermond (Drenthe)
Status: Finished

Tesla with blinded windows

Watch the video:

This test clarified that latency on the 5G network is not an issue anymore for real-time data processing. We tested with a camera on the roof of a Tesla, which wirelessly connected through a modem with the “edge” of our KPN network. This wireless signal looped back to feed the VR-glass of the driver.

Location: Fieldlab Automotive Campus (Helmond)
Status: Finished

Crowd control & safety at Johan Cruijff Arena

Together with the municipality of Amsterdam and Nokia, KPN tested the new 5G network for large events at the Johan Cruijff Arena. In addition, we helped security services with improved mobile connectivity and applied new 5G techniques.

Watch the video:

Location: Fieldlab Johan Cruijff Arena (Amsterdam)
Status: Finished

In the media

De verbindende kracht van 5G

De vijfde generatie draadloze technologie dient zich in de komende jaren aan: 5G. Dit is geen plus-versie van het 4G-netwerk dat we nu kennen, maar een nieuwe functionaliteit met een nog hogere snelheid en betrouwbaarheid. Tom Poelhekken van KPN: "Met 5G knopen we de hele samenleving aan elkaar."

Sneller, slimmer, nauwkeuriger en betrouwbaarder. Naar de komst van 5G-technologie voor mobiele netwerken wordt al lange tijd halsreikend uitgekeken, zeker door telecombedrijf

Hoe drones boeren helpen met de aardappeloogst

Hoe nauwkeuriger een boer zijn aardappelplanten kan bespuiten, hoe minder gewasbeschermingsmiddel nodig is. Vanuit Drenthe komt hulp van een drone en een supersnel netwerk met 5G-technologie.

De aardappelplant bestaat uit aardappelloof boven de grond en knol onder de grond. Aan het eind van de cyclus sterft het loof af. Dit is belangrijk, want na de dood van de plant boven de

De auto als spil in communicatienetwerken

Esther Quelle

Geautomatiseerd rijden is maar één aspect van mobiliteit met 5G-technologie. In het 5G field lab in Helmond stort KPN zich samen met partners op de communicatie tussen auto's onderling en tussen auto's en hun omgeving.

Snuffelrobots en slimme helmen: 5G bij Shell Pernis

Veiligheid is belangrijk bij Shell Pernis, waar basischemicaliën en brandstoffen worden gemaakt. KPN legde er een 5G-netwerk neer en ontwikkelde samen met partners robots en helmen, die het werk nog veiliger en efficiënter maken.

Alles is groot aan Shell Pernis. Het terrein in het Rotterdamse havengebied meet 550 hectare, het equivalent van zo'n duizend voetbalvelden. Boven en onder de grond loopt 160.000 kilometer aan leidingen. Ongeveer zestig verschillende fabrieken maken er basischemicaliën

Aantrekkelijker wonen, werken en recreëren dankzij 5G

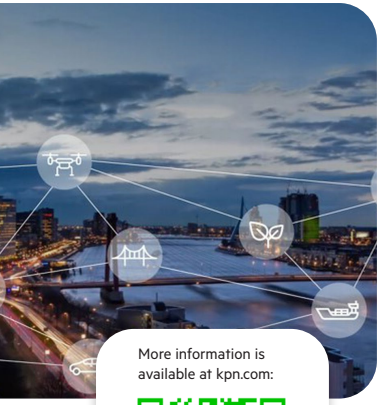
Esther Quelle

Amsterdam Zuidoost beschikt sinds eind vorig jaar over een 5G-netwerk. Samen met de Gemeente Amsterdam en de Johan Cruijff ArenA onderzoekt KPN in een 5G field lab hoe deze technologie het wonen, werken en recreëren in de buurt leuker en veiliger kan maken.

"Als facilitator van evenementen willen wij bezoekers aan het stadion een onvergetelijke ervaring geven," zegt Henk van Raan, CIO en innovatiemanager van de Johan Cruijff

Te land, ter zee en in de lucht: altijd hulp binnen bereik met 5G

Fieldlab use cases 2019

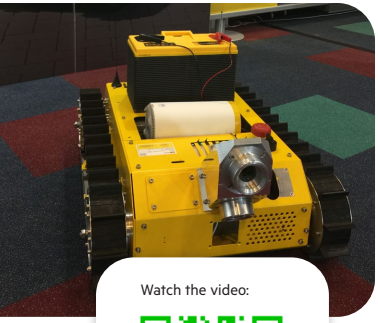


More information is available at kpn.com:

KPN tests 5G network between multiple locations in the Netherlands

KPN has successfully tested the 5G network between multiple locations in the Netherlands. Phone calls, video calls and data sessions were conducted from the latest 5G smartphones between the 5G indoor network in the Johan Cruijff Arena in Amsterdam, the 5G Fieldlab in the Port of Rotterdam and the Technology Lab of KPN in The Hague. KPN made use of the 3.5 GHz spectrum band. With this, KPN is taking the next step in the technical preparation of its mobile network for 5G.

Location: Fieldlab Johan Cruijff Arena (Amsterdam)
Status: Finished



Watch the video:

Wireless sensors for remote monitoring and predictive maintenance

At Shell Pernis, cellular connectivity enables the application of an increasing number of wireless IoT sensors in low-, mid- and high rate processes. This facilitates predictive maintenance and real-time monitoring, increasing both plant safety and production efficiency.

Location: Fieldlab at Shell (Pernis)
Status: Finished

Connected worker

A ‘connected worker’ has direct access to colleagues and knowledge within the organization through technology such as a smart helmet or a ruggedized tablet. This aids digitalization of paperwork processes and work-time reduction in complex inspection and maintenance procedures. The first trials were carried out at Shell Pernis.

Location: Fieldlab at Shell (Pernis)
Status: Finished

Cooperative Adaptive Cruise Control

Driving closer together within less than a second distance, this is what CACC can enable. Each vehicle informs the others real-time. Together with partners, KPN has tested a method that allows vehicles to inform each other about their location, speed and acceleration. These real-time communications help to reduce traffic jams, improve traffic safety, and enhance the overall driving experience.

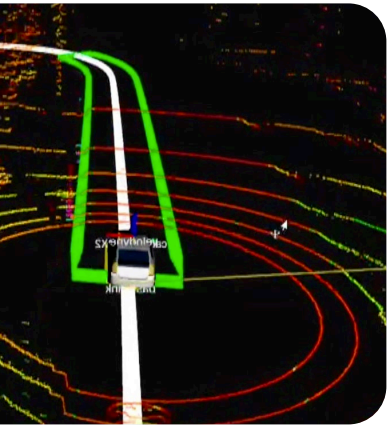
Location: Fieldlab Automotive Campus (Helmond) and test-track RDW
Status: Finished

Watch the video:

Faster and better inspection of pipelines

Inspecting all pipe tracks at Shell Pernis is a time-consuming and expensive process. Using a vehicle with a 4K camera that delivers high-resolution images to a machine-learning platform can make this process much faster. This makes it possible to prevent cracks and fractures by detecting corrosion and other defects with high precision in advance.

Location: Fieldlab at Shell (Pernis)
Status: Finished



Automated intersection crossings

Fieldlabs accelerates towards connected and automated driving. Automated vehicles depend on correct information from traffic lights or, if absent, sensors that indicate a clear road around the corner. Without this, traffic would either be too slow or unsafe. Together with partners, we tested automated intersection crossings with both traffic lights and radar sensors. Different communication technologies were used (both short-range and long-range).

Location: Fieldlab Automotive Campus (Helmond)
Status: Finished

Weed robot

Together with Wageningen University Research (WUR), we have used KPN's 5G + Edge platform to help a weed robot control and get rid of the weed very precisely. Our 5G takes care of the real-time communication between the robot and the AI controller which was set up on KPN's Edge platform. This way, the robot is instructed more accurately and in a timely manner.

Location: Fieldlab Valthermond (Drenthe)
Status: Finished

5G ambulance

Every ambulance in the Netherlands must be within 15 minutes reach from a patient. To save lives, time efficiency is key. That's why KPN Fieldlabs has been testing with UMCG to enable medical specialists to video stream with acute situations in ambulances via 5G connectivity before they arrive at the hospital.

Location: Groningen (on road)
Status: Finished

More information is available at kpn.com:

KPN Future Playground Gaming

KPN tested in the Johan Cruijff Arena in Amsterdam whether the new 5G network is actually faster and more powerful than what we get from 4G. Presenter and fanatical sportsman Arie Boomsma challenged three teams of well-known gamers to compete against each other in the active VR-game “Exodus Burned”. The three teams consisted of Jeremy, xLinkTijger, GameMeneer, Milan Knol, Roediementair and Puxque.

The mobile 5G network makes downloading, sending data and gaming much faster. Heavy games like “Exodus Burned” can easily be played in high quality by several people thanks to the high bandwidth. During the test in the Johan Cruijff ArenA, the VR game was streamed from the cloud to the VR headset via a 5G smartphone. Not only is the high speed of the 5G network important, the short reaction time (ping or latency) makes a big difference too: thanks to almost real-time communication, those playing the game do not suffer from VR motion sickness.

Location: Fieldlab Johan Cruijff Arena (Amsterdam)
Status: Finished

Fieldlab use cases 2020

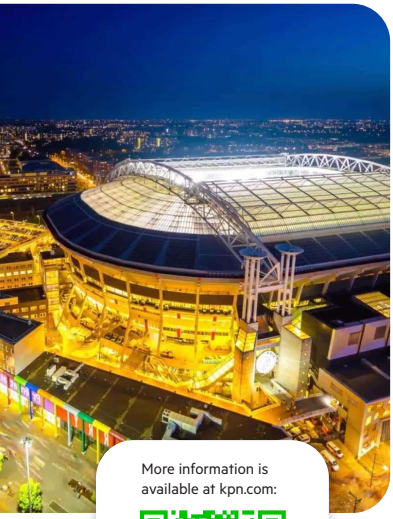
More information is available at kpn.com:

KPN pre-launch at XL Store Rotterdam and Amsterdam

KPN showed consumers the value of 5G on a 3,5GHz spectrum a few months prior to the 5G launch. Consumers experienced 5G on an LG phone. The ambition was to roll out this use case to all big KPN stores in the Netherlands. However, after the first two stores, the stores were closed due to Covid-19. The stores reopened after the 5G launch in July 2020.

Location: KPN XL Store Rotterdam
Status: Finished

"A woman drew on the wall in the Metaverse, then took off her glasses to see if it was really there..."
Eric



More information is available at kpn.com:

5G payment transactions at Johan Cruijff Arena

In and around the Arena, all kinds of pilots are investigating how 5G can increase the safety, convenience and experience of citizens and visitors. Mobile data in such a stadium is of big importance to increase the visitor's experience. For example, it is important that the payment terminals are always working. KPN has been testing with priority access to our network to quickly and reliably authorize payments from banks. Due to the use of 5G technology for payment transactions, Arena visitors have a faster turn at the mobile payment terminals.

Location: Fieldlab Johan Cruijff Arena (Amsterdam)
Status: Finished

More than 8 Gbps down and up in Amersfoort Vathorst

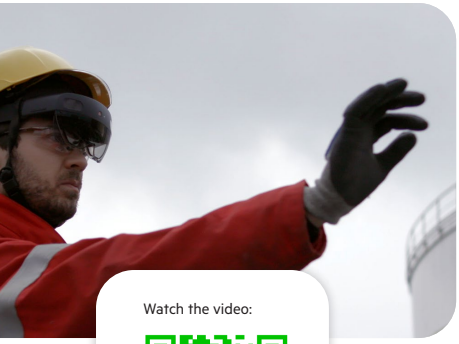
In 2020, Fieldlabs successfully demonstrated the ultra-high speeds that its fiber optic network can handle in the future. In the Vathorst district of Amersfoort, a speed of more than 8 Gbps was achieved in a residential house with a fiber optic connection, with peaks reaching 8.5 Gbps. It was the first time in the Netherlands that such high download and upload speeds have been achieved based on PON technology in a normal residential area.

Location: Amersfoort (customer's house)
Status: Finished

Almelo traffic lights (application priority)

This mobility project focused on smart communication between traffic lights in order to effectively synchronize traffic to reduce pollution, delays, and fuel costs. The intelligent traffic application was running in the cloud. With the help of KPN's 4G network, we were able to reach near real-time communication, getting closer to traffic that talks!

Location: Almelo
Status: Finished

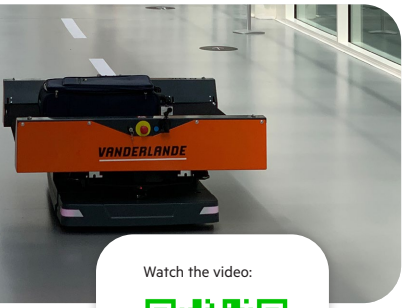


Watch the video:

Remote assist with AR

The current use case focusses on the possibilities of AR and gesture control as provided by the Microsoft HoloLens 2 and the Microsoft Remote Assist application that integrates with MS Teams. As part of the bidirectional video communication, the Remote Assist application provides AR features to assist the worker on site. Markers or other drawings made by the remote party on the camera image are superimposed over the actual environment the local worker sees and remain in place when the local worker turns his head.

Location: Fieldlab at Shell (Pernis)
Status: Finished



Watch the video:

Automated Guided Vehicles

Automated Guided Vehicles (AGVs) require reliably low latency communication to operate efficiently. With our indoor 5G network we demonstrated the advantage of 5G over Wi-Fi based solutions.

Location: Fieldlab Brainport (Eindhoven)
Status: Finished

Fixed Wireless Access pilot 5G

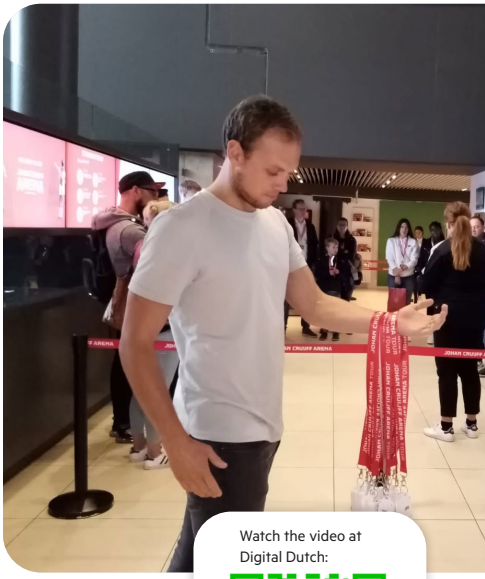
There are places, especially in rural areas, where residents would like to see the quality and speed of their internet improved. In order to provide home broadband internet service for the residents who don't have fiber to the home, a potential solution is Fixed Wireless Access (FWA). With FWA, data traffic is handled over the mobile network. We have tested this in the 5G Fieldlab Drenthe, together with a number of residents of Valthermond, who could use an internet connection via the 5G (test) network.

Location: Fieldlab Valthermond (Drenthe)
Status: Finished

Covid Buzzer based on UWB

The 1.5 meter society was a reality in which football stadiums were taking extra measures to ensure people can safely attend matches and concerts. KPN has provided the Covid Buzzer, a device that vibrates and flashes when someone comes within 1.5 meters of interpersonal distance. Ultra-Wideband (UWB) technology is used to measure the distance between two Covid Buzzers very precisely. The Johan Cruijff Arena in Amsterdam has implemented this solution for visitors taking guided or unguided tours. The implementation was completed in two hours and it is a first step towards implementing the technology in other stadiums in the Netherlands. The collaboration between the Johan Cruijff Arena, KPN, and Advanced Solutions Nederland (ASN) was successful.

Location: Fieldlab Johan Cruijff Arena (Amsterdam)
Status: Finished



Watch the video at Digital Dutch:

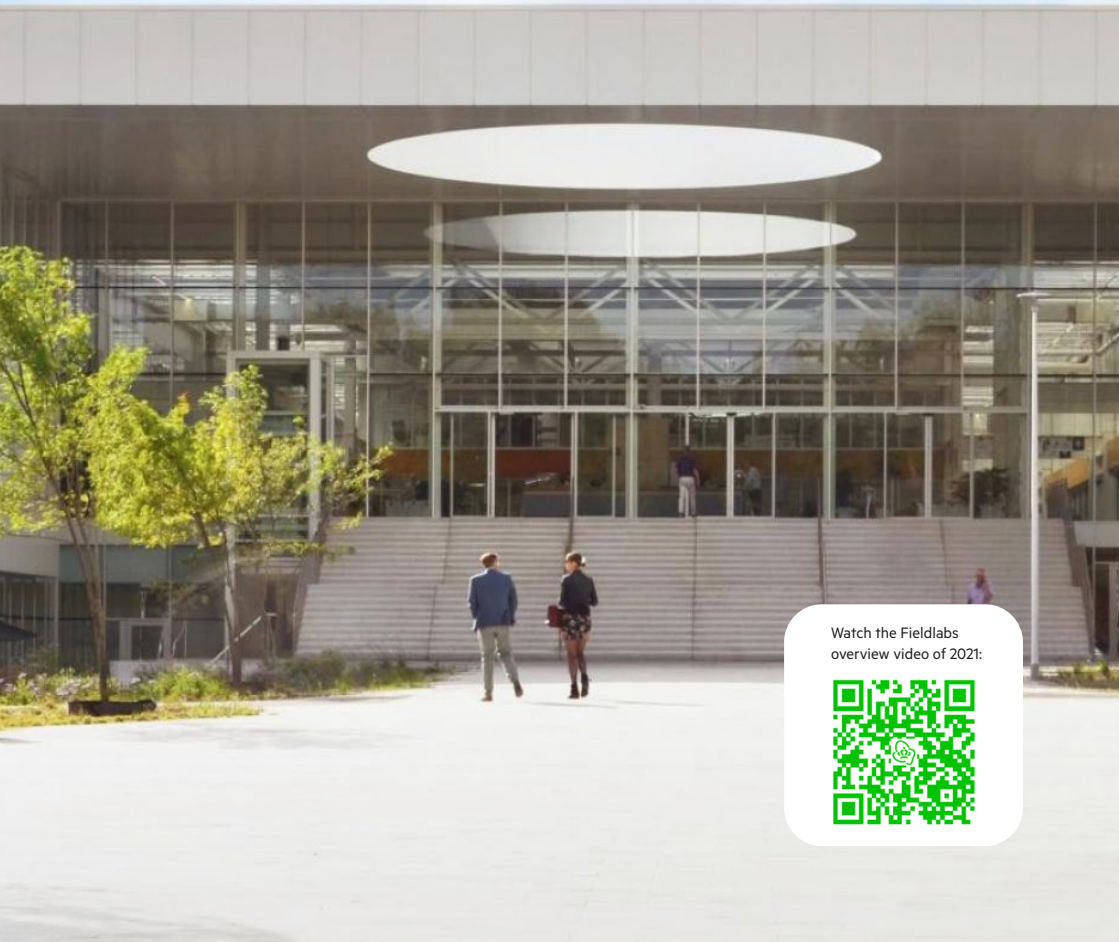
Start of 5G-Blueprint

KPN focuses on seamless roaming around the border together with Telenet (Belgium) to boost cross-border corridors for transport. The goal is to focus on a 5G network within the Netherlands that can seamlessly hand over towards a 5G network in Belgium and support autonomous driving. In addition, use cases in the harbor are tested to facilitate remote operations, aiming to guarantee network performance with 5G slicing.

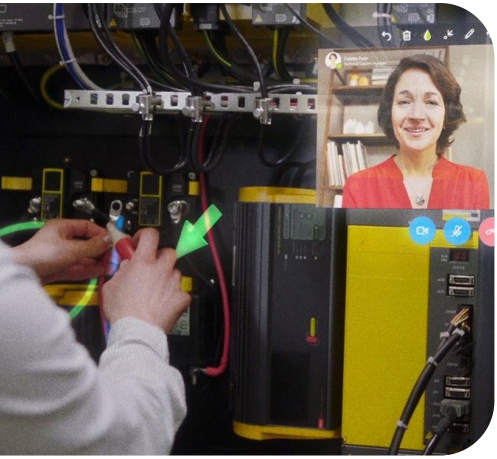
Location: Sas van Gent & Vlissingen (Zeeland)
Status: Ongoing

More information is available at kpn.com:

Fieldlab use cases 2021



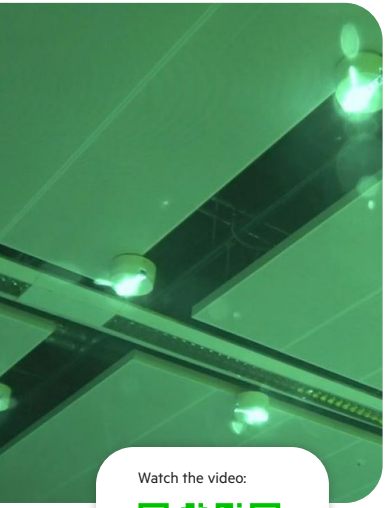
Watch the Fieldlabs overview video of 2021:



Cordis PLC and HoloLens

5G indoor connects the Inspark HoloLens with the Cordis PLC (Programmable Logical Controller) Suite so that the on-site engineer from industrial sectors receives more insights from the PLC and interacts with it more efficiently. The next step is to offload the control function of the PLC to KPN's Edge computing platform to make the digital transition of industrial applications more flexible.

Location: Fieldlab Brainport (Eindhoven)
Status: Finished



Watch the video:

LiFi (Eliot consortium)

Within the consortium 'ELIoT', KPN tested the consumer value of LiFi. The objective of this project was to develop new solutions using LiFi, a potential next generation of wireless communication, which travels over light instead of radio waves (e.g., Wi-Fi and cellular radio). With LiFi, KPN has explored the integration with Wi-Fi (including seamless handover), as well as performance, bandwidth and latency. This new wireless communication technology, which operates in the previously unused light spectrum, delivers potentially improved in-home user experience. KPN successfully performed the test. The value for the consumer market has been identified as not relevant for the short-term future. As a spin-off, multiple business market customers were interested and started their own proof-of-concept (PoC).

Location: Innovation Playground (Rotterdam)
Status: Finished

Festa virtual PLC

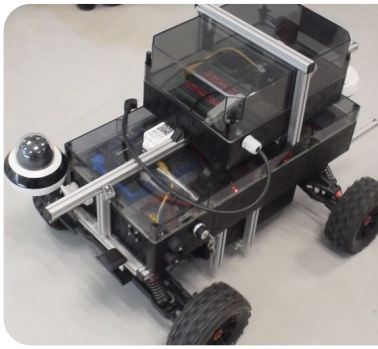
Programmable Logic Controllers (PLC's) exist for more than 50 years. It is a dedicated unit for controlling a single machine. We tested the virtualization of a PLC, running at the Edge, and communicating via 5G. For this test, a virtualized baggage X-ray scanner was used as a machine. Latency increases were directly noticeable and would lead to baggage getting stuck in the machine.

Location: Fieldlab Brainport (Eindhoven)
Status: Finished

MWLC inspection robot

An Automated Guided Vehicle (AGV) was controlled using the Edge at KPN's 5G network. Instructions to the AGV were generated by the functions which ran at the Edge (localization, path-finding, etc.). Localization was realized by the on-board sensors (LiDAR + ultrasound) and with the help of Ultra-Wideband (UWB).

Location: Fieldlab Brainport (Eindhoven)
Status: Finished



Concorda Truck Platooning

Within the EU Concorda project, we tested truck platooning on the road between Helmond and Eindhoven. The trucks could communicate using different short-range and long-range communication channels. By sharing their intended speed, the trucks can get closer together with increased safety and even reduce fuel consumption in the process.

Location: Fieldlab Automotive Campus (Helmond)
Status: Finished

5G Mobix Remote Driving

Within the EU 5G-Mobix project, KPN and partners tested the feasibility of operating a vehicle remotely via our cellular network. We found that while the communication latency might be small compared to the whole chain of components, it is important to provide reliable communication with sufficient uplink bandwidth.

Location: Fieldlab Automotive Campus (Helmond)
Status: Finished

"Recently we had a robot in Rotterdam, which was supposed to avoid obstacles. That thing just kept crashing into everything."
Ramin

Collision Avoidance

As another use case within the EU 5G-Mobix project, we tested collision avoidance using an edge application, together with partners. Vehicles could detect potential collisions and plan for alternative routes.

Location: Fieldlab Automotive Campus (Helmond)
Status: Finished

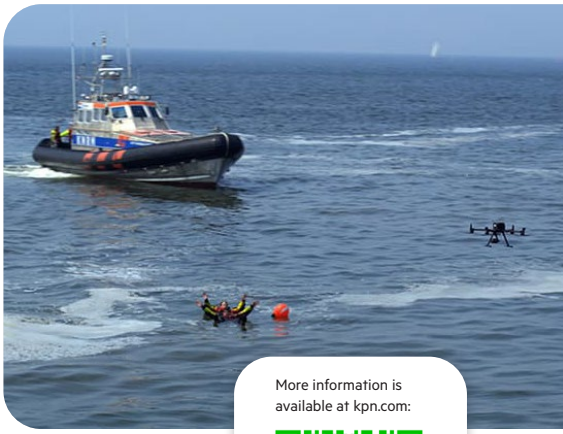
5G body cams at European Championship 2020

During the European Championship 2020 (played in 2021), four matches took place in the Amsterdam Johan Cruijff Arena. KPN has equipped the stadium with a 5G network and sensors in collaboration with Huawei, KPMG, and TNO. The Fieldlab in Amsterdam tested, among other things, how 5G can make body cams safer in places with a large crowd. Research shows that appropriate help or assistance can be offered more quickly. It provides a more complete picture of the situation on site and contributes to the safety of employees and visitors.

More information is available at kpn.com:

Location: Fieldlab Johan Cruijff Arena
Status: Finished

KNRM rescue drone



In collaboration with our partners TNO, Skytools, Delft Dynamics and Proeftuin op de Noordzee, Fieldlabs has tested how we can use drones for aerial drowning detection. A good and reliable network is crucial for controlling the drone and for processing the large amounts of data from the cameras. KPN's 5G network has sufficient bandwidth and, thanks to slicing, can give priority to mission-critical communication, such as in this case during a rescue operation.

More information is available at kpn.com:

Location: Proeftuin op de Noordzee (Scheveningen)
Status: Finished

Fieldlab use cases 2022

Watch the Fieldlabs overview video of 2022:

SCEF (API)

Using a network API in the mobile core we showed that it is possible to inform an application about changes in an IoT device. We successfully connected an application to the core network, receiving updates about the location of an IoT Device.

Location: Innovation Playground (Rotterdam)
Status: Finished

> "We have been guiding people with their first experience in a virtual reality. I was surprised how many people were completely overwhelmed. It often was a combination of feeling vulnerable and amazed."
>
> **David**

Fectar AR/VR for Industry

The Fectar VR/AR technology enables people to interacts with 3D space via a wide range of devices, while KPN's 5G network facilitates the communication with reliable low-latency performance.

Location: Fieldlab Brainport (Eindhoven)
Status: Finished

Calumino: People detection with infrared camera

Dutch scale-up Calumino developed a groundbreaking thermal imaging sensor with the help of KPN's network technology. According to Calumino's Commercial Director, Bart de Jong, the sensor is ideal for pest control and human detection. The KPN Manufacturing Fieldlab in Eindhoven has showcased the solution. The Calumino Thermal Sensor is a high-performance thermal sensor that is powered by AI and ensures privacy protection. The new sensor addresses issues related to privacy, low resolution, and affordability, and can easily integrate into end products. It makes use of computer vision AI-technology, and its embedded analytics identify people or animals by low-resolution blobs, with no breach of privacy. The Calumino-sensor has various applications in building management, healthcare, and pest control.

Location: Fieldlab Brainport (Eindhoven)
Status: Finished

More information is available at kpn.com:

ASN: Realtime indoor localization service

Together with ASN, we have used the RTLS-UWB system to provide asset tracking and process optimization for enterprise customers. Real-time location information of the personnel and assets can be controlled via the enterprise's ERP system with accuracy at centimeter precision.

Location: Fieldlab Brainport (Eindhoven)
Status: Finished

Dimenco 3D image without glasses

The technology developed by Dimenco enables people to directly see 3D effects on a laptop without wearing glasses. This technology could be applied not only to the gaming industry, but also to medical, educational, and industrial sectors, utilizing e.g. digital twin use cases. With the help of 5G and Edge computing, reliable low latency communication, data security, and unit price reduction of industrial devices can be achieved.

Location: Fieldlab Brainport (Eindhoven)
Status: Ongoing

20 Gbps to customers through glass fiber: Yes we can!

We know that our optical fiber network makes it possible to reach highspeeds up to 1 Gbps, but we now have even higher speeds on the horizon. In November 2022, Fieldlabs demonstrated that we can down- and upload at a rate of almost 20 Gigabit per second. This happened at the Caressa Veterinary Clinic on the Goudsesingel in Rotterdam. Like many industries, there is a need for higher speeds and increased data capacity in veterinary medicine.
In collaboration with Nokia, and under the watchful eye of a veterinarian, a number of journalists, and Babak Fouladi and Joost Steltenpool, a speed of nearly 20 Gigabit per second was reached.

Location: Caressa Veterinary Clinic (Rotterdam)
Status: Finished

Fieldlabs use cases 2023

Real-time Kinematics

Real-time Kinematics (RTK) is a positioning technique that improves GPS accuracy using reference point data correction with internet transmission, allowing for centimeter-precision location positioning. In collaboration with KPN IoT, this use case is currently being tested on transportation trucks and on the KPN IoT house drone.

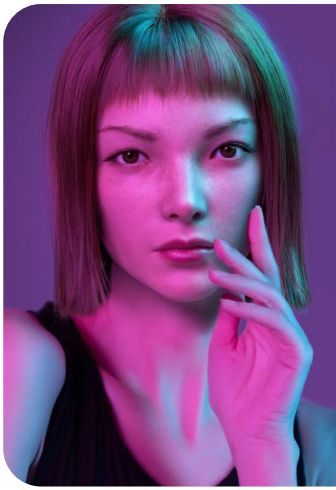
Location: KPN IoT (Rotterdam)
Status: Ongoing

Smallcells & mmWave

The mobile networks in the Netherlands are among the best in the world. In order to be able to offer sufficient capacity in the future, new 5G frequencies will be auctioned this year (2023) in the 3500 MHz band. The next step is also imminent, with the even higher mmWave frequencies becoming available. As the frequency increases, the range decreases. This means that as the frequency increases, more base stations are needed to cover the same area. Small cells help us provide a very high bandwidth to an area without the need for large obtrusive antennas. With our mmWave test in the Innovation Playground we tested how to integrate a small antenna in a lamppost and at the same time reach high bandwidths using future mmWave (high frequencies). We also did signal strength measurements in preparation of a real test setup in the City of Rotterdam.

Location: Innovation Playground (Rotterdam)
Status: Ongoing

Reblika 3D character scans



Reblika specializes in high-quality realistic avatars. With our Metaverse-ready network we are going to test the impact on the network with large numbers of realistic avatars in a Metaverse setting.

Location: Innovation Playground (Rotterdam)
Status: Ongoing

"A while ago, we have been working hard on mobile Fieldlabs, where a bus drives to locations to demonstrate 5G capabilities. Then, COVID-19 hit and all our effort was postponed. Song festival? Postponed. European Cup football? Postponed."

Marlous

InformAR Digital twins of physical spaces

A new and innovative IT company that focuses on quickly delivering 3D solutions to both businesses and government. InformAR creates digital twins of physical spaces, which then can be used for a wide range of applications, such as virtual tours, archiving, and real estate management. This project contributes to the steps towards virtualization and understanding of the process to create 3D assets from physical assets within KPN and its suppliers. More concretely, as 3D cameras can capture real-world objects and environments, they can be used by KPN facilities, for example, to show design or redesign new office or consumer areas.

Location: Innovation Playground (Rotterdam)
Status: Ongoing

5G-Blueprint 2023

Within the EU 5G-Blueprint, we work together with Telenet, TNO and other parties to prepare for uninterrupted 5G coverage across borders. The goal is to enable connected and automated mobility in Europe. We use 5G slicing to guarantee network services and cross-border handovers to keep vehicles connected. The major use case being tested in this project is teleoperated transport of both trucks and barges.

Location: Sas van Gent & Vlissingen (Zeeland)
Status: Ongoing

Fiber To The Room

The goal of Fiber To The Room (FTTR) is to provide a flexible and invisible fiber infrastructure in homes, and improve the broadband experience. This infrastructure is used to provide a wired backhaul for Wi-Fi Access-points and Ethernet connectivity. Therefore, Fieldlabs is testing FTTR at the in-home test location on the Innovation Playground in Rotterdam. Together with partners, KPN is exploring what use cases would most benefit from Fiber To The Room. Next to technical performance, Fieldlabs is looking into ease of installation, different housing scenarios and compatibility with existing infrastructure.

Location: Innovation Playground (Rotterdam)
Status: Ongoing


Balans
UNITED

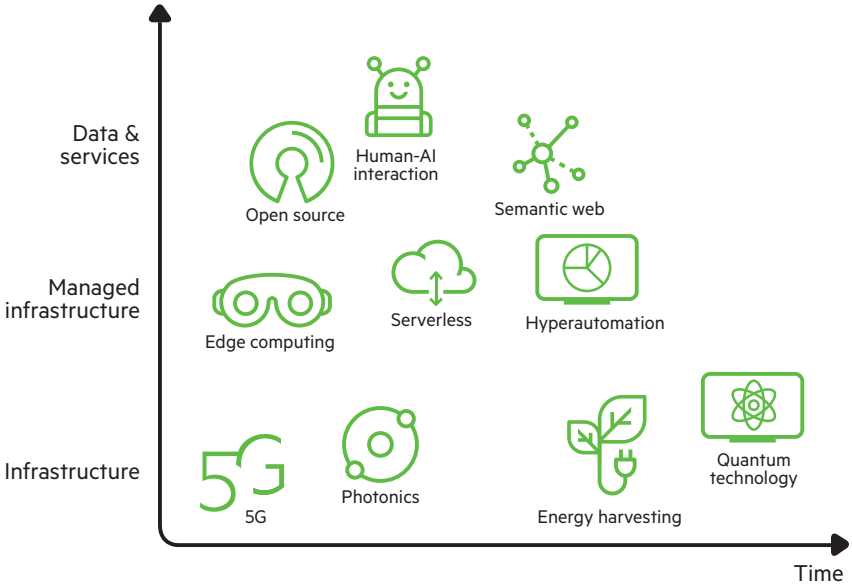
What’s next?

As we look to the future, KPN Fieldlabs continues pushing the boundaries of technology and continues expanding its leading role in digital infrastructure. Our vision is to be at the forefront of innovative network technology, collaborating closely with public and private partners to create faster, more reliable, and more secure networks that are essential to the digital highways of the Netherlands.

We believe that by focusing on our core values such as trust, courage and growth, while ensuring reliability, social responsibility, and sustainability, our innovations will not only meet the needs of the present but also contribute to the long-term success of the various industries we support.

Looking further ahead, the development of 6G technology provides new opportunities for KPN to redefine our industry, further strengthen the innovative performance of Dutch businesses and ensure that the digital infrastructure of the Netherlands remains at the forefront of innovation.

Thank you for joining us on this journey, and we look forward to continuing to innovate and collaborate with our partners to create a better future for all.

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kpn.com/netwerk/5g.htm
kpn
5G-netwerk van KPN
KPN is al 130 jaar het netwerk van Nederland. Op dit moment maken wij ons netwerk 5G ready. Zo kan jij straks nog sneller, veiliger en betrouwbaarder internetten.

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