

# TARGET-X

ACCELERATE THE DIGITAL  
TRANSFORMATION WITH 5G





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**TARGET-X**

## **Trial Platform for 5G Evolution Cross-Industry On Large Scale**

The fifth generation of wireless technology (5G) has arrived and is being rolled out globally. First industrial sectors such as manufacturing are testing the capabilities of 5G showing great potential for ubiquitous connectivity. With the sixth generation (6G), wireless communication will bring new features, improved performance, and functional benefits to several industrial sectors.

**Accelerating the  
digital  
transformation.\***





TARGET-X envisions accelerating the digital transformation of key verticals such as energy, construction, automotive, and manufacturing using large-scale trials in multiple testbeds. By demonstrating, validating, and evaluating the potential of 5G and 6G in real environments, technologies such as real-time communication, localization, self-description, digital twinning, and sensor-network data fusion can be tested and evaluated. The focus of the evaluation is on KPIs (Key Performance Indicators) and especially KVI (Key Value Indicators), such as sustainability, safety, security, and privacy. Based on these KVIs, new business models and a methodological assessment framework for economic and societal evaluation will be developed.



The TARGET-X community brings together a strong network of SMEs, IT and OT partners, and up to 100 FSTP (Financial Support for Third Parties) projects. A selection of use cases will be established for all verticals in the existing 5G testbeds. New 5G features will be developed and integrated into the testbeds and validated in evolved use cases. The projects will both deliver new use cases and technical contributions. The large number of sub-projects will strengthen the 5G and 6G ecosystem and contribute to standardization.

## Testbeds and Trial Sites

TARGET-X aims at five different testbeds on two of the largest European test facilities for smart production and automotive driving: the 5G-Industry Campus Europe in Aachen and the Idiada Automotive testbed close to Barcelona. Five testbeds will be implemented within these trial sites: Automotive, Manufacturing, Robotics, Construction, and Energy.

### Trial Sites

The **5G-Industry Campus Europe (5G-ICE)** is one of the German government's official 5G model regions and, at the time of the application, the largest industrial 5G testbed in Europe. It is a large-scale research infrastructure to validate 5G in production and located at the Melaten Campus of RWTH Aachen University, a university of excellence famous for engineering sciences. The area is covered with a 5G outdoor network of approximately 1 km<sup>2</sup>.

The **IDIADA Automotive 5G-Trial Site** covers 350 hectares, gathering 15 multi-purpose test tracks with a unique controlled environment capable of reproducing worldwide network configurations and conditions to develop and validate connected vehicle solutions.

Testbeds

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**Automotive.**

## 5G for autonomous driving

Applus IDIADA is a global partner to the automotive industry with over 30 years' experience in providing design, engineering, testing and homologation services. The company has more than 2,900 professionals and an international network of subsidiaries and branch offices in 22 countries, with headquarters located in Santa Oliva, Tarragona, Spain.

IDIADA HQ has 14 tracks with a technical center, 370 hectares covered by a confidential and secure environment, where a controlled and exclusive network with 2G, 3G, 4G and 5G NSA technologies is available. IDIADA, together with its partners, aims to boost the development and use of 5G networks in the automotive field through the following 3 use cases.

The feasibility of realizing the use cases using the best technologies will be evaluated and demonstrated throughout the project.

- **Cooperative perception for Connected Automated Vehicles (CAVs)**
- **Digital Road Twin**
- **Predictive Quality of Service**



Testbeds



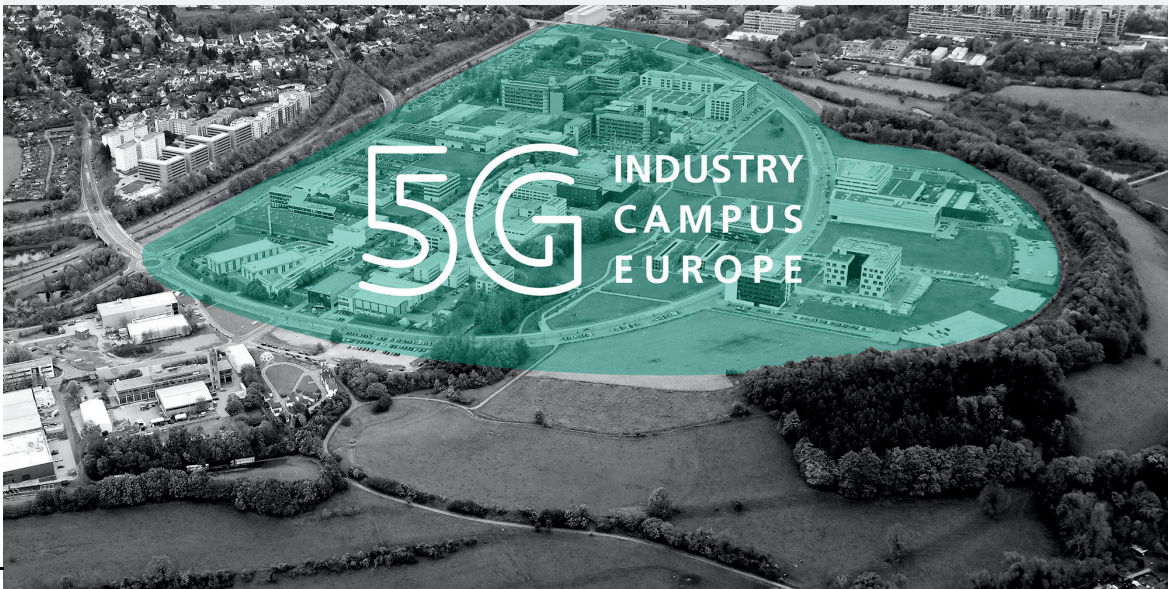
# Manufacturing.

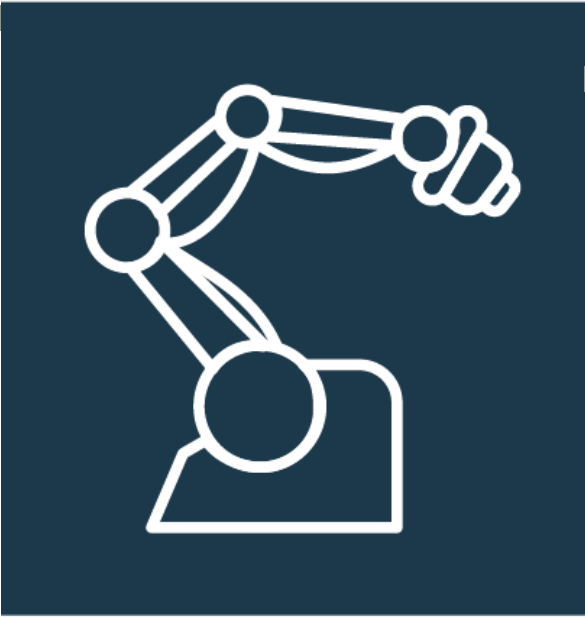


## 5G for manufacturing

At the Fraunhofer Institute for Production Metrology IPT, a shopfloor of 2.700 m<sup>2</sup> is covered with a 5G indoor network as part of the 5G-ICE. Besides coverage at 3,7 - 3,8 GHz, an additional 3GPP Rel. 15 compliant indoor radio cell at mmWave spectrum is installed at 26,7-27,5 GHz.

The IPT trial site provides an ideal playground for testing 5G and 6G technology in a realistic manufacturing environment with a comprehensive set of machine tools for manufacturing, including milling machines, production metrology like coordinate measuring machines and optical sensors, injection molding, and embossing machines or laser material processing machines. In addition to the production and mobile communication equipment, the Fraunhofer IPT also has an on-premise Kubernetes Cluster from German Edge Cloud, a VMware vCenter Server, and a TSN testbed, which is used for real-time communication and computation for cloud-in-the-loop applications. On top, IPT owns extensive measurement and diagnostic equipment to perform performance and diagnostic measurements in the 5G and the production network.





Testbeds

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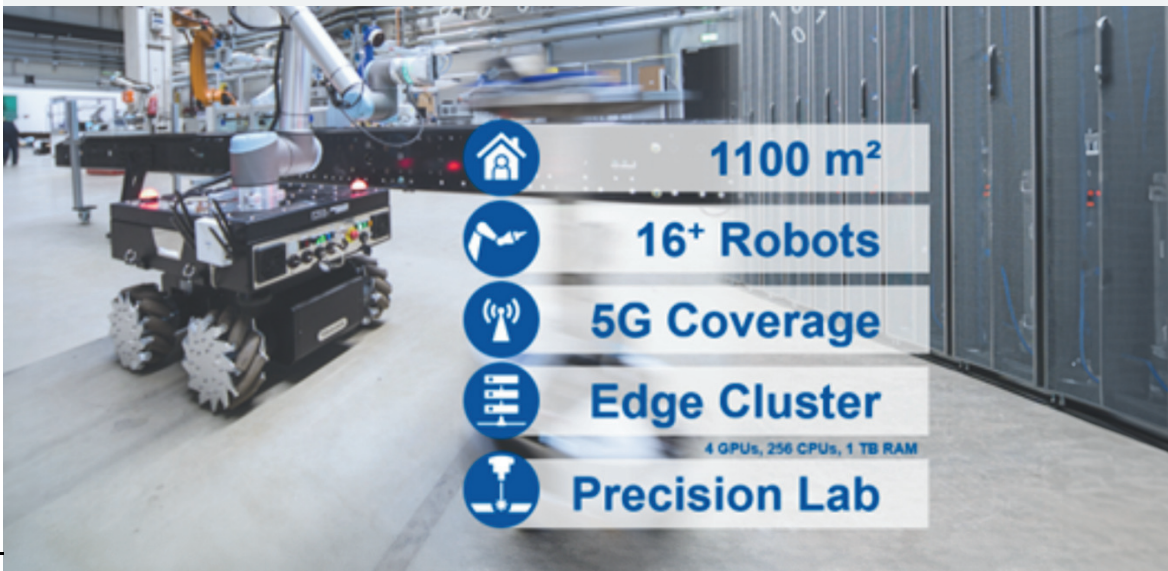
# Robotics.



## Line-less mobile assembly laboratory

Looking for a world-class facility to collaborate on your next assembly or mobile robotics project?

The Laboratory for Machine Tools and Production Engineering (WZL) at RWTH Aachen University offers a state-of-the-art environment with a diverse range of robots, large-scale metrology systems, and real industrial product cases. Specializing in Line-less Mobile Assembly Systems (LMAS), WZL integrates cutting-edge 5G/6G connectivity from the 5G-Industry Campus Europe, enhancing mobile manipulation and agile robotic systems for the manufacturing and assembly sectors. Our versatile robot fleet, supported by an open-source Robot Operating System 2 (ROS2) control architecture, includes autonomous mobile robots, mobile manipulators, and semi-stationary industrial robots. The facility features precise measurement systems for benchmarking localization in a 25×5 m<sup>2</sup> area and offers real industrial products for testing processes in automotive, truck, or aerospace assembly. Designed to simulate modern industrial shop-floors, our lab provides an ideal setting for developing, testing, and validating your experiments in real-world-like conditions.





Testbeds

# Construction.

## Reference Construction Site

The Reference Construction Site operated by the Center Construction Robotics on the Campus Melaten in Aachen provides a living laboratory for research and development in the construction industry. In this environment, innovative processes, concepts and products that address today's most pressing challenges, such as digitalization, decarbonization and the improvement of sustainability, can be tested, evaluated and put into practice under real-life conditions. Amongst others, current research topics include the automation of construction machinery, the integration of robots into construction processes and the development of concepts for robust digital twins of construction processes. New working, teaching and communication concepts are also being developed and tested. Since the Reference Construction Site has been connected to the 5G-Industry Campus Europe, 5G can be introduced and tested as a new standard for mobile communications in construction use cases. The application of 5G technology in construction has the potential to automate processes and reduce the workload of personnel. Yet, this transformation requires enhanced safety concepts to protect humans in partially and fully automated processes, while at the same time advancing the digital transformation.



Testbeds



**Energy.**

The Automation of Complex Power Systems (ACS) Institute at E.ON Energy Research Center (ERC), belongs to RWTH Aachen University. The main target of research at E. ON ERC is energy efficiency, energy savings and sustainable energy supplies. The energy testbed is handled by the RWTH-ACS Institute which involves deploying measurement devices for low voltage and current at the main building of E.ON ERC, RWTH Aachen University. Further edgePMU devices are deployed for the grid measurement trial sites at different locations within the Melaten Campus. The goal is to derive a better understanding of the local grid voltage and the impact of the local 5G network on the measurement quality.

Overall, three subsites will be used in TARGET-X energy vertical which are the Campus distribution grid, WZL line-less mobile assembly laboratory, and CCR Reference Construction Site. The energy monitoring setups used to sample data at these different sites will be connected to the existing 5G-Industry Campus Europe infrastructure. Both the indoor and outdoor 5G networks will be used accordingly. This will allow for an architecture that can be utilized across the different verticals and will increase energy awareness and grid monitoring capabilities in the fields of construction, manufacturing, and energy.



# Consortium Partners.

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- Fraunhofer Institute for Production Technology IPT
- Ericsson GmbH
- RWTH Aachen
- IDIADA AUTOMOTIVE TECHNOLOGY SA
- Center Construction Robotics GmbH
- FUNDACIO PRIVADA I2CAT, INTERNET I INNOVACIO DIGITAL A CATALUNYA
- Marposs SpA
- Fundingbox Accelerator
- Ericsson Arastirma Gelirstirme ve Bilisim Hizmetleri ANonim Sirketi
- 5G Communications for Future Industry Verticals SL
- Marposs Monitoring Solutions GmbH
- Neutron
- Mitsubishi Electric Europe BV
- Fundingbox Communities
- Qualcomm CDMA Technologies GmbH



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