

**tecna:a**

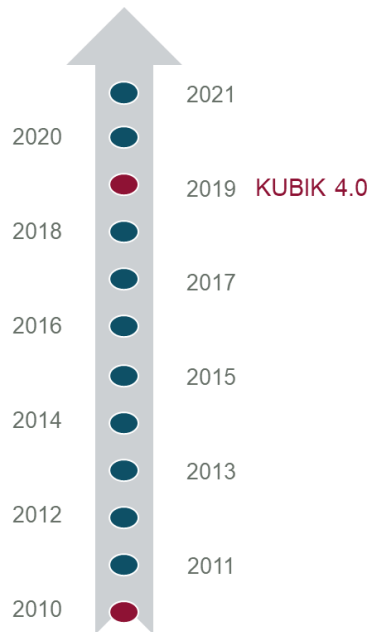
MEMBER OF BASQUE RESEARCH  
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# KUBIK 4.0

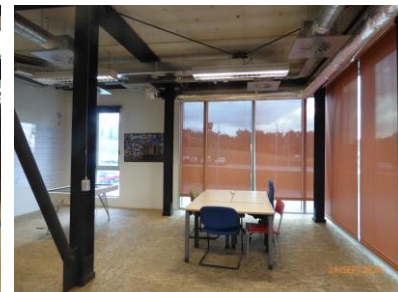
# DIGITAL TWIN OF EXPERIMENTAL INFRAESTRUCTURE

- Smart City Expo
- 16-18 November 2021

## WHAT IS KUBIK?



**KUBIK IS A FULL-SCALE R&D TEST FACILITY FOR THE DEVELOPMENT OF NEW CONCEPTS, PRODUCTS AND SERVICES IN ORDER TO IMPROVE ENERGY EFFICIENCY IN BUILDINGS.**



- ❖ To set 500 m2 ( The building has 3 floors, basement and roof)
- ❖ Kubik has the experimental capabilities to realistically reproduce the real building operating conditions:
  - ❖ Constructive Solutions
  - ❖ Intelligent management of air conditioning and lighting systems
  - ❖ Supply from conventional and renewable energies (geothermal, solar and wind)
- ❖ Monitoring and control system that provides the necessary information for the development of I+D+i activities.

# WHAT KUBIK HAS BEEN TRANSFORMED ?



EXPERIMENTAL INFRASTRUCTURE FOR THE DEVELOPMENT OF NEW CONCEPTS, PRODUCTS AND SERVICES FOR THE IMPROVEMENT OF ENERGY EFFICIENCY, SAFETY, QUALITY OF LIFE AND INTERACTIVITY IN BUILDINGS



- 2021
- 2020
- 2019 KUBIK 4.0
- 2018
- 2017
- 2016
- 2015
- 2014
- 2013
- 2012
- 2011
- 2010



DIGITAL TWIN

DIGITAL TWIN KUBIK is the first Building that has a complete **DYNAMIC AND VIRTUAL** model of the Building.

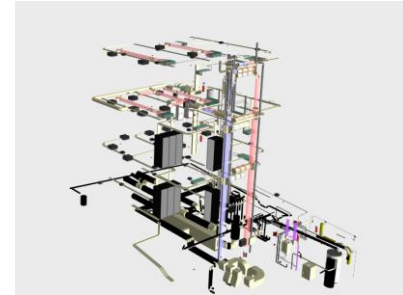
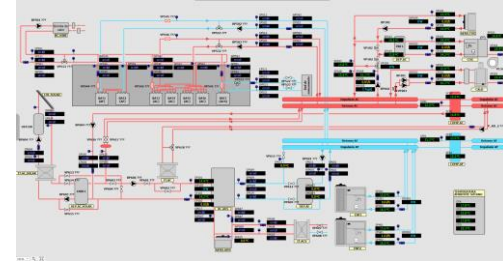
Real-time reflection of the status and evolution of any activity that occurs in the real building

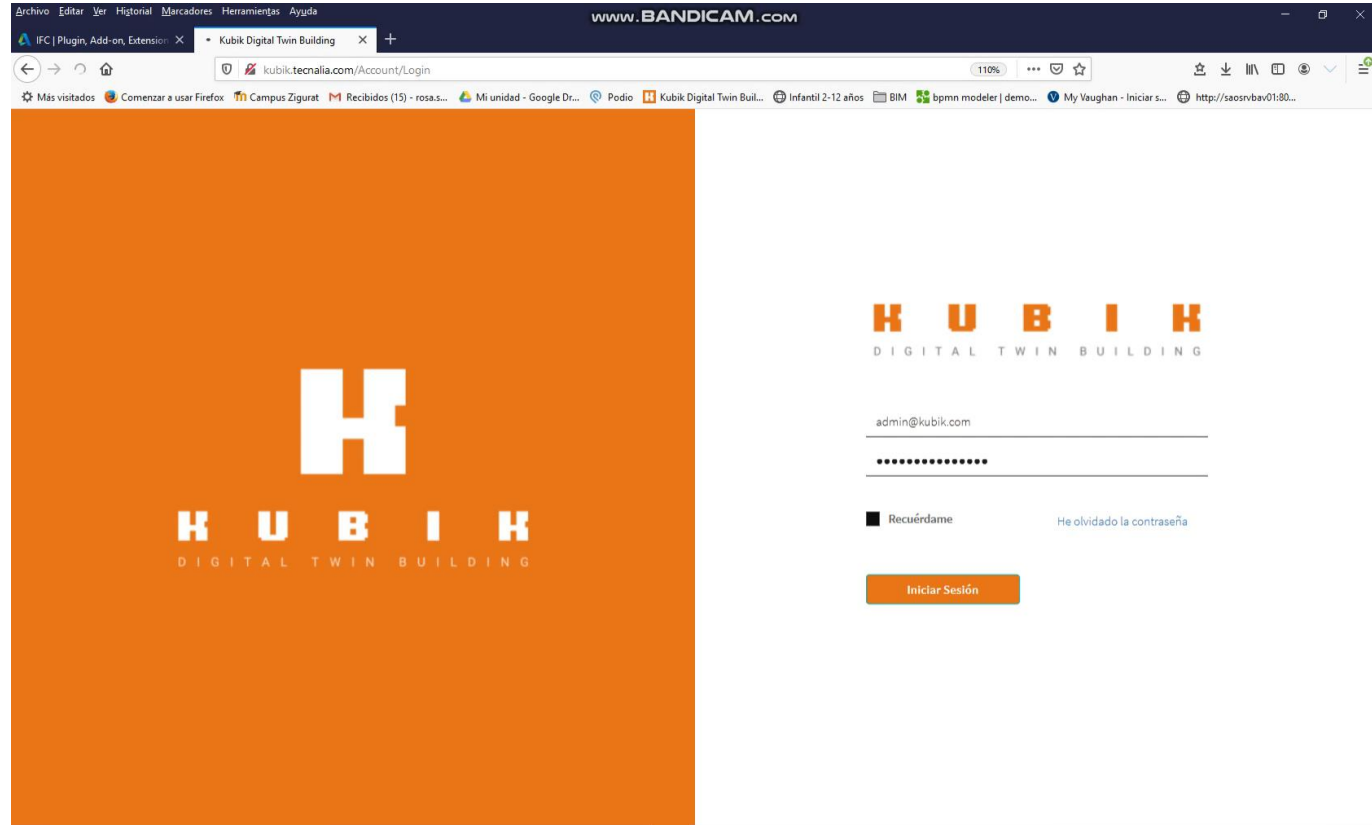
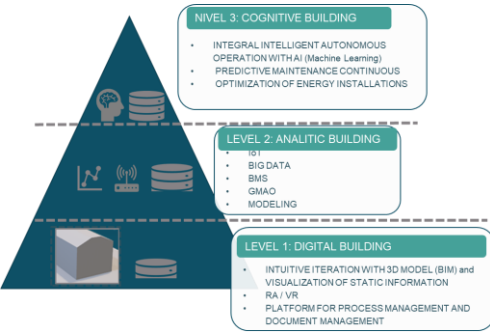
## CURRENT CAPABILITIES



INFRASTRUCTURE WHERE TO APPLY CYBERSECURITY TECHNIQUES, BUILDING BEHAVIOR SIMULATION, AUTONOMOUS BUILDING MANAGEMENT, PREDICTIVE MAINTENANCE, BLOCKCHAIN, IOT (INTERNET OF THINGS), AI (ARTIFICIAL INTELLIGENCE) AND BIG DATA

- ❖ 3.500 sensors and actuators; that allow total control of each of the elements of the installation.
- ❖ Simulation of both a tertiary and residential environment
- ❖ Singular and experimental thermal systems Heat pump coupled to PCM thermal storage battery.
  - ❖ Solar thermal installation
  - ❖ Absorption equipment
  - ❖ Geothermal heat pump
- ❖ IoT node for data interconnection, (Modbus, Backnet, KNX, Dali, Z-wave, EnOcean, LORA, ...)
- ❖ Installation monitoring and control system; that allows to carry in parallel up to 10 structural or digital experiments of the building.
- ❖ Virtualization Environment. BIM-MEP model of the installation connected in real time with the building infrastructure. Allowing a complete monitoring of the installation.
- ❖ Hadoop environment for serialization of installation behavior data.
- ❖ Spark environment for simulation and execution of algorithms for decision-making and control of the installation.





<https://youtu.be/LrFbAhavibQ>

# KNOW A LITTLE MORE VIRTUAL WALK

PLANTA BAJA

<https://poly.google.com/view/7IVDXNiiKYm>



## VIDEO



The objectives and capabilities of the first version of KUBIK

[https://www.youtube.com/watch?v=h4ohUX4\\_xWc](https://www.youtube.com/watch?v=h4ohUX4_xWc)

Functionalities of digital twin versión of KUBIK

<https://www.youtube.com/watch?v=idQkNSSLd-M>

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**THANK YOU!**

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