The Smart Networks project in isolated environments, one of the first Private 5G SA networks with advanced slicing pilots in Spain

- **The project will test a stand-alone Private 5G network and 2 use cases enabled by this advanced network, Augmented Reality and certification through Blockchain for additive manufacturing**
- **The objective is to promote connectivity in environments of difficult accessibility to explore new applications based on real use cases**
- **The pilot project is part of the 5G Barcelona initiative with Mobile World Capital Barcelona, Institute for Advanced Architecture of Catalonia (IAAC), Caelum Labs, Neutroon and Italtel as partners, with the collaboration of MásMóvil and Aotec and the support of the Government of Catalonia**

Barcelona, July 21, 2021.- The Smart Networks project in isolated environments was born to create new pilot projects that help to develop new services in places of difficult accessibility thanks to the implementation of a private stand-alone 5G network powered by Neutroon, in addition to a WIFI-6 network sponsored by Italtel to test and deploy IoT solutions.

Network slicing is one of the characteristics that will allow achieving the maximum potential of 5G. This feature allows multiple logical networks to be executed as virtually independent business operations in a single common physical infrastructure efficiently and without requiring high productive resources.

This is one of the first times that the 5G network slicing method has been used for a proof of concept in Spain. 5G networks cover an extremely wide range of use cases, ranging from the Internet of Things to mission-critical uses such as autonomous vehicles and remote surgery, through simple Internet access or entertainment. Each of these applications has very different latency, throughput, or criticality requirements, making it difficult for them to share the same physical network. Slicing allows multiple virtual networks to be created on a shared common physical infrastructure, offering dedicated virtual networks to meet the specific needs of applications, services, devices, clients or operators. With the concept of network slicing, 5G consolidates and makes accessible a whole series of technologies previously available in isolation, such as software-defined networks (SDN) and virtualized network functions (VFN).

The three pilot projects
The project considers 3 main demos:

5G SA private network: this network will provide advanced connectivity to the farmhouse located in a rural area where the Institute for Advanced Architecture of Catalonia (IAAC) runs Valldaura Labs. This will give IAAC a real testbed to test their different smart city innovations. The 100% multi-vendor, and hybrid network, delivered by Neutroon, allows for end-to-end slicing with just a few clicks to ensure, low latencies, and guaranteed SLAs.

Augmented Reality (AR): consists of the creation of an Augmented Reality experience within the IAAC Biocities project. Through the connectivity provided by the private 5G SA network and an Augmented Reality application, the user will be able to obtain a series of data on the origin of each of the 0km wooden pieces that have been used to build the cross-laminated timber panels structuring the Voxel - a quarantine cabin designed for self-confinement of an occupant. The data that can be extracted from the wood are the species, coordinates of the original tree, volume, sequestered carbon and photos of the original tree.

Additive manufacturing: it involves the creation of a peer-to-peer communication tool based on the identity credential to create a private communication network between the IAAC and the different 3D printing hubs located in Barcelona. The goal is to offer the user a 360 experience where they can safely access any 3D printing hub, select the printer they need, print the file safely without compromising the privacy of their personal data. Once the part is printed, the machine will send a message to the courier service to collect the part and then deliver it to the recipient. And this is possible thanks to the Caelum solution that uses blockchain technology and Identity. Digital Soberana, creates a secure ecosystem that allows real interoperability between the organizations that are part of the process and provides users with secure access credentials to interact between devices.

Collaboration as key part of the project

The pilot project has been developed by MWCapital and the Institute of Advanced Architecture of Catalonia, with the support of Caelum Labs, Neutroon and Italtel, within the framework of the 5G Barcelona initiative, and also has the collaboration of Masmovil, the National SME Telecommunication Association (Aotec), and the support of the Department of the Vice-Presidency and Digital Policies and Territory in the framework of the 5G and Blockchain Strategies of the Government of Catalunya. Its implementation has been carried out at Valldaura Self-Sufficient Labs, a facility of the Institute for Advanced Architecture of Catalonia located in the Collserola Natural Park.

According to Eduard Martín, 5G program director at MWCapital and CEO of 5G Barcelona: “With 4G, we had a one-way road that did not require further specification, but now, with 5G, what we have is a highway with different lanes with different needs. And the way to meet the needs of each lane is slicing”.

Christopher Gehlen, Neutroon's CEO & Co-founder mentioned: "5G is an exponential technology that will have a huge impact on our daily lives, changes we can barely imagine today, as we are still at the start of the slope. Early adopters of advanced use cases powered by 5G will be large Industry 4.0 players, but we need to make sure we don't leave SMEs and rural communities behind. Our mission at Neutroon is simple but ambitious: to make 5G and advanced wireless in general more affordable, flexible and easier-to-use in order to help reduce the growing digital divide"

On the other hand, Josep Ramon Ferrer, Sales Director of Public Sector at Italtel SA confirms that “these such innovative initiatives are the way to link the technological power of 5G and IoT to develop modern urbanism based on environmental sustainability and the efficiency of energy and natural resources. And what better place than a 19th-century farmhouse, located in the

heart of the Collserola mountain, where it can only be accessed by a rural road but it's managed with the highest technology of the 21st century!"

Moreover, Alex Puig, co-founder of Caelum Labs, emphasizes that "with the pandemic, due to restrictions, nobody has been able to make use of 3D machines, many have abandoned the city, but printers of this type are not readily available and specialized centres are needed. Thanks to this project we are bringing these instruments safely closer to people through a screen, and just a couple of clicks away. The idea is that this pilot phase can be exported to the whole world by other FabLabs, and that people with specific credentials can access the machines with total privacy without leaving their homes".

Vicente Guallart, co-Founder of IAAC and co-Director of Valldaura Labs, adds "Valldaura Labs is dedicated to the investigation of contemporary self-sufficiency, based on the holistic integration of architectural, technological, social and ecological systems. 5G, thanks to new key features like network slicing, is therefore a crucial tool for enabling communication with the many sensors, actuators and devices comprising the complex IoT implementations required to manage the many variables of dynamic, real-world environments. By measuring and controlling diverse inputs and outputs, we can trace the flows of people, materials and energy in order to find and leverage opportunities for synthesis and exchange, or to tell their stories. These strategies empowers designers to intelligently optimize decentralized, distributed human and natural ecosystems – through innovations like an Internet of Energy or Internet of Water – even in rural settings. This project represents the best of both the digital and ecological transitions in architecture. In the future, traceability will be fundamental to achieve the Europe of zero emissions that we aim to achieve before 2050".

Thanks to this project, it will be analysed how 5G technology can improve the optimization of internal processes, both operational and maintenance; new services to improve the end-user experience; promote the development and testing testing of next-generation networks such as 5G, WiFi 6, IoT, among others.