



CELTIC-NEXT Proposers Day

26th of January 2022, Online via WebEx



MUSCLES



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MUSCLES ID Card



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| <i>Acronym</i> | MUSCLES |
| <i>Title of the Project</i> | Mobile Ubiquitous Small Cells for Low-cost Energy and Spectrum efficient cloud service delivery |
| <i>CELTIC Label</i> | C2015/1-5 |
| <i>CELTIC label approved on</i> | 23/03/2015 |
| <i>Planned Starting date – End date</i> | 01/01/2017 – 31/12/2019 |
| <i>Actual Starting date – End date</i> | 01/01/2017 – 31/12/2019 |
| <i>Duration (in months)</i> | 36 |
| <i>Project Coordinator</i> | Ayman Radwan, Ph.D. Instituto de Telecomunicações |
| <i>CELTIC Office Programme Manager</i> | Maria João Barros |
| <i>Logo</i> |  |



Instituto de Telecomunicações



- **Instituto de Telecomunicações (IT) is a private, Portuguese non-profit organization, of public interest, a partnership of five institutions with experience in R&D in the telecommunications field**
 - Instituto Superior Técnico
 - Universidade de Aveiro
 - Universidade de Coimbra
 - Portugal Telecom Inovação
 - Nokia Siemens Networks
- **IT is actively involved in fundamental and applied research both at national and international levels. Simultaneously it is committed to foster higher education and training, by hosting and tutoring graduate and postgraduate students.**
 - Wireless Technologies
 - Optics and Photonics
 - Information and Data Sciences
 - Networks and Services
 - Basic Sciences & Enabling Technologies



MUSCLES Consortium



Industry



Telco



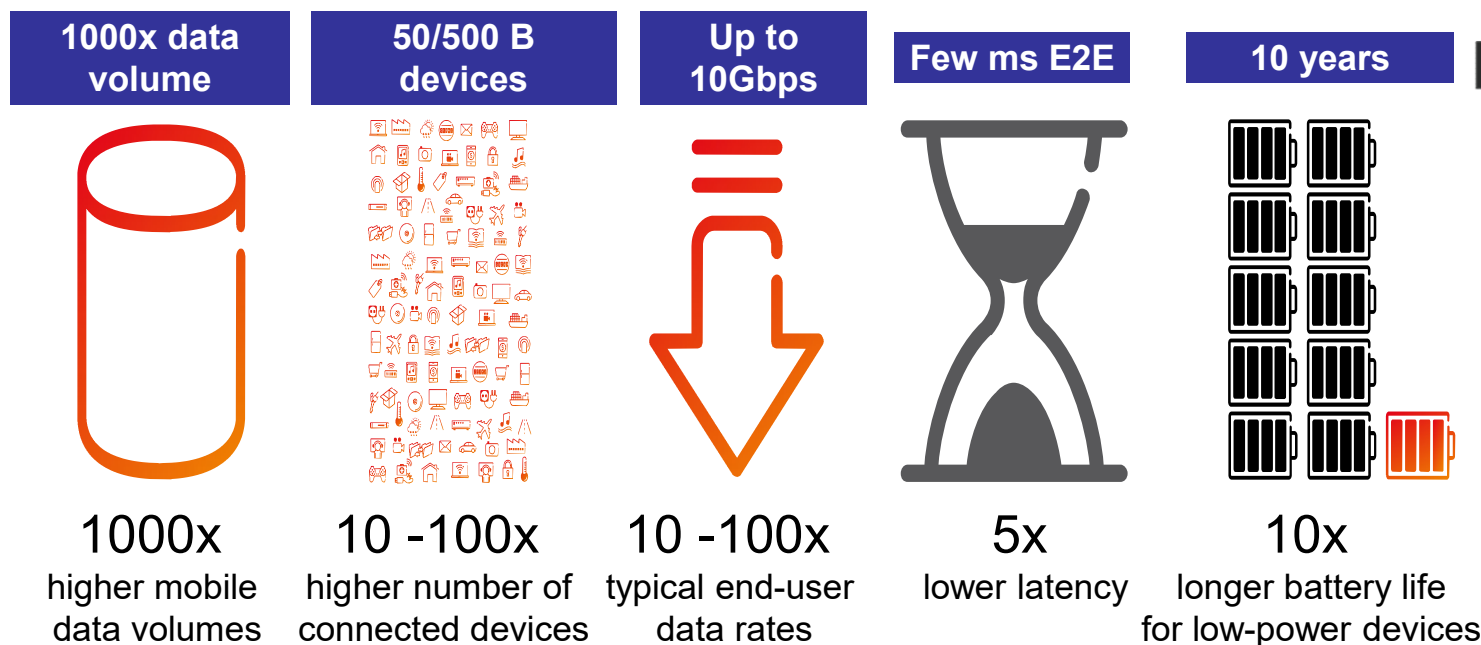
SME



University Research



Motivation and Storyline



- 5G was not yet in the market
- 5G was only expected to be commercially deployed in 2020



Objectives



- We wanted to provide those services, with such demanding requirements, using current networks (4G LTE), with forward compatibility towards 5G
- **Automation:** SON capabilities to provide automatic detection and resolution of network problems
- **Analysis tool:** A system level simulator (ready for 5G), which can serve as an experimental platform to investigate new complicated scenarios
- **Planning tool:** A software tool for the design of Fixed Wireless Access (combining optical fiber wired and mmWave communications)
- **Use-case App:** An IP-based audio-visual content delivery system



MUSECLS Products – New



- **Virtual TV** – a cloud-based solution. It is a professional platform to create and manage Web TV and/or IPTV channels
- **Streamover** – automates the distribution of content to web TV, IPTV, and OTT seamlessly on any platform and device. It is an independent solution based on open source components, available as cloud service on premises
- **Network design** - mmWave network rollout design tool
- **mmWave network management** tool

MUSECLS Products – Updated



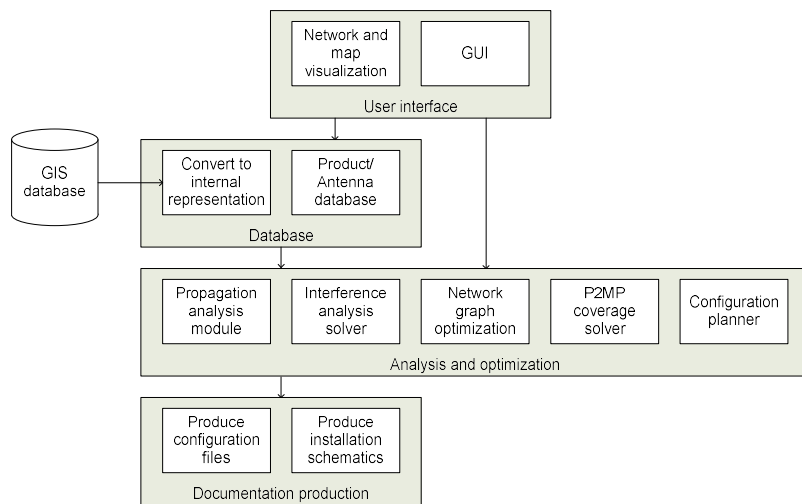
- **ALTAIA**, developed and already existed [at Altice Labs], will benefit from MUSCLES SON solutions, which enhance the performance of the overall system
- **Enhanced and updated System Level Simulator (SLS)** ready for 5G network testing and evaluation [IT] (Important note - Not for commercial)
- The MUSCLES results were transferred to **Allbesmart LDA** (a spin-off company of IPCB). The monitoring functionalities were integrated by Allbesmart in their product of **Mobile Network Analytics Framework (UXPERT)** [IPCB]
- The service provided by the RNPO department improved already (acquired know how) as a result of this project, by allowing for a new way to approach **mobile networks optimization** [Eurico Ferreira]

Network Monitoring tool

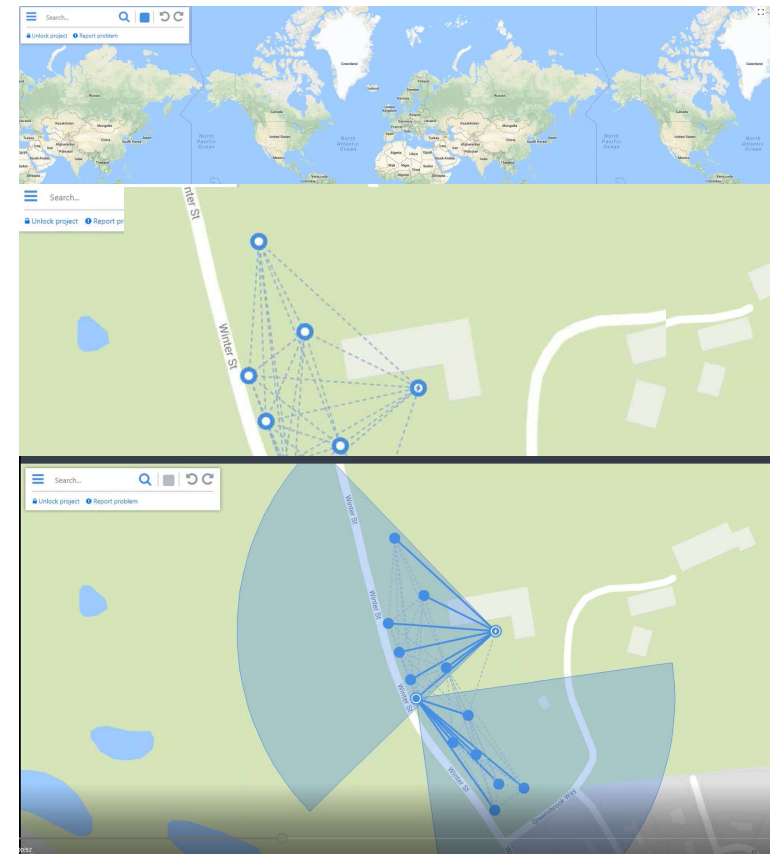
- The monitoring solution developed by IPCB is going to be commercialized by Allbesmart LDA (spin-off company of IPCB) under the marketing name UXPERT



FWA RNP as SaaS

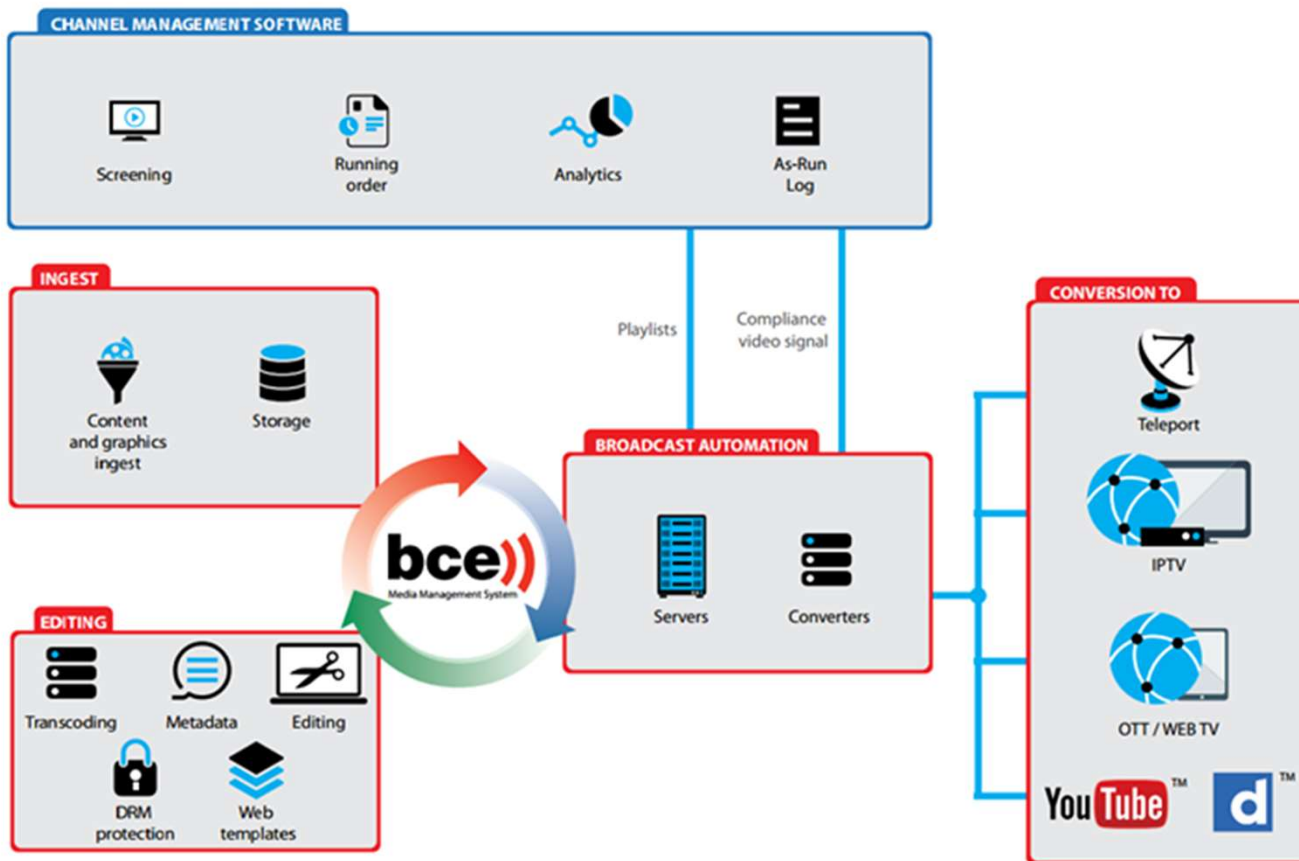


FWA: Fixed Wireless Access
RNP: Radio Network planning



eureka
innovation beyond borders

Virtual TV Webcast



MUSCLES Impact



| Industrial Exploitation | Publications and Theses | Economical Impact |
|---|---|--|
| <ul style="list-style-type: none">• 8 products<ul style="list-style-type: none">• 4 new products• 4 Improved | <ul style="list-style-type: none">• 13 publications<ul style="list-style-type: none">• 5 journals• 8 conferences | <ul style="list-style-type: none">• 5 permanent positions• 1 trademark |
| <ul style="list-style-type: none">• 2 standards<ul style="list-style-type: none">• European ECC• ESTI ANI | <ul style="list-style-type: none">• 2 MSc theses<ul style="list-style-type: none">• On Mobile communication | <ul style="list-style-type: none">• Multiple prototypes• Contribution to open source SW |



CELTIC Project Impact



Industry



eurico ferreira
GRUPO PROEF




bce
broadcasting center europe




Virtual TV
and
Streamover ©

Telco




altice
labs




ALTAIA
Updated by
MUSCLES
automation

SME



Siklu



Commercial
Network
Planning tool

**University
Research**



instituto de
telecomunicações



INSTITUTO POLITÉCNICO
DE CASTELO BRANCO



System Level
Simulator



Commercial
Network
Monitoring tool



Contact Info



For more information and for interest to participate please contact:

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