



CELTIC-NEXT

Σeureka Cluster

**CELTIC-NEXT SRIA & additional Topics of Interest
Spring Call 2024, Online Launch Event, 13th February 2023**

Xavier Priem, CELTIC-NEXT Director



CELTIC's Community



with over 1150 community members across 41 countries (Europe & beyond)

CELTIC's Community builds its Mission, Vision & Roadmap



CELTIC-NEXT in the European Funding Landscape

EUREKA-CELTIC & European Space Agency MoI Signed (Nov. 2021)



Knowledge exchange & SRIAs cross-contributions

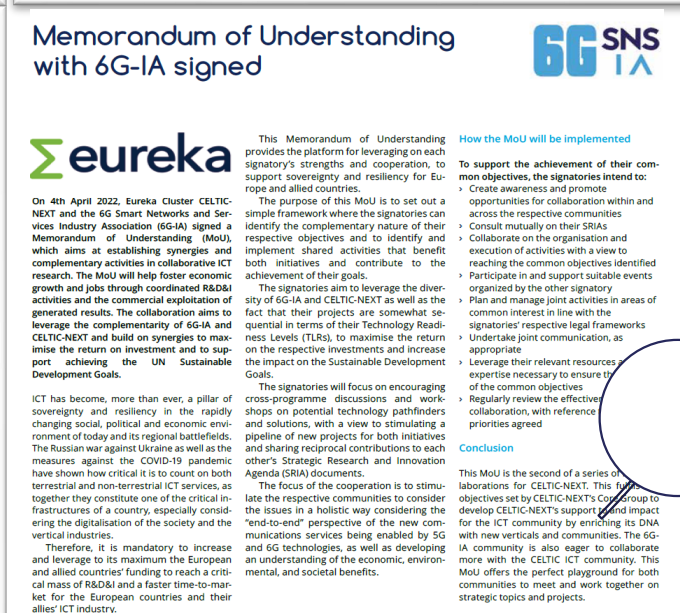
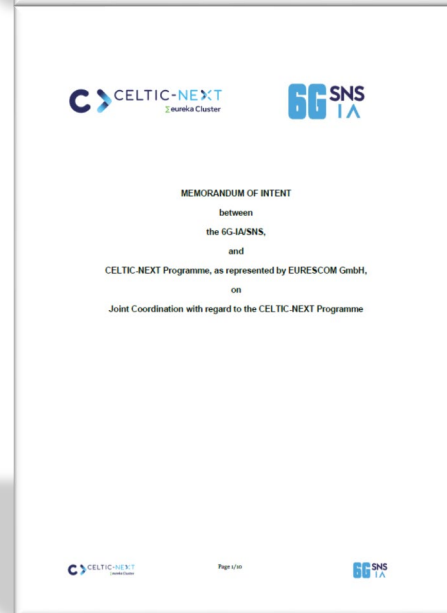
Leveraging funding schemes across TRLs & topics

Calls timing alignment
Easier pipelining of proposals

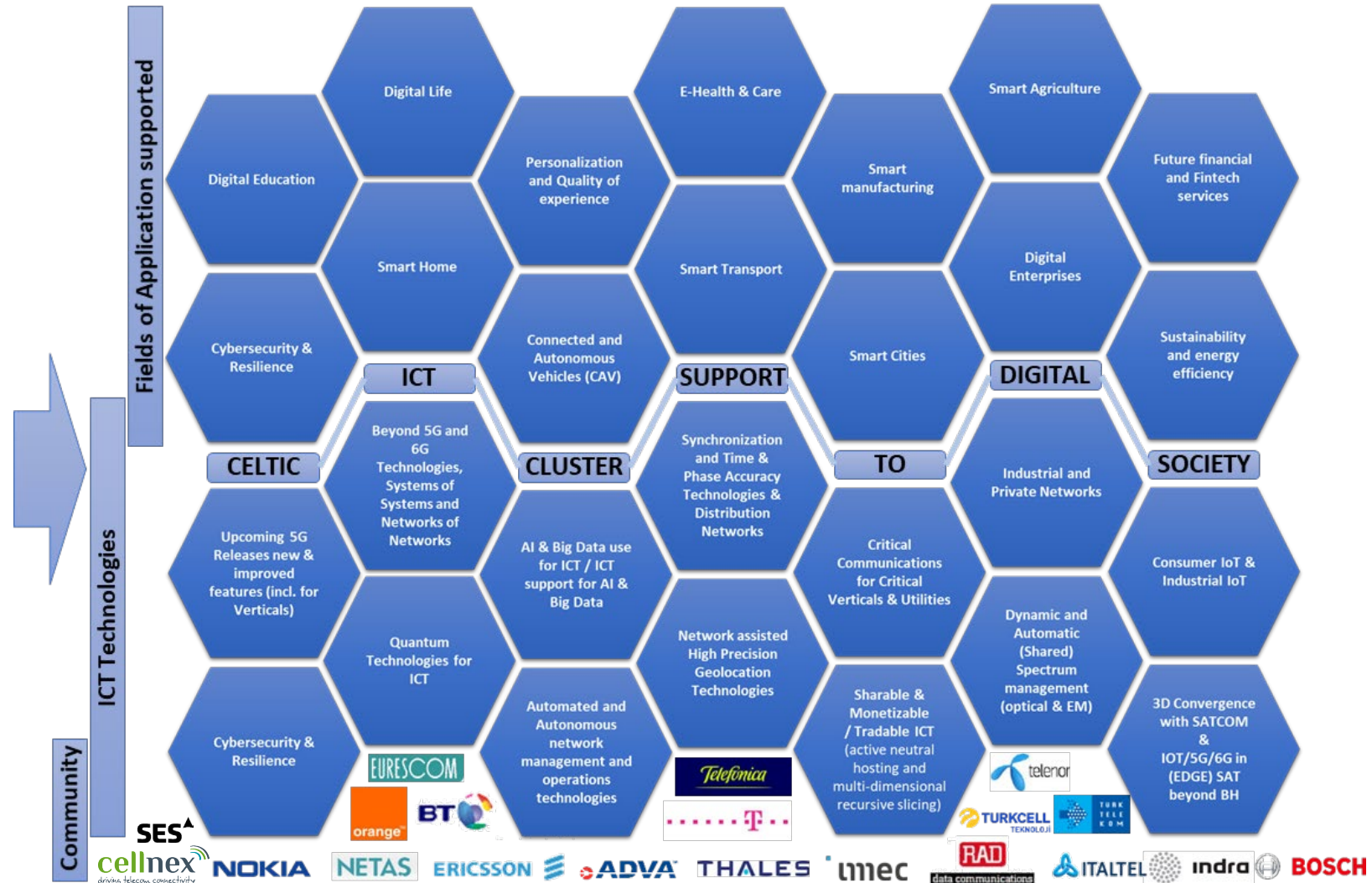
From Research to Market (TRL 7, early adopters, testbeds...)

Offering innovative entities the full panel between top-down programs and bottom-up spaces for their collaborative projects

EUREKA-CELTIC & 6G-IA SNS MoU Signed (Apr. 2022)



As usual, Proposals that address any of the topics of the CELTIC Strategic Roadmap in this bottom-up call are welcomed



<https://www.celticnext.eu/strategic-roadmap/>

Future needs of the end users: High level fields of applications

Human Centred Technologies and Services, for an Augmented Life Experience

- Digital divide elimination
- Smart Regions/Cities/Buildings/Homes
- Smart Transportation
- Smart Tourism
- Sustainability & Efficiency of Smart Energy Grids
- Public Safety & Crowd Control
- E-Health & Care
- Users in Control and Trust of offered services
- Digital support for Education and Remote Education
- Digital (Media, Gaming, Sports, Culture and Entertainment)
- Remote working and Nomadic Working (Digital Nomads)

Full industrial digitization and support of vertical industries

- Digital Enterprises
- Private Networks for Smart Manufacturing (Indus. 4.0)
- Smart Logistics (geolocation IOT networks)
- Smart Agriculture
- Future Financial and Fin-Tech
- ICT support to third party AI based applications
- Connectivity Grid / Telecom Infra as 4th Utility, like Energy

Futuristic use cases

- Holographic "Teleportation"
- "World" Real-time Synchronous Digital Twin

Future needs of the end users: Main technical areas of research

Ubiquity / Pervasiveness	Dynamic capacity following people seamless mobility	Automation, Reliability, Transparency: Cognitive operations	Protection and Trust	Holographic "transportation" & Real-time Synchronous Digital Twin
<ul style="list-style-type: none"> •Urban, sub-urban down to rural •Into the home for education and remote working •One Identity for seamless experience •Smart Regions/Cities/Buildings/Homes 	<ul style="list-style-type: none"> •In "normality" •In "crisis" (pandemics, major climate events) •Highly Precise Positioning •Edge Computing •Open-RAN / vRAN •Slicing 	<ul style="list-style-type: none"> •Extensive Monitoring •Big Data Analytics •Artificial Intelligence •ICT supporting large and intense Ai/ML deployment for verticals (connectivity, processing, data storage...) •Transparency or the Imperceptible latency 	<ul style="list-style-type: none"> •Cyber-security •Identity management 	<ul style="list-style-type: none"> •Holographic media teleport •Multi-sense networks •Time engineered applications

Enabling technologies that have to be mastered

Beyond 5G, from 5G to 6G	Wired and Wireless Industrial ICT	ICT Critical Infrastructure as a Utility, The Critical Connectivity Grid	Space dimension enabled 5G/B5G/6G	Distributed & Smarter Networks
<ul style="list-style-type: none"> Enhanced overall architectures to support needed enablers End-to-end Horizontal and Vertical Network Convergence AI/ML for Digital Infrastructures End-to-end Network Automation Autonomous Systems and Networks Advanced QKD Networking Connectivity as a Shared Critical Utility Wireless and Wired Tera-Broadband technology: <ul style="list-style-type: none"> Wireless (electromagnetic and visual light waves): <ul style="list-style-type: none"> Larger massive MIMO systems No "Cell" Radio Networks with distributed smart mMIMO systems TeraHertz Communications Wired optical: <ul style="list-style-type: none"> Photonics Optical smart networks Optical spectrum: Sliceable Optics, shared lambdas Increasing Bandwidth in Optical Network: use of additional bands, Higher modulation schemas Quantum communications <ul style="list-style-type: none"> QKD Entanglement 	<ul style="list-style-type: none"> Industrial features of 5G and beyond <ul style="list-style-type: none"> Time Sensitive Networks Precision Positioning Private Networks More Indoor techs like Terahertz, Visible Light Coms, Non-3GPP convergence (like Wi-Fi, Industry Net Standards...) Tera scale Internet of Things (IoT) 	<ul style="list-style-type: none"> Macro/Micro Grids' concepts related technologies adapted to ICT as it exists for Energy Full end-to-end Slicing of physical networks and infrastructures (see Smarter Networks) Cyber-security <ul style="list-style-type: none"> Quantum QKD AI/ML & Big Data Real Time Analytics based Security Reinforcement of Sovereignty Cyber-attack based Disaster recovery Trust enablers <ul style="list-style-type: none"> Security Auditability Transparency 	<ul style="list-style-type: none"> SAT enabled 5G/B5G/6G <ul style="list-style-type: none"> Moving ICT to SAT <ul style="list-style-type: none"> RAN in SAT (Space-RAN?) CORE in SAT (Space-CORE?) MEC in SAT (Space-Edge Dc?) MBH in SAT (Space-Mobile Backhaul?) Value Added Services in SAT Earth Meshed Network (including Oceans) <ul style="list-style-type: none"> SAT to Ground SAT to Sea SAT to Air Objects & IOTs SAT to SAT => SAT to All Multimodal SATs <ul style="list-style-type: none"> Combining GPS info with Network info Combining Observation modalities with Network info Avionics communications <ul style="list-style-type: none"> Air to Ground Air to Air Drones / HAPS Balloons? 	<ul style="list-style-type: none"> Deeper "edge-ification" for Distributed, collaborative and hierarchical AI/ML More Multi-Purpose Adaptable Networks: <ul style="list-style-type: none"> Universal adaptive core Programmable network Operating System Advanced very large-scale monitoring (for AI, ML, DL...) Distributed AI/ML <ul style="list-style-type: none"> Consuming Producing Supporting Intelligent and Automated Dynamic Spectrum Management : <ul style="list-style-type: none"> Electro-magnetic Spectrum: Horizontal & Vertical Flexible Sharing CBRS, DSS, LSA, LAA, MultiFire, new enablers... Optical spectrum: Sliceable Optics, shared lambdas Full Slicing <ul style="list-style-type: none"> Real End-to-End leading to: <ul style="list-style-type: none"> Multi-layered multi-tenancy Full neutral hosting Multi-Dimensions sliceable (incl. Spectrum and Time) Thanks to: Deeper Network Programmability

2024 additional topics:

CELTIC and Countries are also looking at:

- **Non-Terrestrial-Networks and Terrestrial Networks convergence**
- **Digitalisation of the Economy thanks to ICT technologies**
- **Clean Growth & Sustainability**
- **Remote Health & Care**
- **ICT for Industry 4.0 and Logistics**
- **Critical Coms for Emergency & Rescue Services**
- **Critical Resilient Infrastructures & Cybersecurity**
- **Open RAN**
- **Private Networks (including Industrial & leisure)**
- **AI for ICT & Networks (including Radio Massive MIMO, Open-RAN RICs, ...)**
- **Consumer IoT, Industry IOT**
- **ICT Technologies for METAVERSES**
- **and 5G Advanced and 6G topics (sensing, location, ...)**

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MANY THANKS FOR YOUR ATTENTION.

CELTIC-NEXT



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