CELTIC-NEXT, a Eureka Cluster

Xavier PRIEM

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www.celticnext.eu

CELTIC-NEXT
∑eureka Cluster

is the EUREKA ECP* Cluster

for next-generation communications

for a secured, trusted, and sustainable digital society.

*Eureka Clusters Program, launched on 17/6/2021

CELTIC-NEXT is…

- **A Public Private Partnership** with Eureka Countries and some regions
- **Open** to any organization willing to contribute to industry-driven ICT research and innovation collaborative projects
- **Over 1000 private and public organisations:**
  - large industry players
  - small & medium-sized enterprises (50% of programme participation)
  - academic/research institutions
- **Several Calls per year: Spring, Autumn, Flagships, and EUREKA ECP Joint Thematic Calls**

Organisation

National Authorities
CELTIC Authorities Committee (CELTAC)

Industry
20 CELTIC-NEXT Core Group (CG)

Management Team

Chairperson:
David Kennedy, EURESCOM

Vice-Chair:
Jari Lehmusvuori, Nokia

Vice-Chair:
Riza Durucasugil, NETAS

CELTIC Director
Xavier Priem

CELTIC OFFICE

- **Office admin support team**
- **Technical IT support team**
- **Programme support team**
- **PR & Marketing support team**
- **Finance support team**

CELTIC Office 01/2022

Xavier Priem

Director

- Overall responsibility for Cluster & Office
- Interface towards Core Group
- Support for PAs
- ECP CC-SG & ICOG Responsible

Xavier Priem (acting)

Christiane Reinsch

Programme Co-Ordinator(s)

- Monitoring of project progress
- Support for projects
- Coordination with all PAs

-------- Assistant --------

Web Administration Projects

Ellen Tallas

Luitgard Hauer

- Accounting
- Administration support
- Proposal registration
- Website management
- Public Relations (Milon Gupta)
- IT-Support Klaas-Pieter Vlieg

MarCom

Milon Gupta

CELTIC-NEXT high level targets are…

Technical Excellence

- ❑ Accelerate the deployment and take up of new advanced end-to-end ICT services, employing the new network concepts of 5G and leading to the implementation of 6G for & in Eureka countries,

- ❑ Actively facilitate the adoption of those ICT technologies by all targeted Verticals into their communities, business models and processes

CELTIC-NEXT high level targets are…

Economical Excellence

- ❑ Consolidate the position of Eurekan ICT Manufacturers and Service Providers, within Eureka Countries and on the Global Market

- ❑ Bring all Eureka Communities to consider the issues in a holistic way considering the “end-to-end” perspective of the new communications

CELTIC-NEXT high level targets are…

Societal & Environmental Excellence

- ❑ Investigate where advanced communications can reduce carbon footprints for many vertical sectors.
- ❑ Assist Eureka Nations and Industry to access the societal benefits & returns of being at the forefront of the new digital society.
- ❑ Consolidate the Eureka Nations Sovereignty in ICT technologies and services, thus, other critical infrastructures relying on ICT infrastructures, like the Energy Grid…

Benefits of CELTIC are … a proven receipt!

- **Bottom-up**
  Proposers are free to define their project proposal according to their own research interests.
- **Close to the market**
  So far projects have led to more than 1500 new or improved products and services.
- **High Success Rate**
  High-quality proposals have a good chance of receiving funding.
  Average success rate 60 %.
- **Flexibility**
  Project focus can be adjusted to new technological developments in the field.

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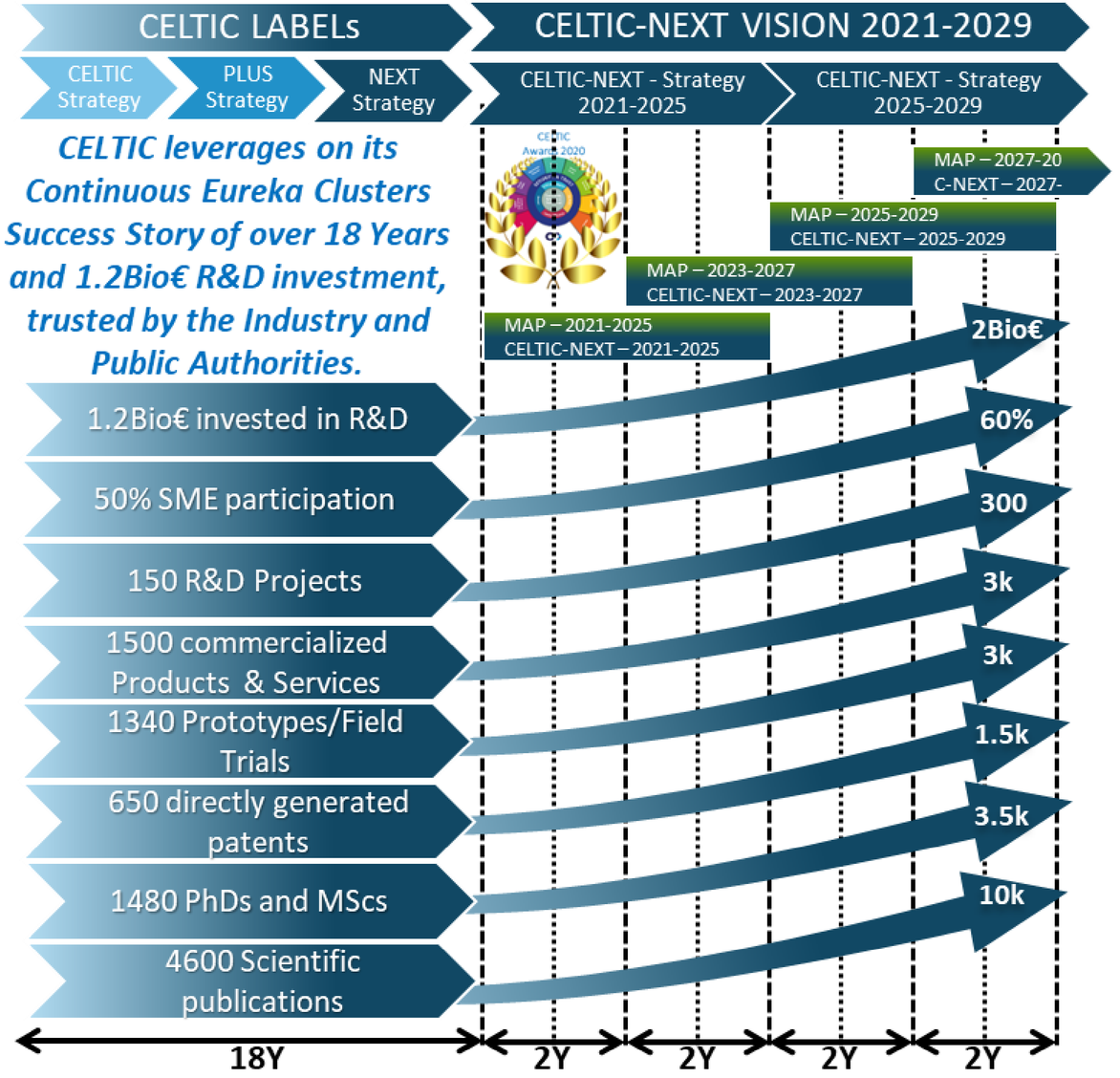

CELTIC-NEXT is the best support for you if…

- ✓ You want to perform collaborative R&D projects within Europe and worldwide associated countries
- ✓ You want to get public funding support
- ✓ You want to have a high chance to get your project approved and funded
- ✓ You want low administrative overhead
- ✓ You want a flexible framework
- ✓ You want high exploitation potential and business impact

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Opportunities to collaborate globally...

- Europe
- Canada
- South Korea
- South Africa
- Singapore

And potentially more countries in the future

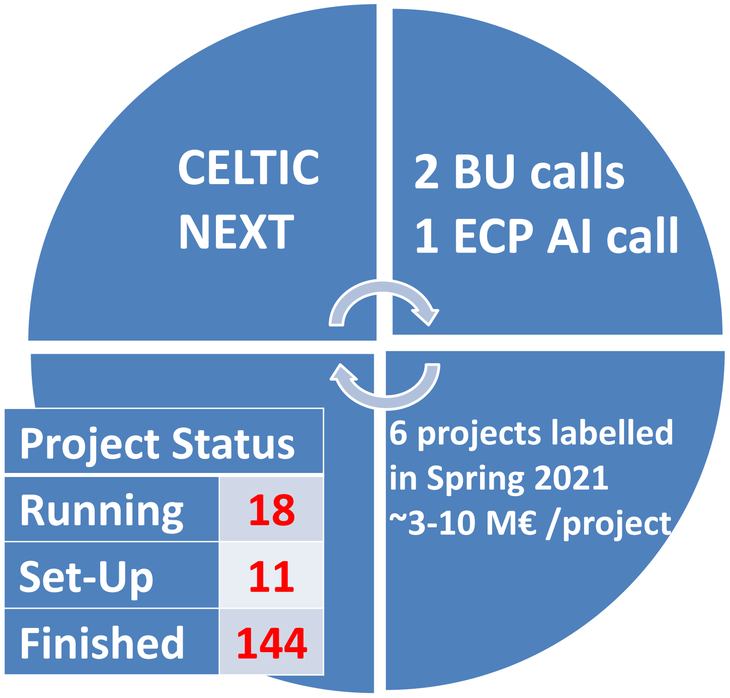
Looking at CELTIC-NEXT into 2022

Next CELTIC Calls & AI-NET Flagship

- CELTIC Spring Call (open)
- CELTIC Autumn Call (deadline tbd)
- Eureka Clusters Joint Thematic Call 2021 (opens soon)
- AI-NET Flagship on automation of telecom networks has started

CELTIC Proposers Days and Events

- CELTIC Online Proposers Day, 26th of January & 4H2022 tbd
- EUCNC & Global Innovation Summit (GIS) in June
- More...



Project Status	
Running	18
Set-Up	11
Finished	144

1st Thematic Call on Accelerating Sustainability

- Active role in the Eureka Clusters 1st AOP Joint Thematic Call
- Sustainable Industry, Green ICT and Space-Earth-Ocean Observation Integrated Systems

CELTIC-NEXT Mission, Vision and Roadmap

The mission of CELTIC-NEXT for the next 4 years is to foster our Eureka collaborative RD&I program for the ICT community, and to accelerate the deployment and take up of advanced ICT services, employing the new network concepts of 5G and leading to the ownership and implementation of 6G in Eureka countries. It is crucial to consolidate the position of Eurekan manufacturers and service providers, with a high degree of Eurekan sovereignty, as globally leading suppliers of the advanced ICT equipment and services needed for the digital revolution.

It is a strong ambition of CELTIC-NEXT to assist Eurekan National Authorities, Eurekan Industry, and Eurekan Societies to access the societal benefits, competitive advantages, and commercial returns of being at the forefront of the new digital society.

CELTIC-NEXT Strategic Roadmap is…

www.celticnext.eu

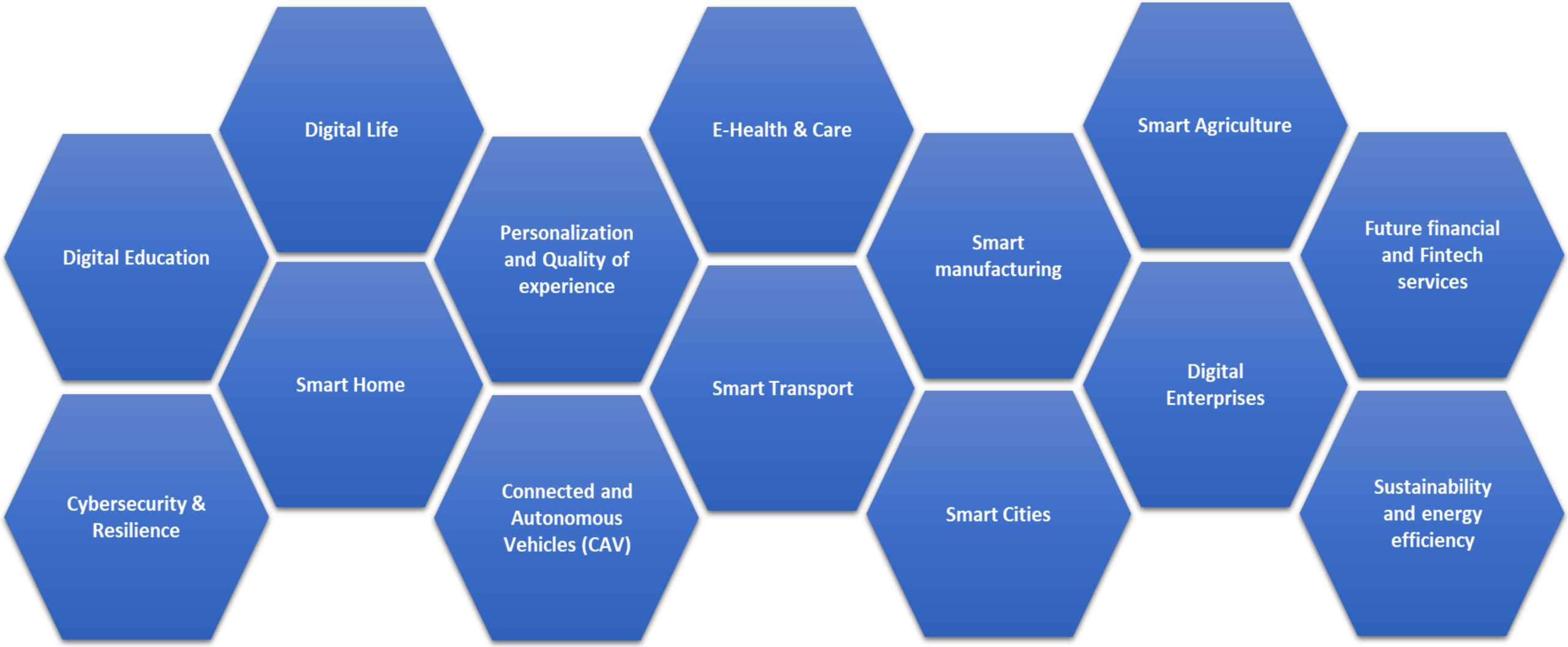
Fields of Application supported

ICT Technologies

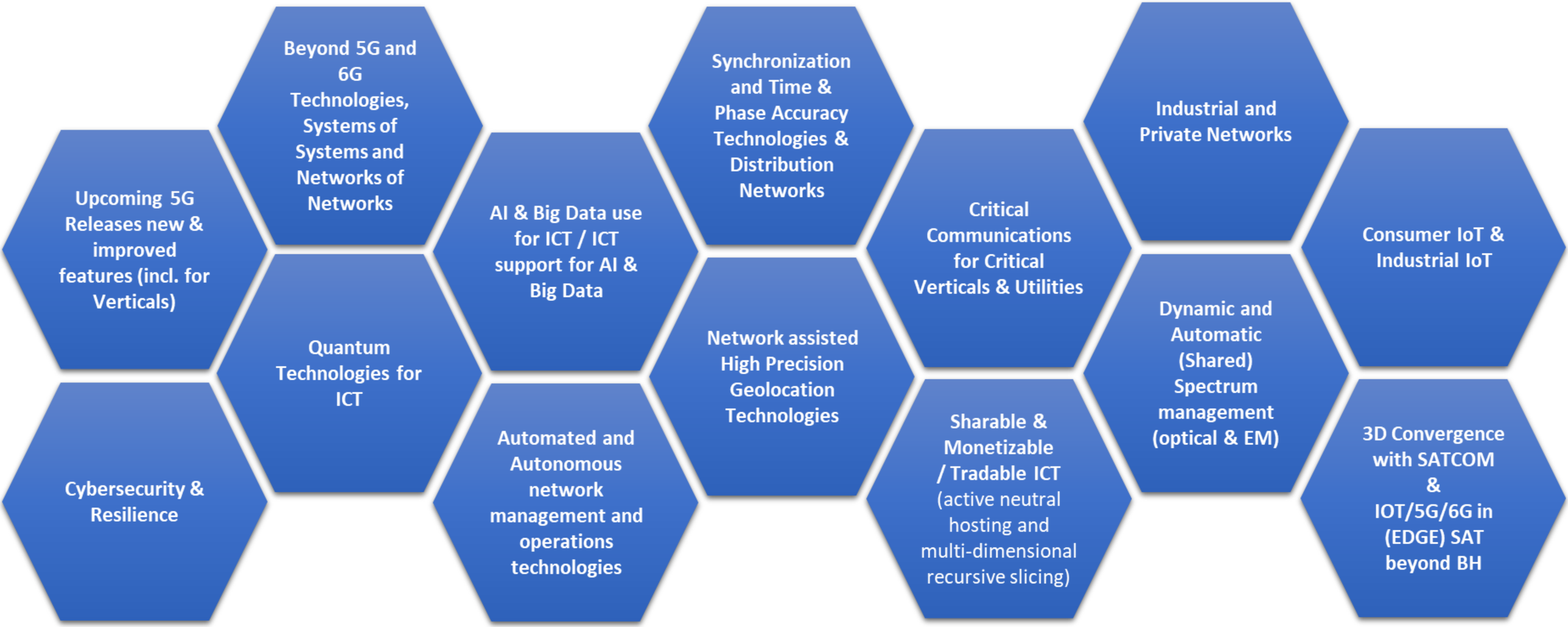
Community

Digital Life
E-Health & Care
Smart Agriculture
Digital Education
Personalization and Quality of experience
Smart manufacturing
Future financial and Fintech services
Smart Home
Smart Transport
Digital Enterprises
Cybersecurity & Resilience
Connected and Autonomous Vehicles (CAV)
Smart Cities
Sustainability and energy efficiency
ICT
SUPPORT
DIGITAL
CELTIC
CLUSTER
TO
SOCIETY
Beyond 5G and 6G Technologies, Systems of Systems and Networks of Networks
Synchronization and Time & Phase Accuracy Technologies & Distribution Networks
Industrial and Private Networks
Upcoming 5G Releases new & improved features (incl. for Verticals)
AI & Big Data use for ICT / ICT support for AI & Big Data
Critical Communications for Critical Verticals & Utilities
Consumer IoT & Industrial IoT
Quantum Technologies for ICT
Network assisted High Precision Geolocation Technologies
Dynamic and Automatic (Shared) Spectrum management (optical & EM)
Cybersecurity & Resilience
Automated and Autonomous network management and operations technologies
Sharable & Monetizable / Tradable ICT (active neutral hosting and multi-dimensional recursive slicing)
3D Convergence with SATCOM & IOT/5G/6G in (EDGE) SAT beyond BH
EURESCOM
Telefónica
telenor
orange
BT
TURKCELL TEKNOLOJİ
TÜRK TELEKOM
NOKIA
NETAS
ERICSSON
ADVA
THALES
imec
RAD data communications
ITALTEL
indra
cellnex driving telecom connectivity
SES

Some Digital Society fields for CELTIC-NEXT



R&D&I Technology pillars for CELTIC-NEXT



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

Human Centred Technologies and Services, for an Augmented Life Experience	Full industrial digitization and support of vertical industries	Futuristic use cases
• 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)	• 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	• Holographic "Teleportation" • "World" Real-time Synchronous Digital Twin

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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
• Urban, sub-urban down to rural • Into the home for education and remote working • One Identity for seamless experience • Smart Regions/Cities/Buildings/Homes	• In “normality” • In “crisis” (pandemics, major climate events) • Highly Precise Positioning • Edge Computing • Open-RAN / vRAN • Slicing	• 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	• Cyber-security • Identity management	• Holographic media teleport • Multi-sense networks • Time engineered applications

Enabling technologies that have to be enabled for verticals

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

• 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:
  • Wireless (electromagnetic and visual light waves):
  • Larger massive MIMO systems
  • No "Cell" Radio Networks with distributed smart mMIMO systems
  • TeraHertz Communications
  • Wired optical:
  • Photonics
  • Optical smart networks
  • Optical spectrum: Sliceable Optics, shared lambdas
  • Increasing Bandwidth in Optical Network: use of additional bands, Higher modulation schemas
  • Quantum communications
  • QKD
  • Entanglement
	•Industrial features of 5G and beyond
	•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)
		• 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
		  • Quantum QKD
		  • AI/ML & Big Data Real Time Analytics based Security
		  • Reinforcement of Sovereignty
		  • Cyber-attack based Disaster recovery
		• Trust enablers
		  • Security
		  • Auditability
		  • Transparency
			• SAT enabled 5G/B5G/6G
			  • Moving ICT to SAT
			  • 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)
			  • SAT to Ground
			  • SAT to Sea
			  • SAT to Air Objects & IOTs
			  • SAT to SAT
			  • => SAT to All
			  • Multimodal SATs
			  • Combining GPS info with Network info
			  • Combining Observation modalities with Network info
			• Avionics communications
			  • Air to Ground
			  • Air to Air
			  • Drones / HAPS
			  • Balloons
				• Deeper "edge-ification" for Distributed, collaborative and hierarchical AI/ML
				• More Multi-Purpose Adaptable Networks:
				  • Universal adaptive core
				  • Programmable network Operating System
				• Advanced very large-scale monitoring (for AI, ML, DI…)
				• Distributed AI/ML
				  • Consuming
				  • Producing
				  • Supporting
				• Intelligent and Automated Dynamic Spectrum Management :
				  • Electro-magnetic Spectrum: Horizontal & Vertical Flexible Sharing CBRS, DSS, LSA, LAA, MultiFire, new enablers…
				  • Optical spectrum: Sliceable Optics, shared lambdas
				• Full Slicing
				  • Real End-to-End leading to:
				  • Multi-layered multi-tenancy
				  • Full neutral hosting
				  • Multi-Dimensions sliceable (incl. Spectrum and Time)
				  • Thanks to: Deeper Network Programmability

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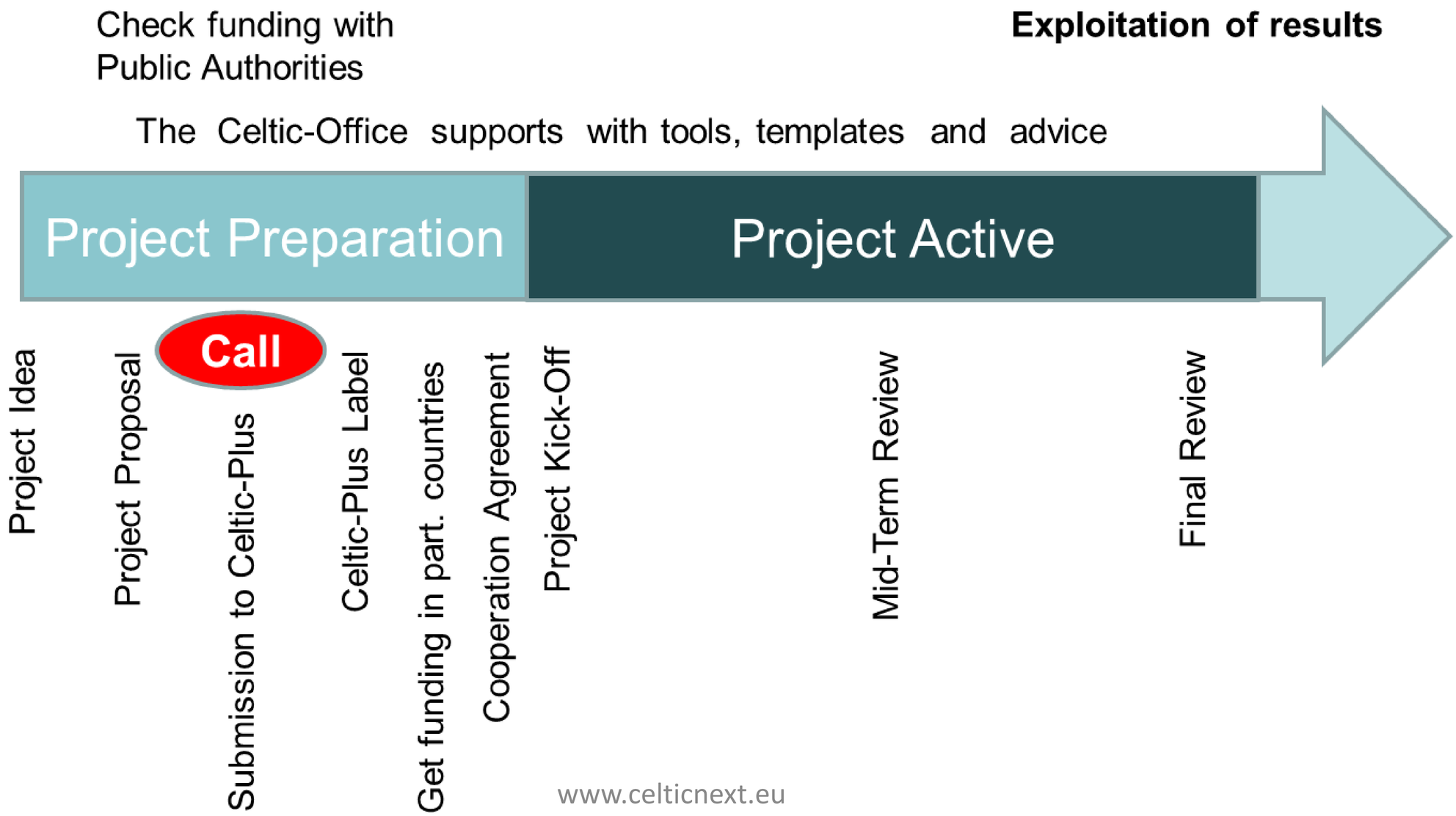
CELTIC Project Timeline



CELTIC Label decision

- Full Proposal Submission by proposers (one stage process)
- Evaluation by: Industry Experts and Public Authorities
- Label Decision: Public Authorities and CELTIC Core Group

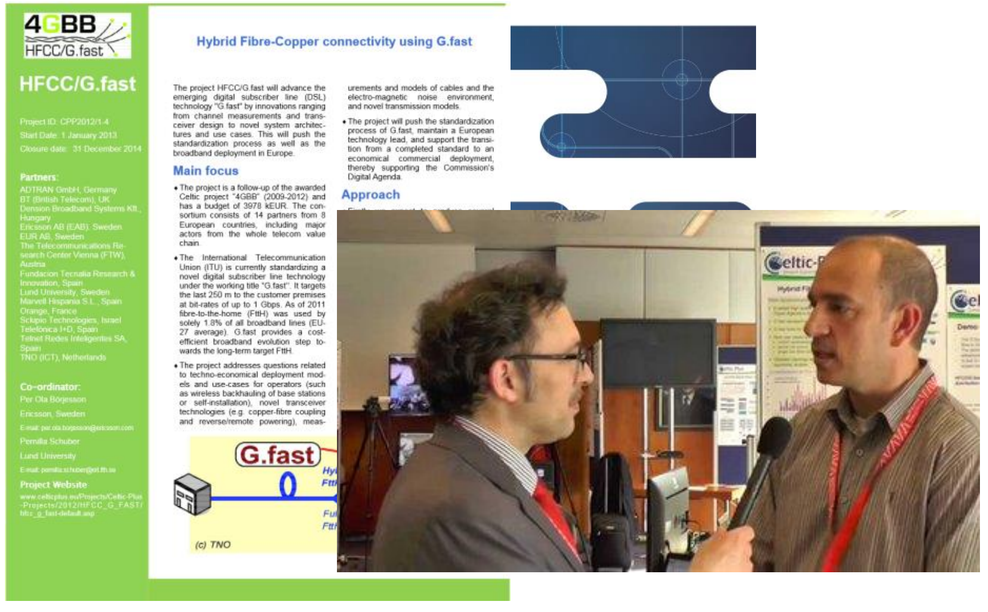
Available Tools

- Workspace based on Only-Office document management server with individual user accounts
- Audio/Web Conferencing based on Cisco Webex
- More information available on

www.eurescom.eu/eurestools.html

Types of Dissemination Activities

- CELTIC website: www.celticnext.eu
- Project website is required
- Project Twitter account should follow @CelticNext Twitter account and vice versa
- CELTIC-NEXT LinkedIn: tiny.cc/celtic-group
- Interviews
- CELTIC Brochure
- CELTIC Project Leaflets
- CELTIC News
- Technical newspapers
- Conference papers
- Standardisation activities



Dissemination and Publication

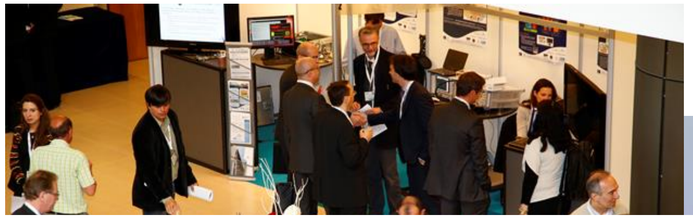
Project Web: -It is expected that Project set-up their own Website.

-Exceptionally Word Press based Website hosted by CELTIC

CELTIC Leaflet: Each project shall produce a two-page leaflet.

The leaflet informs about the project at events where the project should be visible.

Project Twitter accounts: Please follow @CelticNext Twitter account and vice-versa.



CELTIC Event:

–The CELTIC Event takes place each year. It gives projects the possibility to present their work to Managers, Public Authorities and Engineers.

–The last CELTIC Event took place from 19-20 June and was co-located with EuCNC 2019 in Valencia. The Project Exhibition took place from 17-21 June.

Website: www.celticnext.eu

For each Project:

- Public part, general project
- Confidential part
  (extended Project Website)
- Project management
  (implemented after Kick-Off)

CELTIC impact rewarded by 3 EUREKA Innovation Awards

SIGMONA

5G Networks

EUREKA
Global Project of the Year 2019

Innovative software-defined network (SDN) concept
in generalized mobile network architectures, which has contributed to the development of 5G networks

SIMONA:
EUREKA Global Project of the Year 2019

4KREPROSIS

Cameras for FIFA World-cup 2018

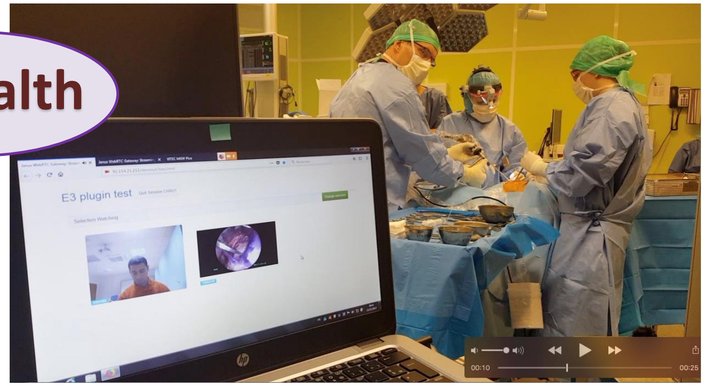
High speed Wireless TV Cameras for Sport events
High resolution Data Transmission

E3 PROJECT e-health solutions

E-Health

E3

Immersive Telemedicine
Ubiquitous Health care services



CELTIC Flagship projects impacts the Business

SASER

Secure Communications for Europe

Spin-off's and Start-ups:

- Cailabs (France)
- aXenic Ltd (UK)

27 new and 28 improved products.

Record Data Transmission: 38.4 Terra bit / sec.

The American Library of Congress (the world biggest) would be transmitted in 3 seconds

60 Partners 80M€

80 Partners 70M€

SENDATE

Secure Networking for a Data Center cloud in Europe

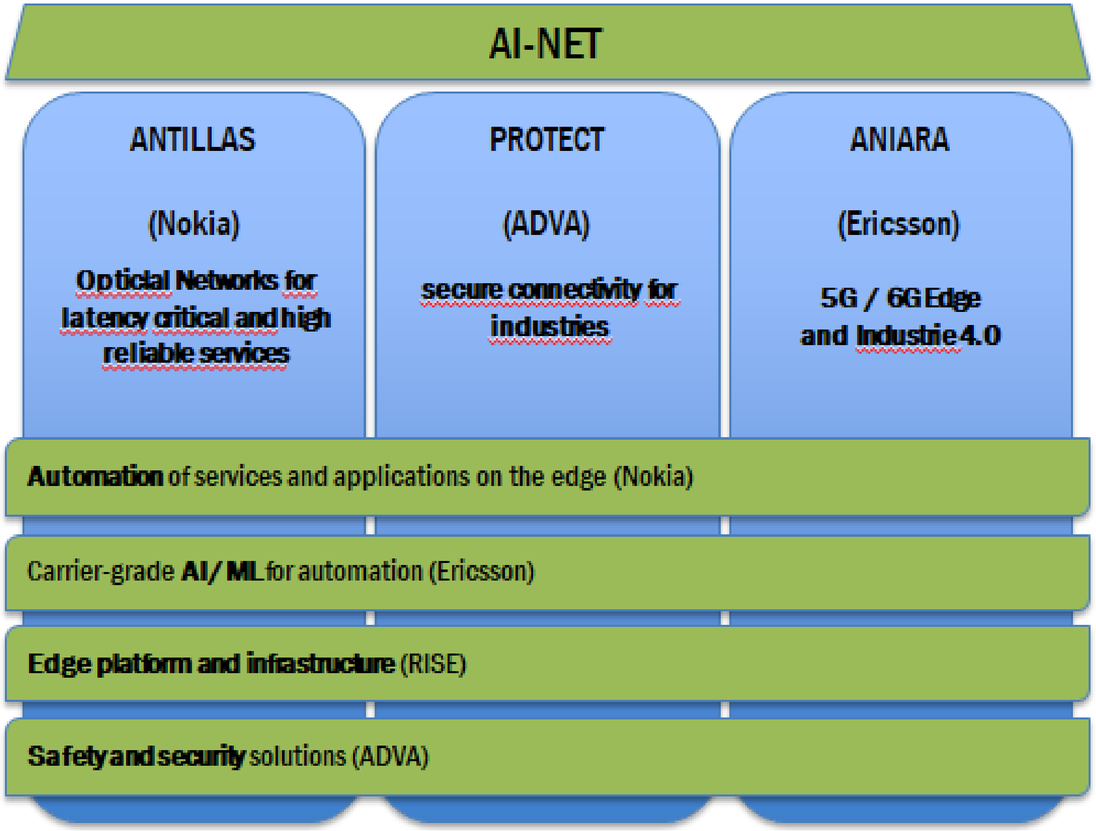
- *The world's first* 100G quantum safe transport over 2,800 km
- *The world's first* 400G link with single-photodiode for DC Interconnect
- Edge Computing shifts high traffic loads away from Core DC
- Secure cloud close to the customer allows low latency applications

Cornelia Rogall-Grothe (State Secretary, BMI – German Ministry of the Interior) and Dr. Georg Schütte, State Secretary of the German Federal Ministry for Education and Research (BMBF) - Copyright: hannibal/BMBF

SENDATE Closing Event in Ericsson's HQ in Kista, March 2019

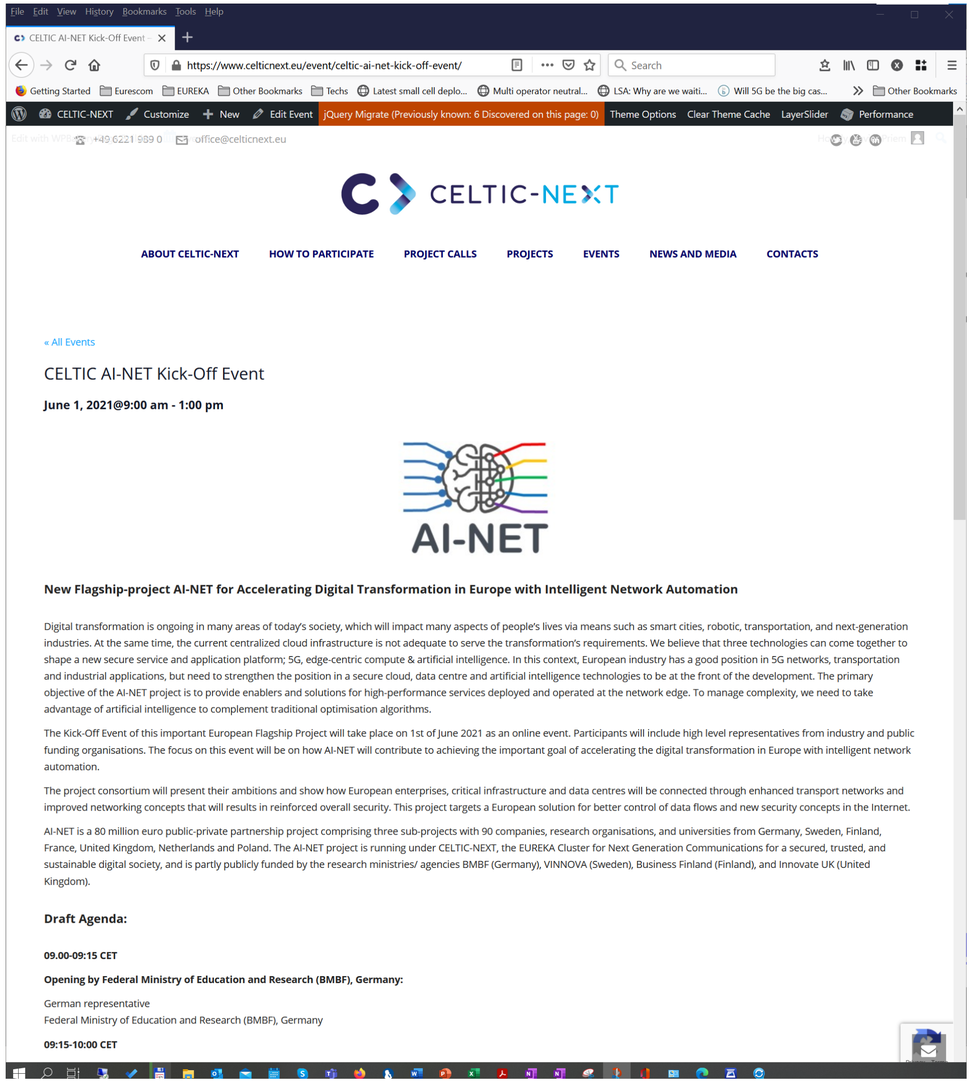
Just started:
CELTIC AI-NET Flagship
Automation of Telekom Networks

90 Partners



- *Accellerating digital transformation in Europe by Intelligent NETwork automation*
- *Adaptive Networks for new services*
- *Automated secure networks*
- *AI/ ML algorithms and efficient hardware implementations for optical data transmissions*
- *Industry 4.0*
- *Securing critical data*
- *Scalable and resilient networks.*

AI-NET Kick-Off done on 1st June 2021



« All Events

CELTIC AI-NET Kick-Off Event

June 1, 2021@9:00 am - 1:00 pm

AI-NET

New Flagship-project AI-NET for Accelerating Digital Transformation in Europe with Intelligent Network Automation

Digital transformation is ongoing in many areas of today's society, which will impact many aspects of people's lives via means such as smart cities, robotic, transportation, and next-generation industries. At the same time, the current centralized cloud infrastructure is not adequate to serve the transformation's requirements. We believe that three technologies can come together to shape a new secure service and application platform; 5G, edge-centric compute & artificial intelligence. In this context, European industry has a good position in 5G networks, transportation and industrial applications, but need to strengthen the position in a secure cloud, data centre and artificial intelligence technologies to be at the front of the development. The primary objective of the AI-NET project is to provide enablers and solutions for high-performance services deployed and operated at the network edge. To manage complexity, we need to take advantage of artificial intelligence to complement traditional optimisation algorithms.

The Kick-Off Event of this important European Flagship Project will take place on 1st of June 2021 as an online event. Participants will include high level representatives from industry and public funding organisations. The focus on this event will be on how AI-NET will contribute to achieving the important goal of accelerating the digital transformation in Europe with intelligent network automation.

The project consortium will present their ambitions and show how European enterprises, critical infrastructure and data centres will be connected through enhanced transport networks and improved networking concepts that will results in reinforced overall security. This project targets a European solution for better control of data flows and new security concepts in the Internet.

AI-NET is a 80 million euro public-private partnership project comprising three sub-projects with 90 companies, research organisations, and universities from Germany, Sweden, Finland, France, United Kingdom, Netherlands and Poland. The AI-NET project is running under CELTIC-NEXT, the EUREKA Cluster for Next Generation Communications for a secured, trusted, and sustainable digital society, and is partly publicly funded by the research ministries/ agencies BMBF (Germany), VINNOVA (Sweden), Business Finland (Finland), and Innovate UK (United Kingdom).

Draft Agenda:

09.00-09:15 CET

Opening by Federal Ministry of Education and Research (BMBF), Germany:

German representative
Federal Ministry of Education and Research (BMBF), Germany

09:15-10:00 CET

https://www.celticnext.eu/ai-net-kick-off-event-celtic-flagship-project-for-intelligent-network-automation/#

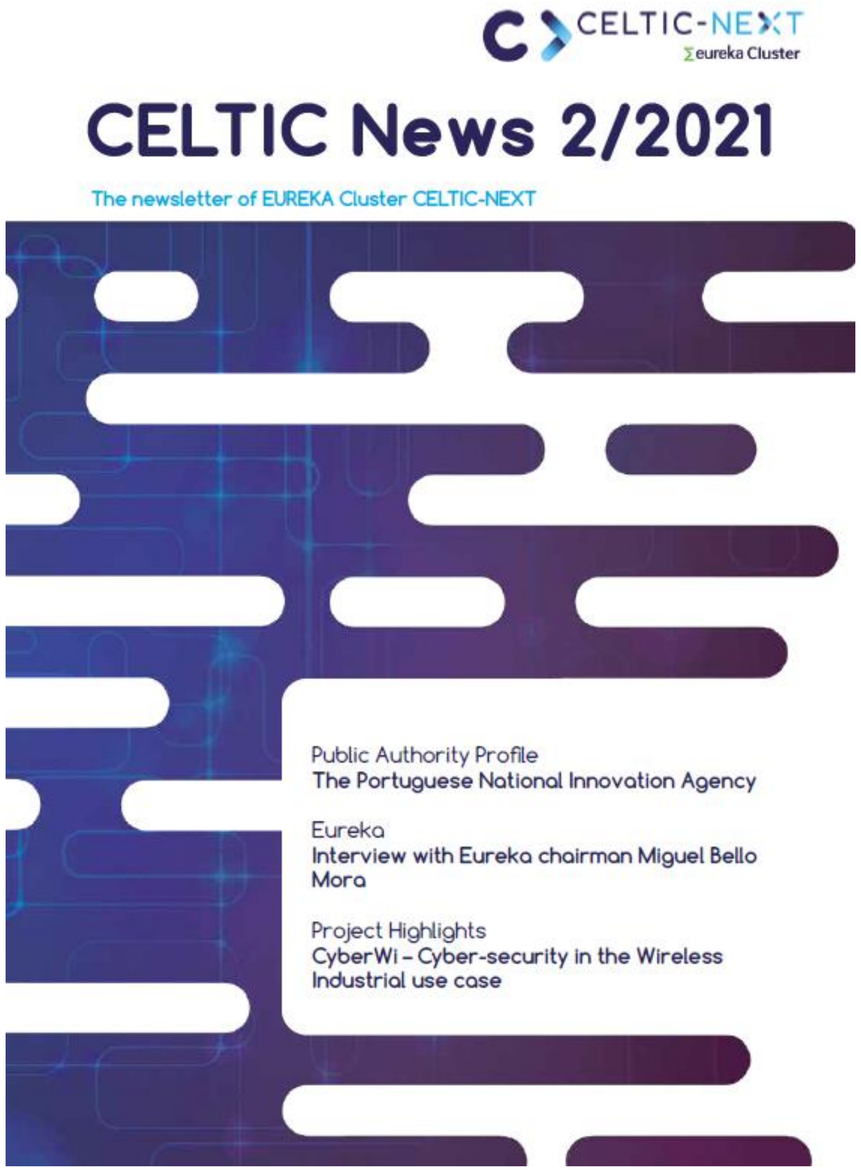
CELTIC-NEXT Newsletter

Please have a look at our Newsletter

https://www.celticnext.eu/newsletter/

and register for free subscription

https://www.celticnext.eu/news-subscription/



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EUREKA-CELTIC-ESA MoI Signature Event – November 2021 – Porto
Also announced to the Ministerial Event the week before

Press Release

Eureka PT Chair | Eureka Cluster – CELTIC | European Space Agency

Connecting Terrestrial ICT with Space ICT

Strategic Collaboration between Eureka, CELTIC-NEXT and ESA ARTES

Eureka Chairman Miguel Bello Mora, Elodie Viau – Director of Telecommunications and Integrated Applications and Head of ECSAT at the European Space Agency (ESA), and CELTIC Office Director Xavier Priem.

Porto, 22 November 2021. Eureka Cluster CELTIC-NEXT (CELTIC-NEXT) and the European Space Agency (ESA) signed a Memorandum of Intent (MoI) today, which aims to bring their respective communities closer together. This will enable the faster convergence and development of terrestrial and non-terrestrial network and service technologies in the innovative field of Space ICT.

The MoI will help to foster economic growth and jobs through coordinated R&DI activities and the commercial exploitation of integrated space and terrestrial systems enabled by 5G and 6G. The collaboration aims to leverage the complementarity of ESA and CELTIC-NEXT and build on synergies to maximise the return on investment and to support achieving the UN Sustainable Development Goals.

MEMORANDUM OF INTENT

between

the European Space Agency,

Eureka Association AISBL

and

CELTIC-NEXT Programme, as represented by EURESCOM GmbH,

on

Joint Coordination with regard to the CELTIC-NEXT Programme

Let’s invent a smarter, safer and more sustainable world together !

Contact details

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Web: https://www.celticnext.eu/

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