

ICT-51-2020

Big Data Technologies and extreme-scale analytics

1. What are you looking for?

- Big Data analytics methodologies and engineering solutions addressing industrial and/or societal challenges. Of interest: machine learning/deep learning, architectures, deep analysis, precise predictions... - considering computing capacity and connectivity issues.
- Responding to industrial requirements
- Quantifiable progress beyond the state-of-the-art whatever the technical domain chosen – performance measured against industry validate benchmarks.
- Data assets must be sufficiently large, realistic, available to the project and described in the proposal.

ICT-51-2020

2. What do you NOT want?

- Exact same project proposals as submitted for ICT-12 topic in 2018 – state-of-the art has advanced!
- Loosely coupled use cases with low impact and little relevance for the overall objectives and approach of the proposal.
- Consortia or industries trying to 'catch-up' on the state-of-the-art. This topic is to extend and progress beyond the state-of-the-art.

ICT-51-2020 – topic evolution

3. Is this new or has it been called before?

- Not a new topic, but continuation of ICT-12a RIA topic of the H2020-ICT-2018-2020 Work Programme
- Linked with topic DT-ICT-05-2020 Big Data Innovation Hubs

ICT-51-2020 – topic evolution

4. Unique instructions for evaluators on this WP topic? Excellence, Impact and more

Specific focus on Excellence:

- solid understanding of the current state-of-the-art and how the proposals plan to go beyond
- sound concept and objectives, meaningful industry-driven use cases

ICT-51-2020 – topic evolution

5. Current project portfolio of ICT-12a-2018

- **INFORE**
- **ExtremeEarth**
- **SmartDataLake**
- **ELASTIC**
- **CloudButton**
- **EXA MODE**

<https://cordis.europa.eu/programme/rcn/703771/en>

ICT-51-2020 – key actors

6. Who are the leading players?

- Academia and Research Centers
- IT providers
- Application domain companies

7. Is there a key group of actors (eg. cPPP or other) driving this?

- Big Data Value Association (BDVA)

<http://www.bdva.eu/>

ICT-51-2020

8. Additional / background documents

Strategic Research and Innovation agenda (SRIA)
developed by the Big Data Value Association
<http://www.bdva.eu/SRIA>

Future Outlook

This topic paves the way to **Horizon Europe Programme:**

- Pillar II 'Global Challenges and industrial competitiveness'; Cluster 'Digital and Industry'; Area of intervention 3.2.6 *Advanced Computing and Big Data*
- and also Area of intervention 3.2.4 *Artificial Intelligence and Robotics*

Upcoming events / information days

- Digital excellence forum Horizon 2020 Proposers' day 19-20 Sep 2019 in Helsinki
<https://ec.europa.eu/digital-single-market/en/news/digital-excellence-forum-ict-proposers-day-2019>
- European Big Data Value Forum 14-16 Oct 2019 in Helsinki
<https://www.european-big-data-value-forum.eu/>

LEIT ICT WP 2018-20

ICT-40-2019 Cloud Computing: towards a smart cloud computing continuum

- Maria Tsakali
- Cloud and Software (Unit E2)
- DG Connect
- *Maria.Tsakali@ec.europa.eu*

Cloud Computing – topic evolution

FP7 Topics: "software & services and cloud computing"

- Total EU contribution: €351.5 million
- Number of projects: 95 (s/w and cloud)
- Average per project: €3.7 million/project

H2020 Topics: "Advanced Cloud Infrastructures and Services"
"Cloud Computing"
"International collaboration with Japan, Korea and Brazil"

- Total EU contribution: € 195 million up to now
- Number of projects: 53 (cloud)
- Average per project: €3.8 million/project

H2020 implementation (cloud budget)

H2020	Budget [MEUR]	EU contribution	RIA	PCP	IA	CSA	Total
WP2014-(ICT7)	73.0	73.15	16		2	5	23
WP2015 (ICT8)	22.0	4.72		1			1
WP2016 (ICT-06)	45.5	49.7	8		3		11
WP2014-18 (Japan, Korea, Brazil)	17.20	17.20	10			1	11
WP2019 (ICT-15)		30	6			1	7
WP2020 (ICT-40)		20					

- WP2014-ICT7: Advanced Cloud Infrastructures and Services
- WP2015-ICT8: Boosting Public Sector Productivity and Innovation through Cloud Computing Services
- WP2016-ICT-06: Cloud Computing

International Collaboration with Japan, Korea and Brazil (WP2014-18):

- EUJ 1 – 2014: Technologies combining big data, internet of things in the cloud
- EUB 1 – 2015: Cloud Computing, including security aspects
- EUJ-02-2016: IoT/Cloud/Big Data platforms in social application contexts
- EUK-03-2016: Federated Cloud resource brokerage for mobile cloud services
- EUB-01-2017: Cloud Computing
- EUK-01-2018: Cloud, IoT and AI technologies
- EUJ-01-2018: Advanced technologies (Security/Cloud/IoT/BigData) for a hyper-connected society in the context of Smart City

Total EU contribution: € 195 million
 Number of projects: 53
 Average per project: €3.8 million/project

Unit E2: H2020 Project Clusters on Cloud & Software

Software Engineering for Services and Applications

H2020 Projects

Aligned, ARCADIA, CloudTeams, DICE, ENTICE, HyVar, Supersede, SWITCH, TANGO, STAMP, Q-Rapids, MELODIC, COLA, Decide, DITAS, Elastest, MegaMart2(ECSEL), Radon, FASTEN, SODALITE, UNICORE

Policy Areas

Open source, Artificial Intelligence/Algorithmic transparency

Future Cloud

(Merging of two former clusters:

*Inter-cloud Challenges, Expectations and Issues
and Novel approaches and technologies for resource and
service management)*

H2020 Projects

CloudSocket, BEACON, SICLOPS, ENTICE
CYCLONE, CLOUDLIGHTNING, SWITCH, BASMATI,
ARCADIA, BEACON, CloudLigthning, CloudSpaces,
ClouT, CloudWave, DICE, iKaaS, INPUT,
IOStack, Mikelangelo, LIGHTKONE, CLOUDAPPLIANCE,
PRESTOCLOUD, Mobile Cloud Networking,
MUSA, RAPID, SWITCH, BIGCLOUD, MF2C, Fed4IoT,
DECENTER, ATMOSHPERE, NECOS

Policy Areas

Interoperability & Portability

Data Protection, Security and Privacy in the Cloud

H2020 Projects

CLARUS, CREDENTIAL, ESCUDO-CLOUD, MUSA,
OPERANDO, PAASWORD, PRISMACLOUD, SERECA, SECURECLOUD,
SLALOM, SLA-READY, STRATEGIC,
SUNFISH, SWITCH, COEMS, RESTASSURED, TREDISEC, TRESCCA,
WITDOM, MSEC

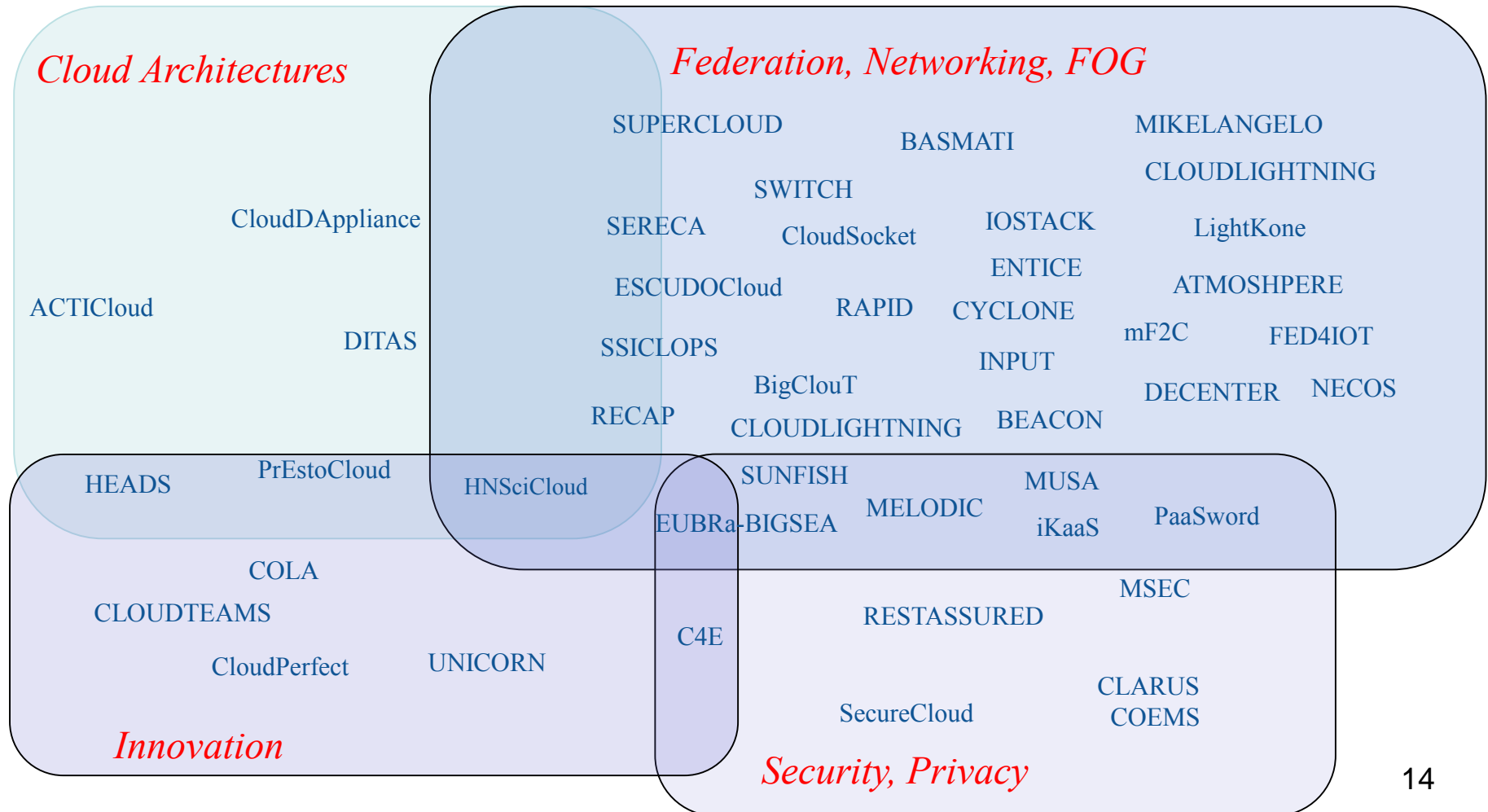
Policy Areas

Free Flow of Data, Cloud Security Certification

Crosscutting Co-ordination & Support Actions

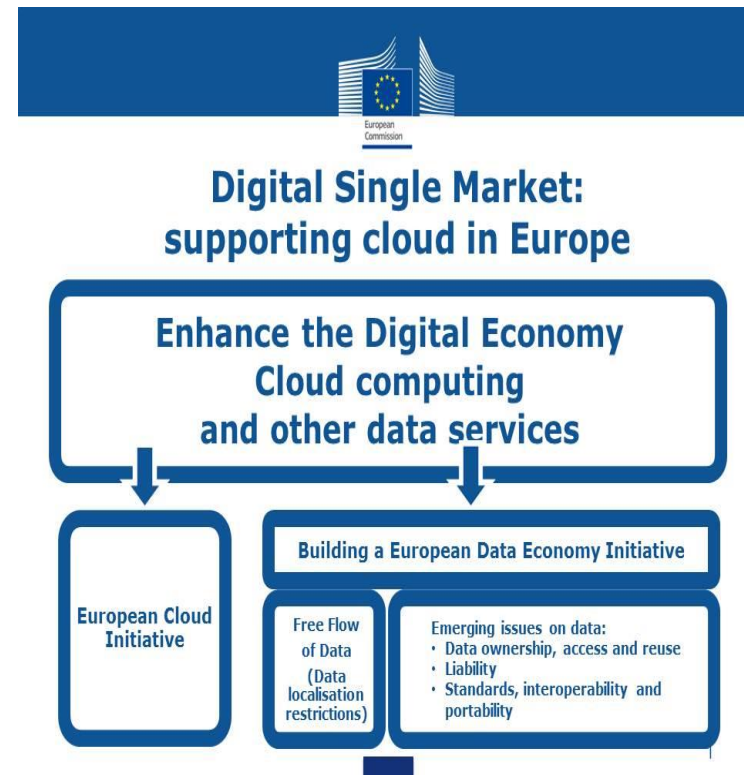
REACHOUT, AppHub, CloudWatch 2, EUBrasilCloudForum

Horizon 2020 project portfolio in Cloud



Policy context: Digital Single Market (DSM)

- ❖ **European Cloud initiative** - tackle fragmentation and raise the trust and confidence of users in cross-border cloud services through EU-wide specifications and certification
- ❖ **Building a European data economy** - enable the best possible use of the potential of digital data to benefit the economy and society. Unlock the re-use potential of different types of data and its free flow across borders to achieve a European digital single market
- ❖ **Free flow of data** - address key obstacles to the freedom of movement of data within the EU
 - ❖ DSM Cloud Stakeholders Group (SWIPO/CSCPRT groups)
- ❖ **Interoperability and standardisation**—increase interoperability of products and services key aspects of EC's Digitising European Industry Initiative



Preparation process for WP2018-20

- Internal consultation
- Position papers from Industry consultation, Experts, NESSI, CloudWatch, HolaCloud, Cloud Project Clusters, etc.
- Open web consultation
- Workshop → Final report: <https://ec.europa.eu/digital-single-market/en/news/consultation-cloud-computing-research-innovation-challenges-wp-2018-2020>

ICT-40-2020: Cloud Computing: towards a smart cloud computing continuum

The specific Challenge

Cloud computing is changing from a pure elastic provisioning of virtual resources (or platforms) to a transparent and adaptive hosting environment that fully realizes the “everything as a service” provisioning concept, from centralized cloud to the edge, and from network and computing infrastructure up to the application layers.

The challenge is to develop comprehensive cloud solutions and testbeds combining various execution platforms for ubiquitous and seamless execution computing environments as a foundation for a complete computing continuum.

- This requires novel solutions for **federating infrastructures, programming applications and services, and composing dynamic workflows**, which are capable of reacting in **real-time** to unpredictable data sizes, availability, locations, and rates. This will provide application developers with greater control over network, computing and data infrastructures and services, and the end-user will benefit from seamless access to continuous service environments.
- Such solutions should also address **security, semantic interoperability, heterogeneous data integration, organisation and linking, data protection, performance, resilience and energy-efficiency requirements** to respond to the future digitisation needs of industry and the public sector.

Addressing these challenges will also be part of and contribute to the technological ambitions of the Next Generation Internet (NGI).

Research & Innovation Actions (RIA) Scope

Proposals will address at **least one** of the following:

- I. **Advanced cloud technologies and testbeds combining aspects of network, computing and data/information resources** (i.e., next generation networks, novel datacenter architectures, fog/edge computing and sensor networks, large-scale analytics and simulation, public, hybrid, multi-cloud computing, etc.) to provide complete solutions encompassing network, computing and data services. The key aspect of these advanced cloud technologies is to **seamlessly combine computation resources all along the data path and support the complete service lifecycle** (i.e. from the end-user request/context to creation of workflows, monitoring of execution platforms, application deployment and adaptation while optimising the execution).
- II. **Advanced Cloud Data Privacy and Security techniques** taking into account issues such as integrating data protection principles, unifying security policies across cloud services and applications, defining personal data semantics, managing data locality, migration and latency.

Research & Innovation Actions (RIA) Scope

III. Novel programming models and semantically interoperable services to support dynamic environments that respond intelligently to changes in application behaviour or data variability; automatic deployment and continuous dynamic composition of semantically annotated services; adaptability of services to different resources & usage contexts; automatic reasoning, scheduling and deployment of workflows on top of the resulting infrastructure.

The proposals should demonstrate the applicability and viability of the proposed solution across multiple application domains.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 and 5 million would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

600 kEuro

Coordination & Support Actions (CSA) Scope

Proposals in this action will address the following:

- Coordinate stakeholders in Cloud Computing and act as support to R&D programmes/activities by disseminating project results and organising scientific and policy events, developing research and innovation roadmaps, and addressing pre-standardisation initiatives.

The Commission considers that proposals requesting a contribution from the EU between EUR 400.000 to 600.000 would allow this area to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact

Research & Innovation Actions (RIA)

- Contribute to the development of an ecosystem and testbeds that will respond to the future digitisation needs of industry and the public sector;
- Assist the development of new cloud-based services and infrastructures in Europe and foster an industrial capability in the cloud computing sector;
- Create new opportunities to encourage European-based providers, in particular SMEs, to develop and offer cloud-based services based on the most advanced technologies;
- Leverage research and innovation projects to support the development and deployment of innovative cloud-based services and next generation applications, for the public and private sectors (including standardisation and applications for AI, Big-Data and other sector-specific applications).

Coordination & Support Actions (CSA)

- Creation of a sustainable European forum of stakeholders representing the Cloud Computing research, industry and users.

Provide appropriate metrics for claimed impacts

Hints to Proposers

What are we looking for?

- ✓ Development of **generic and advanced cloud technologies, mechanisms, techniques, etc.**
- ✓ The proposals should **demonstrate the applicability and viability of the proposed technological solutions** across multiple application domains.

What do we NOT want?

Any User Application development using existing cloud technologies

Upcoming events / information days

ICT Proposers' Days 2019 in Helsinki
September 19-20, 2019



ICT-40-2020: "Cloud Computing: towards a smart cloud computing continuum" will be presented in session:

"Cloud and software challenges beyond 2020"

→ September 20th, from 15:00 - 16:15

(call opens 19/11/19 - closes 22/04/20)

Further Information

H2020 Work Programme 2018-2020

Tbc

Digital Agenda – Cloud Computing

<https://ec.europa.eu/digital-single-market/en/cloud>

European Cloud Computing Strategy - DSM

<https://ec.europa.eu/digital-agenda/en/european-cloud-computing-strategy>

Report from the Public consultation :

<https://ec.europa.eu/digital-single-market/en/news/consultation-cloud-computing-research-innovation-challenges-wp-2018-2020>

Cloud Projects:

- <https://ec.europa.eu/digital-single-market/en/projects/75981/3494>
- http://www.cloudwatchhub.eu/sites/default/files/BookletA4_June2017_inner_v04_web.pdf

ICT-52-2020

Smart Connectivity Beyond 5G

Rémy Bayou – Programme Officer

*Future Connectivity Systems
European Commission – DG CONNECT*

5G Public Private Partnership

Phase 3 in Work Programme 2020: Forward looking R&I

WP 2020, R&I opportunities
- Beyond 5G

5G R&I for "Long Term Evolution"

User needs, cross industry partnerships
with vertical industries

We are
HERE

Phase 3 b) Integrated Verification Trial
- radio+network+applications -

*5G Connected Cars in EU:
Cross border corridors*

Phase 3 a) Verification
Demo/Trial Platform
- Integration radio+ network

Phase I Core Technologies

Phase 2 - Demos
PoC*- Core Techs
Components

*Proof of Concept

Y2015

2016

2017

2018

2019

2020

2021

2022

5G PPP Phase 3 relevant focus:

...this Work Programme aims at leveraging 5G technologies towards downstream innovation both at service and product levels, at maintaining a significant long term commitment to prepare for 5G "Long Term Evolution" and to bridge into smart connectivity platforms, which are expected to emerge during the next multi-annual financial framework (MFF)....

The work also supports the needed transformation of the telecom industry with a growing part of the activities moving from hardware to software in the context of an increased virtualisation of networks.

Context and challenge

The challenge is to go well beyond the 5G capabilities available in 2020. It also looks Beyond 5G to prepare Smart Connectivity systems as a platform for a Next-Generation Internet, supporting a highly flexible connectivity infrastructure that can dynamically adapt to innovative applications whilst facilitating user data control and innovation friendly implementation of relevant legislation. This requires a full value-chain approach towards seamless and secure end-to-end interworking with computing resources and with a range of innovative devices.

General Context- Example value Chain Approach

Requirements Industrial
& Consumer Applications



Telemedicine

Construction

Connected
Mobility

Environment

Factory

Immersive
tourism

8K movie

Sport &
events

....

Service provisioning
Computing and Storage
Data Analytics

Networks
Versatile Infrastructure
Multiple Topologies

Devices: Multiplicity of
Connected Devices

New opportunities
Enabling Technology
Components



Mobile & Last
Mile



High density
access



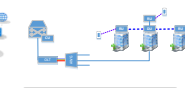
Corporate
nets



Indoor Short
Range



Dense
IoT



Fixed wired
access



Industrial
Automation



360° VR/XR



Fully Automated
Vehicles



Haptic
Communications for surgery



Agri sensors



Smartphones



Computers



Drones

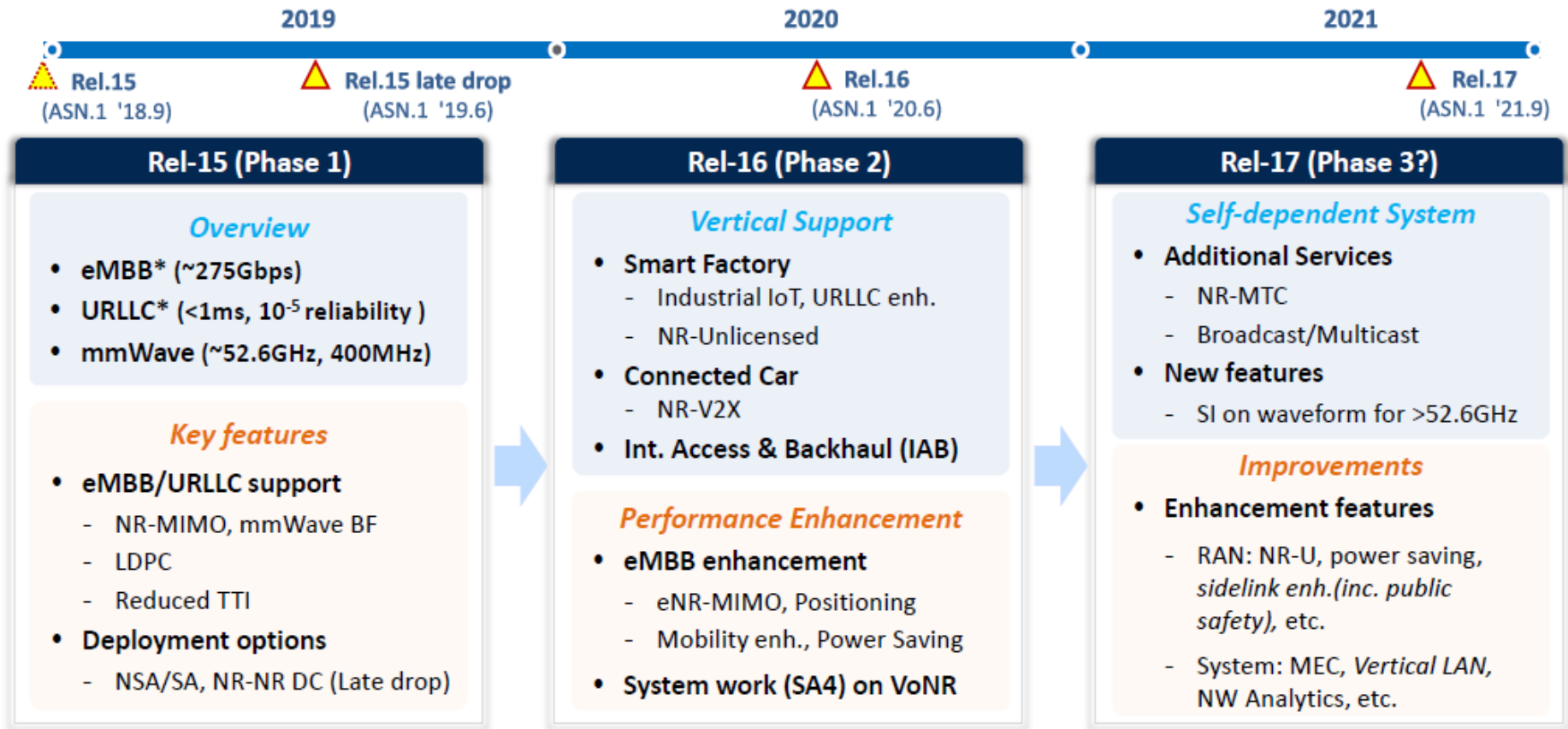


End-to-end Resource
Management and Energy
Efficiency

End-to-end Security and
Trust

3GPP standards already planning evolution

Source: 3GPP/Samsung



ICT-52-2020 Smart Connectivity Beyond 5G

Opening 19/11/2019 - Closing 22/04/2020

up to 55 M€

➤ Research & Innovation Actions (RIA)

€ 5 to 12million/project (indicative). In particular, initiatives with *strong structuring effects* across a large set of key industry stakeholders and programmatic impact for future European actions in the domain of Smart Network and Services *may target the higher budget range*.

A complementary grant agreement will be implemented
across **all** projects in 5G-PPP Phase 3

ICT-52-2020 Smart Connectivity Beyond 5G

Scope

- Infinite network capacity, innovative spectrum use and management, usability of new bands and radio technologies and architectures including optical capabilities
- Imperceptible latencies through flexible connect-compute technologies
- Smart connectivity of massive amounts of things and systems, impact of Mobile edge computing and energy efficiency
- Novel architectures protocols and technologies (e.g. AI) for adaptive networks
- Personalised, multi-tenant and perpetual protection based on security, privacy and trust mechanisms with innovative technologies (e.g. DLT)

Proposals may address one or several of above topics.

ICT-52-2020 Smart Connectivity Beyond 5G

Expected Impact

- Smart connectivity technologies for platforms integrating ubiquitous connectivity, storage, and computing resources opening for new service and business models.
- Smart connectivity platforms towards perceived zero latency.
- Network scalability towards a high number of resource-constrained (IoT) devices
- Characterisation and availability of secure and trusted environments for software based virtualised networks, including underlying hardware limitations and enabling trusted multi-tenancy.
- Innovative radio spectrum use, novel strategies for coverage/service extension, support of novel wireless technologies and use cases through platforms, usability of today unexplored spectrum.
- Heterogeneous networks with dynamic topologies for advanced mobility solutions.
- Dynamic scalability of network capabilities with managed and enhanced optical resources.
- Characterisation of AI and blockchain technologies in the connectivity domain, notably for network/service management and security.
- Significant reduction of total cost of ownership through improved operational and capital expenditure efficiency, and energy consumption.

ICT-52-2020 Smart Connectivity Beyond 5G

What we do NOT want

Innovation Action

- Short term R&I without ambitious perspective
- One off proposals with no follow up potential under next MFF
- Technologies locked to a specific business model

In any case actions which do not clearly focus
on European opportunities and actors

ICT-52-2020 Smart Connectivity Beyond 5G

Topic evolution

New topic

- May however piggyback on previous topics in the 5G PPP notably topic ICT 09 2017 "Networking research beyond 5G" or EUJ-02-2018 "5G and beyond" and ICT-20-2019-2020 5G Long Term Evolution

No specific instructions for evaluators

Project Portfolio : see 5G PPP websites

ICT-52-2020 Smart Connectivity Beyond 5G

Topic evolution

➤ Leading players

- ICT vendors, network service providers, verticals, SMEs
- Academics & R&I centers are expected to have a “visionary” role compared to the previous 5G PPP phases
- Large scale framing initiatives should be strongly industry driven

➤ Key group of actors – participants to projects from

- 5G PPP
- NetWorld2020 ETP

Stakeholders Information Opportunities



<https://ec.europa.eu/digital-single-market/en/news/digital-excellence-forum-ict-proposers-day-2019>

Find out more

5G Action Plan for Europe

<https://ec.europa.eu/digital-single-market/en/5g-europe-action-plan>

ICT Work Programme

<https://ec.europa.eu/programmes/horizon2020/en/what-work-programme>

Funding & tender portal

<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/h2020>

European 5G Observatory

<http://5gobservatory.eu>

5G PPP

<http://www.5G-PPP.eu>

5G PPP Phase III

ICT-52-2020

Thank you for your attention!

ICT-41-2020 5G PPP – 5G innovations for verticals with third party services

Manuel Carvalhosa – Programme Officer

*Future Connectivity Systems
European Commission – DG CONNECT*

5G Public Private Partnership

Phase 3 in Work Programme 2020: accelerating take up and industrial readiness

WP 2020, extra R&I
- 5G innovations for verticals with third party services

5G R&I for "Long Term Evolution"

User needs, cross industry partnerships with vertical industries

We are
HERE

Phase 3 b) Integrated Verification Trial
- radio+network+applications -

*5G Connected Cars in EU:
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2021

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5G PPP Phase 3 relevant focus:

....this Work Programme which also aims at leveraging 5G technologies towards downstream innovation both at service and product levels...

Activities under this headingshould significantly contribute to building a first class European industrial supply side for core 5G technologies with global market footprints and notably for network technologies and systems. They will support the emergence of new innovative market players taking advantage of the growing adoption of distributed cloud computing technologies in 5G networks and making possible open innovation at service level

ICT-41 - General context

Challenge

- Software networks provide high flexibility through implementation of virtual network functions (VNFs). VNF's may be chained across several domains to create Network Applications (NetApps) tailored to the requirements of specific tenants.
- This requires open platforms that provide access to networks resources which can then be used to develop NetApps supporting requirements and developments from specific vertical sectors.

ICT-41-2020 - 5G PPP – 5G innovations for verticals with third party services

Opening 19/11/2019 - Closing 22/04/2020

up to 49 M€

➤ Innovation Actions (IA)

€ 4 to 6 million/project (indicative)

A complementary grant agreement will be implemented across **all** projects in 5G-PPP Phase 3

ICT-41-2020 - 5G PPP – 5G innovations for verticals with third party services - **Scope**

- Experimentation facilities able to provide enhanced experimentation infrastructures on top of which third party experimenters (e.g. SMEs) will have the opportunity to test their applications tailored to specific vertical use cases.
- To create 5G open source repositories for wide use and towards standards development
- Typical vertical use cases: automated mobility, smart factories and industry 4.0

ICT-41-2020 - 5G PPP – 5G innovations for verticals with third party services– Expected Impact

- Testing and validation of NetApp solutions on top of a 5G virtualised experimental environment
- NetApps secure interoperability beyond vendor-specific implementation across multiple domains, availability of standards or reference implementations.
- Open-source repository of network applications that can be further leveraged by other developers.
- Creation of third party markets for start-ups and SMEs. 50% of SMEs are targeted for this action.
- Relevant 5G PPP KPI: Service creation time in minutes.
- Results that may be appropriate for transfer towards an incubator or a start up, either within the project or outside of the projects in follow up actions.

ICT-41-2020 - 5G PPP – 5G innovations for verticals with third party services - What we do NOT want

Innovation Action

- Experimentation facilities that are not sufficiently open, or rich in terms of VNFs, to attract third parties to test NetApps for specific vertical sectors.
- Solutions that clearly will not be taken up by SMEs or start-ups.

ICT-41-2020 - 5G PPP – 5G innovations for verticals with third party services

New topic

- Leveraging on 5G enabling technologies and systems developed within or out of the 5G PPP Phases 1, 2 and 3
- Extending the innovation to software innovations with low market entry barriers that can be leveraged by SME's and new actors

No specific instructions for evaluators

Project Portfolio : see 5G PPP websites

ICT-41-2020 - 5G PPP – 5G innovations for verticals with third party services

➤ Leading players

- SW development companies, SMEs and research centers (public or private)
- Communication research department in universities, industries and research centers

➤ Key group of actors – participants to projects from

- 5G PPP

Stakeholders Information Opportunities



<https://ec.europa.eu/digital-single-market/en/news/digital-excellence-forum-ict-proposers-day-2019>

Find out more

5G Action Plan for Europe

<https://ec.europa.eu/digital-single-market/en/5g-europe-action-plan>

ICT Work Programme

<https://ec.europa.eu/programmes/horizon2020/en/what-work-programme>

Funding & tender portal

<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/h2020>

European 5G Observatory

<http://5gobservatory.eu>

5G PPP

<http://www.5G-PPP.eu>

5G PPP Phase III

ICT-41-2020

Thank you for your attention!

5G PPP Phase III – ICT-42-2020

5G core technologies innovation

Mario Scillia – Programme Officer

*Future Connectivity Systems
European Commission – DG CONNECT*

5G Public Private Partnership

Phase 3 in Work Programme 2020: accelerating take up and industrial readiness

WP 2020, extra R&I opportunities
- Supporting HW supply side and SME's

5G R&I for "Long Term Evolution"

User needs, cross industry partnerships
with vertical industries

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5G PPP Phase 3 relevant focus:

Activities under this headingshould significantly contribute to building a first class European industrial supply side for core 5G technologies with global market footprints and notably for network technologies and systems. They will support the emergence of new innovative market players taking advantage of the growing adoption of distributed cloud computing technologies in 5G networks and making possible open innovation at service level

ICT-42-2020: 5G PPP – 5G core technologies innovation Innovation Actions – Expected Impact

- Support to the emergence of a European offer for new 5G core technologies at TRL 7 or beyond
- Support to the emergence of new actors in the related markets
- Creation of high tech start-ups or of new business opportunities for established SME's.
- Strong SME participation is targeted

ICT-42-2020: 5G PPP – 5G core technologies innovation Coordination and Support Action - **Scope**

- Definition of the expected core hardware components of future connectivity systems where Europe should seize opportunities and strengthen its capabilities
- Definition of the required R&I and investment requirements related to the identified domains
- Definition of related industry roadmap in partnership among relevant EU actors, both from industry and academia

ICT-42-2020: 5G PPP – 5G core technologies innovation Coordination and Support Action – Expected Impact

- Cross industry availability of a European roadmap for hardware enabling technologies supporting European strategic autonomy objectives for connectivity platforms

ICT-42-2020: 5G PPP – 5G core technologies innovation

What we do NOT want

Innovation Action

- R&I on components not **related to** 5G connectivity
- Actions that do not open strong SME opportunities

Coordination and Support Action

- Roadmaps on future connectivity systems which focus is not on hardware systems (**though related SW is in scope**)

In both case ⇒ actions which do not clearly focus
on European opportunities and actors

ICT-42-2020: 5G PPP – 5G core technologies innovation

Topic evolution

New topic

- Leveraging on 5G enabling technologies and systems developed within or out of the 5G PPP Phases 1, 2 and 3
- Extending the innovation to their application at hardware level for devices, terminals, network equipments

No specific instructions for evaluators

Project Portfolio : see 5G PPP and ECSEL JU websites

ICT-42-2020: 5G PPP – 5G core technologies innovation

Topic evolution

➤ Leading players

- Components and hardware development companies, SMEs and research centers (public or private)
- Communication research department in universities, industries and research centers

➤ Key group of actors – participants to projects from

- 5G PPP
- ECSEL Joint Undertaking

Stakeholders Information Opportunities



<https://ec.europa.eu/digital-single-market/en/news/digital-excellence-forum-ict-proposers-day-2019>

Find out more

5G Action Plan for Europe

<https://ec.europa.eu/digital-single-market/en/5g-europe-action-plan>

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<http://5gobservatory.eu>

5G PPP

<http://www.5G-PPP.eu>

ECSEL Joint Undertaking

<https://www.ecsel.eu>

5G PPP Phase III

ICT-42-2020

Thank you for your attention!

5G PPP Phase III – ICT-53-2020

5G for Connected and Automated Mobility (CAM)

Pavlos Fournogerakis – Programme Officer

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European Commission – DG CONNECT*

5G Public Private Partnership

Phase 3 in Work Programme 2020: accelerating
take up and industrial readiness

WP 2020, extra R&I opportunities
**- 5G for Connected and Automated
Mobility (CAM)**

5G R&I for "Long Term Evolution"

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with vertical industries

We are
HERE

Phase 3 b) Integrated Verification Trial
- radio+network+applications -

5G Connected Cars in EU:
Cross border corridors

Phase 3 a) Verification
Demo/Trial Platform
- Integration radio+ network

Phase 2 - Demos
PoC*- Core Techs
Components

*Proof of Concept

Phase I Core Technologies

Y2015

2016

2017

2018

2019

2020

2021

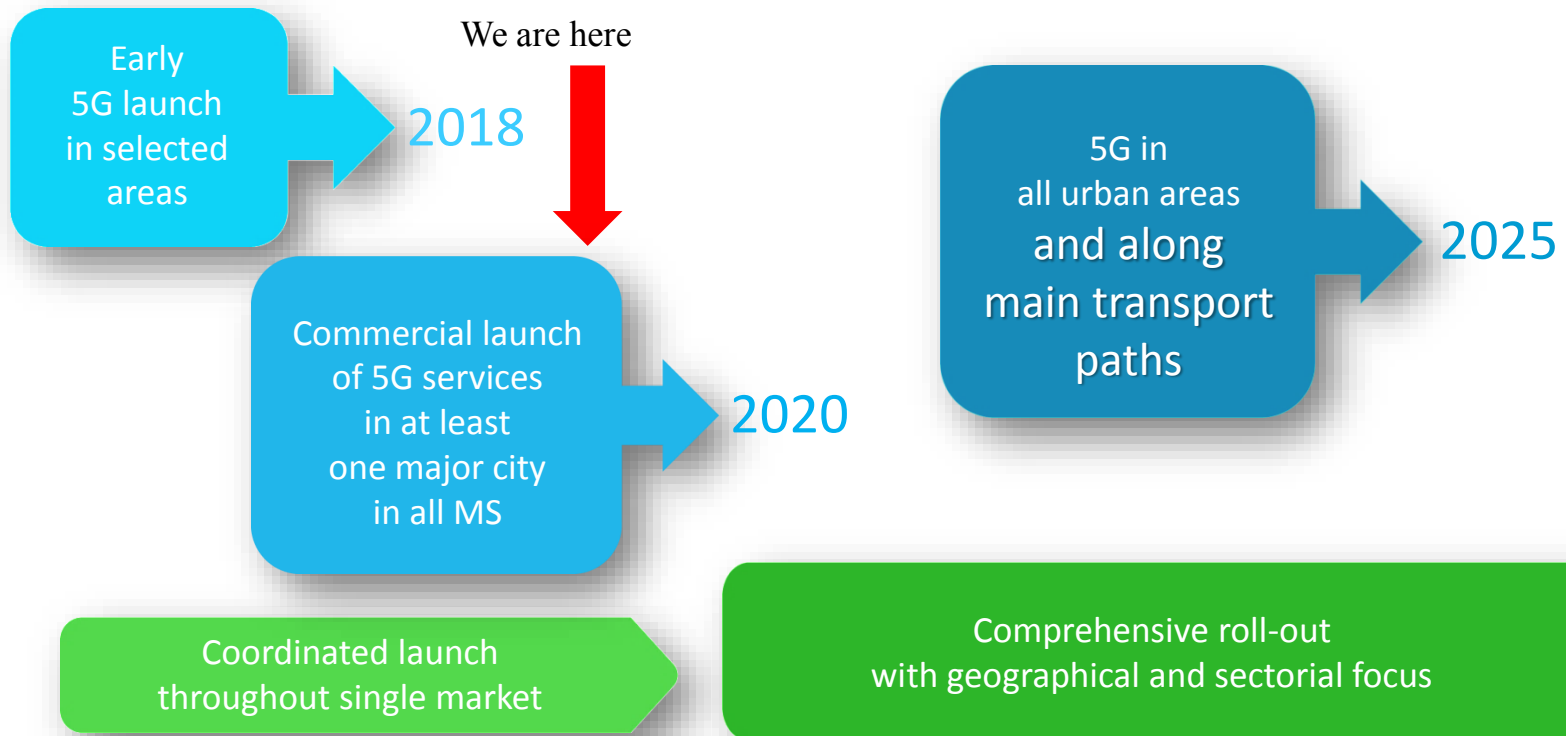
2022

5G PPP Phase 3 relevant focus:

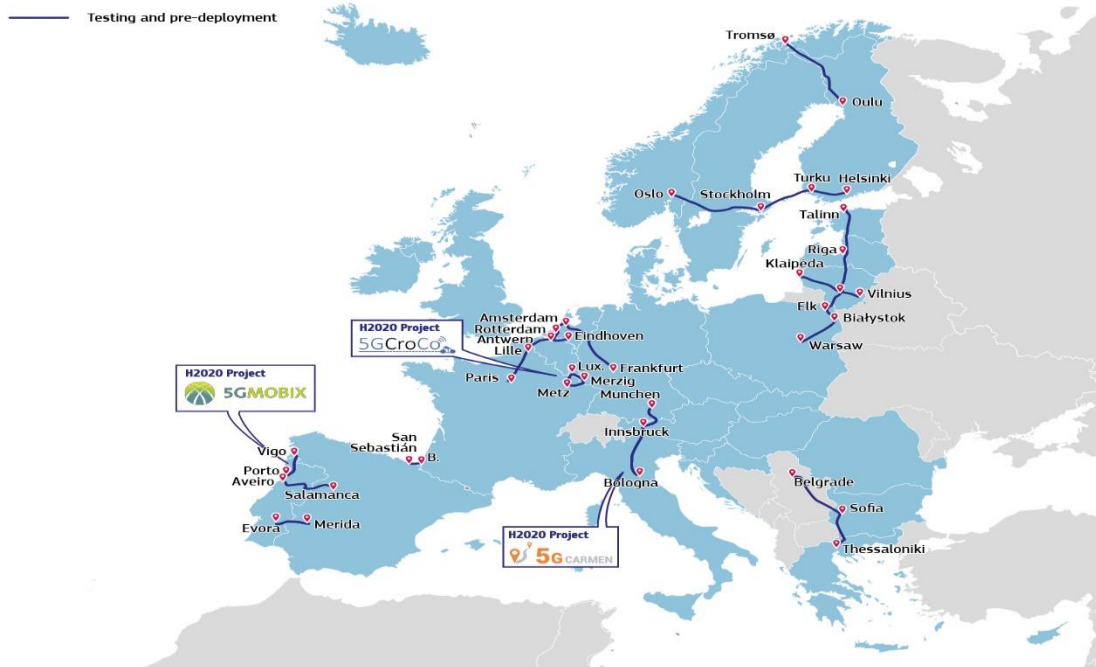
This 5G PPP phase also aims at developing "lead" markets involving cooperation models with key vertical sectors contributing to the wider policy objectives of industry digitisation in the Digital Single Market. It will contribute to the successful implementation of 5G-based cross-border corridors for Connected and Automated Mobility in the EU and prepare for future deployment phases under the next MFF.

5G Context: European policy and 5GPPP

5G Action Plan: European targets for 5G introduction



Connected & automated Mobility over cross border corridors as flagship initiative, the “Rome process”



3 Supporting Projects, to be expanded:

- 5G CARMEN, Brenner corridor
- 5G CROCO, Metz Merzig Corridor
- 5G MOBIX, PT-ES and EL-TK corridors

Next MFF: proposal towards operational deployment

— Testing and pre-deployment
— Large-scale deployment

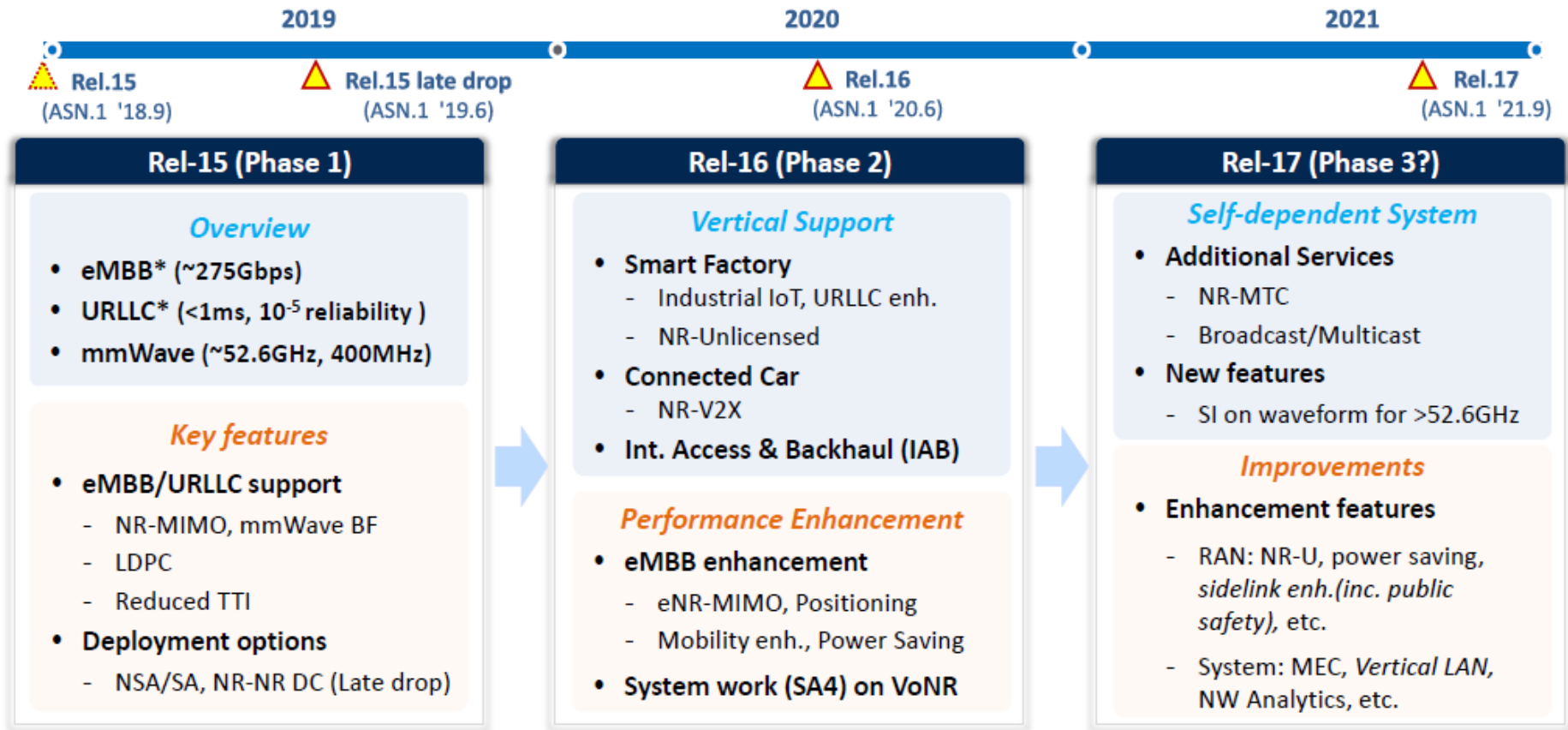
Target corridors under
CEF2 programme

« Strategic Deployment
Agenda » under
development



3GPP standards already planning evolution

Source: 3GPP/Samsung



ICT-53-2020: 5G PPP – 5G for Connected and Automated Mobility (CAM)

ICT-53-2020: 5G PPP – 5G for Connected and Automated Mobility (CAM) - general context

- Connected and Cooperative Assisted Mobility (CCAM) identified as a strategic industrial opportunity in the EU in line with 5G Action Plan objectives
 - Member State support with Letter of Intent, signed at ministerial level in March 2017
 - 5G specifications from 3G PP release 16 will be available early 2020 (5G NR-V2X and beyond)
 - Paves the way towards operational deployment as envisaged with the Connecting Europe Facility proposal
 - Relevant to cross border railway corridors in view of providing services to trains
- ➔ ICT 53 aims at validating 5G for CAM in this wider techno-policy context

ICT-53-2020: 5G PPP – 5G for Connected and Automated Mobility (CAM) - **scope**

- Validation of the latest available 5G specification in the context of innovative CAM applications under realistic conditions and seamlessly functioning across borders covering significant portions of roads or railways.
- Broad innovation perspective covering use cases in the vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), vehicle-to-pedestrian (V2P), and vehicle-to-network (V2N) domains including the supporting service infrastructure.
- Core technological innovation expected from 5G, such as radio, RAN and core network. Innovations in the area of Artificial Intelligence (AI) to enable advanced CAM use cases are also included.

ICT-53-2020: 5G PPP – 5G for Connected and Automated Mobility (CAM) - scope

- Multi-tenant business architecture to optimise the return on investments and the efficiency of the deployed infrastructure, while considering the opportunity of a European cloud supporting roaming of CAM services
- Expected to provide a clear co-existence between multiple technologies (IEEE 802.11p, C-V2X, 5G-V2X) and migration path towards the use of 5G as the technology for CAM.
- It may include advanced services on board of international trains covering passenger services, train traffic management services, as well as other operational services in preparation for the advent of the Future Railways Mobile Communication Systems (FRMCS)

ICT-53-2020: 5G PPP – 5G for Connected and Automated Mobility (CAM) - expected impact

- Validation of 5G technologies and architecture in a CAM context, including business models and applicable standards as well as AI features to support most advanced CAM use cases
- Validated cost/benefit analysis of cross border 5G deployment enabling CAM along 5G corridors potentially including several business domains.
- Characterisation of 5G Release 16 or beyond for the most advanced CAM use cases including innovative spectrum use
- Technological validation of 5G introduction for train/railways use cases
- Development of a sustainable model for a pan-European cloud infrastructure
- Participation of key European industrial partners with high standardisation impact

ICT-53-2020: 5G PPP – 5G for Connected and Automated Mobility (CAM)

- Opening 09/07/2019
- Closing 13/11/2019
- € 7 to 10 million/project (indicative)
- Type of action: Innovation action
- Proposal may address automotive use case, railways, or both
- Special conditions!
 - A complementary grant agreement will be implemented across all projects in 5G-PPP Phase 3

up to 30 M€

ICT-53-2020: 5G PPP – 5G for Connected and Automated Mobility

What we do NOT want

Innovation Action

- Actions that are based on G5 only
- Addressing already covered corridors only
- Focus on use cases already covered by 5G CARMEN, CROCO and MOBIX

ICT-53-2020: 5G PPP – 5G for Connected and Automated Mobility (CAM)

Expansion of ICT-18 topic

- Leveraging on 5G enabling technologies and systems developed within or out of the 5G PPP Phases 1, 2 and 3
- Extending coverage, technology (e.g. AI), use cases, impact towards standards
- Opportunity for new players

No specific instructions for evaluators

Project Portfolio : see 5G PPP ICT-18 projects

ICT-53-2020: 5G PPP – 5G for Connected and Automated Mobility (CAM)

➤ Leading players

- Telecom operators, vendors, IT cloud actors, AI R&D centres, academics
- Automotive industry, road operators, public transport authorities

➤ Key group of actors – participants in projects from

- 5G PPP, ICT-18 projects
- 5G Automotive working group, SDA preparation members
- 5GAA

Stakeholders Information Opportunities



<https://ec.europa.eu/digital-single-market/en/news/digital-excellence-forum-ict-proposers-day-2019>

Find out more

5G Action Plan for Europe

<https://ec.europa.eu/digital-single-market/en/5g-europe-action-plan>

ICT Work Programme

<https://ec.europa.eu/programmes/horizon2020/en/what-work-programme>

Funding & tender opportunities portal

<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/programmes/h2020>

5G PPP

<http://www.5G-PPP.eu>

Horizon2020 web site

<http://ec.europa.eu/programmes/horizon2020>

H2020 Helpdesk, including FAQ

<http://ec.europa.eu/research/index.cfm?pg=enquiries>

5G PPP Phase III

ICT-53-2020

Thank you for your attention!