H2020: EU Framework Programme for Research and Innovation 2014-2020

European Technology Platform (ETP)
NetWorld 2020
http://networld2020.eu/

5G PPP
5G Infrastructure Association
http://5g-ppp.eu/

5G SIG meeting
Report from NetWorld2020 and 5G PPP Association activities

Kjeller, 17 June 2014

Terje Tjelta

NetWorld2020
The new communication networks oriented ETP

setup by ETPs Net!Works and ISI

Version: 20 May 2014

Adobe Acrobat
Document

Key challenges

- PPP Programme that will deliver solutions, architectures, technologies and standards for the ubiquitous 5G communication infrastructures of the next decade

- Programme Ambitions: Key Challenges / High level KPIs
  - Providing 1000 times higher wireless area capacity and more varied service capabilities compared to 2010
  - Saving up to 90% of energy per service provided. The main focus will be in mobile communication networks where the dominating energy consumption comes from the radio access network
  - Reducing the average service creation time cycle from 90 hours to 90 minutes
  - Creating a secure, reliable and dependable Internet with a "zero perceived" downtime for services provision
  - Facilitating very dense deployments of wireless communication links to connect over 7 trillion wireless devices serving over 7 billion people
  - Enabling advanced User controlled privacy

Source: 5G PPP Annex to contractual arrangement.

5G PPP Contractual Arrangement Activities, Investment and Outputs

- Research and innovation activities co-funded under Horizon 2020 in the scope of the partnership.

- Subject to Horizon 2020 Rules for participation and dissemination

- **Commission intends to allocate from Union budget an indicative financial envelope of EUR 700 million for the period of 2014-2020**

- Private Side commits to engage the stakeholder community to invest funds in research and innovation activities specific to the partnership domain both

- Including leveraging factor 5 for private investment value of initiative: 3.5 billion €

Source: 5G PPP Contractual Arrangement.

Proposed budget for financial period 2014 - 2020

- Public contribution around 700 million €

- Private contribution around 700 million €

- From research towards innovation

Year of call for proposals	2014	2015	2016	2017	2018	2019	2020	Total [million €]
Global budget	140	160	180	200	220	240	260	1 400
Estimate research actions	110	120	140	140	150	160	160	980
Estimate innovation actions	30	40	40	60	70	80	100	420

Source: 5G PPP Annex to contractual arrangement.

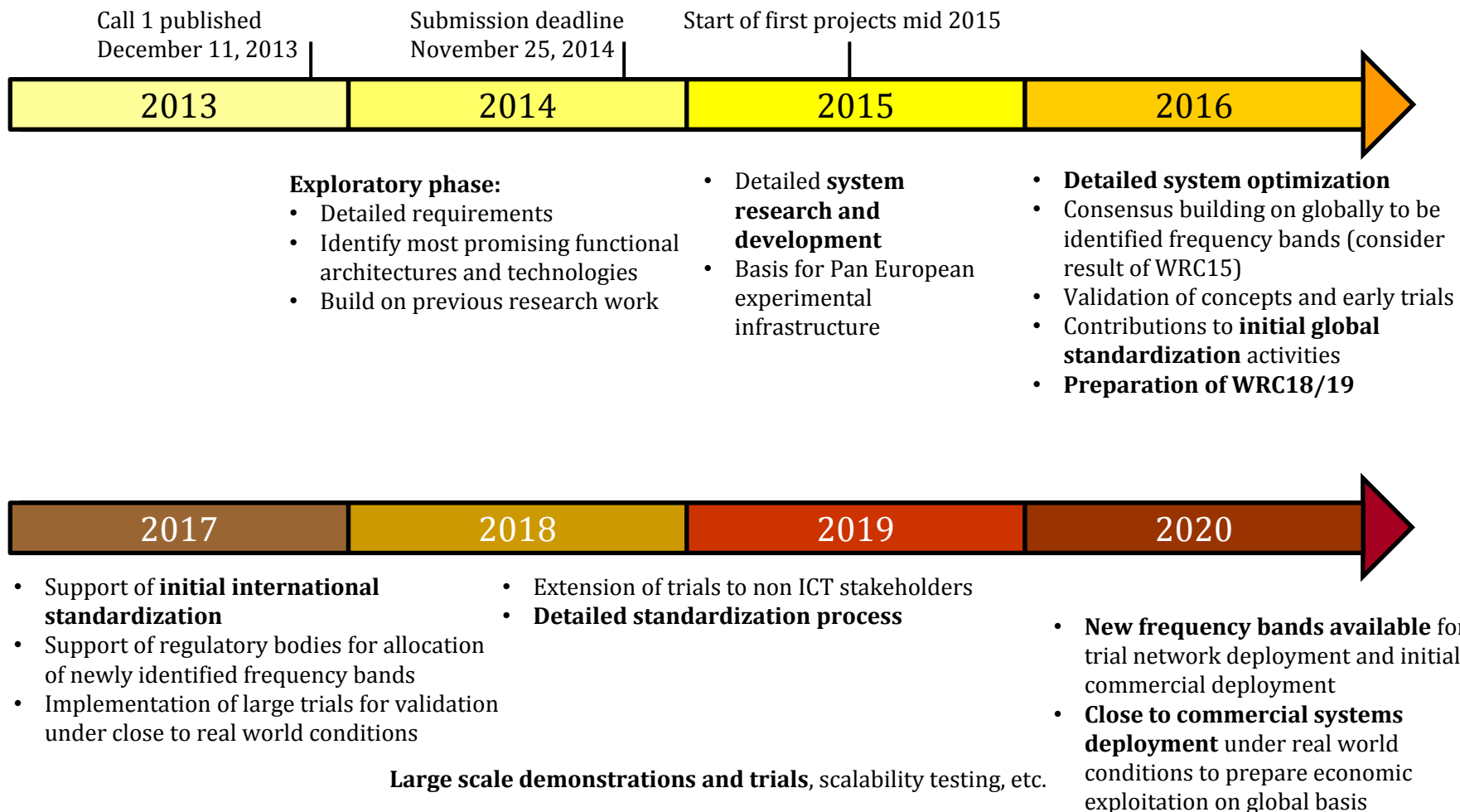# 5G PPP Contractual Arrangement Monitoring – KPIs

- Business-related KPIs:
  - Leverage effect of EU research and innovation funding in terms of private investment in R&D for 5G systems in the order of 5 to 10 times;
  - Target SME participation under this initiative commensurate with an allocation of 20% of the total public funding;
  - Reach a global market share for 5G equipment & services delivered by European headquartered ICT companies at, or above, the reported 2011 level of 43 % global market share in communication infrastructure.

- Performance KPIs:
  - Providing 1000 times higher wireless area capacity and more varied service capabilities compared to 2010;
  - Reducing the average service creation time cycle from 90 hours to 90 minutes (as compared to the equivalent time cycle in 2010);
  - Very dense deployments to connect over 7 trillion wireless devices serving over 7 billion people;
  - Secure, reliable and dependable Internet with a "zero perceived" downtime for services provision.

- Societal KPIs:
  - Enabling advanced User controlled privacy;
  - Reduction of energy consumption per service up to 90 % (as compared to 2010);
  - European availability of a competitive industrial offer for 5G systems and technologies;
  - New economically-viable services of high societal value like U-HDTV and M2M applications;
  - Establishment and availability of 5G skills development curricula in partnership with the EIT.

Source: 5G PPP Contractual Arrangement.
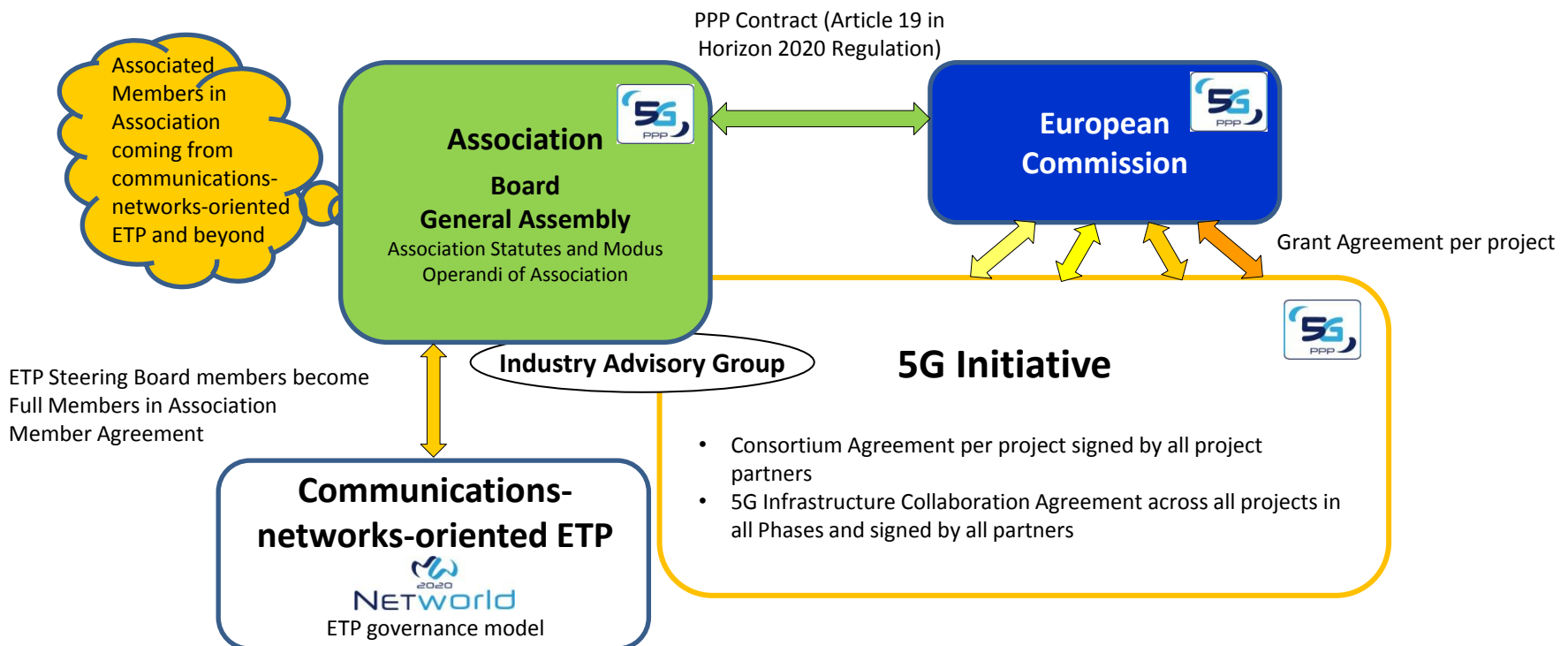
Indicative timeline

Call 1 published
December 11, 2013

Submission deadline
November 25, 2014

Start of first projects mid 2015

2013	2014	2015	2016

Exploratory phase:
- Detailed requirements
- Identify most promising functional architectures and technologies
- Build on previous research work

- Detailed **system research and development**
- Basis for Pan European experimental infrastructure

- **Detailed system optimization**
- Consensus building on globally to be identified frequency bands (consider result of WRC15)
- Validation of concepts and early trials
- Contributions to **initial global standardization** activities
- **Preparation of WRC18/19**

2017	2018	2019	2020

- Support of **initial international standardization**
- Support of regulatory bodies for allocation of newly identified frequency bands
- Implementation of large trials for validation under close to real world conditions

- Extension of trials to non ICT stakeholders
- **Detailed standardization process**

Large scale demonstrations and trials, scalability testing, etc.

- **New frequency bands available** for trial network deployment and initial commercial deployment
- **Close to commercial systems deployment** under real world conditions to prepare economic exploitation on global basis

Source: 5G Infrastructure Association.

7

Governance model – Basic approach
Relation of new ETP to 5G PPP

- **NETworld** will support the [5G PPP] by
  - the direct relation to the PPP Association and
  - the development of the SRAI for the 5G-PPP

PPP Contract (Article 19 in Horizon 2020 Regulation)

Associated Members in Association coming from communications-networks-oriented ETP and beyond

Association

Board
General Assembly
Association Statutes and Modus Operandi of Association

European Commission

Grant Agreement per project

Industry Advisory Group

5G Initiative

ETP Steering Board members become Full Members in Association Member Agreement

- Consortium Agreement per project signed by all project partners
- 5G Infrastructure Collaboration Agreement across all projects in all Phases and signed by all partners

Communications-networks-oriented ETP

NETworld
ETP governance model

- The Association is an international non-profit association, named "The 5G Infrastructure Partnership" under Belgian law. It is the contractual counterpart of the European Commission for signing the 5G-PPP contract, done on 17 December 2013, see http://europa.eu/rapid/press-release_IP-13-1261_en.htm.

Source: NetWorld2020 ETP and Annex to 5G PPP Contractual Arrangement.

Members of 5G Infrastructure Association

Industry
- ADVA Optical Networking SE
- Alcatel-Lucent
- Astrium Satellites
- Atos
- Deutsche Telekom
- DOCOMO Communications Laboratories Europe GmbH
- Ericsson
- Huawei Technologies Düsseldorf GmbH
- IBM Research
- Intel Mobile Communications
- NEC Europe Ltd., NEC Laboratories Europe
- Nokia
- Orange Labs
- Portugal Telecom
- Samsung Electronics Research Institute Ltd.
- SES
- Telecom Italia
- Telefónica I+D
- Telenor ASA
- Telespazio
- Thales Alenia Space
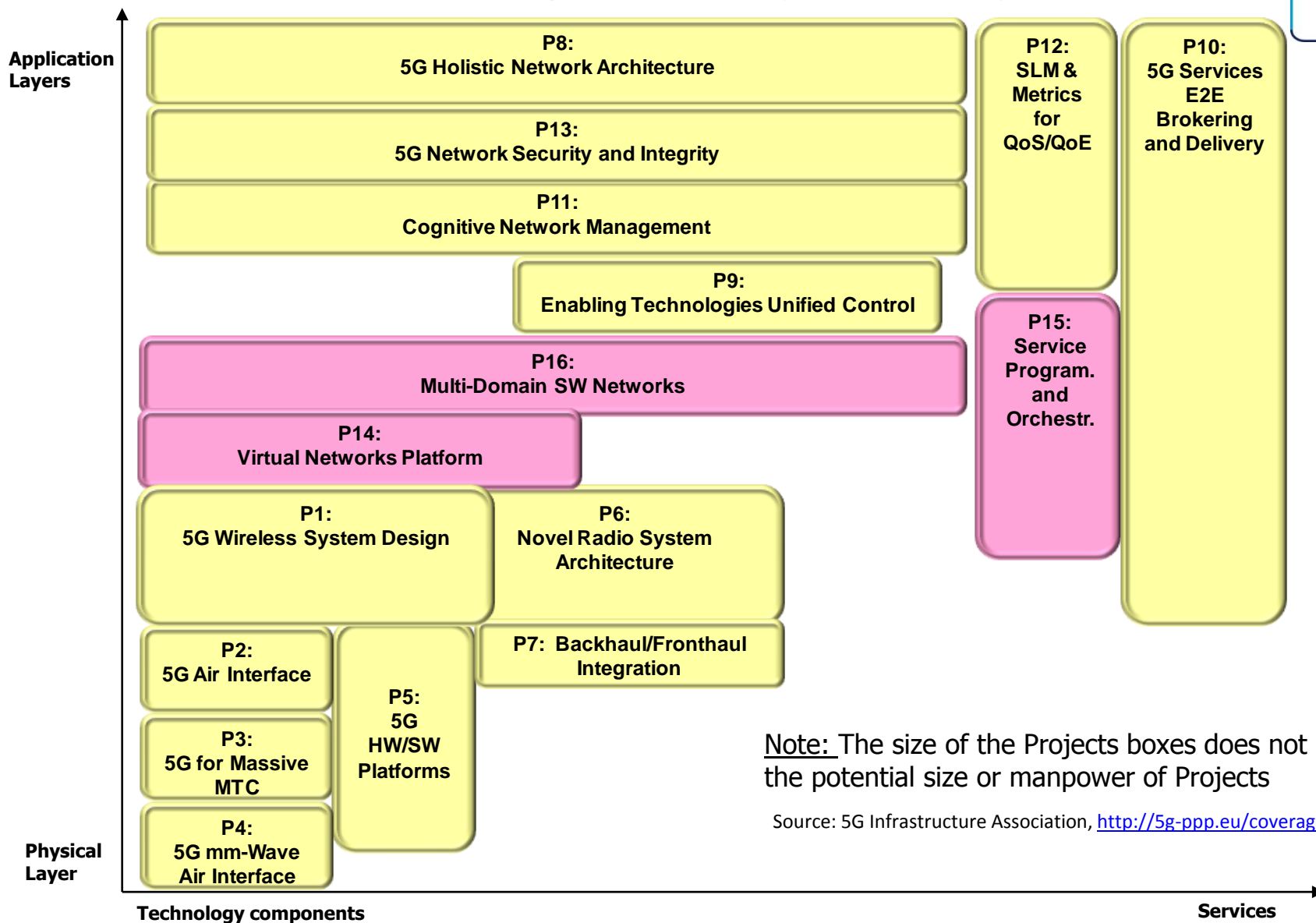- Turk Telekomünikasyon A.Ş.

Research
- CEA-LETI
- Centre Tecnologic de Telecomunicacions de Catalunya (CTTC)
- Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT)
- Fundacion IMDEA Networks
- Instituto de Telecomunicacoes
- IST – University of Lisbon
- TNO
- University of Bologna – DEI

SMEs
- Integrasys SA
- INTERINNOV
- M.B.I. S.R.L.
- Nextworks s.r.l.
- Quobis
- Sequans Communications

Source: 5G Infrastructure Association.

5G PPP Pre-structuring Model – System Perspective

Application Layers

Physical Layer

P8:
5G Holistic Network Architecture

P13:
5G Network Security and Integrity

P11:
Cognitive Network Management

P9:
Enabling Technologies Unified Control

P16:
Multi-Domain SW Networks

P14:
Virtual Networks Platform

P1:
5G Wireless System Design

P6:
Novel Radio System Architecture

P2:
5G Air Interface

P3:
5G for Massive MTC

P4:
5G mm-Wave Air Interface

P5:
5G HW/SW Platforms

P7: Backhaul/Fronthaul Integration

P12:
SLM & Metrics for QoS/QoE

P15:
Service Program. and Orchestr.

P10:
5G Services E2E Brokering and Delivery

Technology components

Services

<u>Note:</u> The size of the Projects boxes does not indicate the potential size or manpower of Projects

Source: 5G Infrastructure Association, http://5g-ppp.eu/coverage-plans/.

How to participate

- Participate in the Networld2020 ETP (http://networld2020.org/) and the 5G-Infrastructure Association (http://5g-infrastructure-ppp.eu/) activities
  - Participation starts with ETP membership
    - NGMN is Observer in NETWorld Steering Board and
    - will become Associated Member of 5G Infrastructure Association
  - Contribute to the Expert Group to update SRIA
  - Support requirements capturing on future networks
  - Members of ETP can be candidates for ETP Steering Board / Association and additional members in Association
- In 5G PPP projects
  - Commission is publishing Open Calls for Proposals
  - Everyone can submit proposals
  - Independent evaluators select proposals based on criteria
    - scientific and technological excellence,
    - impact and
    - Implementation
  - Integration of successful proposals into the PPP program in order to ensure cooperation of projects
- There is no membership in 5G PPP, because participation in PPP projects is open

Source: 5G Infrastructure Association.

Conclusions

- Demand for advanced data services and support of vertical sectors is increasing with challenging requirements on throughput, latency and user experience

- 5G will be a combination of existing and evolving systems, like LTE-Advanced and Wi-Fi, coupled with new, revolutionary technologies designed to meet new requirements, such as virtually zero latency to support tactile Internet, machine control or augmented reality

- 5G research is getting momentum globally

- In Europe 5G PPP launched in December 2013

- 5G PPP Workshop at EuCNC 2014 "The 5G PPP: Vision and Opportunities"
    - Bologna
    - June 26, 2014
    - http://eucnc.eu/