



## Interactive Webinar on EU-US collaboration on 5G funding opportunities in Horizon 2020

**Monday, May 7<sup>h</sup>, 2018**  
The event is free of charge  
Registration is required

ICT Policy, Research and Innovation  
for a Smart Society

[www.picasso-project.eu](http://www.picasso-project.eu)



# EU-US collaboration on 5G funding opportunities in Horizon 2020

## Agenda

- **PICASSO activities and services**

Ms. Margot Bezzi - APRE (PICASSO partner) - **5 Minutes**

- **The 5G PPP and FIWARE perspectives: 5G PPP and FIWARE Pan European Trials and the H2020 ICT-21-2018 call on EU-US cooperation on advanced wireless platforms**

Jacques Magen, InterInnov - **20 Minutes**

- **PICASSO opportunity report: a reflection on recommended technology themes for EU-US cooperation**

Dr. Yaning Zou, Technische Universität Dresden, Germany - **25 Minutes**

- **Q&A - 20 Minutes**



# PICASSO Project

Margot Bezzi

APRE

ICT Policy, Research and Innovation  
for a Smart Society

[www.picasso-project.eu](http://www.picasso-project.eu)



## Project in brief

- > **Coordination and Support Action**, funded by the European Commission/DG CONNECT
- > **Duration:** 30 months – From January 1, 2016 until June 30, 2018
- > **Target countries:** European Union, United States of America
- > **Target groups:** ICT RDI Stakeholders and networks | ICT companies / industry | Policy Makers
- > **Mission:** Enhance EU-US ICT research and innovation collaboration responsive to the societal challenges and industry needs, supported by harmonious policies, to enable economic growth in both the EU and US

# Expert Groups

## 3 Technology Groups

*On Strategic ICT Technology areas in relation to Societal Challenges*

**5G  
Networks**

**Big Data**

**IoT/CPS**

## 1 Horizontal Group

*On ICT Policy*

Policy issues:  
**Privacy and data protection | Cybersecurity | Standards |  
Spectrum | Smart Communities**

**Synergies between policy and  
technology groups**

**+25 Experts in total across all expert groups**

# What's in it for you? PICASSO Benefits and Opportunities

## Landscape analyses and Reports

- **Analysis** of ICT landscape and industrial drivers, societal needs, policy gaps in EU and US
- **Opportunity report** “Towards Enhanced EU-US ICT Pre-competitive Collaboration”
- **Recommendations** on policy dialogue needs, priorities and strategic activities
- **Recommendations** for future topics to funding agencies for EU-US collaboration
- **5 policy briefs** and **1 White paper** summarizing recommendations to policy makers.

## Tools and Services

- **CROSSROADS - ICT Toolkit**, a mobile app providing a smart quick access to ICT activities in EU and US
- **Helpdesk** service, to support access to EU-US ICT-related programmes
- **4+ webinars** on funding opportunities, and **5 webinars** on the identified policy gaps

## Public Relations and events

- **2 international conferences** on ICT research, innovation and policy
  - Next: in Washington, US: June 18<sup>th</sup>-19<sup>th</sup> 2018 - **SAVE THE DATE!**

# Webinar series

Visit [www.picasso-project.eu/projectevents/webinars](http://www.picasso-project.eu/projectevents/webinars) for info and registration

## Webinars



Subscribe to the **PROJECT MAILING LIST** and receive news and updates from the PICASSO Project!

### PICASSO Webinars

#### Upcoming Webinars

- ★ 7th May 2018: PICASSO Webinar "EU-US Collaboration on 5G Funding Opportunities in Horizon 2020"
- ★ 9th May 2018: Policy webinar "EU-US Collaboration for Digital Communities"
- ★ 11th May 2018: PICASSO Webinar "EU-US Collaboration on Big Data Funding Opportunities in Horizon 2020"
- ★ 16th May 2018: PICASSO Webinar "EU-US Challenges & Opportunities in Autonomous Cyber-physical Systems"

# Consortium



**Coordinator**  
inno TSD, France



Technische Universität Dortmund (TUDO),  
Germany



THHINK Wireless Technologies Limited  
(THHINK), United Kingdom



Athens Technology Center (ATC), Greece



Agency for the Promotion of the European  
Research (APRE), Italy



Honeywell International INC (HON), United States



GNKS Consult BV, (GNKS), The Netherlands



Technische Universität Dresden (TUD), Germany



Florida International University, (FIU), United States



Regents of University of Minnesota, (TLI), United States

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PICASSO – EU/US ICT research, innovation and policy collaboration

A detailed illustration of a smart city and its various applications. It includes labels for 'CONNECTED CITY', 'CONNECTED HEALTH', and 'CONNECTED HOUSE'. The scene depicts a city skyline with buildings, a park with wind turbines, and a road with a delivery truck. Various icons represent connectivity, such as Wi-Fi symbols, satellite dishes, and data streams connecting different parts of the city.

# **The 5G Infrastructure Association**

## **EU-US Collaboration on 5G Funding Opportunities in H2020**

**Jacques Magen, InterInnov, 5G IA Board Member**  
**PICASSO 5G EU-US Webinar – May 7th, 2018**

# 5G-IA overview and objectives

- 5G-IA: The voice of the European industry for the development, deployment, and evolution of 5G
  - 70+ members (industry, research, SMEs, associations)
  - Board: Nokia (Chair), SES (Vice-Chair), Orange, Thales, Ericsson, Telecom Italia Mobile, Huawei, Telenor, Nextworks, InterInnov, CTTC
- Primary objectives
  - Ensure a clear European voice on 5G around the world.
  - Drive the digital transformation through leverage and development of 5G technology
  - Facilitate the convergence of telecommunications and vertical industry sectors to create an European-wide ecosystem
  - Steer the European 5G PPP research agenda, program implementation and evolution

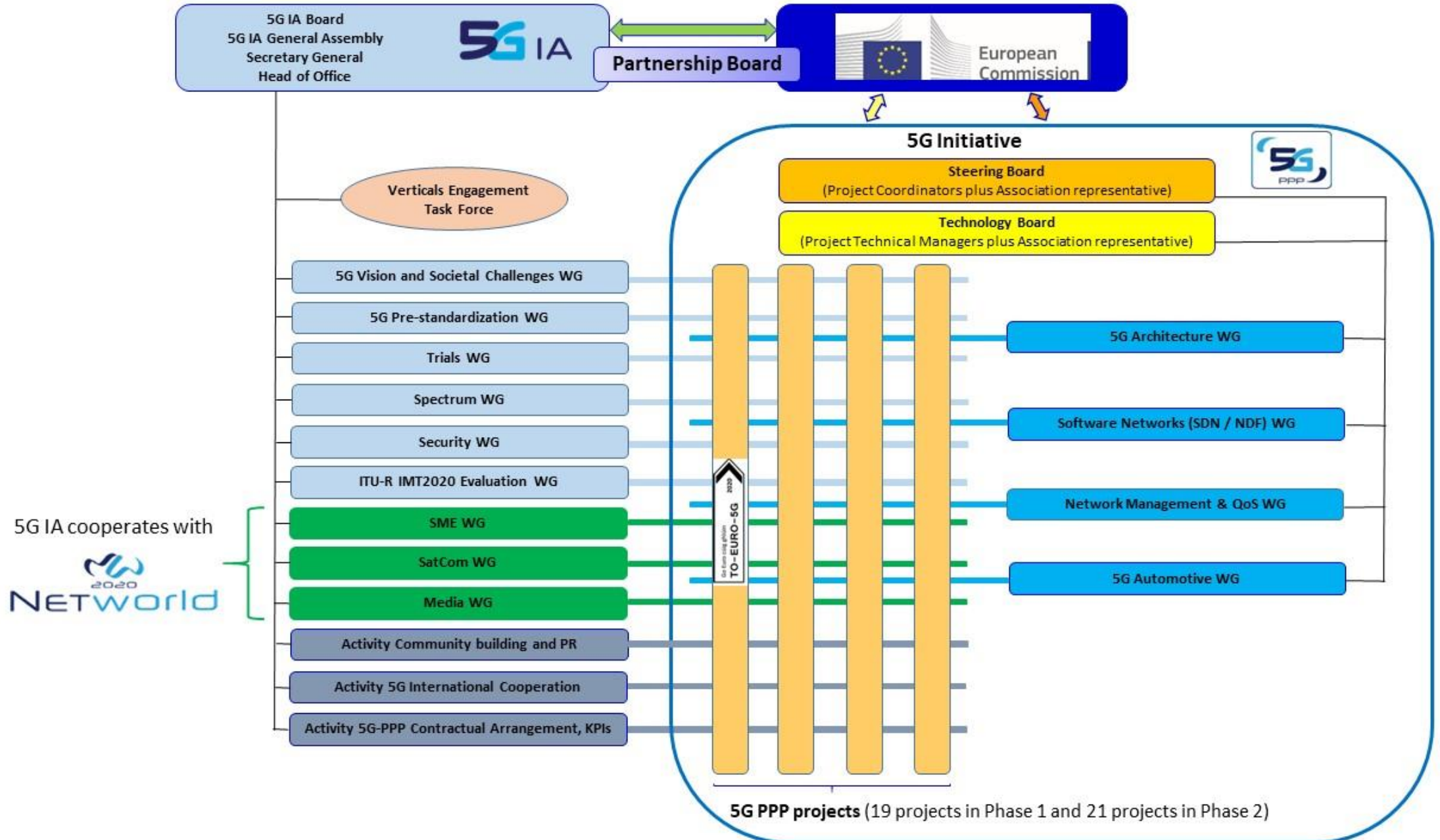
# 5G-IA key activities and events

- The 5G IA carries out a wide range of activities in 5G strategic areas and policy-oriented topics including:
  - Commercial and pre-commercial trials and pilots
  - R&D projects and technology skills enhancement
  - Standardization and spectrum regulation bodies
  - Collaboration with key vertical industry sectors
  - **Interaction with international partners towards consensus building on 5G**

- Events



- Mobile World Congress (5G-IA booth, keynotes, demos)
- **Global 5G Events** (co-organization, keynotes, demos)
- Invited talks
  - 5G World Congress, IEEE 5G World Forum, EC Digitization Initiatives, WWRF 5G Huddle, Autonomous Vehicle World, ...



## 5G IA WGs & Activities

## 5G-PPP Projects WGs

## NetWorld 2020 WGs

### Pre-standardization WG

Mandate, Rationale, Mission ...  
Key words



### Spectrum WG



### Vision and Societal Challenges WG



### 5G International cooperation Activity



### Trials WG

### Security WG

Foster development of 5G Security (Content and Community wise) the way it should be for 5G to generate the necessary trust and confidence to release its full potential

### ITU-R IMT2020 Evaluation WG

*Proposed description is too long*

### Community building and Public Relations Activity

### Software Networks (SDN and NFV) WG

Defines the cloud native design of 5G system: from the IT to Telco.



### 5G Architecture WG



### Network Mgmt & QoS WG

Maintain network state, ensuring services are properly delivered to users, expected QoS is enforced for delivering such services, and security is preserved.

### Automotive WG

Focuses on connected and automated mobility. Range of topics, such as use cases and KPIs, business aspects, spectrum usage, infrastructure capabilities, security and safety.

### SME WG

Show the expertise and innovation of SMEs in 5G and beyond, to increase their participation in global projects and collaborations

### SatCom WG

Define Vision for & Prioritize SatCom related research topics. Foster: fixed/mobile Satellite network CV with 5G network and the link between SatCom Research and standards. Inputs to EC research plans

### Media WG

(NEM Initiative and NetWorld2020)

Identify the Media & content domain requirements and the corresponding impacts on 5G.

### 5G-PPP Contractual Arrangement, KPIs Activity



Trials WG membership is open (approval is required).  
Verticals are welcome to join the WG.



NetWorld2020 membership is free.



WGs on specific Verticals

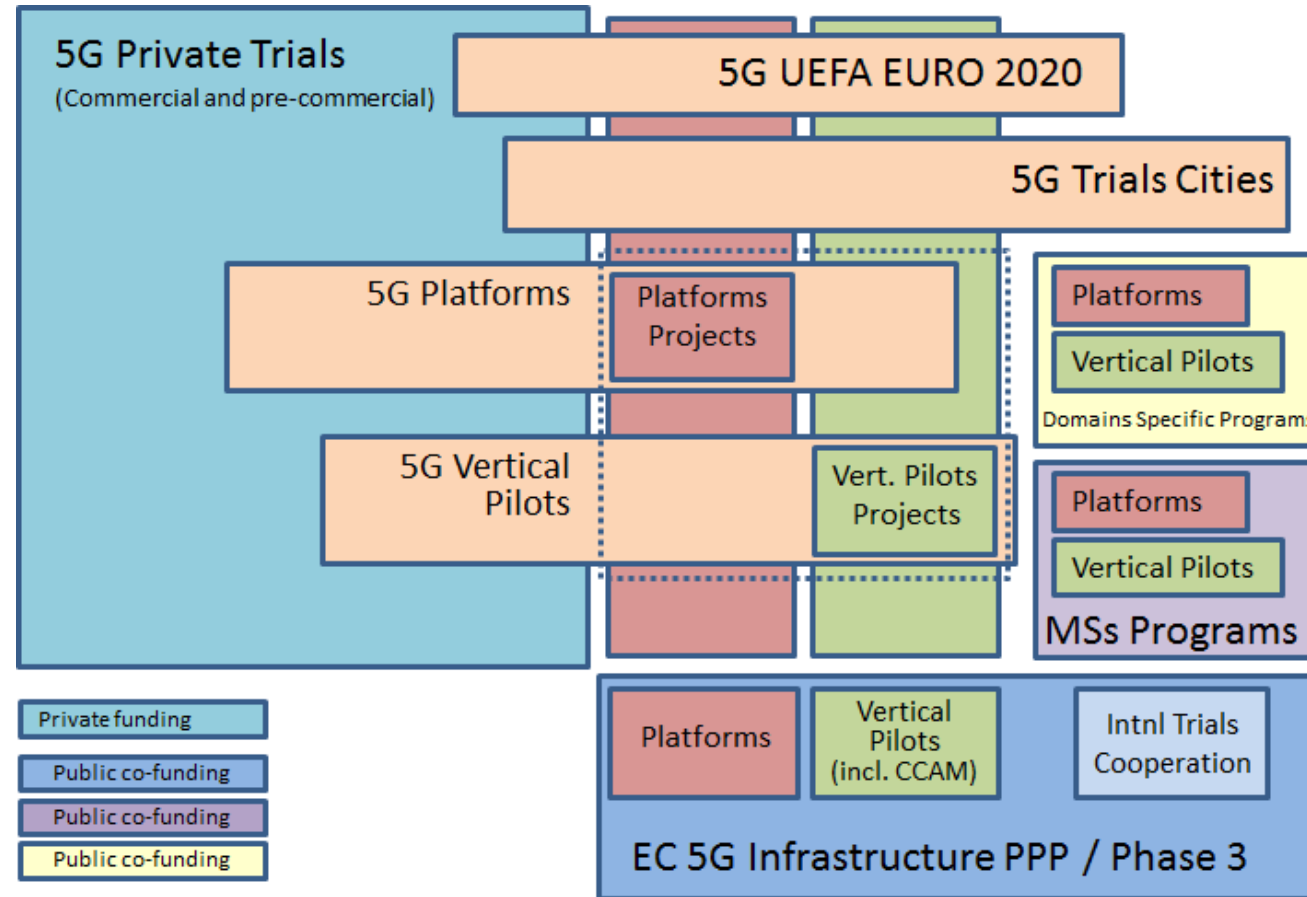
# 5G Pan-EU Trials Roadmap Objectives

- The main objectives of the Roadmap are to:
  - Support global European leadership in 5G technology, 5G networks deployment and profitable 5G business
  - Validate benefits of 5G to vertical sectors, public sector, businesses and consumers
  - Initiate a clear path to successful and timely 5G deployment
  - Expand commercial trials and demonstrations as well as national initiatives

# 5G Pan-EU Trials Roadmap Version 3.0

## Roadmap Strategy

- Pan-European Trials Roadmap – Roadmap Strategy

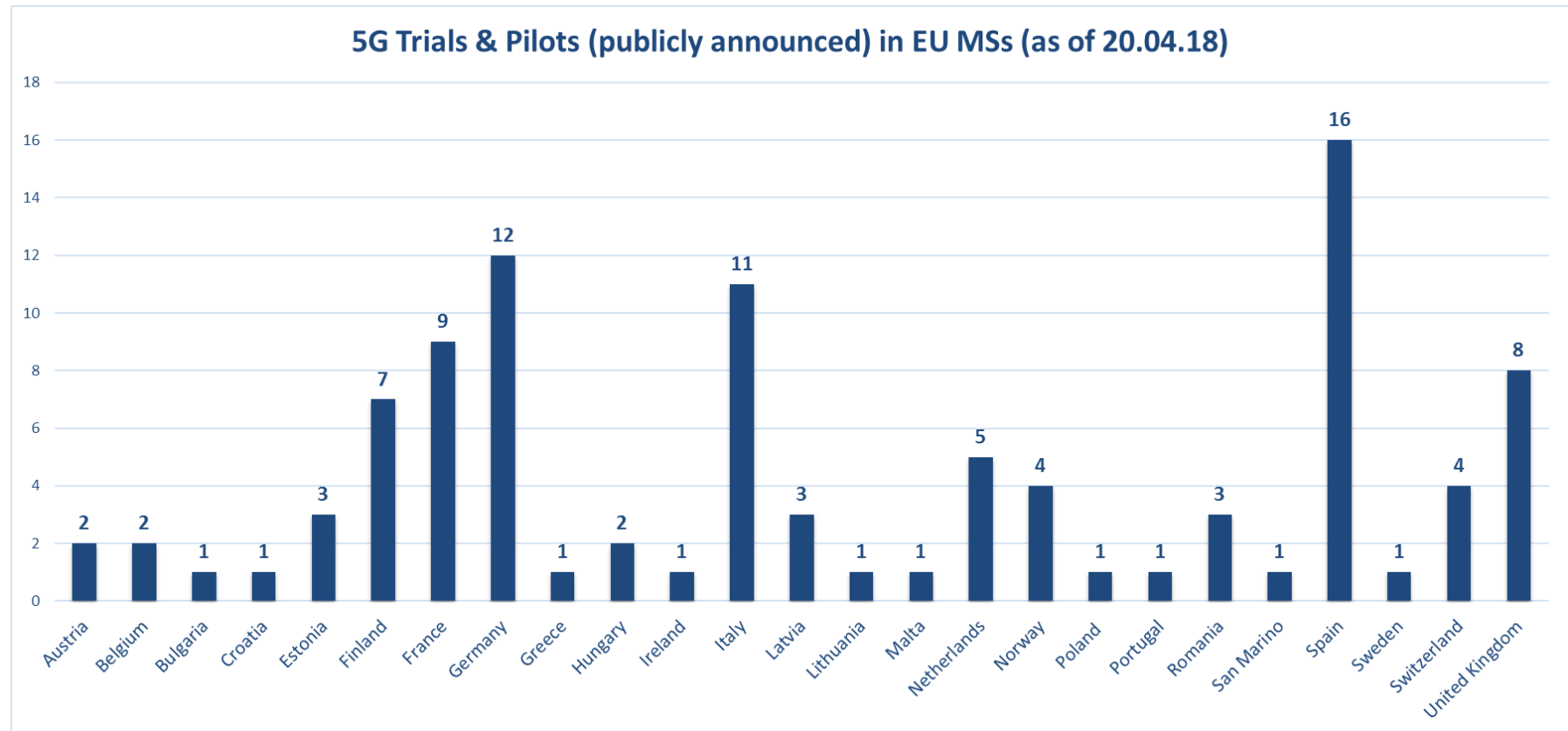


<https://5g-ppp.eu/5g-trials-roadmap/>

# 5G Pan-EU Trials Roadmap Version 3.0

## 5G Private Trials (Highlights)

- 5G Private Trials in EU MSs

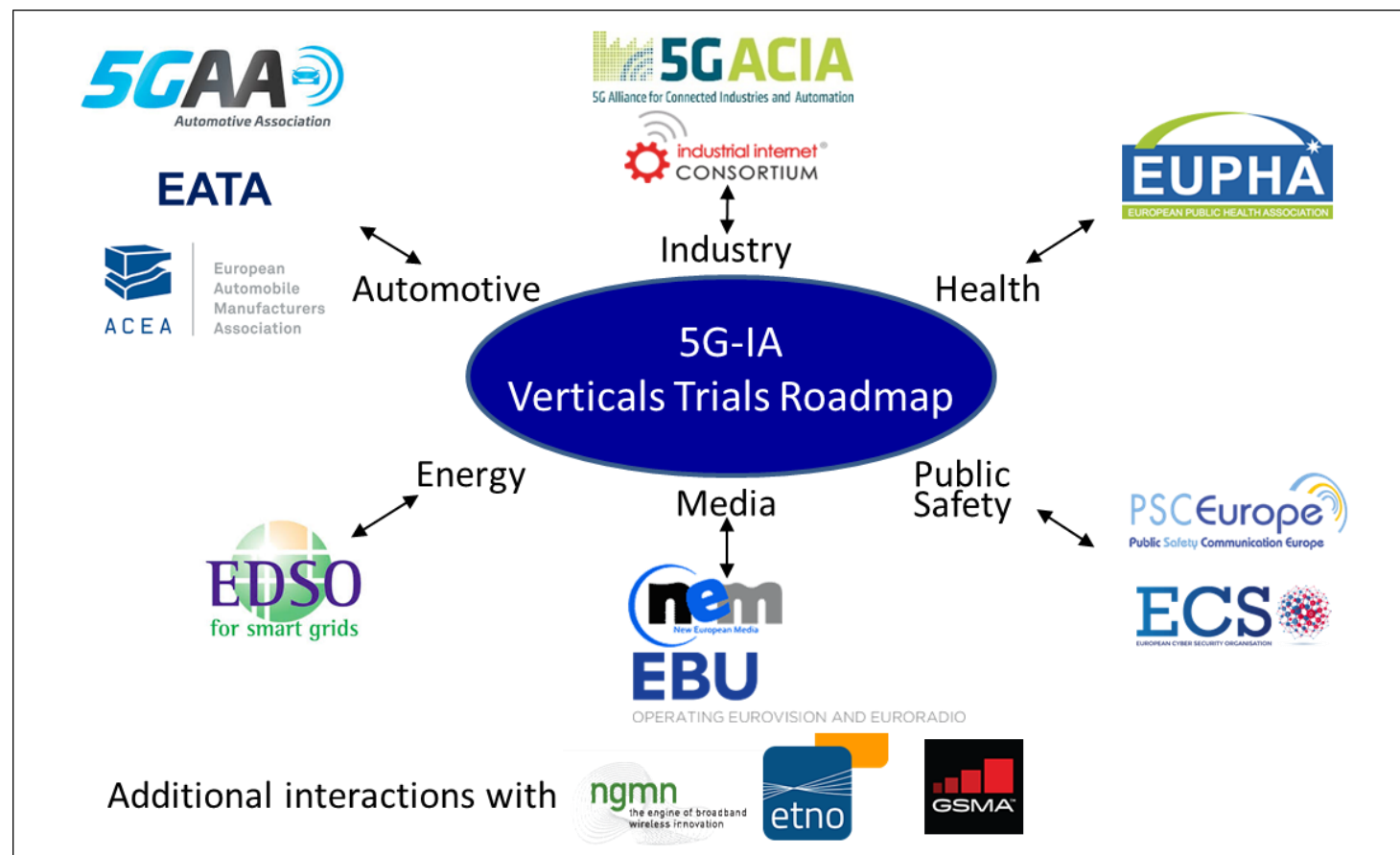


<https://5g-ppp.eu/5g-trials-roadmap/> and <https://5g-ppp.eu/5g-trials-2/>

# 5G Pan-EU Trials Roadmap Version 3.0

## Vertical Pilots (Highlights) (1/2)

- 5G Vertical Strategy – Verticals Sectors and Associations


















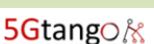




























<https://5g-ppp.eu/5g-trials-roadmap/>

# 5G Pan-EU Trials Roadmap Version 3.0

## Vertical Pilots (Highlights) (2/2)

### EC 5G Infrastructure PPP Phase 2 Projects – Vertical Trials & Pilots (Highlights)

Projects	Vertical Stakeholders	ITU Service Types	Locations	Projects	Vertical Stakeholders	ITU Service Types	Locations
	  	eMBB, URLLC	Montlhéry (FR)		 	mMTC	Hamburg (DE) Turin (IT)
	City councils of Barcelona, Bristol and Lucca	eMBB, URLLC (mMTC)	Barcelona (ES) Bristol (UK) Lucca (IT)		   	mMTC, URLLC, (eMBB)	Terni (IT)
	  	eMBB	Watford (UK) Paris (FR) Madrid (ES)			mMTC (URLLC)	Detmold (DE)
	 	eMBB	Surrey (UK) Munich (DE) Turku (FI)	(Phase 1) 		URLLC	Brande (DK)
		eMBB	Egaleo (EL)		 	mMTC, URLLC, eMBB	Barcelona (ES) Bristol (UK)
	 	eMBB	Athens (EL) Thessaloniki (EL) Madrid (ES) Rome (IT)		 	mMTC, URLLC	Paris, Grenoble (FR)
		eMBB, URLLC	Aveiro (PT) Athens (EL)			URLLC, eMBB	Coventry (UK)
	 	URLLC	Turin (IT), Pisa (IT) Madrid (ES) Nice (FR)			URLLC (eMBB)	Genoa (IT) Ljubljana (SL)

<https://5g-ppp.eu/5g-trials-roadmap/>

## EU-US Cooperation: current status (1/2)

- The 5G Public-Private Partnership (**5G PPP**), the world's largest 5G research program, has been jointly initiated by the European Commission (EC) and the European industry, represented by the 5G Infrastructure Association (5G IA), within the EC Horizon 2020 (H2020) Framework Programme (<https://5g-ppp.eu/>)
  - Focus on 5G technologies (phase 1), trials and verticals (phase 2), and large-scale pilot trials (phase 3)
- The US National Science Foundation (NSF) has recently launched an advanced wireless initiative supported by the White House. Its main instrument is the “Platforms for Advanced Wireless Research” (**PAWR**), that is jointly supported by NSF and by US industry (<https://www.advancedwireless.org/>)
  - Focus on “beyond 5G” advanced wireless research
  - A first call for projects was opened and two projects have been recently awarded; 2<sup>nd</sup> call has just opened
- The EC the EC is also supporting medium- and long-term research projects, with wireless technologies as one of the issues addressed, with focus on THz communications, advanced signal processing, and demand-attentive networks.

## EU-US Cooperation: current status (2/2)

- Cooperation between Europe and the US in the domain of telecommunications has been regularly happening throughout the years, mostly via public and private bilateral agreements. The EC and NSF are regularly organizing workshops and sessions to exchange on specific topics of interest to both parties.
  - Recent examples include the Advanced Wireless Platforms Track of the **EU-US Future Networks Workshop**, co-located with the Net Futures 2017 event that was held in Brussels in April 2017 (<https://ec.europa.eu/futurium/en/next-generation-internet/report-eu-us-future-networks-workshop>) and the “**Visions for Future Communications Summit**” that was co-organized by the NetWorld2020 European Technology Platform (ETP) and the 5G IA and that was held in Lisbon in October 2017, with speakers from Europe and the USA among others (<https://futurecomresearch.eu/>)

**At this stage, however, there is no channel or instrument fully dedicated to supporting EU-US collaboration on 5G, beyond 5G, or advanced wireless**

# EU-US Cooperation: the EU and US calls

- To address the situation, the EC and NSF have decided to combine their effort and launch parallel calls
- The H2020 ICT-21-2018 call focuses on fostering EU-US cooperation on Advanced Wireless Platforms (*deadline on April 21<sup>st</sup>*)
  - This is more “beyond 5G” than 5G, and focusing on wireless. It is de facto “aligned” with PAWR rather than with the 5G PPP (it is rather complementary to the 5G PPP)
- NSF has launched a few solicitations concerning “Research Collaboration”, “Research Collaboration Initiation”, and “Research Fellowships” projects in the ICE-T program, focusing on cooperation with EU projects (*deadline on May 7<sup>th</sup>*) ([https://nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=505516](https://nsf.gov/funding/pgm_summ.jsp?pims_id=505516))
- In parallel, 5G PPP and medium to long term wireless research continues in the EU, and PAWR continues in the US (2<sup>nd</sup> call just opened)

# EU-US Cooperation: near future



- One **Coordination and Support Action** will be selected by the EC as an outcome of the H2020 ICT-21-2018 call
  - Focus is on supporting and strengthening the cooperation in advanced wireless research platforms between the EU and the US rather than actual research
- NSF will select a few projects (?) out of its solicitations
  - Focus is on actual research rather than on coordination

**Cooperation will probably start in Q3 or Q4 2018**

*Considering the differences between the EC and NSF calls and the way EC and NSF work, coordination will be a challenge! Still, it is very nice to see coordination between the EC and NSF in this field*

# EU-US Cooperation: there is more!

- Besides advanced wireless, there is also some cooperation between the EU and the US in the domain of IoT and smart cities
  - FIWARE (<https://www.fiware.org/>), the “Open Source Platform for our Smart Digital Future”, has been working with NIST, the National Institute of Standards and Technology, and US Ignite (who also operates the PAWR Project Office) for more than three years
  - FIWARE contributed to several documents released by NIST –and was mentioned in a document issued by the White House
- FIWARE is just launching **two pilot trials with US cities**
  - **WiseTown: TeamDev** -member of the FIWARE Foundation- is partnering with the **City of Independence (Oregon)** to create an event management system
  - **RAY**: This solution is implementing a telephony support center in the **City of Hartford**, which will be operated by visually impaired people that will support the community over the phone and using remote-support technologies
  - *More details available at <https://www.fiware.org/2018/01/22/global-city-teams-challenge-fiware-challengers-in-the-us/>*





# Towards Enhanced EU-US ICT Pre-competitive Collaboration on 5G

Yaning Zou

Manager of PICASSO 5G Networks Expert Group

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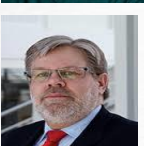


## PICASSO Expert Group on 5G

### Expert Group Members



**Dr Gerhard Fettweis** – Professor, Vodafone Chair, TU Dresden, Germany



**Mr Leif Johansson** – Principle Engineer, National Instruments, Sweden



**Dr Deborah Crawford** – Vice President for Research, George Mason University, US



**Dr Olav Queseth** – Project coordinator for METIS-II, Ericsson, Sweden



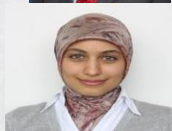
**Dr Amitava Ghosh** – Nokia Fellow and Head of Small Cell Research, Nokia, US



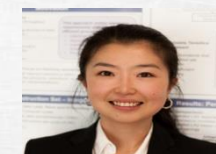
**Mr David Kennedy** – Director, Eurescom, Germany



**Dr Chengshan Xiao** – Program director, NSF, US



**Dr Meryem Simsek** – Senior scientist, ICSI/Berkeley, US



**Manager**  
**Dr Yaning Zou**  
TU Dresden, Germany

# Perspective Challenges

- Asymmetric public funding scopes in EU and US
  - Most US Federal funding agencies are not allowed to fund commercial and industry research
  
- 5G is a highly competitive area for EU and US
  
- The high relevance of 5G with economics and politics
  - In 2016, mobile technologies and services generated
    - ★ 3.9% of GDP and 2.5 million jobs at North America [1]
    - ★ 3.4% of GDP and 2.6 million jobs at EU [2]

[1] <https://www.gsmainelligence.com/research/?file=b0cf4f71cb2d035f429d9de8ca4fc72e&download>

[2] <https://www.gsmainelligence.com/research/?file=89a59299ac2f37508b252124726a1139&download>

# Proposed Technology Themes by 5G Expert Group

- General Strategy: technologies that have niche market shares yet will have strong societal impact
- Technology themes for research collaboration
  - Connecting the last billion – ultra large cell
  - mmWave technology at carrier frequencies beyond 100 GHz
  - Narrowband IoT devices for goods tracking in global supply chain management
  - Ultra-wide band RF IC at mmWave frequency
  - V2X for regional niche markets
  - Satellite communications for broadband access in oceans
  - Spectrum farming

# Connecting the Last Billion – Ultra Large Cell with Local D2D Capabilities

## > Why:

- Social impact & challenges
- Example: scandinavia in EU and mid-west in US.
- Explore the global market

## > Potential topics in this area for EU-US collaboration are:

- System concept and network design for extended range
- Signal processing for long transmission delays
- Interaction mechanisms between Device-to-Device (D2D) and Device-to-Infrastructure Communication
- Digital dividend for supporting rural areas

# mmWave Technology at Carrier Frequencies beyond 100 GHz

## > Why:

- Enabler for the hyper-connected society
- Challenging technology

## > Potential topics in this area for EU-US collaboration are:

- Channel Modelling and characterization for carrier frequencies beyond 100 GHz
- System concept design for low-cost, low-power and high throughput for a reasonable range
- Design and proof-of concept of key technological building blocks, like analog frontends, power amplifiers and antennas

# Narrowband IoT Devices for Goods Tracking in Global Supply Chain Management

## > Why

- Great economic value
- Economies of Scale

## > Potential topics in this area for EU-US collaboration are:

- Ultra-Low Power Technologies, enabling 10 yrs battery lifetime
- Signal processing algorithms, e.g. narrow-band modulation, rate-less coding
- Asynchronous UE-driven mobile network access schemes
- Network slicing

# Ultra-wideband RF IC at mmWave Frequency

## > Why:

- Enabler for hyper connected society
- Challenging technology

## > Potential topics in this area for EU-US collaboration are:

- Design commercial viable building blocks, e.g., local oscillator, power amplifiers and antennas
- Design commercial viable integrated solution, e.g., packaging.

# V2X for Regional Niche Markets

## > Why:

- Regulation differences in EU and US
- Fragmental market

## > Potential topics in this area for EU-US collaboration are:

- V2X chip and software design for vehicles built in the US and sold in the EU
- V2X chip and software design for vehicles built in the EU and sold in the US

# Satellite Communications for Bringing Broadband Access to Oceans

## > Why

- Between Europe and US: Atlantic and Arctic ocean
- Enabler for many business cases and scientific research

## > Potential topics in this area for EU-US collaboration are:

- Satellite communications system design for access to remote areas in the oceans
- Satellite positioning for improved precision
- Harmonised satellite communications regulations for cross-continent services

# Spectrum Farming

## > Why

- Strategically important
- Common problems

## > Potential topics in this area for EU-US collaboration are:

- Spectrum farming framework including spectrum access mechanisms and spectrum sharing approaches
- Link the spectrum farming framework to spectrum policy for effective 5G deployment, supporting different use/business cases, e.g., broadband, IoT and verticals.

# Collaboration Opportunities in the 5G Domain: H2020-ICT-21-2018 and NSF US-EU Internet Core & Edge Technologies

## ➤ Great challenges!

- Different scopes at the EU and US
  - ★ EU: a coordination and support action
  - ★ US: a research action
- Different participation structures
  - ★ EU: a consortium
  - ★ US: individual institutes
  - ★ EU and US sides will be selected separately!!
- Unclear twinning mechanism
  - ★ EU: targets to twinning testbeds in US, especially PAWR.
  - ★ US: focuses on their own research topics. (not necessarily about testbeds)

# Recommendations

- It is ultra important and critical to build mutual understanding and common ground on the content!!
  - An EU-US consortium meeting should be held immediately after the funding is awarded.
  - Trade-off will be expected for both sides.
- Most likely, EU side has to take more coordination responsibilities than the US partners
  - US partners are funded for research while EU partners are funded for coordination.
  - EU and US sides should negotiate and agree on coordination and twinning mechanism
- Nevertheless, this project will pave the way for EU-US collaboration on 5G beyond and 6G.

# 2nd Annual Transatlantic Symposium on ICT and Policy

## ***“Leveraging People, Technology, and Information for a Smart and Connected Society”***

- Location: Woodrow Wilson International Center for Scholars, Washington, DC, USA
- Time: June 18-19, 2018
- Plenary Panel on “**5G and Beyond**” + Breakout session on “**mmWave technology at carrier frequencies beyond 100 GHz**”
- Moderator: **Gerhard Fettweis**, Chair of PICASSO 5G Expert Group, TU Dresden, Germany
- Panellists:
  - **Matti Latva-aho**, University of Oulu, Finland
  - **Theodore Rappaport**, NYU Wireless, US
  - **Amitava Ghosh**, Nokia Bell Labs, US
  - **Olav Queseth** (to be confirmed), Ericsson, Sweden
  - **David Corman**, Program Director, NSF, US





## Questions

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for a Smart Society

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Free of charge and continuously updated, CROSSROADS will provide :

- Access the EU-US ICT projects and networks databases
- Find out more about EU and US programmes facilitating ICT collaboration
- Discover information on existing collaborative initiatives
- Learn about ICT open calls in the EU and the US
- And much more ...

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# Contacts

## Project Coordinator:

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More on Picasso



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collaboration