



## **Euro-5g – Supporting the European 5G Initiative**

### **D1.3: Final report on community building and support**

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#### *Abstract*

*This deliverable reports on the community building and stakeholders' engagement activities performed during the second year of the Euro-5G project, and how individual 5G PPP Phase 1 project activities and associated Work Groups have worked together to achieve synergies in this respect.*

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## Executive Summary

This document provides information on the activities carried out by the Euro-5G project in terms of community building, engagement strategy and support provided to the 5G PPP programme as a whole, as well as recommendations for the next stages of 5G PPP.

The target of the Community Building activity was to build a framework and strong basis to enable community building activities in Phase 1 of the 5G PPP programme. The following activities have been performed:

- Setting priorities and analysing the 5G PPP stakeholders;
- Supporting the activities of other Workpackages within Euro-5G project;
- Organising and leading 5G PPP wide community building and COMMS expert discussions;
- Making sure that information is shared within 5G PPP;
- Accelerating the use of social media channels in communication and community engagement.

The ultimate goal of the activities was to prepare the grounds for a future business ecosystem beyond the Euro-5G life span, and to expand beyond the current 5G PPP community stakeholders. These targets were reached with the following achievements:

- Euro-5G/WP1 coordinated the common activities with the COMMS representatives of each 5G PPP Phase 1 project. By that it linked 5G PPP wide communication and community building activities with 5G PPP projects and the 5G PPP Working Groups.
- The identified target stakeholders - Standardisation organisations (SDOs), Users, 5G Industry and Business Verticals – have been involved, mainly through numerous events and workshops that were organized by 5G PPP projects and 5G PPP working groups.
- In monthly COMMS telephone conferences, projects' events as e.g. workshops were highlighted and brought to the attention at 5G PPP level. This supported better planning and promotion.

Various tools were used to facilitate interaction between 5G PPP working groups and Phase 1 projects, e.g. mailing lists, document server (5G PPP BSCW), telephone conferencing or webmeeting facilities.

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## Abbreviations

<b>3G PP</b>	3rd Generation Partnership Project
<b>5G PPP</b>	5G Public-Private Partnership
<b>AIOTI</b>	Alliance for Internet of Things Innovation
<b>BDVA</b>	Big Data Value Association
<b>EC</b>	European Commission
<b>eMBB</b>	enhanced Mobile Broadband
<b>ETSI</b>	European Telecommunication Standards Institute
<b>FSAN</b>	Full Service Access Network
<b>GA</b>	General Assembly
<b>IEEE</b>	Institute of Electrical and Electronic Engineers
<b>IETF</b>	Internet Engineering Task Force
<b>IRTF</b>	Internet Research Task Force
<b>ITU</b>	International Telecommunication Union
<b>MS</b>	Member State
<b>MWC</b>	Mobile World Congress
<b>NGMN</b>	Next Generation Mobile Networks
<b>PR</b>	Public Relations
<b>SDO</b>	Standards Defining Organisation
<b>WP</b>	Work Package
<b>Y2</b>	Year two



# 1 Introduction

Deliverable 1.3 - Final report on community building and support – summarises the activities of Task 1.1 during Euro-5G period 2. This task was led by InterInnov, supported by Eurescom and 5G IA.

Although dissemination, communication and use of different promotion material (PR means) is an important part of the community building activities, stakeholders' engagement activities are reported in this deliverable, while only high-level dissemination/PR means are presented, as they are described in more detail in Deliverable 3.4. The same applies to the Working Group activities with details reported in D5.7 and D5.5. The International dimension is detailed in Deliverable 4.3.

## 1.1 Three dimensions of community engagement activities

Euro-5G Task 1.1 coordinated community building activities in the Euro-5G project. The community engagement activities have happened in three dimensions, as depicted in Figure 1 below:

### ① Euro-5G project

Within the Euro-5G project, WP1/Task 1.1 has supported other WPs/Tasks as follows:

- WP2 (governance)
  - o Helped in the efficient interaction between the various bodies;
  - o Supported T2.5 "events organisation and participation".
- WP3 (communications)
  - o Identified the relevant communities to be involved/engaged for 5G PPP promotion;
  - o Supported the set-up of an efficient communication methods/interaction between 5G PPP projects and the Euro-5G project;
  - o Identified and involved relevant social media channels, promoted them to 5G projects.
- WP4 (international cooperation)
  - o Supported promotion, dissemination and community engagement within / beyond Europe.
- WP5 (working groups)
  - o Engaged SMEs via the SME WG (Task 5.5, cf. Figure 1 below).

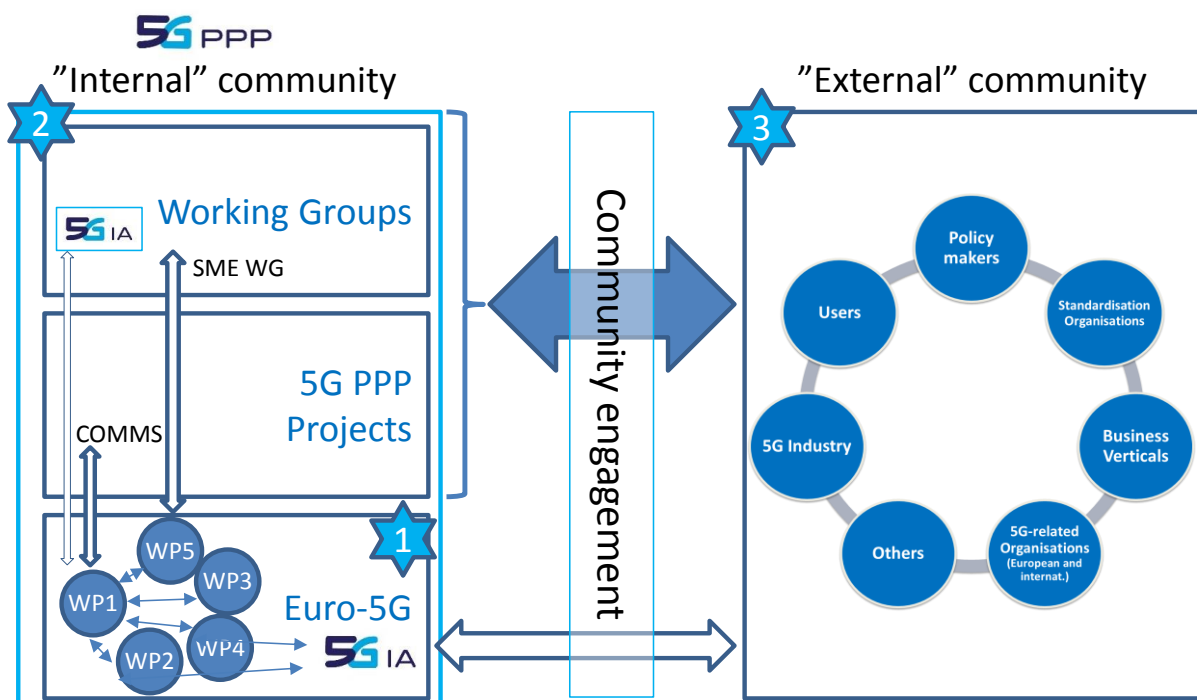


Figure 1 - Community engagement dimensions

## 2 “Internal” 5G PPP community

The “Internal” 5G PPP community consists of:

- The Euro-5G project and its partners’ connections / networks;
- All 5G PPP Phase 1 projects;
- The 5G IA; and
- All 5G PPP Working Groups.

Within the “Internal” 5G PPP community, all 5G PPP projects started to work together already during the first year in the context of the Working Groups i.e. an “Internal” community engagement took place in early phase. The WP1/Task 1.1 had direct contacts and constant communication with the COMMS experts of the other 5G PPP projects. Communication to Work Groups took place via personal contacts and mainly via the 5G IA, as some of the WGs were initiated and chaired by the 5G IA (cf. section 2.2). The 5G IA as such is a remarkable community engagement (internal/external) place, gathering already members from Industry, Research and from SMEs complemented with the associate members from 5G related organizations and from various standardization groups.

## 3 “External” 5G PPP community

The “External” 5G PPP community consists of stakeholders which were analysed and prioritised during the first year of the Euro-5G project and reported in Deliverable D1.1.

The “external” community engagement was largely complemented by activities of 5G PPP Phase 1 projects and 5G PPP Working Groups that had direct relations with external stakeholders, e.g. when attending standardization meetings or organizing workshops and other events. Euro-5G had direct engagement activities through WP2, WP3, WP4 and via the 5G IA. These were made with 5G related organisations, business verticals and policy makers, see Figure 2. Related events were the Global 5G Event (see 2<sup>nd</sup> Global 5G PPP event in Rome in section 3.1.1) or the global press conference at MWC 2017 (see MWC 2017 in section 3.1.2).



Figure 2 – Community engagement activities with “External” 5G PPP community

## 1.2 Community building activity levels

Community building has three levels of activity as depicted in the Figure 3 (from bottom):

- **Awareness:** All identified stakeholders become aware of the aims, actions and achievements of the 5G PPP.
- **Engagement:** Community engagement takes place direct by the Euro-5G project (or via the 5G IA) or indirect via 5G PPP projects, Working Groups, initiatives, online tools, workshops/events organisation, etc.
- **Participation:** Engaged stakeholders participate and work towards commonly planned and agreed objectives.

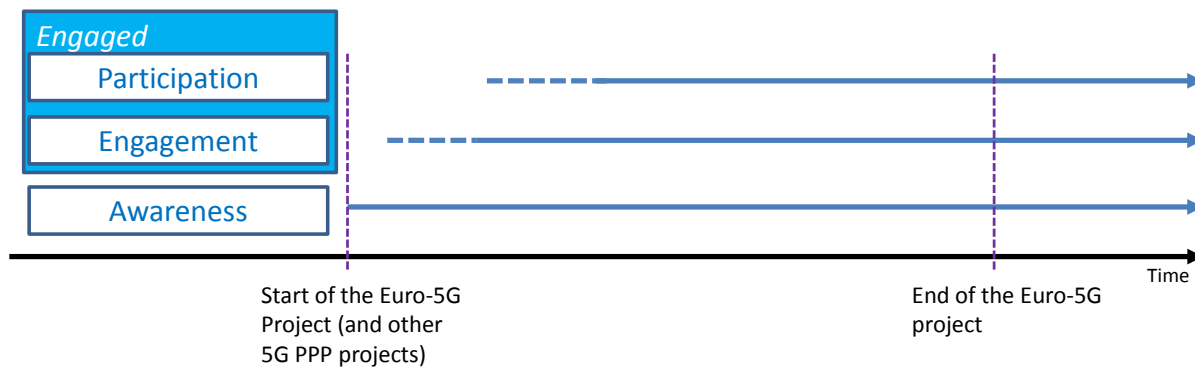


Figure 3 - Community building activity levels

To simplify the terminology in this document, the “Engagement” and “Participation” are grouped together under term “*Engaged*”, as “engaged” stakeholders have worked together towards agreed objectives. In the conclusion section, each stakeholder is analysed with their engagement level: Awareness, Engagement and Participation.

## 2 Community building activities

### 2.1 Activity Community building and Public Relations

Community building has been a parallel horizontal activity to the work of the 5G PPP Working Groups within the 5G PPP, as it was shown in Figure 1. In practice, this work has been coordinated by WP1 in the Euro-5G project, in close co-operation with the other WPs and in particular WP3 - Communication and Public Relations. One of the main means for those activities was the “COMMS” group of dissemination and communication experts from all 5G PPP projects. The work split between WP1 and WP3 has been as follows: WP1 has concentrated on “practical work” e.g. to organise monthly COMMS conference calls, to prepare video interviews, to collect/edit material for brochures/posters, etc. The output of this work has then been used in WP3. In a similar manner, such a collaboration has happened with WP5 - Support to 5G Working Groups - where the community building work has mostly focused on supporting the SME Working Group and its activities. Indeed, this was the WG that expressed needs in terms of community building, while other WGs did not express such requirements.

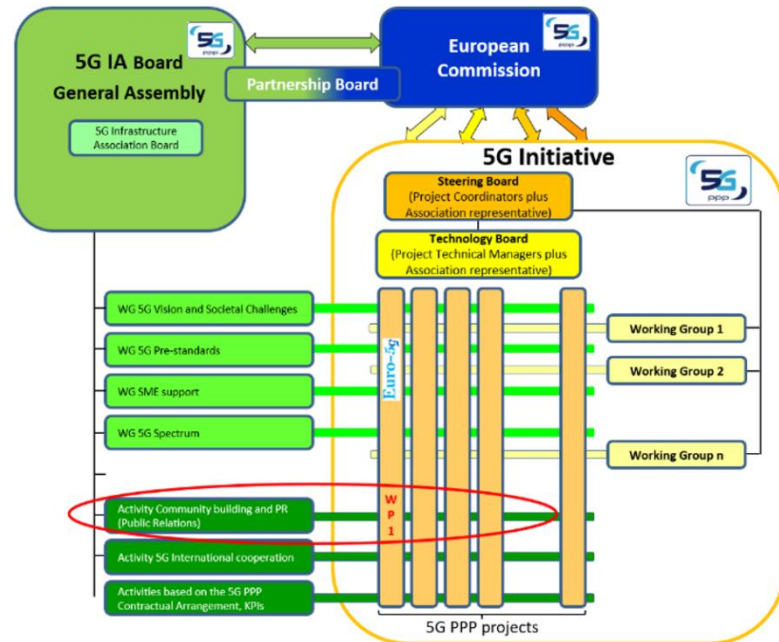


Figure 4 - 5G PPP Governance model

The collaborative work with the 5G PPP projects has mostly taken place in the monthly 5G PPP Community building / COMMS conference calls. Eight conference calls were held between September 2016 and June 2017. It helped 5G PPP projects' COMMS experts to get connected, and allowed interactive exchanges and common work among projects. The main outcome was that they could support each other on activities related to general dissemination/communication and community building at project level, encouraging common activities among 5G PPP projects, and also at 5G PPP level. The calls took place in 2016 (13.9/15.11/12.12), and in 2017 (17.1/31.1/21.3/27.4/2.6). Additionally, there were off-line discussions with projects, especially around the preparation of events practicalities (e.g. the Rome Global 5G Event in 2016, and the EuCNC 2017) and video interview preparations. The topics discussed in the monthly 5G PPP Community building / COMMS conference calls included topics such as:

- Tools to support communication/engagement activities;
- Top-down / bottom-up Announcements<sup>2</sup>;
- Publications at 5G PPP and at individual project level; and
- Events, Workshops planning.

<sup>2</sup> Top-down = Information flow from 5G PPP wide towards individual projects

Bottom-up = information flow from individual project(s) towards 5G PPP wide

Collaborative Community building / COMMS activities started in the first conference call on 13.9.2016 with a survey to analyse:

- What each project would like to get from this cross-project activity;
- What each project is doing with identified stakeholders; and
- Where and how each project could contribute.

Based on the survey, a database was created with Project names, Web-links, LinkedIn, Twitter, COMMS contact(s), including also potential Champions (speakers) to be available for other events beyond project specific ones. An overview of the collected data from projects who responded to the survey is available in the Appendix A (restricted access) and in details in the BSCW (restricted access). The on-line document is stored in the file repository at the BSCW where all projects can have viewing/editing access<sup>3</sup>.

Working topics discussed in the Community Building and COMMS conference calls (and offline between specific projects) are described below more in details.

### 2.1.1 Tools to support communication/engagement activities

At the time when the Community Building / COMMS conference calls started, a closed 5G PPP COMMS LinkedIn group was created. The idea was to use it for 5G PPP COMMS internal communication beyond existing tools, e.g. for events preparation, external meeting planning etc. The other purpose was to test the tool, as a potential need to use additional collaboration tools further to those that were tested during the first year of the Euro-5G project<sup>4</sup>. This closed 5G PPP COMMS LinkedIn group eventually did not prove popular at all. Information sharing and overall communication continued to take place via already existing channels and tools, namely via the COMMS mailing list, and file sharing via file repositories in shared online work spaces at the BSCW. This was an indication that existing tools were effectively used, and it showed that at that time there was not real need to use additional tools in this context.

A public 5G PPP Linked group was created at the same time. It has been used for public 5G PPP and individual project announcements. To create more activities in Twitter and to allow following other 5G PPP project communication, a public European5GProjects<sup>5</sup> Twitter list was created by the SELFNET project. There are now 18 project members on the list. Half of them i.e. 8 projects have subscribed, to access easily other project Tweets for re-Tweeting, and that way to create wider publicity and wider community engagement.



Figure 5: A Common 5G PPP Twitter list

### 2.1.2 Top-down / bottom-up Announcements

The information sharing within 5G PPP and between individual projects is crucial to the success of the overall community building plan. Therefore, an important part of the work carried on across several EURO-5G work packages has focused on regular and continuous interaction and support to communication and exchange of information in various ways. Regular polls for updates were circulated to the COMMS and “projects” mailing lists. Input provided by the various partners has been used for coordinated activities and overall broad advert via 5G PPP portal and Twitter channel.

<sup>3</sup> <https://bscw.5g-ppp.eu/sec/bscw.cgi/d139326/5G%20PPP%20projects%20-%20Call%20for%20actions.xlsx> (restricted access)

<sup>4</sup> D1.1: Intermediate report on community building and support

<sup>5</sup> [https://twitter.com/5GPPP\\_SELFNET/lists/european5gprojects/members](https://twitter.com/5GPPP_SELFNET/lists/european5gprojects/members)

Moreover, regular conference calls were organised: in the monthly Community Building/COMMS calls, shared pre-information in timely manner to projects (Top-down) and vice versa (Bottom-up) was an important mechanism to predict public announcements either at project or at 5G PPP level, to take the best advantage of common dissemination planning.

The “Top-down” information flow from 5G PPP level towards individual projects included 5G PPP wide communication activities (e.g. global events), which individual 5G PPP projects then replicated via their own communication channels and made their project beneficiaries aware of on-going or coming global news/events.

The “Bottom-up” information flow from individual project(s) towards 5G PPP level included individual project announcements including news/events which needed support from the Euro-5G project (on the 5G PPP level) and from other 5G PPP projects. This way, the announcements were replicated in several communication channels (web, Twitter, LinkedIn) and got much broader distribution, that in turn affected positively the outcome e.g. with increased participation in the projects’ organized events/workshops.

### 2.1.3 Publications at 5G PPP and at individual project level

The PR (Public Relation) material is a key element (means) to support community engagement activities. In one of the Community Building / COMMS conference calls, there was a question from a project: Could 5G PPP help to find deals with magazines where project(s) could publish something in order to promote the projects and their achievements?

After some discussion in a COOMS telco we decided to start to collect a database from all projects including Telecom and IT media channels and magazines on 5G networks, Security and on IT business overall. The idea was to find magazines where 5G PPP, mainly Euro-5G and other 5G projects could promote project results with press releases, announcements, publications etc.

Table 1 (full version at the BSCW including more web-links to 5G related topics<sup>6</sup>) below shows the main telecoms media channels on different communication channels that could be and has been used for both press releases and papers on technology advances/research findings.

Channel (+editor) for press releases	website	email	Phone	Overview	Twitter Handle
TechNative	<a href="https://www.technative.io">https://www.technative.io</a>	<a href="mailto:info@technative.io">info@technative.io</a>	+44207-6865431	latest product and user news, in-depth features, reports and pc	@TechNative
TechNativeLive	<a href="https://www.technative.io">https://www.technative.io</a>	<a href="mailto:info@technative.io">info@technative.io</a>	+44207-6865431	Innovative video collaboration community, with over 8000 activ	@TechNativeLive
TelecomTV	<a href="http://www.telecomtv.com">http://www.telecomtv.com</a>	<a href="mailto:info@telecomtv.com">info@telecomtv.com</a>	+44 (0) 207 448 1070	daily insight on the converging world of telecoms, media and ei	@TelecomTV
TelecomTV Guy Daniels, Director of Cont	<a href="http://www.telecomtv.com">http://www.telecomtv.com</a>	<a href="mailto:guy@telecomtv.com">guy@telecomtv.com</a>		Main editorial contact for TelecomTV	@guydaniels
Telecoms.com Jamie Davies, News Editor	<a href="http://telecoms.com/">http://telecoms.com/</a>	<a href="mailto:jamie.davies@knect365.com">jamie.davies@knect365.com</a>		news portal covering the latest technological advancements an	@jamie_informa
Telecoms Tech News	<a href="https://www.telecomst">https://www.telecomst</a>	<a href="mailto:enquiries@techforge.pub">enquiries@techforge.pub</a>	+44(0)1179 80 90 20	Industry news, comment and analysis hub providing the latest	@TTech_News
Telecom News Update					@telecom_updates
Fierce Telecom Mike Dano, Editor	<a href="http://www.fiercetelec">http://www.fiercetelec</a>	<a href="mailto:mdano@fiercemarkets.com">mdano@fiercemarkets.com</a>			@FierceTelecom; @mikeddano
Total Telecom	<a href="https://www.totaltele.com">https://www.totaltele.com</a>	<a href="mailto:info@totaltele.com">info@totaltele.com</a>	+44 (0) 20 7092 1046	breaking news to expert analysis. It is the leading communicati	@totaltelecom
Total Telecom Nick Wood	<a href="https://www.totaltele.com">https://www.totaltele.com</a>	<a href="mailto:nick.wood@totaltele.com">nick.wood@totaltele.com</a>	+44 (0) 20 7092 1046		@Telecolumnist
Inside5G	<a href="http://inside5g.com">http://inside5g.com</a>	<a href="mailto:info@inside5g.com">info@inside5g.com</a>		an up to date, live repository for information, links, comment, c	@Inside5G
The Mobile Network Keith Dyer, Editorial	<a href="http://the-mobile-netw">http://the-mobile-netw</a>	<a href="mailto:keith@the-mobile-network.com">keith@the-mobile-network.com</a>		content and editorial focussing on the companies that develop	@keithdyer
Networking+ Editorial director: Rahiel Na	<a href="http://www.networking">http://www.networking</a>	<a href="mailto:rahieln@kadiumpublishing.com">rahieln@kadiumpublishing.com</a>		A UK-based montly print magazine with in-depth focus on core	@networkingplus
RCR Wireless News Editor-in-Chief – Tele	<a href="http://www.rcrwireless">http://www.rcrwireless</a>	<a href="mailto:dmeyer@rcrwireless.com">dmeyer@rcrwireless.com</a>		wireless and mobile industry news, insights, and analysis to mc	@rcrwirelessnews
SDx Central	<a href="https://www.sdxcentral.com">https://www.sdxcentral.com</a>	<a href="mailto:editors@sdxcentral.com">editors@sdxcentral.com</a>		tech media company focused exclusively on delivering news, re	@SDxCentral

Table 1 - Telecom and IT Media Channels

Euro-5G has used the handles to the media channels and/or specific journalists for important updates even not yet having a press release, giving additional visibility for projects.

### 2.1.4 5G PPP projects organised events / workshops

Events, conferences and workshops have played an important role for the whole 5G PPP internal community (i.e. 5G PPP projects and project participants) and at the same time events have created an excellent place for networking and for common external stakeholders’ engagement. The 5G PPP projects have organized several, different types of events and workshops to show results, to prepare

<sup>6</sup> <https://bscw.5g-ppp.eu/sec/bscw.cgi/139627>



next working items together, and to involve a wide variety of external stakeholders.

In the workshops / events below, the engaged stakeholders were identified based on:

- The discussions at the Community Building monthly conference calls with the COMMS experts of the projects;
- The presenters/speakers profile;
- A registration data in case there was a separate registration for the event/workshop;
- General audience of the event (if bigger event); and
- With more detailed discussions with the organizing project(s).

#### **2.1.4.1 International Workshop on 5G Architecture: a joint FANTASTIC-5G, mmMAGIC, Flex5Gware Workshop – EuCNC 2016**

FANTASTIC-5G, mmMAGIC and Flex5Gware co-organised a workshop on 5G Physical Layer Design and Hardware Aspects Below and Above 6 GHz at EuCNC 2016 in Athens<sup>7</sup>.

Stakeholders engaged: Standardisation organisations, 5G Industry, Users (Research institutes / organisations, Technology providers), 5G Industry, 5G-related Organisations, Policy makers, Others (other international/national projects).

#### **2.1.4.2 METIS-II panel and special session on 5G Architecture and RAN design**

METIS-II participated in the Panel “5G Architecture” where discussions took place centered on the White Paper released in March 2016 by METIS-II on 5G Architecture<sup>8</sup>. Additionally, the METIS-II project organized a special session “METIS-II views on 5G RAN design and architecture” presenting research papers highlighting some of the most recent results of the work in METIS-II<sup>9</sup>.

Stakeholders engaged: Standardisation organisations, 5G Industry, Users (Research institutes / organisations, Technology providers), 5G-related Organisations, Policy makers, Others (other international/national projects).

#### **2.1.4.3 EUCNC 2016 Workshop W04a - Next Generation fronthaul/backhaul integrated transport networks**

5G-Crosshaul project organised a Workshop on “Next Generation fronthaul/backhaul integrated transport networks”, while the 5G-Crosshaul project also contributed to three invited talks to other workshops and released five papers in the main conference.

Stakeholders engaged: Standardisation organisations, 5G Industry, Users (Research institutes / organisations, Technology providers), 5G-related Organisations, Policy makers, Others (other international/national projects).

#### **2.1.4.4 CogNet workshop on “Network Management, QoS and Security”**

CogNet organised a workshop at the EuCNC 2016 on Network Management, QoS and Security, with the projects CogNet, SelfNet, SONATA, 5G-ENSURE and 5G-NORMA all presenting papers at this workshop.

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<sup>7</sup> <https://5g-ppp.eu/event/joint-fantastic-5g-mmagic-flex5gware-workshop-eucnc-2016/>

<sup>8</sup> <http://www.eucnc.eu/2016/www.eucnc.eu/indexe1e4.html?q=node/110>

<sup>9</sup> <http://www.eucnc.eu/2016/www.eucnc.eu/indexc7f5.html?q=node/128>

Stakeholders engaged: Standardisation organisations, 5G Industry, Users (Research institutes / organisations, Technology providers, Developers), 5G-related Organisations, Policy makers, Others (other international/national projects).

#### **2.1.4.5 FANTASTIC-5G special session: Ultra-Reliable and Mission Critical Communication**

FANTASTIC-5G held a special session at the EuCNC 2016 on Ultra-Reliable and Mission Critical Communication<sup>10</sup>. The session presented some of the important use cases, as well as the central technical challenges towards achieving mission critical communications in 5G.

Stakeholders engaged: Standardisation organisations, 5G Industry, Users (Research institutes / organisations, Technology providers, Developers), 5G-related Organisations, Policy makers, Others (other international/national projects).

#### **2.1.4.6 The 4<sup>th</sup> and the 5<sup>th</sup> 5G PPP Phase 2 Information Day**

The 4th 5G PPP information day was held alongside EuCNC 2016 in Athens. The workshop shared the context of the 5G PPP call 2 with all interested parties, and provided opportunities for organisations to present their projects or technological ideas and seek potential collaborators.

The 5<sup>th</sup> 5G PPP information day was held in Bratislava, Slovakia on 26 September 2016 during the ICT Week 2016.

Stakeholders engaged: 5G Industry, Business Verticals, Users (Research institutes / organisations, Technology providers, Developers), 5G-related Organisations, Others (other national projects).

#### **2.1.4.7 CHARISMA workshop - 5G strengthening business and social development: barriers and drivers**

The CHARISMA project organized the "5G strengthening business and social development: barriers and drivers" workshop on September 4th, 2016. The workshop was co-located with the IEEE PIMRC 2016 (Personal Indoor Mobile Radio Communications) in Valencia, Spain<sup>11</sup>.

Stakeholders engaged: 5G Industry, Users (Research institutes / organisations, Technology providers), 5G-related Organisations, Others (other international/national projects).

#### **2.1.4.8 METIS-II panel: What is relevant research for 5G Advanced?**

METIS-II organized a panel at the IEEE PIMRC 2016 (4-7 September – Valencia, Spain): What is relevant research for 5G Advanced?<sup>12</sup>

Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research institutes / organisations, Technology providers), 5G-related Organisations, Others (other international/national projects).

#### **2.1.4.9 5G-PPP Phase 3: Preparation Workshop on 5G for Healthcare**

Euro-5G organized the Preparation Workshop on 5G for Healthcare on 15 September 2016 as part of the [ieeehealthcom2016.com](http://ieeehealthcom2016.com). The workshop focused on the 5G requirements of the health domain and

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<sup>10</sup> <http://www.eucnc.eu/2016/www.eucnc.eu/index0c91.html?q=node/130>

<sup>11</sup> <http://pimrc2016.ieee-pimrc.org>

<sup>12</sup> <http://pimrc2016.ieee-pimrc.org/IEEE%20PIMRC%202016%20%20Technical%20Program.htm#S1569533112>



the nature of projects and experimental activities that are needed to get Health established as one of the key vertical sectors to be supported by the new 5G infrastructure<sup>13</sup>.

Stakeholders engaged: Business verticals, 5G Industry, Users (Research institutes / organisations, Technology providers), 5G-related Organisations, Policy makers, Others (other international/national projects).

#### **2.1.4.10 Workshop on Virtualised Coordinated Spectrum Access for 5G Communications Systems**

5GNORMA and COHERENT 5G PPP projects jointly organised a workshop on “Virtualised Coordinated Spectrum Access for 5G Communications Systems” at the ISWCS 2016 (September 20-23, 2016, Poznan, Poland)<sup>14</sup>.

Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research institutes / organisations, Technology providers), 5G-related Organisations, Policy makers, Others (other international/national projects).

#### **2.1.4.11 SONATA workshop: Agile Service Development and Orchestration in 5G Virtualized Networks**

SONATA’s organised a workshop, Agile Service Development and Orchestration in 5G Virtualized Networks<sup>15</sup>, at the SDN & OpenFlow Congress on 12 October 2016. Additionally, SONATA presented a paper on “Understand Your Chains: Towards Performance Profile-based Network Service Management”.

Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research institutes / organisations, Technology providers), 5G-related Organisations, Others (other international/national projects).

#### **2.1.4.12 Superfluidity project in Taiwan**

Superfluidity project visited to Taiwan on October 31st and November 2nd, 2016. Various events were organised: a distinguished lecture speech at the Institute of Information Science – Academia Sinica, a talk at the National Chiao Tung University and another talk at National Taiwan University of Science and Technology<sup>16</sup>.

Stakeholders engaged: Users (Research institutes / organisations), 5G-related Organisations, Others (other international projects).

#### **2.1.4.13 METIS-II, FANTASTIC-5G, mmMAGIC, 5G-Crosshaul, Flex5Gware @ 2nd International Workshop on 5G RAN design**

METIS-II, FANTASTIC-5G, mmMAGIC, 5G-Crosshaul, Flex5Gware 5G PPP projects jointly organised the 2<sup>nd</sup> International Workshop on 5G RAN design on 8 December, 2016 at the IEEE Globecom 2016 in Washington DC, USA.

Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research institutes / organisations, Technology providers), 5G-related Organisations, Others (other international projects).

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<sup>13</sup> <https://5g-ppp.eu/event/healthcareworkshop/>

<sup>14</sup> <https://5g-ppp.eu/event/workshop-on-virtualised-coordinated-spectrum-access-for-5g-communications-systems-13th-iswcs-2016/>

<sup>15</sup> <https://www.layer123.com/sdn-agenda-day2/>

<sup>16</sup> <https://5g-ppp.eu/event/superfluidity-taiwan-tour-october-31st-november-2nd-2016/>

#### 2.1.4.14 5G PPP Cross-project Workshop

METIS-II, mmMAGIC, and Fantastic-5G organised the 5G Cross-Project workshop in February, 2017, in Athens, whereas other 5G PPP projects Superfluidity, 5G-Norma, 5G-Xhaul, 5G-Crosshaul, Charisma, 5G-Ensure, Flex5Gware, SPEED-5G and Coherent contributed and participated in the workshop<sup>17</sup>. The Athens workshop was the third in a series, after previous ones held in Kista in 2015 and in Valencia in 2016. One objective has been to collaborate among 5G PPP projects and that way to work together e.g. towards common standardization and security aspects.

Stakeholders engaged: 5G Industry (5G PPP projects).



Figure 6 - 5G PPP Cross-project Workshop in Athens

#### 2.1.4.15 5G-Crosshaul – the fusion of Fronthaul and Backhaul in 5G! @MWC 2017

5G-Crosshaul organised a panel - The fusion of Fronthaul and Backhaul in 5G! - at MWC 2017 on 28 February 2017<sup>18</sup>. The topics concentrated on how fronthaul and backhaul will converge in 5G based on an outcome of various research and standardisation forums, such as 5G PPP, NGMN, 3GPPP, IEEE, ITU, IETF, ETSI, etc.

Stakeholders engaged: 5G Industry, Standardisation organisations, Users (Technology providers), 5G-related Organisations, Others (Other international/national projects, Investors).

#### 2.1.4.16 EU-China conference on IoT and 5G Research

The H2020 project EXCITING (EU-China Study on IoT and 5G) organized its first conference that was held on March 9th, 2017 in Beijing, China with support from Huawei, one of the partners of the project consortium. The one-day event presented some of the latest developments of 5G and IoT in both the EU and China, from perspectives of policy-making, research and industry, and identified potential ways forward towards better cooperation between both sides in these two fields.

Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research institutes / organisations, Technology providers), 5G-related Organisations, Policy makers, Others (other international projects).

#### 2.1.4.17 mmMAGIC: the 2<sup>nd</sup> International Workshop on mmW5G

mmMAGIC organised the 2<sup>nd</sup> International Workshop on Millimetre Wave-Based Integrated Mobile Communications for 5G Networks (mmW5G) on March 19, 2017 in San Francisco, USA. The workshop was co-located with IEEE WCNC 2017.

<sup>17</sup> <http://5gensure.eu/news/technical-outcomes-5g-ppp-cross-project-workshop>

<sup>18</sup> <http://5g-crosshaul.eu/5g-crosshaul-panel-at-mobile-world-congress-2017/>

Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research institutes / organisations, Technology providers), Business Verticals, Others (other international projects).

#### **2.1.4.18 5G PPP Workshop on RAN Architecture and integration**

mmMAGIC, METIS-II, 5G-Crosshaul and 5G NORMA organised a common 2-day workshop on RAN architecture and integration on March 30-31, 2017 in London, UK<sup>19</sup>.

Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research institutes / organisations, Technology providers), 5G-related Organisations, Others (other international projects).

#### **2.1.4.19 5G-CROSSHAUL Webinar: NFV/SDN, Time for Real Innovations**

The SDN and NFV were presented and discussed in the 5G-CROSSHAUL organised IEEE COMSOC Webinar: NFV/SDN, Time for Real Innovations on May 23, 2017<sup>20</sup>.

Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research institutes / organisations, Technology providers), 5G-related Organisations, Others (other national projects).

#### **2.1.4.20 3rd International 5G RAN design workshop**

The International 5G RAN design workshop, on May 25 2017 in Paris, was jointly organized by the METIS-II, the FANTASTIC-5G, the mmMAGIC, the 5G-CROSSHAUL and the Flex5GWare projects focusing on the 5G RAN design, architecture, energy efficiency and business models<sup>21</sup>. The workshop provided an opportunity to share and discuss final results from the mentioned projects and other 5G research activities and it was co-located with the IEEE ICC 2017 conference.

Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research institutes / organisations, Technology providers, Developers), Business Verticals, 5G-related Organisations, Policy makers, Others (other international/national projects).

#### **2.1.4.21 4th International Workshop on 5G Architecture**

5G NORMA organised the 4th International Workshop on 5G Architecture in Paris on 25 May 2017 alongside with the IEEE ICC 2017.

Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research institutes / organisations, Technology providers, Developers), Business Verticals, 5G-related Organisations, Policy makers, Others (other international/national projects).

#### **2.1.4.22 5GEx Workshop - Multi-Provider NFV: Towards Cooperative Service Ecosystem – The 5G Exchange Approach**

On May 31<sup>st</sup> 2017 the 5GEx project organised a half-day workshop on "Multi-Provider NFV: Towards Cooperative Service Ecosystem - The 5G Exchange Approach", in collaboration and co-located with the

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<sup>19</sup> <https://5g-mmmagic.eu/5g-arch-workshop-london/>

<sup>20</sup>

<https://event.on24.com/eventRegistration/EventLobbyServlet?target=reg20.jsp&partnerref=Univ&eventid=1416841&sessionid=1&key=147ABED1F85931CCAE689E50A118BCB4&regTag=&sourcepage=register>

<sup>21</sup> <http://www.5g-ran-design.org/>

Network Virtualization Europe 2017 event in Madrid<sup>22</sup>.

Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research institutes / organisations, Technology providers, Developers), Business Verticals, 5G-related Organisations, Policy makers, Others (other international/national projects).

#### 2.1.4.23 Workshop “Spectrum for 5G”



The “Spectrum for 5G” workshop was organized by the Spectrum Working Group on June 7, 2017 in Brussels. The workshop presented recent research results on 5G spectrum and future needs of the frequency bands under consideration for 5G (sub-GHz to millimetre), and discussed management aspects and timely access to the spectrum<sup>23</sup>. 81 attendees participated in the workshop.

Stakeholders engaged: Standardisation organisations (3GPP, ETSI, ITU, IEEE), Users (Developers, Research institutes / organisations, End users, Technology providers, SMEs), 5G Industry (Connectivity providers, Technology providers, SMEs, Start-ups), Business Verticals (Automotive, Factories of the Future, Media & Entertainment, 5G Automotive Association), 5G-related Organisations (5G IA), Policy makers (European Commission, Regulators, Smart Cities, Local governments).

#### 2.1.4.24 5G PPP projects at EuCNC 2017

5G PPP projects were active to promote their work and results at EuCNC 2017 on June 12-15, 2017 in Oulu, Finland as follows<sup>24</sup>:

- FANTASTIC-5G, FLEX5GWARE and SPEED-5G organised the “2nd 5G PPP Workshop on 5G Physical Layer Design and Hardware Aspects Below and Above 6 GHz” on June 12<sup>th</sup>;
  - o Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research organisations, Technology providers), 5G-related Organisations, Others (other international/national projects).
- CHARISMA, SESAME, COHERENT, VIRTUWIND, 5G-NORMA, 5GEx, SPEED-5G, SELFNET and mmMAGIC projects co-organised the “Workshop on Business Models and techno-economic analysis for 5G networks” on June 12<sup>th</sup>;
  - o Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research organisations, Technology providers, Developers), 5G-related Organisations, Others (other international/national projects).
- 5G-CROSSHAUL and 5G-XHAUL co-organised (with iCIRRUS) a Workshop on “New XHaul solutions for the 5G transport challenge” on June 12<sup>th</sup>.
  - o Stakeholders engaged in EuCNC 2017 events above: 5G Industry, Users (Research organisations, Technology providers), 5G-related Organisations, Others (other international/national projects).

<sup>22</sup> <https://5g-ppp.eu/event/5gex-workshop-on-multi-provider-nfv-towards-coopetive-service-ecosystem-the-5g-exchange-approach-network-virtualisation-europe/>

<sup>23</sup> <https://5g-ppp.eu/spectrum-workshop-program/>

<sup>24</sup> <https://5g-ppp.eu/event/5g-ppp-projects-eucnc-2017/>

- The Software Network Working Group (SONATA, 5GEx, 5G-CROSSHAUL, SUPERFLUIDITY, CHARISMA, SESAME, SELFNET, VIRTUWIND, COHERENT) organised a Workshop on “Software Networks and 5G: from network programmability to SDN/NFV combination for effective network slicing” on June 12th.
  - o Stakeholders engaged: 5G Industry, Users (Research organisations, Technology providers), 5G-related Organisations, Others (other international/national projects).
- SESAME, COHERENT, 5G-XHAUL and CHARISMA organised a Special Session on “Development of a Cloud-enabled “Small Cell as a Service” concept, for Multi-Tenancy and Edge Services in the 5G Framework.”
  - o Stakeholders engaged: 5G Industry, Users (Research organisations, Technology providers, Developers), 5G-related Organisations, Others (other international/national projects).
- FLEX5GWare and mmMAGIC, with a 5G-Champion, 5G-MiEdge organised on a Workshop on “Prototyping the 5th Generation Cellular Wireless Technology”.
  - o Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research organisations, Technology providers, Developers), 5G-related Organisations, Others (other international/national projects).
- mmMAGIC organised a Workshop on “Millimetre-wave technology for 5G access, fronthaul and backhaul”.
  - o Stakeholders engaged: 5G Industry, Users (Research organisations, Technology providers), 5G-related Organisations, Others (other international/national projects).
- EURO-5G organized a session to inform new phase 2 projects.
  - o Stakeholders engaged: 5G Industry, Standardisation organisations (via 5G Industry), Users (Research institutes / organisations, Technology providers, Developers), Business Verticals, 5G-related Organisations, Policy makers, Others (other international/national projects).
- 5G-ENSURE organised a workshop on 5G Security on June 12th with the Security Working Group.
  - o Stakeholders engaged: 5G Industry, Users (Research organisations, Technology providers, Developers), 5G-related Organisations, Others (other international/national projects).
- COGNET and SELFNET organised the “2nd Network Management, Quality of Service and Security for 5G Networks” based on the work and results of the 5G PPP Working Groups on Network Management, Quality of Service and Security.
  - o Stakeholders engaged: 5G Industry, Users (Research organisations, Technology providers), 5G-related Organisations, Others (other international/national projects).

#### 2.1.4.25 2nd 5G-ENSURE Project Workshop

5G-ENSURE organised its 2nd International Workshop during the ETSI Security Week 2017 in Sophia Antipolis, France<sup>25</sup>. The workshop provided an overview of the research and technical results in 5G privacy and security achieved within the 5G-ENSURE project.

Stakeholders engaged: 5G Industry, Standardisation organisations, Users (Research institutes / organisations, Technology providers, Developers), Business Verticals, 5G-related Organisations, Policy makers, Others (other international/national projects).

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<sup>25</sup> <http://5gensure.eu/5g-ensure-2nd-international-workshop-research-standardisation>



## 2.2 Working Groups

5G PPP projects nominated their representatives to specific Working Groups to get the best resources to work together on their own and well-known technology areas. Thus, the 5G PPP Working Groups played an important role in practical work to engage first “internal” stakeholders as the cross-project activities took place in different Working Groups. Based on the activities and work results of each Working Group “external” stakeholder engagement has happened when e.g. a Working Group:

- invited external presenters to WG meetings;
- organised a public workshop/event;
- attended standardisation/regulation meetings;
- collaborated in standardisation topics;
- collaborated in publications, papers, etc.

In the Table 2 below is an overview which stakeholders were engaged in the Working Groups related to the Euro-5G project (in practice via 5G IA and via Networld2020):

Working Group	Origin	Engaged stakeholders
Pre-Standardization WG	5G Infrastructure Association	Standardisation organisations
Spectrum WG	5G Infrastructure Association	Standardisation organisations, Policy makers
Vision/Societal Challenges WG	5G Infrastructure Association	Business Verticals, Users
Trials WG	5G Infrastructure Association	5G Industry, Users, Business Verticals
SME WG	Networld2020	5G Industry, Users (SMEs)

Table 2 - Working Groups vs. engaged stakeholders

Other Working Groups (Architecture, SDN/NFV, Network Management & Quality of Service and Security), Working Groups in general and their more detailed activities can be found in the deliverable D5.7 - Final report on support to the working groups.

## 2.3 International community engagement

The Multilateral Memorandum of Understanding (MoU) was signed in October 2015 (Telebrasil joined in May 2017) indicating engagement of international (outside Europe) stakeholders as follows:

- 4G Americas, now 5G Americas (Americas);
- The Fifth Generation Mobile Communications Promotion Forum (5GMF) (Japan);
- 5G Forum (Republic of Korea);
- IMT-2020 (5G) Promotion Group (non-profit organization, China); and
- Telebrasil – Projeto “5G Brasil” (Brasil).

The 5G Infrastructure Association (5G-IA, Europe) played an important role to make this happen, and is the representing European party in the signed MoU.

As agreed in the MoU, the Global 5G Events (cf. section 3.1 for details) have been organized twice a year in a rotation principle where the world’s leading 5G organizations have discussed the latest Research and Development achievements; views on 5G technologies, spectrum, standardization, field trials, applications, the future Roadmap and the global collaboration. The high level international consensus is important to accelerate practical work taking place e.g. in different global standardization and regulation meetings not to forget positive affect to local regulation and 5G technology development.

**Stakeholders engaged:** 5G-related Organisations (international), Policy makers, 5G Industry,

Standardisation organizations.

The international co-operation of the 5G PPP on global level with peer initiatives in other regions was facilitated by the WP4 and is reported more in details in the D4.3.

## 2.4 National Member State (MS) communities/community engagement

The Euro-5G project organised in the WP2/WP4 an online survey between June 2016 and January 2017 to identify first contact persons and/or institutions involved in 5G initiatives in Europe (e.g. 5G PPP projects, ICT National Contact Points). Then each research initiatives were asked what is being developed at the national level in each EU country and affiliates. The information collected provided a list of the European countries as follows:

- 9 countries have ongoing active 5G R&D National programme: Finland, Germany, Latvia, Lithuania, Luxembourg, Malta, Slovenia, Sweden, and United Kingdom.
- 7 countries are planning to initiate a 5G R&D National programme and/or cooperate on 5G initiatives through their ICT programs and through private initiatives: Cyprus, Netherlands, Moldova, Ireland, Israel, Poland, and the Former Yugoslav Republic of Macedonia.

Although this was a survey it was possible to first of all inform national initiatives about the 5G PPP activities, and secondly to open up dialogue with identified national initiatives for further potential collaboration. In European wide this is an important success factor to engage already started national 5G initiatives and projects to the activities taking place on EU-wide.

The survey results are published on the 5G PPP web-site (<https://5g-ppp.eu/european/>) and reported more in details in the Deliverable D4.3.

**Stakeholders engaged:** 5G-related Organisations (national in Europe), Policy makers, 5G Industry, Standardisation organisations (via 5G Industry), Users (Research institutes / organisations, Technology providers), Others (other national projects).

## 3 Promotion support

### 3.1 Support for community events

Events have been exploited not only as an opportunity for promotion and communication about the 5G PPP, but also as community building moments. At events, when we had a booth this was structured as a “networking place” to facilitate interaction with representatives from other communities, including vertical sectors, and other targeted stakeholders as identified by Euro-5G and the 5G PPP Call 1 projects.

During the second year of the project, the major events that also served as “*community building places*” are reported hereby.

#### 3.1.1 The 2nd Global 5G, “Enabling the 5G EcoSphere”, Rome (Italy) on November 9-10, 2016

The two-day event hosted experts from all corners of the globe (Europe, USA, China, Korea, Japan, Brazil and India) who discussed 5G progress through a series of focused sessions on 5G policy perspectives, 5G system architecture, 5G air interface and radio resource management, network management & software networks and 5G for verticals in the new economy.



Figure 7 - Artwork for the 2nd Global 5G Event

Hosted by the 5G Infrastructure Association, the “Enabling the 5G ecosphere” conference was jointly organized by: The 5G Public Private Partnership (5G PPP, Europe), IMT-2020 (5G) Promotion Group (China), The Fifth Generation Mobile Communications Promotion Forum (5GMF, Japan), 5G Forum (Korea) and 5G Americas (Americas).

The second Global 5G event was opened by Antonello Giacomelli, Under Secretary of the Minister of Economic Development, with the mandate for Communications, who announced that the 5G technology will be tested in three different cities in Italy in 2017. Mr Giuseppe Recchi, TIM Executive Chairman, confirmed TIM efforts to meet the European Digital agenda goal to deploy 5G in one major Italian city by 2020.

The first day was closed by the address of Gunther H. Oettinger, European Union Commissioner for Digital Economy and Society. He invited all the participants to join the efforts towards 5G development “*We the need to shape a common vision of the future with 5G that will comfort citizens and economies. To show that smart connectivity is an opportunity, a place where we want to invest into. A common vision where digital technologies and digital communication can make a better life for all.*” Mr Oettinger also handed the first Horizon Prizes (500K Euro each) to: PHOTONMAP represented by Dr Happy Hu from China, for “Collaborative Spectrum Sharing”, and to



DISTRIBUTE, represented by Oliver Holland, King's College London, for “Breaking the Optical Transmission Barriers”.

Networking and discussions continued alongside the conference in the exhibition area, where the 5G associations, 5 industrial players and 17 Horizon 2020 funded 5G PPP projects showcased their results and demos. The exhibitors included:

- Associations: 5G PPP, 5G IA, 5G Mobile Forum
- Projects: COGNET, SUPERFLUIDITY, 5G ENSURE, 5G XHAUL, 5G CROSSHAUL, FIRE, SESAME, METIS II, FANTASTIC 5G, 5G NORMA, MMMAGIC, FLEX5WARE, SPEED 5G, CHARISMA, SELFNET, COHERENT, 5GEX, VIRTUWIND
- Industrial players: ZTE, Datang, Huawei, Nokia, Qualcomm

Roberto Viola, Director General, Directorate General for Communications Networks, Content & Technology, European Commission, expressed his satisfaction and interest visiting the projects' booths and their latest progress.

The event gave also the opportunity to institutional and corporate partners to organize 1-to-1 meetings, which we hope will soon bring new projects' announcement.

The event in numbers:

- 35 speakers
- 370 participants
- 26 different countries represented
- More than 30 Universities and Research Centres
- 8 Representatives of the European Commission
- 7 National Governments represented: Italy, Japan, United States, South Korea, China, Brazil, Sweden
- 900mq exhibition area
- 17 projects booths
- 3 associations booths
- 5 industry players' booths
- Over 70 tweets in 36hr (hashtag #GLOBAL5G)
- 1000 coffee cups served

Stakeholders engaged: All.

The 2nd Global 5G event is reported more in details in the D4.3.

### 3.1.2 Press Conference Event at MWC 2017

The 5G Infrastructure Association organised the Press, Media & Analyst Event “5G Action Plan: from Research to Trials” on 28<sup>th</sup> February at the Mobile World Congress 2017 in Barcelona. The event was opened by Roberto Viola, Director General of DG CONNECT and two panels followed.

Top managers from leading global technology companies, members of the 5G IA discussed the progress made on European 5G Research, the emergence of 5G standards, and prospects for investments in the new infrastructure. Representatives of the vertical industries and the public sector outlined their needs and expectations for 5G. Technology experiments, validation tests and the evolution to field trials as outlined in *5G Action Plan* were among the key issues addressed by the speakers.

Furthermore, 5G IA presented the White Paper “5G innovations for new business opportunities” identifying recommendations of the EU telecom sector towards harmonized 5G standardization, spectrum, deployment and regulation.

The event was attended by over 150 representatives.

Stakeholders engaged: All, the sub-groups in details below:

1. Standardisation organisations:

- 3GPP, ETSI, ITU
- 2. Users:
  - Developers, Research institutes / organisations, End users, Technology providers, SMEs
- 3. 5G Industry:
  - Connectivity providers, Technology providers, SMEs, Start-ups
- 4. Business Verticals:
  - Automotive, Factories of the Future, Media & Entertainment, Energy, eHealth
- 5. 5G-related Organisations:
  - TeleBrasil, 5G Forum, IMT2020 PG, NGMN
- 6. Policy makers:
  - European Commission, Regulators, Smart Cities, Public administration
- 7. Others:
  - ICT press, Media, Industry analysts

The PR material used at the MWC 2017 is reported in the D3.4.

### 3.1.3 3rd Global 5G Event in Japan

The 3rd Global 5G Event, held in Tokyo on 24-25 May 2017, was organised by the Fifth Generation Mobile Communications Promotion Forum (5GMF). This event is part of a series based on a Multi-Lateral MoU, which was signed by 5G-IA (Europe), 5GMF (Japan), 5G-Forum (Korea), 5G Americas, and IMT-2020 PG (China) to cooperate on building global consensus on 5G. The Global 5G Event is held twice a year on rotation basis. In 2016, the 1st Global 5G Event was held in Beijing, China hosted by the IMT-2020 (5G) Promotion Group, and the 2nd event was held in Rome, Italy, organised and hosted by 5G-IA. At the Japanese Global 5G Event (the 3<sup>rd</sup> in the series after China and Europe) the number of participants was around 270 and main discussion topics were industrial policies, standardisation, spectrum regulation, trials and demonstrations, relations with vertical industries.

Major stakeholders from all relevant sectors took part to the event, including:

Stakeholders engaged: All, the sub-groups in details below:

1. Standardisation organisations:
  - 3GPP, ETSI, ITU, IEEE
2. Users:
  - Developers, Research institutes / organisations, End users, Technology providers, SMEs
3. 5G Industry:
  - Connectivity providers, Technology providers, SMEs, Start-ups
4. Business Verticals:
  - Automotive, Factories of the Future, Media & Entertainment
5. 5G-related Organisations:
  - 5G Forum, IMT2020 PG, NGMN, 5GMF, 5G Americas, TeleBrasil
6. Policy makers:
  - European Commission, Regulators, Smart Cities, Local governments

The 3rd Global 5G event is reported more in details in the D4.3.

### 3.1.4 EuCNC, Oulu, Finland 12-15 June 2017

EuCNC 2017 was a special event where the 5G PPP Phase 2 projects were presented with two 90 minutes' special sessions. Mr. Bernard Barani, Acting Head of Unit at DG Connect introduced the conference, while Jean-Pierre Bienaimé highlighted key achievements from Phase 1. Each new 5G PPP project were given a few minutes to introduce their work frame and goals. Euro 5G team supported the audience participation to the conference, through the online promotion and during the event in Oulu with live social media animation, video and photo reportage.

Several Euro 5G projects attended the EuCNC event, whether with a booth or with panel sessions and workshops (cf. section 2.1.4.24). Euro 5G supported the promotion of their participation to the event through the website, Twitter channel and LinkedIn Group. It has facilitated the liaison activity among all the projects and Euro 5G website editors, in order to guarantee the circulation of information within the work group and most important towards the external audience, through a dedicated webpage and timely social media update<sup>26</sup>.

Euro-5G realized over 30 video interviews with the 5G PPP projects and SME representatives to highlight the Phase 1 major outcomes. The video material will be edited in several formats and made available online on the 5G PPP YouTube Channel at: <https://www.youtube.com/watch?v=bfNmiYtG9Cg>.

Furthermore, Euro-5G coordinated the setup of a collective SMEs booth (cf. details in the D5.5), which hosted eight SMEs which are members of the NetWorld2020 SME Working Group: AICO Software, InnoRoute, Ubiwhere, CityPassenger, ARDIC Visiona Ingenieria de Proyectos, Nextworks, Montimage. Each SME showcased their technological achievements and solutions through live demo, 1-to-1 presentations and video projections<sup>27</sup>.



Figure 8- Video interview at the EuCNC 2017



Figure 9- The SME booth at the EuCNC 2017

The PR material used at EuCNC 2017 is reported in the D3.4.

<sup>26</sup> <https://5g-ppp.eu/event/5g-ppp-projects-eucnc-2017/>

<sup>27</sup> <https://5g-ppp.eu/sme-booth-eucnc-2017-approved/>

## 3.2 PR Channels for community support

During the second year of the project, the 5G community has been actively engaged through various PR means including but not limited to social networking. This activity targeted the community as a whole, as well as more specific communities whenever needed, e.g. SMEs. More information about these PR channels is available in the WP3 deliverable D3.4.

In the framework of community building activities, the following PR channels have been continuously updated in order to better engage and inform the various stakeholders:

### 3.2.1 5G PPP Website

The dynamic 5G PPP website (provides a “one-stop” shop for all 5G activities with a dedicated focus on achievements and developments of the European 5G-Initiative.

The 5G PPP website is described more in details in the D3.4.

**Stakeholders engaged:** All.

### 3.2.2 Twitter channels @5GPPP and @NetWorld2020

#### @5G PPP

Currently the account registers **2,500 followers** (with an increase of 200 followers (!) in the last 3 months) and around 1,600 tweets in total. The account is used to broadcast not only Euro 5G news but also 5G IA, Euro 5G projects and SMEs news regarding workshops, conferences, papers, input to or news from standardisation and projects' achievements.

**Stakeholders engaged:** All.



Figure 10 - Screenshot of the @5GPPP Twitter Account

#### @NetWorld2020

Currently the account registers 153 followers and around 500 tweets in total. The account is used to broadcast and relay 5G PPP, 5G PPP projects and other 5G related Tweets around news, events, papers, etc.

**Stakeholders engaged:** All.



### 3.2.3 LinkedIn group

The LinkedIn group registers **234 members** and it broadcasts the news linked to the Euro 5G website thus accelerating web-traffic to the 5G PPP website.

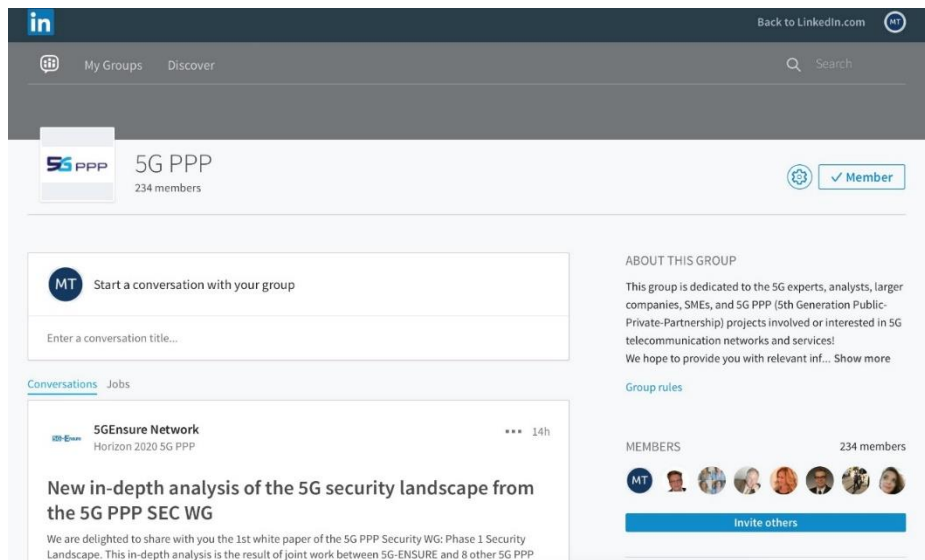


Figure 11 - Screenshot of 5G PPP LinkedIn Group

**Stakeholders engaged:** All.

### 3.2.4 Mailing lists

There are several mailing lists that are helping to facilitate communication and coordination among all active stakeholders within the 5G PPP scene. Here the COMMS mailing list is presented (other mailing lists are reported in the D3.4) as it was seen important information channel for the practical community building activities between the Euro-5G project and the 5G PPP projects.

#### COMMS mailing list

In particular, via the dedicated COMMS mailing list (55 members), the communication and dissemination representatives of each ongoing 5G PPP project can be reached so that there is a way to effectively reach all players and foster regular exchange of information. Specifically communication via this mailing list has helped coordinating on events participation and promotion, publications announcements, Info Days, Twitter promotional campaigns etc.

### 3.2.5 5G PPP Video interviews

#### 3.2.5.1 5G PPP projects

Euro-5G scheduled a set of interviews that were shot during the EuCNC 2016 event in Athens (27-30/06/2016) and then during the EuCNC 2017 event in Oulu (12-15/06/2016).

A strong cooperation between Euro-5G and the Phase I projects was put in place in order to organise these two sets of video interviews. First, a generic email to the “COMMS” -mailing list was sent, explaining the main objectives of these interviews, then each project was contacted through their project’s email (see <https://5g-ppp.eu/5g-ppp-phase-1-projects/>). The discussion in the monthly Community Building/COMMS call accelerated the process to get projects interested and to confirm their participation in the interviews. Then the availability of each person who showed interest in being interviewed was collected and a time schedule was created in order to schedule the interviews in timely manner.

Thus, the actual work of the video interview preparation took place in the Euro-5G/WP1 and the results are available in the Euro-5G/WP3 as “means” when also each 5G PPP project can use videos for their own dissemination and community engagement activities.

The interviews in Athens focused on the Phase I projects' intermediate achievements and what they planned to do in the remaining part of the project. In addition to single project interviews, a general video with the best extracts of each interview has been also released (<https://www.youtube.com/watch?v=pvmyWD3KLyw>).

Regarding the interviews that took place in Oulu, 16 Phase 1 projects were interviewed, explaining their final achievements, showing their demos and explaining what the final achievements will bring to society and business. Also, during these interviews, the projects explained their common 5G PPP achievements/results e.g. in working-groups/forums e.g. pre-standardization, standardization etc. and overall a common work with other projects in 5G PPP, as part of the community building activities launched in the WP1.

**Stakeholders engaged:** All (via projects)

1. Standardisation organisations:
  - 3GPP, ETSI, ITU, IEEE
2. Users:
  - Developers, Research institutes / organisations, End users, Technology providers, SMEs
3. 5G Industry:
  - Connectivity providers, Technology providers, SMEs, Start-ups
4. Business Verticals:
  - Automotive, Factories of the Future, Media & Entertainment
5. 5G-related Organisations:
  - 5G Forum, IMT2020 PG, NGMN, 5GMF, 5G Americas, TeleBrasil
6. Policy makers:
  - European Commission, Regulators, Smart Cities, Local governments

### 3.2.5.2 SMEs

At the EuCNC 2017 event in Oulu (12-15/06/2017), WP1 organised SME video interviews in which the SMEs were able to introduce their company, explain what their company is doing in the 5G environment and received benefits of the 5G PPP Program, and how they are going to commercialise their 5G product(s)/service(s). The SMEs who shared the SME booth at the EuCNC had a priority for video interviews. Moreover, a couple of additional SMEs were interviewed. The videos will be made available by WP3 as “means” to promote SMEs’ activities, expertise and achievements in the 5G PPP. The interviewed SMEs can use videos for their own promotion purposes. The videos will be published after summer vacation period on the 5G PPP YouTube channel, especially to promote and engage new SMEs as part of the community building activities in the WP1.

**Stakeholders engaged:** All (via SMEs). From SMEs’ business point of view: Users, 5G Industry and Business Verticals.

### 3.2.6 PR Material

A set of PR material has been created and distributed during events in order to reach a wide range of external stakeholders. As a summary, the PR material covers (see D3.4 for details):

**5G PPP brochure: First Wave of Research & Innovation Projects:** [PDF](#)

- Stakeholders addressed: ALL
- General information and information about phase 1 projects for general audience and for beneficiaries own dissemination

**First Vision brochure (2015):** [PDF](#)

- Stakeholders addressed: ALL
- The Vision brochure was published on 2015 and it gave an overview of the 5G vision of the European ICT sector. As it was addressing a general audience it explained on high level key drivers and disruptive capabilities of 5G as well as its design principles, key technological components, spectrum and timeline considerations,

**Second Vision brochure (2016): 5G Empowering vertical industries:** [PDF](#)

- Stakeholders addressed: ALL
- The second Vision brochure was published in 2016 and presented innovative digital use cases from most important vertical sectors in Europe, namely: Factories of The Future, Automotive, Health, Energy and Media & Entertainment, and how their requirements impact 5G design.

**Third Vision brochure (2017): 5G Innovations for new business opportunities:** [PDF](#)

- Stakeholders addressed: ALL
- This brochure was published in 2017 and it shows how the 5G PPP innovations go beyond what is announced for early 5G deployments for the eMBB service class, and how all 5G service classes are delivered over a scalable and cost-efficient network. It then explains how 5G technological innovations transform the network into a secure, reliable and flexible orchestration platform across multiple technology and administrative domains. Multi-domain orchestration allows a quick end-to-end service deployment and a dynamic sharing of infrastructure resources among stakeholders, offering new business opportunities and paving the way for new business models.

**The SME brochure:** [PDF](#)

- Stakeholders addressed: 5G Industry (Larger organizations, SME's own partners and (future) customers); Users, Business Verticals and 5G-related Organisations from Europe and from all other continents seeking to cooperate with SMEs in 5G domain.
- The SME brochure was published at the 2nd Global 5G Event in Rome 9.-10.11. 2016 showing the expertise and skills from selected 33 European Small and Medium-sized Enterprises (SMEs) in 5G and related domains. Cf. more in details the D5.5 and the D3.4.

## **4 Engaging the community around the NetWorld2020 ETP**

Various activities were performed in order to support and promote the activities of the NetWorld2020 community. Below an overview of the main activities is given.

### **4.1 Organisation of NetWorld2020 General Assembly**

A NetWorld2020 General Assembly (GA) was organised in Brussels on 19 April 2016. The EURO-5G support for that event was already reported in EURO-5G Deliverable D1.1, submitted in July 2016.

### **4.2 Support to NetWorld2020 Steering Board (SB)**

Euro-5G provided support towards the organisation of NetWorld2020 SB meetings. Meetings were organised on 08/09/16, 06/12/16, 21/03/17 all in Brussels and 15/06/17 in Oulu (collocated with the EuCNC 2017). Activities included the organisation of venue and logistics. Meetings were chaired by Werner Mohr in 2016 and Rui Aguiar in 2017. Uwe Herzog took minutes, collected comments and prepared the revised and final version.

In addition, the election of the SB Chairperson and Vice-Chairs for the period 2017-2018 were organised at the SB meeting in December 2016.

Moreover, EURO-5G organised the NetWorld2020 SB approval of the Service Level Awareness Whitepaper and its publication.

### **4.3 Election of NetWorld2020 Steering Board 2017-2018**

Euro-5G organised the election of the NetWorld2020 SB for the period 2017-2018.

In early October 2016 all NetWorld2020 members were contacted by email to consider becoming a member of the Steering Board and to declare their candidature by filling the Candidature Declaration Form.

By the deadline for submission, 23 October 2016, candidatures were received from 15 industry candidates, 6 research- and 5 SME candidates. According to the regular process an election would have been organised in which the NetWorld2020 members can vote on the candidates. However, as the number of candidates was equal or less than the number of seats per stakeholder category, all candidates were immediately elected. The members of the SB 2017-2018 is shown below:

#### **Industry**

- ADVA Optical Networking SE
- Airbus Defence and Space SAS
- Deutsche Telekom
- Ericsson AB
- Huawei
- NEC Europe Ltd.
- Netaş Telecommunication A.S.
- NOKIA
- ORANGE
- Samsung
- SES S.A
- Telecom Italia
- Telenor
- Thales Alenia Space
- Turk Telekom

#### **Research**

- Centre Tecnològic de Telecomunicacions de Catalunya (CTTC)



- Dublin City University
- IMDEA Networks
- IMEC
- Instituto de Telecomunicações
- University of Oulu

**SME**

- Beacon Tech Ltd.
- Integrasys SA
- InterInnov
- Nextworks
- Quobis Networks SL

**Election of SB Chairperson and 3 Vice-Chairs**

All SB candidates were asked to indicate in their candidature form whether they would also candidate for the SB Chairperson or Vice-Chair role. From this a list of candidates was drawn. An election was organised by the EURO-5G project at the NetWorld2020 SB meeting in Brussels, 06/12/16.

The following persons were elected:

- Rui Luis Andrade Aguiar, Instituto de Telecomunicações (Chairman)
- Maziar Nekovee<sup>28</sup>, Samsung (Vice-Chair)
- Nicola Ciulli, Nextworks (Vice-Chair)
- Egon Schulz, Huawei (Vice-Chair)

## 4.4 NetWorld2020 membership management

NetWorld2020 has more than 1,000 members and managing the membership and keeping the list up to date requires a significant effort. NetWorld2020 keeps receiving high numbers of applications - between 10 and 30 per quarter. Euro-5G processed all new applications and prepared a presentation which was given to the NetWorld2020 SB at their meetings. Applicants were informed of the decision and entered in the membership database and lists in the web and charts. The task also includes removing members from the membership list that cannot be reached anymore by email, i.e. where emails sent to them bounce back. Finally, the task included support to members and handling of member requests.

## 4.5 Update of NetWorld2020 web

Euro-5G project has also taken care of keeping the NetWorld2020 web (Figure 12) up to date. This includes adding information related to events, both organised by NetWorld2020 or within the sector, adding information about public consultations with the NetWorld2020 community, updates from the NetWorld2020 Working Groups. E.g. some efforts have been spent on adding further details and news on the page of the NetWorld2020 SME Working Group, updating information on the NetWorld2020 membership and various kinds of documents.

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<sup>28</sup> Meanwhile replaced as vice-chair by Anders Caspar, Ericsson

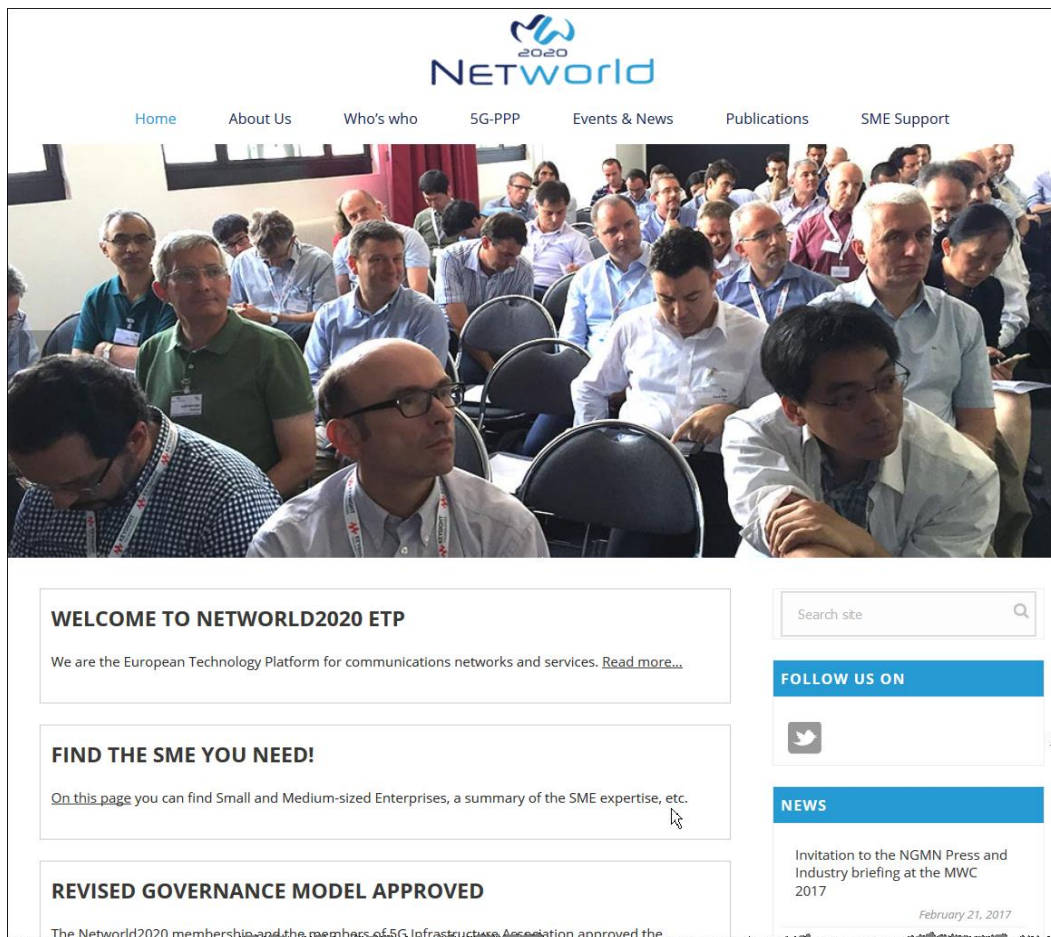


Figure 12 - NetWorld2020 web

## 4.6 Obtaining approval from NetWorld2020 members

In September 2016, Euro-5G organised the vote for the approval of the revised NetWorld2020 Governance Model from NetWorld2020 members. This revision was necessary in the scope of the overall changes of the governance of the 5G PPP and NetWorld2020. This resulted in different roles for NetWorld2020 and 5G PPP: NetWorld2020 will focus its activities more on long-term research with a scope broader and beyond 5G than 5G PPP, while the 5G PPP and the 5G Infrastructure Association are working according to the Contractual Arrangement with a clear target to develop 5G systems and networks.

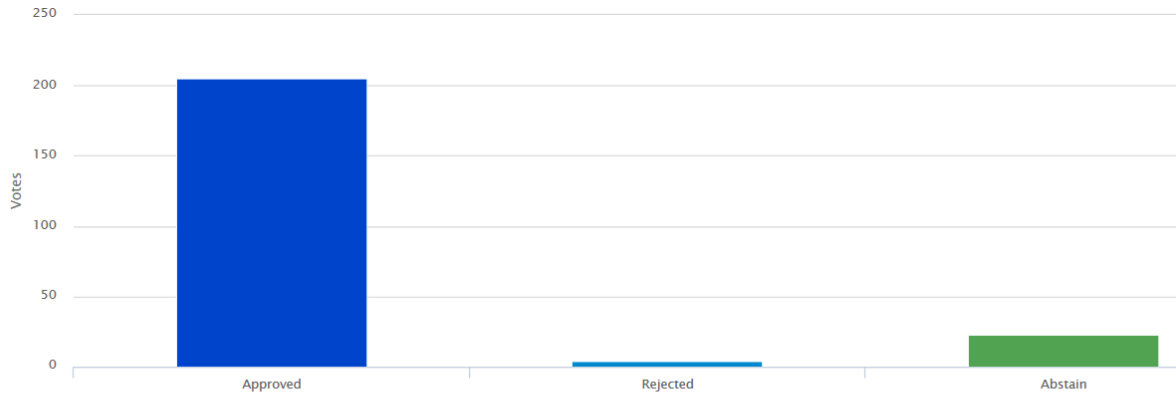
The approval of the proposed change was done electronically. Votes were submitted to an eVoting web service. Every NetWorld2020 full member received an email from EuresTools eVoting Service on Monday, September 12, 2016, containing an individual, member specific voting code to be used, with deadline for voting 3 October 2016. The majority of members have approved the revised Governance. Details can be found in Figure 13 below.

## Approval of revised NetWorld2020 Governance Model (Sep-2016)

[About](#) [Members](#) [Results](#)

### Status: Finished

Please state whether you approve the changes of the NetWorld2020 Governance Model:



### Overview

Total Number of Voters	877
Votes Submitted	232
Votes Not Yet Submitted	645
Total Members Count	877
Total Contacts Count	1691
Participation	26.45%

### Votes

Total 3 items.

No.	Option	Votes	Percentage of Used Votes	Percentage of Total Votes
1	Approved	205	88.36%	23.38%
2	Rejected	4	1.72%	0.46%
3	Abstain	23	9.91%	2.62%

Figure 13 – Details of the approval of the revised Governance Model

## 4.7 Maintenance of tools

A non-negligible effort was spent for maintenance and continuous improvement of the NetWorld2020 tools, which are all hosted on Eurescom servers. Tools include the NetWorld2020 webserver, mailing lists with several thousand subscribers, the ftp-server, the eVoting tool and a teleconference bridge.

## 5 Conclusions and Recommendations for 5G PPP Phase 2

In conclusion, the identified priority stakeholders - Standardisation organisations, Users, 5G Industry, and Business Verticals - were well engaged, mainly in numerous events and workshops organized by the 5G PPP projects and/or the 5G PPP working groups. Indeed, the community engagement happened mostly indirectly, from the Euro-5G (WP1/Task1.1) point of view. The Euro-5G project had direct engagement activity with 5G related organisations (International), Business Verticals and Policy makers; and through WP2/WP4 and the 5G IA. In practice, this activity was carried out in the Global 5G Events and in the global press conference at MWC 2017 (the Business Vertical WS took place during Y1).

Although at high level the community engagement activity (“Awareness” – “Engagement” – “Participation”) reached the “Participation<sup>29</sup>” criteria with priority stakeholders, there is still work to be done with specific level 2 stakeholders which will be more active in subsequent phases of the 5G PPP.

Below is a summary, for each stakeholders’ category, of their engagement activity level, and recommendations for the next stages. The work that started in Phase 1 needs to continue in Phase 2 (and then Phase 3) of the 5G PPP, to be able to keep the high “Participation” level.

- Standardization organisations – Participation
  - There is a wide consensus to get global standards and regulation (WRC) in place and practical work within the 5G PPP happens in the Work Groups and in projects organised workshops and events; on global level in standardisation/WRC meetings.
- Users - Participation
  - Research institutes/organisations, Technology providers, SMEs have been active in the 5G PPP.
  - Smart Cities hold “Engagement” level via business verticals.
  - Developers and End users reached the Awareness –level i.e. in the phase 2 attention should be paid to these stakeholders. Developers would be more active after trials will be started during the phase 2 and when 5G networks will be accessible outside the 5G PPP projects.
- 5G Industry - Participation
  - Global 5G Industry has been active in 5G PPP.
  - Startups have reached “Awareness” -level. After trials will be started they would be more active in the phase 2 (or in the phase 3).
- Business Verticals - Participation
  - Business Verticals worked towards commonly planned and agreed objectives (e.g. standardisation, regulation), that is why “Participation” criteria is fulfilled. However, their work took place mostly independently within their own specific sectors (Automotive, eHealth etc.). After trials will be started in the phase 2 closer participation is expected.
- 5G-related Organisations - Participation
  - There is a wide consensus to get 5G to the global market and organisations worked together to make it happen.
  - Globally agreed MoUs had indirect positive impact to standardization, regulation and technology development. Therefore, recommendation for phase 2 is to highlight these

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<sup>29</sup> Engaged stakeholders participate and work towards commonly planned and agreed objectives

practical achievements in press releases and news i.e. not to leave publicity only on the signed MoU.

- Policy makers – Participation
  - Policy makers have well supported 5G on global, regional and national level with positive impact on standardization, regulation and technology development.
- Others – Engagement
  - On the level 2 - Other international/national projects – have reached “Engagement”. In the phase 2 it is recommended to get their results more visible in the 5G PPP and vice versa to create closer co-operation and to reach “Participation”.
  - On the level 2 - Open Source projects and Investors (VCs) were still on Awareness – level. An assumption is that after trials will be started they would be more active in the phase 2 or in the phase 3.

Other recommendations for 5G PPP phase 2 are as follows:

- The horizontal Activity: Community building and PR (Public Relations) should continue with COMMS experts of the each 5G PPP projects (both phase 1 and 2). This activity would complement more technically oriented work taking place in the 5G PPP Work Groups, creating more awareness and visibility between the 5G PPP projects. In practical terms regular Community Building / COMMS conference calls should continue.
- To increase/strengthen awareness, cooperation and interaction between the various 5G PPP Work Groups, an information sharing e.g. in the Community Building / COMMS conference calls would be preferred (and also within other WGs).
- Networking booths setup and support in future events should continue for community building activities.
- Although it was noticed that there was no need to have additional collaboration tool(s) (cf. section 2.1.1) in the future it may be needed. For that purpose, the following collaboration tools are recommended with their specific usage areas (cf. D1.1 for details):
  1. In case there is need to have surveys or real-time polls during the organised events the "Conference" (<https://conference.com/>) community building tool is recommended.
  2. Talkspirit (<https://www.talkspirit.com/>) offers a collaborative digital platform that eases information sharing and communication by linking several social media channels (e.g. Twitter, Facebook, LinkedIn) together to make it easier to find and share information on a daily basis.
  3. Basecamp (<https://basecamp.com>) provides an effective messaging system

[end of document]