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

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**ICT Policy, Research and Innovation
for a Smart Society**

www.picasso-project.eu

Webinar Objective

> PICASSO will explore how EU-US collaboration in 5G can be served best in the next Horizon 2020 Call for Proposals, taking into account
> - the EU-US innovation ecosystems,
> - the established collaboration between 5G PPP and 5G Americas,
> - the target technical objectives defined by the 5G PPP Strategic Research Agenda
>
> … in order to enhance collaboration with US researchers and innovators

About PICASSO

> **PICASSO** aim: **reinforce EU-US collaboration** in ICT research and innovation focusing on the **pre-competitive research in strategic technology areas**
>   - **5G Networks,** and
>   - other areas
>   - ★ *Big Data,*
>   - ★ *Internet of Things* and *Cyber Physical Systems,* and to
>   - support the EU-US ICT **policy dialogue** by contributions related to privacy, security, internet governance, interoperability, and ethics in order to enable smart applications in vast domains.

> Hence, **PICASSO** will boost the **EU-US partnership** in strategic fields of ICT by **consolidating the ICT collaboration between EU and US organizations** by
>   - **Identifying Common strategic priorities** and **areas mutual interest** to be further investigated in pre-competitive research projects, funded by H2020 and/or US agencies,
>   - **Link Academia and industry more closely** and generate a better understanding on the market opportunities on both sides of the Atlantic, and,
>   - **Bring the voice of companies to policy makers** and recommendations will be made that cover specific policy gaps and suggest ways forward to reinforce the competitiveness of the ICT sector.

PICASSO 5G Networks Expert Group Objectives

> The 5G Networks Expert Group analyses technological and economic drivers as well as potential obstacles of innovations in the economies on both sides of the Atlantic and derives opportunities for EU/US ICT collaboration improvement.

> The technological scope includes Tactile Internet (for non-critical as well as mission-critical applications), mobile broadband (incl. millimeter-wave communications), and ubiquitous IoT- sensor networking. Of particular interest are flexible and scalable solutions, which meet most of 5G requirements. Furthermore, spectrum and network access policies as well as regulatory issues are of main interest.

PICASSO 5G Networks Expert Group Action Plan

> The 5G Expert Group will compile an analysis of existing and emerging sectors as well as evaluate the capabilities of key players in EU and US, and derive areas for joint collaboration activities and their potential gains.

> Depending on the results of the analysis, the 5G Expert Group aims to develop a strategic roadmap addressing the following areas:

> > Applications and Services Attractiveness

> > Technological and economic capabilities

> > Networking effects

> > Key enabling technologies (incl. standardisation timeline)

> > Open technological challenges

> These possible topics are provided as a starting point for discussion within PICASSO and may or may not end up as one of the 5 focus areas in the strategic roadmap.

The Wireless Roadmap
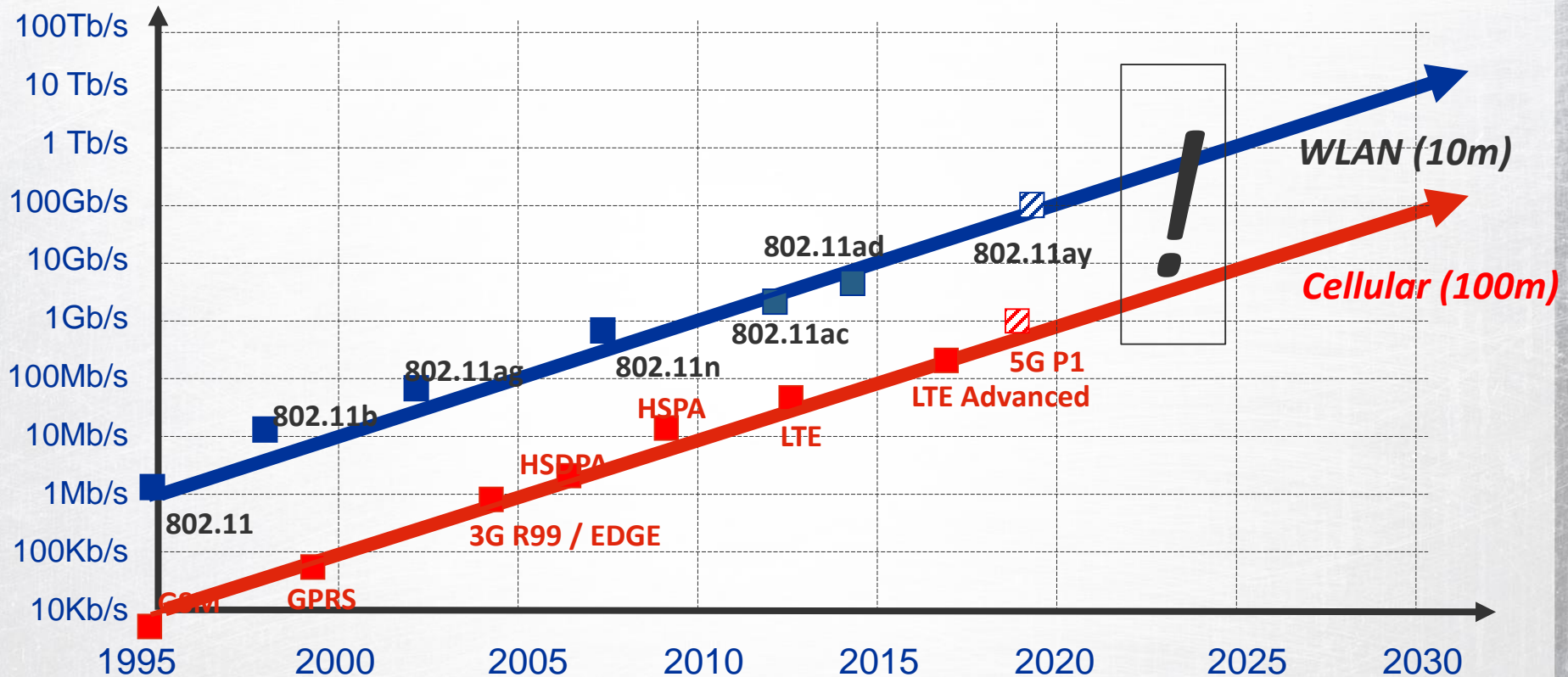
Via Della Conciliazione

2005/4/4

2013/3/12

Source: http://www.spiegel.de/panorama/bild-889031-473266.html

Source: http://www.spiegel.de/panorama/bild-889031-473242.html

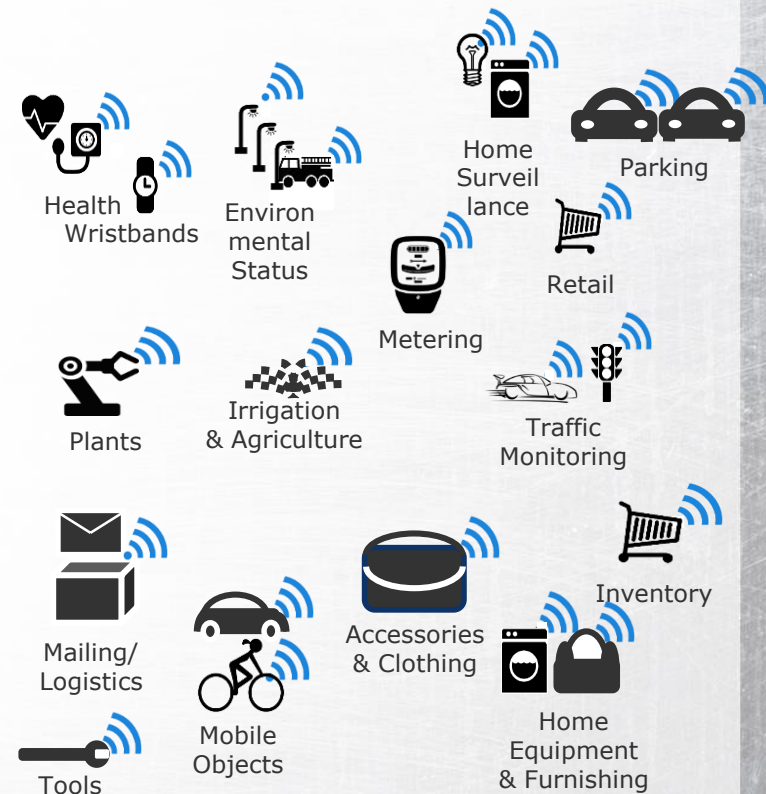# The Wireless Roadmap >2020 Outlook

Thingbook

The Three New Huge
Wide Area Network Opportunities

Monitoring & Sensing
> 10B units / year

Switching & Sensing
~100B units / year

Tracking & Tagging
~1T units / year

Health Wristbands

Environmental Status

Home Surveillance

Parking

Retail

Metering

Plants

Irrigation & Agriculture

Traffic Monitoring

Mailing/ Logistics

Mobile Objects

Accessories & Clothing

Inventory

Home Equipment & Furnishing

Tools

Tactile Internet

Revolution Ahead: The Tactile Internet

5G:

Ubiquitous

Steering & Control
Communications

Health & Care
Traffic & Mobility
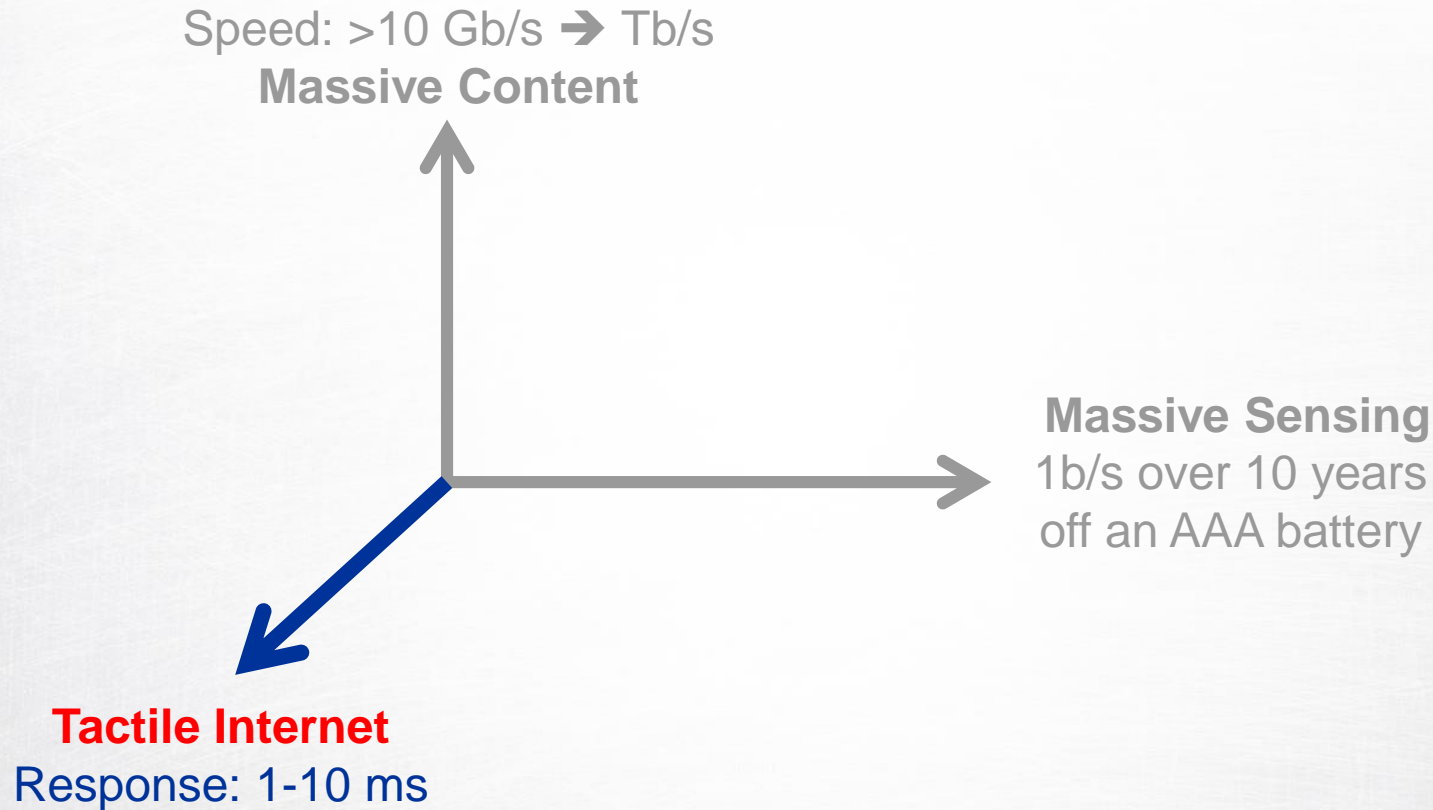Sports & Gym
Edutainment
Manufacturing
Smart Grid
…

≤ 4G:

Ubiquitous
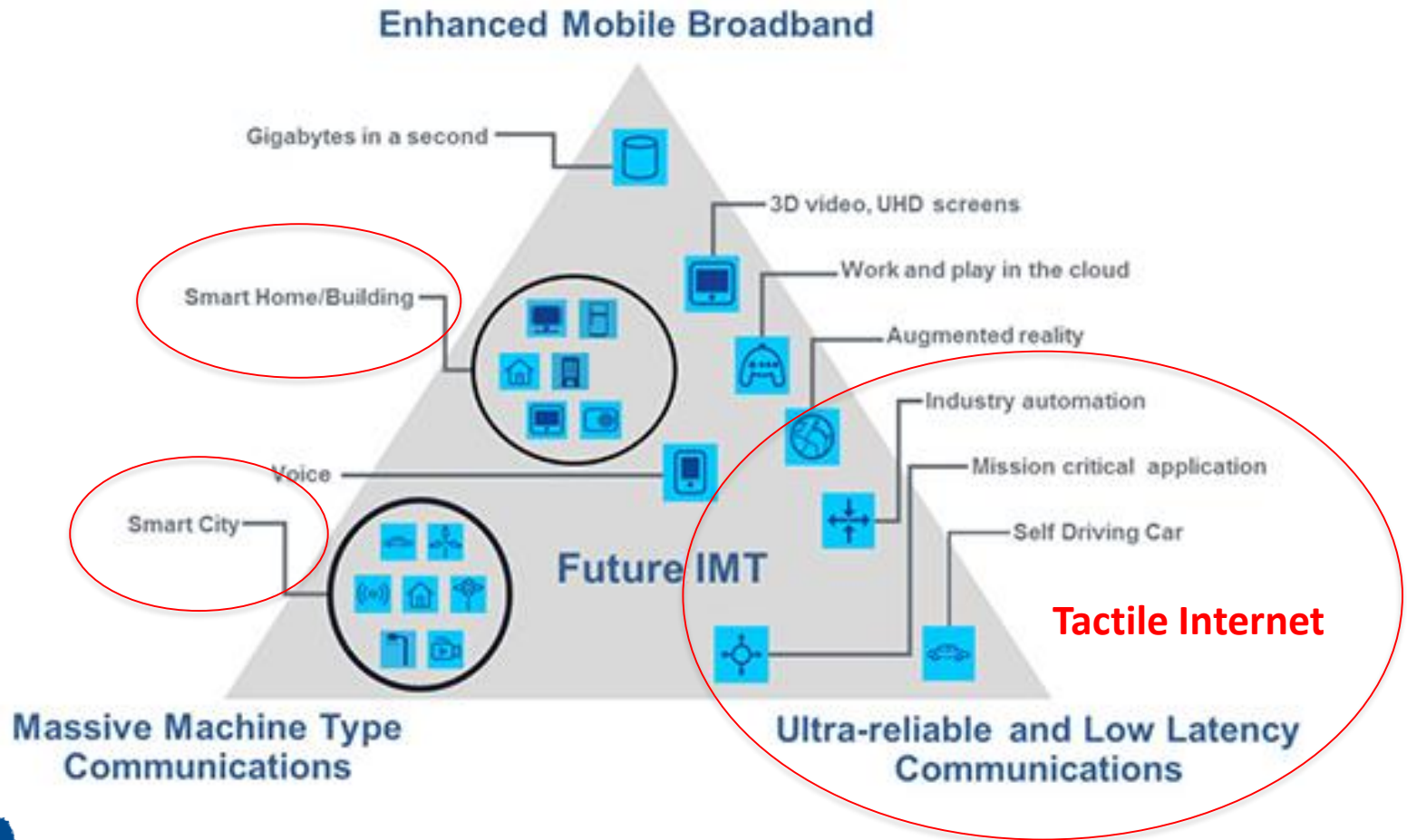
Content
Communications

IoT
Internet of Things
…

A 5G Hyperplane

Speed: >10 Gb/s ➔ Tb/s
Massive Content

Massive Sensing
1b/s over 10 years
off an AAA battery

Tactile Internet
Response: 1-10 ms

Enhanced Mobile Broadband

Gigabytes in a second

3D video, UHD screens

Work and play in the cloud

Augmented reality

Industry automation

Mission critical application

Self Driving Car

Smart Home/Building

Voice

Smart City

Future IMT

Tactile Internet

Massive Machine Type Communications

Ultra-reliable and Low Latency Communications

The following parameters are indicative new network characteristics to be achieved at an operational level:

> 1000 times higher **capacity** (aka mobile data volume per geographical area)

> 10 to 100 times more **connected devices**.

> 10 times to 100 times higher typical user **data rate**.

> 10 times lower **energy consumption**.

> End-to-End **latency** of < 1ms.

> **Ubiquitous** 5G **access** including in low density areas.

IEEE 5G Dresden Summit

September 29, 2016 at International Congress Center Dresden

- *Plenary Keynotes*
- *4 Parallel Tracks including*
  - *Academic Talks*
  - *Industry Talks*
  - *Projects presented by 5G Lab Germany*
- *Exhibition*
- *Panel Discussion*
- *Social Evening Event and Dinner*

→ **Wireless Track**
led by Prof. Fettweis

→ **Network & Cloud Track**
led by Prof. Fitzek

→ **Silicon Track**
led by Prof. Plettemeier

→ **Application Track**
led by Dr. Altinsoy

www.5gsummit.org/dresden/

Intro Gerhard Fettweis & Werner Mohr

> **Prof Gerhard Fettweis**
> - Vodafone Chair Professor at TU Dresden since 1994
>   - ★ Invented GFDM – wave form for 5G
>   - ★ „Tactile Internet" inventor & driver
>   - ★ Serial entrepreneur
> - 5G related activities
>   - ★ Coordinator 5G Lab Germany (with >20 professors & >10 industry partners)
>   - ★ Leader IEEE 5G Initiative / IEEE Tactile Internet (sub-) Commitee
>   - ★ PICASSO 5G Networks Expert Group Chair

> **Dr Werner Mohr**
> - Head of Research Alliances at NOKIA Bell Labs
> - Chairman of Networld2020 ETP (European Technology Platform) Steering Board
> - Chairman of the 5G PPP (5G Infrastructure Public Private Partnership) Association Board