Project: IEEE P802.15 Working Group for Wireless Speciality Networks (WSNs)

Submission Title: Introduction to the H2020 ICT-09-2017 Cluster

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Re: n/a

Abstract: Six projects from the H2020 call ICT-09-2017 (DREAM, EPIC, TERAPOD, TERRANOVA, ULTRAWAVE, WORTECS) have agreed to form an unofficial cluster in order to try to coordinate some dissemination activities to maximise the impact of the projects. This contribution provides some basic information in this cluster and the six projects.

Purpose: Information of the IG THz

Introduction to the H2020 ICT-09-2017 Cluster

Contributors:

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The Horizon 2020 ICT-Call-09-2017 on Networking Research beyond 5G (1/3)

Specific Challenge:

- While 5G networks has an established roadmap towards technology validation, specifications and tests by industry, outstanding **new scientific opportunities are blooming in the field of networking research, with the objective of bringing little explored technologies and system concepts closer to exploitation**. The challenge is to support European scientific excellence notably in the DSP domain, and to bring the most promising long term research coming from the labs closer to fruition. This includes perspectives for the full exploitation of the **spectrum potential, notably above 90Ghz**, with new waves of technologies and knowledge, **bringing wireless systems to the speed of optical technologies**, and for new applications. It includes **interaction with photonic systems** as well as new cooperation networking and protocols, notably in the mobility context.

- **Development and exploitation of academic research through transfer** and innovation towards industry with a **particular focus on SMEs** is an integral part of the challenge.

The Horizon 2020 ICT-Call-09-2017 on Networking Research beyond 5G (2/3)

Scope:

- **Research and Innovation Actions**. Proposals may cover one or more of the themes identified below:

  - **- Scientific and technology advances** for novel use of the spectrum potential, de-risking technological building blocks at frequencies above 90 GHz up to THz communications backed by innovative usage scenarios, address visible light communications and develop radically new approaches for spectrum efficiency.

  - **- Advanced signal processing**, antenna processing, information theory and coding to optimize and reach **Tbit/s** in wireless communications.

  - **- Demand-attentive and cooperation networking** alternative to 5G architectures, including HetNets, opportunistic networks novel architectures and protocols for routing, latency and caching in complex networks notably for mobility.

The Horizon 2020 ICT-Call-09-2017 on Networking Research beyond 5G (3/3)

Expected Impact:

- - Validation of disruptive communication concepts, technologies and architectures;

- - Proof of applicability of challenging spectrum regions towards innovative and cost efficient applications;

- - Advances in signal processing and information theory and scientific publication in world class journals;

- - Industry competitiveness with exploitation of academic research through transfer and innovation towards industry, in particular SMEs or start ups.

Some Background on the H2020-ICT-09-2017-Cluster

- Six projects from the H2020 call ICT-09-2017 have been funded:
  - DREAM
  - EPIC
  - TERAPOD
  - TERRANOVA
  - ULTRAWAVE
  - WORTECS

- These six projects have agreed to form an unofficial cluster in order to try to coordinate some dissemination activities to maximise the impact of the projects.

- This contribution provides some basic information on these six projects.

DREAM (1/2)

- Project Title: D-band Radio solution Enabling up to 100Gb/s reconfigurable Approach for Meshed beyond 5G network

- Project Duration: September 2017 – August 2020

- Project Goals:
  - The H2020 DREAM project is aimed at exploitation of the D-band (130-174.8 GHz) spectrum, with beam steering functionality, to enable wireless links with data rate exceeding current backhaul solutions by at least x 10, thus bringing wireless systems to the speed of optical systems.

- Webpage: www.h2020-dream.eu

DREAM (2/2)

- Project Partners:

- Project Coordinator: Dr. Vladimir Ermolov, vladimir.ermoloc@vtt.fi

EPIC (1/2)

- Project Title: Enabling Practical Wireless Tb/s Communications with Next Generation Channel Coding

- Project Duration: September 2017 – August 2020

- Project Goals:
  - Design and implementation of **next generation Forward-Error-Correction** for wireless Tb/s technology and **Beyond-5G systems**
  - Advancement of **state-of-the-art channel codes** and **channel coding technology** for wireless Tb/s technology
  - **Holistic design approach** that considers code design, decoding algorithms and efficient implementation on advanced silicon technologies in a cross-layer approach
  - Validation and demonstration of new FEC technology and corresponding implementations as **virtual silicon tape-out** using realistic use cases
  - Provide **scientific excellence and contributions** to wireless industry in the domain of B5G standardization and technology development

EPIC (2/2)

- Project Partners:
  - Technikon (Austria)
  - InterDigital Europe (UK)
  - IMEC (Belgium)
  - Polaran (Turkey)
  - Technische Universitat Kaiserslautern (Germany)
  - Ericsson AB (Sweden)
  - IMT Atlantique (France)
  - Creonic GMBH (Germany)

TERAPOD (1/2)

- Project Title: Terahertz based Ultra High Bandwidth Wireless Access Networks

- Project Duration: September 2017 – August 2020

- Project Goals:
  - to investigate and demonstrate the feasibility of ultra high bandwidth wireless access networks operating in the Terahertz band.
  - The project will focus on end to end *demonstration of the THz wireless link within a Data Centre Proof of Concept deployment*, while also investigating other use cases applicable to beyond 5G
  - The project seeks to bring THz communication a leap closer to industry uptake through leveraging recent advances in THz components, a thorough measurement and characterization study of components and devices, coupled with specification and validation of higher layer communication protocol specification.

- Web Page: www.terapod-project.eu

TERAPOD (2/2)

- Project Partners:
  - WATERFORD INSTITUTE OF TECHNOLOGY (Ireland)

  - UNIVERSITY COLLEGE LONDON (United Kingdom)

  - UNIVERSITY OF GLASGOW (United Kingdom

  - TECHNISCHE UNIVERSITAET BRAUNSCHWEIG (Germany)

  - NPL MANAGEMENT LIMITED (United Kingdom)

  - EMC INFORMATION SYSTEMS INTERNATIONAL (Ireland)

  - VIVID COMPONENTS LTD (United Kingdom)

  - INESC TEC - INSTITUTO DE ENGENHARIA DE SISTEMAS E COMPUTADORES, TECNOLOGIA E CIENCIA (Portugal)

  - ACST GMBH (Germany)

  - VLC PHOTONICS SOCIEDAD LIMITADA (Spain)

  - BAY PHOTONICS LTD (United Kingdom)

- Project Coordinator: Dr. Alan Davy

TERRANOVA (1/2)

- Project Title: Terabit/s Wireless Connectivity by Terahertz Innovative Technologies to deliver Optical Network Quality of Experience in Systems Beyond 5G

- Project Duration: July 2017 – December 2019

- Project Goals:
  - Realistic THz channel model and THz-oriented information theoretic framework for link-level and network-level
  - Pencil-beam antenna arrays design and device tracking methods
  - THz-driven hybrid MAC layer protocols, device discovery algorithms and caching and highly adaptable framework for overall optimal resource management
  - Implementation and demonstration of cost- and energy-efficient optical RF-frontend for optical to THz interfacing and baseband digital signal processing for combined optical-wireless terabit transmission links

TERRANOVA (2/2)

- Project Partners:

  - UNIVERSITY OF PIRAEUS RESERACH CENTER (Greece)

  - FRAUNHOFER SOCIETY (Germany)

  - INTRACOM SA TELECOM SOLUTIONS (Greece)

  - OULUN YLIOPISTO (Finnland)

  - JCP-CONNECT (France)

  - ALTICE LABS SA (Portugal)

  - PICADVANCED SA (Portugal)

ULTRAWAVE (1/2)

- Project Title: Ultra capacity wireless layer beyond 100 GHz based on millimeter wave Traveling Wave Tubes

- Project Duration: September 2017 – August 2020

- Project Goals:
  - Objective 1: Exploitation of the whole millimeter wave spectrum both in PmP and PtP for the maximum flexibility in network architecture to respond to the irreversible traffic growth.
  - Objective 2: Demonstration of two novel TWTs at D-band and G-band and a full European chipset for D-band and G-band.
  - Objective 3: First outdoor demonstration D-band PmP at and a PtP as true "fiber on air" at G-band.

ULTRAWAVE
Ultra capacity wireless layer beyond 100 GHz based on millimeter wave Traveling Wave Tubes

ULTRAWAVE (2/2)

- Coordinator Claudio Paoloni, Lancaster University, UK
- Project Partners:

Lancaster University	UK
Fibernova	Spain
Ferdinand Braun Institute	Germany
Goethe University	Germany
HFSE	Germany
OMMIC	France
Universitat Politecnica de Valencia	Spain
University of Rome "Tor Vergata"	Italy

WORTECS (1/2)

- Project Title: Wireless Optical/Radio Terabit Communications

- Project Duration: September 2017 – August 2020

- Project Goals:
  - Development of a system able to deliver ultra-high throughput (up to Tbps) meeting low latency and positioning requirements
    - Radio mm-wave prototype links operating above 90 GHz able to deliver extremely high capacity and low latency
    - LiFi systems offering multi-Gbps up to Tbps in indoor spaces
  - Development of innovative network coordination systems in order to deliver Tbps data rates, with low latency, in a multi Wireless Access Technologies (WAT) environment
  - Demonstration of the ultra-high data rate prototype for virtual reality use-case
  - Provide inputs to standardization bodies (e.g. IEEE 802.11, IEEE 802.15.7 and 3GPP) where and when relevant

WORTECS (2/2)

- Project Partners:

  – Orange Labs (France)
  – Oledcomm (France)
  – B-Com (France)
  – pureLiFi Ltd (United Kingdom)
  – University of Oxford (United Kingdom)
  – University of Las Palmas (Spain)
  – IHP (germany)