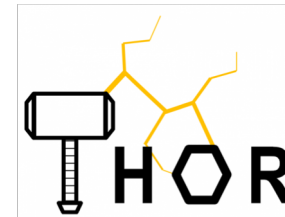


ICT beyond 5G Cluster



ICT Beyond 5G Cluster

Emerging from ICT-07-2019 “Networking Research Beyond 5G”

Collective promotion of **topics and activities** for the cluster projects:

- THz Communication (technologies and protocols)
 - mmW Communication (100GHz +)
 - Visible Light Communication
- Next Generation Forward-Error-Correction





Terahertz based
ultra high bandwidth
wireless networks
for beyond 5G

@H2020Terapod

www.terapod-project.eu

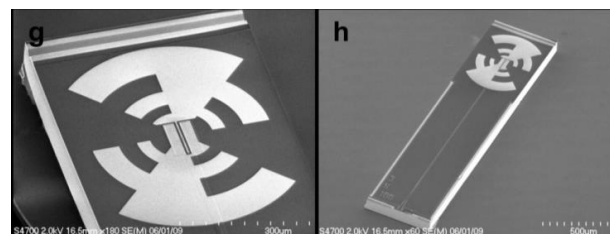
Project Coordinator:

Dr. Alan Davy

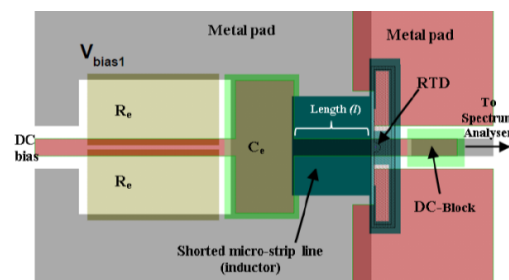
TSSG, Waterford Institute of Technology

TERAPOD Objectives

- Advance the Technology Readiness Level of THz communication devices and systems
- Demonstrate a Fully integrated 'early adopter' **Data Centre** THz communication system.
- Progress Regulation of THz band and Standardization of THz communication protocols and metrology techniques.
- Promote THz communications systems science through Dissemination activities.

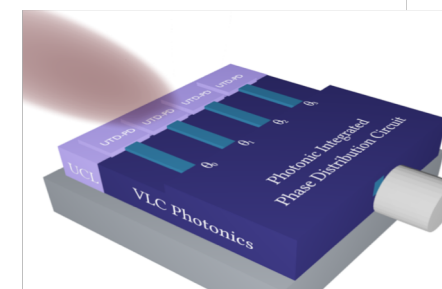


UTC-PDs



RTDs

Photonic Phase
Array





DREAM

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 a 10x**, thus bringing wireless systems to the speed of optical systems.

www.h2020-dream.eu

Partners: VTT (coordinator), Nokia, STM, III-V Lab, CEIT, University of Pavia, ERZIA

Enabling Practical Wireless Tb/s Communications with Next Generation Channel Coding

- EPIC Project Objectives:
 - ◆ Design and implementation of **next generation Forward-Error-Correction (FEC)** for wireless Tb/s technology and **Beyond-5G systems**
 - ◆ Advancement of **state-of-the-art channel codes** and **channel coding technology** for wireless ultra-high throughput communications
 - ◆ **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

TECHNIKON

INTERDIGITAL
EUROPE

mec

POLARAN

TECHNISCHE UNIVERSITÄT
KAISERSLAUTERN

ERICSSON

IMT Atlantique
Bretagne-Pays de la Loire
École Mines-TélécomCREONIC
by coreis & system solutions



European
Commission

Horizon 2020
European Union funding
for Research & Innovation

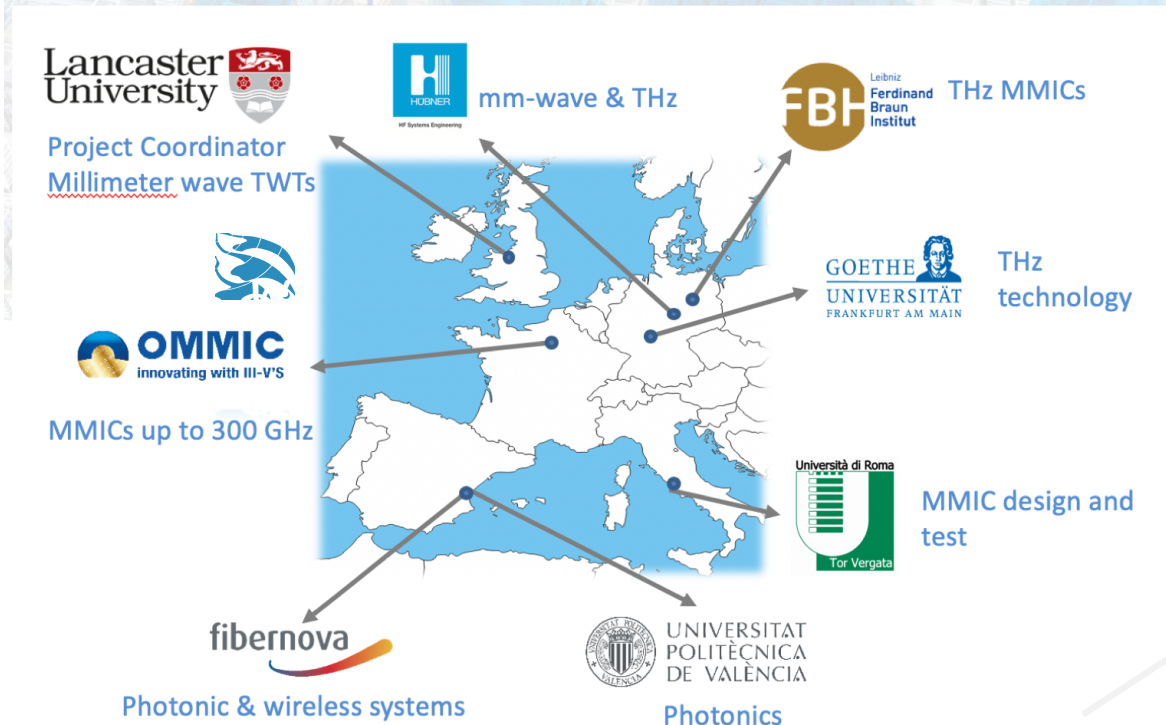


ULTRAWAVE

Coordinator
Claudio Paoloni
Lancaster University
UK

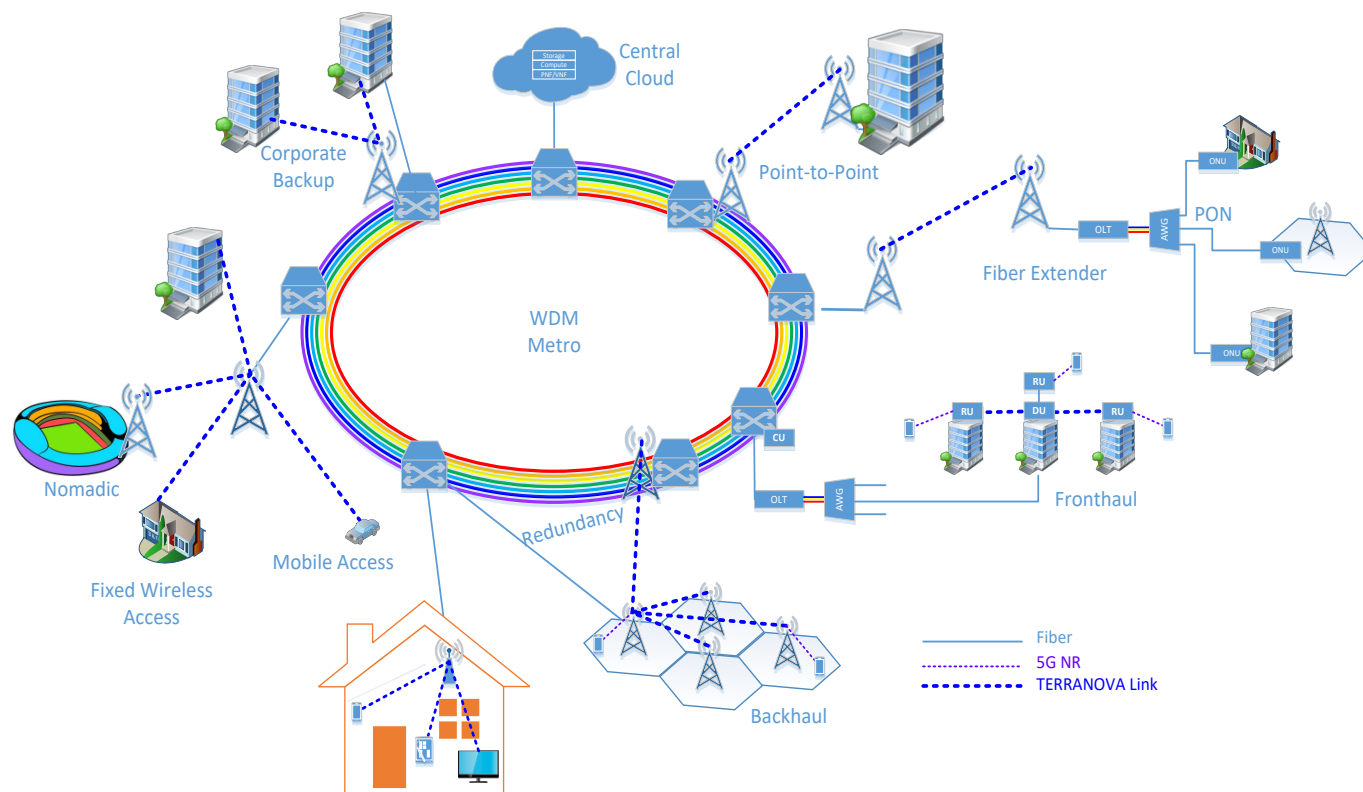
“Ultra capacity wireless layer beyond
100 GHz based on millimeter wave
Traveling Wave Tubes”

Budget €2.9 M
1st September 2017

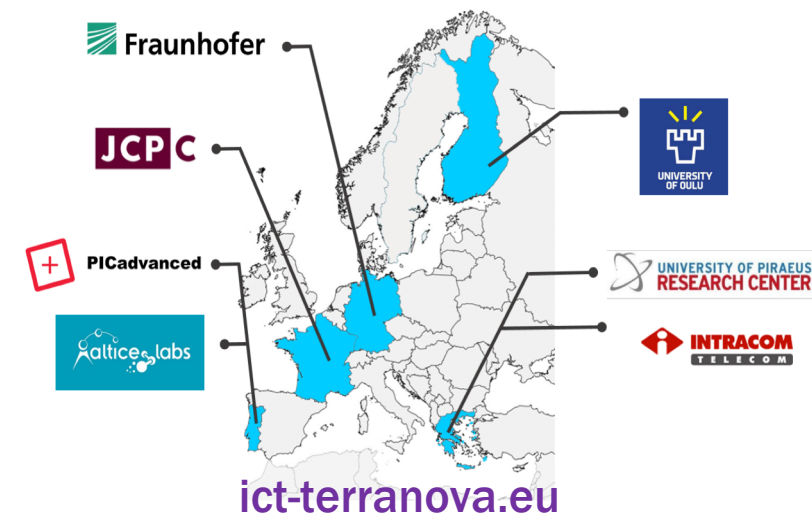
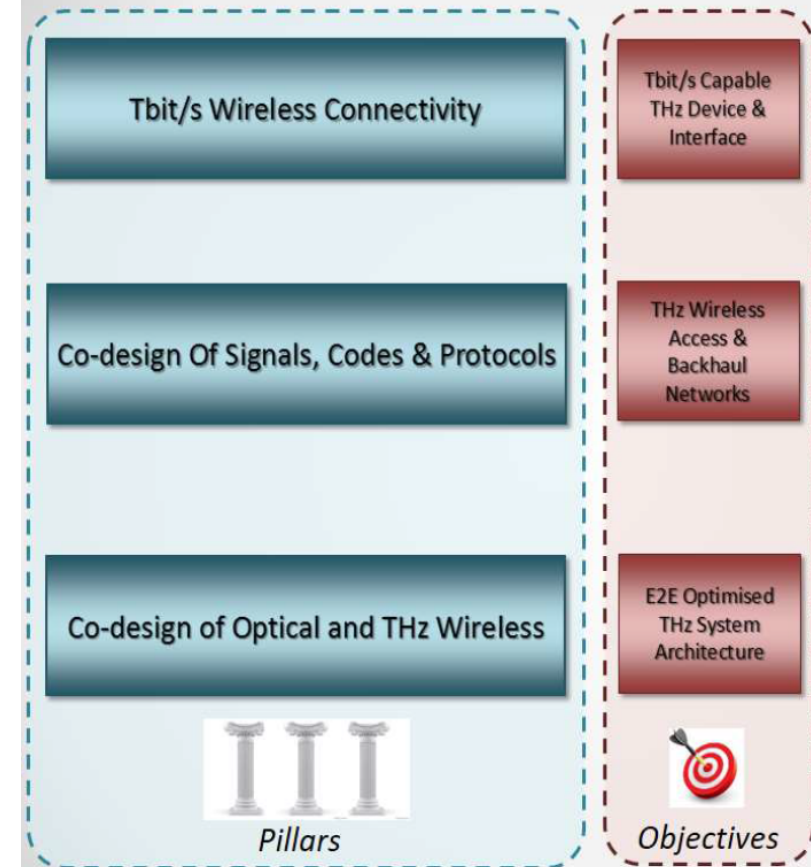


ULTRAWAVE aims to produce ultracapacity layers with more than 100 Gb/s/km² of area capacity by combining area sectors in Point to multipoint at D-band (141 – 148.5) connected by high capacity links at G-band (275 – 300 GHz)

Tbps Wireless Connectivity by THz innovative technologies to deliver Optical NW QoE in SB5G



- ✓ Baseband signal processing for the complete optical and wireless link
- ✓ THz wireless frontends and their integration with photonic components
- ✓ THz network information theory framework and channel & interference models
- ✓ Higher order modulation schemes and pencil beamforming antenna arrays
- ✓ MAC protocols, caching techniques and multiple access schemes



WORTECS



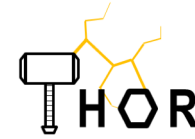
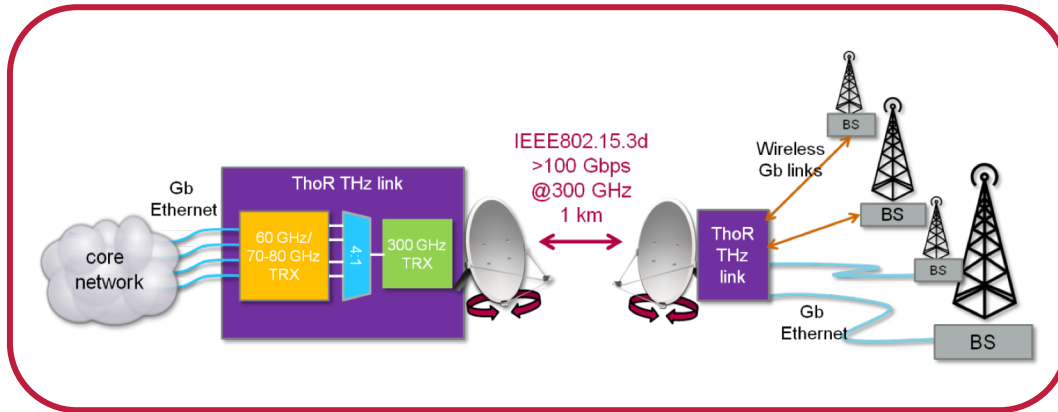
Wireless Optical/Radio TErabit CommunicationS

- ❑ Duration: September 2017 – August 2020
- ❑ Objectives:
 - Development of a system able to deliver ultra-high throughput (up to Tbps) meeting low latency and positioning requirements
 - Radio mmWave prototype links operating above 90 GHz able to deliver extremely high capacity and low latency
 - Optical wireless communication 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

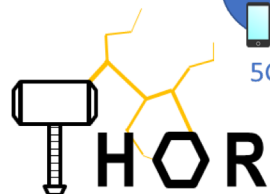
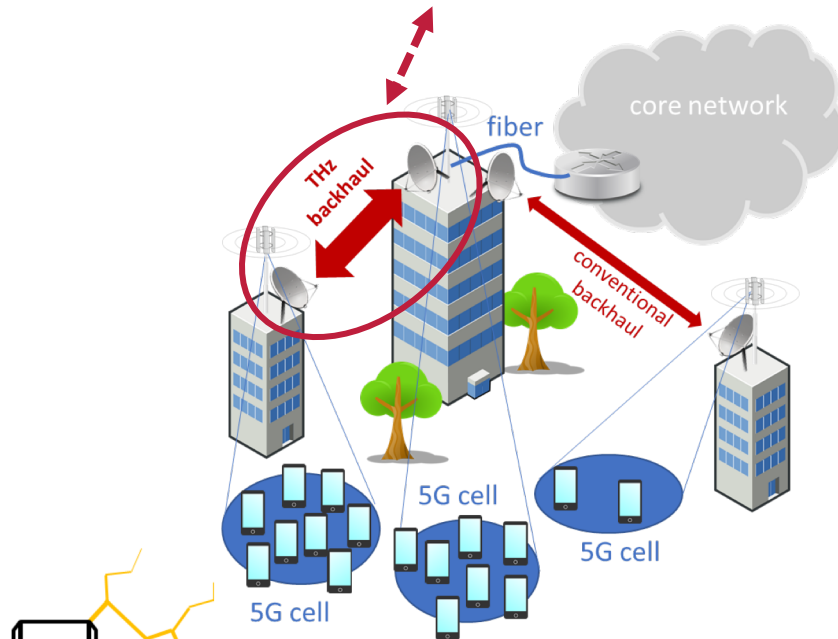


H2020-EU-Japan-Project ThoR

THz end-to-end wireless systems supporting ultra-high data Rate applications



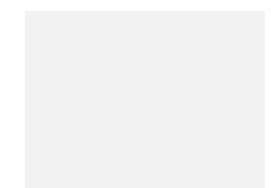
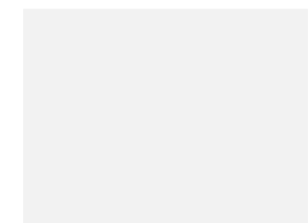
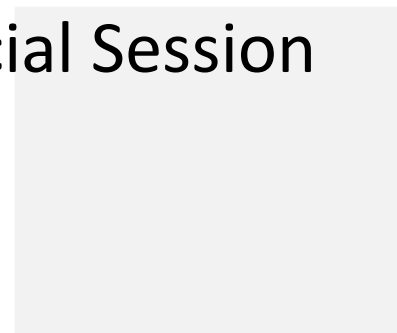
Participants	Country
Companies	
Deutsche Telekom AG	Germany
NEC Corporation	Japan
Siklu Communication Ltd.	Israel
Vivid Components Ltd.	UK
HRCP	Japan
R&D	
Fraunhofer IAF	Germany
University of Lille / IEMN Laboratory	France
Universities	
TUBraunschweig (Coordinator, EU)	Germany
Chiba Institute of Technology	Japan
Gifu University	Japan
University of Stuttgart	Germany
Waseda University (Coord., Japan)	Japan



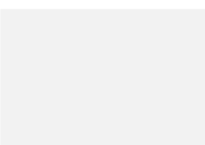
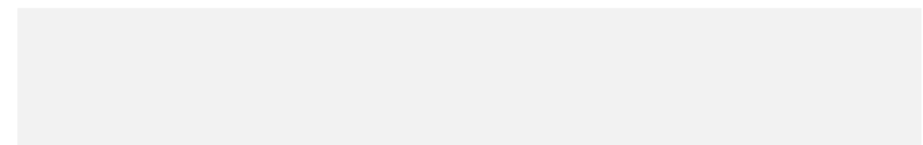
Project duration 1.7.18-30.6.21

CLUSTER Activities in 2019

- IEEE EUCNC 2019 Workshop Beyond 5G
- INFOCOM 2019 UBTCN Workshop
- IRmmW-THz 2019 B5G Special Session
- IEEE 5G World Forum 2019



WORTECS



Communication



www.h2020-dream.eu



www.ict-Terranova.eu



www.epic-h2020.eu

@Epic760150



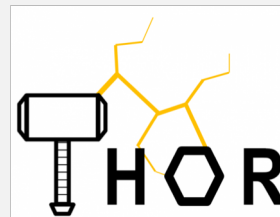
www.terapod-project.eu

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www.ThorProject.eu



www.wortecs.eu

wortecs.eurestools.eu

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Cluster Events



IEEE 5G WORLD FORUM

The flagship event of the IEEE Future Networks Initiative

30 September to 2 October 2019 | Dresden, Germany



Call for Paper
Workshop

From Evolution to Revolution, a roadmap for beyond 5G

An ICT Beyond 5G Cluster workshop

EPI Submission deadline – 15th May 2019

Closing Session

Dr Alan Davy



WORTECS

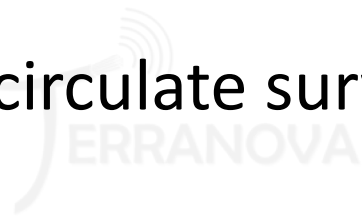
Review of the day ... in short!

- THz photonic (UTC-PD) and electronic (RTD) sources and receivers (FMB Diodes).
- THz components (Waveguides (planar, leaky), antennas, THz micromachining)
- Highly directional beams, [Eaves dropping, Beam forming switching, steering].
- Localisation and tracking.
- Point to Multipoint,
- Photonic / THz integration.
- THz baseband processing, FEC.
- Packaging and integration issues.
- Regulation and Standardisation issues.
- THz band sharing studies.

THz vs micro / mmW / FSO ?

Where to from here?

- **Cluster** will produce a report from the workshop.
 - Will be open for contributions to attendees.
 - Will promote to European Commission.
- **Slides** will be shared to all attendees in the coming days.
- **Cluster** will circulate survey to attendees to gather feedback.
- **Cluster** Begin organization of 3rd Towards THz Workshop for 2020.



ICT beyond 5G Cluster

