one6G ASSOCIATION

AN OPEN ACCELERATOR FOR 6G RESEARCH IN EUROPE

Assoc. Prof. Nancy Alonistioti

FOUNDING PHASE

DRIVE 6G RESEARCH AND INNOVATION EFFORTS

OVERVIEW

- Launched in **March 2021**.
- one6G is a **non-profit** and membership fee free association
- Offering an **open collaborative framework** to explore how to move beyond current communication networks technologies and business.

FOUNDING MEMBERS

cnit consorzio nazionale interuniversitario per le telecomunicazioni

ADLINK Leading EDGE COMPUTING

MRI Klinikum rechts der Isar Technische Universität München

Telcaria

AALBORG UNIVERSITY

HELLENIC REPUBLIC National and Kapodistrian University of Athens EST. 1837

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Technische Universität Braunschweig

HUAWEI

NTT docomo DOCOMO Euro-Labs

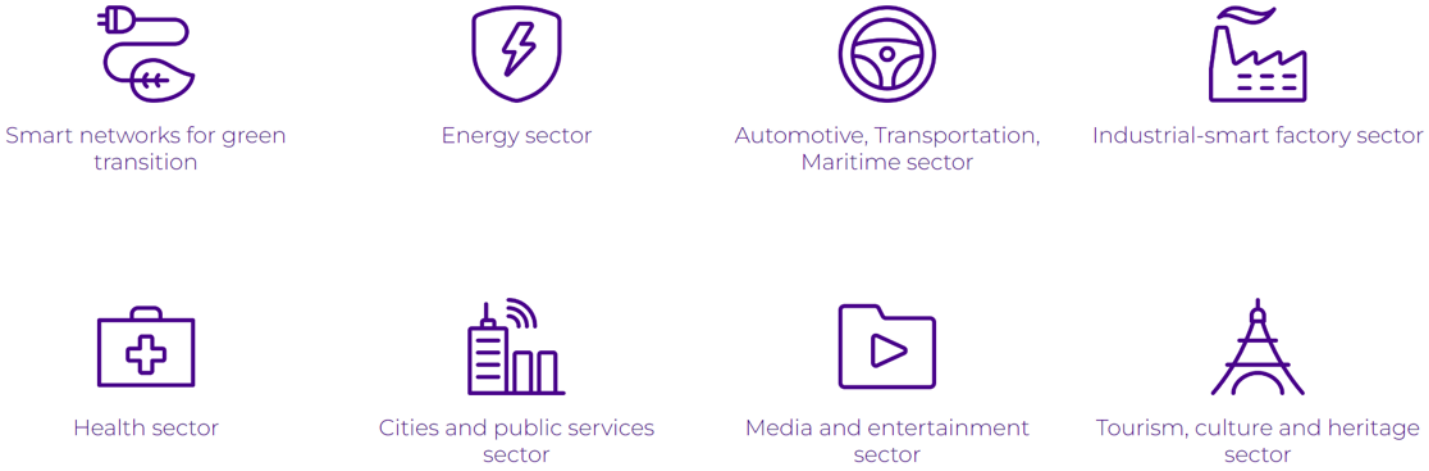
VISION

one6G envisions a future where 6G technologies and solutions allow to unleash the potential of smart connectivity for a **secure, resilient and sustainable** development of our society and economy.

one6G IN ACTION

one6G aims to act as the 6G Research an Innovation hub, gathering major stakeholders from various research, innovation and technological areas and vertical domains.

Early on-boarding of vertical industries targets:



one6G facilitates collaborations for the development of 6G solutions targeting economy and societal needs such as knowledge transfer, verification and validation for 6G solutions. one6G is open to focus on new topics brought in by members, as far as contribution driven.

MEMBERS

As of Nov. 2022 (87 members from 26 countries)

Latest info please refer to: https://one6g.org/members/

ORGANIZATION STRUCTURE

one6G Board *(Chair, Secretary)*

WG1
Use Cases, KPIs, Future Market and Business Scenarios

Collecting and analyzing 6G related use cases, scenarios, and requirements

WG2
Enabling Technologies and System Architecture

Shaping the overall technology foundation

(Higher frequencies, intelligent user plane / in-network computing, distributed / federated AI, next generation MIMO, integrated sensing and communication, NTN, etc.)

WG3
Communication and Dissemination

Community building and association promotion

(6G position paper, web portal, events, newsletter/news, liaisons, webinars, etc.)

WG4
Evaluation, Testbeds, and Pilots

From development to deployment

(Guidelines, gap analysis, testing procedures and certification, testbeds and trials, integrated sensing and communication)

General Assembly

ONE6G LEADERSHIP TEAM

one6G Board

General Assembly and Board Chair
Assoc. Prof. Nancy Alonistioti

WG1
Use Cases, KPIs, Future Market and Business Scenarios

WG1 Chair:
Prof. Mohammad R Shikh-Bahaei, KCL

WG1 Vice Chair:
Prof. Periklis Chatzimisios, IHU

WG2
Enabling Technologies and System Architecture

WG2 Chair:
Dr. Zoran Despotovic, Huawei Technologies

WG2 Vice Chair:
Prof. Luca De Nardis, CNIT

WG3
Communication and Dissemination

WG3 Chair:
Dr. Xueli An, Huawei Technologies

WG3 Vice Chair:
Prof. Albena Mihovska, CTIF Global Capsule (CGC)

WG4
Evaluation, Testbeds, and Pilots

WG4 Chair:
Josef Eichinger, Huawei Technologies

WG4 Vice Chair:
Youssef Nasser, Greenerwave

Note: one6G governance has been elected following the e-voting procedure, defined by the association RoP (Rules of Procedure), which started in August and completed on 4.11.

CURRENT WORKING PROGRAM

	Work Items	Scope of the WGs
WG1 Use cases, KPIs, and Future Market and Business Scenarios	WI 101 - Collection of 6G-related Use Cases and Related Scenarios （completed and in the maintenance mode）	• Consolidate vision • Use case and requirements analysis • Streamline terminology, etc.
WG2 Enabling Technologies and System Architecture	**WI 204 -** Higher Frequencies **WI 205 -** 6G Radio Access **WI 207 -** Intelligent User Plane, In-Network Computing **WI 208 -** Distributed/Federated AI **WI 209 -** Next-generation MIMO **WI 210 -** Integrated Sensing and Communication **WI 211** - Flexible Programmable Infrastructures **WI 212** - Non-terrestrial Networks	• Research of key enabling technologies, concepts, etc. • Evaluation and selection of most promising ones • Integration thereof into a coherent architecture
WG3 Communication & Dissemination	WI 301 - 6G position paper (completed) **WI 302 -** Dissemination: web page, social media, newsletter, one6G internal and external events, webinars	• Liaisons and partnership management • Marketing and promotional activities • Preparation of workshops, conferences, etc.
WG4 Evaluation, Testbeds, and Pilots	**WI 210 -** (cross WG2/WG4) Integrated Sensing and Communication **WI 402** – Definition of the evaluation guidelines for simulation/emulation	• Aspects of testing and evaluation • Test procedures and verification • Testbeds, prove of concepts and trials, etc.

KEY MILESTONES

2021

Feb 5 — **one6G 启动**

March 29 — **Founding of one6G**

June 9 — **EuCNC** one6G Special Session

Sept 16 — **China IMT-2030 6G Summit (Keynote)**

Oct 7 — Second info. Day

Oct 17 — **ITU-R IMT2030** First contribution

Nov 10 — **1st one6G Summit**; **one6G position paper**; **53 members**

2022

Jan. 12 — **one6G 1st GA**

Feb. 08 — one6G in **WiLab** workshop

Mar. 02 — **ITU-R IMT-2030** 2nd contribution

Mar. 28 — **EuCAP** one6G session; **One year Birthday**

Apr. 13 — **WCNC** one6G 6G vertical session

May 5 — **Open Lecture -1**: 6G Network AI

Jun. 8 — **EuCNC** one6G special session on AI for 6G and vertical

Jun. 9 — 

Jun. 13 — 

June 15 — ITU-R **IMT-2030** 3rd contribution (ITU-R IMT-2030 workshop)

July 7 — **Open Lecture-2:** ISAC

Sept 6 — **MeditCom** panel

Sept 15 — **Open Lecture-3: 6G** Testing/Simulation

Sept 21 — **RSPG** workshop

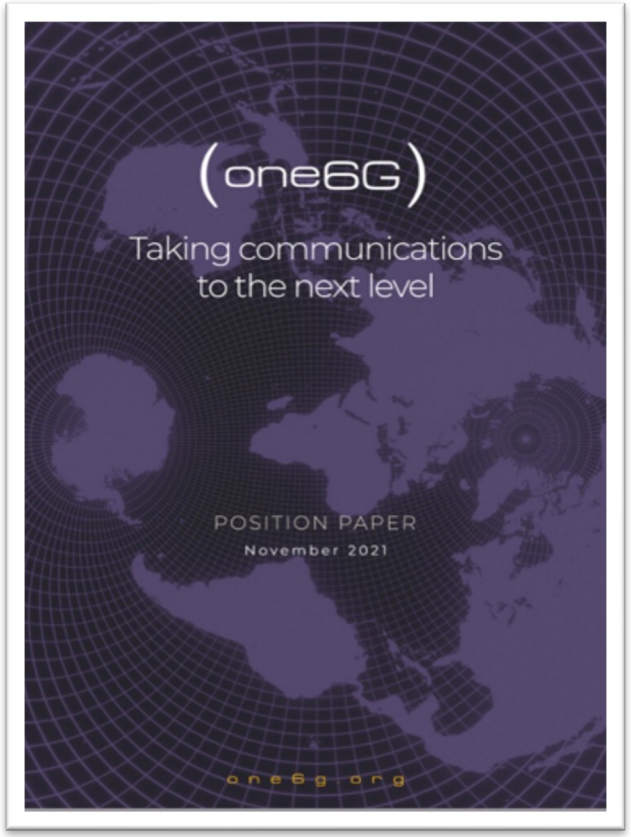
Nov 1 — **WPMC2022** Invited speaker

Nov 10 — **2nd one6G Summit**; 

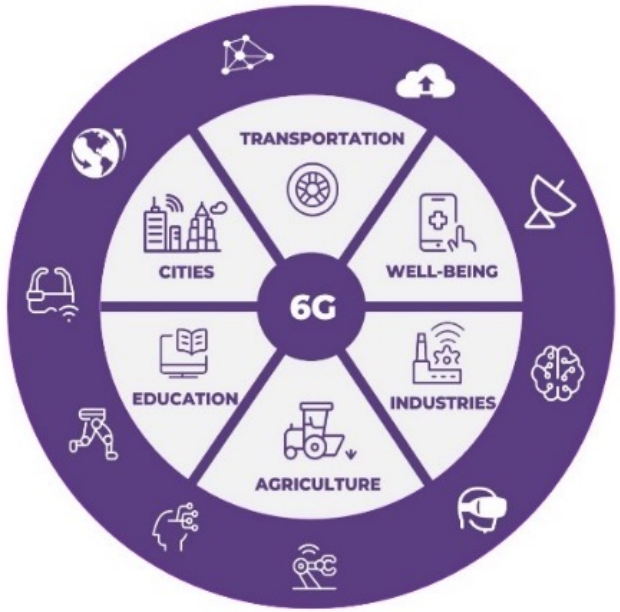
87 members ! from **26** countries

POSITION PAPER

one6G published the 1st position paper to lay out its vision and work plan in Nov 2021.

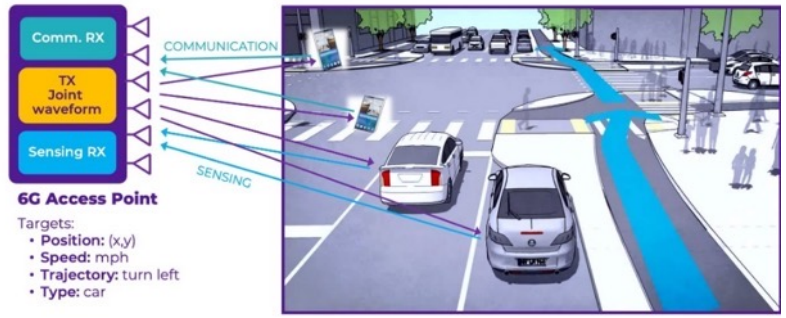


Vertical Use Cases and Requirements



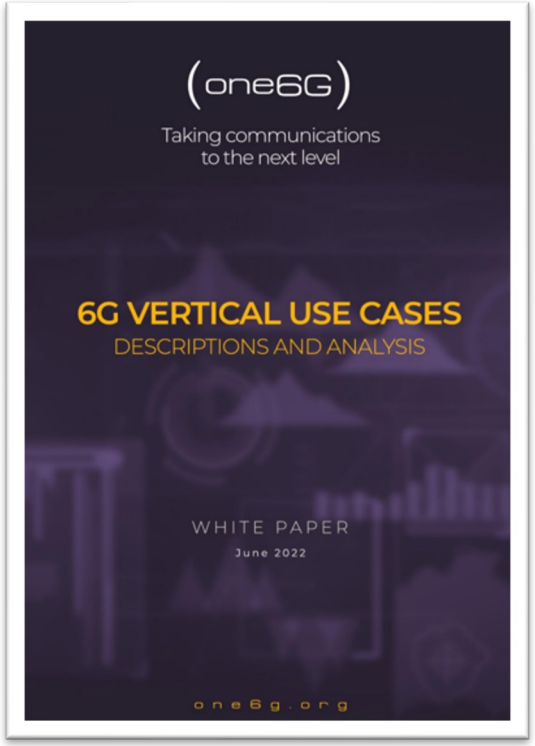
Technology Pillars

- Higher and THz frequencies
- Radio Access
- Next generation MIMO
- Integrated sensing and communication
- Distributed and federated AI
- Flexible programmable infrastructures
- Non-terrestrial networks



WHITE PAPERS

one6G published 2 white papers during EuCNC2022 and ITU-R June meeting time period.



6 Use cases families with 25 use cases analyzed:

- Manufacture: 7
- Automotive: 5
- Health: 5
- Telecom *(MBB/Resiliency):* 4
- Agriculture: 3
- Transportation *(railway):* 1

7 technologies identified:

- THz Frequencies
- 6G Radio Access (6GRA)
- Next Generation MIMO
- Integrated Sensing and Communication (ISAC)
- Distributed Federated AI
- Intelligent User Plane, In-Network Computing
- Flexible Programmable Infrastructures

VERTICAL SURVEY

one6G deeply engages with vertical partners to understand 6G use case and requirements.

"6G will support advances in communications technologies" – that is what the responders who work in the telecommunications domain are hoping for. Their top 3 expectations for 6G are:

1. IoT data exchange and processing
2. Digital twin
3. Unmanned vehicles/autonomous driving

"Reliability and positioning accuracy are essential for industrial stakeholders," said the responders from the manufacturing sector. What they need 6G to provide is:

1. AR/VR services
2. Digital twin
3. Robotic infrastructure

Representatives of the automotive sector are hoping for "100% safe and cheaper real-time data exchange with better coverage." Their top expectations for 6G are:

1. Advanced safety services
2. Faster access to cloud and virtual services
3. IoT data exchange and processing

The responders from the education domain highlighted that "enriched online courses are becoming a trend." What they expect 6G to provide is:

1. Faster access to cloud and virtual services
2. AR/VR services
3. Extended reach of connectivity service

WORKSHOPS & CONFERENCES

one6G deeply engages with academic ecosystem and organizes many industry special sessions.

one6G at EuCAP 2022

April 1, 2022

EuCAP 2022

16th European Conference on Antennas and Propagation

On March 28, one6G organized a session titled "one6G view on propagation models/measurements and antennas for next-generation MIMO systems" gathering over 70 participants. The session was hosted by Rahim Tafazolli (5G/6GIC, UK) as part of EuCAP 2022. Among the panelists were Pekka Kyösti (Keysight, Finland), José F. Monserrat (UP Valencia, Spain), Reiner Thomä (TU Ilmenau, Germany), Thomas Kürner (TU Braunschweig, Germany), and Mate Boban (Huawei Munich Research Center, Germany).

The session was a big success, having gathered 75 attendees (45 physically, 30 online), most of whom visited the EuCAP industrial workshop. It generated a lively discussion with 15 insightful questions from the audience following the panel discussion.

About EuCAP

EuCAP is Europe's flagship conference on antennas and propagation strengthen the links between the scientific antennas and propagation to 5G, space applications, or future communication systems. Its 16th e 27 to April 1, 2022, in Madrid.

More information about the event here.

one6G at WCNC 2022

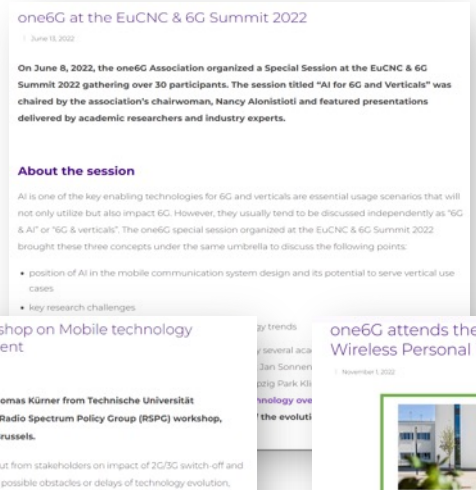
April 15, 2022

IEEE WCNC IEEE Wireless Communications and Networking Conference 10-13 April 2022 // Austin, TX, USA Boosting Verticals into Wireless Orbit

IEEE ComSoc IEEE

On April 13, one6G organized an IEEE WCNC 2022 special session titled "one6G view on enabling 6G technologies for verticals". The session included four eminent experts: Israel Leyva-Mayorga (Aalborg University), Marco Giordani (University of Padova), Ian Wong (VIAVI Solutions), and Andrea Giorgetti (University of Bologna), while the session was chaired by Mate Boban (Huawei Munich Research Center, Germany).

The session topics ranged from the overview of potential 6G use cases for verticals, non-terrestrial



one6G at the EuCNC & 6G Summit 2022

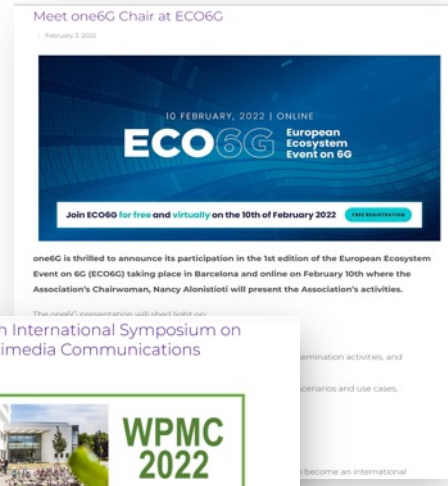
June 13, 2022

On June 8, 2022, the one6G Association organized a Special Session at the EuCNC & 6G Summit 2022 gathering over 30 participants. The session titled "AI for 6G and Verticals" was chaired by the association's chairwoman, Nancy Alonistioti and featured presentations delivered by academic researchers and industry experts.

About the session

AI is one of the key enabling technologies for 6G and verticals are essential usage scenarios that will not only utilize but also impact 6G. However, they usually tend to be discussed independently as "6G & AI" or "6G & verticals". The one6G special session organized at the EuCNC & 6G Summit 2022 brought these three concepts under the same umbrella to discuss the following points:

- position of AI in the mobile communication system design and its potential to serve vertical use cases
- key research challenges



Meet one6G Chair at ECO6G

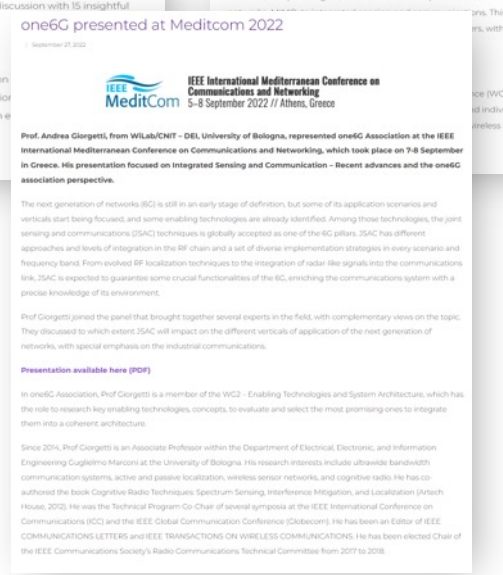
February 3, 2022

10 FEBRUARY, 2022 | ONLINE

ECO6G European Ecosystem Event on 6G

Join ECO6G for free and virtually on the 10th of February 2022

one6G is thrilled to announce its participation in the 1st edition of the European Ecosystem Event on 6G (ECO6G) taking place in Barcelona and online on February 10th where the Association's Chairwoman, Nancy Alonistioti will present the Association's activities.



one6G presented at Meditcom 2022

September 27, 2022

IEEE MediTCom IEEE International Mediterranean Conference on Communications and Networking 5–8 September 2022 // Athens, Greece

Prof. Andrea Giorgetti, from WiLab/CNIT – DEI, University of Bologna, represented one6G Association at the IEEE International Mediterranean Conference on Communications and Networking, which took place on 7-8 September in Greece. His presentation focused on Integrated Sensing and Communication – Recent advances and the one6G association perspective.

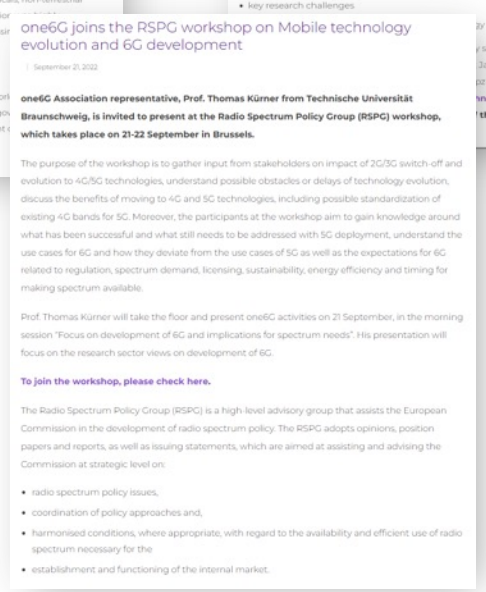
The next generation of networks (6G) is still in an early stage of definition, but some of its application scenarios and verticals start being focused, and some enabling technologies are already identified. Among those technologies, the joint sensing and communications (JSAC) techniques is globally accepted as one of the 6G pillars. JSAC has different approaches and levels of integration in the RF chain and a set of diverse implementation strategies in every scenario and frequency band. From evolved RF localization techniques to the integration of radar like signals into the communications link, JSAC is expected to guarantee some crucial functionalities of the 6G, enriching the communications system with a precise knowledge of its environment.

Prof Giorgetti joined the panel that brought together several experts in the field, with complementary views on the topic. They discussed to which extent JSAC will impact on the different verticals of application of the next generation of networks, with special emphasis on the industrial communications.

Presentation available here (PDF)

In one6G Association, Prof Giorgetti is a member of the WG2 - Enabling Technologies and System Architecture, which has the role to research key enabling technologies, concepts, to evaluate and select the most promising ones to integrate them into a coherent architecture.

Since 2014, Prof Giorgetti is an Associate Professor within the Department of Electrical, Electronic, and Information Engineering Guglielmo Marconi at the University of Bologna. His research interests include ultrawide bandwidth communication systems, active and passive localization, wireless sensor networks, and cognitive radio. He has co-authored the book Cognitive Radio Techniques: Spectrum Sensing, Interference Mitigation, and Localization (Artech House, 2012). He was the Technical Program Co-Chair of several symposia at the IEEE International Conference on Communications (ICC) and the IEEE Global Communication Conference (Globecom). He has been an Editor of IEEE COMMUNICATIONS LETTERS and IEEE TRANSACTIONS ON WIRELESS COMMUNICATIONS. He has been elected Chair of the IEEE Communications Society's Radio Communications Technical Committee from 2017 to 2018.



one6G joins the RSPG workshop on Mobile technology evolution and 6G development

September 21, 2022

one6G Association representative, Prof. Thomas Kürner from Technische Universität Braunschweig, is invited to present at the Radio Spectrum Policy Group (RSPG) workshop, which takes place on 21-22 September in Brussels.

The purpose of the workshop is to gather input from stakeholders on impact of 2G/3G switch-off and evolution to 4G/5G technologies, understand possible obstacles or delays of technology evolution, discuss the benefits of moving to 4G and 5G technologies, including possible standardization of existing 4G bands for 5G. Moreover, the participants at the workshop aim to gain knowledge around what has been successful and what still needs to be addressed with 5G deployment, understand the use cases for 6G and how they deviate from the use cases of 5G as well as the expectations for 6G related to regulation, spectrum demand, licensing, sustainability, energy efficiency and timing for making spectrum available.

Prof. Thomas Kürner will take the floor and present one6G activities on 21 September, in the morning session "Focus on development of 6G and implications for spectrum needs". His presentation will focus on the research sector views on development of 6G.

To join the workshop, please check here.

The Radio Spectrum Policy Group (RSPG) is a high-level advisory group that assists the European Commission in the development of radio spectrum policy. The RSPG adopts opinions, position papers and reports, as well as issuing statements, which are aimed at assisting and advising the Commission at strategic level on:

- radio spectrum policy issues,
- coordination of policy approaches and,
- harmonised conditions, where appropriate, with regard to the availability and efficient use of radio spectrum necessary for the
- establishment and functioning of the internal market.

one6G attends the 25th International Symposium on Wireless Personal Multimedia Communications

November 1, 2022

WPMC 2022

Herning, Denmark, 30 Oct.-2 Nov. 2022

On 1 November, **one6G Association attends the 25th International Symposium on Wireless Personal Multimedia Communications (WPMC)**, themed "5G Way Forward to 6G".

As the conference features a comprehensive, high-quality technical program that includes technical sessions, a variety of tutorials, and workshops, the one6G representative, An Xeuli, from Huawei Technologies (Munich, Germany) will present "6G's view of one6G".

one6G aims to evolve, test and promote next generation cellular and wireless technology-based communications solutions. By supporting global 6G research and standardization efforts, the goal is to accelerate its adoption and overall market penetration, while addressing societal and industry-driven needs for enhanced connected mobility. This with the ambition to speed up the development of new services and applications in domains such as advanced autonomous driving, advanced manufacturing, advanced wireless e-health, remote education etc.

The WPMC 2022 also includes an attractive industry program aimed at practitioners, with keynotes and panels from prominent research, industry, and government leaders, business and industry panels, and vendor exhibits.

WPMC aims to promote knowledge sharing, network, and collaborative activities in the wireless techno-business modelling.

The conference is a joint endeavour under Global Wireless Summit (GWS) and Wireless Personal Multimedia Communications (WPMC) agreement.

More details about the event can be found here.

ONE6G OPEN LECTURE

one6G establishes open lectures series in 2022, as an open 6G knowledge sharing platform.

May 6, 2022
Lecture 1: 6G Network AI

July 7, 2022
Lecture 2: Integrated sensing and communication

Sept 15, 2022
Lecture 3: 6G testbed and simulation

Dec 1, 2022
Lecture 4: Flexible programmable infrastructures

2022

REGISTRATION NOW OPEN

EXTERNAL RECOGNITION

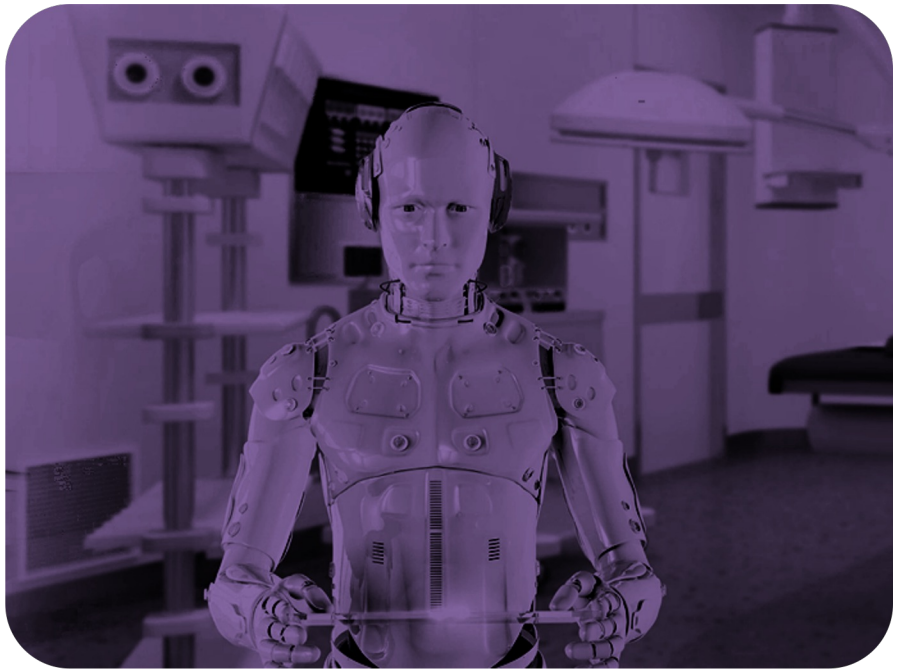
one6G actively engages with external organizations to shape 6G vision together.

- 3 contributions to ITU-R IMT 2030 Vision
- Liaison partner of ETSI
- Consultation partner of RSPG
- MOU partner of WWRF

WWRF-one6G MoU Signing Ceremony on Nov 9th , 2022

NEW ACTIVITIES ANNOUNCEMENT (1/4)

WG1: New initiative on 6G enabled Robotic use cases



- Definition and Classification of robotic usage scenarios
- A deep insight of the actual robotics requirements for 6G and corresponding enabling technologies
- Impact areas of 6G on robotics applications
- Increasing market and business interests in connected robotics via 6G

NEW ACTIVITIES ANNOUNCEMENT (2/4)

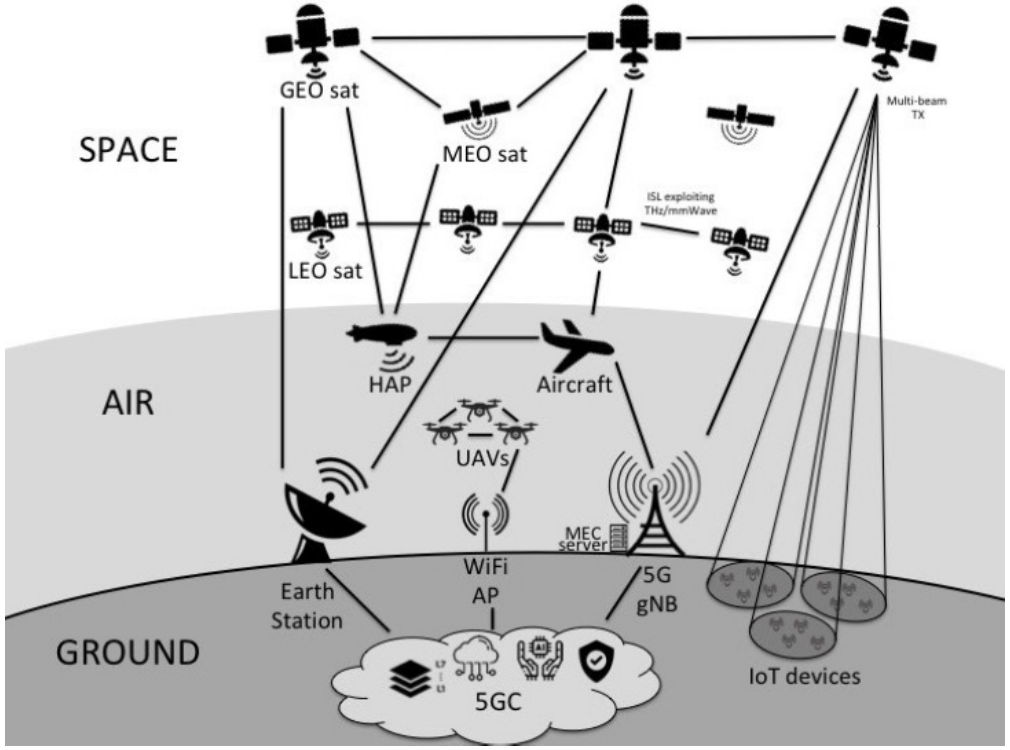
WG2: New work item on non-terrestrial networks (NTN)

Motivation for NTN in 6G:

- Provide ubiquitous connectivity to areas with limited or no coverage
- Complement TN to improve reliability and resilience of communications
- Guarantee service continuity for mobile mission-critical applications (e.g. V2X, IoT)

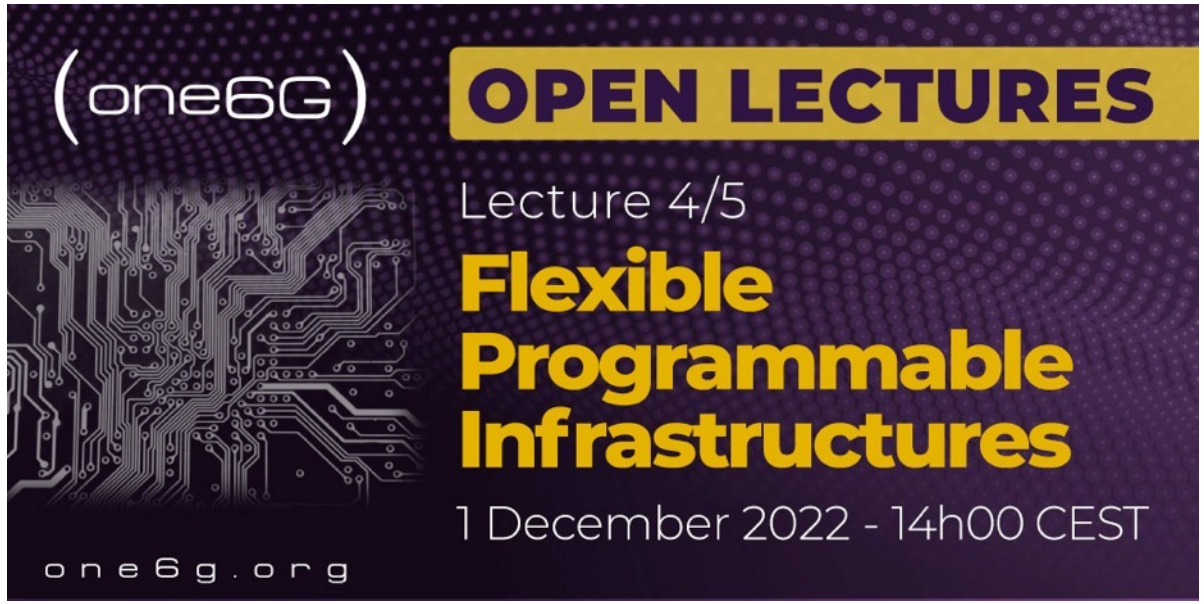
Opportunities and challenges:

- vLEO satellites at high density and with gNB capabilitie enable reduced latency thanks to close distance to earth, but high moving speed induces Doppler and tracking problems.
- Connection network between satellites via inter-satellite links (ISL) to enable reliable and frequent satellite handover.
- Integration of NTN and TN to allow multi-connectivity and seamless service continuity is a system design challenge.



NEW ACTIVITIES ANNOUNCEMENT (3/4)

WG3: New open lecture on“Flexible Programmable Infrastructures”



REGISTRATION NOW OPEN

Rui L. Aguiar
Full Professor at University of Aveiro

Henning Schulzrinne
Levi Professor of Computer Science
at Columbia University

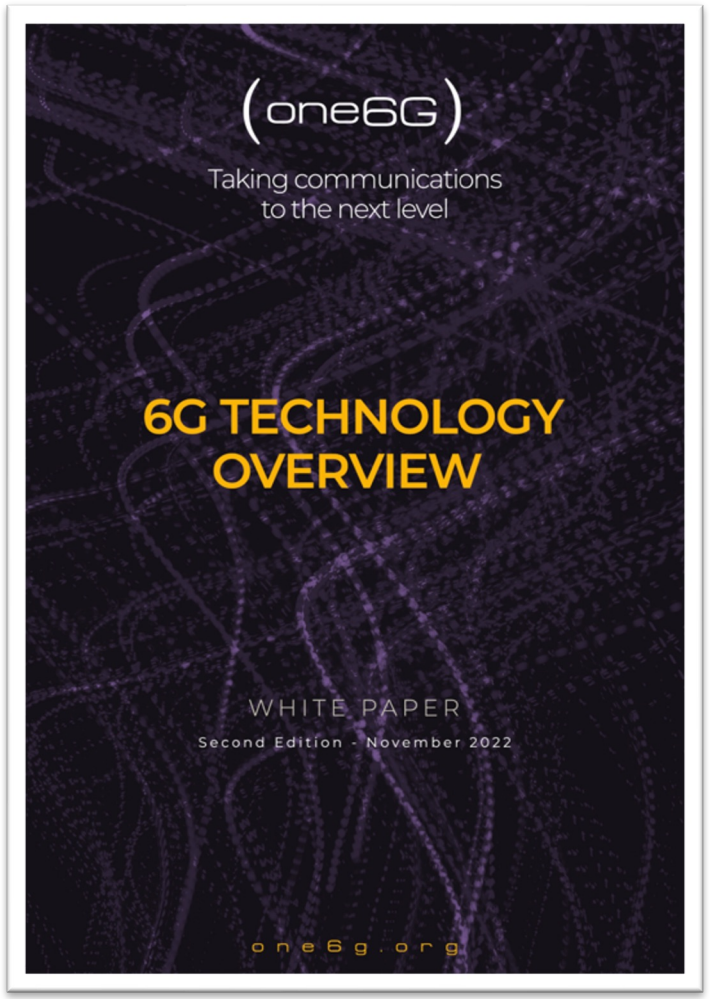
Diego R. Lopez
Senior Technology Expert at Telefonica I+D

NEW ACTIVITIES ANNOUNCEMENT

WG4: new initiative on "Open and shared measurement data”

- Starting with recorded subTHz sensing data.
- Recorded sensing data will be available for one6G members on one6G Sharepoint.
- WG4 welcomes all one6G members to use it for further experiments (e.g. data analytics, imaging, etc.)

WHITE PAPER PUBLISHED ON NOV 10TH



Contributors

- **THz Frequencies:** Thomas Kürner, Tobias Doeker *(TU Braunschweig)*, Mate Boban, Tommaso Zugno *(Huawei)*, Claudio Paoloni *(Lancaster University)*.
- **6G Radio Access:** Israel Leyva Mayorga *(Aalborg University)*, Nikolaos Pappas *(Linköping University)*, Najeeb Hassan *(Huawei)*, Peter Trifonov *(ITMO)*.
- **Next generation MIMO:** Danaisy P. Prado Alvarez *(Universitat Politècnica de València)*, Eduard A. Jorswieck *(TU Braunschweig)*, Ferhad Askerbeyli, Mario Castañeda, Martin Schubert, Michail Palaiologos, Ronald Böhnke, Samer Bazzi, Tobias Laas *(Huawei)*.
- **Integrated Sensing and Communication:** Andrea Giorgetti *(University of Bologna)*, Richard Stirling-Gallacher *(Huawei)*.
- **Distributed Federated AI:** Ramin Khalili *(Huawei)*, Sokratis Barmpounakis, Lina Magoula, Nikolas Koursioumpas *(NKUA)*, Claudia Campolo, Antonio Iera, Antonella Molinaro *(CNIT)*, Elizabeth Palacios *(Universitat Politècnica de València)*, George Karetsos *(University of Thessaly)*.
- **Intelligent User Plane:** Susanna Schwarzmann *(Huawei)*, Jari Mutikainen, Riccardo Guerzoni *(Docomo Euro-Labs)*.
- **Flexible programmable Infrastructures:** Carlos Guimarães, Luca Cominardi *(ZettaScale Technology SARL)*, Aitor Zabala Orive *(Telcaria)*, Artur Hecker, Dirk Trossen, Zoran Despotovic *(Huawei)*.

Download it here

https://one6g.org/resources/publications/

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