Fraunhofer FOKUS

FRAUNHOFER INSTITUTE FOR OPEN COMMUNICATION SYSTEMS

DAY 1 - THURSDAY, SEP 14, 2023

08.00 - 09.00 REGISTRATION

09.00 - 18.00 TRACK 1 - TUTORIAL & WORKSHOP

Beyond 5G and 6G Network Technologies and Enablers: RAN, Core Network Disaggregation, NTN, Edge Computing, Virtualization, Network Automation and ML

Morning: Tutorial "Understanding the Potential of Beyond 5G and 6G Technologies and Enablers"

Afternoon: Half-day Workshop "Beyond 5G and 6G Network Technologies and Enablers: RAN, Core Network, Edge Computing, Network Management and AI"

09.00 - 18.00 TRACK 2 - WORKSHOP

Towards Open Campus Networks Enabling Customized 5G+/6G Networks

Morning: Campus Networks Ecosystems: Looking at Network Technologies, Real-World Deployments, and Use Cases

Afternoon: Upcoming Campus Networks and Technologies

09.30 - 10.45 TRACK 1 | SESSION 1 | TUTORIAL

Understanding the Potential of Beyond 5G and 6G Technologies and Enablers (Part 1)

Chair: Dr. Marius Corici, Fraunhofer FOKUS

The tutorial will cover a comprehensive number of telecommunication technologies from the perspective of the 6G and beyond 5G system as the basis for a highly flexible, customizable, and automatic multi-network infrastructure.

Aiming to mirror the current R&D major trends, it focuses on the importance of full softwarization within the context of Open RAN and Organic 6G core network technologies as well as on its highly ramified implications towards new use case opportunities, campus networks, satellite-terrestrial convergence, functionality split models, fluid deployments, radio advancements, opportunities of AI, automation and network management.

09.30 - 10.45 TRACK 2 | FEATURE

CampusOS Networking Session

The CampusOS project is a German lighthouse project aiming at supporting the creation of an ecosystem for campus networks. This special session will introduce the project and feature first insights, such as an analysis of the current 5G market for private networks as well as differences between public and private campus networks.

Chair: Marc Emmelmann, Fraunhofer FOKUS

CampusOS Overview
Prof. Thomas Magedanz, Fraunhofer FOKUS

5G Campus Network Market
Dr. Bernd Schröder, brown-iposs GmbH

Campus 5G/O-RAN: Baby Brother of Carrier Networks?
Carsten Rossenhövel, EANTC AG

Ecosystem for Open and Modular 5G Campus Networks
Matthias Tammen, RPTU Kaiserslautern

10.45 - 11.15 COFFEE BREAK & DEMOS

11.15 - 13.00 TRACK 1 | SESSION 2 | TUTORIAL

Understanding the Potential of Beyond 5G and 6G Technologies and Enablers (Part 2)

Chair: Dr. Marius Corici, Fraunhofer FOKUS

In Part 2 of the tutorial we will go in-depth through the different software technologies and how they can be applied for Open RAN, Organic core networks, data-intensive network management. We will conclude with a study on the different deployment scenarios for nomadic and mobile network infrastructures underlining the specific opportunities and benefits and their best-practice engineering in the Fraunhofer FOKUS toolkits.

11.15 - 13.00 TRACK 2 | SESSION 1 | WORKSHOP 1 & PANEL

The Campus Network Ecosystem

Chair: Marc Emmelmann, Fraunhofer FOKUS

Within this session future Campus Network technologies and use cases are presented and discussed.

ORAN-based Campus Network for Connected Mobility Use Cases - Lessons Learned
Dr. Oscar Dario Ramos Cantor, Robert Bosch GmbH

Evolution of Campus Network and Panel Discussion
Klaus Nagora, Smart Mobile Labs AG

6G-SANDBOX SNS-JU Experimental Facilities for Early 6G Experimentations
Michael Dieudonné, Keysight Technologies

Node-H Open RAN in Campus Networks
Mike Cronin, Node-H

Private Nomadic 5G in TV Production - Fudge 5G Trials
Erik Vold, NRK

Panelists:
Marc Emmelmann, Fraunhofer FOKUS
Dr. Oscar Dario Ramos Cantor, Robert Bosch GmbH

Michael Dieudonné, Keysight Technologies
Markus Dod, Mugler
Klaus Nagora, Smart Mobile Labs
Mike Cronin, Node-H
Erik Vold, NRK
Bernd Schröder, brown-iposs GmbH

13.00 - 13.40 LUNCH BREAK

13.40 - 14.00 DEMO SESSION

14.00 - 15.30 TRACK 1| SESSION 3 | WORKSHOP 1

Beyond 5G and 6G Network Technologies and Enablers: RAN, Core Network, Edge Computing, Network Management and AI (Part 1)

Chair: Dr. Marius Corici, Fraunhofer FOKUS

SBA and Cloud-native Principles will Shape the Future Telco World
Hans Joachim Einsiedler, Deutsche Telekom AG

Perspectives of Commercial NTN Systems in B5G/6G
Dr. Maria Guta, ESA/ESTEC

ETHER: Energy- and Cost-efficient Framework for Seamless Connectivity over the Integrated Terrestrial and Non-terrestrial 6G Networks
Dr. Lechoslaw Tomaszewski, Orange Innovation Poland

Next-Generation Satellite Communication Systems – Challenges and Ambitions from a European Perspective
Adam Kapovits, Eurescom GmbH

Non-Terrestrial Networks: A Connectivity Paradigm Shift Towards 6G
Dr. Tomaso de Cola, German Aerospace Center (DLR)

Joint Communication and Sensing (JCAS) – a RAN Technology for Next Generation Wireless Communications
Prof. Eckhard Grass, IHP - Leibniz-Institut für innovative Mikroelektronik

14.00 - 15.30 TRACK 2| SESSION 3 | WORKSHOP 2 & PANEL

Current Global Campus Network Trials, Technologies and Use Cases & Panel

Chair: Prof. Slawomir Stanczak, Fraunhofer HHI

Within this session different application domains present and openly discuss their technological approach, their use cases, expectations, and findings.

Deterministic Communication in 6G, Where We Are, and Where To Go
Dr. Hans-Peter Bernhard, Silicon Austria Labs

Campus Network Trials in 5G-OPERA
Thomas Höschele, TU Dresden

Edge-Cloud Continuum: The New Frontier of Aircraft Connectivity in the 6G Era
Dr. Leonardo Goratti, Safran Passenger Innovations

5G Research Projects for Railways
Kevin Wriston, Kontron Transportation Deutschland GmbH

Beyond 5G Campus Networks for Ports - Opportunities and Challenges
Prof. David Gomez-Barquero, Universitat Politecnica de Valencia

Japan–Europe Joint Demonstration Experiment on Satellite-terrestrial Integration for Beyond 5G

Sachie Tsubokura, Japan Radio Co., Ltd.
Co-Authors:
Amane Miura, The National Institute of Information and Communications Technology (NICT)
Norihiro Fukumoto, The University of Tokyo
Akihiro Nakao, The University of Tokyo
Nobuyuki Setoguchi, SKY Perfect JSAT
Atsumu Mishima, SKY Perfect JSAT
Natsuko Ouchi, SKY Perfect JSAT
Katsuyoshi Ishida, Japan Radio Co., Ltd.
Mayuko Tsuji, Japan Radio Co., Ltd.

SONIC Labs – An Overview
Zubeir Bocus, Ofcom

Panelists:
Prof. Slawomir Stanczak, Fraunhofer HHI
Hans Peter Bernhard, Silicon Austria
Thomas Höschele, TU Dresden
Dr. Leonardo Goratti, Safran Passenger Innovations
Kevin Wriston, Kontron Transportation Deutschland GmbH
David Gomez-Barquero, Universitat Politecnica de Valencia
Sachie Tsubokura, Japan Radio Co., Ltd.

15.30 - 16.00 COFFEE BREAK & DEMOS

16.00 - 18.00 TRACK 1| SESSION 4 | WORKSHOP 1

Beyond 5G and 6G Network Technologies and Enablers: RAN, Core Network, Edge Computing, Network Management and AI (Part 2)

Chair: Dr. Marius Corici, Fraunhofer FOKUS

Open Source and Voice Services for 5G/6G Networks
Daniel-Constantin Mierla, Asipto GmbH / Kamailio

Next-Generation Positioning Within 6G
Norbert Franke, Fraunhofer IIS

Standardization of 5G-Advanced and 6G
Thomas Heyn, Fraunhofer IIS

Result Highlights of Early 6G Enablers
Anastasius Gavras, Eurescom GmbH

Emerging Challenges and Solutions in 6G System Security
Prof. Brian Kelley, University of Texas at San Antonio

Directions and Key Enablers Toward 6G Mobile Core for Easy Operation and Management
Masayuki Kurata, KDDI Research

ETSI Approach to Research and Technology, with Some Early Thoughts on 6G Research
David Boswarthick, ETSI

Accelaration of 6G Innovation - The Role of One6G Association
Prof. Nancy Alonistioti, National & Kapodistrian University of Athens

16.00 - 18.00 TRACK 2| SESSION 4 | WORKSHOP 2 & PANEL

Campus Network Evolution from 5G+ to 6G – New Enablers and Applications

Chair: Dr. Florian Schreiner, Fraunhofer FOKUS

Within this session future Campus Network technologies and use cases are presented and discussed.

Putting 5G Campus Network Evolution in Context with 6G Research
Prof. Thomas Magedanz, TU Berlin / Fraunhofer FOKUS / Uniberg AG

Flexible SBA-Native System Architecture for 6G Systems in NPN Settings
Dr. Sebastian Robitzsch, InterDigital Europe Ltd

Balancing Throughput Growth and (Energy) Cost: Promising Opportunities in 6G Networks
Prof. Dr.-Ing. habil. Slawomir Stanczak, Fraunhofer HHI

O-RAN Architecture Challenges towards 6G
Dr. André Drummond, TU Braunschweig

The Vital Role of Private Networks for 6G
Dr. Andreas Müller, Robert Bosch GmbH / 5G-ACIA

6G-Enabled Future Robotics
Dr. Xueli An, Huawei Technologies Düsseldorf GmbH

An Integrator's View on 5G+ and 6G
Andreas Möller, Uniberg GmbH

Panelists:
Prof. Thomas Magedanz, TU Berlin / Fraunhofer FOKUS / Uniberg AG
Dr. Sebastian Robitzsch, InterDigital Europe Ltd
Prof. Dr.-Ing. habil. Slawomir Stanczak, Fraunhofer HHI
Dr. André Drummond, TU Braunschweig
Dr. Andreas Müller, Robert Bosch GmbH / 5G-ACIA
Dr. Xueli An, Huawei Technologies Düsseldorf GmbH
Andreas Möller, Uniberg GmbH

18.00 CONFERENCE GET-TOGETHER & DEMO BY NIGHT

DAY 2 - FRIDAY, SEP 15, 2023 - CONFERENCE

08.00 - 09.00 REGISTRATION

09.00-17.30 CONFERENCE

Going Beyond 5G and Towards 6G – Challenges & Opportunities

There is no doubt that 5G technology became the key enabler of the digital transformation, converging the communication technologies within a single mainstream technology, gradually connecting everyone with everything everywhere. While the economic challenges of the deployment are overcome, 5G rollouts complementing the already worldwide successful 4G/LTE, it is time to look forward towards the beyond 5G and 6G networks, the evolution and the revolution of communications towards 2030. Driven by ubiquitous infrastructure, energy efficiency, de-complexification, extensive trust and security, the next network must fulfill the digitalization promises.

In addition, the standardization community is in full swing towards full network flexibility aiming to provide ultra-low latency, dedicated campus networks and alternatively global networks. It is time to prove the full potential of campus networks, to bring AI technologies to maturity and the data oriented network management as to fulfill the 5G promises and to complement the operator deployments with a myriad of highly customized, while still convergent, vertical networks.

09.00 - 09.30 WELCOME

Conference Start: Welcome to Day 2
Prof. Thomas Magedanz, Fraunhofer FOKUS

Welcome
Dr. Klaus Glasmacher, Federal Ministry for Economic Affairs and Climate Action (BMWK)

09.30-10.30 SESSION 1 | PRESENTATION

Going Beyond 5G: 5G+ Roadmaps, Trials and Experiences

Chair: Guy Redmill, Redmill Marketing Associates Ltd

Progressing 5G Standalone
Tilo Heckmann, Telefonica

ESA Strategic Programme Line 5G/6G and Global Perspectives of NTN Systems
Antonio Franchi, ESA - European Space Agency

5G Evolution and 6G Powered by IOWN
Takehiro Nakamura, NTT DOCOMO

No Room for Error - Beyond 4G in Stable Market Conditions
Hugo van Zyl, Manx Telecom

10.30 - 11.00 COFFEE BREAK & DEMOS

11.00-12.00 SESSION 2 | PRESENTATION

Non-Public Networks Trials: Open Campus Networks – Paving the Road to 6G?

Chair: Prof. David Gomez-Barquero, Universitat Politecnica de Valencia

Intelligent Network Activities in the Dutch Future Network Services Initiative
Toon Norp, TNO

Road to 6G: How Research Platforms Enable Transformative Network Architectures
Abhimanyu Gosain, Northeastern University

German Funding Activities for 5G/6G Non-terrestrial Networks
Moritz Hermann, German Space Agency at DLR

Success Stories and Lessons Learned in the Belgian MPN Market
Robin Leblon, Citymesh

6G: Key Network Enablers
Dr. Ryan Husbands, BT Research & Network Strategy

12.00-13.00 SESSION 3 | PRESENTATION

Use Case / Vertical Application-driven Customized Networks

Chair: Prof. Tarik Taleb, University of Oulu

The Next Frontier: 6G's Disruptive Potential for Vertical Industries
Dr. Andreas Müller, Robert Bosch GmbH / 5G-ACIA

Extending Terrestrial Communication Networks into Space
Dr. Jörg Pfeifle, Airbus Defence and Space

5G for Automotive Use Cases – What's Next on the Roadmap?
Dr. Johannes Springer, 5GAA / Deutsche Telekom AG / T-Systems International GmbH

Campus Networks from the Perspective of Media Production
Jens Pilz, 5G-MAG / Sennheiser

Overview of the Work of the WCM (Working Group Wireless Communications for Machines)
Harald Lukosz, Bosch Rexroth AG

13.00 - 13.40 LUNCH

13.40 - 14.00 DEMO SESSION

14.00-14.30 SESSION 4 | PANEL

Where Is the 5G Business Case? Public vs. Enterprise 5G Networks

Chair: Guy Redmill, Redmill Marketing Associates Ltd

Panelists:
Tilo Heckmann, Telefónica GmbH & Co. OHG
Takehiro Nakamura, NTT DOCOMO
Hugo van Zyl, Manx Telecom
Robin Leblon, Citymesh
Dr. Ryan Husbands, BT Research & Network Strategy
Dr. Andreas Müller, Robert Bosch GmbH / 5G-ACIA
Dr. Jörg Pfeifle, Airbus Defence and Space
Dr. Johannes Springer, 5GAA Director General, Lead Automotive Program, Deutsche Telekom AG / T-Systems International GmbH
Jens Pilz, 5G-MAG / Sennheiser
Harald Lukosz, Bosch Rexroth AG

14.30-15.30 SESSION 5 | PRESENTATION

Towards 6G – Drivers and State of Play (Part 1)

Chair: Prof. Armin Dekorsy, Universität Bremen

6G Drivers, Building a Sustainable Route to 6G
Anita Döhler, Next Generation Mobile Networks (NGMN) Alliance

AI-Native Open RAN: Transforming Mobile Networks
Dr. Alex Jinsung Choi, Deutsche Telekom AG

Slices: European Scientific Large-Scale Infrastructure for Computing/Communication Experimental Studies
Prof. Serge Fdida, Sorbonne Université

The French National Acceleration Strategy on 5G/6G and France 6G Initiative
Hakima Chaouchi, Institut Mines Telecom/French Ministry of High Education and Research

Beyond 5G Vision and R&D Activities in NICT
Dr. Kentaro Ishizu, NICT

15.30 - 16.00 COFFEE BREAK & DEMOS

16.00-16.30 SESSION 6 | PRESENTATION

Towards 6G – Drivers and State of Play (Part 2)

Chair: Prof. Armin Dekorsy, Universität Bremen

Evolution of Non-Terrestrial Networks towards 6G Systems
Prof. Alessandro Guidotti, University of Bologna / CNIT

Current State of 5G Research and Development in South Africa and Opportunities for 6G
Joyce Mwangama, University of Cape Town

6G Networking - Same Challenges
Prof. Tarik Taleb, University of Oulu

16.30-17.15 SESSION 7 | PANEL

Do We Know What 6G Will Be and Will We Need It At All?

16.30-17.15 SESSION 7 | PANEL

Do We Know What 6G Will Be and Will We Need It At All?

Chair: Anastasius Gavras, Eurescom GmbH

Panelists:
Prof. Armin Dekorsy, University of Bremen
Dr. Alex Jinsung Choi, Deutsche Telekom AG
Jaydee Griffith, National Telecommunications and Information Administration (NTIA)
Prof. Serge Fdida, Sorbonne Université
Prof. Alessandro Guidotti, University of Bologna / CNIT
Dr. Kentaro Ishizu, NICT
Dr. Joyce Mwangama, University of Cape Town
Prof. Tarik Taleb, University of Oulu

17.15 CLOSING & FAREWELL