

The Partners



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Funding



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blueSPACE

Building on the Use of Spatial Multiplexing
5G Networks Infrastructures and
Showcasing Advanced Technologies
and Networking Capabilities

This project has received funding from the European Union's Horizon 2020 programme under grant agreement number 762055.



TU/e



Main Objectives

The core concept of blueSPACE is to exploit the added value of optical space division multiplexing (SDM) in the radio access network (RAN) with an efficient optical beamforming interface for wireless transmission in the pragmatic Ka-band.

blueSPACE targets increased bandwidth provision by naturally enabling and supporting hybrid multiple input multiple output (MIMO) signaling. Efficient beam forming and –steering in the photonic domain are combined with seamless interfaces between the SDM fiber medium and a radio frontend exploiting space diversity.

The developed solutions will integrate seamlessly into existing and next generation optical access networks infrastructures and feature full support for software defined networking (SDN) and network function virtualization (NFV).

Project Facts

blueSPACE is a second phase 5G PPP European research project, led by Eindhoven University of Technology (TU/e). The project concentrates the efforts of 14 partners from both academia and industry stemming from 8 different countries to develop technologies enabling a 5G infrastructure with vastly improved performance compared to current technologies, while reducing cost and power consumption.

Duration:

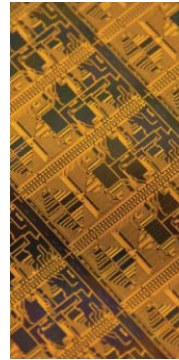
36 Months: June 2017 – May 2020

Consortium:

9 industrial and 5 academic partners from 8 EU countries

Budget:

€6.6 M from the European Commission under the Horizon 2020 programme



Expected Impact

blueSPACE targets a disruptive yet realistic approach for 5G fronthaul, able to address the high capacity and flexibility requirements imposed by advanced 5G services efficiently and in a scalable and future-proof manner. The proposition of blueSPACE offers unrivalled characteristics whose impacts include:

- ◆ Increased bandwidth provision with natural support for hybrid MIMO in the mm-wave frequency range and efficient photonic beam steering, by exploiting space diversity in the RF and optical domains.
- ◆ Establishing a seamless starting/ending interface between the fiber and wireless medium, establishing a unified end-to-end platform that fully integrates with existing approaches for optical access networks.
- ◆ A compact infrastructure that is reconfigurable by means of software defined networking and network function virtualization.

blueSPACE will establish a truly viable and efficient path towards 5G wireless communications with a 1000 fold increase in capacity, connectivity for over 1 billion users, strict latency control and secure, flexible network software programming.

Technical & Research Challenges

CAPACITY

The adaptation of digital radio over fiber (DRoF) schemes in parallel with analog radio over fiber (ARoF) techniques to optical SDM networks based on multi-core fibers. Achieving an increased degree of integration between network elements and full compatibility among fronthaul schemes.

MIMO & BEAM STEERING

Design of optimized interfacing elements between the optical SDM fiber medium and the radiating elements in the remote radio unit (RRU) sites to enable advanced MIMO and beam steering solutions for ARoF architectures.

LATENCY

Increased resource centralization at the central office (CO) with optimum allocation of the baseband unit (BBU) pool, design of switching and interconnection hardware to enable SDM

compatible architectures and minimization of complexity at the RRU to strictly control and minimize latency.

CONTROL

The evaluation and design of a compact infrastructure that is reconfigurable by means of SDN and NFV orchestration. This enables the deployment of virtual baseband units in the CO, as well as network slicing to support the virtualization of the network.

5G FACILITY

Development of advanced hardware solutions with cost efficient analog RoF transceiver modules featuring direct compatibility with optical beam forming schemes and simplified design requirements, as well as remote power delivery to RRUs. Implementation of compact SDM splitters and multicore fiber adapters, enabling advanced SDM based optical distribution and radio access network architectures, while supporting network slicing, SDN control and network function virtualization.

