

# A Converged Copper-Optical-Radio OFDMA-based access Network with high Capacity and Flexibility

*The ACCORDANCE STREP project composed by partners from Estonia, France, Germany, Greece, Spain and United Kingdom, investigates on a new paradigm for the access network: The introduction of OFDMA (Orthogonal Frequency Division Multiple Access) into optical backhauling for wireless networks.*

## At A Glance: ACCORDANCE

**A Converged Copper-Optical-Radio OFDMA-based Access Network with high capacity and flexibility**



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**Funding scheme:** STREP

**Total Cost:** € 5.6m

**EC Contribution:** € 3.5m

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## Main Objectives

Although OFDM has been used in radio and copper-based communication, it's only recently that it's making its way into optics and is expected to offer increased system capacity and flexibility by using highly integrated optoelectronic components.

*“The convergence with fixed networks is likely to deliver all desired benefits of data-centric, quality of services, mobile networks.”*

ACCORDANCE introduces a novel high capacity extended reach optical access network architecture, based on OFDMA technology, implemented through the proper mix of state-of-the-art photonics and electronics. Such architecture is not only intended to offer improved performance compared to evolving TDMA-PON (Time Division Multiple Access - Passive Optical Networks) solutions, but also inherently provides the opportunity for convergence between optical-radio- and copper-based accesses.

The main objectives of ACCORDANCE are:

- Define a novel Access Network Architecture achieving convergence among heterogeneous technologies (optical, wireless, copper)
- Propose low-cost, low-complexity concepts to achieve ultra-high data rates in the access network (even to 100Gb/s)
- Introduce a flexible bandwidth allocation concept
- Provide a smooth migration from and co-existence with legacy access solutions
- Provide multi-operator and multi-service support
- Contribute to standardisation activities on NGOA
- Demonstrate and disseminate the results

## Technical Approach

ACCORDANCE comprises 7 work packages:

WP1: Administrative and Financial Management will control the overall progress of the project.

WP2 will define the complete ACCORDANCE architecture, the basic network elements and their general design and functionality. It will also identify the requirements, investigate the feasibility of the mentioned studies and define ways for a real-world deployment.

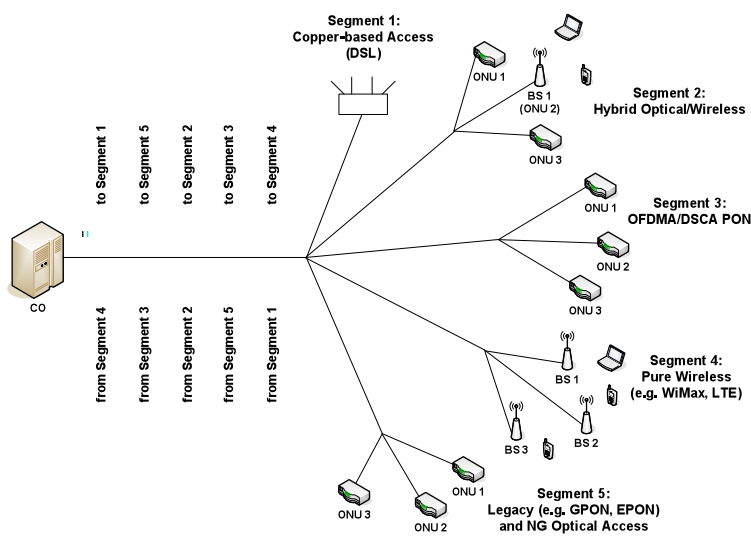
WP3: Implementation of the real-time processing capable functional basic node elements.

WP4 will identify the requirements of the ACCORDANCE MAC, designing a complete MAC protocol suite and developing specific algorithms for dynamic bandwidth allocation.

WP5 will tackle issues that stem from the coexistence of diverse technologies (optical- / wireless- / copper-based) within the same infrastructure, and will exploit the benefits offered by advantageous combining of these technologies for improved wireless network performance.

WP6 will strive to prove the feasibility and usefulness of the solutions proposed and investigated within the project.

WP7 will co-ordinate and perform project result dissemination, maximising chances for achieving the required impact level of the project.



use already available low-cost optical devices and electronics.

- Define a completely novel converged type of network architecture, incorporating essentially all kinds of access technologies, namely optical-, wireless- and copper-based.
- In-depth study of the migration paths to the new ACCORDANCE concept, both from a technical, as well as from a techno-economical point of view.
- Proof of concept and demonstration.

## Expected Impact

- Boost the field of optical and wireless networking globally, and thus strengthen the position of Europe in those rapidly developing fields.
- Provide a natural environment for healthy competition among European

network and service providers that will revitalize the European market and reinforce its competitiveness.

- Contribute to the emergence of a large number of SMEs manufacturing relevant components and equipment and thus stimulate the European telecommunication market.
- Introduce an extremely cost-efficient network infrastructure.
- Provide a competitive business environment to reduce cost/bit for the consumers.
- Active involvement in standardisation bodies.
- Enable a significant enhancement of the overall volume of data-centric traffic and effective management of dynamic traffic patterns and service differentiation.
- Provide a dynamic bandwidth allocation for wireless traffic over the optical network, and adaptation of a centralized wireless scheme to significantly enhance wireless connection quality.
- Answer future bandwidth requirements by achieving ultra-high data rates in the access network.

## Key Issues

- Allocation of the spectrum in a significantly flexible manner and in multiple levels of granularity.
- Splitting the signal into several low-bitrate sub-carriers to provide the opportunity to