

# PROJECT / Next-Generation Coherent Optical Communication Systems


## NG-COS

### Main Objective:

- To develop cost-effective solutions for extraction of phase and amplitude information from the optical field, using advanced signal processing techniques to reduce the hardware requirements associated with coherent detection;
- To develop and implement efficient and simplified digital post-compensation algorithms using the phase and amplitude information of the optical field in order to enable real-time mitigation of linear and nonlinear propagation impairments, with low computational power;

Future high-speed optical communication systems will inevitably rely on new enabling technologies such as advanced modulation formats, coherent detection and receiver-side digital signal processing. In order to apply these technologies to commercial optical communication systems there must be a strong I&D effort to develop efficient and low-cost solutions. This is currently a fast growing investigation topic, which need to be faced in many different fronts, such as:

- Study of propagation and receiver performance of different advanced modulation formats;
- Analysis of network architectures and optical devices in order to reduce the impact of propagation impairments;
- Development of efficient and cost-effective solutions for coherent detection both in metro and access networks;
- Development of digital adaptive post-compensation algorithms for the mitigation of linear and nonlinear impairments.



Within the framework of this project we will focus mainly on the development of cost-effective coherent receivers, using advanced digital signal processing techniques in order to reduce the hardware requirements. Besides, taking advantage of the amplitude and phase information provided by coherent detection, we are also going to develop digital post-compensation algorithms, in order to simultaneously enable higher bit-rates, narrower inter-channel spacing and longer propagation distances without sacrificing the received signal quality.

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