# AI-Enhanced Fiber-Wireless Optical 6G Network in Support for Connected Mobility

**6G EWOC Newsletter**

nº 1
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## Project Launch: We are on Air!

As one of the newly funded European SNS projects, 6G-EWOC launched its concerted efforts towards a fiber-wireless network infrastructure that supports connected mobility through seamless broadband access between vehicles and datacentres.

The kick-off meeting held in January 2024 and the second plenary in June were primarily devoted to the architecture and requirements definition for a series of mobile use-cases. These will feed the development of the constituent component, system and network technologies in the upcoming months.

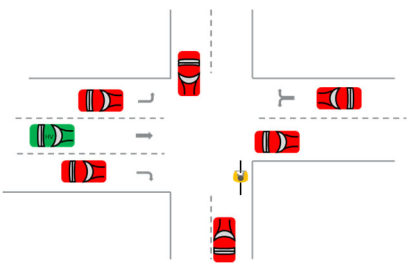
The 6G-EWOC consortium builds on 11 partners and is led by the *Universitat Politècnica de Catalunya* (UPC) as the project coordinator and the *Centre Tecnològic de Telecomunicacions de Catalunya* (CTTC) as the technical manager. Further partners include the RTO *Austrian Institute of Technology* (AIT), industrial photonic design and fabrication experts *III-V Lab* and *Ligentec*, small and medium enterprises *Bifrost Communications* and *Beamagine* specialized in the fields of communication and sensing. The industry end-user perspective will be provided through the mobility technology company *Magna*, the telecom and datacom system integrators *Nokia Bell Labs* and *Nvidia*, and the telecom operator *OTE*.

## Network Architecture & Requirements: The Road Towards Connected Mobility

by *Carina Markus* and *Olof Eriksson*, Magna

The busy urban intersection is the scenario from which the use-cases in 6G-EWOC are extracted. The idea is to make the traffic environment safer by collecting data, centrally processing it and then re-distributing information to traffic participants. This can be information that vehicles' sensor systems can use to "look around the corner" or warnings about dangers. To do this, large amounts of data have to be transmitted, which requires the communication systems to deliver a degree of performance that current technologies do not provide. Examples of challenges connected to this use-case are:

- Improving traffic flow – safer, shorter travel time, less emissions,
- Clearing the path for emergency vehicles– reducing response time
- Protecting vulnerable road users – increase awareness of their presence



Stay tuned for the next issue of our newsletter to read how these requirements impact the 6G architecture…

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Co-funded by the European Union 6GSNS


## *Enabling Technology:*

# *Quasi-Coherent Optical Reception*

by *Jesper B. Jensen*,
Bifrost Communications

The fronthaul takes a prominent role within the 6G network, as it connects centralized network assets with the remote radio heads that are distributed in the field. The fronthaul is responsible for the low-latency transport of data received at the antenna sites to and from datacenters responsible for signal and data processing, referred to as edge computing. Ideally, the fronthaul links offer high capacities to accommodate large wireless signal bandwidths, using low-cost transceiver technology. In this newsletter, we feature quasi-coherent reception as one of the enablers in 6G-EWOC, this time concerning the mobile fronthaul.

The solution, which has been developed by Bifrost Communications, employs a low-cost implementation of coherent detection, where a fixed frequency offset between the signal and local oscillator lasers eliminate the need for advanced digital signal processing (DSP). This makes the Quasi-Coherent Reception technology the ideal solution for latency-sensitive low-cost applications such as the 6G fronthaul.

With its Quasi-Coherent Transceiver Technology Bifrost currently facilitates the need for higher data rates in 5G DWDM fronthaul networks, metro-scale ring networks and access-related ultra-high sensitivity burst-mode receivers for optical line terminals in TWDM Passive Optical Networks.

With Bifrost's patented analogue (no-DSP), near-zero latency solution that further includes chromatic dispersion compensation, Bifrost provides up to 40 km reach at 25 Gb/s and up to 20 km reach at 50 Gb/s in the C-band.

Quasi-coherent transceiver sub-assembly.

In the 6G-EWOC project, Bifrost will collaborate with III-V Labs and Nokia to develop a highly integrated transceiver solution combining hybrid III-V/silicon photonics integration from III-V labs with Bifrost's quasi-coherent reception technology for 50 Gb/s and 100 Gb/s 6G-fronthaul links.

Stay tuned for the first publications towards this ambitious goal.

# *Our Recent Publications*

B. Schrenk, *"Optical Fi-Wi-Fi Bridge with 32-Port Focal Plane Fiber Array for Robust Waveguide Coupling,"* in Proc. IEEE Summer Topicals Meeting '24, Bridgetown, Barbados, Jul. 2024, paper MB3.3.

# *Meet the 6G-EWOC Team*

We are delighted to present further project results at Europe's largest conference on optical telecomm. Take the opportunity to meet us at…

*European Conference on Optical Communications (ECOC)*
*Frankfurt, 22nd – 26th of September*

# *Get in Touch*

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