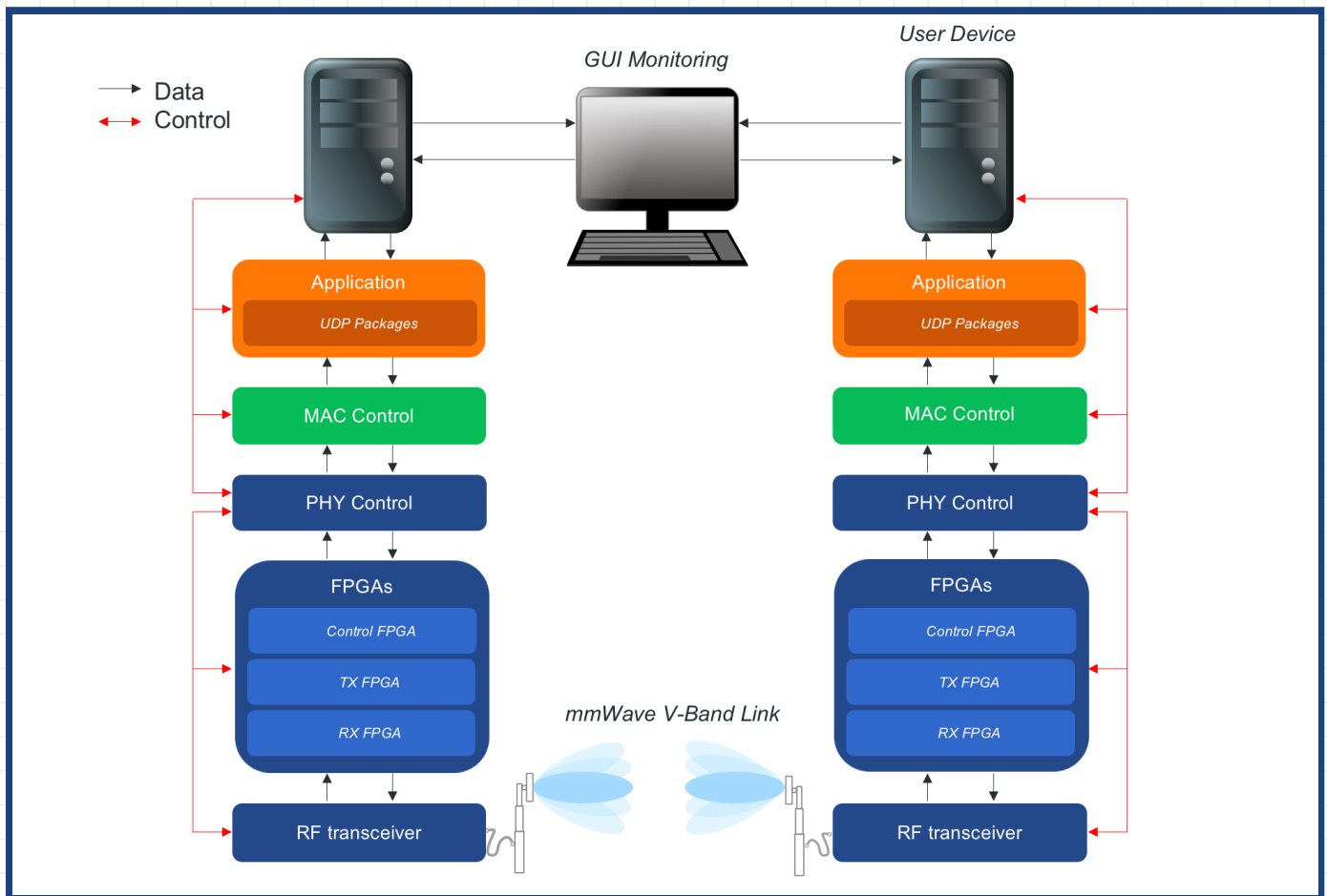


SDR DATA PLANE FUNCTIONALITY

PHY improvements: High throughput mmWave setup



→ Development and evaluation of new applications for the mmWave PHY.

→ Channel characterization environment via HALO (Hardware in the loop) with real time radio control, allowing to capture datasets for offline evaluation.

→ Development and testing of new PHY receiver algorithms with realistic channel impairments.



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PHY improvements: High throughput mmWave setup

CONTEXT

The increasing number of users and demand for higher data rates in wireless communication systems imposes a challenge for the upcoming technologies. In this context, the mmWave transmission concept has become a possible solution to offer high throughput connection, in the order of Gbit/s, as it allows the utilisation of higher bandwidth spans at spectrum areas that are not yet well explored e.g. 60 GHz [1,2]. With the high throughput connection available, new applications such as Augmented Reality, real time high definition video and automated robots are possible, in which will play an important role in the factory of the future.

UNIQUE SELLING POINT

It is well known that the RF impairments become more severe as the transmission frequency is increased i.e. free path loss is higher and diffraction and refraction impose higher losses [3]. In order to assure which theoretical assumptions regarding RF and channel apply in reality, it is important that the development of applications requiring the mmWave PHY are performed under realistic scenarios.

Thus, given the innovative and challenging aspects of the mmWave technologies in the future networks, ORCA offers a facility containing a bidirectional, closed loop mmWave link in the V-Band i.e. 57-66 GHz, which is capable of achieving peak rates of 2Gbit/s at the physical layer, employing beam alignment and beam tracking algorithms. This platform aims to support researchers at investigating mmWave related aspects under real channel conditions.

OPPORTUNITIES

The ORCA's mmWave platform will make possible:

- Development and evaluation of new applications for the mmWave PHY.
- Channel characterization environment via Hardware-in-the-loop (HALO) using the same hardware setup with real time radio control operation, allowing playback and capturing of mmWave signals in order to evaluate captured datasets offline.
- Development and testing of new PHY receiver algorithms with realistic channel impairments, by capturing received signals and processing them offline.

REFERENCES

- The setup employs a Sibeam V band transceiver with integrated phase array antennas. At the base band processing level, the setup makes use of a PXI system from National Instruments [4,5].

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