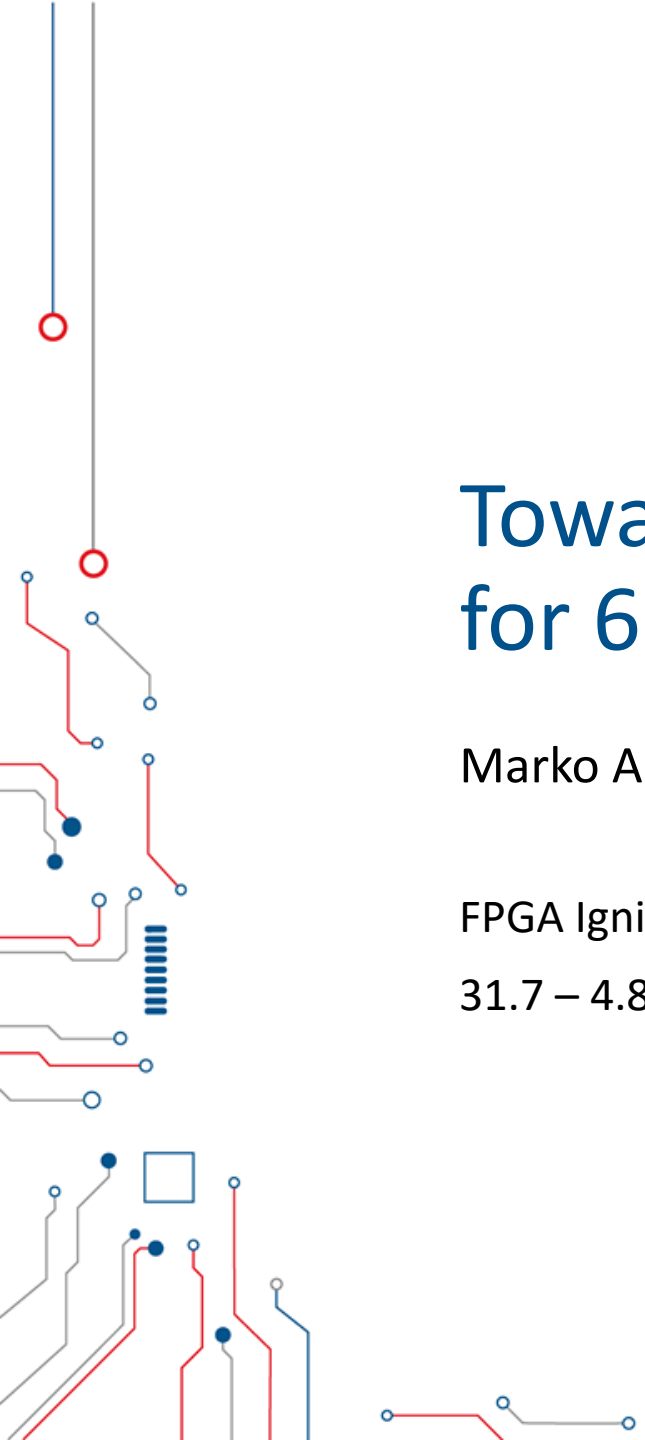

Leibniz Institute for high performance microelectronics

Towards a Rad-Hard Baseband Processor for 6G Non-Terrestrial Networks

Marko Andjelkovic, Nebojsa Maletic, Milos Krstic

FPGA Ignite Summer School, Heidelberg, Germany

31.7 – 4.8.2023

6G-TakeOff

https://www.6g-takeoff.de/

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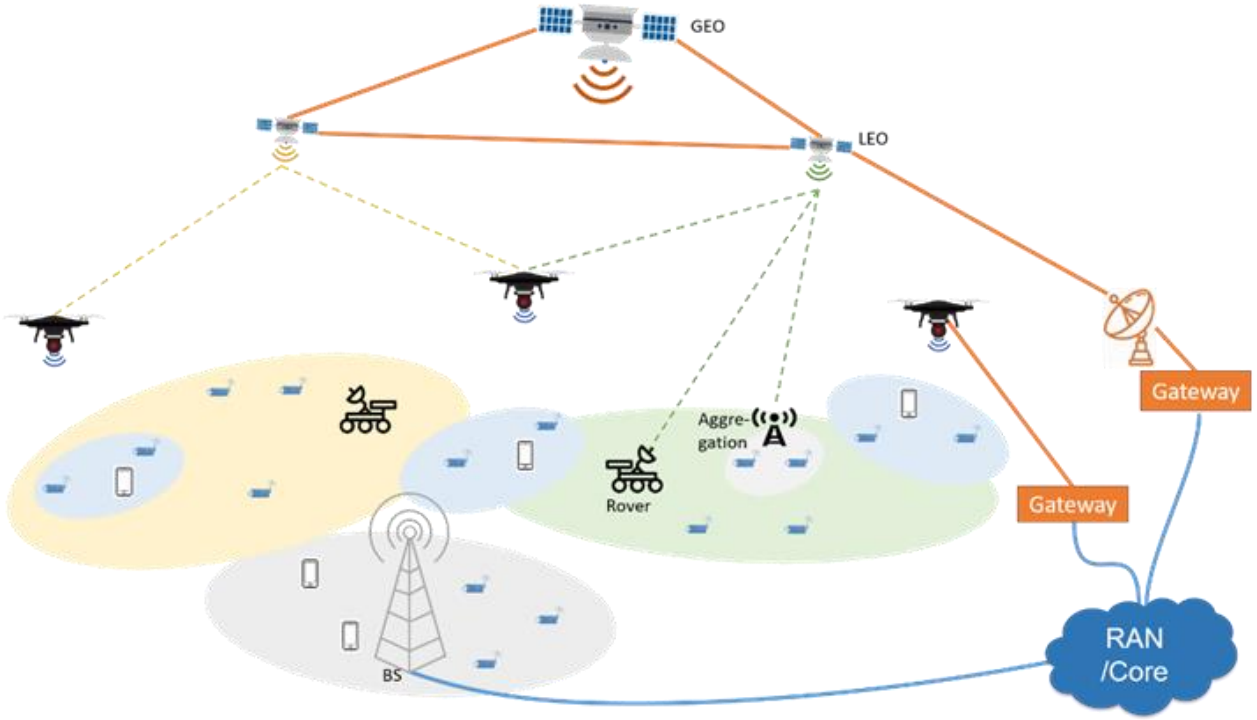
Marko Andjelkovic, Nebojsa Maletic, Milos Krstic
IHP, Frankfurt (Oder), Germany

- **The next generation (6G) communication systems aim to integrate terrestrial, airborne and satellite networks**
  - Integration of ground base stations, drones, helicopters, planes, and satellites
- **6G-TakeOff Ambitions**
  - Connectivity everywhere and anytime
  - Holistic design approach for unified 3D networks
  - Bring together communications and space industries
- **IHP role**
  - Design of rad-hard baseband processor for satellites
  - FPGA implementation and verification of baseband processor
- **Application areas**
  - Smart agriculture, fleet tracking, environmental monitoring, video streaming



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Towards a Rad-Hard Baseband Processor for 6G Non-Terrestrial Networks

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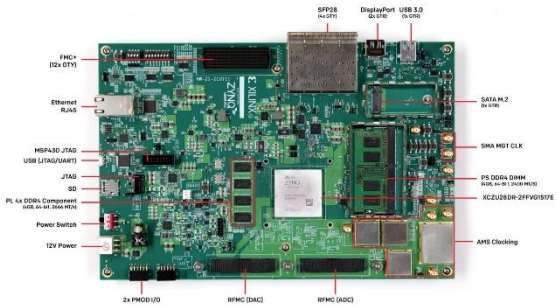
Design concept for baseband processor

- Online adaptation of modulation schemes
- Hardware redundancy for radiation hardness
- Parallelization for high data rates

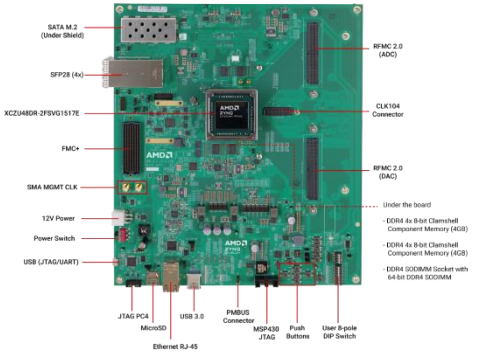
Demonstrator

- To be implemented on commercial RFSoC FPGA
- Lab demo and drone-based demo

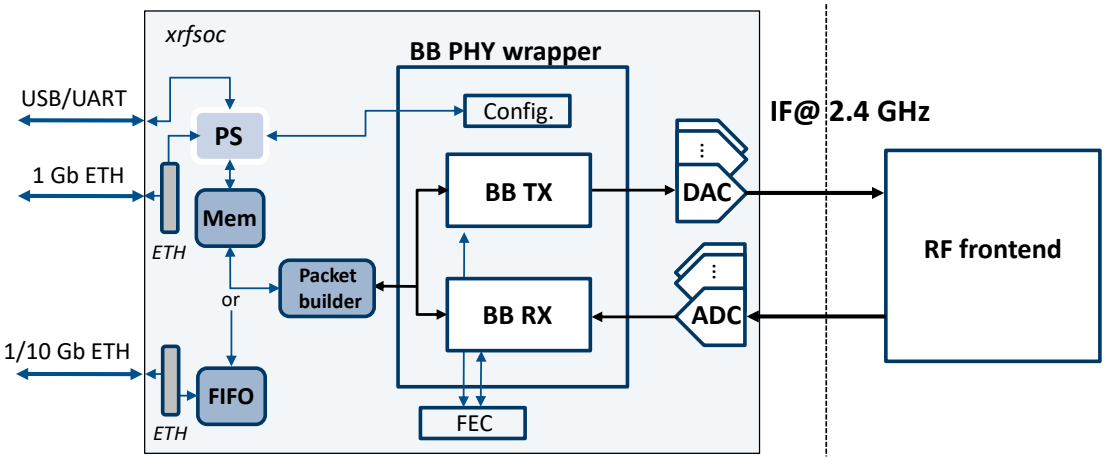
Ultrascale+ RFSoC ZCU111

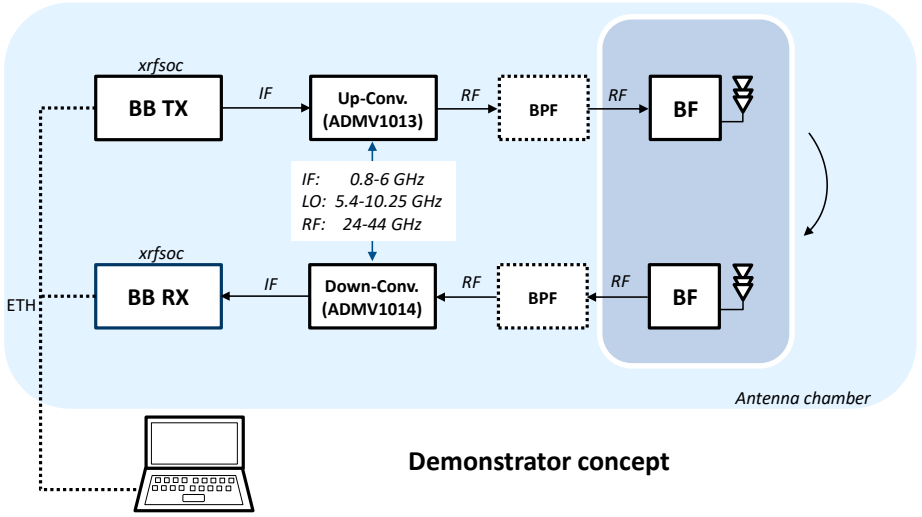


Ultrascale+ RFSoC ZCU208



Only BB PHY, no MAC





Demonstrator concept

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Thank you for your attention!

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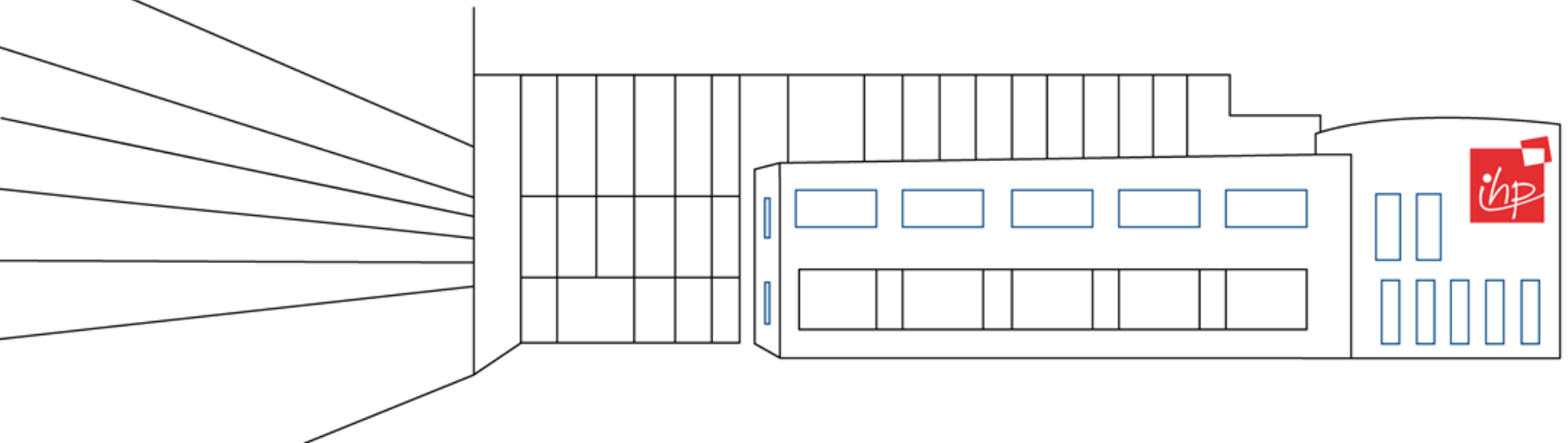

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