# 6G Tandem

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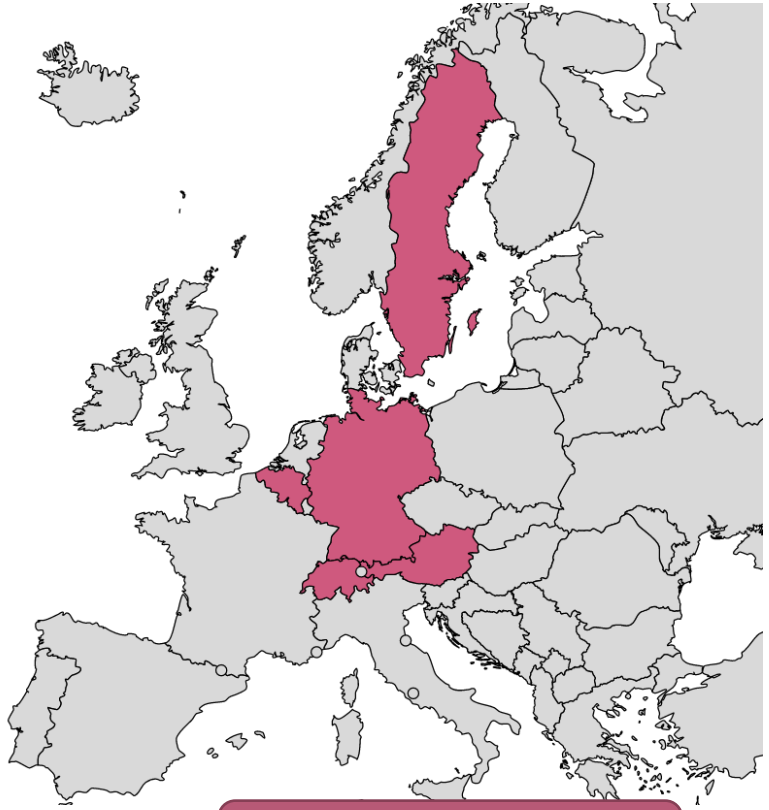
# Agenda

- Project overview
- Introduction to dual-band D-MIMO
- Why D-MIMO?
- Polymer/plastic microwave fiber (PMF)
- Project's Vision
- Key objectives/technologies
- Planned standardization activities



6GTandem partners

# Project Overview



- Project Name: A Dual-frequency Distributed MIMO Approach for Future 6G Applications
- Project website: https://horizon-6gtandem.eu/
- Stream: B-01-02
- Key info: 6GTandem will co-design novel dual-frequency (sub-10 GHz & sub-THz) operation and a new highly integrated and distributed radio transceiver architecture (radio stripe) to achieve superior value with respect to energy, service availability and cost of deployment.

Addressed Verticals:

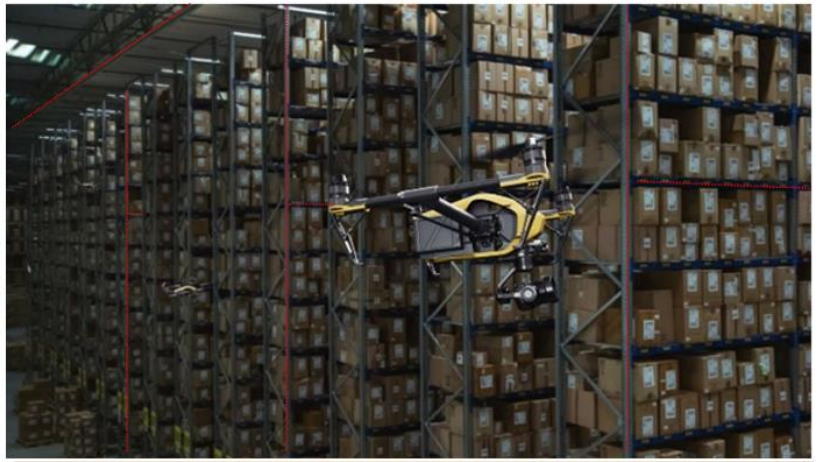
Adaptive robotized factories, warehouses, retail and logistics, Immersive entertainment for crowds of people (e.g., arenas), Human-machine interaction in care environments, hospitals, assisted living, Public transportation

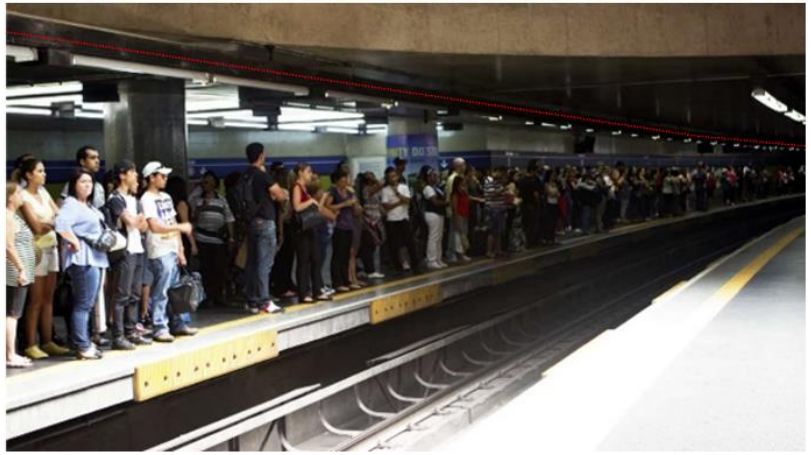
# 6GTandem

A Dual-frequency Distributed MIMO Approach for Future 6G Applications

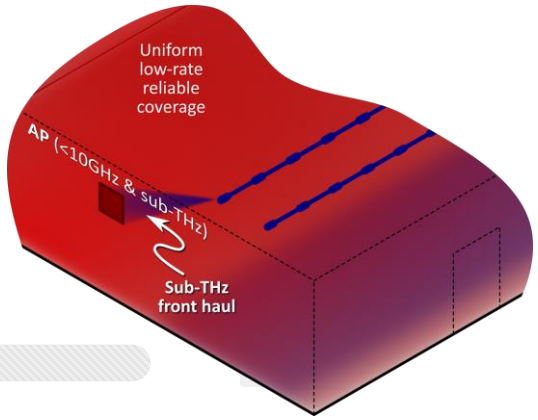
# Introduction to dual-band D-MIMO

Use Cases



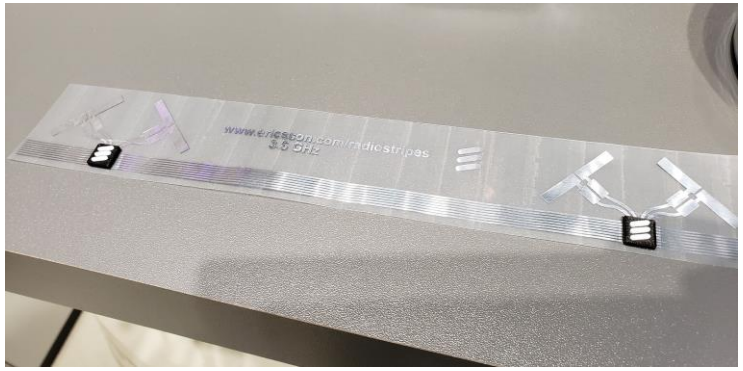


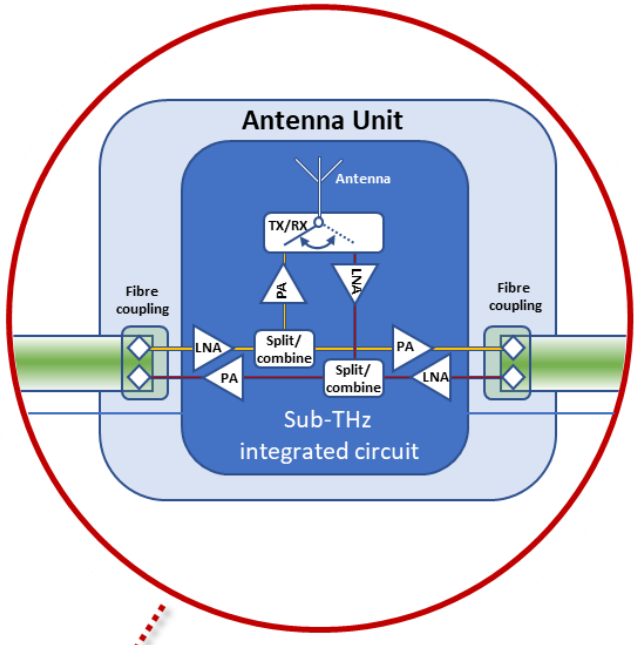
- Low latency
- Sub-cm positioning
- Ultra broadband
- Resilience
- Computation off-load
- Fronthaul

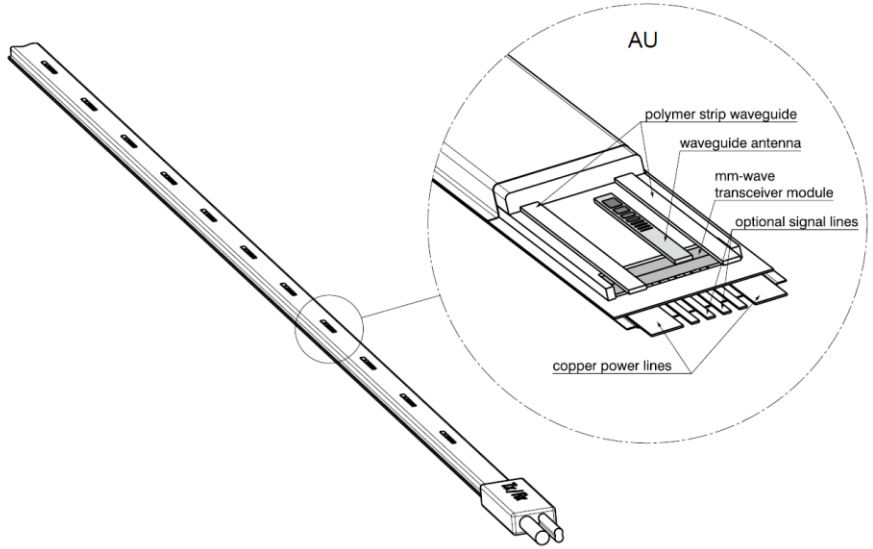


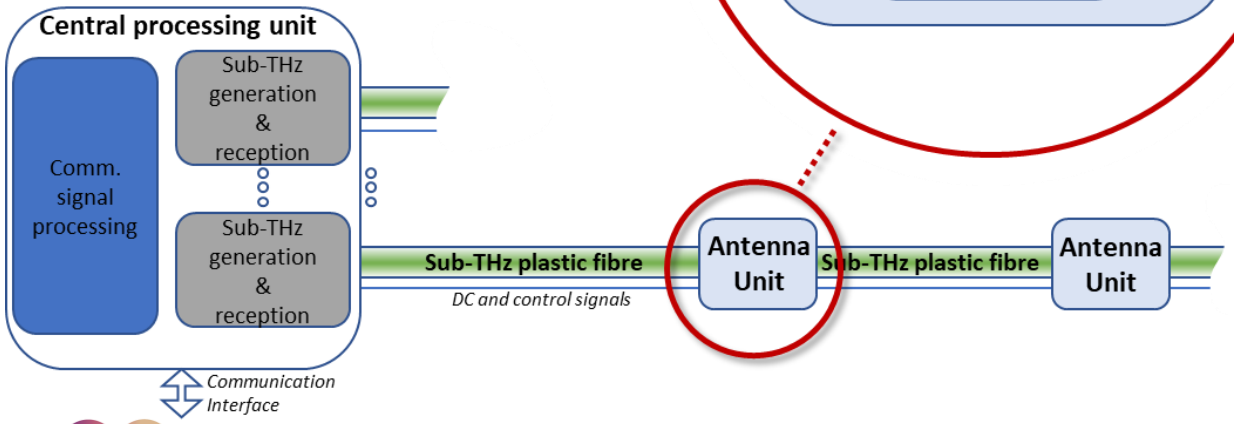
# Introduction to dual-band D-MIMO

The radio stripe building blocks



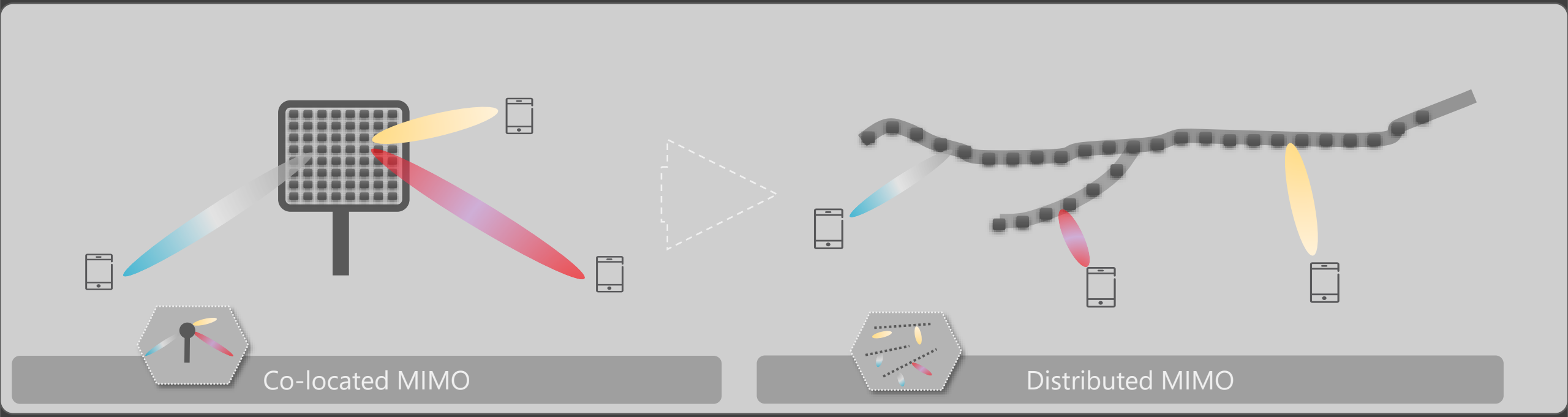



# Why D-MIMO

Massive MIMO – Centralized Vs. distributed



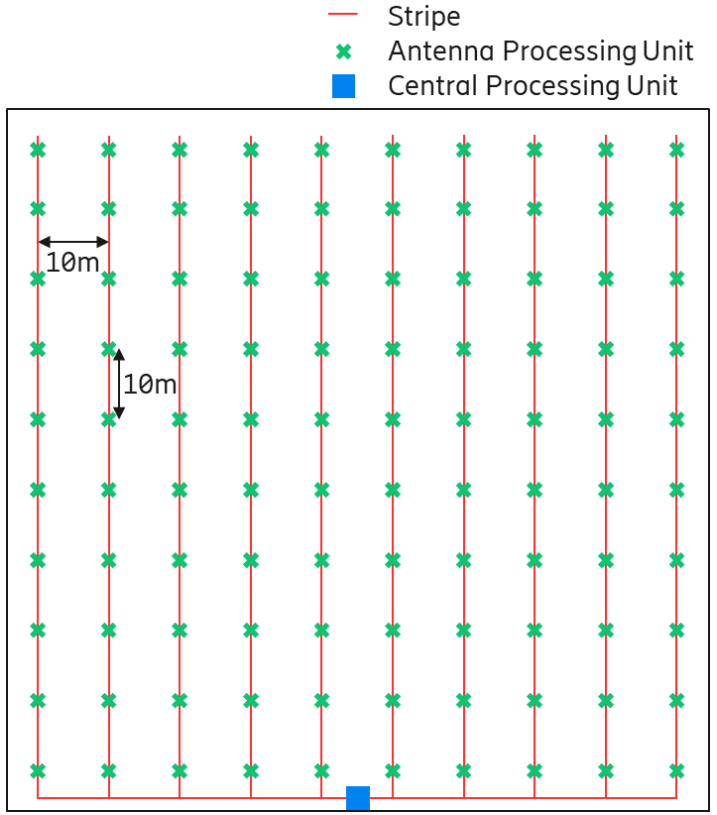

- May have service variations
- Sensitive to blocking
- Heat concentration
- Large and visible installations
- Installation requires personnel with “radio skills”
- Power limited by SAR regulations

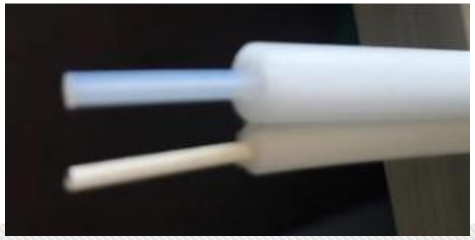
- Reduces impact of all the mentioned issues
- Power and backhaul is integrated in the “stripe” antenna design.
- Cell-free – no handovers, no planning required

# Polymer/plastic microwave fiber (PMF)



- Use a plastic/dielectric waveguide to distribute the RF signal in between the distributed units
- Frequencies >70GHz to get reasonable dimensions
- No laser source, insensitive to temperature variation, dust and misalignment, wideband operation, relatively cheap, short range



# Vision

A sub-THz radio stripe solution consisting of individually controlled Antenna Units with typical AU-to-AU spacing in the order to 10-20m, supporting system throughput up to 1Tbps in D-MIMO operation.

6GTandem aims to provide:

- Optimized design of the dual-frequency operation
- Uniform ultra-high throughput coverage
- Off-load lower frequency bands
- Provide new services such as high-resolution sensing and positioning

## Key Objectives:

1: Develop the 6GTandem system concept driven by use cases requirements
2: Modelling of the 6GTandem system
3: Design of waveforms and communication strategies
4: Development of sub-THz radio stripe hardware
5: Propose new services enabled by the 6GTandem system
6: Validation

## Key technologies used/investigated:

- Cell-free M-MIMO, RF based positioning
- Sub-THz packaging technologies based on eWLB
- Sub-THz radio stripe

# Standardization Activities



## Targeted standardization bodies / groups:

- 3GPP CT
- 3GPP RAN
- ITU-T groups: SG13 - Future networks and emerging network technologies
- ITU-FR groups: SG5 in its WP5D on 6G vision and requirements and SG 1 - Spectrum Management.
- ETSI ISG mWT/THz

ERICSSON

3GPP and ETSI, and it is a Partner Contribution to standards member of the IEEE standards association

infineon

IEC standards for radio frequency and fibre optic connector interfaces

HUBER+SUHNER

## May lead to standardization:

- Radio interfaces and D-MIMO
- Protocol design for dual-frequency operation

# Thank you for your attention!

# 6GTandem Grant Agreement No. 101096302

If you need further information, please contact the coordinator:

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