REINDEER

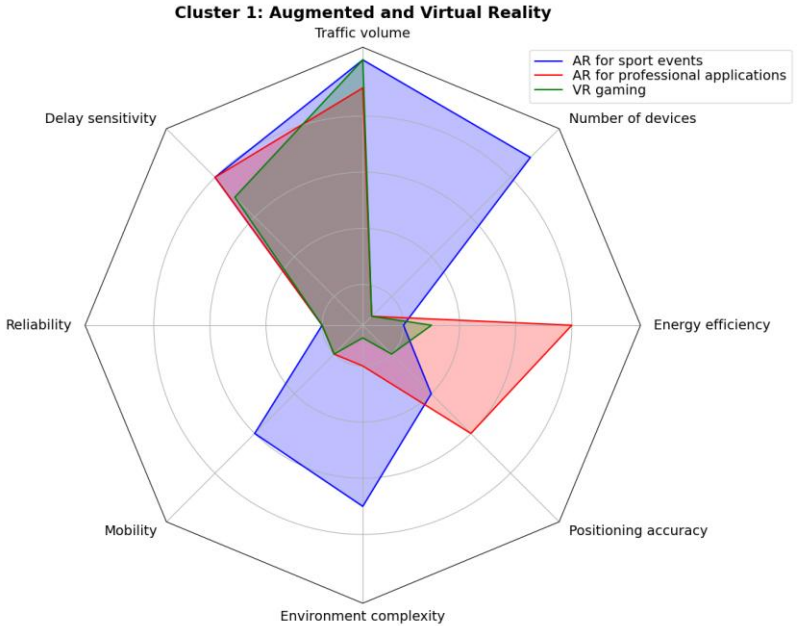
My opinion - not fully focused on THz radios

"There is more to life than increasing its speed"
– Mahatma Ghandi

EUCNC 2022, panel hardware challenges, Liesbet Van der Perre, KU Leuven

What are the biggest disruptions and challenges in technologies as we are moving towards THz region and what use cases they will potentially enable?

- Challenges:
  - Coverage
  - Energy consumption
- Disruptions (related to the challenges): distributed many-antenna infrastructure
- Use cases: AR/VR



What are the key new enabling technologies that we need compared to generations up to 5G when moving up in data rates (and thus carrier frequencies)?

1. Energy efficient infrastructures/deployment: distributed architectures

2. Energy efficient link: many antennas – **'right sizing'** of carrier frequency

3. Energy efficient transmitters and receivers:
   - RF: operating PAs close to saturation
   - Baseband: data shuffling/storage
   - (non-issue: matrix operations)

Does it make sense to combine radio communications, localization, sensing, imaging and spectroscopy and which of them? Or should they be seen as stand-alone functions in future devices?

- Functionally: yes - many identified 6G use cases will benefit from/require position information

- Technologically: How to define ‘combine’ – opportunistic approach? (see later)

Do you see any role or opportunities in machine learning or artificial intelligence that would facilitate RF/digital hardware design and not just require more computational resources?

Yes

In particular coping with non-ideal RF front-ends, 'physics-inspired'-learning approaches may help to build high performance systems with relatively low cost-low power hardware

What are the key items from your perspective requiring early-phase co-design between HW and communications/sensing systems?

Share ‘resource pool’ could help to avoid the ‘duck’ syndrom