

## **CSP-NET Breakout: Communication and Signal Processing & Networking Interface**

**Discussion Leaders:** March Mezzavilla, Ismail Guvenc, Haitham Hassanieh, Tom Henderson, Yuichi Kakishima, Fujio Watanabe, Matthew Andrews, Jing Zhu

**Part 1:** 30 minute intro/presentations from discussion leaders (10' academic, 20' industry)

- What's the biggest pain point in mmWave research?
- What's the most important challenge within the interface CSP/NET?
- What's the ideal simulation/emulation tool for mmWave?
- What's the biggest challenge for 2020? How about 2025?

Academics: 2' minutes each (1 slide - punchline)

- Brief introduction (affiliation, general research interest/experience)
- mmWave-related topic: Ismail - Raytracing, Haitham - Platforms, Tom - ns3 PHY abstraction, Marco - ns3 e2e mmWave

Industry: 5' minutes each

- Brief introduction (affiliation, general research interest/experience)
- mmWave-related topic: NTT DOCOMO - Experimental trials, Interdigital - Standardization, Nokia - multi-hop in ns3, Intel - TCP in ns3

**Part 2:** Open discussion, 60 minutes, based on a list of questions, including

- Channel abstraction. The main challenges are (i) directional time-dynamics and (ii) blockage: traces or statistical models?
- Are there components of the channel models that we still need to understand to perform reasonable simulations?
- Antenna abstraction: how much should we simplify the antenna pattern? What's the impact on interference characterization, MAC, et cetera?
- What are the appropriate tools for networking research? What simplifications are reasonable at the physical layer to scale up the number of nodes?
- Some PHY-MAC layer procedures may be centralized. What is the appropriate interface to the coordinator? What are the bandwidth / delay requirements?
- How can we model delayed/imperfect CSI, pilot contamination, beam non-alignment, et cetera, to measure the impact on the network performance?
- What traffic models should we use, in order to capture the key 5G requirements?
- Network discovery / tracking. How do we model this at a network layer in order to model handover / cell selection?
- Similarly, how are we going to design and test PHY/MAC for new use cases like vehicular and aerial communications?