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OULU 5G test network – Rationale, structure and rollout

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The 5th generation (5G) mobile communication systems are expected to revolutionize everything seen so far in wireless systems. The requirements for 5G vary by application but will include data rates ranging from very low sensor data to very high video content delivery, stringent low latency requirements, low energy consumption, and high reliability. All of these technological requirements are expected to be achieved while keeping the same or lower cost than today's technologies. The application scenarios range from usual broadband mobile to machine-to-machine communications, real-time control with low latency and low data rate sensor networks with large number of nodes, to mention a few. There is general consensus that these goals cannot be met with one single technological solution. The next generation standard will contain a wide range of technology components that can be leveraged depending on time, place and needs. It is also quite evident that the next generation standard must be open enough to allow drastically new technologies not even known during the development phase. Depending on the expected time-frame for 5G roll-out, there are very different views on the 5G system concept. The World Radio communication Conference (WRC'15) was quite important in setting the directions towards the next standard. At WRC'15 new agenda items were suggested to the following WRC'19 event where final decisions on frequency allocations for 5G mobile systems will be made, thus highlighting the timeliness of our research agenda. The planned timeline for 5G system standardization (first standard ready around 2019) means that major innovations will be related to novel spectrum sharing schemes, network virtualization, densifications of cells and other new network architectures including M2M and moving networks. Thus, it is quite clear that air-interface will not play a major role in the first phase of 5G, but will become quite critical beyond 2020 once new spectrum allocations towards higher frequency bands have been made. Thus, the key driver in Oulu based 5G test network is to develop new small cell focused operator business models and innovations around the test network.

Biography

Ari Pouttu has scientific and engineering experience as a researcher, project manager and research manager in fields such as synchronization, interference suppression, coding, and modulation designs in spread spectrum and multicarrier systems. The projects under his command have resulted waveforms and system designs for military radio communication, radar systems, embedded device networks, future wireless radio communications including cellular systems, cognitive networks and navigation applications. He has also been involved with architecture design for Finnish Software Radio including adaptive antennas and related algorithms. He has published more than 40 conference or journal papers in the field of wireless communications and holds two patents. He was the Director of Centre for Wireless Communications in the University of Oulu from 2006 to 2012. Currently, he is heading a research group targeting dependable wireless solutions including solutions for 5G.

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