WWRF: From 5G Huddle Events to ITU Evaluation Group

Presented by
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WWRF

- Founded in 2001
- Formed from EU-funded Wireless Strategic Initiative
- Founder members: Nokia, Ericsson, Motorola, Alcatel, Siemens
- Now more global
- Huawei, Nokia, Intel, China Mobile are leading influences on Steering Board
- Many leading universities participate
- Two Forum meetings per year
- 5G Huddle event
- Publications, workshops, etc.
WWRF and ITU

• Liaison with WP5D of ITU
• Presentations to various ITU Workshops
  –  A New Generation of e-Health Systems
  –  5G : on the count of three…… paradigm shifts
• ITU-R WP5D, #13 meeting, Workshop on "Research views on IMT Technology Evolution", Geneva, Switzerland, July 2012
• ITU_R WP5A - “Requirements and Technologies for The Next Generation of Mobile Communications”, Geneva, Switzerland, in May 2013
• ITU-R WP5D, #18 meeting, Workshop on Research Views on IMT Beyond 2020, Ho Chi Minh City, Vietnam, February 2014

• Participating in ITU IMT-2020 Evaluation Process
Most Recent Events

5G Huddle and WWRF 40

- Events held in Durban, South Africa, May 29th to 1st June, 2018
  - WWRF First Venture in Africa
  - Interested Countries:
    - Kenya, Tanzania, Burkina Faso, Zimbabwe
  - WWRF Members:
    - CSIR – Meraka Institute
    - The Independent Communications Authority of South Africa (ICASA), South Africa
Keynote Speakers and Focus of 5G
Huddle, South Africa

- Continuing the path to an ‘all inclusive’ 5G infrastructure
- Preparing for the reality of 5G – how ready are regions around the world to start reaping the rewards of 5G?
- Spectrum strategies to meet connectivity needs for ALL 5G
  Use cases
- The 5G journey in Africa – Challenges and Opportunities
- 5G in action: implementation and trials across vertical markets
- Real-world implementation of 5G - building the business case through trials and pilots
- Achieving the benefits of 5G in both cities and rural areas – plans and strategies
- 5G in the health sector – transforming health care and wellbeing
- 5G and Smart Water Management
- The role of 5G in delivering a smarter energy and utilities sector
- E-Government – The role of 5G in enhancing citizen engagement, efficiency, transparency and accountability
IMT 2020 Evaluation Group
WWRF Vision and Differentiators

• **Objective**> Focus on Perform advanced technologies evaluation studies based on realistic channel and system modelling assumptions

• **Leveraging**> previous 3G and 4G expertise of members, academic excellence and industrial experience, a global technology perspective and a strategic insight on all factors of the wireless evolution technology chain
Usage scenarios of IMT for 2020 and beyond

**Enhanced mobile broadband**
- Gigabytes in a second
- 3D video, UHD screens
- Work and play in the cloud
- Augmented reality
- Industry automation
- Mission critical application
- Self-driving car

**Future IMT**
- Massive machine type communications
- Ultra-reliable and low latency communications

**Smart home/building**
- Voice
- Smart city
**Capacity scaling**
- massive infrastructure deployment density over large geographical areas that is technologically and financially feasible
- new niche and business opportunities
- introduction of new value chain actors.

**Crowded Local Access**
- massive data local access for dynamic crowds addressed through the interplay of technological and architectural innovations.
• Massively Available Connectivity
  — 5G will accommodate for bursty IoT communications by providing the necessary infrastructure and operations to handle the vastly diversified QoS requirements.

• Reliability and Latency or 5G as the ‘network of control’
  — The realization of Tactile Internet or the Network of Control will open up an “unforeseeable plurality of new applications, products, and services”.


• **Large/ Massive/ Network-MIMO:**

![Image of Large/ Massive/ Network-MIMO](Image Credits: Linkoping Univ, Emil Bjornson)

• **Ultra Dense Networks (‘Cell-less’ wireless):**

  - Topologies and densities of traditional networks
  - Traditional network with increased and diverse traffic requirements
  - Breaking the cellular barrier with an H-UDN approach

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**D2D**: exploiting intelligence at the edge of the network with Device-to-Device (D2D) connectivity and/or smart caching at the mobile side may offer an excellent network load balancing opportunity.

**M2M** supporting a massive number of low-rate devices in the future IoT, in a plethora of diverse scenarios, and very-low-latency data transfers.
WWRF IMT 2020 Evaluation Group

Technical Approach

- **Modelling**: Classification of 5G resources, propagation and channel modelling, node topology (geometry, density, ..)

- **Theoretical Tools to formulate and analyze problems**: Stochastic geometry, Information theory, Mathematical Programming

- **Management models & algorithms**: Understanding the fundamental performance levels. Centralized & Distributed approaches for dynamically assigning resources and assessing performance (by means of system level simulations)
WWRF IMT 2020 Evaluation Group
Membership and Expertise

• **Members** > spanning all stakeholders, bringing in a global perspective, and connecting with all 5G regional initiatives, namely
  – industry (Huawei, Intel, ..),
  – operators (China Mobile, ..),
  – academic research (Carleton University, Canada; CTTC Barcelona; Univ. of Piraeus, Greece; CSIR (South Africa),
  – Europe, North America, Asia, Africa
  – 5GPPP, 5G Forum, 5GMF, ..

• **Expertise/experience** > advanced technologies research and assessment, ITU-R WP5D procedures, system modelling and requirements specifications, large scale system level evaluations
Concluding Remarks

• WWRF & ITU
  – An international “networking platform” between industry and academia
  – Long experience in collaboration with research, regulatory and vision developers across continents
  – Regular and active collaboration with ITU – contributions made to several WP 5D and WP 5A events
  – Active in 5G space from 2012 onwards through WWRF meetings, international workshops and 5G Huddle events around the globe
  – Academic and industry members (of WWRF) actively working in setting-up an ITU Evaluation Group
    • Performance evaluation of PHY and MAC through simulations is aimed at.