5G Enabling the Vehicular Communications Market (WWRF’s ways forward on V2X)

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ITU Workshop on Vehicle Communications and Automated Driving
Beijing, China
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Outline

Introduction of WWRF

- Vertical industries will thrive in 5G networks
- ITU’s visions and requirements on 5G
- VIA at WWRF – A new platform to develop V2X technologies
WWRF (Wireless World Research Forum)

- Develop future vision of the wireless world
- Enable and facilitate the translation of the vision into reality
- Bring a wide range of parties together to identify and overcome significant roadblocks to the vision
- Inform and educate on trends and developments

- Global operation
- Covers every technical field of wireless communications and mobile networking
- Open to all
- Based on membership

70 member organizations

- Manufacturer
- Network operator
- Industry organization
- Academic institute
- Research organization

- Africa
- Americas
- Asia
- Europe
WWRF publications and activities

Recent white papers and books
• LTE Small Cell Enhancement
• User 2020 – a vision
• User perspectives on social networking
• Smart cities and ageing populations
• Cybersecurity for the Future Internet
• Mobile in Africa

Work in progress
• 5G Vision
• 5G Radio technologies
• Mobile in India
Next WWRF events

5G Huddle
October 13 & 14, 2015
Copenhagen, Denmark

WWRF #35 Meeting
October 14 & 16, 2015
Copenhagen, Denmark

WWRF #36 Meeting
May, 2016
Beijing, China
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5G: enabling internet of human and things

Vertical industries will thrive in 5G era

2G -> 3G -> 4G

Voice -> Data -> Rich data

Human-centric Communications

4.5G -> 5G

Machine type communication -> Internet of human and things

Human + Machine Communications

Human-centric Communications

5G: enabling internet of human and things

Vertical industries will thrive in 5G era

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Human + Machine Communications
Organizations for vertical industries

- Google, Nokia: Car
- QC: home automation
- Apple: HomeKit
- Google, ARM: home automation
- GENIVI
- Open Automotive Alliance
- CarConnectivity Consortium
- Open Interconnect Consortium
- Thread
- AllSeen Alliance
- HomeKit
- Hyper/CAT
- oneM2M: MNO
- Siemens: IoT architecture
- ISO/IEC 30141
- IEEE: P2413, 802.24
- GE, Cisco, Intel, IBM, AT&T
- NIST: CPS PWG
- Industrial Internet Consortium
- Intel & Samsung
- Smart Grid, Smart city
- LoRa
- IBM, Semtech
- ITU: SG 16
- AIOTI
- Home auto, energy management

Industry Internet
Network
Service & Application
Why bring verticals into telecom?

- Maximize the value of the telecom networks
  - Monetize the telecom network → Create new services
  - Reuse the existing infrastructure as much as possible → Environment-friendly
  - Virtualization and resource sharing among different verticals → Environment-friendly
5G: convergence of telecom & vertical industries

- VIA (Vertical Industry Accelerator)
- Industry 4.0 Open Lab
- 5G Open Platform
- Open Platform for Industry Cooperation & Innovation

5G: Convergence of Telecom & Vertical Industries

IoV, Smart Grid, e-Health, Smart Metering, …

Telecom Industry

Vertical Industry

Partners: HUAWEI, vodafone, ERICSSON, METIS, Fraunhofer, BOSCH, SIEMENS, SAP, BMW
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ITU’s visions on 5G (IMT-2020)

Source: Document 5D/TEMP/625-E, ITU 22nd Meeting of Working Party 5D, San Diego, USA, 10-18 June 2015
ITU’s requirements on 5G (IMT-2020)

Enhancement of key capabilities from IMT-Advanced to IMT-2020

The importance of key capabilities in different usage scenarios

Source: Document 5D/TEMP/625-E, ITU 22nd Meeting of Working Party 5D, San Diego, USA, 10-18 June 2015
A lot of uncertainties in 5G vertical requirements

- Requirements for vertical industries (MMC, URC) are still vague
- That’s where **VIA-WGs** come in

**VIA-WG**: Vertical Industry Accelerator — Working Group
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VIA under construction in WWRF

- **Chair**
- **Executives**
- **Steering Board**
- **Vision Committee**
  - **WG A** User Needs & Requirements
  - **WG B** Services, Devices and Service Architectures
  - **WG C** Communication Architectures and Technologies
  - **WG D** Radio Communication Technologies

- **Secretariat**

- **VIA Plenary**
  - **WG-V1** V2X (Vehicle-to-X)
  - **WG-V2** Tele-presence
  - **WG-V3** Smart Metering
  - **VIA (Vertical Industry Accelerator)**

- **VIA under construction in WWRF**
  - Bring new members into Steering Board: More key 5G players, vertical industry operators and vendors, auto makers, ...
  - Create VIA as a pre-standardization platform
  - Seed and cultivate new technologies
  - Target the convergence of telecom and vertical industries
  - Proposal of VIA-WG is open to any company or organization
Why VIA-WGs?

VIA-WGs are open to all parties that will be involved in the specification of vertical industries.

VIA-WGs

WWRF

Visions, Scenarios & Technologies

SDOs (CT)

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Why WWRF for VIA-WGs?

- WWRF is a **mature** international organization
  - Full-fledged charters and bylaws
  - Diversified members from both industry and academia
  - In a nutshell, *a platform with very good infrastructure!*

- WWRF would like to become a forum
  - where new ideas / concepts are announced to the world
  - where industry meets academia
  - where telecom industry meets vertical industry
  - where CT (communication tech) meets IT (information tech)

- On this pre-standardization platform
  - The telecom and vertical industries need to sit down to talk
  - New scenarios, use cases, requirements and technologies need to be discussed
  - Consensus needs to be built
  - …
  - Necessary preparation needs to be done before going to SDOs like 3GPP
V2X (vehicle-to Anything)

Self-driving car is NOT accident-free ...
(11 accidents in 6 years for Google’s self-driving car)

An OS for cars?

Safety of Transportation

Huge demands for data

V2X
(vehicle-to-anything)
Auto and telecom engineers have different knowledge sets

**Auto Engineer:** What the heck is modulation, channel coding, TTI, ...?

**Telecom Engineer:** I don’t understand the mechanics, radar or sensors built in the car.

**V2X Project**
How to pull it off?

V2X: vehicle-to-anything (vehicle, infrastructure, pedestrian, ...)

**Professor:** I’m not familiar with either engineering or standard issues.
VIA-WG will bridge automotive and telecom industries

**Auto Engineer:**
The response time of auto-brake has to be less than 1ms to avoid crash.

**Telecom Engineer:**
Well, I think we can help by shortening the TTI to 0.1ms ...

**Professor:**
Didn’t you know that I have invented a groundbreaking technology?

**VIA-WG**
- Pre-standardization platform prior to SDOs
- Consensus building for different industries
- Sort out scenarios / requirements
- Boil down scenarios to technologies
- Seed & cultivate new technology
- Identify future trends
Join us!
Thank you!

http://www.wwrf.ch/