5GAA Webinar:

On the right road with C-V2X

June 11 at 10:00 PDT
Agenda

Introduction
Maxime Flament, 5GAA CTO

Existing commercial OBU and RSU solutions
Jason Ellis – Director, Automotive Business Development at Qualcomm

C-V2X Deployment Activities in Georgia, US
Alan Clelland – Vice President, West at Applied Information

Pre-deployment activities in Virginia, US
Anupam Malhotra – Director, Connected Vehicles & Data at Audi of America

Q&A
Moderated by Maxime Flament, 5GAA CTO

Invitation for a discussion between 5GAA & US Road Infrastructure Owner-Operators on:

✓ rich C-V2X technology ecosystem
✓ ongoing C-V2X deployment activities
✓ C-V2X solutions are available today
Practical Information

Q&A:

• After the presentations, there will be time for a Q&A session
• We kindly ask you to submit your questions in a **written form**, using the **question bar** rather than raising your hand
About 5GAA

• The 5G Automotive Association (5GAA) is a global, cross-industry organization of companies from the automotive, technology, and telecommunications industries (ICT), working together to develop end-to-end solutions for future mobility and transportation services.

• 5GAA supports the idea that 5G will be the ultimate platform to enable C-ITS and the provision of V2X.

• This webinar is an initiative under our “Friends of 5GAA” membership structure, designed specifically to engage with road infrastructure owners & operators (IOOs) and road authorities globally.
What is C-V2X (Cellular-Vehicle to Everything)?

A comprehensive road safety and traffic efficiency solution that allows vehicles to communicate with:

- Other vehicles (V2V)
- Cyclists via smartphones (V2P)
- Pedestrians via smartphones (V2P)
- Mobile networks (V2N)
- Road Infrastructure (V2I)
C-V2X has two complementary communication modes

**Direct (= Sidelink)**

- **V2V**, **V2I**, and **V2P** operating in ITS bands (e.g. ITS 5.9 GHz) independent of cellular network

**Short range** (<1/2 mile), location, speed

Implemented over 3GPP’s “PC5 interface”

**Network (= Up/Downlink)**

- **V2N** operates in traditional mobile broadband licensed spectrum

**Long range** (>1/2 mile), e.g. accident ahead

Implemented over “Uu interface”
Have a great webinar!
Publicly Announced C-V2X Commercial OBU and RSU Solutions Based on Qualcomm Platforms

Jason.Ellis@qti.qualcomm.com

Qualcomm
Non-NDA

11 June 2020
Qualcomm has a Vibrant Ecosystem of C-V2X Solutions

- Qualcomm offers 3 chipset platforms with C-V2X
  - MDM9150 (PC5, GNSS, Apps Processor)
  - SnapDragon 4G Automotive Platform (4G/3G/2G Uu+PC5, Multi-Freq GNSS, Apps Processor)
    - https://www.qualcomm.com/products/snapdragon-automotive-4g-platform
  - SnapDragon 5G Automotive Platform (5G/4G/3G/2G Uu+PC5, Multi-Freq GNSS, Apps Processor)
    - https://www.qualcomm.com/products/snapdragon-automotive-5g-platform

- Qualcomm SA2150P is a fully integrated V2X platform, complementing above modems, along with OBS Aerolink security for complete and mature C-V2X solutions

- Module manufacturers are shipping products today (automotive Tier2); others not listed due to NDAs:
  - Gosuncn
  - LG Innotek (LAM-V500)
    - http://www.lginnotek.com/en/tk_news/ql%ec%9d%84%eb%85%b8%ed%85%8d-%ec%b0%8%eb%9f%8%ec%9a%a9-c-%eb%aa%a%eb%93%88-%ea%b0%9c%eb%b0%9c/
  - Neoway (A90)
  - Quectel (AG15, AG520R, AG550Q)
    - https://www.quectel.com/product/list/AutomotiveModule.htm
  - SimCOM (SIM8100)
  - WNC (WNC C-V2X)
  - ZTE (ZM8350)
Commerical C-V2X RSU and OBU Products Shipping Today From:

- Applied Information
  - https://appinfoinc.com/applied-information-cv2x-testing-in-metro-atlanta/
- Chemtronics
- Cohda Wireless
- Commsignia
  - https://www.commsignia.com/hardware/
- Danlaw
  - https://www.danlawinc.com/v2x-hardware/
- Ficosa
- Genvict
- iSmartWays Technology
- Kapsch TrafficCom
  - https://connectedvehicles.kapsch.net
- Lacroix City
  - https://www.lacroix-city.com/activities/v2x/products/
- Nebula Link
  - http://www.nebula-link.com/Product/view/id/4
- Neusoft
  - https://www.reachauto.com/
- Savari
  - https://savari.net/technology/road-side-unit/
- RED certified products bring C-V2X commercial readiness to Europe

Some product announcements were delayed due to COVID-19, which are not yet listed because the PR was postponed. Even more solutions are NDA-only, and a number are in development. C-V2X connected cars are also coming shortly.

- Products include aftermarket OBU, factory-fit Telematics/C-V2X TCUs, RSUs, Dual-Radio RSUs, RSU+eNB
Thank you

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Cities Lead CV Deployments Too!

Alan Clelland
Applied Information
The Georgia Experience

- Local agencies in the Atlanta metro region collaborating to deploy over 1000 contiguous CV intersections
- C-V2X deployments:
  - Marietta
  - Alpharetta

Metro Atlanta CV-1K Project

On the right road with C-V2X
Applied Information C-V2X Deployment Approach
Marietta, GA

- 1st city in the United States to deploy a city-wide C-V2X (V2N) cellular-based connected vehicle system
- Protecting Vulnerable Road Users through smartphone CV Applications
Marietta, GA

Equipped Components:
• 120 Connected Intersections
• 30 Emergency Vehicles
• 70 Buses
• 40+ Radar Feedback Signs
• 40+ Timed School Beacons
• DMS Signs
• Public V2X Smartphone app (using SAE J2735 & SAE J2945

Applications:
• Emergency Vehicle Preemption
• Cyclist and Pedestrian collision detection
• Pedestrian detection at Crosswalks
• Transit Signal Priority
• Smart school zones, work zones, and speed zones
• DMS Sign Annunciation
• Remote Monitoring and Maintenance

Protecting Vulnerable Road Users through a smartphone CV Application

On the right road with C-V2X
Results

• Remote monitoring and maintenance for all intersections within the city.
  – Cost savings for city traffic operations staff
  – High availability of Connected Vehicle equipment that is monitored and maintained 24/7

• Emergency response
  – Response times decreased by an average of one minute per call
  – Additional lives saved from improved response times
  – Cost savings realized by not having to build new fire stations

• City-wide TSP to ensure buses arrive on time
• TravelSafely application being rolled out to the public (Public & Political perception is positive with plans on advertising the app from the city)
• Plan to install equipment on police and school buses

On the right road with C-V2X
Alpharetta: Smart investment in a Connected Vehicle infrastructure

On the right road with C-V2X
going beyond SPaT.....

- **Fire trucks** getting *preemption* at traffic lights
- **Transit buses** getting *priority* at traffic lights
- **School buses** interacting with passing vehicle traffic on streets
- **Freight trucks** getting green lights in off peak periods
.... and beyond the signalized intersection!

- **School zones, work zones, pedestrian crossings:** The traffic infrastructure beyond intersections
- **Free smart phone app** showing multiple use cases (and benefits of the Uu interface)
- **VRU support** (pedestrian and cyclists)
- **(Upcoming) Left turn assist:** Virtualized BSMs and PSMs
Deployment Showcase

The Infrastructure Automotive Technology Laboratory

iATL Technology Laboratory
The place to collaborate in CV!
Thank you!

Alan Clelland
Applied Information Inc
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Paving the Future of Smart Cities

On the Right Road with C-V2X: 5GAA Webinar

June 11, 2020

Anupam Malhotra
Director, Connected Vehicles & Data
AUDI TRAFFIC LIGHT INFORMATION
LIVE Intersections in the U.S.

- Technology
- Vehicle Rollout
- Infrastructure Rollout

https://media.audiusa.com/en-us/releases/412
Audi of America, Virginia DOT and Qualcomm announce initial C-V2X deployment in Virginia

- Joint efforts to launch initial deployment designed to help enhance safety on select Virginia roadways using C-V2X communications beginning in the third quarter of 2020
- Projects aimed at expanding safety use cases in the vital connected vehicle safety spectrum established by the FCC and proposed to be allocated for C-V2X
- Safety use cases enabled by C-V2X technologies hold potential to dramatically lower fatalities exceeding 36,000 people per year on U.S. roadways
Enabling the virtuous cycle is key to the realization of societal benefits!

- 615K crashes can be reduced with V2V technology
- 36K annual fatalities on U.S. roads can be reduced with V2X
- $800B of economic impact through V2X services
- Vulnerable Road Users (bicyclists, pedestrians, construction workers, etc.) are a particularly important group that will benefit from active safety technology.

- Connected Tolling and similar Road-Usage Charging services can provide a monetary life-line to support investments
- Roadside unit install costs can also be borne as part of the 5G build-out by carriers
- New data-driven services can create further value

- Initial focus on DSRC, but significant progress in Cellular-V2X, integrating short-range and “5G” communications, shifts the landscape for Audi.
- DSRC can no longer be considered a de-facto standard but is an option that will compete in the market.
- Monetizable services initially planned for legacy V2X now possible with cellular.
- Existing Connected Services provide a baseline business case for building active safety services without high costs
Thank you
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Thank you for joining!

For more information please contact:

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