5TH ANNIVERSARY PUBLICATION

5GAA
Automotive Association

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EDITO

"C-V2X continues to drive the automotive transformation – and is now the new reality."

Christoph Voigt
Chairman of the 5GAA Board

These past years have seen revolutionising digital transformations and challenging innovative mobility solutions. 5GAA keeps on shaping the new era of mobility and paves the way towards connected driving. As individuals, in teams, and together with our members, we have embraced digital transformations as opportunities for transportation innovations.
Today, we celebrate five years of intense activities, global cooperation, partnerships and demonstrations that resulted in remarkable achievements.

Our purpose is to develop end-to-end solutions for future mobility and transportation services for road safety, improved traffic efficiency, sustainable impact and more comfortable driving. While our purpose is not new, it is more relevant than ever. It reminds us that 5GAA exists to ensure future generations' wellbeing in a safe and sustainable transportation ecosystem.

For five years, our vision has been guiding the association, gathering eight early co-founding members with the same ambition, and quickly bringing together more than 110 members from the automotive, technology, and telecommunications industry. This rapid expansion generated a genuinely global platform and connected community for cross-industry cooperation.

Members include 13 of the top fifteen global automakers and 9 of the top ten global mobile network operators.

The exponential geographical reach of the association allows 5GAA to exert some influence on the connected driving stage. 5GAA is seen as a leader and enabler at a global level. It has successfully established C-V2X (cellular vehicle-to-everything) and 5G as the technology of choice in the market through numerous partnerships, bringing the expertise of manufacturers to develop 360-degree solutions for safer and more sustainable mobility. Thanks to these partnerships, 5GAA has established more than mobile broadband connectivity, integrating the multiple facets of connected mobility such as interoperability and standardisation.

People bring our purpose and vision to life. We have taken the future of mobility to a new level these past years, accelerating research and organising live demonstrations worldwide, which focused on interoperability tests. The Shanghai, Washington, Paris, Berlin and Turin demonstrations prove that a connected ecosystem holds the unlimited possibilities of investing in C-V2X and 5G. I also take this opportunity to thank our members for their hospitality and for showcasing these crucial innovations' outstanding performance.
We have continued to stand firm on our purpose throughout the years, regularly positioning the association and sharing our members' concerns with institutional bodies. Even though a set of challenges remains to be resolved, we hope to keep seamless exchanges with the institutional actors to unleash the potential of a connected ecosystem.

Today, I am proud to be part of an innovative and ambitious association that strives for a better future as it bridges cultural and technical differences. In this 5th-anniversary special publication, we have gathered some of the greatest stories of impact and success in relation to C-V2X in some regions, such as China and the US, as well as insightful interviews.

I hope you will enjoy the read.

5 years of 5GAA

Sept. 2016

The foundation

AUDI AG, BMW Group, Daimler AG, Ericsson AB, Huawei, Intel, Nokia and Qualcomm Incorporated, launch the '5G Automotive Association' to address society's connected mobility and road safety needs.

Feb. 2017

First 5GAA Meeting

5GAA holds the first in-person meeting in Barcelona, bringing all the Association's members together.

Apr. 2017

5GAA joins 3GPP

5GAA becomes a Market Representation Partner (MRP) in 3GPP, bringing to the 3GPP environment the influence and expertise of vehicle manufacturers and a variety of important companies from the automotive sector.

Jul. 2018

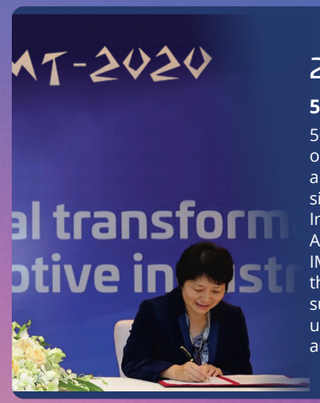
First EU demonstration of C-V2X direct communications interoperability between multiple automakers

5GAA, BMW Group, Ford and Groupe PSA team up to showcase C-V2X advanced performance during the first European demonstration of C-V2X direct communication between multiple transportation actors.

2017

5GAA signs five MoUs

5GAA partners with five influential organisations to foster cooperation and build a better mobility ecosystem. The association signs partnerships with the Global TD-LTE Initiative (GTI), NGMN Alliance, European Automotive and Telecom Alliance (EATA), and IMT-2020 (5G) Promotion Group. Together, the partners are dedicated to better-supporting standards, spectrum, and related use cases in the field of connected and autonomous driving solutions.



2018

Road Operators Workshop

5GAA holds the first Road Operators Workshop in Munich

Aug. 2018

24 CEOs from 5GAA member companies send letter to the European Commission on Connected Car Legislation

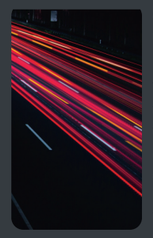
5GAA's members share a letter – signed by 24 member companies – to invite the European Commission to adopt a regulatory framework for Cooperative Connected and Automated Mobility that includes C-V2X on the list of potential technologies.

Nov. 2018

5GAA publishes test results in support of C-V2X FCC petition for Waiver

5GAA files a petition for Waiver with the Federal Communications Commission of the US requesting that C-V2X be allowed to operate in the 5.9 GHz band.

Feb. 2018



5GAA announces deployment of LTE-V2X by 2020

The C-V2X technology will be tested, validated, and commercially available in vehicles in 2020. It addresses the challenges of delivering increased data volume, managing greater scale in connected devices, reducing latency and providing high reliability.

Apr. 2018

5GAA appoints CTO Dr Maxime Flament

Dr Maxime Flament is appointed CTO to advance the 5GAA mission of developing the framework supporting the next-generation of connected mobility solutions.

Apr. 2018

5GAA, Audi, Ford and Qualcomm Showcase C-V2X direct communications interoperability.

2018

5GAA signs four new partnerships

5GAA accelerates the path towards connected and autonomous driving and signs four new partnerships, namely Global Certification Forum (GCF), VDT Alliance, Electronic Communications Committee (ECC), 5G Infrastructure Association (5G IA).

Mar. 2019

5GAA and GCF collaborate on certification and testing

5GAA and the Global Certification Forum (GCF) agree on a collaborative framework combining resources to address market needs for LTE-based V2V and V2X communications technologies and accelerate the global introduction of C-V2X products.

Apr. 2019

5GAA first C-V2X testing event in Europe successfully demonstrates exceptional level of interoperability.

Jan. 2019

5GAA kicks off 2019 with the first Working Group face-to-face meeting of the year, held in Seoul. As part of this meeting, 5GAA has organised a joint workshop in partnership with 5G-Forum and ITS Korea.

May 2019

5GAA live demos event in Berlin for safer roads

5GAA showcases the smart mobility technology developed over the past years and being a reality, during a live demo in Berlin. Thanks to C-V2X technology, vehicles communicate with the cloud, directly with other vehicles, and with surroundings.

Jun. 2019

5GAA and Turin start a first partnership with a public authority

5GAA and the City of Turin become official partners at the occasion of 5GAA's Connected and Automated Driving Workshop in Berlin. The City of Turin is the first public authority 5GAA is officially partnering with. It shows the intention of the City of Turin to start making a strategic path towards innovation.

Jul. 2019

5GAA organises its first remote C-V2X Plugtests™ event

5GAA successfully teams up with ETSI in a second C-V2X-only Plugtests™ event, taking place remotely and focusing on testing ITS Security features to support the C-V2X ecosystem in the C-ITS deployment according to the highest security standards.

Sep. 2019

5GAA and GSMA sign cooperation agreement

Nov. 2019

5GAA live demos in Turin show C-V2X as a market reality and world-first 5G-enhanced ADAS services.

Dec. 2019

5GAA organise the first-ever C-V2X Plugtests™ event with ETSI in Malaga (Spain) which confirms high level of interoperability.

July 2020

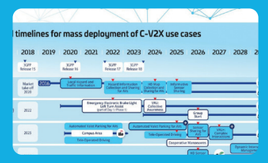
First ETSI-approved LTE-V2X System Profile

5GAA accelerates connected vehicle development with ETSI. The LTE-V2X System Profile is the first of its kind to be specified by an independent, accredited standards organisation in Europe (ETSI TS 103 723) and provides a wide upper layer configuration guidelines for C-V2X.

Sep. 2020

New 2030 C-V2X Roadmap released

5GAA releases new 2030 Roadmap for Advanced Driving Use Cases, connectivity technologies and radio spectrum needs, exploring what leading automakers, mobile network operators and their suppliers expect for the world of automotive connectivity over the coming decade.



Oct. 2020

5GAA supports the European Strategic Deployment Agenda for Connected and Automated Mobility

5GAA proudly contributes to the 5G Strategic Deployment Agenda for Connected and Automated Mobility in Europe, by the 5G Infrastructure Public-Private Partnership, a joint European Commission and European ICT industry initiative to stimulate investment in 5G ecosystems in the field of connected mobility.

Oct. 2020

Virtual showcase on C-V2X Deployment on US Roads

5GAA organises a virtual showcase on 'C-V2X Deployment on US Roads'. The event reveals the exciting C-V2X projects already on the US roads, shares innovative views from on-site companies and local authorities and focuses on the state of play and future of ITS in the US.

Oct. 2020

5GAA statement on FCC Chairman's draft rules for the 5.9 GHz Band

5GAA appreciates the FCC's recognition of C-V2X and the steps FCC Chairman has taken to support this state-of-the-art wireless safety technology. However, 5GAA shares its concerns regarding the transition in the upper 30 MHz which should not delay the availability of C-V2X that automakers are ready to deploy.

Oct. 2020

5GAA teams up with IMT-2020 to accelerate deployment of connected vehicles in China

Continuing the tradition from 2019, 5GAA partners with Chinese IMT-2020 for their 2020 C-V2X 'New Four Layers' and Large-scale Pilot Demonstrations. The demo continues to uphold the 2019 session spirit through technical tests to further promote the implementation of China C-V2X industrialisation.

Nov. 2020

Study on environmental benefits of C-V2X

5GAA releases its study, conducted by TNO, on the environmental effects of V2X communication as it is currently used in transport and can be used in future implementations to understand how connected driving benefits the environment.

Dec. 2020

GAC AION V, world's first car equipped with 5G chip

GAC works with Huawei to equip the AION V with the latest-generation Baron 5000 chip. It becomes the first mass-produced car with a pre-installed 5G chip.

Feb. 2020

5GAA officialises five new MoUs

To strengthen collaboration and facilitate dialogue, 5GAA officialises five new partnerships with several public authorities, namely the Dutch Ministry of Infrastructure and Water Management, the Italian Ministry of Technological Innovation and Digitalisation, the Spanish Directorate-General of Traffic (DGT), the German Federal Highway Research Institute (BASt) and the Electronic Communication Office of Latvia (VASES).

Jun. 2021

New agreement on C-V2X certification programme with GCF

The programme will enable manufacturers to certify their C-V2X capable products – including onboard units (OBU) and roadside units (RSU).

Oct. 2021

IMT-2020(5G) Promotion Group becomes official partner to 5GAA for 2021 C-V2X Cross-industry Pilot Demonstration (Shanghai, Suzhou and WuXi).

Dec. 2021

Live trial of 5G connected car allowing near-real-time notification of roadway hazards through 5G-Edge networks in Turin, Italy

Dec. 2021

5GAA partners with China Society Automotive Engineers (C-SAE)

5GAA signs a new partnership with China Society of Automotive Engineers (China- SAE). The two associations will coordinate their C-V2X technical, testing and deployment activities in many areas.

Mar. 2022

Live Trial of 5G Connected Car Concept allowing near-real-time notification of roadway hazards through 5G and edge technologies in Blacksburg, Virginia (VA).

Mar. 2022

5GAA partners with ETSI and DEKRA to showcase C-V2X Interoperability and discuss deployment during the plugtests at the DEKRA Automobil Test Center in Klettwitz, Germany.

Turning ambitions into innovative accomplishments

‘Today, 5GAA is regarded as the leading global organisation dedicated to automotive connectivity.’

As we close the chapter on the past five years, we see our achievements and connected driving in a new light. We learned thanks to the association that if there is a will, there is a way. Collaboration, dedication, and teamwork have defined the association and its members.
Remarkable wins and results mark these five years, confirming that 5GAA is shaping the new era of transportation through a strong market focus. 5GAA influence has grown extensively with significant successes in the industry. The association leads the connected mobility transformation through intense activity and cooperation between members.
Before looking towards the future of our association, it is essential to remember all the outstanding achievements we have earned so far.

In only five years, 5GAA has become an increasingly connected community and a global platform for cross-industry cooperation, facilitating joint engagements and competence transfers. Washington, Paris, Turin, Berlin are just some of the cities that hosted trials and demonstrations of C-V2X thanks to the successful collaboration between our members.

5GAA has successfully demonstrated C-V2X maturity, the complementarity between C-V2X direct and mobile network communications modes and has showcased advanced services based on 5G for the first time. The association has set critical milestones in the evolution of automotive connectivity to enhance road safety and improve traffic efficiency, greener environmental impact, and more comfortable driving.
More than 200 million connected vehicles

are already on the road, and the first 5G-equipped models (based on 3GPP Release 15) are now hitting the market. In this ambition, China is the first country that has fully enabled C-V2X vehicles to be commercially available, including direct communications. The US looks set to follow suit with new 5G-connected cars and 5G-supported road infrastructure in the planning.

Today, 5GAA is regarded as the leading global organisation dedicated to automotive connectivity. The association has developed several partnerships with the broader telecommunications automotive ecosystem. It now serves as a valuable platform to connect diverse partners and define the future requirements for cooperative driving.

5GAA membership has risen from eight founding companies in 2016 to over 110 members. Our current partners include research and regulatory bodies, associations, standards development organisations (SDOs), road operators and public authorities. In the last few years, the association has increasingly engaged with road traffic operators and authorities concerned with traffic efficiency and safety matters. 5G deployment requires well-developed digital infrastructures and cooperation among all stakeholders involved. Both private and public actors are crucial to accelerate their deployment.

Collectively, our members have established 5G as the reference technology for future automotive connectivity and helped transform C-V2X from a new standard to a market reality through workshops, flagship events, demonstrations, plugtests and technical publications.

One of our most significant achievements has been the publication, in 2020, of our 2030 C-V2X Roadmap, the result of the long-standing collaborative work of the 5GAA members. This Roadmap presents the results of 5GAA’s studies relating to the evolution of automotive connectivity, identifying the most promising advanced driving use cases, highlighting their spectrum needs, and describing the expected timeline for their mass-market deployment.

Moreover, 5GAA has played a fundamental role in listing V2X use cases with service-level requirements. In the last few years, the association has started to focus on all aspects of advanced use cases that will benefit from the evolution of 5G.

Although the journey has been challenging and the pandemic significantly impacted the economy and some of our activities, our members keep working hard together, showing colossal determination. We quickly shifted to the new ‘virtual’ way of working, holding regular meetings and conferences, attending virtual events, organising our work around work items to foster closer cooperation on specific technical applications of 5G and V2X technology. We set ambitious goals, and we achieved them.

But now it’s time to look ahead. We will keep on working to address society’s connected mobility and road safety needs with C-V2X technology. This has been our mission so far and will continue to guide us in the following years.

Interviews

A few words from our founding members

Dr Friedhelm Ramme
Director Product Development,
Ecosystem Expansion
Ericsson GmbH

What personally made you take the leap and join the 5G Automotive Association journey?

Friedhelm Ramme: When 5G appeared on the horizon some five years ago, it became apparent that we were approaching a new level of relevance with this generation of cellular technology. 4G LTE had united the connected consumer segments. Together with the smartphone introduction, it labelled a new era for connected consumer experiences.

Cellular 5G-V2X, with its unique features and capabilities, will mark a comparable innovation step for the connected industries. The automotive industry, with its evolution from connected cars to fully automated vehicles and further to connected and automated transportation for goods and people, will develop into a central application segment for 5G.

Given that in 2017 we were faced with two major industries, both established and rapidly evolving, it became apparent that a better mutual understanding between these industry segments would be needed. A prerequisite to ensure that upcoming 5G network features are developed and deployed so that global automotive operations and service demands can be fulfilled.

Only by working together, in a cross-industry setting, with experts providing different competences and backgrounds, such an ambition can be achieved. A global platform facilitating joint engagements and competence transfers was needed. This in fact made Ericsson, a global leader in advanced cellular communication solutions, stepping forward as founding member of the 5G Automotive Association. Today, we are proud to see how well this incubator has developed into a global flagship for 5G-V2X and cross-industry cooperation.

«C-V2X deployments are already a reality. Same as cellular network deployments were a reality already 20 years ago.»

We speak about the 'future of mobility', but C-V2X deployment is a reality already. What is the most significant achievement for you so far?

FR: Well, C-V2X deployments are already a reality. Same as cellular network deployments were a reality already 20 years ago. What has happened since these early days was a steady evolution of connected services and technologies that can support the application demands as time passes.

Who noticed that the experts are today discussing the requirements for Release-19 of the cellular technology roadmap? We expect a similar and steady evolution of C-V2X technologies and services. We are just seeing the beginning of a joint industry journey.

What are some of the most prominent challenges for achieving the "connected car of the future"?

FR: Thus far, 5GAA and the connected vehicle communities have very much focused on use case discussions. Purpose was to capture requirements, understand technology capabilities and their implications. This has helped bring the automotive and telecommunication community closer to each other.

The next and probably equally important challenge is emerging from global vehicle service operations and the global vehicle market approach. This results in the automotive sector's demand for uniform service experiences and correspondingly for uniform network behaviour, but driven via local cellular network deployment roadmaps and configurations. Despite the global standardisation of 3GPP cellular technologies, cellular networks and particular system configurations are strongly influenced by national legislation and regional economic constraints.

A further major challenge is the pending transformation of road traffic management operations and geographic responsibilities. There is significant digitalisation demand. Systems and operations need to become real-time capable, largely automated and mirror physical roads and road traffic situations in a digital information twin. This kind of information is well suited to the world of connected and automated vehicle operation, traffic and transportation of connected people and goods. 5GAA provides a good foundation that can help with these important steps ahead.

Interviews

A few words from our founding members

Jim Misener
Senior Director of Product Management and the Global C-V2X Ecosystem Lead, Qualcomm Technologies, Inc.

In what regard do you think the association was most impactful to drive progress on connected mobility?

Jim Misener: The term "drive progress" is perfectly fitting. 5GAA drives. We are a tour de force in the two pillars – automotive and telecommunications – that make connected mobility happen. Specifically, we have driven into the collective consciousness and in essence into reality both direct and wireless wide area innovation that truly enhances the literal concept of mobility via connectivity. And we do this globally.

«We are a tour de force in the two pillars – automotive and telecommunications – that make connected mobility happen.»

What's your experience of being part of such a global association?

JM: With 5GAA, I and others at Qualcomm have a capable, worldwide set of teammates, with common basic goals. We engage in significant, well-structured dialogue where diverse ideas are expressed, critically examined until consensus is achieved.

And since I am based in San Diego, California, the experience is often accompanied by waking up quite early, to be met on the other end by very cheerful, friendly compatriots in the association.

For you, what is the most important step/achievement that still needs to be undertaken to accelerate deployment even further?

JM: While I may be known within the association as 'Mr. PC5', my view is actually quite broad. The most important achievement has been to show the interlocking value or complementariness of the technologies that each and every member brings to the table. Collectively, we have made significant and positive impacts on the 5G transportation ecosystem. I know that 'the sum is larger than the parts' is overused, but in the case of 5GAA it is aptly used.

Markus Dominik Mueck
Director & Engineering Manager, Intel Deutschland GmbH

In what regard do you think the association was most impactful to drive progress on connected mobility?

Markus Dominik Mueck: 5GAA has been tremendously successful in advocating for C-V2X technology and its tight integration into the 5G ecosystem. If you look at the situation five years ago, policymakers didn't have this vision on their radar screens, and 5GAA achieved an impressive mindset change across all regions, including the US, Europe, and Asia. The regulation and technology deployment situation has evolved dramatically, and we have to thank 5GAA for all the help and support and for providing members with a platform to encourage innovations from both technology and business perspectives.

«It is inspiring to be part of this journey and to "put your mark" on technology that will enrich the lives of every person on earth.»

In your view, which C-V2X enabled use case or services do you think will have the most added value for drivers or society, and why?

MDM: Simply naming one use case or service would mischaracterise the vast value and ecosystem created through C-V2X. First of all, there are basic safety use cases that consistently increase the overall awareness and thus the safety of vehicles. But we don't stop at the level of vehicles. We include protection of vulnerable road users, including pedestrians, bicycles and the like. Just think of all the lives we will save and the injuries we prevent. The benefits for society are dramatic. Looking further into the future, we see an almost endless potential for specific services – Automated Valet Parking (AVP) and Tele-operated Driving (ToD) are just examples of particular interest as of today. In addition, cities can offer various services leveraging the low latency and high bandwidth that cellular technologies provide.

Looking five years ahead, what are the main future challenges?

MDM: The true challenge clearly lies in taking C-V2X technology to a 100% market penetration, ensuring that every vehicle on the road and suitably equipped other stakeholders (such as vulnerable road users) can actively participate in the C-V2X ecosystem, provide data to enrich the input information available to the decision-making engines and fully take advantage themselves of all available information. The final objective is to improve road traffic efficiency and dramatically increase the safety and comfort of all stakeholders.

Interviews

A few words from our founding members

Rainer Krumrein
Manager TCU Systems Development & Mobile Networks Daimler AG, Mercedes-Benz AG

Let's talk about cars; how do you think C-V2X will improve the overall mobility of people and goods in the city where you live?

Rainer Krumrein: Road safety will be a crucial aspect that will be impacted by the revolution brought by C-V2X technology. In particular, C-V2X will improve safety in areas where cars encounter each other, where sensors are weak, and the visibility is limited, such as in street-crossings surrounded by buildings. Furthermore, C-V2X will significantly improve traffic efficiency by making traffic more fluid. The result will be a reduction in traffic congestions, fuel consumption and emissions. Finally, the deployment of C-V2X is one of the key factors that will lead us towards increasingly autonomous driving.

Five years after the foundation, what are the achievements of the association that you are most proud of?

RK: In my opinion, one of the most significant achievements of the association has been the increased awareness about the many different applications of 5G technology apart from the most popular and well-known smartphone world. Indeed, the new mobile network standard 5G will enable completely new functions in vehicles and beyond, paving the way for future mobility and automated driving. Moreover, 5GAA has had a massive impact in promoting standardisation. Thanks to the outstanding preparation of 5GAA's experts, many meaningful technical solutions found their way into standardisation during the last five years.

How would you describe the "connected car of the future" (in terms of capabilities and characteristics)?

RK: The connected car of the future will always be seamlessly connected, relying on fast and accessible connectivity, enabling connected infotainment services, driving assistance, and autonomous driving. It will not notice borders and can use its connectivity not only for connected infotainment services but also for driving. Thanks to C-V2X technology, the connected car of the future will interact with road infrastructures and other road users, thus increasing safety and making transport smoother and more efficient.

«Thanks to C-V2X technology, the connected car of the future will interact with road infrastructures and other road users, thus increasing safety and making transport smoother and more efficient.»

Dr Walter Weigel
VP & CSO European Research Institute, Huawei Technologies

'5GAA brings together the information and communication technology and the automotive sectors to discuss and work for the same purpose.'

What's the most powerful aspect of the 5G Automotive Association?

Dr Walter Weigel: I think that what makes the 5G Automotive Association so unique and influential is the cross-industry dialogue it enables. 5GAA brings together the information and communication technology and the automotive sectors to discuss and work for the same purpose. There are no junior and senior members but equal partners. This is the precondition for trusted and successful work between different industries.

Let's talk about cars; how do you think C-V2X will improve the overall mobility of people and goods in the city where you live?

WW: First of all, C-V2X will dramatically improve road safety by reducing the number of fatalities and increasing the protection of all road users, including the most vulnerable such as cyclists and pedestrians. Moreover, C-V2X technology will increasingly enable automated driving, thus reducing traffic jams, energy consumption and enabling people who cannot drive (e.g. senior people) to move independently.

Five years after the foundation, what are the achievements of the association that you are most proud of?

WW: I believe much of our industries' significant progress has been achieved thanks to the contribution and support of 5GAA. Inputs to standardisation, studies, interoperability tests, use case descriptions and documents for policymakers are just some examples of the great work we have done together in these last five years.

Interviews

A few words from our founding members

Joachim Göthel
Senior Manager 'Project 5G-Alliance' in the development unit 'Electrics' BMW Group

Let's talk about cars. In the city where you live, how do you think C-V2X will improve the overall mobility of people and goods?

Joachim Göthel: Living in Europe, we have to cope with the situation that C-V2X has not yet been spread out into the market as fast and as intensively as we all intended. However, C-V2X is already there in its network-based variant and I experience C-V2X server-based hazard warnings every day when I drive my car in my home city or on a highway. I can clearly see the upcoming steps of improved safety warnings (both relying on direct communication as well as network-based communication), improved driving assistance functionality (relying on onboard cameras, sensors, and direct communication) as well as more and more automated driving. The latter will probably spread from limited locations like parking areas into everyday driving experience. Undoubtedly, 5G-V2X will be necessary to solve complex manoeuvering tasks under those automated and cooperative driving conditions.

«C-V2X is already there in its network-based variant and I experience C-V2X server-based hazard warnings every day when I drive my car in my home city or on a highway.»

Five years after the foundation, what are the achievements of the association that you are most proud of?

JG: The initial idea of joining two different industrial worlds became true. Indeed, 5GAA is the only association worldwide that is relied on as a stakeholder when assessments on automotive mobile communication are requested. No matter whether this request originates from economic, technological, or political areas. In this role, 5GAA has fostered the progressive path of C-V2X in China, the change towards C-V2X in US spectrum regulation, and, most important, corrected the EU Commission´s trial of a Delegated Regulation which was not technology-neutral then. Due to 5GAA, C-V2X none-the-less got its chance in Europe to build a rapidly emerging market, too.

What are some of the most prominent challenges for achieving the 'connected car of the future?'

JG: 5GAA has laid a secure and solid ground for realising a wide range of functions of the connected car in the future. Now it is up to all partners gathered in this association to finally deliver market-ready products and services with the quality necessary to satisfy customers' automotive needs. Out of 5GAA's many success factors, perhaps the most relevant is how it leverages the specific properties of 5G mobile networks to deliver high-performing, well-defined quality-of-service (QoS) which makes a real difference to former network generations.

Thierry Klein
President, Bell Labs Solutions Research Nokia Bell Labs

What's the most powerful aspect of the 5G Automotive Association?

Thierry Klein: Without a doubt, the most powerful aspect of 5GAA is that we have created a forum bringing together multiple and very diverse stakeholders from the automotive and telecommunications sectors. This includes communication service providers, network infrastructure vendors, chip and component providers, automotive OEMs, Tier-1 suppliers, solution and system providers, and road operators. And we are covering a very broad range of topics on intelligent transportation systems of the future, whether architecture, technology solutions, standardisation aspect, business and market trends and evolutions, or regulatory and policy frameworks. Through the breadth and depth of membership and expertise in 5GAA, we have been able to form leading positions on several critical topics and become the most influential global association for future transportation systems.

«Through the breadth and depth of membership and expertise in 5GAA, we have been able to form leading positions on several critical topics.»

In your view, which C-V2X enabled use case or services do you think will have the most added value for drivers or society and why?

TK: The most influential use cases with the biggest impact will be those use cases that increase road safety, not just for automotive drivers, but also for vulnerable road users and pedestrians, and our cities at large. Any solution and technology that drives a reduction in the number of accidents, injuries, and fatalities will have a huge societal impact. It is a moral obligation that we have to apply technology and find solutions to increase safety on our roads and highways, and in our cities. The C-V2X technologies are uniquely capable of providing increased situational awareness beyond the capabilities of sensors and cameras embedded in each vehicle. Having an advanced view of the road conditions ahead, virtually seeing around turns and in blind spots, understanding the overall traffic conditions, providing early warnings of hazardous road conditions, anticipating changing traffic lights or the presence of emergency vehicles, predicting the movement of other vehicles, road users and pedestrians, augmenting the human driver with additional information and assisted, even autonomous, driving will all lead to increased safety as well as efficiency of our transportation systems.

Looking five years ahead, what are the main future challenges?

TK: I see essentially two main challenges that 5GAA would be in a very unique position to take on. The first challenge is to tackle the issue of the responsible, verifiable, and replicable use of artificial intelligence in autonomous driving. While tremendous progress has already been made by the automotive industry at large, more work on the technology, business, policy, regulatory, insurance, and ethical side is required before we see widespread adoption of autonomous driving. The second issue is focused on sustainability and how we can enable not just safer and more efficient transportation, but also more sustainable and climate-friendly transportation. This includes for example the integration of the transportation system with the electrical grid and micro-generation energy production in another cross-industry collaboration.

Case study

The Chinese connected driving success story

China adopted a top-down approach based on long-term strategy with positive impacts on local communities

Technology advances in connected cars are revolutionising the transportation ecosystem. Interconnected mobility is enabled by road infrastructure and the interoperability of data exchange. China is leading the way for large-scale deployment, successfully introducing the C-V2X technology in new cars and creating safe, smart and efficient mobility.

Imagine a city where cars communicate between themselves, warn each other about road conditions and obstacles, exchange information with infrastructure, send notifications to vulnerable road users to be aware of potential dangers and detect pedestrians who cannot be seen. China is spearheading the deployment globally while other countries seek to close the gap to keep pace.

Back in 2017, following the 3GPP Release 14 defining LTE V2X, the Chinese government, together with the Chinese National Development and Reform Commission, set a 90% target for C-V2X network coverage in big cities and along major highways in 2020, demonstrating its ambition and leadership at developing the next generation of vehicles endorsing technologies including C-V2X and 5G. Following this announcement, the Chinese government formed a committee composed of more than twenty ministries to deploy C-V2X successfully. The committee aimed to accelerate the Internet of Vehicle strategic path and oversee the development of technical standards between the diverse technological layers.

Through this specific committee, China announced the widespread deployment of C-V2X road infrastructure to face transportation challenges and improve road safety and efficiency.

Starting from February 2020, China moved vigorously with technology. Beforehand, the ministries jointly approved a national strategy. The Smart Vehicles Innovation Development strategy was dedicated to instrumenting the large-scale deployment of critical technology. Following this, a phased roll-out was launched as a first decision, equipping new vehicles with C-V2X. China also supported short-range broadcast communication between vehicles and roadside infrastructure using C-V2X in the 5.9 GHz band.

Overall, the technology providers answered a strong desire from the local communities to make mobility more efficient and less congested, deploying 5G and C-V2X technologies and providing users with safer and more efficient mobility services.

Two years later, China is one of the most important players in the connected mobility race and is positioning itself at the forefront of connected vehicle technology deployment due to its large market size, demand for new vehicles, 5G deployment boost and extensive data analysis.

In 2021, nearly 90 cities partnered with local wireless network operators boosting the distribution of tens of thousands of roadside units to equip intelligent highways and urban network roads. Large scale deployment in China is also planned to provide half of the new vehicles with cellular connectivity by 2025.

Through its pioneering efforts, China demonstrates its visionary plans to leverage the car industry based on the full potential of wireless technologies. Automakers and network providers are closely collaborating to embrace connected driving. China was the first to define and instrument a national strategy for the Internet of Vehicle, initiating the mass production of intelligent vehicles and working towards better automotive safety, intelligence and connectivity.

Even though the Chinese government has been the first to establish and implement a national strategy for connected driving and C-V2X mass penetration, success also depends largely on global cross-network supporting extensive data analysis and share. Another indispensable aspect is the policy endorsement from national authorities. In all likelihood, other regions such as the US and Europe can take advantage of China's pioneering efforts, key takeaways and ongoing work towards connected driving, and use them for their own experience.

Stats and Projections*

Source: Statista

33%
connected cars in 2021

72%
connected cars by 2035

50%
total parc connected in China by 2029

87.5
million connected vehicles in 2025

252
million connected vehicles in 2035

Interviews

Let’s talk ‘future mobility’!

Pearse O’Donohue
Director, Future Networks,
DG CONNECT, European Commission

«These rules should ensure that market developments and technology evolution are duly taken into account and that requirements for C-ITS systems neither impose nor discriminate against the use of a given technology.»

How should we view 5G in the automotive sector; is it a game-changer or simply the next iteration of vehicle connectivity?

5G is a real game-changer because it brings secure, high-bandwidth and low-latency connectivity to vehicles and road transport for the first time. As such, it is a key enabler for connected and automated mobility (CAM), which has inspired us to aim for uninterrupted 5G coverage along Europe’s major transport paths by 2025. This objective has been reinforced in the Commission’s Digital Decade Programme, which identifies 5G Corridors for CAM as a priority investment area in the context of the unprecedented plan for the economic recovery of Europe, NextGen EU. From a wider perspective, 5G in the automotive sector will play a significant role in the digital and green transition in Europe.

When we look at the deployment situation in China, half of the new vehicles are already equipped with the critical technology and supporting road infrastructure for 5G. Why is China so advanced in the deployment of C-V2X?

China has indeed an ambitious technology and infrastructure agenda with mandatory requirements set by the government. The European Union takes a more market-based approach complemented by public funding in areas of market failure and public interest, and we put environmental and societal objectives at the core of our policies for digital and sustainable mobility. If we manage to create an open and investment-friendly environment, I believe this approach has the potential to pay off, both for road safety and decarbonisation, as well as for the competitiveness of the automotive and telecom industries.

Cars have become a highly advanced communication technology for the mass market. To efficiently communicate together, they need to generate a vast amount of data. However, the exchange of that data is a challenge. What strategy needs to be instrumented to unlock the potential value of that data?

Modern cars have the capacity to process large amounts of data in real time, but this data is not shared efficiently between vehicles or with the road infrastructure and the network. Existing data frameworks play an important role in data gathering, but they are insufficient to harness the full potential of the data and provide the strong legal framework that is required for data protection, safety and cyber-security. So, together with the right communications technology, we need to develop a European data space for mobility, in line with the Commission’s Data Strategy from February 2020. As well as setting the rules for data sharing in the forthcoming Data Act, the Commission will provide support, under the Digital Europe Programme, for the development of a common European Mobility Data Space.

Roads need network coverage. 5GAA is confident that Europe has a vast potential in advancing long-range connected services deployment. Mobile coverage across countries remains wanting. How can Europe accelerate the coverage process?

We are seeing progress with regards to 5G deployment in Europe; the 5G population coverage has doubled last year to around 50%. However, the situation remains fragmented with some Member States well ahead, including spectrum assignment with coverage obligations along transport paths, while others missed the 2020 deadline for the assignment of 5G pioneer bands. We are working closely with Member States to make the spectrum available as fast and as widely as possible. In order to stimulate private investment into 5G coverage along transport paths, we have launched the Connecting Europe Facility Programme, with more than EUR 1 billion planned for 5G deployment. This includes 5G Corridors for roads, rail and inland waterways, but also 5G Smart Communities, where a broader range of 5G-enabled services in the area of transport are in scope.

What is your long-term vision of Intelligent Transport Systems?

The development of ITS is crucial in achieving the Commission’s targets of zero road fatalities and zero emissions by 2050. In December 2021, the Commission proposed a review of the ITS Directive, which will set the basis for the adoption of a Cooperative-ITS Delegated Act at a later stage. These rules should ensure that market developments and technology evolution are duly taken into account and that requirements for C-ITS systems neither impose on nor discriminate against the use of a given technology.

Interviews

Let’s talk ‘future mobility’!

Maja Bakran Marcich
Deputy Director-General,
DG MOVE, European Commission

Maja Bakran Marcich has been Deputy Director-General for the European Commission’s Directorate-General for Mobility and Transport (MOVE) since 2016. She coordinates the activities related to investment as well as sustainable transport and has been steering the Commission’s transport strategy for safe, connected and clean mobility in Europe.

In your opinion, what are the next steps for automakers and Tier 1 suppliers to accelerate the digital transformation of the automotive industry?

The Commission’s Communication on a Sustainable and Smart Mobility Strategy (SSMS) identifies the deployment of Intelligent Transport Systems (ITS) as a key action in achieving connected and automated multimodal mobility. The latter combines Cooperative, Connected and Automated Mobility (CCAM), which has the potential to transform a driver into a user of a shared fleet of vehicles, with Multimodal Digital Mobility (MDM) services for seamless integration in a multimodal transport system. ITS deployment has the potential to improve significantly the functioning of the whole transport system as these technologies and services better inform transport users and enable them to make more efficient, more coordinated, ‘smarter’ and safer use of transport networks.

What are the opportunities created by connectivity to protect Vulnerable Road Users (pedestrians, cyclists, etc.)?

The SSMS reaffirmed that the death toll for all modes of transport in the EU should be close to zero by 2050. Cooperative Intelligent Transport Systems (C-ITS), which allow vehicles, transport infrastructure and other road users to communicate and coordinate their actions, have an important role in the next steps towards this Vision Zero. Building on existing synergies (such as eCall) with the General Safety Regulation, ITS will increasingly complement and provide support to advanced driver assistance systems (e.g. Intelligent Speed Assistance). This will mark a move from passive and active safety, to cooperative safety, and is expected to bring the desired downward trend in road fatalities back on track.

How can connected and automated mobility contribute to reaching Europe’s green goals?

Improved functioning of the entire transport system is a key element to deliver a 90% reduction in the transport sector emissions by 2050, a target needed to achieve climate neutrality. The European Green Deal places climate action at the core of the EU’s policies and on 14 July 2021 the Commission adopted “the Fit for 55” package. This revision will complement that ambitious package by fostering the uptake of zero-emission vehicles and measures to mitigate current anxieties regarding range and purchase costs. In other words, emerging ITS services will not only accelerate the uptake of zero-emission vehicles but will also help use them more efficiently. Smoothening road traffic flows remains important both for our sustainability objectives and for the efficiency of our logistics systems.

What is your long-term vision of Intelligent Transport Systems?

The accelerated deployment of ITS and C-ITS would give the European automotive and ITS industry an advantage, leading to new business opportunities and jobs creation, as well as further research and innovation. Such deployment depends on matching investments and strong collaboration between private and public stakeholders, and will also lead to an increased exchange of data, benefitting the objectives of all parties, and ultimately better services for all transport users.

Collaboration is key between the diverse actors in the connected driving value chain. Complex questions need to be addressed between ICT companies, automakers and authorities. What could be the perfect kind of collaboration and interaction between these relevant actors?

The recently proposed revision of the ITS Directive future proofs it for all these developments.

«The accelerated deployment of ITS and C-ITS would give the European automotive and ITS industry an advantage, leading to new business opportunities and jobs creation, as well as further research and innovation.»

5GAA in numbers

Action

23
global MoUs and cooperation agreements

8
partnerships with public authorities

CHINA
15
C-V2X equipped models

USA
>60%*
connected drivers

EUROPE
76
million connected cars*

54
C-V2X Use Cases

5
live C-V2X demonstration events

1
2030 roadmap including 5G-V2X

*Source Statista

Expertise

+110
members

13
of top 15 global automakers

9
of top 10 global mobile network operators

76
work items since 2017

27
active work items

49
completed work items

7
working groups

57
publications

22
5GAA quarterly meetings

Communication

15k
followers LinkedIn

3.5k
followers Twitter

8
5GAA conferences

100
speaking slots at third-party events

100
announcements published

11k
mentions in media/ interviews

Time is ripe for 5GAA looking at the next five years

Maxime Flament
Chief Technology Officer 5GAA

The 5G Automotive Association was founded with the objective of contributing to connected mobility needs. Everyone at 5GAA has its stake in the realisation of this objective. People or objects part of the connected mobility ecosystem have, in some way, the possibility to create, send and receive information which can contribute to safer, smarter, and more sustainable journeys. This is not limited to connected cars; a true connected mobility ecosystem can only be called as such if it is diverse, inclusive, trusted, and welcoming. We simplify this with three main digitalisation trends: the *digital roads*, the *digital vehicles*, and the *digital users*. Thanks to the portability and ubiquity of smartphones, digital users have spearheaded the digital transport revolution. Digital vehicles have pushed progress in automation, electrification and sharing services, with strong focus on reducing emissions. Meanwhile, digital roads have made tremendous progress on traffic management, road sensing, ITS and digital road twins. A perfect storm.

After five years, 5GAA is entering a new phase, it needs to stand up to become a grown-up organisation. There is no doubt that 5G will play an essential role in facilitating the efforts around digitalisation of transport. During the next five years, we will see a wide adoption of 5G in vehicles, on consumer devices, and in road infrastructures. This will come with a seamless, ubiquitous connectivity, guaranteed QoS, ultra-low latency, direct communication and improved positioning from which limitless transport ecosystem opportunities will emerge addressing comfort, entertainment, productivity, and many great things we have seen on our smartphones and already connected vehicles; and some we cannot even imagine today. 5GAA wants to make sure this connectivity comes with a societal dimension contributing to saving lives, optimising traffic, and reducing environmental impact.

5GAA is already playing a key role promoting harmonised approaches across the world in line with the continuous 3GPP standardisation efforts. One key topic is the work to reduce uncertainties on the regional communication technology choice. As the vehicles are getting connected to the mobile networks, 5GAA believes it is most likely that industry will embrace the evolution towards 5G-V2X *connectivity and flexible architecture*. We will be ahead of this curve and show the path with timely specifications unlocking the right use cases along our roadmap.

Beyond standards, some use cases can only exist if there is a good level of harmonisation between all actors of the value chain. Whether services are enabled via 5G mobile network or direct communication between vehicles, 5GAA will act as a community supporting worldwide go-to-market for new services & solutions especially when they require coordinated approach addressing all technical and non-technical barriers.

As automation evolves with more connectivity needs, 5GAA will increase its efforts to enable trusted and reliable V2X data integration in the world of ADAS and Automated Driving. Mere driver warnings will no longer be sufficient anymore. It is therefore imperative end-to-end service quality always remains under functionally safe control all the way from vehicle or roadside sensing to vehicle actuation. For this, 5GAA will reinforce its emphasis on 'trust' between people, vehicles, and infrastructure as well as between markets, policymakers, and stakeholders.

5GAA thus has a bright future to create services and solutions for the digitalisation of roads, vehicles and users, fostering system-wide trust based on broadly recognised connectivity and flexible architecture.

«A true connected mobility ecosystem can only be called as such if it is diverse, inclusive, trusted, and welcoming.»

Interviews

Let’s talk ‘future mobility’!

Adrian Scrase
ETSI CTO, Head of 3GPP Mobile Competence Centre (MCC)

«If 5GAA can continue to broker the industry’s priorities going forward, that too will be a significant contribution.»

Do you recall the first time you interacted with 5GAA, and how do you think the association’s significance changed over time?

3GPP held a workshop on the standards priorities for 5G new radio, in Phoenix, in September 2015. As the presentations from the member companies unfolded, it became increasingly apparent that transport systems, particularly car-to-everything systems, were among the brightest new use cases for NR.
Less than a year after that 3GPP workshop, we saw the creation of the 5GAA and the appointment of Dino Flore as Director-General of the association after his term of office as the 3GPP TSG RAN Chair was completed. This close connection with 3GPP was further cemented by 5GAA joining us as a Market Representation Partner in April 2017. Since then, the Association has grown impressively towards a 5GAA membership that is fully capable and involved in the process of bringing transport needs into the 5G specifications – including 3GPP work items.

How should we view 5G in automotive – is it a game-changer or simply the next iteration of vehicle connectivity

From the side of the standards groups, the automotive sector has been highly efficient in its role. The 5GAA members have acted as pathfinders on behalf of many new use cases now looking at the 3GPP system. Other areas were showing the way too – notably for Mission Critical communications, Satellites and Broadcast – but the level of expertise has greatly enhanced the V2X work that 5GAA and one or two other automotive groups have brought to the task.

From your side, I hope that the car industry’s experience in 3GPP has been rewarding and that 5GAA is here to stay as we move into the mature stage of 5G standards creation.

Collaboration is key between the diverse actors in the connected driving value chain. Complex questions need to be addressed between ICT companies, automakers and authorities. What could be the perfect kind of collaboration and interaction between these relevant actors?

3GPP hosts a diverse group of companies and organisations, each with their own set of priorities. The LTE and 5G specification work has always progressed on the timeline and direction demanded by market requirements. From the outset, the automotive sector has provided the necessary guidance on meeting that market need.

We must have tight and achievable targets in each 3GPP release, which often means that delivering the full set of functionality for any technology project takes years of cooperative effort. The automotive experts in the 3GPP and 5GAA membership have been very impressive, bringing [into 3GPP] precise requests and proposals. I believe that the 5GAA’s membership has helped create a pathway into the standards work for others to follow.

Roads need network coverage. 5GAA is confident that Europe has a vast potential to play in advancing the long-range connected services deployment. Mobile coverage across countries remains wanting. How can Europe accelerate the coverage process?

Although this isn’t a question for 3GPP really, I can say – by way of observation – that 5G is the fastest growing network technology in terms of going to market and device availability. This provides the prospect of the broadest possible coverage in line with that growth. Generally, I think that the convergence of all operators on LTE and now 5G NR will also vastly improve the coverage map across the globe as operators and suppliers follow a single technology track.

In your opinion, what are the next steps for automakers and Tier 1 suppliers to accelerate the digital transformation of the automotive industry?

An international approach is needed, encouraging whole regions to cooperate at every level. ‘One standard’, one test accepted everywhere, was an ISO catchphrase, not 3GPP’s, but I do like it, and it is an approach that works well for 3GPP and our partners from all of the regions.

If 5GAA can continue to broker the industry’s priorities going forward, that too will be a significant contribution. The 3GPP groups are looking for the verticals to bring in mature projects for agreement. The current membership of 5GAA knows the task at hand, and I am sure that we are on a good pathway to an exciting transport era.

Interviews

Let’s talk ‘future mobility’!

Nicola Farronato
Head of the Innovation ,
City of Turin

«The C-V2X standard can be of significant impact since it well represents the convergence between smart cities, smart mobility and emerging technologies.»

Do you recall the first time you interacted with 5GAA, and how do you think the association’s significance changed over time?

I had the great opportunity to meet 5GAA on the occasion of the annual conference organised in the city of Turin in autumn 2019. I was part of the organisers under the role of Head of the Innovation team of the City of Turin. I had the opportunity to start appreciating the ecosystem of the 5G Automotive Association, along with its members’ open innovation approach. Turin was the first city globally to join 5GAA as a municipality. It was an excellent strategic move, in my opinion, owing to the outreach and innovation opportunity at the city level that a partner such as 5GAA enables.

What are the societal benefits of using C-V2X in the automotive ecosystem?

In my opinion, the C-V2X standard can be of significant impact since it well represents the convergence between smart cities, smart mobility and emerging technologies. Nowadays, cities like Turin are positioning themselves as global hubs for emerging technologies. Thus, smart mobility represents a core vertical to unleash the great potential that emerging telecommunication infrastructures and standards will have in the community development and quality of mobility.

What are the synergies between industry and public authorities needed to optimise the potential of the digital transformation on our roads?

The digital transformation on our roads is a challenge of paramount importance; hence public and private stakeholders are acting towards a collaborative framework to develop new synergies and enable the transition to smarter cities. In Turin, for instance, we have created a public-private open innovation initiative called Turin Smart Road, which has involved 40 public-private organisations in developing a 35km urban testing bed for connected and autonomous vehicles.

Roads need network coverage. 5GAA is confident that Europe has a vast potential to advance the long-range connected services deployment. Mobile coverage across countries still remains wanting. How can Europe accelerate the coverage process?

Well, 5G is one of the emerging technologies that will deserves high priorities in terms of smart city policies. So I can imagine a crucial role of cities in Europe and globally to advance the adoption and maturity of this infrastructure, thus enabling the community, businesses, and researchers to avail themselves of this new technological backbone. Provided that smart cities are the focus of my research, we must consider that local innovation ecosystems play a crucial role in helping territories evolve and understand emerging technologies and their use cases.

What is your long-term vision of Intelligent Transport Systems?

I think the long-term vision of ITS will be the harmonisation of public and private, urban and extra-urban mobility, considering the emerging approaches of the last mile logistic, for instance, along with urban air mobility trends which are seeking to provide new short-range solutions for personal transportation in regional distances.

Interviews

Let’s talk ‘future mobility’!

Caspar de Jonge
Senior Executive Intelligent Transport Systems

Wim Vandenberghe
Senior Advisor Smart Mobility

«We need to continue to explore mutual win-wins, understand each other’s worlds and contexts, align investment roadmaps and assess technology readiness.»

Dutch Ministry – Ministry for Infrastructure & Water Works

Do you recall the first time you interacted with 5GAA, and how do you think the association’s significance changed over time?

The first time I&W and 5GAA met was at Schiphol Airport Amsterdam with the 5GAA board. A very energetic exchange of views in a daylong meeting. The 5GAA motto was ‘make it happen’ which was music to our deployment ears. Over time after that meeting, we have seen an active 5GAA in the discussions and decision making on the Delegated Act C-ITS, also taking a visible position on international spectrum availability for 5G deployment, and a fruitful conference in Brussels 2020 on future deployment activities.

We have actively contributed to studies in NetExp and Tele-operated driving, and we feel that now is the time to act on the results of these studies to really enhance or accelerate deployment. Although the Dutch Talking Traffic dashboard was met with encouraging reactions from 5GAA, it has not led to the participation of additional automotives from 5GAA in the Talking Traffic value chain. With full understanding of the diversity of the membership body within 5GAA, the Ricardo study on short range RSU costs was an enlightening experience regarding the internal governance and decision-making process.

Our hope and drive was to establish a close Talking Traffic C-ITS relationship with services from 5GAA members being deployed in many vehicles on Dutch roads. That has not happened (yet) for various reasons and circumstances. And we do acknowledge the complexities for automotive entities, having to invest in automation and electrification simultaneously in a consolidating market, wrestling with supply chain issues and other challenges, while MNO’s need to get a handle on service delivery in 5G and making good on the very ambitious marketing promises they have actively promoted for several years.

What are the synergies between industry and public authorities needed to optimise the potential of the digital transformation on our roads?

In our opinion we need to continue to explore mutual win wins, understand each other’s worlds and contexts, align investment roadmaps and assess technology readiness. On a more practical level, in our opinion that also entails deployment understanding, our mutual roles and responsibilities, the business and value case of use cases. This is not clear cut beforehand and my vary depending on the topic/use case, be it higher levels of vehicle automation, use of existing dark fiber along roads in public hands and/or ISA for instance.

How does the regulatory framework need to be changed to maximise the role of connected mobility for decarbonisation?

On a European level we feel that a clear path to full decarbonisation with specific goals and fixed timelines would decrease the uncertainties industry (and member states) are experiencing. And it is not solely regulation but also fiscal policies (both European and in member states) that comes into play to ensure that Climate goals can and will be reached. On the technology side of course we need to ensure neutrality and foster ongoing innovation.

Cars have become a highly advanced communication technology for the mass market. To efficiently communicate together, they need to generate a vast amount of data. However, the exchange of that data is a challenge. What strategy needs to be instrumented to unlock the potential value of that data?

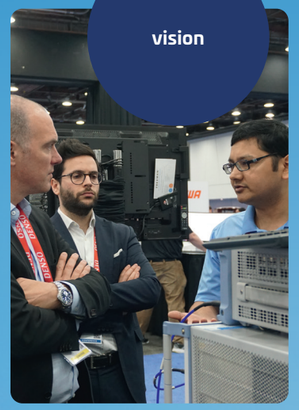
Not a challenge perse in our opinion and experience thus far. For different stakeholders (independent garages) and topics (type approval), it is a very different perspective than for instance the use of public data in private services. In NL we have -on a national scale- several projects where vehicle generated data is essential and exchanged. KIA trial (ADAS and energy use), Data for Road Safety and now Road Monitor with Mercedes. The sheer volume of data needs to be considered as well as the functional use (data being transformed into information) and insights (what do we learn from it and how will we use those learnings) that have been formulated at the start of these projects

In addition: we strongly believe that all public and private entities need to embrace the users data sovereignty. And put an end to the fiction that data is the new gold or oil that can and needs to be commercially exploited or even monopolized; private entities should distinguish themselves through service delivery and added value. From that service perspective the data exchange and availability needs to be organized. Examples are the Dutch UDAP and Data for Road Safety. These exchanges require agreement on technology but also user consent, entry conditions, mutual resposibilities and coming to clear agreements which parts of the value chain will be in public hands and which parts in the private domain. Basically, the fostering and organization of an ecosystem where all can grow and make a return on investment while contributing to the combined value of the entire data chain: multiply and grow before we start to cut up market shares and maximize individual stakes.

Overall, consumers see tremendous value in Advanced Driver Assistance Systems (ADAS); how can consumer trust be leveraged for other applications?

Maybe our view is a bit less exuberant. Many users have no idea what functions are available in their vehicle and lack the information and training in the use of those functions. A lot more information and education is needed to enhance the experience and value. This will increase trust and use and stimulate development and use of’ ’other applications” down the line.

And maybe dial down the marketing a bit (‘this ADAS system does everything all the time anywhere under all conditions’) and more functional uniformity in the functions and the operational circumstances regarding the ADAS system that a driver can or cannot rely on. This has everything to do with consumer trust. And the awareness that technology can greatly enhance the driver experience and safety but will not solve everything (certainly not at once). Again, here the service approach is important. One entity needs to be owner of the service experience. In the case of ADAS this is obviously the manufacturer because of its full control over the ADAS function. Data-driven applications need that same service ownership for the everyday user experience. It is imperative in our view that a service approach is used, not just the technical/ product delivery, not just today but also in light of increasing levels of vehicle automation operating in a wide variety of operational domains.



Our people

On a journey towards connected driving with people at the centre

'We are facing the future with vision and collaboration.'

5GAA is our people. In 5GAA, we firmly believe that our people are the key to the association's success. They are the greatest asset and make sure connected mobility is a reality. Their knowledge and dedication significantly impact technological advances in all facets of connected driving. Therefore, fostering a culture of diversity, inclusion, and ambition is key to successfully pursuing innovative results.

In 2016, we created the association with a clear ambition in terms of the support, development and geographical influence of our members. We focus on people first as the core driver of connected mobility, improving safety for all transportation actors, including the vulnerable road users. This makes our way of working just as important as our achievements.

The recent years forced the association to adapt its worldwide collaboration in a new and unprecedented reality. In the face of this challenge, we achieved several truly admirable milestones that paved the way towards connected mobility for safer, more sustainable and efficient mobility.

Leadership 2022 - 2023

Reporting to the Board, the Executive Committee is the legal representative body of the association and is responsible for the day-to-day management of the 5GAA.

CHAIRMAN
Christoph Voigt

VICE CHAIR
Uwe Puetzschler

DIRECTOR GENERAL
Johannes Springer

SECRETARY
Markus Dillinger

CTO
Maxime Flament

Board 2022 - 2023

The 5GAA Board supervises and advises the Executive Committee concerning the activities of the association and strategic decisions on future activities.

Working Groups 2022 – Chairs and Vice-Chair

The 5GAA Working Groups develop the frameworks, practical aspects, required standards, and business cases for 5G and the future application of connected mobility solutions.

WG1

CHAIR
Tim Leinmüller
DENSO

VICE- CHAIR
Julia Rainer
AUDI

WG2

CHAIR
Chan Zhou
HUAWEI

VICE- CHAIR
Heijin Kim

WG3

CHAIR
Bob Banks
VODAFONE

VICE- CHAIR
Ralf Weber
QUALCOMM

WG4

CHAIR
Leo Baltar
INTEL

VICE- CHAIR
Reza Karimi
HUAWEI

WG5

CHAIR
Antonio Eduardo Fernandez Barciela
STELLANTIS

VICE- CHAIR
Javier Albares
HERE TECHNOLOGY

WG6

CHAIR
Anne-Lise Thieblemont
QUALCOMM

VICE- CHAIR
John Roman
INTEL

WG7

CHAIR
Virendra Kumar
QUALCOMM

VICE- CHAIR
Rejani Syamala
STELLANTIS

Acknowledgments

‘Thanks to all of them, connected mobility is no longer an aspiration but a reality.’

We would like to thank in particular those who have contributed to the growth of the association. None of our achievements over the past five years would have been possible without the contribution of the most talented professionals from the telecommunications and automotive sectors. Thanks to all of them, connected mobility is no longer an aspiration but a reality, and we continue to join forces to devise optimal society-centred solutions.

Working Groups – Past Chairs and Vice-Chair

WG1

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Osman Aydin
DAIMLER

CHAIR
Ivan Vukovic
FORD

VICE-CHAIR
Leo Baltar
INTEL

WG2

CHAIR
Stefano Sorrentino
ERICSSON

CHAIR
Yunpeng Zang
ERICSSON

WG3

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VICE-CHAIR
Hyunjeong Kang
SAMSUNG

WG5

CHAIR
Joachim Goethel
BMW

VICE-CHAIR
Uwe Puetzchler
NOKIA

WG7

CHAIR
Greg Savoie
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VICE-CHAIR
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VOLKSWAGEN

5GAA MEMBERS - MAY 2022

NOTES

NOTES

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