ITU News MAGAZINE

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Technology driving safer transport

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Houlin Zhao

ITU Secretary-General

As the automotive and information and communication technology (ICT) industries continue to merge at a rapid pace, we see opportunities to build better, safer transportation systems multiplying just as fast. But this potential to improve lives won't be realized without greater collaboration between public and private sector stakeholders across these industries.

That's why ITU is working hard to bring a wider group of key stakeholders together to leverage ICT to improve – and transform – transportation.

This edition of ITU News Magazine discusses the latest trends in connected cars, new ITU initiatives to improve smart transportation – and key insights from the annual Symposium on the Future Networked Car (FNC-2020), a gathering of top experts hosted by ITU and UNECE.

Participants at the 5 March event discussed the technical, business and regulatory actions required to build public trust in connected, automated vehicles. They highlighted the state of the art in automotive cybersecurity. Together, they explored the status and future of safety-critical radio-communications for the road, and they presented the latest developments in the review of regulations governing road transport.

FNC-2020 participants also had the opportunity to consider the crucial role of the latest 5G connectivity technologies in delivering safer and more effective transport.

Read on to learn about the experts' insightful discussions at the event, how ITU's work is supporting the development of Intelligent Transport Systems – and what key industry players are doing to leverage the power of ICTs for better transport.

> *"Participants had the opportunity to consider the crucial role of the latest 5G connectivity technologies."*
>
> Houlin Zhao
> ITU Secretary-General

Technology driving safer transport

Editorial

The Future Networked Car

ITU and smart mobility

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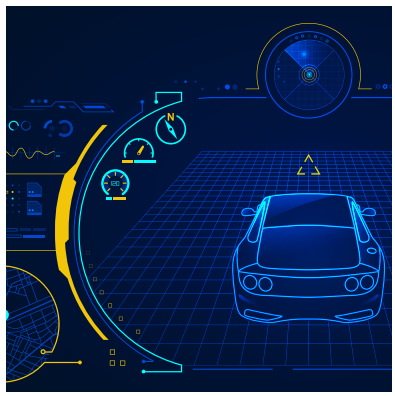


The automotive industry and ITU membership

A focus on road safety

Top 5 automotive tech trends for 2020 and beyond

ITU News asked Roger Lanctot, Director of Automotive Connected Mobility for Strategy Analytics, what he views as the top 5 trends we can expect to see for automotive tech in 2020 and beyond.

1 Fleet-based operations

As cars are increasingly integrated into fleets, pressure will grow to deliver ever more sophisticated connected car solutions capable of collecting data, anticipating system failures, avoiding collisions, and delivering desirable and contextually relevant content to drivers and passengers.

While car makers and commercial fleet operators – including ride hailing companies, car sharing service providers, taxis, and rental car operators – dominate the world of connected fleets today.

The future may bring new operators into the market from technology companies to retailers, transportation companies or even new car dealers offering networks of connected cars to serve evolving transportation needs.

2 5G introduces ubiquitous connectivity

Within two years, 5G technology will fundamentally transform the business of connecting cars allowing cars to communicate vital information for safer on-road interactions and traffic management.

Significant breakthroughs in crash avoidance – between cars and between pedestrians and cars – will unfold as the global car park is "lit up" with higher speed, low latency, wireless connections.

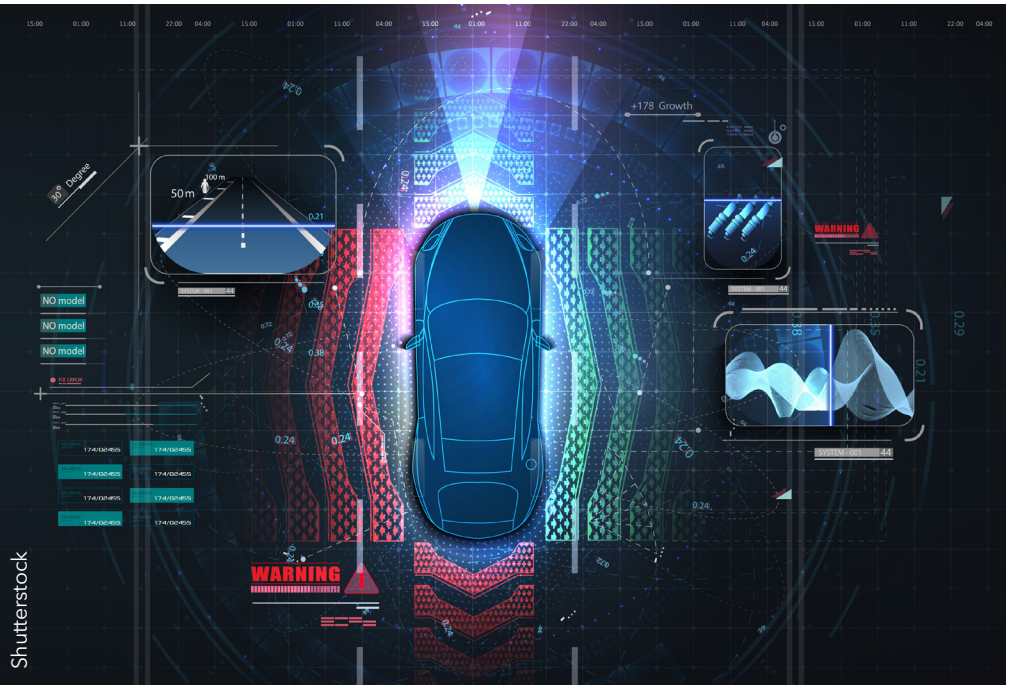
Regulators will finally have the tools to take on active safety challenges and save lives. At the same time, contextual navigation experiences will be amazingly enhanced to ease the normal stresses of human driving even as the industry evolves toward autonomy.

See the interview with Roger Lanctot, Director of Automotive Connected Mobility, Strategy Analytics, at the ITU/UNECE Symposium on the Future Networked Car (FNC-2020).

"The proliferation of networked vehicles offering mobility-as-a-service will push more and more consumers out of their owned vehicles and into the world of shared transportation."

Roger Lanctot

Director of Automotive Connected Mobility for Strategy Analytics



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3 Ad-hoc vehicle use cases undermine ownership

The proliferation of networked vehicles offering mobility-as-a-service will push more and more consumers out of their owned vehicles and into the world of shared transportation.

End-to-end, app-based transportation solutions will integrate payments and personalized experiences.

It remains to be seen precisely which kinds of organizations will lead or eventually dominate this new transportation environment – but car companies, infrastructure companies, transportation suppliers, and others will all play a role.

Regulators and legislators may ultimately play a determinative role – as they are already today in driving the industry toward electrification – by limiting the use of individually owned vehicles in large cities.

4 EV adoption impacts

As fleets of connected cars come to dominate the transportation landscape, fleet operators will continue their embrace of electrification as they recognize the lower cost of operations for electric vehicles.

Where consumers may hesitate to buy and own electric cars – fleet operators will not hesitate.

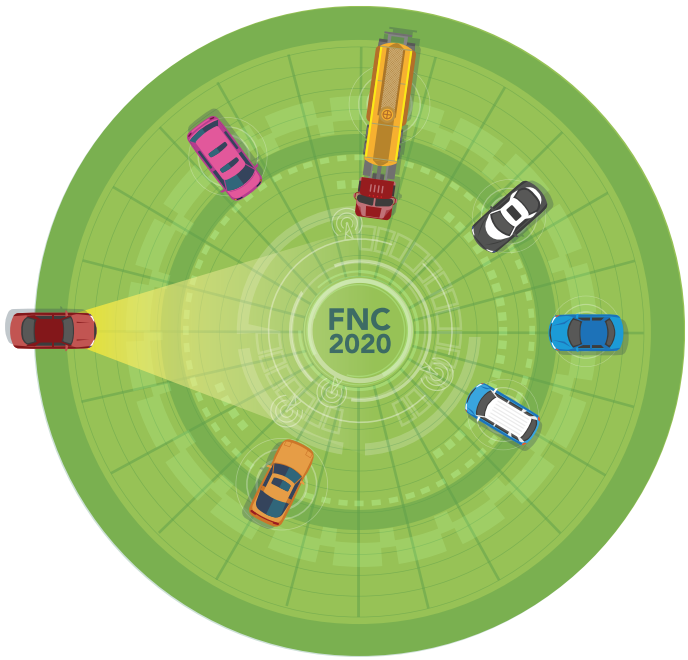
Their success will pave the way for more efficient and widely deployed charging networks leading to swifter consumer adoption than has so-far been seen.

5 Autonomy's path to market

While fully autonomous and networked vehicle fleets may ultimately serve large cities and towns, the evolutionary path to full autonomy may take a decade or more.

Regulators continue to struggle to define certification strategies, but these same regulators prefer not to stand in the path of this advancing technology.

Robotaxis, shuttles, trucks and buses and semi-autonomous personally operated cars will all represent different facets of the evolving world of autonomy as heterogeneous highway driving environments emerge to support both human and machine-driven vehicles. ■



The Symposium on the Future Networked Car 2020

The ITU/UNECE annual Symposium on the Future Networked Car (FNC-2020) brought the automotive and information and information and communication technology (ICT) industries together again to explore advances in connected, automated vehicles and associated implications for technology, business and regulation.

This year's event took place at ITU headquarters on 5 March.

- **Connected and automated vehicles at the cross-roads to success**
- **Policy and regulatory issues to support deployment of automated mobility services**
- **Cybersecurity in the age of automated automotive systems**
- **AI for autonomous and assisted driving – how to ensure safety and public trust**

The Symposium was followed by a meeting of the Collaboration on Intelligent Transport System (ITS) Communication Standards at ITU Headquarters on 6 March 2020, an open platform to advance the development of globally harmonized ITS communication standards.

The symposium was kindly supported by Gold sponsor DEKRA, Silver sponsor Qualcomm and Bronze sponsor RoadDB.

"New technologies are at the heart of this transformation, and international standardization will be essential in ensuring that these technologies are deployed efficiently and at scale."

Houlin Zhao

ITU Secretary-General, speaking at the ITU/UNECE Symposium on the Future Networked Car (FNC-2020), at ITU headquarters on 5 March 2020

See the event website and full programme.

ITU is helping to advance the Sustainable Development Goals (SDGs) and targets related to road traffic, transport and road safety

3 GOOD HEALTH AND WELL-BEING

11 SUSTAINABLE CITIES AND COMMUNITIES

"Today is a great opportunity to hear the views from two industries — the telecommunications and the automotive industry."

Olga Algayerova

UNECE Executive Secretary

"The number of people dying on the roads has not, unfortunately, decreased... Safety and the need to avoid casualties are core."

Jean Todt

President of FIA and the United Nations Secretary-General's Special Envoy for Road Safety

"We must benefit from the new technologies and innovation to make driving safer for everyone."

Naoko Yamamoto

Assistant Director General for Universal Health Coverage and Health Systems at WHO

Speaking at the ITU/UNECE Symposium on the Future Networked Car (FNC-2020), at ITU headquarters on 5 March 2020. ■

Video-interview insights

Thought leaders shared with us their insights at the Symposium on the Future Networked Car 2020 (FNC-2020).

Once the car is connected it has to have secure communication. Like a computer, the car needs to be updated over the air (the cellular, or WiFI network). In our study group on security we have a new standard to secure the connection for over the air software updates.

Bilel Jamoussi

Chief of the ITU–T Study Groups Department

The dialogue between regulators, manufacturers in the car industry, between cybersecurity experts, and AI experts — It is very important to come together to speak about this challenging and currently developing area of industry.

Olga Algayerova

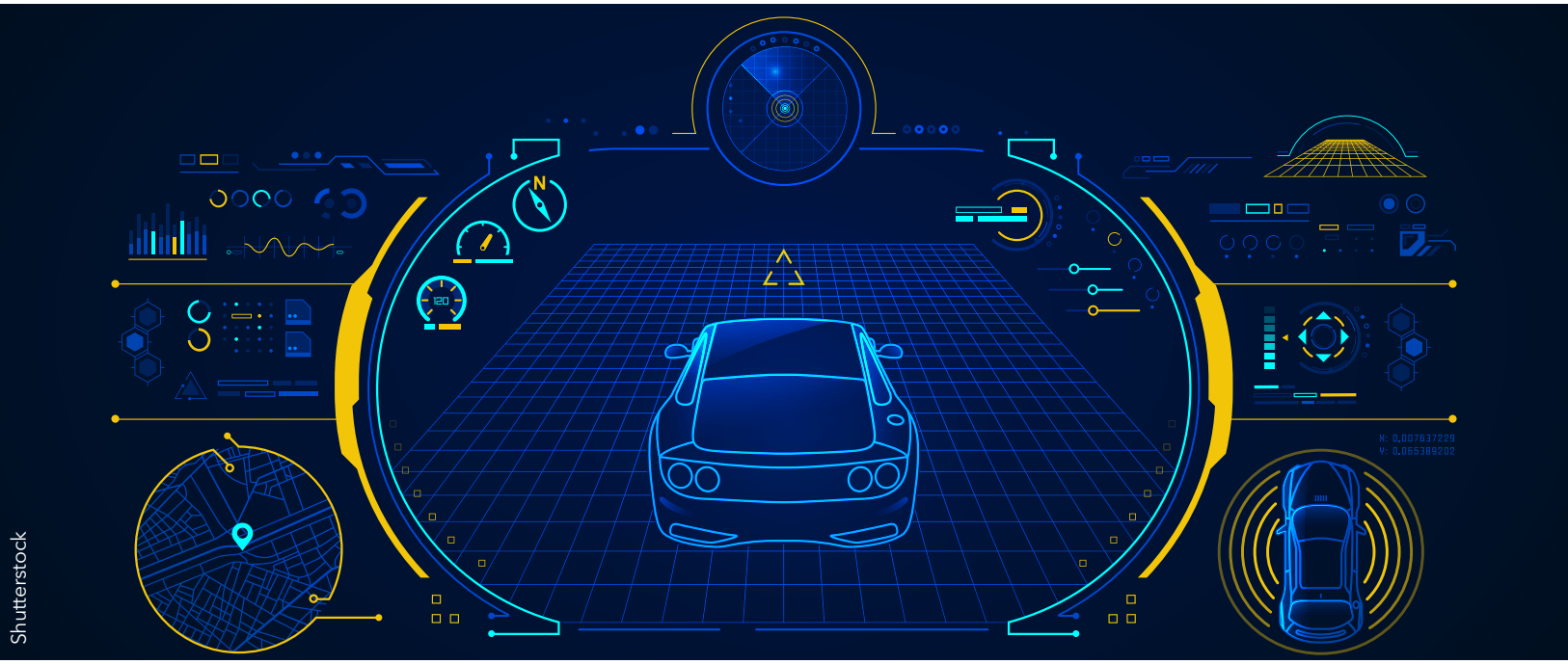
Executive Secretary, UNECE

That issue of how do we make automation work in a safe consistent way so that consumers can have confidence that the vehicles are gong to be as safe as the ones they know, but have the confidence that they will be able to do things for them in a more holistic way? — There's a real challenge there.

Ian Yarnold

UK Department for Transport

See the full interview playlist.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How automotive and technology experts see the future of connected vehicles

Today, all vehicle manufacturers offer cellular connectivity in their vehicles, either as standard equipment or as an option.

Safety applications for vehicles, such as eCall (the pan-European system for vehicle emergency calls), are increasing, as is the ability to connect to Internet information and entertainment.

Communication between vehicles, to and from roadside infrastructure is also on the rise.

But what will be the future evolution of transport as 5G is rolled out?

Participants at the ITU/UNECE Symposium on the Future Networked Car which took place on 5 March 2020 at ITU Headquarters in Geneva, Switzerland, debated this and a range of other issues during four discussion sessions held throughout the day.

Let's not wait for the technology

Niels Peter Skov Andersen, Chair of the ETSI Technical Committee for Intelligent Transport Systems, urged participants not to wait for tomorrow, but to use what is available now, to save lives.

"Let's deploy what technology we have today, and upgrade it later when the new technology comes along," said Andersen.

To learn more about this event and the participants, visit the FNC-2020 webpage.

"Some services can accommodate 2G, some services require 3G, some 4G and some might require 5G. If we wait, we will be waiting 10–15 years, and we won't be able to use the technology that we have available," he said.

Collaboration is key

The importance of collaboration and sharing information was widely echoed by several participants in the discussion.

According to Eduardo Valencia of AMETIC and Director of the #VEHICLES7YFN think tank, the implementation of a future mobility model for Europe that meets sustainability requirements would only be possible if all actors operating in urban or inter-urban ecosystems were to collaborate.

For Remi Bastien of French carmaker, Renault, the key to the success of 5G would be more and more cooperation between different sectors.

For instance, Bastien told participants how Renault has opened cooperation with ICT companies such as telecommunications operator Orange and network provider Ericsson on multi-access edge computing to prepare cooperative collision avoidance to increase road safety.

Bastien is convinced that cooperation between all stakeholders is the only way; between the automotive industry car makers, telcos, infrastructure, edge-computing companies and mobility operators.

Then the question would be how to share the value. "That will be the challenge," he said.

Andersen said: "We need collaboration to ensure that the car understands the road and the car knows what the road sends to us," adding that ETSI has really been trying to work with other standards organizations on how to enable deployment of services.

Moderator T. Russell Shields, CEO and President of RoadDB LLC, referred to PIARC, the World Road Association, as critically important in the activities of intelligent transport systems and encouraged the technology world to become involved.

T. Russell Shields, RoadDB shares his valuable insights on future of mobility, the key challenges to be overcome in Intelligent Transport Systems, shared vehicle sanitation and more, from the Symposium on the Future Networked Car 2020.

"These are really complex questions which require the interaction between road authorities and vehicle manufacturers to move forward."

T. Russell Shields

CEO and President of RoadDB LLC

Much hot air going around automated vehicles

David Wong, Senior Technology and Innovation Manager, SMMT (the UK automotive industry body) highlighted some key issues from a UK perspective, warning that "we are all due a reality check," when it comes to automated vehicles.

According to Wong, the UK market has increasing availability of advanced driver assistance systems (ADAS), and of the 2.5 million passenger cars registered in 2018, 75 per cent already had auto emergency braking (AEB) available. But "when it comes to automated vehicles, there is hot air going around," he said, "and people think that level 5 automation is going to be on our roads very soon."

Wong was reluctant to say that automated vehicles will be on the roads in the next decade, citing level 3 (conditional automation), as currently what is nearest to market.

Roads need mobile network coverage

Wong is confident that the UK has got huge potential to play a leading role in long-range (rather than short range) connected-vehicle services deployment, "but that the barrier to connectivity is coverage," adding that "mobile network coverage on the UK road network remains wanting."

Wong expects that in 2026, all new passenger cars in the UK market will be connected, though "whether people use them [the connected services] and to what extent is a completely separate question," he said.

Bastien is sure that connected vehicles can improve smart mobility significantly, but agreed with Wong that there is indeed a need for more network coverage: "If we consider safety – more than 80 per cent of fatalities occur on country roads where the coverage is not perfect," he said.

For Bastien, the connection to infrastructure and reasonable operational design domain (ODD) are the key conditions for automated driving. "How to define the right ODD that offers safe enough and valuable services is the biggest question," he said.

> *"If we consider safety — more than 80 per cent of fatalities occurs on country roads where the coverage is not perfect."*
>
> Remi Bastien
>
> Vice President for Automotive Prospective at Renault Groupe

5G greeted by a 2G switch off

According to Wong the potential use case for 5G is very much acknowledged and he thinks it has a role in automated driving. "In terms of automated driving, real-time refresh will be a critical use case for 5G," he said, though this will be greeted by the potential 2G/3G switch-off in the UK.

He highlighted concerns with the 2G switch-off bearing in mind that legislation currently serves the 2G model. "Any next-generation development will have to coincide with the sunsetting of the 2G," he said.

For example, legislation requiring that electric-vehicle charging be conducted via smart metering, will pose a problem as this is currently based on a 2G module. Hence, 85 per cent of all households in the UK will need their modules for their smart meters replaced with a long-term evolution (LTE) compatible module.

Despite these concerns, Wong said that stakeholder discussions were taking place.

It was explained to participants during the discussion that in the United States much of 2G has been turned off, and while some of the earlier vehicles with 2G-only capability received voluntary upgrades by car companies, they were the ones still subscribed to the telematic service.

So it seems a satisfactory answer has not yet been found with the issue of 2G switch-off.

What makes 5G different?

Remi Bastien of Renault highlighted what makes 5G different.

"For the network, we could enjoy network slicing, meaning that with 5G we could have a dedicated network for smartphones, for automotive, for IoT, and this could be precious to distinguish the different customers," he said.

Mobile Virtual Network Operators (MVNOs) can offer new business models that car makers can leverage.

Multi-access edge computing (MEV), would also be important, Bastien said. "We could have very efficient and very low-latency real-time performance between the vehicle and the infrastructure – and this could be a strong enabler for automated functions."

Roger Lanctot, Director of Automotive Connected Mobility for Strategy Analytics, pointed out that 5G connectivity cellular solutions would mean not having to pay a subscription for connected services.

Complex issues to solve

The discussion continued with views expressed on a number of unresolved issues such as how to manage software updates with new cars being sold with the prospective of them never going back to the manufacturers; or how to manage connectivity in cars that are older and already on the road. Also, the shorter information and communication technology (ICT) product development lifecycles still need to be reconciled with the longer automotive product development lifecycle.

Towards the end of the session, moderator Shields said: "These are really complex questions which require the interaction between road authorities and vehicle manufacturers to move forward."

At the closing of this inspiring event, Chaesub Lee, Director of the ITU Telecommunication Standardization Bureau, said that he could see more and more collaboration between the automotive and ICT sectors, and thanked the sponsors DEKRA, Qualcomm and RoadDB for their kind support. ■

For enquiries about next year's event: tsbcar@itu.int.


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Policy and regulatory issues for new automated mobility services

Connected cars lie at the interface between transport regulation, ICT regulation and environmental regulation. Introducing new technologies on the road is an ongoing process.

"From a regulator and technologist point of view, we've got to handle two different fundamental problems. We've got evolutionary technologies and revolutionary technologies – and we've got to deal with that all at the same time," said Ian Yarnold, Head, International Vehicle Standards Division, Department for Transport, UK, who moderated a panel discussion of experts gathered at the Future Networked Car Symposium at ITU Headquarters in Geneva, Switzerland. "That creates a really interesting challenge for all of us, to make sure that we get those technologies… for a healthier, safer and happier society."

But, regulators face difficult questions when regulating new technologies that will be introduced on our busy and increasingly complex roads, namely "what is a tolerable risk [for safety]?" voiced Yarnold.

This session explored how authorities in charge of the regulation and certification of vehicles are working to ensure that automated and connected vehicles provide better mobility for all.

New technologies, new regulatory challenges

Despite the potential of these new systems, and technological improvements and support, trends in mortality and injury rates today remain high.

"For the coming decades, we will stick with ADAS [advanced driver-assistance systems] and that means that the systems have to work together with the human driver. This means that there are some important risks which have to do with the human driver," said Ellen Berends, Researcher at the Dutch Safety Board.

Berends showed participants photos of road accidents involving ADAS, warning participants of the potential overreliance on the technology or a lack of understanding of its limitations by human drivers. She also pointed out that driving tests today do not include ADAS systems – and doing so is not possible given the many different operating systems that are in use today.

She advocated for the need to legislate all levels of automation and "raise the bar" if you want to use ADAS as a tool to improve road safety, in order to protect all road users.

"It is unclear how manufacturers have to show that their systems are safe, and this is especially true for levels 1 and 2," said Berends. "When they say that this is not a system that has any influence on safety, then the influence on safety is not assessed at all."

Current regulatory landscape

"Safety is always number one," said Jane Doherty, Director of International Policy, Fuel Economy and Consumer Protection, National Highway Traffic Safety Administration, United States (NHTSA).

All vehicles in the USA must meet Federal Motor Vehicle Safety Standards (FMVSS) before being deployed on the roads. New vehicles are subject to the same FMVSS requirements, said Doherty, but when it comes to new technologies, they want to encourage new entrants and innovation. As such, the NHTSA have introduced nimble regulatory practices, with 12 voluntary safety systems, and voluntary guidance and policy considerations outlined in the 'Automated Driving Systems 2.0: A Vision for Safety' framework.

They need the time to allow manufacturers to develop these new technologies, so when they write regulations – "if we do write regulations specific for ADAS," she said – they will be based on science, data and transparency to make sure that they work for everybody.

But, Manuel Marsilio, General Manager at CONEBI, said that "for us, it's all about safer cycling, so lifesaving technologies in cars and in heavy-duty vehicles… should become mandatory in the future, and not just an optional extra. So, regulation and standards, in this context, play a crucial role."

From a standards perspective, automated cars need to see cyclists, "but what do they look like?" he asked.

There is a need for cooperation and knowledge sharing in the automotive industry regarding the relationship between cars and bicycles to ensure the safe use of the road for all, he said.

A realistic timeline?

10 years ago, manufacturers were saying that automated vehicles would be on the road today – but we are still 20 to 30 years away, said Yarnold.

As the automotive industry moves to a fully autonomous future using artificial intelligence (AI), regulators and policymakers will face new challenges, predicts Niels Andersen, General Manager of the CAR 2 CAR Communication Consortium.

"The moment you use AI we have self-learning systems but a potential consequence is that you might no longer be able to do diagnostic testing, by that I mean, you can't expect the same result twice because the system will have learned," Andersen said.

So, how do you effectively test AI? "I think there is no clear answer at the moment," he said.

A member of the audience from the World Health Organization suggested that taking a phased approach, mixing self-driving cars and "regular" traffic, could be a way forward.

This step-by-step approach is already underway in several countries. Berends pointed out that several locations across the USA are already testing various levels of automation.

Cooperative, international approach needed

By the end of the session, the panellists agreed that a cooperative, international approach to regulation must be taken as we enter this new phase of mobility.

"In order to move to the future technology on-board in the vehicles, we need to change how regulation addresses the test for the type approval process," said Nuria Roman, Chief, Ministry of Industry, Trade and Tourism, Spain. "We need to change the way that the requirements are defined, and how the tests are performed."

"The vehicle is already a complex and sophisticated product that will become more and more sophisticated tomorrow, so it is very important to regulate at the international level," said Luca Rocco, Ministry of Infrastructure and Transport, Italy.

"The vehicle is already a complex and sophisticated product that will become more and more sophisticated tomorrow, so it is very important to regulate at the international level."

Luca Rocco

Ministry of Infrastructure and Transport, Italy

The session concluded with a strong call for "joined up" or collaborative regulation between agencies across verticals. And the moderator mentioned ITU and UNECE had a strong role to play here, by putting ICT regulators in dialogue with the transport regulators. ■

Watch the full webcast here.

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Cybersecurity in the automotive industry – challenges to overcome

Even if a vehicle is designed with state-of-the art security and maintained with over-the-air software updates during its operational life, a cyberattack on that vehicle can still happen at any time.

"How can a car fleet be monitored and by whom, to detect those attacks and mitigate their harmful effects?"

This was just one of the questions that moderator Michael L. Sena of Consulting AB, addressed to a group of intelligent transport experts during a discussion on automotive cybersecurity at the ITU/UNECE Symposium on the Future Networked car (FNC-2020).

Start with the data sources

The ingredient for security in any industry lies in applying "prevent, detect and react", according to Pierre Gerard, Senior Security Expert for Thales, and it all starts with the data sources.

> *"How can a car fleet be monitored and by whom, to detect those attacks and mitigate their harmful effects?"*
>
> Michael L. Sena
> Consulting AB

"Basically you can start with the data sources you already have," says Gerard, "from your telematics, from services that you provide to your customers – you can tap into them to detect what is going wrong."

"It can come from the mobile app," he adds. "Lastly, you can install an intrusion detection system inside the car to detect an attack. Anything suspicious can then be reported."

The security operation centre, explains Gerard, figures out if there is an attack, and a procedure involving AI and Big Data learns the normal behaviour of a vehicle fleet, to then be able to detect any abnormal behaviour.

24/7 monitoring

Participants were surprised to hear that the security process involves a huge monitoring task run by teams of security experts. They would be monitoring 24/7, with the ability to detect an attack, react and prevent further attacks with the potential to lead to stolen vehicles.

ITU News talked with Michael L. Sena, Editor of the Dispatcher, who shares some valuable insights on cybersecurity in vehicles, the challenges brought up most in discussions around intelligent transport innovation and more, from the Future Networked Car Symposium 2020.

"If we are not secure in our communications from the vehicles — if we don't allow the information that is necessary to be used for further automation of our driving — we are not going to use it. We are not going to feel safe — we are not going to feel secure — and we won't be."

Michael L. Sena
Consulting AB

Johannes Springer, of Deutsche Telekom said that in fact the whole production process needs monitoring, considering the maintenance centre, the supplier network, as well as the whole research and development phase.

"But it's not just the car manufacturers who face this security challenge – other service providers in a similar position also need high reliability", says Springer.

Quality assurance

Since driver assisted functions are software-based, three needs to be a chain of trust at both the product and process levels. How can this chain of trust be achieved?

Thomas Thurner, Head of Cybersecurity for DEKRA Digital, pointed out that software and embedded software is developed, integrated and maintained within a complex supply chain. "Without proof of the quality, you cannot assume that the safety and cybersecurity is of a high quality," he says.

Thurner explained to participants that on a process level there should be certified and efficient management systems for software quality and safety, and for cybersecurity.

On the product level there is a need to assess product development, particularly on the testing procedures, the testing strategies and whether they are in accordance with standards, he said.

Thurner also pointed out that across the complete supply chain there is a need for thorough checks and audits, throughout the development, production and operation processes. Process and product supervision is of particular importance at the product's creation, but also throughout its lifetime, again highlighting the necessity of 24/7 monitoring.

Insurance – who is liable?

Another question centred around insurance companies and liability in the event of a hacked car causing an accident.

As Rossen Naydenov of ENISA pointed out: "The car is becoming a software on wheels and it is unclear as to who is at fault or liable."

Would it be the one that produced the software that would be liable – or the one using it? Who would carry the burden of proof?

The experts present, coming from different disciplines, expressed their views on this complex issue.

IPv6 – crucial for security

Many countries are still at the transition phase from IPv4 to IPv6, and according to Latif Ladid, Founder & President of the IPv6 Forum, 3GPP Board Member and Research Fellow at the University of Luxembourg, this continued use of IPv4 has implications for cybersecurity.

Ladid warned that car manufacturers still using IPv4 are more at risk of being hacked, saying that top-level car manufacturers are unaware of the dangers of this and that "capacity building at a top level on IPv6 is important."

The United States Government recently announced its intention to gradually migrate to IPv6-only systems, and by 2025 at least 80% of the US Government will be using IPv6 only.

ITU-T Study Group 17 – building confidence and security

ITU's standardization expert group for security, ITU-T Study Group 17, includes a working group dedicated to security aspects of Intelligent Transport Systems (Q14/17). The working group develops standards addressing topics such as the security of over-the-air software updates to connected vehicles, vehicle intrusion prevention and detection, and security threat information sharing in the automotive context.

FNC-2020 participants learnt more about standardization projects underway in Q14/17 as well as vehicular applications of ITU X.509, a key standard enabling authentication over public networks. The ninth edition of ITU X.509 – a cornerstone of applications relating to public key infrastructure – was released in October 2019.

Read more about: ITU-T Study Group 17.

The Finnish model – a good way to start?

According to Ladid, Finland is by far the best-equipped country to address hacking and cyberattacks, saying that in Finland the ICT regulator itself is the country's cybersecurity head office (employing around 60 people), and that cybersecurity laws are written into the Finnish constitution.

Information sharing – key to cybersecurity

Is the automotive industry sharing threat intelligence in a way that improves cybersecurity, and if not, how can information sharing be improved?

"Information sharing needs to be led by the industry," according to Rossen Naydenov, Network and Information Security Expert at ENISA. "This is not something that regulation can impose."

Naydenov believes that the current automotive stakeholders have trust in each other, but perhaps not the level of trust required for information sharing on cybersecurity (referring specifically to Europe).

"We have seen that in the US the Auto ISAC [Automotive Information Sharing and Analysis Center] helps the industry to stand more firmly against the attackers and prevent new attacks being developed," he said.

Naydenov recommends that if the automotive industry were to create its own ISAC in Europe, then it should be in close cooperation with initiatives focused on threat intelligence sharing in the ICT sector.

Bringing knowledge on a global scale

It was suggested that knowledge about automotive cybersecurity can and should be brought out on a global scale. By international cooperation, experts can learn from each other, and therefore help to support global road safety, together. ■


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How can we ensure safety and public trust in AI for automated and assisted driving

Cars are becoming increasingly automated. Drivers already benefit from a wide range of advanced driver-assistance systems (ADAS), such as lane keeping, adaptive cruise control, collision warning, and blind spot warning, which are gradually becoming standard features on most vehicles.

Today's automated systems are taking over an increasing amount of responsibility for the driving task.

It is expected that soon, sensors will take the place of human impulse, and artificial intelligence will substitute for human intelligence.

This process is defined through various level steps, from low levels of automation where the driver retains overall control of the vehicle in level 1, to a fully-autonomous system in level 5.

10 years ago, manufacturers predicted many cars on today's roads would be fully automated, but it still remains a distant future for the automotive industry. At the recent Future Networked Car Symposium 2020 at ITU Headquarters in Geneva, Switzerland, top experts joined a panel entitled "AI for autonomous and assisted driving – how to ensure safety and public trust" to discuss the progress and the prospects for vehicles that drive themselves – and how we might achieve this future.

Updated predictions for autonomous vehicles

Some panellists agreed that achieving fully autonomous systems, which expect and react to a vehicle's performance to the same level as a human driver in every scenario – also known as ADAS level 5 – is unlikely, certainly in the near future.

"There is no AI. AI is a buzzword! None of these systems are even close to passing a Turing Test. They are code, many of them are black boxes that have done some sort of regression to get coefficient to run things," said Alain Kornhauser, Professor, Princeton University, USA.

Meanwhile, Bryn Balcombe, Chief Strategy Officer of Roborace, distinguished between the algorithms for driving decisions and the underlying hardware architecture. No vehicle is driving itself, rather it is the algorithm driving the vehicle, he pointed out.

"People thought there would be a level 5. Now, there's a lot of discussion about 'There will never be level 5'! It is just too hard to do," said William Gouse, Director, Federal Program Development, SAE International, Washington, DC. "It is not a linear step from level 4 to 5."

He stressed the functional difference between an artificial intelligence (AI) performance in a simulated environment versus a real-world application as a defining barrier to safety and trust.

Critical concerns over security need to be answered first. "Did AI learn bad traffic habits? Did it break some rules because it was hacked?" asked Gouse.

Validating autonomous driving

Ongoing validation of autonomous vehicles is a necessary step to addressing these concerns and ensuring the safety of all road users, said Balcombe.

"When we look at whether these systems are safe, how can we ensure that they perform the driving task as well – if not better – than a human? Because that is the public expectation," said Balcombe.

"It is not going to be acceptable to say [that the automotive driving software] passed in simulator; "I'm sorry that your child ran out in the road, I wasn't expecting that to happen – it wasn't part of my scenario testing." That is something that cannot happen," he said.

> *"Did AI learn bad traffic habits? Did it break some rules because it was hacked?"*
>
> William Grouse
> SAE International

"We have to have some mechanism to monitor the behaviour of these vehicles when they are on the road to keep that public trust."

But it is not just the technology that needs to be monitored in an autonomous future. The panellists agreed that human misbehaviour, rather than human error, is one of the primary causes of road accidents.

"There are some risks regarding artificial intelligence, not because of the technology but because of the use. We are trying to evaluate and assess where the risk could be," said Juan Jose Arriola Ballesteros of the European Commission.

Ballesteros highlighted the importance of the new Focus Group on AI for autonomous and assisted driving, set up by the ITU.

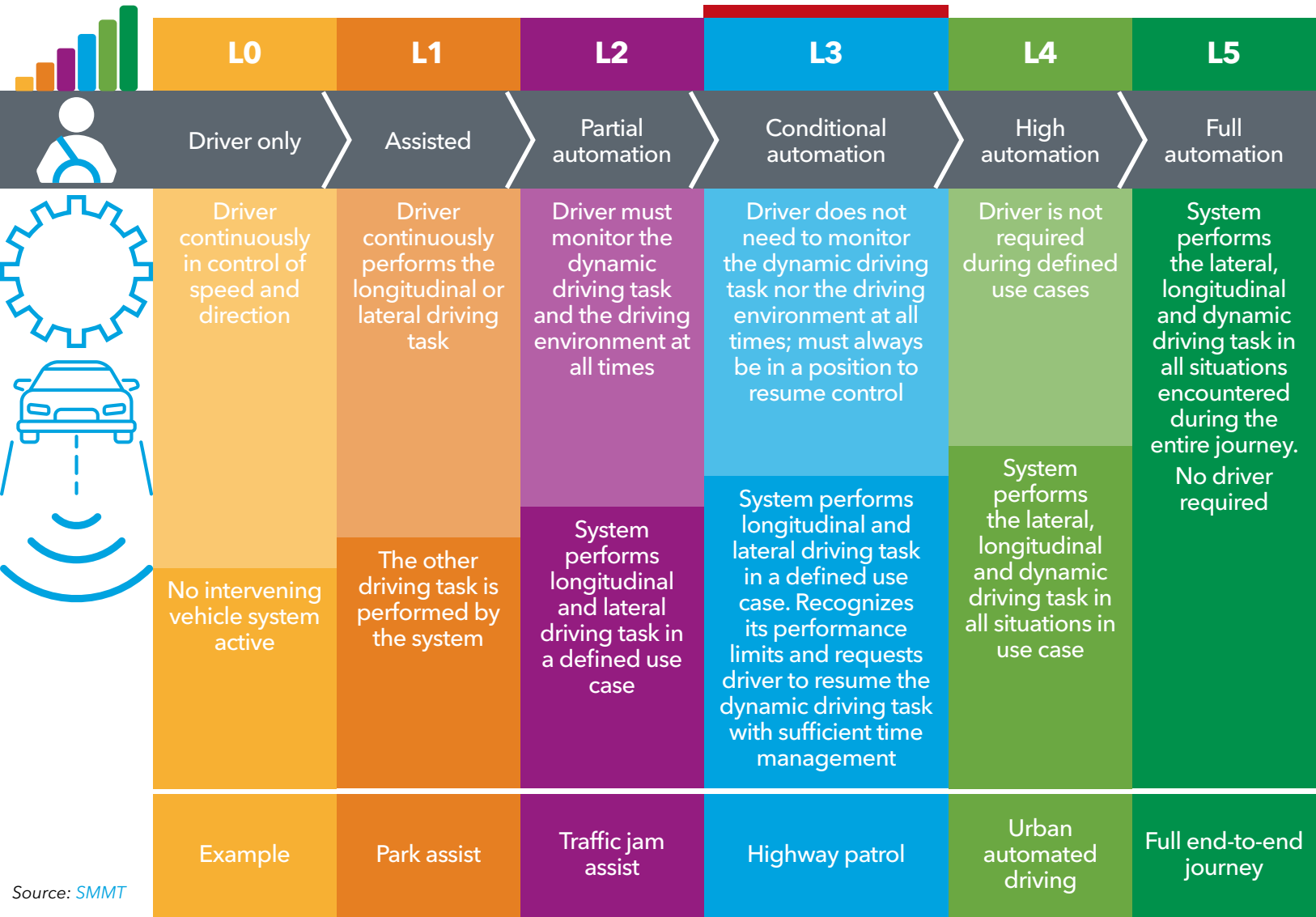
He said that the European Union is working on a strategy based on the principles of trust and excellence, and is currently developing a strategy introducing these new technologies on the roads.

Work is underway on a potential vehicle gateway requirement for Europe. But given the hurdles faced by autonomous driving, panellists agreed that there may be a market for mobility as a service instead of for private use.

"I don't think anybody is going to sell us or let us own a vehicle that we can just send out on public roads with nobody in it to go pick up our lunch. I don't think we are responsible enough as individuals," said Kornhauser. "There is a market for mobility as a service."

This vision of mass transit mobility as a service would need to be done by a respected body that can distribute risk over an enormous number of entities, said Kornhauser. But how do you build public trust?

"If they are not safe, the mobility as a service piece will never happen," he said. ■



Source: SMMT

International standards for a trusted ecosystem of intelligent vehicles

By Chaesub Lee

Director of the ITU Telecommunication Standardization Bureau

The automotive industry is undergoing unprecedented transformation. Electrification has gathered significant momentum. The movement towards self-driving vehicles is accelerating. New business models are pioneering new shared modes of transport. We can now say with confidence that the future of mobility will be electric; highly automated; and, increasingly, shared.

New technologies are at the heart of this transformation, and international standardization will be essential in ensuring that these technologies are deployed efficiently and at scale.

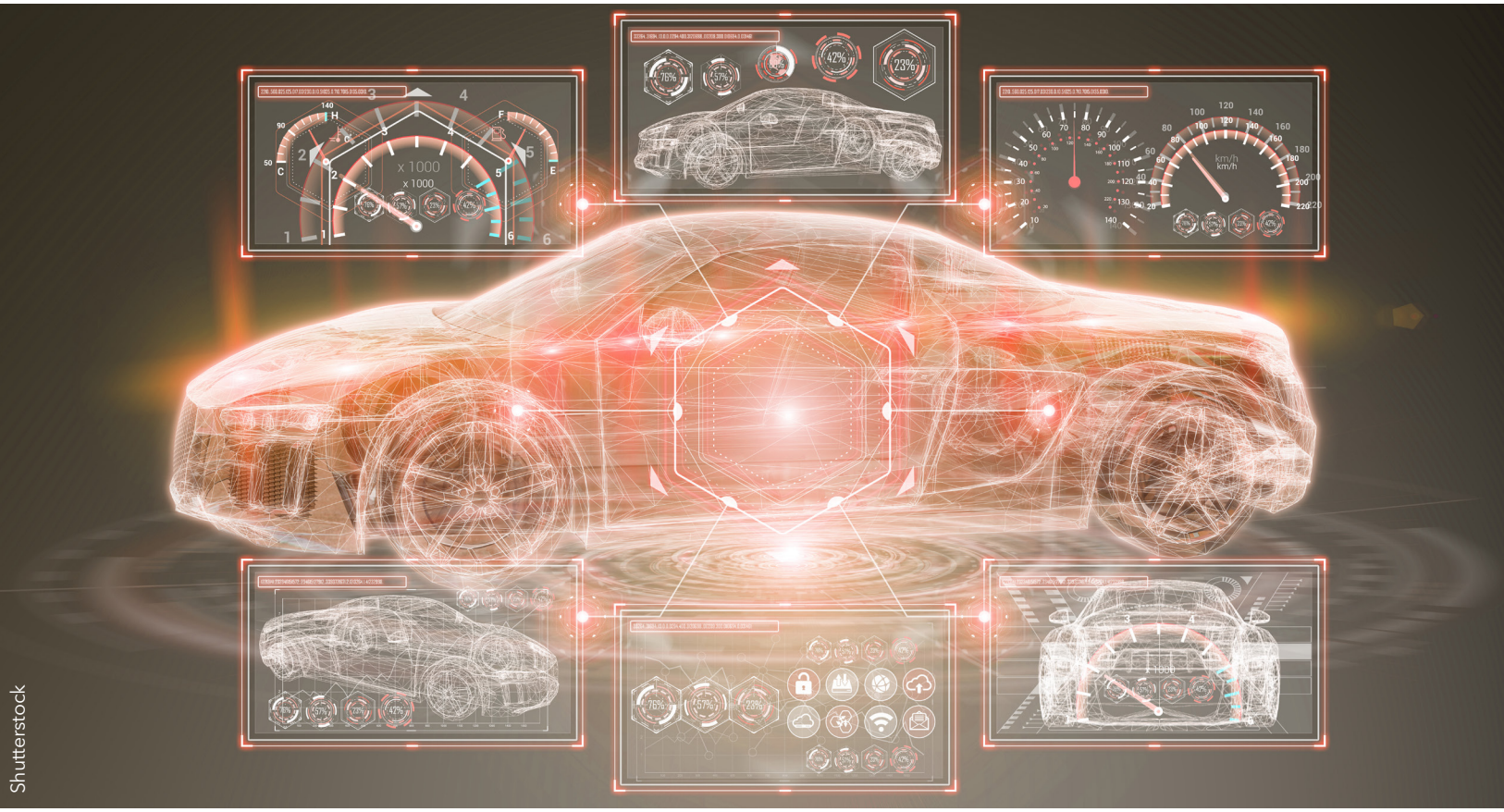
That is why the ITU membership now includes Hyundai and Volkswagen Group, and a diverse range of other automotive industry players such as the Autonomous Drivers Alliance, China's Telematics Industry Application Alliance, Continental, Bosch, BlackBerry, Tata Communications and Mitsubishi Electric.

By joining the United Nations (UN) specialized agency for information and communication technologies, ICTs, they are helping to shape international standards that protect and encourage key investments, improve road safety and help build intelligent transport systems.

ITU support to automotive innovation

Advances in vehicle connectivity and automation have introduced new opportunities to make road transport safer, cleaner and more efficient. But taking advantage of these new opportunities will require a range of new partnerships.

> *"International standardization will be essential in ensuring that these technologies are deployed efficiently and at scale."*
>
> Chaesub Lee
>
> Director, ITU Telecommunication Standardization Bureau



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Here we see the value of inclusive standardization processes. Standardization is key avenue for new partners to build mutual trust and understanding.

The automotive and ICT industries, and the many new market segments emerging at their intersection, find themselves in need of common platforms for growth and innovation – common standards.

The international numbering ranges assigned by ITU enable connected vehicles to roam at a unified roaming fee, and they are also a key enabler for vehicle emergency calls. ITU standards provide for vehicle-to-vehicle and vehicle-to-infrastructure communications, dedicated short-range communications, millimeter wave collision-avoidance radars, and sensor technologies for vehicles to monitor their surrounding environment. Our standards also address vehicular multimedia gateways and "infotainment" systems, the security of over-the-air software updates to connected vehicles, and the performance and quality of in-vehicle communications in everyday as well as emergency contexts.

Road safety and cybersecurity are our top priorities.

The automotive industry is significantly invested in ITU's international standardization of 5G systems, with 5G expected to deliver high-precision communications services tailored to the needs of the automotive industry. We have also seen ICTs becoming central to vehicle control, highlighting the importance of ITU's growing programme of standardization work on automotive cybersecurity.

ITU's latest initiatives for intelligent transport are addressing the latest innovations in vehicular multimedia and the performance of the AI "drivers" in control of automated vehicles. These initiatives are led by ITU Focus Groups open to all interested parties.

An ITU Focus Group on "vehicular multimedia" is working to determine where international standards could support the global introduction of advanced infotainment systems incorporating services such as Augmented Reality navigation, video streaming, and automated in-vehicle climate control.

An ITU Focus Group on "AI for autonomous and assisted driving" is working towards the establishment of international standards to monitor and assess the performance of the AI 'drivers' in control of automated vehicles.

This second group aims to devise a "Driving Test" for AI drivers, a test which could become the basis for an International Driving Permit for AI. The right to hold this permit would be assessed continuously, based on the AI driver's behavioural performance on the road.

The group's deliverables will focus on the behavioural evaluation of AI systems responsible for the dynamic driving task in accordance with the 1949 and 1968 United Nations Conventions on Road Traffic.

This work is expected to make a key contribution to public trust in autonomous driving. It is also expected to introduce a reliable measure of progress in AI driver performance, benefiting industry players and regulators' efforts to evaluate the maturity of autonomous driving capabilities.

Moving forward together

The UN Sustainable Development Goals emphasize the importance of partnerships. This is a principle that ITU is pleased to support.

Working in partnership for more than 10 years, ITU and UNECE have built productive dialogue between our respective communities, helping ITU to develop technical standards in support of vehicle regulations. We also continue to draw great value from the Collaboration on ITS Communication Standards, an open platform for standards bodies to coordinate their contributions to intelligent transport.

2020 is an important milestone for the ICT industry and the ICT industry's many new partners.

Ten years remain to achieve the UN Sustainable Development Goals, and ICTs are expected to provide an enabling platform for the considerable innovation required to achieve these goals.

2020 will mark the beginning of the 5G era. The Internet of Things is maturing, stimulating efforts to build Smart Sustainable Cities. Artificial Intelligence and Machine Learning are finding very practical applications across industry sectors.

And we are seeing nothing less than a revolution in mobility.

This revolution has the potential to create very meaningful improvements in the quality of life enjoyed by billions of people worldwide.

I look forward to our continued work together to ensure that we fulfill this potential. ■


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Using harmonized radio frequency bands for intelligent transport systems

At the World Radiocommunication Conference (WRC-19), ITU Member States adopted Recommendation 208 (WRC-19), "Harmonization of frequency bands for evolving Intelligent Transport Systems applications under mobile-service allocations".

WRC-19 recommended that administrations consider using globally or regionally harmonized frequency bands, or parts thereof, as described in the most recent versions of ITU-R Recommendations, when planning and deploying evolving ITS applications. This will contribute to safety of roads, and economies of scale in bringing evolving ITS equipment and services to the public.

In making this recommendation, WRC-19 also recognized that ITS applications do not have priority over other uses of these frequency bands. Therefore, WRC-19 also recommended that administrations take into account the need to avoid potential interference with other services operating in these same bands.

> *"Work on Intelligent Transport Systems is carried out in the ITU-R Working Party 5A."*

The Recommendation mentions the "need to integrate various technologies, including radiocommunications, into land transportation systems."

It points out that "many new connected vehicles use intelligent technologies in the vehicles' combined advanced traffic management, advanced traveller information, advanced public transportation management systems and/or advanced fleet management systems to improve traffic management."

The new Recommendation also recognizes that "harmonized spectrum and international standards facilitate worldwide deployment of evolving ITS radiocommunications and provide for economies of scale in bringing evolving ITS equipment and services to the public."

About ITU-R Working Party 5A

WP 5A is responsible for studies related to the land mobile service, including wireless access in the fixed service, and for studies related to the amateur and amateur-satellite services.

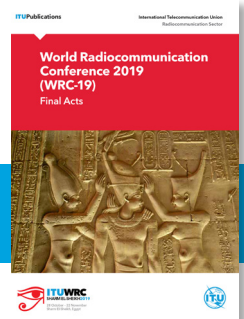
Mobility is becoming an ever-increasing requirement and characteristic of today's communications. In addition to commercial wireless access systems, including radio local area networks (RLANs), specialized land mobile applications such as intelligent transport systems (ITS) are becoming essential in improving the safety and efficiency of our roads and highways.

ITU Member States and Sector Members are invited to participate actively in and to contribute to ITU Radiocommunication Sector (ITU-R) studies on aspects of ITS and evolving ITS (e.g. connected vehicles, autonomous vehicles, adaptive driver assistance systems), through the ITU-R Study Groups.

Work on Intelligent Transport Systems is carried out in the ITU-R Working Party 5A.

More information on the work of ITU-R on ITS will be featured in upcoming editions of the ITU News Magazine. ■

Download the Final Acts to see all WRC-19 outcome documents here.



The future of smart mobility – At the AI for Good Global Summit 2020

The future of smart mobility is more than just the progression and mainstreaming of semi- and fully-autonomous transport systems in the market.

It is also about examining how Artificial Intelligence (AI) technologies can help reduce emissions, increase road safety, increase mobility and enable access to affordable transportation for all.

This year's The Future of Smart Mobility Solution Track at the AI for Good Global Summit 2020, will establish a concrete, inclusive and actionable discussion on how AI-enabled solutions can help achieve the Sustainable Development Goals (SDGs) for improving in-transit traffic safety, developing energy-/environment-efficient vehicles, transportation systems and infrastructure and providing inclusive and accessible mobility opportunities for all.

Below is an outline of the half-day Future of Smart Mobility Solution Track.

SDG 3 Health and well-being (Target 3.6)

Examine how AI-enabled solutions for vehicles, transportation systems and transportation infrastructure by public and private stakeholders can reduce the number of global deaths and injuries from road traffic accidents.

SDG 10 Reduced inequalities (Target 10.2)

- Showcase AI-driven applications, practices and policies that promote the socio-economic inclusion of all amidst the rapid development and deployment of smart mobility systems in the world.

- Investigate the viability of a framework for universal basic mobility that addresses the needs and challenges of stakeholders across different industries and sectors.

SDG 11 Sustainable cities and communities (Target 11.2)

- Identify use cases where AI-enabled solutions can provide safe, affordable, accessible and sustainable transport systems for all, including but not limited to improving road safety and expanding public transport with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and the elderly.

- Discuss solutions in which AI-enabled applications can be used to bridge the gap in mobility access associated benefits between developed and underserved communities, be they in urban, per-urban, rural environs.

- Identify ways in which AI-enabled solutions can support positive economic, social and environmental effects that improved transportation infrastructures can provide.

- Discuss and brainstorm solutions, practices, metrics and policies that enable the development of a minimum performance threshold for smart mobility systems on the road.

SDG 11 (Target 11.6)

- Explore use cases in which smart mobility solutions for vehicles, transportation systems and transportation infrastructure can reduce the adverse per capita environmental impact of cities, with special attention to congestion, air quality, fuel/energy consumption and waste management.

Transforming the driver experience: The connected technology under the hood of intelligent cars

By Amit Sachdeva

Global Head, Business Development, Mobility and IoT, Tata Communications

There was a time when any talk of a new car among enthusiasts or potential buyers revolved around engine power, fuel efficiency and the sleek design and finish. Today, that same conversation has expanded to include sustainability and a connected experience.

Consumers expect every aspect of their life to be connected to the Internet, so why should one's car be any different? Automakers are aware of this and are responding by partnering with technology and B2B companies to find innovative ways to satisfy the demands of customers, and avoid being disrupted.

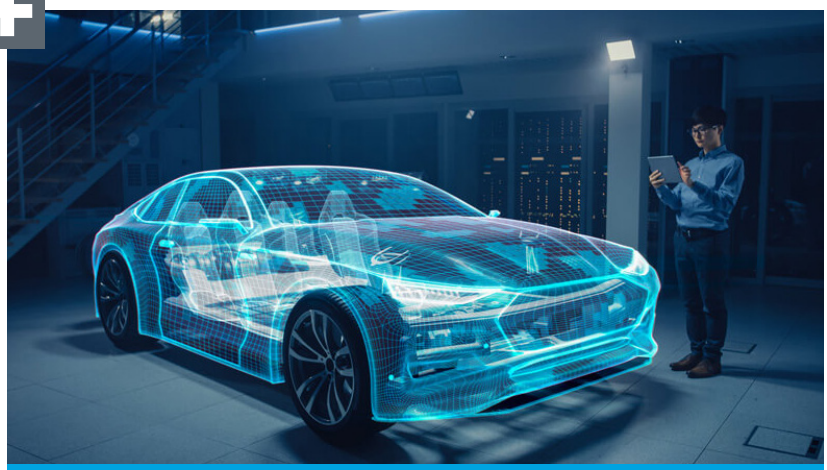
As a result, newer models with embedded Internet of Things (IoT) connectivity and intelligent applications built-in are redefining the manufacturing landscape and the driving experience for consumers.

The surge in the global connected cars market not only impacts the auto industry, it also offers several opportunities for businesses – retailers, insurers, entertainment businesses and of course, the car makers themselves – to leverage the huge volumes of data generated and captured by connected cars to achieve new levels of customer loyalty and open up new revenue streams.

"Enabling connected cars to communicate with other vehicles and the wider IoT ecosystem requires seamless, reliable connectivity."

Amit Sachdeva

Global Head, Business Development, Mobility and IoT, Tata Communications



MOVE™ eSIM

Tata Communications' MOVE™ eSIM enables embedded connectivity and software updates for vehicles globally, with the advantage of complete inter-operability between different SIM providers and mobile network operators.

Multiple opportunities for multiple players

Connected cars harness the power of IoT sensors and connectivity, processing huge volumes of data every moment. Swooping down on the valuable insights offered by this data, car manufacturers are now turning their attention to developing a car's ability to connect with other vehicles, intelligent transport systems and smart city infrastructure. Through this vehicle-to-everything (V2X) connectivity, it is possible to truly transform the driver experience.

Imagine driving to work, and your car alerts you to a great breakfast deal, based on your previous purchases at your favourite coffee shop, and then suggests a new route so that you're able to make it there before you're due at the office. Or, imagine not having to worry about remembering to pay for parking, as your car will take care of the payment automatically when you arrive at a parking lot or drive off.

Analysis of data collected by the connected car enables retailers and other businesses to provide their customers with new, highly personalized and targeted services, by decoding behaviours and preferences for customizing content and products. The outcome? Enhanced brand loyalty, a stronger competitive position and new revenue opportunities.

Advanced technologies offering an edge to players

Enabling connected cars to communicate with other vehicles and the wider IoT ecosystem requires seamless, reliable connectivity. This is where the edge-to-cloud-connected, embedded SIM or eSIM will offer an edge to automakers. As the name suggests, eSIMs are built in the vehicle at the factory.

One key benefit is that they are not tied to a specific mobile network operator like a traditional SIM, enabling automakers to choose the network provider that best meets their needs at the best price point, after the car has left the factory. This flexibility often leads to cost savings.

Crucially, from a maintenance perspective, eSIM enables automakers to securely and remotely provision software updates over-the-air (OTA), without any disruption to the driver – while ensuring vehicle reliability and safety. There are many value-add telematics-related services that can be offered to augment maintenance further across the lifespan of the vehicle, all enabled by eSIM connectivity, including insurance and breakdown services and remote diagnostics.

Collaborating for a connected, secure future

As connected cars steadily gain momentum, businesses and technologies of all kinds become linked through an interdependent ecosystem. This leaves automakers with two choices – embrace collaboration with the wider IoT ecosystem and the new business models and new revenue streams it enables – or risk becoming just a "box", a provider of commoditized hardware. Their future success – even survival – depends on embracing this transformation.

Tata Communications has been working with Microsoft to enable automotive manufacturers to offer consumers worldwide more seamless and secure driving experiences.

We're doing this by combining the IoT connectivity and network intelligence capabilities of Tata Communications MOVE™ (see video) with the Microsoft Connected Vehicle Platform; paving the way for new disruptive connected car services. This integration means that players within the connected car ecosystem – from manufacturers, dealerships, insurers to fleet operators and others – will be able to bring to market new value-added services more quickly and cost-effectively, and ensure that they offer drivers reliable, consistent user experiences, anywhere in the world.

Connected cars are just one example of the massive changes that mobility and IoT innovations are enabling in how businesses operate, how they interact with their customers, and how people engage with the world around them. A true collaborative effort by the technology industry, manufacturers of all kinds of "things", and the public sector can take us closer to a seamlessly and securely connected world. ■

Note: Tata Communications is a member of the ITU Telecommunication Standardization Sector.

The automotive cloud: Q&A with Christian Senger, Volkswagen

ITU News connected with Christian Senger, CEO of the new Car.Software Organization in the Volkswagen Group and Member of the Board of Management of Volkswagen Passenger Cars.

We learnt more about the future of automotive software and the Volkswagen Group's approach to a changing auto industry landscape.

> *"The challenge is that both parties come from different worlds."*
>
> Christian Senger
>
> CEO, Car.Software Organization, Volkswagen Group

What do you see as the most important ways that connected, automated vehicles are transforming the auto industry?

E-mobility and digitalization are setting the pace for the Volkswagen Group. And we are speeding up. In the next ten years, we will be launching 75 new electrified and 60 hybrid models on the market. This way, we will offer the most comprehensive electric portfolio in the industry.

The next major development step which will fundamentally change our industry is digitalization. Already today, software is playing the key role in the car. Our upcoming model generations are fully connected. Their functions can be individually configured and expanded. Thanks to software updates, our vehicles will always be up to date.

What does that mean specifically?

Industrial skills of the type Volkswagen holds will no longer be sufficient. We must become a technology company with our own skills in order to develop vast software volumes for our vehicles and to build up a globally scaled cloud.

These competences are pooled in a new and independent business unit: Our Car.Software Organization will bring together more than 10 000 digital experts throughout the world by 2025. Their mission will to be to develop a standardized software platform for all brands and markets within the Group. This will include the vehicle operating system VW.os and the Volkswagen Automotive Cloud.

What are the top goals of the Volkswagen Automotive Cloud?

Our Automotive Cloud, which we are developing together with Microsoft, will be the central control unit for our upcoming fully connected vehicle fleet. Drivers and passengers will be able to access a growing digital ecosystem connected to the vehicle via the Automotive Cloud.

They will benefit from a growing range of features including vehicle functions that can be enabled, multimedia streaming, smart card services and many more.

What dimension are we talking about?

In future, we will deliver more than 10 million fully connected new vehicles per year throughout the Group. That will mean 50 million vehicles with cloud connections within the space of five years.

Depending on individual use, each vehicle can generate a data volume of several gigabytes per month. Our Automotive Cloud will therefore be designed for high performance.

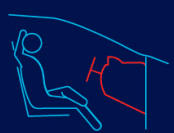
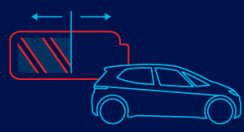
Why is this initiative important for Volkswagen?

The car will increasingly become a digital living space for many people. Individualization using software will be taken for granted. After all, we are familiar with this approach from our own smart phone which becomes increasingly personalized over the course of use. We are also familiar with the idea of subscribing to or purchasing new functions. This will only be possible via a Cloud connection.

The new **Car.software Unit**

Volkswagen develops software in five central areas

approx. 10 000 + experts by 2025

Connected Car and device	**Intelligent body and cockpit**	**Automated driving**	**Vehicle motion and energy**	**Digital Business and Mobility Services**
Volkswagen Group	Audi	Audi	Porsche	Volkswagen passenger cars
				
Transform multiple backends into one Volkswagen Automotive Cloud	Development of a cross-brand, standardized cockpit and body platform for all future E/E-architectures – the "One Infotainment Platform"	A one SW-Stack, cross-branded approach for autonomous driving/ parking and driver assistance systems, scalable from NCAP to level 3 and beyond	Development and delivery of powertrain, chassis and energy/charging software functions, located on a high performance computing platform	Definition of customer experience and management of requirements for the technology stack for the implementation of the mobility services and digital business porfolio for all brands

Source: Volkswagen

In addition, new assistance systems in the field of automated driving will make driving a safer, more convenient experience for people in the future. These systems will also be updated on the vehicle via a Cloud connection so that the latest version is always installed. In brief, the Cloud will be a key element in the digitalization of our vehicles.

What is the importance of the partnership with Microsoft?

We can only succeed in mastering the technological transformation in cooperation with strong partners. Volkswagen and Microsoft supplement each other well.

At Volkswagen, we of course have a profound understanding of the automobile, the last undeveloped data domain, right down to the last detail. On the other hand, Microsoft has proven expertise in the development of scalable technologies and software know-how.

Learning from each other will be a key objective of our cooperation. Both parties will need to adapt to each other and in some cases to leave old paradigms behind them. This has not always been easy, but we are now making good progress.

What are the biggest opportunities and challenges?

We are performing pioneering work. As two of the largest companies in their respective industries, Volkswagen and Microsoft have joined forces to develop a global Automotive Cloud. This is a major undertaking in every respect, one with great possibilities for our many millions of customers. It will be a long-term project which will call for energy and a farsighted approach on the part of all concerned.

Can you specify that?

The challenge is that both parties come from different worlds. We come from the world of automobile and machinery production while Microsoft is at home in the software industry. We both understood that there is no individual patent recipe for success. We can only be successful together. This is the way we are acting.

With our new Car.Software organization, we are concentrating entirely on software. This means separating software with its rapid development processes from hardware development with its lengthy product cycles. This way, we can keep step with the processes in the IT industry.

Volkswagen developes more software itself

On the other hand, Microsoft is orienting itself towards our objective of ensuring the highest standards of safety and quality for our vehicles, as people entrust themselves to our vehicles. After about one and a half years of close cooperation, we have developed a profound understanding for each other. This has generated a tailwind for the tasks ahead of us.

Note: Volkswagen Group is a member of the ITU Telecommunication Standardization Sector.

How ITU member Continental views the future of autonomous mobility

ITU News connected with Frank Jourdan, Member of the Continental Executive Board and President of the Business Area Autonomous Mobility and Safety of Continental.

Continental, an ITU Member, recently announced it will be building a new plant for driver assistance systems.

Why is this new plant for advanced driver assistance systems important for Continental?

The purpose of the new building is to expand our capacity for the production of radar sensors. Advanced driver assistance systems save lives and we are one of the world's market leaders in this area. We are benefiting from steadily increasing fitment rates in new vehicles. And in the future, too, we are anticipating major growth opportunities.

The capacity expansion in our new location in New Braunfels, Texas, is part of our growth strategy. We also operate our own development centers and production sites in the major regions of Europe, America and Asia. Customer proximity in the regions is of paramount importance to us.

How do advanced driver assistance systems actually save lives and how is Continental uniquely positioned to help make these systems a reality?

Our "Vision Zero" – the vision of crash-free driving – will continue to drive our developments in safety technologies and to make safety available to everyone around the globe.

For one thing is sure: only the widespread use of active safety technologies will help to achieve the EU goal of halving the number of road fatalities by 2030. Advanced Driver Assistance Systems are a main building block to realize Vision Zero.

"For one thing is sure: only the widespread use of active safety technologies will help to achieve the EU goal of halving the number of road fatalities by 2030."

Frank Jourdan

Member of the Continental Executive Board and President of the Business Area Autonomous Mobility and Safety of Continental

Continental offers all relevant components for both assisted and automated driving from a single source. This includes the sensors for environment detection based on radar, camera, lidar and ultrasound technology.

In addition, of course, we also supply the central control unit (Assisted and Automated Driving Control Unit) with the necessary computing power to realize the higher functional scope. This includes software solutions (end-to-end) as well as system integration competence related to the complete system architecture.

We must not forget the tyres in our portfolio: We are the only company that has the know-how and the competence to master the contact between vehicle and road.

Are radar sensors becoming standard in all new cars?

The demand for all kinds of sensors, not only for radar sensors, will grow strongly in the next years. At the moment, the demand is still mainly driven by safety regulations and consumer ratings like NCAP or IIHS (Top Safety Pick).

The number and also the design of the sensor setup strongly depends on the specific function to be implemented (e.g. driving and/or parking functions). A general statement about which sensor set will be installed can therefore not be given.

However, the higher the degree of automation, the higher the number of sensors installed. This is especially true with regard to redundancy and protection.

For highly automated systems a sensor set based at least on radar, camera and lidar will be used. Different sensors have also different strengths. Radar sensors e.g. are superior in measuring speed and distance to objects surrounding the car including severe weather and illumination conditions compared to a camera.

What is Continental's strategy for autonomous mobility and safety in the next five years?

Automated and autonomous driving is an exciting and relevant part of Continental's growth story and a big contribution for greater safety.

We see a clear time shift of higher automation levels from level 3 upwards and are working intensively with our partners in the passenger car business on the series development of scalable level 2 premium system solutions.

Concentrating on systems that can be approved according to current standards will help to bring them to market on a broad basis. With our broad and comprehensive portfolio, we are excellently positioned in terms of product strategy.

Along the SensePlanAct chain of effects, for example, we cover all the important core areas of automated driving with modern sensor systems, powerful computer units and redundant electric brake systems.

In addition to the passenger car business, we are working intensively on system solutions and functions for commercial vehicles and trucks. We expect driverless minibuses to be part of the traffic mix in our cities and communities in about a decade. Also known as robo-taxis, they are expected to share the burden of inner-city traffic and form another link in our urban transport systems.

With the CUbE development platform, a global network of researchers and developers at Continental has created a concept vehicle for the practical testing of these research activities. Continental's experts are based at five competence centers in Germany, Singapore, Japan, China and the USA and work together on the development and validation of technologies.

In the truck sector, we have entered into a partnership with Knorr-Bremse AG to develop a complete system solution for highly automated driving (HAD) in commercial vehicles.

This will enable the partners to offer HAD solutions for truck series production of any size in the future. The cooperation covers all functions for driver assistance and highly automated driving.

What do you see are the challenges?

The biggest obstacle is the lack of a legal framework for highly automated driving in 2020. It's now high time that the legislature opens up the way to the actual use of automated driving. In Germany we see new laws on automated driving as an important step forward.

Though we see still the necessity to further specify in detail. These are steps in the right direction, and the logical development following amendment of the Vienna Convention on Road Traffic.

Nevertheless, the specific wording still requires modification and detailing. Also, the appropriate UNECE regulations must be adapted at short notice to ensure a standardized legal structure.

Furthermore, a detailed legal ruling on the responsibility of drivers and manufacturers and on the liability situation is of course essential for the future.

What are some of the biggest trends you see for automated vehicles moving forward?

We see seamless mobility and software as two of the biggest trends when it comes to automated vehicles and future mobility. Seamless Mobility means driving with an automated privately-owned car automated until the city border. By using valet parking the car waits until it is needed again.

The "last mile" will be reached through a driverless vehicle which waits at the valet parking space to bring people to their final destination. Our vision of a seamless mobility also emphasizes the autonomous transportation of goods and special vehicles such as drones.

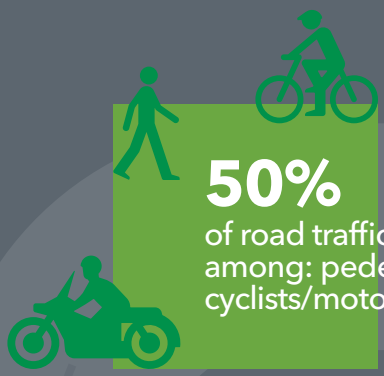
In our eyes, software is a big trend and "the new wheel of the industry". Processes with regard to mobility are becoming increasingly complex and more strongly interconnected. These processes need to be controlled and managed reliably, requiring ever greater amounts of software.

Software will largely define the automated and connected car of the future and new software- and services-related business models will become important.

Road traffic injuries: the facts

1.35 million
die each year in road traffic crashes

#1
cause of death among those aged
5–29 years



50%
of road traffic deaths are among: pedestrians/ cyclists/motocyclists

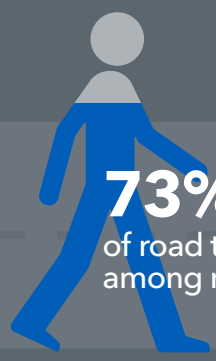
Road traffic crashes cost most countries
3% of GDP

60%
Vehicles

93%
Deaths

Although low- and middle-income countries have only 60% of the world's vehicles, they have 93% of the world's fatalities on the roads

3X
Young males 3x more likely than young females to be killed in a road traffic crash



73%
of road traffic deaths occur among males under 25 years

Source: Road traffic injuries Key facts (February 2020) World Health Organization

unsplash

Let's work together to improve road safety. Technology will be key

By Yushi Torigoe

Chief of the ITU Strategic Planning and Membership Department

There is great concern that road traffic accidents kill more than 1.35 million people every year and are the leading cause of death for children and young adults aged 5–29 years.

Road traffic accidents cost most countries 3 per cent of their gross domestic product.

The numbers are indeed, alarming!

The 3rd Global Ministerial Conference on Road Safety was an opportunity for a dialogue on how we can provide access to safe, affordable, accessible and sustainable transport systems for all.

It is clear that while some countries have made progress on road safety in the past decade through better road safety legislation on speeding, drink driving, seatbelt use, wearing helmets, for example, much more can be done, and we need a set of innovative solutions to save lives on the world's roads.

This text is based on Yushi Torigoe's participation in a panel session on "Enhancing international collaboration for road safety" at the 3rd Global Ministerial Conference on Road Safety held on 19–20 February, in Stockholm, Sweden.

Yushi Torigoe speaking in the panel session on Enhancing International Collaboration for Road Safety

Participants at the conference agreed that intensifying international cooperation and multilateralism through engagement with all relevant actors, including the private sector, is necessary to achieve global road safety targets – including the Sustainable Development Goal target 3.6 – to reduce road traffic fatalities and injuries by half.

We need to put an end to a silo mentality, when it comes to dealing with a global problem.

The resulting Stockholm Declaration recognizes that advanced vehicle safety technologies are among the most effective of all automotive safety devices, and encourages and incentivizes the development, application and deployment of existing and future technologies and other innovations.

However, if these technologies are to be deployed efficiently and at scale, then global standards are a key requirement.

Cross-sector and international collaboration for global standards

ITU has been collaborating globally to develop information and communication technology (ICT) standards specifically related to road safety.

In fact, new ITU focus groups related to connected cars and autonomous and assisted driving have resulted in strengthened multi-sector collaboration, and a surge of new members from the automotive sector.

These include car manufacturers such as Hyundai and Volkswagen Group – and a diverse range of other automotive industry players such as China's Telematics Industry Application Alliance, Continental, Bosch, BlackBerry, Tata Communications and Mitsubishi Electric.

In January the first meeting of the ITU Focus Group on "Artificial Intelligence for Autonomous and Assisted Driving" was held in London.

By joining ITU, these global stakeholders are helping to shape international standards that protect and encourage key investments, improve road safety, and help build intelligent transport systems.

With ITU standards, the products required for safer, connected vehicles and intelligent transport systems benefit economies of scale, and enable outreach to the global markets of ITU's Member States.

ITU's regional coordination

ITU's conference preparation, such as for a World Radiocommunication Conference (WRC), is based on regional preparation, and final consensus is based on coordination among regions.

There is then the opportunity afterwards for regional and local priorities to be adjusted.

The potential of 5G in connected cars

ITU, through its 193 Member States, has been leading international collaboration and cooperation on issues relating to ICTs for over 150 years.

The World Radiocommunication Conference 2019 (WRC-19), for example, welcomed over 3400 participants, and resulted in a key consensus-based agreement to allocate additional radio-frequency bands which will facilitate the development of fifth-generation (5G) mobile networks, which will enable autonomous vehicles and smart cities.

WRC-19 recommended that ITU Member State administrations consider using globally or regionally harmonized frequency bands, or parts thereof, as described in the ITU-R Recommendations (e.g. Rec. ITU-R M.2121), when planning and deploying evolving intelligent transport system (ITS) applications. This will contribute to safety of roads and economies of scale in bringing evolving ITS equipment and services to the public. In making this recommendation, WRC-19 also considered that these bands are shared with other radio services and recommended that administrations take into account the need to avoid potential interference with those other services operating in these same bands.

The future networked car

In another example of cross-sector collaboration, since 2003, ITU and UNECE have brought together representatives of the automotive, information technology, and communications industries, along with government leaders, to discuss the status and future of vehicle communications and automated driving.

This year's Symposium for the Future Networked Car (FNC-2020), was held on 5 March, 2020 at ITU in Geneva, Switzerland.

The Symposium enabled participants to examine the latest advances in the areas of vehicle connectivity, cybersecurity, applications of artificial intelligence (AI), and the global regulatory framework that will support deployment of more highly automated mobility solutions.

Together, participants also explored the relationships between vehicle communications and automated driving by analysing the crucial role of the latest 5G connectivity technologies in delivering safer and more effective transport. ■

Europe's commitment to improving road safety

The European New Car Assessment Programme (Euro NCAP), which rates cars for safety, recently recommended that several new safety features become mandatory by 2022.

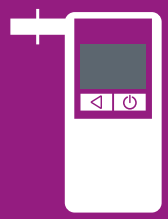
The new 2020 General Safety Regulations include new tests for crash safety and crash avoidance and, for the first time, for post-crash survival, with cars rewarded for features that allow for safe and rapid rescue of occupants.

It will also gradually introduce new advanced safety systems offering more possibilities to reduce casualties.

New motor vehicles shall be equipped with the following advanced vehicle systems:

Intelligent speed assistance

Alcohol interlock installation facilitation



Driver drowsiness and attention warning

Advanced driver distraction warning

Emergency stop signal

For more see.

Reversing detection

Event data recorder

Unsplash/Matt Chesin

Why ITU-assigned numbering ranges are critical to road safety

By Philippe Fouquart

Orange, Rapporteur for ITU work on "Application of numbering, naming, addressing and identification plans for fixed and mobile telecommunications services"

The international numbering ranges assigned by ITU for machine-to-machine (M2M) communications are generally used for data connectivity – these numbers do not need to be reachable from national public telecoms networks, making them "invisible" to users.

But there are exceptions to this general rule, and one very important exception is a call to an in-car emergency service such as eCall, the pan-European system for automatic vehicle emergency calls.

eCall is an M2M service operating under codes +882 and +883, numbering ranges assigned directly by ITU. ITU has assigned numbers under +882 and +883 to global M2M providers for over 15 years, and we have identified an urgent need to bring greater clarity to the role played by +882 and +883 in systems such as eCall.

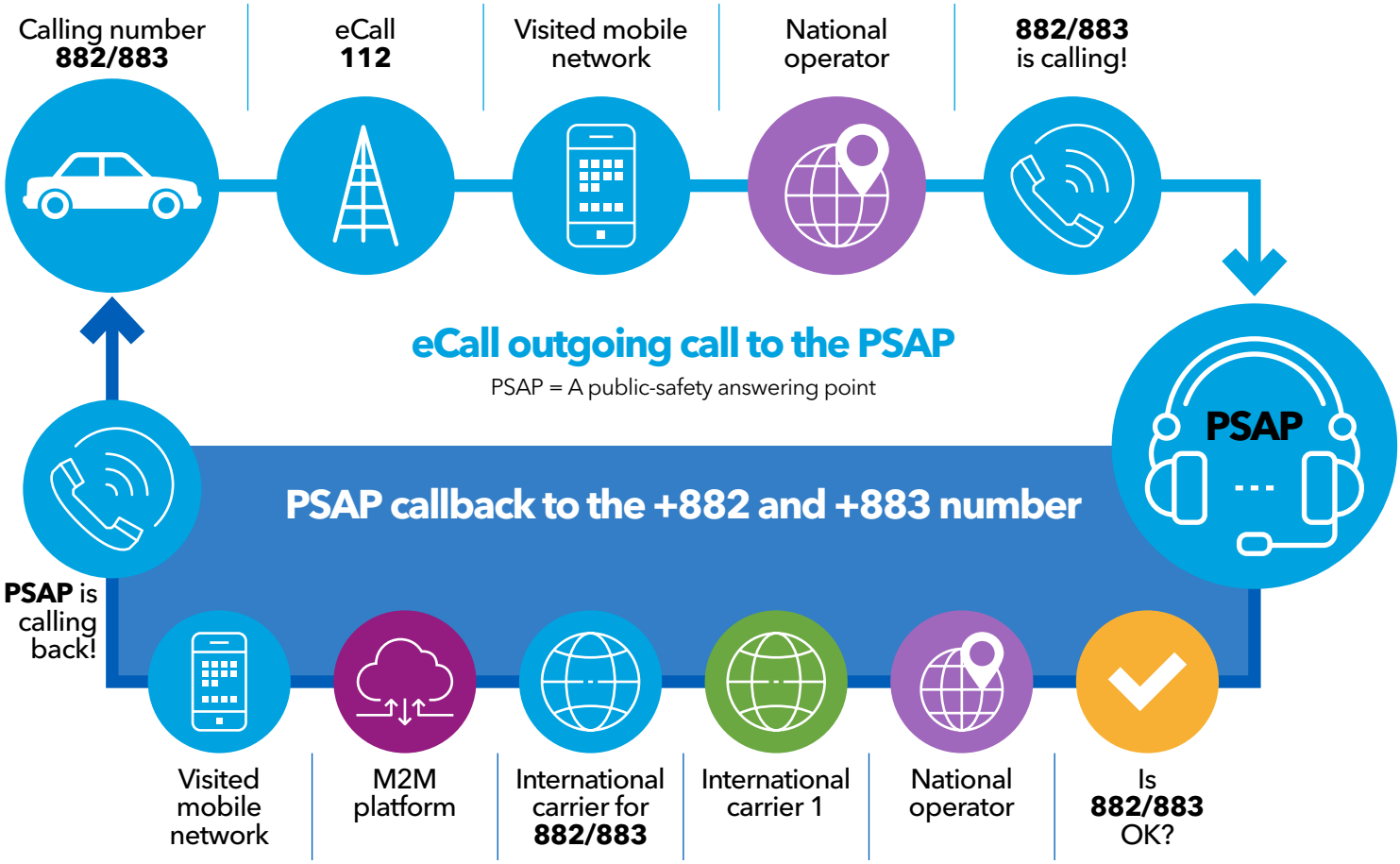
For emergency services to be able to call back the phone numbers used for a vehicle emergency call, users of national telecoms networks must be able to reach +882 and +883 numbers – the success of the eCall system depends on it. If national telecoms operators do not provision the +882 and +883 ranges in their networks, emergency services will not be able to call back to the vehicle in an emergency.

How eCall depends on +882 and +883 ranges

When a vehicle calls eCall 112, this call is routed to emergency services regardless of the vehicle's mobile number, but a +882/+883 number is used as a calling party number (Calling Line Identity) for emergency services to call back if the initial call drops.

For these emergency services to call back when the call drops, national telecoms networks must be able to route the +882 and +883 numbers that are being used as calling party numbers – generally in 15-digit formats – when an M2M device makes an emergency call automatically.

The figure below illustrates the routing of the calls to and from a Public Safety Answering Point (PSAP).



Let's position eCall and in-car emergency systems for success

For emergency services to be able to call back the numbers used by eCall and other similar systems, two conditions must be met:

- The Calling Line Identity for these calls must be passed between network operators in the correct, dialable format; and,
- +882 and +883 ranges must be routed end-to-end through multiple networks.

It is critical that +882 and +883 number ranges are provisioned by national telecoms operators to ensure that calls to these numbers are accepted and routed to international carriers.

ITU would like to urge the international telecoms community to work together to ensure that eCall and other similar systems have the right technical foundations to succeed.

Several national telecoms operators are already provisioning +882 and +883 number ranges, but for the success of in-car emergency calls, such as the pan-European eCall system, the cars and therefore the numbers need to be reachable from everywhere in the world. To ensure this, +882 and +883 number ranges must be provisioned and opened by national telecoms operators. ■

ITU's role in international numbering

ITU is the world's foremost authority on international numbering. This work is led by ITU-T Study Group 2 (Operational aspects). The rules for assignment of numbers under the ranges +882 and +883, developed by Study Group 2, can be found in the ITU standard ITU E.164.1.

The ITU-T Operational Bulletin provides examples of such ranges. See page 4 of ITU-T Operational Bulletin No. 1155-4.

More information on numbering options for eCall is provided by the ECC recommendation (17)04 "Numbering for eCall".

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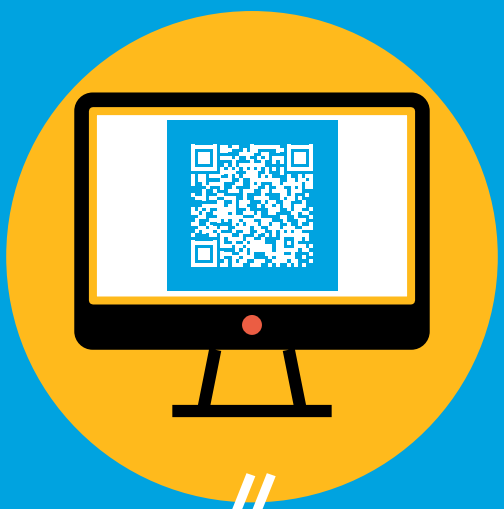

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