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ETSI

Editorial

I wish you
a happy
and successful
New Year.

Transporting people and goods has become much more complex than a few decades ago. The densification of transport modes and their speed and diversity present a variety of issues where safety, security and efficiency are key. Incorporation of ICT into the equation is a must, and though it provides a response to some of the problems, it also raises some interesting challenges.

As an example, transport modes for intermodal urban mobility can include bicycles, scooters, cars or public transport, to name a few. This evolution is reflected in society and lays the foundation for a whole different environment which needs to be addressed within the entire ecosystem.

For instance, ETSI's Intelligent Transport Systems Technical Committee has recently issued a number of use cases for vulnerable road users such as pedestrians. Car manufacturers have made huge progress on vehicles' connectivity to ensure better safety for passengers and road users. At the end of last year, they started announcing ETSI ITS G5-compliant cars (e.g. Volkswagen Golf 8) while they foresee using 5G to enable additional features. In addition, our new Smart Secure Platform is providing solutions to enhance device security addressing different sectors (see page 3).

In ETSI, various Technical Committees are also working on current and future modes of transport to help ensure interoperability and safety for all. The **Tech Highlights** section will give you an update on our rail, aviation and maritime committees while **Zoom on Europe** focuses on European maritime security strategy with our new group CDM. Our exclusive interviews with the General Manager of CAR 2 CAR Communication Consortium and the Chief Technical Officer of 5G Automotive Alliance (5GAA) highlight two approaches for V2X (vehicle-to-everything) communication. Furthermore, you can enjoy our **spotlight** section with a piece written by the Chair of our technical committee Intelligent Transport Systems and the showcase of V2X services implemented in the UK. And in this edition we also cover **3GPP's** approach to Unmanned Aerial Systems and call attention to **oneM2M's** outline for connected and intelligent transport solutions.

But there's much more in this issue, including our new corporate video, so turn the page!

Luis Jorge Romero,
ETSI Director-General

Smart Secure Platform ready for:
IoT, 5G, and security-sensitive sectors

In our July edition we announced the release of the requirements for the new Smart Secure Platform (SSP). The ETSI Technical Committee Smart Card Platform, which standardized the former generations of SIM cards, has now released the first three specifications to launch this open platform designed for multiple applications with various physical interfaces and form factors. SSP is a highly secure, scalable, thus cost-efficient solution optimized to fit many requirements, from IoT applications to complex solutions, hosting several applications such as banking and payment, ID

management and access to mobile networks. Furthermore, the SSP is backwards compatible with the UICC.

The three specifications cover the general technical characteristics of the Smart Secure Platform with ETSI TS 103 666 1, the integration of the Secure Element into a System on Chip (SoC) solution in ETSI TS 103 666 2 and, as the first protocol between the Smart Secure Platform and the outside world, the Serial Peripheral Interface (SPI), which is specified in ETSI TS 103 713.
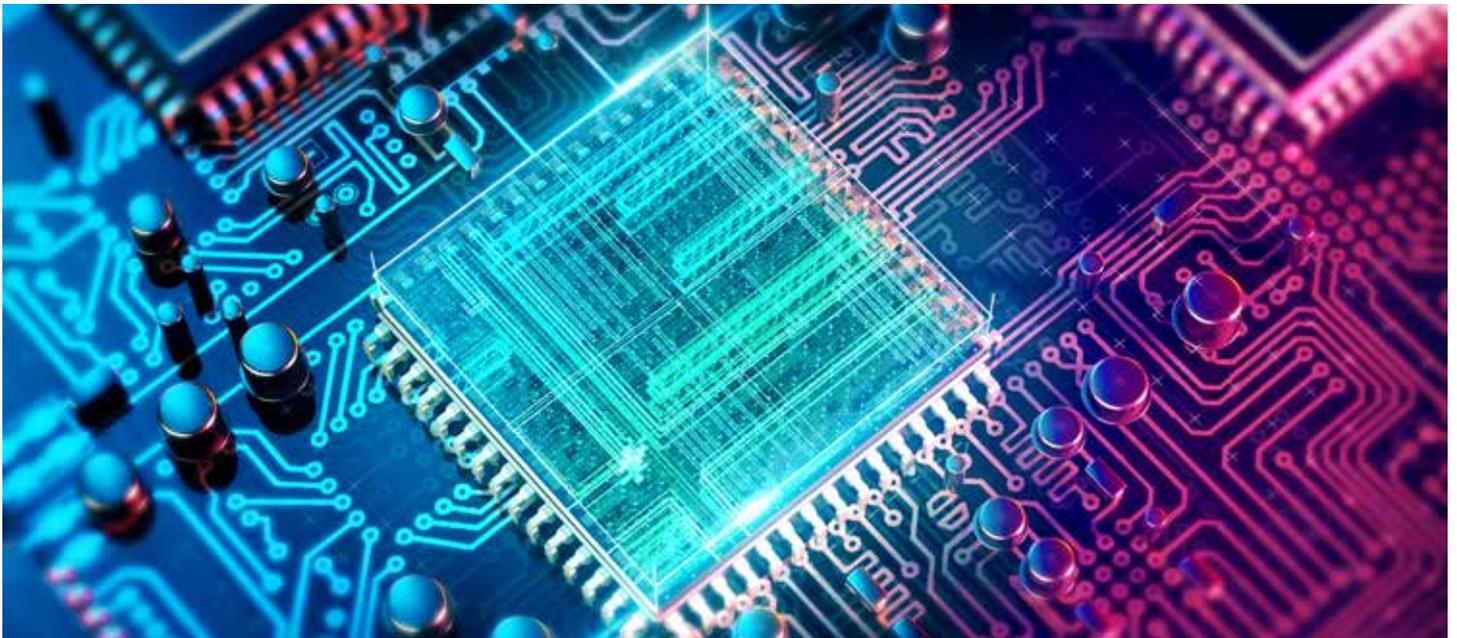
C-V2X interop. event:
a first at ETSI

A week-long interoperability event on mobile technologies for the vehicle-to-vehicle and vehicle-to-infrastructure connectivity (C-V2X) took place in the DEKRA Connected Car Test Area in December in Malaga. In partnership with the 5GAA, it was a great opportunity to test Intelligent Transport Systems (ITS) equipment in both lab and field environments. The test sessions covered ITS functionality such as road hazard signalling, traffic sign violation, and intersection collision risk warning and were based mainly on ETSI ITS standards and 3GPP test specifications. This testing trialled the ITS ecosystem under real-life conditions from infrastructure to applications in vehicles, thus demonstrating the interoperability of C-V2X equipment. In parallel, a joint ETSI/5GAA workshop was organized and focused on achievements and challenges in the connected automotive sector.

ETSI MEC at the
TU-Automotive Europe

This 2-day event at the end of October brought together 500 attendees from the full automotive market ecosystem, from OEMs to Tier 1s, from mobility service providers to Technology Companies, in order to answer the question, What do we need to do next?

Artificial intelligence, 5G, biometrics, blockchain, privacy and consent were some of the topics addressed. It was also the opportunity for the Vice Chair of the ETSI Multi-access Edge Computing (MEC) group, Mr. Dario Sabella, to give an update on MEC standards and APIs and the MEC ecosystem engagement activities. Particular focus was placed on the automotive domain, as MEC is considered by stakeholders as a key technology to provide interoperability of data exchange, especially in multi-vendor and multi-operator environments.

Niels Peter Skov Andersen
shares his vision
of vehicle connectivity
in the future with us.

Can you tell us a bit more about the CAR-2-CAR Communication Consortium?

The CAR-2-CAR Communication Consortium is a non-profit organization, whose members include vehicle manufacturers, equipment suppliers and research institutions that have joined forces for the deployment of Cooperative Intelligent Transport Systems and Services (C-ITS). The main objective of the CAR-2-CAR Communication Consortium is the development, testing and deployment of interoperable cooperative systems in Europe.

Niels Peter Skov Andersen,

General Manager of the CAR-2-CAR Communication Consortium

Niels Peter Skov Andersen has been in standardization for more than 25 years. Before joining the C2C-CC, Niels had a long experience in taking new technologies through standardization to operational systems, and was also involved in the global coordination of standards. He has held several senior positions in the mobile industry, at BlackBerry, Qualcomm, Motorola and Tele Denmark Mobile.

He was an industry participant in the standardization of GSM phase 1, the first Chairman of the 3GPP main plenary TSG SA and Chairman of the TSG GERAN. He is a member of the ETSI Board and has been a member of the Board of directors of the Open Mobile Alliance. He is currently the Chairman of ETSI TC ITS and has been an active industry expert in the EU C-ITS Deployment platform.

These are based on inter-vehicle, vehicle to roadside and vehicle to other road user equipment, short-range communication to improve road safety and road efficiency. Other complementary communications systems such as cellular are considered, where required.

The CAR-2-CAR Communication Consortium has a clear roadmap, from the initial C-ITS service based on awareness of the sharing of environmental information, to cooperative driving and our vision of accident-free automated driving.

There has been a lot of discussions lately about short-range communication for C-ITS versus 5G. What is your view on that?

> There are several different communication needs for future road traffic and automated driving.

I think this has unfortunately been a black and white discussion that does not really understand that there are several different communication needs for future road traffic and automated driving, which will eventually lead to both short-range communication and high-quality cellular connectivity. A simplistic explanation of the communication needs would be the need for:

• Tactical Information (short-range)
• Strategic Information (wide-area)
• Infotainment (wide-area)

The tactical information can be best described as similar to what drivers today can see out of the window of the car, so it is local information and will include safety-critical information, e.g., position, heading and speed of other traffic to avoid collisions etc., and should therefore work everywhere, even without infrastructure, be free of charge and not require any subscription. For this, we believe short-range direct communication is the best solution.

The strategic information is the type of information required for optimizing routing and trip-planning, such as traffic information and up-to-date dynamic maps. This information will typically be provided as a backend service over cellular connections. Clearly, as we move ahead to higher and higher degrees of automation, the requirement for up-to-date information of this type increases, and therefore will require good quality high-bandwidth cellular communication, such as 4G, 5G, etc.

The requirement for infotainment is the same as for infotainment in other situations.

Did you meet any specificities in your work, compared to traditional telecoms issues?

There are a couple of issues that require slightly different thinking. Especially safety. As a very simple example, I was used to discussing latency and the probability that latency should be lower than x ms in the telecoms world, but when I joined the Consortium and discussed this with somebody from the automotive industry for the first time, they talked about time-to-collision. This

> In the automotive industry, latency is about time-to-collision.

was an eye-opener for me, and I had to understand how key functional safety is.

Another big difference is the lifetime of equipment – many people replace their mobile phone every 1-2 years, and we have a new generation of mobile networks every 10 years. When we look at cars, the average lifetime in Europe is currently 17 years and increasing. Investments by road operators in traffic lights and other road infrastructure are typically made with a life expectancy of 25-30 years. Therefore, the big challenge is to ensure full functionality of the equipment for its lifetime.

How do you see the role of ETSI and 3GPP in relation to your activities?

Our activities can be split into research and development, and activities related to deployment. CAR-2-CAR Communication Consortium members are keen on bringing our research and development results into standardization. Our members have a clear preference for standardization to

> The ETSI model makes it quicker and easier to reach solutions.

be performed at ETSI, due to its direct participation model. This avoids the need for coordination with the position of a national delegation or something similar, before participating in standards-related activities. The ETSI model makes it quicker and easier to reach solutions, especially when compromises have to be made.

3GPP is built on similar principles of direct membership participation and the results are used worldwide, but while in ETSI there are dedicated committees dealing with specific sectors, such as Intelligent Transport Systems, the work at 3GPP is more oriented towards general work on cellular technology. This leads to a situation where subjects relevant to other industry sectors might only be dealt with for 20-30 minutes during a week-long meeting, which makes it difficult to justify global travel to these meetings.

> Our members have already launched vehicles and infrastructure equipment based on ETSI standards.

In terms of deployment, our members have already launched vehicles and infrastructure equipment based on ETSI standards, for instance the newly-launched VW Golf 8 supports C-ITS based on the ETSI ITS-G5 standard for short-range communication.

Welcome to our NEW members

Allot Ltd, Israel

Allot is a global provider of network intelligence and security solutions for Service Providers and Enterprises. Their multi-service platforms are deployed in the most demanding environments and they support evolving network architectures by offering the most flexible platforms on the market and fully NFV compliant solutions.

ARTICLE 19,UK

A registered charity, ARTICLE 19 works on a global scale to close the implementation gap between law and practice. They promote media freedom, increase access to information, protect journalists and human rights defenders and fight the shrinking of civic space.

ATEME SA, Finland

ATEME is the emerging leader of video delivery infrastructure, servicing the world's greatest content and service providers. ATEME participates in forums and organizations such as DVB, SMPTE and Alliance for Open Media. They contribute to the different standards defined by the European reference body.

BROADPEAK, France

BROADPEAK designs and manufactures video delivery components for Content Providers and Network Service Providers deploying IPTV, cable, satellite, OTT and mobile services. Their systems and services help operators increase market share and improve subscriber loyalty with superior quality of experience.

CertusNet Inc., China

CertusNet provides Elastic network services covering cloud, network and terminal for global users, enterprises and government agencies. The company is at the forefront of research and development for software defined network, virtual network functions, private cloud solutions, and internet streaming media quality monitoring system.

CryptoSecure LLC, USA

The company is a group of software engineering professionals with a focus on architecture, design and implementation of security solutions that ensure identity, integrity, privacy and protection. They use their expertise in cryptography and security to deliver reliable, extensible and cost-effective solutions.

ELEKTRON, France

Elektron provides Lawful Interception solutions and services for Law Enforcement Agencies (LEAs), National Security Services and Intelligence Organizations, covering communications of all types (Voice, Fax, SMS and Data over Fixed/Broadband and 2G/3G/4G). Elektron currently focuses on designing solutions for next generation 5G(+) networks.

ErvoCom International AG, Switzerland

ErvoCom deals with the global distribution of communications systems with a focus on Intelligent Transport. The group is a leading innovator in the field of telecommunications. Besides hard and software development, ErvoCom offers high-quality services for project engineering, installation and commissioning.

EURA NOVA, Belgium

The company brings IT related solutions by transferring the most recent technologies from R&D to the industry. Their services range from expert consultancy to IT innovation advisory, through to solution delivery projects. They adapt to their customers' environment to help them benefit from the latest IT solutions.

Ford Motor Company, USA

The company is an American multinational automaker that has its main headquarters in Dearborn, Michigan in the U.S. Globally, Ford produces over 6 million vehicles per year with almost 200,000 employees. They are involved in Intelligent Transport Systems in ETSI.

🇩🇪 HTW Dresden, Germany

The Dresden University of Applied Sciences has a distinctive engineering and economics profile in teaching and research complemented by artistic skills. It is a regionally anchored and internationally oriented university with a wide range of courses combined with a wealth of experience in application-oriented research.

🇬🇧 Illuminate Technologies UK Ltd,UK

Illuminate provides innovative capabilities for cyber threat detection, legal compliance for critical communications infrastructure and public safety. Products address cybersecurity requirements in 2G, 4G, 4G and 5G mobile infrastructure, virtualized network infrastructure, and carrier IP networks. They supply mission critical network cybersecurity systems as well.

🇩🇪 NavCert GMBH, Germany

NavCert offers consulting, verification, validation and certification in the field of positioning and navigation. NavCert is Notified Body for the European Electronic Toll System. They offer independent assessments of GNSS products and solutions. They are also responsible for the conformity assessments for PSAPs in Europe.

🏴 PSCE – Public Safety Communication Europe Forum, Belgium

PSCE is an independent forum where representatives of public safety user organizations, industry and research institutes can meet to discuss and exchange ideas and best practices, develop roadmaps and improve the future of public safety communications.

🇩🇰 Seluxit A/S, Denmark

Seluxit's mission is to help their customers securely tap into data to create new value for the IoT market. They wish to be a major contributor to the Internet of Things — how humans can orchestrate connected products to improve our lives while preserving our security and privacy.

🇩🇪 Sikora AG, Germany

SIKORA started with measuring devices for the industrial production of wires and cables. As a leading global company for measuring and control technology as well as for inspection, analysis and sorting systems, they set standards for quality assurance, process optimization and cost savings in many industries.

🇺🇸 SS8 Networks Inc, USA

SS8 is a global expert in next-generation networks and a trusted network compliance solution to large communications providers. They analyze and extract key information from network communications to help customers comply with government regulations, identify anomalous and covert threats, and gain insight into devices and subjects of interest.

🇫🇷 VOGO SA, France

VOGO offers a solution for broadcasting live audiovisual content based on streamed video processing technology. Its technology, the performance of which is unrelated to the number of people connecting to it, improves spectator experience by providing on-demand, multi-camera content, along with analytical audio and video tools for professional usage.

In our exclusive interview, Maxime Flament describes how 5G is going to change the automotive sector, from rapid progress to regulatory challenges.

How is 5GAA working on the future of automotive mobility?

5GAA bridges the technical and cultural gap between the automotive and telecommunications industries in order to address connected mobility and road safety needs. Through the deployment of connected mobility, we can improve the passenger experience, making it greener and more enjoyable, and have the capacity to greatly enhance road safety.

Maxime Flament,

Chief Technology Officer at 5G Automotive Association (5GAA)

Maxime Flament represents 5GAA, the global cross-industry association for the development of connected and automated cars, where he has worked as Chief Technology Officer since 2018. Maxime was previously the Head of Department for Connected & Automated Driving (CAD) at ERTICO – ITS Europe. For 15 years, he has been a leading contributor to many European and international activities on road safety, connected vehicles, automated driving, large-scale pilots and digital mapping. Maxime holds a Ph.D. E.E. (2002) and M.Sc. E.E. (1997) from Chalmers Technical University, Sweden. He also holds a Civil Engineering degree from the Free University of Brussels (1997). In 2001, he was visiting researcher at Stanford University, California, USA.

These technologies form the Cooperative Intelligent Transportation System (C-ITS), and they are already deployed on many vehicles on our streets. The potential to make roads safer for all is enormous, and 5GAA is working to make it happen.

Looking at the future, connected mobility also means better automated driving, ubiquitous access to mobility services and digitalization of transportation and traffic management. Our contribution entails developing, standardizing, testing and deploying cellular-based communications for the automotive market, as well as stimulating global implementation and commercial availability.

5GAA's efforts include promoting standardization. What is the role of 3GPP standards in 5GAA's activity?

3GPP has been gradually building 5G and will include 4G for many years in a non-standalone version. The available connectivity gives a great amount of capacity and already millions of vehicles are connected to mobile networks, but 5G will strongly expand the possibilities. The challenge with mobile networks is to provide low latency for safety-critical situations. As a solution, 3GPP specifies the short-range LTE-V2X PC5 interface.

5GAA promotes one single vehicle connectivity solution combining the long-range mobile network connection with the short-range between vehicles and between vehicles and roadside and other smart devices. This is where 5GAA wants to start its deployment and what the cellular vehicle-to-everything standard is based on. As it covers one single family of standards, it presents better technology synergies and ecosystem support for 5G.

In the future, LTE-V2X PC5 will be integrated with NR-V2X, a new radio interface for advanced driving. For example, it will allow sensor sharing and coordinated manoeuvring for automated driving and will make it possible to address in unicast and groupcast modes, always ensuring a required level of quality.

What are the challenges ahead of C-V2X deployment?

The situation is different in the different regions concerned.

> For C-V2X the situation is different in the different regions concerned.

The Chinese government is extremely supportive of 5G. There are plans to implement LTE-V2X roadside coverage on expressways and major urban roads as soon as the regulations allow it.

In the United States, the Federal Communications Commission (FCC) is assessing the current regulation that gives DSRC radios exclusive use of the 5.9 GHz band. 5GAA submitted a waiver request to allow C-V2X operation in the little-utilized upper 20 MHz of this band. US policymakers recognize the value of technology-neutrality. As of 2022, Ford is deploying C-V2X in all new models in the USA. For this reason, 5GAA is actively advocating to keep the band reserved exclusively for road safety while others would like to open it up to other usage.

On the other hand, in Europe the situation is more complex. The European Council opposed a delegated regulation on C-ITS and this sent a strong message to the European Commission. 5GAA supports a technologically neutral approach, because a level playing field between different technologies is the only way to a safer and more efficient mobility on European roads too. On one hand, many road operators are funded to actively deploy C-ITS solutions but, on the other side, the vehicle manufacturers are still undecided when it comes to opting for

> In Europe, we would recommend that road operators install both ITS-G5 and LTE-V2X PC.

one solution or the other. The only option is to recommend that road operators install both ITS-G5 and LTE-V2X PC5 at marginal extra cost.

What will be the impact of 5G technology on the automotive sector?

C-V2X is a versatile solution that can be integrated with already available cellular modems and platforms. It requires one single modem to provide both short-range safety applications and long-range network communications. This simplicity shortens the time to the markets and overall market penetration, making it scalable and cost-efficient.

Moreover, it can be integrated with 4G/LTE chipsets. It means low power consumption and the possibility of consumer-electronics applications, such as smartphones for pedestrians and cyclists. This will also be a solution for those vehicles lacking the necessary technological requirements. It will also be possible to envisage synergies between transportation and other sectors, such as e-health, smart farming or industry 4.0.

> 5G is going to redefine the driving experience, thanks to multi-gigabit speed.

How is 5G going to change the connected vehicle ecosystem?

5G is going to redefine the driving experience, thanks to multi-gigabit speed that will create new opportunities in infotainment and teleoperation use cases. These features will be reliable, predictable and provide low-latency Quality of Service (QoS).

5G is eventually delivering to the vehicle a dynamic combination of options. We have already successfully shown on-road 5G tests combining safety-relevant dynamic map downloads and multi-media streaming. When the signal drops, the first service is guaranteed while the video quality is reduced.

Operators will have the possibility to provide services tailor-made to the needs of the automotive industry thanks to the new spectrum bands allocated with 5G New Radio.

Safety of life at sea:
How ETSI standards help

The ETSI Technical Group MARINE develops standards for all aspects of marine communications and radiolocation, including man overboard devices.

With approximately 40 European standards, the ETSI Technical Group Marine develops standards for all types of safety of life at sea (SOLAS) and non-SOLAS radio systems, working closely with other groups such as IEC, NMEA, CIRM or ITU-R, to name a few.

Man overboard devices now included

We have recently introduced a new activity addressing the ITU-R class of equipment for Man Overboard (MoB) devices. Reviewing each of our Digital Selective Calling (DSC) standards, both on the functional and interoperability side, they now integrate the handling of such devices.

Along with the man overboard devices we cover other safety related equipment such as survival craft radios, aeronautical transceivers for ship use in distress situations and various signalling/homing beacons.

Bridge Alert Management

Another recent area of work deals with remote control and automation of radio systems to allow integrated bridge networks within the Bridge Alert Management concept. ETSI EN 300 338-1, published in September, outlines the minimum requirements for equipment to be used for generation, transmission and reception of Digital Selective Calling for use on board ships. DSC is intended to be implemented in various frequencies of the maritime mobile service, for distress, urgency and safety communication and general communications.

Radars for Maritime use cases

We also develop standards for non-SOLAS navigation radars, vessel tracking and coastal surveillance radars, radars for inland waterways vessels as well as position determining radiolocation devices. Broadband data communications transceivers for use between off-shore entities are also part of our specifications.

Standards from TG Marine are used by both the Radio equipment and the maritime equipment directives, which makes TG Marine a highly versatile ETSI group!

■ *Pete HIZZEY, Chair of the ETSI MARINE Technical Group.*

In the sky with diamonds:
How we secure air traffic

Air Traffic Management is also part of ETSI's work, making sure we're safer in the sky.

One of the pillars of the work done by the ETSI AERO Technical Group is the provision of Harmonized Standards under the Radio Equipment Directive for aeronautical sensor and surveillance systems, such as multilateration systems, a surveillance technique based on the measurement and comparison of the times of arrival of radio signals emitted from aircraft and received at different antenna locations on the ground. The group also provides standards for various types of radars operating in different frequency bands. These systems are key enablers of the reliable detection and tracking of aircraft in the air and on aerodromes, enabling the safe and efficient operation of aircraft within the European Air Traffic Management Network (EATMN).

To guarantee interoperability with the European Air Traffic Management Network and to be consistent with air navigation services, the group develops Community Specifications to address the essential requirements of the European Community Regulation 2018/1139.

Air-to-ground communication

Datalink standards (for technologies such as VHF datalink, VDL mode 2 or AeroMACS), are essential for communications between aircraft, in the air or on the ground, and ground stations, allowing the safe and secure communication of voice and data between aircraft and air navigation service providers.

Weather forecasts and drones

Last but not least, the group deals with the standardization of meteorological radars, ground aeronautical systems and the constituent parts of the EATMN, with ground-based elements of unmanned aerial systems or remotely piloted aircraft systems, such as civil drones and radiosondes for weather observation.

The ETSI TG AERO radio and air traffic management system experts cooperate with ITU, CEPT, EASA, EUROCAE, EUROCONTROL and ICAO and other relevant aeronautical organizations for all radio-related matters.

■ *Roy Posern, Chair of the ETSI AERO Technical Group.*

The future railway communication:
on tracks for a new system

The standardization of FRMCS (Future Railway Mobile Communication System), the successor to GSM-R, kicked off in 2016 with the transfer of user requirements set by UIC into use cases and the associated requirements for the future mobile rail communication system. From the very beginning, the ETSI TC RT (Technical Committee Railways Telecommunications) played a major role in the technical assessment of these user requirements and the organization of the necessary steps leading to transition towards the corresponding 3GPP study (3GPP TR 22.889). Within 3GPP, the rail user requirements are compared to the existing 3GPP Stage 1 requirements and the resulting gaps are closed by new normative requirements. Starting with 3GPP Rel-15, the corresponding adaptations or new solutions for FRMCS began to develop. Today, it is anticipated that most of the FRMCS user requirements can be provided within about 5 years.

FRMCS user requirements mainly address the standardization of professional communication applications in 3GPP. Examples are the role-based user address scheme "Functional Alias" as well as data services and its complete user-to-user integration or group communications of the Mission Critical Service environment.

Nevertheless, there are still some challenges to be overcome. Some of them include positioning aspects, train speed up to 500km/h and the integration of the rail frequency spectra for the use of 3GPP radio technologies with the main focus on 5G NR.

User requirements which are rail-specific and thus do not address generically a global user domain will be further developed as specific standards by ETSI TC RT.

The efforts of ETSI TC RT should result in FRMCS being a significant success.

■ *Robert Sarfati, Chair of ETSI TC RT, Ingo Wendler, Vice Chair of ETSI TC RT.*

System Architecture now ready for Experiential Networked Intelligence

The ETSI Experiential Networked Intelligence (ENI) group has recently released its architecture in ETSI GS ENI 005. The ENI System is an innovative, policy-based, model-driven functional entity that improves operators' experience. In addition to network automation, the ENI System assists decision-making of humans as well as machines. It facilitates maintenance and reliability of the system that provides context-aware services and thus meet business requirements.

For example, with the ENI System the network can change its behaviour (e.g. the set of services offered) in accordance with changes in context, including business goals, environmental conditions, and the varying needs of end-users. This is achieved by using policy-driven closed control loops that use emerging technologies, such as big data analysis, analytics, and artificial intelligence mechanisms, to adjust the configuration and monitoring of networks and networked applications. It dynamically updates its acquired knowledge to understand the environment. ENI is key for the migration toward new technologies such as SDN and NFV. Use cases showing implementations of the architecture can be found in the revised specification GS ENI 001.

OSM Release SEVEN:
over 20,000 cloud-native applications for NFV environments

The ETSI OSM Community launched its new Release (named "SEVEN") last December. OSM's Release SEVEN now brings cloud native applications to NFV deployments with its brand-new support of native Kubernetes applications, enabling over 20,000 pre-existing production-ready applications as of today, with no need for translation or repackaging. Release SEVEN is thus capable of combining, in the same Network Service, the flexibility of cloud-native applications with the predictability of traditional VNFs and all advanced networking that might be required to build full E2E services.

In addition, Release SEVEN extends OSM's SDN framework to support a wider variety of modern SDN offers with higher level primitives, including an improved workflow for VNF configuration, and the support of additional types of infrastructure, such as Azure and VMware's vCD 10.

Industrial use cases for AR applications and services

The ETSI Augmented Reality Framework (ARF) group has released a report, ETSI GR ARF 002, on industrial use cases for Augmented Reality (AR) applications and services.

The report outlines four categories of use cases identified via an online survey – these are inspection/quality assurance, maintenance, training and manufacturing. It offers valuable information about the usage conditions of AR technologies. A description of real-life examples is provided for each category of use cases highlighting the benefits of using AR. The first scenario shows how AR can greatly facilitate the deployment of wireless networks and the installation of connected objects, and how it can support rich contextual services. For maintenance, AR can be a useful support to employees and subcontractors servicing equipment in the field. The benefits in training are best demonstrated with a scenario involving a hazardous environment, e.g. in a radiological laboratory. The last case shows how a real-time manufacturing assistant in AR can lead to improved KPIs in the context of Industry 4.0.
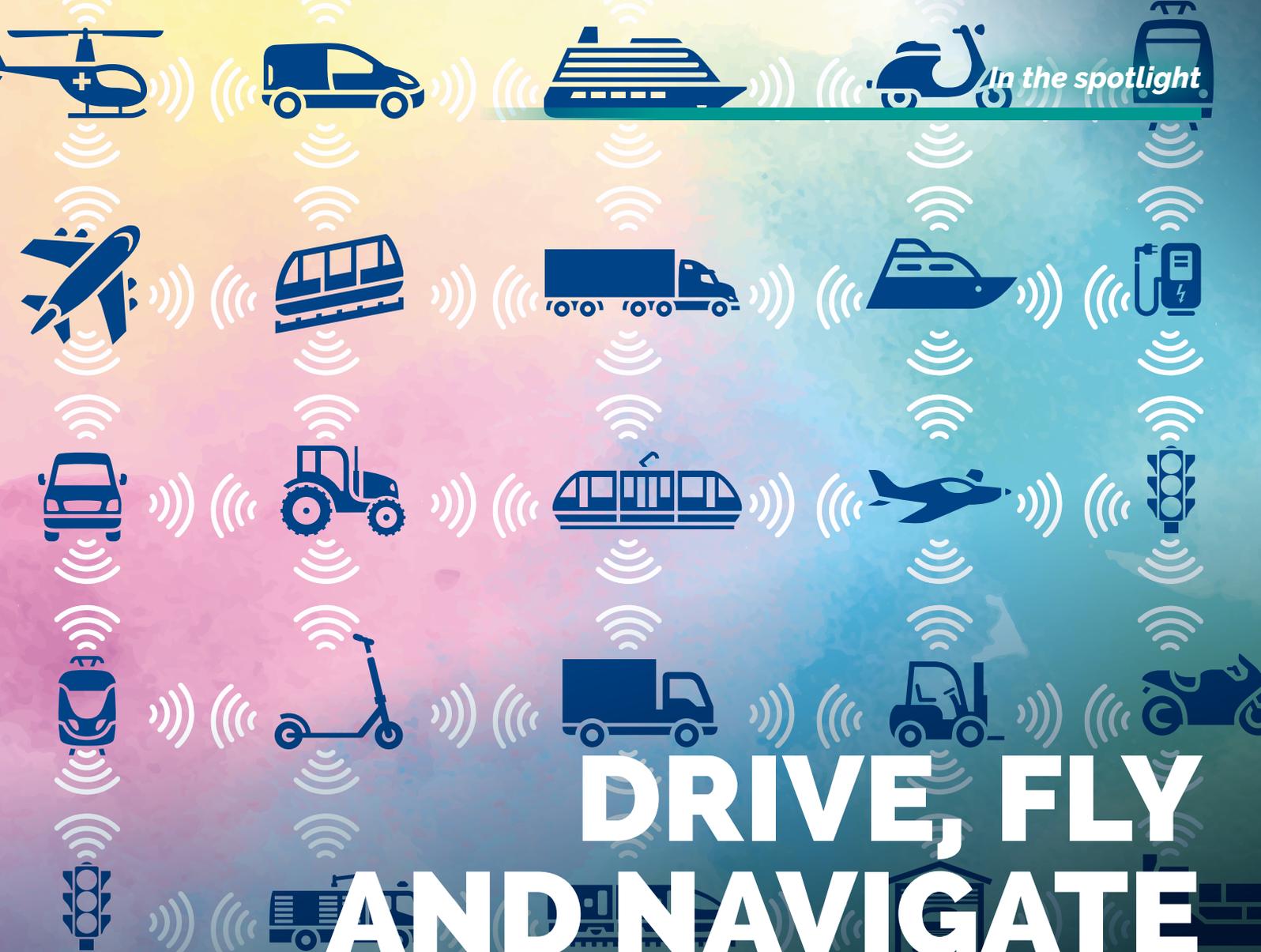
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Transport includes a diversity of means, and we can of course transport goods and people on private and public transport. New services have also emerged. While bikes used to mostly transport people, they are now a way to deliver goods (meals, parcels etc.), and "soft" vehicles, such as scooters, now bridge the gap between home, buses or trains, for instance.

At ETSI we have set up groups to standardize ICT for railways, aviation and maritime transport. We have also created a committee dedicated to Intelligent Transport Systems (TC ITS) which standardizes a system to enable communication with vehicles or infrastructure for better safety. In the following pages, the Chairman of our committee gives us an insight into the ongoing work and the challenges ahead to develop Mobility as a Service. In our use case, Ms. Barbara Hollinger, Business Development Manager at Kapsch TrafficCom, tells us more about projects testing V2X technology based on ETSI ITS-G5 and more specifically about the 100 km connected digital corridor on the A102/A2/M2UK running between London and the port of Dover.

Drive, fly and navigate
with ETSI standards

Transport can be many things, but typically we either talk about the transport of goods or the transport of people. On top of this, there is a multitude of means of transport. But Mobility as a Service is the ultimate goal.

Transport today

The transport of people alone includes walking, cycling, driving motorised vehicles or being a passenger on private or public transport, such as cars, buses, trains, ships and planes. The situation is similar when we talk of the transport of goods.

Over time, a lot of effort has been put into optimizing the different forms of transport, leading to the term Intelligent Transport Systems, but it also means that ITS covers a lot of different solutions, optimized for special cases.

> **Optimizing the different forms of transport led to the term Intelligent Transport Systems.**

Another complexity of the transport sector lies in the variety of actors involved, from private individuals, including small local businesses or large international transport companies, to the public sector, which again comprises road authorities at different levels, from local to national bodies, public transport operated by municipalities, regions or on a national level.

Fragmented standardization

In the same way that transport and ITS are very fragmented, the standardization of ITS is also fragmented and spread over a number of organizations. It is possible to identify more than 25 standards organizations involved in standardizing/specifying ITS. These organizations include ITU-R, ITU-T, ETSI, CEN/CENELEC, ISO, TIAA, ARIB, CCSA, 3GPP, IEEE, IETF, SAE W3C, etc., plus specific forums, such as 5GAA, the CAR-2-CAR Communication Consortium, C-Roads, etc., to name just a few.

So far, ETSI has set up specific groups to handle ICT standardization for railways, aviation and maritime transport, and a group for Intelligent Transport Systems. Each of these groups has been focusing on standardizing the key ICT needs of the respective stakeholders. However, the standardization has typically been focused on a specific sector or a set of applications, but does not consider the overall interoperability of transport.

> **ETSI created ICT standardization groups for railways, aviation, maritime transport and Intelligent Transport Systems.**

ITS standardization

At ETSI, the focus of ITS standardization has, to a large degree, been on Cooperative ITS (C-ITS). C-ITS refers to transport systems, where the cooperation between two or more ITS sub-systems (personal, vehicle, roadside and central) enables and provides an ITS service that offers better quality and an enhanced service level, compared to the same ITS service provided by only one of the ITS sub-systems.

The focus has been on an access-agnostic architecture that allows the protocols to exchange information over different types of access layers, connectionless short-range direct communication and

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wide-area communication, such as public mobile networks, etc. The choice of access layer is, of course, a question of the applications' specific needs. The key focus has been on providing the necessary protocols to enable efficient safety and traffic type services. So far, the primary focus has been on specifying the requirements for the transmission side, while in the meantime, the use of the information received is left open for the implementers to create innovative applications and services.

> **A clear standard for how to share and exchange data is essential to achieve interoperability.**

However, a clear standard for how to share and exchange data is essential to achieve interoperability between the various actors. Interoperability is also a key requirement in the EU ITS Directive. Therefore, ETSI has also created and published test specifications with a test suite, and organized several successful ITS interoperability events. This has now allowed for the first installations of roadside units and the launch of the first mass-market cars supporting the ETSI C-ITS standards. It is worth noting that, unlike traditional communication systems, C-ITS short-range direct communication is designed to do without ubiquitous coverage by roadside units, but only where the road operator wants to provide or collect information. Two vehicles will be able to exchange data without the presence of any infrastructure.

As ITS is more than just C-ITS, work is ongoing in other areas too. For example, ETSI has published the MirrorLink standard which allows applications to run on a mobile phone, but also the sharing of data and a user interface with the vehicle. This type of functionality will be all the more important as society moves towards Mobility as a Service.

Mobility as a service

For passenger transport, there is a shift towards Mobility as a Service. In this case the "service" consists of getting a person from point A to point B. How that happens - on foot, by bike, car, bus, train, plane, or a combination of all these means, is not important. If you take a traditional Park-and-Ride use case, a person leaves home by private car or in a shared car and goes to the nearest railway station, parks the car, takes the train, arrives at another station, and takes the bus or rents a bike to get to the office. Simple and straightforward, but is there a parking space at the railway station, will the train arrive in time for the bus, or will a bike be available?

> **For passenger transport, there is a shift towards Mobility as a Service.**

Today, you can enter your destination in a car's navigation system and get live rerouting based on traffic conditions. A future optimized Park-and-Ride use case should have similar capabilities, such as providing a reserved parking space at the station and reserving a bike at the destination. And if, for instance, there is a traffic jam, an alert can guide the user to another Park-and-Ride station that will get them to their destination more quickly.

To enable this use case, and other Mobility as a Service use cases, additional standardization will play an essential role, as many of the systems involved use different standards and often proprietary solutions.

Crash Avoidance, Safety Systems, Trip Planning, Fleet Management, Travel Assistance, Traffic Signs, Toll Collection, Passenger Information

■ *Niels Peter Skov Andersen, Chair, ETSI TC Intelligent Transport Systems*

Making cars talk to infrastructure
with ITS-G5 technology

Over the last few years, pilot projects have been implemented all over Europe that test V2X technology based on 5.9GHz technology (ETSI ITS-G5). The technology enables safety-related messages to be broadcast by vehicles to other vehicles (V2V), by vehicles to the infrastructure (V2I) and from the infrastructure to the vehicles (I2V). The exchange of real-time information is set to improve traffic safety and efficiency, which will change traffic over the next years.

The C-Roads Platform and InterCor

The major initiative in Europe promoting ITS G5 technology is the C-Roads platform. C-Roads promotes the harmonization of V2X profiles across European countries and currently consists of 18 core member countries, with seven associated partners. Pilot projects are funded by the European Commission and will be deployed over the next two years, mainly testing use cases in highway settings. A next phase will move to the cities to test urban V2X use cases. The aim of those projects is to promote interoperability between solutions implemented in different countries and by industry suppliers.

The InterCor project is part of the C-Roads network and connects the freight routes going through the UK, France, Belgium and the Netherlands.

The A2M2 Connected Corridor

In the UK, the A2M2 Connected Corridor was implemented as an outcome of the InterCor project. Partners Highways England, Kent County Council, Transport for London and the Department for Transport created an environment for testing connected and automated vehicle technology on a live road. In a consortium led by Costain, Kapsch TrafficCom installed roadside V2X Roadside Units on the M2 in Kent, which were connected to a software platform for use case simulation and message and device management. In a first phase use cases, such as Roadworks Warning (RWW), In-vehicle information (IVI) and Green Light Optimal Speed Advisory (GLOSA) are tested along the corridor. This enables partners of the projects as well as interested stakeholders like OEMs to get ready for connected vehicles technology and further improve V2X technology to manage the traffic of the future. The A2M2 Connected Corridor is the first of its kind in the UK and has recently been awarded the prestigious "ITS Project of the Year 2019" award by ITS UK.

V2X at Kapsch TrafficCom

Well known for global tolling and traffic management solutions, Kapsch TrafficCom is also one of the cutting-edge suppliers in V2X technology worldwide. Serving customers with V2X projects on three continents, Kapsch TrafficCom serves as a one-stop-shop for connected vehicle end-to-end solutions covering the whole portfolio of roadside units, onboard units, central systems, software and applications as well as providing consulting and system design services in the V2X environment.

■ *Barbara Hollinger, Sales Enablement V2X, Kapsch TrafficCom AG.*
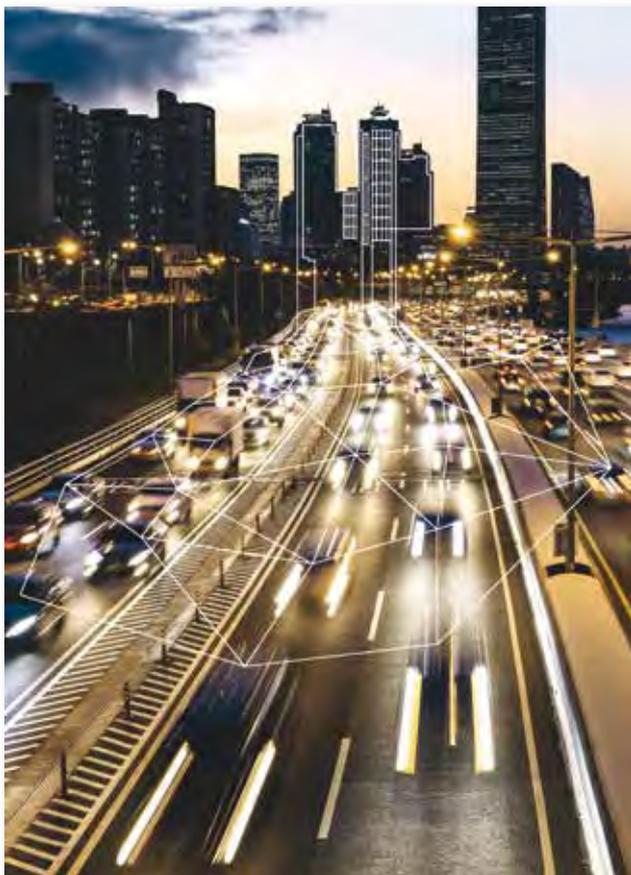
ETSI and ERTICO:
a valued partnership

There have been many mutually rewarding benefits attained from the collaboration between the standards organization ETSI and the private public partnership ERTICO. Read the story.

The beginnings

The story started in 2011, when ERTICO and ETSI joined forces to organize the very first ITS (Intelligence Transport Systems) Cooperative Mobility Plugtests™ event, hosted by TNO, an ERTICO partner, at Helmond in the Netherlands. The launch of this first event was motivated by the need to carry out validation as part of the activities of the FP7 EU-funded project DRIVE-C2X. ERTICO led field operational test activities and TNO led the activities relating to system testing and validation.

DRIVE-C2X was a flagship project for the assessment of Cooperative ITS through field operational tests across Europe, where the test specifications and tools developed by the ETSI ITS Technical Committee, with the support of the ETSI Centre for Testing and Interoperability, were used for assessing the compliance of the C-ITS vehicle and roadside stations implemented in DRIVE-C2X vehicles and road infrastructures. The positive feedback and highly rated usefulness of the first Plugtests event motivated ERTICO and

ETSI to get together and organize regular yearly events.

Moving forward

The second Cooperative Mobility Plugtests event was organized in Satory, close to Versailles, France and was hosted by another DRIVE-C2X beneficiary and ERTICO partner, IFSTTAR (French Institute of Science and Technology for transport development and network). This second event demonstrated the usefulness of Plugtests and the strong interest of the participants in yearly iterations in order to ensure the required level of interoperability of C-ITS vehicle and roadside units to deliver seamless Cooperative Mobility Services. Cooperation between ERTICO and ETSI for promoting Cooperative ITS interoperability showed the benefit of combining ETSI standardization activities with relevant EU-funded projects dedicated to Cooperative ITS deployment and requiring high quality technical specifications as well as the means to assess ITS station interoperability.

To deployment?

In 2013, ERTICO as coordinator launched Compass4D, an EU-funded CIP (Competitiveness and Innovation Framework Programme) for piloting the deployment and the evaluation of three different Cooperative ITS services (Red Light Violation Warning, Road Hazard Warning and Energy Efficient Intersection) in seven cities in Europe. This project, supporting sustainable deployment of C-ITS services, provided opportunities to test ETSI TC ITS specifications and participate in further interoperability events.

ERTICO has a long history with Cooperative ITS, which started twenty years ago when the organization considered the benefits of using Telematics solutions to increase the performance of advanced driver assistance systems (ADAS) and navigation. In 2006, ERTICO as coordinator launched CVIS, the first large scale integrated project, under the FP6 EU funding Scheme, to address technical needs for creating unified solutions for vehicle and infrastructure communications. CVIS contributed in the ETSI TC ITS to defining the set of basic applications and the cooperative awareness message format in WG1, as well as network and architecture in WG2 and WG3. Cooperative ITS services were specified with connectivity agnostic protocol stacks, matching the ETSI ITS-G5 ad hoc network technology as well as Cellular and C-V2X connectivity. Current EU-funded deployment actions, like InterCor for instance, consider the benefits of using Hybrid communication.

■ *Francois Fischer, Senior Manager, ERTICO*

A year in reflection:
looking back at 2019

ETSI's standardization activities are driven by the commercial objectives of our membership, as reflected in the work of our technical bodies. This market-driven approach welcomes many voices, where players from the IT and telecoms world mingle with a wide spectrum of industries and vertical market segments.

Bringing innovation to standardization

Artificial Intelligence (AI) has been one of the most commonly-heard industry terms in 2019. Today's ICT systems are growing exponentially in their scale and complexity. Consequently operators – supported by ETSI's own work in key areas such as virtualization and 'zero touch' management – are looking to automation to orchestrate and optimize the efficiency of their networks. AI's growing role in the autonomous management of tomorrow's networks also raises far-reaching questions about security. Announced in October, our newest Industry Specification Group on Securing Artificial Intelligence (ISG SAI) has been formed to address threats arising from the deployment of AI in multiple ICT-related industries.

Launched in May, meanwhile, our ISG on European Common Information Sharing Environment Service and Data Model (CDM) has been established to develop specifications allowing data exchange among different legacy systems such as those operated by national border surveillance, maritime safety and coastguard agencies.

Ensuring the security of connected devices

We already depend on the Internet in virtually every aspect of our daily lives. With the rise of machine-to-machine communications and the Internet of Things (IoT) – reckoned to exceed 20 billion connected devices by 2025 – this reliance will deepen further. The integrity of networks and data flowing over them has never been more critical, as reflected by our cybersecurity activities.

From smart speakers to heating controllers, connected devices are already present in many homes. They're also a tempting target for hackers, who may exploit fundamental vulnerabilities to access other devices and data on the same household networks. Anticipating June's enactment of the EU Cybersecurity Act (CSA), early in the year our Cybersecurity committee (TC CYBER) released its first standard that sets a baseline for the security of Internet-connected consumer products.

Standards that drive market success

2019 provided ample illustration of the commercial success of our working methods, where close collaboration between ETSI members and other

industry fora provides secure foundations for successful market commercialisation.

The year has seen dozens of commercial 5G network launches plus the availability of numerous 5G devices. This initial launch phase is built on the foundations of 3GPP Release 15, the first full set of 5G specifications that was formally completed in June 2019. In parallel, work has accelerated on Release 16, where the full vision of 5G is realized in an exciting range of use cases, from autonomous machines and smart cities to futuristic applications for personal health and wellbeing.

2019 marked another milestone in the intensive work of our technical bodies to support the commercial success of 5G. In November, our Smart Card Platform committee (TC SCP) unveiled specifications for a brand-new platform designed to address the security and trust concerns of 5G, IoT and tomorrow's connected world. The scope of ETSI's Smart Secure Platform (SSP) goes far beyond the previous-generation SIM card that's now 30 years old. Support for various applications, form factors and physical interfaces makes SCP an ideal solution for scenarios including access to mobile networks, banking, ID management and transportation.

5G and the IoT also present new possibilities to enhance the efficiency of mission-critical communications in a range of public safety scenarios.

In August 2019, our committee on Emergency Communications (EMTEL) issued recommendations covering the use of IoT devices in various use cases, such as providing vital information to 'blue light' services or triggering other actions in the event of an emergency.

All roads lead to 5G

Another industry buzzword – digital transformation – was reflected in co-operation between our technical bodies to define the building blocks for 5G. Published in October 2019 and feeding directly into the work of 3GPP, a new ETSI White Paper on Network Transformation included inputs from the Chairs of our NFV, MEC, ENI and ZSM Industry Specification Groups.

One industry sector where the impact of 5G will be immense is transportation, from future railway systems to unmanned aerial vehicles. A current focus of ETSI's contribution to this work in 2019 has been our close involvement in the development of enhanced specifications for cellular vehicle-to-everything (C-V2X), where Release 16 will allow vehicular systems to exploit the advantages of 5G's New Radio (NR) interface. You can find out more about current 3GPP activities elsewhere in this issue of Enjoy!

Another demonstration of the real-world value of ETSI standards came in

November, when car maker Volkswagen announced that its next-generation Golf 8 will feature ITS-G5 V2X as standard on all models. Dubbed 'Car2X' by VW, this will allow vehicles to connect directly with signals from traffic infrastructure (and other similarly equipped road users).

New working methods and partnerships

Complementing the core work of our technical bodies, 2019 has also seen further consolidation in our own working methods. We have continued to embrace the benefits of an increasingly open source approach to technical standardization. This is illustrated by the success of ETSI Forge, where users of our standards can download collaboratively-produced software tools contributed by ETSI groups working on cybersecurity, multi-access edge computing (MEC), network functions virtualization (NFV) and electronic signatures. Underlying our willingness to foster links with open source communities, April saw the signature of a Memorandum of Understanding with the Linux Foundation – a further example of our goal to benefit from bringing standards development and open source communities closer together.

3GPP
Unmanned Aerial Systems over 5G

To respond to the needs of this quickly maturing sector, there has been a lot of activity in the 3GPP Working Groups to ensure that 5G networks will connect to Unmanned Aerial Systems - facilitating the safe operation of drones and ensuring that they have no negative impact on networks or users.

Here are some of the areas being addressed in the latest 3GPP Releases:

Release 15 - Enhanced LTE Support for Aerial Vehicles (TR 36.777):

This study identifies further performance enhancements for UE-based solutions, Network-based solutions, downlink interference mitigation, uplink interference mitigation, mobility performance and aerial UE Identification over LTE networks.

Also, in Release 15, there are changes to TS 36.331 (Section 5.5.4 - Measurement report triggering) to address the aerial UE interference to the base station (eNodeB). Enhancements included the addition of two reporting events - H1 (above) and H2 (below) UE height thresholds - to help the eNodeB to see the UAV and to deal with any potential interference. Other measures, for signaling and interference reduction by UAVs, were also added.

Release 16 - Remote Identification of Unmanned Aerial Systems (TS 22.125, Section 5):

3GPP SA1 has completed a study into the potential requirements and use cases for remote identification and on the services to be offered based on remote identification of the UAS.

Release 17 - Study on supporting Unmanned Aerial Systems Connectivity, Identification, and Tracking (TR 23.754):

Looking at the architecture and system aspects of command and control functions, having identified the UAS, this study looks at the extent to which the 3GPP system can enable UAS

UAS model in the 3GPP eco-system
(TS 22.125 - Annex A)
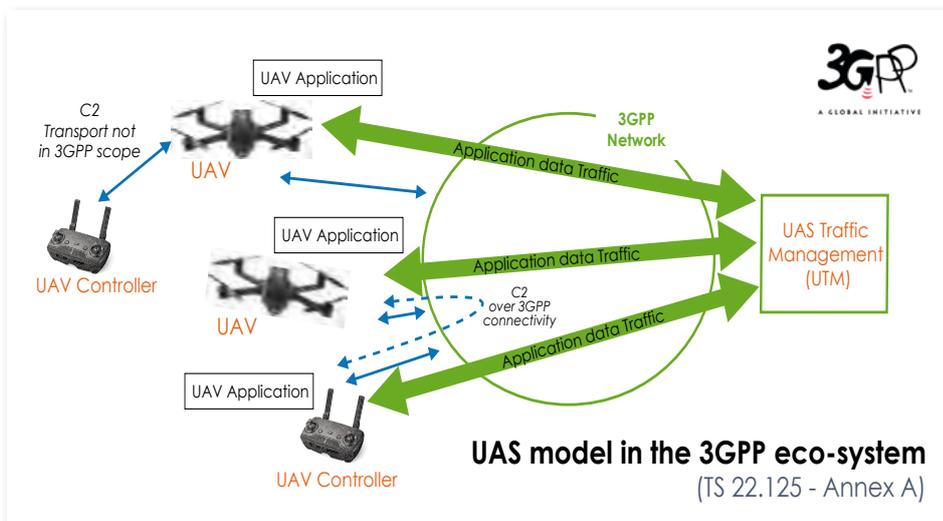
components to establish the necessary connectivity between each other and UAS Traffic Management (UTM) – for both line of sight connectivity and non-line of sight connectivity, and on the detection and reporting of unauthorized UAVs towards the UTM.

Release 17 - Study on application layer support for Unmanned Aerial System (UAS):

The App. dedicated group - 3GPP SA6 - are studying the use cases and requirements (from 3GPP SA1) regarding UAS identification and tracking. Taking the service requirements resulting from TS 22.125 - SA6 is now looking at the potential impact on the application layer, in particular the application support/enabler functionalities for UTM and the service interactions between UAS and the UTM (e.g. fly route authorization, location management, group communication support).

The group is considering architectures and solutions already developed for mission critical and V2X services, for re-use in aerial systems (See *3GPP SP-181252*).

Release 17 - 5G Enhancement for UAVs (TS22.125; TS22.261):

This work is set to produce new KPIs for the communication needs of a UAV with a 3GPP subscription. Specifically, requirements relating to the following will be documented: KPIs based on communication service, KPIs for command and control traffic, On-board radio access node (UxNB), service restriction for UAV and Network exposure for the UAV.

More details on all of the above work can be found in the 3GPP Work Plan at www.3gpp.org/specifications/work-plan

■ *Kevin Flynn, 3GPP Marketing Communication Officer.*

A 'systems' approach for:
connected and intelligent transport solutions

As transportation services become more dynamic and multi-modal, transportation agencies will deploy collaborative systems. This approach depends on sharing data across application silos for which oneM2M™ standards are ideally suited.

As of 2020, market analysts expect more than 95 percent of new vehicles to include Internet connectivity. This trend is fuelling innovation in mobility services as well as connected and autonomous vehicles (CAVs). In the meantime, the cities where these vehicles operate are becoming smarter due to increasingly connected street assets.

The 'systems' approach

CAVs are one element in a larger system of connected assets. Their interactions with other smart assets are one part of the puzzle for managing aggregated traffic flows. Smart assets are another element in the overall system. They can provide timely data to enhance the performance of CAVs, leading to more efficient use of the transportation network.

The self-reinforcing cycle of data sharing also helps the travelling public. They can now optimize journey planning and make travel choices that can affect levels of environmental pollution. Some

people, for example, will avoid private vehicle journeys altogether. In this way, the transportation system benefits the environment through more efficient use of city resources and better tools to manage environmental impacts.

Data Sharing Ecosystems

The key to improving transportation systems is for different ecosystem entities to share data for better decision-making purposes. Participants range from public and private sector fleet operators to emergency service agencies, weather providers and car parking service providers.

Data sharing enables better and up-to-date information models of the transportation system. However, this calls for an open standards environment for the technical sharing of data. It also requires robust procedures to identify and control access while protecting data privacy, security and commercial interests.

Equitable Data Sharing with oneM2M

Midlands Future Mobility (MFM) is a public-private partnership that is developing a real-world test environment for local and regional transport solutions. Its facilities in the UK cover more than 50 miles of roads. This test environment aims to represent the most diverse combination of roads, junctions and traffic measures in the world.

MFM plans to operate a real-time mobility Data Hub to consolidate, store and distribute multiple intelligent transport datasets. This will support vehicle manufacturers as well as technology and transport service providers.

At the heart of the Data Hub is a modern, neutral broker. This builds on the lessons learned from the oneTRANSPORT field trials involving the counties of Buckinghamshire, Oxfordshire, Hertfordshire and Northamptonshire as well as Highways England. Through several intelligent transport pilots, the trials demonstrated improvements in managing traffic congestion and improving road safety.

The Data Hub uses oneM2M standards to deliver a horizontal platform solution. This allows customers and solution partners to collaborate across organizational silos while benefitting from repeatable and reusable technical solutions. The use of oneM2M also reduces vendor lock-in risks and provides a roadmap of new features to enable new IoT opportunities.

■ *Ken Figueredo, Convida Wireless*

European Maritime Security Strategy: Introducing the new ETSI CDM group to support it

The Common Information Sharing Environment (CISE) supports the development of the EU Blue Economy and is a key innovation of European maritime governance. See why the new ETSI CDM group was created in this context.

CISE is also an element of the European Digital Agenda and is a pillar of the European Action Plan for the European Maritime Security Strategy.

Stakeholders such as user communities, member states, public authorities and EU agencies can connect their standardized information platforms (CISE Cross-Sectorial Nodes), powered on a proactive and voluntary basis by the stakeholders' national and European surveillance systems, to a "Common Information Services Network".

A bit of history

On this concept was based EUCISE2020 (www.eucise2020.eu), a Security Research project of the European Seventh Framework Programme, which aimed to achieve pre-operational information-sharing between the maritime authorities of the EU States.

EUCISE2020 was an important milestone in the roadmap for implementation of the CISE with a 2020 horizon.

The Project was held by a temporary grouping of companies led by Leonardo S.p.A and comprising Engineering Ingegneria Informatica S.p.A., GMV Aerospace and Defence S.A.U, Inovaworks II Command and Control, Lda and Satways Ltd.

The birth of ETSI ISG CDM

It was then decided to create the ETSI European Common Information Sharing Environment Service and Data Model Industry Specification Group (ISG CDM). The group's purpose is to provide specifications that will enable multiple organizations to develop an interoperable software for a Common Information Sharing Environment for exchanging data and services.

The work of the ISG CDM, through the standardization of CISE Data Model, enables user communities, Member States, Public Authorities and EU agencies to facilitate information exchange.

Getting into details...

The platform object of the standardization has been developed so as to provide the following services:

- Core: infrastructure services - common tools enabling the connection of the CISE participants through the CISE network;

- Common: application services - exchanging data across the CISE network.

The operative scenarios where CISE provides added value are:

- Investigation of antipollution situations;

- Monitoring of events at sea to create conditions for decision-making on interventions;

- Request for information confirming the identification, position and activity of a vessel of interest;

- Knowledge of surveillance capacities of partner authorities to plan basic tactical surveillance.

ETSI is seen to be the ideal organization to undertake and provide leadership for this work.

The ISG "European Common Information Sharing Environment Service and Data Model" will specify:

- New technical standards for the components of CISE, including the protocol stack, the semantic and data model specifications, the core and common services;

- New operational standards for the operational components of CISE (including the harmonized procedure for shared maritime situational awareness).

So stay tuned for the upcoming specifications!

■ *Lorenzo Ettore Paolo Iapoce, Chair of ETSI CDM ISG, project manager at Leonardo S.p.A*

WHITE PAPER: Network Transformation, building on key technologies for 5G

ETSI has launched a new white paper, entitled Network Transformation: Orchestration, Network and Service Management Framework, written by several of its Industry Specification Groups' (ISG) Chairs. These groups have released specifications on key building block technologies for next-generation networks, feeding the 3GPP 5G specifications.

As the network industry undergoes a significant transformation, it requires the best open standards to ensure interoperability and faster time to market. Driven by the needs of 5G networks and applications, and enabled by transformative technologies, such as NFV and cloud-based deployment practices, this change is likely to be the single biggest technological and business transformation of the industry since the consolidation of mobile communication infrastructures.

The ETSI white paper gives an insight into how ETSI tackles these network transformation challenges through network function virtualization (NFV), multi-access edge computing (MEC), experiential networked intelligence (ENI) and zero-touch network service management (ZSM).

VIDEO: ETSI corporate video

Only have 3 minutes to know more about ETSI? Watch our brand new corporate video now available on our website and Youtube channel and find out who we are, what we do and last but not least, what benefits we offer to our more than 900 members from around the world.

VIDEO: IoT week

The annual ETSI IoT week brings together product managers, solution adopters, technical developers, standard managers, researchers and business users and consumers of IoT services, and provides them with an up-to-date overview of the major European and global trends in IoT services, technology innovations, deployments and the relevant standards work.

Watch our new video to know more about what has become one of ETSI's must attend event!

Latest news
in the Secretariat

Proxy tool for
ETSI General Assemblies

For any voting of the General Assembly, ETSI members can be present or represented by proxy. ETSI members have expressed the need for an electronic tool to provide proxies from the ETSI portal instead of posting or e-mailing them to the ETSI Secretariat.

As a similar tool was developed for the 3GPP Voting tool, we have decided to benefit from the 3GPP solution and adapt it to ETSI as 3GPP does not need a signed form, while this is legally required for ETSI General Assemblies.

The tool was implemented and tested during the summer and made available on the portal in mid-November. People wishing to give a proxy for a GA can access the GA Meeting Calendar page, select the number of the GA, open a "Manage Proxy" menu and give their proxy to someone who is already registered. Once the ETSI Secretariat has validated the signed form, the quorum computation includes this proxy, and the proxy receiver may vote on behalf of the proxy giver.

■ *Vincent Depagne, Chief Information Officer, ETSI*

Call for Nominations

ETSI prestigious Fellowship awards is now open!

The ETSI Fellowship Programme was established to honour and reward those individuals who have made an outstanding personal contribution to ETSI, to building the work of ETSI, or raising its reputation in specific sectors of standardization.

Since its inception in 2016, 16 nominees have received the prestigious ETSI Fellowship award.

Individuals of the following categories are eligible for nomination:

• Current or former participants in ETSI work
• Current or former participants in ETSI's Partnership Projects
• Current or former representatives of Partners or Counsellors
• Former members of the ETSI Secretariat

Any individual representative of a Member, with the exception of the members of the Awards Committee, may propose a candidate for Fellowship. A candidate shall be nominated by at least two individuals from different ETSI Members in order to be eligible for an award.

Nominations shall be made in writing and should be received **before 25 January 2020.** The ETSI Fellowship awards will be announced at the spring General Assembly 2020.

More information is available on our website: https://www.etsi.org/membership/fellows.

Welcome to our new staff members

Sylvie Adragna
Travel administrator

After graduating with a diploma in tourism, Sylvie started her career in several travel agencies before joining Travel Concept, a well-known agency based in Sophia Antipolis. Once there, she managed the ETSI account, among others, for 17 years. Using the Amadeus platform and working closely with some of our former travel administrators, she is now happy to put a face to names she's been booking flights or accommodations for since 2012. She joined ETSI as a travel administrator on 14 October.

Emmanuelle Garcia
Human Resources Professional

Emmanuelle holds a university degree in psychology. During her studies, she was particularly drawn to industrial and organizational psychology and decided to turn to human resources positions. She joined the HR department of a health care organization. After two years in Dublin, where she worked as a customer relations officer, she came back to be part of the HR department of Cannes city hall. Her position there comprised a large scope of recruitment and staff administration activities. Emmanuelle joined ETSI on 4 November.
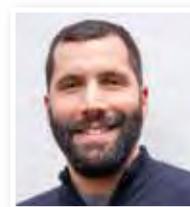
Guillaume Tripoli
Helpdesk Support Technician

After graduating from a biotechnology course, Guillaume wanted to work in medical data analysis, but jobs in that field were scarce 15 years ago. He therefore joined Soleillant, an independent medical laboratory in Cannes, as a technician, where he was also in charge of IT. In 2007, the new ISO 15189 standard changed the ecosystem landscape for independent labs. He then joined Bioesterel laboratory but his position was less versatile so he decided to turn back to IT. He joined ETSI on 12 November.

Hear from us in conferences
and meet with us at exhibitions.

Find more information and register on our website at: www.etsi.org/events

February 2020

7th Annual 5G Huddle
5-6 Feb., New Delhi, IN

Endorsed by ETSI, this event is part of the Wireless World Research Forum (WWRF). This year's focus is on "5G as a catalyst for digital transformation". ETSI's CTO, Adrian Scrase, will deliver a keynote speech at the conference.

9th International Railway Summit
19-21 Feb., Warsaw, PL

This summit is an annual event for the world's key rail stakeholders. The 2-day conference revolves around how digital transformation can break down barriers to travel and trade. ETSI's CTO, Adrian Scrase, will join a panel discussion on how digital technologies can improve cross-border travel.

Internet of Things India 2020
19-21 Feb., New Delhi, IN

Endorsed by ETSI, this event will explore the impact of IoT on manufacturing, transport, supply chain, insurance, logistics, government, energy and automotive. Mr Dinesh Chand Sharma, Director of the EU Project SESEI, in which ETSI is a partner, will be part of the conference.

Mobile World Congress
24-27 Feb., Barcelona, ES

MWC is the largest mobile event in the world. As such, ETSI and 3GPP teams will be on site to meet with members and potential new members. We will also host our annual ETSI Networking Cocktail on 25 February, where we invite our members to join us.

NATO Use of Civil Standards 2020 Workshop
25-27 Feb., Athens, GR

The aim of the workshop is to provide knowledge on the different practices of Civil SDOs and thorough training on the adoption of Civil Standards and the procedures to develop new dual use and other standards in collaboration with civil SDOs. Andrea Lorelli, Technical Officer for ERM TG AERO (task group) in ETSI, will give a presentation on 26/2 and join a panel discussion on 27/2.

March 2020

2nd mWT Plugtests
9-13 March, Sophia Antipolis, FR

The second mWT Plugtests event will focus on the interoperability of mWT networks, testing the practical end-to-end application of Software Defined Networks (SDN). Building on the success of the previous event, it will expand scope and test plan.

FutureNet World
24-25 March, London, UK

Endorsed by ETSI, FutureNet World is a unique industry event that focuses on the strategic and commercial considerations and decisions that CSPs are making today and the implications for the network. This year's theme is on 'Network Automation & AI'. Multiple ETSI groups including NFV, ZSM, MEC, ENI and OSM will participate.

April 2020

MPLS + SDN + NFV World
31 March - 4 April, Paris, FR

Endorsed by ETSI, the Congress will bring together major players from service providers and enterprise network evolution. This year, emphasis is given to network programming (programmability, functions on demand) and self-healing networks (service assurance, closed loop automation, intent-based).

ETSI Summit: European Standards: Are Current Mechanisms Fit for the Future in a Changing Regulatory World?
2 April, Sophia Antipolis, FR

The regulatory environment for market access and spectrum in the EU is changing, which influences the whole CEPT and beyond. The Summit will address the new regulatory initiatives and challenges for industry and markets as well as the role European standards play.

ETSI SNAPSHOT

YTD =
January 2019-November 2019

924 members

26% SMEs

+100 technical groups

438 standards YTD

744 standards under development YTD

19.500 standards' downloads YTD

517 face-to-face meetings YTD

3535 eMeetings YTD

26.390 participants to F2F meetings YTD

32 520 eParticipants YTD

113 partnerships

63 conferences & Plugtests YTD

@ETSI Secretariat

124 people

19 nationalities

ETSI
650 Route des Lucioles
06560 Valbonne France
Tel: +33 (0)4 92 94 42 00

Members from **65** countries

About ETSI

ETSI provides members with an open and inclusive environment to support the development, ratification and testing of globally applicable standards for ICT systems and services across all sectors of industry and society. We are a not-for-profit body with more than 900 member organizations worldwide, drawn from 65 countries and five continents. Members comprise a diversified pool of large and small private companies, research entities, academia, government and public organizations. ETSI is officially recognized by the EU as a European Standards Organization (ESO).

For more information please visit: www.etsi.org

For any information on Enjoy!,
to contribute, to be removed from the list of hard copies or subscribe to it, contact us at: enjoy@etsi.org

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