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**Draft Report – Meeting of Collaboration on ITS Communication Standards**

***(18 March 2022, E-meeting)***

[***http://www.itu.int/go/ITScomms***](http://www.itu.int/go/ITScomms)

# 1 Introduction

The meeting of the Collaboration on ITS Communication Standards (CITS) took place virtually on 18 March 2022. T. Russell Shields (RoadDB) chaired the meeting supported by Stefano Polidori (ITU/TSB Advisor), Mythili Menon (ITU/TSB Project Officer) and Carolina Lima (ITU/TSB Study Group Assistant).

The [recording](https://itu.zoom.us/rec/share/qBoSnvkuv1hmDA2BmfP1lfWkf7LraKDSSh2cW7yxRhzAv75_GRgaeoqvF37sQibB.lPgegK6h9iUGk4WM) of the meeting was made available from [CITS webpage](http://www.itu.int/go/ITScomms).

# 2 Opening, meeting participants and adoption of the agenda

**T. Russell Shields**, Chair of CITS, started the meeting and welcomed the participants. In line with its scope, CITS continues to facilitate the coordination of internationally accepted, harmonized set of ITS communication standards of the highest quality in the most expeditious manner possible to enable the rapid deployment of fully interoperable ITS communication-related products and services in the global marketplace.

Mr Shields thanked the representatives for providing updates to this meeting and for facilitating the exchange of information related to ITS communications standards from their respective organizations to the database being maintained by CITS. Based on the presentations and related discussions at the CITS meetings, the ITS Communication Standards Database will be continuously updated with relevant standards from Standards Development Organizations (SDOs) and other relevant entities.

**45** participants joined the meeting representing many SDOs and other stakeholders. The list of participants is available as [[DOC 29](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/29_List_of_participants.pdf)].

**30** meeting documents were submitted. This meeting report was posted after the meeting as Doc 30. All related meeting documents are openly accessible on the CITS site [here](https://www.itu.int/en/ITU-T/extcoop/cits/Pages/meeting-documents.aspx?RootFolder=/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting&FolderCTID=0x0120008D91490DA7927C4D8A0BB5A73929B07D&View=%7b73BE16B3-22C9-43D5-A9FD-D8BC067A87FF%7d). The meeting was recorded and is available from the [CITS webpage online](http://www.itu.int/go/ITScomms).

The draft agenda as contained in [[Doc 01R2](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/01R2_Chair_draft_Agenda.docx)] was adopted.

# 3 Status of ITS communications work in SDOs and the ITU

## 3.1 [UNECE WP.29 TF CS/OTA](https://wiki.unece.org/pages/viewpage.action?pageId=40829521)

[[Doc 20](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/20_UNECE_WP29_status_report.pdf)] was submitted and presented by Francois Guichard (Secretary).

This presentation underscored that the revised version of the UNECE Road Map on Intelligent Transport Systems was adopted in February 2021. It covers 18 Action Points relating to across transport modes (including rail, road, inland waterways, multi-modal transport, transport of dangerous goods, data security and digitalization and emerging technologies within the domain.

The following documents are currently underway:

• FRAV (Guidelines for ADS safety – draft 1 mid of 2022)

• VMAD (Master document #2 and guidelines - draft 1 mid of 2022)

UNECE also continues to collaborate with the ITU and other partners on the [Future Networked Car Symposium Series](https://fnc.itu.int/).

## 3.2 SAE International/[SAE C-V2X](http://profiles.sae.org/tevcsc2/)

[[Doc 19](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/19_SAE_International_status_report.pdf)] was submitted and presented by William (Bill) Gouse *(SAE International)*. The presentation highlighted the work relating to SAE standards for advanced and vehicle safety technologies.

Mr Gouse presented the foundational documents on V2X Communication Standards including:

• J2735 Message Set Dictionary

• J2945 SEP Guidance for J2945/X Documents

• J2945/3 Requirements for V2I Weather Applications

• J2945/5 Service Specific Permissions and Security Guidance for Connected Vehicle Applications

The presentation also highlighted the importance of SAE J2945/2 – Performance Requirements for V2V Safety Awareness, which:

• Covers four applications: Emergency Vehicle Alert, Roadside Alert, Safety Awareness Alerts for Objects, Adverse Road Conditions

• Includes needs and requirements, design, message and data

The following documents are currently under progress:

• J2945/4 Road Safety Applications (WIP)

• J2945/7 Positioning Enhancements for V2X Systems (WIP)

• J2945/8 Cooperative Perception Systems (WIP)

• J2945/6 Cooperative ACC Performance Requirements

• J2945/C Traffic Probe Use and Operation

• J2945/D Road User to Road User Courteous Communications (WIP)

• J3217 Profiles for V2X Based Fee Collection (WIP)

• J3238 Infrastructure Applications Testing for Interoperability

Within the domain of vehicle driving automation systems, the following standards have been published:

• J3171 Identifying Automated Driving Systems-Dedicated Vehicles (ADS-DVs) Passenger Issues for Persons with Disabilities

• J3216 Taxonomy and Definitions for Terms Related to Cooperative Driving Automation for On-Road Vehicles

In terms of work in process, the following standards are being developed:

• J3208 – Taxonomy and Definitions ASD V&V

• J3247 – Automated Driving System Test Facility Safety Practices

• J3261 – Resources for accommodating the needs of persons with disabilities when using ADS-DVs

• J3237 – Operational Safety Metrics for Verification and Validation (V&V) of Automated Driving Systems (ADS)

The SAE Human Factors Standards Activities include:

• J2395\_200202 – ITS In-Vehicle Message Priority

• J3155 – Camera Monitor Systems Test Protocols and Performance Requirements

• J3114\_201612 – Human Factors Definitions for Automated Driving and Related Research Topics

• J3048\_201602 – Driver-Vehicle Interface Considerations for Lane Keeping Assistance Systems

The SAE Cyber Security Standards Activities include:

• J3061: Cybersecurity Recommended Practice for Cyber-Physical Vehicle Systems

• J1939: Serial Control and Communications – Heavy Duty Vehicle Network

• J2101 WIP: Requirements for Hardware Protected Security for Ground Vehicle Applications

## 3.3 [5GAA](http://5gaa.org/)

[[Doc 24](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/24_5GAA_status_report.pdf)] submitted and presented by Maxime Flament *(CTO, 5GAA)*. Currently, there are 22 active work items in 5GAA including (but not limited to):

• 5GEB – Study on trends and technologies for 5G evolution and beyond

• AVP – Automated Valet Parking Technology Assessment

• CASE – Conformance Assessment Strategy Evaluation

• MAPU – 5G market pull thanks to the benefits beyond safety and AVs

• C-V2X RM II – C-V2X Roadmap phase II: Use Cases and Spectrum

• MBD4V2X – Misbehaviour detection

• S4SEM – Strategy for standardisation engagement and monitoring

• VRU-PRO – Accelerating VRU Protection on the road

The new work items which are currently under development are:

• NRV2XEv – Performance Evaluation of 3GPP NR V2X Rel16

• 5GV2XGTM – 5G-V2X Go-to-market

• PPL II – Precise Positioning phase II

• STiCAD II – Safety Treatment in Connected Automated Driving Functions phase II

• RobotITS – Incorporation of delivery robots in ITS

• NRI Deploy – 5GAA strategic plan to address CEF2 Digital Programme

Since September 2021, the following publications and press releases are available:

• Study: Distributed Vehicular Antenna System

• Study: List of C-V2X Devices

• White Paper: Tele-operated Driving Use-Cases, System Architecture and Business Considerations

• Press Release: Live Trial of 5G Connected Car Connected Car to Concept to Launch in Turin, Italy

• Press Release: 5G Automotive Association Statement of Support for C-V2X Joint Waiver Request

• Press Release: 5GAA Statement on the proposal to amend the Intelligent Transport Systems Directive

With regard to the trial in Turin, eight members were involved including BT EE, Capgemini, Cisco, Harman, Intel, Stellantis, Telefonica, TIM. The main objectives of this trial were to:

• Objective 1 - Multi-MNO scenario: How can a vehicle, which has radio access to MNO A, use a MEC application, which is operated by MNO B Interworking between MNO’s (by NOT losing the benefits of low latency

• Objective 2 - Global operational Availability: How can an OEM as the MEC application developer be sure, especially on a global basis, that a MEC application works in the same way if it’s operated by MNO A, or if it’s operated by MNO B

• Objective 3 - Multi-MNO with MEC roaming scenario: Where the two operators can seamlessly transfer the V2X service from one operator to the other as the car OEM moves from one geo to the other in a roaming scenario. Typically, when an in-vehicle driver does a cross-border travel that involves two operators.

On 31 March 2022, an ETSI C-V2X plug-test was subsequently conducted in Klettwitz, Germany, to explore C-V2X Interoperability and Deployment.

## 3.4 [ETSI TC ITS](https://www.etsi.org/committee/1402-its)

[[Doc 25](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/25_ETSI-TC-ITS_status_report.pptx)] was submitted and presented by Niels Peter Skov Andersen *(Chair ETSI TC ITS)*. Through the presentation, the mandate of ETSI was again highlighted in terms of its responsibility to develop and maintain Standards, Specifications and other deliverables to support the implementation of ITS Service provision across the network, for transport networks, vehicles and transport users, including interface aspects and multiple modes of transport and interoperability between systems, but not including ITS application standards, radio matters, and EMC. The scope of standards development by ETSI including communication media, transport layer, network layer, security and generic web-services.

Within the domain of Cooperative ITS, ETSI’s activities are conducted within ETSI TC ITS in terms of:

• Maintenance of existing standards

• Future extrapolation of standards

• Test specifications for existing standards

• Test specification from European Fee Collection

Cooperative ITS (C-ITS) Release 1 has been completed and has also been reworked for allowing the support of multiple access layer technologies.

The upcoming ETSI TC ITS meeting will conduct discussions on updating Release 2 including additional features and functions for maintaining interoperability and functionality in line with Release 1. The key features of this Release 2 are anticipated to include:

• Collective Perception Service

• Misbehaviour Detection

• Multi-Channel Operation

Ongoing work items include the following:

• Conformance test specifications for ITS PKI management; Part 1: Protocol Implementation Conformance Statement (PICS)

• Testing; Interoperability test specifications for security

• Misbehaviour Reporting service; Release 2

• Collective Perception Service

• Vehicular Communications; Basic Set of Applications; Manoeuvre Coordination Service

• Vulnerable Road Users (VRU) awareness; Part 1: Functional Architecture and Requirements definitions; Release 2

## 3.5 [Car2Car Communication Consortium](https://www.car-2-car.org/)

[[Doc 26](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/26_Car2Car_status_report.pptx)] was submitted and presented by Niels Peter Skov Andersen *(General Manager C2C-CC)*. C2CC supports V2X deployment.

The presentation highlighted that C2C-CC is a non-profit organization predicated on the activities of the European vehicle manufacturers. To this end, its core work focusses on:

• Supporting the Vehicle2X deployment

• Developing guidelines for a Car2Car communication system

• Developing realistic deployment strategies

• Establishing open European standards for a Car2Car communication system

• Facilitating the harmonisation of C2C Communication Standards worldwide

• Use of Free of charge European wide exclusive frequency band (5.9 GHz)

• Establishing the necessary profiling of standards

Based on its ongoing work, Car2Car Consortium has developed the following publications:

• Guidance for day 2 and beyond roadmap

• Whitepaper on ITS G5 and Sidelink LTE-V2X Co-Channel Coexistence Mitigation Methods

• Technical Report on CPM Object Quality

• Study of Vulnerable Road Users awareness

• Safety related message sets

## 3.6 [WWRF VIP WG The Connected Car](http://www.wwrf.ch/vip-wg-the-connected-car.html)

[[Doc 17](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/17_WWRF_Connected_Car_VIP_WG_status_report.pptx)] was submitted and presented by Seshadri Mohan *(Chair, WWRF VIP CV WG)*. The presentation highlighted the scope of WWRF including:

• Developing future vision of the wireless world

• Informing and educate on trends and developments

• Enabling and facilitate the translation of the vision into reality

• Bringing a wide range of parties together to identify and overcome significant roadblocks to the vision

The Membership includes manufacturers, network operators, industry organizations, and academic institutions from all over the world. Currently, WWRF organizes two meetings a year.

The WWRF VIP Connected Vehicle Working Group engaged in the following activities:

• At the 17th CTIF Global Capsule (CGC) Annual Workshop Dr Seshadri Mohan delivered a talk on AI/ML-Enabled Connected Vehicles.

• A Connected Vehicles Session was organized as part of WWRF Meeting’46, 1-3 December, Paris, France

• A Workshop on the theme of “AI/Machine Learning-Enabled Connected Vehicles” was held on 15 December 2022 as part of IEEE Advanced Networks and Telecommunications Symposium (ANTS)

• A Panel was organized on the theme of “Impact of 5G and 6G on Connected Vehicles” as part of the workshop at IEEE ANTS 2022.

## 3.7 W3C

[[Doc 18](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/18_W3C_Automotive_WG_status_update.docx)] was submitted but no presentation was given for unavailability of representative. The report elaborates on the “Automotive Working Group”. The Group builds on real-world experience from the first Vehicle Information Service Specification (VISS), which is in production vehicles, and whose version 2 was published as First Public Working Draft, with a goal to subsume version 1.

The standard aims to create a rich ecosystem for vehicles by running on the "head unit". To do this, it provides an access method to a common data model for all the signals information available on vehicles, such as engine temperature, fuel/charge level, range, tire pressure etc. It currently knows about a thousand and will be growing to accommodate advances such as electrification, autonomous and driver assist technologies. VISS 2 includes HTTP REST in addition to WebSocket, addresses access control authorization, and a robust authentication model. This version also improves data feed subscriptions. A reference implementation is currently exploring supporting Message Queuing Telemetry Transport (MQTT) protocol which is used in the automotive industry.

The working group has also published Vehicle Signal Specification Ontology (VSSo) and Vehicle Signal Specification Core Ontology (VSSo Core) as First Public Working Draft, previously transferred from incubation in the Automotive Business Group and now developed on the W3C Recommendation track.

## 3.8 [C-SAE](http://www.csaeconf.org/)

[[Doc 13](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/13_C-SAE_status_report.pptx)] was submitted to provide an overview of the activities of China Society of Automotive Engineers (China-SAE or CSAE), a national academic organization, which was founded in 1963. The main focus lies on”:

• LTE-V2X Standard System: China's C-V2X standard system has been initially formed. Standards have covered core technologies in the access layer, network layer, message layer, and security layer.

• Industrial Ecosystem in China: The C-V2X industrial operation chain mainly includes communication chips, communication modules, terminal equipment, motor vehicles, intelligent transport, testing & verification, and operations & services.

In terms of application scenarios with reference to enabling driver assistance and autonomous driving, the focus is on:

• Emergency brake warning

• Green light notice

• Intersection autonomous driving

• Intelligent Transportation System

## 3.9 [TTC WG on Connected Car](https://www.ttc.or.jp/e)

[[Doc 14R1](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/14R1_TTC_Connected_Car_WG_status_report.pptx)] was submitted and presented by Hideki Yamamoto *(TTC-Telecommunication Technology Committee)*.

The presentation highlighted the role of China Industry Innovation Alliance for the Intelligent and Connected Vehicles (CAICV) which was established in 2017 and supported by MIIT Over 500 members, including companies, universities, institutes from automotive, telecommunication, transportation and electronics industries. It presented the work of TTC in the field of:

• Intelligent Vehicle Innovation and Development Strategy;

• Notice on Promoting 5G Accelerated Development;

• Guidelines on Promoting the Construction of New Infrastructure in the Transportation

• Notice on Organizing Pilot Work for the Coordinated Development of Smart City Infrastructure and Intelligent Connected Vehicles; and

• New Energy Vehicle (NEV) Industry Development Plan (2021-2035)

It was noted that China's C-V2X standard system has been initially formed. Standards have covered core technologies in the access layer, network layer, message layer, and security layer.

The presentation also underscores the various application scenarios including:

• Emergency brake warning (V2V)

• Intersection autonomous driving (V2I)

• Green light notice (V2I)

• Intelligent transportation in Changsha (V2I)

## 3.10 [TSDSI](https://tsdsi.in/)

[[Doc 27](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/27_TSDSI_status_report.docx)] was submitted and presented by Sharad Arora (Founder and Managing Director Sensorise Digital Services Private Limited, India). The Telecommunications Standards Development Society, India (TSDSI) is an autonomous, membership based, standards development organization (SDO) for Telecom/ICT products and services in India. It develops standards for access, back-haul, infrastructure systems, solutions and services that best meet India specific Telecom/ICT needs, based on research and innovation in India. Recently, TSDSI published a report [DCS Report] capturing the India specific flight requirements during take-off, in-flight and post-flight operations. This study includes the requirements on the connectivity aspects between drones and 3GPP cellular network and recommendations for using Digital Sky Platform [DGCA Guidance manual], a regulatory framework from Directorate General of Civil Aviation (DGCA), India for seamless and secure operations of Drones in Indian airspace.

In terms of its current work within various SDOs, TSDSI is working closely with Telecommunication Engineering Centre (TEC) to incorporate Vehicle Tracking Device as part of the Mandatory Testing and Certification for Telecom Equipment (MTCTE). Additionally, the Essential Requirements are being drafted in close collaboration with the International Centre for Automotive Technology (ICAT). The test schedule is likely to be finalized in the [Phase 3](https://www.mtcte.tec.gov.in/er_list) of MTCTE implementation.

TSDSI is also working with the Bureau of Indian Standards (BIS) on the development of Indian product standards on ITS related to Automotive Tracking Device (ATD) and Integrated Systems and Intelligent Transport Systems (ITS): Reverse Parking Alert System (RPAS).

## 3.11 [ISO TC241](https://www.iso.org/committee/558313.html)

[[Doc 10](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/10_ISO_TC_241_status_report.pptx)] was submitted and presented by Dave Conway (Convenor WG6).

The presentation highlighted scenarios that could go wrong with autonomous driving including:

*• Scenario 1*: The vehicle detects two living creatures in its path. It can only avoid one? Which does it hit? Avoid the moose to save the car, but hit the child?

*• Scenario 2*: Two driverless vehicles approach a single lane width passing point. Which has right of way? The one with greatest sense of urgency algorithm?

In line with the above, Scope of ISO 39003 is being developed. It will detail aspects of an autonomous vehicle that require considerations to made by the designer/manufacturer to ensure that key aspects are not overlooked or disregarded. This standard does not offer the technical precision to prescribe the required controls but would, rather, offer a set of “protocol guidelines” that a vehicle manufacturer might choose to self-certify against to assure that the desired necessary ethical considerations were addressed during design and effectively controlled. The Committee Draft of the same was published on 14 February 2022. Next meeting is planned on 27-28 April 2022

The ISO TC241 collaborates with FG-AI4AD with various exchanges between Bryn Balcombe and Dave Conway on the complementarity of the efforts. ITU is not a stable representative in the committee meetings which are all held virtually due to COVID in the last two years.

The Chair of FG-AI4AD, Bryn Balcombe is invited to foster collaboration with ISO TC241.

## 3.12 [IEEE 802.11 TGbd](https://www.ieee802.org/11/Reports/tgbd_update.htm)

[[Doc 16](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/16_IEEE_802_11_TGbd_status_report.pdf)] was submitted and presented by Bo Sun.

This presentation highlighted that no physical meetings have been held for the Group since March 2020 (only remote meetings took place). IEEE P802.11bd were in WG LB recirculation from D1.0 to D3.0. In 2022 Mar IEEE 802.11 virtual plenary meeting, TGbd approved resolutions to all comments for LB 259 and WG11 approved the generation of D4.0. IEEE 802.11 WG has approved a motion to request IEEE-SA 802 EC to conditionally approve forwarding P802.11bd to SA Ballot. The TGbd has appointed Yujin Noh as Tech Editor after Bahar Sadeghi stepped down. As a part of the future meetings, the following will be organized:

• IEEE 802.11 #193, WG11 Interim meeting, May 8~13, Warsaw, Poland, Hybrid

• IEEE 802.11 #194, WG11 Plenary meeting, Jul 10~15, Montreal, Canada, Hybrid

• IEEE 802.11 #195, WG11 Interim meeting, Sep 11~16, Waikoloa, Kona, HI, USA

• IEEE 802.11 #196, WG11 Plenary meeting, Nov 13~18, Bangkok, Thailand

## 3.13 [CCSA](http://www.ccsa.org.cn/english/tc.php?tcid=tc10)

[[Doc 12](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/12_CCSA_TC10_status_report.pptx)] was submitted and presented Ge Yuming.

The presentation highlighted the various Technical Committees are functioning (TC):

• TC1: Internet and application

• TC3: Network

• TC4: Communication power supply & station operational environment

• TC5: Wireless communication

• TC6: Transport and access network

• TC7: Network management & operation support

• TC8: Network & information security

• TC9: Electromagnetic environment &protection

• TC10: IoT

• TC11: Mobile internet application and terminal technical

• TC12: Aerospace Communication Technology

The presentation also provided an overview of the Technology and Standardization Architecture of V2X in CCSA including aspects such as assisted driving, automated driving, remote driving, traffic efficiency and telematics among others.

It also provided a list of CCSA Application and Message related standards including:

• Technical Requirements of Message Layer of LTE-based Vehicular Communication

• Test Method of Message Layer of LTE-based Vehicular Communication

• The Requirements Standard for Enhanced V2X Application Layer Data Interaction

• Application Identity Assignment and Mapping of LTE-based Vehicle Wireless Communication Technology

• High Level Autonomous Driving Data Interaction Content based on Vehicle Infrastructure Cooperation

• Use Case and Technical Requirements of V2X based on Mobile Internet

The presentation also highlighted the following CCSA Communication Equipment Related Standards:

• Technical Requirement of Vehicle Terminal for LTE-based Vehicular Communication

• Test Method of Terminal for LTE-based Vehicular Communication

• Technical Requirement of Road-Side Unit for LTE-based Vehicular Communication

• Test Method of Sidelink-enabled road side unit for LTE-based vehicular communication

# 4 Status of ITS communications work in ITU

## 4.1 [Overview of all ITS work items in ITU](http://www.itu.int/en/ITU-T/extcoop/cits/Documents/ITS-work-items.xlsx)

The [spreadsheet](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/ITS-work-items.xlsx) (freely available online) contains information about all ITS related work items in ITU. Covering the work of ITU-T (Study Groups 12, 13, 16, 17, 20) and ITU-R (WP5A), the spreadsheet will be updated based on inputs received from constituent Study Groups and other relevant groups.

## 4.2 [ITU-R WP5](https://www.itu.int/en/ITU-R/study-groups/rsg5/Pages/default.aspx)

[[Doc 23R1](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/23R1_ITU-R_status_report.pdf)] was submitted and presented by Uwe Loewenstein, Counsellor, ITU-R WP5.

The main ITS related activities within the ITU-R WP 5A and WP 5D were elaborated on.

Under WP5A, the following Recommendations are being revised with anticipation that it will be finalized by November 2022:

• Rec. M.2121 (01/19) - Harmonization of frequency bands for ITS in the mobile service

• Rec. M.2444 (11/18) - Examples of arrangements for ITS deployments under the mobile service

With the aim of finalization by 2023, WP5A is also developing a new report ITU-R M.[CAV] – Connected Automated Vehicles. The main elements of this report include:

• Radiocommunication elements for CAVs

• Radiocommunication systems supporting CAV

• Spectrum needs for CAV radiocommunication

• Spectrum harmonization

Under WP5D, the new report on “The use of the terrestrial component of IMT for the Cellular-Vehicle-to-Everything” is being developed. This report covers the relationship between IMT technologies in terrestrial networks and C-V2X.

## 4.3 ITU-T [SG16](https://www.itu.int/en/ITU-T/studygroups/2017-2020/16/Pages/default.aspx) ([Q27/16](http://www.itu.int/ITU-T/workprog/wp_search.aspx?isn_sp=3925&isn_sg=3934&isn_qu=4207&isn_status=-1,1,3,7,2&details=0&field=acdefghijo))

[[Doc 22](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/22_ITU-T_SG16_status_report.pptx)] was submitted and presented by Hideki Yamamoto *(Vice-chairman, SG16)*. This presentation provided brief highlights of the ITU-T Focus Groups established by ITU-T SG16 within the domain of ITS.

The ITU-T SG16 is divided into the following Working Parties:

• WP1/16 – Multimedia content delivery

• WP2/16 – Multimedia e-services

• WP3/16 – Media coding and immersive environments

ITU-T SG16 established the Focus Group AI for autonomous and assisted driving (FG-AI4AD) in October 2019. FG-AI4AD supports standardization activities for services and applications enabled by AI systems in autonomous and assisted driving. It focuses on the behavioural evaluation of AI responsible for dynamic driving tasks, so as to ensure that performance of AI on roads meets, or exceeds, the performance of a competent and careful human driver, and, consequently, to build public trust in these technologies. For related updates see **paragraph 4.6** below.

ITU-T SG16 has established the Focus Group on Vehicular Multimedia (FG-VM) in July 2018. FG-VM identifies gaps in the vehicular multimedia standardization landscape and eventually draft technical reports and specifications covering, among others, vehicular multimedia use cases, requirements, applications, interfaces, protocols, architectures, and security, leveraging from previous work done by ITU in this field. FG-VM has completed the two deliverables and transferred to SG16 and subsequently, SG16 has approved two Recommendations based on these two. For related updates see **paragraph 4.4** below.

The Joint project team with ITU-T SG16 and ISO/TC22/SC31/WG8 on Vehicle Domain Services (JVDS) was established in SG16 in October 2019. The first document, ISO 23139-1 “Road vehicles — Vehicle domain service (VDS) — Part 1: General information and use case definitions” was approved in IS ballot in ISO in 2021. The ITU-T SG16 WP2 plenary in September 2021 approved it as ITU-T Recommendation F.749.5. The JVDS was closed in April 2021.

The next SG16 meeting is expected to take place in October/November 2022.

## 4.4 Focus Group on Vehicular Multimedia ([FG-VM](https://www.itu.int/en/ITU-T/focusgroups/vm/Pages/default.aspx))

[[Doc 15](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/15_FG-VM_status_report.docx)] contains an update of the activities related to the Focus Group on Vehicular Multimedia. The document contains an overview of all the meetings and workshops conducted within the remit of FG-VM. Established in July 2018 by ITU-T Study Group 16, FG-VM had been developing three Technical Reports three Working Groups:

• WG1: Technical Report (TR1) on “Use cases and requirements for the vehicular multimedia networks”. This Technical Report was finalized and published by FG-VM in 2019, revised in 2020 and then submitted to SG16 for consideration. Subsequently, this Technical Report was updated within SG16 and endorsed in August 2020, following AAP approval process, as Recommendation ITU-T F.749.3.

• WG2: Technical Report (TR2) on “Architecture of Vehicle Multimedia Systems”. This Technical Report was finalized and published by FG-VM in April 2020 as contained in FGVM-O-058. Subsequently, following its submission to SG16, the TR2 was updated as ITU-T Recommendation and approved (TAP approval process) in January 2022 by ITU-T SG16 as ITU-T H.551” Architecture of vehicular multimedia systems”. The TAP was chosen as the TR2 includes consideration on security and privacy.

• WG3: Technical Report on “Implementation Aspects of Vehicular Multimedia”. This Technical Report is currently under-development. The latest draft is as contained in [FGVM-O-071](https://extranet.itu.int/sites/itu-t/focusgroups/vm/output/FGVM-O-071.zip) (15-16 December 2021).

The mandate of FG-VM has been extended till October 2022 by the Parent Group, ITU-T Study Group 16. The 16th meeting of FG-VM, e-meeting is scheduled to take place on 27-28 April 2022. The FG-VM Plenary Meeting will be preceded by the Workshop on Implementation aspects on Vehicular Multimedia on 27 April 2022.

It was mentioned that FG-VM work is unique and very valuable. It identified the need to additional standardization work related to AR and VR for vehicles. ITU SG16 may bring that standardization needs within the current SG16 framework.

## 4.5 ITU-T [SG17](https://www.itu.int/en/ITU-T/studygroups/2017-2020/17/Pages/default.aspx) ([Q13/17](https://www.itu.int/itu-t/workprog/wp_search.aspx?isn_sp=3925&isn_sg=3935&isn_qu=6705&isn_status=-1,1,3,7&details=0&field=acdefghijo))

[[Doc 11](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20210910-e-meeting/11_ITU-T_SG17_status_report.pdf)] was submitted and presented by Sang-Woo Lee *(ITU-T Q13/17 Rapporteur)*. Within ITU-T, Study Group 17 is the lead Study Group working on security aspects including generic security architecture, mechanisms and management guidelines, ITS security including V2X communications. Within ITU-T Study Group 17, Question 13 serves as the lead Question for developing Recommendations regarding security aspect for ITS including road transport, railway, maritime and air transport as well.The approved Recommendation under this Question includes:

• X.1371 - Security threats in connected vehicles

• X.1372 - Security guidelines for Vehicle-to-Everything(V2X) communication

• X.1374 - Security requirements for external interfaces and devices with vehicle access capability

• X.1375 - Methodologies for intrusion detection system on in-vehicle networks

• X.1376 - Security-related misbehaviour detection mechanism for connected vehicles

Ongoing work-items include those on:

• Software update capability for ITS communications devices

• Security guidelines for vehicular edge computing

• Security requirements for categorized data in V2X communication

• Methodologies for intrusion prevention system in connected vehicles

• Framework of security threat information sharing for connected vehicles

• Security guidelines for an electric vertical take-off and landing (eVTOL) vehicle in an urban air mobility environment

During the next study period of SG17 Q13 will continue to develop recommendations on security aspects of ITS. Additionally, 10 on-going work items including X.1373 revision work will be developed in the next study period.

The collaboration between UNECE Task force on cybersecurity and OTA issues and SG17 is very welcomed and encouraged to continue.

## 4.6 Focus Group on AI for Autonomous and Assisted Driving ([FG-AI4AD](https://www.itu.int/en/ITU-T/focusgroups/ai4ad/Pages/default.aspx))

[[Doc 28](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/28_FG-AI4AD_status_report.pdf)] was submitted and presented by Bryn Balcombe, FG-AI4AD Chair. The FG-AI4AD was established in October 2019.

The 7th Meeting of FG-AI4AD was held on 6-7 October 2021. It was preceded by the launch of the AI for Road Safety Initiative on 6 October 2021, supported by the ITU, the UN Secretary-General’s Special Envoy and the UN Envoy on Technology. The launch was organised as a part of the AI for Good Summit. The AI for Road Safety initiative is in line with the UN General Assembly Resolution (UN A/ RES/74/299) on Improving global Road Safety, which highlights the role of innovative automotive and digital technology, as well as in line with the UN Secretary General’s roadmap on digital cooperation. The launch event was attended by 315 participants.

The 8th Meeting of FG-AI4AD was held on 1-2 December 2021. During this meeting, the following deliverable was completed:

• FGAI4AD-02 "Automated driving safety data protocol – Ethical and legal considerations of continual monitoring”

The following deliverables are still under development:

• TR01: “Automated driving safety data protocol – Specification”

• TR03: "Automated driving safety data protocol – Practical demonstrators”

• TR04: "Automated driving safety data protocol – Public safety benefits of continual monitoring”

The CITS meeting welcomed the efforts from FG-AI4AD on AI performance behaviour and automated driving in service monitoring. The excellent coordination between FG-AI4AD with WP.29 was highlighted. Even if the FG-AI4AD work is planned to conclude in October 2022, when the final reports will be submitted to ITU-T SG16 for further consideration, the CITS experts felt that the good work from FG-AI4AD, and especially the coordination and collaboration with various stakeholders on AI aspects related to vehicles, would benefit from a continuous ITU led activity. It would be important to discuss if a group similar to the CITS or another framework, e.g., under the new "AI for Road Safety Initiative", could bring this excellent work on "AI for vehicles" forward at international level.

## 4.7 [ITU-T SG20](https://www.itu.int/en/ITU-T/studygroups/2017-2020/20/Pages/default.aspx)

[[Doc 21](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/21_ITU-T_SG20_status_report.pdf)] was submitted by Marco Carugi (*ITU-T Q2/20 Rapporteur and SG20 co-representative to CITS*). The presentation underscored an overview of the relevant ITS related activities under the remit of SG20.

The presentation highlighted the determination of the Recommendation ITU-T Y.4215 “Use cases, requirements and capabilities of unmanned aircraft systems for Internet of Things”. Additionally, the following draft Recommendations are underdevelopment:

• Draft Recommendation ITU-T Y.dt-ITS “Requirements and capability framework of digital twin for intelligent transport system”

• Draft Recommendation ITU-T Y.RMDFS-arch “Functional architecture of roadside multi-sensor data fusion systems for autonomous vehicles”

For what concerns ITS and cities, the work is going towards “Intelligent transport” more than “Intelligent Transport Systems”. So, a suggestion is to perhaps reconsider working on the draft Recommendations using the terminology of “Intelligence in Transport”.

The next ITU-T SG20 Meeting will take place 18 – 28 July 2022.

## 4.8 Organizations that did not send a progress report at this meeting

• [ATIS](https://www.atis.org/01_strat_init/connectedcar/)

• [ARIB](http://www.arib.or.jp/english/index.html)

• [CEN TC278](https://www.itsstandards.eu/)

• [IEC SEG11](https://www.iec.ch/dyn/www/f?p=103:186:0::::FSP_ORG_ID,FSP_LANG_ID:23128,25)

• [IETF IPWAVE WG](https://datatracker.ietf.org/wg/ipwave/about/)

• [IMDA](https://www.imda.gov.sg/)

• [ISO TC 22](https://www.iso.org/committee/46706.html)

• [ISO TC 204](https://www.iso.org/committee/54706.html)

• ITU-T SG12 ([Q4/12](https://www.itu.int/itu-t/workprog/wp_search.aspx?isn_sp=3925&isn_sg=3931&isn_qu=4155&isn_status=-1,1,3,7&details=0&field=acdefghijo))

• [TIA](http://www.tiaonline.org/all-standards/committees/tr-48)

• [TIAA](http://www.tiaa.org.cn/EN/)

• [TTA PG905](http://www.tta.or.kr/English/new/standardization/Committee_newEngList.jsp)

• UNECE TF CS/OTA

• [IEEE 1609 WG VT/ITS](https://standards.ieee.org/project/1609_2_1.html)

## 4.9 Incoming Liaison Statements

CITS received the following liaison statements, which were duly noted.

• [Doc 04](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20210910-e-meeting/04_LS_FG-AI4AD.zip): LS/i asking for feedback on draft ETSI TR 102 638 Basic Set of Applications Release 2 [from ETSI TC ITS]  
*Abstract:* Through this Liaison Statement, ETSI, has shared TR 102 638 Release 2 use cases with external organizations, e.g., 5GAA, C2C-CC, etc. to ask for feedback on the contents. The background is that in particular in 5GAA there has been extensive work on use cases definitions and descriptions, and it would be beneficial to leverage and consolidate the work in the framework of the collaboration between ETSI and 5GAA.

• [Doc 05](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/05_LS_ITU-T_SG16-LS266.zip): LS/i on Consent of ITU-T Recommendation F.749.5 | ISO 23239-1 "Vehicle domain service: General information and use case definitions" [from ITU-T SG16]  
*Abstract:* This LS informs of the start of the approval process for new Recommendation F.749.5 | ISO 23239-1 "Vehicle domain service: General information and use case definitions", which was developed by Q27/16 and ISO TC22 SC31 WG8 within the JVDS. Q27/16 also informs you of its work on vehicular multimedia systems, and invites further collaboration.

• [Doc 06](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/06_LS_ITU-T_SG16-LS267.zip): LS/i on Determination of ITU-T H.551 "Architecture of vehicular multimedia system" [from ITU-T SG16]  
*Abstract:* This liaison statement informs the Determination of ITU-T H.551 "Architecture of vehicular multimedia systems" based on the second deliverable on vehicular multimedia from the ITU-T FG-VM.

• [Doc 07](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20210910-e-meeting/07_LS_ITU-T_SG16-LS247.docx): LSi/r on provision of inputs to the online ITS communication standards database (reply to CITS-LS13) [from ITU-T SG20]  
*Abstract:* This liaison contains the response from ITU-T Study Group 20 to CITS on the provision of inputs to the online ITS communication standards database.

• [Doc 08](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/08_LS_ITU-T_FG-AN-LS8.zip): LS/i on the first deliverable on use cases for autonomous networks from ITU FG-AN [from FG-AN]  
*Abstract:* This liaison statement informs the relevant bodies of the approval of the first deliverable of ITU-T FG-AN, “ITU-T Technical Specification Use cases for Autonomous Network”.

• [Doc 09](https://www.itu.int/en/ITU-T/extcoop/cits/Documents/Meeting-20220318-e-meeting/09_LS_ITU-T_TSAG-LS49.zip): LS/i on Intelligent Transportation Systems (ITS) [from TSAG]  
*Abstract:* TSAG thanks CITS for the CITS activity report and encourages relevant ITU-T study groups with activities related to ITS communications to provide regular updates on their ITS work items to CITS.

Many of the incoming LS were referred to CITS for information. Accordingly, these LSs were noted. Additionally, the relevant information provided in the LS will be utilized to update the database as required.

# 5 ITS Standards Online Repository

Based on the inputs received from and presentations delivered by the SDOs, the [ITS communication standards database](https://www.itu.int/net4/ITU-T/landscape#?topic=0.131&workgroup=1&searchValue=&page=1&sort=Revelance) will be updated by ITU as soon as possible, taking into account resources availability.

# 6 Next meeting

The next CITS meeting is planned on 23 September 2022. The final date will be confirmed via email list.

# 7 Closure of the meeting

The Chair, Russ Shields, thanked ITU for remotely hosting the CITS meeting and having supported its organization. The Chair expressed his gratitude to the representatives from the SDOs who attended the meeting and thanked them for their contributions to the meeting, which will serve as the basis for the pertinent inputs to be fed into the ITS Communication Database. He also expressed his appreciation for the ITU Staff (Mr Polidori, Ms Menon and Ms Lima) for organizing the CITS meetings and building of the ITS communication standards database. He further invited the participants to attend the [Future Networked Car Symposium-2022](https://fnc.itu.int/), *22 – 25 March 2022*. The meeting closed at 16h14 hours local Geneva time.

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