ITS Standardization Activities of ISO/TC 204

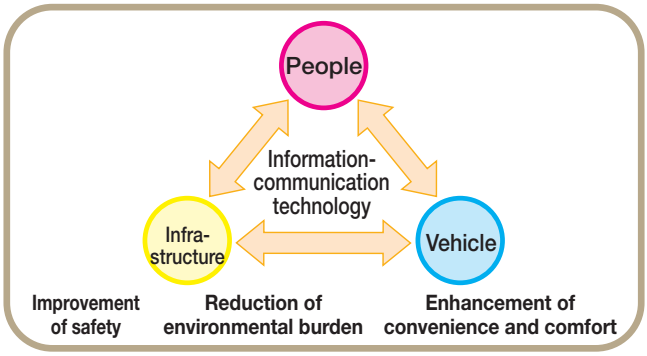
2025

Standardization of ITS

What is ITS?

ITS (Intelligent Transport Systems) is designed to rapidly improve road traffic safety, transport efficiency and comfort and to significantly contribute to energy and environmental conservation through traffic flow facilitation, such as elimination of traffic jams, by using communication technologies to link between people, infrastructure and vehicles.

Due to its wide variety of related technologies and its ability to drastically change social and economic structures, ITS has the potential to create new industries and markets.



Importance of participating in international standardization programs

The WTO (World Trade Organization)'s TBT Agreement (Agreement on Technical Barriers to Trade) aims to reduce or remove unnecessary trade barriers. International standards are documents written by standardization organizations independent of the United Nations or government institutions. Although they are not inherently legally binding, compliance with those standards is considered mandatory, based on the TBT Agreement.

Moreover, the GPA (Agreement on Government Procurement), an appendix of the TBT Agreement, requires countries party to the agreement to define a technical specification based on the applicable international standard (if one exists) when they carry out government procurement that exceeds a certain size. Even for international procurement, in addition to traditional evaluation indexes, including technological advantages, cost (cost performance), and international prevalence, it is increasingly required that the technology applied complies with an international standard in areas where global standards exist. Thus, to improve Japan's global competitive strength in the industrial field, it is essential for Japan to actively participate in international standardization programs and to position Japan's superior technologies as open and global standards in accordance with global trends.

Especially from the standpoint of ensuring user convenience, it is important to reduce costs while promoting international standardization of its various basic technologies without sacrificing the interoperability and expandability of the systems and, at the same time, smoothly enabling the social changes that will be fostered by ITS. In addition, more companies are expanding overseas as domestic markets shrink due to the aging population and low birthrate or are collaborating with foreign companies for development and application of advanced technologies. Under such circumstances, businesses are more likely internationalized or diversified across industries, so Japanese companies need to develop technologies accepted worldwide while completing or collaborating with foreign companies to maintain their presence.

TBT Agreement (extracts)

(Members,) Recognizing the important contribution that international standards and conformity assessment systems can make in this regard by improving efficiency of production and facilitating the conduct of international trade;

(From the Preamble.)

Where technical regulations are required and relevant international standards exist or their completion is imminent, Members shall use them, or the relevant parts of them, as a basis for their technical regulations except when such international standards or relevant parts would be an ineffective or inappropriate means for the fulfilment of the legitimate objectives pursued (…)

(From Article 2.4.)

What is standardization?

Document (…) that provides, for common and repeated use, rules, guidelines, or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

Standards should be based on the consolidated results of science, technology, and experience, and aimed at the promotion of optimum community benefits.

(Source: ISO/IEC Directives Part 2, 2021 (ISO/IEC Guide 2:2004))

Key roles of standardization:

- Securing the compatibility of products. Assurance of interface
- Improvement of production efficiency
- Assurance of quality
- Accurate communication, promotion of mutual understanding
- Prevalence of technologies from research and development
- Assurance of safety and security
- Reduction of environmental burden
- Enhancement of industrial competitive strength, preparation of competitive environment
- Promotion of trade, and more

ITS International Standardization Activities

International standardization for ITS is carried out by the TC 204 Technical Committee (TC) of the International Organization for Standardization (ISO). TC 204 was established in 1992, and held its first meeting the following year. Working groups (WGs) consisting of experts on the theme of the group from various countries, have been established under TC 204 and are responsible for developing drafts of standards. Some working groups have been suspended, merged, or newly created since the inception of TC 204, and there are currently 13 active working groups (see next page).

International standardization also involves setting up a broad range of liaisons with other TCs handling ITS-related technologies, as well as with the IEC, ITU, and other international standardization bodies and related organizations.

Deliverable	Published	Under development
International Standards	205	66
Technical Specifications	73	45
Publically Available Specifications	2	0
Technical Reports	72	15
Other (Amendments, etc.)	9	3
Total	361	129

(As of July 2025)

Scope:

Standardization of information, communication and control systems in the field of urban and rural surface transportation, including intermodal and multi-modal aspects thereof, traveller information, traffic management, public transport, commercial transport, emergency services and commercial services in the intelligent transport systems (ITS) field.

Excluded:

• In-vehicle transport information and control systems (ISO / TC 22).

Note:

ISO / TC 204 is responsible for the overall system aspects and infrastructure aspects of intelligent transport systems (ITS), as well as the coordination of the overall ISO work programme in this field including the schedule for standards development, taking into account the work of existing international standardization bodies.

Mutual liaison within the ISO/IEC (mutual dispatching of representatives)

- JTC1 (INFORMATION TECHNOLOGY)
- JTC1/SC6
- JTC1/SC17
- JTC1/SC27
- JTC1/SC42 (Artificial Intelligence)
- TC22 (Road vehicles)
- TC22/SC31 (Data communication)
- TC22/SC32
- TC22/SC33 (Vehicle dynamics and chassis components)
- TC22/SC39 (Ergonomics)
- TC23/SC19
- TC104 (Freight containers)
- TC122 (Packaging)
- TC154
- TC211 (Geographic information/Geomatics)
- TC268/SC2 (Sustainable mobility and transportation)
- TC 307 (Blockchain and distributed ledger technologies)

Mutual liaison within the ISO/IEC (Representative dispatched from TC 204)

- IEC/SyC Smart Cities
- JTC 1/SC 7 (Software and systems engineering)
- JTC 1/SC 31 (Automatic identification and data capture techniques)
- TC 8 (Ship and marine technology)
- TC 8/SC 11 (Intermodal and Short Sea Shipping)
- TC 241 (Road traffic safety management systems)
- TC 286 (Collaborative business relationship management)
- TC 315 (Cold chain logistics)

TC 204
(Intelligent Transport Systems)

Mutual liaison within the ISO/IEC (Representative dispatched to TC 204)

- IEC/TC 9 (Electrical equipment and systems for railways)
- JTC 1/SC 2 (Coded character sets)
- JTC 1/SC 29 (Coding of audio, picture, multimedia and hypermedia information)
- TC 20/SC 14 (Space systems and operations)
- TC 268 (Sustainable cities and communities)
- TC 269 (Railway applications)

Liaison Organizations

- 5GAA (5G Automotive Association)
- APEC (Asia-Pacific Economic Cooperation)
- DCSA (Digital Container Shipping Association)
- ERA (European Union Agency for Railways)
- ETSI (European Telecommunication Standards Institute)
- ICAO (International Civil Aviation Organization)
- IEEE (Institute of Electrical and Electronic Engineers)
- ISOC (Internet Society)
- ITU (International Telecommunication Union)
- OGC (Open Geospatial Consortium)
- SAE (Society of Automotive Engineers)
- SBS (Small Business Standards)
- TISA (Travelers Information Services Association)

(Liaison representatives can participate in the relevant liaison committee meetings and obtain documents.)

Framework for Standardization

TC 204 Committee Organization (International)

The US has served as chair and lead country for TC 204 since its inception. Complementing the 13 WGs under TC 204, a joint working group (JWG) with the ISO/IEC/JTC 1/WG 11 (Smart cities) was formed in 2023. This JWG has begun working on the development of a standard for city data models related to transportation planning.

In an effort to further accelerate the development of standards in TC 204, advisory groups (AGs) tasked with improving TC operations and assessing its business plan were established in 2021. These AGs carry out initiatives such as reviewing activities from a cross-WG perspective. A new chairperson assumed office in 2023 and is planning to strengthen such initiatives.

Relationship between ITS standardization organizations

TC 204 Chairperson

Secretariat : SAE International

AG2	: Identifiers	Germany
AG3	: Operational improvement group	USA
AG4	: Program coordination	Norway
AG5	: Publication and marketing review	USA
AHG2	: ITS Cybersecurity	USA
JWG1	: City data model transportation planning	USA

Working Group		Convenor
WG 1	: Architecture	USA
WG 3	: ITS geographic data	Japan
WG 5	: Fee and toll collection	Sweden
WG 7	: General fleet management and commercial/freight	Canada
WG 8	: Public transport/emergency	USA
WG 9	: Integrated transport information, management and control	Australia
WG 10	: Traveller information systems	France
WG 14	: Driving automation and active safety systems	Japan
WG 16	: Communications	USA
WG 17	: Nomadic Devices in ITS Systems	Korea
WG 18	: Cooperative systems	Germany
WG 19	: Mobility Integration	Norway
WG 20	: Big Data and Artificial Intelligence supporting ITS	South Africa

Participating members (35 countries): Contribute to the meetings, participate actively in the work, and have the obligation to vote.

Australia, Austria, Belarus, Belgium, Canada, China, Czech Republic, Denmark, Egypt, Finland, France, Germany, Hungary, India, Islamic Republic of Iran, Republic of Ireland, Israel, Italy, Japan, Hashemite Kingdom of Jordan, Republic of Korea, Malaysia, Netherlands, New Zealand, Republic of North Macedonia, Norway, Russian Federation, Kingdom of Saudi Arabia, South Africa, Spain, Sweden, Switzerland, Uganda, United Kingdom, United States of America

Observing members (26 countries): Follow the work as observers with the right to submit comments and attend the meetings.

Algeria, Bulgaria, Chile, Congo, Croatia, Cuba, Cyprus, Ethiopia, Greece, Hong Kong China, Indonesia, Mexico, Mongolia, Montenegro, Pakistan, Philippines, Poland, Portugal, Romania, Serbia, Singapore, Slovakia, Thailand, Turkey, Ukraine, Uzbekistan

ITS Standardization Committee of Japan

The ISO (and IEC) allows participation of only one member organization per country. Based on the approval of the Cabinet Office, Japan is represented by the Japanese Industrial Standards Committee (JISC).

Within Japan, the ITS Standardization Committee (National Committee), set up under the auspices of the Society of Automotive Engineers of Japan (JSAE), carries out TC 204 international standardization activities on behalf of the Japanese Industrial Standards Committee (JISC). The main tasks of the Committee are to (1) act swiftly in response to changes in the standardization environment, (2) carry out standardization projects in accordance with the established strategy, (3) provide assistance with national standardization (JIS), and (4) provide related parties with up-to-date information.

To share information on ITS communications, the Committee also liaises with the ITS Info-Communications Forum, administered by the Association of Radio Industries and Businesses (ARIB) and the TTC Standardization Committee, administered by the Telecommunication Technology Committee (TTC).

ITS Standardization Committee Organization

ITS Standardization Committee

- Planning strategies for ITS standardization
- Decision on votes
- Comprising 30 members, including manufacturers, consumers and neutral parties

Secretariat: Society of Automotive Engineers of Japan

Technical committee

- Confirmation of progress in work by subcommittees
- Information exchange
- Comprising some 30 members, including WG representatives, liaison persons and experts

Liaison

ITS Info-Communications Forum
Secretariat: Association of Radio Industries and Businesses

TTC Standardization Committee
Secretariat: The Telecommunication Technology Committee

- Development of standardization drafts and response to international working groups

Working group	Secretariat
Architecture (WG 1)	JSAE (Society of Automotive Engineers of Japan)
ITS geographic data (WG 3)	DRM (Japan Digital Road Map Association)
Fee and toll collection (WG 5)	HIDO (Highway Industry Development Organization)
General fleet management and commercial/freight (WG 7)	HIDO (Highway Industry Development Organization)
Public transport/emergency (WG 8)	JICE (Japan Institute of Country-ology and Engineering)
Integrated transport information, management and control (WG 9)	UTMS (UTMS Society of Japan)
Traveler information systems (WG 10)	UTMS (UTMS Society of Japan)
Vehicle/roadway warning and control systems (WG 14)	JSAE (Society of Automotive Engineers of Japan)
Communications (WG 16)	JEITA (Japan Electronics and Information Technology Industries Association)
Nomadic Devices in ITS Systems (WG 17)	JEITA (Japan Electronics and Information Technology Industries Association)
Cooperative systems (WG 18)	HIDO (Highway Industry Development Organization)
Mobility integration (WG 19)	HIDO (Highway Industry Development Organization)
Big Data and Artificial Intelligence supporting ITS (WG 20)	JSAE (Society of Automotive Engineers of Japan)

Role of ITS and the Necessity for Standardization in the Advancement of Automated Driving Technologies

Author: Kenya Sato, Director of the Doshisha University Mobility Research Center

Advancement of Automated Driving Technologies

1) Transitioning from autonomous to cooperative automated driving

Automated driving technologies that operate the vehicle automatically using onboard sensors to detect pedestrians, bicycles, and other vehicles in the vicinity are currently becoming more widespread. This means comzputers are starting to perform the recognition, decision-making, and operation tasks that have been handled by the driver until now. Automated driving technology has been evolving from advancement of the existing driving safety support systems shown in Fig. 1-(1), which rely on multiple sensors and high-precision 3D maps and use rule-based algorithms to operate the vehicle, into systems referred to as end-to-end (E2E), shown in Fig. 1-(2), which achieve near-human levels of driving operation by primarily relying on cameras to monitor the vehicle surroundings and using AI-based algorithms everywhere.

In the context of automated driving, higher vehicle speeds lead to greater efficiency. Not only do shorter travel times to destinations save time for passengers, but high-speed travel is also easily adaptable to traffic flow, reducing interference with other vehicles, and therefore raising the overall traffic efficiency. In contrast, driving at high speed result in a more severe set of conditions (operational design domain (ODD)) including weather, road conditions, the scope of driving, and other factors. Also, higher speeds have a negative impact on safety. Technical limits to the ability of automated vehicles to react to sudden changes at high speed can increase the risk of accidents and the extent of damage in a collision. Conversely, slowing down and moving at a lower speed provides more time to react to objects or pedestrians, making it easier to avoid accidents and control the vehicle. At the same time, lower speeds make it easier to cope with a wider range of driving conditions. For example, having a vehicle move at a walking pace reduces the risk of a collision or other accident, but also decreases movement efficiency.

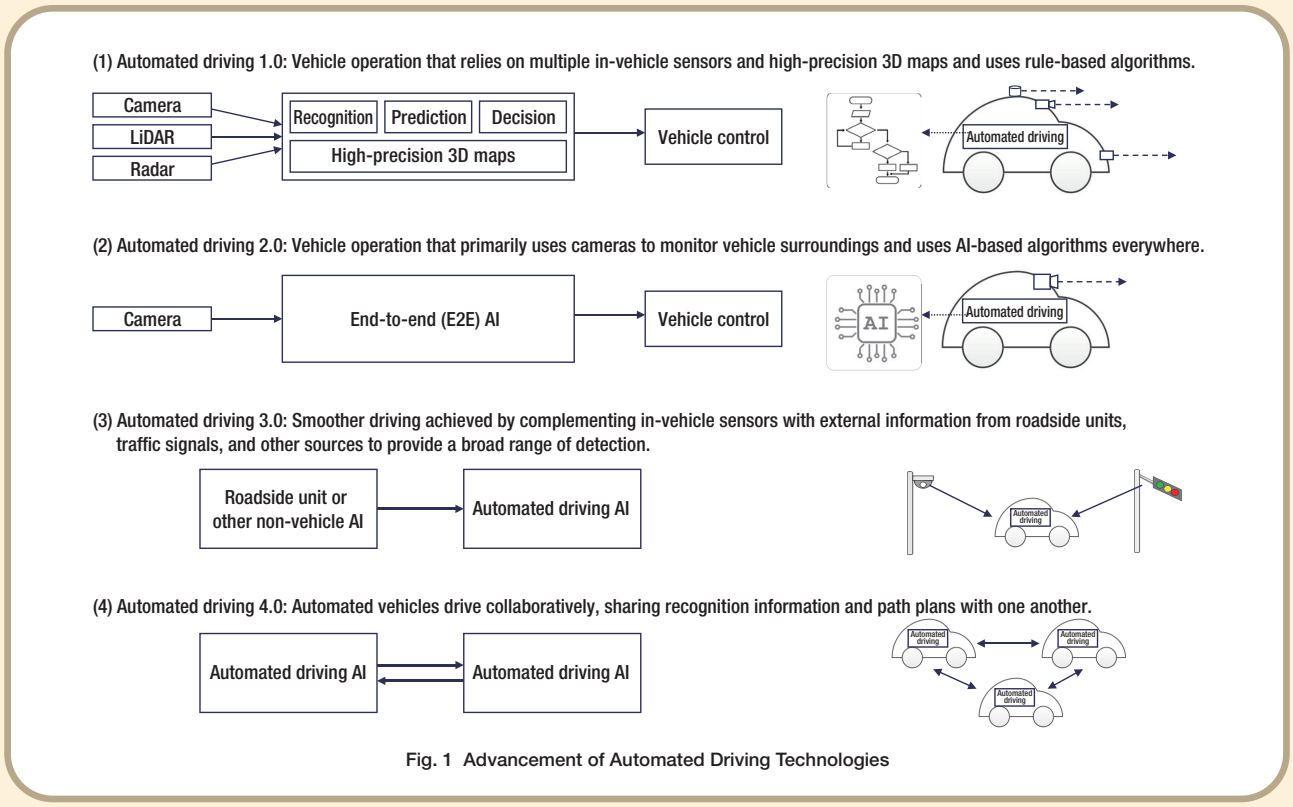


Fig. 1 Advancement of Automated Driving Technologies

Summarizing the above, as demonstrated in Fig. 2, there is an inverse correlation between safety and efficiency. Cooperative automated driving technology is necessary to enhance both. One concrete approach is the introduction of direct vehicle-to-infrastructure (V2I) communication between vehicles and roadside units (e.g., traffic signals or vehicle detectors) as a means of expanding and supplementing the information that can be obtained by in-vehicle sensors. Complementing sensors in the vehicles with those in roadside units and anticipating conditions on roads with poor visibility, scheduled traffic signal changes, or other upcoming situations, is expected to enhance driving efficiency by making driving smoother. Vehicle-to-network (V2N) communication that uses the mobile phone network is also envisioned as a supplement to V2I communication. This will make it possible for other vehicles to detect pedestrians or cyclists that would normally be in a blind spot or outside the detection range of in-vehicle sensors.

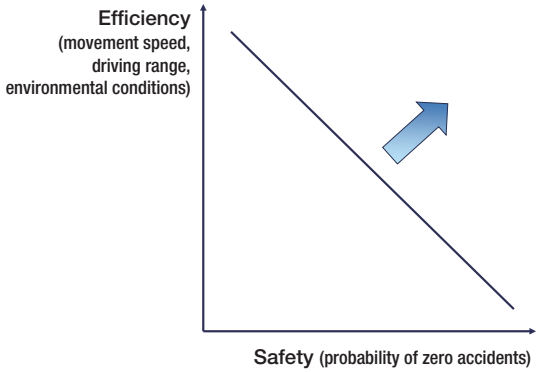


Fig. 2 Tradeoff between Safety and Efficiency

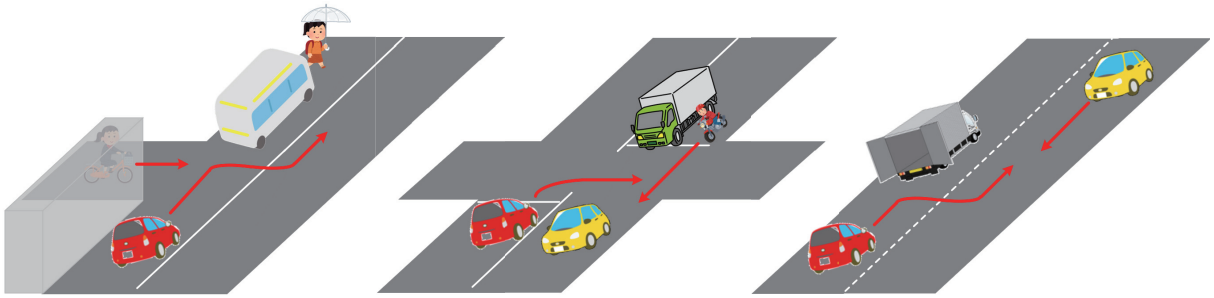


Fig. 3 Examples of Information outside In-Vehicle Sensor Range Helping to Enhance Safety

Fig. 3 presents examples of ways in which obtaining information that is outside the detection range of in-vehicle sensors contributes to enhancing safety. Foreseeable cases include a pedestrian or cyclist suddenly coming out from a blind spot, the approach of an oncoming vehicle when making a right turn, or a vehicle in the opposite lane veering close to pass a parked vehicle. Relying on information provided by a roadside unit or the like to expand the detection area and identify whether it is safe to proceed in advance makes it unnecessary for the vehicle to slow down significantly and helps create a smoother traffic flow.

Additionally, using direct vehicle-to-vehicle (V2V or, alternatively, V2N2V via the mobile phone network) communication between various vehicles enables interaction such as the mutual coordination of path plans between automated vehicles. This can make driving safer and smoother in the case like merging shown in Fig. 4.

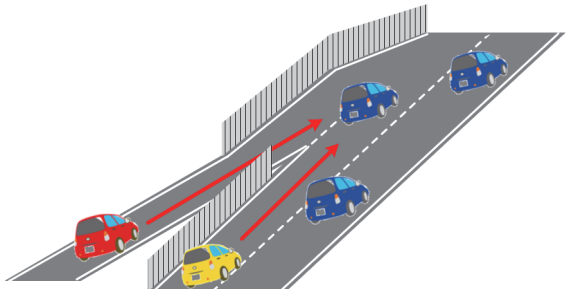


Fig. 4 Example of the Need for Smooth Interaction

2) Models for Automated Driving Technologies

For our purposes, the models are defined as follows. The automated driving 1.0 model relies on multiple sensors and high-precision 3D maps, and uses rule-based algorithms to operate the vehicle. The automated driving 2.0 model operates the vehicle by primarily relying on cameras to monitor the vehicle surroundings and using AI-based algorithms everywhere (E2E AI). The automated driving 3.0 model provides a broad range of detection by complementing in-vehicle sensors with external information from roadside units, traffic signals, and other sources to achieve smoother driving. Finally, the automated driving 4.0 model refers to automated vehicles driving collaboratively, sharing recognition information and path plans with one another.

Automated driving 2.0 attempts to reproduce driving by a human driver through AI-based algorithms, using cameras as a substitute for human sight. Although that approach has the potential to reduce decision or operation errors made by humans, the inability to get information in blind spots outside the range of detection of the cameras means that this model cannot be expected to be significantly safer or more efficient than a human. In general, E2E AI uses training on the sensor inputs of the in-vehicle cameras as the basis to output vehicle operations, which is a monolithic module configuration from input to output. As shown in Fig. 5-(1), the use of roadside unit information in the automated driving 3.0 involves the direct input of sensor information using V2I communication. That process will likely require a significant amount of new training. One conceivable approach to improving training efficiency would be to, for example, subdivide the prediction and planning AI module to integrate the recognition AI function into the roadside units and transmit its results via V2I communication. In addition, automated driving AIs will have to coordinate with one another to achieve the interaction between multiple vehicles featured in automated driving 4.0. Doing so will, for example, require the operators/agents within the AI modules to exchange information through V2V communication.

The above shows that achieving AI-based driving is dependent on adopting a modular configuration and implementing common communication interfaces and information transmission formats to provide high levels of safety and enhance efficiency through V2I and V2V communication.

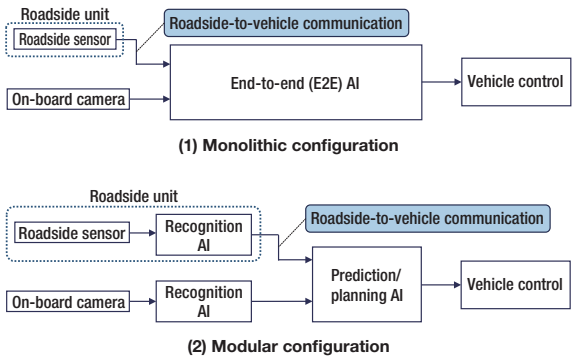


Fig. 5 AI Models Using V2I Communication

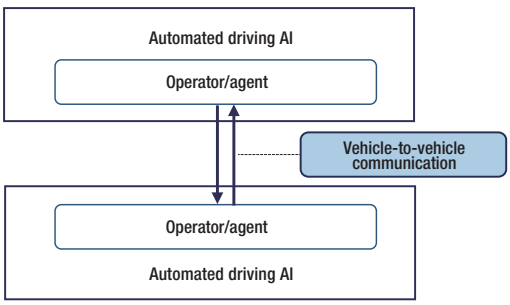


Fig. 6 Coordination between Automated Driving AIs via V2V Communication

The Necessity for Standardization

Recent eye-opening progress in information and communication technology (ICT) has spurred advances in the ITS field as well as various other related industrial fields, ranging from individual technologies related to vehicles, roads, mobile communication, and information infrastructure to mobility services related to travel, logistics, and transportation management. In this scenario, sophisticated functions becoming entangled in complex ways needs standardization in order to enable mutual coordination between these functions. The following section describes why standardization is necessary and presents some specific examples with respect to cooperative ITS, which constitutes the foundation for cooperative automated driving technologies..

1) Compatibility and interoperability

The adoption of standard specifications would allow the mutual coordination of products and systems supplied by different companies and nations. This would ensure product compatibility and allow products from different manufacturers to be used alongside each other. In particular, when coordinating multiple communication-capable devices, the mutual exchange of information will be rendered impossible if these devices use different communication protocols or the devices transmit and receive different types of data.

The use of standardization to realize interoperability within the field of cooperative ITS may make it possible to, for example, help avoid collision accidents by obtaining information from other vehicles via V2I or V2V communication, even for vehicles developed by different companies, or realize smoother traffic flows using information from traffic signals installed at the side of the road (Fig. 7).

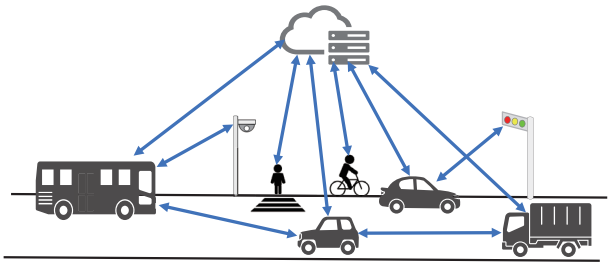


Fig. 7 Information sharing via V2V and V2I communication

2) Acceleration of technological innovation

The existence of a standardized technical foundation facilitates mutual understanding within that technical field, and makes it easier for companies and the like to develop new technology. The development of new technology based on existing standards can accelerate technological innovation and facilitate the sharing of best practices and the like.

This approach also allows studies into the feasibility of adopting open and closed strategies. In other words, a company can decide to standardize its technologies and partially share these technologies with a wide range of other companies to promote and profit from its global popularization (i.e., an open strategy), while combining this approach with a closed strategy that maintains the confidentiality of some technologies to protect exclusivity.

ITS station reference architecture (Fig. 8) has been prepared to advance common understanding in technical fields related to cooperative ITS. By describing a system configuration for cooperative ITS based on OSI reference model in a computer network, inherently complex concepts can be explained more easily, facilitating understanding of basic network principles, as well as the roles of layers and modules.

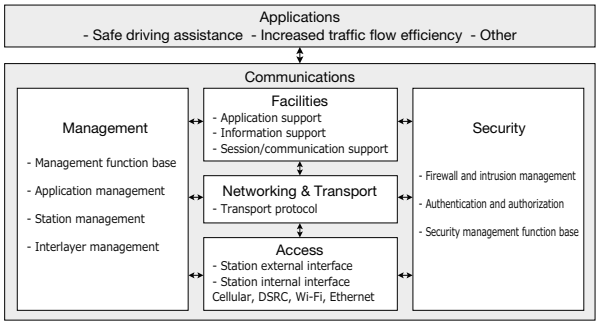


Fig. 8 ITS station reference architecture

3) Improvement of development efficiency

When developing multiple systems, each system needs its own middleware, data processing module, and components. Having to develop all of these individually (i.e., silofication) results in poor efficiency and makes new function expansion and the like more difficult. Therefore, as shown in Fig. 9, development efficiency can be improved by commonizing internal system functions. In addition, utilizing a common application programming interface (API) can make system development even easier.

Ensuring that separate modules function independently means that other modules will not be affected if the technology or protocol of one module changes. This can simplify system design and troubleshooting.

One of the main reasons for the massive expansion of the Internet, is probably the adoption of modular architecture by creating layers of communication systems based on an OSI reference model using the transmission control protocol/internet protocol (TCP/IP). Each layer is independent and changes or improvements to one layer can be carried out without affecting the other layers. This facilitates the adoption of new technologies and protocols. As a specific example, if a wireless LAN is adopted instead of an Ethernet, the system can function as-is without having to change any other layers. In addition, the standardization of application protocols such as HTTP facilitated the development of applications without having to consider lower-level layers.

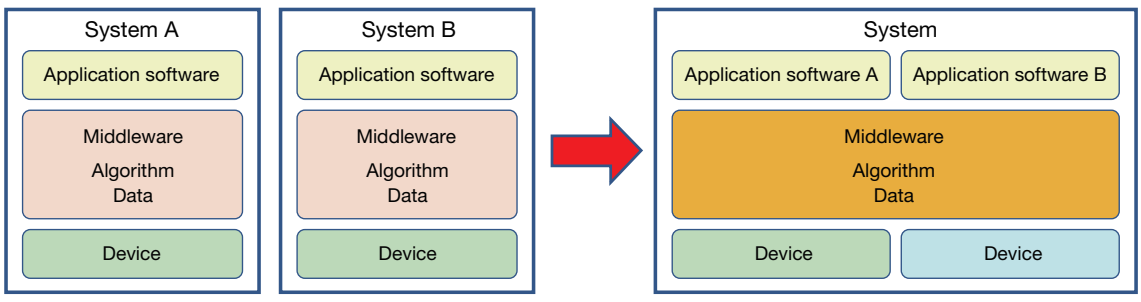


Fig. 9 Improvement of development efficiency by commonization

4) Cost reduction and quality improvement

The adoption of standard specifications helps to increase the efficiency of design and manufacturing processes, thereby reducing cost. Part commonization and mass-production can be realized by creating products based on unified specifications. In addition, the quality of products and services can be maintained at or above a certain level by making sure these standardized specifications are followed. This allows consumers to acquire highly reliable products.

For example, the creation of high-definition maps covering large areas for automated driving is an extremely high-cost process. Rather than having only one company create and only one company use these maps, standardizing the data and interfaces so that the maps are accessible by multiple companies can reduce the overall cost. In a separate example, setting up different roadside devices for each company's products is impractical. The rational approach is to enable the commonization and shared use of infrastructure facilities such as roadside devices located in public areas, traffic management centers, and emergency measures after an accident or natural disaster.

5) Regulatory unification and market expansion

When different nations adopt different regulations, companies are forced to dedicate many resources to comply with each set of regulations. The adoption of international standards helps to unify regulations and relieves the burden of companies. Products that comply with international standards are more likely to be accepted in the international market. This helps companies move into new markets and enables global business expansion.

Transition from cooperative driving automation to new mobility services

Cooperative driving automation that functions by sharing information from other vehicles and the traffic infrastructure to help improve safety and efficiency can lead to the development of new mobility services via the sharing of information over an even wider range.

As an example, Fig. 10 shows an information communication platform for realizing cooperative driving automation (3) and (2). This platform consists of three layers: mobile devices installed in automated driving systems that use sensors to detect the surrounding driving environment and control the vehicle, edge servers that rapidly integrate and share information at cooperative devices (including traffic signals and roadside sensors) and mobile phone base stations, and a cloud server that integrates the big data obtained from a wide area. All of these are designed based on ITS station reference architecture, allowing the sharing of dispersed information, and helping to realize a mutually cooperative system. It should be possible to achieve new mobility services founded on such information communication platforms that are designed to realize cooperative driving automation. For example, it can help autonomous taxi and ride sharing services to operate more efficiently and safely, leading to the provision of even more comfortable and smooth transportation to users through cooperative vehicle behavior. In addition, the real-time sharing of data from logistics vehicles and the fine tuning of traffic conditions and optimum routes can shorten delivery times and lower cost, enabling substantial improvements in delivery efficiency.

At the same time, cooperation at the overall urban transportation system level has the potential to realize optimized traffic management and improved energy efficiency. This can add extra convenience to the lifestyles of people living in cities and pave the way to the realization of sustainable smart cities.

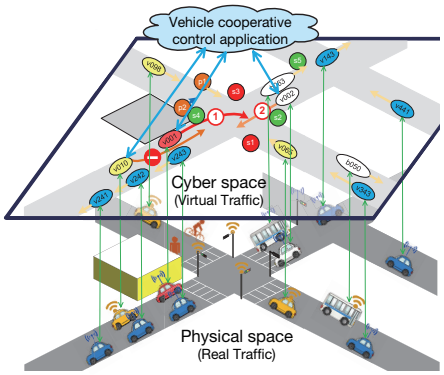


Fig. 11 Example of cooperative traffic system based on cyber and physical systems

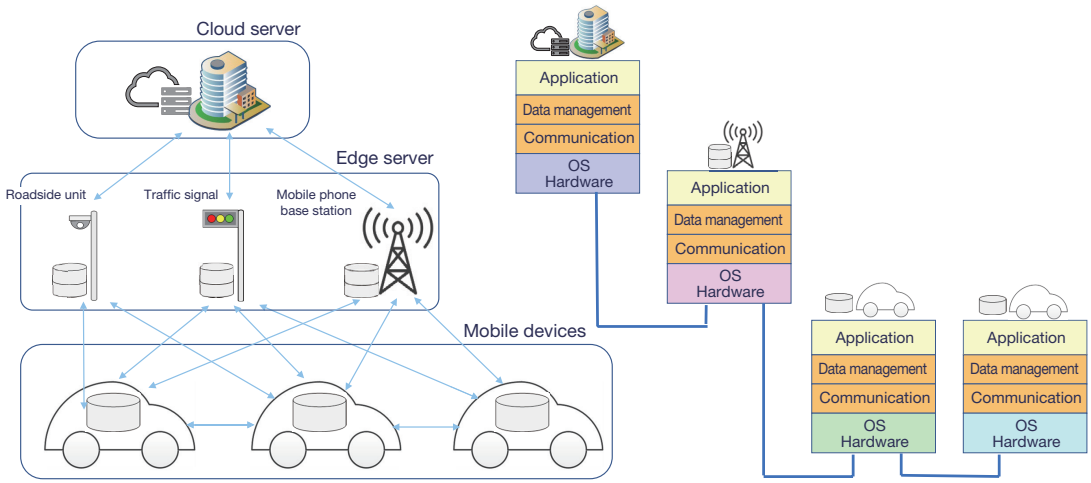


Fig. 10 Example configuration of information communication platform for realizing cooperative driving automation

Reference

(1) Pranav Singh Chib, Pravendra Singh, Recent Advancements in End-to-End Autonomous Driving Using Deep Learning: A Survey, IEEE Transactions on Intelligent Vehicles, Vol.9, No.1, 2024.

(2) Yousuke Watanabe, Kenya Sato, and Hiroaki Takada, DynamicMap 2.0: A Traffic Data Management Platform Leveraging Clouds, Edges and Embedded Systems, International Journal on Intelligent Transport Systems Research, Vol.18, Issue 1, pp.77-89, 2020.

WG 1 Architecture

ITS is a large-scale collection of systems covering many areas of application, with a large number of people involved in its development over a long period. This makes it crucial to establish an architecture that ensures the expandability of the systems that comprise ITS as well as their interoperability and compatibility. WG 1 is developing standards for common information and methods in the ITS sector, including shared terminology, the standardization of data representation formats, architectures for sharing service and system concepts, as well as risk assessment methods and the benefits of services.

List of WG 1 Work Items

		Standardization themes	ISO Number	Content
	1	Privacy aspects in ITS standards and systems	ISO/TR 12859	Guidelines for protecting privacy in the development of ITS standards and Systems
	2	Reference model architecture(s) for the ITS sector	ISO 14813-1	Definitions of service domains (categories, groups)
			ISO 14813-5	The terms and forms to be used when documenting or referencing the architecture
			ISO 14813-6	The description of ASN.1 to be used as standardised syntax notation and its relation to other data description languages
	3	ITS central data dictionaries/Part 1: Requirements for ITS data definitions	ISO 14817-1	Defines the requirements for data dictionaries that list the data definitions to be shared by the parties involved in ITS
	4	ITS central data dictionaries/Part 2: Governance of the Central ITS Data Concept Registry	ISO 14817-2	Management procedures for data registration
	5	ITS central data dictionaries/Part 3: Object identified assignments for ITS data concepts	ISO 14817-3	OID structure
★	6	Using web services (machine-machine delivery) for ITS service delivery -Part 1: Realization of interoperable web services	ISO 24097-1	Stipulation of guidelines on the use of web services designed to support collaboration between internet-based systems
★	7	Using web services (machine-machine delivery) for ITS service delivery -Part 2: Elaboration of interoperable web services' interfaces	ISO/TR 24907-2	Technical guidelines to achieve web service interoperability in the context of ITS
★	8	Using web services (machine-machine delivery) for ITS service delivery -Part 3: Quality of services	ISO/TR 24097-3	Quality of services in the context of ITS
	9	Use of unified modelling language (UML) in ITS International Standards and deliverables	ISO/TR 24529	Stipulation of rules and guidelines on the use of UML for ITS standards, data registries and data dictionaries
	10	Using XML in ITS standards, data registries and data dictionaries	ISO 24531	Stipulation of rules on the use of XML for ITS standards, data registries and data dictionaries
	11	Harmonization of ITS data concepts	ISO/TR 25100	Provision of guidelines for data concepts related to registration in data registries
	12	'Use Case' pro forma template	ISO/TR 25102	Provision of a template to facilitate use case description
	13	Training requirements for ITS architecture	ISO/TR 25104	Definition of requirements concerning training courses about ITS architecture
	14	Cooperative ITS - Part 1: Terms and definitions	ISO/TR 17465-1	Definition of Cooperative ITS
	15	Cooperative ITS - Part 2: Guidelines for standard documents	ISO/TR 17465-2	Guidelines on the formulation of Cooperative ITS standards documents
	16	Cooperative ITS - Part 3: Release procedures for standards documents	ISO/TR 17465-3	Release procedure for the development of standards documents on cooperative ITS
	17	Vocabulary	ISO TS 14812	Vocabulary Related to ITS
	18	Architecture - Applicability of data distribution technologies within ITS	ISO/TR 23255	Report on possibility of application for the data delivery technology
	19	Identifiers	ISO 5345	Procedure for specifying ITS identifiers

★ Item(s) that Japan is / has been actively working on

ITS Reference Model Architecture (ISO 14813 Series)

System architecture plays an important role in ensuring that everyone concerned shares a common understanding of the services and systems, and in guaranteeing the expandability of systems as well as their interoperability and compatibility. The ITS reference architecture (ISO 14813 series) was established for reference in developing architectures and as a model to compare architectures in different countries.

Continuous maintenance is required to deal with new services and systems arising from technological advances.

Requirements for the ITS Central Data Registry and Data Dictionary (ISO 14817)

While it is extremely important that the various system components in ITS use consistent names for the data they handle for reasons that include ensuring interoperability and improving the efficiency of system development through the sharing of data, the fact that the development of multiple systems, specifications, and standards is carried out simultaneously and in parallel and the large number of people involved in system development makes this very difficult.

Data dictionaries are designed to promote sharing by managing dictionaries of information about the definitions and formats of data subject to shared use.

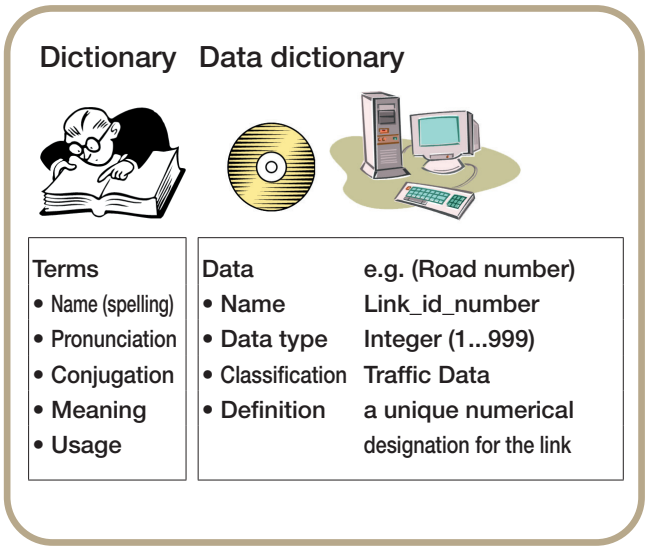
Although WG 1 developed the ISO 14817 series around the year 2000, and has conducted data registry trial operations in the past, it has yet to move to actual operations. We will put forth application ID (ITS-AID), vocabulary (data concept) and data model, among others, as content candidates for the data registry.

Many of these have already been defined by standards organizations within and outside of ISO, and collaborative activities are already proceeding in order to plan the alignment and harmonization of definitions.

The ISO 14817 series has been developed to define the framework, format and procedures for information and data exchange used in the ITS field. Part 1 describes the logical structure of the data dictionary and registered data, Part 2 the operation of data registry, and Part 3 the adoption of the OID (Object Identifier) layered in a tree format within the data management system.

WG1 conducted trial operations of a data registry around the year 2000, but this did not result in it being operated. When the cooperative ITS standardization activities became more active, it was judged necessary to introduce a data registry as soon as possible. In response, trial operations began to recommence in 2013.

Although recruitment of the registry management organization commenced, having obtained the approval of the TC 204 plenary meeting in Florida in April 2019, there was no operational period that satisfied the recruitment conditions. As such, for the time being, the ITS application identifier is managed offline. At the TC204 General Assembly in April 2020, the establishment of an advisory group for the work on identifier designation was approved. At the same time, a standard (ISO 5345) that defines the process of identifier designation has been published.

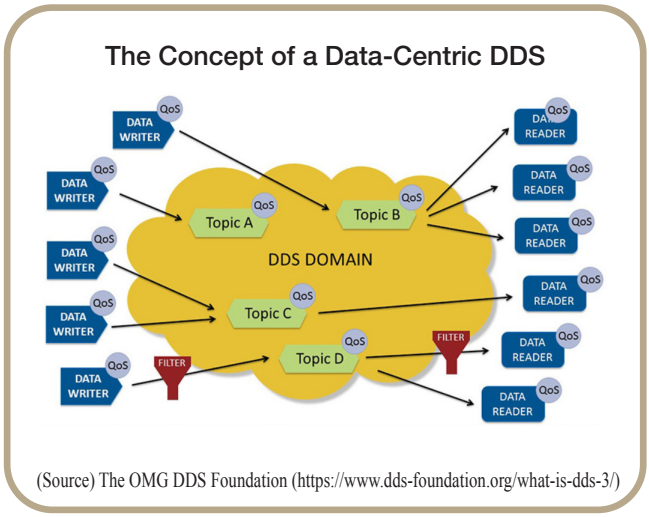


Application of ICT-related technologies in ITS

In the context of the rapid advancement of ICT-related technologies, a high degree of safety and reliability, as well as information security is important for utilizing ICT-related technologies in ITS systems which often see long term use as social systems. WG 1 is working on standardizing the rules and guidelines required for leveraging the ICT-related technologies and data description languages in the construction of the overall ITS structure. Until now, it has issued the standards for use of web service (ISO 24097-1) and guidelines related to interoperability and quality of service (ISO/ TR 24097-2, 3) and in addition, it has issued the usage rules, etc. for data description languages such as UML, XML, etc.

Recently, the TR (ISO/TR 23255) concerning ITS applicability of data distribution services (DDS) technologies in distributed systems has been developed.

DDS provides QoS-controlled data sharing, and is being adopted in many fields, including the automotive field. Applications communicate by publishing and subscribing to topics identified by their topics name. Subscriptions can specify time and content filters and get only a subset of the data being published on the Topic. Different DDS Domains are completely independent from each other. There is no data-sharing across DDS domains. OMG® (Object Management Group®) has established the middleware protocol and API standard.



(Source) The OMG DDS Foundation (https://www.dds-foundation.org/what-is-dds-3/)

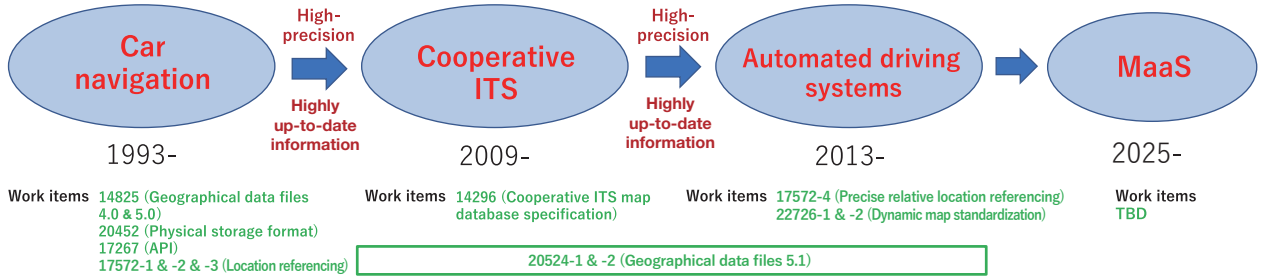
WG 3 ITS geographic data

WG 3 is working towards standardization of geographic data for navigation and automated driving.

Most applications in ITS involve services relating to the movement of people, goods and vehicles. As they require information on starting point/destination and routes in addition to data such as time or cost, these services use geographic data. Geographic data plays a notably critical role in vehicle navigation systems, which exhibit remarkable advances, as well as in cooperative ITS, which is gradually being implemented and deployed. In addition, information comprising high precision 3D images of the road environment and dynamic spatiotemporal information which supersedes the conventional concepts of geographic data are likely to play an important role in rapidly evolving automated driving technology.

WG 3 has been involved in standardizing exchange formats between geographic data providers, as well as compact storage formats allowing high-speed searching and location reference methods, etc. It has also worked on developing functional requirement specifications, data models, and data elements for geographic data. For many years, WG 3 had limited its scope to static geographic data, but is now extending that scope to dynamic spatiotemporal data as well.

Changes in Requirements for ISO TC 204 WG 3



- Car navigation: In 1993, Japan was the only country in the world where car navigation was popular.
  - Japan chaired ISO TC 204 WG 3 established in 1993
- Cooperative ITS: The European CVIS Project (2006-2010) proposed the concept of Cooperative ITS.
  - Local dynamic map: an important system element *CVIS=Cooperative Vehicle-Infrastructure Systems
- Automated driving systems: SIP-adus Project (2014-2022) proposes dynamic maps.
  - Dynamic map: an important system element *SIP-adus=Cross-Ministerial Strategic Innovation Promotion Program -Innovation of Automated Driving for Universal Services
- MaaS: WG 19 (Mobility integration) established in TC 204 in 2018.
  - Candidates for cooperation with WG 3: Tourist navigation, useable transportation networks (costs, nodes), parking management systems...

List of WG 3 work items

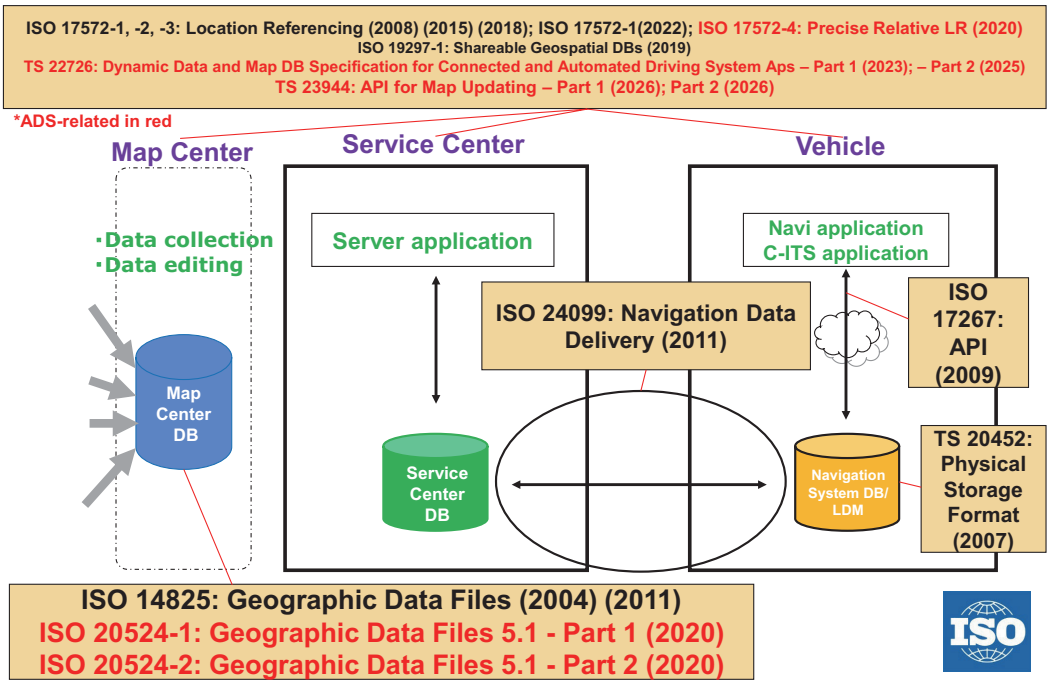
		Standardization themes	ISO Number	Content
★	1	Requirements and Logical Data Model for a Physical Storage Format (PSF) and an Application Program Interface (API) and Logical Data Organization for PSF used in Intelligent Transport Systems (ITS) Database Technology	TS 20452	Standardization of physical storage format for hard discs and etc. used for navigation
★	2	Navigation data delivery structures and protocols	ISO 24099	Standardization of data structures and protocols to transmit map data
★	3	Location referencing for geographic databases	ISO 17572-1 to 3	Standardization of location referencing when exchanging data between different applications or geographic databases
	4	Navigation systems – Application Programming Interface (API)	ISO 17267	Standardization of data access methods for application programs such as navigation systems
	5	Shareable geospatial databases for ITS applications	ISO 19297-1	Presenting the new framework which enables access to various geographic databases and data sharing between them
★	6	Geographic Data Files – GDF5.1 Part 1	ISO 20524-1	Standard (Part 1) for data exchange in geospatial databases for applications such as cooperative ITS, multi-modal navigation, and automated driving systems
★	7	Geographic Data Files – GDF5.1 Part 2	ISO 20524-2	Standard (Part 2) for data exchange in geospatial databases for applications such as cooperative ITS, multi-modal navigation, and automated driving systems
★	8	Precise Relative Location Referencing for Geographic Databases	ISO 17572-4	Addition of the forth profile that permits location referencing of “Which lane?” and “Where in the lane?” for the cooperation/automated driving system
★	9	Spatio-temporal Data Dictionary	TR 21718 V.2	Data dictionary second edition (TR) of static/dynamic data about spatio-temporal object for ITS and the cooperative/automated driving systems
★	10	Dynamic data and map database specification for connected and automated driving system applications	TS 22726-1	Standardization of static, semi-static, and semi-dynamic map data elements and their data model used for applications of ADS and C-ITS systems (Part 1) Revised version under development as of July 2025
★	11	Dynamic data and map database specification for connected and automated driving system applications	TS 22726-2	Standardization of static, semi-static, and semi-dynamic map data elements and their data model used for applications of ADS and C-ITS systems (Part 2)
	12	Application programming interface for map updating Part 1	PWI/TS 23944-1	Requirements
	13	Application programming interface for map updating Part 2	PWI/TS 23944-2	Architecture and platform-independent data model

★ Item(s) that Japan is / has been actively working on

ADAS: Advanced Driver Assistance Systems
PSF: Physical Storage Format

WG 3 All related work items diagram (as of July 2025)

Automated driving system-related = red (planned year of issue/year of issue);
Non-automated driving system = black (planned year of issue/year of issue)



Geographic Data Files

GDF 5.1 (ISO 20524-1, FDIS 20524-2)

In terms of applications, GDF 5.0 primarily deals with geographic databases for navigation systems, but there is a growing need to update it in response to the emergence of new applications for cooperative ITS, multi-modal navigation, and automated driving systems. In October 2014, PWI 20524 was approved, and the process of revising GDF 5.0 was underway.

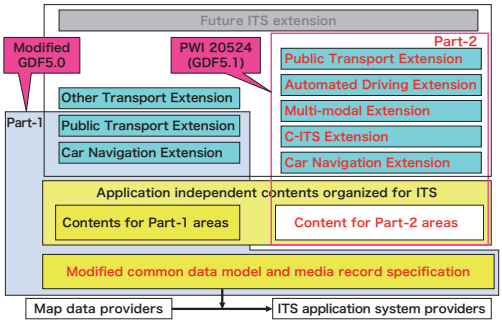
In the field of cooperative ITS, Japan is leading the preparation of specifications to represent data for a limited area with a high degree of precision, in contrast to the GDF 5.0 specifications that provide a single level of precision for all areas.

For multi-modal navigation, France is taking the lead in preparing specifications to achieve compatibility between the EN 12986 Reference Data Model for Public Transport (Transmodel) and GDF 5.0. Regarding automated driving systems, amidst expectations of future Japanese, European and US input, Japan will be taking the lead in this area. The ISO for Part 1 was issued in April 2020, and the ISO for Part 2 is pending as of July 2020. Japan will also take the lead on automated driving systems, with Part 1 published by IS in April 2020 and Part 2 published in November 2020.

As there has not been an international standard to date for models describing the road shape data for coordinating systems and/or automated driving systems, Japan suggested the Belt Concept (belt areas such as lanes are determined by physical and painted features) that would become the basic concept. This Belt Concept has received great interest from other participating countries, particularly those in Europe, and so it was able to get approval and a high degree of praise.

With respect to GDF, the joint working group (JWG 11) formed by TC 211/WG 10 (Ubiquitous public access) and TC 204/WG3 has begun its activities.When it was initially developed, GDF (geographic data file), the basic standard of WG 3, was based on the 191xx-array of standards of TC 211. Subsequently, as WG 3 focused on car navigation

GDF 5.1 Functional Block Diagram



systems and automated driving systems, gradually a gap began to be seen, partly because the geographical information systems of TC 211 did not target a specified application field. It is perceived that one of the factors behind this gap was caused by the lack of cooperation between TC 211 and TC 204.

In collaboration with ISO/TC 211, JWG 11 drafted a gap analysis technical report (TR 19169 Geographic Information - Gap-analysis: mapping and describing the differences between the current GDF and ISO/TC 211 conceptual models to suggest ways to harmonize and resolve conflicting issues), which was released as a TR in June 2021. Additionally, PWI 5974 (Evolution and revision formation for GDF) is still under joint development, and preparatory work is underway to determine the development direction and scope for GDF 6.0.

Navigation Data Delivery and Structures and Protocols (ISO 24099)

There is a growing demand for more up-to-date map data in the fields of navigation systems and ADAS. Addressing this demand requires the study of systems that enable only the necessary map data (necessary portions) to be transmitted when needed in real time. Japan therefore led the way in proposing map data delivery structures and protocols, which were issued as an IS in January 2011.

Physical Storage Format (TS 20452) and API Standards (ISO 17267)

Due to delays in discussing the drafts for Physical Storage Format (NP 14826) and API Standards (NP 17267), work was forcibly stopped in accordance with the new ISO rules. However, an NP ballot to register the standardization matters agreed upon concerning NP 14826 was proposed and approved, leading to its publication as TS 20452 in June 2007. For NP 17267, a new PWI was approved in October 2003, and issued as an IS in November 2009.

Location Referencing (ISO 17572)

This covers methods for location referencing when information is exchanged between different applications and geographic databases. It is designed to find locations in different map databases when traffic information is exchanged between systems.

Initially, it was decided that a method based on coordinate systems and road descriptors would be adopted as an option, pending the results of demonstration experiments in Europe and the United States. However, progress in this field was stalled for some time because the results were not readily available.

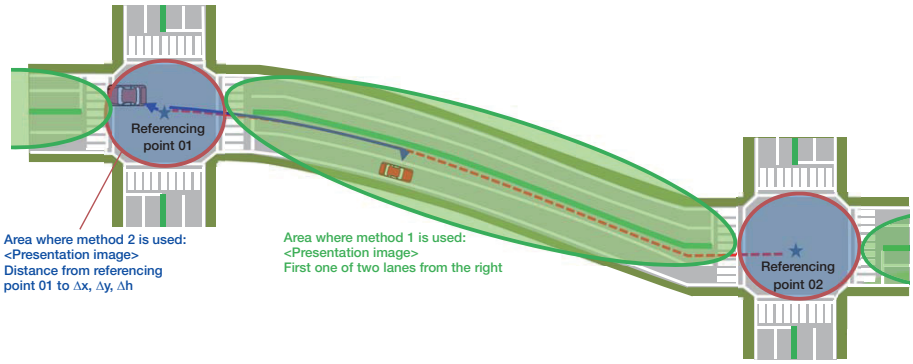
During the stalemate, the need for standardization of general-purpose LR grew sharply as the information community moved rapidly toward standardization. WG 3 therefore decided to broaden its focus from coordinate systems and road descriptors and work to establish a more comprehensive standard. Discussions took place on two methods: pre-coded profiling (precoded location references: a referencing method assuming common pre-coded location tables like VICS or TMC), and dynamic profiling (dynamic location references: a method which varies in real time). The development was launched in 2000. It was subsequently issued as an IS in December 2008.

Dynamic Profiling evolved from the European proposal (AGORA-C) and incorporated Japan's proposal on using coordinates. The systematic reviews carried out since 2011 provided the opportunity to add Japan's Section ID Method as a new sample location reference method. An updated version was issued as ISO 17572 in January 2015.

In January 2016, Part 2 of ISO 17572 was revised to add the NP 21219-20 (see the list of WG 10 work items) to the pre-coded profile, and issued as an IS in September 2018.

In April 2016, the addition of a fourth profile, the Precise Relative Location Referencing Method, which enables precise location referencing for cooperative and automated driving systems, was approved. Work on NP 17572-4 started, leading to the publication of an IS in April 2020.

Precise relative location referencing method



Structured using two methods. Select one of two methods depending on the portion or use of the road.

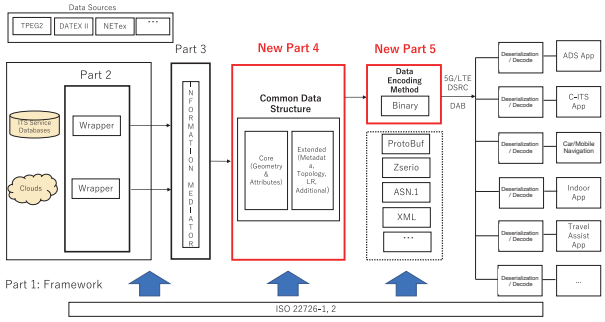
Method 1: Lane number counting
Applied to the portion of the road where the lane is used to identify the lane

Method 2: Measuring distance from a referencing point
Applied to portions of the road with unclear lane definition (within an intersection, before/after a tollgate, etc.)
Applied to the area within 200 m from a referencing point
Used as positional representation relative to the road (positional accuracy: 25 cm or less)

Shareable Geospatial Databases for ITS Applications (ISO 19297-1)

Developments in communications and database technologies are allowing the introduction of new services such as indoor and multimodal navigation for mobile devices such as smartphones. New future services will require more extensive and detailed geospatial databases than the current car navigation map databases. This work item aims at standardizing the framework for new database services allowing the use and sharing of various geospatial databases.

The scope of this work item comprises four Parts, and the IS concerning the framework was issued as Part 1 in May 2019. This is being followed by the development of the common data structure WD as Part 4. In April 2020, the existing Part 4 was split into two parts to increase efficiency, with development continuing as Part 4 (Common Data Structure) and Part 5 (Data Encoding Method). Due to circumstances such as the ill health of the Korean SWG 3.5 convenor, both parts were temporarily suspended at the directive of the ISO central secretariat in February 2023. The feasibility of restarting both parts is currently under discussion.



Overall Conceptual Diagram for 19297 (consists of 5 parts)

API for map updates (PWI/TS 23944-1 and PWI/TS 23944-2)

In light of the increasing sophistication of the demand for map updates stemming from the latest advances in automated driving systems, a joint task force led by WG 3 and comprising related organization outside TC 204 (CEN TC 278/WG 7 (ITS Spatial Data), TN-ITS (Transport Network – Intelligent Transport Systems), and SENSORIS (Sensor Interface Specification)) was instituted in February 2023. Work is now in progress following the approval of the PWI below at the TC 204 plenary meeting in May 2023. Note that this standard addresses the gap analysis recommendations from AG 4.

✓ Target: TS with Part-1 & -2

✓ Title: Intelligent transport systems - Application programming interface for map updating

- Part-1: Requirements
- Part-2: Architecture and platform-independent data model

Dynamic data and map database specification for connected and automated driving system applications (TS 22726-1 and TS 22726-2)

This work item standardizes the logical data models for static map data, which will be necessary in new applications for cooperative ITS and automated driving systems. In addition, the logical data model for semi-static/semi-dynamic data, like traffic jam, accident and weather information, is defined without collision with multiple existing standards (including them instead). Also, by defining the relationship between semi-static/semidynamic data and static map data, the logical data model is provided that includes resulting three types of data items: static/semi-static/semi-dynamic.

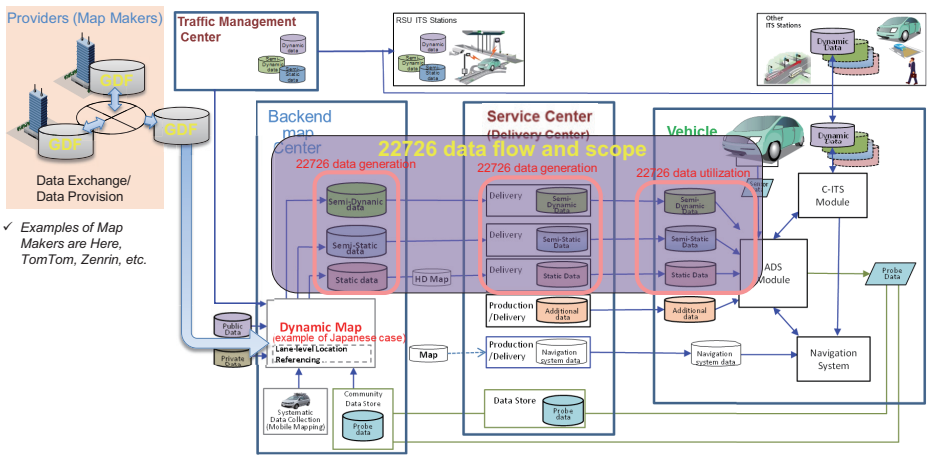
The titles of each part of 22726 are as follows.

Part 1: Architecture and logical data model for harmonization of static map data

Part 2: Logical data model of dynamic data

Although Part 1 was issued in June 2023, issues concerning traffic regulation information and other matters has led to the formal commencement of work toward issuing a revised version as quickly as possible. Europe was in charge of editing Part 2, which was issued in February 2025 after integrating the requirements proposed by Japan.

Scope of PWI 22726



WG 5 Fee and Toll Collection

WG 5 is working on standardizing Electronic Fee Collection (EFC). Initially, all aspects of fees for roads, parking lots, ferries, etc. were targeted for standardization, but current work is focused on road charging systems. In addition to the Dedicated Short-Range Communications (DSRC) method used in Japan's ETC as communication methods between road side unit and vehicle, there is also the GNSS/CN method that uses GNSS (Global Navigation Satellite System) and CN (Cellular Networks).

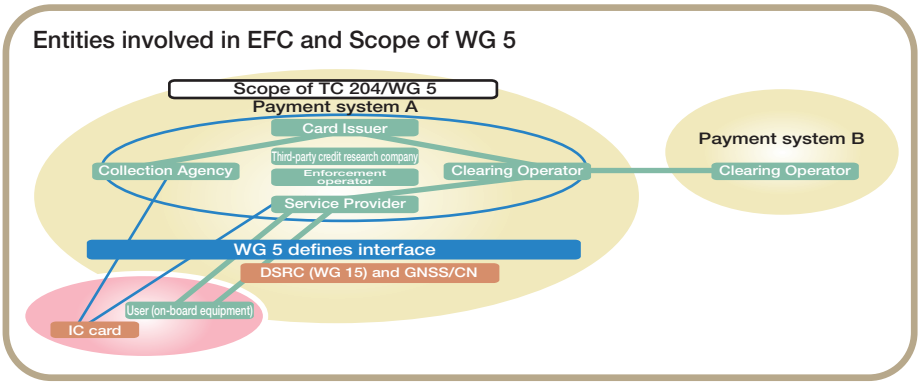
List of WG 5 work items

		Standardization themes	ISO Number	Content
	1	EFC – Application interface definition for dedicated short-range communication	ISO 14906	Prescription of data structures, commands and other factors to ensure the interoperability of EFC applications for DSRC based EFC
★	2	EFC – Test procedures for user and fixed equipment-Part 1 to 2	ISO 14907	Part 1 defines procedures and conditions for tests of EFC-related equipment. Part 2 defines conformance tests for on-board equipment, conforming to the EFC application interface definition (ISO 14906).
	3	EFC – Systems architecture for vehicle-related tolling-Part 1 to 3	ISO 17573	Definition of reference architecture for the entire EFC system and prescription of frameworks of various EFC-related conditions
★	4	EFC – Guidelines for security protection profiles	DIS 17574	Provision for EFC security establishment in reference to IEC 15408 (IT security evaluation standard)
★	5	EFC – Security framework	ISO 19299	Prescribe the framework to develop EFC security system by risk assessment and definition of system model.
	6	EFC – Application interface definition for autonomous systems	ISO 17575	Prescription of data structures, commands and other factors to ensure the interoperability of EFC applications for autonomous systems (GNSS/CN)
★	7	EFC – Interface Definition for on-board Account Using Integrated Circuit Cards	ISO 25110	Interface definition between roadside equipment and on-board equipment using IC cards that enable reading and writing of EFC information and account information on IC cards
★	8	EFC – Compliance Checking of autonomous systems over DSRC	ISO 12813	Checking the correct charging of autonomous EFC OBE by downloading the vehicle data via DSRC initiated by roadside equipment.
	9	EFC – Information exchange between service provision and toll charging	ISO 12855	Describes the information flow between EFC service providers and parties who charge fees.
★	10	EFC – Localisation augmentation communication for autonomous systems	ISO 13141	Describes the communication requirements for enhancing the locating function of OBE for the autonomous system (GNSS/CN) using DSRC
	11	EFC – Evaluation of on-board and roadside equipment for conformity to ISO TS 12813-Part 1 & 2	ISO 13143	Defines conformity evaluation methods for the interfaces defined in TS 12813 (Compliance check communication for autonomous systems) between OBE and roadside equipment
	12	EFC – Evaluation of on-board and roadside equipment for conformity to ISO TS 13141-Part 1 & 2	ISO 13140	Defines conformity evaluation methods for the interfaces defined in ISO 13141 (Localization augmentation communication for autonomous systems) between OBE and roadside equipment
	13	EFC – Evaluation of equipment for conformity to TS 17575-1 to 3	ISO 16407 TR 16401 ISO 16410	Conformity evaluation methods for TS 17575 (Application interface definition for autonomous systems) Part 1: Charging, Part 2: Communication and connection to the lower layers, Part 3: Context data
	14	EFC – Charging performance part 1 & 2	AWI 37444	EFC performance standard (metrics) and inspection framework will be merged with parts 1 and 2 as ISO 37444, and work has begun on adding EFC using vehicle number plate information.
★	15	EFC – Interface definition between DSRC-OBE and external in-vehicle devices	DIS 16785	Interface for extending DSRC OBE to autonomous systems (EFC using GNSS/CN)
★	16	EFC – Investigation of EFC standards for common payment schemes for multi-modal transport services	TR 19639	Scheme for the common use of cards and other media for transport services
★	17	EFC – Investigation of charging policies and technologies for future standardization	TR 21190	Proposing new work items based on research on new toll policy and corresponding technologies that are under consideration for adoption in all countries.
★	18	EFC – EFC support for traffic management	TS 21192	Define the data exchange between each entity relating to the architecture such as creating a common conceptual model for traffic management by charging.
★	19	EFC – Requirements for EFC application interface on common media	TS 21193	In accordance with the proposals in TR 19639, describes the requirement and data definition of common media for allowing common usage among various modes of transportation.
★	20	EFC – EFC Personalization of onboard equipment-Part1 to 3	DIS 21719-1 TS 21719-2 TS 21719-3	Describes a method of setting up EFC on-board equipment: Part 1 defines its framework, Part 2 defines the setup via DSRC, and Part 3 defines the setup via IC card.
★	21	EFC using car number information Pre-study on the use of vehicle license plate information and ANPR technologies	TR 6026	Technical report for further new proposals on EFC using Automatic Number Plate Recognition (ANPR) technology
	22	Image-based tolling systems – Testable and measurable characteristics	TR 25221	Analyzing images (of number plates) to be used for tolling systems, with the aim of identifying the locations (points) that were obtained in the images.
	23	Image-based tolling systems – Test suite structure and test purposes	NP 25588	Definition of the structure and purpose of test suites for images (of license plates) used to collect tolls.
	24	Support for road safety and traffic management	PWI 25609	Application of services for road safety through the use of the EFC framework and traffic management data.
	25	Continuous toll schemes	CD 25610	Preparation of a framework for new toll schemes based on distance travelled or involving connected vehicles.

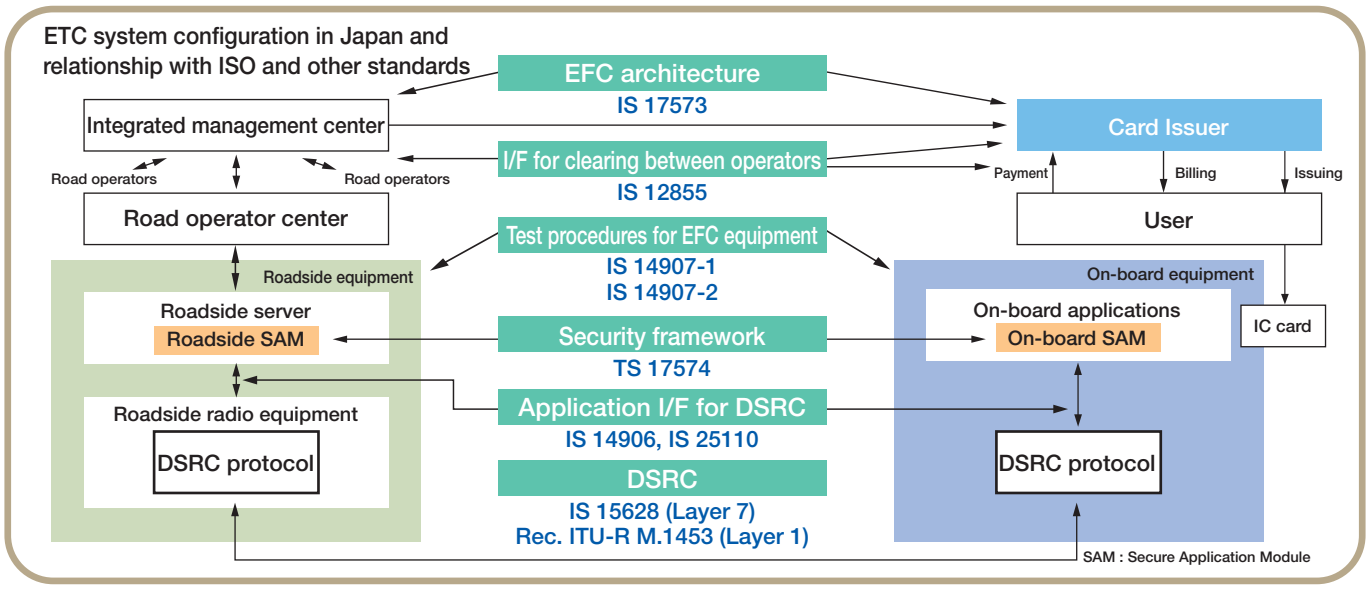
★ Item(s) that Japan is / has been actively working on

Overall Structure of EFC, Scope of WG 5, and DSRC method EFC

EFC-related entities include Card Issuers, Service Providers, Clearing Operators, and Collection Agencies, whose relationship is shown in the Figure on the right. WG 5 is working on the standardization of the EFC application interface (data elements, command definitions, and other factors) both for DSRC and GNSS/CN, which are means of communication between Service Providers and Users, and on the standardization of the test procedures and data security. Work on the standardization of DSRC has been completed by TC 204 WG 16 (former WG 15) and ITU-R SG 5.

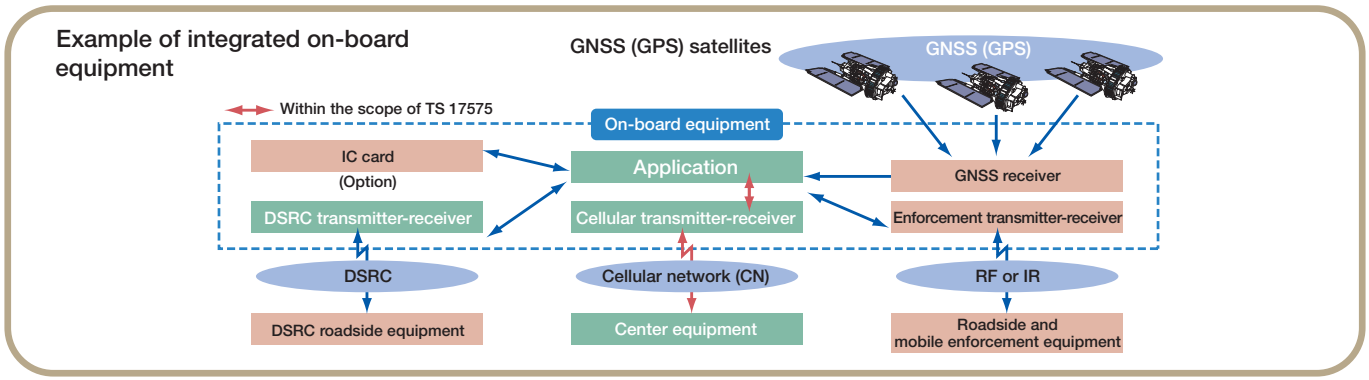


The figure below shows the ETC system configuration in Japan, and the corresponding ISO standards and ITU recommendations



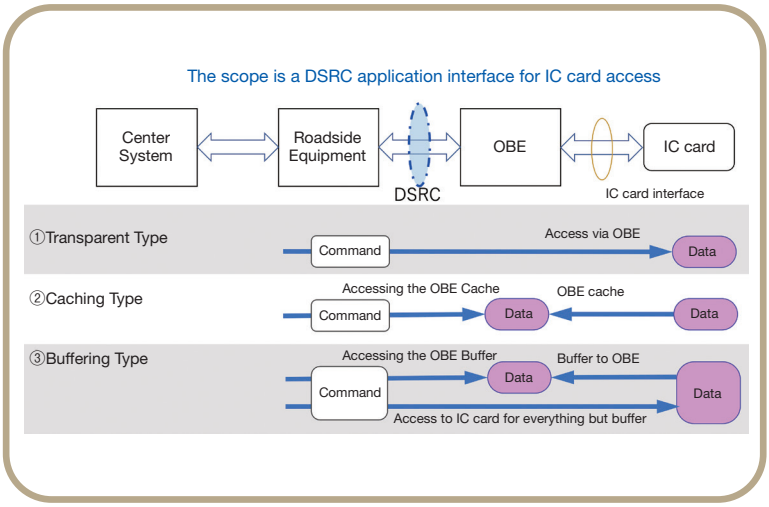
Application Interface Definition for Autonomous Systems (GNSS/CN) (ISO 17575)

The GNSS/CN based EFC was approved as a work item in 1997. The toll collection system for Heavy Goods Vehicles (HGV) in Germany since 2005, and Belgium since 2016 adopted this system. The OBE continuously positions the geodetic coordinates of the present location using a built-in GNSS (GPS) receiver, and collects tolls referring to tariff data. Various means of calculating these tariffs are available, including a method in which the tariff data is downloaded via a cellular network and processed on-board the vehicle, and a method in which position data is transmitted via the cellular network and processed at a Center. A variety of charging methods can be applied, such as zone charging for each virtual charging area entered, and distance-based charging applied to how far the vehicle has traveled. The Figure illustrates integrated on-board equipment both the GNSS/CN method and the DSRC method.



Interface definition for IC card-based OBE payments (ISO 25110)

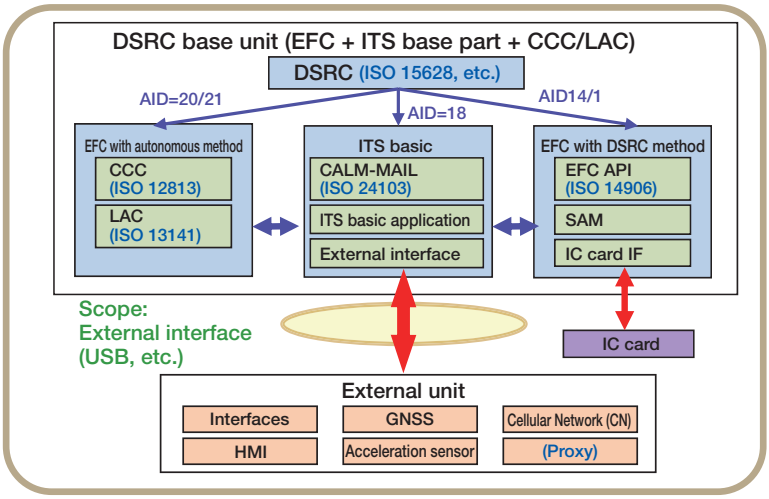
There are two major EFC-related charging methods. One is the central account system predominant in Europe and US, and the other is the on-board account system using IC cards, used in Japan, Korea and other Asian countries. The ISO 25110 application interface defines three types, (1) the transparent type (2) the caching type (3) the buffering type, that enables roadside equipment to access IC cards via DSRC and on-board equipment is modeled on the Japanese and South Korean ETC and other systems. Japanese ETC using the caching type provides a secure data handling mechanism by equipping a SAM (Secure Access Module) on the on-board equipment and retaining storing privacy information from an IC card in the SAM.



Interface definition between DSRC-OBE and external in-vehicle devices (DIS 16785)

Defines the application interface between the DSRC OBE and the external OBE when connected to achieve higher functionality and was officially published in 2014.

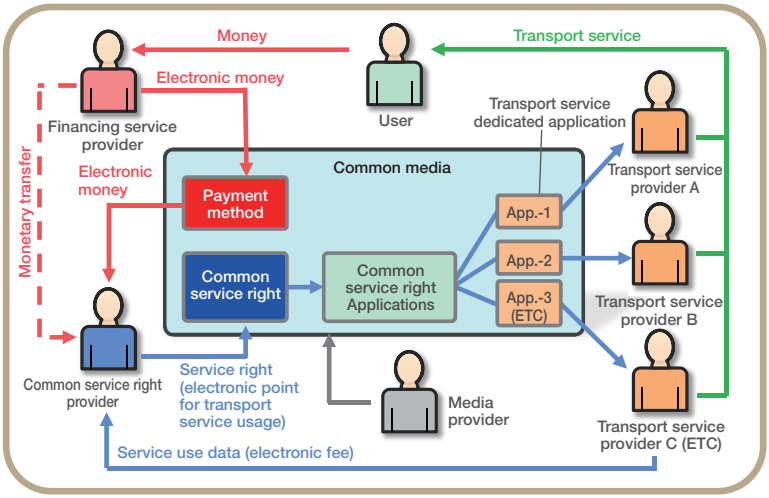
The OBE can also be used as an autonomous EFC OBE by connecting an external onboard device that implements a GNSS receiver module and a cellular communication module to the OBE. Thus, expandability can be provided by configuring the OBE with an external connection interface.



Common Payment Schemes for Multi-Modal Transport Services (TR 19639, TS 21193)

In Asian countries, there is a need to make payments with a single card for public transport, toll road and others. A common platform for inter-operable usage crossing over multiple transport services discussed in Urban ITS and Smart city, like MaaS, is anticipated for big data analysis in transport, for traffic demand management and for provision of incentives to users.

TR 19639 describes research into schemes allowing the use of ETC and/or public transportation cards as common payment media and proposes new work items. TS 21193 specifies the requirements and data definitions for EFC to media that can be shared amongst various types of transportation services.



Charging policy and technology (TR 21190)

While WG 5 has been working on the international standardization of EFC in DSRC and GNSS/CN methods to date, in recent trends in road pricing, new charging policies have been proposed and gradually brought into practical use with new technologies, including (1) toll method through guiding routes using ETC 2.0 in Japan, and (2) toll method using odometers in US In addition, the new technologies have been developed that can be applied to toll charging is under way, including 5th generation cellular and RFID adopted with high driving speeds. This work item warp up research on new toll policies and technologies enabling them to be adopted in many countries who are considering introducing them, and summarized new work items.

Relationship between charging policy and charging technology
(Portion applied with charging policy based on new technology becomes a new candidate item)

Charging technology \ Charging policy		Financing of road infrastructure			Traffic management	
		Toll road (ETC)	Inter-city road (Heavy goods vehicle charge)	All road	Urban road (Congestion Charge)	Inter-city road
ANPR: Automatic Number Plate Recognition					London Stockholm	
DSRC		World wide (More than 50 countries)	Austria, Czech Republic Poland, (Slovenia)		Oslo, Bergen, etc. Singapore	
GNSS	Cellular network		Germany, Slovakia, Hungary, Belgium, Russia, Bulgaria		(Singapore)	
	Odometer			USA Road Usage Charge		
	DSRC					Japan Smart route selection
RFID: Electronic tag		North America, South and Central America India, Taiwan, etc.				USA Express lane
WAVE: New DSRC		(South Korea)				
WIM: Dynamic load measuring apparatus		China				

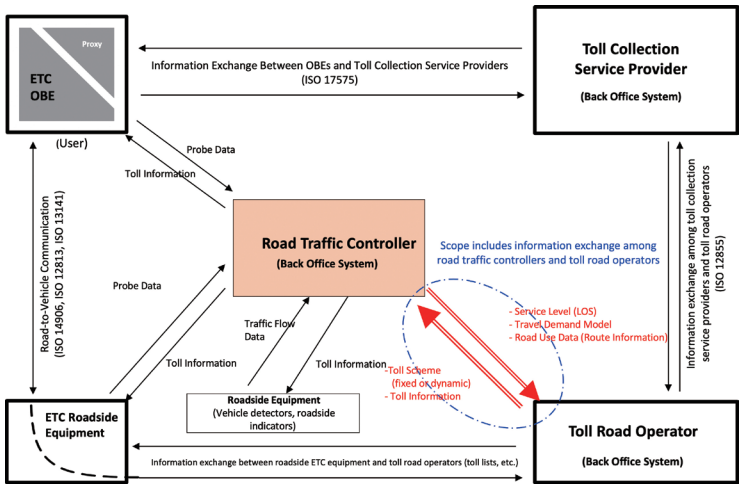
EFC based on existing technology

EFC based on new technology

Note: Countries in parentheses planning to introduce in near future

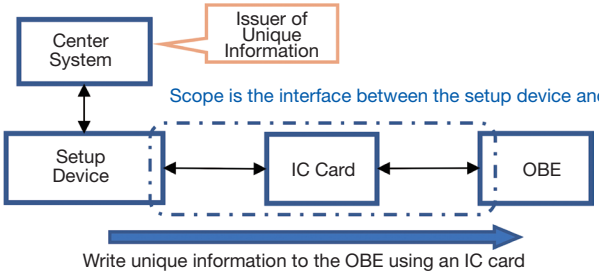
EFC support for traffic management (TS 21192)

This item was approved as a new work item that adding "Road & Traffic Manager" to the traditional EFC operation model and proposing the concept of a "traffic management via EFC support" service in collaboration with Toll Charger. Referring to traffic management such as smart route-selection and tolling discussed in Japan, ERP (Electronic Road Pricing) in Singapore and Express/HOT (High-occupancy toll) lane in US, this standard defines the common concept model of traffic management based on traffic-demand-dependent dynamic tolls and the data exchange between Road & Traffic Operator and Toll Charger.



EFC Personalization of On-Board Equipment Using an IC Card (TS 21719-3)

In order for a user to use on-board equipment, it is necessary to write unique information, such as the on-board equipment ID, to the on-board equipment. In Europe, standardization was also proposed for the unique information to be configured to enable a single OBE to be used for downstream billing across toll roads in multiple countries.Part 1 outlines the personalization of on-board equipment and Part 2 defines how to write unique information via DSRC adopted in Europe. Part 3 defines how to write unique information via IC card, which has been adopted in Japan, South Korea, and China.



Investigation of Test Methods for Image-Based Tolling Systems (TR 25221)

Image-based tolling systems – Testable and measurable characteristics

The purpose of CD 25221 is to analyze images (of number plates) to be used for tolling systems, with the aim of identifying the locations (points) that were obtained in the images. In this process, test methods for identifying number plate images in various countries are being investigated.

WG 7 General Fleet Management and Commercial/Freight

In WG 7, the transport of hazardous goods and freight multi-modal transport have been standardized (a merger of previous WG 6 (General Fleet Management) and WG 7 (Commercial/Freight) agreed upon at the Montreal meeting in November 1999). Specific work items being discussed for standardization include the operational monitoring of commercial freight vehicles, data dictionary and message sets for international multi-modal transport, and commercial freight vehicle monitoring.

List of WG 7 work items

		Standardization themes	ISO Number	Content
★	1	General fleet management and commercial freight operations – Data dictionary and message sets for electronic identification and monitoring of hazardous materials/dangerous goods transportation	ISO 17687	Definition of data dictionary and message sets supporting automatic identification, monitoring, and exchange of emergency response data for hazardous materials loaded on vehicles
	2	Electronic information exchange to facilitate the movement of freight and its intermodal transfer – Road transport information exchange methodology	AWI 24533-1 ISO 24533-2	Definition of data concept applied to freight multi-modal transport. Includes data exchanging message through transport interface along logistic chains.
	3	Electronic information exchange to facilitate the movement of freight and its intermodal transfer – Governance rules to sustain electronic information exchange methods	TS 17187	Definition of governance rules for electronically conducting organization process inter-connected by business entities for electronic commerce under secure and open environment through a standard framework of the data exchange.
★	4	Freight land conveyance content identification and communication	ISO 26683-1 ISO 26683-2 ISO 26683-3	Definition of application interface profiles and context for land transportation data exchange related to freight identification, package identification, container identification, and freight movement.
★	5	Automotive visibility in the distribution supply chain – Part 1: Architecture and data definitions	ISO 18945-1	Establishes the framework and architecture of data collection, and provides data definition for visibility of vehicles, self-driving construction machines, and agriculture machines in distribution supply chains.
★	6	Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV)	ISO 15638-1 to 27	Definition of collaborative telematics application of regulated commercial freight vehicles.
★	7	Framework that uses TARV as a secure vehicle interface.	TS 7815-1 TS 7815-2	Definition of a framework for regulatory bodies to collect data without going through a service provider

★ Item(s) that Japan is / has been actively working on

Data Dictionary and Message Sets for Electronic Identification and Monitoring of Hazardous Materials/Dangerous Goods Transportation (ISO 17687)

Subject to this standardization are the data dictionary and message sets for supporting the exchange of information on hazardous materials as well as automatic identification and monitoring.

Effects of standardization are:

1. Real-time information collection (identification of vehicles, information on hazardous materials)
2. Support for cooperation between control center operators and emergency responders on site (police, firefighters, etc.) when an accident occurs during hazardous material transport
3. Monitoring of physical conditions (temperature and pressure, etc.) during hazardous material transport

In Europe and the United States, intermodal transport involving ships, railways and trucks is common in hazardous material transport. These items destined to be standardized are considered effective in providing one-stop service at borders.

Electronic information exchange to facilitate the movement of freight and its intermodal transfer—Road transport information exchange methodology (ISO 24533)
Electronic information exchange to facilitate the movement of freight and its intermodal transfer—Governance rules to sustain electronic information exchange methods (TS 17187)

Work is progressing on the standardization necessary for electronic information exchange between shippers and logistics operators in international multi-modal transport. Since it is difficult to unify the international logistics data standards that differ by country and transport mode, a new concept called Electronic Supply Chain Manifest (ESCM) has been developed.

Freight land conveyance content identification and communication, architecture, reference standards, and monitoring (ISO 26683-1, -2, -3)

The system architecture for cargo management in surface transport aims to standardize application profiles (usage) applied to international multi-modal transport through the combined use of existing international standards and other rules, and to standardize the monitoring architecture for freight tracking. Part 3 has been published on May 10, 2019.

Automotive visibility in the distribution supply chain - Part 1: Architecture and data definitions (ISO 18495-1)

It is intended for the international standardization of monitoring systems encompassing identification (ID) and database (types of data: what, when, where, and how) for the transport of fully assembled vehicles, from delivery from the factory until the time of sale.

Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) (ISO 15638-1 to 27)

This set of standards is applied to the framework for conducting data collection/value information provisioning services assuming a system to provide users (freight operators) with regulatory and operational information through installation of vehicle sensors and GPS reception equipment in regulated commercial freight vehicles and transmission of data generated by these devices to service providers. It includes authentication for private ITS providers. It is also assumed that information regulatory violations be provided by service providers to the regulatory authorities. In Europe and the United States, operational management of commercial vehicles is being conducted through making the adoption of digital tachographs mandatory (use of a next generation tachograph was mandated in Europe on June 15, 2019).

At the April 2015 Hangzhou meeting, Part 20: Weigh in motion (proposed by the EU) and Part 21: Enhancements using roadside sensors (proposed by Japan), at the October 2016 Auckland meeting, Part 22: Vehicle stability monitoring, and at the April 2019 Florida meeting, Part 24: Safety information provision were proposed and approved as new work items and created as ISO standards.

In the future, the ISO 15638 series is supposed to enable driver management, operational management and weight monitoring of heavy vehicles, and stable driving through combination of standards for each Part. The intention is to make it a valuable standard to improve efficiency of urban logistics.

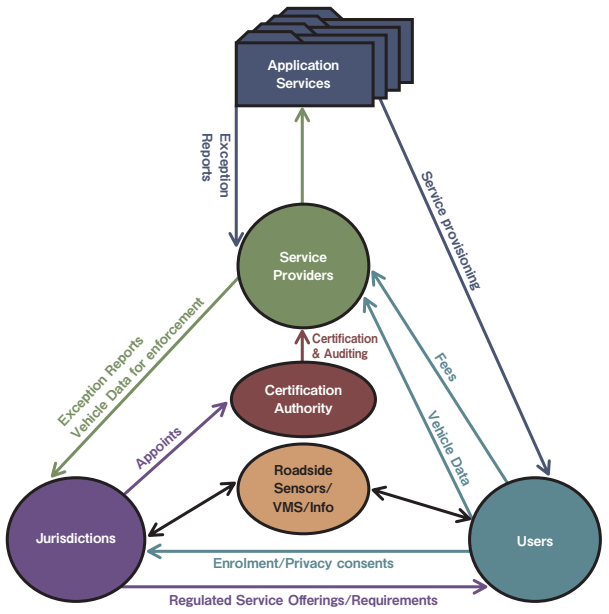
Part 21 is a standard that contributes to the worldwide deployment of the Japanese ETC 2.0 service by standardizing cases of use of onboard and roadside equipment.

Part 22 is a framework for monitoring freight balance and informing the driver of the state of freight to protect heavy vehicles from the risk of rollover accidents. Part 24 provides a variety of information necessary for safe driving.

Part 25 will be a standard for a system for providing clearance information to heavy vehicles, preventing collisions with bridge girders. Part 26 is a framework for monitoring charging data while driving.

Part 27 is a framework for monitoring fleets that use automated driving.

Figure Framework diagram of ISO 15638



15638 series

ISO Number	Title
ISO 15638-1	Framework and architecture (Under revision)
ISO 15638-2	Common platform parameters using CALM
ISO 15638-3	Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services
TS 15638-4	System security
ISO 15638-5	Generic vehicle information
ISO 15638-6	Regulated applications
ISO 15638-7	Other applications
ISO 15638-8	Vehicle access management
TS 15638-9	Remote electronic tachograph monitoring (RTM)
ISO 15638-10	Emergency messaging system/eCall (EMS)
ISO 15638-11	Driver work records (work and rest hours compliance) (DWR)
ISO 15638-12	Vehicle mass monitoring (VMM)
TS 15638-13	'Mass' information for jurisdictional control and enforcement (MICE)
ISO 15638-14	Vehicle access control (VAC)
ISO 15638-15	Vehicle location monitoring (VLM)
ISO 15638-16	Vehicle speed monitoring (VSM)
ISO 15638-17	Consignment and location monitoring (CLM)
ISO 15638-18	ADR (dangerous goods) transport monitoring (ADR)
TS 15638-19	Vehicle parking facilities (VPF)
ISO 15638-20	Weigh-in-motion (WIM) monitoring
ISO 15638-21	Enhancements using roadside sensors (ERS)
ISO 15638-22	Vehicle stability monitoring
ISO 15638-23	Tire monitoring
ISO 15638-24	Safety information provision
ISO 15638-25	Vehicle tall clearance monitoring
TS 15638-26	Electric vehicle dynamic charging monitoring
NP 15638-27	Operation status monitoring for fleets using automated driving

WG 8 Public Transport and Emergency

WG 8 is responsible for the standardization of information relating to public transport and emergency vehicles. Public transport includes not only buses, trams, and trains, but also ride sharing and similar services.

One example of a specific standardization item is the work on Interoperable Fare Management Systems (IFMS) led by CEN. That work involves building public transport fare systems that can be operated by multiple operators across different types of transport services. Such systems not only make fare payment more convenient for users of public transport, but also help simplify the handling of fares for operators.

Mobility as a service (MaaS) has been growing worldwide. In addition, interest in traveler information has been rising, leading to the use of systems capable of providing various transport services. This makes it necessary to keep a close eye on those trends and consider standards.

The global increase in travel demand has increased the number of travelers to not only Japan, but also various other countries. This means public transport plays a greater role in providing safe and convenient transportation for such travelers.

List of WG 8 work items

		Standardization themes	ISO Number	Content
★	1	Data dictionary and message sets for pre-emption and prioritization signal systems for emergency and public transport vehicles (PRESTO)	ISO 22951	Definition of the data dictionary and message sets to give right-of-way priority to emergency and public transport vehicles going through a signalized intersection
★	2	Public transport – Interoperable fare management system – Part 1: Architecture	ISO 24014-1	Definition of conceptual architecture to establish a public transport fare management system that accommodates multiple operators and services
★	3	Public transport – Interoperable fare management system – Part 2: Business practices	TR 24014-2	Description of the set of rules necessary for implementing IFMS based on the architecture defined in Part 1, and the relationships among these rules
	4	Public transport – Interoperable fare management system – Part 3: Complementary concepts to Part 1 for multi-application	TR 24014-3	Definition of the business practices within applications and interoperability among applications in the multiple application environment
★	5	Public transport user information – Part 1: Standards framework for public information systems	ISO 17185-1	Comprehensive standard covering the information provided to public transit users in various countries and regions
	6	Public transport user information – Part 2: Public transport data and interface standards catalogue and cross reference	TR 17185-2	Standardization of interfaces to provide information to travelers and definition of protocols for cross referencing
★	7	Public transport user information – Part 3: Use cases for journey planning systems and their interoperation	TR 17185-3	Definition of use cases for journey planning systems and of their interoperation
	8	Emergency evacuation and disaster response and recovery – Part 1: Framework and concept of operation	TR 19083-1	Standard for evacuation and restoration in emergencies
★	9	Interoperability between IFM systems and NFC mobile devices	TR 20527	Definition of the interoperability between IFMS systems and mobile equipment using near field communication devices
	10	Common transport service account systems – Part 1: Framework and use cases	TR 21724-1	Definition of framework and use cases for the accounting system for public transport payment
	11	Performance testing for connectivity and safety functions of automated driving buses - Part1: General framework	ISO 21734-1	Definition of the framework related to the connectivity and safety of automated buses that communicate with road infrastructure such as signalized intersections, crossings, bus stops
	12	Performance testing for connectivity and safety functions of automated driving buses - Part 2: Performance requirements and test procedures	NP 21734-2	Definition of performance requirements and test methods to ensure the connectivity and safety of automated driving buses
	13	Performance testing for connectivity and safety functions of automated driving buses - Part 3: Service framework and use cases	DTR 21734-3	Definition of the service framework and use cases for supporting automated buses
★	14	Role model for electrified driving public transit charging monitoring	NP 25611	Basic role model for electrified driving public transit charging monitoring

★ Item(s) that Japan is / has been actively working on

The Importance of Public Transport

The reason WG 8 is targeting public transport for standardization is the awareness that growing dependence on personal road vehicles for travel and the transport of goods is having a severe impact on society and daily life and has become unsustainable. Reducing dependence on personal vehicles will require making spread out, low-density cities denser and more compact, and initiating a transition from the current dependence on personal road vehicles to modes of transportation such as walking, cycling, and public transit. Such actions will also contribute to solving environmental issues.

However, personal road vehicles feature door-to-door delivery and excellent comfort, and are also viewed generally less expensive than using public transit in terms of direct costs borne by the vehicle user during travel.

Boosting the appeal of public transit (lower fares, enhanced ride comfort, higher speed) is an effective measure to encourage a transition to such transportation. Information plays a crucial role in enhancing appeal, and advances in ICT have made it possible to obtain information such as public transportation fares and networks, connections, required time, and congestion before or during a trip, and then select the optimal route or means of transportation.

Making public transit significantly more appealing calls for taking advantage of information and communication technology to provide inexpensive, seamless mobility for everyone. The MaaS services operated in various countries can be seen as a precursor to such new forms of public transport.

At the same time, automobile sharing is becoming more common in various countries, as is the introduction of bus rapid transit (BRT) and similar systems featuring excellent transport capacity and convenience. WG 8 must address all these trends.

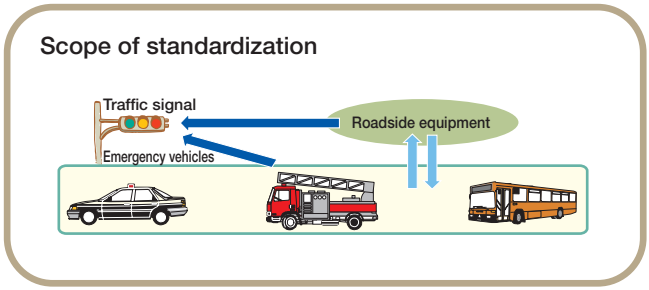
Pre-emption and Prioritization Signal Systems for Emergency and Public Vehicles: PRESTO (ISO 22951)

PRESTO is designed to exchange data efficiently for traffic signal pre-emption and prioritization so that public transport vehicles such

as emergency vehicles, buses and trams can cross roads or pass intersections preferentially over other vehicles. Data is exchanged principally between vehicles and roadside units. The scope of WG 8 standardization is the message sets and data dictionary in the mobile communication domain.

Specifically, the system uses the location, speed, destination, direction taken at intersections (going straight, left or right turn), and other information about the emergency vehicle to control traffic signals (e.g., extending green time or shortening red time) and enable that vehicle to pass through intersections safely and quickly. The system also notifies other vehicles and pedestrians of the approach of an emergency vehicle to prevent hindrances to that vehicle.

It is currently at the SR stage, and the integration of policies to carry out vehicle-to-vehicle communication and exchange information is under consideration.



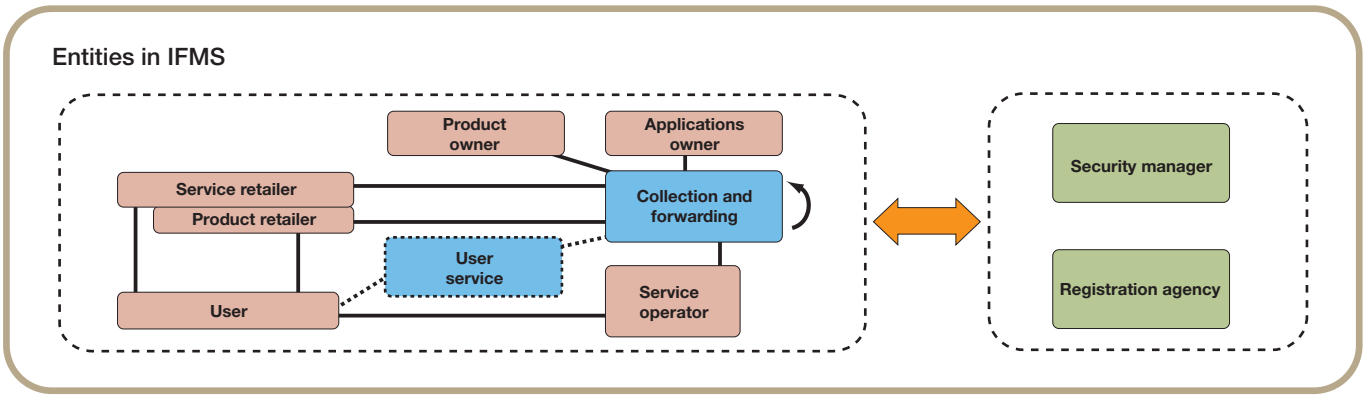
Interoperable Fare Management System: IFMS (ISO 24014)

An interoperable fare management system (IFMS) is a conceptual architecture for the overall coordination of related systems to realize efficient operation and management of fare collection through IC cards and other payment methods in railways, buses, and other types of public transport. In Europe, standardization efforts are carried out by CEN/TC 278/WG 3, and WG 8 has decided to collaborate with CEN in that respect given the major social significance of IFMS. This standard will make the payment of fares for users of public transport both simpler and more efficient.

The standard consists of three parts. Part 1 defines the architecture, and Part 2 describes the set of rules necessary to operate an actual IFMS based on the architecture from Part 1. Finally, Part 3 describes the business practices and interoperability of applications in a multi-application environment.

This standard is referred in Suica, Pasmo, and other schemes widely used in Japan.

In contrast, since Europe does not have a common pan-European payment protocol, work on standardizing cEMV (contactless Eurocard, Mastercard and Visa Card) is currently under way.



Public Transport User Information (ISO 17185)

The TransModel formulated by CEN was originally intended as the basis to assess a reference model concerning information related to public transport. However, due to preparation clearly requiring time and effort, Japan proposed drafting a comprehensive standard encompassing information on users of public transport for various countries, and that proposal was accepted.

The standard encompasses the Japanese standard in addition to the European TransModel and the US PTCIP.

Performance Testing for Connectivity and Safety Functions of Automated Driving Buses (IS 21734)

This standard will establish test procedures for connectivity and safety in the operation of automated buses that communicate with roadside infrastructure at signalized intersections, crosswalks, bus stops, and critical points along bus routes.

The standard consists of three parts.

- Part 1 prescribes a framework and operational scheme for public transit that makes use of automated buses, and defines the functions and requirements for applicable transport services. The elements of the system include automated buses, the transport infrastructure, monitoring centers, and passengers.
- Part 2 defines the requirements related to connectivity and safety to ensure the reliability of public transport that uses automated buses. It also standardizes the performance test methods and test procedures enabling the safe operation of automated buses providing public transit.
- Part 3 prescribes use cases to support automated buses. This part will serve to measure the effectiveness of, and implement any necessary improvement in, public transport supported by automated buses.

WG 9 Integrated Transport Information, Management and Control

WG 9 is working on the standardization of traffic management (traffic information and control, etc.) Specifically, it is working on the systematization of information and standardization of communication systems between traffic management centers, between centers and roadside modules, and between roadside modules, to enable efficient data exchange and to provide information to outside organizations.

List of WG 9 work items

		Standardization themes	ISO Number	Content
	1	Data interfaces between centres for transport information and control systems – Part 2: AP-DATEX	ISO 14827-2	Definition of a DATEX-ASN-based communication protocol between centers for transport information and control systems
★	2	Data interfaces between centers for transport information and control systems – Part3: Data interfaces between centers for intelligent transport systems (ITS) using XML (Profile A)	ISO 14827-3	Definition of an XML-based communication protocol between centers for transport information and control systems
	3	Data interfaces between centers for transport information and control systems – Part3: Data interfaces between centers for intelligent transport systems (ITS) using XML (Profile B)	TS 14827-4	Definition of an XML-based communication protocol between centers for transport information and control systems
★	4	Data exchange involving roadside modules communication	ISO 15784-1, 2, 3	Application profile of communication between roadside modules
	5	Integrated transport information, management and control – Data quality in ITS systems	TR 21707	Definition of data quality for ITS
	6	Interface protocol and message set definition between traffic signal controllers and detectors (IPMSTSCD)	ISO 10711	Definition of interface and message set between vehicle detectors and traffic signal controllers
★	7	The use of simulation models for evaluation of traffic management systems – Input parameters and reporting template for simulation of traffic signal control systems	TR 16786	Specification of input parameters and report templates in evaluating signal control systems through simulation
★	8	Definition of data elements and data frames between roadside units and signal controllers for cooperative signal control	ISO 19082	The definition of a use-case, requirements and data concepts for traffic signal control, incorporating probe data
	9	Data interfaces between centers for transport information and control systems – Platform independent model specifications for data exchange protocols for transport information and control systems	TS 19468	Platform independent model specifications for data exchange protocols for transport information and control systems
	10	Roadside modules SNMP data interface	ISO 20684-1 TS 20684-2 to 7,10	Definition of application interface using SNMP between roadside modules and the center
★	11	Roadside modules AP-DATEX data interface	ISO 22741-1 TS 22741-2,10	Definition of application interface using DATEX-ASN between roadside modules and the center
	12	Field device Simple Network Management Protocol (SNMP) data interface	TS 26048-1,3,18	Definition of application interface with roadside modules using SNMP
	13	Smart streetlighting management platform for road traffic safety enhancement	TR 19482	Stipulations for a system platform that uses lighting to show cautions or other messages on the road surface.
	14	Integrated transport information, management and control – General information of audio-based artificial intelligence (AI) road hazard information system (ARHIS)	TR 24853	Stipulations for a system platform that analyze the road conditions from sound by using AI and provide drivers with cautions.
★	15	A survey of signal intersection data specifications for traffic management and mobility services	TR 25971	Signalized intersection data specifications for traffic management and mobility services.

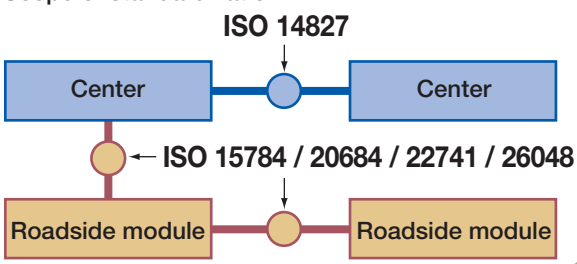
★ Item(s) that Japan is / has been actively working on

Scope of standardization

The scope (center-to-center, centers-to-roadside) of standardization that WG 9 is working on is shown in the Figure. Centers refer to transport management centers. Roadside modules include signal control devices, information boards and sensors installed along roads.

Ensuring interconnectivity is one advantage of promoting the standardization of information and communication between centers as well as centers and roadside modules. It also reduces the risks involved in purchasing modules by procurers, and in development by module suppliers.

Scope of standardization



Definition of data elements and data frames between roadside units and signal controllers for cooperative signal control (ISO 19082)

Taking advantage of the ability to collect probe data through V2I communication, this document aims to facilitate the building of a signal control system by standardizing the data that can be used to control traffic signals based on vehicle detector and probe data.

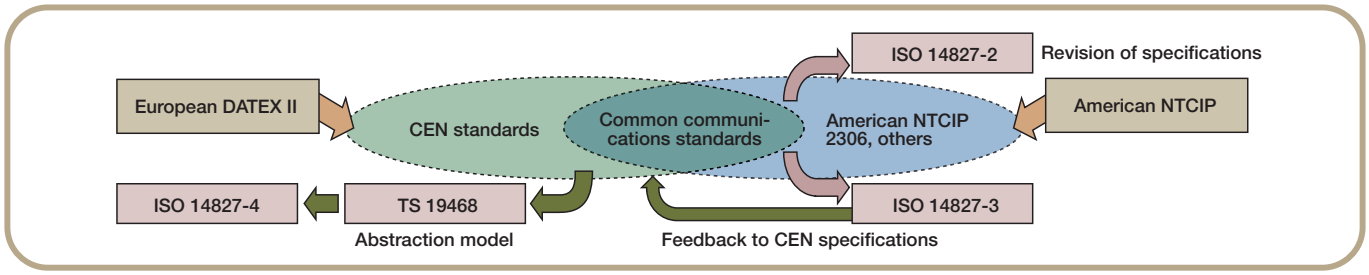
The document proposed by Japan was issued as a TS in 2020, and discussions on updating it to an IS are underway.

Communication between centers (ISO 14827, TS 19468)

Communication between centers is aimed at information exchange between traffic management centers, in which information collected by one transport management center is exchanged with neighboring centers, enabling the implementation of extensive transport management. WG 9 stipulates the definition forms of messages and the protocol for the exchange of messages of communication between centers.

First, Japan led the way in the publication of ISO 14827 Parts 1 and 2, which stipulate an application protocol called DATEX-ASN. Thereafter, Part 3, which defines an XML-based protocol that merges the European DATEX II and the U.S. NTCIP standards for communication between centers, was also published. A subsequent review led to withdrawing Part 1 and issuing a revised Part 2 in 2022.

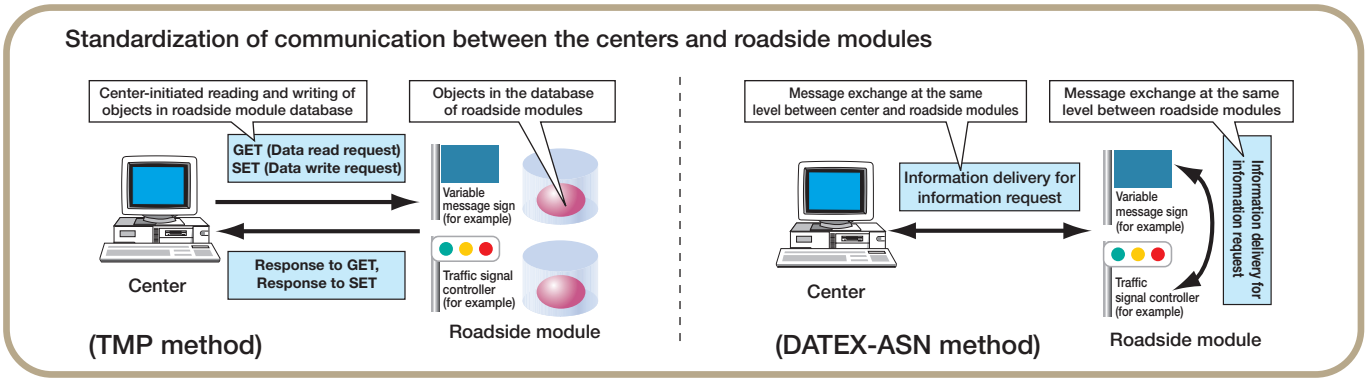
Part 4, which defines a SOAP-based protocol, has been issued. This protocol is compliant with the TS 19468 standard that specifies a platform-independent abstraction model based on DATEX II and was published under European leadership.



Communication between centers and roadside modules (ISO 15784)

Regarding the communication between centers and roadside modules, this standard specifies an array of underlying standards for the upper layer 3 of OSI, and defines application profiles for their use.

Specifically, Parts 2 and 3 which, respectively, specify the Transportation Management Protocols (TMP) stipulated as part of the National Transportation Communication for ITS Protocol (NTCIP) US communication standard and the DATEX-ASN stipulated in ISO 14827-2 for communication between centers, have been issued. Part 2 was revised in 2024 to comply with the latest security methods.



Communication Interface between centers and roadside modules (ISO 20684, ISO 22741 TS 26048)

This item aims to standardize the data set used between centers and roadside modules, as well as between roadside modules themselves, using the application profiles defined in ISO 15784.

The SNMP-based 20684 series led by the United States and the DATEX-ASN protocol-based 22741 series led by Japan are being discussed in parallel. Parts 1 to 7 and Part 10 of the 20684 series were published by 2022, but are now being restructured under the 26048 series for harmonization with NTCIP. In contrast, Parts 1 and 2 of the 22741 series were published by 2024.

Moreover, Korea proposed the standardization of communication with visual message signs using both methods, and Part 10 of the 22471 series was issued in 2024. Part 3 of the 26048 series is currently under assessment.

Interface protocol and message set definition between traffic signal controllers and detectors (ISO 10711)

In the context of communication between vehicle detectors and signal control units, the scope of this item is to standardize data sets concerning the measurement data and vehicle detector settings data used to generate signal control data parameters.

The standard includes two protocols, one involving the simultaneous bulk transmission of all items, and the other based on dividing items into groups and transmitting them separately. Japan was an active proponent of the transmission in groups protocol, which was released as an IS in 2012.

WG 10 Traveler Information Systems

Traveler information systems, subject to standardization by WG 10, constitute a core part of ITS. This working group has work items designed to study data dictionaries and message sets to provide information to drivers through various communication media, such as FM broadcasting, DSRC, and digital broadcasting. Recently, the Transport Protocol Experts Group (TPEG) has stepped up its UML modeling activities.

List of WG 10 work items

		Standardization themes	ISO Number	Content
	1	TTI messages via traffic message coding	ISO 14819-1	Coding protocol for the RDS-TMC
			ISO 14819-2	Event and information codes for the RDS-TMC
			ISO 14819-3	Location referencing for the RDS-TMC
			ISO 14819-6	Encryption and conditional access for the RDS-TMC
★	2	Intelligent transport systems – Graphic data dictionary	ISO 14823	Specification for road traffic signs and designs code data dictionary codes
			TR 14823-2	Example of road traffic signs and designs data dictionary codes transmission message description
	3	Traffic and Travel Information via Transport Protocol Experts Group	TS 18234-1	TPEG1 binary version; Introduction, numbering and versions
			TS 18234-2	TPEG1 binary version; Syntax, semantics and framing structure
			TS 18234-3	TPEG1 binary version; Services and network information
			TS 18234-4	TPEG1 binary version; Road Traffic Message (RTM) application
			TS 18234-5	TPEG1 binary version; Public Transport Information (PTI) application
			TS 18234-6	TPEG1 binary version; Location referencing applications
			TS 18234-7	TPEG1 binary version; Parking information
			TS 18234-8	TPEG1 binary version; Congestion and travel time application
			TS 18234-9	TPEG1 binary version; Traffic event compact
			TS 18234-10	TPEG1 binary version; Conditional access information
			TS 18234-11	TPEG1 binary version; Location Referencing Container
			TS 24530-1	TPEG XML version; Introduction, common data types and tpegML 1
			TS 24530-2	TPEG XML version; Location referencing
			TS 24530-3	TPEG XML version; Road traffic message
			TS 24530-4	TPEG XML version; Public Transport Information
			ISO 21219-1	TPEG2 UML version; Introduction, numbering and versions
			ISO 21219-2	TPEG2 UML version; UML modeling rules
			ISO 21219-3	TPEG2 UML version; UML to binary conversion rules
			ISO 21219-4	TPEG2 UML version; UML to XML conversion rules
			ISO 21219-5	TPEG2 UML version; Service framework
			ISO 21219-6	TPEG2 UML version; Message management container
			ISO 21219-7	TPEG2 UML version, Location referencing container
			ISO 21219-9	TPEG2 UML version; Service and network information
			ISO 21219-10	TPEG2 UML version; Conditional access information
			ISO/AWI TS 21219-13	TPEG2 UML version; Public transport information
			ISO 21219-14	TPEG2 UML version; Parking information application
			ISO 21219-15	TPEG2 UML version; Traffic event compact
			ISO 21219-16	TPEG2 UML version; Fuel price information application
			ISO 21219-17	TPEG2 UML version; Speed information
			ISO 21219-18	TPEG2 UML version; Traffic flow and prediction application
			ISO 21219-19	TPEG2 UML version; Weather information
			ISO 21219-21	TPEG2 UML version; Geographic Location Referencing
			TS 21219-22	TPEG2 UML version; OpenLR Location Referencing
			TS 21219-23	TPEG2 UML version; Road and multimodal routes application
			TS 21219-24	TPEG2 UML Version: Light encryption for TEPG
			ISO 21219-25	TPEG2 UML Version: Electromobility charging infrastructure
			TS 21219-26	TPEG2 UML Version: Vigilance location information
			ISO/AWI TS 21219-27	TPEG2 UML Version: Information on driving restrictions

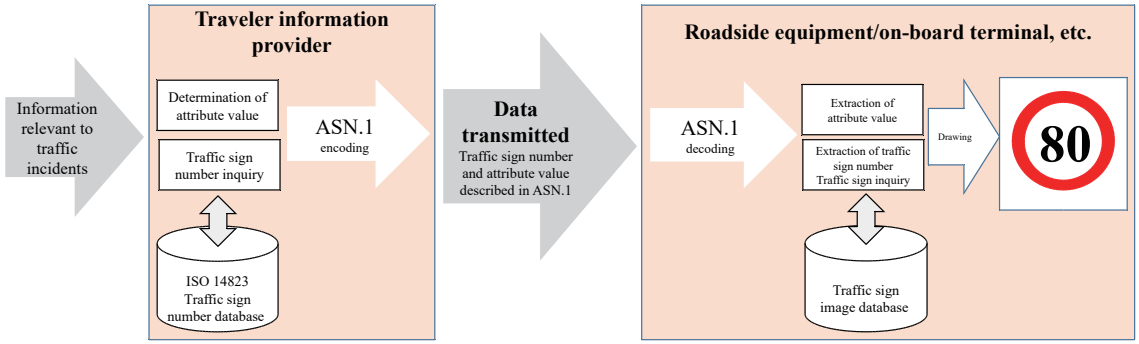
Note: TTI: Traffic and Travel Information, RDS-TMC: Radio Data System-Traffic Message Channel
★ Item(s) that Japan is / has been actively working on

Graphic Data Dictionary (ISO 14823)

This work item involves the standardization of a graphic data dictionary (GDD) of pictograms, including road traffic signs and designs. The GDD codes are provided by traffic information providers or traffic control centers to display the appropriate pictogram on variable information boards or on-board displays. Since pictograms vary from one country to another, the standard is strictly limited to covering the codes corresponding to the pictogram (code 11348 for road work, for example) and its attributes (e.g., time, distance, direction, vehicle width, and vehicle height), but not the graphic form of the pictogram. The ISO 14823-1 standard was published in May 2024.

Furthermore, examples of codes and attributes described in ASN.1 were published as a TR (14823 Part 2).

Example of the flow of data and processing with respect to IS 14823 (in the case of variable speed restrictions)



TTI Messages Using Broadcasting-Type Digital Media (TS 18234-1 to 11, ISO/TS 21219-1 to 27, TS 24530-1 to 4)

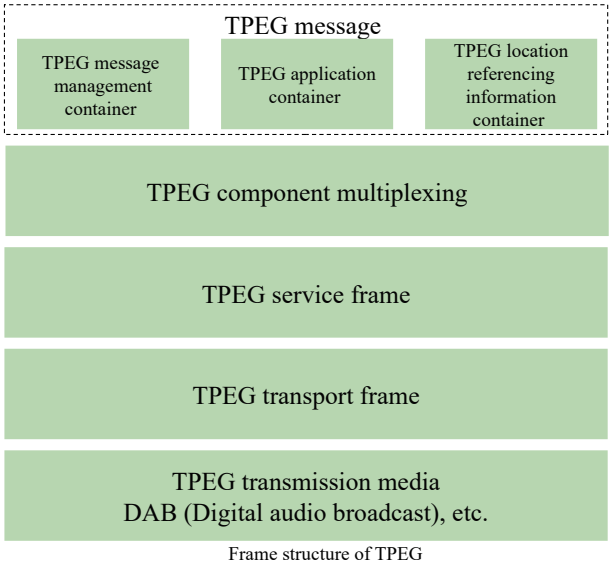
TPEG is a proposal to standardize a method of providing traffic information using high-speed digital data broadcasting.

Standardization of the next-generation TPEG2, which uses UML, is currently underway. Even as the European Traffic Information Service Association (TISA) is energetically working on those drafts, actual systems making use of TPEG are becoming more widespread, particularly in Europe and North America.

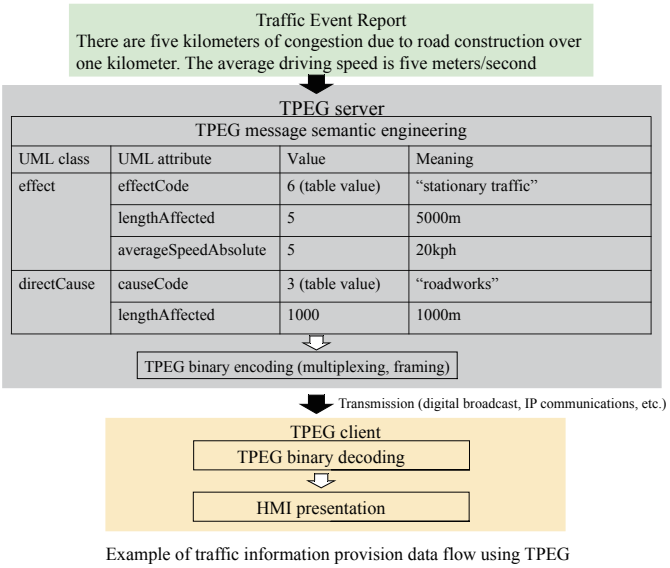
TPEG messages are comprised of the TPEG message management container which manages the application's generation time and version, the TPEG application container of the traffic event information (TPEG-TEC) and TPEG parking lot information (TPEG-PKI), etc., and the TPEG location referencing container concerning the location information for the events.

The figure shows examples of generation of traffic congestion information utilizing TPEG-TEC (TPEG traffic event compact).

When a traffic event report ("There are five kilometers of congestion due to road construction over one kilometer. The average driving speed is five meters/second") is transmitted to the TPEG server, binary data that has undergone semantic encoding, multiplexing, and framing in accordance with the UML specifications of TPEG-TEC is sent to the client via digital broadcast and IP communications, and after it is decoded the event information is displayed to the user.



Frame structure of TPEG



Example of traffic information provision data flow using TPEG

WG 14 Driving automation and active safety systems

WG 14 is working on the standardization of driving support systems and automated driving systems to reduce driver workload, improve convenience, raise awareness of danger, prevent accidents/mitigate damage and reduce CO_2 using advanced technologies. Vehicles equipped with systems such as Adaptive Cruise Control (ACC) and Forward Vehicle Collision Mitigation Systems (FVCMS)—standards created by WG 14—are available on almost all new vehicles in many countries.

Work items concerning automated parking and automated driving have been increasing, and standards on those topics are gradually being published.

Chaired by Japan, WG 14 includes many participating countries and is internationally recognized as one of the most active groups in TC 204.

List of WG 14 work items

		Standardization themes	ISO Number	Content
	1	Adaptive Cruise Control systems (ACC)	WD 15622	System for maintaining a certain distance from the vehicle ahead Consists of classification according to the existence of a clutch or active braking, and specification of control strategy, and driver intervention characteristics Revised to include ISO 22718 LSF (annulled) and ISO 22179 FSRA (annulled).
	2	Forward vehicle collision warning systems (FVCWS)	ISO 15623	System for preventing rear-end collisions by activating a warning whenever the vehicle in front is too close and prompting the driver to maneuver to avoid collision Consists of specification of detection range and performance, as well as evaluation methods concerning the vehicle ahead
★	3	Traffic Impediment Warning Systems (TIWS)	TS 15624	System that identifies obstacles in roads ahead of the vehicle through roadside sensors, and informs the driver using roadside message boards Has been established as TS as the infrastructure depends on unique factors that vary from one country to another
	4	Manoeuvring Aids for Low Speed Operation (MALSO)	ISO 17386	System to inform the driver of obstacles found at the rear or corners of the vehicle when backing up and turning at low speed Specification consists of classification based on detection areas, and specifications of system operation conditions, and test methods
★	5	Lane departure warning systems (LDWS)	ISO 17361	System to warn the driver of an actual or possible departure from a lane due to driver's inattention. Consists of specification of lane departure definition, warning conditions, and test methods
	6	Lane change decision aid systems (LCDAS)	DIS 17387	System to inform the presence of a vehicle in a blind spot or a vehicle approaching from behind when a driver is trying to change lanes Consists of classification based on areas covered, and specifications of warning conditions, and test methods
	7	Forward vehicle collision mitigation systems (FVCMS)	ISO 22839	System that automatically applies emergency braking to mitigate collision damage if there is a risk of collision with the vehicle ahead Operational concepts, system requirements, and evaluation procedures are specified
	8	Extended-range backing aid systems (ERBA)	ISO 22840	System to provide information on obstacles at the rear of the vehicle when backing up for a relatively long distance. Consists of specification of the obstacles concerned, detection area and system operation conditions, in comparison with MALSO
	9	Cooperative intersection signal information and violation warning systems (CIWS)	ISO 26684	System based on roadside and vehicle cooperation that displays current traffic light information on on-board equipment and uses it to activate a warning system if the driver is about to ignore a red light Specifies basic functions and information contents
	10	Curve speed warning systems (CSWS)	ISO 11067	System alerting the driver, using a navigation map for example, if a safe speed is exceeded as the vehicle approaches a curve Specifies system definition and required items
	11	Lane keeping assistance systems (LKAS)	ISO 11270	System that recognizes the lane markings and automatically controls steering to help keep the vehicle in it Specifies system definition and requirements
★	12	Assisted Parking System (APS)	ISO 16787	System that detects parking spaces and provides automatic steering while parking Specifies system definition and requirements
★	13	External hazard detection and notification systems (HNS)	ISO 18682	Specification of fundamental concepts for notifications and warnings in cooperative and autonomous systems
★	14	Pedestrian Detection and Collision Mitigation Systems (PDCMS)	CD 19237	System that automatically applies emergency braking to mitigate collision damage if there is a risk of colliding with a pedestrian ahead Operation concepts, performance requirements, and evaluation procedures are specified
★	15	Report on standardization for vehicle automated driving systems (RoVAS)	TR 20545	A technical report with a broad view of automated driving functions, with items to standardize spanning many fields.
★	16	Road Boundary Departure Prevention Systems (RBDPS)	ISO 19638	The system will control the vehicle's braking and steering to prevent departure from the road boundary.
	17	Cooperative Adaptive Cruise Control (CACC)	ISO 20035	The system maintains a suitable distance to the vehicle ahead using V2V and V2I communication with multiple vehicles and the infrastructure.
★	18	Partially Automated Parking System (PAPS)	ISO 20900	The system controls both the longitudinal and lateral movement of the vehicle during parking maneuvers. The driver remains in the car in Type 1, and remotely supervised by the drive outside the car in Type 2.
	19	Emergency Electronic Break Light systems (EEBL)	ISO 20901	The system warns the driver against danger caused by emergency braking of forward vehicles on the upcoming road.
★	20	Partially Automated Lane Change Systems (PALS)	ISO 21202	The system recognizes lane markings and conditions around the vehicle through sensors, and changes lanes automatically upon receiving instructions or confirmation from the driver.
	21	Partially Automated In-lane Driving Systems (PADS)	WD 21717	The system automatically controls the vehicle in longitudinal and lateral directions within the lane.
	22	Bicyclist detection and collision mitigation systems (BDCMS)	ISO 22078	System that automatically applies emergency braking to mitigate collision damage if there is a risk of colliding with a bicyclist ahead. Operation concepts, performance requirements, and evaluation procedures are specified.
	23	Low-Speed Automated Driving (LSAD) Systems for Predefined routes	ISO 22737	System that, in the limited operational design domain, automatically operates vehicles in low speed.
	24	Taxonomy and definitions for terms related to driving automation systems for on-road motor vehicles	CD TS 22736	Public available specifications describing taxonomy and definitions for terms related to driving automation systems for on-road motor vehicles. ISO and SAE work collaboratively on revision of draft of SAE issued standard.
★	25	Automated valet parking systems (AVPS) – Part 1: System framework, requirements for automated driving and for communications interface	ISO 23374-1	Defines a series of communication specifications for searching for parking facilities with available spaces, making reservations, and calling parked vehicles, as well as performance requirements and test methods for Level 4 automated driving in parking facilities.
★	26	Collision Evasive Lateral Manoeuvre system (CELM)	CD 23375	System using in-vehicle sensors that detects an object to be avoided and controls the lateral movement of the vehicle to avoid colliding with the object.
	27	Vehicle to Vehicle Intersection Collision Warning systems (VVICW)	ISO 23376	System using vehicle-to-vehicle communications that warns the driver if the vehicle is predicted to collide with another vehicle at an intersection in the direction that the vehicle is heading.
★	28	Motorway Chauffeur Systems – Part 1: Framework and general requirements (MCS-1)	DIS 23792-1	Stipulates the overall framework of systems for Level 3 automated driving on limited-access highways (Part 1) and functional requirements and test procedures for automated driving within a lane.
★	29	Motorway Chauffeur Systems – Part 2: Discretionary Lane Change (MCS-2)	DIS 23792-2	Adds functional requirements for lane changing off systems for Level 3 automated driving on limited-access highways and stipulates a test method for it.
	30	Minimal Risk Maneuver – Part 1: Framework, straight-stop and in-lane stop – Part 2: Road shoulder stop	ISO 23793-1 AWI 23793-2	A function to automatically achieve a minimal risk condition (MRC) when an automated driving system cannot continue to operate a vehicle. Part 1 specifies the framework and common requirements, and Part 2 specifies the requirements for systems that pull the vehicle over to the road shoulder.

List of WG 14 work items

		Standardization themes	ISO Number	Content
	31	Highly Automated Motorway Chauffeur Systems (HMCS)	CD 19484	Specifies functional requirements and test procedures for systems that perform Level 4 automated driving on motorways.
★	32	Truck Platooning Systems (TPS)	ISO 4272	Specifies functions for joining and leaving a platoon, functions for platoon maintaining control and communication information, and evaluation and testing methods for systems that manage platoon driving (multiple trucks maintaining a certain distance while driving in the same lane).
	33	Automated Braking during Low Speed Maneuvering (ABLS)	ISO 4273	Requirements and test method for braking operations to prevent contact with obstacles while driving at speeds of approx. 10 km/h (comments are being submitted for 10 km/h or more) or less for the purpose of parking.
★	34	Remote support for LSAD system (RS-LSADS) – Performance requirements, system requirements and performance test procedures	ISO 7856	Specifies requirements and test methods for mechanisms to support automated vehicles equipped with low-speed automated driving systems (LSADs), as standardized by ISO 22737, through remote driving or remote assistance.
★	35	Automated Valet Driving Systems (AVDS) – Part 1: Part 1: Requirements, System Framework, Communication Interfaces and Test Procedures	DIS 12768-1	Automated driving systems that expand the operational design domain (ODD) of automated valet parking systems (AVPS) from within the limitations of a parking area to, for example, the roadways between different parking areas
	36	Automated Valet Driving Systems (AVDS) – Part 2: System framework, security procedures and requirements	AWI 12768-2	Defines the necessary security requirements for AVDS.
	37	Operational Design Domain Boundary and Attribute Awareness for an Automated Driving System	CD 17720	Studies into the types of expected behavior of automated driving systems at the boundaries between areas in which automated driving is and is not possible
★	38	Acceleration control for pedal error – Performance, requirements and test procedures	PAS 19486	Specifications on warning the driver using a warning lamp in the instrument panel and a buzzer, as well as on automatically controlling engine output and the brakes to prevent collision with an object or excessive acceleration in the event that the driver erroneously presses the accelerator pedal.
★	39	Information interface framework between automated driving system and user	TR 19560	Organizes the set of information that is to be transmitted to the user by an active automated driving system (ADS) when necessary according to the urgency and importance of that information.

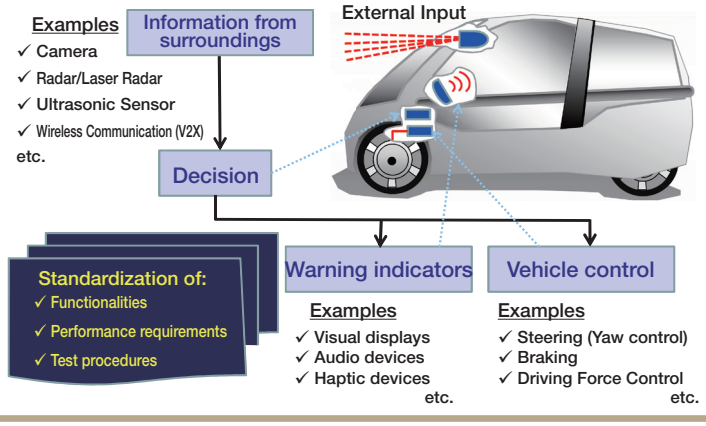
★ Item(s) that Japan is / has been actively working on

WG 14 is broad in scope, as it covers standalone/cooperative warnings and control systems, including vehicle control, sensing of the surrounding environment, communications, and presenting information to drivers, and the group has issued 31 international standards to date. We have 31 currently valid standards, and 17 currently under development.

WG 14 has also established collaborative relationships with standardization bodies including ETSI TC ITS*[1], SAE DSRC TC*[2], SAE ORAD TC*[3], and ISO/TC 22/SC 33*[4].

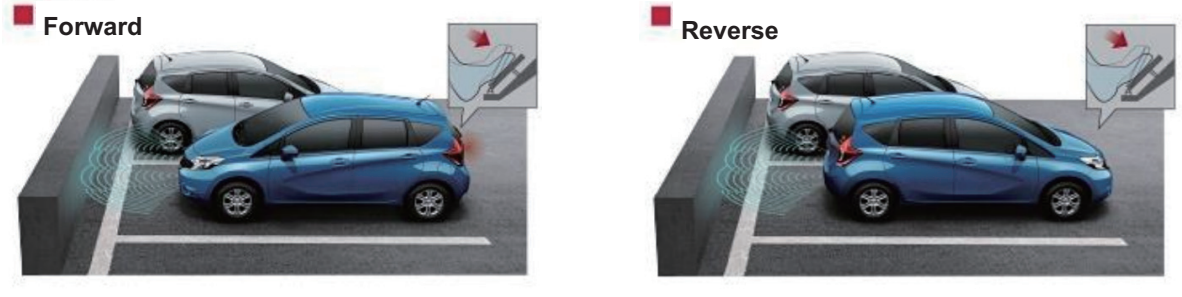
*1 European Telecommunications Standards Institute Technical Committee of ITS
*2 Dedicated Short Range Communication Technical Committee
*3 On-Road Automated Driving Technical Committee
*4 Road vehicles - Vehicle dynamics and chassis components

Scope of WG 14



CD/PAS 19486 Acceleration control for pedal error (ACPE)

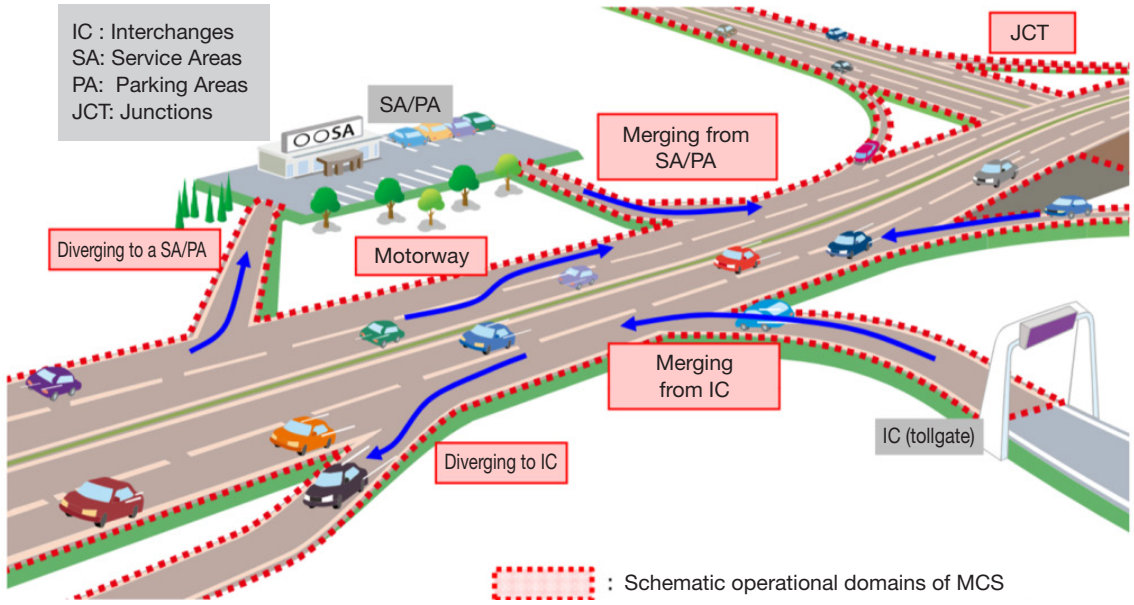
Drivers mistaking the accelerator for brake pedals, causing the vehicle to accelerate unintendedly and collide with an object, occur frequently. To mitigate damage in such a collision, ISO/PAS 19486 specifies functional requirements for Acceleration control for pedal error. The revised version will add expanded requirements for target objects and activation conditions based on the latest technologies.



DIS 23792-1 Motorway Chauffeur Systems (MCS) - Framework and general requirements (MCS Part 1)

DIS 23792-2 Motorway Chauffeur Systems - Lane change (MCS Part 2)

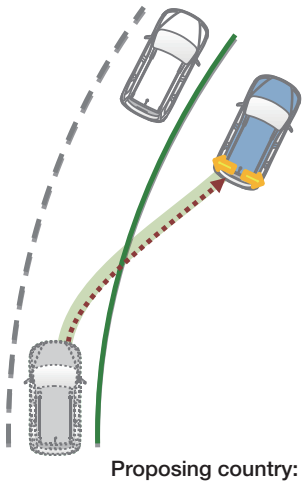
The practical application of Level 3 automated driving systems on motorways has started. On the other hand, it is expected that for the time being automated driving systems will be provided with limited capabilities such as operation under specified conditions taking into account the weather and traffic flow, and driving within single lanes. In addition to this, Level 3 systems assume that the user is ready to take over driving when the system stops operating, and it is important for the user to correctly understand the conditions under which the system begins and ends operation. This standard anticipates a multiple part configuration. Part 1 stipulates the overall configuration and common requirements along with performance requirements and test procedures for automated driving within a single lane. Part 2 adds performance requirements for lane changes to be added in the future, and stipulates the test procedures for these. Part 3 is being prepared as a TS and integrates the standardization of mandatory lane changes for merging.



Proposing country: Japan

AWI 23793-2 Minimal Risk Maneuver (MRM) for Automated Driving systems

Level 4 or above (and specified Level 3) automated driving systems are required to achieve the MRC (minimal risk condition) automatically when there is a system failure or when the vehicle deviates from the operational design domain. The action that should be taken (MRM = Minimal Risk Maneuver) differs depending on the extent of the system failure, and the environment in which the vehicle is placed, etc. This part covers the standardization of requirements and test procedures concerning stopping on the road shoulder as an extension of the MRM classification framework.



Proposing country: South Korea

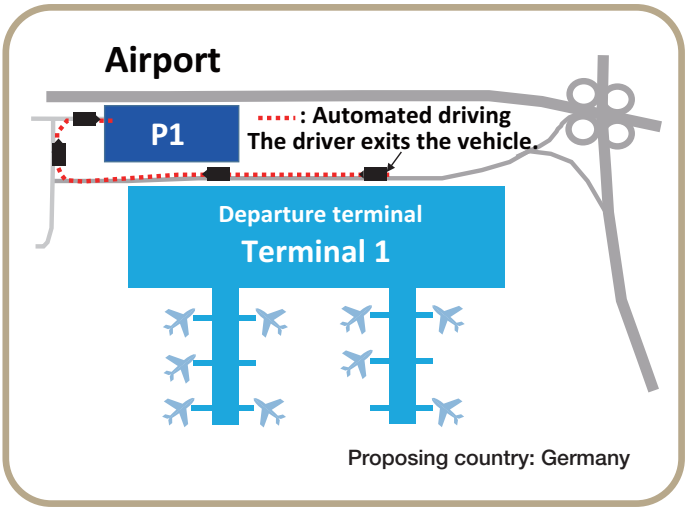
DIS 12768-1 Automated Valet Driving Systems (AVDS-1)

These are automated driving systems that expand the operational design domain (ODD) of automated valet parking systems (AVPS) from within the limitations of a parking area to, for example, the roadways between different parking areas.

Possible cases of this type of system are as follows. For example, after the driver and any other vehicle occupants exit a vehicle at the departure terminal of an airport, the on-board system cooperates with roadside infrastructure systems to autonomously move the vehicle to a chosen parking area. Or, after the vehicle is parked in this manner, the vehicle is moved autonomously to a maintenance area for services such as maintenance, charging, washing, or the like, before being returned autonomously to the original parking position.

The overall system configuration is basically the same as an automated valet parking system (AVPS), but requires high-level recognition and control performance due to the complexity of roadway profiles and routes.

If such systems become more widespread in line with AVPS, it may be possible to imagine substantial improvements in user convenience via greater vehicle usage efficiency, the implementation of related supplementary services, and the like.

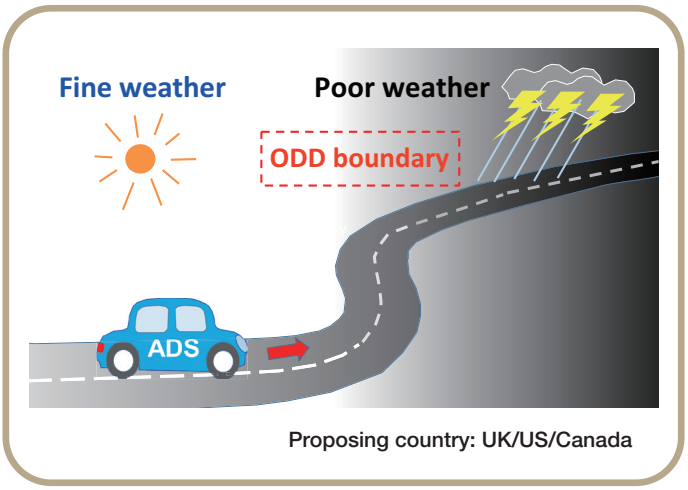


Proposing country: Germany

CD 17720 Considerations on automated driving systems (ADS) response to violations of operational design domain (ODD) boundary conditions

Although Level 3 automated driving systems have started to be practically adopted on motorways, fully automated driving in any location and under all environmental conditions still requires various technological breakthroughs. Consequently, automated driving will be limited to certain areas and certain environmental conditions for the foreseeable future.

This standard studies the types of expected behavior of automated driving systems at the boundaries between areas in which automated driving is and is not possible.



Proposing country: UK/US/Canada

CD 19484 Highly Automated Motorway Chauffeur Systems (HMCS)

Vehicles offering seat rearrangement and the possibility of storing the steering wheel as well as the accelerator and brake pedals to enhance occupant comfort during Level 4 automated driving on motorways are under consideration. This makes it critical to design the system to ensure safety is not compromised when the vehicle reaches the automated driving domain boundary, even in the event of a vehicle malfunction or occupant emergency.

Therefore, this standard specifies the functional requirements and test procedures for the means of providing information on boundaries defining whether automated driving is possible or not, emergency stop functionality in the event of a vehicle malfunction or occupant emergency, and also for a human machine interface that keeps occupants informed on their roles. This standard is expected to further enhance the convenience of automated driving.

Revising Already Published Work Items

The 15622 Adaptive cruise control systems (ACC), AWI 21717 Partially Automated In-Lane Driving Systems (PADS), AWI 19638 Road boundary departure prevention systems (RBDPS) items, all published in September 2018, as well as the AWI 23375 Collision evasive lateral manoeuvre systems (CELM) item published in February 2023, are all being reviewed to adapt them to the latest systems currently found on the market.

WG 16: Communications

WG 16 is involved in standardizing the communication systems used in ITS. This working group is holding deliberations on ITS Station Systems used in ITS communication and the DSRC inherited from the now disbanded WG 15 (Dedicated Short Range Communications), in addition to probe data systems.

List of WG 16 work items

		Standardization themes	ISO Number	Content
★	1	Wide area communication - Protocol management Information	ISO 15662	Defines a checklist for ITS applications in wide area communication systems between service centers and user terminals. Japan is taking the lead in preparing a draft standard
	2	Station and communication architecture	ISO 21217	Describes the architecture that forms the basis of the overall ITS communication system using ITS station, and specifies the station concept, function outline, communication scenario, etc.
	3	ITS Station Management	ISO 24102	Specifies management of all management entities in ITS station, and management functions for communication between different media
	4	Hybrid communications - Access technology support	ISO 21218	Specifies interfaces for third layer connections between different ITS station communication media, and interfaces for connecting to communication interface management entities
	5	CALM 2G., CALM 3G	ISO 21212 ISO 21213	Standardization of interfaces for receiving ITS services via 2nd and 3rd generation mobile communications. References existing mobile telephony standards and specifies a framework that complies with CALM.
	6	CALM IR	ISO 21214	Standardization of interfaces for receiving ITS services via infrared. Japan's optical beacon is outside of its scope
	7	ITS-M5	ISO 21215	Standardization of interfaces for receiving ITS services via CALM M5 5 GHz band. Uses IEEE 802.11p as a base
★	8	CALM MM	ISO 21216	Standardization of interfaces for receiving ITS services via millimeter waves
★	9	CALM MAIL CALM Media Adapted Interface Layer	ISO 24103	Specifies media conversion for the use of ASL (Application Sub-Layer; ARIB STD-T88 and ITU-R M.1453- 2) functions with DSRC that comply with ISO 15628 (DSRC L7)
	10	CALM ITS using public wireless networks – General requirements	ISO 25111	Specifies interface requirements for receiving ITS services using Mobile Broadband Wireless Access (MBWA)
	11	CALM WiMAX	ISO 25112	Standardization of interfaces for receiving ITS services using WiMAX (IEEE 802.16)
★	12	CALM HC-SDMA	ISO 25113	Standardization of interfaces for receiving ITS services using HC-SDMA (iBurst, etc.)
	13	CALM Applications using satellite	ISO 29282	Use of satellite communication for ITS
★	14	CALM IEEE 802.20	ISO 29283	Standardization of interfaces for receiving ITS services using IEEE 802.20
	15	CALM - Using broadcast communications	ISO 13183	Standardization concerning management interfaces and session connections required to receive broadcast communication in the CALM environment
	16	LTE	ISO 17515	Standardization of the use of LTE (Long Term Evolution) for ITS, and standardization of D2D and LTE-V2X communications
	17	CALM 6LowPAN	ISO 19079	Standardization for conformity between 6LowPAN, the Personal Area Network (PAN) network layer equivalent of short-range wireless networks, and CALM
	18	CALM CoAP	ISO 19080	Standardization for conformity between CoAP, a simplified, HTTP-like high level machine-to-machine (M2M) protocol, and CALM
★	19	IPv6 Networking	ISO 21210	Standard for functionality that achieves a seamless communication environment (handover between identical media, media switching, etc.) using IPv6
★	20	Non-IP networking	ISO 29281	Standardization of concepts, mechanisms and interfaces for non-IP communications in CALM
	21	Communication protocol messages for global usage	TS 16460	Method for interoperation and coexistence between WAVE (Wireless Access in Vehicular Environments) and CALM FAST
★	22	Application management	ISO 24101	Specification of mechanisms and conformance test to add, modify, or delete ITS applications using ITS Station
★	23	DSRC - DSRC application layer	ISO 15628	Interface for roadside-to-vehicle communication equivalent to communication protocol Layer 7 (including some functions equivalent to Layers 3 to 6)
★	24	Vehicle probe data for wide area communications	ISO 22837	Standardization of core data elements and typical probe messages for probe data services
★	25	Basic principles for personal data protection in probe vehicle information services	ISO 24100	Standardization of basic rules for the protection of personal information in probe data services
	26	Probe data reporting management	TS 25114	Examination of commands for directing uplink conditions to probe vehicles
★	27	Event based probe vehicle data	TS 29284	Standard concerning event-based probe data
★	28	Criteria for Privacy and Integrity protection in Probe Vehicle Information Systems	ISO 16461	Readjustment of anonymity requirements and evaluation criteria in probe data systems
★	29	Service architecture of probe vehicle systems	ISO 19414	Standardization of a service framework to examine the definition of service areas, use of common services and centralization of services in probe data systems Work item proposed by Japan
★	30	Pre-emption of ITS communication networks	TR 18317	Method for securing ITS communication networks during an emergency
	31	CALM Security considerations for lawful interception	TR 11766	Identification of the definition, architecture and mechanisms for lawful interception in ITS. Examination of elements (interfaces) for common use and general procedure for LI. TR (technical documents) issued
	32	Data retention for law enforcement	TR 11769	Identification of data retention methods associated with lawful interception. Examination of data types and schemes for retention
	33	ITS Safety and emergency messages using any available wireless media - Data registry procedures	ISO 24978	Standardization of message data registry used for vehicle collision notification via wireless communications
	34	Optical camera communication	ISO 22738	V2X communications using visible light communications
★	35	Use cases for sharing of probe data	TR 4286	Describes usage cases in which probe data such as ETC 2.0 is shared by various services
	36	Lower layer protocols for usage in the European digital tachograph	ISO 4426	Lower layer standard for usage in European digital tachographs that use DSRC
★	37	ITS communication role and functional model	TR 17732	Descriptions of the roles and functional models in ITS communication
	38	Station unit requirements	AWI 23708	Definition of the station requirements being promoted under METR as general ITS station requirements (TS publication planned)

★ Item(s) that Japan is / has been actively working on

Protocol Management Information (ISO 15662)

Shows the information items necessary for data exchange relying on long-range communications in ITS applications. This information serves as meta-information (attribute information) for messages defined by the TC 204 WGs, and functions as a checklist when creating systems that process those messages. It was issued as an IS in 2006.

- Selection of a communications system (Response speed, directivity, use environment, service area, service time, band and connection cost)
- Application identifier (Message ID, message number and message transmission time)
- Address (Sender and destination)
- Priority (Interruption processing and blocking control)
- Security (Mutual authentication, data authentication and hiding)
- Execution of application (Reasonable time, timestamp and objective range)

Architecture

Since around 2000, WG16 has developed a number of international standards based on the “CALM (Communications Access for Land Mobiles)” concept, which enables continuous handover while freely using various wireless communication media in ITS. The “CALM” name is currently being removed in conjunction with document revisions, but the concept is being developed with ITS Station as its core.

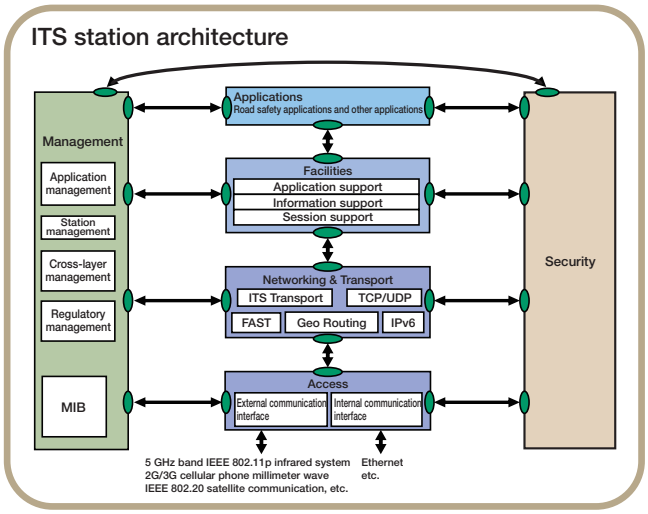
Station/Communication Architecture (ISO 21217)

The Station/Communication architecture standard (ISO 21217) specifies the ITS station and reference architecture for communication, and plays an important role as the core ITS communication standard that uses ITS station.

ITS communication system consists of four subsystems: roadside equipment, on-board equipment, personal devices and the central system. Subsystems include an ITS station, which necessary for communications. The ITS station is configured in accordance with the reference architecture shown in the Figure on the right.

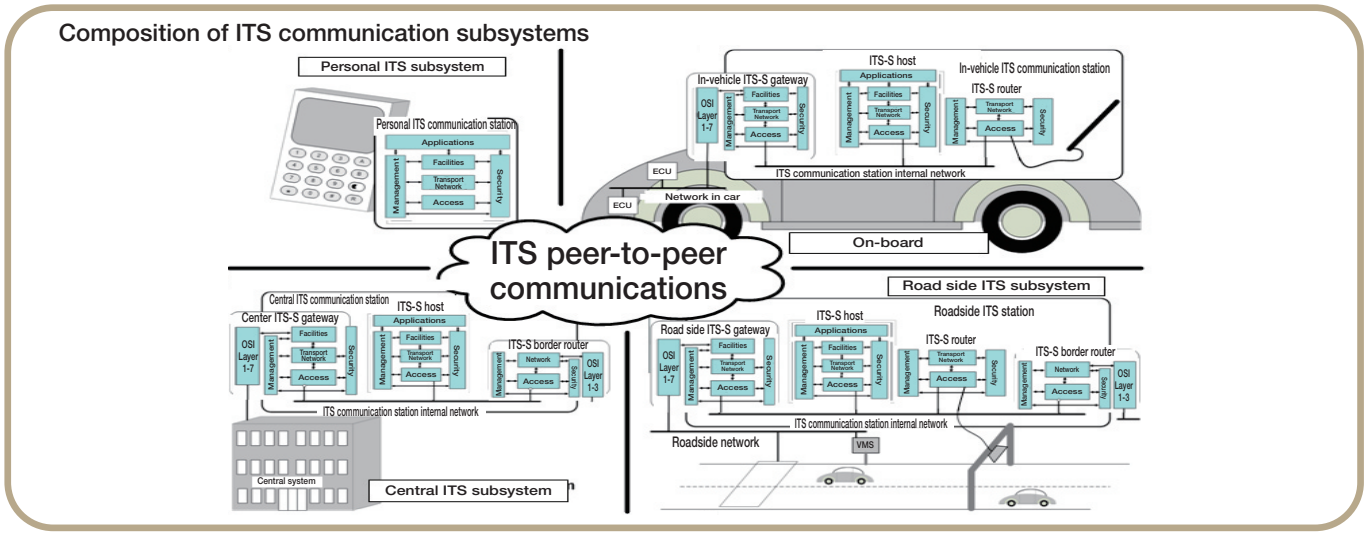
ITS stations feature various communications formats. The architecture standard divides them into 16 communications classes, depending on whether or not 1) multihop communications are used, 2) IPv6 or a non-IP protocol is used for the network layer, 3) handover is conducted, and 4) there is an Internet connection.

Handover, the functional feature that defines CALM, is performed not only between identical types of communication media but also between different ones. Handover is one of the functions that characterize this standard.



ITS Station Management (ISO 24102)

This was made an IS in 2010 with the aim of organizing all aspects of management entities and communications between media. In a subsequent revision, the standard was subdivided into six separate standards to create detailed definitions for ITS station communication functionality, Currently, five of these have been registered as WG 16 standards.



Media (Lower Layer)

Multiple media can use ITS station, with more to be added based on future technological advances or changes in demand.

MSAP (ISO 21218)

Standardization work focusing on service access point specifications acting as interfaces between different communication media, the upper layer, and the management entities. It was issued as an ISO standard in 2008, and later renamed (Hybrid communications - Access technology support).

ITS- M5 (ISO 21215)

Among existing ITS communication media, wireless LAN technology-based M5 is expected to play a central role.

In 2004, work on IEEE 802.11p was launched as an official IEEE 802.11 task group. Using this as a base, functional parts adapting it for use with ITS Station were added, and an ISO standard was issued in 2010. Descriptions were added, and renamed (Localized communications -- ITS-M5) in 2018.

IR (ISO 21214)

Standardization work was led by Austria and Germany, and an ISO was established in 2006. It is used to check for fraudulent practices in systems using GNSS/cellular (GNSS/CN) for heavy vehicle charges. It clarifies characteristics of the standard that uses a method different from the optical beacon already in wide use in Japan. A new revision was published in 2015.

MM (ISO 21216)

At the Chengdu meeting in 2002, an editor from Japan was elected. The physical layer was determined based on examining relevant system case studies and investigating millimeter-wave communications and application characteristics. It was made an ISO standard in 2012. Revisions have been discussed since 2015. Revision is currently being examined.

2G, 3G (ISO 21212, ISO 21213)

This is a standard for interfaces for the use of 2nd and 3rd generation mobile communications for CALM. This was established as an ISO standard in 2008.

MAIL (ISO 24103)

Following the development of DSRC as ITS 5 GHz band media, 5GHz band DSRC is used in many regions including ARIB STD-T75 in Japan (standardized as ISO 15628).

The method of using DSRC as CALM communication media was standardized as CALM MAIL (Media Adapted Interface Layer) by referring to ARIB STD-T88 (ASL: Application sub-layer), and was issued as an ISO standard in 2009. DSRC, which is already used as ITS communication, can be applied to ITS station to enable use of a wider range ITS stations.

ITS using public wireless networks

Since around 2005, wireless broadband communication, which allow IPbased high-speed, high volume data process, has been gaining attention. An examination of CALM-MWB aimed at making use of its performance and functionality in the ITS field has been launched. In 2007, the name of the item was changed to “CALM-ITS using public wireless networks” to allow a broader, more comprehensive examination of wireless systems.

- General requirements for using public networks (ISO 25111)
  CALM ITS using public wireless networks - General requirements (ISO 25111)
- Mobile wireless broadband using IEEE 802.16e using IEEE 802.16g (ISO 25112)
  Mobile wireless broadband using IEEE 802.16e/IEEE 802.16g (WiMAX) (ISO standard published in 2010)
- Mobile wireless broadband using HC-SDMA(ISO 25113)
  Mobile wireless broadband using ANSI ATIS HCSDMA (iBurst) (ISO 25113 published in 2010)
- Mobile Wireless Broadband applications using Communications in accordance with IEEE 802.20 ISO 29283
  ITS-CALM Mobile wireless broadband using IEEE 802.20 (625k-MC mode/Wideband mode)
  (ISO standard published in 2011)

Satellite (ISO 29282)

Standardization for using satellite communications in ITS stations, which started based on a study of the European SISTER project. It was published as an ISO standard in 2011.

Broadcast (ISO 13183)

UK proposed standardization for an interface to use broadcast communications (DAB, DVB, etc.) with ITS stations. It was published as an ISO standard in 2012.

LTE (ISO 17515)

Standardization is being conducted to adapt LTE (E-UTRAN) 3.9th generation mobile communications to ITS station. As a first step, Part 1, which concerns the standardization of general usage, has been published. The standard for ad hoc communication of D2D (Device-to-Device) was issued as Part 2, and the standard on its application to V2X communications was published as Part 3. The base refers to the 3GGP standard.

Optical camera communication (ISO 22738)

This is designed to communicate by receiving the blinking state of a light source, such as LED, through an optical camera. This communication method uses the blinking pattern of a light source, and a similar technology has also been adopted in Japan.

Network

Network (ISO 21210)

This standard will provide functionality to achieve a seamless communication environment (handover between identical media, media switching, etc.) using ITS station with IPv6. It will take into consideration the Internet and IPv6.

Media selection through CALM CME

A CME (CALM System Management Entity) standard for functionality was studied that selects appropriate media by comparing the application’s media requirements with media properties and characteristics. The results of the CME study will be transferred to ISO 24102 for conformity with non-IP communications.

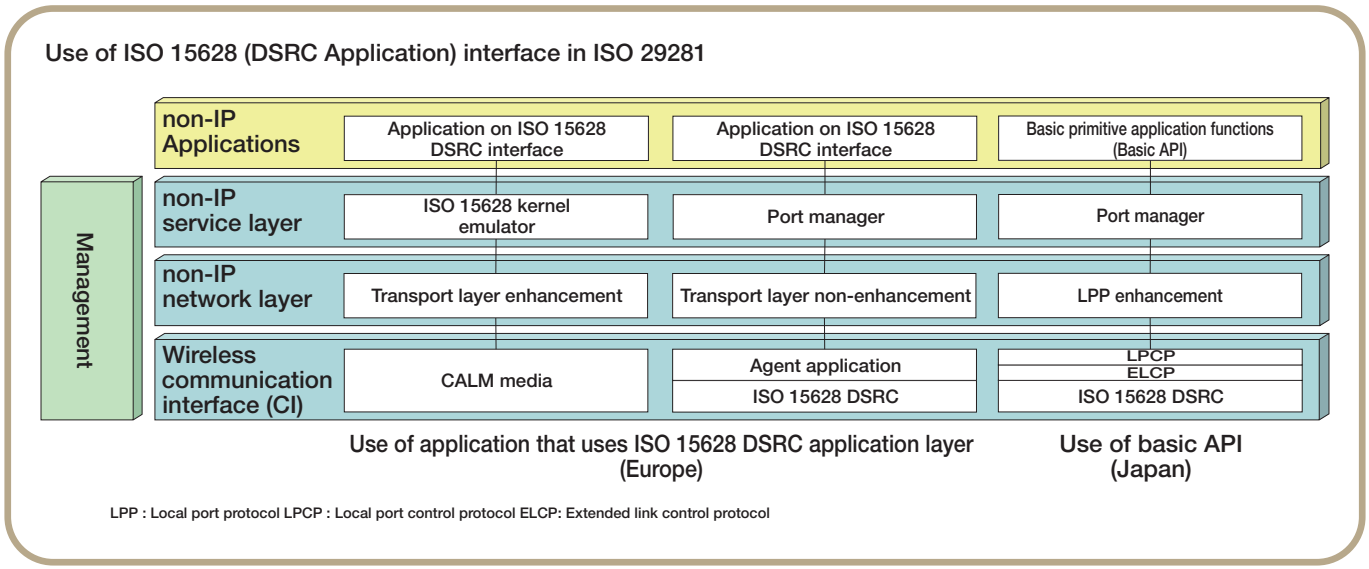
Non-IP networking (ISO 29281)

CALM non-IP (ISO 29281)

The CALM FAST subsystem was proposed as a PWI at the Cape Town meeting in 2006, and subsequently renamed to CALM non-IP communication mechanisms. The standardization plan is under examination in the context of the operating conditions and mechanisms for roadside and onboard equipment required to provide immediate and reliable roadside-tovehicle as well as vehicle-to-vehicle communications using CALM. The examination assumes non-IP communication concepts and mechanisms other than Internet-based network communications. In that context, it also emphasizes the inclusion of existing systems, such as the CEN and Japanese DSRC systems, to ensure that the effective use of such systems is taken into consideration.

Japan's DSRC and the basic API is the Japanese DSRC usage system

described in ARIB STD-T88 (Association of Radio Industries and Businesses), DSRC basic application interface specifications (ITS Info-Communications Forum) and joint research into next generation road service provision systems (National Institute for Land and Infrastructure Management, Ministry of Land, Infrastructure, Transport and Tourism (MLIT) and 23 private companies). By positioning this as an ITS station-related international standard, it puts Japanese technology in the global spotlight, and is expected to ease coordination between countries in terms of technological cooperation and the adoption and deployment of technology. First issued as an ISO standard in April 2011, it was reissued in two parts in April 2013.



Dedicated Short Range Communication (DSRC)

Dedicated Short Range Communication (DSRC)

Short-range data communication used in ITS applications such as ETC is called Dedicated Short Range Communication (DSRC). The actual operating range is covered by the OSI (Open Systems Interconnection) seven-layer model communication protocol. Standardization of the radio communications protocol corresponding to Layer 1 was conducted by ITU-R, and the recommendation, which includes Japanese and European protocols, has been approved. ISO is focused on standardization of Layer 7.

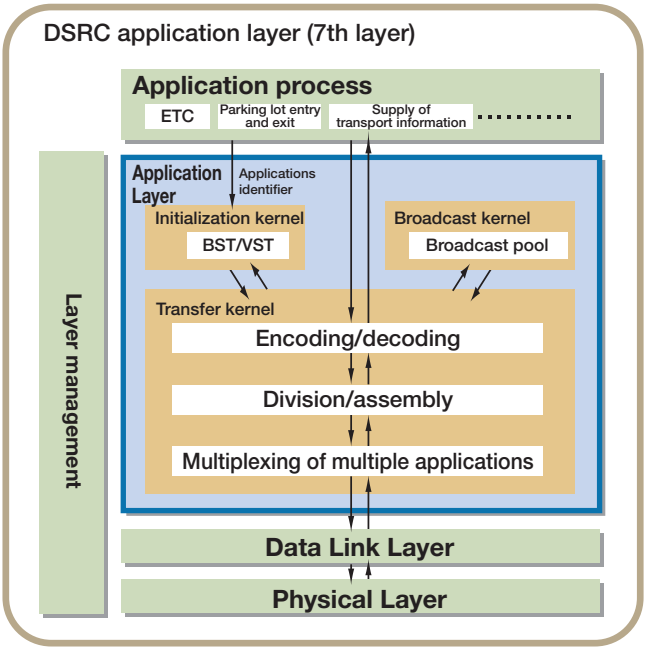
In parallel with international standardization work, the standardization of DSRC was promoted in member countries and regions. Europe adopted the 5.8 GHz passive DSRC (CEN DSRC) as a standard (EN), while the 5.8 GHz active DSRC standard (ARIB STD-T75) was established in Japan. Many countries have been considering adopting DSRC, with some exceptions like Italy installing their own local systems.

In Japan, the ASL (Application Sub Layer) standards and basic application interface technical specifications have been positioned above the 7th layer.

DSRC application layer (ISO 15628)

In DSRC, Layers 3 to 6 are usually omitted so that vehicles moving at high speeds can communicate directly with road side equipment within a limited communication range. The functions required by these layers are included in the application layer. Various applications are available through DSRC, and an application entity identifier (AID) is stipulated in the application layer. Roadside or on-board application processes specify the AID to communicate with the opposite (on-board or roadside) process via layers at or below the application level. Communication functions are performed mainly by the transfer kernel. These functions include information encoding/decoding, division/assembly of fixed frames and multiplexing/subdivision of data from multiple applications.

Japan took the lead in drafting this work item in the former WG 15 (disbanded in 2014, with this standard transferred to WG 16), which incorporates requests from various countries and regions. The ISO



standard was published in 2007. A revision was subsequently issued in 2013, and a new review was initiated in June 2025. Since this standard is the base for the application of 5 GHz band DSRC in Japan and other countries, also references many other standards, it is crucial to closely examine how those are impacted by the review and ensure the process assesses any necessary updates to related standards in addition to revising this one.

Communication lower layer of European digital tachographs (ISO4426)

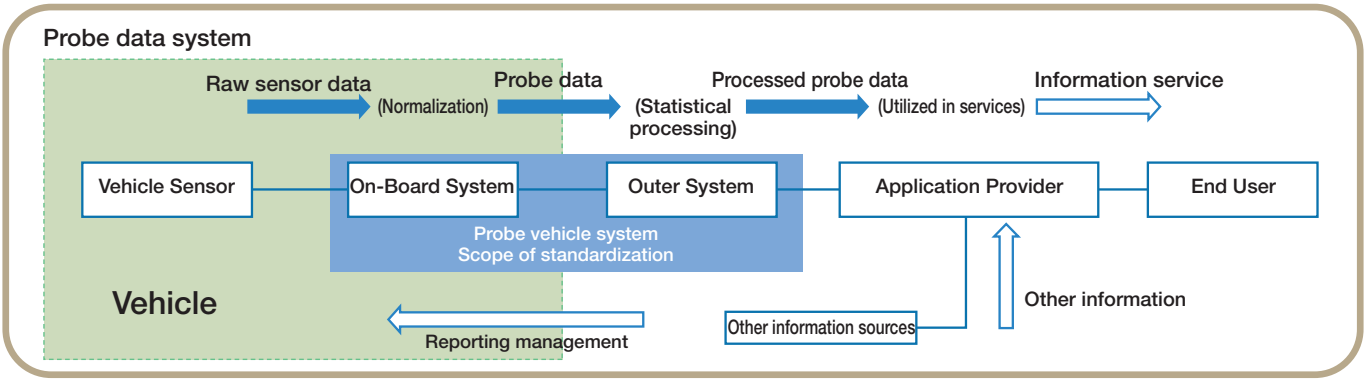
Communication lower layer standard for use in European digital tachographs that use DSRC. Proposed in 2019, this standard was issued in 2021.

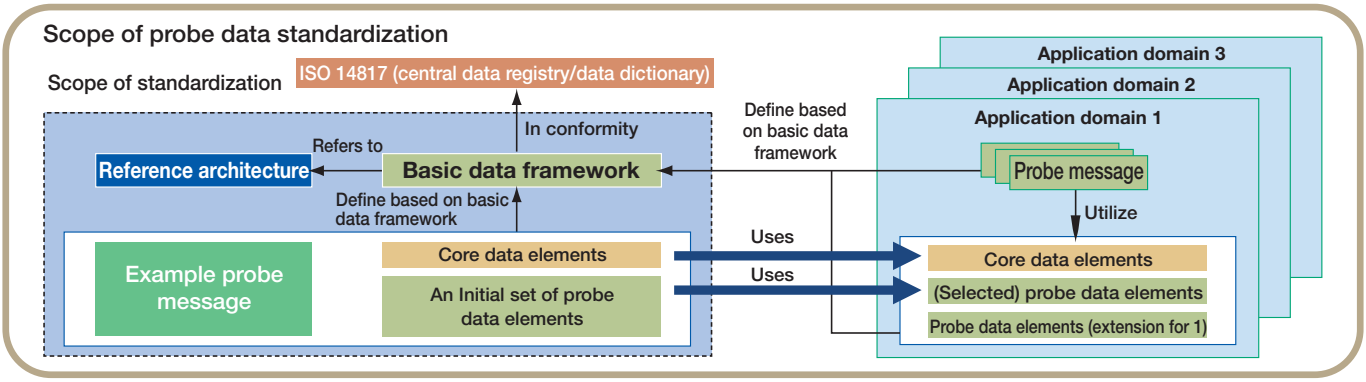
Probe Data

What is probe data standardization?

A system consisting of a group of vehicles that uses medium-to-wide area wireless communications to collect and transmit various types of data, and of center functions that statistically process that data to acquire information on traffic, road, and environmental conditions, is called a probe vehicle system. Probe data refers to the data sent to centers and other external systems by on-board systems. Speed and other basic data elements in probe data are known as probe data elements, and a set of multiple data elements is a probe message. Probe messages always contain time and location stamps.

SWG 16.4 is working on the probe information system and chaired by Japan. It is in charge of standardization for the probe data itself, standardization for the instructions on probe data reporting management, standardization for the architecture of probe data, and also personal data protection in probe data services.





Vehicle probe data for wide area communications (ISO 22837)

For probe data, standardization of the items below has been established. It was published as an ISO standard in 2009.

- Basic framework: Specifies the methods to define probe data elements and probe messages. Expansion and revision of the standard will be performed in accordance with this framework.
- Reference architecture: Defines the structure of the probe data system covered by this standard and the semantic structure of probe data.
- Core data element: Defines a group of probe data elements showing the time and location stamps included in all probe messages.
- Initial set of probe messages: Defines a group of typical probe messages.

Event-based Probe Data (TS 29284)

Event-based congestion probe data obtained after sensor value-based processing and evaluation by on-board systems was studied.

Probe data reporting management (TS 25114)

Reporting management is a set of instructions regarding transmission of probe data to groups of vehicles. It includes:

- Instructions to start and stop transmitting probe data
- Specification of the type of probe data to be transmitted
- Adjustment of the threshold value to determine the necessity of transmission

Transmitting these instructions from the center to vehicles makes it possible to control the unnecessary transmission of data and obtain detailed reports on what data is desirable to achieve effective data collection.

This TS was published in 2008.

Basic principles for personal data protection in probe vehicle information services (ISO 24100)

The following are defined as personal data handled by probe vehicle information services: contract registration information with probe data suppliers, communication IDs, passwords for certification, communication logs and personal data included in probe data itself.

To enable probe data suppliers to provide data without undue concern, the strict observance of personal data protection laws is being complemented by the preparation of guidelines to be followed by stakeholders and the standardization of design guidelines necessary for that purpose. This was established as an ISO standard in 2010.

Evaluation standards for probe privacy (ISO 16461)

Unified standards of anonymity and security for the probe data system will be established, and the infrastructure for secure use by information suppliers will be developed. Mutual recognition and interconnection between probe information systems are defined. This was established as ISO standard in 2018.

Probe services architecture (ISO 19414)

Concerning probe information systems, the Japan-proposed PWI aiming to standardize the service framework by examining clarification of the service field as well as sharing and centralization was published in 2020.

Shared probe data (TR 4286)

This TR describes usage cases of probe data sharing for using probe data. Also describes Japanese ETC 2.0 usage cases, and was proposed by Japan in 2019, before being issued in 2021.

Application Management

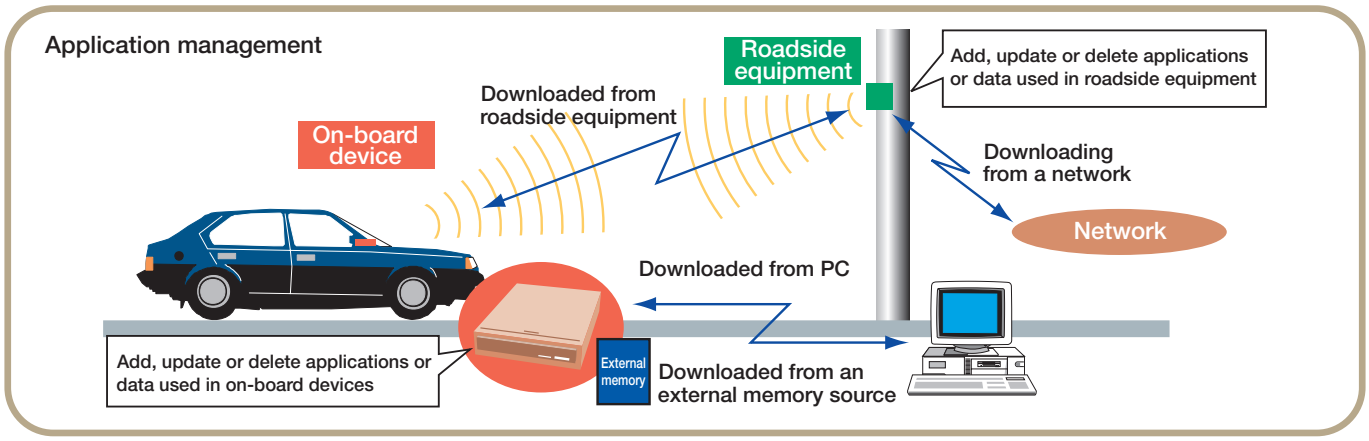
Application management (ISO 24101-1)

This item examines methods for installing applications on equipment featuring ITS communications functionality (roadside equipment or on-board devices that execute ITS applications). Standardization work on mechanisms, structures and methods for adding, updating, or deleting applications is then conducted.

Methods for managing, installing, updating and uninstalling applications, as well as structures for application management security, were standardized, issued as an ISO standard in 2008.

Application Management - Conformance Test (ISO 24101-2)

After the completion of ISO 24101-1, standardization efforts turned to items related to compliance tests. TTCN-3 (Testing and Test Control Notation Version 3) is used for the description of test procedures. This was established as an ISO standard in 2010.



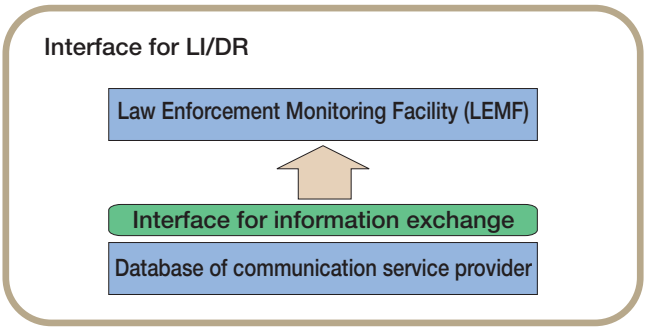
Pre-emption of ITS Communication Networks

In the wake of the Great East Japan Earthquake in 2011, Japan led efforts to compile use case scenarios and communication requirements with the aim of ensuring emergency communication in the event of a natural disaster from the perspective of road traffic. This was published as Disaster recovery preemption (TR 18317) in 2017.

Lawful Interception/Data Retention

Europe had been discussing the standardization of communication-based mechanisms to intercept communications via cellular phones, email, the Internet, and the like, to track vehicles, and the like as countermeasures against terrorism. ETSI established LI/DR study groups, and the ISO also launched a project for international cooperation that includes countries outside of Europe. WG 16 analyzed threats in the ITS and CALM fields, and compiled definitions, architectures, and methods of legitimate interception, as well as data retention methods and the like associated with legitimate interception.

TR 11766 and TR 11769 were published as summaries of the situation in each region.



eCall

Standardization of ITS Safety and Emergency Notifications using any Available Wireless Media-Data Registry (ISO 24978), which defines registries and the operations for emergency message, started in 2005. The ISO was published in 2009. Installation of eCall in new vehicles became mandatory in Europe in 2015.

Roles and Functional Models of ITS Communication

Published in 2024 as a newly compilation of the roles and functions demanded of ITS communication for applying to MaaS, smart cities, and the like. Proposed by Japan (ITS communication role and functional mode (TR 17732). Work progressed to utilize to re-confirm the activity scope of WG 16.

ITS Station Requirements

Of the specifications related to METR that have been discussed in WG 19, this activity is charged with applying station requirements as general requirements for ITS stations Station unit requirements (AWI 23708). The aim is to issue a TS.

WG 17 Nomadic Devices in ITS Systems

WG17 oversees the establishment of standards for ITS services that use nomadic devices such as smartphones and portable navigation devices (PNDs), which are becoming popular worldwide.

To use information that cars have, WG17 promotes the standardization of application interfaces, safety support system guidance protocols, information services for travelers with nomadic devices, and green ITS for transport, which considers CO_2 emissions.The table below lists the work items for WG17.

List of WG 17 work items

	Standardization themes	ISO Number	Contents
1	The use of nomadic and portable devices to support ITS services and multimedia provision in vehicles & Part 2: Definition and use cases for mobile service convergence	TR 10992 TR 10992-2	Defines use cases related to the provision of ITS services and multimedia content to nomadic and mobile devices in vehicles. Part 2 specifies definitions and use cases related to platforms for providing services using various devices or the cloud.
2	Vehicle interface for provisioning and support of ITS services – Part 1: General information and use case definition – Part 2: Unified gateway protocol (UGP) requirements and specification for V-ITS-SG*1 I/F – Part 3: Unified vehicle interface protocol (UVIP) server and client API specification – Part 4: Unified vehicle interface protocol (UVIP) conformance test	TR 13185-1 ISO 13185-2 to 4	Part 1 is a TR that describes a series of drafts related to vehicle interfaces for realizing ITS services, and defines general information and use cases for vehicle ITS station gateways (V-ITS-SG). Parts 2 to 4 are IS that define the requirements and specifications related to the V-ITS-SG proposed by WG 17. These Parts define the UVIP application interface protocol between vehicle information interfaces such as V-ITS-SG and nomadic devices as clients, and define the conformance tests for this UVIP protocol.
3	Guidance protocol via personal ITS station for advisory safety systems – Part 1: General information and use case definition – Part 2: Road guidance protocol (RGP) requirements and specification – Part 3: Road guidance protocol (RGP) conformance test specification	TR 13184-1 ISO 13184-2, 3	A series of drafts related to guidance protocols for driving safety support systems that use personal ITS stations. Part 1 is a TR that defines general information and use cases. Parts 2 and 3 define the requirements and specifications for protocols (RGP) and specify the procedures for testing compatibility with these protocols (RGP).
4	The use of personal ITS station to support ITS service provision for travelers – Part 1: General information and use cases definition – Part 2: General requirements for data exchange between personal ITS station and other	ISO 13111-1 to 2	Part 1 defines use cases for provisions of ITS services intended for travelers to nomadic and mobile devices, and Part 2 defines the requirements and specification for data exchange.
5	Indoor navigation for personal and vehicle ITS stations – Part 1: General information and use cases definitions – Part 2: Requirements and specification for indoor maps – Part 3: Requirements and specification for indoor positioning references – Part 4: Requirement and specification for interface between P/V and Central ITS stations – Part 5: Requirements and message specification for C-ITS-S*2 based positioning – Part 6: Requirements and specification for registration of indoor maps and indoor positioning references	ISO 17438-1 ISO 17438-2 ISO 17438-3 ISO 17438-4 ISO 17438-5 PWI 17438-6	Part 1 of the indoor navigation standardization, jointly prepared by WGs 3, 8 and 18, defines general information and use cases. Part 2 defines the requirements and specification for indoor maps and Part 3 examines the requirements and specification for indoor positioning references, while Part 4 defines the requirements and specification for the interface between personal/vehicle and central ITS stations. Part 5 will define the requirements and message specification for central ITS station (C-ITS-S)-based positioning. Part 6 will define the registration requirements and message specifications for indoor maps and indoor positioning references at the central ITS station.
6	Urban mobility applications via nomadic device for green transport management – Part 1: Requirements for interface between ITS stations – Part 3: Mobility integration service applications using hybrid V2X	ISO 18561-1 PWI 18561-3	This standard covers trip planning and management for green (low CO2 emissions) transport using nomadic devices in specified areas or road sections. Part 1 defines general information and use cases and Part 2 defines trip and modal choice applications and specifications. Part 3 will provide stipulations covering the increased sophistication of mobility relying on hybrid V2X communication systems.
7	Framework for green ITS (G-ITS) standards – Part 1: General information and use case definitions – Part 2: Trip and modal choice applications and specification	TR 20529-1 ISO 20529-2	The Green ITS standard is intended as foundation to make use of ITS to reduce CO_2 emissions. Part 1 will compile general information, use cases, and guidelines, while Part 2 will establish the foundation for the standard, define integrated applications for mobile services, and formulate the specification.
8	Information for emergency service support via Personal ITS station – Part 1: General requirements and technical definition – Part 2: Service requirement for road accident notification	ISO 20530-1 PWI 20530-2	Covers the sending of vehicle emergency information in the event of a collision or other emergency via a nomadic device. Part 1 will provide the requirements and technical definitions, while Part 2 will define the service requirements and notifications in the event of an emergency.
9	Nomadic device service platform for micro mobility – Part 1: General information and use case definition – Part 2: Functional requirements and data set definitions – Part 3: Data structure and data exchange procedures	TR 22085-1 ISO 22085-2 ISO 22085-3	Covers service platforms employing nomadic device to make use of micro mobility accommodating one or two riders. Part 1 defines general information and use cases, Part 2 will specify functional requirements and define the data sets, and Part 3 will specify the data structures and the procedures for exchanging data.
10	Collection of agent behavior information and sharing between ITS stations	TR 22087	Defines the requirements and message specifications for the positioning of central ITS stations (C-ITS-S) as Part 5 of the standardization proposal related to indoor navigation being jointly pursued by WGs 3, 8, and 18.
11	Network based precise positioning infrastructure for land transportation – Part 1: General information and use cases definition – Part 2: Functional requirements and data interface via nomadic device	TR 22086-1 ISO 22086-2	Aims to establish precise (about 20–30 cm accuracy) positioning infrastructure using a DGPS system with four ground-based reference stations based on the results of field tests in South Korea. Part 1 defines general information and use cases, and Part 2 will specify the functional requirements and data interface.
12	Extracting trip data via nomadic device for estimating CO_2 emissions – Part 1: Fuel consumption determination for fleet management – Part 2: Information provision for eco-friendly driving behavior – Part 3: Carbon footprint determination for eco-routing platforms in emission trading systems	ISO 23795-1 ISO 23795-2 NP 23795-3	For extracting travel data via nomadic devices to measure CO_2 emissions, Part 1 provides the specification for estimating fuel consumption to manage platoon driving for trucks or other vehicles, Part 2 provides the information of different events (e.g., speed, sudden acceleration/deceleration, idling, fuel cut, or eco-driving) which in necessary to measure CO_2 emissions related to driving behavior. Part 3 is studying methods for determining the carbon footprint for an eco-routing platforms in emissions trading systems.
13	Seamless positioning for multimodal transportation in ITS stations – Part 1: General information and use case definition – Part 2: Nomadic & mobile device dataset for positioning data fusion – Part 3: Data fution dataset exchange interface on nomadic device	DTR 6029-1 DIS 6029-2 CD 6029-3	Defines the seamless indoor and outdoor positioning solutions for multimodal transportation in ITS. Part 1 defines an overview and use cases, and Part 2 specifies the technical requirements related to nomadic device-based positioning data fusion between the three domains of nomadic devices, mobility, and infrastructure. In addition, Part 3 defines the processes and data exchange formats for sensor fusion.

List of WG 17 work items

	Standardization themes	ISO Number	Contents
14	Energy-based green ITS service for smart city mobility application via nomadic and mobile device – Part 1: General information and use case definition – Part 2: Functional requirements of data platform – part 3: EV-based demand response charging services – Part 4: Service framework for sustainable urban public transit operation & management	TR 17748-1 CD TS 17748-2 DIS 17748-3 CD 17748-4	Covers energy-related green ITS on nomadic and mobile devices. Part 1 as a TR defines general information and use cases, Part 2 is studying a TS to specify the technical requirements and data platform concerning energy consumption and the reduction of CO2 emissions, and Part 3 is to define the exchange requirements for the data used in EV-based demand response charging services. In addition, Part 4 is considering an IS to define the services and frameworks for operating and managing public transportation in a sustainable city. These work items were proposed by SWG 17.2.
15	Roadside infrastructure supported location-based services on nomadic & mobile devices for urban connected automated mobility – Part 1: General information and use cases definition – Part 2: Functional requirement of data platform – Part 3:NO turn on red (NTOR) at signalized infractions – Part 4: Unprotected turn in T-intersections – Part 5: Advisory right of way (ROW) at roundabouts – Part 6: Unprotected (Permitted) turn at junctions with traffic signals – Part 7: Poor visibility advisory at boundaries	DTR 17739-1 CD 17739-2 CD 17739-3 NP 17739-4 CD 17739-5 CD 17739-6 PWI 17739-7	Covers roadside infrastructure supported location-based services to ensure the safety of vehicles and vulnerable road users. Part 1 as a TR defines general information and use cases and Part 2 is studying an IS for the functional requirements of a location-based data platform. Part 3 is studying specific services for signalized intersections, such as those in the US, that do not allow turning on a red light, while Part 4 is studying services for T junctions. Additionally, Part 5 is studying services for priority traffic at roundabouts and Part 6 is studying services at unprotected turns permitted at signalized intersections. Part 7 is studying functions for advance notification of visibility conditions in areas with physically limited visibility or rapidly changing visibility due to weather conditions. These work items were proposed by SWG 17.1.
16	EV Battery Safety Monitoring and Performance Evaluation for Nomadic & Mobile Device – Part 1: General Information and Dataset Requirements	PWI 25974-1	This is a proposal to develop a standard, consisting of four parts, for battery safety monitoring and performance evaluation based on information collected from vehicles via nomadic devices. Currently, the Part 1 PWI has been approved, but the content is still under consideration. The planned titles for the other parts are: Part 2 : Data Communication Requirements and Protocols, Part 3 : Performance Evaluation and Testing Procedures, and Part 4 : Emergency Response Integration Guidelines.

* V-ITS-SG: Information gateway of vehicles that comply with ITS Station architecture proposed by WG 17

The following three SWGs currently operate under this WG.

(1) SWG 17.1: Location-based services that support roadside infrastructure for connected automated mobility

This SWG is responsible for services for vulnerable road users (VRUs) or connected vehicles provided in designated areas such as pedestrian crossings, school zones, unsignalized intersections, T junctions, roundabouts, weaving sections, or ramp metering zones by roadside infrastructure through nomadic or mobile devices. It assesses the definition of general requirements and use cases to provide the services. Under advice from Advisory Group 4 (AG 4) of TC 204, the SWG is coordinating with other WGs and has also started to examine further cross-sectorial services.

(2) SWG 17.2: Energy-based green ITS services for smart city mobility applications

This SWG is working on the development of international standards that define energy-based green ITS services. This form of ITS services are urban traffic management and smart city mobility applications using nomadic and mobile devices which offer the information not only on measurement of energy consumption and CO2 emissions, but also on the energy capacity of traffic sections in a smart city.

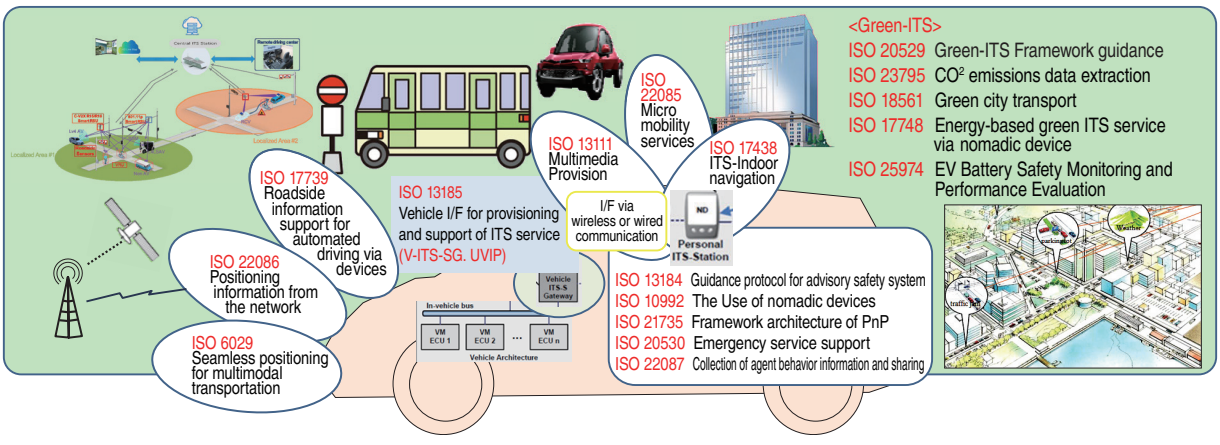
(3) SWG 17.3: Mobile location information and navigation services

This SWG is working on standards on the services like indoor navigation, seamless positioning, and high-precision position provided to connected personal mobility using nomadic and mobile devices.

Starting this year, Japan has dispatched representatives to, and is keeping a close eye on the activities of, each of those three SWGs.

Overview of standardization proposals under discussion by WG 17

Scope of tasks: standardization of ITS that makes use of nomadic devices

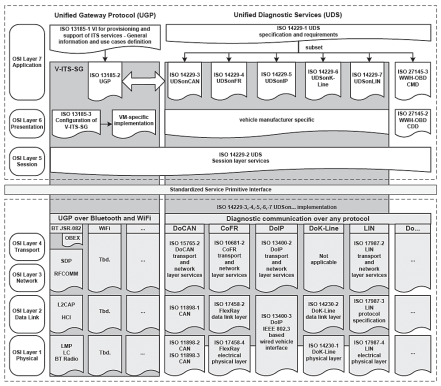


Vehicle Interface for the Provisioning and Support of ITS Services (ISO 13185-1 to 4)

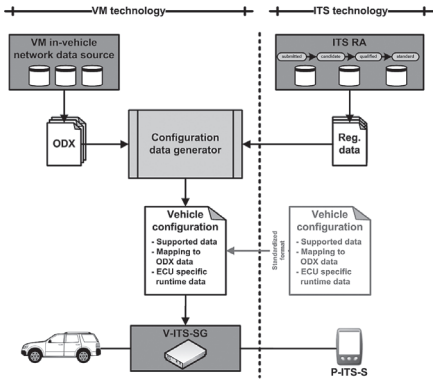
This standard covers gateways meant to allow applications in nomadic devices to use vehicle information. Discussion on this item was conducted in collaboration with TC 22/SC 3/WG 1 (Road vehicles/ Electrical devices/Serial data communications, current TC 22/ SC 31) that is in charge of standardization for vehicles.

This series consists of four parts, which have all been published. Part 1 (general information and use cases) has been published as a TR, and Part 2 (protocol requirements) as an IS. Structural requirements that were standardized as Part 3 were discussed at a joint working group (JWG) with TC 22. It was put on the ballot as a new work item at the JWG, but turned down in 2014. Subsequently, after discussions with people involved in TC 22 and TC 204, the policy not to use the term "gateway" was agreed. Instead, a standard proposal for a vehicle interface server/client model SPI was newly proposed as Part 3 and was issued as an IS in 2018. Furthermore, the standard for conformance testing was issued as Part 4 in 2020.

Relationship between ISO 13185 and other vehicle information standards



Sample ISO 13185 V-ITS-SG configuration image process



Indoor navigation for personal and vehicle ITS stations (ISO 17438-1 to 6)

ISO 17438 series is a standardization item on the use of mobile devices to provide guidance indoors. As indicated in the title ("for personal and vehicle ITS stations"), seamless integration of nomadic devices with onboard devices (e.g., telematics or navigation) is assumed to be general information.

Use examples are defined in Part 1.

In addition to representing indoor spaces using four layers (background, space, network, and POI*), maps incorporating additional information such as opening hours are also being considered. This standardization item will be dealt with in the TC in joint consultation with the relevant WGs. Part 1 was issued as an IS in 2016 and is currently under revision. Part 2 stipulates the requirements and specifications for indoor maps while Part 3, which defines the requirements and specifications for indoor positioning references, were issued in 2024. Part 4, which defines requirements and specifications for interfaces between terminal and centers, was issued in 2019 and is currently under revision. Part 5, which defines the requirements and message specifications for positioning in central ITS station bases, is awaiting publication. The drafting of Part 6, which will standardize methods of recording indoor map and indoor position reference points in central ITS stations, began in 2025.

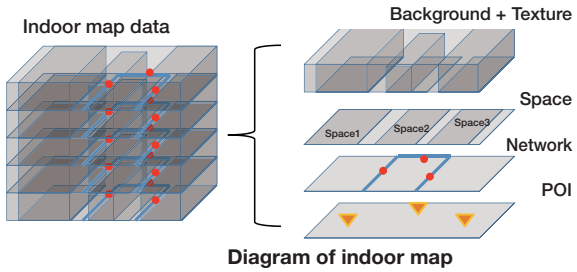


Diagram of indoor map

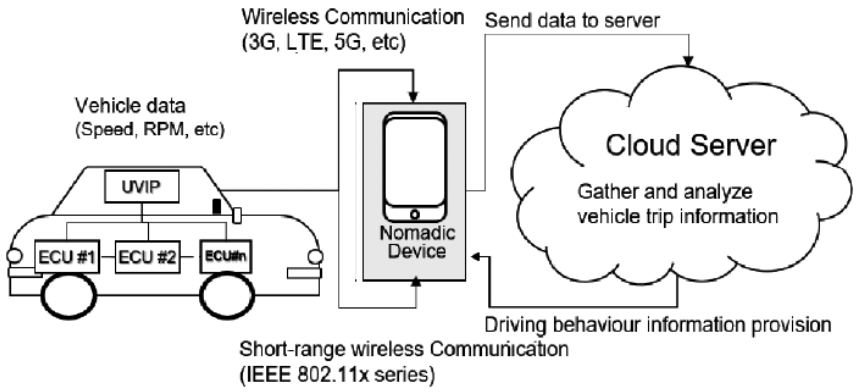
*POI: Point of Interest

ISO 23795-1 to 3 Extracting trip data for estimating CO_2 emissions

The proposed standard for estimating CO_2 emissions of vehicles using a portable device consists of two parts. Part 1 is the method of estimating by comparing the speed and consumption cycle of virtual vehicles that have accumulated on the network side with actual vehicle speeds. Part 2 stipulates information on different events related to driving acts (speed, rapid acceleration/deacceleration, idling, fuel cut, eco-driving etc.) as the information necessary for estimating CO_2 emissions.

Through these estimations, the objective is to enable the development of an application that fleet business owners, logistics business owners, public transportation business owners, and environmentally friendly driving instructors can use to measure the energy consumption and the equivalent amount of gasoline or diesel consumption by a specified standard vehicle. Part 1 was published as an IS in 2022 and Part 2 was published as an IS in 2024.

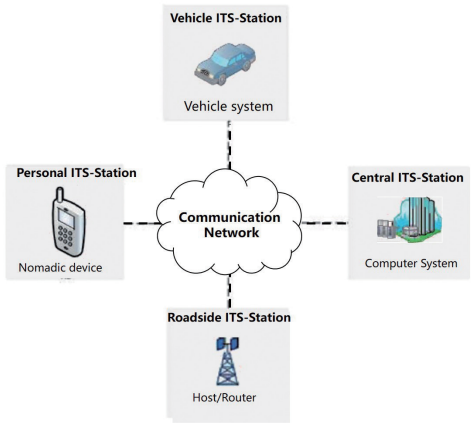
Part 3 is currently under assessment which will define methods of determining the carbon footprint (CFP) from travel, and methodologies to use that CFP in CO2 emissions trading schemes to enable the selection of environmentally friendly routes.



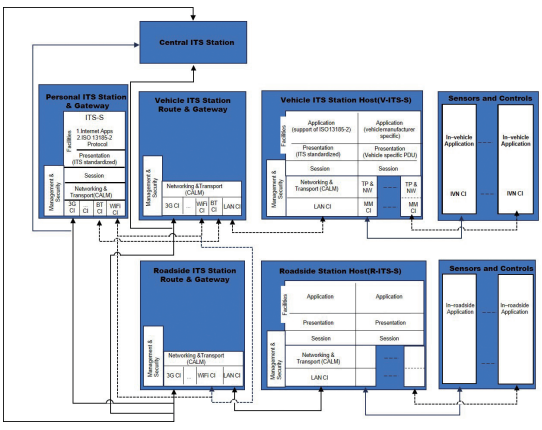
Overview of the service system

Provision of ITS and multimedia services for travelers (ISO 13111-1 and 2)

This standard specifies the interfaces to support various applications for nomadic and mobile devices based on personal ITS stations, as well as the data exchange protocol with vehicle, central, and roadside ITS stations, for the provision of ITS services to travelers. This makes it possible to provide vehicle information, advice to the driver, warning systems, entertainment systems, traffic information, low speed traffic system (non-vehicular transportation) information, and multi-modal navigations services. Part 1 defines use cases, and was published as a TR in 2017. Part 2 defines requirements and specifications for data exchange, and was published as an IS in 2022.



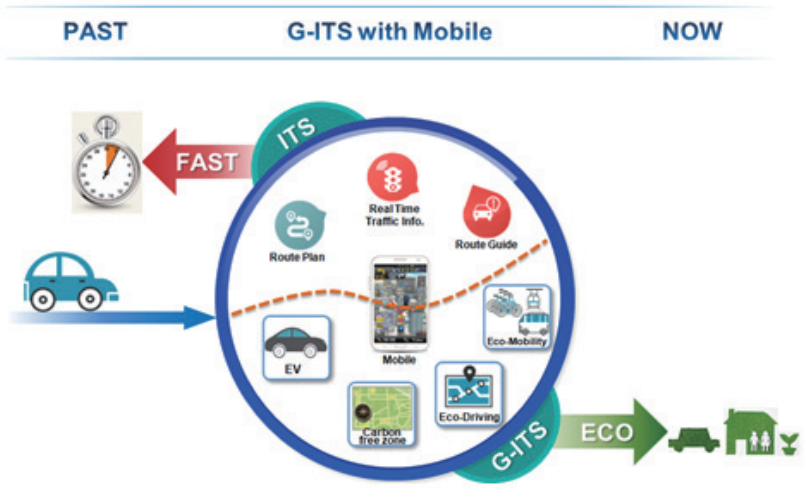
Communication system for ITS



Connections between personal ITS stations and other ITS stations

Framework for Green ITS standards (ISO 20529-1 and 2)

This framework proposes standards that provide a foundation for Green ITS (e.g., CO_2 reduction) activities, including surface transportation with e-mobility. Part 1 consists of a Green ITS standard common framework including gap analysis of existing ITS standards, studies of use cases, and guidelines to facilitate practical implementation by policy makers. It was published as a TR in 2017. Part 2 establishes the foundation for the standard, defines integrated applications for mobile services, and formulates the specification. It was published as an IS in 2021.

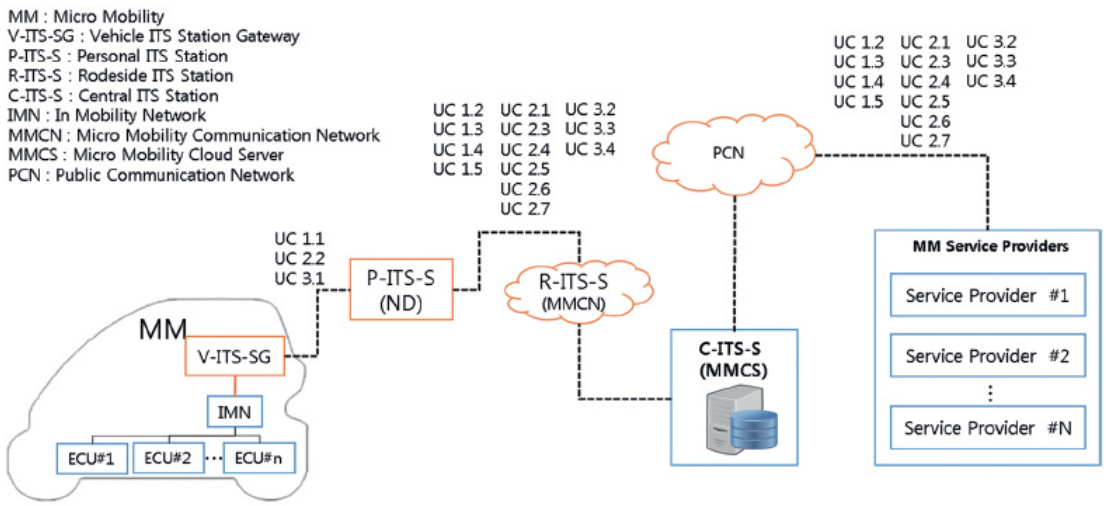


Overview of Green ITS services

Service platform for micro-mobility (ISO 22085-1 to 3)

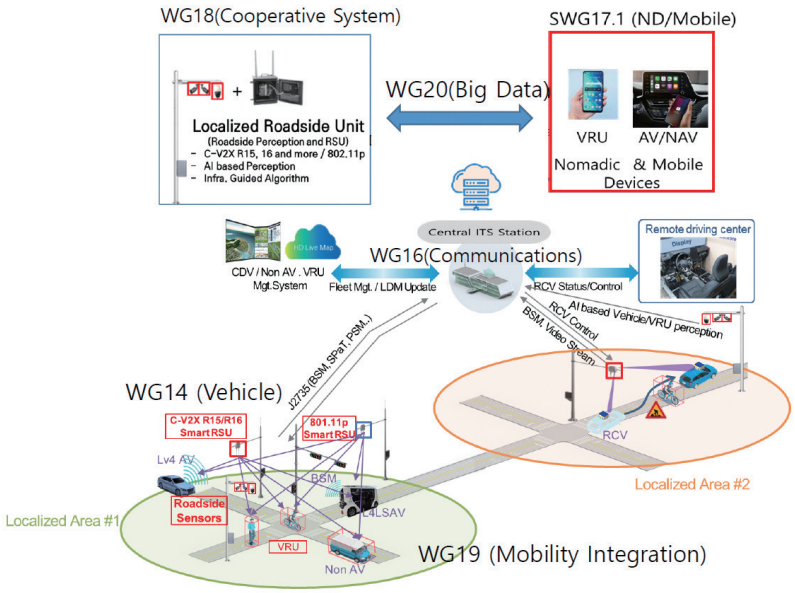
This standard proposes the provision of a service platform that uses nomadic devices for first- and last-mile services connecting public transit routes as micro-mobility carrying one or two passengers for short distance trips becomes increasingly convenient and necessary. Part 1 categorizes the market scale and situations in various countries, and defines functional requirements and use cases. It was published as a TR in 2019. Part 2 specifies the functional requirements and dataset for providing pre-trip information (e.g., available parking place information), necessary en-route information (e.g., route design information), and post-trip information (e.g., parking position information) for micro mobility. It was published as an IS in 2021. Part 3 defines the data structure and data exchange procedure to enable cloud-based mobility services that involve a data exchange interface between micro mobility services and nomadic devices. It was published as an IS in 2022.

Conceptual diagram of general use cases



Roadside infrastructure supported location-based services for automated driving (ISO 17739-1 to 7)

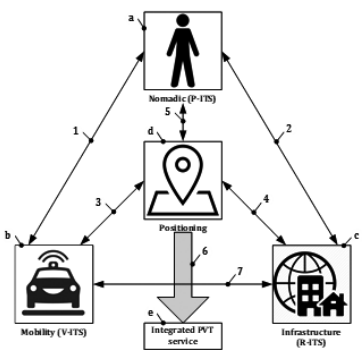
The ISO 17739 series specify the services based on the location covered by roadside infrastructure to ensure the safety of vehicles and vulnerable road users. This series was proposed by SWG 17.1 from 2023 to this year and consists of the following seven items. Part 1 is a TR to define general information and use cases. Part 2 studies an IS for the functional requirements of a location-based data platform. Part 3 and subsequent parts consider services for various road sections. (The following description is written assuming vehicles run on the right.) Part 3 covers signalized intersections that do not allow right turns at a red light, Part 4 addresses unsignalized T junctions, and Part 5 covers roundabouts. Part 6 looks at left turns at signalized intersections without a dedicated turn signal. Finally, Part 7 targets steep downhills, sharp corners, fog, and other road conditions involving poor visibility.



Relationship between SWG 17.1 and other WGs

Seamless positioning for multimodal transportation (ISO 6029-1 to 3)

This standard specifies the data monitoring, collection, and combination processes for the collection and application of external sources required by indoor and outdoor seamless positioning solutions for multimodal transportation in ITS. Part 1 defines general information and use cases, and Part 2 specifies the technical requirements related to nomadic device-based positioning data fusion between the three domains of nomadic devices (P-ITS-S), mobility (V-ITS-S), and infrastructure (ITS-infrastructure). At this time, Part 1 has been published as a TR, while Part 2 has completed DIS balloting and is under discussion. Part 3, which aims to define the processes and data exchange formats for sensor fusion, is under discussion at the CD stage. These items are related to WG 16 and the workgroups are expected to cooperate on assessments.



1: Data exchange between network environment and mobility services, including the exchange of mobility/personal data with P-ITS-S.
2: Data exchange with the infrastructure, including infrastructure information, as well as the exchange of personal data with P-ITS-S.
3: Data exchange between mobility endpoints and sensor fusion positioning applications.
4: Data exchange between infrastructure endpoints and sensor fusion positioning applications.
5: Data exchange between P-ITS-S and sensor fusion positioning applications.
6: Seamless positioning calculation.
7: Use cases for positioning data exchange.
a: The P-ITS domain is represented by ITS-compliant mobile devices carried by people.
b: The V-ITS domain is represented by ITS-compliant vehicles.
c: The R-ITS domain is represented by ITS-compliant roadside infrastructure devices.
d: Positioning domain for all devices in the P-ITS, V-ITS and R-ITS domains.
e: Results in integrated provision of position-, speed- and time-based services.

Seamless positioning system diagram

WG 18 Cooperative ITS

Cooperative systems integrate vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and infrastructure-to-infrastructure (I2I) communication platforms, to provide extensive ITS services.

List of WG 18 work items

		Standardization themes	ISO Number	Contents
	1	Globally unique identification	ISO 17419:2025	Specification of unique identifiers to be used in cooperative ITS
	2	Data exchange specification for in-vehicle presentation of external road and traffic related data	TS 17425:2016	Data exchange specification for in-vehicle presentation of external road and traffic related data
	3	Contextual speeds	TS 17426:2016	A data exchange standard for in-vehicle presentation of regulated and recommended speeds according to road conditions
	4	ITS station facilities for the transfer of information between ITS stations	TS 17429:2017	Prescribes ITS station facilities for the transfer of information between ITS stations
	5	Local dynamic map	ISO 18750:2025	Standard for Local Dynamic Map (LDM)
	6	Using V2I and I2V communications for applications related to signalized intersections	TS 19091:2019 AWI TS 19091 (revised)	Road-to-vehicle communication messages (SPaT, MAP) for applications related to signal-controlled intersections
	7	Dictionary of in-vehicle information (IVI) data structures	TS 19321:2024 AWI TS 19321 (revised)	A data structure dictionary for in-vehicle information (IVI) applications
	8	Position, velocity and time functionality in the ITS station	TS 21176:2020	Prescribes ITS station functionality that provides information on the position, speed, and time
	9	ITS station security services for secure session establishment and authentication between trusted devices	ISO 21177:2024	Specify ITS station security services for establishing and authenticating secure sessions between trusted devices
	10	Global transport data management (GTDM) framework	TS 21184:2021	Standard for a data dictionary used in the secure connection between an in-vehicle ITS station and the vehicle's information system
	11	Communication profiles for secure connections between trusted devices	TS 21185:2019	Standard for ensuring the security of communications between vehicles and ITS stations
	12	Guidelines on the usage of standards - Part 1: Standardization landscape and releases - Part 2: Hybrid communications - Part 3: Security	TR 21186-1:2021 TR 21186-2:2021 TR 21186-3:2021	Guidelines for relations and application method of standards relating to collaborative ITS
★	13	Automated valet parking systems (AVPS) -Part 2: Security integration for type 3 AVP	TS 23374-2:2023	Standard for integrated security of Automatic Valet Parking Systems (AVPS)
	14	Facilities layer services - Part 1: Architecture - Part 2: Communication profile handler - Part 3: Content subscription handler - Part 4: Facilities services handler - Part 5: Message sets - Part 6: Segmentation service	AWI 24854-1 to 4 CD TS 24854-5 AWI 24854-6	Definition of the guidelines and requirements related to the creation and use of functions and ITS message sets for the facility layer of ITS stations. (Planned as a replacement and supplement to TS 17429:2017.)
	15	Evaluation of national and regional ITS-related policies to identify ITS station unit requirements	PWI TR 24855	Creation of a global inventory of relevant policies within the ITS domain, and extraction of technical requirements related to safety and security issues from those policies.

★ Item(s) that Japan is / has been actively working on

Background behind the establishment of WG 18

In 2009, the European Commission (EC) issued Mandate M/453 on the standardization of cooperative systems and assigned the standardization tasks to ETSI TC ITS and CEN/TC 278.

CEN/TC 278 then established WG 16 and started cooperating with TC 204 on standardization. That same year, TC 204 established WG 18 as a counterpart group.

Roles and tasks of WG 18

Based on the requirements of M/453 and the needs of road managers and road companies in Europe, WG 18 has been developing standards for advanced and trial deployment of infrastructure-related applications such as safety applications around intersections, probe information, and provision of road traffic-related information. At the same time, standards has been developed for ITS station functionality, which is the information infrastructure that supports cooperative systems.

Activities are currently focused on incorporating the outcomes of advanced deployment projects such as C-Roads into the already formulated standards.

Local Dynamic Map (LDM) (ISO 18750)

Local dynamic maps (LDM) are databases used in cooperative systems that feature superimposed location referencing as well as dynamic and quasi-dynamic information. In ITS station architecture, they are one of the functions of the facility layer, and are mainly used for safety applications.

Their fundamental structure consists of temporary information concerning congestion, traffic obstacles, the weather, and other factors, with information on dynamic objects, targets and objectives (including the currently displayed traffic signal) acquired mainly through communication with ITS stations and sequentially layered on the location referencing information.

The ISO 18750 standard defines the LDM concept and was published as an IS in 2018.

In-Vehicle Signage (TS 17425)

In-vehicle signage, which displays a range of road traffic information in vehicles in response to road traffic operator intent, is a system similar to the VICS and ITS spot services used in Japan to provide simplified graphic information.

"Data exchange specification for in-vehicle resentation of external road and traffic related data (TS 17425)" compiles functional requirements of In-vehicle Signage and requests for communications messages, and it was issued as a TS in 2016.

In-vehicle Information (TS 19321)

In-vehicle Information (IVI) is a concept that encompasses, and expands on, In-vehicle Signage (TS 17425) and Contextual speeds (TS 17426). Even though it describes systems for transmitting road sign and speed limit information from the roadside to the vehicle, this work item only covers the message structure and does not stipulate specific applications. This item was issued as the Dictionary of in-vehicle information (IVI) data structures (TS 19031) in 2015.

SPaT, MAP, SRM and SSM

To deploy safety or environment applications for areas around intersections with controlled signals requires the sending of information on the current signal status and related information on areas around intersections from the roadside infrastructure to the vehicles.

This work item stipulates the messages used to handle signal display information (signal phase and timing: SPaT) topology information on the locations of stop lines and intersection configuration (MAP), and priority control information concerning public transport and emergency vehicles (signal request message: SRM and signal status message: SSM). In 2017, this item was published as Using V2I and I2V communications for applications related to signalized intersections (TS 19091).

Secure connections between in-vehicle ITS communication station and vehicle information systems

The standardization of systems to retrieve information from the sensors built into the vehicle by connecting onboard ITS devices and vehicle information systems has been controversial since the launch of ITS standardization, and has yet to be realized due to differences in outlook between stakeholders. However, discussions on assessing standardization in the limited context of use in applications that only allow extremely short delays, such as applications relying on V2V communication to prevent collisions, have been initiated.

"Security services at ITS stations for establishing secure sessions and rapid authentication" (ISO 21177) and "Communication profile for secure connection between ITS stations and vehicles" (TS 21185) are specifications for ensuring security of communication between vehicles and ITS stations. "Data dictionary of vehicle-based information for C-ITS applications, the Global transport data management (GTDM) framework" (TS 21184) is a specification for the data dictionary used in communication.

Integrated Security for Automatic Valet Parking System (AVPS) (DTS 23374-2)

This standard describes integrated security for automated valet parking systems (AVPS). The system was standardized by WG 14 under the leadership of Japan and Germany,.

Since AVPS constitutes a cooperative system realized through coordination between parking facilities and vehicles, experts from WG 14, 16, and 18 worked together on this item in accordance with the policy that discussions regarding cooperative system security should be centralized in WG 18. The resulting document was issued as a TS in 2023.

WG 19 Mobility Integration

In ISO/TC 204, WG 19 constitutes a joint working group that collaborates with CEN/TC 278/WG 17. The primary purpose and work items of this working group is defining international standard for mobility integration but it does not include the work items that fall into the scope of existing working groups. WG 19 acts collaboratively and works on the items that cannot be performed by other working groups. The scope of the working group is broad, including not just urban but also inter-urban mobility. Specifically, the working group engages in activities to formulate infrastructure-related international standards. These standards will serve as ITS technology usage guidelines and urban administration policies to resolve the issues holding back the realization of a society that makes use of automated driving systems to address the concentration of the population in cities and provide mobility in sparsely populated areas, improve the urban environment, and solve the population concentration issues. Japan is working on proposals for the international standardization of the digital transformation of smart cities, of the use in low Earth orbit satellite systems in ITS to respond to natural disasters, and even of the automated driving infrastructure.

List of WG 19 Work Items

		Standardization Theme	ISO Number	Content
★	1	1 ITS- Role model of smart city ITS service application	TR 4445	Japanese proposal Summarizes the role model for realizing smart city ITS service applications in a TR
★	2	LSAD system service architecture	TS 5255-1 TR 5255-2	Japanese proposal Compilation of service architecture that includes infrastructure support for low-speed automated driving systems
★	3	Intelligent transport systems – Mobility integration – Gap and overlap analysis of ISO/TC 204 work programme for mobility integration	Internal document	Gap and overlap analysis of standards relating to mobility integration and compilation of report. Being utilized in the activities of AG 4.
★	4	Intelligent transport systems - Management for Electronic Traffic Regulations (METR) - Part 1: Part 1: Operational concept (ConOps)	TS 24315-1 DTR 24315-2 DTS 24315-3 PWI 24315-4	Defined the concepts and architecture for electronically storing static and dynamic information about infrastructure, such as road signs, traffic restriction information, and the like Comprised of 8 parts.
★	5	Intelligent transport systems - Urban-ITS - 'Controlled Zone' management using C-ITS	TS 24311	Specifications for controlled zone management, which manages vehicular access in urban areas.
★	6	Mobility Integration - Vulnerable users and light transport	TR 24317	Compilation of specifications for safety information relating to pedestrians and light modes of transport.
★	7	Mobility Integration concept	TR 4447	TR that acts as a bridge between European MaaS and North American MOD
★	8	Ground-based automated mobility system	PWI/DTR 4448 NP 25614	Defines roadside operations for automated vehicles Comprised of 15 parts
★	9	Parking – Part 1: Core data model	TS 5206-1	International standardization of industry APDS standards
★	10	ITS data management, access and mobility issues – Governance using secure interfaces : High level specifications & information resource	TS 5616	Communication & data standards guidebook. Online collection of links. Comprised of 9 parts.
★	11	Digital infrastructure service role and functional model	TR 7872	Japanese proposal Compiling a service that provides digital infrastructure information to ITS service providers
★	12	ITS data aggregation role and functional model	TR 12770	Japanese proposal Compiling a service that aggregates ITS data needed by ITS service providers.
★	13	Enterprise view, Physical view (PWI)	TR 7878	Norway Proposal: Compile role models for MaaS, MOD, and IFMS
★	14	Multimodal pricing	PWI/TR 7874-1 PWI/TR 7874-2	US Proposal Compile multimodal payment rules Comprised of 2 parts.
★	15	Role model for mobility service using LEO satellites	TR 17783	Japan proposal Summarizes the role model for LEO satellite use in ITS.
	16	Role models for MaaS	DTR 22625	Compiles physical and functional views of role models.
★	17	Predictive risk information provision service	TR 24856	Compiles services that provide predictive risk information from infrastructure.

★ Item(s) that Japan is / has been actively working on

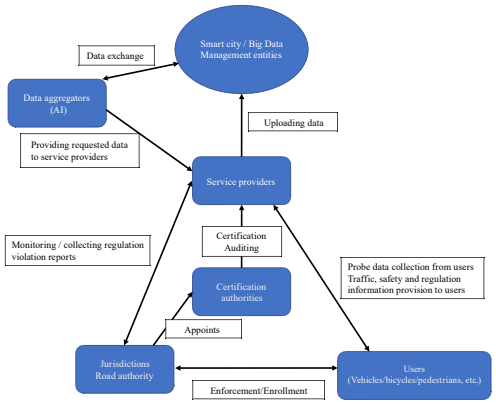
Role Model for Smart City ITS Service Applications (TR 4445)

At the Singapore meeting in October 2019, Japan proposed the "Role Model for Smart City IT Service Applications," it was approved as a new work item, and international standardization work started. In approving this work item, Japan's efforts such as ETC 2.0 road information collection role model can be standardized internationally, and it realizes an environment where Japan's various frameworks and architectures for ITS services can be proposed.

WG 19 aims to develop the international standard specifications necessary to solve the issues related to mobility integration in urban and inter-urban environments that other existing WGs are not overseeing. In line with that objective, the new proposal submitted to WG 19 expands on this objective while referring to the WG 7-formulated monitoring system architecture (ISO 15638) for commercial vehicles and organizes the core frameworks for smart cities that utilize transportation-related big data in order to introduce ITS service applications. The core of service providers' role is to provide mobility integration information services for mobility users. Service providers' service provision functions are monitored by a certification authority to prevent data tampering and to ensure security. The certification authority is founded on strict conditions and is inspected by the adminis-

trative body overseeing enforcement and by road authorities. Mobility integration ITS application users (vehicles, motorcycles, pedestrians, etc.) sign user service provision agreements with service providers and utilize various ITS service applications, and, in addition to gaining the convenience of mobility, also receive important information, such as safety information, for realizing a safe and secure society. Probe information, such as user location information, is collected by each service provider. Data collected by service providers is gathered by data management organizations in possession of smart city big data, and it is then utilized in a privacy-protected manner. This data can be utilized for a variety of smart city services by sharing data and data collecting entities, furnishing the necessary data for ITS services from service providers and in the timings and formats required by service providers. The use of this role model to understand the position of various ITS business use cases and to develop business models is being considered.

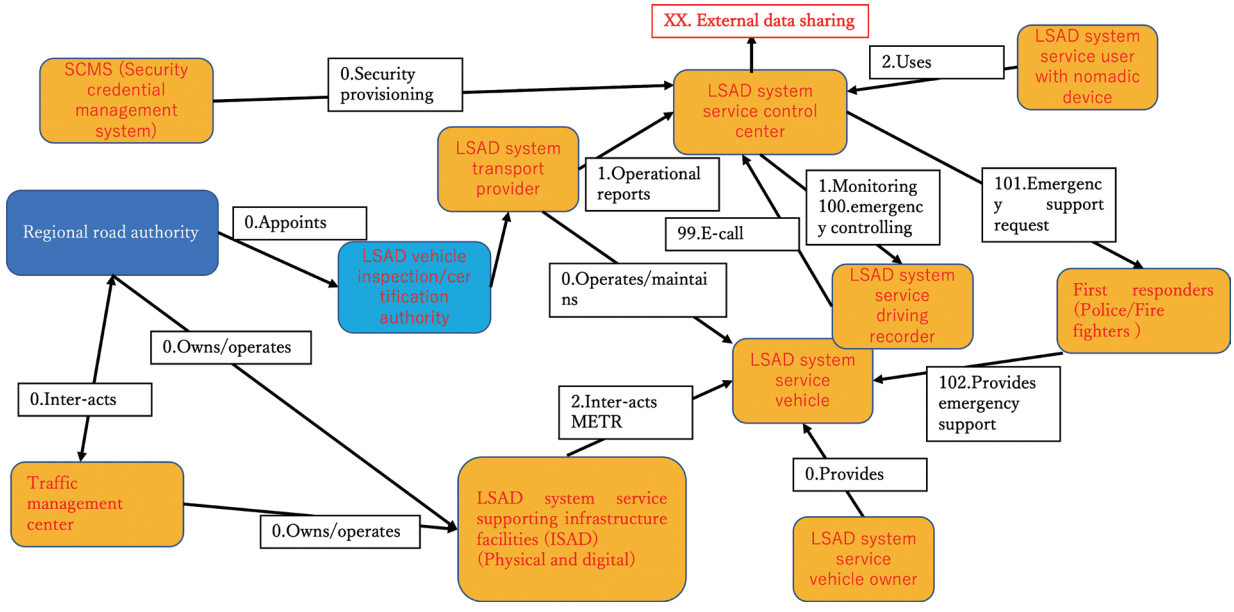
A draft concept for smart city core architecture



System services role function model for LSAD driving systems (TS 5255-1)

This new work item proposed by Japan at the online international meeting in April 2020 and approved as PWI, specializes in studying, analyzing, and explaining the basic requirements of the architectural model of the service application in order to introduce low speed automated driving (LSAD) services as a new mobility in urban and sparsely populated areas. It is positioned as the basis of various automated driving usage cases and it is believed it can be useful in the development of automated driving business models. Standardization of the service architecture is necessary to promote the introduction of low-speed automated driving services as a new mobility that is used as a means of moving people and goods in urban and mountainous areas. There are various pilot projects using LSAD being implemented around the word, including Japan, and international standardization has been proposed based on the results of those projects. The work item defines the overall service architecture, including infrastructure and road facilities (driving monitoring platform, emergency response platform, operation management platform, user service platform for online reservations and payments, infrastructure platform for automated driving support, etc.). Part 1 describes the overall architecture of LSAD movement support for "people and goods" (clarifying that there is no overlap with WG 8 by including infrastructure and logistics services). Part 2 extracts the issues by analyzing the functional gaps, and Part 3 formulates the system components that should be standardized internationally.

DTS 5255-1 LSAD System Service Role Functional Model



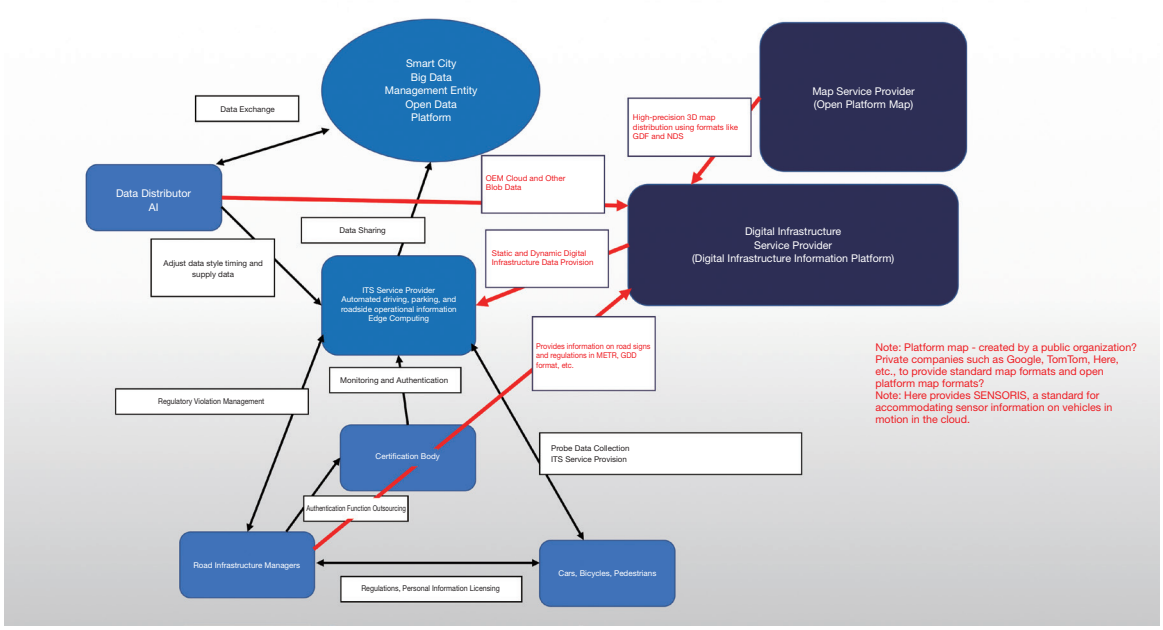
Operational physical layerData flow

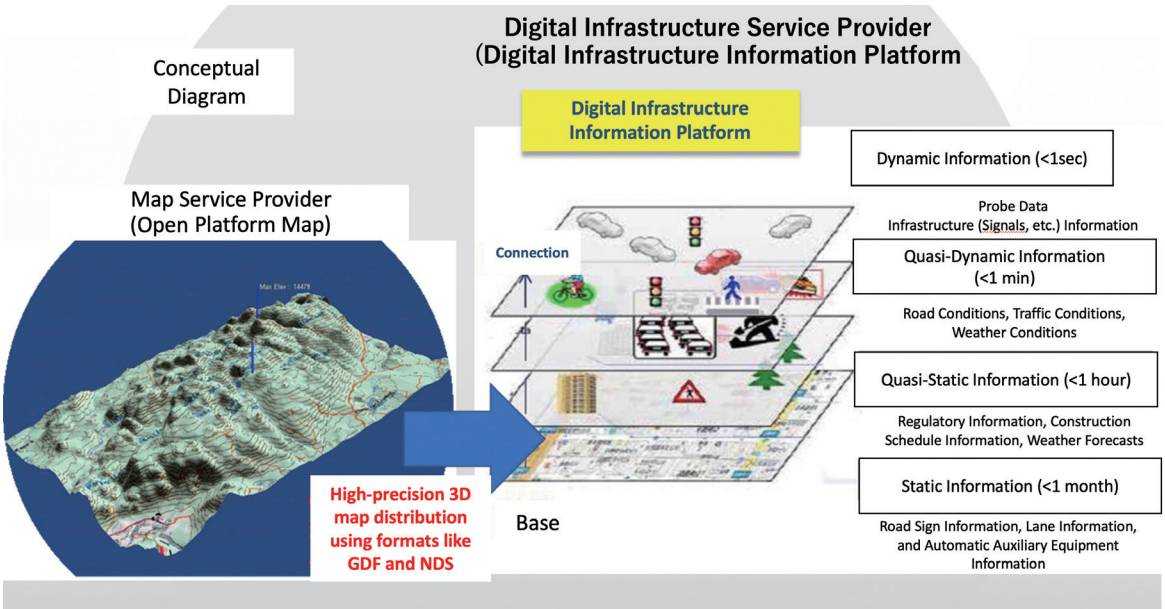
Source: ISO/TC204/WG19

Role Functional Model for Digital Infrastructure Services (TR 7872)

This work item was newly proposed by Japan and approved as PWI at the WEB International meeting in December 2020. It aims to compile the digital infrastructure information services needed for service providers to provide parking information, roadside operation information, Management for Electronic Traffic Regulations (METR), and other services necessary to solve issues related to mobility integration in urban and interurban environments into a TR. The Road Bureau of the Ministry of Land, Infrastructure, Transport and Tourism has begun to consider the need to provide electronic information on infrastructure facilities to realize a society with automated driving. It is also considering the need for high-precision three-dimensional maps to enable automated driving. Given this situation, Japan has proposed this international standardization to strengthen its position further and contribute to TC 204's international standardization work. Furthermore, this proposal adds a new Digital Infrastructure Service Architecture role to the basic role model work item ISO/TR 4445, a Japanese proposal. This action aims to clarify the roles required for the deployment of ITS mobility service applications that require digital infrastructure support. integration information services for mobility users. Service providers' service provision functions are monitored by a certification authority to prevent data tampering and to ensure security. The certification authority is founded on strict conditions and is inspected by the adminis

ITS Digital Infrastructure Service Architecture Role Model Diagram (Draft)

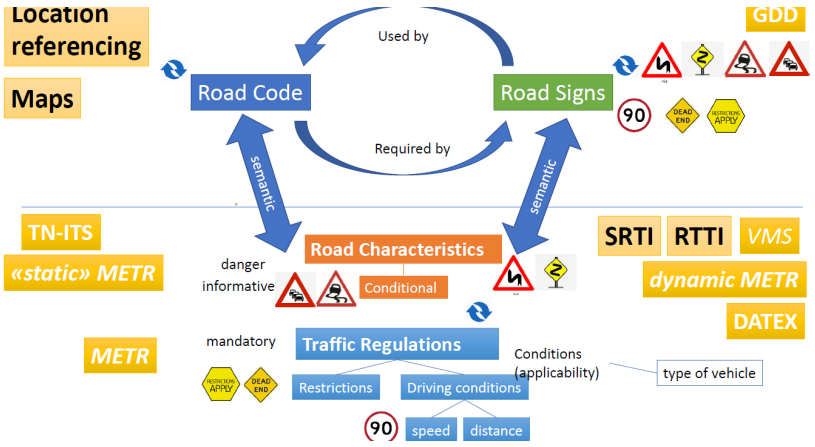


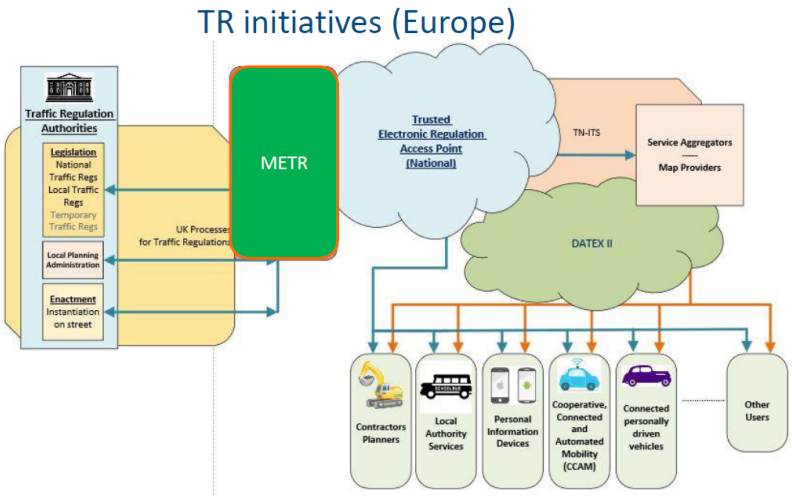


Source: ISO/TC204/WG 19

Management of Electronic Traffic Regulations (TS 24315-1)

This work item, newly proposed by UK and approved as PWI at the April 2019 International meeting, aims to compile the necessary electronic traffic regulation information services needed for service providers to offer the Management for Electronic Traffic Regulations (METR) services required for solving the challenges associated with mobility integration in urban and interurban environments. In Europe, DATEX II and TN-ITS are working together to put together a CEN standard. There is also a movement led by the United States to put together a METR concept in the form of a workshop. As shown in the figure on the right, METR is associated with various standardization activities and is being carefully worked on.





Source: ISO/TC204/WG19

Parking information core data and models (AWI TS 5206-1)

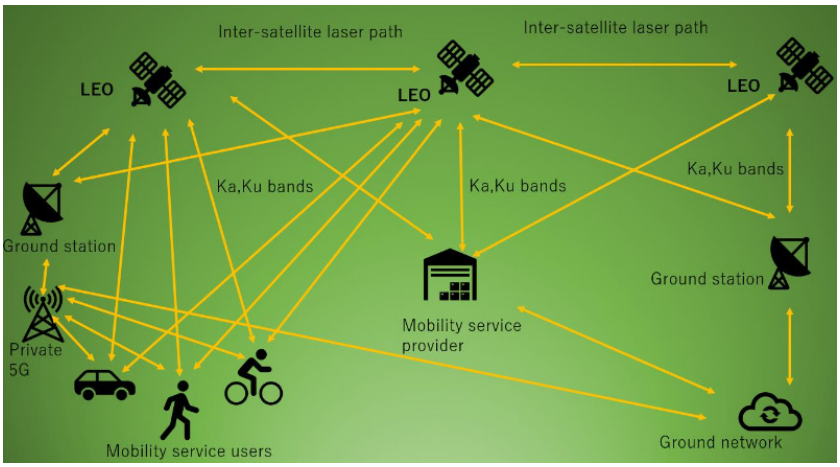
This work item was newly proposed by UK and approved as NP at the international meeting in April 2020. It was achieved by requesting that the Alliance for Parking Data Standards (APDS) utilize the shared terminology and definitions they created for the parking industry data using UML, creating an international standard. This TS covers both ISO and intra-European activities. It has been decided that the APDS standard will be incorporated into the European DATEX II standard. It is associated with various standards.

Vulnerable Road Users, Standards Gap Analysis for New Mobility (TR 24317)

Newly proposed and approved as PWI at the April 2019 International meeting, this work item will address micro-mobility devices (e.g., e-scooters, etc.), power or power-assisted vehicles (e.g., e-bikes, power wheelchairs, etc.), and full-power vehicles (e.g., motorcycles, mopeds, etc.) in light power and active mode C-ITS. Work will be performed to standardize mobility integration to support all travelers using active light modes of transport. The gap assessment will focus on collaborative ITS for planning, managing, and traveling end-to-end trips for all users, including people with disabilities. Use cases from Japan are being provided to cooperate in its formulation.

Role model for the use of low Earth orbit satellites in ITS (TR 17783)

This aims at using low Earth orbit satellite systems for ITS services in situations such as when the terrestrial network cannot be used after a natural disaster or other catastrophe.

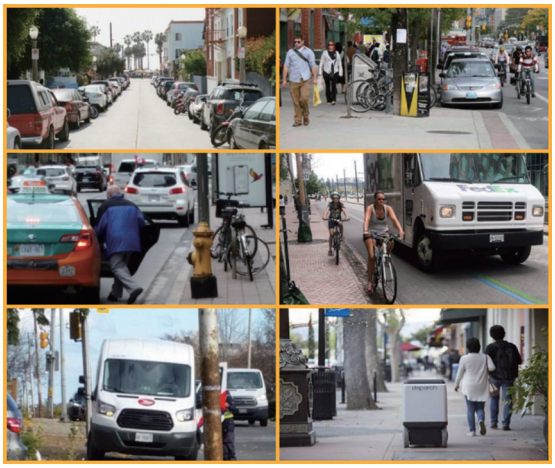


Source: ISO/TC204/WG19 document

Roadside operations for automated vehicles to utilize the roadside for unloading and loading/unloading passengers (PWI TR/DTR 4448)

This work item, newly proposed by Canada and approved as PWI at the October 2019 International meeting, summarizes automated vehicles for curb and sidewalk operations, joint use of automated and non-automated vehicles, and movement of people and goods. In all, 11 multi-part structures will be developed for terminology, taxonomy, classification, architecture, a hierarchy for identifying curb and sidewalk suitability, deployment of advanced automation and access, curb or sidewalk metrics that permit operation of automated vehicles or devices, and mixed environments with human-operated ones.

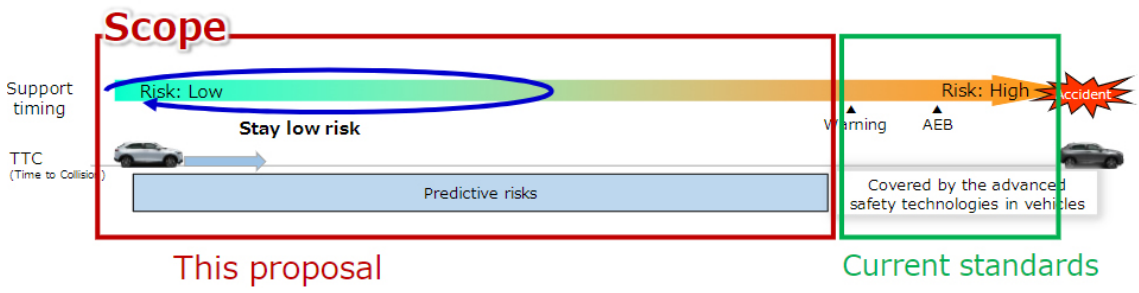
This item is divided into several parts. The formulation of TS 25614, Orchestration of loading and unloading, is also underway.



Source: ISO/TC204/WG19 document

Role models for risk estimate information provision (TR 24856)

This document is to describe the basic roles and functional models for risk estimate information provision are as follows. This technical report compiles role models of service providers which provide the services aiming to maintain safety in partnership with all traffic users by sharing traffic accident risk information in advance.



WG 20 Big data and Artificial Intelligence supporting ITS

As standardization related to AI and big data has gained impetus in various fields, WG 20 was established in 2021 to address the need to study ITS-specific use cases to ensure appropriate standardization in the ITS field.

The original objective of compiling use cases (TR 12789) is essentially complete. The next planned step is to cooperate with other WGs on assessing how to make use of AI, big data, deep learning and blockchain technologies in ITS.

List of WG 20 Work Items

	Standardization themes	ISO Number	Content
1	Big data and artificial intelligence supporting intelligent transport systems - Use cases	CD TR 12786	Definition of use cases related to the utilization of big data and AI in ITS
2	In-vehicle passenger monitoring and care services using deep learning technology	WD TS 22577	Defines vehicle occupant monitoring and care services utilizing deep learning technologies in driverless vehicles.

JWG 1 City data model transportation planning

The development of ISO/IEC-5087-3 (Transportation planning), which was part of the three-part of the ISO/IEC 5087 standard being developed by ISO/IEC JTC 1/WG 11 (Smart cities), is now being conducted by the initiative of transportation experts. Consequently, a new joint working group was established in 2023 at the proposal of the US, and TC 204-led standard development has begun.

In Japan, the Mobility Integration Working Group corresponding to WG 19 is responsible for this joint working group.

List of JWG 21 Work Items

	Standardization themes	ISO Number	Content
1	City data model - Part 3: Service level concepts - Transport	ISO/CD TS 5087-3	Specify an ontology to represent city structures and activities Part 3 specifies the service level (transportation planning)

Working groups that have been discontinued

In response to technological, social, and business changes in the standardization environment for ITS, TC 204 not only establishes new working groups, but also merges or disbands existing ones. The list below presents working groups that have ceased their activities.

Working Groups that have stopped activities

WG Name	Main Activities	Change in Situation
WG 2 Quality and Reliability	Considerations on standardization for quality and reliability relating to systems.	Effectively disbanded in 1998
WG 4 Automatic Vehicle and Equipment Identification	Considering automatic identification systems for cars or freight using on-board devices or simple media.	Disbanded in 2018
WG 6 General Fleet Management	Considerations on standardization for general items relating to fleet management.	Merged into WG 7 in 1997
WG 11 Route Guidance and Navigation Systems	Considering data contents and communications methods relating to route guidance and navigation systems.	No activities since May 2004 and therefore effectively disbanded
WG 12 Parking Management	Considerations on standardization for parking lots.	Disbanded in 1998
WG 13 Man-Machine Interface	Considerations on standardization for the human factor and the machine interface.	Transferred to TC 22 (Road vehicles) in 1995 Disbanded under TC 204
WG 15 Dedicated Short-Range Communications	Considering standardization of dedicated short-range communication methods for roadside unit-to-vehicle	Disbanded in 2014 WG 16 has taken over the management of published standards

Introduction to Related Standardization Activities

ITS Standardization at CEN/TC 278

The CEN (European Standards Committee)/TC 278 is a European technical committee responsible for ITS which was established in 1992 before the creation of ISO/TC 204. Previously known as Road Transport and Traffic Telematics (RTTT), it was renamed as ITS at the TC 278 plenary meeting in March 2013. At CEN, standards are usually prepared according to the following procedure.

They are first formalized as technical specifications (TS), and then are subject to review before finally either becoming a European standard (EN) or being cancelled. In principle, technical standards developed by European standard organizations such as CEN are non-binding. However, due to the binding legal force of Directive (EU) 2015/1535 (updated from the former Directive 98/34/EC), technical standards developed under the standardization directive effectively become mandatory standards. European EN standards differ from ISOs in that: (1) once detailed work on an EN has started, similar standardization work in individual European countries ceases; (2) once an EN is established, any standard in individual European countries that no longer compatible with the new one is abolished; and (3) EN is mandatory in public procurement.

At present, CEN/ TC 278 has 14 active Working Groups (WGs) and TC 204 and CEN/TC 278 collaborate closely in working on standardization.

In addition, CID (Commission Implementing Decision) for promoting standardization of Urban ITS was issued in February 2016, and WG 17 was created within CEN/TC 278 in April.

Currently, EU funding is nearing completion and standardization work is almost complete. The results will be presented ISO/TC 204/WG 19 and are being proposed as an ISO. Also, at the CEN/ TC 278 Stockholm plenary meeting in September 2019, the name WG was changed to Mobility Integration and became the same as ISO/TC 204/WG 19. The original name Urban ITS is no longer used in the EU as the expression is considered unsuitable. WG 17 project teams include PT 1701 to PT 1711, as well as PT 1712 that was newly created in 2020. These teams have developed the European ITS communications and information protocols (EU ICIP). WG 17 aims to develop a toolkit for governments to realize smart cities. Joint working group (JWG) meetings with WG 19 Mobility integration, established at the ISO/TC 204 Budapest plenary meeting in September 2018, are held frequently.

List of CEN/TC 278 working groups

	CEN/TC 278 Working Group	Working Group	Lead Country	Corresponding TC 204 Working Group
★	WG 1	Electronic Fee Collection (EFC)	Sweden	WG 5
	WG 2	Freight and Fleet Management systems (FFMS)	Dormant	WG 7
	WG 3	Public Transport (PT)	France	WG 8
★	WG 4	Traffic and Traveler Information (TTI)	United Kingdom	WG 10
	WG 5	Traffic Control Systems (TC)	Dormant	WG 9
	WG 6	Parking management	Dormant	WG 14
	WG 7	ITS Spatial data	Germany	WG 3
	WG 8	Road Traffic Data (RTD)	Netherlands	
	WG 9	Dedicated Short Range Communications (DSRC)	Dormant	WG 16 (abolished WG 15)
	WG 10	Man-Machine Interfacing	Dormant	(TC 22/SC 39/WG 8)
	WG 11	Subsystem and intersystem interfaces	Dormant	
	WG 12	Automatic Vehicle and Equipment Identification	Dormant	WG 4 (abolished)
	WG 13	ITS Architecture	Dormant	WG 1
	WG 14	Recovery of Stolen Vehicles	Dormant	
	WG 15	eSafety / eCall	United Kingdom	
★	WG 16	Cooperative ITS	Germany	WG 18
★	WG 17	Mobility inegration (formerly Urban ITS)	Norway	WG 19

★JWG

Source: https://www.itsstandards.eu/aboutus/

●The Vienna Agreement

Background and significance of the Vienna Agreement

The Vienna Agreement, concluded in 1990, aims to foster close cooperation between CEN (the European Committee for Standardization) and ISO standardization programs. The Vienna Agreement defines cooperation between both organizations on the following three points.

1) Document exchange between TC and CEN/TC:
   Documented draft standards prepared by the committees of each group will be exchanged through their respective coordinating countries.
2) Dispatching mutual representatives to committees and WGs:
   Per agreement between the TC and CEN/TC committees, up to four representatives may attend meetings of the other party's committee. In such instances, non-CEN national members are given priority as representatives.
   •1 Formal appointment by the ISO/CEN committee is required.
   •2 Representatives are expected to have an interest in the subject and contribute constructively at the meeting. The representatives do not have voting rights.
3) Parallel inquiries in developing standards:
   The ISO has priority in leading work items when the NP requirement is met. Leadership by CEN is only exceptionally permitted, with the approval of a simple majority of P-member of non-CEN nations in the ISO committee. However, ISO leadership is required for later revisions to standards developed under the CEN lead. Exceptions are only made upon approval by a simple majority of P-members of non-CEN nations. When the development of the standard is led by CEN, it is important to participate in CEN meetings, in accordance with the Vienna Agreement, at the development stage, since voting in TC is to be made in parallel at the DIS phase.
4) Others:
   The CS (Central Secretariat), CEN, and the NSB (National Standardization Body) are responsible for the correct implementation of the Vienna Agreement. The ISO Central Secretariat and CCMC (CEN/CENELEC management center) are responsible for ordinary transaction and management. Secretary-generals of ISO and CCMC are responsible for making decisions of necessary actions when problems emerge in the enforcement and functionality of the Vienna Agreement and its guidelines. The Vienna Agreement plays a special role in the ISO standard development to CEN standardization activities, and as such, non-European countries may feel it gives European countries an unfair advantage. On the other hand, it is also possible to say that it plays a role in preventing disadvantages from being passed to non-European countries, with internationally influential European standardization activities completed within Europe. Thus it is important to use the rights given to non-European countries via the Vienna Agreement as tools to counter standardization in progress at the initiative of Europe.

References
(1) https://boss.cen.eu/media/CEN/ref/va_FAQ.pdf
(2) Guidelines for the implementation of the Agreement on Technical Co-operation between ISO and CEN (Vienna Agreement), Seventh Edition dated 2016. https://webdesk.jsa.or.jp/pdf/dev/md_472.pdf

ISO/TC 22 (Road Vehicles) Standardization Activities

Founded at the same time as ISO in 1947, TC 22 is one of the oldest TCs.The following diagram shows its scope and structure. TC 22 plenary meetings are held every 18 months, and the following eight member countries regularly attend: France, Germany, USA, Japan, Italy, Sweden, South Korea and Malaysia. There are 1036 TC 22-published international standards as of July 2025, and 212 draft standards are currently under development.

Scope and structure of TC 22

ISO/TC 22

Chair: France
P member: 35 countries
O member: 48 countries

Secretariat: AFNOR
International secretariat: BNA

[Scope] (Revised June 2023)
Standardization of all aspects for all types of road vehicles and their interfaces approved for operation on public roads for the whole life cycle concerning safety, security, sustainability, compatibility, interchangeability, maintenance, evaluation of performance and quality.
It also includes, but is not limited to, these vehicle related aspects:
- Hardware and software
- Driving automation
- Communication and connected driving
- Test equipment and tools

SC	Name	Chair
SC 31	Data communication	Germany/ France
SC 32	Electrical and electronic components/ systems	Japan
SC 33	Vehicle dynamics and chassis components	Germany
SC 34	Powertrain	Japan
SC 35	Lighting and visibility	Italy
SC 36	Safety and impact tests	US
SC 37	Electrically propelled vehicles	Germany
SC 38	Motorcycles and mopeds	Japan
SC 39	Ergonomics	US
SC 40	Commercial vehicles, buses and trailers	Italy
SC 41	Gasoline engine vehicles	Italy

AFNOR: Association Française de Normalisation; BNA: Bureau de Normalisation de l'Automobile (France)

Work items related to automated driving

SC	WG	Work Items
SC 31	WG 6 Extended vehicle/Remote diagnostics	ISO 20077 (series) Extended vehicle (ExVe) methodology ISO 20078 (series) Extended vehicle (ExVe) web services ISO 23239-1 Vehicle domain service (VDS) — Part 1: General information and use case definitions ISO/TR 23786 Solutions for remote access to vehicle — Criteria for risk assessment
SC 32	WG 8 Functional safety	ISO 21448 Safety of the intended functionality
	WG 11 Cybersecurity	CD PAS 8475 Cybersecurity Assurance Levels (CAL) and Targeted Attack Feasibility (TAF) AWI TR 8477 Cybersecurity verification and validation ISO/SAE 21434 Cybersecurity engineering
	WG 13 Safety for driving automation systems	TS 5083 Safety for automated driving systems – Design, verification and validation
	WG 14 Safety and Artificial Intelligence	ISO/PAS 8800 Safety and artificial intelligence
SC 33	WG 3 Driver assistance and active safety functions	ISO/PAS 11585 Partial driving automation - Technical characteristics of conditional hands-free driving systems AWI PAS 11585-2 Partial driving automation — Part 2: Test method to evaluate the performance of partial driving automation conditional hands-free driving systems ISO/PAS 21779-1 Test method to evaluate the performance of Acceleration Control Pedal Error (ACPE) – Part 1: Car-to-car from standstill AWI/PAS 21779-2 Test method to evaluate the performance of Acceleration Control Pedal Error (ACPE) – Part 2: Car to pedestrian with creeping speed WD 25355 Test method for evaluating the performance of rear cross traffic alerting system
	WG 9 Test scenarios of automated driving systems	ISO 34501 Test scenarios for automated driving systems – Vocabulary ISO 34502 Test scenarios for automated driving systems – Scenario based safety evaluation framework ISO 34503 Test scenarios for automated driving systems – Taxonomy for operational design domain ISO 34504 Test scenarios for automated driving systems – Scenario categorization ISO 34505 Test scenarios for automated driving systems — Scenario evaluation and test case generation
SC 35	WG 3 Visibility	ISO 24650 Sensors for automated driving under adverse weather conditions – Assessment of the cleaning system
SC 39	WG 8 TICS on-board-MMI	DTS 5283-1 Driver readiness and intervention management — Part 1: Partial automation (Level 2) PWI TR 5283-2 Driver readiness and intervention management — Part 2: Conditional automation (Level 3) ISO/PAS 23735 Ergonomic design guidance for external visual communication from automated vehicles to other road users

●Memorandum of Understanding between TC 22 and TC 204

Due to developments in driving assistance technology and embodiment of standardization work with progress in driving automation technology, duplicated content of duties between TC 22 and TC 204 were revealed. A memorandum of understanding for establishing cooperation procedures between both TCs was therefore agreed in June 2014. The memorandum describes procedures including that the scopes of both TCs and liaison between remain unchanged, but problems of duplicated standardization work should be solved between both WGs, and problems not solvable between the WGs should be resolved between the chairmen of the WGs. As a result of the cooperative activity based on this memorandum, TC 22/SC 33/WG 16 (Active safety test equipment) has published the pedestrian dummy standards (ISO 19206-1). TC 204/WG 14 has published standards for pedestrian detection and collision mitigation systems (ISO 19237). To promote future standardization activities, which are crucial for the automotive industry, the need for flexible handling of cooperation between both TC/WGs is becoming an issue of concern.

ISO/TC 268 Standardization Activities

●TC 268/SC 2 Sustainable mobility and transportation subcommittee

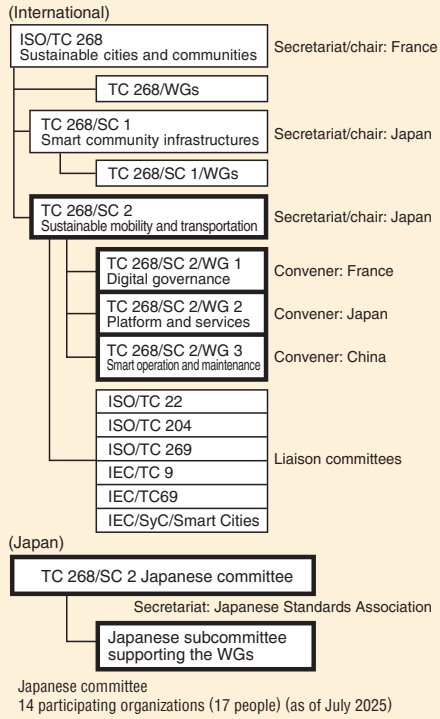
ISO/TC 268 (Sustainable cities and communities) was established in February 2012 and has been working on international standardization in this field since then. TC 268/SC 1 (Smart community infrastructures) was established at the same time based on a proposal from Japan and has been advancing the standardization of infrastructure technologies related to energy, transportation, natural disaster measures, etc.

In the spring of 2020, SC 1/WG 3 (Smart transportation) proposed the formation of a subcommittee (SC) to carry out standardization related to organizational issues, infrastructure, and services in the mobility and transportation options for cities and communities, including new technologies such as electric, hydrogen, and automated driving. In the fall of 2021, SC 2 (Sustainable mobility and transportation) was established, and in 2022 working groups were established based on the respective proposals of France and Japan, kicking off activities to develop standards.

In Japan, the Japanese Standards Association (JSA) serves as the Secretariat for the national committee organized as a counterpart to TC 268/SC 2. There is wide participation in this national committee from research institutes, academic experts, business operators in the automotive, train, and transportation services fields, and business groups as well as the Ministry of Economy, Trade and Industry (METI), Ministry of Land, Infrastructure, Transport and Tourism (MLIT), and the Digital Agency.

As of January 1, 2026, the committee will transfer to JTC 4..

Committee Structure



Japanese committee
14 participating organizations (17 people) (as of July 2025)

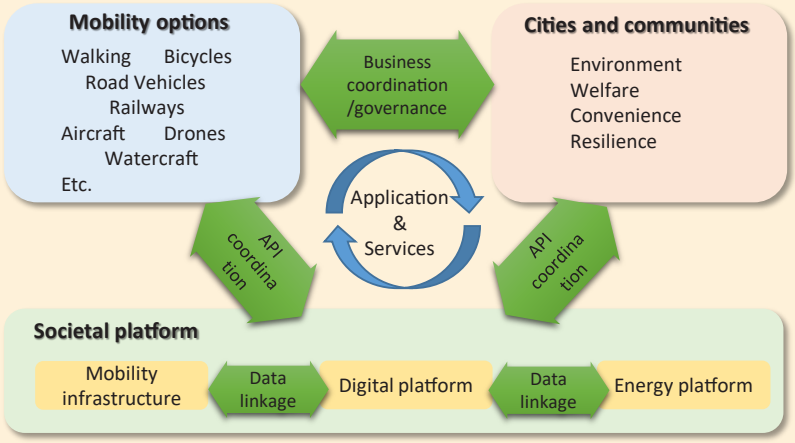
Scope of committee activities

ISO/TC 268:
- Standardization in the field of sustainable cities and communities.
- Includes the development of requirements, frameworks, guidance, and supporting techniques and tools related to the achievement of sustainable development considering smartness and resilience.

ISO/TC 268/SC 1:
- Standardization related to urban infrastructure (water management, energy, ICT, waste processing, etc) that will play a major role in supporting smart cities and resolving urban issues.
- The creation of environments in which advanced Japanese technology can be assessed appropriately, and the promotion of contributions and involvement from Japan toward urban development around the world.
- The promotion of the global and the vitalization of international exchange about urban infrastructure.

ISO/TC 268/SC 2:
- Standardization in the fields of sustainable mobility and transportation will promote of a multi-sectorial integrated approach for cities and communities.
- The consideration of organizational issues, infrastructures, and services in the mobility and transportation options for cities and communities, including those related to new technologies (i.e. electric, hydrogen, autonomous).
- Requirements, frameworks, guidance, as well as supporting techniques and tools with a long-term vision to plan, develop, operate, maintain, and manage sustainable mobility and transportation systems and services.
- Excluded: Road vehicles covered by ISO/TC 22, intelligent transport systems covered by ISO/TC 204, railway applications covered by ISO/TC 269, and electrical equipment and systems for railways covered by IEC/TC 9.

Target Business Areas for Standardization by ISO/TC 268/SC 2



Stakeholders in each area

Cities and communities:
- Local government officers
- Public agencies
- Citizens
- Visitors

Mobility options:
- Mobility providers
- Associated industries

Societal platform:
- Road operators
- Service providers
- Utility companies

Main standards under development at ISO/TC 268/SC 2

WG	Reference	Title	Overview
WG 1	PRF 16481	Digital governance – Strategic needs regarding ISO 37101 purposes of sustainability	A vision related to functional and environmental needs of component mobility systems.
WG 1	DIS 16483	Digital governance – Indicators	Metrics capable of quantifying the evolution of sustainable mobility systems.
WG 1	PWI 25645	Digital governance – Mobility data framework	Establishes a platform for the development of data-driven mobility solutions.
WG 2	TR 16497-1	Sustainable Mobility Services – Part 1: Use Cases	Extraction of future standardization needs by collecting and organizing cases of MaaS and other smart transportation initiatives from Japan, US, and Europe, and analyzing the mutual gaps between them.
WG 2	PWI TR 16497-2	Sustainable Mobility Services – Part 2: Gap and overlap analysis	Analyzes the use cases collected in Part 1.
WG 2	PRF 16499-1	Automated mobility using physical and digital infrastructure – Part 1: Service role architecture	Definition of electric road systems equipped with a dynamic charging function for BEVs.
WG 2	DIS 4078-1	Roadside feeding electric road system – Part 1: Service role architecture	Definition of electric road systems equipped with a dynamic charging function for BEVs.
WG 2	DIS 4078-2	Roadside feeding electric road system – Part 2: Service and operational concept	Concepts for services and operation of electric road systems
WG 2	DIS 23098-1	Mobility monitoring and services by data sharing platform – Part 1: Role model	Describes a functional role model for mobility monitoring services that use a data sharing platform.
WG 2	PWI 23098-3	Mobility monitoring and services by data sharing platform – Part 3: Regulated services	Describes services subject to regulation in mobility monitoring services that use a data sharing platform.
WG 2	PWI 23098-4	Mobility monitoring and services by data sharing platform – Part 4: Supplement role to regulated services	Describes supplemental roles of services subject to regulation in mobility monitoring services that use a data sharing platform.
WG 2	CD 25264-1	Photovoltaic power supply management for mobility – Part 1: Role model	Describes role models of solar cell power supply management for mobility.
WG 2	PWI 25580	Digital scheduling service	AI cloud-based security service provisioning for mobility services.
WG 2	PWI 25581-1	Mobility service using AI and big data – Part 1: Role Model	AI and big data governance in the context of various mobility and transport services.
WG 3	PWI 23174-1	Smart operation and maintenance – Part 1: General rules	Describes general rules including roles and functional models related to smart operation and maintenance in urban mobility and transportation.

●Policy for Collecting and Organizing Cases of Sustainable Mobility

The table to the right indicates the main categories to collect sustainable mobility initiatives carried in countries and territories around the world, which will dedicate future discussions on standardization.

- Involvement of related bodies (public, private, other)
- Connection with political objectives (care and assistance, education, disaster preparedness, environment, tourism, economic revitalization, etc.)

Policy targets	Environment	
	Equity and Inclusion	
	Economic growth	
	Others	
Travel modes considered	Existing modes	Private modes
		Public transport
		Others
	New Mobility services	Sharing services
		On-demand services
		Others
Organization involved (style of collaboration)	Local municipality (local government)	
	Transport operators	
	NPO	
	Other public sectors	
	Other private sectors	
	Others	
Impacts on social issues	Contribution to decarbonization policy	
	Contribution to support for outings for the elderly	
	Contribution to the revitalization of local small cities	
	Contribution to school commuting support	
	Contribution to utilizing with existing public transportation	
Overview	Outline	
	System image	
	introduction effects	

ETSI TC ITS Activities

ETSI (European Telecommunication Standards Institute) is a nonprofit organization approved by the EU (European Union) as ESO (European Standardization Organization). It is developing standards for the entire telecommunication field.

It is based in Sophia Antipolis, in the suburbs of Nice in southern France. Its logo "World Class Standards" represents the global influence of the organization, which has member companies and organizations in more than 60 countries.(1)

Unlike the ISO membership structure in which each country is represented in the organization, any company, organization or individual paying the membership fee becomes a member of ETSI. It has numerous member companies and organizations in the United States and in Asian countries including Japan, in addition to countries in Europe.

Among more than 40 TCs (technical committees) including those for wireless, wired, broadcast and network, TC ITS is responsible for standardization of ITS. It comprises five working groups, as shown in Table 1, that are developing standards corresponding to each technical field.

Table 1 ETSI TC ITS Structure Diagram

WG 1	Application requirements and services
WG 2	Architecture and cross-layer items
WG 3	Networking and Transport
WG 4	Communication media and media-related items
WG 5	Security

The cooperative ITS standardization directive (M453) was presented by European Commission in October 2009. ETSI and CEN (the Euroean Committee for Standardization) undertook the standardization. Consequently, even at the initial stage, called Release 1, more than 110 relevant standards were published.(2)

ETSI has published many standards related to communications for vehicle-to-vehicle and roadside-to-vehicle using 5.9 GHz band DSRC. Two European standards (ENs) shown in Table 2 are especially well known.

Table 2 Typical European Standards published by ETSI TC ITS

EN 302 637-2	Specification of Cooperative Awareness Basic Service	Definition of transmission/reception, etc., of CAMs (Cooperative Awareness Message) to steadily provide other participants in traffic at a certain interval with data of positions, movement and attributions, etc., in vehicle-to-vehicle and roadside-to-vehicle communications to promote their awareness.
EN 302 637-3	Specifications of Decentralized Environmental Notification Basic Service	Definition of transmission/reception, etc., of DENMs (Decentralized Environmental Notification Message) to provide details at random times, mainly when dangerous incidents occur in road traffic.

These standards are implemented in roadside devices and invehicle equipment from a variety of equipment vendors. Conformance and interoperability between devices is tested in events called C-ITS Plugtests™ held by ETSI every year.

The development of other standards is in progress in preparation for actual deployment of cooperative ITS, including congestion control in case of growth in numbers of vehicles equipped with ITS devices, and discussion on issues in multi-channel communications.

ETSI/TC-ITS has also begun to develop a set of standards in anticipation of automated driving technologies called Release 2.

Examples of these include:

- Truck platooning; Pre-standardization study
- Cooperative ITS for the safety of Vulnerable Road Users (VRU)
- Collective Perception Service that shares the information from onboard sensors with other vehicles using wireless communications
- Manoeuvre coordination service at intersections and merging roads

Note that in January 2019, a draft delegated act related to ITS station specifications was released by the European Commission. The 5.9 GHz Dedicated Short-Range Communications (ITS-G5) have been designated as the communications medium in princile, it however states that a revision will be carried out within three years taking account of the new communications technologies (LTE-V2X, 5G, etc.).

Taking this situation into account, ETSI is studying the feasibility of interoperability among heterogeneous ITS systems, such as LTE-V2X, using a mobile phone communication technology, and ITS-G5 (5.9 GHz, Dedicated Short-Range Communications), and backward compatibility.

ETSI TR 103 576-2

Pre-standardization study on ITS architecture;
Part 2: Interoperability among heterogeneous ITS systems and backward compatibility

Since communications among heterogeneous ITS systems require installation of at least two receivers, animated discussions continue about technical feasibilities and challenges.

Work on ETSI TC-ITS is closely related to that in the SAE V2X Communications Committee. Both groups are closely exchanging information to arrive at the harmonization and co-development of standards.

Verification of harmonization and information sharing in relation to work items of ETSI/TC ITS are also in progress under TC 204.

References
(1) http://www.etsi.org/about, ETSI Annual Report, April 2017,
(2) Japan Automobile Research Institute: ITS report 2014

ITS-related standardization in ITU

The International Telecommunication Union (ITU) is developing Recommendations and other material in the field of ITS communications.

ITU Recommendations stipulate the technical requirements that communication systems and devices should comply with, as recommendations, and each country or company must adopt the necessary Recommendations as essential requirements.

The ITU is a specialized agency of the United Nations with a membership consisting of 194 Member States, as well as over 1,000 institutions (companies, universities, and other organizations) as of July 2025. ITU is composed of three sectors: ITU-R (Radio communications), ITU-T (Telecommunications), and ITU-D (Telecommunications development).

ITU-R is involved in the adoption of international regulations and international treaties regarding terrestrial and space (satellite) radio frequency allocation and the orbital position of geostationary satellites. Countries must establish relevant laws and regulations in accordance with the rules and treaties. Study groups (SG) which are lower-level bodies under ITU-R generate recommendations, which are the standards for wireless communications. ITS primarily falls under SG 5 (Terrestrial services) with concrete deliberations taking place in Working Party 5A (WP 5A, Land mobile service excluding IMT; amateur and amateur-satellite services). A Working Group (WG) responsible for applications in the transport field has been established under WP 5A. In addition, the use of C-V2X has also been studied in WP5D (International Mobile Telecommunication Systems).

ITU-T is also responsible for generating recommendations for research and standardization with respect to the technologies and the usage of telecommunications. In fields related to ITS communication, standardization work is being carried out in various SGs, including SG 12 (Quality), SG 16 (Multimedia applications), SG 17 (Security), and SG 20 (IoT and smart cities).

ITU-D is promoting the development of Telecommunications through global technology assistance activities in the telecommunications field.

●Standardization of ITS in ITU-R

ITS standardization in ITU-R originated with a Study Question proposed in 1994. In 1997, a policy involving the standardization of ITS radio communications became a Recommendation (M.1310). This policy also led to the approval of the Recommendations for functional requirements, short-range radar at 60 and 76 GHz, and dedicated short-range communications at 5.8 GHz in 2000.

Subsequently, progress made in assessing and implementing advanced ITS radio communications led to new recommendations for ITS radio communication requirements. In 2011, the ITS radio communications guidelines (M.1890), as well as a new vehicle communications incorporating outcomes from 700-MHz advanced ITS wireless systems, the European ETSI, and other standardization efforts, and high-resolution radar in the 79 GHz band, became recommendations.

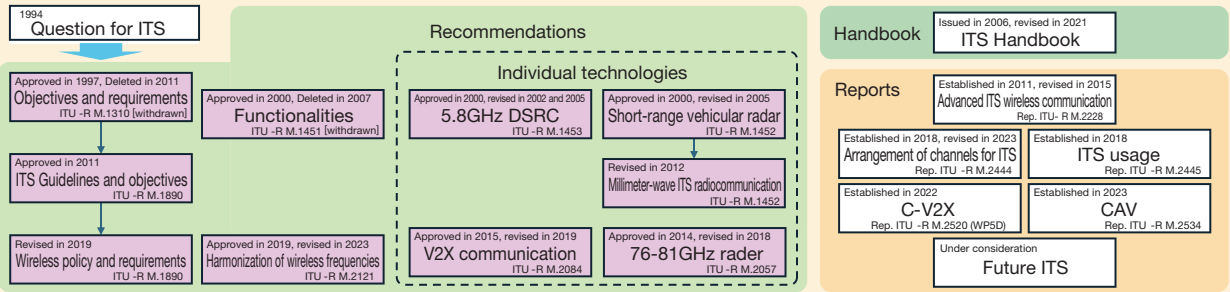
At the 2019 World Radio communication Conference (WRC), it was decided to recommend that the use of globally or regionally harmonized spectrums should be considered for ITS planning and deployment, and that coexistence with existing services should be considered where necessary. Consequently, the harmonization of ITS radio frequencies was made into a recommendation (M.2121), and related reports on the arrangement of channels for ITS (Report M.2444) and on the current use of ITS (Report M.2445) were produced.

Connected automated vehicles (CAV) were addressed in a report on CAV radio communication (Report M.2534) prepared in 2023, while the use cellular communication was covered in a cellular vehicle-to-everything (C-V2X) report (Report M.2520) written by WP 5D in 2022.

There are ongoing discussions on new reports that will cover future ITS functionality and advances.

A timeline providing an overview of ITS and other Recommendations prepared and approved until now is presented below.

Timeline of the preparation of ITS-related Recommendations



List of Recommendation documents

Recommendation number	Recommendation name	Target system	Publication Year/month
ITU-R M.1452-2	Millimetre wave vehicular collision avoidance radars and radiocommunication systems for intelligent transport system applications	60GHz/76GHz radar systems 60GHz communication systems	2012/5 (revision)
ITU-R M.1453-2	Intelligent transport systems - Dedicated short range communications at 5.8 GHz	5.8Ghz DSRC systems	2005/6 (revision)
ITU-R M.1890-1	Operational radiocommunication objectives and requirements for advanced Intelligent Transport Systems	General ITS radio communication	2019/01 (revision)
ITU-R M.2057-1	Systems characteristics of automotive radars operating in the frequency band 76-81 GHz for intelligent transport systems applications	76-81GHz radar systems	2018/01 (revision)
ITU-R M.2084-1	Radio interface standards of vehicle-to-vehicle and vehicle-to-infrastructure communications for Intelligent Transport System applications	V2V and V2I communication systems	2015/09
ITU-R M.2121-1	Harmonization of frequency bands for Intelligent Transport Systems in the mobile service	General ITS radio communication	2019/01

●ITS-related Standardizations in ITU-T

In ITU-T, eleven SGs (Study Groups) share the standardization work in the ICT field.

Focusing on the importance of ITS communications, ITU held a Fully Networked Car Workshop in collaboration with ISO and IEC as one of the events at the Salon International de l'Auto in Geneva from 2005 through 2013. From 2014, it has been hosting a Future Networked Car Symposium collaboratively with UNECE.

Before beginning the process of actual recommendation development, focus groups (FGs) enabling non-members to participate in preliminary discussions were established. Four FGs were set up between 2007 and 2013: FG-FITCAR, FG-FITCAR II and FG-CarCom, which discussed voice calls from vehicles, and FG Driver Distraction, which discussed what ICT technology can do to reduce auto accidents based on the UN report and ITU Council Resolution. The outcomes of those discussions led to related recommendation developments in SG 12 (Quality). The FG on Vehicular Multimedia (FG-VM) was established between 2018 and 2022 to study the extraction, organization and resolving of issues concerning the standardization of multimedia related to automobiles. Similarly, the FG on AI for Autonomous & Assisted Driving (FG-AI4AD) was established between 2020 and 2022 to study AI for automated driving. Turning the outcomes from those two focus groups into recommendations is now being considered in SG 16 (multimedia). Two items were already turned into recommendations.

The main items discussed at ITU-T include the standardization of network architectures and gateway platforms for ITS communications, security in ITS communications, and quality of service using ITS communications. (For its most recent status, refer to the following ITU-T Website: https://www.itu.int/en/ITU-T/Pages/default.aspx)

ITS communications study group (SG) in ITU-T

Study group	Fields in charge and main standardization fields in ITS communications
SG 2 (Operational aspects)	Provision and operation of management of telecommunication services Numbering standardization, telecommunication management in a disaster situation, and network operation and maintenance
SG 12 (Performance, QoS and QoE)	Performance, QoS (Quality of Service) and QoE (Quality of Experience) of the info-communication network.Discussing standardization on in-vehicle communication via handover, etc.
SG 16 (Multimedia)	Multimedia applications using the info-communication network Discussing on requirements and architecture (including gateway platform) to the info-communication network from the point of view of various applications including ITS communications
SG 17 (Security)	Security of the info-communication network Discussing on security technology in ITS communication and its related standardization
SG 20 (IoT and smart cities)	IoT and smart cities and communities Studying standardization related to mobility services in cities

Outline of recommendations

SG	Name of the document	Document number	Content
SG 2	Criteria and procedures for the reservation, assignment and reclamation of E.164 country codes and associated identification codes (ICs)	ITU-T E.164.1	Defines the numbers +882 and +883 and the like for eCall, emergency calling connecting to the nearest emergency response center which activate automatically when car accident occurs
SG 12	Narrowband hands-free communication in motor vehicles	ITU-T P.1100	Hands-free communication adapter using in-vehicle narrow band voice encoding
	Wideband hands-free communication in motor vehicles	ITU-T P.1110	Hands-free communication adapter using in-vehicle wide band voice encoding
	Super-wideband and fullband stereo hands-free communi-cation in motor vehicles	ITU-T P.1120	Hands-free communication adapter using in-vehicle ultra wide band and full -band stereo voice encoding
	Subsystem requirements for automotive speech services	ITU-T P.1130	In-vehicle subsystem requirements for speech services
	Speech communication requirements for emergency calls originating from vehicles	ITU-T P.1140	Speech communication requirements for emergency calls from vehicles
SG 16	Functional requirements for vehicle gateways	ITU-T F.749.1	Functional requirements for in-vehicle gateways
	Service requirements for vehicle gateway platforms	ITU-T F.749.2	Service requirements for in-vehicle gateway platforms
	Use cases and requirements for vehicular multimedia networks	ITU-T F.749.3	Use cases and requirements for in-vehicle multimedia networks
	Use cases and requirements for multimedia communication enabled vehicle systems using artificial intelligence	ITU-T F.749.4	Use cases and requirements for multimedia communication-enabled in-vehicle systems using artificial intelligence
	Vehicle domain service - General information and use case definitions	ITU-T F.749.5	Defines general information and use cases for vehicle domain services
	Requirements of vehicle information for automated driving in vehicle gateway platforms	ITU-T F.749.6	Vehicle information requirements for vehicle gateways in automated driving
	In-vehicle multimedia applets: Framework and capability requirements	ITU-T F.749.8	In-vehicle multimedia applets: framework and functional requirements
	Architecture and functional entities of vehicle gateway platforms	ITU-T H.550	Architecture and functional entities of in-vehicle gateway platforms
	Architecture of Vehicle Multimedia Systems	ITU-T H.551	Architecture for vehicle multimedia systems
	Implementation of vehicular multimedia systems	ITU-T H.552	Implementation of in-vehicle multimedia systems

SG	Name of the document	Document number	Content
	Communications interface between external applications and a vehicle gateway platform	ITU-T H.560	Communication interface between external applications and an in-vehicle gateway platform
SG 17	Security threats to connected vehicles	ITU-T X.1371	Document summarizing security threats in threat information to consistently promote standardization of security related to connected cars
	Security guidelines for vehicle-to-everything (V2X) communication	ITU-T X.1372	Security guidelines for vehicle-to-vehicle communication, including V2V, V2I, V2D, and V2P, and when the vehicle and other devices communicate
	Secure software update capability for intelligent transportation system communication devices	ITU-T X.1373	Security guidelines for remote software updates for ITS communication devices (currently under revision)
	Security requirements for external interfaces and devices with vehicle access capability	ITU-T X.1374	Security requirements for external interfaces and devices to access the vehicle's systems
	Guidelines for an intrusion detection system for in-vehicle networks	ITU-T X.1375	Guidelines for detecting external intrusions into in-car networks
	Security-related misbehaviour detection mechanism using big data for connected vehicles	ITU-T X.1376	Specifies a method for detecting security-related unauthorized behavior using data collected from vehicles and service providers
	Guidelines for an intrusion prevention system for connected vehicles	ITU-T X.1377	Guidelines for systems that prevent external intrusion in connected cars
	Security requirements for roadside units in intelligent transportation systems	ITU-T X.1379	Security requirements for ITS roadside units
	Security guidelines for cloud-based event data recorders in automotive environments	ITU-T X.1380	Security guidelines for automotive cloud-based event data recorders
	Security guidelines for Ethernet-based in-vehicle networks	ITU-T X.1381	Security guidelines for in-vehicle Ethernet
	Guidelines for sharing security threat information on connected vehicles	ITU-T X.1382	Guidelines for sharing information on security threats to connected cars
	Security requirements for categorized data in vehicle-to-everything (V2X) communication	ITU-T X.1383	Security requirements for methods of categorizing data handled in V2X communication and for the types of data
SG 20	Requirements of transportation safety service including use cases and service scenarios	ITU-T Y.4116	Defines the requirements for transportation safety management services. Defines the requirements for sensors, networks, data delivery, natural disaster management, maintenance, and the like.
	Requirements and capability framework for IoT-based automotive emergency response system	ITU-T Y.4119	Defines the requirements for emergency response systems when a traffic accident occurs.
	Accessibility requirements for smart public transportation services	ITU-T Y.4211	Defines the requirements for transportation service access by persons with an impairment. Categories and defines these requirements into an information layer and an interface layer.
	Requirements and capability framework of digital twin for intelligent transport system	ITU-T Y.4225	Defines the requirements for ITS digital twins. Defines the requirements for data interaction, processing, simulation, visualization, privacy, and security.
	Minimum set of data structure for automotive emergency response system	ITU-T Y.4467	Defines the emergency response data structure when a traffic accident occurs.
	Minimum set of data transfer protocol for automotive emergency response system	ITU-T Y.4468	Defines the emergency response data transfer protocol when a traffic accident occurs.
	Functional architecture of network-based driving assistance for autonomous vehicles	ITU-T Y.4471	Defines the functional architecture, functional entities, and reference points for network-based driver assistance systems.
	Requirements and Functional Architecture for Smart Parking Lot in Smart City	ITU-T Y.4456	Defines the requirements for smart parking lot systems: The functions necessary for the system to enable empty space searches, reservations, and payment by smart phones.
	Architectural framework for transportation safety services	ITU-T Y.4457	Defines the architectural framework to satisfy the requirements defined by Y.4116. Defines the required functions in accordance with the IoT architecture defined by Y.4000.
	Functional architecture of roadside multi-sensor data fusion systems for autonomous vehicles	ITU-T Y.4487	Defines the required functions in accordance with the IoT architecture described in Y.4000. Defines the functional entities for autonomous vehicles.
	Requirements for autonomous urban delivery robots interworking	ITU-T Y.4607	Describes the necessary functions for realizing home delivery services using unmanned vehicles.
	Reference architecture for the interworking of autonomous urban delivery robots	ITU-T Y.4605	Reference architecture for home delivery services using unmanned vehicles
	Unified IoT Identifiers for intelligent transport systems	ITU-T Y.4809	Defines data formats for road signs and signals.
	Requirements and capability framework of public smart charging service for electric vehicles	ITU-T Y.4230	Defines the requirements and functions of public charging services for electric vehicles.
	Requirements, capabilities and use cases of Internet of Things infrastructures in roadside traffic perception system	ITU-T Y.4232	Requirements, functions, and use cases for IoT infrastructure in roadside traffic perception systems.

●CITS (Collaboration on ITS Communication Standards)

CITS (Collaboration on ITS Communication Standards) was structured as a framework to provide a place where standardization institutions/bodies involved, including ITU-R, ISO, IEC, IEEE, regional standardization bodies and various forums, etc., establish collaboration and cooperation on the initiative of ITU-T. It aims to foster information sharing and opinion exchange in the form of workshops and meetings, and for work sharing, cross citation and revision of standard drafts based on agreements. Since the preparatory meeting held by ISO/TC204 and ITU-T SG 16 in August 2011, 34 CITS meetings have been held as of March 2024, at which participants exchanged and shared meaningful information about what had been achieved by each standardization body. In March 2024, a new expert group related to communication for autonomous driving (EG-ComAD) was established and began discussion.

ITS-related Standardizations by IEEE

The Institute of Electrical and Electronics Engineers (IEEE) is a professional organization for electrical and electronics engineering. Based in the United States, the institute discusses and formulates standards concerning technologies such as electronics, communications, and information. The IEEE standards are managed by the IEEE Standards Association (SA), which is responsible for standardization. The IEEE is organized into 39 groups called societies, which focus on a particular specialized field. Those involved in ITS include, notably, the Vehicular Technology Society, Intelligent Transportation Systems Society, and Computer Society. Working groups (WGs) under committees in each society consider specific standards.

●Standardizations by the IEEE 802 Committee

IEEE 802, a standards committee in the Computer Society, works on the standardization of local area networks (LANs) and metropolitan area networks (MANs). It includes WGs for both wired and wireless technologies. Table 1 lists wireless technology WGs related to ITS.

Table 1 ITS related Working Groups under IEEE 802 Committee

802.11	Wireless Local Area Network (WLAN)	Deals with technologies for wireless communication within a building and/or facility (Several tens to several hundreds meters)
802.15	Wireless Personal Area Network (WPAN)	Deals with technologies for wireless communication within a room (Several to several tens meters)
802.16	Wireless Metropolitan Area Network (WMAN)	Deals with technologies for wireless communication within a region like a city (Several to several ten kms)
802.20	Mobile Broadband Wireless Access (MBWA)	Deals with broadband IP wireless communication in high speed mobile environments such as vehicles
802.21	Handover between heterogeneous networks	Deals with technologies to continue communication by switching across different kind of networks
802.22	Wireless Regional Area Network (WRAN)	Deals with cognitive radio technologies enabling communications in TV broadcast band without causing interference

Task Group p of WG 802.11 standardized a 5.9 GHz band communication protocol adapted for the ITS use environment using the IEEE 802.11a wireless LAN protocol as a basis. IEEE 802.11p was published in 2010. In Europe, similarly, the European Telecommunications Standards Institute (ETSI) ITS Technical Committee defined ITS-G5, a communication standard using IEEE 802.11p, in 2009. TC 204/WG 16 also standardized IEEE 802.11p-based communication media as ISO 21215.

Subsequently, the protocol was extended using IEEE 802.11ac and ax wireless LAN technologies to achieve higher speeds, leading to the standardization of IEEE 802.11bd, which is compatible with the 60 GHz millimeter wave frequency band, in 2023.

Table 2 Outline of IEEE 802.11p Specifications

Frequency band to be used	5.85-5.925 GHz
Channel band width	10 MHz (optionally 20 MHz available in part)
Number channels	7
Modulation method	OFDM (same as IEEE 802.11a)
Max. transmission power/ communication distance	Class A: 0 dBm/ 15m, Class B: 10 dBm/ 100m Class C: 20dBm/ 400m, Class D: 28.8dBm/ 1000m
Medium access benefit	RSU and OBU are substantially equal. Quick link establishment

●Standardizations in IEEE 1609 Project

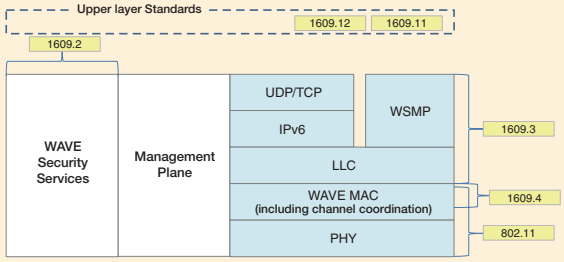
In the context of the IEEE 1609 project, the IEEE Vehicular Technology Society ITS committee has been working on the standardization of Wireless Access in Vehicular Environments (WAVE), which uses IEEE 802.11p as the communication media. Even systems utilizing LTE-V2X based on the Third Generation Partnership Project (3GPP) Release 14 are now partially using the IEEE 1609 standard.

Based on 1609.0 (Architecture), which describes the overall configuration, the standards have been published, and some are still being examined for revision. However, some parts are no longer being revised or were withdrawn after publication.

Table 3 Standardization Items in IEEE 1609

1609.0	WAVE Architecture
1609.1	Resource Manager (withdrawn)
1609.2	Security Services for Applications and Management Messages
1609.3	Networking
1609.4	Multi-Channel Operation
1609.11	Over-the-Air Electronic Payment Data Exchange Protocol for ITS (withdrawn)
1609.12	Identifier
1609.13	Reliable Data Transport Mechanisms for Multiple Receivers (Cancelled)
1609.20	Recommended practice for extending the functionality of IEEE Std 1609.2 (Cancelled)

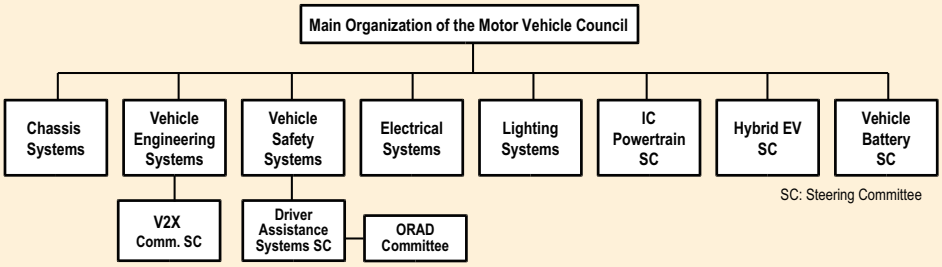
Overall WAVE architecture



SAE International Standardization Activities

SAE International is a non-profit organization whose aim is to create standards and promote related programs. The origin of the organization can be traced to the Society of Automobile Engineers, founded in 1904 in the United States. In the process of expanding its scope, originally that of motor vehicles exclusively, to include aircraft, ships, railway and other modes of transport, it began to use the term "Automotive," meaning a self-propelling conveyance, and to deploy branch offices in Canada and Brazil. It thus became known as the Society of Automotive Engineers or SAE International.

It now has more than 145,000 members worldwide, of whom 20,000 are engaged in standardization work. The standardization organization comprises more than 600 technical committees under six councils. The council that is most relevant to TC 204 is the Motor Vehicle Council. Unique to SAE is that specialists participate in the organization's standardization work for voting and other activities in a personal capacity, unlike other bodies, where they act as representatives of countries or organizations.



●Agreement on Standard Co-Development between ISO and SAE

The SAE agreed with the PSDO (Partnership Standards Development Organization) on TC 22 (Road Vehicles) and TC 204 (ITS) in September 2016. The agreement aims to achieve the collaborative creation of common standards to avoid creating conflicting standards in the same technology field, so that especially CAV (Connected and Automated Vehicles) and C-ITS (Cooperative ITS) using communications can smoothly develop and prevail. The SAE and TC 22 have continued to work together toward the development of standards related to "Automotive Security Engineering". Furthermore, the SAE and TC 204 have also made progress in the development of standards related to the "Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles". A wireless power supply method for electric vehicles, etc., is one of the fields the groups are considering for future development.

●SAE Automated Driving Committee Activities

The SAE ORAD (On-Road Automated Driving) committee is considering standards pertaining to automated driving. SAE J3016 "Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles" and SAE J3018 (Guidelines for Safe On-Road Testing of SAE Level 3, 4, and 5 Prototype Automated Driving Systems (ADS)), etc. have already been issued.

Other representative standards that are currently under development include the following two items:

- SAE J3092 (Dynamic Test Procedures for Verification & Validation of Automatic Driving Systems (ADS))
- SAE J3131 (Automated Driving Reference Architecture)

Based on the joint development agreement in the preceding section, SAE J3016 was formulated by a joint working group with ISO/TC 204 and work to revise it to improve its contents is in progress. This working group is comprised of members selected from the ORAD committee on the SAE side and members selected from WG 14 on the ISO/TC 204 side. First edition issued in August 2021 as an ISO/SAE co-owned document called ISO PAS 22736/SAE J3016.

●Reorganization of the SAE V2X Committee

The SAE DSRC (Dedicated Short-Range Communications) technology committee has established standards relevant to cooperative ITS in the United States. Well-known standards include SAE J2735: DSRC Message Set Dictionary (Dedicated Short-Range Communications Message Set Dictionary) and the SAE 2945 series (DSRC performance requirements).

Meanwhile, as a consequence of the progress of cellular communications technologies, the C-V2X (Cellular V2X) technology committee was newly organized in June 2017, but overlaps in work content with the DSRC technology committee became apparent due to the standardization of applications with low dependence on the communications medium, etc.

In addition, as a consequence of the expansion of the scope of the studies of cooperative ITS, the V2X Communications Steering Committee was established to control ITS communications technologies such as vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), vehicle-to-pedestrian (V2P), etc. The former DSRC technology committee and C-V2X technology committee were reorganized in February 2019 as nine Technology Committees under the umbrella of the V2X Communications Steering Committee.

- DSRC (matters unique to wireless access technologies)
- Cellular V2X (ditto)
- Advanced applications
- Security
- V2X Core (matters in common)
- Infrastructure Applications
- Traffic Signal Applications
- Vehicular Applications
- Tolling Applications

Since there is a close relationship between the work of the SAE V2X technology committee and the work of TC 204, ongoing exchanges of information between them are necessary.

TC 204 List of Work Items and Progress Stages as of July 2025

WG	ISO Numberr	Title	Stage						Pub-lished
			PWI	NP	WD	CD	DIS	FDIS	
ISO/TC 204	ISO 24535:2007	Intelligent transport systems — Automatic vehicle identification — Basic electronic registration identification (Basic ERI)							○
ISO/TC 204	ISO 24534-1:2010	Automatic vehicle and equipment identification — Electronic registration identification (ERI) for vehicles — Part 1: Architecture							○
ISO/TC 204	ISO 24534-2:2010	Automatic vehicle and equipment identification — Electronic registration identification (ERI) for vehicles — Part 2: Operational requirements							○
ISO/TC 204	ISO 24534-3:2016	Intelligent transport systems — Automatic vehicle and equipment identification — Electronic registration identification (ERI) for vehicles — Part 3: Vehicle data							○
ISO/TC 204	ISO 24534-4:2010	Automatic vehicle and equipment identification — Electronic registration identification (ERI) for vehicles — Part 4: Secure communications using asymmetrical techniques							○
ISO/TC 204	ISO 24534-4:2010/Amd 1:2019	Automatic vehicle and equipment identification — Electronic registration identification (ERI) for vehicles — Part 4: Secure communications using asymmetrical techniques — Amendment 1							○
ISO/TC 204	ISO 24534-5:2011	Intelligent transport systems — Automatic vehicle and equipment identification — Electronic Registration Identification (ERI) for vehicles — Part 5: Secure communications using symmetrical techniques							○
ISO/TC 204	ISO 24534-5:2011/Amd 1:2019	Intelligent transport systems — Automatic vehicle and equipment identification — Electronic Registration Identification (ERI) for vehicles — Part 5: Secure communications using symmetrical techniques — Amendment 1							○
ISO/TC 204	ISO/PWI 22261-2	Intelligent transport systems — Field device SNMP data interface — Part 2: Part 1: Global objects	○						
ISO/TC 204	ISO/PWI TS 21867-1	Intelligent transport systems - Application programming interface for map updating — Part 1: Part 1: Requirements	○						
ISO/TC 204	ISO/PWI TS 21827-2	Intelligent transport systems - Application programming interface for map updating — Part 2: Part 2: Architecture and platform-independent data model	○						
ISO/TC 204	ISO/TR 17384:2008	Intelligent transport systems — Interactive centrally determined route guidance (CDRG) — Air interface message set, contents and format							○
ISO/TC 204	ISO 17264:2009	Intelligent transport systems — Automatic vehicle and equipment identification — Interfaces							○
ISO/TC 204	ISO 17264:2009/ Amd 1:2019	Intelligent transport systems — Automatic vehicle and equipment identification — Interfaces — Amendment 1							○
ISO/TC 204	ISO 17263:2012	Intelligent transport systems — Automatic vehicle and equipment identification — System parameters							○
ISO/TC 204	ISO 17263:2012/Cor 1:2013	Intelligent transport systems — Automatic vehicle and equipment identification — System parameters — Technical Corrigendum 1							○
ISO/TC 204	ISO 17262:2012	Intelligent transport systems — Automatic vehicle and equipment identification — Numbering and data structures							○
ISO/TC 204	ISO 17262:2012/ Amd 1:2019	Intelligent transport systems — Automatic vehicle and equipment identification — Numbering and data structures — Amendment 1							○
ISO/TC 204	ISO 17262:2012/Cor 1:2013	Intelligent transport systems — Automatic vehicle and equipment identification — Numbering and data structures — Technical Corrigendum 1							○
ISO/TC 204	ISO 17261:2012	Intelligent transport systems — Automatic vehicle and equipment identification — Intermodal goods transport architecture and terminology							○
ISO/TC 204	ISO 15075:2003	Transport information and control systems — In-vehicle navigation systems — Communications message set requirements							○
ISO/TC 204	ISO 14816:2005	Road transport and traffic telematics — Automatic vehicle and equipment identification — Numbering and data structure							○
ISO/TC 204	ISO 14816:2005/ Amd 1:2019	Road transport and traffic telematics — Automatic vehicle and equipment identification — Numbering and data structure — Amendment 1							○
ISO/TC 204	ISO 14815:2005	Road transport and traffic telematics — Automatic vehicle and equipment identification — System specifications							○
ISO/TC 204	ISO 14814:2006	Road transport and traffic telematics — Automatic vehicle and equipment identification — Reference architecture and terminology							○
ISO/TC 204/ JWG 1	ISO/CD TS 5087-3	Information technology — City data model — Part 3: Service level concepts - Transport				○			
ISO/TC 204/ WG 1	ISO/PWI 25965	Intelligent transport systems — Ontologies — Model management	○						
ISO/TC 204/ WG 1	ISO/PWI TS 25321	Intelligent transport systems — Ontologies — Vehicle operational information	○						
ISO/TC 204/ WG 1	ISO/TR 25104:2008	Intelligent transport systems — System architecture, taxonomy, terminology and data modelling — Training requirements for ITS architecture							○
ISO/TC 204/ WG 1	ISO/TR 25102:2008	Intelligent transport systems — System architecture — 'Use Case' pro-forma template							○
ISO/TC 204/ WG 1	ISO/TR 25100:2012	Intelligent transport systems — Systems architecture — Harmonization of ITS data concepts							○
ISO/TC 204/ WG 1	ISO 24531:2013	Intelligent transport systems — System architecture, taxonomy and terminology — Using XML in ITS standards, data registries and data dictionaries							○
ISO/TC 204/ WG 1	ISO/TR 24529:2008	Intelligent transport systems — Systems architecture — Use of unified modelling language (UML) in ITS International Standards and deliverables							○
ISO/TC 204/ WG 1	ISO 24097-1:2017	Intelligent transport systems — Using web services (machine-machine delivery) for ITS service delivery — Part 1: Realization of interoperable web services							○
ISO/TC 204/ WG 1	ISO/TR 24097-2:2015	Intelligent transport systems — Using web services (machine-machine delivery) for ITS service delivery — Part 2: Elaboration of interoperable web services' interfaces							○
ISO/TC 204/ WG 1	ISO/TR 24097-3:2019	Intelligent transport systems — Using web services (machine-machine delivery) for ITS service delivery — Part 3: Quality of service							○
ISO/TC 204/ WG 1	ISO/TR 23255:2022	Intelligent transport systems — Architecture — Applicability of data distribution technologies within ITS							○
ISO/TC 204/ WG 1	ISO/TR 17465-1:2014	Intelligent transport systems — Cooperative ITS — Part 1: Terms and definitions							○
ISO/TC 204/ WG 1	ISO/TR 17465-2:2015	Intelligent transport systems — Cooperative ITS — Part 2: Guidelines for standards documents							○

WG	ISO Numberr	Title	Stage						Pub-lished
			PWI	NP	WD	CD	DIS	FDIS	
ISO/TC 204/ WG 1	ISO/TR 17465-3:2015	Intelligent transport systems — Cooperative ITS — Part 3: Release procedures for standards documents							○
ISO/TC 204/ WG 1	ISO 14817-1:2015	Intelligent transport systems — ITS central data dictionaries — Part 1: Requirements for ITS data definitions							○
ISO/TC 204/ WG 1	ISO 14817-2:2015	Intelligent transport systems — ITS central data dictionaries — Part 2: Governance of the Central ITS Data Concept Registry							○
ISO/TC 204/ WG 1	ISO 14817-3:2017	Intelligent transport systems — ITS data dictionaries — Part 3: Object identifier assignments for ITS data concepts							○
ISO/TC 204/ WG 1	ISO 14813-1:2024	Intelligent transport systems — Reference model architecture(s) for the ITS sector — Part 1: ITS service domains, service groups and services							○
ISO/TC 204/ WG 1	ISO 14813-5:2020	Intelligent transport systems — Reference model architecture(s) for the ITS sector — Part 5: Requirements for architecture description in ITS standards							○
ISO/TC 204/ WG 1	ISO 14813-6:2017	Intelligent transport systems — Reference model architecture(s) for the ITS sector — Part 6: Use of ASN.1							○
ISO/TC 204/ WG 1	ISO/TS 14812:2025	Intelligent transport systems — Vocabulary							○
ISO/TC 204/ WG 1	ISO/TR 12859:2009	Intelligent transport systems — System architecture — Privacy aspects in ITS standards and systems							○
ISO/TC 204/ WG 1	ISO 5345:2022	Intelligent transport systems — Identifiers							○
ISO/TC 204/ WG 3	ISO 24099:2011	Navigation data delivery structures and protocols							○
ISO/TC 204/ WG 3	ISO/PWI TS 23944-1	Intelligent transport systems - Application programming interface for map updating — Part 1: Requirements	○						
ISO/TC 204/ WG 3	ISO/PWI TS 23944-2	Intelligent transport systems - Application programming interface for map updating — Part 2: Architecture and platform-independent data model	○						
ISO/TC 204/ WG 3	ISO/DTS 22726-1	Intelligent transport systems — Dynamic data and map database specification for connected and automated driving system applications — Part 1: Architecture and logical data model for harmonization of static map data						○	
ISO/TC 204/ WG 3	ISO/TS 22726-1:2023	Intelligent transport systems — Dynamic data and map database specification for connected and automated driving system applications — Part 1: Architecture and logical data model for harmonization of static map data							○
ISO/TC 204/ WG 3	ISO/TS 22726-2:2025	Intelligent transport systems — Dynamic data and map database specification for connected and automated driving system applications — Part 2: Logical data model of dynamic data							○
ISO/TC 204/ WG 3	ISO/TR 21718:2019	Intelligent transport systems — Spatio-temporal data dictionary for cooperative ITS and automated driving systems 2.0							○
ISO/TC 204/ WG 3	ISO 20524-1:2020	Intelligent transport systems — Geographic Data Files (GDF) GDF5.1 — Part 1: Application independent map data shared between multiple sources							○
ISO/TC 204/ WG 3	ISO 20524-2:2020	Intelligent transport systems — Geographic Data Files (GDF) GDF5.1 — Part 2: Map data used in automated driving systems, Cooperative ITS, and multi-modal transport							○
ISO/TC 204/ WG 3	ISO/TS 20452:2007	Requirements and Logical Data Model for a Physical Storage Format (PSF) and an Application Program Interface (API) and Logical Data Organization for PSF used in Intelligent Transport Systems (ITS) Database Technology							○
ISO/TC 204/ WG 3	ISO 19297-1:2019	Intelligent transport systems — Shareable geospatial databases for ITS applications — Part 1: Framework							○
ISO/TC 204/ WG 3	ISO 17572-1:2022	Intelligent transport systems (ITS) — Location referencing for geographic databases — Part 1: General requirements and conceptual model							○
ISO/TC 204/ WG 3	ISO 17572-2:2018	Intelligent transport systems (ITS) — Location referencing for geographic databases — Part 2: Pre-coded location references (pre-coded profile)							○
ISO/TC 204/ WG 3	ISO 17572-3:2015	Intelligent transport systems (ITS) — Location referencing for geographic databases — Part 3: Dynamic location references (dynamic profile)							○
ISO/TC 204/ WG 3	ISO 17572-4:2020	Intelligent transport systems (ITS) — Location referencing for geographic databases — Part 4: Precise relative location references (precise relative profile)							○
ISO/TC 204/ WG 3	ISO 17267:2009	Intelligent transport systems — Navigation systems — Application programming interface (API)							○
ISO/TC 204/ WG 5	ISO/AWI 37444	Electronic fee collection — Charging performance framework			○				
ISO/TC 204/ WG 5	ISO/TS 37444:2023	Electronic fee collection — Charging performance framework							○
ISO/TC 204/ WG 5	ISO/CD TR 25610	Electronic fee collection – Continuous toll schemes				○			
ISO/TC 204/ WG 5	ISO/PWI 25609	Electronic fee collection – Support for road safety and traffic management	○						
ISO/TC 204/ WG 5	ISO/AWI TS 25588	Electronic fee collection-– Image-based tolling systems –Test suite structure and test purposes			○				
ISO/TC 204/ WG 5	ISO/PWI TS 25493	Electronic fee collection – Image-based tolling systems – Test suite structure and test purposes	○						
ISO/TC 204/ WG 5	ISO/TR 25221:2025	Electronic fee collection — Image-based tolling systems — Measurable characteristics							○
ISO/TC 204/ WG 5	ISO 25110:2025	Electronic fee collection — Interface definition for on-board account using an integrated circuit card (ICC)							○

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			PWI	NP	WD	CD	DIS	FDIS	
ISO/TC 204/ WG 5	ISO/DIS 21719-1	Electronic fee collection — Personalization of on-board equipment (OBE) — Part 1: Framework					○		
ISO/TC 204/ WG 5	ISO/TS 21719-1:2018	Electronic fee collection — Personalization of on-board equipment (OBE) — Part 1: Framework							○
ISO/TC 204/ WG 5	ISO/TS 21719-2:2022	Electronic fee collection — Personalization of on-board equipment (OBE) — Part 2: Using dedicated short-range communication							○
ISO/TC 204/ WG 5	ISO/TS 21719-3:2021	Electronic fee collection — Personalization of on-board equipment (OBE) — Part 3: Using integrated circuit(s) cards							○
ISO/TC 204/ WG 5	ISO/TS 21193:2024	Electronic fee collection — Requirements for EFC application interfaces on common media							○
ISO/TC 204/ WG 5	ISO/TS 21192:2024	Electronic fee collection — Support for traffic management							○
ISO/TC 204/ WG 5	ISO/TR 21190:2018	Electronic fee collection — Investigation of charging policies and technologies for future standardization							○
ISO/TC 204/ WG 5	ISO/TR 19639:2015	Electronic fee collection — Investigation of EFC standards for common payment schemes for multi-modal transport services							○
ISO/TC 204/ WG 5	ISO 19299:2020	Electronic fee collection — Security framework							○
ISO/TC 204/ WG 5	ISO 17575-1:2016	Electronic fee collection — Application interface definition for autonomous systems — Part 1: Charging							○
ISO/TC 204/ WG 5	ISO 17575-2:2016	Electronic fee collection — Application interface definition for autonomous systems — Part 2: Communication and connection to the lower layers							○
ISO/TC 204/ WG 5	ISO 17575-3:2016	Electronic fee collection — Application interface definition for autonomous systems — Part 3: Context data							○
ISO/TC 204/ WG 5	ISO/DIS 17574	Electronic fee collection — Guidelines for security protection profiles					○		
ISO/TC 204/ WG 5	ISO/TS 17574:2017	Electronic fee collection — Guidelines for security protection profiles							○
ISO/TC 204/ WG 5	ISO/AWI 17573-1	Electronic fee collection — System architecture for vehicle-related tolling — Part 1: Reference model			○				
ISO/TC 204/ WG 5	ISO 17573-1:2019	Electronic fee collection — System architecture for vehicle-related tolling — Part 1: Reference model							○
ISO/TC 204/ WG 5	ISO/FDIS 17573-2	Electronic fee collection — System architecture for vehicle related tolling — Part 2: Vocabulary						○	
ISO/TC 204/ WG 5	ISO/TS 17573-2:2020	Electronic fee collection — System architecture for vehicle related tolling — Part 2: Vocabulary							○
ISO/TC 204/ WG 5	ISO 17573-3:2024	Electronic fee collection — System architecture for vehicle-related tolling — Part 3: Data dictionary							○
ISO/TC 204/ WG 5	ISO 17573-3:2024/AWI Amd 1	Electronic fee collection — System architecture for vehicle-related tolling — Part 3: Data dictionary — Amendment 1				○			
ISO/TC 204/ WG 5	ISO/DIS 16785	Electronic Fee Collection (EFC) — Application interface definition between DSRC-OBE and external in-vehicle devices					○		
ISO/TC 204/ WG 5	ISO/TS 16785:2020	Electronic Fee Collection (EFC) — Application interface definition between DSRC-OBE and external in-vehicle devices							○
ISO/TC 204/ WG 5	ISO 16410-1:2017	Electronic fee collection — Evaluation of equipment for conformity to ISO 17575-3 — Part 1: Test suite structure and test purposes							○
ISO/TC 204/ WG 5	ISO 16410-2:2018	Electronic fee collection — Evaluation of equipment for conformity to ISO 17575-3 — Part 2: Abstract test suite							○
ISO/TC 204/ WG 5	ISO 16407-1:2017	Electronic fee collection — Evaluation of equipment for conformity to ISO 17575-1 — Part 1: Test suite structure and test purposes							○
ISO/TC 204/ WG 5	ISO 16407-2:2018	Electronic fee collection — Evaluation of equipment for conformity to ISO 17575-1 — Part 2: Abstract test suite							○
ISO/TC 204/ WG 5	ISO/TR 16401-1:2018	Electronic fee collection — Evaluation of equipment for conformity to ISO/TS 17575-2 — Part 1: Test suite structure and test purposes							○
ISO/TC 204/ WG 5	ISO/TR 16401-2:2018	Electronic fee collection — Evaluation of equipment for conformity to ISO 17575-2 — Part 2: Abstract test suite							○
ISO/TC 204/ WG 5	ISO 14907-1:2020	Electronic fee collection — Test procedures for user and fixed equipment — Part 1: Description of test procedures							○
ISO/TC 204/ WG 5	ISO 14907-2:2021	Electronic fee collection — Test procedures for user and fixed equipment — Part 2: Conformance test for the on-board unit application interface							○
ISO/TC 204/ WG 5	ISO 14906:2022	Electronic fee collection — Application interface definition for dedicated short-range communication							○
ISO/TC 204/ WG 5	ISO 13143:2025	Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to ISO 12813							○
ISO/TC 204/ WG 5	ISO 13141:2024	Electronic fee collection — Localization augmentation communication for autonomous systems							○
ISO/TC 204/ WG 5	ISO 13140:2025	Electronic fee collection — Evaluation of on-board and roadside equipment for conformity to ISO 13141							○
ISO/TC 204/ WG 5	ISO 12855:2025	Electronic fee collection — Information exchange between service provision and toll charging							○

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ISO/TC 204/ WG 5	ISO 12813:2024	Electronic fee collection — Compliance check communication for autonomous systems							○
ISO/TC 204/ WG 5	ISO/TR 6026:2022	Electronic fee collection — Pre-study on the use of vehicle licence plate information and automatic number plate recognition (ANPR) technologies							○
ISO/TC 204/ WG 7	ISO 26683-1:2013	Intelligent transport systems — Freight land conveyance content identification and communication — Part 1: Context, architecture and referenced standards							○
ISO/TC 204/ WG 7	ISO 26683-2:2013	Intelligent transport systems — Freight land conveyance content identification and communication — Part 2: Application interface profiles							○
ISO/TC 204/ WG 7	ISO 26683-3:2019	Intelligent transport systems — Freight land conveyance content identification and communication — Part 3: Monitoring cargo condition information during transport							○
ISO/TC 204/ WG 7	ISO/TS 24533:2012	Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Road transport information exchange methodology							○
ISO/TC 204/ WG 7	ISO/PWI 24533-1	Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Part 1: Road transport information exchange methodology	○						
ISO/TC 204/ WG 7	ISO 24533-2:2022	Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Part 2: Common reporting system							○
ISO/TC 204/ WG 7	ISO 18495-1:2016	Intelligent transport systems — Commercial freight — Automotive visibility in the distribution supply chain — Part 1: Architecture and data definitions							○
ISO/TC 204/ WG 7	ISO 17687:2007	Transport Information and Control Systems (TICS) — General fleet management and commercial freight operations — Data dictionary and message sets for electronic identification and monitoring of hazardous materials/dangerous goods transportation							○
ISO/TC 204/ WG 7	ISO/TS 17187:2019	Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Governance rules to sustain electronic information exchange methods							○
ISO/TC 204/ WG 7	ISO/CD 15638-1	Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 1: Framework and architecture				○			
ISO/TC 204/ WG 7	ISO 15638-1:2012	Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 1: Framework and architecture							○
ISO/TC 204/ WG 7	ISO 15638-2:2013	Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 2: Common platform parameters using CALM							○
ISO/TC 204/ WG 7	ISO 15638-3:2013	Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 3: Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services							○
ISO/TC 204/ WG 7	ISO/TS 15638-4:2020	Intelligent transport systems — Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) — Part 4: System security requirements							○
ISO/TC 204/ WG 7	ISO 15638-5:2013	Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 5: Generic vehicle information							○
ISO/TC 204/ WG 7	ISO 15638-6:2014	Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 6: Regulated applications							○
ISO/TC 204/ WG 7	ISO 15638-7:2013	Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 7: Other applications							○
ISO/TC 204/ WG 7	ISO 15638-8:2014	Intelligent transport systems — Framework for cooperative telematics applications for regulated vehicles (TARV) — Part 8: Vehicle access management							○
ISO/TC 204/ WG 7	ISO 15638-9:2020	Intelligent transport systems — Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) — Part 9: Remote digital tachograph monitoring							○
ISO/TC 204/ WG 7	ISO 15638-10:2017	Intelligent transport systems — Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) — Part 10: Emergency messaging system/eCall							○
ISO/TC 204/ WG 7	ISO 15638-11:2014	Intelligent transport systems — Framework for cooperative telematics applications for regulated vehicles (TARV) — Part 11: Driver work records							○
ISO/TC 204/ WG 7	ISO 15638-12:2014	Intelligent transport systems — Framework for cooperative telematics applications for regulated vehicles (TARV) — Part 12: Vehicle mass monitoring							○
ISO/TC 204/ WG 7	ISO/TS 15638-13:2015	Intelligent transport systems — Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) — Part 13: "Mass" information for jurisdictional control and enforcement							○
ISO/TC 204/ WG 7	ISO 15638-14:2014	Intelligent transport systems — Framework for cooperative telematics applications for regulated vehicles (TARV) — Part 14: Vehicle access control							○
ISO/TC 204/ WG 7	ISO 15638-15:2014	Intelligent transport systems — Framework for cooperative telematics applications for regulated vehicles (TARV) — Part 15: Vehicle location monitoring							○
ISO/TC 204/ WG 7	ISO 15638-16:2014	Intelligent transport systems — Framework for cooperative telematics applications for regulated vehicles (TARV) — Part 16: Vehicle speed monitoring							○
ISO/TC 204/ WG 7	ISO 15638-17:2014	Intelligent transport systems — Framework for cooperative telematics applications for regulated vehicles (TARV) — Part 17: Consignment and location monitoring							○
ISO/TC 204/ WG 7	ISO 15638-18:2017	Intelligent transport systems — Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) — Part 18: ADR (Dangerous Goods)							○
ISO/TC 204/ WG 7	ISO/TS 15638-19:2013	Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 19: Vehicle parking facilities (VPF)							○
ISO/TC 204/ WG 7	ISO 15638-20:2020	Intelligent transport systems — Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) — Part 20: Weigh-in-motion monitoring							○
ISO/TC 204/ WG 7	ISO 15638-21:2018	Intelligent transport systems — Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV) — Part 21: Monitoring of regulated vehicles using roadside sensors and data collected from the vehicle for enforcement and other purposes							○
ISO/TC 204/ WG 7	ISO 15638-22:2019	Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 22: Freight vehicle stability monitoring							○
ISO/TC 204/ WG 7	ISO 15638-23:2025	Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 23: Tyre pressure monitoring (TPM)							○

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ISO/TC 204/ WG 7	ISO 15638-24:2021	Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 24: Safety information provisioning							○
ISO/TC 204/ WG 7	ISO 15638-25:2024	Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 25: Overhead clearance monitoring							○
ISO/TC 204/ WG 7	ISO/TS 15638-26:2024	Intelligent transport systems — Framework for cooperative telematics applications for regulated vehicles (TARV) — Part 26: Electric vehicle dynamic charging monitoring							○
ISO/TC 204/ WG 7	ISO/NP 15638-27	Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 27: Operation status monitoring for fleets using automated driving		○					
ISO/TC 204/ WG 7	ISO/TS 7815-1:2025	Intelligent transport systems — Telematics applications for regulated commercial freight vehicles (TARV) using ITS stations — Part 1: Secure vehicle interface framework and architecture							○
ISO/TC 204/ WG 7	ISO/TS 7815-2:2025	Intelligent transport systems — Telematics applications for regulated commercial freight vehicles (TARV) using ITS stations — Part 2: Specification of the secure vehicle interface							○
ISO/TC 204/ WG 8	ISO/PWI 25966	Intelligent transport systems — Emergency services — ITS requirements for two-wheeled road ambulance	○						
ISO/TC 204/ WG 8	ISO/PWI TS 25837	Intelligent Transport Systems - Public Transport - In vehicle telematics requirements	○						
ISO/TC 204/ WG 8	ISO/PWI TR 25613	Intelligent transport systems – Emergency services – Automated emergency vehicles driving (AED)	○						
ISO/TC 204/ WG 8	ISO/NP 25611	Role model for electrified driving public transit charging monitoring		○					
ISO/TC 204/ WG 8	ISO/PWI TR 24852	Intelligent transport systems – Public transport – Complementary concepts to ISO 24014-1:2021 for account-based ticketing	○						
ISO/TC 204/ WG 8	ISO/AWI 24851	Intelligent transport systems — Public transport — cEMV Transit Tokenisation			○				
ISO/TC 204/ WG 8	ISO 24298:2025	Intelligent transport systems — Public transport — Light emitting diode (LED) destination board system for public transport buses							○
ISO/TC 204/ WG 8	ISO 24014-1:2021	Public transport — Interoperable fare management system — Part 1: Architecture							○
ISO/TC 204/ WG 8	ISO/TR 24014-2:2013	Public transport — Interoperable fare management system — Part 2: Business practices							○
ISO/TC 204/ WG 8	ISO/TR 24014-3:2013	Public transport — Interoperable fare management system — Part 3: Complementary concepts to Part 1 for multi-application media							○
ISO/TC 204/ WG 8	ISO 22951:2009	Data dictionary and message sets for preemption and prioritization signal systems for emergency and public transport vehicles (PRESTO)							○
ISO/TC 204/ WG 8	ISO/CD TR 22260-1.2	Intelligent transport systems — Emergency service for automated public transport systems — Part 1: General framework				○			
ISO/TC 204/ WG 8	ISO/AWI 22260-2	Intelligent transport systems — Emergency service for automated public transport systems — Part 2: Service Requirements			○				
ISO/TC 204/ WG 8	ISO/PWI 22260-2	Intelligent transport systems – Public transport – Emergency recovery service for automated public transport systems — Part 2: Service requirements	○						
ISO/TC 204/ WG 8	ISO 21734-1:2022	Intelligent transport systems — Performance testing for connectivity and safety functions of automated driving buses in public transport — Part 1: General framework							○
ISO/TC 204/ WG 8	ISO/CD 21734-2	Public transport — Performance testing for connectivity and safety functions of automated driving bus — Part 2: Performance requirements and test procedures				○			
ISO/TC 204/ WG 8	ISO/TR 21734-3:2024	Intelligent transport systems — Performance testing for connectivity and safety functions of automated driving buses in public transport — Part 3: Service framework and use cases							○
ISO/TC 204/ WG 8	ISO/TR 21724-1:2020	Intelligent transport systems — Common Transport Service Account Systems — Part 1: Framework and use cases							○
ISO/TC 204/ WG 8	ISO/TR 20527:2022	Intelligent transport systems — Interoperability between interoperable fare management (IFM) systems and near field communication (NFC) mobile devices							○
ISO/TC 204/ WG 8	ISO/TR 20526:2017	Account-based ticketing state of the art report							○
ISO/TC 204/ WG 8	ISO/TR 19083-1:2016	Intelligent transport systems — Emergency evacuation and disaster response and recovery — Part 1: Framework and concept of operation							○
ISO/TC 204/ WG 8	ISO 17185-1:2014	Intelligent transport systems — Public transport user information — Part 1: Standards framework for public information systems							○
ISO/TC 204/ WG 8	ISO/TR 17185-2:2015	Intelligent transport systems — Public transport user information — Part 2: Public transport data and interface standards catalogue and cross references							○
ISO/TC 204/ WG 8	ISO/TR 17185-3:2015	Intelligent transport systems — Public transport user information — Part 3: Use cases for journey planning systems and their interoperation							○
ISO/TC 204/ WG 8	ISO/TR 14806:2013	Intelligent transport systems — Public transport requirements for the use of payment applications for fare media							○
ISO/TC 204/ WG 8	ISO/AWI 4398	Intelligent transport systems — Guided transportation service planning data exchange			○				
ISO/TC 204/ WG 8	ISO/TS 4398:2022	Intelligent transport systems — Guided transportation service planning data exchange							○
ISO/TC 204/ WG 9	ISO/TS 26048-1	Intelligent transport systems — Field device Simple Network Management Protocol (SNMP) data interface — Part 1: Global objects							○
ISO/TC 204/ WG 9	ISO/AWI TS 26048-3	Intelligent transport systems — Field device SNMP data interface — Part 3: Variable and dynamic message signs			○				

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ISO/TC 204/ WG 9	ISO/AWI TS 26048-18	Intelligent transport systems — Field device SNMP data interface — Part 18: Part 18: Roadside units			○				
ISO/TC 204/ WG 9	ISO/PWI TR 25971	Intelligent transport systems — A survey of signal intersection data specifications for traffic management and mobility services	○						
ISO/TC 204/ WG 9	ISO/PWI TS 24853	Intelligent transport systems — Integrated transport information, management and control — General information of audio-based artificial intelligence (AI) road hazard information system (ARHIS)	○						
ISO/TC 204/ WG 9	ISO 22741-1:2022	Intelligent transport systems — Roadside modules AP-DATEX data interface — Part 1: Overview							○
ISO/TC 204/ WG 9	ISO/TS 22741-2:2024	Intelligent transport systems — Roadside modules AP-DATEX data interface — Part 2: Generalised field device basic management							○
ISO/TC 204/ WG 9	ISO/TS 22741-10:2024	Intelligent transport systems — Roadside modules AP-DATEX data interface — Part 10: Variable message signs							○
ISO/TC 204/ WG 9	ISO/TR 21707:2008	Intelligent transport systems — Integrated transport information, management and control — Data quality in ITS systems							○
ISO/TC 204/ WG 9	ISO/TS 20684-2:2021	Intelligent transport systems — Roadside modules SNMP data interface — Part 2: Generalized field device basic management							○
ISO/TC 204/ WG 9	ISO/TS 20684-3:2022	Intelligent transport systems — Roadside modules SNMP data interface — Part 3: Triggers							○
ISO/TC 204/ WG 9	ISO/TS 20684-4:2022	Intelligent transport systems — Roadside modules SNMP data interface — Part 4: Notifications							○
ISO/TC 204/ WG 9	ISO/TS 20684-5:2022	Intelligent transport systems — Roadside modules SNMP data interface — Part 5: Logs							○
ISO/TC 204/ WG 9	ISO/TS 20684-6:2022	Intelligent transport systems — Roadside modules SNMP data interface — Part 6: Commands							○
ISO/TC 204/ WG 9	ISO/TS 20684-7:2022	Intelligent transport systems — Roadside modules SNMP data interface — Part 7: Support features							○
ISO/TC 204/ WG 9	ISO/TS 20684-10:2021	Intelligent transport systems — Roadside modules SNMP data interface — Part 10: Variable message signs							○
ISO/TC 204/ WG 9	ISO/CD TR 19482	Intelligent transport systems — Smart streetlighting management platform for road traffic safety enhancement				○			
ISO/TC 204/ WG 9	ISO/TS 19468:2022	Intelligent transport systems — Data interfaces between centres for transport information and control systems — Platform-independent model specifications for data exchange protocols for transport information and control systems							○
ISO/TC 204/ WG 9	ISO/DIS 19082	Intelligent transport systems — Definition of data elements and data frames between roadside modules and signal controllers for cooperative signal control					○		
ISO/TC 204/ WG 9	ISO/TS 19082:2020	Intelligent transport systems — Definition of data elements and data frames between roadside modules and signal controllers for cooperative signal control							○
ISO/TC 204/ WG 9	ISO/TR 16786:2015	Intelligent transport systems — The use of simulation models for evaluation of traffic management systems — Input parameters and reporting template for simulation of traffic signal control systems							○
ISO/TC 204/ WG 9	ISO 15784-1:2008	Intelligent transport systems (ITS) — Data exchange involving roadside modules communication — Part 1: General principles and documentation framework of application profiles							○
ISO/TC 204/ WG 9	ISO 15784-2:2024	Intelligent transport systems — Data exchange involving roadside modules communication — Part 2: Centre to field device communications using Simple Network Management Protocol (SNMP)							○
ISO/TC 204/ WG 9	ISO 15784-3:2008	Intelligent transport systems (ITS) — Data exchange involving roadside modules communication — Part 3: Application profile-data exchange (AP-DATEX)							○
ISO/TC 204/ WG 9	ISO 14827-2:2022	Intelligent transport systems — Data interfaces between centres for transport information and control systems — Part 2: AP-DATEX							○
ISO/TC 204/ WG 9	ISO/AWI 14827-3	Transport information and control systems — Data interfaces between centres for transport information and control systems — Part 3: Data interfaces between centres for intelligent transport sytems (ITS) using XML (Profile A)			○				
ISO/TC 204/ WG 9	ISO 14827-3:2019	Transport information and control systems — Data interfaces between centres for transport information and control systems — Part 3: Data interfaces between centres for intelligent transport sytems (ITS) using XML (Profile A)							○
ISO/TC 204/ WG 9	ISO/TS 14827-4:2022	Intelligent transport systems — Data interfaces between centres for transport information and control systems — Part 4: Data interfaces between centres for Intelligent transport systems (ITS) using XML (Profile B)							○
ISO/TC 204/ WG 9	ISO/AWI 10711	Intelligent Transport Systems — Interface Protocol and Message Set Definition between Traffic Signal Controllers and Detectors			○				
ISO/TC 204/ WG 9	ISO 10711:2012	Intelligent Transport Systems — Interface Protocol and Message Set Definition between Traffic Signal Controllers and Detectors							○
ISO/TC 204/ WG 10	ISO/TS 24530-1:2006	Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) — Part 1: Introduction, common data types and tpegML							○
ISO/TC 204/ WG 10	ISO/TS 24530-2:2006	Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) — Part 2: tpeg-locML							○
ISO/TC 204/ WG 10	ISO/TS 24530-3:2006	Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) — Part 3: tpeg-rtmML							○
ISO/TC 204/ WG 10	ISO/TS 24530-4:2006	Traffic and Travel Information (TTI) — TTI via Transport Protocol Experts Group (TPEG) Extensible Markup Language (XML) — Part 4: tpeg-ptiML							○
ISO/TC 204/ WG 10	ISO 21219-1:2023	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 1: Introduction, numbering and versions (TPEG2-INV)							○
ISO/TC 204/ WG 10	ISO 21219-2:2019	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 2: UML modelling rules (TPEG2-UMR)							○
ISO/TC 204/ WG 10	ISO 21219-3:2019	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 3: UML to binary conversion rules (TPEG2-UBCR)							○

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ISO/TC 204/ WG 10	ISO 21219-4:2019	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 4: UML to XML conversion rules							○
ISO/TC 204/ WG 10	ISO 21219-5:2019	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 5: Service framework (TPEG2-SFW)							○
ISO/TC 204/ WG 10	ISO 21219-6:2019	Intelligent transport systems — Traffic and travel information(TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 6: Message management container (TPEG2-MMC)							○
ISO/TC 204/ WG 10	ISO 21219-7:2024	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 7: Location referencing container (TPEG2-LRC)							○
ISO/TC 204/ WG 10	ISO 21219-9:2023	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 9: Service and network information (TPEG2-SNI)							○
ISO/TC 204/ WG 10	ISO 21219-10:2023	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 10: Conditional access information (TPEG2-CAI)							○
ISO/TC 204/ WG 10	ISO/AWI TS 21219-13	Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 2 (TPEG2) — Part 13: Public transport information service (TPEG2-PTS)			○				
ISO/TC 204/ WG 10	ISO/TS 21219-13:2025	Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 2 (TPEG2) — Part 13: Public transport information service (TPEG2-PTS)							○
ISO/TC 204/ WG 10	ISO 21219-14:2023	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 14: Parking information (TPEG2-PKI)							○
ISO/TC 204/ WG 10	ISO 21219-15:2023	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 15: Traffic event compact (TPEG2-TEC)							○
ISO/TC 204/ WG 10	ISO 21219-16:2023	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 16: Fuel price information and availability (TPEG2-FPI)							○
ISO/TC 204/ WG 10	ISO 21219-17:2023	Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 2 (TPEG2) — Part 17: Speed information (TPEG2-SPI)							○
ISO/TC 204/ WG 10	ISO 21219-18:2019	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 18: Traffic flow and prediction application (TPEG2-TFP)							○
ISO/TC 204/ WG 10	ISO 21219-19:2023	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 19: Weather information (TPEG2-WEA)							○
ISO/TC 204/ WG 10	ISO 21219-21:2025	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 21: Geographic location referencing (TPEG-GLR)							○
ISO/TC 204/ WG 10	ISO/TS 21219-22:2017	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 22: OpenLR location referencing (TPEG2-OLR)							○
ISO/TC 204/ WG 10	ISO/TS 21219-23:2016	Intelligent transport systems - Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 23: Roads and multimodal routes (TPEG2-RMR)							○
ISO/TC 204/ WG 10	ISO/TS 21219-24:2017	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 24: Light encryption (TPEG2-LTE)							○
ISO/TC 204/ WG 10	ISO 21219-25:2024	Intelligent transport systems — Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) — Part 25: Electromobility charging infrastructure (TPEG2-EMI)							○
ISO/TC 204/ WG 10	ISO/TS 21219-26:2018	Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 2 (TPEG2) — Part 26: Vigilance location information (TPEG2-VLI)							○
ISO/TC 204/ WG 10	ISO/AWI TS 21219-27	Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 2 (TPEG2) — Part 27: Part 27: Driving restriction regulations (TPEG2-DRR)			○				
ISO/TC 204/ WG 10	ISO/TS 18234-1:2013	Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format — Part 1: Introduction, numbering and versions (TPEG1-INV)							○
ISO/TC 204/ WG 10	ISO/TS 18234-2:2013	Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format — Part 2: Syntax, semantics and framing structure (TPEG1-SSF)							○
ISO/TC 204/ WG 10	ISO/TS 18234-3:2013	Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format — Part 3: Service and network information (TPEG1-SNI)							○
ISO/TC 204/ WG 10	ISO/TS 18234-4:2006	Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 4: Road Traffic Message (RTM) application							○
ISO/TC 204/ WG 10	ISO/TS 18234-5:2006	Traffic and Travel Information (TTI) — TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 5: Public Transport Information (PTI) application							○
ISO/TC 204/ WG 10	ISO/TS 18234-6:2006	Traffic and Travel Information (TTI) - TTI via Transport Protocol Expert Group (TPEG) data-streams — Part 6: Location referencing applications							○
ISO/TC 204/ WG 10	ISO/TS 18234-7:2013	Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format — Part 7: Parking information (TPEG1-PKI)							○
ISO/TC 204/ WG 10	ISO/TS 18234-8:2012	Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format — Part 8: Congestion and Travel Time application (TPEG1-CTT)							○
ISO/TC 204/ WG 10	ISO/TS 18234-9:2013	Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format — Part 9: Traffic event compact (TPEG1-TEC)							○
ISO/TC 204/ WG 10	ISO/TS 18234-10:2013	Intelligent transport systems — Traffic and travel information via transport protocol experts group, generation 1 (TPEG1) binary data format — Part 10: Conditional access information (TPEG1-CAI)							○
ISO/TC 204/ WG 10	ISO/TS 18234-11:2013	Intelligent transport systems — Traffic and Travel Information (TTI) via transport protocol experts group, generation 1 (TPEG1) binary data format — Part 11: Location Referencing Container (TPEG1-LRC)							○
ISO/TC 204/ WG 10	ISO 14823-1:2024	Intelligent transport systems — Graphic data dictionary — Part 1: Specification							○
ISO/TC 204/ WG 10	ISO/AWI TR 14823-2	Intelligent transport systems — Graphic data dictionary — Part 2: Examples			○				
ISO/TC 204/ WG 10	ISO/TR 14823-2:2019	Intelligent transport systems — Graphic data dictionary — Part 2: Examples							○

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ISO/TC 204/ WG 10	ISO 14819-1:2021	Intelligent transport systems — Traffic and travel information messages via traffic message coding — Part 1: Coding protocol for Radio Data System-Traffic Message Channel (RDS-TMC) using ALERT-C							○
ISO/TC 204/ WG 10	ISO 14819-2:2021	Intelligent transport systems — Traffic and travel information messages via traffic message coding — Part 2: Event and information codes for Radio Data System-Traffic Message Channel (RDS-TMC) using ALERT-C							○
ISO/TC 204/ WG 10	ISO 14819-2:2021/AWI Amd 1	Intelligent transport systems — Traffic and travel information messages via traffic message coding — Part 2: Event and information codes for Radio Data System-Traffic Message Channel (RDS-TMC) using ALERT-C — Amendment 1				○			
ISO/TC 204/ WG 10	ISO 14819-3:2021	Intelligent transport systems — Traffic and travel information messages via traffic message coding — Part 3: Location referencing for Radio Data System-Traffic Message Channel (RDS-TMC) using ALERT-C							○
ISO/TC 204/ WG 14	ISO 26684:2015	Intelligent transport systems (ITS) — Cooperative intersection signal information and violation warning systems (CIWS) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO/PWI 25972	Intelligent transport systems — Low-speed automated vehicle parking services (LSAPS) - System framework and requirements for automated and remote manoeuvring	○						
ISO/TC 204/ WG 14	ISO 23793-1:2024	Intelligent transport systems — Minimal risk manoeuvre (MRM) for automated driving — Part 1: Framework, straight-stop and in-lane stop							○
ISO/TC 204/ WG 14	ISO/AWI 23793-2	Intelligent transport systems — Minimal risk manoeuvre (MRM) for automated driving — Part 2: Road shoulder stop — Minimum requirements and test procedures			○				
ISO/TC 204/ WG 14	ISO/DIS 23792-1	Intelligent transport systems — Motorway chauffeur systems (MCS) — Part 1: Framework and general requirements					○		
ISO/TC 204/ WG 14	ISO/TS 23792-1:2023	Intelligent transport systems — Motorway chauffeur systems (MCS) — Part 1: Framework and general requirements							○
ISO/TC 204/ WG 14	ISO/DIS 23792-2	Intelligent transport systems — Motorway chauffeur systems (MCS) — Part 2: Requirements and test procedures for discretionary lane change					○		
ISO/TC 204/ WG 14	ISO/PWI 23792-3	Intelligent transport systems - Motorway chauffeur systems (MCS) — Part 3: Requirements and test procedures for mandatory lane change	○						
ISO/TC 204/ WG 14	ISO 23376:2021	Intelligent transport systems — Vehicle-to-vehicle intersection collision warning systems (VVICW) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO/CD 23375	Intelligent transport systems — Collision evasive lateral manoeuvre systems (CELM) — Requirements and test procedures				○			
ISO/TC 204/ WG 14	ISO 23375:2023	Intelligent transport systems — Collision evasive lateral manoeuvre systems (CELM) — Requirements and test procedures							○
ISO/TC 204/ WG 14	ISO 23374-1:2023	Intelligent transport systems — Automated valet parking systems (AVPS) — Part 1: System framework, requirements for automated driving and for communications interface							○
ISO/TC 204/ WG 14	ISO 22840:2010	Intelligent transport systems — Devices to aid reverse manoeuvres — Extended-range backing aid systems (ERBA)							○
ISO/TC 204/ WG 14	ISO 22839:2013	Intelligent transport systems — Forward vehicle collision mitigation systems — Operation, performance, and verification requirements							○
ISO/TC 204/ WG 14	ISO 22737:2021	Intelligent transport systems — Low-speed automated driving (LSAD) systems for predefined routes — Performance requirements, system requirements and performance test procedures							○
ISO/TC 204/ WG 14	ISO/SAE PAS 22736:2021	Taxonomy and definitions for terms related to driving automation systems for on-road motor vehicles							○
ISO/TC 204/ WG 14	ISO/SAE CD TS 22736	Taxonomy and definitions for terms related to driving automation systems for on-road motor vehicles				○			
ISO/TC 204/ WG 14	ISO 22078:2020	Intelligent transport systems — Bicyclist detection and collision mitigation systems (BDCMS) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO/WD 21717	Intelligent transport systems — Partially Automated In-Lane Driving Systems (PADS) — Performance requirements and test procedures			○				
ISO/TC 204/ WG 14	ISO 21717:2018	Intelligent transport systems — Partially Automated In-Lane Driving Systems (PADS) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO 21202:2020	Intelligent transport systems — Partially automated lane change systems (PALS) — Functional / operational requirements and test procedures							○
ISO/TC 204/ WG 14	ISO 20901:2020	Intelligent transport systems — Emergency electronic brake light systems (EEBL) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO 20900:2023	Intelligent transport systems — Partially-automated parking systems (PAPS) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO/TR 20545:2017	Intelligent transport systems — Vehicle/roadway warning and control systems — Report on standardisation for vehicle automated driving systems (RoVAS)/Beyond driver assistance systems							○
ISO/TC 204/ WG 14	ISO 20035:2019	Intelligent transport systems — Cooperative adaptive cruise control systems (CACC) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO 20035:2019/CD Amd 1	Intelligent transport systems — Cooperative adaptive cruise control systems (CACC) — Performance requirements and test procedures — Amendment 1				○			
ISO/TC 204/ WG 14	ISO/AWI 19638	Intelligent transport systems — Road boundary departure prevention systems (RBDPS) — Performance requirements and test procedures			○				
ISO/TC 204/ WG 14	ISO 19638:2018	Intelligent transport systems — Road boundary departure prevention systems (RBDPS) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO/TR 19560:2025	Intelligent transport systems — Information interface framework between automated driving systems and users							○
ISO/TC 204/ WG 14	ISO/PAS 19486:2025	Intelligent transport systems — Acceleration control for pedal error (ACPE) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO/PWI 19485	Intelligent transport systems - Acceleration control for pedal error (ACPE) — Performance requirements and test procedures	○						

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ISO/TC 204/ WG 14	ISO/CD 19484	Intelligent transport systems — Highly Automated Motorway Chauffeur Systems (HMCS)				○			
ISO/TC 204/ WG 14	ISO/CD 19237	Intelligent transport systems — Pedestrian detection and collision mitigation systems (PDCMS) — Performance requirements and test procedures				○			
ISO/TC 204/ WG 14	ISO 19237:2017	Intelligent transport systems — Pedestrian detection and collision mitigation systems (PDCMS) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO 18682:2016	Intelligent transport systems — External hazard detection and notification systems — Basic requirements							○
ISO/TC 204/ WG 14	ISO/CD TR 17720	Intelligent transport systems —Operational Design Domain Boundary and Attribute Awareness for an Automated Driving System				○			
ISO/TC 204/ WG 14	ISO/DIS 17387	Intelligent transport systems — Lane change decision aid systems (LCDAS) — Performance requirements and test procedures					○		
ISO/TC 204/ WG 14	ISO 17387:2008	Intelligent transport systems — Lane change decision aid systems (LCDAS) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO 17386:2023	Intelligent transport systems — Manoeuvring aids for low-speed operation (MALSO) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO 17361:2017	Intelligent transport systems — Lane departure warning systems — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO 17361:2017/ Amd 1:2023	Intelligent transport systems — Lane departure warning systems — Performance requirements and test procedures — Amendment 1							○
ISO/TC 204/ WG 14	ISO 16787:2017	Intelligent transport systems — Assisted parking system (APS) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO 15623:2013	Intelligent transport systems — Forward vehicle collision warning systems — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO/WD 15622	Intelligent transport systems — Adaptive cruise control systems — Performance requirements and test procedures			○				
ISO/TC 204/ WG 14	ISO 15622:2018	Intelligent transport systems — Adaptive cruise control systems — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO/DIS 12768-1	Intelligent transport systems — Automated Valet Driving Systems (AVDS) — Part 1: Requirements, System Framework, Communication Interfaces and Test Procedures					○		
ISO/TC 204/ WG 14	ISO/AWI 12768-2	Intelligent transport systems — Automated Valet Driving Systems (AVDS) — Part 2: Part 2: System framework, security procedures and requirements			○				
ISO/TC 204/ WG 14	ISO/PWI 11270	Intelligent transport systems — Lane keeping assistance systems (LKAS) — Performance requirements and test procedures	○						
ISO/TC 204/ WG 14	ISO 11270:2014	Intelligent transport systems — Lane keeping assistance systems (LKAS) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO 11067:2015	Intelligent transport systems — Curve speed warning systems (CSWS) — Performance requirements and test procedures							○
ISO/TC 204/ WG 14	ISO 7856:2025	Intelligent transport systems — Remote support for low speed automated driving systems (RS-LSADS) — Performance requirements, system requirements and performance test procedures							○
ISO/TC 204/ WG 14	ISO 4273:2024	Intelligent transport systems — Automated braking during low-speed manoeuvring (ABLS) — Requirements and test procedures							○
ISO/TC 204/ WG 14	ISO 4272:2022	Intelligent transport systems — Truck platooning systems (TPS) — Functional and operational requirements							○
ISO/TC 204/ WG 16	ISO/TS 29284:2012	Intelligent transport systems — Event-based probe vehicle data							○
ISO/TC 204/ WG 16	ISO 29283:2011	ITS CALM Mobile Wireless Broadband applications using Communications in accordance with IEEE 802.20							○
ISO/TC 204/ WG 16	ISO 29282:2011	Intelligent transport systems — Communications access for land mobiles (CALM) — Satellite networks							○
ISO/TC 204/ WG 16	ISO 29281-1:2018	Intelligent transport systems — Localized communications — Part 1: Fast networking & transport layer protocol (FNTP)							○
ISO/TC 204/ WG 16	ISO 29281-2:2019	Intelligent transport systems — Localized communications — Part 2: Legacy system support							○
ISO/TC 204/ WG 16	ISO/TS 25114:2010	Intelligent transport systems — Probe data reporting management (PDRM)							○
ISO/TC 204/ WG 16	ISO 25113:2010	Intelligent transport systems — Communications access for land mobiles (CALM) — Mobile wireless broadband using HC-SDMA							○
ISO/TC 204/ WG 16	ISO 25112:2010	Intelligent transport systems — Communications access for land mobiles (CALM) — Mobile wireless broadband using IEEE 802.16							○
ISO/TC 204/ WG 16	ISO 25111:2009	Intelligent transport systems — Communications access for land mobiles (CALM) — General requirements for using public networks							○
ISO/TC 204/ WG 16	ISO 24978:2009	Intelligent transport systems — ITS Safety and emergency messages using any available wireless media — Data registry procedures							○
ISO/TC 204/ WG 16	ISO 24103:2009	Intelligent transport systems — Communications access for land mobiles (CALM) — Media adapted interface layer (MAIL)							○
ISO/TC 204/ WG 16	ISO 24102-1:2018	Intelligent transport systems — ITS station management — Part 1: Local management							○
ISO/TC 204/ WG 16	ISO 24102-2:2018	Intelligent transport systems — ITS station management — Part 2: Remote management of ITS-SCUs							○

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ISO/TC 204/ WG 16	ISO 24102-3:2018	Intelligent transport systems — ITS station management — Part 3: Service access points							○
ISO/TC 204/ WG 16	ISO 24102-4:2018	Intelligent transport systems — ITS station management — Part 4: Station-internal management communications							○
ISO/TC 204/ WG 16	ISO 24102-6:2018	Intelligent transport systems — Communications access for land mobiles (CALM) — ITS station management — Part 6: Path and flow management							○
ISO/TC 204/ WG 16	ISO 24101-1:2008	Intelligent transport systems — Communications access for land mobiles (CALM) — Application management — Part 1: General requirements							○
ISO/TC 204/ WG 16	ISO 24101-2:2010	Intelligent transport systems — Communications access for land mobiles (CALM) — Application management — Part 2: Conformance test							○
ISO/TC 204/ WG 16	ISO 24100:2010	Intelligent transport systems — Basic principles for personal data protection in probe vehicle information services							○
ISO/TC 204/ WG 16	ISO/AWI TS 23708	Intelligent transport systems — Station unit requirements			○				
ISO/TC 204/ WG 16	ISO 22837:2009	Vehicle probe data for wide area communications							○
ISO/TC 204/ WG 16	ISO 22738:2020	Intelligent transport systems — Localized communications — Optical camera communication							○
ISO/TC 204/ WG 16	ISO 22418:2020	Intelligent transport systems — Fast service announcement protocol (FSAP) for general purposes in ITS							○
ISO/TC 204/ WG 16	ISO 21218:2018	Intelligent transport systems — Hybrid communications — Access technology support							○
ISO/TC 204/ WG 16	ISO 21217:2020	Intelligent transport systems — Station and communication architecture							○
ISO/TC 204/ WG 16	ISO 21216:2012	Intelligent transport systems — Communication access for land mobiles (CALM) — Millimetre wave air interface							○
ISO/TC 204/ WG 16	ISO 21215:2018	Intelligent transport systems — Localized communications — ITS-M5							○
ISO/TC 204/ WG 16	ISO 21214:2015	Intelligent transport systems — Communications access for land mobiles (CALM) — Infra-red systems							○
ISO/TC 204/ WG 16	ISO 21213:2008	Intelligent transport systems — Communications access for land mobiles (CALM) — 3G Cellular systems							○
ISO/TC 204/ WG 16	ISO 21212:2008	Intelligent transport systems — Communications access for land mobiles (CALM) — 2G Cellular systems							○
ISO/TC 204/ WG 16	ISO 21210:2012	Intelligent transport systems — Communications access for land mobiles (CALM) — IPv6 Networking							○
ISO/TC 204/ WG 16	ISO 21210:2012/ Amd 1:2017	Intelligent transport systems — Communications access for land mobiles (CALM) — IPv6 Networking — Amendment 1							○
ISO/TC 204/ WG 16	ISO 19414:2020	Intelligent transport systems — Service architecture of probe vehicle systems							○
ISO/TC 204/ WG 16	ISO 19080:2016	Intelligent transport systems — Communications access for land mobiles (CALM) — CoAP facility							○
ISO/TC 204/ WG 16	ISO 19079:2016	Intelligent transport systems — Communications access for land mobiles (CALM) — 6LoWPAN networking							○
ISO/TC 204/ WG 16	ISO/TR 18317:2017	Intelligent transport systems — Pre-emption of ITS communication networks for disaster and emergency communication — Use case scenarios							○
ISO/TC 204/ WG 16	ISO/TR 17732:2024	Intelligent transport systems (ITS) — Communications — ITS communication role and functional model							○
ISO/TC 204/ WG 16	ISO 17515-1:2015	Intelligent transport systems — Communications access for land mobiles (CALM) — Evolved universal terrestrial radio access network (E-UTRAN) — Part 1: General usage							○
ISO/TC 204/ WG 16	ISO 17515-2:2020	Intelligent transport systems — Evolved universal terrestrial radio access network (E-UTRAN) — Part 2: Device to device communications (D2D)							○
ISO/TC 204/ WG 16	ISO 17515-3:2019	Intelligent transport systems — Evolved-universal terrestrial radio access network — Part 3: LTE-V2X							○
ISO/TC 204/ WG 16	ISO 16461:2018	Intelligent transport systems — Criteria for privacy and integrity protection in probe vehicle information systems							○
ISO/TC 204/ WG 16	ISO 16460:2021	Intelligent transport systems — Localized communications — Communication protocol messages for global usage							○
ISO/TC 204/ WG 16	ISO 15662:2006	Intelligent transport systems — Wide area communication — Protocol management information							○
ISO/TC 204/ WG 16	ISO/AWI 15628	Intelligent transport systems — Dedicated short range communication (DSRC) — DSRC application layer				○			
ISO/TC 204/ WG 16	ISO 15628:2013	Intelligent transport systems — Dedicated short range communication (DSRC) — DSRC application layer							○
ISO/TC 204/ WG 16	ISO 13183:2012	Intelligent transport systems — Communications access for land mobiles (CALM) — Using broadcast communications							○
ISO/TC 204/ WG 16	ISO/TR 11769:2010	Intelligent transport systems — Communications access for land mobiles (CALM) — Data retention for law enforcement							○
ISO/TC 204/ WG 16	ISO/TR 11766:2010	Intelligent transport systems — Communications access for land mobiles (CALM) — Security considerations for lawful interception							○

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ISO/TC 204/ WG 16	ISO 4426:2021	Intelligent transport systems — Lower layer protocols for usage in the European digital tachograph							○
ISO/TC 204/ WG 16	ISO/TR 4286:2021	Intelligent transport systems — Use cases for sharing of probe data							○
ISO/TC 204/ WG 17	ISO/PWI 25974-1	Intelligent transport systems - Electric vehicle (EV) battery safety monitoring and performance evaluation for nomadic and mobile devices — Part 1: General information and dataset requirements	○						
ISO/TC 204/ WG 17	ISO 23795-1:2022	Intelligent transport systems — Extracting trip data using nomadic and mobile devices for estimating C0₂ emissions — Part 1: Fuel consumption determination for fleet management							○
ISO/TC 204/ WG 17	ISO 23795-2:2024	Intelligent transport systems — Extracting trip data using nomadic and mobile devices for estimating CO₂ emissions — Part 2: Information provision for eco-friendly driving behaviour							○
ISO/TC 204/ WG 17	ISO/NP 23795-3	Intelligent transport systems — Extracting trip data via nomadic device for estimating CO2 emissions — Part 3: Carbon footprint determination for trading emission reductions in eco-routing platforms		○					
ISO/TC 204/ WG 17	ISO/TR 22087:2025	Intelligent transport systems — Collection of agent behaviour information and sharing between ITS stations							○
ISO/TC 204/ WG 17	ISO/TR 22086-1:2019	Intelligent transport systems (ITS) — Network based precise positioning infrastructure for land transportation — Part 1: General information and use case definitions							○
ISO/TC 204/ WG 17	ISO 22086-2:2024	Intelligent transport systems (ITS) — Network-based precise positioning infrastructure for land transportation — Part 2: Functional requirements and data sets for nomadic devices							○
ISO/TC 204/ WG 17	ISO/TR 22085-1:2019	Intelligent transport systems (ITS) — Nomadic device service platform for micro-mobility — Part 1: General information and use case definitions							○
ISO/TC 204/ WG 17	ISO 22085-2:2021	Intelligent transport systems (ITS) — Nomadic device service platform for micro mobility — Part 2: Functional requirements and dataset definitions							○
ISO/TC 204/ WG 17	ISO 22085-3:2022	Intelligent transport systems (ITS) — Nomadic device service platform for micro mobility — Part 3: Data structure and data exchange procedures							○
ISO/TC 204/ WG 17	ISO/TR 21735:2019	Intelligent transport systems — Framework architecture for plug and play (PnP) functionality in vehicles utilizing nomadic devices							○
ISO/TC 204/ WG 17	ISO 20530-1:2020	Intelligent transport systems — Information for emergency service support via personal ITS station — Part 1: General requirements and technical definition							○
ISO/TC 204/ WG 17	ISO/PWI 20530-2	Intelligent transport systems - Information for emergency service support for nomadic and mobile devices — Part 2: Service requirements for vehicle incident notification	○						
ISO/TC 204/ WG 17	ISO/TR 20529-1:2017	Intelligent transport systems — Framework for green ITS (G-ITS) standards — Part 1: General information and use case definitions							○
ISO/TC 204/ WG 17	ISO 20529-2:2021	Intelligent transport systems — Framework for Green ITS (G-ITS) standards — Part 2: Integrated mobile service applications							○
ISO/TC 204/ WG 17	ISO 18561-1:2020	Intelligent transport systems (ITS) — Urban mobility applications via nomadic device for green transport management — Part 1: General requirements for data exchange between ITS stations							○
ISO/TC 204/ WG 17	ISO/PWI 18561-3	Intelligent transport systems — Urban mobility applications via nomadic device for green transport management — Part 3: Mobility integration service applications using hybrid V2X	○						
ISO/TC 204/ WG 17	ISO/TR 17748-1:2024	Intelligent transportation systems — Energy-based green ITS services for smart city mobility applications via nomadic and mobile devices — Part 1: General information and use case definitions							○
ISO/TC 204/ WG 17	ISO/CD TS 17748-2	Intelligent transport systems — Nomadic and mobile devices — Energy-based green ITS services for smart city mobility applications — Part 2: Functional requirements of data platform				○			
ISO/TC 204/ WG 17	ISO/DIS 17748-3	Intelligent transport systems — Energy-based green ITS services for smart city mobility applications via nomadic and mobile devices — Part 3: Data exchange requirements for electric vehicle (EV)-based demand response charging services					○		
ISO/TC 204/ WG 17	ISO/CD 17748-4	Intelligent transport systems — Energy-based green ITS services on nomadic devices for smart city mobility applications — Part 4: Service framework for sustainable urban public transport operation and management				○			
ISO/TC 204/ WG 17	ISO/DTR 17739-1	Intelligent transport systems — Roadside infrastructure supported location-based services on nomadic and mobile devices for urban connected automated mobility — Part 1: General information and use cases definition						○	
ISO/TC 204/ WG 17	ISO/WD 17739-2	Intelligent transport systems — Roadside infrastructure supported location-based services for connected automated mobility — Part 2: Data structure and message set definition			○				
ISO/TC 204/ WG 17	ISO/WD 17739-3	Intelligent transport systems — Roadside infrastructure supported locationbased services for connected automated mobility via nomadic and mobile devices — Part 3: No turn on red (NTOR) at junctions with traffic signals			○				
ISO/TC 204/ WG 17	ISO/NP 17739-4	Intelligent transport systems — Roadside infrastructure supported location- based services on nomadic devices for connected automated mobility — Part 4: Unprotected turn at T-junctions		○					
ISO/TC 204/ WG 17	ISO/WD 17739-5	Intelligent transport systems — Roadside infrastructure supported location- based services on nomadic devices for connected automated mobility — Part 5: Advisory right of way (ROW) at roundabouts			○				
ISO/TC 204/ WG 17	ISO/CD 17739-6	Intelligent transport systems — Roadside infrastructure supported location- based services on nomadic devices for connected automated mobility — Part 6: Unprotected turn at junctions with traffic signals				○			
ISO/TC 204/ WG 17	ISO/PWI 17739-7	Intelligent transport systems - Roadside infrastructure supported location-based services on nomadic devices for connected automated mobility — Part 7: Poor visibility advisory at boundaries	○						
ISO/TC 204/ WG 17	ISO/AWI 17438-1	Intelligent transport systems — Indoor navigation for personal and vehicle ITS station — Part 1: General information and use case definition			○				
ISO/TC 204/ WG 17	ISO 17438-1:2016	Intelligent transport systems — Indoor navigation for personal and vehicle ITS station — Part 1: General information and use case definition							○
ISO/TC 204/ WG 17	ISO 17438-2:2024	Intelligent transport systems — Indoor navigation for personal and vehicle ITS stations — Part 2: Requirements and specification for indoor maps							○
ISO/TC 204/ WG 17	ISO 17438-3:2024	Intelligent transport systems — Indoor navigation for personal and vehicle ITS stations — Part 3: Requirements and specification for indoor positioning reference data							○
ISO/TC 204/ WG 17	ISO/AWI 17438-4	Intelligent transport systems — Indoor navigation for personal and vehicle ITS station — Part 4: Requirements and specifications for interface between personal/vehicle and central ITS stations			○				

WG	ISO Numberr	Title	Stage						Pub-lished
			PWI	NP	WD	CD	DIS	FDIS	
ISO/TC 204/ WG 17	ISO 17438-4:2019	Intelligent transport systems — Indoor navigation for personal and vehicle ITS station — Part 4: Requirements and specifications for interface between personal/vehicle and central ITS stations							○
ISO/TC 204/ WG 17	ISO/FDIS 17438-5	Intelligent transport systems — Indoor navigation for personal and vehicle ITS stations — Part 5: Requirements and message specification for central ITS station (C-ITS-S) based positioning						○	
ISO/TC 204/ WG 17	ISO/PWI 17438-6	Intelligent transport systems - Indoor navigation for personal and vehicle ITS stations — Part 6: Requirements and specification for registration of indoor maps and indoor positioning references	○						
ISO/TC 204/ WG 17	ISO/TR 13185-1:2012	Intelligent transport systems — Vehicle interface for provisioning and support of ITS services — Part 1: General information and use case definition							○
ISO/TC 204/ WG 17	ISO 13185-2:2015	Intelligent transport systems — Vehicle interface for provisioning and support of ITS services — Part 2: Unified gateway protocol (UGP) requirements and specification for vehicle ITS station gateway (V-ITS-SG) interface							○
ISO/TC 204/ WG 17	ISO 13185-3:2018	Intelligent transport systems — Vehicle interface for provisioning and support of ITS Services — Part 3: Unified vehicle interface protocol (UVIP) server and client API specification							○
ISO/TC 204/ WG 17	ISO 13185-4:2020	Intelligent transport systems — Vehicle interface for provisioning and support of ITS Services — Part 4: Unified vehicle interface protocol (UVIP) conformance test specification							○
ISO/TC 204/ WG 17	ISO/TR 13184-1:2013	Intelligent transport systems (ITS) — Guidance protocol via personal ITS station for advisory safety systems — Part 1: General information and use case definitions							○
ISO/TC 204/ WG 17	ISO 13184-2:2016	Intelligent transport systems (ITS) — Guidance protocol via personal ITS station for advisory safety systems — Part 2: Road guidance protocol (RGP) requirements and specification							○
ISO/TC 204/ WG 17	ISO 13184-3:2017	Intelligent transport systems (ITS) — Guidance protocol via personal ITS station for advisory safety systems — Part 3: Road guidance protocol (RGP) conformance test specification							○
ISO/TC 204/ WG 17	ISO 13111-1:2017	Intelligent transport systems (ITS) — The use of personal ITS station to support ITS service provision for travellers — Part 1: General information and use case definitions							○
ISO/TC 204/ WG 17	ISO 13111-2:2022	Intelligent transport systems (ITS) — The use of personal ITS stations to support ITS service provision for travellers — Part 2: General requirements for data exchange between ITS stations							○
ISO/TC 204/ WG 17	ISO/TR 10992:2011	Intelligent transport systems — Use of nomadic and portable devices to support ITS service and multimedia provision in vehicles							○
ISO/TC 204/ WG 17	ISO/TR 10992-2:2017	Intelligent transport systems — Use of nomadic and portable devices to support ITS service and multimedia provision in vehicles — Part 2: Definition and use cases for mobile service convergence							○
ISO/TC 204/ WG 17	ISO/TR 6029-1:2024	Intelligent transport systems — Seamless positioning for multimodal transportation in ITS stations — Part 1: General information and use case definition							○
ISO/TC 204/ WG 17	ISO/DIS 6029-2	Intelligent transport systems — Seamless positioning for multimodal transportation in ITS stations — Part 2: Nomadic and mobile device dataset for positioning data fusion					○		
ISO/TC 204/ WG 17	ISO/CD 6029-3	Intelligent transport systems — Seamless positioning for multimodal transport in ITS stations — Part 3: Data fusion dataset exchange interfaces on nomadic devices				○			
ISO/TC 204/ WG 17	ISO/PWI 1779-5	Intelligent transport systems - Roadside infrastructure supported location- based services on nomadic devices for connected automated mobility — Part 5: Advisory right of way (ROW) at roundabouts	○						
ISO/TC 204/ WG 18	ISO/PWI TR 24855	Intelligent transport systems - Cooperative systems - Evaluation of national and regional ITS-related policies to identify ITS station unit requirements	○						
ISO/TC 204/ WG 18	ISO/PWI TS 24854	Intelligent transport systems - Cooperative systems - Facility layer segmentation service	○						
ISO/TC 204/ WG 18	ISO/AWI TS 24854-1	Intelligent transport systems — Facilities layer services — Part 1: Architecture			○				
ISO/TC 204/ WG 18	ISO/PWI 24854-2	Intelligent transport systems - Facilities layer services — Part 2: Communication profile handler	○						
ISO/TC 204/ WG 18	ISO/AWI TS 24854-2	Intelligent transport systems — Facilities layer services — Part 2: Communication profile handler			○				
ISO/TC 204/ WG 18	ISO/PWI 24854-3	Intelligent transport systems - Facilities layer services — Part 3: Content subscription handler	○						
ISO/TC 204/ WG 18	ISO/AWI TS 24854-3	Intelligent transport systems — Facilities layer services — Part 3: Content subscription handler			○				
ISO/TC 204/ WG 18	ISO/PWI 24854-4	Intelligent transport systems - Facilities layer services — Part 4: Facility service handler	○						
ISO/TC 204/ WG 18	ISO/AWI TS 24854-4	Intelligent transport systems — Facilities layer services — Part 4: Facilities services handler			○				
ISO/TC 204/ WG 18	ISO/PWI 24854-5	Intelligent transport systems - Facilities layer services — Part 5: Message sets	○						
ISO/TC 204/ WG 18	ISO/CD TS 24854-5	Intelligent transport systems — Facilities layer services — Part 5: Message sets				○			
ISO/TC 204/ WG 18	ISO/PWI 24854-6	Intelligent transport systems - Facilities layer services — Part 6: Segmentation service	○						
ISO/TC 204/ WG 18	ISO/TS 23374-2:2023	Intelligent transport systems — Automated valet parking systems (AVPS) — Part 2: Security integration for type 3 AVP							○
ISO/TC 204/ WG 18	ISO/TS 21189:2019	Intelligent transport systems — Cooperative ITS — Test requirements and protocol implementation conformance statement (PICS) pro forma for ISO/TS 17426							○
ISO/TC 204/ WG 18	ISO/TR 21186-1:2021	Cooperative intelligent transport systems (C-ITS) — Guidelines on the usage of standards — Part 1: Standardization landscape and releases							○
ISO/TC 204/ WG 18	ISO/TR 21186-2:2021	Cooperative intelligent transport systems (C-ITS) — Guidelines on the usage of standards — Part 2: Hybrid communications							○
ISO/TC 204/ WG 18	ISO/TR 21186-3:2021	Cooperative intelligent transport systems (C-ITS) — Guidelines on the usage of standards — Part 3: Security							○

WG	ISO Numberr	Title	Stage						Pub-lished
			PWI	NP	WD	CD	DIS	FDIS	
ISO/TC 204/ WG 18	ISO/TS 21185:2019	Intelligent transport systems — Communication profiles for secure connections between trusted devices							○
ISO/TC 204/ WG 18	ISO/TS 21184:2021	Cooperative intelligent transport systems (C-ITS) — Global transport data management (GTDM) framework							○
ISO/TC 204/ WG 18	ISO 21177:2024	Intelligent transport systems — ITS station security services for secure session establishment and authentication between trusted devices							○
ISO/TC 204/ WG 18	ISO/TS 21176:2020	Cooperative intelligent transport systems (C-ITS) — Position, velocity and time functionality in the ITS station							○
ISO/TC 204/ WG 18	ISO/TS 20026:2017	Intelligent transport systems — Cooperative ITS — Test architecture							○
ISO/TC 204/ WG 18	ISO/AWI 19321	Intelligent transport systems — Cooperative ITS — Dictionary of in-vehicle information (IVI) data structures				○			
ISO/TC 204/ WG 18	ISO/TS 19321:2024	Intelligent transport systems — Cooperative ITS — Dictionary of in-vehicle information (IVI) data structures							○
ISO/TC 204/ WG 18	ISO/AWI TS 19091	Intelligent transport systems — Cooperative ITS — Using V2I and I2V communications for applications related to signalized intersections			○				
ISO/TC 204/ WG 18	ISO/TS 19091:2019	Intelligent transport systems — Cooperative ITS — Using V2I and I2V communications for applications related to signalized intersections							○
ISO/TC 204/ WG 18	ISO 18750:2025	Intelligent transport systems — Local dynamic map							○
ISO/TC 204/ WG 18	ISO/TS 17429:2017	Intelligent transport systems — Cooperative ITS — ITS station facilities for the transfer of information between ITS stations							○
ISO/TC 204/ WG 18	ISO 17427-1:2018	Intelligent transport systems — Cooperative ITS — Part 1: Roles and responsibilities in the context of co-operative ITS architecture(s)							○
ISO/TC 204/ WG 18	ISO/TR 17427-2:2015	Intelligent transport systems — Cooperative ITS — Part 2: Framework overview							○
ISO/TC 204/ WG 18	ISO/TR 17427-3:2015	Intelligent transport systems — Cooperative ITS — Part 3: Concept of operations (ConOps) for 'core' systems							○
ISO/TC 204/ WG 18	ISO/TR 17427-4:2015	Intelligent transport systems — Cooperative ITS — Part 4: Minimum system requirements and behaviour for core systems							○
ISO/TC 204/ WG 18	ISO/TR 17427-6:2015	Intelligent transport systems — Cooperative ITS — Part 6: 'Core system' risk assessment methodology							○
ISO/TC 204/ WG 18	ISO/TR 17427-7:2015	Intelligent transport systems — Cooperative ITS — Part 7: Privacy aspects							○
ISO/TC 204/ WG 18	ISO/TR 17427-8:2015	Intelligent transport systems — Cooperative ITS — Part 8: Liability aspects							○
ISO/TC 204/ WG 18	ISO/TR 17427-9:2015	Intelligent transport systems — Cooperative ITS — Part 9: Compliance and enforcement aspects							○
ISO/TC 204/ WG 18	ISO/TR 17427-10:2015	Intelligent transport systems — Cooperative ITS — Part 10: Driver distraction and information display							○
ISO/TC 204/ WG 18	ISO/TS 17426:2016	Intelligent transport systems — Cooperative systems — Contextual speeds							○
ISO/TC 204/ WG 18	ISO/TS 17425:2016	Intelligent transport systems — Cooperative systems — Data exchange specification for in-vehicle presentation of external road and traffic related data							○
ISO/TC 204/ WG 18	ISO/TR 17424:2015	Intelligent transport systems — Cooperative systems — State of the art of Local Dynamic Maps concepts							○
ISO/TC 204/ WG 18	ISO 17423:2025	Intelligent transport systems — Application requirements and objectives							○
ISO/TC 204/ WG 18	ISO 17419:2025	Intelligent transport systems — Globally unique identification							○
ISO/TC 204/ WG 19	ISO/NP TS 25614	Intelligent transport systems — Kerbside management — Orchestration for loading and unloading		○					
ISO/TC 204/ WG 19	ISO/TR 24856:2025	Intelligent transport systems — Mobility integration — Role model of the human-centric predictive risk information provisioning service							○
ISO/TC 204/ WG 19	ISO/TR 24317:2023	Intelligent transport systems — Mobility integration — Mobility integration needs for vulnerable users and light modes of transport							○
ISO/TC 204/ WG 19	ISO/TS 24315-1:2025	Intelligent transport systems — Management of electronic traffic regulations (METR) — Part 1: Vocabulary							○
ISO/TC 204/ WG 19	ISO/DTR 24315-2	Intelligent transport systems — Management of electronic traffic regulations (METR) — Part 2: Operational concepts (ConOps)						○	
ISO/TC 204/ WG 19	ISO/DTS 24315-3	Intelligent transport systems — Management of electronic traffic regulations (METR) — Part 3: System of systems requirements and architecture (SoSR)						○	
ISO/TC 204/ WG 19	ISO/PWI TS 24315-4	Intelligent transport systems — Management of electronic traffic regulations (METR) — Part 4: Regulation system requirements (RSR)	○						
ISO/TC 204/ WG 19	ISO/PWI 24315-5	Intelligent transport systems — Management of electronic traffic regulations (METR) — Part 5: Traffic regulation order perspective (TRO)	○						
ISO/TC 204/ WG 19	ISO/PWI TS 24315-8	Intelligent transport systems — Management of electronic traffic regulations (METR) — Part 8: Data requirements	○						
ISO/TC 204/ WG 19	ISO/PWI TS 24315-9	Intelligent transport systems — Management of electronic traffic regulations (METR) — Part 9: Maps	○						

WG	ISO Numberr	Title	Stage						Pub-lished
			PWI	NP	WD	CD	DIS	FDIS	
ISO/TC 204/ WG 19	ISO/PWI TS 24315-10	Intelligent transport systems — Management of electronic traffic regulations (METR) — Part 10: Cybersecurity	○						
ISO/TC 204/ WG 19	ISO 24311:2024	Intelligent transport systems — Mobility integration — 'Controlled zone' management for urban vehicle access restrictions (UVARs) using C-ITS							○
ISO/TC 204/ WG 19	ISO/DTR 22625	Intelligent transport systems– Mobility integration - Physical and functional view						○	
ISO/TC 204/ WG 19	ISO/TR 17783:2024	Intelligent transport systems — Mobility integration — Role and functional model for mobility services using low Earth orbit (LEO) satellite systems							○
ISO/TC 204/ WG 19	ISO/TR 12770:2023	Intelligent transport systems — Mobility integration — ITS data aggregation role and functional model							○
ISO/TC 204/ WG 19	ISO/TR 7878:2023	Intelligent transport systems — Mobility integration — Enterprise view							○
ISO/TC 204/ WG 19	ISO/CD TR 7874-1	Intelligent transport systems — Mobility integration multimodal pricing — Part 1: Framework				○			
ISO/TC 204/ WG 19	ISO/PWI 7874-2	Intelligent transport systems — Mobility integration multimodal pricing — Part 2: Data	○						
ISO/TC 204/ WG 19	ISO/TR 7872:2022	Intelligent transport systems — Mobility integration — Digital infrastructure service role and functional model for urban ITS service applications							○
ISO/TC 204/ WG 19	ISO/TS 5616:2024	Intelligent transport systems — Secure interfaces governance — Minimum requirements and governance procedures							○
ISO/TC 204/ WG 19	ISO/TS 5255-1:2022	Intelligent transport systems — Low-speed automated driving system (LSADS) service — Part 1: Role and functional model							○
ISO/TC 204/ WG 19	ISO/TR 5255-2:2023	Intelligent transport systems — Low-speed automated driving system (LSADS) service — Part 2: Gap analysis							○
ISO/TC 204/ WG 19	ISO/TS 5206-1:2023	Intelligent transport systems — Parking — Part 1: Core data model							○
ISO/TC 204/ WG 19	ISO/TR 4448-1:2024	Intelligent transport systems — Public-area mobile robots (PMR) — Part 1: Overview of paradigm							○
ISO/TC 204/ WG 19	ISO/PWI TS 4448-2	Intelligent transport systems — Public-area mobile robots (PMR) — Part 2: Data definitions and general concepts	○						
ISO/TC 204/ WG 19	ISO/PWI TS 4448-3	Intelligent transport systems — Public-area mobile robots (PMR) — Part 3: Journey meso-planning	○						
ISO/TC 204/ WG 19	ISO/PWI TR 4448-4	Intelligent transport systems — Public-area mobile robots (PMR) — Part 4: Signage for human awareness	○						
ISO/TC 204/ WG 19	ISO/PWI TS 4448-5	Intelligent transport systems — Public-area mobile robots (PMR) — Part 5: Public-area mobile robot access on human pathways	○						
ISO/TC 204/ WG 19	ISO/PWI TS 4448-7	Intelligent transport systems — Public-area mobile robots (PMR) — Part 7: Public-area mobile robot behaviour on human pathways	○						
ISO/TC 204/ WG 19	ISO/PWI TS 4448-8	Intelligent transport systems — Public-area mobile robots (PMR) — Part 8: Public-area mobile robot-to-human communication signals	○						
ISO/TC 204/ WG 19	ISO/PWI TS 4448-9	Intelligent transport systems — Public-area mobile robots (PMR) — Part 9: Journey data recorder for public-area mobile robots	○						
ISO/TC 204/ WG 19	ISO/PWI TS 4448-10	Intelligent transport systems — Public-area mobile robots (PMR) — Part 10: Suitability of pathway infrastructure for public-area mobile robots	○						
ISO/TC 204/ WG 19	ISO/PWI TS 4448-11	Intelligent transport systems — Public-area mobile robots (PMR) — Part 11: Environmental worthiness of public-area mobile robots	○						
ISO/TC 204/ WG 19	ISO/PWI TS 4448-12	Intelligent transport systems — Public-area Mobile Robots (PMR) — Part 12: Crash procedures	○						
ISO/TC 204/ WG 19	ISO/PWI TS 4448-13	Intelligent transport systems — Public-area Mobile Robots (PMR) — Part 13: Mapping procedures	○						
ISO/TC 204/ WG 19	ISO/PWI TS 4448-14	Intelligent transport systems — Public-area Mobile Robots (PMR) — Part 14: Personal assistant public mobile robots (PMR) for goods	○						
ISO/TC 204/ WG 19	ISO/PWI TS 4448-15	Intelligent transport systems — Public-area Mobile Robots (PMR) — Part 15: Personal assistant public mobile robots (PMR) for passengers	○						
ISO/TC 204/ WG 19	ISO/PWI TS 4448-16	Intelligent transport systems — Public-area mobile robots (PMR) — Part 16: Safety and reliability	○						
ISO/TC 204/ WG 19	ISO/TR 4447:2022	Intelligent transport systems — Mobility integration — Comparison of two mainstream integrated mobility concepts							○
ISO/TC 204/ WG 19	ISO/TR 4445:2021	Intelligent transport systems — Mobility integration — Role model of ITS service application in smart cities							○
ISO/TC 204/ WG 20	ISO/WD TS 22577	Intelligent transport systems — Nomadic and mobile devices — In-vehicle passenger monitoring and care services using deep learning technology			○				
ISO/TC 204/ WG 20	ISO/CD TR 12786.2	Intelligent transport systems — Big data and artificial intelligence supporting intelligent transport systems — Use cases				○			

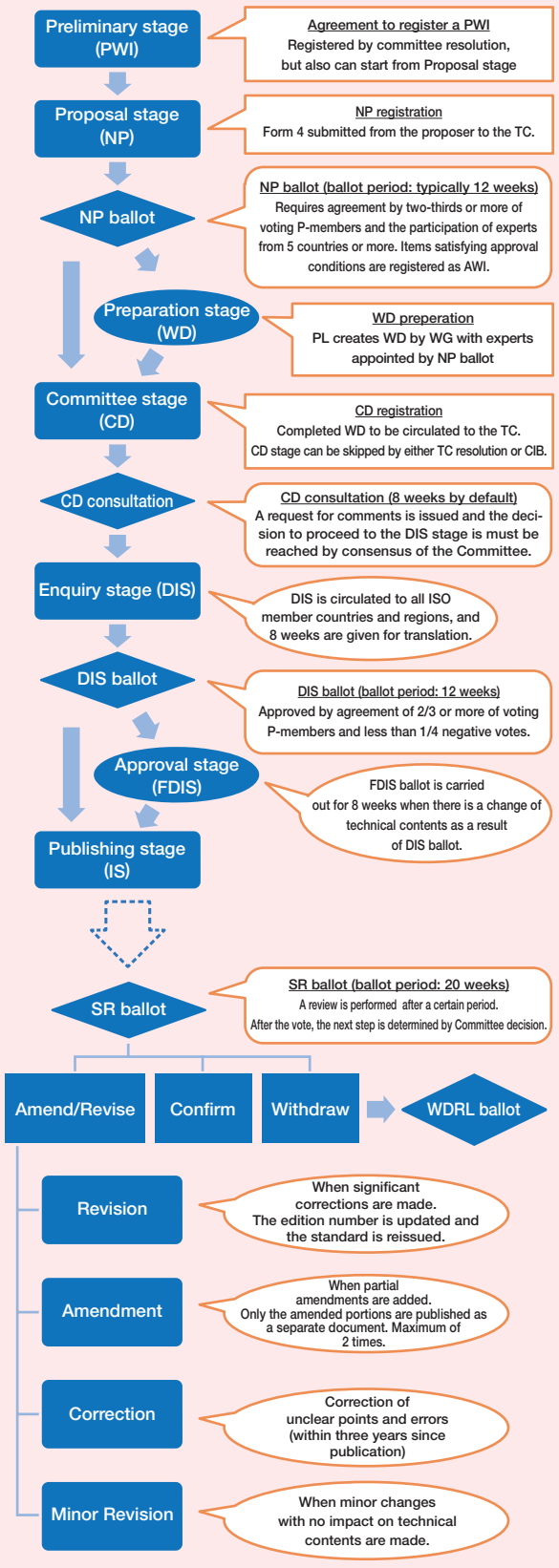
Venues of TC 204 Plenary Meetings

TC 204 holds two plenary meetings per year, with the host country rotated between the North America, Europe, and Asia Pacific regions. Due to preventing the spread of COVID-19 infection, the previous Five meetings from April 2020 through April 2022 were held online.

Number of times	Year/ month	Venue	Country
1st	1993.04	Washington	US
Special Meeting	1993.06	Stuttgart	Germany
2nd	1993.11	Tokyo	Japan
3rd	1994.04	Atlanta	US
4th	1994.12	Paris	France
5th	1995.05	Sidney	Australia
6th	1995.11	Yokohama	Japan
7th	1996.05	London	UK
8th	1996.10	Orland	US
9th	1997.03	Noosa	Australia
10th	1997.10	Berlin	Germany
11th	1998.04	Toronto	Canada
12th	1998.10	Seoul	Korea
13th	1999.06	Amsterdam	Netherlands
14th	1999.11	Montreal	Canada
15th	2000.06	Kyoto	Japan
16th	2000.11	Napoli	Italy
17th	2001.04	Honolulu	US
18th	2001.10	Queensland	Australia
19th	2002.05	London	UK
20th	2002.10	Chicago	US
21st	2003.06	Nagano	Japan
22nd	2003.10	Wein	Austria
23rd	2004.05	Vancouver	Canada
24th	2004.10	Beijing	China
25th	2005.04	Paris	France
26th	2005.11	Portland	US
27th	2006.04	Busan	Korea
28th	2006.11	Cape Town	South Africa
29th	2007.04	Lexington	US
30th	2007.11	Qingdao	China
31st	2008.04	Munich	Germany
32nd	2008.11	Ottawa	Canada
33rd	2009.05	Chiang Mai	Thailand
34th	2009.09	Barcelona	Spain
35th	2010.04	New Orleans	US
36th	2010.11	Jeju	Korea
37th	2011.04	Prague	Czech Rep.
38th	2011.10	Tampa	US
39th	2012.04	Melbourne	Australia
40th	2012.10	Moscow	Russia
41st	2013.04	Seattle	US
42nd	2013.10	Kobe	Japan
43rd	2014.04	Oslo	Norway
44th	2014.10	Vancouver	Canada
45th	2015.04	Hangzhou	China
46th	2015.10	Potsdam	Germany
47th	2016.04	Concord	US
48th	2016.10	Auckland	New Zealand
49th	2017.04	Paris	France
50th	2017.10	San Antonio	US
51st	2018.04	Seoul	Korea
52nd	2018.09	Budapest	Hungary
53rd	2019.04	Kennedy Space Center	US
54th	2019.10	Singapore	Singapore
55th	2020.04	Held online	
56th	2020.10	Held online	
57th	2021.04	Held online	
58th	2021.10	Held online	
59th	2022.04	Held online	
60th	2022.10	Tampere	Finland
61st	2023.05	San Antonio	US
62nd	2023.10	Singapore	Singapore
63rd	2024.04	Oslo	Norway
64th	2024.10	Cambridge	US
65th	2025.05	Amman	Jordan

Development of International Standards

TC 204 has published numerous international standards on subjects pertaining to ITS. Standards are developed by discussing and voting upon those subjects in accordance with the rules on developing standards specified in the ISO Directives. The following shows an overview of the workflow.



Target deadlines for standard publication

Development stage	Document	Target deadline (months)		
		18 months	24 months	36 months
Proposal stage	NP	Proposal → Approval → Registration	Proposal → Approval → Registration	Proposal → Approval → Registration
Preparation stage	WD	-	-	12
Committee stage	CD	-	6	6
Enquiry stage	DIS	13	12	12
Approval stage	FDIS/IS	5	6	6

Conditions for automatically deleting work items

- A PWI does not move to the NP stage within 3 years.
- No decision on follow-up actions is made within six months following the DIS or FDIS target deadline.
- If DIS approval is not reached within five years after NP registration.

Definitions and abbreviations

TC : Technical Committee
SC : Sub Committee
WG : Working Group
PL : Project Leader
PWI : Preliminary Work Item
NP : New Work Item Proposal
AWI : Approved Work Item
WD : Working Draft
CD : Committee Draft
DIS : Draft International Standard
FDIS : Final Draft International Standard
IS : International Standard
SR : Systematic Review
WDRL: Withdrawal
TS : Technical Specification
Document published when agreement on an international standard cannot be reached immediately for a standardization item because it is still at the development stage, or for any other reason, even if such agreement is likely to be reached in the future.
PAS : Publicly Available Specification
Intermediate specification published ahead of the completion of an international standard. Agreement is reached at the NP stage.
TR : Technical Report
Document containing data different from an international standard. It must not include matter implying that it is normative contents.

Timing of systematic reviews

Deliverable	Max. elapsed time before systematic review	Max. number of times deliverables may be confirmed	Max. life
IS	5 years	No limit	No limit
TS	3 years	Once recommended	Preferably 6 times
PAS	3 years (No default action by ISO CS)	Once	6 years If not converted after this period, the deliverable is proposed for withdrawal
TR	Not specified	Not specified	No limit

ITS Standardization Activities of ISO/TC 204

2025

This publication is a part of the program of technical regulations, standards and conformity assessment promotion for changing energy supply/demand structure (international standardization related to the high-level automated driving systems enabling smart mobility systems) in FY 2025 commissioned by Japanese Standards Association.

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