



Topic 6. Standardization of ITS

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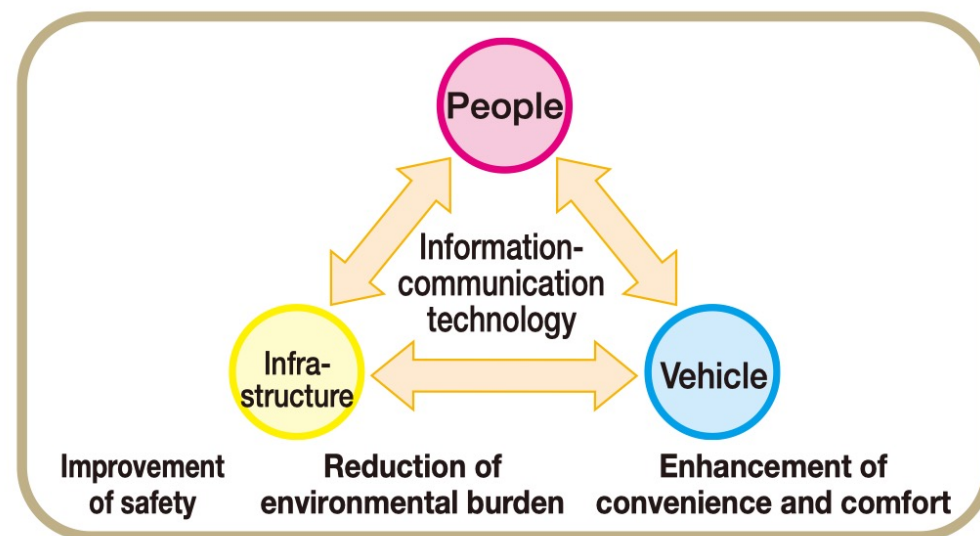
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What is ITS?

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 eliminate unnecessary trade barriers by aligning various standards with international standards.

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 standardiza-

tion 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.

Landscape of standardization of ITS (related standardization bodies)

ITS supports the movement of people and goods on a variety of levels.

The core technologies of ITS are information and telecommunication technologies.

As shown in the next page, ITS international standardization is carried out by ISO, IEC, JTC and ITU. The TC 204 committee specializes in ITS standardization activities.

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

Under study at TC 204 are standardization proposals for (1) systems architecture, (2) interfaces (message sets, etc.), (3) frameworks (data dictionaries and message templates), (4) system performance requirements, and (5) test methods. This booklet describes the present state of ITS standardization, with a focus on TC 204 programs.

Reference

What is standardization?

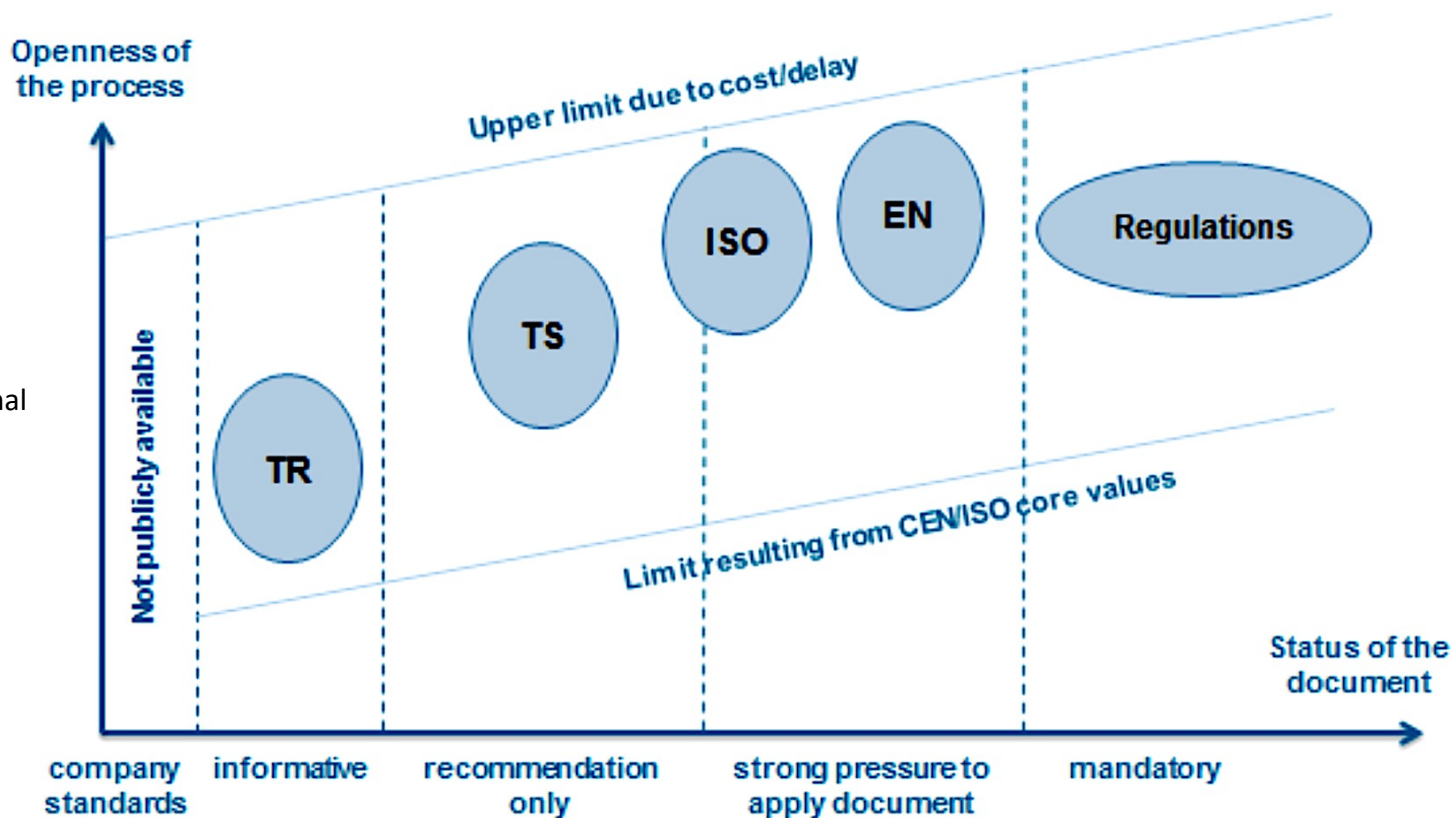
Standardization consists of programs to minimize, simplify, and rationalize things, whenever possible, which, if left alone, would become divergent, complex, or chaotic.

The original aim of standardization in the industrial field is to secure the compatibility of products and provide an environment where customers willing to buy products are not confined to purchasing things from a specific supplier.

What are standards?

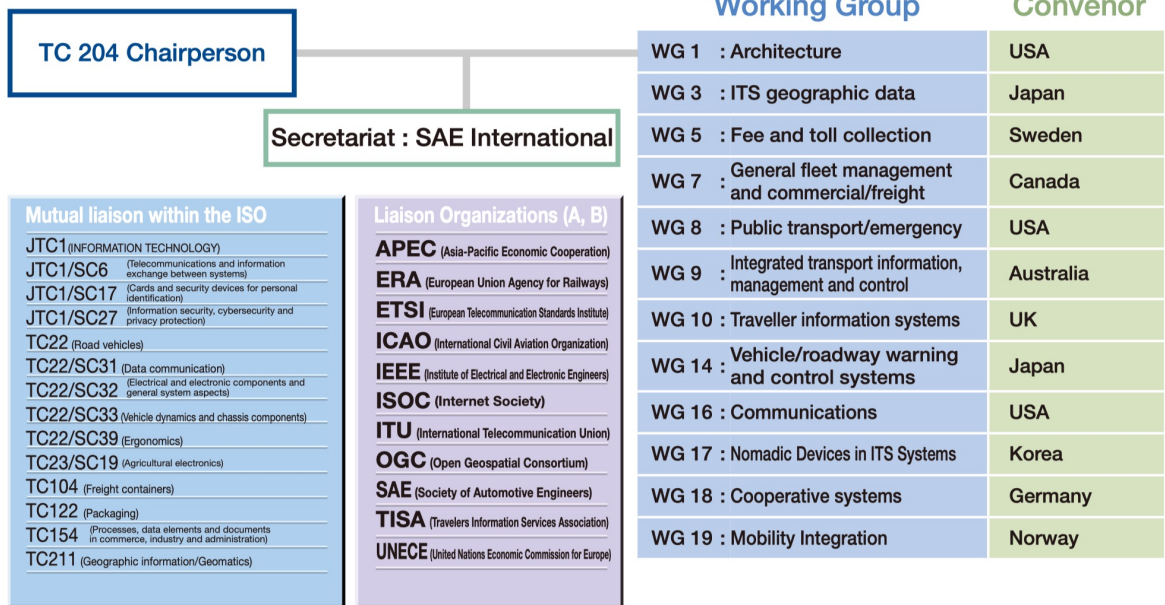
Written rules defined by standardization are generally referred to as "standards."

Typically, a standard has no binding power as would a legal requirement, which means that standards are optional. In ordinary transactions the standard on which parties concerned rely should be defined based on an agreement among them. In fact, government agencies often mandate compliance with specific standards (mandatory standards) for the purpose of public benefit, such as for maintaining compatibility, preventing mutual intervention, or protecting consumers.



ISO - Standards of International Standard Organization
 ES - European Standards
 TS - Technical Specifications
 TR - Technical Reports

Relationship between ITS standardization organizations



Participating members (29 countries): Contribute to the meetings, participate actively in the work, and have the obligation to vote.

Australia, Austria, Belarus, Belgium, Canada, China, Cyprus, Czech Republic, Finland, France, Germany, Hungary, India, Islamic Republic of Iran, Ireland, Italy, Japan, Republic of Korea, Malaysia, Netherlands, New Zealand, Russian Federation, Norway, South Africa, Spain, Sweden, Switzerland, United Kingdom, United States of America

Observing members (30 countries): Follow the work as observers with the right to submit comments and attend the meetings.

Algeria, Bulgaria, Chile, Colombia, Congo, Croatia, Cuba, Denmark, Egypt, Ethiopia, Greece, Hong Kong China, Indonesia, Israel, Mexico, Mongolia, Montenegro, Pakistan, Philippines, Poland, Portugal, Romania, Republic of North Macedonia, Saudi Arabia, Serbia, Singapore, Slovakia, Thailand, Turkey, Ukraine

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. Technical standards developed in European standard organizations such as CEN, are in principle, optional. However, the binding power of Directive 98/34/ EC - Procedures based on the New Approach, technical standards developed under the standardization directive become virtually mandatory European 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. The WG 17 project team includes PT 1701 to PT 1711, and PT 1712, which was newly created in 2020. EU ICIP (European ITS communications and information protocols) deliberations have started. WG 17 aims to develop a toolkit for governments to realize smart cities. Joint WG meetings with WG 19 Mobility Integration, created at the ISO/TC204 Budapest plenary meeting in September 2018, are being held frequently.

In the Committee TC 278, as well as in TC 204, there are working groups, which are responsible for various areas of activities. ISO/TC 204 is organised in Working Groups (WG), and cooperates partly with CEN/TC 278.

 CEN/TC 278	 ISO/TC 204
WG1: Electronic Fee Collection (EFC)	WG5: Fee and Toll Collection
WG4: Traffic and Traveller Information (TTI)	WG10: Traveller Information Systems
WG16: Cooperative ITS (C-ITS)	WG18: Cooperative Systems (C-ITS)
WG17: Mobility Integration	WG19: Mobility Integration
WG3: Public Transport	WG1: Architecture
WG7: ITS Spatial Data	WG3: ITS Database Technologies
WG8: Road Traffic Data	WG7: General Fleet Management and Commercial / Freight
WG15: eSafety (eCall)	WG8: Public Transport / Emergency
	WG9: Integrated Transport, Management and Control
	WG14: Vehicle / Roadway Warning and Control Systems
	WG16: ITS Communications (C-ITS, DSRC)
	WG17: Nomadic devices in ITS

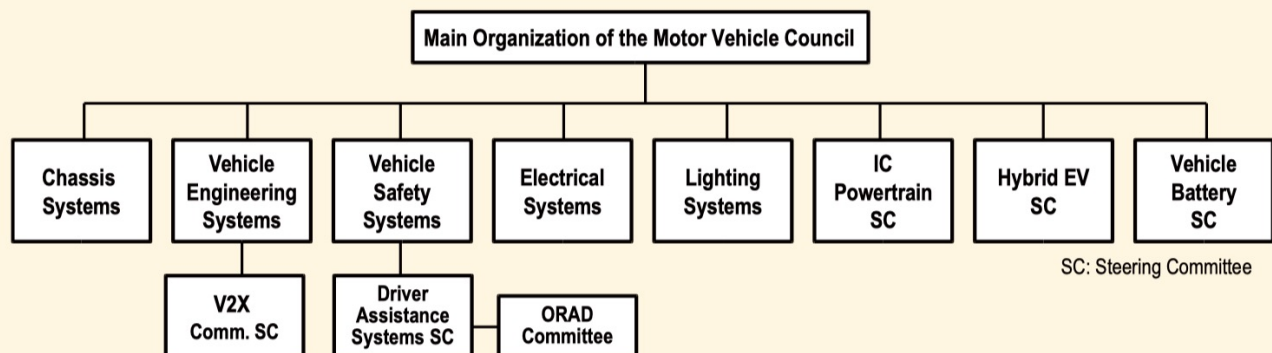
List of CEN/TC 278 working groups

CEN/TC 278 Working Group	Working Group	Lead Country	Corresponding TC 204 Working Group
WG1	Electronic Fee Collection (EFC)	Sweden	WG5
WG2	Freight, Logistics and Commercial Vehicle Operations	United Kingdom	WG7
WG3	Public Transport	France	WG8
WG4	Traffic and Traveler Information	United Kingdom	WG10
WG5	Traffic Control Systems	United Kingdom	WG9
WG7	ITS Spatial Data	Germany	WG3
WG8	Road Traffic Data	Netherlands	
WG9	Dedicated Short-Range Communications (DSRC)	Germany	WG16 (abolished WG 15)
WG10	Human-Machine Interfacing	Germany	(TC22/SC13/W8)
WG12	Automatic Vehicle and Equipment Identification	Norway	W4 (abolished)
WG13	Architecture and Terminology	United Kingdom	WG1
WG14	Recovery of Stolen Vehicles	France	
WG15	eSafety / eCall	United Kingdom	
WG16	Cooperative ITS	Germany	WG18
WG17	Mobility integration (formerly Urban ITS)	Norway	WG19

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.



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 European 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.

Websites related to ITS

National and regional ITS representative organizations

ITS America	www.itsa.org	ITS Germany	www.itsgermany.org
ITS Australia	www.its-australia.com.au	ITS Netherlands(Connekt)	www.connekt.nl
ITS China	www.itschina.org	ITS Norway	www.its-norway.no
ITS Canada	www.itscanada.ca	ITS Spain	www.itsspain.es/
Czech and Slovak Intelligent Transport Systems & Services	https://www.sdt.cz/intro.php?lang=en	ITS Singapore	www.itssingapore.org.sg
ITS Finland	www.its-finland.fi	ITS South Africa	www.itssa.org
ITS France	www.atec-itsfrance.net	ITS Sweden	www.its-sweden.se
ITS Hong Kong	www.itshk.org	ITS Taiwan	www.its-taiwan.org.tw
ITS Japan	www.its-jp.org	ITS Thailand	www.its.in.th
ITS Korea	www.itskorea.kr	ITS United Kingdom	www.its-uk.org.uk
ITS Malaysia	www.itsmalaysia.com.my	REAM (Malaysia)	www.ream.org.my

Organizations involved in standardization of ITS (International)

AASHTO (America)	www.aashto.org	ISO	www.iso.org
ANSI (America)	www.ansi.org	ISO/TC204	www.iso.org/committee/54706.html
ASECAP	www.asecap.com	ITE	www.ite.org
ASTM (America)	www.astm.org	ITU	www.itu.int
CEN (Europe)	www.itsstandards.eu	ISO/IEC JTC1	www.jtc1.org
ERTICO (Europe)	www.ertico.com	NEMA (America)	www.nema.org
ETSI (Europe)	www.etsi.org	OMG	www.omg.org
ETSI ITS (Europe)	www.etsi.org/technologies/automotive-intelligent-transport	PIARC	www.piarc.org
IEC	www.iec.ch	SAE International	www.sae.org
IEEE	www.ieee.org	US-DOT (America)	www.dot.gov

INTERNATIONAL
STANDARD

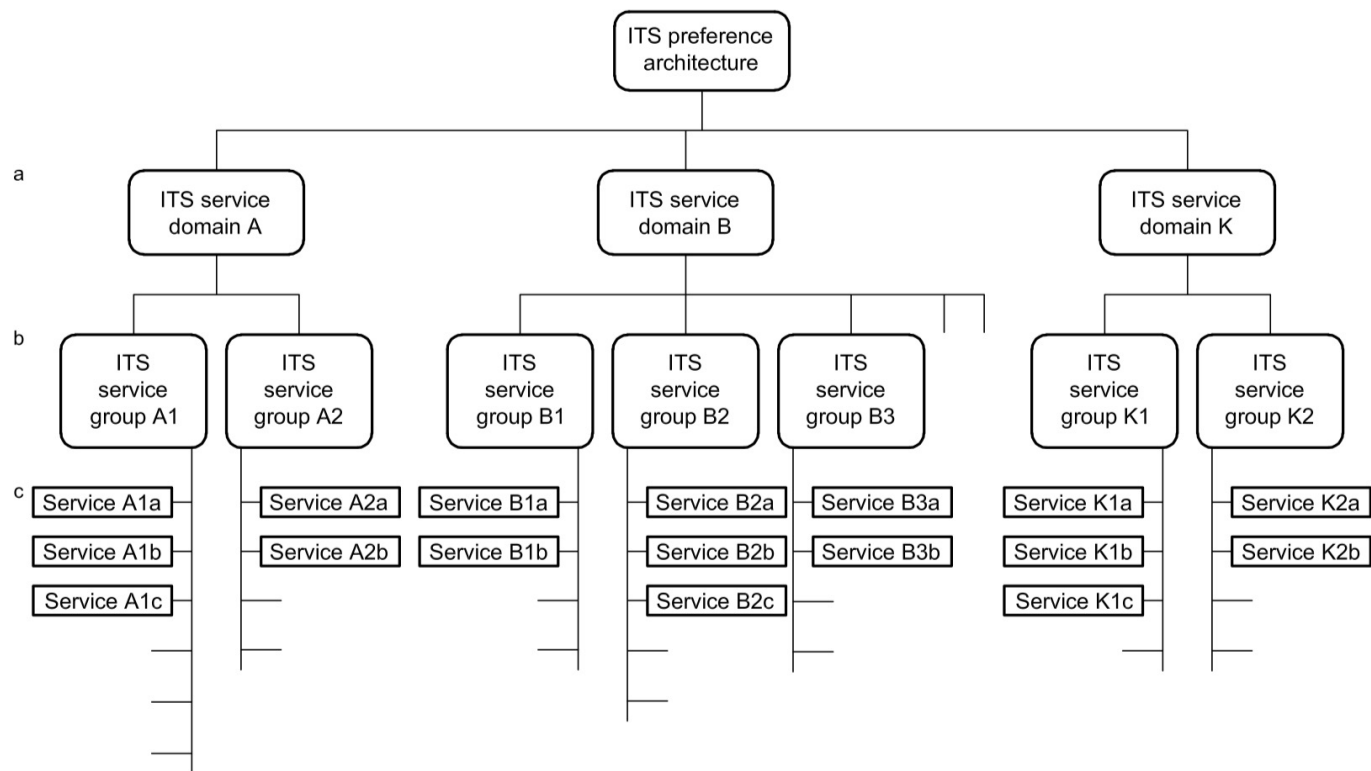
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**Intelligent transport systems —
Reference model architecture(s) for the
ITS sector —**

**Part 1:
ITS service domains, service groups and
services**

ISO 14813-1:2007(E)

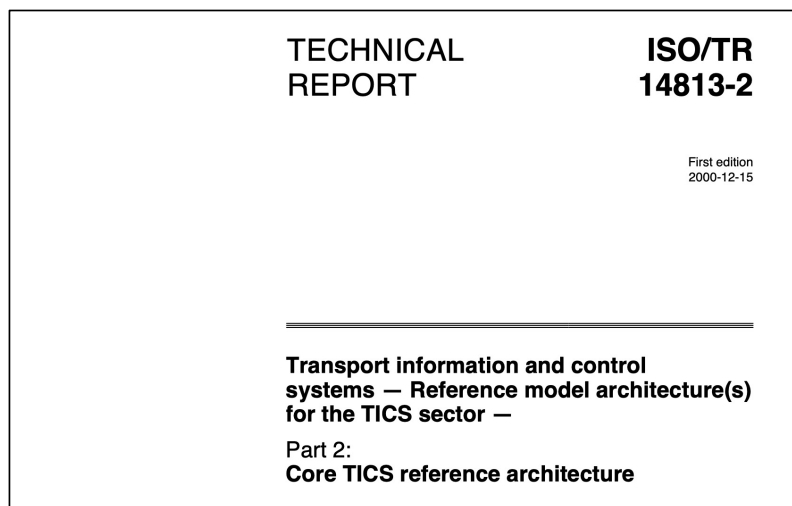


Service domain	Service group	Example services
1. Traveller information	1.1 Pre-trip information	<i>Pre-trip information – Traffic and roadway</i>
		<i>Pre-trip information – Public transport (bus and rail)</i>
		<i>Pre-trip information – Commercial vehicle</i>
		<i>Pre-trip information – Personal interactive</i>
		<i>Pre-trip information – Modal changes and multi-modal information</i>
	1.2 On-trip information	<i>On-trip information – Roadside</i>
		<i>On-trip information – In-vehicle signing</i>
		<i>On-trip information – Public transport vehicle</i>
		<i>On-trip information – Parking information</i>
		<i>On-trip information – Mobile devices</i>
		<i>On-trip information – Pedestrian and bicycle route guidance</i>
	1.3 Route guidance and navigation – Pre-trip	<i>Dynamic in-vehicle route guidance and navigation programming/setup</i>
		<i>Integrated multi-modal trip guidance</i>
		<i>Pedestrian and bicycle route guidance</i>
	1.4 Route guidance and navigation – On-trip	<i>Autonomous in-vehicle navigation</i>
		<i>Dynamic in-vehicle route guidance and navigation (based on real-time network information)</i>
<i>Integrated multi-modal trip guidance</i>		
<i>Pedestrian and bicycle route guidance</i>		
1.5 Trip planning support	<i>Individual trip planning</i>	
	<i>Centralized trip planning</i>	
	<i>Data archiving</i>	
	<i>Data warehouse</i>	
1.6 Travel services information	<i>Travel services information – In-vehicle</i>	
	<i>Travel services information – Personal interactive</i>	
	<i>Travel services information – Dedicated location</i>	



In accordance of international standard ISO/TR 14813-2 there are 32 ITS services in 8 category.

Service Category	Service Number	Service Name
Traveller Information	1	Pre-trip Information
	2	On-trip Driver Information
	3	On-trip Public Transport Information
	4	Personal Information Services
	5	Route Guidance and Navigation
Traffic Management	6	Transportation Planning Support
	7	Traffic Control
	8	Incident Management
	9	Demand Management
	10	Policing/Enforcing Traffic Regulations
	11	Infrastructure Maintenance Management
Vehicle	12	Vision Enhancement
	13	Automated Vehicle Operation
	14	Longitudinal Collision Avoidance
	15	Lateral Collision Avoidance
	16	Safety Readiness
	17	Pre-crash Restraint Deployment
Commercial Vehicle	18	Commercial Vehicle Pre-clearance
	19	Commercial Vehicle Administrative Processes
	20	Automated Roadside Safety Inspection
	21	Commercial Vehicle On-board Safety Monitoring
	22	Commercial Vehicle Fleet Management
Public Transport	23	Public Transport Management
	24	Demand Responsive Transport Management
	25	Shared Transport Management
Emergency	26	Emergency Notification and Personal Security
	27	Emergency Vehicle Management
	28	Hazardous Materials and Incident Notification
Electronic Payment	29	Electronic Financial Transactions
Safety	30	Public Travel Security
	31	Safety Enhancement for Vulnerable Road Users
	32	Intelligent Junctions and Links



Examples of use case diagrams

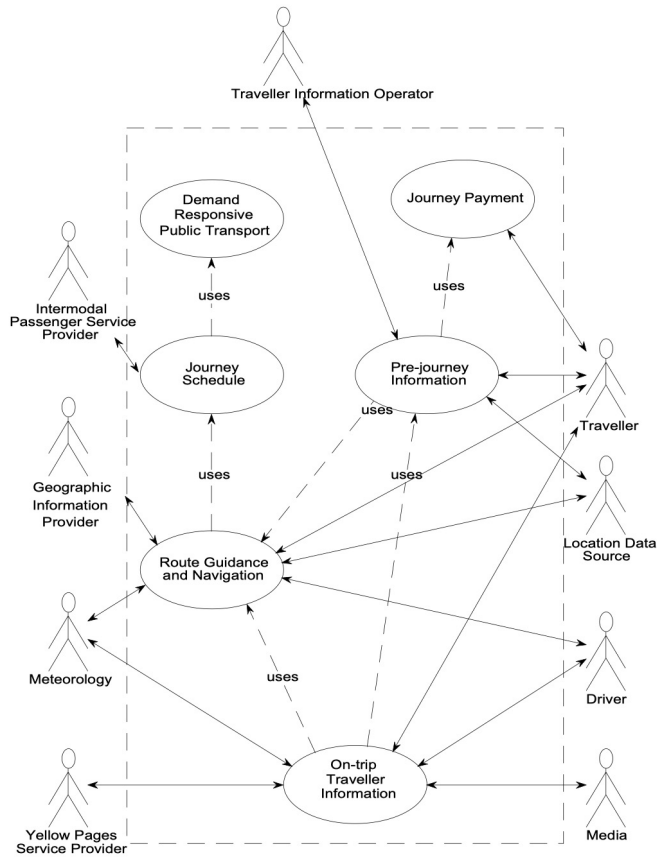


Figure 15 – Traveller information Use Case diagram

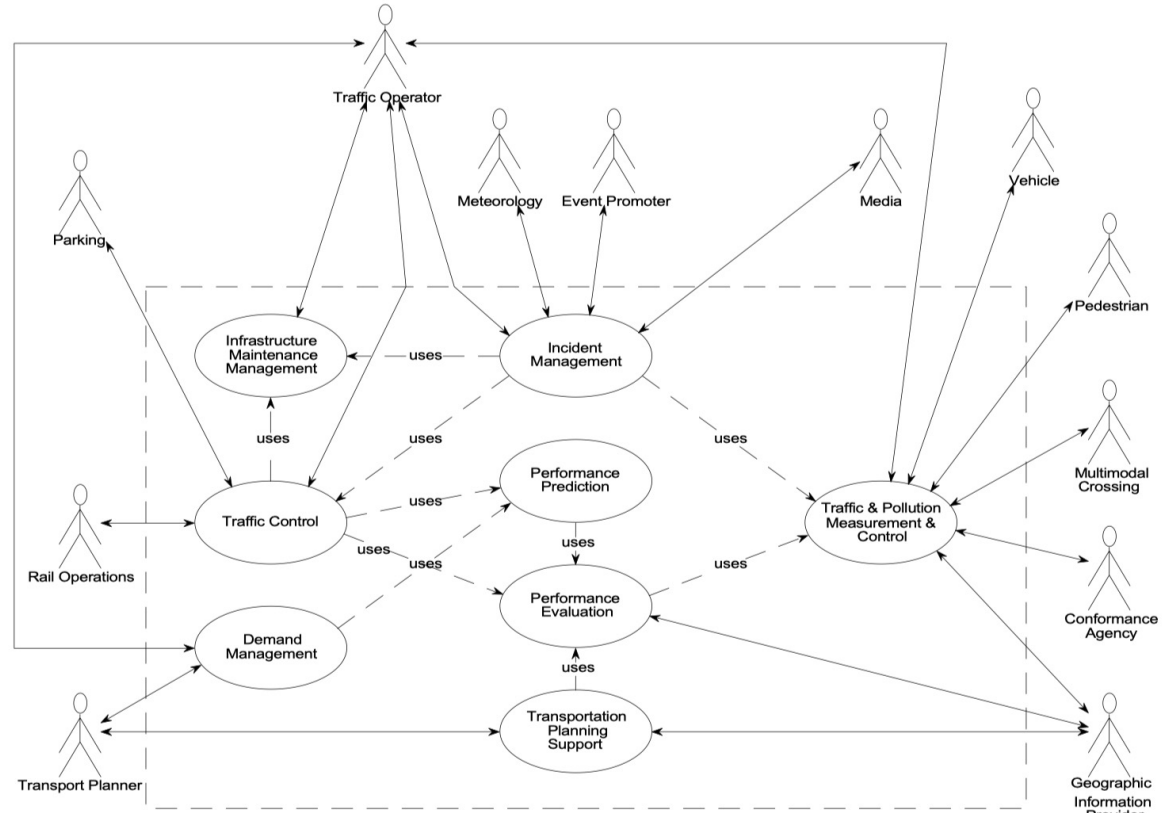


Figure 16 – Traffic management use case diagram



ITS Standardization Activities of ISO/TC 204

2021

Standardization of ITS	1
Framework for Standardization	2
Activities of TC 204 Working Groups	3
International Standardization Efforts Enabling the Realization and Spread of Automated Driving and Smart Mobility Services	
- initiatives in Japan	40
Related Standardization Activities	48
TC 204 List of Work Items and Progress Stages	56
Development of International Standards	68

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