
INDUSTRY STANDARDS

1 Activities of the Automobile Standardization Committee

1.1. Introduction

The Standardization Board of the Society of Automotive Engineers of Japan (JSAE) is mainly in charge of working on international automotive standards via the Road Vehicles Technical Committee (TC 22) and the Intelligent Transport Systems (ITS) Technical Committee (TC 204) of the International Organization for Standardization (ISO). Japan chairs Subcommittee 32 (SC 32) and Subcommittee 38 (SC 38) in ISO/TC 22. This article introduces the activities of TC 22 in fiscal 2018.

1.2. Roadmap of the Standardization Board

In May 2018, the Standardization Board vision and future policies were compiled and released as a roadmap (Fig. 1). In this roadmap the vision was expressed as, “The realization of a super-smart mobility society, leading the world through strategic standardization that contributes to realizing an abundant mobility society with zero traffic accidents, zero environmental impact, zero wasted movement, free movement, and to ensuring highly efficient logistics” Furthermore, the future policies to be enacted to achieve that vision include: (1) Looking ahead to the Japanese government’s goal of Society 5.0, make progress toward compliance with Industry 4.0, using AI and big data, and promote standardization that contributes to the realization of new services, management, and social systems, (2) strengthen strategic planning functions, (3) strengthen standardization promotion functions, and (4) strengthen external collaborations.

1.3. Establishment of the Automobile Standardization Committee

The organizational structure of the Standardization Board was changed to the structure shown in Fig. 2 in June 2018 in an effort to push forward with the roadmap. As a result, the Automobile Standardization Committee was established. The main reasons for these changes

were to make the JIS/JASO standard deliberations independent and to create a structure enabling sufficient deliberations both in Japan and internationally. Furthermore, the Strategic Planning Working Group (WG) was established directly under the Automobile Standardization Committee to support to it as well as to enhance the strategic planning functions so that they can better cope with all the various roadmap measures.

1.4. Mid-Term Review Report

The Automobile Standardization Committee conducts its standardization activities based on a 5-year long-term plan. As of the present time (2018), the Committee is carrying out activities in line with the 10th automobile standards establishment and revision long-term plan originally formulated in 2015. The mid-term review report was compiled in 2018, the midway point of this 5-year plan. An outline of this report is detailed below.

1.4.1. Promoting strategic standardization

In 2015, when the 10th long-term plan was originally formulated, the number of proposals for international standards that originated in Japan was insufficient compared to other advanced standardization countries such as Germany. Consequently, the basic policy of the 10th long-term plan was defined as “the prompt spread of Japan’s superior technologies around the world through standardization”. The key performance indicator (KPI) for this policy was the number of proposals originating from Japan, and the target was increased by 30% compared to the 9th long-term plan. That progression is shown in Fig. 3. The number of proposals from Japan achieved the target by the time of the mid-term review (fiscal 2018) indicating that a solid mechanism for proposing international standards from Japan was successfully built. However, the current range of proposals originating from Japan cannot necessarily be said to focus on strategic standardization areas. Looking ahead, it will be necessary to systematically shift proposals toward more strategic areas, and measures to achieve this will contin-

		2020	2025	2030	2035	2040	2045	2050	
Technological Trends	Electrification	Introduction		Expansion			Maturity		
	Automated driving	Introduction		Expansion			Maturity Super-smart mobility society		
	ICT	Progress in intelligence and connected vehicles → Creation and expansion of new value, new services, and new business							
Basic policies		Lead the world through strategic standardization that contributes to realizing an abundant mobility society with zero traffic accidents, zero environmental impact, zero wasted movement, free movement, and to ensuring highly efficient logistics.							
Priority issues for standardization		Strategic international standardization and creation of JIS & JASO standards in the fields of automated driving, electrification, and intelligent and connected technologies (ICT). Shift from standardization of goods to standardization of systems							
		Promotion of standardization (standardization of services, management, and social systems, etc.) in anticipation of Society 5.0 (super-smart society). Compliance with Industry 4.0, use of AI and big data, and compatibility with real time data platforms, etc.							
Strengthening strategic planning functions		Lead international standardization in a way that contributes to market acquisition and competitiveness.		Lead standardization activities to form rules for creating and expanding markets in new fields.					
		<ul style="list-style-type: none"> ● (2018 →) Establish Strategic Planning WG #1 (collaboration with JAMA and METI). ● (2020 →) Construction of new international standardization long-term plan #1 (integration of TC 22 & TC 204, format of JASO). ● Establish Strategic Planning WG #2 (collaboration with other industries). Research <ul style="list-style-type: none"> ● Construction of new international standardization long-term plan #2 (integration with other industries). ● (2020 →) Establish Super-smart mobility & social system Standardization Review Committee. 							
Promote standardization. Strengthen functionality.	Develop human resources	Speedy creation of international standards.		Strengthen creation of service, management, and social system standards.					
	Support functions	<ul style="list-style-type: none"> ● (2018 →) Posts that contribute to International Conferences, set committee requirements #1. ● (2019 →) New program to develop professionals #1. ● (2018 →) Provide information sharing DB. ● (2019 →) Establish international standardization support WG #1. ● Posts in International Conferences, set committee requirements #2 (to handle service & system standards). ● New program to develop professionals #2 (to handle service & system standards). ● Utilize AI (e.g., introduce drafting tools). ● Establish international standardization support WG #2 (to handle service & system standards). 							
Strengthen external collaborations.		Strengthen domestic and international collaborations.		Rebuild international standardization system to realize super-smart mobility & society.					
		<ul style="list-style-type: none"> ● (2018 →) Create technological & regional cooperation mapping #1 (VDA, SAE, BNA, & CATARC, etc.). ● Create technological & regional cooperation mapping #2 (to handle new fields). ● Collaboration with related organizations in new fields (telecommunications, infrastructure, energy, & computers, etc.). ● Strategies for cooperation in new fields (systems, rules, & intellectual property, etc.). 							

Fig. 1 Roadmap of the Standardization Board

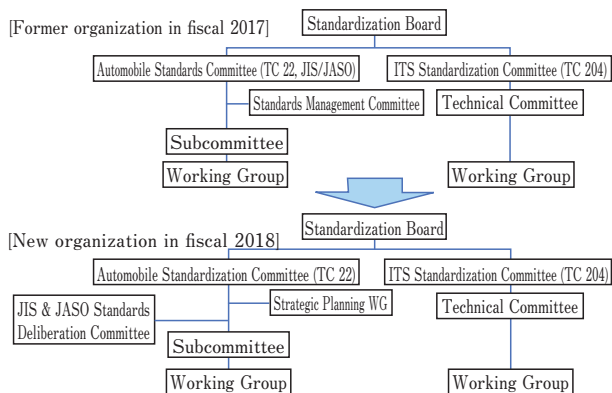


Fig. 2 Organization of the Standardization Board

ue to be examined.

1.4.2. Promoting understanding of standardization activities

Cooperation with the automobile industry, related industries, related organizations, and others is essential to successfully promote standardization. Therefore, it is necessary to actively and continuously disseminate the results of the standardization activities and any issues that arise.

In that context, results are being reported to the Ja-

pan Automobile Manufacturers Association (JAMA). Cooperation was deepened by setting up liaison members between the main JAMA and JSAE committees. In addition, the first forum on strategic internationalization was held at the 2018 JSAE Annual Spring Congress to promote better understanding of their international standardization activities. A large percentage of the forum participants were automotive executives and management level officers, and a certain level of understanding was obtained. Strategic advancement of international standardization requires the continuous development of proper human resources. Therefore, the JSAE holds its own ISO workshops (Fig. 4) to complement the workshops organized by the Japanese Standards Association (JSA) and the Ministry of Economy, Trade and Industry (METI). According to the responses on the questionnaires given to workshop participants, they are highly satisfied with the content of the JSAE workshops.

1.4.3. Examining and implementing ongoing issues from the 9th long-term plan

Overseas collaboration has been cited as one of the ongoing issues since the 9th long-term plan. In addition to the JSAE's cooperation with current partners such as

Year	End of 9th plan	2016	2017	2018
KPI (Number of proposals from Japan)	17 cases	Promotion of work items based on the 10th long-term plan.		
		Implementation of the PDCA cycle.		Mid-term review of 10th long-term plan.
Key initiatives (Number of proposals from Japan: NP).		[11 cases]	[8 cases]	[5 cases]
Strategic standardization areas		1	0	1
Automated driving (Advanced driving support)		<ul style="list-style-type: none"> ● ISO/TR 21959: Road Vehicles - Operational definitions for measures of human performance and state within the context of automated driving systems ▼ (French proposal) ISO/PAS 21448: Safety of the Intended Functionality (SOTIF) □ ISO 20900: Partially Automated Parking Systems (WG 14) 	<ul style="list-style-type: none"> ▼ (US proposal) ISO/TR 23720: Methods for evaluating other road user behavior in the presence of automated vehicle external communication ▼ (Swedish proposal) ISO 19206-3: Requirements for passenger vehicle 3D targets ▼ (Swedish proposal) ISO 19206-4: Requirements for bicyclist targets ▼ (French proposal) ISO 22733-1: Test method to evaluate the performance of autonomous emergency braking systems ▼ (French proposal) ISO 22735: Test method to evaluate the performance of lane-keeping assistance systems □ ISO 21202: Partially automated lane change systems (WG 14) □ ISO 17572-4: Part 4 - Precise relative location references (WG 3) 	<ul style="list-style-type: none"> ▼ (Swedish proposal) ISO/PW 19206-5: Requirements for motorcycle targets □ ISO 23374: Automated valet parking systems (AVPS) - Performance requirements and test procedures (WG 14) □ ISO 22726: Dynamic data and map database specifications for connected and automated driving system applications - Part 1: Architecture and logical data model for harmonization of static map data (WG 3)
Electric vehicles		<ul style="list-style-type: none"> ◆ ISO 21782: Test specifications for electric propulsion components (Parts 1 to 6) ◆ ISO 21498: Electrically propelled road vehicles - Electrical tests 	<ul style="list-style-type: none"> ◆ ISO 19363: Magnetic field wireless power transfer - Safety and interoperability requirements 	<ul style="list-style-type: none"> ◆ ISO 21782: Test specifications for electric propulsion components (Parts 4 to 6)
Information communication & Information security		<ul style="list-style-type: none"> ▼ (Germany & US proposal) ISO - SAE - PASO ISO 21434: Road Vehicles - Cybersecurity engineering 		<ul style="list-style-type: none"> ● ISO 24089: Software update engineering
Advanced safety and environmental-friendliness, basic technology areas		10	8	4
		<ul style="list-style-type: none"> ● ISO 21956: Ergonomics aspects of transport information and control systems — Human machine interface specifications for keyless ignition systems ● ISO 20794-1: Automobiles - Clock Extension Peripheral Interface (CXPI) - Part 1 ● ISO 20794-2: Part 2 ● ISO 20794-3: Part 3 ● ISO 20794-4: Part 4 ● ISO 14229-8: Unified diagnostic services (UDS) - Part 8: UDS on CXPI ● ISO 8092-5: Connections for on-board electrical wiring harnesses - Part 5: Test methods and general performance requirements for wiring harness connector operation ● ISO 21755-1: Motorcycles - Measurement method for evaporative emissions - Part 1: SHED test procedure ● ISO 21111: General requirements and test methods of optical Gigabit Ethernet components ● ISO 20574: Durability test method for starter motor for stop and start system 	<ul style="list-style-type: none"> ● ISO 23239-1: Vehicle domain data collection service - Part 1 ● ISO 21111-8: In-vehicle Ethernet - Part 8: Electrical 100 Mbit/s communication channel and components requirements and test methods ● ISO 22565: Durability test method of starter relay for stop and start system ● ISO 21755-2: Motorcycles - Measurement method for evaporative emissions - Part 2: Measurement method using permeation test procedure ● ISO 6727: Motorcycles - Symbols for controls, indicators, and tell-tales ● ISO 9021: Motorcycles and mopeds - Controls - Types, positions and functions ● ISO/TS 20458: Design and performance specifications for advanced Pedestrian Legform Impactor ● ISO/TS 20459: Injury risk functions for advanced Pedestrian Legform Impactor 	<ul style="list-style-type: none"> ● ISO 12219-10: Measurement methods of diffused volatile organic compounds (VOC) - Trucks and buses ● ISO 16750: Environmental conditions and electrical testing for electrical and electronic equipment ● Electronic shift operation method and display ● DME vehicle pressure equalization inlet
		<ul style="list-style-type: none"> ● Proposals from Japan Reference: ▼ Overseas proposals ◆ JARI proposals □ TC 204 proposals 		

Fig. 3 Current State of Progress of Strategic Standardization

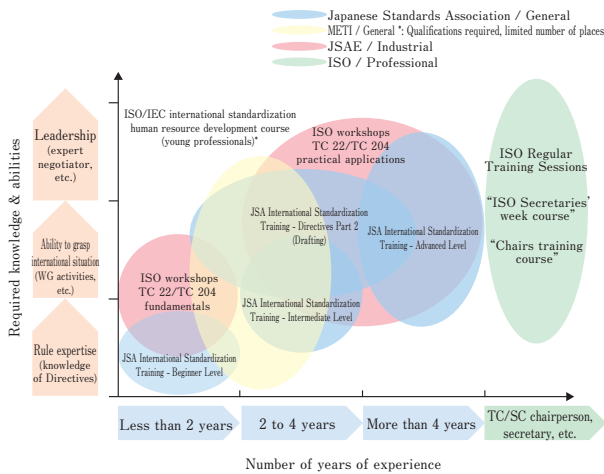


Fig. 4 Positioning of ISO Workshops

the German Association of the Automotive Industry (VDA) and the Society of Automotive Engineers (SAE) in the US, they have also started working with the China Automotive Technology and Research Center (CAT-ARC), the Bureau of Automobile Standardization (BNA) in France, and the Thai Industrial Standards Institute

(TISI) in Thailand, and constructed pipelines for the exchange of information. In the future, the JSAE will strategically strengthen its cooperative efforts after first defining clear purposes centered around specific topics for these efforts.

1.4.4. Examining a functional approach

A functional approach that closely links related areas is essential for items that have a wide range of related technical areas. For autonomous driving, efforts are made to share information about and coordinate TC 22 and TC 204 activities when cooperating with related organizations outside the JSAE. In addition, the Automated Driving Standardization Coordination Group has been established as a forum to discuss Japan's strategy and tactics. It is expected that this kind of review and examination, which employs a functional approach, will need to expand into other fields of expertise in light of the fact that the roadmap drawn by the Standardization Board contains initiatives that extend beyond the framework of automobiles.

Table 1 ISO Issued in Fiscal 2018 from Japanese Proposals

	Issued ISO No.	Title	Subcommittee	ISO/TC
1	ISO 26262-2:2018	Road vehicles — Functional safety — Part 2: Management of functional safety	Electrical and electronic components subcommittee	TC22/SC32/WG8
2	ISO 26262-12:2018	Road vehicles — Functional safety — Part 12: Adaptation of ISO 26262 for motorcycles	Motorcycles subcommittee	TC22/SC32/WG8
3	ISO/TR 21959-1:2018	Road vehicles — Human performance and state in the context of automated driving — Part 1: Common underlying concepts	Ergonomics subcommittee	TC22/SC39/WG8

1. 5. Summary

Table 1 shows the international standards (ISO/TC 22) issued by Japan in fiscal 2018. This table indicates that a system to steadily disseminate Japan's superior technologies in the form of international standards has been established. Moving forward, the JSAE will strive to become an organization capable of making transitions via proposals in strategic areas, and that will promote its ability to handle connections that go beyond the conventional framework of automobiles, which will increase in the future.

2 ITS Standardization Committee Activities

2. 1. What is ITS?

ITS (Intelligent Transport Systems) are systems that achieve dramatic improvements in road traffic safety, transportation efficiency, and comfort by connecting people, roads, and vehicles using communication technologies. In addition, they contribute greatly to energy and environmental conservation by promoting smoother traffic flow and reducing traffic congestion (Fig. 5).

The technologies related to ITS are diverse and have the potential to create entirely new industries and markets in the form of projects that can significantly change our social system.

2. 2. International Standardization of ITS

The international standardization of technologies related to ITS is carried out by the ISO (International Organization for Standardization), IEC (International Electrotechnical Commission), JTC1 (Joint Technical Committee), and ITU (International Telecommunication Union).

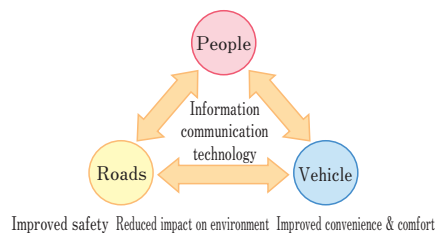


Fig. 5 Outline of ITS

Among these groups, the ISO/TC 204 committee specializes in standardization across the entire system. It was first established in 1992 and began its activities the following year. As of June 2018, it had issued 271 standards, and 122 additional standards are still being worked on. The organization is divided into 12 working groups (WG). Japanese representatives serve as the chairperson and secretariat of WG 3 (ITS database technology) and WG 14 (Vehicle and roadway warning and control systems).

The ISO only allows one organization from each country to participate as a member organization. In Japan, the Japanese Industrial Standards Committee (JISC) has participated and the JSAE has been designated as the deliberative organization for TC 204 (ITS). The ITS Standardization Committee is the group within JSAE that conducts discussions on Japan's policies in TC 204. Furthermore, Japanese subcommittees have been created and assigned to each specialized field corresponding to the previously mentioned 12 working groups. Cooperation across these subcommittees is handled by the Technical Committee established by the JSAE (Fig. 6).

The field of ITS influences not only multiple different industries, but also has a widespread impact on Japanese citizens' lives, leading industry, government, and academia to working together on these activities.

2. 3. International Standardization Strategic Five-year Plan

In the ITS Standardization Committee, the concerned parties involved in standardization activities share their awareness and understanding of the state of technological development and standardization. At the same time, the ITS International Standardization Strategic Five-year Plan is formulated and updated every year to promote mutual understanding of the current states of the annual action plans in all the various fields and working groups.

2. 4. Trends in Fiscal 2018

In recent years, standardization efforts related to automated driving, especially coordinated systems that use

Organization of ITS Standardization Committee

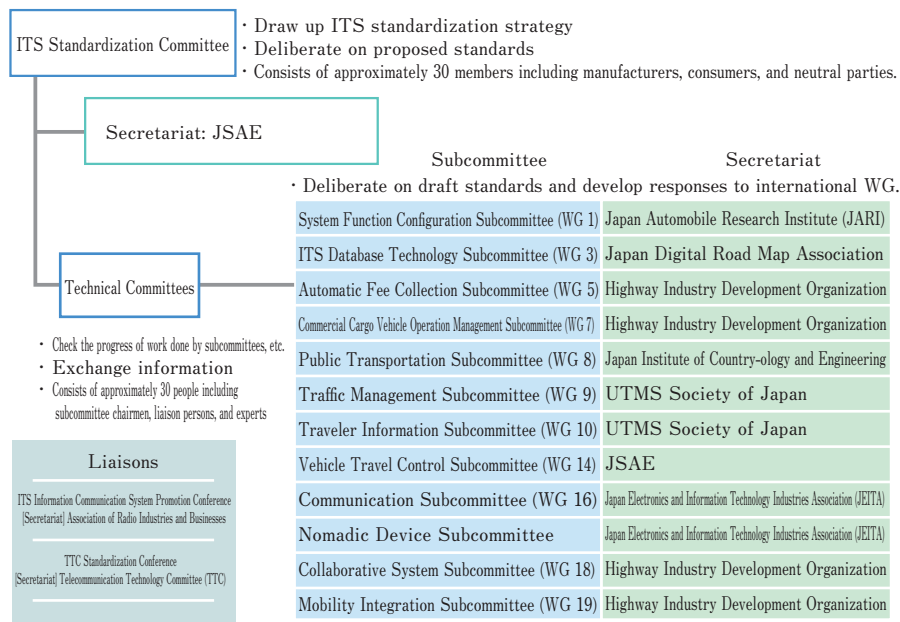


Fig. 6 Japanese Organizational Structure for ITS Standardization

Table 2 Main Japanese Proposals*

Standard No.	Name of standard
23792-1	Motorway chauffeur system - Part 1: Framework and basic requirements
23792-2	Motorway chauffeur system - Part 2: Requirements and test methods for traveling in a single traffic lane
23374	Automated valet parking systems (AVPS)

*: Work items proposed by Japan to TC 204 during fiscal 2018.

communication technologies, have been actively pursued. In fiscal 2018, WG 4 was dissolved and WG 19 (Mobility Integration) was newly established to meet the rising demands of new mobility services, such as Mobility as a Service (MaaS).

Tables 2 and 3 show the main Japanese proposals made during fiscal 2018 and the main ISO standards that were ultimately issued.

The ITS Standardization Committee is also focusing on the spread and popularization of these systems. In May 2018, representatives from China and Korea were invited to the ITS AP Fukuoka International Conference to conduct an international standardization session for people working on all manner of ITS-related issues in Asia. In addition, in February 2019, a seminar was held to introduce the latest standardization trends concerning connected car-related technologies for people working on ITS issues in Japan.

Table 3 Main ISO Standards That Were Issued*

Standard No.	Content of standard
ISO 14827-3	Data interfaces between centres for ITS using XML
ISO 15638-21	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 17572-2	Location referencing for geographic databases - Part 2
ISO 19638	Road boundary departure prevention systems (RBDPS)
ISO/TR 21190	Electronic fee collection - Investigation of charging policies and technologies for future standardization - Part 2
ISO/TR 21718	Spatio-temporal data dictionary
ISO/TR 24097-3	Using web services (machine-machine delivery) for ITS service delivery - Part 3
ISO 29281-2	Communication access for land mobiles (CALM) - Non-IP networking - Part 2

*: TC 204 standards issued during fiscal 2018 that Japan proposed and was actively involved in.

For more details please refer to the "ITS Standardization" topic on the JSAE website.

<https://www.jsae.or.jp/01info/org08.php> (in Japanese)

3 JASO Standards Issued in Fiscal 2018

Newly established JASO standards

[C: Chassis and brakes]

C 468: Passenger car - Disc brake motor on caliper (MOC) assembly bench test procedure

[D: Electrical equipment]

D 015-6: Automobiles - Clock Extension Peripheral In-

terface (CXPI) - Part 6: CXPI Controller Specifications & Conformance Test Specifications
D 015-7: Automobiles - Clock Extension Peripheral Interface (CXPI) - Part 7: Subset Protocol Specifications & Protocol Conformance Test Specifications

[M: Material and surface treatment]
M 364: Automobile Gasoline Engine Oils
M 365: Automobile Gasoline Engine Oils - Motored Fuel Economy Test Procedures
M 366: Automobile Gasoline Engine Oils - Firing Fuel Economy Test Procedures

JASO revisions

[C: Chassis and brakes]
C 448: Passenger car - Disc brake caliper assembly bench test procedure
C 406: Passenger cars - Braking device - Dynamometer test procedure

[D: Electrical equipment]
D 605: Electric connectors for automobiles
D 612-4: Automotive parts - Fuses - Part 4: Fuse-links with female contacts (type A) and bolt-in contacts (type B)

[F: Machinery elements]
F 116: Automotive parts - Hexalobular driving fasteners

[T: Motorcycles]
T 003: Motorcycles - Riding position

Newly Established JASO Technical Papers
TP 19001: Explanation of CISPR 25: 2016 (Vehicles, boats, and internal combustion engines - Radio disturbance characteristics - Limit and methods of measurement for the protection of on-board receivers)
TP 19002: Road vehicles - Guidelines of vehicle test methods for lightning

4 JIS Standards Issued in FY 2018

This section introduces the standard numbers and names of JIS (Japanese Industrial Standards) standards published (established or revised) up to the end of March 2019.

Newly Established JIS
D 0103: Automobile parts - Glossary of devices and parts of electric equipment
D 1048: Acoustics - Test method for sounds generated by vehicles of category M and N when stopped and running at low speed - Engineering method
K 6403: Classification system for vulcanized rubber for automotive applications