"Cross-ministerial Strategic Innovation Program (SIP)
Phase 2/Automated Driving
(Expansion of Systems and Services)/
Study of Communication Technologies for Use
by Automated Driving Systems"

FY2019 Report

Overview

Mitsubishi Research Institute

April 2020

Table of Contents

1. Background

- In order to tackle the diverse technical challenges involved in the practical implementation of automated driving, during SIP Phase 2, collaborative area efforts are being conducted, focused on preparing environments that can be used by autonomous vehicles and developing the core technologies necessary for ensuring safety. During the process of consideration regarding driving environments, the road traffic information formats and communication requirements needed for automated driving are to be decided and standardized.

2. Overview of last fiscal year and goals for the current fiscal year

[Overview of the last fiscal year]

- The "Study on the Use of New Communication Technologies, Including V2X Technology, by Automated Driving Systems" (1) investigated efforts in Japan and abroad to use new or existing wireless communication systems in automated driving systems, (2) listed the main wireless communication systems being considered for use in automated driving, (3) organized use cases that show promise for the use of wireless communication systems in automated driving, and (4) organized the mutual relationships between use cases and wireless communication systems.

[Goals for the current fiscal year]

- We will continue with the study performed last fiscal year with the goals of (1) conducting detailed studies and analyses of use cases and (2) studying and analyzing debates regarding the expectations of companies and organizations, with a focus on 5 GHz band V2X, and debates within individual countries regarding its deployment. We will also aim to create basic materials for use in SIP Phase 2 discussions regarding the communications used in automated driving.

3. Overall study process

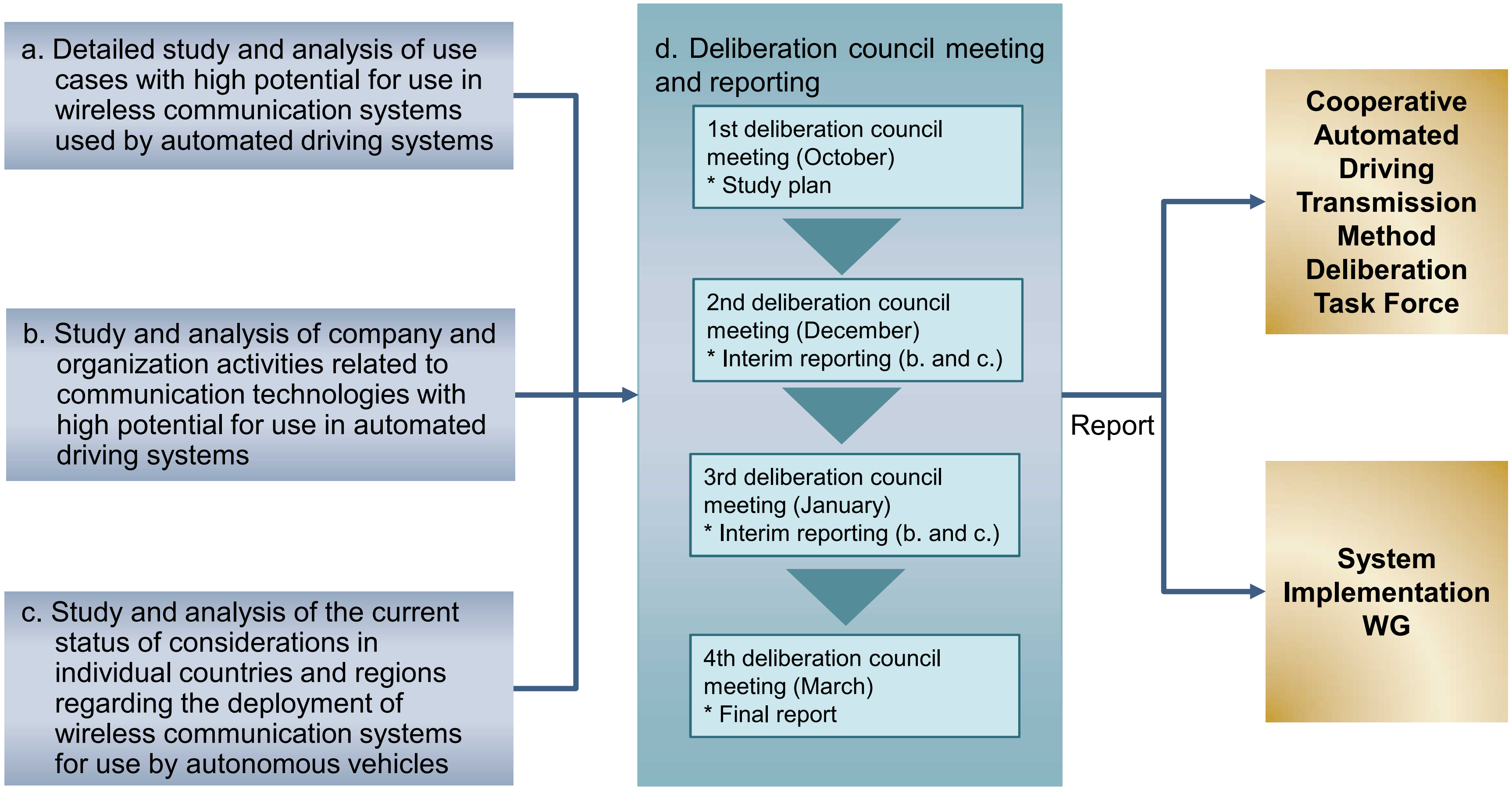


Figure Overall study process

a. Detailed study and analysis of use cases with high potential for use in wireless communication systems used by automated driving systems

1. Study contents and scope
2. Study results

1. Study contents and scope

[Study contents]

- We selected several representative use cases studied in the fiscal year 2018 study, selected overseas projects that were considering these use cases, and investigated who was leading these projects, who was involved in them, their backgrounds, the expected outcomes of the projects, etc.

[Study scope]

- We selected branching and merging support, commercial vehicle operation and management, driving support in intersections, and traffic signal support and optimization. This is because research and development regarding these fields is underway in Japan, and because there is a need for consideration aimed at future practical implementation.
- We investigated the leaders and participants of the projects listed below, their backgrounds, expected project outcomes, and the like, to the greatest extent possible.

Table - Overseas projects investigated in the study and their use case definitions (1/2)

Use case	Project	Definition of use case within project
Branching and merging support	C2C-CC	• In expressway merging locations, related moving vehicles use DSRC communication technology to exchange information, and vehicles beyond merging areas exchange information in order to extend times and increase following distances.
	CARMA	• Vehicles communicate with each other, or with roadside units, to enable merging vehicles equipped with CADS (Cooperative Automated Driving Systems) to convey their intent to merge to vehicles on cruising lines and to merge into the cruising line while accelerating, and to enable vehicles on cruising lines to promote merging while adjusting their speeds.
Commercial vehicle operation and management	China Mobile, SAIC, Huawei	• On-board camera images (HD streaming video of a 240 degree arc around the vehicle) transmitted by vehicles 30 km away or further are confirmed, and drivers perform steering, acceleration, and braking. Steering and other vehicle control signals are sent to vehicles via 5G networks (transmission delay of less than 10 ms).
	Baidu, Pand Auto	• An application is used to remotely perform automatic parking and calling of car sharing vehicles.

1. Study contents and scope

Table - Overseas projects investigated in the study and their use case definitions (2/2)

Use case	Project	Definition of use case within project
Driving support in intersections	C2C-CC	• Roadside units use DSRC communication technology to transmit information regarding blind spots to passing vehicles, etc., for use when making left or right turns in intersections with poor visibility due to buildings, etc., and the turning vehicles provide this to the driver to improve safety. • When making left or right turns at intersections without traffic signals, related moving vehicles use DSRC communication technology to exchange information, and vehicles beyond inflow areas exchange information in order to increase following distances. • When making left or right turns at intersections, preceding vehicles moving in the same direction, etc., use DSRC communication technology to exchange information, determining if continuous driving should be selected, and relaying this information to the driver. • Roadside units use DSRC communication technology to receive information regarding the behavior of vehicles at intersections, perform GLOSA (Green Light Optimized Speed Advisory) control for each lane, and convey lane change recommendations to the vehicle.
	5GAA	• At intersections with poor visibility due to obstacles (non-LOS), roadside units detect vehicles approaching intersections and use road-to-vehicle communication via Cellular-V2X messages to warn vehicles about approaching vehicles. • When vehicles are turning left at intersections, their forward field of vision is blocked by the vehicle in front of them (non-LOS), and oncoming vehicles are approaching, vehicle-to-vehicle communication via Cellular-V2X messages is used to warn vehicles about approaching vehicles.
	ITS Strategic Plan	• Vehicle-to-vehicle communication is used to provide support when entering dangerous intersections.
Traffic signal support and optimization	C2C-CC	• DSRC communication technology is used to provide vehicles approaching traffic signals with green light timing for their respective traffic signals and recommended speeds for reaching intersections. The vehicles that receive this information relay it to the driver so that the driver can pass through the intersection while the light is green at an appropriate speed.
	5GAA	• Traffic signals perform road-to-vehicle communication via Cellular-V2X messages to notify approaching vehicles of traffic signal timing.
	ITS Strategic Plan	• Based on information or requests sent from vehicles, traffic signal timing is changed to optimize traffic flow and improve service for commercial vehicles (public transportation, freight trucks, etc.).

2. Study results (branching and merging support)

Project name	Use case definition	Background	Benefit	Deployment	Communication requirements
C2C-CC	[Cooperative merging on highways] • In expressway merging areas, vehicles driving on the cruising line and vehicles attempting to merge transmit information about themselves and conditions around them to provide support for smooth merging • Scenario 1: A vehicle driving on a cruising line notifies a merging vehicle of conditions on the cruising line • Scenario 2: A merging vehicle issues a request to a vehicle driving on the cruising line to provide it with merging space	• In areas where lanes end or merge, drivers must change lanes under spatial and temporal constraints • This involves various tasks, such as searching for suitable gaps between vehicles driving on the cruising line and indicating their intent to change lanes. This complexity creates a higher likelihood of accidents.	• Reduce the number of complex tasks drivers must perform when merging, which will reduce the number of accidents	• Presented as a project phase Day3+ use case	• Use of ITS G5 • Compatibility with NGV (IEEE Next Generation Vehicular) • MCO (Multi Channel Operation) • CPM (Collective Perception Message) transmission • Details regarding Scenario 2 requests are unknown
CARMA	[Cooperative ramp merge] • Vehicles communicate with each other, or with roadside units, to enable merging vehicles equipped with CADS (Cooperative Automated Driving Systems) to use DSRC to convey their intent to merge to vehicles on cruising lines • Merging vehicles identify the speeds of vehicles on the cruising line and gaps between them to merge when possible, and merging is promoted through speed adjustment by vehicles on the cruising line	• In order to ensure the safety of vehicles on merging lanes and cruising line lanes in merging areas, this system makes it easier for merging vehicles to enter cruising lines when approaching and merging	• Cruising line vehicles will accelerate or decelerate when merging to enable one to four merging vehicles to merge into the cruising line • Reduce the number of complex tasks drivers need to perform, improving driver comfort, resulting in decrease of accidents	• Presented as a project phase CARMA2 use case	• Use of DSRC (IEEE1609 and 802.11 standard) • Ethernet transmission and cellular transmission (for access to the CARMA platform)

2. Study results (commercial vehicle operation and management, remote operation of work vehicles in dangerous areas)

Project name	Use case definition	Background	Benefit	Deployment	Communication requirements
China Mobile, SAIC, Huawei	[Remote operation] • Drivers remotely operate vehicles from 30 km away. Multiple high-resolution video cameras installed in vehicles send multiple real-time HD video streams over high-bandwidth 5G networks, giving drivers a 240 arc of view around the vehicles	• Improved efficiency through remote operation (digging sites, large-scale land preparation projects, etc.) • Supplementation for future automated driving (platooning control, car sharing remote operation, rescue activities in disaster areas, etc.)	Use of remote operation in mining sites (smart mining) • Creation of safe working environments • Work efficiency improvement • Utilization of geographic superiority	• At MWC Shanghai 2019, heavy mining machinery over 1,000 km away from Shanghai was operated remotely. The delay was 16 ms or less • Automated trucks that use 5G have been put into use in a mining area in Inner Mongolia	• When E2E delay is kept at 10ms or below and emergency braking is performed by a vehicle traveling at a speed of 90 km/h, the additional distance covered before braking begins is 25 cm or less • When performing remote operation at a mining site, a base station must be built near the mining site to provide sufficient 5G coverage for remote operation
Baidu, Pand Auto	[Remote operation] • Users use an app to automatically dispatch a car sharing vehicle from a parking area and send it to the user's location. The same app is used when returning the vehicle to automatically send it back to the parking area and park it in a parking space. • High accuracy 3D map transmission was performed between vehicles and the cloud	• The development of China's sharing economy and government measures to promote it • Improved car sharing business efficiency and convenience	• High accuracy 3D maps were transmitted to and from the cloud to improve automated driving and automated parking in complex road environments	• Pand Auto (a car sharing company) has been issued a test license for 5G automated driving in Chongqing. Remote operation using 5G is included in the use case	• The requirements for high accuracy 3D map communications with vehicles are unclear. However, during the test the vehicles drove at 10 km/h and the parking success rate in the parking area reached 90%

2. Study results (driving support in intersections)

Project name	Use case definition	Background	Benefit	Deployment	Communication requirements
5GAA	[Cross-Traffic Left-Turn Assist] • Vehicles attempting to enter and pass through intersections provide vehicles attempting to turn left in those intersections with information regarding their positions and their states (approach direction, etc.). This enables the vehicles making left turns to detect collision risks in intersections and to alert drivers. [Intersection Movement Assist] • Vehicles attempting to enter and pass through intersections provide other vehicles attempting to drive straight through those intersections with information regarding their positions and their states (approach direction, etc.). This enables the vehicles driving straight to detect collision risks in intersections and to alert drivers.	• Collisions occurring in intersections	• Avoidance of collisions in intersections • Safe driving and automated driving	• Envisioned primarily for intersections in suburbs and rural areas	• Locations, behavior, turn signal states, etc. must be transmitted • Service requirements Distance: 350 m Message: 300 B Delay: 100 ms Reliability: 100% (For advanced automated driving cases involving the exchange of driving plans and planned trajectories: Message: 1000 B Delay: 10 ms Reliability: 99.9%)
ITS Strategic Plan	[Intersection Movement Assist] • Vehicles attempting to enter and pass through intersections send out information to that effect. This information is received by other vehicles, and drivers are notified of this risk.	In order to achieve the (NY) Vision Zero goal of zero traffic accident fatalities and reduced injuries, work has begun on the creation of a safety support system that uses V2V/V2I and IVP https://www.cvp.nyc/	• Reduce the number of accidents in intersections by 26% and reduce costs by 23% • Reduce accidents by vehicles driving straight and making left turns at intersections without traffic signals, accidents by vehicles turning right at intersections with traffic signals, accidents at red lights, and accidents at stop signs	—	—

2. Study results (traffic signal support and optimization)

Project name	Use case definition	Background	Benefit	Deployment	Communication requirements
ITS Strategic Plan	[Intelligent Traffic Signal System (I-SIG)] • Data collected from vehicles via V2V and V2I communication are used to measure traffic flow and driving behavior on a per-lane basis and control traffic signal systems • Comprehensive optimization application for traffic signal systems, supporting traffic signal priority, exclusivity, pedestrians, etc. [Transit Signal Priority (TSP)] [Freight Signal Priority (FSP)] • Traffic signal operation is controlled to prioritize passage by public transportation vehicles and freight vehicles. • Vehicles transmit information regarding their need for prioritized passage to roadside infrastructure. Different priority levels are assigned to vehicles based on various factors, such as traffic conditions, traffic signal control device conditions, vehicle types, and vehicle conditions.	• Fundamental function for MMITSSs (Multi-Modal Intelligent Traffic Signal Systems) (I-SIG)	• Traffic conditions are improved by maximizing traffic flow • Integrate data received from vehicles with conventional sensor data to accurately infer traffic conditions at traffic signals • Traffic conditions and public transportation/freight transport delays will be identified and prioritization processing will be performed, maximizing the performance of the entire network	—	• Vehicles must drive at 35 mph and traffic signal phases must change five seconds after vehicles pass sensors installed 250 feet before intersections (transmission ends before that)

2. Study results (traffic signal support and optimization)

Project name	Use case definition	Background	Benefit	Deployment	Communication requirements
C2C-CC	[Traffic light Information], [Green Wave Information], [Green Light Optimum Speed Advisory], [Automated Green Light Optimum Speed Advisory] • Data regarding the status of traffic signals is provided to vehicles (the number of seconds until the light changes, the amount of time until the light is green and cars can pass, etc.) [Traffic Signal Priority Request/ Preemption] • Vehicles and infrastructure communicate and priority control is applied to traffic signals to improve public safety and contribute to the smooth passage of public transportation [Red light violation protection] • Vehicles are alerted that they are about to drive through a red light [Optimized Traffic light information with V2I] • Information received from vehicles is used to optimize traffic signal control, and GLOSA information, etc., is provided to vehicles	—	[Green Light Optimum Speed Advisory] • Traffic flow is smoothed and overall traffic energy consumption efficiency is improved • Individual vehicles accelerate and decelerate less, making high energy efficiency driving possible while reducing travel times	—	[Green Light Optimum Speed Advisory] • Traffic signals (roadside units) transmit intersection locations, traffic signal phase information, and traffic signal timing information for individual lanes and driving directions

2. Study results (traffic signal support and optimization)

Project name	Use case definition	Background	Benefit	Deployment	Communication requirements
5GAA	[Speed Harmonization] • Speed recommendations, determined based on traffic conditions, road conditions, weather information, etc., are sent to vehicles (HV: Host Vesicles)	• Efficiency improvement and environmental considerations • Automated driving	• Traffic flow is optimized, emissions are minimized, and smooth riding comfort are ensured	• Envisioned for use in urban areas, rural areas, and expressways	• Vehicles must transmit information such as locations and behavior • Information such as safe driving speeds and road conditions must be sent to vehicles • Service requirements Distance: 123/59/26 m Message: 300 B Delay: 2500/1800/1400 ms Reliability: 80% (For automated driving that does not require driver intervention: Distance: 59/23/8 m Delay: 1500/800/400 ms)

b. Study and analysis of company and organization activities related to communication technologies with high potential for use in automated driving systems

1. Study contents and scope
2. Study results (OEMs)
3. Study results (telecommunications carriers)
4. Study results (vendors)
5. Study results (international standards organizations)

1. Study contents and scope

[Study contents]

- We selected several telecommunications carriers, vendors, OEMs, and industry organizations in each region (Japan, the U.S., Europe, and China), etc., as companies that utilize the 5 GHz frequency band, focusing on companies participating in the national projects looked at by the FY2018 study.
- We assessed and organized information regarding these companies' 5 GHz communications trends. In the course of this study, we also assessed and organized information regarding notable trends in other companies, as well, when pertinent.

	OEM	Telecommunications carrier	Vendor
Japan	• Toyota • Nissan • Honda	• NTT DOCOMO • SoftBank • KDDI • Rakuten	• Mitsubishi Electric (E) • NEC (E) • DENSO (S) • Panasonic (E) • Oki Electric (E)
U.S.	• GM • Ford • FCA • Tesla	• AT&T • Verizon • Sprint	• Qualcomm (E) • Intel (E) • Waymo (E)
Europe	• BMW • VOLVO • VW • Renault • Scania • MAN	• Orange • Deutsche Telekom • Vodafone	• Ericsson (E) • Bosch (S) • Continental (S) • NXP (E)
China	• FAW Group • SAIC Motor • NIO	• China Mobile • China Telecom	• MOMENTA (E) • Huawei (T)
South Korea	• Hyundai		• Samsung (T)
International	• 5GAA • IEEE • C2CCC • 3GPP • ISO • SAE • ETSI		

* The letters in parentheses next to vendor names indicate their categories. (S): Supplier, (T) Telecommunications carrier, (E) Other (general electronics manufacturer, chip vendor, etc.)

2. Study results (OEMs)

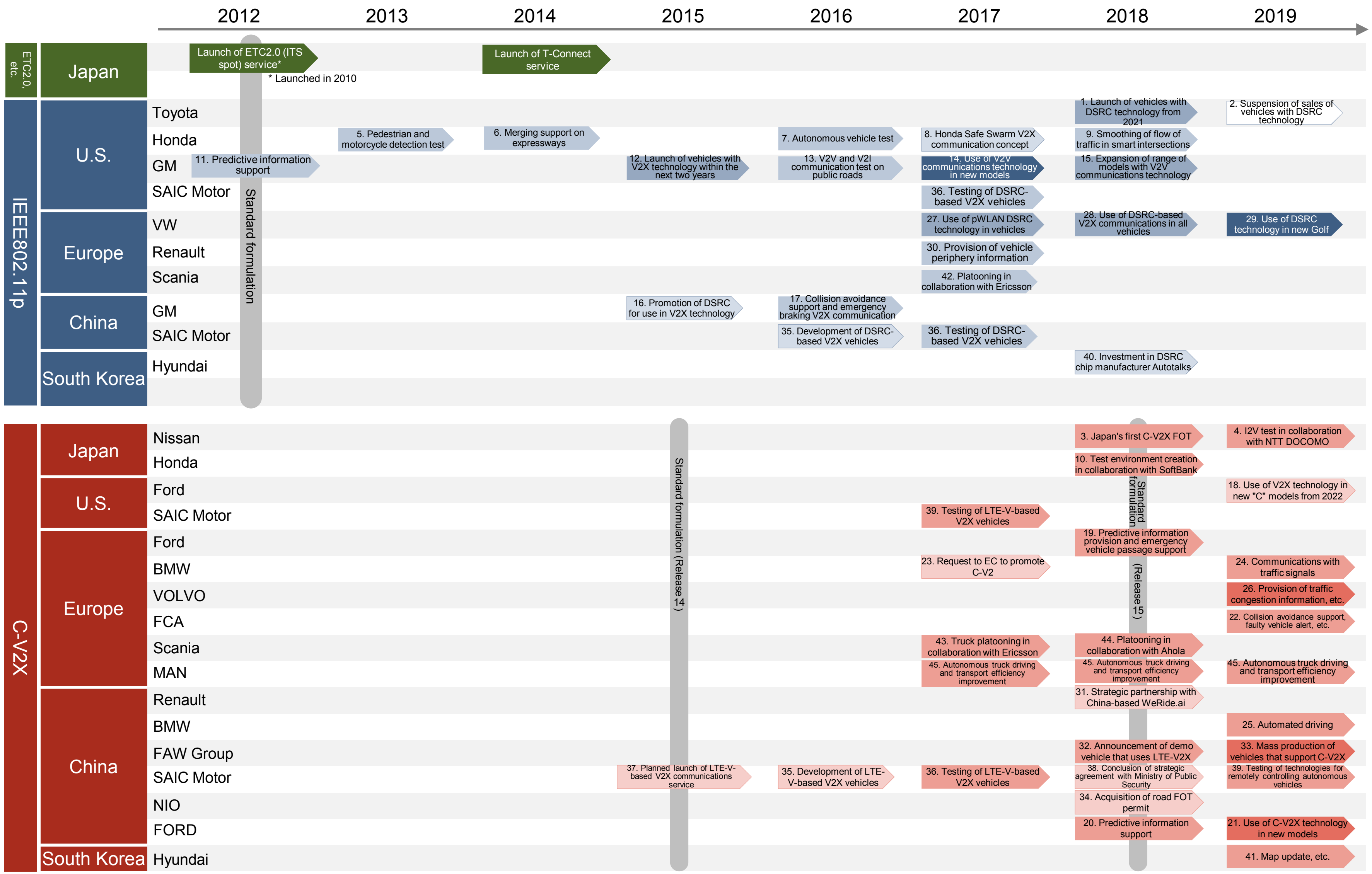
■ DSRC-related activities by companies

- Development on DSRC began early on, and there has been a great deal of product planning and numerous product releases since 2015.
- Regionally, in the U.S. and Europe FOTs have been conducted, product plans have been created, and products have been released.

■ C-V2X-related activities by companies

- Since the formulation of the C-V2X standard in 2015, some companies have engaged in C-V2X-related activities. From 2017 onwards, there have been numerous stance announcements, FOTs, and product plans, but no products have been released so far.
- Regionally, in Europe and China, FOTs have been conducted and product plans have been created.

2. Study results (OEMs)



* There are no study results regarding automated driving system efforts by TESLA that use communications technologies.

* ETC2.0, etc., efforts before 2012 are indicated on pages 10 to 20.

IEEE802.11p (trends) ETC2.0, etc.: Stance announcement | FOT | Product planning | Product release | Product release cancellation, etc.

C-V2X (trends): Stance announcement | FOT | Product planning | Product release | Product release cancellation, etc.

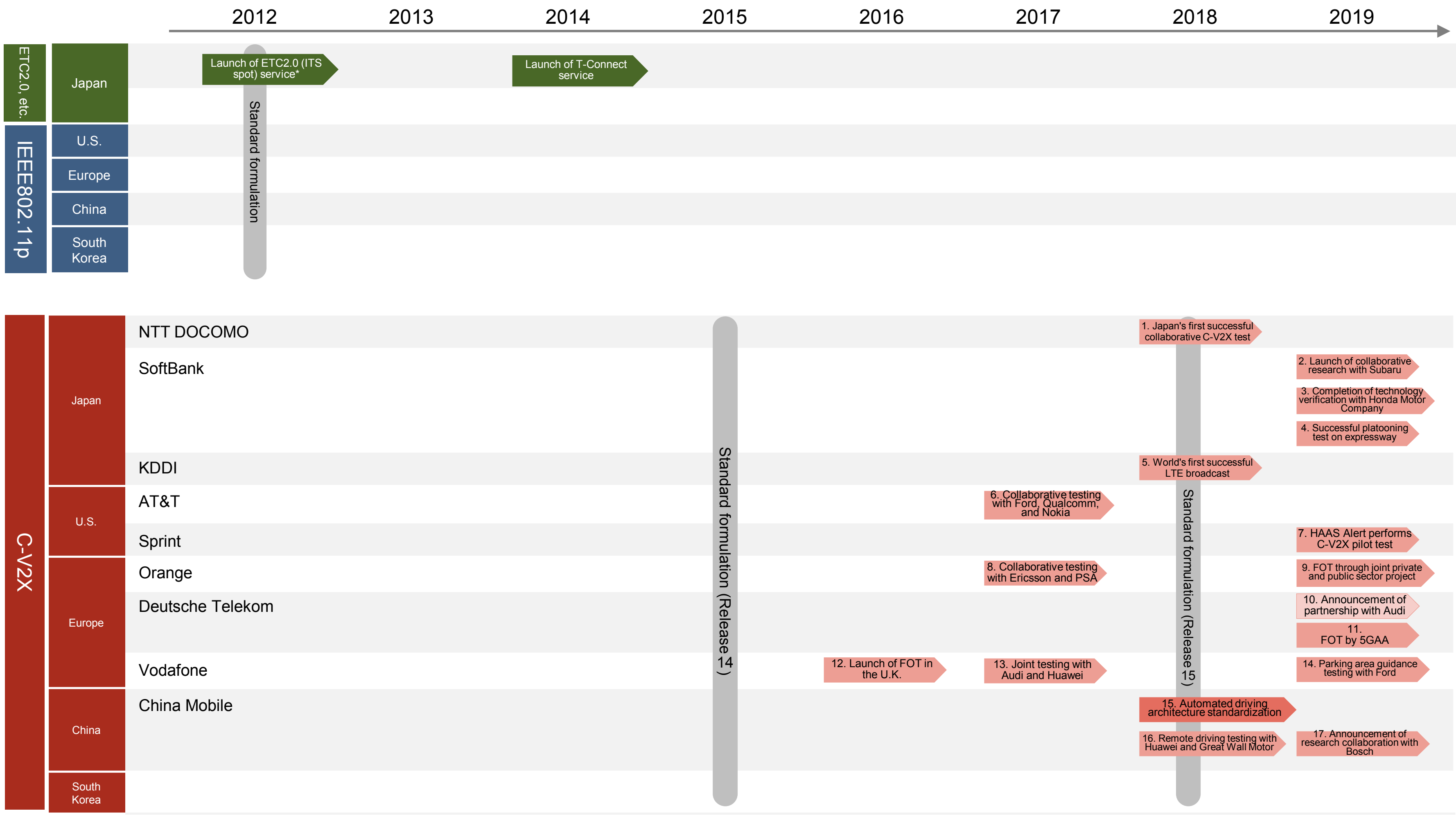
* Numbers correspond to results of studies of companies, etc., on following pages.

3. Study results (telecommunications carriers)

- **DSRC-related activities by companies**
  - No telecommunications carriers conducted activities that used DSRC.

- **C-V2X-related activities by companies**
  - From 2016 onwards, FOTs using C-V2X were conducted, but no products have been released as yet.
  - Regionally, there have been many activities in Europe. Progress has also been made towards product releases in China.

3. Study results (telecommunications carriers)



* There are no study results regarding automated driving system efforts by Rakuten, Verizon, or China Telecom that use communications technologies.
* ETC2.0, etc., efforts before 2012 are indicated on pages 24 to 27.

IEEE802.11p (trends) ETC2.0, etc.: Stance announcement → FOT → Product planning → Product release → Product release cancellation, etc.

C-V2X (trends): Stance announcement → FOT → Product planning → Product release → Product release cancellation, etc.

* Numbers correspond to results of studies of companies, etc., on following pages.

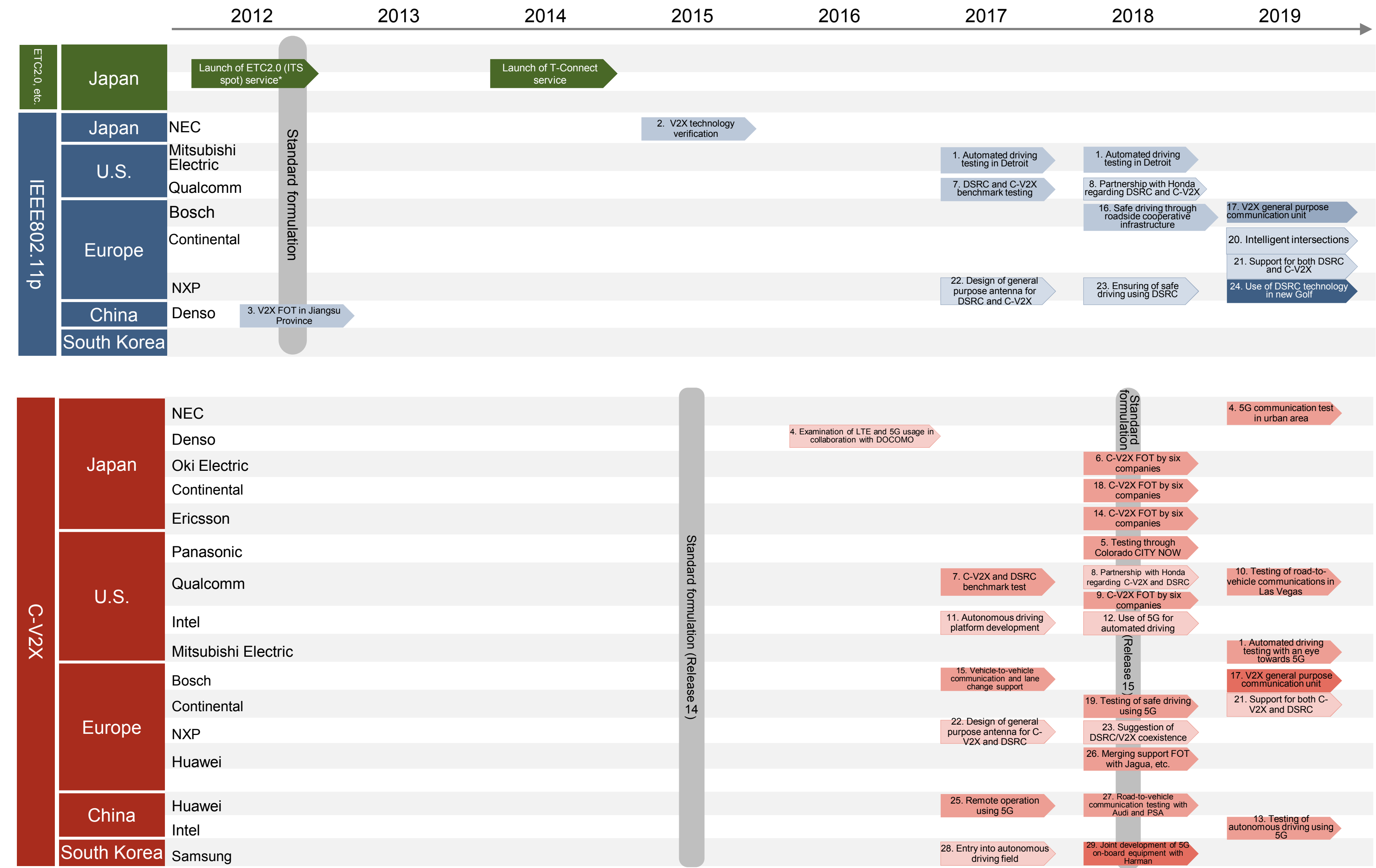
4. Study results (vendors)

- **DSRC-related activities by companies**
  - DSRC FOTs began early on, in 2012, and there has been a great deal of product planning and numerous product releases since 2017.
  - Regionally, in the U.S. and Europe FOTs have been conducted, product plans have been created, and products have been released.

- **C-V2X-related activities by companies**
  - Since the formulation of the C-V2X standard in 2015, some companies have engaged in C-V2X-related activities. From 2017 onwards, there have been numerous FOTs and product plans, but no products have been released so far.
  - Regionally, in the U.S. and Europe, FOTs have been conducted and product plans have been created.

- **DSRC and C-V2X handling**
  - Qualcomm, Bosch, Continental, and NXP are developing highly versatile on-board equipment, etc., that can use both DSRC and C-V2X.

4. Study results (vendors)



* There are no study results regarding automated driving system efforts by MOMENTA that use communications technologies.
* ETC2.0, etc., efforts before 2012 are indicated on pages 31 to 35.

IEEE802.11p (trends) ETC2.0, etc.: Stance announcement | FOT | Product planning | Product release | Product release cancellation, etc.

C-V2X (trends): Stance announcement | FOT | Product planning | Product release | Product release cancellation, etc.

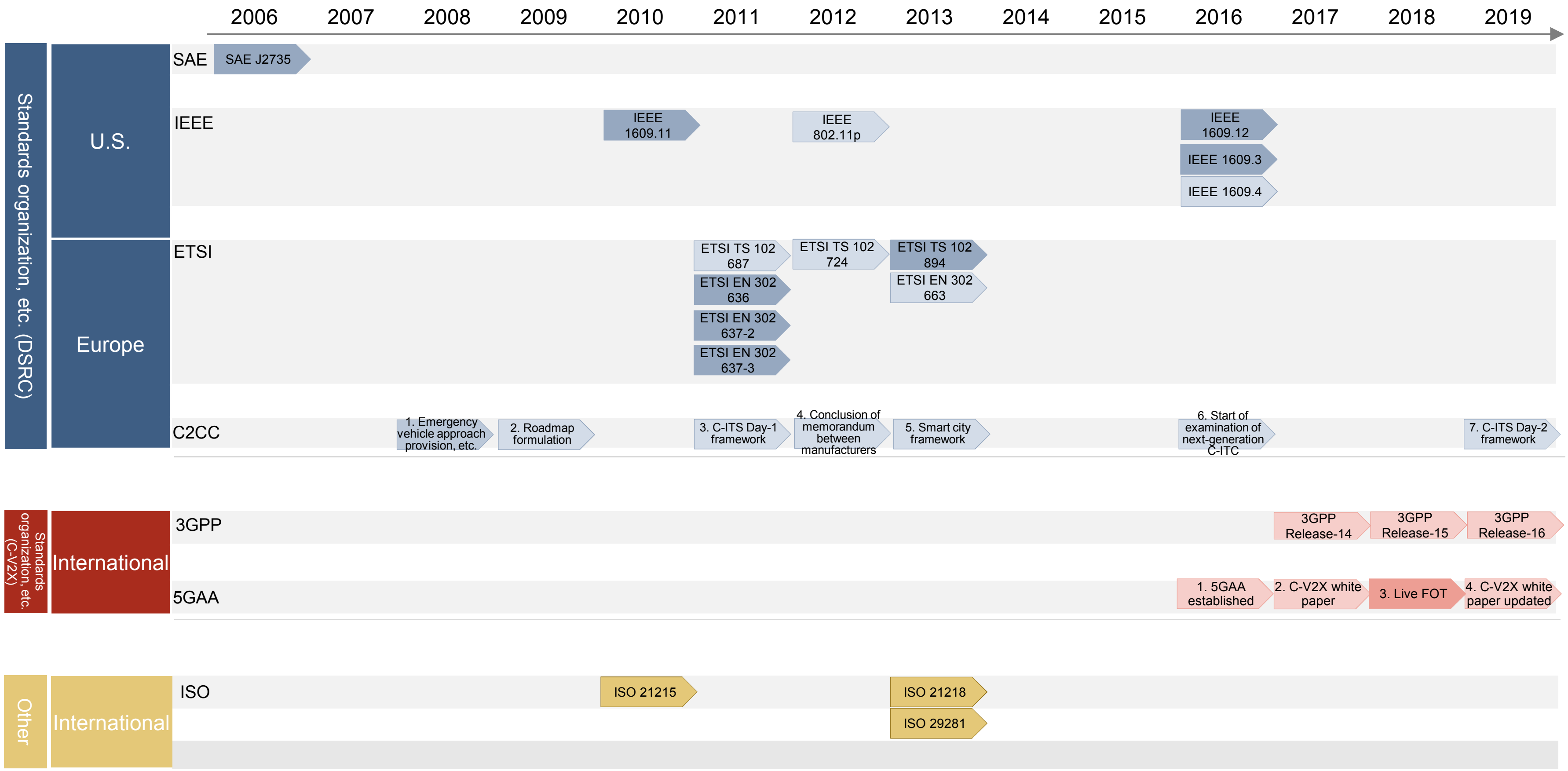
* Numbers correspond to results of studies of companies, etc., on following pages.

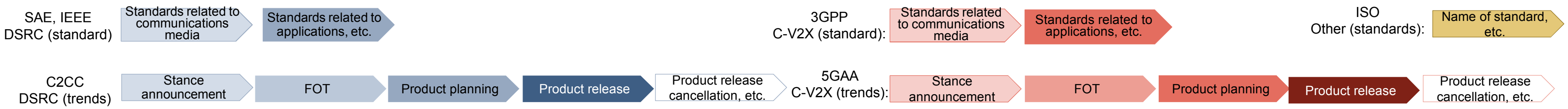
5. Study results (international standards organizations)

- **DSRC-related activities by international standards organizations, etc.,**
  - There are numerous DSRC standards, not only for communications media, but also for applications.
  - Consortiums primarily composed of motor vehicle manufacturers began conducting FOTs and examining use cases early on.

- **C-V2X-related activities by international standards organizations, etc.**
  - C-V2X standards that are purely communications standards have been created, but there are no application-related standards.
  - Consortiums primarily composed of motor vehicle manufacturers began conducting FOTs starting in roughly 2018, linked to standards.

5. Study results (international standards organizations)





* SAE, IEEE, and 3GPP standards are categorized into communications media standards and application standards based on their contents, OSI layer, etc.

* C2CC and 5GAA correspond to results of studies of companies, etc., on following pages.

c. Study and analysis of the current status of considerations in individual countries and regions regarding the deployment of wireless communication systems for use by autonomous vehicles

1. **Study contents and scope**
2. **Summary of policies in Europe, China, and the U.S.**

1. Study contents and scope

[Study contents]

- The study investigated reports and other materials summarizing the results of considerations in the U.S., Europe, and China regarding the deployment of 5GHz V2X, one of the main wireless transmission systems with high potential for future use in automated driving systems.

Name of document		Issuer (publication/release timing)	Positioning	Overview
Europe				
1.	**Commission Delegated Regulation supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the deployment and operational use of cooperative intelligent transport systems (draft)**	European Commission (March 2019)	Delegated regulation for EU member states	European Commission delegated regulations that define minimum legal requirements for mutual operation of C-ITS and make large-scale deployment of C-ITS systems possible in the EU.
China				
1.	**Made in China 2025**	State Council (May 2015)	Governmental strategic plan	Strategic plan that defines an action program for the 10 year period leading up to 2025 with the goal of making China a manufacturing powerhouse that leads the world's manufacturing industry by 2049, when the country celebrates its 100th anniversary
2.	**Strategy for Innovation and Development of Intelligent Vehicles**	National Development and Reform Commission (January 2018)	Governmental strategic plan	Comprehensive motor vehicle industry development policy that promotes supply-side structural reforms through the development and growth of smart cars and defines the implementation of innovation-led development strategies, including those in related fields
3.	**Guide to the Construction of National Vehicle Network Industry Standard System**	Ministry of Industry and Information Technology, Standardization Administration of China (June 2018)	Government-defined standard requirement specifications	Top-down standardization specification proposal issued by the Chinese government. Its objectives are to establish standards that contribute to ICV and related technologies and industries through industry-wide collaborations that span various fields and greater mutual coordination
U.S.				
1.	**ITS Strategic Plan 2015-2019**	Department of Transportation ITS Joint Program Office (December 2014)	Research and development plan	Document that clarifies the direction and goals of the Department of Transportation's ITS program and defines the framework around which the ITS Joint Program Office and other Department of Transportation agencies will conduct research, development, and adoption activities.
2.	**Federal Motor Vehicle Safety Standards V2V Communications (Notice of Proposed Rulemaking)**	Department of Transportation National Highway Traffic Safety Administration (January 2017)	Notice of proposed rulemaking	Notice of proposed rulemaking regarding a new safety standard, Federal Motor Vehicle Safety Standard No. 150, that would apply to all new light vehicles
3.	**Preparing for the Future of Transportation: Automated Vehicles 3.0 (AV 3.0)**	Department of Transportation (October 2018)	Policy guideline	Defines the Department of Transportation's basic policies regarding autonomous vehicles and sets forth guidelines regarding the roles to be fulfilled by the Department of Transportation, its agencies, state and local governments, and private sector operators.
4.	**Request for comment regarding V2X communications**	Department of Transportation (December 2018)	Request for comment	Request for public comment, issued in response to advances in communications technologies that use V2X, regarding the impact of these technological advances on V2X as a whole and on the roles of the Department of Transportation.
5.	**Notice of proposed rulemaking regarding the use of the 5.850-5.925 GHz band**	Federal Communications Commission (December 2019)	Notice of proposed rulemaking	Notice of proposed rulemaking regarding revisions to the allocation of the 5.9GHz band by the FCC and request for public comment regarding this proposed rulemaking
International				
1.	**Timeline for deployment of C-V2X – Update**	5GAA (January 2019)	White paper on the trends and future outlook of the C-V2X industry	Overview of C-V2X usage in the safety field, FOTs, the advancement of C-V2X technologies, and future development plans

2. Summary of policies in Europe, China, and the U.S.

Europe	China	U.S.
• As the first phase in the future implementation of Collaborative and Connected Autonomous Vehicles (CCAV), Europe aimed to start C-ITS deployment within the EU by 2019. • To do so, **it set as a target the use of C-ITS in "day-1" services**. • It selected **ITS-G5**, a mature and proven technology, **as the main communications technology**. • However, this policy **does not close the door to using new communications technologies such as C-V2X and 5G in the future**. • This stance by the European Commission resulted in backlash from C-V2X supporters, who argued that the policy was not technologically impartial, **and the European Commission's policy proposal was rejected**.	• Unlike the approaches of Europe and the U.S., which are vehicle-focused, China's automated driving policy **focuses on the entire ecosystem** in order to take the lead over the West in preparing the infrastructure necessary for automated driving. • **In line with the timeline set forth in Made in China 2025,** all development of smart cars and the communications technologies used in them is aimed at becoming the world's smart car leader by 2035. • **The country aims to create a society of smart cars and automated driving using LTE-V2X and 5G.** It is striving to drive this through policy **and through legal systems**, including technology standardization.	• Since the early to the mid-2010s, U.S. policy **positioned DSRC as its central V2X communications technology**. • Following the change of administration, a clear policy of technology neutrality and innovation promotion was established, and the government **switched to an approach of supporting the development of individual technologies**, without deciding on communications technology victors or losers. • The Department of Justice is working to maintain the 5.9GHz band, but **has begun considering the adoption** of **communications technologies other than DSRC** (C-V2X, 5G, etc.) • The FCC, on the other hand, has **announced that it will free up the 5.9GHz for unlicensed use, a long-pending issue, and that it will review its allocation for ITS communications technologies**.

d. Deliberation council meeting and reporting

1. Deliberation council meetings and SIP System Implementation Working Group reports

[Study contents]

- A deliberation council has been established to deliberate regarding the use of new communications technologies, including V2X technologies, by automated driving systems. The deliberation council has had a total of four meetings.
- Study results were reported to the System Implementation Working Group and the Cooperative Automated Driving Communications Method Deliberation Task Force.

■ Deliberation council meetings

	1st meeting	2nd meeting	3rd meeting	4th meeting
Date/ time	October 18, 2019 (Fri) 10:00 a.m. to 11:30 a.m.	December 6, 2019 (Fri) 10:00 a.m. to 11:30 a.m.	January 30, 2020 (Thu) 3:00 p.m. to 5:00 p.m.	March 18, 2020 (Wed)
Location	Mitsubishi Research Institute, 4F Large Meeting Room D	TKP Toranomon Ekimae Conference Center Meeting Room 4A	TKP Toranomon Ekimae Conference Center Meeting Room 4A	Final report sent by email

1. Deliberation council meeting meetings and SIP System Implementation Working Group reports

[Study contents]

- A deliberation council has been established to deliberate regarding the use of new communications technologies, including V2X technologies, by automated driving systems. The deliberation council has had a total of four meetings.
- Study results were reported to the System Implementation Working Group and the Cooperative Automated Driving Communications Method Deliberation Task Force.

■ Reporting to SIP System Implementation Working Group

	1st meeting	2nd meeting
Date/ time	November 6, 2019 (Fri) 10:00 a.m. to 12:00 p.m. (Portion we were responsible for: 11:30 a.m. to 11:50 a.m.)	February 12, 2020 (Wed) 10:00 a.m. to 12:00 p.m. (Portion we were responsible for: 10:42 a.m. to 11:02 a.m.)
Location	Cabinet Office Meeting Room (Chuo Godo-chosha Building 8, 6F, Meeting Room 623)	Cabinet Office Meeting Room (Chuo Godo-chosha Building 8, 6F, Meeting Room 623)

■ Reporting to Cooperative Automated Driving Transmission Method Deliberation Task Force

	1st meeting	2nd meeting	3rd meeting
Date/ time	October 4, 2019 (Fri) 11:00 a.m. to 12:30 p.m.	November 20, 2019 (Wednesday) 1:00 p.m. to 2:30 p.m.	January 8, 2020 (Wed) 1:30 p.m. to 3:00 p.m.
Location	Chuo Godo-chosha Building 4, 4F Joint Special Meeting Room 2	Chuo Godo-chosha Building 8, 8F Special Meeting Room	Chuo Godo-chosha Building 4 Joint Agency Meeting Room 1214