戦略的イノベーション創造プログラム

"Strategic Innovation Promotion (SIP) Program for Automated Driving Systems Phase Two (Expansion of Systems and Services)“ Study of Overseas Trends, etc., in Preparation for International Collaboration Regarding Traffic Environment Information

FY2021 Results Report

Overview

Mitsubishi Research Institute

March 2022

Background and objectives

Background

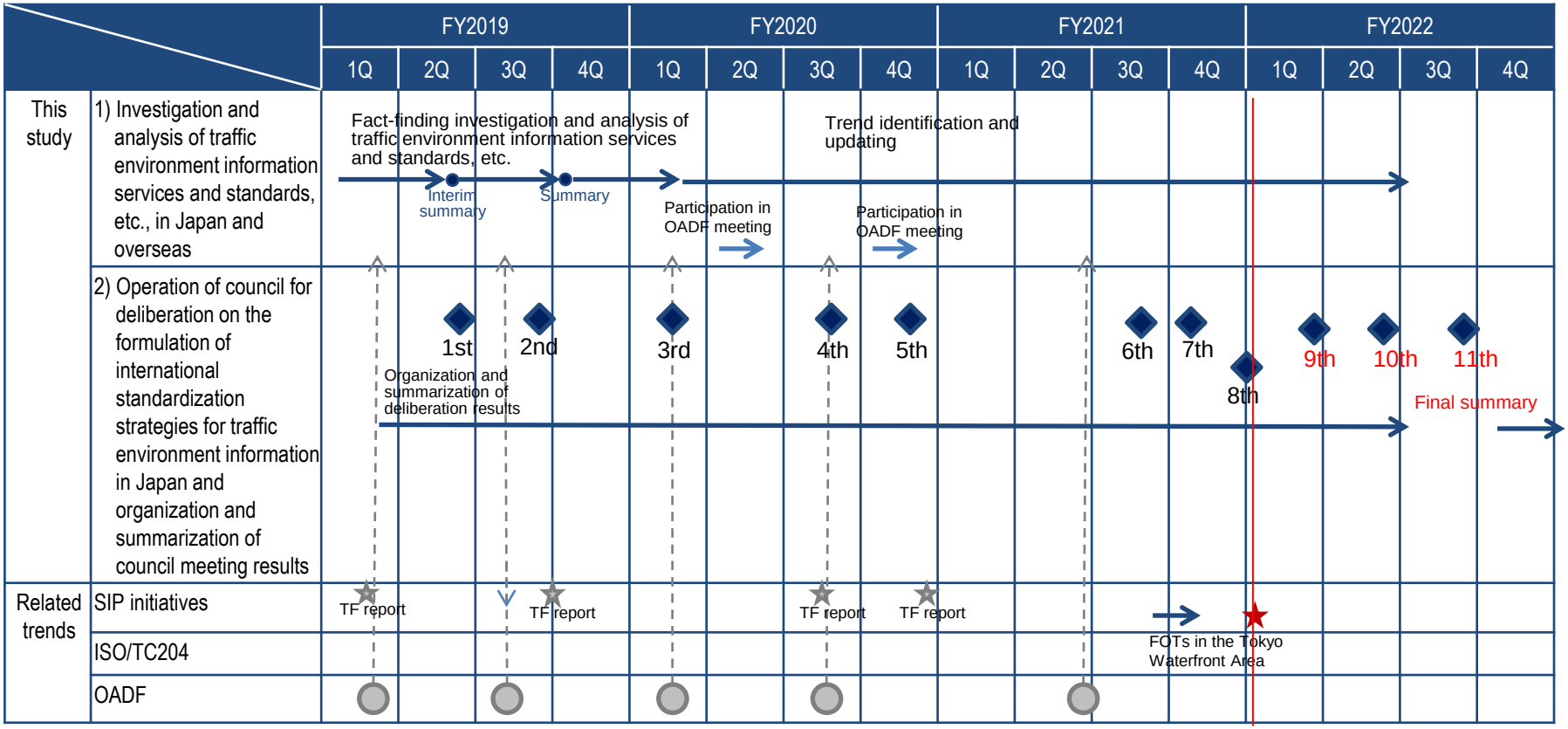
The Cross-ministerial Strategic Innovation Promotion Program (SIP) Phase Two - Automated Driving (Expansion of Systems and Services) being conducted by the Cabinet Office is working to create systems for exploiting roadway traffic environment information, such as dynamic information in dynamic maps, with the aim of practically implementing advanced automated driving and achieving Society5.0. In order to **promote international standardization related to roadway traffic environment information**, it is **essential to consider project strategies that are harmonized with global efforts through coordination with organizations (such as the ISO) that promote international standardization and overseas organizations (such as the Open AutoDrive Forum (OADF)) that promote the industry standardization of high-accuracy 3D map information and roadway traffic environment information.**

Objectives

SIP Phase 2 included initiatives whose purpose was the creation of systems for effectively utilizing traffic environment information. This study aims to appropriately reflect the results of those initiatives in international standards while harmonizing with overseas standards organizations. To do so, we **investigated domestic and overseas trends in the standardization of traffic environment information** and **deliberated together with related parties in Japan regarding information sharing and international standardization strategies.**

2. Overall schedule

- FY2019: A study of trends involving standardization, etc., was conducted from July to December, and basic materials were prepared for use in deliberations regarding international standardization strategies.
  Deliberation council meetings were held once every two or three months in an effort to produce a shared understanding of the direction to be taken by international standardization strategies.
- FY2020: Information regarding both de facto and de jure trends were collected through ISO/TC204, OADF, and other meetings. This information was shared with related parties in Japan through deliberation council meetings, and meeting participants deliberated regarding international standardization strategies based on the status of SIP program studies and international trends.
- FY2021 onward: Within the initiatives conducted as part of the SIP Phase 2 Tokyo Waterfront City FOTs, etc., investigations were carried out based on international trends and standardization strategies were deliberated on.



3. Contents of this year's initiatives [1/2]

Basic approach

- Delve more deeply into the implementation issues from FY2020 and follow up on the issues pointed out regarding the year-end report. With respect to the traffic environment information interfaces believed to be important in deliberating international standardization strategies, assess actual conditions through the use of these interfaces in the FOTs in the Tokyo Waterfront City area, etc.

1. Study of international standard trends

- We investigated measures carried out within this year's study, including looking at comments in the FY2021 year-end report of the SIP Task Force on Transport Information Infrastructure/International Cooperation Working Group.

(1) Follow-up regarding FY2020 study

- Continue with follow up regarding the latest trends in the five information fields, such as traffic environment information interfaces, for which approaches were defined in FY2020

(2) Selection of new study themes for deliberating international standardization and commencement of study on these themes

1) Standardization trends involving the delivery of traffic environment information via V2N
2) Trends involving V2X using cellular technologies
3) Trends involving data platforms/access points related to mobility

3. Contents of this year's initiatives [2/2]

2. Holding of deliberation council meetings to deliberate on strategies

- Based on the results of the FY2021 trend investigation, etc., deliberations continued regarding the direction to be taken by international standardization strategies, etc., involving traffic environment information.

Session no.	Date (planned)	Agenda (proposed)
1st	October 2019	• Position, objectives, and deliberation schedule of deliberation council • Interim report on the results of the study of standard trends • Points of dispute concerning international standardization
2nd	December 2019	• Report on the results of the study of standard trends • ISO discussion trends • Direction to take with regard to international standardization strategies
3rd	June 2020	• ISO discussion trends • Contents of ADASIS provisions and the standardization of interface specifications for traffic environment information • CRP deliberation status
4th	October 2020	• ISO discussion trends • Direction of deliberations with regard to interface specifications for traffic environment information #1
5th	February 2021	• ISO/OADF discussion trends • Summarization of direction to take with regard to international standardization strategies (FY2020)
6th	October 2021	• Review of initiatives up to and including last year • Deliberation of direction to take with regard to new items requiring standardization (1)
7th	December 2021	• Deliberation of direction to take with regard to new items requiring standardization (2) • Follow-up regarding roadway traffic environment information interfaces
8th	February 2022	• Summarization of direction to take with regard to international standardization strategies (FY2021)

1) Standardization trends involving the delivery of traffic environment information via V2N

Study trends in the standardization of traffic environment information delivery via V2N

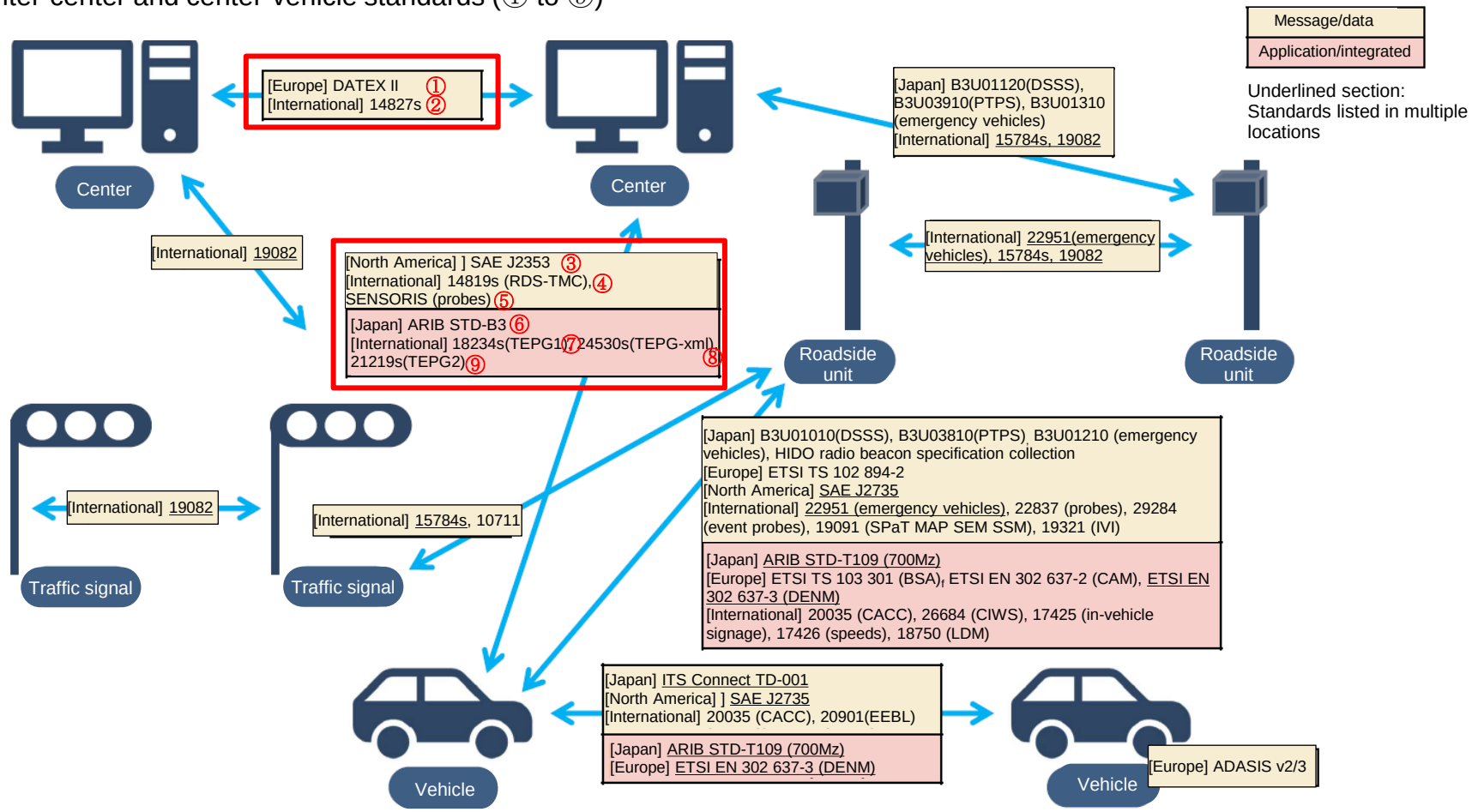
Aims of study

- **Status of standardization of method used to express traffic environment information used in the SIP program**
  - The SIP program is working on delivering four types of traffic environment information by V2N (lane-specific road traffic information, rainfall information, emergency vehicle information, and traffic signal prediction information)
  - We studied whether or not traffic environment information could be expressed using existing standards for message sets, protocols, and the like, and we are using our findings to deliberate on strategies for globally standardizing SIP program results.

- **Status of standardization of information delivery triggers (PUSH/PULL, etc.) and the approach to take with respect to the information delivery range**
  - The SIP program is going beyond ISO's PUSH/PULL standards to deliver information using PUSH and PULL methods depending on the type of information to be delivered.
  - We are investigating to what degree these issues have been stipulated in international standards and deliberating regarding how much room there is for SIP program results to be reflected in international standards (requires coordination with related operations).

Roadway traffic environment information-related standards

- The standards that concern traffic environment information are indicated below. Of these, we created an overview of center-center and center-vehicle standards (① to ⑨)



* The numbers in the "International" field are ISO standard numbers. Numbers followed by an "s" are series standards, in which there are multiple standards within a single number.

Contents of individual standards

- We determined if the four types of information being studied by the SIP program are covered by standards, or expected to be covered by standards.
- Specifically, we organized the study contents of each standard based on information presented regarding them on the web. We then determined **if the above four types of information are covered by standards, or expected to be covered by standards.**
- With regard to ISO21219, of the series that consists of Part 1 to Part 26, we investigated Parts 14, 15, 16, 18, 19, and 25, which contain stipulations regarding data and message sets related to dynamic, semi-dynamic, and semi-static information.

Standard	Information delivered via V2N in the SIP program			
	Lane-specific road traffic information*1	Rainfall information	Emergency vehicle information	Traffic signal prediction information
① DATEX II (CEN 16157)	✓ (Front end of traffic flow, speed of traffic flow, traffic flow status, etc.)	✓ (Precipitation information)	-	✓ (Traffic signal status, etc.) * Appears to be current traffic signal aspect.
② ISO 14827s	- *2	- *2	- *2	-
③ SAE J2353	-	-	-	-
④ ISO 14819s	✓ (Road event status, traffic problems, etc.)	✓ (Weather conditions)	-	-
⑤ SENSORIS	-	-	-	-
⑥ ARIB STD-B3	✓ (Traffic congestion information, required time information, etc.)	✓ (Heavy rainfall information)	-	-
⑦ ISO 18234s	✓ (Road traffic information, traffic congestion information, etc.)	-	-	-
⑧ ISO 24530s	✓ (Information regarding recommended routes, etc.)	-	-	-
⑨ ISO 21219s	✓ (Traffic congestion information, etc.)	-	-	-

*1:With regard to lane-specific road traffic information, none of the standards clearly indicate if information is lane-specific.
*2: There are references to traffic management systems, weather systems, and emergency management systems, but they are presented purely as examples, and there are no stipulations regarding them.

Comparison of SIP deliberation contents and related standards [1/2]

- We organized the contents of standards related to the four types of information being investigated by the SIP program for delivery via V2N by individual element, such as the transmission methods used.
- We then organized contents for the same elements for the seven standards envisioned as applying to information delivered via V2N.
- ① and ② are center-center standards, while ④, ⑥, ⑦, ⑧, and ⑨ are center-vehicle standards. We based this information on the contents of the individual standards published on websites, etc.

Item	Information delivered via V2N in SIP				Transmission method	Message set use	Protocol	Delivery method		
	Road traffic information	Rainfall information	Emergency vehicle location information	Traffic signal prediction information				PUSH/PULL	Area where information can be received	Delivery timing
SIP	✓ Lane-specific				LTE	Y	HTTP	PULL	Information for carriageway area in front of test vehicle	1 minute interval
		✓			LTE	Y (JASPAR)		PULL	Area around the test vehicle (30 km x 30 km square), information for specified area	5 minute intervals
			✓		LTE	Y	WebSocket MQTT	PUSH	Information for area within 1 km radius around vehicle	2 second intervals after event occurs
				✓	LTE	Y		PUSH	Information for area 500 m/1 km in front of vehicle	When cycle starts
① DATEX II	✓	✓		✓	(Wired)	Y	-	-	-	-
② ISO14827	-	-	-		(Wired)	-	DATEX-ASN (Part1), HTTP (Part3)	-	-	-

* Hyphens indicate areas not covered by information available online.

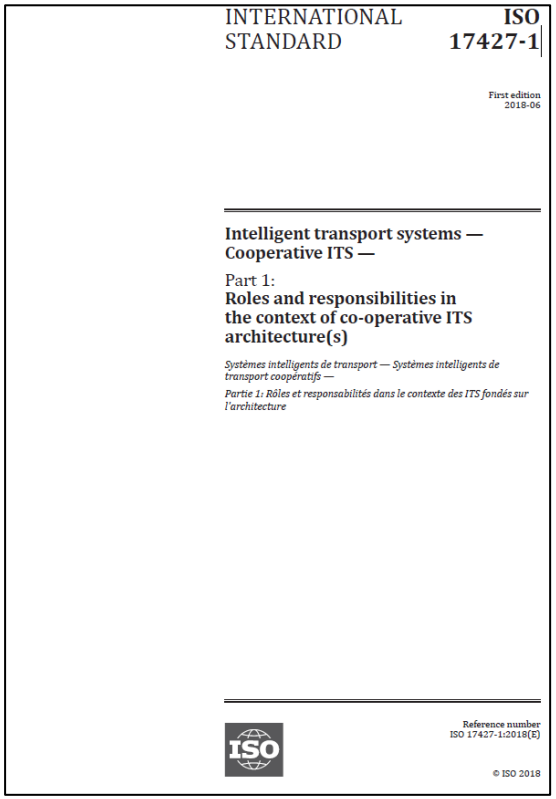
Comparison of SIP deliberation contents and related standards [2/2]

Item	Information delivered via V2N in SIP				Transmission method	Message set use	Protocol	Delivery method		
	Road traffic information	Rainfall information	Emergency vehicle location information	Traffic signal prediction information				PUSH/PULL	Area where information can be received	Delivery timing
SIP	✓ Lane-specific				LTE	Y	HTTP	PULL	Information for carriageway area in front of test vehicle	1 minute interval
		✓			LTE	Y (JASPAR)		PULL	Area around the test vehicle (30 km x 30 km square), information for specified area	5 minute intervals
			✓		LTE	Y	WebSocket MQTT	PUSH	Information for area within 1 km radius around vehicle	2 second intervals after event occurs
				✓	LTE	Y		PUSH	Information for area 500 m/1 km in front of vehicle	Cycle start
④ ISO14819	✓	✓			Analog broadcast (RDS*)	Y (ALERT-C)	-	-	-	Once every few seconds/minutes (static information), immediately (dynamic information)
⑥ ARIBSTD-B3		✓			Analog broadcast (DARC*)	Y	-	-	Information about prefectures reached by the station's signal and surrounding areas	Twice every 5 minutes
⑦ ISO18234		✓			Digital broadcast	Y	-	-	-	-
⑧ ISO24530		✓			Digital broadcast	Y	-	-	-	-
⑨ ISO21219		✓			Digital broadcast	Y	-	-	-	-

* RDS: Radio Data System * DARC: Data Radio Channel

Trends in the standardization of PUSH/PULL approaches [1/2]

- ISO17427-1
  - Objectives of study
    - Investigate the status of standardization of the approach used with respect to the delivery range of traffic environment information.
    - In particular, focus on the perspective of to what degree international standardization has been performed for the quantitative approaches applied to delivery methods, such as information transmission frequency and area, used when delivering traffic environment information.
  - Overview of study results
    - ISO17427-1 defines "PUSH" and "PULL" approaches to delivering information regarding obstacles, etc., on roads.
    - However, unlike the PUSH/PULL delivery of the SIP project, ISO17427-1 defines the type of delivery of information from ITS services as "PUSH/PULL," and does not address the concepts of "PUSH/PULL" with respect to data delivery.
    - The standard therefore does not stipulate the specific frequency of data delivery or the delivery range.


INTERNATIONAL STANDARD

ISO 17427-1

First edition
2018-06

Intelligent transport systems — Cooperative ITS —

Part 1:
Roles and responsibilities in the context of co-operative ITS architecture(s)

Systèmes intelligents de transport — Systèmes intelligents de transport coopératifs —

Partie 1: Rôles et responsabilités dans le contexte des ITS fondés sur l'architecture

Reference number
ISO 17427-1:2018(E)

© ISO 2018

Source: ISO17427-1

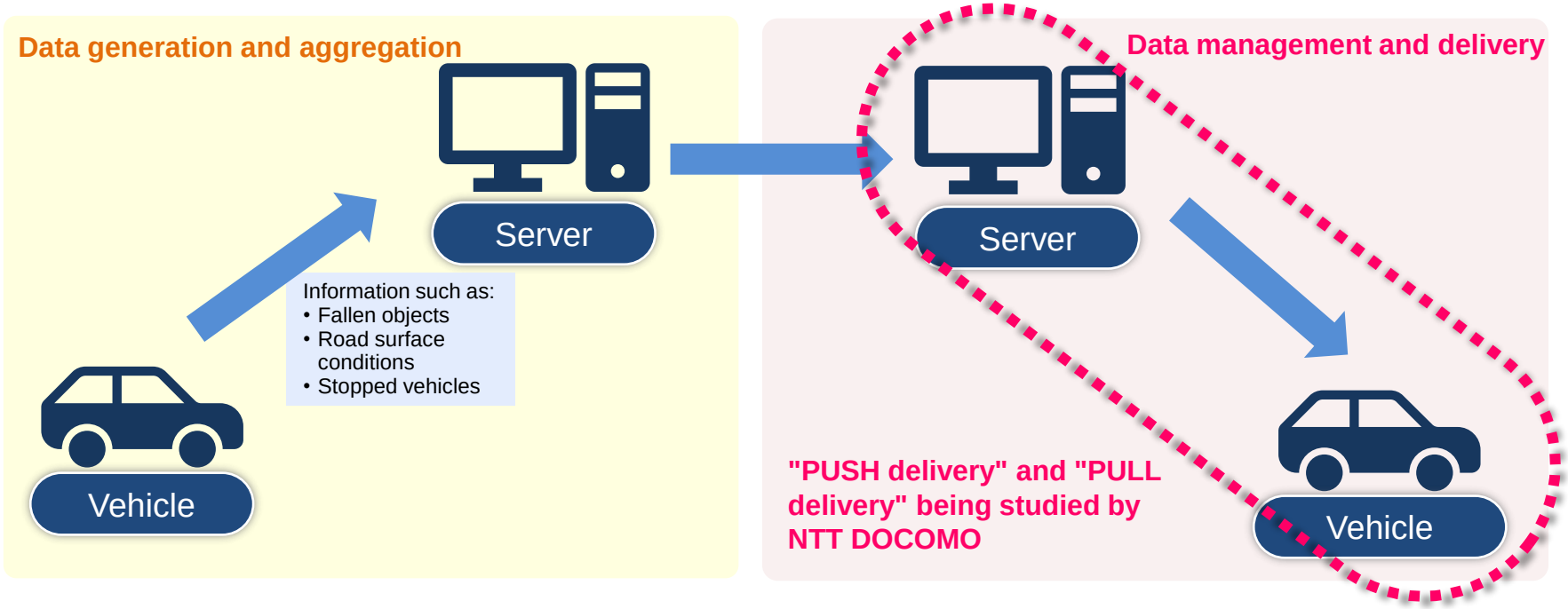
3.26
service in pull mode
ITS service (3.14) actively requesting the data that is required for the service operation

3.27
service in push mode
ITS service (3.14) operating on data delivered without request by an actor or its system

Trends in the standardization of PUSH/PULL approaches [2/2]

- The scopes of "PUSH/PULL" as defined by the ISO and the "PUSH delivery/PULL delivery" of the SIP program differ from each other. ISO specifications do not define PUSH/PULL with respect to specific data management or delivery methods.

	ISO17427-1 context	SIP context
PUSH	The process by which data is gathered in specific time intervals or when specific events occur and temporarily stored for future use.	The process by which servers extract information for the area around the vehicle, based on the vehicle's location information, and deliver this information to the vehicle.
PULL	The process by which required data is actively requested when executing services.	The process by which information that applies to medium and wide areas is selected by the vehicle and received.



Deliberation regarding standardization strategies for traffic environment information delivery via V2N [1/2]

Analysis conclusions

- **Contents of stipulations in existing standards**
  - Rainfall information:
    - Can be handled by existing standards.
    - It is possible to express rainfall volume using CEN16157 (DATAX).
    - With ISO 14819s, as well, it is possible to express weather conditions on roads.
  - Road traffic information:
    - Existing standards indicate formats for expressing road information, but there are no existing standards capable of expressing this information at a lane-specific level of resolution.
  - Emergency vehicle location information:
    - There are no existing standard capable of expressing this information.
  - Traffic signal prediction information:
    - Depends on type of traffic signal information being provided (current color, aspect step diagram).
    - The current traffic signal color information can be expressed using CEN16157 (DATAX).

- **Protocol**
  - When delivering SIP traffic environment information, using MQTT was an original approach, but SIP research results, etc., must be monitored to confirm the viability of using MQTT.

- **Information delivery range**
  - The SIP Waterfront City FOTs are investigating information delivery triggers (PUSH/PULL, etc.) and the information delivery range, and it is highly likely that deliberation regarding these specifics has already progressed beyond existing standards.

Deliberation regarding standardization strategies for traffic environment information delivery via V2N [2/2]

Aims when deliberating regarding standardization strategies

- **Standardization of message sets for expressing road traffic information at the lane level**
  - For automated driving purposes, it would be best to express road traffic information at the lane level so that vehicles could be provided with higher resolution road traffic information.
  - It is vital to create standards that can express information at the lane level from the perspectives of both information collection and information delivery. Without these standards, roadside unit and on-board equipment support would not become widespread.
  - The media and data formats that should be used for traffic signal information vary depending on the use case. Trends need to be checked for different types of use cases. Furthermore, use cases may differ from region to region, such as between Europe and the U.S., so we will keep an eye on future global trends.

- **Standardization of protocols that support delivery via LTE**
  - One of the results of the SIP project has been the creation of message sets that can be used to deliver traffic environment information using MQTT, developed with an eye towards V2N information delivery in the future.

- **Standardization of information delivery triggers (PUSH/PULL, etc.) and the approach to take with respect to the information delivery range**
  - SIP is going beyond ISO's PUSH/PULL standards and has succeeded in organizing information regarding how to perform delivery using PUSH and PULL methods depending on the type of information to be delivered.
  - If the methods of triggering information delivery are not defined, there will be differences in the triggering methods and information handling processes used by roadside units and on-board equipment, so standardization would be beneficial.
  - We are deliberating announcing these results globally, such as in the form of a technical paper (doing so would require coordination with related operations).

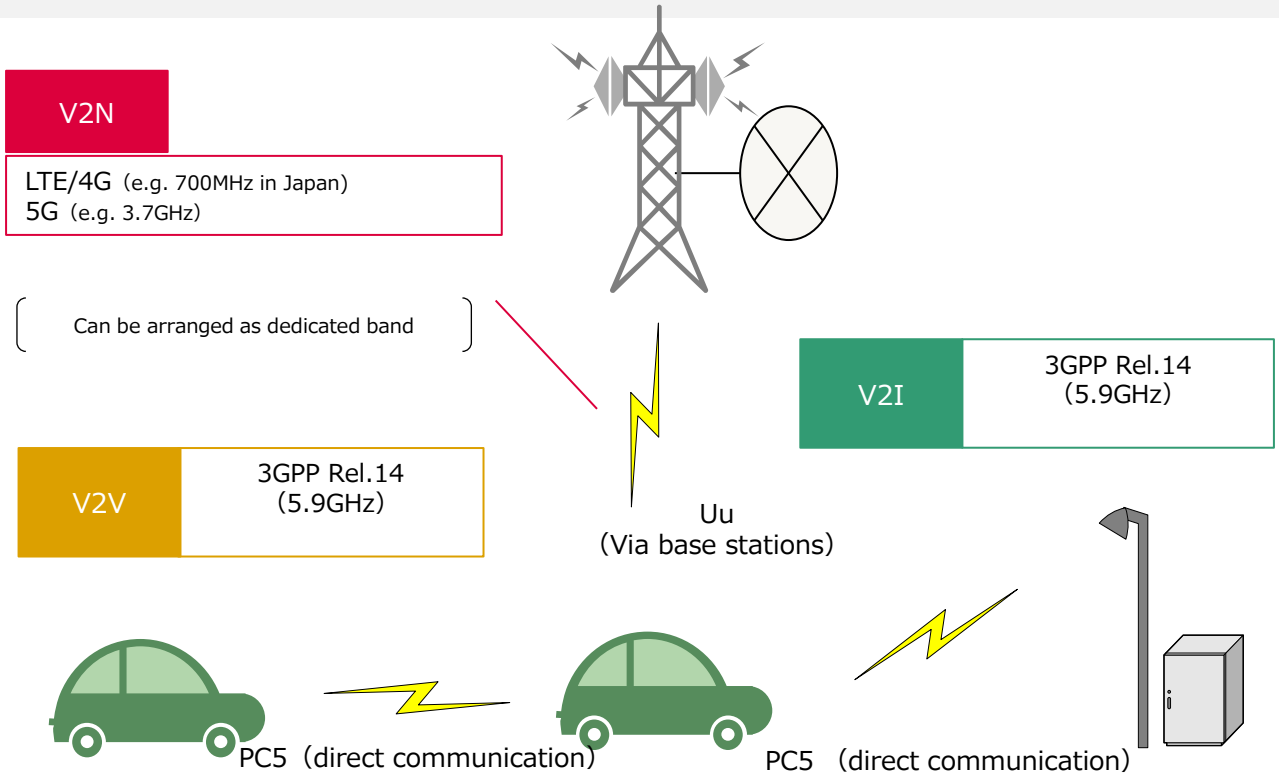
2) Trends involving V2X using cellular technologies

V2X Technologies using Cellular

V2X Technologies using Cellular are categorized as follows,

- Celluler-V2X
- V2N(Network)
- LTE-V2X、5G-V2X

The terminology of those technologies are not fixed and the meaning is changing depends on the situation, country, report, and project.



V2X Technologies using Cellular

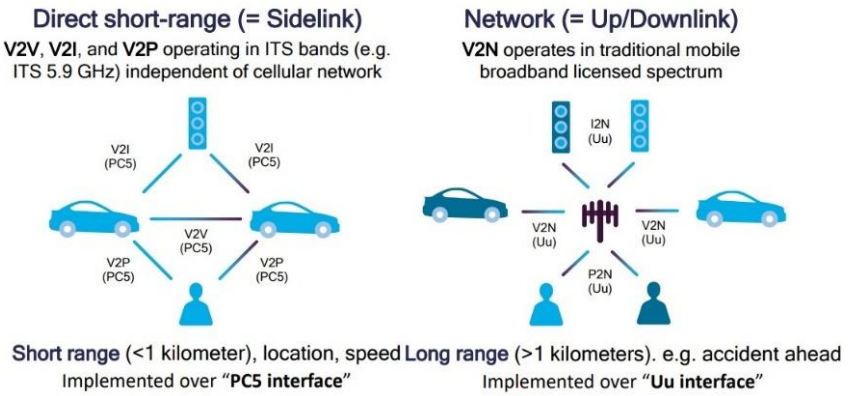
Cellular V2X/C-V2X

Cellular V2X as a word to conclude PC5 and Uu

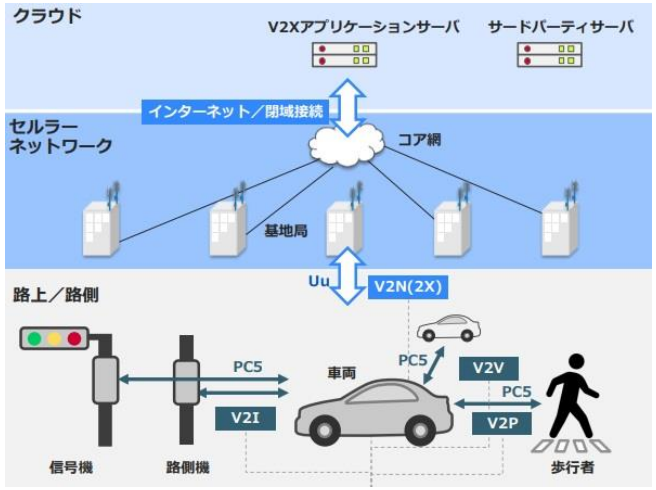
Majority

Source：5GAA calls cellular V2X as “LTE Uu” and “LTE PC5”
https://5gaa.org/wp-content/uploads/2017/08/5GAA-V2X-Terms-and-Definitions110917.pdf

Source：5GAA also defines Sidelink and Uplink/Downlink
https://www.gsma.com/iot/wp-content/uploads/2020/07/02_5GAA_Maxime-Flament.pdf



Source：ITS Forum Japan
https://itsforum.gr.jp/Public/J7Database/p62/Cellular_system_201906.pdf



＜Exception＞Cellular V2X as only intended PC5

Source：FCC Use of the 5.850-5.925 GHz Band(ET Docket No. 19-138) 90.7(Definition)

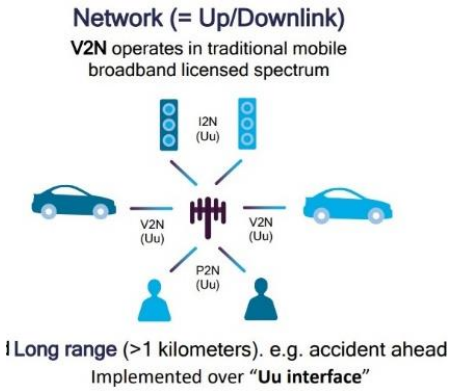
“Cellular Vehicle to Everything (C-V2X) Service. The use of cellular radio techniques defined by the 3rd Generation Partnership Program (3GPP) to transfer data between roadside and mobile units, between mobile units, and between portable and mobile units to perform operations related to the improvement of traffic flow, traffic safety, and other intelligent transportation service applications in a variety of environments. ”

V2X Technologies using Cellular

V2N

V2N as only intended to Uu

Source：As previously mentioned, 5GAA intends V2N as U u



Source：ITS America "The role of V2N and 5G in the V2X eco system" https://itsa.org/wp-content/uploads/2021/04/4-27-21_com msignia-slides.pdf

range		SHORT-RANGE <1 mile	LONG-RANGE >1 mile
Network protocol	cellular	C-V2X (PC5)	4G or 5G (Uu)
	wifi	DSRC (802.11p)	
V2?		V2V, V2I, V2P	V2N
application		SAFETY AND EFFICIENCY	MOSTLY FOR INFOTAINMENT AND EFFICIENCY

LTE-V2X

Depends on the report

①LTE-V2X as both PC5 and Uu

Source：ITS America "The role of V2N and 5G in the V2X eco system"

②LTE-V2X as only PC5

Source：ETSI - EN 303 613:Intelligent Transport Systems (ITS); LTE-V2X Access layer specification for Intelligent Transport Systems operating in the 5 GHz frequency band https://www.etsi.org/deliver/etsi_en/303600_303699/303613/01.01.00_20/en_303613v010100a.pdf

Summary of the part

- We surveyed the scope and usage of each of the V2X-related terms that utilize cellular communication technology.
  - For cellular V2X (C-V2X), it is generally utilized as a generic term for Uu and PC5.
  - V2N is generally used for Uu only.
  - LTE-V2X is the most frequently misunderstood, and is sometimes used as a generic term for Uu and PC5, and sometimes used only for PC5. (The term LTE-V2X is never used for Uu only.)

- Other projects in SIP generally consistent with the above definition, so the results for this fiscal year are tentatively set aside for the present.

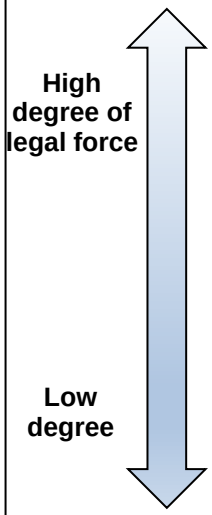
3) Trends involving data platforms /access points related to mobility

European mobility data platform trends

Key points

- **In 2017, the European Commission put into effect regulations concerning the collection and use of mobility-related data**
- **EU member nations are required to comply with these regulations**

<Ref.> What are EU "regulations"?



(1) Regulation (REACH, etc.)	Regulations are formulated in order to unify laws and regulations among EU member nations. They are directly legally binding for the nations, and do not require individual laws to be created in each country in order to have legal force. They supersede all national laws.
(2) Directive (RoHS, WEEE, ELV, etc.)	Directives are not directly applied. Instead, the objective within them only have legal force within individual countries when corresponding laws are made within individual countries.
(3) Decision	Decisions directly apply to the implementation or abolition, etc., of specific activities by concerned parties (specific member nations, companies, and individuals).
(4) Recommendation	Recommendations are expressions by the European Commission of the actions that they hope that member nations, companies, and individuals will implement. They do not have legal force.
(5) Opinion	Opinions are statements of the beliefs and ideas of the European Commission regarding specific themes. They do not have legal force.

EU Regulation 2017/1926 [1/2]

Regulation name: COMMISSION DELEGATED REGULATION (EU) 2017/1926
of 31 May 2017
supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide multimodal travel information services

Summary:

- This regulation was formulated to establish the specifications necessary to ensure that EU-wide multimodal travel information services are accurate and available across borders to users.
- Individual countries are to create National Access Points (NAPs) based on this regulation and prepare platforms for collecting and using data.

Abridged translation) Mitsubishi Research Institute

EU Regulation 2017/1926 [2/2]

- **Mobility data managed by NAPs**

Safe and Secure Truck Parking	**Safety Related Traffic Information (SRTI)**	**Real-Time Traffic Information (RTTI)**	**Multimodal Travel Information Services (MMTIS)**
The Commission Delegated Regulation concerning this, (EU)885/2013, was adopted in 2013.	The Commission Delegated Regulation concerning this, (EU)886/2013, was adopted in 2013.	The Commission Delegated Regulation concerning this, (EU)2015/962, was adopted in 2015. It went into effect on July 13, 2017.	The Commission Delegated Regulation concerning this, (EU)2017/1926, was adopted on October 21, 2017.
Theme: Provision of information services for safe and secure parking places for trucks and commercial vehicles **Data:** Generally speaking, static data related to the parking areas, especially information regarding the number of parking areas. In some countries, information regarding safety and equipment can also be accessed. For some parking areas (only in Denmark, Germany, Luxembourg, and the Netherlands), there is also dynamic data on the availability of parking places	**Theme:** Data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users **Data:** The EU regulation requires the following eight types of safety-related information to be provided. (a) Temporarily slippery roads (b) Animal, people, obstacles, debris on the road (c) Unprotected accident areas (d) Short-term road works (e) Reduced visibility (f) Wrong-way drivers (g) Unmanaged road blockages (h) Exceptional weather conditions	**Theme:** Specifications for EU-wide real-time traffic information services **Data:** (1) Static road data (2) Dynamic road status data (3) Traffic data Example of data provided in Bulgaria (1) ⇒ Traffic signs reflecting traffic restrictions, permanent access restrictions, and other dangers/traffic circulation plans/locations of tolling stations/locations of parking places and service areas (2) ⇒ Road closures, lane closures, bridge closures, accidents and incidents, poor road conditions, weather conditions affecting road surfaces and visibility, etc.	**Theme:** Provision of EU-wide multimodal travel information services **Data:** Static travel and traffic data must be provided through the NAP by December 1, 2019, for the travel and traffic data set out in point 1.1 of the Annex to the Commission Delegated Regulation. Static travel and traffic data must be provided through the NAP by December 1, 2020, for the travel and traffic data set out in point 1.2 of the Annex to the Commission Delegated Regulation.

Source: EU EIP - Annual NAP Report2020

Study of platform trends in Europe (status of individual countries)

NAP support (NAPs currently in operation) (confirmed on November 15, 2021)

The color-coded map at left shows the status of NAP support. The meanings of each color are as indicated below.

Green: Countries in which NAPs already support all four information categories
Yellow: Countries in which NAPs already support at least one of the information categories
Red: Countries in which none of the information categories are supported yet

According to an annual report issued in 2020 by the EU, as of December 2020, at least one NAP category is being supported in a total of 23 countries (Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Netherlands, Norway, Poland, Slovakia, Slovenia, Spain, Sweden, U.K.).

The map at left adds three more countries (Malta, Portugal, Romania), bringing the total up to 26 countries.

Source: EU EIP - Annual NAP Report 2020, A2 - Working Group NAP, Monitoring & Harmonisation of National Access Points in Europe
https://www.its-platform.eu/highlights/eu-eip-publishes-annual-nap-report-2020

Overseas projects involving mobility data platforms (MDM Platform (Germany))

Project (platform) name	MDM Platform (Germany)
Main parties	• Federal Ministry for Digital and Transport (BMVI) (Germany) • Federal Highway Research Institute (BASt) (Germany) This platform is based on a collaboration between Germany's Federal Ministry for Digital and Transport and Federal Highway Research Institute. The MDM Platform was created and is operated by the Federal Highway Research Institute (BASt) as part of the federal government's innovation program.
Project (platform) objectives	The MDM Platform, an internet service, is used to supply, search, and subscribe to online traffic-related data and to transmit online data between data providers and data clients. This platform relays data provided by data providers to data clients.
Collected information and role of platform	● Data cataloging function Neutral B2B platform/standard regulations for data exchange/Germany's largest provider of information regarding traffic flow, traffic congestion, road construction, mobility options, parking areas and the like ● Data searching and brokering function On the page's "Search" tab, geographical areas (in Germany) and data types (real-time traffic data, unexpected road incidents and conditions, and other data) can be selected to perform searches and display search results. Users who are interested in the displayed results can contact the data provider for additional information, to begin contract negotiations, or the request data provision.

Reference: https://service.mdm-portal.de/mdm-portal-application/index.do
https://www.mdm-portal.de/?lang=en

Metadata - From German NAP

- This is an example of the metadata search page of Germany's NAP (MDM Platform). The search results are as shown in the figure at right.

- Users can perform searches by selecting the filter conditions they desire for the filter types below.
  * Data category
  * Data category details
  * Transport modes
  * Update intervals
  * MDM brokering (yes/no)
  * Conditions of use
  * Geographical area
  * Road network coverage (road type)
  * Access information (model (NeTEx CEN/TS 16614, etc.))

  Sample search results are shown on the following page. Users who are interested in the displayed results can contact the data provider for additional information, to begin contract negotiations, or the request data provision.

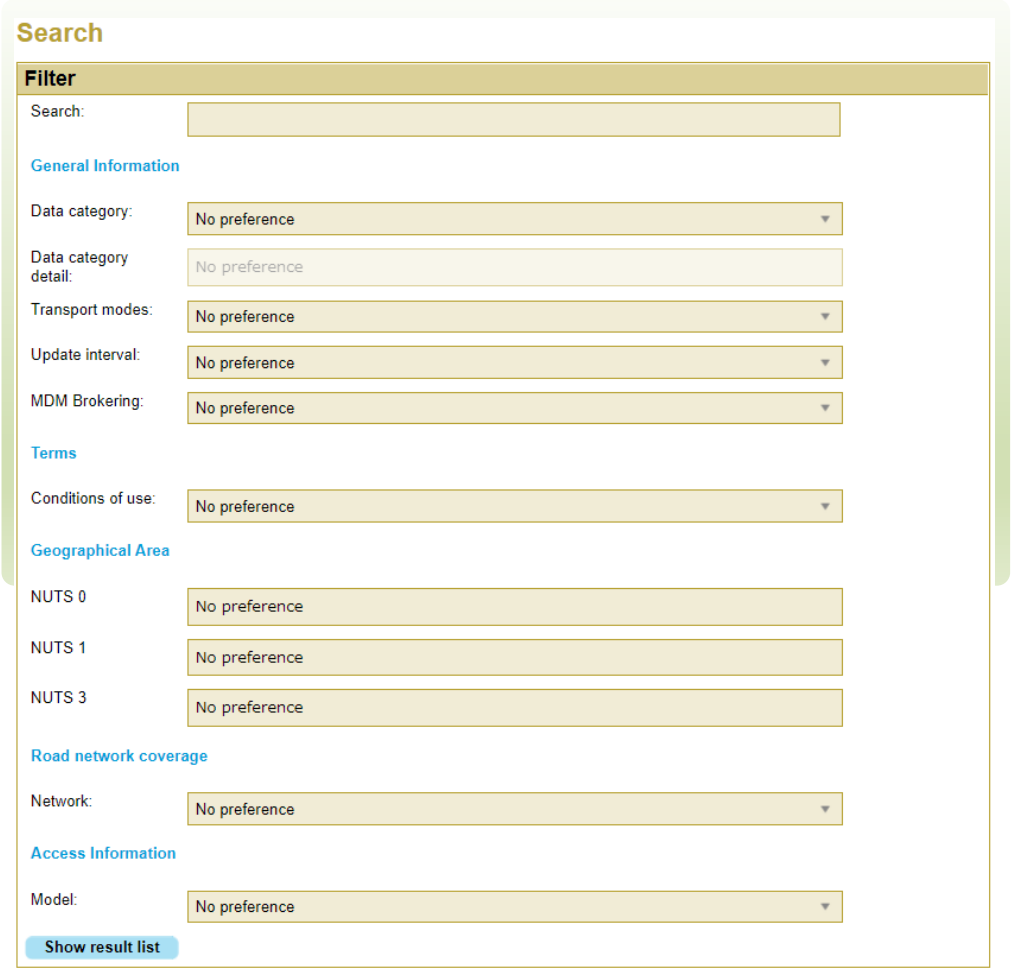


Fig. Metadata search screen (German NAP)

Source: MDM Platform website
https://service.mdm-portal.de/mdm-portal-application/_recherche.do?reset=1

(1) NAP use case

- This section presents use cases for services that use the MDM Platform, Germany's NAP.

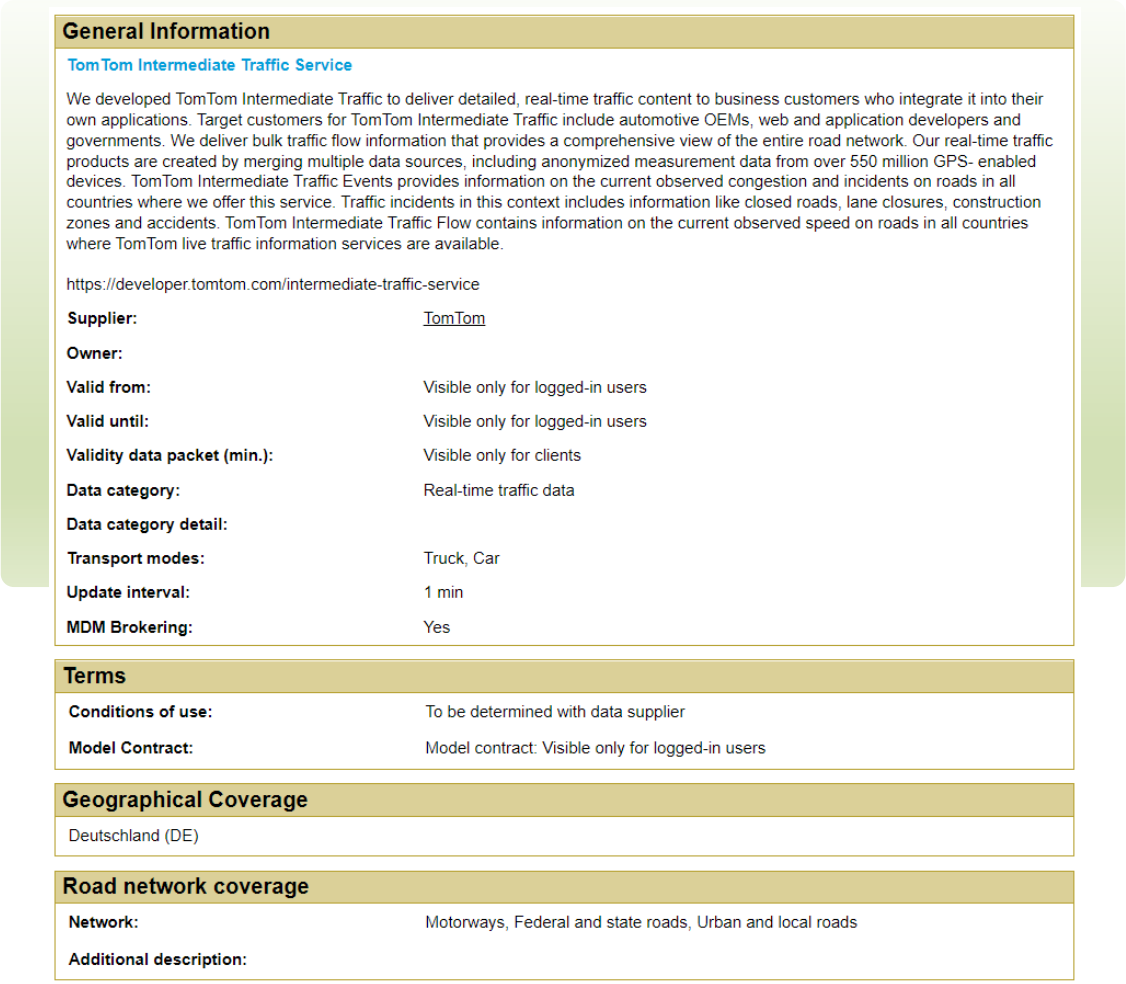
Frankfurt am Main metropolitan data exchange: TomTom, Frankfurt

- The Integrated Traffic Control Centre (IGLZ), which is operated by Frankfurt's road traffic bureau, uses FloatingCarData (FCD) from provider TomTom*. This data expresses traffic conditions with a higher level of accuracy than conventional modeling methods. TomTom data is distributed via the **MDM**. It enables users to access every type of traffic information 24 hours a day from computers, smartphones, and tablet devices.

- In order to improve traffic control, not only does Frankfurt acquire data from **MDM** (as a data recipient), but it also provides information concerning construction sites, traffic impediments, and parking area occupancy rates via the **MDM** (as a data provider) to public and private sector providers of traffic information services. TomTom makes traffic condition mapping more accurate and up-to-date, and it can be used by Frankfurt via MDM.

- Through **MDM**, users can use standardized data formats and transmission paths, **which eliminates the need for bilateral coordination regarding data provision**. DATEX II is used as the de facto standard data model for transmitting traffic data when exchanging data with **MDM**. SOAP and OTS2 are used as transmission protocols.

(2) Metadata for usage data (from catalog) [1/2]



General Information

TomTom Intermediate Traffic Service

We developed TomTom Intermediate Traffic to deliver detailed, real-time traffic content to business customers who integrate it into their own applications. Target customers for TomTom Intermediate Traffic include automotive OEMs, web and application developers and governments. We deliver bulk traffic flow information that provides a comprehensive view of the entire road network. Our real-time traffic products are created by merging multiple data sources, including anonymized measurement data from over 550 million GPS- enabled devices. TomTom Intermediate Traffic Events provides information on the current observed congestion and incidents on roads in all countries where we offer this service. Traffic incidents in this context includes information like closed roads, lane closures, construction zones and accidents. TomTom Intermediate Traffic Flow contains information on the current observed speed on roads in all countries where TomTom live traffic information services are available.

https://developer.tomtom.com/intermediate-traffic-service

Supplier:	TomTom
Owner:	
Valid from:	Visible only for logged-in users
Valid until:	Visible only for logged-in users
Validity data packet (min.):	Visible only for clients
Data category:	Real-time traffic data
Data category detail:	
Transport modes:	Truck, Car
Update interval:	1 min
MDM Brokering:	Yes

Terms

Conditions of use:	To be determined with data supplier
Model Contract:	Model contract: Visible only for logged-in users

Geographical Coverage

Deutschland (DE)

Road network coverage

Network:	Motorways, Federal and state roads, Urban and local roads
Additional description:	

Fig.: Metadata search results [1/2]

Source: https://service.mdm-portal.de/mdm-portal-application/publDetail.do?publicationId=2841000&backDest=rechercheResult

(2) Metadata for usage data (from catalog) [2/2]

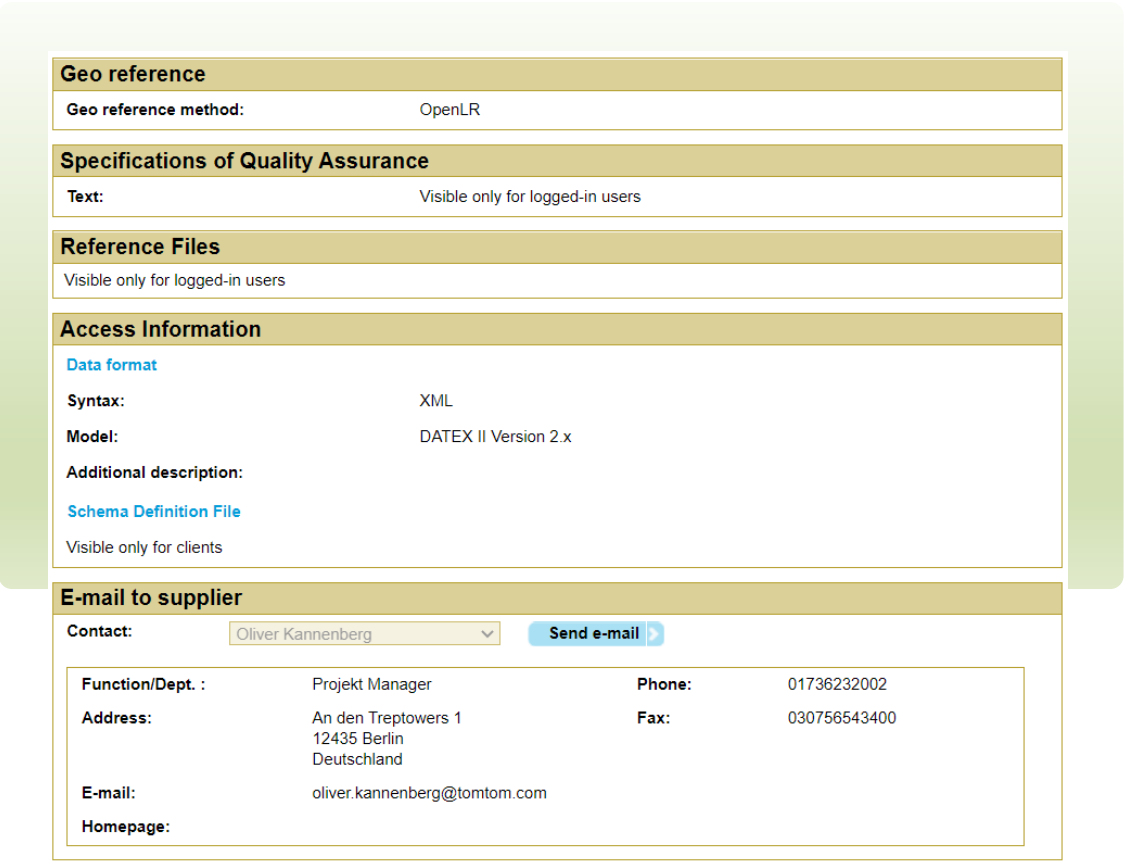
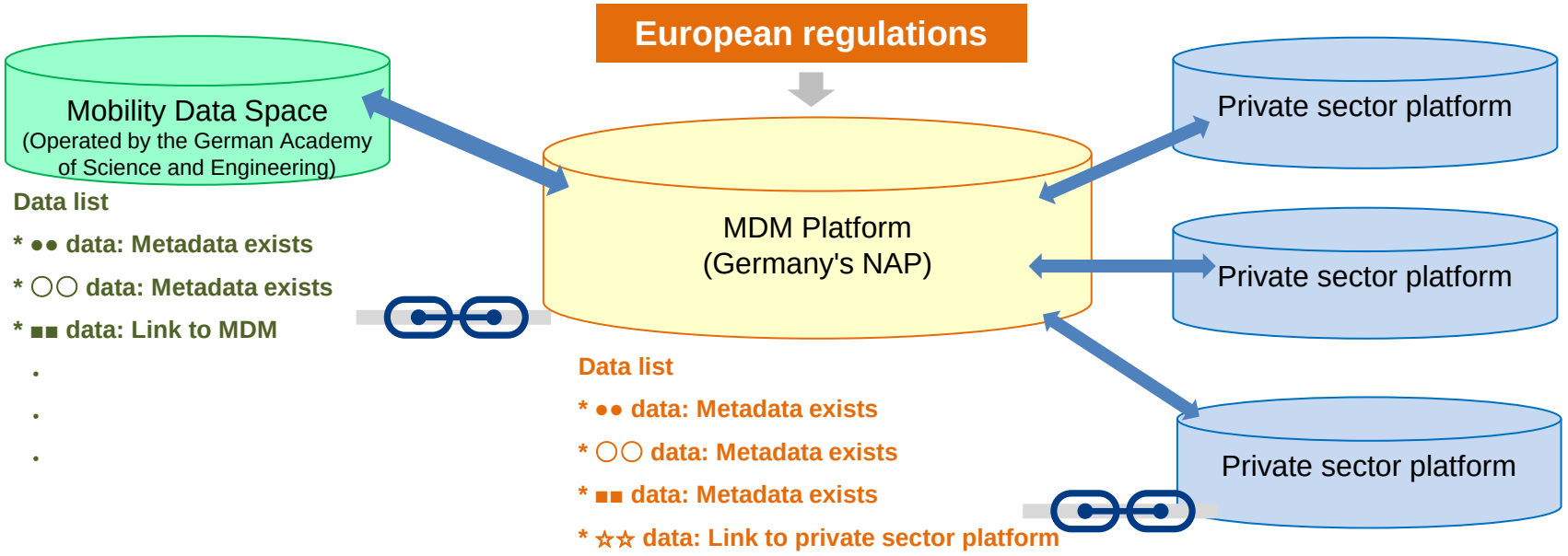


Fig.: Metadata search results [2/2]

Source: https://service.mdm-portal.de/mdm-portal-application/publDetail.do?publicationId=2841000&backDest=rechercheResult

Integration between NAP and other platforms

- **In Germany, the MDM Platform functions as a data platform directly regulated by European regulations (national access point, or NAP)**
- MDM collects as much mobility data-related information as it can from different means of transportation, network elements, and actors.
- This also includes mobility data that is also provided through other German data portals (such as geoportal.de, mCLOUD.de, and open-data-oepnv.de). When users searching for data cannot find the data they want via MDM, they can also search these parallel data portals.



Trends involving data platforms/access points related to mobility

Aims of study

- **Overview of the status of the study**
  - We studied the status of laws and regulations in Europe enacted with the aim of establishing mobility data platforms, the systems used by National Access Points in Europe, and related matters.
  - We also studied the situations in specific individual countries, such as Germany, Sweden, and France, in greater depth.

- **Looking toward next year**
  - There is still room for more in-depth investigation of the data formats used when listing data on mobility data platforms and activities for promoting greater data distribution.

2. Policy used in summarizing information this year and plans for next year

Review of measures implemented this year [1/2]

1. Study of international standard trends

1) Standardization trends involving the delivery of traffic environment information via V2N

- The media and data formats that should be used for traffic signal information vary by use case. Furthermore, use cases sometimes differ depending on the region (Europe, U.S., etc.).
- SIP is going beyond ISO's PUSH/PULL standards and has succeeded in organizing information regarding how to perform delivery using PUSH and PULL methods depending on the type of information to be delivered.

<Looking toward next year>

- ✓ With regard to delivering traffic signal information, we will continue to investigate global trends for various use cases, not looking solely at V2N but also encompassing other transmission standards and message sets.
- ✓ PUSH/PULL transmission is still novel in comparison to related international standardization trends. We are also considering summarizing SIP results in the form of technical paper, etc.

3) Trends involving data platforms/access points related to mobility

- In 2017, Europe put into effect regulations concerning the collection and use of mobility-related data. EU member nations must comply with these regulations, so each country is preparing data platforms/access points.
- These data platforms/access points make it possible to obtain private sector probe data, information from road administrators, public transportation scheduling information, and the like from the platforms. This information is also used in navigation services.

<Looking toward next year>

- ✓ There is still room for more in-depth investigation of the data formats used when listing data on mobility data platforms and activities for promoting greater data distribution.

Review of measures implemented this year [2/2]

2. Holding of deliberation council meetings to deliberate on strategies

Meeting session number (date/time)	Agenda/discussion points
6th meeting (October 12, 2021)	1. Implementation of this year's study 2. Sharing of information regarding status of standardization with respect to individual topics and direction to take in future deliberations 1) Status of perspectives on cooperation 2) Status of delivery of traffic environment information via V2N 3) Status of data platforms 3. Future plans
7th meeting (December 27, 2021)	1. Confirmation of this year's plan and sharing of previous task force report 2. Sharing of information regarding status of standardization with respect to individual topics and direction to take in future deliberations 1) Standardization trends involving the delivery of traffic environment information via V2N 2) Status of data platforms 3. Future plans
8th meeting (February 28, 2022)	1. Summary of this year's study and follow-up 1) Standardization trends involving the delivery of traffic environment information via V2N 2) Trends involving V2X using cellular technologies 3) Trends involving data platforms/access points related to mobility 2. Policy used in summarizing information this year and plans for next year

Contents of measures planned for next year [1/2]

1. Study of international standard trends

- We plan to continue to perform even more in-depth studies of the following matters.

1) Standardization trends involving the delivery of traffic environment information via V2N

- PUSH/PULL transmission is still novel in comparison to related international standardization trends. We are also considering summarizing SIP results in the form of technical paper, etc.

[New] 2) International traffic signal information delivery trends

- With regard to delivering traffic signal information, we will continue to investigate global trends focusing on individual use cases, encompassing other transmission standards and message sets.

3) Trends involving data platforms/access points related to mobility

- Investigation of standard formats, etc.
- Data sharing promotion activities

Contents of measures planned for next year [2/2]

2. Holding of deliberation council meetings to deliberate on strategies

- We plan to hold a total of three meetings in FY2022 (once in each of the first, second, and third quarters).
- We are also considering having other parties participate as observers in related operations within SIP, etc.

This report documents the results of Cross-ministerial Strategic Innovation Promotion Program (SIP) 2nd Phase, Automated Driving for Universal Services (SIP-adus, NEDO management number: JPNP18012) that was implemented by the Cabinet Office and was served by the New Energy and Industrial Technology Development Organization (NEDO) as a secretariat.