

**Cross-ministerial Strategic Innovation Promotion Program (SIP)
Automated Driving Systems/ Large-scale Field Operational Tests/
General Survey of International Trends Regarding International
Cooperation with Dynamic Maps**

FY2017 Annual Report

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Overview

Japan seeks to contribute to the international community in the development of dynamic maps, a field expected to be integral to the automated driving system. To that end, this study investigates over the course of 2 years (FY17-18) dynamic map data models and developments on map data constructions both domestically and abroad, and works to identify differences in specifications of various nations' dynamic maps. For conformity of industry standards between those of Japan and abroad, it also aims to reinforce cooperative ties, through exchange of views and debate, between organizations worldwide that conduct research and development in the automated driving industry.

In FY2017, the focus was primarily on Research Items ① and ②.

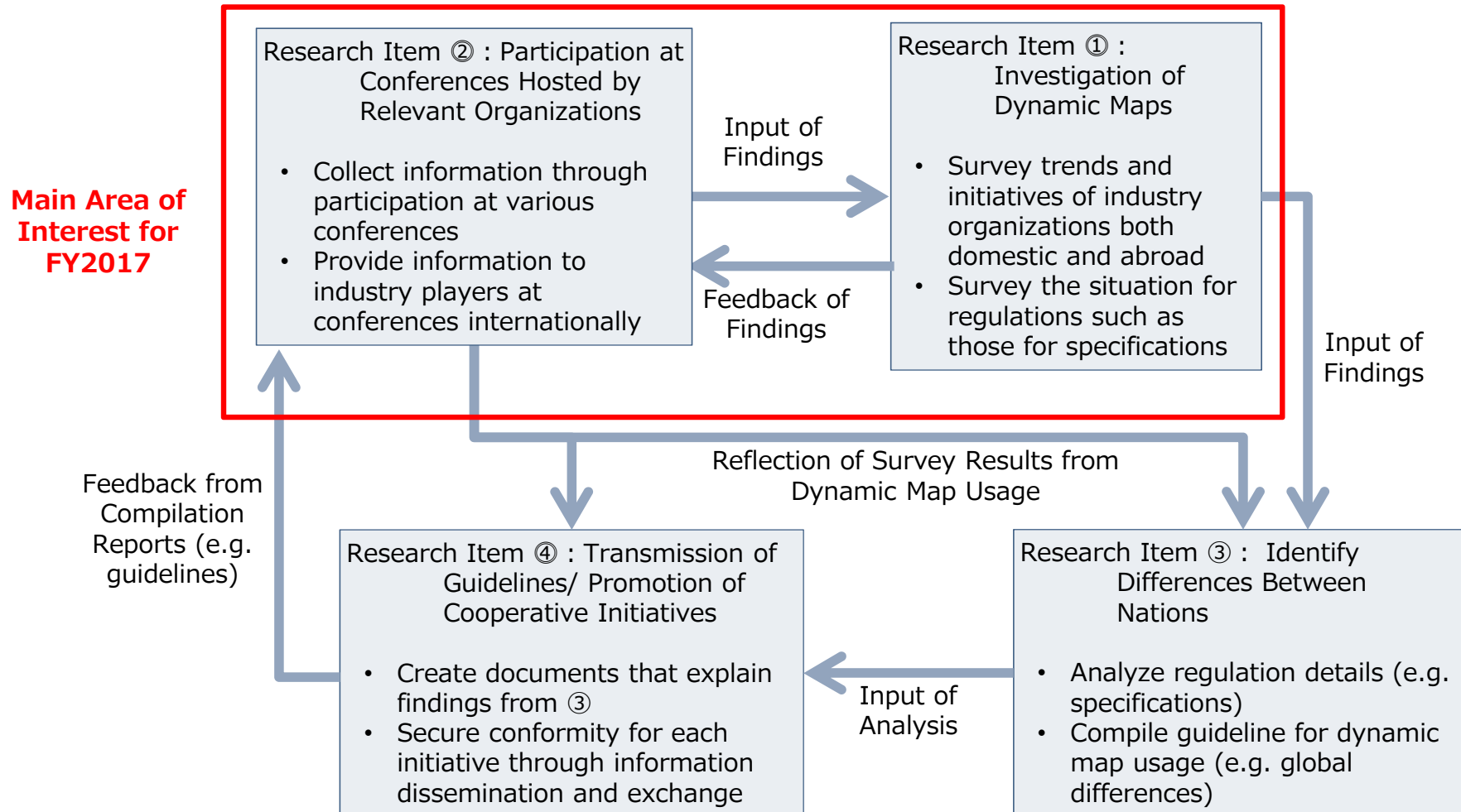


Figure: Research Items

Research Item ① : Investigation of Dynamic Maps

The investigation gathered information such as details of the standardization documents and activity surrounding the formulation of industry specifications for dynamic maps. This was done through surveying public materials and exchanging information with industry players at conferences and in individual meetings.

Table: Primary Initiatives in the Global Formulation and Development of Dynamic Map Specifications

Standardization Level	Domestic/ Int'l	Organization	Specifications
Industry Standards	Domestic	SIP-adus	Dynamic Map Specifications for Dynamic Map Field Operational Tests
	Int'l	NDS	Navigation Data Standard Open Lane Model 1.0
		ADASIS	Advanced Driver Assistance Systems Interface Specification
		TISA	Traffic Message Channel (TMC) Transport Protocol Experts Group (TPEG)
		SENSORIS	Sensor Ingestion Interface Specification
		OADF	–
International Standards	–	ISO/TC204	22726 : Dynamic events and map database specifications for applications of automated driving systems, cooperative ITS, and advanced road/traffic management systems
			20524 :Geographic Data Files – GDF5.1

Research Item ① : Investigation of Dynamic Maps [Overseas Initiatives 1/2]

The investigation compiled activity details of European organizations that are actively developing industry standards.

NDS



- Navigation Data Standard Association (NDS) aims to develop a standard data base format that is compatible with all car navigation systems.
- Navigation Data Standard is a standard data base format that maintains compatibility with all systems. It separates the software and map data and features immediate data update.
- Comprises 36 organizations (as of Feb 2018)

ADASIS



- Advanced Driver Assistance Systems Interface Specification Forum (ADASIS) aims to develop an interface for ADAS applications and onboard maps.
- Advanced Driver Assistance Systems Interface Specification is an application interface for vehicle control and provides map information to ADAS.
- Comprises 51 organizations (as of Feb 2018)

SENSORIS



- Initiated by HERE, SENSORIS aims to develop open standards such as a format for processing and analyzing information collected onto a cloud from vehicle sensors.
- It is studying specifications for uplinking vehicle sensor data to a cloud center and those necessary for services that result from the realization of vehicle sensor data.
- Comprises 26 organizations (as of Nov 2017)

TISA



- Traffic Information Service Association (TISA) aims to develop open standards for traffic information and traveler information services.
- It is developing 2 formats: TMC that is used to transfer traffic, weather, etc. information over FM channels and TPEG that uses digital broadcast to transfer information related to traffic, public transport, weather, etc.
- Comprises 92 organizations (as of Feb 2018)

Research Item ① : Investigation of Dynamic Maps [Overseas Initiatives 2/2]

OADF

OPEN
AUTODRIVE
FORUM

- With European organizations (NDS, ADASIS, TISA, SENSORIS) and related companies at the center, Open AutoDrive Forum is a platform that promotes cross-domain debate and coordination to advance automated driving.
- It promotes the Auto Drive Ecosystem, which is a cycle of map production, delivery to vehicle, onboard cooperation with ADAS Module, and vehicle data (sensing data) feedback.
- 61 participants including auto makers and map providers (as of Feb 2018)
- Organizes meetings once every 2-3 months in Europe, U.S., or Asia

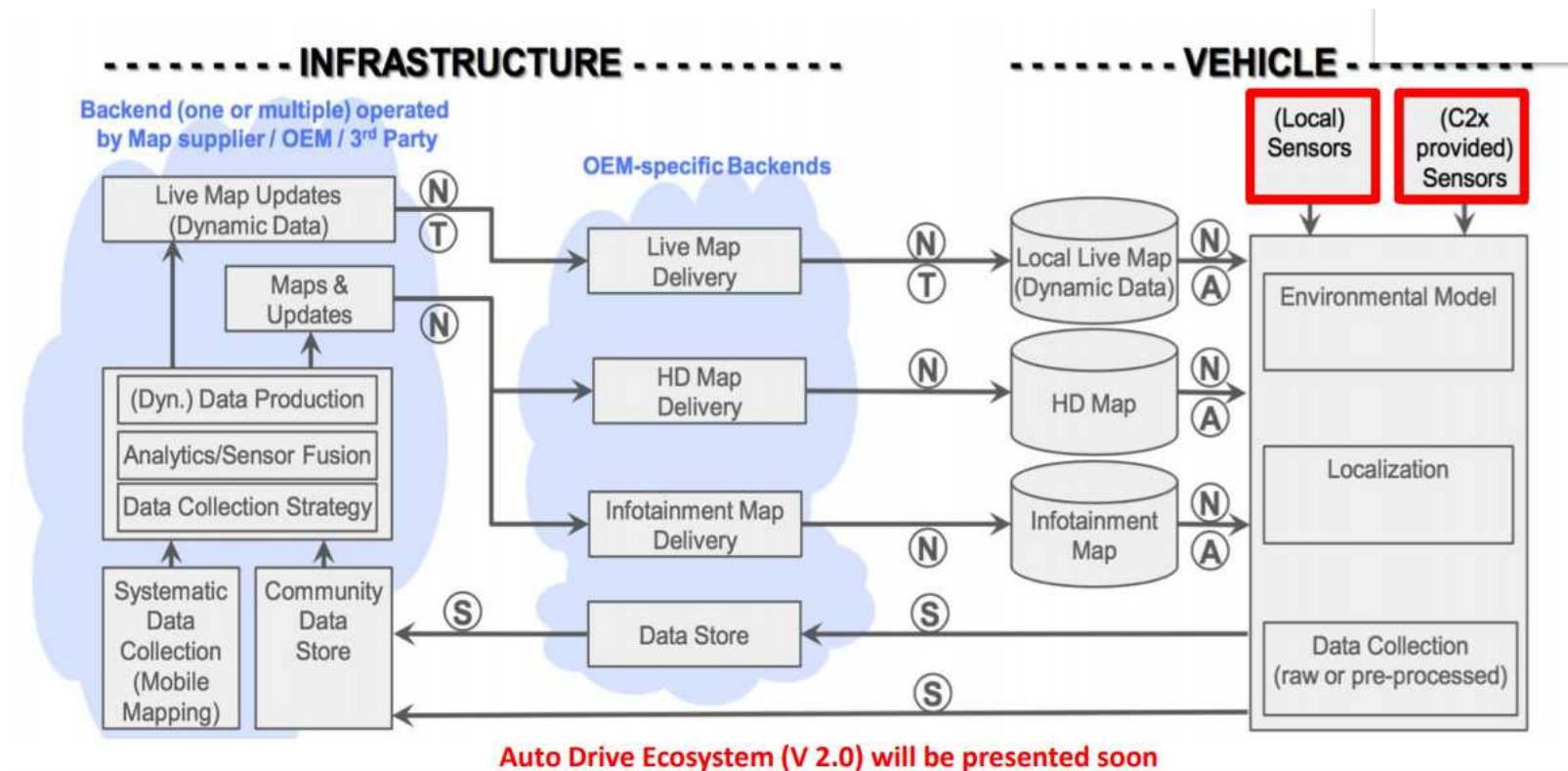


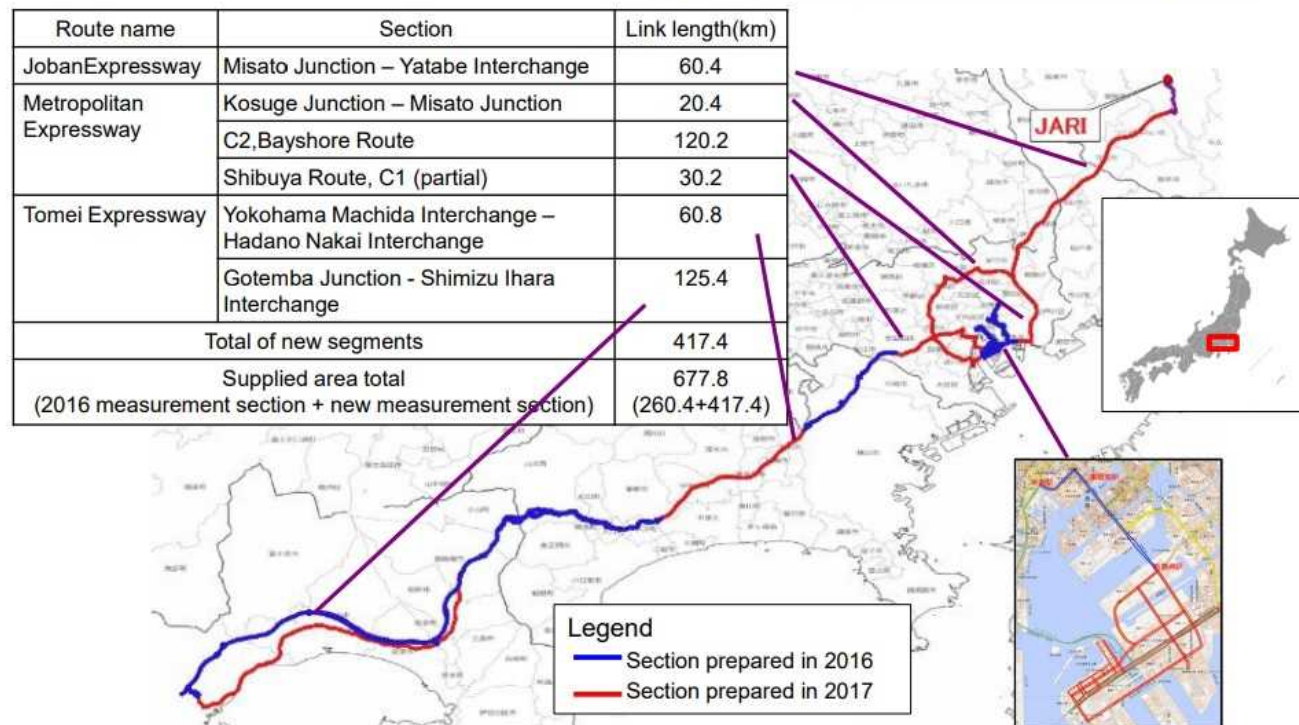
Figure: Auto Drive Ecosystem by OADF

Source : Dr. Volker Sasse, SIP-adus Work Shop2017, November 2017

Research Item ① : Investigation of Dynamic Maps [Domestic Initiatives]

- So far with regard to dynamic maps, SIP-adus has created documents defining requirements (proposed) and specifications for basic map data and production (proposed).
- It has also created prototypes of high-accuracy 3-dimensional maps and conducted field operation tests.
- As of December 2017, it has provided data for part of local roads and expressways.

about 677km in each direction



Source: Excerpted from Cabinet Office press release (November 15, 2016)

Figure: Scheduled Test Area

Source : Mr. Yoshiaki Tsuda, MITSUBISHI ELECTRIC CORPORATION, SIP-adus Work Shop2017, November 2017

Research Item ① : Investigation of Dynamic Maps [International Initiatives]

- Under TC 204, the technical committee for ITS standardization within the ISO, WG3 is working on the standardization of geospatial information and related matters with ITS database technology at the core.
- It defines the relationship between semi-static/semi-dynamic data and static data for dynamic maps, and the logical data model that includes the 3 types of data (static, semi-static, and semi-dynamic) is PWI approved.
- Besides the logical data model, there is current deliberation that aims for ISO publication of geographic data file GDF5.1 (CD 20524-1, NP 20524-2) and lane-level location referencing (NP 17572-4).

PWI 22726のスコープ

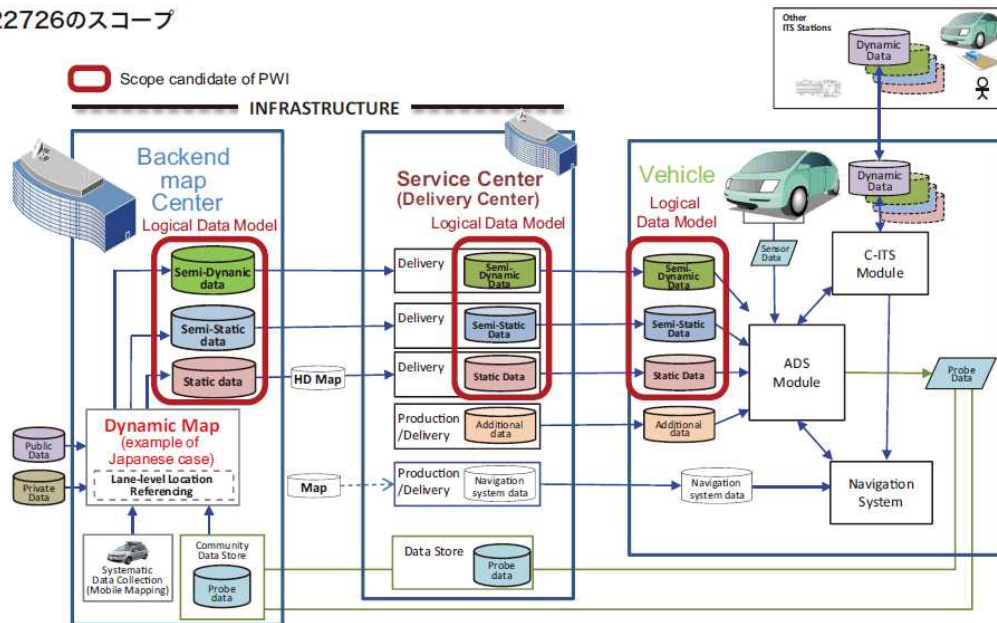


Figure: Scope of PWI22726

WG3全ワークアイテム関連図

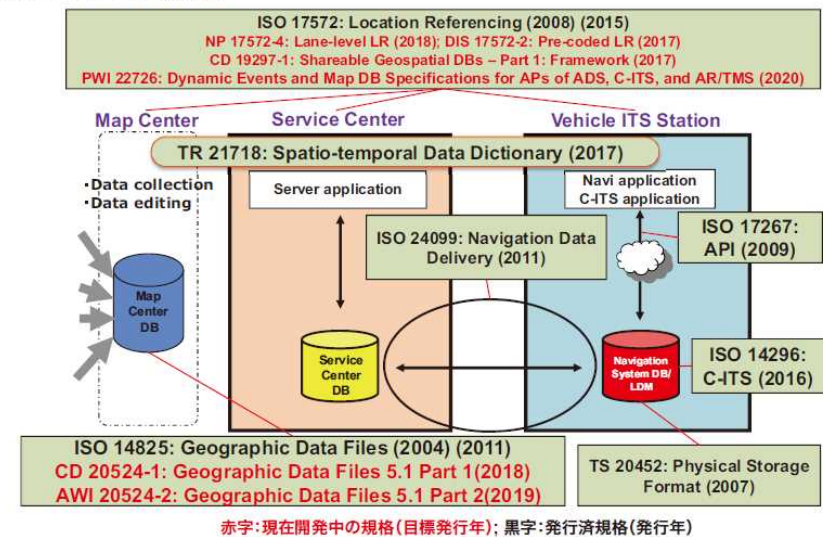
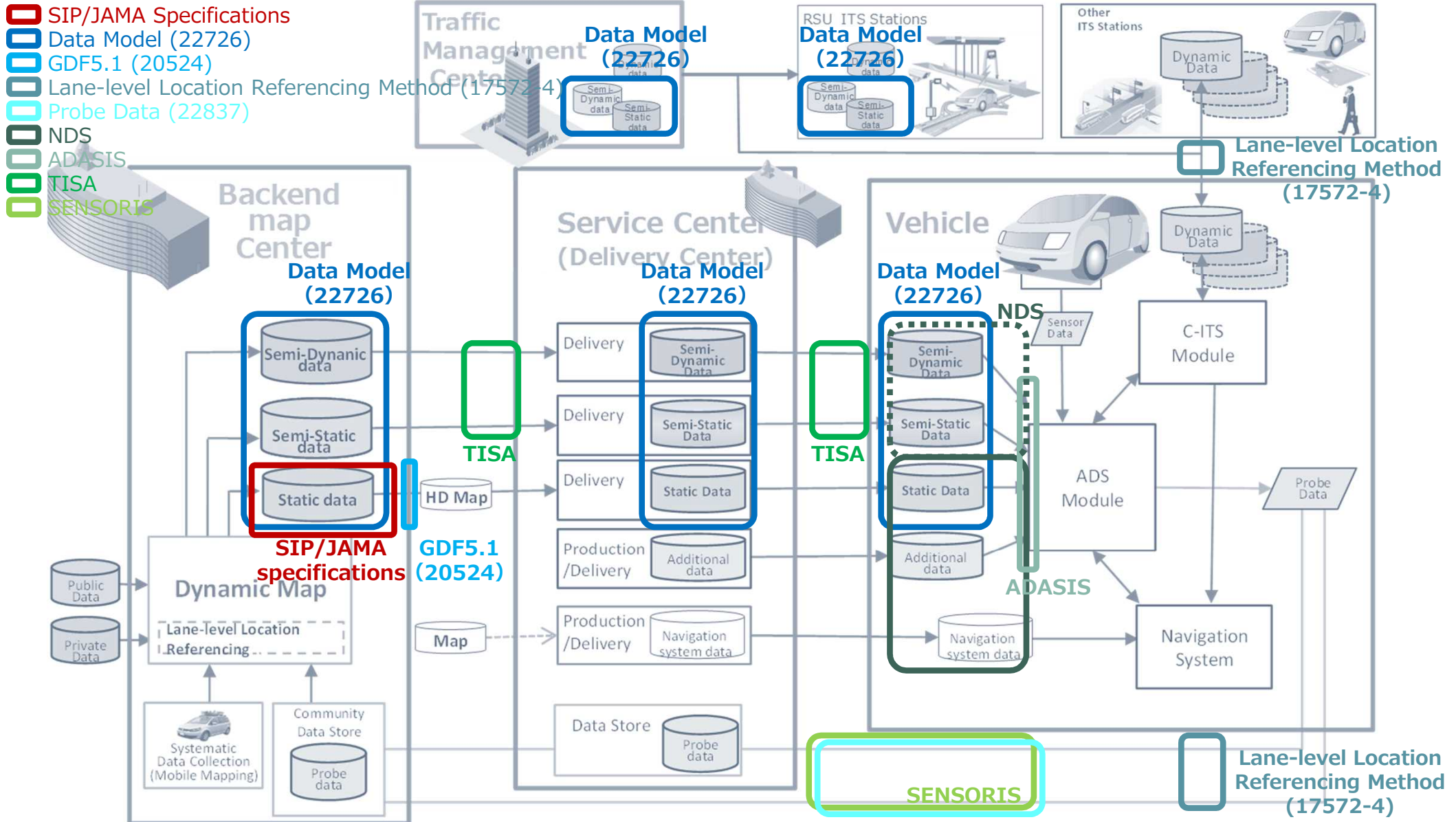


Figure: Relationship Diagram for WG3 Work Items

Source : ITS Standardization 2017, Society of Automotive Engineers of Japan, October 2017

Research Item ① : Investigation of Dynamic Maps [summary]

Domestic and international activities related to dynamic maps are organized below.



Research Item ② : Participation at Conferences Hosted by Relevant Organizations [Overseas Conferences]

The investigation disseminated information regarding the current state in Japan and sought out cooperative partnerships with appropriate organizations through participation in conferences like OADF and information exchange with relevant parties.

Table: Participation in Conferences Hosted by Relevant Organizations

Conference	Date	Location	Conference Summary
8 th OADF	November 13, 2017	Tokyo, Japan	<ul style="list-style-type: none"> • Presentation of current state of SIP-adus <ul style="list-style-type: none"> - Welcome Speech by Mr. Fukushima Overview of SIP and description of items being considered with regard to automated driving systems - Keynote Speech by Mr. Ozawa, Dynamic Map Platform Co., Ltd. Presentation of the current situation regarding the maintenance of high-accuracy 3D map data at DMP and initiatives for map data maintenance updates - SIP-adus Presentation by Dr. Nakajo, University of Tokyo Presentation of verification experiment objectives, test items, distribution data (data items) and overview of data maintenance routes, promotion of automated driving, program participants, and schedule • Agreement to continue cooperation with SIP-adus
9 th OADF	March 6, 2018	Budapest, Hungary	<ul style="list-style-type: none"> • Presentation of the current situation of SIP-adus in concert with the report from European counterparts • Agreement to periodically share their nation's recent developments with respect to automated driving

Research Item ② : Participation at Conferences Hosted by Relevant Organizations [Domestic Conferences]

A major objective of information sharing within Japan is to unify the direction of all domestic standardization activity through debate, modification, and cooperation. Accordingly, a consortium of individuals from academia, the automotive industry, and related fields called the Dynamic Map Standardizing Strategy Initiative was established.

Table: Dynamic Map Standardizing Strategy Initiative Schedule

Conference	Date
1 st Meeting	January 15, 2018
2 nd Meeting	February 22, 2018
3 rd Meeting	March 22, 2018