SiP

SiP 戦略的イノベーション創造プログラム
Cross-ministerial Strategic Innovation Promotion Program

Cross-ministerial Strategic Innovation Promotion Program. The third phase of the SIP/ Establishment of smart mobility platform / 「Realization of Shared Space through Digital Smart Mobility 」

March 2026

Tsukuba Smart City Consortium
University of Tsukuba(Lead organization)
Tokio Marine & Nichido Fire Insurance Co.,Ltd.
NIPPON KOEI
NEC Corporation
KDDI CORPORATION

Realization of Shared Space through Digital Smart Mobility

Proposed by: University of Tsukuba (Lead Institution), Tokio Marine & Nichido Fire Insurance Co.,Ltd.
NIPPON KOEI, NEC Corporation, KDDI, Mitsubishi Electric

Demonstration Site Cooperation: Tsukuba

②School Route Safety Inspection Support
(Traffic Safety Measures)

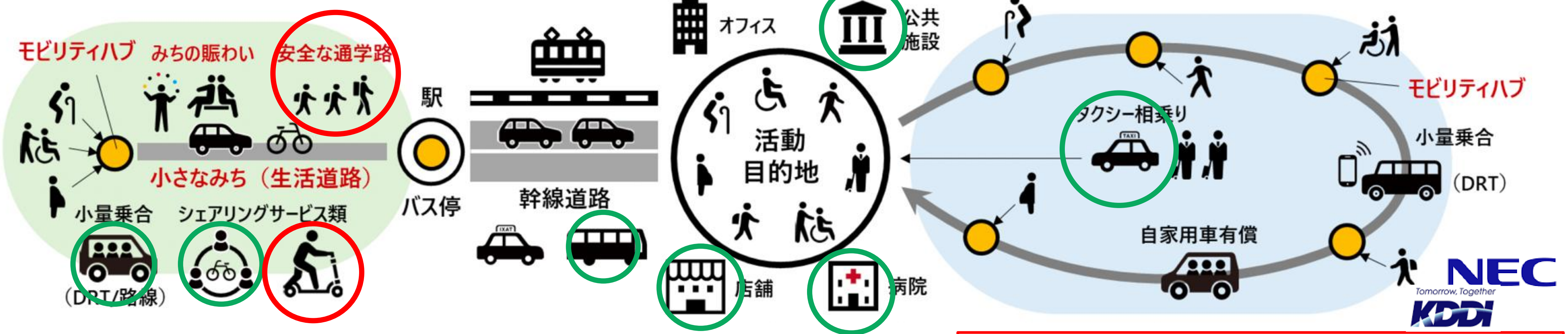
東京海上日動
NIPPON KOEI

SIP つくばスマートシティコンソ

つくば市 CITY OF TSUKUBA

【Metropolitan areas, suburban areas】

【Rural/mountainous areas】



NEC
KDDI

①Personal Mobility Research
Addressing the Mobility Divide

筑波大学 University of Tsukuba
MITSUBISHI ELECTRIC Changes for the Better

Tsukuba City
Data Integration Platform

③TF collaborative Model:
Systematization of **JMDS** and Demonstration Experiments

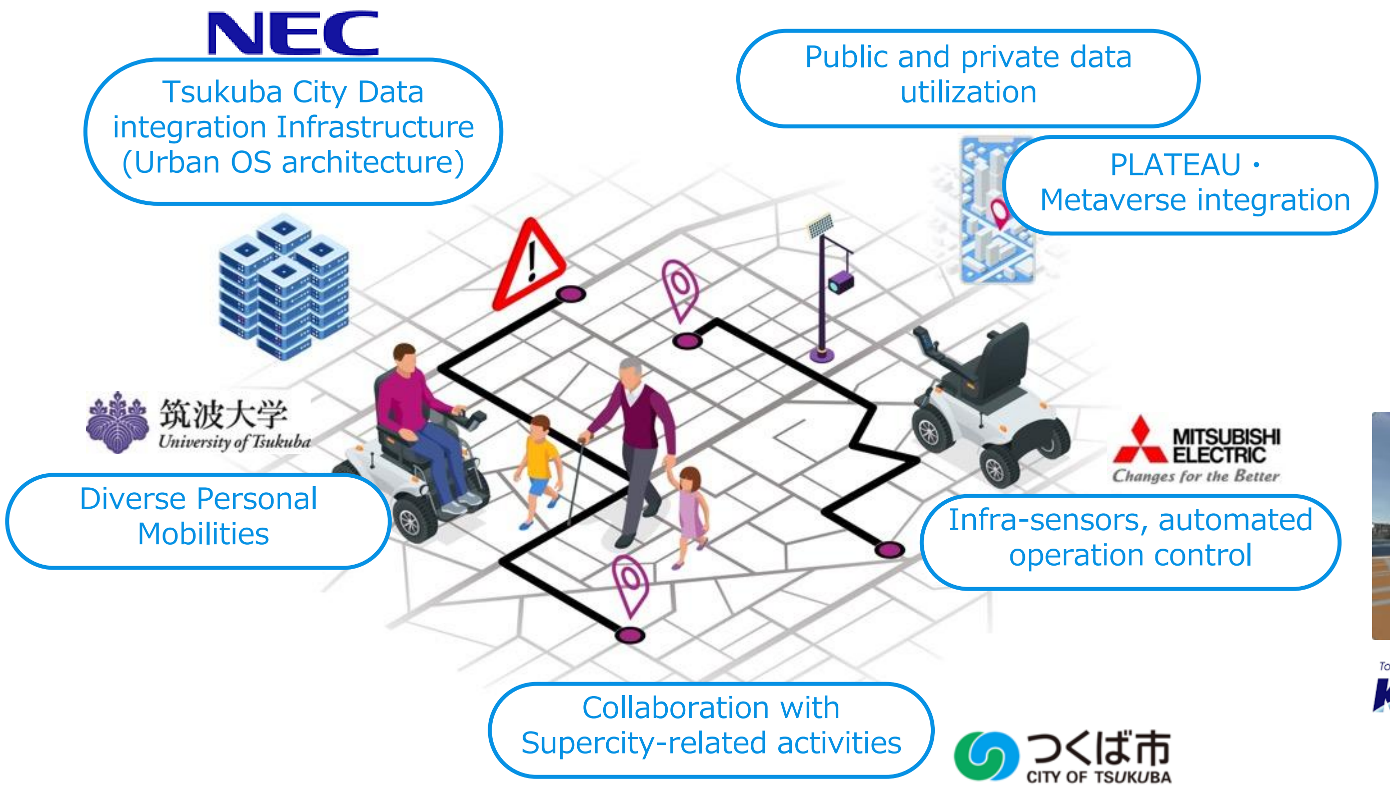
東京海上日動
NIPPON KOEI
⑦ Establishment of a safe and secure area management method for living roads

NEC
⑨ “Mobility Data Space” in which data platforms are linked in a decentralized federal manner in order to contribute to smart mobility.

Tomorrow, Together KDDI
⑪ 3D visualization considering the different management platforms of next-generation mobilities

筑波大学 University of Tsukuba
⑫ Re-design of diverse personal mobility and infra-structure integration

MITSUBISHI ELECTRIC Changes for the Better
⑬ Infrastructure integrated mobility platform to support automated driving from various sensors and open data

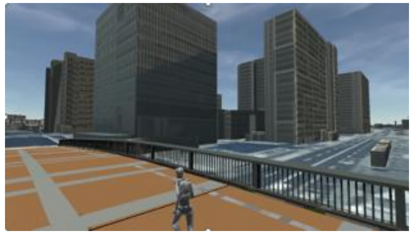


Identification of hazardous locations using AI and private data

Identification of hazardous locations through joint inspections of school routes

東京海上日動

NIPPON KOEI



Tomorrow, Together KDDI

People moving through a city in the PLATEAU urban model

Realization of shared spaces

Implementation in society ① : **Sustainability of the community**

TF1： Proposing sustainable mobility services and implementing them nationwide (to address the mobility divide)

Implementation in society ② : **Human life**

TF2： Proposing and implementing broad-based infrastructure for safe, comfortable, and lively cities (traffic safety measures)

⑦Establishment of a safe and secure area management method for living roads(⑦-1、⑦-4)

Tokio Marine & Nichido Fire Insurance Co.,Ltd.

NIPPON KOEI

⑦ Creating safe, secure and vibrant street spaces and transport systems (⑦-1, ⑦-4)

SIP Goals

SIP
東京海上日動
NIPPON KOEI

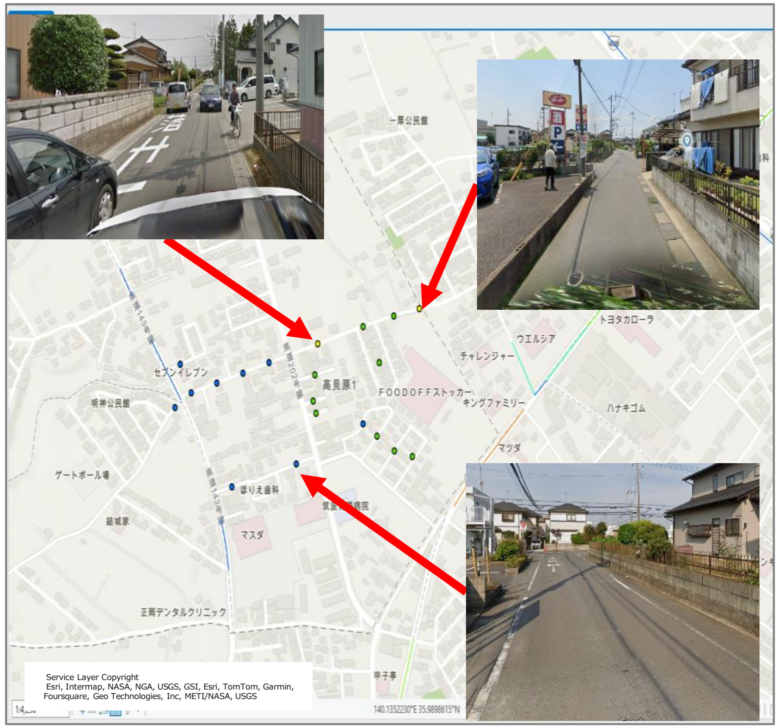
Objectives

- Establishment of a replicable ‘area management approach for safety and security on local roads’

Realisation of safe, secure and vibrant street spaces through a bottom-up approach

- By identifying hazardous locations using AI risk scores and through school route inspections, we will address accident risks from both a vehicle and pedestrian perspective. Through participatory measures involving schools and students to tackle accident-prone areas within the district, we aim to create safe, secure and vibrant road spaces.

Identification of hazardous locations using AI risk scores



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Identification of hazardous locations through joint inspections of school routes

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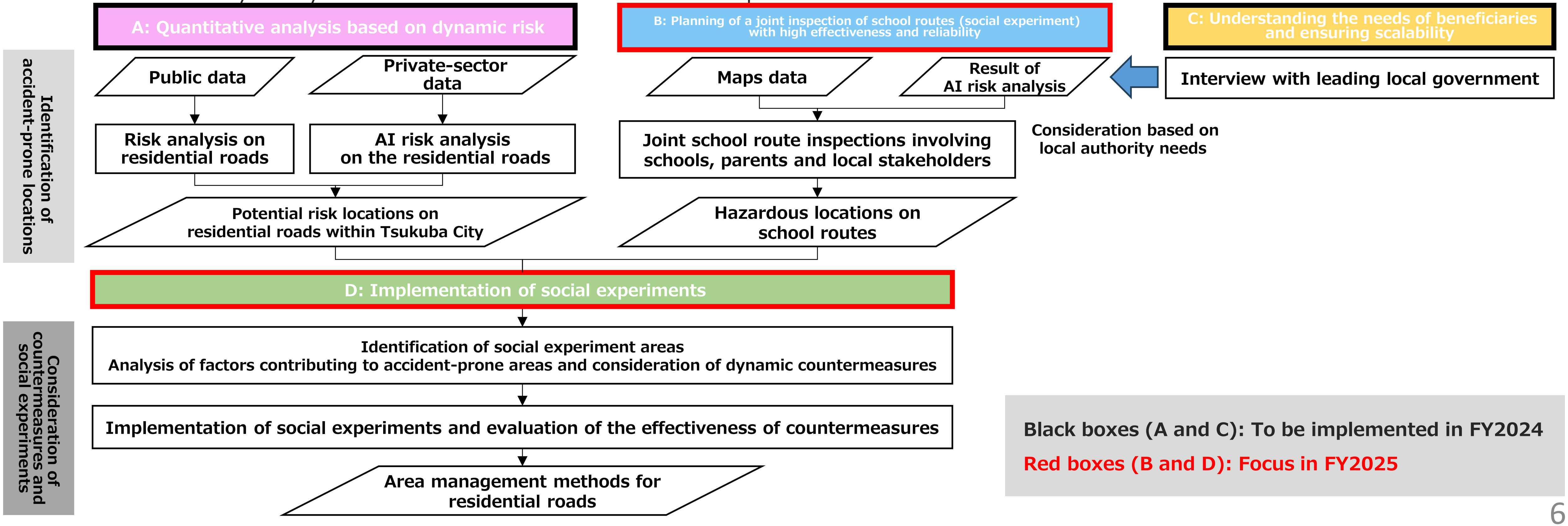
A safe, secure and vibrant road environment

⑦ Creating safe, secure and vibrant street spaces and transport systems (⑦-1, ⑦-4)

Overall Project Objectives / Policy Objectives for this Project

- **Research and Development Objectives** | Aiming to establish 'safe and secure area management methods for local roads' that can be rolled out across the region
- **Overview of Research and Development** | See figure below
- **Target Policy** | Identify potential risk points and dynamically fluctuating risks using dynamic risk analysis, and identify subjective hazard points identified through joint inspections of school routes. From both sources, identify conditions and locations where accident risks increase, and examine countermeasures that take into account not only safety improvement but also the creation of a vibrant atmosphere, whilst evaluating the effectiveness of accident risk reduction. Establish area management methods for residential roads that consider not only safety but also the creation of a vibrant atmosphere.



⑦ Creating safe, secure and vibrant street spaces and transport systems (⑦-1, ⑦-4)

Pilot Study of a School Route Inspection System [Overview]

東京海上日動 NIPPON KOEI

- In order to create safe and secure road environments, it is important not only to identify hazardous locations based on quantitative data, but also to identify such locations and consider countermeasures based on qualitative feedback from road users
- Although safety inspections of school routes are carried out annually, these have traditionally been paper-based; it is hoped that digitisation will enable these inspections to be conducted more efficiently and effectively
- A school route inspection system was developed, and a pilot study was conducted to verify whether it contributes to the streamlining and enhancement of the school route safety inspection system
- We invited primary, junior high and compulsory education schools in Tsukuba City to participate, and 17 schools took part (we promoted the system to schools by highlighting not only road safety but also the potential for improved operational efficiency).

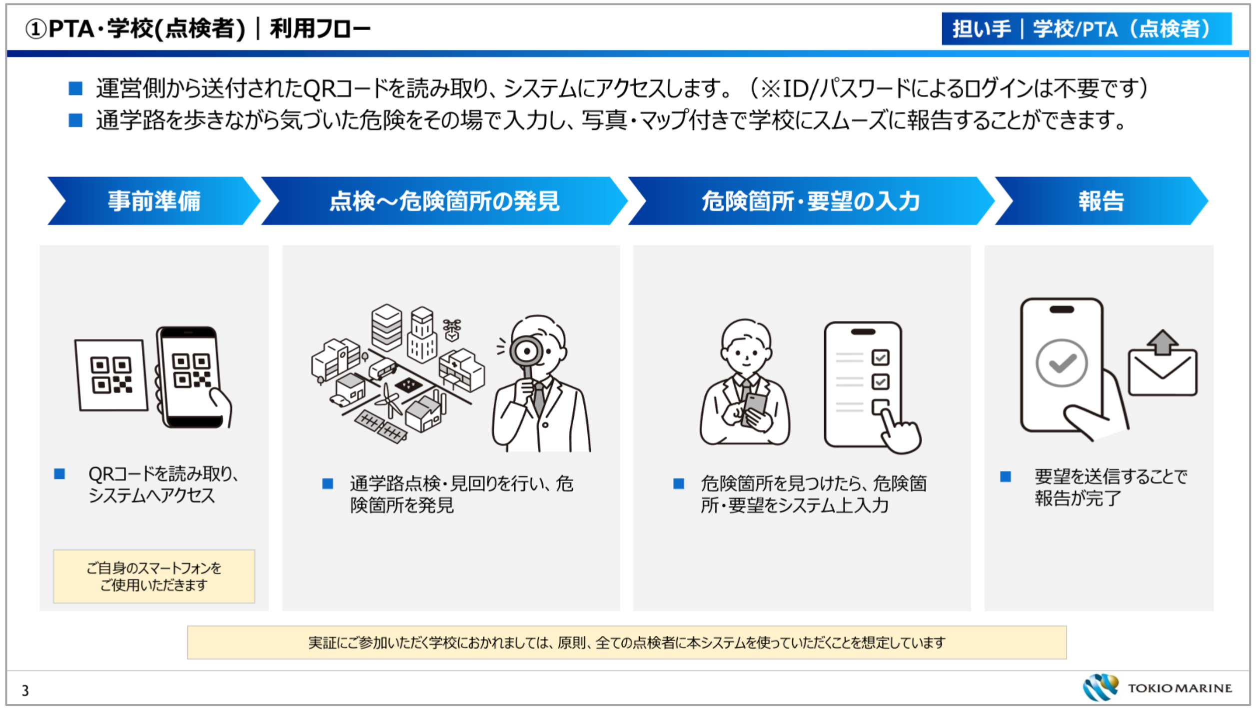
実証のお願い｜通学路安全点検における点検/要望作成/提出のデジタル化と危険地点情報の収集

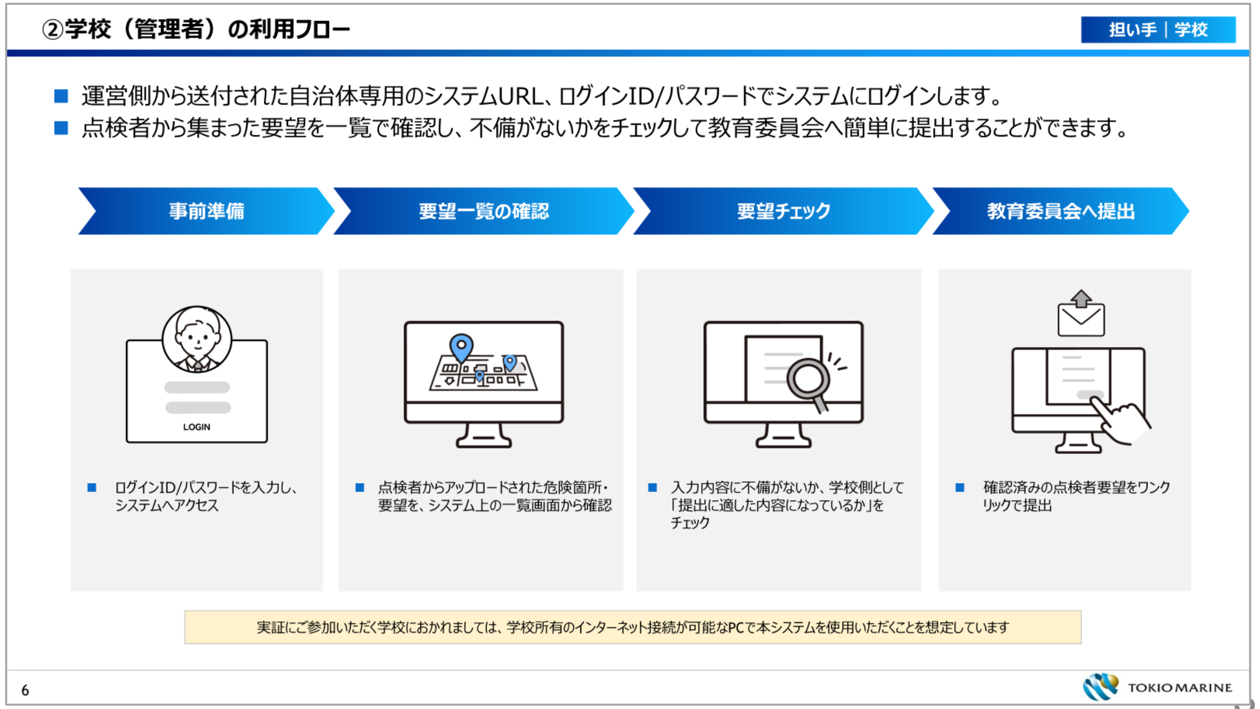
企画概要	■ 内閣府のプロジェクトにおいて、安心安全な道路空間の構築を目指した研究開発を推進しています ■ その中で、通学路安全点検(危険地点情報の収集)を効率的且つ効果的に実施するためのデジタルサービスを開発しました ■ 学校やPTAにおける業務負荷軽減に貢献しつつ危険地点情報を効率的に収集する方法を考えており、実証の企画をさせて頂きました
実証内容	■ 各学校へ以下ツールをご提供します ■ 安全点検・要望作成・教育委員会への提出までを実際に使っていただけますと幸いです ①点検システム｜スマートフォン・タブレットにて点検・要望作成に利用 ②管理システム｜PCにて要望確認・提出に利用 ■ 完了後にアンケートへのご入力をお願いいたします
実施フロー	■ 運営から各学校へツールをご利用頂くための情報＋アンケートをご提供します ①点検システム｜スマートフォン・タブレットから利用するための**QRコードとURL** ②管理システム｜PCにて利用するための**ID・パスワード(および利用規約)** ■ 後続スライドの利用マニュアル等もご確認の上、各プロセスをご対応頂きたく存じます
問合せ先	東京海上日動火災保険株式会社 部 担当 電話

1 TOKIO MARINE

⑦ Creating safe, secure and vibrant street spaces and transport systems (⑦-1, ⑦-4)
Pilot Study of a School Route Inspection System [Overview]

- The pilot trial was conducted between August and October 2025, followed by questionnaires and interviews.
- Two types of systems-a safety inspection system and a school management system-were distributed to participating schools for use.
- Inspection system: Teachers, parents and others use smartphones to report hazardous locations and requests for improvements
- Management System: School administrators review the hazardous locations and improvement requests submitted by inspectors, cross-reference them with AI-generated risk scores displayed on a digital map, narrow down the requests to be submitted to Tsukuba City, and then send them





⑦ Creation of Safe, Secure and Vibrant Road Spaces and Transport Systems (⑦-1, ⑦-4)

Pilot Test of the School Route Inspection System

[Summary of Verification Results]

東京海上日動 NIPPON KOEI

- The flowchart for identifying candidate locations for countermeasures, combining the results of quantitative identification of accident-prone spots based on dynamic risk with the results of qualitative identification of hazardous spots from joint school route inspections, is as follows.

<Flowchart: Identification of Accident-Prone Areas to Consideration of Countermeasures>

Identification of accident-prone locations

A: Quantitative analysis using dynamic risk

National Police agency accident data
↓
Accident Analysis
Analysis of Accidents
↓
School Routes Accident Locations

B: Planning of a joint inspection of school routes (social experiment) with high effectiveness and reliability

Map data / Result of AI risk analysis
↓
Based on
Joint inspection of school routes
↓
Hazardous locations on school routes

Selection of areas

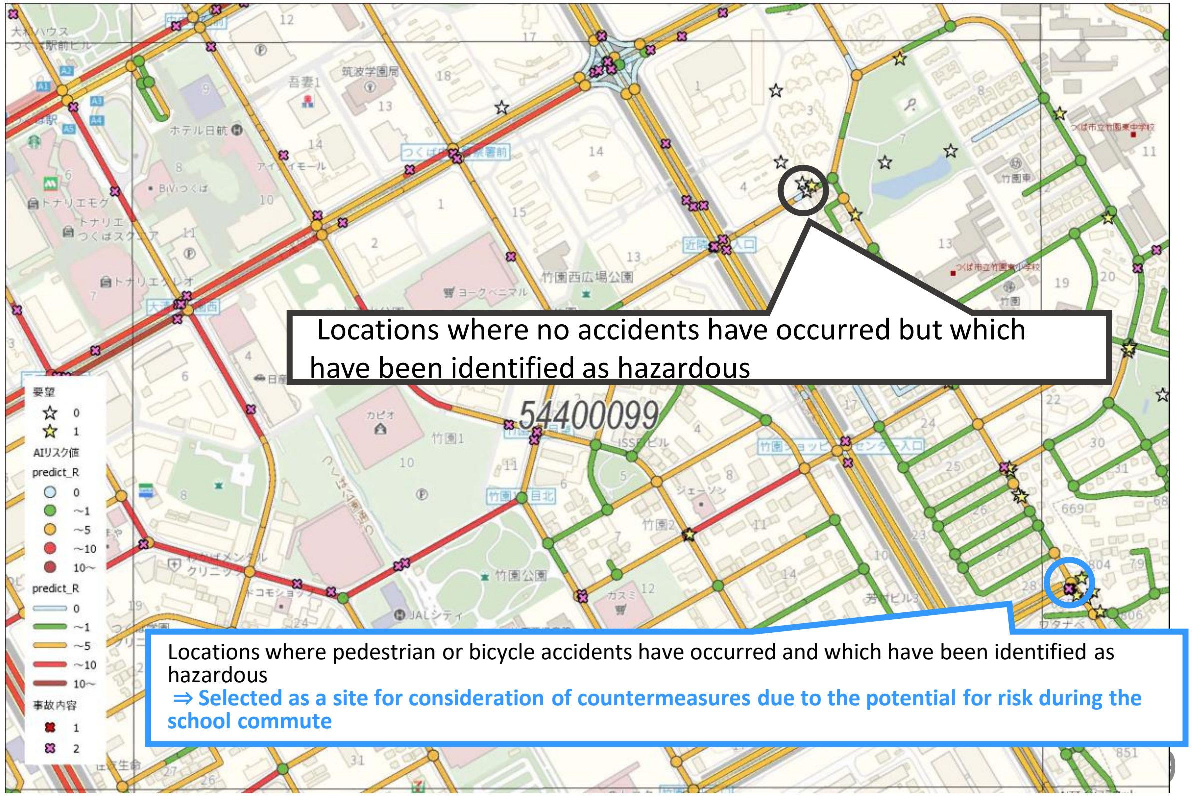
↓ (A and B)
Selection of Areas for Countermeasure Consideration
↓

Consideration of countermeasures

Analysis of factors contributing to accident-prone areas and consideration of countermeasures

Item	Content
Identification of accident-prone areas	• Accident-prone locations are identified based on the combined scores of ranked accident counts, AI risk, and inspection results. * Target areas: 1-km meshes with inspection data within 1 km of participating schools.
Site selection	• Based on accident details and inspection results, locations where school-commute accident risks are evident and identified as hazardous were selected for further consideration of countermeasures.
Measure consideration	• Countermeasures are considered based on accident details, AI risk value parameters and inspection results

<Overlay of accident details and inspection results (example)>



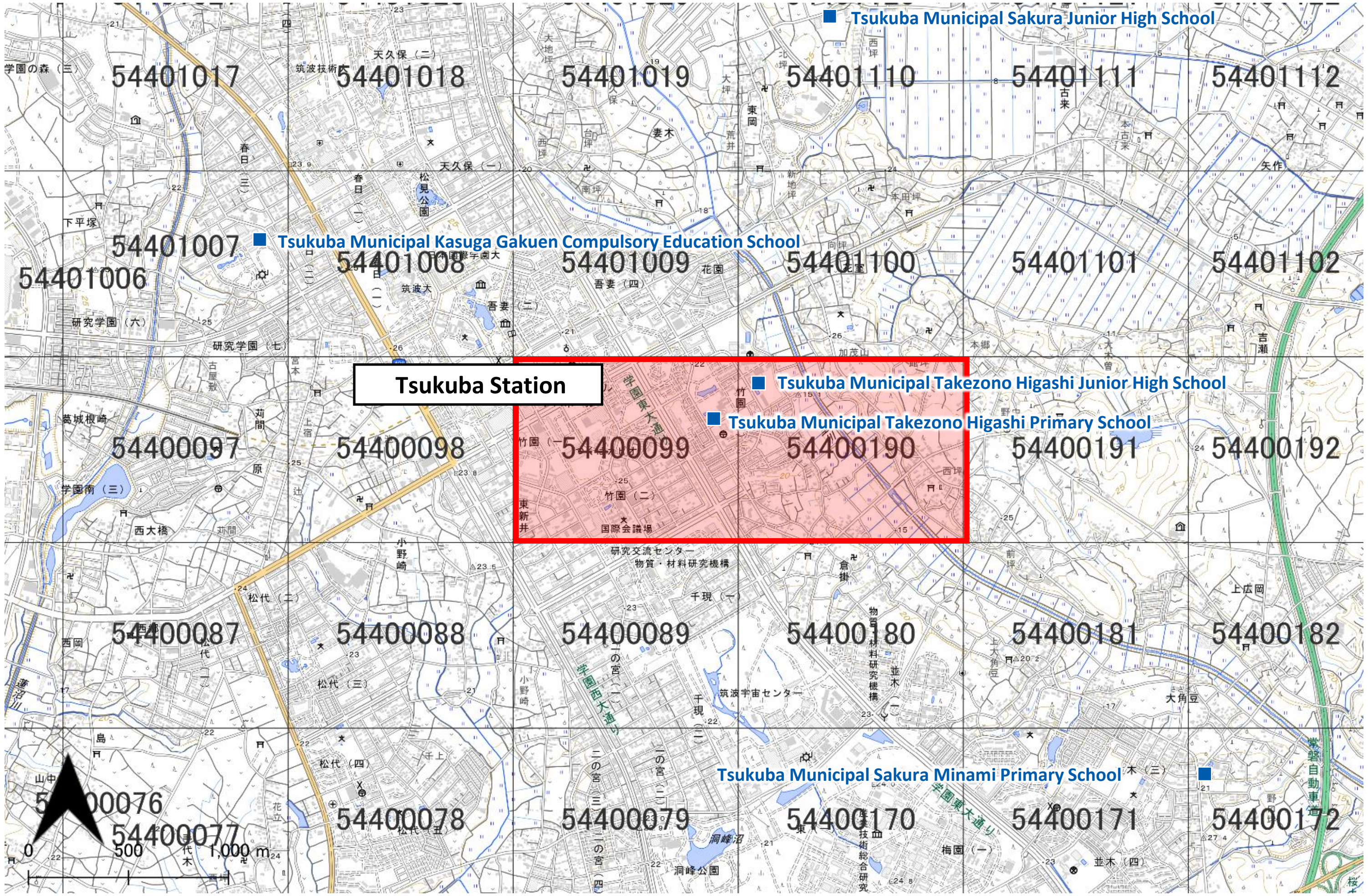
⑦ Creation of Safe, Secure and Vibrant Road Spaces and Transport Systems (⑦-1, ⑦-4)

Pilot Test of the School Route Inspection System

[Summary of Verification Results]

◆ Meshes identified as potential accident-prone areas were selected based on the number of requests received in the inspection results

<Extracted Accident-Prone Locations>



Mesh Code	Inspection Results Number of requests	Number of Accidents Total for 2022–2024
54400099	21	47
54400190	20	9
54400016	10	9
54401009	8	35
54401064	7	1
54401065	6	3
54400069	5	6
54400035	4	16
54400045	4	11
53407078	3	2
54400036	3	13
54400062	3	0
54401023	3	7
54401036	3	4
53407087	2	1
54400046	2	27
54400055	2	2
54400076	2	7
54001011	2	2
54401029	2	3
54401032	2	2
54401100	2	22

⑦ Creation of Safe, Secure and Vibrant Road Spaces and Transport Systems (⑦-1, ⑦-4)
Pilot Test of the School Route Inspection System
[Summary of Verification Results]

◆ Results of the Selection of Areas for Measures

<Location Map of Areas Under Review>

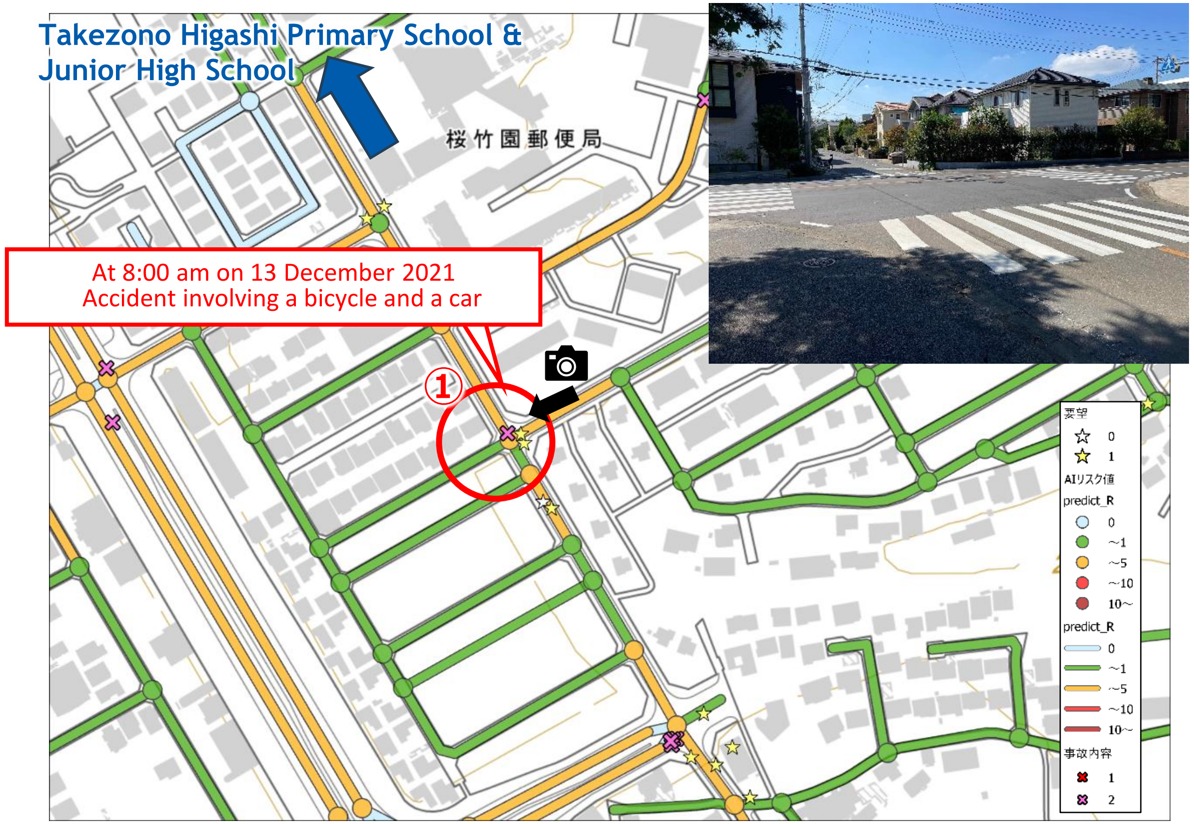
<Accidents, AI Risk Values and Inspection Results>

No	Details of the Accident	AI Risk Score	Inspection Results (Recommendations)
①	• A collision involving a bicycle occurred in 2021	5 or fewer	• There is heavy pedestrian and bicycle traffic, as well as high vehicle volume, during the morning school run (installation of traffic lights) • Pedestrians, cyclists and motorists cross paths, posing a risk of collision (Installation of a dedicated cycle lane)
②	• A bicycle accident occurred in 2023 • Accidents involving pedestrians occurred in 2024	5 or fewer	• There are many vehicles turning right and left at T-junctions, making it feel dangerous to cross at the pedestrian crossing (Installation of crossing flags) • Many people bypass the red light and cross via the road on the residential side. Particularly in the mornings, there are many cyclists travelling at high speed, and I have witnessed several instances where schoolchildren were in danger (Ensure people use the pedestrian crossing and obey traffic signals)
③	• Bicycle accidents occurred in 2023	Less than one	• Primary school pupils crossing the pedestrian crossing are difficult to see, posing a high risk of them darting out (Raising awareness among children; felling of trees)

⑦ Creation of Safe, Secure and Vibrant Road Spaces and Transport Systems (⑦-1, ⑦-4)
Pilot Test of the School Route Inspection System
[Summary of Verification Results]

- According to National Police Agency accident data, one bicycle accident occurred during the morning period.
- AI risk analysis indicates that, as the daytime population on weekdays contributes relatively significantly, pedestrians during school commuting hours may be influencing the risk of accidents.
- The inspection results highlighted comments such as ‘there is heavy foot traffic of primary school pupils on their way to school in the morning’ and ‘it is dangerous as pedestrians, cyclists and cars are intermingling’.
- Based on the above analysis, it was confirmed that accident risks during school commuting hours are consistent.

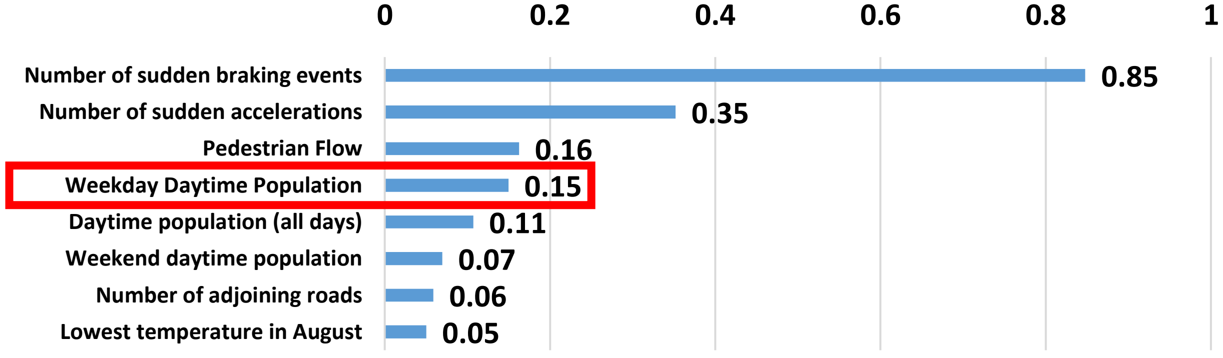
<Map showing locations under consideration for measures>



<Accidents, AI Risk Values and Inspection Results>

No	Details of the incident	AI Risk Score	Inspection Results (Recommendations)
①	A collision involving a bicycle occurred in 2021	Sudden braking was the most significant contributing factor, whilst sudden acceleration and pedestrian-related parameters were relatively high	• There is heavy pedestrian traffic of primary school children and high traffic volume during the morning school run (installation of traffic lights) • Pedestrians, cyclists and motorists cross paths, creating a risk of collision (Installation of dedicated cycle lanes)

Analysis results for AI risk scores



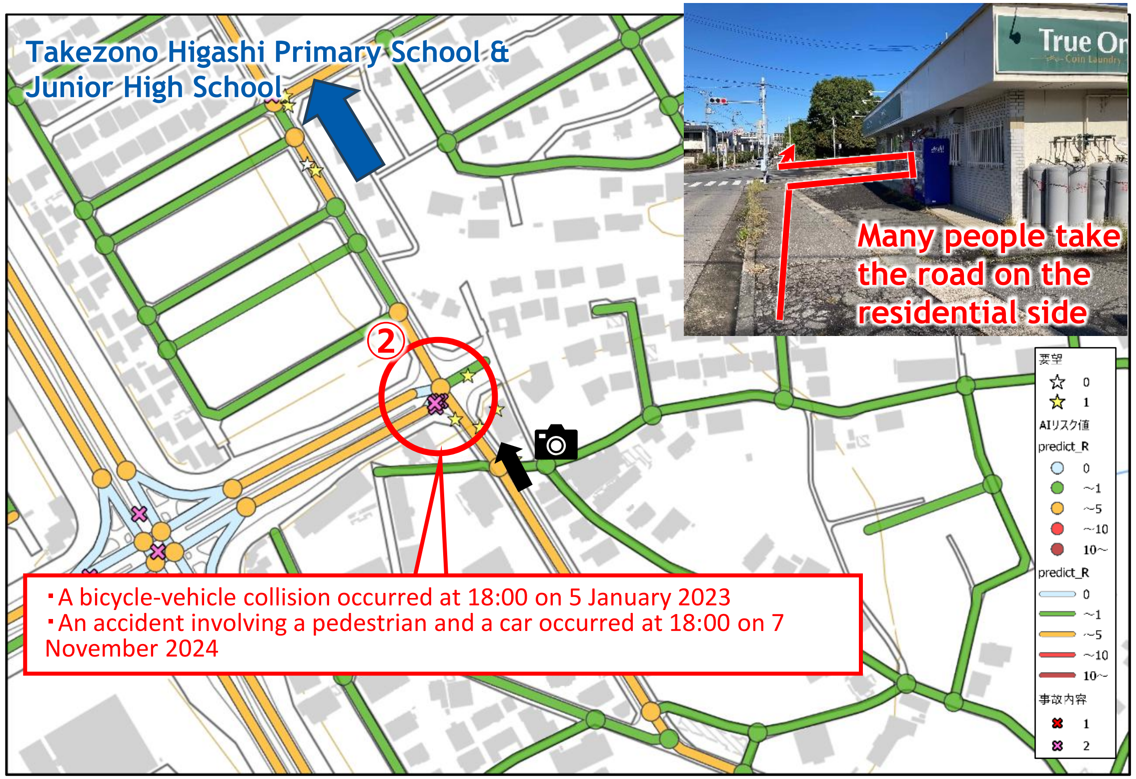
⑦ Creation of Safe, Secure and Vibrant Road Spaces and Transport Systems (⑦-1, ⑦-4)

Pilot Test of the School Route Inspection System

[Summary of Verification Results]

- According to National Police Agency accident data, there has been one bicycle accident and one pedestrian accident each during the night.
- AI risk analysis indicates that the presence or absence of traffic lights has a relatively high influence, suggesting that behaviour around the junction is linked to accident risk.
- Inspection results revealed comments such as ‘it is dangerous to cross the pedestrian crossing due to the high volume of vehicles turning left or right’ and ‘there are many cyclists travelling at high speeds’.
- The inspection results also provided information regarding pedestrian movement patterns and behaviour—such as the fact that many people take the road on the residential side even when the traffic light is red—which cannot be captured by risk analysis.

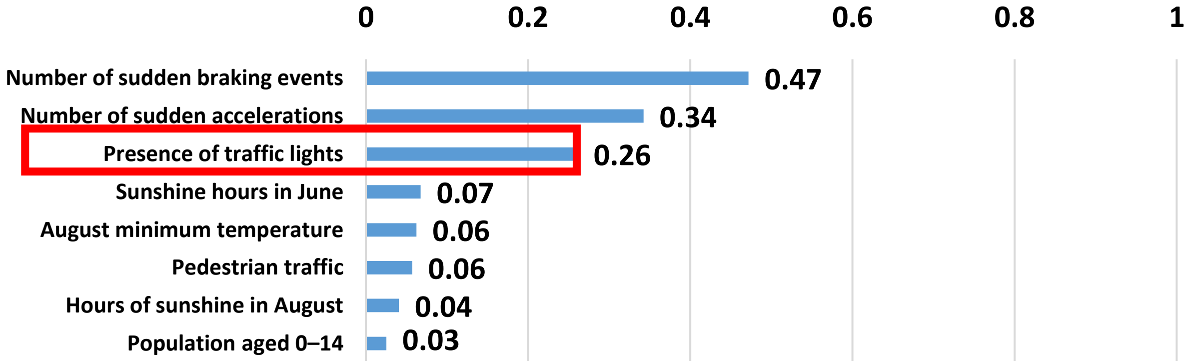
<Map showing locations under review>



<Accidents, AI Risk Values and Inspection Results>

No	Details of Incident	AI Risk Value	Inspection Results (Recommendations)
②	• A collision involving a bicycle occurred in 2023 • Pedestrian accident occurred in 2024	• Sudden braking is the most significant factor, followed by sudden acceleration and the presence or absence of traffic lights • The population aged 0–14 contributes	• There are many vehicles turning right and left at T-junctions, making it feel dangerous to cross at pedestrian crossings (installation of crossing flags) • Many people turn onto the road on the residential side to cross, even when the traffic light is red. Particularly in the mornings, there are many fast-moving bicycles, and I have witnessed several instances where children on their way to school were in danger

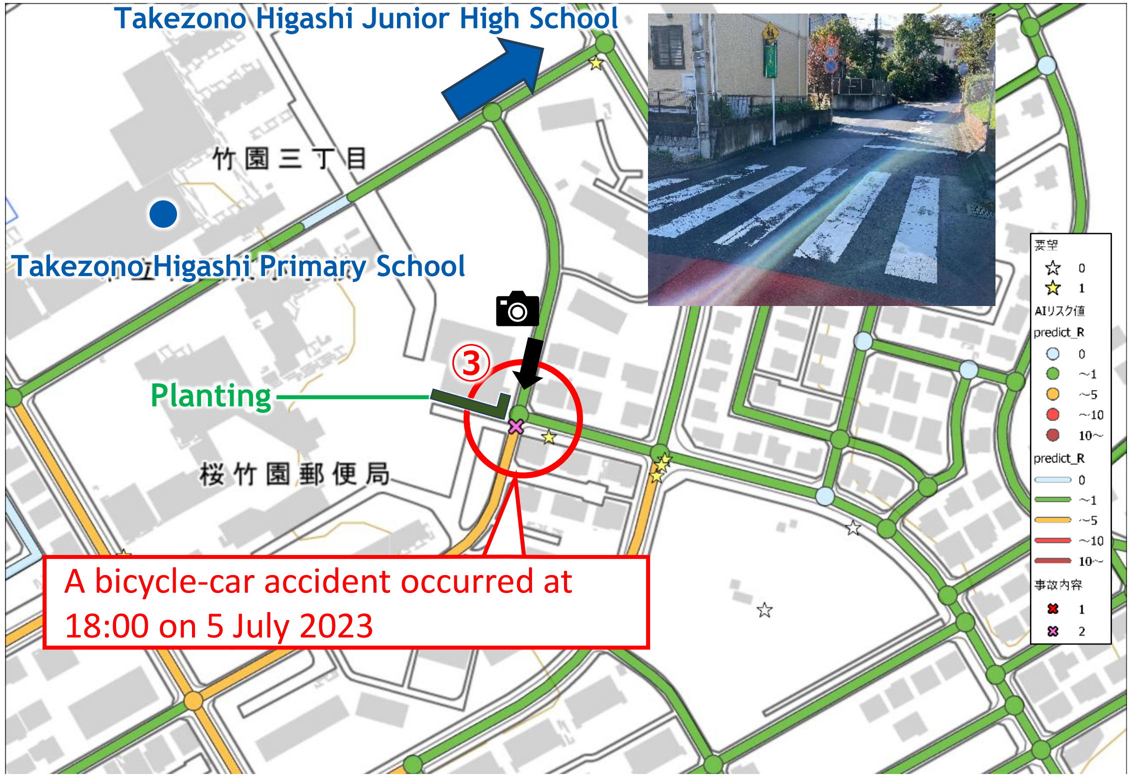
Analysis results for AI risk scores



⑦ Creation of Safe, Secure and Vibrant Road Spaces and Transport Systems (⑦-1, ⑦-4)
Pilot Test of the School Route Inspection System
[Summary of Verification Results]

- According to National Police Agency accident data, one bicycle accident has occurred at night.
- The contribution of AI risk analysis was generally low, suggesting that this may not be a specific risk factor, or that the risk cannot be expressed in numerical terms.
- Inspection results revealed comments such as ‘primary school pupils crossing the pedestrian crossing are difficult to see’.
- Although information regarding visibility—such as the difficulty in seeing primary school pupils—needs to be obtained using 3D data, the cost of processing such data is high and it cannot be expressed through AI risk analysis; therefore, the ability to gather visibility-related risks from the inspection results is useful.

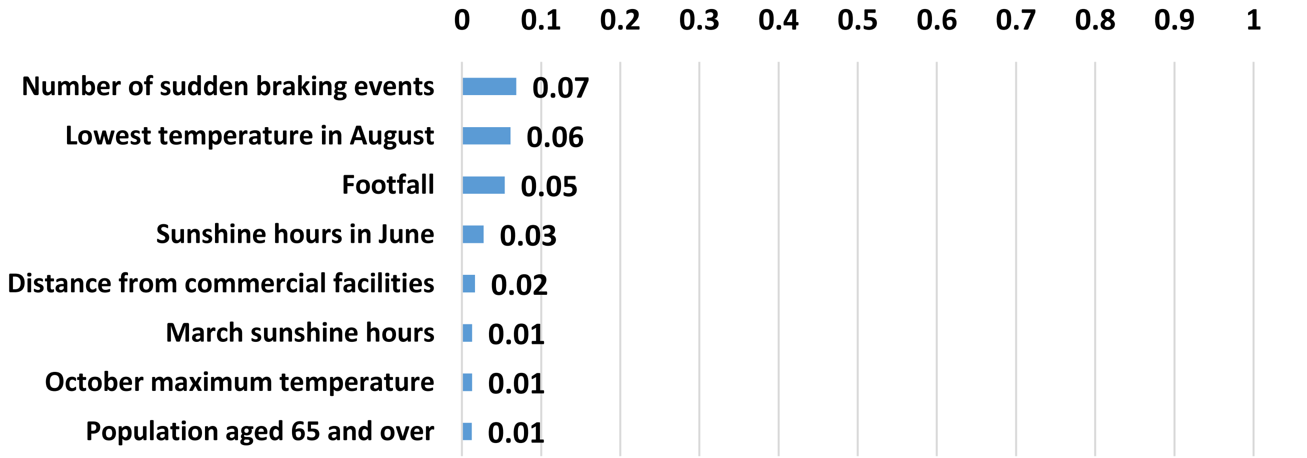
<Map showing locations under review for measures>



<Accidents, AI Risk Values, Inspection Results>

No	Accident Details	AI Risk Value	Inspection Results (Recommendations)
③	A collision involving a bicycle occurred in 2023	Overall low risk contribution	Primary school pupils crossing the pedestrian crossing are difficult to see, posing a high risk of them darting out (Raising awareness among children; tree felling)

Analysis results for AI risk scores



⑦ Creation of Safe, Secure and Vibrant Road Spaces and Transport Systems (⑦-1, ⑦-4)
Pilot Test of the School Route Inspection System
[Summary of Findings (Questionnaire)]

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- The questionnaire survey results confirmed that the inspection system was effective in reducing workload and was rated as intuitive and user-friendly. A majority of respondents stated that digitisation enabled them to report the status of hazardous areas in greater detail, contributing to the more sophisticated identification of such areas.
- The management system also demonstrated benefits in terms of reducing the workload. Many respondents noted that it had become easier to grasp the status of hazardous areas, and that this led to increased trust in schools and local authorities.

Questionnaire items for the inspection system (for inspecting parents/guardians)

Purpose of the evaluation	Scope of the evaluation	Survey questions
Has digitisation led to greater efficiency and reduced workload in school route safety inspections?	Effect on reducing workload	• A majority of respondents reported **that the effort required for recording has decreased** • **The proportion** of respondents stating that the time taken for recording **was 'less than 1 minute' or '1 to less than 5 minutes' has increased**
	Ease of use	• A majority rated it as **intuitive and easy** to **use** • Over half of respondents reported that **they were able to start using the system smoothly without any special instructions**
Has digitisation made it easier to report and identify hazardous areas?	Enhanced information	• Over half of respondents reported that **they were able to provide more detailed reports on the status of hazardous areas**
Is the system one that users would like to continue using?	Intention to use	• **Approximately 70%** of respondents would **recommend rolling out the system to other schools** • A majority of respondents stated they would like to continue using the system

Questionnaire items for the management system (for teachers and other school staff)

Purpose of the Verification	Verification Content	Survey Questions
Has digitisation led to greater efficiency and labour savings in school route safety inspections?	Effect of reduced workload	• The majority of respondents reported that **information sharing has become faster** • **Over 70%** of respondents reported that the time required for **compiling** data and reporting to the Board of Education **had been 'reduced by more than 50%'**
	Ease of use	• The majority of respondents reported that the system **was easy to understand and** that they **could easily access the necessary information**
Has digitisation made it easier to report and identify hazardous areas?	Enhanced information	• The majority of respondents felt that it was **easier to grasp the situation regarding hazardous areas in greater detail** • A majority of respondents felt that this had **led to greater peace of mind for parents and increased trust in schools and local authorities**
Is the system one that users would like to continue using?	Intentions to use	• Approximately 80% of respondents would **recommend rolling out the system to other schools and local authorities**. • The majority of respondents stated they would like to continue using the system

⑦ Creation of Safe, Secure and Vibrant Road Spaces and Transport Systems (⑦-1, ⑦-4)

Pilot Test of the School Route Inspection System

[Summary of Verification Results (Interviews)]

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NIPPON KOEI

- Interviews were conducted with primary and secondary schools that participated in the pilot scheme. It was confirmed that the school route safety inspections prioritise the risk of traffic accidents above all else. The ability of the school route safety inspection system to present risk analysis results proved effective in facilitating objective judgements and prioritisation.
- Opinions were expressed that it is easier to consider requests when options for countermeasures, along with their feasibility and effectiveness, are presented.
- It was suggested that having requested locations and countermeasure details stored within the school route inspection system would be useful during handover procedures.

Purpose of the verification	Verification Items	Summary
What are the key points for identifying hazards when conducting school route inspections?	Key considerations when identifying areas perceived as hazardous along school routes	**Risks of collisions between vehicles and children, roads with heavy traffic, areas with poor visibility, junctions without traffic lights,** and **locations with narrow pavements** are recognised as hazardous. **The safety of children travelling to school by bicycle** is also a key concern. It is considered important to identify **hazardous** areas **from the perspective of the PTA, parents and pupils**.
	Items identified as hazardous by inspectors	**The risk of traffic accidents is the top priority. Priorities are determined** by considering **the level of danger, the number of children using the route,** and the **urgency** of the issue**.** The standard procedure involves gathering opinions **from each district**, discussing them, and submitting a report.
Has the school route inspection system made the identification of hazardous areas more efficient and sophisticated?	The impact of risk analysis results on inspectors	Objective data **clarifies the priority of hazardous areas and provides a basis for countermeasures**. Parents and the PTA gain **new** insights by conducting inspections whilst reviewing quantitative data.
Based on the results of the school route inspections, what measures would you like to see implemented?	Approach to countermeasures	As **the nature of the countermeasures varies depending on the type of hazard (e.g. speed, visibility, missing signs)**, **having options makes it easier to consider them**. It can sometimes be **unclear who is responsible or who to consult**. When considering measures, joint inspections with the city council and the police, as well as on-site surveys, are carried out.
Would creating a database of requested areas and proposed measures be effective?	Benefits of accumulating data on areas requiring attention and corrective measures	It is expected that **accumulating data on** areas requiring attention and corrective measures **will lead to more efficient and sophisticated inspections**. Having access to a history of past requests and measures makes it **easier to avoid duplication and manage progress**. This enables a sustainable approach, **even in the event of the PTA organisation shrinking or ceasing to exist**. **It is also effective for handing over information** to new teaching staff and parents.

⑦ Creating safe, secure and vibrant street spaces and transport systems (⑦-1, ⑦-4)
Pilot Scheme for a School Route Inspection System [Future Plans]

TOKIO MARINE NICHIDO 東京海上日動 NIPPON KOEI SiP

◆ Summary of Achievements for the Current Financial Year

- This financial year, we conducted a social experiment utilising a system designed for school route safety inspections, targeting primary and secondary schools in Tsukuba City. Based on the results of the social experiment, we conducted a review with a view to the social implementation of the school route safety inspection system.
- We conducted questionnaire surveys and interviews with the primary and secondary schools that participated in the pilot scheme.
    - The questionnaire survey confirmed that the system had led to greater efficiency and reduced workload in inspection tasks through digitalisation, and that it had enabled detailed reporting on the status of hazardous locations.
    - The interviews revealed that the risk of traffic accidents is given the highest priority during school route inspections, with priorities determined by considering factors such as the level of danger, the number of children using the route, and the urgency of the situation. It was confirmed that utilising objective data, such as AI risk scores, is beneficial as it clarifies the priority of hazardous locations and provides a clear basis for countermeasures.
- Candidate locations for countermeasures were identified by combining the quantitative results of accident-prone locations derived from AI risk scores with the qualitative results of hazardous locations identified through school route inspections. By incorporating the qualitative feedback from the school route inspections, it was possible to identify the existence of potential risks and understand the details of risk factors.
- Furthermore, we were able to gather information regarding risks that cannot be fully captured by accident data or AI risk analysis alone—such as the position and direction of pedestrians and cyclists, and visibility—from the qualitative feedback based on the school route inspections.

◆ Plans for the Next Financial Year

- As this year’s pilot project only involved collecting opinions on accident-prone locations using the school route inspection system, from the next financial year onwards, we will implement a comprehensive series of road safety measures, ranging from the identification of accident-prone locations via the school route inspection system to the consideration of countermeasures.
- In this year’s pilot scheme, the system was used to replace standard school route inspections. Next year, we will examine how the results of identifying high-risk locations change when inspectors are made aware of the AI-identified risk points.
- The results of this year’s pilot project enabled us to identify locations where bicycle accidents had occurred. However, as data analysis—including AI risk analysis—contains limited information regarding bicycles, it is difficult to analyse risk factors. Therefore, next year we will trial the identification of bicycle-related risk locations using the school route inspection system.

⑨Establishment and demonstration of an infrastructure for integration and mutual use of various mobility platforms and related data

NEC Corporation

⑨ Establishment and demonstration of an infrastructure for integration and mutual use of various mobility platforms and related data

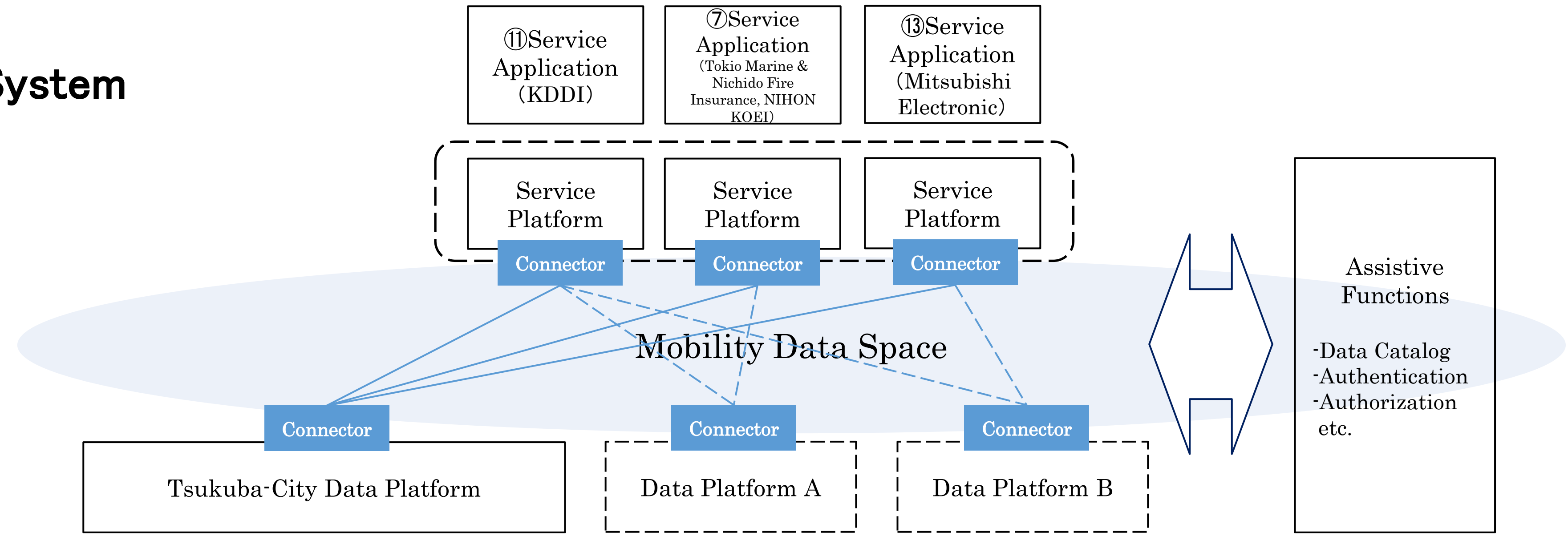
■ Overview

- ■ This study aims to do just that is incubation for social implementation of "Mobility Data Space" (technical specification studies, demonstrations, etc.)
- ■ Specifically, we will verify mobility services through demonstrations by Tsukuba Consortium co-implementers, formulate technical specifications (frameworks) for mobility and data spaces, and consider social implementation (organization, structure, etc.).

■ Purpose

- ■ As a role model, we aim to implement it through the demonstration of mobility data space in the Tsukuba-City area.

■ Overview of the Demonstration System



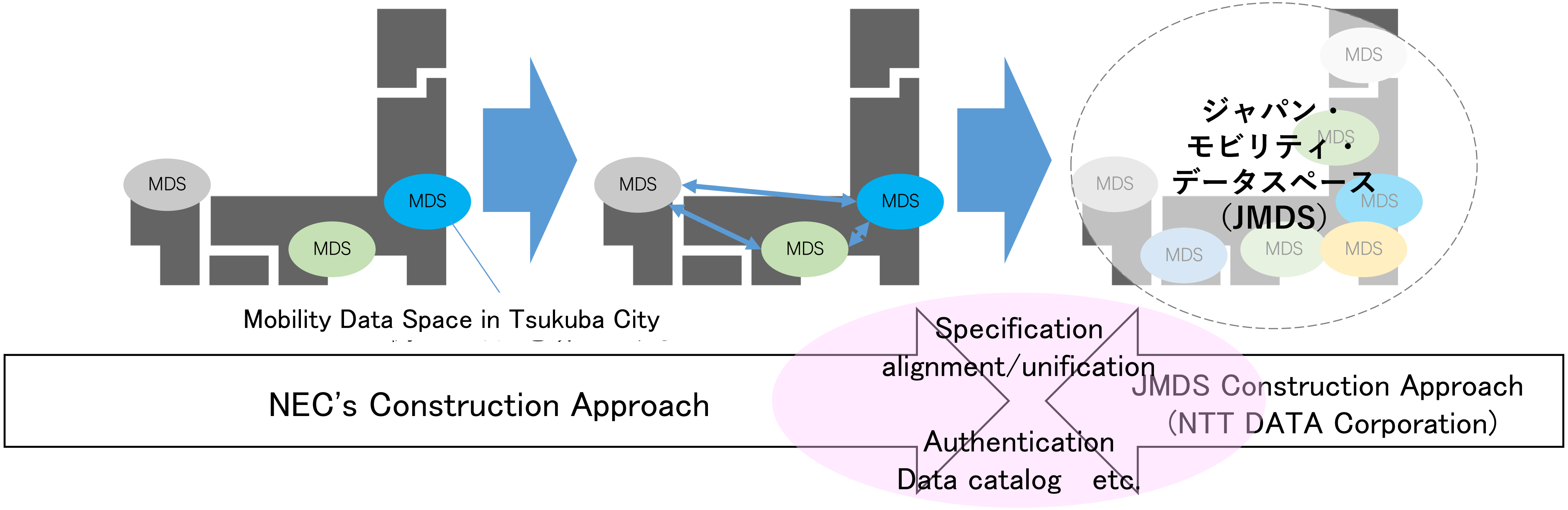
⑨ Establishment and demonstration of an infrastructure for integration and mutual use of various mobility platforms and related data

SIP

To expand to other regions, with Tsukuba City as a role model.

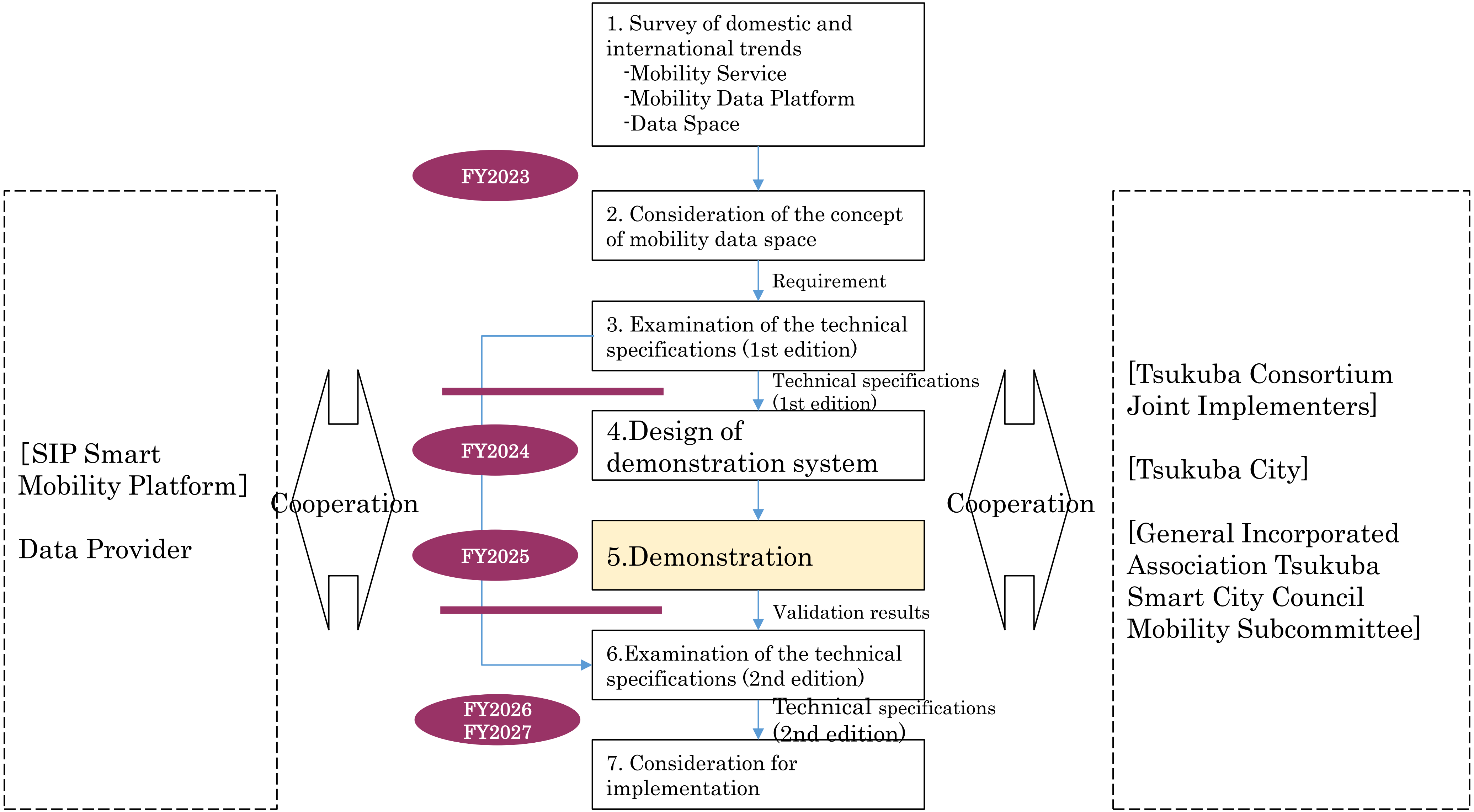
■ Approach to implementation in other regions

- ■ Establish standard technical specifications and operational models, with Tsukuba City's implementation as a role model.
- ■ Horizontally expand to each region based on standard technical specifications (data sharing is possible among data spaces in each region with common specifications).
- ■ Ultimately, data spaces in each region will collaborate to form the "Japan Mobility Data Space (JMDS)".



⑨ Establishment and demonstration of an infrastructure for integration and mutual use of various mobility platforms and related data

■ Specific details and schedule



⑨ Establishment and demonstration of an infrastructure for integration and mutual use of various mobility platforms and related data

■ Summary of FY2025 Achievements

- **Construction of a demonstration system: Development of a data user support function using generative AI**
  - Based on the MDS demonstration system built last year, we developed a data user support function leveraging generative AI. The goal was to compensate for data users' lack of data knowledge and to verify the effectiveness of generative AI as an added value for the Mobility Data Space.

- **Demonstration: Preparation of demonstration data**
  - We prepared mobility-related data for demonstrations by Tsukuba Consortium members, coordinating with data providers based on the MDS demonstration system from the previous year. Tsukuba City provided event, road construction, school route, Zone 30, and bicycle path information, which was connected to MDS. To address inconsistent data formats and non-digitized information, data was formatted into NGSI. External providers supplied weather, event, and bus location information, also connected to MDS.

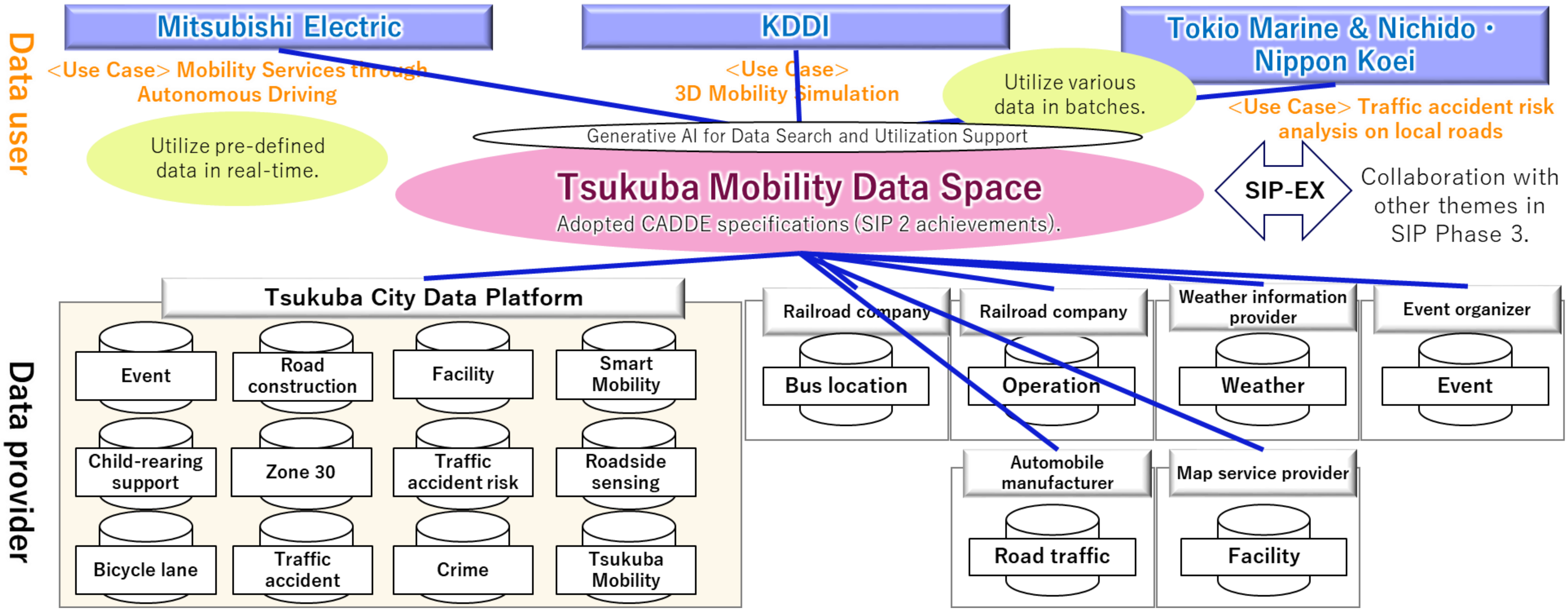
- **Demonstration: Service verification using MDS by Tsukuba Consortium members**
  - We conducted joint demonstration experiments with Mitsubishi Electric Corporation and Tokio Marine & Nichido Fire Insurance Co., Ltd., utilizing the Mobility Data Space. With Mitsubishi Electric, we verified autonomous mobility services using data registered in MDS and information from roadside sensors. Specifically, by controlling mobility to avoid certain locations based on pre-registered road risk information in MDS, we confirmed the accuracy and effectiveness of the information provided by MDS. From Tokio Marine & Nichido, we received traffic accident risk information within Tsukuba City, establishing a framework for wide-area data collaboration.

- **Demonstration: Verification of data user support function using generative AI**
  - To enhance and streamline data utilization within the Mobility Data Space, we verified the applicability of a generative AI-powered data user support function. For natural language inputs such as "traffic accident risk" and "recommended events," we confirmed the ability to suggest relevant data, automatically generate keywords, perform advanced filtering, and summarize data.

⑨ Establishment and demonstration of an infrastructure for integration and mutual use of various mobility platforms and related data

■ Demonstration: Preparation of demonstration data

- Prepare data for demonstration within the Tsukuba Mobility Data Space.
- By connecting various data related to Tsukuba City, integrated utilization for a wide variety of services becomes possible.



⑪Development of mobility-enabled services on urban OS

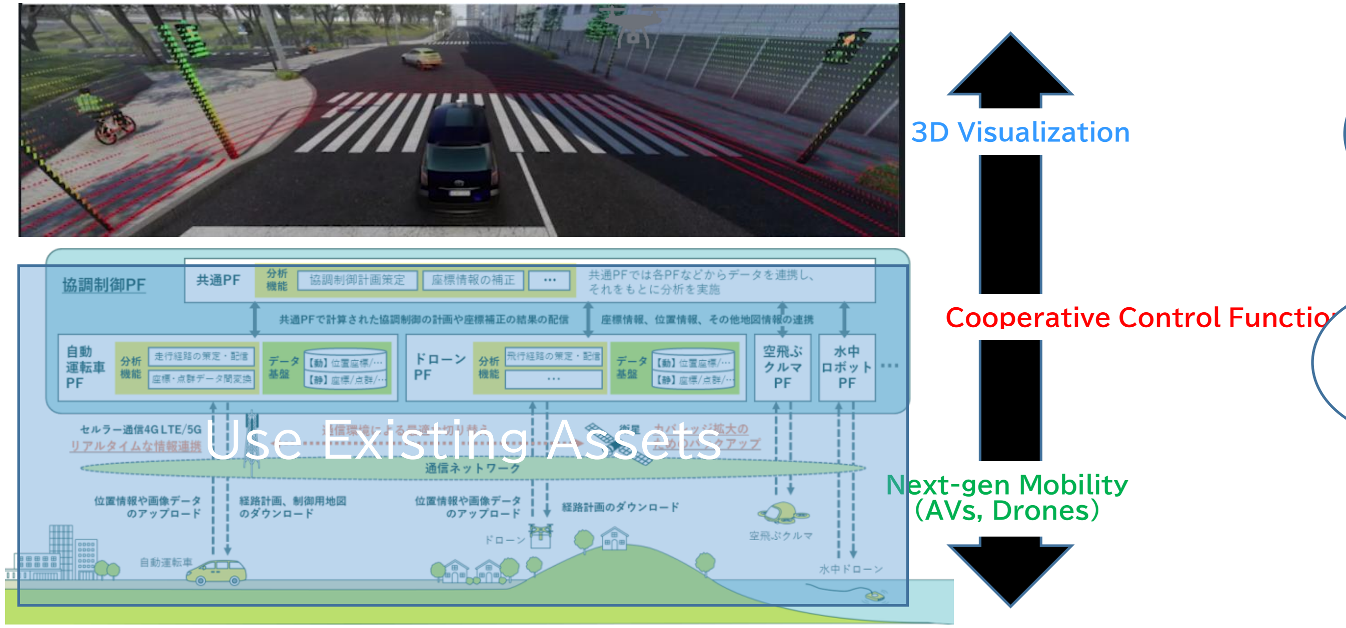
KDDI CORPORATION

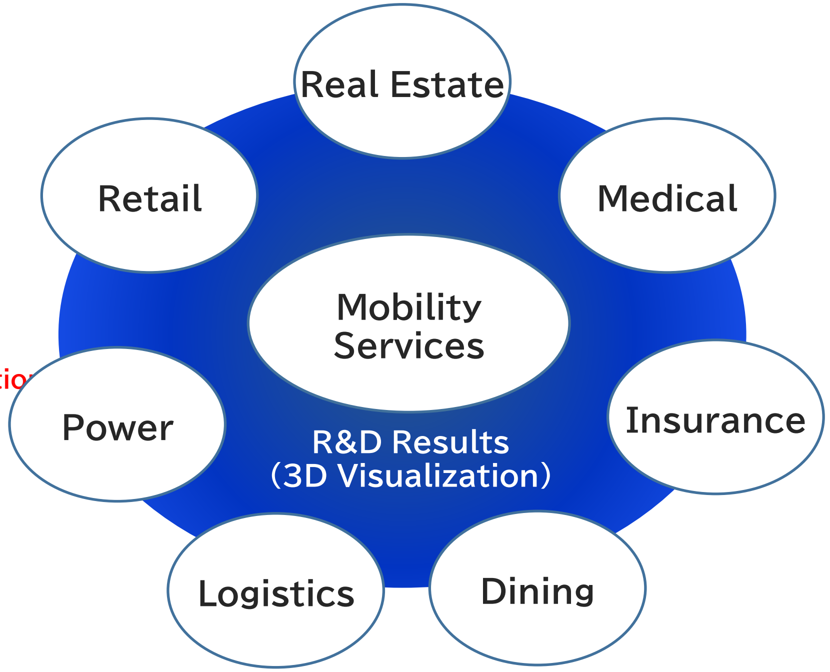
Tomorrow, Together

Overview

Built 3D visualization for next-gen mobility data (AVs, drones)
Supports smart-city service planning by businesses and municipalities

R&D Overview	Target Outcome
Visualize AV and drone data in 3D space	Enable cross-industry mobility services





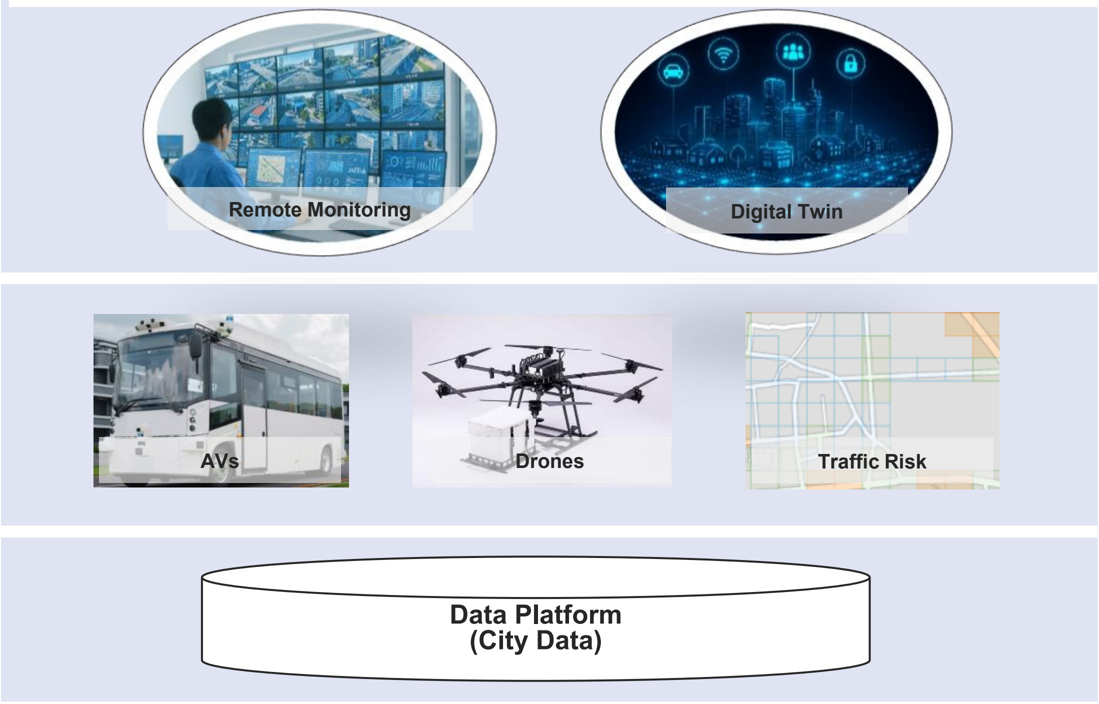
Target Concept

Stakeholder Hearing and Status

Confirmed Tsukuba City's need for monitoring and digital twins
Development completed as planned

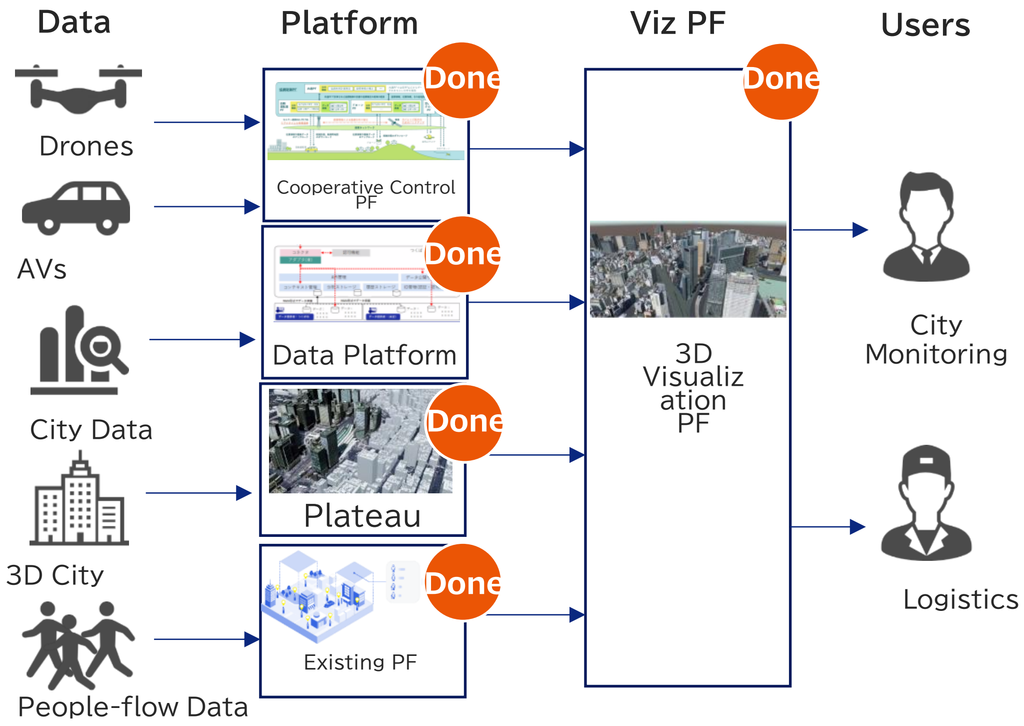
Hearing (Tsukuba City)

Need identified: remote monitoring and city/mobility digital twins



Achievement Status

Link Cooperative Control PF, Data Platform,
and people-flow data to 3D Visualization PF

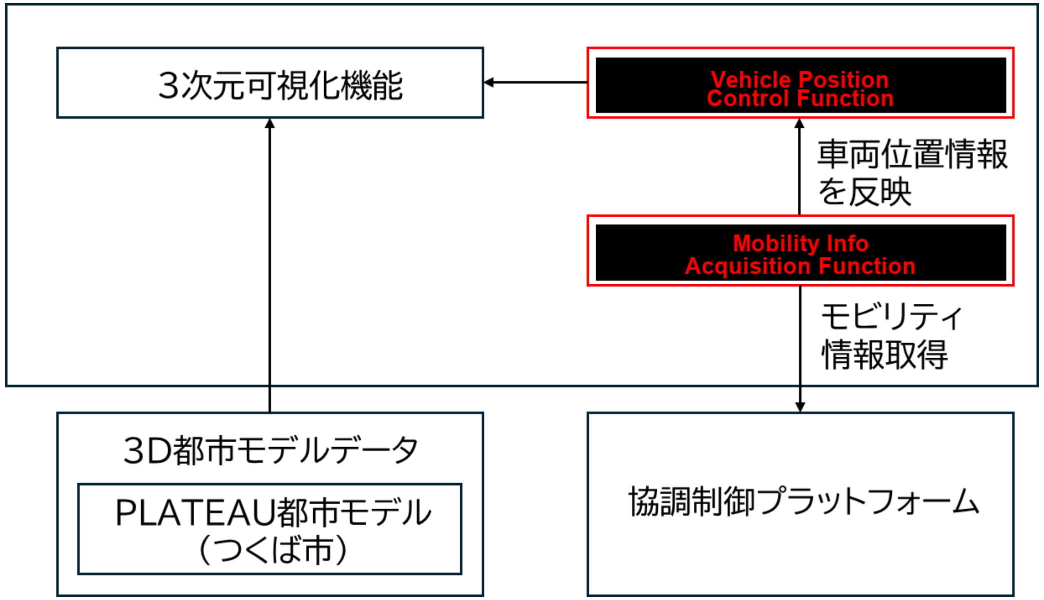


Cooperative Control PF and 3D Visualization PF (1/2)

Completed integration of Cooperative Control PF and 3D Visualization PF
Enabled 3D visualization of coordinated AV/drone movement

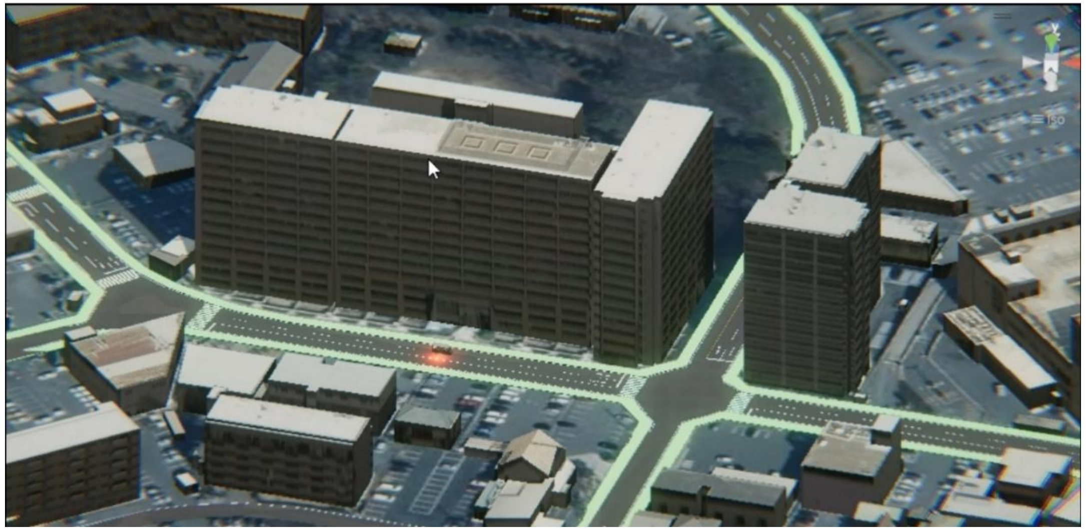
Developed Functions

Developed vehicle control and mobility-data acquisition for 3D visualization



3D Visualization (1/3)

AV starts from a designated spot
and moves to a drone connection point



Cooperative Control PF and 3D Visualization PF (2/2)

3D visualization of coordinated AV/drone movement
between Tsukuba sites (stores, clinics, pharmacies, public facilities)

3D Visualization (2/3)

Drone receives a delivery item from the AV at the connection point
and transports it to the destination

3D Visualization (3/3)

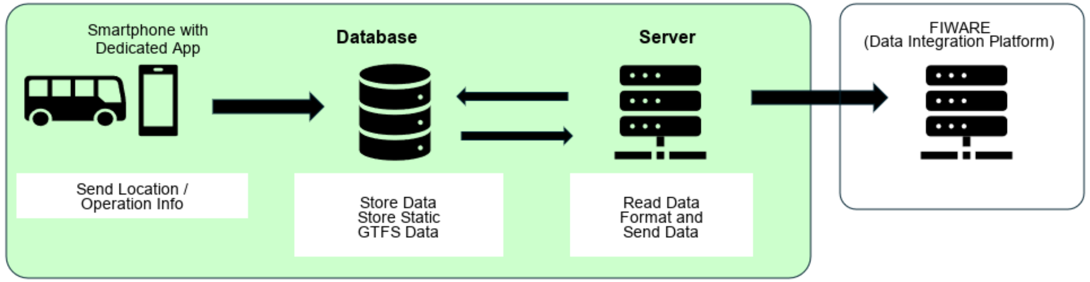
Drone returns to the connection point
and the AV moves to the designated spot

Data Platform and 3D Visualization PF

Data Platform integration is expected to enable external project and intra-consortium collaboration

External Collaboration (Cabinet Office*)

3D visualization of autonomous-bus location data is expected



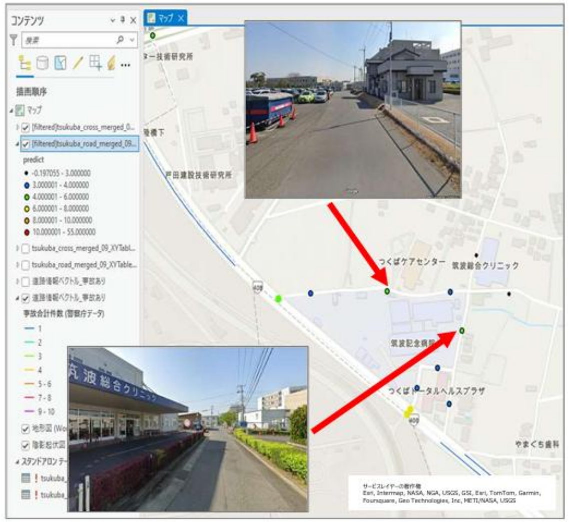
No.	項目名	name	type	説明
1	エンティティ作成時刻	dateCreated	DateTime	エンティティの作成時刻
2	エンティティ最終更新時刻	dateModified	DateTime	エンティティの最終更新時刻
3	ルート	refRoot	Relationship	路線 ID
4	停留所	refStop	Relationship	停留所 ID
5	通過順位	stopSequence	Number	その便での該当標柱の通過順序
6	経度,緯度	location	geo:point	走行している車両の場所の経度、緯度
7	車両のステータス	status	Text	走行している車両のステータス

*Cabinet Office public call, Oct. 2024
"Advanced Services and Regulatory Reform Survey"

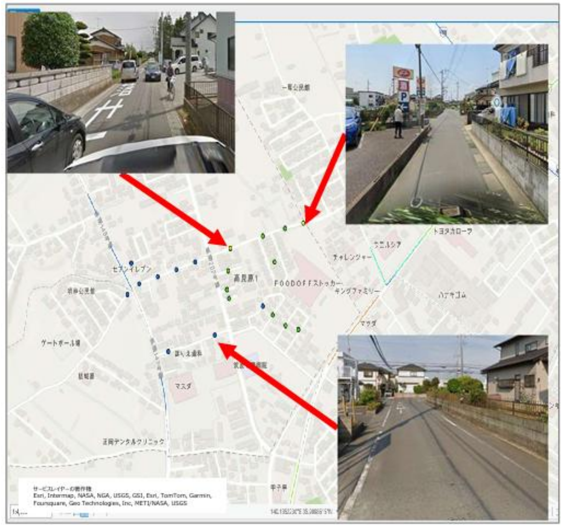
Consortium Collaboration (Tokio Marine)

3D visualization of Tokio Marine traffic-risk data is expected

Residential / School Zone



Residential Road



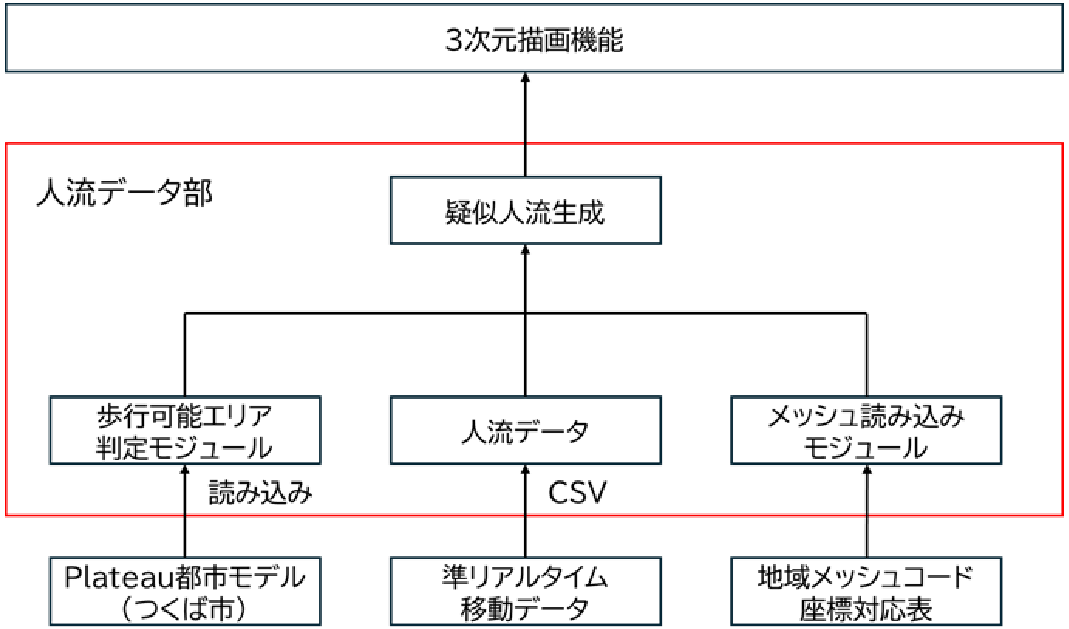
Reference: FY2024 Shared Space Report
Excerpt from Report

Existing People-flow PF and 3D Visualization PF

Existing people-flow PF and 3D PF integration is expected to complete

3D Visualization of People-flow Data

Integration with Tsukuba City's people-flow data is expected

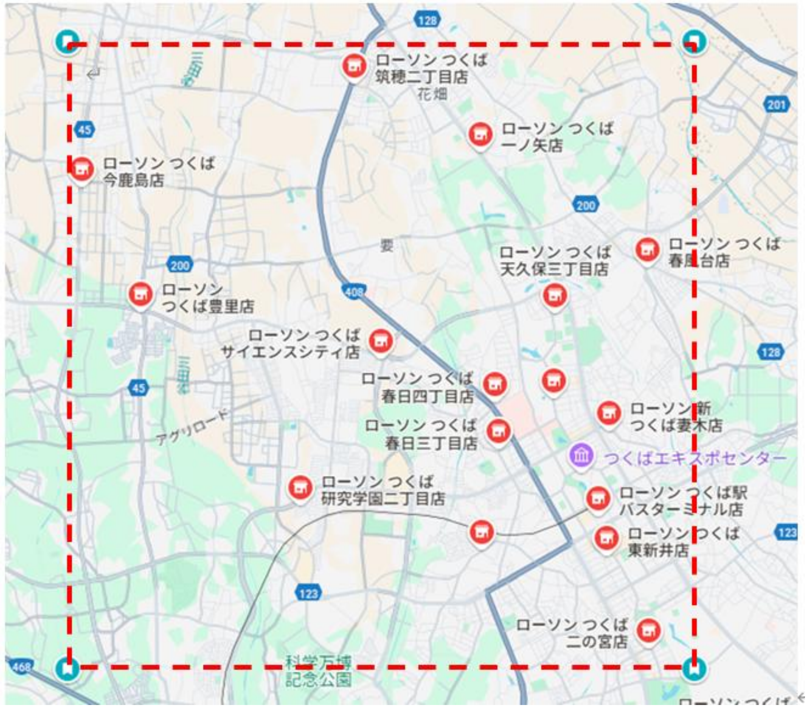


Reference: Simulation Area and Bases for Cooperative Control PF

Stub generation targets a Tsukuba City area
Bases are departure/arrival points for next-gen mobility

Target Area Map

The following Tsukuba area is defined as the stub target



Position	Coordinates
Northwest	36.136825, 140.037101
Northeast	36.136825, 140.126708
Southeast	36.064424, 140.126708
Southwest	36.064424, 140.037101

Target Base Information

The following bases are assumed for stub operation

	Base List
Convenience Stores	Lawson Tsukuba Sta. BT
	Lawson Higashi-Arai
	Lawson Shin-Tsukuba Saiki
	Lawson Ninomiya
	Lawson Katsuragi ES
	Lawson Kenkyu-gakuen 2
	Lawson Kasuga 3
	Lawson Kasuga 4
	Lawson Science City
	Lawson Harukazedai
	Lawson Toyosato
	Lawson Imakashima
	Lawson Tsukuho 2
	Lawson Ichinoya
Clinics	Tsukuba Cityia IM Clinic
	Tsukuba Center Clinic
	Tsukuba Gakuen Clinic
	Takezono Family Clinic
	Minami-odori Clinic
	Arita Clinic
	Sato Clinic
	Katsuragi Clinic
	Miyamoto IM Clinic
	Kenkyu-gakuen Clinic
	Tsukuba Tsuji Clinic
	Grace Clinic
	Noguchi IM Clinic
	Kenkyu-gakuen Clinic
	Sugitani Medical
	Minano Clinic IM/Resp.
	Kawai Clinic
	Kurata IM Clinic
Pharmacies	Matsukiyo Tonarie Q't
	Matsukiyo York Town Takezono
	Sundrug Tsukuba
	Nanzando Takezono
	Welcia Gakuen Chuo
	Sugi Drug Ninomiya
	Welcia Gakuen Ninomiya
	Welcia Doho Park-dori
	Welcia Matsushiro
	Welcia Kenkyu-gakuen
	Tsuruha iias Tsukuba
	Welcia Gakuen Azuma
	Welcia Kasuga 3
	Akebono Medical
	Sugi Drug Amakubo
	Welcia Kasuga
	Tsuruha iias Tsukuba
	Bambi Pharmacy
	Welcia Kenkyu-gakuen N.
	Welcia Sakura
Public Facilities	Tsukuba Station
	City Hall
	Block 70 (Nanamaru Park)
	Univ. of Tsukuba
	Univ. of Tsukuba Hospital
	Tsukuba Public Health Center
	Toyosato Health Center
	Oho Health Center
	Kasuga Community Center
	Koike Community Center
	Endo-Shinden Community Ctr.
	Higashihara Community Ctr.
	Nishiyagayo Community Ctr.
	Tsukuba Municipal
	Shimana Community Ctr.

⑫Extraction of requirements for vehicles, infrastructure that contribute to re-design

University of Tsukuba

筑波大学
University of Tsukuba

Efforts to Implement Mobility Sharing
Efforts Toward Regulatory Reform

Overview of Regulatory Reform

For personal mobility, by implementing necessary safety measures—such as utilizing sensor technologies to ensure pedestrian safety—and based on public road demonstration experiments confirming that pedestrian safety can be secured, operation at a maximum speed of 10 km/h without individual permits or accompanying safety personnel shall be allowed, provided that the road environment and method of travel meet the verified safety conditions.

Speed control using LiDAR

Speed control using GNSS

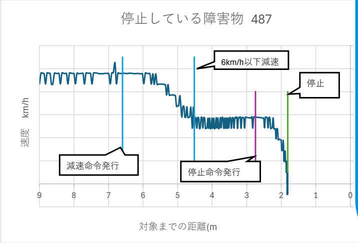
FY2023: Continued discussions among Tsukuba City, the National Police Agency, and the Cabinet Office → Selection and development of mobility units equipped with speed-suppression (vehicle control) functions conducted by Tsukuba City and the University of Tsukuba

FY2024: Through R&D under SIP, technical verification was carried out for functions such as automatic deceleration control for collision avoidance and alert/notification systems

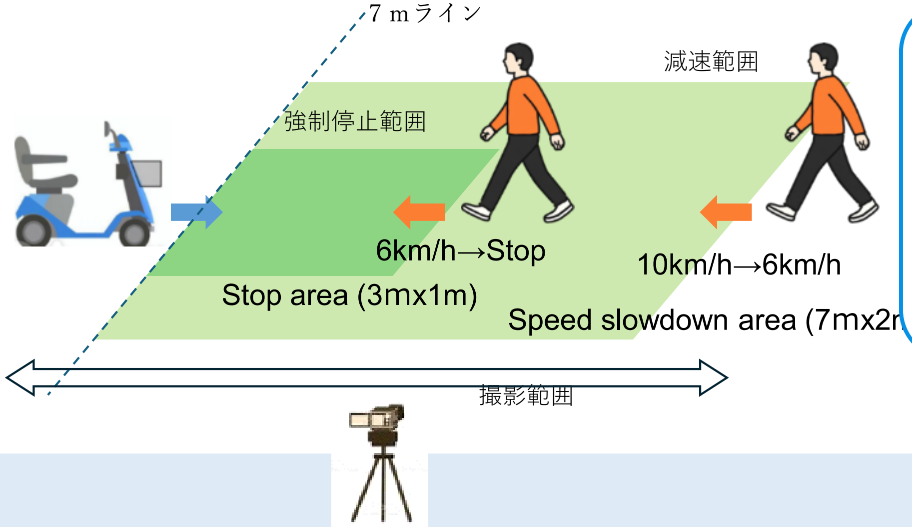
FY2025: Future policy directions were compiled at the National Strategic Special Zones Advisory Council (June 2025) → and public road demonstration tests were conducted.

Efforts to Implement Mobility Sharing
Efforts Toward Regulatory Reform

By adopting sensor-based digital safety personnel, we propose regulatory and legal reforms to allow the maximum speed of personal mobility devices on sidewalks and similar areas to be increased to 10 km/h. A prototype vehicle was developed and demonstration tests were conducted.

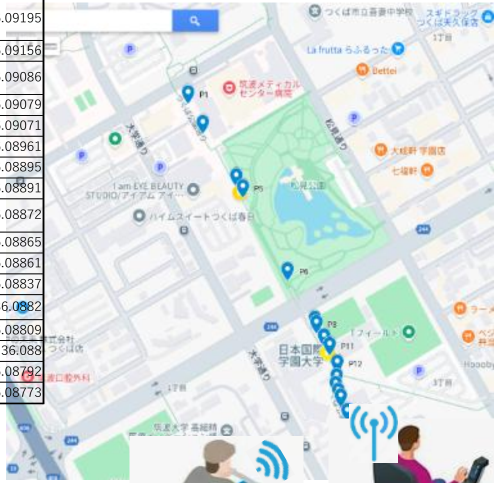


Vehicle preparation



proposal finalized

名前	経度	緯度
P1	140.1056	36.09195
P2	140.1059	36.09156
P3	140.1064	36.09086
P4	140.1065	36.09079
P5	140.1066	36.09071
P6	140.1073	36.08961
P7	140.1078	36.08895
P8	140.1078	36.08891
P9	140.1079	36.08872
P10	140.108	36.08865
P11	140.108	36.08861
P12	140.1082	36.08837
P13	140.1081	36.0882
P14	140.1081	36.08809
P15	140.1082	36.088
P16	140.1082	36.08792
P17	140.1083	36.08773



Validation of the specification proposal.

【 Preliminary demonstration 】

Verification of the vehicle's basic performance and fundamental control specifications.

【 Closed-environment testing 】

Evaluation by general users (monitors) of detection range, control specifications, and social acceptance.

【 Public road demonstration (January–February 2026) 】

Comprehensive evaluation on public roads with accompanying safety personnel.

Efforts to Implement Mobility Sharing
Efforts Toward Regulatory Reform

Validity of Obstacle Detection Range During Public Road Operation

Zone A (Detection area for limiting maximum speed to 6 km/h)

・On average, one obstacle is detected approximately every 36 meters of travel.

・Stationary obstacles such as hedges, trees, parked bicycles, steep slopes, and wheel stops account for 77% of all detections.

It is necessary to reconsider the adjustment of detection sensitivity and the detection of low-height obstacles.

Zone B (Detection area for forced stopping)

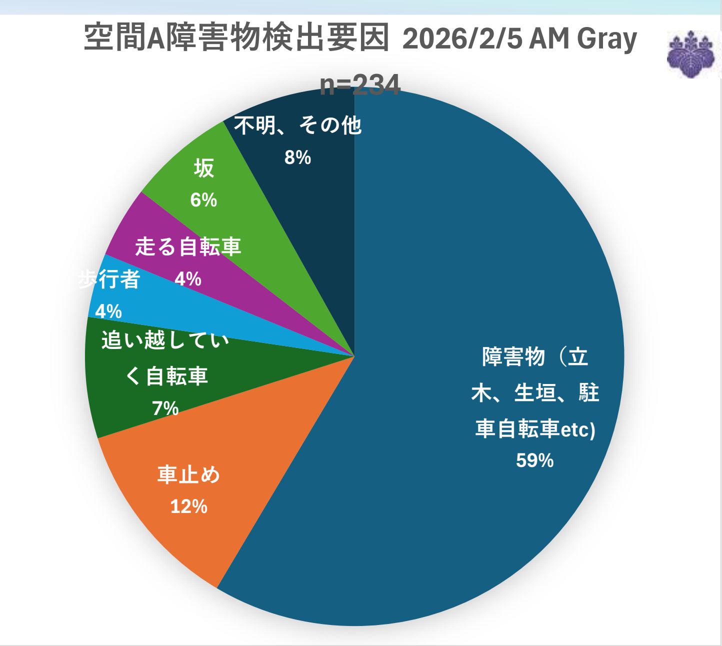
・83% of these occurred at wheel stops before and after crosswalks and during travel on narrow roads.

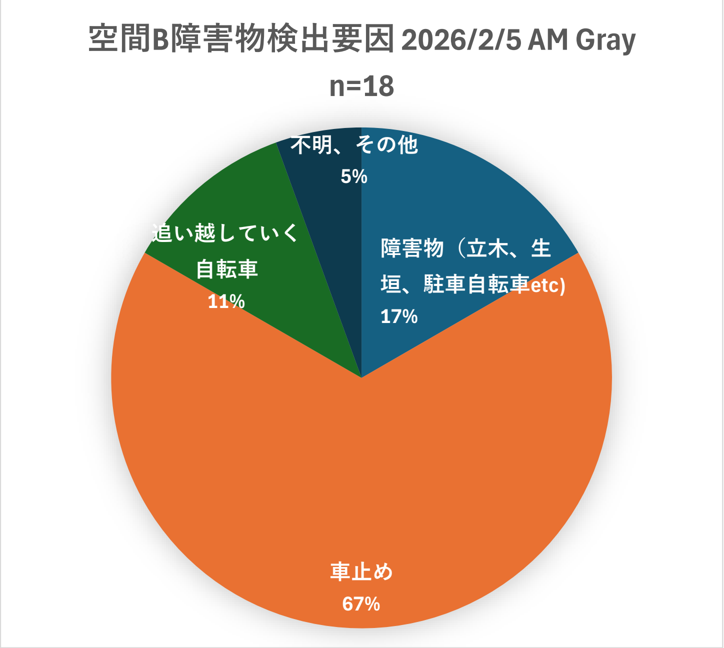
・While the forced stop function before crosswalks is considered effective in preventing accidents at crosswalks, unexpected stops may cause anxiety for passengers and, depending on the situation, may also pose risks.

Considering the effectiveness of the deceleration function, it is necessary to examine the necessity of the forced stop function.

（ZONE A）
Height ： 0.3m～2.0m
Forward range ：0m～7.0m
Lateral range: ：2.0m

（ZONE B）
Height ：0.5m～2.0m
Forward range：0m～3.0m
Lateral range: ：1.0m （）





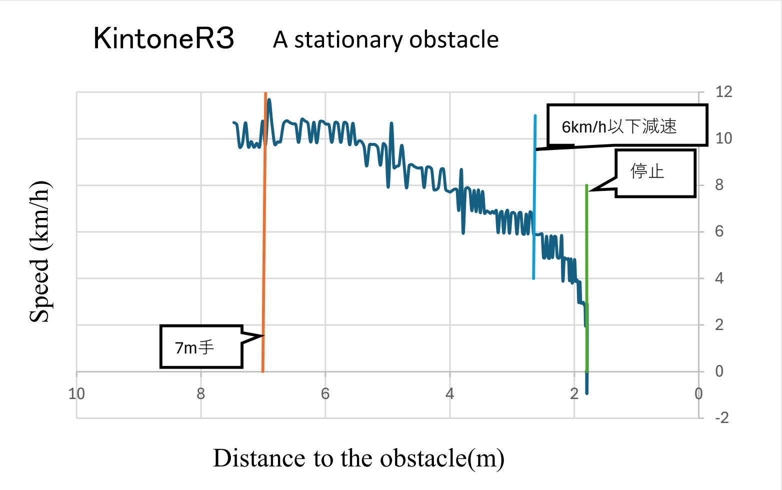
Efforts to Implement Mobility Sharing
Efforts Toward Regulatory Reform

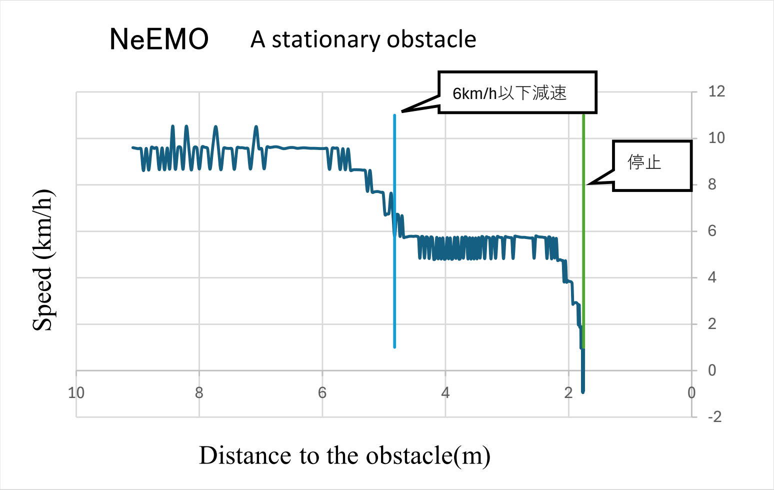
Verification of the applicability of speed control across vehicles with different structures.

Although demonstrations have been conducted using a handlebar-type electric wheelchair, we evaluated the required performance of a digital safety operator for vehicles with differing structures, motors, and braking systems. As a comparison target, a small, lightweight three-wheeled vehicle was selected.

・Regarding the overall braking performance for detecting both stationary obstacles and approaching obstacles and coming to a stop, the distance to the obstacle at the time of stopping showed no difference; therefore, the performance can be considered equivalent.
・The tendency to decelerate gradually from 10 km/h to 6 km/h is presumed to be due to the control philosophy of the Kintone R3. In the test from 10 km/h to a full stop, sufficient braking force was confirmed.
・Based on these findings, it became clear that when implementing a digital safety operator and geofencing, it is necessary to select a vehicle equipped with a sufficiently powerful motor, a deceleration mechanism, and a brake structure that can be electrically controlled.

名称	NeEMO	KintoneR3
製造メーカー	ヤマハ発動機株式会社	株式会社KINTONE
外観		
型式	J9A1	R3
種類	ハンドル型電動車椅子	特定小型原付
寸法	1190x695x1165	1350x600x950
質量	90Kg	60kg
駆動方式	後輪直接駆動	後輪駆動
制動方式	電磁ブレーキ＋モーター回生制動	ドラム＆ディスクブレーキ+回生ブレーキ
操舵方式	バーハンドルによる前輪操舵	バーハンドルによる前輪操舵
制御方式	電子スロットルによるマイコン制御	電子スロットルによるマイコン制御
駆動モーター（定格出力）	230W x 2	350W
タイヤ	100/70-8	10x3.00
車輪数	4輪	3輪





⑬Social systemization of automated driving

Mitsubishi Electric Corporation

Responsible party: Mitsubishi Electric Corporation

Research Outcomes for Fiscal Year 2025 and Progress Against the Annual Plan

【Achievement goals】

To enable safe and secure operation of mobility on neighborhood streets and busy streets, we will construct the mobility platform shown in **Figure 1**. This platform will coordinate with a mobility data space and utilize not only the mobility's own sensors, but also various sensors installed throughout the city and open data such as traffic conditions and weather. The target mobility is primarily green slow mobility such as personal mobility devices.

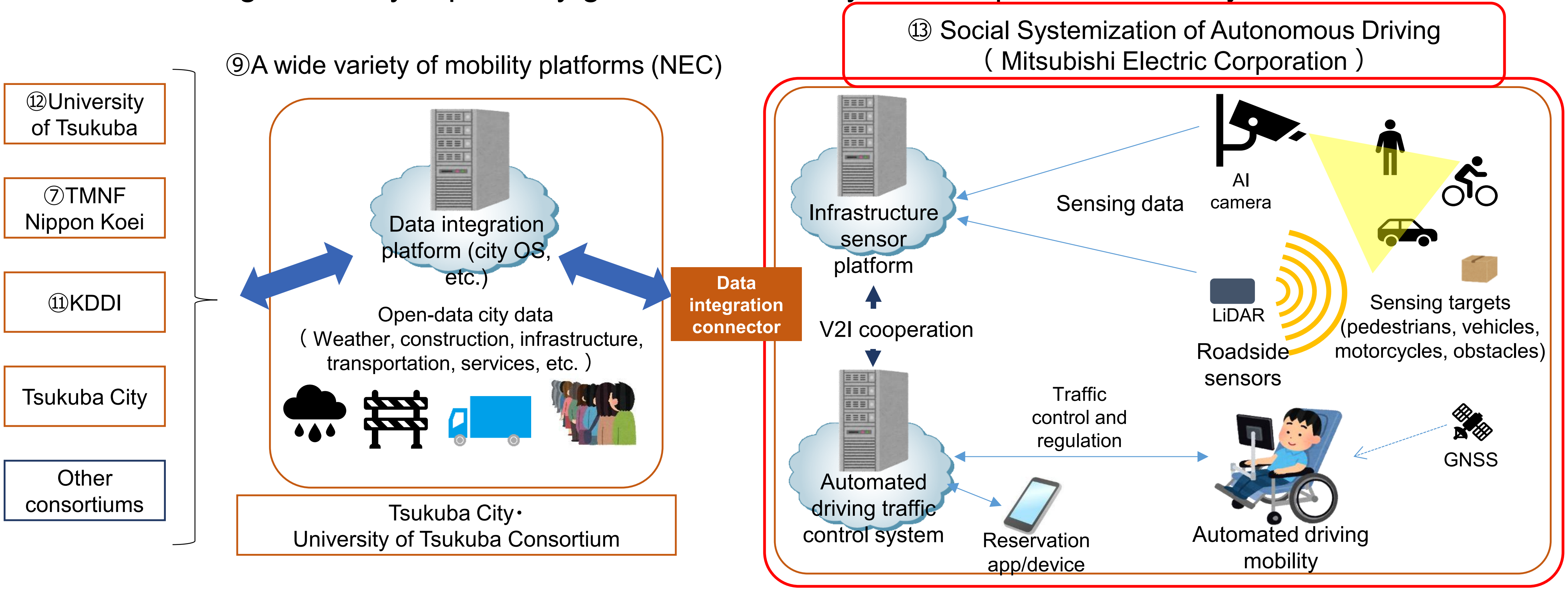


Figure 1: Overview of the mobility platform

【Progress Status 】

Figure 2 shows the planned schedule and actual results up to fiscal 2025 for R&D Item 13. Blue arrows indicate planned activities, red arrows indicate actual achievements.

From FY2023 through FY2024, we carried out requirements definition for social systemization of autonomous driving and concretized the plan. In FY2024 we adjusted installation of equipment to be used in system construction and demonstration experiments according to the plan, and using the constructed system we conducted two on-road demonstration experiments in FY2025. The first demonstration validated data linkage functions between infrastructure sensors and mobility; the second validated linkage with external data via MDS.

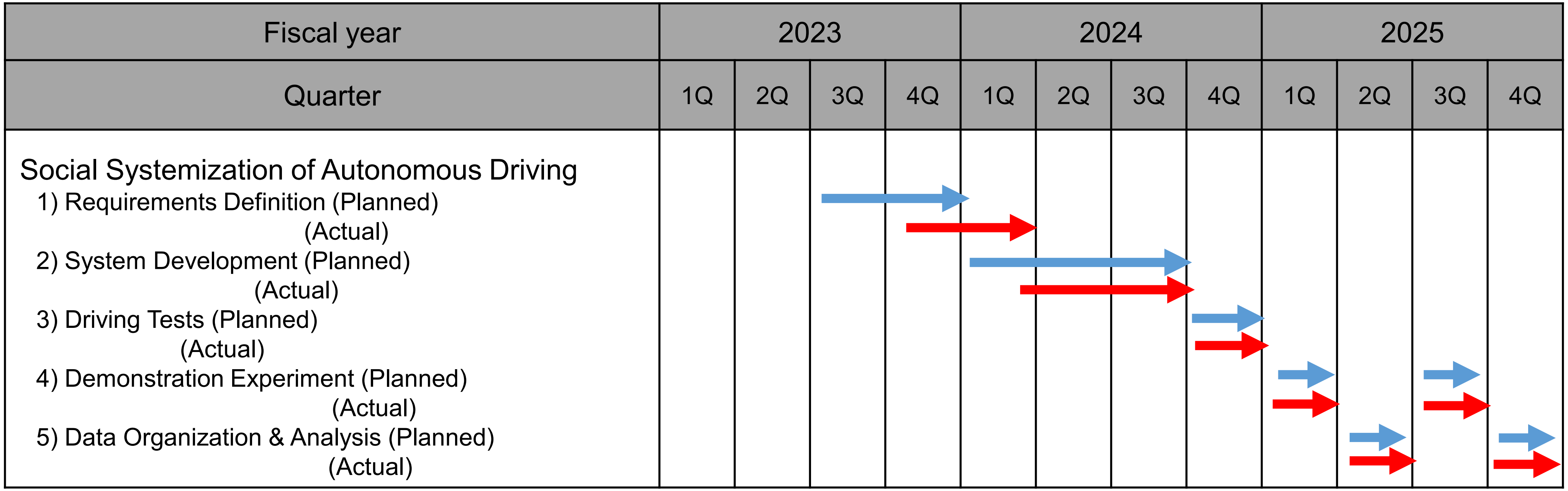


Figure 2: Implementation Plan and Actual Results for R&D themes⑬

【Progress Status】

① Overall system overview

We built an infrastructure-sensor platform to acquire obstacle information on driving routes from infrastructure sensors and various external data obtained via MDS.

By integrating those data, we implemented safe and secure deceleration/stop control based on risk estimation of driving mobility, and route-congestion prediction for operation optimization, and conducted autonomous-driving demonstration experiments in Tsukuba City.

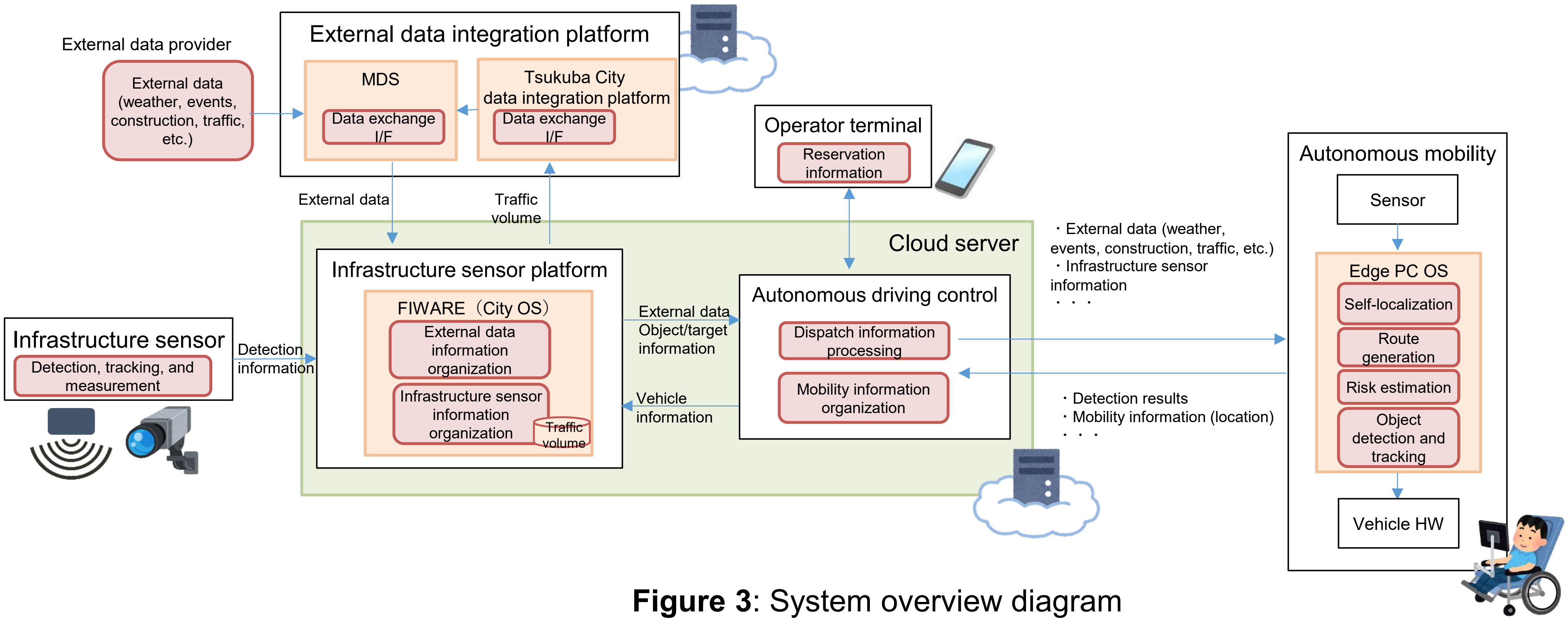
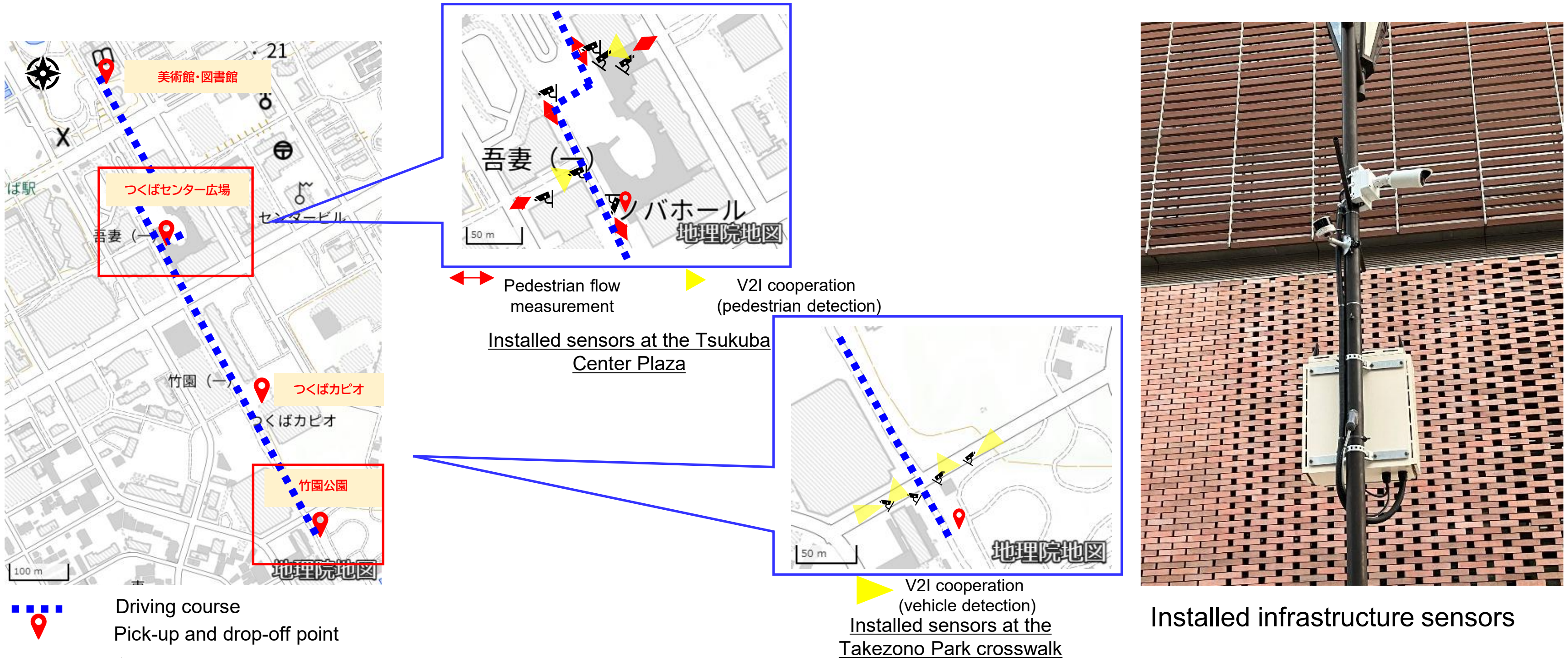


Figure 3: System overview diagram

【Progress Status 】

② Infrastructure sensors and cooperative system construction status

We built an infrastructure-sensor platform with high data-linkage affinity by adopting the same urban OS (FIWARE / Orion) as the Tsukuba City data integration platform and MDS, and installed four infrastructure sensors on the road in front of Takezono Park in addition to seven units around Tsukuba Station.
Each infrastructure sensor consists of an AI camera, LiDAR, and a communication unit that houses these devices. The sensors measure object information and pedestrian/vehicle flow needed for vehicle–road coordination and assess congestion levels from flow counts.
For external data linkage, we implemented data ingestion from multiple external data providers (weather, event, construction, road risk information) via the MDS. Flow counts collected by infrastructure sensors are also provided to the Tsukuba City data platform, enabling mutual use.



Reference map：地理院地図（https://maps.gsi.go.jp/）

Figure 4: Overview Diagram of Infrastructure Sensor Installation

【Progress Status 】

③ Small mobility functional development status

By FY2024, the small mobility units were equipped with various sensors to recognize surrounding objects and environment. To achieve speeds higher than typical pedestrian speed, we implemented more precise speed control using a rotary encoder, and implemented safety features such as obstacle recognition for deceleration and stopping, and travel-area restriction functions.
Demonstration tests confirmed that these functions allowed the vehicle to slow and stop in a manner considerate of passenger comfort.
Communication devices for data linkage were also installed. In FY2025 we built deceleration/stop functions linked with the infrastructure sensors and a dispatching function that leverages congestion forecasts using external data linkage platforms.