

# Digital Transformation (DX) of road System - Promote xROAD -

In order to use roads safely, wisely, and sustainably, we will accelerate the "xROAD" DX initiative, which aims to make road surveys, construction, maintenance, management, and administrative procedures more sophisticated and efficient through the introduction of new technologies and the utilization of data.

## Policy and examples of initiatives for DX road system

### [Policy] Through the use of new technologies such as AI and ICT

- ① Improve the sophistication and efficiency of road survey, construction, maintenance and management, etc.
- ② Make procedures and fee payments online, cashless and contactless.
- ③ Improve the sophistication of data collection, utilization of accumulated data, and openness.

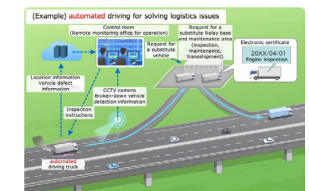
#### ■ Assistance for automatic driving

Promoting efforts to realize automated driving trucks with road-vehicle coordination by providing information such as merging assistance information on some sections of the Shin-Tomei Expressway.



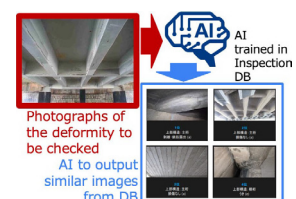
#### ■ Next generation ITS

Promoting next-generation ITS utilizing innovative technologies with the aim of solving transportation issues by contributing to social and economic activities.



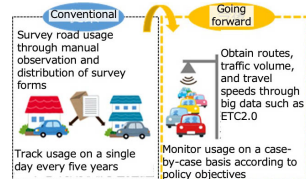
#### ■ Utilization of data

Establish a "Road Data Platform" to promote advanced and efficient road management and data utilization in a wide range of fields.



#### ■ Establishment of a new road traffic survey system

Review the conventional national survey on road and street traffic conditions by utilizing big data such as ETC2.0, to establish a new road traffic survey system.



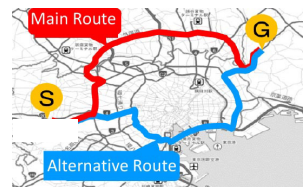
#### ■ Advancement of road management

Promote further advancement and efficiency of road maintenance and management by promoting the introduction of new technologies such as AI and ICT.



#### ■ Improvement of convenience

Promote efficiency of administrative procedures, cashless payment through ETC-only expressways, and various types of payment methods on and off expressways through the use of ETC.



## Future development of DX in the road system

### ■ Up to the end of FY2022

#### Advancement of road management

- Commenced deployment of snow removal equipment that can be automatically controlled

#### Increase in sophistication and efficiency of administrative procedures

- Started operation of the system to confirm special vehicle passage

#### Data utilization and release

- Operation and release of road facility inspection database

### ■ Up to the end of FY2023

#### Data utilization and release

- Publication of road base map information
- Real-time traffic volume data

### ■ Up to the end of FY2024

#### Supporting the realization of automated driving

- Promote initiatives to realize automated driving trucks

#### Data utilization and release

- Operation of the road data platform to begin

### ■ From FY2025

#### Increase sophistication and efficiency of road maintenance and management

- Improvement of convenience for road users

#### Improve safety and convenience for road users

- Development and operation of next-generation ITS

## Support from the road side for the diffusion and promotion of automated driving

In addition to promoting efforts toward the realization of automated trucks on expressways, we will provide focused support for the efforts of local governments that aim to develop towns that utilize automated driving.

## Improvement of the road environment necessary for automated vehicles

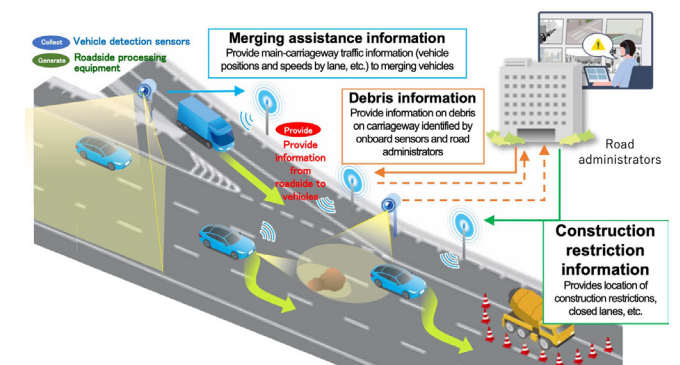
### Background / data

- [Government Targets] To realize Level 4 automated trucks on expressways around FY2025; social implementation from FY2026 onward.

In FY2024, lanes for automated driving (Ref. 1) at 100 km or more will be set up during late-night hours on a section of the Shin-Tomei Expressway (Surugawan-Numazu SA to Hamamatsu SA).

From FY2025 onward, expressway lanes for automated driving will be developed on the Tohoku Expressway and other roads.

Promote efforts to realize road-vehicle coordinated automated trucks by providing information on merging assistance, falling objects, and construction regulations.



## Regional support using automated driving

### Background / data

- [Government Targets] To provide regionally limited unmanned automated driving services in approximately 50 locations by FY2025, and in more than 100 locations nationwide by FY2027.
- [MLIT Target] (specific initiative) To double the number of "year-round operation projects on general roads" that lead to social implementation to more than 20 locations; to plan and operate at least one location in each prefecture.

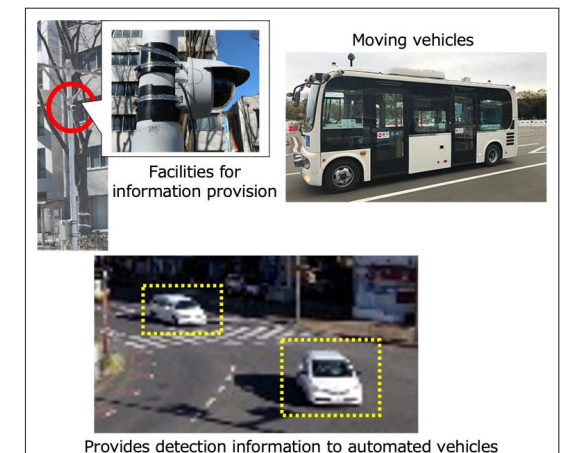
Prepare a guide for the introduction of automated driving based on the results of demonstration experiments, and provide focused support for the development of a driving environment based on urban development plans that utilize automated driving.

Promote efforts to provide information on road conditions in order to realize automated driving services on general roads.

### ■ Guidance for the introduction of automated driving (Image)



### ■ Information on road conditions Demonstration experiment (Maebashi City)





## Promotion of next-generation ITS

In response to the maturing and increasingly complex nature of social and economic activities, we will promote next-generation ITS using innovative technologies to solve transportation problems and contribute to social and economic activities.

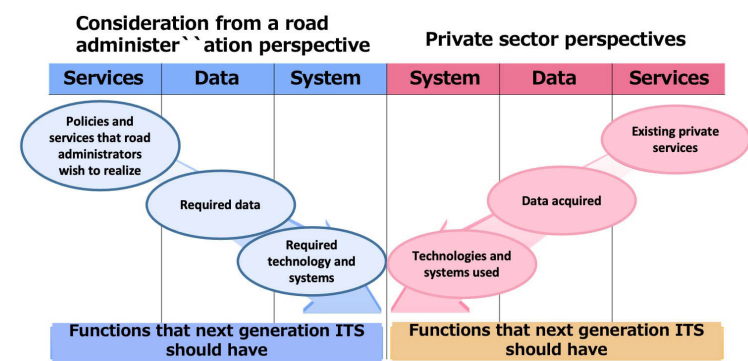
### Background / data

- Around 90% of new car sales are expected to be connected cars by 2035 (Ref. 1).
- Overseas ITS promotion efforts are accelerating.
  - In Europe, the C-Roads (Cooperative Roadside-to-Vehicle ITS) project is progressing, and vehicle data formats are being standardized (FMS standard) to improve logistics efficiency.
  - In China, roadside-to-vehicle cooperation system by 5G is under construction.
  - Singapore plans to shift to a next-generation ERP (road toll collection system) using GNSS satellite positioning from the second half of 2023.

## Study approach for next generation ITS

Based on the discussions of the study group on next-generation ITS consisting of industry, government, and academia, set targets for next generation ITS, specify the required services and necessary data from both public and private perspectives, and promote the development of a data integration infrastructure for both inside and outside of vehicles.

### Image of the data linkage infrastructure inside and outside the vehicle

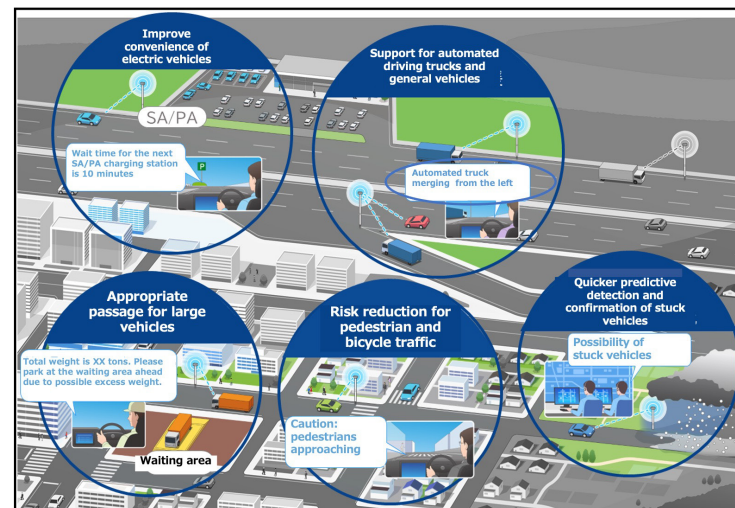


## Implementation of pilot projects

First, for services to solve urgent social issues(Ref. 2) of high social concern, "preliminary projects" that can be realized in the short term even with current technology will be established, and verification experiments will be conducted.

Through demonstration experiments, we will establish the functions that next-generation ITS should have from the viewpoints of road administration and the private sector, and clarify aims for future roads in the medium and long term.

### Proposed image of pilot project



Ref. 1: Fujii Keizai, "Future Outlook for Connected Car, V2X and Automated Driving Related Markets 2021".  
Ref. 2: Safety and security, carbon neutrality, human flow and logistics (automatic operation)

## Providing high-level road infrastructure services by mobilizing AI, ICT and other technologies

Through the active introduction of AI, ICT, and other technologies and the use of data, we will realize more sophisticated and efficient road survey, construction, monitoring, inspection, maintenance, and management, as well as promote the use of data, including in the private sector.

### Background / data

- Number of skilled workers in the construction industry, who is indispensable for road maintenance, has declined.  
1997 (peak): approx. 4.55 million → 2021: approx. 3.11 million (approx. 30% decrease)

## Promotion of i-Construction

Promoting i-Construction, including the introduction of ICT construction using 3D data and more advanced utilization of 3D models.

## Construction of a road data platform

Establish a "Road Data Platform" to promote road management and performance management utilizing data.

Partial release of data will enable data utilization in a wide range of fields, including the private sector.

## Measures to strengthen the road management system utilizing AI and ICT

- Boost performance and efficiency by utilizing AI, ICT, and accumulated data for inspection, construction, and recording, for appropriate maintenance and management of roads.

- Accelerate the advancement of road management, including early detection of abnormalities through automatic traffic obstacle detection systems.

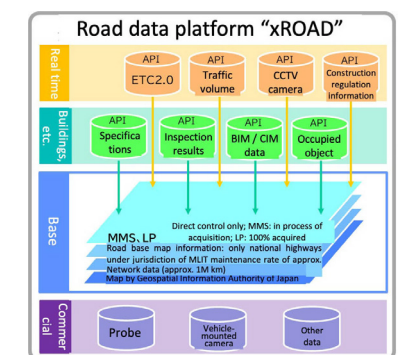
\* CCTV cameras on emergency transportation roads in sections that require constant observation.  
Installation rate (2019 to 2025): 0% → approx. 50%

- Revise the maintenance management standards(Ref. 1) for national highways under jurisdiction of MLIT by June 2024 to improve the sophistication and efficiency of road patrolling.

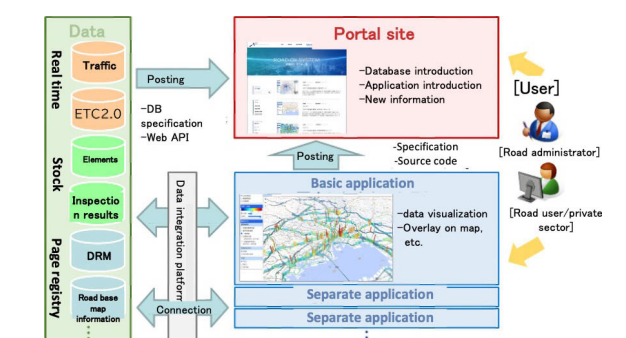
Ref. 1: Standards for maintenance and administration of general national highways and expressways managed by the national government (Draft) (Revised March 29, 2013)

## Road data platform

### Concept

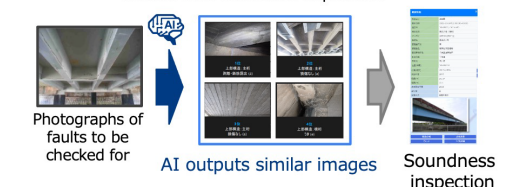


### Configuration image

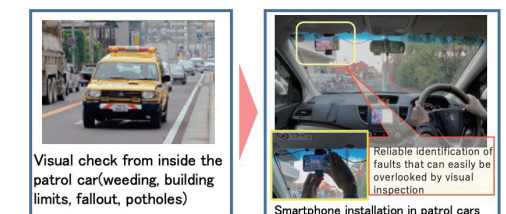


### Image of advanced soundness inspections

- <Prior situation>
  - Utilize manually extracted past cases of similar damage for soundness inspections
- <Going forward>
  - AI outputs similar cases quickly
  - Use comprehensive check of similar defects and structures in soundness inspections



### Image of advanced soundness inspections





## Digitization of administrative procedures and improvement of convenience for road users

To improve productivity and convenience, we will promote streamlining of administrative procedures, cashless operation by making expressways ETC-only, and various types of payment inside and outside of expressways by using ETC.

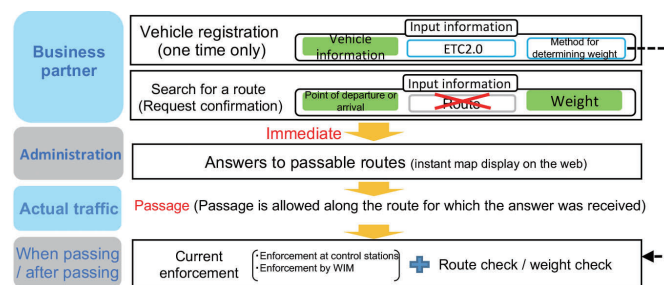
### Background / data

- <Number of permits for oversized and/or overweight vehicles>  
Approx. 390,000 (2017) -> Approx. 520,000 (2022) [approx. 1.3 times]
- <Road Occupancy Permit (aggregated results by Regional Development Bureau)>  
Number of permits: Approx. 40,000 (average annual number of permits for national highways under jurisdiction of MLIT: 2018 to 2022)

## Expediting procedures for oversize and overweight vehicles

Promote the computerization of road information, and expand the use of the Vehicle Passage Confirmation System for oversized and/or overweight vehicles, which allows registered special vehicles to pass through immediately.

### ■ Oversize and overweight Vehicle Passage Confirmation System (New system through promotion of digitalization)



## Digitization of road ledgers

Digitize road ledgers and make them available on the website.

## Digitization of procedures for permitting utilization at specified vehicle stopping facilities

Establish an environment where bus and other operators can apply online for stop permit procedures.

## Establish an environment where bus and other operators can apply online for stop permit procedures

Digitize location information of occupied properties to promote proper road management and prevent road construction accidents.

Centralized online procedures for road occupancy permits, including those from local governments.

Information on optical fiber capacity will be consolidated and disclosed to the public and local governments, and the format of licensing procedures will be standardized and made available online.

## Improving convenience of Expressways

Systematic promotion of cashless payment through the conversion of tollgates on expressways to ETC-only, to improve operational efficiency and reduce tollgate congestion.

Promote introduction of ETC multi-purpose use service(Ref. 1) on public toll roads and parking lots.

### ■ Examples of ETC-only tollgates



Metropolitan Expressway Inner Circular Route Kasumigaseki (clockwise direction) entrance

### ■ Example of ETC multipurpose use system application



November 2023 Introduced at Misato-Nagareyama Bridge toll road  
Introduced in private parking lots July, 2017

Ref. 1 : A system that enables the use of ETC technology outside of expressways while realizing cost reductions through the centralized processing of payment information.

# Improvement of safety, security and liveliness in road space

## - Improve comfort of regions and towns -

To realize a society in which all people can live safely, securely, and comfortably, we will promote traffic safety measures, universal design, the elimination of utility poles, and the creation of space for bicycle traffic. We will also promote initiatives to meet diverse needs for road space, including new mobility such as e-scooters and the creation of lively communities.

## Creating safe and secure road space

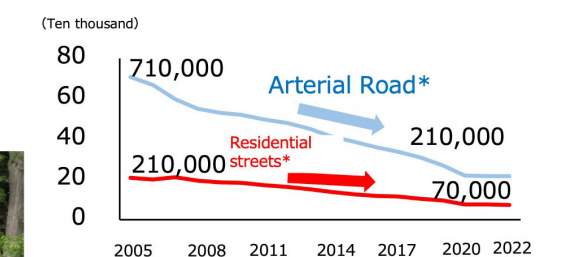
Necessary to promote traffic safety measures, as many accidents still occur even though the number of traffic accidents is on the decrease

- Necessary to promote the conversion of automobile traffic to motor vehicle-only roads and arterial roads, and to promote functional differentiation from residential streets.

As Japan faces an aging society with a declining birthrate, it is necessary to develop spaces that are safe, secure, and designed with consideration for the Universal Design.



### ■ Number of fatal and injury accidents by road type



\*Arterial roads: counted as roadway width of 5.5m or more  
\*Residential streets: counted as roadway width of less than 5.5m  
Source: based on annual report of traffic accident statistics

## Realization of diverse needs for road space

Diverse needs for road space, including the installation of open cafes and parklets on sidewalks\* to create liveliness and improve the attractiveness of the city.

\* Efforts to create stagnant space mainly by utilizing shoulders and stopping lane

### ■ Open cafe on the sidewalk



National Route 8: Tsuruga City, Fukui Prefecture

### ■ Installation of parklets



Minami Ise-machi Dori parklet: Nagoya City, Aichi Prefecture

### ■ Walking space with Universal Design



### ■ Secure space for passage of bicycles



Bicycle lane (Musashino City, Tokyo)

## Road policies diversify in response to the needs of the society

