



## Rules for the development of automated driving

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Automated driving systems will become widespread within the next two decades. In preparation, many corporations are conducting automated vehicle demonstrations and automated driving service experiments in Japan, and the Japanese government is holding public discussions on the development of relevant rules for public roads. In recognition of these fact, the Strategic Conference for the Advancement of Utilizing Public and Private Sector Data<sup>1</sup> released the “Charter for Improvement of Legal System and Environment for Automated Driving Systems” on April 17, 2018 (the “Charter”) and the “Public Private ITS Initiative/Roadmaps 2018” on June 15, 2018 (the “Roadmap”).

The Roadmap points out that automated driving systems will have profound effects on society, such as: (a) reduction of the number of traffic accidents, alleviation of traffic congestion, and lessening of the relevant environmental load; and (b) the potential to change conventional industrial structures related to the provision of automobile/transport services by changing the focus of business models and adding value to these services. Moreover, based on the Charter, the government revised the Road Transport Vehicle Act (“RTVA”) and the Road Traffic Act (“RTA”) in a manner that recognizes the generally used SAE<sup>2</sup> classifications which sort automated driving systems into levels (from 0 to 5; **Table 1**).

The Japanese Cabinet issued the revisal bills on March 8, 2019 and submitted them to the 198th ordinary Diet session. The Diet passed the bills revising the RTVA and the RTA on May 17 and May 28, respectively. With these revisions, the RTVA now addresses (up to) Level 4 automated driving on public roads and the RTA allows automated driving at Level 3 on public roads. This article outlines the main points of these two amendments, and touches on the apportionment of liability for damages in the case of an accident

<sup>1</sup> A subpanel of the government’s Strategic Headquarters for the Advanced Information and Telecommunications Network Society: IT Strategic Headquarters

<sup>2</sup> The SAE (Society of Automotive Engineers) is an international standardization organization for engineering, centered on automotive engineers.

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involving an automated vehicle (the Automobile Liability Security Act).

**【Table 1: Definitions of automated driving levels】<sup>3</sup>**

Level	Overview	Object and Event Detection and Response for Safe Driving by:
The driver performs some or all dynamic driving tasks.		
Level 0 No automation	<ul style="list-style-type: none"> <li>The driver performs all dynamic driving tasks.</li> </ul>	Driver
Level 1 Driver assistance	<ul style="list-style-type: none"> <li>A system performs vehicle driving control sub-tasks in either a longitudinal or lateral direction within an operational design domain.</li> </ul>	Driver
Level 2 Partial automation	<ul style="list-style-type: none"> <li>A system performs vehicle driving control sub-tasks in both longitudinal and lateral directions within an operational design domain.</li> </ul>	Driver
An automatic driving system (when activated) performs all dynamic driving tasks.		
Level 3 Conditional automation	<ul style="list-style-type: none"> <li>A system performs all dynamic driving tasks within an operational design domain.</li> <li>Where continued activation is difficult, an appropriate fallback response can be made to an intervention request made by the system.</li> </ul>	System (DDT fallback-ready driver)
Level 4 High automation	<ul style="list-style-type: none"> <li>A system performs all dynamic driving tasks and can respond within an operational design domain where continued activation is difficult.</li> </ul>	System
Level 5 Full automation	<ul style="list-style-type: none"> <li>A system performs all dynamic driving tasks and can respond within limitation where continued activation is difficult (in other words, not within an operational design domain).</li> </ul>	System

[The Japanese government will make efforts to realize: (i) for private vehicles, Level 3 automated driving systems on expressways by around 2020 and Level 4 automated driving systems on expressways by around 2025; (ii) for logistics services, truck platooning<sup>4</sup> on expressways by 2021, and automated driving systems at Level 4 on expressways after 2025; and (iii) for transport services, unmanned automated driving transport services at Level 4 in specified areas (such as underpopulated areas) by 2020. (Public-Private ITS Initiative/Roadmap 2018, p. 6)]

## 1. Amendment of the Road Transport Vehicles Act

### (1) Definition of “Automated Driving Equipment”

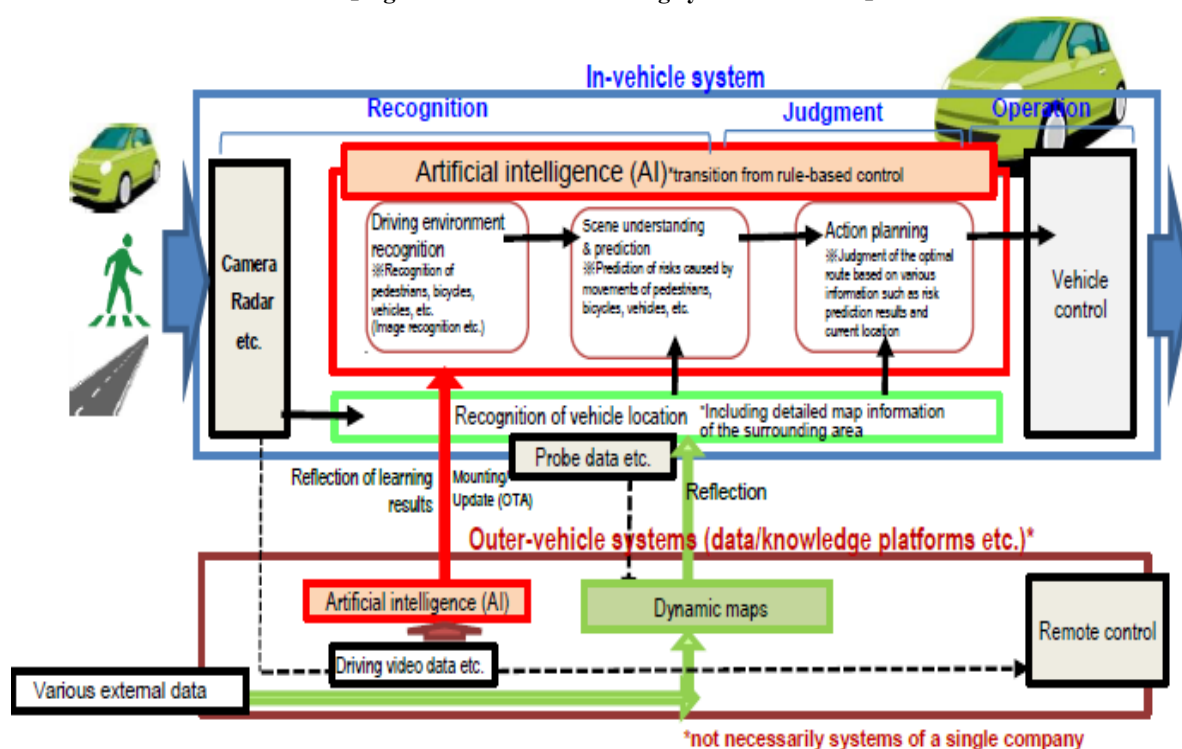
According to the current RTVA, automobile equipment listed in Article 41 must comply with the technical standards for safety, pollution prevention, and other environmental protections (Safety Standards) specified by the Ordinance of the Ministry of Land, Infrastructure, Transport, and Tourism (the MLIT), or it cannot be put into operational use. The revised bill adds “Automated Driving Equipment” to the equipment list.

<sup>3</sup> SAE International J3016 (2016) “Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles.”

<sup>4</sup> Linking two or more trucks in a convoy

In short, the definition of “Automated Driving Equipment”<sup>5</sup> is equipment: (i) that is composed of sensors for detecting the state of a vehicle and the surrounding environment (e.g. cameras and radar), as well as the computers and programs that process the information transmitted from such sensors (i.e. artificial intelligence), (ii) functioning to replace all of the capabilities related to the recognition, prediction, judgement, and operations of the driver (i.e. driving tasks), when it is used under the conditions specified by MLIT,<sup>6</sup> and (iii) that has a device for recording the information necessary to confirm such operational state (Figure 1)<sup>7</sup>. As MLIT will specify the conditions under which each item of such equipment can be used (the driving “environmental conditions”), depending on such conditions, the law may permit operation on roads at statuses of Level 3 or Level 4<sup>8</sup>.

【Figure 1: Automated driving systems overview】



[Public-Private ITS Initiative/Roadmaps 2018, p. 14]

According to the report published by MLIT in January 2019, specific criteria should be set based on technological development,

<sup>5</sup> A term newly established by the revised bills

<sup>6</sup> According to the “Safety Technology Guidelines for Automated Driving Vehicles,” a report published by the MLIT in September 2018, the following are listed as driving environmental conditions which are included in the Operational Design Domain (ODD: specific conditions of the design driving environment on which the automated driving systems operate normally).

- Road conditions (expressways, general roads, number of lanes, presence of lanes, dedicated roads for automated driving vehicles, etc.)
- Geographical conditions (city area, mountain area, geo-fence settings, etc.)
- Environmental conditions (weather, restriction on usage during nighttime, etc.)
- Other conditions (speed limit, necessity of coordination with signal infrastructure, limitations to specified route, need for security personnel, etc.)

<sup>7</sup> An operating state recording device is not essential for automated driving itself, but it is included to facilitate confirmation of circumstances after an accident (i.e. whether the accident was the result of driver error, system failure, etc.). This is a characteristic part of the above definition.

<sup>8</sup> At Level 3, the system basically operates in a specified area, but when there is an intervention request from the system, it is necessary for the driver to take over driving. At Level 4, in a specified area, the system will be responsible for all operations, and no driver intervention is expected.

evolving international standards, and the traffic conditions of Japan, among other factors; as such, the government intends to remain “flexible” throughout development of its “Safety Standards for Automated Driving Equipment.”<sup>9</sup> In addition, until the Safety Standards are formulated, the government will promote technological development based on its “Safety Technology Guidelines for Automated Driving Vehicles,” and proceed with updating the guidelines at a stage when it has consolidated (what it feels to be) the necessary technical knowledge.

**(2) Expansion of the scope of “Disassembly and Maintenance,” and mandatory provision of the technical information necessary for inspection and maintenance**

Currently, keeping a maintenance record (e.g. in a book) is required only for maintenance and/or alterations involving the removal or disassembly of equipment (defined in the RTVA as “Disassembly and Maintenance;” e.g. an overhaul). With the digitization and advancement of automobile technology, there is equipment which can be maintained and altered without removing/disassembling it from a vehicle, although such maintenance/alteration may affect compliance with Safety Standards. Therefore, the necessity to record such maintenance and/or alteration of equipment is increasing. As such, the term “Disassembly and Maintenance” should now include maintenance/alteration relevant to Automated Driving Equipment, which is carried out without removing/disassembling it (e.g. updating programs through the Internet), and be replaced with the term “Specific Maintenance.” In addition to the scope of maintenance/alteration to be recorded, with regard to advanced technology for highly developed vehicles, auto manufacturers must provide technical information, such as maintenance manuals, or else it will be impossible to carry out inspections and maintenance on such vehicles. The revised RTVA will oblige auto manufacturers, etc., to provide model specific technical information to business operators and users who carry out “Specific Maintenance,” although the Japanese government has so far only required the auto manufacturers to “make efforts” to provide such technical information.

**(3) Creation of a permission system for alteration, etc., of programs**

Manufacturers can update the programs built into the Automated Driving Equipment through software updates via the Internet without physically replacing the device, just as with a normal computer program. Those parties who would like to carry out software upgrades, that may not comply with the Safety Standards listed in the relevant MLIT ordinance, must obtain permission from MLIT. As there is a possibility that such “unauthorized” program updates will not meet the applicable Safety Standards, the revised RTVA will introduce a mechanism to check in advance.

**(4) Administrative work concerning technical information necessary for inspection**

Under the existing RTVA, the National Agency for Automobile and Land Transport Technology carries out examinations as to whether vehicles conform to Safety Standards (what they call the “Standard Conformity Examination”). They apply the same examination to the software updates noted above. With the introduction of such electronic inspection of vehicles, the agency will handle the administrative work concerning the technological information necessary for the Standard Conformity Examination specified by the relevant MLIT ordinances.

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<sup>9</sup> See footnote 5 (above)

## 2. Amendment of the Road Traffic Act

### **(1) Definition of “Automated Driving Equipment”**

The definition of “Automated Driving Equipment” is the same for the amendments concerning both the RTA and the RTVA.

### **(2) Obligation to install a device to record operational conditions**

Under the revised RTA, a vehicle with Automated Driving Equipment may not be operated without a “device for recording information necessary for confirmation of the operational state” (an “Operation Condition Recording Device” or “OCRD”) being installed, functional, and operational. Both the driver and the person accountable for the maintenance of the vehicle (or the automated driving equipment) are responsible for ensuring this requirement is met. Inclusion of such device makes it possible to confirm the circumstances at the time of an accident (such as driver errors, system malfunctions, etc.). Users of vehicles required to have an OCRD must preserve the data recorded by the devices, in accordance with a Cabinet Office Order, and provide such data and device when requested by a law enforcement officer that suspects a vehicle has been improperly maintained. Law enforcement officers may also request that the vehicle manufacturer take any necessary measures to make the record comprehensible (i.e. visible and audible).

### **(3) Compliance with the conditions of use**

The revised RTA quotes the RTVA conditions under which Automated Driving Equipment can be used and further mandates that drivers must not drive vehicles containing such equipment if that equipment does not satisfy those conditions of use.

### **(4) Use of a smartphone, etc.**

Article 71-5-5 currently stipulates that while driving a vehicle, drivers are prohibited from using mobile phones, etc., without a hands-free function, and/or while focusing their attention on the screen of an in-vehicle display. However, this provision does not apply if all of the following conditions are satisfied:

- (i) the vehicle concerned is not improperly maintained (See 2(2) above),
- (ii) the vehicle satisfies the conditions of use pertaining to Automated Driving Equipment (See 2(3) above), and
- (iii) upon a failure in (i) or (ii) above, the driver is capable of immediately recognizing such failure and effectively operating the vehicle without the Automated Driving Equipment.

According to (iii) above, if it is possible to immediately switch from automated driving to manual driving, and ensure that the driver can operate the vehicle, the prohibitions associated with the current Article 71-5-5 will not apply. Therefore, while driving with Automated Driving Equipment, the driver may use a smartphone or watch TV on an in-vehicle display. However, although drunk driving is explicitly prohibited in the RTA, the law does not offer any guidance on the issue of other behavior while traveling within a vehicle with an automated driving system (e.g. eating food, reading a book, etc.)<sup>10</sup>. In this regard, an additional resolution was made to clarify (to the extent possible) the judgement criteria for actions taken while driving a vehicle using Automated Driving Equipment.

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<sup>10</sup> In the Safety Technology Guidelines for Automated Driving Vehicles, the automated driving vehicles at Level 3 must have an HMI (Human Machine Interface), with functions such as driver monitoring, so that the driver can take over operation from the system. For example, if the driver goes to sleep, the system can issue an alarm; thus, it is premised that sleep will not be allowed.

### **3. Discussion on liability for damages in the case of an accident with an automated driving vehicle**

MLIT has formed a panel on the liability for damages in the case of an accident involving automated driving, and the panel published its report on March 20, 2018. This report examines the future of liability for damages, focusing on accidents involving the use of automated driving systems of Levels 1 to 4 (especially Levels 3 and 4) under the Act on Securing Compensation for Automobile Accidents; highlights of its Article 3<sup>11</sup> (and the associated proviso) are as follows<sup>12</sup>:

- (i) Even when using an automated driving system to operate a vehicle, the vehicle owner or business operator can put the vehicle into operational use for their own benefit and exercise operational control; therefore, for speedy relief of damages, during the transition period in which vehicles of Levels 0 to 4 are mixed together, it is appropriate to consider a mechanism to enforce the reimbursement of claims against automobile manufacturers by insurance companies, etc., while maintaining the conventional liability of the person who puts an automobile into use.
- (ii) In principle, it would be appropriate to deal with the damages caused by computer hacking in the same way as the governmental program guaranteeing compensation for automobile accidents involving a stolen car. However, this would not apply if the vehicle owner, etc., did not take necessary security measures or failed to fulfill maintenance inspection duties.
- (iii) The person who put an automated driving system into operational use (e.g. the driver) cannot receive compensation for damage to themselves (i.e. only “the death and bodily injury of another person” are targeted)<sup>13</sup>.
- (iv) “Due care” pertains to holding a person who puts an automobile into use liable: timely repairs and updates of software or system data, performed according to requirements of the automated driving system, are considered to comprise part of the duty of care.
- (v) The system should be able to operate the vehicle safely, even when external data errors or communication interruptions occur, and systems that cannot ensure such safety may be held to bear “defects in automobile structure or function.”

### **4. Discussions on automated driving, etc.**

As revision of the RTVA and RTA has involved delegation to Ministerial Ordinance, Cabinet Office Orders, guidelines and so on, deciphering specific contents, implications, and compliance procedures will require close attention. For example, the Cabinet Office Order will stipulate the duties surrounding recording of operational state but, in practice, the designs of Automated Driving Systems may not allow for the requisite data recording capabilities (leading to associated issues such as what items of data to record and how long to preserve them given personal information concerns). In addition, with the development of other technologies related to vehicles<sup>14</sup>, there is increased “movement” in the transportation industry, including the field of automated driving, that may profoundly transform business models; careful consideration with a wide perspective will be required.

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<sup>11</sup> A person that puts an automobile into operational use for that person's own benefit is liable to compensate for damage arising from the operation of the automobile, if this results in the death or bodily injury of another person; provided, however, that this does not apply if the person and the driver prove (a) that they have exercised due care in connection with the operation of the automobile, (b) that the injured party or a third party other than the driver has acted intentionally or negligently, and (c) that there was no defect in automotive structure or function.

<sup>12</sup> Basically, the current policy maintains the responsibility imposed by Article 3 of the Act, and such policy is reflected in the “Charter for Improvement of Legal and Environment for Automated Driving Systems.”

<sup>13</sup> Already, insurance companies are selling insurance for automated driving demonstrations, and voluntary insurance that supports automated driving.

<sup>14</sup> Such as so-called “CASE” (Connected, Automated driving, Sharing, Electric) vehicles and the combination of a plurality of transportation methods seeking integration into one “MaaS” (Mobility as a Service)



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