7 Other Achievements and Activities

Other Achievements and Activities

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1 Other Implemented Projects

This section introduces the projects implemented in the second phase of SIP-adus (Cross-ministerial Strategic Innovation Promotion Program (SIP) Automated Driving for Universal Services) which are not introduced in the Mid-Term Results Report or in Section 7: "Other Achievements and Activities," nor in Sections 2 to 6 of this report but conducted during the second phase of SIP-adus, for reference in future research and development of automated driving.

1.1. Commissioned Project on Survey on Environmental Improvement for Practical Use of Transport Services by Automated Driving in the New Town Area

In 2019, a survey project was conducted in the new town areas of Tama City in Tokyo and Sanda City in Hyogo Prefecture, in cooperation with the Ministry of Land, Infrastructure, Transport and Tourism, local governments, and local transportation service providers, in order to organize the issues for the introduction of public transportation services which utilize automated driving.[1] The reason for selecting the new towns was that many of the new town areas were developed in the period from the mid 1960s to the mid 1980s, many of the residents are aging, and they are located in hilly areas, making the provision of public mobility services an urgent issue. Although they were only short-term tests of about one week, the residents of the new town areas could try actually riding a vehicle, and their raw opinions could be gathered through questionnaires and interviews, including their needs, expectations, and concerns about automated driving. On the other hand, issues in urban space design, business models, and public acceptance for social implementation were identified through study meetings with stakeholders.

1.2. Survey on Utilization Method of V2X (vehicle-to-everything) Information for Ensuring Traffic Safety under Coexisting Traffic – Simulation of Evaluation of Impact of Autonomous Vehicles on Traffic Flow –

A study was conducted on the impact of automated vehicles on general vehicles and traffic flow, with the aim of utilizing the results in the planning of traffic safety measures and traffic management operations when general vehicles and automated vehicles are running together.

Fixed-point cameras installed at observation points within the FOTs (Field Operational Tests) in the Tokyo waterfront area acquired data on current traffic flow and the traffic volume and vehicle behavior when automated vehicles were running, the impact of automated vehicles in mixed traffic was collated via traffic flow simulations based on this data, and a study of how it could be used in planning traffic safety measures and traffic management operations was conducted.

1.3. Survey for Introducing Precise Docking Technology by Automatic Driving to BRT (Bus Rapid Transit)

The importance of the accurate arrival of buses at bus stops without any gap is recognized as an element of barrier-free transportation, and technology for precision docking at bus stops using magnetic markers was studied in the Haneda area of the FOTs in the Tokyo waterfront area in the automated driving of the second phase of SIP-adus. On the other hand, in the first phase of SIP-adus, due to the development schedule the guiding line method, which uses a camera to read a guiding wire and has been successfully introduced overseas, was adopted for the

buses that were to be used in the Tokyo 2020 Olympic and Paralympic Games, and technical verification was required for the system usage conditions of this guiding wire system, such as weather and illumination, as well as the durability of the guiding wire. This project also incorporated testing of the effects on barrier-free access, the reduction of riding and getting off time, and the prevention of falls when riding and getting off and when the bus stopped and started.

1.4. Study of Overseas Trends, etc., in Preparation for International Collaboration Regarding Traffic Environment Information

The SIP-adus has worked on the construction of dynamic maps since the first phase, and the construction of a mechanism to utilize dynamic road traffic environment data linked with high-precision three-dimensional map information in the second phase. To promote the international standardization of road traffic environment data, researches of domestic and international standardization trends have been conducted and international standardization activities have been supported.

In particular, study meetings with various Japanese organizations and experts have been conducted, focused on exchanges with overseas organizations that promote industry standardization of high-precision 3D map information and road traffic environment data (e.g. the Open Auto Drive Forum (OADF)).[2]

In addition, the creation of mechanisms for the distribution and management of mobility data (e.g., the European Commission's NAPCORE,[3] which coordinates National Access Points, and the German Federal Ministry of Transport and Digital Infrastructure's Mobilithek)[4] has been active in Europe in recent years, and an additional investigation of these mobility data distribution and management mechanisms was conducted, and they were used as a reference for promoting the development of the MD communet®[5], a portal site for road traffic environment data.

<div style="border:1px solid #000; padding:4px; display:inline-block; text-align:center; font-weight:bold;">2</div> ## Handling of SIP-adus Results and Assets

In the final fiscal year, the Intellectual Property Committee discussed the handling of intellectual property obtained through the second phase of SIP-adus and organized it as follows. Also, how the website, research and development facilities, test data, etc. will be stored and accessible after the end of the second phase of SIP-adus is described.

2.1. Handling of Intellectual Property

In the terms and conditions of the operation consignment contracts between the contractors and NEDO, intellectual

property rights are defined as the right to receive industrial property rights (patent rights, utility model rights, design rights, circuit layout-design exploitation rights, and copyrights), industrial property rights, copyrights, and know-how. This section will explain the handling of patents and copyrights.

(1) Patents

The Japanese version of the Bayh-Dole Act (Article 17 of the Industrial Technology Enhancement Act,[6] hereinafter referred to as the "Bayh-Dole Act") states that the intellectual property rights relating to all consigned research and development (including that conducted through national research and development corporations, etc.) to which ministries and agencies provide government funding may belong entirely to the contractor (e.g., a private company) if the contractor agrees to certain conditions. Therefore, the rights to the patents obtained as a result of the SIP-adus shall belong to the contractors based on the Bayh-Dole Act.

(2) Copyrights

Copyright to the results reports for each project registered in NEDO's Result Report Database[7] belongs to NEDO. The copyright to other materials, such as progress report materials of projects presented to working groups and taskforces, and presentation materials used at various events, belong to the respective authors, and NEDO will not assert copyright nor exercise any moral rights. However, when the results of the second phase of SIP-adus are cited in other materials, credit is to be given that the results are from the SIP-adus project.

Example of credit:

> This [paper/report/presentation, etc.] contains the results of "The Second Phase of Cross-ministerial Strategic Innovation Promotion Program (SIP) Automated Driving for Universal Services" (NEDO management number: JPNP-18012) which was implemented by the Cabinet Office and served by the New Energy and Industrial Technology Development Organization (NEDO) as a secretariat.

2.2. Types of Websites and Actions Following the End of the Second Phase of SIP-adus

Websites have been used for proactive information distribution in the second phase of SIP-adus. The following describes each website's contents and how it will be handled following the end of the second phase of SIP-adus.

(1) SIP-adus Website[8]

The SIP-adus website is managed and operated by the Cabinet Office and NEDO, and contains reports on the results

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of each project, presentation materials for events such as the SIP-adus Workshop, and the driving plan for the FOTs in the Tokyo waterfront area. It is planned for the SIP-adus website to remain accessible for several years after the end of the second phase of SIP-adus.

(2) SIP-café[9]

SIP-café is an online community for sharing ideas about the automated driving society, and is a website operated and managed by a contractor in accordance with NEDO's consignment of research as part of the projects to foster public acceptance. SIP-café is aimed at the general public and its contents include automated driving-related news, interview articles, columns by experts, and announcements and reports on events related to fostering public acceptance. The successor of SIP-café is still under discussion at the time of writing this final report, so please refer to the SIP-adus website for the latest information.

(3) Websites Managed and Operated for Respective Projects

The websites operated and managed by contractors in accordance with the research and development work consigned by NEDO (e.g. Jidosapo[10] for regional FOTs and the road traffic environment data portal site MD communet®) belong to the respective contractors, and are planned to be managed and operated by them after the completion of the second phase of SIP-adus.

2.3. Research and Development Facilities, Experimental Data, etc.

Fixed assets and cost items acquired during the research and development will be owned by the contractor in accordance with the terms and conditions of the operation consignment contract between the contractor and NEDO, on the premise that they will continue to be used or disposed of after the contract ends. The facilities and equipment used in the FOTs in the Tokyo waterfront area are under discussion for transfer to a subsequent project.

The data obtained from the FOTs belongs to the implementer of the tests, who will manage it appropriately based on a data management plan. Special data use agreements were established for the experimental data obtained in the FOTs in the Tokyo waterfront area and the data was provided to those who requested it. Specifically, the provision of experimental data from the V2I (Vehicle-to-Infrastructure) FOTs, which used narrowband wireless communications and roadside infrastructure, began on May 21, 2021, and the provision of data obtained from the V2N (Vehicle-to-Network) FOTs, which used a wide-area public network, began on May 31, 2022.[11] Regarding V2N, in addition to video data etc. from dashcam

recorders, data from the equipment installed in the test vehicles used in four FOTs (lane level road traffic data, rainfall information, predictive SPaT (Signal Phase and Timing) information, and simulated emergency vehicle location information) was provided. The method of applying for the data involved applying to NEDO's contact point for the FOTs in the Tokyo waterfront area after consenting to the terms of use for the FOTs in the Tokyo waterfront area data. The data usage period will be until the end of the second phase of SIP-adus for both V2I and V2N data.

Software and programs created in the course of research and development activities are copyrighted by the creator based on the Bayh-Dole Act.

3 Report of Results for Each project

In the second phase of SIP-adus, the results reports for each project are available from the following two repositories. Please use them if you want to obtain more detailed information after reading the mid-term results reports or this final results report.

3.1. SIP-adus Website

The reports by project and by fiscal year can be downloaded from the page linked from the "Research and Development" tab of the SIP-adus website. This page contains detailed reports in Word format and summary reports in presentation format. The English versions of the summary reports are available on the English site of the SIP-adus website. Those who wish to read the reports can freely download the PDF files.

Also, this Final Report and the Mid-term Report, the PDF version of the SIP-adus Use Cases for Cooperative Driving Automation[12] and the PDF version of the Roadmap for Communication Methods for Cooperative Automated Driving[13] are also registered on this site and can be downloaded in whole or in parts.

3.2. NEDO's Results Reports Database

The final results reports for each project on the SIP-adus website are also registered in NEDO's results reports database. This database only has the detailed versions. NEDO's results reports database can be accessed from the "Publications" tab on the NEDO website, but consent to the database's terms of use and user registration are required. This database contains reports of all NEDO projects, so it is necessary to filter the search by specifying keywords. If you specify "P18012" as the project number, it will filter the results to the final reports of the second phase of SIP-adus. Although only the detailed versions are registered in NEDO's results reports database, they will be accessible for a longer period of time.

4 Information Distribution Through Lectures and Paper Presentations

The SIP-adus research results continue to be presented and lectured at conferences and events outside of the SIP-adus, mainly at universities and research institutes. Table 1 shows the major research presentations and lectures.

Table 1: Presentations at Other Conferences by project (excerpt)

Project Name	Major Conference or Publication
Approach development for improving an automated driving validation environment in virtual space	Safety Engineering Symposium 2021 Gunma University Next Generation Open Innovation Council FAST-zero '21 Automotive Functional Safety Conference 2021/2022 Science Trends February 2022 CAE Forum 2022 Invited Lecture IEEE ICCVE 2022 Society of Automotive Engineers of Japan, Autumn Congress 2022
Research on the recognition technology required for automated driving technology (levels 3 and 4)	Journal of TRB IEEE ITSC2021 IEEE IV2021 FAST-zero '21 ICAM2021 IEICE journal
Research and study on HMI and safety education methods for advanced automated driving	ICICT2020/2021 HCI International 2020 TRANSLOG2020/2021 IEEE TALE2020 ITS Symposium JSET 2021 IEA2021 IEEE IV2021/2022 FAST-zero '21, HFES2021
Research on assessment of the impact of automated driving on society and the economy and on measures to promote deployment	Science Council of Japan 2019 Japan ITS Promotion Forum Automotive Software Frontier CICV 2022
Strategic planning for fostering social acceptance and survey regarding its evaluation	Lectures throughout Japan in cooperation with Kyodo News and regional newspapers on the theme of "Considering Mobility in the 100-year Life Era: The Spread of Automated Driving and Consumer Awareness"

5 Conclusion

Various research and development activities have been conducted in the second phase of SIP-adus. At the same time, there has also been a focus on the distribution of information on the results both domestically and internationally. The results are summarized in the Mid-term Result Report and this report, as well as in detailed results reports for each project. We hope that they are referred to and are useful for future research and development related to automated driving, and that they help realize the automated driving society that is aimed for in "The Future of a Digitalized Transportation Society 2022"[14].

[References]

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(12) SIP Use Cases for Cooperative Driving Automation, https://en.sip-adus.go.jp/rd/rddata/usecase.pdf, (accessed on 22nd October 2022)

(13) SIP Roadmap of V2X Communication Methods for Cooperative Driving Automation - Activity Report of Task Force on V2X Communication for Cooperative Driving Automation in FY2021, https://www.en.sip-adus.go.jp/rd/rddata/roadmap.pdf, (accessed on 6th December 2022)

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