

# 7 Other Achievements and Activities

## Other Achievements and Activities

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This final chapter introduces a number of SIP-adus projects expected to prove useful in upcoming discussions of automated driving that were not touched upon elsewhere. It also describes already announced research results, the provision of research themes for field operational tests (FOTs) in the Tokyo waterfront area, and the conveying of achievements.

### 1 Other Major Projects

This section presents a number of projects not mentioned in Chapters 2 to 6 that are promising in terms of laying the groundwork for further research and development on automated driving.

#### 1.1. Research and Study of Common Reference Point (CRP) in High Definition Map

Since it is unrealistic to expect all high precision 3D maps installed in automated vehicles to be the same, divergence in locations between maps is an issue. Addressing that issue requires using a common (high precision relative location referencing) protocol to provide a shared understanding of the representation of the location of vehicles and other entities. After defining the automated driving needs concerning the reference point formalized for that purpose (common reference point (CFP)), we defined three use cases (1: fallen objects and congestion, 2: support for merging on highways, and 3: intersection on a general road). We then studied the theoretical CRP functional requirements and items to implement for CRPs (e.g., features to define as anchorage points (APs), methods of defining CRPs, and methods of managing CRPs). Our study remained theoretical because at present, the issue of differences in recognition due to different high precision 3D maps has yet to actually manifest. However, since this technology will be necessary as automated driving evolves and becomes more widespread, we expect to capitalize on this research to determine concrete factors such as definition or maintenance methods.

#### 1.2. Survey Concerning Proposals to Build an IP Strategy

In light of points made by the Governing Board in 2019, we gathered experts on intellectual property and compiled patent and standardization trends for the purpose of building an intellectual property strategy. We asked strategy and business models concerning competitiveness from SIP-adus and related Japanese industries, and held discussions that also involved the participation of corporations aiming for commercialization.

We selected the Approach development for improving an autonomous driving validation environment in virtual space and

Building a portal site service for multi-purpose deployment of geographical data (from the Surveys and research on design and creation of an architecture for automated driving and driver assistance project) as crucial themes. For the first theme, we listed the advantages and disadvantages of open and closed elements, and determined the scope of items to make open as part of DIVP and to keep closed. For the second theme, we summarized the points of caution and intellectual property concerns involved in deploying the various items of geographical data we collated, and in combining them and applying them to social implementations. Our summary will be incorporated in the building of the portal site by NTT Data.

#### 1.3. Basic Survey of Automated Buses That Are Convenient for Vulnerable Road Users

We conducted validating research and FOTs to clearly identify the requirements for the commercialization and social implementation of an automated bus-based transportation that can be used with greater confidence for the purpose of offering autonomy to vulnerable road users such as people using wheelchairs, people with a visual, hearing, or other disability, or people with a stroller.

Specifically, we investigated and analyzed the needs of vulnerable road users as well as trends in and outside Japan, and worked with collaborators such as the Japan Automobile Manufacturers Association (JAMA) and other stakeholders to draw up a concept for a future bus that vulnerable road users can use with confidence. We then recruited monitor evaluators and used a mock-up and VR video to conduct an actual evaluation in June 2021. Our next step will be to propose design guidelines that also cover proposals for the interior layout.

#### 1.4. Study of Communication Protocols That Realize the Cooperative Driving Automation Use Cases

The 2019 Study of Communication Technologies for Use by Automated Driving Systems project made a detailed study and analysis of use cases pertaining to the use of existing and new wireless communication systems in automated driving systems. Based on that study, the Task Force (TF) on V2X communication for Cooperative Driving Automation worked to classify automated driving and advanced driving safety support systems into categories such as offering look-ahead

information on highways or general roads, or providing support for merging and lane changes, eventually compiling the 25 cases in the Use Cases for Cooperative Driving Automation divided in three categories.

The TF is now working with the ITS Info-communications Forum (ITS Forum) to codify the communication requirements for those cooperative driving automation use cases (e.g., data volume, communication area, allowable latency, transmission rate, and packet reception ratio). This codification will be used to summarize issues in short range (700 MHz band, 5.9 GHz band) and wide area (5G and other cellular networks) communication and formulate solutions. Simulations will then be used to validate the appropriateness and feasibility of those solutions. Keeping advances in communication technologies in mind, concrete requirement specifications for the use cases and their respective wireless communication technologies will be prepared, and a roadmap for communication protocols for cooperative driving automation and advanced driving safety support systems will be formulated.

## 2 Provision of Data on the Field Operational Tests in the Tokyo Waterfront Area

The FOTs in the Tokyo waterfront area conducted from October 15, 2019 to the end of February 2021 involved the participation of 29 organizations from Japan and other countries. Tests related to automated driving on public roads were performed, covering a total distance of 64,591 km in the Tokyo Waterfront City area alone. These large-scale FOTs also included impact assessments and other evaluations, and provided valuable experimental data. Asking SIP-adus stakeholder (e.g., experiment participants, contractors, and universities or other research institutes) about their needs regarding the experimental data revealed that the needs of stakeholders were considerably diverse, particular among universities and other research institutes. We therefore build a system to make the experimental data collected in the FOTs in the Tokyo waterfront area available and enable research institutes and other organizations engaged in technology or other development that will contribute to the commercialization of automated driving to effectively leverage that data.

The data provided includes videos from roadside cameras or drive recorders, vehicle travel paths, infrastructure logs, and vehicle behavior (e.g., speed, acceleration). A portion of the data can be visualized using a viewer, but most of it is typically provided as raw data in various formats. Users are responsible for extracting and processing or otherwise manipulating the data themselves.

People who wish to use the data must consent to the Terms of Use for the Data from the Field Operational Tests in the Tokyo Waterfront Area and submit an application to the NEDO contact point for the FOTs in Tokyo waterfront area. NEDO will determine whether to approve or reject the submission after consulting the FOTs in the Tokyo Waterfront Area Consortium and, if necessary, the Intellectual Property Committee. If the submission is approved, the FOTs in the Tokyo Waterfront Area Consortium will provide the data. Note that period of use of the data is the duration of the SIP-adus project.

## 3 Conveying Achievements

### 3.1. Announcements to the Media

It is important to foster awareness and understanding of SIP activities through press releases and other media announcements, and all supervising government agencies, contractors, and management

agencies issue press releases. Projects featuring extensive press releases include the regional field operational tests (press releases by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) and contractors), the portal site from the Surveys and research on design and creation of an architecture for automated driving and driver assistance project (press releases by the Cabinet Office and NEDO), the Kyoto Application Contest (press releases by the Cabinet Office, the City of Kyoto, and other stakeholders), and the holding of the SIP-adus Workshop and Mid-Term Report Conference. These press releases introduced SIP activities in many media outlets. In addition, the safe driving outpatient care aspect of the Research on ADAS for People with Visual Field Defects project was featured by media outlets such as the NHK Journal, the Yomiuri Shinbun, and the Nihon Keizai Shinbun.

### 3.2. Conveying Information via Websites or Social Media

Project reports from past SIP-adus research are available in Japanese and English (summary only) from the SIP-adus website. Presentation material and panels from past SIP-adus Workshop events can also be viewed on the site at any time. The SIP café website makes effective use of videos to present news related to automated driving and event information, columns by, or interviews with, specialist and experts, test ride reports and other material in an even more accessible manner.

The project reports are also available from the NEDO Results Report Database on the NEDO website.

### 3.3. Conveying Information at Various Events

We have organized awareness raising activities and test rides targeting the media, and also hosted dialogs with the general public involving automated driving promotional leaders and residents in the regions, regional automated driving summits gathering local leaders in areas conducting FOTs, the Mid-Term Report Conference, and summits by specialists and experts. The main publicity events held in each fiscal year are shown in Fig. 1.

Of those, the Mid-Term Report Conference held on March 25 and 26, 2021, which shares the same goal of making the SIP-adus activities and achievements of the past three years broadly known and understood as this mid-term report, took place at the Tokyo Ariake venue and targeted a Japanese audience. Zoning for the exhibits was not based on technologies, but rather organized in a sequence that was easy for visitors to understand, and congenial names were chosen. Conference exhibits also featured actual automated vehicles and devices from the FOTs, as well as a hands-on corner. An online guided tour enabling mutual communication was also arranged for online visitors. The archives of the Mid-Term Report Conference were posted to the online site archive in July 2021.

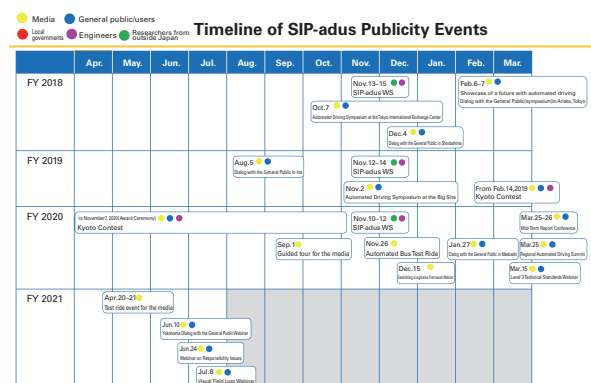


Fig. 1: Main Publicity Events by Fiscal Year

## Other Achievements and Activities

### 3.4. Conveying Information at Events outside Japan

Many automated driving-related events are also held throughout the world. Major events include the Transportation Research Board (TRB) Annual Meeting and Automated Road Transportation Symposium (ARTS, formerly Automated Vehicles Symposium (AVS)) in the U.S., the Transportation Research Arena (TRA) and European Conference on Connected and Automated Driving (EUCAD) in Europe, and the ITS World Congress which rotates annually between the U.S, Europe, and the Asia-Pacific Region. Before the COVID-19 pandemic, SIP-adus sent several experts and actively made presentations and participated in sessions. At the time of writing (July 2021), many events are held online, limiting participation from Japan to that medium as well. Events at venues are expected to return gradually, and we will continue to emphasize technological exchanges and the conveying information from Japan.

### 3.5. Other Research Achievements and Announcements in Presentations

In addition to making its results broadly understood by many people, SIP-adus is actively pursuing opportunities to make presentations in an effort to strengthen coordination with other related conferences. The research announcements and presentations (including speeches) made at other academic conferences until March 2021 are listed by SIP-adus project in Table 1.

| Project name  | Main events or organizations where presentations or papers were presented  |
|---|--|
| Development of Method to Provide Autonomous Driving Assessment Environment in Virtual Space                           | MotorFan interview, Automotive Functional Safety Conference, Automotive Software Frontier 2020, Society of Automotive Engineers of Japan   |
| Research Related to Recognition Technologies and the like Necessary for Automated Driving Technology (Levels 3 and 4) | Society of Automotive Engineers of Japan, Symposium on Sensing via Image Information ION GNSS+ 2020, IV 2020   |
| Investigation of HMI and Safety Education Methods Adapted to Advanced Automated Driving                               | HCI International 2020, Automated Vehicles Symposium 2020, Society of Automotive Engineers of Japan, IEEE international conferences, ITS Symposium JEITA Ergonomics Committee, Nihon Kogaku Kenkyukai Information Processing Society of Japan            |
| Surveys and Research on Design and Creation of an Architecture for Automated Driving and Driver Assistance            | Aichi ITS Council, Public transportation open data frontlines  |
| Research on ADAS for People with Visual Field Defects   | Japan Imaging and Perimetry Society, Japan Glaucoma Society, International Association of Traffic and Safety Sciences, Society of Automotive Engineers of Japan, World Glaucoma Congress, CBI Annual Meeting, Kansai Association of Corporate Executives |
| Basic Survey of Automated Buses That Are Convenient for Vulnerable Road Users   | Needs and seeds matching networking event 2020   |

Table 1: Other Conferences or Organizations Where Announcements Were Made, By Project

Similarly, ongoing communication with various stakeholders is essential to fostering public acceptance. We will therefore not only plan events from a long-term perspective, but also focus on deepening understanding through mutual communication as we cooperate with events organized by other government agencies.

### 【References】

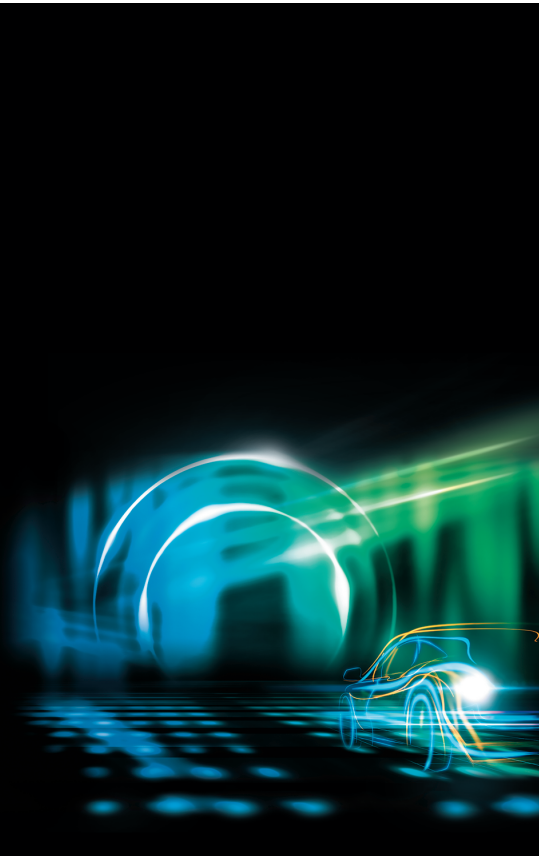
- (1) Cross-Ministerial Strategic Innovation Promotion Program (SIP) Automated Driving for Universal Services R&D Plan, May 26, 2021.
- (2) Cross-Ministerial Strategic Innovation Promotion Program (SIP) Automated Driving for Universal Services R&D Plan, May 14, 2021.
- (3) SIP-adus Project Reports:  
<https://en.sip-adus.go.jp/rd/>
- (4) SIP café website  
<https://sip-cafe.media/info/>
- (5) SIP Use Cases for Cooperative Driving Automation:  
<https://en.sip-adus.go.jp/rd/rddata/usecase.pdf>
- (6) NEDO Results Reports Database (user registration required):  
<https://en.sip-adus.go.jp/rd/rddata/usecase.pdf>

### 【About the author】

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## 4 Conclusion

Spreading awareness and fostering awareness of SIP activities by publishing papers, providing data, engaging in public events, and advertising is a crucial activity that we will continue to pursue.



## SIP 2nd Phase : Automated Driving for Universal Services — Mid-Term Results Report (2018–2020)

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