Report on the development of social implementation and human resource development programs centered on social acceptability, stakeholder coordination, etc.

March 2024

BOLDLY Co., Ltd.

BOLDLY
UPDATE MOBILITY

Table of contents

Research background and purpose

Background that led us to consider practical application and commercialization
Each region has regional transportation operators with a history of over 100 years, and they have a history of building safety and security by setting their own private standards that go beyond national regulations. In order to continue the safe and secure assets that Japan has built for the next 100 years, we will work to develop human resources who support transportation.
We will develop human resources and build a system based on the assumption that 10,000 autonomous buses will be in operation in 2030.

自動運転立国のシナリオ 17

A.望ましいシナリオ

①2020年代、国内で自動運転シャトル普及に成功

約10,000台の自動運転シャトルで、地域公共交通の持続化モデル構築に成功

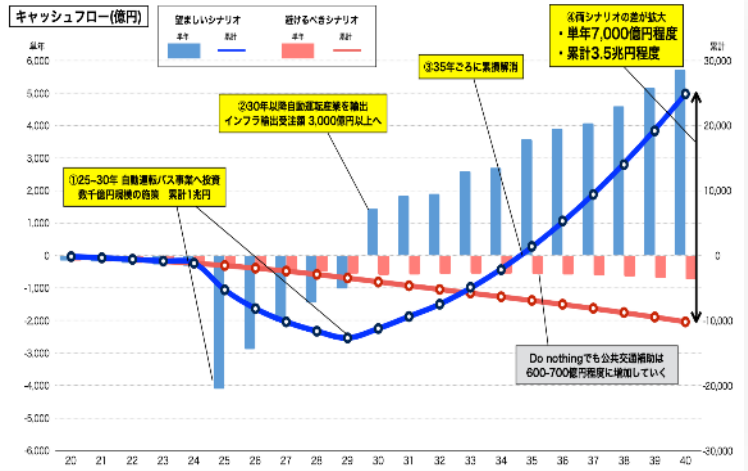
②2030年代には、日本型事業モデルを海外輸出に成功

法、製造認証、インフラ、社会実装、保険、メンテナンス、データ基盤、アプリなど
➡高齢化が進むASEANや、インフラ老朽化が進む欧米各都市に輸出

B.避けるべきシナリオ

自動運転産業の育成に失敗(第2のスマホ) 、公共交通も廃線減便が止められず
自動車産業における国際的リーダーシップを完全に失う

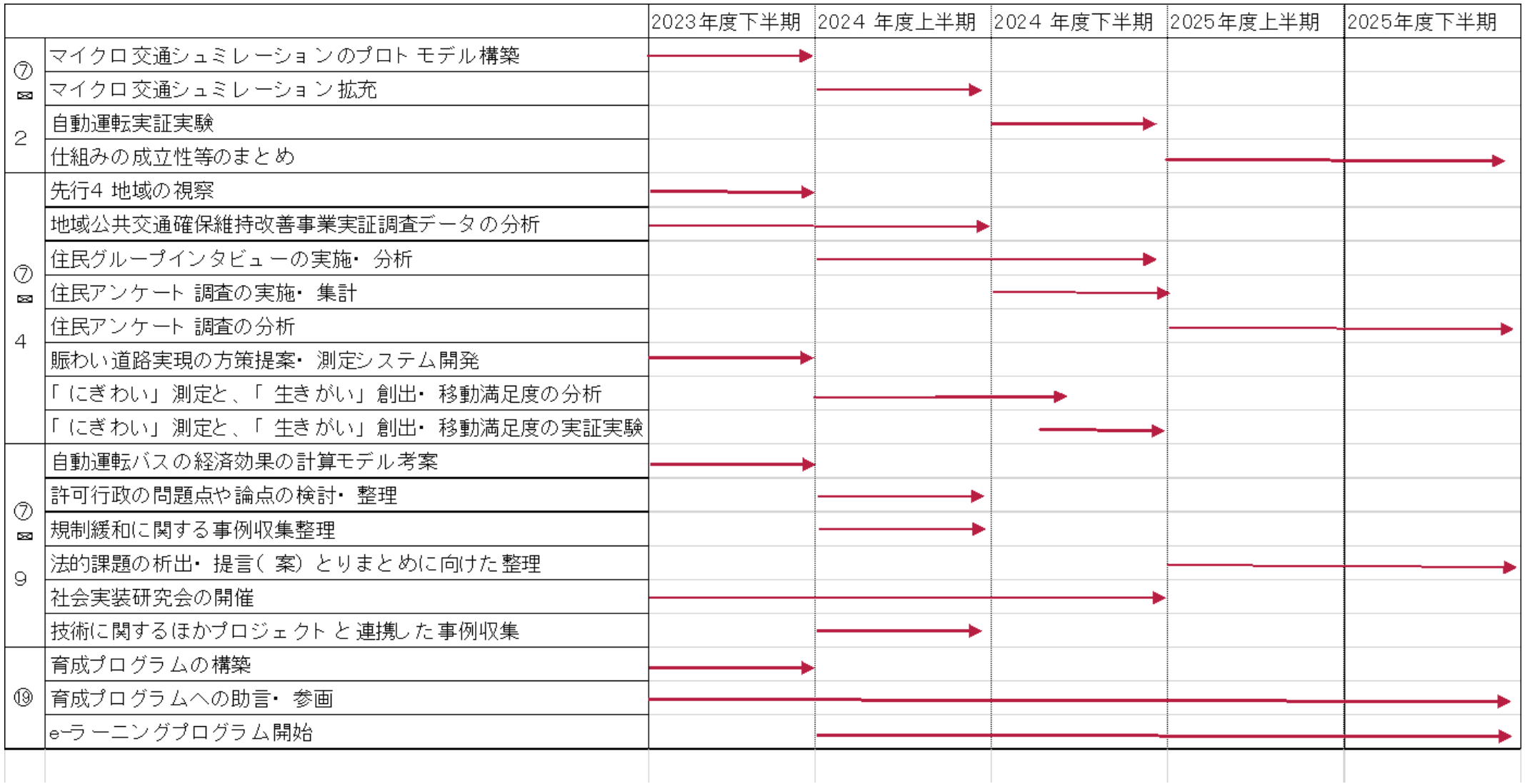
2020年代が世界をリードするラストチャンス 18



Research overview

Research items	Report summary
⑦-2 Developing a theory of street network configuration planning for existing urban areas	We developed a method for extracting the spatial introduction range of slow mobility using high-granularity human flow data, targeting cities where autonomous driving demonstrations were conducted. We also constructed a micro-traffic simulation targeting that space.
⑦-4 Acquiring social acceptance and cooperation, as well as establishing rules, for residential and bustling roads.	In addition to conducting inspections of the four preceding areas, we have begun analysis using existing resident survey results. Based on these results, the research policy for 2025 and beyond will be determined. We plan to conduct group interviews with residents and conduct an original questionnaire that includes measuring well-being. In addition, we have begun analysis using data from a demonstration survey of subsidies for securing, maintaining, and improving local public transportation.
⑦-9 Proposing systems and rules	Devising a calculation model for the economic effects of autonomous buses Autonomous Driving: Social Implementation Research Group, survey of trends in legal systems and rules in each country Lead discussions on collaboration, responsibility, and standardization with various industry organizations Proposal of “code of conduct” for various stakeholders regarding autonomous driving
⑲ Human resource development for social implementation of services	We have compiled the know-how necessary to discover, develop, and retain human resources in the four regions where we have developed autonomous bus services (Sakai Town, Ibaraki Prefecture, Kamishihoro Town, Hokkaido, Nisshin City, Aichi Prefecture, and Ota Ward, Tokyo (Haneda Innovation City)). We will develop e-learning programs and open a mobility knowledge center.

Process


2023年度下半期
2024 年度上半期
2024 年度下半期
2025年度上半期
2025年度下半期
⑦
2
マイクロ交通シュミレーションのプロト モデル構築
マイクロ交通シュミレーション拡充
自動運転実証実験
仕組みの成立性等のまとめ
⑦
4
先行4 地域の視察
地域公共交通確保維持改善事業実証調査データの分析
住民グループインタビューの実施・ 分析
住民アンケート 調査の実施・ 集計
住民アンケート 調査の分析
賑わい道路実現の方策提案・ 測定システム開発
「にぎわい」測定と、「生きがい」創出・ 移動満足度の分析
「にぎわい」測定と、「生きがい」創出・ 移動満足度の実証実験
⑦
9
自動運転バスの経済効果の計算モデル考案
許可行政の問題点や論点の検討・ 整理
規制緩和に関する事例収集整理
法的課題の析出・ 提言(案)とりまとめに向けた整理
社会実装研究会の開催
技術に関するほかプロジェクトと連携した事例収集
⑲
育成プログラムの構築
育成プログラムへの助言・ 参画
e-ラーニングプログラム開始

The goal

- Create a manual for the nationwide implementation of autonomous-driving society.
- Make recommendations for regulatory reform and the development of laws that should be in place, based on the issues in the system to be targeted following the study of strategies in sub-issue I, and the issues from the regions where BOLDLY autonomous buses areput into practical use.
- Aim for 900 e-learning participants per year.
- To build a system in which entrepreneurs who have received education by FY 2027 will become human resources who can develop themselves and can be expanded horizontally to surrounding areas.
- Complete community formation and collaboration between local governments and ministries to continuously implement human resource development and startup creation support.

⑦-2

Developing a theory of street network configuration planning for existing urban areas

Construction of a road space configuration method based on the introduction of autonomous vehicles

1． Extraction of low-speed travel demand using high-granularity human flow data and study of the scope of reconfiguration of urban road space

Utilizing high-granularity human flow data (GEOTRA activity data), we analyzed and visualized the spatial extent and frequency of use of walkability within the city (Figure-1).In addition, cluster analysis using modularity indexes was applied to identify mobile communities traveling at speeds of 3-4 km/h (Figure-2).In FY2024, we plan to evaluate the walkability of the extracted urban space and study the configuration of new road space, including the scope of reconfiguration of the street network with the introduction of autonomous vehicles and the location of mobility hubs.

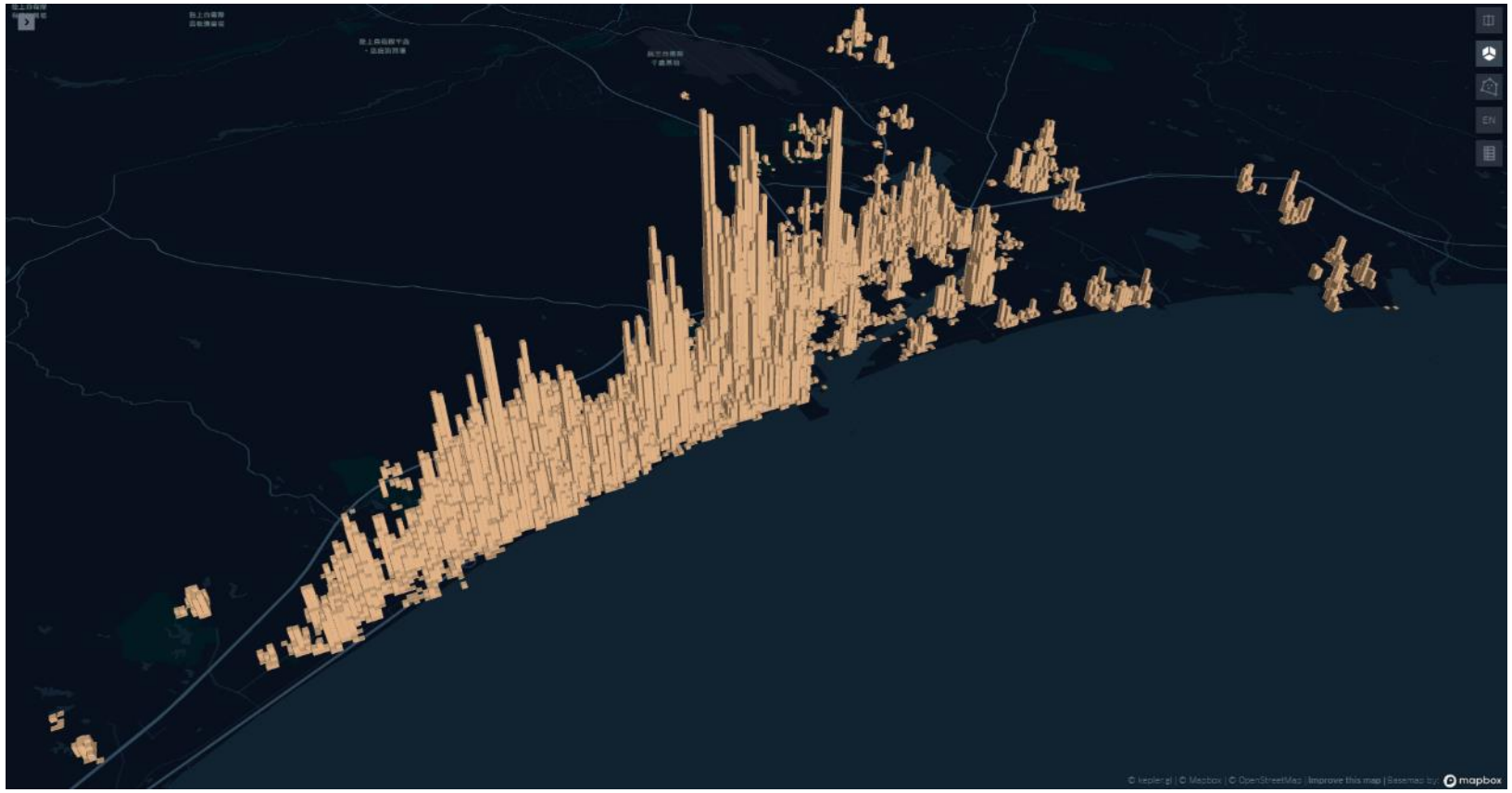


Figure-1 Spatial distribution of walking trip volume (Tomakomai City area, vertical direction is walking trip volume)

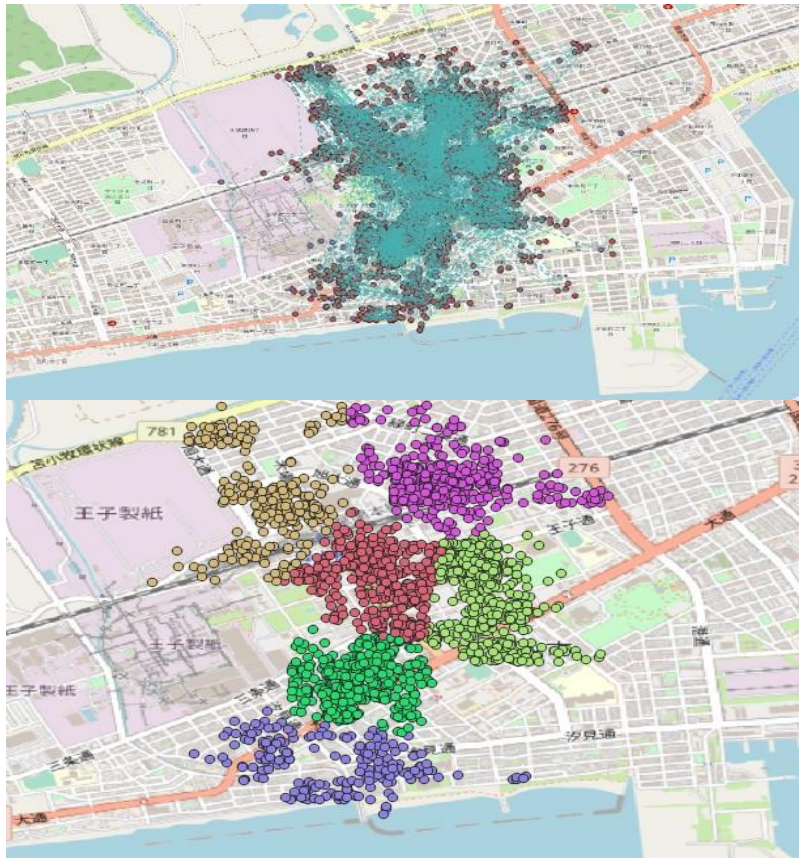


Figure-2 Low-speed transit cluster (Tomakomai Station area)

2． Study on how to configure the intra-urban traffic network and road space based on the assumption of the introduction of autonomous vehicles

In FY 2023, a prototype model of the micro-traffic simulation was constructed (Figure-3).

In FY 2024, we plan to conduct vehicle driving simulations with an eye toward road-vehicle linkage with data from past autonomous vehicle driving performance.

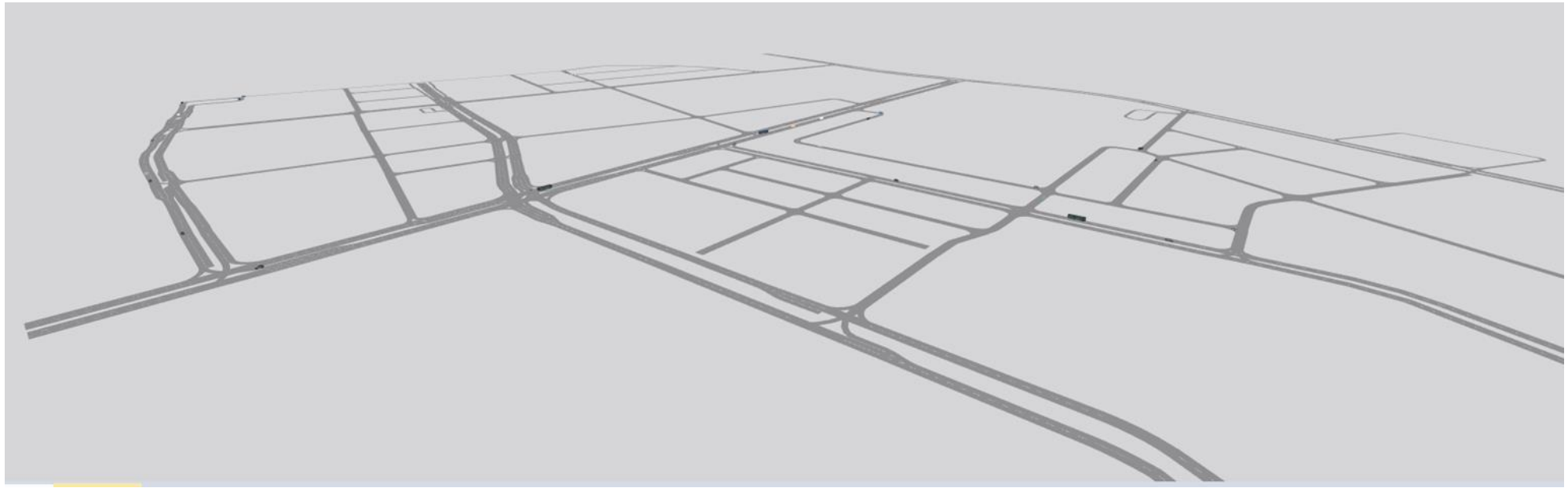


Figure-3 Micro traffic simulation (Example: Tomakomai Station area)

⑦-4

Acquiring social acceptance and cooperation, as well as establishing rules, for residential and bustling roads.

Initiative overview

Survey in 4 areas (Sakai-Ibaraki, Kamishihoro-Hokkaido, Nisshin-Aichi, Ota-ku -Tokyo (Haneda Innovation City))

- Route to school
- Tourist area, many pedestrians
- Zone 30 downtown area

Re-design Guidelines

Proposals for methods to acquire social acceptance and cooperation in local communities, calculate economic benefits, etc.

Reflected in legislation, standards, directives, government reports, etc.

Method and timeline for evaluating the impact of implementing autonomous shuttles

Preliminary study (FY2023～FY2025)

1. Site visits to the four preceding regions

①Sakai Town, Ibaraki Pref. ②Nisshin City, Aichi Pref. ③Gifu City, Gifu Pref. ④Kamishihoro Town, Hokkaido

2. Analysis of existing resident survey results

Analysis using the data compiled by the projects subsidized by the MLIT from the following viewpoints :

① Alignment of autonomous shuttle service status (destination, route, time of day, frequency, price) with resident (user) needs,

② Impact of autonomous shuttle operations on the community ⇒ Acceptability for fully autonomous driving operation,

③ Impressions from a ride on an autonomous shuttle.

Main study (FY2024～FY2025)

3. Group interviews with residents

Residents 1:users (passengers)

Residents 2:non-users

4. Conducting our own surveys, including measurement of residents' well-being

Changes in the lives of users and local residents ＋ Change in the well-being of users and local residents ＋ Impact on the local communities

Survey of the four regions - Summary

- Visited four regions where BOLDLY operates autonomous shuttles on a regular basis (test rides + interviews)
- Confirmed that there are differences in the effects of the autonomous shuttles in each region. Will consider how to measure effects of autonomous shuttles based on these differences.

	①Sakai Town, Ibaraki Pref.	②Nisshin City, Aichi Pref.	③Gifu City, Gifu Pref.	④Kamishihoro Town, Hokkaido
Regional Characteristics	Suburban area	Residential area	Central city area	Snowfall area
No. of Shuttles	ARMA 5 units, MiCa 3 units	ARMA1 + 1 unit (under demonstration)	ARMA 3 units	ARMA unit
Autonomous Driving Level	Level 2	Level 2	Level 2	Level 2
Number of Routes	3	1+1 (under demonstration)	2	2
Route Type	New routes (the area not covered by the existing route buses)	Complement of the existing community buses	Complement of the existing route buses	Complement of the existing community buses
Effects	• Civic pride • Outings/Health • Reduction in the number of on-street parking • Improvement of traffic manners • Synergy with new facility development • PR and site visits	• Outings/Health • Education (to increase interests of students in science and technology)	• Civic pride • Creating liveliness in the city center	• Reduction in the number of on-street parking • Improvement of traffic manners • PR and site visits
Related Measure	• New facility development, etc.	• Reservation by personal ID + token (points awarded) • Drone	• Decided to continue operation for 5 years	• Town OS (facial recognition) • Plans to introduce AI conductors • Consolidation of freight and passengers • Drone
Remarks	• Estimated economic impact available	• Comparison with the other mobility services is possible with the new route. • Potential of token applications	• Effects in the central city area • Over 10,000 people used the service in about 3 months (11 people per trip)	• FY24 Level 4 scheduled to start

Survey of the four regions - Details of interviews (1/2)

①Sakai Town, Ibaraki Pref.

<Detailed route>
(a) Town loop bus : daily, 30 minutes each way x 5 round trips
Community center, medical and childcare facilities,
supermarkets, town hall, schools, roadside station
(b) Connection with bus terminal: daily, 30 minutes each way x 4 round trips
Express bus terminal, supermarket, town hall, school, roadside station
(c) Rapid service: 20 minutes each way x 3 round trips on designated days
Sympathy Hall and Roadside Station

<Background of autonomous shuttle operation>
- Launched the regular operation on public roads in 2020 (first case in Japan by a municipality).
- Then, added routes and new shuttles.

<Status>
- Through the efforts such as operators communicating with people outside the shuttle by gesturing to them, signaling to following vehicles, etc., understanding for the autonomous shuttle operation has grown in the community.
- The residents' reactions to the autonomous shuttles and the residents' stories show that the autonomous shuttles have become a symbol of the city's affluence and increased civic pride.
- New clinics, sports facilities, and other bases has been developed along the autonomous bus routes.
- Private stores provides space for a bus stop for free The number of on-street parking decreased in order not to obstruct the autonomous shuttle operation.
- It is also expected to have the effect of reducing accidents and overspeeding.
The autonomous shuttles, as the pacemakers, reduced speed of other vehicles.

②Nisshin City, Aichi Pref.

<Detailed route>
(a) Nisshin City Hall - Nisshin Station:
Tuesday - Saturday, 50 minutes x 6 round trips City Hall, hospitals, etc.
(b) Nisshin Station - Higashiyama housing complex (under demonstration experiment):
30 minutes x 5 round trips
Shopping from the housing complex to supermarkets, drugstores, etc.

<Background of autonomous shuttle operation>
- When the regional public transportation plan was developed, mobility for the elderly people on higher ground was raised as an issue. The tenants at the time of the housing development in the 1960s are now in their 70s.
- Therefore, small-scale transportation is needed where the city's buses don't cover.
- While drivers are needed in small-scale transportation, there is a shortage of drivers. One of the solutions is to introduce autonomous shuttles.

<Status>
- The city promotes digitization such as introduction of autonomous shuttles and drones.
- The goal is to create a city with a wide variety of transportation options, including city buses, on-demand taxis, and autonomous shuttles.
- The city will expand the area of the autonomous shuttle service by utilizing the purchased shuttles.
- One of the goals is to promote outings, as the internal seating arrangement of the shuttle promote passengers to communicate with each other. In fact, a lot of communication between users is raised in the route (b).
- Coupons are distributed for users who make ride reservations with the My Number card. In the future, the city aims to promote going out and preventing frailty.
- The city used the shuttle for elementary school students' experience which aims to increase interest of children for new technology.

Survey of the four regions - Details of interviews (2/2)

③Gifu City, Gifu Pref.

<Detailed route>
(a) Central city route (Gifu Station - Gifu City Hall): Daily, 40 minutes 12 round trips
(b) Sightseeing route (Gifu Station - Gifu Park): Saturdays, Sundays, and holidays, 60 minutes x 3 round trips

<Status>
- The city launched regular operation in November 2023, with the commitment of five years operation.
- The aim is to create a bustling city center and increase civic pride.
- The number of users exceeded 10,000 in three months, earlier than expected. 11 passengers per trip. Sightseeing route is fully booked.
- A local bus also runs along the same route, but only once every 30 minutes, so some people use autonomous shuttle instead of bus.
- A wide range of people the shuttle service as a complement of the existing bus service.

④Kamishihoro Town, Hokkaido Pref.

<Detailed route>
(a) Roadside station loop route: Monday, Thursday, Saturday, 30 minutes x 4 round trips
(b) West & North housing complex loop route: Monday and Thursday, 30 minutes x 4 round trips
Operates on Mondays, Thursdays, and Saturdays when the community bus is not in service.
Often used by women and the elderly for shopping, hot bath facilities, and town hall.

<Background of autonomous shuttle operation>
- In 2017, the first demonstration test of autonomous shuttles on public roads in Hokkaido Pref. began.
- After the first demonstration in a snowy environment, regular operation begin in 2022.
- The objective is to address labor shortages. Drones were also introduced prior to the autonomous shuttle service.

<Status>
- After a year of regular operation, the autonomous shuttle service have become popular among the town's residents.
- Initially, there were trucks and other vehicles parked on the street, but gradually the number of vehicles parked on the street decreased. It also improves traffic manners.
- Linked to Kamishihoro Smart Pass. Personal authentication is implemented with facial recognition and my-number-card.
- The goal is to start Level 4 autonomous driving in some sections in FY2024. AI conductors were introduced in anticipation of future unmanned operation.
- The ultimate goal is to have autonomous buses and community buses complement each other and run on the same schedule.

Preliminary study （1）

Purpose

This preliminary study is to achieve the hints for the research and survey planned in 2024 and 2025, learning from the past survey results about the public acceptance for the autonomous driving bus, how people’s motivation and behavior for the mobility could be changed, in Kamishihoro-town and Nisshin-city, where the autonomous driving buses are already in operation.
The survey data from the “FY 2021 Regional Public Transportation Maintenance and Improvement Project" was used as the data for the past year's residents' survey.

Main perspectives of the preliminary study:

(1) The following survey items were tabulated for each of Kamishihoro Town and Nisshin City.
①Purpose of use, ②Desired frequency of use, ③Peace of mind, ④Desire for continued operation, ⑤Acceptability of unmanned operation.

(1) Comparative analysis of the above items ② to ⑤ was conducted between the working-age generation (under 60) and the senior generation (60 and over),The χ2 test was used to confirm the relationship between generation and each survey item.

Target

■Sample size:

- Kamishihoro-town: 133 people
- Nisshin-city: 272 people

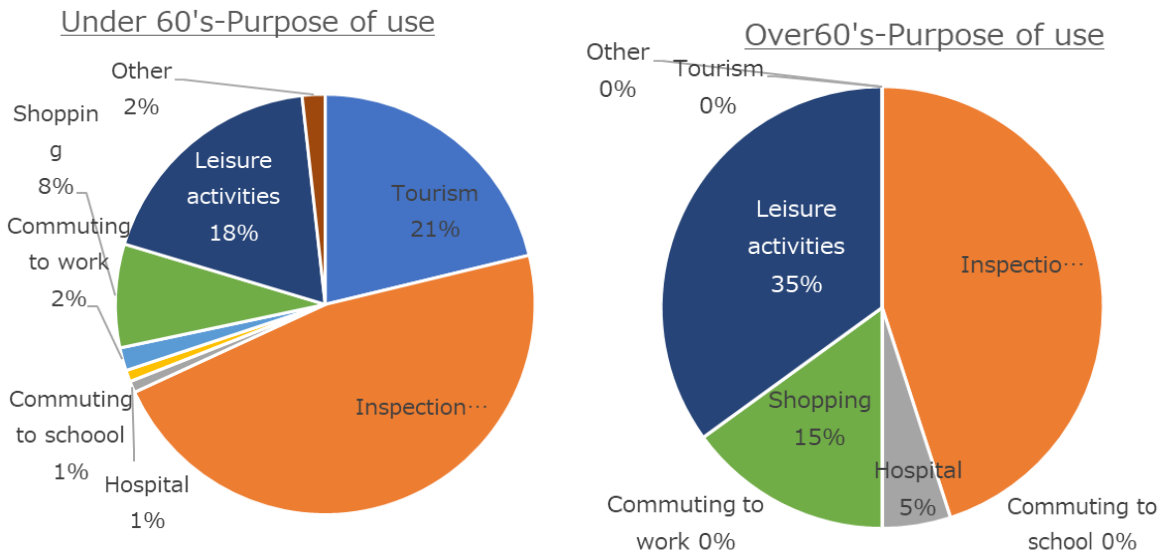
Regarding Nisshin City, some of the results of the survey conducted in FY2023 were included in the "Data from the 5th Nisshin City Regional Public Transportation Conference" and are presented here as reference data.

Preliminary study （２）

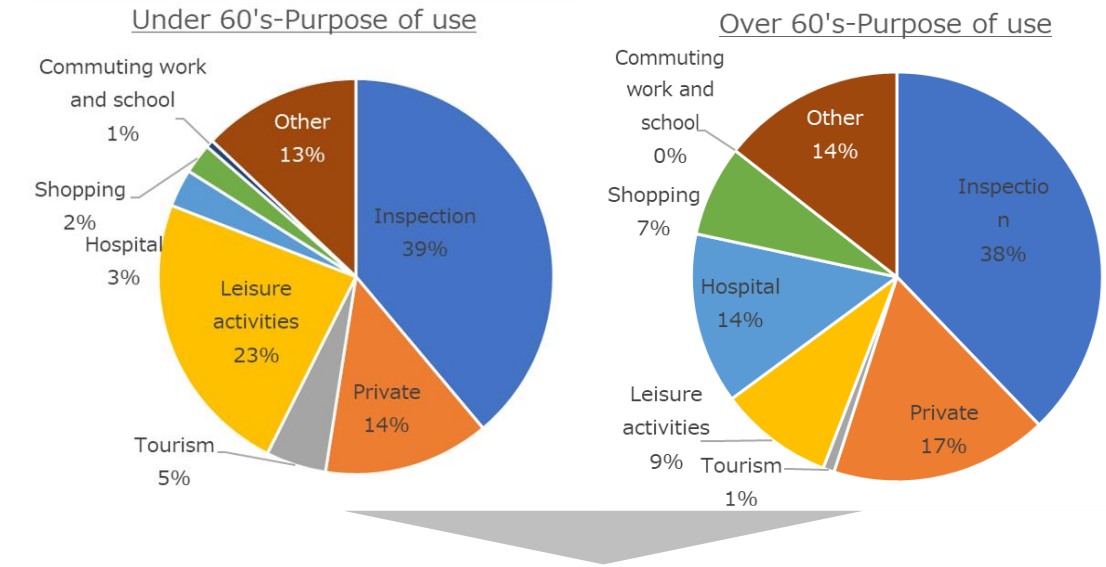
（１）Purpose of use

〇The most popular answer was “inspection”, while “shopping” was the most at Nisshin in FY2023.
〇Nisshin City added an operational course in FY2023, and its use is becoming established as a part of daily transportation such as shopping.

【Kamishihoro-town】



【Nissin-city（FY2021）】



【Nissin-city（Fy2023）】

Source: Nissin-city Regional transport conference(FY2023)

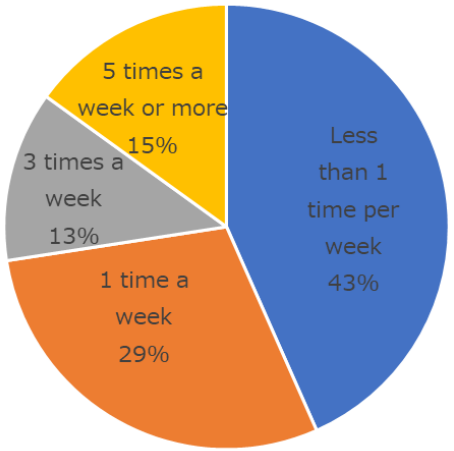
Preliminary study （３）

（２）Frequency

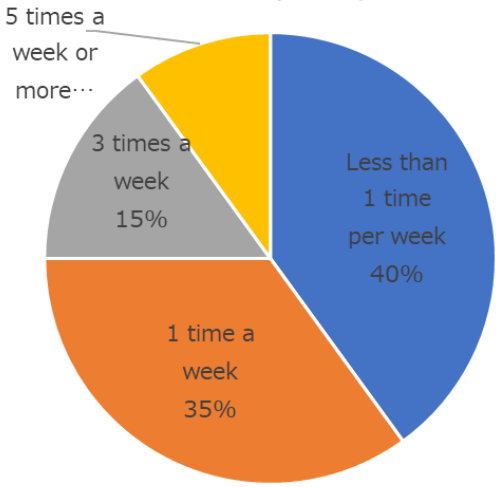
〇Many residents want to use the service at least once a week, indicating a desire to use the service as part of their daily transportation.

【Kamishihoro-town】

Under 60's-Frequency of use

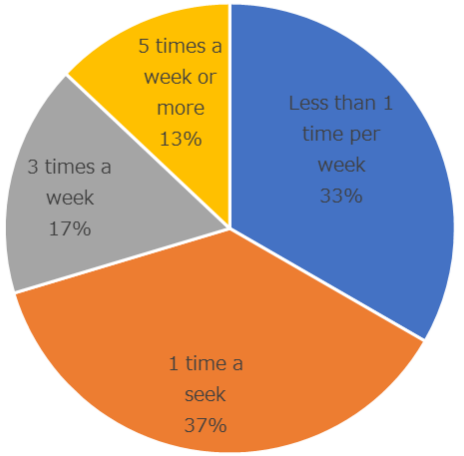


Over 60's-Frequency of use

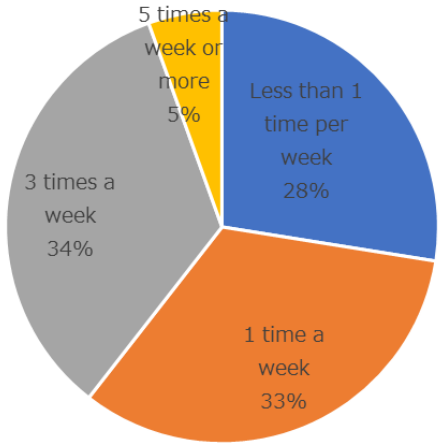


【Nissin-city（FY2021）】

Under 60's-Frequency of use



Under 60's-Frequency of use

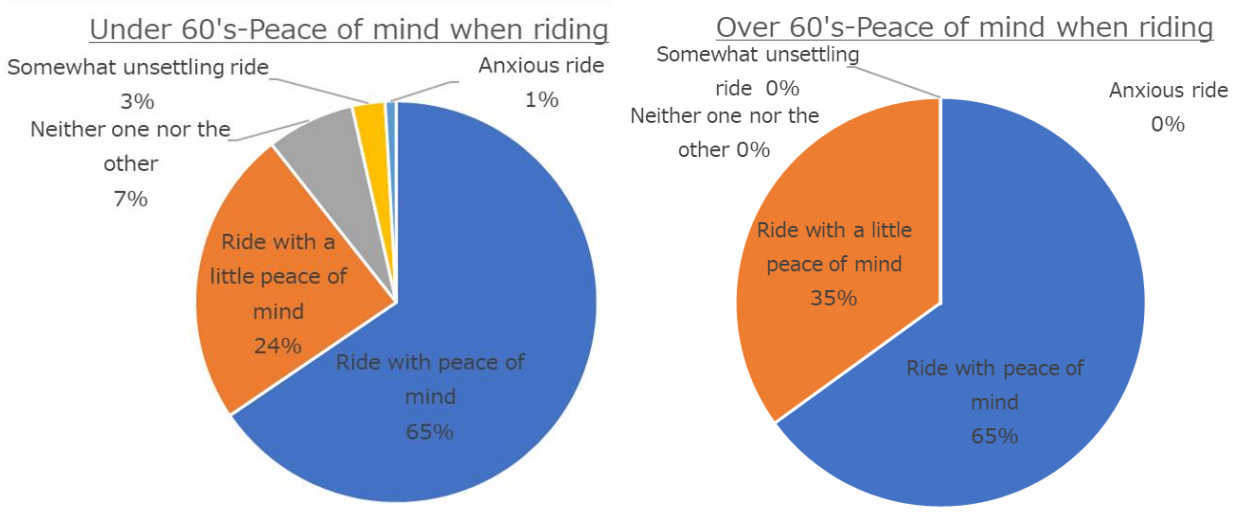


Preliminary study （４）

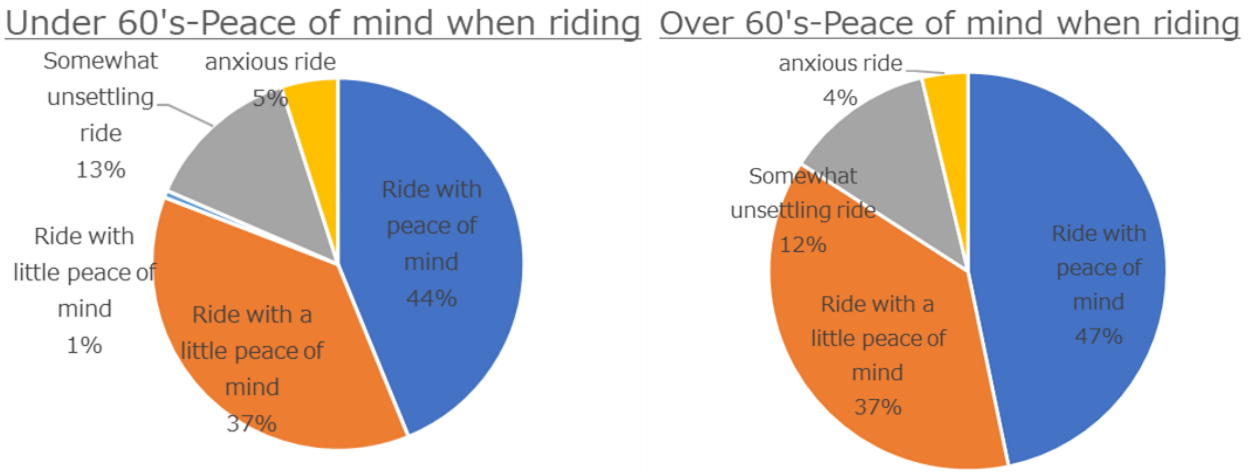
（３）Peace of mind/Satisfaction

〇Most people were satisfied.

【Kamishihoro-town】



【Nissin-city（FY2021）】



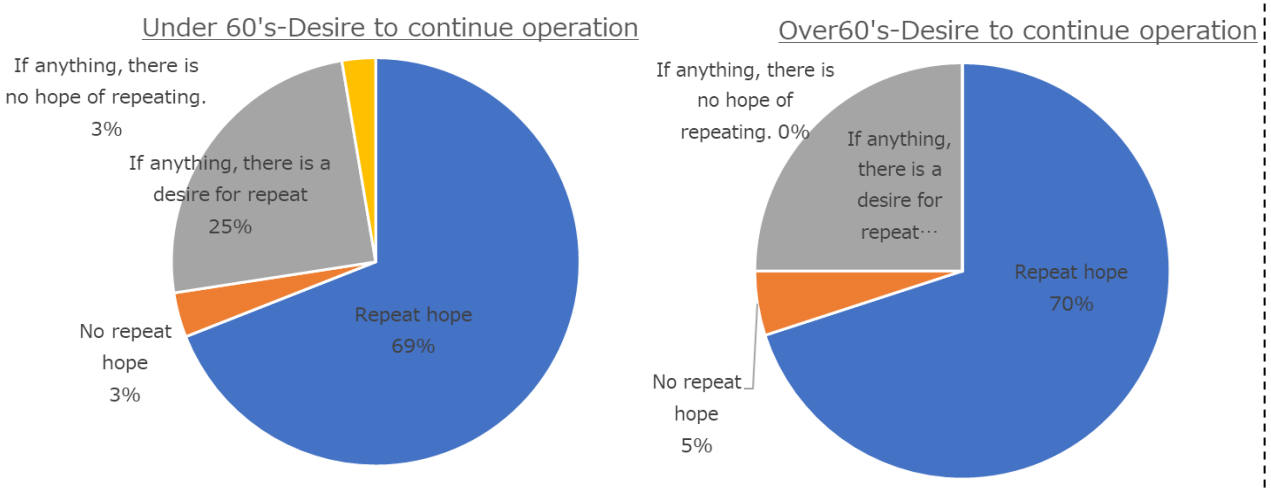
Preliminary study （５）

（４）Intention to use

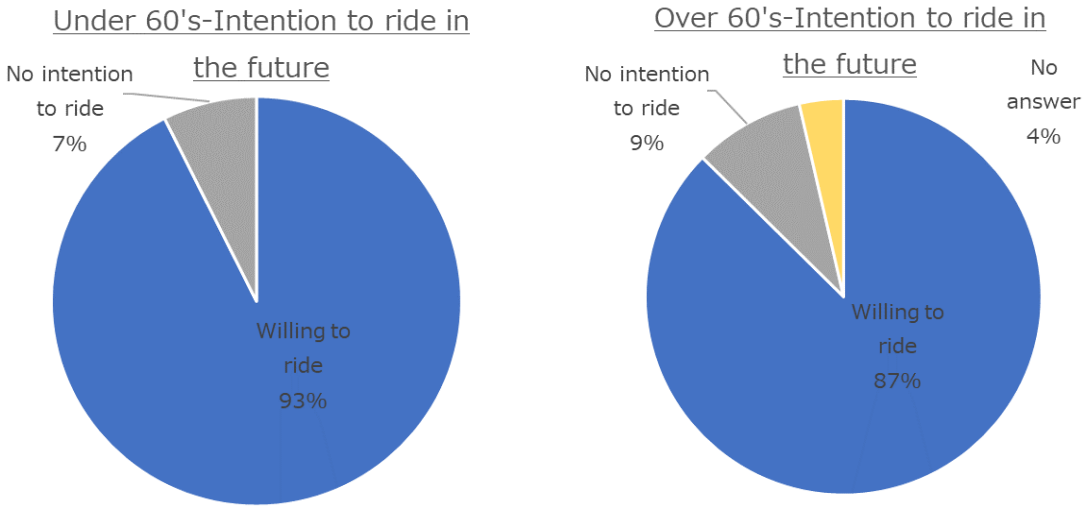
〇Most people intended to use it continuously, likely to be integrated into their everyday life.

〇In particular, the increase in the percentage of respondents wishing to continue service between FY2021 and FY2023 in Nisshin-city, suggests that residents are becoming more aware of the convenience of the service as daily life transportation in relation with (1) purpose of use

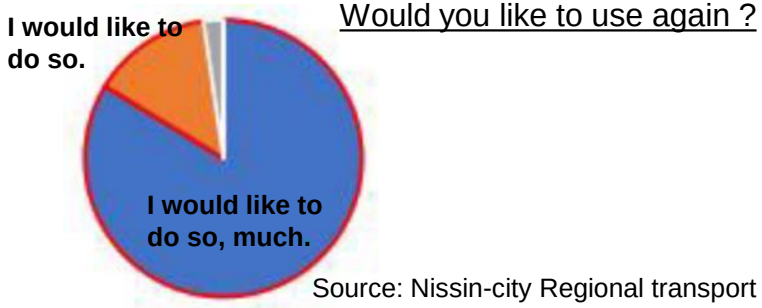
【Kamishihoro-town】



【Nissin-city（FY2021）】



【Nissin-city（FY2023）】



Source: Nissin-city Regional transport conference(FY2023)

Preliminary study （６）

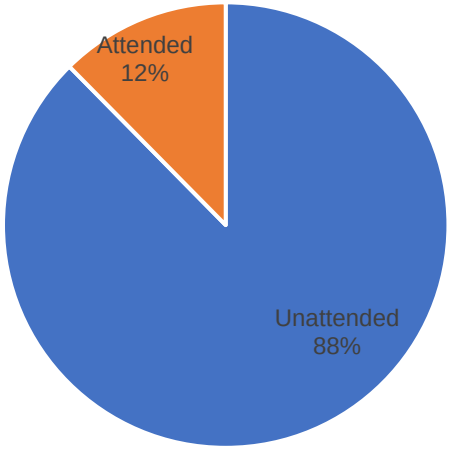
（５）Acceptance for fully autonomous driving operation（with or without operator）

〇More than 90% accepted the operation without operator in both, showing high public acceptance result.

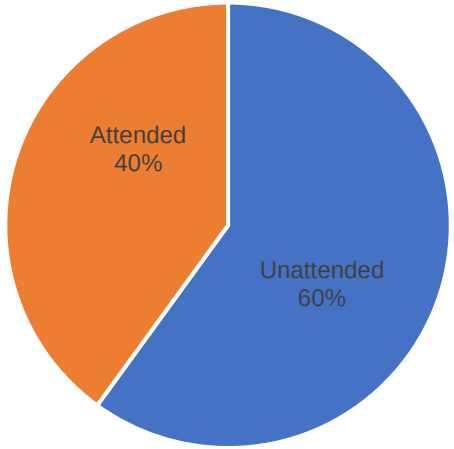
〇In both, people under 60 are more likely to accept automation than people over 60.

【Kamishihoro-town】

Under 60‘s-Availability of the attendant



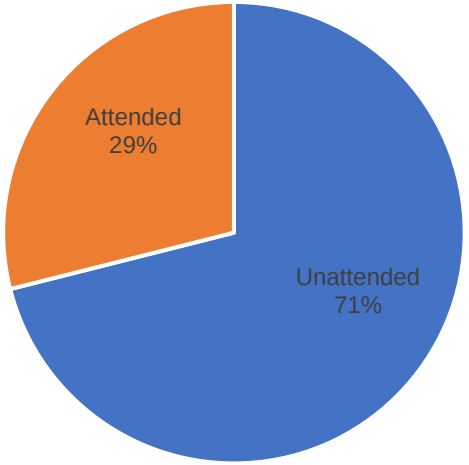
Over 60’s-Availability of attendant



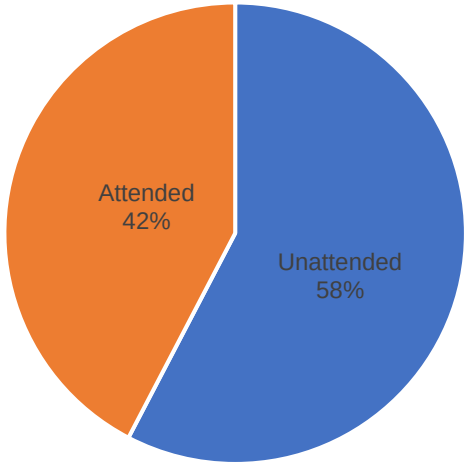
When comparing responses regarding acceptance of unmanned vehicles (unmanned vehicles + conditionally unmanned vehicles) and manned vehicles, it was confirmed that those under 60 years of age were more likely to accept unmanned vehicles than those over 60 years of age.
(P = .0021, P < .01).

【Nissin-city（FY2021）】

Under 60’s-Availability of attendant



Over 60’s-Availability of attendant



When comparing responses regarding acceptance of unmanned vehicles (unmanned vehicles + conditionally unmanned vehicles) and manned vehicles, it was confirmed that those under 60 years of age were more likely to accept unmanned vehicles than those over 60 years of age.
(P = .0225, P < .05).

Preliminary study（7）

Point

○ The most popular answer was “inspection”, while “shopping” were also seen, already utilized for their everyday mobility life.

○ Many people utilized at least more than once a week, and most people intended to use it continuously, especially those who intends so were increased in Nisshin-city, looking more users promising.

○ Further more, as most people felt safe and satisfied with, mostly accepting no operators, they are likely to expect the autonomous driving bus.

○ The association between the generations of the working generation (under 60) and the senior generation (60 and over) and each survey item was confirmed using the $\chi 2$ test. The results for "acceptability to unmanned access (with or without an attendant)" showed that the working generation was more accepting of unmanned access than the senior generation in both, with Kamishihoro Town having less than 1% probability of significance and Nisshin City less than 5% probability.

○ Confirmed high expectation and acceptance for the autonomous driving in both regions.

○ Need to continue to study more in detail in various areas to effectively understand expectation and requirement for the autonomous driving in order to secure appropriate regional mobility.

Proposal for measures to realize lively roads

Research will be conducted by 10 cognitive psychologists, social psychologists, perceptual psychologists, statisticians, engineers, jurists, ethicists, technology management scholars, tourism scholars, and cultural anthropologists in an interdisciplinary and cross-disciplinary manner, taking advantage of the research strengths as a social engineering university with a fusion of humanities and sciences.

With the participation of some students as research assistants, **the 10 faculty members of Tama university** will attempt to propose and implement measures to realize small and busy roads within the city with the aim of reducing traffic accident fatalities of pedestrians and bicycle riders on the roads for daily life.

An empirical analysis of the distance from the following vehicle during an "emergency stop" in MiCa operations, the recovery time, and passenger operations during that time. Statistical studies will also be conducted on information data such as the number of takeovers obtained during remote monitoring.
(in Ibaraki Prefecture)

Insights Obtained and Research Directions

・Will it be similarly socially acceptable (tolerated) in the event of paid fares and disadvantages to residents?
It is necessary to investigate whether there is "consideration" for autonomous vehicles by checking whether they have local license plates.

・The difference between "coexistence" and "segregation" (routes that are traveled by autonomous vehicles and routes that are not traveled by autonomous vehicles) should be analyzed.

・When the vehicle is under emergency braking, an automatic voice announces, "Emergency stop! Please wait for a moment" and other in-car announcements and guidelines are needed to alert drivers of the need for such announcements.

・The number of people who do not use the service (e.g., they use their own cars, or they have family members give them a ride). The opinions of those who do not use autonomous vehicles (e.g., those who use their own cars, those who have family members give them rides (elderly)) should be collected to examine the relationship between social acceptance and the bustle of the area.

・The survey should be conducted by comparing the questionnaire as of 2021 with the current situation to determine whether the value of autonomous vehicles will change if they become less “rare” after people become accustomed to the existence of autonomous vehicles, or if they become implemented in other areas, and whether the impact on “civic pride” and “consideration for (autonomous vehicles)” will change.

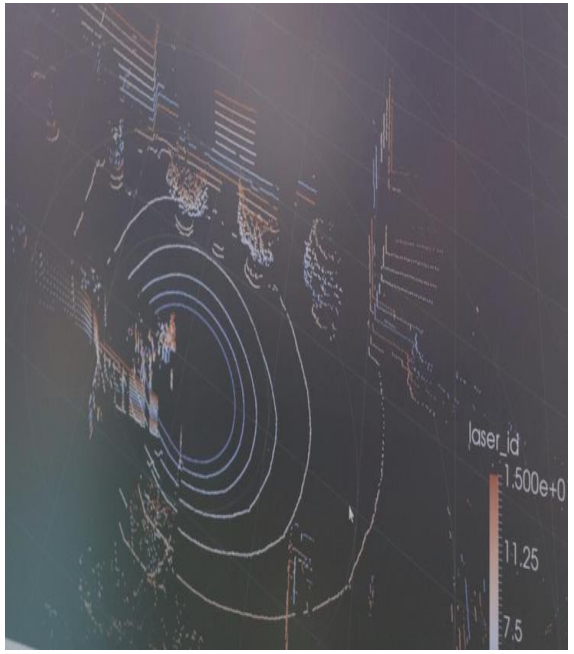
・The value of autonomous vehicles needs to be captured by comparing the questionnaire in 2021 with the current situation and how it will change.

TAMA UNIVERSITY 多摩大学

Development of crowd measurement system

Preparation for the development of a activity measurement system

"Bustling" is necessary for redefine. Simply having many people is simply congestion. The psychology of the people who gather there should also be taken into account for "activity".
For the purpose of evaluating roads of activity, we will develop a system to measure not only the physical situation as measured by LiDAR, etc., but also the atmosphere of the busyness of the place.
To achieve this, psychological indicators will be used along with sensors such as LiDAR.



Students were made to stand and move to objectively determine the degree of bustling by using LiDAR.

TAMA UNIVERSITY
多摩大学

HANEDA Future Forum - autonomous Driving Lv4

On November 19, 2023, "HANEDA Future Forum - autonomous Driving Lv4" was held at Haneda Innovation City (Ota-ku, Tokyo), with Hikasa and Imamura as speakers. Associate Professor Mutsumi Suganuma served as the moderator of the forum, which was also attended by representatives from Ota Ward, Kajima Corporation, and BOLDLY Corporation.

The first part of the event began with opening remarks by Hiroki Yagi, Director of the Innovation Business Division, Department of Industry and Economy, Ota Ward, followed by presentations and discussions by Takashi Hikasa, lecturer, Tama University; Yasuko Imamura, associate professor,; and Yuki Saji, President and CEO, BOLDLY Corporation, which operates an autonomous driving bus. He specializes in law.

Hikasa, who specializes in law and serves as the representative of the "Study Group on Ethical Guidelines for autonomous Driving" consisting of interdisciplinary members from fields such as criminal law and traffic engineering, is working to create and disseminate the legal and ethical guidelines necessary for the implementation of autonomous driving in society. He mentioned that the specific automatic operation security personnel will be responsible for a variety of tasks in Level 4, and explained the importance of their role. He also mentioned that the specified automatic operation security personnel should be key persons who will be the starting point of "urban development" as mobility human resources who will play many roles.

From the viewpoint of hospitality, Associate Professor Imamura mentioned the importance of creating customer experiences from the customer's point of view and customer delight (an experience that exceeds expectations and creates positive emotions in the customer). In autonomous driving, not only the pursuit of technology, but also the demonstration of hospitality by people will lead to user delights and human connections. He also mentioned the importance of "embracing emotions" in autonomous driving.

Yuki Saji, President and CEO, introduced an actual case study of autonomous driving in Ibaraki Prefecture, and talked about how he hopes to make the transportation business a popular industry by making the industry more attractive through autonomous driving.

During the panel discussion, the three panelists exchanged opinions on the topic of "The Role of People and Communication in autonomous Driving". Discussion topics included whether manned rather than unmanned vehicles would be more acceptable in Japan, and expectations for autonomous vehicles to play a key role in transportation infrastructure in underpopulated areas.

In the second part, five students from the College of Business Administration and Information Science and the College of Global Studies participated in the "Mirai Generation Talk" together with the three speakers from the first part. The three speakers from the first part and Mr. Naoki Taniguchi of the Development Division Business Department of Kajima Corporation exchanged opinions about urban development using autonomous driving. The students expressed a variety of opinions, such as "I want to improve the image of autonomous driving" and "I hope that autonomous driving will enliven the city where I live.

Finally, as part of the "Drawing a Mirai Workshop," participants wrote down their expectations and issues regarding autonomous driving and shared them with each other.

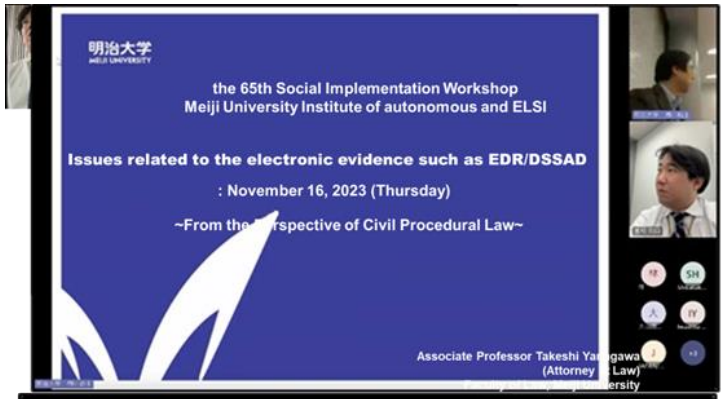
⑦-9

Proposing systems and rules

Study Group on autonomous Driving and Social Implementation

Raise and discuss issues from a wide range of perspectives, including technology development, MaaS, community development, resident participation, insurance systems, governance, etc.

No.	Title	Date	Lecturers
The 57th	Social Implementation Methods of autonomous Driving		Mr. Sou Kaihatsu Creative & Communication Team, Mobility Business Strategy Office, Panasonic holdings corporation
The 58th	How to Educate Traffic Education		Mr. Ryo Ohtani autonomous Driving Research Department, autonomous Driving Standardization Group, Japan Automobile Research Institute
The 59th	About HMI		Tomoyuki Kitazaki Director Human-Centered Mobility Research Center, National Institute of Advanced Industrial Science and Technology
The 60th	Objects for consideration of insurance composition regarding autonomous driving at present		Professor Mario Nakabayashi Director Institute of Autonomous Driving, Meiji University Professor Hatsuo Hizuka Waseda University, School of Law
The 61th	Can behavioral economics be applied to traffic guidance?		Associate Professor Yoichiro Fujii, School of Commerce, Meiji University
The 62th	Simulation criminal trial on autonomous driving (Co-organized by Meiji University Law School, Tama University ELSI Center, Niigata University ELSI Center)		Dr. Higasa (Law), Full-time Lecturer, Faculty of Management and Information Sciences, Tama University Assistant Professor Koki Nezu , Faculty of Law, Niigata University Professor Koji Nakayama, Institute of autonomous driving and ELSI, Meiji University Mr. Shoichi Shibayama, Research Fellow (Attorney at Law), Institute of Autonomous driving and ELSI, Meiji University Dr. Yoshio Nakamura (Attorney at Law), Former public prosecutor Mr. Naokazu Yoshida, Researcher (Attorney at Law), Institute of autonomous driving and ESLI, Meiji University
The 63th	The 2nd MIAD Overseas Symposium (Cosponsored by Meiji University School of Law)		Dipl.-Jur. Lasse F. Quarck, hristian-Albrechts-Universitat zu Kiel Ms. Huveyda Asenger, Institute of Comparative Law, Meiji University Assistant Professor Koki Nezu, Faculty of Law, Niigata University Professor Koji Nakayama, Institute of autonomous driving and ELSI, Meiji University Mr. Naokazu Yoshida, Research Fellow (Attorney at Law), Institute of autonomous driving and ELSI, Meiji University
The 64th	Symposium co-hosted by the Faculty of Law, Meiji University, and the Meiji University Institute of autonomous driving and ELSI Autonomous driving and legal liability		Professor. VOLKER MICHAEL JAENICH JENA University, Germany (Law department agreement school)
The 65th	Issues related to other electronic evidence such as EDR/DSSAD		Associate Professor Eiji YANAGIKAWA, School of Law, Meiji University
The 66th	Utility of External HMI in autonomous Driving Vehicles		Mr. Shoichi Minokawa Director Innovation Department, Ichikoh Industries, Ltd.
The 67th	Initiatives including autonomous Driving in Kamishihoro Town		Mr. Tatsu Kaji Manager, Digital Promotion Division, Kamishihoro Town Hall
The 68th	Activities of ”the Study Committee on Innovation Governance for a New Mobility Society” of the Society of Automotive Engineers of Japan		Mr. Kenji Suganuma Secretary, Innovation Governance Review Committee (Senior Expert, Digital Architecture and Design Center, Information Technology Promotion Agency, Japan)
The 69th	About autonomous driving cars and the automobile industry		Mr. Hitoshi Kaise Partner, Roland Berger Strategy Consultants



Survey of trends in laws and rules concerning autonomous driving in various countries

(1) Trends in Amendments to German Road Traffic Laws, etc. (Comparison with Japan)
(2) EU Product Liability Directive and AI Liability Directive Legislative Moves
(3) Proposal for an autonomous driving and insurance system in the United Kingdom

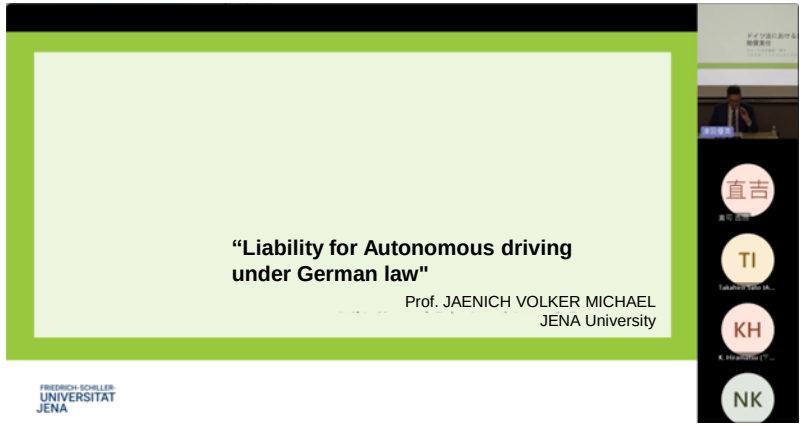
- **The 2nd MIAD Overseas Symposium**
  (Cosponsored by Meiji University School of Law)

“criminal liability for the use of artificial intelligence"
Dipl.-Jur. Lasse F. Quarck
（hristian–Albrechts–Universität zu Kiel）

“Artificial intelligence in court proceedings example of German criminal proceedings"
Dr. Hüveyda Asenger
(Institute of Comparative Law, Meiji University)

- **Symposium co-hosted by the Faculty of Law, Meiji University, and the Meiji University Institute of autonomous driving and ELSI**

“Liability for Autonomous driving under German law"
Prof. JAENICH VOLKER MICHAEL, JENA University, Germany
(Law department agreement school)

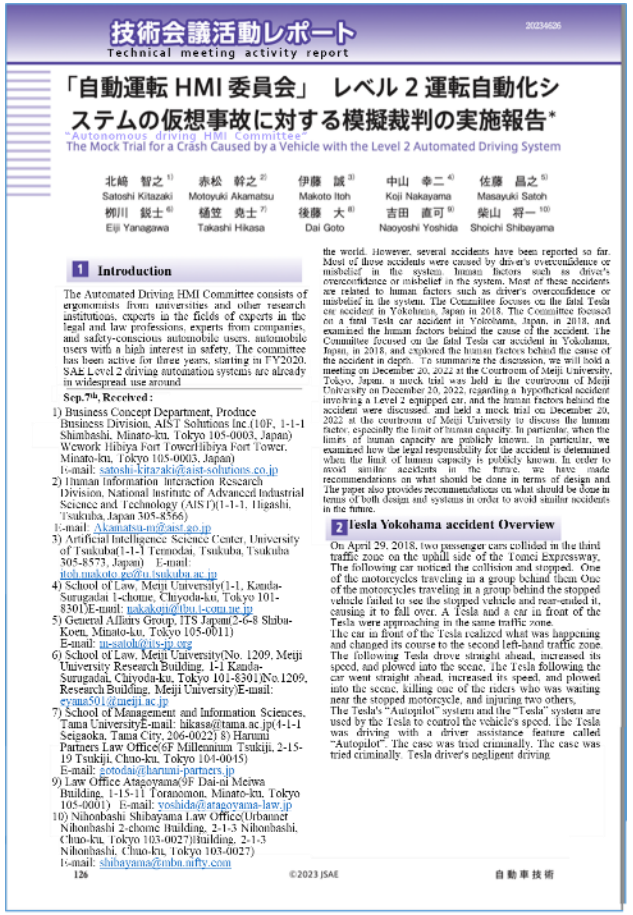


Collaborate with diverse industry associations and lead discussions on liability, standardization discussions, etc.

(1) JSAE (Society of Automotive Engineers of Japan) and HMI Committee
(contact point of technology, people and law)

(1) JSAE (Society of Automotive Engineers of Japan)-Innovation Governance Study Committee for a New Mobility Society

(2) JEITA (Japan Electronics and Information Technology Industries Association) Smart Mobility Study Group



技術会議活動レポート
Technical meeting activity report

「自動運転 HMI 委員会」 レベル 2 運転自動化システムの仮想事故に対する模擬裁判の実施報告*

*Autonomous driving HMI Committee
The Mock Trial for a Crash Caused by a Vehicle with the Level 2 Automated Driving System

北崎 智之[1] 赤松 幹之[2] 伊藤 誠[3] 中山 幸二[4] 佐藤 昌之[5]
Satoshi Kitazaki Motoyuki Akamatsu Makoto Itoh Koji Nakayama Masayuki Satoh
柳川 鋭士[6] 樋笠 堯士[7] 後藤 大[8] 吉田 直可[9] 柴山 将一[10]
Eiji Yanagawa Takashi Hikasa Dai Goto Naoyoshi Yoshida Shoichi Shibayama

1 Introduction

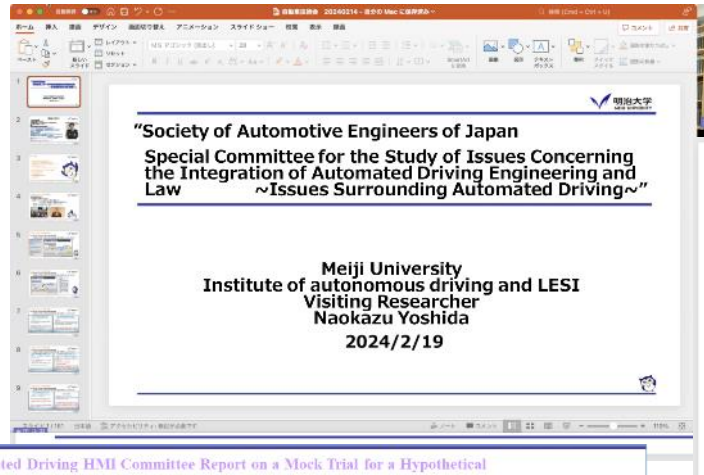
The Automated Driving HMI Committee consists of ergonomists from universities and other research institutions, experts in the fields of experts in the legal and law professions, experts from companies, and safety-conscious automobile users. automobile users with a high interest in safety. The committee has been active for three years, starting in FY2020. SAE Level 2 driving automation systems are already in widespread use around the world. However, several accidents have been reported so far. Most of those accidents were caused by driver's overconfidence or misbelief in the system. human factors such as driver's overconfidence or misbelief in the system. Most of these accidents are related to human factors such as driver's overconfidence or misbelief in the system. The Committee focuses on the fatal Tesla car accident in Yokohama, Japan in 2018. The Committee focused on a fatal Tesla car accident in Yokohama, Japan, in 2018, and examined the human factors behind the cause of the accident. The Committee focused on the fatal Tesla car accident in Yokohama, Japan, in 2018, and explored the human factors behind the cause of the accident in depth. To summarize the discussion, we will hold a meeting on December 20, 2022 at the Courtroom of Meiji University, Tokyo, Japan, a mock trial was held in the courtroom of Meiji University on December 20, 2022, regarding a hypothetical accident involving a Level 2 equipped car, and the human factors behind the accident were discussed. and held a mock trial on December 20, 2022 at the courtroom of Meiji University to discuss the human factor, especially the limit of human capacity. In particular, when the limits of human capacity are publicly known. In particular, we examined how the legal responsibility for the accident is determined when the limit of human capacity is publicly known. In order to avoid similar accidents in the future, we have made recommendations on what should be done in terms of design and The paper also provides recommendations on what should be done in terms of both design and systems in order to avoid similar accidents in the future.

Sep.7th, Received:

1) Business Concept Department, Produce Business Division, AIST Solutions Inc.(10F, 1-1-1 Shimbashi, Minato-ku, Tokyo 105-0003, Japan) Wework Hibiya Fort Tower(Hibiya Fort Tower, Minato-ku, Tokyo 105-0003, Japan) E-mail: satoshi-kitazaki@aist-solutions.co.jp
2) Human Information Interaction Research Division, National Institute of Advanced Industrial Science and Technology (AIST)(1-1-1, Higashi, Tsukuba, Japan 305-8566) E-mail: Akamatsu-m@aist.go.jp
3) Artificial Intelligence Science Center, University of Tsukuba(1-1-1 Tennodai, Tsukuba, Tsukuba 305-8573, Japan) E-mail: itoh.makoto.gu@u.tsukuba.ac.jp
4) School of Law, Meiji University(1-1, Kanda-Surugadai, Chiyoda-ku, Tokyo 101-8301)E-mail: nakakoji@law.meiji.ac.jp
5) General Affairs Group, ITS Japan(2-6-8 Shibu-Koen, Minato-ku, Tokyo 105-0011) E-mail: m-satoh@its-jp.org
6) School of Law, Meiji University(No. 1209, Meiji University Research Building, 1-1 Kanda-Surugadai, Chiyoda-ku, Tokyo 101-8301)No.1209, Research Building, Meiji University)E-mail: eyana501@meiji.ac.jp
7) School of Management and Information Sciences, Tama University)E-mail: hikasa@tama.ac.jp(1-1-1 Seigaoka, Tama City, 206-0022) 8) Harumi Partners Law Office(6F Millennium Tsukiji, 2-15-19 Tsukiji, Chuo-ku, Tokyo 104-0045) E-mail: gotodai@harumi-partners.jp
9) Law Office Atagoyama(9F Dai-ni Meiwa Building, 1-15-11 Toranomon, Minato-ku, Tokyo 105-0001) E-mail: yoshida@atagoyama-law.jp
10) Nihonbashi Shibayama Law Office(Urbannet Nihonbashi 2-chome Building, 2-1-3 Nihonbashi, Chuo-ku, Tokyo 103-0027)Building, 2-1-3 Nihonbashi, Chuo-ku, Tokyo 103-0027) E-mail: shibayama@robu.nifty.com

2 Tesla Yokohama accident Overview

On April 29, 2018, two passenger cars collided in the third traffic zone on the uphill side of the Tomei Expressway. The following car noticed the collision and stopped. One of the motorcycles traveling in a group behind them One of the motorcycles traveling in a group behind the stopped vehicle failed to see the stopped vehicle and rear-ended it, causing it to fall over. A Tesla and a car in front of the Tesla were approaching in the same traffic zone. The car in front of the Tesla realized what was happening and changed its course to the second left-hand traffic zone. The following Tesla drove straight ahead, increased its speed, and plowed into the scene, the Tesla following the car went straight ahead, increased its speed, and plowed into the scene, killing one of the riders who was waiting near the stopped motorcycle, and injuring two others. The Tesla's "Autopilot" system and the "Tesla" system are used by the Tesla to control the vehicle's speed. The Tesla was driving with a driver assistance feature called "Autopilot". The case was tried criminally. The case was tried criminally. Tesla driver's negligent driving.

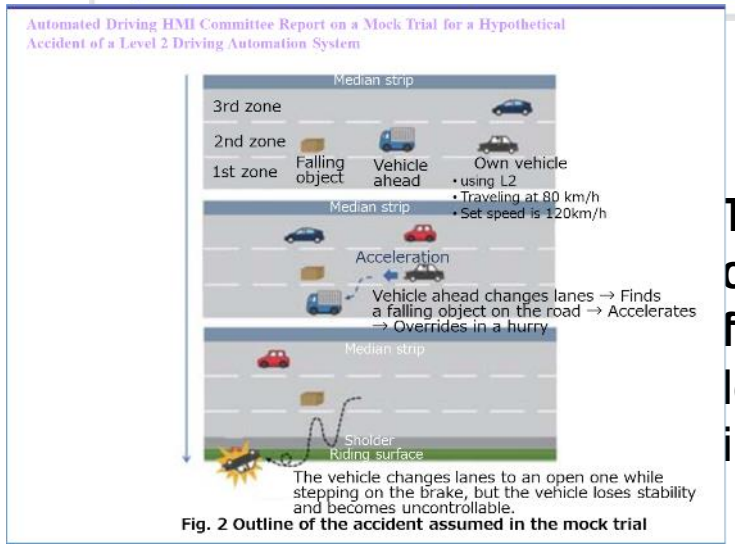


"Society of Automotive Engineers of Japan
Special Committee for the Study of Issues Concerning the Integration of Automated Driving Engineering and Law ~Issues Surrounding Automated Driving~"

Meiji University
Institute of autonomous driving and LESI
Visiting Researcher
Naokazu Yoshida
2024/2/19

"Society of Automotive Engineers of Japan
Innovation Governance Study Committee for a New Mobility Society
Science Council of Japan
[Opinion: Ethical, Legal, and Social Issues in Automated Operation]"

Meiji University
Institute of autonomous driving and LESI
Visiting Researcher
Naokazu Yoshida
2023/8/25



Automated Driving HMI Committee Report on a Mock Trial for a Hypothetical Accident of a Level 2 Driving Automation System

Fig. 2 Outline of the accident assumed in the mock trial

Together with industry associations, the committee will study new rule formulation and liability issues, and lead discussions on the social implementation of autonomous vehicles.

Proposed "Rules of Conduct" for various stakeholders in autonomous driving

System / Functions of vehicles / Obligations of traffic participants / Obligations of the driving environment / Accident management and dispute resolution

(35 items in 5 chapters)

Outline of Automatic Driving Guideline

明治大学 MEIJI UNIVERSITY

Structure:

1. System for Automated Driving Vehicles (8 items)
2. Autonomous Driving Functions of Automated Driving Vehicles (14 items)
3. Obligations pertaining to other traffic participants (2 items)
4. Obligations for maintaining the driving environment (3 items)
5. The rules for traffic accident treatment, dispute resolution, and insurance (8 items)

The five parts of the document, as described above, are composed of 35 items, We have tried to comprehensively grasp the environment surrounding autonomous vehicles and, as much as possible, to verbalize the principles without neglecting them.

(Points)

- Maintain predictability
- Appropriate allocation of responsibility
- Overall optimization

Rules for AI and DX

(From "rule-based" to "principle-based")

明治大学 MEIJI UNIVERSITY

In the future, we plan to study more detailed aspects by providing guidelines, performance standards, and the submissions from academia regarding each item.

Issues that have emerged from past activities

1) Collaboration with Sakaimachi to resolve issues surrounding autonomous vehicles

- **Dialogue with local residents □ Dialogue & communication through questionnaires, workshops,forums, etc.**

Meiji University Activity 4 (Proposal for planning the social implementation process)

Adaptive management and planning including regional certification & compensation insurance (Adaptive management)

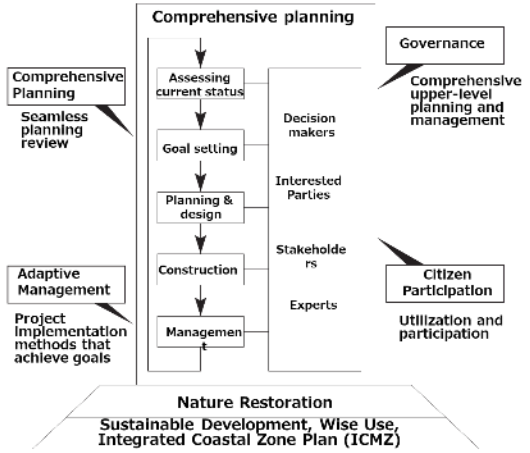


Fig 2.1 Positioning of adaptive management

Table 2.2 Draft system of adaptive management

Level	Item		Responsible (Who?)	Time (when?)	Content (What?)	Method (How?)
Level 1	Comprehensive goal		Businesses and stakeholders	Planning stage	Goal to be achieved	Through council meetings, workshops, etc., the project proponent and related parties share information on current issues and policies for nature restoration, and reach a consensus.
Level 2	Specific action plan/project implementation policy		Businesses and stakeholders	Planning stage	Specific action plans/project implementation policies to be implemented in order to achieve the goals.	
Level 3	Establishment of target achievement criteria	Establishment of target achievement criteria	Businesses and stakeholders	Planning stage	Criteria to determine specifically whether the results of the "Specific Action Plan/Project Implementation Policy" are achieving the goals.	A specialist team led by the project proponent consults with stakeholders and experts, and compiles the results. In order to incorporate the opinions of stakeholders and advice from scientists, organizations such as working groups or review committees may be established.
	Monitoring	Plan formulation			Monitoring items, timing/frequency, scope/points, methods, and implementation system	
		Implementation	Businesses and stakeholders	Project implementation stage	Implementation of the established monitoring plan	The project proponent will take the lead, and to the extent possible, collaborate with local residents, NPOs, etc.
		Review and improvement of management methods	Businesses and stakeholders	Project implementation stage	Evaluation of management methods based on monitoring results and consideration of improvements	A specialized team led by the operator will compile the results of monitoring, discuss them with relevant parties, and compile them based on consensus.

2) Formulation of rules surrounding autonomous vehicles that utilize data

- **Establish operation rules after organizing data related to specific autonomous operations.**
- **Clarify the separation of safety standards and operating rules for autonomous vehicles themselves**

3) Clarification of responsibilities using data to solve issues surrounding autonomous vehicles.

- **Accident analysis using driving simulators, EDR and CDR**
- **Consideration of ADR methods**

Consideration of a model for calculating the economic impacts of autonomous shuttle （１）

○ The economic impacts of introduction of autonomous shuttles are currently evaluated in terms of advertising and government subsidies, and the like. However, these are limited impacts that could only be obtained at the time of introduction in leading regions.

○ In 2023, MLIT released the guidelines for calculating the cross-sector effects* as a tool to visualize the multifaceted external effects of regional public transport. This cross-sector effect refers to "the multifaceted effects of regional public transportation that can be determined by comparing the sectoral replacement costs of various administrative sectors that would be additionally required if regional public transportation were discontinued, and the financial expenditures borne by the government for its operation.

○ Public transit supports the entire regional economy. What the ripple effect would be on the entire regional economy if public transit were discontinued (i.e., how much regional economic activity is currently supported by public transit) cannot be determined through cross-sector effects. Therefore, a calculation model using the input-output table was considered.

*https://wwwtb.mlit.go.jp/kinki/content/cross_sector_leaflet.pdf

Consideration of a model for calculating the economic impacts of autonomous shuttle （２）

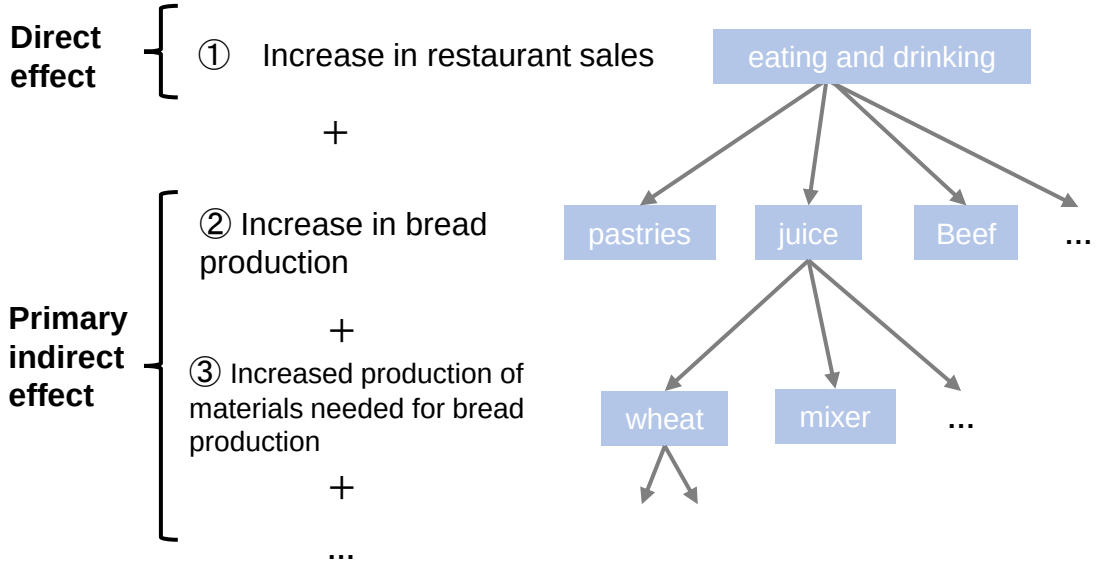
Concept of Economic Ripple Effect Analysis

- To estimate economic ripple effects (production inducement effects), gross value added inducement effects, employment inducement effects, and tax revenue effects using an input-output table

- To estimate economic ripple effects considering indirect effects

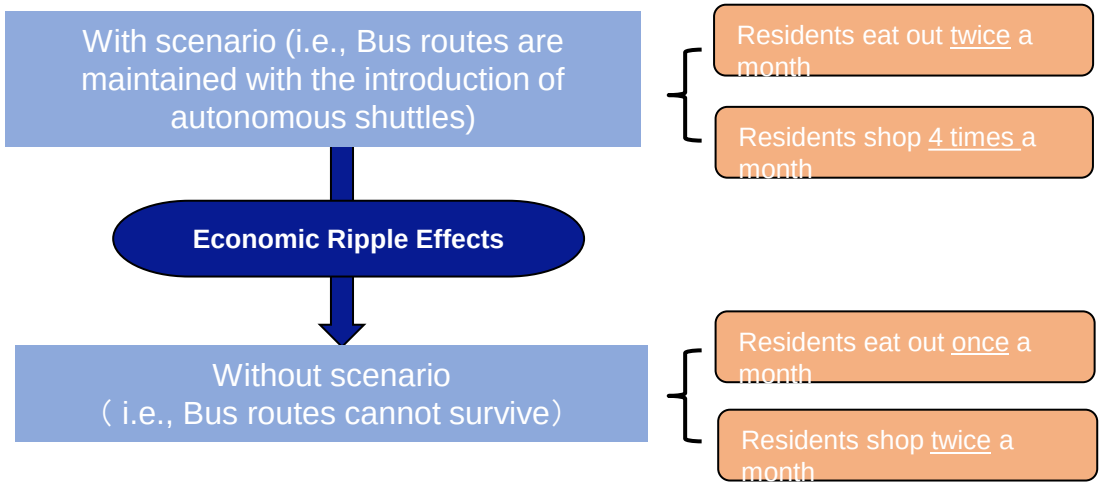
Concept of Economic Ripple Effect Analysis

Increase in outings due to introduction of autonomous shuttles



- To develop an input-output table for municipalities implementing autonomous shuttles from existing statistics.

- To quantify the economic impact of the difference in behavior between the two cases (with and without autonomous shuttle) using the economic ripple effect analysis method.



⑲

Human resource development for social implementation of services

Human resource development for social implementation of services

Social Implementation of Smart Mobility Platforms
Elements of human resource development to get the public to cooperate

1. **Educational Program Implementation**: Provide concise educational programs to deepen the general public's understanding of basic smart mobility technologies.
2. **Safety and Privacy Awareness**: Provide information about how smart mobility impacts personal life, especially privacy and safety, to enhance trust and acceptance of the technology.
3. **Community Event Participation**: Encourage participation in local community events and workshops to enhance understanding of smart mobility technology through direct experience.
4. **Feedback Mechanism Development**: Actively collect feedback from residents and use it to improve platforms, facilitating smoother societal implementation of technology.

Development of new human resources and training programs for **regional mobility security personnel**

Regional mobility must be accepted and take root in the region, and the creation of experience value from the user's perspective cannot be ignored.
Therefore, we will focus on the roles and functions of cabin attendants (CAs), who have contact with passengers and create added value in conjunction with security duties on aircraft, and create an educational program that incorporates this framework into the functions of regional mobility security personnel.
In creating and implementing the educational program, we will explore the possibility of deploying CAs' knowledge horizontally.
Aiming to realize integrated mobility services that unite social welfare, education, tourism, logistics, and other mobility services, the project aims to create and train mobility personnel who can "co-create new value" from the user's perspective.

TAMA UNIVERSITY 多摩大学

Human resource development for social implementation of services

Development of new human resources and training programs for **regional mobility security personnel**

Framework for the Role and Function of the CA

Role	Function
Security personnel	・Daily security operations ・safety response
Service Personnel	・Basic customer service ・Provide added value
Marketing Personnel	・Identify customer needs and issues ・Propose improvements to security and service

analysis

- Functions of Regional Mobility Security Personnel:

In addition to security and service personnel, they will also be responsible for the functions of marketing personnel, such as improving operational procedures and services, understanding user issues and needs, etc., aiming to realize a self-reinforcing loop for improving user experience and creating new value by collecting data from the user's viewpoint.

→Develop human resources for mobility security personnel who can "co-create new value" from the user's perspective.

- Create educational programs

Create an educational program incorporating CA's findings and conduct e-learning and practical training.
Explore the possibility of utilizing human resources and horizontally deploying knowledge in CA's second careers and side jobs.

[Summary of Survey Research]
On-site survey in Sakaimachi, Ibaraki Prefecture:
Test-ride of automatic operation flights, observation of passengers, inspection of remote monitoring centre, interview of monitors, and observation and interview of operator operations
Current CA hearing:
Gathering opinions on the potential of local mobility personnel as a second career or side job, their affinity with the business, and their contribution to the business, including education.

TAMA UNIVERSITY 多摩大学

END

This paper includes the results of Cross-ministerial Strategic Innovation Promotion Program (SIP) 3rd Phase, “Development of Smart Mobility Platform” promoted by Council for Science, Technology and Innovation, Cabinet Office. (Project Management Agency : New Energy and Industrial Technology Development Organization (NEDO) (Project Code JPNP23023))