

Cross-ministerial strategic innovation promotion program/
automated driving for universal services/

Improvement of the social environment for practical implementation and horizontal deployment of automated driving services

FY2019 Interim Report (Overview)

Highway Industry Development Organization

New Civil Engineering Co., Ltd.

Oriental Consultants Co., Ltd.

Nippon Koei Co., Ltd.

Fukken Co., Ltd.

1. Project summary

Background

Growth Strategy 2019
(Innovative Business Activity
Action Plan for FY2019)

“Long-term field operational tests (FOTs) in focused areas, and promotion of further advanced FOTs toward commercialization” “KPI: Starting driverless automated transportation services on public roads in rural areas by 2020”

**Public-Private
ITS Initiative/
Roadmaps 2019**

“<Vision of the automated driving implementation in 2020 - automated driving transport services using the FOT framework>” “we will work on realizing a society that enables the elderly drivers to freely move in each area around the country by around 2025 by expanding the services across the country”

Objectives

**Objectives of
this project**

* To support social implementation at one locations for “**social implementation verification**”

To implement long-term FOTs at a level similar to commercialization at two locations for “**long-term FOTs**”

To compile “**introduction manual for social implementation**” based on the results obtained.

* In addition, two location is being coordinated

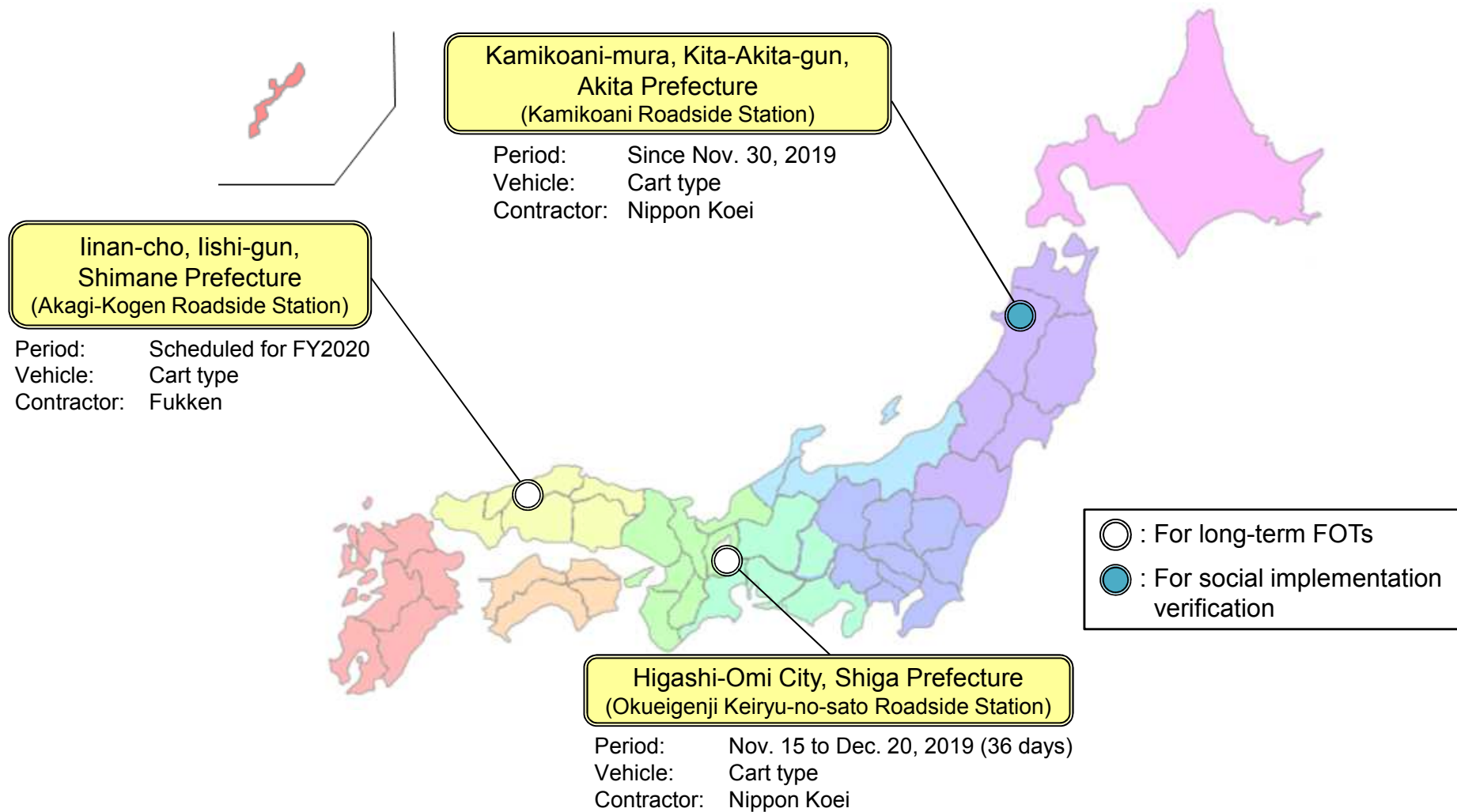
Implementation goals

Implementation goals

To **establish a sustainable service model and promote its penetration**

2. FOT locations (including planned locations)

○ The following three locations are planned as FOT locations (each for social implementation verification and long-term FOTs), and we have been implementing tests one by one, when preparations have been made.*



* In addition, two location is being coordinated

3. Kamikoani

On-going Status of Social Implementation at Kamikoani

3. Kamikoani

■ Overview of social implementation

Start date	Saturday, November 30, 2019
Organization	NPO Kamikoani-mura Isō Service Kyokai (transportation service association)
Objective	To promote regional revitalization through automated transportation services implemented in areas centered around the roadside station and to support transportations mainly by the elderly * Automated transportation services are being implemented as onerous passenger transportation with private vehicles for the first time in Japan.
Route	Travels through three routes circulating around three communities (Kosawada, Fukudate, Dogawa) around the Kamikoani Roadside Station.
Travel distance	Total length: Approx. 4 km (Kosawada-Dogawa route is approx. 5 km in roundtrip taking about 40 minutes, Kosawada-Fukudate route is approx. 4 km in roundtrip taking about 40 minutes, Kosawada circulation route is about 2 km in roundtrip taking about 20 minutes)
Running method	An Automated Driving Level 2 vehicle (driver is on board) drives through mixed traffic (open road).
Fare	200 yen/use
Operational pattern	Weekdays: 1 regular tour/day for Kosawada-Dogawa route Leaving the Dogawa Community Center at 8:30 am. Also running on-demand in other hours. Holidays: Running on-demand throughout the day. The vehicle is charged from 12:00 to 13:00 in both weekdays and holidays.

■ Vehicle used

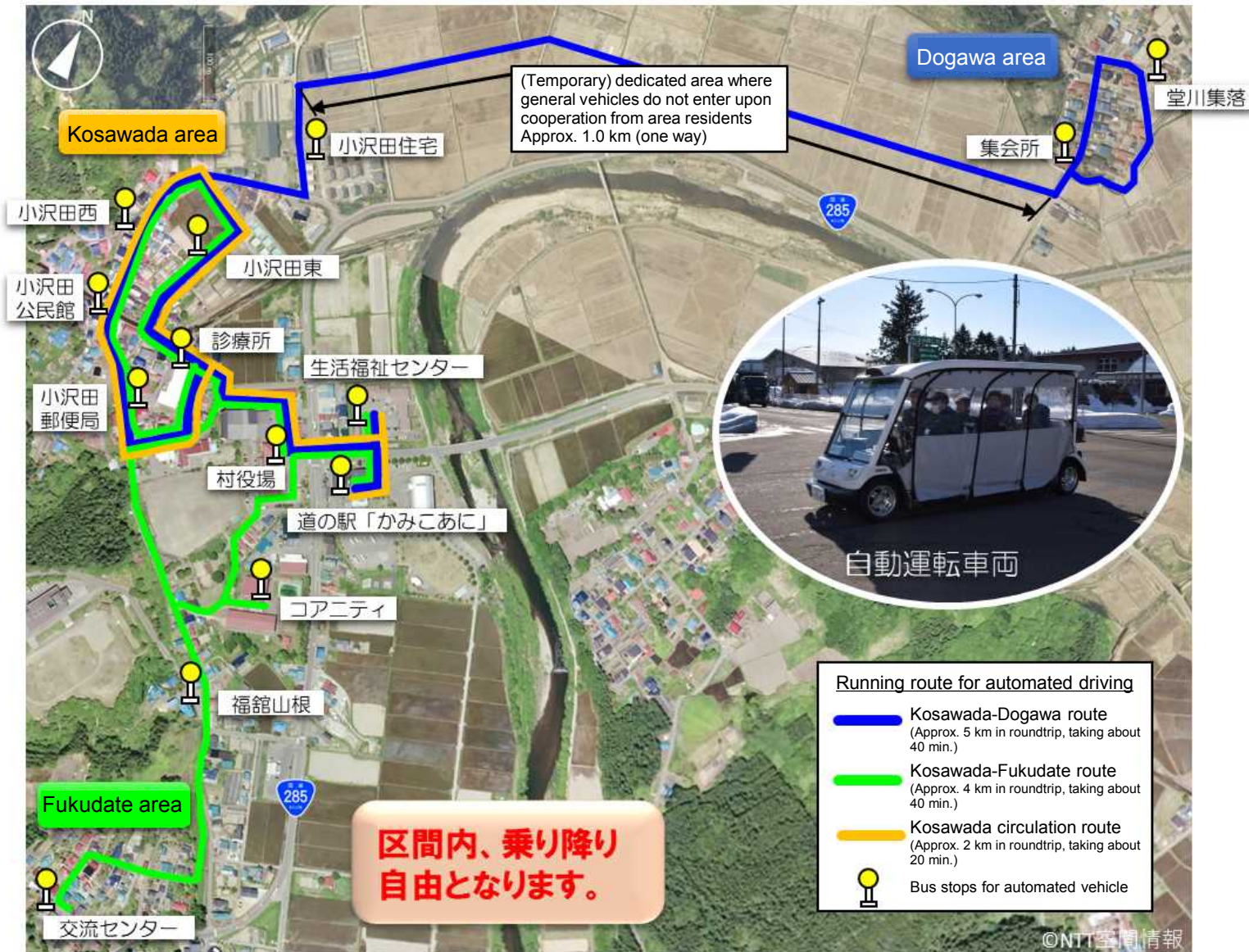
- Made by Yamaha Motor Powered Products
- Capacity: 7 persons
- Driving speed: About 12 km/h max.
- Vehicle introduced: 1



Electromagnetic induction winding

3. Kamikoani

■ Running route: Approx. 4 km in total



3. Kamikoani

- At the beginning of the service launch, the number of users did not increase well, due to bad weathers, but then gradually rose.
- In the analysis of the results for one month, main characteristics include heavy influence of weathers, frequent use of on-demand services or long-distance travels, as well as during weekends.
- Aiming for the average number of users to reach 15 persons/day, we will continuously promote coordination with various regional events and roadside stations.

Analysis ① Heavy influence of weathers

Weather	No. of users
Fine	10/day
Bad	4/day

1st week (Sun. 12/1 to Sat. 12/7) 28
 2nd week (Sun. 12/8 to Sat. 12/14) 43
 3rd week (Sun. 12/15 to Fri. 12/20) 59

Analysis ② Many users from distant communities

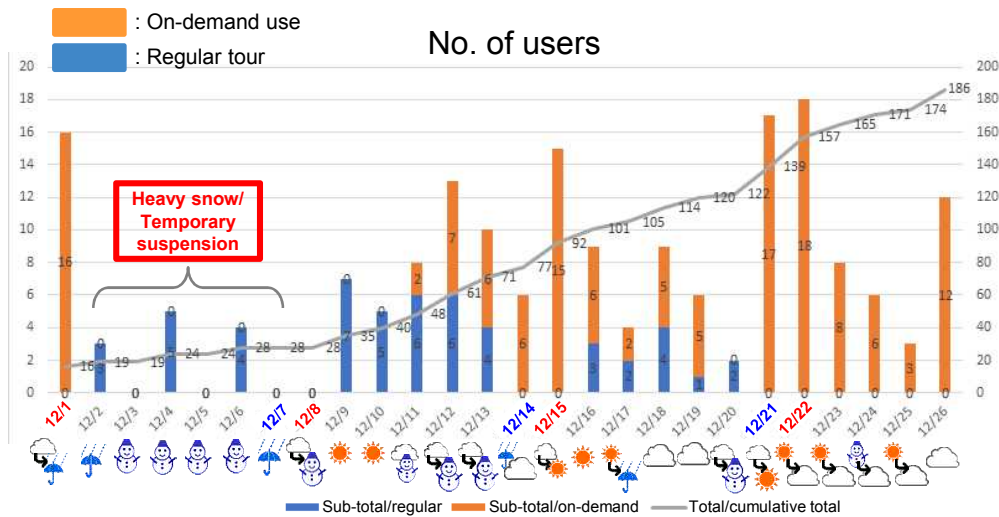
Number of users of routes

* Distance to center of village
 Dogawa: approx. 2 km Fukudate: approx.. 1 km
 Kosawada: approx. 0.5 km

Analysis ③ Many users during weekends

Analysis ④ High ratio of on-demand use

Ratio of using individual course



<Approach to reach average number of users o 15 persons/day>

- Improved customer service (Ex.) Measures against cold
- Tie-up with roadside station/convenience stores.



4. Okueigenji

Long-term FOT Results (Flash Report)

Okueigenji

4. Okueigenji

■ Overview of FOTs

Period	Friday, November 15, 2019 to Friday, December 20, 2020
Objective	<ul style="list-style-type: none">• To support transportations in daily lives of the elderly by transporting them to the town office's branch or clinics located in the roadside station.• To provide transportation services to tourists for the Suzuka Juza (Choshi-ga-kuchi) or adjacent camping sites.• To support delivery of agricultural products to the roadside station (for morning markets) by transporting both passengers and cargoes.
Population in areas along the routes	181 (for two communities along the routes from the 2015 National Census data)
Test routes	From Roadside Station to Choshi-ga-kuchi Iriguchi
Travel distance	Approx. 4.4 km in roundtrip (circulating time about 30 minutes)
Running method	An Automated Driving Level 2 vehicle (backup driver is on board) drives through mixed traffic (open road).
Operational pattern	<ul style="list-style-type: none">• A total of 6 regular tours per day, 2 in the morning and 4 in the afternoon (considering the timetable for community buses)• Travels on a semi-fixed route basis while users can getting on and out at their desired places

■ Vehicle used in the tests

- Development: Yamaha Motor Powered Products
- Capacity: 6 persons
- Driving speed: About 12 km/h max.
- Vehicle introduced: 1



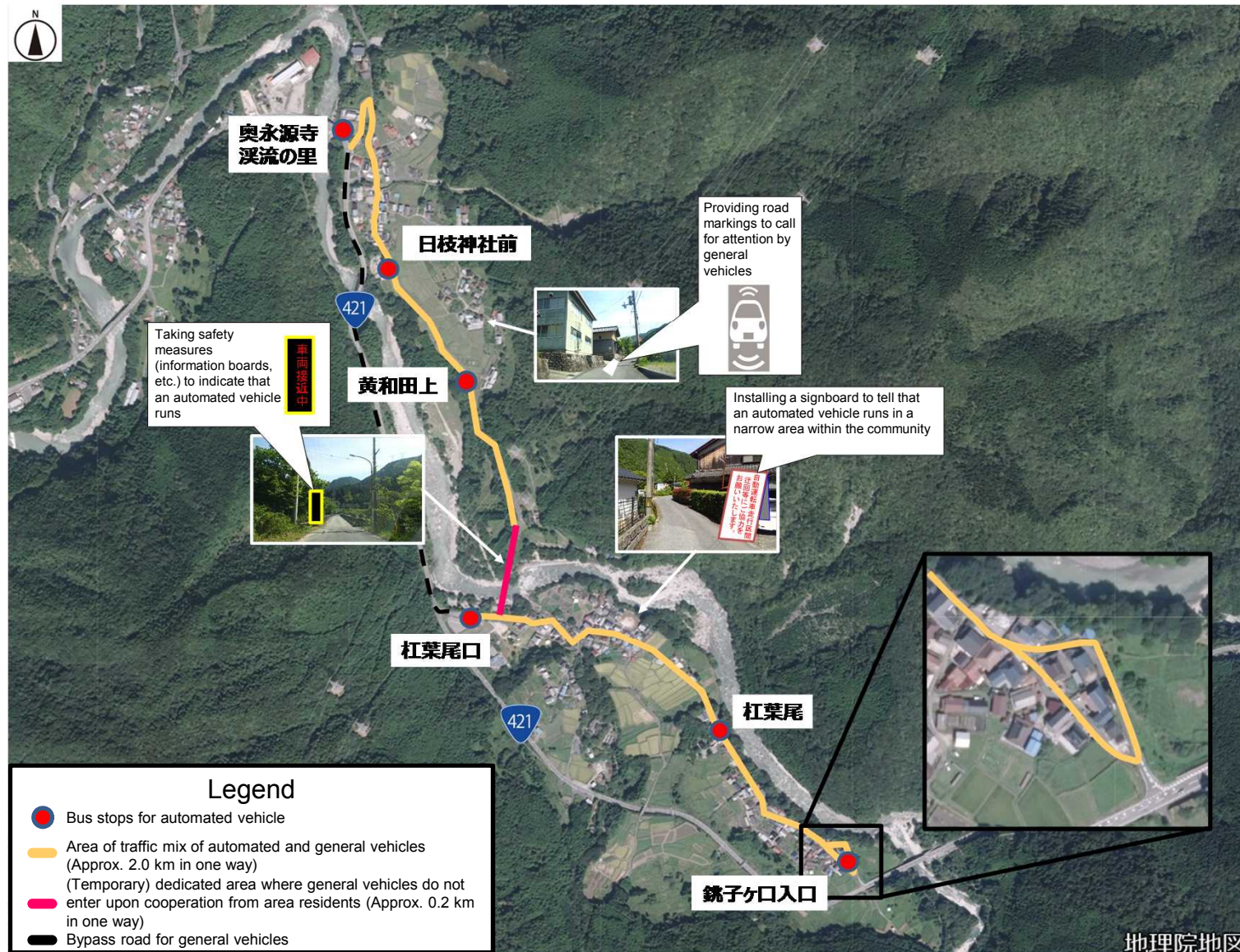
4. Okueigenji

■ Main verification details

	Item	Main verification details
Technology	Securing driving space	<ul style="list-style-type: none"> ○ Securing driving space leveraging characteristics of hilly and mountainous areas <ul style="list-style-type: none"> • Securing special driving spaces (specifying such spaces while considering the status of coordination for obtaining understanding/cooperation by residents on routes, effects of low-speed driving on traffics, and possibility of excluding general vehicles, based on the availability of bypass roads and cooperating attitudes by residents and drivers) • Measures for general vehicle drivers and pedestrians to appropriately recognize spaces dedicated for automated vehicles (such as installing signages, information boards, and caution/warning plates for roads dedicated for automated vehicles to areas within communities and Route 421 connecting to the spaces)
	Operation management system	<ul style="list-style-type: none"> ○ Establishing an operation management center <ul style="list-style-type: none"> • Practicality of drive monitoring system (real-time monitoring of operating status of the vehicle with in-vehicle camera, and emergency response measures (connection of the driver and the operation management center with Skype, etc.)) • Convenience of the reservation system utilizing smartphones and wired phones (operation management for on-demand driving with a simple reservation system -- the method of using the system will be communicated to residents at an explanatory meeting for residents)
Business model	Business implementation system	<ul style="list-style-type: none"> ○ Implementing an experiment assuming the future operation system <ul style="list-style-type: none"> • Sharing of roles and business feasibility management through “Councils for Okueigenji Community Automated Driving Transportation (tentative name)” (coordination assuming that the services will be incorporated in the businesses of the organization, as well as selecting/coordinating a provider of services for future implementation) • A community cooperation system such as participation by local volunteers, etc. (review for reducing operation and coordination costs assuming that the community will manage crew or operators at the operation management center, among others)
	Versatile cooperation measures	<ul style="list-style-type: none"> ○ Improving the convenience for the elderly, increasing opportunities for them to go out <ul style="list-style-type: none"> • Creating an opportunity to visit the roadside station, by offering services for use, such as shopping at the station, going to branch clinics, using administrative procedures at the town office or post offices (in cooperation with events at the roadside station) • Securing the convenience of transportation to city areas by transiting to an existing community bus at the roadside station (implementing an experiment in view of the future operation policy of Higashi-Omi (of using community buses as the main line transportation, and automated vehicles as the terminal transportation)) ○ Improving the convenience for tourists <ul style="list-style-type: none"> • Providing automated transportation services at the route connecting the trailhead of Suzuka Juza (Choshi-ga-kuchi) and the roadside station ○ Delivery of agricultural products (root vegetables, processed foods, etc.), practicability of product delivery from the roadside station
	Business profitability	<ul style="list-style-type: none"> ○ Profitability and sustainability as a business (feasibility of the service) <ul style="list-style-type: none"> • Forecasting future demands/costs, comparative analysis • Considering the way of collecting fares based on transportation characteristics of community residents, such as a fixed-price system to achieve continuous operation

4. Okueigenji

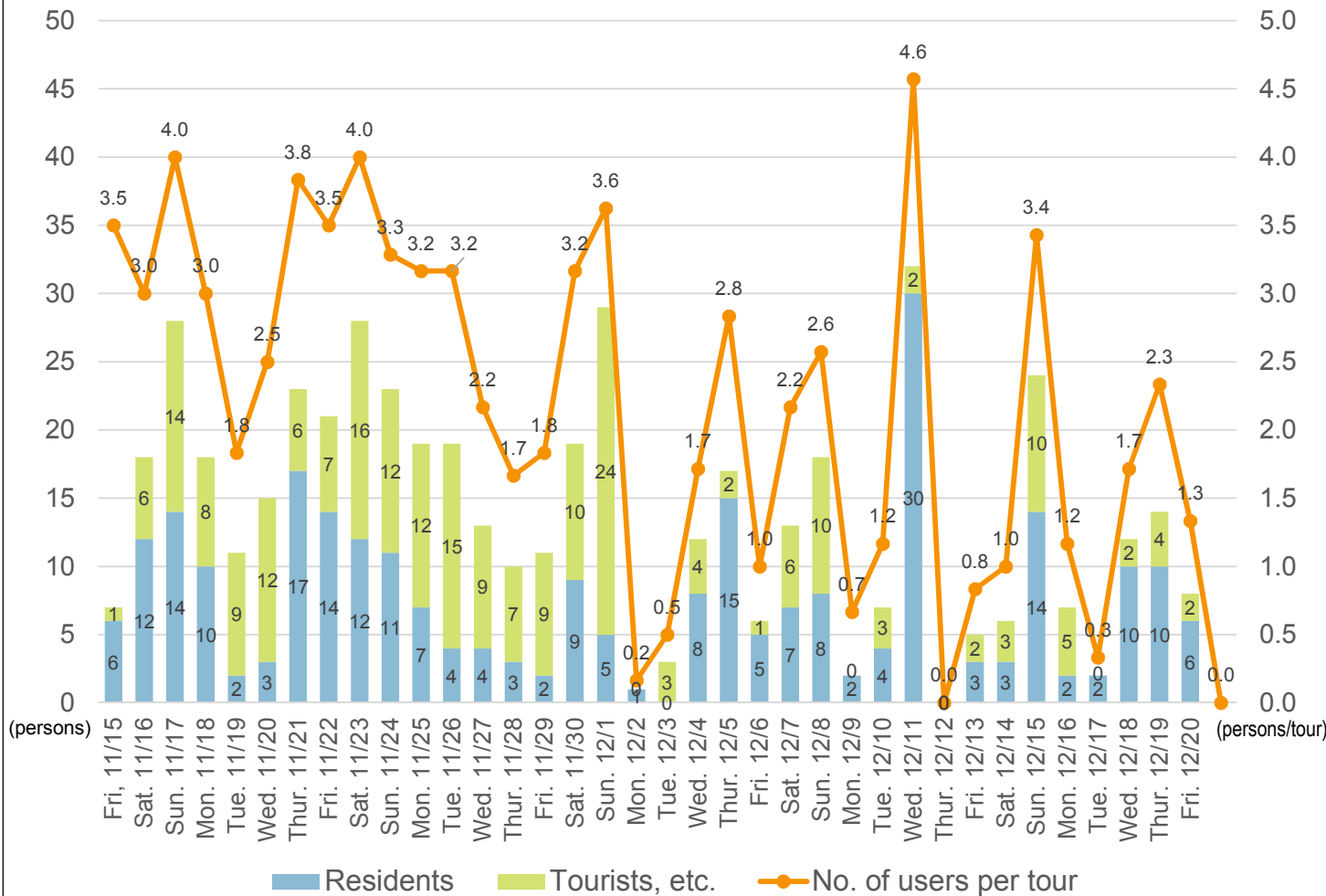
■ Test route: Approx. 4.4 km (roundtrip)



4. Okueigenji (Flash Report on Test Results)

<Status of use>

- A total of 501 persons use the service (among which 265 persons are community residents) * Excluding those for site observation, etc.



<Fare system>

- Collects 20 yen per ride from users of the automated vehicle
- At the end of the test, various types of tickets incl. coupons, on-demand tickets were also sold.

<Voices from users>

Very satisfied since I could go to places usually I have to walk with this automated vehicle. (Participant in the town shopping tour)



Convenient as I could use it on-demand from the salon to my home! (Heavy user living in areas along the route)



4. Okueigenji (Safety Measure)

<Securing driving space>

- Distributing a safety map containing driving routes, narrow areas, etc. to communities
- Guiding general vehicles by clearly stating areas of passing each other or notifying that vehicle is approaching

Driving space



Notice of automated vehicle approaching by an electric signboard



Road marking



Notification leaflet



Clearly indicating area where vehicles can pass by each other



<Major usage scene>

- Regularly using to ship goods to the Yamasato market at the roadside station, or going to a branch clinic annexed to the roadside station
- Participating in events for tourists or residents (shopping tour, salon visit, etc.)
- Using as a transportation measure to the trailhead (Choshi-gakuchi) or for autumn-leaf viewing



Going to a branch clinic



Participating in the salon event for residents around the roadside station



Tourist event (held on 12/1)



Using when shipping goods to the Yamasato market



Transports to go to Choshi-gakuchi



Shopping tour