December 3, 2019

East Japan Railway Company

Takanawa Gateway Station Overview

Trial deployment of new station service equipment and the creation of never-before-seen station stores

○Based on the concept of “Global Gateway Shinagawa,” Takanawa Gateway Station, which will open in spring 2020, aims to become a gateway linking Tokyo with the world as the hub of a new city slated to open around 2024. Incorporating various aspects of JR East Group’s “give it a go” approach, we will make it a place for starting new projects by deploying the latest station service equipment and conducting verification tests.

○As an “ecoste” (Environment Earth Conscious Station of East Japan Railway Company) incorporating environmental conservation technologies promoted by JR East, Takanawa Gateway Station will promote a variety of initiatives, including a reduction in energy consumption through the adoption of roof membranes and giving consideration to the environment through the use of lumber from the Tohoku region, thereby working toward the achievement of the United Nations Sustainable Development Goals.

○Passenger guidance robots leveraging AI and autonomous mobile robots will be deployed on a trial basis.

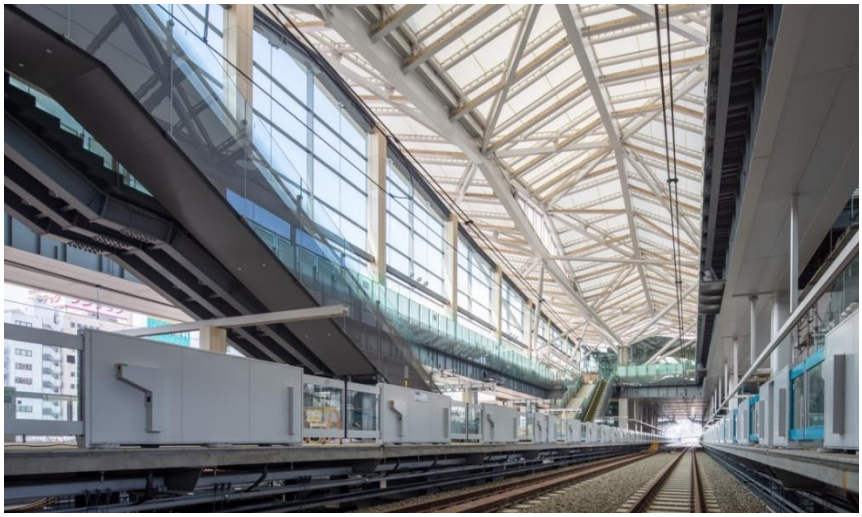
○An unmanned store enabling AI-based payment by TOUCH TO GO Co., Ltd., that aims to enhance customer service and solve the issue of labor shortages and a new store by Starbucks Coffee Japan, Ltd., will open at the station.

As of November 2019

1. Station Overview

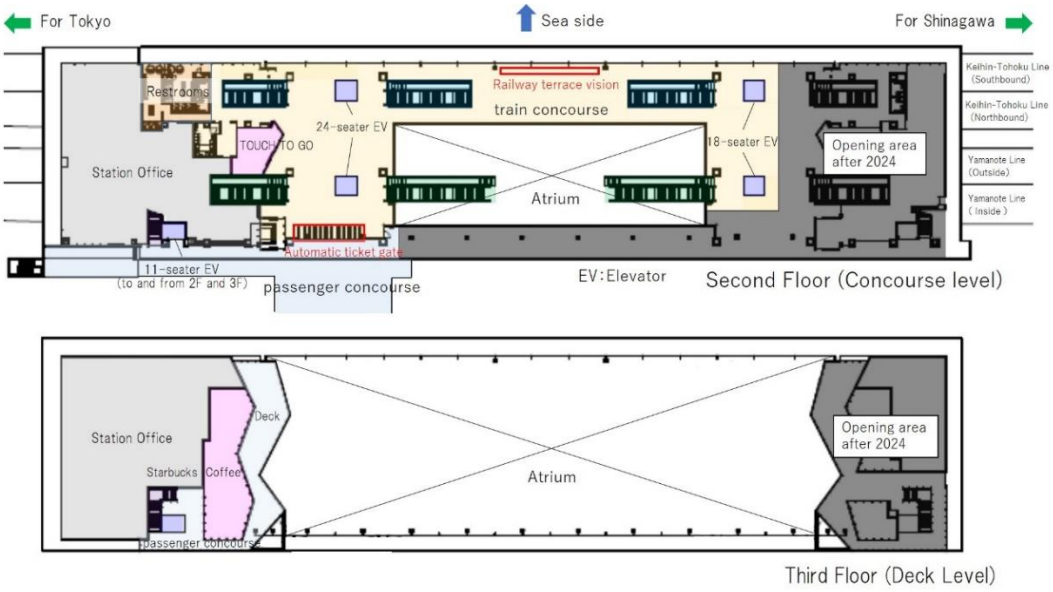
（1）Station design

With Kengo Kuma as design architect, we opted for a design that conveys Japanese style at every turn as the gateway to an international exchange hub. Under a large roof designed in the motif of origami that evokes Japanese sliding paper doors, there is a symbolic atrium and large glass surface, thereby realizing a space that creates a feeling of integration between the station and the city.



View of atrium from the platform level as of November 2019

＜Station Layout＞

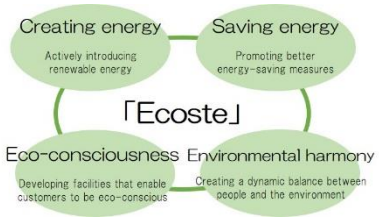


Various Equipment	Platform doors: Yamanote Line and Keihin-Tohoku Line platforms Escalator: 6 (3 on each platform) Elevators inside the ticket gate (to and from platform and concourse): 4 (a 24-person elevator and an 18-person elevator on each platform) Elevators outside the ticket gate (to and from 2F and 3F): 1 (an 11-person elevator)

(2) Environmental Initiatives

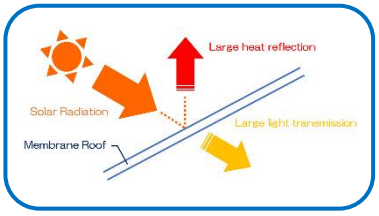
As an “ecoste” deploying a variety of environmental conservation technologies (eco menu), Takanawa Gateway Station is conducting the following initiatives.

* “Ecoste” is an initiative in which various environmental conservation technologies, such as energy saving and renewable energy, are introduced at stations. With a focus on the four pillars of “energy saving”, “energy creation”, “eco-feeling“, and “environmental harmony”, an “eco menu” based on each of these pillars is introduced at stations. (As of December 2019, there are 10 such stations, including Yotsuya, Musashi-Mizunokuchi, Urawa, and Kaihin-Makuhari stations)



① Improvement of thermal environment and reduction in energy consumption for lighting through the adoption of roof membrane

・Curb increases in indoor temperature by adopting membrane materials that reflect the heat from sunlight to a high degree.
・Reduce energy consumption for lighting during the day by utilizing the light transmission of membrane roofing.



② Giving consideration to the environment through the use of lumber from the Tohoku region

・We will use domestic lumber from locations such as Furudono Town in Fukushima Prefecture and Ishinomaki City in Miyagi Prefecture and plan to acquire the three-star rank under the Minato Model, a carbon dioxide fixation certification system* promoted by Minato City with the aim of preventing global warming

* The Minato Model is a system that contributes to the prevention of global warming by increasing CO_2 absorption volumes through promoting an increase in the amount of CO_2 fixation and domestic forest improvement by encouraging the use of domestic lumber in buildings and other structures built in Minato City. Minato City awards certification based on the amount of lumber used.

③ Installation of solar panels

・Solar panels will be installed on the rooftop of the platform for Tokyo-bound trains.

④ Installation of small wind turbine power generators

・Two small wind turbine power generators will be installed alongside railway lines.

⑤ Establishment of green spaces

・A green space of approximately 70m^2 will be established alongside the Tokyo-bound Yamanote Line railway line, and wall greening panels of approximately 80m^2 in size will installed on the boundary between the road and the station premises.

⑥ Adoption of LED lighting fixtures

・LED has been adopted for station lighting.

2. Station service equipment

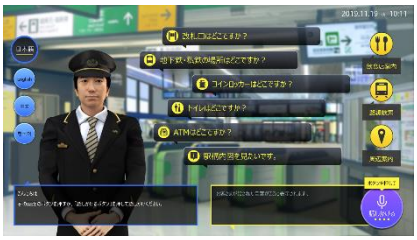
Robots using the latest technology and station service equipment will be deployed on a trial basis in the station.

（1）Station service robots (Details on separate sheet)

① Passenger guidance robots

AI-based passenger guidance robots and digital signage will be introduced on a trial basis to provide guidance on the station, facilities in the surrounding area, transfer information, and information on events to be held at Takanawa Gateway Station.

AI-based guidance robots



AI-based Passenger Signage

② Security and cleaning robots (autonomous mobile type)

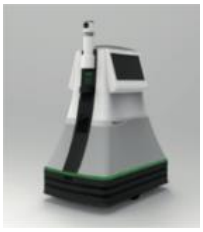
Security robots that detect suspicious objects and other items and cleaning robots that clean station premises while moving along a pre-programmed path will be deployed on a trial basis.

Security robot

Cleaning robot

③ Mobile guidance and mobile advertising robots (autonomous mobile type)

A verification test will be carried out on autonomous mobile robots that perform passenger guidance and display advertising, and robots that assist the movement of passengers in the station.



Mobile guidance and advertising robot

Mobility assistance robot

*There are some days and times robots are not in operation.

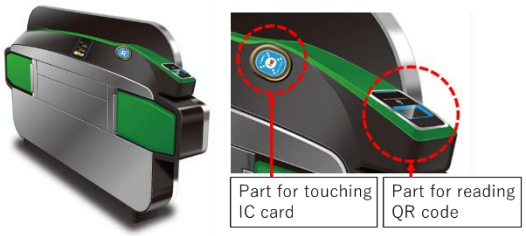
（2）Station service equipment

① Easy-to-touch automatic ticket gates

Automatic ticket gates featuring an improved touch part for IC cards that will also make them easy-to-use for wheelchair users will be introduced on a trial basis.

Moreover, we plan to conduct a monitoring assessment test of ticket gates using a QR code®.

*QR Code® is a registered trademark of DENSO WAVE INCORPORATED.



Automatic ticket gate (rendered image)

② Easy-to-hear public address equipment

A public address system that measures concourse noise at all times and automatically controls the volume of announcements to an easy-to-hear and appropriate level in line with changes in noise level will be introduced on a trial basis.

③ Diverse digital signage

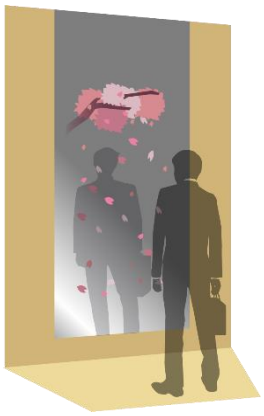
Digital signage displaying train operation information and other news will be installed. LCD monitors at the map-type ticket fare table above ticket vending machines features information in two languages (Japanese and English).

Moreover, a Railway Terrace Vision will be installed at an event space inside the ticket gate, in addition to signage mirrors on restroom mirrors that evoke a sense of the seasons.

…Railway Terrace Vision…

The station, which stands on a former rail yard and was the location in 1872 for the first railway to open in Japan, will in future be a city that aims to be a new international exchange hub. At the Railway Terrace Vision, videos will be played that show how this area will become a focal point that connects the past and future, Japan and the world, and many people.

Railway Terrace Vision (rendered image)



A signage mirror with a design inspired by a flurry of falling cherry blossoms (rendered illustration)

3. Station stores

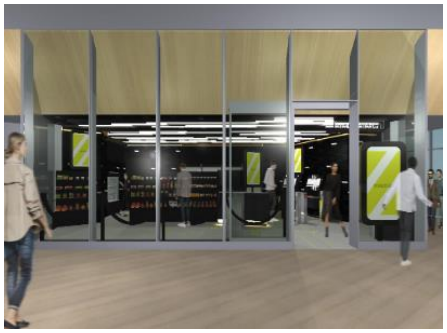
The first-ever permanent TOUCH TO GO, *a*n unmanned store enabling AI-based payment, will appear on the second floor (inside the ticket gate). On the third floor (outside the ticket gate), a new store by Starbucks Coffee Japan, Ltd., will open that meets diversifying workstyles.

(1) TOUCH TO GO, an unmanned store enabling AI-based payment

(Operator: TOUCH TO GO Co., Ltd.)*

- After two past verification tests at Omiya Station and Akabane Station, a permanent store featuring an unmanned AI-based payment system will open at Takanawa Gateway Station.
- Through unmanned AI-based payment technology that allows customers to make walk-through purchases just by picking up products, and the provision of products that leverage the expertise of the JR East Group, we will realize an innovative buying experience while aiming to solve the issue of labor shortages.

* TOUCH TO GO Co., Ltd.
TOUCH TO GO Co., Ltd. is a joint venture company established in July 2019 by JR East Startup Co., Ltd., and Signpost Corporation, the recipient of the Outstanding Company Award, of the FY2018 JR EAST STARTUP PROGRAM, in order to fully commercialize stores featuring unmanned AI-based payment systems.



【Location】2F (inside ticket gate)
【Opening hours】6am to 12am (planned)
【Main products】Lunch boxes, ready-to-eat dishes, confectionary, and beverages

(2) Starbucks Coffee, Takanawa Gateway Station (provisional name)

(Operator: Starbucks Coffee Japan, Ltd.)

- Starbucks Coffee, Takanawa Gateway Station (provisional name), a new store targeting business people and station users will open.
- In cooperation with Starbucks Coffee Japan, Ltd., JR East will aim to respond to a variety of business situations and diversifying work styles. In addition to introducing payment settlement by *Suica* and other public transportation electronic money, and Mobile Order & Pay, a service that allows drinks and food to be ordered and paid for in advance from the Starbucks app and picked up without having to wait in line at the cash register, booth-style shared offices (STATION BOOTH) will be installed in store.

【Location】3F (outside ticket gate)
【Opening hours】7am to 9pm (planned)

・・・ STATION BOOTH・・・

STATION BOOTH is a booth-type shared office at STATION WORK shared offices operated by JR East. Users can spend time comfortably in high-security, completely private rooms equipped with power supply, USB, monitor, aromatic scents, and other features.

STATION BOOTH

As of December 2019, STATION BOOTH offices are in operation at four locations: inside the Sobu ticket gate on B4F at Tokyo Station; inside the Koshu-kaido ticket gate at Shinjuku Station; inside the Metropolitan ticket gate at Ikebukuro Station; and on the third floor in ecute Tachikawa at Tachikawa Station. (For details see https://www.stationwork.jp/)

(3) Verification test on promoting the appeal of travel leveraging the latest technology

・In cooperation with Japan Airlines Co., Ltd., JR East will conduct a verification test on the appeal of travel leveraging the latest technology.

・We will install equipment leveraging virtual technology that enables a simulated experience of travel through the five senses. In addition to seeing and hearing, we will re-create the appeal of localities by utilizing scents, breezes, and mists as participants go on a virtual trip, guided by a local navigator.

JAL INNOVATION Lab

(rendered image)

【Location】Starbucks Coffee, Takanawa Gateway Station (provisional name) in store
【Period】Approximately six months from the opening of the store
【Opening hours】7am to 9pm (planned)

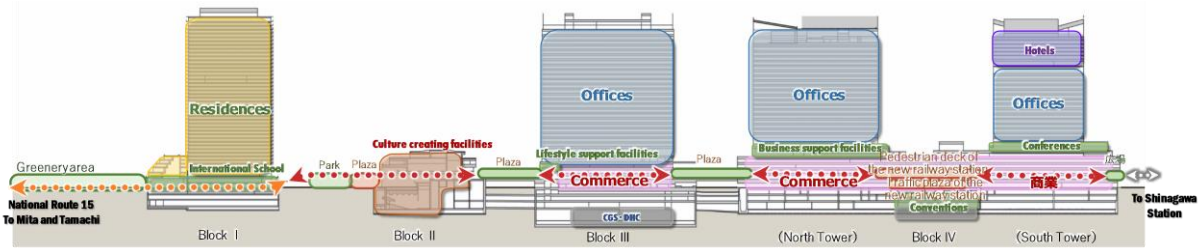
4. Shinagawa Development Project

The opening of Takanawa Gateway Station will mark the creation of the gateway to a new city in phase one of the Shinagawa Development Project, which is being promoted based on the concept of Global Gateway Shinagawa. In parallel with the opening of the station, we will begin preparatory work with the aim of developing a city and plan to embark in earnest upon construction work in 2020.

Moreover, we will establish a local base for city development, TokyoYard Building, near Takanawa Gateway Station around March 2020. To realize the opening of the city around 2024, we will promote city development preparations and activities that continuously create new businesses and cultures, such as the Tokyo Yard Project (http://cityup.jp/tokyoyardproject/).

Summary of the Shinagawa Development Project (phase I)

The aim is to open the city around 2024.



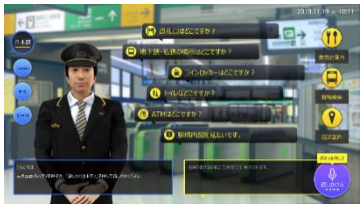
Date of block	Total	Block I	Block II	Block III	Block IV
Lot area	Approx. 72,000㎡	Approx.12,700㎡	Approx.8,000㎡	Approx.13,000㎡	Approx.38,300㎡
Total floor space (Floor space used in floor-space ratio)	Approx. 851,000㎡ (Approx.690,200㎡)	Approx.149,000㎡ (Approx.103,700㎡)	Approx.31,000㎡ (Approx.24,300㎡)	Approx.211,000㎡ (Approx.174,500㎡)	Approx.460,000㎡ (Approx.387,700㎡)
Main purposes	–	Residences, educational facilities, parking lots, etc.	Culture creating facilities, parking lots, etc.	Offices, commerce, lifestyle support facilities, heat source machine rooms, parking lots, etc.	Offices, commerce, hotels, conventions, conferences, business support facilities, parking lots, etc.
Number of floors/Maximum height	–	45 floors above ground, 3 floors below ground ／Approx.173m	6 floors above ground, 4 floors below ground ／Approx.45m	31 floors above ground, 5 floors below ground ／Approx.167m	30 floors above ground, 3 floors below ground ／Approx.164m

Details of robots for deployment at Takanawa Gateway Station

【Separate Sheet】

【Stationary Robots / Guidance】

1. AI-based Passenger Signage Trial Deployment

JR East Information Systems Company	
 	○Uniquely combines AI technologies such as voice recognition and natural language processing to provide spoken guidance in four languages (Japanese, English, Chinese, and Korean) to passengers requiring assistance, such as for station directions and road directions around the station. ○Provides real-time information on train operations via coordination with all the information services owned by JR East.

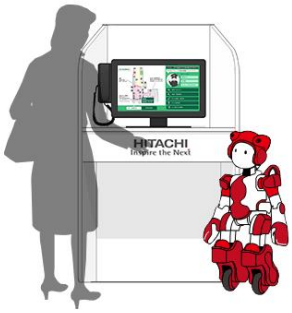
2. BotFriends Vision Trial Deployment

Operator: EAST JAPAN RAILWAY TRADING CO., LTD. / Manufacturer: Toppan Printing CO., LTD.	
 	○A multilingual (Japanese, English, Chinese, and Korean) digital assistant like a concierge that provides passengers with the optimal information when they state their information requirements. ○Realizes universal design by taking into consideration a variety of customers who use the station. ○Capable not only of providing automated responses through AI, but also of providing guidance combining manned remote interaction in real time.

3. AI Sakura-san Trial Deployment

Operator: EAST JAPAN RAILWAY TRADING CO., LTD. / Manufacturer: Tifana.com Co., Ltd.	
 	○Provides guidance in response to inquiries for station maps and transfer information in addition to guidance on tourist spots, souvenir recommendations, and other topics. ○Communicates in four languages (Japanese, English, Chinese, and Korean)

4. EMIEW3＋Navigation from the station Trial Deployment

Operator：EAST JAPAN RAILWAY TRADING CO., LTD. / Manufacturer：Hitachi, Ltd.	
	○The communication robot, EMIEW3, and Hitachi's digital guidance signage. ○EMIEW3 and digital guidance signage utilize their own distinctive features to give guidance in line with customer needs. ○Provides easy-to-understand information in line with customer needs by coordinating with external information services. ○Provides support in 4 languages (Japanese, English, Chinese, and Korean).

【Security】

Security Robot Trial Deployment

Jointly Developed by CENTRAL SECURITY PATROLS CO., LTD. and Nihon Unisys, Ltd	
	○Performs tasks including detecting selected objects and giving warnings (relaying status notifications to other security guards on duty) while patrolling a pre-programmed path. ○Issues warnings to suspicious persons as necessary by sounding a siren and turning on a flashlight. ○Gives consideration to safe movement through an LED lamp on the upper part of the robot that lights up and voice alerts from a speaker.

【Cleaning】

1. EGrobo Trial Deployment

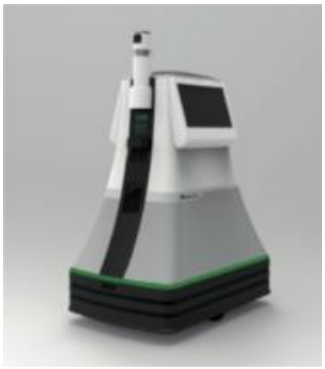
Operator: JR East Environment Access Co., Ltd. and EAST JAPAN RAILWAY TRADING CO., LTD. / Manufacturer: AMANO Corporation	
	○Conducts autonomous cleaning of station premises at night (in some cases EGrobo will be operated during the day for demonstration purposes). ○Cleans dirt from floor surfaces with a revolving brush or pad and water. ○Gives consideration to safety by automatically stopping and avoiding collision when it detects a person or object. ○The operational status of cleaning robots is notified by email to a remote location.

2. CLINABO Verification Test

Operation: JR East Consultants Company / Manufacturer: NIPPON SIGNAL CO., LTD.	
	○Receives station congestion information from sensors (infra-red sensors and laser radar sensors) installed at Takanawa Gateway Station that conduct monitoring and information gathering. ○Performs automated cleaning on station concourses in accordance with a pre-programmed path and station congestion information. ○Gives consideration to safety by automatically stopping and avoiding collision when it detects a person or object.

【Mobile Robots / Guidance and Advertising】

1. Station Service Robot Verification Test

Frontier Service Development Laboratory, Research and Development Center of JR East Group	
	○Receives station congestion information from sensors (infra-red sensors and laser radar sensors) installed at Takanawa Gateway Station that conduct monitoring and information gathering. ○Patrols station concourses in accordance with a pre-programmed path and station congestion information. ○Provides guidance on station facilities and other subjects via an in-built screen. ○Displays information on promotional campaign advertisements and etiquette via its in-built screen.

2. Guidance Communication Robot (HOSPI) Verification Test

JR EAST MECHATRONICS CO., LTD. and Panasonic Corporation	
	○Performs passenger guidance (screen display and voice guidance) and guides passengers to concourse facilities (elevators, toilets, railway terraces) along a pre-programmed path. ○Communicates in two languages (Japanese and English). ○Capable of giving guidance to a programmed destination by leading the way. ○Displays information on promotional campaign advertisements and etiquette via its in-built screen.

【Mobility Robot】

WHILL NEXT Verification Test

JR EAST MECHATRONICS CO., LTD. and Panasonic Corporation	
	○Wheelchair-type mobility support robot. ○Emulates the guidance communication robot, HOSPI, WHILL NEXT supports the mobility of passengers to their concourse facility destination. ○Aiming to offer services at connecting stations and stations where walking distances are long, a verification test will be conducted at Takanawa Gateway Station.

* Mobility Revolution Consortium (Note 1) will undertake operation of station service robots and JRE ROBOTICS STATION, LLP (Note 2) will undertake coordination.

(Note 1) An organization established on September 5, 2017 as a platform for realizing mobility reform through open innovation pertaining to social issues that are challenging for JR East to tackle alone and a vision of next-generation public transport.
(Note 2) An organization established on July 14, 2017 centering on JR East Group companies in order to promote the development and deployment of service robots. Coordinates the Let's bring up Guidance AI systems project.

* There are some days and times robots are not in operation.