NEXTSTATION

MARRAKECH 2015

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5TH INTERNATIONAL CONFERENCE ON RAILWAY STATIONS

NEXTSTATION

Palmeraie Palace

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Research & Development on future issues in accessibility for disadvantaged passengers

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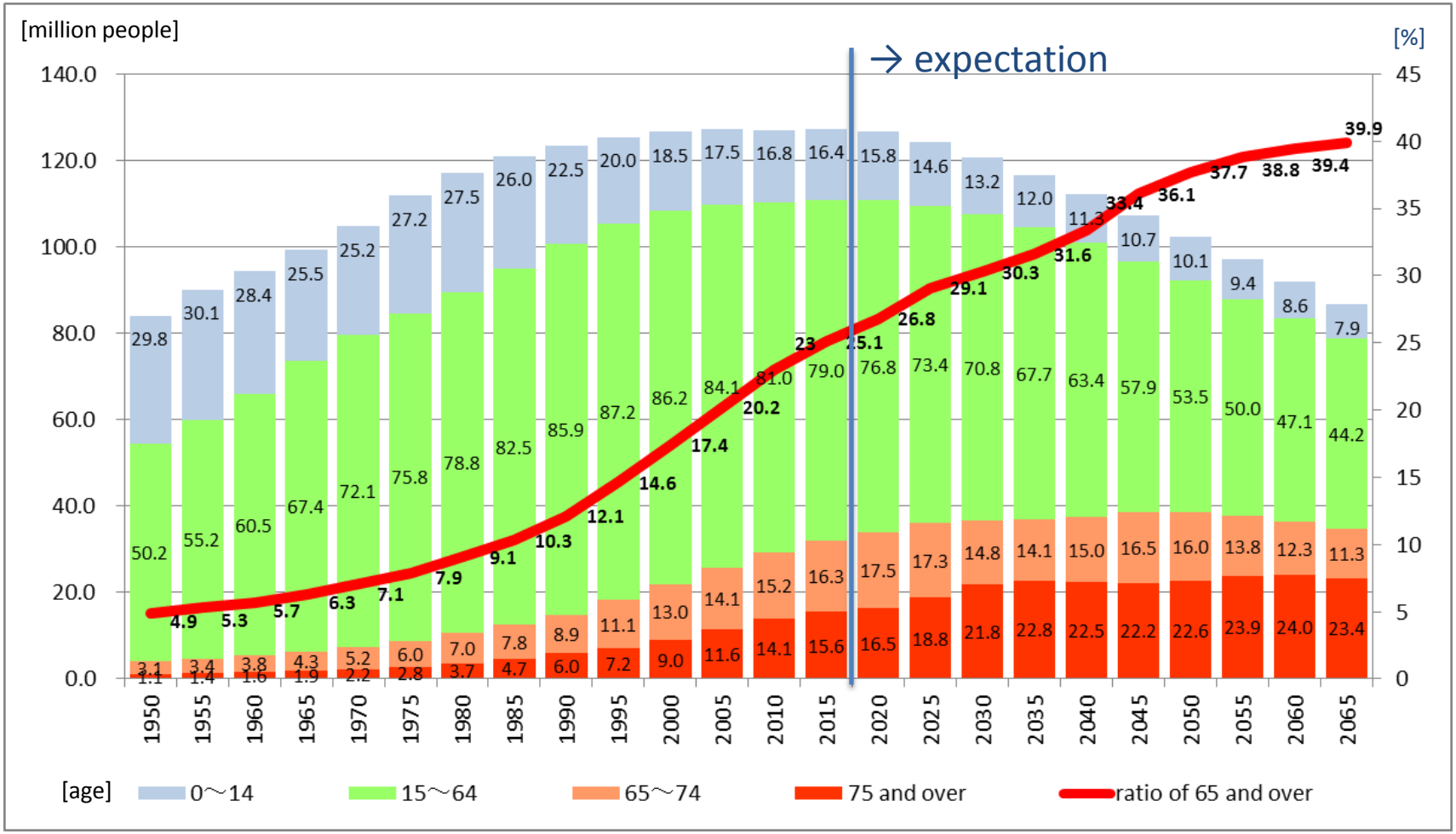
"5th INTERNATIONAL CONFERENCE ON RAILWAY STATIONS"
3-A Enhancing client's experiences

About East Japan Railway Company (JR East)

JR Hokkaido
JR East
JR Central
JR West
JR Shikoku
JR Kyushu

Number of Employees	59,240 (as of April 1, 2014)
Number of Stations	1,678 (as of April 1, 2014)
Number of Rolling Stock	13,348
Average Number of Trains Per Day	12,773
Passenger Line Network	7,474.2 kilometers (as of April 1, 2014)
Average Number of Passengers Per Day	17.10 million (2013)

65 years old and over / total population in japan



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1. R&D on visual environment for the elderly

Background and purpose

Existing signage guidelines are concerned with those with diminished vision or color-blindness. But there is **a need for stricter standards for elderly** who are prone to defective eyesight due to cataracts, etc.

The purpose of this R&D is **to develop guidelines** based on our research.

Evaluation test

Contents of research

1) Brightness, illuminance and color saturation within the station, and signs with which the visually impaired elderly have difficulty.
2) Evaluation of existing signage design.
3) Comparative evaluation of existing and modified signage design by elderly subjects.

1. R&D on visual environment for the elderly

Results

1) After the evaluation of existing signage design (background and text color), need for improvement was found in 4 lines among 12 main rail lines in the Tokyo area.
2) **Figure 2 shows proposal for improvement**.
3) Brightness contrast should be **more than 0.65**.
4) Letter size should be **more than 70mm**.
   The more complex characters are illegible.
5) Platform sign should be on a **black background rather than the assigned route color background**.
6) **Pictograms should be shown with shadows**.

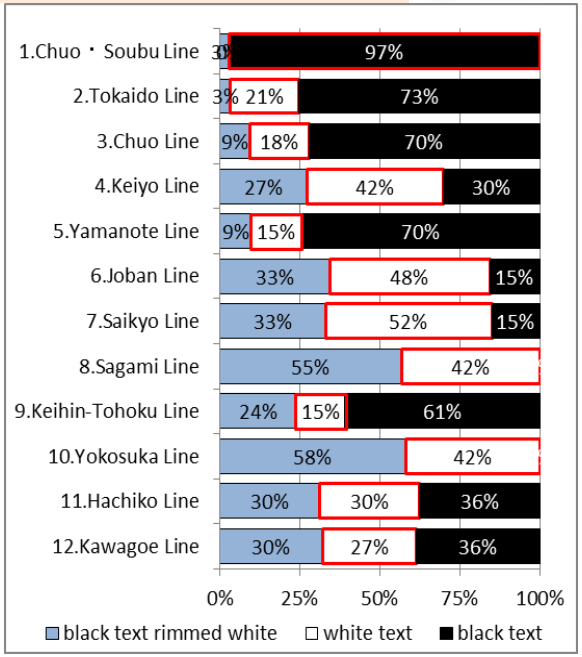


Fig.1 Evaluation of recognizability for each line
（Letter color presently used in red rectangle）

Fig.2 Proposal based on evaluation

Fig.3 Before and after proposal (Left : current / Right : proposed)

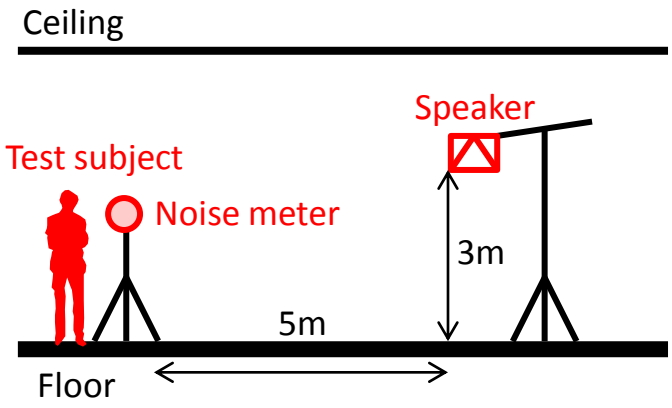
2. R&D on auditory environment for the elderly

Background and purpose

Our aging society needs **a proper auditory environment** with consideration for the elderly. The purpose of this R&D to **develop guidelines** based on our research.

Contents of research

1) Tests were carried out in 3 Tokyo area stations with 10 subjects (age 66 to 80) with poor hearing.
2) Relationship between noise level and acceptability analyzed.
3) Specific S/N, the ratio of provided sound announcements to background noise, analyzed.
4) Noise level measured in various stations.



Outline of experiment

2. R&D on auditory environment for the elderly

Results

1) Specific S/N should be **more than 10dB**. **20dB** is highly audible.(Figure 1)
2) Noise level should **be less than 65dB**. (Figure 2)
3) Stations achieving **less than 65 dB** have installed **noise absorbing material** **in ceiling**.(Figure 3)
4) The number of speakers should be **increased** and sound level of each **lowered**.
5) Speakers should be installed **6m apart**.

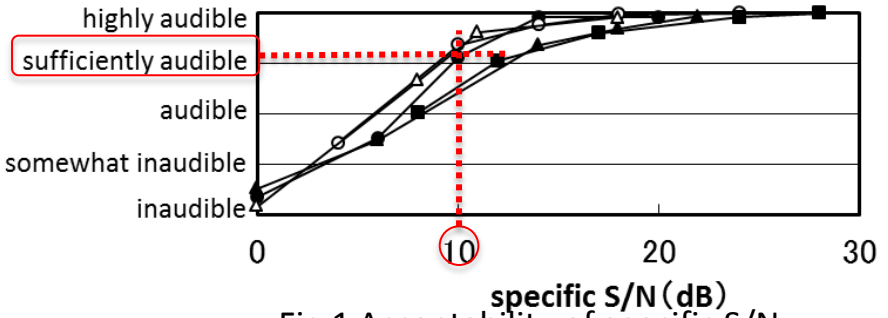


Fig.1 Acceptability of specific S/N

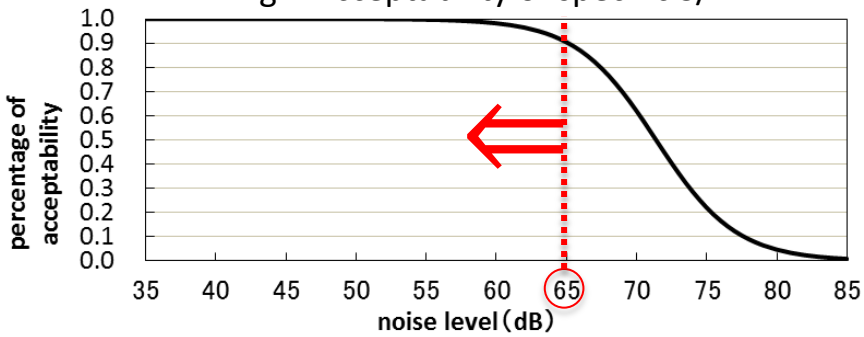


Fig.2 Acceptable noise level

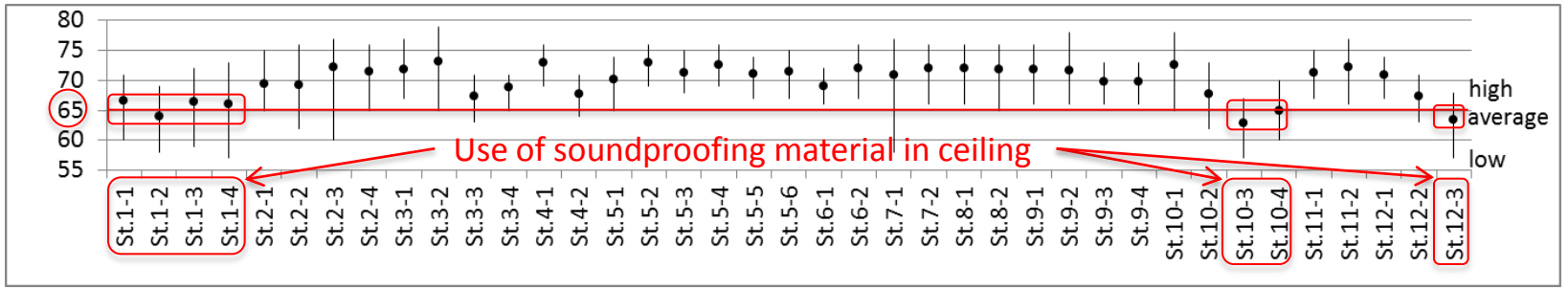
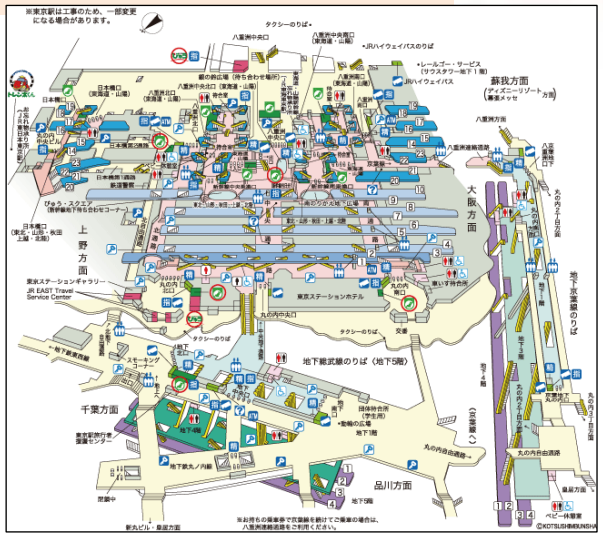


Fig.3 Comparison of noise level

3. R&D on mobility support for the visually impaired

Background and purpose

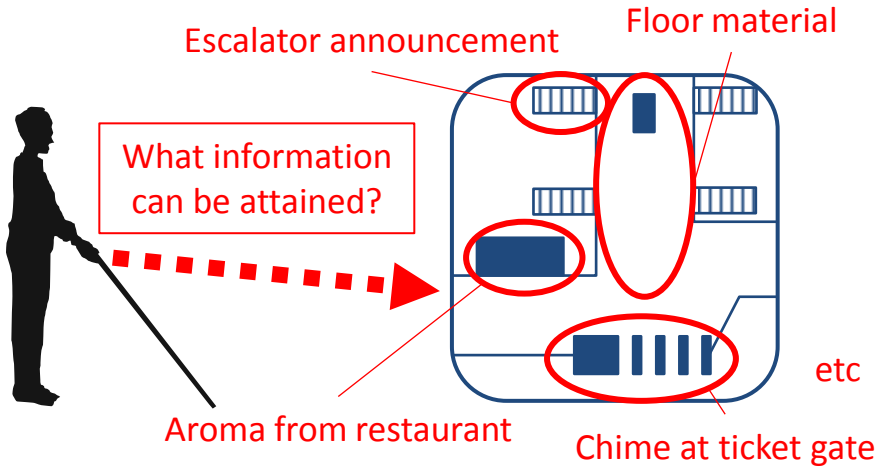
Information which the visually impaired can attain from the map is about **1/70 compared to full-sighted users**.
Tactile maps used in stations are not easily understood.
We studied **mobile tactile maps** to support the visually impaired in stations.



Complicated station space

Contents of research

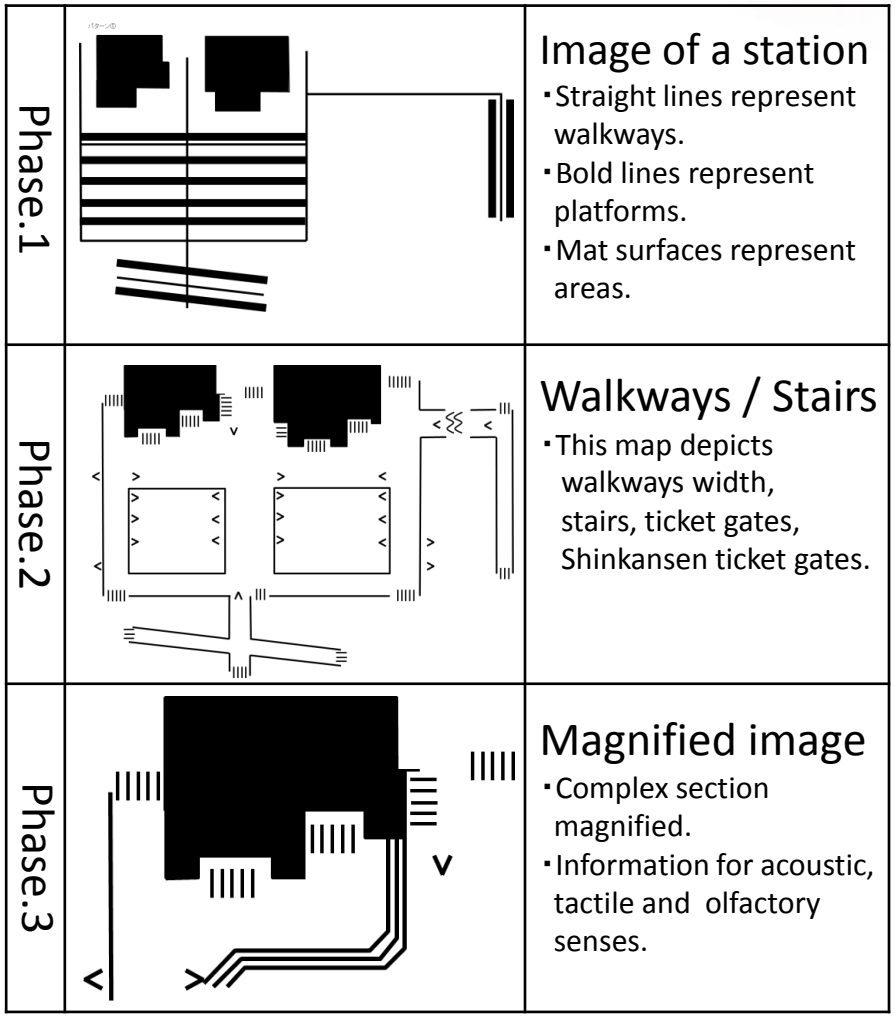
1) Movement capability of the visually impaired researched.
2) Maps using non-visual information developed.
3) Appropriate information volume considered.
4) Confirmed practicality of mobile tactile maps.



3. R&D on mobility support for the visually impaired

Results

1) Information **attainable by the visually impaired**.
   Acoustic sense : Chime at ticket gate, platform announcements, footsteps, sound of rollers, wind
   Tactile sense : Guide blocks, floor material, handrail braille
   Olfactory sense : Restaurant aromas
2) There should be **no more than 4** map keys.
3) **Straight lines**, **bold lines**, **mat surfaces** and **symbols** can be recognized **with fingertips**.
4) The map should be made in **3 different sizes**.



tactile map in 3 different sizes

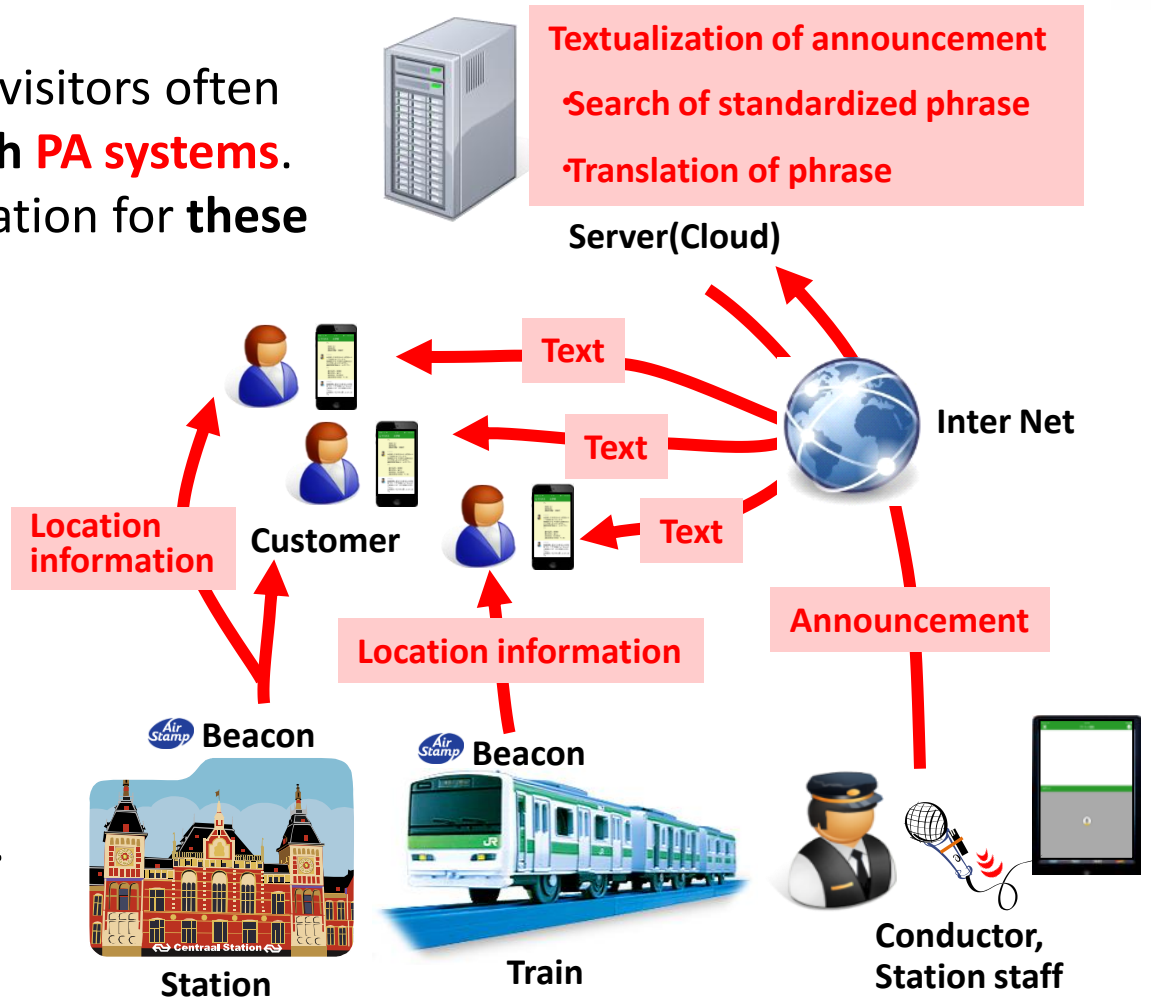
4. R&D on information service for the hearing impaired and foreign visitors

Background and purpose

The hearing impaired and foreign visitors often **cannot attain information through PA systems**. Methods of information dissemination for **these users** are being developed.

Development outline

1) Development of application for smartphone/iPhone.
2) Use of sound beacon to limit the area of information distributed.
3) Voice recognition, noise cancel/decreasing systems, etc.
4) Operable by conductor/station staff.



5. Conclusion

JR East has been conducting a wide range of studies and R&D to improve accessibility for people with disadvantages in mobility and have accumulated a certain level of knowledge regarding the respective factors.
However, there remain many issues and we have not yet achieved the ideal environment for all passengers.

Taking into account the Tokyo Olympic Games to be held in 2020, we need to design our stations in conformity with various users' needs from the point of view of Universal Design.

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Thank you for listening