

Promoting our “technology vision”



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Setting challenges to achieve our technology vision

It is over a year since we drew up our Technology Vision, in March 2018. The challenges we have set ourselves are gradually taking shape. For example, in “Pursuing further safety and reliability of transportation,” we are conducting tests for detecting abnormal external Shinkansen sounds through machine learning of sound data. In “Providing railway/transportation services that play a role in supporting the creation of appealing areas,” we are pushing forward with initiatives to generate new value in cooperation with various partners. This includes the further development of the prepaid IC card ICOCA and the online train reservation service e5489, as well as the holding of an idea competition (“Umekita Innovation Challenge”) to ensure that Umekita (Osaka) Underground Station (provisional name), scheduled to open in spring 2023, becomes a showcase for our Technology Vision.

And in “Building sustainable railway/transportation systems,” where we are working toward the realization of Condition Based Maintenance (CBM), we will begin operating rolling stock condition-monitoring equipment, and we will soon be implementing facilities management using 3D data in a railway Mobile Mapping System (MMS)¹, developed in collaboration with Asia Air Survey Co., Ltd., a company with which we have a capital tie-up. These initiatives will serve to integrate our various systems.

Innovation means business transformation

In our Technology Vision, we are not simply aiming to develop technology. Innovation means the creation of new value through a transformation of existing business processes. Our aim is to continually provide our customers with value in the form of even safer and more comfortable railway transportation services 20 years from now –in spite of a decline in the population– by utilizing rapidly evolving new technology and also by transforming our own operations. To achieve this, we are pressing on with initiatives to become “a company that continues to take on challenges,” as set out in the JR-West Group Medium-Term Management Plan 2022.

¹ MMS (Mobile Mapping System): A technology whereby sensor equipment such as laser scanners and digital cameras, installed on the vehicle, combine with a Global Navigation Satellite System (GNSS) to measure the surrounding environment in 3D while the vehicle is moving.

Building a safe and comfortable

The challenge of “Umekita (Osaka) Underground Station” Open innovation initiatives

Umekita (Osaka) Underground Station (provisional name), scheduled to open in spring 2023, is positioned as a station of the future for realizing our Technology Vision, and our goal is to provide seamless, one-to-one services. Employing an open innovation format, we are working together with a wide range of partners to achieve rapid and flexible development, including repeated validation testing at the actual station.

In order to create new services at the station, in fiscal 2019 we solicited ideas for services under the following theme: “Novel and futuristic services at ‘Umekita (Osaka) Underground Station (provisional name), the Gateway to Japan, which excite customers.” Three ideas were then chosen. In the coming years, we will press on with initiatives to realize seamless, personally tailored customer services.

An “island-style ticket vending machine” using an interactive projector

Combining a projector and sensors, station names and Shinkansen seats are projected onto the station wall or counter, and by touching the projected images/text, passengers can reserve and pay for their rail ticket, etc.



Top Prize



Prize for Excellence

“BLIND ATTENDANT” Visually impaired persons are guided to Umekita via beacon-equipped braille blocks

Beacons installed in the station interact with devices carried by customers, guiding them via audio along a barrier-free route. This helps visually impaired customers to get around.

Three ideal forms

<p>1</p> <p>Pursuing further safety and reliability of transportation</p> <ul style="list-style-type: none"> • Visualization of risk through technology • Optimal fusion of people and technology • Reducing accidents at level crossings through integration with Intelligent Transport Systems (ITS), etc. • Enhancing safety and transportation quality through rapid collection of information via social networking services (SNS), etc. 	<p>Enhancing safety through collaboration between new technologies and people, and through partnership between customers and society</p>
<p>2</p> <p>Providing railway/transportation services that play a role in supporting the creation of appealing areas</p> <ul style="list-style-type: none"> • Providing simple and seamless railway/transportation services • Proposing a new kind of travel in response to diverse needs • Providing personally tailored customer services 	<p>Supporting the provision of warmhearted, one-to-one railway/transportation services through technology</p>
<p>3</p> <p>Building sustainable railway/transportation systems</p> <ul style="list-style-type: none"> • Enhancing productivity using new technologies such as IoT and AI • Reforming work styles using ICT technology • Building environmentally sound railway/transportation systems • Coordination with diverse transportation modes • Simplification of ground equipment 	<p>Providing environmentally sound transportation systems that are sustainable even in an era of population decline, by promoting work style reform and productivity enhancements through the use of new technology</p>

future through technology

Use of data science Aiming for rapid value creation

Spurred on by the most critical issue for our business, namely, to enhance the productivity of our operations in response to the decline in the working population, we continue to resolve business issues by utilizing data science technology in the AI and IoT fields. Data science is a new field that differs from the conventional engineering field, which has been the foundation for the railway business. Positioning data science as a new core competence of the Group, we will rapidly create new value with a sense of urgency in our work.

Incorporating data science will enable us to...

Realize safety enhancements in an efficient manner, by building highly accurate models for visualization, abnormality detection, and fault prediction, and by sensing changes in the condition of railway rolling stock and equipment in advance

Create new value, including utilizing railway rolling stock and equipment data for resolving issues on a cross-divisional basis and for application to the service field, including customer information, rather than viewing the resolution of operational issues as simply a matter of data analysis within a particular division

Example of resolving a business issue using data science

Enhancing the accuracy of snow accretion prediction during snowfall

Regarding the accretion of snow on Shinkansen bogies during snowfall, the necessity of snow removal work is decided the day before, but there is the issue of the accuracy of snow accretion prediction on the previous day. In order to provide safer and more stable transportation, we commissioned an AI prediction model from a third-party provider to enhance the accuracy of snow accretion prediction, and have built a highly accurate model. We are currently at the testing stage, and continue to resolve practical implementation issues before commencing live operation.

Implementation through fusion of snow accretion prediction model and image analysis AI

