

Digitalization Creating the Future of Railways

On May 1, this year, Japan celebrated the start of the new Reiwa era. Referring to the date by the specific era name, or “gengo”, is a system deeply rooted in Japanese history, and the start of a new era is a refreshing change for us. Now we would like to welcome this Reiwa era with hopes for peace and prosperity.

Meanwhile, what can we expect for railways in the years within and beyond the Reiwa era? We hope that they will provide significant means of mobility with enhanced values, namely a safer and reliable, universal, and enjoyable mode of transportation.

Railways will be faced with certain challenges in the years ahead. Among them, it is particularly important to address the issue of declining numbers of working people, who today represent a large segment of our passengers, and the issue of increasingly powerful natural disasters. Furthermore, we also need to explore more ambitious measures such as further speed increases associated with Shinkansen’s autonomous train operation and advancements in energy-saving technologies. To solve these issues, digital technologies are essential tools.

It is crucial for RTRI to further enhance five strengths of railways: 1.) safe and stable transportation, 2.) high-speed operations, 3.) mass transport capacity, 4.) punctuality, and 5.) energy efficiency. Accordingly, we have pursued safety enhancements through research into seismic measures for Shinkansen, earthquake-proof reinforcement of structures, and various human factor issues. Going forward, we will aim to cause a paradigm shift in railway systems through digitalizing railways through the utilization of integrated communications and controlling technologies. In targeting such



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digitalization, we will address the tasks of enhancing safety of train operation, automating maintenance, and developing autonomous train operation.

In order to enhance safety of train operation, we will develop technologies to estimate the damage caused by natural disasters in real time while assisting in the early restoration of operations by estimating and monitoring precipitation amounts, wind speeds, water levels of rivers, and changes in slope conditions in order to minimize the infrastructure damage. We will also develop technology related to obstruction monitoring at stations as well as a human error prevention system that monitors drivers’ physiological indices, including concentration and drowsiness.

As part of our advancements toward automated maintenance, we will address condition monitoring of facilities, automated diagnosis, failure prediction,

Message from RTRI President

and automated maintenance planning in order to reduce maintenance costs and labor. In order to achieve autonomous train operations, we will develop technologies for automated driving, autonomous routing by each train, and automated preparation of demand-based timetables. In addition, we will be building a shared platform to analyze the big data associated with maintenance, track conditions, and local weather.

We must create a new system by fusing new digital technologies into our knowledge, experience, and manufacturing techniques that have been developed over the years. For this purpose, it is important to provide a unique workplace to inspire creation of technology and expertise in order to attract and develop human resources for the new era.

Furthermore, we have been actively committing to the international standardization of railways in order to develop the overseas market for Japanese railways in this age of railway industry globalization. We will continue focusing on various activities to enhance the presence of Japanese railway systems through, for example, hosting the 12th World Congress on Railway Research.

Under the vision “We will develop innovative technologies to enhance the rail mode so that railways can contribute to the creation of a happier society”, RTRI will continue to address the challenges of research and development for the future of railways. In this new era of Reiwa, I wish all of you peace and prosperity, and your continued support for RTRI would be most appreciated.

