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Message from Managing Editor

To ensure railway safety and sustainable development, it is essential to accurately monitor the ever-changing conditions of railway infrastructure and wayside equipment and use the resulting information to support timely decision-making. As countries around the world face common challenges, including increasingly severe weather-related disasters, aging railway infrastructure, and shortages of maintenance personnel, the need for effective monitoring technologies and data utilization has become more pressing than ever.

The latest issue, Ascent No. 19, presents RTRI's research and development efforts under the theme "Monitoring and Visualization Technologies for Railway Infrastructure." This issue features a method for identifying debris-flow-prone mountain streams using high-resolution elevation data; a seismic observation method based on Distributed Acoustic Sensing (DAS), which uses existing telecommunication optical fiber cables installed along railway lines as sensors; and technologies that apply image processing and AI to analyze forward-view images captured by cameras mounted on trains for evaluating the condition of track components and wayside equipment.

These studies share a common objective: to efficiently acquire detailed, high-density data on the condition of railway infrastructure across extensive areas and to apply these data to disaster preparedness and more efficient maintenance planning and management. Another notable feature is their effective use of existing facilities, publicly available data, and commercially available equipment. These approaches are expected to reduce the workload associated with maintenance and contribute to improving the safety and reliability of railway systems.

By introducing these research and development efforts, we hope this issue will deepen readers' understanding of technologies that contribute to further enhancing railway safety and reliability. We also hope that it will provide new insights and foster collaboration to address the challenges facing railways around the world.

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