NEUBREX

NEWS RELEASE

November 9, 2026
Neubrex Co., Ltd.

Neubrex Announces Long-Range DAS Measurement Capabilities Covering a Combined 300 km Across Two Routes

NBX-S4140 Simultaneously Measures up to 150 km per Route for Wide-Area Monitoring of Railways and Expressways

Neubrex Co., Ltd. introduces the measurement capabilities and potential applications of its long-range distributed acoustic sensing (DAS) system, the NBX-S4140, for wide-area monitoring of railways and expressways. The system captures vibration and acoustic signals at individual locations along optical fibers in real time and supports simultaneous measurement of two independent fiber routes, each extending up to 150 km. The combined measurement length can reach 300 km, although the actual measurement distance depends on fiber attenuation and measurement settings.

DAS is a sensing technology that measures vibrations and acoustic signals transmitted to optical fibers by detecting changes in backscattered light. Where existing telecommunications fiber optic cables are installed along railways or expressways, unused fibers within these cables can be utilized as sensors. This enables the collection of data on vibration locations, changes over time, and frequency characteristics, potentially reducing the need to install new dedicated sensing cables.

The NBX-S4140 is equipped with two independent optical output and receiver systems, enabling simultaneous measurement of two optical fibers without switching between them using an optical switch. It also supports configurations in which the unit is installed at an intermediate point along a monitored section, with optical fibers connected in both directions. Since the optical fibers themselves do not require an external power supply, measurement equipment can be centralized at a single monitoring site.

For illustrative purposes, Figure 1 shows a hypothetical configuration in which a single unit simultaneously measures optical fibers extending in both directions from Shin-Kobe Station on the Sanyo Shinkansen line, located near Neubrex's headquarters in Japan. Figure 2 shows a similar hypothetical configuration using Taichung Station on Taiwan High Speed Rail as the monitoring site.



Figure 1. Hypothetical Monitoring Coverage from Shin-Kobe Station, Japan

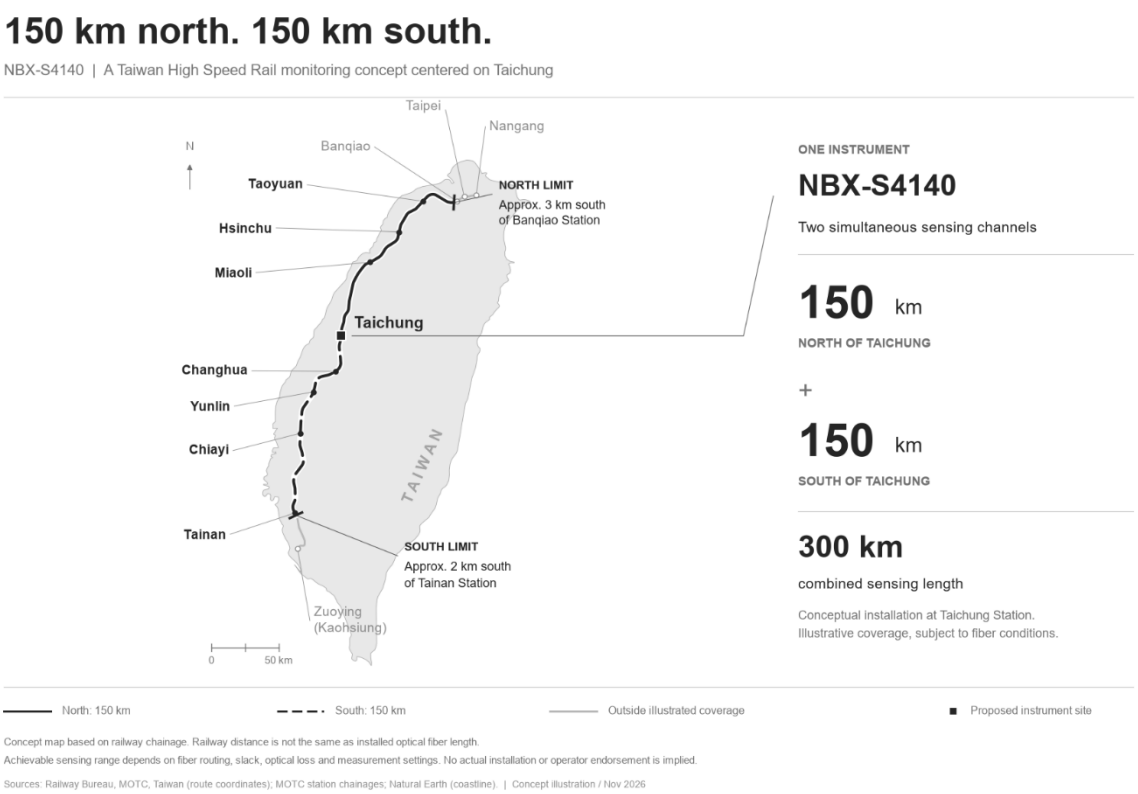


Figure 2. Hypothetical Monitoring Coverage from Taichung Station, Taiwan

Centralized Monitoring Across Multiple Sites

By utilizing the DAS Network Stream Server developed by Neubrex, measurement data from NBX-S4140 units installed at multiple locations can be collected at a single site via the internet for centralized monitoring. For example, a configuration connecting five units can support a combined optical fiber measurement length of up to 1,500 km. This exceeds the approximately 1,326 km Shinkansen route distance from Tokyo to Kagoshima-Chuo.

The actual monitoring coverage and interrogator locations are designed according to the route lengths of existing optical fibers, connection losses, and measurement settings.

Potential Applications

- Railways

Neubrex proposes using optical fibers installed along railway lines to capture vibrations caused by passing trains, earthquakes, falling rocks, and impacts on bridge girders. By combining data analysis with railway kilometer markers and infrastructure asset locations, the system is intended to support train location tracking and help narrow down sections requiring on-site inspection following natural disasters. Neubrex is also exploring research applications that use vibration frequency characteristics to assess the condition of structures.

- Expressways

Neubrex proposes collecting vibration data generated by vehicle traffic and construction activities near expressways over long distances to support traffic monitoring. The company is also exploring applications for detecting vibrations associated with vehicle collisions and identifying the sections where accidents occur. By verifying the correlation between measured locations and expressway kilometer markers, as well as the ability to distinguish collision-related vibrations from normal traffic and construction activities, Neubrex aims to support early accident detection and on-site inspections.

Depending on the monitoring objectives and cable installation conditions, vibration propagation characteristics and acquired signals are evaluated to select appropriate measurement settings and analysis methods. Measurement locations are correlated with railway or expressway kilometer markers and infrastructure asset locations to help identify affected sections and track changes over time. Application-specific analysis software and separate AI processing modules can also be combined to evaluate the detection and classification of target events.

About Us

Founded in 2002, Neubrex is one of the few manufacturers worldwide specializing in distributed fiber optic sensing systems.

The company offers a range of innovative products, including the NEUBRESCOPE series of high-precision distributed fiber optic sensing interrogators, FutureNeuro optical fiber sensor cables specifically designed for sensing applications, and NEUBREGATE, a monitoring system that automates data processing and management for distributed fiber optic sensing. Neubrex also provides optical fiber measurement services delivered by experienced engineers. With a proven track record of deployments in countries around the world, the company possesses leading technical expertise in distributed fiber optic sensing.

In addition to its headquarters in Kobe, Japan, Neubrex maintains bases in North America (Houston, USA) and Europe (Baden, Switzerland). The company provides products and monitoring services to customers requiring high-quality measurements in fields such as natural resources, energy, and civil infrastructure.

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