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NEC Corporation

Toyota Technical Development Corporation (TTDC)

NEC and Toyota Technical Development Develop Stable Wireless Control System for Cars and other Moving Objects in Factories – Productivity-boosting system introduced into Toyota’s Motomachi Plant –

TOKYO, Japan and AICHI, Japan - May 20, 2022 - NEC Corporation (NEC, Head Office: Tokyo, Japan; President and CEO: Takayuki Morita) and Toyota Technical Development Corporation (TTDC, Head Office: Aichi, Japan; President: Yoshiyuki Kagawa) today announced the development of a stable wireless control system for cars and other moving objects in factories and warehouses.

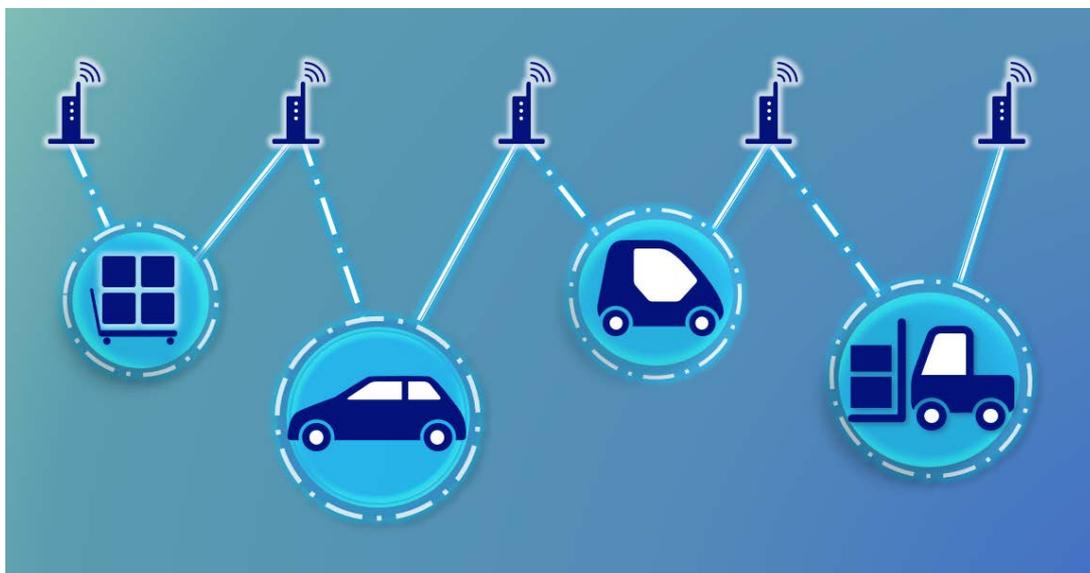
This system pairs NEC Wireless-connection Stabilization Software ^(NOTE) with communication modules developed by TTDC, which are then mounted onto cars, automated guided vehicles (AGVs), and the like to ensure stable communication that is free from disruptions and interference. By resolving these issues of roaming-based communication with moving objects, the developed system enables real-time data acquisition and command transmission, helping to increase the productivity and efficiency of production sites.

This system has already been introduced at the Motomachi Plant of Toyota Motor Corporation and is contributing to efforts to boost productivity using wireless communication inside the plant.

The two companies intend to apply the knowledge gained through this partnership to systems that perform wireless control of AGVs, machine tools, robots, and the like, collect inspection data, and transmit programs for Toyota Motor Corporation and other customers in the manufacturing field.

The digital transformation (DX) of the manufacturing field through automation and the Internet of Things (IoT) is accelerating as companies aim to boost productivity and respond to growing labor shortages. In particular, there is an increasing need for highly reliable and low-delay wireless communication systems for AGVs and robots used over wide areas or across different processes. Stable wireless communication is recognized as a serious issue in factories and warehouses that are full of equipment and facilities that block radio waves and make flexible changes in production lines difficult.

This system developed by NEC and TTDC realizes stable communication with moving objects by maintaining strong wireless reception, identifying low-interference communication paths with other wireless devices in real time, and seamlessly switching to these paths.



Outline of wireless control system that realizes stable wireless connections



Compact wireless communication module mounted on moving object



Compact wireless communication module connected to vehicle

Characteristics of developed system:

1. Real-time identification of high-quality communication paths and rapid switching

Using NEC's proprietary technology, this system identifies usable communication bands in real time based on how congested the bands are as well as the field strength of the access points, enabling seamless transition to high-quality communication paths and access points. This enables stable wireless communication even in environments where levels of reception and congestion are constantly changing.

2. Use of existing access points through network virtualization technology

Again using NEC's proprietary technology, this system creates a virtual image of the entire wireless communication space and switches to the appropriate communication paths on this virtualized network, stabilizing the wireless connections without the use of sophisticated access point functions. This allows the system to be used with existing access points and network equipment.

3. Simple mounting onto moving objects using a compact module

Using TTDC's proprietary technology, this system was implemented within a compact module (board size: 72 × 44 mm) for simple mounting in a wide range of moving objects with limited installation space.

This system will be showcased at the Wireless Technology Park (WTP) 2022 exhibition to be held at Tokyo Big Sight from Wednesday, May 25 to Friday, May 27.

NOTE) This solution was developed by NEC using research results from the Cross-ministerial Strategic Innovation Promotion Program (SIP Phase 2)/Physical Space Digital Data Processing Infrastructure project run by the Cabinet Office of Japan with management support from the New Energy and Industrial Technology Development Organization (NEDO), as well as research results from the National Institute of Information and Communications Technology (NICT).