DMG MORI CO., LTD.
Head Office: 2-35-16 Meieki, Nakamura-ku,
Nagoya City 450-0002, Japan
TEL: +81(0)52-587-1811
FAX: +81(0)52-587-1818

Press Release

May 21, 2020

DMG MORI & NTT Com Launch Joint Experiment on Remote Operation of Autonomous Traveling Robot with Local 5G

DMG MORI CO., LTD. (hereinafter called DMG MORI) and NTT Communications Corporation (hereinafter, NTT Com) began joint experiments (hereinafter, the Experiment) on remote operation of the autonomous traveling robot,[*1] an automated guided vehicle equipped with a collaborative robot (hereinafter, AGV), using local 5G technology[*2] on May 21, 2020.

The use of local 5G, which is characterized by “ultra-high speed,” “multiple concurrent connections” and “low latency,” helps us develop an AGV with higher performance as we can acquire precise location information and detailed operation information for higher autonomous driving accuracy and safety while reducing data processing loads in edge computing for a lighter vehicle body. The two companies will examine the feasibility of using local 5G for AGV operation through the Experiment.

1. Background

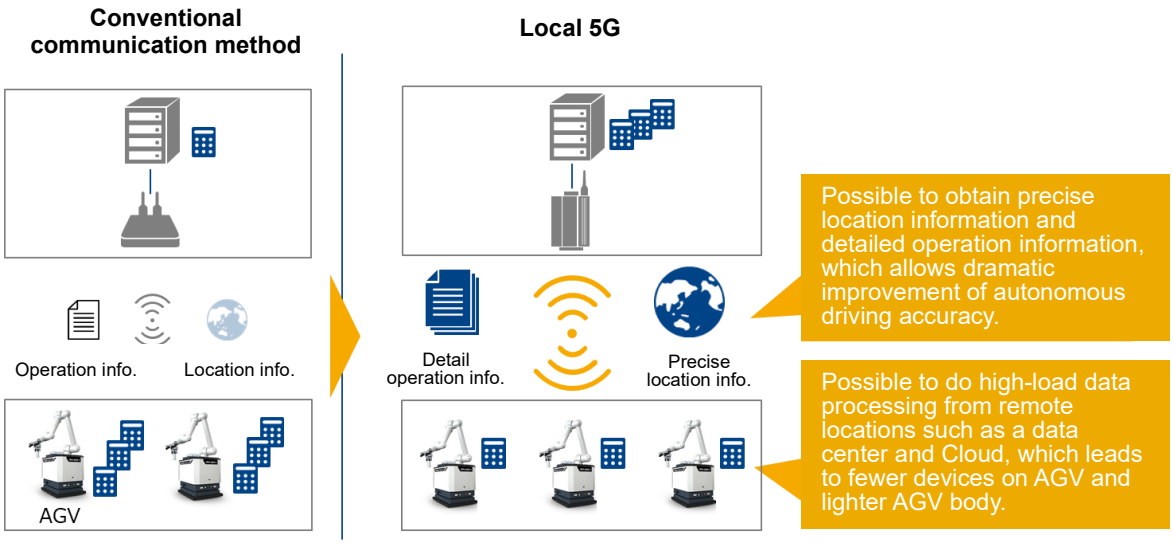
DMG MORI has been providing various digital solutions including the measuring, operation monitoring and sensing functions to help customers fully utilize their machine tools for 10 to 15 years or longer.
In recent years, with customers’ production needs changing significantly, for example, flexible production (e.g. variable production and high-mix low-volume production); greater productivity; and standardization of operator skills, more and more customers consider introducing automation systems. Under these circumstances, we expect that the AGV operation tests using a local 5G network that provides “ultra-high speed,” “multiple concurrent connections” and “low latency” will enable us to realize a more sophisticated AGV.

Meanwhile, NTT Com has been promoting “Smart Factory” that solves customers’ shop issues through digital transformation (DX) as one of their strategic priorities. To this end, the company, which believes local 5G will play a major role in collecting and transmitting data for use as a valuable tool, is focusing on accumulating use cases of local 5G.

The two companies aim for achieving more sophisticated AGVs, shop automation and digital transformation by verifying the radio properties and other characteristics of local 5G in a factory.

DMG MORI CO., LTD.
Head Office: 2-35-16 Meieki, Nakamura-ku,
Nagoya City 450-0002, Japan
TEL: +81(0)52-587-1811
FAX: +81(0)52-587-1818

< Benefits to be brought about by local 5G>



2. Outline of the Experiment

For the Experiment, we have obtained an experimental test license to set up a local 5G network on the 28 GHz band at DMG MORI Iga Campus. With the network, we will investigate and measure the radio propagation and communication quality of local 5G in a shop floor environment, and test the remote operation of an AGV via local 5G.

Period:

May 21, 2020 to April 2021

Location:

DMG MORI Iga Campus

DMG MORI CO., LTD.
Head Office: 2-35-16 Meieki, Nakamura-ku,
Nagoya City 450-0002, Japan
TEL: +81(0)52-587-1811
FAX: +81(0)52-587-1818

Test items (Plan)

(1) Radio propagation (Measure reception levels and check interference)

(2) Communication quality (Measure latency, throughput performance and packet error rates)

(3) Application (Test AGV remote operation via local 5G)

- Check if local 5G can provide stable connection for AGV operation.
- Visualize the status of the remotely operated AGV.

Role of respective companies

DMG MORI	- Provide a test site - Provide application test equipment - Implement application tests - Assess the feasibility of local 5G use cases
NTT Com	- Apply for an experimental test license. Design, build and operate a local 5G system - Implement radio propagation and communication quality tests - Assess the feasibility of local 5G use cases

3. Future plan

DMG MORI and NTT Com will join forces to conduct the Experiment and do further verification based on the test results, aiming to achieve the full deployment of local 5G in production environments. The companies will also seek to develop products and solutions that bring about more advanced production improvements, such as digital monitoring of the entire factory where multiple AGVs and production equipment are connected.

Additionally, NTT Com will consider providing local 5G services that can satisfy more extensive application requirements.

Reference AGV from DMG MORI

The AGV robot WH-AGV5, currently being developed in-house, creates a collaborative production environment where humans and robots can work together. The WH-AGV5 capable of loading/unloading workpieces and carrying them between processes is suitable for a wide range of production types such as variable production, high-mix low-volume production and 24-hour continuous operation.

The AGV employs DMG MORI's original structure designed to offer excellent stability to robot movements on uneven surfaces, allowing itself to be suitable for environments where machine tools are used. The SLAM technology[*3] is also incorporated in the AGV for travel control, making autonomous traveling possible. Equipped with a collaborative robot, it also provides workpiece loading and unloading to/from a machine tool.

Through the Experiment, DMG MORI will seek to achieve higher performance of the AGV and develop new products and solutions by taking advantage of the three distinctive features of 5G: "ultra-high speed," "multiple concurrent connections" and "low latency."

DMG MORI CO., LTD.
Head Office: 2-35-16 Meieki, Nakamura-ku,
Nagoya City 450-0002, Japan
TEL: +81(0)52-587-1811
FAX: +81(0)52-587-1818

Autonomous traveling robot WH-AGV 5

*1: “Autonomous traveling robot” is an automated guided vehicle (AGV) equipped with a robot. It comes with laser range scanners and runs without rails.

*2: Unlike 5G services provided by mobile carriers, local 5G is generally used by local companies and governments that set up their own 5G networks in their buildings or on the premises.

*3: SLAM (Simultaneous Localization and Mapping) is a technique that allows an AGV (robot) to create a map of its environment while localizing its position within the map based on the information obtained from laser and image sensors.