

To help in the fight against the COVID-19 pandemic, the Kawasaki Group is advancing a number of product- and service-based initiatives, such as the development of automated PCR viral testing robots. At the same time, in consideration of employee health and safety, we are taking steps to promote new ways of working, such as expanding remote working and setting up “support offices.”



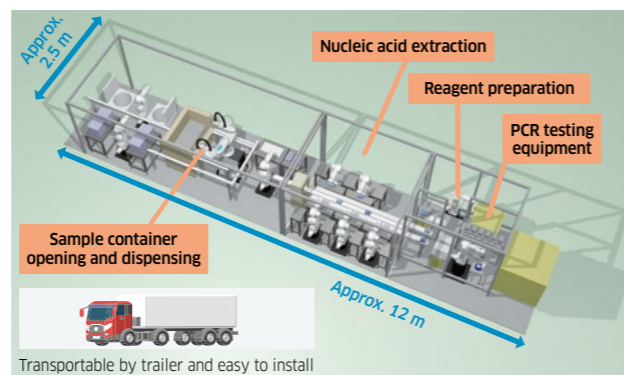
### Developing an Automated PCR Viral Testing Robot System

Medicaroid Corporation, a joint venture of Kawasaki and Sysmex Corporation, a major clinical testing equipment and reagent maker, is contributing to society by leveraging its unique strengths—expertise in both robotics and medicine—to develop and test an automated PCR viral testing robot system and other products in preparation for additional waves of COVID-19 infection.

This automated PCR viral testing robot system consists of a robotic PCR test sample collection system and an automated PCR sample analysis system. The system helps prevent the secondary infection of doctors by enabling them to collect PCR test samples using a remote-controlled robot. This system leverages the technology of Kawasaki's *Successor* remote-operated human-robot collaborative system unveiled in 2017. Furthermore, automating the analysis of PCR test samples will enable the continuous 24-hour operation of testing centers. These systems will thus reduce the infection risk for and burden on medical professionals while preventing human error issues and alleviating medical professional shortages, thus significantly enhancing the PCR testing infrastructure.

The system can be compactly arranged to fit in mobile cargo container, making it easy to install and helping to save space. By enabling rapid testing via PCR test results to confirm that individuals are virus-free before they board airplanes or enter event venues, we aim to help restore the movement of people, greatly contributing to the normal functioning of society.

Furthermore, we are developing support systems using mobile robots for use in coordination with this system. These systems will enable remote preparation for medical examinations, such as asking patients basic questions, taking their temperature, and listening to their heartbeat, and share information, such as dietary or drug dosage records, helping alleviate nursing staff shortages.



Automated PCR viral testing robot system

### Automatic Body Temperature Checking System at Kawasaki Good Times World and Kawasaki Robostage

Kawasaki installed an automatic body temperature checking system using its *duAro2*, a dual-arm SCARA robot capable of safely working together with humans, at the Kobe Maritime Museum/Kawasaki Good Times World (Kobe) and the Kawasaki Robostage robot showroom (Odaiba, Tokyo).

The automatic body temperature checking system uses a dual-arm robot equipped with a non-contact temperature sensor in its right hand. As each visitor enters, they position their forehead near the temperature sensor, then hold their hand in front of an operation-start sensor to have their body temperature checked. If the visitor's temperature is below a predetermined limit, the robot lifts the barrier held in its left hand, allowing the visitor to enter. If the visitor's temperature exceeds the limit, a staff member is called to the entrance. The entire process is thus carried out using only contactless sensors, meaning there is no physical contact between employees and visitors, helping to prevent the spread of COVID-19.

The *duAro2* is part of the *duAro* series, designed to safely collaborate with and work alongside humans. These highly

practical robots can learn through simple direct teaching\* and are therefore used in a wide variety of situations and tasks. For safety, *duAro* robots' arms are covered in a soft material, and if a robot does come into contact with a person during operation, the robot detects the collision and halts its movement.

\* Direct teaching: A method of inputting movement instructions in which the operator directly moves the robot's arms and the robot memorizes these movements.



### PCR Testing Sample Collections Booths

The Energy System & Plant Engineering Company has begun producing PCR testing sample collection booths.

These sample collection booths are intended to prevent the infection of medical professionals via droplets transmitted from patients undergoing testing. The patient area is equipped with a UV sterilizing lamp to prevent patient-to-patient transmission, as well.

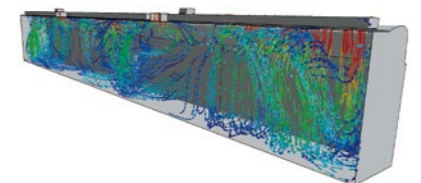
We have already delivered finished units to the Kobe Medical Association and Kawasaki Hospital, and three additional booths, with an upgraded design and additional functionality, are currently being built at Harima Works.



### Measures to Improve Ventilation in Rolling Stock

Train cars are ventilated using onboard air conditioning systems, by opening doors at stops, and by opening windows. Leveraging its extensive rolling stock design and production experience and air conditioning simulation technology, the Rolling Stock Company is advancing research into effective ventilation measures.

In response to requests from railway operators, we are looking into ways to improve ventilation by, for example, modifying window designs. Combining such improvements with simulations will enable Kawasaki to offer unique package solutions.



Air conditioning simulation

### Social Contribution

The Energy System & Plant Engineering Company produced approximately 6,500 medical-use face shields and 15,900 medical gowns at Kobe Works and Harima Works in April and May 2020. These were donated to medical institutions to help prevent the spread of COVID-19.

In addition, Kawasaki Group company Kawaju Support Co., Ltd. lent and set up outpatient reception tents for Kawasaki Hospital in Kobe City free of charge in April 2020.



### Work Environments

Approaching the need to prevent the spread of COVID-19 as an opportunity to revise work styles, Kawasaki is advancing new measures. In addition to expanding the range of employees eligible to work from home, we set up multiple “support offices” in the common spaces of Company dormitories and housing to provide alternative, socially distanced workspaces for employees who find it difficult to concentrate on work at home. We have also implemented such measures as adopting flexible work systems, such as staggered work hours and non-overlapping shifts, implementing hiring and training activities online, and reinforcing our network environments.



A “support office”