

国立研究開発法人 日本医療研究開発機構  
Japan Agency for Medical Research and Development



**AIST** | National Institute of Advanced Industrial  
Science and Technology

Project to Promote the Development and Introduction of  
**Robotic Devices for  
Nursing Care**

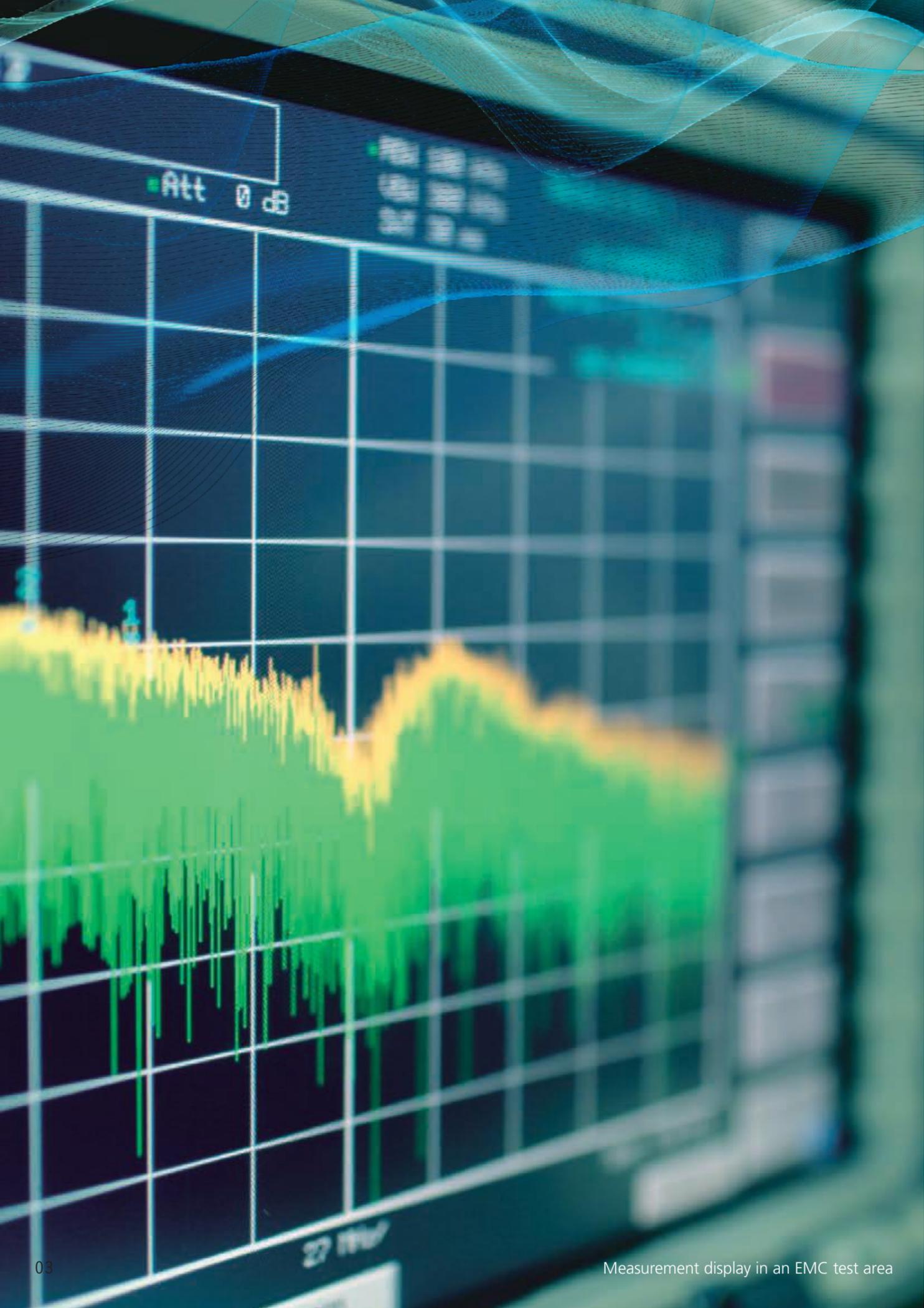
<http://robotcare.jp/>

# The Development of Robotic Equipment for Nursing Care has begun.

What if we could better help nursing care recipients be independent?  
And what if we could better reduce their caregivers' work load?

As Japan's society grows older, efforts to find answers to these questions must be accelerated. The Ministry of Economy, Trade and Industry (METI) has initiated the Project to Promote the Development and Introduction of Robotic Devices for Nursing Care to address this need. The project's aims are to support and promote the development, practical application, and introduction of robotic care equipment, and to create an environment for the preparation of standards necessary to introduce robotic equipment into nursing care settings.

After launching the project in 2013, METI later entrusted it to the Japan Agency for Medical Research and Development (AMED), a funding body that was established in 2015. Organically linking medical care and technology, the project continues to pursue developmental advancements that will supplement people's natural abilities.



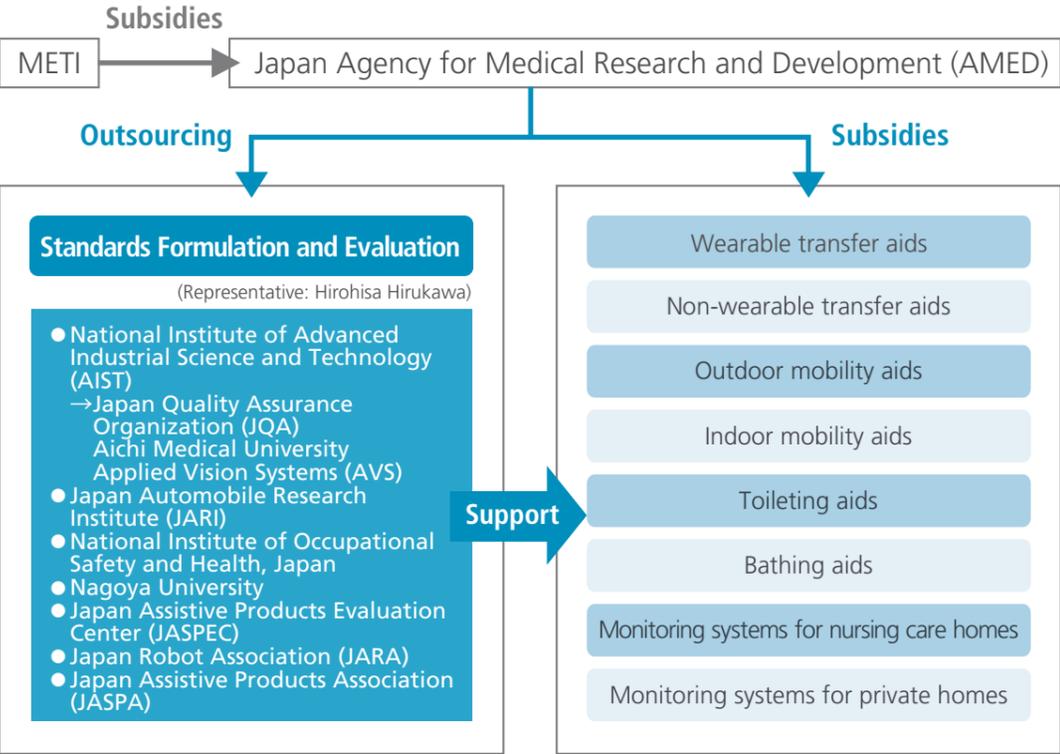
The Project to Promote the Development and Introduction of Robotic Devices for Nursing Care is comprised of two schemes.

1. “Development Subsidies”

This scheme provides subsidies to private enterprises that desire develop products in priority areas. Its purpose is to encourage the development and practical application of robotic care equipment.

2. “Standards Establishment and Evaluation”

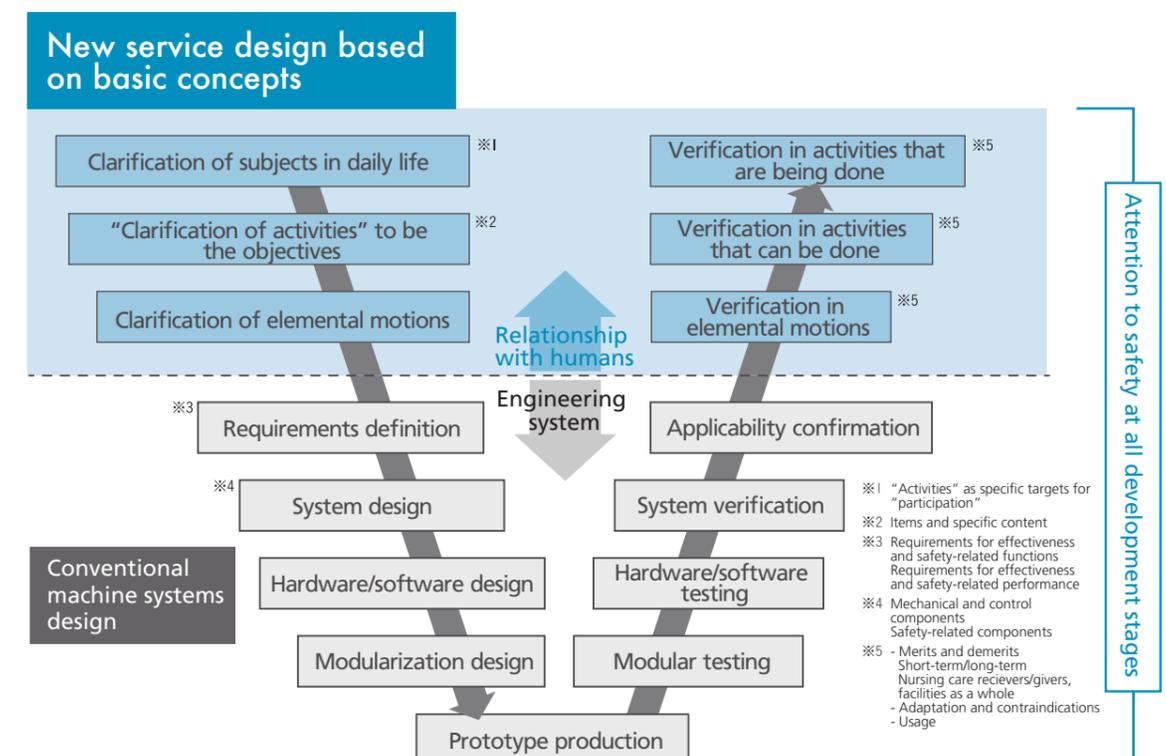
This scheme publicizes the introduction of robotic care equipment into nursing care home, new nursing care programs that make use of related technologies, research on demonstration guidelines and standardization, and development and introduction guidelines.

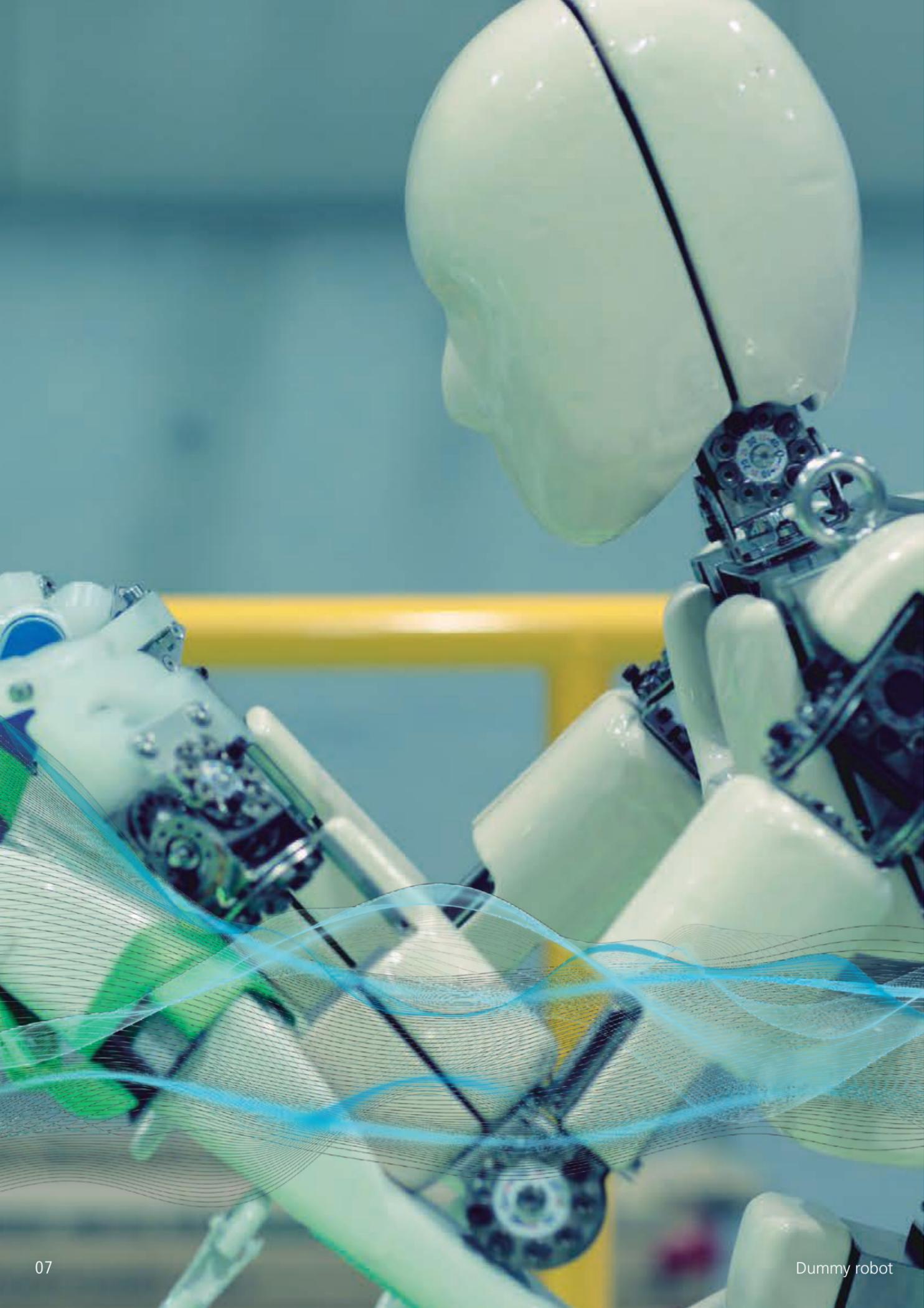




## A V-model for developing robotic care equipment based on concepts of the project

The process of developing robotic care equipment is unique in that it stresses not only conventional “system design” — i.e., design verification that begins with the engineering system — but also “service design,” which is design verification that begins with the relationship with human beings.





## Development with priority on safety

Accelerating the development of robotic care equipment and achieving care that improves people's abilities requires strict and repeated safety verification from various angles.

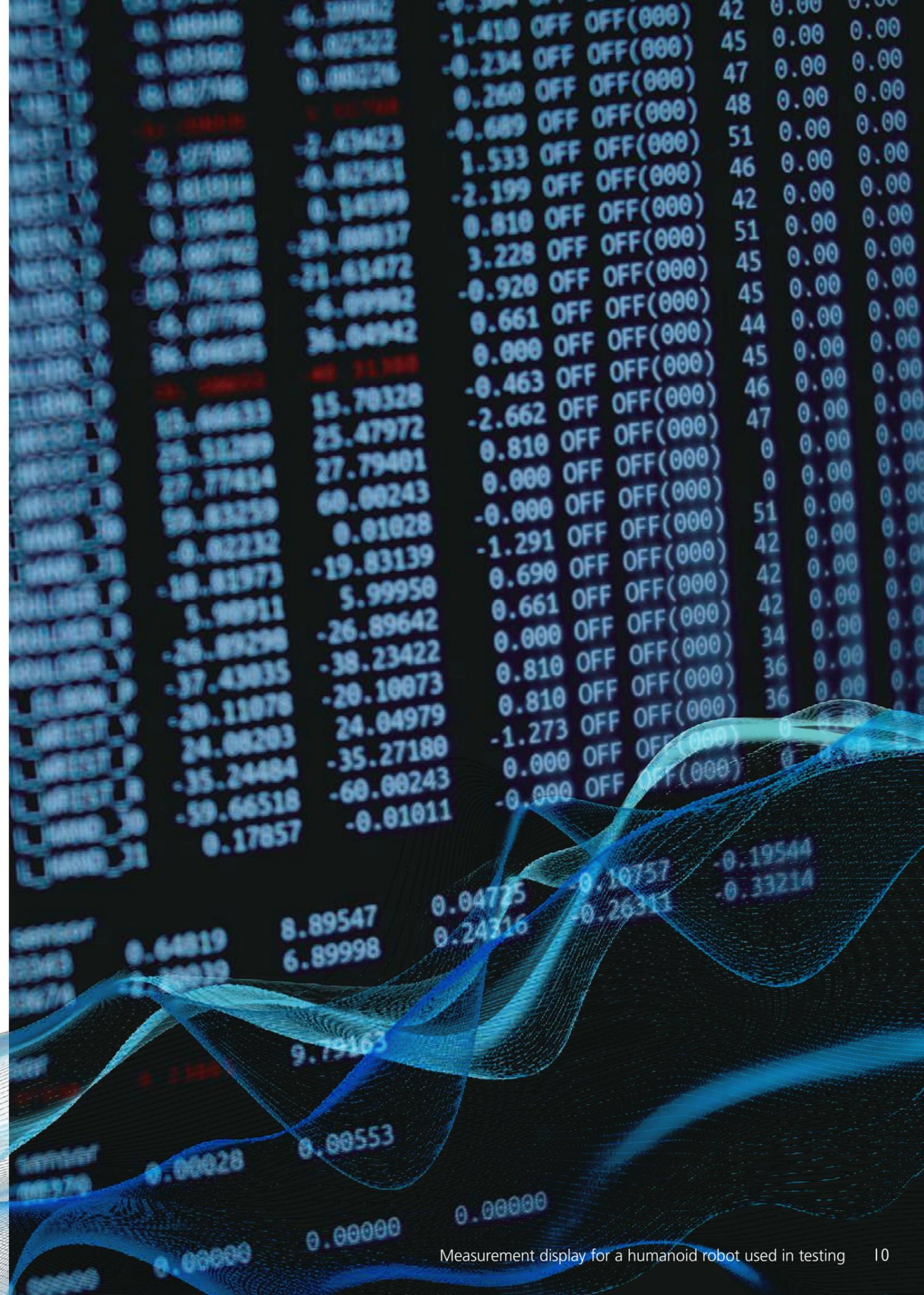
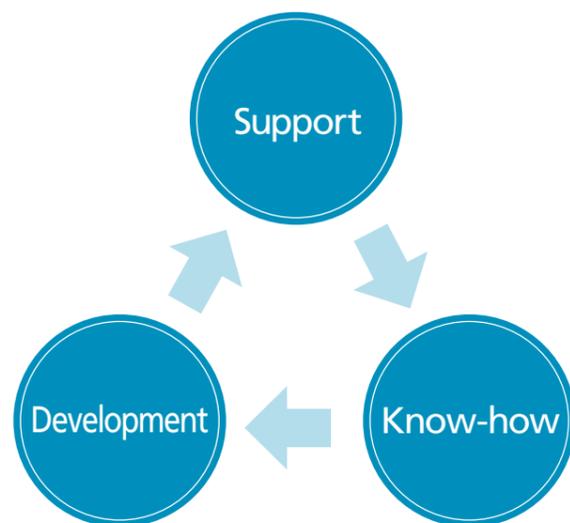
AMED assists equipment developers by making available to them a full array of safety verification facilities and devices capable of obtaining more precise data. This includes giving them opportunities to conduct the various kinds of simulation and testing that are needed during development with robots developed to avoid putting strain on actual human bodies.

# Awareness of problems in the conventional process of nursing care robot development gave birth to an important new mind-set.

The development and efficacy verification of robotic care equipment has traditionally involved “first making a device and then verifying its effectiveness in actual use settings.” However, such an approach is inadequate if the goal is effective equipment development.

Consequently, our first concern is to clarify the objective — specifically, how to make a robot that benefits “people” — and then to set about designing and producing a robot that achieves it. From there, the task is to substantiate the robot’s effectiveness through the results of efficacy and safety verifications.

This process serves as an important mind-set in R&D for robotic care equipment that benefits people.





## Basic guidelines for the development of robotic care equipment

Although research and development for nursing care robots has gained considerable momentum in recent years, putting those robots into practical use is still a work in progress.

The Project to Promote the Development and Introduction of Robotic Devices for Nursing Care is an undertaking toward achieving this aim. AMED has established the following two points as basic guidelines in the development of practical robotic care equipment.

### Basic Guideline 1:

View the purpose and effects of robotic care equipment in terms of its impact on “people.”

Do not simply pursue mechanical performance.

Develop and apply nursing care robots with the clear objective of “making people’s lives better.”

### Basic Guideline 2:

View robotic care equipment as a physical means of providing “nursing care that brings improvement.”

Nursing care robots are not to be a means for compensating for disability.

They are to be positioned within overall nursing care programs that are developed with focus on an interactive relationship with human-provided nursing care.

# Eight priority development areas

A component of the Japan Revitalization Strategy that received Cabinet approval in 2013 is a “five-year plan for developing nursing care robots.” The plan calls for strategic steps toward the development and introduction of robotic care equipment. The Ministry of Economy, Trade and Industry and Ministry of Health, Labour and Welfare responded by establishing “Priority Areas where Robotic Technology is to be Introduced in Nursing Care of the Elderly.”

The ministries reexamined the demand for robotic technologies in nursing care in 2014 and subsequently revised the priority areas in order to response to needs in in-home nursing care and dementia care.

The following points are provided as basic guidelines and safety considerations for the development of robotic care equipment in each priority area.

Measurement device in an EMC test area



## Wearable transfer aids

Wearable devices using robot technology to provide power assistance to caregivers



## Non-wearable transfer aids

Non-wearable devices using robot technology providing power assistance to caregivers in lifting care receivers



## Toileting aids

Adjustable-position toilets using robot technology for treating excrement



## Bathing aids

Devices using robot technology to support elderly people in the series of motions required for getting in and out of bath



## Outdoor mobility aids

Walking-aid devices using robot technology to support elderly people walking outdoors and to secure safe carrying of loads



## Indoor mobility aids

Walking-aid devices using robot technology to support elderly people moving indoors, and sitting and standing; particularly assisting them in getting to and from toilets and supporting their position in using the toilet.



## Monitoring systems for nursing care homes

Monitoring system platforms consisting of devices with sensors and external communication functions using robot technology, used in nursing care facilities



## Monitoring systems for private homes

Monitoring system platforms consisting of sensors detecting when such people fall over and external communication functions using robot technology, used for home nursing care

# Two outstanding devices that help realize the project's vision Advancing into fields in which developers cannot succeed alone

## Neos + Care NK Works Co., Ltd.

Neos + Care senses a person's movements in three dimensions using an infrared sensor camera system installed in his or her room. The system supports appropriate nursing care by accumulating data in a server, sounding an alarm when it detects a movement that could lead to a fall, and sending notices on the person's condition through portable devices. Because it uses infrared technology, it allows caregivers to see the person's condition with clear images, even in the dark.

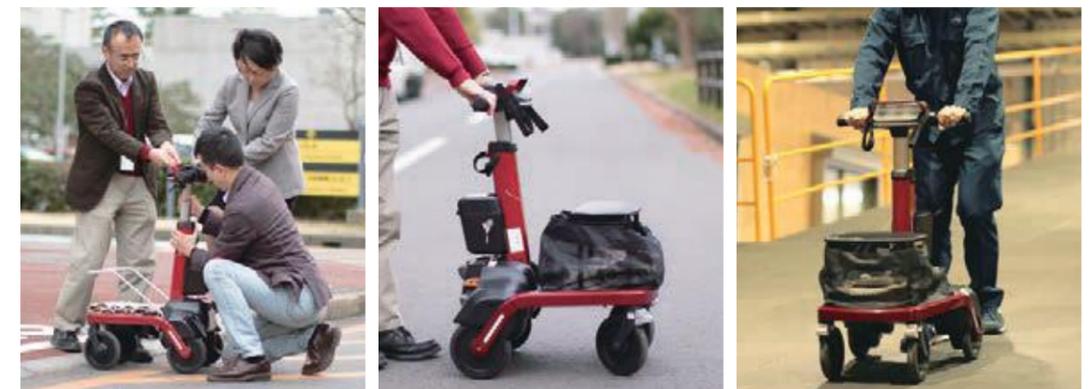


### A word from the developer

"We had access to facilities and equipment capable of performing the safety verifications and simulations we required. This allowed us to link consideration for the individual to technology and to create a robotic care device with a design that truly benefits people."

## Robot Assist Walker RT.1 RT.WORKS Co., Ltd.

This robotic walker assists walking while judging conditions in the surrounding environment. All the user has to do is put his or her hands on the handle bar. The device supplies supplementary power when going uphill and automatically brakes when going downhill, thus safely assisting walking. It also provides peace of mind to both the user and his or her family with an IoT technology-based monitoring service.



### A word from the developer

"We were able to accelerate the development of our robotic care device by safely acquiring simulation data on the burdens placed on human bodies beforehand."

### Dr. Yayoi Okawa, Medical Doctor, AIST

"Increasing 'capability' that allows the elderly to enjoy a sense of fulfillment can be described as the foundation of nursing care support. I anticipate that advancements that give people greater opportunity to participate in society, rather than suffer from decreasing abilities, will come with the progressing development of robotic care devices that 'support' monitoring and mobility and take on duties normally handled by caregivers."



Making maximum use  
of human resources  
Breathing life into  
robotic technology

Because their products are used by people, developers must have access to sophisticated facilities and environments for safety verification as well as expert medical and engineering advice.

The future of innovative nursing care in Japan, oriented toward long and healthy living, starts here.