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NEXTY Electronics Corporation  
NEXTY System Design Corporation

## **Real-Haptics: Imparting Robots With Gentleness and Fineness of Control**

**--NEXTY Electronics now offers related development & engineering support--**

NEXTY Electronics Corporation (President: Atsushi Aoki; Headquarters: Minato-ku, Tokyo; hereinafter referred to as "NEXTY Electronics"), has become a member of the Real-Haptics Engineering Council\*<sup>1</sup> organized by the Keio University Haptics Research Center at Keio University since May 2019. By doing so, NEXTY Electronics and its subsidiary, NEXTY System Design Corporation (President: Takeo Hagiwara; hereinafter referred to as "NSD"), can now provide R&D and engineering support for real-haptics, IP technology owned by Keio University, and modules\*<sup>2</sup> incorporating the technology. Membership also enables the two companies to offer these modules\*<sup>3</sup> to other members of the Council.

Real-haptics makes it possible to sense at a distance the hardness, softness, elasticity and other characteristics of objects, and allow robots to gently grasp soft and delicate objects, all of which were previously difficult to achieve. This technology also enables systems to be built at extremely low cost for its sensorless technique.

Demo machines utilizing this technology were completed in August, and were being shown to customers from September.

### **Real-haptics' Strengths**

With the severe labor shortage accompanying Japan's shrinking population coming to the fore as a social issue, the number of robots that will replace humans in Performing time-consuming tasks is set to increase. Furthermore, it is Predicted that if the world's major factories are fully automated, there will be nearly 50 billion robots, or five times the global population, doing the jobs of humans by 2050.

As the robotics market continues to grow enabling robots to gently grasp soft objects, a vital factor in these machines' evolution.

Real-haptics enables the most suitable movements to be made for a given situation that combine position and force control. It can also digitize haptics\*<sup>4</sup> sensations, transmit them to a distant location, and finely control the amount of force used in grasping. With the technology, robots can now be imparted with gentleness, dexterity and fineness of control.

Through this joint development, installing virtual actions in the cloud on actual robots makes it possible for them to perform actions that adjust the amount of force used to grasp an object as they sense it through touch.

### **NEXTY Electronics and NSD's Strengths**

NEXTY Electronics and NSD, a Group company, will use the aforementioned haptics reproduction modules to support the joint development and engineering of robots using real-haptics.





Drawing on the collective capabilities of the Toyota Tsusho Group, NEXTY Electronics is a leading company in the field of electronics. Through its specialties of technologies and commercial products, it is responding to customer and global needs in a wide range of fields that include autonomous driving, IoT and industrial equipment, thereby providing solutions to the challenges faced by today's society.

NSD, a joint venture between NEXTY Electronics and Toshiba Electronic Device Solutions Corporation, can provide the products and services sought by the market with the advanced semiconductor and embedded software development and technological capabilities it has cultivated in the automotive field.

By synergizing Nexty's network, information resources and NSD's technological capabilities, we will support customers with planning, development, design, manufacture, sales and business creation related to the next generation of robots for use in Factory automation, collaborative robots and service robots, as well as play a part in further developing robotics technologies and solving related social issues.

## What Real-haptics Can Achieve

### 1. Enable actions to be performed from anywhere

->Real-haptics allows a worker to feel an object by touch even from a distance, allowing tasks to be performed in harsh environments that require haptics.



### 2. Make actions visible

->Real-haptics can decipher the experienced actions of a craftsman, converting tacit knowledge into explicit knowledge, and passing those expert techniques on to unskilled persons.



### 3. Make actions super-human

->By using amplified haptic data, tasks can be performed where a large force is controlled with a small one. This allows humans to perform tasks that require power and speed beyond what they are physically capable of.



### 4. Make actions into contents (from IoT to IoA\*<sup>5</sup>)

->By creating a library of actions as mentioned above, specifying times and actions in cyberspace, and installing into an object, it is possible to reproduce the required actions when needed .

\*1 Real-haptics Engineering Council: An industry-academic council operated by Keio University that focuses on launching and facilitating new businesses that use real-haptics.

\*2 Haptics reproduction modules for robots incorporating Motion Lib, Inc.'s ABC-CORE (a haptic controller that controls force output of servos) available through the Keio University Haptics Research Center.

\*3 Modules can be provided to companies that are not currently Council members by their joining the Council.

\*4 Haptics: The sense of touch, which enables an object's hardness, softness or elasticity to be sensed.

\*5 IoA: Internet of Actions. A concept that is attempting to open the way to completely new fields of application where the actions of humans and robots are gathered together and exchanged over a network.





## **NEXTY Electronics' Real-Haptics Demo Machines**

We developed demo machines for single and triple-axis robots that allow users to experience real-haptics.

### **Single-axis Robot**



- Holds objects by moving two fingers simultaneously with a single-axis motor.

**Holds fragile items, like a potato chip, without breaking them**

### **Triple-axis Robot**



- A robot arm with three fingers, each with three independent joints. It grasps objects by moving each finger individually.

**Firmly grasps an elastic blue ball**

\*Contact NEXTY Electronics to sign up for a demo.

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