

June 5, 2015

## **Development of Two Therapeutic Support Systems Incorporating Robotic technology with the Funding Program for Development and Testing of World-leading Medical Devices in Fukushima Prefecture**

**Olympus Corporation (President: Hiroyuki Sasa) today announced the development of the Multi-jointed Flexible Robotics System for Therapeutic Support with the Funding Program\* for Development and Testing of World-leading Medical Devices in Fukushima Prefecture, and the successful completion of two prototypes (non-clinical use).**

Today medical practices for the treatment of disorders such as cancer with inserting the gastrointestinal endoscopes via the mouth or anus, and also using the laparoscope and other instruments through the number of holes onto the abdominal cavity to remove lesions are widely adopted. Because these practices not requiring open surgery, their benefits include less post-surgical pain and faster recovery, in consequence they have been widely adopted. To promote the adoption and development of these minimally invasive treatments which reduce the burden on patients, there is a decisive need to develop new devices.

The development of the robotic systems supported by the funding program in Fukushima Prefecture between FY2012 and FY2014 aiming to promote post-earthquake recovery in the prefecture, leading to the completion of two prototypes: a Therapeutic Support System for Gastrointestinal Endoscopies and an Electrically Driven Laparoscope with Multiple Degrees of Freedom.

In the future, Olympus intends to continue contributing to the Fukushima recovery leveraging medical device production facilities in Fukushima Prefecture as it aims commercialization of the new therapeutic support systems. Through these technologies, Olympus also aims to support the innovation of minimally invasive treatment.

This work was announced at a progress report meeting held by Fukushima Prefecture on June 3, 2015 for research and development funding provided through the Medical Industry Cluster Project.

### ● Overview of prototypes

#### **Prototype 1: Therapeutic Support System for Gastrointestinal Endoscopies**

**A therapeutic support system that incorporates two manipulating tools with multi-jointed tips together with a gastrointestinal endoscope. By this system, the physician can manipulate these tools at will.**

#### **Prototype 2: Electrically Driven Laparoscope with Multiple Degrees of Freedom**

**This laparoscope system automatically keeps the view in display directed at the points that the physician desired to see.**



**Therapeutic Support System for Gastrointestinal Endoscopies  
(Left: the Whole System, Right: Endoscope Tip)**



**Electrically Driven Laparoscope with Multiple Degrees of Freedom**

\* With the recovery of Fukushima Prefecture following the Great East Japan Earthquake and the accident at Fukushima Daiichi Nuclear Power Plant as its primary objective, the Funding Program for Development and Testing of World-leading Medical Devices is a mechanism whereby the prefecture provides support for businesses engaged in the research and development or testing of medical devices such as surgical support robots that present development challenges in order to secure employment by further encouraging the prefecture's medical and welfare device industry cluster. Olympus undertook the development described in this news release with assistance from Fukushima Prefecture via the program. Some research work was contracted to Professor Ichiro Sakuma of the Graduate School of Engineering, The University of Tokyo.

(See attached document)

## ●Development Background

Olympus has for many years operated a broad-based medical business. Our businesses encompass both medical equipment and services, including in its role as a leading supplier of endoscopes such as the gastrointestinal endoscopes, and also other minimally invasive surgical instruments for laparoscopic surgery.

By combining robotics with Olympus's existing technology for endoscopes and therapeutic devices, this development aims to create new therapeutic support systems.

## ●Prototype Details

### Prototype 1: Therapeutic Support System for Gastrointestinal Endoscopies

**A therapeutic support system that incorporates two manipulating tools with multi-jointed tips together with a gastrointestinal endoscope. By this system, the physician can manipulate these tools at will.**

The system consists of a gastrointestinal endoscope, manipulating tools with multiple joints used to perform the procedure, an over-tube for getting these into position, and a console for operating the manipulating tools. It enables the physician to manipulate multiple joints via an input unit while viewing endoscopic images on the monitor mounted in the console.

One anticipated use for the system is in endoscopic submucosal dissection (ESD)<sup>\*1</sup>. This procedure is currently performed by the physician manipulating the endoscope itself in order to use the endoscopic tool protruding from its tip to excise the lesion. In contrast, the new prototype helps the physician to manipulate, flexibly and simultaneously, the two manipulating tools with multiple joints while viewing images from the gastrointestinal endoscope on the monitor. The system also has the potential to help promote the wider adoption and development of treatments conducted from inside the gastrointestinal tract.

\*1: Endoscopic submucosal dissection (ESD) is a therapeutic technique for cutting and peeling submucosal layers in order to treat early-stage tumors and other lesions in the mucous membranes of the gastrointestinal tract.

### Prototype 2: Electrically Driven Laparoscope with Multiple Degrees of Freedom

**This laparoscope system automatically keeps the view in display directed at the points that the physician wants to see.**

Laparoscopic surgery generally requires an assistant operating the laparoscope to provide video images in anticipation of which location the physician performing the actual procedure wants to view. This requires a high degree of coordination between the two physicians.

In contrast, the Electrically Driven Laparoscope with Multiple Degrees of Freedom uses electrical control of the bending section at the laparoscope tip to keep the display directed at the intended site (lock-on function). This function helps coordination between the two physicians by eliminating the need for the physician to make frequent adjustments to obtain the desired view field. Olympus thinks this would support reducing stress on physicians and improving surgical efficiency.

Note: the two new prototypes are not intended for clinical use, being still at the research and development stage, and have not yet received approval based on medical-device registration in any country.