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Hong Kong and Zurich conduct world's first in vivo teleoperated magnetic endoscopy using animal model

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Procedure performed in tandem by operators in Hong Kong and Zurich over a geographical distance of 9,300 km



The Chinese University of Hong Kong (CUHK)'s Faculty of Medicine (CU Medicine) and the Swiss Federal Institute of Technology Zurich (ETH Zurich), Switzerland, have conducted the world's first in vivo teleoperated magnetic endoscopy using a porcine model, performing a biopsy of the stomach wall.

In a teleoperated system, the operator controls and monitors the system from a controller console, and a robotic agent translates their commands into actions in the operating room. There must be a reliable, high-speed network connection between these two.

In this study, CU Medicine and ETH Zurich used a bedside server computer that established wired communication with Navion, a clinically ready and portable magnetic navigation system, and with a magnetic endoscope and the robotic system. An operator used a console in Zurich to interact with the robotic system which was 9,300 km away physically over the internet. Communication between the operator console and the robotic system was established through a WebSocket, a computer communications protocol that facilitates real-time data transfer from and to the server.

The robotic platform used in this study is installed in the Hybrid Operating Room at the Multi-Scale Medical Robotics Center (MRC), one of CUHK's InnoHK Centres established as part of the Hong Kong government's InnoHK initiative. The MRC Hybrid Operating Room is a one-of-its-kind facility in Asia that is fully dedicated to research, development and preclinical evaluation of new surgical robots and medical devices. ETH Zurich is one of MRC's overseas collaborating institutions.

Professor Dr Bradley Nelson, Director of the Multi-Scale Robotics Lab, Head of the Institute of Robotics and Intelligent Systems, ETH Zurich, said, "In the next step of our research, we will be performing tele-endoscopy on a human stomach. In addition to endoscopic procedures, such as cancer screening, there is a lot of potential for this technology. This includes its application to other areas of the gastrointestinal tract, to the neurovascular system and in foetal surgery."