Robot for minimally invasive surgery

INVENTORS: Claudio Quaglia
Pier Andrea Farneti
Selene Tognarelli
Arianna Menciassi
Simona Celi
Izadyar Tamadon
Sara Condino
Vincenzo Ferrari
Giorgio Soldani
Paola Losi

STATUS PATENT: Granted

PRIORITY N°: 102018000005507

PRIORITY DATE: 18/05/2018

PUBLISHED AS: IT; PCT

Invention

The present invention relates to a minimally invasive robotic manipulator for simulating, accessing and releasing of heart valves into a patient’s body, even equipped with an endoscopic vision system and a navigation system.

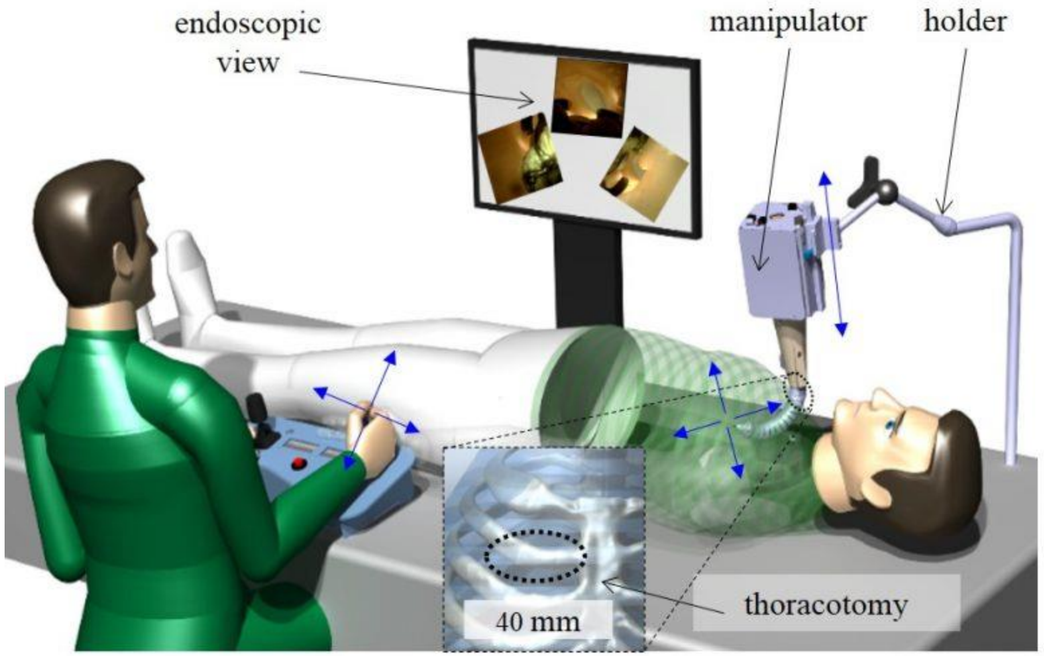
The traditional heart valve replacement process is obtained by a sternotomy, which needs making a cut in the middle of the patient’s chest to reach the aorta. Such sternotomy is associated with many problems both during the operation and in the post-operative period. The patented robotic system is proposed for the positioning of a cardiac valve under endoscopic guidance. The robotic system is equipped with a flexible manipulating arm (figure above) adapted to be introduced into the patient’s body. Its distal end utilizes releasing means (figure below) to introduce and release the valve into the blood vessel. Such arm is further equipped with at least two cameras and an electronic control unit in order to automatically calculate the trajectory of manipulating arm for releasing in a desired position of the valve.

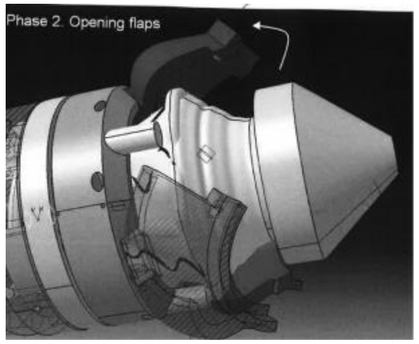
The main advantages are:

- Precision robotic system;
- Minimally invasive;
- Endoscopically;
- Cameras on the robotic arm to see into a blood vessel during the positioning and the releasing of the valve;
- Automatic and real time calculation of the trajectory for releasing the valve.

Pisa University, CNR – Consiglio Nazionale delle Ricerche and Fondazione Monasterio are co-owners of the patent.

Drawings & pictures





Industrial applications

The main application is represented by minimally invasive, endoscopic surgery for high control positioning and releasing of an aortic valve into the blood vessel of a patient.

Possible developments

The research group is currently looking for partners (companies specialized in the production of artificial valves, investors, etc.) to start collaborative projects to further develop the technology and / or to license it to them.

The current maturity level of the technology is TRL 3.

For more information:

Tech Transfer Office of Scuola Superiore Sant'Anna

Headquarters: Piazza Martiri della Libertà 33- Pisa

Web site : www.santannapisa.it

E-mail: uvr@santannapisa.it

For more information:

Ufficio Regionale di Trasferimento Tecnologico

Headquarters: Via Luigi Carlo Farini, 8 50121 Firenze (FI)

E-mail: urtt@regione.toscana.it

SCUOLA SUPERIORE SANT'ANNA PISA

REGIONE TOSCANA

urtt Ufficio Regionale di Trasferimento Tecnologico