

Endonasal Surgical Robot for Sinus and Neurosurgery

Summary

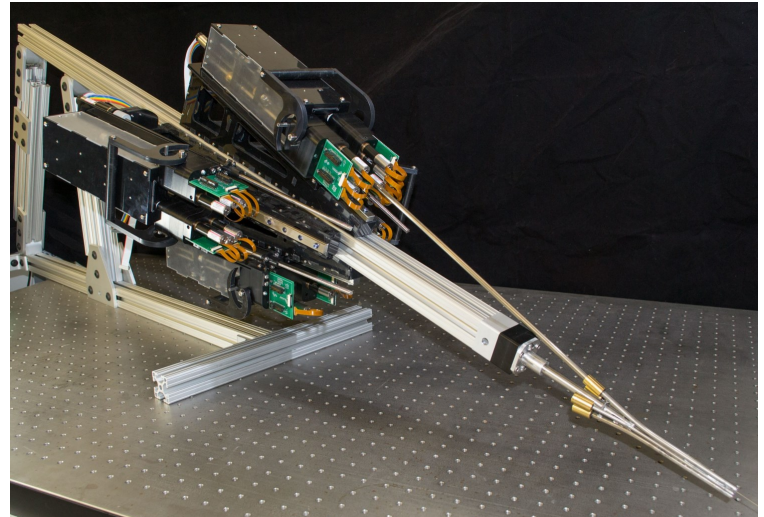
Vanderbilt engineers have developed a robotic system for performing sinus and neurosurgery through the nose. This provides a less invasive way to access surgical sites in the sinuses and near the middle of the patient's head, leading to faster recovery times. The robot is modular and sterilizable with detachable cartridge-based instruments. Each instrument is a concentric tube robot, which is a needle-sized tool that can bend and elongate. The system delivers four of these instruments through a single nostril.

Addressed Need

- ◇ Current tools are typically straight and rigid.
- ◇ The robot obviates the need for two surgeons to work in tandem, by enabling a single surgeon to control both the endoscope and manipulators.
- ◇ Existing surgical robots cannot be inserted through the nostrils

Technology Description

This is a teleoperated system in which the surgeon sits at a console and remote controls the robotic manipulators. Motors and electronics are bagged and reusable, while the instruments are sterile and



potentially disposable. Instruments are interchangeable during surgery. A variety of existing endoscope designs (both rigid and flexible) can be integrated with the robot.

Technology Features

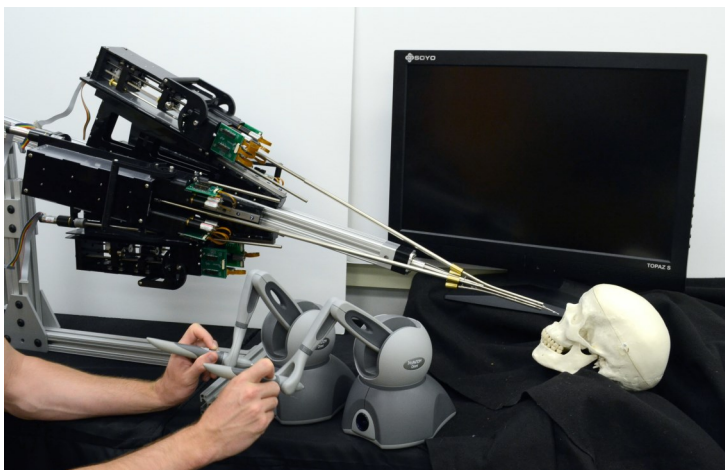
- ◇ Teleoperated
- ◇ Modular instruments
- ◇ Needle-sized instrument tips
- ◇ Reconfigurable instrument locations

Technology Development Status

- ◇ Prototype built and tested
- ◇ Control algorithms formulated and tested

Intellectual Property Status

- ◇ A Patent Application has been filed
- ◇ Visit research program page for details and list of publications: <http://research.vuse.vanderbilt.edu/MEDlab/research/removing-brain-tumors-nose>
- ◇ Watch a technology demonstration video at: <https://youtu.be/mjMnqafTlak>



CTTC CONTACT:

Ashok Choudhury PhD
(615) 322-2503
Ashok.choudhury@vanderbilt.edu

INVENTORS:

Robert J. Webster PhD
Stanley Duke Herrell MD
<http://research.vuse.vanderbilt.edu/MEDlab/>

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