

INNOVATIVE OPTICAL FIBER TACTILE SENSOR

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Partner institution : CONCORDIA UNIVERSITY

A new technology based on a discretely loaded beam type optical fiber tactile sensor for tissue manipulation and palpation in minimally invasive robotic surgery developed by Professor Packirisamy's team at Concordia University.

A FAST GROWING MARKET

In traditional open surgery, surgeons use their fingertip palpation to investigate the hidden anatomical structures of tissue. However, in minimally invasive robotic surgery (MIRS) systems, while surgical instruments interact with tissues, surgeons do not sense any tactile information.

The global minimally invasive surgical devices market is expected to reach \$35.5 Billion by 2016 at a CAGR of around 8%*. Imaging technologies such as MRI and ultrasound have considerably changed the usage patterns of diagnostic techniques and will drive the market.

**Minimally Invasive Market - Global Trends, Competitive Analysis & Forecast to 2016, Markets and Markets, April 2012*

A BREAKTHROUGH TECHNOLOGY

More than six years of intensive research at Concordia permitted to develop the first MRI compatible optical fiber tactile sensor that is able to restore tactile information both in dynamic and static conditions.

The novelty of the sensor lies in its ability to measure the discrete force distribution by using only one single part (the beam).

Due to this novel design, the sensor does not require the use of an array of sensors to measure the distributed tactile information. This capability simplifies the integration of the sensor into any suitable space available at the tips of surgical instruments.

A theoretical model of the sensor and a finite-element model of the sensor-tissue interaction were developed. To validate the sensor, a prototype of the sensor was fabricated and tested. The miniaturization of the sensor using MEMS technologies will permit to integrate it into the tips of surgical instruments (probe, grasper, catheter, etc.).

A PERFECT PRODUCT-MARKET FIT

- Ultrasound friendly and MRI-compatible.
- Able to operate under both dynamic and static loading conditions.
- High repeatability, spatial resolution and sensing range.
- High reliability with a simple design and low complexity of measurement electronics.

A BUSINESS OPPORTUNITY

- An international patent-pending technology that is only available through Aligo Innovation.
- A licensing opportunity for co-developing the technology into a commercial grade product.
- A unique opportunity to address the fast growing MIRS market and other application fields involving tactile sensors.

PATENT STATUS

Utility patents for the USA (pending).

For Information please contact:

Richard Romagnino
Director, Business Development
T.: 514 840-1226, ext. 3005 / rromagnino@aligo.ca