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## Tactile Feedback Laser System for Robotic Surgery

### » Reference Number

659.1

### » Background

Researchers in the University of Calgary's Division of Neurosurgery and Department of Physics & Astronomy have developed a laser system for robotic surgery that provides the operator with a sense of touch. Unlike a knife, when a surgeon operates with a non-contact laser, there is no haptic feedback. Without the sense of touch, the surgeon must rely on sight and experience, compromising dexterity and limiting surgical outcome.

The invented system overcomes this problem by synthesizing haptic feedback when the focal point of the laser is coincident with a real surface, giving the operator the impression of touching something solid. This "virtual surface" felt by the operator possesses stiffness and frictional properties that change dynamically in response to sensor readings. Although nothing but light ever contacts the real surface, the operator receives information about how it reacts to laser light through haptic channels. When applied to laser surgery, the laser cutting intensity is controlled in response to operator-applied force. Just as a knife penetrates to a greater depth with additional pressure, the haptic surgical laser ablates more quickly with increased force.

### » Areas of Application

- Robotic surgery.
- Existing surgical laser tools held by a passive arm.

### » Competitive Advantages

- Current surgical lasers do not provide the operator with a sense of touch.
- Incorporating haptic feedback will enhance the safety, performance and acceptance of surgical laser technology.

### » Stage of Development

- A prototype system has been developed and tested.
- Testing with a surgical laser needs to be completed.

### » Intellectual Property Status

A US Provisional Patent application has been filed. Worldwide rights are available.

### » Contact

Sandy De Vos, Project Assistant  
Email: [devoss@uti.ca](mailto:devoss@uti.ca)

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