Robot arms to revolutionize neurosurgery — and more

The development of a space-age robot enabling neurosurgeons to operate with greater precision and dexterity from outside the operating room received critical funding that should see it in use by 2006.

The $30-million Project neuroArm, a joint Calgary Health Region and University of Calgary venture, will incorporate microsurgical tools and real-time magnetic resonance imaging (MRI) to guide surgeons — working behind a desk — through the brain’s complex folds. A $10.5-million federal grant from the Canadian Foundation for Innovation, announced Mar. 9, will complete the funding.

Once the neuroArm is built, sound, sight, and touch data enhanced through the robotic sensors and MRIs will flow onto computer screens to create 3-dimensional images that will map the brain for surgeons.

The microscopic precision of what will be the world’s first image-guided surgical robot, being built by the same company that designed the Canadarm used by NASA in outer space, is part of a technological revolution, says Dr. Garnette Sutherland, project leader.

“It’s not just about building a robot, it’s about changing surgery,” Sutherland said from his office in Calgary.

“Robotics are more precise ... are much more ergonomic and improve surgeon stamina. It opens the door to telesurgery, surgical simulation, and translates molecular imaging and nanotechnology into the operating room.”

Sutherland worked with MD Robotics of Brampton, Ont., for 2 years to design the squat robot, which is reminiscent of Star Wars’ R2D2. The machine will be operated by a surgeon using hand controls to move surgical tools while watching a screen, thus increasing visualization and removing the danger of hand tremors.

Sutherland envisions other disciplines will use the neuroArm to improve techniques and patient care. “Virtual surgery is a natural progression of robotics,” he said. (Robot photo reprinted from Louw DF et al. “Surgical robotics: a review and neurosurgical prototype development.” Neurosurgery 2004;54:525-37) — Dina O’Meara, Calgary, Alta.