INVITATION (MASTER'S PROJECT)

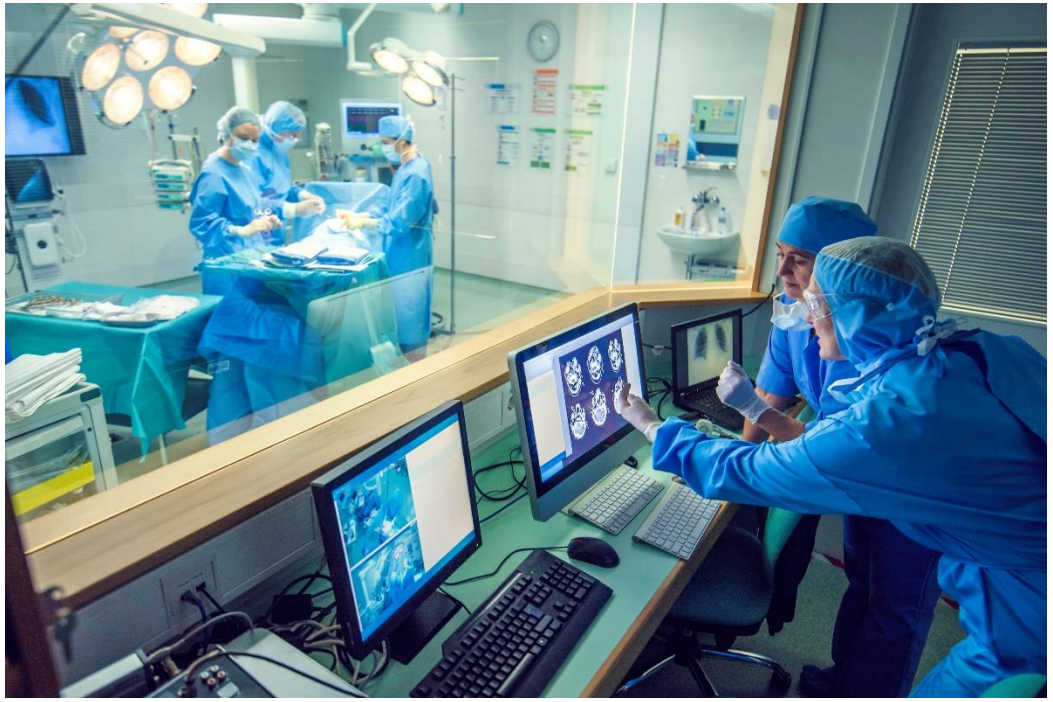
SURGICAL ROBOTICS LABORATORY

www.surgicalroboticslab.nl

SUPERVISORS: CM HEUNIS[1] & PROF. S. MISRA[2]

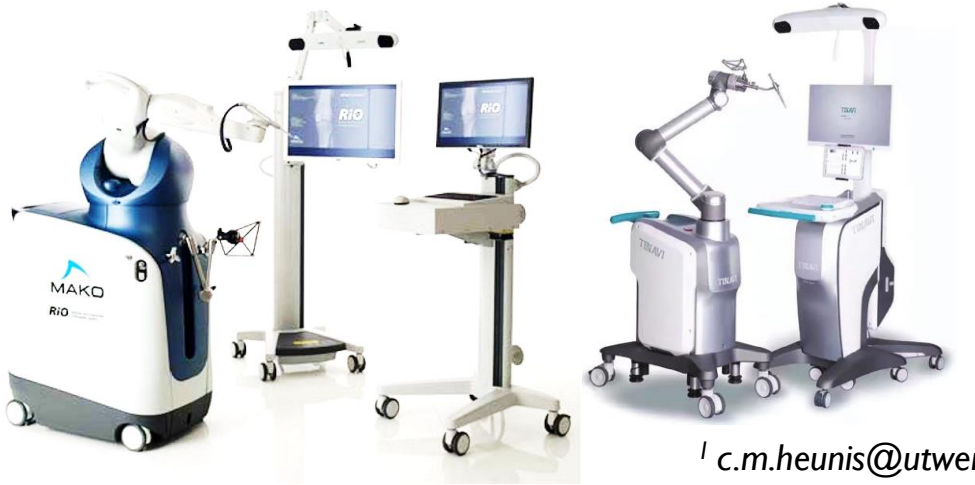
Project title: Toward a Clinician-Friendly User Interface for the ARMM System

Background: While considerable robotic technology has been integrated into the operating room, until recently, the actual performance of surgery is still relying mainly on hand-eye coordination. This project concerns the requirements, development, and evaluation of a prototype human-machine interface for the Advanced Robotics for Magnetic Manipulation (ARMM) system, a novel telerobotic surgical system. A critical component of the system is the Human-Machine Interface workstation, where information will be provided to and received from the operator.



Tasks:

- Determine the best options for visual feedback (touchscreen) based on visual information from an imaging modality and two liquid crystal displays.
- Implement UI and UX design for the two touch screens that allow the user to monitor and control the settings of the robot and to view and manipulate 3-D CT images.
- Audio feedback from the surgical site and the operating room staff should also be provided by a wireless communication system.



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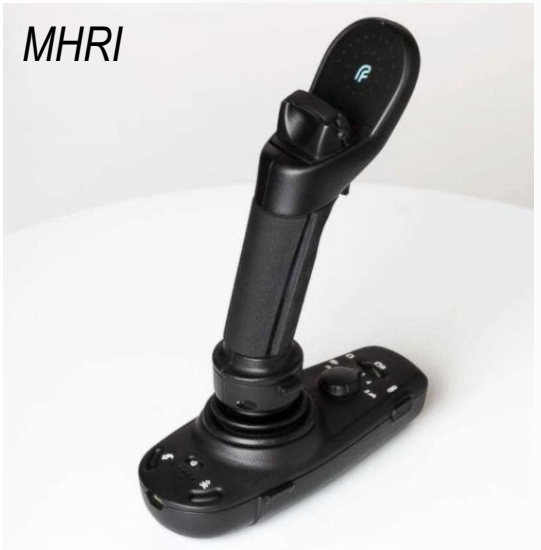
Project title: Design/software development of a joystick/haptic manipulator for tele-manipulated robotic vascular surgeries

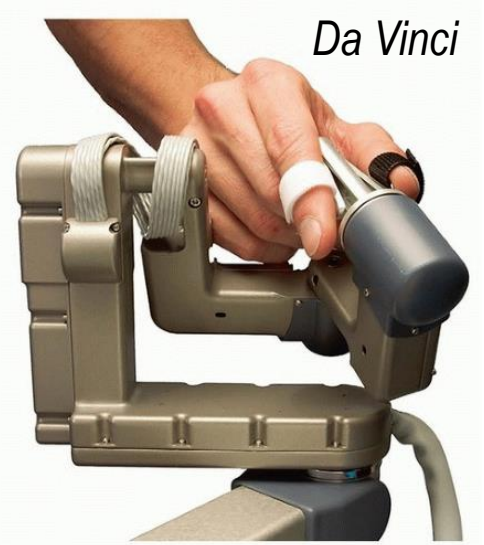
Background: While considerable robotic technology has been integrated into the operating room, until recently, the actual performance of surgery is still relying mainly on hand-eye coordination. This project concerns the development of a Human-Machine Interface for the Advanced Robotics for Magnetic Manipulation (ARMM) system, a novel telerobotic surgical system. Specifically, a joystick-guided robotic framework must be developed and integrated, allowing for smooth control of the robotic end-effector by a clinician.

Tasks:

- Determine the best options for a straightforward and intuitive joystick-guided robotic control system
- The system should be integrated with a dual touch screen UI developed for the ARMM system
- The joystick should be universally used both in elective and emergency surgery
- Focus could be on either the design and integration or on the high-level software development

Auris Health Monarch Platform





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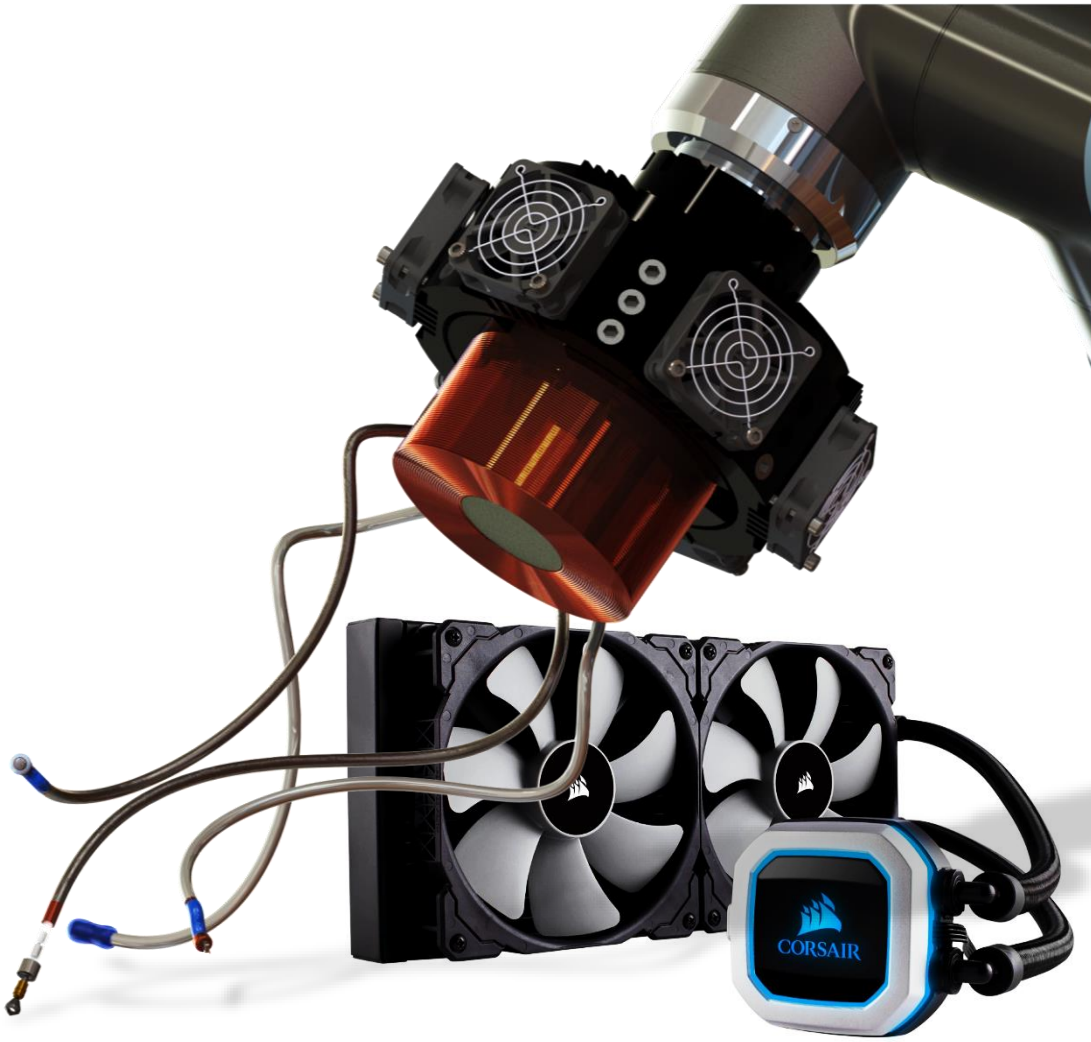
Project title: Design and integration of a liquid cooling system for a 6 DoF robot-mounted electromagnet

Background: Electromagnetic coils are inevitably subject to heating from large currents and ambient temperature. While temperature affects the susceptibility of the magnetic material in general, the temperature also affects the conductivity, which in turn influences the magnetic field. Furthermore, an increase in coil temperature may lead to a hazardous environment, especially during surgery, when close contact to the skin is required. This project explores the design and simulation of a liquid thermal cooling technique to address thermally-induced problems.

Tasks:

- Research an effective thermal management and cooling system for electromagnetic coil cooling, inspired by CPU-based cooling technology
- Design the system and conduct a finite-element simulation on the effectiveness of the cooling system
- Fabricate the system and integrate it with an existing electromagnet



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