

# DESIGNING NEW MEDICAL EQUIPMENT

**Slade, Alan**

Medical Engineering Research Institute  
Faculty of Engineering and Physical Sciences  
Division of Mechanical Engineering and Mechatronics  
University of Dundee  
Dundee, Scotland, DD1 4HN.

*Abstract. Robots are finding increasing use in surgery as a means of releasing the surgeon from hazard and fatigue and also in enhancing the safety and comfort of the patient. This is particularly true of Minimal Access Surgery (MAS), which includes thoraoscopy (chest surgery), laparoscopy (abdominal surgery) and interventional flexible endoscopy. MAS is revolutionising surgery and is now accepted as a major complement to conventional open surgery. The popularity of MAS is due to the numerous advantages it offers over conventional open surgical procedures - particularly the reduction of the trauma to the patient, accelerated recovery and improved cosmesis. However, against these must be set an inevitable increase in the dexterity demanded of the surgeon and an increase in the time taken for the operations. This paper describes the design problems that are unique to medical equipment, in particular those intended for interventional surgery. From the mechatronic design point-of-view, it is a challenging task: medical devices have tough performance and safety requirements to be achieved within a device with reduced dimensional and weight constraints. The employment of design tools such as Pro/Engineer and Pro/MECHANICA assist in providing a fast visualization of the assembled parts and the dimensional optimisation. In addition, they allow updates in the design quickly and can generate codes for CNC machines and rapid prototyping. Examples will be given from the portfolio of research projects that we are currently working on within MERIT.*

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