The Use of Augmented Reality in the Operating Room: a Review

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Introduction

- Survey of how AR is used in surgery
- Today:
  - the problem
  - overview of options
  - progress

Augmented Reality

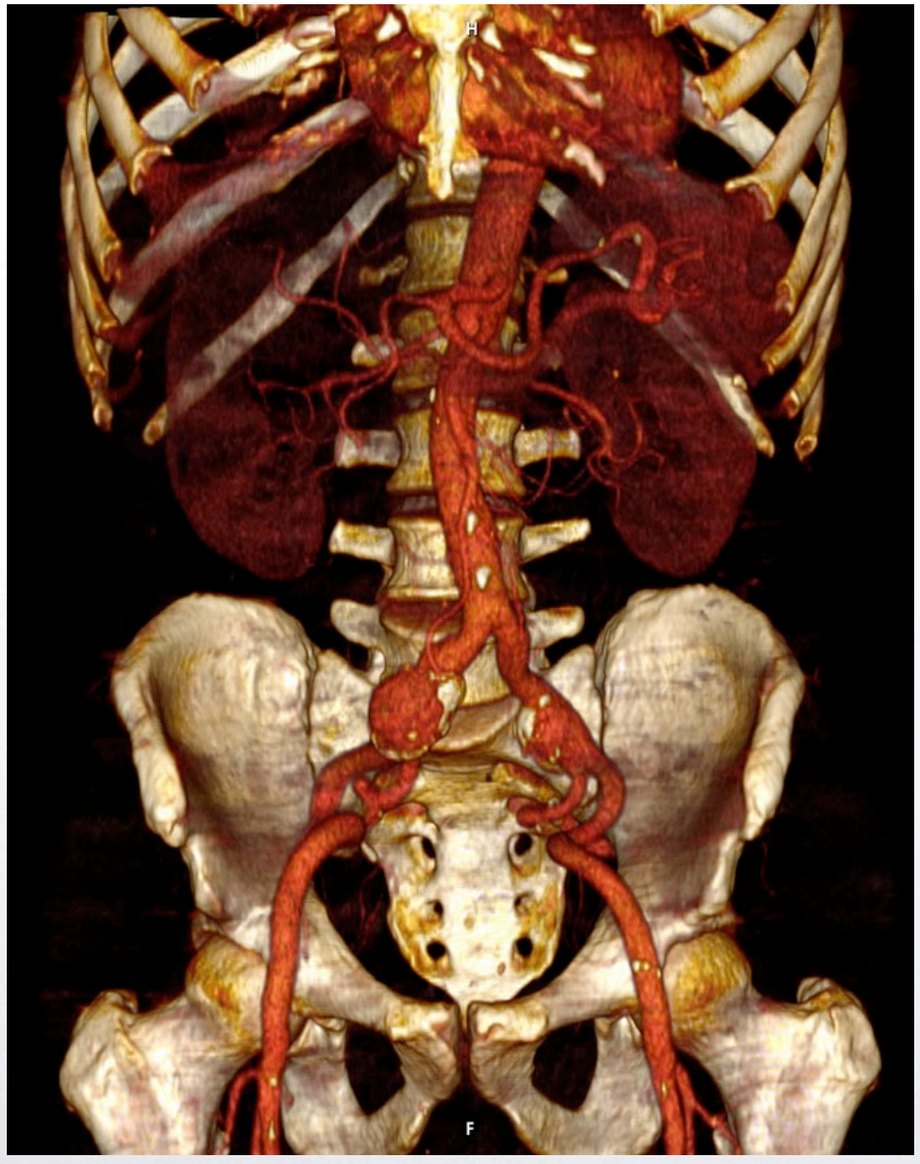
- Hybrid of VR and reality
- Interactive in real time
- Registered in 3-D

Augmented Reality

Why AR in the OR?

- Medical Imaging is well-established
- Traditional displays are of limited use
- Surgical procedures are becoming more technical
- Want to improve accuracy and efficiency

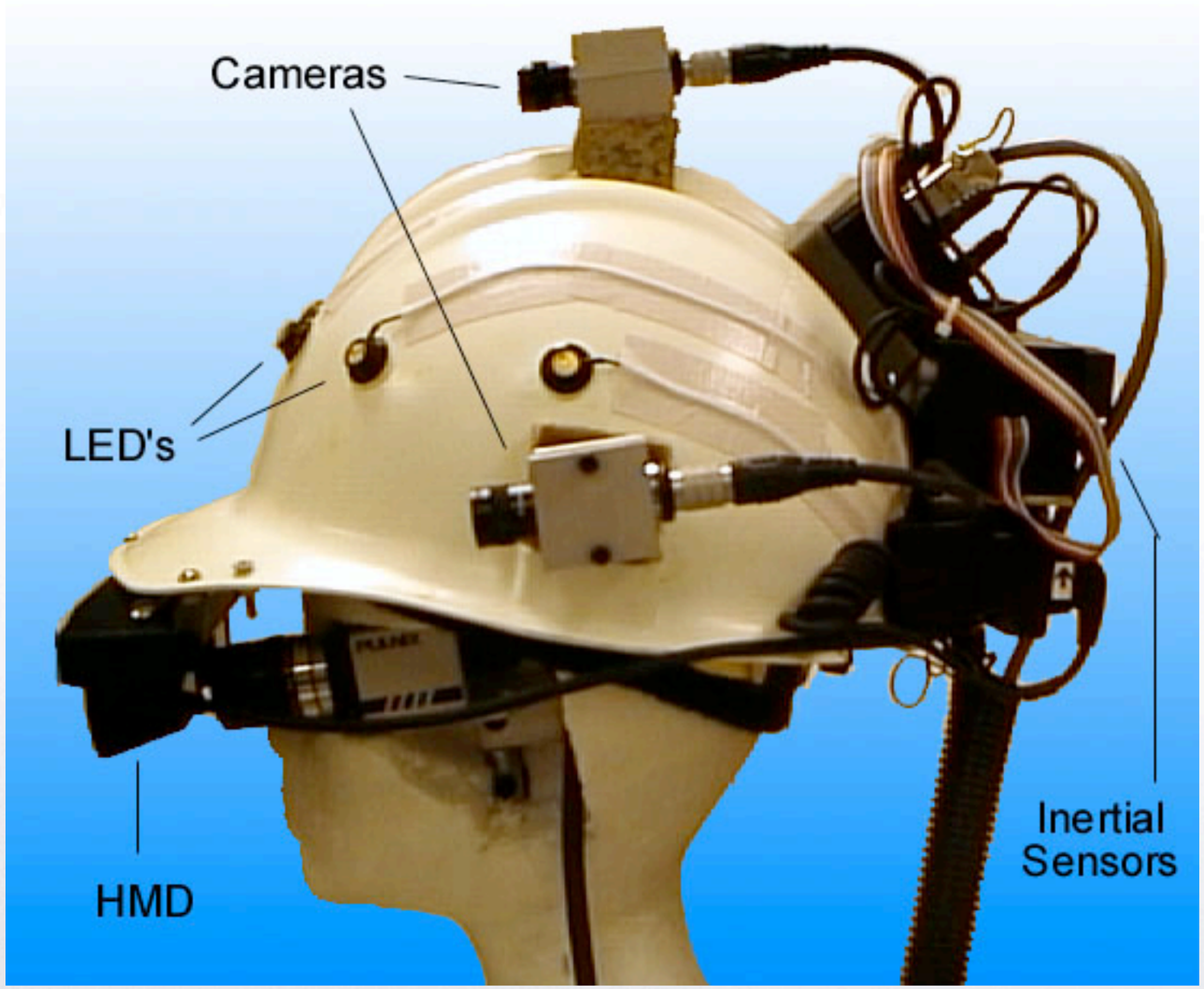
Why AR in the OR?



Medical AR Techniques

- Head-Mounted Displays (HMDs)
- See-through Monitor Displays
- Stereoscopic Displays (teleoperators)
- Fluorescence Techniques
- Auditory Information

Head-Mounted Displays

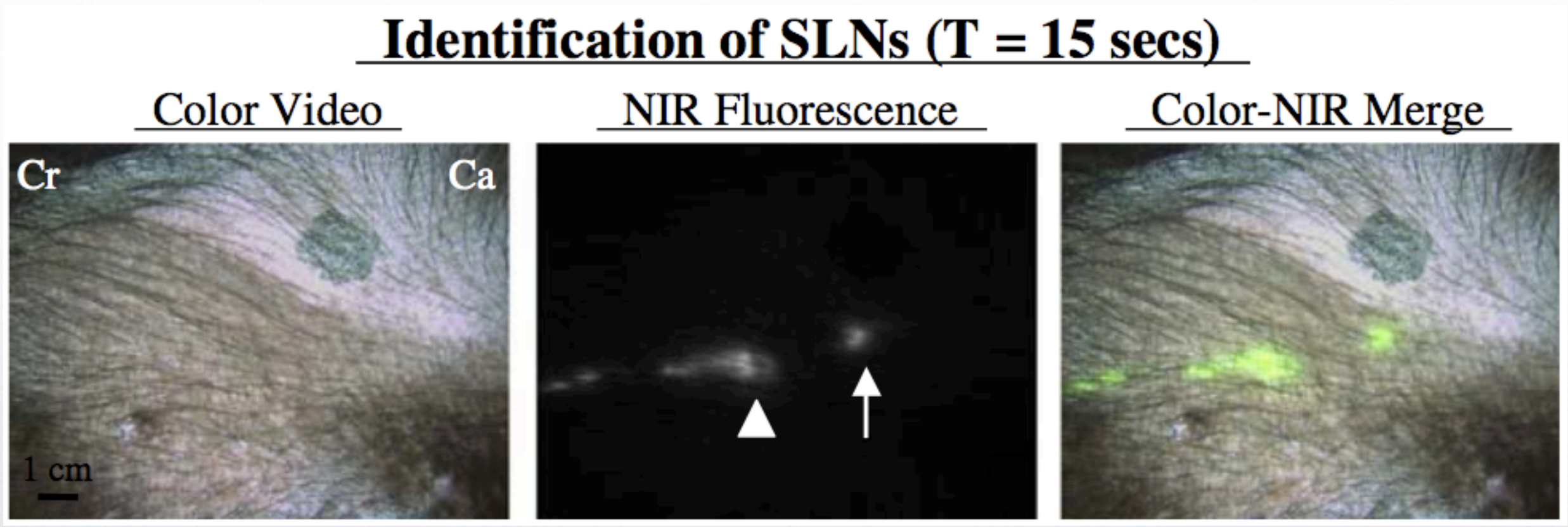


Monitor Displays

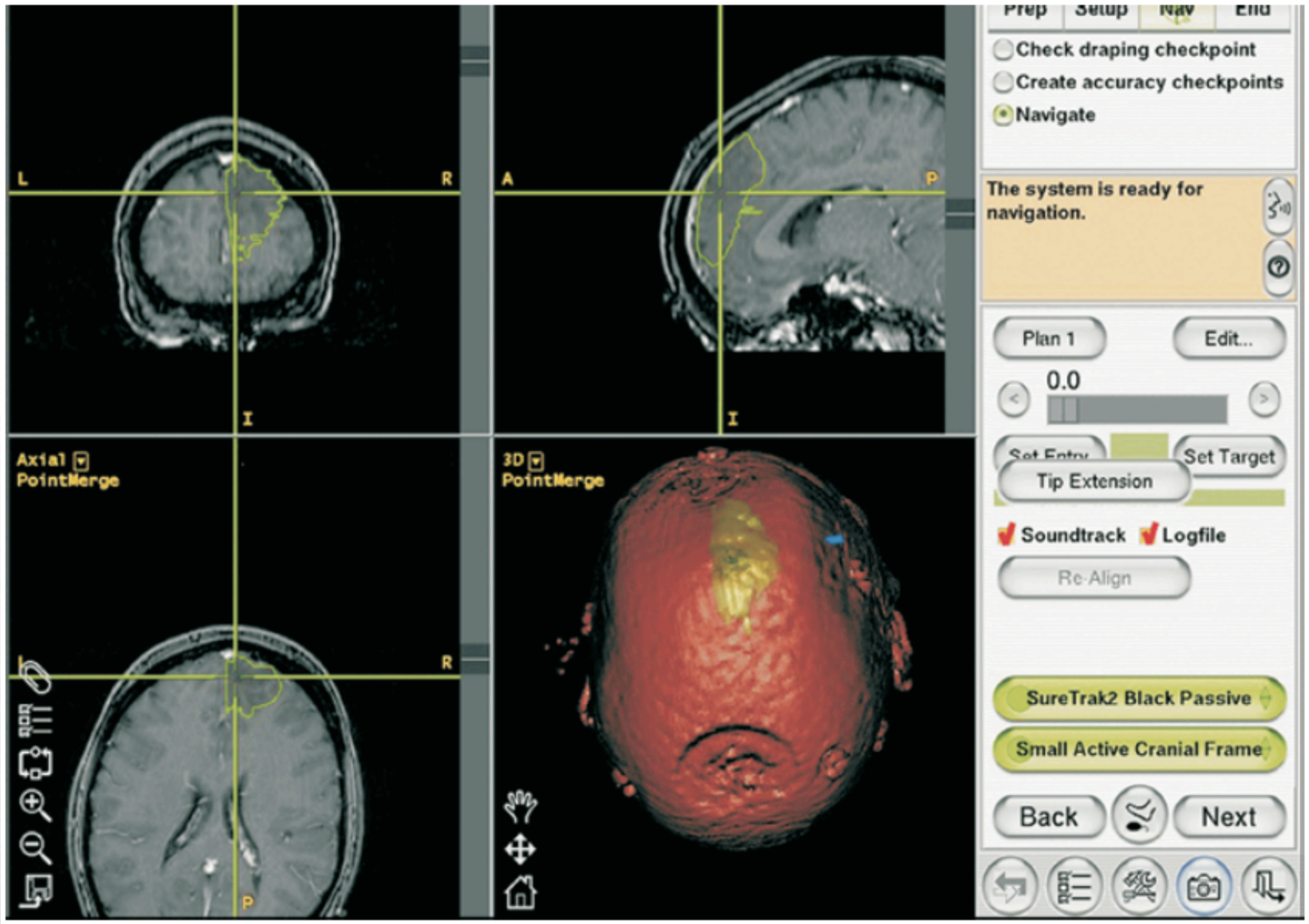
Stereoscopic Displays

Fluorescence

- Benefits: invisible, safe, less attenuation than visible light, targeted



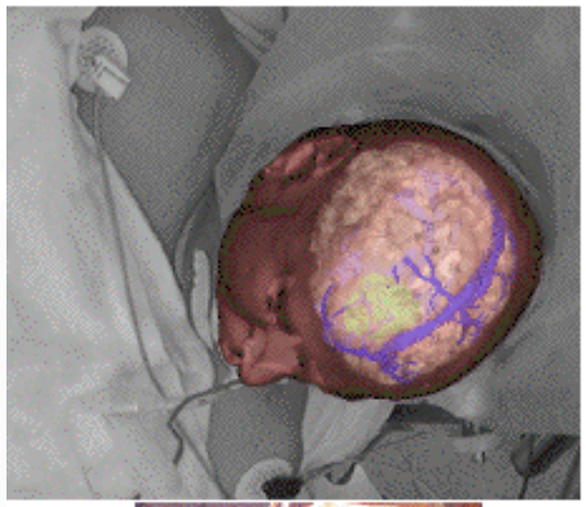
Auditory Information

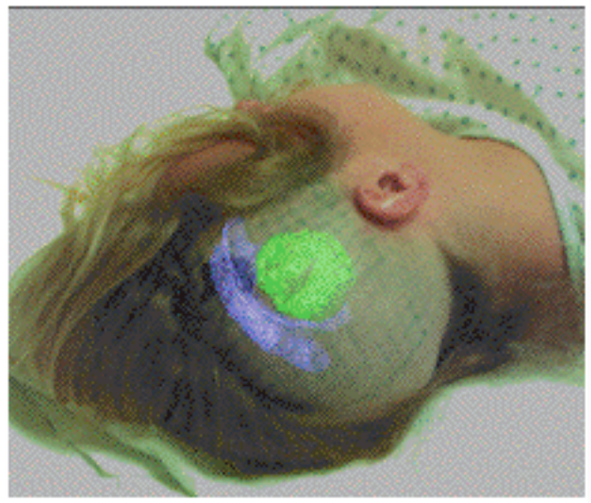


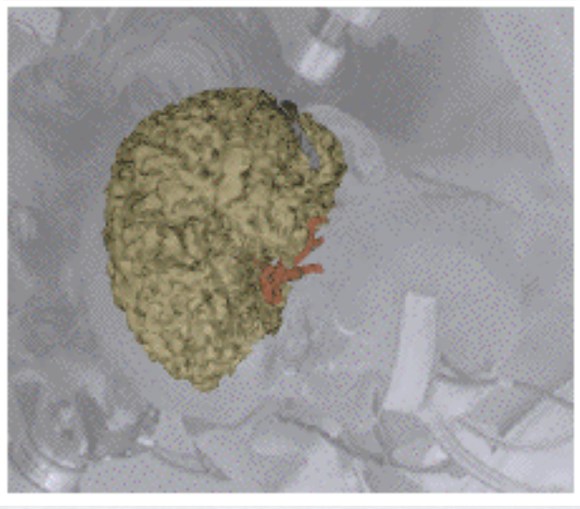
Applications

- Neurosurgery
- Laparoscopic Surgery
- Needle Insertion
- Orthopaedics

Neurosurgery



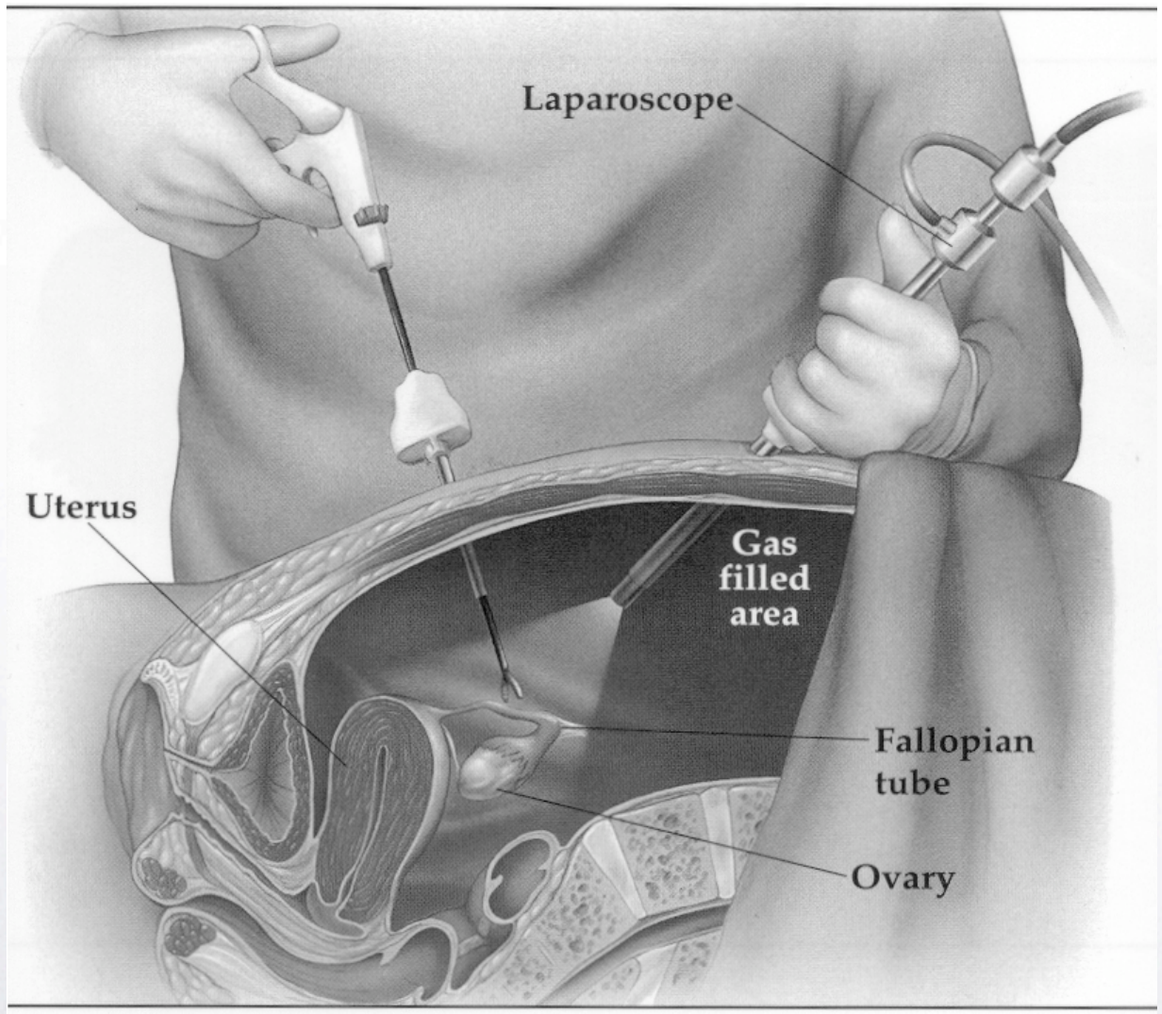




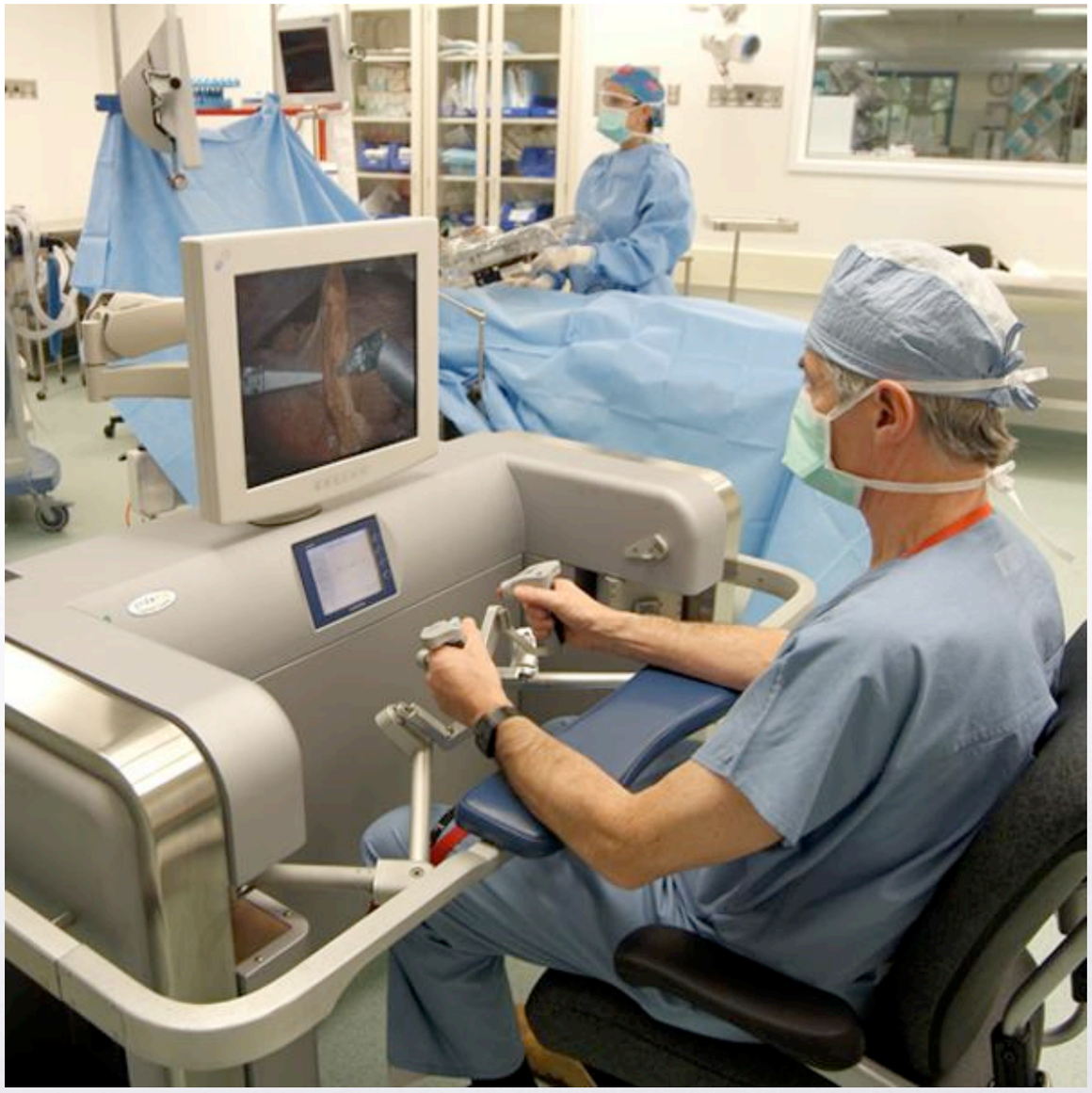
Laparoscopic Surgery

- Minimally-Invasive Surgery (MIS)
  - Pros: reduces surgical complications, operating times and recovery times
  - Cons: limits vision and increases difficulty

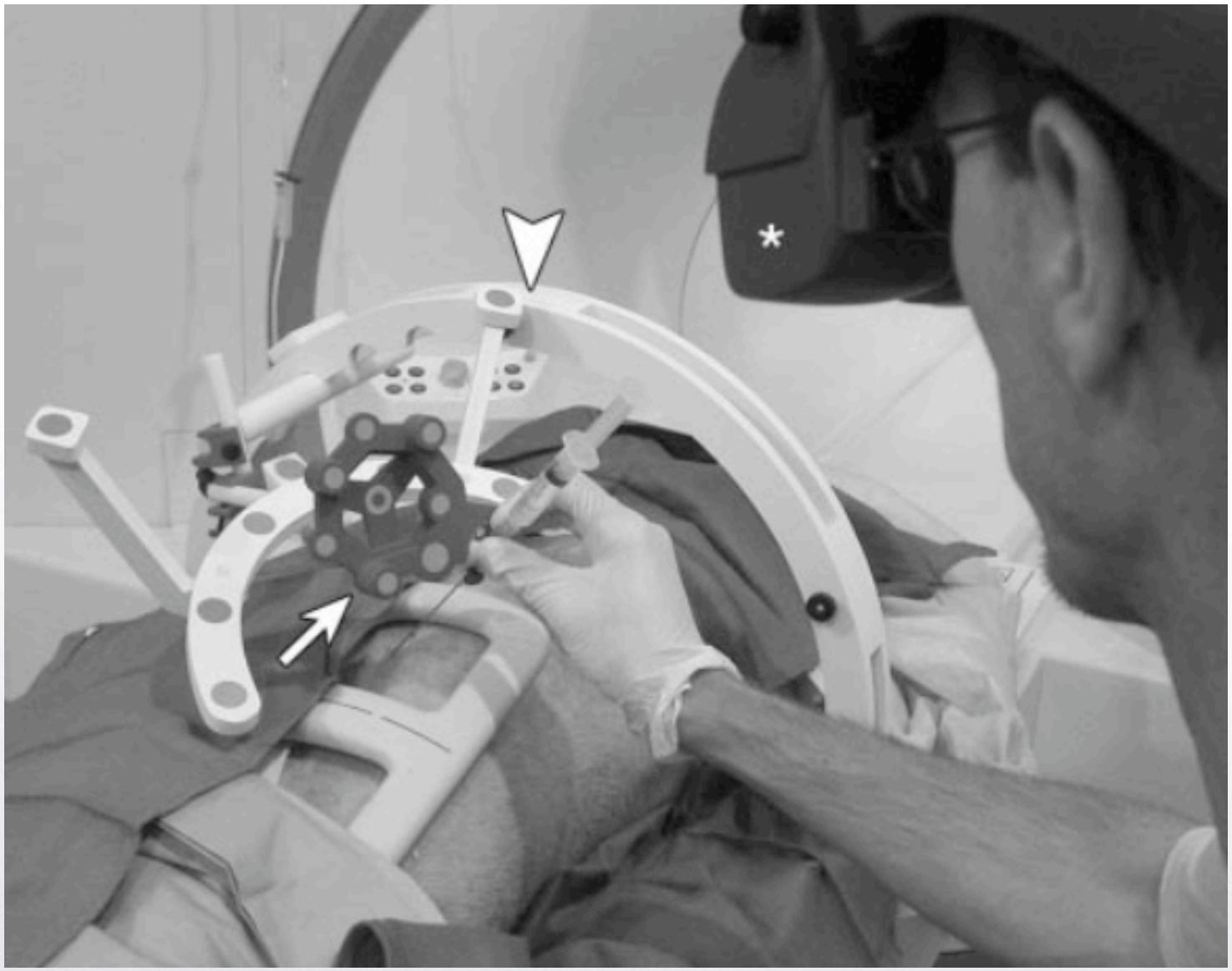
Laparoscopic Surgery

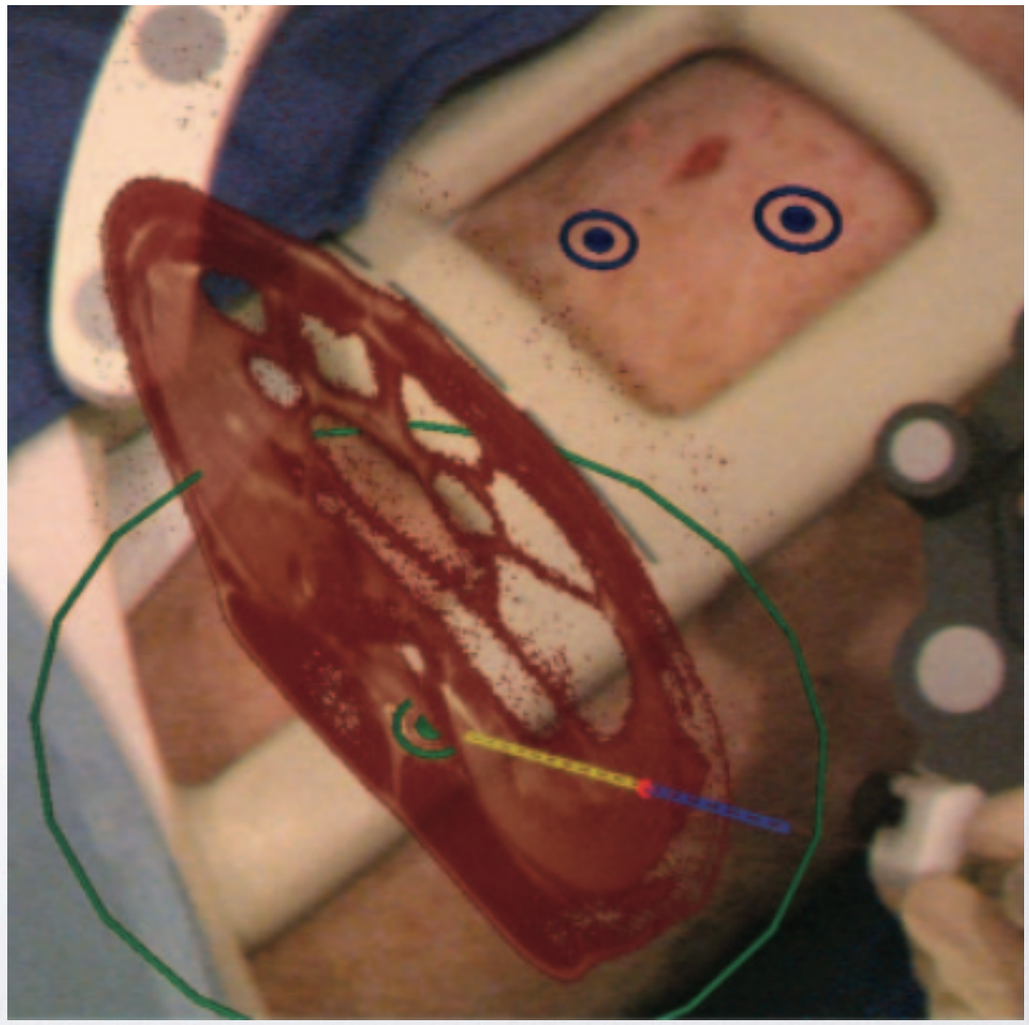


Laparoscopic Procedure



Needle Insertion





Orthopaedic Surgery

Goals

- In-depth look at techniques and procedures
- Bridge the gap between problem-driven and technique-driven research
- Evaluation of the options presented in December

Questions?