**State-of-the-Art:**

Technical background

* Fiducial tracking
* Tomography
* 3D modeling
* Navigation
* Leap motion

Automated surgical microscopy

* Current concept / design / standard
* Dimensions (space occupation)
* Mechanics ()
* Application (draping)
* Benefits

Robotic motion control for surgical microscopy

* P2P, linear, spherical (Pivot) movement
* Mouth / foot panel
* Motion regarding point-of-interest (smart?)
  + Region avoidance regarding safety: internal collision against soft tissue / damaging brain tissue / protecting vessel and aneurysm
  + Regarding vision: reflex / visibility / info priority
* Robot motion control & interaction with gestures. interpretation and execution
* Stability / vibration

Microscopical visualization / display

* Binocular vision (enhanced 3D perception)
* Optical vision
* External screen (importance of parallel view)
* Multi–viewer
* Other illuminations + spectrum filtering (normal light / fluorescence)
* Focus depth
* Resolution

Human-Machine-Interaction

* Affordability
* Ergonomic
* Control penal / touch screen
* Control input (0-force, pose teach-in, focusing)
* Gesture Control
  + Gesture monitoring
  + Gesture interpretation (smart?)
  + Performance /
* Speech control
* Head mounted display
  + Delay
  + Current concept / design / standard
  + Localization (head tracking)
  + Field of view
  + Hologram (mesh / volume)
* Augmentation
  + Current accuracy
  + Scopis
  + Morita, rcolisc <http://www.dospara.co.jp/express/vr/395738>

Other aspects regarding surgical microscope

* Contamination
* Cost
* Maintenance

Haptic feedback

**Use Cases:**

To observe:

* Comfort
* Obstacle in OR
* Reachability of device & personal
* Mishandle (touching by mistake)
* Configurability

**Ideas:**

Head tracking 🡨 direct 🡪 Microscope motion

<https://www.youtube.com/watch?v=3AEDYrQeIx4>

https://www.youtube.com/watch?v=IHNtC19eXdw

<https://navigation.scopis.com/company>

<https://navigation.scopis.com/>

<https://www.youtube.com/watch?v=OlNjw9Q0Uzk>