**AR REMOTE SURGICAL ASSISTANT**

**SUMMARY**

*AR Remote Surgical Assistant is an AR application that allows a surgeon receive feedback and instructions from another person in a remotely location. Information is shared via auditive and visual feedback.*

*The assistant visualizes the surgical field in the form of a 2D live video. The assistant can give instructions via voice chat, or drawing over the video image.*

*The surgeon wears an AR device, and can hear the assistant´s voice, and see the instructions displayed on a 2D AR canvas, showing the instructions drawn by the assistant.*

*Live surgery video is transmitted directly from the surgeons headset to the assistant device, which can be a regular computer or Tablet.*

**Minimum requirements *(would result in a really helpful AR app with clinical application)***

* Live video transmission from surgeon´s headset to assistant´s display.
* Bidirectional voice chat.
* Assistant´s display;
  + Hability to point things on the image.
  + Hability to draw points, lines or freeforms over image.
  + Hability to freeze the image, so the assistant can draw the instructions unnafected by surgeon´s head movements (screen Split in two, one showing the live surgery, the other one the paused video where he or she can draw the instructions. This second screen would be the one shared with the surgeon).
  + Hability to erase or modify drawn instructions.
* Surgeon´s display;
  + Hability to see a 2D virtual canvas, displaying info (images shared by assistant with instructions drawn over it. Which can be the frozen surgery image or other images).
  + Hability to hide/show, move or scale this 2D virtual canvas.
  + Hability to enable/disable mic and audio, increase/decrease volumen or mute.
  + Hability to initiate/stop/record video transmission.

**Strongly desirable features**

* Assistant´s display;
  + Hability to share images such as xrays, schematics or text (he could have a window on the main screen where he or she can drop images, and a button to share them. An auditive signal, ping, could be played anytime something is shared).

**Bonus features *(Future projects, Project enhancement. Difficult to develop, and not essential)***

* Assistant´s display;
  + Pointing things over live video (opposed to drawing over paused image). This has the inconvenience that a structure could be pointed in the assistant´s end which is a 2D image. However, over the surgeon´s end, a 3D pointer (mouse arrow for example) would appear in AR mode, but, due to the lack of Depth perception by the assistant there´s no way this can be precise.
* Surgeon´s display;
  + Hability to instantiate 3D models (bone models, real size surgical implants), or previously stored images such as X-rays, or schematics (surgical preoperative plan or info).