Augmented Reality Assisted Surgery

Prof. Luc SOLER, Prof. Didier MUTTER, Prof. Jacques MARESCAUX
IRCAD - IHU Strasbourg
Aeronautics solution for surgery

Airplane
R&D: Overcoming Human limits
Aeronautics solution for surgery

From Satellite view to planning
Solution: Have a Map!
3D Cartography of Patient
3D Patient modelling and Surgical planning

www.visiblepatient.com

Windows 64 bits / MacOS X Maverick (9) / iOS / Android
3D Patient modelling and Surgical planning

*www.visibePatient.com*

Exemple of last 6 months 3D modelling
R&D: Hololens Surgical planning
Aeronautics solution for surgery

From Planning to AR Guidance
Intraoperative Use
Augmented Reality Guidance

FUSION

Virtual 3D image + video image = Augmented Reality
IRCAD Interactive Augmented Reality

Real-time tracking of skin deformation ➔ Simulation of organs deformation

Future: Holographic Augmented Reality
Second case: Minimally Invasive Surgery

Shape and Location Modification due to the surgeon interaction

- Pneumoperitoneum, OP-Table displacement, etc...
Pneumoperitoneum effect

defformation due to pneumoperitoneum is inhomogeneous

Large deformation of shape: not only translation
Aeronautics solution for surgery

Intraoperative Image Guidance
Main Project: Lasar
Automated Augmented Reality on soft tissue

An Augmented Reality Framework for Soft Tissue Surgery
Aeronautics solution for surgery

Robotics
Robotics & Visible Patient: Plug & Play

Robotized colorectal Surgery, Prof. Amando Melani
Augmented Reality Guided Personalized Surgery

Augmented Reality Guided Personalized Surgery
Computer Assisted Image-Guided Surgery

Future based on Hybrid Surgery
CONDOR + Fast Path : deep learning

Projet CONDOR

Harmonic + IRT-B-CoM
+ IHU + IRCAD + Unistra
INSERM + Medtronic
A.I. analysis of Surgical Video


Thanks for your attention!

IRCAD-IHU R&D Team 2017