VOSTARS
Video Optical See-Through Augmented Reality Surgical system

Vincenzo Ferrari
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Dipartimento di Ingegneria dell’Informazione
&
Centro EndoCAS per la Chirurgia Assistita dal Calcolatore

Horizon 2020
Call: H2020-ICT-2016-2017
Topic: ICT-29-2016
Type of action: IA (Innovation Action)
EndoCAS – University of Pisa

- Director Prof. Mauro Ferrari
- Coordinator Eng. Vincenzo Ferrari, Phd
- The Research team involves: 13 Engineers, Surgeons (& other Clinicians), Radiologists, Residents, Economists
The mission of EndoCAS is to develop breakthrough technologies based on engineering and information technologies to improve the current medical procedures and reduce their invasiveness by means of an optimal use of medical imaging.
How to obtain AR in medicine?

- Real Data source
- Virtual Data source
- Tracking modality
- Registration technique
- Visualization Processing

- Display type
- Perception location
Optical See-Through AR display

Natural view

User dependent calibration troubles
Geometric Calibration of Head-Mounted Displays and its Effects on Distance Estimation

Falko Kellner, Benjamin Bolte, Gerd Bruder, Ulrich Rautenberg, Frank Steinicke, Markus Lappe, and Reinhard Koch

Optical See-Through HMD Calibration: A Stereo Method Validated with a Video See-Through System

Yakup Genc†  Frank Sauer†  Fabian Wenzel†  Mihran Tuceryan†  Nassir Navab†
Video See-Through AR display

AR registration

Camera mediated view
Positive results achieved by applying the proposed strategy in assisting freehand maxillary repositioning.

High-resolution cameras

Electrochromatic panel
Two cameras capture the field of view in 3D. The surgeon can see it on an OLED screen on the inside of an electrochromatic panel, which can be both transparent and opaque.
Comfortable and lightweight support as the concept proposed by the Designer Kilian Kreiser and Pilotsish

Micro HD cameras with USB 3.0 interface

HD micro Displays
THE CALL

- ICT-29-2016 - Innovation Action!
- “Focus is on MICRODISPLAY-BASED immersive, AUGMENTED AND VIRTUAL REALITY visualisation systems.”
- “Actions should address VALIDATION AND DEMONSTRATION of new microdisplay-based visualization systems for key applications in e.g. HEALTHCARE, maintenance & training, entertainment, tourism or sports.”
- “Strong industrial commitment, be DRIVEN BY USER NEEDS and concrete business cases supported by STRONG EXPLOITATION STRATEGIES”.
VOSTARS SPECIFICATIONS AND ADVANTAGES

- Stereoscopic vision.
- Lightness and wearability.
- Accurate and robust registration of virtual content to real scene.
- Lack of need for obtrusive external trackers.
- Hardware and Software specifics defined through a pro-active collaboration between engineers, designers and surgeons.
- Advantages of both the VIDEO and the OPTICAL SEE-THROUGH modalities → (VST&OST!)
- **Project proposal deadline** 12° April 2016
- **GAP Invitation Letter** 29° July

- Grant Agreement preparation
- Consortium Agreement preparation
- Grant & Consortium Agreement signature
- Pre-financing @ coordinator 25° November
- Pre-financing transfersments to the partners done
- Pre-kick off meetings and kick-off meeting done
- 1°, 2° February meeting to define device specification
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