How Can Medical Holograms And 3D Imaging Be Helpful During Endovascular Procedures

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Holographic Augmented Reality - a Unique Experience

The only true 3D interactive holograms within hands reach

- Ultimate 3D visualization - see true volumes floating in the air or accurately positioned inside the patient
- Close-range precise interaction - directly explore, touch and manipulate real-time medical holograms
- Experience prolonged use without any fatigue or nausea

Digital Light Shaping™ (DLS) Technology

Real-time reconstruction of interference-based 3D volumetric holograms in “mid-air”

- The best method known to science to precisely reconstruct and display 3D objects in free space
- Contains all 3D visual-depth cues at multiple focal planes
- Provides optical reality and not an optical illusion, not “trick[ing]” the brain in any way

The Fundamental Limitations of Existing Stereoscopic Solutions

Vergence Accommodation Conflict: all current 3D stereoscopic technologies project a single far-away plane to each eye, creating a 3D illusion with a constant mismatch between the fixed image focus and the dynamic image perceived location

Current Stereoscopic Solutions:
- Provide an illusion of depth perception
- Posture and the cute “stereo-touchable” 3D images
- Support only a short user experience - may give the user a headache with prolonged use
- Are not adequate for most professional applications
- None are appropriate for medical/clinical applications

RealView’s Digital Light Shaping™ technology does not carry any of these limitations
New Interaction Zone: From Gesture to Touch

- Single fixed focal plane
- Stereoscopy

30cm 70cm 100cm 130cm 200cm 400cm 500cm 600cm ∞

Users’ eyes

Gesture zone

Floating “in-air” holograms

Structured Cardiology
- IVUS and FFR
- OCT
- Angio/Coro

Electrophysiology
- AF
- Atrial Flutter
- Ventricular Tachycardia

Interventional Oncology
- Volumetric Biopsy
- Guided Treatments

Products under development. Not commercially available.

Commercial 3D Acquisition Modalities

Real-time hologram generation from existing 3D volumetric data

Intuitive comprehension of 3D structures
- Precise catheter manipulation (e.g. through vessel, valve)
- Device-tissue interaction (e.g. mitral clip orientation and optimal fixation)
- Procedure duration and success

Intuitive comprehension of 3D electro-anatomical maps
- Precise navigation of the ablation catheter to anatomical / electro-anatomical sites
- Creation of contiguous ablation lesions
- Procedure duration and success

The Clinical Challenge
Real time, dynamic catheter navigation and interaction in free 3D space

Structural Cardiac Procedures
- AV Valve Interventions
- LAAO
- TAVR

Electrophysiology Procedures
- Atrial Fibrillation
- Atrial Flutter
- Ventricular Tachycardia

HOLOSCOPE-i Potential Clinical Impact
- Intuitive comprehension of complex 3D structures
- Precise catheter manipulation (e.g. trans-septal puncture)
- Device-tissue interaction (e.g. mitral clip orientation and optimal fixation)
- Procedure duration and success

HOLOSCOPE-i Potential Clinical Impact
- Intuitive comprehension of 3D electro-anatomical maps
- Precise navigation of the ablation catheter to anatomical / electro-anatomical sites
- Creation of contiguous ablation lesions
- Procedure duration and success
Interactive Live Holography – Mitral Valve 3D TEE with Doppler

Medical Holography™ - Independent Expert Opinion - Roberto M. Lang, MD*

"The potential of this technology to teach and understand cardiac anatomy in 3D will undoubtedly revolutionize the guidance of minimally invasive surgical and percutaneous procedures, which are currently being performed using 2D/3D images displayed on flat screens."

"The advantage is real-time interaction with an anatomically accurate, volumetric dataset in the setting of a minimally invasive procedure..."

"Bravo to the authors for taking this first important step".

European Heart Journal, June 2016

* Professor of Medicine, Director - Noninvasive Cardiac Imaging Laboratory, University of Chicago. Internationally renowned cardiologist and specialist in echocardiography; past president of the American Society of Echocardiography. Dr. Lang is a pioneer in the development of three-dimensional echocardiography, a field of the art method to observe heart function.
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- Control Station
- 3D Auxiliary Monitor
- Human Holographic Interface (HHI)

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Launch and Clinical Trials in 2018

**THANK YOU!**

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