

INTERACTIVE HOLOGRAMS IN AUGMENTED REALITY

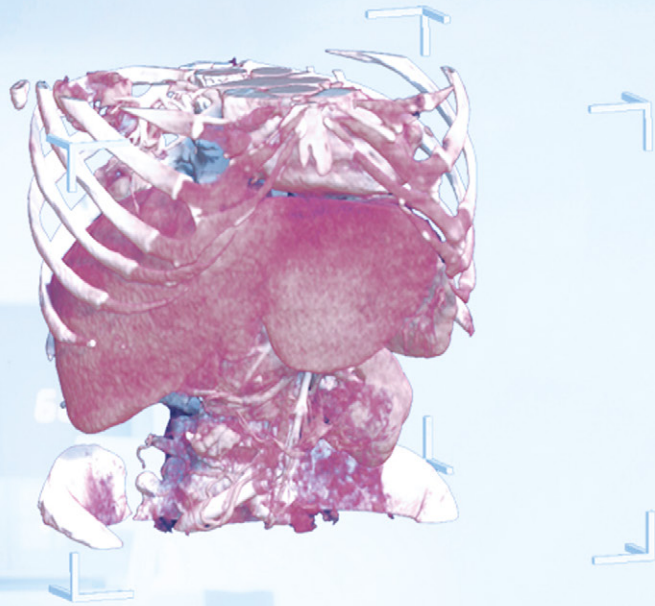
Supporting medical procedures' planning and performance



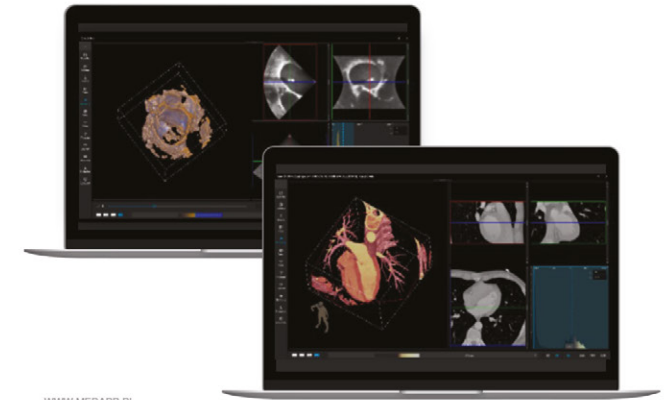
CarnaLifeHolo

MedApp

EMPOWERING PEOPLE FOR BETTER HEALTH



CarnaLife Holo.



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WHAT IS CARNALIFE HOLO?

A 3D imaging system to support precision, **comfort** and **safety** of medical procedures

CarnaLife Holo is a globally groundbreaking 3D imaging technology. With the software developed by MedApp S.A. and the help of Microsoft HoloLens 2 goggles, physicians are able to use three-dimensional visualization of imaging data that allows the evaluation of complex anatomical relationships both during the planning and execution of the procedure. Users can interact with the projected hologram, including rotating, scaling, moving, or going inside anatomical structures using gestures and voice commands, without loss of sterility or the necessity to work with an additional technician. The goggles provide an interactive screen available during surgery planning and anywhere in the operating room, but most importantly, they increase physician productivity and precision of the procedure. Ultimately, using CarnaLife Holo reduces health care costs.

Support of treatment teams

The **CarnaLife Holo System** supports the work of treatment teams by enabling:



BETTER PREPARATION OF SURGEONS FOR PROCEDURES

- increased efficiency of planning and preparing for a medical procedure
- better assessment of the size and location of tumor lesions¹
- more accurate planning of optimal access to pathology



REDUCING COSTS OF SURGICAL PROCEDURES:

- reduction of duration of the treatment by 1/3², and therefore increasing the efficiency of medical teams
- potential reduction of the length of patient hospitalization and the number of side effects after procedures



TRAINING AND OPPORTUNITY FOR ASSISTANT PHYSICIANS TO PARTICIPATE IN THE MOST COMPLEX PROCEDURES

Direct benefits for patients

CarnaLife Holo technology also brings direct benefits for patients:



Enables visualization and fosters understanding of the specifics of the procedure



Makes it possible to plan procedures more accurately, leading to potentially less invasive treatment as a result of better medical diagnosis



Reduces the duration of treatment by an average of 1/3³ which may result in a reduction of the anaesthetic burden on the patient's body during the surgery



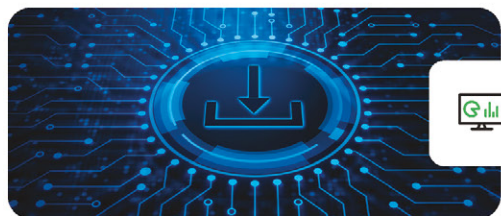
Potentially reduces the time of recovery

¹ Wierzbicki, Ryszard, et al. "3D mixed-reality visualization of medical imaging data as a supporting tool for innovative, minimally invasive surgery for gastrointestinal tumors and systemic treatment as a new path in personalized treatment of advanced cancer diseases." *Journal of Cancer Research and Clinical Oncology* (2021): 1-7.

² Ibid.

³ Ibid.

The process of holographic visualization



STAGE 1

Imaging data acquisition from diagnostic imaging devices in hospitals, for example computed tomography (CT), magnetic resonance (MR), PET, echocardiography, and rotational angiography.



STAGE 3

Creating 3D visualization and projection in the goggles.



STAGE 2

Sending data from a secure information system for archiving and instant transmission of images from diagnostic equipment (PACS) that supports DICOM protocols to the CarnaLife Holo application.



STAGE 4

By using mixed reality (MR) technology, the operator is able to see a three-dimensional visualization combining the real setting (e.g. patient, operating table) and virtual elements (the inside of the patient).



MORE ABOUT THE PRODUCT

Real-time connection

CarnaLife Holo makes it possible to record the procedure and connect with other facilities in real time to support remote surgery with expert knowledge and commentary. For example, in June 2021, a team of physicians from the Department of Vascular Surgery and Angiology of the IPUH1 in Lublin, using a system created by MedApp S.A., remotely assisted a team performing surgery in the capital city of Bulgaria, Sofia.

MORE ABOUT THE PRODUCT

Fixed equipment in the operating room

CarnaLife Holo can be used as fixed equipment in the operating room regardless of the specialty. The safety of the system is confirmed by a CE certificate.

Certified medical device

CarnaLife Holo is the analytical module of the CarnaLife telemedicine system, which is certified as Class CE IIB diagnostic support medical device.



Technology for cardiology, interventional cardiology, orthopedics, otolaryngology, oncological and vascular surgery

Hundreds of treatments worldwide

using CarnaLife Holo.

Cut: SMART
Mode: LOCATE

Main benefits of the solution

Physicians specializing in cardiology, interventional cardiology, orthopedics, otolaryngology, oncology and vascular surgery appreciate the benefits of our technology **that enhance the quality of the procedures.**

Key aspects of the solution are:

- Accelerated planning procedure
- Potential reduction of the duration of treatment
- Possibility of reducing the number of mistakes through natural depth perception of the visualized image
- Faster localization of oncological lesions
- Possibility of remote medical consultation
- Possibility of moving and placing the hologram anywhere in the operating room
- Interaction with the hologram through gestures and voice commands, no loss of sterility when interacting with the hologram
- Real-time transmission and visualization of echocardiography data
- Independent verification of medical data, minimizing the possibility of errors

Cardiology and interventional cardiology.



Procedure examples

- ✓ Ductus Botalli closure procedure
- ✓ In situ stent graft implantation procedure (for abdominal aortic aneurysm)
- ✓ ASD
- ✓ PFO
- ✓ Left atrial appendage closure procedure (LAAO)
- ✓ Basilica procedure
- ✓ Implantation of a MitraClip device
- ✓ Balloon pulmonary angioplasty

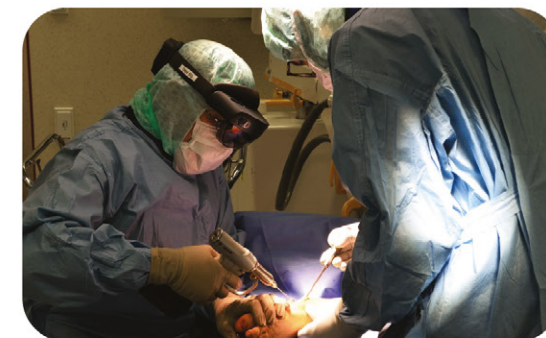


Surgical oncology.

Procedure examples

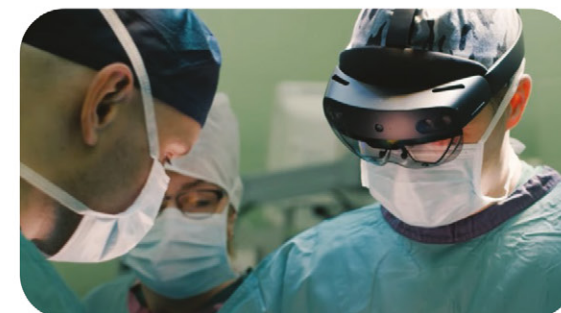
- ✓ Removal of liver tumor (NanoKnife)
- ✓ Removal of pancreatic cancer with metastases to the liver (NanoKnife)
- ✓ Removal of pancreatic cancer
- ✓ Thermoablation of liver tumors

Orthopedics.



Procedure examples

- ✓ Anterior cruciate ligament reconstruction
- ✓ Hip acetabular replacement
- ✓ Foot reconstruction and ankle endoprosthesis insertion
- ✓ Custom-made implants
- ✓ Oncoorthopaedics
- ✓ Revision of endoprosthesis
- ✓ Pelvis fracture



CarnaLife Holo - competitive advantages.

- ✓ The technology is CE certified within the European Union and complies with ISO13485.
- ✓ The software works in a closed environment without the need for Internet access and cloud data.
- ✓ Data is stored in accordance with GDPR regulations.
- ✓ Medical data in DICOM 3.0 format is processed in real size.
- ✓ Wide use of technology: cardiology, oncology, orthopedics, urology, laryngology and others.
- ✓ Multiple applications: treatment planning, intraoperative application and training.



More information about the company and the innovations we are developing, is available at: www.medapp.pl or our social media:

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