



# VSI HOLOMEDICINE



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# WHAT IS VSI HOLOMEDICINE?

VSI Holomedicine is a complete and functional system which covers all medical fields and processes, making them digital, safer, and more efficient. It is continually developed with involvement of the medical staff, the patients, and the IT. VSI will be seamlessly integrated into the existing hospital infrastructure. From surgical plannings to documentation, from patient education to patient rounds, from telesurgery to training; all these processes and more are digitalized and optimized by VSI. It is an enormous improvement in working conditions, increases patient safety and care, and guarantees optimal quality.

During their daily routines the doctors and staff will use the VSI – Virtual Surgery Intelligence running on the mixed reality glasses HoloLens. They will see virtual 3D Holograms of important patient information, prepared by AI, such as lab results, MRI/CT scans, surgical reports etc., in real space in front of them. With voice commands these can easily be toggled to allow the wearer full control. VSI is defined by doctors for doctors, and with their help, continually improved and developed. Each and every hospital's requirements are considered, allowing them to shape the future of their internal processes exactly the way they want them.



VSI Patient Education



VSI Surgery Planning



VSI Surgery



VSI Telemedicine



VSI Documentation



VSI Holoportation



VSI Patient Rounds



VSI Teaching



# ADVANTAGES OF VSI HOLOMEDICINE

- Simple and fast processes via holograms controlled via voice commands and gestures
- Defined by doctors for doctors, and continually enhanced.
- Complete hospital system for all processes and medical fields
- Fully and seamlessly integrated into the existing infrastructure
- Future proof due to continuous development and improvements



# VSI PATIENT EDUCATION

Visual clarification using VSI Patient Education for a deeper understanding of both the illness and the procedure is a central aspect of VSI Holomedicine. In this case, the doctor and patient see the same 3D representation of the CT/MRI scans in real space. The doctor can slice into them using a virtual cube, or highlighting a specific spot using a pen, helping the patient see and understand information that is usually outside their grasp. The three-dimensional presenta-

tion supports the patient's processing of information, allowing them a more in depth understanding of what is happening to them.

The quality of the patient education is increased, and the patient will in turn trust both the doctor and the hospital more. They will be less afraid of surgical procedures, and they, along with the doctor, come out happier.



# VSI PLANNING

VSI Surgery Planning is a tool designed for planning surgical procedures. CT, MRI, SPECT, CBCT and other scans are automatically represented three-dimensionally in VSI after quick and easy “drag and drop” of the relevant data from the doctor’s computer or from the PACS system.

A virtual toolbox of 10 different tools allows the user, among other features, to slice into the 3D scan, giving a different

perspective of a specific point of interest, to draw the incision point in advance of the surgery, or to plan the placement of a catheter.

Once finished, the doctor can save the planning and load it back into VSI when they begin the surgery, which can then be superimposed on the patient, leading to accurate anatomical orientation and an optimal surgical situation.

# VSI PLACEMENT

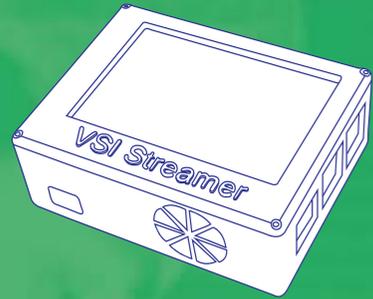
VSI visualizes MRI, CT and many other forms of data in real 3D. The doctor then sees a complete representation of all the tissues, fractures, and pathologies. Due to the nature of mixed reality, the real world will still be visible.

The surgeon can slice into the 3D scan to see the different slices in ways they have not seen before, and load planings made before the surgery to help with the upcoming procedure. Using artificial intelligence, the 3D visualization

is superimposed one-to-one on the patient's body, giving the surgeon a perfect understanding and orientation of the anatomy.

During the surgery the surgeon disables the 3D scan with a simple voice command, or by quickly flipping up the front display of the glasses. After the surgery, these can then be reactivated to compare the end result with the desired plan.





**VSI Streamer**



**HoloLens 2**



**Ultrasound, Endoscope**

# VSI STREAMER

The doctor can view the live feed from an ultrasound, microscope, endoscope, laparoscope device etc. virtually using the VSI Streamer Box.

The virtual monitor in mixed reality can be placed wherever the user wants it to be: No more turning away from the patient to view the screen. Multiple of these devices can be connected to the

HoloLens at the same time. The patented VSI Streamer Box is connected via HDMI to any ultrasound, microscope, endoscope, laparoscope device etc.

The video feed, which is usually visible on a monitor, is now wirelessly viewable on a virtual monitor in VSI on the HoloLens. Since this is mixed reality, the real world remains visible.

# VSI TELEMEDICINE

The most state-of-the-art telemedicine in hospitals: VSI, together with the digital whiteboard Surface Hub, enables optimal telemedicine, ideal for cooperation, interdisciplinary teamwork, and first-rate practically oriented training.

If the surgeon has a question, they can have the HoloLens put on them and activate VSI Telemedicine via voice command to quickly call a colleague or specialist and discuss diagnostic aspects or possible complications during the procedure, and how to proceed.

The receiving colleague answers the call on a Surface Hub where they can then see the exact

view of the surgeon live from the operating theatre. This allows them to give relevant situational advice without having to be present themselves. In addition, the colleague can mark and draw on the whiteboard to explain certain steps to the surgeon visually. If no Surface Hub is present, the call can also be answered with a normal desktop or laptop computer.

VSI Telemedicine is an ideal tool for practical teaching of assistant doctors. They can watch procedures unfold before them from the view of the surgeon, while the operating theatre is less crowded, allowing a more focused and safe surgery.



# VSI HOLOPORTATION

VSI Holoportation projects both people and objects virtually to another location. Using VSI and Kinect cameras, an object or person is recognized and sent as a hologram to another device.

The receiving user then also projects themselves into the operating theatre. For example, a doctor from abroad could join a local surgery by being projected into it, allowing them to give situational advice in a natural way.

Since the surgery is likewise being sent to the doctor abroad, they can study it as if they were actually there.



# VSI DOCUMENTATION

If the doctor wishes to take pictures or videos for a surgical report, patient rounds, or any other reason, the VSI Documentation feature will come in handy. The files are safely kept in the system for later viewing and usage. Additionally, the

doctor can dictate text, for example for a surgical report. This helps save time and energy on the side of the doctor, leading to an overall more positive and optimal experience. The text is also saved in the system for later use.



Fig. 1: VSI menu



Fig. 2: VSI menu speech to text





# VSI PATIENT ROUNDS

Save time and stress with the digital, mobile, and faster rounds done using VSI Patient Rounds, enabling better patient care and more detailed monitoring of disease progression.

With VSI Patient Rounds the doctor can virtually retrieve and view relevant patient data, all the while speaking with the patient naturally, without the need for a computer. The doctor can also call on archived images and videos, make new ones, and compare to assess disease progression.

The additional functionality of dictation allows the physician to create the round-report concurrently with their analysis. The text is saved for later use in the system. Any further medications or procedures can be initiated from here, giving access to a centralized control.

The doctor can, in special cases, call an expert or superior to ask for help or advice. The view from the HoloLens is shared with the receiver's computer to enable full cooperation and communication.

# VSI TEACHING

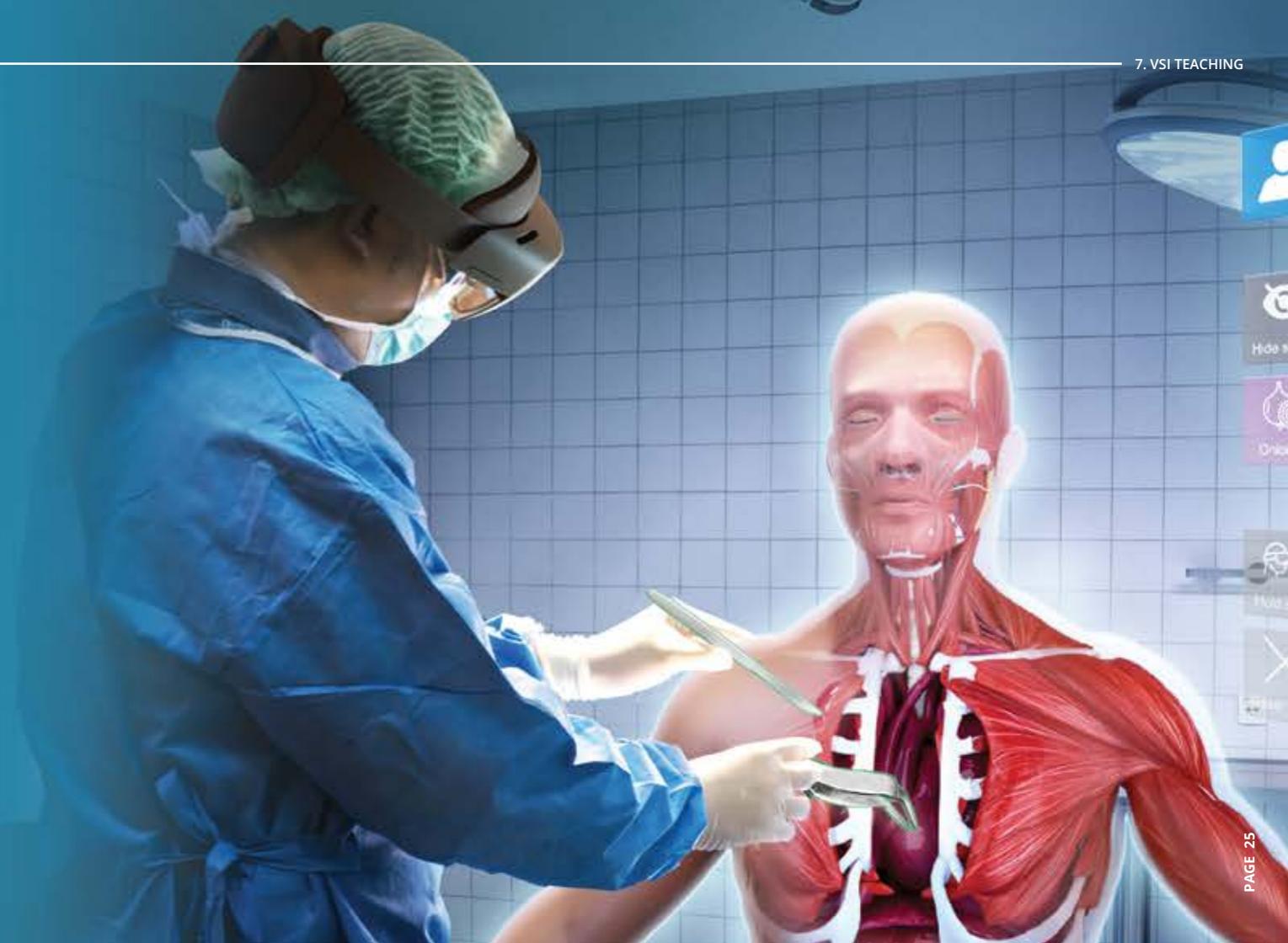
VSI Teaching offers modern and practically oriented training of physicians based on real MRI, CT, and SPECT scans, represented three-dimensionally in VSI.

All anatomical details and structures become visible, and can be interacted with by rotating, scaling, slicing, and peeling them. Additional functionalities like Natural Rendering and Bone Rendering make the scans look photorealistic and lifelike, helping the trainees better train

anatomical orientation, pathology identification, and fracture detection.

Surgical procedures can be planned and trained, for example using virtual incision site markings, or catheter placement assistance.

Surgeries can be viewed and followed live from anywhere, or can be reviewed at a later time using a recording.





# VSI NATURAL RENDERING

Natural Rendering is a method for photorealistic visualization of soft and hard tissues in CT scans. The usually grey coloured images gain realistic colouring and three-dimensionality. Even the smallest tissue structures become clearly visible. Natural Rendering is especially

useful for patient education, training of medical students and assistant physicians, and helping doctors and surgeons properly identify and diagnose diseases, along with blood vessels and nerves that might be problematic during the surgery.

# VSI BONE RENDERING

VSI Bone Rendering creates photorealistic constructions of the bones, which is useful in many facets of the Holomedicine.

Bone structures are rendered within seconds from CT or CBCT images. They appear realistically, both in terms of density and colour. On top of the bones, the soft tissue can be enabled, allowing

the doctor to slice through to the fracture and get a complete understanding of the surgical site.

Having a 3D representation of the relevant bone structures gives a whole new perspective and understanding of the procedure.



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VIEW

VSI ASSISTANT™

MEDICAL RECORD

PROFILE PRIVATE





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