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CANON'S VIRTUAL REALITY SOLUTION TRANSFORMS ULTRASOUND LEARNING FOR MEDICAL STUDENTS & HEALTHCARE PROFESSIONALS

A pioneering partnership between Canon Italy and Canon Medical Systems gives textbook ultrasound education an immersive upgrade with the ground-breaking Canon RF 5.2mm F2.8L Dual Fisheye lens and the EOS R5 C.

Industry: Medicine
Founded: 1913
Location: Rome, Italy
Services: Ultrasound and radiology education
Products used: EOS VR System – EOS R5 C and RF 5.2mm F2.8L Dual Fisheye Lens
Canon Installation Partner: Canon Italia S.p.A.

Objectives

- Enhance medical education and speed up the learning curve
- Attract and engage potential and actual medical students by establishing an innovative educational path for ultrasound
- Take complex information and convey it in an easy-to-understand way
- Create more immersive lessons for radiology students using the most impactful imaging solutions
- Capture the POV of a doctor carrying out an ultrasound procedure, seeing both the ultrasound machine and the patient at the same time
- Increase medical recruitment numbers and drive interest among young doctors in the field of radiology

Challenges

- Budget and resources constraints
- No one technical at the organisation who can shoot VR
- Filming in a small room with poor lighting conditions
- The need to explain and deliver complex medical information simply and effectively
- How to keep the experience entertaining and engaging with AR elements
- High turnover of healthcare professionals
- Limited opportunities to put theory into practice for students

Approach

Canon Italy and Canon Medical Systems had long sought a collaboration within Italy's healthcare sector. It was clear there was a wealth of experience and showcases using EOS VR within Canon's global operations, but also a lack of best practices established in the medical field, especially in clinical education.

With his interest and open-minded approach, his professional educational attitude and the knowledge of healthcare professional needs, Professor Roberto Grassi was a natural fit for guiding this project. The ultrasond skills and clinical knowledge of Prof. Vito Cantisani have been an indispensable asset. This was a ground-breaking collaboration, made possible by the support of Microchaos and filmmaker Stefano Conca Bonizzoni, which pushes VR technology beyond the boundaries of play and entertainment, expanding its potential into the medical world.

Scope

Ultrasound scanning rooms may not always be a fitting environment to ensure a wide and consistent learning of protocols, anatomy, image optimization method and measurements for all the participants. We had to think to provide education and training, through innovative and unconventional solutions.

The opportunity here was to enhance education and introduce new forms of learning for medical students across Italy.

To achieve this, Canon Italy introduced an unprecedented EOS VR system, consisting of the EOS R5 C and the world-first RF 5.2mm F2.8L Dual Fisheye Lens. Ultrasound, being one of the most operator-dependent diagnostic methods, lends itself particularly well to this type of practical application.

Results

- Created a powerful end-to-end single-camera virtual reality solution that's quick and easy to set up
- Captured high-quality videos in 8K which created an innovative educational pathway for ultrasound
- Captured stereoscopic 180° content for a fully immersive learning experience
- Allowed students to experience a 'real' ultrasound exam before waiting for their third year
- Great feedback from students who found it more appealing, engaging and effective
- Ensured easy post-production and streamlined workflow thanks to the single 8K sensor

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Improving education

How do you keep students engaged? How do you give each of them the right amount of time and attention to grasp complex medical subjects? In a traditional learning environment like a lecture hall with a slideshow, that's tricky enough at the best of times. The need for remote learning caused by the worldwide pandemic only highlighted shortcomings in the education programme and old-fashioned teaching methods.

It sparked a conversation about how Canon's revolutionary VR lens could improve medical education, specifically in ultrasound training. As for the societies that Prof. Grassi and Prof. Cantisani were representing at that time, they have been the perfect partner for this collaborative project.

> "You have the feeling that you are the operator in an actual ultrasound room"

Tearing up the textbook

Launched in 2021, Canon's first-of-its-kind RF 5.2mm F2.8L Dual Fisheye lens, proved to be a transformative upgrade. The full solution comprised of the innovative VR lens and the Canon EOS R5 C mirrorless camera, which worked together to capture immersive 8K videos of an ultrasound exam from the point of view of the doctor, featuring 180 degrees of vision. With a full-frame 8K sensor and long recording times, EOS R5 C was the perfect pairing.

Experienced via a medium-budget standalone VR headset, the videos demonstrated the videos demonstrated the impressive diagnostic capabilities of Aplio i-Series Prism Edition. This educational video series was rolled out as learning modules for the radiology course, shifting focus from slideshows and textbooks into the brave new world of virtual reality. Lectures never looked so attractive.

In Italy, medical students can only access the hospital for practice in their third year. This means they are limited to learning the academic theory for two years before they can see how to act on a patient in real life. The bigger picture impact of this VR solution, therefore, cannot be underestimated. The benefits for students are tangible.

Alex Dell'Era, Clinical and Technical Marketing Manager at Canon Medical Systems Italy, explains: "From a webinar or textbook it's hard to perceive everything. Here, you can actually learn. And you have the feeling that you are there looking over the shoulder of the doctor in the ultrasound room. It's mind blowing, as you know it's virtual, but it feels so real! Plus, it's learning on demand. So if you miss something, you can just put the headset back on and watch again."

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180 points of view

“The unique level of details which the R5 C can provide (8K) and Dual Fisheye lens’s expansive field-of-view (180°) not only offered a realistic and immersive experience, but also the possibility to add relevant AR elements during editing which guides the user where to look and gives them extra notes,” he adds.

From a production perspective, the stereoscopic L-series lens is designed to make the step into VR as simple and seamless as possible for existing filmmakers. It’s super compact, lightweight and easy to mount and start shooting straight away in 8K pin-sharp quality. Thanks to the two circular fisheye images, which are recorded side-by-side onto a single 8K sensor, post-production was a breeze – allowing you to focus on what the viewer is perceiving – in this case an abdominal ultrasound examination.

“A high-quality image is crucial in medicine. Every small detail counts. You need to be able to see which button the doctor is pressing on the control panel. And when it comes to diagnostic scans, every pixel counts! So the 8K is a game-changer,” says Alex.

The lens’s ability to simultaneously capture the ultrasound scanner and the patient was particularly beneficial. It ensured students could understand the intricate interaction between the operator, patient, and ultrasound – an essential aspect of ultrasound training – in stunning high resolution. The combination of the two left and right eye lenses and the R5 C’s single full frame sensor nullifies the problem of lens alignment and image synchronisation. The system captures a side-by-side fisheye image directly onto a single file, shaving off significant editing time. No more manually stitching together separate shots.

“The 8K is a game-changer”

Accelerating the learning curve

The response to this unprecedented VR experience has been overwhelmingly positive. Both students and teachers have found that the videos significantly improved their understanding of the ultrasound process. Conveying complex information in an engaging way has been key.

“The participants of the sessions we had so far were incredibly enthusiastic. It seems this could represent the beginning of a new educational method that accelerates the learning curve of students, medical doctors and why not other experts,” ponders Alex.

The next step is to pair immersive with interactive. Alex concludes: “Many other fields such as computed tomography, angiography and magnetic resonance will be explored. The limit is only our imagination.”

The Canon Solution

Canon EOS R5 C

- 8K cinematic full frame video
- Incredible 45 megapixel stills at up to 20fps
- Extensive lens choice
- Fast, accurate, reliable focusing
- Extensive professional recording formats and tools
- A compact, lightweight design with active cooling
- A wealth of connectivity

RF 5.2mm F2.8L Dual Fisheye lens

- Enables simplified 180° VR setup and capture
- Dual Fisheye stereoscopic lenses with 190° field of view
- Compact, lightweight design with fast f/2.8 aperture
- Two UD elements per lens for high image quality
- Sub Wavelength structure Coating (SWC) to suppress ghosting and flare
- Precisely synchronised and controlled EMD units
- L-series build and weather resistance
- Gelatin filter holder for precise exposure control

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