Article
Andrej Braguca · Oct 28, 2022 5m read

Virtual Lab: VR and AI enables training in crisis scenarios in the ICU

VR ICU® is a participant of InterSystems FHIR startup incubator — Caelestinus. The article will tell you about our VR solution for HealthCare build with InterSystems FHIR Server.

We are a technology startup Virtual Lab that develops solutions using advanced VR/AR technologies. VR ICU® is a training platform for medical staff in ICU, which was created during the Covid era for the needs of hospitals.

Benefits of cooperation with InterSystems

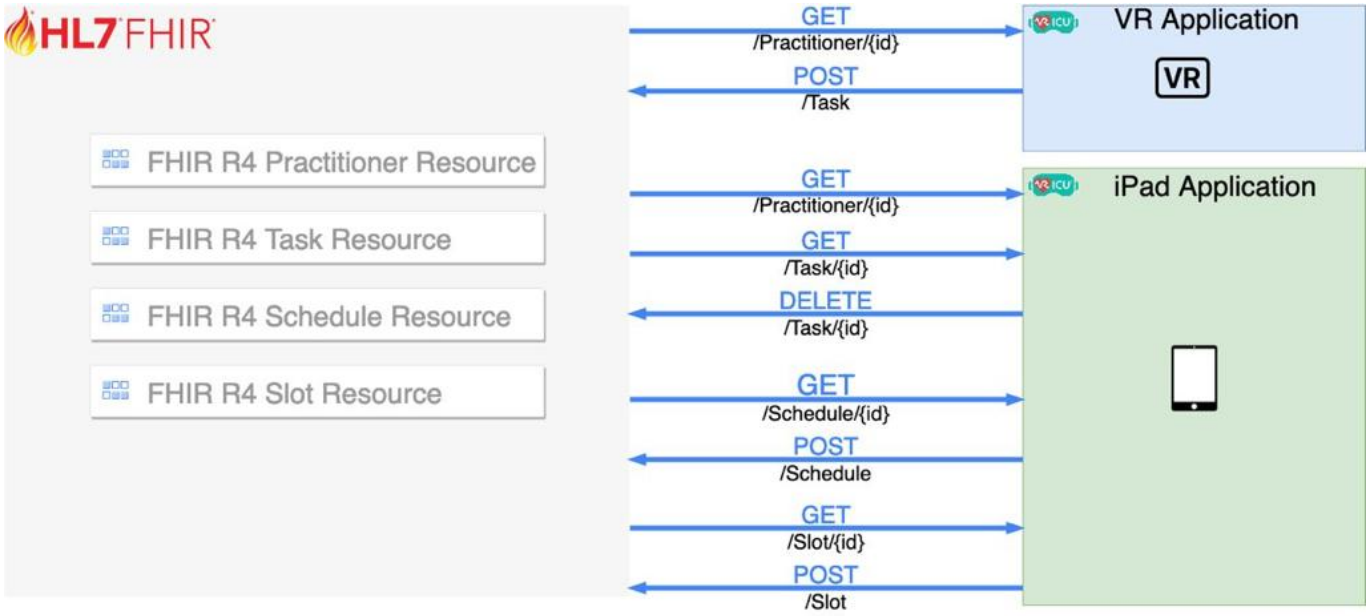
Our VR ICU® solution responds to practice needs and is developed in collaboration with hospitals.

In addition to the technical solution and the skills acquisition itself, it is essential – for the effective management of the hospital or the Department of Anesthesiology and Intensive Care - to record training sessions, their progress, and success rates. An overview of who has undergone training and when gives the chief medical officers a clear overview of the number of persons competent to work with the devices in the ICU, allows them to efficiently train them to maintain skills, plan staff reserves in a controlled manner and expand their competencies.

In this respect, the cooperation with InterSystems is essential for us, which allows us to store the data during each training session within our application. We currently keep track of the participant's name, the date and length of the training, the type of training, the type of device, the number and type of errors, and, if necessary, information that the training was completed successfully.

How does it work? The user logs in to the app and selects an account.

The account is in the database under resources as a Practitioner according to HL7 standards. At the start of a training session, a new "Task "is created in the app – here, the start time of the training session and the type of training session are entered, and when the session is completed, the end time of the training session is entered again. Errors are written in the Output table. When the training is complete, the data from the Task are serialized into JSON, which is sent to the cloud using the FHIR API. To visualize the data outside of the VR app, we developed an app for tablets. This app is connected to the data stored on the cloud and displays individual training sessions of specific users.



he HR department uses the training data to provide an overview of the training completed and the level of trainees, to plan their further training effectively, and to keep track of staff competencies and their interchangeability in the ICU care process.

[You can see the app here](#).

Today, VR ICU® is used by hospitals, universities, and simulation centers.

Virtual reality takes education and training to a new level. By learning through experience,

training effectiveness and memorability are increased.

The use of the FHIR cloud server from InterSystems as a tool for storing training progress data in the VR ICU® and the FHIR API for communication has also positively influenced our entry into foreign markets, especially Germany, where the FHIR standard is a widely accepted solution for transferring information with HR and for communicating with third-party scheduling systems.

Head of the Departement of Anesteziology and Intensive Care review

How did it start?

In the year 2020, a pandemic hit our country. Hospitals were overcrowded, and there was a staff shortage, especially in the ICU. The head of the Dept. of Anesthesiology, Resuscitation and Intensive Medicine appeared on the evening news and explained that if more doctors quarantined or became ill, he did not have enough qualified staff to operate the lung ventilators. The other hospitals confirmed the same situation. We had the idea of creating a digital copy of the pulmonary ventilator explicitly designed for training and helping hospitals to train doctors from other departments.

We approached the head of the Anesthesiology Resuscitation Department – ARO, the experts in the simulation center. People from the practice supported the idea, and some got involved in the development. We were also supported by medical equipment manufacturers who see the added value of virtual reality training.

How did we proceed in the project, and what is the importance of the solution?

1. We assessed the current situation in the ICU:

· More than 50% of ICU procedures cannot be trained without real patients and/or medical devices.

· Medical device manufacturers have a problem gathering medical staff in one place for training procedures (only 30% of trainees stay until the end of the training)

· Turnover in the last two years is approximately 20% in the Department of Anesthesiology and Intensive Care.

2. Solution to the problem:

· Automated training platform in virtual reality

· Simulates ICU procedures without real patients and without the need to use real medical devices

· Saves technology and medical supplies

· Also available for remote training, presence in one virtual space from different locations/workplaces

· Safe environment to practice risk situations

· Minimises the risk of human error

3. Potential:

· Use of artificial intelligence (AI) to simulate and practice critical situations and determine correct procedures

· AI enables the simulation of patient-device-patient interactions

· Manufacturers' devices concentrated in one place in one virtual space make training easier for hospitals

Fulfilling the vision

The goal of the VR ICU® is to function as a platform where the hospital selects the 3D devices from a catalog of those it actually uses and creates a training environment from them.

The vision we presented to medical device manufacturers was initially supported by BBraun, Fresenius and Linet. Other companies then followed the example of these bold pioneers. We are also expanding our device portfolio according to the markets we enter. We currently have associates in the USA, Asia and South America who are supplementing information and negotiating with manufacturers.

We are presenting VR ICU® at global conferences, we are happy we could be part of the Caelestinus incubator. Thanks to our collaboration with InterSystems we had the opportunity to attend the InterSystems Global Summit 2022 in Seattle and right now we are in HLTH 2022 in Las Vegas.

The VR ICU® has already won a number of awards, most recently in Linz, Austria, where we won best start up thanks to this solution.

These successful presentations attract the attention of investors. We welcome referrals to those who would like to take our product further. We plan to sell licenses to Czech, Slovak and German hospitals in 2023. We welcome business partners as well as partners who would accelerate the practical use of VR ICU® – the market entry process or who want to contribute to the development of the AI/VR version.

Are you interested in VR ICU, have questions or recommendations – email the project manager and owner VLab, Leos Kubicek, leos@virtual-lab.cz

#API #FHIR #Startup #Visualization #Other