



THE ADDED VALUE OF VR SIMULATION TRAINING



VIRTUAL REALITY

From high-end VR goggles to your phone, the possibilitie are virtually endless. Step into the world of virtual reality simulation training and discover how it can benefi your organisation!

Dear reader,

With this brochure we will give you an insight into the world of virtual reality simulation software for the education and training of emergency services. Our goal is to give you an understanding of why this training tool is rapidly gaining in popularity worldwide, as well as its many benefits and applications.

Virtual reality simulation software is a highly versatile tool that can easily be implemented in any training curriculum, for any discipline and for all levels of emergency responders. The set-up can be as simple or extensive as you like without compromising its results – it has a proven positive effect on both teaching output and learning retention. Furthermore, it allows emergency and safety services to be less reliant on live exercises and thereby more flexible in their offering of learning opportunities for their students and staff, in terms of both frequency and location. This brochure will explain these benefits in detail, supported by testimonials from enthusiastic users worldwide.

XVR Simulation

INTRODUCTION TO VIRTUAL REALITY SIMULATION

We believe that virtual reality simulation software plays an important role in the continuous education, training, and assessment of emergency responders today and in the future.

We look forward to sharing this vision with you on the following pages.

TRAINING **EFFICIENCY**

Using virtual reality simulation software for training and educating emergency responders can dramatically increase your training output and maximise efficiency. There is a rising demand for experienced safety and security personnel, while a decrease in incidents allows for less learning on the job which causes a decline in experience build-up, thereby leading to growing skill gaps. Whether an instructor is leading a training, or students go through the learning experience individually, training with simulated scenarios can dramatically increase your training efficiency. It saves an instructor time and resources when he takes a participant through a customised virtual reality scenario, compared to conducting an on-site exercise. This means that instructors can go through more types of scenarios as well as train more participants in an average day of training.

Simulated scenarios can also be set up as self-led exercises. Participants can complete exercises on a device with internet access, whenever and wherever suits them best. This allows them to take control of their own learning experience without needing an instructor present. They can also prepare themselves ahead of a live exercise or assessment, ensuring that they arrive on-site ready to go. Instructors can create an unlimited number of scenarios, which allow for a more immersive and engaging learning experience for their training participants, while reaching far more participants compared to a physical setting.

WHY SELF-LED?

A self-led exercise can be completed by a student without the need for an instructor to be present. This means an academy or school can significantly increase the amount of people being put through a learning experience at any time. It also allows them to prepare students and staff before they attend an exercise, having already experienced an immersive and interactive scenario, thus increasing the efficiency of the actual training or lesson.

Training efficiency





Fire and Emergency Academy Rhineland-Palatinate (Feuerwehr- und Katastrophenschutzakademie Rheinland Pfalz - LFKA-RP) has been a long-time user of XVR Simulation software. Matthias Lemgen of the LFKA-RP says his school has been able to train significantly more people since they started using XVR's platforms in 2004. "With XVR, we can create a realistic representation of the situation. By integrating simulation training into our curriculum, we can replicate major incidents virtually and thus train significantly more incident commanders than with classical exercises. Virtual exercises require less people and resources, and they can then be used for more training."



2021 Hochschule der Polizei Rheinland-Pfalz, HPRP

IN PRACTICE AT: LFKA & HPRP

The University of Police in Rhineland-Palatinate (Hochschule der Polizei Rheinland-Pfalz, HPRP) has been using XVR On Scene since 2019 after running an initial pilot programme in 2018. Markus Oppenhäuser of the HPRP is very enthusiastic about adding simulation software to the school's training curriculum. "By using XVR, we can offer more exercises and training because they can be carried out in the virtual realm in a much more resource-efficient way. Thus, students can train more often and acquire necessary skills through training, which transforms theoretical knowledge into practical application."

LEARNING IN A SAFE ENVIRONMENT

Being an emergency responder is not without risks. Studies in the United States show that approximately 12% of all injuries in the fire and rescue service occur during training¹. Next to the personal suffering of the emergency responders, this causes emergency services to have extra costs through unavailable personnel and potential medical costs. Training with virtual reality simulation can help reduce the number of direct injuries, but also contributes to fewer indirect injuries, caused for example by the inhalation of potential toxic of fumes. For both new recruits as well as current emergency responders, training with virtual reality simulation offers a safe alternative to educate, train, exercise and assess. Protocols, standard operating procedures, exploration, methods of operation, and more can all be practiced in virtual reality, providing the participant with incident experience before entering a crisis situation. Practicing on the fire ground is still necessary, but the amount of time a participant is exposed to potentially dangerous situations can be reduced to a minimum with simulation software.

Not only does virtual reality simulation provide a safe learning environment in a physical context, it also helps participants from a didactical point of view. Being in the virtual environment, participants can feel safe to make mistakes, allowing them to explore alternatives while the stakes are lower.



LEARNING IN A CONTROLLED ENVIRONMENT

When conducting an exercise in the field, it can be challenging to provide the same learning experience to all participants. Weather conditions may change, actor performance may vary, and other variables can change at any second. Especially when training for large-scale disasters, it can be extremely hard to recreate and repeat situations in a live simulation, i.e. a large motorway accident, a rapidly spreading fire in a chemical plant, or a mass riot in the city centre. Training in a virtual reality environment ensures that every student meets the same learning goals and maintains

1 National fire protection association, firefighter, United States firefighter injuries in 2020: 2 (2021)



or develops the same skills as the instructor envisioned for the scenario. Scenarios are easily repeatable, so classes and students must face the same challenges and stress. Moreover, if a specific student or staff member could benefit from a more challenging experience, the instructor is able to escalate an incident scenario depending on the participant's performance. Training with XVR Simulation software means the instructor is in control of the learning experience, while also being less dependent on external factors.

IMMERSION AND LOCALISATION

Using virtual reality simulation for training purposes has a beneficial effect on knowledge retention and skill development across a wide range of disciplines. Immersion in the material being learned is an important part of the overall learning process. The high level of immersion that can be achieved with virtual reality training is one of the reasons why this training method is so effective. When using virtual reality, immersion can be achieved by creating realistic scenarios with high-quality and believable graphics, and also by using technological training aids that support a higher level of immersion, such as head-mounted displays or large curved screens.

Another important aspect of the learning process is adapting the material to those learning it - in this

case localising the virtual environments and scenarios. Virtual environments can be made very realistic and true to the local conditions, thereby making the training scenarios relatable and recognisable to those situations that participants will encounter in their daily work. For example, it is possible to replicate local neighbourhoods to familiarise new recruits with typical risk sites in their district/county, or reconstruct previous incident sites for after-action reviews. The object library in XVR On Scene contains localised content from around the world. Emergency response vehicles and personnel are modelled after their real-life equivalents and updated every year. XVR also has a built-in object creator, which allows you to upload objects and pictures into the virtual world. In this way, instructors can create truly relatable scenarios.



WHY IS IMMERSION IMPORTANT?

The more believable a learning experience, the higher the effectiveness and retention of said experience. The higher the immersion rate, the more real and/or believable the experience in a virtual world is. Several factors contribute to the level of immersion. The quality and roleplay of the instructor play a part, just like the quality of the graphics, animations and scenario. With XVR Simulation software, the scenario builder has multiple tools at hand to localise a scenario, for example with country specific traffic signs, shops or vegetation, an incident scenario feels more relevant and believable, thus improving the effectiveness of the learning experience.



Immersion and localisation

IN PRACTICE AT: THE SIMULATION CENTRE COVENTRY UNIVERSITY

The Simulation Centre - Coventry University (Enterprises Ltd.) has been using XVR's platforms since 2015. They are currently using the XVR Simulation platform to simulate realistic incidents at their training centre, located on Coventry University Technology Park, where they use innovative solutions to secure maximum immersion for their students.

Simulation Centre Manager James Doyle says, "We find that attention to detail is a key part of the immersion scenarios need to be realistic, plausible, and relevant. Having recognisable content in terms of buildings, vehicles, and surroundings really enhances the immersion. We make use of multiple technologies to make our scenarios as immersive as possible for our delegates. XVR On Scene provides critical visuals, which combined with lighting, sound, temperature, and simulated smells all contribute to immersion levels."

"We also keep the scenarios running - we don't break the bubble for example to help someone. If someone needs constructive support as part of the learning experience, we use real face-to-face interactions by a realistic role player or deliver injects via telephone or simulated social media. This all helps to immerse the participant quickly and maintain their focus to have a positive learning experience."



FLEXIBILITY IN LEARNING GOALS

One of the greatest benefits of using virtual reality training software is its versatility and flexibility in catering to a broad range of training and learning goals. You can carry out education, training, exercises, and assessments for both individuals and teams that meet your organisation's objectives. Instructors have almost infinite freedom to build and plan their training scenarios to follow their desired narrative. Well-planned scenarios can also easily be used for more than one purpose. For example, a scenario depicting violent inner-city riots or fast-spreading fires can be used to train staff at both operational, tactical, and strategic level. By tweaking the external interventions and consequences of the participant's decisions or observations, each scenario can still be customised to the individual learner, ensuring a tailored learning experience.

Emergency services around the globe use XVR Simulation's training software to perform large-scale, multi-agency exercises. Potential learning goals might be training communication between agencies, applying interactive approaches or assessing individuals for certain skill sets. With XVR Simulation software instructors are in complete control to create scenarios that support any learning goal for any participant at any point of the learning cycle – in any discipline.

VR FOR VISUAL MATERIAL CREATION

Virtual reality simulation software can be applied to more than just training situations. It can also be used for generating videos and screenshots for educational purposes, either in a classroom setting or via an e-learning platform. Visual materials can be used effectively to support the grasping of theoretical concepts, because XVR Simulation software makes it easy to create any visuals for any lesson.

IN PRACTICE AT: SINGAPORE CIVIL DEFENCE FORCE

the academy."



Singapore Civil Defence Force (SCDF) has been using the XVR Simulation platform for their Advanced Command Training System (ACTS) for years. With it, they have been able to achieve a multitude of training and education goals. "With our state-of-the-art system, powered by XVR Simulation, we can use virtual reality simulation to create realistic training scenarios which help bridge training gaps between classroom and in-field training," says Lieutenant-Colonel Ser Boon Hui, Deputy Director for Development of the Singapore Civil Defence Academy (SCDA). "Training scenarios which are complex or difficult to simulate with conventional training facilities can now be created using our Advanced Command Training System with ease. Trainers can create scenes in the virtual world to effectively illustrate complex concepts for greater understanding."

Captain Ron Chua, Course Commander in the Leadership Development Center of the SCDA, says: "Advanced Command Training System enables us as instructors to create scenarios that are unique to their geographical area, recreate specific incidents for training reviews or debriefs. The ability to coordinate multiple trainees who are geographically separated from me reduces the hassle we face in conducting the training centrally in

LEARNING RETENTION

For first responders, being able to successfully retain and apply knowledge and skills, has a direct impact on real-world emergencies. Research has shown that particularly in sectors such as emergency services and safety & security, first responders tend to base their approach and decisions on their previous experience (rather than applying a logical and methodical consideration to a list of possible solutions) during incidents and other high-pressure situations. Therefore, the more experience incident commanders and other staff can readily draw from memory, the better decisions they can make.

Learning is not a linear process – it is an endless cycle where new information and experiences are taken in, reflected upon, and then put into practice in the real world. This way of learning is also known as the experiential learning cycle, and is supported by and

improved with virtual simulation training scenarios. Training and exercising with virtual reality provides participants with experiences, requires them to take action and reflect upon those actions. This active way of learning leads to a greater understanding and retention of the material.

Using virtual reality simulation software, participants can actively experience a wide range of interactive incident scenarios in a safe, controlled, and replicable environment. Virtual reality incident scenarios can be repeated over and over, participants can test different solutions and approaches to see the consequences of their decisions, and they receive immediate feedback from the instructor on how they performed. Using immersive technologies, incident commanders can gain a wealth of experience with both everyday incidents and large-scale emergencies.



WHAT IS THE **EXPERIENTIAL LEARNING CYCLE?**

A recurring process in which the student learns from experiences that are directly connected to the realities being studied. The student experiences a learning moment, which they then reflect upon. They go on to consider possible decisions and outcomes before finally applying their conclusions in a real-life situation. Virtual reality learning drives this cycle by providing the opportunities to continuously experience, reflect, think, and act.

Dr Katherine Lamb Company Director at K Lamb Associates LTD

DR KATHERINE LAMB ON: LEARNING RETENTION

Dr Katherine Lamb is a respected authority on Incident Command training and assessment. She has a long uniformed career, she is specialised in Incident Command and crisis decision making, and developed and established the Effective Command Behavioural Marker for command competence training and assessment.

According to Dr Katherine Lamb, "There is a misnomer that incident commanders can get a lot of the experience they need through attending incidents. But in reality, incident numbers are dropping, and opportunities to practice or acquire key skills, is



diminishing each year. This has an impact on each command tier and is amplified on those with fewest incident exposure, e.g. the higher officer ranks within an organisation."

"Virtual reality gives us so much options to replicate incidents and lessons learned from both training and assessments and populate the "memory banks" in the incident commander's head. This prepares them to take naturalistic or intuitive decisions very, very quickly and make their actions more effective and prompt. It enables incident commanders to deal with future incidents as effectively as possible."

WORKING REMOTELY

The Covid-19 pandemic forced emergency services to come up with innovative solutions to keep skills updated and train their staff in new ways. Organisations were required to be flexible and creative in their efforts to continuously train and educate their staff remotely when needed, so that everyone – from students to management – is up-to-date and prevent any skill or knowledge gaps from developing.

Virtual reality simulation software is an ideal way of facilitating staff education, training, and assessments remotely. Instructors can give lessons or host webinars via webcam, and staff can complete self-led exercises from home. Whole teams can even get together in an online setting to complete virtual training scenarios customised to their learning objectives, all from the comfort of their own home. Instructors and participants can communicate with both video and audio, and instructors can provide immediate feedback, inject additional events and guide their students almost as if they were in the same room. Many emergency services teams from around the world experimented with different ways of working and training remotely, often with great success. At XVR Simulation, we have witnessed organisations using virtual reality simulation software to facilitate incident command trainings and assessments, and even multi-agency exercises – all remotely, with each participant sitting either in their home office or at the station. Instructors and staff alike have been enthusiastic about the opportunities this way of working will offer them in the future, even when the pandemic is over.

Remote training is a cost- and resource-effective solution for emergency service organisations, especially in countries with a large geographical dispersion of their staff and only a few training locations. Organisations do not have to cover costs for travel, lodging, and potential over-time, and participants spend less time away from their work duties and their families.

ENVIRONMENTAL BENEFITS

Educating and training remotely offers as substantial benefits to the environment as travel movements can be reduced. Next to reduced travel movements, training virtually also has other benefits to the environment as there is no waste water run-off and no release of smoke, chemicals, or other pollutants that could pose a danger to the training participants and the surrounding natural environments, such as you might see after exercises at live training grounds. It also avoids using any of the natural resources or end-of-life materials usually consumed during outdoor live trainings.



IN PRACTICE AT: LEICESTERSHIRE FIRE & RESCUE SERVICE

Leicestershire Fire & Rescue Service (LFRS) tested a remote training and assessment solution using XVR On Scene during the Covid-19 pandemic. Anthony Wildgoose, Station Manager at the LFRS, has been pleased with the results they have gotten during the trial period. Remote training has assisted LFRS to utilise a stable platform to deliver our Incident Command Development Sessions, allowing education and training to continue through the pandemic measures. Our delivery of training has been uninterrupted by being able to adapt and innovate using the available technology. Our Incident Command Department achieved 100% remote delivery, without anybody present at our training venue to achieve this."

"The main value is the time saved. For example, individuals can access training easier without travel times and interruption, and remote assessments can be conducted on those who are unable to attend the training centre. Remote training can also provide financial savings, as money is saved on travelling expenses."

"LFRS will continue a remote-based delivery model for educational development sessions. We hope to increase the number of attendees via the remote sessions, which will potentially allow us to deliver more sessions to individuals and groups more frequently, ensuring their skill sets as effective commanders is maintained."



FINANCIAL BENEFITS

Training with virtual reality software is a very costeffective training method for emergency services. While there is an initial investment required to obtain the softand hardware and getting staff up and running with the new equipment, the financial benefits are considerable compared to, for example, live training.

Due to its flexibility, virtual reality simulation software allows you to train more staff, in more types of scenarios, in less time while using less means. In a day, an instructor can carry out more virtual, repeatable exercises that have less start-up costs, with little dependency on external factors such as weather, both for individual as well as team exercises, and with a broader range of training goals than you would be able to do with live training in the same amount of time. By providing training on-site and developing the training expertise in-house, costs for external courses and trainings can also be reduced. Furthermore, there is less operational impact, as simulated training scenarios require less staff to be present. The costs of maintenance of the technical equipment needed for virtual reality training are also far lower than those for maintaining live training.

In countries with a large geographical dispersion of staff, organisations can save on cost items such as travel and lodging for training participants, if they train on-site at their work station in an online setting instead of in training centres across the country. For self-led training, these savings could be even greater, as participants can complete these from their (home) office or in downtime during shifts without needing an instructor to be present.

A final point to consider is that using virtual reality simulations during the recruitment process may help to eliminate candidates who do not possess the required skills or mindset to join the force – and help potential recruits decide early on in the process whether they think they will enjoy this line of work. Virtual reality simulation exercises also ensure that each candidate goes through the same experience, providing equal chances for everyone. Finding and training the right candidates from the beginning is, aside from being cost- and timeeffective, of utmost importance to all emergency services.

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"XVR has been an essential part in our way and art of teaching and training. When we opened our new, very modern facility in 2019, it was built around XVR Simulation software - it is in the very heart of our new building, with the purpose to integrate different disciplines: emergency response, rescue, police, border guard, customs, prison officers. We are looking for solutions to merge different levels of learning, basic vocational training, higher education (bachelor level), and strategic level masters and further education trainings for agencies."

senirry

IN PRACTICE AT: THE ESTONIAN ACADEMY OF SECURITY SCIENCES

The Estonian Academy of Security Sciences provides professional education for Estonian civil servants and has been using XVR Simulation Software since 2009. Rector Marek Link says about their decision to start training virtually: "Initially, when we looked at the XVR Simulation platform, our knowledge about it was very superficial. It looked cool, but it was something we just simply couldn't afford. Then we changed our approach. The question was not if we could afford it, the focus shifted to 'why do we need it, what's in it for us'? At that time, most of the crisis management (CM) exercises were organised on physical training grounds, however coordination and organisation of those is guite resourceful in terms of money and time and not very environmentally friendly. That was the reason why they were organised only 4-5 times per year. Not all of the students could practice their management and decision-making competencies, some of them were passive role players. So, the major consideration was that we needed to increase the volume of exercises per year, so instead of having 4-5 exercises per year, we could have 4-5 exercises per day and everyone gets to practice their CM skills many times. Practicing decision-making skills in VR first has good value for real-life exercises too – you can get more out of them."

LOCAL SUPPORT

Virtual reality training software is for some emergency services still a new and unexplored tool. The expertise for creating the best set-up, exercises, and curriculum featuring virtual training may not be present within the organisation (initially). Learning how to use and apply new training methods and tools therefore often requires a certain amount of "train the trainer". That is why good, trustworthy support is of great importance not only during the start-up phase, but also as you master the software and are able to create more complex and challenging exercises.

As the XVR community spans the globe, we have set up the service and support department at our headquarters in the Netherlands and regional support centres in Australia, North America and Asia to ensure that our users can get immediate support when they need it. Moreover, XVR Simulation has a great number of local partners, with knowledge of the local needs of emergency services around the world. We host annual User Group Meetings (locally and online from a studio) in 4 languages, where we present the latest software version updates, share tips and tricks on optimising training efforts and set-ups, and enable our users to share their experiences and feedback on using our platforms with us and each other. After each new software version release, we also host workshops to introduce any new features more in-depth.

At XVR Simulation, we take pride in providing the best service to our users. We make sure that each new user is equipped to train with the XVR platform, and we offer training sessions to get them started. Existing users can always count on us or one of our regional partners for technical support or advice. We are passionate about helping and developing our world's emergency services, which is why we work in close cooperation with our users to constantly improve and expand the XVR platform.



ARFFS ON: LOCAL SUPPORT

The Aviation Rescue Fire Fighting Service of Airservices Australia (ARFFS) has been using XVR's platform for training since 2018. Being located in Australia, half-way around the world from XVR HQ in the Netherlands, means that having access to immediate support is important to keep everything running smoothly.

"Having a local contact to discuss issues as they arise, or to follow up on technical questions, is helpful to ensure we have the ability to use the software and continue our program delivery," says Nathan Smith, Training Officer at ARFFS. He also appreciates the willingness of the XVR user community to support one another. "I have had conversations with other organisations and members about XVR. It's beneficial to all of us to discuss and learn from each other. Community activities like workshops and the annual User Group Meetings also provide excellent opportunities to network and discover new ways of building and utilising the software."

XVR REGIONAL SUPPORT CENTRE ASIA ON: LOCAL SUPPORT

The XVR Regional Support Centre Asia is located in Singapore. Wayne Lee supports users from among others China, Australia and New Zealand in real-time. "Our team is able to provide prompt response to both our clients and partners' queries and any issues they may encounter to ensure the training system runs smoothly 24/7. Next to maintenance, we provide quality support, consultancy, training, and services for our clients to ensure that their training curriculum is always advancing."

"We are more than just a software company. We are a community of like-minded people, in the same industry, who seek to further develop the training software and advance the training capabilities of safety and security professionals around the world. The added value of this close-knit community is immense. Not only are our users learning from and networking with each other, we are building a knowledge hub for better training and furthering the industry."



XVR VIRTUAL LEARNING CYCLE



04 REFRESH & EVALUATE

Following each training or assessment, participants can complete scenario-based refresher courses in a time and place of their choosing. This optimises learning retention and is ideal to prevent knowledge loss and skill gaps over time.



03 TRAIN & ASSESS

The participant is now ready for an immersive training or assessment in a safe, repeatable, and controlled environment. Each participant will have a unique, but comparable, training experience using computer-simulated scenarios while receiving direct feedback from the instructor.







Let participants prepare for upcoming training and assessments in an engaging way with scenario-based learning. This can easily be done from home and does not require an instructor, allowing you to prepare participants more efficiently.

02 TEACH & LEARN

Proper preparation has made the participant more receptive towards new learning experiences. The instructor can now provide a solid theoretical background for the upcoming training, supported by a visual and interactive representation of the learning materials.

TRAIN VIRTUALLY ANYWHERE, ANYTIME

COLOPHON

"The Added Value of Virtual Reality Simulation training" is a publication by XVR Simulation. For more information on the subject, please contact XVR Simulation at info@xvrsim.com.

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SCAN ME

Are you curious to know how to implement VR training into your

curriculum? Scan the QR code.

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SPECIAL THANKS TO

Matthias Lemgen Markus Oppenhäuser James Doyle Ltc Ser Boon Hui Cpt Ron Chua Dr Katherine Lamb Marek Link Anthony Wildgoose Nathan Smith

ABOUT XVR SIMULATION

XVR Simulation was founded in 2000. We are passionate about helping emergency services develop the competencies needed to manage incidents in our increasingly complex world. Over the years, our company has grown from a small, but enthusiastic start-up focused on emergency services to a mature company with a proven product with diverse and dedicated users all over the world.

In the summer of 2021, XVR Simulation and LearnPro eFireService merged to form the LearnPro Group Itd. The LearnPro Group is a global leader in virtual reality training and e-learning for the health and emergency services. The software suite of LearnPro Group provides emergency services with a platform for learning management, an authoring tool, competency management and virtual reality training.

VISION

We believe in enhancing the competence and expertise of safety, emergency, and incident response professionals using virtual simulations. We do this by creating flexible, immersive, and user-driven software where learning is key and the instructor is in control. Our XVR platform offers an immersive learning environment for all levels of incident command, to be used in both single and multi-agency exercises.

WORLDWIDE

XVR is being used by over 300 customers in 50 countries worldwide, training more than 150,000 incident responders every year. XVR Simulation works in partnerships with national and international government agencies, private companies, research institutes, schools and training centres in the fire & rescue services, police, and ambulance services.

THE ADDED VALUE OF VIRTUAL REALITY SIMULATION TRAINING

Colophon





WANT TO KNOW MORE?



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