

# Simulating crisis scenarios with shared immersive technology

How researchers at Mid Sweden University can study how people react and behave in lifelike simulated disasters with no risk or danger





CASE STUDY - IGLOO CUSTOMER STORY

### Highlights

Mid Sweden University's Risk and Crisis Research Centre (RCR) studies risk communication and risk mitigation and crises such as forest fires, disease outbreaks and violence with civil unrest. Learning how people act in a crisis is crucial to preparing for one as well as preventing one. And the researchers wanted to develop their approach accordingly.

The University worked with Igloo Vision to develop the RCR Simulation Lab - an 8-metre x 8-metre facility, powered by an Igloo Immersive Media Player, equipped with:



To register data from the simulations, the RCR Simulation Lab features:



This combination of technology gives a multisensory approach to immersion. Depending on the simulation, the researchers can also introduce actors, props, and backstories for participants.

The RCR Simulation Lab represents a unique environment for research, innovation and learning, where researchers can study scenarios they would be unable to in the field. The University has made the lab available to companies and organisations looking to train staff through simulation, such as in an exercise with Jämtland County's Fire and Rescue Service, which used the facility to simulate a response to a shopping centre in the aftermath of a violent attack.



### About Mid Sweden University

**Mid Sweden University** is one of Sweden's leading universities in distance education and cuttingedge research. It has eight different research centres, including the RCR, and its world-famous Swedish Winter Sports Research Centre.

Mid Sweden University welcomes approximately 13,000 students every year from across the world. 60% of its students attend one of the University's two campuses at Sundsvall and Östersund. The rest engage in distance education via web-based courses and programmes.

RCR was launched in 2010. It studies how people assess risks, how organisations manage crises, and what affects society's vulnerability. The research looks at crises such as forest fires, disease outbreaks, and civil unrest. It also investigates how different organisations work together when a crisis occurs.



Researchers use the Igloo-powered RCR Simulation Lab for simulating scenarios that would be too dangerous or expensive to observe in the field.



### The situation

The University of Mid Sweden's RCR was looking at new ways to tackle crisis and disaster management studies. Disasters and crises, of course, are tremendously difficult to study in the field and the researchers were reliant on traditional methods like interviews or surveys.

The researchers wanted to challenge these traditional methods. They wanted to find new ways of gaining knowledge and increasing competence in the face of crises. An idea came to mind after a

successful experiment in which participants reacted to silent videos.

What if the screen could become larger, until the participants were no longer looking at videos, but felt they were part of them? The idea was still in the early stages, but what they were imagining was the idea of a simple room and screen becoming an immersive space.

As researchers, they were aware that, in their studies of disasters and accidents, they could only ever study these events after they've happened. Perhaps increasing their understanding lay in being able to study what happens during a disaster - in being able to study people's reactions in the first few minutes of an incident, or even the first few seconds.

But how would the University create such a space that would allow for such immersion? And how could it run scenarios that so closely resembled a real incident?



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### The solution

The RCR researchers drew from nine different disciplines, but they were not technicians. They carried out a significant amount of research and worked with a range of technical experts. With technical guidance, they could hash out what exactly they wanted, and what was feasible. Initial ideas of having real rain or snow inside the lab, for example, were not realised.

The major challenges were how to fit their available site with immersive technology, and how to streamline its use. The University realised it was one • thing to get projectors running. And another to operate lamps, lighting or smoke machines from the same system at the same time. What it wanted was for anyone to be able to go up to the lab, press a few buttons and start a simulation.

Mid Sweden University chose to work closely with Igloo Vision on the immersive space. Igloo would further support the University with recommendations in the design and build process.

To show its commitment to multisensory immersion, Mid Sweden University would make use of:

- A custom-built 8-metre-square immersive space powered by an Igloo Immersive Media Player
- Eight short-throw laser projectors, lighting, cameras, floor vibration, infrared heating, and more
- A 360° video camera for capturing content, and XVR Simulation for creating 3D virtual environments

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microphones, surround sound, LED

Igloo was instantly on board. The Igloo team saw this as an exciting challenge rather than something impossible, and that was very inspiring."

Jörgen Sparf, Associate Professor of Sociology at Mid Sweden University





### 1 Study groups of people

The University wanted to study groups of people and how they interacted with each other in the face of a crisis or disaster. Though it did consider virtual reality (VR) headsets, it felt that virtual avatars wouldn't quite replace face-toface interaction. And, it needed to be able to observe and record what was happening, which wouldn't be as easy if all the participants wore headsets.

### 2 Incorporate low-tech techniques

The University realised not every scenario would call for all the technology it had equipped the RCR Simulation Lab with. Some scenarios could be immersive if it combined a simple video or graphic with props or backstories. It needed a space that could also allow participants to interact with physical objects, not something that would cut them off from the world.

### 3 Integrate readily with other software

It was crucial that the RCR Simulation Lab should operate in a straight-forward, userfriendly fashion. A single person would need to run a prepared simulation in seconds inside an Igloo. The Igloo can also integrate with all the software the University would make use of, including:

- XVR Simulation, for producing 3D virtual environments
- QLab which would operate the lighting, floor vibration and so on
- Adobe Illustrator graphics for experiments
  that didn't need fully dynamic displays

### 4 Make use of the full Igloo software suite

Igloo immersive technology comes off-the-shelf with a suite of software to display a variety of content on the Igloo system. This could be opening a web browser to view maps or street views in 360°, or live-streaming video content. Igloo software is layer-based, meaning different layers can be placed on top of each other, or switched on or off. This was extremely attractive to the University. It found this could have such applications such as displaying a virtual apartment on one layer. A space behind the projected windows could then display a dynamic background layer below for the 'outdoors'.



### Why Mid Sweden University was attracted to shared immersive tech

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We seldom do things where there is only one participant in the RCR Simulation Lab, and as we're a majority of sociologists, we're mainly interested in seeing the human interaction, and that would be lost if we focused too much on VR headsets. There's a risk of people acting like isolated planets, just floating around in a VR environment."

Jörgen Sparf, Associate Professor of Sociology at Mid Sweden University

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We're very pleased with the system, and one thing that has been particularly great is the updates to Igloo Warper - being able to layer video meant we could have one layer showing the insides of an apartment featuring several windows, and then a dynamic layer underneath showing different views from those windows, such as daylight, dusk, different weather conditions."

Kari Pihl, Manager at the RCR Simulation Lab





How immersive tech was integrated into the RCR Simulation Lab The RCR Simulation Lab makes it possible for researchers to study how people behave in scenarios that would be very difficult to witness in the field. An adjacent control room outside the lab runs the simulation and observes and records how people react and what they say. Through the use of QLab, programmable keys can run the scenario and control the entire network.

Despite the innovations of the lab, the University was keen to avoid a situation where it seemed to be 'bandwagoning' on any new technology. It took a disciplined approach, asking what each piece of technology added and how it would function as a part of a larger whole.

The University originally intended to create content primarily through the use of a 360° camera. It found that the use of a VR toolkit could often improve on or supplant this. After researching platforms used in creating crisis simulations, it chose XVR Simulation.

The first instance of using XVR has been in collaboration with the local Fire and Rescue Service who were already familiar with simulation training. The collaboration grew from a conversation about what scenarios the firefighters found difficult to train within their existing set-up. They cited mass-casualty violence as an example, which led to the production of an extraordinary scenario.

The Igloo Immersive Media Player projected and played a simulation in a virtual shopping centre environment. The scenario revolved around the firefighters delivering first aid in the aftermath of a violent attack. Virtual people appeared in the projection while actual live actors portrayed people in distress. The soundscape featured alarms, people moving, and gunshots, along with the use of smoke machines and floor vibrations.

This led to a tremendously effective training scenario. The virtual projection meant the scenario could seem far more immersive and realistic to the firefighters. In turn, this meant training could be more effective and be more readily put into practice.

In the future, the University is looking forward to expanding the use cases of the RCR Simulation Lab, particularly for research purposes. One example was a recent experiment simulating an apartment during a long term crisis for the purpose of investigating how people have assimilated risk communication. It also anticipates making the lab available to students as part of their courses across disciplines.



### Evaluating the impact

The facility has exceeded the expectations of the University. It has come to represent a unique space for research, innovation and learning. People can let their imaginations run free and work towards having tangible benefits for society or organisations.

#### Impressions of the Igloo:

"Participants are very impressed by the system and the technology!"

"The Igloo has definitely lived up to the expectations, and even more."

#### Success of the Igloo:

"You can train safely, and you can do mass training. Over the course of a couple of days, you can bring in different groups to train several times. The strengths of the lab are able to do things safely and more cost-effectively."

"There had been a violent attack and an explosion in this scenario, and I could feel the firefighters were fully immersed."

### Using the Igloo:

"Igloo Vision's software makes it possible to layer videos and display all kinds of content and inputs... such simulation scenarios would not have been possible without the technological advancements in digital projection made by Igloo Vision."

#### Working with Igloo:

"Igloo had the competence, and the experience. And Igloo could think of different solutions for this kind of environment - we were sitting in a building where the space was defined, it was square, not round like regular Igloos, we didn't know what to do with that."

"We've had an hour before we had to demonstrate something in the lab and we weren't able to get it up and running, and the support has had an incredibly quick turnaround."



Keys to success

At Igloo we have worked on many deployments of immersive technology. And we are always keen to advise customers, and also to learn from customers, about the factors that enable an Igloo to become an effective tool.

From our perspective, the Mid Sweden University deployment has five main keys to success:



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### A solid partnership with Team Igloo

As it felt it was missing technical guidance, Mid Sweden University worked very closely with Igloo. We were able to give recommendations and ideas at every stage. Mid Sweden University also made use of a support contract following the installation. This meant Igloo support was available to the University in a case where a demonstration was an hour away. The University has also benefited from patches and upgrades to Igloo software. A close partnership has been invaluable and continues to be after the installation.



The University wanted to take a multisensory approach. Beyond 360° projection and surround sound, it included temperature, smells and vibrations. And to further enhance the Igloo, it made use of short-throw laser projectors (getting all the benefits of laser projectors in a more confined space with no loss of image quality and reduced shadowing) and a bespoke sound system (which can simulate loud, dynamic sounds such as a fire breaking out at a nightclub, or even an active war zone). This is a premium facility, which adds to interest and engagement. And it ensures the RCR Simulation Lab is providing superb multisensory immersive experiences.

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## A solution to an existing problem

The researchers were attempting to find a new innovative solution for studying crises. They felt limited by an over-reliance on traditional methods that could be used after the event. They also felt this could have multi-disciplinary uses and provide a service to clients and partners. **The Igloo** has exceeded expectations in simulating situations that would be too expensive or dangerous to create in real life. It has also proven its worth to local organisations, such as the Fire and Rescue service.



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### A long-term content strategy

The University first made use of a 360° camera for capturing photos and videos to share in the lab. It then realised that, instead of limiting itself to what a camera could capture, it could create anything from the imagination using VR simulations. Mid Sweden University knows one of the key strengths of the Igloo is that scenarios can be played back and repeated endlessly for new groups of participants. **The University can put together a bank of content to be reused for many years to come.** 

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### Senior-level evangelists

The researchers have been instrumental in getting this project off the ground. They represented the University in many talks between potential collaborators, expert technicians and local organisations. Professors of the Department of Humanities and Social Sciences have secured highlevel support from the University in ensuring the funding and construction of the RCR Simulation Lab. **Senior-level voices secured support and uptake of the Igloo, before and after its installation.** 



For more information

Igloo Vision is the shared immersive space company. Igloo designs, develops and delivers immersive technology and software that takes any digital content and puts it into a shared immersive space.

From bases in the UK, USA, Canada, and Australia, we work with clients worldwide. Our largest, fastest-growing market is education. So far, 25+ universities have installed Igloo immersive workspace systems, and many more installations are in the pipeline.

- The University of Adelaide
- Michigan State University
- University of Brighton
- Mid Sweden University
- Cardiff University
- Arkansas State University
- Zhejiang University

- Florida International University
- Khalifa University
- California State University, Long Beach
- Ryerson University
- Deakin University
- University of Loughborough
- University of Essex

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