



# Using shared immersive technology to train military personnel

Cubic Defence UK is providing innovative tactical training for the next generation of soldiers with Igloo Shared VR



# Highlights

Simulation training is crucial to military and defence organisations worldwide in planning responses to a widening number of threats. Leading providers of military training solutions, **Cubic Defence UK** was investigating new and innovative immersive technologies in providing simulation training for soldiers.

Following the success of Igloo immersive spaces as part of the Steel Sabre exercises, Cubic invested in an Igloo dome to

augment its Synthetic Wrap offering - a portable virtual training dome that can simulate a variety of battlefield environments.

The Synthetic Wrap is a 6-metre dome, equipped with 360° immersive projection and surround sound.

Trainees can now step onto the battlefield. Tasks can be ordered as if they are carrying out their warfighting tasks, with the situation changing in direct response to the decisions and actions they take.

The Synthetic Wrap has been used in a variety of tactical training, including:

Simulating air defence to train soldiers in situational awareness and shooting down enemy aircraft.

Providing training environments for Joint Fires Observers, acquiring and adjusting targets for artillery and air delivered attack.

Training fire rescue teams in fire safety with XVR Simulation software.

With Igloo-powered immersive tech, Cubic has been able to:

Provide bespoke training events for soldiers from several NATO Nations.

Effectively train 2,000 soldiers in a single three-week programme.

Demonstrate the Synthetic Wrap to Her Majesty Queen Elizabeth II at Ubiq 300, the celebration of the 300th anniversary of the Royal Artillery.

Provide pre-deployment training for soldiers using the Synthetic Wrap in the UK, Kenya and Canada.



## About Cubic Defence UK

**Cubic Defence UK** is a division of Cubic Mission and Performance Solutions, a leading provider of combat training systems, virtual simulation and cyber technologies worldwide. Cubic makes the world better through innovation, technology solutions and world-class products in defence and transportation, and trains customers worldwide to improve their effectiveness and operational readiness.

Cubic specialises in the design, construction and maintenance of training facilities and indoor and outdoor shooting ranges, special training facilities including maritime counter-terrorist facilities, live-fire training mock-ups, close quarter battle houses - and simulation training systems.

With over 20 years of experience, Cubic is ideally placed to provide the

most appropriate solution to meet an end user's specific requirement. Cubic Defence UK's Igloo has been crucial in providing simulation training, using immersive technology to produce Shared Virtual Reality (VR) for the use of military services worldwide.



# The situation

## Seeking effective team training through immersive scenarios

Over recent years, simulation-based military training has rapidly gained in popularity amongst defence organisations. While traditional training methods are still crucial to how militaries operate, simulation training offers the benefits of:

- Boosting operational effectiveness.
- Providing a variety of different training scenarios.

- Reducing costs associated with training requiring facilities or open terrain.
- Reducing the risks of training in dangerous settings or combat scenarios.

Cubic was interested in offering innovative tactical training through the use of immersive technology. What it would come to realise, however, was that the traditional method of using VR - through headsets - would not be suitable for the needs of its trainees.

Once a trainee puts a headset on, although they are placed in virtual space, they are cut off from their teammates in real space. Nor can they use any of their tools or equipment.

Cubic needed a method of simulation that was not only immersive, but authentic. It was seeking a resolution where soldiers could still interact with and train alongside their teammates and retain all the trappings and paraphernalia of field training.



# The solution

## Immersive technology + projection space = retaining the benefits of VR in a shared environment

Cubic investigated a variety of mixed reality and immersive technology to compare what provided the most effective simulated training for combatants.

It originally looked at VR headsets for one-on-one immersion, but found the main drawback was that the user was effectively cut off from what they would interact with in the field.

It felt interacting with avatars in virtual space to replace teammate interaction didn't quite cut it for military training. And it didn't reflect that soldiers in the field also use low-tech tools such as notepads, panoramas and maps, and would want to use issued communications equipment.

Cubic instead began looking at Igloo immersive spaces in the form of domes. Half-domes and 220° domes would give the soldiers the chance to interact with their teammates and equipment, but if they were continually reminded that they were being observed over their shoulder, they would behave differently than when they were in the field.

A 360° dome seemed the optimum solution. The success of an initial demo with Igloo immersive tech led to Cubic purchasing a 6-metre Igloo Shared VR dome, equipped with surround sound and five projectors.

The Igloo would prove to be ideal in simulating a variety of virtual environments around the trainees, who could be completely immersed in a closed-off environment, but with all their teammates and tools to interact with as normal.

“ There are several systems on the market such as VR headsets, or half-domes, but the team dynamic doesn't cut it. A headset cuts you off from your team, from your maps. 220° domes have an exposed back-end where people can stick their noses in, so the trainees are always conscious they are being observed, so behave unnaturally.”

**Neale Smiles, Operations Manager, Cubic Defence UK**



## Why Cubic Defence was attracted to immersive tech

The solution of an Igloo was a natural progression as Cubic sought a way to provide effective simulation training that retained the benefits of VR as a shared experience. With Igloo Shared VR, Cubic found it could:

1 **Train soldiers in teams**  
Keeping the team dynamic was crucial to how Cubic wanted to offer training. By sharing the same immersive space, trainees were able to communicate together as easily as they would in the field, meaning the team skills they developed would be readily transferable.

2 **Extend the use of its existing technology**  
To create the virtual world inside the Igloo, Cubic was able to use an engine it was already familiar with. Initially, it was entirely VBS3 (from Bohemia Interactive Solutions), but has now evolved to hybrids using Unity and other image generators (IGs), which provide realistic, geo-referenced synthetic environments.

3 **Produce high-quality, accurate immersion**  
Over the vast 360° screen, Cubic could recreate geo-referenced terrain and exercising forces to display a virtual world. Simulated effects would be relayed, and the consequences of actions by the trainees could be displayed, making for accurate, intensive immersion.

4 **De-risk high-quality training safely and affordably**  
Military services are routinely asked to provide better training to adapt to a rise of new threats, but at a lower cost. Virtual simulations, therefore, represent an affordable way to demonstrate a rapid number of scenarios, without risk of danger. Within an Igloo, Cubic could provide more effective and engaging training at affordable costs that could outshine traditional classrooms or VR headsets.

5 **Future applications**  
Cubic could see countless applications for its Igloo. Beyond situational training, it realised it could be used in simulating all manner of complex tactical training, and not even just for teams, but for individuals and collectives too. It would even find the Igloo would be able to offer training for organisations outside military services.

Furthermore, Cubic is adopting the Unity game engine in the future thanks to its integration with the Igloo software. As Unity is an engine that is so widely used, there's a huge community on which to draw from to create realistic simulations.



“ You can get a whole team in here, which means the dynamic you expect to take place on a battlefield actually happens. Once the door shuts and the instructor leaves, they very rapidly - within 30 seconds - start to behave as they really would in a real-life situation.”

**Neale Smiles, Operations Manager, Cubic Defence UK**





## How immersive tech was integrated into Cubic's Synthetic Wrap

**Immersive technology and a virtual game engine lets you prepare any number of different scenarios, which can be readily switched between. Cubic Defence saw it could be innovative in offering a range of tactical training.**

One such application looked into training artillery observers. In the field, these spotters act as the 'eyes' of the guns, which are used to direct fire. They scan the field with binoculars and other target acquisition systems, look for targets and call for fire from the gun batteries - who can be several miles behind them - and observe rounds land.

A team of three or four people could be placed within an Igloo, with all the

trappings and paraphernalia of the field. Cubic made use of simulation programs such as VBS3. Data from exercises currently underway could be transmitted into the 360° projection in real-time, so real soldiers, vehicles and locations would appear within the virtual world.

The observers could develop assist skills in landing the rounds correctly and in guiding the gun battery over the radio to readjust for subsequent targets.

An interesting spin-off from artillery training was the use of Igloo for air defence operator training. Skills such as aircraft recognition through to local air situational awareness proved to be well suited to a dome. The air defence

detachment then practised procedures for protecting vulnerable points by shooting-down enemy aircraft (and not shooting down friendlies!)

Cubic has recently begun branching out into blue light training, demonstrating the benefits of Shared VR in training to Police, Fire & Rescue and specialist emergency services.

Cubic continues to find new uses for its Igloo immersive technology. Crucially, what Cubic has noticed is that trainees find the training enjoyable and something they can readily put into practice. Young recruits especially find it intuitive, being familiar with similar technology through video games.



# Evaluating the impact

## Shared VR is effective in training teams together + intuitive for younger recruits

Following a demo exercise that trialled Igloo immersive tech, Cubic purchased a 6-metre Igloo dome to provide innovative simulation training for groups of trainees together.

Cubic also noted that not only was simulated training effective, but that trainees enjoyed it. Many of them picked it up very quickly - finding similarities with video games. Interestingly, Cubic has picked-up on the fact that younger soldiers tend to leave their older superiors standing when training is on a headset-based VR system. With Shared VR, where it is more about doing their real jobs without interacting with a game controller, the rank balance is restored.

### Impressions of the Igloo:

*"We very quickly began to realise the Igloo was perfect for what we wanted to get out of training."*

*"We've readily managed to use the Igloo to get a 360° view of the area and engage with aircraft to go through drills."*

### Success of the Igloo:

*"The trainees really get a buzz out of it."*

*"The trainers think they're doing something worthwhile, because the trainees are enjoying it."*

### Comparison with other training methods:

*"All the training they usually do is in front of them on a range. This is more like a real battlefield where things go on around them."*

*"Putting three or four people in a dome is far better than having three or four people with headsets on."*

Cubic sees its Igloo-powered technology offering even more applications to come, and has found it can even be used for training beyond the military services. It was able to work with XVR Simulation to produce training for fire rescue operators.

Cubic continues to further develop its Igloo. For example, it has upgraded the Igloo Immersive Media Player (IMP) which powers the dome, and is adopting the Unity game engine to provide a wider range of more authentic virtual environments. It is looking to build on its single dome further in the future.



# 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 Cubic Defence UK deployment has five main keys to success:

1

## A solution to an existing problem

Cubic knew being able to offer effective, immersive simulations to military organisations would be an innovative new way of training soldiers. The Igloo proved to be crucial in providing a variety of tactical training. **By solving this dilemma, the Igloo delivered tangible value, and Cubic has reported on more effective training.**

2

## Working with high-quality content and software

Cubic already knew how to get excellent content that would make the best use of its Igloo. Using VBS software, it could produce a virtual world that input real terrain and data from soldiers to fully immerse the users. **Creating immersive content was nothing new to Cubic. It was already familiar with working with virtual game engines, and will be adopting Unity in the future.**

3

## Formal integration into workflows

Cubic offers a range of solutions for military services across the globe that includes simulated tactical training. Once the Igloo was ready for the Synthetic Wrap, Cubic was intent on offering it to military services worldwide in order to offer a solution to ever-growing threats. **Immersive technology is not a gimmick. It is intrinsic to how Cubic offers training.**

4

## Choosing the right tool for the right job

Cubic researched a full range of alternative solutions. It looked at what tools suited its need. For its demo, which had to service a large number of trainees in a short amount of time, it hired a 9-metre dome. Afterwards, it purchased a 6-metre dome to offer different training options. **Cubic was always able to choose from the entire gamut of Igloo's immersive products to fit what it needed.**

5

## A strong, senior-level advocate

From the outset, Cubic's Operations Manager has been a strong advocate of immersive technology. He has been keen to demonstrate its effectiveness in retaining the trappings of the field while keeping trainees immersed enough they behave as if they're in a real scenario. **Senior-level support secured visibility for the Igloo internally and backed it up with a strong case.**



For more information

## Igloo Vision is the shared immersive space company

From bases in the UK, USA, Canada, and Australia, we work with clients worldwide. Increasingly, companies and institutions are turning to Igloo immersive technology for simulation and training applications, including:

- Cubic Defence UK
- Risk and Crisis Research Centre
- Michigan State University
- BP
- Medtronic
- UK Ministry of Defence
- University of Brighton
- UK Fire Services College
- Incident Command Training Centre
- Qinetiq
- NATS
- Lanes Group with Thames Water
- AECOM and Wessex Water

To find out more, visit us at  
[www.igloovision.com](http://www.igloovision.com)

email us on  
[info@igloovision.com](mailto:info@igloovision.com)

or telephone us on  
+44 (0) 1588 673 337