

What to look for in your immersive technology solution

Igloos vs CAVEs





What's an Igloo?

The Igloo, originally, was a product of the 1990s dance music community. And it was put together by technically-minded pragmatists who wanted to deliver the best possible experience at the lowest possible price-point.

The term Igloo is a brand name, which refers to the original dome-shaped systems. An Igloo can now come in a range of standardised shapes and sizes, including cubes and cylinders as well as domes. It is also possible to use an Igloo Media Player to retrofit any space with Igloo immersive technology, regardless of size, shape, or dimensions.

Igloo also integrates with any type of display technology, including 2D and 3D projection, LED, or other flat panel displays. It is a layer-based visualisation system that can work with any content, from any source, in any format, for any use case.







Immersive workspaces Any size you like

Cylinders From 5-to-9-metres

From 6-to-21-metres

The difference between a CAVE and an Igloo

There's a common misunderstanding out there in the immersive technology market.

All too often, the terms CAVE and Igloo are used interchangeably. But, the truth is, they are two <u>very</u> different technologies, with <u>very</u> different attributes, and <u>hugely</u> different costs. So, we thought it may be useful to emphasise the distinctions. This, in turn, may help potential users and buyers of immersive environments to choose the one that best meets their particular requirements.





What's a CAVE?

The CAVE, originally, was a product of the 1990s academic community. And it was put together by idealistically-minded academics who wanted to deliver the most realistic possible experience using the best possible components.

The word CAVE itself is an acronym for Cave Automatic Virtual Environment. It's also a clever reference to the allegory of Plato's Cave (which explores the nature of perception, reality, and illusion).

It is typically a cube-shaped space using extremely high-resolution projectors. The walls, floor, and ceiling act as projection screens to create an immersive environment. And a user generally wears stereoscopic glasses to see, walk around, and interact with 3D content using a variety of input devices.



Open-fronted cylinders

From 5-to-6-metres

Cubes From 2.5-to-3-metres

What's the difference?

You could debate the details for hours. But, in essence, it comes down to three key points:

Complexity

A CAVE is a complex system, made-up of complex components. So, they are complex to use, complex to maintain, and complex to upgrade. They can also require a complex set of onsite services, like a dedicated power supply, ventilation and air conditioning. And importing content from other 3D tools and models also tends to be a complex process.

By contrast, the Igloo is built with usability in mind. After a few hours of training, anyone can operate it. The entire system fits under standard ceiling heights and can be connected to existing services. And it is compatible, out-of-the box, with a wide range of 3D, 360° or VR content, and all the digital tools that any corporate, industrial or academic user might use as part of their everyday workflows.

Also, thanks to the Igloo Web application, a huge range of webbased applications are easily accessible in an Igloo immersive space. And through Igloo Control, accessing 360° images and video is as easy as drag-and-drop. An Igloo can be used by almost anyone, irrespective of their level of technical expertise, for almost any type of project that entails 3D, 360° or VR content - or, indeed, any kind of digitised content.





An Igloo can be used by almost anyone, irrespective of their level of technical expertise, for almost any visualisation, simulation or collaboration activity that entails 3D, 360° or immersive content.



Flexibility

Most CAVEs are bespoke systems and, once installed, have limited scope for customisation. So, they tend not to be very flexible. And, often, they endup as single-use systems which are primarily used by one team or, at best, one department.

By contrast, an Igloo is modular. It can be up or down-graded at will, using standard, off-the-shelf components. So, for example, 2D projectors could be replaced with 3D, or swapped out for LED panels; head-tracking could be added or subtracted; and other ways to interact can be easily incorporated (like gesture control, voice control, haptics or accelerometers). If head-tracking is a particular requirement (as it is with many CAVE installations) an Igloo lends itself to several approaches. For example, a choice of third-party head-tracking solutions is available. Or, if a client intends to use their own software, this can be integrated through the Igloo API.

And, when specifying an Igloo solution, the purchase options are flexible too. A client can purchase an all-in-one solution of a structure, projection hardware, and Igloo Media Player. Or they can choose to retrofit an existing space (or even an existing CAVE) irrespective of its shape or dimensions, with Igloo technology.





If required, an Igloo can be scaled-up to become as complex and costly as a CAVE (but a CAVE could never be scaled-down to be as elegant and affordable as an Igloo). And, those scale-ups can be done at any stage - as the client's needs evolve, so too can their Igloo.





In summary, CAVEs can be great for very specific tasks (like high-end engineering applications). And, to get the best from them, deep technical expertise is generally required.

If you are looking for something less bespoke, which can be used by a broader range of people for a wider range of applications, with more scope for scaling up and down, you may want to consider an Igloo.

iglo



Cost

The costs of a CAVE reflect the quality and complexity of the components within it, and are then bulked up by the integrator's margin. Typically, the costs we see quoted are in excess of US\$2 million, and can be much higher. In addition, there are the additional services to factor-in (for example, one user told us it had spent US\$150,000 on the air conditioning alone).

> An Igloo will generally be around 5% or 10% of the price of a CAVE. Even with the highest possible specification, it would be unusual for an Igloo to exceed 25% of the price. And, thanks to the flexibility of the Igloo technology, you can scale it up and down (and the costs with it) to suit your needs.

So, if you are thinking of investing in a new immersive environment, or replacing an existing system, here are a few considerations:

| | | CAVE | |
|-------------|--|---|---|
| Cost | How affordable is it? | Often has a price ticket in excess of US\$1 million and, to become more affordable, needs to be downgraded to a 'powerwall' or 'V-type' format. | Starts at less than one-tenth of the cost of a CAVE – with an entry-level price of well below \$100,000. |
| racticality | How big is it? | Usually uses rear projection, so its footprint tends to be much larger than the usable space. | Usually uses front projection or LED panels, so its footprint is barely larger than the usable space. |
| | How easy is it to install? | Tends to be a custom installation requiring significant services — such as power, ventilation and air conditioning. | A simple, pop-up design that fits below standard ceiling heights and can run with conventional power, ventilation and air conditioning. Or the Igloo technology can be used to retrofit any existing space. |
| | Is it portable? | Usually a permanent installation which can't be moved and needs to be fed by its own dedicated services (power, air conditioning, etc). | Although permanent installs are an option, many Igloo solutions are intended to be semi-portable (and even come packed in flight cases), so can be transported to different locations. |
| | How easy is it to upgrade or downgrade? | Tends to be a bespoke installation, based on fixed components and proprietary technology. | A modular system deploying off-the-shelf components which can be upgraded (or downgraded) with ease. |
| | Is it content-agnostic? | Generally uses proprietary technology, so it may be difficult to import content from other VR or 3D tools and platforms. | Is content-agnostic, works out-of-the-box with game engine content and web-based content, and integrates with a huge range of business tools. It also uses layer-based visualisation software to allow for easy switching between use cases. |
| Usability | How easy is it to operate? | Tends to be a complex piece of kit that requires deep technical expertise to start-up, operate, and maintain. | Uses simple touchscreen controllers and interfaces, making it easy to import, set-up and schedule content, switch between channels, integrate multiple formats, etc. |
| | Is the experience claustrophobic? | Can be of any size, but will generally be 3-metre-square, which can often feel claustrophobic, especially for group-work. | Can be of any size, but will often have a 6-metre diameter, which comfortably accommodates teams of up to 10 people. Also available in open-fronted versions for a more open experience. |
| | Are 3D visualisation and head- tracking integrated? | Stereoscopic 3D glasses combined with head-tracking tends to be standard, allowing a user to 'walk around' projected content. | Any Igloo installation can be scaled-up to include 3D projection and head-tracking. A wide choice of options is available, thanks to the flexibility of the technology and availability of the Igloo API. |
| | How do you navigate through content? | Generally uses wearable devices (like headtracking) or haptic feedback devices, which some users can find awkward. | Can use any technology, including wearables and haptics, but also gesture control, voice control, game controllers, and Android or iOS devices. |
| | How immersive is the experience? | Tends to be a supremely immersive experience with 3D projection spanning the walls, floor and ceiling. | As immersive as is required – uses 2D panoramic projection as standard, and can be upgraded to 3D and fully spherical formats. |
| | How much computer power is required | Tends to be a highly sophisticated, power-hungry beast, requiring significant computer power. | Standard systems use Dual RTX 5000 GPU technology, with 1TB SSD storage, and can be upgraded as required. |
| | How good is the resolution | Tends to use the highest of high-end projectors, so benefits from the highest resolution available. | Projectors can be specified to suit requirements, ranging from entry-level lamp projectors to the most sophisticated laser projectors. |
| | How noisy is it inside? | Some users report that the noise of the high-end projectors can be a real distraction. | With standard lamp, laser projectors, or flat panels, the noise is no more than a faint hum (of course, if you like noise you can turn up the surround-sound system!). |



Speaking off the record

In putting together this comparison we spoke, off the record, to several CAVE users about their experience with the systems:



It's great to show off when people are visiting. But, most of the time it just sits there wasting space.

Originally, it was specified by one engineer for a particular application. Unfortunately, he left soon after it was installed, then his technician left. And, since then we've had neither the demand nor the knowledge.

There are still pockets of use. And, when it is running, the level of collaboration and teamwork you see is great. But the complexity gets in the way. It's difficult to operate. It's difficult to calibrate. It's difficult to import data. And it's also surprisingly noisy (those big projectors sound like a jumbo jet taking off).

There's definitely potential in what it can do. But the reality of using puts too many people off - so they stick with a combination of VR headsets and flat screens.

Speaking on the record

We are also fortunate to have a growing roster of clients who are happy to talk about their experience with their Igloo systems. Here are some of their thoughts on the technology:



"As well as helping to give residents and other stakeholders a chance to see the plans and give their opinions on them, it allows the teams of engineers, designers and safety experts to work together and examine every aspect of the project in detail." Edonis Jesus, Consulting BIM Lead, Lendlease

"From shooting to getting the content up in the 360°, it really is quite straightforward. It works with a number of file types and software packages that are already the breadand-butter of these different fields." Terence O'Neill, Head of Digital Scholarship and Makerspace Services, MSU Libraries





"We are seeing a number of benefits [through the use of the Igloo] such as *improved engagement and project* buy-in from our operations colleagues, and more efficient, effective design reviews with significant time and cost savings." Simon Osborne, Delivery Manager, Wessex Water



"We've seen significant savings from using the Igloo technology - in fact, it's paid for itself on the first large scheme, and we've got over 50 schemes coming through the process." Martin Hennessey, Director of Capital Delivery, Dŵr Cymru Welsh Water



"We have been impressed by how easy it is to use the system, and how straightforward it is to incorporate and visualise a wide range of different imagery, BIM models and associated 3D data."

Anne Carroll, Design Manager, Dŵr Cymru Welsh Water





For more information

Igloo Vision is the Shared VR company. We design, develop and deliver immersive 360° domes, cylinders, and all of the enabling technologies.

We take any VR or 360° content and put it in a shared immersive space anyone can use. It's a bit like stepping into a huge VR headset. And, because groups of people can get inside, it's always a shared experience. It's perfect for collaborative teamwork. And it's great for entertainment and experiences.

Based in the UK countryside, Igloo also has offices in London, the USA (both in New York and Los Angeles), Canada and Australia. Our clients include:

- Accenture
- NTT
- Microsoft
- AECOM
- Skanska
- Lendlease
- Lanes Group

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