

The refreshed WWI Galleries create a balance between home and war front stories

WWI: The galleries of experience

To mark the centenary of World War One the Imperial War Museum is breaking new ground through its revamped galleries. *Zoe Mutter* explores the role technology plays in the poignant and powerful portrayal of the conflict.

A group of inquisitive children huddle around an interactive table-top projection exploring the turning point of World War One. Just beside them a couple embrace in an area designed for reflection, watching archive footage and listening to audio clips from diaries and letters.

These are just some of many who have been educated and captivated by technology in the Imperial War Museum's renovated World War One Galleries. Visuals, lighting schemes, interactivity and sound design are used cleverly to evoke emotion in those who have a personal connection to the war and inform young minds that are curious to learn.

Imperial War Museums (IWM) was founded in 1917 - as the First World War was still being fought - to record experiences during the conflict. The Crystal Palace-based museum first opened to the public in 1920 before moving to its present home on Lambeth Road, South London, in 1936.

"Now we're beyond living memory of the war's conflict but the recently reopened galleries give us the opportunity to retell its story with the historical distance of 100 years," said curator, Ian Kikuchi.

Aside from the galleries' renovation, the entire museum received a £40 million makeover in July. The building had become impractical for the number of visitors so a lower ground floor was created, allowing a chronological progression from the lower floor WWI Galleries, first floor Second World War exhibits and the Post 1945 exhibits which will later occupy the floor above.

Seamless technology

"The First World War galleries which opened in 1989 were lacking in technological advancement and the equipment was not as effectively integrated with the exhibits as it is now," said Jo Saull, digital producer for the project.

"We can now add AV in unexpected areas such as transducers hidden in our trench experience walls or subtle Kinect cameras tracking movement in

interactive exhibits," added Kikuchi. "Technology is different now and its functions are more seamless."

Audience testing carried out early in the process revealed visitors wanted four questions answered: Why did the war begin? Why did it go on? How was the war won? What happened next? The chronological order implied by the questions led the exhibition to answer them in chapters, beginning in 1900 before the war started and running up to 1929 after it ended.

The refreshed galleries needed to attach equal weight to the home and war front stories and in each of the 14 sections AV helps do this in a way fixed text and objects alone can't.

Creating a gallery of experience through the revamp was crucial so rather than covering the war in hindsight the exhibits used quotes from letters and diaries to explore what it was like to live through.

"We believe this gives the exhibits a freshness of perspective rather than focusing on how it was reported after the war," said Kikuchi. "It's hard to think people didn't know how the war would end when it was being fought, so hopefully we convey this."

Setting new standards for museums

"The IWM's brief was extensive - a series of challenges that addressed not only the First World War Galleries but the Atrium Galleries and the

regeneration programme for the whole building," said John Pickford, associate at Casson Mann, the company responsible for overall creative direction, storyboarding, quality and integrity of the suppliers work - from lighting to projections, and the media itself, the company worked with each partner to ensure they fulfilled the vision and creative concept.

The IWM wanted to change the way people engage with the war by creating galleries that set new standards for narrative-based museums.

The project began four years ago, with Casson Mann joining in the summer of 2011 to create installations that grouped objects under one narrative theme. This comprised 56 AV installations, 10 audio installations and a gallery-wide soundscape to work with 900 graphic elements supporting around 1,600 artefacts. This all happens within 1,050 sq metres of the gallery, creating an extremely dense exhibition.

"There is no single or group of key elements in terms of AV but rather a gallery wide desire to use AV in a sympathetic and appropriate manner to best support the artefacts and more importantly the IWM's narrative," said Pickford.

When considering meaningful AV integration, Casson Mann decided upon a set of constraints to make it sympathetic with the exhibition's content and narrative. Rather than create a static exhibition of objects, it aimed for a sensorial gallery of dramatic sights and sounds - from striking projections, animations and interactives to staccato gunfire bursts that place visitors in the time and space of WWI.

"In such a dense gallery, one priority was to create a feeling of open space and a landscape of the Western front," said Pickford. "This was made through a series of textured concrete plinths, creating a very physical landscape upon which AV media and object displays could impact. As appropriate to the media upon them, projections and monitors were embedded into, dug in or projected beyond to create an illusion of distance and horizon."

A delicate balance

Designing museum exhibits entails achieving a delicate balance between being hard-hitting and sensitive. Technology can be added to enhance visitors' understanding of emotional subjects and immerse them in a world they might be unfamiliar with. In this case Sysco integrated AV carefully into the space, whilst DHA Designs created atmospheric lighting schemes.

"The role of AV is to reinforce exhibits, adding and explaining information rather than acting as a centrepiece," explains Hugo Roche, Sysco managing director. This was achieved by working closely with the curators to understand what they want to convey to visitors, which was to offer a personal perspective of the horrors of the Great War whilst remaining sympathetic to the topic.

"The whole spectrum of AV technology is then assessed to decide on the most unobtrusive, effective method of delivery. It is, naturally, an iterative process: the AV technology develops hand-in-hand with content development which is, in turn, affected by the 'story' and the emotional impact it creates in the viewer's mind." The equipment, content and style of presentation then develops over the course of the project.

"We have a very large audience and some visitors



The IWM wanted to change the way we engage with the war by creating galleries setting new standards for museums; an AV table from a reflection space; curator Ian Kikuchi and digital producer, Jo Saull

are young or may be vulnerable in other ways, but our subject matter is by its very nature violent and traumatic," added Kikuchi. "Therefore some of the most shocking imagery is located where it won't be immediately visible to a very young person. For example, one exhibit tells the story of atrocities against civilians. This includes photographs of dead bodies but they are flat on a plinth top so you have to stand over them to view them."

In a similar vein, the animated projection, *Shock*, might be a very violent image but it is manufactured. "You're not seeing the blood of real people," the curator added. "We have to reflect violence, death and suffering but we don't need to ram it in our visitors' faces. For things like *Shock* we were constantly questioning how far to push things. Not wanting to gamify it too much."

DHA Design director, Jonathan Howard, also has to make the lighting atmospheric, precise and unobtrusive. He said: "The key aim was to convey some of the atmosphere of the battlefield without making it sombre or overtly theatrical."

The division between the war and home fronts was crucial - the former using a cool white LED at 4000K to communicate a daylight feel, and the latter using a warmer 3000K LED to give the impression of domesticity. A sawn light effect was produced by concealed lighting troughs around the walls.

Havells-Sylvania Beacon Muse spots offered the innovative zoom focus adjustment needed plus the opportunity to use shutter blades for precise focusing. "The biggest challenge was co-ordinating

over 300 fixtures with a low ceiling height, rampant ductwork and large quantities of screen-based material which had to avoid light spill," added Howard.

Delivering more content

The IWM houses the oldest film archive in the world, predating the National Film Archive by a generation. Certain exhibits in the galleries focus solely on displaying such footage which relies on shrewd display and projector selection.

"Other types of AV allow us to focus on aspects of the war that don't exist in photographs or film, such as our *Shock* projection exhibit detailing the capabilities of weapons," added Kikuchi. "This is an example of how you can use animation and motion capture cleverly to cover such topics."

Multi layered visual technology was also integrated extensively. For example, an exhibit documenting the war in Africa begins with an animated introduction before displaying five sub strands featuring illustrations.

"This information may not always be read if written down but if you animate the story it makes it accessible and digestible. This is what AV lets you do - deliver more content to the visitors," said Kikuchi.

"And in colour too," added Saull. "The war was not fought in black and white but that is how some people have experienced it until now. One problem with black and white images is they can look flat and lose some of their depth, so some assets were gently tinted to make them more immediate."



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Dramatic content needed to be presented in a way that was engaging and informative; to maximise interactivity sensors are incorporated into some exhibits, from touch screens to infrared and capacitive sensors; audio is introduced skilfully to ensure the emotional impact of war is conveyed

Animations and interactivity

Content partners created animations and interactive content for the galleries - ISO, Squint/Opera and Guy Holbrow. *European Rivalries* and *Why War* - two animations produced by Holbrow - used different techniques to depict war. The first was a visual hybrid of two period illustrations for five European characters that were made to fit within the shape of their countries. A newspaper dataflow featured in the second animation, pulling out relevant information and dropping it into a newspaper format.

Glasgow-based content design company, ISO developed 17 media and interactive exhibits for the gallery, ranging from large pieces like *Shock* and *The Real Somme* to interactive games and simulators such as the World War tables and U-Boats.

“For *Shock* we created a CGI sequence of French and German soldiers under waves of shrapnel fire. Motion capture performance was used to create groups of men and model uniforms and weaponry before we video mapped to a relief projection screen echoing the work of futurist artists once the media was added,” said creative partner, Damien Smith.

“The biggest challenge was how to present dramatic content across a range of exhibits in an engaging and informative way that didn’t shy away from the horrors of warfare. By mixing large scale media with more concentrated areas of interaction visitors get a sense of the scale of the Great War without losing the human dimension.”

Meanwhile Squint/Opera produced eight pieces including a trench network map projected on to an interactive model book, a touchscreen interactive about the Battle of the Somme, reflection spaces with central audio visual tables, projections of soldiers’ silhouettes in the trenches and a recruitment poster touch screen with accompanying wall projection.

Squint/Opera’s producer, Ben Townsend, is increasingly finding museums looking towards digital media to create immersive and involving exhibits: “Our approach is to help visitors become really engaged with the stories and subject matter. The key to making this work was the integration of sound, set works and many types of AV.”

The exhibition is highly integrated. For example

- the walk-through trench exhibit combines projections, lighting effects, a periscope and sound design with set works. “Elsewhere in the exhibition, integrated table-top projections were achieved as a result of our collaboration with the exhibition designer, curators, hardware contractors, set works contractors, and sound designers. To maximise interactivity, we incorporated sensors from touch screens to infrared and capacitive sensors,” he said.

Adding fluidity

The lightness of touch projection opens up a range of options for museum exhibits. When an image needs to appear on a surface rather than being broken up by the bezel of a screen, introducing a projector can add fluidity. Design firm Casson Mann preferred the use of projectors to monitor screens, finding it more in keeping with the feel and low light level of the galleries in which screens could dominate.

“Projectors also offered the opportunity to show media at a scale that is more appropriate to that of some of the large objects and to be able to create ambient landscapes - to allow the visitors to escape the confines of the gallery or the tyranny of the wide screen monitor,” said Casson Mann’s Pickford. “Wherever possible we would try to seamlessly integrate the object and the AV media - placing objects at the heart of media rather than mere polite adjacency. For example, in one reflection space a glove is placed on a table surface within a shell shaped bell jar and is completely projected around.”

An evaluation day at Sysco allowed Saull and the team to sample the possible AV effects. Roche said: “Museum installation is characterised by developing and choosing solutions before you can set them up in the gallery space; either because the museum is being used for other exhibitions, or is undergoing renovation. The best way to achieve this is to simulate and model the effects the equipment will produce and develop the system. In this case Epson projectors were most suitable and 35 EB-G6900WU are used, combined with BrightSign media players and 7th Sense Delta media servers. In the trenches area, we needed a portrait mode image so a projectiondesign F22 (now Barco) was deployed.

“Interactive touch screens play an important part in presenting deeper levels of background information, but they need to fit into the exhibit environment: not bolt on to it. To achieve this, 17 bezel-less Iiyama touchscreens showing interactive animations and content fitted neatly into the different display areas,” says Pickford.

Elsewhere, archive footage from the Battle of the Somme was displayed on a 65-inch NEC MultiSync V652 screen and a six-screen video wall was built using NEC X462UNV displays, chosen for their quality and used in combination with a Dataton Watchout system to display large high quality photos in the *Feeding the Front* exhibit. Medialon Show Control is used to get the right level of control and provide comprehensive feedback to enable the technical staff to monitor system status”

“The *Feeding the Front* video wall is designed to look like a giant factory window you can peer through,” said Saull. “As our big gallery system Medialon switches content on and off and synchronises in various areas.”

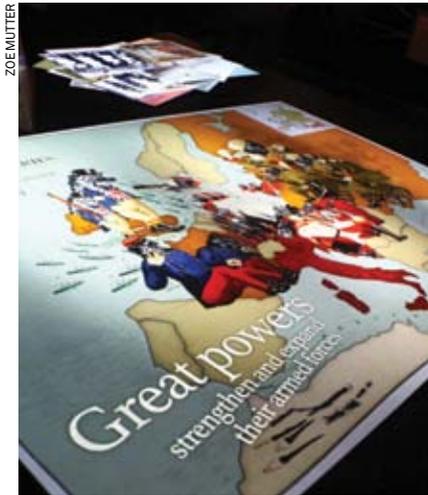
Further digital labels comprised 12-inch and 24-inch Black Cat screens. “These were chosen for design reasons because we needed a specific size screen for certain exhibits and Black Cat is great at producing custom panels,” commented Saull.

Inventive display integration saw Lilipt seven-inch miniscreens incorporated into camera housing along with Raspberry Pi players, selected for their small size. These act as a digital display on the back of the camera to view archive images. The screens also made an appearance in a trench periscope featuring a stereoscopic viewer to display 3D imagery.

The majority of content was played through 7th Sense players which due to their capability to play audio and visual content were well suited to the large scale high definition content that needed to run alongside soundscapes. In certain areas BrightSign players were used to play lower res archival footage.

Encouraging interaction

Interactive pieces employed some game-like mechanics to engage younger visitors. For example, »



Projections of silhouettes in the trenches; the museum addresses different aspects of the war in each section; Guy Holbrow's *European Rivalries*

a piece called *Timeslice* makes use of a Kinect camera to detect hand movement and move papers around an interactive table or turn pages of a book.

Similarly the *Supply Line* table is covered with objects visitors are encouraged to interact with. Touching an object triggers the interactive content when a Firefly camera detects movement.

"Once you're in the game RF sensors on the table detect touch," added Saull. "We looked at various camera options and found it difficult to find one that worked as a webcam. The software was developed in Director and sourcing a camera that would talk to Director and allow everything to be controlled without it going into auto mode was tricky."

Powerful and atmospheric audio

Underpinning the AV is an all-encompassing soundscape to create an environment in which the visitor can imagine the events and emotions of people experiencing war. Audio is introduced skilfully to ensure the emotional impact is conveyed without making walking through the galleries too traumatic.

"The subject matter is emotive so we worked hard to synchronise areas so sound hits you in waves," said Saull. "In the trenches a plane might fly over every 10 minutes, creating a balance in the space."

To ensure a mixture of powerful and atmospheric audio was used, Swiss company Idee und Klang crafted carefully considered soundscapes. The brief was to create an audio concept that would make the journey through the gallery a seamless experience.

"It had to support the overall dramaturgy of the exhibition and act as a solution to a fundamental problem: the war can be extremely loud and brutal, but it also involves moments of silence," said Ramon de Marco from Idee und Klang.

Both extremes needed to coexist in the galleries'

open architecture, calling for an element to act as an auditory mediator. Therefore in quiet sections of the exhibition it would mask the loud sounds spilling over from the more intense sections.

To solve this problem, the audio experts created a weather soundscape shared through all sections. "War is always taking place outdoors so the sound of weather lets the visitors experience that fact first-hand," he continued. "The generative and ever-changing nature of the soundscape makes sure every visitor experiences the exhibition in a slightly different way. Returning to a section a few minutes later means it appears under different conditions."

Making the war come to life

Subdivided into segments adjacent to one another, the museum addresses different aspects of the war. Every section is enhanced by multi-channel sound sculptures which consist of specific and historical sounds, making the war come alive.

Some exhibits allow visitors to experience war situations first-hand, such as the walk-in trench featuring a real biplane and the sounds of shooting action above. Supported by lighting effects and projections, 20+ loudspeakers including RSF SpotDAP450s and Fohhn AT-201s placed within the walls and on the ceiling help convey the daily routine of soldiers lingering in the quagmire.

"Various interactive stations add further to the audio and we ensured every sound blends seamlessly with the gallery audio, even if some interactives are created by third-party companies," continued de Marco. Idee und Klang adopt the Acousmatic Room Orchestration approach to design acoustic moods and music for museums, expos and installations. "The associated system - AROS - is a room generating not a room simulating system, leading to

a real spatiality," adds de Marco. "Like instruments in an orchestra, each sound of a composition has its own speaker and location within the space."

The speakers are installed in walls, the ceiling and floor or even in objects, making it possible to reach a high offset in depth for the room. "Our goal is to create sound atmospheres where you don't hear the speakers but instead get the feeling you are right within that situation," he added.

Speakers need to deliver high quality audio and be integrated as invisibly as possible. "It's important to invest time in mixing the soundscapes in-place," he added. "The space and its speakers are like an instrument we compose for." Speaker configuration predominantly comprised Fohhn models, including a 5.1 and a 7.1 system to accompany *Shock*, so visitors could hear shells passing overhead.

Additional Solid Drive SD-1 transducer speakers are embedded into the trench wall to make the voices seem as if they are coming from the silhouettes. Meanwhile Powersoft Ottocanali amplifiers and JBL Control 67 loudspeakers featured in the *Supply Line* exhibit and K-array KT-20 speakers featured in the trench and over the World War One tables carrying narration to give it directionality.

In the reflection spaces where visitors can sit and listen to directional audio coming from above Panphonics SSH60X60 directional loudspeakers were the model of choice. Meanwhile, an Ovation media server and sequencer ran the trench video and audio, supporting the required number of channels.

Breaking new ground

"The process of putting the exhibition together has taken almost as long as the war did to fight," pointed out Kikuchi. "It's been a fantastic experience and this is the first exhibition I've worked on where such a wide array of technologies and creative processes have been used - AV, animation, interaction, film stills and motion graphics."

Saull also feels honoured to have been part of such an important project that helped visitors discover the story of World War One through the lives of those who experienced it. When she joined the team 18 months ago conversation revolved around the galleries breaking ground in terms of the AV. "I spent 11 years at the Science Museum where groundbreaking means using the newest technology that people haven't seen yet," she said.

"What we've done here is groundbreaking - not just through the technology but visuals too. For instance, we sent a camera crew out for the Somme to film the landscape in three different seasons. People are transfixed by the story in that area which proves we've achieved what we wanted to with technology." ■

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