BEYOND THE DEMO:

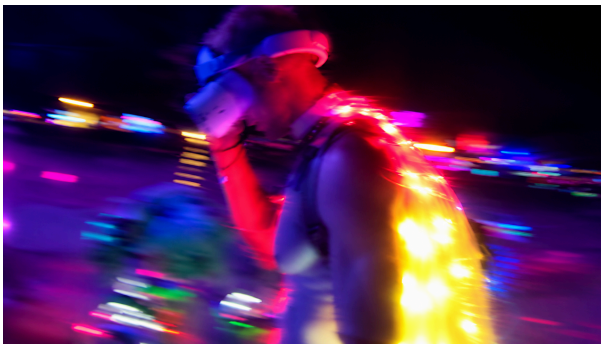
Experiential & Interaction Design Learnings from the 2026 IBC Accelerator "IFeL: Immersive Festival Live - Remote Presence at Scale"

2026 IFeL TEAM CONSORTIUM:

IFeL Champions: BBC R&D · ITV Studios UK · Reality Hack at MIT · King's College London · University of Galway · SMPTE (Society of Motion Picture and Television Engineers) · EBU (European Broadcasting Union) · University of Southampton · XPLOR (Academy of Live Technology)

IFeL Participants: Shure · Magic Beans · The Third Orchestra · Surround Sync · RePro Stream · Beam Immersive









INTRODUCTION

Opening up the experience space

Immersive media is often defined by its technologies: spatial audio, VR, volumetric capture, smart glasses, 3D environments. Much of the conversation consequently centres on how convincingly these technologies can create a sense of being there. Our starting point was broader. Earlier BBC R&D multimodal and participatory research had already shown us the importance of agency and connection in creating immersive experiences. For live events, this feels particularly significant.

People do not simply observe a concert or performance. They move, dance, listen, respond to performers, notice one another and contribute to the atmosphere. Their presence is part of the event. **This made interaction central to our IFeL exploration**. Once we can give a remote participant a sense of presence, what can they actually do with it? Can they choose where they are in relation to a performer? Can sound draw them through a space? Can their body become part of the interaction? Can people occupying physical and virtual spaces perceive and respond to one another? Can an audience become part of the creative process? We explored these questions through very different live contexts and technologies.
We used these different contexts to **probe different parts of the experience**, without trying to define a single immersive-event format.

This also reversed a familiar **technology-led starting point: the experience we wanted to create began to define what we needed from capture, sound, tracking, rendering and devices**.

The exploration

The work developed through three live-event Proof of Concepts (PoCs), each opening different questions around immersive experience and interaction:



1. Montreux Jazz Festival / Vulfpeck
Multi-view immersive capture · spatial audio · remote presence



2. The Third Orchestra / Bush House
Spatial and object-based sound · movement · physical and virtual space



3. The Voice of Holland
Volumetric capture / 4DGS · spatial navigation · audience participation

We also took questions emerging from these PoCs into **Reality Hack at MIT,** where we could experiment more freely with pure VR interactions.

At Montreux, choosing a camera began to look more like choosing a position. At Bush House, spatial sound turned listening into something physical. Embodied experiments used gesture and movement to communicate between people and spaces. Working across VR, smart glasses, headphones and other devices exposed how hardware itself shapes interaction and social presence. Other experiments raised questions about participation, representation and collective experience.

Together, they became an exploration of how people might perceive, move, act and connect when media becomes spatial.

The following reflections focus on five areas that became particularly interesting through that exploration: perspective, body and materiality, devices, participation and connection, and orchestration.

01 PERSPECTIVE

Viewpoint becomes spatial

At Montreux Jazz Festival, the Vulfpeck performance gave us a context for exploring multiple immersive viewpoints with Surround Sync, alongside spatial audio captured by Shure. Having both visual and spatial audio material exposed a wider interaction question: if a participant can change where they are in relation to the performance visually, what should happen to their acoustic perspective? The initial proposition seems straightforward: allow the audience to choose where they watch from.

In a spatial experience, however, choosing a viewpoint can begin to mean choosing **where I am**, and **where I want to be**. A position close to a musician creates a different relationship with the performance from one inside the crowd. An elevated position reveals something else again. Some perspectives can place a remote participant somewhere a physical audience could never occupy. This changes the interaction-design problem. A grid of camera thumbnails may provide access to multiple views, but it carries a familiar 2D interaction model into a spatial environment.

We therefore explored portals, spatial markers, venue maps and other ways of making viewpoint selection feel connected to the space itself. The spatial audio capture also pointed towards an important next step: connecting visual and acoustic perspective. If someone moves visually from the crowd to a position beside a musician, how should their acoustic position change with them? **This makes the transition itself part of the interaction design**. Its character depends on the participant's role within the experience and how they are able to move through it.

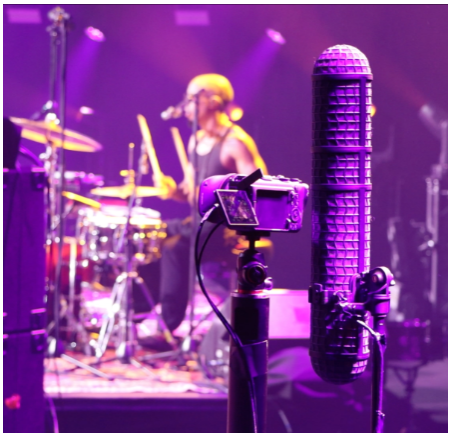
Are they walking through the venue, flying above it, moving through a portal, or teleporting instantly between positions? Each suggests a different relationship between visual movement, spatial sound, duration and orientation. A transition therefore does more than connect two viewpoints. It helps communicate how the participant exists and moves within the experience. Image, sound and movement need to support that logic together, while practical constraints such

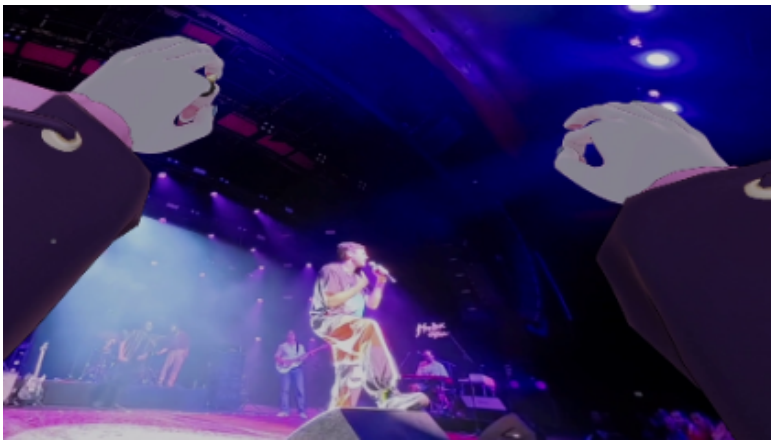
as buffering and latency also become part of what can be designed. Viewpoint becomes an interaction material — potentially both visual and acoustic. **As my position changes, what I see, hear and understand about where I am need to change coherently.**
If they move from the crowd to a position beside a drummer, for example, the drummer should not only appear closer but sound closer too. How that change happens also matters: whether the participant walks, flies, passes through a portal, or moves instantly shapes how they understand the transition and their movement through the space.

Image: Montreux Jazz Festival, Vulfpeck performance - several captured viewpoints













The Voice exploration pushed this further through experimental **4D Gaussian Splatting** (4DGS), as captured by one of our project Co-Champions, XPLOR. A volumetrically captured performer opens the **possibility of moving around the performance more freely, beyond predetermined camera positions** — changing proximity, angle and spatial relationship to the performer. This begins to shift viewpoint from camera selection towards spatial navigation. Position, orientation, proximity, scale, movement, sound and attention can all become part of how the experience is composed.

Image: 4DGS The Voice of Holland







02 BODY & MATERIALITY

The interface expands

Once media occupies space, interaction can extend beyond the screen and controller. At Bush House, The Third Orchestra gave us a live context for exploring **spatial and object-based sound through movement**. Working with King's College London, Magic Beans and Shure, we explored how spatial audio, 3D environments and interaction could come together around the performance.

In the fuller prototype, tracked headphones allowed participants to move physically through a reconstructed soundfield. Approaching an instrument or turning towards a voice changed what they heard. Sound could establish place, guide attention and invite exploration; the participant's position and orientation became part of how the composition was experienced. This also meant that people could inhabit the same experience while hearing it differently: each participant's position and orientation created their own spatial perspective. A shared experience does not necessarily mean an identical experience.

This opened a social question: **how might individual exploration develop into collective participation?** People could gather around shared sounds and respond to one another through movement or gesture. Ideas such as blowing, clapping and passing movement or sound between people were storyboarded as future possibilities, although they were not implemented in this PoC.

The AAR (Audio Augmented Reality) exploration with Magic Beans also raised a question about where an immersive experience can happen. Headphones placed spatial audio within participants' existing surroundings, allowing them to remain aware of the people and physical environment around them. **The environment being experienced is therefore not only what we design or add digitally, but also what is already there. Sound, sight, movement, touch, people and physical objects can all contribute spatially to how someone understands where they are. The design question becomes how these existing and designed layers work together as one multisensory experience.** This suggested a way to connect remote performance with what is happening locally.

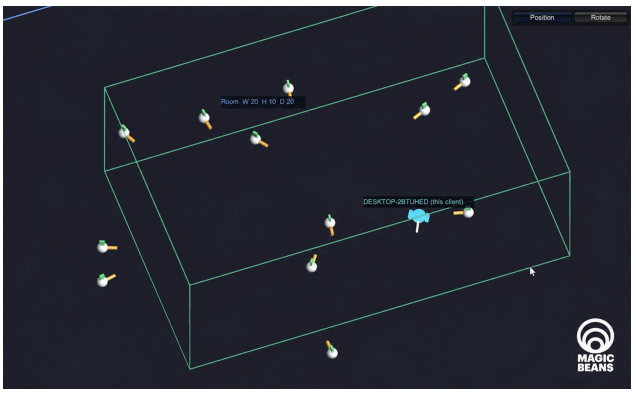
Because audio cues can be less explicit than visual controls, guidance needs careful design, combining sound with visual, spatial or haptic cues where appropriate. **Using more than one sensory channel can also support accessibility.**

A future version could explore spatial glasses that display interactive 3D objects within the participant's surroundings, rather than a flat 2D interface. Some objects that currently need to be physically installed could become spatial digital elements, making the experience easier to set up in different places. Physical objects remain valuable when touch, weight or a shared point of focus matter to the interaction. Both approaches could let participants connect with the artist and remote audience while still seeing and responding to people physically around them.

Image: Bush House / The Third Orchestra: physical movement through the soundfield Magic Beans AAR material situated in the participant's real environment















With Reality Hack at MIT, we explored a different aspect of the interface: **how movement and gesture could connect participants across physical and virtual spaces**. Through small VR experiments, we explored dance and movement following, gestures passed between people, social gestures, and movement that affected shapes, particles or other elements of the virtual environment. In one experiment, a gesture began with a performer in physical space, was interpreted by someone in VR and passed to another physical participant.

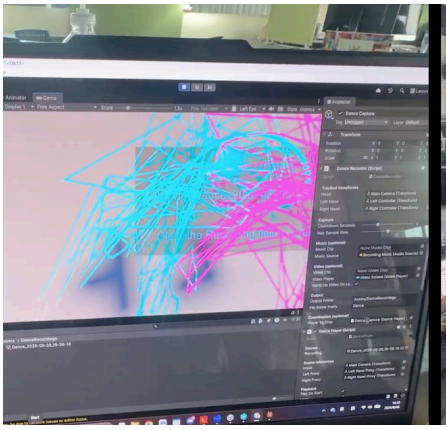
These experiments exposed the importance of body representation. Legs mattered when an interaction depended on dance or whole-body movement; when the system could not represent that movement convincingly, the interaction suffered. This raised a design question: which parts of the body need to be captured and represented for a particular experience?

Literal representation is only one option. Movement could instead become particles, sound, traces, objects or changes in the environment. The question is **what information about someone's presence and movement needs to reach other participants**. Voice could guide people through unfamiliar spatial interactions without repeatedly drawing them back to a screen, while tangible objects could create points of connection between physical and digital space.

Across these explorations, the interface expanded across body, movement, gesture, sound, voice, objects and space.

Image: Reality Hack/MIT VR mini experiments showing dance, gesture and whole-body interactions



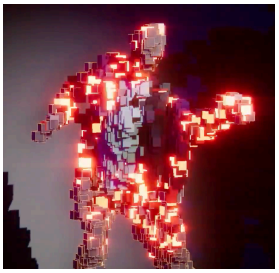












03 DEVICE AS DESIGN MATERIAL

The hardware changes the interaction

Working across different devices made another part of the interaction-design problem tangible: changing the device can change the experience itself. We initially explored AI glasses because they offered a very different relationship with a live event. Unlike VR, glasses can keep the participant visually and socially present in the physical environment while adding a digital layer

around it. For live performance, this creates interesting possibilities around augmentation, audience–artist interaction and experiences shared with people physically around you.

In practice, we quickly encountered the boundaries of the available technology. The smart glasses we experimented with were better suited to camera, audio, voice and AI interactions than to the sustained spatial interaction we were exploring. The AR glasses we tested also overheated during active use, limiting sessions to around 15 minutes. This makes them difficult to use for sustained live experiences, where an audience may need to participate comfortably for much longer. Battery life, display capabilities and available forms of interaction introduced further constraints. VR exposed a different issue: what the device can perceive determines what the experience can know about the body.

The embodied experiments described earlier made this particularly tangible. Interactions involving dance and whole-body movement quickly exposed differences in what different hardware configurations could capture and represent. Additional body tracking can provide richer movement data, but it also adds equipment, calibration, and things for the participant to wear.

This creates an **important design trade-off**. Increasing interaction fidelity can also increase the barrier to entering the experience. **More sensing may enable richer types of movement, while additional setup, wearables and technical complexity can make participation less immediate and less accessible.** The useful level of sensing therefore depends on what the interaction actually requires. A small gesture may need very little tracking; an experience built around dance may require considerably more.

This points to a broader principle for immersive design: **more technology does not necessarily create a stronger experience**. There can be greater value in investing in a clear interaction model and designing a small number of important experience beats exceptionally well. The technology should earn its place by supporting the story, interaction or relationship we want the participant to experience. **Choosing what is necessary — and what can be left out — is part of the design.**

Different devices also create different social conditions. Fully immersive VR can create a strong individual spatial experience while reducing awareness of people physically nearby. Pass-through and mixed reality retain more of the surrounding environment. Smart glasses preserve physical and social context but currently offer a more constrained interaction space. Headphones can create a personal spatial layer while leaving the visual world shared.

Speakers and soundbars can make spatial media collective without asking participants to wear anything. Device choice is therefore an interaction-design decision. Each configuration changes what someone can perceive, how they can act, how they are represented, how easily they can enter the experience, and how connected they remain to other people. For immersive live events, the device becomes part of the design material, shaping the experience from the beginning.

Image: Devices - Smart glasses / VR headset / body tracking / headphones / shared soundbar experience.



04 AGENCY, PARTICIPATION & CONNECTION

What does my presence change?

The experiments made a useful distinction between interaction and participation. Selecting a viewpoint is interaction. Moving through a soundfield is interaction. Triggering something is interaction. Participation introduces another relationship: my presence or action begins to matter within the wider experience.

The Third Orchestra was particularly interesting because the performance itself was already relational. Musicians responded to one another through sound and space. Bringing audiences into that environment raised questions about how much freedom they should have, how they understand what is possible and how individual exploration might develop into collective experience. Too little guidance can make an unfamiliar spatial experience difficult to understand. Too much instruction can remove the agency that makes exploration interesting. This led us towards **agency within structure**: creating enough cues for people to understand the possibilities while leaving space for different behaviours and levels of participation.

The gesture, voice and sound-passing experiment explored this at a small scale. Its value was not the gesture mechanic itself. One person's movement became material for another person's interpretation, and the interaction changed because another person was involved.

The Voice offered a different example. Voting already belongs to its format, so our exploration could build on an audience behaviour that has meaning within the programme. **The way we worked with artists also shaped what we could explore.** We collaborated with The Third Orchestra and brought our own artist, rapper/performer Charlie Blaine, into The Voice exploration, giving us room to consider how performers and audiences might influence one another. At Montreux, Vulfpeck performed, and we captured the event. That gave us valuable material for exploring viewpoints, but less opportunity to design participation with the artists. Future work should involve performers from the start, so the audience's role grows from the performance itself.

This became an important learning across the Accelerator: interaction can emerge from the event, audience and purpose. Different performances create different possibilities for participation.

The experiments also suggested a wider way of thinking about immersion. A sense of presence can come from spatial fidelity, but it can also emerge through relationship: noticing another participant, responding to a performer, having your movement recognised, affecting something together or contributing to the creative experience. Interaction can be part of what makes the experience immersive.

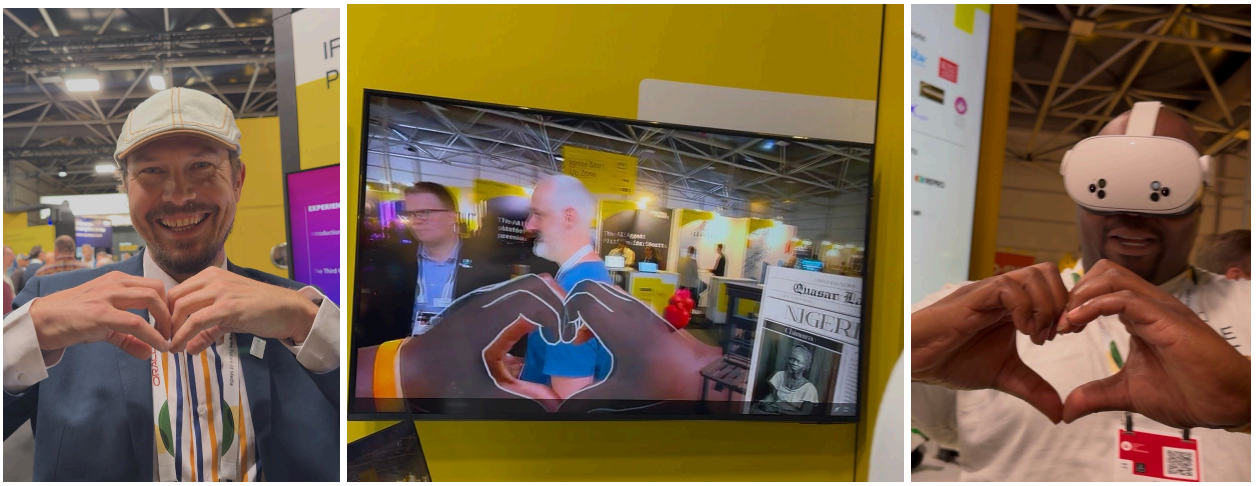
Live events make this particularly important. A concert or performance is already social. The performer, crowd, atmosphere and awareness of other people contribute to the experience. This makes audience–artist, audience–audience, physical–remote and individual–collective relationships part of the design territory.

A group experience is more than several people accessing the same content. People need ways to perceive one another, understand what others are doing, and respond or affect something together. How that presence is represented is itself a creative decision. Shared immersive experiences don't have to default to person–avatar interaction and emotes; another participant might be perceived through sound, movement, an object, a trace, or a change in the environment.

Beam Immersive's social VR demo prompted us to consider how a shared virtual music experience might **scale to 1,000+ participants** across VR, mobile and desktop. It opened questions about guidance, communication and meaningful participation that would be valuable to explore with a live audience.

At any scale, the principle is simple: I am here. Someone else is here. I can perceive them. They can perceive me. Something can happen because we are here together.

Image: Exploring physical and digital multi-player social interactions









05 ORCHESTRATION

Experience is the system

Across IFeL, one recurring challenge was how different technologies and interaction possibilities come together as one experience. Capture, spatial sound, tracking, volumetric media such as 4D Gaussian Splatting (4DGS), devices, physical space and participation each introduce different possibilities and constraints.

From the participant's perspective, however, these boundaries disappear. They experience the result as a whole. **Immersion therefore does not sit within any single technology or format. It emerges through the relationship between body, space, sound, viewpoint, other people and how the system responds.** This makes orchestration an experiential and interaction-design problem.

What matters is how it connects with everything around it: whether a spatial perspective has a meaningful role, whether sound supports movement and orientation, whether an interaction contributes to the story, and whether different forms of participation feel connected rather than accumulated as features. Different modalities can support one another. Sound can maintain continuity while visual perspective changes. Voice can guide an unfamiliar interaction.

Movement can become input without requiring visible UI. Physical elements can connect actions across spaces. Distribution is part of this system too. We experimented with experiences across VR, mobile, headphones, shared screens and existing platforms such as YouTube. Moving between them changes what you can perceive and what forms of interaction are possible. This makes distribution part of the experience-design question: what needs to remain consistent, and what needs to adapt to the device, platform and context?

Technical constraints also become part of this orchestration. Latency, tracking, transitions, platform and device limitations are experienced directly by the participant, so storytelling, interaction and sound can be designed with them in mind. This reinforces another learning from the exploration: the strongest experience does not necessarily use the most technology. The important decisions are which elements genuinely contribute, where to invest in the interaction, and which experience beats need to work exceptionally well.

The experience is the level at which all of these decisions come together.

AN EMERGING INTERACTION LANGUAGE

Image: What stays with people is the moment they felt they belonged inside it



Across IFeL, very different experiments began to connect.

Viewpoint became a position. Sound became guidance. Movement became input. Space became an interface. Gestures became communication. Presence became something that could be perceived and shared.

These are still emerging interaction patterns, an early vocabulary shaped through experimentation. What made the Accelerator valuable was the opportunity to explore them horizontally across very different technologies, performances and environments. A volumetric performer, a spatial soundfield, an audience-controlled viewpoint and a gesture passed between physical and virtual participants may appear to be separate technical experiments. From an experiential and interaction-design perspective, they investigate the same underlying territory: how people perceive, act, participate and connect when media becomes spatial.

This gives us a clearer direction for further Creative R&D. Spatial storytelling can investigate how position, movement, sound and attention shape narrative. Embodied interaction can explore the body, voice and physical objects as interaction materials. Participation can move deeper into contribution, consequence and collective action. Representation can explore how we perceive

other people's presence beyond literal avatars. Device exploration can examine how different forms of sensing and mediation change the experience itself.

Orchestration can investigate how these elements work together across devices, platforms, physical and virtual spaces, and different audience scales — including how individual spatial perspectives can coexist within a shared experience.

Exploring broadly gave us a clearer understanding of what we can deliver now, where the current boundaries are, and where to explore next.

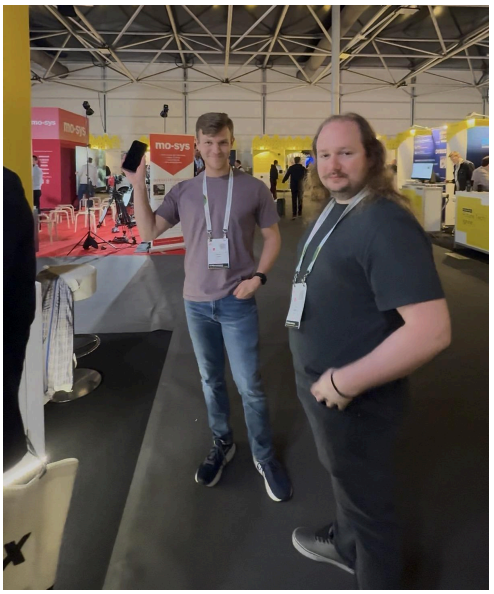
Shared standards and workflows could help bring immersive experiences to more people. Each experience still needs to be shaped for its particular performance and audience: a story told through sound, space and movement; room for people to follow their curiosity (agency to explore and make choices); and moments when one person's actions change what others experience.

Technology provides the conditions that make these experiences possible.
What stays with people is the moment they felt they belonged inside it.

Image: IFeL team at IBC 2026 in Amsterdam, the Netherlands











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