Nested Cinema: An Immersive Fiction-Film Experience

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Abstract

Nested Cinema is an original immersive experience that complicates the boundaries between the physical and the virtual, between the real and the imaginary. Nested Cinema reimagines film through the orchestration of technology across three distinct layers of experience – traditional screens, the installation space and cinematic virtual reality – giving rise to a new immersive mode of dramatic fiction and expanded cinema. By combining established and emerging production and presentation technologies, the project explores the narrative and atmospheric effects of a nested multimodal environment, as well as new modes of visitor engagement and novel audiovisual expression and communication.

Nested Cinema is an intimate multimedia installation that combines an atmospheric physical film set with dynamic lighting features, a cinematic virtual reality (CVR) space, and filmed content on screens. The CVR narrative space, based on 360-camera video, correlates with the set design of the installation, while the content on the screens within the physical space correlates with the wider narrative space of the story. The narrative experience for the installation visitor is structured purposely for continuous transitions between these three perceptual layers, which are traversed and synchronized by 11-channel surround sound in the room. Nested Cinema thus offers a specific visitor experience that works across these three layers of cinematic reality to weave a unique narrative structure – combining audio-visual, environmental, and embodied production of meaning, while blurring the boundaries between real and virtual, direct and mediated experience.

For the installation visitor, Nested Cinema obscures the distinction between the represented space of the story and the real physical space they occupy by re-creating an alternate version of the installation space in CVR. Through spatial audio that traverses all three perceptual layers, and through the continuation of narrative action between the two-dimensional screens and the VR headset, the installation aims to forge a sense of real presence of the fictional narrative space outside of the walls of the installation, immersing the viewer in the action, and facilitating a

spatial – rather than merely an emotional or narrative – identification with the main character. The Nested Cinema experience prioritizes atmosphere over story, allowing for the narrative structure to be guided and inspired by the spatial atmosphere, rather than the other way around, as would be the case in a more standard mode of cinema where narrative meaning is the main structuring principle. In this way, the project aims to explore and advance the narrative and expressive potential of cinema by unifying disparate modes of experiencing a story, to forge a unique form of narrative and atmospheric immersion for the audience. (See File 1 of the supplemental material for a video clip of the experience.)

The Real Space and the Virtual Space

Both traditional computer-generated VR and the 360-video-based CVR share the fundamental aspect of immersion and presence in space, which in fixed-frame cinema is merely mediated on the two-dimensional screen by the perspective and movement of the camera within the represented space. One of the objectives of immersion, as the academic and author Jenna Ng states, is "to enable the viewer to consign to oblivion differentiations between actual and virtual reality – to 'forget' the frame and the boundaries of the screen" [1]. CVR combines the immersion and presence of VR with aspects of traditional cinema, namely its photographic relation to physical space – thus representing both an extension and a shift from the traditional cinema paradigm. While the mobility of the frame in CVR is limited to the position of the 360 camera in space, the boundaries of this "immersive frame" are eschewed, as in other VR modes, shifting the focus from time to space. In other words, in the (cinematic) VR experience, the 'where' comes before the 'why' and the 'what' [2]. Or as the multi-media artist and researcher Sam Gillies puts it, "the viewer derives meaning not through the relationship of different perspectives of space, as is commonly articulated in fixed frame media, but rather through the relationship of the viewer to the space itself" [3]. In CVR, this prioritization of space over narrative sequence generates creative and experimental opportunities, without the need to depart from the visual traditions of cinema. However, while a CVR experience aids immersion through the first-person perspective, forging identification with both the character and the story world for the viewer, VR storytelling is limited by the viewer's unrestrained perspective in the 360-environment, which reduces their access to narrative information presented via sequential means

[4]. This can be contrasted with traditional fixed-frame cinematography, which guides the viewer's attention precisely through the singular camera perspective delimited by the frame of the image (and the screen) – allowing for a sequential flow of meaning and narrative.

While photographically represented physical space is prioritized in the CVR image, the appeal of physical space has a strong tradition within expanded cinema, which has forged a "cinematic paradigm of moving images within the gallery" [5]. Installation projects such as *Electric Earth* [6] or *Affective Cinema* [7] integrate audio-visual content with the embodied presence of the viewer within a space – expanding the fixed frame of film by constructing what the academic and author Andrew Knight-Hill refers to as 'spatial framings of the audiovisual' [8], instead of immersing the viewer in a virtual presence of VR. Such expanded cinema pieces give rise to atmospheres that unify the physical space of the gallery and the audiovisual structures through their shared aesthetic affinities, rather than polarizing experienced realities, as is arguably the case in VR-based installations, such as *Shrine of the Goat* [9] or *Facades* [10]. While multi-sensory VR installations such as *Starless* [11] can generate atmospheres through an experiential synthesis of the physical and virtual spaces using pass-through cameras, *Star Wars: Secrets of the Empire Hyper-Reality Experience* [12] unites the VR and the physical space, so that they are experienced simultaneously, leading to an immersive multisensory effect where the senses combine to reinforce the fictional reality.

The more complex approach of Layered Reality, the company behind *The War of The Worlds: The Immersive Experience* [13], is to combine VR (and other technologies) with live theater, sound, and physical sensations such as touch, temperature, and smell. The alternation between the physical and virtual environment in the "layered reality" approach is comparable to Nested Cinema. However, Nested Cinema is fundamentally concerned with reimagining the film viewing experience with the additional spatial and virtual reality dimensions. Therefore, it essentially focuses on creating a sense of unified cinematic atmosphere, prioritizing audiovisual stimuli associated with traditional cinema, particularly cinematography, production design, music, and lighting and sound effects, while placing the visitor in a stationary viewing position as in the cinema or on the living room sofa. Furthermore, just like watching a film, Nested Cinema is a passive, mediated experience, without the visitor directly interacting with the

experience, and without the experience interacting back in the form of live performance. Instead, the alternation between the disparate layers of the experience represents a novel application of the principles of film editing to what is essentially a linear film experience with additional spatial dimensions.

Nested Cinema incorporates the sequential screen storytelling of fixed-frame cinematography with the spatial dimension and virtual presence afforded by CVR, and the expression of physical space from the tradition of expanded cinema – weaving a unified cinematic atmosphere in the process. The storytelling is complicated made more complex by the synchronization of three different screens, which leads to a more spatial and atmospheric approach to linear sequence and editing. Rather than editing for a single film sequence following the action from different angles, the three screens operate as a form of spatial editing, giving multiple views simultaneously, while minimizing the frequency of conventional cuts on any given screen. In this way, the selective focus on narrative action afforded by traditional cinematography – particularly through the expressive power of the close-up shot – is maintained on the screens, while a greater continuity of time and space through long uninterrupted shots can be sustained.

The Narrative Space of Nested Cinema

Nested Cinema creates a unique experience by communicating the story through the installation environment that includes dynamic lighting, three screens, CVR, and spatial audio. How these perceptual layers are combined is a novel creative, conceptual and technological approach which I refer to as “nesting.” Nesting relies on the amplification of spatial immersion by alternating the visitor’s attention between the physical film set, the two-dimensional screens, and a VR headset. The value of the nesting approach is the fact that the physical space is nested in the much larger fictional context of the story, and the aim is for the visitor to gradually buy into the fictional reality of the physical space they occupy, while simultaneously getting a sense of physical presence of the larger fictional space beyond the walls of the installation set. The treatment of sound facilitates this nested approach by bringing the synchronized and asynchronous sound into a single perceptual field. While the 11 speakers are strategically located to help the visitor distinguish between sounds within and outside the walls of the installation space, there is no

clear distinction between sound originating within the story world and non-diegetic sound (sound external to the story world), and the sound mix treats the three visual layers of the experience as a unified whole.

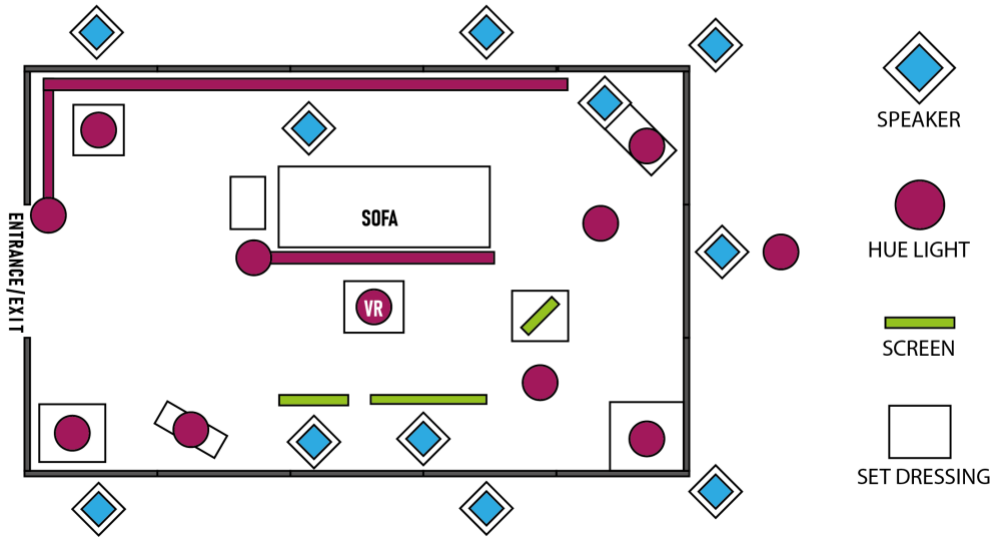
The 2023 installation is based around a short story entitled *Vera's Not Alone*, which I wrote specifically for Nested Cinema, and is therefore inspired by the creative opportunities of the concept and technology. The installation space represents the fictional "home" environment of the story's protagonist, Vera, who is portrayed by actress Taiseer Fouda. The atmospheric quality of the space is defined by a combination of colors, textures, architectural balance, and aesthetic decisions, which can be firmly located in the tradition of cinema production design, and, by extension, the tradition of fiction cinematography. The production design includes an old sofa in the middle of the room, which forms a part of the fictional world, but is also where the installation visitor sits during the experience (Fig. 1). Therefore, the sofa can be considered the locus of the collapsing boundaries between the physical and the virtual pertinent to Nested Cinema. In front of the sofa there is a small table on which the VR headset is placed. The installation space also includes various automated dynamic lighting fixtures which change color and intensity in response to the atmospheric and emotional needs of the narrative. The objects in the space and the lighting fixtures are intricately and creatively integrated and woven together. Hence, while the lighting fixtures form a part of the (nonrealist) cinematic fictional environment (the diegesis), the lighting changes are not internal to the world of the story and are therefore fundamentally extra-diegetic. The VR-headset table, which is also extra-diegetic (although fitting in well with the fictional atmosphere) has a dynamic light placed inside that comes on whenever CVR content is available to the visitor (Fig. 2). The production design and the automated dynamic lighting were conceived, designed, and technically realized by Jayne Sayer.

<Fig 1>

<Fig 2>

The installation space includes two side-by-side 47-inch LED screens, one mounted horizontally and one vertically. The vertical format lends itself ideally to portrait framing, which is prominent in parts of the story, while innovating on the traditional landscape cinematic composition. There is also a 15-inch CRT screen that, similarly to the lighting fixtures and the sofa, operates between diegetic and non-diegetic thresholds, being a part of the fictional environment, yet also presenting some of the fictional content to the visitor, in orchestration with the two primary screens. Finally, there are two speakers below the LED screens, one bookshelf speaker and a

subwoofer speaker, both behind the sofa. The remaining seven speakers are all placed around the wider room, external to the walls of the installation, and hence not visible to the visitor. (Because the ceiling of the set is made from soft fabric, the sound from the external speakers still has full penetration into the space.) The sound and music were composed, produced, and mixed by Rob Szeliga. (See Fig. 3 for the installation floor plan. See File 2 of the supplemental material for schematic details of the technological realization of the project.)



<Fig. 3>

Walkthrough of the Visitor's Experience in *Vera's Not Alone*

The 16-minute film experience, which can be classed as post-apocalyptic science fiction, is ambiguous and opaque in the provision of narrative information, instead taking advantage of the spatial and atmospheric communication inherent to Nested Cinema, thus establishing certain narrative particulars with considerable efficiency. To illustrate the specific operation of narrative and atmosphere in Nested Cinema, it is instrumental that I describe and contextualize the sequential and spatial experience of *Vera's Not Alone* from the installation visitor's perspective:

Upon the visitor's entry into the installation space, the experience begins with a brief announcement that clarifies the visitor's role as an audience member (as opposed to an active participant) and provides basic instructions on when and how to access the VR content. Then the

room goes dark, and the story commences by showing various Instagram-style selfie photos and videos on the screens that establish the main character and her past. This is followed by footage of a nuclear explosion, which suggests an apocalyptic event and creates a bridge to the present circumstances of the character that are more aligned with the fictional space and installation space. The lighting fixtures around the room, as well as the sound design and music, amplify the effect of the explosion, making it both a visceral and emotionally captivating experience. (This introductory part of the experience can be seen in File 1 of the supplemental material.)

After this brief introduction, the screens go dark, the lights in the space dim down, and the VR light comes on, suggesting that VR content is available. When the visitor dons the headset, they find themselves in the same environment, with the perspective in VR precisely matching their physical perspective on the sofa; the two LED screens are nevertheless absent in the virtual, fictional space. When the visitor turns their head to the left, they see the character Vera sitting next to them, also wearing a VR headset – seemingly also immersed in a VR experience (Fig. 4). While extending and thus amplifying the atmosphere of the physical space to the virtual one, this moment in the nested experience also spatially communicates that the installation space represents the fictional space occupied by Vera, while simultaneously forging a spatial identification with the character. The utilization of speakers within the installation space contributes to the sense of presence of the character in the physical space of the installation, but the immersion of VR also aligns the visitor's perspective in the story world with that of the character. After a short while, the visitor hears a sudden sound of a power cut, and the scene goes completely dark. Then comes the sound of Vera walking around the room, and a moment later, she turns on a battery-powered flashlight, illuminating the VR space. She puts on her boots and leaves her room; the visitor can hear a thud of the heavy metal door once she leaves the field of vision.

<Fig 4>

Once Vera leaves the room, the VR headset goes dark, prompting the visitor to remove it. When they do, they see Vera on the two LED screens as she walks through dark corridors, illuminated by her flashlight. On the screens, Vera is shown via continuous tracking shots, from the front on one screen and from the back on another (Fig. 5). There is a clear sense of continuation of action from the previous scene---and hence also a continuation of the fictional space beyond the boundaries of the room. In other words, while the physical installation space and Vera's room are a precise match in spatial terms, the fictional space extends far beyond the installation walls, which is an illusion supported by an array of speakers placed externally to the installation walls.

<Fig 5>

When Vera arrives at a large disused industrial hall, she locates the fuse box and flips the power back on. The lighting in the installation space rises suddenly in synchronization with the fictional content. As the space surrounding Vera is revealed on the two screens, the accompanying diegetic sound from the external speakers solidifies the sense of fictional reality occupying the space directly outside the physical walls of the installation. The CRT screen then shows a diegetic CCTV view of the hall. Soon, Vera (and the visitor) hears ominous bangs and thuds; horrified by the unexpected presence of something or someone, she rushes to hide in an adjacent boiler room. There, accompanied by ominous music, she discovers evidence of another occupant in this improvised post-apocalyptic industrial shelter, in the form of a blanket, book, and glasses. She snaps a few photos of the items on her phone, forging a transition into the next scene.

The three screens then show an automatic computer visual search via an internal offline database against the recently taken photos, suggesting the internet is no longer available. The lighting in the room changes rapidly in color and intensity, in unison with the varied content on the screens, thus enhancing the complex visual montage. While Vera is not physically present in the space for the visitor, the previously established understanding of the installation space as a representation of Vera's room now aligns the visitor's perspective with Vera's in the room – although how exactly she is experiencing or conducting the visual search is not suggested. The visual search links the blanket to one of Vera's Instagram photos shown at the start – a selfie of Vera and her friends during a night out, in which a homeless man (portrayed by Scott Spiro) is accidentally captured in the background. Moments later the very same man can be seen on the CCTV, being thus revealed as the mysterious cohabitor. The power goes out again, with the recognizable shutting-down sound, suggesting that perhaps the man was responsible for the power cut on both occasions. This time, the visitor is immersed in the dark physical space (as opposed to being in the VR space during the first power cut). The absence of visual stimuli, and the continuation of diegetic sound, place the physical and the virtual experience of the fictional space on an equivalent plane of experience for the visitor, making the real and fictional spaces sensorily indistinguishable. Footsteps can now be heard coming closer from outside, and the bookshelf speaker behind the sofa carries the sound of Vera's panicked panting. Eventually, loud bangs can be heard on the metal door, with the sound being accurately positioned across the room from Vera's breathing. Because of the actual darkness, the soundscape extends the fictional reality

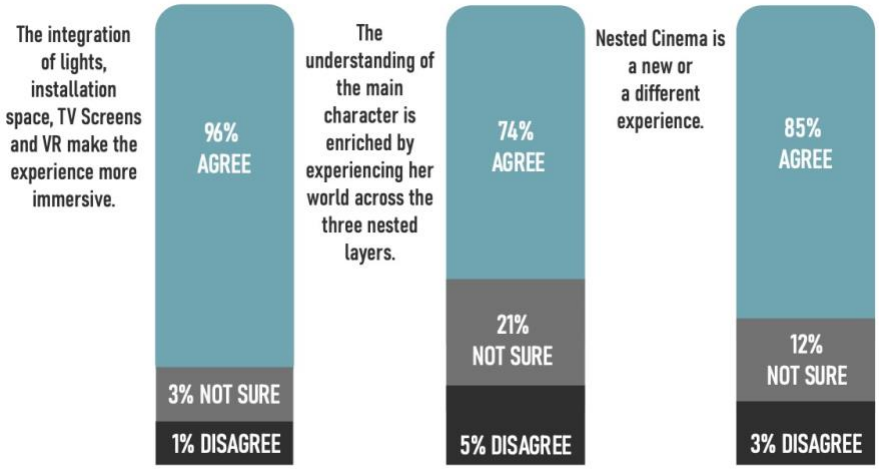
into the actual reality in a more visceral and embodied way than would be possible with a VR headset, which primarily focuses on vision. Here the visitor's bodily response is activated, forging emotional engagement but also communicating narrative through spatial and atmospheric means. Such atmospheric communication of meaning and narrative is the desired effect of the nested experience, where physical space, screen content, 360 VR and spatial sound gradually constitute a unified, immersive fictional space.

The final scene of *Vera's Not Alone* gives two options for experiencing the scene: either through the combination of screens and lighting in the physical space that matches the atmosphere on the screens, or in the VR headset. There is also the possibility to alternate between the two viewing options of the scene. Each of the two LED screens carries a close-up of one of the two characters, representing an abstract, stylized, frozen-in-time magnification of the Instagram moment on the street with the man caught in the background. The CRT screen is looping this selfie Instagram moment as a short video. While the two characters engage in a poetic dialogue on the two screens, the VR headset view represents a continuation of the previous scene (with the man approaching and banging on the door). In this present scene, he turns out to be a friend rather than a threat, which is symbolized by his offering of food to Vera (Fig. 6). The VR experience is accompanied by the continuous dialogue sound synchronized to the two screens, placing the meaning of the words in a different abstract context in the VR mode. These two parallel views of the scene can also be read as parallel views of the past and the present in relation to Vera's story. This final scene explores an additional creative and expressive potential of Nested Cinema, which generates narrative meaning through a parallel spatial and atmospheric experience rather than primarily through sequential means. However, the scene also creates an alternative climax of the story, which is not based in a narrative sense of closure or conclusion (this in fact is not provided) but rather it gives an atmospheric climax – expanding the atmosphere of the piece across all nested layers simultaneously.

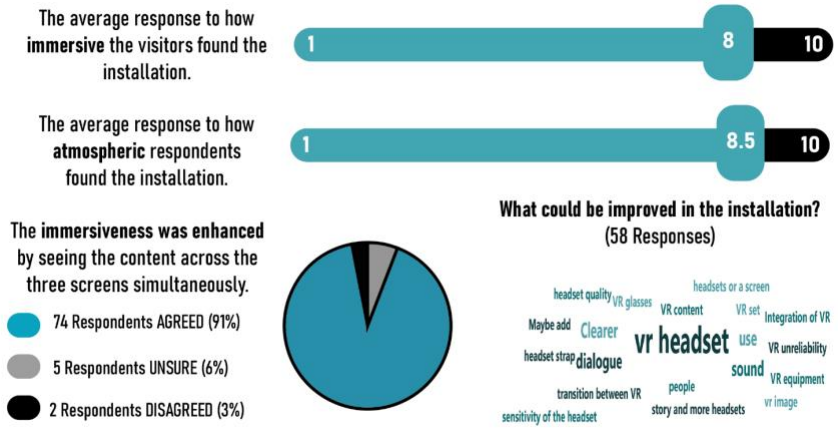
<Fig 6>

Audience Response and Reflection on the First Realization of the Project

The first Nested Cinema installation of *Vera's Not Alone* was open to the public in MediaCityUK in June 2023. Over 100 visitors attended the experience, and a total of 81 respondents completed an anonymous survey upon exiting the experience , with 41 of those also taking part in qualitative interviews (Figs 7, 8). There were some technical issues with the first installation of Nested Cinema, almost exclusively related to the VR headset functionality, which were reflected in both the surveys and the interviews. This is because current off-the-shelf VR equipment is simply not sufficiently customizable for the needs of Nested Cinema, which requires the VR headset to essentially function as a passive 360 screen, providing a stable flow of 360 content. Furthermore, at peak times, it was not possible to have only one person in the experience at a time (which was the intended mode of the installation), and this led to further technical issues, resulting in an incomplete experience for some visitors.



<Fig 7>



<Fig 8>

The interviews nevertheless revealed a clear sense of atmospheric immersion experienced by the audience; here are some notable comments:

I had never experienced anything like this before. It was a great feeling. I felt scared. I got the chills, my knees were shaking. It was like “Bam!”, you’re just into it, and you’re looking everywhere, and you are like in that world. That was a really great feeling. Something I haven’t felt before.

I found it very engaging with the lights in the room going on and off and changing colors at the same time as events within the film, which immerses you even more than a typical experience. And putting on the VR headset also puts you into the space with the characters.

In the past approaching short films and art exhibitions, I've always like psyched myself up to be ready to watch it, and being in a room as whole space dedicated to this one short made me feel very ready for it as well. I didn't feel like I had to work as hard to immerse myself.

I'd describe it as a very immersive kind of experience. I'd definitely say it's also a very unique cinematic experience. I've been to lots of different sort of art film showcases before, but none which involve the spectator in the same nuanced way as this one does.'

'It was quite relaxing because even though it's apocalyptic in theme and sinister in tone, you are on a comfy sofa in a darkened space with lots of fascinating things that took me completely out of myself and the stresses of the day, and plunged me into a very visceral experience.'

I really enjoyed the multiple screens with multiple versions of the same shot on the different screens. I found that really enjoyable. And I think that could be the future of cinema, to be honest, because that felt really immersive, you could see it from almost a 360 view of every scene that was happening. And the set design was brilliant.

The visitor feedback demonstrates the value and efficacy of the conceptual approach to immersive experience and expanded cinema explored through the Nested Cinema installation. The first installation was an invaluable opportunity to test the concept, but it also illuminated the creative and technological opportunities for future development. It will be vital to expand on the number of VR headsets available to visitors, as designing the experience for one visitor at a time poses a clear limitation, especially during peak visitor times. It is also possible to advance the VR content beyond 360 video, to provide multiple visitor perspectives based on their precise

location in the installation space, while resolving an issue with digital noise in the 360 video, linked to low-light atmospheric conditions. The next step will therefore be to experiment with generating a photo-realistic virtual environment and performance – taking advantage of the latest technological developments in the field.

Acknowledgments

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8. Knight-Hill [3] p. 57.

9. Jacek Ludwig Scarso, *Shrine of the Goat* (2022), installation.

10. Kerryn Wise and Bean Neal, *Facades* (2021), installation.

11. Ben Andrews and Emma Roberts, *Starless* (2017), installation.

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13. Andrew McGuinness, *The War of The Worlds: The Immersive Experience* (2019), installation.

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Fig. 1. The Nested Cinema installation space. (©Pavel Prokopic)

Fig. 2. The installation screens from the visitor's perspective, with headset on the VR-headset table (bottom of image). The table light is on, as VR content is available. (© Pavel Prokopic)

Fig. 3. The floor plan of the Nested Cinema installation set, including the positioning of speakers, screens, lighting fixtures and props. (©Jayne Sayer)

Fig. 4. When the visitor dons the VR headset and looks to their left, they will find Vera sitting next to them on the sofa, also using a VR headset. (©Pavel Prokopic)

Fig. 4. As Vera walks down the corridor, the visitor can see the scene simultaneously as a continuous shot from the front on the vertical screen and following her from the back on the horizontal screen. (©Pavel Prokopic)

Fig. 5. A four-way split screen view of the synchronized final scene content. Vertical close-up on Vera on the right, horizontal close-up on man in the bottom middle, Instagram moment on the CRT screen on the bottom left, and the 360 CVR scene showing in the headset on the top left. (©Pavel Prokopic)

Fig. 7. Nested Cinema 2023 installation audience visitor survey summary 1. (©Jayne Sayer)

Fig. 8. Nested Cinema 2023 installation visitor survey summary 2. (©Jayne Sayer)