

## 9 The projective shift between installation art and new media art: from distantiation to connectivity

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In one of the most influential assessments of the emergence and development of the projected image in the 1960s and 1970s, Chrissie Iles, in her catalogue essay for the Whitney's exhibition, *Into the Light: The Projected Image in American Art 1964–1977* (2000–1), convincingly situated early projective installation as a hybrid of the white cube and the black box, at the intersection of Minimalism and cinema. The installations of the 1960s and 1970s to which she refers (by Robert Morris, Dan Graham, Anthony McCall, Paul Sharits, Anastasi, Barry La Va, Peter Campus, and Yoko Ono, among others) adopt Minimalism's engagement of the spectator 'in a phenomenological experience of objects in relation to the architectural dimensions of the gallery', where space is transformed into a perceptual field.<sup>1</sup> In projected-image installations, the Minimalist model of space is mixed, she argues, with cinema's own model of space – 'the dark, reverie-laden space of the cinema' which tends to fix bodies in front of a single screen to enable their absorption into filmic narratives. Iles insists, however, that this new hybrid does not consist in a mere mixing. For the cinematic model is posited as broken apart by the Minimalist phenomenology of the pieces, which encourage 'movement, the sharing of multiple viewpoints, the dismantling of the single frontal screen, and an analytical, distanced form of viewing' – a phenomenology which turns the spectator's attention away 'from the illusion on the screen to the surrounding space, and to the physical mechanisms and properties of the moving image.'<sup>2</sup> The projected image might make space more elusive, but the spectator is invited to distance him- or herself from its absorbing effects. The projected image, in short, is a site that allows viewers to negotiate with possible confusions between the real and the fictional by being exposed to the mechanisms of illusion or by being made aware of the materiality of space in relation to the illusionistic image.

In the 1960s and 1970s, various aesthetic strategies were explored to elaborate these distantiations and screen-surrounding space connections. One of these strategies consisted in turning the apparatus of film projection into the artwork and, as such, in making visible the technological means of illusion,

as in Anthony McCall's *Line Describing a Cone* (1973). This was McCall's first so-called 'solid light film', where conventional cinematic viewing was reversed by the introduction of a 16mm film projector in the darkened empty space of the gallery. Viewers were invited to watch a light beam emanating first as a line and developing gradually into a cone, while also attending to the projection of the beam first as a dot and gradually as a full circle on a distant wall. They watched, but could also interact with the light beam, interrupting its flow, walking into the cone, disappearing into it and reappearing on the other side. Thus the installation not only disclosed the hidden devices of cinematic illusion but also succeeded in unfixing the cinematic position of the spectator in front of the screen.

Another strategy was to explore closed-circuit video, a technology enabling the simultaneous filming and projection of images in real time, which would split and double the viewer's own image, as in installation works by Peter Campus and Dan Graham. In Campus's closed-circuit video installations, for example, the viewer experiences her image doubled, divided, reversed, or magnified, sometimes projected concomitantly with her mirror reflection. The main effect of such operations was to trouble the viewer's sense of cohesion, unity, and self-identity. In an installation like *Interface* (1972) – a work composed of a glass pane; a video camera located behind and directed toward the glass; and a video projector connected to the camera, placed in front of the glass and obliquely to the camera on the other side – the spectator circulates in the space in front of the glass. It is in that very space that she will experience the double mirror/screen function of the glass, the simultaneous reflection of herself and transmission of her projected image filmed by the camera in real time. In such settings, the spectator is confronted with two opposed images of herself: a black-and-white positive image (the video image) and a coloured negative image (the reflection). Video projection is thus the means by which the spectator engages in the act of perceiving the self-in-space, according to two irreconcilable (subjective/objective; internal/external) viewpoints. It facilitates the development of a critical attitude on the part of the viewer towards her own sense of self, and inhibits the tendency towards narcissistic blending of the self into one's own image.

This brief overview of some of the pivotal traits of the projected image as it developed in the 1960s and 1970s allows me to begin to formulate the shift I see happening in more recent forms of mixed/augmented reality projections combining real-world and virtual spaces. While the projected images of the 1960s and 1970s partook of an aesthetics of self-criticality, distantiation, and reality-versus-illusion, augmented reality (AR) art contributes to the shaping of an aesthetics of immersiveness, relationality, and real–virtual continuum. As I hope to show, it has come to act as a binding technology compensating for the unbinding operations of earlier forms of projected-image works and

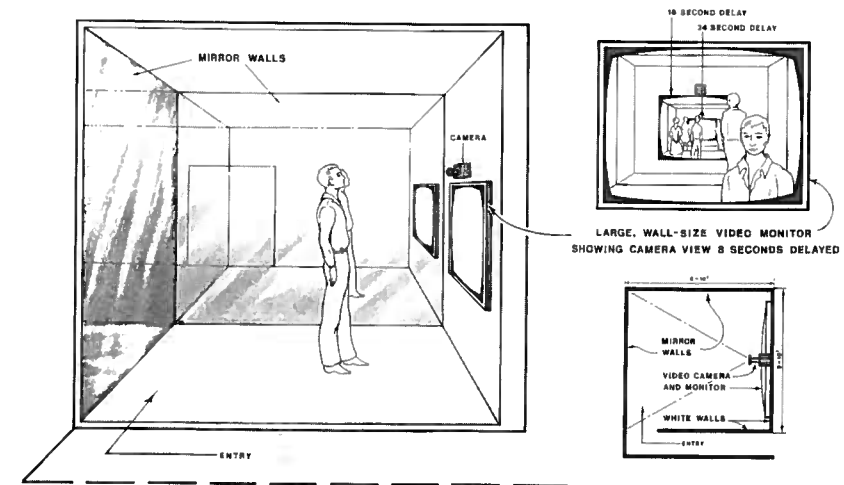
favouring the regrouping of users as communities and collectives rather than the dividing and distancing of the self.

To better appreciate this shift and before addressing augmented reality art proper, it is useful to contrast one of the key works made during the years of the emergence of projective installations – Dan Graham's *Present Continuous Past(s)* (1974) – with one of the most manifest non-digital forms of augmented reality projections: Olafur Eliasson's *The Weather Project* (2003). This comparison, between two installations exploring mirror reflections and projection to very different ends, helps to highlight the main characteristics of the projective shift. More crucially, it will help to formulate a clearer hypothesis concerning the nature of this shift.

The earliest of these two works, *Present Continuous Past(s)* (figure 9.1), consists in a closed-circuit video installation whose structural set-up is orchestrated to delay the transmission of images initially taken by a surveillance camera. The setting includes one video camera facing a mirror wall, one monitor located below the camera, an additional lateral mirror wall, and a microprocessor. Graham offers a precise description of the installation as one that simultaneously turns the spectator into an object but also a subject of perception:

The mirrors reflect present time. The video camera tapes what is immediately in front of it and the entire reflection on the opposite mirrored wall. The image seen by the camera (reflecting everything in the room) appears eight seconds later in the video monitor (via a tape delay placed between the video recorder, which is recording, and a second video recorder, which is playing the recording back). If a viewer's body does not directly obscure the lens's view of the facing mirror the camera is taping the reflection of the room and the reflected image of the monitor (which shows the time recorded eight seconds previously reflected from the mirror). A person viewing the monitor sees both the image of himself or herself of eight seconds earlier, and what was reflected on the mirror from the monitor eight seconds prior to that – sixteen seconds in the past (the camera view of eight seconds prior was playing back on the monitor eight seconds earlier, and this was reflected on the mirror along with the then-present reflection to the viewer). An infinite regress of time continuums within time continuums (always separated by eight-second intervals) within time continuums is created. The mirror at right angles to the other mirror-wall and to the monitor-wall gives a present-time view of the installation as if observed from an 'objective' vantage exterior to the viewer's subjective experience and to the mechanism that produces the piece's perceptual effect. It simply reflects (statically) present time.<sup>3</sup>

Graham's account specifies quite clearly how *Present Continuous Past(s)* elaborates the interpenetration of past and present times – live, recorded, and projected. The entry of the spectator into the room is the trigger by which



Dan Graham, *Present Continuous Past(s)*, 1974. Mirrored wall, video camera and monitor with time delay, 96in x 144in x 96in/244cm x 366cm x 244cm (overall). Courtesy of the artist and Marian Goodman Gallery, New York.

this interpenetration is launched. Although installation art has often been defined as participatory (for example, in Julie H. Reiss's and Claire Bishop's studies of the genre), in this work the recording, transmission, and postponing mechanisms are set off by the viewer whether she wills it or not.<sup>4</sup> The monitor projects to the viewer her own image but delays its transmission and inserts it into a regression of images within images within images, a regression ensured by the reflection of the images in the mirror wall facing the camera. The installation thus institutes the spectator as a split subject, spatially divided between her mirror reflection over there and her body over here, but also temporally split between past, present, and future. Simultaneously, however, she sees a present-time view of herself in the reflections of the lateral mirror wall. She may also discontinue the recording and delaying process by blocking the lens's view of the facing mirror. The mirror projection of the self and the blocking of the electronic projection of the self provide the possibility of seeing oneself seeing and the implicit possibility of figuring out the recording, delaying, and projective mechanisms of the installation.

The phenomenology of Graham's work is complex. A phenomenology of the lived body is established, one that posits the inseparability of the spatial and the temporal in the perceptual experience of the art object by emphasising what Maurice Merleau-Ponty designated as the paradoxical role of the mirror image: an image that 'forces me to leave the reality of my lived *me* in order to refer myself constantly to the ideal, fictitious, or imaginary *me*, of which the specular image is the first outline.'<sup>5</sup> The result of this is that the spacetime of



9.2 Olafur Eliasson, *The Weather Project*, 2003. Monofrequency lights, projection foil, haze machines, mirror foil, aluminium, scaffolding. Installation view at Turbine Hall, Tate Modern, London (The Unilever Series), 2003. © 2003 Olafur Eliasson. Courtesy of the artist, neugerriemschneider, Berlin, and Tanya Bonakdar Gallery, New York.

the video image and the spacetime of the room are disclosed in their interdependency, opposition, and possible reconciliation. But at the same time the spectator's sense of space and time is split and confused – 'virtualised' rather than grounded, in an experience which contrasts notably with that provided by contemporary Minimalist sculpture.

Twenty-nine years later, Olafur Eliasson assembled *The Weather Project* (figure 9.2) specifically for Tate Modern's Turbine Hall. The installation presented a gigantic semicircular screen covered with hundreds of monofrequency lamps radiating yellow light which was made to appear, through a play of mirrored reflections, as a full spherical sun – a glowing disc suspended from a mirrored ceiling. The disc was inserted in an environment of drifting patches of mist to create a microclimate as if of a sun in moving clouds. The mirrors lining the ceiling not only created the top half of the sun but also doubled the height of the space, whereas the fog refracted the light in ways that blurred the boundary between the space and its reflection. The mirrored ceiling also allowed viewers to see themselves as minuscule black shadows in space, surrounded by other visitors and immersed in the monumentality of the installation, in the 'spectacle' of the fabricated landscape. As pointed out by art historian James Meyer, the phenomenology at play here was clearly different from that invoked in the 1960s and 1970s by artworks engaged in self-criticality and institutional critique. It took the form of an event in relation to which spectators were constituted as a 'mass audience':

Something unexpected happens to spectators of *The Weather Project*. We lie down – and lose ourselves, become part of, indeed become, the spectacle before us. The phenomenological practices of the '60s and '70s, to which Eliasson's work is sometimes compared, prized an active spectator – one who could "see" and, in seeing, make informed decisions. But *The Weather Project* delivers a mass audience that cannot fail to be overwhelmed by the magnitude of the installation itself: The museum is not so much "revealed" as transformed into a destination, an event.<sup>6</sup>

The kind of phenomenological experience provided by Eliasson might be thought to have some key features in common with that supplied in Graham's *Present Continuous Past(s)*. Both works use reflections to merge the spectator's 'real' space with some 'illusory' content, and so confuse the spectator's spatial (and, to an extent, temporal) orientation. However, they also substantially differ. The viewers of Graham's work are not constituted in the kind of spectral collectivity, or 'mass audience' as they are by Eliasson's. Furthermore, while the mirrored ceiling of Eliasson's work allows viewers to see themselves seeing, this self-reflexivity does not necessarily extract them from the realm of the specular or of the spectacular. Why? Namely because they are immersed in the environment, unlike the viewers in Graham's work, who can more easily

distance themselves from the projection. Indeed, the spectators of *Present Continuous Past(s)* have a frontal relation to the projected images and a lateral relation to some of the reflected images; they also have the opportunity to block the regressive re-projections of their own image.

It is not that *The Weather Project* prevents the spectator's awareness of her own bodily position in space in relation to others, or that she is blind to the mechanisms of the illusion of the projected sun (these are apparent and can effortlessly be observed by the visitors). Rather, the installation unfolds a real-virtual continuum which is substantially different from *Present Continuous Past(s)*'s real-versus-image dynamics, made out of delays and image regressions. Scale also matters here, consolidating a sublime effect in *Weather* from which it is difficult to detach oneself. Finally, the voluntary or involuntary character of viewer participation is substantially different in the two pieces. Graham's work catches the viewer's image whether she wills it or not, while the audience of *The Weather Project* sought its reflection out, growing throughout the exhibition, between October 2003 and March 2004, to reach a reported record crowd of two million visitors, immersing spectators who wilfully – interactively – spent time there to form small, ephemeral, and spontaneous communities. This last point also helps to highlight that *The Weather Project* alerts us to something which is an important feature of contemporary digitally based AR (augmented reality) works, namely, that projection is not simply about a projected or reflected image as in its 1970s counterpart. Projection refers to the act of thrusting an image outward or forward but also light, mist, and smell (even, as we will see, voices, heartbeats and emotions). These non-iconic forms of projections are endemic to recent media projections.

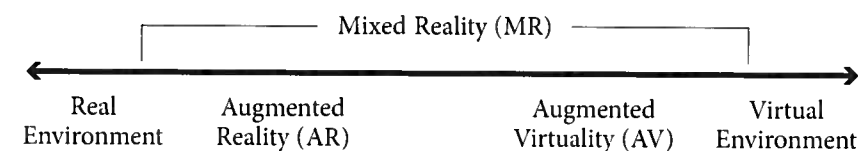
The securing of a real-virtual continuum that does not sharply separate the real from projection; the embrace of the condition of the 'society of the spectacle' (defined by Guy Debord's assertion that 'everything that was directly lived has moved away into a representation'); the shift from 'subjection' to 'participation' or 'interactivity'; the move from a concern for the subject's false sense of unified self to a concern for the shaping of mass communities, gatherings, and collectivities; the shift from self-reflexivity to immersion; the increase of polysensorial receptivity through the deployment of non-iconic projections: these features which are all found in Eliasson's *Weather Project* are also among the key attributes of current digital projections in augmented reality art.<sup>7</sup> As stipulated above, the installation does not rely on digital technology (it was made out of lights, projection foil, mirror foil, aluminium, scaffolding, and a haze machine), but I understand it to partake of the same actual-virtual overlap, real-illusory spatial confusion, and audience-projection interaction dynamic as AR digital projections.

These specifications allow me to formulate my main claim: projection in new media art, especially in digital and non-digital augmented reality artistic

practices, is inseparable from a binding impulse. Grounded in the development of community forms of public art, relational aesthetics, and mobile technologies, media practices of the 2000s use projection for the sake of connectivity. In digital forms of augmented reality, this binding impulse will be confirmed by the activation of interactivity, the interactivity between users and between users and machines, which systematically implies the formation of communities. But Eliasson's non-digital *Weather Project* already says it all: projection – the mirror reflections which allow the sun to complete its circle and allow the spectators to see their projected images, as well as the projection of mist that works to hold the whole as a tactile experience of a unified landscape – has passed from a self-reflexivity/distantiating/reality-versus-illusion logic to an immersion/interactivity/real-virtual continuum/holding-together device.

#### Augmented reality art projections

Since the early 1990s, the confirmation of mixed reality (MR) or augmented reality (AR) over virtual reality (VR) in a variety of domains – medicine, military training, robotics, education, communications, entertainment, tourism, design, and art, to name the most obvious – has increased awareness of how difficult it is to separate the real and the virtual, and how they in fact exist in a continuum. The engineer Paul Milgram introduced the concept of the 'virtuality continuum' to describe the unbroken scale ranging from real to virtual environments, with augmented reality and augmented virtuality located 'anywhere between' the two ends of the spectrum:<sup>8</sup>



As Milgram's schema specifies, the real-virtual continuum – the unbroken scale ranging from real to virtual environments – is the foundational assumption of digital forms of augmented reality. AR builds up a continuous succession between the real and the virtual, in which the two categories tend to lose their distinction in relation to one another.

The concept of the real-virtual continuum is the foundational assumption of any AR system – and I borrow here Ronald Azuma et al's definition of augmented reality as a system which 'supplements the realworld with virtual (computer-generated) objects that appear to coexist in the same space as the realworld.'<sup>9</sup> AR was developed primarily to compensate for the restrictions of VR, namely its purportedly 'total' immersion of the user in a synthetic

world. Yet AR does so not by discarding the virtual but by connecting it to the real, adjusting as it were the virtual frame of reference to what the user sees and hears. It does so, moreover, not simply by adding computer-generated information to space but by adding data to the user's sensory perception of space. In medical applications, for example, a surgeon can now wear a head-mounted display (HMD) device equipped with a semi-transparent visor which fuses his or her perception of the patient's body with the preparatory study of the internal anatomy projected on the screen.<sup>10</sup> In automobile applications, AR visualising systems enable the projection of GPS cartographic information on the car's windscreen, allowing the driver to see the outside environment through a constantly updated map of the area. Mixed, composite, or augmented reality is thus, as much as Minimalism ever was, a 'real-world' perceptual paradigm. Considering that the definitive (yet still unachieved) goal is 'to create a system such that the user cannot tell the difference between the real world and the virtual augmentation of it', the perceptual motivation underlying AR research carries several technical challenges, notably the imperative to perfect the panoply of technologies that converge to assemble a mixed real-virtual continuum for the observer-participant, from audiovisual (head-mounted, wall-mounted, handheld) display and playback devices to human-machine interface systems to body-tracking, sensing, and surveillance instruments, one of the most difficult technical challenges being the requirement for the computer to track where the user is looking and determine what he or she is seeing in order to augment his or her view.<sup>11</sup> This connectivity with perception has been from the start the impetus of AR explorations.

A derivative of installation art and virtual art, augmented reality art allegedly 'enhances' site by de/un/re-specifying it. It does so by connecting spectators to these sites through networking systems (mobile phones, GPS, the internet), sensing, tracking, and surveillance technologies, and by simultaneously projecting the detected data (sound, voice, images, different forms of bodily and environmental data) within the extended site. The projection of dynamic data is inseparable from the extraction of data enabled by the detection and geo-localisation technologies. This is how the real-virtual continuum is produced and maintained. Its productivity, moreover, most often lies in the connection it establishes between users. These traits become more explicit when we consider some of the key augmented reality environments produced in the last five years or so. Seiko Mikami's *Gravicells: Gravity and Resistance* (2004), for example, proposes a platform covered with panels of string-like lines that deform as the sensors underneath react to the participant's weight, tilt, and velocity. The changing platform (whose changes intensify when there are at least two spectators reacting to one another) is calculated by GPS systems that register the changes in the space, a calculation displayed on different wall screens that enhance the real-time dynamic between image,

body, gravity, sound, and light. We might think also of Usman Haque's *Evoke* (2007), an animated projection on the façade of York Minster which lights up in response to the voices of the nearby public. An equally technologically sophisticated example is Stelarc's ongoing prosthesis project, *The Extra Ear (or an Ear on an Arm)* initiated in 1997, which famously involves the construction of a prosthetic ear out of soft tissue and flexible cartilage; its grafting (through a series of cosmetic, reconstructive, and orthopaedic surgeries) to one of the artist's arms, and its projected transformation into a communicational device. The ear will be made not to hear, but – through an implanted sound chip and a proximity sensor – to emit sounds addressed to nearby spectators, and will eventually be connected to a modem and a wearable computer to broadcast RealAudio sounds to which the spectator will be invited to reply through internet connection.

As these examples indicate, and as I shall go on now to show in more detail, AR projection as it is most often used by artists betrays ultimately a desire for connectivity through participation; a collectivity which is, however, enabled by non-participatory, i.e. unidirectional and panoptical, technologies of surveillance and detection. It also heavily relies on interactivity – the spectators' experience with technology. Interactivity ensures the triggering of projection which in turn ensures the constitution of anonymous and temporary communities, whose model varies from work to work but is likely, as we will see, to be unitary and amenable. Finally, it raises a fundamental question about projection: does interactive induced projection produce ways of perceiving which represent alternatives to those enforced by our ordinary experience, or does it merely sustain the mode of perception in which individuals are required to engage in a society of pervasive computing?

#### Inter-agero ergo sum

As the art of projection moves away from its reality-versus-illusion and related distantiation operations to embrace real-virtual continuum and immersive-inclined strategies, it propels spectatorship in a relational logic that can easily counter the perceptual potential of AR. Art critic Nicolas Bourriaud, the initiator of the concept of relational aesthetics, defines relational art as an artistic practice which takes, as its theoretical horizon, 'the realm of human interactions and its social context, rather than the assertion of an independent and *private* symbolic space.'<sup>12</sup> Its central theme is 'being-together': that is, the 'encounter' between the viewer and the artwork, together with the 'collective elaboration of meaning.'<sup>13</sup> In AR practices, interactivity is explored to produce projections whose main function is precisely to shape such collective deployments. I want to examine here five AR environments – by artists Lincoln Schatz, Rafael Lozano-Hemmer, Kazuhiko Hachiya, Mathieu Briand,

and Christa Sommerer & Laurent Mignonneau – to identify the modalities by which projection can be explored aesthetically to produce more or less complex community formations. More fundamentally, I will argue that the potential of AR as a perceptual paradigm lies in its ability to suspend its projection-*for*-connectivity/projection-*for*-collectivity impulse by favouring instead the inter-perceptuality or inter-sensoriality of these sites. In making this argument I will rely on Jean-Luc Nancy's notion of community as a practice of inoperativeness. The productivity of this notion lies precisely in its insistence on recognition of the several unsatisfying (redundant, reactive) forms of interactivity and projection in AR artistic practices, as it also lies in the questioning of the problematic 'communities' which are supposed to derive from such interactive projection settings.

The projection-*for*-community impulse through surveillance technologies may take the form of generative multi-channel video installations, such as those devised by Lincoln Schatz. In his installations, cameras capture images of public spaces, notably lobby environments and construction sites of specific buildings, which are then transformed and combined by specific software with stored images from the past. In *Here* (2007–), for instance, an arrangement of two interactive video walls (9ft by 9ft) commissioned for the entrance of One Arts Plaza in the Dallas Arts District are each composed of screens which display stored digital video images of the lobby (the images are initially stored as Quick Time files on Mac) in four overlapping layers, merging past with present and building as it were a fluid memory of the space and its visitors over time. From the moment the building opened, two cameras (one for each wall) began recording and storing daily collected images of the lobby. This process is planned to last at least eight years. Each video wall displays a different version of the same event and visitors are invited to react to these images as their own image appears on screen. The images pulled from the memory database are continuously recombined and manipulated in ways that make their repetition statistically unlikely. Supporting such projections is the promise of the establishment of a virtual community of visitors and passers-by, upon whose bodies a sense of community or being together is gradually built over time.

A similar example of this projective 'community' function, one that relies on the banking of data destined to interact with new entering data, are Rafael Lozano-Hemmer's *Pulse* works (2006–). Lozano-Hemmer's AR environments rely on the use of sensors that measure the heart rates or voices of passers-by to convert them into light beams projected in the public space as other passers-by simultaneously engage with the sensor devices. *Pulse Park* (2008) (figure 9.3) is surely the most emblematic work of the series, comprised as it was of a matrix of light beams moving and crisscrossing over the central oval field of Madison Square Park in New York. The intensity of the beams was modulated by sensors installed at the north end of the Oval Lawn that



Rafael Lozano-Hemmer, *Pulse Park*, 2008. Madison Square Park, New York City.  
Heart-rate sensor, computer, DMX controller, custom software, dimmer rack, 200  
Source Four spotlights, generator, dimensions variable (the lawn is an oval measuring  
80m x 60m). Photo by James Ewing. Courtesy of the artist.

measured the heart rate (more specifically, the systolic and diastolic activity) of the visitors, which could then be translated and visualised as pulses of moving light beams projected by spotlights placed along the perimeter of the lawn. As each user made contact with the sensor, a light beam emerged to intersect with other light beams set off by other participants. According to Lozano-Hemmer, the result was 'a poetic expression of our vital signs, transforming the public space into a fleeting architecture of light and movement'.<sup>14</sup> But, although the heartbeats were indeed poetically translated into light through touch – and as such were productive of an interesting synaesthesia that let users see what was haptically generated – the translations were somewhat disappointingly homogeneous. The only differences between light beams lay in their pulse, and differences between pulses were minimal at best. Poetic expression was also inseparable from the institution of a virtual community of light-beam substitutes of the self, a virtual community triggered by the interactivity of participants who did not necessarily relate to each other otherwise. Projection, in this sense, is, in fact, the making of a dematerialised community, whose components (light beams) are akin to one another and whose form is not easily altered by the users. In contrast to other relational architectural works by Lozano-Hemmer, such as *Voz Alta* (2008), where the interactive devices allow participants to add their own personal stories to the installation, the constituency of the lit community was only marginally controlled by the users: participants could only manage the direct presence and memorised presence of the light beams by holding or letting go of the sensors. Although the artist specifies that the recording of the participants' pulses was 'immediately converted into light pulses by the computers' and that participants were surrounded by two hundred heartbeats, these were not heartbeats but highly mediated translations of heartbeats whose pulsing configuration was clearly predetermined by the network of sensors.<sup>15</sup>

Similarly, *Pulse Front* (2007) was a matrix of light over Toronto's Harbourfront, made with light beams projected by twenty robotic searchlights. These were exclusively controlled by a network of sensors that measured the heart rate of the participants. As Lozano-Hemmer's description specifies, 'ten metal sculptures detected the pulse of people who held them: the readings were immediately converted into light pulses by the computers and also determined the orientation of the beams. When no one was participating, the matrix showed the heart rate recordings for the last ten people who tried the interfaces'.<sup>16</sup> Hence, although the presence of users is required to activate the sensors, this interactivity is in fact a response to a predetermined sensing system, and this considerably nuances the actual level of interactivity involved in the participants' 'making' of light projections. In addition, once again the virtual light-beam communities only slightly modify their shape under the influence of the users, which is only to a very slim extent under their control.

All of these works may be said to share in what Julie H. Reiss and Claire Bishop have called installation art's aesthetic of participation.<sup>17</sup> Indeed, spectator participation may well appear to be more intensive in augmented reality art. However, as I hope to have shown, the extent of the spectator's willed participation in many of these works (I am referring here especially to the works of Schatz and Lozano-Hemmer) is really quite limited, and cannot obviously be identified with a more 'active' as opposed to 'passive' stance. The key rule underlying or triggered by AR projections is, certainly, interactivity – they are the very site of affirmation of an *inter-agero ergo sum* ('I interact, therefore I am') – but one is left with a sense of not having much control over the outcome of the projection. It is also crucial to emphasise that projection here (the generative projection of all the visitors of One Arts Plaza in the Dallas Arts District who will be filmed by the hidden cameras as they enter the lobby, as well as the light projection of visually translated heartbeats detected by the sensor technology laid out in Madison Square Park) forms collectivities which are quite poor in intersubjectivity. They lack in intersubjectivity what they gain in numbers of participants. The resulting communities are a conglomerate of at least two anonymous users, whose constituency is governed by laws of expansion and projection of personal data into the public sphere, so that the isolated participant might be inserted into a collective 'anyone + anyone + anymore'.

These collective formations are not automatically innovative, as they often simply correspond to an ephemeral gathering of individuals interacting within a preset environment. Sited but not belonging to a specific site, connecting but most often through technologies which enable connection at a distance, they fall more into the category of what Manuel Castells, in his study of the social uses and social effects of wireless communication in everyday life, has designated as 'ad hoc groupings', which find their 'technological platform in this capacity to call for action or ... for sharing – in instant time'.<sup>18</sup> Required to interact; destined to sustain what individuals are required to do in a society of pervasive computing, namely, to insert himself or herself in a standardising logic of instantaneous community formation; anonymous yet celebrated in his or her embodied response to the site; allegedly 'in direct contact' with the immediate environment yet exceedingly mediated: the spectator turned user is solicited as a *destinataire* (recipient) in ways that do not necessarily produce alternative, redistributed, or critical ways of perceiving.

#### Poly/inter-sensoriality

It is imperative to underline, however, that some environments are more responsive, imaginative, and diversified. As I hope to show below, the exploration of perception in current AR research – including the switching of

percepts between users, the switching of senses from one organ to another, and polysensoriality – does allow for new forms of user relationships. In artworks based on these experiments, the operation of projection is, productively, complicated. There is a whole area of technological experimentation in the field of AR research which is dedicated to translations, multiplication, or intertwining of the senses, notably the work of Carson Reynolds, Alvero Cassinelli, and Masatoshi Ishikawa, from the Ishikawa Komuro Laboratory, and their *Aural Antennae* (2008–): a portable device which translates sound impulses into vibro-tactile stimulus. By swapping audio sensation for haptic sensation, the compact device can be worn as an electronic travel aid for the hearing-impaired. The wearable computing system *Haptic Radar/Extended Skin Project* (2006–) by the same team, which translates visual data into vibro-tactile cues, allows users to feel distant objects on the surface of their skin. *Fingersight* (2006–) (more technically called *Fingertip Visual Haptic Sensor Controller*) by George DeWitt Stetten and Roberta Klatzky from the University of Pittsburgh is a device that maps texture detected by reflected laser light to vibrations felt on the surface of the finger. These inventions are crucial, as they project data in ways that diversify and complicate perceptual and sensorial relations to the environment instead of standardising them or forcing them towards the formation of behavioural collectivities, which discourage intersubjectivity, creativity, and heterogeneity. In AR art, similar research informs the work of Kazuhiko Hachiya, Mathieu Briand, and Sommerer & Mignonneau.

Kazuhiko Hachiya's *Inter Dis-Communication Machine* (1993), for example, designed to be used by two participants or more, requires that each user wears a machine equipped with an HMD (head-mounted display) and a winged backpack. The backpack is equipped with a battery (7.5V), a TV tuner, and a transmitter. A TV antenna is installed inside the wings. The machine uses radio waves to send the video image. Each HMD has two monitors and a video camera but only displays to the user the other user's view of the surrounding space. As participants exchange their visual perspectives, they thus see the immediate environment as the other sees it: differently. Hachiya explains that the machine was indeed created to inject in the user a 'double identity self' as well as 'perceptual confusion over the way in which they see the world. But at the same time the work strongly encourages the participants to recognise what they can see through one another's eyes so that they establish a physical and psychological unity while they are invited to involve themselves with the work.'<sup>19</sup> Projection becomes a modality by which two individuals can connect while being exposed to different views of a shared space.

Exploring a similar yet more complicated device, Mathieu Briand devised for some of his recent installations head-mounted display devices to be worn by users who can then click on a button to swap instantaneously their views

of the environment with other participants, seeing as it were through the eyes of the other. Equipped with a battery-powered, audio-video helmet – a head-mounted display device composed of a built-in video camera on top and a visor located in front of the eyes that doubles as a small screen – the visitor to Mathieu Briand's *SyS\*05.ReE\*03/ SE\*1/MoE\*2* (2002) or *UBIQ: A Mental Odyssey* (2006–) circulates 'hesitantly' in the exhibition space, seeing his or her environment through the visor but also, after clicking on a button attached to a handheld device which activates the swapping of views with other participants, private views of other helmeted visitors circulating elsewhere in the same space at the same time.<sup>20</sup> Most vehemently in *UBIQ* in its MIT List Visual Arts Center version of 2006, real time is a condition of possibility for altered perception in a space of self and other, in which private views become public and are replaced by another's view. The system is only operative if two, three, or four users are engaged in the process, here and now, so as to allow perceptual substitution. This is why Briand – who stipulates that the experience of real time is the main stake of his work – prefers the term 'lived time' to that of 'real time':

if no one is there, there is no image. The exhibition was conceived like this so that the visitor is always at the heart of a work and no longer just facing an icon ... Personally, I try to conceive works within which the visitor becomes a receiver-emitter, systems that don't lead the viewer to a truth or a response, but rather lead the self to introspection.<sup>21</sup>

The uniqueness of *UBIQ* lies in the fact that the work displays perceptual activity on the users' individual visors in the form of micro-projections. It displays it not to propose a similar view of the world but different views, delaying, splitting, and switching them, in situations where one never really knows for sure whose view is being displayed. Interestingly, the delaying mechanisms of *Present Continuous Past(s)* are not far away here, indicating that the rupture between video-projective installations of the 1970s and more recent digital forms of AR installations is not as radical as may initially be thought – a point to which I will return in my conclusion. This is Briand's thrust, for sure, when he declares that, in his work, 'our usual sense references are perturbed, but it is this destabilisation that allows us to discover new things. This is the emission/reception that I'm talking about', and says that he wants 'to branch out into alternative connections in the brain', enabling the user to 'apprehend the world differently through new perceptions and dive into the *inframince*'.<sup>22</sup>

What is crucial to emphasise here is how these works explore interactive projections for the development of communities which can't hold as a homogenised whole. Projection is a hiatus that both links the participants but also marks their difference. The same must be said about Christa Sommerer &





9.4 Christa Sommerer & Laurent Mignonneau, *Mobile Feelings II*, 2003. Two users exchanging their heartbeats at EMAF Osnabrück. Interface device contains a pulse and a touch sensor, a breath sensor, a micro-ventilator, a micro-motor (inside a yellow box), two LEDs, microcontrollers and a Bluetooth module (both inside the blue box). © 2003, Christa Sommerer & Laurent Mignonneau. Supported by France Telecom Studio Créatif, Paris and IAMAS Gifu, Japan. Photograph by Laurent Mignonneau. Courtesy of the artists.

Laurent Mignonneau's *Mobile Feelings I* and *II* (2003–4) (figure 9.4), which invites users to hold 'mobile feelings' phone devices equipped with sensors, vibrators, ventilators, and micro-bio-electrochemical systems that capture their heartbeat, blood volume and pulse, skin conductivity, sweat, and smell: when the devices are held by several participants, a user can select another user and receive that person's bodily sensations, through a vibration, a pulse, a slight stroke, a small wind or humidity. Within each device a Bluetooth module will either establish a direct connection between the devices in a range of 10m or communicate with a PC or PDA connected to the internet or to a mobile phone network. These connections allow the devices to communicate with each other wirelessly and send information to remotely located users. The work reproduces the private-public situation of mobile phones – a reduced sense of privacy combined with the unintentional witnessing of people's private lives. It explores the ambivalence of sharing personal information with an anonymous audience. The innovativeness of these devices lies in the fact that their set-up allows participants to communicate with strangers not, as is now habitually the case, via voice or images, but through atypical body sensations, including vibrations, smell, and sweat. The emphasis put on the tactile experience is also interesting as it reduces but never eliminates the sensory input channels of vision and sound. These channels are constantly negotiating with tactility, even more so in cases when users are strangers remotely located in relation to one another. For Sommerer & Mignonneau, the main objective is 'to get media art off the walls and out into people's lives', by exploring 'novel forms of mobile communications' that might as well include smell and sweat as more private ways of 'feeling and communicating with each other over distance'.<sup>23</sup> The integration of otherwise unperceivable sensorial experiences opens the possibility of exploratory forms of intersubjectivity.

The communities that emerge from such AR projections are communities made out of participants who can never easily settle into a resolved connection, precisely because of the need to decipher the nature of the tactile sensations and bodily properties communicated by the devices. The artists may well say that '*Mobile Feelings* devices allow remote users to feel each others' heartbeat and breath from a distance' almost 'instantaneously' and that the 'strong sense of bodily connection through these devices' is 'similar to "holding each other's heart in their hands" and feeling the other's heartbeat and strength', but users are in fact situated in bodily projections which continuously need adjustment, negotiation, and interpretation. The allegedly 'immediate' haptic feedback is after all a translation of the frequency and strength of the user's heartbeat or breath which is itself initially received via the wireless Bluetooth and relayed as data to the actuator.<sup>24</sup> There is nothing direct, instantaneous, homogeneous, and immediately binding or reflexive in the experiencing of these communicative devices. I believe this to be a strength. As in Briand's *SyS\*05.ReE\*03/*

*SE\*1/MoE\*2* and *UBIQ: A Mental Odyssey*, as well as in Kazuhiko Hachiya's *Inter Dis-Communication Machine*, projection (the projection of views of a shared space; the projection of bodily data in a shared space) is set up so that the proximity, directness, and waning of distance it is assumed to establish are thickened, discontinued, and reconnected, re-distanced, re-mediated, and interrupted by the user's intersensorial acts of adaptation to culturally denigrated bodily properties. There is no community resolution here, although there is intersubjectivity processing in real time and what literary critic Steven Connor, when speaking of inter-sensoriality, has called a complex, 'an indefinite series of integrations and transformations' through the mixing of senses (smell, touch, sound, and vision).<sup>25</sup>

Interactivity – and I follow here Jens Jensen's definition of the term as 'a measure of a media's potential ability to let the user exert an influence on the content and/or form of the mediated communication' – is necessarily contingent, and its productivity as a condition of possibility for community projection has limitations and undesirable consequences.<sup>26</sup> As Slavoj Žižek has pointed out, the uncanny double of interactivity is interpassivity. Whilst spectators of mixed or augmented reality art are now invited to interact with the screen and such relationships might seem to have put an end to the passive consumption of artworks (for example, in some of the works described above, the spectators shout, move, touch, hold, select, put on HMD helmets, and 'participate actively in the spectacle'), these consumptions create situations 'in which', as Žižek says, 'the object itself deprives me of my own passive reaction of satisfaction (or mourning or laughter), so that it is the object itself that "enjoys the show" instead of me, relieving me of the superego duty to enjoy myself'.<sup>27</sup>

Supporting this view, new media specialist Erik P. Bucy has empirically shown that interactivity is not so much located in the properties of technology and communication settings but instead mostly in the user's experience and perception of interactivity. The user might perceive that he or she is participating in a 'meaningful two-way exchange without ever achieving actual control over the content' or when the exchange in fact lacks communicative reciprocity or behavioural opportunities.<sup>28</sup> This perception varies from one user to another, depending heavily on the user's skills and experience in advanced information. Thus, the assumption that two-way communication is necessarily desirable and that it leads to more knowledge does not hold. Interactive settings may increase frustration and confusion and reduce memory when they demand too much time, expertise, and cognitive resources of the user. More importantly, in light of AR's community projections, as Bucy argues, 'at low levels of interactivity, such as that afforded by new media, a certain level of sociality and civic engagement may be cultivated, leading to norms of reciprocity and possibly the formation of social capital ... As the information environment becomes ever more interactive, individualised, and fragmented,

however, shared experiences across unlike groups may diminish, encouraging selfishness and self-indulgence.<sup>29</sup> Interactivity is thus not automatically participation- or sociality-prone. AR artworks are not immune to such fluctuations, but can address them well in works which don't simply equate interactivity, progressiveness, and community.

I have argued here that the shift from real-versus-virtual to real-virtual continuum projective installations, and from self-reflexive projection to projection as a means for or a result of interactivity, becomes problematic when saturated by interactive demands and when it leads to uniform conglomerations of users. It is a fact that, as is clearly the case in the poly/inter-sensorial work of Hachiya, Briand, and Sommerer & Mignonneau, projection is a means of sociality, exchange, and community when interactivity is not an end in itself, when it allows for difference, perceptual shifts and permutations, exploratory forms of synaesthesia, and intersubjectivity. As the work of Jean-Luc Nancy has succeeded in demonstrating, the formation of communities requires *désœuvrement* (inoperativeness) – gaps, *dissensus*, diversity, innovations, delays – to prevent their turning into homogeneities mobilised by problematic operations of inclusion and exclusions.<sup>30</sup> New media projections of images, sounds, smells, light, bodily sensations are at their best when they are open to *désœuvrement*. As such, they gain in complexity when they integrate some of the delaying practices of earlier projective installations, such as those set into play in Graham's *Present Continuous Past(s)*. Therefore, the historical shift in contemporary projection art does not have to be oblivious to the projection devices that precede augmented reality. In fact, it is not. As it remembers and reuses these earlier paradigms, however, AR typically changes the function of delay between projection and spectator, moving away from the goal of self-reflexivity and the disclosure of the split subject, to rethink interactivity and to propose intersubjective forms of community.

#### Notes

- 1 Chrissie Iles, 'Between the still and moving image,' in Iles, *Into the Light: The Projected Image in American Art 1964–1977* (New York: Whitney Museum of American Art, 2000), p. 33.
- 2 Iles, 'Between the still and the moving image.'
- 3 Doug Hall and Sally Jo Fifer (eds), *Illuminating Video: An Essential Guide to Video Art* (New York: Aperture Foundation, 1990), p. 186.
- 4 Claire Bishop, *Installation Art* (London/New York: Routledge, 2003); Julie H. Reiss, *From the Margin to Center: The Spaces of Installation Art* (Cambridge, Mass.: MIT Press, 2001).
- 5 Maurice Merleau-Ponty, *The Primacy of Perception*, ed. James M. Edie, trans. Carleton Dallery (Evanston, Ill.: Northwestern University Press, 1964), p. 136. On Merleau-Ponty's positing of the continuity of internal life and external material

- world, see Dorothea Olkowski and James Morley (eds), *Merleau-Ponty, Interiority and Exteriority, Psychic Life and the World* (New York: State University of New York Press, 1994).
- 6 James Meyer, 'No more scale: the experience of size in contemporary sculpture', *Artforum*, 62:10 (Summer 2004), p. 222.
  - 7 Guy Debord, *Society of the Spectacle* (Detroit: Black & Red, 1983), no. 1.
  - 8 P. Milgram and A. F. Kishino, 'Taxonomies of mixed reality visual displays', *IEICE Transactions on Information and Systems*, E77-D (12) (1994), pp. 1321-29.
  - 9 Ronald Azuma, Yohan Baillot, Reinhold Behringer, Steven Feiner, Simon Julier, and Blair MacIntyre, 'Recent advances in augmented reality', *IEEE Computer Graphics and Applications*, 21:6 (November/December 2001), pp. 34-47; accessed online at [www.cs.unc.edu/~azuma/cga2001](http://www.cs.unc.edu/~azuma/cga2001).
  - 10 J. P. Mellor, *Enhanced Reality Visualization in a Surgical Environment* (Cambridge, Mass.: MIT Press, 1995).
  - 11 Jim Vallino, 'Introduction to augmented reality', online publication, [www.se.rit.edu/~jrv/research/ar/](http://www.se.rit.edu/~jrv/research/ar/).
  - 12 Nicholas Bourriaud, *Relational Aesthetics* (Dijon: Les Presses du Réel, 1998), p. 14.
  - 13 Bourriaud, *Relational Aesthetics*, p. 15.
  - 14 [www.lozano-hemmer.com/english/projects/pulsepark.htm](http://www.lozano-hemmer.com/english/projects/pulsepark.htm).
  - 15 [www.lozano-hemmer.com/english/projects/pulsefront.htm](http://www.lozano-hemmer.com/english/projects/pulsefront.htm).
  - 16 [www.lozano-hemmer.com/english/projects/pulsefront.htm](http://www.lozano-hemmer.com/english/projects/pulsefront.htm).
  - 17 '[I]n installation art from its inception in the 1960s sought to break radically with the paradigm [of traditional painting and sculpture]: instead of making a self-contained object, artists began to work in specific locations, where the entire space was treated as a single situation into which the viewers enter. The work of art was then dismantled and often destroyed as soon as this period of exhibition was over, and this ephemeral, site-responsive agenda further insists on the viewer's first-hand experience ... Instead of representing texture, space, light, and so on, installation art presents these elements directly for us to experience. This introduces an emphasis on sensory immediacy, on physical participation (the viewer must walk into and around the work) and on heightened awareness of other visitors who become part of the piece ... [T]his need to move around and through the work in order to experience it activates the viewer, in contrast to art that simply requires optical contemplation (which is considered passive and detached)'. Bishop, *Installation Art*, pp. 10-11. See also Julie H. Reiss, *From the Margin to Center*, p. xiii.
  - 18 Manuel Castells, Mireia Fernandez-Ardèvol, Jack Linchuan Qui, and Araba Sey, *Mobile Communication and Society: A Global Perspective* (Cambridge, Mass.: MIT Press, 2007), p. 249.
  - 19 Ars Electronica Archive, Prix Ars Electronica 1996, accessed on-line at [www.aec.at/en/archives/prix\\_archive/prix\\_projekt.asp?iProjectID=11264](http://www.aec.at/en/archives/prix_archive/prix_projekt.asp?iProjectID=11264).
  - 20 Gregory Volk, 'Back to the Bosphorus', *Art in America*, 90:3 (March 2002), p. 45.
  - 21 Mathieu Briand, in Evelyne Jouanno, 'Mathieu Briand: hacking contemporary reality', trans. Rosemary McKisack, *Flash Art*, 37:238 (October 2004), p. 115.
  - 22 Briand, in Jouanno, 'Mathieu Briand', pp. 115-16.
  - 23 [www.interface.ufg.ac.at/christa-laurent/WORKS/Frames/FrameSet.html](http://www.interface.ufg.ac.at/christa-laurent/WORKS/Frames/FrameSet.html).
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- Sommerer and Laurent Mignonneau: Interactive Art Research* (Vienna: Springer-Verlag, 2009), pp. 202, 207.
- 25 Steven Connor, 'Intersensoriality', talk given at the conference on The Senses, Thames Valley University, 6 February 2004, online publication, [www.bbkc.ac.uk/english/skc/intersensoriality/](http://www.bbkc.ac.uk/english/skc/intersensoriality/).
  - 26 Jens F. Jensen, 'Interactivity: tracking a new concept in media and communication studies', *Nordicom Review*, 19:1 (1998), p. 201. Jensen reconfirmed his definition in 'The concept of interactivity - revisited: four new typologies for a new media landscape', *ACM International Conference Proceeding Series*, 291 (2008), p. 129.
  - 27 Slavoj Žižek, 'The interpassive subject', *Traverses*, no. 3 (1998), online publication, [www.lacan.com/zizek-pompidou.htm](http://www.lacan.com/zizek-pompidou.htm). I thank Darin Barney for referring me to this important text.
  - 28 Erik P. Bucy, 'Interactivity in society: locating an elusive concept', *The Information Society*, 20 (2004), p. 376.
  - 29 Bucy, 'Interactivity in society', p. 379.
  - 30 See Jean-Luc Nancy, *The Inoperative Community* (Minneapolis: University of Minnesota Press, 1991).