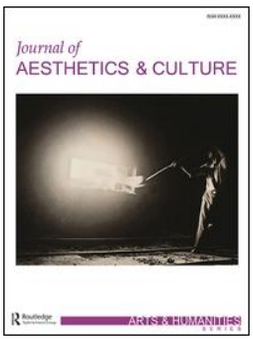

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Bodies and real-time interfaces: in video performance and interactive digital 3D installation art by VALIE EXPORT and Jette Gejl Kristensen

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Abstract
This article considers the interface as the physical interaction of human body and technology inspired by the theories of Maurizio Lazzarato, Brian Massumi, and Anna Munster. Through artworks by VALIE EXPORT (*Adjunct Dislocations II*) and Jette Gejl Kristensen (*Hyperkinetic Kayak*) it examines how bodies and advanced technology together perform real-time interfaces in concrete spaces launching complex events of affective encounters.

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Keywords: *interface; body; video performance; interactive digital 3D installation; real-time; VALIE EXPORT; Jette Gejl Kristensen*

In her thought provoking essay 'A Cyborg Manifesto' (1991) Donna Haraway strikes a blow for the cyborg. She finds today's machines "disturbingly lively" to an extent that, "have made thoroughly ambiguous the difference between natural and artificial, mind and body, self-developing and externally designed, and many other distinctions that used to apply to organisms and machines."[1] It is the reworking of the nature/culture opposition that makes the idea of the cyborg so desirable to her feminist mindset because the fusion of human and machine questions the Western subject and therefore presents a liberating potential for women. It would be liberating to tell the human myth from the point of view of the cyborg and throw away the Western myth of origin based on the "natural" family, the original unity, Adam and Eva, that produces specific human relations and leaves the woman/mother to designate nature and man/patriarch to culture. To install the cyborg as the first human instead is perhaps not so far-fetched after all, if we take Nigel Thrift at his word. He explains

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that the human body is characterized by "its un-paralleled ability to co-evolve with things, taking them in and adding them to different parts of the biological body producing something which, if we could see it, would resemble a constantly evolving distribution of different hybrids with different reaches. [...] [The] *human body is a tool-being*."[2] In the end, this also corresponds very well with the image of the first human and its first tool, the biface or handaxe. The biface fits into the palm of the hand as if it had grown out of the body, the first ever interface.

To consider the human body in its physical interaction with technology is to consider the interface. This article considers works of art—by VALIE EXPORT and Jette Gejl Kristensen—that focus on the live situation of how bodies interact with advanced technology in a signaletic exchange situation. The focus is on that which goes on as it goes on, so to speak. The key concern is not the message being sent, but the mere fact that something takes place in time. The signaletic is understood as the sending and perceiving of sense material over time and the endless processing of that material. The works examine how bodies and advanced technology together perform real-time interfaces in concrete spaces and thereby distribute affective connections and encounters and how the signaletic is rendered in continuous feedback loops.[3]

In 1960s, the Austrian artist VALIE EXPORT (b. 1940) began an investigation into the relations between female body, camera, and screen. These early intermedia works display an interest in the possibilities for time–space dislocations offered by the new electronic media. EXPORT was part of an international avant-garde movement that invented the notion of Expanded Cinema, which was an investigation of film as materiality and process and activated the live context of watching — in bringing together live image and body performance in a situation where the viewing position was activated. Expanded Cinema was deeply influenced by the political movements of the 1960s and wanted to heighten awareness of the structural and political implications of common viewing habits; they also aspired to change these habits.[4] For EXPORT, this resulted in an age-long investigation of the female body as sign and materiality. She saw the use of technology as a way to set the female body free of its hitherto status as biological essence.[5] Technology offered new ways to open the body to its surroundings and thereby question the status of the subject, rethinking the body in terms of what some today would call post-humanism. Some of her early works can be seen as first steps toward an understanding of the human–machine interface and, perhaps, even easier to understand the matter with, as the computer is not yet involved. By using a simpler and more transparent technology, she exposes the whole operation of human–machine interaction in an almost pedagogical manner; however, the unusual character of her un-habitual imagery can sometimes be hard to grasp at first sight.

AUTOHYPNOSIS (concept 1969/presentation at Steirischer Herbst, Graz, 1973) is an early and simple interface that questions mechanisms of reward and punishment in society. It is an interactive video installation that encourages the viewer to step on a pattern of arrows and words on the floor; the words being: I, love, resignation, experience, *medi[tat]ion* (i.e. mediatization), and please note that "tat" in German translates into action! If you crack the code, a signal activates system feedback and the viewer is rewarded in the form of a cheering crowd on a video monitor.[6] The video installation demonstrates how bodies respond to media, and EXPORT makes this point especially clear when she uses the bracketed word *medi-[tat]ion* by which she suggests that media acts, or, makes action happen as was the keyword in the 1960s (cf. happening). In this interface, she focuses on making viewers experience actualized time as she has them trigger a sequence of events through their bodily interaction with technology. Another work that focuses on the experience of actualized time is *ZEIT und GEGENZEIT* (Time and Countertime) (1973), though without the active participation of viewers. It is a video installation showing on videotape the act of melting ice played backwards, while an actual plate of ice cubes is placed in front of the video monitor showing the melting of ice in real time.[7] It is the juxtaposition of backward and forward time that makes the duration of time visible to the viewer. In these works, she dealt with technology's relation with time and the human body's relation with both.

But let us turn to actual interface situations and the video performance *Adjunct Dislocations II* (1973/1978) performed at the festival Pro Musica Nova in May 1978. The first step toward this

performance was two 8-mm films and one 16-mm film she made in 1973, also called *Adjunct Dislocations*, in which she placed two cameras on her body, one on her chest shooting forward and one on her back shooting backwards. The idea was to make a two-point of view film that would "show" the (invisible) body as the interface between the two opposite shots, placing the moving body at the center of an actual space to prove that, at all times, it is situated in relation with space.[8] She would walk through the city filming back alleys, main streets, stairways, backyards, etc., making up an on-screen multifaceted moving cityscape. But it was still only a film projecting the illusion of movement onto a screen. Even though the screening simultaneously would show three images on the screen, cf. the title *Adjunct Dislocations*, it would only represent an illusion of movement in time, as conventional film technology is, in fact, composed of single shots brought about to move, they are not actually moving themselves (see Figure 1).[9]

It was not until the Pro Musica festival in 1978, when she employed video together with the body in a performance, that she was able to further develop the notion of the body moving in time and space. She utilised the body camera concept to make a live performance, this time with a video camera transmitting the live signal to four monitors placed between the performer and her audience. EXPORT, with the two cameras attached to her body, would slowly walk to the center of a spiral installation in the middle of the room. Thus, the audience would simultaneously be witnessing the live performance and the live transmission of the performance. The performance captures the essence of video and its relation to time. It demonstrates the distribution of time taking place in the constant movement of the image, the different camera angles cutting the experience of space into a multifaceted real-time transmission, in which time is rendered as un-chronological flow of images on several screens. EXPORT seems to be unfolding video as the crystallization of time according to Maurizio Lazzarato's analysis with her emphasis on the real-time quality of the medium. According to Lazzarato, video technology is the first to imitate time, to be time, and can therefore not represent the world.[10] Contrary to film, which consists of a montage of still images creating an illusion of one moving image, video is a flow of light on the magnetic tape. It is made up of rasters of dots and lines, a flickering web.[11] To be accurate, video is not a recording technique (though it can be used as such); it is a technique for capturing what is already there, and framing it. It is the endless processing and rendering of time:

Figure 1. VALIE EXPORT: *Adjunct Dislocations* (1973). Expanded cinema. Photo: Hermann Hendrich. © VALIE EXPORT.

> The distinctive feature of the video camera is the ability to receive *inputs* and to send *outputs* in real-time. The work of video technology lies in its entirety between input and output: in its connection to power, and the processing, transformation, and re-circulation of power so that it may be processed once again.[12]

In the 1978 version of *Adjunct Dislocations*, EXPORT demonstrates that the body belongs to the same modality as the signaletic material rendered by the video technology and that the human body contributes to the endless contraction and distribution of time together with technology. The body is not alien to technology; on the contrary, the body and the time crystallization machines have in common that they act through time. With reference to Friedrich Nietzsche, Lazzarato explains that it is in the body that we should look for more reality, not in the soul (see Figures 2 and 3).[13]

The Danish artist Jette Gejl Kristensen (b. 1963) has worked with 3D technology since 2001 when she first produced the film trilogy *Stone*, *Grass*, and *Fabric*. The films are shown to an audience in a classic cinematic setting. These early films are not interactive, but experiments into whether or not abstract virtual forms can move the material body, and actually, the virtual abstraction proves to have some physical impact on the body. Her first work *Stone* (2001) gives an overwhelmingly direct sensation of drowning. The 3D signal creates a wave that slowly moves out into the room on floor level, lapping over the viewer's feet and rising up over one's body and a feeling of suffocation occurs when the wave reaches the throat.

In Kristensen's interactive digital 3D installation *Hyperkinetic Kayak* (2009–2010), the computer and the viewer together produce a virtual space as a result of digital signals from the computer's processing of data and the viewer's body movement in the kayak.[14] The installation thus launches a live event. In moving the kayak paddle, the viewer interacts with the computer program and the interaction produces different visual on-screen phenomena creating a 3D virtual environment between the screen and the person seated in the kayak. The computer graphic framework forms virtual graphic icescapes that you sail into as you move both above and under sea level and at intervals beautiful, abstract, and richly colored geometric patterns, sometimes resembling the Northern lights, emerge and move in your direction. You are literally surrounded by sound and image. Under water, the sound is somewhat deep and thick, or like being inside a diving bell,

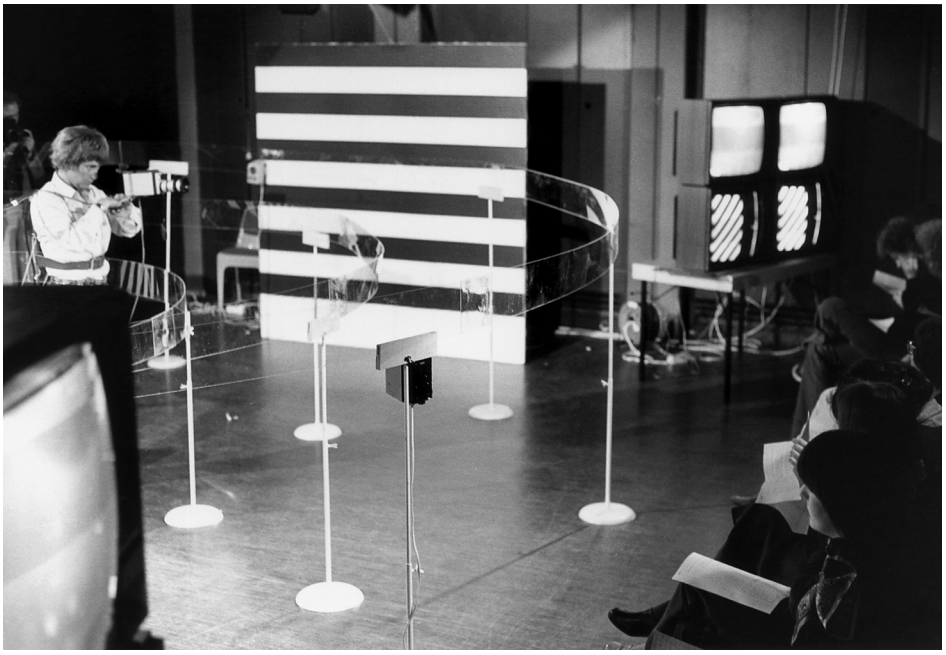

Figure 2. VALIE EXPORT: *Adjunct Dislocations II* (1973/1978). Closed circuit installation, closed circuit performance. © VALIE EXPORT.

Figure 3. VALIE EXPORT: *Adjunct Dislocations II* (1973/1978). Closed circuit installation, closed circuit performance. © VALIE EXPORT.

whereas when you fly into the sky it gets higher and clearer. So, by moving your body in the kayak you move the computer to transmit digital signals that again move your experience in the kayak in a perpetual image making process (see Figure 4).

The two basic techniques used for the computer graphic framework are the wave equation and volume rendering. The wave equation secures a horizon in the 3D universe and the volume rendering sets the framework for the deep space, and together they create a virtual cube, a 3D coordinate system, with a water horizon inside surrounded by cyber space outside the cube. Inside this virtual universe, the virtual kayak is

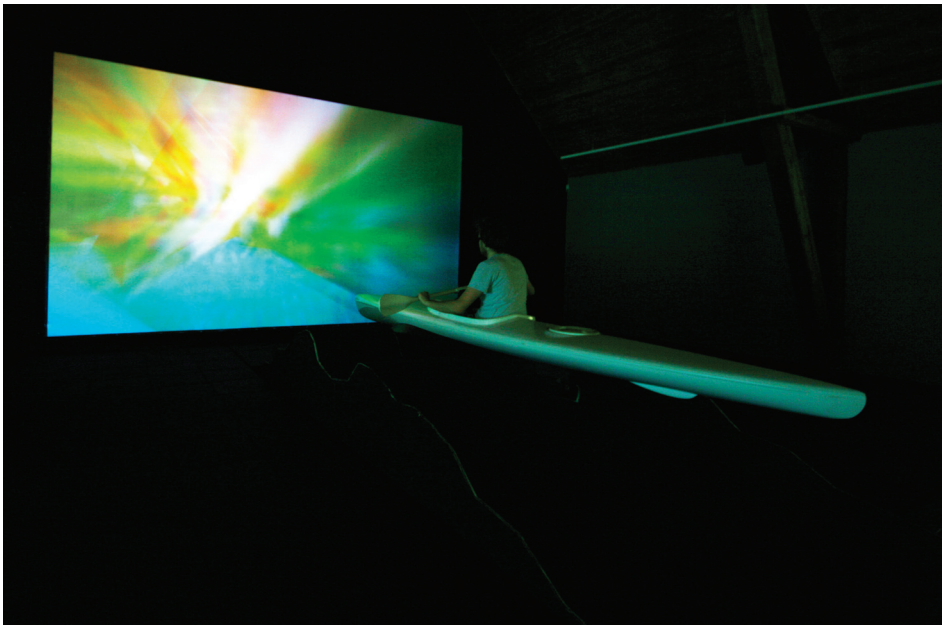

Figure 4. Jette Gejl Kristensen: *Hyperkinetic Kayak* (2009–2010). Interactive digital 3D installation. © Jette Gejl Kristensen.

floating around until somebody gets into its real-life match and paddles away activating the computer. The computer gets online information fed from Greenland. The work is connected to actual measurements of the temperature at Qaanaaq in the North Western part of Greenland, which means that the *Hyperkinetic Kayak* changes with climate change. As the temperature falls or rises, the 3D universe and the movements of the kayak are affected. Every time the computer starts up it collects the current temperature in Qaanaaq, which combines with other parameters such as light, color, sound, reaction time, interaction with kayak, etc., in the volume rendering. The program has seven different main frames from which it chooses randomly, and into which all the variable data are fed creating ever-new oscillations and thereby ever shifting and live visualizations from the data (see Figure 5).

While it is Kristensen's intention that the viewer should not "meet the medium," or see the digital, meaning that the image should not at any stage dissolve into pixels, it is however her aim, that there should be bodily recognition of the movements in the boat and of the sense of moving around in a landscape, the main focus being on the sensory-motor interaction with the computer.[15] In this sense, Kristensen draws attention to the relations between body, computer, and image production. She does not want the viewer to become absorbed in mimetic representations of landscape, rather she wants to drive the viewer into physical interaction with the computer in a way that makes the viewer aware of his or her own participation in the production of images and the time factor. Like video technology's relation to image making, must be understood in relation to time, according to Lazzarato, so must digital technology, as the computer also produces an un-chronological flow of images, and in both cases the image must be understood as tactile, as it is subject to the tangible interference of the user.[16] In the kayak, it is through the user's corporeal kinetic engagement—the interface with the computer—that the live event is processed and the body's actions continuously rendered by technology (see Figure 6).

The two interface-pieces, one analogous the other digital, however different in technology, demonstrate the production of an event from live material of the body and live transmission of video and computer data on a screen. Neither of the projections can be understood as representations in the traditional sense. As the image is continually updated in real-time, it reflects changes in the referent and must rather be considered presentations of what goes on as we view.[17] Another common denominator is that the body plays an integrated part in the interfacial circuit; in the case of EXPORT it is the performer's own body and in

Figure 5. Jette Gejl Kristensen: *Hyperkinetic Kayak* (2009–2010). Interactive digital 3D installation. © Jette Gejl Kristensen.

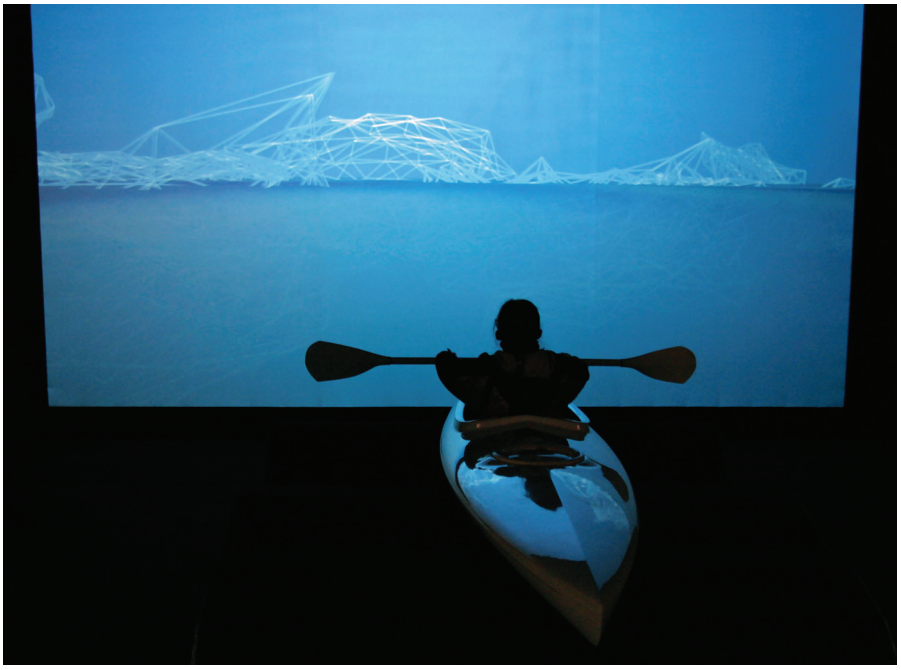

Figure 6. Jette Gejl Kristensen: *Hyperkinetic Kayak* (2009–2010). Interactive digital 3D installation. © Jette Gejl Kristensen.

the case of Kristensen it is the body of the viewer. New media art of this kind point to the sensory-motor interaction of body and environment and it opens the user's eyes to new ways of perceiving and sensing his or her being in the world as an embodied being.

To qualify thoughts on the interaction between humans and machines, Anna Munster distances herself from what is generally thought on the interface. She is trying to get away from the metaphor of the face, or what she calls a *facialized logic*[18] that marks most thinking of the body–computer interaction, as it produces opposition between the human and the inhuman machine.[19] She believes that the Western mindset that privileges the individual subject and its individual visual facial expression as the sign of the soul haunts the way we generally conceive of the computer as alien and inhuman. This again promotes anthropomorphism as a cover-up in computer design to meet alienation tendencies, for instance in phenomena such as the Happy Mac icon from Apple, or "The Norns" from Cyberlife.[20] Contrary to this, Munster encourages a way of thinking about the interface that downplays faciality in favor of thinking of the machine as both a contact surface and disappearance of the space of difference between humans and computers.[21] This marks a shift in the way of thinking, from a preoccupation with what constitutes the difference between artificial and human intelligence to a focus on what the interaction between matter and code *does* to our understanding of embodied life. It is more interesting how digital code relates to bodies and how this relation produces affect.

More specifically, Munster defines the interface as a fold, "a topology and movement of extension and envelopment between body and computer" and compares to the baroque notion of corporeal experience as that which, "extends and intensifies and, in so doing, splits, folds or inflicts away from a sense of the body as bound and closed to the outside world."[22] And she concludes that, "Hence the body-computer interface in new media is typically both intensely embodied and diffusely abstract;"[23] as is the case with *Hyperkinetic Kayak*. The fold is a useful notion as it connects the inner and the outer world and should be thought of as a platform of exchange, an interstitial space between matter and code. But although Munster talks of situations and dynamic processes, she still argues that the relation between human and computer is a case of data (the body), which are "unrepresentable" matter, being translated into code (the computer).[24] As a consequence she maintains

that computer renderings are *representations* of bodies in situations. In this explanatory model, the image will always at some time be fixed in space. She still thinks of the interfacial fold as a figure to bridge the gap between two disparate materialities. But if we take Lazzarato into consideration, and our two art cases, *Adjunct Dislocations II* and *Hyperkinetic Kayak*, and focus on what bodies and video/digital technology have in common: that they both act through time, and that the essential feature of video/digital is the flow of images, then, the interfolding of the outside and the inside world in the interface as a *non-representational* situation for the distribution of affective encounters makes good sense.

Let us return to *Adjunct Dislocations II* and *Hyperkinetic Kayak* and consider how the works can be understood as producer of events rather than representations. At any rate, compared to the previous discussion, it seems fruitless to think of both these works as representing any meaning prior to their own happening. In the philosophy of Brian Massumi, the body in movement is a point of departure, yet it is a thinking of the body that "means accepting the paradox that there is an incorporeal dimension *of the body*. Of it, but not it. Real, material, but incorporeal. Inseparable, coincident, but disjunct."[25] To Massumi, the body is real, yet abstract, or better virtual, which is suggested by both titles of the artworks, and both works also trigger other concepts central to Massumi, such as affect, sensation, and event.

Seated in the *Hyperkinetic Kayak* the user will move the vessel and activate the computer program causing motions that will affect back at the user. The user's physical movements are processed in the computer program and are returned in the renderings of the computer. The renderings take the form of a live surrounding virtual landscape and soundscape and it affects the viewer in a perpetual loop of ever-new creations. To be affected is when an automatic response is triggered in the body system; it is an intensity, a suspension, a passion; but it is radically different from emotion, which belongs to another register. Emotion has to do with subjective content and the sociolinguistic fixing of experience in semantic chains of signification.[26] Affect, on the contrary, is a physical reaction that takes place in the body, and yet, it is also that which escapes confinement in the particular body; it is also the body's potential for interaction, that which makes us react in the split of a second.[27] Affect is a virtual turning point, a possibility for shift of direction in the system. It carries with it the possibility of turning our habits upside down, a shock to the system.

But a ride in the kayak also confronts the viewer with the fact that his or her movements and doings happen in a specific environment, and how his or her actions are embedded in, and responsive of, that particular environment, how body and surroundings are relational and interdependent, and how his or her senses are synaesthetically connected. Massumi explains the enfolding of the exterior world in the interior, that is, the body's spatiality (though he would rather think of the body as radically open) to take place through a deep layering of different modes of perception. Thus, *proprioception* provides feedback on the relative positions of bodily parts via muscles and ligaments. Proprioception again is contrasted with *exteroception*, the body's tactile perception of the outer world (e.g. through sight, taste, smell, touch, hearing, and balance) and with *visceral perception*, which delivers information on the state of the inner organs. Exteroception, the realm of the tactile, belongs to the domain of the skin, which creates the contact surface between the subject and the outwardly perceived objects. Proprioception folds tactility into the body, in the sense that it closes off the skin's contact with the outer world and thereby joins the epidermis and the viscera. Proprioception translates the easy performance of the body's encounter with objects into relational muscular memory. It is the cumulative memory of skills, habits, and bodily attitudes. One should imagine that it is through the different layers of senses in the body that communication between the inner and the outer world and vice versa takes place.[28]

In her performance, VALIE EXPORT would have known about the audience watching her from a point of view from where she could not see herself. She would have been aware of this problem, as she had staged the point-of-view of the other in the four TV monitors. The audience would be watching both her performance in real life and the rendering of that same movement on-screen. The performance demonstrates what Massumi calls *mirror-vision* as opposed to *movement-vision*. He refers to our everyday experiences as mirror-vision.[29] Mirror-vision should be

understood as a simple axis in which you see yourself from a fixed point. Mirror-vision is not movable because to see yourself in a mirror you must keep your gaze still. You cannot see yourself move. This is in fact the conscious experience of sight that we move around with in everyday life. It is like seeing from one point on an axis to another. The perspective is simple. You can, of course, change your point of view, but the new viewpoint will also be static. The double-identity structure of the mirror image can quite unproblematically be transferred to an intersubjective perspective. We mirror ourselves daily in one another.

By contrast movement-vision, which we also use, but which is invisible to ourselves, consists of constantly moving positions and hence perspectives. Mirror-vision and movement-vision are discontinuous and the cleft between them cannot be filled, but it may be crossed. You can never see yourself move as others see you move. If you could, you would have moved radically into the position of the other. But since you cannot concretely move outside yourself this cannot be done. Movement-vision is relational and is guaranteed by an observer. However, it is possible for the subject to assume this observer-position *virtually*. By assuming the virtual position, the subject moves outside himself or herself. Seeing oneself as others see one actually means finding yourself on the axis of sight at a tangent to the self and the other, understood both as factual entities and as conditions for identity. It is to enter a space that opens out an external perspective on the relation between the self and the other, on the subject–object axis. The tangential point at which movement-vision meets mirror-vision and diverges from it is the space between the subject and object poles.[30]

Adjunct Dislocations II is the acting out of the theory of mirror-vision and movement-vision in time. EXPORT's own position embodies mirror-vision (though with an applied backward sight) and the audience watching the performance both live and mediated embody the movement-vision position, and the whole set-up stages, or illustrates, the virtual capacity of the body, but in "real" life it takes the co-operation of both video technology and several human bodies to make the event visible in time and space.

Massumi asserts that the body is faster than both thought and language. The continuous transporting of information through the sensory apparatus—the fact that the body is a constantly vibrating, productive organism, radically open to the world, a recipient and producer of happenings, means that the physical body is faster than language or thought. One needs to imagine that the body is a split second ahead of thought. The body is pre-present whereas thought is present, and it is this very ultra-short distance between the two that constitutes the virtual, the potential that is about to happen. The virtual capacities are the body's emergency services. The sensation one sometimes has that something is happening too quickly, or that it's happening before it actually happens, can be attributed to these virtual capacities.

The works stage the opportunity for millions of events to take place, events that cannot be fixed in representations as they are the result of the continuous interaction between humans and machines acting through time. In the Massumian terminology, the pure event is super-empirical, as it emerges in relation to both past and future, it is the virtual pure potential.[31] The aesthetics of the interface can be said to be the moving virtual environment created by the encounter of body and machine. It has shown itself to be both a contact surface and the disappearance of the space of difference between humans and machine, as Munster would say. Through the envelopment of body and computer, or video installation, an intensification of the bodily senses is produced and the viewer will sense his or her own sensing.

Notes

1. Donna Haraway, 'A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century', in *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991), 152.
2. Nigel Thrift, *Non-Representational Theory: Space, Politics, Affect* (London and New York: Routledge, 2008), ebook 445 (my emphasis).
3. Bodil Marie Stavning Thomsen in her introductory article for this volume.
4. Roswitha Mueller, *VALIE EXPORT: Fragments of the Imagination* (Bloomington and Indianapolis, IN: Indiana University Press, 1994), 1–3.
5. Ibid., 59. This was also Donna Haraway's point of departure.

6. http://www.valieEXPORT. at (accessed July 13, 2011).
7. Mueller, *VALIE EXPORT*, 71.
8. http://www.valieEXPORT. at (accessed July 13, 2011) and http://www.youtube.com/watch?v=R8poj5NXf6c (accessed July 22, 2011).
9. Maurizio Lazzarato, *Videophilosophie. Zeitwahrnehmung im Postfordismus* (Berlin: b–books Verlag, 2002), 65.
10. Ibid., 14.
11. Ibid., 67.
12. Ibid., 79. My translation. Original German quotation: "Die Besonderheit der Videokamera besteht darin, in Realzeit *inputs* zu empfangen und *outputs* auszusenden. Zwishcen *input* und *output* ist die ganze Arbeit der Videotechnologie enthalten: sich mit einem Strom verbunden, ihn bearbeiten, transformieren und ihn wieder der Zirkulation übergeben, damit er neu bearbeitet werden kann."
13. Ibid., 12.
14. *Hyperkinetic Kayak* was produced in co-operation with computer scientist Peter Møller-Nielsen, Aarhus University and Centre for Advanced Visualization and Interaction (CAVI), Aarhus University, and Rasmus Lunding produced the sound.
15. Conversation with the artist July 8, 2011.
16. Lazzarato, *Videophilosophie*, 91.
17. Lev Manovich, *The Language of New Media* (Cambridge, MA and London: The MIT Press, 2001).
18. Anna Munster, *Materializing New Media: Embodiment in Information Aesthetics* (Hanover and London: University Press of New England, 2006), 128.
19. Ibid., 138.
20. Ibid., 124–125.
21. Ibid., 132.
22. Ibid., 118–119.
23. Ibid., 119–120.
24. Ibid., 139.
25. Brian Massumi, *Parables for the Virtual. Movement, Affect, Sensation* (Durham and London: Duke University Press, 2002), 5.
26. Ibid., 27–28.
27. Ibid., 35.
28. Ibid., 58.
29. Ibid., 46ff.
30. Ibid., 51.
31. Ibid., 58.