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Understanding the Telematic Apparatus

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Introduction

Telematic performances connect performers (musicians, dancers, actors, etc.) situated at two or more geographically distributed locations. They are connected by technologies that enable live interaction. As suggested by the terms and neologisms given to these works—"networked music," "distributed choreography," "cyberformance," or "cybertheater"—they are frequently referred to and discussed within the domain of the concert, dance or theater performances.[6] From this perspective, telematic performances appear as a remediation of classical performance formats, a remediation first made possible by telephone, radio and satellite technologies of the 1970s, then becoming more popular with the advent of the internet and, since the 2000s, Internet 2.[7] Arguably, this understanding leads to such works being perceived either through an esthetic lens, in which they are seen as emulating the traditional formats, and to which their characteristics appear as disrupting—or enriching—elements that ought to be reduced—or explored; or through an experimental lens, in which an acceptance of phenomena like latency and glitch in signal processing contribute—along with the virtualization of sound, image, space, and body—to the development

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[6] See Pauline Oliveros, "Networked Music: Low and High Tech," Contemporary Music Review 28, nos. 45 (2009): 433–435; Lisa Marie Naugle, "Distributed Choreography: A Video-Conferencing Environment," A Journal of Performance and Art 24, no. 2 (2002): 5662; Helen Varley Jamieson, "Adventures in Cyberformance. Experiments at the Interface of Theatre and the Internet," (Master's Thesis, Queensland University of Technology, 2008); and Maria Chatzichristodoulou, "Cyberformance? Digital or Networked Performance? Cybertheaters? Virtual Theatres?... Or All of the Above?," in *CyPosium - The Book*, ed. Annie Abrahams and Helen Varely Jamieson (Brescia: Link Editions, 2014), 19–30.

[7] See Jay David Bolter and Richard Grusin, *Remediation. Understanding New Media* (Cambridge: MIT Press, 1999).

of an novel and impactful audiovisual apparatus. In such a perspective, all of a sudden, telematic performances can appear as multilayered and complex arrangements of human and non-human agents. They can thus serve as a trope for social interaction under the conditions of a highly digitized society organized in a complex layering of networks, leading to models of subjectivation that have been described as "nodal subjects."[8]

The present paper advocates the latter approach, that of experimentation. It looks beyond the artistic field to show how certain aspects of telematic performances that appear as deviations from classical performative formats, are in fact essential to their character and quality as a standalone artistic genre. In the first part of the paper, we look at Alan Turing's contemplations about machine intelligence with an unconventional reading of the "Turning Test." With the help of Vilém Flusser's cultural anthropology, we then proceed from a descriptive to a more theoretical understanding. Finally, in the main part of this paper, the findings are applied to our own artistic practices with telematic performances.

The "Turing Test" as Telematic Performance

John Cage's *Imaginary Landscape no. 4* for 24 performers on 12 radios is considered by some to be the first work of networked (music) performance.[9] In 1950, one year before its composition, Alan Turing published his seminal article *Computing Machinery and Intelligence.* This proposed an experimental system to tackle the question of whether machines can think. Though not commonly regarded as such, this "Imitation Game"—later known as the "Turing Test"—could be considered an early conceptualization of a telematic performance.[10]

In the test, one person (C) communicates in real time with two other entities (A and B) located in a "room apart."[11] Indeed, this might apply to any dialogic communicative process involving a mediating interface—a phone call for example—but, the interface in the "Turing Test" is not just a tool to overcome distance or physical detachment as with earlier, 19th century inventions like the telegraph or the telephone. On the contrary, it is precisely the separation of spaces that is essential to Turing's bi-directional experimental system. Here, distance is not a deficiency, but an unrenounceable prerequisite. The experiment is enacted in two phases. First, an interrogator (C) has to determine which of the participants in the "room apart" is a man (A) and which is a woman

[8] See Vilém Flusser, "Die Stadt Als Wellental in Der Bilderflut," in Nachgeschichten. Essays, Vorträge, Glossen, ed. Vilém Flusser (Düsseldorf: Bollmann Verlag, 1990), 173–180; and Phillip H. Gochenour, "Distributed Communities and Nodal Subjects," New Media and Society 8, no. 1 (2006): 33–51.

[9] See Alvaro Barbosa, "Computer-Supported Cooperative Work for Music Applications" (PhD diss., Pompeu Fabra University, 2006); and Roger Mills, *Tele-Improvisation. Intercultural Interaction in the Online Global Music Jam Session* (Cham: Springer International Publishing, 2019).

[10] See Alan M. Turing, "Computing Machinery and Intelligence," Mind 59, no. 236 (1950): 433–460.

[11] Ibid., 433.

(B). The objective of the man (A) is to influence the interrogator (C) to misidentify them; the objective of the woman (B) is to help and support the interrogator (C). In a second version of the test, crucial to Turing's argument, the man (A) is replaced by a machine, more specifically, by a digital computer. How well will the computer perform in the "Imitation Game?" "Will the interrogator decide wrongly as often, when the game is played like this, as he does when the game is played between a man and a woman? These questions replace our original, 'Can machines think?'"[12]

To make the test work, Turing introduces a "fairly sharp line between the physical and the intellectual capacities" of the humans and machines.[13] Visual information, "tones of voice," and even handwriting are excluded as communication channels as these could give unwanted hints as to the gender or species of the respondent. Consequently, Turing only allows written language and proposes a teleprinter as "the ideal arrangement" for communicating between the two rooms.[14]

For many commentators, the complete erasure of embodiment on the level of signal processing in this "inaugural moment of [the] computer age" would become the idiosyncratic feature of cybernetic theory.[15] In such a model, information is conceptualized as fully untouched by its physical carrier. Interpretations of the "Turing Test" nevertheless strongly differ on the scope and consequences of such inherent disembodiment. For Dieter Mersch, on one side of the argument, the experimental system is incapable of proving whether machines are able to "think" because the entities communicating in the test are merely "brains in a vat." Rather than mistaking machines for humans, the test only seems to prove that humans are nothing other than discarnate machines, mistaking human for machines. Turing is accused of being a victim of his own cybernetic premises, the argument merely tautological.[16] In the introduction to her seminal book, *How we Became Posthuman,* Katherine Hayles adopts a contrary position and argues that the manner in which the initial version of the "Imitation Game" introduces the notion of gender, irreducible to merely symbolic form, exemplifies the "importance of putting embodiment back into the picture."[17]

It is not within the scale and scope of this paper to evaluate contending interpretations of the "Turing Test," but rather, to focus on its specific arrangement; one that entails a separation of physical spaces and a mediating interface that determines input value, and inevitably includes filtering processes that effect output value. In this sense, the test is meticulously designed, not only with regard to the mediation of embodiment (in this case: exclusion) on a representational plane, but also in relation to a number of other issues that similarly characterize artistic telematic performances. Beyond technical aspects, like the latency of signal processing which Turing was

[12] Ibid., 434.
[13] Ibid.
[14] Ibid.
[15] Katherine N. Hayles, *How We Became Posthuman. Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago, London: The University of Chicago Press, 1999), xi.
[16] See Dieter Mersch, "Turing-Test oder das 'Fleisch' der Maschine," in *Körper des Denkens. Neue Positionen der Medienphilosophie*, ed. Lorenz Engell, Frank Hartmann, and Christiane Voss (München: Wilhelm Fink Verlag, 2013), 9–27.
[17] Hayles, *How We Became Posthuman*, xiv.

obviously aware of, this chiefly concerns the *fragmentation* of the time-space continuum (as a perceptual phenomenon), and the *functioning of the mediating apparatus* (in a conceptual perspective).[18]

Fragmentation of Spaces and Bodies

Due to both the bi-directional organization of multiple spaces and the maneuvering of a connecting interface, telematic performances negotiate a fragmented environment of intricate layers which cannot be perceived or overseen easily.[19] This results in a constant uncertainty regarding what is *here* and what is *there,* and when actions *actually* occur. And it results in the decentering of the participating subjects understood as nodes in a multiplicity of relations.[20] In the "Turing Test," the interrogator's uncertainty about the partly concealed second room is of course intended, but the vast literature in the aftermath of Turing's *Computing Machinery and Intelligence* shows how much disarray the proposed test set provoked. Not only is it contested as to whether the "Imitation Game" involves two or three separate spaces, but there also seems to be confusion regarding the exact information given to the interrogator about the entities in the room(s) invisible to him or her.[21] In the original "Imitation Game," the interrogator knows that there is a man (A) and a woman (B), but ignores who is who. When in the second test setting, the machine replaces the man (A), Turing does not explicitly say whether the interrogator is informed about this change. As a consequence, two fundamentally different interpretations emerged: In the "standard reading" a.k.a. "The Standard Turing Test," the interrogator is aware that the game is now played between a digital computer (A) and a woman (or a human, B).[22] By contrast, in the "literal reading" a.k.a. "The Original Imitation Game Test", the interrogator still interrogates with the premise that there is a man (A) and a woman (B), resulting in a "sort of meta-game, of which the interrogator is unaware."[23]

Again, it is not the intent of this paper to decide upon which reading of Turing's paper is correct, whether Turing's thoughts were "not expressed with perfect lucidity," or whether he "was tempting us to misread."[24] However, the confusion demonstrates how the test's experimental

[18] Turing, "Computing Machinery and Intelligence," 434f.

[19] Franziska Schroeder and Pedro Rebelo, "Sounding the Network: The Body as Disturbant." *Leonardo Electronic Almanac* 16, no. 4 (2009), accessed November 9, 2019, https://www.leoalmanac.org/leonardo-electronic-almanac-volume-16-no-4-5-april-may-2008.

[20] Robin Renwick, "The Relation of Nodalism to Network Music," *The International Journal of New Media, Technology, and the Arts* 11, no. 2 (2016): 21–28.

[21] Ned Block, "The Mind as the Software of the Brain," in *Thinking. An Invitation to Cognitive Science*, ed. Edward E. Smith and Daniel N. Osherson (Cambridge: MIT Press, 1995), 378.

[22] Gualtiero Piccinini, "Turing's Rules for the Imitation Game," in *The Turing Test. Studies in Cognitive Systems,* ed. James H. Moor (Dordrecht: Springer Netherlands, 2003), 111; Susan G. Sterrett, "Turing's Two Tests for Intelligence," *Minds and Machines* 10, no. 4 (2000): 542.

[23] Piccinini, "Turing's Rules for the Imitation Game," 111; Sterrett, "Turing's Two Tests for Intelligence," 542.

[24] Andrew Hodges, *Alan Turing. The Enigma* (Princeton: Princeton University Press, 2012), 415; Judith Genova, "Turing's Sexual Guessing Game," *Social Epistemology* 8, no. 4 (1994): 315.

system leads to a substantial insecurity and to a fragmentation of the perspectives and subjectivations that can be applied in the bi-directionally connected spaces at play. Thus, different entities come to the fore in the two rooms. Exegetes of Turing's paper are of the opinion that the interrogator *assumes* (literal reading) that he is interrogating a woman and a man although in actual fact he is dealing with a machine and a woman; with a machine and a man; with a machine and a human; or even with a machine and a man mimicking a woman.[25] Likewise, he *knows* (standard reading) that his dialogic partner at the other location is—besides the machine—a woman, a man or a human independent of gender.[26] It should not go unmentioned that some scholars think that Turing's paper addresses more than one of these test versions.[27] Evidently, it is Turing's exegetes who strikingly attest the insecurities created by the construction of the test and its specific spatial arrangement as a well-shaped dialectic of discovery and concealment. The participating subjects, understood as nodes, are shaped towards different (one could also say: fluid) identities according to the relations the communication system imposes.

Functioning of the Mediating Apparatus

Implicitly or explicitly, Turing introduces more figures as potential participants in the game, further questioning overbearing concepts of gender, race or posthumanism.[28] They include a woman with no soul, a discrete state machine mimicked by a digital computer, a man who is good as a telepathic receiver, an animal, a black man and a white man, etc.[29] Different kind of bodies appear one after another, questioning "the nature of gender and sex, the natural and the artificial, the analogue and discrete and the biological and cultural."[30] Why, therefore, should corporeity be excluded from the test design, as is often asserted by its exegetes?[31] More so as the very first question refers precisely to bodily features, asking about the hair of the witnesses as an indicator of

[25] William J. Rapaport, "Syntactic Semantics: Foundations of Computational Natural-Language Understanding," in *Aspects of Artificial Intelligence*, ed. James H. Fetzer (Boston: Kluwer Academic Publishers, 1988), 83; Sterrett, "Turing's Two Tests for Intelligence," 543; Saul Traiger, "Making the Right Identification in the Turing Test," *Minds and Machines* 10 (2000): 562; Genova, "Turing's Sexual Guessing Game,", 317.

[26] Huma Shah and Kevin Warwick, "Imitating Gender as a Measure for Artificial Intelligence. Is It Necessary ?," in *Proceedings of the 8th International Conference on Agents and Artificial Intelligence*, (2016): 115; Piccinini, "Turing's Rules for the Imitation Game," 114.

[27] For one instance, see Sterrett, "Turing's Two Tests for Intelligence."

[28] It has been controversially discussed to which extent Turing was aware of the sexist implications of the proposed test and his text. Obviously, the sexual guessing of the test or the classical attributions of the "man" as the active and the "woman" as the passive part are highly problematic. Nevertheless, it has been argued that Turing, during the course of his text, "questions the very reality of discrete categories." See Genova, "Turing's Sexual Guessing Game," 315. As a homosexual, he has experienced the power of such categories in a blatant manner. In 1952, he was charged with homosexual acts, considered as a criminal offence in the United Kingdom at that time, and forced to undergo hormonal treatment. A connection to his death in 1954 cannot be excluded, Hodges, *Alan Turing. The Enigma*, 488. A rehabilitation was carried out only in 2013.

[29] Turing, "Computing Machinery and Intelligence," 441–453.

[30] Genova, "Turing's Sexual Guessing Game," 313.

[31] Hodges, *Alan Turing. The Enigma*, 415; Mersch, "Turing-Test oder das 'Fleisch' der Maschine," 14.

their gender. The test would not make much sense if the interrogator were able to have a direct "sensual or bodily impression" of the witnesses as the interrogator's identifying task would not necessitate a question at all.[32] In this type of interpretation, there is a confusion between the *structure* of the information that has to be sent through the connecting technical apparatus and the *content* of such information. Its structure has to be abstracted and, in this case, digitized in order to prevent the interrogator from having a direct visual or sensual clue of the entities in the other spaces. But on a content level, no topic is to be excluded, as Turing explicitly states.[33] Even the palatability of strawberries and cream—an aesthetic category which is indeed dependent on a knowledge on "sensual and bodily impression"—might be a topic of investigation.[34] Natural language in its written form—the medium which is proposed for communication between the two rooms in the "Turing Test"—is able to combine both aspects: it is digital in its syntax or structure (it consists of a discrete number of signs), but it might be analogue or aesthetic on a semantic and expressive level (as might be proven by literary history).[35]

The design of the "Turing Test" applies a specific stratification in an interplay of discovery and concealment. While it does use language in its digital form for signal processing in the connecting apparatus, the analogue, expressive or embodied aspects of what is happening in the two rooms are nevertheless crucial and can be decoded on both sides. Therefore, issues of embodiment such as gender, race or "flesh" do not have to be excluded from the test.[36] On the contrary, as Hayles has stated, enacted and represented bodies are conjoined through the technology that connects them: "This construction necessarily makes the subject into a cyborg."[37] The disjunction between enacted, phenomenal bodies presented as flesh on one side of the apparatus, and represented, semiotic bodies reconstructed through the technical interface, brings into question static concepts of identity. The machine can be mistaken for human, the man can be mistaken for the woman, black for white, machine for man, human for animal. In such posthuman conditions, enacted and represented bodies and their mediating technologies seem to be inextricably intertwined. Subjects appear as nodes in which different threads—physical, cultural, aesthetic, political, etc.—cross. Like with any telematic performance, the "Turing Test" has to deal with this mesh of human and non-human agents and has to observe the functions of the mediating apparatus, should the apparatus not define us.

[32] Ibid.

[33] Turing, "Computing Machinery and Intelligence," 448.

[34] Turing, "Computing Machinery and Intelligence," 447.

[35] The distinction between digital and analogue (aesthetic) as well as syntactic and semiotic here refers to Nelson Goodman, *Languages of Art. An Approach to a Theory of Symbols* (Indianapolis: Hackett Publishing Company, 1976), 135ff.

[36] Mersch, "Turing-Test oder das 'Fleisch' der Maschine," 9.

[37] Hayles, *How We Became Posthuman*, xiii.

The Telematic Apparatus in Theory

In his analysis of contemporary society, suspensefully balancing phenomenology and semiotic theory, Czech philosopher Vilém Flusser analyzed the function of mediating apparatuses, implying societal disaffection with a lived, real-world experience and a tendency to disembodiment. Flusser's model is useful for advancing from a descriptive approach to a more theoretical reasoning. Moreover, it offers the utopian version of a free and democratic "telematic" society.

Abstraction and Fragmentation in Digitization

Cultural history, in Flusser's understanding, is a development "from the concrete toward higher and higher levels of abstraction."[38] He proposes a four-stage teleology. After a period of being immersed in a four-dimensional space-time continuum of concrete experience, human beings discover themselves in a three-dimensional experience. As they encounter objects, they begin to forge physical tools. This is the first step. The second step, the prehistoric age, is characterized by traditional pictures in which a two-dimensional mediation zone slides between the humans and the world until the surfaces of images eventually unroll into one-dimensional linear texts, making understanding and explanation possible. This is the domain of the third step: the historical age. The present moment, however, is in a transition to "post-history". The mediation zone has collapsed into bits and particles that must be gathered up in mosaic-like structures. This is the fourth step: the level of technical images, digital projections, of calculation and computation. These particles are "neither visible nor graspable nor comprehensible" and can only be captured with the help of instruments, of apparatuses. The subsequent gesture in post-history—after handling objects by hand, drawing images overseen by the eye (prehistory), using the fingers for writing texts (in history)—is the push of keys by fingertips.[39] This is the situation in which the witnesses in Turing's test, communicating by teleprinters, find themselves. In this model of the subject, the self is constructed of particles, in this case, from the field of social relations that systems of communication enable and compel. *Tele*-communication systems and digitization through infor-*matics* are mutually dependent and serve as a basis for a future "*tele-matic*" society.

Agency of the Apparatus

In this narrative, culture appears as fully mediated in an existential, ineluctable sense. The signs, codes and gestures constituting the "mediating zone" in different configurations are inscribed in a dialectic of discovery and concealment, where only the "codified world" gives meaning to the "real world," but where the codes and symbols also have the tendency to get opaque and to

[38] Flusser, *Into the Universe of Technical Images* (Minneapolis: University of Minnesota Press, 2011), 6ff.
[39] Ibid., 23.

signify only themselves.[40] This double structure is characteristic of Flusser's understanding of "apparatus." Unlike the tools in his "prehistory" or the machines in "history" which tear objects from the natural world and "in-form" them, the apparatuses of post-history work in the way of informatics. That is to say, their intention is symbolic, or rather, that "machines change the world, apparatuses change the meaning of the world."[41] Tapping the keys of an apparatus which calculates and computes means grasping bits and particles and arranging them into mosaic-like combinations, into technical images consisting of pixels or grains as on computer screens or in photographs. But at the same time, the apparatus has non-human agency.[42] It is programmed for a certain purpose. Therefore, power moves from the user to the programmer/operator and the apparatuses tend to program their users. Taking the example of the first apparatus in Flusser's understanding—the photo camera—"not only the gesture but also the intention of the photographer is a function of the apparatus."[43] The program structure of the apparatus, its techno-code, is reintroduced behind the back of the user and conditions him; evidence of the Janus-faced character of any technological structure:

> All apparatuses (not just computers) are calculating machines and in this sense "artificial intelligences," the camera included, even if their inventors were not able to account for this. In all apparatuses (including the camera), thinking in numbers overrides linear, historical thinking. This tendency to subordinate thinking in letters to thinking in numbers [...] has been a question of bringing thought into line with "extended matter" constructed out of punctuated elements. Hence the quantum (computational) structure of all the movements and functions of the apparatus.[44]

The apparatus can be considered a plaything which stimulates thought, and in situations where apparatuses create information (and not only produce repetition), this game has to be played in a way that users are not subjected to the apparatus and its program, but rather, subject the apparatus to their agency.[45] The apparatus has to be turned on itself. The direction of such agency therefore has the opposite direction than it does in the historical age: "When I write, I write past the machine [typewriter] toward the text. When I envision technical images [digital projections], I build from the inside of the apparatus."[46] Therefore, technical images or more generally speaking, digital projections, no longer create pictures of reality as traditional images, but create concrete

[40] Flusser, *Kommunikologie* (Mannheim: Bollmann Verlag, 1998), 209f.
[41] Flusser, *Towards a Philosophy of Photography* (London: Reaktion Books, 2000), 25.
[42] Ibid., 83.
[43] Flusser, *Into the Universe of Technical Images*, 20.
[44] Flusser, *Towards a Philosophy of Photography*, 31f.
[45] Ibid., 67.
[46] Flusser, *Into the Universe of Technical Images*, 36.

forms from abstract, point-like elements. Unlike traditional images, technical images are not descriptive but imperative.[47]

The fragmentation of perspectives is the increasing tendency of abstraction and, as the term suggests, an intensified "atrophy" of "everything physical, everything voluminous."[48] Both the model of the apparatus (with its dense interweaving of human and technological agents and concepts) and the model of the subject (as a node in a field of relations) perspicuously recall the above reading of the "Turing Test" as an early example of a telematic performance. If it is true that we do not want to be manipulated by the apparatus we use but want to use our "power of imagination," we must then understand the program of the apparatus itself.[49]

The Telematic Apparatus in Practice

How does the telematic apparatus work? In the second part of this paper, the question is applied to the artistic practices of our research team at the Institute for Computer Music and Sound Technology of the Zurich University of the Arts. This group has been exploring telematic performances in a variety of concerts, performances and in test series which started over six years ago. Commencing with distributed musical concerts simultaneously linking two to four venues (between cities including Zurich, Bern, Belfast, New York, San Diego, Stanford and Hong Kong, among others), this research also extended to other formats such as theater and dance. The locations were connected by bi-directional, low-latency, multi-channel audio and video transmission. One part of the research focused on developing these connecting tools, troubleshooting bothersome firewall issues and facilitating the planning and set up of audio and video connections, most notably when synchronizing more than two venues for an event. For these purposes, the open source JackTrip, which has proven to be a very useful and versatile tool for audio connections, was rewritten in Pure Data (tpf-client), and a constantly running server was mounted so that the clients at each performance venue could establish communication (tpf-server).[50] This server structure was also used for the UltraGrid utility supporting the video connection. All software components are open source and can be used and further developed by other parties.[51]

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[47] In his later text, Flusser rather used the term "digitalization" instead of "technical image." See Flusser, *Die Schrift. Hat Schreiben Zukunft?* (Göttingen: European Photography, 2002), 119ff; Flusser, *Into the Universe of Technical Images*, 45.

[48] Ibid., 131.

[49] Ibid., 167.

[50] JackTrip emerged in April 2004 for a concert between three locations at the CCRMA Industrial Affiliates meeting, Stanford University. It was presented at the 117th Audio Engineering Society Convention in October 2004; information provided by Chris Chafe, emails from October 22, 2019; see Juan Pablo Cáceres and Chris Chafe, "Jacktrip: Under the Hood of an Engine for Network Audio." *Journal of New Music Research* 39, no. 3 (2010): 183–187.

[51] See Petr Holub et al., "UltraGrid: Low-Latency High-Quality Video Transmissions on Commodity Hardware," in Proceedings of *The 20th ACM International Conference on Multimedia*, (2012); The tools are described in Haefeli, Schütt, Müller (2019); the tpf-client is available at https://gitlab.zhdk.ch/TPF/tpf-client, the tpf-server at https://gitlab.zhdk.ch/TPF/tpf-server.

In this paper, nevertheless, the telematic apparatus is described neither from a technological nor music-compositional perspective, but from a scenographic one, where scenography is understood as the visual, experiential and spatial composition of a performance. As telematic performances are dialogic by nature, the review of the following examples from our practice focuses on the interaction between the bi-directionally arranged spaces and on how enacted and represented bodies relate to each other. It starts from the hypothesis that the telematic apparatus can only be subverted—become playful—if there is a deep understanding of its components and their interplay. Therefore, the following description commences from a basic starting point and advances, step by step, to more complex conceptualizations. The metaphor that the enacted body has to be abstracted and digitized before transmission (by cameras and/or computers), and then regathered in a "concretising gesture" to be spread out on a surface (by computers, projectors, screens), is helpful.[52] As we operate in performative situations, gestures play a prominent role and are a guiding principle in the analysis and the construction of telematic apparatuses. Video, one of the main components of such an apparatus, is understood here as "an epistemological tool: it presents, speculates, and philosophizes."[53]

Gestures of Sight

The most basic and common way to visually represent remote performers on a local stage is by recording them with a video camera at the remote location and projecting the resulting images on a local screen. For this purpose and not unlike photography, this apparatus fixes subjects that exist in a three-dimensional visual space on a two-dimensional surface. Unlike photography, it allows dialogical situations.[54] In the bi-directional arrangement of telematic performances, one of the basic gestures to get into a dialogue with a remote performer is to face them, to look into their eyes, or more precisely, to look at their representation on screen. Now, as the two-dimensional screen does not transfer information in a volumetric way, in order to look out of the screen, one has to look into a camera. If musicians communicate visually, they however—unless television newscasters—do not usually look into cameras, they look at their fellow remote musicians, they look on the screen where they appear. Therefore, if a dialogical, telematic situation shall emerge—and not just a reciprocal broadcast, the recording camera has to overlay the screen or be placed very close to it. Only then the sightlines between the local and the remote musicians attune intuitively. Figure 1 shows an easy setting for a pedagogical one-to-one situation with one local (student) and one remote performer (teacher) and two cameras, one static and representing the student in life-size at the teacher's location, and one pan-tilt-zoom camera that can be controlled

[52] Flusser, *Writings*, ed. Andreas Ströhl (Minneapolis: University of Minnesota Press 2002), 114.

[53] Flusser, *Gestures* (Minneapolis: University of Minnesota Press 2014), 145.

[54] Flusser extensively analyzed the gestures of video, highlighting its dialogical character; see Flusser, *Lob Der Oberflächlichkeit. Für Eine Phänomenologie Der Medien* (Bensheim, Düsseldorf: Bollmann Verlag, 1993), 233-235; Flusser, *Gestures*, 142-146.

from the teacher's side and can zoom in on details of posture, touch, etc. Figure 2 shows a concert set-up in a similar logic with one local and two remote players.

Figure 1: Room 1 (local), Zurich, Zurich University of the Arts, Campus Toni-Areal; flute: Giulia Cudini. Room 2 (remote), Zurich, Zurich University of the Arts, Campus Toni-Areal; flute: Matthias Ziegler; audio and streaming: Johannes Schütt; video and streaming: Joel De Giovanni

Figure 2: Room 1 (local), Zurich University of the Arts, Campus Toni-Areal, Concert Hall 1; flute: Matthias Ziegler; Room 2 (remote), DiMenna Center for Classical Music, New York; bass: Mark Dresser; piano: Denman Maroney. NowNet Arts Festival 2019

In such one-to-one settings, not many obstacles have to be overcome. They are akin to simple video-chat situations. But as soon as the number of musicians, cameras and screens raises, the arrangement becomes increasingly complex and visual gestures quickly point into futile directions or come to nothing. A basic solution is to interpret a group of musicians globally as if it was a single person. In Figure 3, the two lower screens in V shape are placed according to such an understanding. The camera that is aligned with one of the screens records three of the five musicians and represents them at the remote location on a screen in an identical, but reversed lineup. The same arrangement is repeated with the other group, the other half of the ensemble sitting at the

opposite side of the stage. As a result, this group-to-group situation—as with the one-to-one situation—guarantees that the sightlines between the local and the remote performers are intuitively appropriate.

It should be noted that, what applies to eyesight applies similarly to auditory experience. Instead of cameras and screens, microphones and loudspeakers are the components of the apparatus. To facilitate musical interaction between the musicians, it has been proven to be beneficial to acoustically represent the remote musician at a stage position which is aligned with his or her visual representation, be it through point-source loudspeakers or by left-center-right panning.

Figure 3: Room 1 (local), Zurich University of the Arts, Campus Toni-Areal, Concert Hall 1; musicians: Gulia Cudini, Barnabas Völgyesi, Hannah Walter, Zhang Kaj Ju, Johanna Zschocke; audio and streaming: Hanspeter Ehrsam, Johannes Schütt; video and streaming: Benjamin Burger, Joel De Giovanni; coordination: Patrick Müller. Room 2 (remote), Hong Kong Baptist University, Au Shue Hung Building, Concert Hall; musicians: Tete Bae, William Lane, Leung Chi Shing, Joshua Poon; audio and streaming: Lai Ching Kong; video and streaming: Ziv Chun; coordination: William Lane. The Modern Academy 2016, Hong Kong New Music Ensemble

Gestures of Bodies

One dimension of telematic performances that has not yet been taken into consideration, and which noticeably adds to the complexity of the telematic apparatus, is the audience. Spectators also have their sightlines and musicians not only communicate with fellow musicians, but also with the public. On a sonic plane, as soon as acoustic amplification occurs, it is quite common to separate the auditory perspectives of the musicians on stage from those of the public. While the musicians get an individual sound monitoring by earphone or by loudspeakers placed close to them; the public get a representation by an array of loudspeakers at the edge of the stage mixed by a front of house position. In the scenographic deployment of Figure 3, a similar concept is applied to the visual arrangement of the screens. Besides the aforementioned small screens

positioned in V shape as introduced above, a large screen at the back of the stage has the function of showing the remote scene. The stage is thus divided into two visual regimes, one for the public (big screen) and one for the musicians (V-shaped screens).

Although there might be a charming interplay between the two types of screens and their functionalities (in particular for the public), and although such a set up can be and has been artistically exploited, it is not entirely satisfying, aesthetically.[55] It is close to a non-reflective display with an observation window disconnected from the local musicians which, placed above them, flattens any spatial perception and reduces the screen to a merely functional transmission device. Before exploring other options of productively separating the sightlines of the audience and the performers, it might be rewarding to look at functional aspects of such visual regimes.

Besides acoustic markers, musicians may also communicate by gestural cues for coordination. In a telematic situation, however, the usual hierarchy of signal transfer is inverted. Because the lag of the visual transmission by video is usually bigger than the latency of the sound, the latter arrives earlier than the former—contrary to a "natural" situation where a fellow musician perceives the visual bodily gesture earlier than the sound.[56] Even if cues (information transfer) often grasp at nothing, some musicians nevertheless appreciate if the remote musician is represented on a screen, it seems to facilitate musical interaction substantially. For them, bodily movements and the expression of the remote musician do contribute to an overall perception that enhances awareness and the feeling of presence. One could say that the musicians are *attuned* to each other, where attunement is understood as the symbolic representation of states of mind through gestures.[57]

The perception of gestural cues is different from the process of attunement. For the former, a mapping of only a segment of the fellow musician's body is sufficient, whereas our experience suggests that full body and life-size representation better supports attunement (an aspect which is not respected in Figure 3).[58] In both cases, nevertheless, mutual gaze does not include eye contact. Neither in telematic, nor in "normal" situations do musicians stare at each other, instead their bodily posture is directed towards the audience.[59] The T-shaped stage in Figure 4 is a reflection of such experiences. The remote performer is recorded by two cameras, one producing a front shot, the other a side shot. Two projectors rearrange these images on two screens, one facing the audience, the other positioned alongside the local musician. Performers are able to play with their communication channels, use facial expressions—an important feature to communicate with the

[55] Patrick Müller, Matthias Ziegler, and Johannes Schütt, "Towards a Telematic Dimension Space," in *Proceedings of the International Conference on New Interfaces for Musical Expression*, (2019): 393–400.

[56] Chris Chafe, "Tapping into the Internet as an Acoustical/Musical Medium," *Contemporary Music Review* 28, nos. 4–5 (2009): 415.

[57] Flusser, *Gestures*, 4.

[58] See Satoshi Kawase, "Gazing Behavior and Coordination during Piano Duo Performance," *Attention, Perception, & Psychophysics* 76, no. 2 (2014): 527–540.

[59] See Schroeder and Rebelo, "Sounding the Network."

audience— and at the same time glancing from the corner of the eye to the fellow remote musician in order to attune and intensifying the perception of his or her presence.[60] Enacted and represented bodies thereby enter multilayered stratifications.

Figure 4: Room 1 (local), Zurich, Zurich University of the Arts, Campus Toni-Areal; drums: Florian Kolb. Room 2 (remote), Zurich, Zurich University of the Arts, Campus Toni-Areal; flute: Matthias Ziegler; audio and streaming: Johannes Schütt; video and streaming: Benjamin Burger, Joel De Giovanni

Figure 5: Room 1 (local), Zurich, Zurich University of the Arts, Campus Toni-Areal; flute: Matthias Ziegler Room 2 (remote), Zurich, Zurich University of the Arts, Campus Toni-Areal; drums: Florian Kolb; audio and streaming: Johannes Schütt; video and streaming: Benjamin Burger, Joel De Giovanni

Although such a display still works with flat, two-dimensional screens, their spatial positioning on stage hints to the possibility of a volumetric representation. The integration of the remote space in the local stage plays with its depth and dimensions, but it also exposes the fragmentation of the time-space continuum, which is characteristic of telematic performances stemming from the division of spaces and the dimensionalities of representation. The grading of depth and the

[60] See Katahira, Kenji, Haruka Shoda, and Satoshi Kawase. "The Role of Body Movement in Co-Performer's Temporal Coordination." In Proceedings of The Inaugural International Conference on Music Communication Science (2007): 72–75.

consideration of the performers' and the audience's sightlines can also be achieved in a potentially more elegant way: In Figure 5, a number of black semi-transparent screens are deployed and distributed between the local performers. The transparency of the projection surface has the advantage of allowing the projected image to be seen on both sides of the screen. A musician placed behind it can see and interact with the remote performer and sees the same projection as the audience (albeit inverted). An ensemble of musicians with remote and local, enacted and represented bodies can thus be situated so that their gestures can executed and read in a process of communication—among themselves *and* by the audience. The application of translucent screens can also be combined with the abovementioned T-shape display. The result is an illusionary arrangement of bodies oscillating between presence and absence (Figure 6).

Figure 6: Room 1 (local), Zurich, Zurich University of the Arts, Campus Toni-Areal; musicians: Giulia Cudini, Rosemund van der Westhuizen, Hannah Walter, Zhang Kaj Ju. Room 2 (remote), Zurich, Zurich University of the Arts, Campus Toni-Areal; musicians: Laila Frej Florentino Campeloh, Patrycja Pakiela, Darko Percevic, Veronika Tóth-Potzner; audio and streaming: Johannes Schütt, Roman Haefeli; video and streaming: Benjamin Burger, Joel De Giovanni; composition: Bojan Milosevic

To make such setups work in a bi-directional, dialogic way, certain conditions must be implemented. Video screens mediating distributed spaces do not work as mirrors, but rather as windows.[61] Therefore, if such a window integrated into a stage is directed towards a remote location, the architecture of the two stages in dialogue have to be superimposed. Represented bodies have to be placed at the exact position of their enactment at the remote position. It is not the image, nor the representation that is mirrored, but the physical spaces with their enacted bodies that have to be reversed, in all their spatial dimensions. The process can also be described as such: another reality is added to the one at the local stage, whereas this "reality" is not merely a virtual object, but a reality taking place simultaneously at another location: a sort of reverse augmented reality.

[61] Flusser, *Gestures*, 144.

Gestures of Carriers

We have now introduced sightlines between single musicians, between audience and performers and we have incrementally raised the number of the agents participating in our telematic performances. Our next step is the introduction of movement. The scenographic displays described until now work with performers who may gesticulate, but whose position on stage remains static during the performance. Musicians—at least in the field of classical, contemporary or improvised music—usually do not walk or run through the scene. As soon as dancers or actors come into play, the topological situation radically changes. Moreover, actors and dancers tend to interact more intensely than musicians on the level of physical gesture and bodily presence. Can screens disentangle themselves from their character as "ontologically flattening device[s]?"[62]Are there alternatives to the representation of moving bodies on a static screen at the remote location?

Our first experiments to get the carriers for representation in motion started with loudspeakers. On each of two identical but mirrored stages, one actor is interacting with one loudspeaker on castors rendering the voice of the remote performer. The grid on the floor shown in Figure 7, along with a miniature projection of the remote stage at the side wall, allows an assistant to move the loudspeaker to the correct positions corresponding to the movements of the remote actor. Experience has shown that such displays work particularly well as soon as actor and speaker are in close interaction, be it side by side or facing each other. The technical device then seems to morph into a persona, backed by the anthropomorphic shape of the loudspeaker, which is not devoid of a deliberately ironic touch.

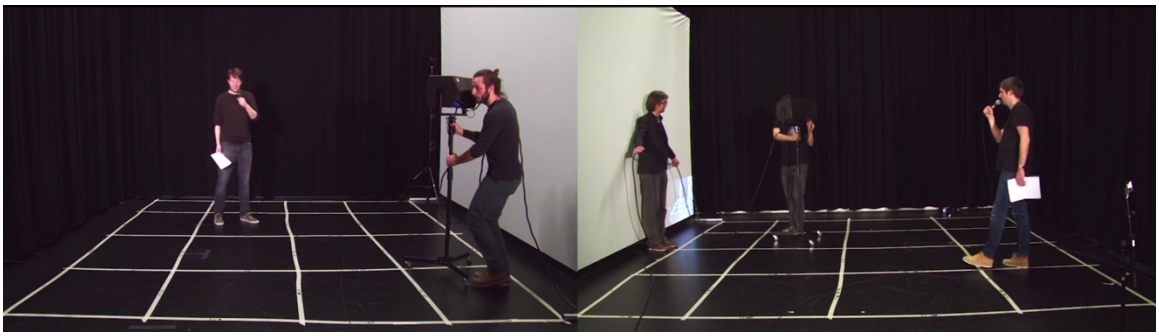


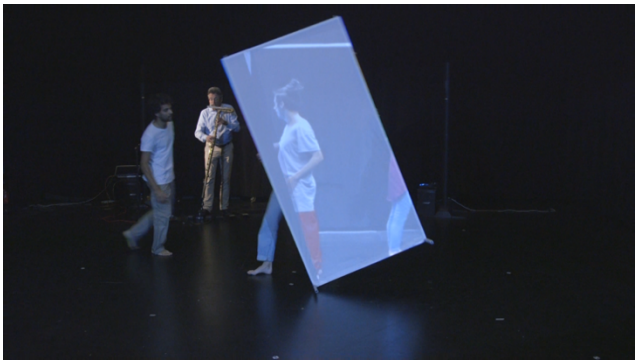
Figure 7: Room 1 (left), Zurich, Zurich University of the Arts, Campus Toni-Areal; performers: Benjamin Burger, Marco Zbinden. Room 2 (right), Zurich, Zurich University of the Arts, Campus Toni-Areal; performers: Joachim Aeschlimann, Joel De Giovanni; audio and streaming: Johannes Schütt; video and streaming: Benjamin Burger, Joel De Giovanni

[62] Kris Paulsen, *Here / There. Telepresence, Touch, and Art at the Interface* (Cambridge: MIT Press, 2017), 17; Flusser, *Into the Universe of Technical Images,* 15.

Compared to the transmission of sound, warranting a headset microphone on one stage and a loudspeaker on the other, a visual representation including movement can be more difficult. A camera has to follow the actor on one side, a screen on the other has to be moved, followed by a projector. As a result, three assistants are needed rather than one and the scene can get quite crowded. Even if the integration of these assistants manipulating technical devices into an aesthetically plausible stage setting might be an attractive task, and even if the independence of the single components and their handling allows for a play with surprising perspectives and medial effects, the situation does not seem satisfying in the long run. In the following step, an important functional modification was applied: automation.[63]

Gestures of Screens

In a performance at two distinct (identical but mirrored) locations within the campus of the Zurich University of the Arts, audio and video transmission of the two musicians (one on each stage) and of the four dancers (a male-female couple on each stage) was organized as follows (see Figure 8):



Figures 8 and 9: Room 1 (Figure 8: local; Figure 9: remote), Zurich, Zurich University of the Arts, Campus Toni-Areal, Immersive Arts Space; performer: Felipe Fizkal, Jonas Labhart, Clarisse Mialet
Room 2 (Figure 8: remote; Figure 9: local), Zurich, Zurich University of the Arts, Campus Toni-Areal; performer: Sabine Aeschlimann, David Ramalho, Matthias Ziegler; audio and streaming: Ernesto Coba, Bojan Milosevic; video and streaming: Joel De Giovanni; video mapping: Martin Fröhlich; director: Benjamin Burger; Digital Day 2018[64]

[63] Ibid., 19.

[64] For documentation, visit "Moving Screens, Sounds and Bodies," YouTube video, 12:57, posted by "Network Performance Format," February 16, 2019, https://www.youtube.com/watch?v=LXMi2U9qesg.

- three static cameras—one at the front, one at the left and one at the right side of the stage—film the performance;
- one screen, roughly 1 x 2 meters, serves as a projection surface and can be moved freely by the dancers; the screen is translucent so that a performer standing behind it can see the projected image whereas he or she is invisible to the audience;
- two projectors fixed on each side of the stage bring the image from the remote location to the screen (for the video transmission UltraGrid was used);
- a motion capture system (OptiTrack) tracks the stage position of the screen as well as its vertical and horizontal rotation;[65]
- a video mapping system (Sparck) places the video from one of the remote cameras on the local screen, using two projectors placed in the two front corners of the stage, it therefore chooses the cutout of the video image exactly representing its (virtual) location at the remote space; additionally, depending on the vertical rotation of the screen, it chooses one of the three camera perspectives and one of the projectors (or a mixture of them), thereby minimizing distortion effects;[66]
- the musicians are represented at the remote location by point source speakers set up at their (virtual) location on stage (for the audio transmission a JackTrip based algorithm was used); their position remains static throughout the performance.

The screens which can be brought into motion do not show the whole remote location. On the contrary, they only give an insight into fragments of it—the fragment of the part of the remote location that could be seen in the frame of the screen if it were there. In our first experiments, we provided an additional video channel from stage to stage on a reference screen which broadcasted an overview of the processes on the other side. For communication and rehearsal purposes this "tunnel" seems valuable, but for the performance itself we realized that there was no deeper engagement happening for the performers. It seems that the ongoing availability of the data and the absolute certainty about the other disabled the need for playfulness and intuition and therefore the willingness for exploration. Turning the "tunnel" off during the performance and only providing the portable screen as a tool to retrieve visual and positioning data, enabled a search for the presence and closeness of the other and of the telematic apparatus.

Therefore, this experimental arrangement has proven fruitful as it allows one to explore and reflect the multilayered interplay of enacted and represented bodies, of real and virtual spaces and their implied fragmentation of human and technical agents. The gestures of the screen in motion can adopt a variety of functions, functions which were dramaturgically arranged in the distributed choreography *Moving Screens, Sounds, and Bodies.* These are described in the following selection:

[65] To access the motion capture system, see Optitrack, "Optitrack – Motion Capture Systems," https://optitrack.com/.
[66] To access the software for surface projection mapping, see tecartlab, "tecartlab – tinkering with technology for the sake of art," http://tecartlab.com/.

- Representation of enacted bodies from remote location: One of the performers moves the screen following the movements of the remote performer so that his image appears on the screen; if this is the case at both locations, two performers can directly interact on a gestural level. The screen is then representative of the (body of the) remote performer.
- Hybridization of represented (remote) and enacted (local) bodies: A performer can manipulate the position of the screen so that absent and present bodies superimpose and merge into a hybrid body (Figure 9).
- Window: the screen can also be used to literally "scan" the remote location by slowly moving over the stage; it then shows what is at the respective place, be it an object, a musician, a dancer or otherwise. The screen in this case mutates to a window giving information about the remote space, and it works differently if the screen is held upright or laterally, giving a more consisting impression of the remote space in the latter case.
- Door: In the following situation, the screen gets a sort of (imaginary) door: performer 1 is behind the screen and thus invisible to the audience; performer 2 joins them; performer 1 moves out and becomes visible. The surprising effect of transformation from performer 2 to performer 1 questions the overall construction of the complex spatial arrangement, at the same time confusing it.
- Screen as a body or an object in itself: as soon as the performers start to play with the screen as an entity in itself, it transmogrifies into an object or a body. Even if the screen serves as a representative of the remote performer, the local performer can choose between interacting with the dancer projected on the screen, with the screen itself as an object or with the fellow performer located behind the screen in order to move it.
- Mirror: performer and screen can be positioned in a way that a visual feedback occurs: the representation of the enacted body at the remote location is filmed and projected back to the local screen.
- Light source: Another possibility of visual feedback is to place both screens at the same position at the two locations, they then show themselves, not only subjoined in a reflective dimension but also serving as a mere light source.
- Technical device: as the video mapping system chooses different cameras and projection perspectives according to the horizontal and vertical rotation of the screens, jumps and glitches in the representational video image may occur which can then be deliberately exploited by the performers. This discloses its technicality and makes the functionality of the medium transparent.

These possibilities are multiplied if the actions at the two locations are deliberately differentiated, if, for example, the dynamic of movements is high on one of the stages and slow on the other. The characterizing fragmentation of space perception is then raised to a grade of

considerable puzzlement. Even more so if the interactions among the musicians—and between them and the dancers—are taken into consideration. In any case, the setup does not simply frame two independent spaces that are somehow connected by video and audio transmission, to a much greater degree it enables a smooth transition between the different spaces—real and virtual—whose characters can be created or abruptly interrupted. One is not extradited to the activities of the telematic apparatus, it is instead a place of playful operation, showing its filtering and mediating aspects and its potentiality of discovery and concealment. Subjects can play out their role by entangling themselves in a net of possible relations or reacting to such entanglements initiated by other agents. The agents—performers, screens, sounds, spaces, carriers, objects, etc.—are not fixed in a well-tailored space-time construction, they are in constant transformation between embodiment and representation and constitute a multi-dimensional space which layers are unfolded for the public.

Conclusion: the Telematic

For his vision of a "telematic society," Vilém Flusser's ideal form of communication was a kind of improvisatory "chamber music," as the title of the last chapter of his book *Into the Universe of Technical Images* reads.[67] There, players are placed at the nodes of a multidimensional network, able to be in constant and playful dialogue with any other nodes and able to follow a set of rules steadily developed by the common action of its participants.[68] The zero-dimensional structure of the grains and particles which constitutes the post-historical stage, allows them, by computing, to envision nearly infinite possibilities. The dialogical character of the act of communication in networks ("Netzdialoge")—directed against a discursive one with unidirectional broadcasting in a one-to-many communication ("Amphitheaterdiskurse")—implies the use of digital technologies—of apparatuses. As such, "the question of how human intelligence and artificial intelligence are related" decidedly becomes topical.[69] Between the alternatives of humanizing the artificial or making humans more like apparatuses, Flusser, the philosopher of gestures, seemed to envision the latter, surprisingly enough. In his premonition, robots manage the daily needs of people's "derelict bodies." They sit in isolated cells, receiving, sending and changing images by their fingertips, staring at tiny screens.[70]

What if people do not stare at tiny screens, but performatively play with mobile ones instead? Even if the term "telematic" in Flusser's conception of a "telematic society" and its use in "telematic performance" might not be entirely congruent, both concepts and practices share

[67] Flusser, *Into the Universe of Technical Images,* 159.
[68] Ibid., 159ff.
[69] Ibid., 113.
[70] Ibid., 161.

common features which are crucial to them. In both cases, distance is mediated in a dialogical, bi-directional way; digital apparatuses are applied; represented and enacted bodies appear; subjects are relational to human and non-human agents; rules are gradually and playfully developed while using the apparatuses; multilayered relations are organized in networks. So, what if embodiment is put back into the picture as Hayles has called for, regarding the posthuman condition of our societies?

Theoretical and artistic discourses concerning the relation between bodies and technology in telematic performances sometimes refer to the figure of the "cyborg."[71] More specifically, it alludes to a "metaphorical cyborg," understood as a "temporary [...] techno-corporeal coupling."[72] At the same time, "communication technologies [...] are the crucial tools recrafting our bodies," enforcing new social relations.[73] These discourses, broadly speaking, tend to adopt one of two positions, either framing the cyborg as a mere coupling of tools and bodies with the potential to transform individual subjects; or as a subversive strategy to go beyond pre-defined dichotomies or categorizations in general, transforming the very nature of subjectivity.[74]

Our experiences in *Moving Screens, Sounds, and Bodies* shows how performers might get into a playful interaction with a highly artificial technical apparatus. Latency for example, which emerges by signal processing in the transmission process, becomes a constant, an idiosyncrasy of the performer's environment, and different latencies of audio and video transmission come into play. It can be used as a strict composing strategy or can allow a more liberated handling by going into a constant "float" or "negotiation" between the local and remote performers. This constant fluctuation in different timings result in a homeostasis, perceived by the performers as if the remote performers were actually present. They develop an incredible sensory awareness, an almost "sixth sense" of presumption and speculation about the localization and intentions of the remote other, in what becomes a multi-layered and interrelated play between human and non-human interaction.

Through an interplay of movement and sound and through the manipulation of specific elements of the provided telematic technological environment—including latency, experiences of presence and absence, selective information hierarchies and glitching data—performers seek sense of unison. Unison in such a system means a homeostasis in the interchange of information, guesswork and unexpected events on both sides. This forces an ongoing process of rebalancing and returning to the collective body, a constant (re)negotiation of the rules of the game in the sense of Flusser's apparatus theory.

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[71] For one instance, see Jennifer Parker-Starbuck, *Cyborg Theatre. Corporeal / Technological Intersections in Multimedia Performance* (New York: Palgrave Macmillan), 2011.

[72] Hayles, *How We Became Posthuman*, 125.

[73] Donna Haraway, *Simians, Cyborgs, and Women. The Reinvention of Nature*, (New York: Routledge, 1991), 164.

[74] For one instance, see Roy Ascott, *Telematic Embrace. Visionary Theories of Art, Technology, and Consciousness* (Berkeley: University of California Press,1990); Haraway, *Simians, Cyborgs, and Women*.

When information can only be selective, fragmentation occurs and certainties seem to dissolve. The technical means used here—high-quality, low latency, bi-directional video and audio streaming, movement tracking, video mapping—are not merely transmission media, but active players that connect and coordinate systems within real and virtual spaces. The sensory apparatus of the machine interferes and interacts with the sensory apparatus of the performers. No atrophy of the physical and the voluminous is consequential. On the contrary, telematic performances like *Moving Screens, Sounds, and Bodies* make the tensions between human and non-human agents perceivable in a strongly physical sense. They question binary categorizations and transform notions of intimacy, the sense of presence and the (im)possibility of both touch and simultaneity in fragmented and augmented realities.

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Abstract

Under the conditions of its geographic distribution, the "telematic performance" can be regarded as a remediation of traditional concert, theater or dance formats. Conversely, and as this paper argues, the telematic performance can also be understood as an artistic format of its own right, one which then can serve as a trope for social interaction under the conditions of critical posthumanism. To gain a wider perspective, this paper analyzes Alan Turing's "Imitation Game" from his seminal article *Computing Machinery and Intelligence*, 1950, proposing it as an early conceptualization of a telematic performance. This against-the-grain reading of Turing's text reveals certain attributes that are distinctive to this type of performance. Following a descriptive and analytic critique of the "Turing Test," Vilém Flusser's theoretical considerations of digitization and technical apparatuses comes into play. In the second and main part of the paper, these findings are applied to a series of artistic practices with telematic performances developed by a research team

at Zurich University of the Arts. The section details the construction of telematic apparatuses and demonstrates the multilayered interaction between human and nonhuman agents.