Mapping fluid spaces: semiotic bodies and cyberart

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Abstract: The insistent interrogations by digital artists of the fluid spaces that have been created by new and sophisticated technologies do not only concern novel kinds of spatial awareness. They even more specifically attempt to map the new forms of human positions and positioning produced by our active and continuous interchanges in real-time, which implies nothing less than new modes of subjectivity. Although maps have to some extent always fulfilled these functions, what is different today are the technologies at our disposal which not only generate new dynamic spaces but also demand the development of new mapping strategies allowing for both improvisational and subjective positioning in constant negotiations for space. I would go even further and suggest that the works by these artists imply that the subject-object framework be relinquished for that of an implicated agent and an expansive field in which the agency of any identifiable presence is intertwined with other agencies. This pragmatic approach implicates a dialogic and communicative self immersed in incessant recontextualization and, therefore, involves mappings of the intermeshing between agents responding to their environments in ceaseless participation. Pragmatic-semiotic research and cyberart converge here as such an approach would seem to carry the potential not only for theorizing different fields of research but also for a fruitful dialogue among cultural theory, technicity, and digital art. This will be discussed by examining the works by digital artists Stelarc, Rejane Cantoni and Daniela Kutschat.

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Mapping Fluid Spaces: Semiotic Bodies and Cyberart

As new technologies generate new techno-social spaces, new strategies of orientation become necessary. This is a development that has caught the attention of contemporary artists who have been insistently interrogating the spaces created by new and sophisticated technologies—the Internet, GPS, WLAN, international databanks, RFID object space, smart architecture / fluid architecture, etc. These so-called "anthropotechnical" spaces are radically changing not only our relationships with the life-world but also the way we orient ourselves in space. How do we experience these spaces that are characterised by an instantaneous and dynamic relationship between humans and technology? And how can we locate ourselves in a world that is increasingly IT-dominated and therefore fluid, instantaneous and consistently interacting? What new systems of orientation are required to explore these spaces that have been scientifically but not yet philosophically investigated, as these mappings do not only concern novel kinds of spatial awareness?

These and similar questions have recently been insistently interrogated by digital artists who even more specifically attempt to map the new forms of human positions and positioning produced by our active and continuous interchanges in realtime. This implies nothing less than new modes of subjectivity. Although maps have to some extent always fulfilled these functions, what is different today are the technologies at our disposal which not only generate new dynamic spaces but also *demand* the development of new mapping strategies allowing for both improvisational and subjective positioning in constant negotiations for space. I would go even further and suggest that the works by these artists imply that the subject-object framework be relinquished for that of an implicated agent and an expansive field in which the agency of any identifiable presence is intertwined with other agencies. From this follows further that the sensorial experience of such a field or space becomes a function of the way the agent relates to the form of mapping employed.

Locating the subject has always been one of the prime functions of maps —it is interesting to follow how, at the time of geographical expansion, cartographic writing developed when writers such as Rabelais, Montaigne and Cervantes sought to "map out" their worlds for their readers by appropriating the worlds they were navigating through discourse and space. As maps were plotted a new self emerged which was partly defined by the relationship of the self to space; a subject that had to develop new strategies to deal with the Cartesian space that Western maps embody, making him or her an omniscient spectator of the projected space that maps represented as objects of art, science and technology. What is different today are the technologies at our and therefore also at the disposal of artists, because not only do these technologies generate new dynamic spaces, they even *demand* the development of new mapping strategies. I would go even further and suggest that we relinquish the subject-object framework for that of implicated agent and expansive field.

This field could then be called an "agential space," as suggested by Vincent Colapietro, and which he sees as a space in which agents are at once caught up transcending their immediate control and implicated in the effective exercise of their somatic, social agency.[1] It involves improvisational and variable perspectives and positions of agents involved in incessant interpretation and recontextualisation. Pragmatic-semiotic research and cyberart join hands here as such an approach would seem to carry the potential not only for theorising different fields of research but also for a fruitful dialogue among cultural theory, technicity, and digital

[1] Vincent Colapietro, personal communication 21 February 2007.

art, which I will discuss examining the works by digital artists Stelarc, Rejane Cantoni and Daniela Kutschat.

New Spaces

"Agential space," then, designates the field in which the agency of any identifiable presence is intertwined with other agencies. In other words, these agents or presences are such situated and embodied forces that the exercise of agency is best understood in terms of introducing disturbances into this field, or tracing these intersecting force patterns. The notion of "agential space" seems all the more relevant in view of the extent to which new technologies increasingly influence our lives. As Nigel Thrift puts it,

> We have to look at how, as a result of the intervention of software and new forms of address, these background time-spaces are changing their character, producing novel kinds of behaviours that would not have been possible before and new types of objects which presage more active environments.[2]

In other words, the instantaneous positioning relationship that these new technologies produce are based on an *Umwelt* of information, which releases humans into a coordinate system of (re-) active realtime. The new strategies and grammars of orientation that such coordinate systems demand have already been analyzed from the perspectives of the natural and technological sciences. The Humanities have, however, not yet taken full account of what this development implies, in particular the extent to which it has created a need to redefine anthropological conditions and practices.

What Thrift attempts to do is to map the human environment, "to capture the outlines of a world just coming into existence, one which is based on continuous calculation at each and every point along each and every line of movement."[3] New grammars of orientation demand new forms of mapping. What is characteristic for the ongoing technological revolution, however, is the informatisation of space and a direct embedding of the representation in the spatial structure and in the spatialising technologies themselves.

Of prime interest here is therefore the medial spaces and complex practices of orientation developing against the background of this IT-based folding together of space—map—human. But how can such fluid spaces be mapped? And what would the maps and the mapping of this new space look like? I would argue that the focus would have to shift to the relationship between agent(s) and map. Following Ingold and others, I will argue that, rather than the often-used metaphor of the map as network, these new maps would have to be meshworks.[4] In the sense intended here, meshes are formed by intervowen lines articulating heterogeneous components which produce dynamic diagrams interacting so as to avoid collisions but yet affording growth and movement (cf. de Certeau's "wandering lines"). In other words, they are processes involving diagrammatic thought of illimitable scope rather than closed systems of finite objects. Such a pragmatic approach implicates a dialogic and communicative self immersed in incessant recontextualisation and, therefore, involves mappings of the intermeshing between agents ceaselessly participating in and responding to their environments.

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[2] Nigel Thrift, "Movement-Space: The Changing Domain of Thinking Resulting from the Development of New Kinds of Spatial Awareness," *Theory of Culture and Society* 4 (November 2004): 583.

[3] Thrift, "Movement-Space," 583.

[4] Cf. Tim Ingold, *The Perception of the Environment* (London: Routledge, 2000).

What kind of maps?

Let me therefore start by defining a map from a semiotic perspective. A map is a diagram, the graphic register of correspondence between two spaces that relationally represents its object. It is this relational quality that provides diagrams with the claim to more or less objectively represent "reality" that has become discounted in other forms of representation today. I would argue that what makes the diagram such a useful figuration is that

- diagrams are relatively independent to their objects: the relationship between the objects exists independent of the map, and can be independently located and calculated.
- diagrams are abstracted to a certain criteria of relevance that can be generalised.
- diagrams represent both intelligible and sensible relations: they do not need to represent something that exists but can also be a model for the production of something new, e.g. a blue-print of an architect's drawing for the construction of a house.

This is what accounts for the creative potential of diagrams: since they allow experimenting on, both on paper, on screen or in our minds, this very feature makes them excellent tools for outlining both thought and action. It makes them indispensable for formal reasoning: according to Charles Sanders Peirce, diagrammatic reasoning is fundamental to our thought processes. The diagram is a complex iconic sign affording—indeed, inviting—such possibilities of manipulation and transformation as it "suppresses a quantity of details, and so allows the mind more easily to think of its important features" (*CP* 2.282)[5]

But what is particular with diagrams such as maps is their strong indexical properties, which is what I would argue accounts for their dynamism: diagrams presuppose, even demand interaction. This lies in the indexicality of the diagram / map as a visual sign. Even though the diagram is iconic, it is, as a visual sign, always "embodied in some particular materiality or particular form, or as instance of an iconic representation."[6] A diagram always refers to something—even more so, it calls our attention to the object it refers to and to the formal similarity between these relations.

This becomes vital in map reading. Since the most important function of maps is their interaction with their users, these therefore become part and parcel of the map action—because users must locate themselves within the map to engage with it in order to orientate themselves not only within the map but in the "real" or imaginary space it represents. With map reading, "I am here" becomes "I am there"—a strange fusion of a deictic gesture that points *from* the body to the map and at the same time to itself: the diagram or map user, as a body positioned in space, is therefore an essential part of it. Indexicality becomes the condition for the possibility of operating a map. Because maps demand an active user to function, their bird's-eye or vertical orthogonal view was once made for those who needed an overview to survey their commercial enterprises or lands. That is what makes modern maps off-springs of modernity and embodying the idea of the sovereign subject—not only is the map made from the viewpoint of a "celestial eye," but in order to use the map, the user *must* depart from an "all-seeing" perspective or position, mentally taking in—seizing—the environment from his or her point of view.[7] This development focused on maps as objects and products instead of processes of mapping: the convention of perspective made the late Medieval and Renaissance spectator and mapmaker into "a totalising eye," seeing the world as a *tableau* and plan.[8]

The modern map can thus be seen as the epitome of Cartesian subjectivity. Maps were once instrumental for the development of the Cartesian concepts of time and space[9] and it might well be that they will be essential for developing the new sense of space and time instigated by our new technologies. In contrast to earlier measurements of space that were taken at a specific

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[5] Charles Sanders Peirce, *Collected Papers* (1931-58) . Ed. Charles Hartshorne, Paul Weiss and Arthur Burks. Cambridge, MA: Harvard University Press, 1974.

[6] Cf. Lucia Santaella, *Matrizes da linguagem e pensamento* (Sao Paulo: Iluminuras, 2001).

[7] Michel de Certeau, *The Practice of Everyday Life* (Berkeley: University of California Press, 1984) 92.

[8] Certeau, *The Practice of Everyday Life*, 92.

[9] Cf. Jeremy Black, *Maps and History* (London: Reaktion, 1997) 7.

point in time, calculated and transferred into a static map, our IT-based space today is, as Nigel Thrift reminds us, "based on continuous calculation at each and every point along each and every line of movement."[10] But, as he points out, at the same time these new understandings of space and time are characterised by a sense as being "more plastic, constantly mobile and dynamic."

Mapping space

How can this space be mapped? What features of our present mapping practices can be applied to these new evolving "qualculative" fields?[11] These are fields which, as he points out,

> demands certain kinds of perceptual labour which involves forms of reflexivity that positions the subject as an instrument for seeing, rather than as an observer, in which a number of the mechanisms that we take for granted have been integrated into larger systems or into specialised feedback processes. Increasingly agents do not encounter finished, preexisting objects but rather "clearings" that disclose opportunities to intervene in the flow.[12]

However new, these apprehensions of space and time are still based on the mathematical calculations without which our virtual worlds would be unthinkable. They depend on a "fine grid of calculation," which is what makes these new capacities at all possible. Such a grid must necessarily be some kind of diagram, which not only embodies the multiple calculations which produced it but which indeed has the possibility to produce new senses of spatial—and temporal—knowledge. It must necessarily also be performative, since it generates new space relative to it, which would mean that, far from being a static and finite object, it should open up new spatial possibilities and potential. Mapping becomes a question of perspectives and positions of agents who are implicated in these spaces and a practice allowing for both improvisational and subjective positioning in continuous negotiations for space.

These kind of processes could be seen as a modern anthropotechnical version of the archaic practice of "wayfaring," which produced sketch maps of travels and voyages from lines. Comparing the function and form of the lines on a sketch maps with those of cartographic maps, the anthropologist Tim Ingold argues that, whereas the sketch map consists of lines drawn *along* a surface, "scientific" or modern cartographic maps go *across*, cutting through the ocean following the course plotted by the navigator.[13] Once arrived (although preserved in a logbook), the "ruled" line can be rubbed out. The "sketched" line, however, is narrative: it is a gesture drawn in a close context to its referent and thus highly indexical as it is made up of stories of comings and goings.

These highly indexicalised maps disappeared with the development of modern cartography, which relied on the subject-object relation to the environment. That relationship was presupposed by Cartesian subjectivity, which made the user of the map an omniscient spectator. Such a dualist approach to the world is precisely what these new technologies now seem to challenge by evoking new modes of agency as involvement in social sets of practices. Moreover, these new modes replace the subject-object relation with that of the map user as a socially situated agent improvising in an expansive field. This field is crisscrossed with patterns of other agencies and in which agents as such are inescapably implicated in the lives and activities of other agents, orienting her or himself along the lines of the meshwork formed by the interaction between her or him and the environment. These agents are therefore participants, responding, reacting and interacting to and with other agents as well as to the environment, creatively transforming and transfiguring it. Moreover, the agents –our— relationship to themselves or to ourselves is always made more complex by our relationship to others. That is why we are always situated and embodied forces whose exercise of agency is best understood in terms of introducing disturbances into a particular space or of tracing the

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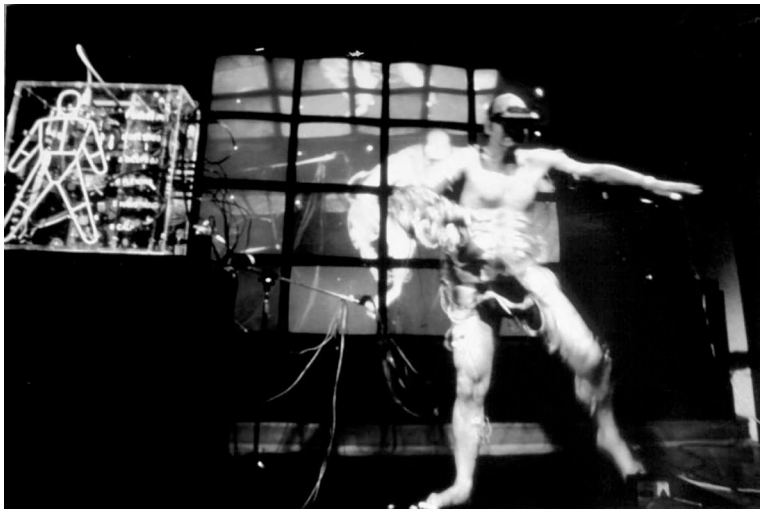
[10] Thrift, "Movement-Space," 583.
[11] Thrift, "Movement-Space," 592.
[12] Thrift, "Movement-Space," 593.
[13] Ingold, The Perception of the Environment, 56; 230.

complex, consistently emerging patterns of intertwining forces as an ongoing dialogue between us and our *Umwelt*.

Mapping fluid spaces

This development has caught the attention of artists who have always been at the forefront of technosocial developments. Those working in digital media in particular have been insistently interrogating the consequences and the potential of such intermeshing processes. Seizing the opportunity to both thematise and explore what these new techno-social environments *mean* and what positions and perspectives they create, artists have consistently been blurring and eroding the boundaries between subject and object by mapping their bodies into cyberspace as an expansive and dynamic field, positioning themselves and others as responsive agents. Such transmediality shifts the attention from the individual body to complex human—technology interfaces within collective infrastructures. As Johannes Birringer points out, the resulting interactivity indicates "a new understanding of environments of relations / responsibility and a relational aesthetics based on interhuman exchange or physical interaction as well as a new technological kinesthetics."[14]

One of the first to engage with this kind of feedback systemss and cybernetic loops was the Australian performance artist Stelarc. Stelarc's project for the past twenty years has been to try to redesign the body by the means of various prostheses in order to overcome the body's shortcomings in an increasingly techno-social environment. As he argues ,[15] the body's metabolism can no longer "cope with the speed and power, and precision of technology", but, instead, finds itself in alien environments "unplugged from its biosphere" and lost in technosocial space. That is why Stelarc finds the body "obsolete," not that we could do away with it but in the sense that the notion of ego-driven body is a concept of a "simplistic, zombie-like body being driven by a psyche, mind or self" that is invalid, if it is not what Birringer calls an "expressive body" that performs and responds with the sensorial environment it is in.[16]



So viewed, the body is not a site of inscription but a physiological structure; it is no longer an "object of desire", but, instead, an "object for redesign." Stelarc is not interested in the notion of cyborg as a body that has undergone a traumatic loss of organs and, therefore, receives implanted metallic parts, a "sci-fi, macho, military, metallic-phallic construct".[17] This

[14] Johannes Birringer, "Interacting: Performance & Transmediality," *Monologues: Theatre, Performance, Subjectivity*, ed. Clare Wallace (Prague: Litteraria Pragensia, 2006) 300.

[15] Stelarc. 1998. Web interview. <http://www.stelarc.va.com.au/ (19.04.2005)

[16] Birringer, "Interacting: Performance & Transmediality," 304.

[17] Stelarc. 1998. Web interview. <http://www.stelarc.va.com.au/ (19.04.2005)

projects a medical body on life-support systems. Instead, he sees this redesigned body as the opportunity for a multiplicity of bodies that can be separated spatially but connected electronically to become connected and thus, evolve into a greater operational entity. The Internet, in Stelarc's view, is not a strategy ideal for disembodiment, since you need a physical body to be plugged into the system; instead, it offers a potential for both intimate and involuntary experiences, such as in Stelarc's use of his "Third Hand" and by his electronically wiring his own body into the internet.

By using collective infrastructures such as the internet, Stelarc achieved to be telematically—and simultaneously—present at the Pompidou Centre in Paris, the Media Lab in Helsinki and "The Doors of Perception" conference in Amsterdam. During his performance, people in these three cities could access Stelarc's body to remotely choreograph its movements via a touch-screen interface. This enabled them to enter another body, namely Stelarc's, in another place, at the same time as Stelarc's body became a "host for the behavior of remote agents".[18] Stelarc's performance could therefore be viewed as

- an early and very schematic prototype of the digital meshwork mapping anthropotechnical space as its interwoven cables, i.e. its "lines" articulating heterogeneous components produce new technosocial space in constant interaction with the map "users," the audience inducing his movements at the various touch-screen interfaces.
- proposing ways of practising agency by bringing in disturbances into a field or by generating complex emerging patterns of intertwining forces.
- strongly suggesting the necessity of theorising a new kind of spatial distribution, in which the categories "nearness" and "distance" are made "obsolete"—a word Stelarc himself likes to use when it comes to the body and bodily functions.
- an example of the interplay of socially and somatically implicated agent in an expansive and expanding spacefield which not only brings to the fore the interhuman exchange and new technological aesthetics that Birringer pointed out but also contributes to a new understanding of responsive environments. • Stelarc's own emphasis on the importance that the body can host a "multiplicity of remote agents" would also seem to enhance not only the Communitas aspects of performance (cf. Turner)[19] but also suggests that of the body as part of the communal.

Moreover, Stelarc's performance enhances the dialogic nature of agential space as the interplay between the users and the various avatars, the "outgrowths" of mathematically calculated grids of time and space, functions on the premise of socially positioned and responsive participation, namely that all parts must follow certain prescripted rules and codes.

My second example is a mapping of an immersive interactive environment called OP_ERA, developed by Rejane Cantoni and Daniela Kutschat. Adressing the problem of human-technical involvement, OP_ERA explores how and through what kind of interfaces one system may best interact with another and how we can enter and interact with a data world, from perspectives we are familiar with, without being disturbed by incalculable devices beyond our control.

OP_ERA is a world shaped as a set of interconnected logical dimensions, conceived to generate spatial cognition through multisensorial experimentation of space models evolving in relation to the human body. Its logical architecture consists of interacting dimensions structured by logical linkages. Each dimension leads to the next one and simultaneously to all previous ones. In some sense, OP_ERA has a beginning, a kind of narrative hierarchy from the first dimension to the fourth, but it has no end, nor any kind of narrative path leading from a higher dimension to a lower one. Such a structure is created with the intention to generate feedback loops, which allow events occurring in lower dimensions to affect the outcome of events in higher ones. The technological device the artists are using is the "Haptic Wall"—a SMART wall interface designed to produce tactile stimuli originating from sonic data collected by a set of microphones placed in and around the exhibit area. As soon as a microphone picks up a sound, the software samples and converts it into outputs that control sensors built into the wall.

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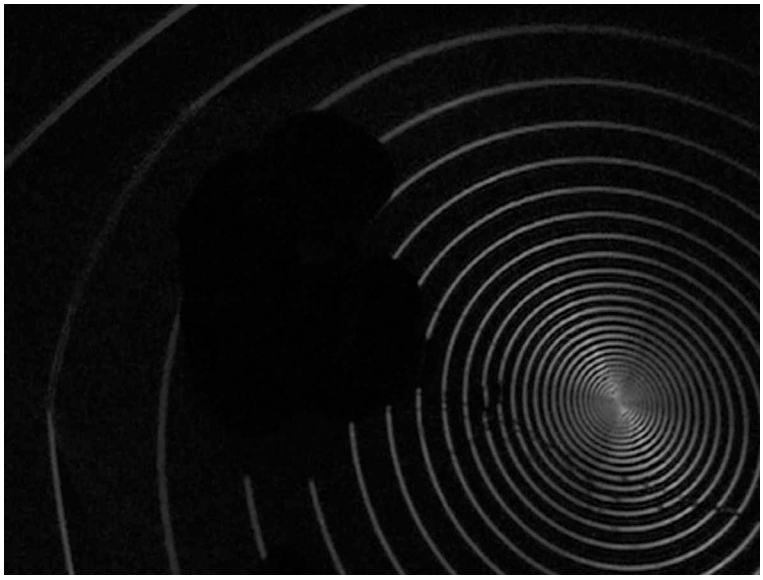
[18] Stelarc. Performance at the Hochschule für Gestaltung und Kunst, Lucerne 16 April 2002

[19] Turner, Victor. *The Ritual Process*, New York: Aldine de Gruyter, 1995.



Clip 1. opera (screen shot)

The four dimensions in OP_ERA (2001 and 2003), namely X, XY, XYZ and XYZT relate to the history of spatial concepts. The first dimension, X, is a finite segment composed by a multitude of points that are sound-based elements which represent pre-programmed computational objects that make up the world as sounds. Their nature is to transmit—attack, sustain or release from reverberation to echo—sound information. In this dimension, the user distinguishes the shape of space and his or her relative position in it by emitting and receiving sound information. Interaction or space cognition are limited to ear perception; in other words, the overall spatial concept is placed in reverberation.

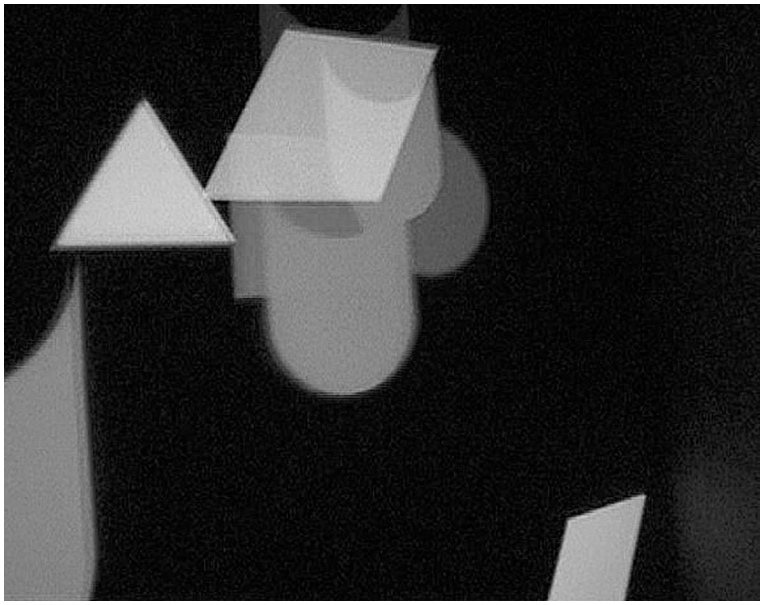
Clip 2. opera (screen shot) first dimension

The realm of the second dimension, XY, is flat. The shape of its space extends in two dimensions: the "imported" one, X, or length, plus width. Interacting by drawing the shape of space, the artists have it extend in two dimensions: the "imported" one, X, or length, plus width. All its objects "exist" only within the limits of length and width, like a huge flat screen. There are four cardinal orientation points—N, S, E, W—within this dimension.

Therefore, objects and the human agent / interactor are free to move in four directions—up and down, right or left. All objects are *rendered* as light waves independently of their nature, i.e. whether they are sounds, shapes, or avatars, but *perceived* as vibrating lines, with all occupants of this dimension, including the user, having a common boundary: a space confined to a finite and limited plane. Only by touching will the human agent / interactor be able to know the actual nature of an object, whether it is a shape or a sound element. Since space in XY is confined to a finite and limited plane, the logic follows that if we try to exceed its limitations we will step out of it.

Clip 3. opera (screen shot) second dimension

The third dimension, XYZ, is a cubic realm, which turns space into an essentially empty box—a limitless void in which all things are contained and through which they move. Within this imaginary box three forms—a green triangle, a red square and a blue circle—perform a kind of Oskar Schlemmer's mathematical ballet, as the artists have suggested. All forms have various forms "behaviors" attributed to them, translating randomly according to the intrinsic qualities of their shapes. The triangle moves through the diagonals, the square through the orthogonal axes and the circle by rotating like a satellite. This ballet would go on forever were it not for the users' interaction but, as the human body is incorporated into the spatial scheme, the choreographic algorithm tracks its presence, generating responsive events by changing and flipping the plane and direction.



Clip 4. opera (screen shot) Third dimension

In the fourth dimension, XYZ and T form a landscape evolving in time. Space is projected as a condensation of all three realms—X, XY, XYZ—composed by a multitude of emerging Lorentz attractors (three-dimensional structures corresponding to the long-term behavior of a chaotic flow) evolving in time according to the interactor's position in a complex, non-repeating pattern. In this dimension, space visualisation and cognition is only possible through simulation.

As you can see from Rejane's and Daniela's "short history of space," in this space

- the interaction human / technology is tied to the development of spatial dimensions, even limiting the potential experience of space
- everything is spatially distributed in this responsive field, with several possible points of departure.
- the successively "folding" boundaries, though at first clearly distinguishable, suddenly either dissolve or fold into something else, interacting with the agents' positioning and perspective
- space is set in motion by an agent introducing disturbances
- agency is understood in terms of introducing disturbances or tracing complex patterns, with the consequence that, in such interactive motion, space in all its various forms is in constant motion—movement-space abstracted

Clip 5. opera (screen shot) fourth dimension

Interactivity in these art works involves an entire environment that can only be mapped through the continuous biofeedback from the artists' sensory stimuli. What new perspectives do these new agential spaces suggest? What new positions and positionings come forth in these artist mappings? I would argue that these interactions humans—technology, the generation of what Nigel Thrift calls "qualculation"[20] demonstrate how fundamentally the new qualities based on time-space calculations are producing "new cultural conventions, techniques, forms, genres, concepts, even … senses." The new apprehensions of the altered time and space is what lie at the core of these artists' performances which show how agents, despite inherently implicated in social, somatic practices, are able to transfigure and transgress these by their creative imagination. We cannot get away from Cartesian space, since the mathematical calculations underlying it also provide the perspectives and projections for the responsive fields in which participating agents are at once caught up in fields transcending their immediate control and implicated in the effective exercise of their somatic, social agency. However, Cartesian space emerges *out of* these formalisations and symbolisation, rather than the other way round, that agential placements and positions emerging out of abstract Cartesian space. But what these new technologies offer are new possibilities of mapping and projecting of and by these bounded, situated agents who are not so bounded and circumscribed that they are not able to transfigure this space by their creative imagination.

As we mentioned earlier, all map reading is indexical from the aspect that it refers a) to the relationship between user and map invalid and b) to the relationship between the map and its referents. In cyberspace, there is yet another indexical aspect. Because, although these various attempts to map technosocial space in digital art involve highly sophisticated technologies, the participants nevertheless need a physical body for the interactive experience, which means that they need to be indexically, i.e. referentially anchored. Interacting in virtual space, the participant becomes a biocybernetic body, divided into two complementary media: one body which remains carnal and "real" in the environment it exists, and its avatar, which is the virtual, disembodied projection of the "real" body.[21] Although we might seem to momentarily lose ourselves in cyberspace, our physical body remains carnal and "real." That is what makes it possible for us to maintain proprioception, the sensation of self from within the body.

Although the medium of digital art is fundamentally self-referential, as are our digital maps and may seem virtually non-indexical, there must still be reference in order for us not to

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[20] Thrift, "Movement-Space," 593.

[21] Cf. Lucia Santaella, Culturas e artes do pós-humano: Da cultura das mídias à cibercultura (São Paulo: Paulus, 2003).

lose ourselves in cyber- and antropo-technical space. However, in this agential space with its ceaseless intermeshing of various agents, life becomes a meshwork of successive foldings. It is not a network of connectors, since this environment cannot be bounded but is a constantly expanding space along which we live our lives as a transformative process. That is why mapping this new space requires different strategies because what we are mapping is a world of processes, of continuous numerical calculations and of nomadologic movement of transformation and change.