IMMERSION AND BEYOND

A CRITICAL APPROACH TO UNDERSTANDING THE AESTHETIC POTENTIAL OF 3D AUDIO

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Abstract

Since around one decade, the word "immersion" has become one of the major terms relating to current developments in digital media. Being able to (re-)create the experience of being surrounded by and immersed in sensory impressions is widely considered as a main characteristic of nowaday's digital technologies, as for example in games, in 360° film or in 3D audio. As in 3D audio, immersion's aesthetic strength is mainly assigned to cohesiveness as well as to its capability to create an "as if" experience. By this it is coming very close to the experience of reality, and is touching, if not transgressing the boundaries to Virtual Reality.

Concerning sound and audiomedia, there is, however, an interesting history of critical approach, when it comes to illusionism and realism made possible and enhanced by new technologies. This paper will not only point out critical aspects of immersion as a goal for media experience in general, but show artistic methods and strategies, by which the critique can be made fruitful, expanding 3D-audio's aesthetic potential beyond the limitations of the merely obvious.

"Technologies (…) can be understood as formalizations, i.e., as frozen moments, of the fluid social interactions constituting them, but they should also be viewed as instruments for enforcing meanings."

Donna Haraway, A Cyborg Manifesto (1984)1

The following thoughts stem primarily from an artistic position, not from a technical or managerial one. The prime aim of the following discourse on 3D audio is to carve out major specifics of working with and in this new medium. By emphasising and advocating the artistic position in respect of the "fluid social interactions"[2] Donna Haraway is referring to, the above-mentioned discourse is not only pointing to the facilitation of aesthetic possibilities, but also to negotiating technologies' "meaning", which its inventors and promoters need to perform with society and the arts in order to bring out the innovative potential of a new apparatus.

Just "pimping" conventional formats, making a habitual outcome just more spectacular, isn't exactly what artists are looking for, when a new media technology is coming up. Instead, artistic interest appeals to pushing the boundaries of existing art, design and even life practices in order to make use of new technologies' inherent specifics, which allow genuine artistic and perceptual innovation. It is not that artists need new media technologies in order to become more creative: artistic creativity has always been there. However, media technologies need the artist in order to unfold and accomplish their innovative and at the same time meaningful potential. If this potential is not addressed or challenged, the innovative power of the technology remains limited or nil, and the devices might be considered just a gimmick, maybe nice to have and a bit thrilling, but at the same time also nothing in particular.

This is the baseline of what can be called artistic research, which means conceptualising, investigating, exploring, producing, and evaluating what can be created by the means and possibilities of new media technologies, which is, in this case, 3D audio.[3]

1 On the realisation of 3D audio "visions"

One can vividly imagine what was going on when Arseni Avraamov performed his *Symphony of Sirens* in 1922 in Baku at the Caspian Sea on the occasion of the 5th anniversary of the Soviet Union. The instruments for this quite unconventional "symphony" were distributed all over the town. According to Avraamov's score, several music bands played in public places; at the same time, huge choirs where singing and marching in the streets, sirens wailed from the factory roofs in different pitches and patterns, ship horns hooted in the harbour, from the ramps of the warehouses steam whistles intoned the

1) Haraway, p. 23.
2) Ibid.
3) The experiences and findings in this paper are all based on the work directed within the Soundscape- & -Environmental Media Lab at the Darmstadt UAS' Faculty of Media. It covers not only autonomous sound genres and formats, i.e. hear plays, electroacoustic music, and sound installation, but also includes research and creation of Fulldome Media and 360° film, especially in combination with 3D audio.

Marseillaise and *The Internationale*, artillery and machinegun units shot rhythmic spurts into the air, a formation of combat aircraft soared into the sky high above the city. And standing on a prominently high roof, Avraamov conducted these diverse groups of musical instruments with arm gestures and flags.

Those who attended *The Symphony of Sirens* were surrounded by sounds from all around, and more than that, they were situated amidst all sound sources, which streamed to the listeners' ears from all directions, or more precisely, all from distinct positions, from above left and from underneath half right, from close to the ear and from a distance, from behind and from the front side.

Often, the audience joined in singing with the choirs, marching with the bands, cheering from the roadside, or applauding from the balconies, and became, by this, active and audible parts of this soundscape.

How thrilling, if we could listen back to *The Symphony of Sirens*, performed all over the urban space. However, for a long time it was barely reproducible by technical means, as the specific positions in space and by this the environmental experience of the resounding landscape have only become possible to reproduce or re-compose relatively recently. Before 3D audio became available, one could have simply tried to project such plastically complex and diverse pieces into a listening space by multiple loudspeaker channel arrangements.

The 80 speakers in Bayle's *Acousmonium*,[4] the over 300 speakers in the Philips Pavilion at the Brussels World Fair,[5] Stockhausen's and Nono's aural-spatial settings, as well as numerous sound installations that freely distribute a large number of speakers throughout a space (such as those of Kubisch, Leitner, or Fontana) all represent examples of the desire for a precisely placed sonic plasticity in the contemporary audio arts – for the purpose of organising sound along the x, y and z axes within a 360° sphere. This artistic desideratum is, however, to be understood as something different from multi-channel or surround arrangements in which sounds are represented along a series of speakers and injected into a space.

The systems described, however, are also associated with a complicated production technology that is difficult to operate and which needs extensive hardware.

Since the beginning of this decade, the technologies of 3D audio have become readily available. Today, there are different brand names and technological systems, representing different 3D audio concepts. In Darmstadt UAS' SEM-Lab we have been working since 2011 with the Fraunhofer Institute's *Spatial SoundWave System* (SSW) producing 3D audio works within the context of our artistic research projects. We appreciate the SSW for a number of reasons all rooted in its aesthetic openness, but especially because it is not limiting artistic approaches to a single privileged listening position commonly known as a "sweet spot". However, we don't want to cultivate

4) Developed by composer Francois Bayle in 1974 at the GRM in Paris, also executed using fewer or more speakers.
5) Such as in the way Edgare Varèses *Poème Electronique* was performed in the Philips pavilion, in collaboration with Le Corbusier and his assistant Iannis Xenakis.

a bias toward the SSW-system, just mention it as our major apparatus of reference.

2 The soundscape approach: problems of implementation

For our artistic work, we approach 3D audio not as a new-fangled technical novelty, but explore it as a distinct aesthetic concept. The term "soundscape"[6] makes this comprehensible in terms of designing with sound, and as a general methodology. Composed by the words sound and landscape, the term soundscape indicates a sculptural ("plastic"), three-dimensional placement of sounds within a 360° sphere. It can be easily compared with everyday life listening experiences: various kinds of sounds are found at specific places within a landscape, where they assume a certain position, dimension, and plasticity. The collaboration of all sound shapes and positions – whether loud or faint, near or far, desired or undesired – leads to a comprehensive experience of a landscape of sounds, indeed to a specific soundscape.[7] The term "soundscape" thus inherently connotes an aesthetic approach to working with three-dimensional audio systems. It has proved to be a useful and inspirational paradigm for sculpting with sound, and it is interesting to see that the SSW's programmed gestalt pattern presents certain similarities to some terminologies from Soundscape Studies.

From the soundscape paradigm, the genre of soundscape composition emerged. It developed on the basis of everyday life, machine and natural sounds, processing and composing them from their representational origins to abstraction. Composers such as Hildegard Westerkamp, Barry Truax or others arranged quite a number of their soundscape compositions for multi-channel or surround settings, in order to come close to the impression of an acoustic landscape. By using the previously mentioned production and replay technologies the sounds will be arranged directionally along a horizontal line of loudspeaker positions, and through volume adaptations, a certain scaling of distances can become audible. A 3D positioning of sound in space, making a soundscape-like topography audible, can, however, not to be obtained by this, nonetheless some spatial approximations.

For more spatial precision, gaining by this a striking liveliness, the ornithologist Walter Tilgner uses, for his recordings of soundscapes and natural bird concerts, dummy head miking, which renders a quite satisfactory, however, not perfect, reproduction of the three-dimensional listening experience possible. Surrounded by the numerous insects' and birds' singing, humming and buzzing in Europe's biotopes, Tilgner's recordings create auditory impressions of a stunning authenticity and tactility. Yet, the earphones which you inevitably need to hear this are physically depriving and disturbing: the urgent wish arises to remove them, and by this encounter in listening

6) Breitsameter 2010. The term "soundscape", comprised of "sound" and "landscape" was first documented in 1966 by Richard Buckminster Fuller. R. Murray Schafer continued to use it beginning in 1968, beginning from the premise that hearing is, at its basis, a perception of the environment. The presence of sounds in daily life, art and media presents itself concretely as an acoustic topography.
7) The term "soundscape" (Klanglandschaft) is in no way limited to the acoustic representation of an existing landscape, but rather includes any auditory phenomenon, whether consciously designed or found.

a corporeal being-in-the-world, which provides compared with the dummy head experience an unsurpassable intensification.

In order to achieve this, a technology is necessary, which displays audio in its three dimensionality. We obviously are approaching it, by the 3D audio technologies which have come up since the beginning of this decade, and their capabilities of positioning sound in space.

3 The 3D audio apparatus: a tool toward a hologrammatic experience

For quite a number of years there has been a choice of different 3D audio systems available, which have their pros and cons. It would be a separate talk to explore how these different systems, which actually try to break into the market, have not only their own technological but also conceptual peculiarities. Each of these systems contains assumptions and presets which direct and form our hearing.[8]

Our first encounter with 3D audio was in 2011 at the planetarium in Jena, where the Fraunhofer Institute's SSW was freshly installed with 64 speakers. It was used especially for accompanying Fulldome films.[9] This is the context in which our 3D audio artistic research in the SEM-Lab began: in 2012,[10] as 3D soundtracks for the Fulldome cinema. With the expectation of eliciting certain filmic qualities, 3D audio in this context initially served to support the dramaturgical function of being enveloped by moving images. For example, a sonic element positioned in the space can direct the gaze to where important dramatic elements are presented. This increases the perception of the entire wraparound spce while at the same time identifying the full spectrum of the visible environment with the audible environment. This last part cannot, however, be fully realised, as the images in the 360° film must be projected onto the outer surface of the room and are not visible to the observer as holograms. 3D audio, however, urges towards a hologrammatic experience, which is especially fascinating: the idea and the perspective to perceive sound as an almost corporeal extension in space. Sounds treated like this beg to be liberated from their purely servile function, and so the production of 3D autonomous audio pieces in the SEM-Lab started as well.

The 3D operated space ceases to be a given thing in need of being "filled" with sound. Instead, the space is built by sounds, sculpted by sound and becomes a three-dimensional entity defined by a topography of sound – an agile landscape capable of being experienced from multiple perspectives. Specific existing soundscapes can be reproduced, as well as compositions of imaginary plastic/sculptural sound worlds.

8) This is an important discussion we need to have in the very near future; however, it must be considered on another occasion.
9) This refers to a film format in which moving images are projected onto the 360° surface of a dome.
10) An entire series of 3D audio productions created at Darmstadt UAS' Soundscape and Environmental Media Lab together with Fulldome films (in part in co-production with HFG Offenbach) was awarded prizes, including the autonomous sound art piece *I, Water* (2012) by Philipp Boß, Felix Deufel, Yannick Hofmann, Klaus Schüller, Natascha Rehberg.

The technical highlights and strengths of the SSW include the fact that it is not channel-based, meaning the sounds do not need to emanate from speakers, but rather virtual speakers are created through which acoustic sources may occur at any position in a room. Briefly described, the technical basis for the SSW system is a kind of condensed wave field synthesis.

4 The question of aesthetic necessity and plausibility

In aiming at audio compositions independent from visuals, it could be considered quite critical that a large portion of 3D audio productions up until now have realised their three-dimensionality in an often unmotivated way. In many cases, this has involved stereo productions from bands or orchestras, or stereo ear plays that have been converted to 3D. Within these scenarios, the listener finds him/herself situated amongst the instruments or the speaking human protagonist – a situation which unquestionably produces a "wow" effect, but lacks any further meaning. What becomes clear through this experience is that the use of 3D audio is not fully realised by "pimping" a conventional frontal presentation format. To form a specific and sculptural listening experience out of it requires a more exact artistic motivation. Those derive, to begin with, from exploring genuine dramaturgical ideas, concepts, or expressions that are closely linked to 3D audio. Within the framework of artistic research, it appears useful to first ascertain some historic-cultural considerations.

4.1 Immersion

Immersion is a catchword that describes the experience of being hermetically surrounded by coherent medial sensory impressions. It always implies a concept of a world in itself (*Eigenwelt*), which proves to have a long tradition. In 1849, the composer Richard Wagner described the experience in which audience, artwork, environment, and the actors involved melt into each other to form the basis of his concept of the *Gesamtkunstwerk* (artistic synthesis). However, the historical traces reach much further back into history:

The polychorality of the Venetian School in the early 16th century builds on the experiential concept of immersion. The same applies to the acoustic experiences of the medieval Gothic cathedral, were being enveloped in sound and not being able to locate the sacred voices' original source is part of the religious concept.

We can even find an example as far back as the Neolithic Period, 5000 years ago: The Hypogeum of Malta, a subterranean burial and worship site. Within this structure, a male voice, such as that of a priest, is amplified and curiously reflected so that the people present are enveloped by it.[11] In all examples, it is not difficult to imagine how this would unfold an intense, cult-like effect, such that it would become quite difficult to distance oneself from the happenings there, either socially or psychologically.

11) In this way, the voice liberates itself from the body of its creator and emerges at a completely different place in the dark of the underground room.

3D Audio, so it seems, is closely linked to the concept of immersion, which creates and supports a heightened awareness, intensifying an experience to a religious or esoteric level.

4.2 Tangibility and illusion

Imagine the sound of the following situation: a storm is starting. The thunder is approaching, the squalls make the leaves and the trees rush violently. Single rain drops are landing with a smack, then a cloud bursts, the storm's roaring, the leaves' swooshing, the thunder in the distance; in proximity: single birds' voices have come up. With a 3D-Audio system such scenarios can be reconstructed and re-experienced in an intriguing way, creating the impression as being materially present. Rain, leaves, wind cannot only be located auditorily, but often also felt in a very tactile way. It will appear real, palpable, tangible.

With 3D audio, sound scenarios and compositions can be fashioned into an almost material-tangible presence and experience. Materiality of all kinds becomes "real". Even a gust of wind can be felt on the ear. The sounds seem to be authentic, material, touchable – tangible.

This, too, is a long-cherished artistic desideratum, exemplified by the legendary coin in the antique amphitheater of Epidauros, whose impact on the floor was supposed to be dependably heard and located even in the last row – a sound experience identical to the real one, unlimited by a privileged "sweet spot". Sounding "real", feeling almost physically tangible, appearing almost "as if..": the realism which can be obtained by 3D audio is indeed stunning. This "as if…" leads us to the next specifics inherent in 3D audio

4.3 Virtuality

It is the concept of virtuality:[12] the ear possesses the capacity to perceive where the eye cannot – beyond the field of vision and the visual faculty, for example behind a person or in the dark. In this way, hearing achieves a presence independent of physical existence.

An example of this can be observed in a whispering gallery.[13] Here, words spoken quietly in one spot can be perceived at a spot dozens of metres away – so authentically and tangibly that the speaker could be standing directly next to the listener. This experience can be compared with the experiential concept of the SSW's "virtual loudspeaker".

Such whispering galleries can be found, for example, at St. Paul's Cathedral in London and the Gol Gumbaz Mausoleum in Bijapur, India. It is a virtualisation of the speaker as it suggests his or her presence, however, lacks its materiality. It should come as no surprise that such astonishing phenomena are occasionally assigned mysterious qualities.

As referred to earlier, 3D audio is based on the principle of the "virtual loudspeaker" as opposed to a channel-based principle. "Virtual loudspeaker" effects where the sounds get completely detached from their sources are also audible in many Gothic cathedrals and in the Neolithic Maltese Hypogeum, offering an experience of auditory presence as if being "real" and "true" in a place where there is no physical sound source. This certainly supported the cults' mystical effects.

12) The term "virtual" literally connotes the possibility of existence or of having an effect.
13)

4.4 Critique

Immersion, tangibility, illusion, virtuality: these terms represent core potentials and specifics for working in and with 3D audio. In mentioning them in close connection with the latter, they have become almost synonymous with the technology itself and established as almost undeniable certainties: on the one hand trendy buzzwords, on the other hand obviously generally unquestioned positings.

However, these concepts keep 3D sound connected closely to awe-inspiring, ostentatious and religious or pseudo-religious forms and expressions. 3D audio seems to stay in immediate connection with an aesthetic of grandness, and as the aspects of illusion, tangibility and the "as if"-virtuality were identified as its inherent specifics, 3D sound productions and devices are mostly measured on the basis of how truthful and realistic the sounds played back on the 3D system appear. At least, this is the way the 3D apparatus is presented to us by the industry.

Such an unreflecting naturalism tends to intensify the illusionary nature of an immersive environment to the point of naiveté. We can easily imagine the artistic nightmare of rampant, numerous illusion-oriented compositional styles based on the dogma of immersiveness in contemporary media.

Illusion-oriented artistic concepts, as for example naturalism or virtuality, have been legitimately criticised since the baroque period and especially during the 20th century due to their delusiveness and their empathy-demanding mode of adoption. To Schönberg, Klee, Kandinsky, Picasso, Ruttmann, as well as to Brecht, Weill, Nono and Boulez this critique was often related to fundamental societal and political concerns.

The problematic of a clearly immersive approach lies in its tendency to embrace and assimilate its participants, integrate them as part of the setting, and therefore make it difficult for the individual to distance him/herself. However, where observer status and options for distancing are restricted, not only are our listening habits challenged, but also our intellectual tradition of the Enlightenment-based acquisition and understanding of our world.[14]

The question is: can composers escape this coerciveness of fostering such as an affirmative recipient's role by composing in and with 3D audio? If yes, are artistic concepts imaginable which are feasible for 3D audio, allowing the recipient a mental distancing, in order not to give up one's critical faculty within the immersive embrace?

14) cf. H.M. McLuhan's continually unfolding concept of the audio-tactile surrounding sensation produced by the electronic age in contrast to the frontal-visual perception of the age of Gutenberg, among others in his work *The Gutenberg Galaxy: The Making of Typographic Man*. Toronto 1962, p. 11 et seqq).

5 Artistic strategies in 3D audio work against illusion and "embrace"

5.1 Concepts of abstraction vs. the naiveté of illusionism

In 2016, the Canadian composer Barry Truax was invited to Darmstadt UAS' SEM-Lab, to adapt his multi-channel soundscape composition *Chalice Well* to 3D audio. Already from its idea, this piece fulfills the principle of immersion in the profoundest sense of the word,[15] so that an adaption to 3D seemed obvious.

Already in the piece's original multi-channel version the listener is situated in a water spring, surrounded by its flowing, gurgling, fizzing, pulsating, and whirling. This experience is, however, not presented as a naturalistic reproduction of specific acoustic events, but rather as an original composition manifested in a careful electro-acoustic shaping of the original sound material. Through digital processing, the sounds are abstracted to evoke imaginings of physicality, materiality, surface feel, and movement beyond realism. Because these sounds do not refer to conventional figurative concepts, they communicate a strongly physical presence while freed from the illustrative and illusionary.

Chalice Well is a convincing example of how a careful material concept can prevent the naiveté of illusionism. The adaptation of *Chalice Well* lead to the absorbing sonic sensation of being enveloped, but not to the mere imitation of sounds under water pretending[16] to be realistic or even naturalistic.

5.2 Fragmentisation and deconstruction vs. affirmative embrace

A concept pursued by Anne Pischulski and Denise Röhrig in their voice play *Schienensuizid/ Railway Suicide* (2015)[17] is that the physical and mental states of being surrounded and involved do not necessarily generate affirmative embrace and assimilation. It captures the fragmentary, apparently meaningless and random perceptions, in this case of a person planning to kill himself. This 3D audio piece unfolds along a ragged soul landscape, using speech, voices and various sounds, finally positioning them in space creating a collage, leaving the materials seemingly dissimilar and unconnected, however, eloquently illuminating each other.

This is also the strategy with the 3D composition *Through the Gate of Croatia and Back* (2016) from young composer Aleksandar Vejnovic. The listener is put in the position of being within a person's mind. Instead of trying to create a simulated acoustic likeness, the composer's goal is to use the sound world to present an interior fragmentising mirror reflecting the external world by deconstruction. Here, 3D audio is not used as an instrument of the homogenously illusionary space, but rather as an approach to the torn and contrary, to the contrasting, and confrontational.

An entire series of sound art pieces and compositions have been created by the SEM-Lab on this basis of exploring fragmentisation and deconstruction.

The compositional construction of an urban soundwalk with the complexity and contrariness of its material and spatial sounds, sound textures, and auditive horizons, can also be plausibly communicated by 3D audio without slipping into the purely realistic and descriptive. The sculptural positioning of sounds in a space thus presents also a method of deconstructing and collaging: a concept juxtaposed to the production of illusion.

5.3 Concepts of internalisation vs. the naiveté of being immersed by an outer world

It is important to consciously understand the difference between a naïve objectivism, which assumes that one perceives and takes in what is outside of oneself, making the 3D environment, by this, a mere illustrative backdrop, and, on the other hand, a sound experience which understands that the auditory impressions given by an artwork have already passed through the inner world and the aesthetic concepts of a protagonist or composer, or as is generally said, of a "reflector". In German this artistic process is called "Vergeistigung"; an approximate English equivalent would be "internalisation" in the sense of an artistic-conceptual abstraction. Such an understanding can impregnate the composer against the naïve assumption that what he or she makes audible is an illustrative and – made by new technologies – stunning or brilliant copy of an outside world.

Tangibility and plasticity created by 3D audio, is then not necessarily the expression and simulation of the outside world but, in the end, the result of a mental processing. This is not identical with the abstracting material concept mentioned in 5.1, but concerns everything: form, content, narrational and/or dramaturgical concept, as they all can or need to be subjected or submitted to the internalising mental process.

5.4 Concepts of fixed genres vs. new concepts of presentation, reception and listening

3D audio directs the listener out of its frontal, purely receptive observer role, leads him or her into the role of an explorer who carefully monitors the sounds in all directions and spatial positions, like one would observe the marks and appearances in a landscape. To cope with this, one needs to look into the ways listeners are placed in a 3D auditory environment, and investigate their reception framework. In reflecting on this aspect, we can think of encouraging flexibility between sitting and moving around while listening the option of listening by lying in a recumbent position, maybe with new types of listening chairs (e.g. swiveling reclining seats or couchettes) by which one could turn around during listening, positioning one's ears *ad libitum* developing new methods of listening, in which not only the directional listening is trained but also the sensitivity for positions is emphasised, and a type of listening termed *soundscape listening* which seems quite paradoxical, as one

15) Truax originally composed the piece for 8-channel diffusion, but created a 3D audio version at the invitation of the SEM-Lab/Darmstadt UAS.

16) Independently from Truax, the young audio artist Natascha Rehberg developed a comparable material concept for her piece *Rata-Schaan* (2015). It refers to motifs of Rudyard Kipling's *Jungle Book* and explores the primeval forest as an abstractly tangible sound environment. It also establishes a path to action and interaction within the 3D audio space, although this has not been specifically implemented thus far. Like in the real jungle, *Rata-Schaan* compels visitors' actions to influence the sound texture comprised of plants, insects, birds, and animals, which then influences the behaviour of the visitor herself. Concepts are being worked on currently in the SEM-Lab that allow recipients to interact not only mentally but also operatively.

17) The production was originally produced as a 3D soundtrack for a Fulldome film in 2015, but possesses the autonomous qualities of a piece of sound art.

needs to listen at the same time to the polyphonic totality and pay attention to the single sounds as well.

Inherited ways of reception do not do justice to the new listening specifics of 3D audio. Appropriate listening methods need to be applied and practiced.

6 Conclusion

The previously mentioned elaborations are not new. There were similar discussions in the 1960s when stereo production came up in the realm of Hoerspiel, of radio drama and radio art. At that time, stereo was considered to foster a naïve illusionism, embracing and lulling the listener, and a lively discourse started discussing illusion-critical artistic strategies. These discussions turned out to be very fruitful, as the 1970s were a very prolific time in which an aesthetic pluralism in radio drama and radio art emerged, detaching it from the aesthetic norms of mono directional artistic productions.

In the age of 3D audio, such discussions are more relevant than ever, as auditory art forms tend to align themselves more and more in a dominant illusionary aesthetic reaching from Hollywood's dramaturgical blueprints to the highly assimilating patterns of computer games.

The 3D apparatus in all its diverse forms is presented by the industry as stunningly realistic and highly simulative. If the artists don't enter the constitutive discussions and social negotiations about it mentioned by Donna Haraway, the outcomes created by this innovative apparatus will stay identical to the industry's propaganda, and the essential meaning it contains can never become an aesthetic topic in its own right.

By this, the *formalisations*, as Haraway put it, will freeze prematurely, and what once was considered a new medium will then lose its innovative character. This risks commodification, in confirmation of the artistic status quo, just through a medium which is a bit more shiny, a bit more flawless and a bit more stiffly frozen through a more perfected technology.

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