LEA

LEONARDO ELECTRONIC ALMANAC

VOL 19 NO 3 VOLUME EDITORS **LANFRANCO ACETI, STEVE GIBSON & STEFAN MÜLLER ARISONA** EDITOR **ÖZDEN ŞAHİN**

Live visuals have become a pervasive component of our contemporary lives; either as visible interfaces that re-connect citizens and buildings overlaying new contextual meaning or as invisible ubiquitous narratives that are discovered through interactive actions and mediating screens. The contemporary re-design of the environment we live in is in terms of visuals and visualizations, software interfaces and new modes of engagement and consumption. This LEA volume presents a series of seminal papers in the field, offering the reader a new perspective on the future role of Live Visuals.

LIVE VISUALS

Cover Image
The Encounter, Elif Ayiter, 2010, Screenshot of Cinematic Play
Session in Second Life. © Elif Ayiter. Used with Permission.

LEONARDO ELECTRONIC ALMANAC, VOLUME 19 ISSUE 3

Live Visuals

VOLUME EDITORS
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Leonardo Electronic Almanac
Volume 19 Issue 3

When Moving Images Become Alive!

"Look! It's moving. It's alive. It's alive... It's alive, it's moving, it's alive, it's alive, it's alive, it's alive, IT'S ALIVE!"

Frankenstein (1931)

Those who still see – and there are many in this camp – visuals as simple 'decorations' are living in a late 19th century understanding of media, with no realization that an immense cultural shift has happened in the late 20th century when big data, sensors, algorithms and visuals merged in order to create 21st century constantly mediated social-visual culture.

Although the visuals are not actually alive, one cannot fail to grasp the fascination or evolution that visuals and visual data have embarked upon. It is no longer possible to see the relationship of the visual as limited to the space of the traditional screens in the film theater or at home in the living room with the TV. The mobility of contemporary visuals and contemporary screens has pushed boundaries – so much so that 'embeddedness' of visuals onto and into things is a daily practice. The viewers have acquired expectations that it is possible, or that it should be possible, to recall the image of an object and to be able to have that same object appear at home at will. The process of downloading should not be limited to 'immaterial' digital data, but should be transferred to 3D physical objects. [1]

Images are projected onto buildings – not as the traditional trompe l'oeil placed to disguise and trick the eye – but as an architectural element of the building itself; so much so that there are arguments, including mine, that we should substitute walls with projected information data, which should also have and be perceived as having material properties (see in this

volume "Architectural Projections" by Lukas Treyer, Stefan Müller Arisona & Gerhard Schmitt).

Images appear over the architecture of the buildings as another structural layer, one made of information data that relays more to the viewer either directly or through screens able to read augmented reality information. But live visuals relay more than images, they are also linked to sound and the analysis of this linkage provides us with the opportunity "to think about the different ways in which linkages between vision and audition can be established, and how audio-visual objects can be composed from the specific attributes of auditory and visual perception" (see "Back to the Cross-modal Object" by Atau Tanaka).

iPads and iPhones – followed by a generation of smarter and smarter devices – have brought a radical change in the way reality is experienced, captured, uploaded and shared. These processes allow reality to be experienced with multiple added layers, allowing viewers to re-capture, re-upload and re-share, creating yet further layers over the previous layers that were already placed upon the 'original.' This layering process, this thickening of meanings, adding of interpretations, references and even errors, may be considered as the physical process that leads to the manifestation of the 'aura' as a metaphysical concept. The materiality of the virtual, layered upon the 'real,' becomes an indication of the compositing of the aura, in Walter Benjamin's terms, as a metaphysical experience of the object/image but nevertheless an

experience that digital and live visuals are rendering increasingly visible.

"Everything I said on the subject [the nature of aura] was directed polemically against the theosophists, whose inexperience and ignorance I find highly repugnant. . . . First, genuine aura appears in all things, not just in certain kinds of things, as people imagine." [2]

The importance of digital media is undeniably evident. Within this media context of multiple screens and surfaces the digitized image, in a culture profoundly visual, has extended its dominion through 'disruptive forms' of sharing and 'illegal' consumption. The reproducibility of the image (or the live visuals) – pushed to its very limit – has an anarchistic and revolutionary element when considered from the neocapitalistic perspective imbued in corporative and hierarchical forms of the construction of values. On the contrary, the reproducibility of the image when analyzed from a Marxist point of view possesses a community and social component for egalitarian participation within the richness of contemporary and historical cultural forms.

The digital live visuals – with their continuous potential of integration within the blurring boundaries of public and private environments – will continue to be the conflicting territory of divergent interests and cultural assumptions that will shape the future of societal engagements. Reproducibility will increasingly become the territory of control generating conflicts between *original* and *copy*, and between the layering of *copy* and *copies*, in the attempt to contain ideal participatory models of democracy. The elitist interpretation of the aura will continue to be juxtaposed with models of Marxist participation and appropriation. [3]

Live visuals projected on public buildings and private areas do not escape this conflict, but present interpretations and forms of engagements that are reflections

of social ideals. The conflict is, therefore, not solely in the elitist or participatory forms of consumption but also in the ideologies that surround the cultural behaviors of visual consumption.

Object in themselves, not just buildings, can and may soon carry live visuals. There is the expectation that one no longer has to read a label – but the object can and should project the label and its textured images to the viewer. People increasingly expect the object to engage with their needs by providing the necessary information that would convince them to look into it, play with it, engage with it, talk to it, like it and ultimately buy it.

Ultimately there will be no need to engage in this process but the environment will have objects that, by reading previous experiences of likes and dislikes, present a personalized visual texture of reality.

Live visuals will provide an environment within which purchasing does not mean to solely acquire an object but rather to 'buy' into an idea, a history, an ideology or a socio-political lifestyle. It is a process of increased visualization of large data (Big Data) that defines and re-defines one's experience of the real based on previously expressed likes and dislikes.

In this context of multiple object and environmental experiences it is also possible to forge multiple individualized experiences of the real; as much as there are multiple personalized experiences of the internet and social media through multiple avatar identities (see "Avatar Actors" by Elif Ayter). The 'real' will become a visual timeline of what the algorithm has decided should be offered based on individualized settings of likes and dislikes. This approach raises an infinite set of possibilities but of problems as well.

The life of our representation and of our visuals is our 'real' life – disjointed and increasingly distant from what we continue to perceive as the 'real real,' delusively hanging on to outdated but comfortable modes of perception.

The cinematic visions of live visuals from the 19th century have become true and have re-designed society unexpectedly, altering dramatically the social structures and speeding up the pace of our physical existence that constantly tries to catch up and play up to the visual virtual realities that we spend time constructing.

If we still hold to this dualistic and dichotomist approach of real versus virtual (although the virtual has been real for some time and has become one of the multiple facets of the 'real' experience), then the real is increasingly slowing down while the virtual representation of visuals is accelerating the creation of a world of instantaneous connectivity, desires and aspirations. A visuality of hyper-mediated images that, as pollution, pervades and conditions our vision without giving the option of switching off increasingly 'alive' live visuals. [4]

The lack of 'real' in Jean Baudrillard's understanding is speeding up the disappearance of the 'real' self in favor of multiple personal existential narratives that are embedded in a series of multiple possible worlds. It is not just the map that is disappearing in the precession of simulacra – but the body as well – as the body is conceived in terms of visual representation: as a map. These multiple worlds of representations contribute to create reality as the 'fantasy' we really wish to experience, reshaping in turn the 'real' identity that continuously attempts to live up to its 'virtual and fantastic' expectations. Stephen Gibson presents the reader with a description of one of these worlds with live audio-visual simulations that create a synesthetic

experience (see "Simulating Synesthesia in Spatially-Based Real-time Audio-Visual Performance" by Stephen Gibson).

If this fantasy of the images of society is considered an illusion – or the reality of the simulacrum, which is a textual oxymoron at prima facie – it will be determined through the experience of the *live visuals becoming alive.*

Nevertheless, stating that people have illusory perceptions of themselves in relation to a 'real' self and to the 'real' perception of them that others have only reinforces the idea that Live Visuals will allow people to manifest their multiple perceptions, as simulated and/or real will no long matter. These multiple perceptions will create multiple ever-changing personae that will be further layered through the engagements with the multiple visual environments and the people/avatars that populate those environments, both real and virtual.

In the end, these fantasies of identities and of worlds, manifested through illusory identities and worlds within virtual contexts, are part of the reality with which people engage. Although fantastic and illusory, these worlds are a reflection of a partial reality of the identity of the creators and users. It is impossible for these worlds and identities to exist outside of the 'real.' This concept of real is made of negotiated and negotiable frameworks of engagement that are in a constant process of evolution and change.

The end of post-modernity and relativism may lead to the virtuality of truism: the representation of ourselves in as many multiple versions – already we have multiple and concurrent digital lives – within the world/s – ideological or corporate – that we will decide or be forced to 'buy into.'

It is this control of the environment around us and us within that environment that will increasingly define the role that live visuals will play in negotiating real and virtual experiences. The conflict will arise from the blurred lines of the definition of self and other; whether the 'other' will be another individual or a corporation.

The potential problems of this state of the live visuals within a real/virtual conflict will be discovered as time moves on. In the end this is a giant behavioral experiment, where media and their influences are not analyzed for their social impact *ex ante facto*; this is something that happens *ex post facto*.

Nevertheless, in this ex post facto society there are some scholars that try to understand and eviscerate the problems related to the process of visuals becoming alive. This issue collects the analyses of some of these scholars and embeds them in a larger societal debate, hinting at future developments and problems that society and images will have to face as the live visuals become more and more alive.

The contemporary concerns and practices of live visuals are crystallized in this volume, providing an insight into current developments and practices in the field of live visuals.

This issue features a new logo on its cover, that of New York University, Steinhardt School of Culture, Education, and Human Development.

My thanks to Prof. Robert Rowe, Professor of Music and Music Education; Associate Dean of Research and Doctoral Studies at NYU, for his work in establishing this collaboration with LEA.

My gratitude to Steve Gibson and Stefan Müller Arisona, without them this volume would not have been

possible. I also have to thank the authors for their patience in complying with the guidelines and editorial demands that made this issue one that I am particularly proud of, both for its visuals and for its content.

My special thanks go to Deniz Cem Önduygu who has shown commitment to the LEA project beyond what could be expected.

Özden Şahin has, as always, continued to provide valuable editorial support to ensure that LEA could achieve another landmark.

Lanfranco Aceti
Editor in Chief, Leonardo Electronic Almanac
Director, Kasa Gallery
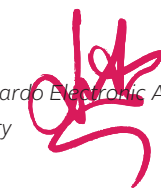
1. 3D printing the new phenomenon will soon collide with a new extreme perception of consumer culture where the object seen can be bought and automatically printed at home or in the office. Matt Ratto and Robert Ree, "Materializing Information: 3D Printing and Social Change," *First Monday* 17, no. 7 (July 2, 2012), http://firstmonday.org/ojs/index.php/fm/article/view/3968/3273 (accessed October 20, 2013).
2. Walter Benjamin, "Protocols of Drug Experiments," in On Hashish, ed. Howard Eiland (Cambridge, MA: Harvard University Press, 2006), 58.
3. " The point here is not to issue a verdict in the debate between Adorno and Benjamin, but rather to understand the debate between them as representing two sides of an ongoing dialectical contradiction." Ryan Moore, "Digital Reproducibility and the Culture Industry: Popular Music and the Adorno-Benjamin Debate," Fast Capitalism 9, no. 1 (2012), http://www.uta.edu/huma/agger/fastcapitalism/9_1/moore9_1.html (accessed October 30, 2013).
4. Paul Virilio, *Open Sky*, trans. Julie Rose (London: Verso, 1997), 97.

MACHINES OF THE AUDIOVISUAL

The Development of "Synthetic Audiovisual Interfaces" in the Avant-garde Art Since the 1970s

by

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A B S T R A C T

This paper scrutinizes how a number of avant-garde filmmakers and video artists since the 1970s have developed alternative models of the audiovisual apparatus in order to explore a synthetic relation between sound and image. Rather than depending upon the term 'apparatus' implying a rigid separation of different media arts, I define their artifacts as the "synthetic audiovisual interface" in the light of their two common characteristics: firstly, as experimentations with 'interfacing' different media components, the artifacts are intended upon translating image into sound, or vice versa, by virtue of unearthing, transforming or recombining material and structural attributes of a media including film, video, and computer; and second, as investigations into 'interfacing' the human and the machine, the artifacts are channeled into pushing the threshold of the relation between two perceptual modes (hearing and seeing) or between human perception and their operation. Drawing on the examples of Paul Sharits, Lis Rhodes, Woody Vasulka, Bruce McClure, and Ryoji Ikeda and examining how their artifacts share a constructive and combinatory approach to the media and a range of their audiovisual effects, I argue that these two characteristics of the "synthetic audiovisual interface" allow us to consider three phases of the development in audiovisual technologies – celluloid, analogue video, and digital technology – as converging in a conceptual parallel.

The term 'audiovisual' refers to the connectivity between the auditory and the visual. Despite their irrevocable difference, these two senses have been conjoined in a variety of technological practices that explored possible forms of exchange since the age of mechanical media encompassing film, television, video, and the computer. As Mara Mills and John Tresch note, the preoccupation with audiovisual interactions beginning in the 19th century has entailed "the synchronization of the different senses, the supplementation of one by the other, and the pursuit of body-machine compatibility." [1] In the terrains of the avant-garde art since the twentieth century, which encompass kinetic art, expanded cinema, light art, video art, and current digital audiovisual performance, these conceptual elements have promoted both the experiments with the components of a machine for renewing the relation between sound and vision, whether synching the two or translating one into another, and those with the coordination of the machine and the two senses. At stake in those experiments, albeit different in medium and approach, is that they are grounded in – and realize – the concept of 'inteface' as an aesthetic framework for constructing a mechanical system in which the two different modalities of sound and vision are connected in interdependent manner. Considered from Alexander R. Galloway's perspective, the concept of 'interface' is delimited neither to the technical dimension of computation nor to the digital defined as a single medium. Rather, it refers to a system of the 'threshold' prevalent both in the pre-digital (literature, painting, theatre, and cinema) and digital forms of communication and arts, an aggregation of different material and technical components through which information or image "moves from one entity to another, from one node to another." [2] In contrast to the more familiarized notion of the interface in the computer as serving to achieve transparency and purity, [3] the interface as threshold suits a variety of machine-based avant-garde arts that explore and foreground constitutive plurality, material heterogeneity, and technical hybridity. This is particularly the case with the practices of audiovisual avant-garde art, as Ian Andrews aptly writes: "the 'purest' form of the audiovisual is one where there is a direct causal relation between audio and video – video being a direct consequence of the audio signal...or audio generated directly from graphics." [4]

In what follows, I will investigate the ways in which alternative models of the audiovisual apparatus have developed since the early 1970s as a number of filmmakers and video artists experimented with a synthetic relation between sound and image in the terrains of avant-garde art. Instead of depending upon the term 'apparatus' implying a rigid separation of different media arts, I will characterize the practitioners' machine-mediated devices to generate the variation of visual imagery in relation to sonic or musical modulation as the "synthetic audiovisual interface." My use of the term 'interface' in this context has two following implications. First, the devices commonly aim at translating image into sound, or vice versa, by virtue of unearthing, transforming or recombining material and technical attributes of a medium including film, video, and the computer. Here the term 'interface' means the interfacing of auditory and visual components that comprise the medium. Second, the devices are channeled into testing the 'threshold' of the relation between two perceptual modes (hearing and seeing) or between human perception and their operation, thereby investigating the interfacing of the human and the machine. While maintaining material and technical differences between each medium, I will argue that the three phases of audiovisual technologies, ranging from the celluloid-based cinema to the electronic to the digital medium, can be reorganized into a conceptual parallel in terms of a constructive and combinatory approach to the medium and a range of audiovisual effects – simultaneity, synchronicity, contiguity, incongruity, etc. – that the medium makes. What I intend to underline in this remapping is to find a range of correspondences between the avant-garde cinema that was chiefly seen to affirm film's material specificity as its supreme devotion, and the avant-garde audiovisual art based on post-filmic materials such as video and the digital. Media scholar Yvonne Spielmann calls this correspondence "synchronicity," [5] but it is important to highlight that the term is applied not simply to the interrelation of the two avant-garde practices, but also to their common underlying aesthetic and technical premises.

The 1970s is the first period in which variations of the 'synthetic audiovisual interface' vigorously emerged in both filmic and post-filmic avant-garde practices. This emergence was driven by the resurrection of the optical sound system that dates back to the late 1920s on the one hand, and by the invention of video as an audiovisual medium on the other.

In the optical sound system, the fluctuations of the sound modulate a light source, which in turn enables the sound to be exposed onto the filmstrip as changing optical density. During this process, the sound is translated into the filmstrip's graphic element that is scanned by a photocell and played back by loudspeakers. As Jan Philips Müller writes, the optical sound system "constitutes the medium of technical and aesthetic practices of temporal sound-image coordination" due to its "conversion and transmission of sound signals over several entities." [6] In mainstream film industry, this synthetic sound was replaced by the magnetic and other advanced sound systems after World War II. However, such practitioners as Norman McLaren, Len Lye, John and James Whitney, Kurt Kren, to name just a few, experimented with the then-outdated optical sound, whether in the context of visual music or avant-garde cinema, to explore the 'graphic mode' of inscribing and representing sound. [7] Whilst the practitioners explored the mode of the abstract sonic writing by directly manipulating the material surface of celluloid, the idiosyncrasy of the experiments with the optical sound in the US and British avant-garde cinema of the 1970s lies in transforming the cinematic apparatus in ways that exceed its traditional form made up of the single screen and the viewer's passive identification with it. As a result, some renowned filmmakers such as Paul Sharits, Lis Rhodes, and Guy Sherwin used film loops and multiple projectors in order to interrogate an active spectator who interacts with the artwork and its surroundings not only mentally and aesthetically, but also physically and
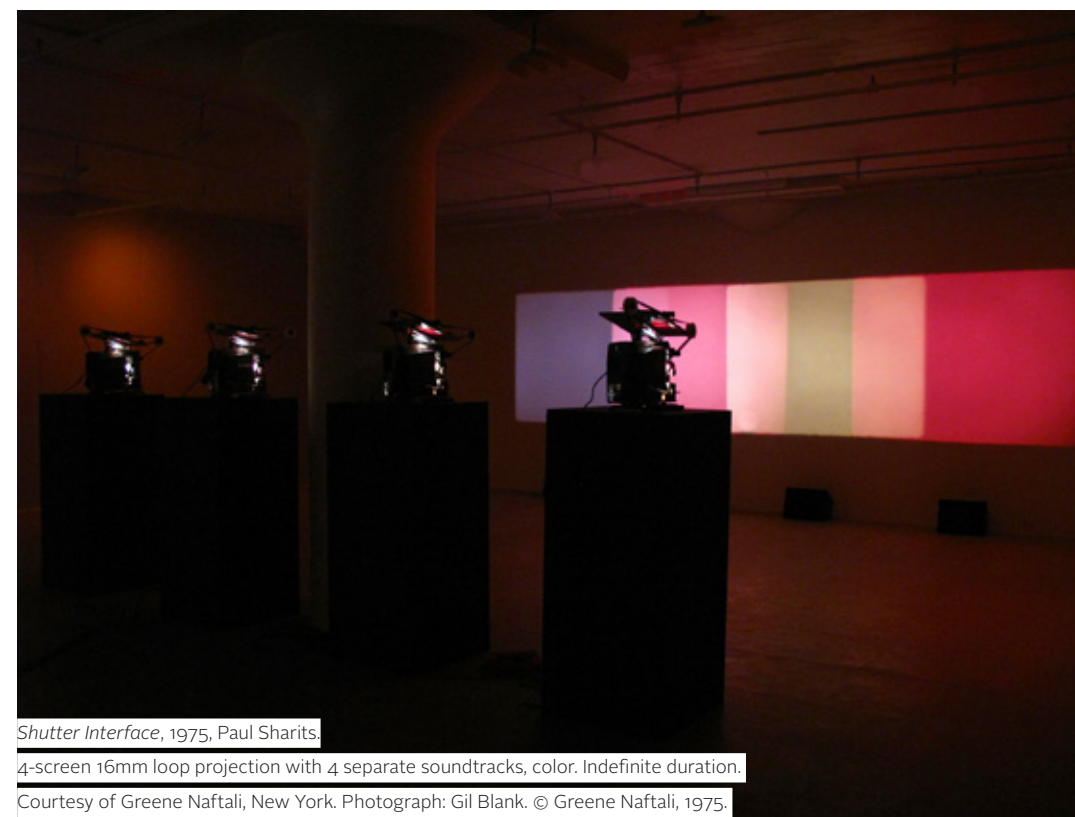
Shutter Interface, 1975, Paul Sharits.
4-screen 16mm loop projection with 4 separate soundtracks, color. Indefinite duration.
Courtesy of Greene Naftali, New York. Photograph: Gil Blank. © Greene Naftali, 1975.
Used with permission.

affectively. Here the gallery space is seen as the point at which *the internal synthesis* of audible and visual components is extended into *the external synthesis* of the optical sound projection system and the viewer's perceptual apparatus. At the same time, as Chris Welsby points out, the lack of predictability common to the multi-screen projection practices of the British expanded cinema was grounded in "using machines as generative systems" that were able to "create an almost infinite number of image combinations when projected side by side." [8]

From his early career in the 1960s Paul Sharits examined the aesthetics of the synthetic sound in relation to his use of projection with variable frame rates, which could draw the viewer's attention to the material and technical processes from the transition between film frames to apparent motion. In doing so, he sought to construct "operational analogues... between ways of seeing and ways of hearing," and test "what thresholds of relatedness might exist" between the two. [9] In the 1970s Sharits deepened his exploration of the optical sound by moving away

from conventional theatrical projection and instead by installing multiple projectors inside the gallery wall. This turn of the approach, which Sharits labeled "location film practices," originated from his investigation into the synthetic arrangement of sound and vision. In 1971, Sharits wrote that the film's images and sounds could "interweave" into "a new emergent, percept-mixed 'whole," [10] and the multi-screen projection served as a key method for constructing the whole. The locational film pieces consist of multiple (three to six) film loops operated by projectors with variable frame rates. Each projector's shutter produces sound with different frequency, which bears a direct, synchronic relation to the sprockets on each filmstrip. In this way, this system enables open-endedness marked by the interplay of different visual and auditory tracks and their complex permutations. *Shutter Interface* (1975), [11] one of his locational film pieces, combines four overlapping screens of flickering colors with a variety of beep tones that are synchronized with each flickering filmstrip's black frames. This non-standard, heterogeneous cinematic apparatus materializes the concept of the interface as threshold in that it brings

about a continuous collision of sound and image. As Sharits himself notes, "Both light and sound occur in waves, and in optical sound composite prints are both functions of interrupted light: that is, both are primarily vibratory experiences whose 'continuous' qualities are illusional." [12] Exploring the capabilities and limitations of the human perceptual system, this locational installation enables the viewer to be immersed in the disorienting collision of oscillating images and sounds, and thereby to exert a "diagnostic analysis of the qualities and functions of film as a physical-perceptual fact." [13]

In a similar way as Sharits' locational film pieces, Rhodes' *Light Music* (1975) [14] employs two projectors that throw light simultaneously across a room filled with smoke. Here the spectator's single viewpoint established by the standard theatrical setting is disrupted, and the beams dissecting the room are as important as the imagery – patterns of black-and-white bars of varying degrees. Rhodes explores the extent to which the projection of the moving image in cinema is inextricably tied to the viewer's embodied perception and thus translated into his experience of the three-dimensional space. According to Lisa Le Feuvre's account, "this work is designed for the audience to move away from the position of a static viewer, to move in and out of the screening. This creates a set of social relations against the definition of traditional film – the film becomes a collective event where the audience are invited to make interventions into the work itself." [15] At the same time, this work is remarkable in terms of the way in which the soundtrack and images are simultaneously generated. The light emitting through the celluloid onto the screen produces the images. And the sound is produced in the same way, but onto a photoelectric cell that converts light pulses into oscillating voltages. As Nicky Hamlyn explains, in this work its optical soundtracks came in two forms: "'variable area,' which appears as an analogue

wave-form…and 'variable density,' which appears as horizontal bands of fluctuating brightness." [16] In this way, Rhodes succeeds in achieving not simply the conceptual synchronicity between sound and image, but also the mutual translatability between the two. Rhodes herself has clarified this point as follows: "the visual aspect of the graphic strip is not enhanced by the soundtrack, rather the particular quality of the images are necessary to achieve specific sounds." [17]

While the optical sound system gained renewed attention in the avant-garde cinema of the 1970s, video then emerged as a new medium for a group of artists who had investigated the aesthetics of audiovisuality and invented their own model of video synthesizer, including Nam June Paik (Paik/Abe Synthesizer), Steven Beck (Direct Video Synthesizer), Eric Siegel (Electronic Video Synthesizer), and Steven Rutt and Bill Etra (Rutt/Etra Synthesizer). Since the wake of analogue video, Steina and Woody Vasulka had scrutinized the aesthetics of the synthetic sound as they employed audio synthesizers in order to convert a video signal into an audio signal, or as they used the Rutt/Etra Scan Processor to take more precise modulation of electric signals and thereby shape variable dynamic forms that can be seen and heard simultaneously. In either case, the two artists demonstrated the reciprocal translatability of visual and sonic elements as a key domain of video's material specificities, and sought to develop variable, multidimensional visual forms as manifestations of audio noise. Their early single-channel signal processing works, such as *Noisefields* (1974) and *Soundsize* (1974), present abstract imagery, including circles and dots, as derived from the merger of camera-fed visual sources and wave-generated audio sources. The electronic visuality of these two pieces is related to the variability of the audio signal, so that the patterns and colors of the abstract shapes are interlocked with the changing frequencies and pitches of the oscillating noise. It is interesting to note

that Woody Vasulka considers the development of the machine for electronic audiovisual synthesis able to transform the cinematic or electronic apparatus: "It looks like I will still be looking for frameless cinema as a possible escape from the confinement of the cathode ray tube, trying to depart into some other dimensions." [18] He envisions that the 'other dimensions' can be realized by virtue of the 'omni-present, omni-potent features of this new medium.' It is in this sense that Vasulkas' body of works includes not simply video performances, but also several installation pieces, including the installation version of *Noisefields* (*Noisefields – The Installation, from a Series of Light Revisited* (1974/2002)), [19] in which the artists could expand the audiovisual synchronicity of video into the space outside the machine, that is, the viewer's space of reception. In this installation version, Vasulka placed a number of transparent plastic rectangular boards mounted on steel supports, and projected a series of flickering effects onto them. The imagery, which is comprised of constantly changing surface noises and a glaring circle, is synchronized with the stream of pulsating noises, and the viewer is invited to perceive the continuous interchange between the two oscillating senses as derived from Vasulka's video sequencer that manipulates video's electronic signal vertically and horizontally in transformative and procedural ways. By allowing the viewer to feel the audiovisual viscerally in the gallery space, *Noisefields – The Installation, from a Series of Light Revisited* reveals the technical and material synchronicity between sound and image, which forms a grounding feature of electronic video.

The synchronic correlation of electronic sound and abstract imagery, which characterizes the works of Vasulka and other early video pioneers, prefigured the contemporary audiovisual artists who work on the advanced digital technologies in order to construct the 'machines of the audiovisual' and manipulate sound and image simultaneously. Still, the efforts to develop synthetic audiovisual interfaces are not unique to electronic and digital artists, and the examples of Sharits and Rhodes examined before demonstrate the less acknowledged correspondences between the Structural/Materialist film in the US and UK and the early video art. In fact, these correspondences are what we have been witnessing since the 2000s, where the filmic and the post-filmic avant-gardes have converged in the reconfiguration of the synthetic audiovisual interface as a device for activating a sense of 'liveness.' Despite its different manifestations, the pursuit of 'liveness' and performativity can be viewed both in terms of the *internal interfacing* of the components of the audiovisual apparatus and in terms of the *external interfacing* between the apparatus and the viewer. As for the first aspect, artists break open and examine the material and technical properties of the apparatus in ways that the boundaries of its audiovisual stimuli become unstable: for instance, the boundaries of the film frame, the boundaries of digital code, the location of the screen and the projection light. As Duncan White neatly notes, what connects the current mixing of analogue and digital media is "a sense of process" and "ephemerality in contrast to permanence and durability." [20] And as for the second aspect, the presence of the machine in live performances aims at making its surroundings more immersive and integrating the viewer's enhanced perception into its operation. Steven Ball argues that projection in the audiovisual performances of the current era finds itself "in spatial relationships and closer to the conditions of a music practice." [21]

The film projection performances of Bruce McClure [22] can be seen as deepening the tradition of remaking the cinematic apparatus for the synthetic coordination of sound and image, which was made by Sharits and Rhodes, in a period that the celluloid filmstrip and the film projector are increasingly regarded as part of an outdated medium. McClure reconstructs his film projector by assuming it as a machine whose optical

stimuli are translated into a series of explosive noise produced by the contact between the filmstrip and the projector shutter, and by connecting it with an array of effectors and sound pedals used to amplify the sound of the electric guitar. In this way, McClure uses the projector like an instrument that he can experiment with during his projection, as he states: "The film is subverted in favor of the light from a projector. So I think it takes on more of a participatory role in projection, rather than being the primary conduit." [23] In doing so, he emphasizes the unique characteristics of film as a generator of a real-time, performative event in which the combination of sound and image is perceived as a process. In one of McClure's performances in 2007, the screen is filled with a series of geometrical patterns ranging from a circle marked by grids to a series of rectangles different in size. The rhythm of noise is synchronized with the change in the visual patterns. For instance, we can hear an array of drone sounds whose pitch changes according to the change in the flicker of the circle-grid pattern, and a series of hammering sounds attack our ears in a way that their punctuations are aligned with the change in the rectangular patterns' flickers. Grounded in his background of architecture, McClure considers projected film image not as the visual information delimited by the screen whose size and dimension are predetermined, but as an ever-changing solid-light sculpture that leads the viewer to perceive the space between the projector and the projection wall. McClure clarifies that his projector as a performance machine is designed to shape the viewer's synthesis of the auditory and the visual senses: "I'd describe it as visceral, because of the beat, probably. The beat is unrelenting. But as you grow accustomed to it you become aware of overtones in the body bounce of flashing light and ringing." [24]

Ryoji Ikeda's *Test Pattern* series (2008-present) [25] can be compared to *Light Music* not simply because of its presentation of barcode-like abstract imagery synchronized with explosive noise, but because of its investigation into "the relationship between critical points of device performance and the threshold of human perception." [26] He further notes his intention of the work as follows: "the velocity of the moving images is ultra–fast, some hundreds of frames per second, providing a totally immersive and powerful experience." [27] We realize that the viewers of *Light Music* share this experience in different material and technical configurations. If *Light Music* encourages the viewer to see the interfacial nature of the cinematic apparatus by opening up three intervals between its components (between the filmstrip and the audiovisual image, between the image and the projector, and between the projector and the screen), then *Test Pattern* draws the viewer's perceptual attention to the processes of the real-time computer interface which encodes digital information into a series of sensible audiovisual signal patterns. In this way, Ikeda devised his system of translating sound and image in a way that the real-time analysis of the latter becomes the music table to visually create or manipulate the former. The patterns of visual information in his work serve to visually depict the frequencies and rhythms of sound. Thus in this system visualizing sound and making visual formation heard are identical. As Anna Munster notes, digital cross processing in current audiovisual practices renders sensation as mutually relational, achieving "visual sonification, sonic visualization," and "diagramming a resonating, moving architecture." [28]

> *The patterns of visual information in his work serve to visually depict the frequencies and rhythms of sound. Thus in this system visualizing sound and making visual formation heard are identical.*

In sum, my remapping of the different yet overlapping avant-garde audiovisual practices within the framework of interface ultimately aims at constructing a cross-medial perspective on the "conceptual synchronicity" [29] between film, video, and the digital. Examining the collision and exchange between the media under the similar formal variations leads us to see how each medium's material and technical specificities go beyond reaffirming its conceptual and expressive boundaries and expand itself into dynamic, multifaceted manifestations through which it is 'interfaced' with its others. The concept of the 'synthetic audiovisual interface' then offers an insight into the extent to which the pursuit of the synaesthetic correlation between image and sound in the rich traditions of machine-based avant-garde arts has involved not simply the rearrangements of the two senses, but also a variety of material, technical, and discursive collisions that transcend the reductive understanding of the aesthetic functions of an apparatus as sharply distinct from those of the other.

In this sense, my brief rewriting of the history of the audiovisual arts across different media does more than trace and illuminate the historical precedents for the contemporary audiovisual live performances. From a broader standpoint, I argue that revealing the synchronicity of filmic and electronic/digital audiovisual practices in the light of designing the 'synthetic audiovisual interfaces' ultimately tallies with the need to invent what Edward Shanken calls the "hybrid discourse" on the cultural and artistic convergence of avant-garde/contemporary art and new media art, which have largely been regarded as separate or mutually exclusive. As Shanken compellingly notes, since the 1960s with the advent of electronic and cybernetic technologies, new media art and avant-garde/contemporary art have had as much correspondences as mutual autonomy and ostensible differences, in the sense that the theories and technologies at the

core of the historical developments of both occupy "a hybrid stance, straddling medium-specificity and a range of non-specific tendencies, including universality, intermedia, multimedia, and convergence." **30** In this context, the "hybrid discourse" serves to bridge the theoretical and discursive gap between the two terrains and thereby establishes a stepping stone for leaping toward an alternative historiography of the entwinement of art and technology across different disciplines and media, and the concept of the 'synthetic audiovisual interface' is a small attempt to explore its possibilities. ∎

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