Pulse63:

Live Streaming and Architectural Projection Mapping at Moogfest 2018

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Abstract:

*Pulse63* is a live streaming and projection mapping installation at architectural scale developed for *Moogfest* 2018, in Durham, NC. The project explores the relationship between telepresence and “superarchitecture”. This paper will consider the artistic aspects of these terms through the work of Eduardo Kac, Pipilotti Rist, Doug Aitken, and others. The intent is to create a visual installation at *Moogfest* that works as a monolithic visual signifier by applying artistically mediated telepresence and “superarchitecture.”
Pulse63 is an outdoor art installation at Moogfest 2018 in Durham, NC. It uses live concert videos as source material for projection onto a 10 storey building in downtown Durham, NC. The intent of the installation is to create an artistic interpretation of what is happening now from multiple venues within the city and the festival as a singular public art installation.
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Introduction

*Pulse63* is an investigation into group telepresence for distributed events through “*superarchitecture*” by combining physically disparate locals into a single real-time experience that superimposes visual media on architecture to redefine the temporal experience of public space. Through the use of exterior architectural facades the artist is inherently engaging with public space. Telepresence allows for the relocation of audience experience from one location to another, while, “*superarchitecture*” is the tool through which *Pulse63* will confound existing architecture, streaming media, and public space.

The installation of *Pulse63* is not only site specific but also time and context specific. Its context is as a part of the larger music, arts, and technology festival *Moogfest*. It will be important to explore the features of this festival and location that have lead to the collaboration and provide a canvas as well as source materials for the creation of *Pulse63*. Exploring the physical and contextual setting of *Pulse63* will help us facilitate an understanding of both the audience and the space that this work will engage with.

This design process had to navigate technical specifics of funding, permission from building proprietors and town government, hardware installation, power, and internet access, while conjointly informing and being informed by the artistic qualities of the interaction between video source material, the specifics of chosen architectural features, and the placement of buildings in both the flow of the festival and the city of Durham..
Public Art, Telepresence, and “Superarchitecture”
Public Art

*Pulse63,* as an outdoor projection mapping project, exists in context with the broad field of public art. To explore this artistic concept it will be useful to investigate a seminal public art installation and a more thematically linked exploration. This investigation will lend a focused understanding of public art from which to place *Pulse63*'s engagement within art historical precedent.

*Tilted arc,* by artist Richard Serra, was a raw steel slab 120 feet long and 12 feet high that bisected the *Federal Plaza* in DC. The work drew immediate ire from those who worked in the plaza as they had to circumnavigate the piece to cross the pavilion. This interruption of the public's path was the intended purpose of *Tilted Arc,* and Serra was quoted as saying, “The viewer becomes aware of himself and of his movements through the plaza. As he moves, the sculpture changes. Contraction and expansion of the sculpture results from the viewer’s movement. Step by step the perception not only of the sculpture but of the entire environment changes.”* Tilted Arc* is about interjection, in Serra’s case forceful and jarring, into the daily routine of those who occupy the site of the installation. *Pulse63* will also work as interjection into public space. However, where *Tilted Arc* was a physical obstruction, *Pulse63* uses projected light as visual interjection in an attempt to show the audience what is happening in their city at that moment. Serra also constructed *Tilted Arc* to address the audience as they moved around the installation by warping the mass and direction of the steel. Similarly, *Pulse63* uses the three dimensional attributes of the architecture on which it is installed, and variance in scale to create a visual installation that is engaging to its large potential audience.

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Anish Kapoor’s *Cloud Gate* is a monumental piece of public art that shares a theme with *Pulse63*: reflection. The monolithic and colloquially named “Bean” is installed in Chicago's Millennium Park and consists of 168 stainless steel plates weighing 110 tons and polished to a reflective finish. The massive form reflects the shoreline of Chicago, the audience, and their immediate surroundings across the undulating surface of the sculpture; warping with the form as well as the viewer’s position. This effect is not a direct reflection of the city but creates an artistically mediated interpretation of its immediate surrounding environment. *Pulse63* also interprets its surrounding environment in time. Though, where *Cloud Gate* uses a reflective surface as mediating device *Pulse63* uses telepresence, which we will discuss shortly, to create a remote reflection of what is happening now in its surrounding environment. *Pulse63* also engages with the idea of scale found in *Cloud Gate*. Both the size of the “Bean” and how the reflections warp its surroundings allow Kapoor to manipulate the audience’s sense of scale. In *Pulse63*, architectural projection mapping allows us to manipulate the scale of the video while also engaging the whole facade of a building as a monolithic digital sculpture.

Unlike the other public art installations investigated, the application of telepresence allows *Pulse63* to explore more than one site. *Pulse63* must negotiate the site specificity of its installation location but also is in conversation with the site from which its moving image media is sourced. This investigation is further complicated by the relationships between Durham and *Moogfest*. Though the installation focuses on the activities of *Moogfest*, the festival makes up only a portion of what is happening in Durham at that specific time. As public art, *Pulse63* offers the opportunity for the remote exploration of other locales to an internal audience, those participating in *Moogfest*, and all those present in the general public space.

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http://chicagoist.com/2015/09/17/photos_how_the_bean_was_constructed.php#photo-1
Telepresence

Telepresence is a subsection of telematics, or the branch of information technology that deals with long-distance transmission of computerized information. As the telephone allows for long distance transmission of voice, phone from the Greek “phōnē” or voice, telepresence allows for the long distance transmission of presence. However for artistic purposes the term is best summarized by Eduardo Kac in his essay *Telematic Art*,

“as a way to produce an open and engaging experience that manifests the cultural changes brought about by remote control, remote vision, telekinesis, and real-time exchange of audiovisual information. I see telepresence art as challenging the teleological nature of technology. To me, telepresence art creates a unique context in which participants are invited to experience invented remote worlds from perspectives and scales different than human.”

It is through Kac’s interpretation of telematics in art that *Pulse63* engages with real time transmission of audiovisual information on a scale different from human for audience experience of remote locations.

To better understand this reading it is beneficial to examine other art that engages with this doctrine and more useful still to start with Kac’s own *Rara Avis*. *Rara Avis* was installed in 1996 at the Nexus Contemporary Art Center in Atlanta, Georgia and consisted of a room made into an aviary. Central to the aviary was Kac’s “Macowl”, a mixture of the form of a macaw and the binocular vision of an owl, and a virtual reality (VR) headset through which the audience could experience the Macowl’s binocular vision. Additionally if the operator turned their head while wearing the headset the Macowl’s head would correspondingly turn. By giving the audience the ability to view the aviary, and themselves, through the Macowl’s perspective Kac

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attempted to give the audience the ability to cast, transmit in real time via the internet, their presence into that of the bird. Pulse63 does not attempt to give the audience a one-to-one embodied experience of the remote venues in the same way as Rara Avis. However, through live streaming media Pulse63 offers a view of a concurrent remote world and through application of “superarchitecture” changes the scale of that world. Though Pulse63 doesn’t offer an embodied experience of this world through telepresence, it is of note that because the installation of Pulse63 is internal to the festival the audience can choose to partake in an embodied experience at the source location of the streaming media by simply walking there.

In another example of telepresence in art, the London-based theater group, Punchdrunk, collaborated with the MIT Media Lab to reimagine their immersive play Sleep No More with a remote web presence. The show, installed in a New York City warehouse with over 100 cinematically detailed rooms, allowed masked audience to participate but not speak. Through an array of digital sensors within the masks, webcams, and microphones onsite, visitors could interact with remote participants, who engaged the performance through a web browser. The interactions are not in the most obvious one-to-one experience that is used in Kac’s Rara Avis. Instead, while the onsite audience moves through the space, the web participants interact with a text-based web application and only occasionally get to see (through dispersed webcams) or influence (in the case of a remotely controlled typewriter) the performance, or their paired onsite partner. Tod Machover, an M.I.T Opera of the Future Professor, wanted to see if “you can take a live experience, whether it’s a concert or a theater show or hanging out with people you care about, and experience that somewhere else.” Pulse63 similarly attempts to allow a remote audience to experience (rather than simply see) a live event. As in Extending Sleep No More,

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\textit{Pulse63} does not offer a one-to-one embodied experience of telepresence but constructs an artistically mediated and interpreted engagement by warping the live feed over architecture to create “superarchitecture.”

The New World Symphony’s WALLCAST\textsuperscript{®} (Fig. 4) is a commercial and direct application of telepresence where an audience can watch a live stream of a performance happening concurrently inside the New World Center, located in Miami Beach, Florida. It shares many attributes with \textit{Pulse63}, live streaming concert footage for a public audience on an architectural scale. However, there are many places where \textit{Pulse63} differentiates from this application. \textit{Pulse63}’s location allows it to speak to those participating in \textit{Moogfest} but through its placement in the center of downtown it can also address a greater and more differentiated audience through interjection into Durham’s nightlife. Further, WALLCAST\textsuperscript{®} tries to offer a full experience, as-if-you-were-there, for those who can not be present inside the indoor music venue. \textit{Pulse63} offers an additional experience, an interpretation and extension of the source material. Finally, though WALLCAST\textsuperscript{®} is certainly at architectural scale, it is not “superarchitecture” as it does not address the architectural features nor the architectural context.

\textit{Rara Avis} and \textit{Sleep No More} both show ways of engaging the idea of telepresence in artistic works. Neither work tries to be an exact displacement of the audience’s five senses to a remote location, as may be the case in more engineering, business, or scientific fields, but engages specific aspects of presence for exploration. \textit{Rara Avis} explores the embodied experience of seeing through the eyes of a much smaller being. While \textit{Extending Sleep No More} allow the remote audience to experience a massive theatrical production from a single chair. Similarly, \textit{Pulse63} is not an attempt to transport audience literally to another place, but will
focus in on specific qualities of telepresence; the viewing of a remote location, through live streaming media, at a scale other than human through “superarchitecture.”

“Superarchitecture”

In Kissing Architecture, Sylvia Lavin, describes “superarchitecture” as “the medium, offers a way to understand the seductive contact between architecture and not architecture as a means of mingling one medium with another so that neither loses its specificity.” Though Lavin talks about many different media through which to accomplish this commingling, such as Jeff Koons’ reflective Balloon Dog, our focus will be on projected media. On this specific application Lavin continues,

“what is important and potentially new is the fact that projected images and architecture converge without collapsing into one—that unlike fresco, one sees through a projected image and the surface is direct rather than proximate. . . . Nor does this new relationship between architecture and other mediums operate in the manner of parallel play between two, as happens . . . when sculpture is plopped adjacent to a building. Rather, it is because the union of the architectural surface and the surface of the luminous image is not ideal and immaterial, but rather provisional and material, that it more fulsomely opens new questions.”

It is with understanding of “superarchitecture” that Pulse63 investigates the application of live streaming media and architectural projection mapping to create an installation that is greater than the sum of its parts while letting each medium exist independently. Lavin’s concept of “superarchitecture” leads us to an investigation of the work of seminal artists Pipilotti Rist and Doug Aitken.

Pipilotti Rist’s Pour Your Body Out (7354 Cubic Meters) is an example of the artist’s use of projected imagery and existing architecture to construct “superarchitecture”. The installation projects colorful, abstracted, and yet familiar video onto the white, interior walls of the large

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Marron Atrium, designed by Yoshio Taniguchi, and is accompanied by a large, communal, and comfortable seating element.9 Lavin comments, “The video took this amorphous space, which by itself is indeterminately both circulation and gallery, and gave it definition. . . . loose flow into dense accumulation.”10 Rist’s intent can be seen in the inclusion of the atrium’s volume, 7354 cubic meters, in the title of her work. This implies that Rist’s work is not solely the projected media but the space that is created through the intersection of the projected video, sound, the atrium’s architecture, furniture, and the audience. Rist’s incorporation of the presence of her audience into the construction of “superarchitecture” is an influential element in the construction of Pulse63. Through projected image Rist creates a visual language to address the room’s innate architecture, but more importantly she transforms the context from an airy causeway into a singular dense accumulation. Rist both addresses the architecture fully and changes the original context of architecture; both are necessary for successful “superarchitecture,” and both will be negotiated in the completion of Pulse63 through the development of a visual language with which to address the architectural features, and by changing the immutable dark presence of architecture at night into a luminous and dynamic visual installation.

Doug Aitken’s Song 1 is another sample of “superarchitecture” that shares a common thematic feature with Pulse63, source material based around musical performance. Song 1 was a 360° projection on the exterior facade of the Smithsonian’s Hirshhorn Museum and Sculpture Garden, in Washington D.C. and featured a 40 minute music video11 of the 1934 pop song “I Only Have Eyes for You” reimagined and mixed by contemporary artists like Beck, James

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Murphy, No Age, Devendra Banhart, Luck Dragons and others. Kerry Brougher in her essay Crystallized Music describes,

“Project(ing) on a curved building, establishes a shallow, anamorphic space, an illuminated frieze; it is a negative arc sliced out of the city. . . . We can enter the film but will only emerge in the same place on the other side; fiction and reality have merged. Film has flowed completely out of the black box and is no longer a train to exotic locales or a time machine to other eras, but—like illuminated architecture—its fluid and flowing images exist as part of the urban landscape, reflecting its realities, its stored database of shared memories, and even its mass dreams and fantasies."

Aitken’s work isn’t simply a music video on a wall but creates a reflection of the environment that surrounds it, transforming moving image and architecture into an artistic encapsulation of the events which transpire around it. As Aitken reflects the atmospheric qualities of D.C. back onto the city, Pulse63 strives to reflect congruent happenings as exterior architecture back onto the cityscape of Durham, allowing the audience to enter the installation and exit on the other side with knowledge of what is happening in the city at that moment.. As Aitken relies on the abilities of other artists and acts as director, Pulse63 relies on the performances of the musicians who act as source media. In contrast, where Aiken relies on the rhythm of “I Only Have Eyes For You” to drive the visuals, Pulse63 will be a silent installation, which is designed to encourage a desire for the audience to engage with the remote source directly. Pulse63 will similarly blend projected media of live music performance and architecture to attempt to reflect this atmospheric quality back into the city Durham.

Both Pipilotti Rist and Doug Aitken take existing architecture and commingled it with visual media to create what Lavin defines as “superarchitecture”. While, certainly

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not the only way to create “superarchitecture,” these examples speak to tools, methods, and concepts that will be leveraged in the construction of Pulse63. Rist’s attention to the audience as part of the installation is analogous to Pulse63’s intent in using the flow of the audience as a central feature in reaching the concept of “superarchitecture.” Song 1, as a visual beacon on the landscape to reflect the experience of a city’s inhabitant back out onto the city, will similarly be mirrored by Pulse63’s reflection of what is happening in the interiors of Moogfest back out into the public cityspace of Durham. Understanding these established “superarchitects” has anchored the goals of Pulse63.
Practice-led Research
The tools used in Pulse63 are the result of a research path that involves attempts (failed and successful) to create "superarchitecture," previous exploration of investigation of live streaming media as a tool for telepresence, exploration of material qualities of projected image and surface, and a timeline of experimentation with projection mapping at scale. These projects set the stage for Pulse63 leading to a richer understanding of the main research areas through practice-led research.

Through the Looking Glass: A Senior Exhibition was installed in the Armory Gallery Mezzanine in Blacksburg, Virginia and served as an early exploration into both telepresence and “superarchitecture.” A dual projector array was used to cover one wall of the gallery with a dynamic grid of live processed first-person-view action videos and a live camera feed of the gallery (Fig. 1). The processing effect was done in homage to the style of Andy Warhol’s screen prints and the conceptualization of the project was similarly inspired by the same artist. Including a live feed in the projection was an experimentation with the concept of telepresence. The audience would become part of the art, seeing their own image as part of the installation. However, this effect was not well implemented. Both the placement of the camera, resolution, ambient lighting and randomness of the feeds placement in the display made it difficult for the audience to see and recognize their own image among the other media. The work addressed the architectural features of the wall of the gallery as a sole monolithic surface but engaged super architecture by shifting the context of the wall from a singular solid into a multifaceted, overstimulating, and dynamic visual installation. Pulse63 will similarly address the entire architectural facet of its installation site in order to change the context.
of both the base architecture and the projected media while exploring telepresence, not through an onsite camera feed, but through lived streamed media.

*Plasma* was similar in function to Eduardo Kac’s *Rara Arvis* as it intended to translate an audience’s movement into another environment. Instead of Kac’s robotic bird, *Plasma* was a virtual physics simulation in which a viscous substance undulated in its own gravity until an audience member, provided with a LEAP Motion hand tracking camera, manipulated the substance. The original installation was projected onto a concave and glossy plastic disk and included an eight channel sound environment mapped to the motion of the substance through space. (Fig. 2 *Plasma* was supposed to allow the audience to map their physical presence into a virtual world. However, the planar aspect of the video and the surround sound systems, as well as the disjointed qualities of the video and audio system, never lead to a construction of a cohesive environment as the disk was hung on the wall and the speakers were arrayed around the audience on the floor. The convex projection surface was intended to help create a sense of 3D space inside the imagery, but this illusion was weak in practical application as the effect was slight and only worked from a very specific viewing angle, a problem that persists in a lot of industrial projection mapping applications. Further, the gloss on the plastic combined with the light from the projector created glare that highlighted the material qualities of the disk, not the created environment. The projected material and the surface were therefore in conflict, not working together to create “*superarchitecture*.”

*Pulse63* will not try to add or address elements that it can not resolve into a cohesive whole, forgoes a direct one-to-one interpretation of telepresence for a conceptually mediated from, and will engage the native characteristics of its projection surface to emphasize rather than distract.
In the Moss Arts Center Projection Mapping Project a small group each created short animations of colored blocks to an original musical track. These animations were mapped onto the Moss Art Center’s grand staircase ceiling (Fig. 9). Though predominantly an aesthetic study, the projection addressed the entire architectural facet as a whole. It created a visual language through which to engage the architectural features and explored that language robustly; creating an installation that highlights both projected media and the architecture’s innate characteristics. However, it does not go further to create a greater contextual whole that goes beyond architectural decoration. Pulse63 will create a visual language with which to address the existing surface fully but will reach further than the Moss Arts Center Projection Mapping Project to create a greater exploration of the commingling of projected image and architecture so, as Lavin says, it, “pushes architecture out beyond its own envelope to risk exploding into something else...permits the building to outperform itself.”

Pulse16, at Rock the Blocks Music and Arts Festival in Blacksburg, VA, used architectural projection mapping and quasi-live video from its five venues to create an outdoor installation that would capture the events happening concurrently to facilitate a multi-nodal sense of telepresence (Fig. 3). A festival of this size does not have access to a live streaming infrastructure to use as source media, so four undergraduate (Cinema, Communication, and Visual Art) students were equipped with cameras and wifi enabled SD cards. After each video was recorded the students used their smart phones to upload the video to a private Dropbox account on local wifi. Files were then downloaded on site and mixed for projection onto the street-facing facade of the Armory Gallery. The term “quasi-live” was used because in initial trials it was approximated that from recording to

projection the delay would be about fifteen minutes; not live, but generally enough time to see a feed at Pulse16 and still make it to the event. However, testing didn’t account for greater traffic on local wifi networks during high density events, such as concerts, and the actual delay was often as much as an hour. Another issue with the installation was that there were no signifiers of the quasi-live status of the source material nor the venue that each video was currently being cast from leaving the audience confused as to what was happening or its purpose. The projection also set up a visual language for engaging with the architecture that wasn’t able to resolve across the whole aspect and offered no compelling visual reason for this. Pulse63 not only derives its conceptual heart from Pulse16 but will include signifiers of both the live status of the video and the location of the source, will use hardline ethernet and professional streaming infrastructure (which will be described in more detail later) to guarantee the “live” status of the feed, and develop a visual language that fully engages the building’s architectural features.

Of the problems with Pulse63 the two major limiting factors were related, funding and scale. An opportunity to address those factors would be present through the ACCELERATE Festival at the Smithsonian Museum of American History, Washington D.C. in October of 2017. As part of the ACCELERATE Festival I participated as animator, instigator, and technical director of the Smithsonian Museum of American History Projection Mapping Project under Creative Technologies Director and Professor, Thomas Tucker. The animation developed would attempt to create “superarchitecture” on the building’s Washington D.C. Mall facade. However, this projection ended up serving primarily as an aesthetic study and as such didn’t succeed in creating “superarchitecture.” It didn’t address the native forms of the building and would have been more effective if projected on a flat plane. As in many commercial applications of
projection mapping, you can see that if the projection is viewed from an off angle it breaks the 3D illusion of the animation. While the building’s form may have been inspiration for the animation it doesn’t create a greater conceptual whole out of the mingling of projected media and architecture. However, my role as technical director did serve me in creating a realistic understanding of the technical, financial, and municipal requirements of projection mapping at architectural scale.
Place, Time, and Mediums
The installation of *Pulse63* will reveal and hopefully support the exploration of the thesis questions. Though, at the time of publication, the piece is still a week from installation, an exploration of how the design of *Pulse63* served to facilitate this exploration is possible. A process that started with the selection of the final site; a process of exploring relation to the city of Durham and *Moogfest*, “superarchitectural” viability (the ability for the source media and the architectural surface to interact and explore the qualities of each), funding, logistics (projector mounting and placement, power, and internet), and the amenability of building proprietors. Once the site was selected the process of design consisted of navigating “superarchitecture” at the behest of telepresence. Both site selection and design were strongly influenced by previous exploratory work into both telepresence and “superarchitecture,” as well as art historical precedent. Finally, though at the time of writing *Pulse63* will still exist theoretically, it is not too early to talk about future iterations and potentials for the artistic themes discussed herein.

**Moogfest & Durham**

*Pulse63*, as a site specific installation, exists in context with the site it is installed. However, since *Pulse63* is also a time based installation which relies on live streaming media from a specific event, *Moogfest* is the specific context with which it will interact. Therefore, it is necessary to look at both the context that the festival positions itself within, and the city of Durham, North Carolina. These investigations into Moogfest and Durham will provide a better understanding of the context *Pulse63* will inherently be in conversation with.

*Moogfest* had its start in New York City in 2004 as a small party to celebrate the 50-year anniversary of its namesake’s, Robert “Bob” Moog, first homemade Theremin, marking a lifetime career as a electrical engineer and pioneer of analogue synthesizer production. *Pulse63* takes
its appended number “63” in honor of the 63 years since Moog created that first Theremin. After his death in 2005 the festival became a semiannual celebration of Bob Moog’s legacy. The festival was centered around avant garde electronic music production but, “by 2014... no longer was the music festival a sufficient platform for experimentation and conversation. To complement the nighttime performances, a technology conference was added to the program, bridging the divide between engineering and artistry.\textsuperscript{15} Moogfest CEO Adam Katz describes it as, “TED through a distortion pedal... We don’t have a sponsor package. To work with us takes collaboration, takes conversation, takes long-term commitment.\textsuperscript{16} However, such lofty goals can have trouble taking off, shortly after calling Moogfest, “a cozy EPCOT that made electronic music and avant-garde ideas fun for all ages,” Christopher Weingarten of Rolling Stones noticed, “a cognitive dissonance between the World's Fair environment and accompanying paragraphs of techno-babble, jargon and advertising copy. Descriptions of things set up expectations that no technology could deliver.\textsuperscript{17} Pulse63 may suffer from a similar issue, in my attempt to develop something to test my abilities to their limits I may have sacrificed the ability to create something smaller and but more thoughtful; an important realization that will hopefully lead me in my future work to take smaller steps to facilitate richer exploration.

Though Moogfest started in New York City, as it grew it followed Bob Moog’s path and moved to Asheville, North Carolina (still the home of the Moog Music Inc.) and in 2016 Moogfest moved to Durham, North Carolina.\textsuperscript{18} Durham’s position as central to North Carolina’s Research Triangle (anchored by NC State, Duke, and UNC Chapel Hill) along with its city-on-the-rise

\textsuperscript{15} “About” Moogfest. Accessed April 24, 2018 https://www.moogfest.com/about
\textsuperscript{17} Christopher R. Weingarten. “Moogfest 2016: Was It Actually the Future of Music?” Rolling Stones. May 23, 2016. Accessed April 24, 2018
\textsuperscript{18} “About” Moogfest. Accessed April 24, 2018 https://www.moogfest.com/about
atmosphere—best exemplified by the American Tobacco Campus which was once the largest tobacco company in the world and is now a reimagined tech incubator, apartments, museum, and public park—lead to the hip, young, tech, and innovation friendly environment that attracted *Moogfest* from Asheville, NC. The same postindustrial experience is turned from tech to art by the centrally placed iteration of the 21c Museum and Hotel franchise and the historical The Durham Hotel. With such fast-paced investment in Durham, gentrification must be a concern and it is felt by city residents and government, which is discussed by locals Dawn Vaughan and Zachary Eanes in *The Herald Sun*. Inclusion is also an issue *Moogfest* strives to acknowledge as well with their festival themes of afrofuturism, transhumanism, and a non-gender binary themed lineup this year. The art and tech mixture in Durham and its position central to the Research Triangle of North Carolina make it a prime location for *Moogfest*.

*Moogfest* and Durham come together to provide a rich canvas for *Pulse 63’s* investigation into telepresence and “superarchitecture.” The culture and themes of *Moogfest* support the exploration of artistic practice through technology and the team has been supportive in providing the necessary groundwork, field testing, and logistics required of an installation like *Pulse*63. Durham’s rich architecture provided myriad potentially beautiful installation sites to investigate “superarchitecture”, the building’s proprietors and the city government has been excited and supportive of the work, and the current growth of the city has lead to a waveform-esque skyline. I believe that the combination of the city and the festival have provided a near perfect place to explore the themes of *Pulse*63.

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19 “Histoy” *American Tobacco*. Accessed April 24, 2018
https://americantobaccocampus.com/about/1/history

Site Selection

The beginning of site selection was predominately a matter of scale for the final installation of Pulse63. The Smithsonian Museum of American History Projection Mapping Project gave insight as to how much projection mapping costs and how it scales. The original concept (Fig. 14) featured three different architectural features with concert footage projected onto them. This multi-nodal concept of Pulse63 would quickly be realized as infeasible. Though Moogfest would provide on site logistics, support, team members, and a streaming infrastructure; all other fundraising had to be done independently. As a performative installation and with the high value of infrastructure, an operator needed to be present at each location which precluded working on multiple sites in this iteration. With this understanding of scale it became apparent that the final installation of Pulse63 would be a single site installation.

While it would have been possible to scale down the installation of Pulse63 to focus on architectural features rather than an entire facade, scale was an important feature of the iteration. As Kac described, an important feature of telepresence is the experience of remote world on a scale other than human.21 To fully explore this concept Pulse63 choose to address a singular monolithic surface rather than smaller iterations that may not address this central feature of telepresence.

The location of the installation was another major conceptual factor in choosing the final installation site. As a site and time specific installation, Pulse63 needed to address both the physical city of Durham and the contextual event of Moogfest. If the installation was presented at a site dominated by the festival it would only serve as a feedback loop, engaging an audience

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who already knows and participates in the festival and would not act, as *Tilted Arc*, as interjection. The site needed to address the greater city so *Pulse63* could engage with both participants of the festival as well as the greater population, leaving open the possibility of intervention into the audiences experience of nightlife in Durham.

Technical issues also informed the site selection process. *Pulse63* needed to be able to address the chosen architectural feature(s) fully with the equipment and funding available. Additionally, the site needed to meet the other technical requirements: access to power, hardline and low traffic ethernet connection, a place to set up that could be protected from the elements, clear line of site between the projectors and the architecture, as well as permission from the buildings proprietor(s)/tenant(s). The final installation site needed to meet all the requirements, technical and conceptual, to be considered for *Pulse63*.

Of the many sites considered for *Pulse63*, 123 West Main Street was chosen for best meeting the conceptual and technical criteria, specifically the Southwestern facade (Fig. 4). 123 West Main is also placed on a hill (Fig. 5) so the Southwestern facade occupies a prominent place on the skyline due to overlooking a four lane bypass, train tracks, as well as the entirety of the American Tobacco Campus, Durham Performing Arts Center, and the baseball stadium. This position will give *Pulse63* not only a large swath of visual engagement but different types of audience with which to explore telepresence through “*superarchitecture*”-- those passing by and underneath on adjacent sidewalks, those driving by on the highway and city streets, those at the American Tobacco Campus or the Durham Athletic Park, those participating in *Moogfest*, the general public who may not be participating in the festival, as well as planes looking distantly on the skyline of Durham as they pass by. 123 West Main also is adjoining a large parking lot in which to erect a control booth, projectors, weather protection, and generators. The proprietors of the building, the Self Help Credit Union, were supportive of the installation.
Originally, ethernet was to be run directly out of 123 West Main but due to the financial nature of the business this was not possible. However, there were myriad businesses within the 300 foot ethernet span that offered to assist with this feature. The size of the facade offered a surface area that could be fully addressed with the resources available, while the building’s architectural features lended themselves to the source material in such a way that the architecture and media will complement each other. Finally, 123 West Main’s location on the intersection of West Main Street (the central promenade for Durham nightlife) and N. Mangum Street (which acts as the central trunk of Moogfest) allows Pulse63 to address both the city and the festival equally. The features, location, available resources, and a supportive community at 123 West Main made it a prime location for the installation of Pulse63.

Live Streaming Media

Telepresence, in a way, is the goal of all film. For Walter Benjamin (technology and artistic theorist) in 1936, film, "burst this prison-world asunder by the dynamite of the tenth of a second, so that now, in the midst of its far flung ruins and debris, we calmly and adventurously go traveling." Benjamin is writing of the theater, where a generally seated audience is transported to another time and/or place, fictitious or real; the creation of worlds or the exploring of distant places that has been the forte of cinema for the last century. Pulse63 intends to change this relation by presenting to an audience in motion, as Aitken and Rist do in their own works, as well as by presenting a happening occurring in tandem with the audience’s own position in time and space. Though the media is streamed remotely the audience is able to change their path and participate in the environments being presented to them by exploring the

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mixture of an active (one not seated in an auditorium) audience through the location and context of public space and architecture. Live streamed media transport the audience's visual attention at the site of Pulse63, as in film, but also offers the option of an embodied experience with the streamed media. This is accomplished by projecting the media in a location that is internal to the festival grounds rather than remote, as streaming media is traditionally consumed. Further, as Aitken’s Song 1 creates a metaphorical reflection of the surrounding city, Pulse 63 will reflect out into public space remote but congruent happenings.

With Pulse63’s use of streaming video as source material, it was important to change the context of that material in a way that supported the exploration of telepresence. Streamed media is available wherever people have internet and a screen to watch it on, but the viewer must choose (usually through the use of a web application) to watch the feed. This experience is often as a single viewer or in a small group of remote viewers watching at home or from afar. Pulse63 is presented at a site internal to the festival grounds so it speaks to an audience in direct contact with the event being streamed rather than remote viewers. By projecting on architectural scale in public space the streaming media is not searched out and consumed by individuals but is interjected out onto all who occupy that space. Further, the feed is not presented in the direct as-if-you-were-there way as WALLCAST® but is mediated and interpreted through artistic application of streaming media to existing architecture. This effect is more similar to Kapoor’s Cloud Gate, the audience for which likely has every opportunity to interact with a reflection in their daily lives but not at the scale or through the artistically mediated craft of Kapoor’s installation.

The specific source material, live streaming concert footage, shares many attributes with film but does have its own native vocabulary and intricacies that must be understood and navigated in Pulse63. The incoming media will resolve to the standard aspect ratio of 16:9, a
slightly elongated rectangle that is the current standard in video capture and distribution and is used in TVs, laptops, and some phones. Due to its ubiquity, this horizontal rectangle has become nearly synonymous with in-home media consumption, and is, by far, the primary viewing format for streaming media. The incoming media while active will be styled towards communication with four tripod mounted source cameras, panning and zooming. This will be combined with a small aperture to create a large focal area. Stage lighting will likely be dramatic as if to create a modern rendition of chiaroscuro; an analogy that is hindered by a quality of digital grain resulting from a quickly changing ISO in an attempt to keep the image properly exposed. These are the visual qualities of the incoming source material that Pulse63 will have to negotiate.

The southwestern facade of an eight story building with a seven storey volume attached to the centerline is the site for Pulse63 (Fig. 6). With a height of 100 feet, the building has a strong vertical aspect, perpendicular to the horizontal aspect of the source media, and leading to strong opportunity for creative negotiation of mediums. The facade is mostly painted white and lacks ornamentation, making it appealing as a solid anchor for the media by enhancing the readability of the source footage. Windows that run parallel and on either side of the attached volume are small and align rhythmically with a series of small vents on the center panel. The central panel is broken into seven floors (above the large doorway on the first floor) by small but visible channels in the concrete. Together, the floors create the large vertical aspect out of seven identical horizontal sections adding to the visual rhythm of verticality. 123 West Main’s southwestern facade gives Pulse63 a strong anchor for the ephemeral projection, minimal ornament to enhance readability of visual media, and a vertical aspect with which to negotiate the horizontally based source material.
Amalgamation
Exploration of the base mediums from which Pulse63 has been constructed is only a look into the tools that were available to use. The design process was then tasked with combining these tools to create both “superarchitecture” and artistically mediated telepresence for public consumption. As seen in the work of Doug Aitken and Pipilotti Rist, the construction of “superarchitecture” requires both the development of a visual language with which to address existing architecture, and the confounding of the two mediums in a way that, “permits the building to outperform itself.” This is accomplished in the installation by allowing architecture to exist as a tool for the exploration of telepresence.

While typically a technical consideration rather than conceptual, the availability and types of projectors available did dictate some of the ways in which the architecture could be addressed. Two 8,000 lumen projectors with native aspect ratios of 16:9 were not bright enough to address large swaths, nor the upper sections of the building. To do that a larger projector was needed, but due to budgetary concerns only a single 22k lumen projector with a 4:3 (nearly square) aspect ratio could be acquired. The two smaller projectors were able to address the 3 lowest floors of the central protrusion. While the square aspect ratio of the the larger projector allowed Pulse63 to not only address the remaining 5 floors on that facet, but create two parallel banners proximal and, due to the angle of the projection, higher than the central form (Fig. 18). Addressing both the extrusion and the central mass of the building also allowed for a more full experience and an in-the-round rather than planar engagement with the architecture.

After analysing the innate qualities of our base elements, 123 West Main and the streaming concert footage, the two need to be combined so that neither loses their individuality yet creates “superarchitecture”. For this purpose Pulse63 will rely on two interpretations of the original source footage; a horizontal form cropped on the top and bottom at the same aspect as

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the seven floors of the protrusion and a vertical form cropped from the left and right (Fig. 8). These two aspects will need to be panned (move horizontally or vertically across the source footage) to keep the subject in frame. This also positions Pulse63 as a performative installation; mirroring the performances of the musical artist that act as source material.

This two main interpretations, horizontal and vertical then need to be applied to the surface of 123 West Main. The horizontal element will be applied in series on the seven associated floors (Fig. 9). This horizontal format also gives the footage a cinematic feeling as it conforms more closely to the wide screen frame of modern cinema, while the vertical crop can be applied over all seven of those sections to create a monumental presence of the subject. The vertical form will also be applied on the two banners of the central mass of the building; distal anterior, and superior to the central projection (Fig. 21). This allows Pulse63 to continue with a theme of repetition in both horizontal and vertical aspects while engaging the form of 123 West Main’s native architectural features.

The design language engaged by Pulse63 addresses the base architecture but it must also create a greater context from the application of the two mediums. The application of live streaming concert footage onto the architecture of 123 West Main transforms a solid immutable foundation into an effervescent reflection of what is happening simultaneously across Durham. The scale of the building changes our interaction with live streaming media from predominantly individually through small screens into architectural scale and public interjection. Pulse63, as Aitken reflects D.C. back onto itself in Song 1, reflects disperate and sequestered happenings out into the atmosphere of Durham during the time of its installation.

As was seen in Pulse16, without signifiers of the videos’ live status the audience may not interpret the footage as desired. Pulse16, at a smaller scale, could alleviate the need for signifier because the audience was physically close to the installation and could interact and
discuss the context of the media with the operator. However, *Pulse63* will engage with a much broader audience consisting of those passing by and underneath on adjacent sidewalks to planes looking distantly on the skyline of Durham. Therefore, *Pulse63* will include graphical elements that can be triggered periodically, another performative element, that will signify the live status of the incoming video, the origin of the feed, and the artist currently performing. This will negotiate the audience’s interaction with *Pulse63* by letting the audience know what they are seeing is live and that it is happening as part of *Moogfest* and therefore has the possibility of participating with both *Pulse63* and the source material.

By engaging different depths of the architectural mass, *Pulse63* will have in-the-round visual appeal and be able to address an audience from those on the sidewalk beneath it to planes looking distantly on the skyline of Durham as they pass by, creating a visual beacon, entryway, and testament to the city of Durham during the time of its installation. The work changes the context, scale, and audience of live streaming media to explore artistically mediated telepresence. It creates a visual language in which to address the architectural facets of the building on which it is projected while also changing the context of the base architecture from a monolithic mass into effervescent visual installation and reflection of what is happening remotely in Durham out onto the skyline and the public.

**Future Work and Iterations**

Though, at this time, *Pulse63* has yet to be installed it is not too early to look to future iterations of this work. The intersection of live streaming media and architecture is a conceptually rich area with many avenues for further exploration through themes other than music festivals. It will be important for the site of interaction to be internal to the area from which live streaming media is sourced however, giving the audience the opportunity for both a telematic and artistically
mediated experience of the media as well as physically embodied interaction. Though currently technical feasibility is challenging, moving back to a run-and-gun style of street cinematography that was used in Pulse16 would present an artistically richer feed compared to traditional streaming infrastructure. This would also enhance the collaborative artistic underpinnings of this installation by employing individual cinematographers as artistic collaborators. Also, with access to greater support, future iterations of this work could fully deploy the original multi-nodal, both multiple inputs (live streams) and multiple outputs (sites of installation), concept that was not able to be explored here. There is also room to investigate the other side of scale and public placement that was explored in this iteration. Finally there may be room for more compelling manipulation and post processing of the source footage, though I believe readability is an important feature of this investigation of telepresence and “superarchitecture.”
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Figures

Fig. 1 Still from documentation *Through the Looking Glass: A Senior Exhibition*, 2014. Dual wall projection, Software, database of web sourced FPV action sports footage, camera, computer.24

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Fig. 2. Still from documentation of *Plasma* as installed at the Virginia Tech Science Festival 2017 (without convex disk). Projection, Software, LEAP Motion, 8-Channel Audio System, Computer.25

Fig. 3. Still of *Pulse16* April 2016. Armory Gallery. Blacksburg, VA. Music concert source footage, software, projection, site specific.\(^{26}\)

Fig. 4. 123 West Main Street Durham, NC. Focus on south western aspect. The installation site for *Pulse63*.27

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Fig. 5. Wide view of the South Western Facade over Durham Athletic Park and American Tobacco Campus.  

Fig. 6. View of 123 South Main south western facade with dimensions.  

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Fig. 7. Projection arrangement on 123 West Main.\textsuperscript{30}

Fig. 8. Source footage 16:9 aspect ratio (top-left), horizontal crop (bottom-left), vertical crop (right).
Fig. 9. Horizontal framing distributed on the facade of 123 West Main.  

Fig. 10. Vertical framing on facade of 123 West Main.

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