

Unstable /Utopias

Counter-Narratives of Imaging Technology

A Thesis

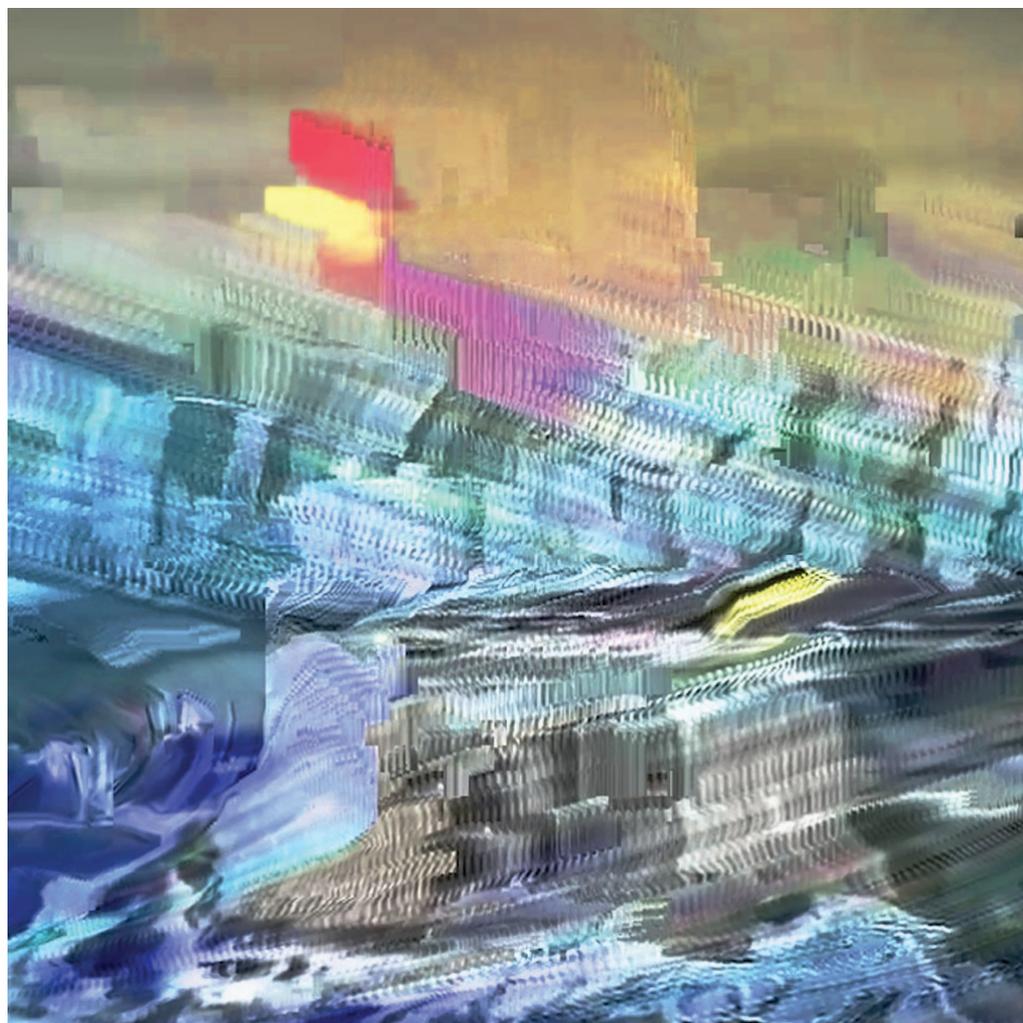
Presented to the Faculty of the Graduate School
of Cornell University

In Partial Fulfillment of the Requirements for the Degree of
Master of Science in Advanced Architectural Design

by

Leanna Mei Humphrey

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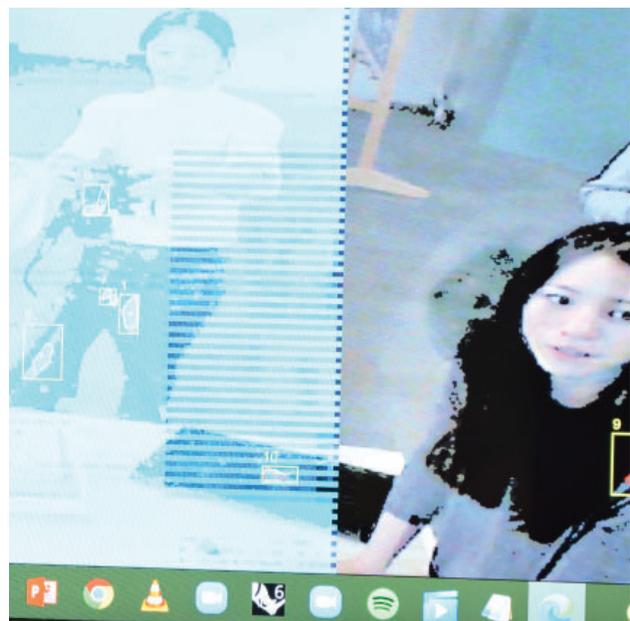
ABSTRACT

The increasing speed and ubiquity of imaging technologies pose numerous challenges to traditional distinctions between representation and reality. Yet, the role of the digital image as a medium is largely unexplored despite the significance of media and representations in architectural design and practice. Architectural images simultaneously proliferate and disappear. This thesis seeks to explore the medium of the digital image, arguing that its prevailing invisibility is concomitant with techno-utopian narratives constructing technology as an objective and autonomous driver of progress. Design research methods are used to reveal and trouble narratives embedded in digital images while also seeking counter-narratives through alternative computation design practices. Roosevelt Island, and its latest development Cornell Tech, serves as the site of study through its extended history as a site of urban experimentation and utopian projects. Images of the campus and Roosevelt Island are deconstructed to trace their formation and consumption, then manipulated and re-constructed towards counter-narratives of visibility. This research culminates in the installation of a video program that re-appropriates these images to reveal a hidden agency in the materiality of the digital image.

BIOGRAPHICAL SKETCH

Leanna Mei Humphrey is an architect and educator interested in questions of media and representation. She received her Bachelor of Architecture from Virginia State Polytechnic University in May 2015 where she was a finalist for the prestigious Pella Prize. She will receive her Master of Science in Advanced Architectural Design from Cornell University in August 2022. Her thesis “Unstable Utopias” seeks to uncover a hidden agency in the site of the digital image.

Leanna has worked as a project manager/architect in Chicago, teaching and research assistant at Cornell University for various faculty and courses, an assistant to Virginia Tech’s Chicago Studio travel program, and an educator at New York City’s Center for Architecture.



For Will.

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1. INTRODUCTION

This thesis investigates the digital image as a ubiquitous but understudied site of material agency within discourses of architectural representation. This study takes an open and explorative approach that intersects theoretical research and analysis with design projects that engage directly with digital images as a material. A framework of digital haunting¹ is devised to address the dual visible, invisible materiality of digital images and challenge paradigms of visibility.

New York City's Roosevelt Island, with a particular focus on Cornell Tech, serves as a case study site regarding the role of digital images in representations of urban space and identity. The case study results in a series of small studies culminating in an installation proposal of interactive video-programs. These projects intend to make evident while simultaneously countering current narratives of digital media at Cornell Tech and Roosevelt Island. Additionally, this study hopes to open doors for future investigations in digital image representations and provoke new discourses on computation in design processes.

This introductory chapter outlines the research context, an overview of Cornell Tech and Roosevelt Island, a problem statement, and the overall thesis structure and objectives.

1.1 RESEARCH CONTEXT

The increasing speed and ubiquity of imaging technologies have long posed numerous challenges to traditional distinctions between representation and reality. However, so too has the architectural drawing. Yet, despite this overlap (and the prevalence of digital images today), the medium of the digital image is sorely overlooked in architectural discourse. This thesis argues that the invisibility of the digital image is concomitant with troubling constructions of technology as an objective and autonomous driver of progress. To leave the site of the digital image unquestioned relinquishes it as a site of material agency that this study hopes to reclaim.

“Digital image” serves as a loose category representing the shift from traditional pen-and-pa-

¹ Digital haunting emphasizes the tie between technical understandings of digital media and paradigms of haunting, or spectral materialities. Digital haunting is further discussed in the literature review.

per, hand-mechanical drawing to electronic images on screens. Unlike previous media, digital images consist of data seen through computational processes of electric signaling. While digital images are understood to be everywhere (on our phones, computers, TVs, tablets, and even on buildings), they are often discussed as something else: a film, photograph, book, email, drawing, etc. The invisibility and ubiquity of this medium leave significant room for further clarification and technical detail that is not addressed in this thesis. Rather, this thesis broadly addresses the exceptional distinction of digital images from previous media (that is, not equating digital images to film or drawing, nor specific programs or software) to study its commutative properties. Further definitions for the digital image are discussed in the next chapter.

This gap in attention reflects a broad obscuration of the medium of digital images within the discourse on architectural representations. This latter discourse seems to take two paths. On the one hand, new imaging technologies are presented as opportunities to give architects greater access to final built works, reducing the difficult moment of translation in traditional drawing practices. These discussions are related to fabrication and building technology—such as 3D printing, BIM systems or on-site modeling, automation systems, and possibilities for customization.

In other cases, imaging technologies are informational tools that make visible additional site research or options for structure and form. Data collection, analysis, and visualization are increasingly a component of architectural practice, as is the use of material-saving structural analysis plug-ins. This perspective also contributes to the use of video walkthroughs and atmospheric visualizations that give further virtual presence to a building before construction.

In the first, new technologies allow for greater direct access to the work and bypass traditional drawing processes altogether. In the second, they provide additional points of mediation that create a new set of architectural work distinct from the built result. These are not exhaustive and often overlap but parallel Robin Evans's concerns in *Translations from Drawing to Building* (1997) regarding the architect's struggle to either prioritize or relinquish the work of the drawing.

"Drawing," for Evans, largely refers to traditional methods of architectural representation relying on orthographic projections. However, this understanding of drawing is insufficient today, given



Fig. 1: "The Origin of Painting" by Karl F. Schinkel, 1830



Fig. 2: A screencap of "Lacework" by Everest Pipkin, 2020

the prevalence of digital images and alternative modes of architectural representation. But when Evans looks between these two paths for one focusing on the “transitive, commutative properties of drawing,” is there a similar path in the realm of digital images that would be useful for architects?

A helpful comparison delineates this field of inquiry. In *Translations*, Evans shows architect Karl F. Schinkel’s rendition of *The Origin of Painting* as an example of traditional paradigms of representation in architecture. More interestingly, Evans also presents these paradigms as an inversion of traditional understandings of representation in Western art.² The “peculiar disadvantage” of architectural practice, the distance between their work, often drawing, and the built result, is revered in Schinkel’s painting as the mechanical manifestation of thought into the world. The tracing is a projection not just of the pre-existing Diboutades but also of things not yet present.

Comparing *The Origin of Painting* with *Lacework*, a recent project by digital artist Everest Pipkin (2020), reveals the changing landscape of paradigms of technology, media, and representation. *Lacework* is a video series that slows, interpolates, and upscales videos from MIT’s Moments in Time dataset. Moments is a collection of one-million 3-second videos intended for the training of AI systems to “recognize and understand” various activities; each clip is labeled with a verb such as “asking,” “flying,” “arresting,” and, presumably, “drawing” (“Moments,” 2018). In an accompanying text, Pipkin describes their long, intimate, and tedious process sorting through the database to develop *Lacework* and the use of various platforms (like a self-made Tinder-like swiping system) and tools (such as Topaz Lab’s AI Gigapixel upscaling system) to achieve the final effect. The resulting texture and experience of *Lacework*’s reinterpretation of the clips give them an unusual unity as if one is looking through the lens of a machine.

Pipkin’s intimate and algorithmic interpretation of Moments creates a generative friction against Schinkel’s painting—and that of his shepherd. Their juxtaposition resists simplistic mirroring, instead provoking a continued interrogation of understandings of representation. Here, the role of representation within architecture is not an isolated feature of traditional practice but

² (Evans, 1997, p.164) “[I]t was the architect who was obliged to show the first drawing in a pre-architectural setting, ... drawing is, from the beginning, a divided activity, resolvable into a prior act of thought and a consequent manual undertaking.”

brought into larger contexts of media and representation in the digital age. *Lacework* intervenes in Moments in Time's data analysis process for machine learning, making evident not only the impossible depth of meaning that is impossible to be addressed as such but the significance of the intersection of people and machines in constructing these frameworks. By using similar tools and processes as would be used in machine learning (human labor and analysis intersection computational tools), Pipkin creates their counter-database. *The Origin of Painting*, as in the title, establishes a linear projection of representation, while *Lacework* makes space, time, and scale questionable and indeterminate. *Origin* presents necessity; *Lacework*, superfluity. Therein, these works set a field of inquiry within which this thesis seeks to operate—what is the material agency of the digital image in architectural representation?

1.2 CASE STUDY BACKGROUND

Cornell Tech was formed in response to a 2011 competition in New York City. Then-Mayor Michael Bloomberg instigated the competition following studies by the city's Economic Development Corporation (EDC) that noted the city was "underweight as a center of applied science and engineering," as exhibited in a graphic comparing the economies of the NY area with Boston and San Francisco in dollars and workforce percentages. The campus, the report continued, would significantly boost the economy through "more than a billion dollars in capital investment on the site, nearly 7,000 construction jobs," employing "hundreds of people at good middle-income ages," and therefore spin-off "hundreds of new businesses" and "thousands of new jobs" (Pinsky, 2011, p. 21-24). Bloomberg's letter to the Higher Education Community offered "capital funding, City-owned land, and comprehensive resources" towards developing new leadership in "science, technology, engineering and mathematics" that will "be critical in developing the workforce and ideas that will drive economic growth in our city and increase our competitiveness in the 21st Century" (Hernández, 2011). The competition framework—a trade of funding, "City-owned land," and other resource assistance for financial gain in the City economy—provides the basis for Cornell Tech as a form of investment in this financial future and the role of technology (and land) in that investment (Delgado et al., 2013; Giles, 2012; Hernández, 2011; Pinsky,



Fig. 3: Panorama from South of the Cornell Tech campus, centered in the image, by the author



Fig. 4: Roosevelt Island Site Plan

2011). It also sets the stage for the goals of the master plan and design decisions for urban form, institutional presence, and infrastructural connections that arise in response to these aims (Budds, 2017; *Cornell Tech Campus Framework Plan - AIA*, 2020; Delgado et al., 2013; Lange, 2012). The intersection of these groups showcases their intersecting interests and convergence under a common narrative of technology as an autonomous driver of progress.

The EDC study and competition letter form the basis for Cornell Tech's aims for a techno-utopia. This portrayal manifests in the school campus on Roosevelt Island and in its extensive digital presence (Budds, 2017; Delgado et al., 2013; Lange, 2012).^{3,4} For Cornell Tech, the imaging of the campus is directly related to its utopian narrative – similar to previous island visualizations in a different form.

Cornell Tech has recently finished phase one of its still-ongoing development, occupying much of the southern half of Roosevelt Island (Delgado et al., 2013; Stone, 2022). The master plan, developed by SOM, ultimately anticipates a cumulative 2.1 million SF of campus that includes academic buildings, co-locations with partners and entrepreneurs, an executive education center, and residences (Delgado et al., 2013). SOM's descriptions of the plan emphasize the campus's role as "bringing together an open and collaborative community," "permeable," and as "connected as possible" (Koop, 2017). Images promoting the individual buildings are annotated to explain how their form and structure address these concerns: "collaboration as an organizing concept" and "public space as connective tissue" (Koop, 2017).

The emphasis on connectivity is particularly evocative for the island as a historically difficult-to-reach site.⁵ Previously known as Welfare Island, it long served as a site of urban experimentation. The island's isolation prompted narratives of a "healthful environment" for social reform that justified the off-loading of the city's undesirable populations (Berdy & Roosevelt Island Historical Society, 2003; "Roosevelt Island," 2009). Leading architects and designers

³ Cornell Tech's digital presence spans heavy coverage from a wide variety of interested parties due to the campus's role in bridging private companies, government funding and resources, academic institutions, businesses, and their own self-representation on social media platforms and their primary website.

⁴ See the SOM master plan as well as designs for the Bloomberg and Tata Innovation Center, particularly as depicted in presentations during the process of campus development (Delgado et al., 2013; Koop, n.d.).

⁵ Roosevelt Island, between Queens and Manhattan, is accessible by car only via the Roosevelt Island bridge, connecting Queens to the Motorgate garage, by gondola connecting to Manhattan only, by ferry, or by the F train. The Queensborough bridge passes over the island but is not accessible to it.

were brought on board to design innovative institutions under these aims, and the island is full of iconic structures from various periods. The 1832 penitentiary, 1841 lunatic asylum, 1845 almshouses, and 1854 smallpox hospital spawning a medical center, nursing school, and research laboratory all find benefit in the island geography – accessible enough, centered in the East River between Queens and Manhattan, with a natural moat of rushing water on either side, preventing the transfer of disease, temptation, and generally unwanted persons (Berdy & Roosevelt Island Historical Society, 2003; *Blackwell's Island (Roosevelt Island), New York City (U.S. National Park Service)*, n.d.; “Roosevelt Island,” 2009; Carroll, 2018; Gray, 2012; Kawamata et al., 1993).

In the mid-20th century, the island became a controlled test site for the popular theories on ideal communities and neighborhoods, such as those developed by Jane Jacobs and Oscar Niemeyer (“Dream for an Island: New Yorkers Propose to Turn Unused Isle into ‘city,’ but Project Has Many Hurdles,” 1961; Mills, n.d.; Nevins, 1975; Stern et al., 1995). In 1958, the Urban Development Corporation was formed by New York State to address “growing urban blight, lack of low- and moderate-income housing, and inadequate access to educational, recreational, cultural, and community facilities” (DiNapoli, 2010). The UDC issued a 141-page report on Welfare Island documenting current conditions with suggestions for redevelopment. To financially support addressing these needs, New York City leased the island to New York State for 100 years. The Roosevelt Island Operating Corporation (RIOC) was developed to manage the island for the State. The RIOC manages an island bus route, the tram and trash, the parks, and much of the island’s infrastructure (*About Us | Roosevelt Island Operating Corporation of the State of New York*, n.d.; “Roosevelt Island,” 1973). Community concerns are directed to the RIOC despite the island’s municipal coding as a part of Manhattan.

During this hand-off, leading firm Johnson and Burgee was brought on board to develop their master plan for the island following the report’s findings (Johnson & Burgee, 1969; Stern et al., 1995). They proposed the main street and much of the housing areas still present today, focusing on neighborhood living and place-making through a focus on the street (Kawamata et al., 1993; “Roosevelt Island,” 1973; Stern et al., 1995). General excitement around these ideas resulted in the plan’s presentation to the public as an exhibition at MOMA, also published as a

booklet: "The Island Nobody Knows" (Johnson & Burgee, 1969).

The Johnson & Burgee master plan was shortly followed by one of very few national, open architectural competitions for mixed-income housing in America (Nevins, 1975, p. 2). The competition, announced by the UDC, received 250 proposals, of which 35 were selected by the Architecture League of New York to be exhibited (Nevins, 1975). Documentation around the competition emphasizes Jacobsian notions of place-making and urban renewal, portraying an exciting hopefulness about the possibilities of "good high-rise design" (Nevins, 1975, p. 4)—"the operative assumption in the program was that there are known criteria which designers can incorporate that can influence neighborhood development. These criteria are stated and implied in the competition program" (Nevins, 1975, p. 3).

While the EDC's report and Bloomberg's competition may have been spurred by the rise of tech sectors nationwide, the UDC report and Johnson and Burgee masterplan and subsequent housing competition center on neighborhoods and communities, expanding on the then-recent rise of theories on ideal neighborhood planning. Both attest to Roosevelt Island's long-standing history as a site of urban experimentation and a repository for the utopian dreams of New York City.

1.3 PROBLEM STATEMENT

The distinction of digital images as today's primary mode of architectural representation invites many new questions regarding the role of technology and media in design practices. However, these questions are not adequately addressed in current discourse that bypasses the digital image as a point of mediation. It disappears in service of its referents - either attending directly to the built environment or focusing on particular software and imaging systems. The absence of this discussion not only leaves such questions unanswered but defers the material agency of such representations to modern hegemonic narratives.

This project examines the role of digital images across the recent history of Roosevelt Island, particularly the development and self-representation of Cornell Tech, in representing urban space. The techno-utopian narratives of Cornell Tech, established through its aims as an

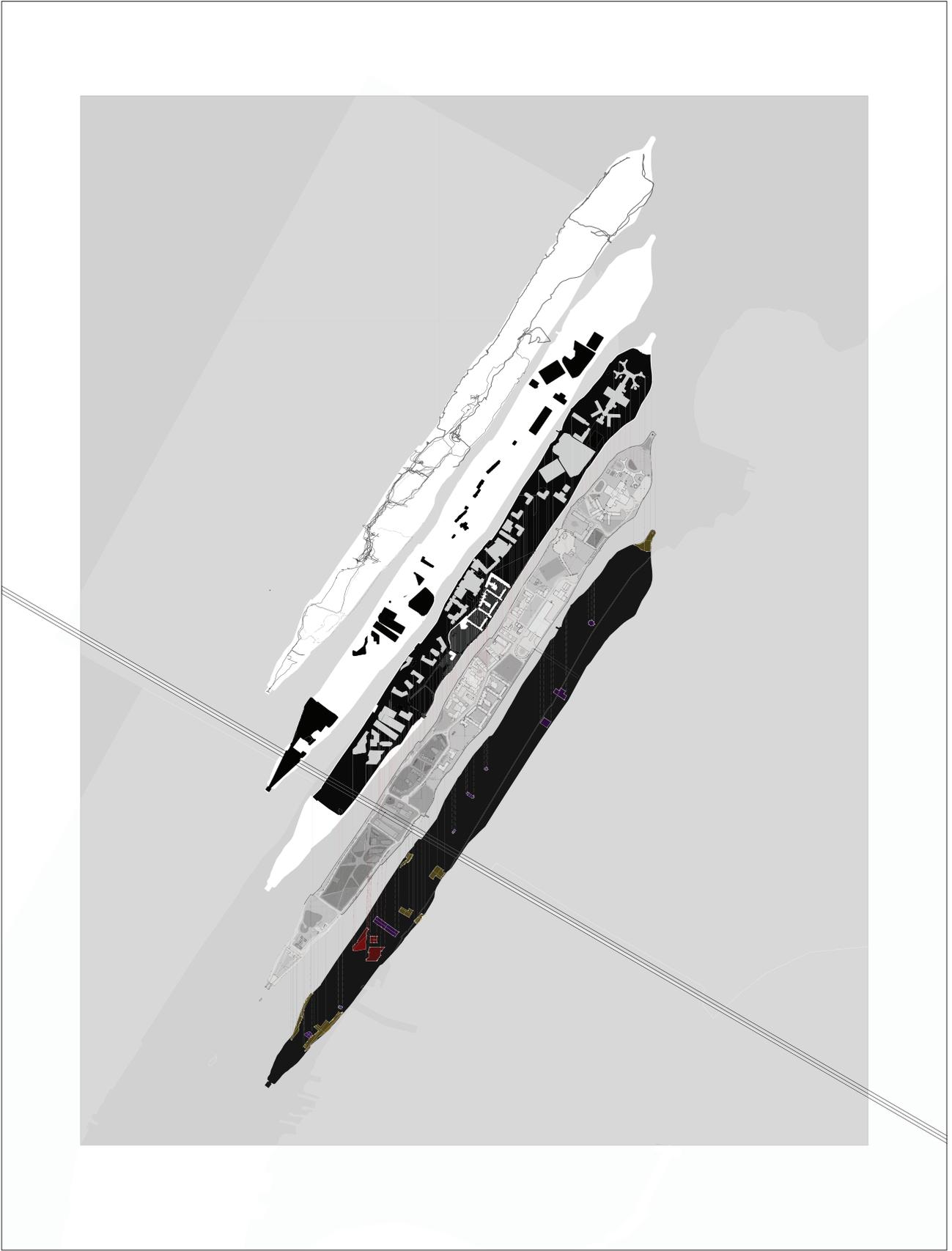


Fig. 5: Roosevelt Island Exploded Site Plan

institution, manifest in their particular use of digital images. Cornell Tech's desire to make present the future of technology presents a new temporal construction of urban space distinct from previous utopian visions. The increasing speed and ubiquity of digital imaging as a means of representation perhaps play a role, and its invisibility as a medium a cause for concern. These narratives and representational practices have even further bearing on criticisms of datafication, urban tech, and computational practices. Through design research, this thesis studies the images of Roosevelt Island and Cornell Tech and their relation to prevailing dreams of a techno-utopia.

1.4 STRUCTURE AND OBJECTIVES

The second chapter presents a literature review establishing foundational definitions and theories and identifying the framework of digital haunting used throughout this thesis. The third chapter, methodology, details the research and design processes and resultant projects. The fourth chapter summarizes key outcomes and findings from the design projects, showcasing evidence of the materiality of the digital image and its ties to techno-utopian narratives. The fifth chapter concludes this thesis, reflecting on the projects and considering possibilities for further research.

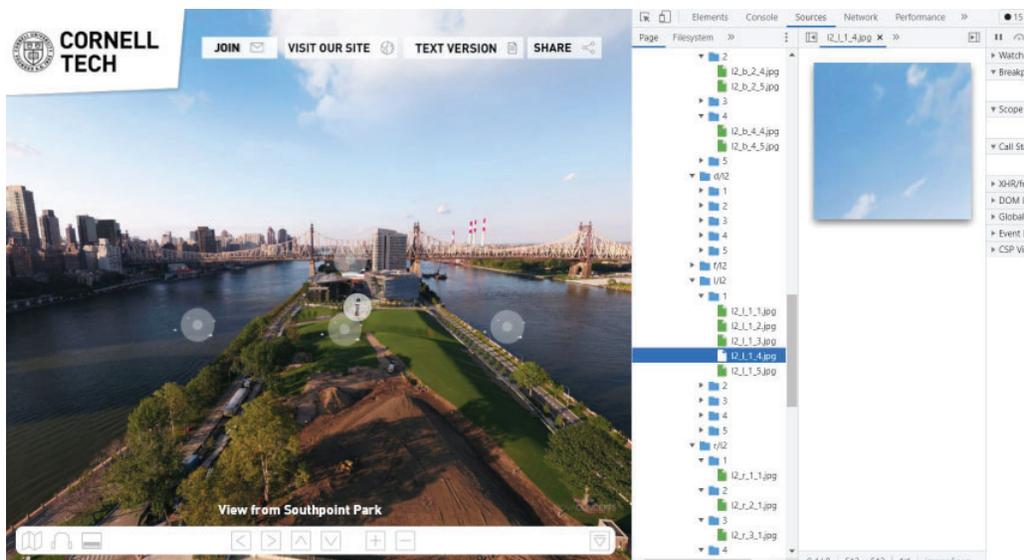


Fig. 6: Screenshot of the Cornell Tech virtual tour in a web browser

2. LITERATURE REVIEW – DIGITAL HAUNTING

The following literature review outlines foundational texts and theories underpinning this thesis. The first section, Imaging Technologies, further defines the scope of the term digital image through definitions by John May, Lev Manovich, and Vilém Flusser. These technical definitions unveil current understandings of the role of digital images in other fields and make clear the shortcomings of architectural writings on digital media.

The second section discusses the development of Digital Haunting, a conceptual framework used throughout this thesis. Digital haunting serves to engage and reveal the digital as a material practice, building on the technical understanding of digital images. Associations between digital media and ghosts, horror, and haunting are traced in relation to the technical attributes of digital images outlined previously.

2.1 IMAGING TECHNOLOGIES

The post-orthographic shift in architectural representation is reliant largely on digital and virtual technologies that allow visual constructions not possible through mechanical calculation. There is abundant discourse connecting these emergent visions to new formal imaginaries, to changing concepts and effects of authorship, and to fabrication practices that hint at a return of the figure of the master builder (Carpo, 2011). However, the digital image is a much more ubiquitous medium with greater implications for architectural work and thinking than that brought through new modeling, analytical processes, and fabrication methodologies.

In his book *Signal. Image. Architecture.*, John May seeks a technical specificity in defining images, distinguishing them from chemical or mechanical media such as film photographs and traditional drawing. He writes, “images are data, and all imaging is, knowingly or not, an act of data processing” (May 2019, 43). And today, just about everything is this data-as-image: from most current photography, to social media feeds, digital texts, construction ‘drawings’, and anything moderated by electrical signals.

May's technical clarification reveals a medium of ubiquitous deceptiveness – hiding an embedded temporality directly related to the rapid speed at which such images are produced and reproduced in response as a result of their content – data. This distinguishes images from photographs and drawings in a more profound way than added functionalities and gestural substitution (e.g., holding shift instead of using a straightedge or zooming via finger pinch instead of getting closer). Rather, the gap between “representation and intervention” is removed, such that imaging simulates thinking itself: “If photography was an attempt to externalize the retina, imaging is an attempt to externalize *the entire nervous system*” (May, 2019, 97). The world is immediately data. This suggests a replacement of a linear, historical, orthographic time with a post-orthographic automatic present, and to disregard this temporal shift is to become disoriented in “an ocean of simulations” (May, 2019, 108).

Previous attempts to define this both specific and wide-reaching medium are in Vilém Flusser's “technical images,” a broader category that addresses images produced not necessarily through electricity but rather any form of ‘particles’ (2011), and Lev Manovich's “new media” (2001). Flusser's broader category of “technical images” do not necessarily require electricity but rather the use of ‘particles’ (2011) while “new media” is any numerical data accessible by computer (Manovich, 2001, p.20). Still, Flusser, like May, characterizes technical images as “posthistorical, without dimension,” and emphasizes their hallucinatory character, freed from an object of reference (2011, p. 10). Flusser also continues to define technical images through their conceptual purpose and role, such as in relation to an object of reference, one's imagination, or in functioning as a depiction or model. By contrast, new media is more directly focused on the specific apparatus of the computer.

The term ‘digital image’ used throughout this thesis is most directly derived from May's definition of image as “outputs of energetic processes defined by signalization” (2019). This points to various attributes unique to digital images and makes evident their presence in numerous forms today. First, digital images are notably ephemeral, being produced by electric signals that are often in flux. This ephemerality is recognized by May, Flusser, and Manovich in the immediacy and mutability of digital images. Secondly, digital images are overwhelmingly ubiquitous. The digital image is not only found in many forms today – computer or phone screens, TVs and

tablets—but also can contain such a vast multitude of other recognized content or media. “New media” in particular is constructed around this observation, emphasizing the possible reduction of all new media into numerical data. Finally, these characteristics occur precisely due to the production of digital images relying directly on their hidden form as such numerical data.

2.2 DIGITAL HAUNTING

The framework of digital haunting was devised throughout the development of this thesis to address the peculiar materiality of digital images. Following the definitions above, digital images are produced by the electrical signaling of numerical data. In turn, they are uniquely ephemeral and ubiquitous relative to other forms of traditional media and challenge traditional conceptions of media and material presence. The digital image contains layers of visibility and invisibility that are difficult to separate. Through digital haunting, this thesis aims to identify and emphasize the unique and un-acknowledged materiality of digital images. Digital haunting is also proposed as a distinct way to reference digitally-mediated representations and re-imaginings in relation to their referent. Unlike simulation or representation, digital haunting acknowledges not only the distance and distinction between the two presences as a kind of space, but also its agency and possibility from which we might begin to find meaning from within the hyperreal.

As a term, digital haunting draws on an established association between digital media and imaging with ghosts, horror, and haunting. Jeffrey Sconce’s *Haunted Media* points to an uncanny “living” quality in the flows of electronic media as part of this reasoning, as well as senses of “immediacy” and “presence” in radio, television sets, and so on (Sconce, 2000). In Sconce’s examples, the rational, scientific narrative often associated with new technologies is often set alongside fears and anxieties regarding illusion and discorporality. Similarly, *Digital Horror: Haunted Technologies, Network Panic, and the Found Footage Phenomenon* also identifies anxieties on presence but juxtaposed against a sense of either dispersibility or disposability (Reyes & Blake, 2015, p.3).

Additionally, digital haunting is directly used to describe the uncanny relationship between physical and virtual worlds. A GameEnvironments article on Division 2’s missing Vietnam Veter-

ans' Memorial describes the experience as a "digital haunting" to address the memorial's virtual absent-presence (Meyer, 2020). In Erin Huang's Ocean Media, digital haunting describes how "ghostly things inhabit in between the iterations of images" in the practice of remote sensing and mapping the ocean floor (Huang, 2021). Haunting is tied in each case to the mediation of perceptions of worlds and space, practices of mapping, and the slippages and differences between them. The ghostly presences in virtual worlds and digital representations of space occur in many forms engendered by the multilayered, temporal materiality of the digital image. When used as a framework or aim, digital haunting serves to draw attention to this expansive sense of materiality, as with the materiality of a ghost or specter, that is both visible and invisible.

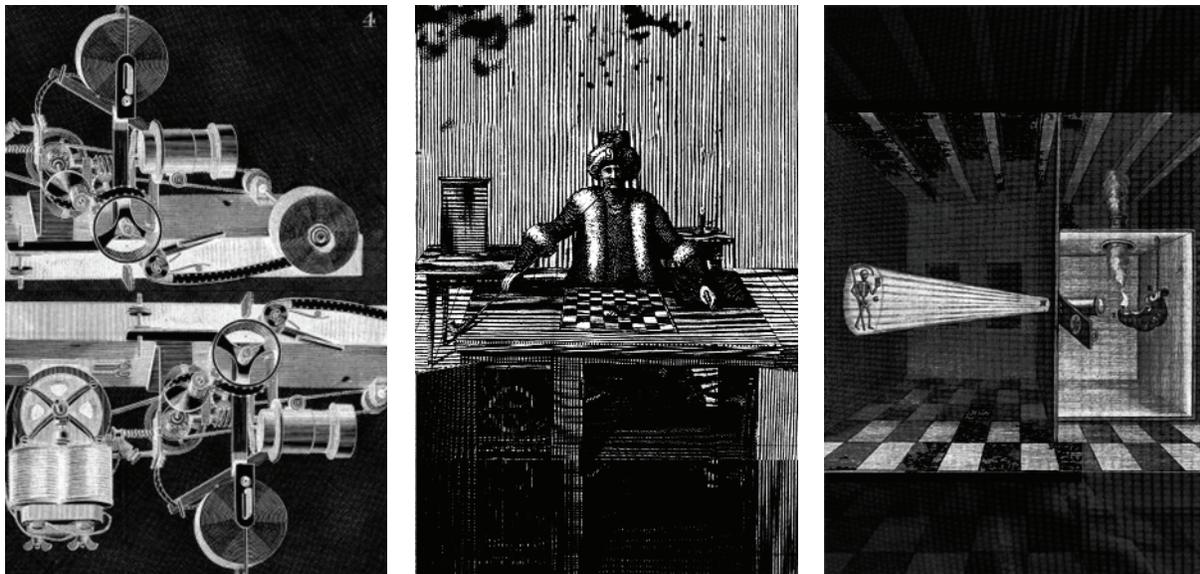


Fig. 7: Three cards with edited images of a phantoscope, mechanical turk, and magic lantern

3. METHODOLOGY: ROOSEVELT ISLAND CASE STUDY

This thesis was developed through a series of design projects constituting a case study of Roosevelt Island. This case study serves to explore how the medium of the digital image contributes to changing narratives in the depictions of urban space, particularly as potential utopias. Roosevelt Island, haunted by a multitude of phantom histories and futures, presents a rich and complicated site of study on the collision between narratives of history and innovation and the indeterminable complexity of memory. The island's recent addition of the Cornell Tech campus also serves as a direct provocation of the possibilities and limitations of computational representations, especially as constituent elements of urban form.⁶ These varied depictions of Roosevelt Island are studied through an exploratory design process guided by the framework of digital haunting, engaging directly with the media and material of study to disorient, defamiliarize, and re-contextualize them to reveal and trouble hidden narratives. As a whole, these projects seek to evidence otherwise invisible characteristics of digital images and make present the materiality of digital images to reveal their implicit narratives.

The following sections discuss the individual design projects resulting from this study. The first section outlines an “unmapping” of Roosevelt Island, a digital drawing used for documenting and communicating early research. The second section discusses an installation piece, installed in Sibley Dome and Hartell Gallery at Cornell University, that became the primary result of the case study. The installation focused more directly on specific captures of Roosevelt Island and their manipulation as digital images using JavaScript and front-end development tools. The third section discusses a printed booklet series that serves as another form of archive, like the first project, but addressing the exploratory and nonlinear studies that were otherwise undocumented. Finally, the fourth section discusses the Unstable Utopias website hub, another ongoing archive for the web that will continue to be in development and hosts many of the previous projects.

⁶ Cornell Tech's broad aims as an applied science and engineering facility are further tied to the role of technology in urban space through the Jacobs Technion-Cornell Institute. The Jacobs Institute, resulting from Cornell University's existing departments partnership with Technion Israel Institute of Technology, “fosters radical experimentation at the intersection of research, education, and entrepreneurship” as organized in three “hubs” of study: an Urban Tech Hub, Health Tech Hub, and Connective Media Hub (“Cornell Tech - Research,” n.d.).

3.1 UNMAPPING ROOSEVELT ISLAND

Early research on Roosevelt Island was collected over three months in late 2021 and included collecting various maps and images of the island from digital resources available online publicly or through Cornell, as well as images, drawings, and experiences as captured over a 3-day site visit in November. The first design project directly followed the challenge of collecting and documenting this early research as a form of data visualization. Rather than a traditional site plan, I draw a digital “unmapping” of the island to provoke questions of legibility and legitimacy in the form of the drawing. This unmapping sought to overlay relevant information and findings in a 2d graphic that placed pieces in relation to each other and challenged the varying kinds of information and timelines uncovered in this research phase. The drawing uses typical architectural notation practices in both standard and unexpected ways to navigate and organize various points of interest around the site. The drawing base used GIS information publicly available online for the site geography and building footprints, which was further detailed using photographs and google maps satellite imagery for cross-reference. In particular some areas were out of date in the GIS model, which showed the previous Goldwater Hospital on the Cornell Tech campus site, and the google maps satellite images also did not show the current development of the campus. This information was initially processed in Rhino where different timelines and information that might inhabit the plan were exploded out and apart from the central island outline.

The unmapping then continues through this breaking apart of the island as necessary to reveal multiple island layers of information in a 2d surface. Architectural notation practices are used to begin to draw narratives around the splitting of the island space and convey passages of time across the graphic. This process leads to the eventual splitting of the island in order to reveal more information. Other elements pull out as a radial diagram to showcase gradual changes or developments, roughly becoming further disconnected as time extends further away.

Other information forms similarly inhabit and fill in the areas around the island plan, such as notices and documents, key dates, figures, as well as different views such as perspectives, sections, details, and so on. Finally, different paths to show movement and transportation are marked out and overlaid, and much of the transportation to and from the island is pulled out in

section. Elements are further adjusted using programs like Adobe Illustrator and Photoshop to fill in areas, adjust line types and weights, and color and texture, to further allow the overlay of these various forms of information in and reinterpretations of the drawing as it moves through varying software. Despite being digitally produced, this drawing was ultimately printed to scale as a large reference sheet and does not contain interactive or moving elements.

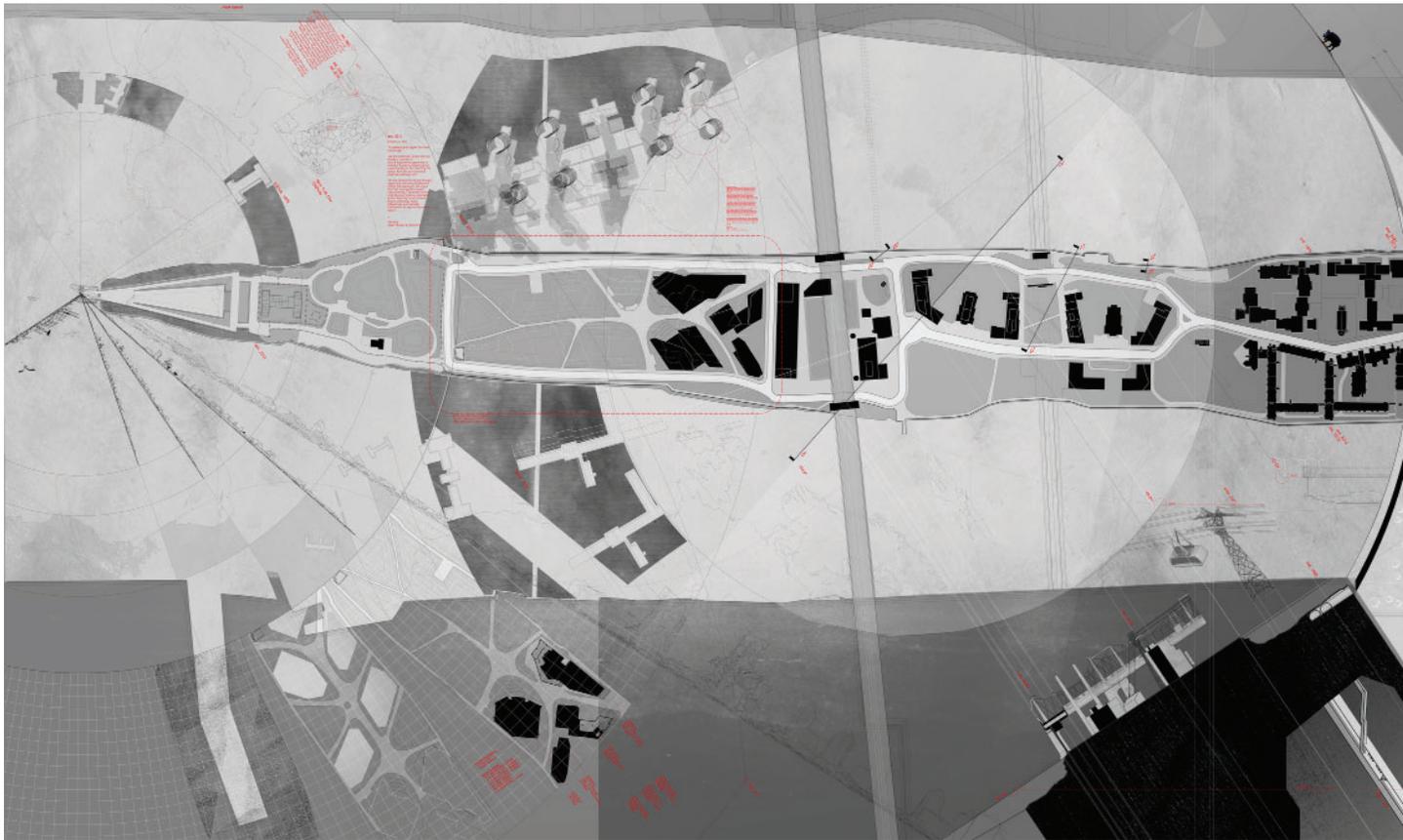


Fig. 8: Unmapped Site Plan of Roosevelt Island



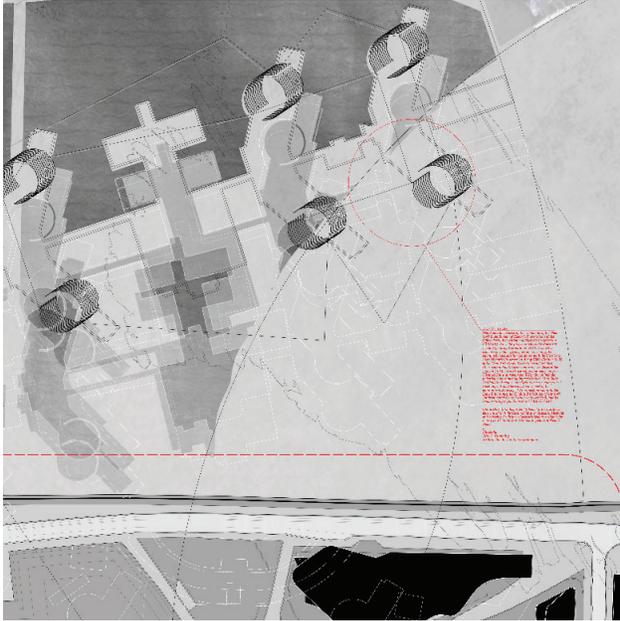


Fig. 9: Crop of unmapped siteplan

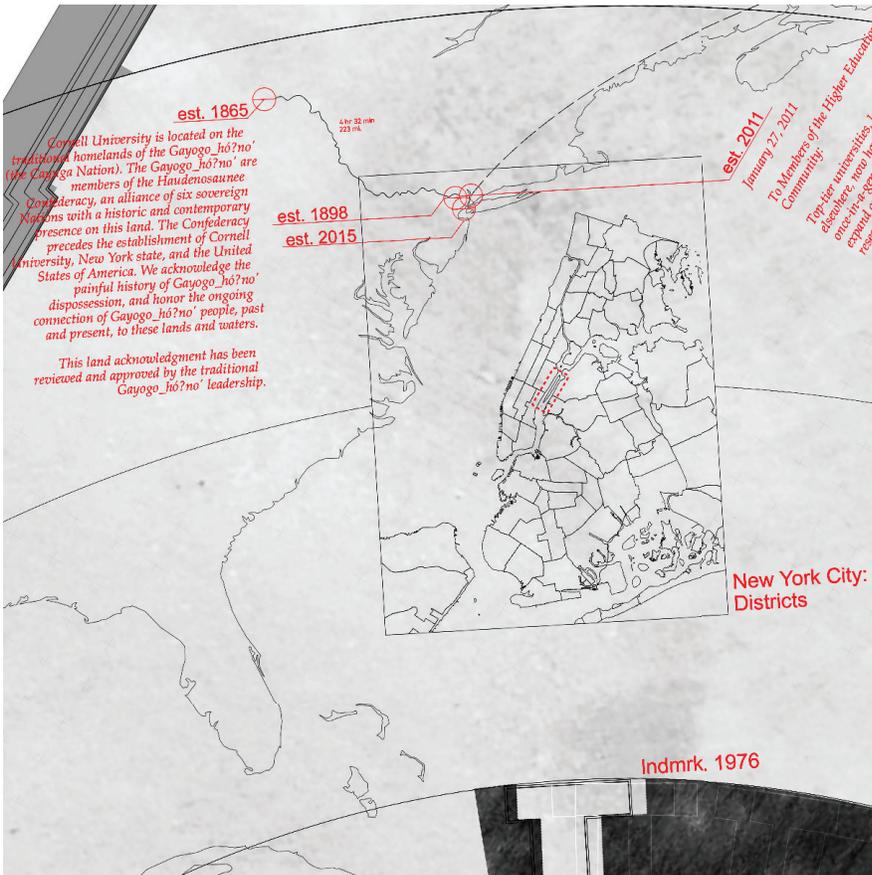


Fig. 10: Crop of unmapped siteplan

3.2 DIGITAL HAUNTING INSTALLATION PROPOSAL

In asking how the medium of the digital image contributes to the development and identity of Roosevelt Island, and in particular that of Cornell Tech, images of the island from various sources over time were collected as the base material for design research. These included satellite captures such as used in Google Maps, topographic plans, illustrative plans for planning, photographs, various renderings, my own recordings from a site visit, and architectural drawings and proposals for future projects. Following the Unmapping of the Island, research began to focus primarily on three areas: images in the planning and self-representation of Cornell Tech's campus, the virtual accessibility of the island via public satellite imagery and GIS information, and the series of proposals or dreams for the Island that, realized or not, have shaped its course.

While the unmapping drawing functioned as an archive or documentation exercise for research, the second major design project sought to more directly co-opt the images of study for further study. After a series of short experimental studies, I designed a series of six video-programs that fed into a camera feed and into each other, as a constantly updating computational performance. This ultimately became an installation proposal and was installed on April 28th and 29th in Sibley Dome as an open forum. The video-programs were later reduced for a smaller presentation on the thesis in entirety on May 12th in Hartell Gallery.

The six video-programs are divided into three acts of two scenes each that play simultaneously on separate screens arranged in order from Act One to Three. Each uses a database of images and video built from material gathered from the focus areas above, and runs a program over the feed to continually re-read and modify the content in the space of the screen. They respond to incoming information through various means of image processing established in a program script. The camera feed emphasizes the intersection of the videos with their spatial context and potential observers while opening the program loop to unknown elements.

This video-program approach developed in response to the intermediary studies that found the common and overlooked interface of the web browser an interesting site of study for architects in addressing the materiality of digital images. Through front-end web development tools, websites and web applications can run a wide variety of programs and visualization effects

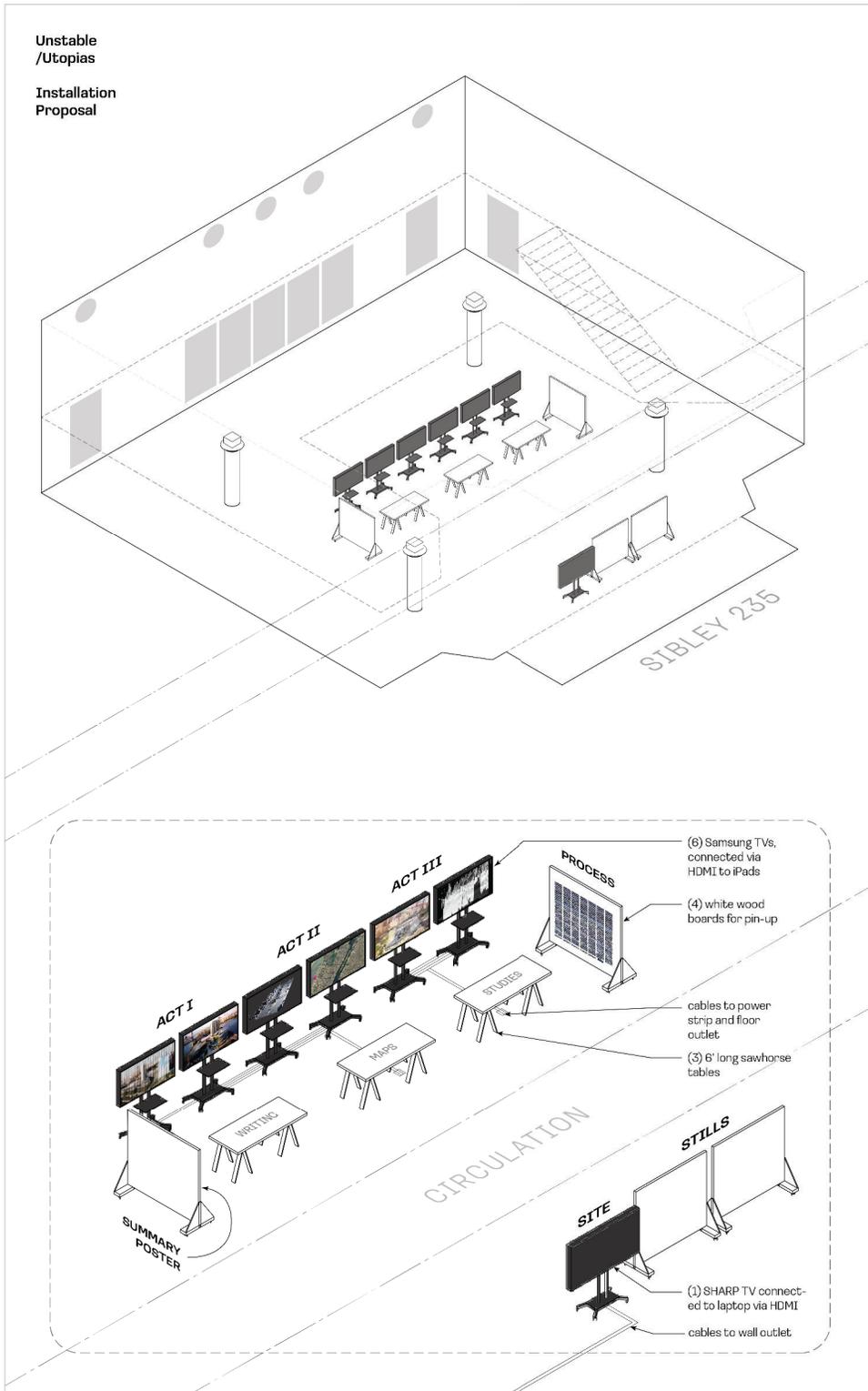


Fig. 11: Installation diagram



Fig. 12: Photo of the Installation in Sibley Dome, April 28-29, 2022

that make quick and significant use of features of digital images. The ubiquity of browsers and their ability to host most any other file type in some manner made this an ideal approach. The video-programs used in the installation were all run in a client browser and built in HTML, CSS, and, primarily, JavaScript. JavaScript, a high-level, multi-paradigm programming language, is used for client-side scripting in 97% of websites, supports animation, event triggers and interactivity, and contains numerous third-party libraries and frameworks that expand its use and accessibility.

The video-programs are then structured in three acts, two 'scenes' each. Each act begins with a base video portraying an investigation into different forms of capture. Acts One and Two focus on specific captures: Cornell Tech's online interactive tour and satellite imagery of the island respectively. Act Three focuses on imaginary representations and intersects with modified material from the previous acts as well as a database of previous visions for the island. The second scene in each act is an interpretive offshoot. Another script re-captures and processes the first scene into another form, extracting other kinds of content or legibility. Act Three also uses this point to overlay information from the camera feed into the video output. A description of each act is outlined below.

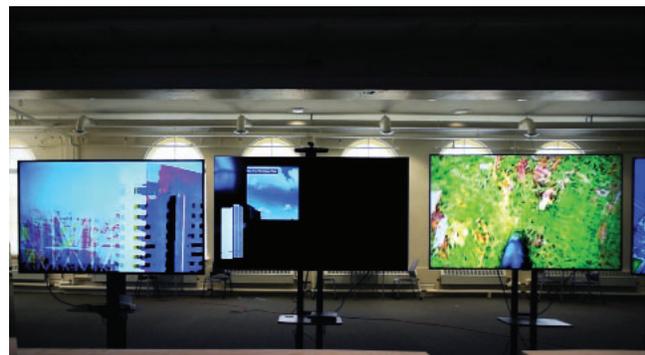


Fig. 13: Photo of the Installation in Sibley Dome, April 28-29, 2022

3.2.1 “ACT ONE: SITE ANALYSIS”

Act ONE: Site Analysis, begins by addressing the 360-tour on the Cornell Tech website, designed by studio Novaconcepts, as a mediated depiction of the identity of the campus. Scene one portrays a simple capture of the expected use of the site and introduction into its intended use and expectations while scene two deconstructs the visualization into a variety of parts and various readings. If there is an illusion of depth and access in the image, an equivalence of the tour to space, there is also a surface here made of a collapse of information that can be then deconstructed into parts. What information is legible to the screen, to the reader, to the machine? And what is its use? I sought to pull out other information present in the image such as the pixel color, location, as well as referenced data in the application such as stored images for icons or used to edit the original 360-degree images for a smooth effect. Eventually, the navigator in the first scene becomes increasingly aimless, eventually zooming and lingering in the broad expanse of sky inherent in the 360-degree capture, while the same readings of the screen display continue to populate scene two in response. The tour is disrupted on multiple levels towards defamiliarizing the surface-level experience of virtually inhabiting the campus.

3.2.2 “ACT TWO: TABLEAU”

Act Two: Tableau continues through an inversion of this analysis. If there is a desire to portray a depth in the image that hides its content as a surface, so too does the surface hide depth. A photogrammetry model made from screenshots of Google maps situates Cornell Tech in the broader context of a fragmented, digitally visualized Roosevelt Island. If site analysis draws information out of the collapse, the second act seeks to look ‘before’ it. What does the frame of the moment of the image hide when pulled apart? The first scene draws aerial photographs, satellite images, various drawn plans, proposals, and images of the island into conversation with each other. In the second scene, these become a field of parts as files that can be traced further and further back, or forward.

3.2.3 “ACT THREE: AN ORACLE”

Act Three: An Oracle asks of our engagement with the image – what does it mean for it to have agency and how is that enacted? Elements from the first two deconstructions re-assemble in a new moment through computational processing. A video-feed enters new streams of information into the system, making visible the externalization of many elements of image processing in line with information processing. Act Three, in particular the second scene, is the loop point for the set, and looks to bring in additional information from outside the program and pre-set information. The loop point as an extension of the processing of digital images is an engagement with ourselves, our vision, our reading and re-reading and shaping of the image, and an acknowledgement that such is happening simultaneously, all the time. Scene one then begins with my own set of material and offers a databank of questions for consideration that go into further altering and editing the content, shown then in scene two.

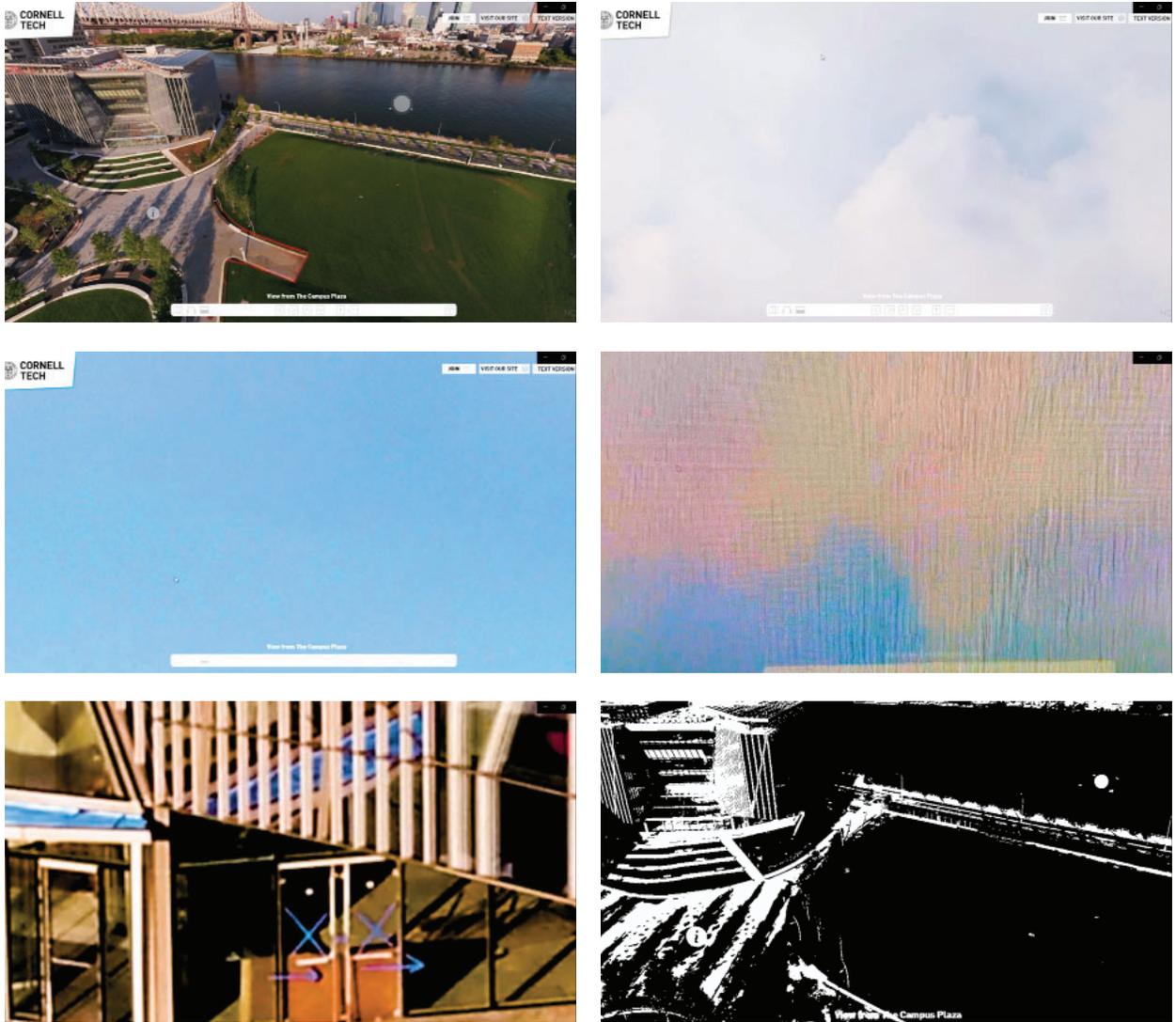


Fig. 14: Selection of still from Act One, Scene One



Fig. 15: Selection of still from Act One, Scene Two

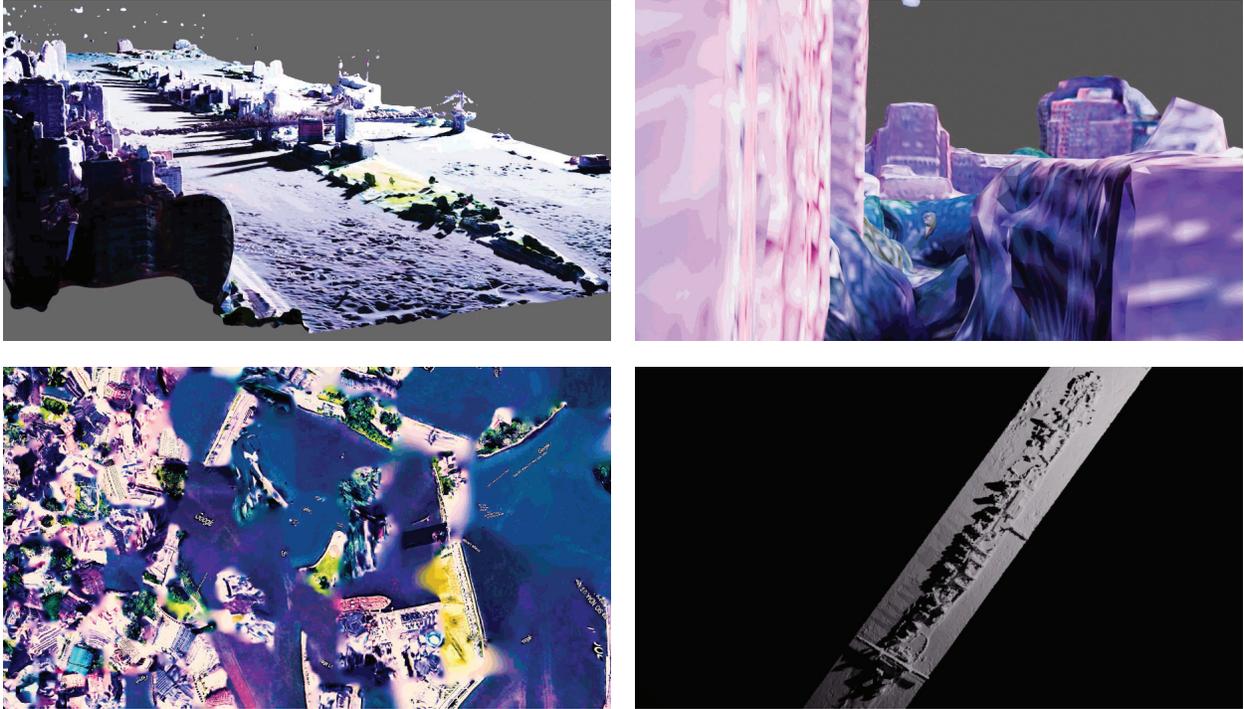


Fig. 16: Selection of still from Act Two, Scene One

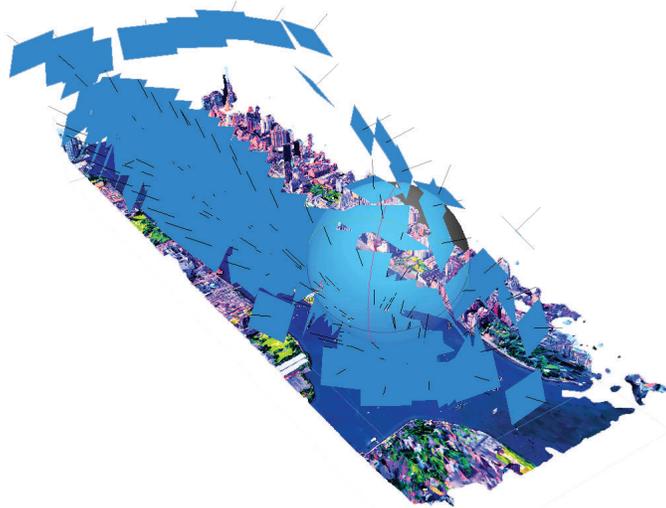


Fig. 17: Screenshot of a photogrammetry analysis

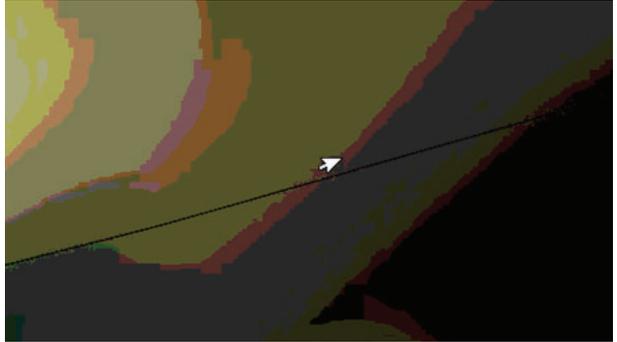
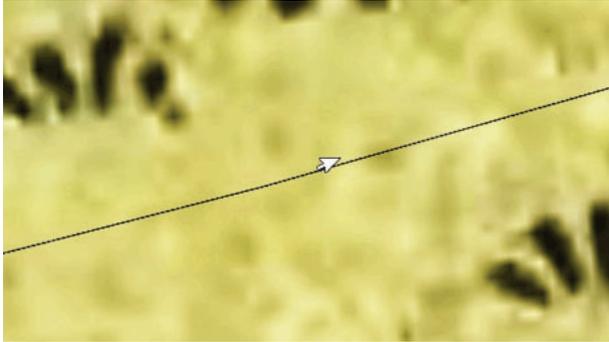
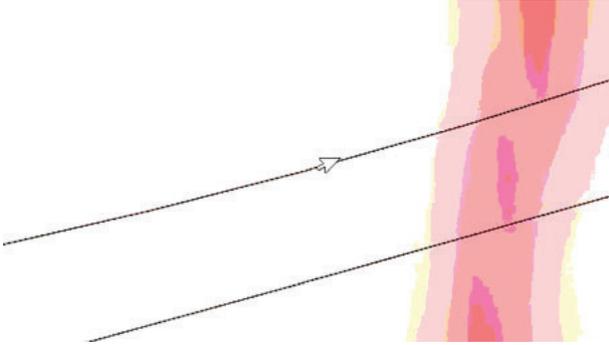
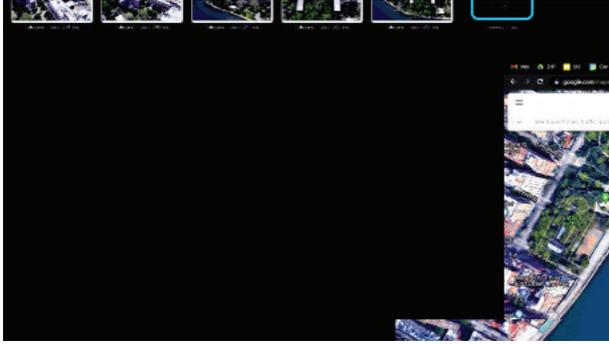


Fig. 18: Selection of stills from Act Two, Scene Two

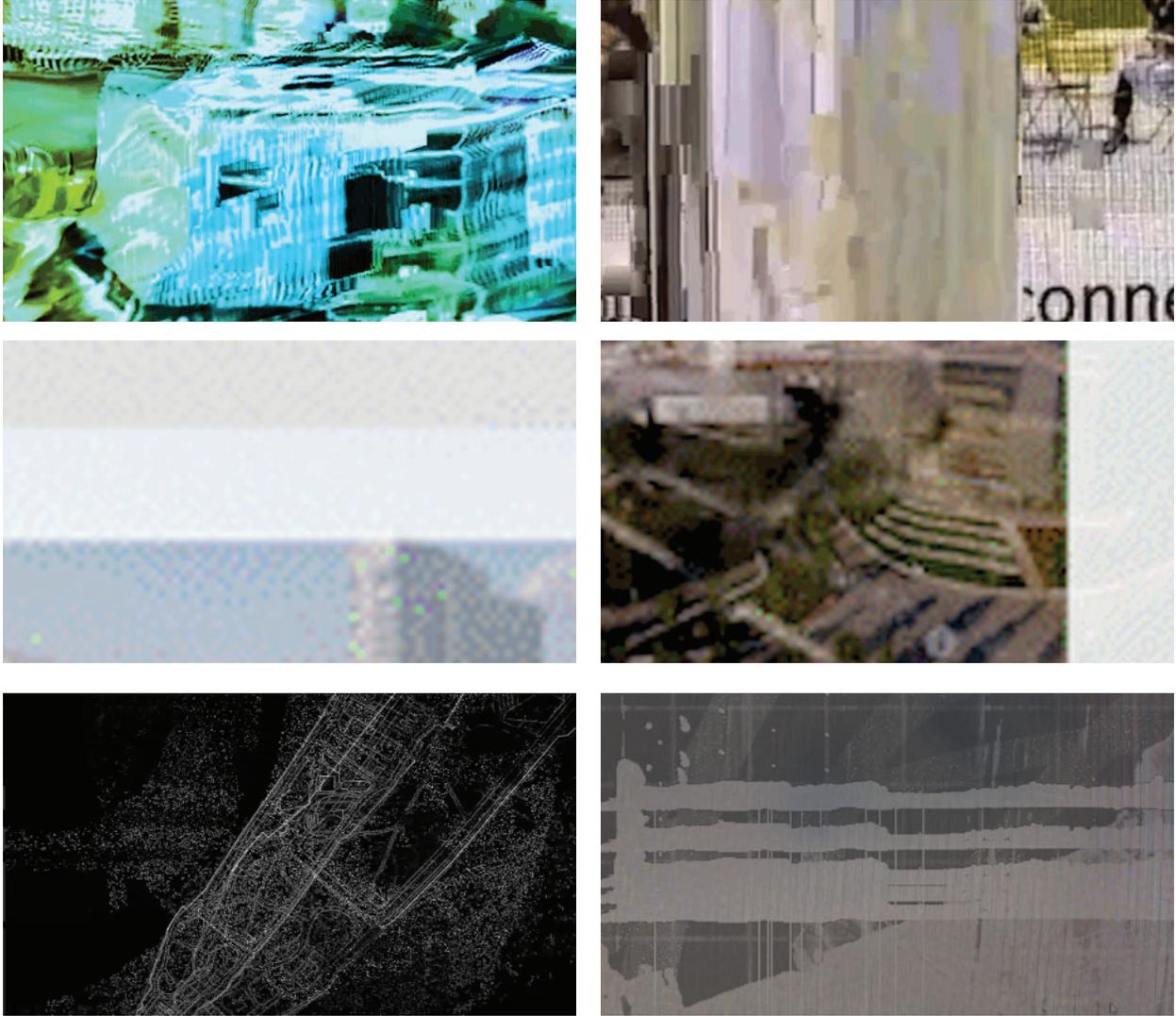


Fig. 19: Selection of still from Act Three, Scene One

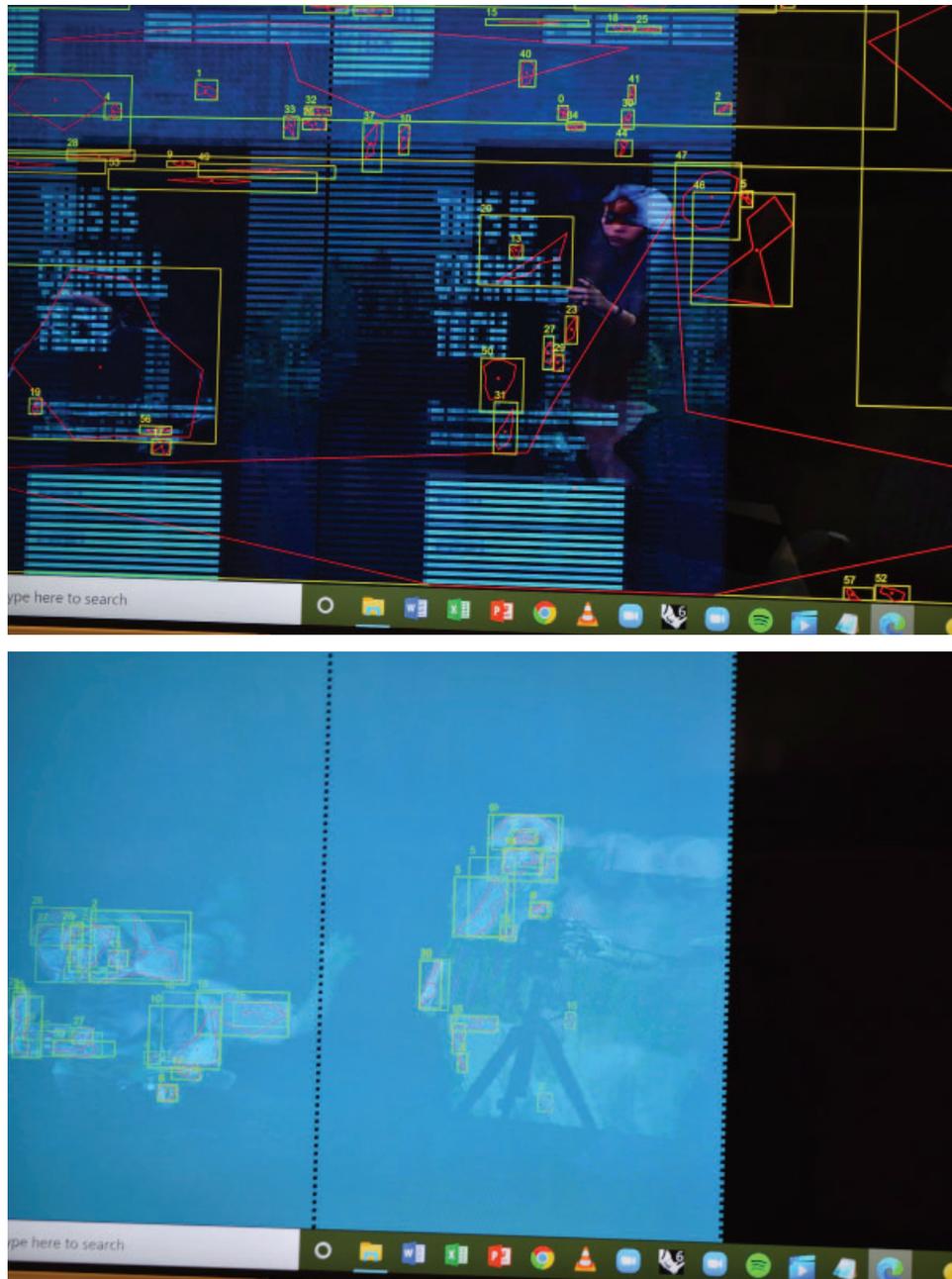


Fig. 20: Photos of Act Three, Scene Two during Sibley Dome installation

3.3 PROJECT ARCHIVE, PRINTED BOOKLET SERIES

The numerous experimental offshoots, small studies, inventories, and supplementary information developed and collected throughout this thesis were collected in a booklet series available both digitally and in print. The booklets are both a stand-alone project and an accompaniment to the installation. Select topics were developed to organize the various kinds of content collected in the booklets as different focus areas and paths of interest took shape. The use of these loose, thematic categories draws heavily from Walter Benjamin's Arcades Project, an incomplete work collecting a wide variety of quotes and commentary organized into convolutes of key topics.

Booklet Series

- a. Images of Utopia: Architecture and representation
 - A. Unstable/ Utopias: Counter-narratives of imaging technology
 - B. Digital + Haunting: The medium and technology of the digital image
 - C. Cornell Tech: On siting/sighting
 - D. Dream for an Island: Urban experimentation on Roosevelt Island
 - E. Phantasmagoria, Part 1: The imaging machine
 - F. Surface: Thin sections
 - G. Apparatus: Temporal frame
 - H. Phantasmagoria, Part 2: Projected futures
- J. Appendices

Some smaller projects documented in the booklets include: a short film on Roosevelt Island reflecting on its temporal experience, constructed from video and audio taken during a site visit (D), a deck of cards showing an expansive set of references regarding digital media for use in delineating a field of inquiry (A, B, E, H), a set of digital material swatches (B), and a deconstruction of Cornell Tech's virtual tour website page (F).

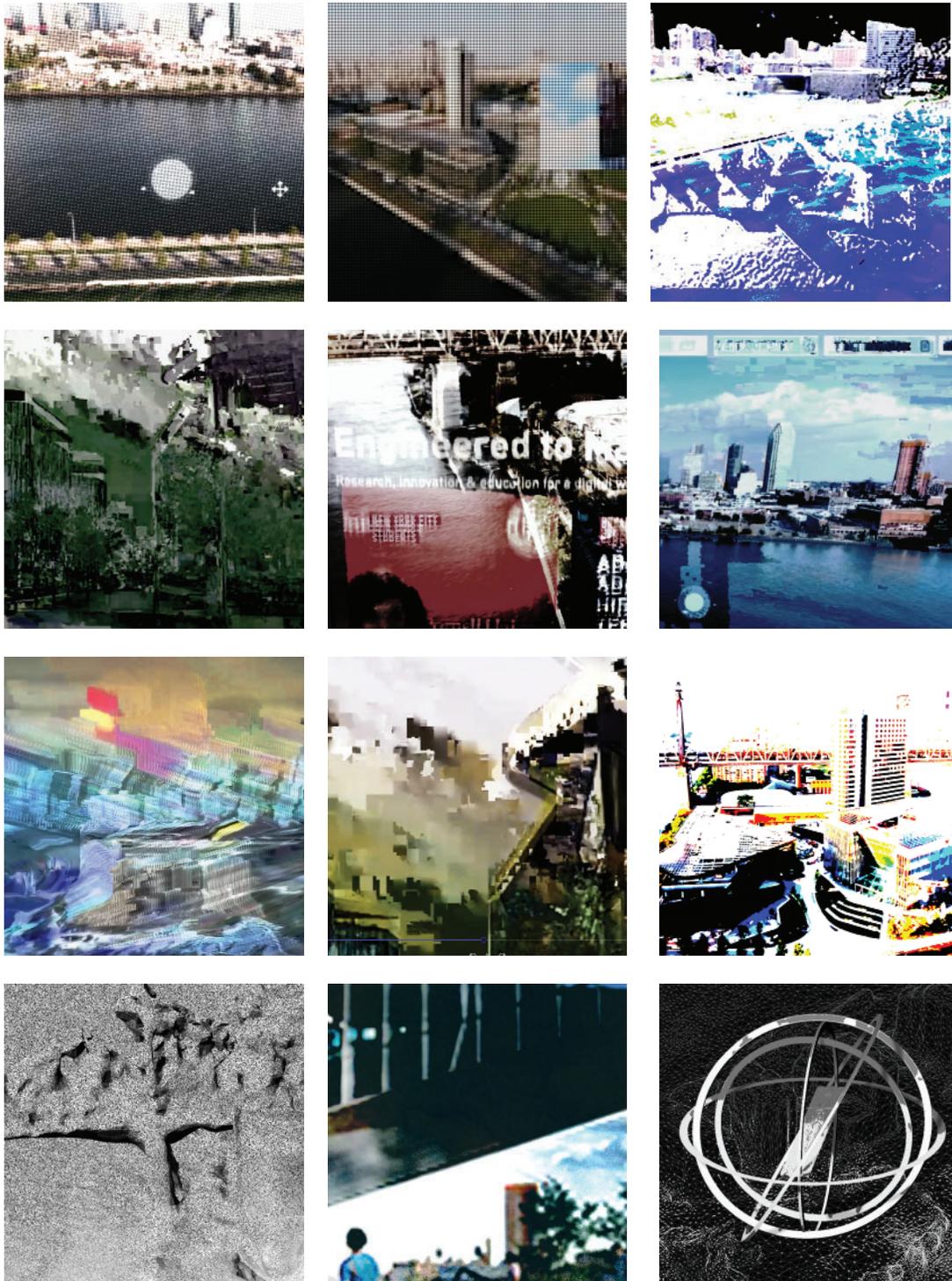


Fig. 21: Selections from digital material “swatch” series

3.4 UNSTABLE UTOPIAS WEBSITE HUB

In addition to the booklet series, the Website Hub serves as another repository for the various design projects of this thesis, though more focused on the potential for future work and growth from the project. The website functions as a small hub that allows continued access to the ideas presented in this thesis and draws attention to the ubiquity of digital images through its availability on many platforms. As a website, it uses the same tools as the installation series (HTML, CSS, JavaScript) but with a stationary, individual audience in mind instead of an ambulatory public. Rather than video input or simultaneous spatialization of each act, they are engaged through individual mouse and keyboard interactions on a browser page.

The website primarily hosts the installation videos and their modified forms for this change in accessibility. The site also hosts a summary text and can continue to host further writing regarding the rethinking of the medium of digital images in architectural work. The homepage features a floating site plan drawing of Roosevelt Island, rotating in the center of a browser window. A counter at the top reads the angle of rotation as the plan spins clockwise. Clicking the plan produces additional copies, while holding the mouse causes faster movement.

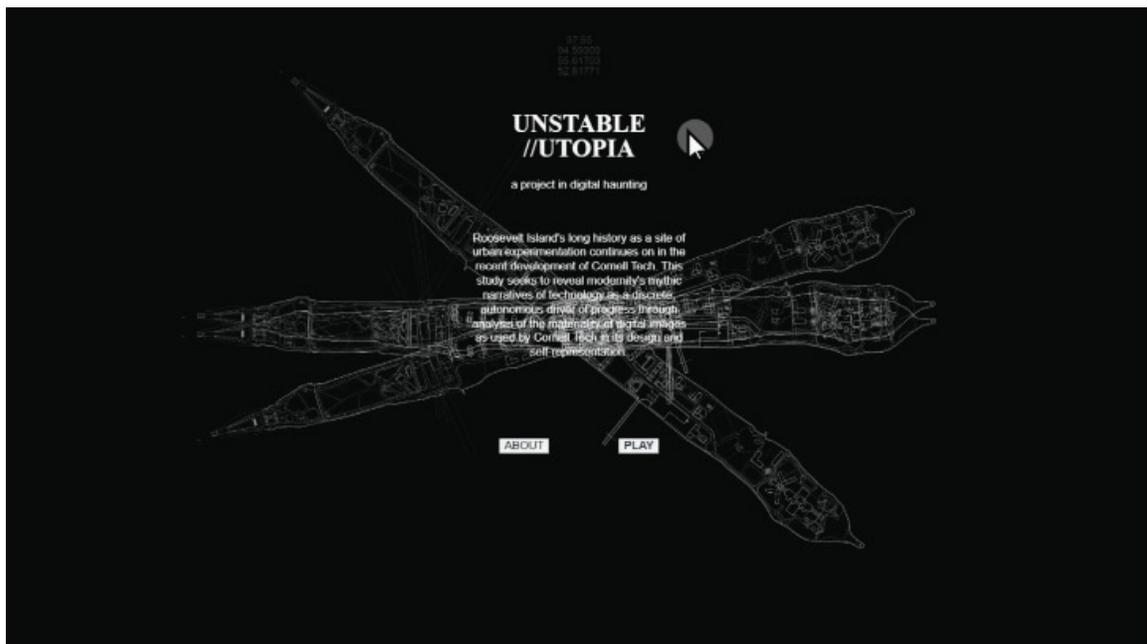


Fig. 22: Screenshot of website homepage

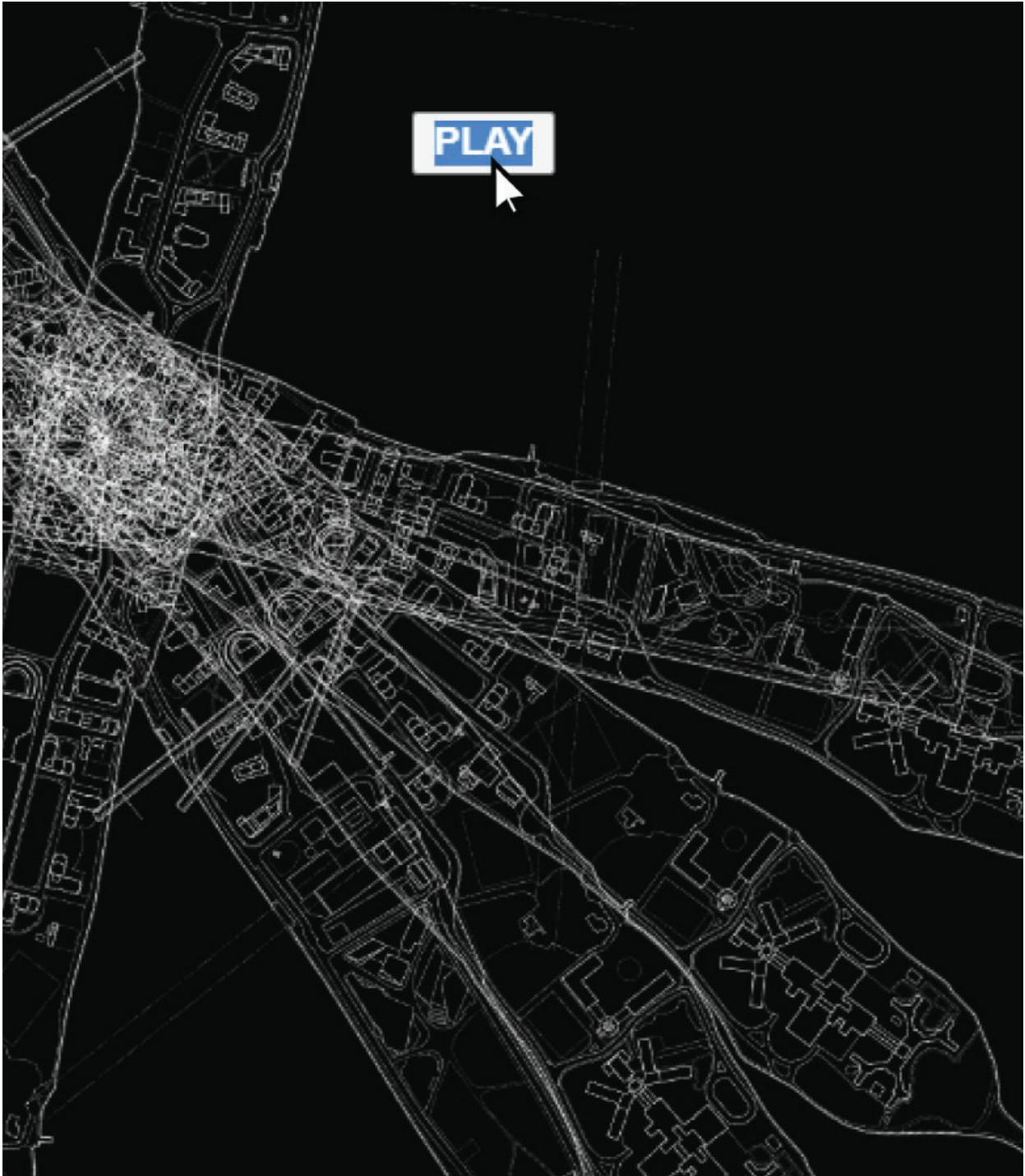


Fig. 23: Cropped screencap of website homepage

4. OUTCOMES: IMAGING AND UTOPIA

This chapter discusses some key outcomes and reflections on the preceding design projects. Through material explorations on various representations of Roosevelt Island and Cornell Tech, these design projects make evident the presence of an otherwise unseen digital materiality. Reflecting on the attributes of this materiality brings forth the site of the medium of the digital image, the techno-utopian narratives underpinning its perceived invisibility, and, therein, its hidden agency. Additionally, the range of design projects further serves to develop the framework of digital haunting as a process of revealing and countering various visibilities and invisibilities.

The first section, digital as material, discusses the invisibility of the medium of the digital image in the development and self-representation of Cornell Tech, primarily evidenced throughout the installation video-programs. The second section then discusses the relationship between these invisibilities and the techno-utopian narratives conveyed by Cornell Tech, especially in relation to models of imaging in previous utopian proposals for Roosevelt Island. The third section reflects on the role and potential of glitches as experienced in shaping the design projects and the meaning of digital haunting.

4.1 DIGITAL AS MATERIAL

At first glance, Cornell Tech seems a continuation of a long history of utopian projects at Roosevelt Island, but its differences reveal a shift in paradigms of imaging technology in the digital age. Since its conception as a response to a government-sponsored competition for an applied science and engineering school, Cornell Tech is an investment in developing new technologies and technology-related careers towards the improvement of New York City. In turn, it has an expansive digital presence that emphasizes the power and promise of the lens of a computer, a digital eye.

However, despite their technology-driven agenda, the images used throughout Cornell Tech's development and self-representation leave the medium of the digital image largely unacknowledged. Rather, the digital image serves only as a point of access to other forms of media and



Fig. 24: Google Maps photogrammetry material image

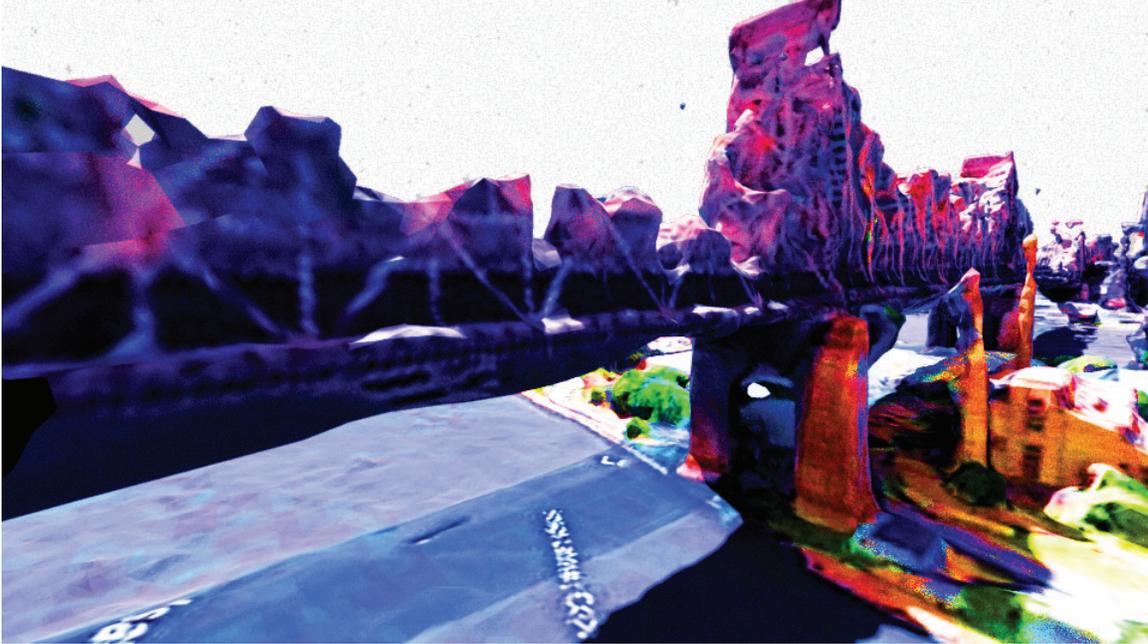


Fig. 25: Edited render from Google Maps photogrammetry model

technology, not read as a medium in and of itself, at least of any significance. In the case of the Cornell Tech virtual campus tour, seen in Act One: Site Analysis, digital access to the image of the campus proposes an equivalence between visibility and knowing. The drone images constituting the tour do not attempt to replicate an on-the-ground experience, showcasing instead their ability to capture a larger bird's eye view. The photographic captures also portray an early point in campus construction, prior to the completion of phase one. These decisions begin to evidence a presumed utility in digitally visualizing the site, that is, that this digital visibility is a neutral, objective, and inherently progressive means of access. As such, this presumption obfuscates the material presence of this access as a digital image, a moment bypassed in service of immediate visibility. The techniques used in constructing the tour – the set of supplementary photos, use of 360-degree drone images stitched together by code, the overlay of animated icons for intuitive navigation—desire a smooth experience of visualizing the campus through digital means. In the video-program, the defamiliarization and deconstruction of this site into various kinds of information (linked files, web infrastructures, pixel data) undoes the veneer of smoothness.

Expanding and investigating the moment of visualizing the site on screen brings any linkage between the online tour and physical campus site into question, if not severing them completely. Instead, this virtual accessibility seems to obscure other kinds of inaccessibility to the site and institution as caused by security issues, the ongoing development of the campus, and the general inaccessibility of Roosevelt Island relative to other areas in New York City. This reinterpretation, separating the experience of the tour from a knowing of the campus, also opens up digital experiences to alternative forms of interactivity and entanglement reliant on their material and temporal presence. Although the same data is continuously re-processed and read throughout Act One, new meanings and experiences arise.

Through the disassembly and manipulation of these images, a digital materiality becomes clear where it was previously invisible. The invisibility of the medium of the digital image, and in turn its material presence, is both attributed to and countered by the same characteristics of the medium. That is, the electric signaling that produces digital images maintains a distinct temporality, is an ubiquitous form of media, and can be reduced to discrete data.

4.2 TECHNO-UTOPIAN NARRATIVES

The invisibility of the digital image is troubling not only as an unacknowledged site of material agency for architects but also with respect to the techno-utopian narratives underpinning its use. Cornell Tech puts forth a variety of narratives establishing a techno-utopian vision for the campus and its future, that is, portraying technology as an objective and universal rectifier, an autonomous driver of progress and prosperity, and as a means of optimization. These and more are evidenced in their conception through Bloomberg's competition, their institutional aims, and also in their use of digital images.

These narratives are challenged and troubled by digital images because they are haunted by the invisibilities catalogued earlier. Because they are haunted, they are not objective and cannot function as objective rectifiers. The invisibilities exposed through Act two of the study projects, and the unmapping of Roosevelt Island, now become relevant to the narratives; the same invisibility from before is only the case under the techno-utopian narratives, or could perhaps be why the images used as such for Cornell Tech and Roosevelt Island. The presenting of the images or the digital materiality in the installation then similarly counters these narratives and provokes alternative readings and challenges to these presumptions.

4.3 GLITCH METHODS

Derived from another form of electric signaling, a glitch, technically, is a transient phenomenon that occurs at the point where signals change. In that brief, indeterminate state, unanticipated outcomes appear briefly, and should disappear, but instead propagate and produce profoundly different results. Throughout the design projects, the sense of glitch and indeterminacy in the digital image was particularly generative towards multi-layered and contradictory readings, therein supporting various attempts at counter-narratives. The role and potential of glitch becomes evident in the scope of the project in seeing the adjustments engendered by forming deliberate, unanticipated juxtapositions. The revelations produced during these moments counter the utopian narratives by demonstrating new realizations, new interpretations, and new consid-

erations in works previously considered complete.

Glitch draws back to digital haunting as an identification of a moment of material presence and agency. The glitch opens pathways for the interstitial hauntings of the digital image to emerge. In *Glitch Feminism*, Legacy Russell characterizes the glitch as a form of refusal, or even anti-material, again engaging a dual visibility-invisibility in the site of the digital image (Russell, 2020). In the unmapping drawing, despite being a static piece, glitch is perhaps another lens to interpret the murky and multi-layered organizing of information as an extended refusal to legibility. Embracing glitch as a method, particularly in line with digital haunting, disrupts and challenges conventional narrative.

In the installation, while all video-programs attempt to capture and instigate moments of 'glitch', *Act Three: An Oracle* opens the series to multiple, continuous inputs that could give rise to deliberate yet uncontrolled responses. The camera feed on scene six entangles the programs in physical space and passes it through the installation. The observer anticipating the objective rectification provided by the digital image instead becomes a participant in the dynamic creation of unique experiences and perceptions. The observations become generative actions.



Fig. 26: Photo of screen playing Act One recordings

5. CONCLUSION

In 1874, “we see the ocean navigated and the solid land traversed by steam power, and intelligence communicated by electricity. Truly this is a most miraculous era. ... The progress of the age has almost outstripped human belief; the future is known only to Omniscience” (Marx, Leo, 2010, p. 51). From 1922, “given the boat and the steam engine, is not the steamboat inevitable?” (MacKenzie & Wajcman, 1999, p. 8) In the current century, “technology seems to change by a sort of inexorable evolutionary progress ... people are pawns in the process. We ride rather than drive the innovation wave” (Benjamin, 2019, p. 38). Last year, Alphabet’s Sidewalk Labs advertised their new application: “the traditional urban development process struggles to design for complex and competing priorities. Delve uses machine learning to reveal optimal design options – and deliver better neighborhoods” (Announcing Delve: Discovering Radically Better Urban Designs | Blog | Sidewalk Labs, n.d.). And at the Jacobs Technion-Institute at Cornell Tech, Urban Tech Hub founding director Michael Samuelian questions, “how can we leverage the power of technology to make cities stronger, fairer, and more resilient?” (Urban Tech at Jacobs Technion-Cornell Institute Takes a People-First Approach, n.d.).

Samuelian’s question sees the problems of cities (“air pollution, congestion, and homelessness”) through a vision of technology as an external and objective rectifier. Technology matters, and has enormous impact, but the narrative above portrays technological progress as a modern creation myth that obfuscates the complex socio-cultural, political, and other factors contributing to the development of technology. This calls for an urgent rethinking of how architects and urban designers engage with computation and data, both as used in driving the design and use of urban form, and in analytical studies and representations of cities, where these images contribute to a hegemonic concept of time, place, memory, and humanity.

When anthropologist Shannon Mattern (2021) notes how the long-standing perception of cities as “knowledge repositories and data processors” has culminated in a paradigm of “city as computer” as a means of finding rational order, she reveals a corollary paradigm of computation as an autonomous technology, derived from preceding models of efficiency and optimization to their extreme. As such, Y-Combinator and Sidewalk Labs looking to reduce “the messiness of

urban life” into data renders invisible the multitude of forms of knowledge that “do not compute” in the cold objectivity of the computer. However, Mattern’s criticism of reductive computational practices in designing urban spaces perhaps reflects a similar sentiment to those she (rightfully) questions. Mattern characterizes cities as complex assemblages – is the development of the computer where these begin to be flattened into mere ‘data’. dana boyd and M.C. Eilish of the Data & Society Research Institute write, “the datasets and models used in these systems are not objective representations of reality. They are the culmination of particular tools, people, and power structures that foreground one way of seeing or judging over another,” a view on computation that echoes back in time (Benjamin, 2019).

In order to address these concerns, this thesis sought to uncover the materiality of the digital image as an understudied and unseen medium. The image, understood technically as electrical signals based on numerical data, presents new possibilities and limitations that have significant bearing on architectural thought, methodology, and practice. Relationships between past and present are brought into question and new temporalities emerge to be increasingly immediate and automatic. The statistical seeing of time and possibility produces the future in mathematical conjecture. A media agnosticism cedes control to increasingly complex and hidden actors.

A framework of digital haunting guided a rethinking of digital images and media as a multi-layered material. These questions are studied through a case study of Roosevelt Island, leading to the development of a series of design projects that deconstruct and manipulate images in search of exploratory methods of computational practice. As a result, the materiality of the digital images used is further expressed and revealed as a point of material agency that might be used by architects or urban designers in rethinking digital and computational representations of space.



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