# Architecture of a Post Physical Universe

A Thesis Presented for the
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Degree
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To my wife, Callie, without whom I would have never made this dream a reality.

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# Abstract

As architects we are fundamentally forced to make arguments within the physical realm. However since mid 1990's the world has become more and more reliant upon the digital. Now in 2017 it is the way we voice public opinion, shop, visit with our friends and much more. This digital space has taken over, and while humanity would more than survive without this modern technology, it continues design our world around it. This architecture project glimpses into the future of how we as architects are continually dealing with this new infrastructural space. While many projects have played architecture as the victim, the intent of this project is not to look down and say "this will kill that." Instead this project acknowledges current modes architectural technologies in this realm and pushes further to start a dialogue on how we as architects can and will be involved in this digital space.

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# Chapter 1: The Circumstance of Digital Life

Many of you may wonder in your daily lives where is the internet (Figure1)? What is the cloud and where do I find it? The answer is everywhere. The information we look at everyday, our email, google searches, youtube videos, they all have a physical location.

According to a recent study the average human uses about 1.4 gigabytes of data on their mobile device each month. In the US and Western Europe it's much higher at 4 gigabytes per month which equates to 7 exabytes globally in 2016. By 2021 this amount will increase seven times to 49 exabytes globally and all of this data requires physical

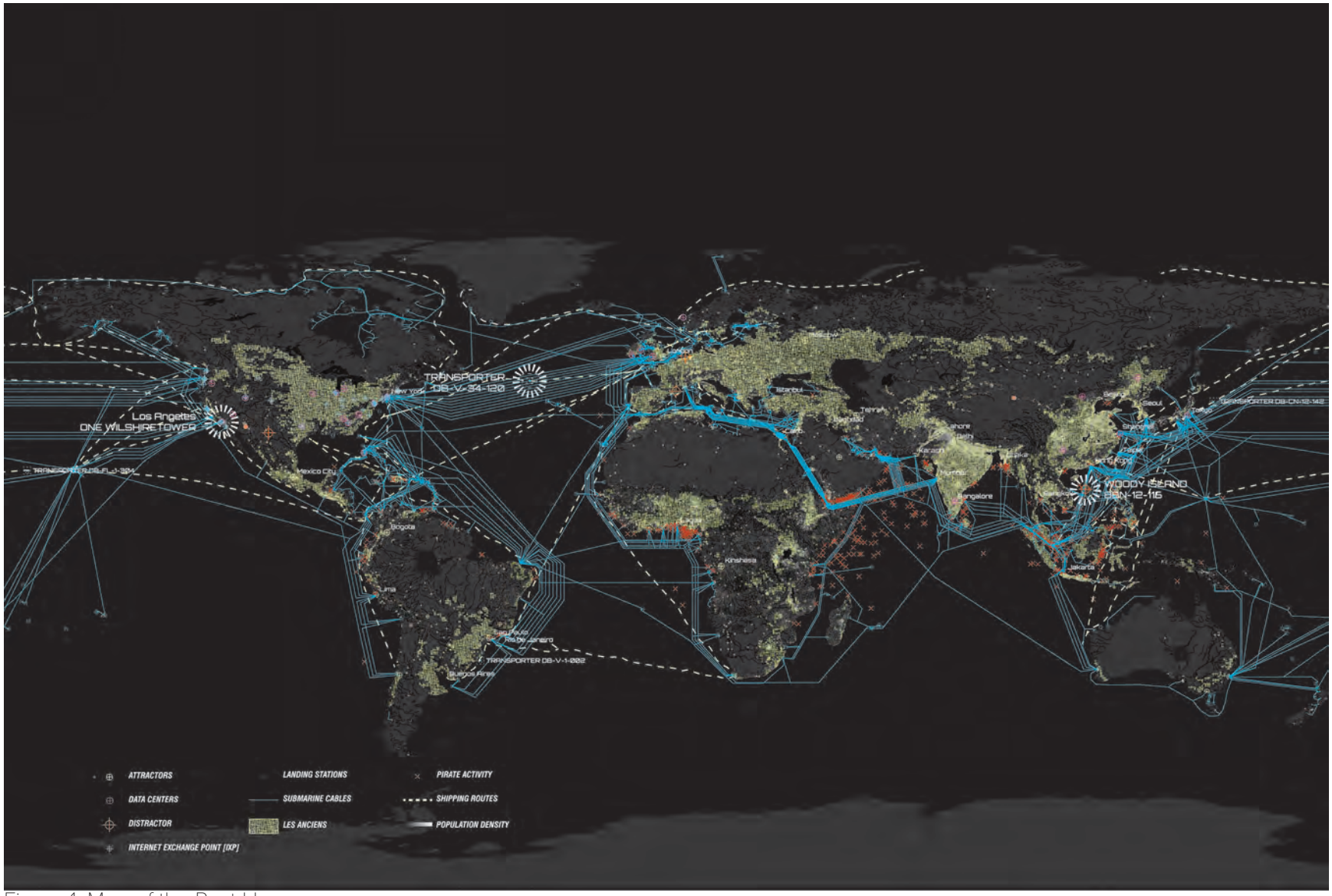


Figure 1: Map of the Post Human

infrastructure.

In the past 30 years the technological world has boomed. We have moved from one car garages, with a t.v. and a shared phone connected to a wall, to everyone having there own personal car, t.v., and phone. In fact the phones never leave our side They provide instant access to unimaginable amounts people and information. As Benjamin Bratton states in his article iPhone City, we do not always need to arrive, because we are already there. As such many new technologies have focused around fitness. Nintendo introduced the Wii, a gaming system that uses gestures and human movements. We now have apps and devices that track our every move, telling us exactly how many steps we take in a day. With these advancement we are not only tracked we are moved corralled like cattle by the availability of the digital infrastructure (Figure 3). Some of the nations top researchers have been using these tools as a way to research human patterns. We find that we are incredibly unique as a species. Unlike any other animal our movement is completely sporadic. We no longer move across the landscape tracking wild game, scavenging for berries or gathering material for our survival. We now move about our cities because we are curious. We see something we like so we move there.[1] As such we again see technology catering to these whimsical movements and by way of games and apps, such as geocaching or Pokemon GO technology again leads us by the hand and we are brought about through somewhat choreographed experiences. Projects such as Datagrove (Figure 2) by the Future Cities Lab have already started using this data. The installation of LEDs and speakers makes people aware of the data streaming through the site. The carefully designed LEDs pulse with the digital activity while the sound connected to more local changes, as it

1. This research is based off of a conversation at Oak Ridge National Laboratory on Social movement by the Urban Dynamics Institute.



Figure 2: Datagrove

senses people in its immediate surroundings the sounds of the pulse will be louder, drawing nearby people to it. This provides them with a multi-layered experience of the digital landscape.

Other projects such as Augmented 3d city or pokemonGO use primarily visual arguments. Augmented 3d allows users to control their environment by superimposing the digital world atop the physical. The same method is used in the pokemonGO, however the users have less control over what or where these superimpositions occur. These projects seek only our attention and are there to provide us with pleasure. Other projects such as Nuage Vert by *HeHe* or Amphibious Architecture by *the Living* seek to make us aware of the physical context through digital means. Using lights and sensors as spectacle we are made aware of certain ecological agendas.

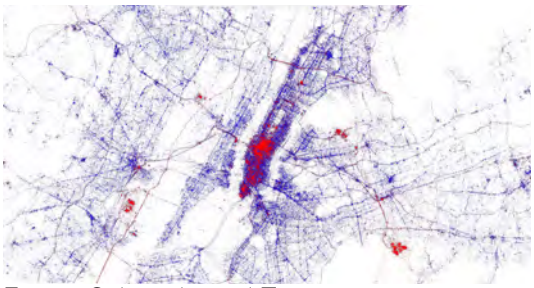

Figure 3: Locals and Tourists

This project seeks to question how architects become involved in this digital realm. We use these ecological, political and social agendas as ways to connect to the general public. It implements similar strategies of democratic design by not posing the definitive answer but a possible answer or a projected response to current events. It uses data mapping as a technique to situate the project with in our current geographical context. From there it implements strategies of how professionals of data can place these large infrastructural agents into the world and have a positive impact. These projections are all based off of actual devices and current technologies. It takes these technologies into the future and speculates not only what they are currently but what they could be in the future. It subltely poses that the future is already here we only have to know where to look.

# Chapter 2: Discovering the Post Physical

The investigation started with categorization of different territories where digital interaction could occur. It focused mainly on the activity transmitted by mobile devices. The examination revealed 5 possible territories for exploration, The *ATTRACTORS, DISTRACTORS, SETTLEMENTS, IMAGINATIONS, LES ANCIENS,* and *FACILITATORS.* These territories are related. During the process of exploration they became more and more related and it is difficult at time to differentiate between them.

*ATTRACTORS:* the sites which attract the agencies of the telecommunications. They are public and open. They are marvels, They seek to bring people in and entertain.

*DISTRACTORS:* Inherently secretive. They mask their intentions from the public. These are territories of restricted access and allow entry to only the most elite personnel.

*SETTLEMENTS*: Outer space, satellite space stations, planets, galaxies and subterranean vaults. These are the new territories of a TYPE I civilization.

*IMAGINATIONS*: The wildest and most volatile of all the digital spaces. This in not just an overlap of physical and digital space but the overlap of the dark web. These are the spaces that can be both sublime and uncanny. They can be pleasurable or frightening. These are spaces that border fiction and confuse reality.

*LES ANCIENS*: Unspace, underground corridors, basement and other areas where digital technology is at a minimum. These spaces also carry the remnants of a much simpler life. The romanticism of the rural.

# ATTRACTORS



Figure 4: Global Internet Map

Public and open. These sites seek to bring people in. They exist around where data is the most available. People begin to congregate around these sites because their world revolves around the data it provides. *ATTRACTORS* (Figure 4) are unique in that the very nature of their attraction makes them larger. While people flock to these sites to stream media, they are harvested for data making the attraction even greater. These people transform into a kind of lotus eater[1], drunk with data they continue to consume and become lost in their own stream.

1.Lotus Eaters refers to Homer's *Odyssey*, where Odyseus and his men encounter an island where the inhabitants eat the primary plant the lotus. It's narcotic effect caused people to sleep in peaceful apathy until its effects diminished.

# DISTRACTORS

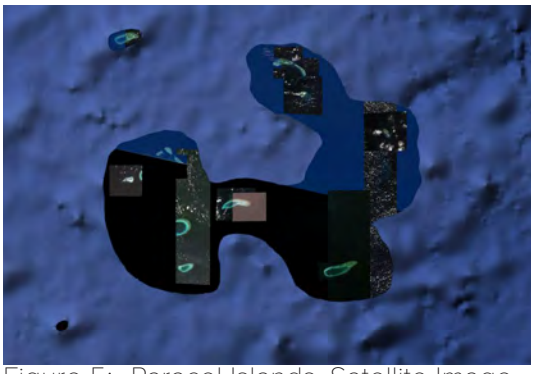

Figure 5:  Paracel Islands, Satellite Image

Pushing and diverting. These sites mask their physical world intentions from the world through digital interpretation. They manipulate most digital technology whether it be a misleading turn on your navigations system or blurring an image so that it remains hidden to the digital eye (Figure 5). These site are accessible but only through the analogue world. They allow the most skilled and elite personnel giving way to the naked human eye where they still only grant a limited access view.

# SETTLEMENTS



Figure 6:  NO MANY SKY [2016]

Outer space, satellite stations, planets galaxies and subterranean vaults. These are the new settlement of a Type I civilization.[22] We are already galactic citizens in the current day and age, although we have yet to make contact with any other galactic civilizations or life forms that we know. These settings utilize techniques of the *ATTRACTORS* and the *IMAGINATIONS*. These however are nowhere near as volatile or predator like. These are controlled primarily by governments on outreach missions. These galactic settlers have no physical contact with the planet earth. All contact is transmitted via satellites. These *SETTELMENTS* (Figure 6) bring us into contact with never before seen worlds and much like the images of postcards and advertisements these transmissions carry the ideal image of space and never before seen things. Narratives that each person begins to attach their own personal story.

2.In 1964, Kardashev defined three levels of civilizations, based on the order of magnitude of power available to them: Type I, II and III. Type I is a technological level of a civilization that can harness all the energy that falls on a planet from its parent star. www.wikipedia.com

# IMAGINATIONS



Figure 7: Pixels [2015]

These are the wildest and most volatile of all the digital spaces. This is not just an overlap of physical and digital space but the overlap of the dark web. These are villainous spaces that take prisoners and this experience could change you for a day or a lifetime but it will change you. These experiences are also hard to define as they roll and weave through lines of code, chewing on concepts and wreaking havoc to unsuspecting victims.

These events (Figure 7) to human in our time seems like stuff of movies or fictions but the truth these outliers of the digital world have been lurking through the web waiting to prey on us, the innocent. These are sometimes vengeful and at other times they are games much like the trick of the joker.

# les Anciens



Figure 8:  First Utility District

Unspace , underground corridors, basements and janitor closets. The areas where digital technology hasn't yet reached or was purposefully excluded. These spaces (Figure 8) exist everywhere and are in the periphery of normal everyday environments. These areas sometimes act as safe zones from the digital world. They are the foil and escape of the *IMAGINATIONS*. These spaces exist without intelligent machines. These spaces are the digital wilderness untouched by most of humanity yet it exists in every home and office building. These are not spaces in which people reside but instead the waves of technology sit outside the boundary waiting to communicate with the rest of the world.

# Chapter 3: Attractors

In 2015 the average human being used 1.9 GB of data per month and their mobile device. In western Europe and the United States it averaged 4.5 GB per month. Globally this equates to 49 exabytes a year. By 2020 we are expected to use 9.8 GB per month. All of this data is currently trafficed through buildings like these.

One Wilshire Tower (Figure 9) in Los Angeles there is 650,000 square feet and 30 floors, full of telecommunications and data storage infrastructure. This building is unique in that below the building is a landing point for an undersea data cable that ties the western United States to eastern Asia. Thirty percent of the internet traffic between East Asia and the United States travels through this building.



Figure 9: One Wilshire Tower



Figure 10: Infomart

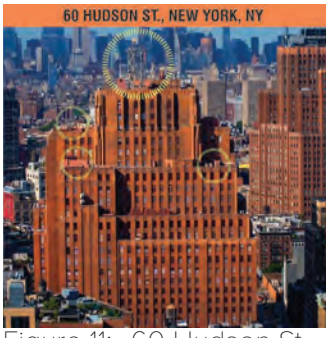

Figure 11: 60 Hudson St.



Figure 12: 111 Eighth Ave.

These attractors (Figures 10-12) are not only gateways of the digital world they are consumers of energy and producers of heat. A cool 68 degrees is the standard temperature for these structures yet they house only computers, wire and a few people. Recent studies by Microsoft and Google show that the attractor body will run smoother and more efficiently at a temperature of 90 degrees.

The largest problem with these facilities are that they are extreme consumers of energy. Each storage room is typically kept at 68 degrees Fahrenheit, and with computers that run all day and night that get hot. They also consume energy to power the actual machines.
Recent studies show ever that these machines do not need to be kept so cool and in fact that they run smoother and more efficiently at a temperature range of 80-90 degrees Fahrenheit. The problem with “running it hot” is that human bodies don’t like to work at this temperature for extended periods. However when humans no longer occupy these spaces and we no longer have the need to account for safety and welfare of a human. We can let artificially intelligent data bodies roam through our data streams and maintain the hidden world which is the core of our everyday life.

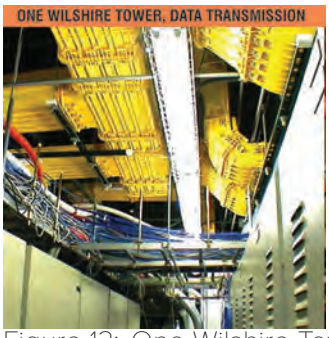

Figure 13: One Wilshire Tower

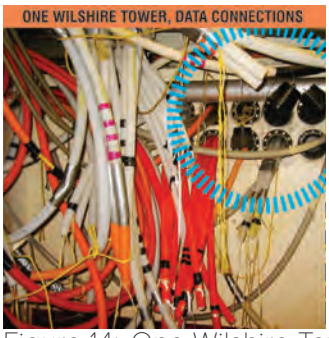

Figure 14: One Wilshire Tower

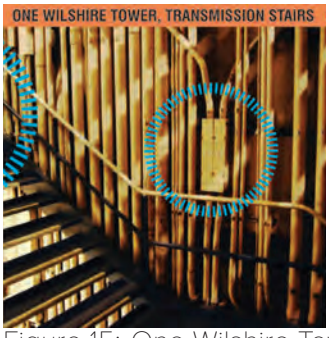

Figure 15: One Wilshire Tower


Figure 16: One Wilshire Tower

In the interior of One Wilshire Tower (Figures 13-16) we see evidence in the physical connection of digital universe. Our lives run through these strands of wire and are transmitted out again. At One Wilshire Tower and other *ATTRACTOR* territories (Figure 17) we no longer have the need for excess space. We need the floor only to support and organize our servers. Stairways to allow the occasional human to travel through and make adjustments that can't be done by the robot caretaker.

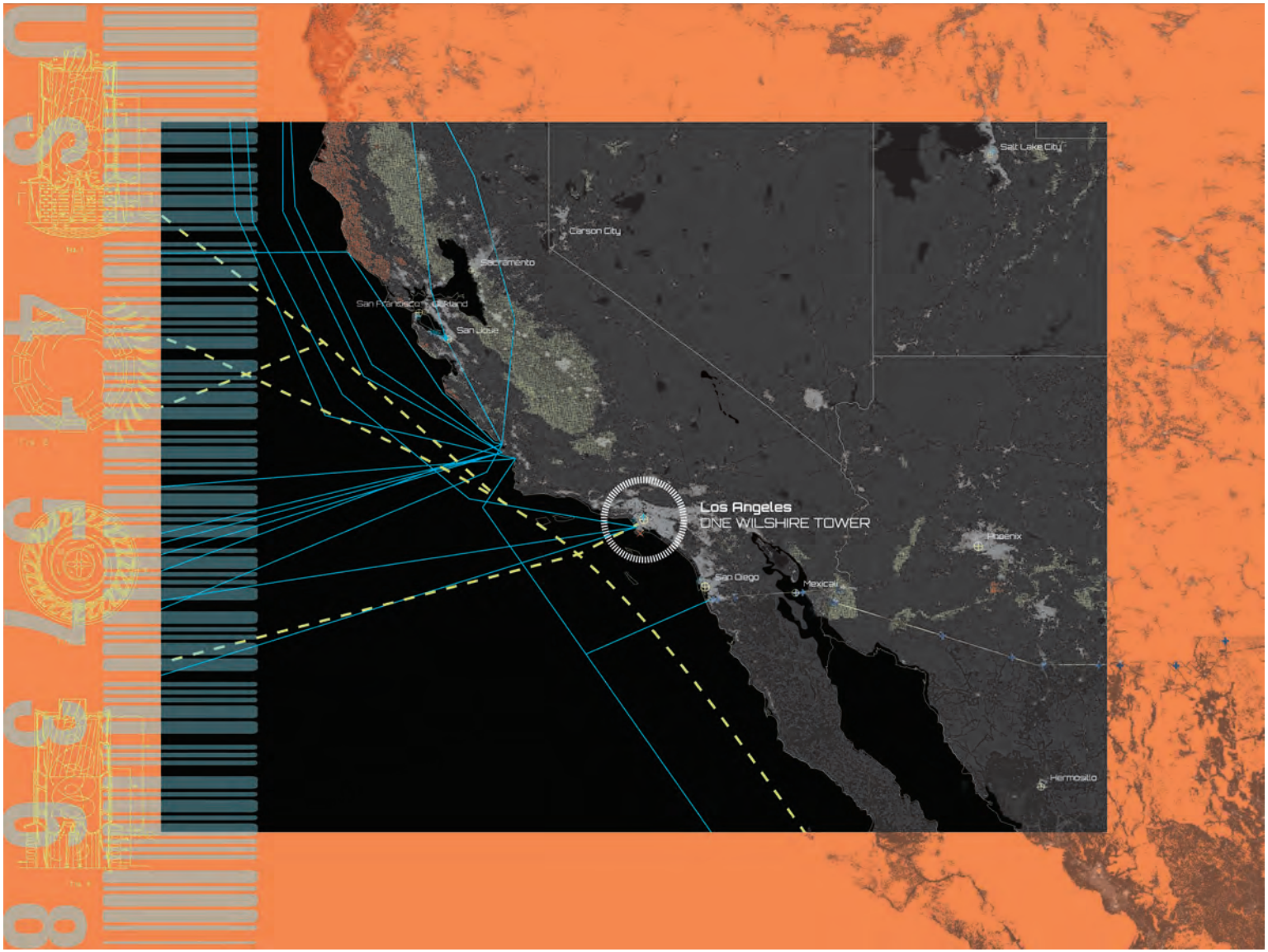


Figure 17: Map of Scenario 001

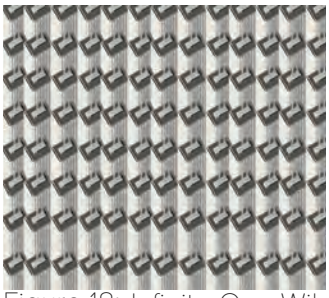

Figure 18: Infinite One Wilshires



Figure 19: ILA Data Centers

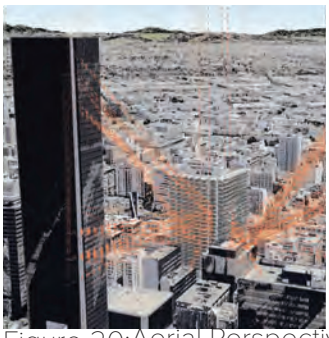

Figure 20:Aerial Perspective One Wilshire Tower




Figure 21: Street Perspective One Wilshire Tower

As the need for more and more data storage and transmission increases so will these *ATTRACTORS*. In fact 8 other sites within three city blocks (Figure 19) of One Wilshire Tower have begun to dedicate ample floor space to the storage of data while the sky and streets are dedicated to it's transmission (Figures 20-21, and 25).

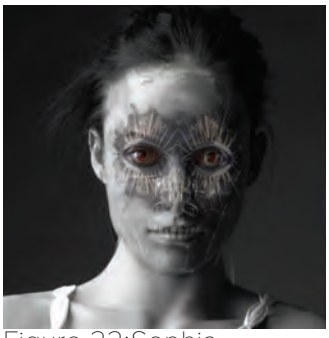

Figure 22:Sophia




Figure 23:Server Error

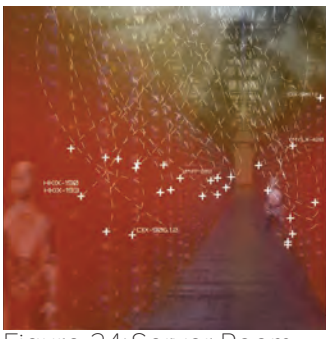

Figure 24:Server Room

As humans begin to give up more and more to machine simple tasks will be dedicated to robots. Sophia is the caretaker of this facility. She walks endlessly through the whispers of data. Her interface is controlled an read by technicians in cool air conditioned offices. Sophia (Figure 22) easily navigates the terminals and traverses the windy, hot conditions (Figures 23-24) that is new One Wilshire Tower. A building with no room for humans but only the digital wavelengths of their

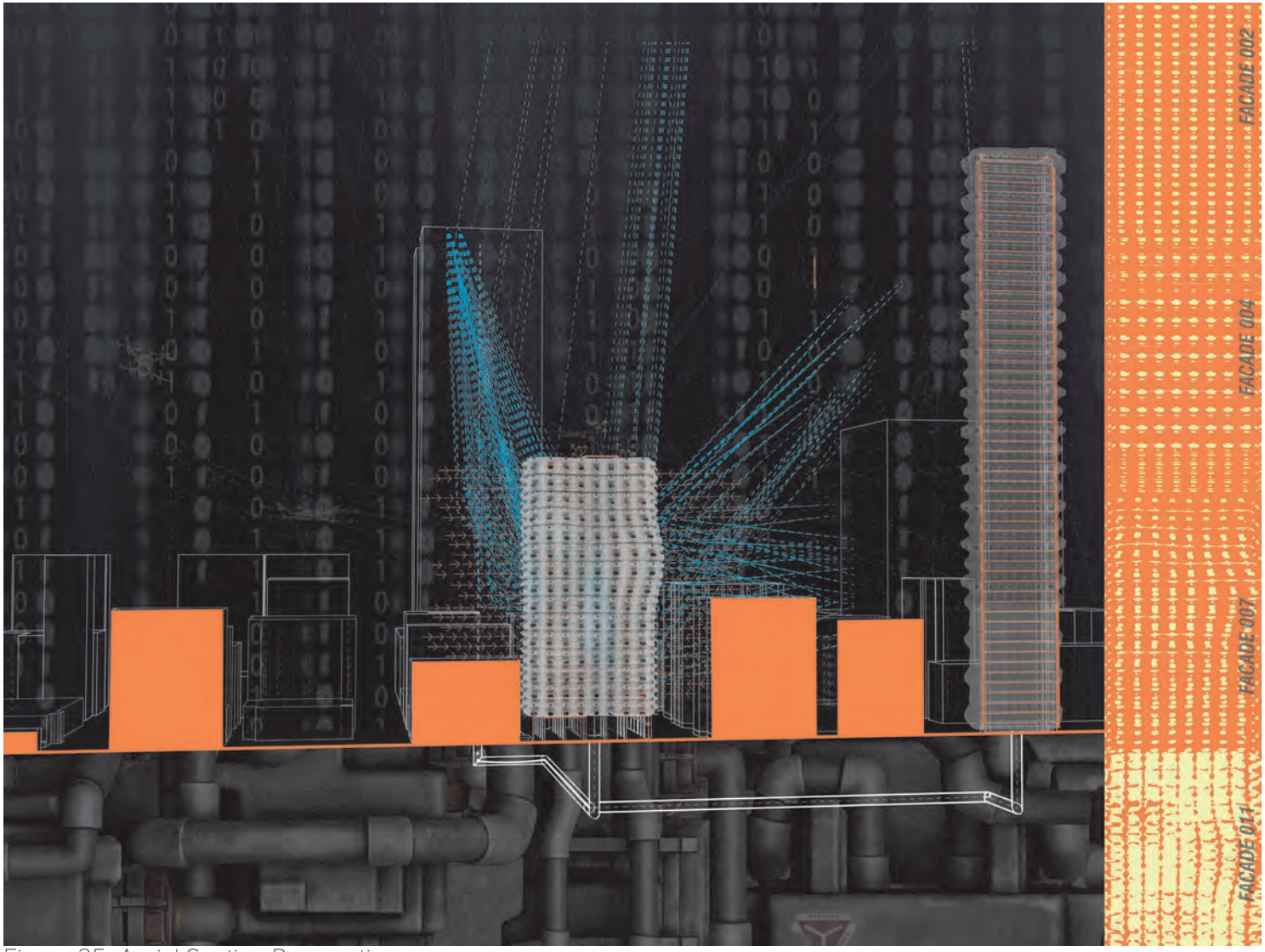


Figure 25: Aerial Section Perspective

# Chapter 4: Distractors

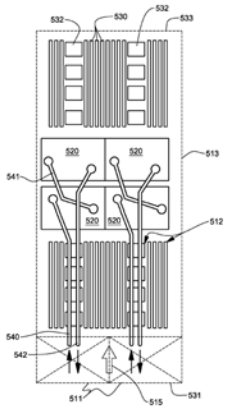

Figure 26:Under Water Data Server Patent

The digital world is tied together through the use of physical infrastructure with both physical connection and radio transmission waves. Satellites are becoming more and more a part of that transmission process. How the world is viewed through the lens of satellite imagery is how much of the world is discovered. These sites are masked from the world through manipulation of these images. These *DISTRACTORS* become hot spots for speculation . What are they hiding? What is kept there?

50% of the world lives within 200 kilometers of water. Why wouldn't data centers be kept here? As global climate change affect the sea levels more and more water is available to us. This opportunity (Figure 26) allows us to preserve our dry land resources which will become more valuable in the future but also allows us to take advantage of all the sea has to offer. As we have seen, the impact of building on land has been significant but how can we learn from this to change the sea in a positive way.



Figure 27: Registration Point



Figure 28: Calibration Point Corona Project



Figure 29: Registration Points



Figure 30: Registration Point

Satellites have become the 21st century lens through which we view the world. These agents connect us globally and allows us to view new previously unseen civilizations and events. However these satellites require a physical infrastructure (Figures 27-30) to calibrate. These often remote structures and landforms are the glue for which we seam our new world view. These sites are strange sites and as they are meant only to be viewed from 36,000km above the Earth's surface. On the surface they are the victims of speculation and myth.



Figure 31: Paracel Islands, Satellite Image



Figure 32: Vliegbasis Vlokel, Satellite Image

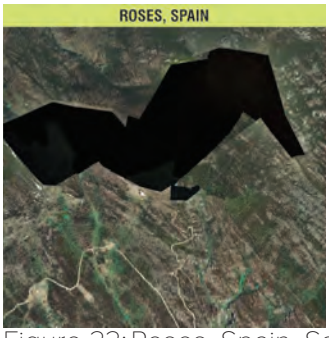

Figure 33: Roses, Spain, Satellite Image



Figure 34: US-Mexico Border Satellite Image

These sites viewed on our LCD screens have been translated and stitched together from thousands of satellite images. Specific sites in the world because of their association with different activities are masked from this digital lens. These sites are the *DISTRACTORS* (Figures 31-34). Their intentions are unknown and as such they are the subjects of wide speculation from false weather events, satellite glitches or nuclear test sites. These sites distract us from their true nature by nature of false of facades and digital manipulation.




Figure 35:Map of Scenario 002

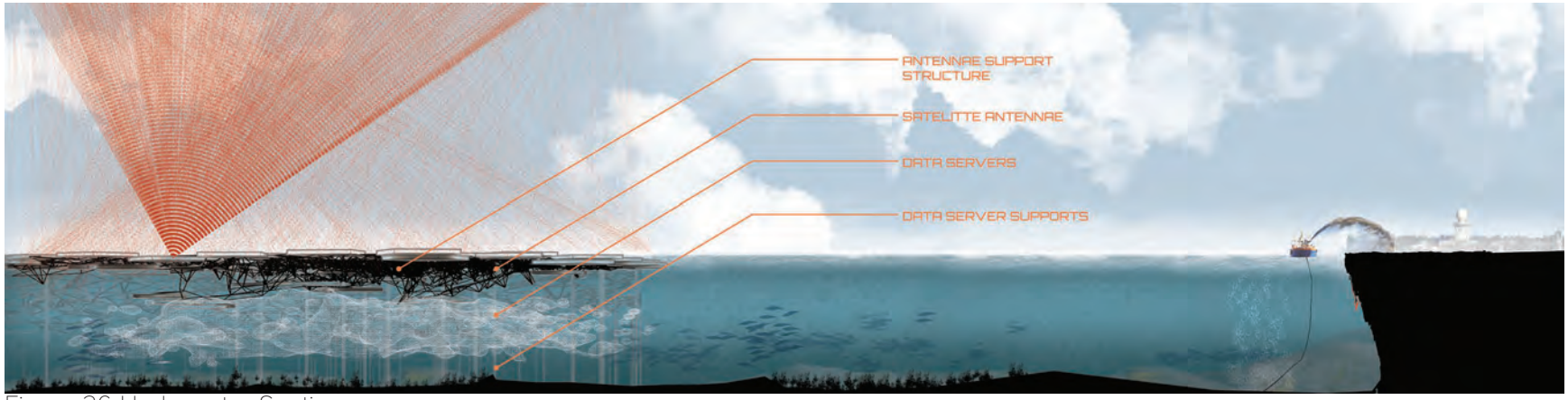


Figure 36: Underwater Section



Figure 37: Inhabitants of Woody Island



Figure 38: Future Islands

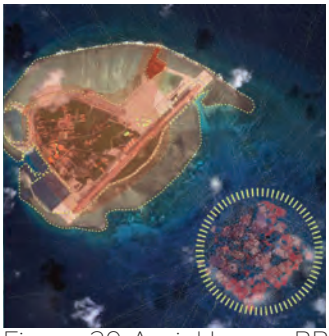
Figure 39: Aerial Image BBN-16-112

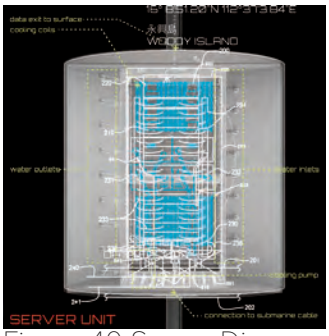

Figure 40: Server Diagram

Woody Island, a small island in the South China Sea (Figure 35) there exists a small military base. The island houses Chinese soldiers (Figure 37) for up to six months at a time. They share the growing island (Figure 38) with small population of fisherman. They serve as guards to the waters, where an informal war has been taking place over fishing rights. This sea is the food source of over 4 countries. China as the largest marshals the waters and depending upon which side you agree with perhaps they are governing unjustly.

Woody Island had become the site for an underwater data storage reef BBN-16-112 (Figure 36 and 39). Where the Chinese government stores the contents of the copies of American web pages. Here countless amounts of American dollars flow into disputed waters.

The reef has also become home to the declining species of sea turtles. As more and more development happens along the coastlines sea turtles become confused by the lights, mistaking them for moon light. Here the lights of the servers (Figure 40) blink and fad with lunar calendar. It provides a safe area from fisherman as the area is guarded from boats.

Here the inhabitants of the data reef (Figure 41) BBN-16-112 become the marine life. They thrive from need for money and cheaply produced goods.

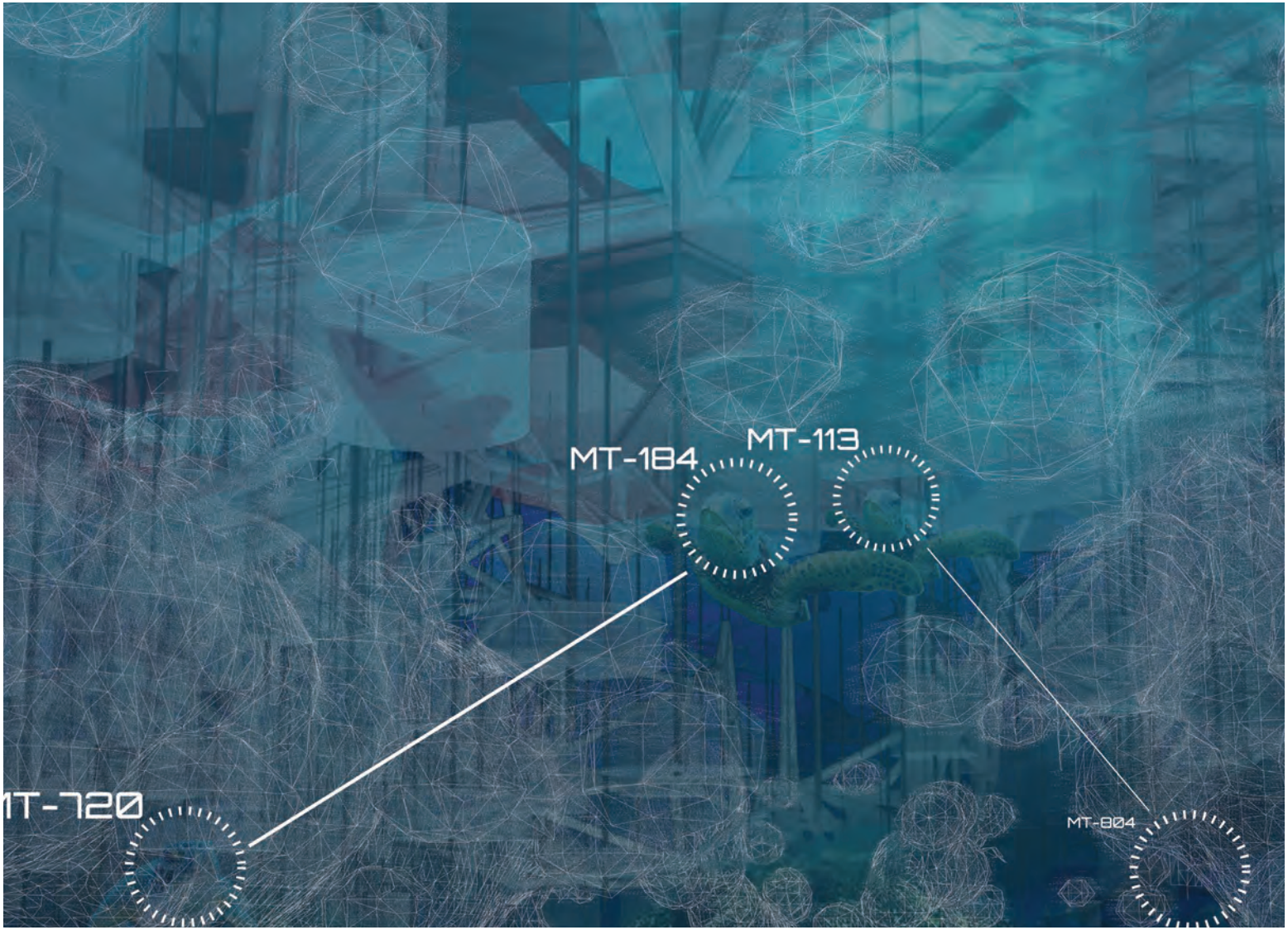


Figure 41: Re-inhabited Waters

# Chapter 5: Facilitator

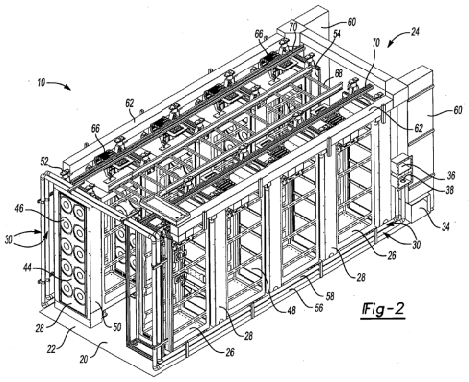


Figure 42:
Shipping Container Data Center

The Data Barge DB-Z-34-120 (Figure 53) brings data to the world. As the lead ship of the fleet it travels between Eastern United States and English Channel. DB-Z-34-120 has been spotted in several large piers but only for a moment. It often hides below the water surface harvesting the water for cooling and energy. This ship travels solo and features a crew of none. It is operated by the Hydra Company. Hydra has exclusive rights to ship and all of the data contained within it. Its main function as a data center means DB-Z-34-120 carries over 40 times it's weight in digital capital, facilitating events such as Fashion Week and UEFA Champions League to millions of millions of viewers worldwide.

The oceans and waterways are the highways for large goods. The load capacity of barge is by far the most superior of all transportation methods. One barge carries roughly the equivalent of 70 large semi-trucks or 16 rail cars. As our goods and capital evolve we will need new ships that can carry and distribute these goods. As currency and energy evolve into the main currency we find ways to move these valuables across the world (Figure 42). This new breed of barges the DB-V model by Hydra CO. moves society's most valuable commodity between major ports. These agents facilitate the movement of capital, information, social media, and entertainment.



Figure 43: Dolomedes Factus

The DB-V is largely mechanical (Figure 44). It is highly engineered to use its surroundings to function. Upon arrival to its destination it submerges itself (Figure 45) by bringing in water. It cools the servers which are sealed in shipping containers. As it submerges it releases energy collection devices. It spreads (Figure 43) itself as an array of collectors. These each array collects energy from both the currents in the ocean and the sun. They also emit light beacons which allow other ships to stay at a safe distance from the submerged ship.

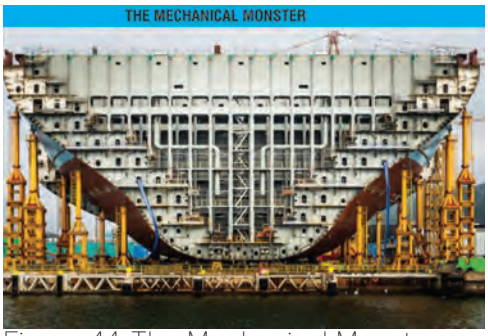

Figure 44: The Mechanical Monster



Figure 45: The Mighty Servant

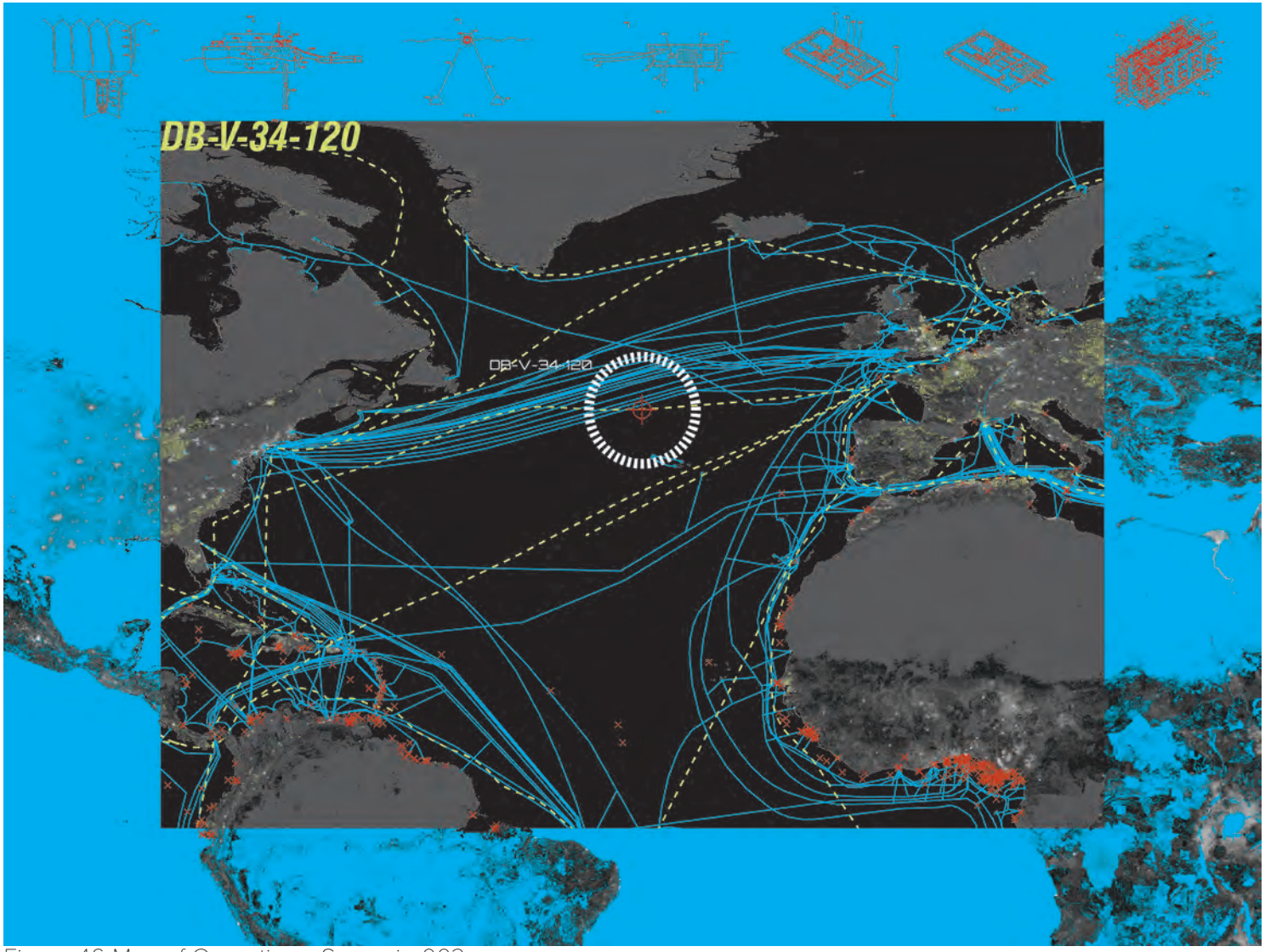


Figure 46: Map of Operations, Scenario 003



Figure 47: DB-V-34-120 enters New York



Figure 48: DB-V-34-120 under Tower Bridge




Figure 49:
Mardi Gras




Figure 50:
Coachella




Figure 51:
Fashion Week New York




Figure 52:
Fashion Week London

This barge the first of its kind travels between London and New York (Figures 46-48). It provides data on demand, and helps to facilitate the now one billion dollar fashion industry. As top fashion executives and celebrities stream the show through the data barge it is transmitted to teenage girls all over the world. It allows a new kind of fashion craze. The fashion world is served with immediate gratification as now billions across the globe shop for the latest trinkets. They see that the same show leads to #Coachella where the two are linked by the *Instagram* accounts of so many(Figures 49-52). This ship DB-V-34-120 provides access when there is none. It allows us live our normal lives or at least what we would like to be our normal life. This barge shows us that worlds data belongs to the world and travels the world. Providing access to all.

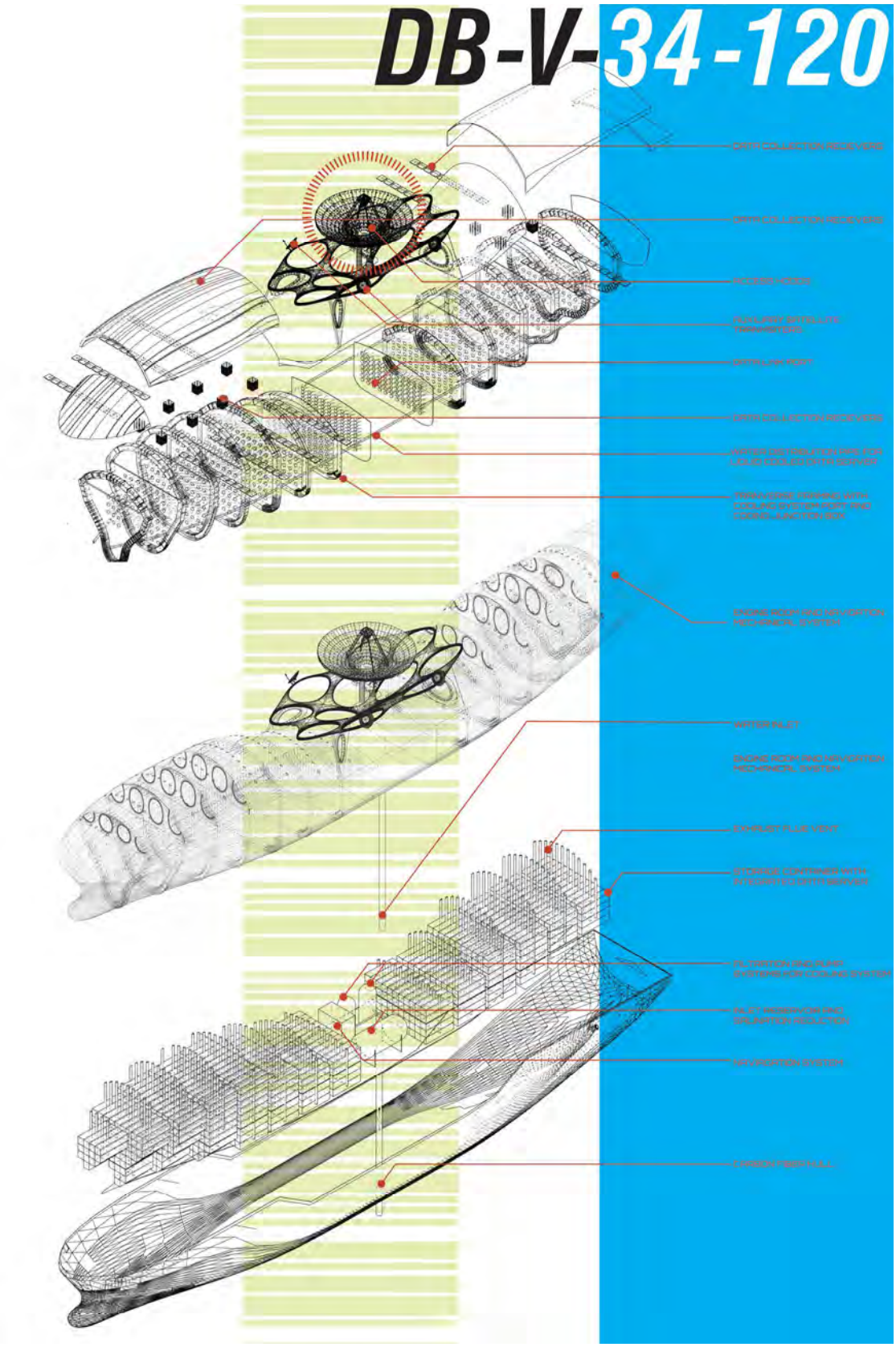


Figure 53: DB-V-34-120 axonometric

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# Vita

Mathew Smith grew up in Little Rock, Arkansas. He received a Bachelor of Art in Art History and Bachelor of Arts in French from the university of Arkansas at Little Rock. While attending school he worked construction, where he tailored his life to learning about architecture. Upon graduating he hopes to gain licensure as a professional architect and open a design build firm.