

2016

# Umass September 11 Intervention

Mohamad Farzinmoghadam

University of Massachusetts, mfarzinmoghadam@larp.umass.edu

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# UMASS SEPTEMBER 11 INTERVENTION

A Thesis Presented

by

MOHAMAD FARZINMOGHADAM

Submitted to the Graduate School of the  
University of Massachusetts Amherst in partial fulfillment  
of the requirements for the degree of

MASTER OF ARCHITECTURE

September 2016

Department of Architecture

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## UMASS SEPTEMBER 11 INTERVENTION

A Thesis Presented

by

MOHAMAD FARZINMOGHADAM

Approved as to style and content by:

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Kathleen Lugosch, Chair

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Carey Clouse, Member

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Professor Stephen Schreiber  
Chair, Department of Architecture

*This project is dedicated to those blameless victims of the September 11 tragedy and Christoffer Carstanjen, UMass computer research specialist, who lost his life in that violent aggression.*

## ACKNOWLEDGMENTS

*I would like to express my deepest appreciation and gratitude to my advisors, Kathleen Lugosch and Carey Clouse, for their excellent guidance, encouragement, and inspiration from the beginning to installation. The completion of this project would not be possible without support from my family, friends, and colleague.*

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## ABSTRACT

### UMASS SEPTEMBER 11 INTERVENTION

SEPTEMBER 2016

MOHAMAD FARZINMOGHADAM

B.S., SHAHID BEHESHTI UNIVERSITY

M.ARCH, TARBIAT MODARES UNIVERSITY

M.ARCH, UNIVERSITY OF MASSACHUSETTS AMHERST

Directed by: Professor Kathleen Lugosch

September 11 terrorist attacks not only affect the United States but also the entire international community. Hundreds perished; most of them innocent citizens from over ninety different nations. It has changed the history of America, much like Japan's strike against Pearl Harbor. The 9/11 attacks triggered the United States' ongoing war against terrorism, starting with Afghanistan as the first target to overthrow Taliban, changing the course of world history.

The significance of the incident and severity of that traumatic loss makes a case for a memorial on the UMass campus in tribute to those victims. It is worth mentioning that a UMass community member (computer research specialist) lost his life in that event. The intention of this design is to pay a well-deserved tribute to the victims of the September 11 tragedy, together with providing information about the whole story. The statistics of the event have a visceral interpretation. All different aspects and numbers are incorporated into the design: number of the flights, number of the people killed, nationality of the victims, each have their specific place in the design pattern.

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## CHAPTER 1

### SEPTEMBER 11 HISTORY AND BACKGROUND

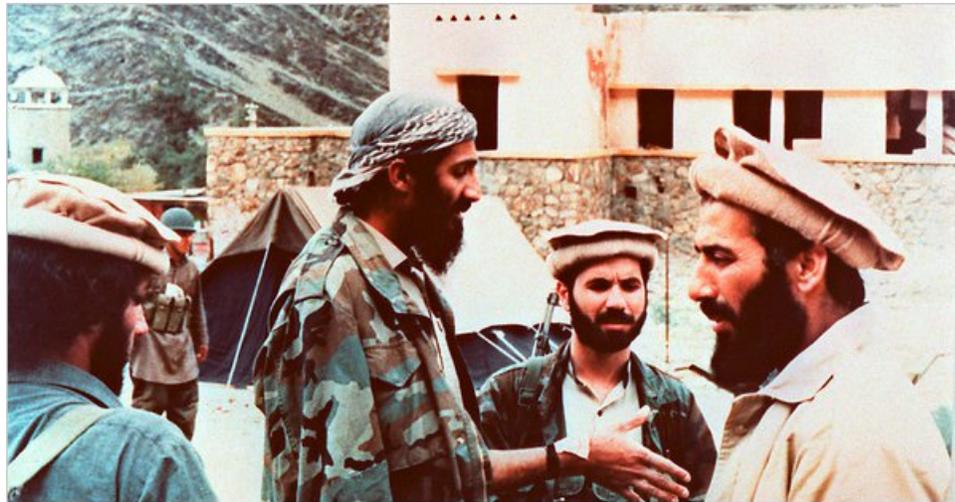
#### 1.1 Brief Historical Background

Since the beginning of 21st century, the Middle East has experienced religious and political transformation as a result of deep frustration with direct and indirect imperialistic behavior of the Western government in their political systems. The former colonial empires took over many Arabian lands. This trend accelerated after the creation of Israel, the fight for Palestine, and the Six-Day War. The oil boom transforms many Arab nations to the world's wealthiest nations. Economic and cultural changes fueled the rise Wahhabism among Saudi-Arabians; a rigid form of Islam seen as a strange and dangerous version in the eyes of other Middle Eastern nations.



**Figure 1.1:** Israeli forces in Gaza during Six Day War (Israeli troops roll into Gaza after invading Egypt during the 6 Day War , 2016)

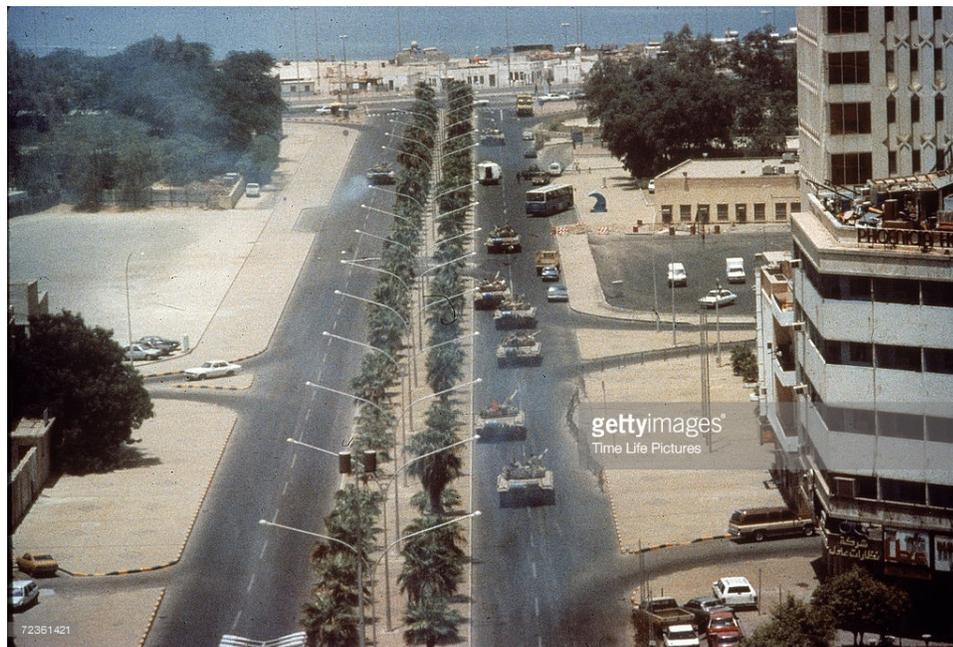
Since then, many of these Wahhabists actively participated against imperialistic powers in different regions. For example, angry radicals assassinated Egyptian leader Anwar Al Sadat, who was blamed for 1979 Egypt-Israel Peace Treaty. Many of the people who have been arrested, such as Atiyah Abd al-Rahman and Ayman al-Zawahiri, were indicted with a few charges and released within three years. Rahman and Zawahiri settled in Afghanistan and Pakistan respectively to rebuild al-Jihad there. Osama bin Laden, who inherited \$80 million from his father's fortune, later joined the Jihadi group and decided to finance the fight against the Soviet invasion of Afghanistan and pro-Communist central government. Zawahiri and bin Laden worked together in recruiting and training Arabs volunteers in Peshawar Pakistan. After the Soviet Union announced to take their army out of Afghanistan in 1988, they formed a new group with other top Jihadi leaders called al-Qaeda (the word means "The Camp") (Hillstrom, 2012).



**Figure 1.2:** Bin Laden fought closely with Mujahidin and early formation of al-Qaeda in Afghanistan (Untitled illustration of a bin-Ladan shaking hand with Mujahidin, 2016)

## 1.2 Global Threat of al-Qaeda

In 1990, Saddam Hussein—who had been in power of Iraq since 1979—invaded neighboring country Kuwait. The United States organized multi-nation coalition forces, operating Desert Storm to liberate Kuwait, which was successfully completed. During the Gulf War, Hussein asked Arabs to carry out jihad against the Americans. The presence of American forces in Saudi Arabia was justified under the pretext of possible future Hussein aggressive acts. This presence and influence of Western countries over Arab regimes provoked radical Islamists, especially al-Qaeda, to recognize the United States as an evil force (Smith, 2010).



**Figure 1.3:** Kuwait invasion by Saddam Hussein and the Desert Storm Operation for liberating Kuwait (LIFE Images Collection/Getty Images, 1990)

In 1993, six Americans lost their lives and more than a thousand were injured by a truck full of explosives in the parking lot of the World Trade Center's North Tower. Although the direct link between al-Qaeda and the 1993 bombing plot was never determined, Ramzi Yousef, the mastermind captured in 1995, attended the Al-Qaeda

camp in the late 1980s. Between 1990 to 1995, the attacks from al-Jihad that absorbed into al-Qaeda later, intensified against many Arabian governments. Bin Laden in his public letter called Fahad King a corrupt and an oppressive ruler who let Saudi Arabia become an American colony. This letter made bin Laden a hero among many Arab youths who were frustrated by economic depression and rigid political systems (Coll, 2004).



**Figure 1.4:** A survivor of the 1993 attack of the World Trade Center (Lederhandler, 1993)

After expelling from Saudi Arabia and Sudan, bin Laden moved back to Afghanistan, which was governed by fundamentalist Taliban. In 1996, he declared a fatwa against the Americans. The Taliban gave al-Qaeda and bin Laden freedom to provide logistic and financial support to radicals in the Western countries. Between 10-20,000 jihadists from disillusioned youth trained in the al-Qaeda camp, Tora Bora near the Pakistan border.

In 1998, al-Qaeda launched the first attacks relying solely on al-Qaeda terrorists on two American embassies in Nairobi and Dar e Salaam, which was followed by infinite operations by Clinton's administration. The operation failed to kill any significant figures from al-Qaeda. Later that year, al-Qaeda launched a terrorist attack on the USS Cole, but there was no response by America because of the power transition in the United States (Combs & Slann, 2008).



**Figure 1.5:** Al-Qaeda attack on the USS Cole in 2000 (USN, 2000)

Bin Laden gave permission for an airplane hijacking proposed by Khaled Sheikh Mohammed in early 1990. The plan was to hijack several airplanes and hit strategic targets on the eastern US coast including the White House, US Capital, the Department of Defense's headquarters (Pentagon), and the Twin Towers. Al-Qaeda warriors enrolled in US flight schools and learned about the piloting fundamentals. The Plotters, Marwan al-Shehhi, Mohamed Atta, Ziad Jarra, and Ramzi Binalshibh were members of Hamburg al-

Qaeda, entered the US by mid-2000, and took flight training in Florida. The US visa of Ramzi Binalshibh was rejected because of his Yemeni citizenship and was replaced by Hani Hanjour. Nineteen strongmen supported the plotters in taking the control of the airplanes. By July 2001, the hijackers mixed into the community and the pilots took first class flights to familiarize with the planes' layout (Coll, 2004).

### 1.3 September 11 Attacks Timelines

#### 1.3.1 American Airlines Flight 11

September 11 flight tickets were purchased on August 26. They selected the cross-country flights because of fuel loads. American Airlines Flight 11 departed Logan Airport at 7:59 AM with ninety-two passengers on board. At 8:14 AM, the pilot failed to correspond to the air traffic controller and AA Flight 11 deviated from the original path (Carlisle, 2007).



**Figure 1.6:** Mohamed Atta (The Flight AA-11 pilot) in the Portland International jetport on September 11 (Security camera, 2001)

At 8:19 AM, one of the flight attendants on board, Betty Ong, reported about flights hijacked to the American Airlines Reservation Control Center.

*"[I'm] Number 3 in the back. The cockpit's not answering. Somebody's stabbed in business class and - I think there's mace - that we can't breathe. I don't know, I think we're getting hijacked."* (A Voice From The Sky, 2004)

At 8:26 AM, the flight transponder was turned off and stopped sending any signals. Mohamed Atta, the AA-11 pilot, accidentally broadcast a message to the Boston air controller:

*"We have some planes. Just stay quiet and you'll be okay. We are returning to the airport. Nobody move. Everything will be okay. If you try to make any moves, you'll endanger yourself and the airplane. Just stay quiet."* (Voices From the Cockpit , 2004)



**Figure 1.7:** The American Airlines Flight 11 smashed into the North side of the World Trade Center of North Tower (Naudet, 2001)

Flight AA-11 changed direction south at 8:28 AM and four minutes later Amy Sweeney, another flight attendant, contacted the American Airlines Flight Services. Sweeney reported at 8:44 AM that:

*"Something is wrong. We are in a rapid descent... we are all over the place. We are flying low. We are flying very, very low. We are flying way too low ... Oh my God we are way too low."* (Extract: 'We have some planes', 2004)

8:46:40 AM American Airlines Flight 11 hit the north side of World Trade Center North Tower at the level of about the 96th floor.

### **1.3.2 United Airlines Flight 175**

At 8:14 AM, United Airlines Flight 175 (UA-175) departed from Logan Airport for Los Angeles with sixty-one passengers and ten crewmembers at approximately the time that Flight AA-11 was hijacked. The terrorist pilot, on this flight, was Marwan al-Sheihhi. The last communication with the flight UA-175 was at 8:42 AM by reporting a "suspicious transmission" from flight AA-11. Five al-Qaeda terrorists took control of the airplane by killing the pilots and at least one of the flight attendances between 8:42 to 8:46 AM. One minute later, the hijackers changed the transponder signal and did not respond to air control requests. At 8:58 AM, UA-175 flight changed its direction toward New York City. At 9:00 AM, Peter Hanson who traveled with his wife and two years old daughter made a phone call to his dad (Coll, 2004).

*"It's getting bad, Dad -- A stewardess was stabbed -- They seem to have knives and Mace -- They said they have a bomb -- It's getting very bad on the plane -- Passengers are throwing up and getting sick -- The plane is making jerky movements -- I don't think the pilot is flying the plane -- I think we are going down -- I think they intend*

*to go to Chicago or someplace and fly into a building -- Don't worry, Dad -- If it happens, it'll be very fast -- My God, my God."* (Sherwell, 2011)

At 9:03 AM, United Airlines Flight 175 smashed into the southern corner of the World Trade Center South Tower.



**Figure 1.8:** The United Airlines Flight 175 hit into the southern corners of the World Trade Center of South Tower (Fitch, 2001)

### **1.3.3 American Airlines Flight 77**

At 8:20 AM, American Airlines Flight 77 (AA-77) departed Dulles International Airport outside Washington D.C. and headed to Los Angeles. This flight had six crewmembers, fifty-eight passengers on board and was hijacked by five terrorists. Between 8:51 AM to 8:54 AM, terrorists took control of the airplane and Hani Hanjour,

the terrorist pilot, deviated the airplane from the assigned path. A few seconds later, the Flight AA-77 transponder was turned off. The American Airlines and United Airlines ordered that all flights be grounded. Several Passengers on board managed to contact their families. At 9:20 AM, the airplane headed directly to Washington D.C. when air controllers cautioned the US Secret Service about the possible intention of the hijackers for hitting the White House. At 9:37:46 AM, American Airlines Flight 77 (AA-77) smashed into the southwest part of the Pentagon building (Hillstrom, 2012).



**Figure 1.9:** The southwestern part of the Pentagon Building targeted by the American Airlines Flight 77 (Rudisill, 2001)

#### 1.3.4 United Airlines Flight 93

The last airplane hijacked on the day of September 11 was United Airlines Flight 93. Flight UA-93 departed from Newark, New Jersey at 8:42 AM. Seven Crewmembers and thirty-seven passengers were on board traveling to San Francisco. Ziad Jarrah, the terrorist pilot, with three other terrorists hijacked the airplane after a short struggle in the

cockpit at 9:32 AM. Hijackers forced passengers and crewmembers to the rear part of the airplane where they contacted their families and friends. By that time, they found out about two other flights that hit the Twin Towers and the possibility of the same attempt on this airplane as well. So they planned to take action for getting the airplane back or taking it down. Flight UA-93 passengers started their attack at 9:57 AM. Terrorists tried to hold back passengers from the cockpit and at 10:02 AM, hijackers took the airplane down into Shanksville, Pennsylvania when they were almost defeated (Carlisle, 2007).



**Figure 1.10:** The United Airlines Flight 93 crash site in Shanksville Pennsylvania (U.S. Government, 2001)

### 1.3.5 The Twin Towers collapse

At 9:58:59 AM, fifty-six minutes after being hit by United Airlines Flight 175, the World Trade Center South Tower collapsed and killed all civilians and emergency personnel inside-and-surrounding the building in ten seconds. Ashes of the collapse covered block-after-block in downtown as people fled from the district in panic. At

10:28:25 AM, thirty minutes later, the World Trade Center North Tower collapsed and caused the second wave of ashes, dust, and horrific roar throughout downtown. The fall of the Twin Tower destroyed or damaged surrounding buildings. Around 2,996 innocent people (an estimate) lost their lives and more than 2,700 people injured in the September 11 terrorist attacks (Carlisle, 2007).



**Figure 1.11:** The Collapse of the World Trade Center North Tower (Untitled illustration of Collapse of the South Tower)

#### 1.4 The Ripples of September 11 Attacks

The World after September 11 was different and new to the one that we used to know. The United States declared war against al-Qaeda. In the US, the Bush administration took new measurements to prevent any similar terrorist attacks on US soil. Although, these new measures were supported and were seen as necessary by many Americans, while others criticized them as they were in contradiction with American values. The Taliban refused to hand over Osama bin Laden to the US. In a month, US troops started a massive bombardment campaign on the Taliban and al-Qaeda bases in Afghanistan. These attacks were followed by the arrival of US ground forces in Afghanistan later that month. The Taliban military and government were defeated very quickly, but leader Mullah Omar Mohammad and bin-Laden escaped from the US troops to (probably) a mountain in the north of Pakistan. Afghanistan War was tragic when we look at the consequences of the war. By the end of May 2013, around 2,191 American soldiers and 1,080 coalition forces lost their lives in the Afghanistan War. The number on the Afghan side is more horrifying with more than 14,000 casualties (Hillstrom, 2012).



**Figure 1.12:** The US soldiers in the village of Bagram 2011 (U.S. Army, 2011)

Since George Bush, Dick Cheney, Paul Wolfowitz (Deputy Secretary of Defense), and Donald Rumsfeld believed that Saddam Hussein was involved in the September 11 terrorist attacks, the next target on the "War Against Terror" was set to topple down Saddam Hussein from power. The war was justified by a case presented to United Nations Security Council in February 2003 by Colin Powell, the Secretary of State. The United States claimed that Saddam Hussein had the "Weapons of Mass Destruction", which might be used against US targets. The Bush administration believed that replacement of the dictatorship government in Iraq with a democratic regime might create a democratic movement in other parts of the Middle East as well. This change eventually eliminated the radical extremist ideologies from the Middle East. Despite all arguments and critics, full military invasion of Iraq started on March 20, 2003 (Keegan, 2004).



**Figure 1.13:** George W. Bush started the Iraq War for toppling down the Saddam Hussein on March 20, 2003 (Haidar, 2003)

With powerful air strikes, the US took control of Baghdad, the Iraq capital, on April 9, 2003 and Saddam Hussein managed to escape. He finally was captured in December 2006 in the city of Tikrit. After the Iraq occupation and conducting a comprehensive investigation, it revealed that the Saddam Hussein government did not have any weapons of mass destruction. The absence of mass destruction weapons affected the credibility of the United States and the Iraq War internationally. The US experienced the economic cost of war, growing number of casualties and wounded soldiers, and a high rate of terrorist attacks. By May 2013, around 4,804 of US troops lost their lives in the war. The war created a horrifying situation for Iraqi citizens with a high rate of poverty, hunger and displacement. By May 2013, around 122,036 lost their lives in terrorist attacks or US daily military operations. The security condition improved after the US increased the number of troops in Iraq (Brennan et al., 2013).



**Figure 1.14:** The US military casualties transported to the Dover Air Force Base (U.S. Air Force, 2006)

## CHAPTER 2

### PRECEDENTS: TEMPORARY INSTALLATION AND SEPTEMBER 11

#### MEMORIALS

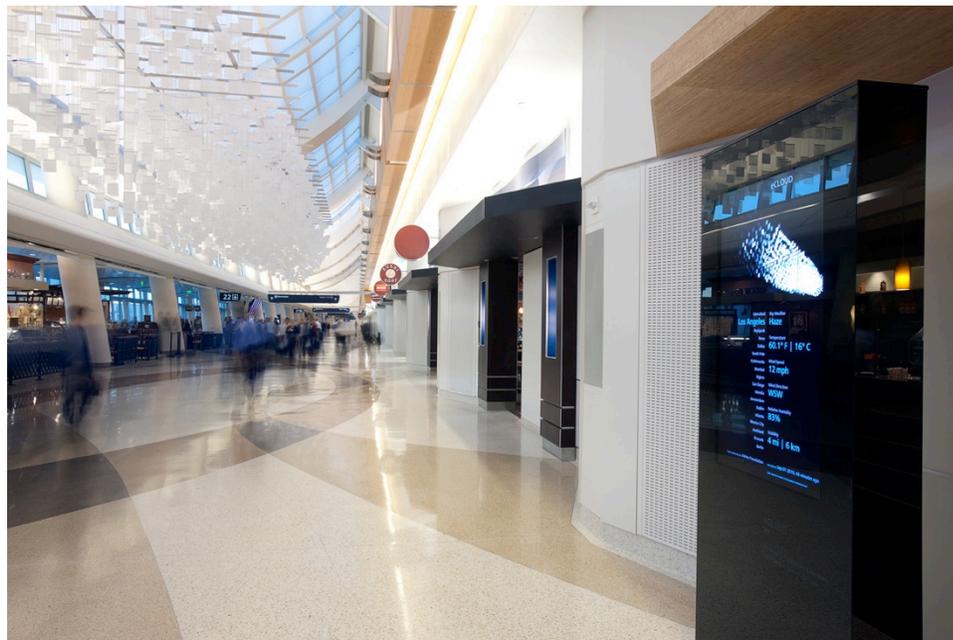
##### 2.1 Architectural Temporary Structures

For the last few decades, many practices have emerged focusing primarily on the temporary installations. Public art, urban renewal, landscape or even urban streets are some areas where the architecture blended into art and formed a new model of practice. Temporary installations can be seen as experiments in design and building that create opportunities for young architects to explore innovative approaches to the design process. For a long time, the temporary installations like Bernard Tschumi follies worked as progressive pedagogical tools for ridiculing the status quo and redefining the future of the architecture discipline. For architects, a temporary installation is a gateway for a free exploration of innovative architectural ideas without any restrictions imposed by clients. Temporary installations, in many cases, are similar to competitions and paper projects, which allow architects to experience new forms, methods, and process. The low construction cost gives architects courage and precious freedom for different experiments (Bonnemaison and Eisenbach 2009). The design and built projects are considered as sound and powerful teaching and research tools, and have become more common in architecture programs like the MIT Media Lab, Bartlett Faculty of the Built Environment in London, and Yestermorrow Design/Build School. Three projects presented in the following sections conceptually inspired me in designing the UMass 9/11 Intervention. Although the first two projects, AirFIELD sculpture by Ueberall and eCLOUD by

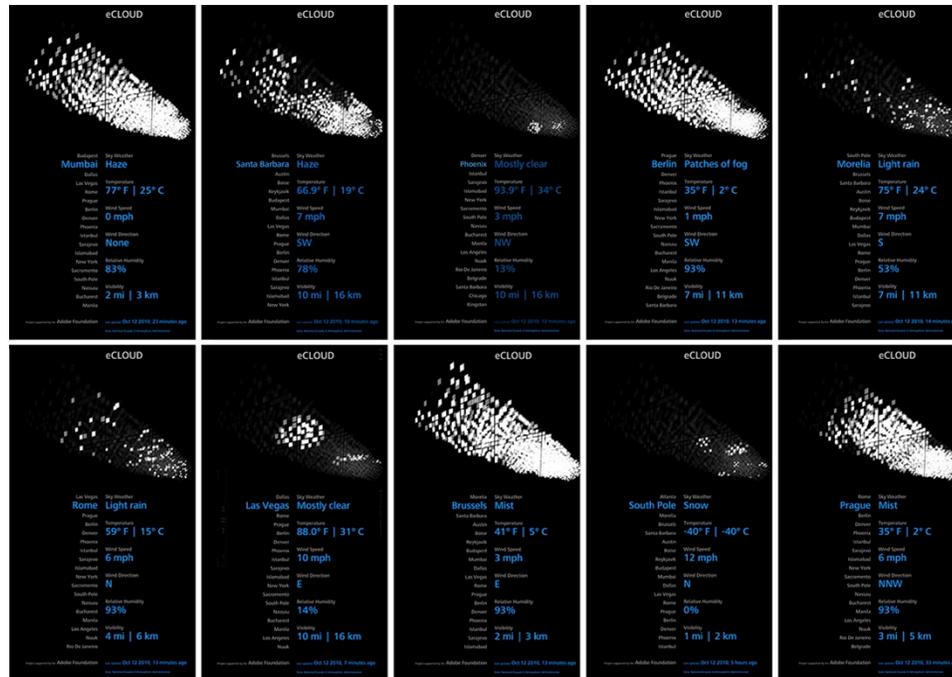
Ueberall are permanent installations, the design and tectonic qualified them to be considered as a precedent for my project.

### 2.2.1 Case study 1: eCLOUD by Ueberall

eCloud is a dynamic sculpture installed in Norman Y. Mineta International Airport. The formation, materiality, and behavior of clouds were the main sources of the inspiration for this project. This sculpture consists of thousands of small square panels, which can be switched electronically and performed as pixels. An animation created by changing states of these smart glasses is based on real-time weather data. The National Oceanic and Atmospheric Administration provided the real-time weather data from 100 flight destinations. These panels are arranged and suspended from the concourse ceiling. The volume looks like a pixelated cloud hung from the tensile structure (eCLOUD | Norman Y. Mineta International Airport, San Jose, California, 2010).



**Figure 2.1:** eCLOUD by Ueberall in Norman Y. Mineta International Airport, San Jose, California (Lowell, 2010)



**Figure 2.2:** The computer algorithm converts real-time weather data compatible to show on eCLOUD smart pixels (Lowell, 2010)

### 2.2.2 Case study 2: AirFIELD sculpture by Ueberall

The AirFIELD is another dynamic sculpture designed and installed by Ueberall group in Hartsfield-Jackson International Airport of Atlanta, Georgia. This sculpture is composed of thousands of custom-made Liquid Crystal discs synced to real-time flight data. The state of these discs changes with an electric charge from opaque to transparent states. The algorithm analyzes real-time air traffic data and generates motion behavior throughout the sculpture. (AirFIELD | Hartsfield-Jackson International Airport, Atlanta, Georgia, 2012).



**Figure 2.3:** Trajectory of landing and taking off of airplanes were used in generating the whole composition of the AirFIELD sculpture (Goods, 2012)



**Figure 2.4:** The AirFIELD installation in Hartsfield-Jackson International Airport, Atlanta, Georgia (Goods, 2012)

### 2.2.3 Case study 3: Soap Opera by Raumlabor

Soap Opera, an installation for the opening ceremony of “Ruhr 2010 European Capital of Culture” was designed and built by Raumlaborberlin, a German interdisciplinary design team working on the strategies for urban renewal. Soap Opera exaggerates the process of transformation from colliery into a cultural location. Luminous bubbles made of transparent and oversized latex balloons float around the shaft tower and surrounding buildings. The visitors immerse into the soap, experiencing noise and the

sound of the past. *"For a few hours, the precision and hardness of the architecture and its materials are confronted with the soft, incomprehensible form of the ephemeral foam."*

(Raumlaborberlin, 2010)



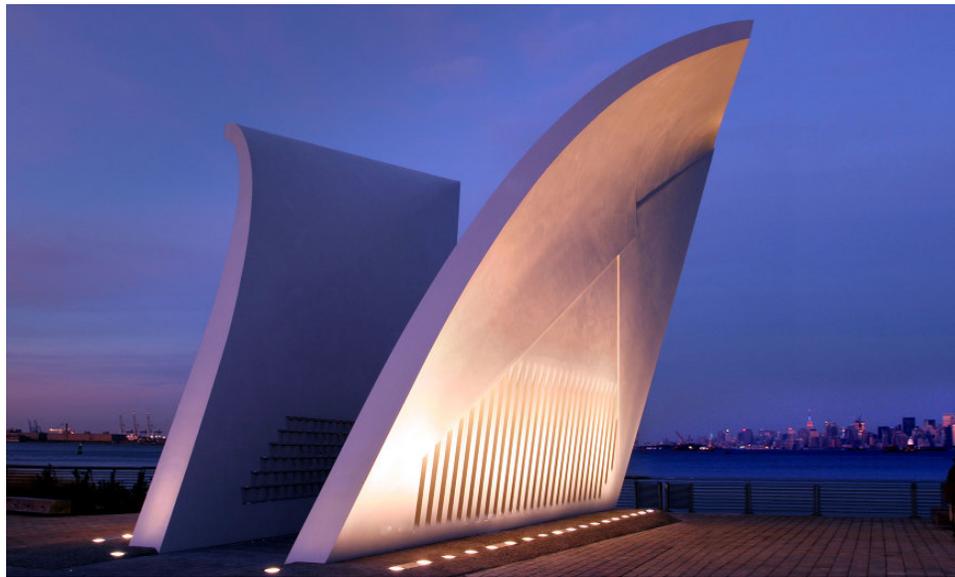
**Figure 2.5:** Soap Opera installation outside the colliery by Raumlabor (Untitled illustration of bird view of Soap Opera installation)

### 2.3 September 11 Memorial and Museum

Soon after the September 11 terrorist attacks, temporary memorials were installed in New York City and many other locations around the globe. Every year on September 11, family members and elected officials gather at the National September 11 Memorial and read the name of the victims (including the name of 1993 World Trade Center bombing attack). Among all these memorials, three significant permanent memorials - Postcard Memorial designed by Masayuki Sono in New Jersey, Pentagon Memorial designed by Julie Beckman and Keith Kaseman in Virginia, and the National September 11 Memorial designed by Michael Arad and Peter Walker in New York City - are presented in the following sections.

### 2.3.1 Case study 4: Postcard Memorial by Masayuki Sono

This memorial concept is in creating a place for reconnecting the community with the September 11 victims. The structure consists of two large postcards, materializing the ritual connection with loved ones. The postcards are built upon waterfront framing of the view to the location of the Twin Towers across the harbor. Each victim from Staten Island has a profile silhouette name on a 9" x 11" granite plaque. Two hundred forty-seven profile silhouettes represent Staten Island residents who lost their lives on September 11. The lighting system illuminates profiles and creates movement and depth in the structure (September 11 memorial - Clouds Architecture Office, 2004).



**Figure 2.6:** The September 11 memorial on St. George Esplanade, Staten Island (Moriguchi, 2004)



**Figure 2.7:** Postcard Memorial by Masayuki Sono (Moriguchi, 2004)

### **2.3.2 Case study 5: Pentagon Memorial by Julie Beckman and Keith Kaseman**

The Pentagon Memorial has a simple and elegant design approach; it creates a timeline of the victims' age. The one hundred eighty-four design elements represent souls lost in the September 11 terrorist attack on the Pentagon building spanning from three-year-old Dana Falkenberg to the oldest, John D. Yamnicky, 71, a Navy veteran. The design element scattered from the entrance, which represents Zero line to September 11, 2001, 9:37 AM, Each Memorial Unit made of stainless steel and covered with granite surges from the ground, lit from a pool beneath it. Eighty-five crape myrtles are scattered around the memorial to provide shade as they grow. The Memorial designed and developed by Julie Beckman and Keith Kaseman (Design Elements, 2008).



**Figure 2.8:** September 11 Pentagon Memorial (Untitled illustration of 9/11 Pentagon Memorial)



**Figure 2.9:** The one hundred eighty-four design elements represent souls lost in the September 11 terrorist attack in the Pentagon building (Untitled illustration of 9/11 Pentagon Memorial).

### 2.3.4 Case study 5: Reflecting Absence by Michael Arad and Peter Walker

The September 11 Memorial occupies half of the 16-acre site. The Reflecting Absence Memorial consists of two square voids positioned in place of the former World Trade Center (WTC) Towers. Michael Arad, AIA, the designer of the memorial, converted the footprint of WTC buildings into compelling symbolic form; two dual-leveled sculptural voids, a reflection of the memory of unforgettable victims and buildings. In the center of each reflecting pool, there is another void, which allows water to flow constantly and to cascade inside. The noise of 30-foot waterfall on the walls creates a thunderous roar reminiscent of the endless tears and mourning after that tragic incident. The name of the nearly 3,000 victims of February 26, 1993, WTC bombing and September 11, 2001 attacks carved on the bronze parapets around the pools. The public can walk around in the memorial landscape surrounded by oak trees (Gendall, 2011).



**Figure 2.10:** "Reflecting Absence", the World Trade Center Memorial (Squared Design Lab, 2004)



**Figure 2.11:** Reflecting Absence memorial Newyork City (Image credit by the Author)

## CHAPTER 3

### DESIGN OF UMASS 9/11 INTERVENTION

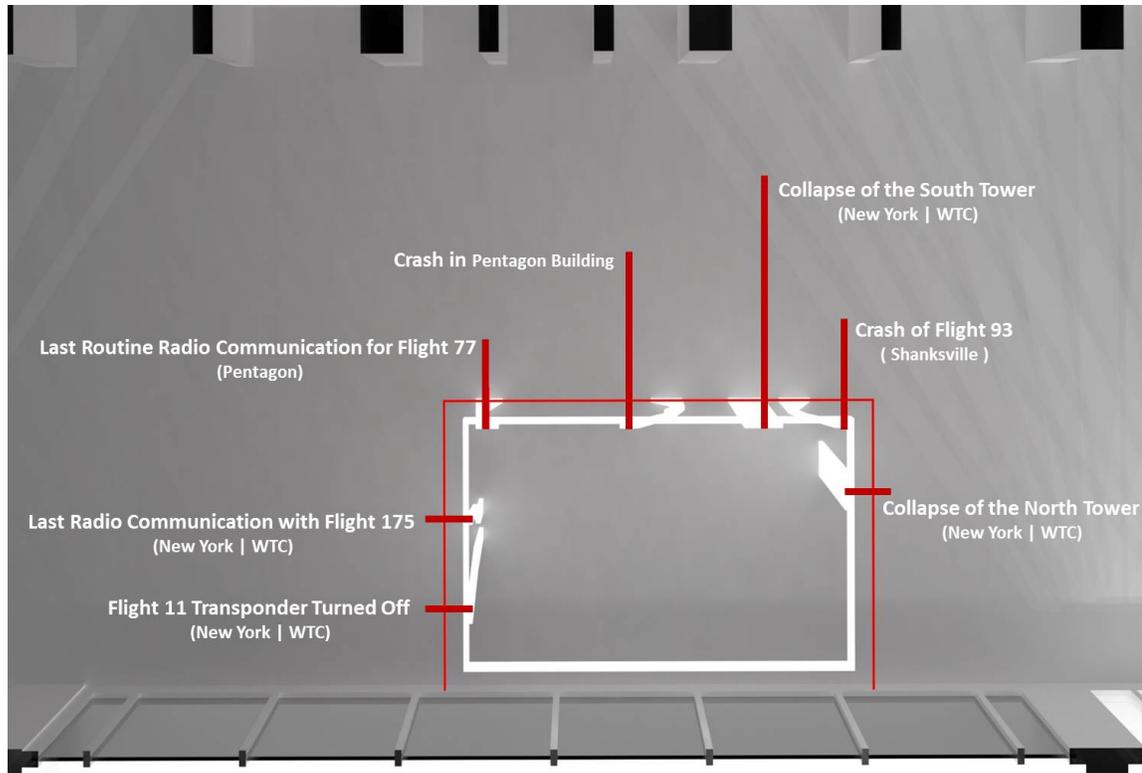
#### 3.1 Concept Design

The subject of the project creates a lot of tightness, tensions, and emotions in its essence; creating a simple and serene environment for this Intervention was my primary goal. A simple rectangular shape was selected as an overall form of the structure. The dimensions of the main structure are nine feet by fourteen feet; numbers obtained from the date of attacks (9/11/2001). The width represents the day, and the length is the sum of the month and the year (11+2+0+0+1). In defining the general dimensions, my main attempt was to find the ratio for the structure that is as close as possible to the golden rectangle ratio (Figure 3.1).



**Figure 3.1:** Main structure of the Intervention (Image credit by the Author)

Seven columns represent the four flights (American Airlines Flight 11, United Airlines Flight 175, American Airlines Flight 77, and United Flight 93) and the three buildings (Twin Towers and the Pentagon building) holding the Intervention structure. The positions of columns represent the chronological order of the events from 5:45 AM to 6:42 PM on the day of September 11 (Figure 3.3, Figure 3.4, Figure 3.5, Figure 3.6). One way to deal with the position of columns was to put four columns at corners for holding the Intervention structure, distributing the rest randomly. But this positioning was not aesthetically or architecturally suitable for this project and visitors won't be curious enough to ask questions about logic or essence of these columns. On the other hand, these columns support the whole structure weight, therefore randomizing the location of the columns' need to obey the structural rules and necessities. For exploring unique positioning for columns, the timeline of the events on the day of September 11 had been investigated to find an appropriate pattern ("September 11 Attack Timeline," 2013, "9/11: Timeline of events," 2013). The pattern of incidence had been explored to find the best positioning both structurally and aesthetically (Figure 3.2).



**Figure 3.2:** Location of columns in structure (Image credit by the Author)

The time (8:21 AM) that transponder turned off was selected for American Airlines Flight 11, which hijacked and hit the North Tower of the World Trade Center. For United Airlines Flight 175 that hijacked and crashed into the South Tower of the World Trade Center, last radio communication with Flight 175 (8:21 AM) was selected as a milestone. Last radio communication with American Airlines Flight 77 (8:51 AM) was considered as a milestone. The crash time of the United Airlines Flight 93 with the Pentagon building was picked for the position of the column, which represents the Pentagon building. The collapses of the North Tower at 9:59 AM, and the South Tower at 10:28 AM, were selected for the positions of columns. Finally, for United Airlines Flight 93, time of the crash in Stonycreek Township, PA, 10:03 AM was used for defining the location of the last column. Two corners of the structure were set as the origin and end of

the timeline; then these times were scaled and converted to distances to regulate the locations of the columns (Figure 3.2).

<b>Shanksville</b>	8:16AM 93 Classes Begin in Shanksville	8:42 AM 93 Flight 93 Takes Off	9:27 AM Last Routine Radio Communication	9:28 AM Takeover Fight	9:32 AM Threatening Language from Flight 93 Cockpit	
	33 Passangers 7 Crews 4 Hijackers	33 Passangers 7 Crews 4 Hijackers		35,000 Above eastern Ohio feet 700 seconds later, indicates that the fight is continuing		
<b>New York   WTC</b>	5:45 AM Hijackers Pass Security Screening 2 hijackers	7:59 AM Flight 11 Takes Off 66 Passangers 11 Crews 7 Hijackers 76400 Pounds of fuel	8:14 AM Last Routine Communication with Flight 11	8:14 AM Flight 175 Takes Off 14 Mins Delay 41 Passengers 9 Crews 5 Hijackers	8:19 Flight 11 Crew Contacts Airline 27 mins	8:21 AM Flight 11 Transponder Turned Off
<b>Pentagon</b>	7:35 AM Hijackers Board Flight 77 58 Passangers 6 Crews 5 Hijackers	8:20 AM Flight 77 Takes Off 10 Mins	8:51 AM Last Routine Radio Communication for Flight 77	8:55 AM Flight 77 Makes Unauthorized Turn South	8:56 AM Flight 77 Transponder Turned Off	9:00 AM Flight 77 Turns Eastward

**Figure 3.3:** Timeline-1 of events on the day of September 11 (Graph created by the Author)

<b>Shanksville</b>	9:36 AM Flight 93 Crew Contacts United Airlines	9:41 AM Transponder for Flight 93 is Turned Off	9:50 AM Phone Calls Provide Flight 93 Passengers and Crew with Vital Information	9:57 AM Fight for Flight 93  5,000 Feet Above sea level 120 Second 30 degree	<b>10:03 AM Crash of Flight 93</b>  580 miles per hour 20 Min to DC	10:06 AM Shanksville Students Take Shelter
	8:23 AM American Airlines Attempts to Contact Flight 11 Cockpit	8:24 AM American Airlines Attempts to Contact Flight 11 Cockpit	8:37 AM Air Traffic Control Contacts the Military	<b>8:24 AM Last Radio Communication with Flight 175</b>	8:46 AM Crash of Flight 11  93- North Tower 99 FDNY and NYPD Dispatch units to World Trade	8:50 AM Alerting the President
<b>Pentagon</b>	9:05 AM American Airlines Headquarters Aware that Flight 77 is Hijacked	9:30 AM NORAD Deploys Fighter Jets	9:33 AM Flight 77 Heads for the Pentagon	9:34 AM Approach of Flight 77  3.5 Miles to 330 Pentagon 2,000 Degree 530 Decending Miles per Hour	9:36 AM Evacuation of Vice President Cheney	<b>9:37 AM Crash of Flight 77</b>  42 degree angle 200 towards Corridor 5 feet above the roof. Multiple explosions

Figure 3.4: Timeline-2 of events on September 11(Graph created by the Author)

<b>Shanksville</b>	10:07 AM Cleveland Center Notifies NEADS	10:08 AM Shanksville Volunteer Fire Company Responds	10:15 AM United Airlines and NEADS Aware that Flight 93 Has Crashed in PA	6:00 PM Pennsylvania Governor Conducts Press Conference	8:00 PM President George W. Bush Addresses the Nation		
	8:54 AM United Airlines Attempts to Contact Flight 175's Cockpit	8:59 AM On Board Flight 175	9:03 AM Crash of Flight 175  77- South Tower 85 losing altitude Feet 5000 per min 587 Miles per Hour	9:05 AM Alerting the President	9:16 AM American Airlines Headquarters Aware that Flight 11 Crashed into the WTC	<b>9:59 AM Collapse of the South Tower</b>  56 Mins Burning 10 Seconds to 600 Collapse approximately killed	<b>10:28 AM Collapse of the North Tower</b>  102 Mins Burning 1400 approximately killed
<b>Pentagon</b>	9:42 AM The First Response	9:42 AM Nationwide Ground Stop	9:45 AM Evacuation of the White House and U.S. Capitol	9:47 AM Arlington County Fire Department Assistant Chief Responds	9:50 AM Incident Command Post Set Up at Pentagon	9:55 AM President Bush Evacuated to Air Force One	10:10 AM President Bush Makes Statement

Figure 3.5: Timeline-3 of events on September 11(Graph created by the Author)

<b>Shanksville</b>							
<b>New York   WTC</b>	11:02 AM Evacuation of Lower Manhattan	5:02 PM Collapse of 7 WTC					
<b>Pentagon</b>	10:13 AM Rescuers Evacuate the Pentagon	10:15 AM Collapse of the Pentagon E Ring	10:20 AM Complete Evacuation of the Pentagon Ordered	12:16 PM American Air Space cleared	2:50 PM President Bush Returns to the White House	3:15 PM Evidence Points to al Qaeda	6:42 PM Secretary of Defense Rumsfeld Holds a Press Conference

**Figure 3.6:** Timeline-4 of events on September 11(Graph created by the Author)

Many innocent citizens lost their lives in the September 11 aggressive incidents. Finding design elements for representing every victim with identical quality that could form an indistinguishable unity with other elements was a big challenge in the design process. I used fiber optics for the material of the design elements because of transcendental quality in fiber. Fiber optic elements represent 3000 victims of the September 11 attacks. A parametric design approach was used for generating the positions of the design elements.

Position and length of the fiber optic elements were determined by an equation with different variables such as age, year and place of birth of the victims. In other words,

we have 3,000 fiber optic elements with different lengths each identifying an individual victim (Figure 3.7).

	Daniel Thomas Afflitto	32	Cantor Fitzgerald	Manalapan	NJ	United States
	Emmanuel Afuakwah	37	Windows on the World	New York	NY	United States
	Joseph Agnello	35	New York Fire Department	New York	NY	United States
	David Agnes	46	Cantor Fitzgerald	New York	NY	United States
	Joao A.D. Aguiar Jr.	30	Keefe, Bruyette & Woods	Red Bank	NJ	United States
	Lt. Brian G. Ahearn	43	New York Fire Department	Huntington	NY	United States
	Jeremiah J. Ahern	74	New York State Department of Taxation and Finance	Cliffside Park	NJ	United States

**Figure 3.7:** Sample information used in the parametric design (Image credit by the Author)

The main structure holds the fiber optic elements, which illuminate the floor and reflect on the ceiling of the waiting hall. Reflections are the conceptual symbol of the everlasting vernal presence of the victims in our daily life. The swinging of these fiber optics resulted from visitors walking through space will create a dynamic atmosphere and will increase interaction between visitors and the Intervention (Figure 3.8).



**Figure 3.8:** Fiber optics Arrangement in the structure (Image credit by the Author)

The two wars in Iraq and Afghanistan as ripples of the September 11 terrorist attacks were the primary and immediate responses to this endless and aggressive violence. There have been many controversial debates over the level of success achieved by the international coalition known as the War on Terror. For creating a prolific ground for further constructive discussions among visitors, symbolic icons that represent the victims of these two wars have been added to the main structure as well. The essence of these symbols is to remind visitors that the effects of September 11 were not limited to the incidents on that date and have incomprehensible and broader impacts all around the world. Statistics of these two wars have been explored for finding appropriate design patterns; data about number of coalition forces and civilians who lost their lives in the Iraq War since 2003 (Table 3.1 and Table 3.2), number of coalition soldiers and citizens

who died in Afghanistan since 2001 (Table 3.3 and Table 3.4) were used in designing the additional installations.

**Table 3.1:** Coalition force fatalities in the Iraq War (2003 – 2013); Fiji and Czech Republic with one death excluded from this table.

Year	Australia	Azerbaijan	Bulgaria	Denmark	Estonia	Georgia	Hungary	Italy	Kazakhstan	Latvia	Netherlands	Poland	Romania	SAL	Slovenia	Spain	Thailand	UK	Ukraine	USA	Total
2003			5																		5
2003																					1
2003				1				17				2				10	2	53	3	486	574
2004			2		2		1	2		1	2	14		1	3	1		22	6	849	906
2005	1		6	1				8	1			1		1				23	9	846	897
2006	1			4				6		2		1	2	3	1			29		823	873
2007				1		2						5	1					47		904	961
2008		1				3												4		314	322
2009																		1		149	150
2010																				60	60
2011																				54	54
2012																				1	1
2013																					
Total	2	1	13	7	2	5	1	33	1	3	2	23	3	5	4	11	2	179	18	4,486	4,804

**Table 3.2:** Civilian deaths in the Iraq War (2003 – 2013); Total casualties have been estimated between 111,872 to 122,306 people.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
January	3	597	1,177	1,543	2,925	817	350	263	389	524	357
February	2	652	1,268	1,565	2,590	1,036	389	304	252	356	358
March	3,977	992	854	1,935	2,676	1,613	426	336	311	377	
April	3,437	1,306	1,114	1,767	2,486	1,262	510	385	289	392	
May	547	657	1,323	2,249	2,799	792	386	387	381	304	
June	599	898	1,297	2,541	2,168	696	498	385	386	529	
July	651	816	1,520	3,266	2,659	609	407	443	308	469	
August	796	863	2,261	2,818	2,400	614	614	516	401	422	
September	561	1,029	1,414	2,535	1,292	557	332	254	397	396	
October	520	1,012	1,294	2,961	1,246	547	434	312	366	290	
November	488	1,631	1,461	3,024	1,086	520	226	307	279	239	
December	528	1,080	1,134	2,824	963	575	475	217	388	275	
Total	12,109	11,533	16,117	29,028	25,290	9,638	5,047	4,109	4,147	4,573	715

**Table 3.3:** Collation forces and civilian fatalities in the Afghanistan War (2001 – 2013); Countries with less than five deaths excluded from this table (Albania, Belgium, Lithuania, South Korea, Portugal, Latvia, Sweden)

Year	Australia	Canada	Denmark	Estonia	France	Georgia	Germany	Hungary	Italy	NATO	Netherlands	N. Zealand	Norway	Poland	Romania	Spain	Turkey	UK	USA	Total	Afghanistani
2001																			12	12	400
2002	1	4	3				10											3	49	70	800
2003		2					6								2				48	58	2,400
2004		1	1		3				1				1					1	52	60	
2005		1			2		4		2						1	18		1	99	131	478
2006		36			6				6		4				1	1		39	98	191	699
2007	3	30	6	2	3		7		2		8		2	1	1	4		42	117	232	950
2008	3	32	13	1	11		3	2	2		6			7	3	2		51	155	295	2,300
2009	4	32	7	4	11		7		9		3		1	8	3	1	2	108	317	521	2,412
2010	10	16	9	1	16	5	9	2	12		4	1	5	6	6	4		103	499	711	2,777
2011	11	4	3	1	26	5	7	3	8	6		4	1	13	2	4		46	418	566	1,167
2012	7				8	7			5	2		6					12	44	310	402	
2013			1							1				1				2	17	22	
<b>Total</b>	<b>39</b>	<b>158</b>	<b>43</b>	<b>9</b>	<b>86</b>	<b>17</b>	<b>53</b>	<b>7</b>	<b>47</b>	<b>9</b>	<b>25</b>	<b>11</b>	<b>10</b>	<b>36</b>	<b>19</b>	<b>34</b>	<b>14</b>	<b>440</b>	<b>2191</b>	<b>3271</b>	<b>14,383</b>

Since the Iraq and Afghanistan wars were ripples of the September 11 attacks and did not occur at the same date and place, these symbolic elements were represented individually and differently both in terms of design language and materiality. Multiple design alternatives were investigated ranging from a continuous chromic surface hovering around the main structure, to random fractal pieces placed at the two end of the Intervention (Figure 3.9). Although there is no doubt about the importance of these two wars in understanding the impacts of the 9/11 attacks and aftermath, I decided to the represent them in a modest and subtle fashion in this Intervention which does not affect the integrity and unity of the main structure.



**Figure 3.9:** Design alternatives for September 11 ripples (Image credit by the Author)

There are 33 cubic columns scattered in either front and back of the main structure. Each representing the number of civilian Afghans, Iraqis, and coalition forces who lost their lives in different years of the wars. For instance, one of the columns represents 966 victims of coalition forces in 2004 or another one designated to 5,047 Iraqi civilians who lost their lives in 2008.

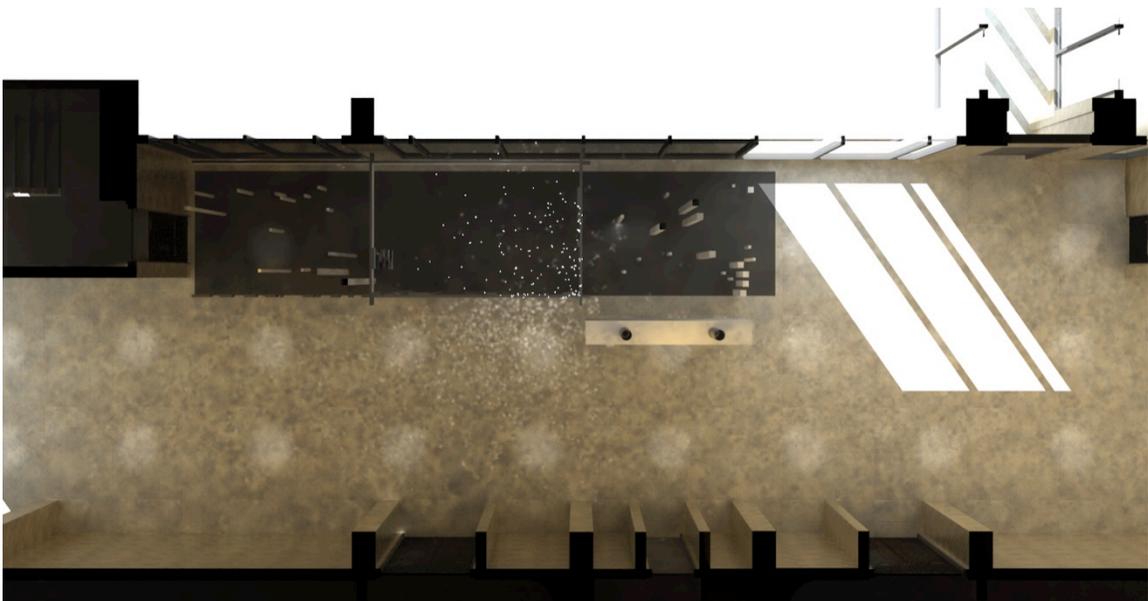
**Table 3.4:** Iraq and Afghanistan casualties between 2001 and 2013

<b>Year</b>	<b>Afghanistan Civilian</b>	<b>Iraqi Civilian</b>	<b>Coalition Forces</b>
2001	400		17
2002	800	12,109	71
2003	2,400	11,533	632
2004		16,117	966
2005	478	29,028	1,028
2006	699	25,290	1,064
2007	950	9,638	1,193
2008	2,300	5,047	617
2009	2,412	4,109	671
2010	2,777	4,147	771
2011	1,167	4,573	620
2012			403
2013			489
<b>Total</b>	<b>14,383</b>	<b>121,591</b>	<b>8,542</b>

In term of materiality, three different types of Plexiglas (translucent, white and color) were selected to represent Afghans, Iraqis or coalition forces. These cubic columns stabilize by attaching to the ceiling and floor (Figure 3.10, Figure 3.11). The simplicity of the design and the material of these symbols create a serene atmosphere without affecting the main structure.



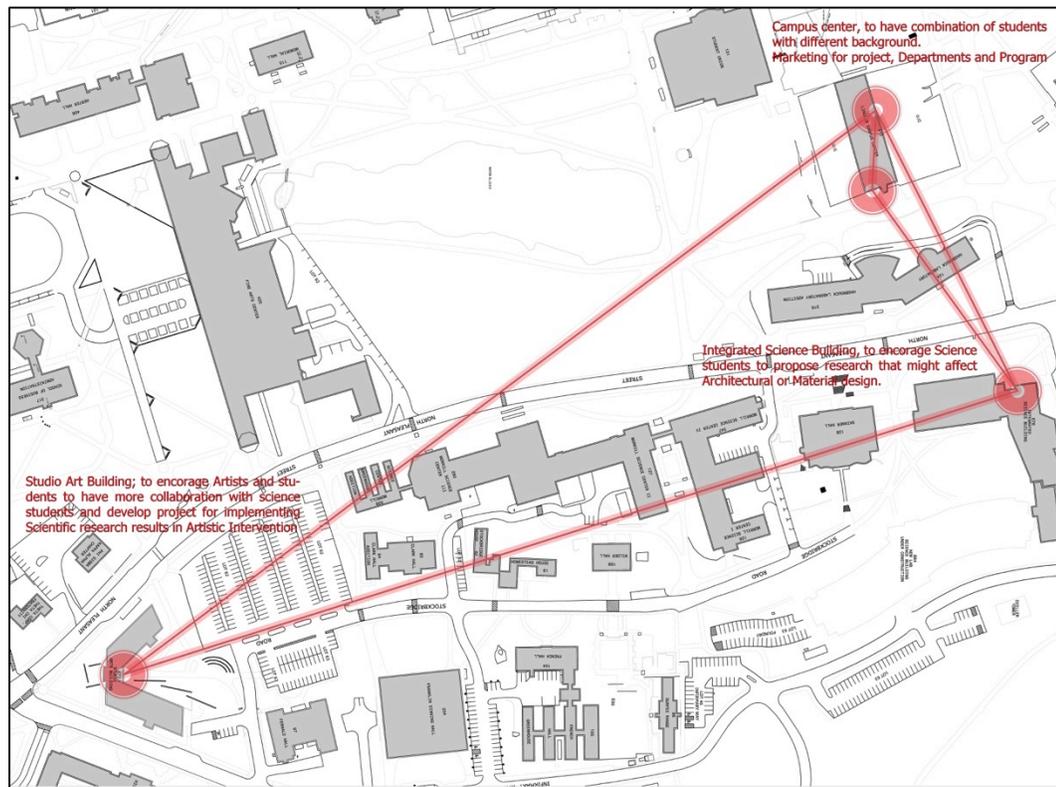
**Figure 3.10:** Photo rendering of ripple arrangement in the Intervention (Image credit by the Author)



**Figure 3.11:** Plan of positioning elements representing the Afghanistan and Iraq wars (Image credit by the Author)

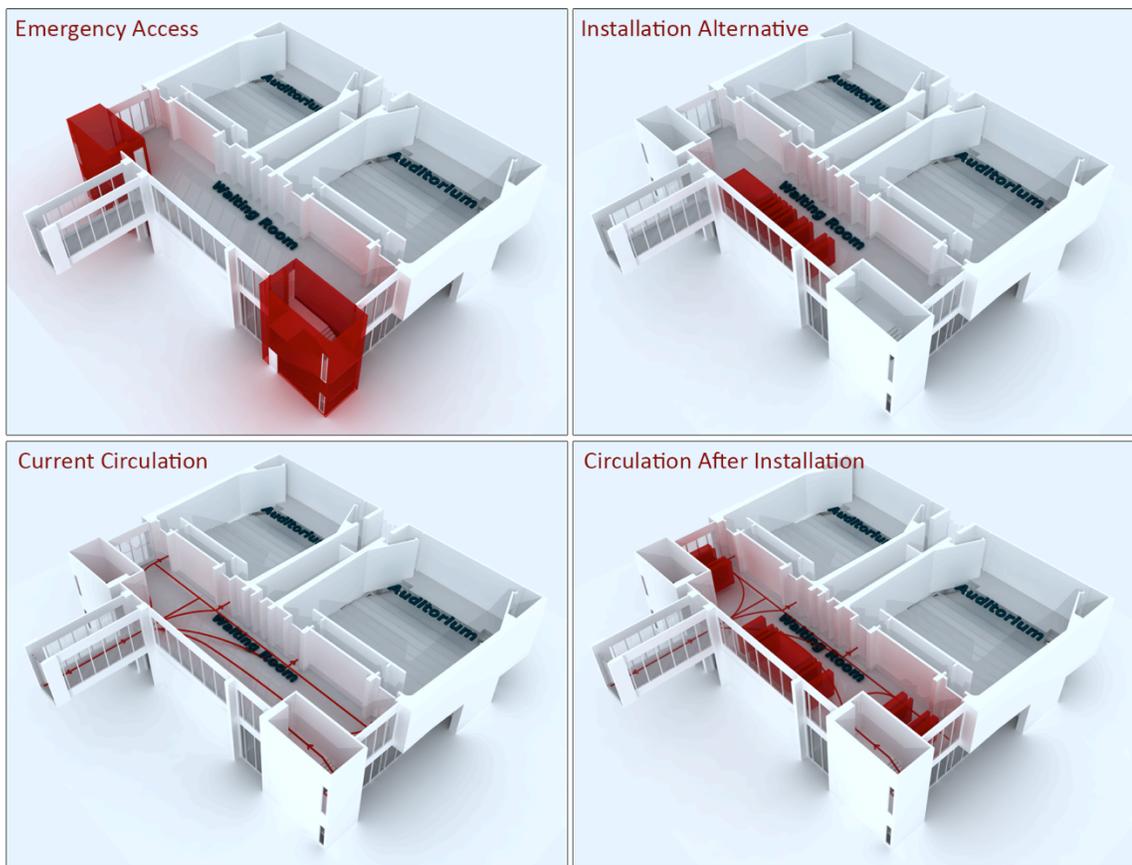
### 3.2 Exhibition Site Selection and Analysis

September 11 attacks have significant effects on many aspects of US citizens' daily life; whether it is emotional, financial, or even simple daily activity. The direct or indirect impacts of those incidents cannot be disregarded in searching for an appropriate location for the September 11 Intervention. Therefore, instead of using UMass common exhibition spaces, I decided to find a public place for installing the Intervention; a public place with a serene environment and an acceptable UMass community flows. There should be enough space for the Intervention, so the Intervention does not affect daily life and flows of UMass students. Different sites in UMass campus (Campus Center, Studio Art Building, and Herter annex) were investigated to find an appropriate location for the Intervention (Figure 3.12).



**Figure 3.12:** UMass Campus site analysis for finding an appropriate location for the Intervention (Graph created by the Author)

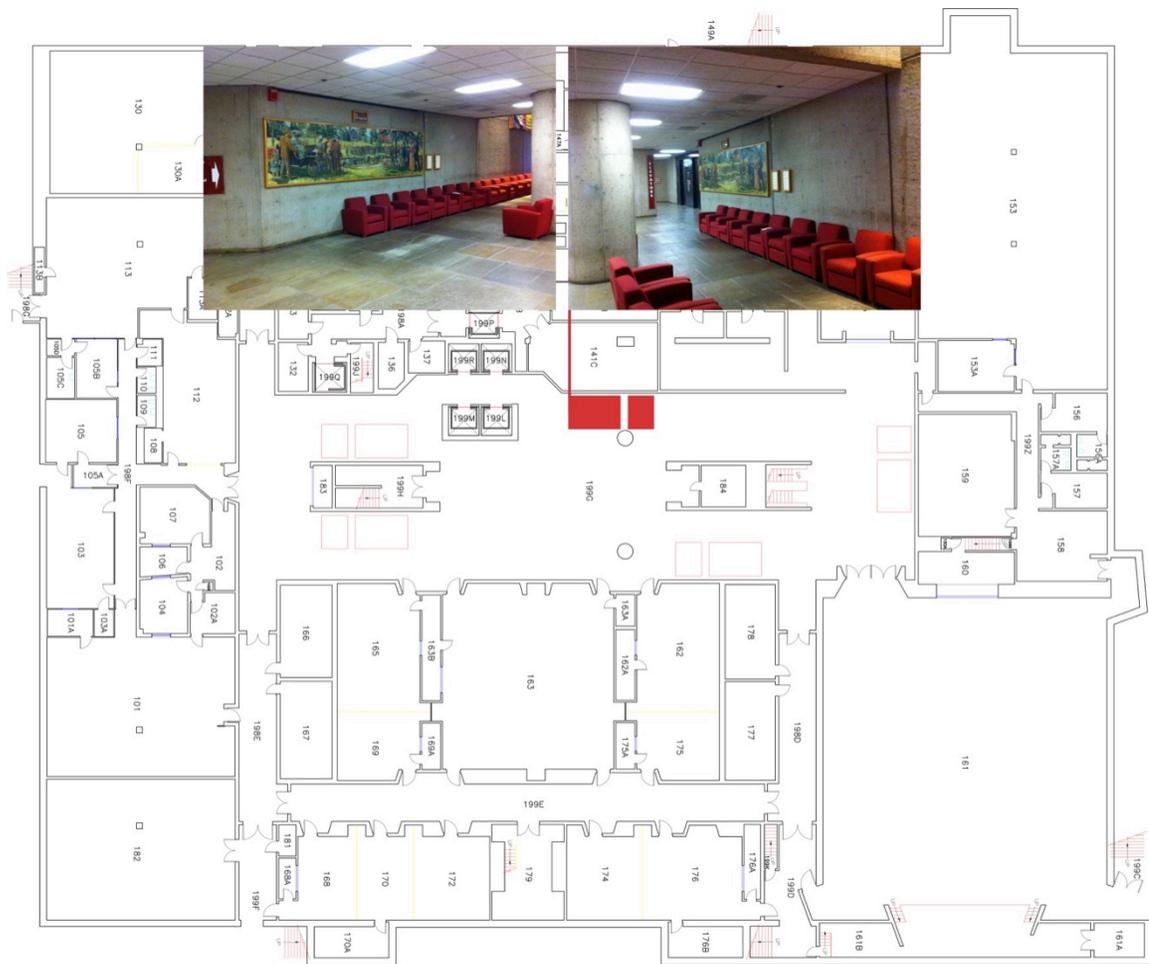
For every site alternative, circulation, people flows, and lighting were explored in order to understand the affect of installation on their current conditions. Also in these alternatives, accessibility, public safety, building codes, and university regulations were investigated. Herter and campus center lower level have been selected and submitted to UMass design and construction inspector to get approval for the final location of the September 11 Intervention site.



**Figure 3.13:** UMass Herter annexes building site analysis (Image credit by the Author)

Since the Intervention was installed for just one month, any alteration in the selected site should be temporary. Columns cannot be attached to the floor, or the ceiling and blockage of natural light need to be limited. The source of artificial lighting in this project is fiber optics; these small dots have weak effects on their environment.

Therefore, it is important to control both artificial and natural lights at the installation site. Besides, any additional component for blockage of natural light will increase the cost of the project. After, comprehensive study on different aspects of site alternatives, and consultation with UMass Design and Construction division, Campus Center lower level was selected to host the Intervention structure for a month. Adaptation with building regulation, the absence of any natural lighting, and having an adequate flow of students are some of the main reasons justifying this selection (Figure 3.14).



**Figure 3.14:** UMass Campus Center lower level (Image credit by the Author)

### 3.3 Final Design of September 11 Intervention

After finalizing the concept and detail design of the main structure and the ripple elements, more realistic photo simulations (Figure 3.15, Figure 3.16, Figure 3.17, Figure 3.18, Figure 3.19) were generated for checking the design and presenting it to UMass authorities to get required permits. The main structure of the Intervention has received positive feedback from critics and faculty members in the Architecture Department. While meeting with UMass faculties and officials, many of them had concerns about the ripple design elements including accessibility, public safety, and the adverse effects on the main structure.



**Figure 3.15:** Photo Simulation of the UMass September 11 Intervention (Image credit by the Author)



**Figure 3.16:** Photo simulation inside the Intervention (Image credit by the Author)



**Figure 3.17:** Photo rendering of the Intervention in Herter Annex (Image credit by the Author)



**Figure 3.18:** Photo simulation\_1 from ripple design elements to the main structure  
(Image credit by the Author)



**Figure 3.19:** Photo simulation\_2 from ripple design elements to the main structure  
(Image credit by the Author)

### 3.4 UMass university permissions and Building Permit

In order to get installation permission, the project was presented to the UMass Public Art Committee (UPAC) on June 11, 2013. With consensus, UPAC members gave approval for installation of the UMass September 11 Intervention on the UMass campus. There were some uncertainties about the initial site alternative (Herter Annexes) especially in term of adaptation with building codes and blockage of egress access. UPAC members asked for further study on other alternatives including UMass Campus Center. Since the Intervention is a stand-alone structure without any attachment to a building ceiling or floor, UPAC members expressed their concerns about public safety and accessibility to the installation. According to UPAC member, detailed design documents need to be coordinated with UMass Design and Construction Division and Environmental Health and Safety Department. After selection of UMass Campus Center lower level as a final host, the Intervention project was presented to Meredith Schmidt, director of Campus Center/Student Union Complex.

Based on the Mass amendments to International Building Code 2009 (Figure 3.20<sup>1</sup>), if a structure covers more than 120 square feet (11.16 m<sup>2</sup>), it needs to obtain a building permit for installation. Obtaining a building permit could increase cost and time for the project. In order to install the structure without a building permit, the dimensions of the main structure reduced from 9 by 14 feet to 9 by 13 feet.

## SECTION 3103 TEMPORARY STRUCTURES

3103.1 General. The provisions of this section shall apply to structures erected for a period of less than 180 days. Tents and other membrane structures erected for a period of less than 180 days shall comply with the *International Fire Code*. Those erected for a longer period of time shall comply with applicable sections of this code.

3103.1.1 Permit required. Temporary structures that cover an area in excess of 120 square feet (11.16 m<sup>2</sup>), including connecting areas or spaces with a common *means of egress* or entrance which are used or intended to be used for the gathering together of 10 or more persons, shall not be erected, operated or maintained for any purpose without obtaining a *permit* from the *building official*.

**Figure 3.20:** Temporary structure regulation in the International building code 2012  
(Image credit by the Author)

### 3.5 Detailed Design

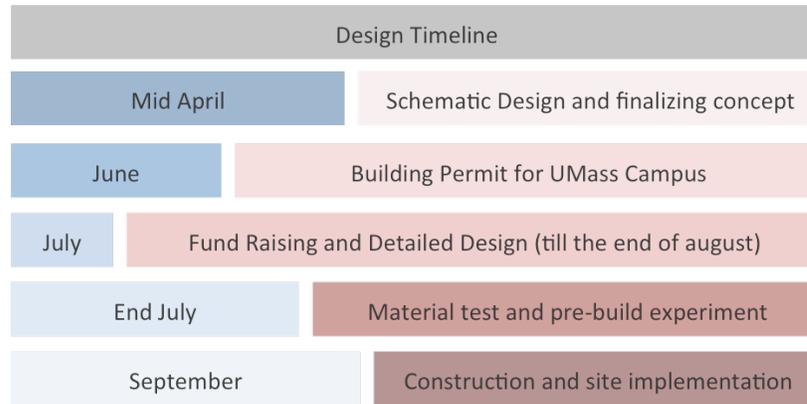
The preliminary cost estimation of the project was around \$5,570 with the possibility to rise to \$9,165 in the worst-case scenario. The fiber optic elements are the major portion of the project cost (Table 3.5). In the preliminary cost estimation, the Kickstarter website was used to reach out to UMass students and community for donations to this project. The fundraising process for this project was not successful therefore; we decided to cut project cost as much as possible. The symbolic elements representing the Iraq and Afghanistan wars were excluded from the exhibition. Instead of using kit-12 battery-operated fiber optics, I decided to use regular fluorescent lamps that are cheaper compared to battery-operated kits. Since the UMass Campus Center lower level does not have any window, there was no necessity for American DJ CGS-7A gel sheets for covering the window. After these modifications, new cost estimation for the

exhibition was cut down to \$ 3,200. This project was partially funded by UMass community donations and the designer covered the remaining portion.

**Table 3.5:** Preliminary cost estimation for the UMass September 11 Intervention; Fiber Optic Lighting Kit 12 Inch Battery Operated (Option 2) was not included in the total cost.

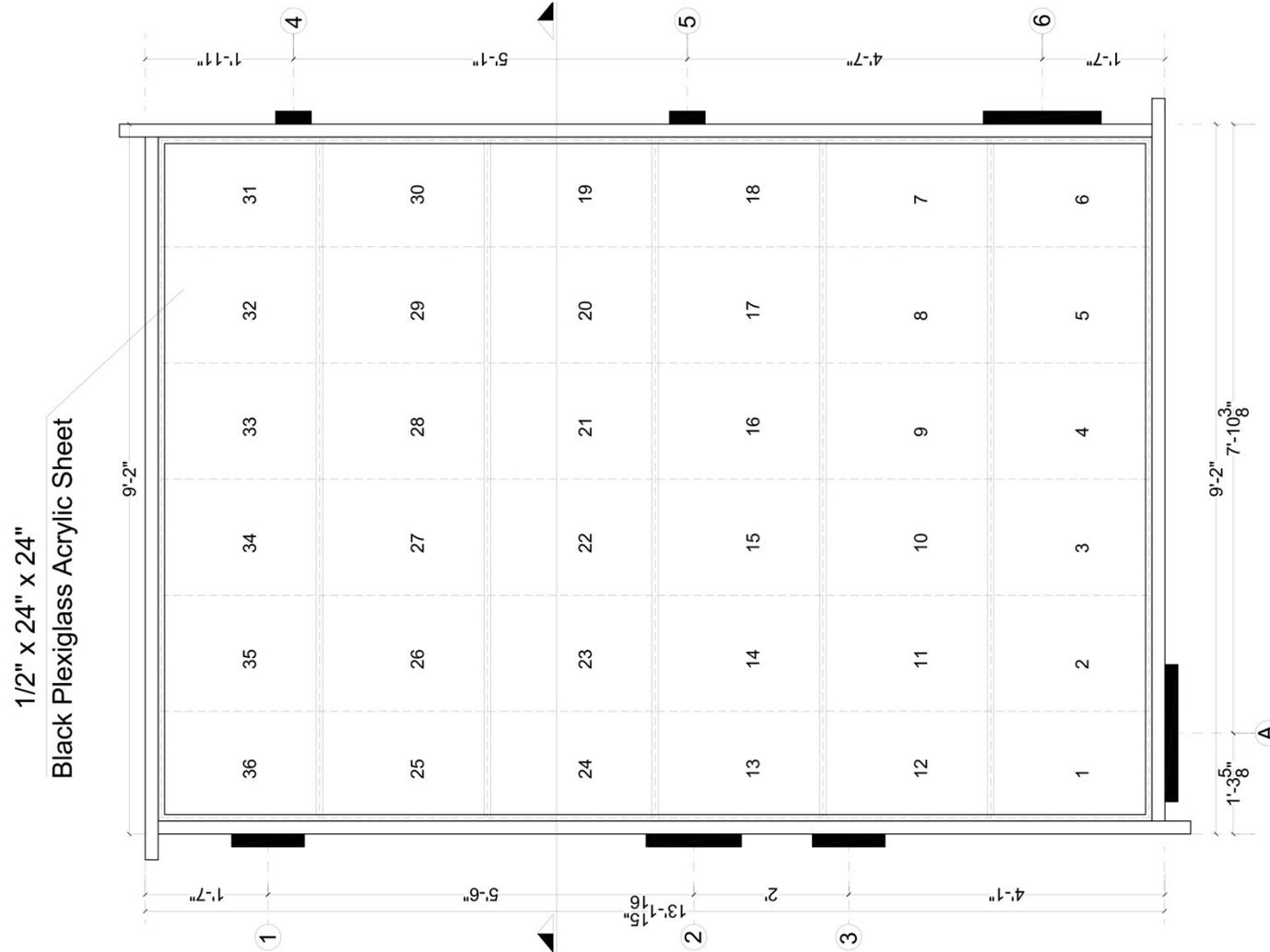
Item	Price/Unit	Number	Size	Price
Audio Equipment		3		Borrowed
Monitors		3		Borrowed
Projectors		1		Borrowed
Foam Installation	131	3		\$392.85
Plexiglass Type 1		20		\$870.00
Plexiglass Type 2		12		\$296.00
Plexiglass Type 3		10		\$363.00
Plexiglass Color/Grey				\$155.89
Fiber Optic Lighting Kit 12 Inch Battery Operated (Option 1)	\$1.05	2986	23552	\$2,472.96
Fiber Optic Lighting Kit 12 Inch Battery Operated (Option 2)	\$2.50	2986	23552	\$5,888.00
American DJ CGS-7A Gel Sheets for windows cover	\$4	200	200	\$800.00
Others (Paints, accessories, etc.)				\$400.00
Total				\$5,750.70

Based on the initial timeline (Figure 3.16), the design and construction of project was supposed to start in mid-April with the project opening on September 11. The deadline to finish and implement this project on site was set on September 10, 2013 - the opening day of the Guantanamo Exhibition as well. But the process of permitting took more time than expected and the crowdsourced fundraising through Kickstarter website was not successful. As a result, the project finished on January 21, the first day of the spring semester in the academic year 2013-2014.



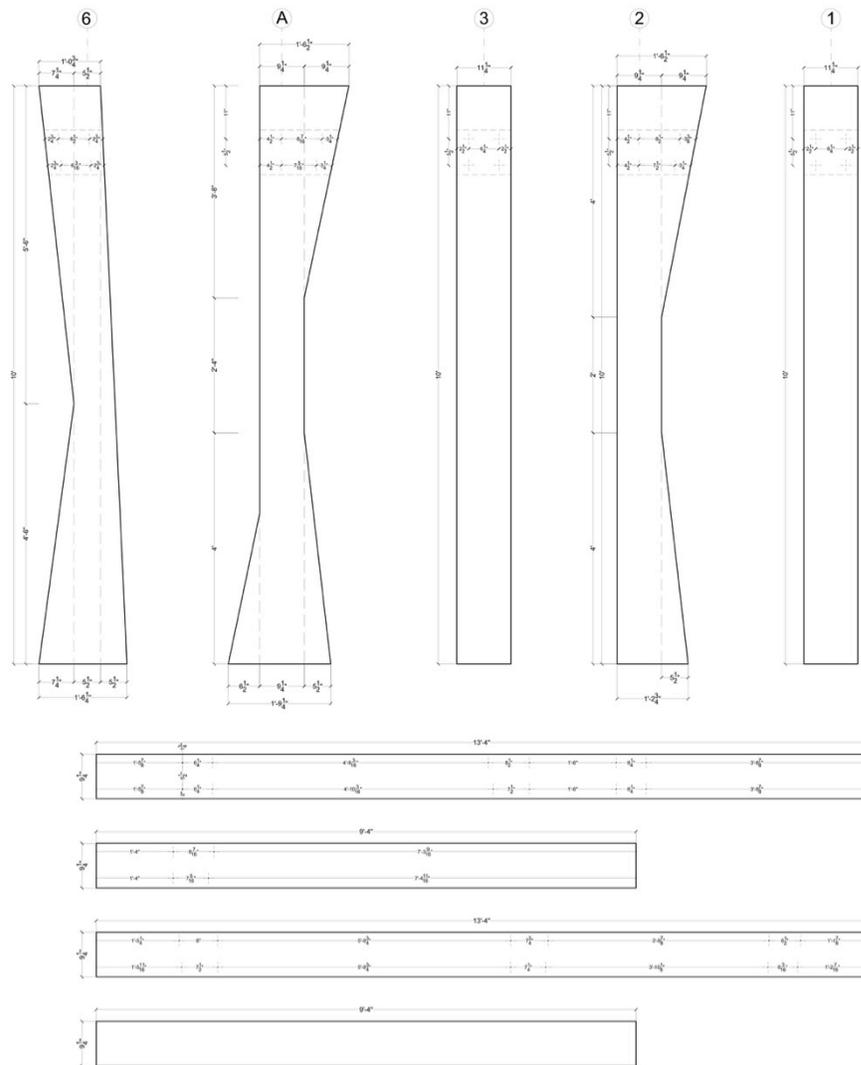
**Figure 3.21:** Primarily schedule for design and construction of the Intervention (Image credit by the Author)

In order to fulfill structural necessities, seven columns were rearranged around the main structure (Figure 3.22, Figure 3.23); the overhang was reduced to one foot and seven inches. The structural columns cover nine feet and two inches span. Since this project is a free standing structure without any attachment to floor and ceiling, one column was placed on the shorter side of the Intervention for transferring the lateral forces to stabilize the structure. Columns were built of ten-foot long spruce lumbers; columns connected to beams at  $8' - 9\frac{3}{16}$  and  $8' - 5\frac{3}{16}$  levels. Therefore, visitors experienced almost eight feet clear height under the main structure. Irregular columns composed of triangular lumber screwed to 2" x 6" lumber that mainly transferred structural loads (Table 3.7).

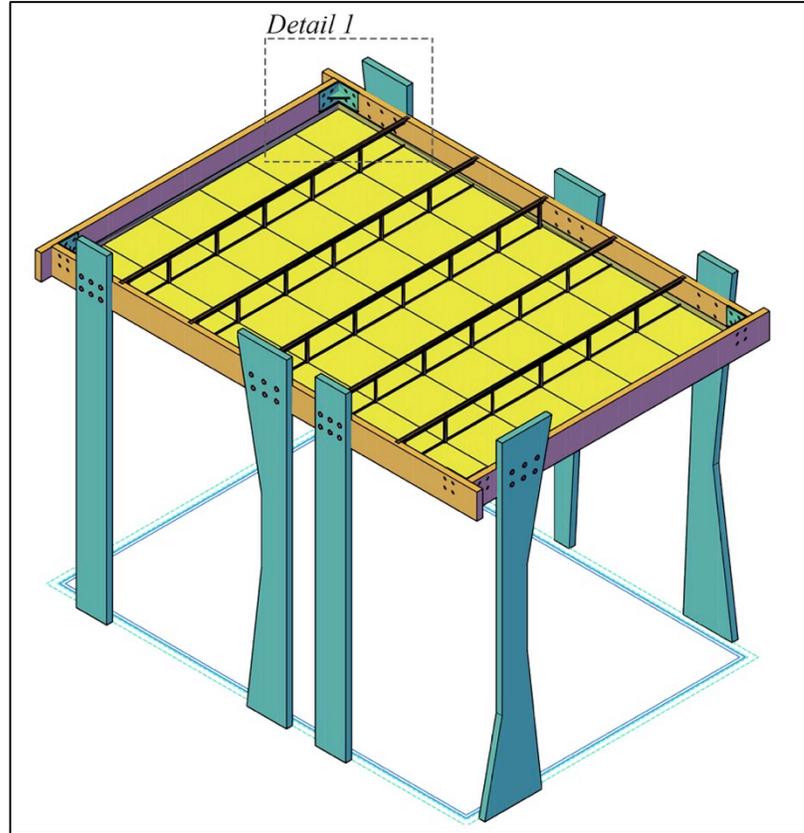


**Figure 3.22:** Plan of the main structure (Drawing produced by the Author)

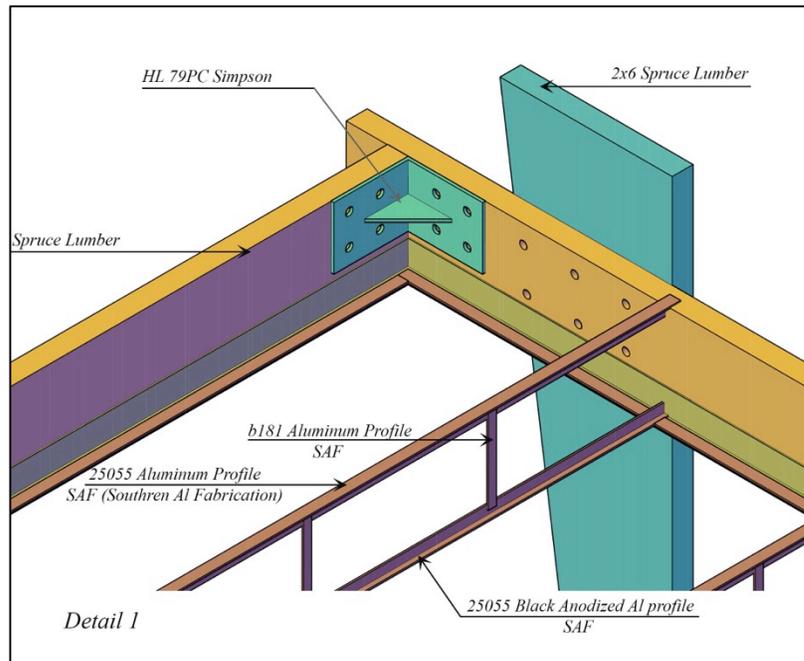
Ten-foot lumber with a thickness of two inches was used for the structural beams. For creating rigid connections, columns screwed to beams in four places (six nodes in wider columns). In this way, connections have more resistance to lateral movements at joints (Figure 3.23). In corners, heavy angle connectors were used for constructing rigid connections between two beams. For creating a meticulous architectural detail at edges, tee joints on corners were preferred over butt joints. In doing so, the length of beams increased four inches (Figure 3.24, Figure 3.25).



**Figure 3.23:** Dimension of columns and beams in elevation (Drawing produced by the Author)

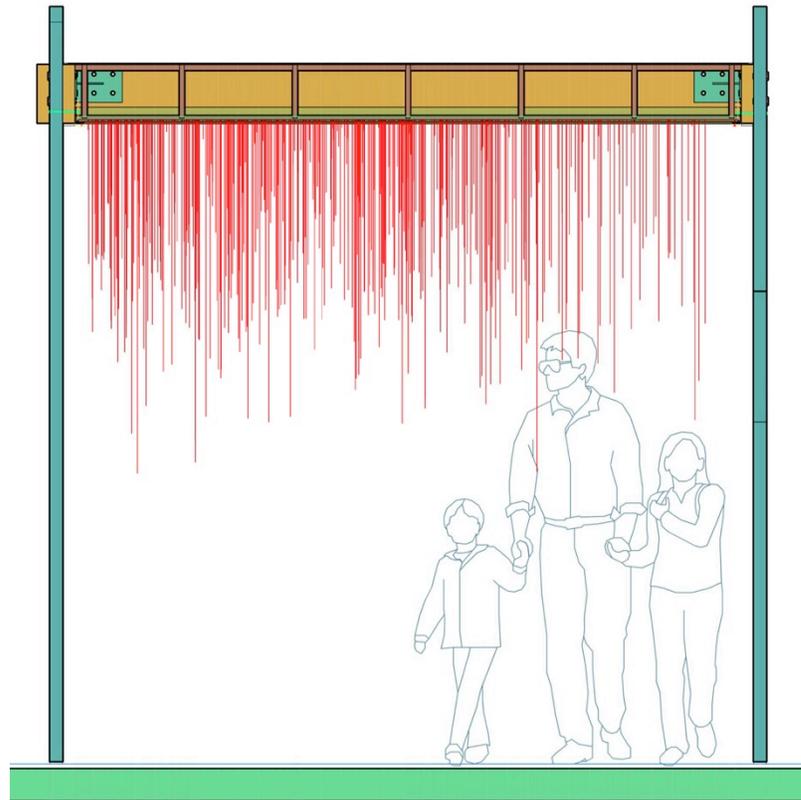


**Figure 3.24:** Isometric view of the Intervention (Drawing produced by the Author)



**Figure 3.25:** Detail of structural connections (Drawing produced by the Author)

Since fiber optics have weak illumination characteristics, and reflection of lights is quite essential in this project, black Lexan (quarter inch thickness) was selected for drop-ceiling panels. Structural details, aluminum frameworks for drop ceiling, electric wiring, and fluorescent lamps concealed behind the opaque black panels (Figure 3.26). Fiber optics passed and suspended through small holes carved by a laser cutter machine. Locations of holes were determined by an equation with different variables such as age, year and place of birth of the September 11 victims. For public safety, these fibers attached loosely to panels, so if a kid pulls down fibers, it does not affect the drop ceiling panels.



**Figure 3.26:** Cross-Section A\_A of the Intervention (Drawing produced by the Author)

**Table 3.6:** Detailed list of materials for the Intervention

<b>Material Type</b>	<b>Size</b>	<b>Number</b>
<b>Drop ceiling Plexiglass</b>		
1/4" Black Lexan	24 1/2" x 16 1/2"	4
1/4" Black Lexan	24 1/2" x 18"	8
1/4" Black Lexan	25 3/4" x 16 1/2"	8
1/4" Black Lexan	25 3/4" x 18"	16
1/4" Black Lexan	4' x 8'	3.5
<b>Structural Elements (Wood)</b>		
Lumber 2 x 10	9' 4"	2
Lumber 2 x 10	13' 4"	2
Lumber 2 x 12	9' 6"	3
Lumber 2 x 10	9' 6"	2
Lumber 2 x 6	9' 6"	3
Lumber 2 x 8	9' 6"	1
Lumber 2 x 12	8'	1
Lumber 2 x 8	4'	1
Lumber 2 x 10	5'	1
Lumber 2 x 6	4'	1
<b>Structural Elements (Metal and Aluminum)</b>		
HL79PC Heavy Angle		8
Carriage Bolts with Nuts (1/4" x 4")		40
Carriage Bolts with Nuts (1/4" x 2")		32
T profile Aluminum (1"x1"x1/8")	9'	5
T profile Aluminum (Black)	8' 9 3/4"	5
Profile Aluminum (1"x1/8")	8 1/2"	30
L Profile Aluminum (2 1/2"x1 1/2" x 1/8")	12' 9"	2
L Profile Aluminum (2 1/2"x1 1/2" x 1/8")	8' 7"	2
Profile Aluminum (1"x1/8")	8' 7"	2
Profile Aluminum (1"x1/8")	12' 9"	2
<b>Decorative Elements</b>		
Fiber Optic (Full Spool 4920 ft)	38662.11 " (3221.84')	1
<b>Lightings</b>		
T5 Fluorescent		18

## CHAPTER 4

### INSTALLATION AND UMASS COMMUNITY FEEDBACK

#### 4.1 Construction and installation process

Construction of the Intervention started in January 2014 with coordination and assistance of Daniel R. Pepin, the Building Manager in UMass Department of Environmental Conservation. Nariman Mostafavi, Ph.D. Candidate in Building and Construction, Nevin Gomez in M.S.C.E. Structural Engineering program, and Matthew Sutter M.Arch student, Sheema Rahmanseresht Ph.D. Candidate in Physics program were involved in the construction of this project. It took three weeks to complete the 9/11 Intervention.

We stored the cedar framing lumber after the purchase for about two days in a heated space. In doing so, if there is a deformation in lumber, it won't affect the assembly process. By cutting and assembling of regular Lumbers (2" x 12" and 2" x 10"), we built the irregular form of columns in the Eco Department Woodshop. For minimizing costs and wastes in the process, we planned ahead of time. A remaining part of one cut was used in another column for creating the irregular form (Figure 4.1).

After finishing assembly of the main structural elements, we sanded columns and beams with 220-grit sandpapers for smoothing surfaces and creating highest quality wood surfaces. We did not eliminate deeper imperfections. Inferno Propane Torch Kit is originally used for burning brush. Liquefied petroleum gas was used for torching structural elements in this project. We held the flame three inches away from each piece for torching the wood without charring it (Figure 4.2).



**Figure 4.1:** Columns after assembly in the department woodshop (Image credit by the Author)



**Figure 4.2:** Torching structural elements using Inferno Propane Torch Kit (Image credit by the Author)

In the next step, we wiped the charred woods with a soft broomstick to remove the char leaving. To keep the surface uniform, we rubbed structural elements following the grain of the woods. We then applied polyurethane by lightly stroking a 3-inch paintbrush across the surface. The pieces dried in a day before drilling holes on the surface of them (Figure 4.3).



**Figure 4.3:** Charred woods after applying polyurethane on the surfaces (Image credit by the Author)



**Figure 4.4:** Columns on each side of the structure were put into position and bolted down to a beam before final assembly of beams together (Image credit by the Author)

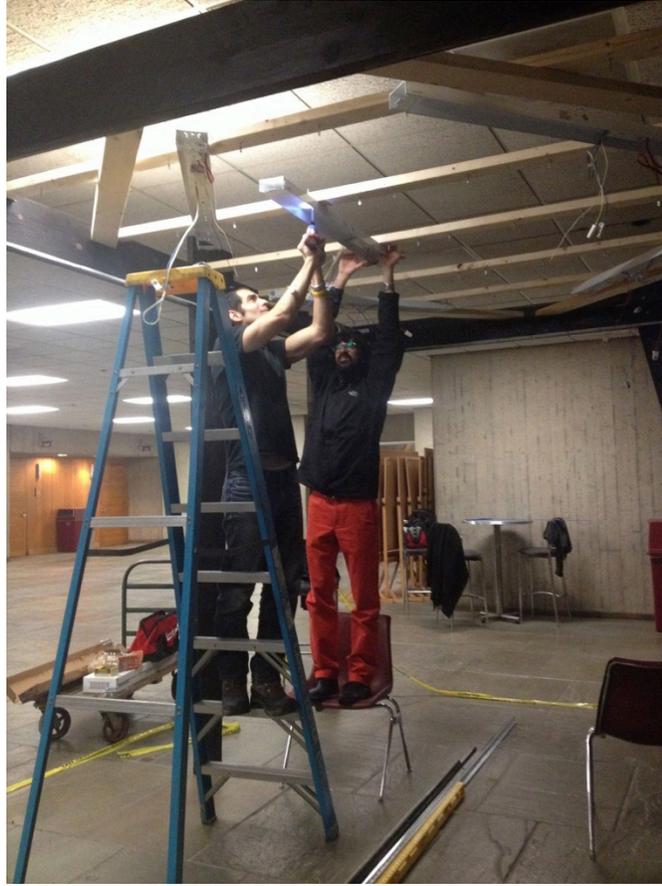
Columns on each side of the structure were put into position and bolted down to a beam before final assembly of beams together. In the next step, we held the structural components on two edges and bolted down together. On each corner, two HL79PC Heavy Angle brackets were used for connecting beams on each side to another. After connecting all four sides together, we created a diagonal connection with a wooden element (2"x4") on each corner. In doing so, edges of structure could be more resistant to lateral forces and serve as a rigid connection (Figure 4.4, Figure 4.5, and Figure 4.6).



**Figure 4.5:** The assembly process of structural elements (Image credit by the Author)



**Figure 4.6:** The structure of the Intervention; a diagonal connection at corners for creating a rigid connection (Image credit by the Author)



**Figure 4.7:** Fluorescent lightings and electrical wiring attachment to secondary beam system (Image credit by the Author)

For an extra support for the structure and the drop ceiling, rows of beams with two feet distance between elements connect to the topside of the primary beams. Aluminum frameworks for drop ceiling, electric wiring, and fluorescent lamps also attached to this secondary beam system (Figure 4.7). Aluminum frames were painted reflective black for creating a uniform drop ceiling texture. Holes on Lexan panels were craved using laser-cutting machines. Fiber optics cut into around three thousand pieces each with a precise measurement, passed, and suspended through small holes. For public safety, these fibers folded on the backside of the panels and attached loosely to panels (Figure 4.8 and Figure 4.9).



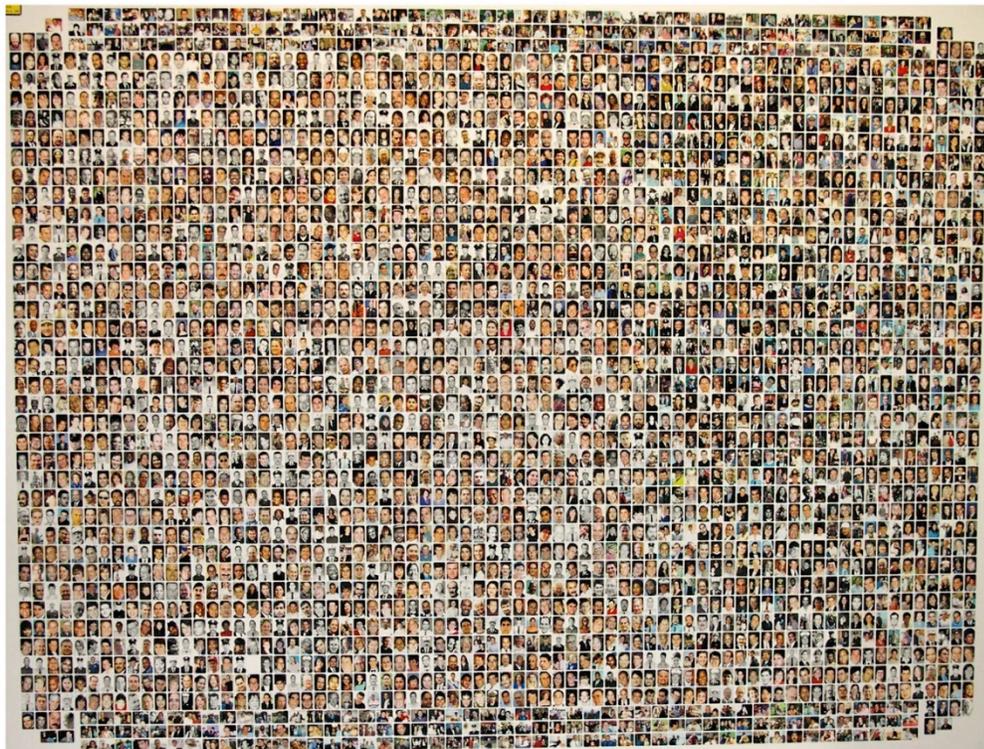
**Figure 4.8:** The attachment process of fiber optics to Lexan panels (Image credit by the Author)



**Figure 4.9:** Placement of drop ceiling panels with suspended fiber optics (Image credit by the Author)

## 4.2 Exhibition

For a month before the opening ceremony, we advertised the exhibition by sending out invitation letters to UMass departmental email lists. The September 11 Intervention event was set on UMass official calendar two months before the opening ceremony. Posters were put up on many advertisement boards on the UMass Campus (Figure 4.10).



### UMASS 9/11 INTERVENTION

27 JANUARY - 27 FEBRUARY 2014

OPENING MONDAY JANUARY 27 4:30PM- 6:30PM

UMass Amherst Campus Center concourse lower level

<http://people.umass.edu/mfarzinm/umass-911-intervention.html>

**Figure 4.10:** Flyer of the exhibition (Graph produced by the Author, original image presented in prosecution exhibit for the trial of Zacarias Moussaoui, 2006)

The exhibition officially started on January 27, 2014, after a small opening ceremony with UMass architecture faculty and students.



**Figure 4.11:** UMass 9/11 Intervention opening ceremony 1 (Image credit by the Author)



**Figure 4.12:** UMass 9/11 Intervention opening ceremony 2 (Image credit by the Author)

For two months, the Intervention structure stayed open to UMass and Amherst communities. The Massachusetts Daily Collegian published an interview about the 9/11 Intervention on February 10, 2014 (Hoff, 2014):

.... *“I just try to show that this incident did not affect one community – I think that it’s something that affects all the communities,” Farzinmoghadam added. “This project is a small effort, a very little one.*

*But I try to bring two sides of the story together somehow to talk. The consequences affected all of us and all people around the World, not just the US citizens. This project could break some barriers between the two sides and help to (facilitate) communication and talk.”*



**Figure 4.13:** Subtle play of light and patterns by fiber-optics (Image credit by the Author)

On February 17, 2014, Diane Lederman published another interview on the Mass Live website (Dlederman, 2014).

*“It was such a huge event and affected so many people ... we “wanted to stay as abstract as possible.” we didn’t want to make people depressed.*

*We didn’t want to use names in the exhibit – faces of all those who lost their lives are part of a poster explaining the exhibit’s creation. “For me they are unknown people.” But he wanted to capture each victim through the fiber optic strands providing an impressionistic feel.”*



**Figure 4.14:** From left to right: Carey Clouse, Nariman Mostafavi, Sheema Rahmanseresht, and Kathleen Lugosch (Image credit by the Author)

### 4.3 Community feedback

The UMass September 11 Intervention had different visitors from the UMass community and surrounding towns. Most visitors heard about the event via UMass departmental email lists. While the majority felt that the exhibition was the success and respectful tribute to the victims of the September 11 incident, they also gave constructive comments on the event. Below is a selection of positive feedback from visitors:

*"Very moving - beautifully done."*

*"A beautiful tribute - thank you for sharing with our Campus."*

*"Was confused at first, but upon reading it, it is amazing! This made my day. From someone whose had loved one in the war due to 9/11, it means so much! Love it!"*

*"Within the installation, the threads appear almost as stars ... and we are told as children that stars are the souls of loved ones up in heaven. The Victims are now stars within the installation. One remembers and reflects while activities outside the space go on as normal, just as life had to go on beyond the shock and the event. Thank you for this thoughtful art."*

*"Wonderful. It's breath-taking to look at, and the meaning makes me speechless."*

The world has changed since the day after the September 11, as human bonds were not strong enough to tie us together. All the cultural, racial and religious differences ruthlessly have torn us apart. Being suspicious about any differences unconsciously became part of our norms. Aggressive action was legitimized and presented as the only logical option for fighting the radicalism. The anger and frustration over these tragic incidents led us to collective punishment against innocent citizens, who were assumed guilty simply because they were born in the Middle East. And the result was not promising at all! New radical groups, different targets, and stricter security measures have been in place in public spaces since then. The aftermath of the September 11 attacks has remained in our hearts, souls, and daily life. Maybe it is time to reconsider our position in fighting against radicalism, or to learn from these periodic defeats. Violence is not, cannot, and will not be the answer.

The significance of the September 11 incidents and the severity of that traumatic loss makes for an entirely well-deserved consideration for a memorial on the UMass campus in tribute to those loved souls of the blameless victims of that horrifying tragedy. It is worth mentioning that one of UMass community member (computer research specialist) lost his life in that violent aggression.

The intention of this thesis is to pay tribute to the victims of the September 11 tragedy, and to provide information about the whole story. The statistics of the event were given a physical interpretation. All different aspects and numbers are incorporated into the design: number of the flights, and nationality of the victims, each having their particular conceptual representation in the design process. The UMass September 11 Intervention was intentionally installed in the UMass public space to show the presence of that day in our daily life. This project was designed to offer a serene and subtle environment for contemplation; a little attempt to offer some reconciliation.

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