

Worcester Polytechnic Institute Digital WPI

Interactive Qualifying Projects (All Years)

Interactive Qualifying Projects

June 2009

Postmodern Postmortems: Art to Highlight Social Issues in Venice, Italy

Brendan J. Turcotte

Worcester Polytechnic Institute

Follow this and additional works at: <https://digitalcommons.wpi.edu/iqp-all>

Repository Citation

Turcotte, B. J. (2009). *Postmodern Postmortems: Art to Highlight Social Issues in Venice, Italy*. Retrieved from <https://digitalcommons.wpi.edu/iqp-all/1267>

This Unrestricted is brought to you for free and open access by the Interactive Qualifying Projects at Digital WPI. It has been accepted for inclusion in Interactive Qualifying Projects (All Years) by an authorized administrator of Digital WPI. For more information, please contact digitalwpi@wpi.edu.



Postmodern Postmortem

An Interdisciplinary Qualifying Project
Submitted to the faculty of
Worcester Polytechnic Institute
in partial fulfillment of the requirements for the
Degree of Bachelor of Science

Submitted By:

Brendan Turcotte

Sponsoring Agency:

Venice Project Center

Submitted To:

Project Advisors:

Frederick Bianchi

Fabio Carrera

Date: June 1, 2009

<http://users.wpi.edu/~ppope>

Abstract

In celebration of the 20th Anniversary of the WPI Venice Project Center, we are launching the Venice 2.0 Initiative. The “Postmodern Postmortem” is a product this initiative. The basic concept is to use art as a means to highlight the key findings that emerged from the over 120 projects that were conducted in Venice since 1988. It is the desire of the Venice 2.0 Initiative to develop 20 "installations" to be scattered throughout Venice to pique the interest of passersby, hinting at some of the issues that have affected Venice in recent years. We plan to make these displays very subtle, engaging the senses, and deeply meaningful. The installations will be coordinated throughout the city. We also hope to engage young people in these urban issues through the use of gaming and artistic expression. The goal is to provide a blueprint for implementation of these installations. In addition to being used by the Venice 2.0 Initiative, such a blueprint could be used by urban youth to produce their own artistic commentary on the issues.

Contents

Executive Summary	6
1. Introduction.....	9
1.1 Global Context	9
1.2 Local Context	9
1.3 The Status Quo	9
1.4 The Gap	10
1.5 This Project	10
2. Background	11
2.1 Venetian Retail Sector.....	11
2.2 Crumbling Canal Walls	12
2.3 Preserving Venetian Public Art	12
2.4 Venice’s Aging Population	13
2.5 Infrastructure of Venice	14
2.6 Boat Turbulence and Canal Damage.....	15
2.7 Illegal Garbage Dumping	15
2.8 Rising Tide.....	16
2.9 Youth Issues.....	16
2.10 Urban Reality Game	17
2.11 The Venice Biennale.....	17
3. Methodology	19
3.1 Mission	19
3.2 Boundaries.....	19
3.3 Objectives	19
3.3.1 Determining the requirements	19
3.3.2 Assessing the interactive and collaborative possibilities	20
3.3.3 Devising a system to achieve the artistic goal	20
3.3.4 Determining the equipment needed for implementation of the system	20
3.3.5 Identify logistic challenges.....	20
4. Results & Analysis	21
4.1 Storefronts.....	23
4.1.1 Installation Requirements	23

4.1.2 Interactive Possibility	23
4.2 Wakeup	26
4.2.1 Installation Requirements	26
4.2.2 Interactive Possibility & System Design.....	26
4.3 Missing In Art.....	28
4.3.1 Installation Requirements	28
4.3.2 Interactive Possibility & System Design.....	28
4.4 The Toll	29
4.4.1 Installation Requirements	29
4.4.2 Interactive Possibility & System Design	30
4.5 X-Ray.....	31
4.5.1 Installation Requirements	31
4.5.2 Interactive Possibility & System Design	31
4.6 Bubbletto	33
4.6.1 Installation Requirements	33
4.6.2 Interactive Possibility & System Design	34
4.7 Scents & Sensibility	35
4.7.1 Installation Requirements	35
4.7.2 Interactive Possibility & System Design	35
4.8 Scratchitti	36
4.8.1 Installation Requirements	36
4.8.2 Interactive Possibility & System Design	36
4.9 Brodo Di Pesce	36
4.9.1 Installation Requirements	36
4.9.2 Interactive Possibility & System Design	37
4.10 Spray it Forward	37
4.10.1 Installation Requirements	37
4.10.2 Interactive Possibility & System Design	37
5. Conclusions & Recommendations	39
5.1 Alternate Reality Game	39
5.2 Storefronts.....	39
5.3 Wakeup	40

5.4 Missing In Art.....	41
5.5 The Toll	41
5.6 X-Ray	42
5.7 Bubbletto.....	42
5.8 Scents & Sensibilty	42
5.9 Scratchitti	43
5.10 Brodo Di Pesce	43
5.11 Spray it Forward.....	43
Appendix A.....	44
Appendix B.....	49
Appendix C.....	50

Executive Summary

The Venice Project Center was started in 1988 by Dr. Fabio Carrera. Since that time there have been over 120 Interdisciplinary Qualifying Projects performed by WPI students. These projects have been ongoing studies of issues critical to the city of Venice, in particular, art preservation, canal preservation and reasons for changing demographics. The students involved with these IQPS have made significant contributions to the body of knowledge about these issues and have made recommendations for solutions. However, recommendation and implementation are different things. Making the residents and tourists aware of the issues is the first step to a solution. To celebrate the 20th anniversary of the center, a series of art installations will be researched with the intent to bring an awareness of these issues to Venetian citizen. The aim of this research is to find feasible methods of public art in keeping with the current culture and atmosphere of the city.

Urban social issues from the previous IQPs were chosen to be featured in art installations. An installation is a work of art that is dependent on its location. It may derive its meaning from the history of the location, for example, or the physical attributes of the place may add something to the implementation of the work. Appendix A provides a discussion of the history and types of contemporary installation art. Each of these installations have the possibility of being placed outdoors in the city or indoors in an exhibit hall such as the Biennale. Some are more appropriate to one venue or the other. The decision is up to the sponsor of the installation.

Venetian Retail Sector: Stores selling the daily necessities to residents have been closing. Some have been reopened as souvenir shops for tourists. The ones that remain vacant stand as a reminder of how life used to be in historic Venice. An installation could be devised that would show images through the windows of an abandoned building, giving it the appearance of being occupied. This would be accomplished by using a projector to show a video of silhouettes moving about as if they were store clerks and customers. The images would be projected onto a screen covering the windows. To make the display interactive, a motion detector would be used to activate the video when someone approaches to look in the window. The viewer's shadow would cover part of the window allowing the image to be seen only in the shadowed area.

Crumbling Canal Walls: There are two causes for the damage to canal walls that have been chosen as the subject for art installations. The first is about the wake made by a motor boat speeding through the canals. It has been shown that the faster the speed, the more energy imparted to the wake. It is this extra energy that is causing more than normal erosion of the walls of the canals. The walls are difficult and costly to repair, so it would be in everyone's interest to reduce the rate of damage. The second highlighted cause the turbulence caused by vaporetto and delivery boats when they idle at

a dock. In order to keep the boat in one place at the dock, the driver must cycle the engine propeller forward and reverse. This turbulence spreads out bouncing off the canal walls increasing the power the water has to do damage.

There are two different installations planned for this issue, one for each of the causes mentioned above. In the case of the speeding motor boats, sensors would be floated in the canal to detect and measure the wake. When the water is relatively calm a clear image is projected on the canal wall. As the water becomes more choppy, the image becomes more blurred. The image could be of a damaged wall and/or a message about keeping the speed limit.

Another installation is planned to keep people aware of the trouble with turbulence. A bubble machine would be placed near a dock. When a vaporetto or delivery boat idles too long, a stream of bubbles would be dispersed reminding everyone to hurry up and move on.

Public Art: Public art is the term used for painting, sculpture or architecture in the public areas of a community. Any media can be used to create public art, in Venice it is the stone work that is remarkable. At the height of the Renaissance builders hired skilled craftsmen to carve everything from walls to wells and fountains. Even the pedestals of flagpoles were carved. The issue is that many pieces of art are damaged or missing. From and exposure to weather and also from theft and vandalism, these treasures are disappearing.

To remind Venetians about what they are missing and to appreciate the art that still exists, an installation could be implemented to replace the art that is damaged or disappeared. Instead of replacing the art with stone, it would be replaced with the projection of an image. The image would be the piece that is missing and maybe include additional information about it.

Venice's Aging Population: As Venice's economy became more dependent on tourism, the cost of living for residents rose. This is just one of the reasons that young people gave for moving to the mainland. Another reason given for leaving is the lack of jobs outside of the tourist industry. On top of this, the birthrate for Italy is one of the lowest in Europe. That is not to say the older generation have been left behind. The elderly that have been interviewed truly love their city and can't imagine living anywhere else.

The installation calling attention to the changing demographics of their city may leave Venetians feeling a little depressed. A sound, such as the tolling of a bell, would be used to mark the number of Venetians who have died that day. It would be a localized audio installation, with the tolling of different bells for the different parishes each person was from. To counteract the tolling of the bells for the dead, a sound could be added

after the bells ringing for the births of that day. This information can be retrieved daily from the internet by a processor hooked to the audio device.

Venice's Infrastructure: The infrastructure of a city is vital to its survival. Venice is no different. However, it is not something that the average citizen concerns himself with. It is useful for a Venetian to know where his water comes from or where his sewer goes so that he does not take these things for granted. Most residents do not know that under the bridges are conduits for telephone and electric.

In order to bring the inner workings of the city to light, an image would be projected onto the underside of a bridge showing the pipes, wires and conduits. Using a simple projector as in the previous installations, this is a simple and interesting way to educate the residents about their city.

Illegal Garbage Dumping: The trash is collected every day in Venice except Sunday. By law, residents allowed to bring their garbage out in the morning only. This is so that the trash does not get raided by animals and birds that leave a mess. There are some people that disregard this law, creating an unsightly and unhealthy situation for everyone.

Because the police know the areas that frequently have this type of trouble, and because it is so difficult to catch the offenders in the act, this installation proposes a way for the resident to catch himself. When a bag or container of garbage is placed outside at any time of day other than morning, a scent would be released into the air. This would operate much like the automatic air fresheners available on the market today. We would hope that the person would be reminded to wait until morning the next day.

Rising Tide: These many islands have always had a fragile relationship with the Adriatic, but today, there are more reasons to be concerned. With global warming raising sea levels around the world, Venice seems to be in particular trouble. In addition to that silt is always accumulating in the canals, reducing the area available for water. If the canals are not dredged regularly, it is easy for the water to overflow the sides.

The Venice Project Center had proposed an installation involving eating soup and lower sea levels. However, after research it was discovered that the sea level is actually rising. Therefore this installation will not be implemented.

1. Introduction

1.1 Global Context

Changing demographics and decaying infrastructure are social issues that countries of the world share. A social issue is a matter of concern or controversy that directly or indirectly effects a population in a community. Though an issue may be too large for any one individual to solve, changes in a situation can be made through a change in the attitude of the entire community, and these changes can often lead to a better situation for everyone. Making the citizenry aware of the issue is the first step to a solution. The two examples that follow reflect the general global issues of “aging population” and “preservation vs. progress dilemma”.

The rise in the average age of citizens in the United States is putting a strain on the national Social Security and Medicare systems. It is estimated that by 2050 there will be one social security recipient for every 2 workers.¹ In addition to the economic impact, such a shift in the demographics requires a change in attitudes about aging, where many of the elderly, though they may be physically frail, have the same intellectual interests and ability to contribute to the community.²

The subject of what to do with “old” buildings is a matter of debate in many places. In Moscow and throughout China, historic architecture is being lost in the frenzy to catch up to the western world. Such buildings are not viewed as valuable pieces of the city infrastructure and as a result are neglected or destroyed.^{3,4}

1.2 Local Context

Venice, Italy also faces these social issues. The disappearance of pieces of public art, the disregard for the laws of garbage disposal and the decline in stores offering the basic necessities have had a major impact on the quality of life in this city. Vacant store fronts project an image of urban decay pointing to the real decay of the ancient buildings and canal walls. The young people have been leaving Venice in search of better financial opportunity, leaving behind those that are deeply rooted in the community, but unable to continue its vitality.

1.3 The Status Quo

For the past 20 years, IQPs at the WPI Venice Project Center have researched the many issues faced by Venice as a historic, world renowned city. Two separate projects focused on the demographics of Venice 2008. One of these studies explored the quality

¹ “The Graying of America.” *Newsweek* 153, no. 4 (January 26, 2009): 76-76. MasterFILE Premier, EBSCOhost (accessed April 15, 2009).

² Perslstein, Susan. “Creative Expression and Quality of Life: A Vital Relationship for Elders.” *Generations* 30, no. 1 (Spring 2006): 5-6. MasterFILE Premier, EBSCOhost (accessed April 15, 2009).

³ Luke Harding. “Moscow’s historic buildings ‘being destroyed’.” *Irish Times* (May 15, 2007). Newspaper Source, EBSCOhost (accessed April 15, 2009).

⁴ Jane Macartney. “Heritage ‘is being lost’ in march to modernisation.” *Times, The (United Kingdom)* (n.d.). Newspaper Source, EBSCOhost (accessed April 15, 2009).

of life of the elderly, the other on the opportunities for young adults. Studies have been completed in 2004 and 2008 on the need for historic preservation. And in 2005, 2006, and 2007 attempts were made to study the retail sector of Venice as an indication of socioeconomic health of the city. These IQPs have proved helpful in revealing many elements of concern and some have identified steps to resolving these concerns.

1.4 The Gap

Though a solution may be identified, motivating the government and citizenry to implement it is difficult. Making the residents and tourists aware of the issues is the first step to a solution. By using displays that engage the viewer with the use of his/her senses, many may become concerned enough to change their attitudes and these changes can often lead to a better situation for everyone.

1.5 This Project

To fill this gap, a series of art installations will be researched with the intent to bring an awareness of these issues to Venetian citizen. The aim of this research is to find feasible methods of public art in keeping with the current culture and atmosphere of the city. A feasible method would include the use of inexpensive yet durable technology and meaningful content. This research project will provide the Venice 2.0 Initiative a blueprint for implementation, including resources, of artistic installations based upon the findings of the past IQPs of the Venice Project Center.

2. Background

As stated in the abstract of this paper, this IQP is a product of the Venice 2.0 Initiative. As such, it is important to explain the conclusions of previous IQP project associated with the Venice Project Center that will be the basis of the “Postmodern Postmortem”.

2.1 Venetian Retail Sector



Figure 2 - An open storefront



Figure 1 - An old closed storefront

A series of projects has endeavored to analyze the Venetian retail sector in relationship to the comfort level of the residents throughout the city. Comfort level in this context refers to the ability of residents to purchase the basic necessities of life within a reasonable walking distance and at a reasonable price. What was discovered was that because of a decline in the population of Venice since WWII, the number of local shops stocking these has been dwindling. Once started, the cycle was hard to stop. It may have been that the population decline caused stores to close, but then the lack of markets within walking distance caused more people to move away. To maintain its vitality, the retail economy switched to the tourism trade, focusing on souvenirs. Stores offering necessary daily items have increased their price in order to afford the increased cost of building space.^{5,6} As this progression continued, some stores have remained empty and others have been

replaced with modern-looking businesses. The unique charm and personality of the city is being interrupted.

⁵ Greene, Ta Karra, Isabella, Benjamin, Jervis, Freddy, Modeste, Danielle. Residential Comfort Level: An Analysis of the Venetian Retail Sector. An Interdisciplinary Qualifying Project. July 2005

⁶ Chandonnet, Greg, Christo, , Andrew, Pope, Patricia, Singh , Karen. The Evolution of Stores and Decline of Residential Comfort: The Availability of Necessary Goods in the Historical Center of Venice. An Interdisciplinary Qualifying Project. July 2004

2.2 Crumbling Canal Walls

Motorboats traveling the canal system in Venice do not obey the speed limits set for the waterway. An IQP study done in E-term 2002 showed that only 3% of motorized traffic followed the posted limit. As boats continue to exceed the speed limits, the wake they generate cause erosion of the canal walls. The energy in a motorboat's wake increases exponentially with the km/h increase in speed.

One reason that the limits are disregarded is that enforcement of the limit is focused primarily in the Grand Canal, leaving the other byways unchecked. Another reason is that taxis and cargo delivery rely on speed to satisfy their customers.⁷ Regardless of the reason a motorist chooses to speed, the erosion caused by the boat's wake creates a serious situation because the wall of a canal in Venice is often the wall or foundation of a building. This damage is difficult and costly to repair.



Figure 3 - A canal undergoing repairs

2.3 Preserving Venetian Public Art

Venice is city rich in art. During the Renaissance, merchants with newfound wealth commissioned artists to immortalize themselves and their family or to praise God for their prosperity.⁸ As a result, the buildings, bridges, even flagstaff pedestals were decorated with bas relief. Churches were likewise richly designed and adorned.



Figure 4 - A deteriorating piece of public art

From 1990 to 2006⁹ there have been 12 IQPs that studied some aspect of cataloguing or restoring the public art and architecture of Venice. This tally does not include the

⁷ e, Emily. The Moto Ondoso Index: Assessing the Effects of Boat Traffic in the Canals of Project. July, 2002.

⁸ Foley, Meagan, Larson, Alex, Navien, Timothy, Riley, Phoebe. Preserving Venetian Heritage. An Interdisciplinary Qualifying Project. 2008.

Projects/Venice/Center/Areas/Chronology/

projects concerned with the archeological study of the city, which also relates to value we place on the rich artistic heritage of the Venetians. These studies showed that over the centuries, this public art has been damaged or removed because of vandalism, theft or the ravages of time.¹⁰

2.4 Venice's Aging Population

The average age in Venice is currently around 50. There are some interesting reasons for this trend. According to 2007 statistics Italy has the second to lowest birthrate among European nations and among the highest death rates.¹¹ An IQP done in 2008 interviewed over twenty Venetians between the ages of 11 and 45. They discovered that though Venice offers many educational opportunities, there is a lack of corresponding career opportunities upon graduation. Often young people move away to pursue professional jobs.¹² Because Venice neighborhoods have a strong sense of community and a much slower pace of life than a typical major city, the elderly find this city a comfortable place to live. Research performed by another IQP (also done in 2008) found that 70% of the people interviewed were born in Venice, had never left and would not consider living anywhere else.¹³ There are certainly many other factors causing the demographic shift, including factors that bring young people into Venice. However, the overall change is toward an older population.

Bells are an important part of the culture of Venice. Since the first bell tower was constructed in the 7th Century, Venetians have heard the message of the bells, a single bell or a combination of bells had its own meaning. If it was a tower belonging to a church, the message might be the time of the Mass, or to announce a wedding or a funeral. If it was a municipal tower the message might be the time of day, an execution, or the beginning or ending of the work day. The citizens could tell by the sound, where the bell was and what it meant. For example the tower of St Mark's Basilica had five bells and each had a special purpose. The *Renghiera* (or the *Maleficio*) announced executions; the *Mezza Terza* proclaimed a session of the Senate; the *Nona* sounded midday; the *Trottiera* called the members of the Maggior Consiglio to council meetings and the *Marangona*, the biggest, rang to mark the beginning and ending of working day.

An IQP study of the sounds of Venice was done in July 2003. The group collected and catalogued sounds that were heard around the city in an attempt to identify the characteristic sounds of Venice. Included in this study were 120 interviews, questioning individuals about what they were aware of hearing throughout the city.

¹⁰ http://wikivenice.org/index.php/Damage_to_public_art

¹¹ <http://www.infoplease.com/ipa/A0004395.html>

¹² Birmingham, Meagan, Kejriwal, Akhil, Marquis, Julie, Peña, Pedriant. .Challenges and Opportunities of Young Venetians. An Interdisciplinary Qualifying Project. B term 2008.

¹³ DeMartino, Angelina, Kent, Julie, Mallette. Venice: An Aging City. An Interdisciplinary Qualifying Project. B Term 2008

Using this data, this installation could discover the proper tolling of bells or other sounds that would stand out in a person's mind and thereby make it a more effective conveyance of the message.¹⁴

2.5 Infrastructure of Venice

In the first paragraph of the introduction, we noted that decaying city infrastructure was a serious issue. This installation will attempt to make citizens and tourist alike take note of what holds the beautiful city of Venice together. Examples of infrastructure are canals, sewage/water pipes, and bridges.

One of the names for Venice is "The City of Bridges". There are 473 bridges crossing 182 canals that connect the numerous islands that make up the historical center of Venice. It was these bridges, constructed in the 13th Century that allowed the individual island communities to become the Venice we know today. The bridges are not only historically significant and beautiful, they are a vital part of everyday life. Beyond their importance to pedestrian traffic, these bridges function as carriers for Venetian utilities. Many citizens are unaware that under some of the bridges are pathways for water pipes and telephone, gas, and electrical lines.¹⁵

Sewage disposal is another piece of infrastructure vital to a city. Many people living in close quarters could cause very unhealthy conditions. However, this is something that most people would rather not think about. For centuries, the canals have been used to remove waste from under the city. Pipes lead from the brick settling tanks, which are located under the houses, to the canal walls where the high tide washes the sewage away. Slowly these old systems are being replaced with more modern type septic systems, however, few residents of Venice understand how it works.¹⁶

As so often is the case with the things we use every day, the infrastructure is taken for granted. The issue of decaying canal walls will be addressed by the "Wake Up" installation. The installation titled "X-Ray" could be used to call attention to other underpinnings to the city.

¹⁴ Leenhouts, Doug, Messier, Paul, Neithercut, Scott. The Sounds of Venice. An Interdisciplinary Qualifying Project. July 2003

¹⁵ http://wikivenice.org/index.php/Bridges#History_of_Bridges

¹⁶ Babic, Kristopher T., Borek, Michael, Leeds, Grant G., Sidiroghu, Stylianos,. Analysis of Sewer Holes and Canal Wall Damage in Venice Italy. An Interdisciplinary Qualifying Project. July 1998

2.6 Boat Turbulence and Canal Damage

Turbulence is a result of the boat's propellers (props) turning underwater. The definition of turbulence is: “unstable eddying motion in a fluid”. The props do not cause wake, or any other particularly visible disturbance, because the water they displace is replaced by more water as quickly as it moves. However, the displaced water continues away from the props interacting with the water it collides with, thus creating small localized currents of sorts. If the turbulence occurs near enough and in the direction of the



Figure 5 - A Venetian Vaporetto

docks and building foundations, it begins to erode the surface. Each bit of turbulence does not do significant damage by itself. In fact, the effect is almost negligible. Due to the vast number of boats that patrol the canals daily, however, the turbulence's effect becomes much more noticeable over time.

The problem is particularly bad near common docks, such as those for the vaporetto. Boats will typically run the motors slowly while docked so as to stay close to the dock and allow people to board more easily. As a result, sections of foundation have been eroded over time around such areas.

2.7 Illegal Garbage Dumping

In researching the background for this issue, no news or magazine articles were found (using EBSCO Host) nor any web nor Venipedia articles describing a widespread garbage problem in the city of Venice. However, human nature being what it is, there are some areas in which there are find habitual offenders. In other words, certain people do not understand the reason for the law and therefore consider it a nuisance to be avoided. They put the trash receptacles or just trash bags out at their own convenience without regard for the inconvenience caused to others. The inconveniences that others endure include sidewalks and alleys blocked by cans or bags of garbage and litter strewn streets as a result of trash blown out of its container or thrown around by foraging birds and animals.

As background for this installation it would be helpful to know how trash collection does work in Venice. VENEZIA Servizi Territoriali Ambientali (VESTA) is the waste management company for the city. VESTA collects garbage 6 days a week. Upon arrival, the garbage collector knocks or rings the doorbell to alert the residents to their arrival. The resident then allows the worker in to collect the trash, or the resident himself/herself will bring the trash to the cart. The cart, once full, is then brought to a dockside collection station to be emptied onto a barge. The barge also collects the

recyclables in a separate bin.¹⁷ It is not necessary for the resident to be home at the time of collection. The resident is allowed leave the trash outside in the morning, but not the night before and not on Sundays. It is very difficult for enforcement personnel to catch a scofflaw “in the act” so this installation hopes to do that for us, in a sense.

2.8 Rising Tide

The relationship between Venice and the Adriatic is fragile. The city depends on the twice daily tide to flush out its sewer system. In this way the tides are beneficial and necessary for Venice as a city to function. On the other side of this coin the “aqua alta” (meaning: high water) happens much more frequently now than a century ago and is an example of the tides being problematic. This condition is when the high tide is so high that it floods over the edges of the canals. John Keahey, author of the book Venice Against the Sea states that 100 years ago, extreme high tide happened on average 7 times a year. In the 1950s, that number rose to 20 times a year.¹⁸ In 1989 aqua alta occurred 40 times and in 1996, 99 times¹⁹. Sixteen hundred years ago, the sea level of the Adriatic was almost six feet lower than it is today. An IQP study done in 2004 estimated that the sea level around Venice is rising 0.23cm per year.²⁰

There are several conditions being blamed for this. Global warming and its result of melting polar ice caps are causing sea levels to rise around the planet.²¹ In the early part of the 20th Century, industries pumping groundwater under mainland Venice caused the islands to subside, that is the base of the islands sank into the space that formerly held ground water.²² Heavy shipping and cruise ships are damaging the lagoon.²³ Silt buildup and not being dredged out of the canals in a timely matter also contribute to the increased water level.²⁴

2.9 Youth Issues

Graffiti is most often viewed as a crime. It is the name for images or lettering scratched, painted or marked in any manner on property not owned by the person doing the marking. In many cases, it is unsightly and unwanted. Despite the social stigmatism attached to graffiti and the graffitist, this type of self expression has thrived since ancient times. Examples of graffiti have been found in ruins of ancient Greece and Rome.²⁵ The graffiti artists in modern times uses this medium to express their views on social issues in

¹⁷ Lorente, Daniel, Moore, Tyson, Tang, William, Waggener, Nikolas. The Establishment of a new Recycling System for the Historical Center of Venice. An Interdisciplinary Qualifying Project. July 2002.

¹⁸ Harris, Joseph A. Turning the Tide. Smithsonian Magazine. September 2002. Vol. 33 Issue 6, pg 76

¹⁹ www.pbs.org/wgbh/nova/venice/solutions.html

²⁰ Angelini, Nick, Corsetto, Laura, DeFusco, David, Scarsella, Michael. Reconstructing Sea Levels Prior to 1872 Through Venetian Art and Architecture. An Interdisciplinary Qualifying Project. July 2004

²¹ <http://www.epa.gov/climatechange/fq/effects.html#q11>

²² http://www.en.wikipedia.org/wiki/Venice#sinking_of_Venice

²³ The Rise and Fall of Venice. Geographical (Royal Geographical Society). Jul2000, Vol. 72 Issue 7, p26

²⁴ http://www.venipedia.org/index.php/Canal_maintenance

²⁵ <http://en.wikipedia.org/wiki/Graffiti>

the public forum. Because certain people are drawn to expressing themselves in this way (and because many more may have the urge yet refrain) this is a very attractive method for the Venice Project Center to engage the youth of Venice.

2.10 Urban Reality Game

URG or Urban Reality Game, and ARG or Alternate Reality Game are synonyms for the latest wave of entertainment for avid puzzlers. Also called “pervasive gaming”, the development of the story depends upon hundreds of players working to piece the story together, while at the same time influencing its outcome. As opposed to video or computer games, ARGs are not concerned with the technology. The ARG uses whatever exists in the real world, whether billboards or pamphlets or payphones, to leave clues, plotlines and interactions between players and characters. Everything fictional is made to seem as real as possible. But it is the interactivity of the game that makes it so popular. It’s the chat – gossiping, guessing, and working as a team creating the narrative – that players love as much as the puzzle itself.²⁶

The first game of this genre *The Beast* (by 42 Entertainment, 2001), but it was the enormous success of *I Love Bees* in 2004 (created by 42 Entertainment and commissioned by Microsoft) that made people think of the possibilities. Ultimately, *I Love Bees* was a marketing ploy leading up to the release of the computer game *Halo 2*. But since then not-for-profit groups have used this device to raise awareness of issues in a very realistic way. Case in point is *World Without Oil* (created by Ken Eklund, funded by Corporation for Public Broadcasting and presented by **Independent** Television Service 2007), an ARG that had players searching for and actually finding solutions for a society without fossil fuels.²⁷

ARGs as an art form have many possibilities. Andrea Phillips, an ARG writer and producer who was part of the team at London-based developer Mind Candy, which produced the game *Perplex City* says, "A lot of people in entertainment are seeing the value of using alternate reality gaming to tell stories as their own creative form, not just as a buzzy viral way to get more eyeballs....Collaboration in storytelling is an old tradition, even older than print. All our stories are ultimately descended from this sort of back-and-forth oral tradition. So you could say we're working to reclaim something we lost hundreds of years ago when we first started recording narratives with pen and paper, and later with film."

2.11 The Venice Biennale

The Venice Biennale is one of the most prestigious cultural institutions in the world. In 1893 mayor Riccardo Selvatico and the Venetian City Council passed a

²⁶ Stewart, Sean. 2006. Alternative Reality Games. Available online: <http://seanstewart.org/interactive/args/>. accessed March 13, 2009

²⁷ Wollenberg, Anne. 2008. ARG is an Alternative Way to Play with Real World Problems. Guardian. July 24, 2008. (available online: <http://www.guardian.co.uk/technology/2008/jul24/games.internet>)

resolution to set up an Esposizione biennale artistica nazionale (biennial exhibition of Italian art), to be inaugurated in 1894. Ever since, it has been in the forefront of promoting what is new in the art world by organizing international events. The scope of its mission includes multi-disciplinary art forms such as dance, music, film, architecture, theatre, as well painting, sculpture and multimedia contemporary art.

The Biennale uses many venues are available to it through agreements with the Venetian government. From the city council they make use of the Giardini di Castello for its visual arts and architecture exhibitions, and the Palazzo del Cinema and the Palazzo del Casinò on the Lido for cinema. By agreement with the Italian Navy and



Figure 6 - The Venice Biennale

Inland Revenue, the Arsenale is also used for visual art and architecture, and the Teatro alle Tese and the Teatro Piccolo Arsenale is used for dance, music and theatre.

In 2004, the Biennale was transformed into a Foundation. The Foundation has been charged with taking the Biennale from an attraction of major events to a permanent exhibition center and a laboratory of culture, art and ideas. Currently, the Venice Biennale's Historical Archives of Contemporary Arts (ASAC) holds a database concerning the film library, photo library and Venice Film Festival. Future plans include expanding this database to bibliographic, historical, and scientific records of the Biennale and the arts. These include the documentation collected since its foundation in 1895.²⁸

For a discussion of public art, social issues in art, and art installations see Appendix A.

²⁸ www.labiennale.org

3. Methodology

The methodology used to determine the technical requirements are common to each installation. Any special considerations are detailed in the Results and Analysis section of this document.

3.1 Mission

The purpose of this project is to help the Venice Project Center use art to highlight the findings of past IQPs. This was accomplished by examining the feasibility of artistic concepts and exploring media that allows for interaction between designers or between observers.

3.2 Boundaries

The scope of this project is limited to the technical aspect of the creation of each installation. This includes the selection of equipment, the arrangement and relationship of the chosen equipment, and the assessment of the feasibility of the solution.

The selection of location, supply of external needs or stimulus, and detailed assessment of the operating cost of each installation is outside the scope of this project.

3.3 Objectives

The objectives for research in each installation were to determine and evaluate key aspects common to each situation.

The objectives for each installation are:

1. To determine the requirements
2. To assess interactive and collaborative possibilities
3. To devise a system to achieve the artistic goal
4. To determine the equipment needed to implement the system
5. To identify logistic challenges

3.3.1 Determining the requirements

The first step in determining the requirements is to understand the desired result. This is necessary to ensure that the goal of the installation is preserved. To understand the desired results, the outline for each installation was reviewed. The installation concepts were also discussed with members of the Venice Project Center. Questions were asked such as “Will this be implemented indoors or outdoors?” “Who is the intended audience?” “What is the artistic vision behind this installation?” and “What is the desired effect?” These questions were important to gain an understanding of each installation as a work of art, and then to design the system to produce that artwork.

Please see Appendix B for the “Sponsor Requirement Form”

3.3.2 Assessing the interactive and collaborative possibilities

Involving the observer is an important aspect of each installation. When the observer is engaged by the artwork, the observer takes more notice, and the message can be more easily conveyed. To determine appropriate methods of interaction for each installation, ideas were discussed with members of the Venice Project Center. The possibility of initiating an ARG in the future created a need to consider a way to incorporate clues into the execution of each installation to allow for the progression of the game.

3.3.3 Devising a system to achieve the artistic goal

Once the requirements for each installation were known, a system could be devised to combine various pieces equipment in such a way that it produces the artwork desired. Such a system design would include the placement of equipment and the sources for all technology needed.

3.3.4 Determining the equipment needed for implementation of the system

With a completed system concept, equipment would be found to produce the desired results. By searching the internet for companies that specialize in such things as projection equipment, motion detectors, and computer software, the implementation team can choose the equipment best suited to the installation. The internet is an effective tool for evaluating products because of the availability of additional information such as customer opinions and expert reviews. Comparative pricing information is also available through the internet. By starting with a general search on the phrase “projection equipment”, for example, a trail begins to form. A list of companies and models are displayed. Then it can be determined who makes the equipment with the needed features. Customer opinions and expert reviews can be considered at this point in order find the model best suited to the needs of the installation. Once a model has been decided upon, price comparisons and where to actually purchase the equipment are considered.

3.3.5 Identify logistic challenges

The environment chosen will have an impact on concerns that are common to all these projects. Many of these ideas will need electricity and data for some sound or video projection equipment. Any equipment used will have to be weather, damage, and theft resistant. Equipment would also need to be placed so as to not be in the way of anything, have no obstructions itself, and be as discreet as possible. In the process of meeting the previous 4 objectives, various logistic issues such as these have been discovered. The resolution of these issues is outside the scope of this IQP. An enumeration of these issues appears in the Results and Analysis section for each installation.

4. Results & Analysis

From applying the methodology to the concepts and issues behind each installation, we have determined some common requirements for each installation.

Each installation must:

- Engage the viewer's senses, both in attracting their attention to the display and interesting them in the message of the display.
- Be subtle and unobtrusive to the natural ambience of the surrounding area
- Be meaningful, that is, touch the emotion and/or the intellect of the viewer to care about the social issue
- Have the possibility to coordinate with the other installations around Venice.
(This may need to be implemented separately due to time or money constraints.)

The following is a table of the installations and the senses it will engage:

Name	Concept	Issue	Sense
Storefronts	Project older image of flourishing store on top of shuttered shop	The transformation of the retail sector in Venice	sight
Wakeup	Project information about <i>moto ondoso</i> on a canal wall. Option 1: you can only read the information when the water is still; option 2: you can only read it when there is wake	Damage to canal walls due to boat wakes	sight
M.I.A.	Project image of public art that has gone missing in the spot where it used to be on display. Slide loop will stay on main image, but will also quickly flip through other missing pieces in Venice	The disappearance of public art	sight
The Toll	Beam an ultra-directional sound to passers-by. The audio beam will broadcast a number of "dead tolls" corresponding to the number of people who died in Venice that day. The tolls will be in a loop. We could consider overlaying another set of sounds to correspond to births.	The demographic decline of the city	hearing

<u>X-Ray</u>	Project the "guts" of a bridge from underneath, showing the pipes and cables that go through it	The hidden skeleton of Venice – appreciating infrastructure	sight
<u>Bubbletto</u>	Rigger a soap bubble machine whenever <i>vaporetto</i> docks at nearby boat stop	<u>Turbulence</u> , the invisible threat to canal walls.	Sight and touch
<u>Scents & Sensibility</u>	Spray a strong perfume whenever a bag is dropped (at a known dumping location) in the streets of Venice	Garbage bags left out overnight against city regulations	Smell and maybe touch
<u>Scratchitti</u>	Scratched sound graffiti highlighting location-specific issues anywhere in Venice	Audio addition to any of the installations	hearing
<u>Brodo di Pesce</u>	Eat a soup and watch the sea level change	The fragile relationship between Venice and sea level	taste
<u>Spray It Forward</u>	Electronic graffiti with societal messages (and sounds?)	Youth issues	touch
<u>URG</u>	Urban Reality Game intended to supplement and work with the installations. The URG could require players to learn about the issues that the installations are illustrating in order to advance in the game.	All. This would encourage people to investigate the reality behind their city.	Sight, hearing, touch, smell, and <i>Intellect</i> (the 6 th ?)

Each individual installation also has the possibility of being implemented indoors or outdoors. By indoors we mean a venue such as the Biennale and by outdoors we mean working within the streets of historic Venice. The results and analysis for each individual installation will now be presented.

4.1 Storefronts

This Installation would address the issue of transforming the retail sector of the city. In Venice, as with any city, businesses move in and out of any given area. More specific to Venice, however, is the type and appearance of these stores. The old retail stores had a certain appearance that added to the charm of the city, and gave the area character. These stores have been disappearing in recent years, and the new stores that have been replacing them are consistent with modern businesses. That is to say, the new businesses have a less charming appearance, and look the same as they would in any city, and therefore do not add as much to the unique personality of the city in which they reside. Furthermore, some of the old stores that go out of business are not reoccupied, and so just remain as boarded up buildings.²⁹ The artistic vision of this installation is to “revive” some of the old businesses that once added charm and functionality to the city.

4.1.1 Installation Requirements

If a vacant building was used, the installation would be accomplished by projecting images of activity onto the empty windows of the old buildings. The images would be silhouettes of people in the store, making purchases and interacting with the staff and each other. The projection equipment could be placed inside or outside of the building with the images landing on screen covered windows. Logistical challenges of outdoor placement include theft or vandalism of the equipment, weather damage, and lack of electricity source. These issues do not exist for indoor placement.

If an exhibit hall, such as the Biennale was used, the installation could be accomplished by projecting an image of the old building itself onto a screen and then using another projector, showing the silhouettes through those windows. Another method would be to build a theatre type façade of the front of an old Venetian building. This façade would then be used to accept the images.

4.1.2 Interactive Possibility

In order to keep the display fresh and interesting, it is desirable to have the installation interact with the viewers. There are two main possibilities we found for interaction with the viewer: 1) whether or not the video is pre-generated or real-time and 2) whether or not the display is activated by a viewer.

1) The images could be derived in a few ways. Though this not interactive, a pre-generated film to display is the simplest is to have. The movie could be made in a studio

²⁹ Chandonnet, Greg, Christo, Andrew, Pope, Patricia, Singh, Karen. The Evolution of Stores and Decline of Residential Comfort: The Availability of Necessary Goods in the Historical Center of Venice. An Interdisciplinary Qualifying Project. June 1, 2009. <http://users.wpi.edu/~ppopestores@wpi.edu>

and enhanced with special effects techniques to make clear silhouettes. A more complicated but more interactive way would be to derive the images from the people on the street. With this method the activity in the store window could be somehow derived from video footage of a nearby street. This method would very subtly engage passersby and observers by incorporating them into the installation. This involvement could be real-time, time delayed, or just loosely based on the footage.

In order to incorporate footage from the streets into the projections, there must be a way to process the video feed from the cameras. If the street footage is to be incorporated directly from the feed into the projection, then all that is necessary is to have the videos combined in the desired way. If the video feed is to be modified before incorporation, more advanced video processing will be required. In order for the people on the street to be used as a basis for silhouettes, their bodies must be identified within the video footage. Software does exist that can perform this function, but it is expensive and complex to use. Once the people were identified in the footage, their outlines would then be extracted from the feed to be used in the projection.

2) A system of displaying pre-generated video which is on at all times is the simplest of all to implement. This would require a projector and some sort of computer to supply the footage. The projector would be placed inside the store, making power and security less of a concern. This would back project on screens in the windows. The motion detector would activate the projection only when there was activity in the street, to save on power and lamp life of the projector.

To cause the system to react to a viewer, a simple motion detector could be used. The basic application would be to have the system turn on whenever someone came within range of the installation. Another version of this would be to locate the motion detector on another street, causing the installation to activate and surprise the person passing in front of the building.

Another way for the installation to react to a viewer would be to limit the area on the windows upon which the video would be displayed. The image could be displayed only on sections that are shadowed by the observer, so the observer would need to walk up to the window and 'look in' to see the activity in the store. This method would require that the image be projected from the back of the screen. The system to implement this would also require a projector and some sort of computer to supply the footage. For the interactive possibilities, video cameras and some sort of motion and/or shadow detection device would also be needed. A typical data projector can be used to display the footage on the screen. The detection system can be done with the use of webcams, or standalone motion detectors. Motion detectors are available at typical hardware stores. While a webcam would provide more functionality in one device, it becomes more complicated to actually implement those functions other than the video capture device. There exist common software applications that allow the webcam to record video footage, and then

to store, manipulate or display it. In order to use to a webcam as a motion or shadow detector, a custom software application would be needed to analyze video feed and determine the composition of the footage in terms of movement or shadows and their locations. A standalone motion detector could be incorporated without much difficulty to begin the display when sufficient movement is detected in the vicinity.

The simplest way to implement the shadow trigger is available during the daytime. The sunlight will naturally drown out most of the visible image, making the screen appear mostly blank. When the observer approaches the screen to investigate, they would cast a shadow on the store front. This will reduce the interference from the sunlight, and allow the images to be visible. If the same effect were to be implemented at night, or when there is less sunlight to work with, the process would be much more difficult. The computer that controls the projector would need to know where on the image the observer's shadow is, and only project in that region of the screen. This would require devices to identify the location of the shadow outside the building, and have a method for the computer to isolate that region of the image to send to the projector.

For a different implementation of this idea, an installation could be set up in a display area such as Biennale Exhibit Hall. An image of the entire storefront could be projected onto a screen or a wall. This indoor display allows an extra degree of detail in the video because we have more control over the brightness of the area. In this way the "people" in the store can be more than just shadows. As an alternative, within the gallery, a stage type façade could be built for the installation as the base upon which the projection is made. This adds a convincing physical element to the display but also adds permanency to the scene. The projection could include videos of real people or animated images doing business in the store.

The interactive possibilities for the indoor implementation are similar. Cameras, video or still, could be placed in hidden or visible places to take pictures or videos of people who are visiting the exhibit. These images could be used to directly place the viewer in the store real-time, or could be stored for later. Stored images could be processed and used to add the person into the pre-generated video, to make them part of the life scene in the store. This could be done with face recognition software that would place the face of the person onto a template character. With more camera angles, image processing, and templates, the person could be fully incorporated into the scene. Over time with either of these methods, the characters in the store could be completely replaced with people who have visited the exhibit, possibly creating a database from which to pull a set of characters that rotates day to day, or even over the course of the day.

4.2 Wakeup

Most cities rely on roads as their main thoroughfares. Venice is different in that the city uses canals. The Venetian canals, like all busy thoroughfares are susceptible to wearing out. The main difference is that wear in the canals takes the form of erosion of the canal walls rather than a roadbed. This is a problem primarily because many of the canal walls are also the walls and foundations of buildings. As such, if the canal walls erode outward, the adjacent building wall erodes inward. Erosion of the canal walls is difficult and costly to repair.

The erosion is caused by boats disregarding the posted speed limits, and therefore create wake in the canals. The boats' wake travels out from the boat and bombards the canal walls. Over time, this wears out the wall in the same as the ocean wears away a rocky cliff. This installation attempts to draw attention to this problem.³⁰

4.2.1 Installation Requirements

This installation would project an image onto the canal wall. The image could be a message about the damage, and difficulties in repairing it, or it could be an image of damage to a canal wall taken somewhere else in the city. In either case, a sensor in the water would detect the presence of wake in the canal, and change the projection in a certain way to illustrate the effect of wake. The projection could be turned on or off, or it could change from a healthy canal wall to an image of a damaged wall.

4.2.2 Interactive Possibility & System Design

This installation is fundamentally interactive, because it is the action of the passing boats that cause the reaction in the projection. As boats pass by at higher speeds, they will create wake. There would be a sensor floating in the water in the canal that would detect the presence of the wake and also its magnitude. When wake of sufficient magnitude is detected, the output can change.

This installation requires a projector and a sensor, for either the indoor or outdoor implementation. The requirements of the projector are the same as they are for the Storefronts installation. That is that a very bright projector, 2000 lm or more, with variable output brightness is needed for the outdoor implementation, and a projector of less, but still significant, intensity is needed for the indoor implementation. For the outdoor implementation, the contrast ratio and output resolution of the projector are also important. These will allow the projection to better be seen on the canal wall.

The output of this installation would be a projection on a canal wall. There are many possibilities for what this projection could be. The image would be projected

³⁰ Chiu, David, Jagannath, Anand, Nodine, Emily. The Moto Ondoso Index: Assessing the Effects of Boat Traffic in the Canals of Venice. An Interactive Qualifying Project Report. July 30 2002.
http://www.wpi.edu/Academics/Depts/IGSD/Projects/Venice/Center/Projects/IQP_public/E02/MotoOndoso/E02_Report-MotoOndoso.pdf

directly on a canal wall from the opposite side of the canal. The image when the water is at rest could be a message about how wake affects the walls, or how difficult it is to repair eroded walls. The rest image could also be something more artistic to convey the message, or it could be nothing at all. The image shown when there is wake in the canal could also be one of many things. It could be a message or image illustrating the effects of wake on the walls, or it could be an image of damaged walls, projected on the good walls. This image of damage could also be enhanced with information about wake and the canals.

One unusual way of adapting the image to the conditions in the canal would be to reflect the image off of the water's surface. This would make the image readable only when the water is still. When there is wake in the canal, the image is dispersed and becomes unreadable. An even more unusual alternative would be to reflect the image off the water, but have it readable only when there is wake present in the canal. This could be done with high quality video cameras, a powerful computer, and some sophisticated software. It is possible to observe the surface of the water and its effects on the reflected image, and calculate a series of modifications to the source image such that the reflection is readable and somewhat clear. While this is possible, implementing the system is very complicated and difficult.

As a more reasonable alternative for responding to the conditions in the canal, there could be multiple sets of images that could be used at different times, depending on conditions. This would require only sensors in the water to measure the wake. The sensors in the water would detect the magnitude of the wake, and select different sets of images for display. The image sets could be clear for when the water is still, and varying degrees of distorted for the different magnitudes of wake. The advantage of this method is that it allows more response to the actual conditions in the canal, while being easier to generate and display. All the images would be pre-generated, and so would not require significant computing power to produce in real time.

To implement this installation indoors, a wave tank of sorts could be used to simulate the wake. The wake could be produced by a large paddle at one end that just pushes back and forth. Alternatively, one or more propellers could be placed in the tank to create wake and turbulence similar to the boats in the canal. There could be particles in the water to make the currents and turbulence more visible. A projection or physical model could be used to illustrate the effects of the wake in a sort of time lapse fashion.

For the interactive element to the indoor implementation, the wake generation could be controlled by the visitors. The paddle could be moved manually, or have settings for magnitude and/or frequency. A propeller could be turned or aimed, and the speed could be controlled. Interactions would work better with a physical model, if one could be created that could be reset without too much trouble. Interactive effect on a projection could be managed, with difficulty depending on the level of realism desired in the

response of the image.

4.3 Missing In Art

Venice is a city rich in art. Much of the city's art was once on public display for everyone to enjoy. Over the years, this public artwork has been disappearing, either due to damage from age, vandalism, theft or other reasons. Many of the missing pieces have been preserved in images or photos taken while they were still available. The loss of this artwork is another blow to the list of things that makes Venice unique.³¹

4.3.1 Installation Requirements

This installation would take preserved images of the artwork, and project them onto the locations that the art once occupied. This would be a way to bring back some of the missing artwork, and help restore some Venice's lost beauty. This is one installation that could be duplicated in many locations for increased effect.

4.3.2 Interactive Possibility & System Design

This installation is fairly straight forward. The projector needs to be in a good spot to have a clear shot at the surface it is to project on. Then the decision must be made as to which piece of artwork to display. There are some options in this decision. Either the image of the art that used to be at that location or another piece of artwork could be used. An alternate piece of art could be chosen for specific reasons, such as to incorporate into an Alternate Reality Game, or to make a particular point. This decision is at the artist's discretion. The image could also be embellished by adding historical information relevant to the artwork or location. The interactive possibilities for the outdoor implementation are somewhat limited. For example, the image could be triggered by motion in the vicinity or in a nearby location. The motion detector would activate the projection only when there was activity in the street, to save on power and lamp life of the projector.

Implementing this indoors changes things somewhat. An indoor location takes the art out of context as far as where it used to be. This could be compensated for with one larger image that includes some surroundings, multiple projections to show more of the surrounding area, or a small map in one corner of the image to show where it used to be. There could be multiple of these set-ups for different pieces of art, or have just one that cycles through various locations. The indoor venue could provide power outlets and places to put computers to control these images. Being inside would also allow for more tolerance of projector brightness (or lack thereof).

There could be a screen or other interface to allow visitors to choose what is

³¹ Foley, Meagan, Larsen, Alex, Navien, Timothy, Riley, Phoebe. Preserving Venetian Heritage. An Interdisciplinary Qualifying Project. December 12, 2008. http://www.veniceprojectcenter.org/B08/ve08-pres/B08_Preserve/REPORT/PDF/Report_Preserve-B08.pdf

displayed. Choices could include specific pieces of art, areas where the art used to be, or maybe a "grab bag" sort of item where a randomly chosen piece of art would be displayed. If the display was implemented on a small scale, large enough for only a few people at a time with displays reaching around the viewer, "head tracking" could be implemented. Head tracking, as shown in the videos on Johnny Lee's website³², would require the viewer to wear a headset of some sort. With some more detailed and complete footage of the areas where the art was, this would allow the viewer a very realistic and involving experience. This would require a small scale display, because the effect of head tracking only works for the person wearing the headset. With or without the head tracking, a real or animated aerial "fly to" type of transition, similar to what Google Earth does, would add an interesting touch to the transitions. This would require some aerial footage or possibly use Google Earth or some part of it for the location transitions. Using Google Earth may involve acquiring some permission for this type of use, but this could be easier than creating/acquiring the footage ourselves.

4.4 The Toll

The idea behind this installation is to bring awareness to Venetians that theirs is an aging society. The average age in Venice is currently around 50. Often young people move away to pursue professional jobs³³. There are certainly many other factors causing the demographic shift, including factors that bring young people into Venice. Bells are an important part of the culture of Venice. Since the first bell tower was constructed in the 7th Century, Venetians have heard the message of the bells. Each single bell or combination of bells each have their own meaning.

4.4.1 Installation Requirements

This installation would play sounds according to the number of births and deaths in the city for the day. This would be in the form of beaming ultra-directional sound in a given place, so that when someone walks by they can hear the toll. The directionality of the sound would help grab peoples' attention, because the sound will begin and end abruptly. There would be one sound for each person who died, and a different sound for each birth that day. These would alternate, so that when one count completed, the other sound would continue. These counts can be found online. This would draw the people's attention to the imbalance between the numbers.

³² <http://johnnylee.net/projects/wii/>

³³ Birmingham, Meagan, Kejriwal, Akhil, Marquis, Julie, Peña, Pedriant. .Challenges and Opportunities of Young Venetians. An Interdisciplinary Qualifying Project. B term 2008.

4.4.2 Interactive Possibility & System Design

This installation would require speakers and some sort of source for the audio, at a minimum. Other devices may be added to expand functionality, such as a motion detector to conserve power. The speakers could be directional, such that the sound can only be heard when right in front of the speaker. This would help grab attention, as the sounds will start and stop suddenly. Truly directional speakers tend to be expensive. They can be in the neighborhood of \$300 for pseudo-directional, or up to \$1700 or more for actually directional speakers. Normal speakers could be used along with shells or cones of various sorts to simulate the effect of directional speakers to a certain extent. This would be the more cost effective option. There are other unusual types of speakers that could be used to make the installation that much more memorable. For the outdoor implementation, weather must be taken into account. While not 'directional', there exist speakers that are designed to be used outdoors that should be considered.

Once the speakers are in place, the source for the sound is needed. Simple mp3 or other recording devices will be adequate if the sound is to be a fixed message or track. If the sound is to be changing daily or otherwise relatively frequently, an alternate method should be considered. A device with a wireless connection and some programmability would be necessary if the soundtrack were to be automatically updated daily with the birth and death counts for the city. The updates could be done manually, but still wirelessly, by having a source device with Zigbee or Bluetooth capability. This would allow one of the installation's designers to discretely approach and update the soundtrack on the device connected to the speakers. A Sun SPOT or certain Arduino devices would have this wireless capability. While neither possess typical mp3 capability, they would be able to produce the sounds with a little work. They could use a digitally sampled version of the soundtrack, and pulse one of the general IO pins at varying frequency to produce the sound. There are many resources, such as forums about how to create sine waves and just about any other shape wave using a pulse width modulated signal and a filter.

The sound played through the speakers could be a combination of two sounds: a bell toll sound for each death of the day, and some more cheerful sound for each birth. The births could possibly be represented with cheerful bells, a baby cry, a baby laugh, or any other sound that could be associated with children. The sounds could alternate until one ran out of counts, or each sound could play its full count time and then have the other play.

4.5 X-Ray

The bridges that span the canals are very important parts of the city's infrastructure, and are necessary for more than just getting across the canals. The bridges provide a means to get pipes and cables across the canals, without having them in the way of anything. Many people are not aware of the important role the bridges play in the city's daily functionality.

4.5.1 Installation Requirements

This installation would project the inner workings onto the bridge, so people would realize how much the bridges do for the city. The bridges are also the way for pedestrians to cross the canals, so they are used a great deal. All the traffic across the bridges puts strain on them, and so they will eventually wear out.

4.5.2 Interactive Possibility & System Design

This installation would need a projector, and possibly a motion detector, camera, speakers, or some sort of stress meter. The image for the projector would need to be created for any of the options for this installation. There exist pictures of the internals of the bridges, but these are not quite suitable for this purpose. The pictures can, however, be used as the basis for new images to be created. The new images will be of the correct size and artistically interesting while still being representative of the actual structures in the bridge. The other advantage of synthesizing an image for use in this installation is that it is easier to manipulate the image as needed. For example, if the image is to be displayed on the underside of the bridge, it will be projected on a curved surface. In this case the image should be stretched and warped before projection, so that when it lands on the curved surface, it appears straight and clear.

One concept for this installation is to project the interior contents of the bridge onto the underside, so boats in the canal can see it as they pass under the bridges. This method keeps the projector out of the way, and somewhat more discrete. It also guarantees that the image will be projected onto a shadowed surface, so the projector used does not need to be as bright. The disadvantage is that the audience is mostly limited to the boats in the canal. Another method would be to place the projector to one side of the bridge on top of the wall, or on the sidewalk, and project onto the side of the bridge. This requires more careful placement of the projector, so that it is safe, out of the way, and discrete. The pre-distortion of the image will be a little simpler for this angle, and shaping the outline of the image is of less concern, because the blank portions of the image that do not land on the bridge will be nearly invisible by the time they do land on a surface to be seen. With careful selection of the bridge and which side of the chosen bridge is used, this could also be projecting into a shadow for most or all of the day.

In addition to the projection, other aspects were discussed. The possibility of making a creaking or similar sound when a certain weight is present on the bridge was considered. This would be representative of the effect that the constant load of

pedestrians has on the bridge, and its contribution to the bridge wearing out. While this sounds simple, the measuring of the weight on the bridge is somewhat difficult. There exist sensors that will measure the stress on a structure, but such sensors are typically used on large scale structures, and are typically integrated during construction. In order to use sensors for this purpose they would need to be attached and calibrated in such a way as to detect relatively small changes in stress on the bridge. While the weight on the bridge could change significantly according to the number of people on the bridge, the bridge will not move or shift much at all, as it is designed to do. Sensors would therefore need to detect the small indications of the stress on the bridge. This will be difficult to accomplish with sensor that have not been integrated and calibrated to the bridge in question. This method of responding to the load on the bridge is not feasible.

As an alternative to stress meter for assessing the load on the bridge, a webcam could be used to look at how many people are on the bridge at a given time. It would be possible to use the webcam to compare the current image of people on the bridge with an image taken when there was no one on the bridge. There exists software that will be able to perform this comparison, and the result can be used in the decision as to the sound to be played. The software could look at the amount of motion on the bridge, or could compare the amount of the original image that is visible through the crowd. This is a more reasonable method by which to interact with the load on the bridge, though it is still a rather involved process. The simplest method by which to trigger the sounds would be generic motion detector, although that might not have the desired resolution to distinguish between differing load levels. The motion detector would really only be able to tell the difference between “load” and “no load.” It might be possible to increase the resolution by adjusting the tolerance of the detector to require more movement before triggering.

To implement this idea indoors, there could be mock-ups of the bridges and even other parts of Venice set up in the area. These could be screens on which the images of the pipes and such would be projected. Visitors could walk around the area and look at the inner workings of their city. The floor could be decorated so as to resemble the canals and other ground work of Venice. This could simplify the projection by including the background textures in the image and projecting everything onto a white screen, rather than having to compete with an existing texture. These displays would likely be back projected so that the viewers do not block the projections as they get close to examine it.

Interaction with this installation could be accomplished by using a method based on the interactive whiteboard shown on Johnny Lee's³⁴ website. By having the projections be of only the surface of Venice visitors could be provided with a "flashlight" or "X-ray vision" of sorts, and/or a pen or pointer device like those shown in the video. The flashlight could be detected and in the areas where it "shines" the inner workings

³⁴ <http://johnnylee.net/projects/wii/>

would be displayed. Somehow in conjunctions with, or possibly instead of the light or x-ray, pointer devices could be used with the multi-point tracking of the WiiMote to allow the viewers to select an area of the display to bring forward enlarge on the display. If implemented on a small scale, the head tracking (also on Johnny Lee's³⁵ website), could be used with the pointers to allow for 3D manipulation and viewing of the pipes and such inside the city.

A final system that was considered would project onto the side of the bridge from the walkway. The image would be distorted such that it arrived on the side of the bridge and reflected to appear square. A number of motion detectors would be used to activate the display only when there are people around to see it. The projector would need to be placed at a bridge that has one side that faces away from the sun most of the time. This would allow the InFocus IN26+ to be used more comfortably, although this projector should be adequate for use in more direct sunlight.

4.6 Bubbletto

The Vaporettos are the public transportation of Venice. They are constantly traveling from dock to dock, taking people where they need to go. When they get to each dock, they need to stay put, so that people can safely get on and off. This is commonly done by idling the engines and driving very slowly into the dock, to hold the boat against the dock. This causes a problem called turbulence.

Turbulence is the result of the propellers driving the boat. It is not usually a problem, as the boats travel in the canals, and far enough away from the walls that the turbulence dies out before it reaches the walls. The problem at the docks is that the turbulence is caused right up against the docks, so that is barely diminished by the time it hits the wall. This serves to erode the wall under the dock. This is clearly a problem, as the docks could potentially collapse if enough of the wall beneath it erodes.

4.6.1 Installation Requirements

This installation is one of the more subtle projects considered. This reflects the subtlety of the turbulence itself. Turbulence is difficult to observe, because it is water moving through water, without reaching the surface, in general. This installation will be a bubble blowing machine positioned in the vicinity of a dock where the Vaporettos stop. A sensor in the water will detect the arrival of a boat, and the turbulence it causes. This will then activate the bubble machine. The winds in the area will blow the bubbles around, similar to the movement of the water.

³⁵ <http://johnnylee.net/projects/wii/>

4.6.2 Interactive Possibility & System Design

This installation interacts with its environment more than the direct observers. This will respond to the schedule of the Vapporetto, and the observers will need to figure that out. The most basic implementation of this installation is to use a timer to trigger the bubbles. The timer would be set to the schedule of the Vapporetto, and so would be close to the correct timing, but not exactly in sync.

A more accurate, although somewhat more complicated implementation is to have the bubbles be triggered by a sensor rather than a timer. The bubbles would be triggered by the arrival of a boat, which will be detected by a sensor in the water. The sensor could be similar to the sensor used for *Wakeup*, or it could be optical based, similar to a motion detector. It could also be placed completely underwater to detect the turbulence itself, but that carries the risk of it getting caught in the boat's propellers and damaging the sensor and possibly the boat.

The optical sensor method would involve an infra-red (IR) emitter and an IR sensor both mounted on the side of the dock, pointing out towards the canal. When a boat reaches the dock, the light from the IR emitter would reflect off of the boat back into the sensor. This will tell the device that is monitoring the sensor that the boat has arrived. These sensors are fairly simple to implement, and are commonly used in applications as proximity detectors.

Regardless of how it is detected, once the Vapporetto has arrived, another controller activates the bubble machine. The bubble machine will be placed such that the bubbles can be seen by the people at the dock, but still be out of the way. A good place for it might be on top of the covered waiting area. The motion of the bubbles in the air is analogous to the motion of the water in turbulence.

If this installation were to be implemented indoors, it would take more creativity to arrive at a trigger for the bubble machine that is subtle, but not impossibly so. One possibility is triggering off of the arrival of guests, either to the exhibit hall or the specific exhibit itself. The trigger could also be from video monitoring of a nearby Vapporetto stop, with a sensor arranged the same way as it would be for the outdoor implementation. The video feed could be displayed in the exhibit somehow to help viewers make the connection, or the video could be excluded to make it more difficult. The trigger could also come from one of the other exhibits, if several of these installations are implemented in the same place. For example, the trigger could come from the *Wakeup* section, when the participants point the propellers at the shore.

4.7 Scents & Sensibility

The goal for this installation is to encourage residents to obey the law which requires them to put out their trash for collection only on the morning of the scheduled pick up. As background for this installation it is helpful to know how trash collection does work in Venice. VENEZIA Servizi Territoriali Ambientali (VESTA) is the waste management company for the city. VESTA collects garbage 6 days a week. Upon arrival, the garbage collector knocks or rings the doorbell to alert the residents to their arrival. The resident then allows the worker in to collect the trash, or the resident himself/herself will bring the trash to the cart. This is apparently not good enough for some people, as there are areas where trash bags are left out overnight, against regulations. There are areas where this happens more frequently, and so these areas can be targeted by this installation.

4.7.1 Installation Requirements

At these common sites, sensors would be placed to detect people dumping the trash. When triggered, they would spray really strong perfume. This could be a foul smell, sprayed in sufficient concentration to be very unpleasant. Alternatively, it could be a scent that is normally nice, but sprayed in such concentration that it is staggering.

4.7.2 Interactive Possibility & System Design

This system would require a sensor, a controller and an actuator. The actuator would be some device that will spray the perfume when it detects someone with the sensor. There are a number of consumer products, such as the Air Wick FRESHMATIC Ultra or this Automatic Air Freshener Dispenser with a Photo Cell, that spray perfumes of sorts into the air for freshening. There are also more commercial products, such as the Good Sense Automatic Spray Dispenser System, for public bathrooms and the like. Unfortunately, all of these devices are designed to perform their functions to a pleasant extent, and so are not enough for this installation. This could be solved by modifying one of these devices. It should be possible to disconnect the actuator control signal from the device's native control unit and attach it to the control unit chosen for this installation. This installation is simpler in input and output functions, so a simpler controller can be used. A microcontroller, such as a Sun SPOT, or an Arduino could be used to accomplish this purpose. They are capable of receiving the input from a sensor and triggering the spray.

To make a solid decision about a sensor to use, more needs to be known about the specifics of the location that the installation will be installed at. If it will be an area that generally sees very little activity, a simple motion detector could be used. If there is a set area that is known to be used for dropping garbage bags, then a perimeter of beam sensors could be used to detect someone's arrival in the area. In other cases, one or more ultrasonic range finding sensors could be used to detect the added presence of trash or

people. The specific selection of sensor will be tailored to a given location for the installation.

4.8 Scratchitti

This installation is intended to fill gaps left by the other installations. This will allow a medium to convey details of smaller issues in Venice that are either not large enough, or not localized enough to warrant an individual installation. This can also be used to increase the spread of some of the other installations.

4.8.1 Installation Requirements

This is an audio based installation. It would require some audio devices to play the messages and possibly some sensors if desired. Subjects for this installation would need to be decided on.

4.8.2 Interactive Possibility & System Design

This installation could use Felix Hardmood Beck's Soundbombs to play the messages at the relevant sites. These are small balls with motion detectors that can record and then playback any message when they detect motion. These could be placed around Venice to highlight specific areas or issues. These could also be used in conjunction with an ARG, either as clues or as prizes of some sort. Other small audio players could be used, although they would generally require additional equipment to control the timing of the playback.

4.9 Brodo Di Pesce

The relationship between Venice and the sea level and tides is very delicate. If the tides are too low, the city does not get enough water to perform some of its basic functions. If the tides are too high, then there is flooding and damage. The sea level has been slowly but surely rising over the past many years. So while the number of particularly low tides has been decreasing, the number of equally dangerous high tides has been increasing.

4.9.1 Installation Requirements

This installation is still in the early conceptual stages. It is difficult to devise an installation that relates taste to the sea levels, even if they are decreasing similarly to soup being eaten. It is even more difficult to involve taste with the issue of the sea levels rising.

4.9.2 Interactive Possibility & System Design

There is not a working concept for this installation as of yet. It is hoped, however, that once collaboration begins on this and other installations, that the extra heads working together will produce something successful.

4.10 Spray it Forward

The main idea for this installation is to allow the viewer to create the work of art themselves. For example, by embedding an LED light pen into a spray can, a viewer interacts with the installation by virtually spray painting graffiti messages. But what is the point of such an installation and how does it relate to the Venice Project Center? The answer is that it would allow all of the other installations throughout the city to be coordinated. By connecting a series of interactive white boards that are placed at each installation around Venice, viewers can post their views on the issue being presented. This will appeal especially to youth and engage them in the discussion.

4.10.1 Installation Requirements

This installation would need some way for a viewer to interact with the installation in a creative way. This calls for a projector, or some other sort of display, as well as a method of input for the electronic art. This could be as simple as a projector and a computer terminal, or it could be more complex like an interactive whiteboard.

4.10.2 Interactive Possibility & System Design

Interactive whiteboards have been around for a few years. It is a digital device used for visual presentations wherever regular whiteboards would be used. A positional system uses sensors around the perimeter to determine the position of the “marker” or stylus. Infrared or lasers reflect off the stylus to triangulate its position. A tactile surface uses the pressure of the stylus to determine its position. Analog Resistive Interactive Whiteboards use two sets of resistive materials on their surface. These two surfaces generate electricity upon contact and the board can then determine the position of the stylus. Electromagnetic Interactive Whiteboards are commonly in use today. A special marker with a coil imbedded in the tip is used for writing and the board has an array of wires that generate electrical signals on contact. This system makes it possible for one to rest his/her wrist or hand upon the whiteboard without creating a false signal.³⁶ What is written on the whiteboard can be stored on the connected computer for later use.

Interactive whiteboards are a possible implementation for this installation. It is possible that something like this could be expanded to communicate between all the installations to unify and link them together. Interactive whiteboard products, such as: Mimio’s Interactive White Board and NEC’s IW77 Interactive Whiteboard cost from \$700 up to \$4000-\$5000 for some other models. Using ready product interactive whiteboards is difficult from a cost standpoint. The alternative is to create an 'interactive

³⁶ <http://www.tech-faq.com/interactive-whiteboard.shtml>

whiteboard' using a projector and one or more Wii Remotes. Johnny Lee³⁷ has instructions for using Wii Remotes and pens that emit infra-red light to simulate an interactive whiteboard. This is a more cost effective option.

³⁷ <http://johnnylee.net/projects/wii/>

5. Conclusions & Recommendations

The proposed system possibilities were considered, and one implementation method was chosen for its overall practicality. The systems presented here are intended to be a straight forward implementation for each installation. These systems can be elaborated upon at the implementer's discretion.

To assist in any future installations that might be conceived, a list of questions was compiled to aid the implementer in determining the information necessary to design the installation. This list can be found in appendix B.

5.1 Alternate Reality Game

An alternate Reality Game (ARG) is the best way to tie all of these installations together. To be successful an ARG needs a believable story and background. The more blurred the line between game and reality, the more fun the ARG. Players receive storylines and clues via e-mail, telephone, websites, flash drives and occasional face-to-face meetings. A geocache can be used as well as public libraries and tourist sites.

Players look for a reward other than just the story for its own sake. Taking as an example the game World Without Oil (see background section 2.1.0), players would enjoy an ARG that would help solve an issue or current affair in Venice. Receiving some tangible reward such as a trinket or a t-shirt is also popular. As a part of these installations, players crisscrossing the city might be able to earn stamps in a passport to be redeemed for a prize when complete. The website www.unfiction.com is a good resource for ARG design and implementation.

5.2 Storefronts

For this installation in an outdoor setting, we recommend using the pre-generated video silhouettes as the image, installing the projection equipment inside the abandoned building and using a motion detector to activate the installation. The shadow of passersby would reduce the light from the sun enough that the projection would be visible on the screen, but only where the viewer's shadow fell. This, combined with the motion detector, provides a level of interactivity to the installation. The projector would not need to be as bright for this as it would if it were to be outside projecting on the front of the screen. In this case, it is desirable that the projection not be easily visible during the day.

A projector that has a dimmable output would be preferred. The ViewSonic PJ503D was chosen as the projector for this installation for its brightness and cost. It is sufficiently bright for this purpose, and is the least expensive of the projectors considered. It has a low output resolution, 800x600, but even this is adequate for this purpose. The process of back projecting on a screen during the day, and the nature of the image, will result in a blurred image, regardless of the projector's resolution. A typical motion detector for a home yard floodlight or alarm system would also be used in this installation.

For an indoor installation we recommend building the façade in the exhibit hall and using the same equipment to project the image onto the screen covered windows. The façade can be painted to look like any building in Venice. In fact an entire street could be built using this method.

5.3 Wakeup

The images would be projected onto the canal wall at the installation site. Sensors in the water will measure the wake. Based on the reported magnitude of the wake, the control system for the projector can decide on an image to project. Possibilities include an image of damaged wall on top of the undamaged wall, information and statistics on the cost and difficulty of repairing damaged canal wall, or a combination of the two. Any of the possible images could be modified to appear as if it were being viewed through rippling water. The image sets could be clear for when the water is still, and varying degrees of distorted for the different magnitudes of wake. The choice of when to display each set of images is dependent on artistic choice and which would best illustrate the point of the installation and draw attention to the problem of wake.

The advantage of this method is that it allows more response to the actual conditions in the canal, while being easier to generate and display. All the images would be pre-generated, and so would not require significant computing power to produce in real time.

This system would use a projector and floating sensors. The sensors would use the Sun SPOT microcontroller from Sun Microsystems. The devices would be placed in water tight containers and communicate with a base station via Zigbee, a short-range wireless communication method and protocol similar to Bluetooth. The Sun SPOTs have accelerometers in them that can measure the speed of their movement, and by so doing, they can determine the magnitude of the wake. For the projector, the Canon REALiS SX7 would be ideal. With its exceptional brightness, it could easily project a visible image on the canal wall during the day. The high output resolution of this projector also allows for detailed images to be used to compensate somewhat for the unusual surface that is being projected upon. The problem with this projector is that it is quite expensive. The InFocus IN26+ would be an adequate substitute, and at a much more reasonable price.

If implemented indoors, the canal will be replaced by a wave tank. Visitors would be able to create waves in the tank, and watch the effects of the wake on the ‘canal wall’ which will either be displayed on a nearby screen or wall, or could be a physical construct of an appropriate material in one end of the tank. The size and shape of the tank, as well as the method by which to create the waves or wake is subject to artistic planning to be most interesting and functional in illustrating the problem of wake.

5.4 Missing In Art

If this will be outdoors, the projector must be placed in a weather proof container of some sort. Also needed will be a motion detector so that it will only be on when a viewer is present. It is recommended that the image cycle between the original work of art and some information about the art, for example, the name of the artist and year it was completed (if known).

5.5 The Toll

The ideal equipment for this system would be truly directional speakers, such as Holosonic's Audio Spotlight,³⁸ but this is not feasible from a cost perspective. High quality directional speakers are very expensive, and often mostly available only to corporations, rather than individuals. Typical speakers can be made somewhat more directional by adding cones or boxes to mount them in to help shape the sound waves leaving the speaker. For these reasons, and also the fact that this installation will be outside, it is recommended that outdoor speakers be used. The Hercules 4780436³⁹ speaker is designed to be used outdoors, and has a standard 3.5mm headphone plug for input. These speakers can either be powered from batteries, or from an external source. This allows it flexibility for placement within the location.

For the audio source, the simplest to implement would be to use an inexpensive mp3 player. The disadvantage to this is that it would require someone to visit the installation every time the audio track needed to be changed. In this case, the installation would need to be visited directly, the device would need to be removed, and the new audio track would need to be transferred to the device. This method has the advantage of being inexpensive, as there exist small mp3 players for \$15. This method is also easy to implement as it does not require any hardware or software work, it simply uses existing modules in their stock state.

An alternative for the audio source would a Sun SPOT⁴⁰ microcontroller. These devices have integrated wireless capability, so someone would only need to be near the device to update its soundtrack, no disassembly of the installation would be required. The disadvantages of using such a device is that it does not have native audio output, and no standard support for mp3s or any other audio format. This can be overcome with a little hardware and software work. A 3.5mm audio jack could easily be added to some of the device's output pins. The more complicated step would be to synthesize the audio output. The easiest way to do this with a microcontroller would be to use a pulse width modulated (PWM) signal and an analog lowpass filter. The PWM signal would vary in frequency and pulse 'on' time, and then be smoothed into an analog sine wave shape by the filter. This will result in a suitable audio signal to use in this installation.

³⁸ <http://www.holosonics.com/>

³⁹ <http://www.newegg.com/Product/Product.aspx?Item=N82E16836193008>

⁴⁰ <http://www.sunspotworld.com/index.html>

5.6 X-Ray

It is recommended for this installation to be implemented as an image on the side of the bridge. There are two main reasons for this. One, the pre-distortion of the image will be a little simpler for this angle, and shaping the outline of the image is of less concern. Two, it has the possibility of being seen by more people, the walkers as well as boat passengers.

The image would be distorted such that it arrived on the side of the bridge and reflected to appear square. A number of motion detectors would be used to activate the display only when there are people around to see it. The projector would need to be placed at a bridge that has one side that faces away from the sun most of the time. This would allow the [InFocus IN26+](#) to be used more comfortably, although this projector should be adequate for use in more direct sunlight.

5.7 Bubbletto

A final system that was considered used two SunSPOTs, one to detect the boat, and one to activate the bubble machine. The machine chosen was the Gazillion Bubbles machine for its large quantity and size of bubble created. It also has a rather large reservoir of bubble soap so it will last some time before needing to be refilled. This machine was also chosen because it has a power switch and is battery powered. The batteries allowed for it to be used away from a power source, and the switch allowed it to be modified such that it can be controlled directly by a Sun SPOT.

The Sun SPOT was chosen because of its default hardware, which includes an accelerometer which will be used to detect the device's motion in the water that signals the arrival of the boat. These devices also have integrated wireless communication ability, so the device in the water can signal the device controlling the bubble machine when to activate the machine.

5.8 Scents & Sensibilty

The actuator would be Air Wick FRESHMATIC Ultra Automatic Air Freshener Dispenser with a Photo Cell, with the perfumes modified to be unpleasant. It should be possible to disconnect the actuator control signal from the device's native control unit and attach it to the control unit chosen for this installation. A microcontroller, such as a Sun SPOT, or an Arduino could be used to accomplish this purpose. They are capable of receiving the input from a sensor and triggering the spray.

If it will be installed in an area that generally sees very little activity, a simple motion detector could be used. If there is a set area that is known to be used for dropping garbage bags, then a perimeter of beam sensors could be used to detect someone's arrival

in the area. In other cases, one or more ultrasonic range finding sensors could be used to detect the added presence of trash or people. The specific selection of sensor will be tailored to a given location for the installation.

5.9 Scratchitti

Given the nature of this installation, the only recommendation is use the Soundbombs to fill in any gaps in the other installations or the range of issues that they address.

5.10 Brodo Di Pesce

Given the vague state of this installation, the main recommendation is that it be one of the first to be opened up to collaborative design. This will be a good test of benefits of having many minds working towards the same goal. Where a small group has been unsuccessful, perhaps a larger group might succeed.

5.11 Spray it Forward

We will create our own 'interactive whiteboard' using a projector and one or more Wii Remotes. It could be done so a projector displays MS Paint that is running on a computer. A WiiMote is positioned off to the side and communicating with the computer. The purpose of the WiiMote is to track the position of the virtual spray can. The virtual spray can will contain a bright InfraRed (IR) LED. When the person uses the spray can on the whiteboard, the WiiMote sends the position to the computer, which then interprets it as if it were a cursor on the computer screen. The output is displayed through the projector onto the white board making it look like the spray can actually painted. To connect these whiteboards from installation to installation, a communications network could be established between them.

Appendix A

In order to understand the impact this project will have on the city of Venice, it is important to understand the types of art works that are being proposed and the precedent set for using art to solve social problems. What constitutes “art” is difficult, if not impossible, to define. There are, however, objective terms that can be applied to the techniques of creating art. It is through the effective use of these techniques, this project hopes to offer the city of Venice solutions that fit with its artistic culture and heritage while allowing it to grow gracefully into the twenty-first century.

One of Venice Project Center’s IQP studied the public art found throughout the city of Venice.⁴¹ Newport News Public Art Foundation’s website has the perfect definition of **public art**: “In simple terms, public art is any work of art or design that is created by an artist specifically to be sited in a public space.” During the prosperous height in Venice’s history, wealthy merchants commissioned artists to immortalize themselves and their family or to praise God for their prosperity. Much of this art is imbedded in the buildings, walls and bridges of the city. These patricians may have viewed these works of art not only as a gift to themselves but also as a gift to their community. Today, we see a community that values art in its public spaces is a community with pride in itself. It wishes to present an image of itself as beautiful and welcoming, and its citizens as thinking, feeling, and educated people.⁴²



An artwork itself can become the defining symbol of the community as the Eiffel Tower identifies Paris. Piazza San Marco is often used to identify Venice in movies, books and advertisements. It is the individual pieces of public art imbedded in the Basilica di San Marco, the Doge’s Palace and other surrounding structures that make up the beauty of the piazza.

While in the past, public art took the traditional forms (painting, sculpture, architecture), modern art in public places are more likely to be “installation art”. **Installation art** is a term used to describe a work that can not be separated from its surroundings. What we today call “installation art” has been around since cave paintings. The earliest example is the cave painting

⁴¹ Foley, Megan, Larsen, Alex, Navien, Timothy, Riley, Phoebe. *Preserving Venitian Heritage. An Interdisciplinary Qualifying Project Submitted to the faculty of Worcester Polytechnic Institute.* http://www.veniceprojectcenter.org/B08/ve08-pres/B08_Preserve/REPORT/PDF/Report_Preserve-B08.pdf

⁴² NNPAF • 735 Thimble Shoals Blvd, Suite 100, Newport News, VA, 23606 http://nnpaf.org/what_is_art.html accessed 4/19/09

at Lascaux. Here, the artists made canny use of the undulating wall surfaces to help render the features of the animals. In modern times however, an installation uses a dedicated space to create an immersion experience for the viewer. This is accomplished in ways as varied as the artists themselves. Artists may use common objects or no objects at all; light and dark; indoors or out, all for the purpose of engaging the viewer in a real-time experience.⁴³

Installation art is divided into two categories: filled-space and site-specific. A filled-space installation is concerned with artifice, private vision of reality, or idealization. It can be created anywhere there is room for the artist to work. The composition is just as meaningful in any locale. A site-specific installation is dependant on the place. It is concerned with exposing the world as it is at its basic level and often this meaning is derived from the placement of the work.⁴⁴

Filled-space is divided further into “enchantments” and “impersonations”. An **enchantment** creates for the viewer an overall environment, relying on theatre and the viewers willingness to suspend their disbelief for the immersion experience. A very good example of this is Disneyland. When it first opened in 1955, it offered the guest an idealized vision of familiar surroundings. The guest used his senses to interact with the work of art.⁴⁵ There are enchantment installations to evoke all of the emotions, not just happiness. Sylvie Belanger is a Canadian artist who says this about her work, “Presently, my use of photo/video images, interactivity and sound technologies, orients the work where the poetic and the seduction of images create a psychologically unsettling space that questions our time/space experience as well as our experience of the self/subject.”⁴⁶

An **impersonation** is an installation that mimics a life situation, sometimes subtly elaborating on it. It is often practical in nature, in that the art work itself is used as part of everyday life.⁴⁷ Theo van Doesburg, Sophie Taeuber-Arp and Hans Arp were commissioned in 1926 to redesign Café Aubette. These three used their skills as artists to create a work that provided an improved vision of the everyday world in the same time and space of the everyday world.⁴⁸ For the purposes of this project, this work of impersonation art might be one to model for PreserVenice.



Site-specific installation art is divided into interventions and rapprochements. **Interventions** in art are very much like interventions in psychology. They are “in your face” encounters meant to shock the viewer out of complacency. Daniel Buren was a pioneer of intervention installations. As a conceptual artist, he wanted to knock down from their pedestals traditional art, museums, and galleries so as

⁴³ Rosenthal, Mark. 2003. *Understanding Installation Art: From Duchamp to Holzer*. Munich: Prestel. pg 23

⁴⁴ Rosenthal, Mark. 2003. *Understanding Installation Art: From Duchamp to Holzer*. Munich: Prestel. pg 28

⁴⁵ Rosenthal, Mark. 2003. *Understanding Installation Art: From Duchamp to Holzer*. Munich: Prestel.. pg 38

⁴⁶ <http://www.sylviebelanger.com/>

⁴⁷ Rosenthal, Mark. 2003. *Understanding Installation Art: From Duchamp to Holzer*. Munich: Prestel. pg 33

⁴⁸ Rosenthal, Mark. 2003. *Understanding Installation Art: From Duchamp to Holzer*. Munich: Prestel. pg 51

to have them “rise to street level”. His work “Within and Beyond the Frame” (1973) was a set of cloth banners in his trademark strip, hanging in a line continuously from inside the gallery through the window to the outside of the building. His intent was to blur the borders between the gallery and the street, each space intruding upon the other.⁴⁹



The word **rapprochement** means the act of being drawn near or together. In this case it is life and art that are brought together. Rapprochements in site-specific installations are characterized by the site itself being one with the work, so much so that the work may appear invisible. James Turrell created “Sky Piece” at the Live Oaks Friends Meeting House. This simple rectangular aperture in the ceiling opens the worship space to the heavens. This provides a feeling of spirituality without the traditional themes of sacred art.⁵⁰

Within the context of installation art, **interactive art** refers to the viewer (or audience) participating in the creative process. This participation can be as simple activating a switch to light up the display, or as complicated as viewer’s reaction reflecting in the work and changing it’s meaning.⁵¹ A simple example of interaction can be seen in Brazilian artist Ana Miguel’s *I Love You* (created in 2000). In this installation, she placed a large feather bed on the floor of the gallery with a series of spider webs above. Visitors were invited to lie down and rest. A soundtrack of love songs were triggered by the weight of their head on a pillow. It was all soothing – except for the giant spider web above creating a feeling of menace.⁵²

Video and sound art is technique also a used in an installation. They are as the name implies, using film, video and audio equipment to enhance the experience the artist intends. A pioneer of video art was an installation by Frank Gillette and Ira Schneider called *Wipe Cycle* (1969). It was installed at the Howard Wise Gallery in New York City. The artists positioned 9 monitors around the studio. Four of these played pre-recorded material of the gallery. The five other monitors displaced live or delayed images of the people in the gallery. A story is told of Andy Warhol visiting this installation and being fascinated by it. He was switching his briefcase from hand to hand trying to follow his movements.⁵³

The term “sound art” was made popular by electroacoustic musician Dan Lander in the mid 1980’s. This term unfortunately escapes exact definition. It encompasses electronic music,

⁴⁹ Rosenthal, Mark. 2003. *Understanding Installation Art: From Duchamp to Holzer*. Munich: Prestel. pg 61

⁵⁰ Rosenthal, Mark. 2003. *Understanding Installation Art: From Duchamp to Holzer*. Munich: Prestel. pg 79

⁵¹ De Oliveira, Nicolas and Oxley, Nicola and Petry, Michael. 2003. *Installation Art in the New Millennium: The Empire of the Senses*. London: Thames & Hudson. pg 46

⁵² De Oliveira, Nicolas and Oxley, Nicola and Petry, Michael. 2003 *Installation Art in the New Millennium: The Empire of the Senses*. London: Thames & Hudson. pg 130

⁵³ Rush, Michael. 2007 *Video Art*. New York: Thames & Hudson, 2003 revised 2007 pg 19-20

experimental music, noise music, sampling and musical collage.⁵⁴ The one common link seems to be however, that sound art takes place in an exhibition situation rather than a performance situation. Composer Annea Lockwood refers to it as an “audio installation”. It is intended to evoke a feeling, making sound art the perfect accompaniment, so to speak, to installation art.⁵⁵

Art has been used throughout history to highlight social issues, making works of art valuable as a record of history. Though modern installations are only temporary, the record of their existence leaves for future generations a means to view our life and times. Krzysztof Wodiczko is known for his video projections on public monuments and his themes of giving voice to the marginalized of society who are too often over looked.

In 1998 his work “The Bunker Hill Monument Project” projected interviews with mothers and brothers of young men killed in neighborhood violence in Charlestown Massachusetts. It was fitting to project such a theme on the monument, first, because the monument was near the neighborhood in focus, and second because the monument itself is a token of the collective memory of the American revolution. The memory passed down of american men dying for “life liberty and the pursuit of happiness contracts the conditions present in Charlestown in the 1990’s.”⁵⁶

Although not an art form per se, ARG or Alternate Reality Game is the latest wave of entertainment for avid puzzlers. Also called “pervasive gaming”, the development of the story depends upon hundreds of players working to piece the story together, while at the same time influencing it’s outcome. As opposed to video or computer games, ARGs are not concerned with the technology. The ARG uses whatever exists in the real world, whether billboards or pamphlets or payphones, to leave clues, plotlines and interactions between players and characters. Everything fictional is made to seem as real as possible. But it is the interactivity of the game that make it so popular. It’s the chat – gossiping, guessing, and working as a team creating the narrative – players love as much as the puzzle itself.⁵⁷

The first game of this genre *The Beast* (by 42 Entertainment, 2001), but it was the enormous success of *I Love Bees* in 2004 (created by 42 Entertainment and commissioned by Microsoft) that made people think of the possibilities. Ultimately, *I Love Bees* was a marketing ploy leading up to the release of the computer game *Halo 2*. But since then not-for-profit groups have used this device to raise awareness of issues in a very realistic way. Case in point is *World Without Oil* (created by Ken Eklund, funded by Corporation for Public Broadcasting and

⁵⁴ Licht, Alan. 2007. *Sound Art: Beyond Music, Between Categories*. New York: Rizzoli International Publications. pg 11-12

⁵⁵ Licht, Alan. 2007. *Sound Art: Beyond Music, Between Categories*. New York: Rizzoli International Publications. pg 14

⁵⁶ Saltzman, Lisa. 2006. *Making Memory Matter: Strategies of Remembrance in Contemporary Art*. Chicago: University of Chicago Press. Pg 30-45

⁵⁷ Stewart, Sean. 2006. *Alternate Reality Games*. On-Line. Available from Internet, <http://seanstewart.org/interactive/args/>, accessed 13 March 2009

presented by Independent Television Service 2007)an ARG that had players searching for and actually finding solutions for a society without fossil fuels.⁵⁸

ARG as art form has many possibilities. Andrea Phillips, an ARG writer and producer who was part of the team at London-based developer Mind Candy, which produced the game Perplex City says, "A lot of people in entertainment are seeing the value of using alternate reality gaming to tell stories as their own creative form, not just as a buzzy viral way to get more eyeballs....Collaboration in storytelling is an old tradition, even older than print. All our stories are ultimately descended from this sort of back-and-forth oral tradition,...So you could say we're working to reclaim something we lost hundreds of years ago when we first started recording narratives with pen and paper, and later with film."

⁵⁸ Wollenberg, Anne. 2008. *ARG is an Alternative Way to Play with Real World Problems*. Guardian. July 24, 2008. (available on-line: <http://www.guardian.co.uk/technology/2008/jul/24/games.internet>)

Appendix B

Sponsor Requirements Form

To be completed by the sponsor of the installation in order to facilitate implementation.

What is the artistic vision behind this requirement?

- What issue or project is being highlighted?
- Who is the intended audience?
- What is the effect on the viewer that is desired?
- Will the viewer interact with the installation?
- Will the images (if used) change often?

What are the technical needs of this installation?

- Will this be implemented indoors or outdoors?
- If outdoors, is the location in direct sunlight or bright lights of any kind?
- Will this installation involve water and its reflection?
- What sort of electricity is available near the chosen site?
- Will the installation be activated at all times or only in the presence of the viewer?
- Will the installation include sound?
 - Is there ambient noise at the location that would interfere?
 - Are there noise restrictions at certain times of the day?

What is the budget for implementation of this installation?

Appendix C

Equipment Selection

Projectors

To be seen in daylight, the projector must be very bright. Relevant units of measuring light's intensity are Lumens(lm) and Lux. Lumens are a measure of the intensity of the light leaving a source, while Lux is a measure of the intensity of light reaching a surface. The unit lux is lumens per square meter, so Lux takes into account the area to be illuminated. If 1,000 lumens were focused onto one square meter, that square meter would be lit with an illuminance of 1,000 lux. The same 1,000 lumens spread over 10 square meters would light the space with 100 lux. Recommended lumen rating for a projector to be used in a room with sunlight is at least 2,000 lumens. This should be the minimum lumen rating for a projector if it is intended to be visible during the day. The other side to consider is that 2,000 lumens will be very bright at night, so a projector with variable brightness may be desired.

A wide range of projectors was considered, including a range of price and intensities. Each projector has a certain balance of cost, intensity, and performance. These were the primary attributes considered when choosing a projector for an installation. The projectors that were considered are:

Model	List Price	Lumens	Dimensions (WxLxH)	Features / Comments
ViewSonic PJ503D	\$500	1500	10.4" x 3.8" x 8"	800x600 Resolution, 2000:1 Contrast Ratio
Epson PowerLite 77c	\$750	2200	7.5" x 16.9" x 14.9"	34' Projection Range, 25' Max Image Size, 1024x768 Resolution, 400:1 Contrast Ratio
InFocus IN26+	\$750	2400	12" x 9.4" x 4"	33' Projection Range, 21' Max Image Size, 1024x768 Resolution
InFocus IN10	\$1,249	1800	2.5" x 7.8" x 6.1"	Can project from up to 16',* Built in speakers, 1280x1026 Max resolution, 4000 hour lamp life, 1100:1 contrast ratio
InFocus Work Big IN10 Ultra-Mobile 3LB	\$1250	1800	7.8" x 6.1" x 2.5"	22' Max Image Size, 1280x1024 Resolution, 1100:1 Contrast Ratio
Epson PowerLite Home Cinema 720	\$1,299	1600	4.9" x 16.0" x 12.2"	Can project from up to 22',* No speaker, 1280x720 Max resolution, 3000 hour lamp life, 10000:1 contrast ratio
Optoma EP729 Micro	\$1500	1600	6" x 2.46" x 7.87"	25' Max Image Size, 1024x768 Resolution, 2200:1

Portable			2.2 lbs	Contrast Ratio
Canon REALiS SX7	\$5,200	4000	4.5" x 10.6" x 13.2"	Can project an image from up to 16" * Built in speakers, 1600x1200 Max resolution, 2000 hour lamp life, 1000:1 contrast ratio

Note: * Brightness diminishes with distance

Webcams

Webcams can be used in most installations as video or still frame capture devices, and also as sensors of other types. The important factors to consider are the cost, the resolution and the frame rate. Other features can help differentiate two choices when other options are equal, but are not essential.

Here is a list of webcams considered:

Model	List Price	Video Resolution	Frame Rate	Snapshot Resolution	Features / Comments
USB 3 LED PC Webcam Camera plus	\$11	800x600	15 fps	800x600	6 LEDs mounted around lens for additional light; Focus adjustable with ring around lens
Logitech 961400-0403 Quickcam	\$17	640x480	15 fps	640x480	Integrated microphone
Microsoft LifeCam VX-3000	\$27	640x480	30 fps	1280x960	Integrated microphone; Automatic face tracking software; Pan, tilt, zoom control supported
Logitech QuickCam Deluxe	\$41	640x480	30 fps	640x480	Integrated microphone; Automatically adjusts audio and video to compensate for background noise or lighting
Microsoft LifeCam VX-6000	\$40	1280x1024	30 fps	2560x2048	Integrated microphone; 71 degree wide angle lense; Pan, tilt, zoom control supported
Logitech QuickCam Pro 9000	\$72	1600x1200	30 fps	1600x1200	Integrated microphone

Panasonic BL-C131A Network Camera Wireless	\$277	640x480	30 fps	640x480	Integrated microphone; 802.11 wireless; View video from a standard web browser, video display, or compatible cell phone or PDA; 8 preset shooting positions; Integrated heat sensor to detect person entering vicinity
--	-------	---------	--------	---------	--