White Paper Report

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White Paper

Journey Beyond the Fairs **– University of Central Florida**
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Figure 1 Screen Shot of MuseumLeap Opening

Evolution of Concept:

Journey Beyond the Fairs, now called *MuseumLeap*, was designed to examine the potential links between the traditional brick and mortar footprint of a museum and its space in the virtual online community. The goal was to create a "Virtuous Circle" where a museum visitor can begin a journey of exploration in both the physical or virtual world, and where each world enhances that of the other[1]. As the only structure remaining from both Worlds Fairs held in Flushing Meadows-

[1] Wang, Y., "Cultivating Personalized Museum Tours Online and On-Site," *Interdisciplinary Science Reviews, Vol.34, No.2 published June 2009 at* http://www.chip-project.org/presentation/ISR02%20Wang.pdf, (accessed July 20, 2014).

Corona Park, the Queens Museum (QM) holds a unique place in the history of the Fairs. The museum has an expansive collection of materials pertaining to both the 1939/1940 and 1964/65 New York World's Fairs. This collection is on display through their new Visible Storage approach that permits the museumgoers to see many items that had held in storage prior to the museum's recent renovation. *MuseumLeap* is the virtual component of QM's *New York World's Fair Visible Storage Gallery.*

MuseumLeap was envisioned to dovetail into our National Science Foundation funded project – *Interconnections: Revisiting the Future* (now named *ChronoLeap*). This project focused solely on the 1964/65 New York World's Fair. However, as the Queens Museum's Visible Storage concept led to a drastic change in the visual presentation of the artifacts and a much closer tie between the 1939/1940 and 1964/65 New York World's Fairs we elected to create an independent virtual environment for this Digital Humanities Start-Up grant concept that addressed both of the Fairs. This environment would be developed in Unity 3D as a virtual world they could experience with a browser rather than download. We felt this would provide users with a responsive environment that required no delay due to download and installation. Another deciding factor was our ability to have an experience that could be viewed in both PC and MAC computers

Work completed:

Construction delays at Queens Museum led to an overall production delay with *MuseumLeap.* The UCF team remained in contact with QM officials about their progress and decisions in relation to the exhibit area and Visible Storage concept. During this period weelected to move to QR Code triggers rather than the bar codes triggers that were outlined in the proposal. Several reasons led to this change. First, barcodes are limited in how they can be scanned – a user must go in one direction either horizontally or vertically, depending on how the barcode is mounted. However, the QR Code is classified as two dimensional and the user can scan left to right or up and down. This reduces user frustration of passing a smartphone reader in the wrong direction. Secondly, QR Codes have become synonymous with additional information while barcodes are equated with the purchase of an item. We felt a visitor might be more inclined to scan a QR Code. Finally, programs exist that permit the incorporation of images as the background for the QR Code and could be more esthetically pleasing within a museum setting.

Once construction permitted the UCF team to travel to the Queens Museum and view the location of the New York World's Fair exhibit cases, both the QM and UCF teams began the selection of real world artifacts to be linked within the virtual environment. The selection of artifacts was impossible prior to this point as all the artifacts were in storage during the renovation. Artifacts were selected based on their significance to the Fair and "what does this

have to do with the Fair?" Photographs of artifacts were taken and then screened to see which intrigued potential users. Eight artifacts were selected – four from each Fair to test the concept linking the virtual environment to the onsite Visible Storage gallery. The process included selection of artifacts and development of information for the data triggered by the QR Codes. Dr. Lori Walters (UCF); Louise Weinberg (QM) and Wendy Jimenez (QM); and advisors Dr. Lawrence Samuel, Dr. Howard Segal and Dr. Karla Kitalong were involved in this aspect of the project.

Artifacts Selected (Final):

1939/40 Fair: Westinghouse Pavilion Elektro Robot – Elektro was a centerpiece of the Pavilion, "Worker Joe" Statue from atop the Soviet Pavilion, special Trylon and Perisphere RCA Radio, Pullman Train Car from the Railroad Pavilion. These artifacts were selected due to their importance at the Fair and their visibility within the Visible Storage collection. Additionally, we attempted to select items that the visitor might be curious as to the items connection to the Fair. For example, "Worker Joe" was a large piece, yet it has no obvious link to the 1939/40 NYWF. However, the story behind the large statue atop the Soviet Pavilion is an outstanding example of Soviet propaganda and its fate in 1940 reveals the impact of World War II on the Fair.

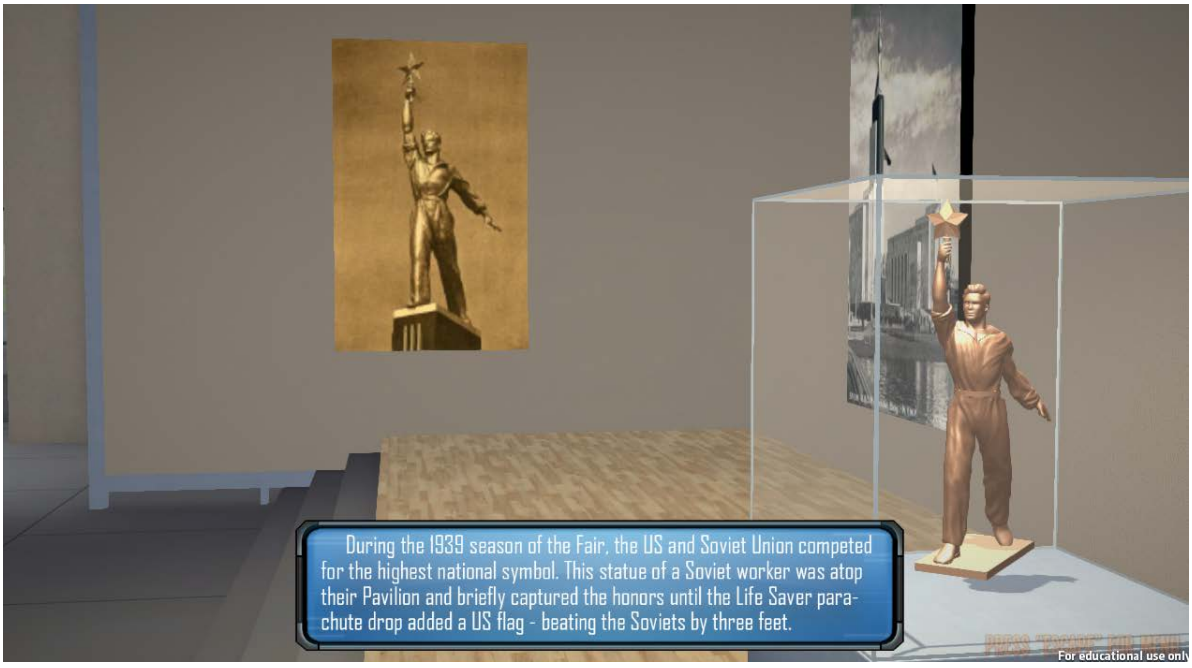

Figure 2 "Worker Joe" artifact from atop Soviet Pavilion - note detail

Figure 3 Remaining 1939/1940 World's Fair Artifacts

1964/65 Fair: Polynesian figurine salt and pepper shakers from the Hawaii Pavilion, TV Viewer souvenir that provides images from the Fair, New Jersey State Pavilion model from the original Robert Moses New York World's Fair model, President Abraham Lincoln bust by Gutzon Borglum from the Illinois Pavilion. As with the 1939/40 Fair, the 1964/65 Fair artifacts were selected due to their significance to the Fair, visibility with the storage case and ability to tell a story. The Queens Museum has several pavilion models that are in various states of disrepair. On the surface, one of our youthful visitors look at them as just 'beat up old pieces of plastic." However, these items remain from Robert Moses' official 1964/65 New York World's Fair model. And more importantly provide an opportunity to address this significant historical figure.

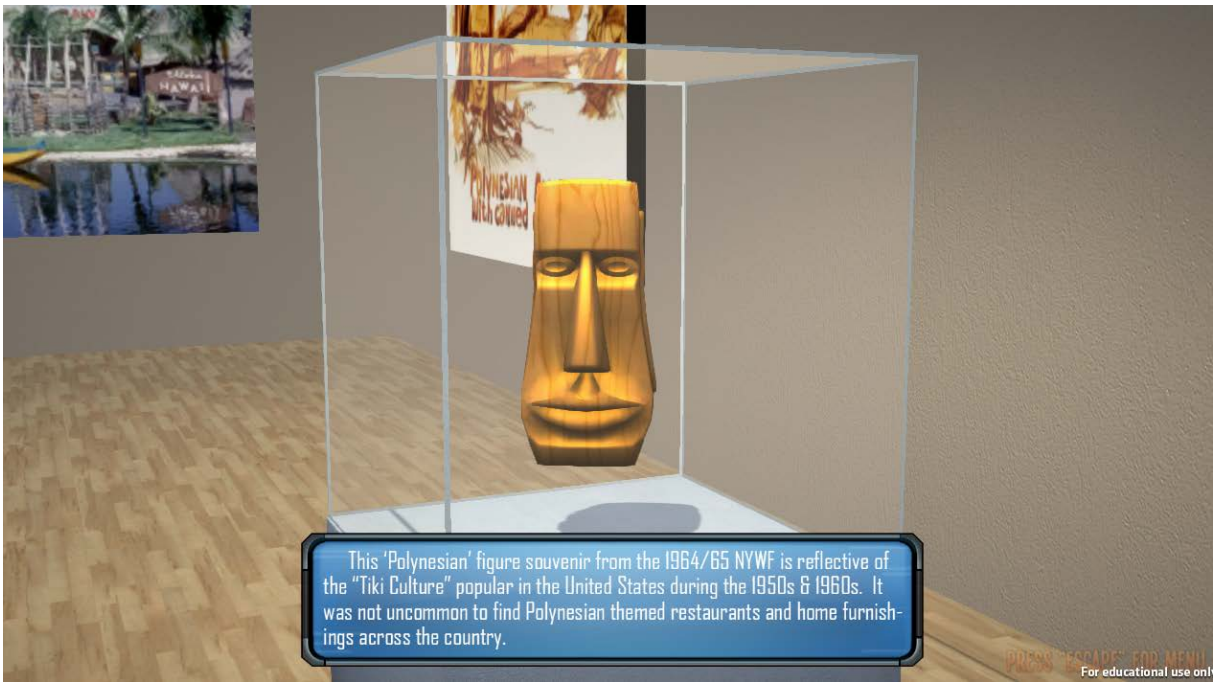

Figure 4 Polynesian souvenir spice shaker

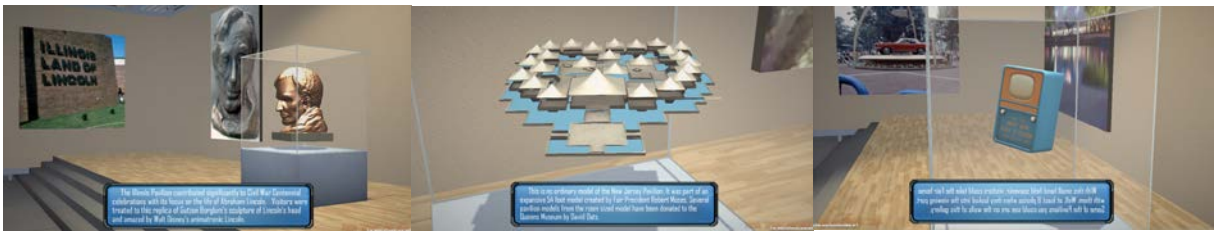

Figure 5 Remaining 1964/65 World's Fair Artifacts

Several other artifacts were created, but we determined their locations within the Queens Museum Visible Storage were not ideal. As a result, we finalized the experience with the eight artifacts listed.

Production:

Modeling/ Textures – The experience called for the development of a virtual Queens Museum interior and exterior and Flushing Meadows-Corona Park in the immediate vicinity of the museum. The Visible Storage experience at QM necessitated an incorporation of both the 1939/1940 and 1964/65 New York World's Fairs and the interior of the facility needed to reflect both of the Fairs. Since the Queens Museum building was constructed for the 1939/1940 World's Fair and was strategically situated adjacent to the centerpieces of both Fairs, it was decided to incorporate these elements into the Museum's exterior courtyard and enable users to toggle between the centerpieces. This involved the reworking of the 1964/65 Fair's Unisphere and the creation of the 1939/1940 Fair's Trylon and Perisphere.

Finally, all of the selected artifacts listed above needed to be created in detail as they were the focus of the larger experience to enable users to forge the links between the virtual environment and the artifacts contained within the museum's Visible Storage experience. Within each gallery wall, imagery was added to convey additional information for the visitor. All modeling was created in Maya.

Unity - When this grant was submitted, Unity had yet to become the leading game engine utilized by educational and independent developers. However, the Queens Museum construction time delays enabled the lab to evaluate options and determine that the Unity game engine was preferable to the ORGE engine our NSF project was committed to. Unity was a far more user friendly platform that did not require the development of unique code for every aspect of the environment as was the case in OGRE. The creation of *MuseumLeap* in Unity provided for an

environment that was closer to the level of quality the middle school aged target user group was accustomed to through their gaming experience – especially in relation to real-time lighting and shadows. Unity also permitted *MuseumLeap* to be experienced on both MAC and PC platforms. Discussions within the team and with our independent evaluator also made the ability to have the experience browser-based with no installation by the user required a highly desirable feature. Finally, it was abundantly clear that the open-source ORGE community was shrinking and that development in Unity provided many benefits, including the very practical one that it would make it much easier to support another phase of the project due to its widespread use in the educational community. The world could be maintained independently by the Queens Museum if desired. The university could also provide student intern volunteers to assist in the construction of models.

All artifacts had to be placed into their respective gallery and needed to have code developed for movement, lighting and information panels. Appropriate code to enable the interactive features, including the migration between the Trylon/Perisphere and Unisphere, had to be introduced. Finally, sound effects and music were added to complete the experience.

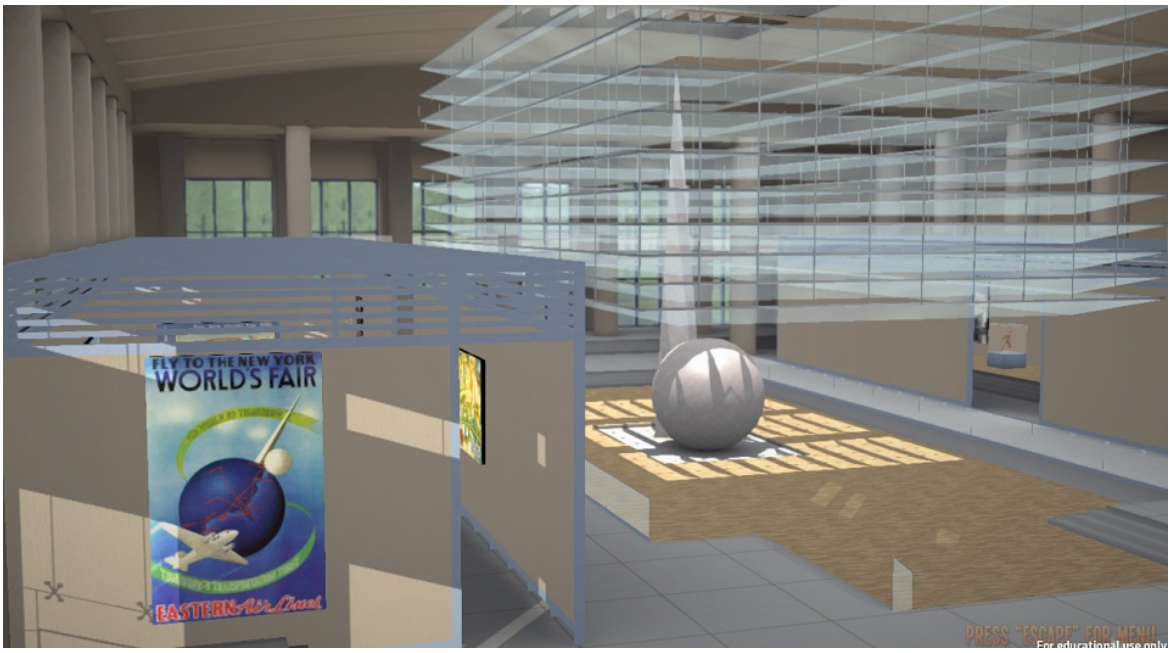

Figure 6 Virtual Queens Museum Interior

Figure 7 Queens Museum Exterior

QR Codes - As noted earlier, the original proposal called for barcodes and for the reasons listed above we changed to QR Codes. We did need to address how to display the QR Codes at the Queens Museum. Ideally, the codes would have been placed into the cabinet adjacent to the artifact. We tested the codes in relation to size, material, distance, lighting and their use with various smart phone devices and QR Code readers. It became apparent that older smart phone devices that had lower resolution cameras had difficulty with registering the QR Code from a distance greater than 13 inches when a glass panel was introduced to replicate the display glass. This immediately eliminated the possibility of installing the codes within the cases as the distance between the glass and shelves exceeded 13 inches – even if the QR code was printed at a size that exceeded the desired 2" x 2" size. It was determined larger sizes within the unit itself would break up the aesthetic value of the display and be distracting to individuals without smart phones or who did not wish to participate in the experience. Therefore we elected to have each QR Code adhere to the glass itself at a point that would be visually in line with the associated artifact. The codes were aligned at a height intended to be accessible to wheelchair users. All QR Codes were generated and printed. Angling the codes was intended to call attention to them.

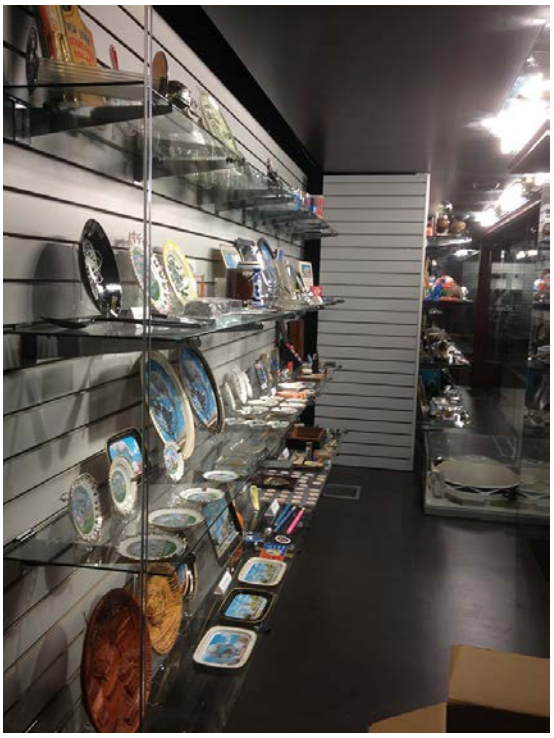

Figure 8: Side view of one portion of Visible Storage Gallery Units - note distance to front glass

Figure 9: Close up of Polynesian figures and Lincoln Bust

Website – a website, www.museumleap.com, was created to serve as a starting point for the virtual experience. The site houses the interactive Queens Museum experience and additional information about the 1939/1940 New York World's Fair and 1964/65 New York World's Fair artifacts.

Video – A teaser video was produced and can be seen at http://vimeo.com/84256686

Historical Content: Dr. Walters coordinated with project consultants Dr. Lawrence Samuel and Dr. Howard Segal in relation to the connections between the artifacts in the brick and mortar museum and virtual assets.

Dr. Lawrence Samuel is author of *The End of the Innocence: The 1964-1965 New York World's Fair* and *New York City 1964: A Cultural History.* His knowledge of the 1964/65 New York World's Fair and culture of the era was critical in assisting in the selection of artifacts and with understanding how the event fit within 1960s America.

Dr. Howard Segal is a Professor of History at the University of Maine and Director of their Technology and Science Project. Dr. Segal's expertise was critical in the selection of 1939/1940 New York World's Fair artifacts and making them relevant to our target audience.

Mr. Paul M. Van Dort served as image advisor for the 1939/1940 New York World's Fair. Mr. Van Dort is creator/curator of the expansive http://www.1939nyworldsfair.com/ website that is dedicated to the 1939/1940 Fair.

Evaluation and suggestions:

Dr. Karla Kitalong from Michigan Technological University served as project evaluator. She was involved in project planning and formal evaluation. A UCF student assisted in photography. On Saturday and Sunday, April 5 and 6, an observation was conducted at the Queens Museum to understand which visitors would activate the QR codes and under what circumstances. Signs were placed at points were visitors would enter World's Fair Visible Storage Gallery. These signs included appropriate QR code reader applications that could be downloaded to their iPhone and Android devices.

Fewer than 10% of museum visitors interacted with the QR code feature. An environmental factor could be the low level lighting of in the exhibit area. The bright lights inside the display cases effectively showcase the artifacts, but silhouette the QR codes. The evaluator surveyed visitors – some indicated they 'never' activate QR codes and others indicated they did not wish to download another app. The most astonishing comment was they never activate QR codes as the usually generate only "bad commercial information."

We experimented with a variety of QR code formatting styles for the small smart phone screen, including placing the image first, placing the text first, and incorporating more or less text as warranted by the amount of explanation required for the artifact. It was determined providing the render of the artifact initially rather than text motivated the user to continue to scroll. They were receptive to image, text paragraph, image, text paragraph. More than five panels of any combination appeared to overwhelm the user and they did not continue to scan other QR codes. However, it was advised by the evaluator to reduce the size of the initial image so that the user understands there is accompanying information. It was also advised to edit the texts for wordiness as possible.

Ultimately, the evaluator and PI concluded that the visitors did not activate the QR codes more frequently because they did not notice them, or, if they did notice them, they were not sure of the benefit. To assist in overcoming the area's lowlighting, the evaluator suggested adding a bright border to the QR code to make them standout.

However, we feel that QR codes are not the ideal trigger the experience within the Visible Storage Gallery at the Queens Museum. The primary issue is the layout of the gallery, the cabinets are not independent units based on topic and there is no cabinet base or other area that the codes can be adhered to without obstructing the view. The layout did not permit the creation of a panel with the code and text or an image to draw in the user. The low lighting of the area also presented an issue with users who had older iPhones and Android devices. These users had to scan the codes several times before they registered and this significantly decreased the user's desire to scan beyond the second QR code station.

Additionally, QR codes are passive triggers and require the visitor to scan the code and if the code cannot be a compelling visual draw, the percentage of users decreases significantly. We are continuing to research the issue beyond the life of the grant and are exploring the use of Bluetooth low-energy (BLE) wireless technology. Commonly referred to as iBeacon (Apple's version of the technology) it is compatible with iPhone devices 4s and newer, third generation iPads and up, and Android devices that are 4.3 and later. The beacon sends out a signal that is acquired by the user's handheld device. BLE technology is simple and relatively inexpensive in relation to equipment costs.

The units are small and can be hidden at strategic points in the museum. They emit a signal that when the user walks within the range, their handheld device receives and displays content on their smartphone/ tablet if they have the appropriate app installed. Essentially, it provides an accurate indoor alternative to GPS. It should be noted that there is a weatherproof beacon that can enable trigger points outside on museum property.

BLE technology is starting to make appearances in retail for alerting buyers to specials, airlines have been testing them at airports to alert their passengers and Major League Baseball has launched an iBeacon interactive initiative experience at MLB parks.