DDF annual report

Title of Investigation:

The Pavilion: A Collaboration of Art and Technology

Principal Investigator:

Joseph M. Howard (Code 551)

Other External Collaborators:

Randall Packer, American University

Initiation Year:

FY 2003

Aggregate Amount of Funding Authorized in FY 2004 and Earlier Years:

$8,5000

FY 2005 Authorized Funding:

$1,000

Actual or Expected Expenditure of FY 2005 Funding:

Construction materials and printing to create a display at the Goddard Space Flight Center Visitor's Center

Status at End of FY 2005:

Transitioning work to American University and pursuing grants from the D.C. Arts Commission, the Daniel Langlois Foundation, and American University for construction of a gallery exhibit at the Katzen Arts Center.

Expected Completion Date:

May 2008

Purpose of the Investigation:

The Pavilion project built an exhibit at the Goddard Space Flight Center Visitor's Center, explaining how mirrors have been used historically in both art and technology Virtual images are those you see in a flat mirror. Real images, on the other hand, appear in "front" of the mirror,

almost as if you could reach out and touch them. The large concave mirrors (Figure 1) provide both virtual and real images, depending on how close you stand to them. When you see an upside-down image of yourself, you are seeing a "real" image. You can try to shake hands as seen in Figure 2, or even "pass through" yourself. When you see a right-side-up image of yourself, you are seeing a virtual image. Real images are unusual to most people, and they provide an immersive environment that alters one's normal perception of reality. The essence of the "real" and the "virtual" image is at the heart of the artistic side of this collaboration, where progress is underway at American University to create a gallery exhibit at the new Katzen Arts Center in the fall of 2007. NASA played a technical leadership role in the early phases of this project (2003–2005) by providing expertise in mirrors and constructing demonstration models that are now housed at American University.

The original Pepsi Pavilion presented at the 1970 Expo in Osaka, Japan, inspired this project. The Pepsi Pavilion was one of the first artworks and performance spaces to completely immerse a large number of viewers in an interactive environment. At its heart was a 30-m dome mirror, subtending a full 210° (solid angle—completely surrounding the viewers. The visitors' experienced real images of themselves and others who appeared to be floating in the space above and around them. (As mentioned, a real image results from the curvature of the mirror and is located in an accessible location; in this case, it is between the dome mirror and the viewer, allowing one to visually shake hands with yourself or even pass through your own image. A virtual image, on the other hand, is when the image lies behind a mirror, in space where the light from the object does not travel; as one sees in a flat bathroom mirror.) The Pavilion Project recreates a portion of this experience and extends it using a networked environment, where images are captured, processed, and projected into the gallery space with the viewer. Project materials have been transferred to American University, where planning is underway for this full exhibition at the Katzen Arts Center in the fall of 2007. The display summarizes the Pepsi Pavilion and The Pavilion project work as part of a video presentation.

FY 2005 Accomplishments:

Figure 1. The Pavilion Project display at the GSFC Visitor Center, September 1, 2005

Figure 2. In the top photo, Dr. Joseph Howard of GSFC, the PI of the Pavilion Project, is interacting with his real image, attempting to shake his own hand. In the bottom photo, Dr. Randall Packer of American University is attempting the same.

Planned Future Work:

This Pavilion display is currently being shown at the GSFC Visitor's Center (August 2005–July 2006). In the summer of 2006, the display will be transferred to Dr. Randall Packer at American University for display in the campus media department. Fundraising efforts are currently underway for a gallery exhibit at the Katzen Arts Center.

Key Points Summary:

The project's innovative features: These include real-time viewing over the Internet of images created by spherical dome mirrors, creating an immersive environment for the viewer.

Potential payoff to Goddard/NASA: This exhibit inspires the next generation of space explorers. It satisfies outreach requirements of both the Goddard Visitor's Center and in the future at American University's Katzen Arts Center.

The criteria for success: Completing the installation at the Visitor's Center in August 2005 was our criterion for success. From a programmatic point of view, we obtained funding support from corporate and foundation sponsors for future non-NASA gallery exhibits (TBD).

Technical risk factors: These included image quality resulting from non-spherical surface of dome, and access to the viewer to create immersive feeling.