

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)  
Calling Planet Earth - Space Outreach to the General Public (6)

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DESIGNING A SUSTAINABLE MOON BASE 3D ENVIRONMENT AS AN INTERACTIVE  
LEARNING TOOL

**Abstract**

This paper presents an on-going project that Sasakawa International Center for Space Architecture (SICSA) graduate students and staff have been working on with support of the Houston Museum of Natural Science (HMNS) since September 2010. The project aims to create a 3D Moon settlement environment for the HMNS's Discovery Dome program. HMNS uses full-dome video of the solar system, earth science topics and the human body to take students on learning adventures. Discovery Domes are completely immersive domed planetariums that utilize digital technology and can be installed in fixed facilities or in mobile, inflatable domes. The Houston Museum of Natural Science built the first digital fixed dome in 1998 and the first portable one in 2003. So far the Museum has supplied the domes to 75 locations on six continents, which can bring lessons about the universe to remote places on Earth.

The 3D interactive model of a sustainable Moon Base for 80 people will be used as a learning tool to ignite students' interest in science and technology and help them to explore challenges and opportunities that space exploration offers. The students will be able to navigate through the whole settlement, walk into facilities and see how people may live on Earth's only natural satellite in the future. They will learn about importance of sustainability in remote environments using a Moon base as an example. Subjects that students will be able to explore and discuss later in their classrooms with teachers include:

1. Closed loop life support systems;
2. Environmental challenges that people will face living on the Moon;
3. Sustainable design issues and concerns;
4. Human factors;
5. Advanced technologies;

The paper will describe the project and SICSA graduate students' involvement in identifying the way the design can lead K-12 students to learn more about science and help to understand important aspects of space disciplines. The paper will also discuss challenges and advantages of using digital technology for educational purposes and emphasize importance of bringing a "wow" factor into classrooms of all levels.