Field Trip to Mars

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ABSTRACT

"Field Trip to Mars" is the first-ever headset-free group virtual reality vehicle experience. Taking the literal shape of a classic yellow school bus, the vehicle is home to an immersive virtual experience that transports school children to the surface of the Red Planet.

CCS CONCEPTS

• **Computer systems organization** → *Real-time systems*; • **Software and its engineering** → *Virtual worlds software*; • **Computing methodologies** → *Graphics systems and interfaces*; • **Applied computing** → *Education*;

KEYWORDS

Virtual worlds, engineering, fabrication, computing

1 INTRODUCTION

Oscar-winning visual effects company Framestore will discuss how they created first-of-its-kind technology to bring Mars to Earth, using innovation to inspire an entire generation.

2 MAPPING IN GAME ENGINE

Using a proprietary method of building a world from open-source map data we built the actual streets of the USA Science & Engineering Festival's city, Washington D.C., to create a 250-square-mile Mars "worldscape" through the Unreal game engine.

3 TRANSPARENT ELECTRIC GLASS

We designed a configuration of transparent LCD screens backed by switchable film with LED backlights sandwiched between. When kids board the bus the LCD screens are fed a white image, rendering them transparent. When the experience begins an electrical current is fed to the switchable film turning it opaque, the LED backlights are illuminated and VR Martian content replaces the white image on the LCD.

4 TRACKING THE BUS

Framestore wrote a bespoke piece of software to translate the information from the live bus route to the visual display on the windows. The software combines data from an accelerometer, gyroscope, laser surface velocimeter, and GPS data, which is then output to custom-built high-end gaming PCs. The laser surface velocimeter measured bus speed with a custom built plug-in for Unreal. A custom built circuit board combined 3-axis accelerometer, gyroscope, magnetometer and GPS to measure the direction the bus is going, where the bus is on a map and any vibrations with a custom-built plugin for the game engine.

Custom built high-end gaming PCs using the fastest graphics processors available (at the time of production) powered the real-time rendering requirements of four networked computers plus a control server along with two redundant back-up computers to run the show.

5 RESULTS AND CONCLUSIONS

Through providing a dazzling experience within the comfort of a school bus, the young scientists and technologists of tomorrow couldn't help but look to the future as they commuted to the festival.

6 ACKNOWLEDGEMENTS