

Velotron Arise

David Hunt*

Rigging Tech Art Lead, Bungie LLC – Part-time Lecturer, University of Washington



Figure 1: *Velotron Arise* screen captures.

Abstract

Velotron Arise is an interactive experience featuring live music and visual art performance. It incorporates a unique combination of VR and AR to bring multiple people simultaneously into the same realtime 3D animated scene.

The story progression is driven by the interactions of the audience using connected devices that include the HTC Vive and handheld mobile smartphones. The connected audience size can scale from 5 to 50 people to accommodate the amount of space available.

Visual elements within the scene are animated by live performance of the musician, Joseph Sheedy accompanied by unique visual glitch effects that are generated within the 3D scene by technical artist, David Hunt. The audience is immersed in this unique looking and sounding world where their actions influence how the scene plays out.

Keywords: virtual reality, augmented reality, music, glitch art, live performance, realtime animation

Concepts: •Music-driven animation ~ Interactive performance

1 Story

Realtime 3D animation portrays the giant robot, Velotron, who arises in the far future to restore life to the mechanical planet, Xion. When activated by the audience, Velotron gradually

*e-mail:kloctower@gmail.com

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SIGGRAPH 2016 Posters, July 24-28, 2016, Anaheim, CA

ISBN: 978-1-4503-ABCD-E/16/07

DOI: <http://doi.acm.org/10.1145/9999997.9999999>

awakens and stands up the towering height of 60 meters tall. He reaches down to pick up the audience, who he then carries to the center of the world where he activates the Xion Datacore.

The audience experiences the transition of this world from static darkness into a vibrant spring morning full of life signifying the rebirth of a vast and beautiful world. The story resolves when the population of Anatomecha returns to inhabit their peaceful mechanical utopia.

2 Live Music Performance

Musician and Software Developer, Joseph Sheedy performs live music on EWI (Electronic Wind Instrument) and keyboard. The musical performance is entirely digital and is experienced through the speakers and headphones of connected devices.

Sheedy has developed custom Max4Live modules to broadcast OSC (Open Sound Control) data from Ableton Live to the Unity 3D game engine. His original music produces multi-track waveform envelopes, midi events and FFT frequency spectrum data that drives realtime animation in the world of Velotron Arise. These elements help progress the story by bringing life and color to the environment and characters.



Figure 2: *Joseph Sheedy performing EWI, controlling animated elements within the Velotron Arise realtime 3D scene.*

3 Live Glitch Art Performance

Technical Artist and Game Developer, David Hunt creates unique visual glitch effects by exploiting errors within the Unity3D game

engine. These effects are generated live within the Velotron Arise scene using customized game control hardware, MIDI devices and the Leap Motion controller.

His performance is synchronized with the music and responds to audience interaction. Brightly colored fractal patterns portray the artist's vision of a super-intelligent mechanical civilization that is awakened 3 billion years in the future.



Figure 3: Technical Artist David Hunt performing animated glitch art for Velotron Arise using the Leap Motion controller.

4 Audience Interaction

One audience member is selected to operate the HTC Vive in full room-scale Virtual Reality.

Four additional audience members are selected to use handheld smartphones to connect to the same scene. The smartphones can be aimed in any physical direction to display a full 3D view of the virtual world. A custom user interface on each smartphone provides control over specific elements within the scene, connecting them with the Vive operator.

Up to 50 additional audience members can connect via their own mobile devices to view and interact with the same 3D scene using a basic set of controls displayed in their web browser.

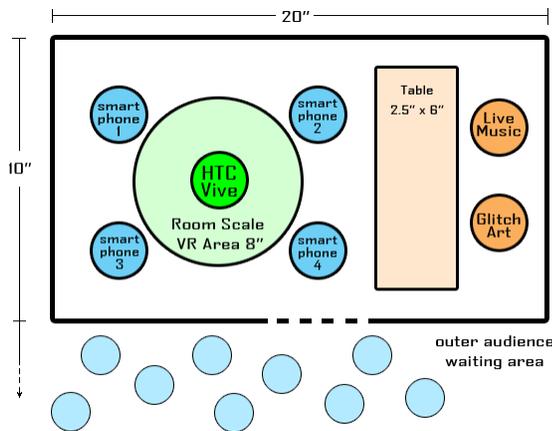


Figure 4: Floor plan diagram for Velotron Arise performance.

5 Technical Details

All of the handheld mobile devices connect to a local area Wi-Fi network that hosts a custom WebSocket server.

The four main smartphones transmit accelerometer data to control elements that represent their physical orientation that is observable by the operator of the HTC Vive.

General audience can connect via mobile devices that display custom user interfaces in the web browsers. User input data is routed back to the animated scene.

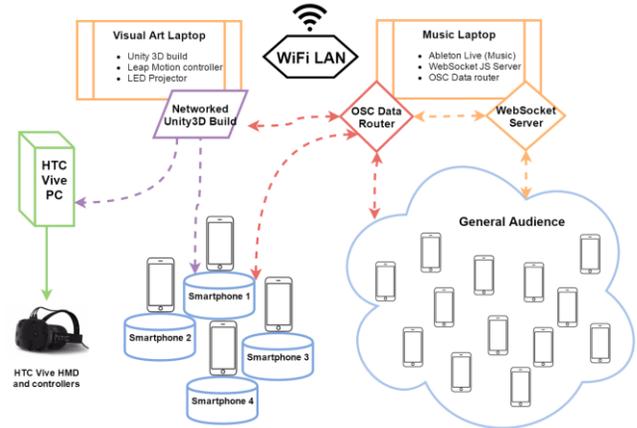


Figure 5: Technical flowchart for hardware/software setup.

These combined technologies provide users of the connected smartphones with a unique experience of Augmented Reality. The smartphones are handheld, enabling these participants to also see the live performances of the musician and visual artist, who are located nearby. The smartphone users are also aware of the physical movement of the HTC Vive operator so they may gain situational awareness of their interactions with the virtual scene.

Acknowledgements

Tom Doyle, Endeavor One - for the use of HTC Vive equipment.

Contributors

Joseph Sheedy - Musician, Software Developer
joseph.sheedy@gmail.com - velotronheavyindustries.com
Vulcan Inc. 2015 - present, Software Developer
 Rooster Park - Senior Developer
 University of Washington PCE - Python Instructor
 VHI (software development) - freelance software developer
 Music: Tubaluba, Beast Please Be Still, HONK! Fest West, Velotron Heavy Industries (band)

David Hunt - Technical Artist, Game Developer
klocktower@gmail.com - anatomecha.com

Bungie LLC 2005 - present, Rigging Tech Art Lead
University of Washington, Part Time Lecturer 2007 - present
 UW Bachelor of Arts, Interdisciplinary Visual Art, 2000
 Drexel U. Learning Technologies, masters candidate - present
 Game Developers Conference presenter, 2015 and 2009
 Autodesk Masterclass presenter, 2008
 Member: VES, IGDA