The Immersive Archive
Mobile & Environmental Media Lab
USC School of Cinematic Arts

Project Overview:
Virtual, Augmented and Mixed Reality (XR) are rapidly expanding mediums, but few realize that they have a very long history of development emerging out of early prototypes by research labs, artists, and inventors. These early decades of XR development have not yet been comprehensively archived and exhibited. In some instances, it is possible to access research papers and other documentation about these projects which can give a general sense of their functions.

But what if we could actually visit those early labs virtually, learn more about these pioneering efforts, and experience what these prototypes were really like?

Objective:
The Immersive Archive is focused on developing simulations that restore and exhibit XR devices and visions throughout immersive media history. Similar in concept and function to a Film Archive or Internet Archive that collect, restore, and conserve a wide range of media, the objective here is to provide users an interactive, first person, immersive experience of the XR medium throughout its evolution, with links to a rich context of historical background and archival materials for deeper exploration.

We recognize that in order to establish best practices for immersive media preservation and support future study, there needs to be a collaboration between artists, institutions, and industry. As the field enters the next chapters of XR development, we hope this initiative will build knowledge and engagement around the preservation of immersive media experiences. We also hope to spark discourse around how these histories are documented, to ensure these narratives are shaped by a wide and representative community covering the breadth of immersive media efforts. Early prototypes of this archival initiative invite discussion on these questions.

Approach:
The first phase of this project has focused on the development of proof-of-concept simulations of the first efforts to develop XR technologies. These immersive experiences include:

- The Sensorama was an early VR device developed in 1960 by Morton Heilig. It combined a stereoscopic 3D display with sensory elements like vibrating seats, fans for wind effects, and scent emitters which provided a multisensory, immersive cinema experience using 3D films.
- Ivan Sutherland's head-mounted-display was one of the earliest mixed reality devices developed in 1968 at his Harvard research lab. It suspended a display in front of the user's eyes and used head tracking, laying the foundation for modern immersive technologies.
- The NASA VIEWlab began in 1985 at NASA Ames Research Center, developing what eventually became known as virtual environment or "virtual reality" systems. The project attempted to develop a simulator for the space station and a series of interactive experiments with the dataglove, head-coupled displays and 3D audio.

The simulations of these projects are developed in a Unity-based 3D computer graphics environment and displayed in contemporary VR devices such as the HTC Vive and Meta Quest. The 3D assets used in the simulations, such as Sutherland's HMD and the Sensorama device, are captured with high-resolution photogrammetric scanning technologies and imported into the Unity environment. Current prototypes of these experiences allow users to enter or put on virtual models of the early devices, see the original content that was developed, and interact with device components. Next steps include guided descriptions of the devices, annotations of the technology components, and the addition of further landmark XR projects.

The Immersive Archive Team:
The development team for this project consists of faculty, staff, and students from the School of Cinematic Arts (SCA) along with other schools on campus. The team is working in collaboration with SCA's HMH Foundation Moving Image Archive, The Computer History Museum, and expert advisors such as Professor Erkki Huhtamo, Media Archaeologist at UCLA; Professor Lisa Messeri, Cultural Anthropologist at Yale specializing in the History of Science and Technology; and Henry Lowood, Harold C. Hohbach Curator, History of Science & Technology Collections Curator, Film & Media Collections.

The USC Mobile & Environmental Media Lab
The USC Mobile & Environmental Media Lab is known for its pioneering research efforts in the area of 'Ambient Storytelling' through the application of Virtual, Augmented, and Mixed Reality technologies to develop unique interactive location-based experiences. Housed within USC's School of Cinematic Arts, the lab's design methodology straddles the cultures of visual storytelling, games, and interaction design. This approach combines conceptual tools of storytelling (dramatic arc, character motivation, conflict, obstacles, and resolution) with the core concerns of game design (systems, procedures, constraints, objectives, resources, core mechanics). The lab's research has explored context- and location-specific mobile storytelling, interactive architecture, vehicular and environmental lifelogging, and automotive experience design in collaborations with a wide range of industry partners including Intel, BMW, Steelcase, Microsoft, Google, and Niantic.

The Computer History Museum The Computer History Museum's (CHM) mission is to decode technology--the computing past, digital present, and future impact on humanity. From the heart of Silicon Valley, we share insights gleaned from our research, our events, and our incomparable collection of computing artifacts and oral histories to convene, inform, and empower people to build a better world.