



Going Beyond Reality: Creating Extreme Multi- Modal Mixed Reality for Training Simulations

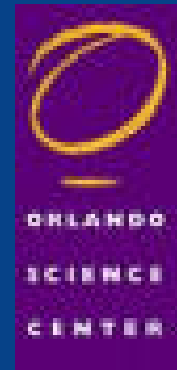
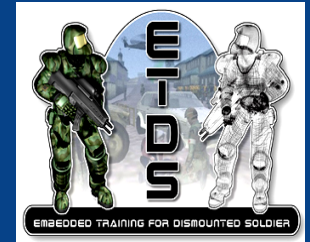
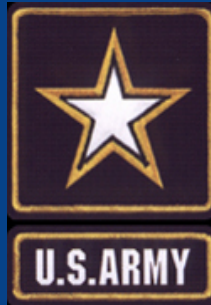
Scott Malo, Digital Production Supervisor
Christopher Stapleton, MCL Director
Dr. Charles Hughes, MCL Chief Scientist

**Media Convergence Laboratory
University of Central Florida**

A Partnership of

**Institute for Simulation and Training
School of Computer Science
College of Arts and Science**

We wish to thank our partners



Combat Reality



Blood, sweat, tears, life and death

Live Simulation



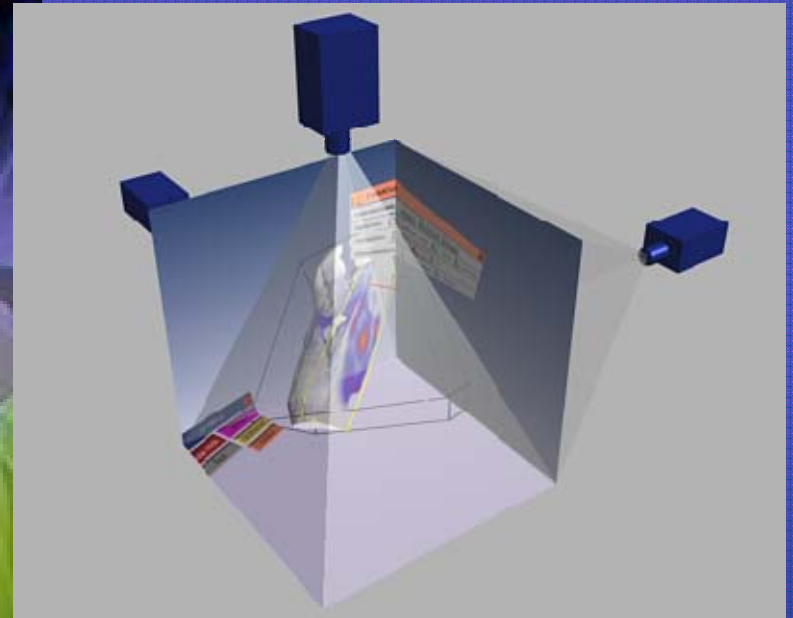
Physical, immersive, multi-modal

Virtual Reality



Dynamic, flexible, on-demand

Immersion Beyond the projection screen



CAVE

Cinemagic

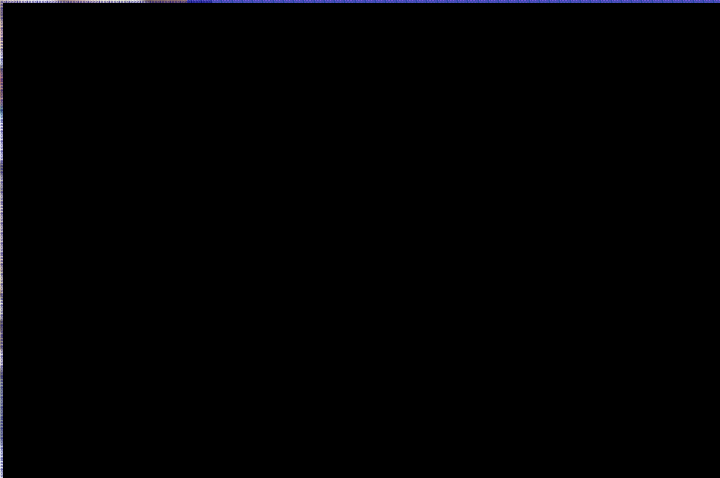


Imaginary Reality



Compelling, emotional, memorable

Real Training vs. Entertainment



Real MOUT Training at MOUT McKenna



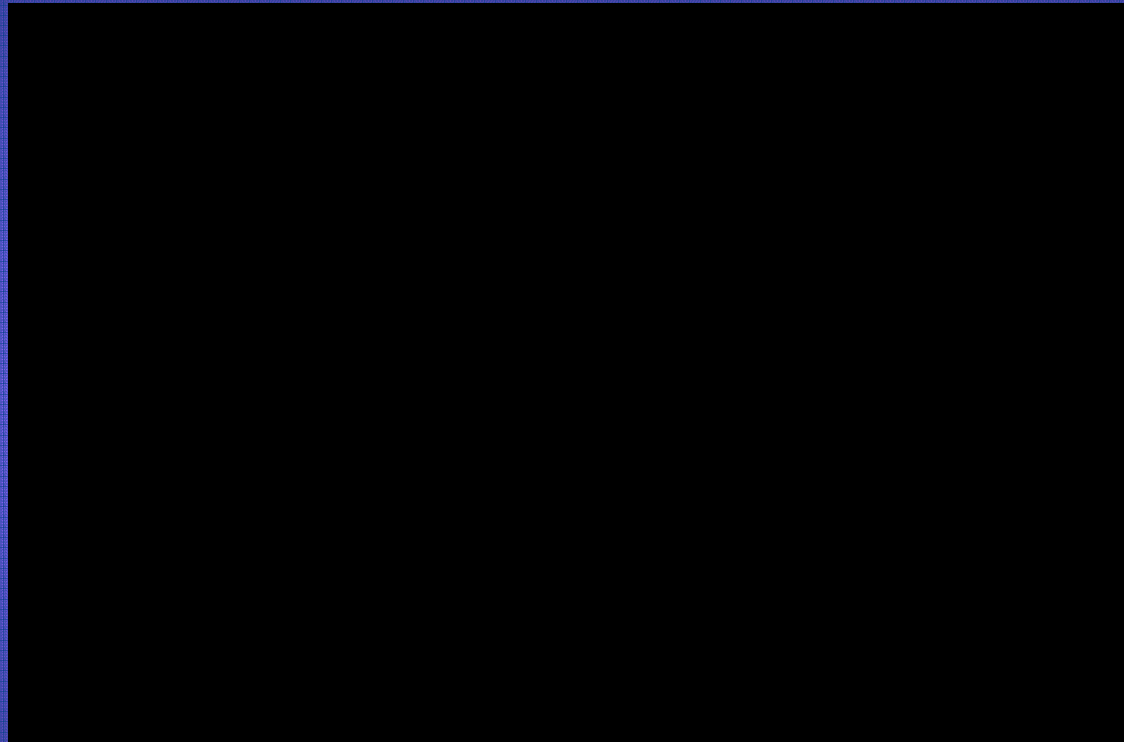
Clip from the Columbia Pictures Film -
Black Hawk Down



Mixed Reality in Military Operations in Urban Terrain

Power of Mixed Reality

What is Mixed Reality?

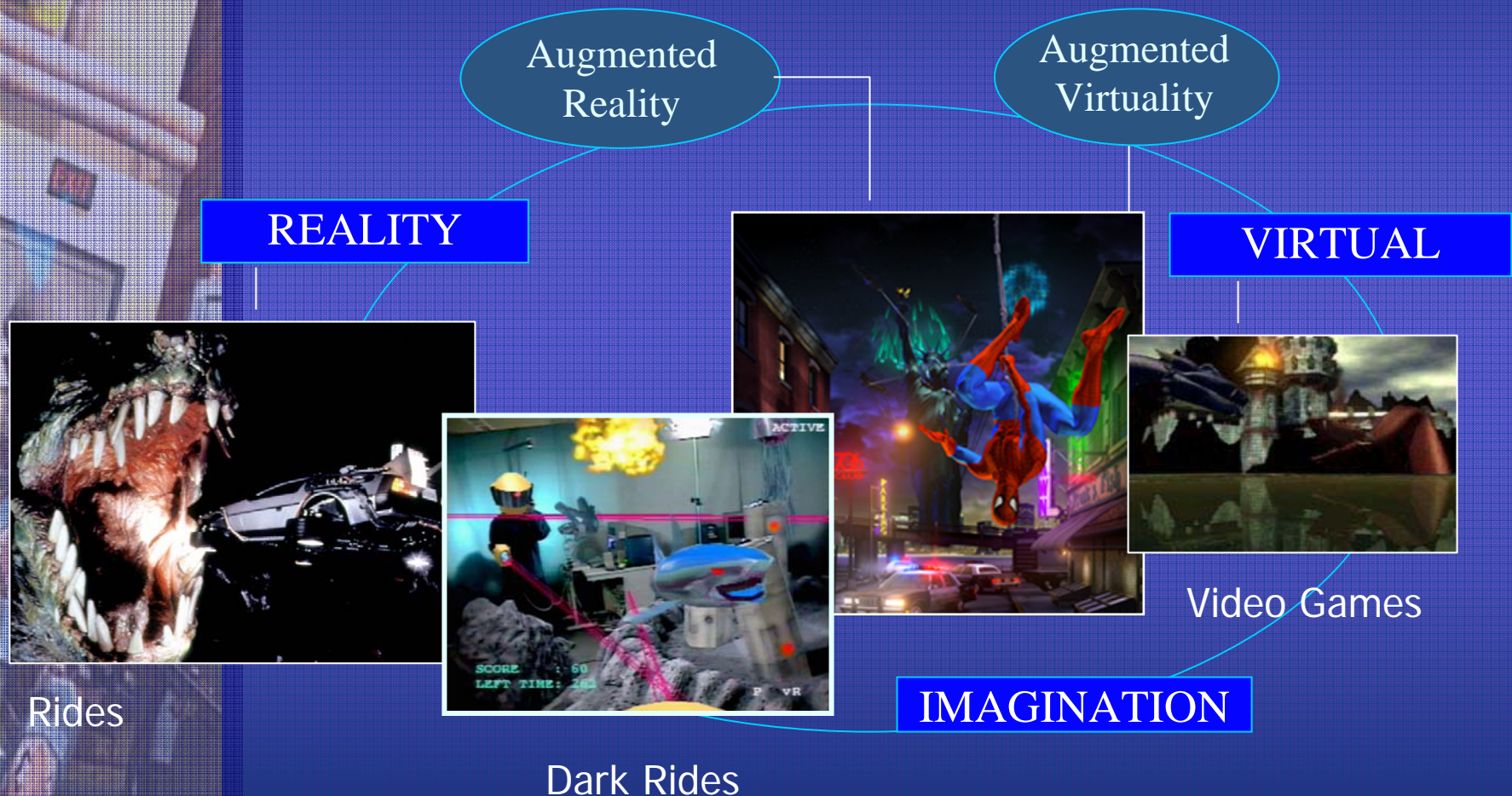


MR MOUT 2.0 Scenario – Mixed Reality vs. Reality Views

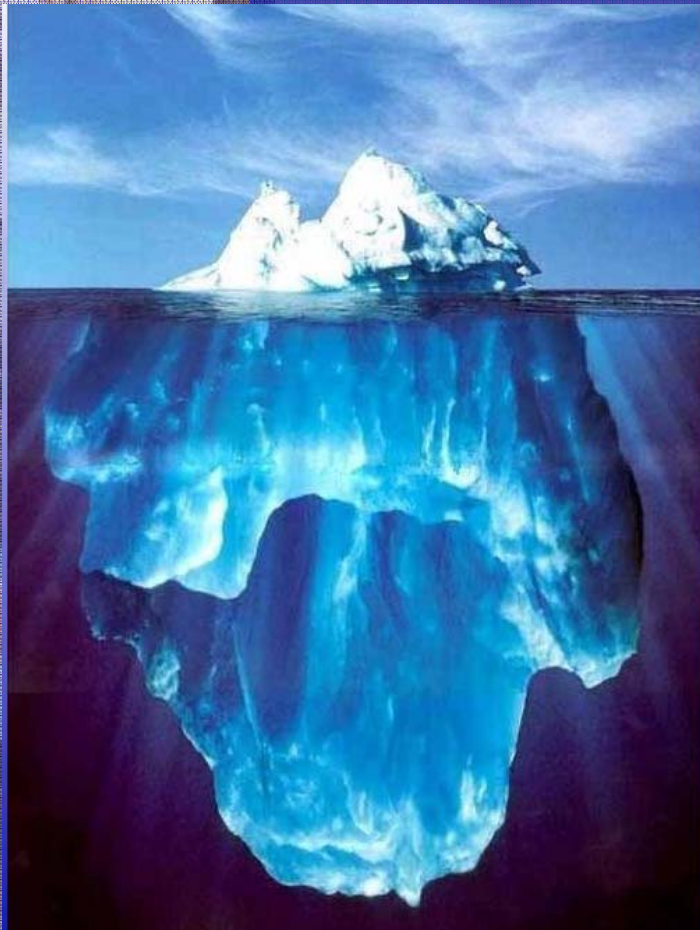
Mixed Reality is the blending of the real world and the virtual world and the combination is seamless

Redefining Mixed Reality

"Magic is behind the eyeballs"



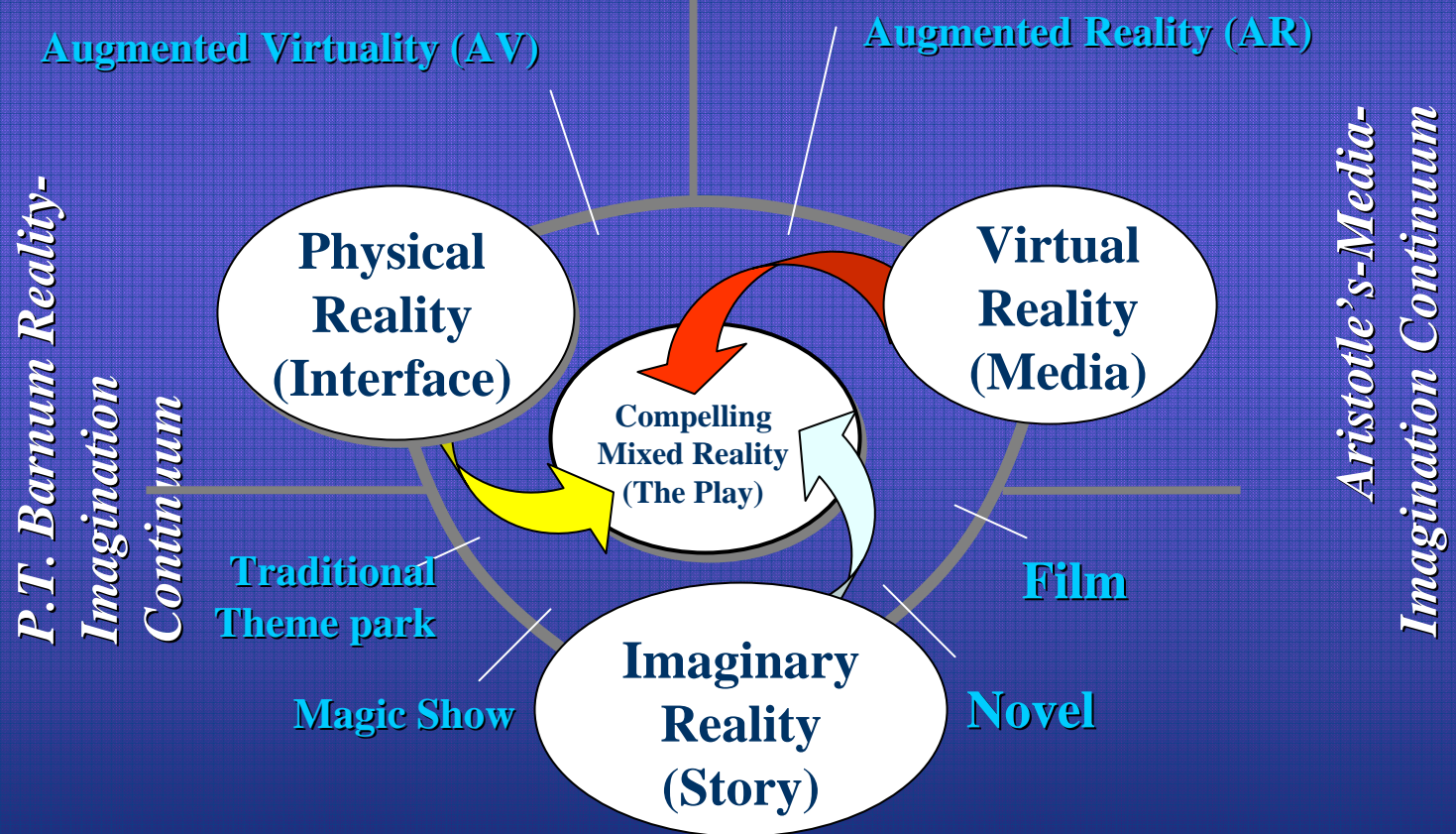
Ernest Hemingway



"What is in the (text) book is only one fourth of the story. It is like an iceberg where three-quarters of the story you don't see, it is beyond the page."

Mixed Fantasy Continuum (adding imagination)

Milgram's Reality-Virtuality Continuum



The Art of Mixing Reality



Artist Rendition of the MR MOUT "visor" HUD

The Art of Mixing Reality



Borrow from the best

Eyes on the Prize



Previsulization

Creating the Assets



Characters, Environments, Textures

MR Mini MOUT



Scenography

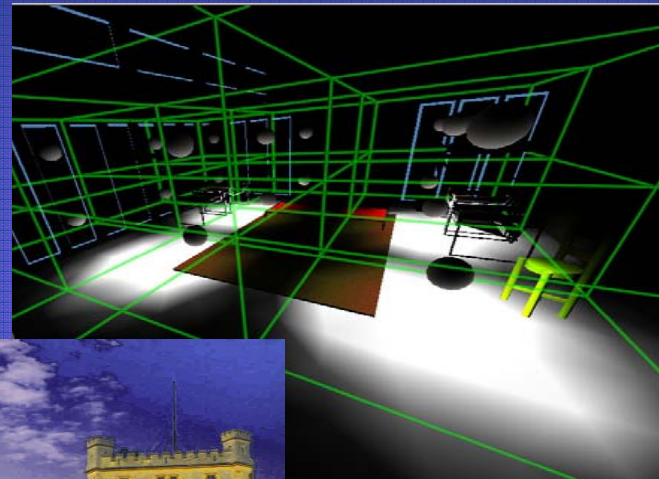


Designing the SFX



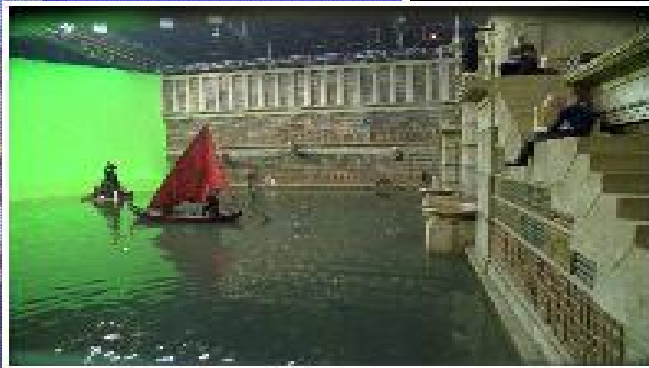
Special Effects (SFX)

Designing the Lighting



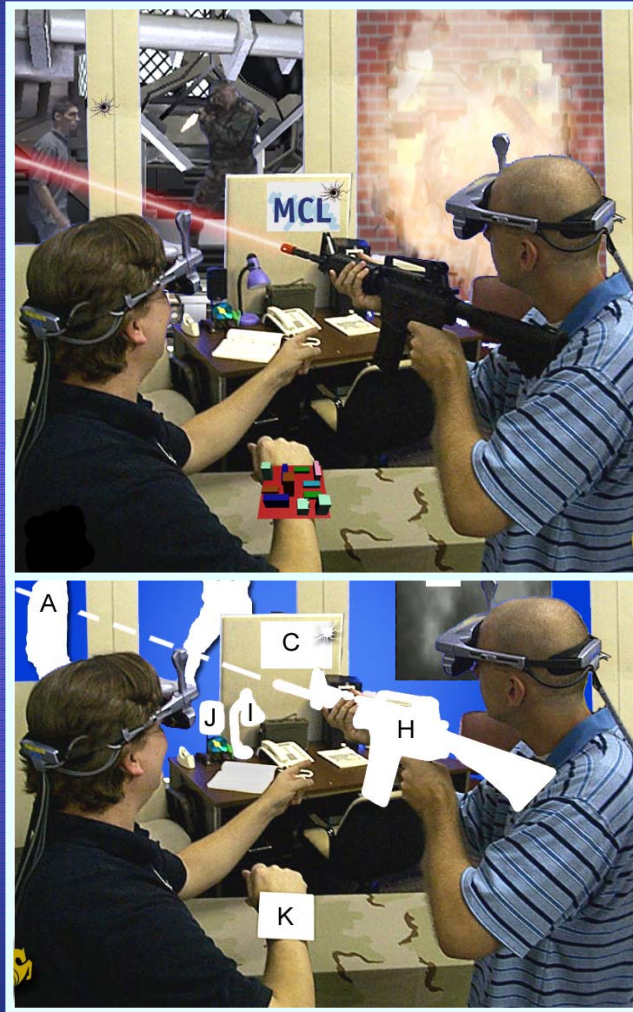
Illumination, Shading, Shadows Palettes

Layers of Illusion



Real-time Compositing

Building Each Layer



A. Video & 3D Targets

B. Physical Scenery

C. Virtual Props

D. ChromaKey Occlusion

E. Virtual Scenery

F. Virtual FX

G. Virtual Vehicles

H. Haptic Device

J. 3D MR Audio

I. Physical SFX

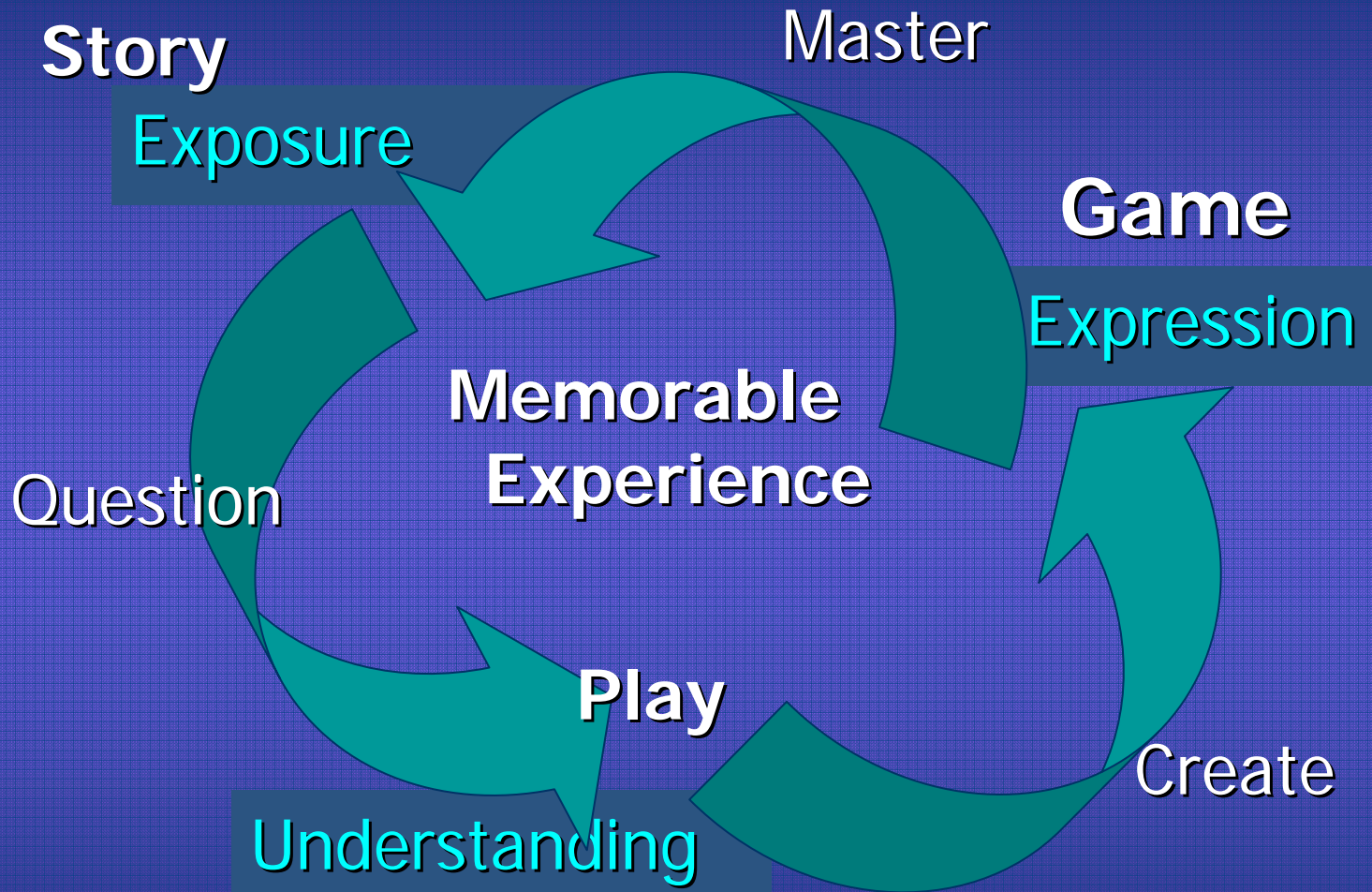
K. Virtual Interface

L. Story



3D Capture

Power of Content





Animatic

Timing & Juxtaposition



Virtual Test

Interactivity and game play

Augmentation

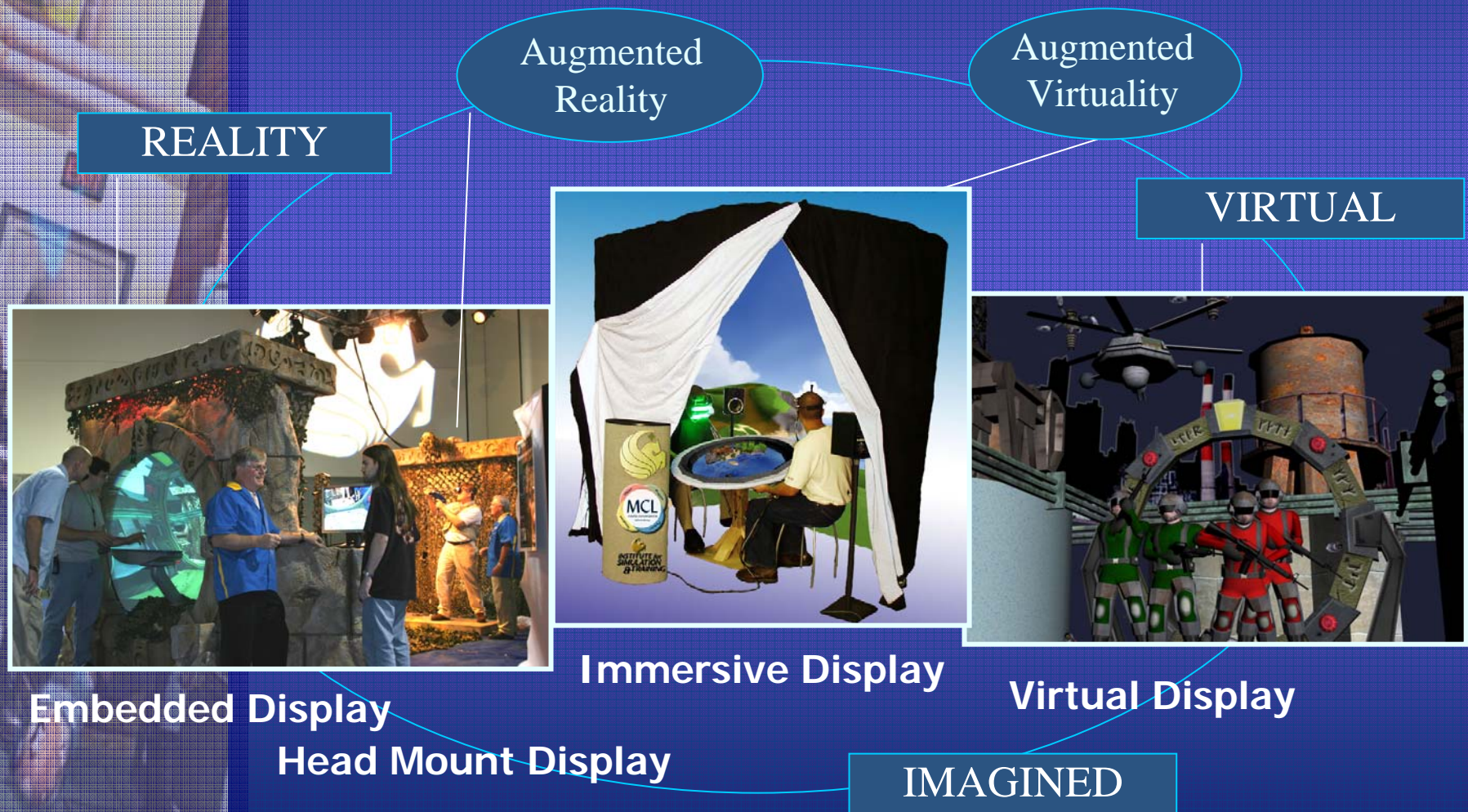
Integrating Reality



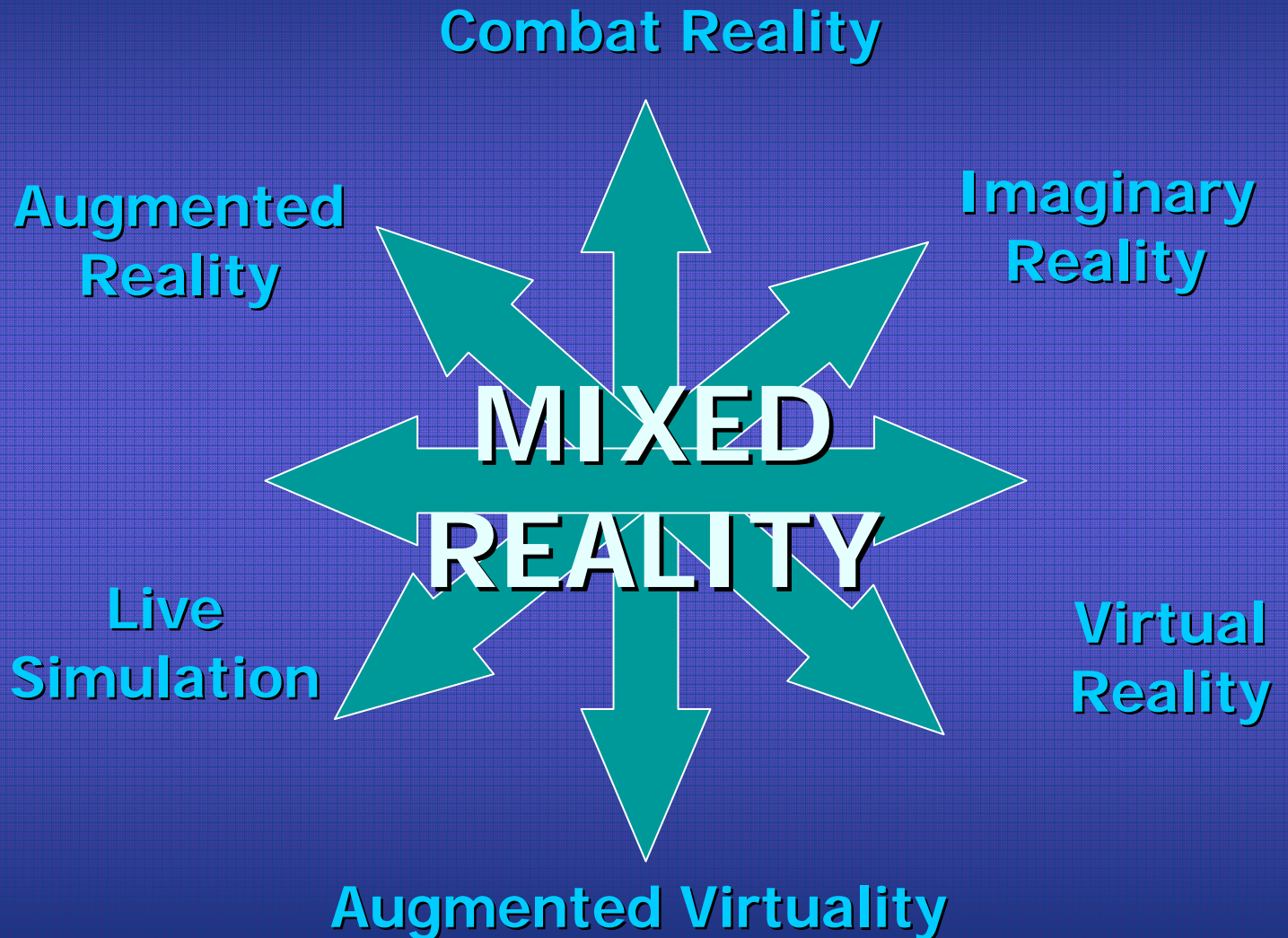
Points of View

Planning, Training, Observing, AAR

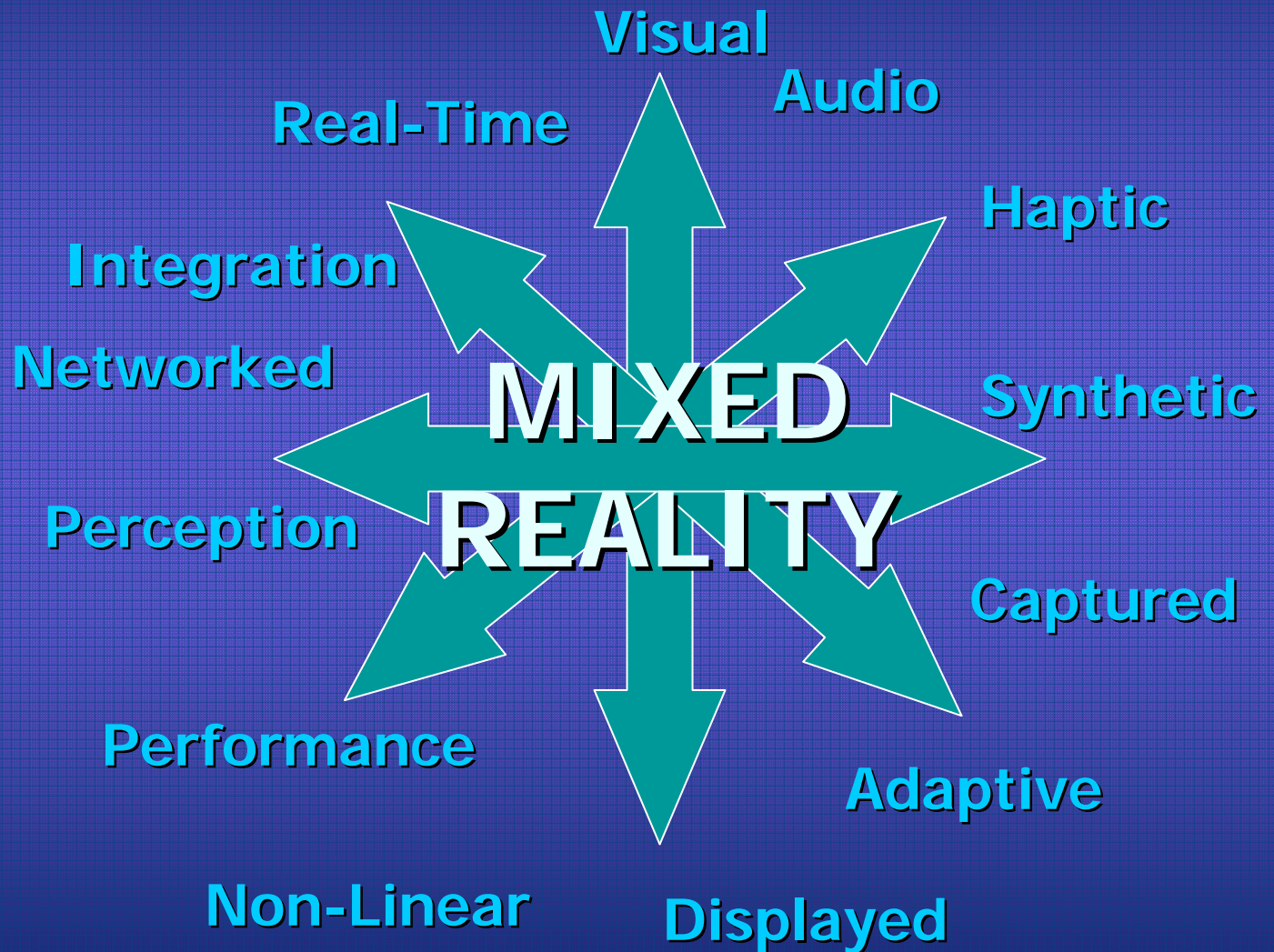
Technology Transfer



Filling in Gaps



Filling in Gaps



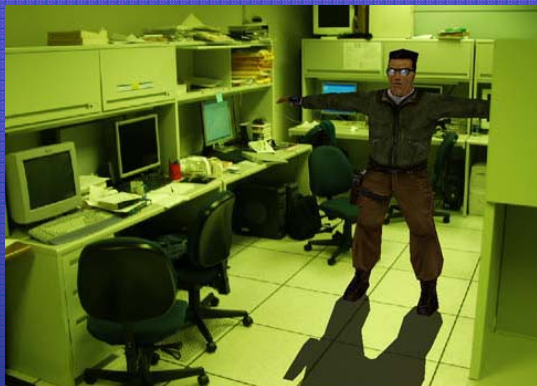
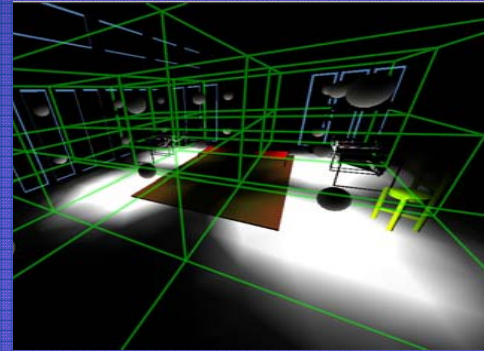
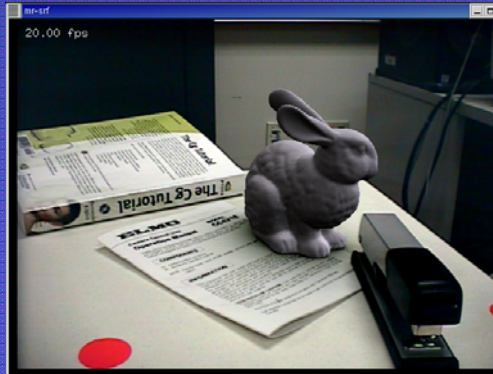
Power of MR

Melting the Boundaries

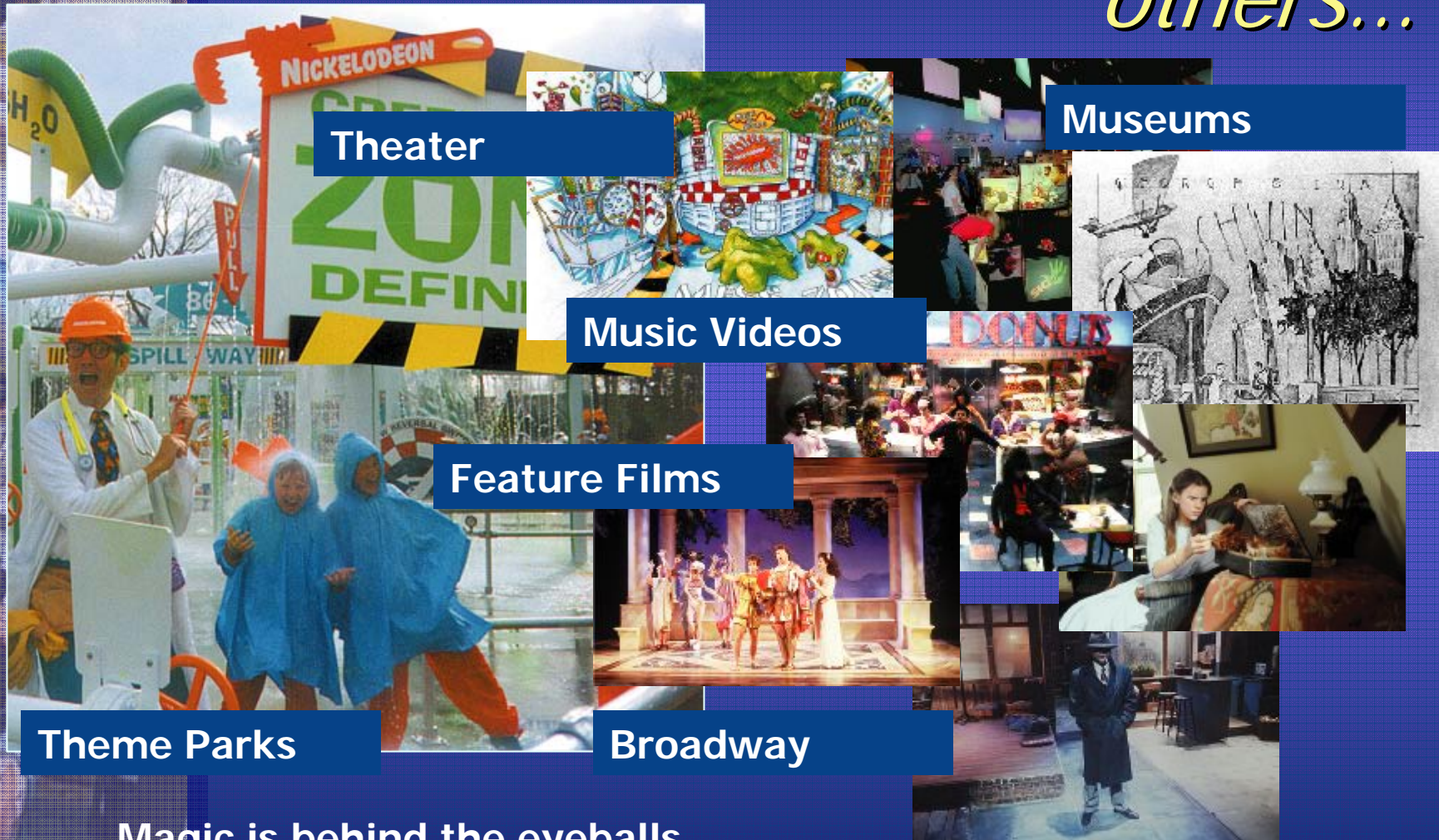


Real-time, immersive, 3D, visceral multi-modal

Real-time Rendering



...painting with the imaginations of others...



Magic is behind the eyeballs...



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