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Implementing Immersive Virtual Reality in an Aviation/Aerospace **Teaching and Learning Paradigm**

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Implementing Immersive Virtual Reality in an Aviation/Aerospace Teaching and Learning Paradigm

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Agenda

- Training in Immersive Environments
- Virtual Space in Education & Training
- Creating & Implementing a Virtual Space
- The ERAU Lab: Capabilities & Technologies
- Future Opportunities

Training in Immersive Environments

The Virtuality Continuum

Video-Mixing Non-/Semi-Optical Immersve Tangible See-through AR AR Immersive VR VR Interfaces Computer Computer Generated Generated Content Content **MIXED REALITY Amplified Reality** Virtualised Reality Mediated Reality Real Augmented Augmented Virtual **Environtments** Reality Virtuality **Environments** (REs) (AR) (AV) (VEs) Real Reality Video Reality VIrtual Reality

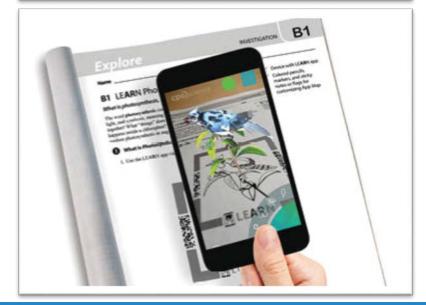
Aksenova, 2013, adapted from Milgram & Kishino, 1994

Virtual Space in Education & Training

• **Education:** collaborative learning, enhanced systems training, gamification, enhanced visualization of materials

- Medicine: integrated systems to aid surgery, patient rehabilitation in a virtual environment
- Military: virtual training environment, head-up displays (HUD) and head-mounted displays (HMDs)





Creating & Implementing a Virtual Space

- Mission and Purpose of the ERAU COA ARVRMR Lab:
 - To explore, develop, and test immersive simulation technologies for use in aviation research, teaching and learning
- Benefits of having a Virtual Space
 - Undertaking of high-risk tasks
 - Demonstrating effects of actions
 - Completing repetitive tasks
 - Increasing cognitive processes
 - Customizing performance-based training





The ERAU Lab: Capabilities



Cessna 172 Virtual Walkaround





F/A-18 Hornet VR Receiver Aerial Refueling
Part-Task Trainer



Mission: ISS VR experience

The ERAU Lab: Technologies

• Equipment:

- HTC Vive Pro HMD system
- Custom Graphics PC Workstation, 4.2 GHz
 Intel i7-7700K CPU, GeForce 1080
 Graphics Card
- Oculus VR headset
- AVT Simulation and U.S. Navy Naval Air Systems Command F/A-18 Hornet VR Receiver Aerial Refueling Part-Task







Future Opportunities

- Simulation training efficiencies
- FAA Airman Standards
- Gamification
- Military and commercial pilot training
- Physiological testing and training

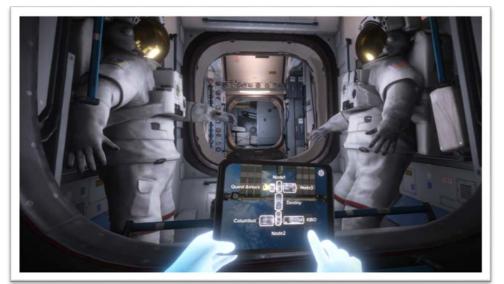


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Questions?



Thank you from the ERAU ARVRMR Team

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- Mark Leary
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- Clyde Rinkinen
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- Raul Rumbaut
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- Brent Terwilliger
- Tyler Wise