Making Virtual Reality A Reality: Applications of Augmented/Virtual Reality

PRESENTED BY:
Timothy Belloff • Matthew Pellegrini • Jennifer Oxenford • Ben Fineman
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Activities and Support that KINBER has for AR/VR/360 Video

Jennifer Oxenford, Director, Community Engagement, KINBER
Keystone Initiative for Network Based Education and Research (KINBER) is Pennsylvania’s statewide research, education, and community network.

- Non-profit, member based organization that provides a variety of next generation broadband connectivity solutions and services to community anchor organizations in PA.
- Formed in 2010 to receive capital funding through a $99.6 million NTIA grant, with over $29M matching funds.
- Owns and operates 1800+ mile PennREN fiber optic infrastructure in Pennsylvania.
- One of 38 Research and Education Networks nationwide.
- KINBER offers network connectivity to its advanced PennREN network and trusted technology solutions to its member community.

www.kinber.org
PennREN Connected Institutions
(updated March 2017)

Higher Education
Bloomsburg University of Pennsylvania
Bucknell University
Bucknell University Small Business Development Center
Bucks County Community College
Butler County Community College
California University of Pennsylvania
Carnegie Mellon University
Cheyney University of Pennsylvania
Clarion University of Pennsylvania
Community College of Beaver County
Community College of Philadelphia
Delaware County Community College
Drexel University
East Stroudsburg University of Pennsylvania
Edinboro University of Pennsylvania
Franklin and Marshall College
Harrisburg Area Community College
Harrisburg Area Community College
Midtown Campus
Indiana University of Pennsylvania
Kutztown University of Pennsylvania
Lafayette College
LHMG Community College
Lehigh University
Lock Haven University of Pennsylvania
Lock Haven University of Pennsylvania – Clearfield
Luzerne County Community College
Mansfield University of Pennsylvania
Millersville University of Pennsylvania
Montgomery County Community College
Northampton County Community College
PASSHE Center City Multi Campus
Penn State Abington
Penn State Behrend
Penn State Berks
Penn State Brandywine
Penn State DuBois
Penn State Fayette
Penn State Greater Allegheny
Penn State Harrisburg
Penn State Hazleton
Penn State Hershey
Penn State Lehigh Valley
Penn State Schuylkill
Penn State Shenango
Penn State University Park
Penn State Wilkes-Barre
Penn State Worthington Scranton
Penn State York
Pennsylvania College of Technology
Pennsylvania Highlands Community College
Pennsylvania State University Wilkes Barre
Reading Area Community College
Shippensburg University of Pennsylvania
Slippery Rock University of Pennsylvania
Susquehanna University
Thaddeus Stevens College of Technology
University of Pittsburgh
University of Pittsburgh Bradford
University of Pittsburgh Greensburg
University of Pittsburgh Johnstown
University of Pittsburgh Titusville
University of Scranton
Villanova University
West Chester University of Pennsylvania
Westmoreland County Community College

Library/Library System
Centre County Federation of Public Libraries
Union County Library System

Public Media
WQED Multimedia

State/Local Government
Area Transportation Authority of North Central PA
Lackawanna County Borough of Pottstown

Non-Profit/Cultural
Camp Susque

Corporate
DSS
Empire Access
MAW Communications
The Pajama Factory
River Valley Internet
TierPoint
The WARE Center

K-12
Fannett Metal High School
Hempfield School District
Lancaster Country Day School
Penn Manor School District
The Hill School
The Northwest Tri County Intermediate Unit #5
Troy Area School District

Hospitals/Healthcare
Butler Memorial Hospital
Geisinger Health System
KINBER Role in Supporting AR/VR/360 Video

- R&E Community has always been a leader in virtual immersive environments (CAVE, tele-immersion, viz labs, etc.)
- PADLA AR/VR event in June 2016
- Samsung 360 Video Pilot Opportunity
- Offered Webinars/Trainings to encourage awareness
- Collaborative Video Working Group
- Offered half-day AR/VR/360 workshop at last year’s KINBERCON annual conference
- AR/VR/360 Video “Experience Zone” at last year’s KINBERCON annual conference
AT&T Samsung 360 Video Pilot

• KINBER reached out to AT&T/Samsung in Summer 2016
• Visited their Experience Center Store in NYC and met with Samsung about pre-production 360 video gear, futures, etc.
• Partnered on 360 Video Capture of Flight 93 Distance Learning Program
• Worked with Samsung to offer a pilot opportunity for KINBER community
• Two pilot exploration meetings held:
  • Oct. meeting at University of Pittsburgh (Oct. 2016)
  • Dec. meeting at Drexel University (Dec. 2016)
• Drexel entered into NDA with Samsung to partner on possible applications, use pre-production gear, develop HE applications
360 Video Application Areas for Education

- Simulation Training
- Admission Tours & Recruitment
- Exposure Therapy
- Conflict Management
- Athletics
- Entertainment
- Workforce Development
- Health and Safety Training
- Virtual Field Trips
- Live Event Archival
- Global Studies
- Medicine/Health
- Gaming & Film
What is 360 Video and How is it Different?

✓ Main Difference is that **camera sees in all directions at one time** so capture is **highly IMMERSIVE**.

✓ Video Recordings include a **view in every direction** at the same time, shot using an **omnidirectional camera** or a **collection of cameras**.

✓ Viewer is in the center of a **fully immersive real environment** (as opposed to the computer generated world of a VR environment).

✓ Playback offers an **active viewing experience**. User chooses what to focus on.

✓ **Viewed on a VR Headset** (Gear VR, Google Cardboard) or **viewed online** (YouTube, Vimeo, FB, etc)
360 Video Gear Considerations and Overview

• “Prosumer” 360 Cameras (to shoot/capture the 360 video)
  • LG 360cam $135
  • Samsung Gear 360 $229
  • 360RIZE, 360Fly 4k $199
  • Ricoh Theta V $429
  • GoPro Fusion $699 (Nov. 2017)
  ...

• Viewing
  • Using a VR headset (e.g., Gear VR or Google Cardboard)
  • On a 360 Video enabled platform (YouTube, Facebook)

Coming soon: 360 video camera eyegear
www.orbiprime.com
# Camera Gamut - Today

<table>
<thead>
<tr>
<th>Consumer</th>
<th>Consumer Grade Rigs</th>
<th>Pro VR Cameras</th>
<th>Cinema</th>
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<tbody>
<tr>
<td>Integrated, multi-lens, single form factor and single stream output</td>
<td>Mass market cameras adapted into VR rigs</td>
<td>Early prototypes and experiments with VR purpose built systems</td>
<td>Rigs created around leading cinema camera platforms and systems</td>
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**Low** | **Quality, Complexity, Cost, Size** | **High**

- **Ricoh Theta**
- **360 Fly**
- **Samsung Gear 360**
- **Orah**
- **Lumixcam 180 stereo**
- **Kodak Pixpro**
- **Vuze**
- **GoPro Omni**
- **Facebook Jaunt**
- **Red Cinema Rig**
- **BlackMagic Rig**
- **Sony A7 Rig**
- **Nokia Ozo**
Challenges with 360 Video

- Where to put lights, crew
- How to find production (pre, during, and post) help, support, expertise
- Lack of understanding of how best to use 360 assets for programmatic value. How to incorporate into curriculum for program goals.
- Time and workflows (shooting, encoding, editing, post-production, etc).
- Cost (balance goals vs. budget + reality)
- Interoperability (starting over with vendors/platforms not having same requirements)
- Limited data so far. We need more research!
Example - Flight 93 Footage

Stitched in CARA VR using a single analysis key (no adaptive warping applied over the clip) and no real intervention in the stitching. Complied T/B stereo pair at 4096 x 2048 per eye for a 4096x4096 finished video. Created low quality half resolution (2k rather than 4k) quick views to be able to review.

Nicholas Jushchyshyn, Program Director - Animation & Visual Effects, Drexel University Westphal College of Media Arts & Design
Case Study: Flight 93 360 Video Footage Challenges

Timeline

• Video captured in Sept. 2016 onsite at Flight 93 National Memorial for inaugural Distance Learning program (Sept. 2016)
• Took several months to find someone in PA with the appropriate skillsets who could edit/post-produce (Dec. 2016)
• Saw test raw files to view (Feb 2017)
• Still trying to figure out how best to proceed with the rest of the 360 video files (Oct. 2017)

Flight 93 National Memorial Inaugural Distance Learning Event 360 Video Test Clips https://samsungvr.com/view/WnnXSZZtiiT
How to Build Capacity and Community

• Clearly there is **growing interest** in use of AR/VR/360 Video in education.

• There are also **pockets of existing expertise on campuses** that can help.

• There are **other sources of expertise and support** – state and regional networks (like KINBER), Distance Learning Associations (PADLA), national expertise (Internet2 MetaVerse Working Group, Educause).

• **Talk to vendors** (e.g., Samsung partnership would not have happened if we hadn’t asked!).

• Help **facilitate and support new collaborative, pilot, funding opportunities** in your communities.
AR/VR/360 Video – It’s Just the Beginning

360 Video Case Studies at Pitt, Meagan Koleck, Media Specialist, Classroom Services, University of Pittsburgh

Real Applications of Augmented Reality, Virtual Reality and 360 Video for Research and Education, Ben Fineman, Program Manager, NET+ Video, Voice, and Collaboration Services, Internet2

The Unbounded Classroom, Case Study/Application in K12, Adam Geiman, Drew Arena, 4th Grade Teachers, Blue Ball Elementary

Virtually Inspired, Innovations in Online Learning, Marci Powell, USDLA Chair Emerita and Past President
Questions

Photo Credit: VR Life
## Contacts

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