Palmyra Cove Nature Park
Institute for Earth Observations

The GLOBE Program

MERGING GLOBE WITH MIXED REALITY FOR DATA VISUALIZATION AND DATA COLLECTION TRAINING

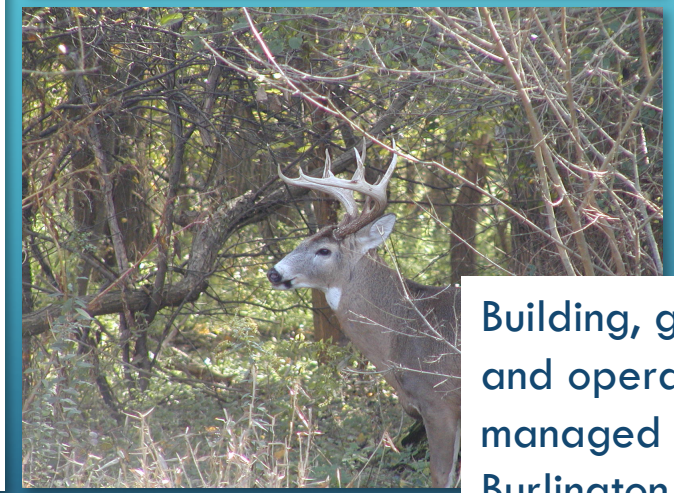
23RD GLOBE ANNUAL MEETING
DETROIT, MICHIGAN, 14-18 JULY 2019

PETER DOROFY & JOHN MOORE

ABOUT PALMYRA COVE GLOBE PARTNERSHIP

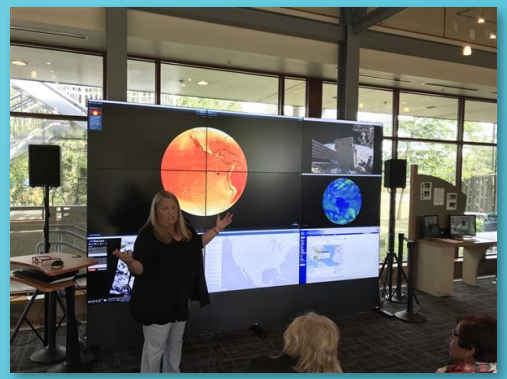
250 Acres woodlands, wetlands, meadows, river shorelines, freshwater tidal cove

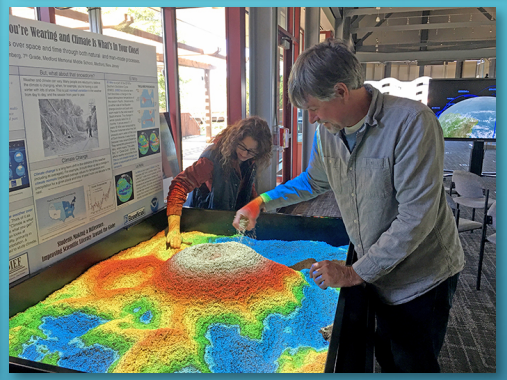
Environmental STEM Center building. Education program sees over 4000 K-12 students.



Building, grounds, and operations managed by the Burlington County Bridge Commission

ABOUT PALMYRA COVE GLOBE PARTNERSHIP



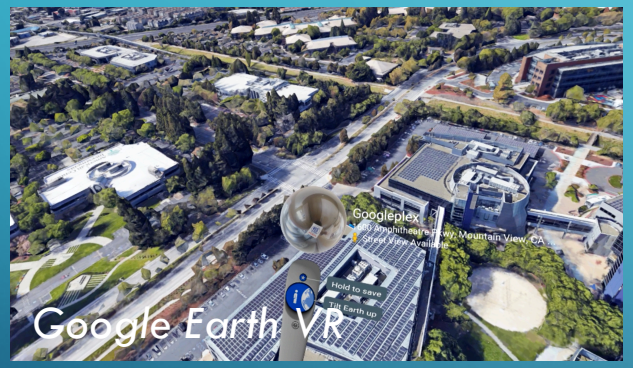


INNOVATION LAB

- Give teachers, students, and the public mixed reality experiences in data visualizations and data collection simulations.
- Provide teachers a “sandbox” experience of various mixed reality platforms that may integrate into their classroom setting.
- Prototype mixed reality desktop solutions for deployment to in-house exhibits, selected informal science centers, and selected K-12 classrooms.
- Develop mixed reality mobile solutions in real-time data visualizations for deployment to Android and iOS.

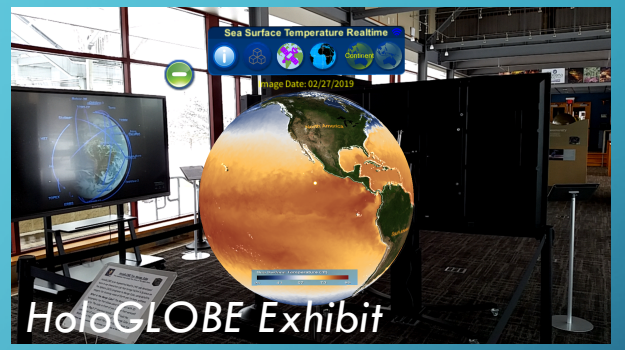
INNOVATION LAB – MIXED REALITY PROJECTS

Canned Solutions:



In-House Solutions:

In-House Development:



The Road to Mixed Reality

Virtual Reality

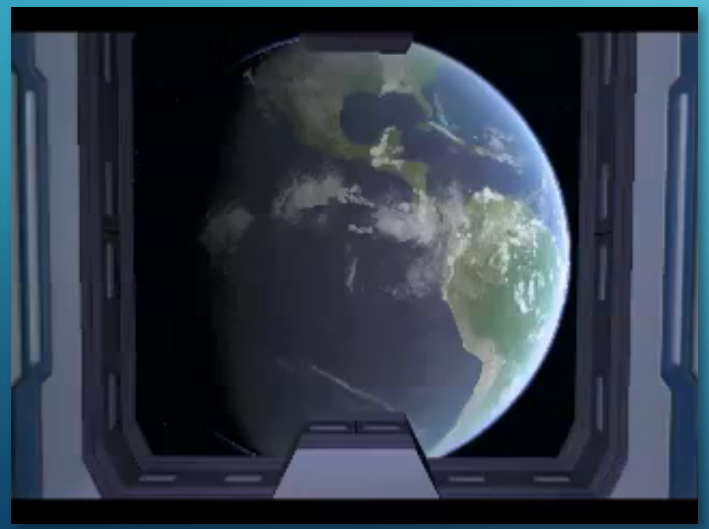
Fully Artificial.

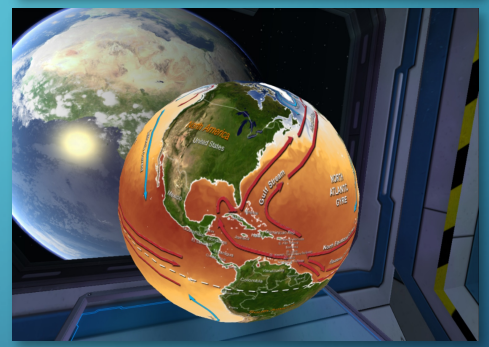
Full immersion in virtual environment.

USOAR

- Desktop virtual reality
- Gaze input only, no touch (Oculus DK2 dev)
- Little awareness of physical surroundings

Understanding Satellite Observations through Augmented Reality. VR experience on board a mobile science lab using satellite data from NASA and NOAA sources.





Augmented Reality

Virtual objects overlaid on real-world environment.

Real-world enhancement with digital objects.

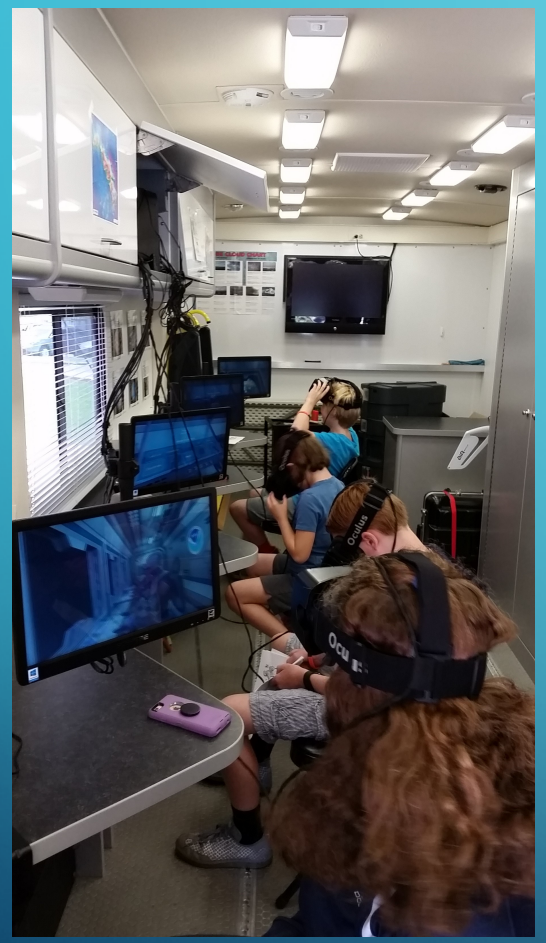
Robot Kyle brought out of USOAR into the real-world.

Mixed Reality

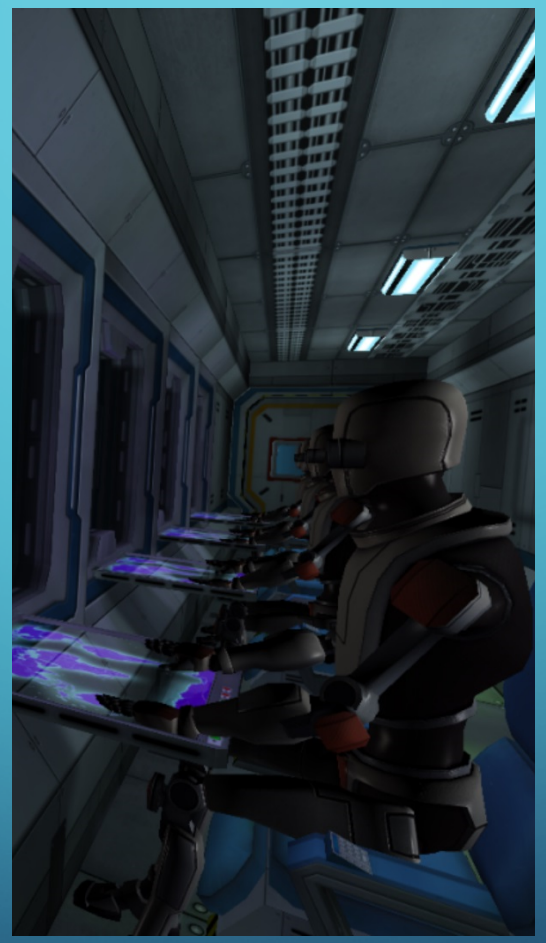
Virtual environment combined with real-world.

Interaction with both real and virtual.

MIXED REALITY IS BLENDING REALITIES



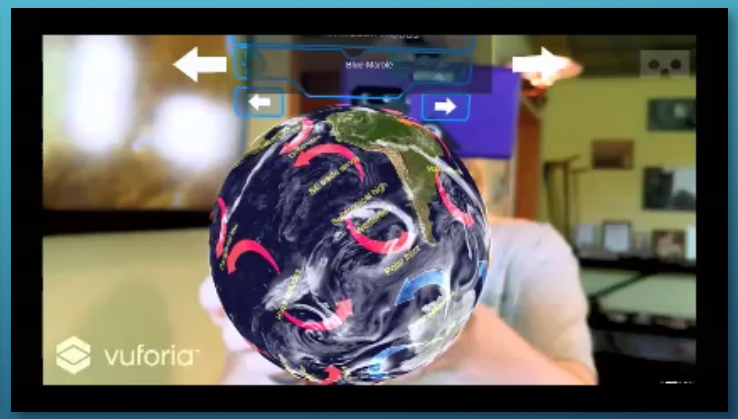
+



=

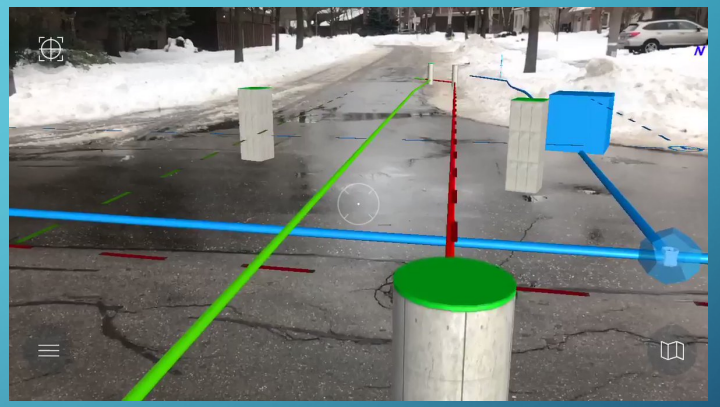
MOBILE MIXED REALITY

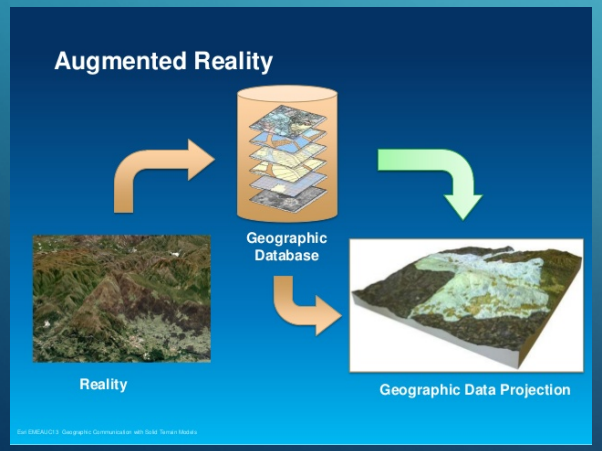
- Hardware limitations (memory, cpu, gpu)
- Streaming content may invoke cellular data usage
- Awareness of physical surroundings
- Not tethered to a machine

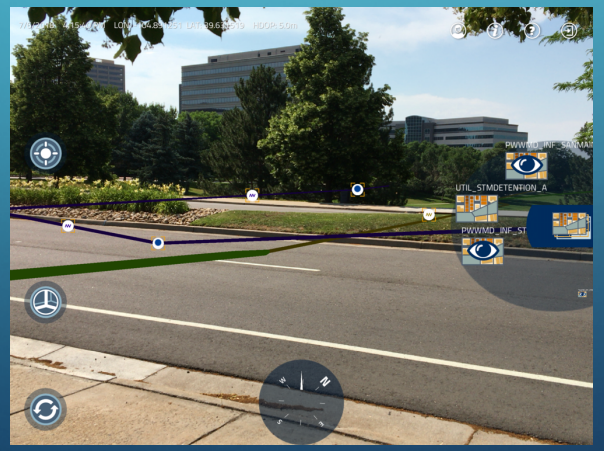


CONSIDER:

- Shelter boxes and instruments with augmented instructional aides.
- Pokémon Go-like to help guide students.
- AR study site fully equipped for planning and prototyping.
- VR protocol training on virtual land cover.

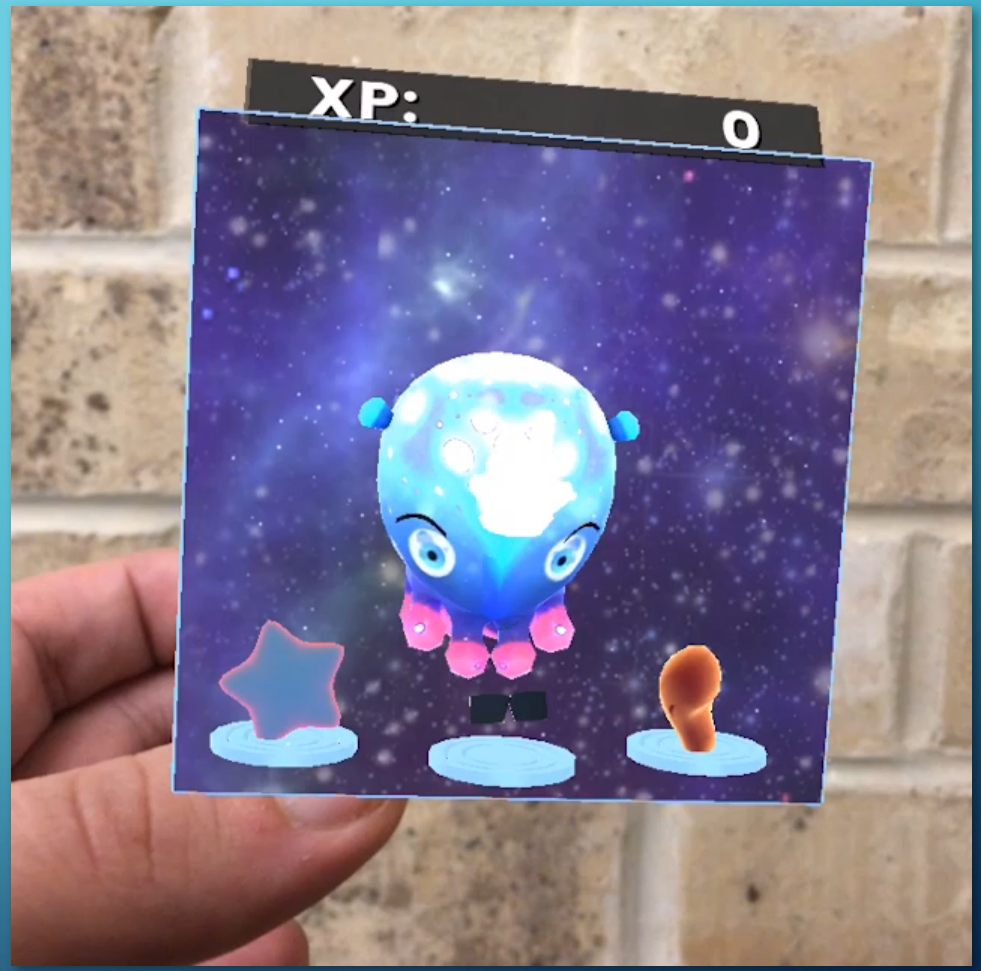






MERGE CUBE

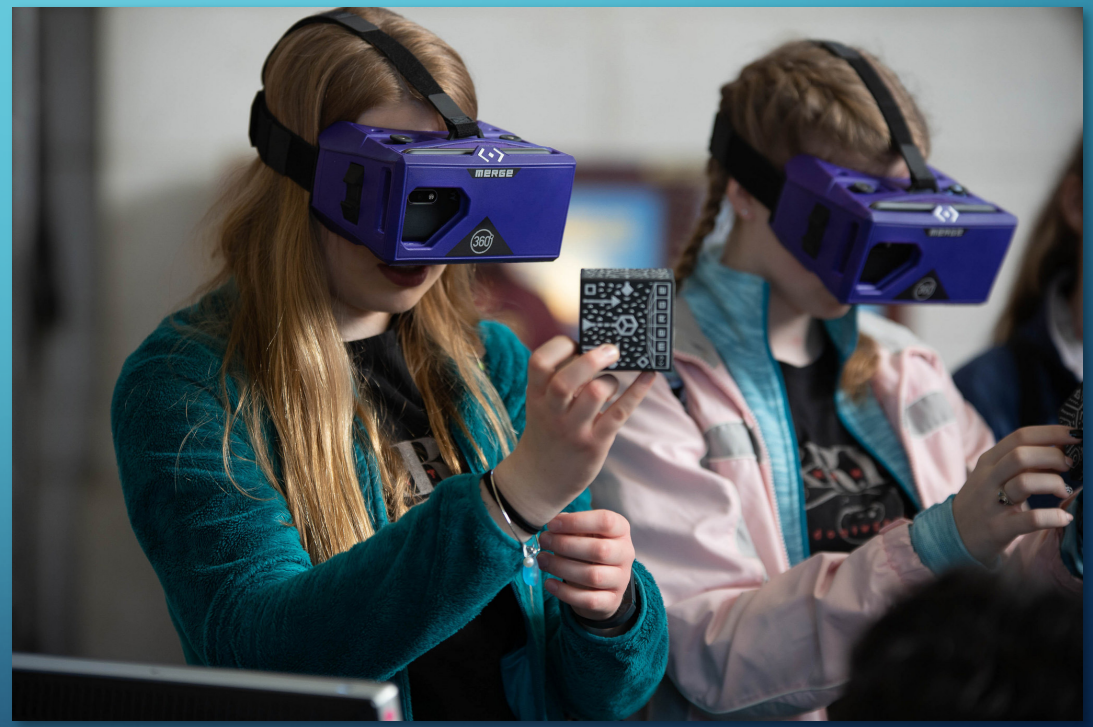
“The world's first, holographic object you can hold in the palm of your hand.”



HoloGLOBE For Merge Cube

Institute for Earth Observations at Palmyra Cove

NASA and NOAA visualizations of the Earth in the palm of your hand! HoloGLOBE brings NOAA's Science on the Sphere (SOS) programs to MERGE Cube, using satellite imagery and data simulations for stunning views of Earth and its many systems.



FEATURES:

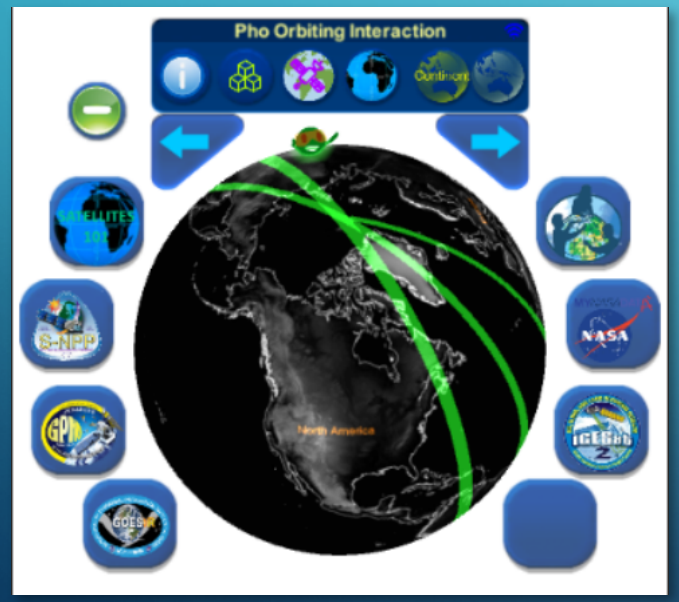
- Unique AR experience of the Earth using authentic data.
- Watch SOS programs in the palm of your hand.
- Tested on Android phones from high end to low end (Samsung Galaxy 8, Galaxy 5, Moto G4, and BLU R1 HD)
- Allows both AR and non-AR modes.

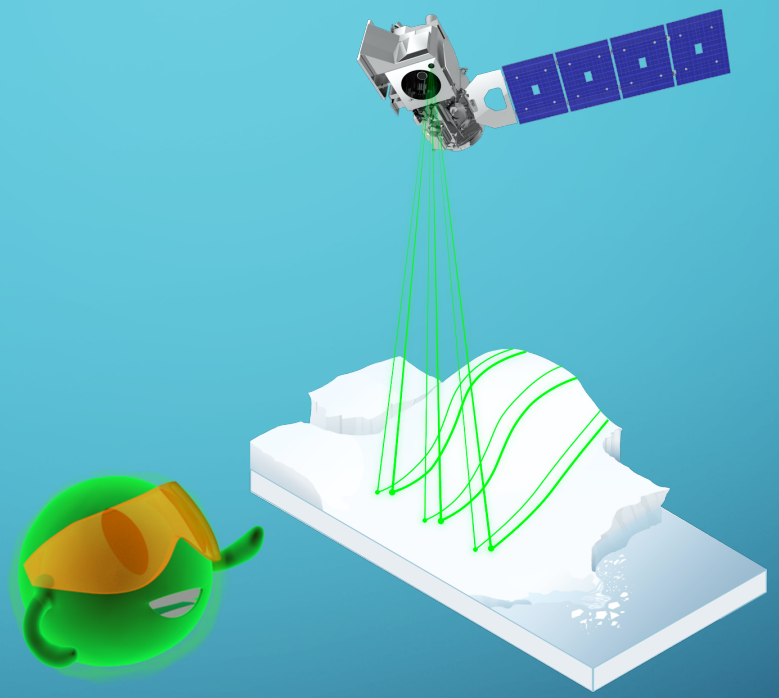
ICESAT-2 MODULE FOR HOLOGLOBE

Team: Emme Wiederhold, Adriana Manrique, Valerie Casasanto

Features:

- Pho Orbiting Interaction
- Point Cloud Gallery (rasterized)

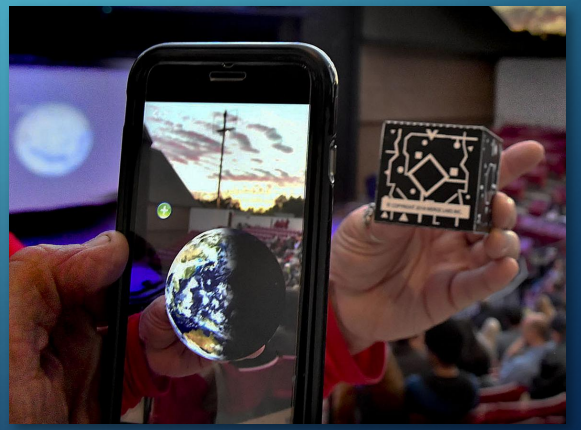




ICESat-2

ICE, CLOUD, AND LAND ELEVATION SATELLITE-2

Making an Impact?

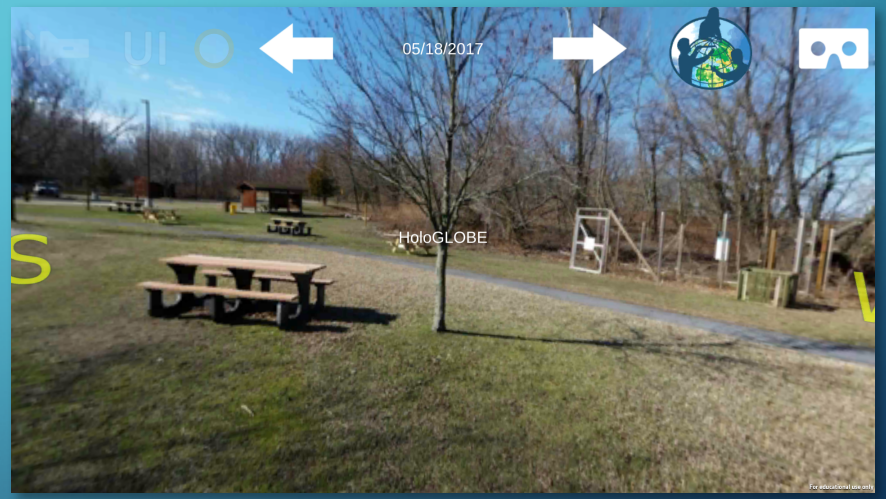


20,000+ downloads!

Exhibit cube. Room scale alternative to Science on the Sphere. Portable?

WHAT'S NEXT FOR HOLOGLOBE?

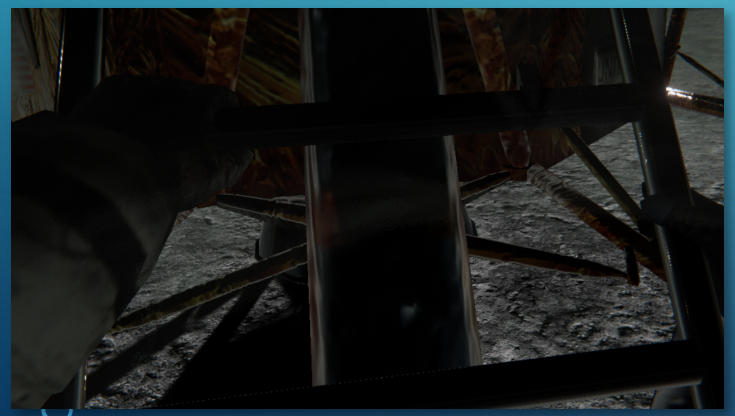
- Integrate Google Cardboard Camera that allows users to capture, upload, and share panoramic views of GLOBE study sites. Metadata to include location, protocol measurements, links to satellite imagery.
- Add latest datasets of ICESat-2.
- Refresh HoloGLOBE.



LUNAR LEARNING EXPEDITIONS

- Visit Apollo 11 landing site from a historical perspective; deploy experimental package.
- Address moon landing misconceptions; additional experiments (ex: feather and hammer drop)
- Revisit the landing site in the future (50 years later) with new experiments. Integrate GLOBE data collection protocols such as soil collection and surface temperature.
- Tailored for short visitor walk through experience, or extended expeditions for more in depth training.

Looking toward Little West Crater



Stepping off the LEM

Measuring surface temperature

Extracting a soil sample


Palmyra Cove
NATURE PARK
INSTITUTE FOR EARTH OBSERVATIONS

CONTACTS

- Peter Dorofy, Institute for Earth Observations at Palmyra Cove, pdorofy@bcbridges.org
- John Moore, Institute for Earth Observations at Palmyra Cove, jmoore@bcbridges.org

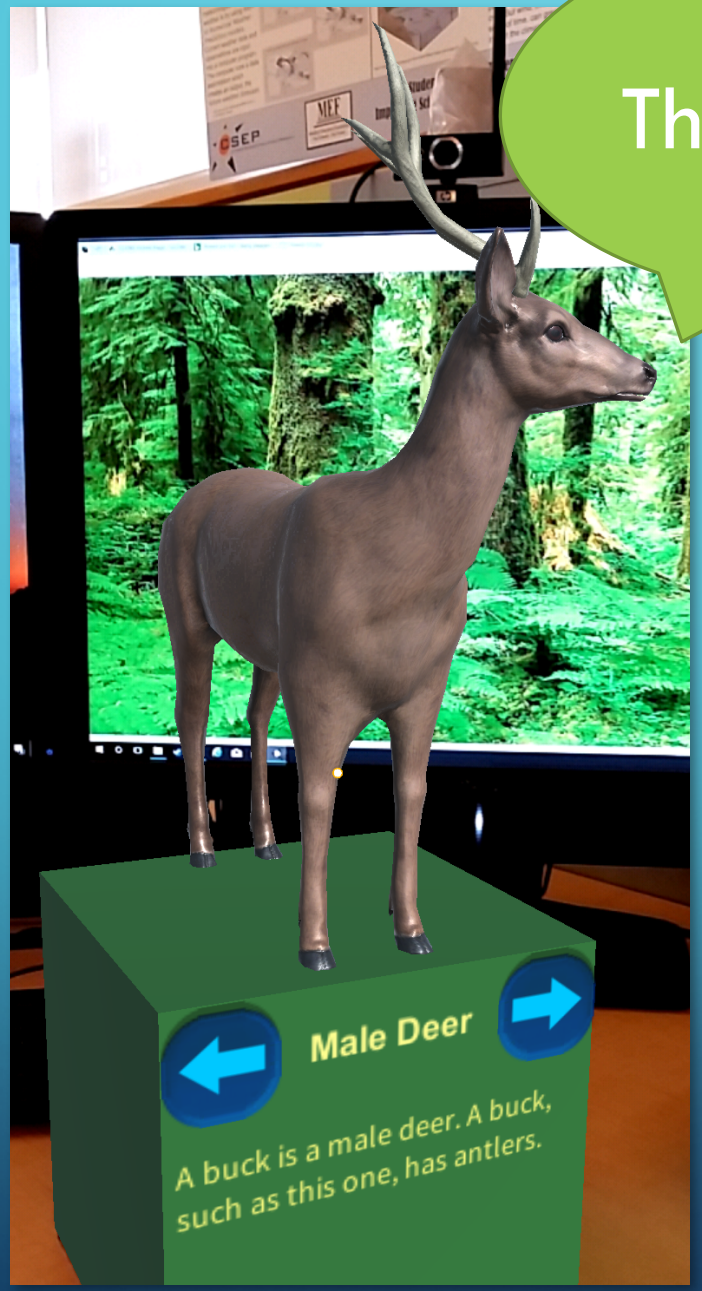
ACKNOWLEDGEMENTS

Partial funding provided by the National Science Foundation (NSF DUE-1610911)

and the NASA CAN Grant Mission Earth

GAME INSTITUTE

www.gameinstitute.com


Male Deer
A buck is a male deer. A buck, such as this one, has antlers.

Thank You