

Virginia Tech's Mirror Worlds

Nicholas F. Polys, PhD
SIGGRAPH 2018
CARTO BOF

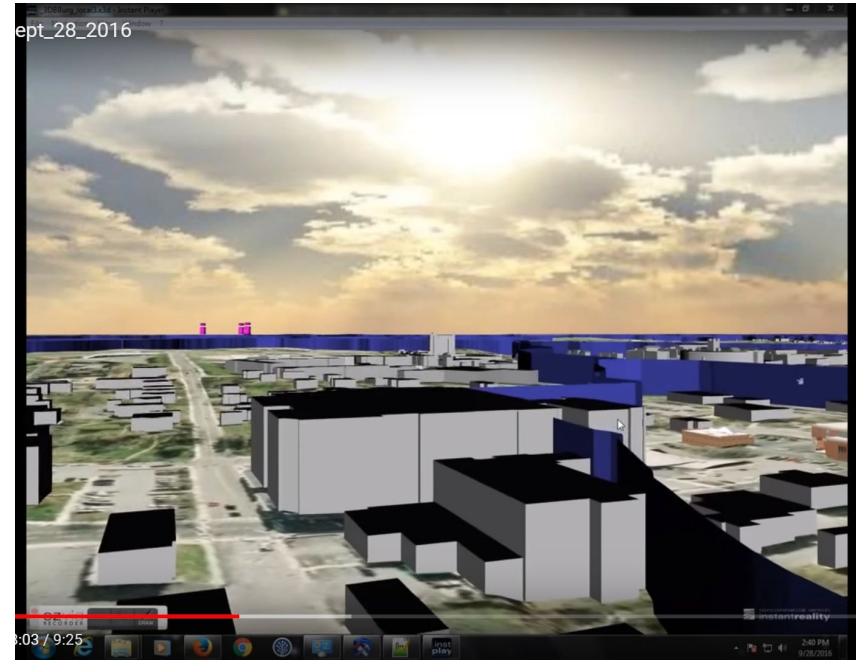
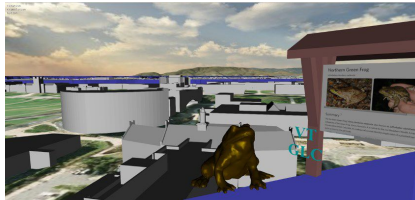


X3D Blacksburg



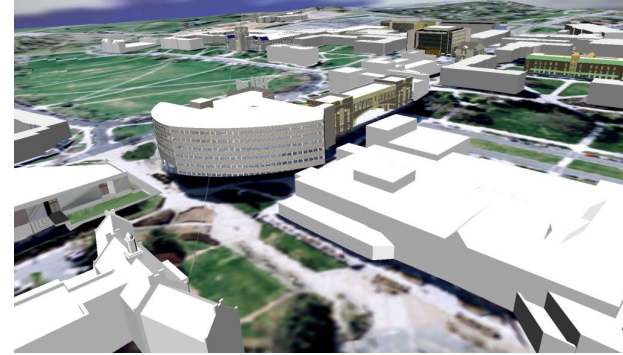
X3D Blacksburg

- Terrain
- Imagery, openstreetmap
- Town buildings
- Campus buildings
- Sketchup buildings
- Frog scans
- ...

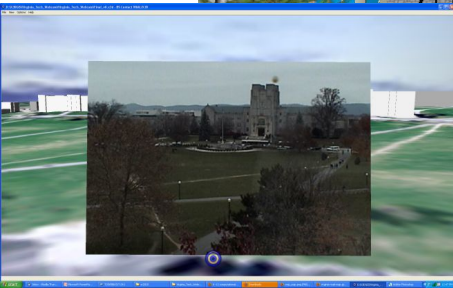
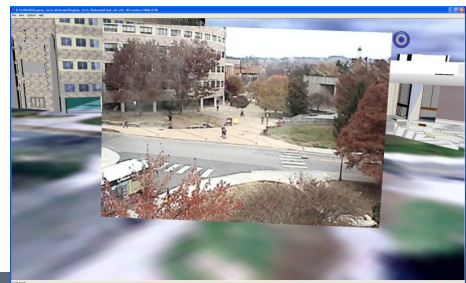
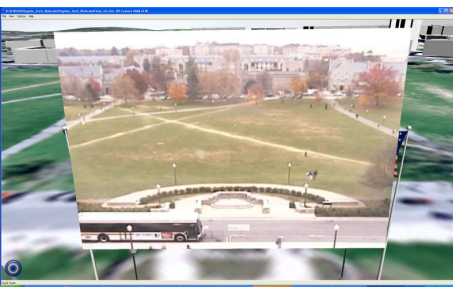


X3D Blacksburg

- n-D City model
- Enterprise scale GIS infrastructure
- International standards:
 - Web3D (X3D)
 - OGC (3D portrayal)
- Integrates sensor feeds and crowd-sourced content



X3D Blacksburg Mirror World





Town & Building LODs



*X3D
shared
multi-user
VT Campus*



*X3D
Immersive*

X3D Blacksburg Applications (2016-2017)

Environmental Awareness E.g. <https://youtu.be/ZIXbsR4KSzc>

Nicholas Polys, Jessica Hotter, Madison Lanier, Laura Purcell, Jordan Wolf, W. Cully Hession, Peter Sforza, and James D. Ivory. 2017. Finding frogs: using game-based learning to increase environmental awareness. In Proceedings of the 22nd International Conference on 3D Web Technology(Web3D '17). ACM, New York, NY, USA, Article 10, 8 pages. DOI: <https://doi.org/10.1145/3055624.3075955>

City Buildings: LOD methods

Nicholas F. Polys, Ankit Singh, and Peter Sforza. 2016. A novel level-of-detail technique for virtual city environments. In Proceedings of the 21st International Conference on Web3D Technology (Web3D '16). ACM, New York, NY, USA, 183-184. DOI: <https://doi.org/10.1145/2945292.2945322>

Forests

Haitao Wang, Xiaoyu Chen, Nicholas Polys, and Peter Sforza. 2017. A Web3D forest geo-visualization and user interface evaluation. In Proceedings of the 22nd International Conference on 3D Web Technology (Web3D '17). ACM, New York, NY, USA, Article 9, 9 pages. DOI: <https://doi.org/10.1145/3055624.3075956>

Data Fusion

Nicholas F. Polys, Peter Sforza, W. Cully Hession, and John Munsell. 2016. Extensible experiences: fusality for stream and field. In Proceedings of the 21st International Conference on Web3D Technology (Web3D '16). ACM, New York, NY, USA, 179-180. DOI: <https://doi.org/10.1145/2945292.2945320>

X3D Blacksburg 2018

Town planning & visualization requires context

- Development proposal visualized in 3D
- Focus group of 13 community members
- Perceptions of density measured before and after
- 3D and VR significantly improved the dialogue (judged by users)

Nicholas Polys, Cecile Newcomb, Todd Schenk, Thomas Skuzinski, and Donna Dunay. 2018. The value of 3D models and immersive technology in planning urban density. In Proceedings of the 23rd International ACM Conference on 3D Web Technology (Web3D '18). ACM, New York, NY, USA, Article 13, 4 pages. DOI: <https://doi.org/10.1145/3208806.3208824>

Designing for Density



Sketchup -> X3D



roanoke times blacksburg x Blacksburg study From x Blacksburg seeking feed x The future of downtown x Could Blacksburg alley b x

com/news/local/blacksburg/could-blacksburg-alley-become-pedestrian-throughfare/article_16917982-d301-5bba-b78a-d954dc810cbf.html

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Could Blacksburg alley become pedestrian throughfare?

By Yarin Ranabou yarin.ranabou@roanoke.com 381-1661 May 5, 2018



JES
Home Inspection

© Down, 0 Interest, 0 Payments Until 2018!

THE WALLS ARE TALKING.
YOUR HOME IS SETTLING.

Latest News

A proposal to turn an alley into a more pedestrian- and bike-friendly thoroughfare is being discussed in Blacksburg. A portion of what is called the...
Looking Back: News items from The Roanoke Times

1st person views



Viewpoints and tours



Focus Groups conditions

13 stakeholders: planners, residents



Immersive Portrayal

VT HyperCube (CAVE) = 26.4 m pixels



Immersive Portrayal II

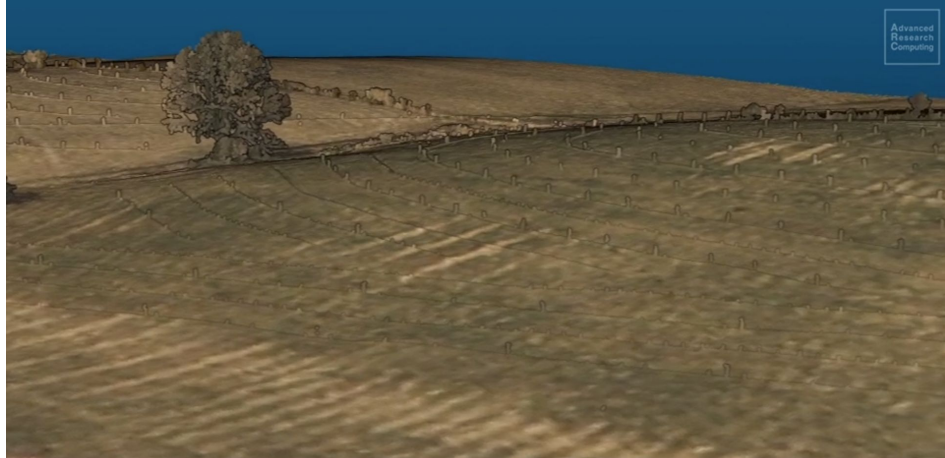
Users rated the 3D and immersive portrayal as significantly more beneficial to planning discussions and impressions of massing and density.

See paper for full results.

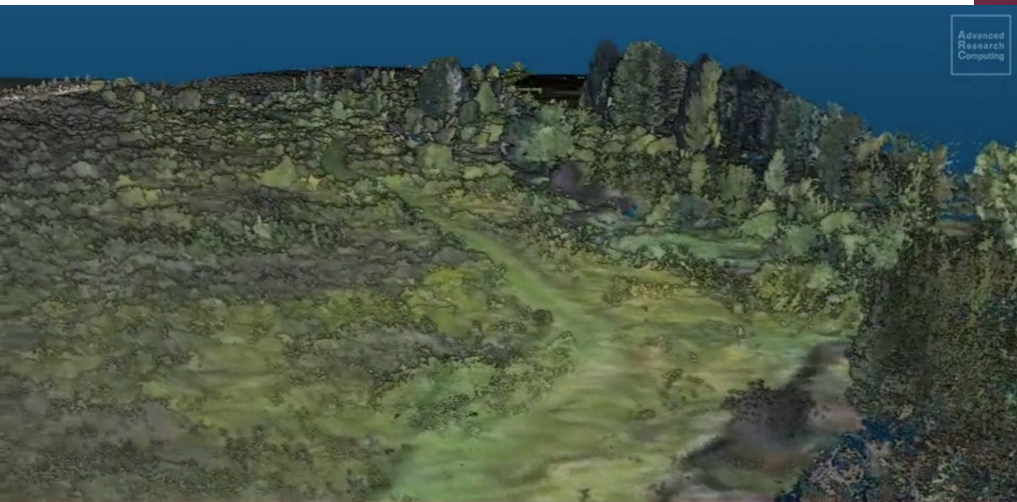


More X3D!

- Drone-based acquisitions
 - LiDAR
 - Photogrammetry



Remote field trips and analysis can be done online with Web3D and Virtual Reality.



Highly detailed laser scans from drone fly-overs show the shape and dynamics of the streambank over time.

- Forestry
- Biological Systems
- Engineering
- Crop and Soil Science
- Geography

<https://vimeo.com/visionarium2018>

WebVR

With X3DOM Javascript library

- Photospheres
- Videospheres
- Volumes
- Heritage
- 3D city models
- ...



More BOFs @ SIGGRAPH 2018

Carto : Mon 12-1:30

Web3D Korea Chapter: Mon 3-5

Design Printing & Scanning : Wed 11-12:30 Room 116

Web and VR Evolution: Wed 12:30-2 Room 116

Medical : Wed 2-3:30 Room 116

Contact

Join the Community at

www.Web3D.org/join

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