High Resolution LiDAR Point Cloud Rendering of Virtual Environments

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Purpose:

- Study any real-life environment within VR
- To study a location later in time without being there. Such as:
  - Home interiors
  - Crime scenes
- Real spaces:
  - Have a lot of clutter and objects
  - Difficult & time Consuming to 3D model
- Terrestrial LiDAR
  - 44 million colored points / 7 minutes
- Combine LiDAR point clouds with VR Display technology?
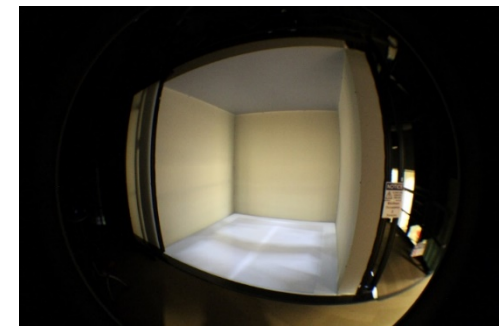
LiDAR Data is hard to work with…

- Size of data sets (20 GB +)
- # of point primitives per frame (Geometry Bound)
- Uneven density of points
- Point Size / Rendering Techniques
- Mirrors / Reflections

We have a solution!
Can capture and display any real life environment in 5-8 hours
Looking for collaborators interested in studying real world environments in VR.

More Info:

- https://vizhome.org – downloadable home point cloud models

- Werner, N.E., Carayon, P., Casper, G.R., Hoonakker, P., Smith, C.A., Brennan, P.F. (2016). Affordances of household features important to personal health information management: Designing consumer health information technology for the home. In Mollo, V. and Falzon, P. (Ed), Proceedings of the Healthcare Systems Ergonomics and Patient Safety Conference. Toulouse, France, October 5-7, 2016, pp. 390-394.

- Tong, M., Borkenhagen, A., Casper, G., Arnott Smith, C., Werner, N.E. (2017). Exploring interactions in the home environment: Personal health information management strategies of patients with chronic illness. 2017 International Symposium on Human Factors and Ergonomics in Health Care.

- Hoonakker, P.L.T., Casper, G., Peer, A., Arnott Smith, C., Tredinnick, R., Werner, N., Ponto, K., (2018). Healthcare in a virtual environment: workload and simulation sickness in a 3D CAVE. Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018), Volume V: Human Simulation and Virtual Environments, Work With Computing Systems (WWCS), Process Control. Florence, Italy, Aug 26-30, 2018.

- Nicole E. Werner, Anna F. Jolliff, Gail Casper, Thomas Martell & Kevin Ponto (2018) Home is where the head is: a distributed cognition account of personal health information management in the home among those with chronic illness, Ergonomics, 61:8, 1065-1078

- Jolliff, A. F., Hoonakker, P., Ponto, K., Tredinnick, R., Casper, G., Martell, T., & Werner, N. E. (2020). The desktop, or the top of the desk? The relative usefulness of household features for personal health information management. *Applied ergonomics*, *82*, 102912.