

Realize the Value of Virtual Reality Through Aggregating Reality-Capture and Design Models

Lucas Richmond
Sr. Media Studio Manager

Chad Knutson
VDC/FM Manager

Class summary

Learn how to take existing project information and capitalize on Autodesk, Inc., platforms; ReCap 360 Pro software; Remake software; Revit software; and Maya software—all to create and aggregate models and present information in an immersive virtual-reality setting to derive value for the overall project. The case study we'll look at is a historically significant, high-visibility project that needed various reality-capture methods to mitigate possible risk and liability during construction. The team was able to use these requirements to drive drone flights, photogrammetric models, and laser scans. These were used to enrich the design models and create an environment to run scenarios for logistics and feasibility studies. The downstream effect will help the owner better understand the complexity and manage understanding of changes as they occur. The created environment will also aid in developing future projects that have similar challenges. This session features ReCap, Maya, and Revit. AIA Approved



Key learning objectives

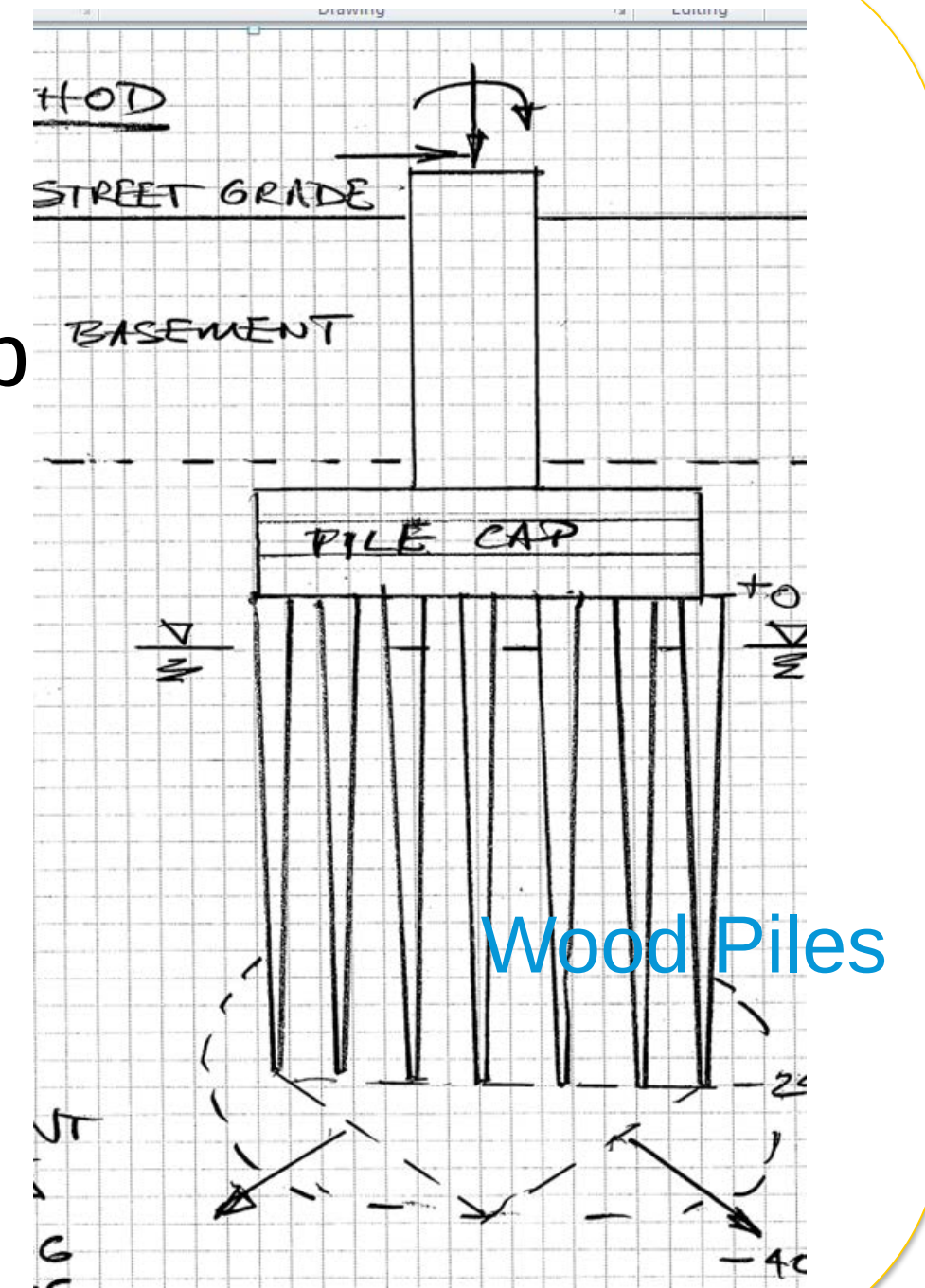
At the end of this class, you will be able to:

- Recognize existing project information that can be used in a VR setting
- Learn how to improve the workflow process of making a quality VR project experience
- Learn how to derive value from creating a high-end VR experience
- Learn about preserving historical buildings with new technology and workflow

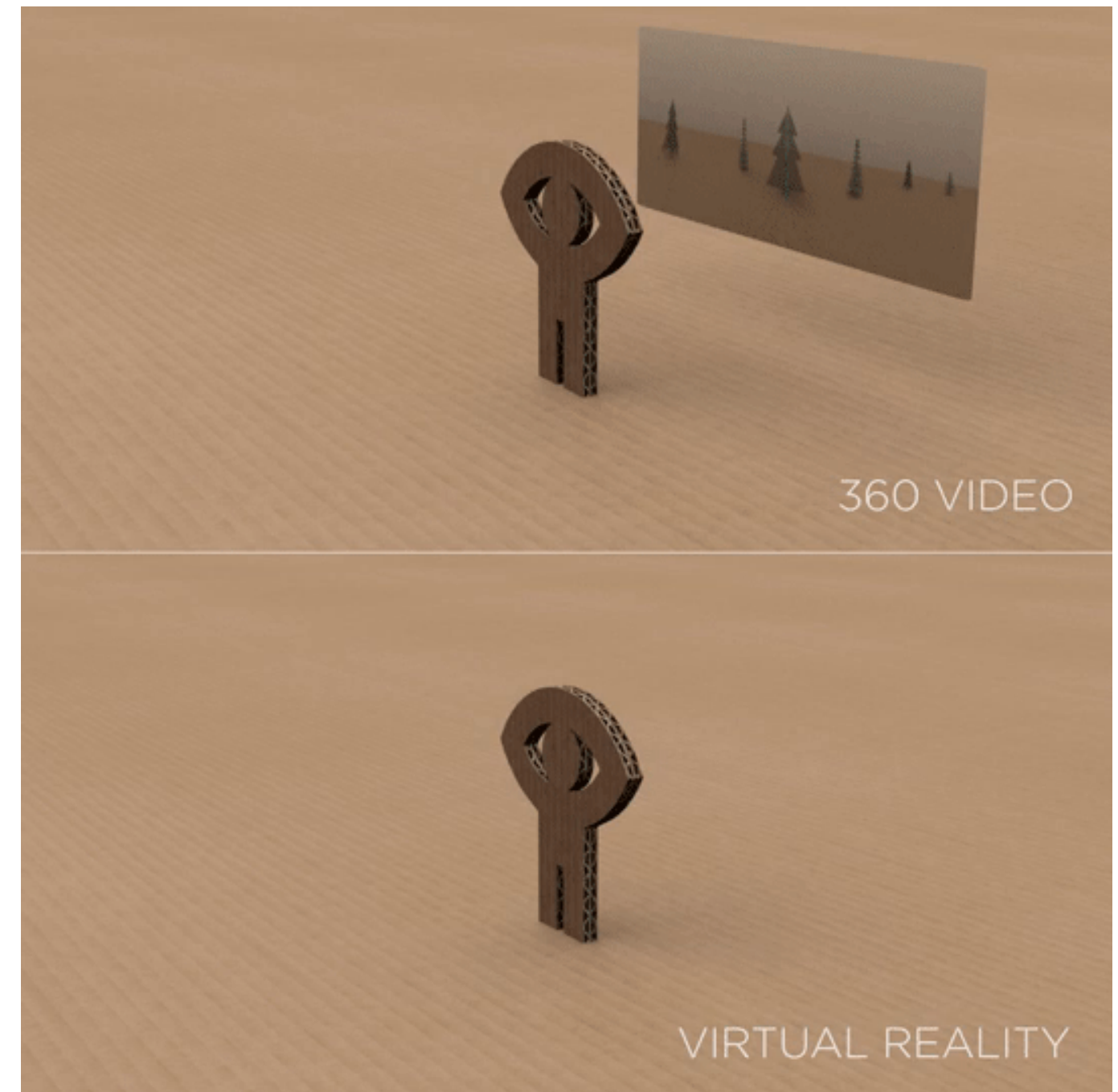
Project Overview



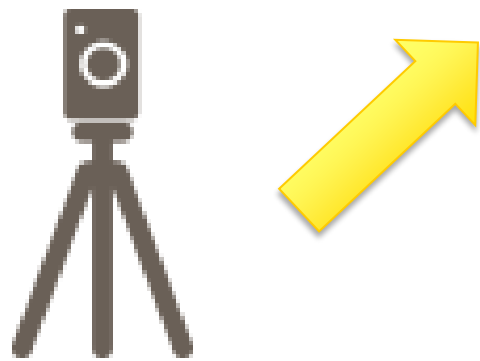
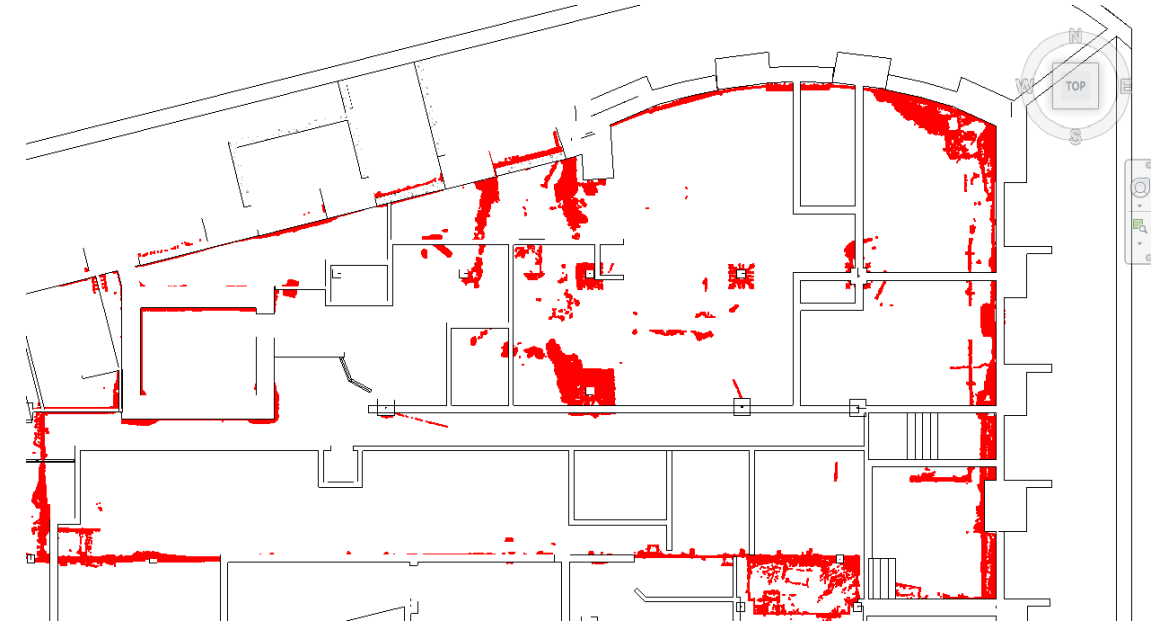
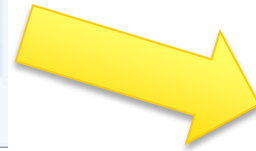
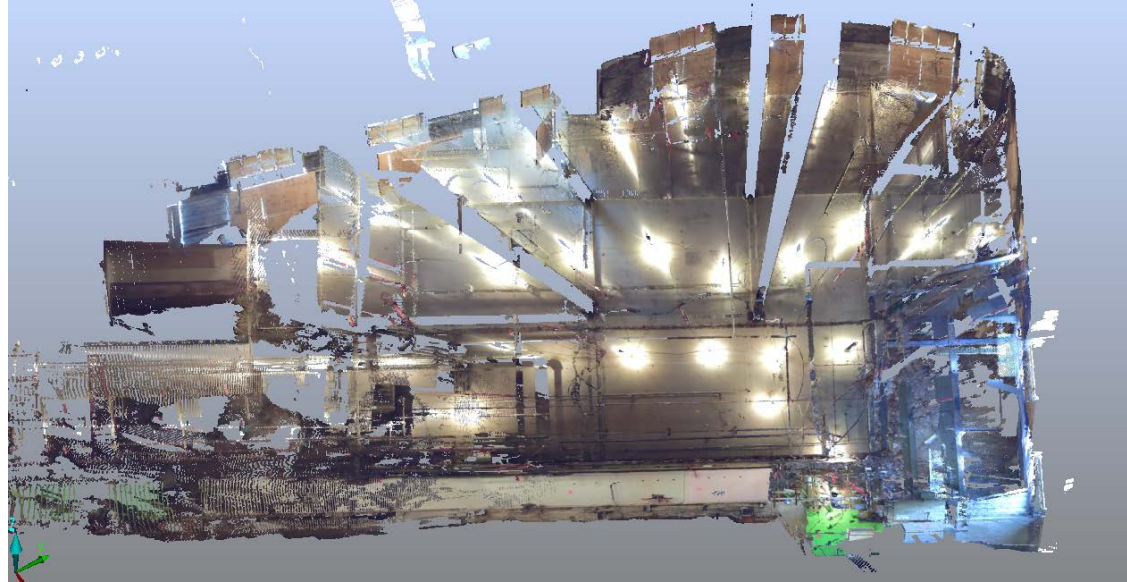
- Historically Significant Building
- Operational Civic City Hub
- Sinking due to Rotting Timber Piles
- Goals;
 - Save the Building
 - Mitigate Risk



Point of Clarification: VR vs. 360 Photo



Traditional Workflow



Project Opportunities

Contractual
Requirements



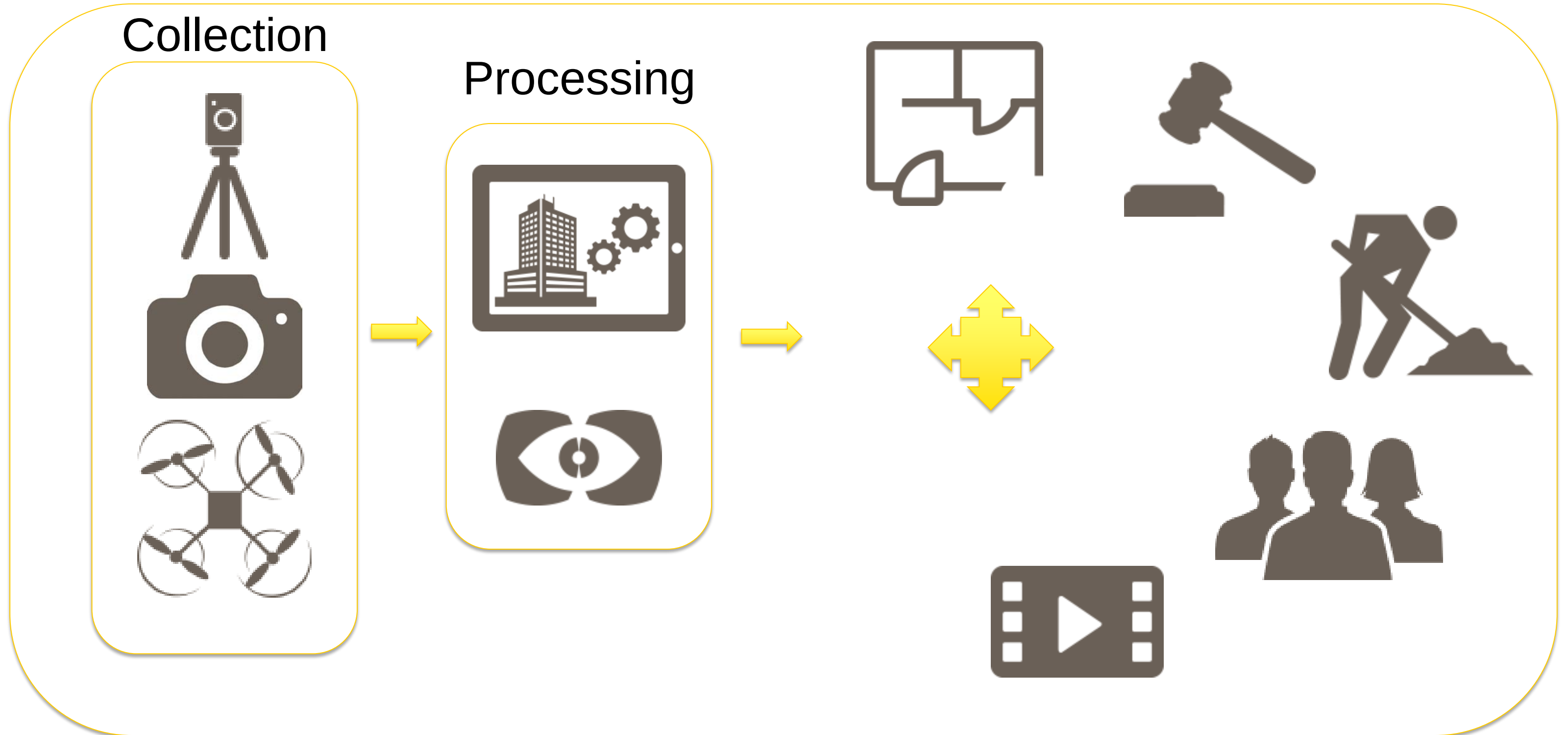
Risk
Mitigation



Date	Time	1		2		3	
		Elev. Reading	Δ from 1986	Elev. Reading	Δ from 1986	Elev. Reading	Δ from 1986
4/2/86	0.00	17.89	0.00	17.96	0.00	17.95	0.00
5/23/86	51.00	17.89	0.00	17.97	-0.01	17.96	-0.01
6/4/86	63.00	17.89	0.00	17.97	-0.01	17.95	0.00
6/12/86	71.00	17.89	0.00	17.97	-0.01	17.95	0.00
6/18/86	77.00	17.89	0.00	17.96	0.00	17.95	0.00
6/24/86	83.00	17.89	0.00	17.97	-0.01	17.95	0.00
7/2/86	91.00	17.89	0.00	17.96	0.00	17.95	0.00
7/10/86	99.00	17.89	0.00	17.97	-0.01	17.96	-0.01
7/16/86	105.00	17.89	0.00	17.97	-0.01	17.96	-0.01
7/25/86	114.00	17.89	0.00	17.97	-0.01	17.96	-0.01
7/31/86	120.00	17.89	0.00	17.96	0.00	17.96	-0.01
8/7/86	127.00	17.88	0.01	17.96	0.00	17.96	-0.01
8/18/88	869.00						
8/26/88	877.00						
9/7/88	889.00						
9/30/88	912.00						
10/12/88	924.00						
11/10/88	953.00						
11/23/88	966.00						
1/4/89	1008.00						
1/24/89	1028.00						
1/3/90	1372.00						
10/21/03	6411.00	17.81	0.08	17.90	0.07	17.90	0.05
6/28/05	7027.00	17.79	0.10	17.88	0.09	17.88	0.07
6/14/06	7378.00	17.79	0.10	17.88	0.08	17.88	0.07
6/25/07	7754.00	17.81	0.08	17.89	0.07	17.89	0.06
7/17/08	8142.00	17.78	0.11	17.87	0.09	17.87	0.08
10/7/09	8589.00	17.77	0.12	17.85	0.11	17.85	0.10
8/23/10	8909.00	17.79	0.10	17.88	0.08	17.88	0.07
12/16/11	9389.00	17.79	0.10	17.88	0.08	17.90	0.05
2/3/2014	10169.00	17.77	0.12	17.86	0.10	17.86	0.09
1/12/2015	10512.00	17.77	0.12	17.86	0.10	17.86	0.09
4/10/2015	10600.00	17.79	0.10	17.88	0.09	17.87	0.08
5/11/2015	10631.00	17.77	0.12	17.86	0.10	17.87	0.08
6/30/2015	10681.00	17.78	0.11	17.86	0.10	17.87	0.08
7/27/2015	10708.00	17.78	0.11	17.78	0.18	17.87	0.08
8/28/2015	10740.00	17.81	0.08	17.90	0.06	17.90	0.05
9/29/2015	10772.00	17.77	0.12	17.86	0.10	17.85	0.10
10/29/2015	10802.00	17.81	0.08	17.89	0.07	17.89	0.06
11/20/2015	10824.00	17.76	0.13	17.86	0.10	17.85	0.10
12/2/2015	10836.00	17.76	0.13	17.84	0.12	17.85	0.10
12/30/2015	10864.00	17.77	0.12	17.85	0.11	17.85	0.10
1/22/2016	10887.00	17.76	0.13	17.85	0.11	17.85	0.10
2/15/2016	10911.00	17.76	0.13	IA		17.84	0.11
3/19/2016	10944.00	17.77	0.12	17.85	0.11	17.85	0.10
4/15/2016	10971.00	IA		17.86	0.10	17.86	0.09
5/20/2016	11006.00	17.76	0.13	17.84	0.12	IA	
6/24/2016	11041.00	17.79	0.10	17.87	0.09		
7/19/2016	11066.00	17.79	0.10	17.88	0.08	17.87	0.08
8/19/2016	11097.00	17.77	0.12	17.86	0.10	17.86	0.09
9/13/2016	11122.00	17.78	0.11	IA		17.87	0.08
10/16/2016	11155.00	17.78	0.11	17.86	0.10	17.86	0.09



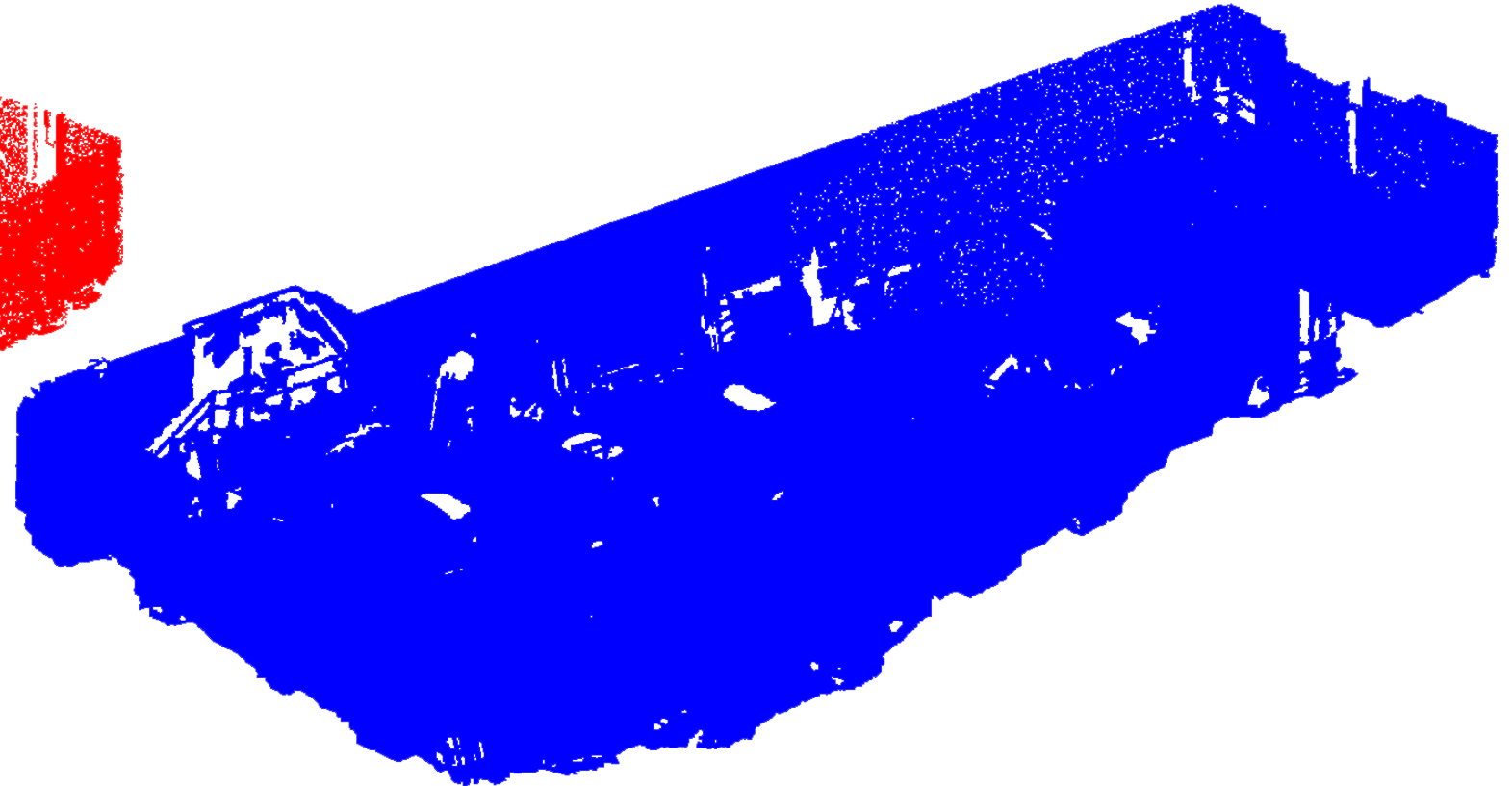
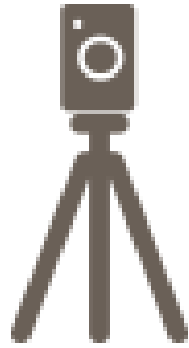
Multi Streams for Data Usage



Drone Footage



Collection



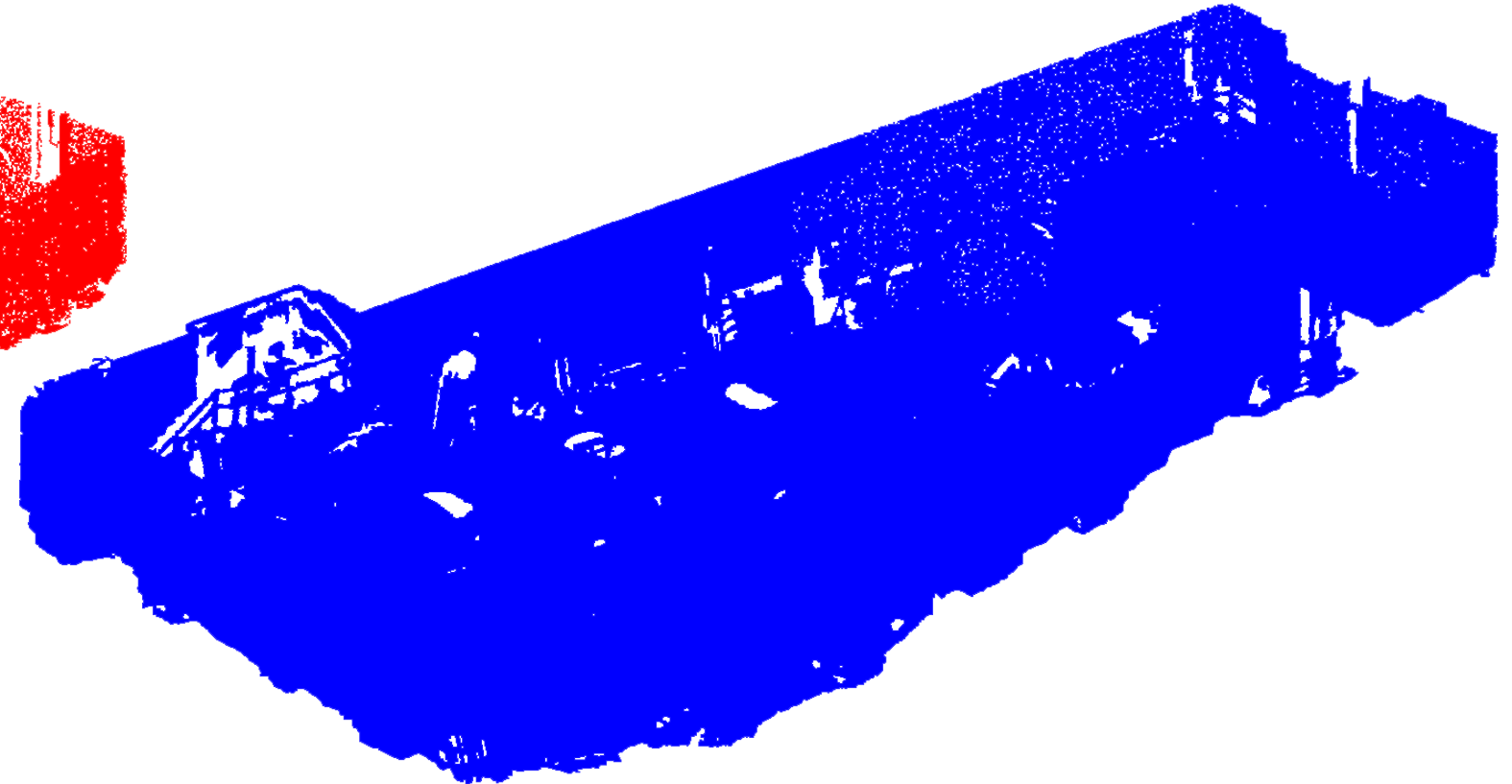
Analysis



Laser Scan / Point Cloud Mesh



Photogrammetry Mesh



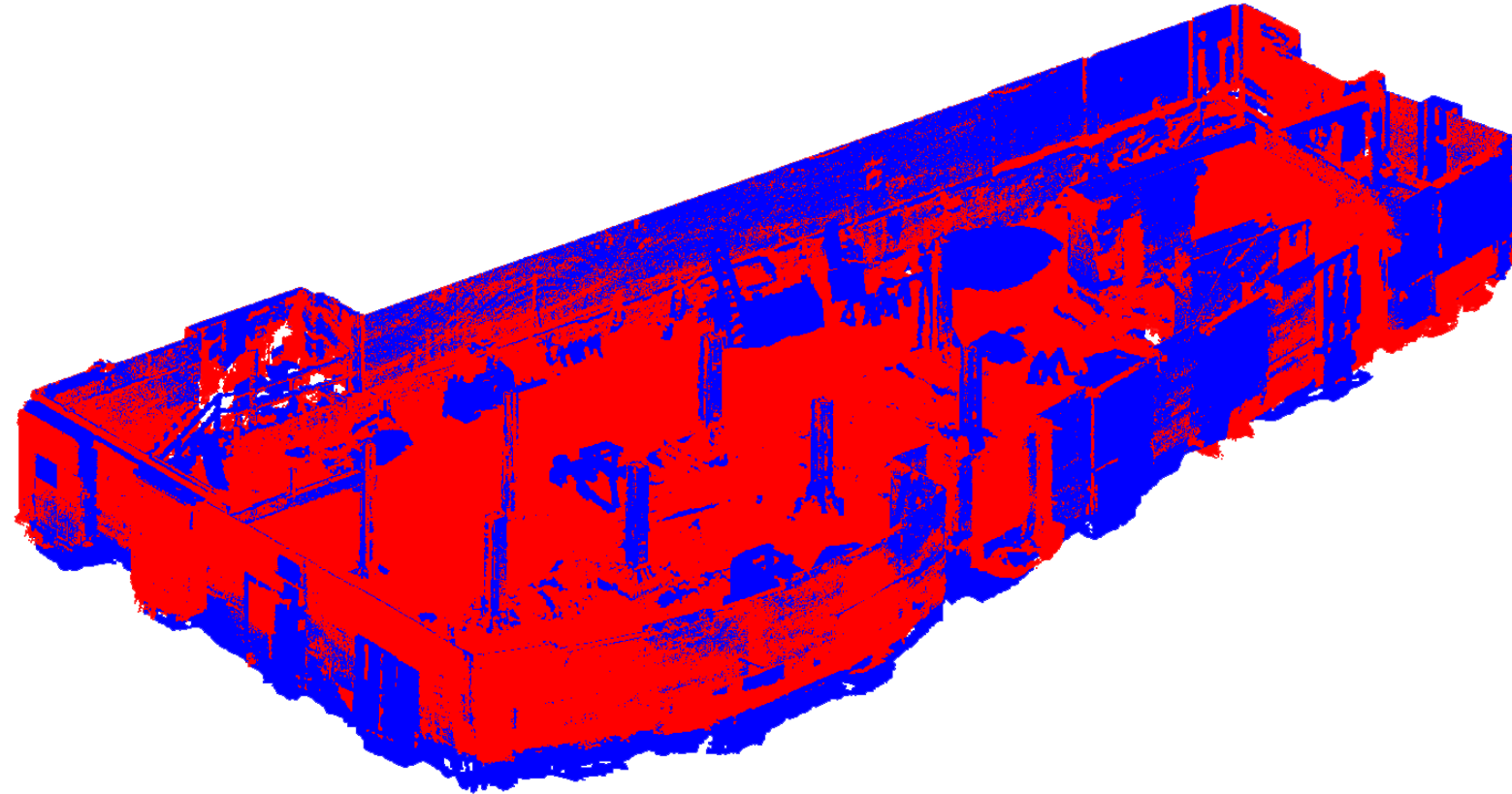
Analysis



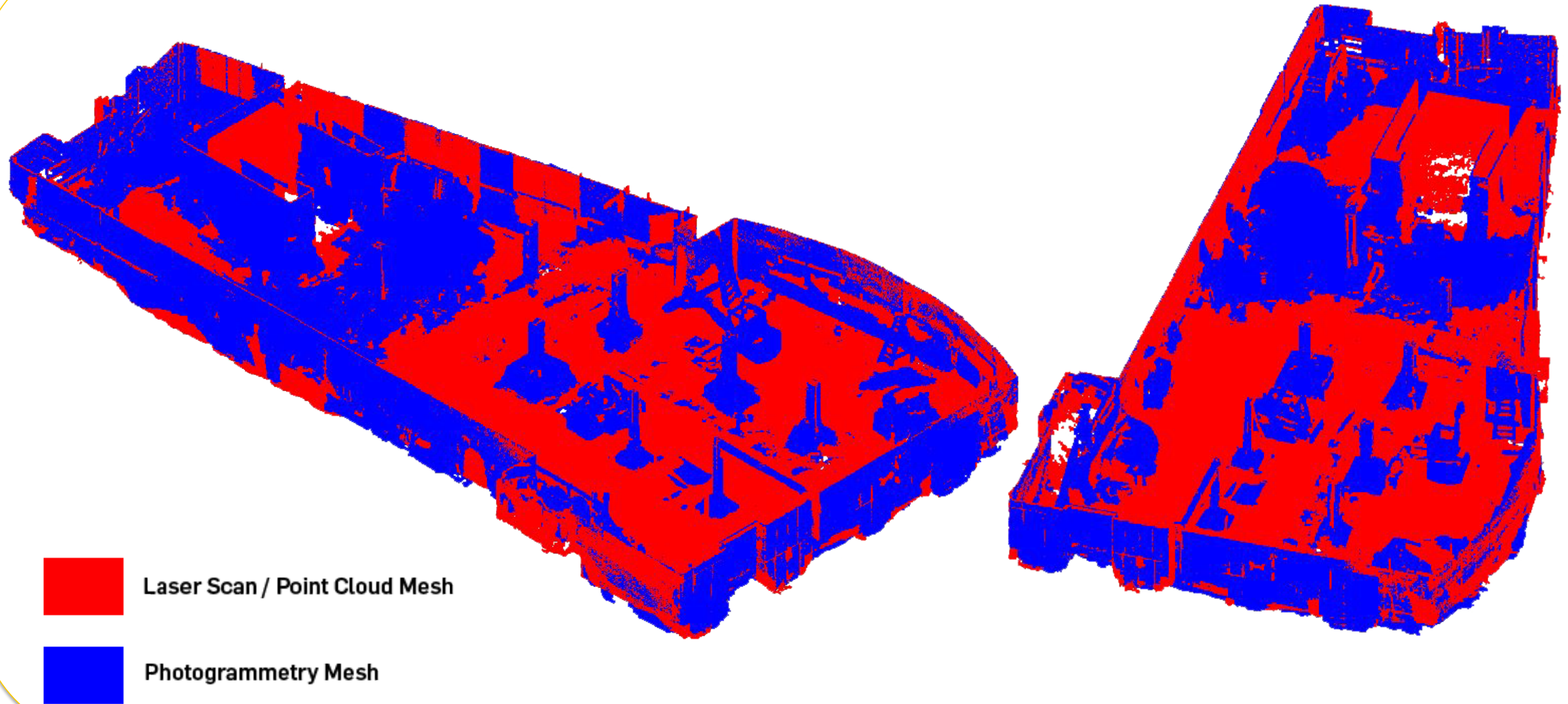
Laser Scan / Point Cloud Mesh



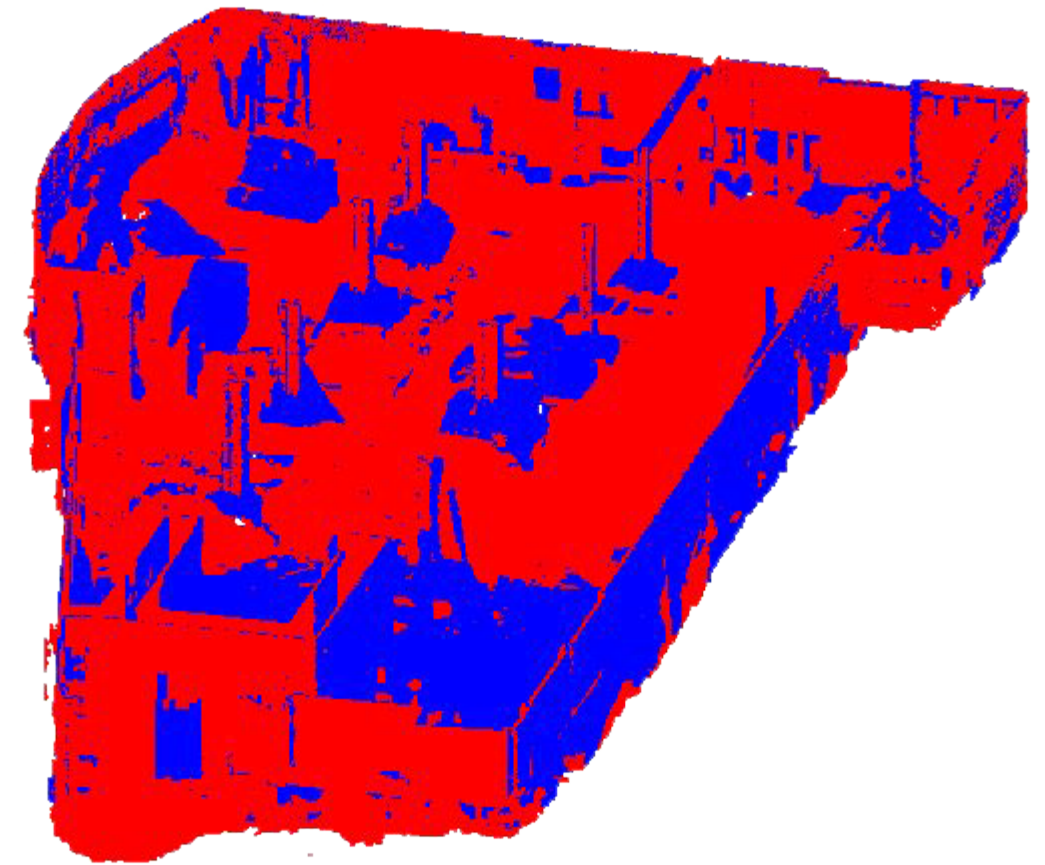
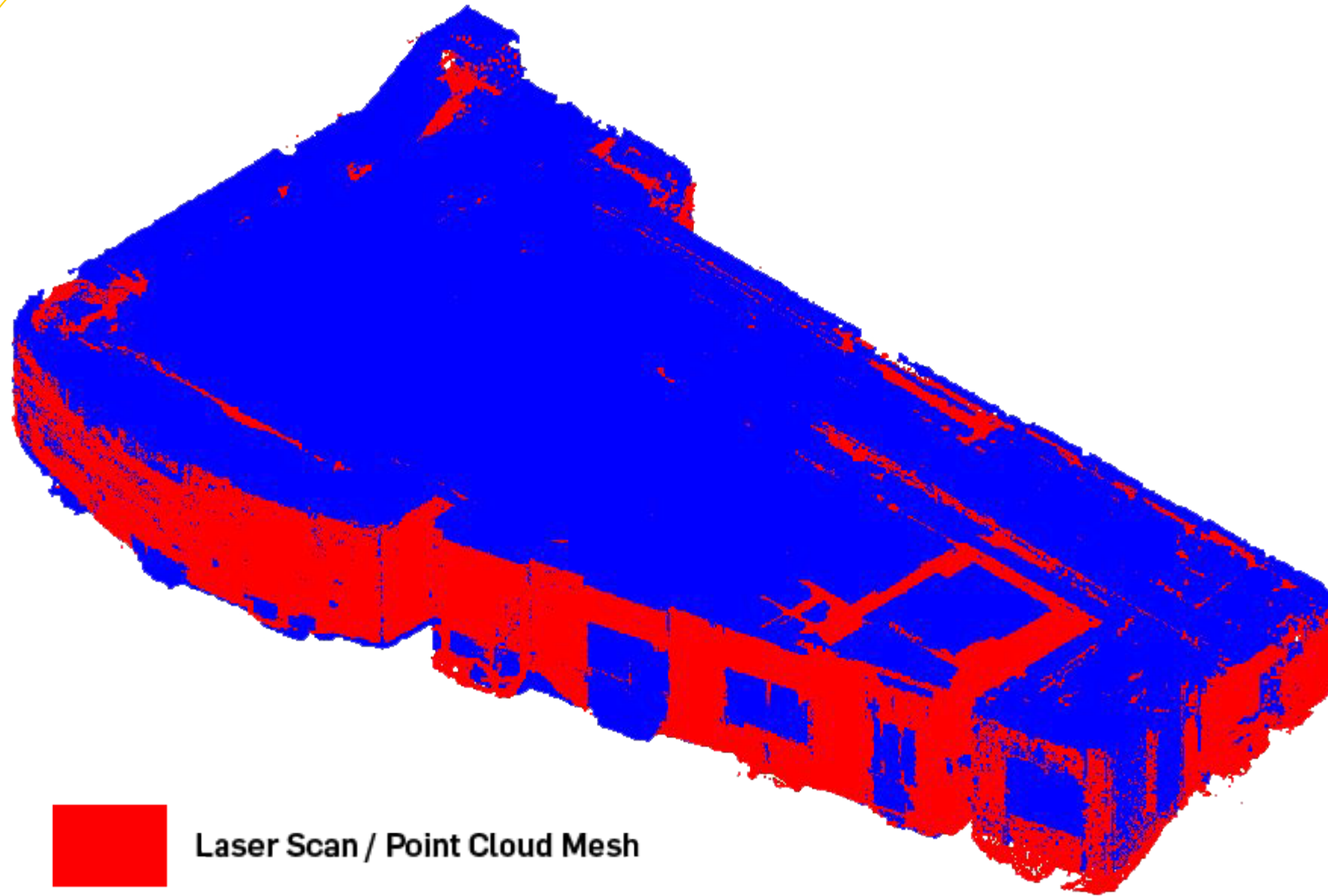
Photogrammetry Mesh



Analysis



Analysis

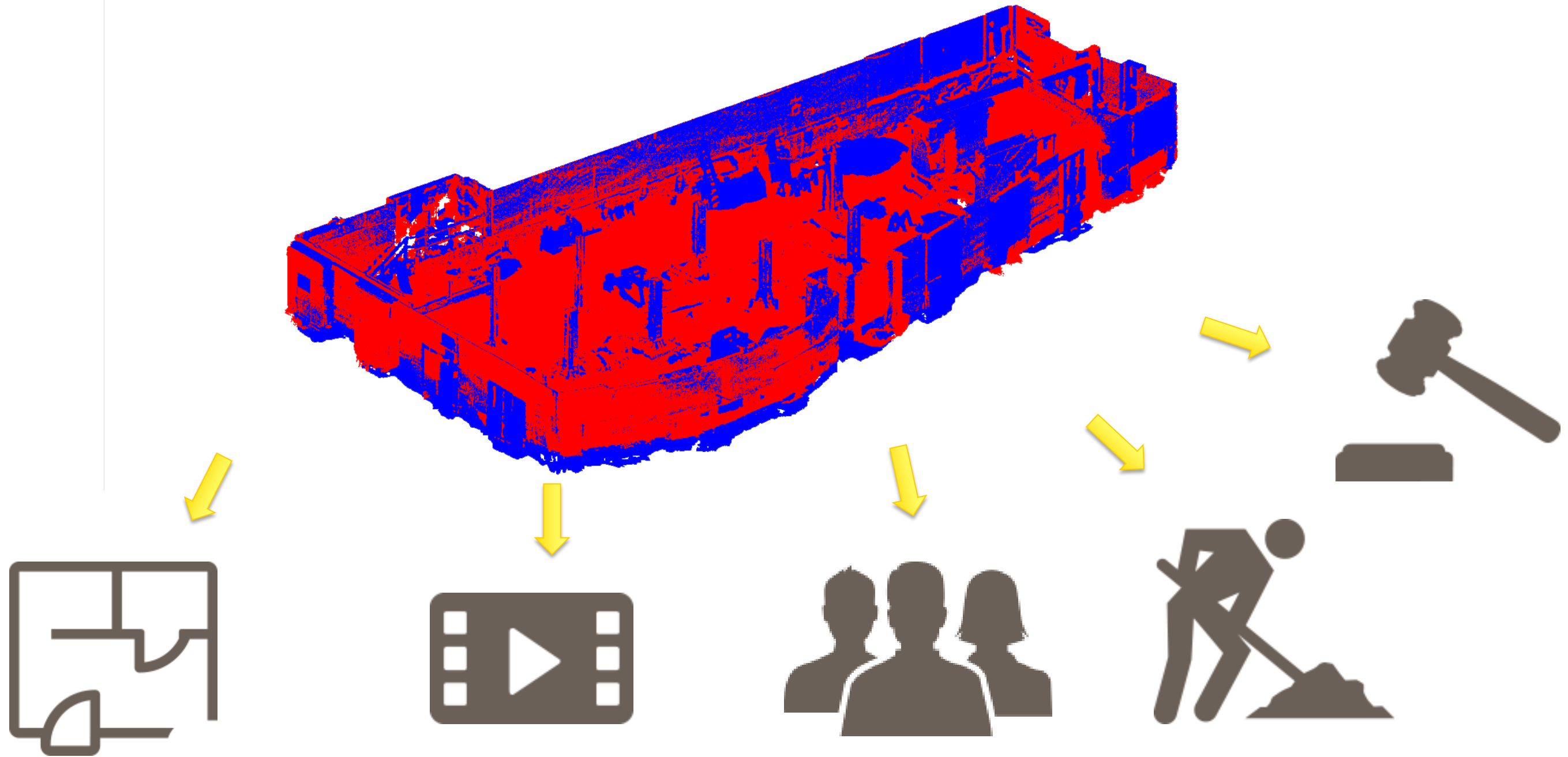


Laser Scan / Point Cloud Mesh

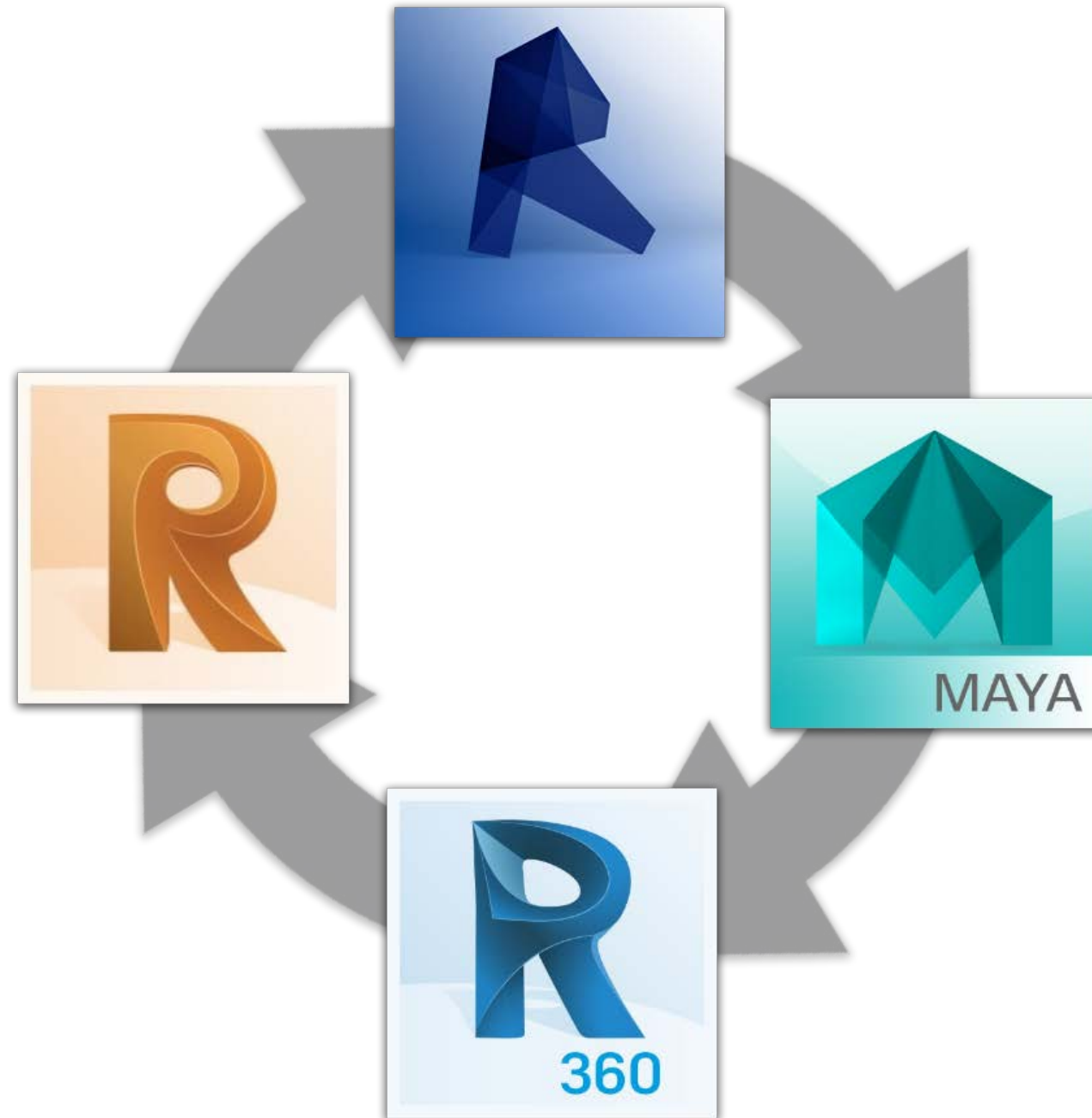


Photogrammetry Mesh

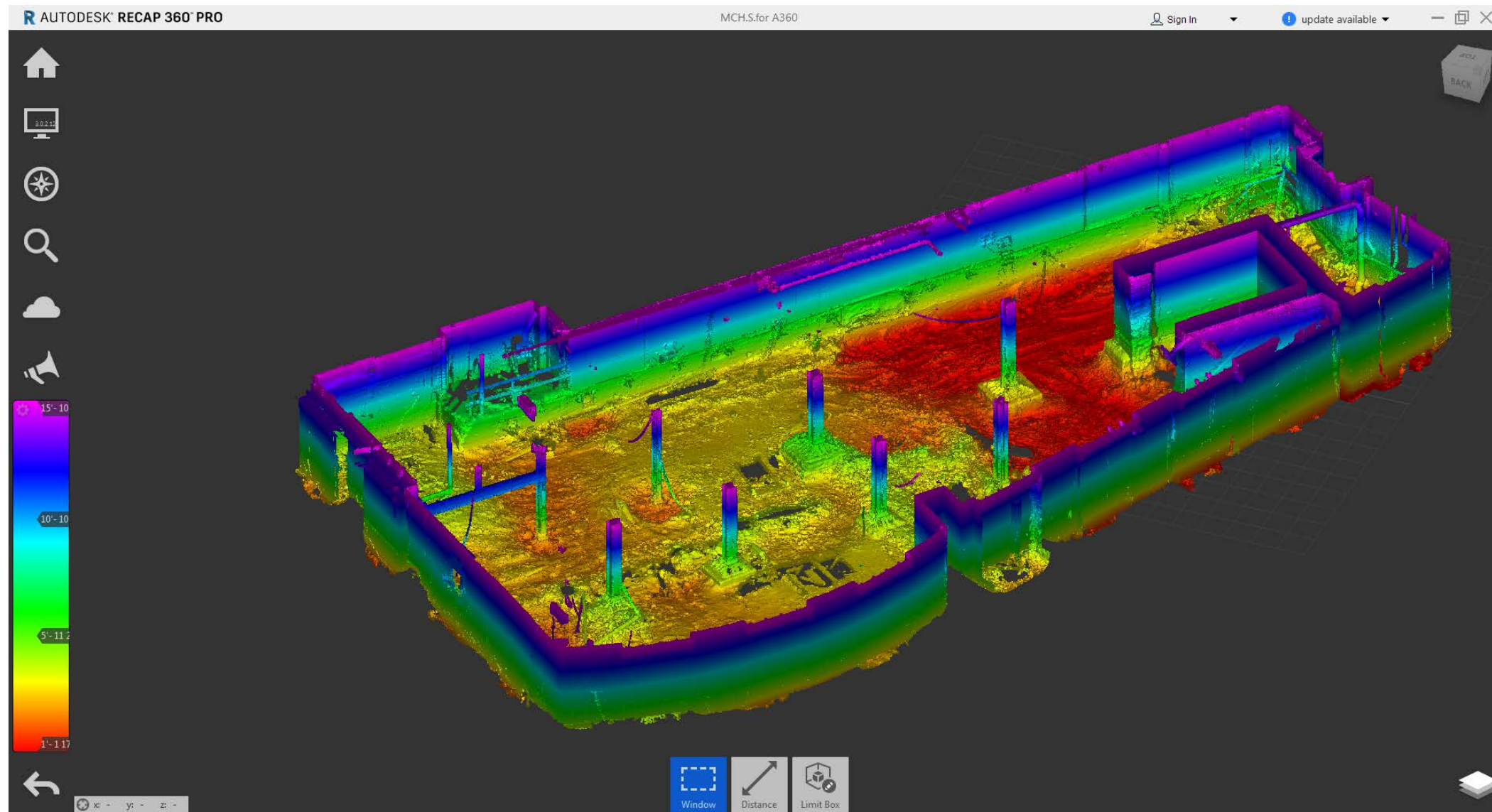
Distribution of Information



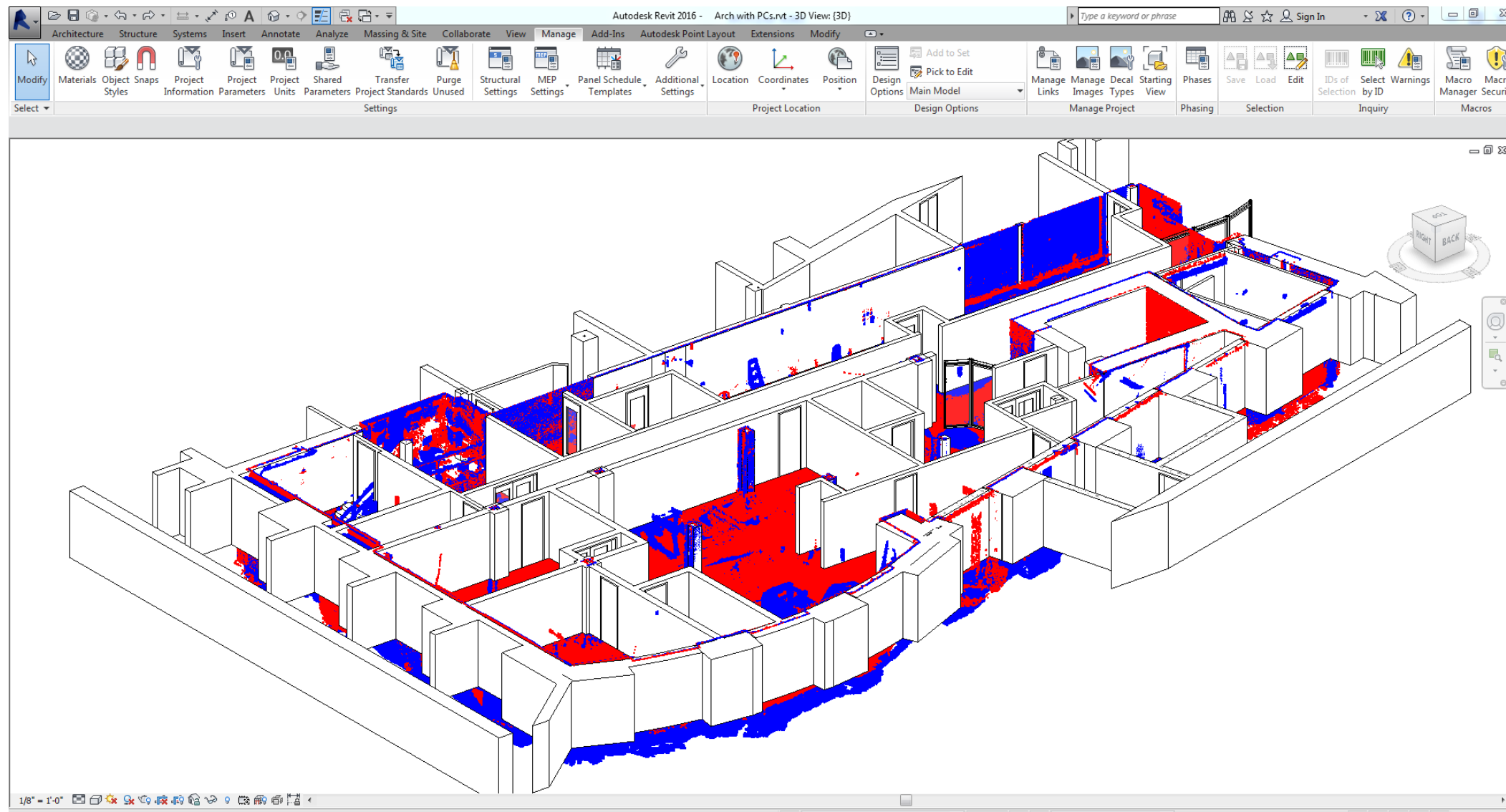
Cross Platform Interoperability



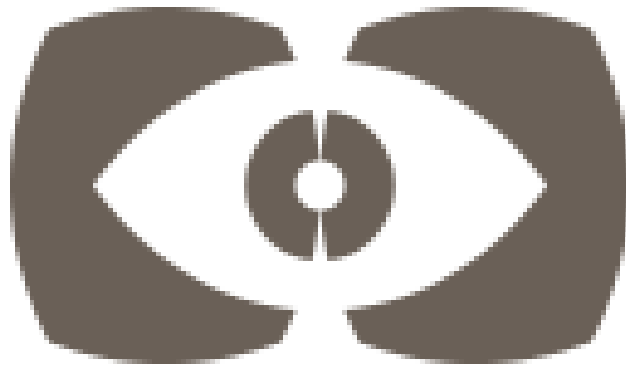
Data Usage



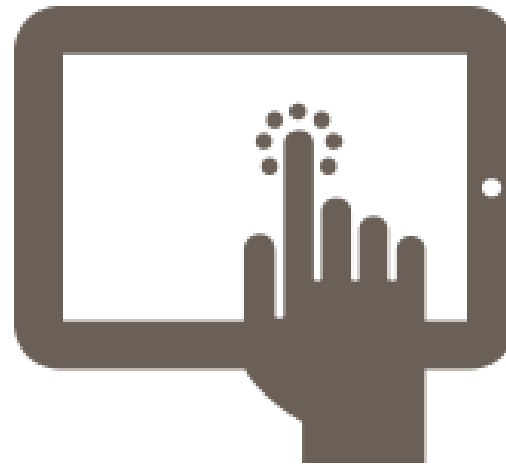
Data Usage



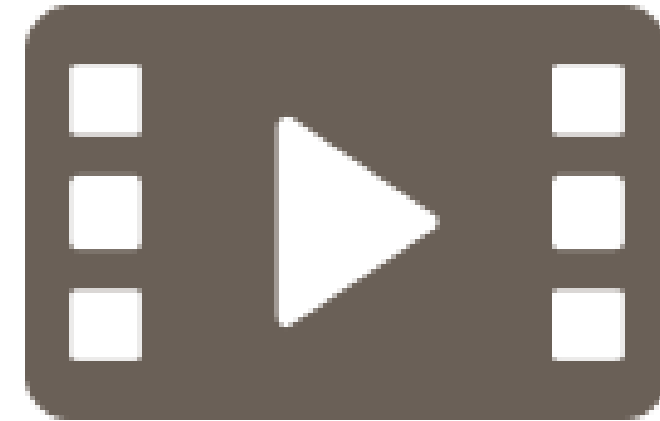
Virtual Mock Up Process



Virtual Reality

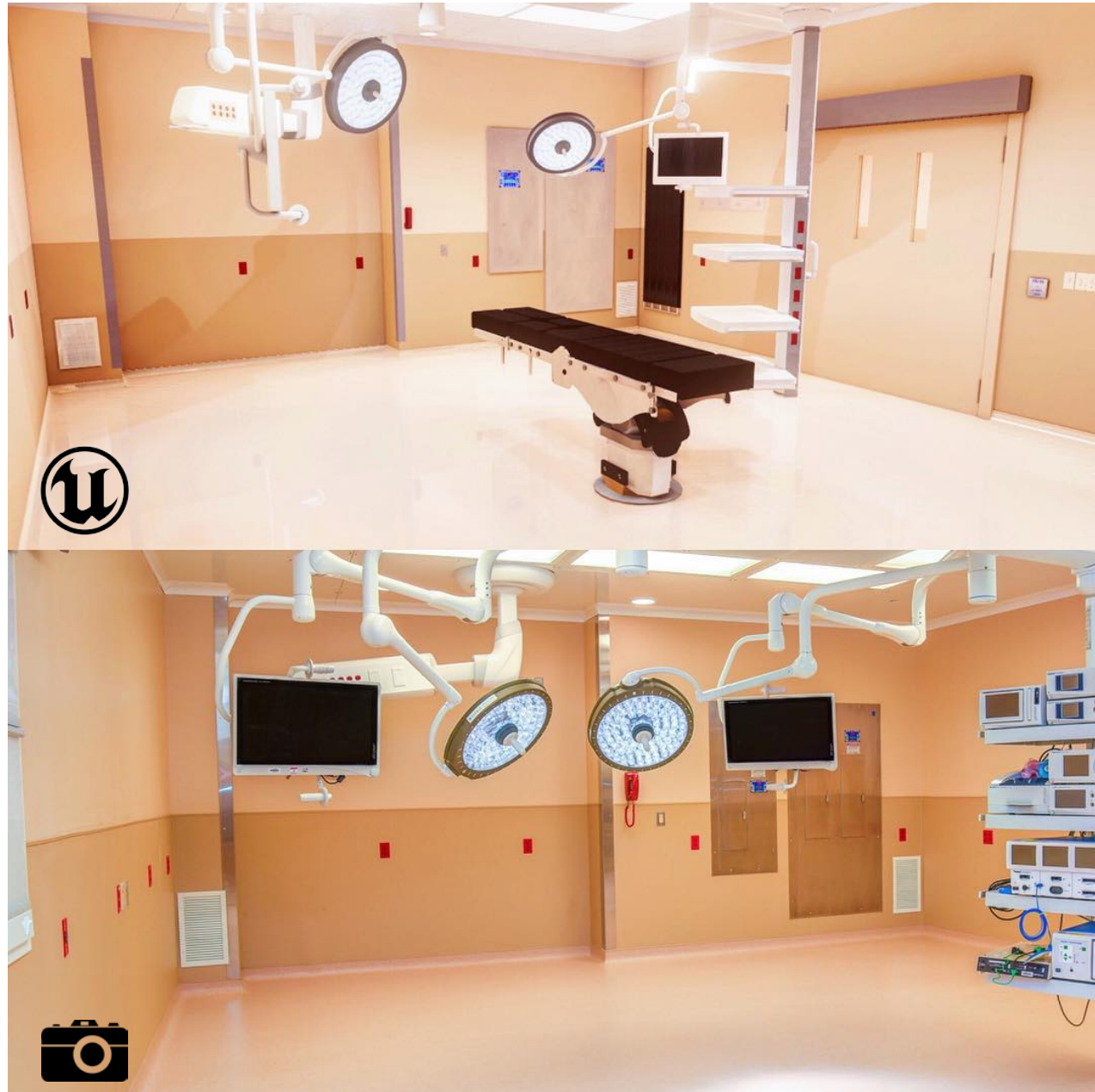


Mobile



Animation

Virtual Mock Up Process



High Frame Rates
+
High Aesthetic Quality
+
Maximum Resolution
High Standard of User Experience

- > 4k Textures
- > IES Lighting
- > Clean UV Mapping
- > Level of Detail Models

Virtual Mock Up Process

Cleaning the Mesh

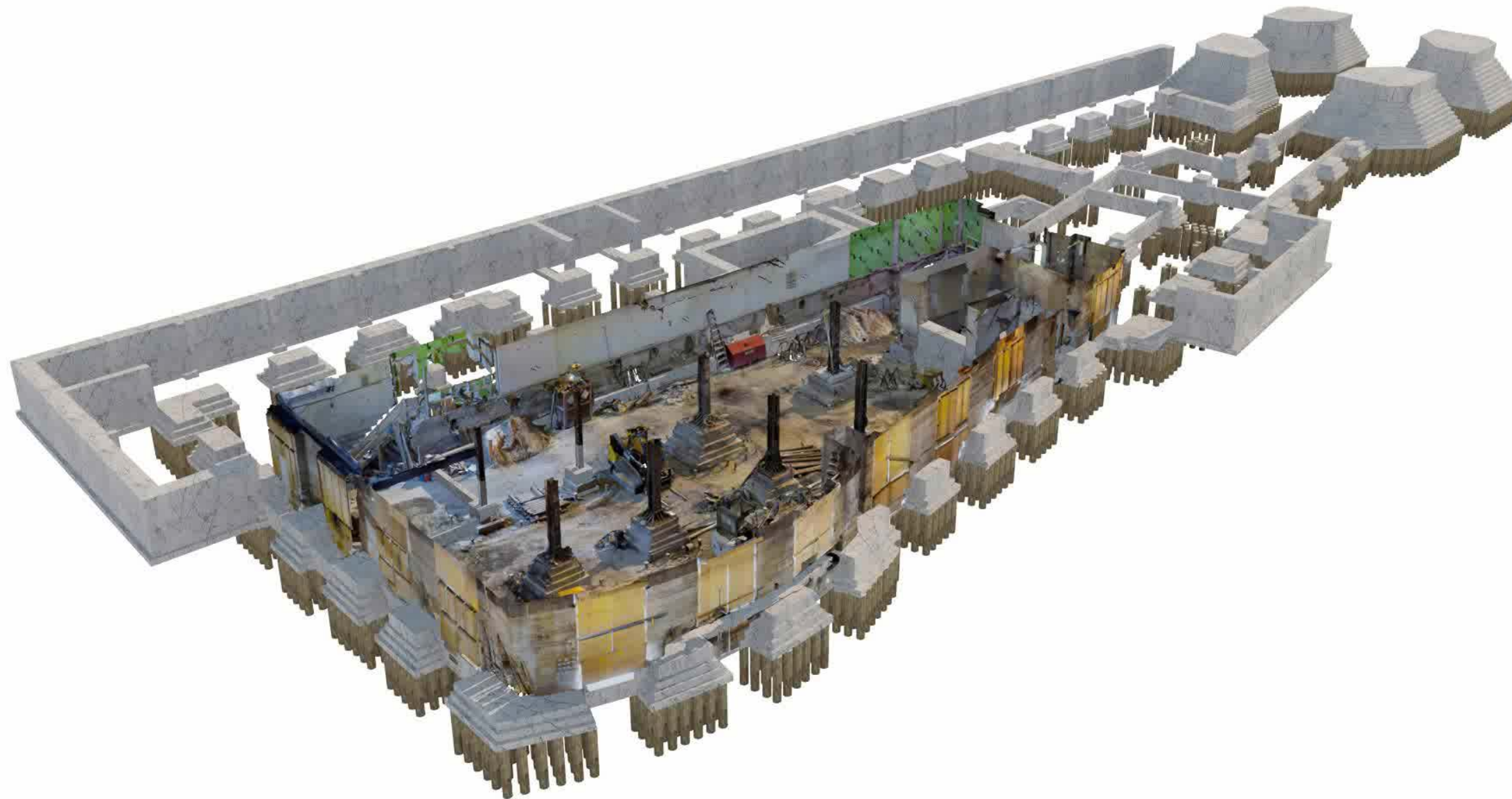


Virtual Mock Up Process



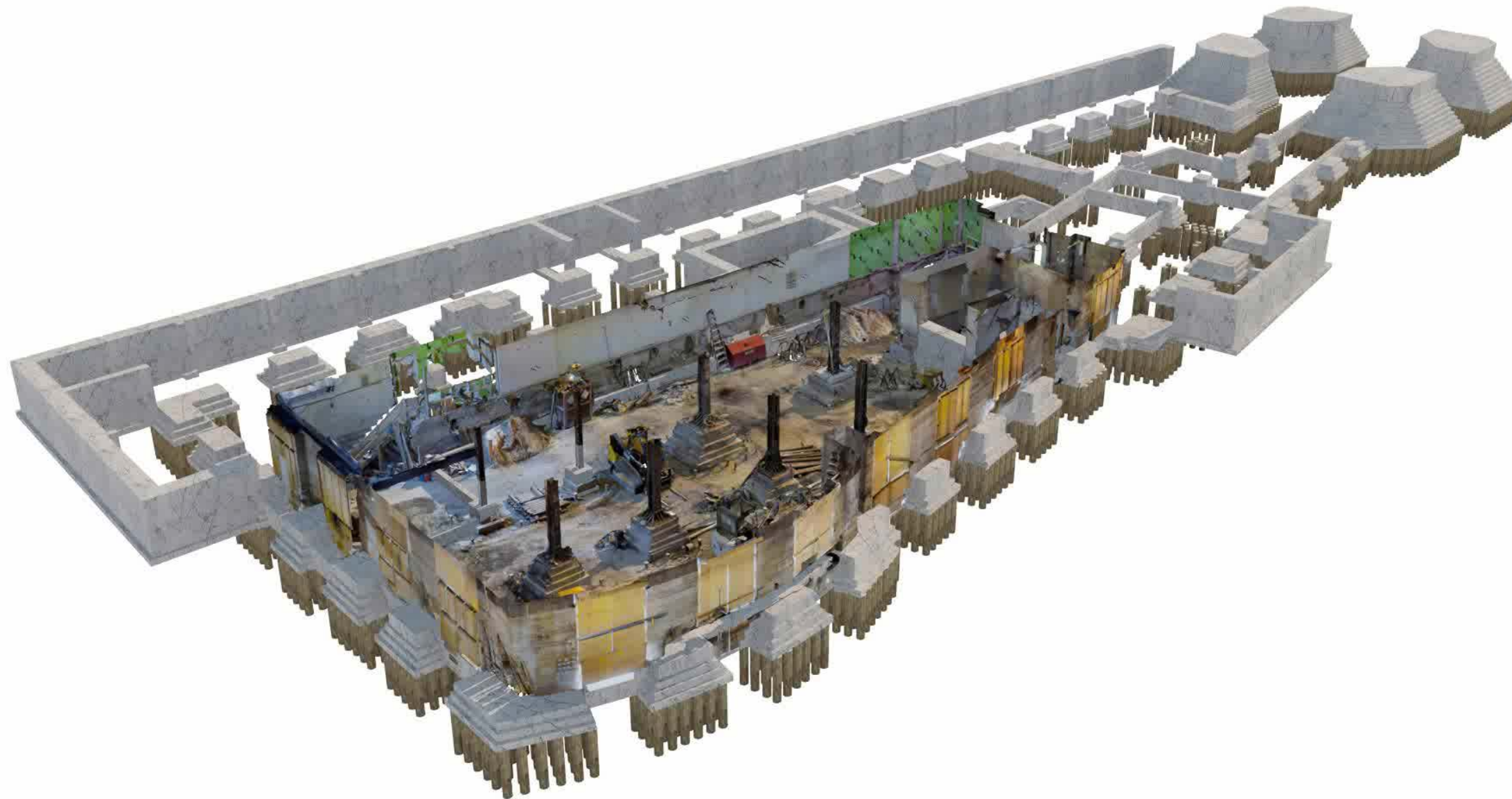
Importing Existing As-Built

Virtual Mock Up Process



Alignment of As-Built to Scanned Mesh

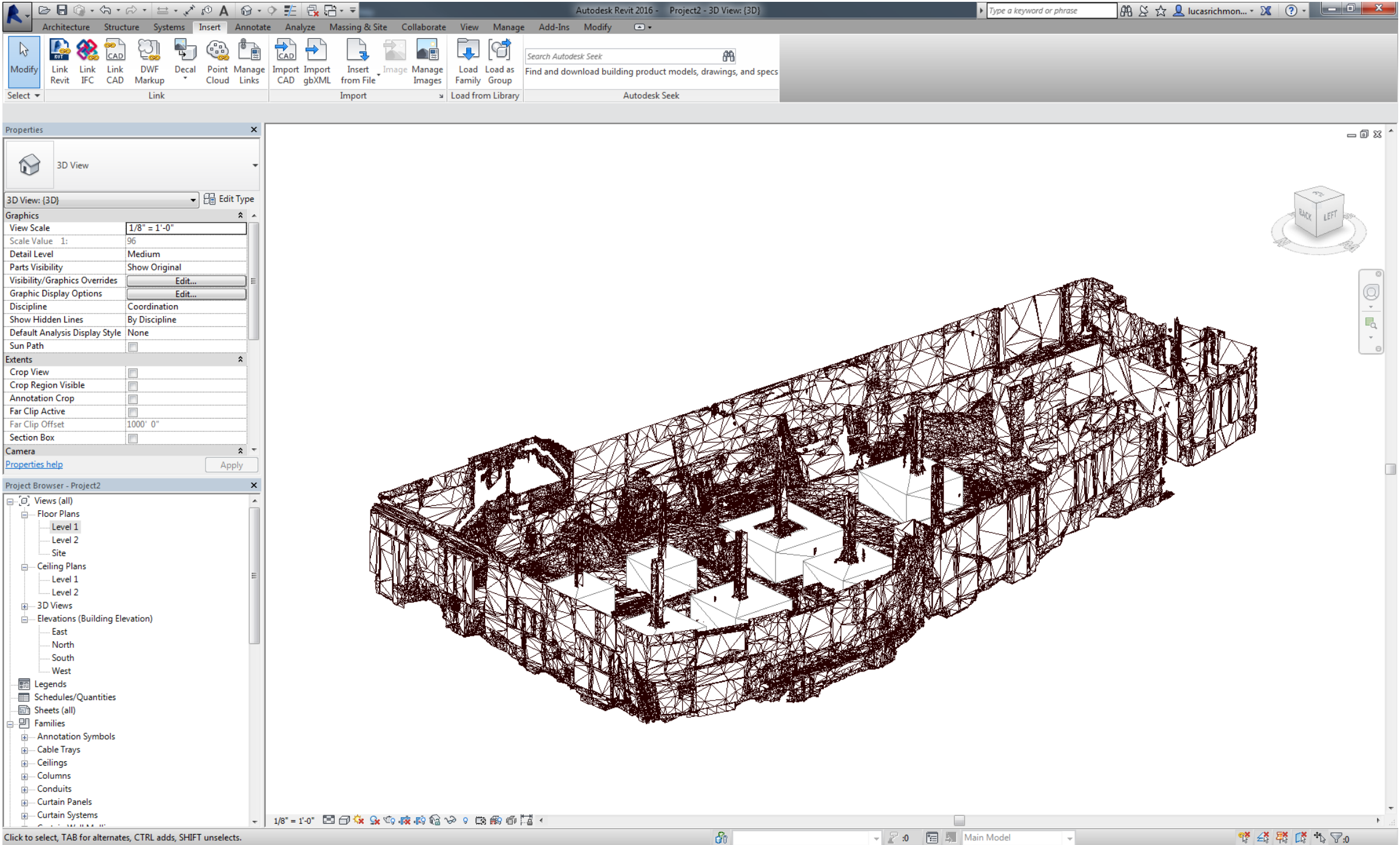
Virtual Mock Up Process



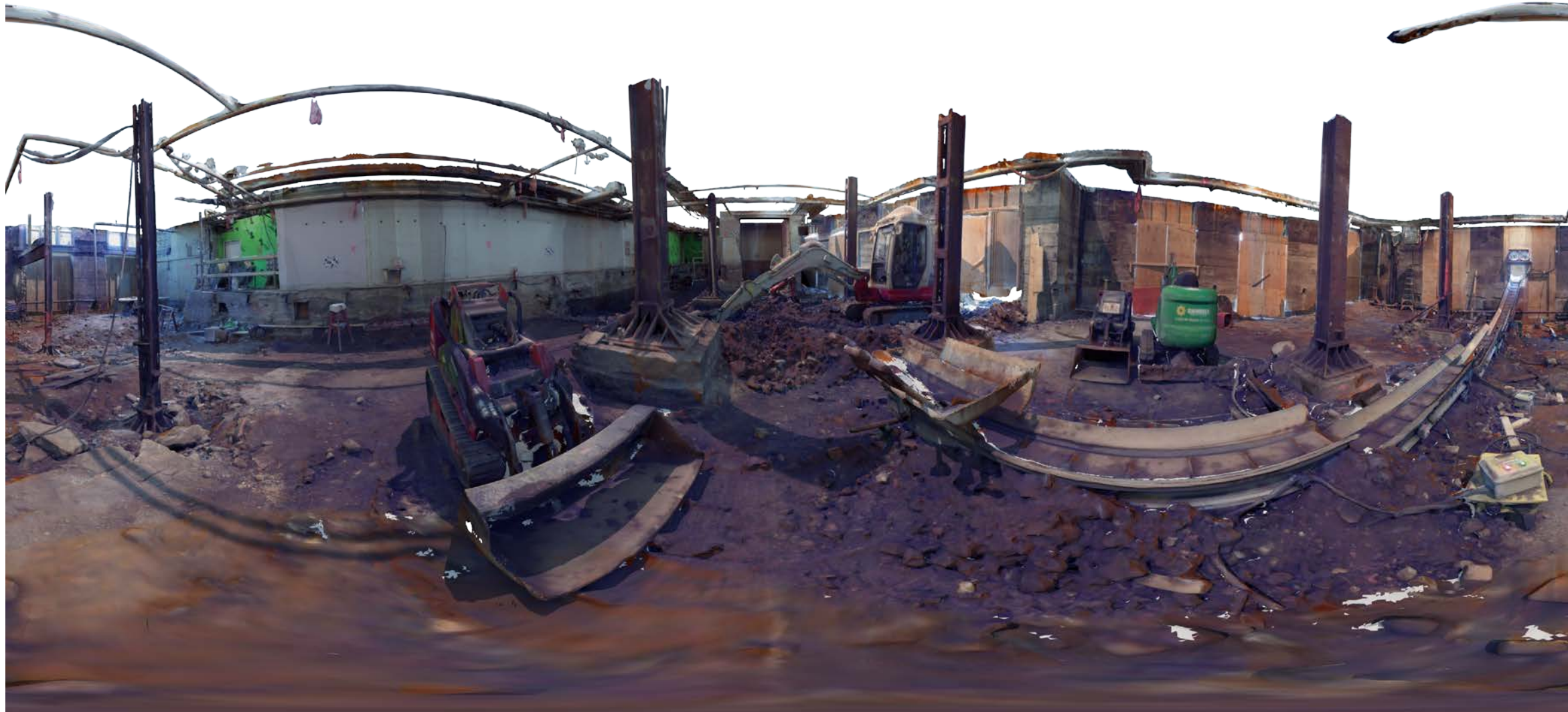
Creating the Virtual Model Simulation



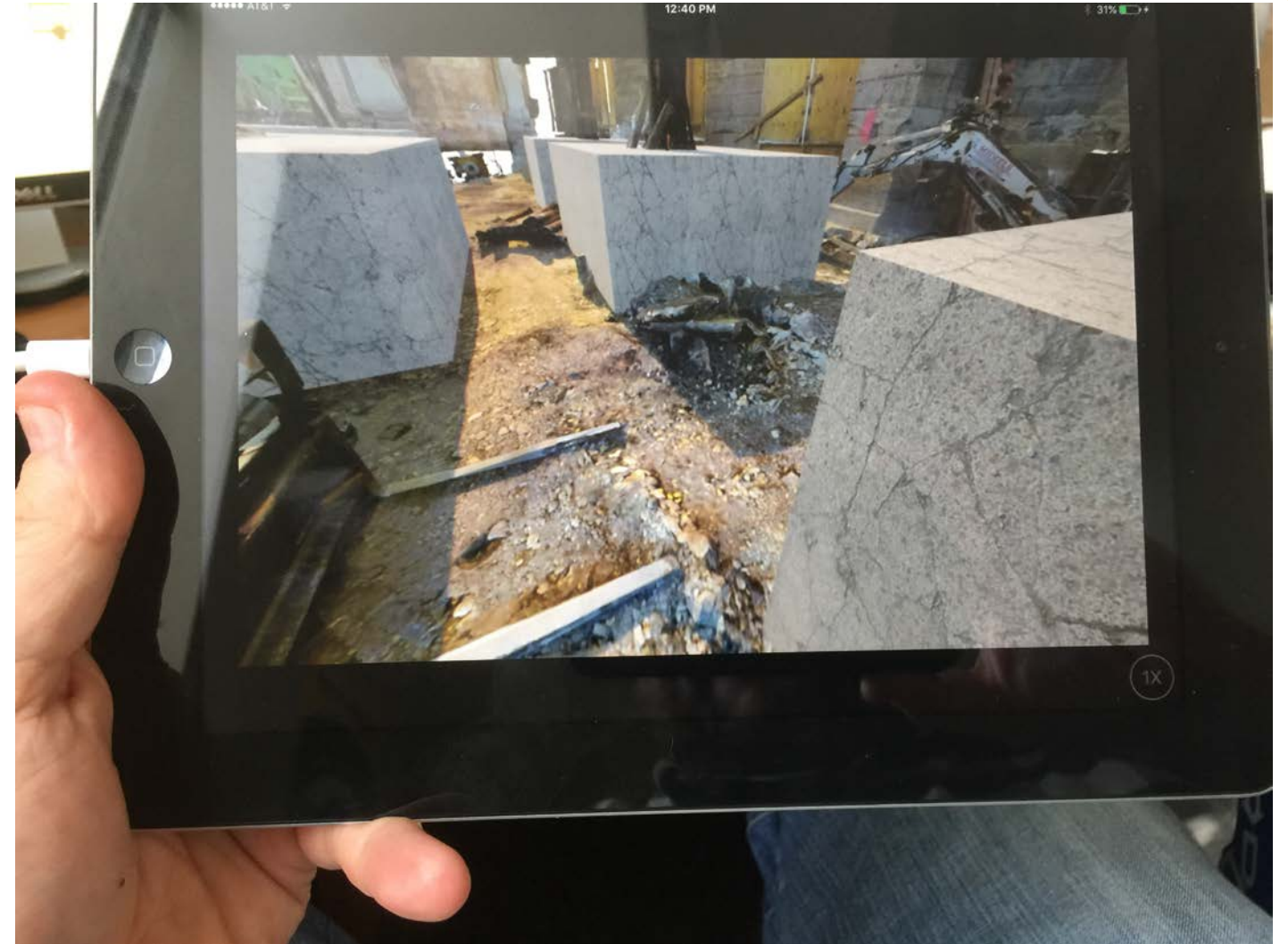
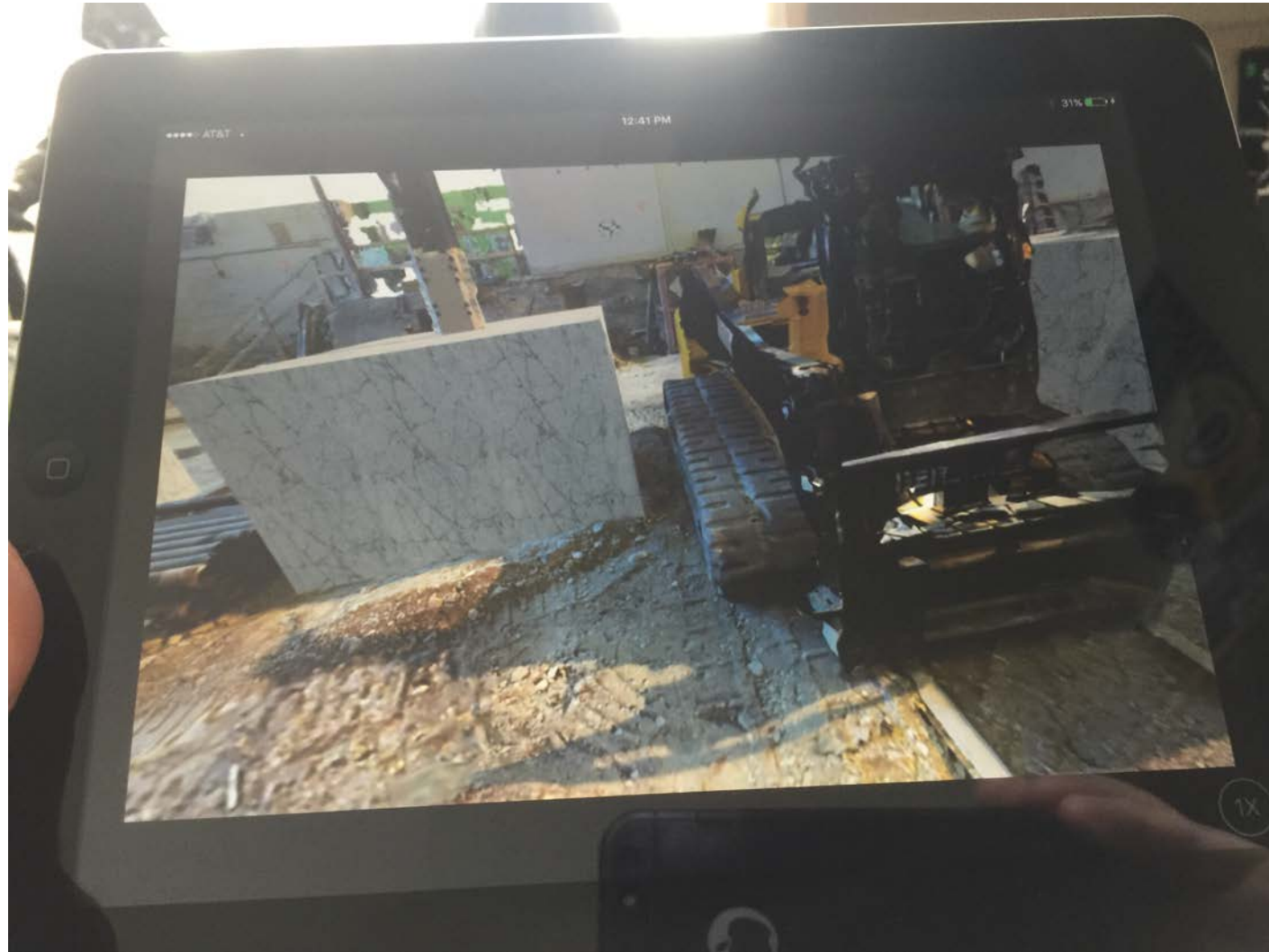
Communication Options



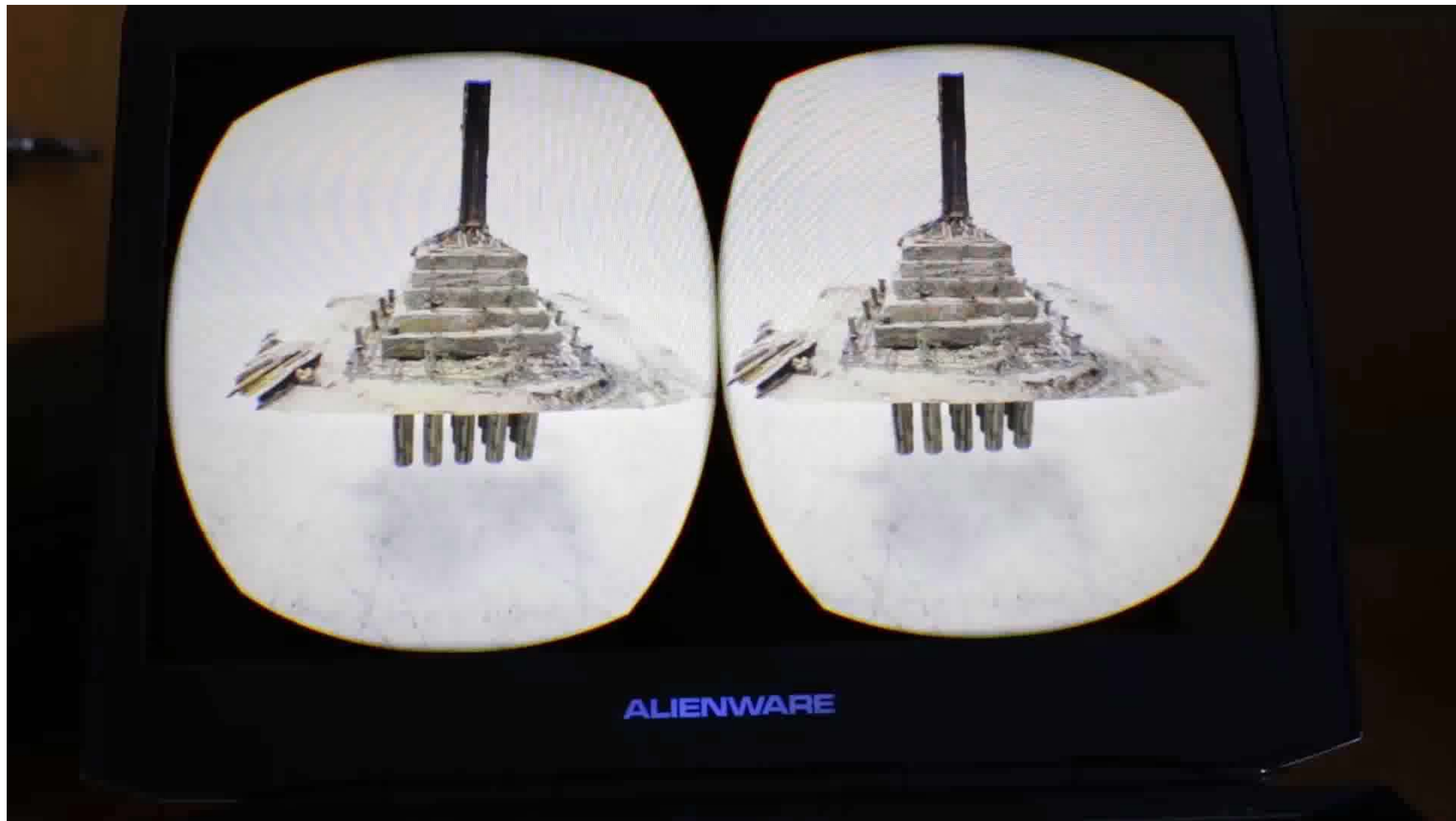
Communication Options



Communication Options



Interactive VR Photogrammetry



Key learning objectives

At the end of this class, you will be able to:

- Recognize existing project information that can be used in a VR setting
- Learn how to improve the workflow process of making a quality VR project experience
- Learn how to derive value from creating a high-end VR experience
- Learn about preserving historical buildings with new technology and workflow

Questions?



