

# AS322686 - Registering Scans with ReCap Pro

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Lanmar Services





## “Laser Larry” Kleinkemper, AIA

Lanmar Services – an RnD for AEC firm

20+ years of computer modeling buildings

90's – The Computer Rendering / Animation guy in Architecture

2000's – The Revit guy

2007 – The holographic guy

2008+ The 3D Scan to BIM guy

An Architect, who's main purpose in life is to help advance Architectural Practice with technology.

He is a Geek!

# Who are you?

Knowing who is in the room, helps!

Ultimately, this will help him make better jokes throughout the class!

....unfortunately, they still won't be funny.

1. How many have access to a scanner and register point clouds?
2. How many have used point clouds for their work?
3. How many do not know what is a point cloud?
4. Architects? Engineers? Surveyors? Contractors?

The Most important part of any scanning Hardware or Software is the OPERATOR and their training.



new project



what's new?



# R AUTODESK® RECAP PRO



## Join the Autodesk Research Program

Influence the future of ReCap Pro by participating in user research!

[Learn More >](#)

## Beta Period Expiration

Thank you very much for using our beta point cloud cleaning and scan-to-mesh features in ReCap Pro™. Your use and feedback on these features has given us valuable information on the future direction of the product and has hopefully helped you explore new workflows with reality data.

On **31 October 2018 at 12:00 am Pacific Daylight Time**, you will no longer be able to kick off a scan-to-mesh project or point cloud cleaning operations. Projects in progress at the time the service is turned off will be lost. Our next ReCap update will remove the feature icons from the ReCap Pro menu. Those versions of ReCap Pro that are not updated will receive an error when customers attempt to use the feature.

Meshes that have already been created will remain accessible to you as long as you maintain an active A360 account. Projects that have already been cleaned will retain their cleaned state.

If you have any questions, please visit the [ReCap forum](#).



recent projects



YCJL-Exterior



YCJL\_3rd Floor



YCJL\_1st Floor

current project

# YCJL-Exterior

[open](#)

# What will we be reviewing today

BEST SCANNING PRACTICES FOR REGISTRATION

AUTO VS MANUAL REGISTRATION

TARGETS

CONTROL

INDEXING

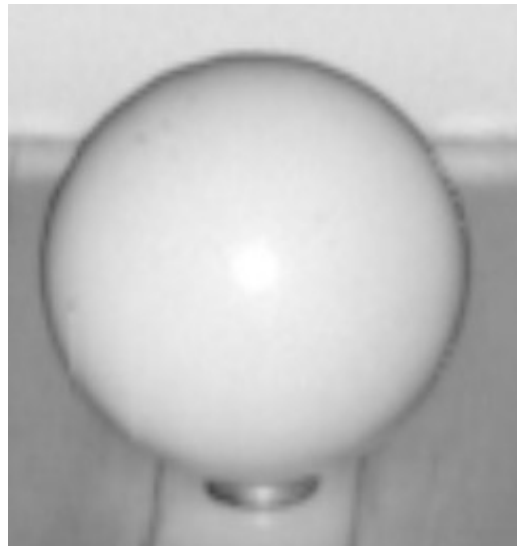
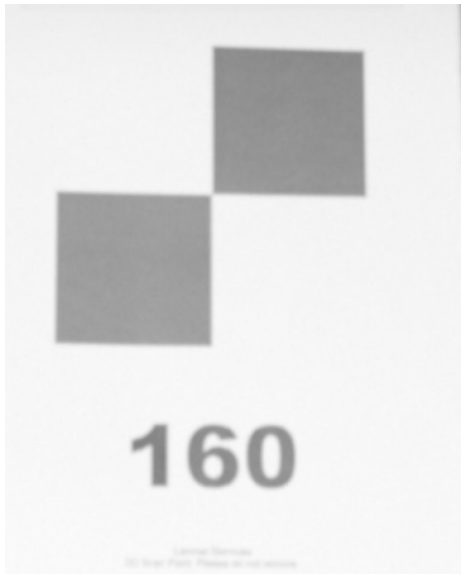
HOW TO VERIFY YOUR WORK

IMPORTING INTO REVIT

# Targets – Who needs them?

Classic Checker Boards

Spheres



# What is Control?

Survey Control vs Scanning Control

Total Station

Checker Board

Prisms and Pins / Monuments / Crows Feet (X cut in Concrete)

The Poor man's Control – Disto

measure from target to target

check measurements in the computer



## Importing the Data

Generally keep it under 200 scans per Cloud registration.

This will vary base on Scans size and your computer.

Exterior = 200

First Floor = 200

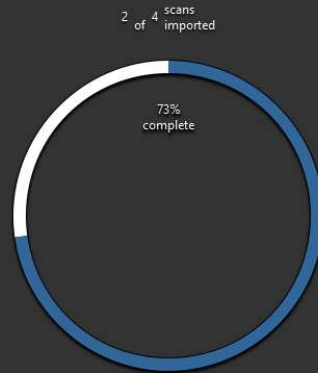
Roof = 200

Let's create a NEW Project!

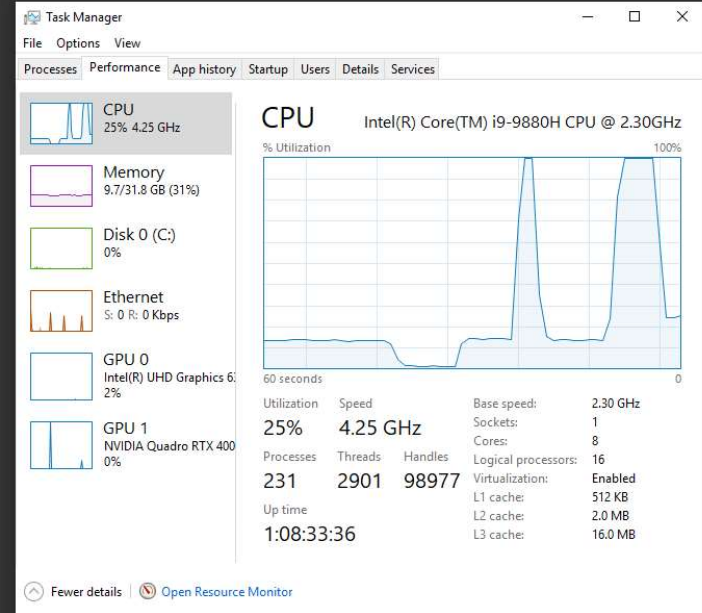




import  
files



10:37 elapsed time ~2:58 left to go



cancel  
auto registration

register  
manually

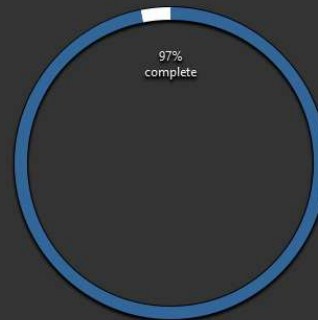




import  
files



3 of 4 scans  
imported



15:03 elapsed  
time ~0:00 left  
to go

Task Manager

File Options View

Processes Performance App history Startup Users Details Services

**CPU** Intel(R) Core(TM) i9-9880H CPU @ 2.30GHz  
26% 4.41 GHz

**Memory** 9.3/31.8 GB (29%)

**Disk 0 (C:)** 0%

**Ethernet** S: 16.0 R: 40.0 Kbps

**GPU 0** Intel(R) UHD Graphics 6: 1%

**GPU 1** NVIDIA Quadro RTX 400 0%

% Utilization over 60 seconds

Utilization	Speed	Base speed:	2.30 G...
26%	4.41 GHz	Sockets:	1
Processes	Threads	Logical processors:	16
228	2875	Virtualization:	Enabled
Up time:	1:08:38:02	L1 cache:	512 KB
		L2 cache:	2.0 MB
		L3 cache:	16.0 MB

Handles: 98507

Open Resource Monitor



cancel  
auto registration

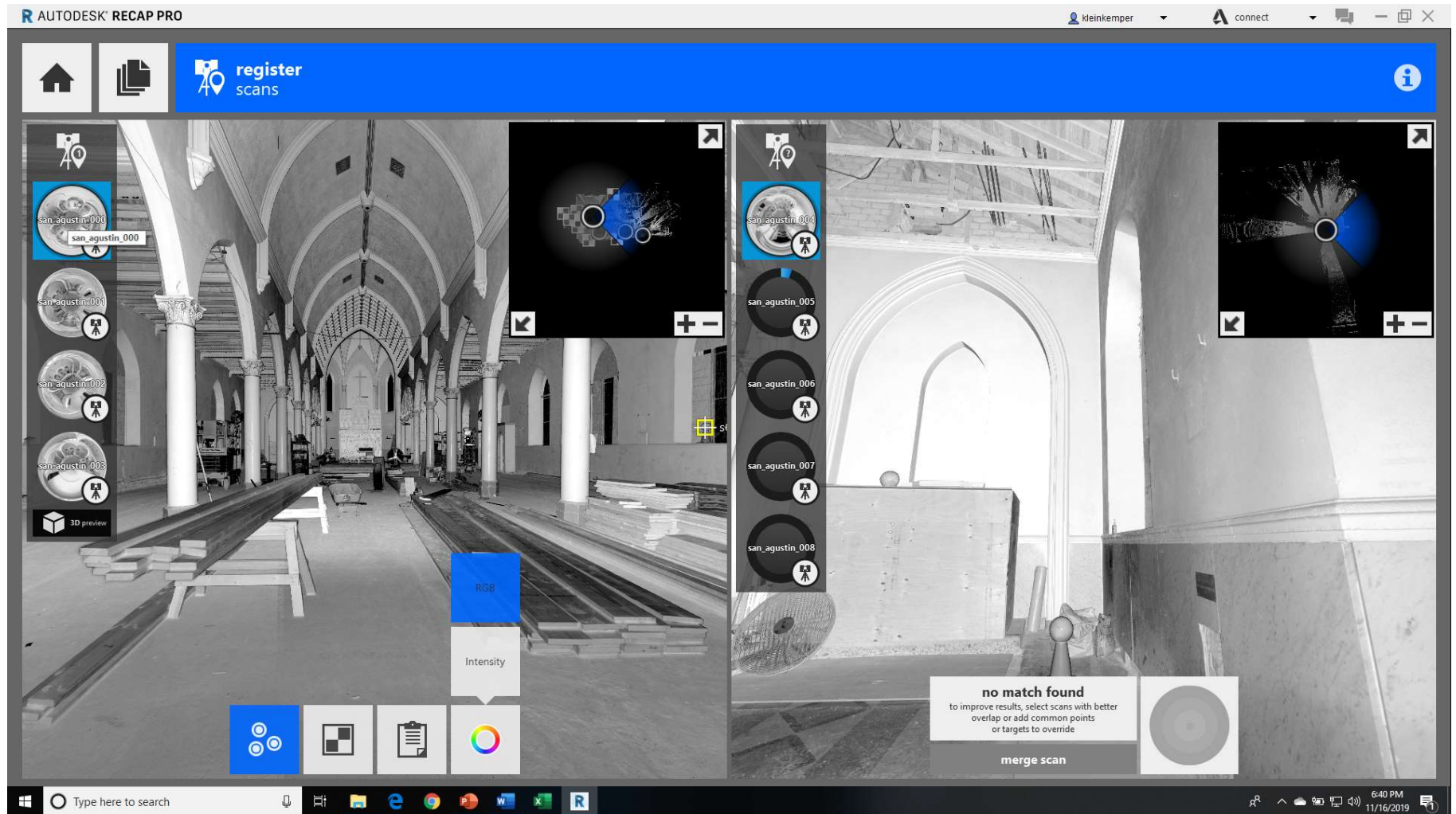
register  
manually



## Auto vs Manual Registration

- Some times SPECTACULAR!
- Some times CRAPTASTIC!
- CHECK YOUR WORK!!!!
- The Most important part of any software, is the Operator and her training!

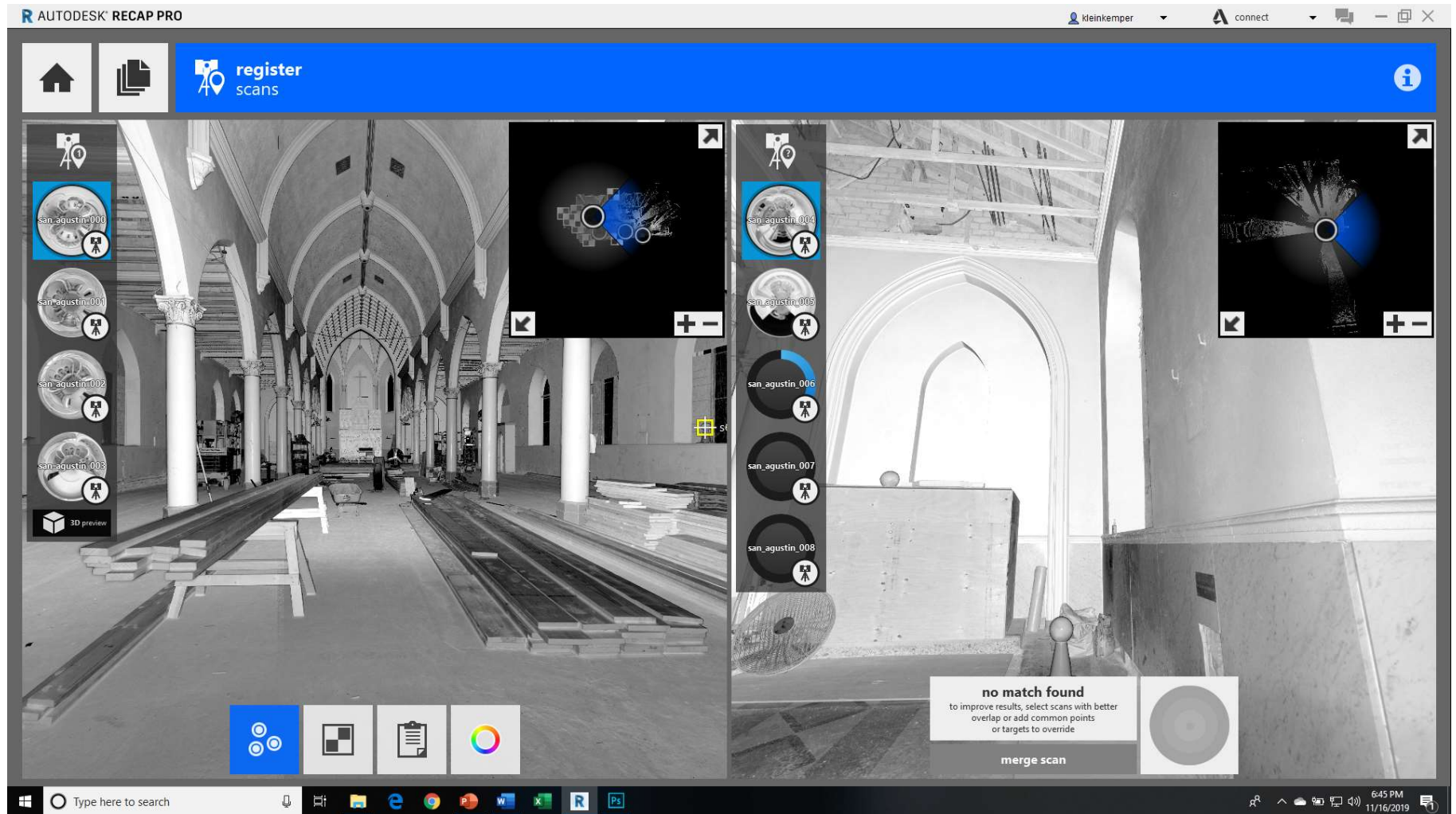
# Groupies!!!



## 3 point selection

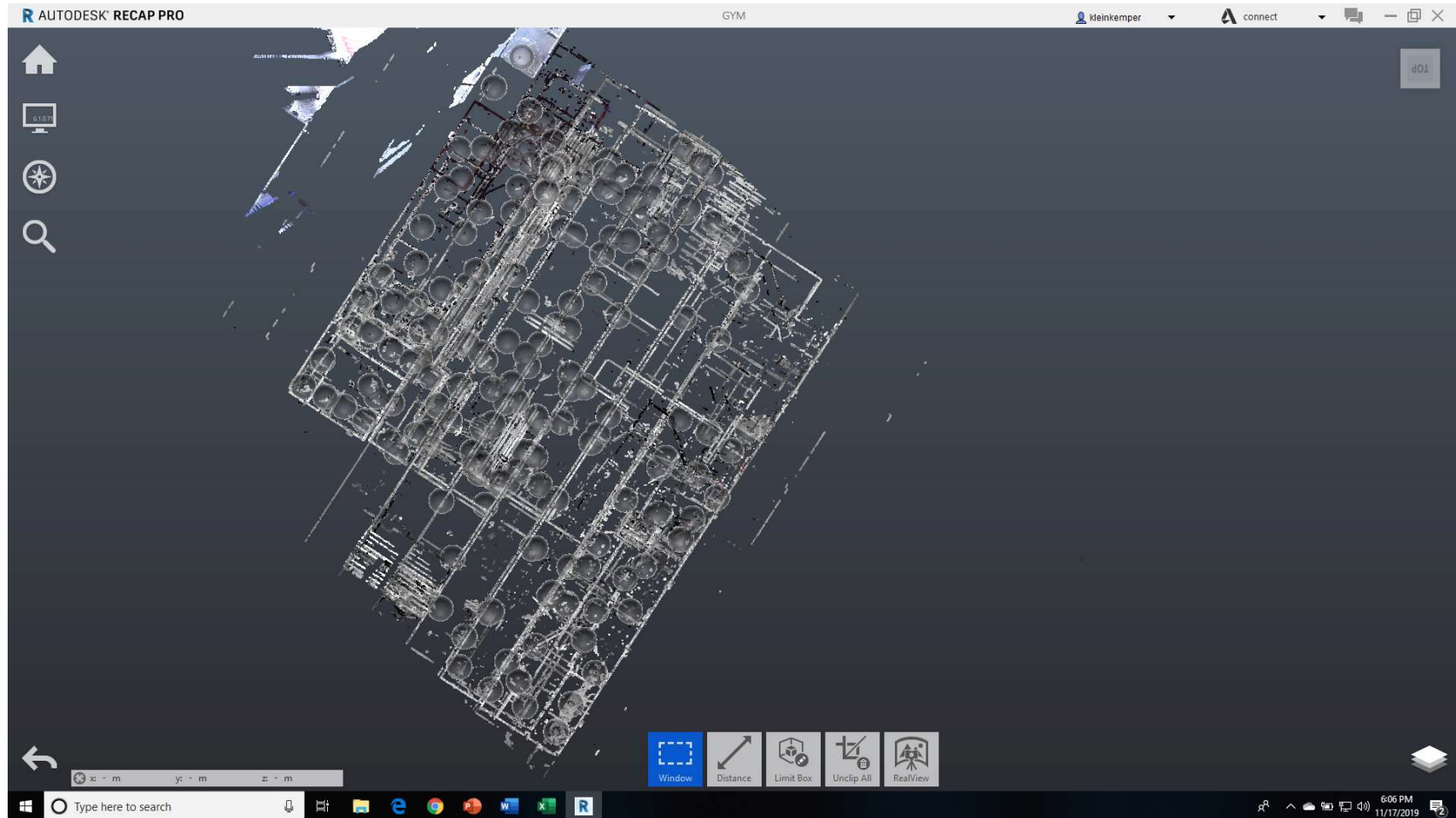
- Select points based on XYZ
- Spread points out to avoid unusual rotations
- Keep points under 10M or 30'
  - IF you set your scanner resolution for 5mm at 10m – 120m out your point spread is 60mm
  - IF your from the USA and set your scanner for  $\frac{1}{4}$ " at 30' – at 360' out your point spread is 3"

# 3 point selection - XYZ





# What happens when you only select X but not Y

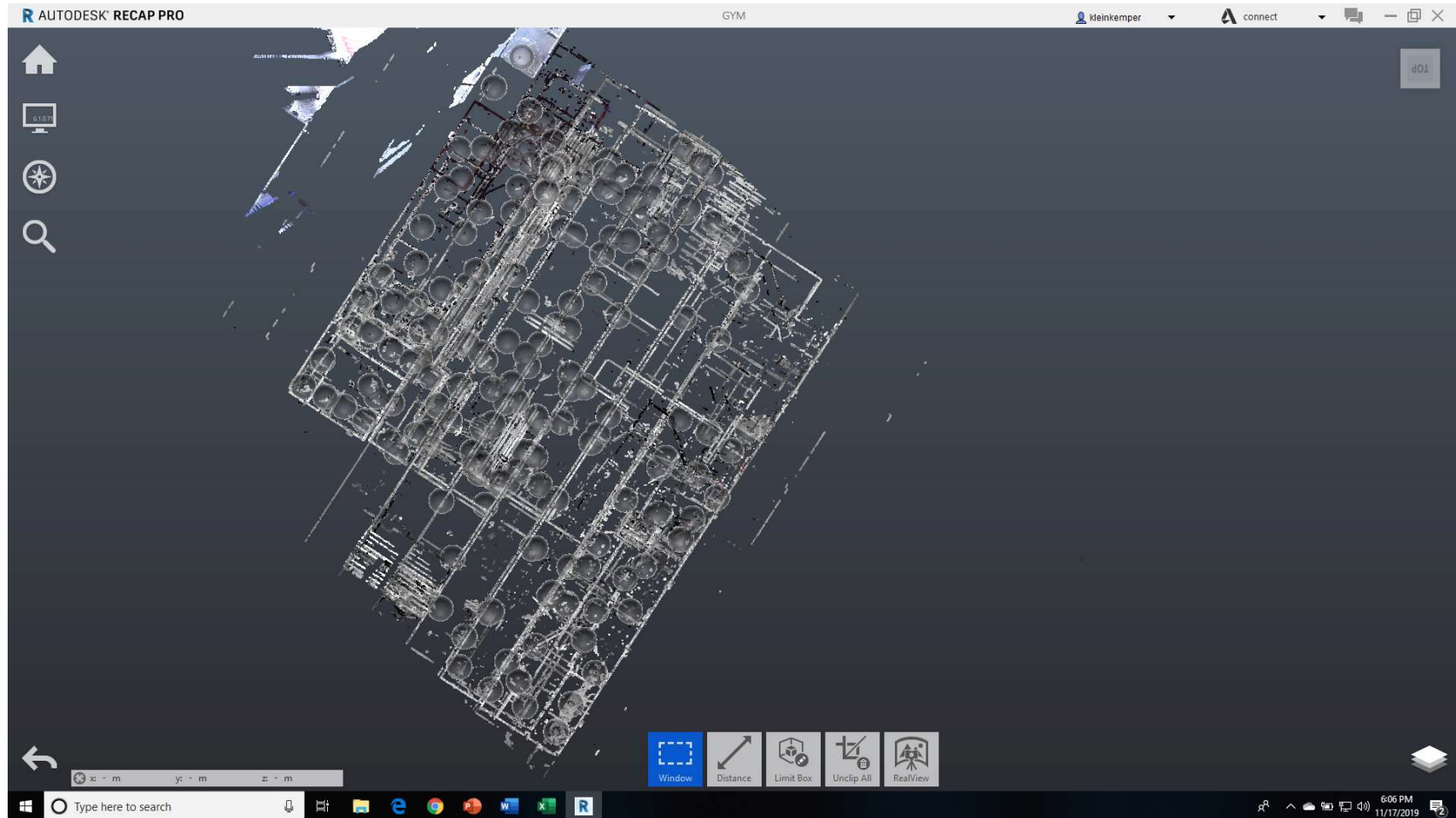


# What happens when you only select X but not Y





# What happens when you only select X but not Y



# Structured Data vs Unstructured

- Structured - Terrestrial

- Faro (on a tripod)
- Leica (on a tripod)
- Z+F (on a tripod)



- Unstructured – Mobile

- Dot Product
- GeoSLAM
- Paracosm
- Leica Pegasus

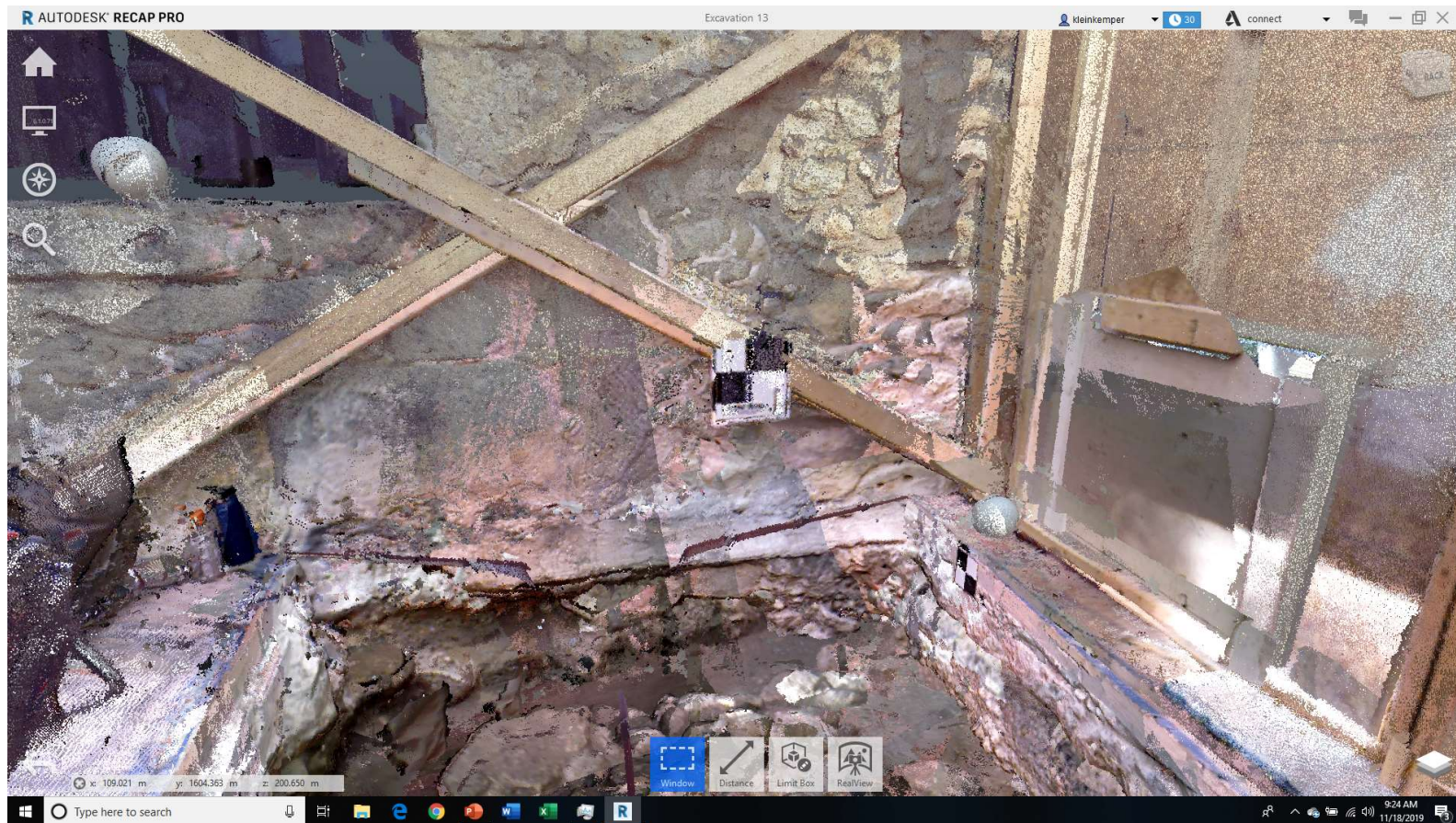


**NOT ACTUAL SIZE!**  
**May Appear bigger in Mirrors!**



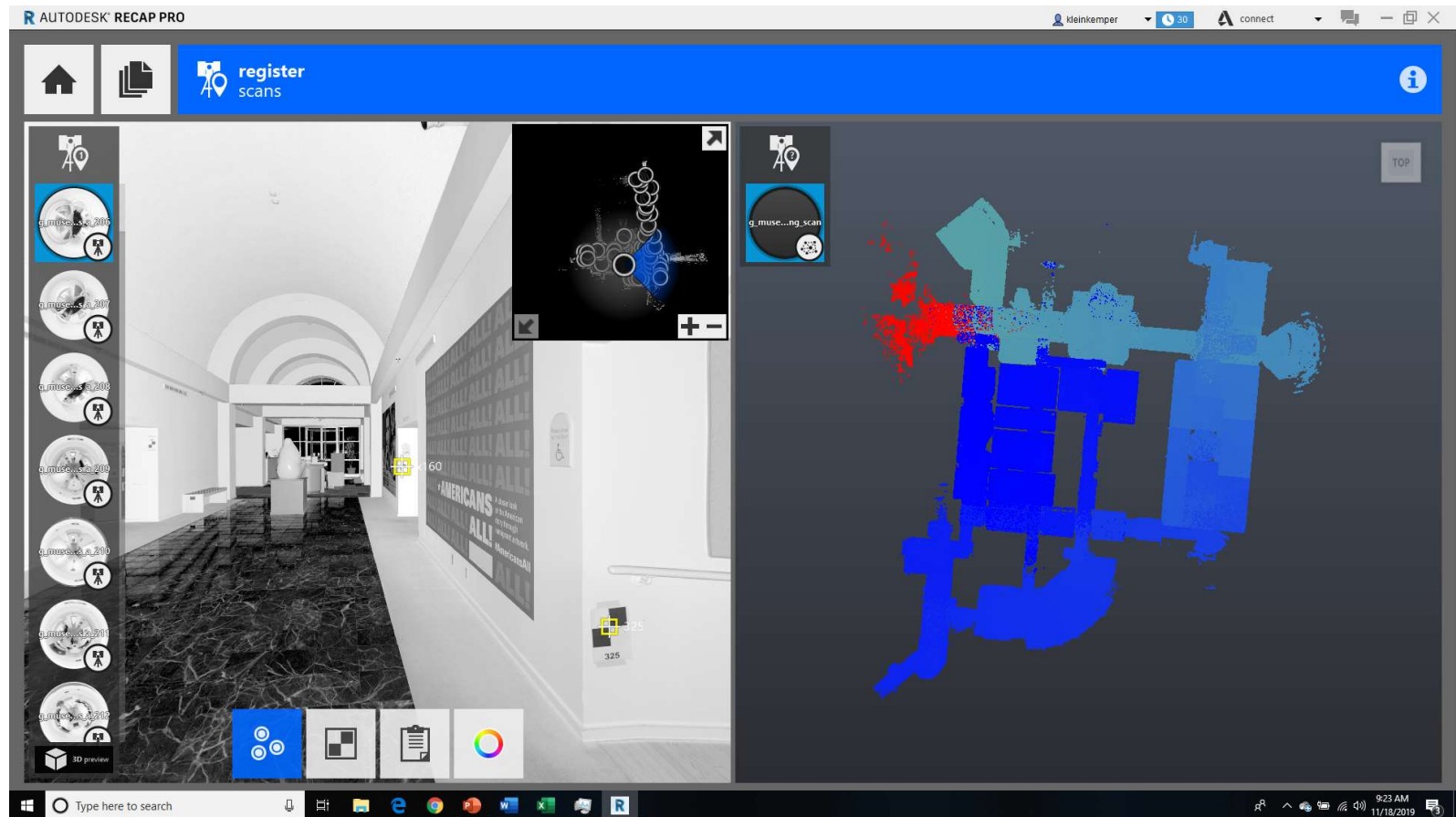


# Structured Data vs Unstructured Excavations w/ Z+F and Dot Product



# Structured Data vs Unstructured

## Museum Faro and GeoSLAM



# Targets

- Classic Checkerboard – but how accurate is it really?
- Spheres – Expensive to cheap options
- Prisms
- Points on the ground
- 3 point selection - look for Fingerprints

# Adding Control

- Difference between Survey Control and Scanning Control
  - How to clear the control
  - How to manually add
    - Meters vs Imperial – Bug #2
  - How to add from a csv file



## What is indexing???

	A	B	C	D	E	F	G	H
1	ID	X ( Easting)	Y (Northing)	Z (Elevation)	Intensity	Red	Green	Blue
2	301	####	###	###	####	###	###	###
3	302	####	###	###	####	###	###	###
4	303	####	###	###	####	###	###	###
5	304	####	###	###	####	###	###	###
6	305	####	###	###	####	###	###	###

# Color vs BW Scans

Color = XYZ + an Intensity Value + RGB

It is nearly double the file size of BW = XYZ + an Intensity Value

It won't help you find the walls any better!

We only use Color when it is:

1. Marketing – The beauty shot!
2. Plant rooms with color coded pipes
3. The client says too and is willing to **PAY** for it!

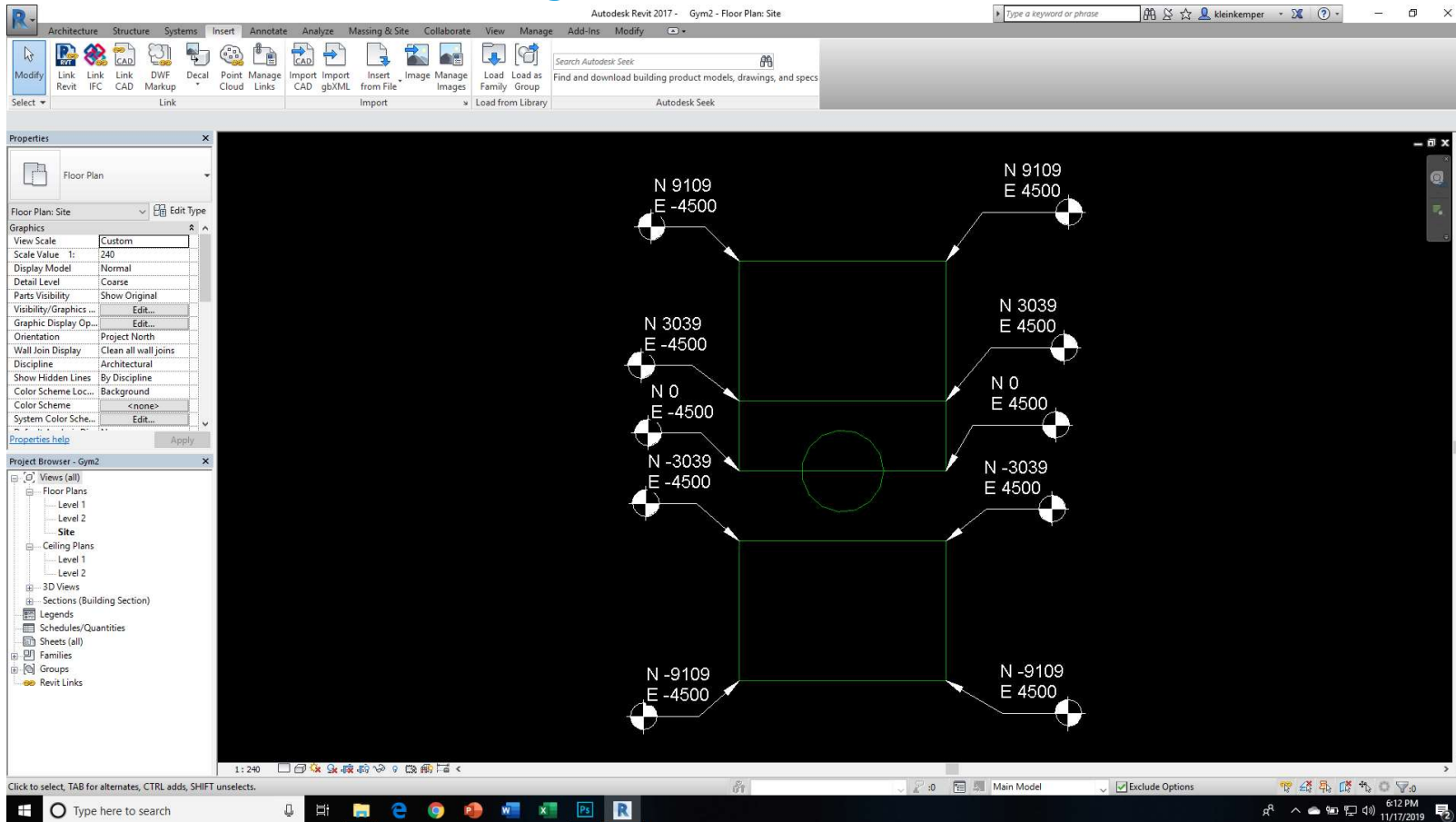


Checking your work in plan and section

## Revit – Adding point clouds

## Checking your work in Revit

# Creating Coordinates in Revit



Add Coordinates in Recap

Re-import to Revit Origin to Origin

# Questions

- Is a point cloud from a drone – Structured or unstructured?
- What is the most important part of the Scanner?
- What is the most important part of registration software?
- Which is more accurate a sphere or checker board?
- Is a Faro scanner on a tripod – Structured or unstructured
- What is the maximum number of scans you should add to 1 registration
- When should you use Color Scanning?

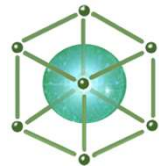
## MOST IMPORTANT 3 THINGS TO KNOW

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And please visit us at  
[LanmarServices.com](http://LanmarServices.com)



**LANMAR SERVICES**  
3D LASER SCANS TO READY TO USE BIM