

Walk-in Slide: AU 2014 Social Media Feed

1. Click on the link below, this will open your web browser

<http://aucache.autodesk.com/social/visualization.html>

2. Use “Extended Display” to project the website on screen if you plan to work on your computer. Use “Duplicate” to display same image on screen and computer.

CO5712

Merging the Model with the Field:

3 Applications for Model-Based Layout & As-BUILTs

Scott Cloud & Shawn Mancill

Brasfield & Gorrie

+

Cathi Hayes & Carl Singleton

Leica Geosystems

Class summary

This class will explore the use of [Autodesk Point Layout](#) software on three (3) [real-life construction projects](#) each highlighting different workflows: as-built documentation, self-perform concrete layout, and a quality assurance application. Beyond the exciting use cases, learn how to add construction layout points from the perspective of a contractor who self-performs concrete. You will learn how to add control points for aligning model data in the office and in the field; add points to Revit families and other components; and sort, filter, and edit points. You will learn how to prepare data for the field inside of [Revit](#) software so that data flows efficiently into the [Leica MicroSurvey Layout](#) field software that controls the Leica iCON robot. You will also learn how to add as-built points and bring them back into Revit software to assess deviations in the field.

Key learning objectives

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

- Add project control points in Revit software with APL
- Add construction layout points to Revit software families
- Prepare points data, plan underlays, and reference models for the field
- Send as-built points from the field back into Revit



FIRM OVERVIEW

BRASFIELD & GORRIE



**BRASFIELD
& GORRIE**
GENERAL CONTRACTORS

BRASFIELD & GORRIE, LLC



AUTODESK UNIVERSITY 2014

AUTODESK

TRUE GENERAL CONTRACTOR

RESOURCES

- 274 superintendents
- 144 Field Engineers
- 115 Foreman
- 1640+ Field Employees
- 4,000+ Equipment Fleet



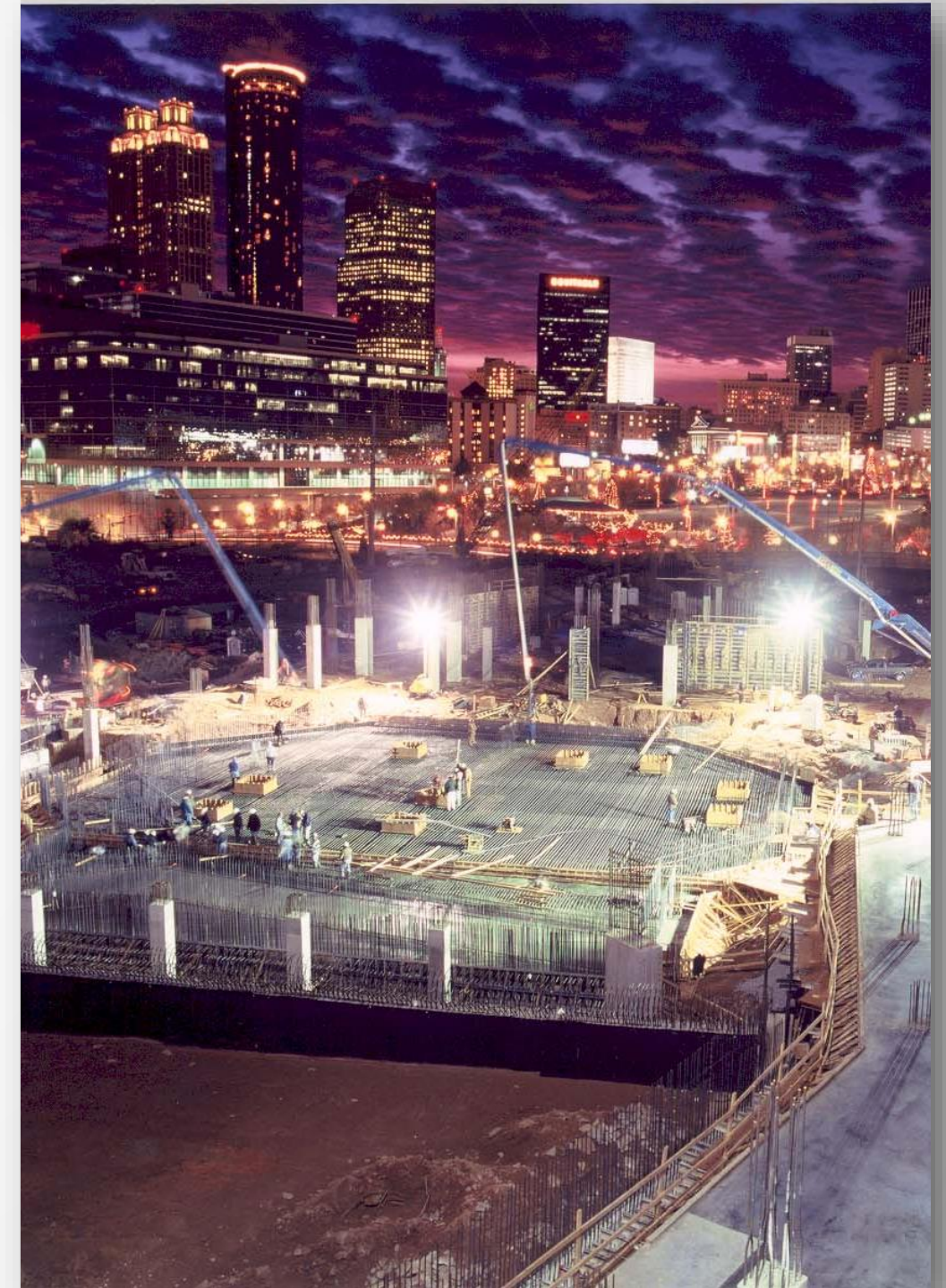
**BRASFIELD
& GORRIE**

1010 MIDTOWN

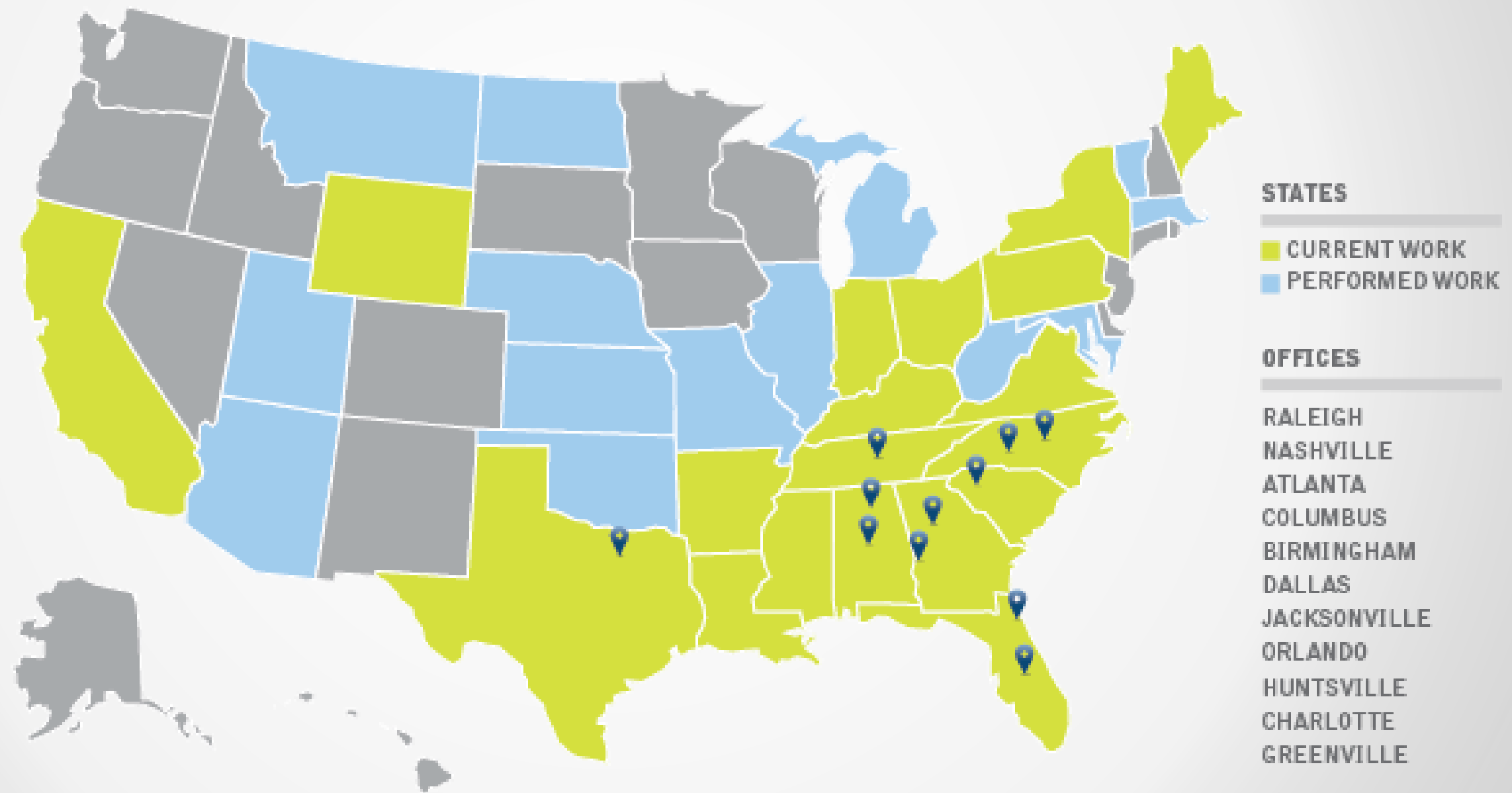
Print# 80206080
Date: 02/06/08

Aerial Photography, Inc. 954-558-0484

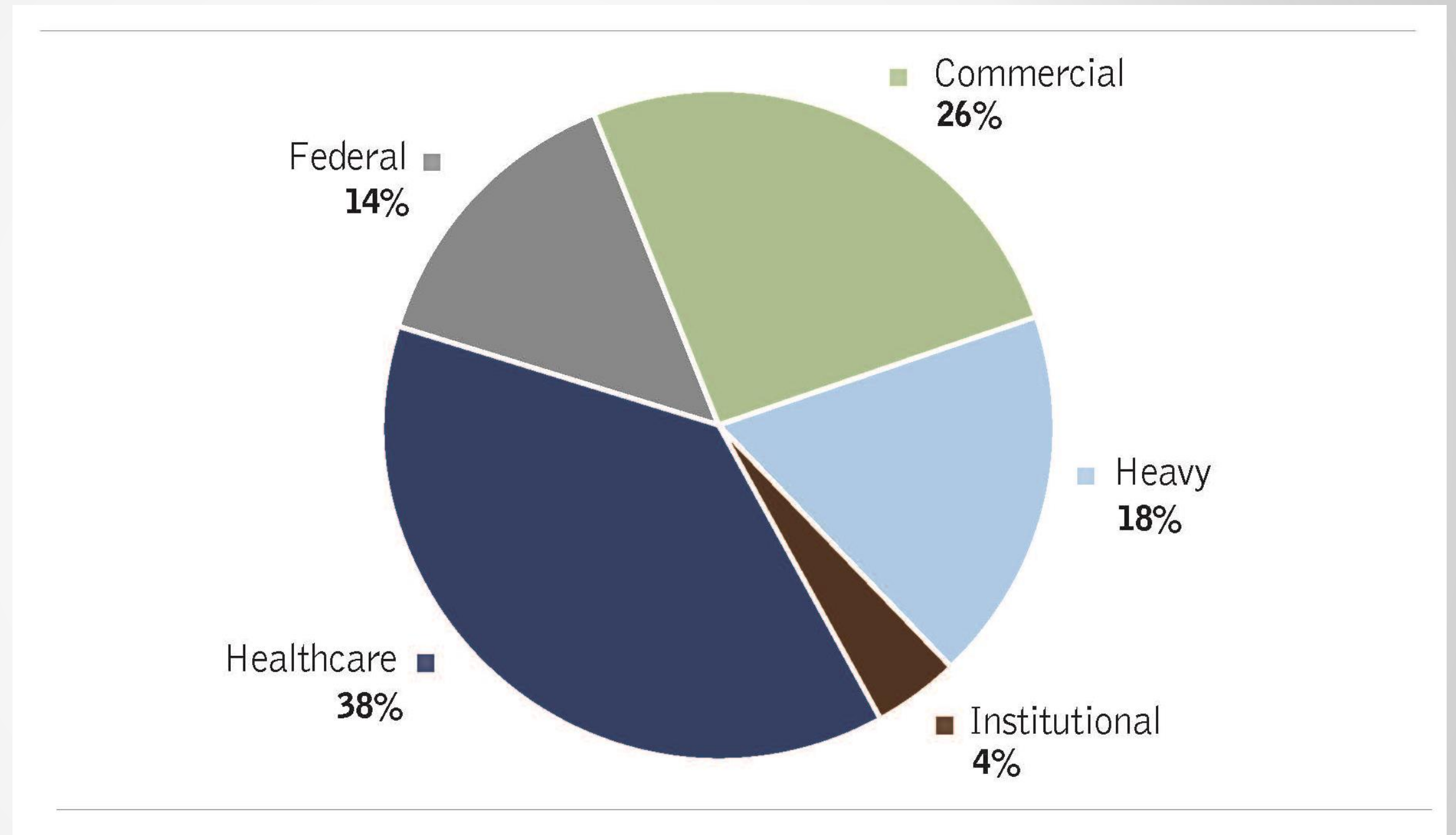
**5 million CY of concrete
poured since 2003**



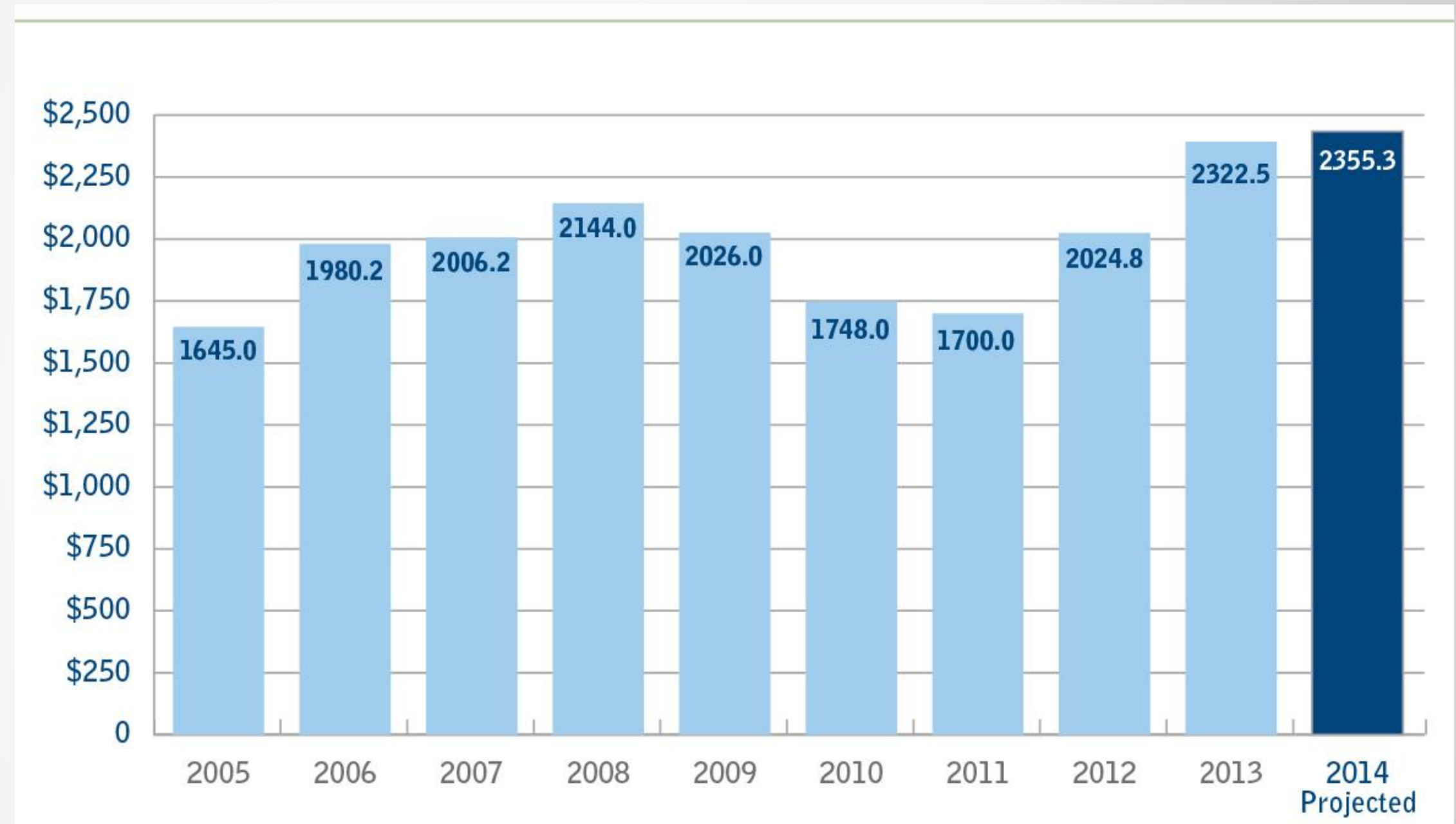
WHERE WE WORK



WORK MIX BY TYPE



GROSS REVENUES



Leica Geosystems – Pioneers in Measurement Technology

The background image is a composite. On the left, a woman with brown hair, wearing a dark blazer and a yellow patterned scarf, looks towards the camera. Behind her is an aerial photograph of a dense city, likely New York City, with many skyscrapers. Overlaid on the right side of the city image are two distinct data visualizations: a 3D point cloud or mesh of buildings in shades of blue and cyan, and a 2D topographic map with a color gradient from green to red, indicating elevation. The text 'Over 200 Years of Global Innovation' is centered over the city image in a large, white, bold font with a blue outline.

Over 200 Years of
Global Innovation

Leica
Geosystems

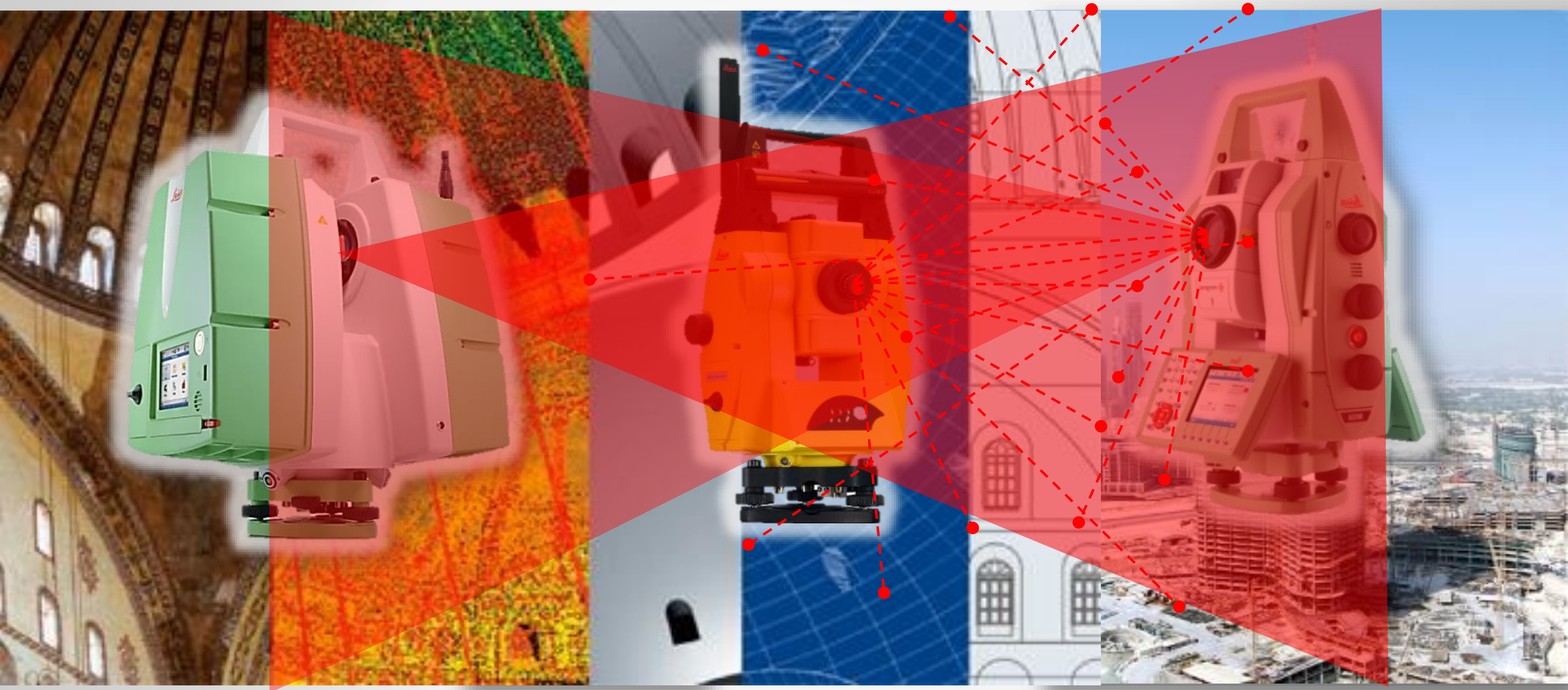
Leica Geosystems: Mission



Our mission
is to be **the** #1 supplier
of innovative solutions
to capture, analyze and
present spatial information and
take BIM to the field with
positioning technology.



Leica: A Rich History in Building Construction



Leica Geosystems– Worldwide Trusted Brand

Building Tall and Straight Around the World



World Trade Center
Tower 1
541m



432 Park Ave
428m



Al Hamra
412m



Burj Khalifa
828m



Commerzbank Tower
300m



Q1 Tower Gold Coast
323m



HEXAGON



Part of the Hexagon Family

- Hexagon – parent company of Leica Geosystems
- Hexagon has over 13,200 employees in more than 40 countries
- Net sales of about 2,400 MEUR (about 3 Billion US). Hexagon's share is quoted on the Stockholm stock exchanges.



Implementing APL

WHY

To merge the digital world with the physical

To eliminate duplicate efforts of “drawing” between the field and office and gain efficiency

To bring 3D visual abilities to layout process

KEY CONSIDERATIONS

1. Support utilization of current layout equipment
2. Keep responsibility for layout in the field, by Field Engineers
3. Integrate Field Engineers into VDC process



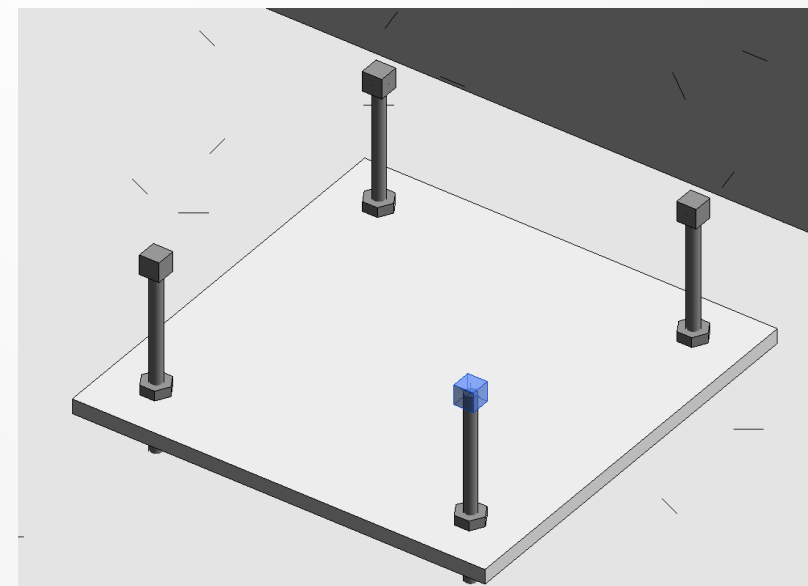
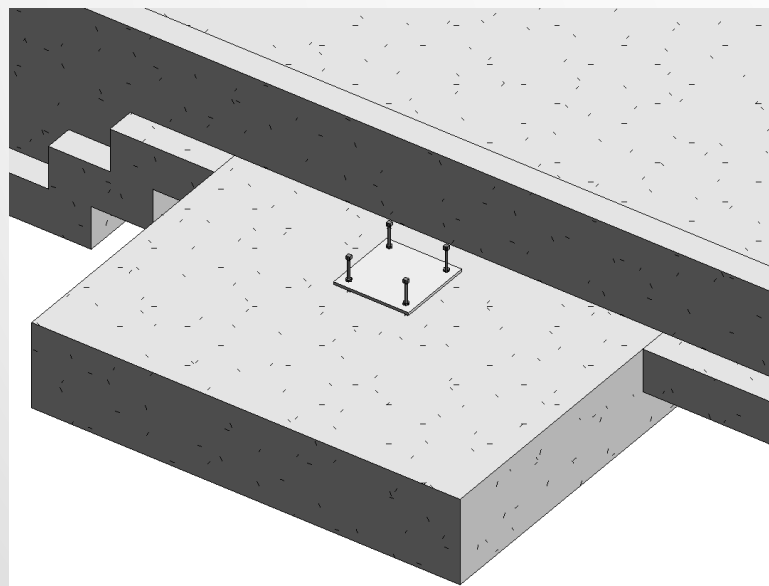
Bowen Administration Building

- Administration plant for Bowen Power Plant
- \$10m Construction Budget
- 40,000 SF – 3 stories
- 13 month schedule
- First project / case-use for APL



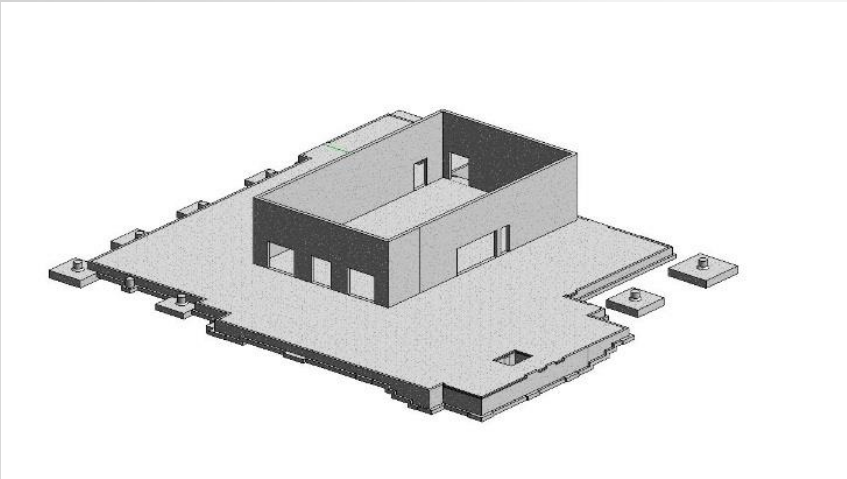
APL – Autodesk Point Layout Bowen Administration Building

- Anchor bolt back check using model and APL.
- Determined accuracy of points produced in Revit
- Validated calculated points from field engineer
- Overlaid as-built points with modeled points in Revit

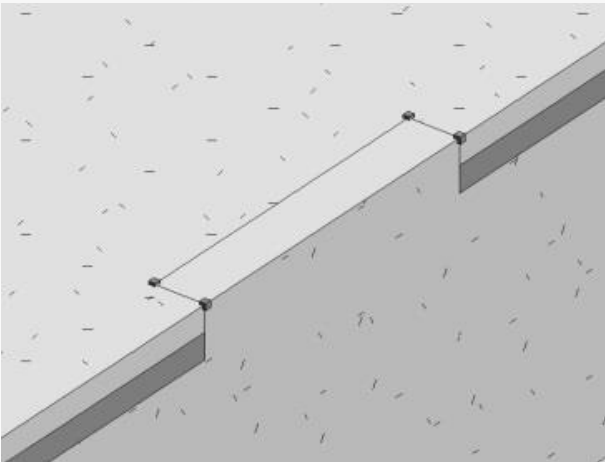


GTP Duct Pt	
Generic Models (1)	Edit Type
Constraints	
Host	Footing-Rectangular-QTO :...
Offset	0' 9 1/2"
Moves With Nearby Eleme...	<input type="checkbox"/>
BG Phase	
Construction	
BG Area	
BG Pour Sequence	
Dimensions	
Volume	0.00 CF
Identity Data	
Comments	
Mark	
Phasing	
Phase Created	Project Completion
Phase Demolished	None
Other	
PointRole	Stake Out
PointNumber	2120
PointElement	
PointDescription	Anchor Bolt

APL – Current Workflow



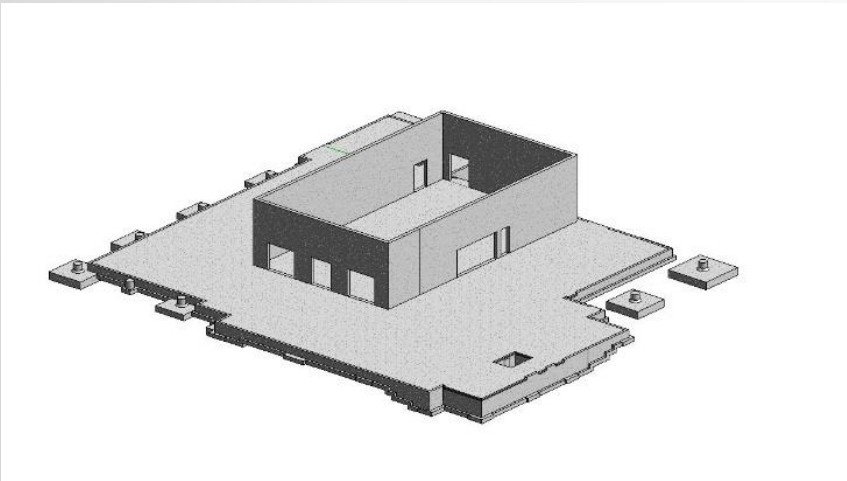
VDC Builds Model



VDC Applies Points



Field Engineer Performs Layout/ As-Built



VDC Updates Model



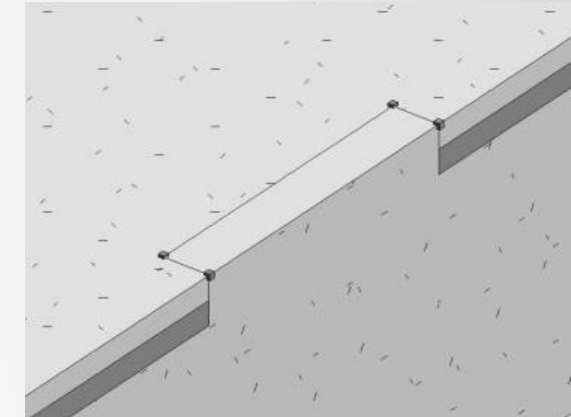
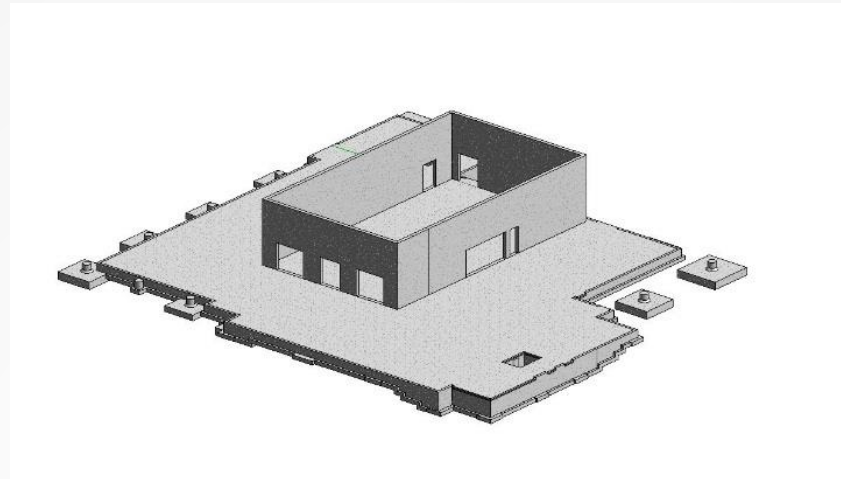
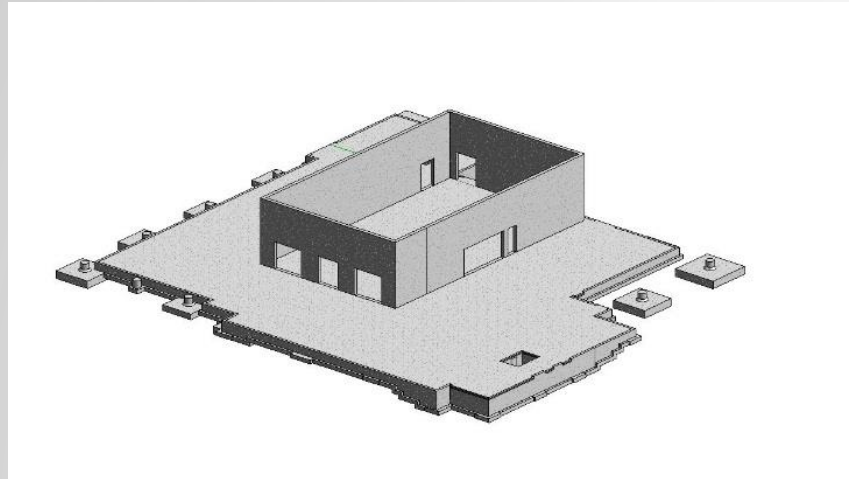
POINT NU	Y	X	Z	DESCRIPTION
CP1	3.018904	19.27166	5.359375	Control Point
CP2	14.69078	-19.9992	5.395833	Control Point
DR1000	-9.14255	-0.04604	7.25	
DR1001	-9.14255	3.280481	7.25	
DR1002	-9.14255	-8.45007	7.25	
DR1003	-9.14255	-5.12851	7.25	
DR1004	15.19078	-8.41364	7.25	
DR1005	15.19078	-5.0825	7.25	
DR1006	15.19078	-0.05593	7.25	
DR1007	15.19078	3.271664	7.25	
DR1008	15.19078	8.093159	7.166667	
DR1009	15.19078	14.42271	7.166667	
CB2000	-8.13476	-19.9158	8.015625	
CB2001	14.19599	-19.9158	8.015625	
CB2002	14.19599	-19.9158	1.080987	
CB2003	-8.13735	-19.9158	1.078437	

VDC Updates CSV



Process Repeats

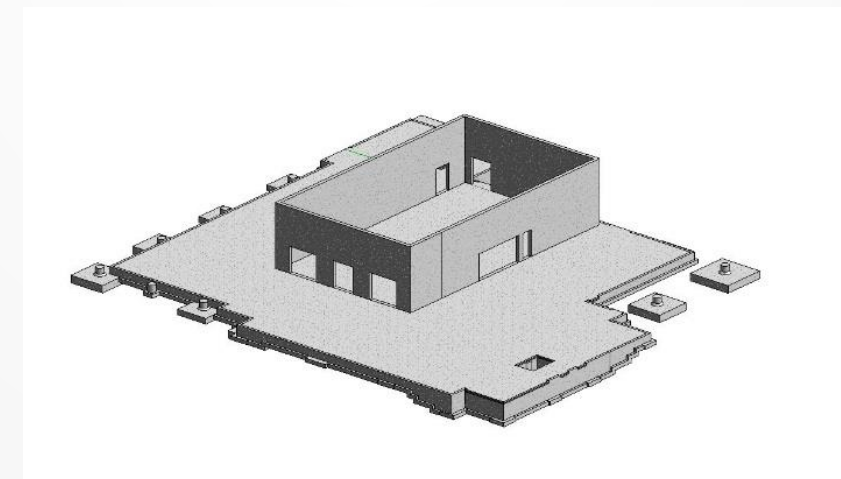
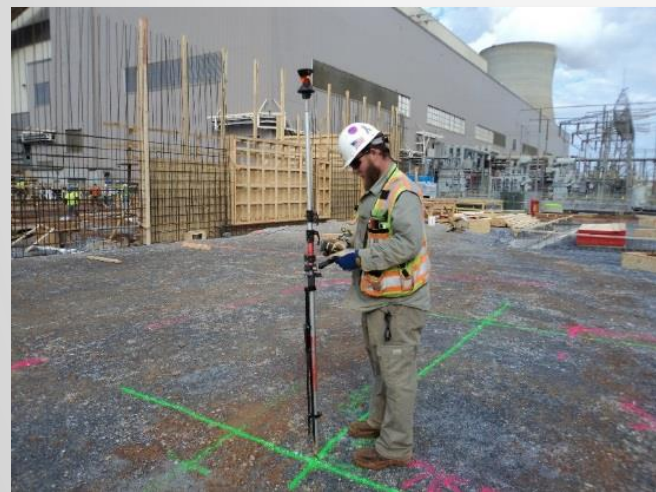
APL – Future Workflow



VDC/Self Perform Builds Model

Field Engineer Scrubs/Checks Model

Field Engineer Applies Points



Field Engineer Performs Layout/ As-Built

Field Engineer Manages Model

Process Repeats

Emory Proton Treatment Center

“A concrete box in the middle of the city”

- \$80m construction budget
- LDP – RFE = 22 months
- LDP – CO = 32 months
- LDP – 1st Patient = 38 months



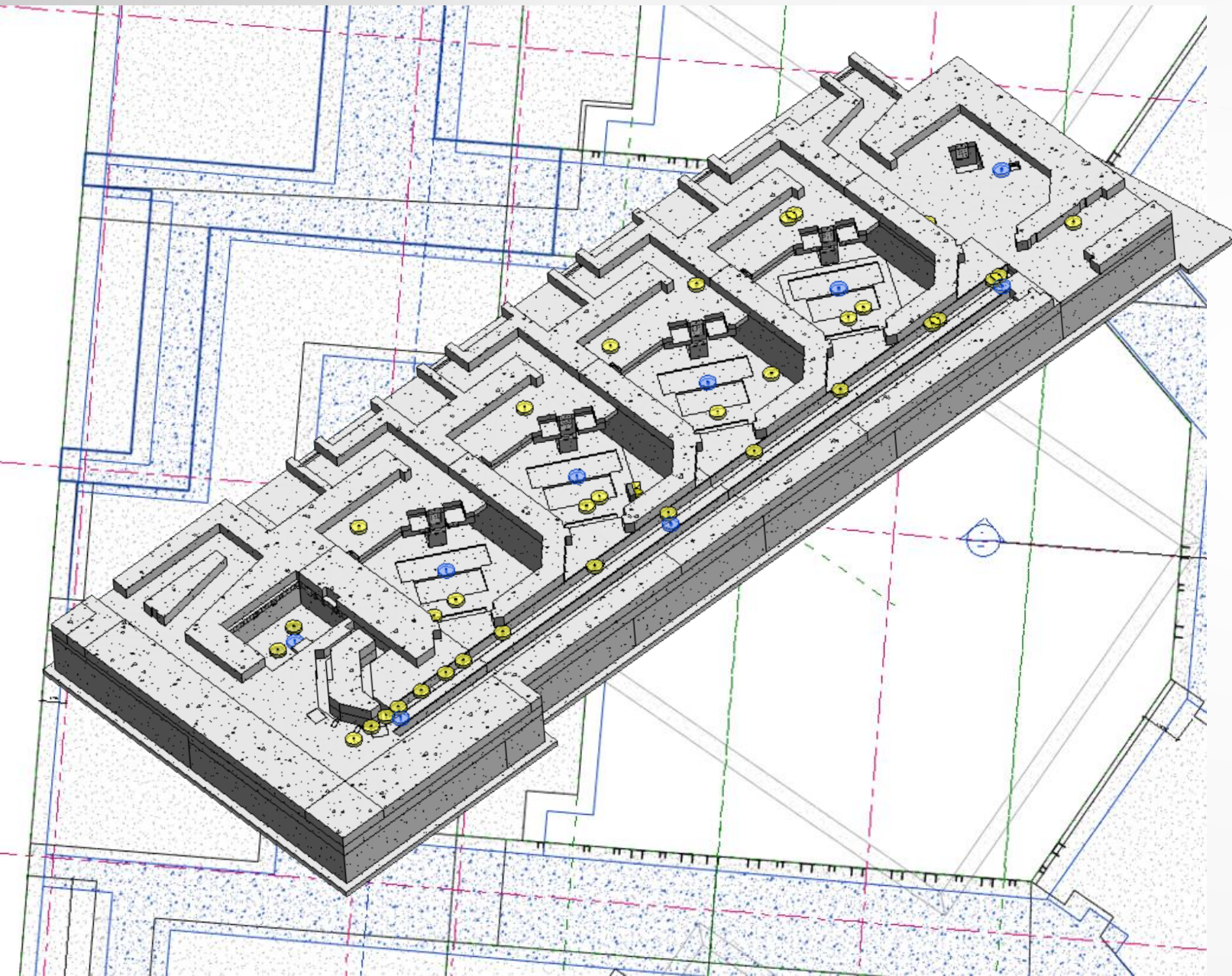
VOA





Emory Proton Treatment Center

“A concrete box in the middle of the city”



How was APL used?

- Hybrid Revit/APL & Carlson workflow from the Construction Concrete Model
- Utilized Revit/APL, Leca MircoSurvey Layout, & Cyclone for as-building & scanning post construction

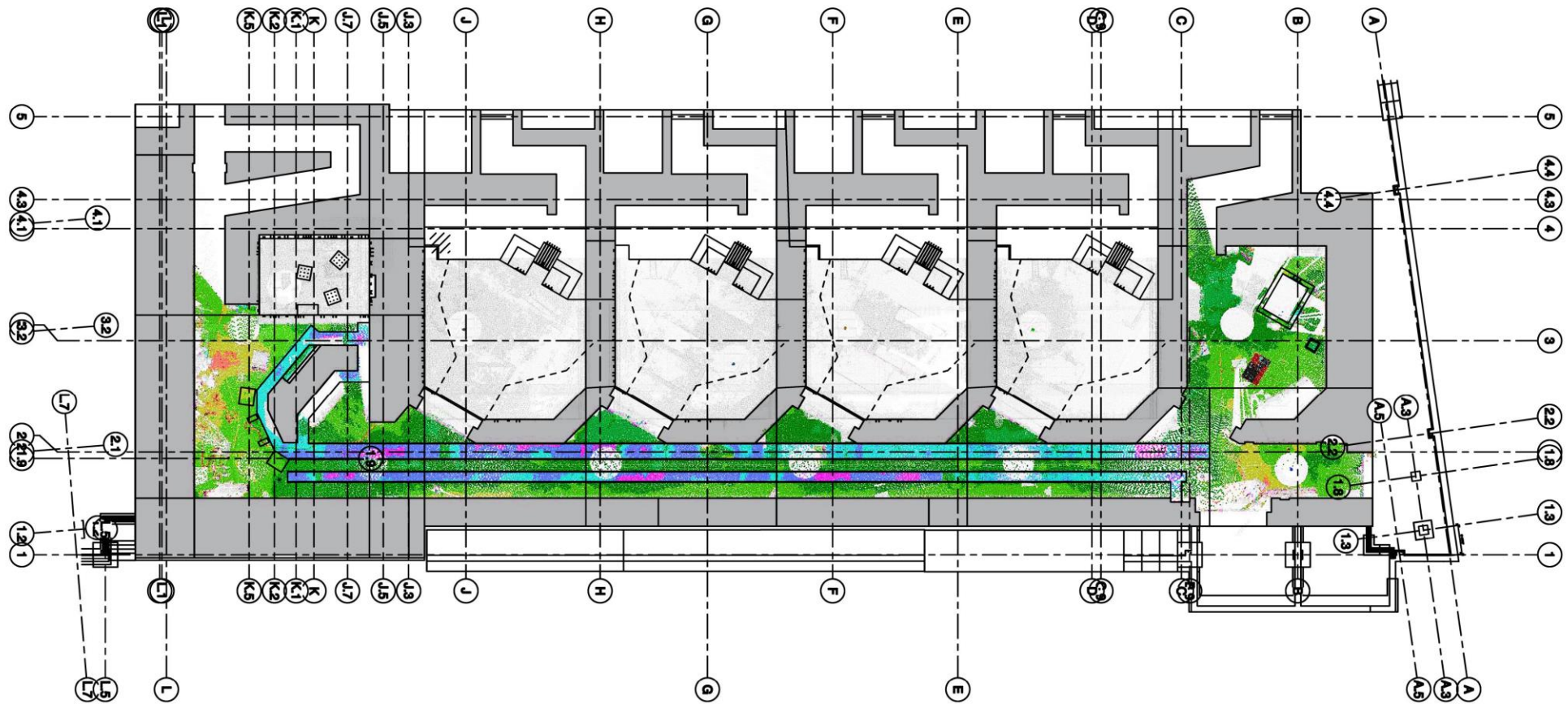
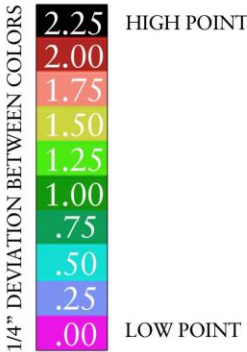
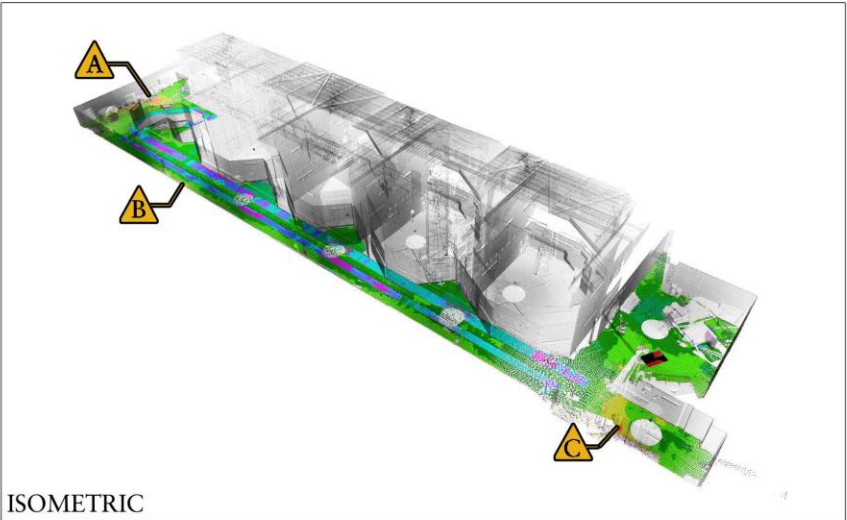
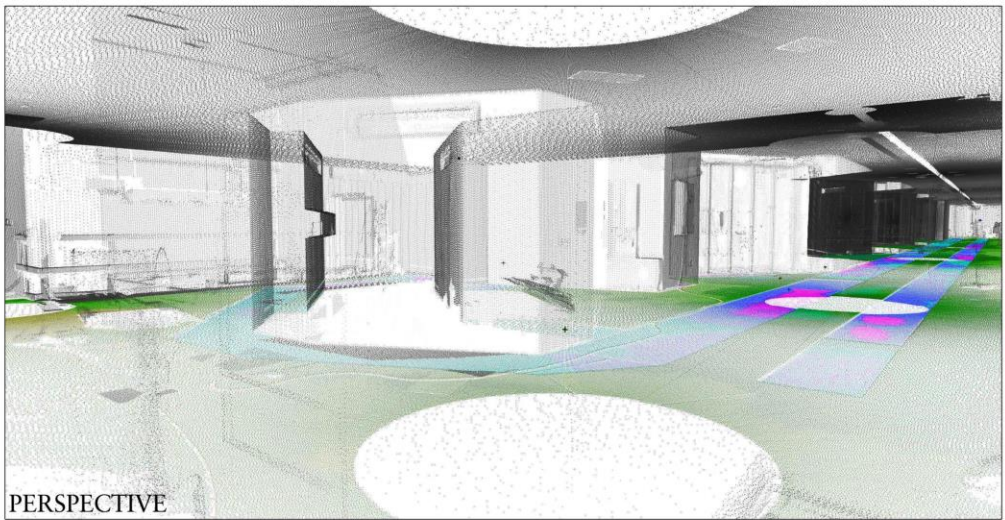
Georgia Proton Treatment Center

3/32" = 1'-0"

Revisions
08/07/2014

SLAB
DEVIATION
DIAGRAM

SD-1



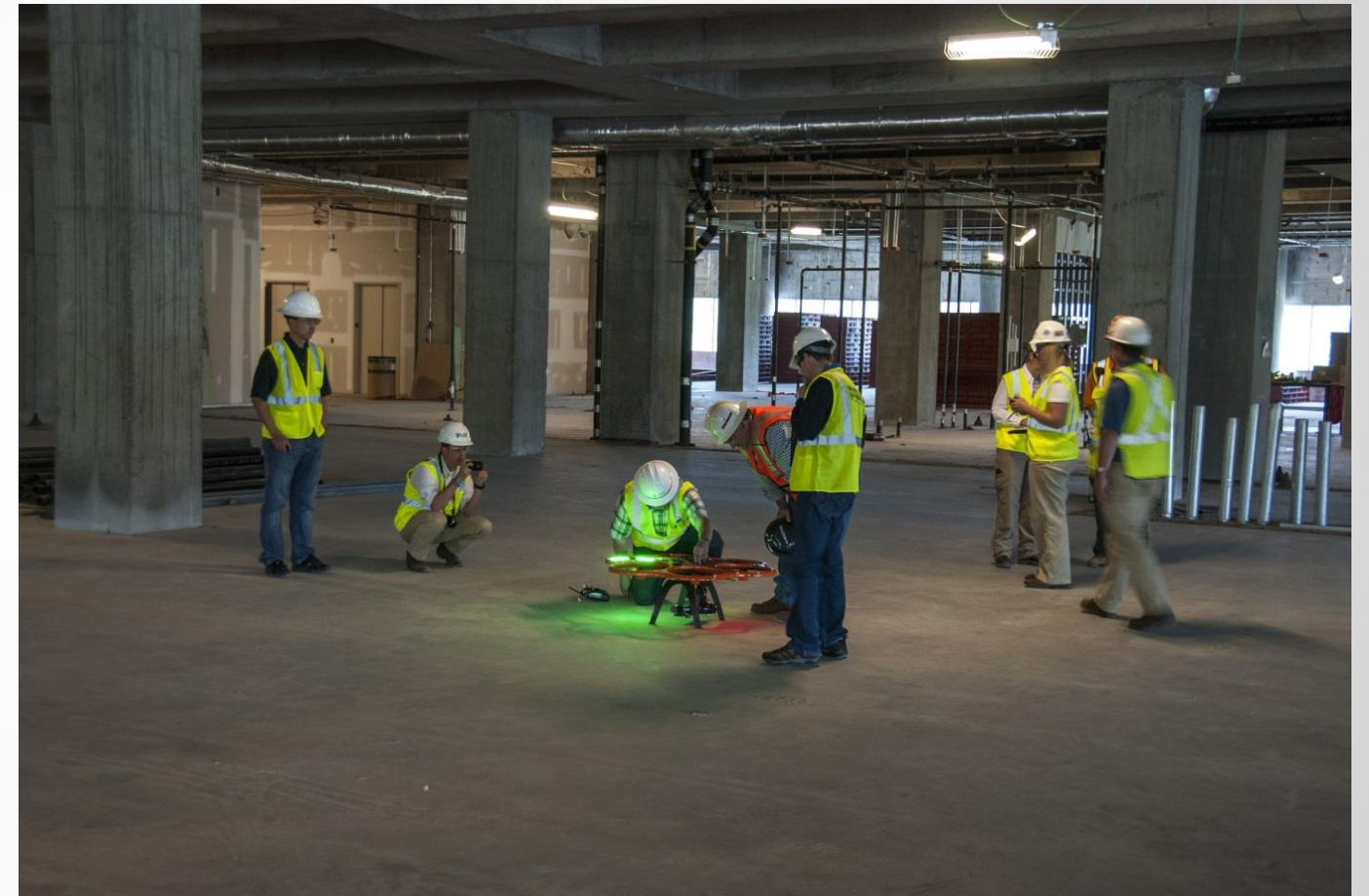
FLOORPLAN



APL – Autodesk Point Layout

Grandview Hospital Completion

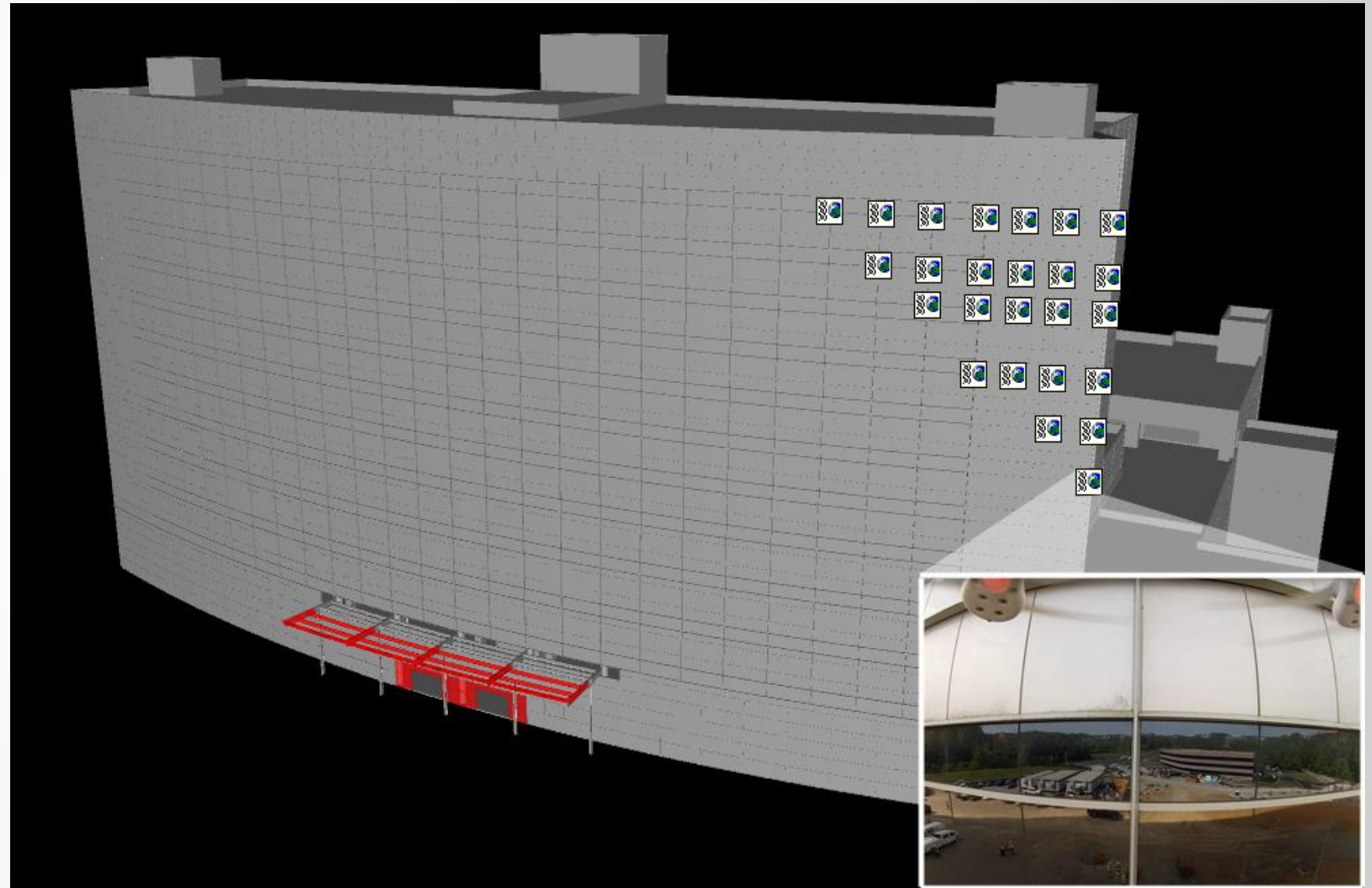
Adding Points and Pictures



APL – Autodesk Point Layout

Grandview Hospital Completion

Adding Points and Pictures



Live Demonstration



Export Data: DXF and csv from Revit / APL



Autodesk Revit 2015 - Not For Resale Version - 34X72 Presentation Room_ACAD Underlay_TS Layout_2_2015.rvt - Floor Plan: Level 1

Architecture Structure Systems Insert Annotate Analyze Measure & Site Collaborate View Manage CloudWorx Leica Autodesk Point Layout Modify

Control Pts Room Points Ceilings Ceilings
Manual Pts Wall Points Face Points Face Points
Floors/Slabs/Footings ModelLine Points ModelLine Points

Export Pts Import Pts Search/Re Export Pts
Manage Pts Compare Pts Renummer Points
Zoom Pts Locate Duplicates Add Pt Tags
Settings Edit AutoMap Edit CodeMap
Conduit Points Pipe Points
Locate AsymWalls
Extrusion Points Cleanup Family Setup Point Nesting
Export Parameters Import Parameters
Create Coord Create DXF/DWG Select Points
Grid Offset Report Connect Points Modify Points
Slab Analysis Point Cloud Analysis

Help About APL

Project Browser - 34X72 Presentat... x

- Views (all)
- Floor Plans
 - Level 1
 - Level 2
 - Level 03 - T.O. Basem
 - Level 04 - T.O. Fnd. W
 - Roof
 - Site
 - TS Height
- Ceiling Plans
 - Level 1
 - Level 2
- 3D Views
 - 01 - Existing
 - 02 - Demo
 - 3D View 1
 - 3D View 2
 - 3D View 3
 - 3D View 4
 - 3D View 5
 - 3D View 6
 - 3D View 7
 - A10 - Substructure
 - B10 - Superstructure
 - B20 - Exterior Enclos
 - Back of Room_Frank
 - C10 - Interior Constr
 - C20 - Interior Finish
 - E20 - Furnishings
 - Perspective 3D
 - (3D)
- Elevations (Building Eleva
- East
- North
- South
- West

Legends

Schedules/Quantities

Sheets (all)

- 000 - Temporary Schedul
- 101 - Substructure
- 102 - Superstructure

Families

Project Browser - 34X7... Properties

1/8" = 1'-0"

18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z A B C D E F G H I J K K

Prism Pole A

Prism Pole B

Scanning Total Station w Wheels

Robotic Total Station

"Bob"

"Frank"



Export Data: DXF and csv from Revit



Autodesk Revit 2015 - Not For Resale Version - 34X72 Presentation Room_ACAD Underlay_TS Layout_2_2015.rvt - Floor Plan: Level 1

Architecture Structure Systems Insert Annotate Analyze Massing & Site Collaborate View Manage CloudWorx Leica Autodesk Point Layout Modify

Control Pts Manual Pts

Room Points Wall Points Floors/Slabs/Footings

Ceilings Face Points ModelLine Points

Export Pts Import Pts Search/Replace Desc

Manage Pts Compare Pts 1:2 Renummer Points

Zoom Pts Locate Duplicates Add Pt Tags

Settings Edit AutoMap Edit CodeMap

Conduit Points Pipe Points

Locate AsymWalls

Extrusion Points Cleanup Family Setup Point Nesting

Export Parameters Import Parameters

Create Coord DXF Create DXF/DWG Select Points

Grid Offset Report Connect Points Modify Points

Slab Analysis Point Cloud Analysis

Help About AP

APL MEP Tools Wall Tools Family Tools Bonus Tools

Project Browser - 34X72 Presentat...

Views (all)

Floor Plans

Level 1

Level 2

Level 03 - T.O. Basem

Level 04 - T.O. Fnd. W

Roof

Site

TS Height

Ceiling Plans

Level 1

Level 2

3D Views

01 - Existing

02 - Demo

3D View 1

3D View 2

3D View 3

3D View 4

3D View 5

3D View 6

3D View 7

A10 - Substructure

B10 - Superstructure

B20 - Exterior Enclosu

Back of Room_Frank

C10 - Interior Constr

C20 - Interior Finish

E20 - Furnishings

Perspective 3D

{3D}

Elevations (Building Eleva

East

North

South

West

Legends

Schedules/Quantities

Sheets (all)

000 - Temporary Schedul

101 - Substructure

102 - Superstructure

Families

18

17

16

15

14

13

12

11

10

9

8

7

6

5

4

3

2

1

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z A B C D E F G H I J K K

Export Points to File

Point Export Order:

- ☒ [Y,X,Z] : N,E,H
- ☐ [X,Y,Z] : E,N,H
- ☐ MEP Layout [Y,X,Z]
- ☐ Scene Targets

Point Selection

- ☒ Select All
- ☐ Select Some

Output Units:

- ☒ Decimal Feet
- ☐ Decimal Meters

General Options

- ☒ Export DXF file
- ☒ Check for Duplicate Point #'s
- ☐ Set Elevations to 100'
- ☐ Include Code column

Header Prefix: Extension: csv Delimiter: Comma Export Precision: 8

Coordinate System: Filter:

Export File Name: 34X72 Presentation Room_ACAD Underlay_TS Layout_2

File Location: D:\My Documents\2\01_BIM Business\04_Marketing\Evi

BIM 360 Field Create Issues BIM 360 Field Create Attachment OK Cancel

Scanning Total Station w/ Wheels

Robotic Total Station

Frank

1/8" = 1'-0"



Getting Points to the Field



iCON BIM
Robot 50/60



“Frank”



Nova MS 50



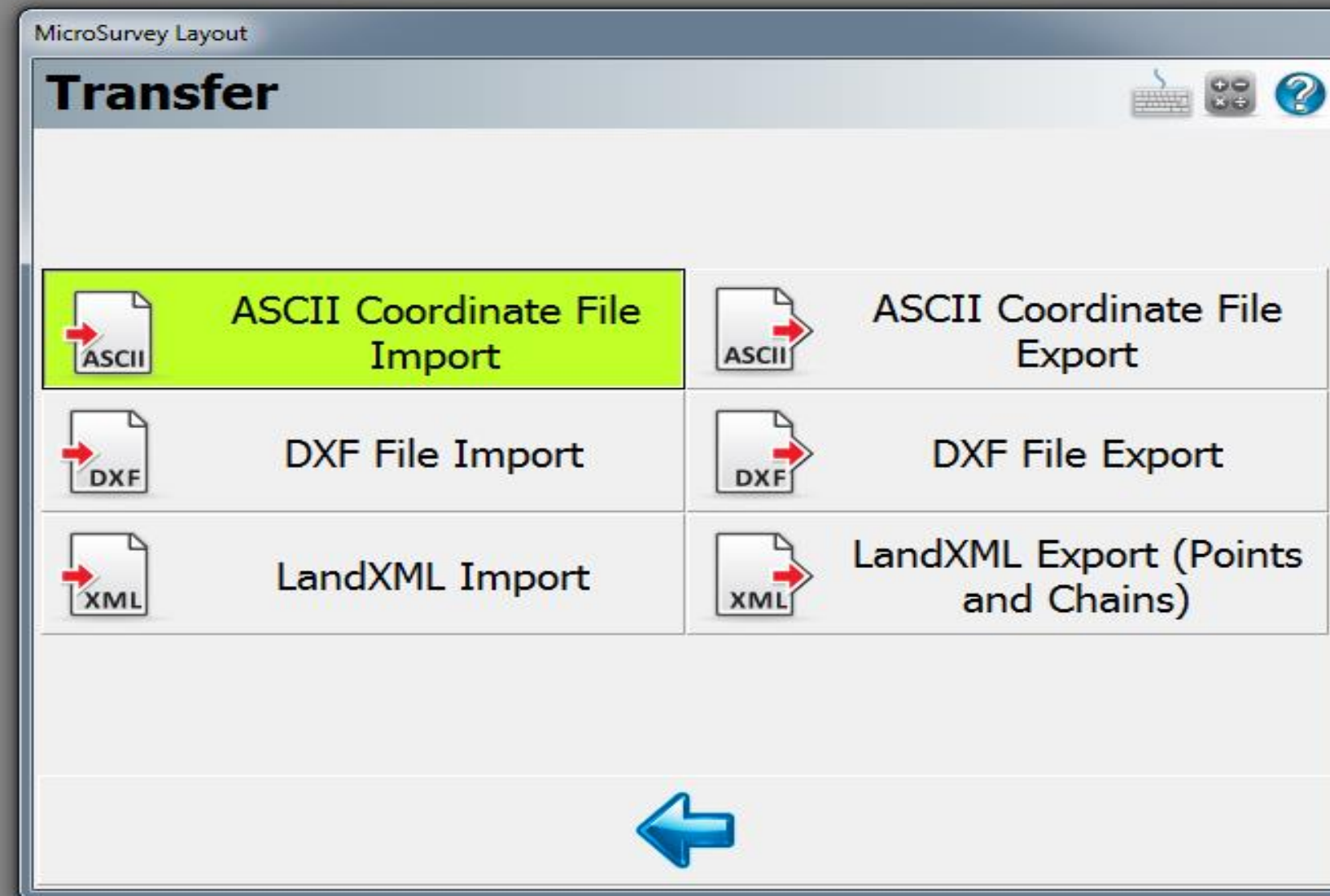
“BOB”

Leica
Geosystems

Open Data in Field Software: MicroSurvey Layout



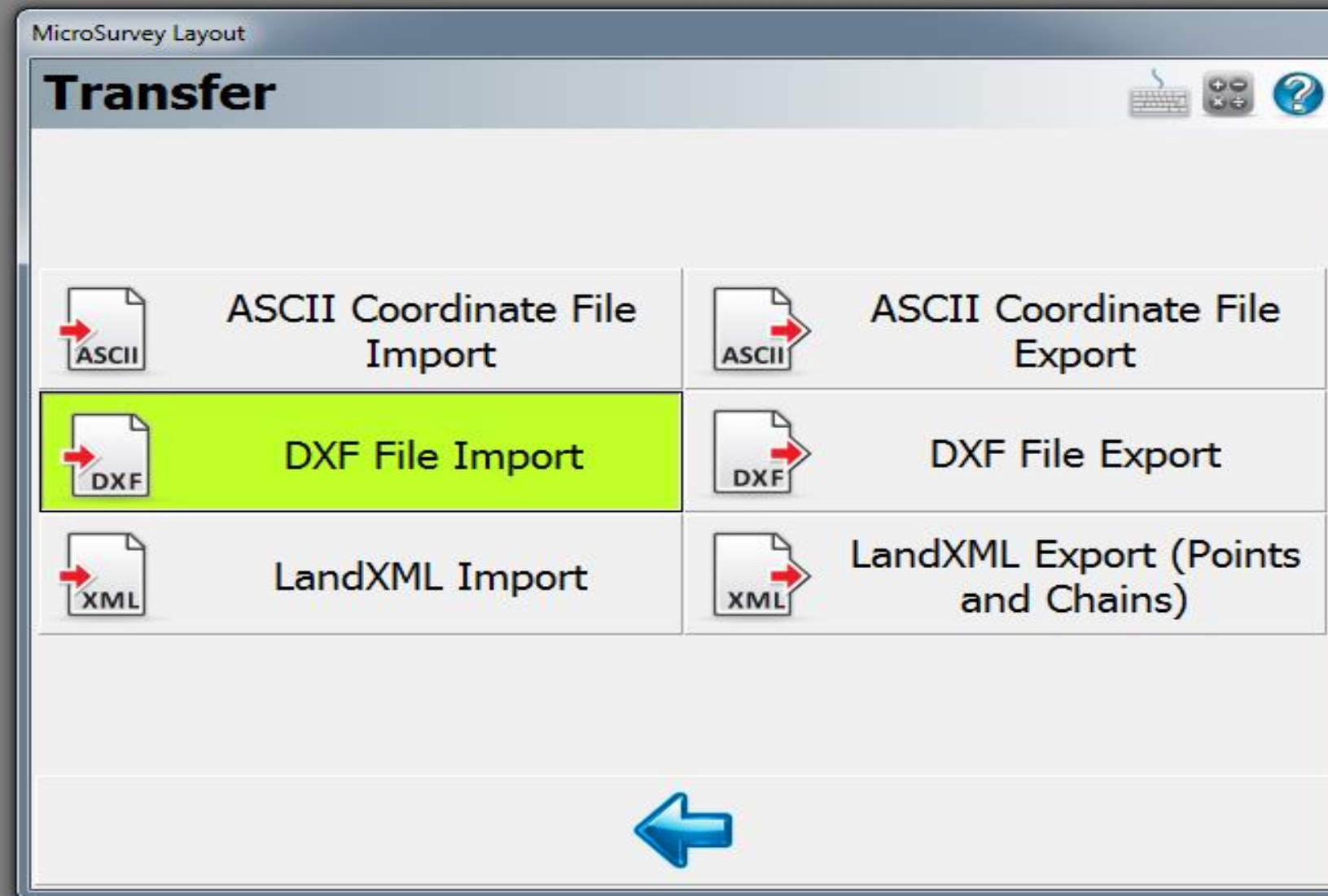
AU_2014_Layout - Layout



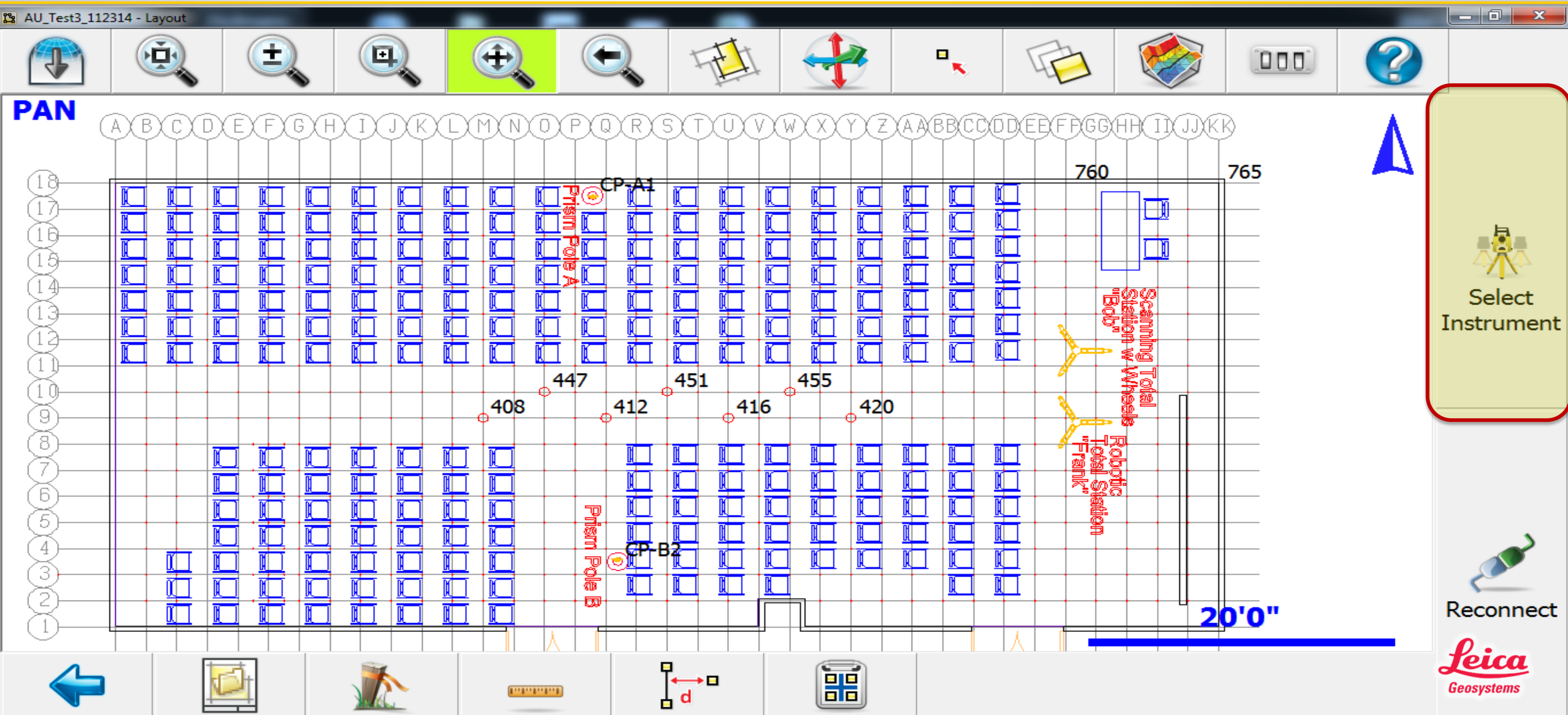
Open Data in Field Software: MicroSurvey Layout



AU_2014_Layout - Layout



Open Data in Field Software: MicroSurvey Layout



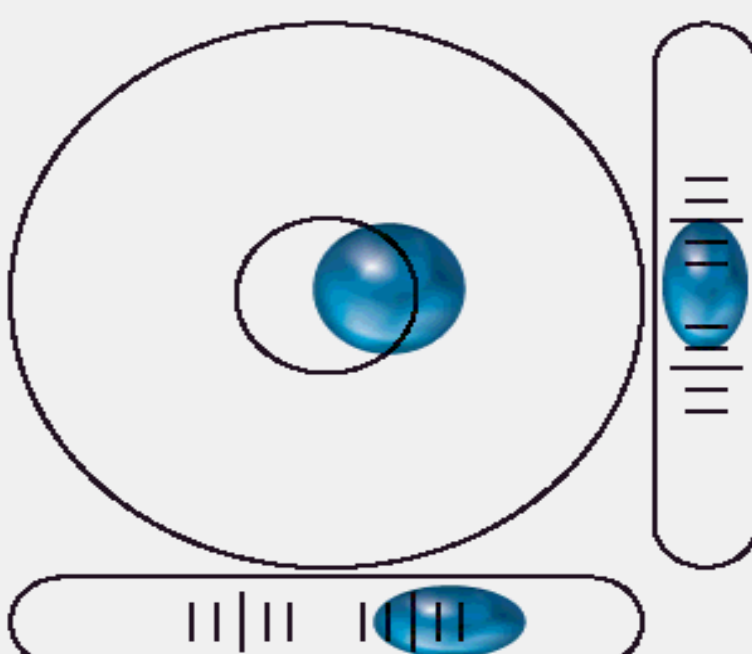
Connect to Robot: MS50 "BOB"



AU_Test3_112314 - Layout

MicroSurvey Layout

Level Instrument



Cross Inclination:
-0°02'27.5"


Length Inclination:
-0°00'16.0"

Sec/Div: 30"

Tolerance: 6'

Plummet: 100%

☐ Check Level Every Shot

 Continue

Select
Instrument

Reconnect

Leica
Geosystems



Connect to Robot: Select Measurement Type



AU_Test3_112314 - Layout

MicroSurvey Layout

Target Manager

 Backsight	 Foresight
Target:	<input type="text" value="MPR122"/>
Target Height:	<input type="text" value="6'0"/> <=
<input type="checkbox"/> Use Temp. Height:	<input type="text" value="0'0"/> <=
EDM Mode:	<input type="text" value="IR Standard"/>
Leica Constant: 28.1mm	

☒ OK Target List Default Settings ☒ Cancel

Leica
Geosystems







Orient Robot: Control Points



AU_Test3_112314 - Layout

MicroSurvey Layout

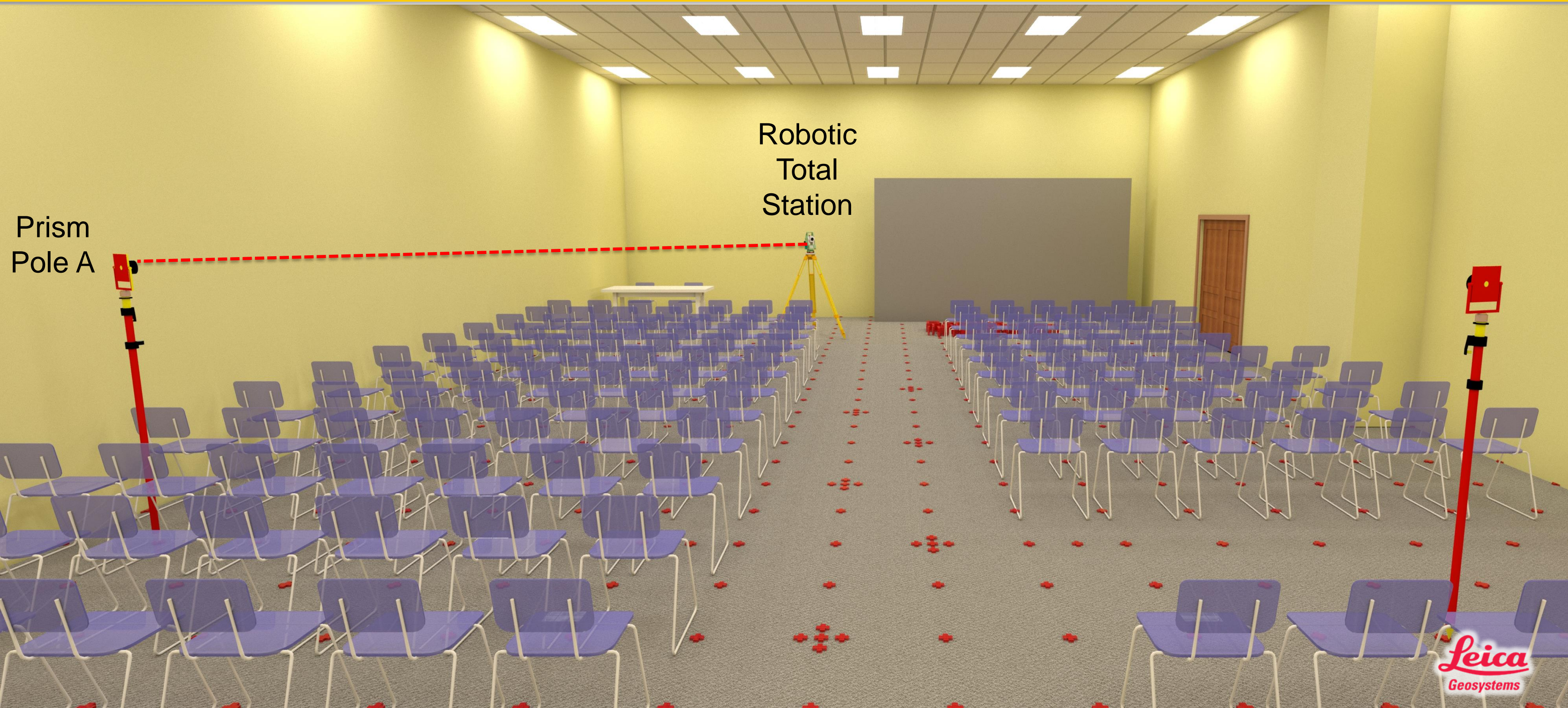
Select Measure Mode

	Measure Only (No Store)
	Occupy Point
	Ref Points
	Ref Line

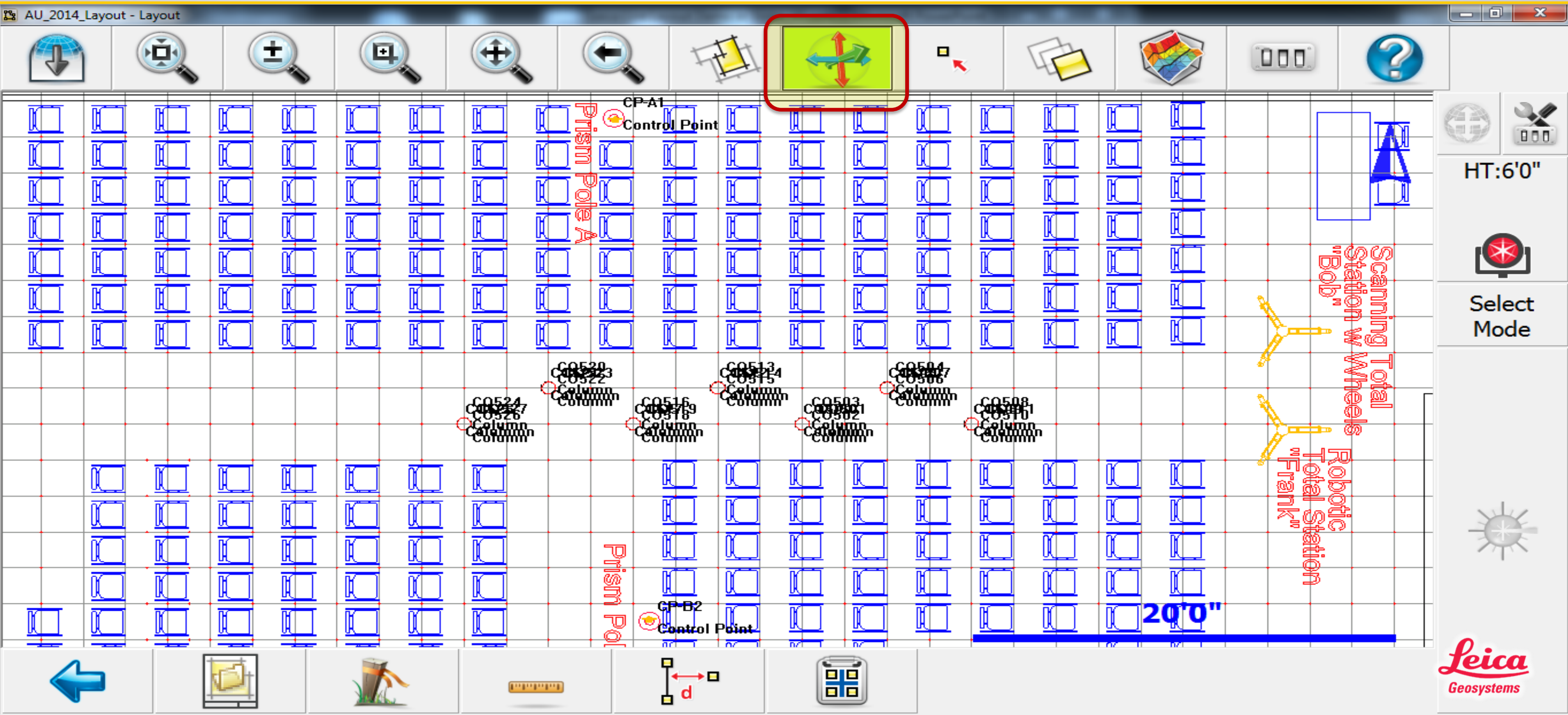
←


Leica
Geosystems


Step 1: Orient Robot Using Control Points




Orient Robot: Control Point A




HT:6'0"


Select Mode

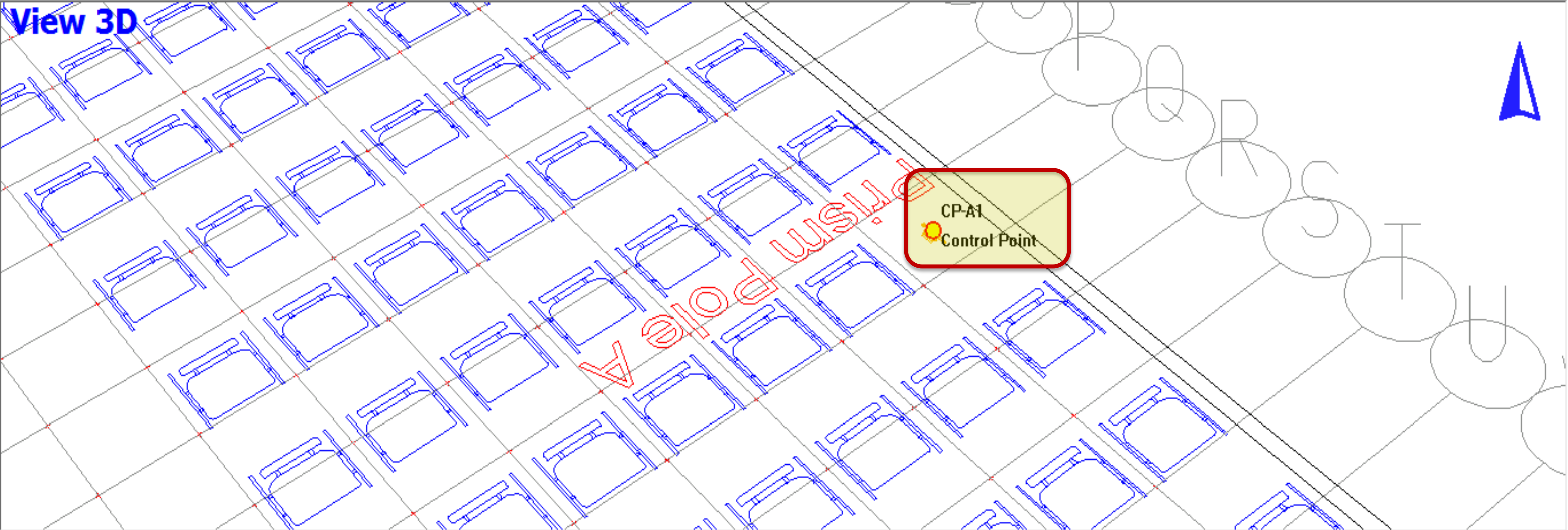




Orient Robot: Control Point A



AU_Test3_112314 - Layout



Trk



HT:6'0"
IR Std



Reset
(Ang/Dist)



Leica
Geosystems

Please select point and take measurement.



Store Point



Close

Observed Point

Instrument Height

CP-A1

0'0"



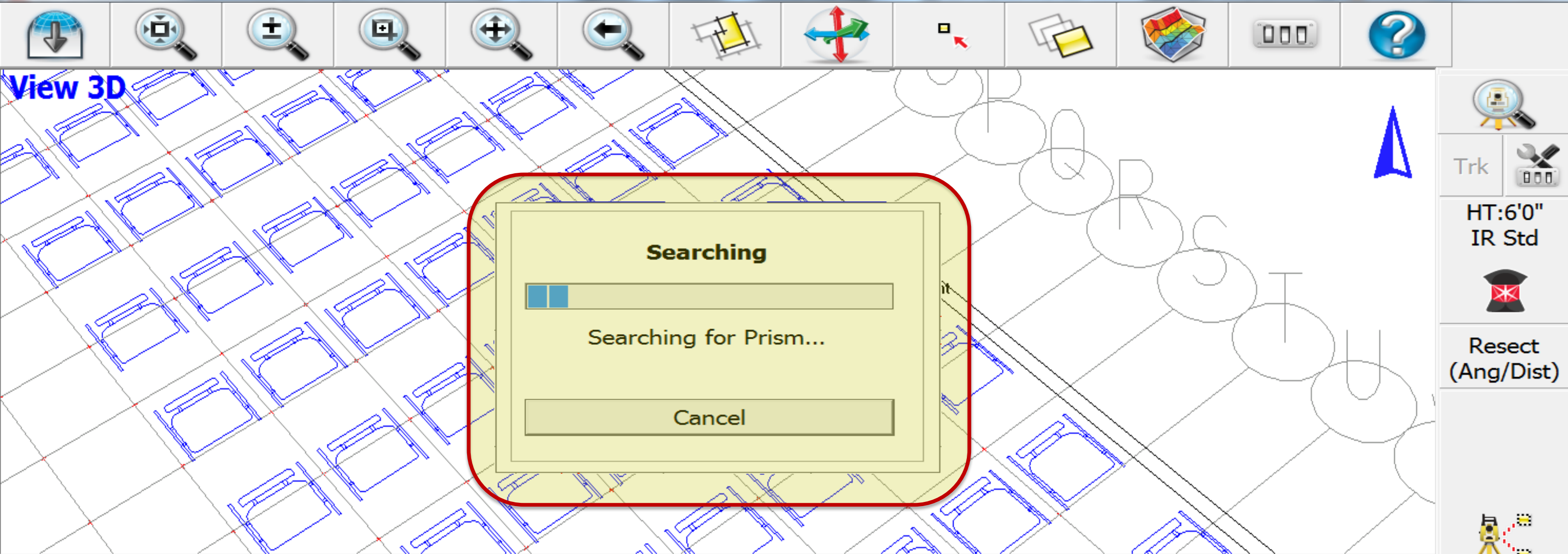
AUTODESK UNIVERSITY 2014

AUTODESK

Orient Robot: Control Point A



AU_Test3_112314 - Layout



Please select point and take measurement.

<input checked="" type="checkbox"/>	Store Point	Observed Point	CP-A1
<input type="checkbox"/>	Close	Instrument Height	0'0"

Leica
Geosystems

Orient Robot: Control Point A



AU_Test3_112314 - Layout

View 3D

CP-A1
Control Point

Prism Pole A

Trk

HT:6'0"
IR Std

Reset
(Ang/Dist)

Please select point and take measurement.

Store Point

Close

Observed Point

Instrument Height

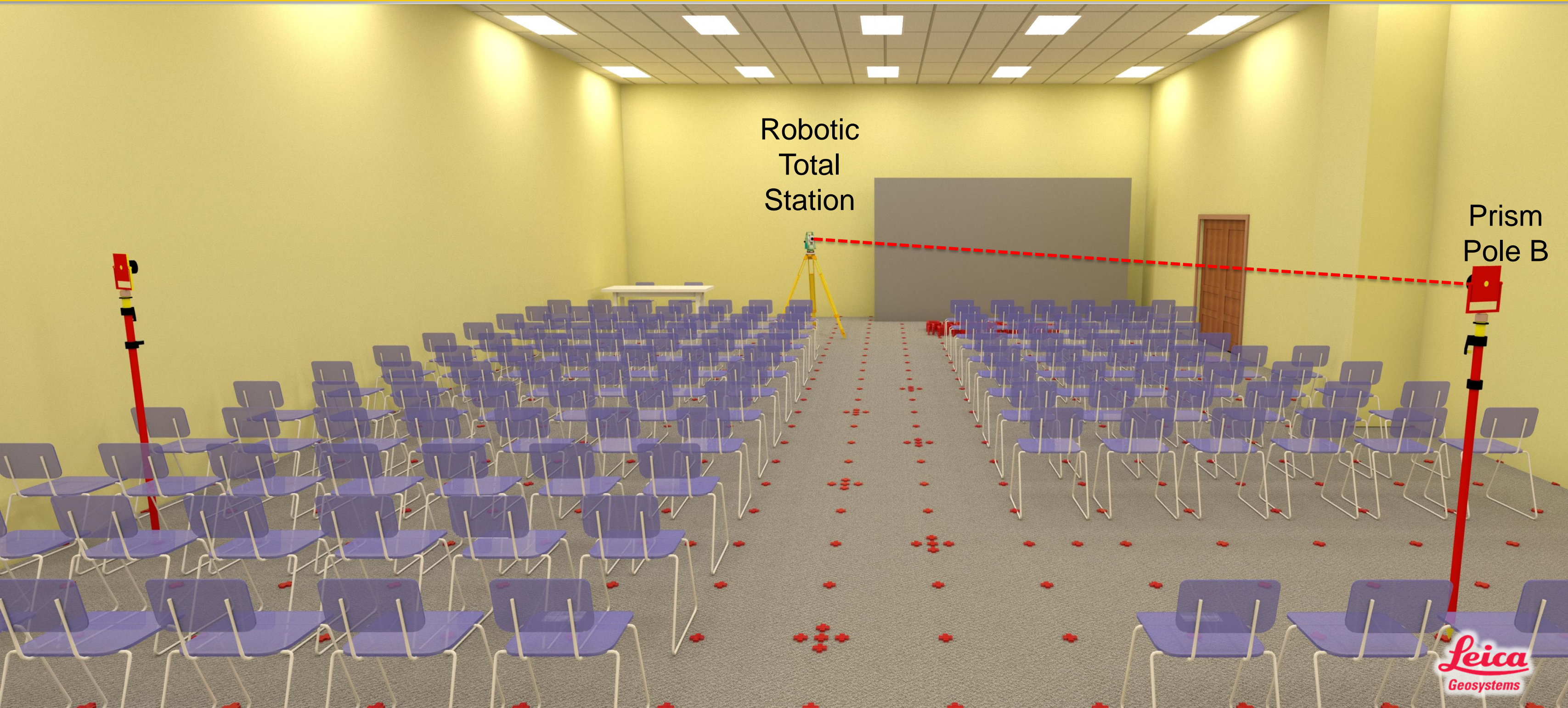
CP-A1

0'0"

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AUTODESK

Step 1: Orient – Shoot Control Point B



Orient Robot: Control Point B



AU_Test3_112314 - Layout

Trk

HT:6'0"
IR Std

Reset
(Ang/Dist)

Please select point and take measurement.

☒ Store Point

☐ Close

Observed Point

Instrument Height

CP-B2

0'0"

Orient Robot: Orientation Results



AU_Test3_112314 - Layout

Select Point

447

408

412

CP-A

CP-B

Prism A

Prism B

StdDev: N 1'2 3/4" E 0'1 1/4"

Store Point

Observed Point

Close

Instrument Height

0'0"

Scanning Total Station w/ Wheel

HT:6'0"

IR Std

Robot

Reset (Ang/Dist)

10'0"

MicroSurvey Layout

Orient Robot

Orientation Result

Backsight Observations

HA 143°16'50" VA 87°22'33"

SD 32'0 7/8" HD 32'0 1/2"

HI 0'0" HT 6'0"

Backsight Errors

Calc Horz Dist 32'0" Error 0'0 1/2"

Calc Elev 0'0 1/8" Error 0'0 1/8"

Plate Setting

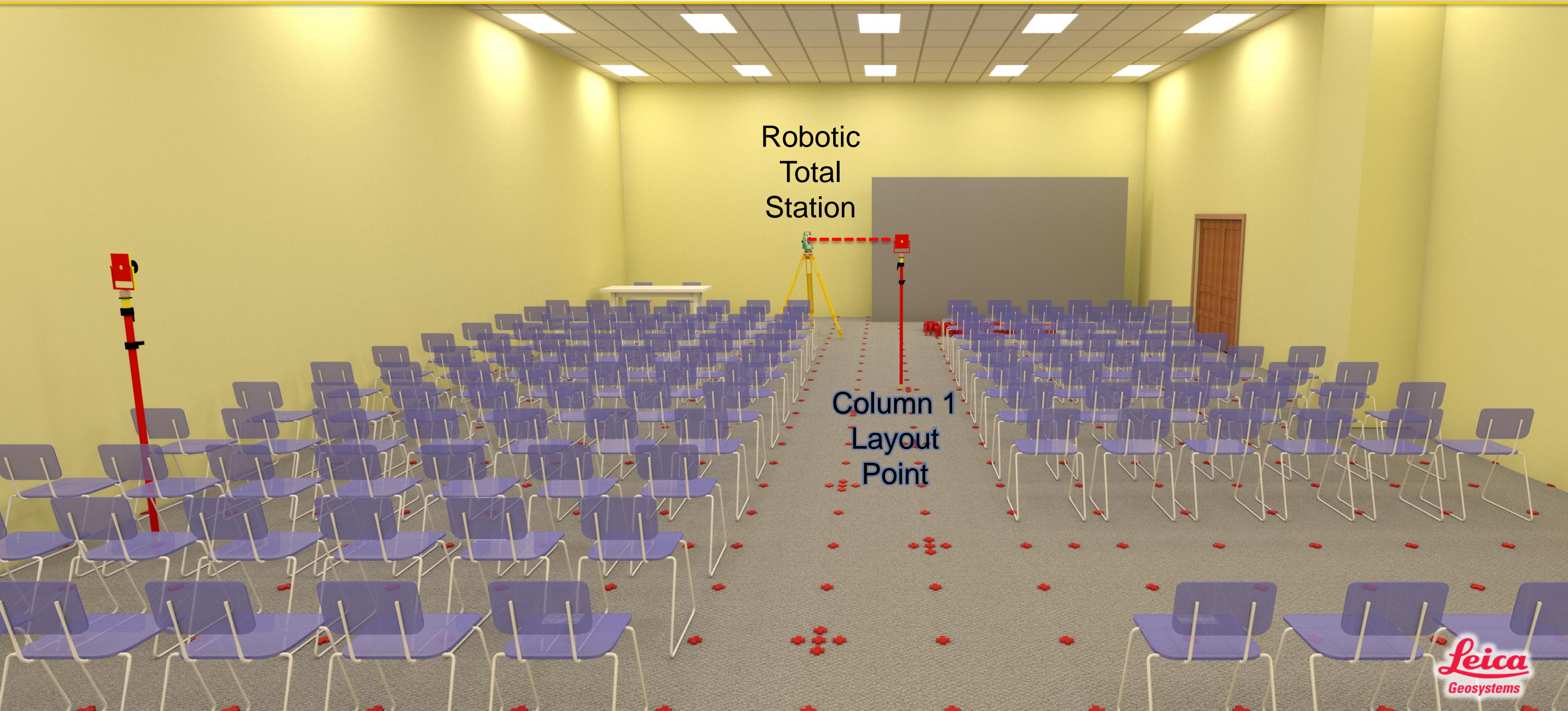
Do Not Modify 143°16'50"

Accept

Observe Again

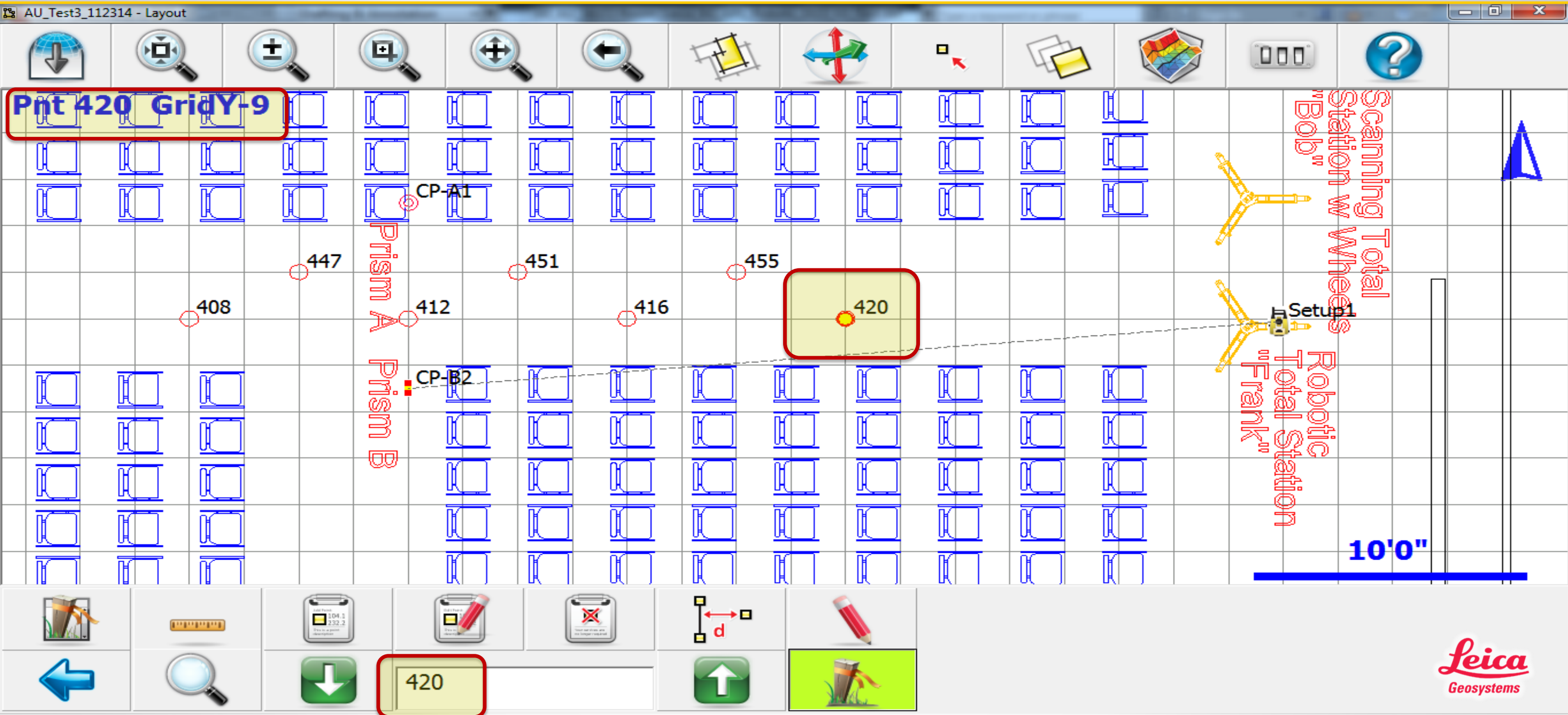
Cancel

Step 2: Layout Point 1



Leica
Geosystems

Step 2: Layout Point 1



Step 2: Layout Point 1



AU_Test3_112314 - Layout

MicroSurvey Layout

Point Layout

Point ID	420
Point Desc	GridY 9

Prev Next

Nearest Search

☒ Use List [Edit Layout List](#)

Design Point Offset

Direction	0°00'00"	Northing	7'6 13/16"
Distance	0'0"	Easting	56'6 3/4"
		Elevation	0'0"

☐ Do not show this screen again.

Layout Point Close

Step 2: Layout Point 1



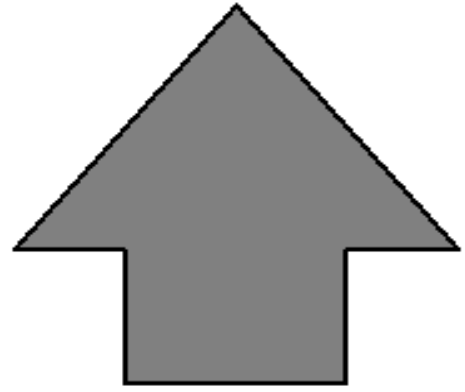
Leica
Geosystems

Step 2: Layout Point 1

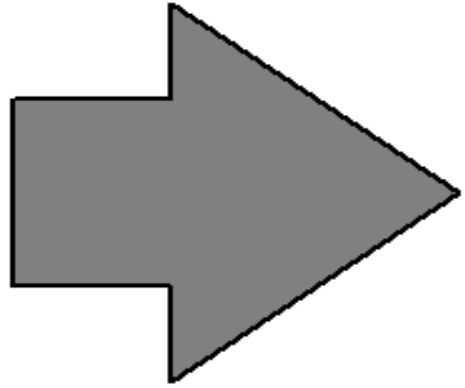


AU_Test3_112314 - Layout

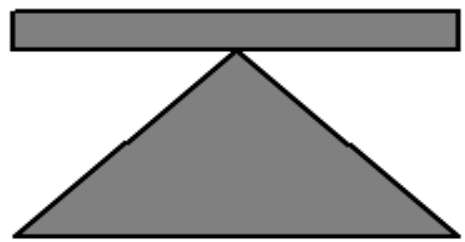
Viewing Instrument



16'7 15/...



2'4 13/16"



0'0 1/8"



Trk



HT:6'0"
IR Std



Store Point



Point 420, Desc GridY-9

Grid



Leica
Geosystems



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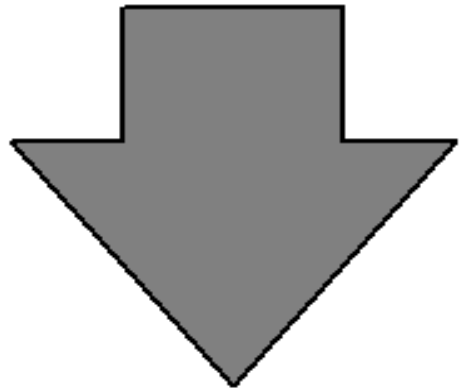
AUTODESK

Step 2: Layout Point 1

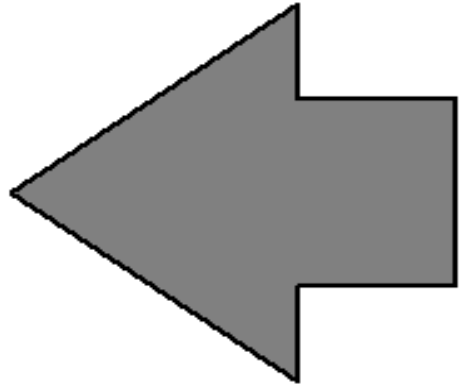


AU_Test3_112314 - Layout

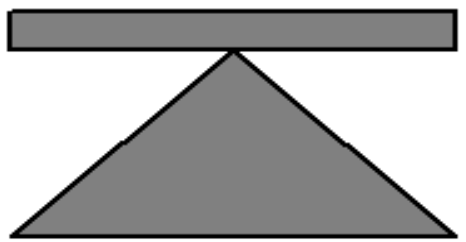
Viewing Instrument



0'3 11/16"



0'0 7/16"



0'0 1/16"



Trk



HT:6'0"
IR Std



Store Point



Point 420, Desc GridY-9

Grid



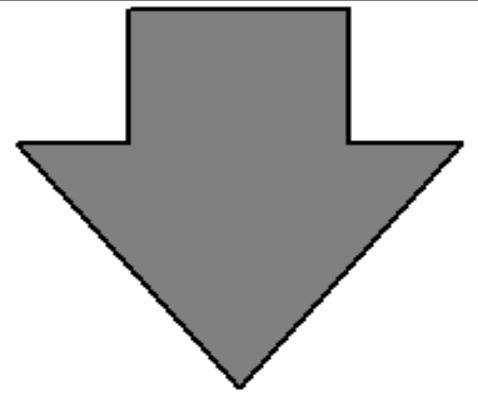
Leica
Geosystems

Step 2: Layout Point 1

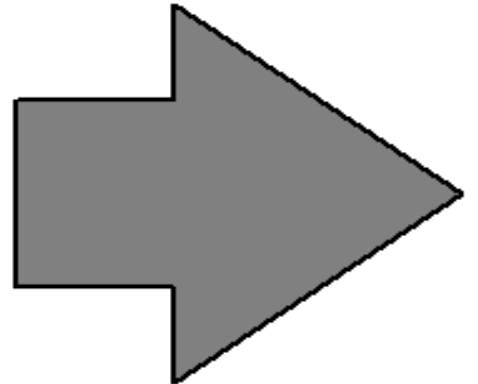


AU_Test3_112314 - Layout

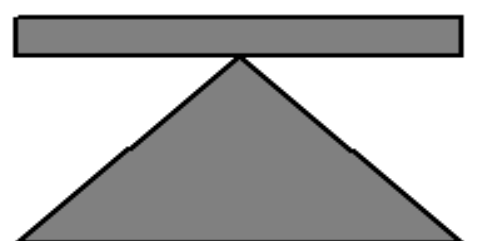
Viewing Instrument



0'0 1/4"



0'0 1/8"



0'0 1/16"



Trk



HT:6'0"
IR Std



Store Point



Point 420, Desc GridY-9

Grid

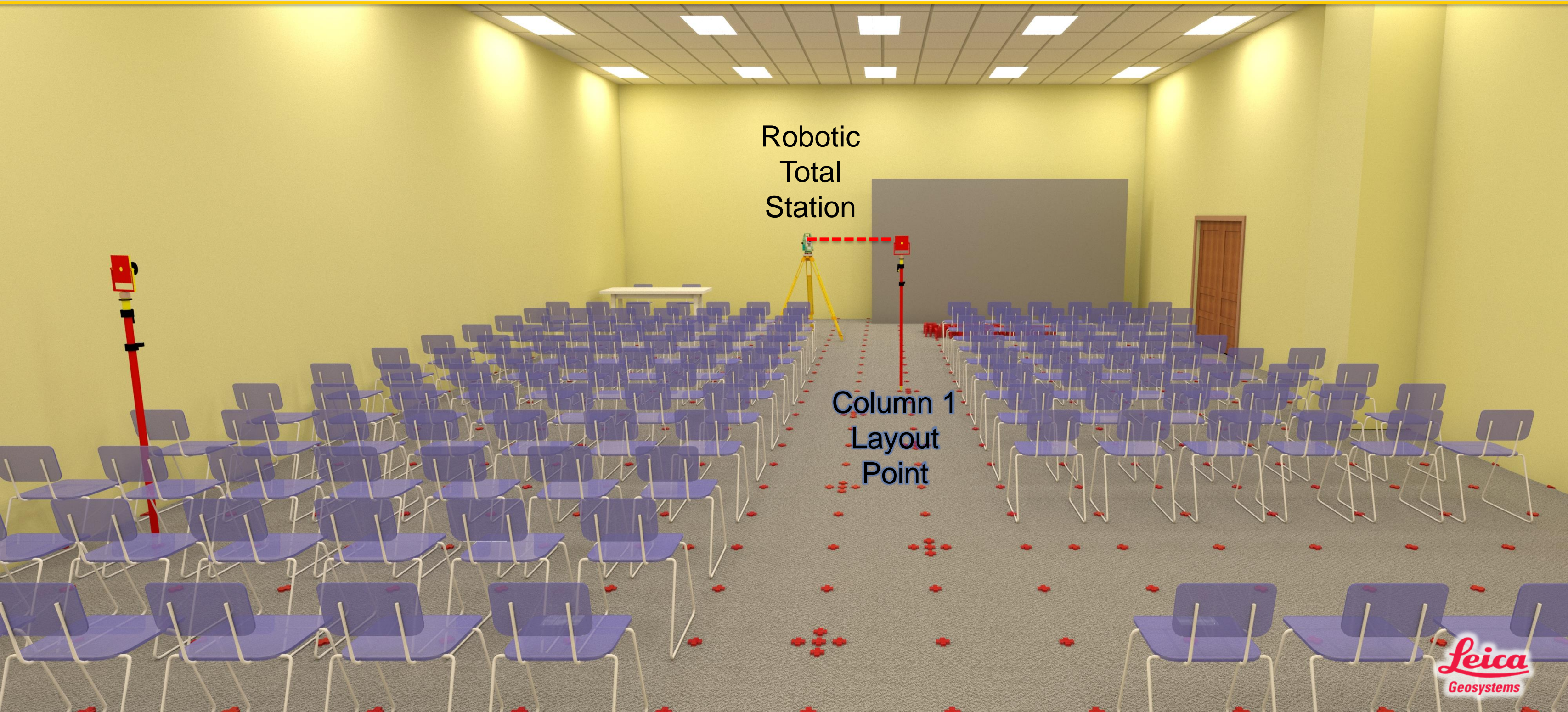


Leica
Geosystems

A diagram showing a cube with arrows indicating a cycle. The cube is drawn in perspective. Arrows are shown on the edges of the cube, indicating a clockwise cycle when viewed from the front. The arrows are red and point in the direction of the cycle.

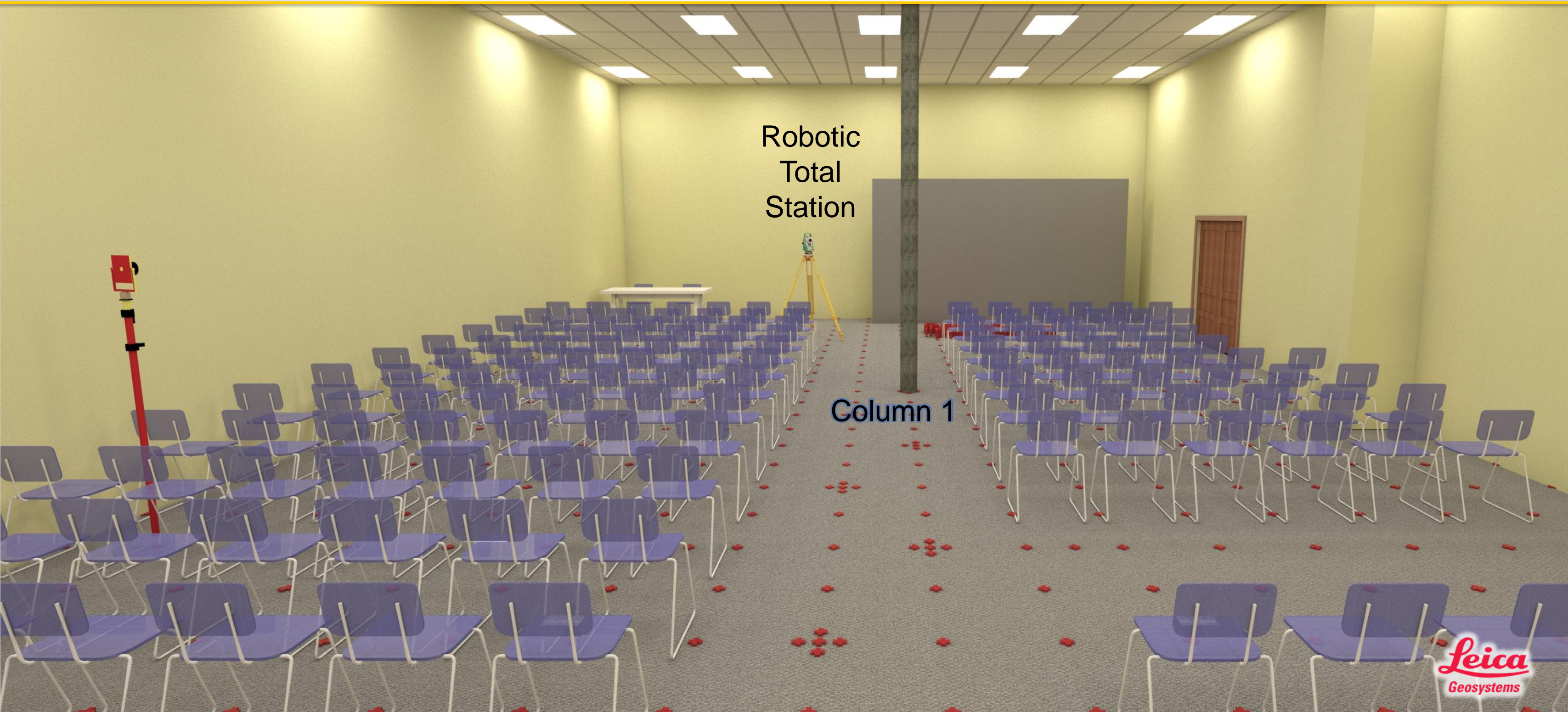
Leica
Geosystems

Step 2: Layout Point 1

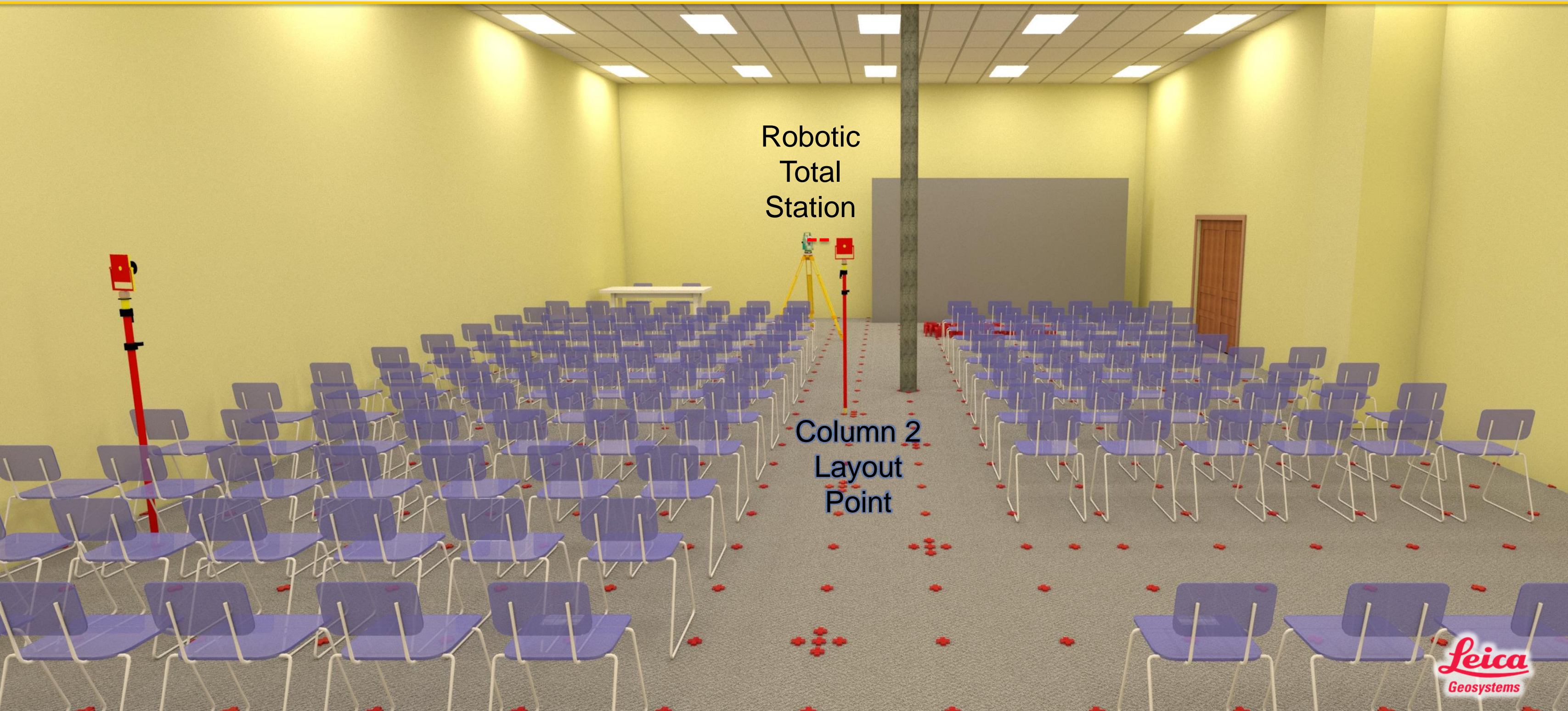


Leica
Geosystems

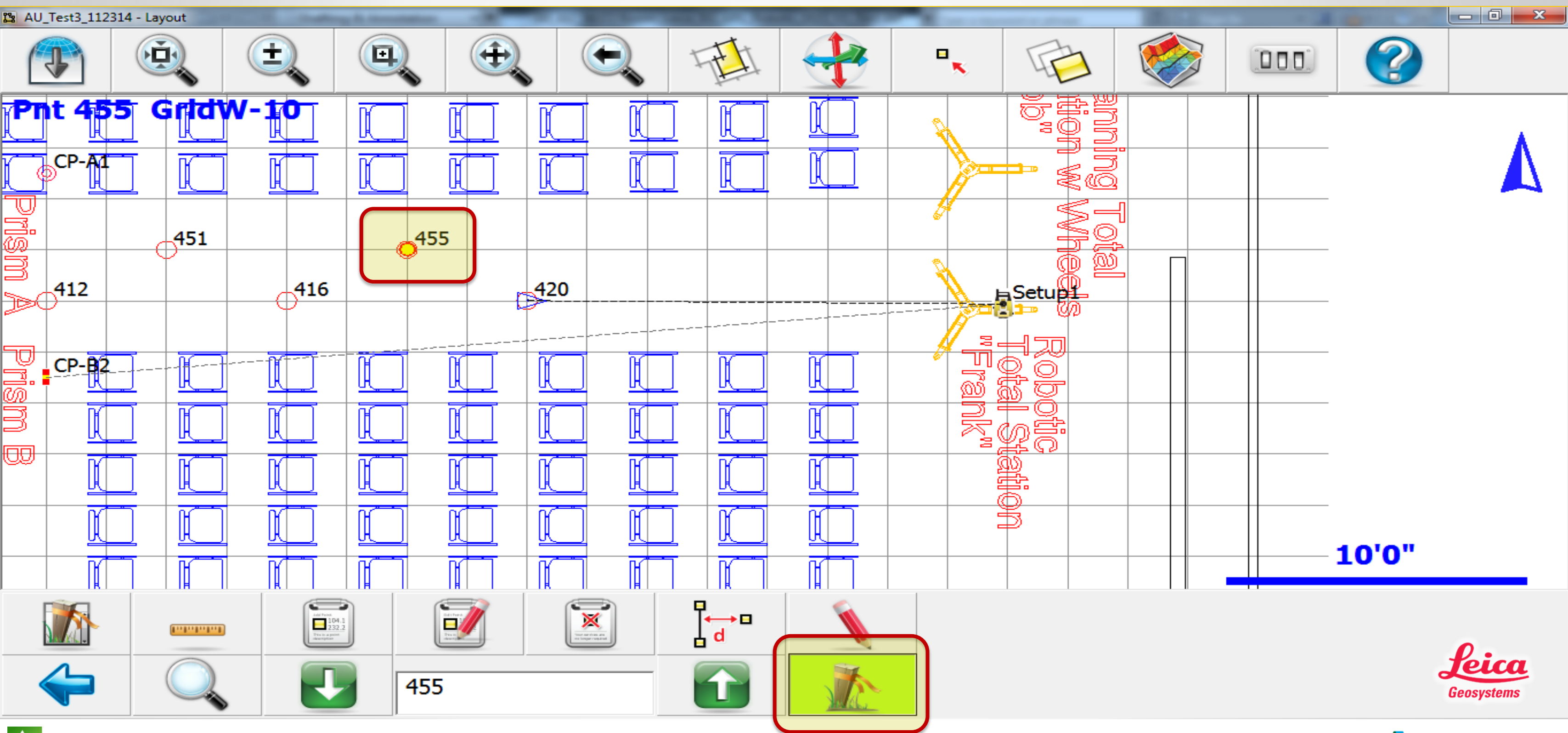
Step 3: Place Column 1



Step 4: Layout Point 2



Step 4: Layout Point 2



MicroSurvey Layout

Point Layout

Point ID

455

Point Desc

GridW-10

☒ Use List

Edit Layout List

Design Point Offset

Direction

0°00'00"

Distance

0'0"

Northing

9'6 13/16"

Easting

52'6 3/4"

Elevation

0'0"

☐ Do not show this screen again.

Prev

Next

Nearest Search

Layout Point

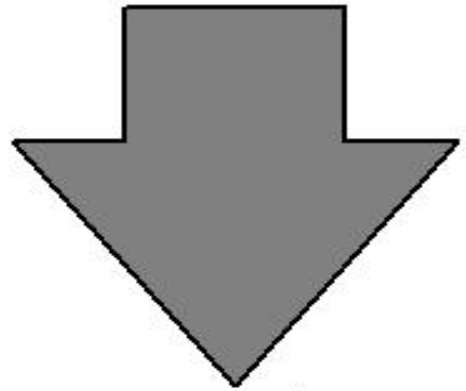
Close

Step 4: Layout Point 2

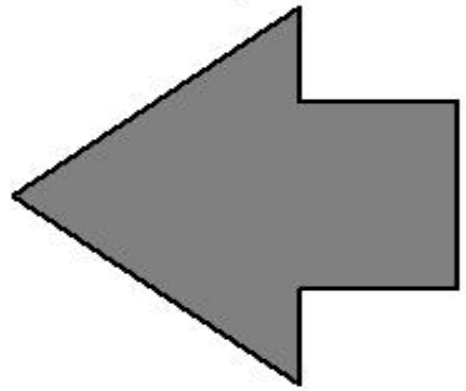


AU_Test3_112314 - Layout

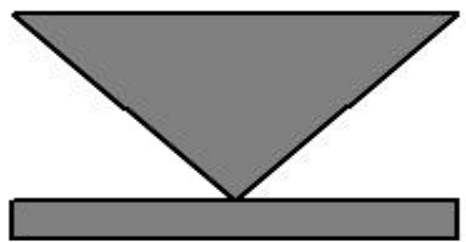
Viewing Instrument



4'0 1/2"



1'11 1/2"



5'11 15/...



Trk



HT:0'0"
IR Std



Store Point



Point 455, Desc GridW-10

Grid



Step 4: Layout Point 2



AU_Test3_112314 - Layout

+ -

Page

Out

Left

Cut to Design

4'0 1/2"

1'11 1/2"

5'11 15/16"

Inst

Trk

HT:0'0"

IR Std

Store Point

Leica

Geosystems

Map

Point 455, Desc GridW-10

20'0"

Leica
Geosystems

Step 4: Layout Point 2



AU_Test3_112314 - Layout

Viewing Instrument

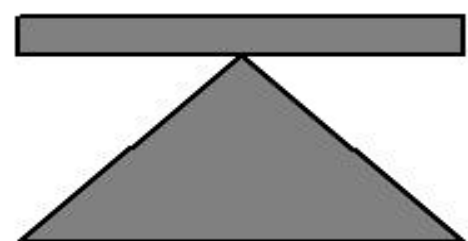
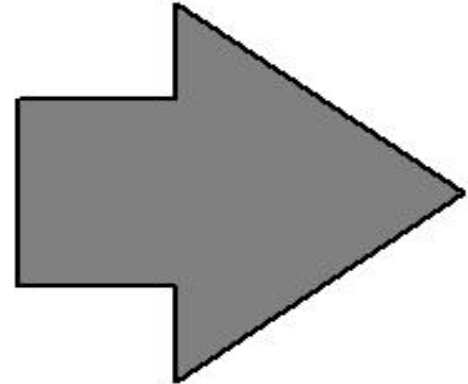
0'0"



0'0 3/16"



0'0 1/8"



Trk



HT:6'0"
IR Std



Store Point



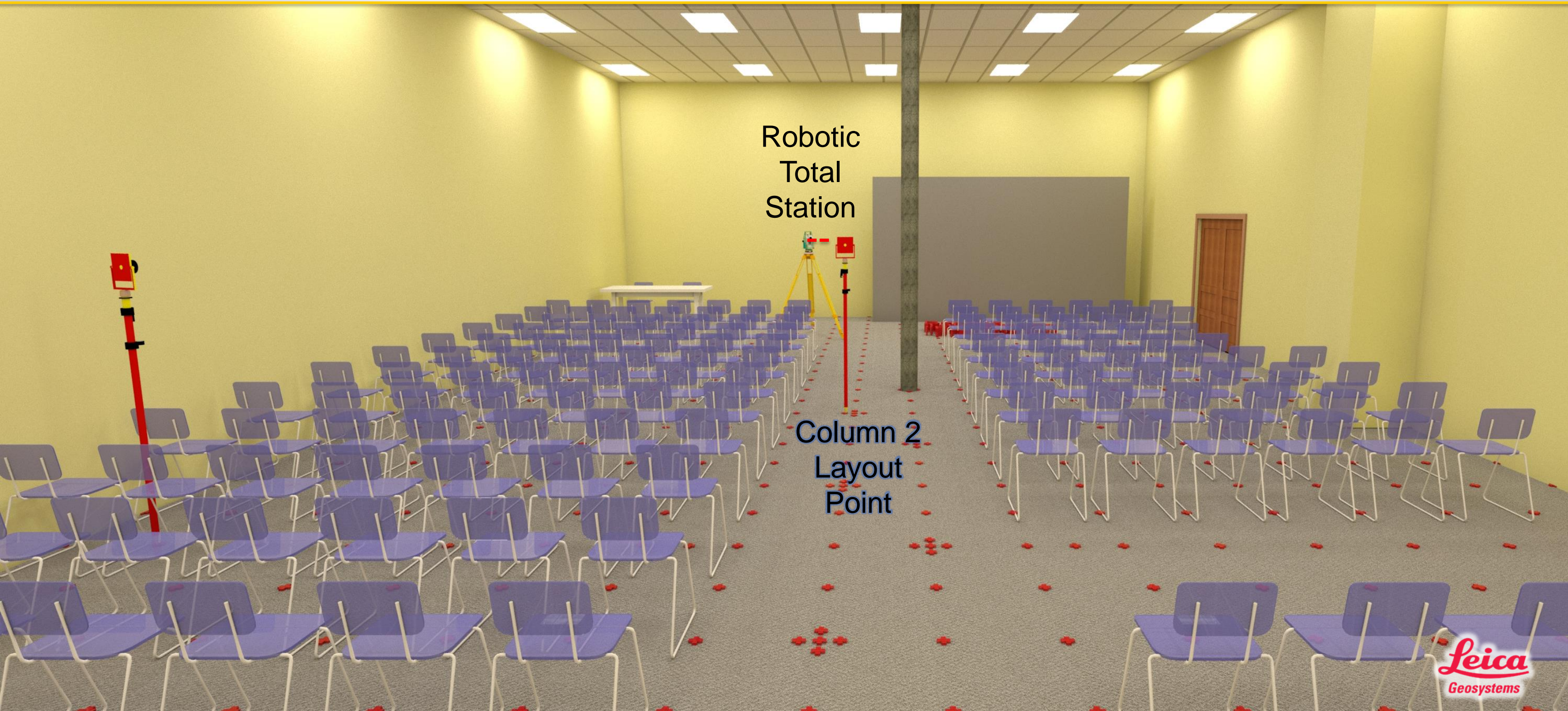
Point 455, Desc GridW-10

Grid

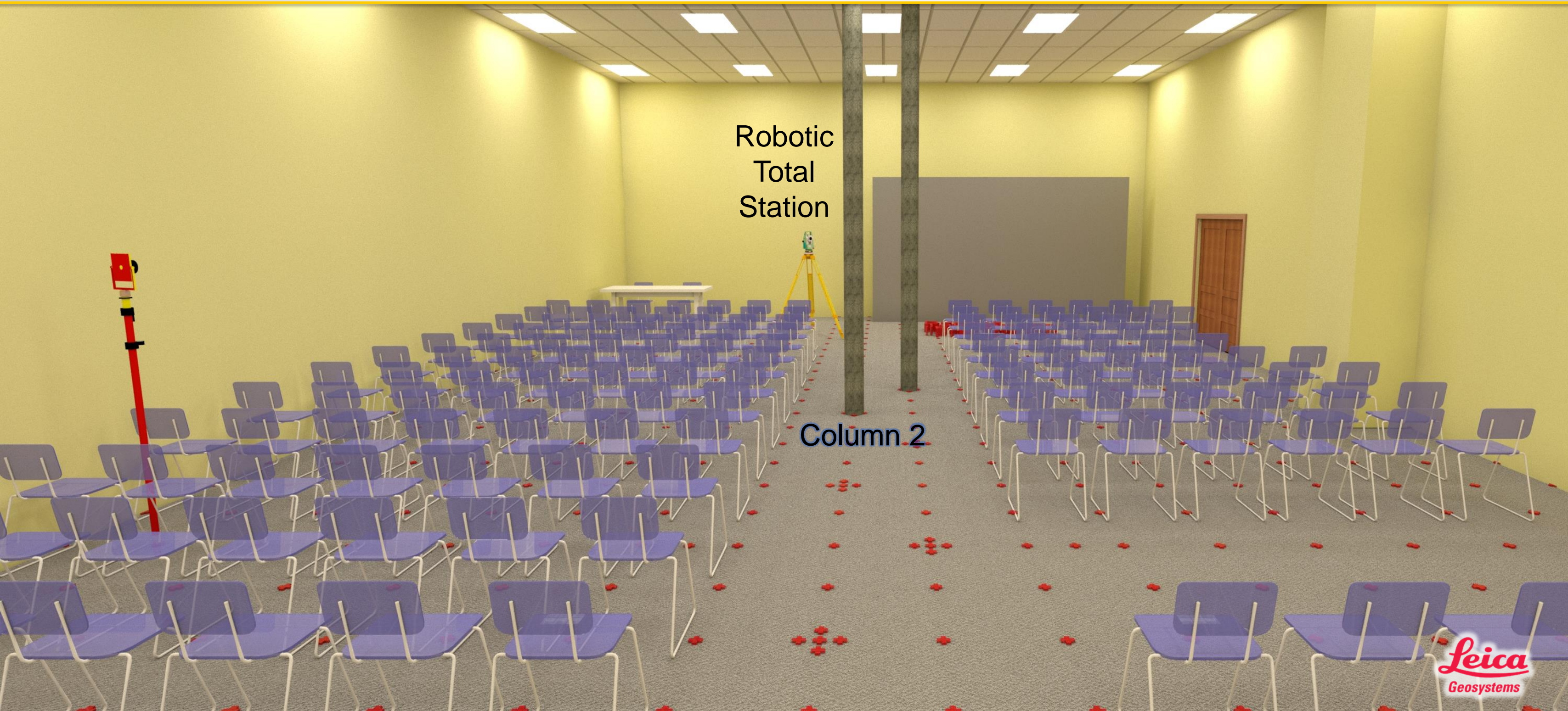


Leica
Geosystems

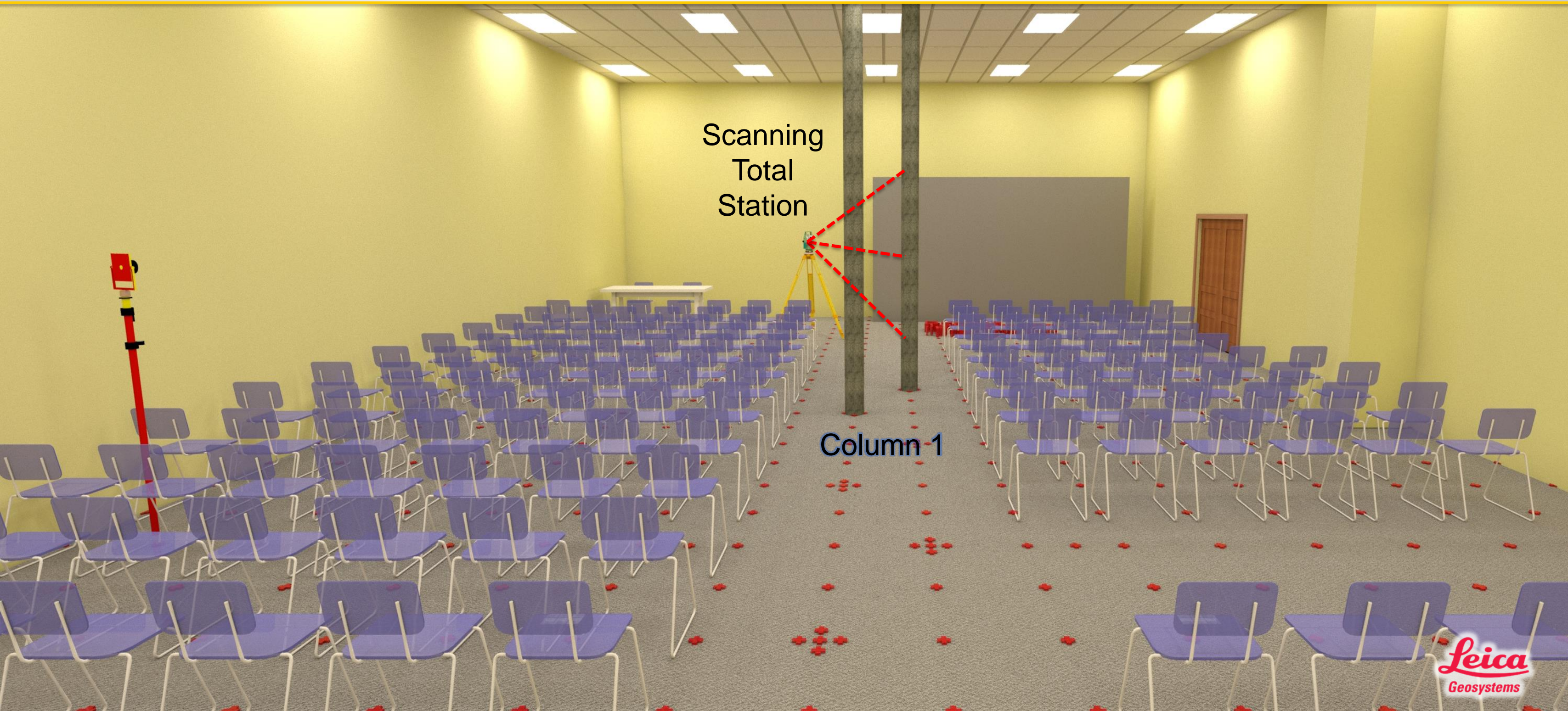
Step 4: Layout Point 2



Step 5: Place Column 2

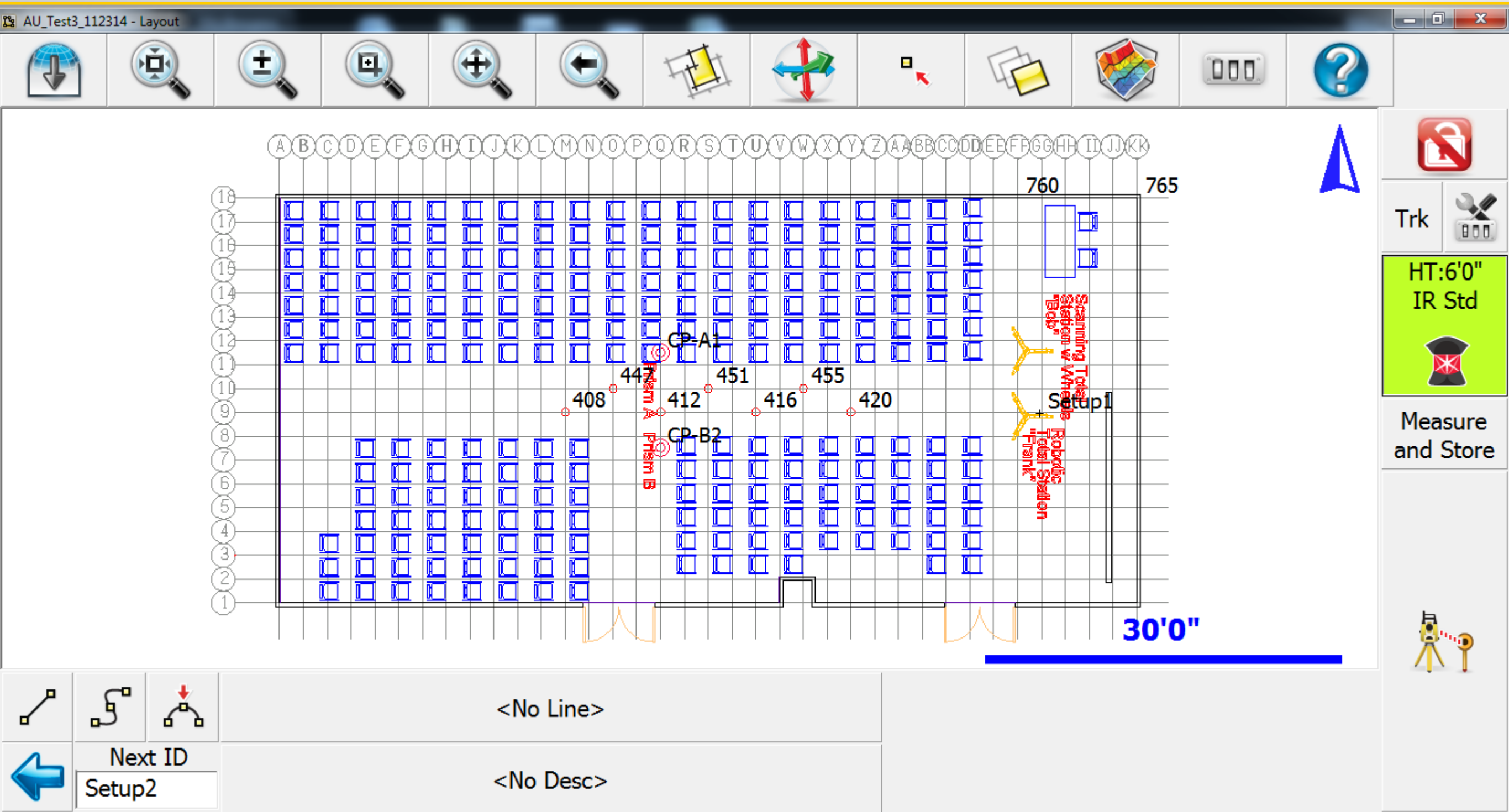


Step 6: Backcheck Column 1 – “BOB”



Leica
Geosystems

Step 6: Backcheck Column 1 – “BOB”





Step 6: Backcheck Column 1 – “BOB”



AU_Test3_112314 - Layout

MicroSurvey Layout

Target Manager

 Backsight	 Foresight
Target:	MPR122
Target Height:	Leica Mini Prism
Use Temp. Height:	Leica Mini 360
EDM Mode:	MPR122
Leica Constant: 28.1mm	Leica HDS Target
	Leica Reflective Tape
	Reflectorless

OK Target List Default Settings Cancel





Step 6: Backcheck Column 1 – “BOB”





AU_Test3_112314 - Layout

MicroSurvey Layout

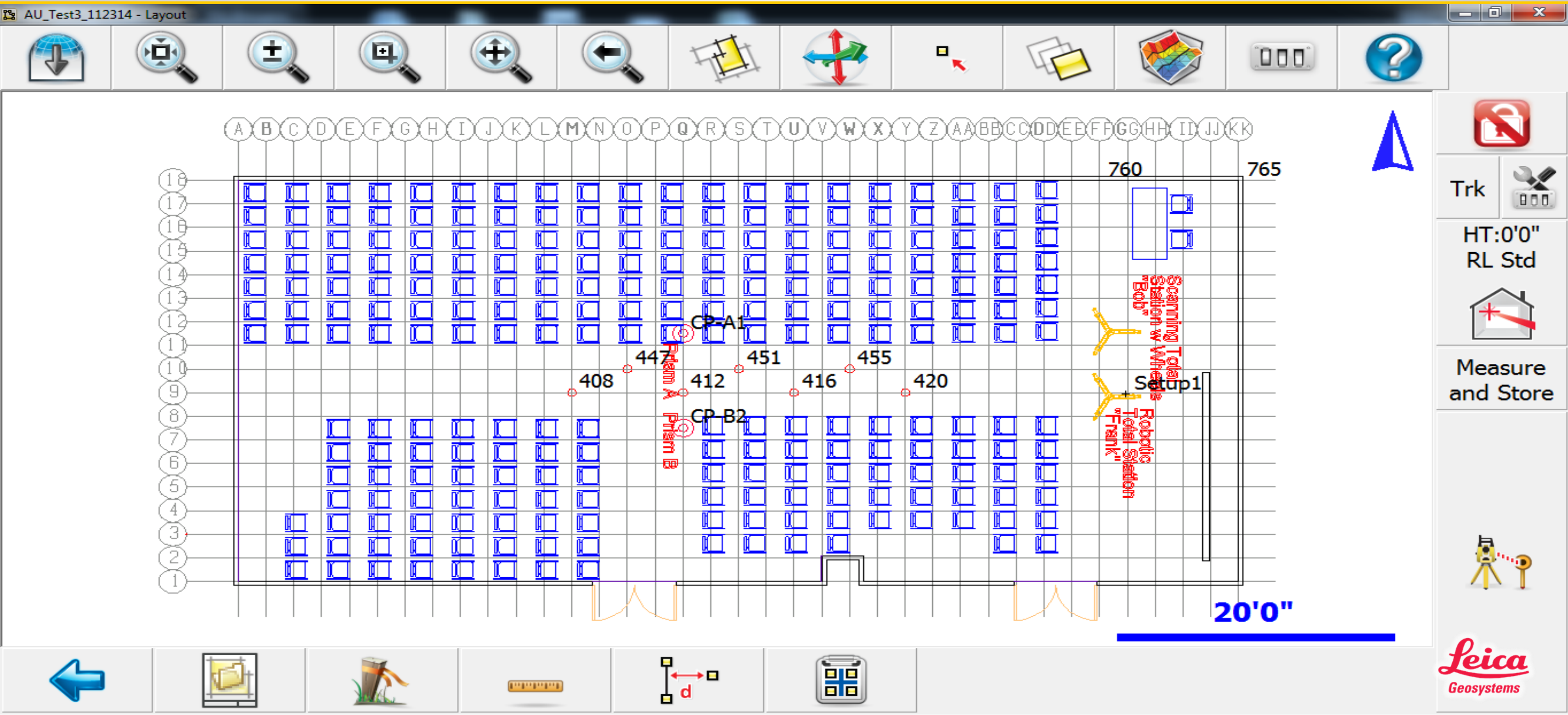
Target Manager

 Backsight	 Foresight
Target:	<input type="text" value="Reflectorless"/>
Target Height:	<input type="text" value="0'0"/> <=
EDM Mode:	<input type="text" value="RL Standard"/>
Leica Constant: 34.4mm	

 OK Target List Default Settings  Cancel

Leica
Geosystems

Step 6: Backcheck Column 1 – “BOB”



Step 6: Backcheck Column 1 – “BOB”



AU_Test3_112314 - Layout

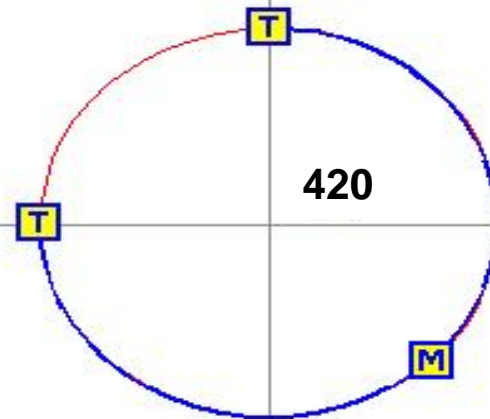
Step 6: Backcheck Column 1 – “BOB”



AU_Test3_112314 - Layout



3Pt Arc on DXF Layer:A-COLS



0'10 13/16"



Leica
Geosystems

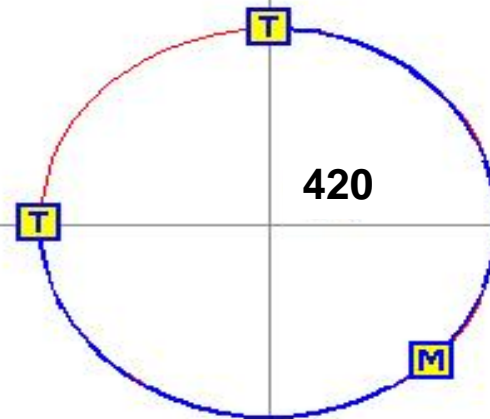
Step 6: Backcheck Column 1 – “BOB”



AU_Test3_112314 - Layout



3Pt Arc on DXF Layer:A-COLS



0'10 13/16"



Leica
Geosystems

Step 6: Backcheck Column 1 – “BOB”



AU_Test3_112314 - Layout

+

-

Page


Waiting

For


M

MicroSurvey Layout


Instrument Settings




Set Guide Light On




Set Laser Pointer On




Set ATR On




Map Auto Center On




Level Instrument




Cancel




Joystick




Instrument Information



EDM Settings



Search Settings



Enable Auto-Location

Trk

HT:0'0"


RL Std


Store Point

0'10 13/16"

0.00 C 0'0"

Layout Method: Directional

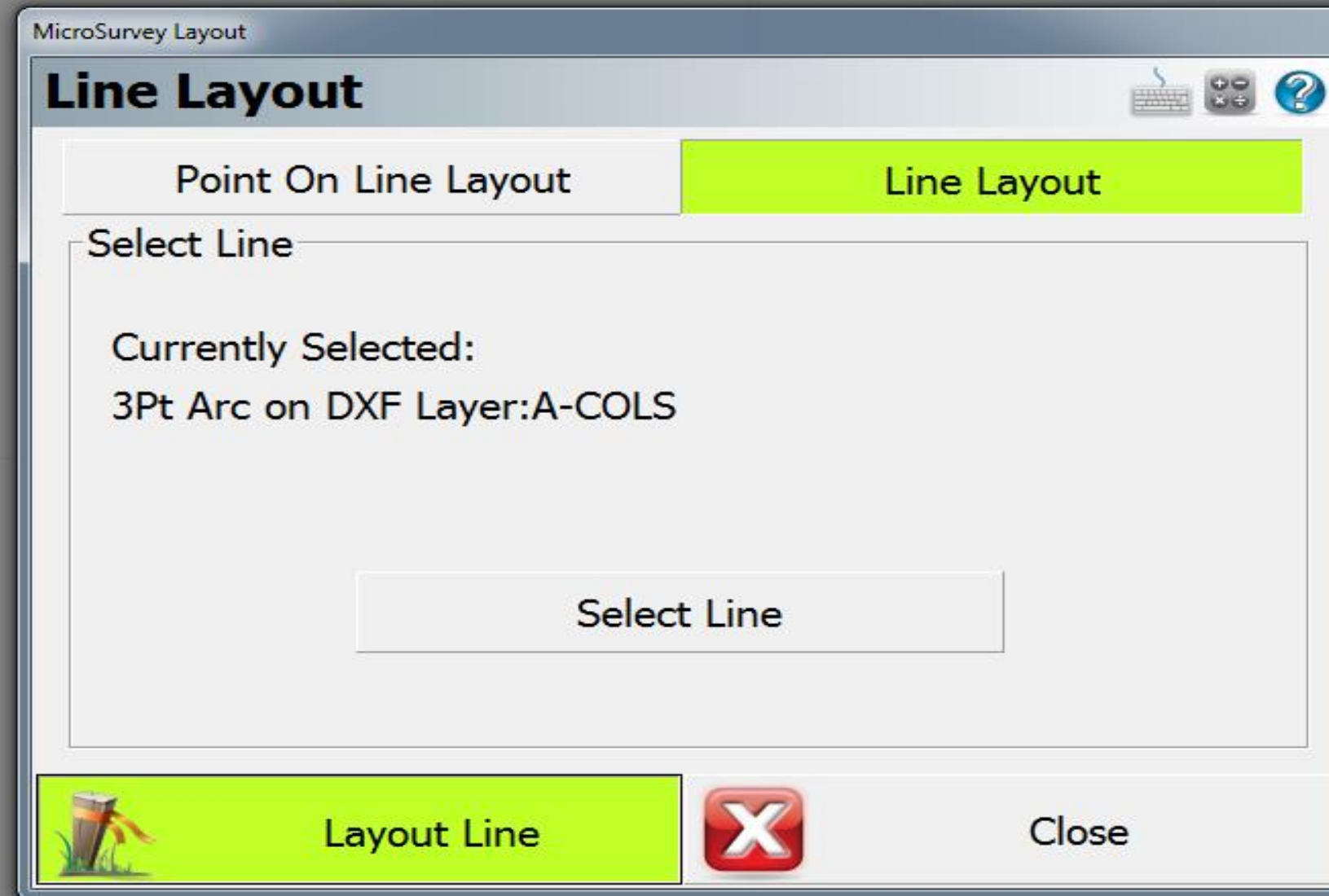




Step 6: Backcheck Column 1 – “BOB”



AU_Test3_112314 - Layout



Leica
Geosystems

Step 6: Backcheck Column 1 – “BOB”



AU_Test3_112314 - Layout

Waiting For Measurement...

Trk
HT:0'0"
RL Std
Store Point

0'10 13/16"

Line
Layout Method: Directional

Leica Geosystems

AUTODESK

Step 6: Backcheck Column 1 – “BOB”



AU_Test3_112314 - Layout

+ -

Stn
In
On Grade

1.38
0'0 1/8"
0'0 11/16"

ZOOM BOX

Inst

0'8 3/8"

Line

Layout Method: Directional

Trk

HT:0'0"
RL Std

Store Point

Step 6: Backcheck Column 1 – “BOB”



AU_Test3_112314 - Layout



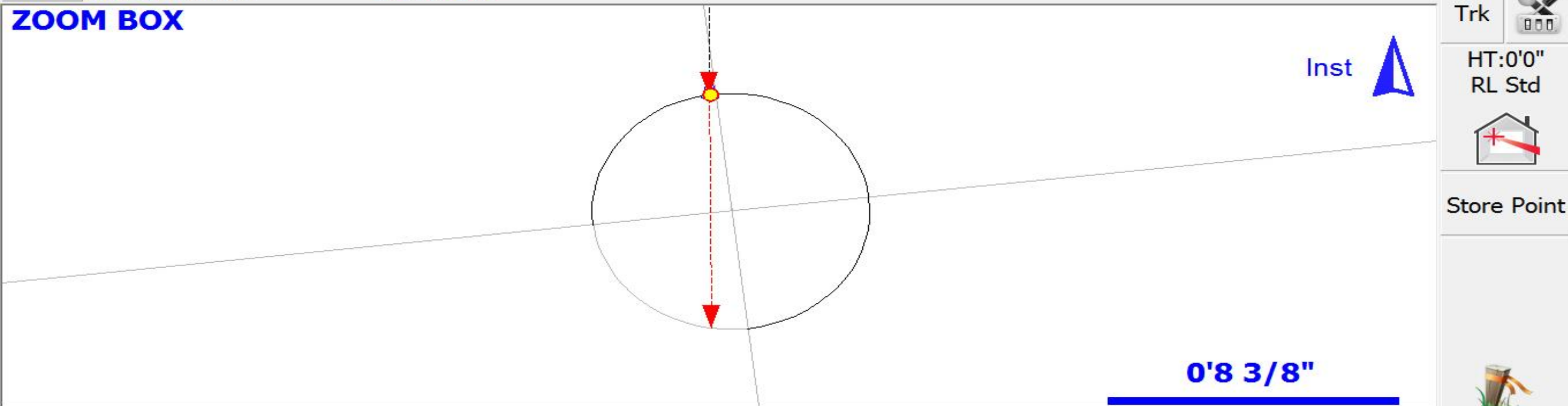
+ - Stn
Page Out
Cut to Design

1.06

0'0 3/16"

3'8 7/16"

ZOOM BOX



Trk



HT:0'0"
RL Std



Store Point



Line

Layout Method: Directional



Leica
Geosystems

Step 6: Backcheck Column 1 – “BOB”



AU_Test3_112314 - Layout

+

-

Stn

Page

In

On Grade

1.00

0'0 1/2"

0'0 1/4"

←

ZOOM BOX

Inst

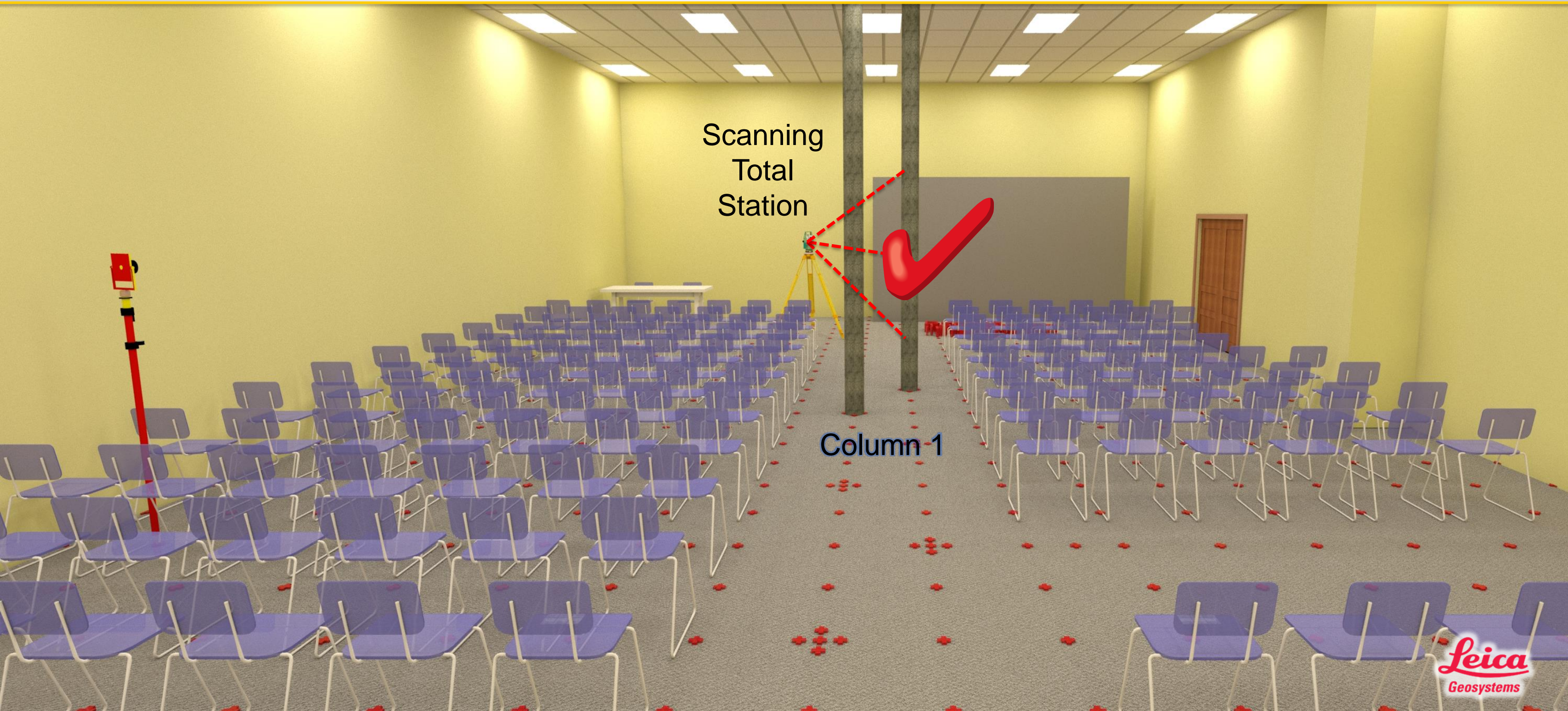
▲

0'8 3/8"

Line

Layout Method: Directional

Step 6: Backcheck Column 1 – “BOB”

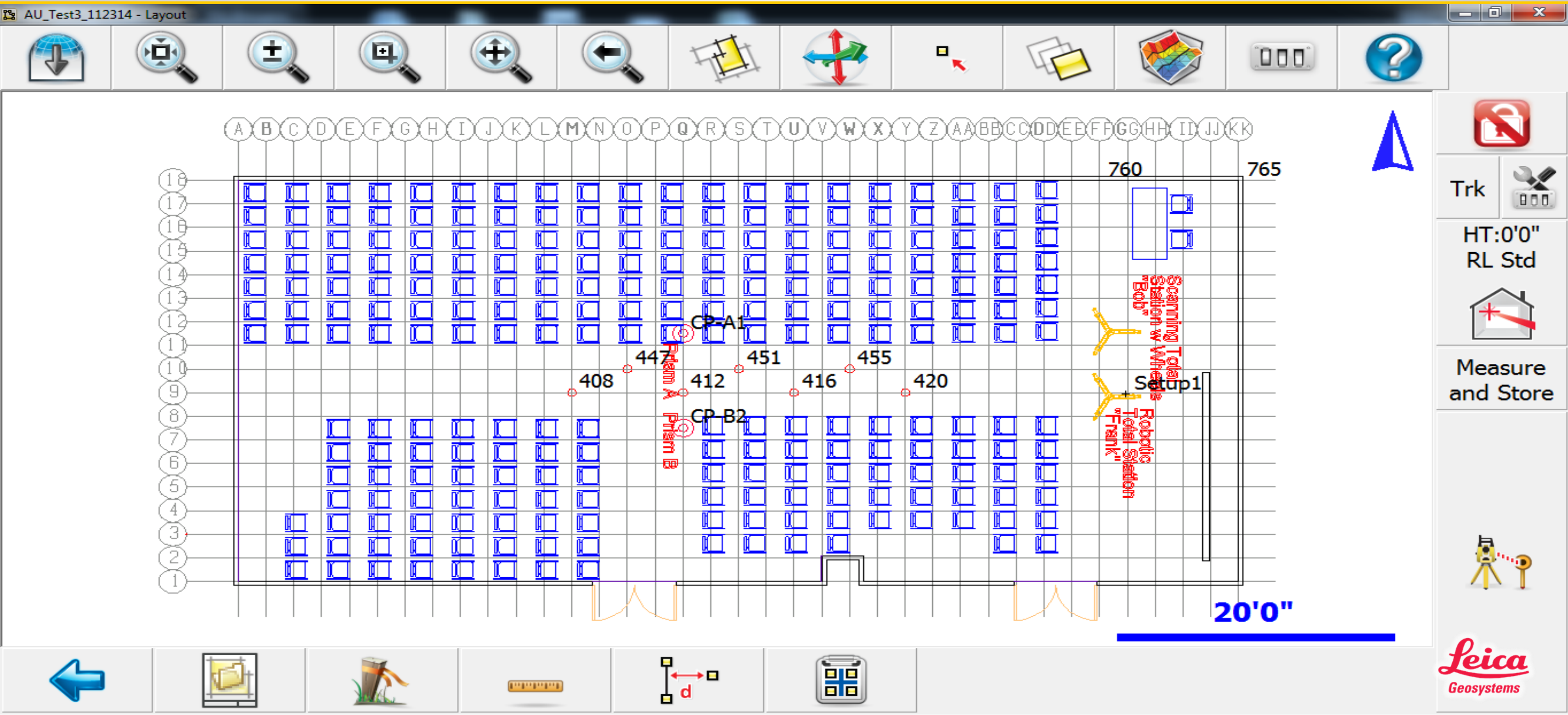


Step 7: Backcheck Column 2 Location



Leica
Geosystems

Step 7: Backcheck Column 2 – “BOB”



Step 7: Backcheck Column 2 – “BOB”



AU_Test3_112314 - Layout

Trk

HT:0'0"
RL Std

Measure and Store

Leica
Geosystems

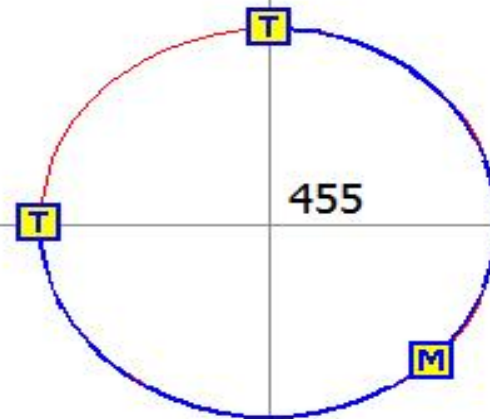
Step 7: Backcheck Column 2 – “BOB”



AU_Test3_112314 - Layout



3Pt Arc on DXF Layer:A-COLS



0'10 13/16"



Leica
Geosystems

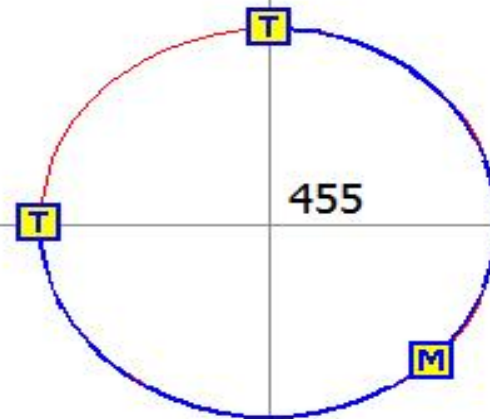
Step 7: Backcheck Column 2 – “BOB”



AU_Test3_112314 - Layout



3Pt Arc on DXF Layer:A-COLS



0'10 13/16"



Leica
Geosystems



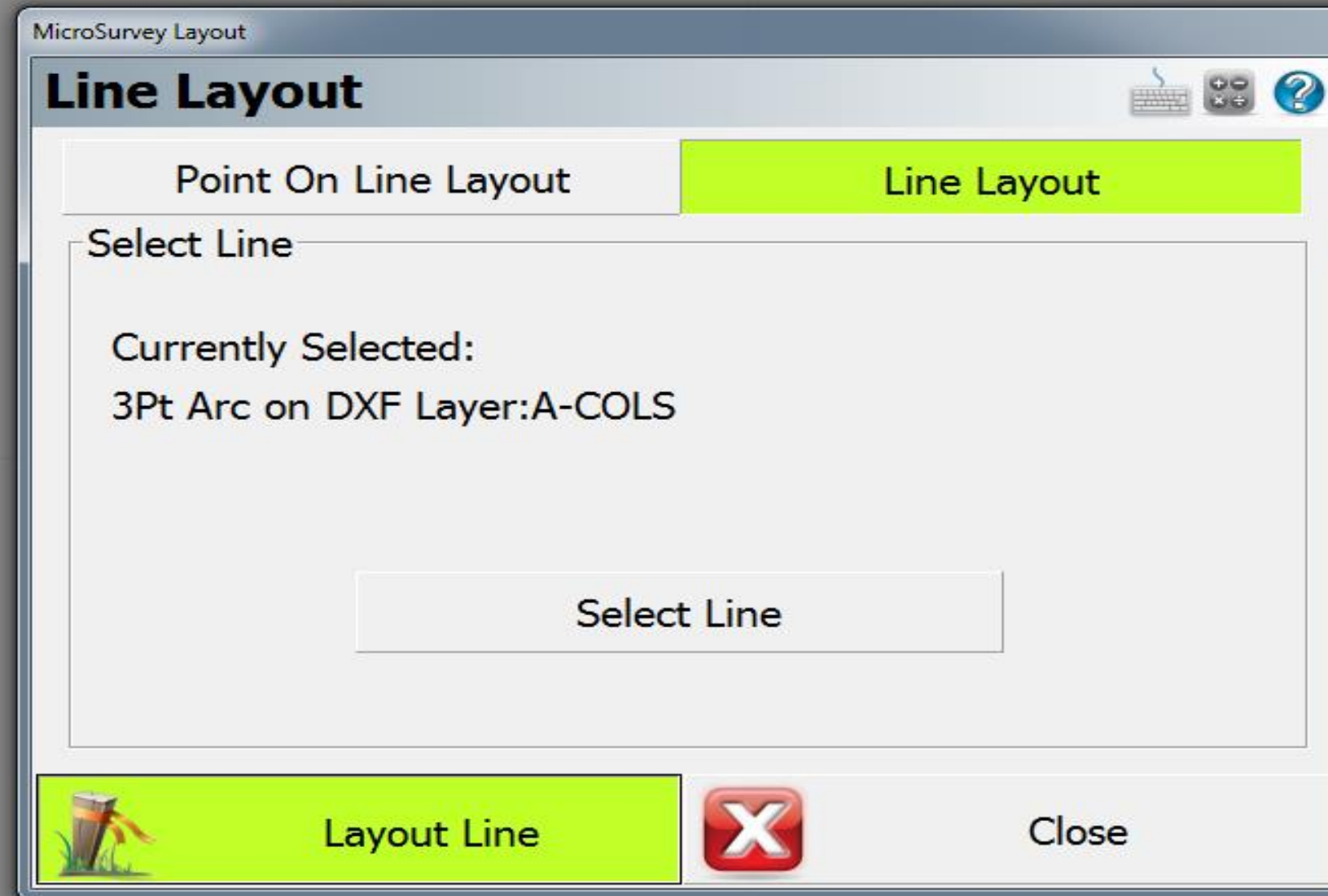
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AUTODESK

Step 6: Backcheck Column 1 – “BOB”



AU_Test3_112314 - Layout



Leica
Geosystems

Step 7: Backcheck Column 2 – “BOB”



AU_Test3_112314 - Layout

+ -

Stn

Page

In

On Grade

0.89

0'1 1/8"

0'0 1/4"

←

ZOOM BOX

Inst

▲

As-Built

(Blue Triangle)

→

0'8 3/8"

Line

Layout Method: Directional

Trk

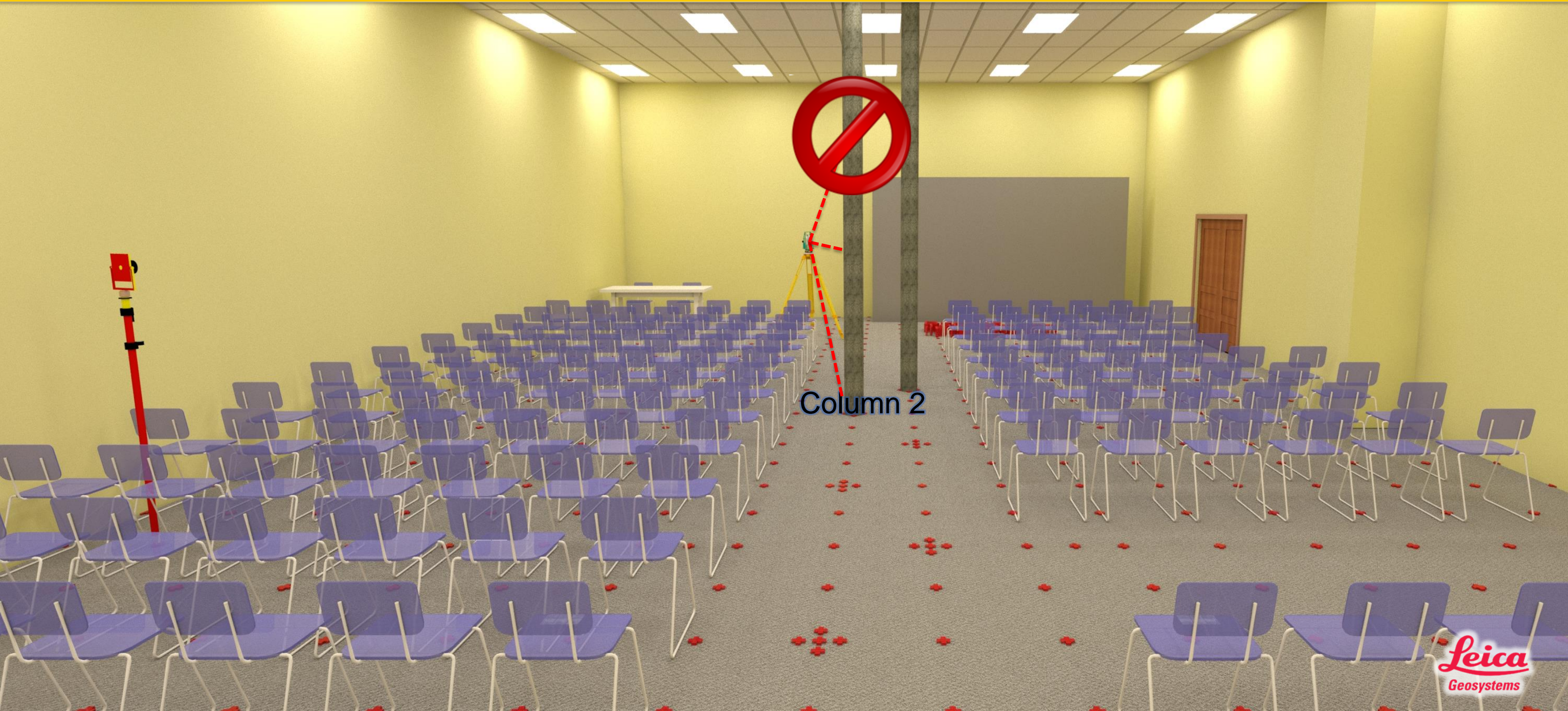
HT:0'0" RL Std

Store Point

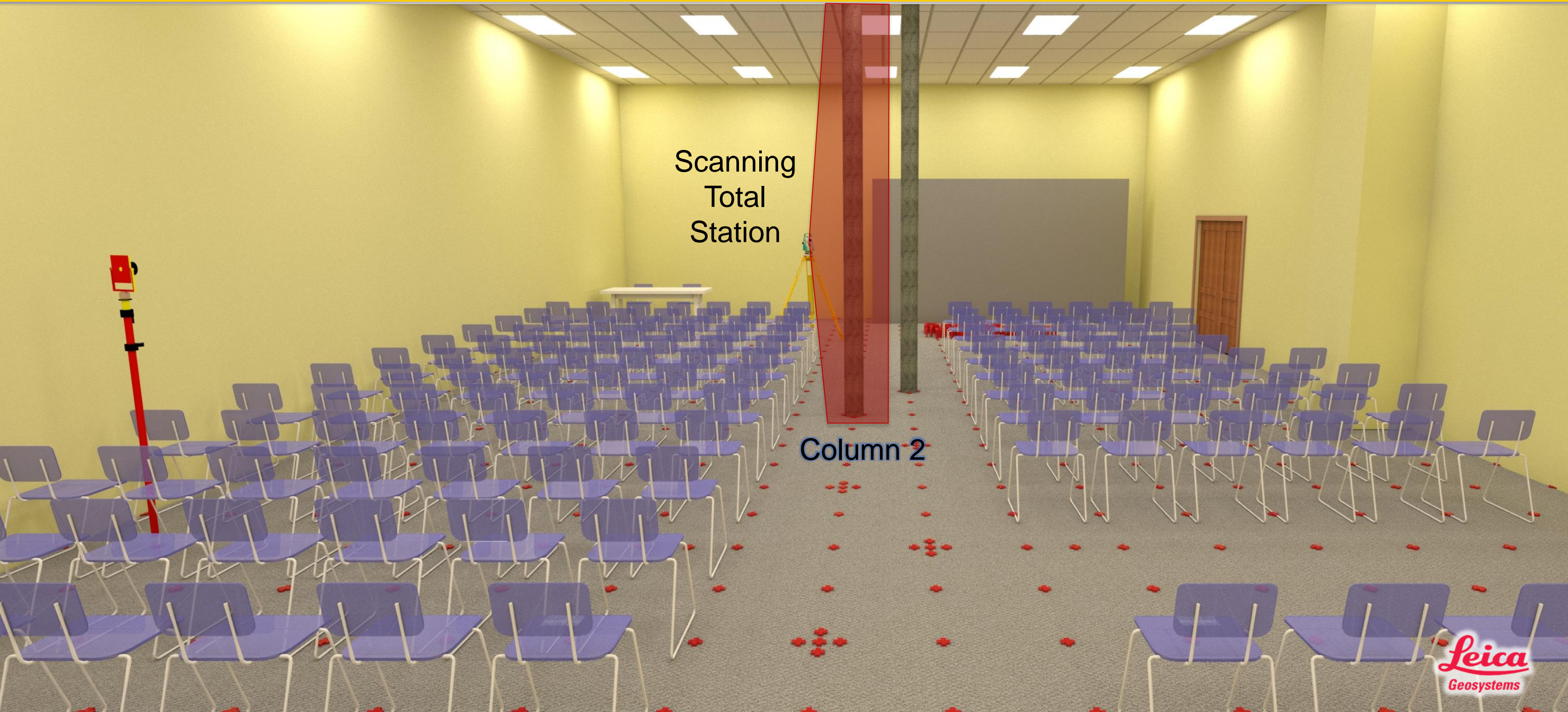




Step 7: Backcheck Column 2 Location



Step 8: Scan Column 2










Step 8: Scan and Roundtrip Data





AU_Test3_112314 - Layout

MicroSurvey Layout

AU_Test3_112314

	Project		Plan
	Calculate		Edit
	Disconnect		Roads Manager
	About		

Layout Mode  As-Built Mode  Exit

Trk

HT:0'0"
RL Std

Measure and Store

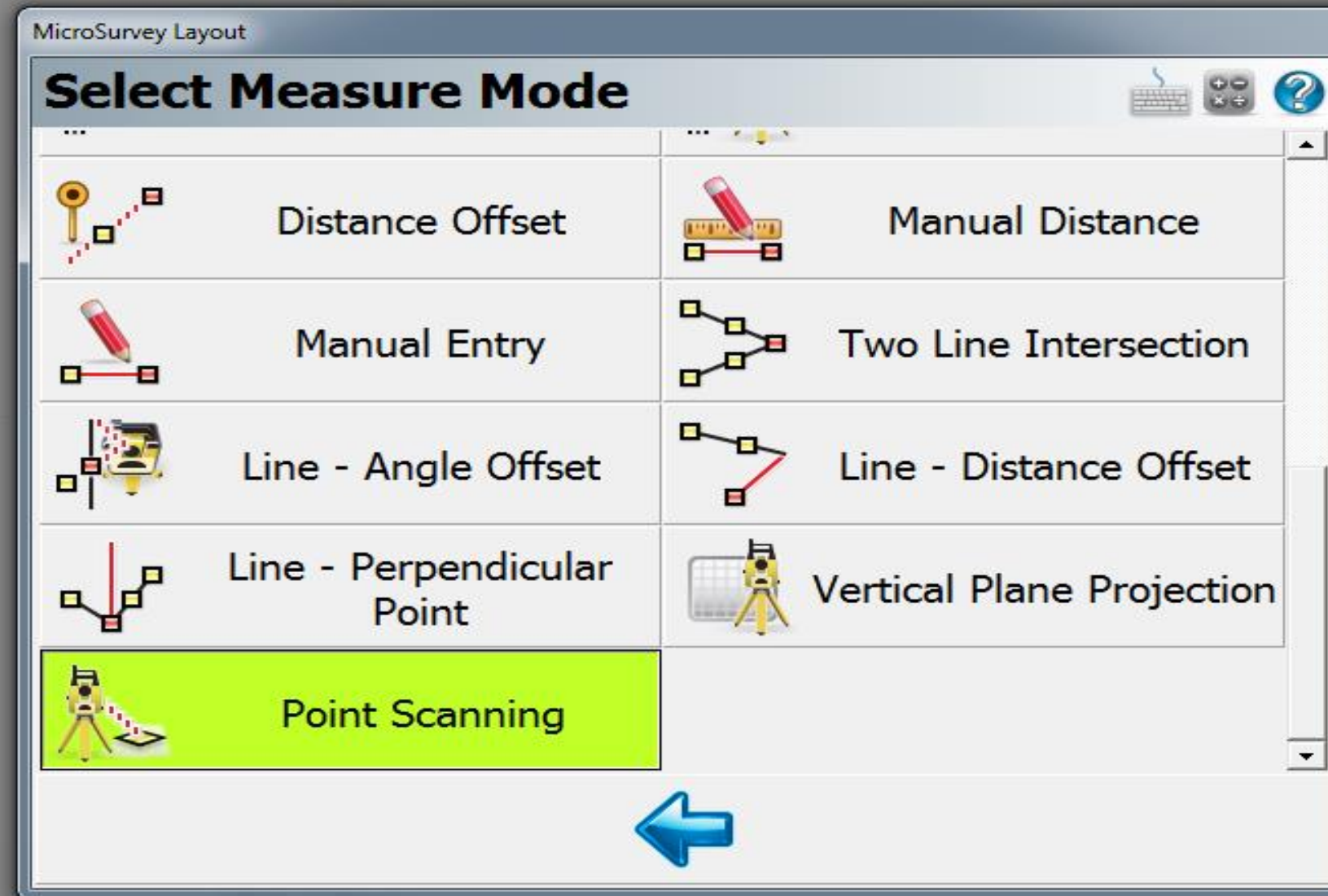
0'8 3/8"



Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout



Trk

HT:0'0"
RL Std

Measure and Store

0'8 3/8"

Leica
Geosystems

Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout

MicroSurvey Layout

Scan Settings



Type	Resolution	Distance Filter	Video
------	------------	-----------------	-------

Scan Method: Rectangular

Scan Rate: 1000 pts/s, up to 300m

☒ Store Signal to Noise Ratio (SNR) values with scan points

☐ Apply Artifact Filter to the point cloud

 Cancel  Next

Trk

HT:0'0"
RL Std

Measure and Store

0'8 3/8"

Leica
Geosystems

Step 8: Scan and Roundtrip Data





AU_Test3_112314 - Layout

MicroSurvey Layout

Scan Settings

Type	Resolution	Distance Filter	Video
Define spacing by: Distances			
Slope Distance:	20'3 1/4"	DIST	
Horizontal Spacing:	0'0 1/16"		
Vertical Spacing:	0'0 1/16"		

 Cancel  Next

Trk
HT:0'0"
RL Std
Measure and Store

0'8 3/8"

Leica
Geosystems

Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout

MicroSurvey Layout

Scan Settings

Type	Resolution	Distance Filter	Video
<input checked="" type="checkbox"/> Apply Distance Filter - only objects within the Minimum and Maximum Distance will be scanned.			
Minimum Distance:		18'0"	
Maximum Distance:		22'6"	

Cancel Next



Trk

HT:0'0"
RL Std



Measure
and Store

0'8 3/8"



Leica
Geosystems

Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout

MicroSurvey Layout

Scan Settings



Type	Resolution	Distance Filter	Video
------	------------	-----------------	-------

View Streaming Video

Connection:

FrameRate:

Maximum BitRate:

 Cancel  Next

Trk

HT:0'0"
RL Std

Measure and Store

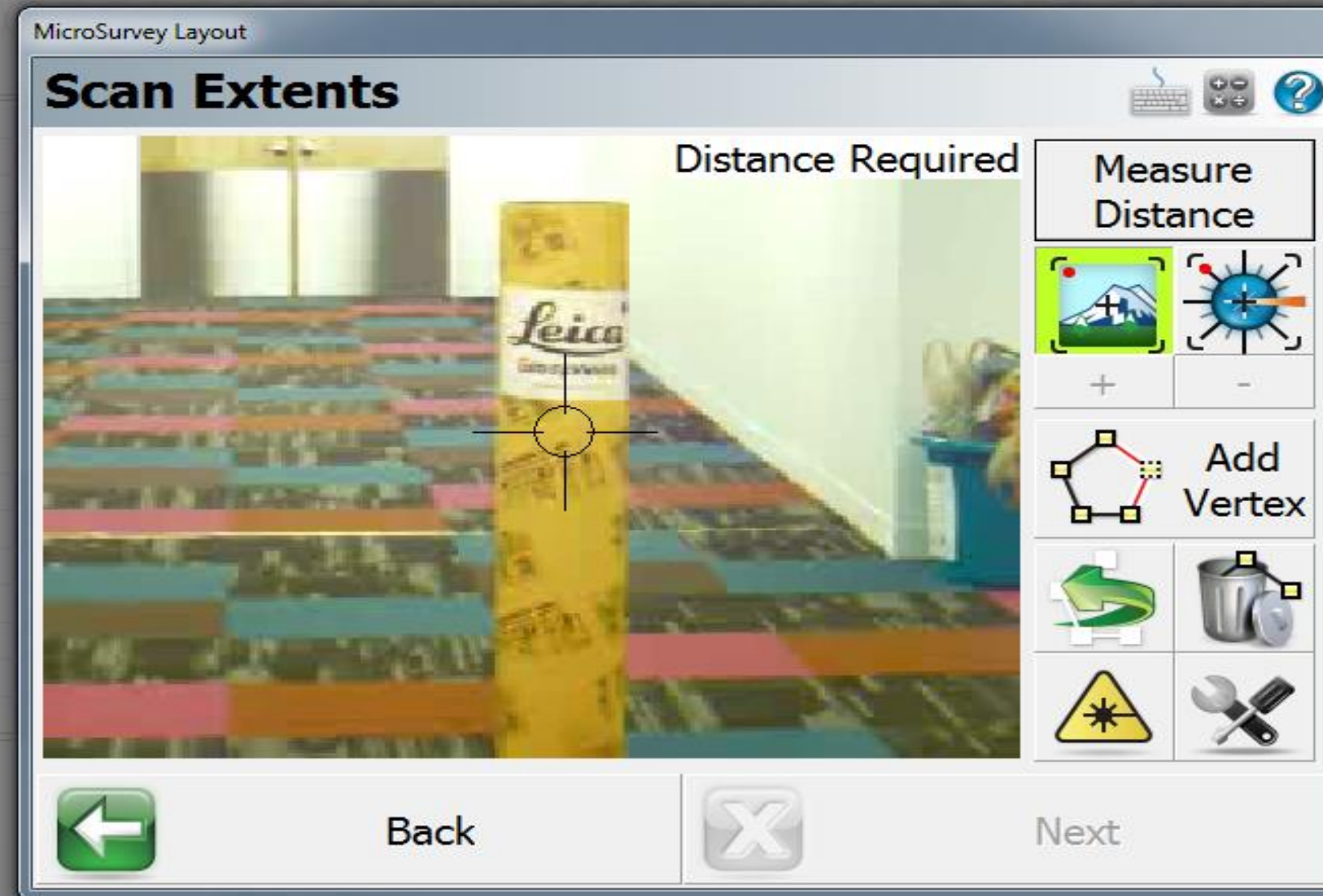
0'8 3/8"

Leica
Geosystems

Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout

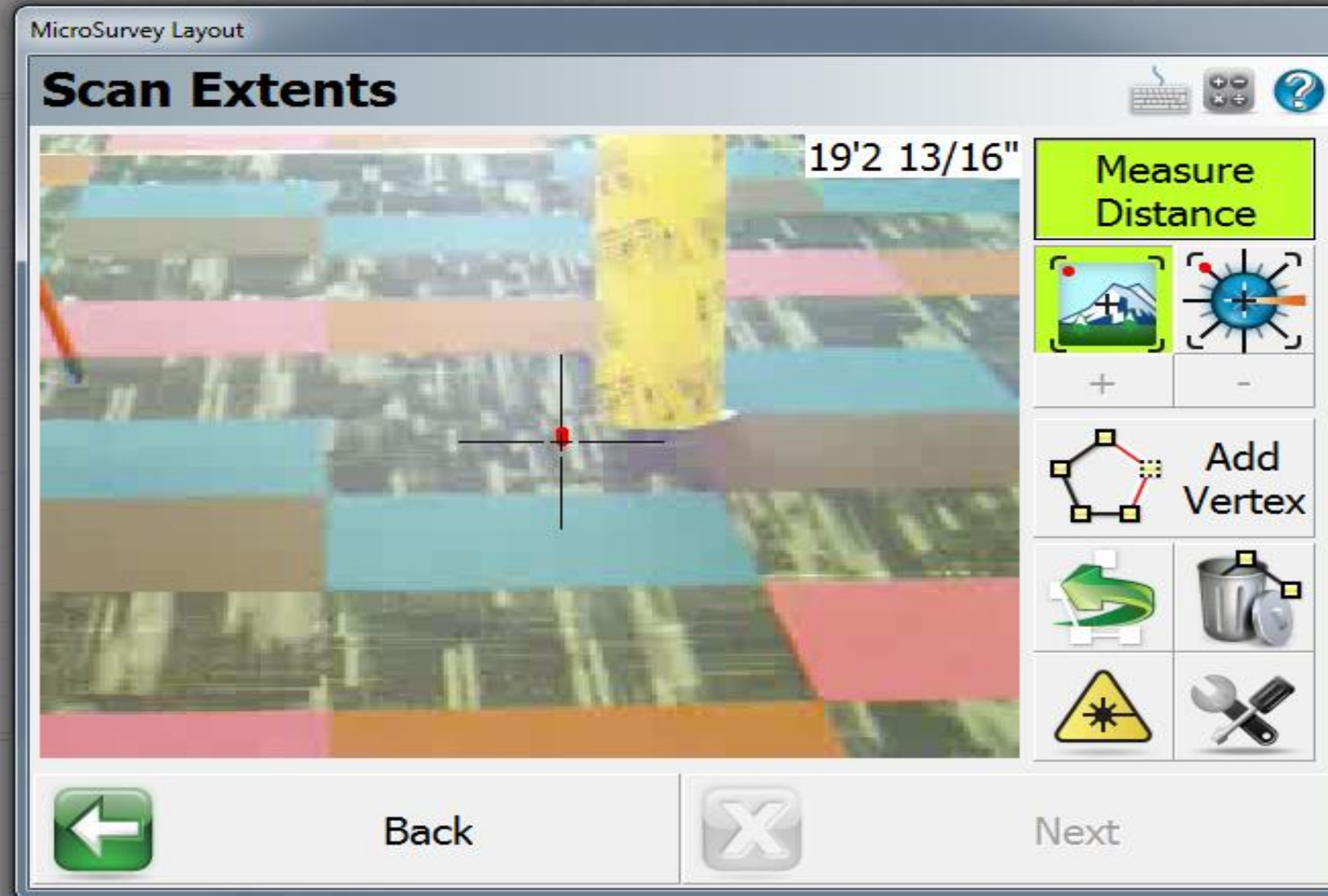


Leica
Geosystems

Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout

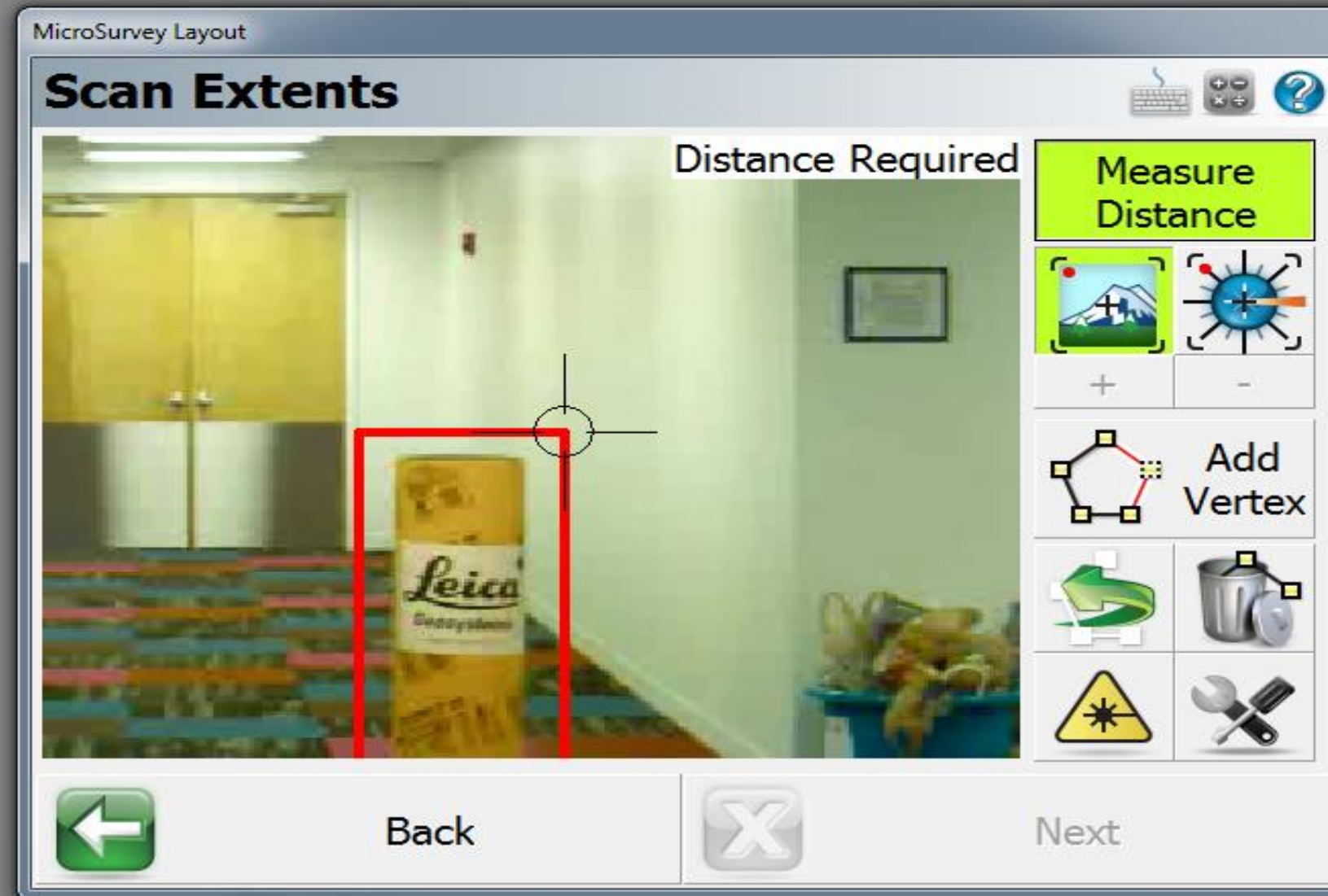


Leica
Geosystems

Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout



Trk

HT:0'0"
RL Std



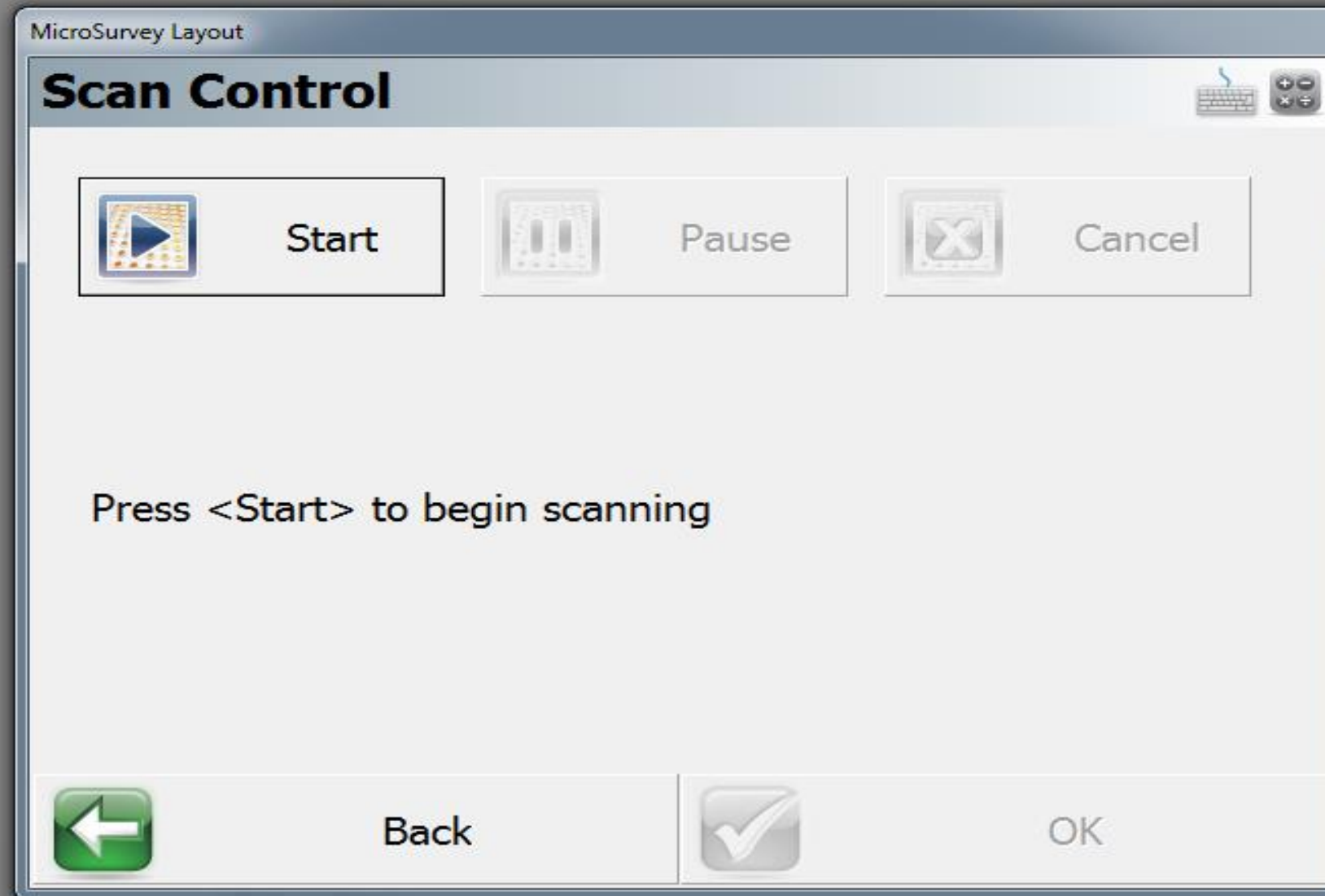
Measure
and Store



Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout



Trk

HT:0'0"
RL Std



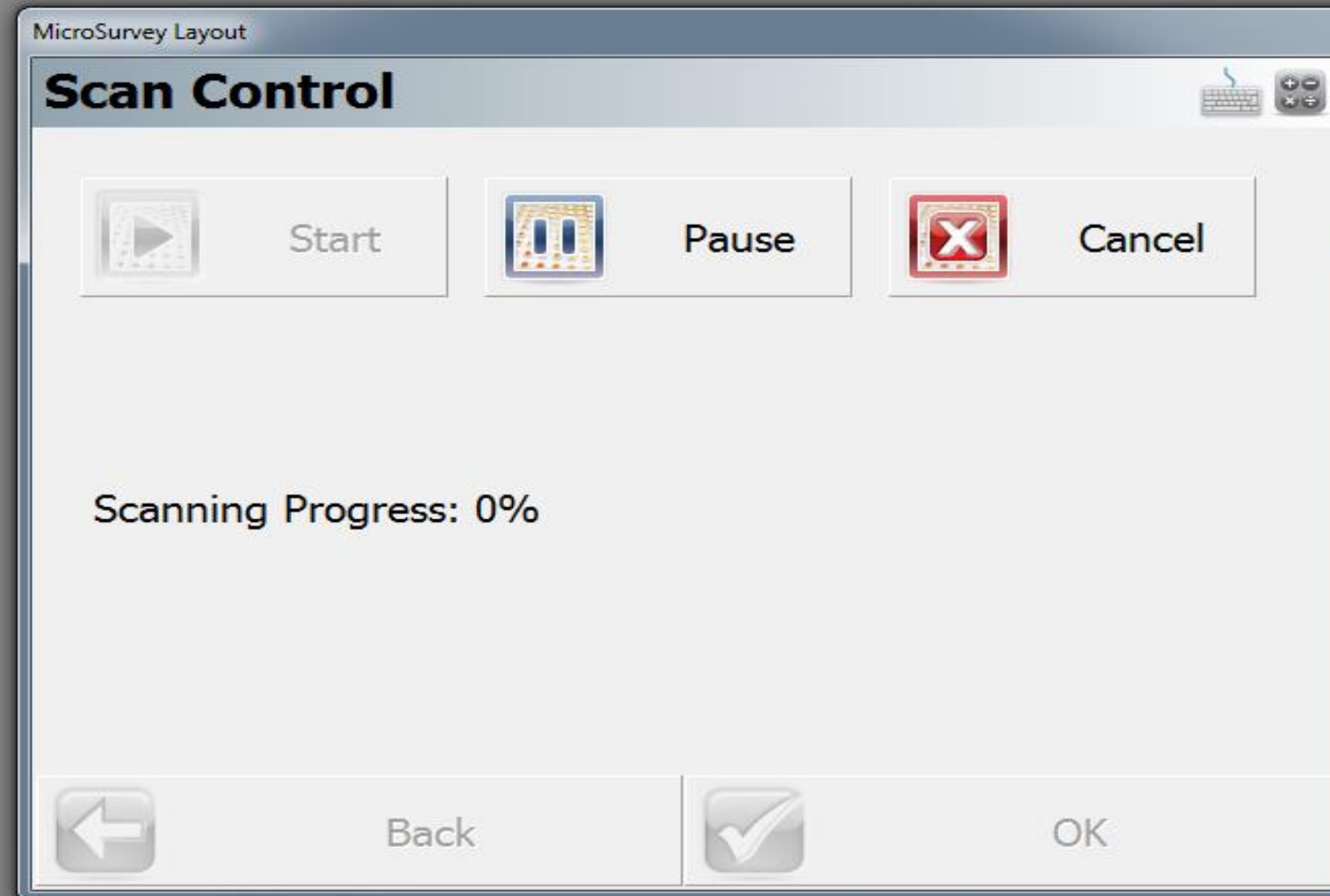
Measure
and Store



Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout



Trk

HT:0'0"
RL Std



Measure
and Store

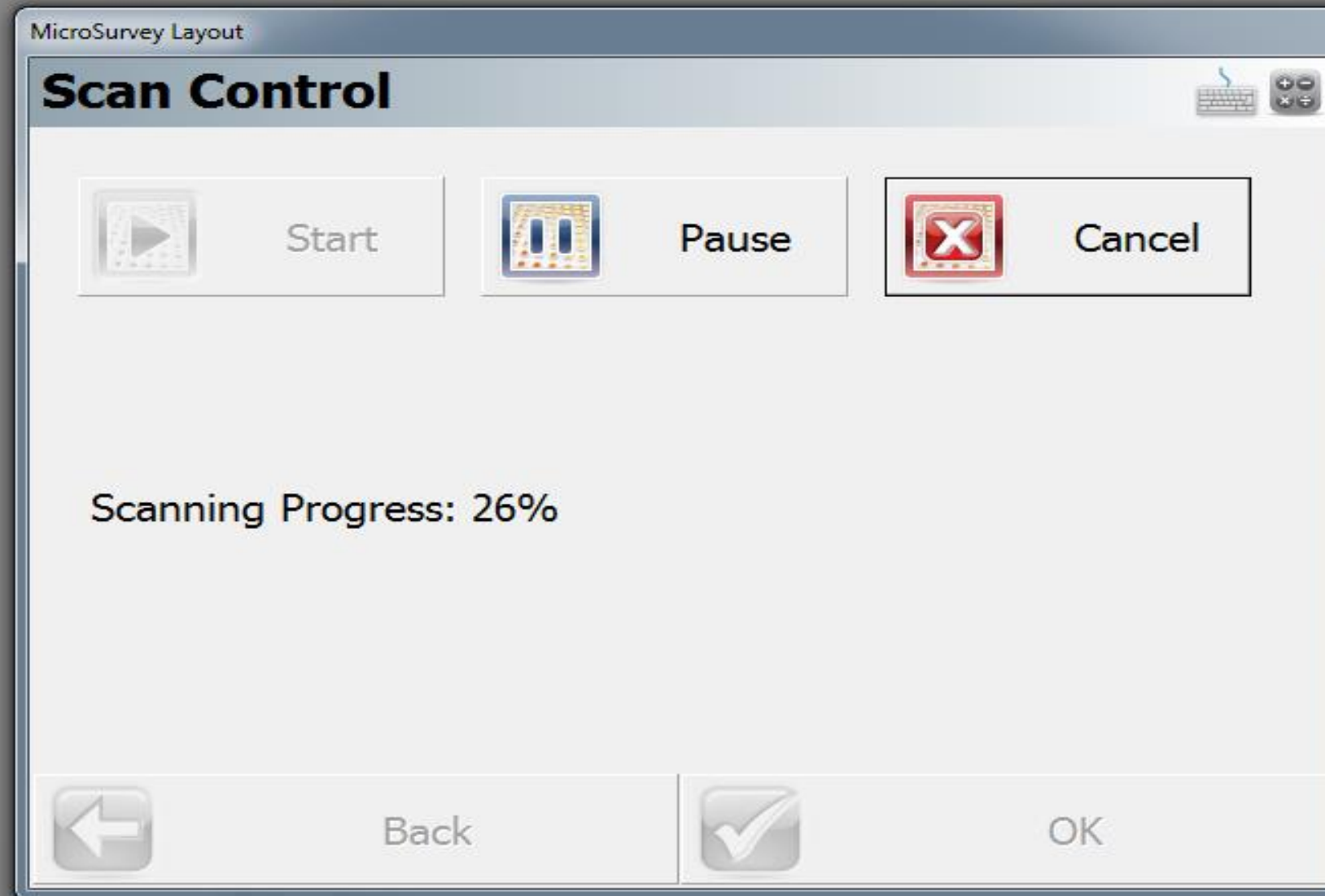


Leica
Geosystems

Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout



Trk

HT:0'0"
RL Std



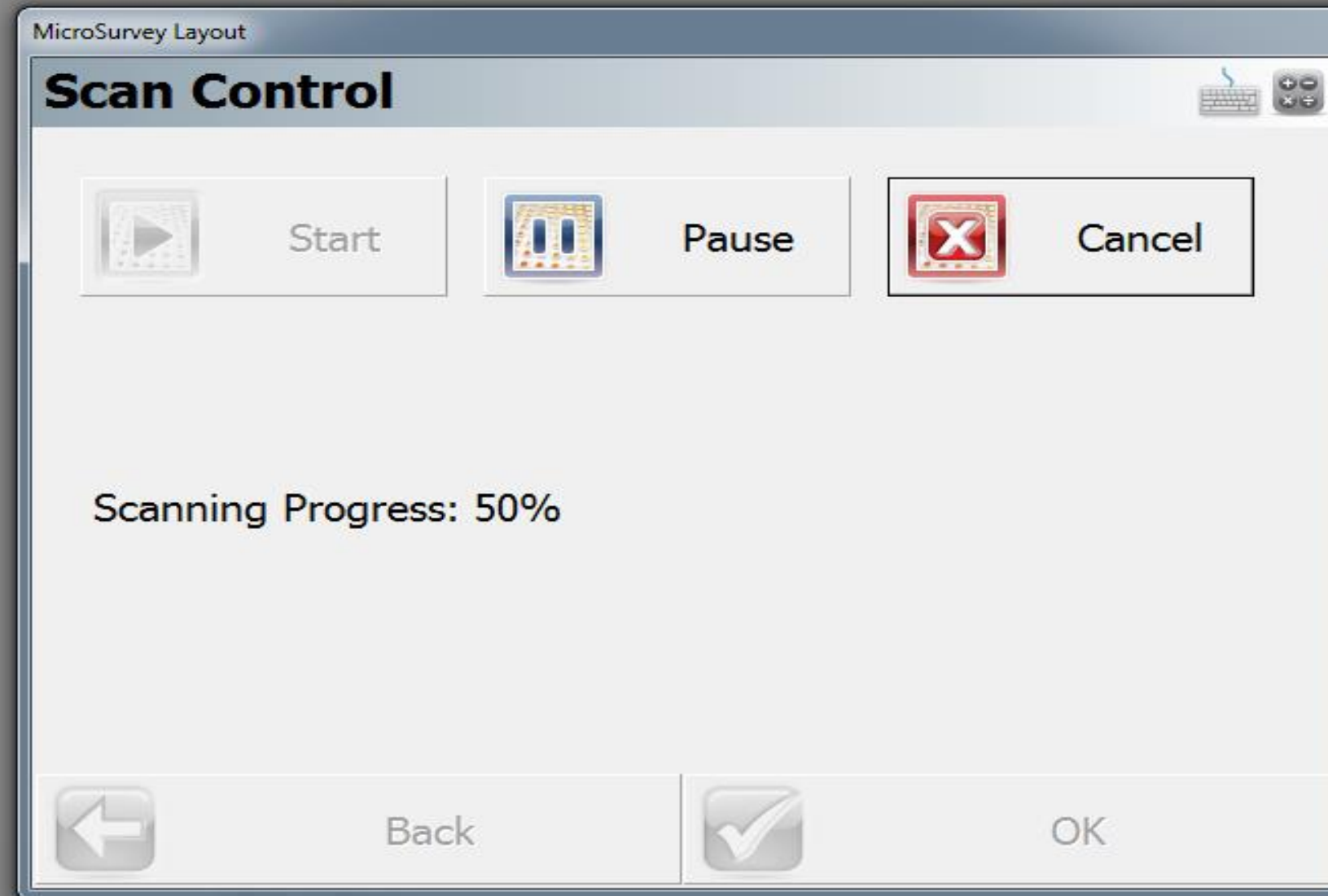
Measure
and Store



Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout



Trk

HT:0'0"
RL Std



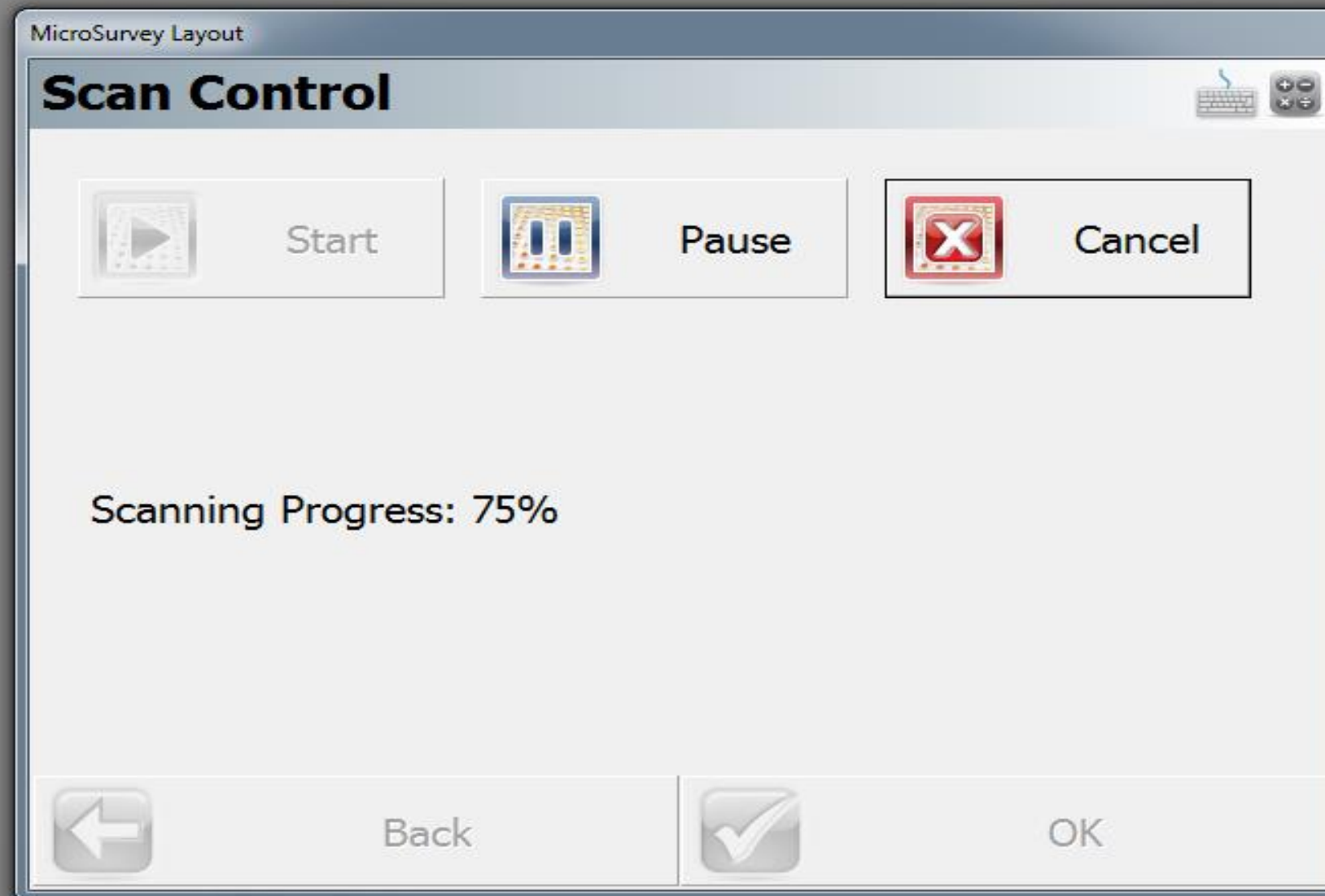
Measure
and Store



Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout



Trk

HT:0'0"
RL Std



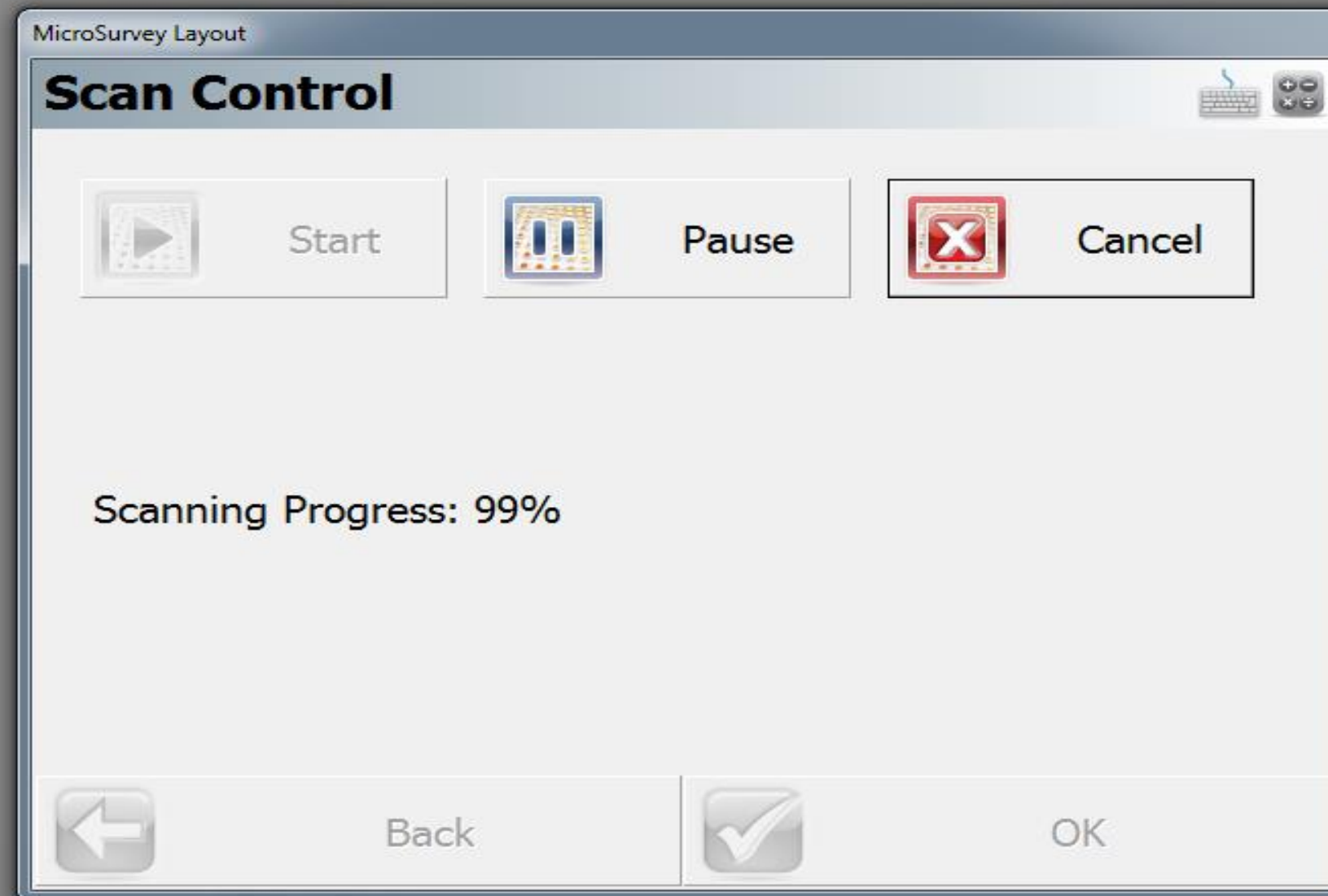
Measure
and Store



Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout



Trk

HT:0'0"
RL Std



Measure
and Store



Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout


MicroSurvey Layout

Scan is finished

Scan file name:
GComScan_20141123_222737.sdb

☒ Transfer scan file to local project folder

☒ Create HeXML file:
AU_Test3_112314_Scan.xml

 OK



Trk

HT:0'0"
RL Std



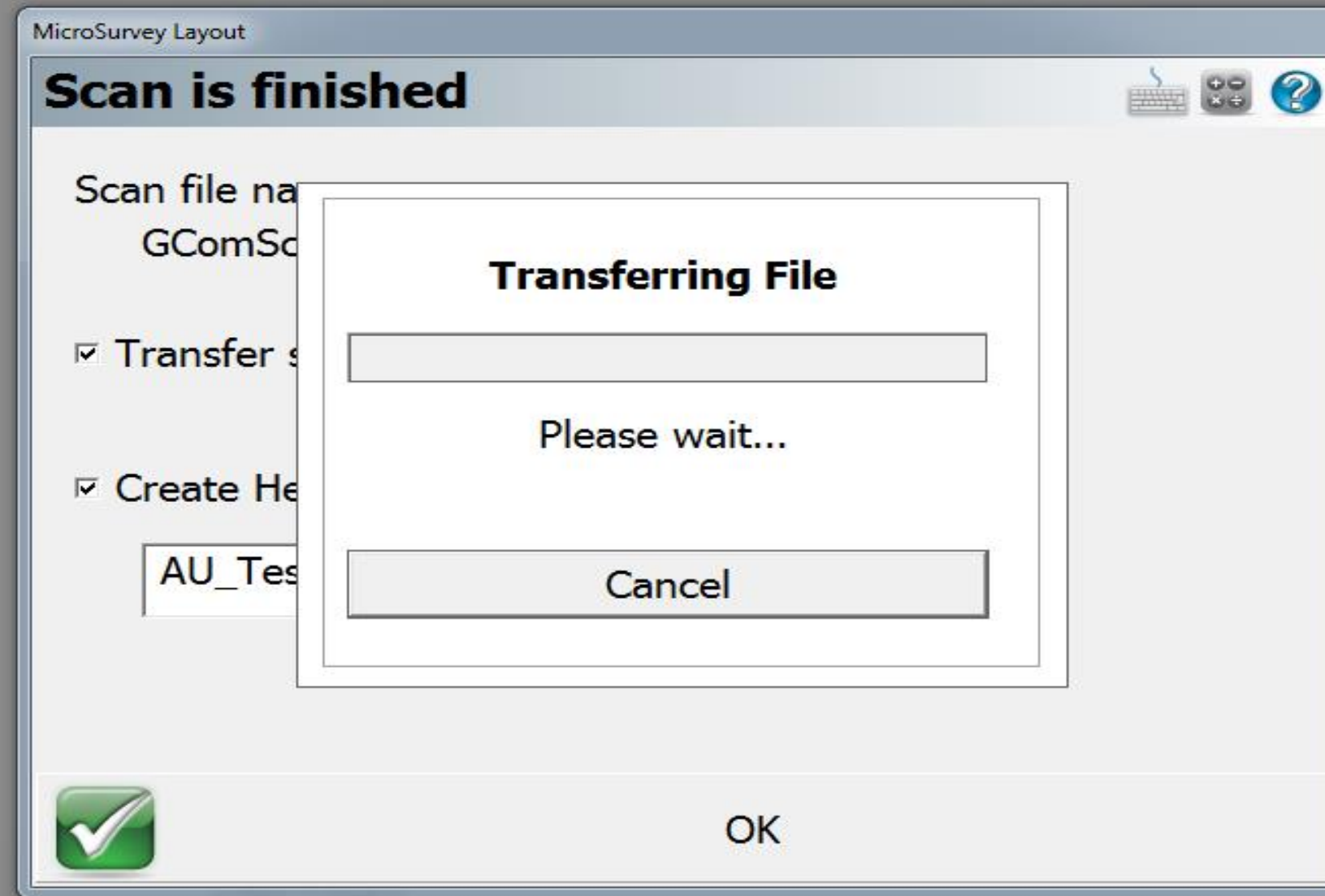
Measure
and Store



Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout



Trk

HT:0'0"
RL Std



Measure
and Store

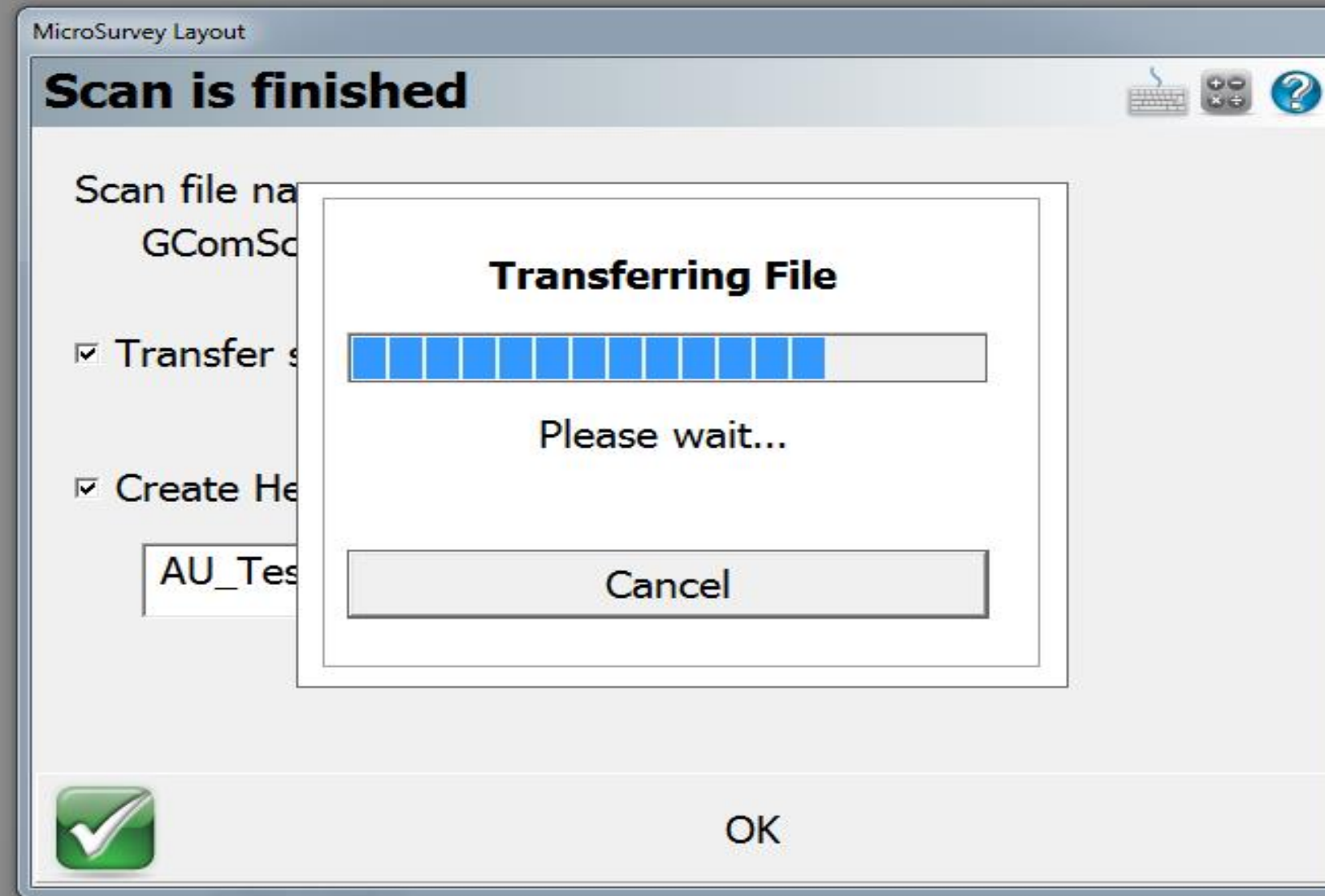


Leica
Geosystems

Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout



Trk

HT:0'0"
RL Std



Measure
and Store

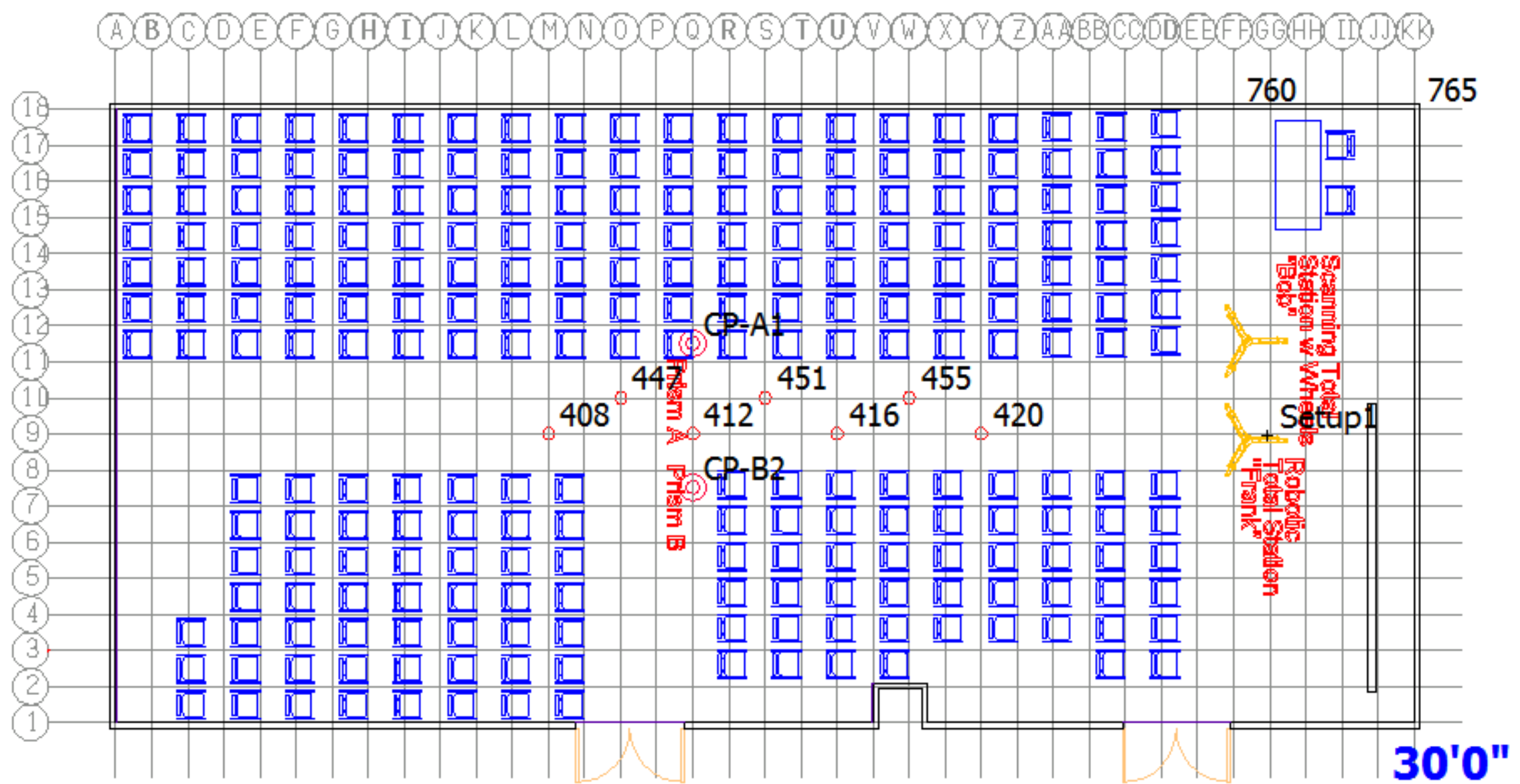


Leica
Geosystems

Step 8: Scan and Roundtrip Data



AU_Test3_112314 - Layout



Trk

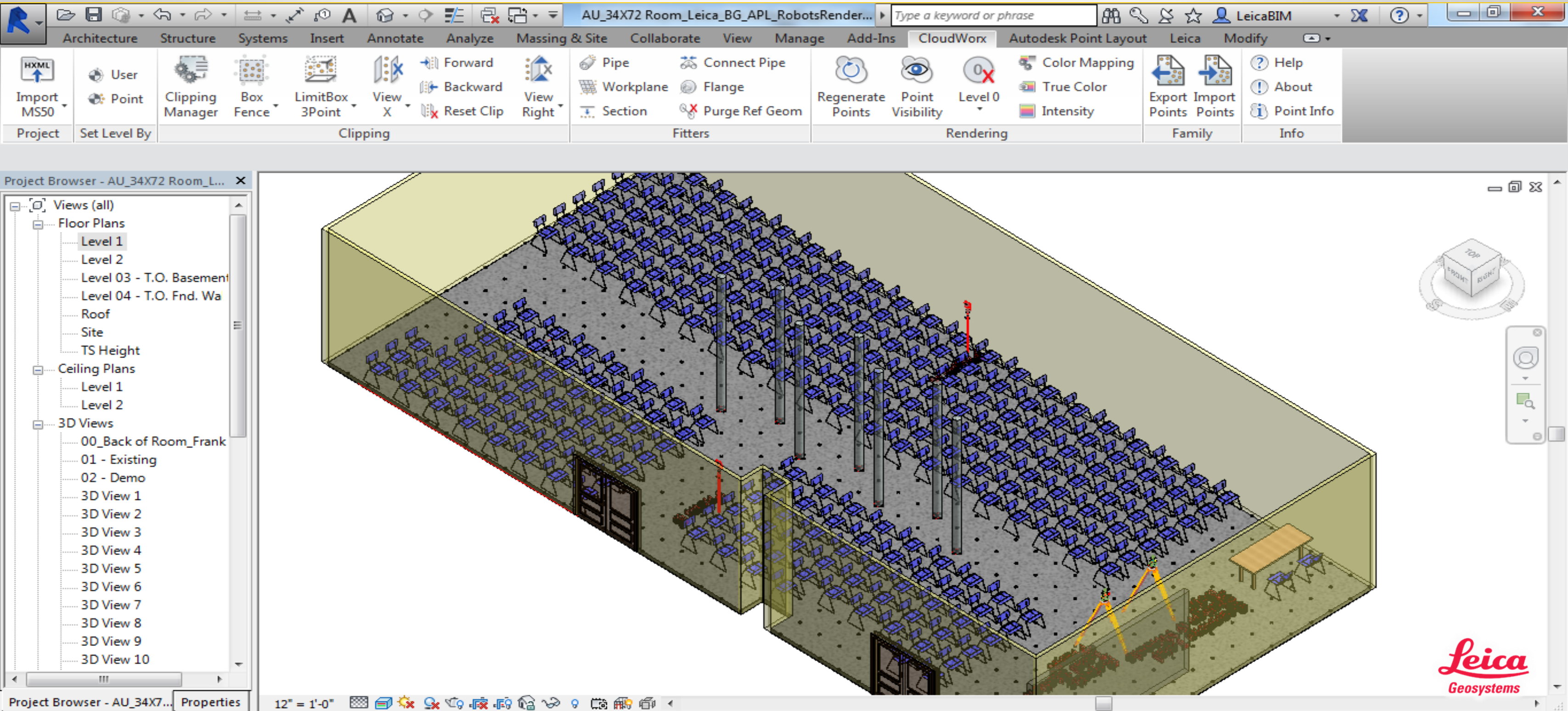
HT:0'0"
RL Std

Measure
and Store



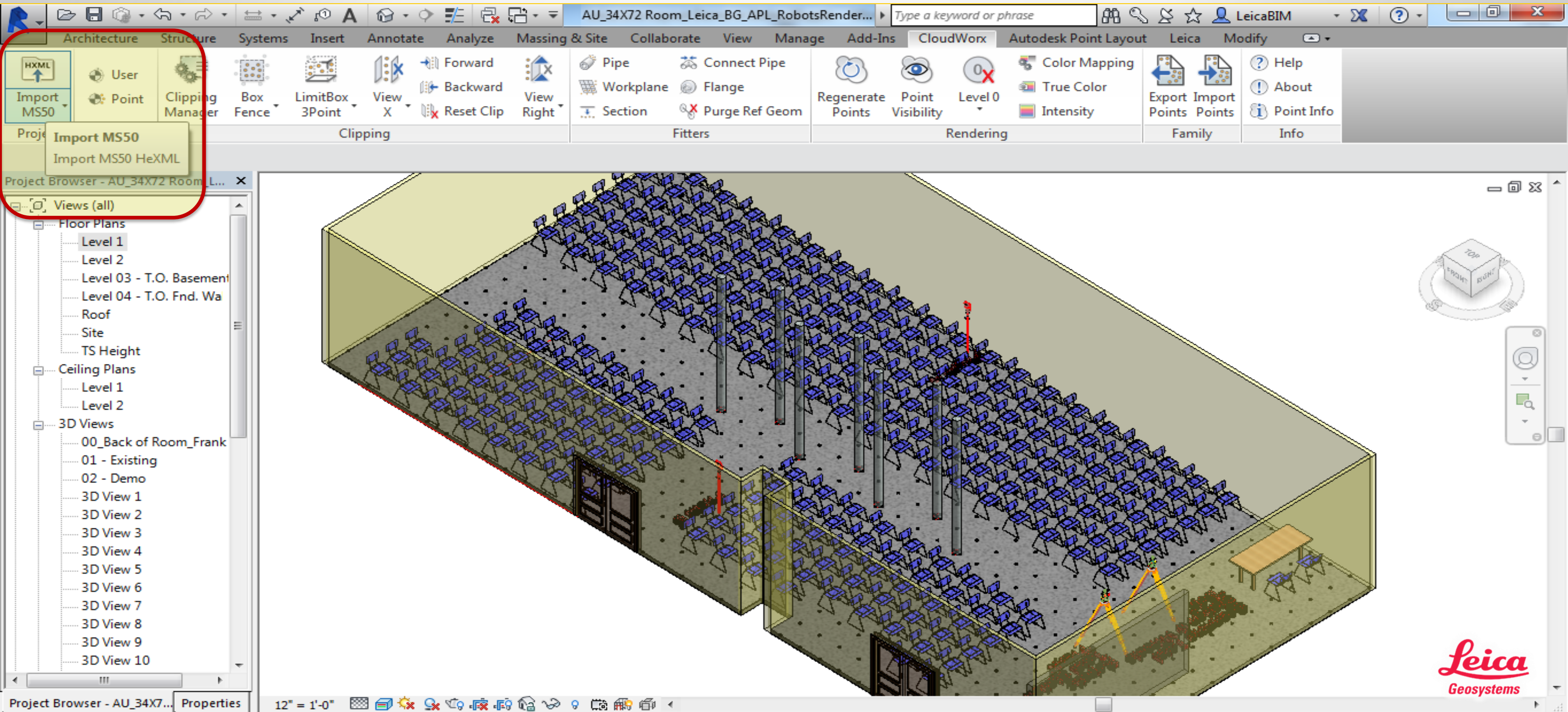
<No Line>

Step 8: Scan and Roundtrip Data into Revit

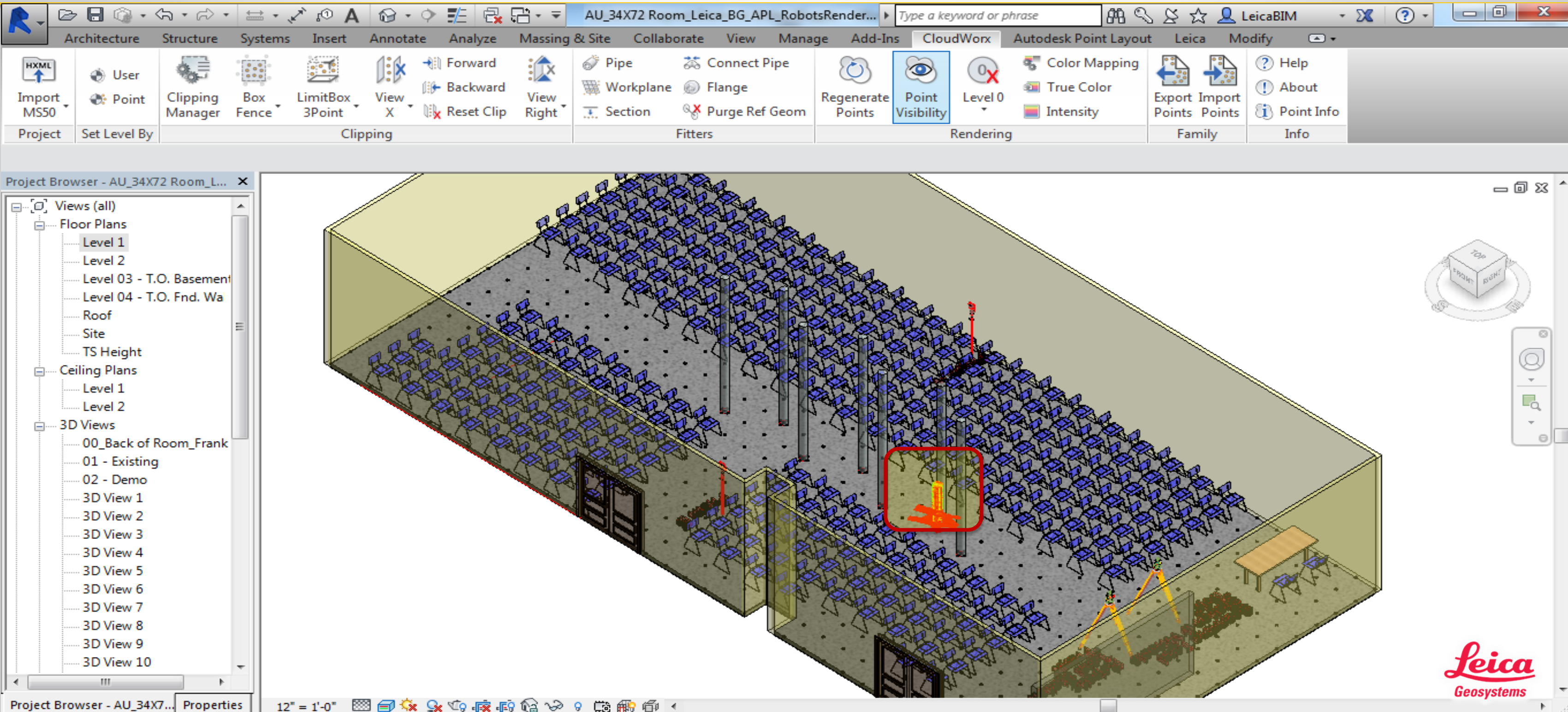


Leica
Geosystems

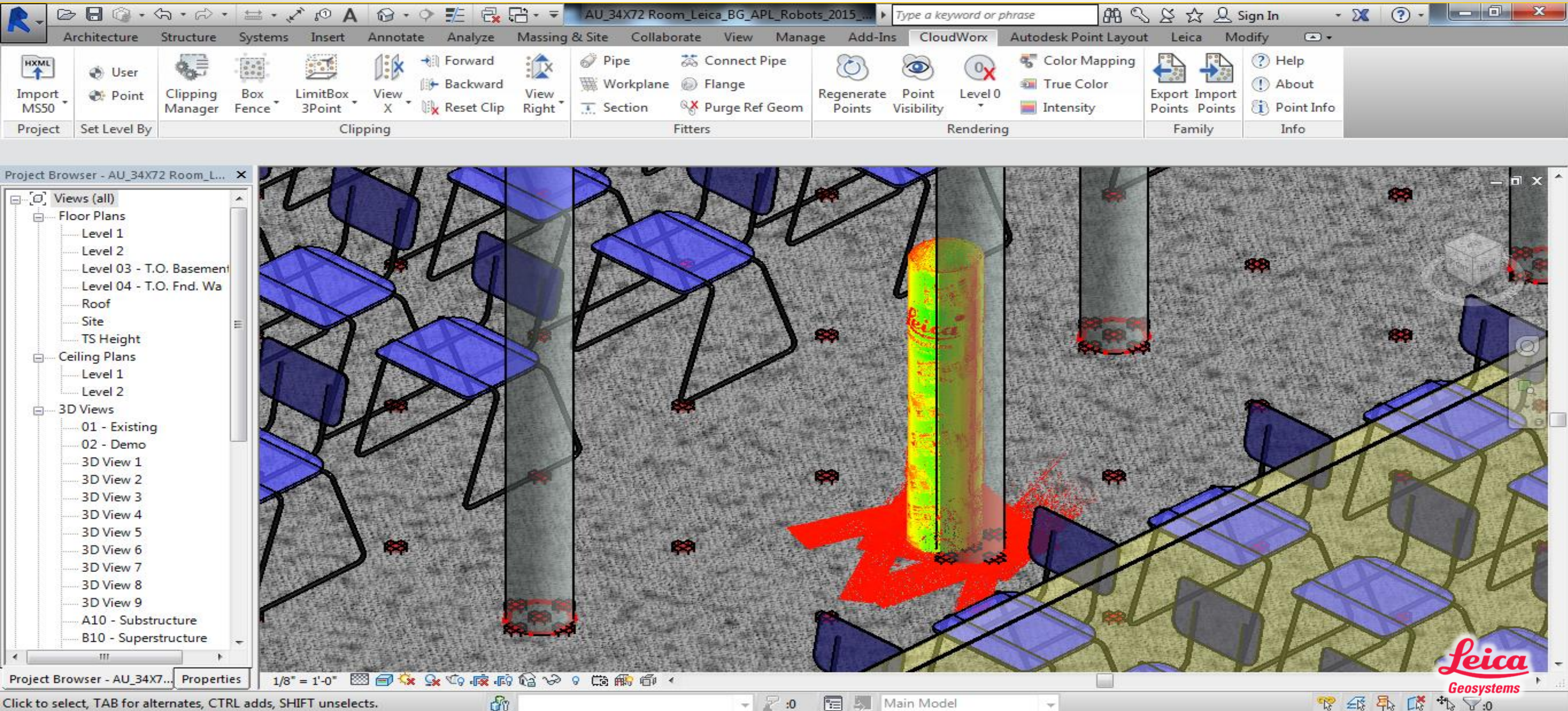
Step 8: Scan and Roundtrip Data into Revit



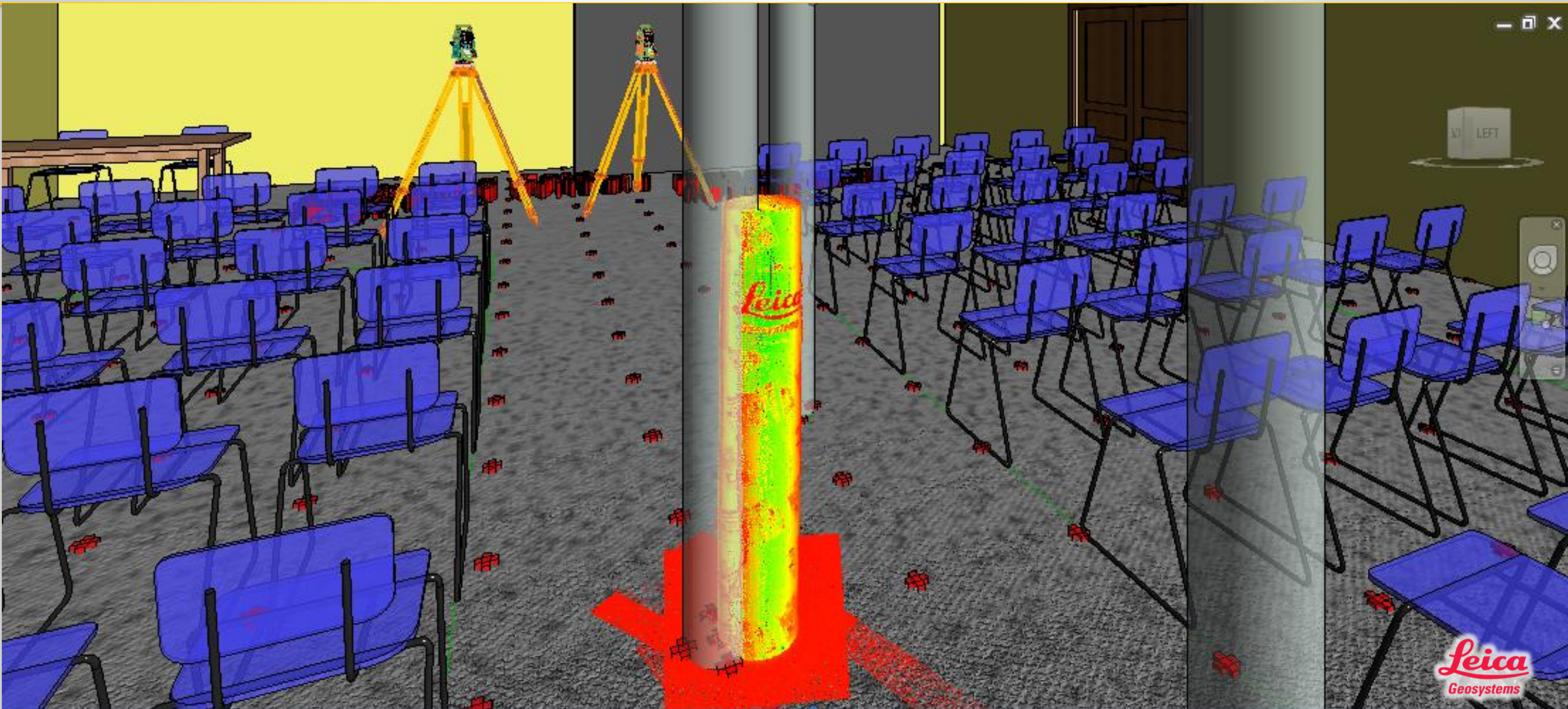
Step 8: Scan and Roundtrip Data



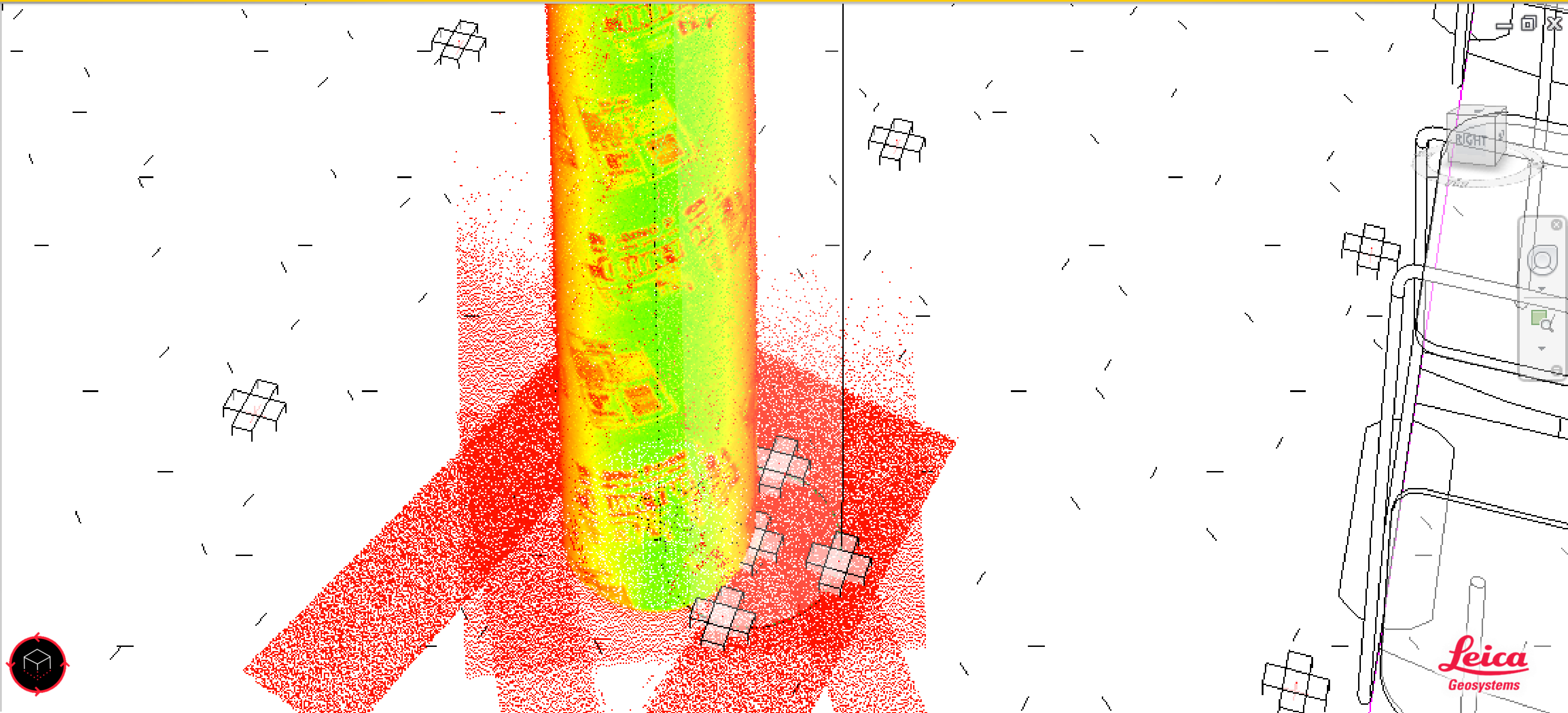
Step 8: Scan and Roundtrip Data



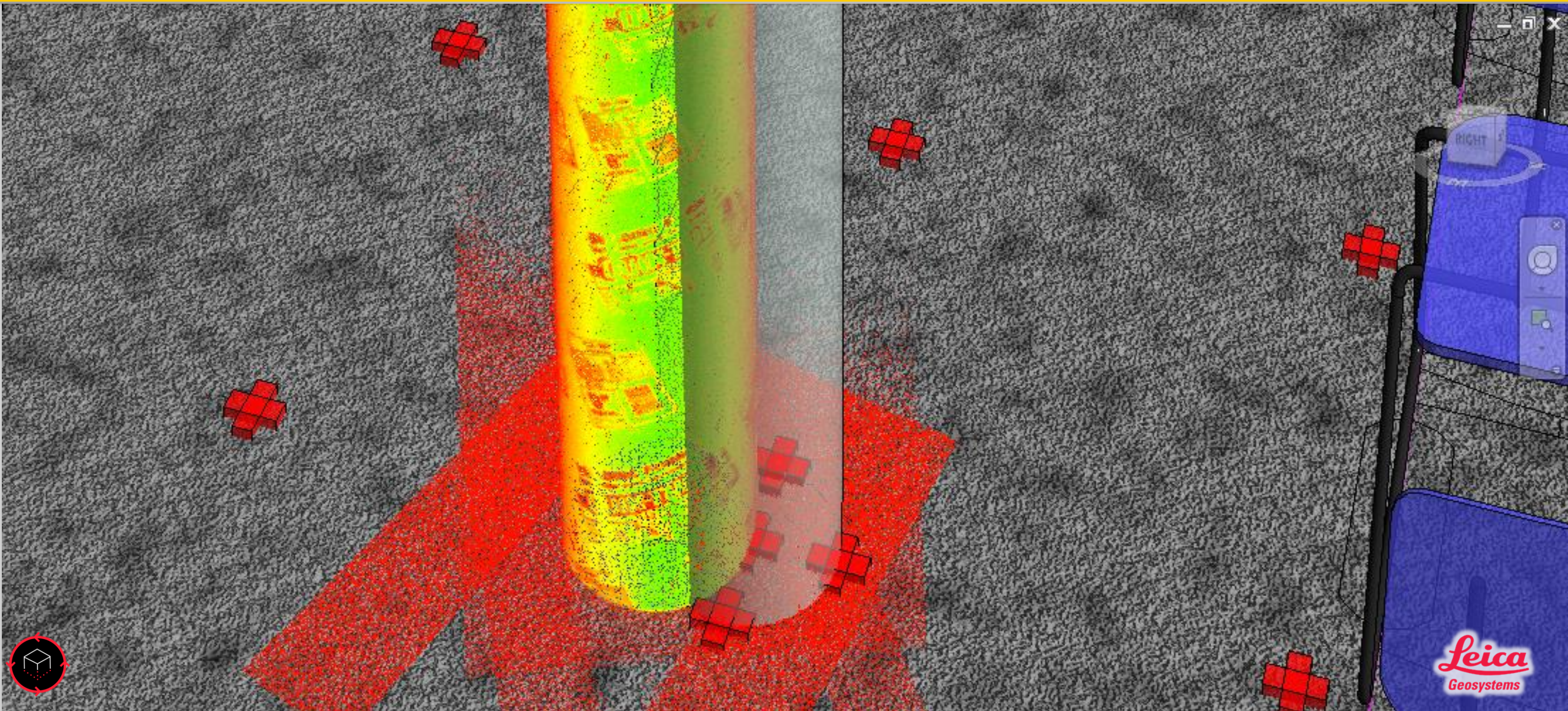
Step 8: Scan and Roundtrip Data



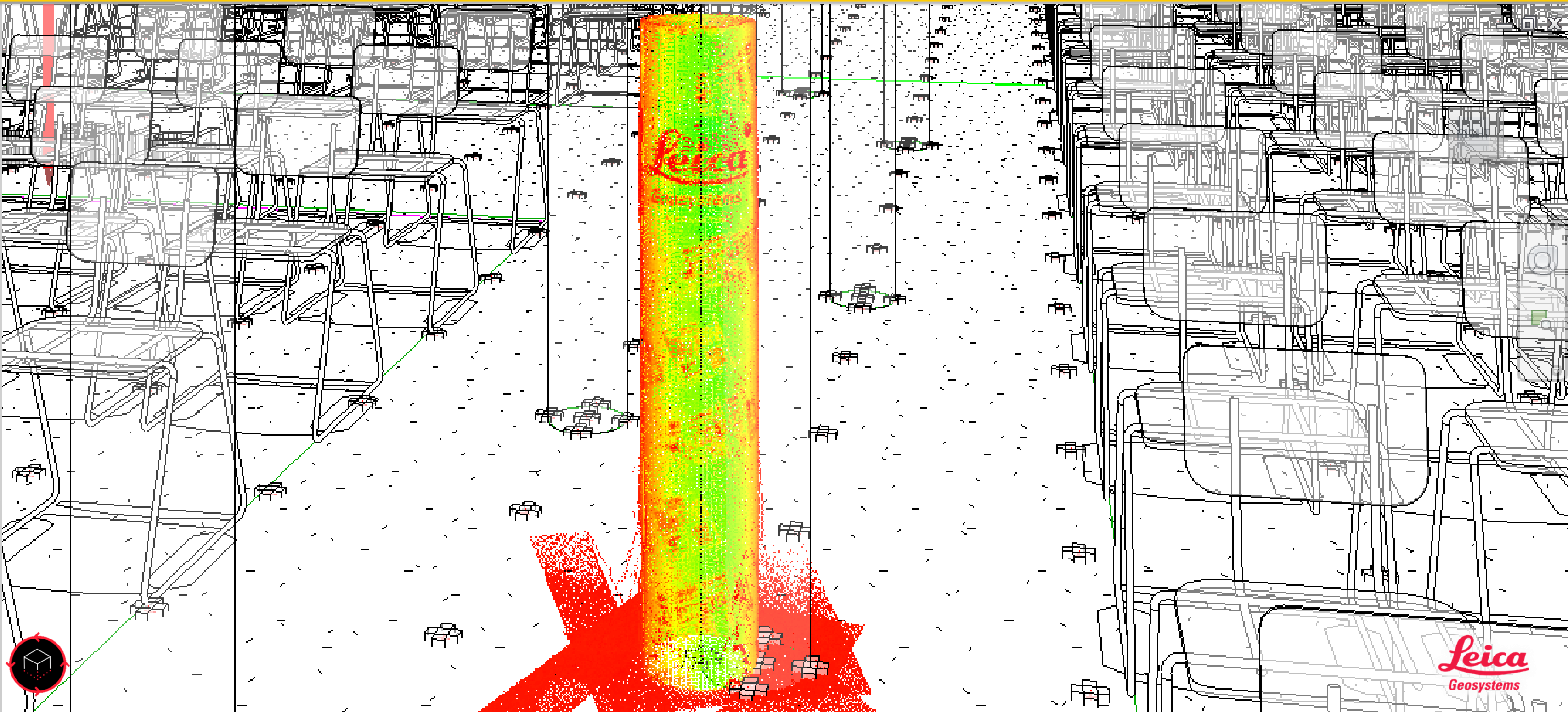
Step 9: Import Scan into Revit – Auto Oriented and Registered



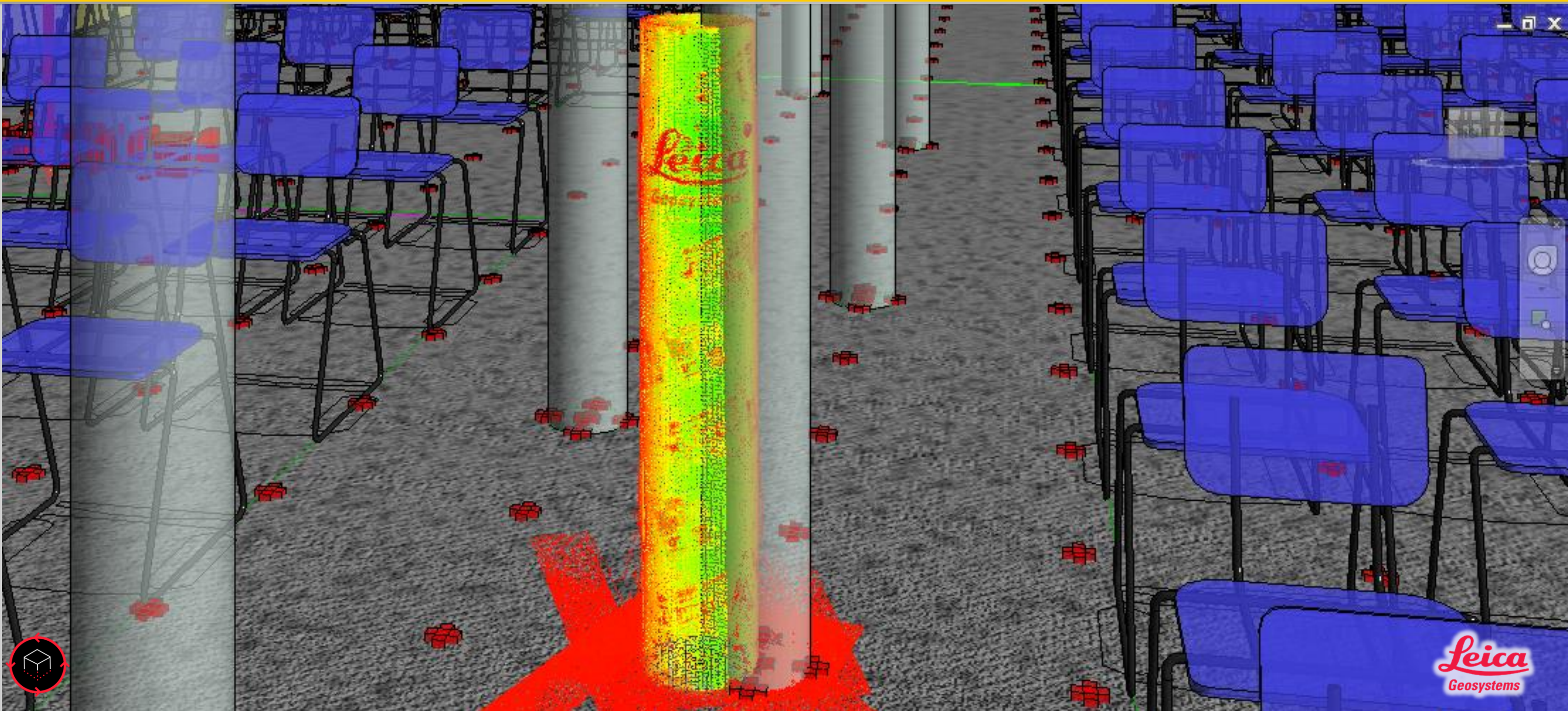
Step 9: Import Scan into Revit – Auto Oriented and Registered



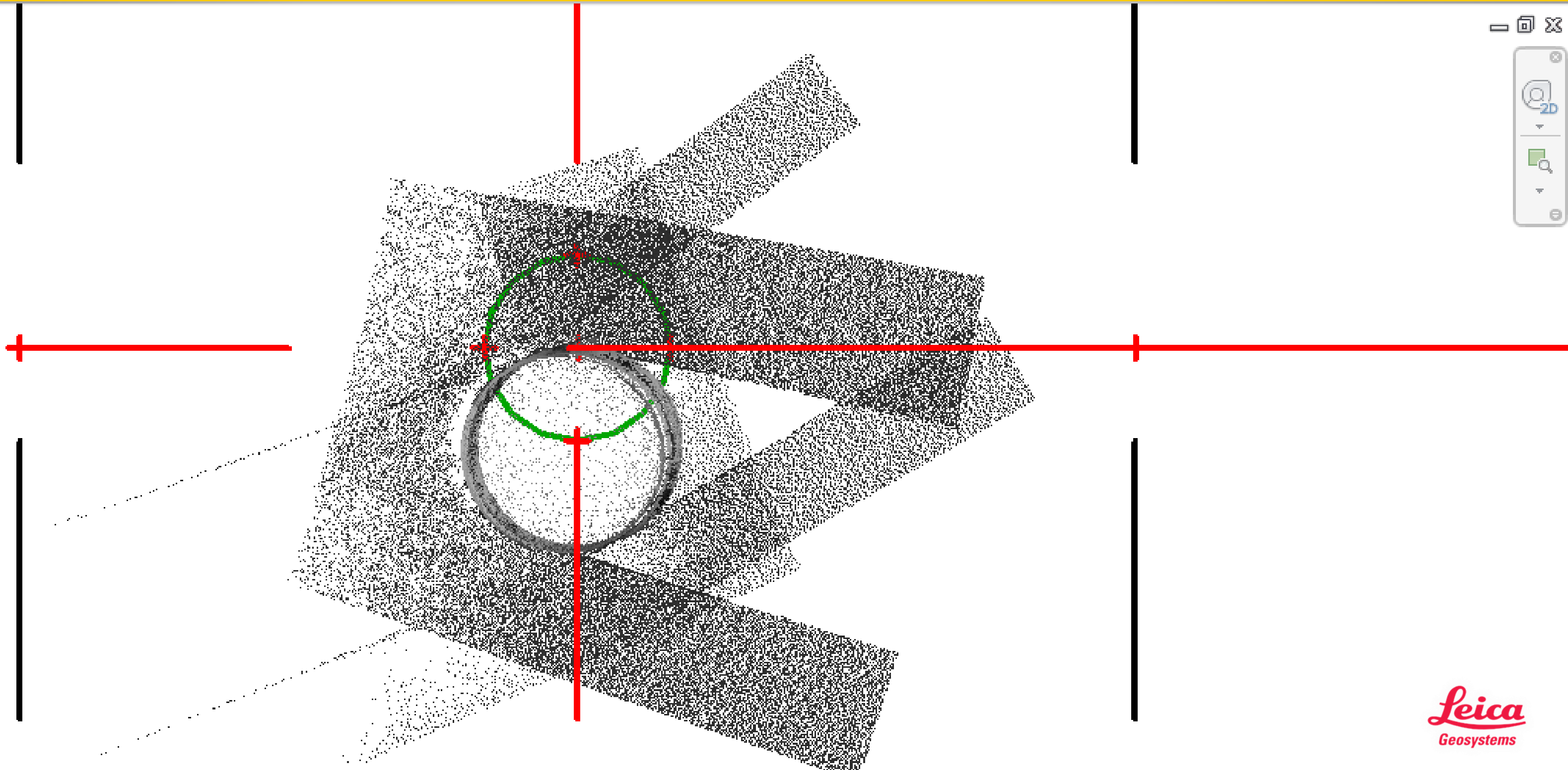
Step 9: Import Scan into Revit – Auto Oriented and Registered



Step 9: Import Scan into Revit – Auto Oriented and Registered



Step 9: Import Scan into Revit – Auto Oriented and Registered





Session Feedback

- Via the Survey Stations, email or mobile device
- AU 2015 passes given out each day!
- Best to do it right after the session
- Instructors see results in real-time







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