Laser Scanning Gone Wild: 4D clash detection with the point cloud at Broward Center for Performing Arts

Kristopher M. Lengieza
Director of VDC at Stiles Corporation
@Gieza0527

Alix Loiseau
VP of ACAI Technologies

Class Summary

Learn how we used laser scanning and Autodesk® Building Design Suite to coordinate the installation of a new chiller and air handling unit in the basement of one of Florida's premier performance venues. We demonstrate how we used Autodesk® ReCap™, Autodesk® Revit®-based software, Autodesk® Navisworks® software, and Apple® iPads® tablets to create a 4D clash detection model to preplan the movement of a 8.5-ton chiller into the existing mechanical room. Because performances scheduled throughout the construction limited downtime, having an efficient process was critical. The virtual design and construction (VDC) team learned the most efficient ways to transfer point cloud files using the ReCap™ RCS format, perform clash detection in the point cloud in Navisworks®, create models, and distribute the information to the team for use in the field. This lean process helped all team members visualize and plan their work, and it provided the owner with a useful as-built model for future work.

Key learning objectives

At the end of this class you will understand the process for:

- Aggregating point cloud files into ReCap™, navigate the point cloud, take measurements, and distribute data from ReCap™
- Bring laser scans into Revit® to model existing conditions
- Perform clash detection in Navisworks® using laser scans and Revit® files
- Explain why laser scanning is a cost effective way to document as-built conditions and coordinate renovation work

Broward Center for Performing Arts

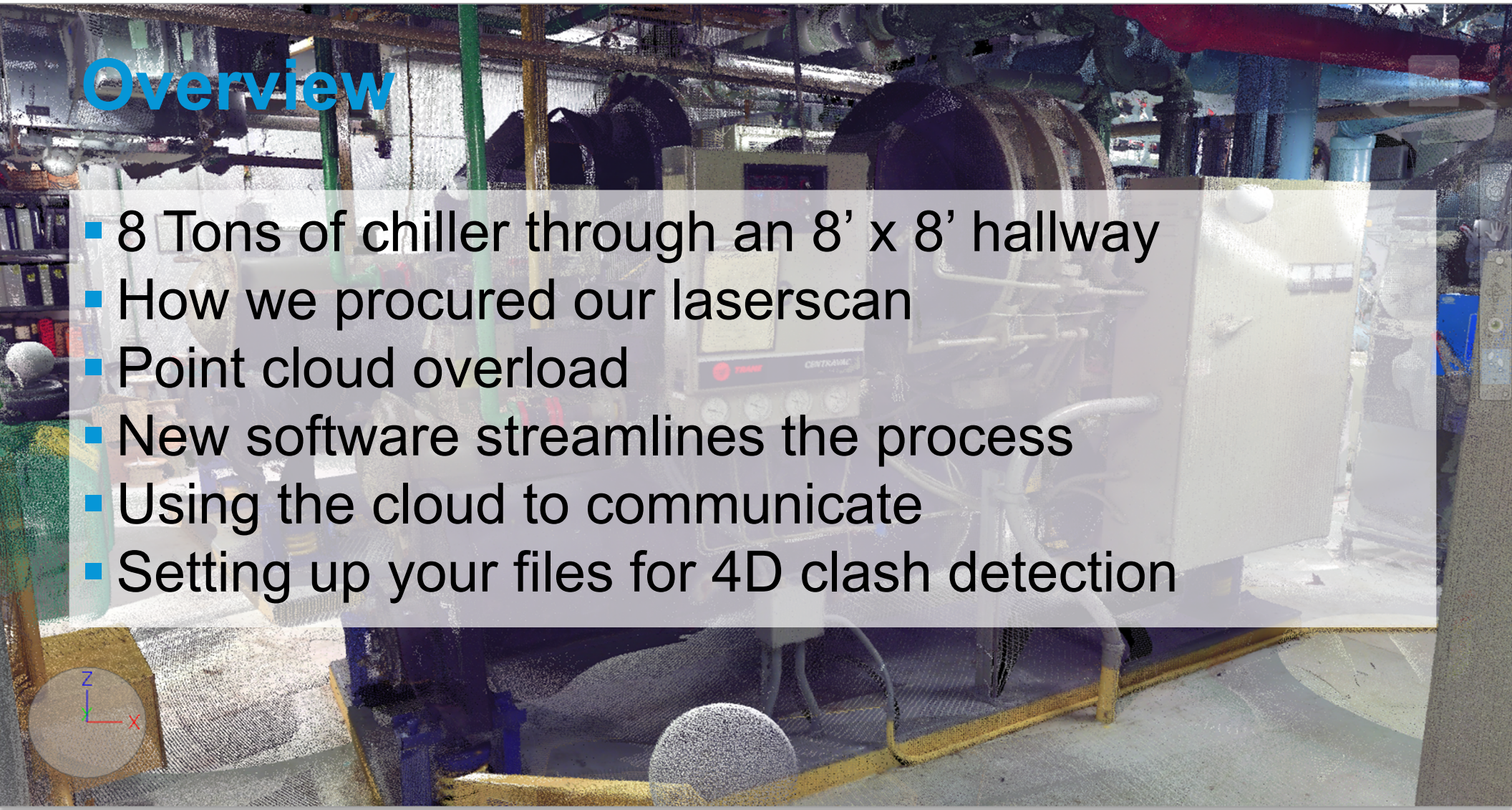
Fort Lauderdale, FL

ACAI technologies, inc

STILES CONSTRUCTION Invest. Build. Manage

AUTODESK.

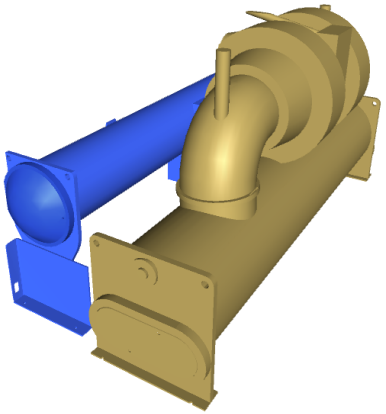
Overview



- 8 Tons of chiller through an 8’ x 8’ hallway
- How we procured our laserscan
- Point cloud overload
- New software streamlines the process
- Using the cloud to communicate
- Setting up your files for 4D clash detection

What we thought we needed to scan

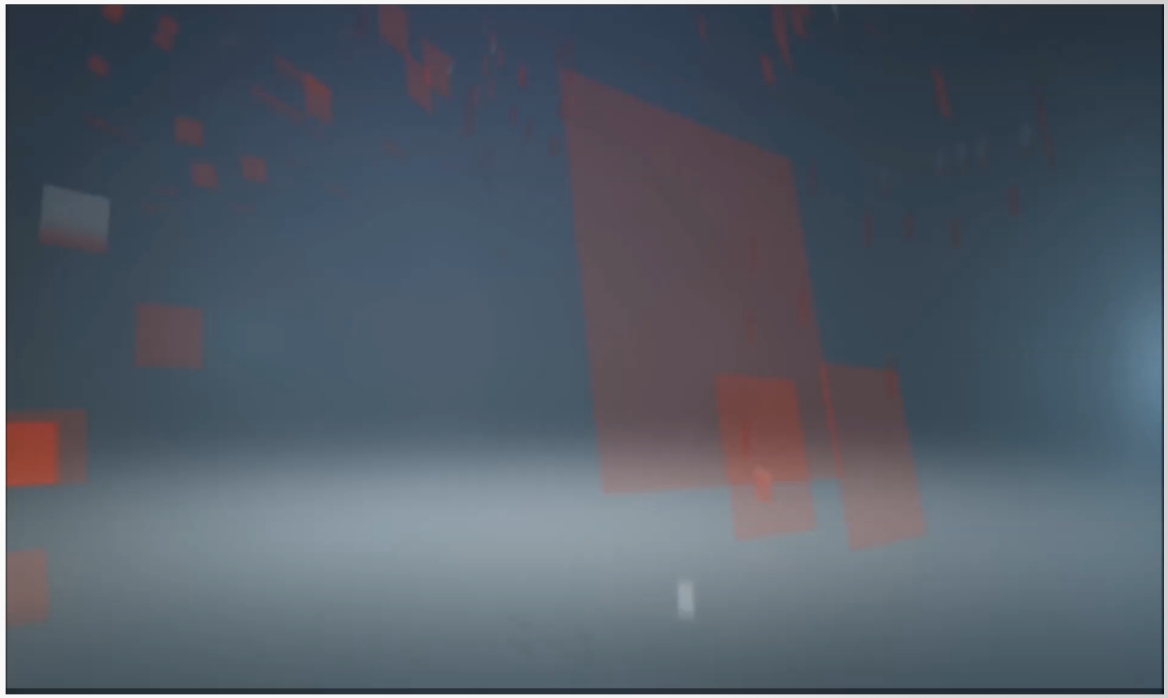
The task at hand



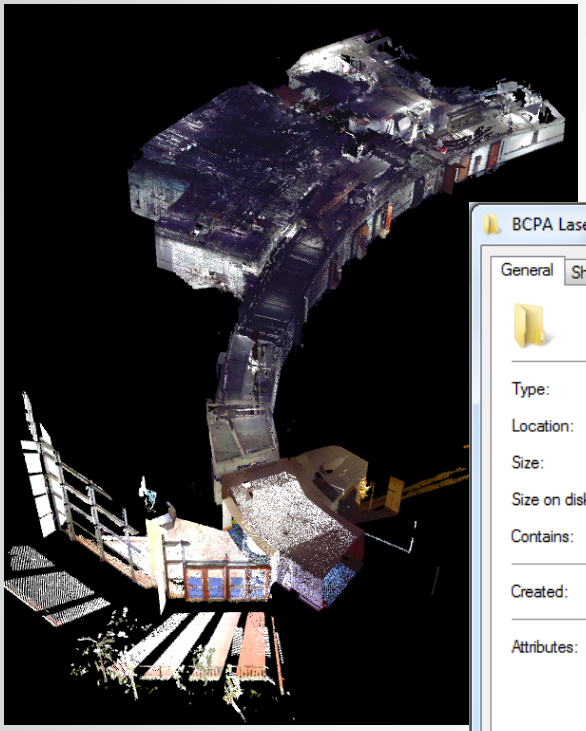
Laser Scanning Basics

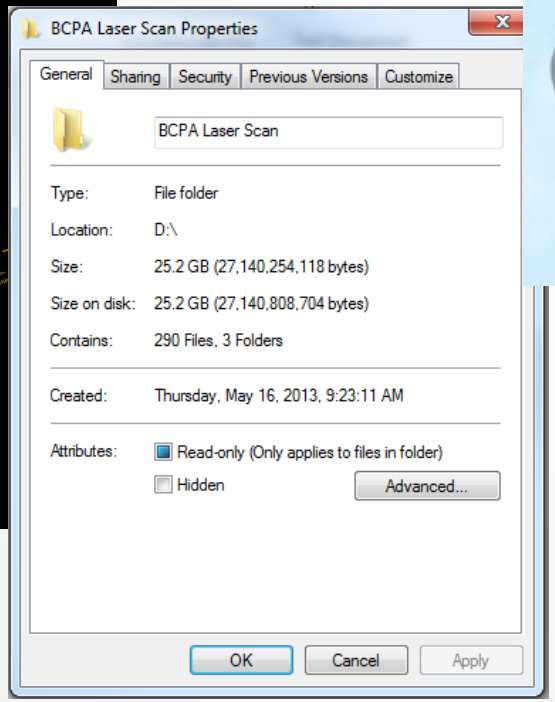
- Leica, Faro, Trimble
- Scan Density
- Number of Setups
- Post Processing
- Do you need a model or raw files?
- How long should it take?

http://youtu.be/or6JuiFBdbQ

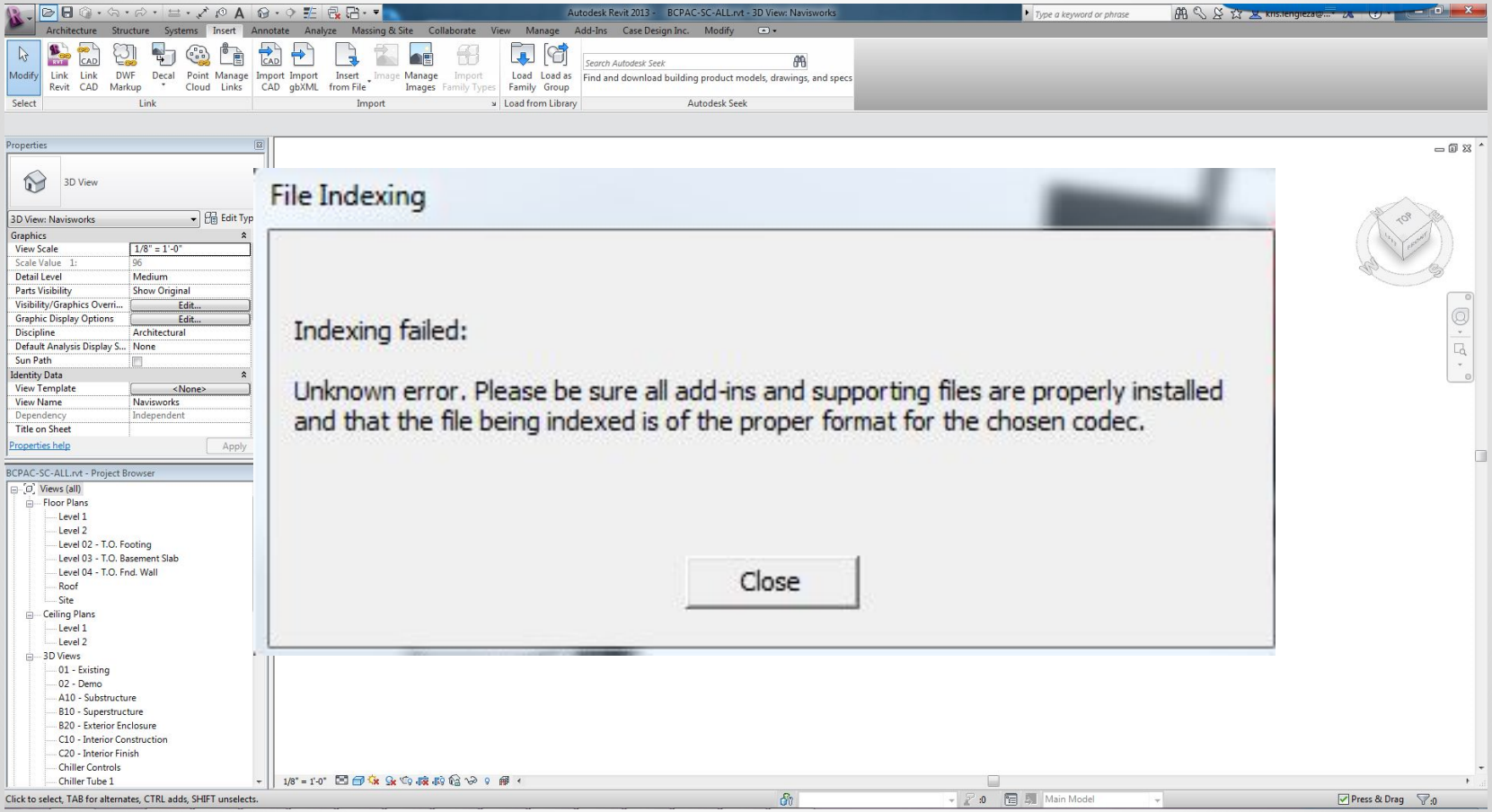


20 GB, that's a lot of points

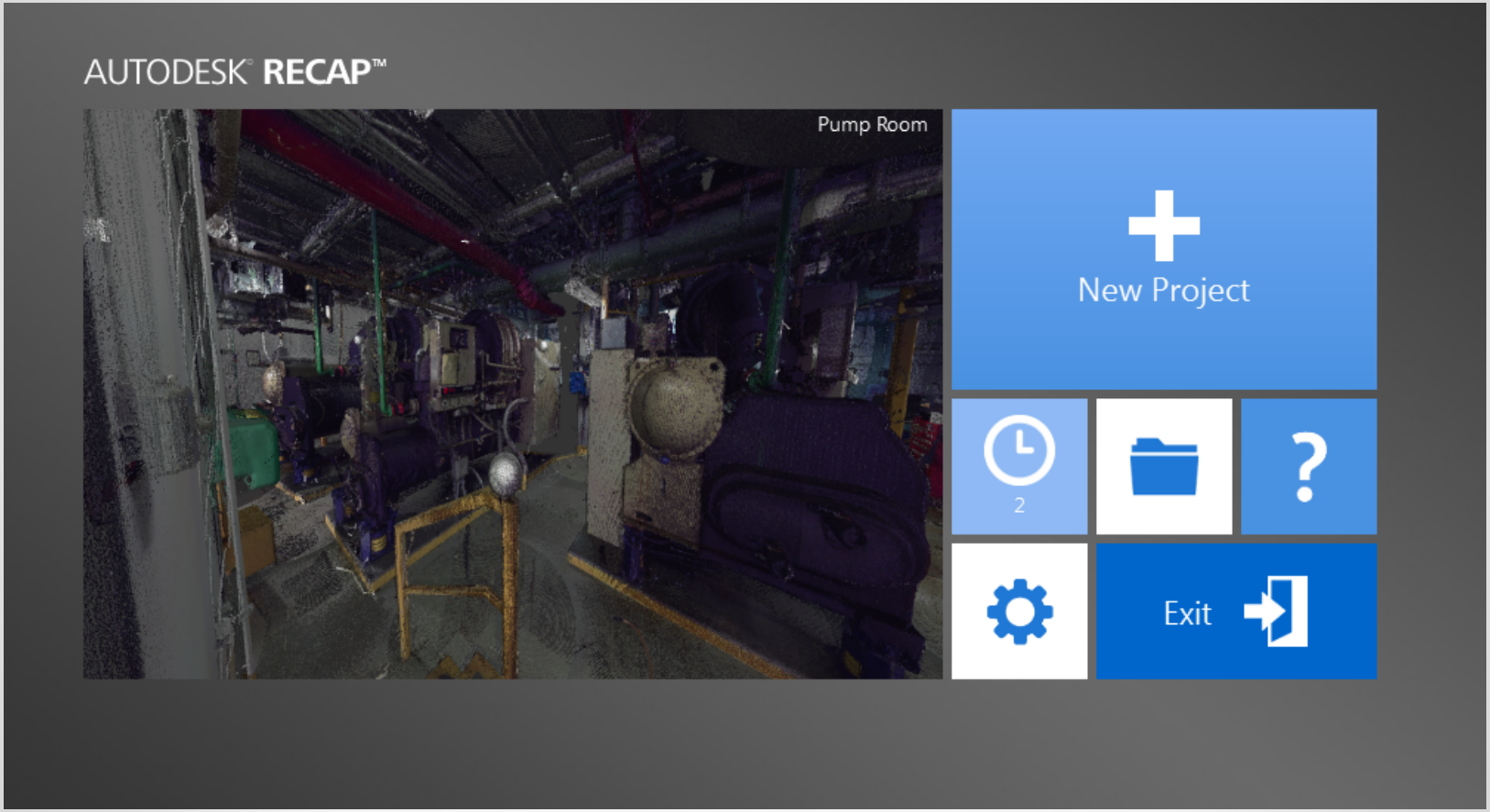




Revit and Navisworks 2013 if you dare



Recap, Revit and Navisworks 2014



Recap, Revit and Navisworks 2014

			
	Navisworks	Recap	Faro Scene
Cached	.NWC	.RCS	.FLS
Aggregator	.NWF	.RCP	.FLW
Aggregated	.NWD*		

*File is aggregated but a working copy of Recap is required to open it in addition to Navisworks, the .RCS files are not contained inside of the .NWD therefore it is still working like an .NWF

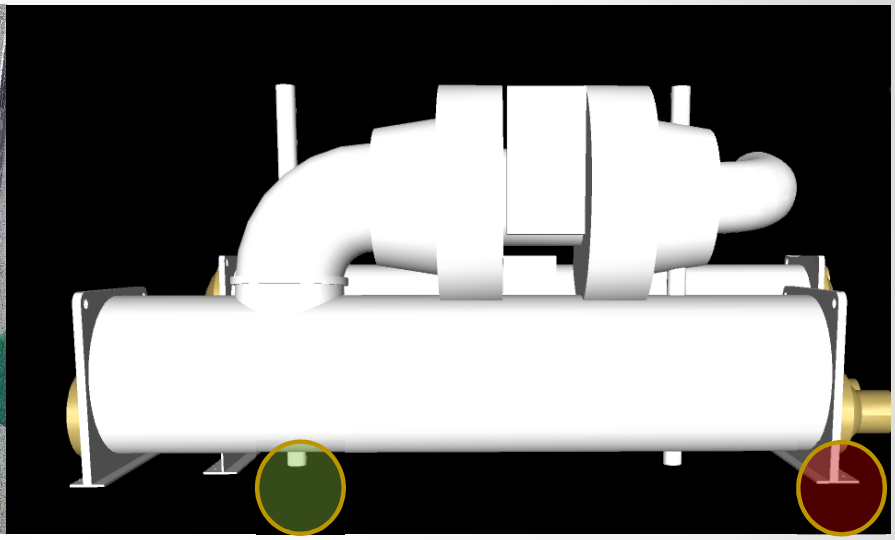
Recap and Autodesk 2014

http://youtu.be/bCTf_mIBSs8

Lets figure out what's in the way

Communicating with the team

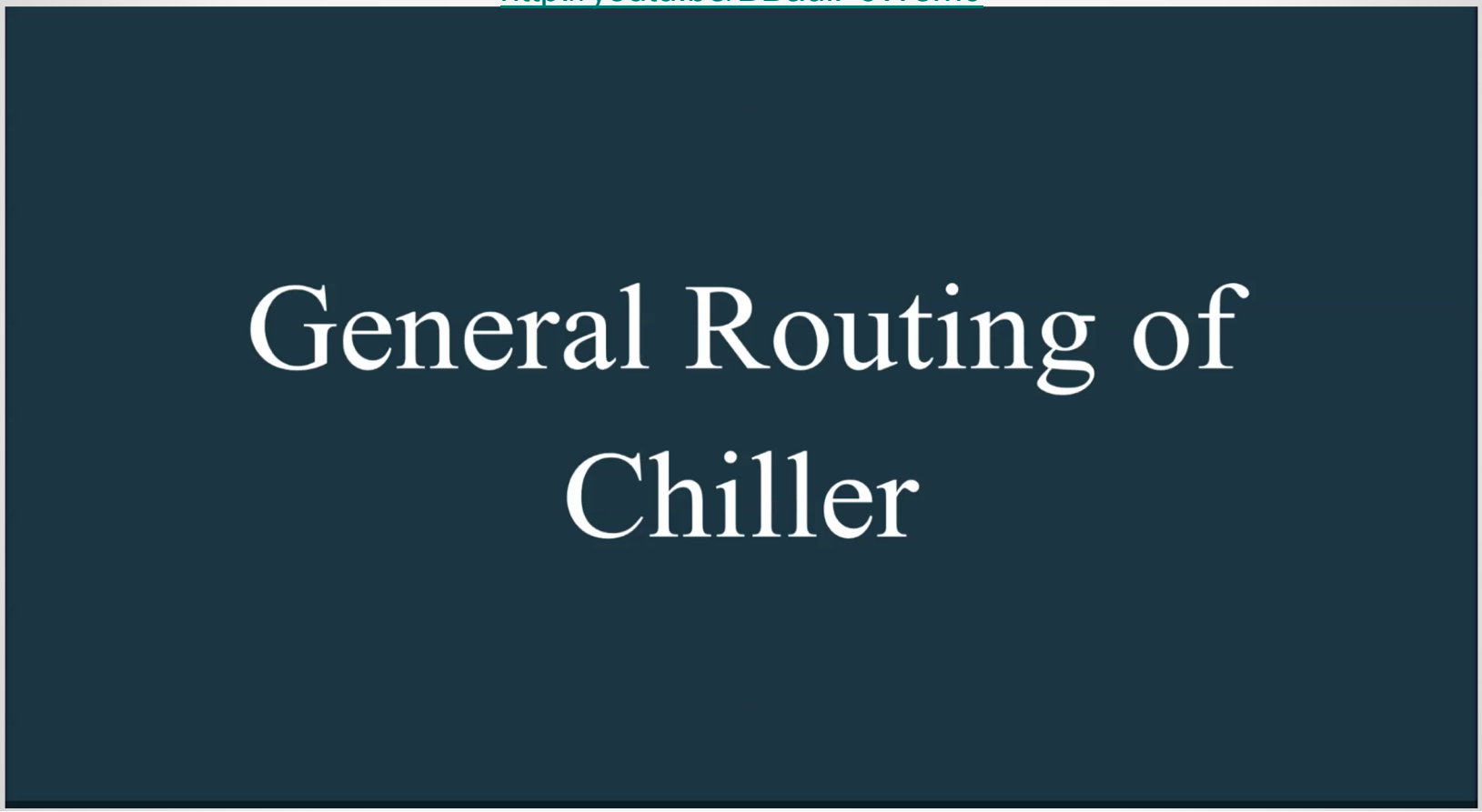
Communicating with the team



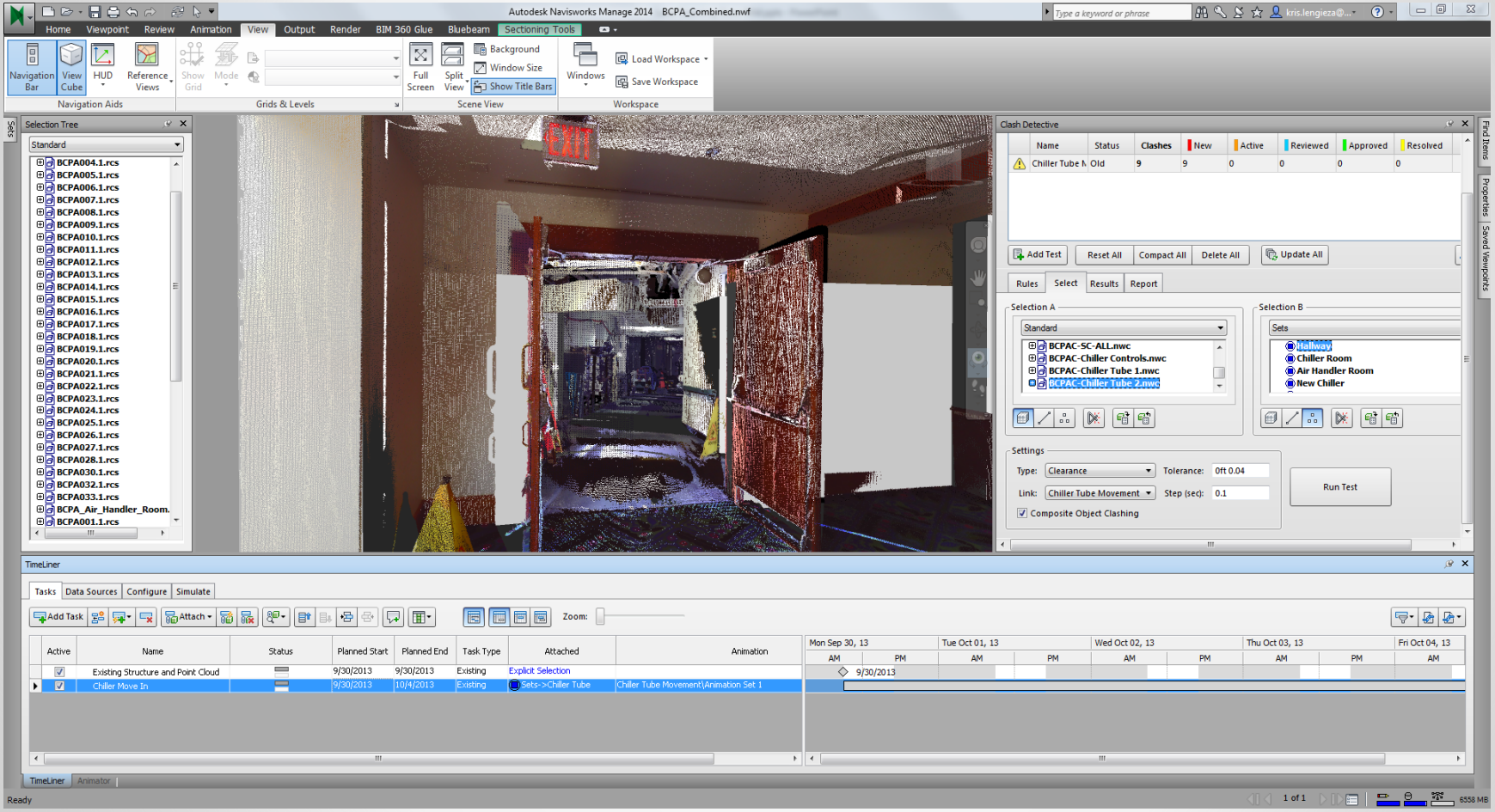
- Reflect Trade Knowledge in the model
  - What kind of skates to be used?
  - Relocating skates during the move?
  - How we will lower it down the step?
  - What will the Manufacturer allow?

4D Point Cloud Clash Detection

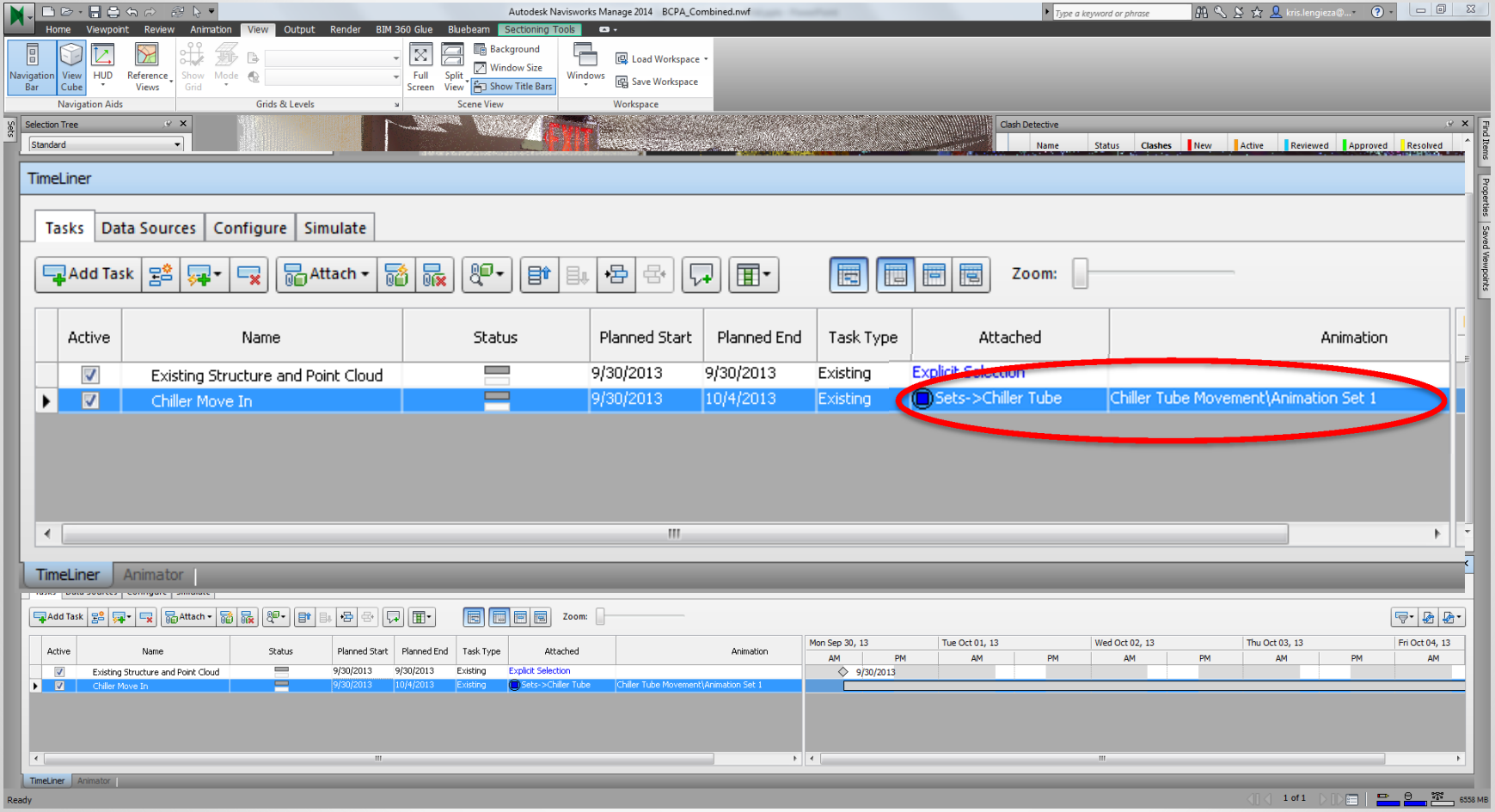
http://youtu.be/BBauiP6Wem0



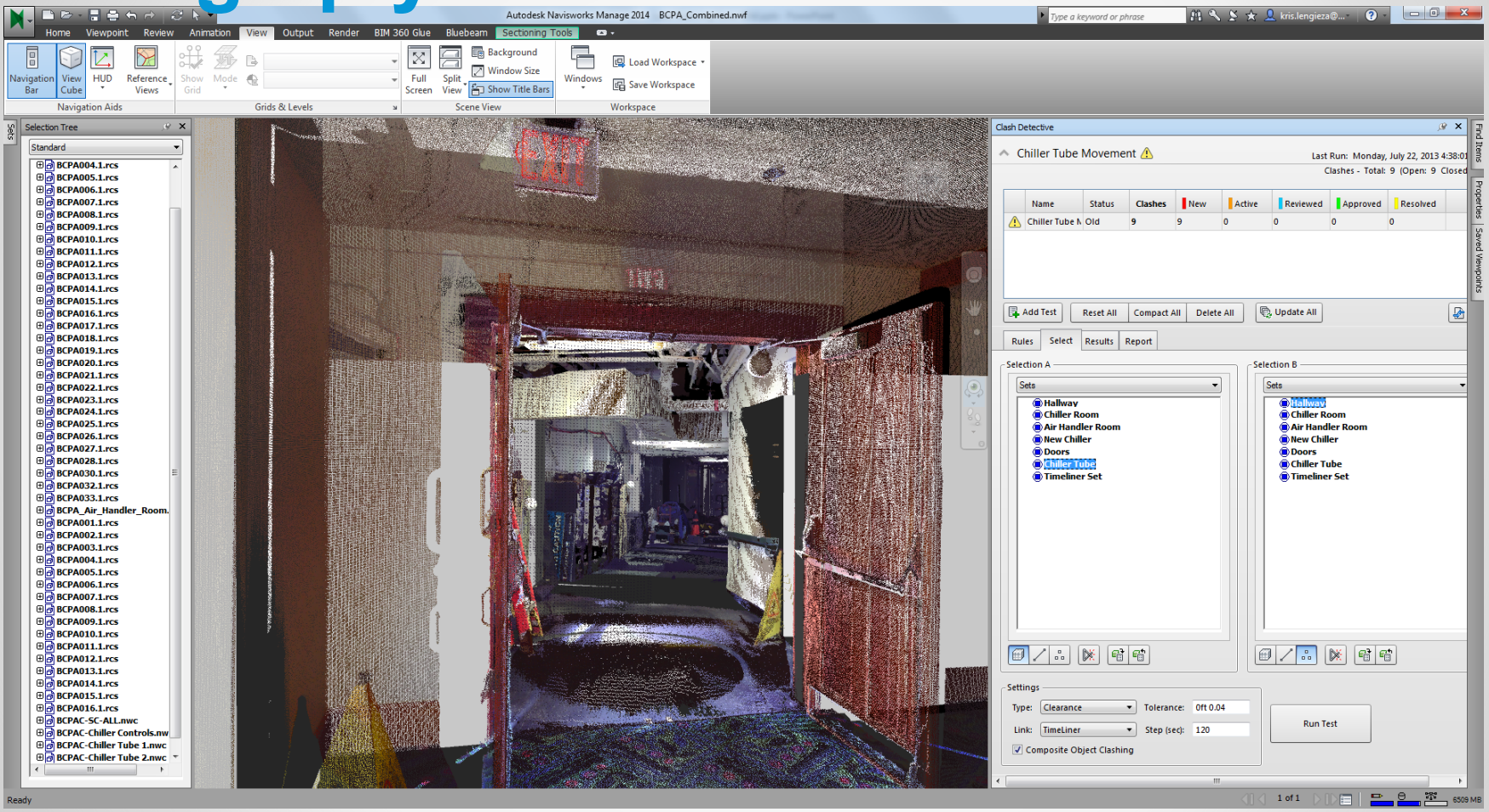
Setting up your 4D Clash Detection



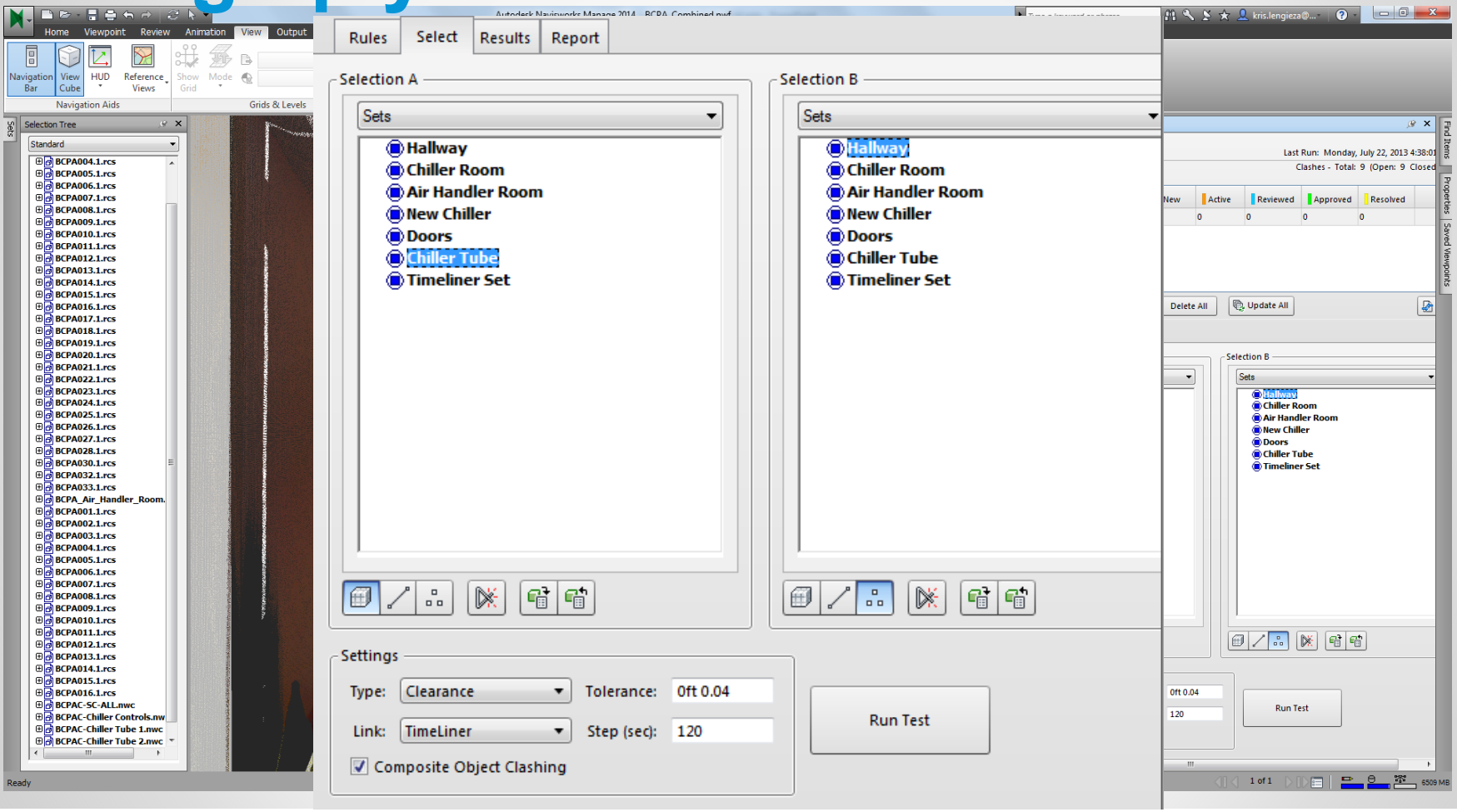
Setting up your 4D Clash Detection



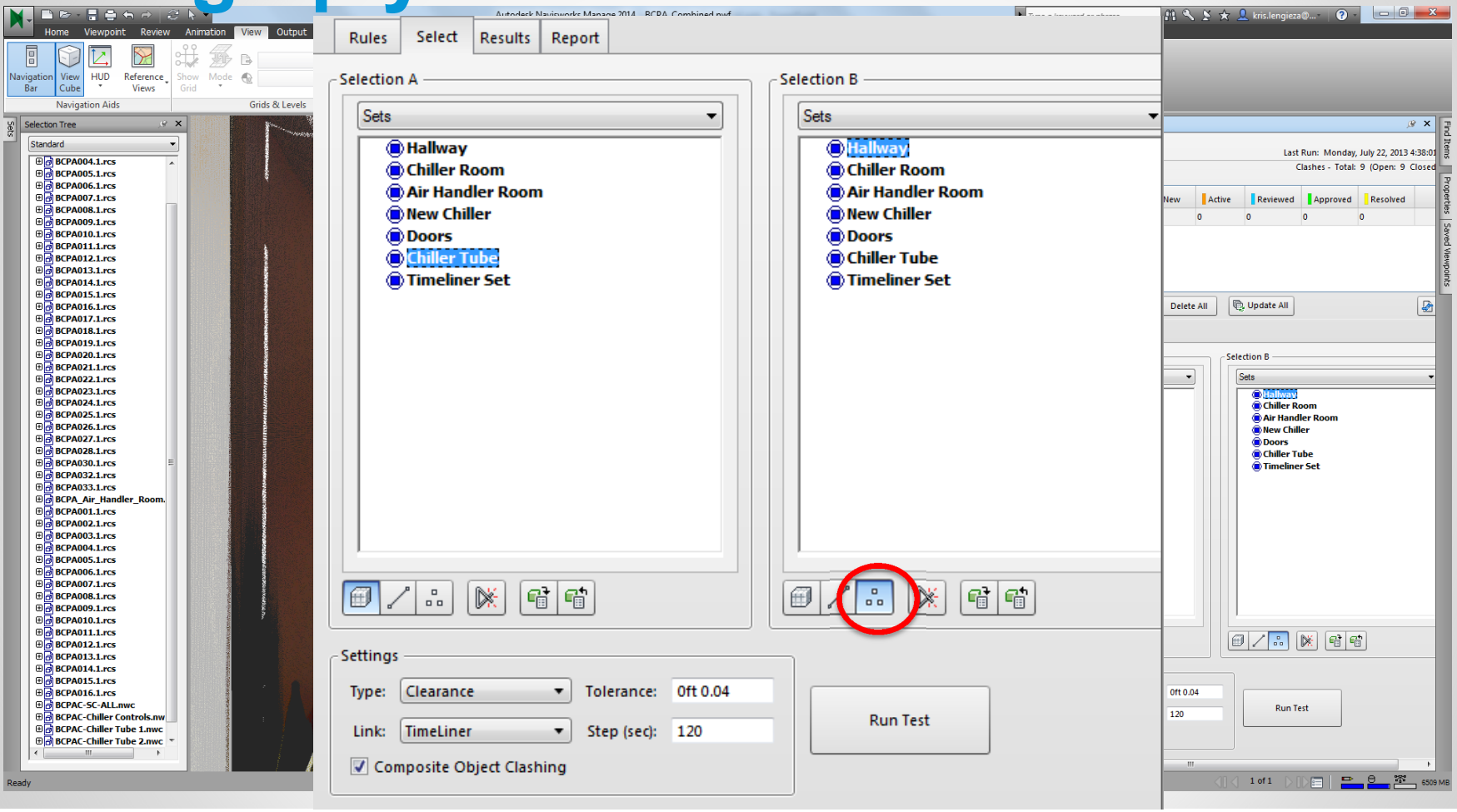
Setting up your 4D Clash Detection



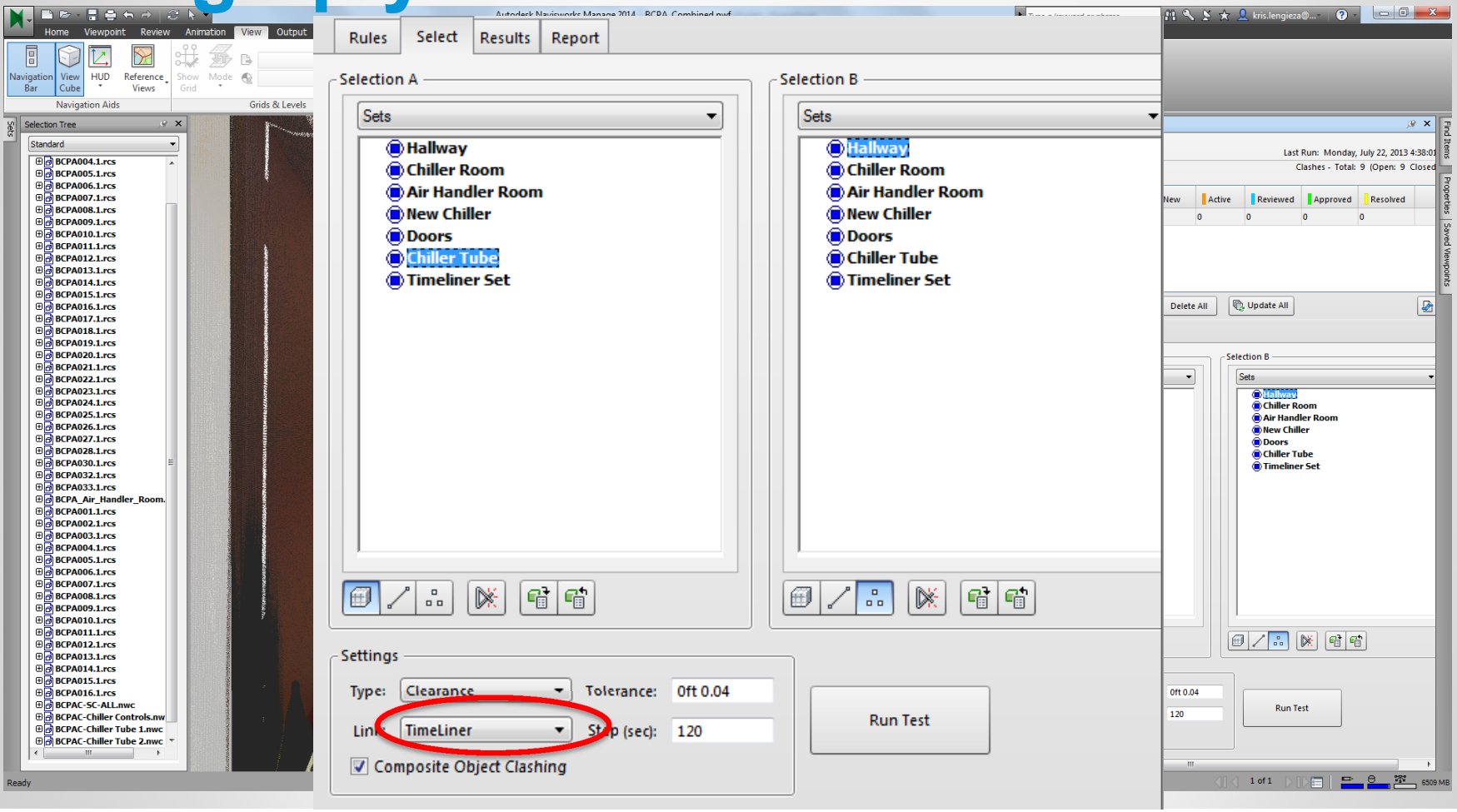
Setting up your 4D Clash Detection



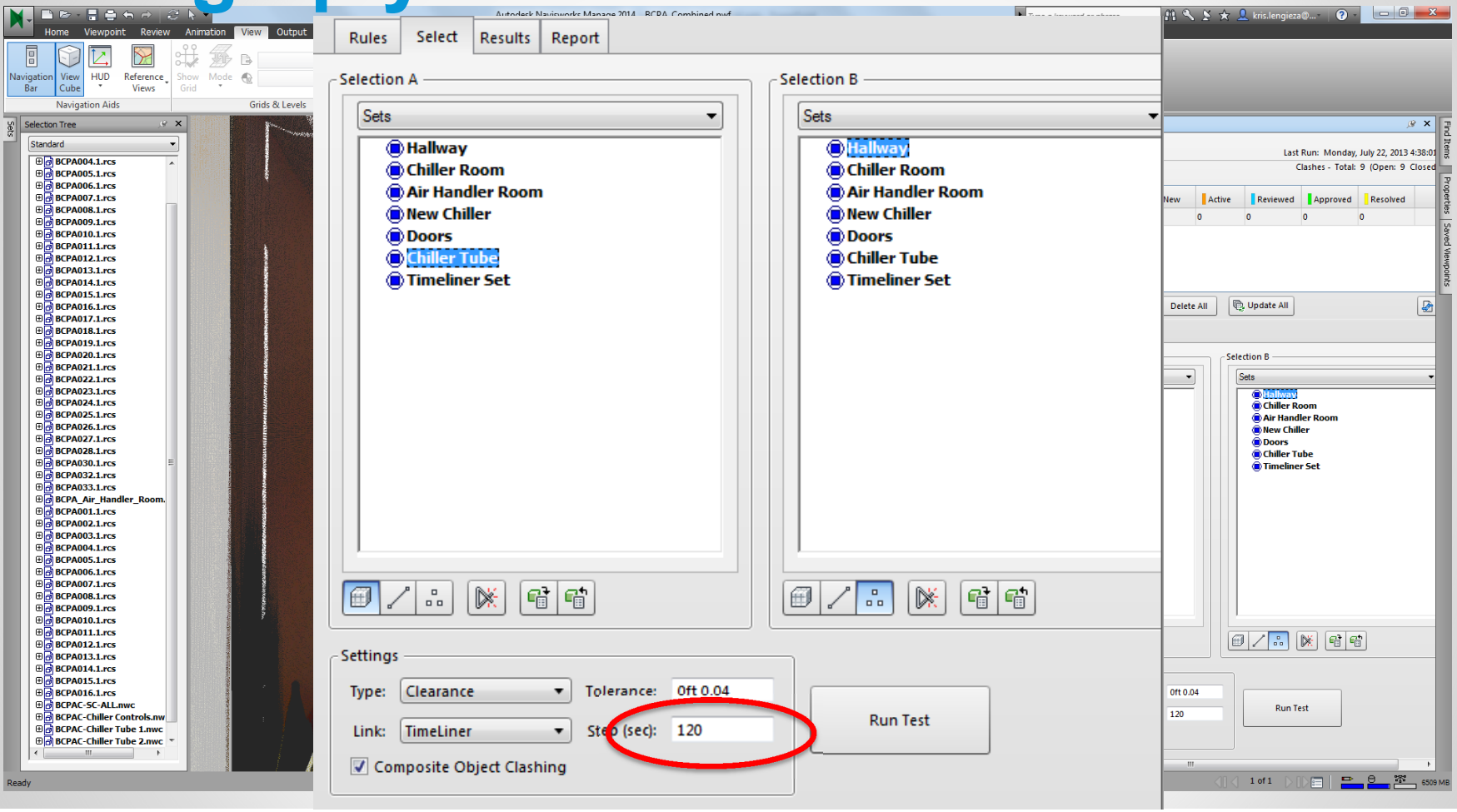
Setting up your 4D Clash Detection



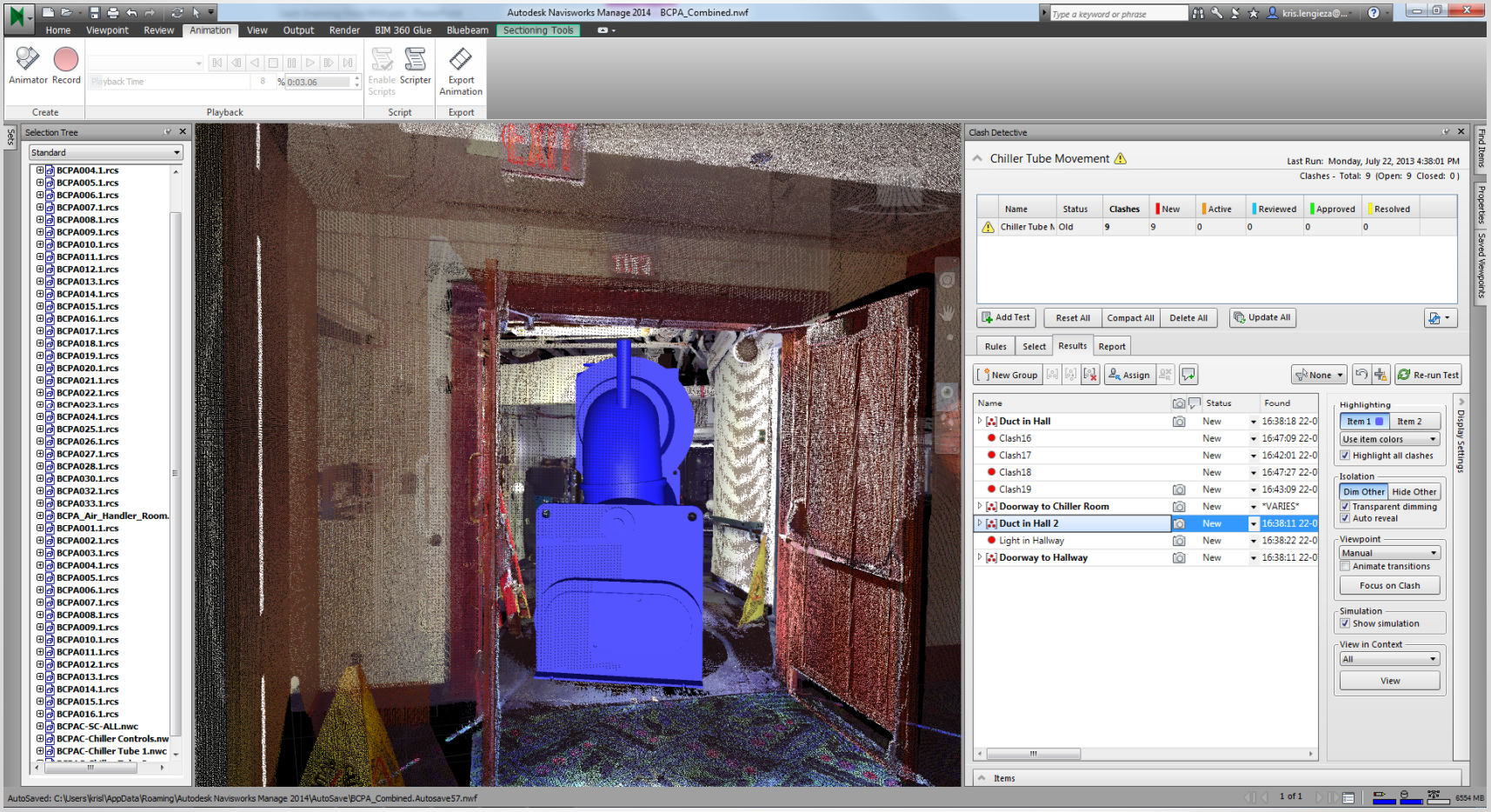
Setting up your 4D Clash Detection



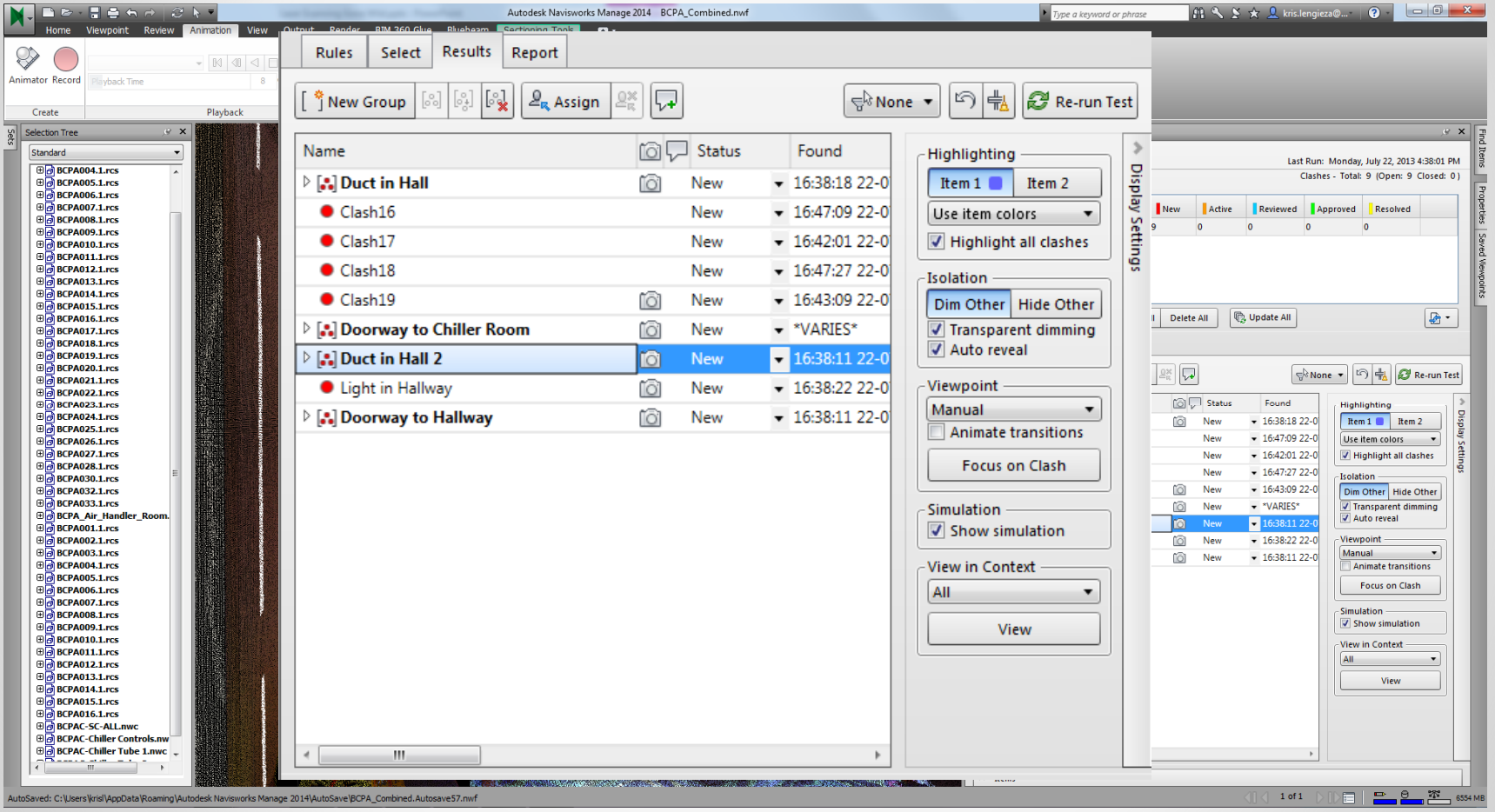
Setting up your 4D Clash Detection



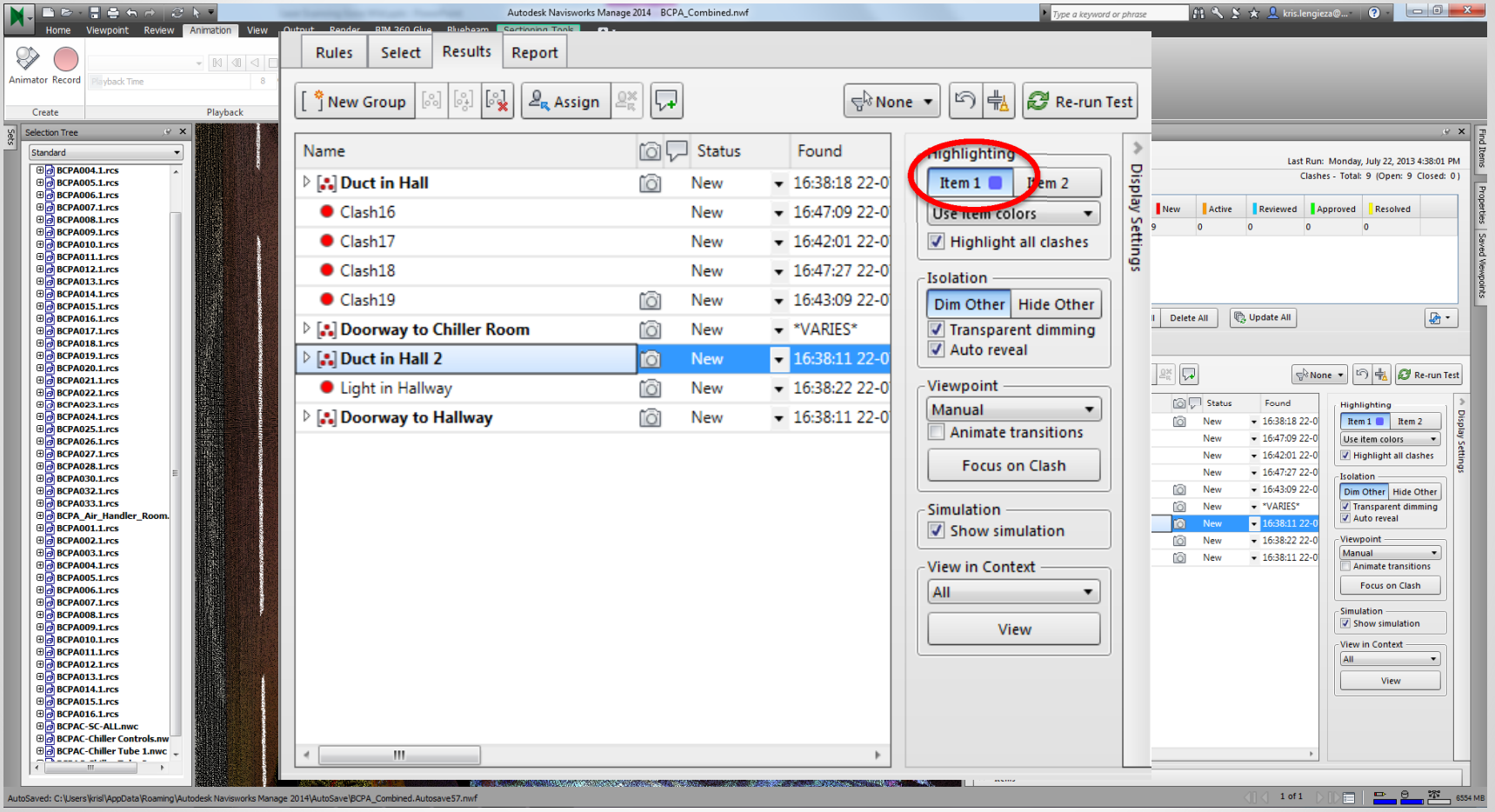
Setting up your 4D Clash Detection



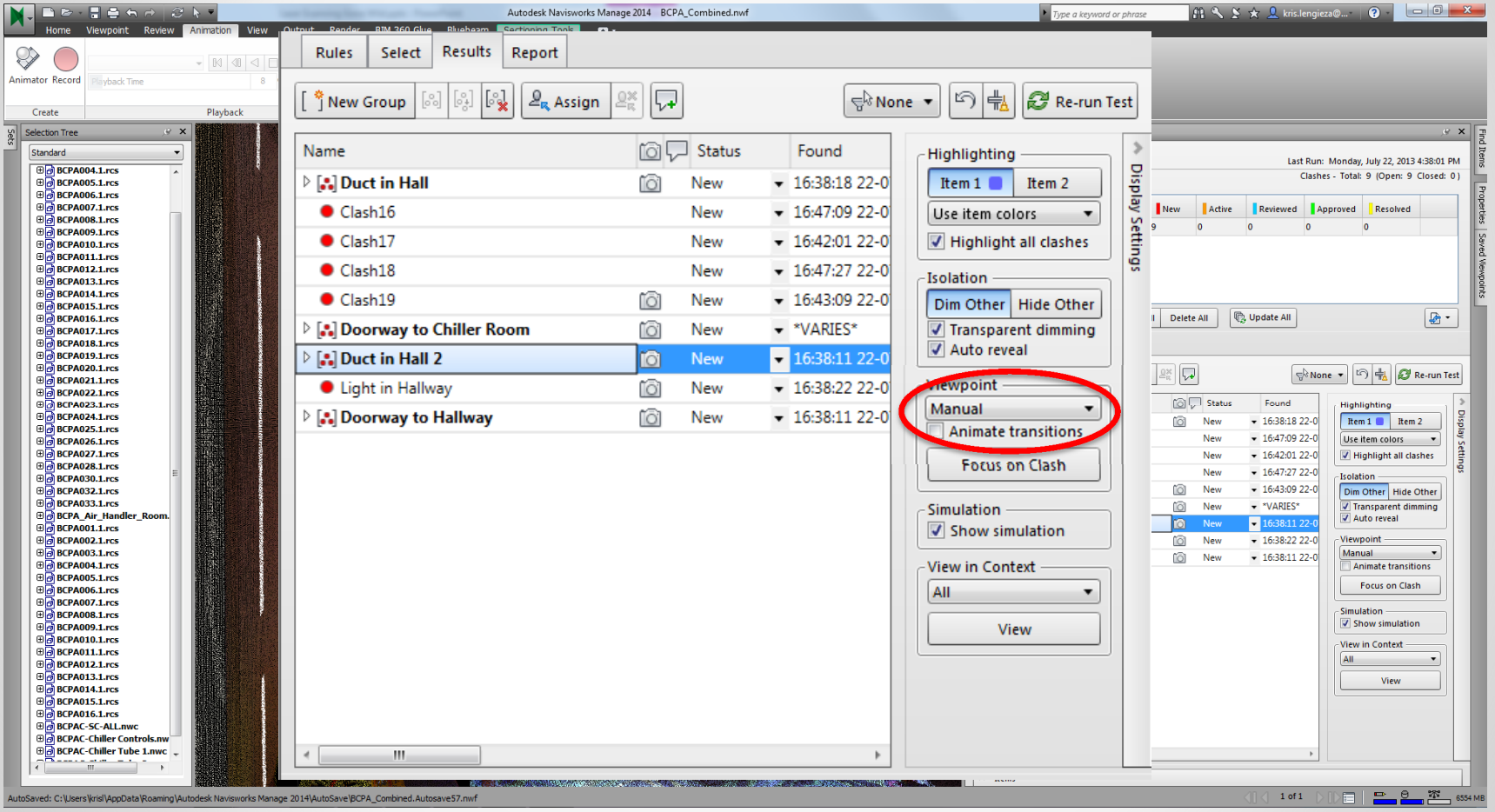
Setting up your 4D Clash Detection



Setting up your 4D Clash Detection



Setting up your 4D Clash Detection



4D Point Cloud Clash Detection

- Keys to Success
  - Load individual point files
  - Create your animation and or timeline first
  - Make sure you are using the correct Clash Detective Settings
    - Clash against points
    - Link to Animation or Timeliner
    - Set your Step to an appropriate amount
    - Do not highlight point cloud hits
    - Change viewpoints to manual
  - Patience
  - Keep un-necessary clouds turned off

Now, would it work

Conclusion

- Laser scanning can be cost effective
  - Rapid Measurements
  - No return trips
  - Information can be shared with a team
- Software advances are streamlining the process
- Work with a team with a proven workflow
- Make sure you capture all the data you will need
- Involve your team as much as possible

Contact Us

Kris Lengieza
Director of VDC Stiles Construction
Kris.Lengieza@stiles.com
@gieza0527

Alix Loiseau
VP of ACAI Technologies
Alix@acaitechworld.com