

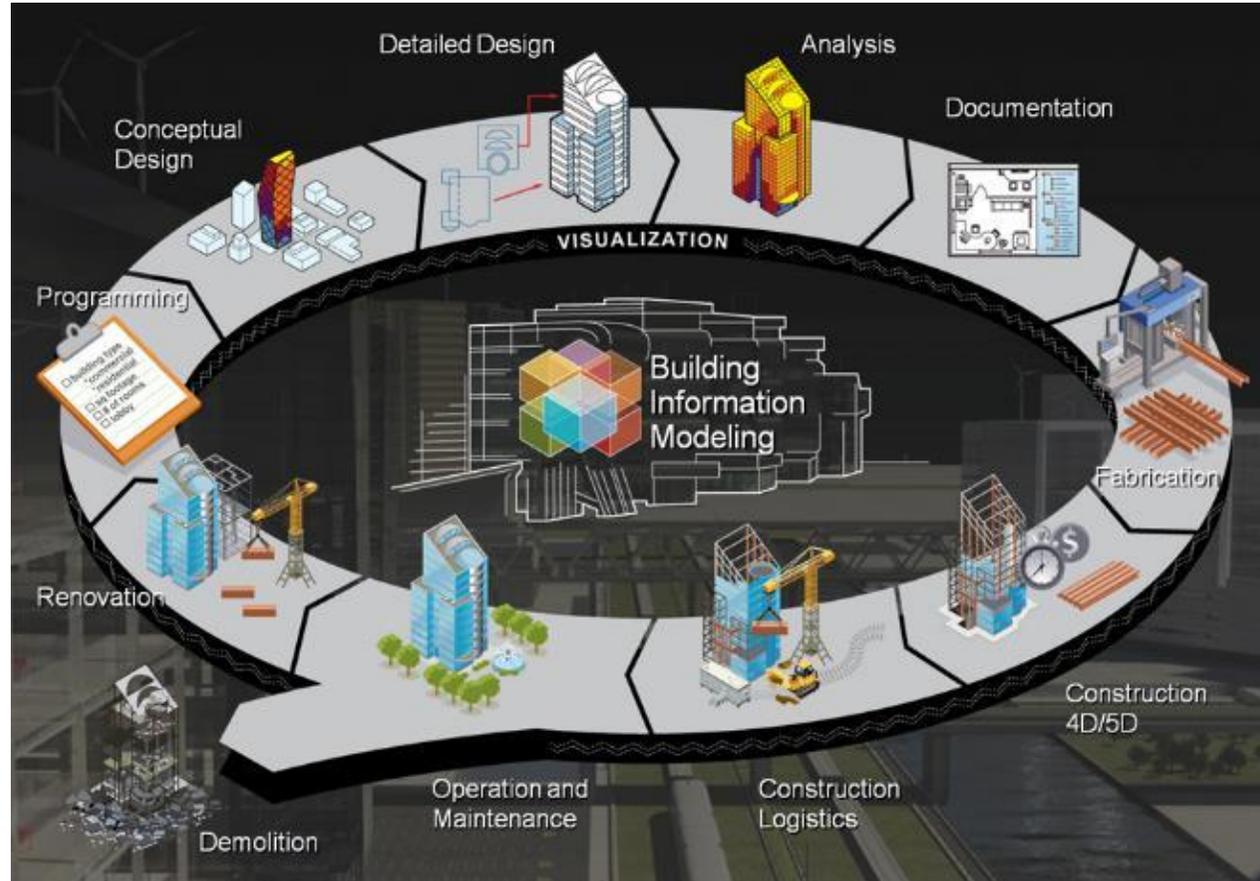


# Laserscanning within the building lifecycle

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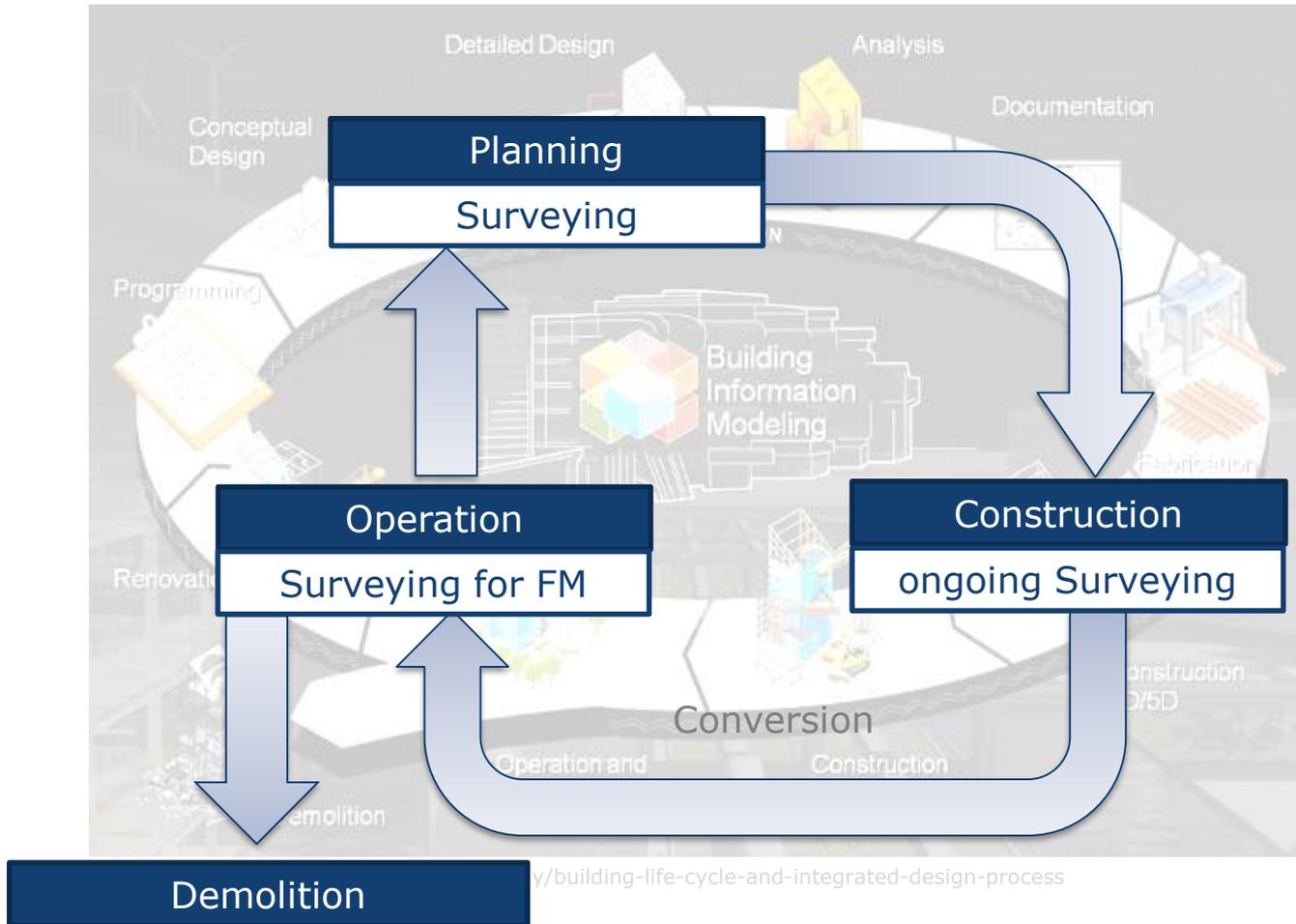
FIG workshop "BIM for Surveyors"

# What is the building lifecycle?



<http://www.climatechwiki.org/technology/building-life-cycle-and-integrated-design-process>

# When do I need reality capture?



Planning

Surveying

### Capture



### Process

*"consolidate the captured data to make them useable"*

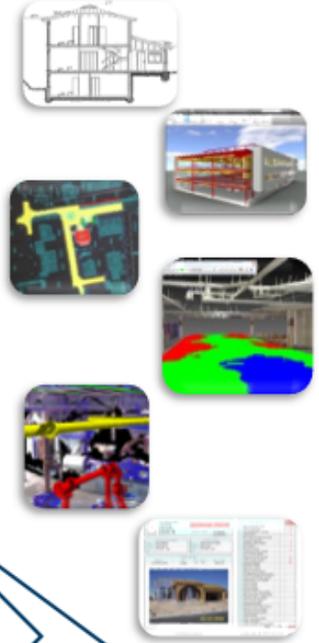
- Registration
- Data Fusion
- Data Management
- Data Distribution
- Data Conversion



### Integrate + Value



### Deliver

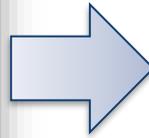


Planning

Surveying

## Scan-To-BIM

Turning point clouds into an as-built BIM model



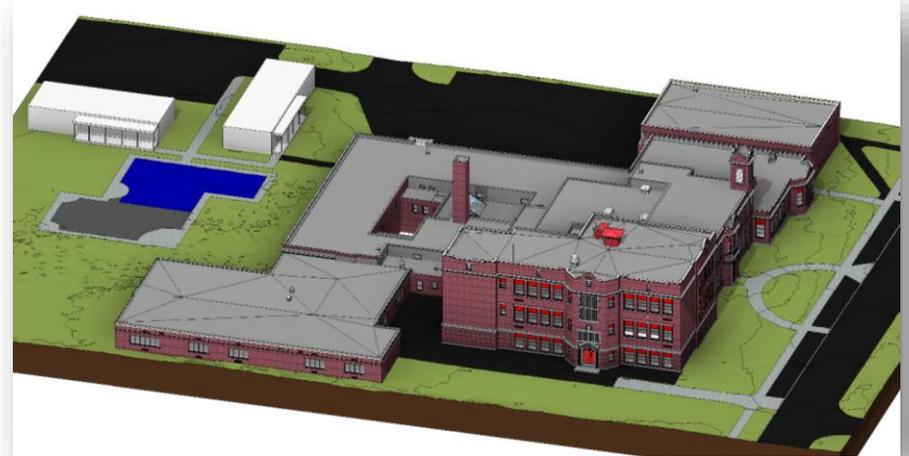
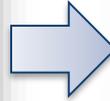
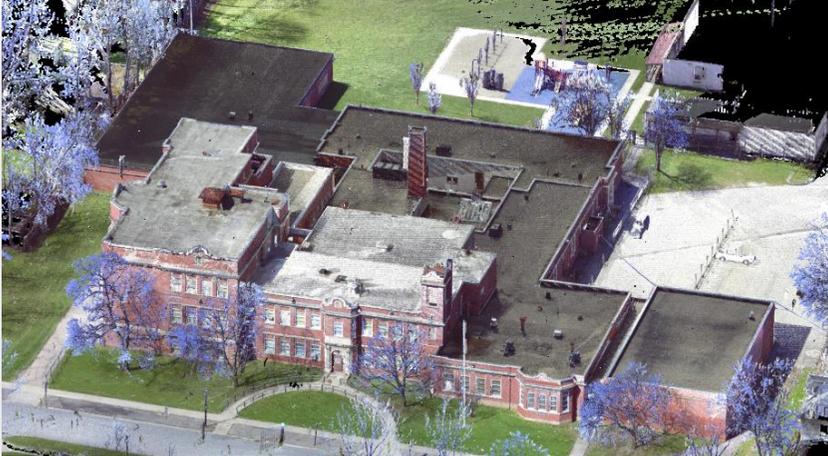
But:

As-built capturing is quick and easy, detailed modelling can be very time consuming

### Rochester School 16



## Rochester School 16



### Facts:

- Scans: 470
- On-site measurement: 5 days
- Modelling: 5 weeks for 2 persons

Planning

Surveying

## Scan-To-BIM

Turning point clouds into an as-built BIM model

How can we reduce the time consuming and expensive modelling?



## Automation

Intelligence  
of the system

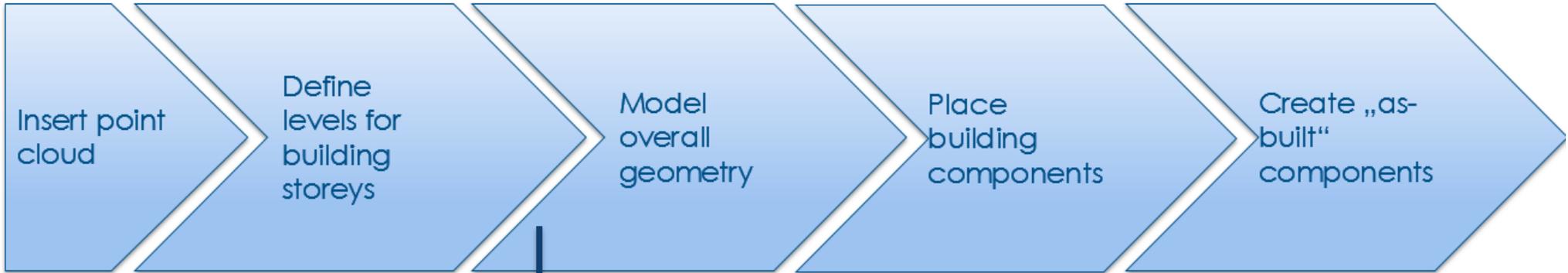
- Use the point cloud as model reference
- Fitting of basic geometry
- Fitting of complex model objects
- Object recognition and parameter adjustment

Planning

Surveying

## Scan-To-BIM

Turning point clouds into an as-built BIM model



- Wall and pipe fitting
- Wall and pipe alignment
- Work plane fitting
- Construction guides

Planning

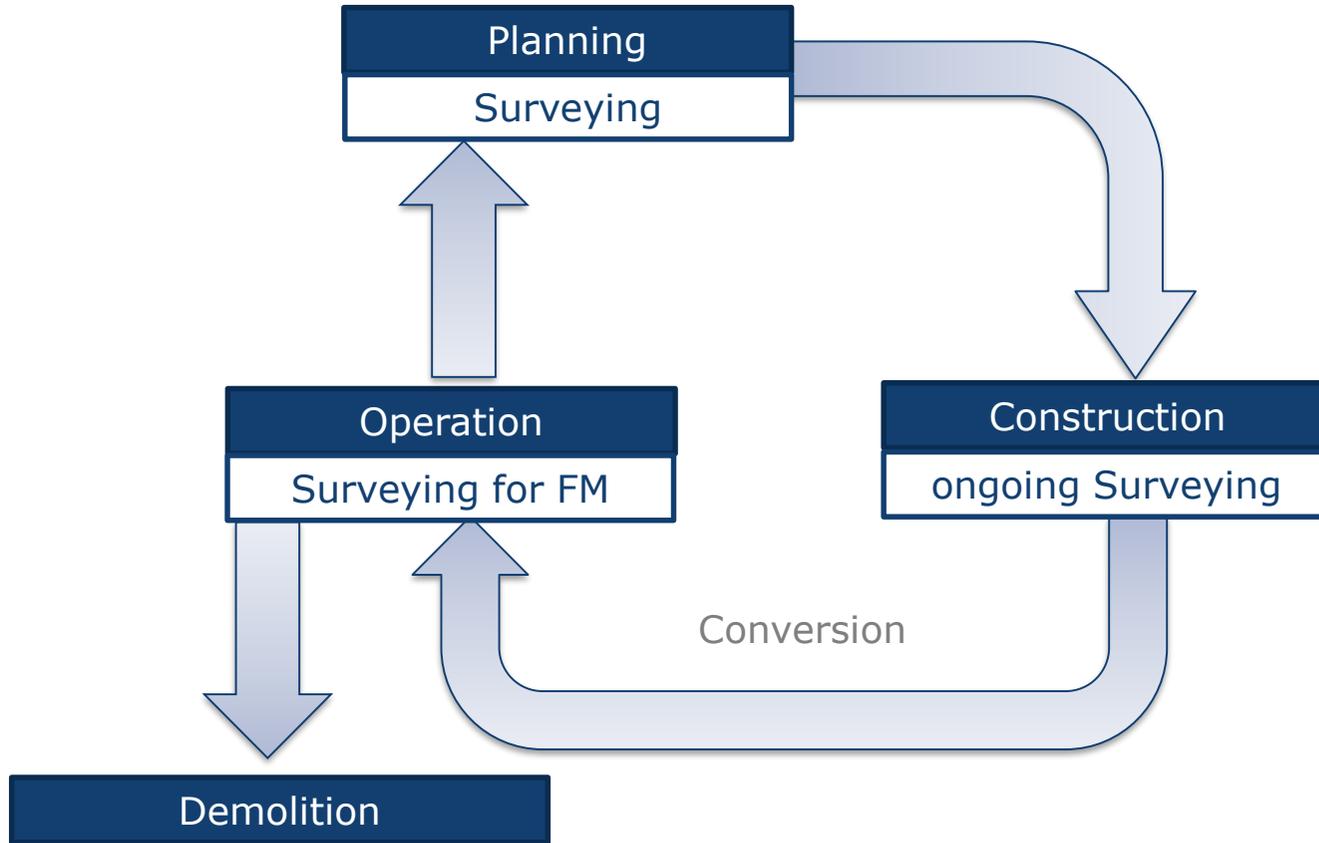
Surveying

# Scan-To-BIM

Turning point clouds into an As-build BIM model

The screenshot displays the Autodesk Revit 2015 software interface, specifically the Scan-To-BIM workflow. The main window is split into two views: 'Floor Plan: Floor\_2 - Lilienthalstrasse.rvt' on the left and '3D View: (3D) - Lilienthalstrasse.rvt' on the right. The floor plan view shows a point cloud of a building's floor plan, with a scale of 1:100. The 3D view shows a wireframe model of the same building, with a scale of 1:200. The interface includes a ribbon with various tools for point cloud processing, such as 'Prepare Point Cloud', 'Ortho Image', 'Fit Wall', 'Toposurface', 'Align Walls', 'Fit Plane', 'Intersect 2 Planes', 'Intersect 3 Planes', 'Coordinates', 'Export PC Region', 'PointSense', and 'Modify'. The 'PointSense' panel is active, showing 'Auto Mode on' and 'Auto Mode off' options. The 'Properties' panel on the left shows settings for the 'Floor Plan: Floor\_2' view, including 'Orientation: Project North', 'Discipline: Architectural', and 'View Range: Floor\_2'. The 'Project Browser' on the left shows a tree view of the project structure, including 'Floor Plans', '3D Views', and 'Elevations'. The 'FARO' logo is visible in the bottom right corner of the image.

# When do I need reality capture?



Construction

ongoing Surveying

Applications:

- Model quality check
- Live analysis for construction processes
- Construction process verification

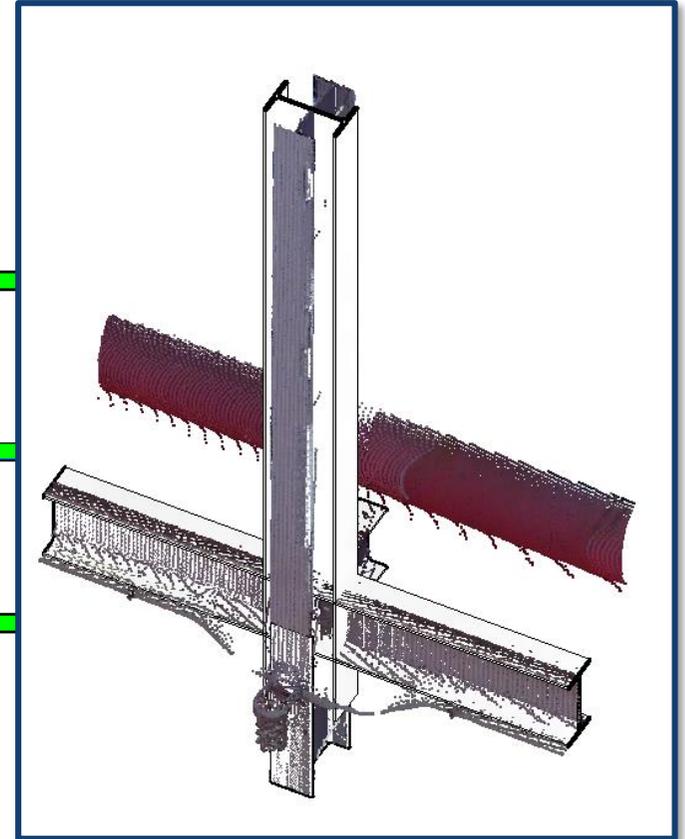
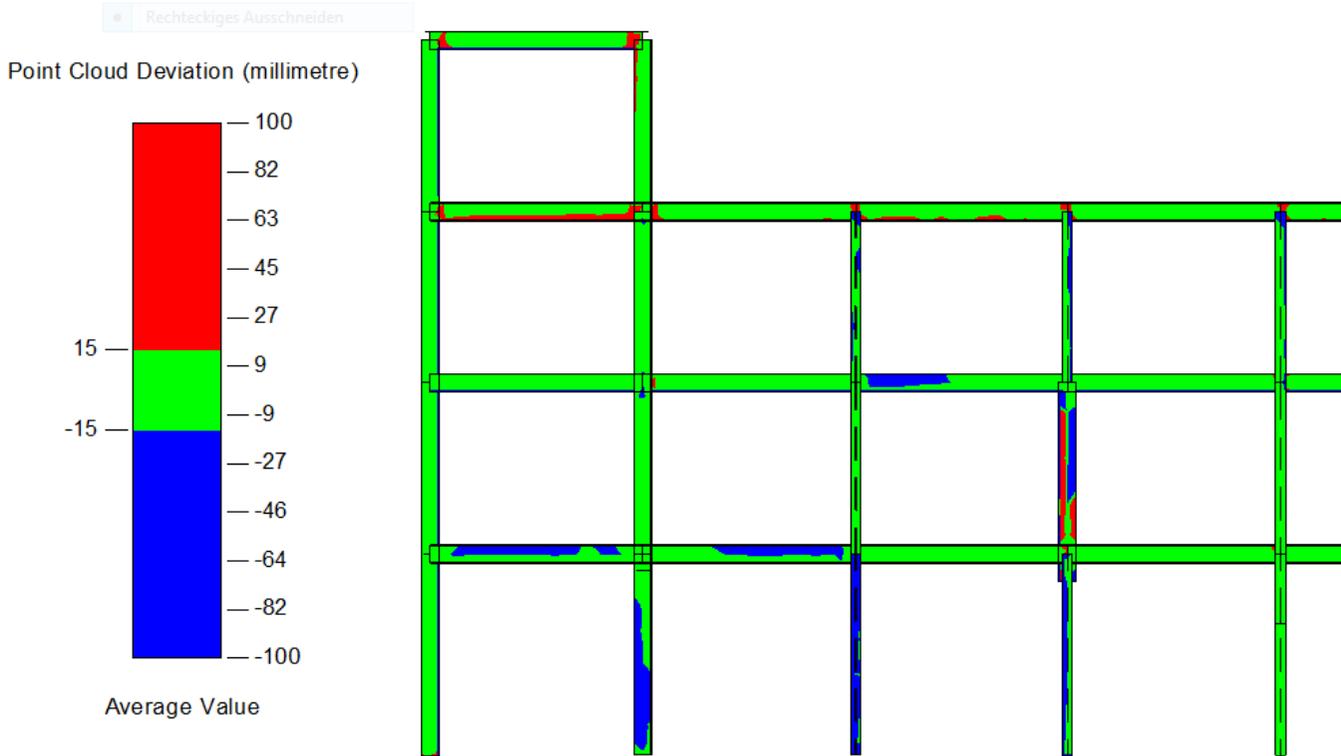


Construction

ongoing Surveying

Application:

Check for differences between the model and the as-built situation

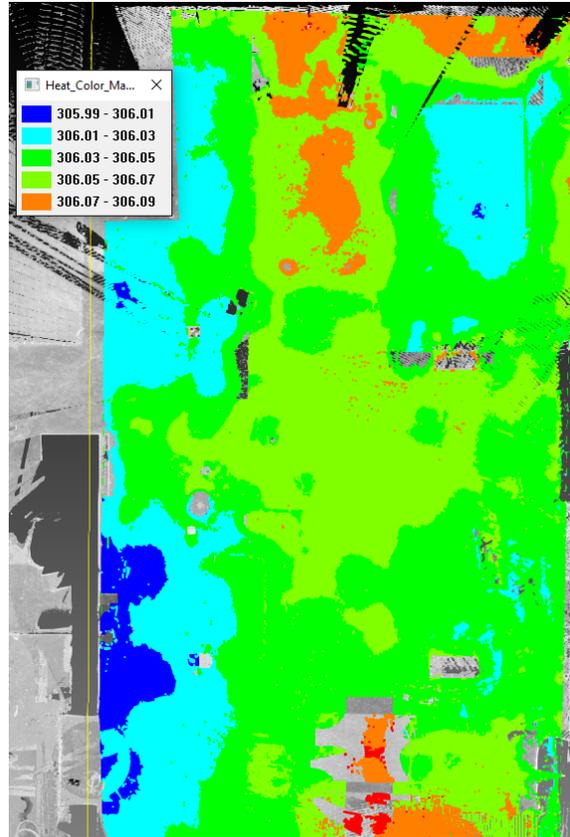
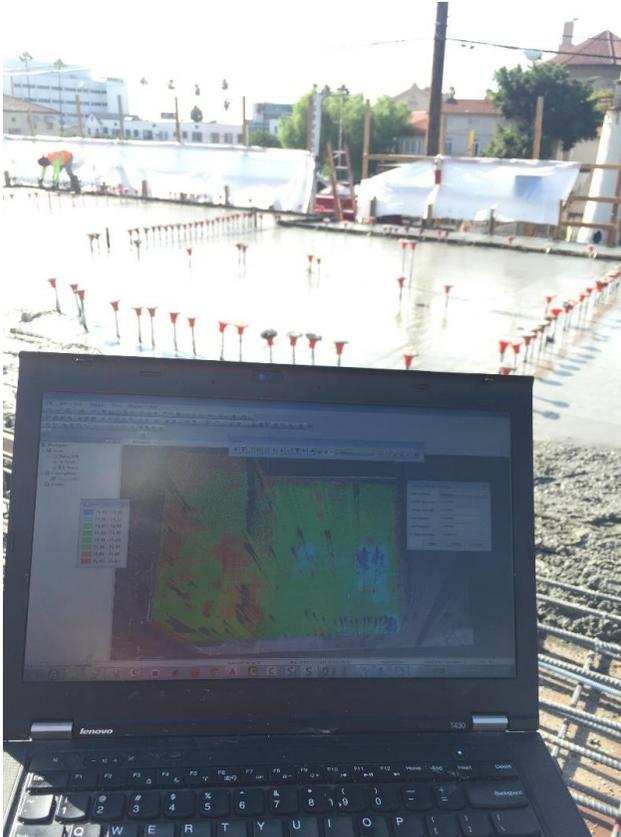


Construction

ongoing Surveying

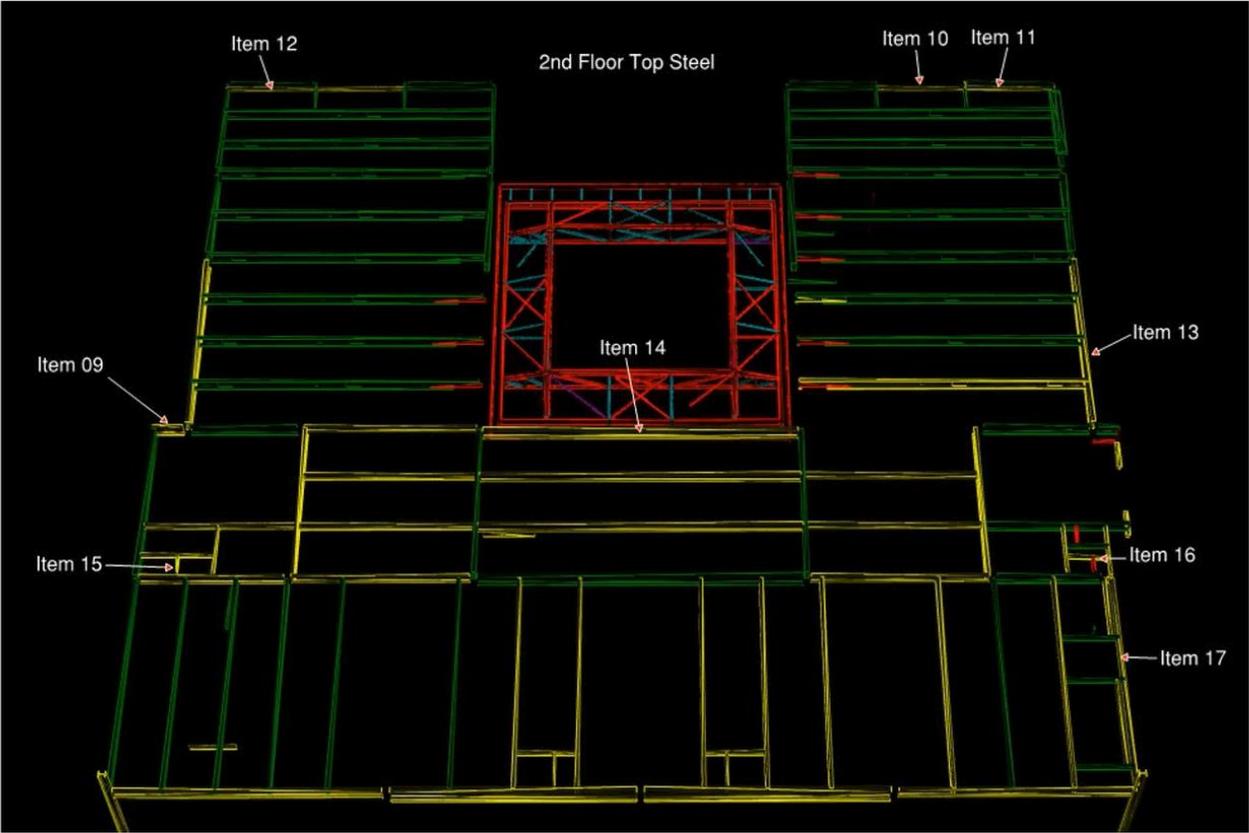
Application:

Live analysis for construction processes



Wet concrete scanning:

Live feedback on-site as long the concrete is changeable



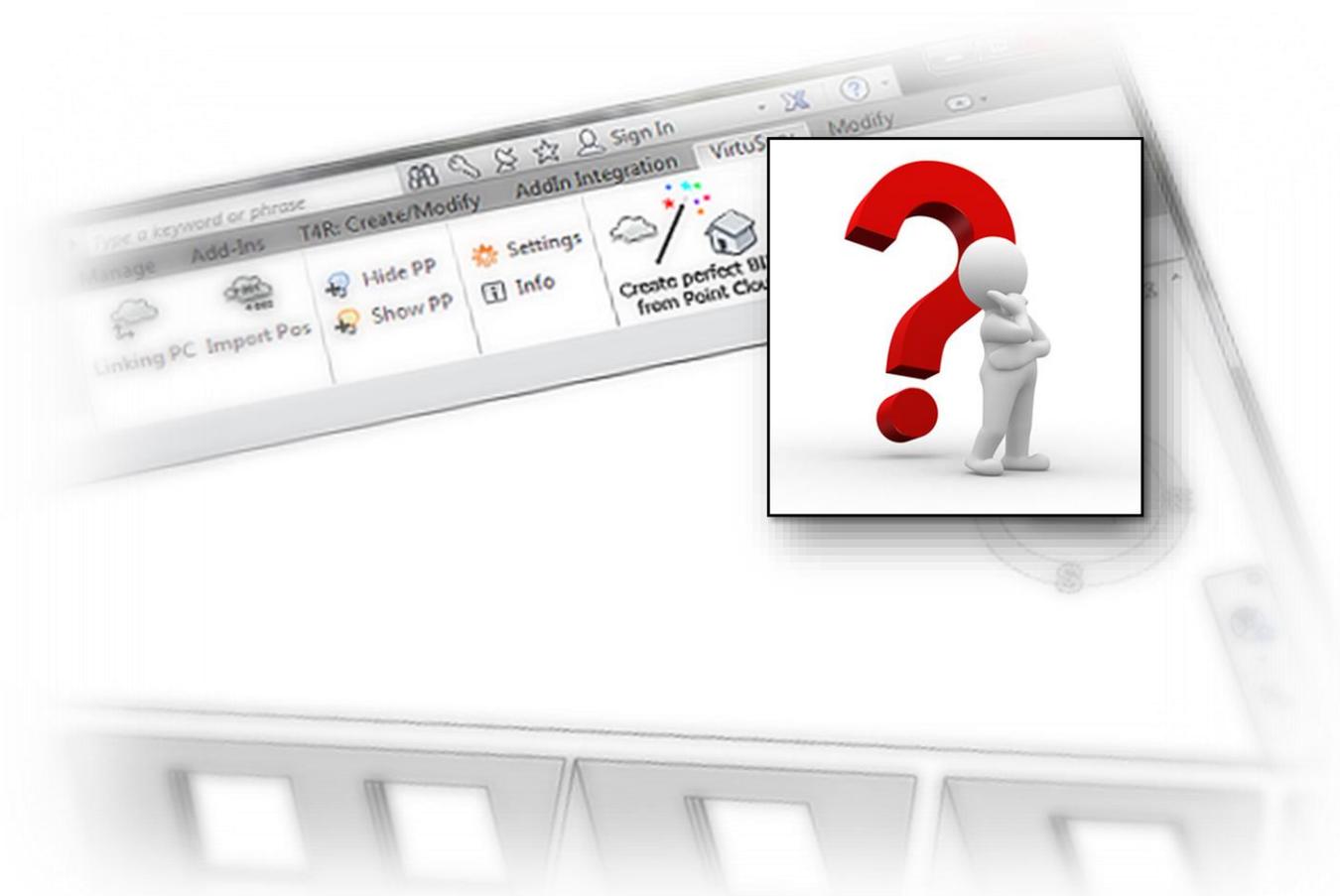
How does structure compare to the design model?

Where is it off or missing?

- = installed to tolerance
- = out of tolerance
- = missing
- = occluded
- = Not Enough Data



# What can we expect in the future?



# What can we expect in the future?

- Sensor integration and faster data acquisition (walk and fly)
- Automated modelling embedded in user workflows with quality control toolsets
- Almost instant on-site feedback if construction meets design specifications

Questions?