The ASDMCon project:
The challenge of detecting defects on construction projects

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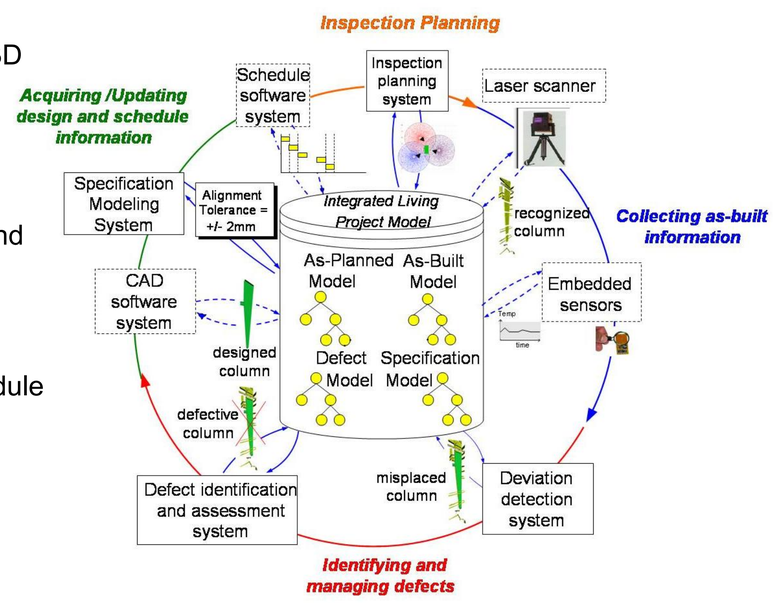
Overview

ASDMCon goals

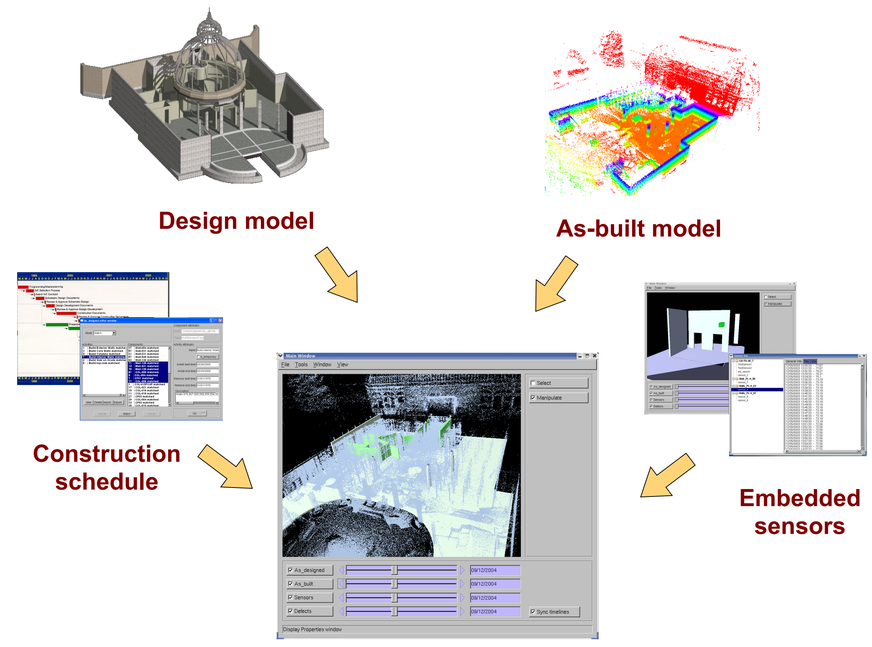
- Detect defects on construction sites using 3D imagers and embedded sensors
- Support visualization of 3D models that change over time
- Support manual and automatic detection of geometric deviations between the design and the built conditions.

Integrated project model cycle

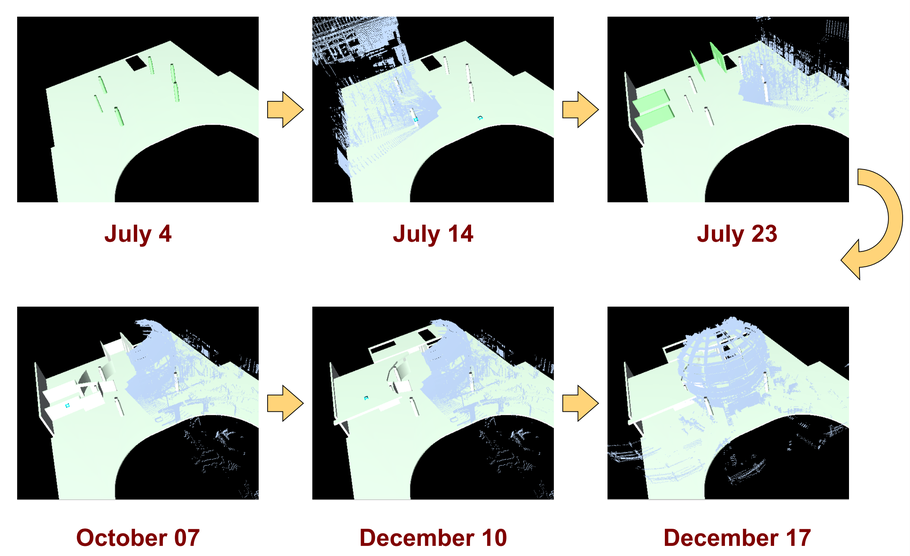
1. Acquire and update the design and schedule information
2. Inspection planning
3. Collect as-built information
4. Identify and manage defects



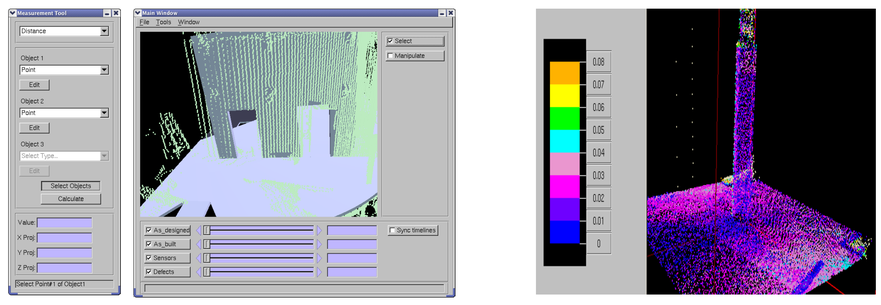
4D visualization environment



Time sliders



Deviation analysis tools

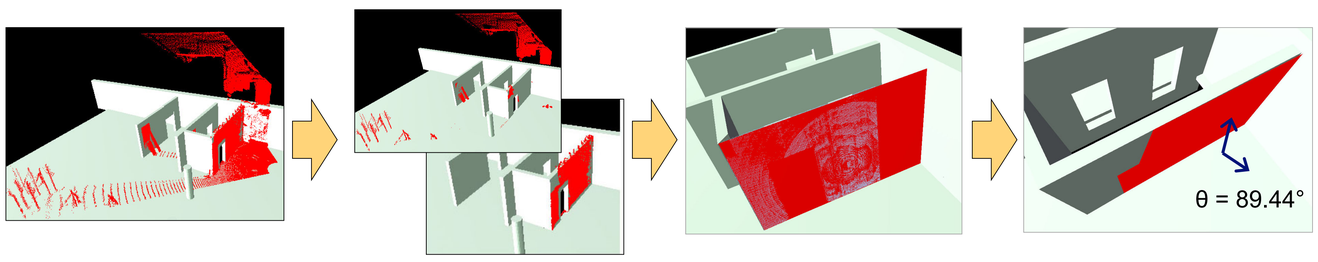


Measurement tool

Deviation coloring tool

Automatic defect detection

Defect detection pipeline



Input: Integrated project model

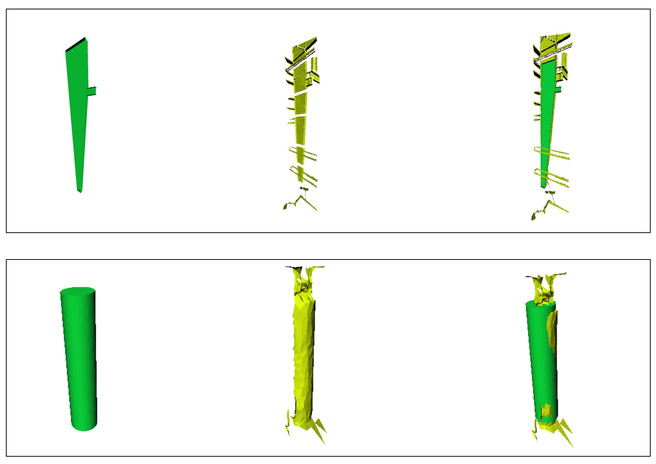
Segmentation and clutter removal

Verification

Deviation analysis

Verification methods

Object recognition

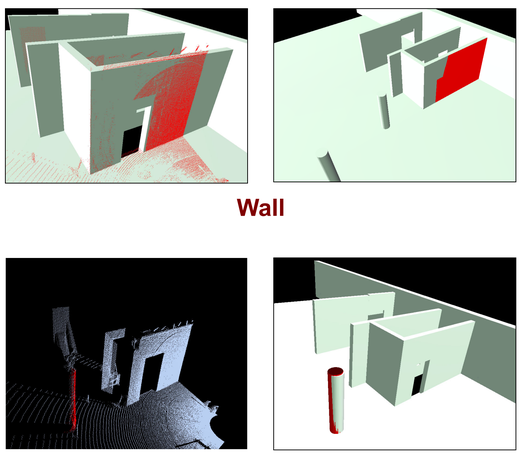


Design model

Segmented built data

Registered model and data

Reverse engineering



Wall

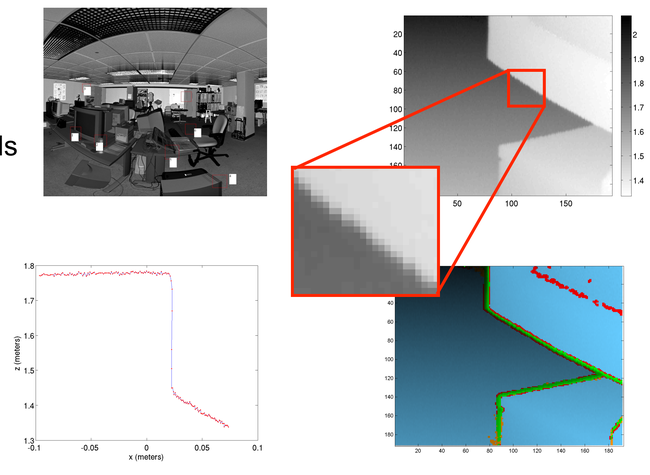
Column

Future work

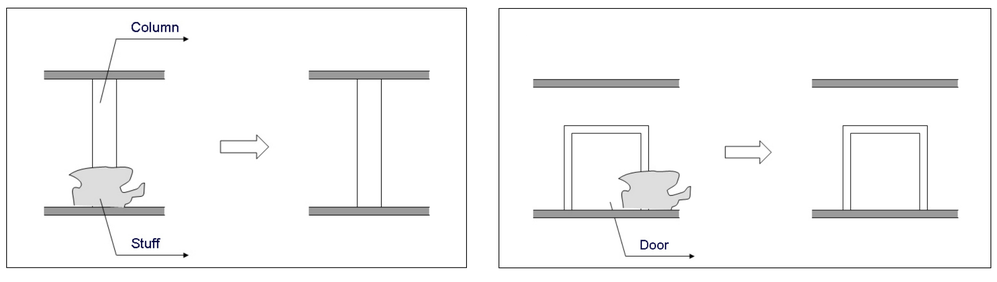
Modeling accuracy analysis

- Problem: Most modeling-from reality methods do not support model accuracy estimation
- Solution: Develop end-to-end uncertainty modeling

- Problem: Sensing anomalies can lead to measurement error
- Solution: Understand, model, and detect anomalies



Example: Mixed pixel analysis

Shape grammars

- Problem: Real construction sites are full of clutter
- Solution: Use domain knowledge to make inferences about obscured data