BIM/GIS Convergence within a 3D Model Utilizing LiDAR Data

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BIM/GIS Convergence within a 3D Model using LiDAR Data

- **Discussion Outline**
  - **Review Quad Capital Review Program**
  - **Approach for Building the Spatial Data**
  - **Data Acquisition Process – LiDAR/BIM/CAD**
  - **Data Development Process**
  - **Next Steps**
  - **Lessons Learned**

• Review of Quad Capital Renewal (QCR) Program

- Forms the physical and intellectual heart of the University of Chicago campus.
- Consists of 35 buildings occupying 1.7 million sq. ft.
- Composed of a system of quadrangles formed by limestone masonry buildings in the Collegiate Gothic style.
- Built over an 80-year period (1890-1970), as the program and finances dictated.

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- **Review of Quad Capital Renewal (QCR) Program**

One BIG problem – we don't have the plans!

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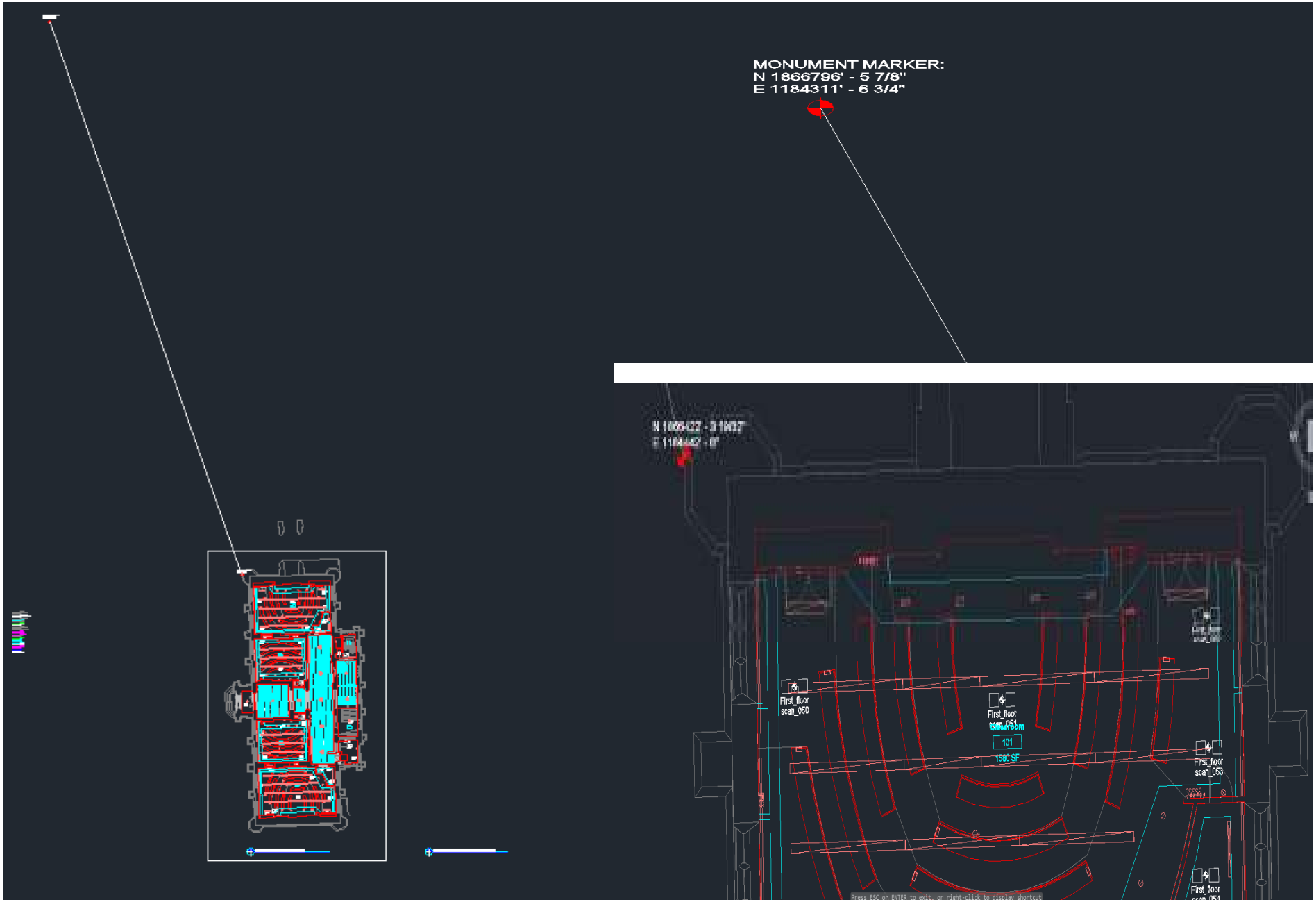
- **Approach for Building the Spatial Data**
  - **Hire a firm to acquire LiDAR: Exterior/Interior**
  - **Build data sets that can roll directly into applications:**
    - ✓ **Survey Control: State Plane Deliverables**
    - ✓ **LiDAR scanning: point clouds/composites by Hall**
    - ✓ **CAD drawings: Space Management System**
    - ✓ **BIM drawings for architectural studies/design**
    - ✓ **GIS – migration to SDI and Space Optimization**


MONUMENT MARKER:
N 1866796' - 5 7/8"
E 1184311' - 6 3/4"
First_floor scan_060
First_floor scan_061
101
1580 SF
First_floor scan_053
First_floor scan_054

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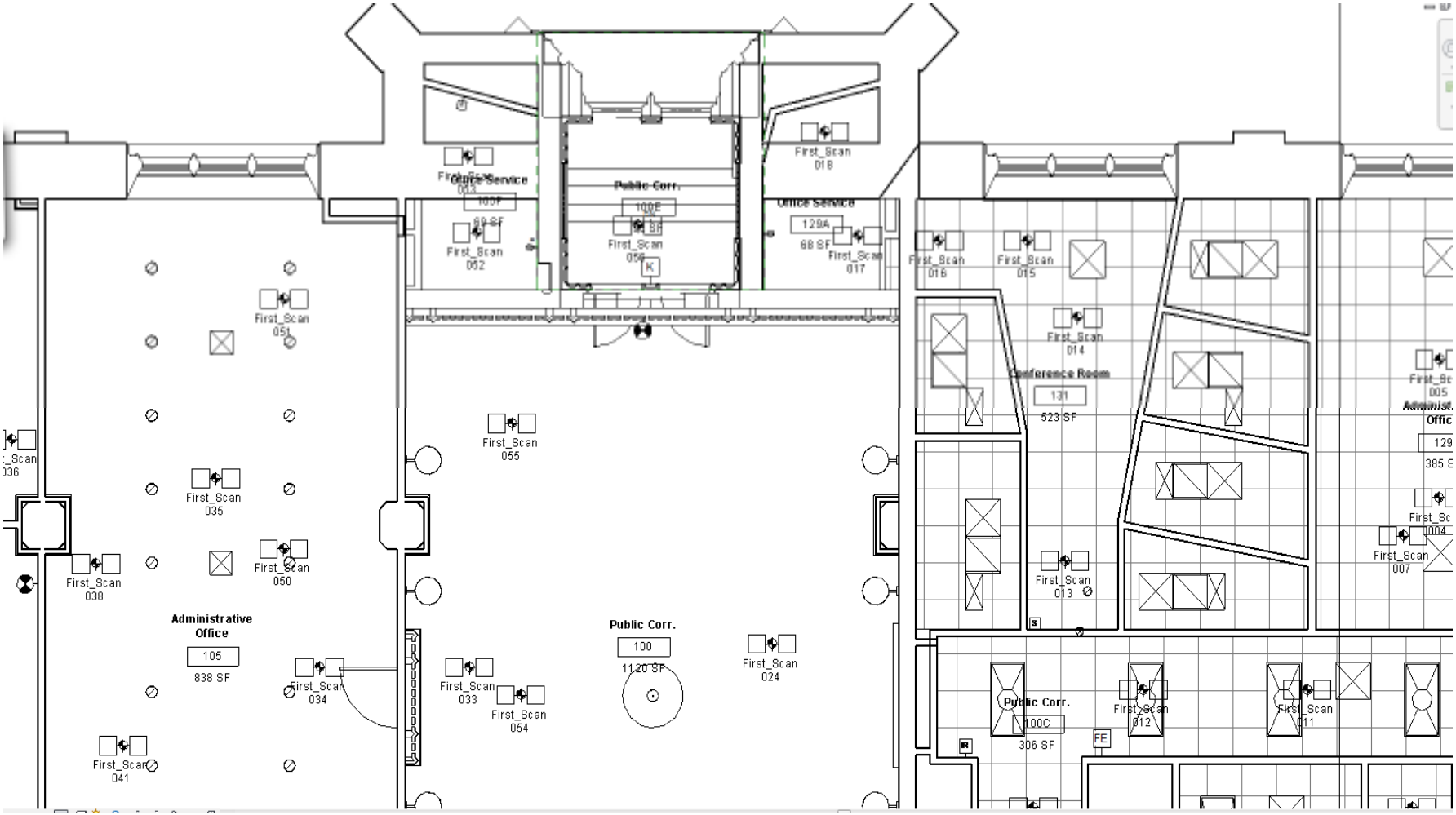
- **Data Acquisition Process – LiDAR**



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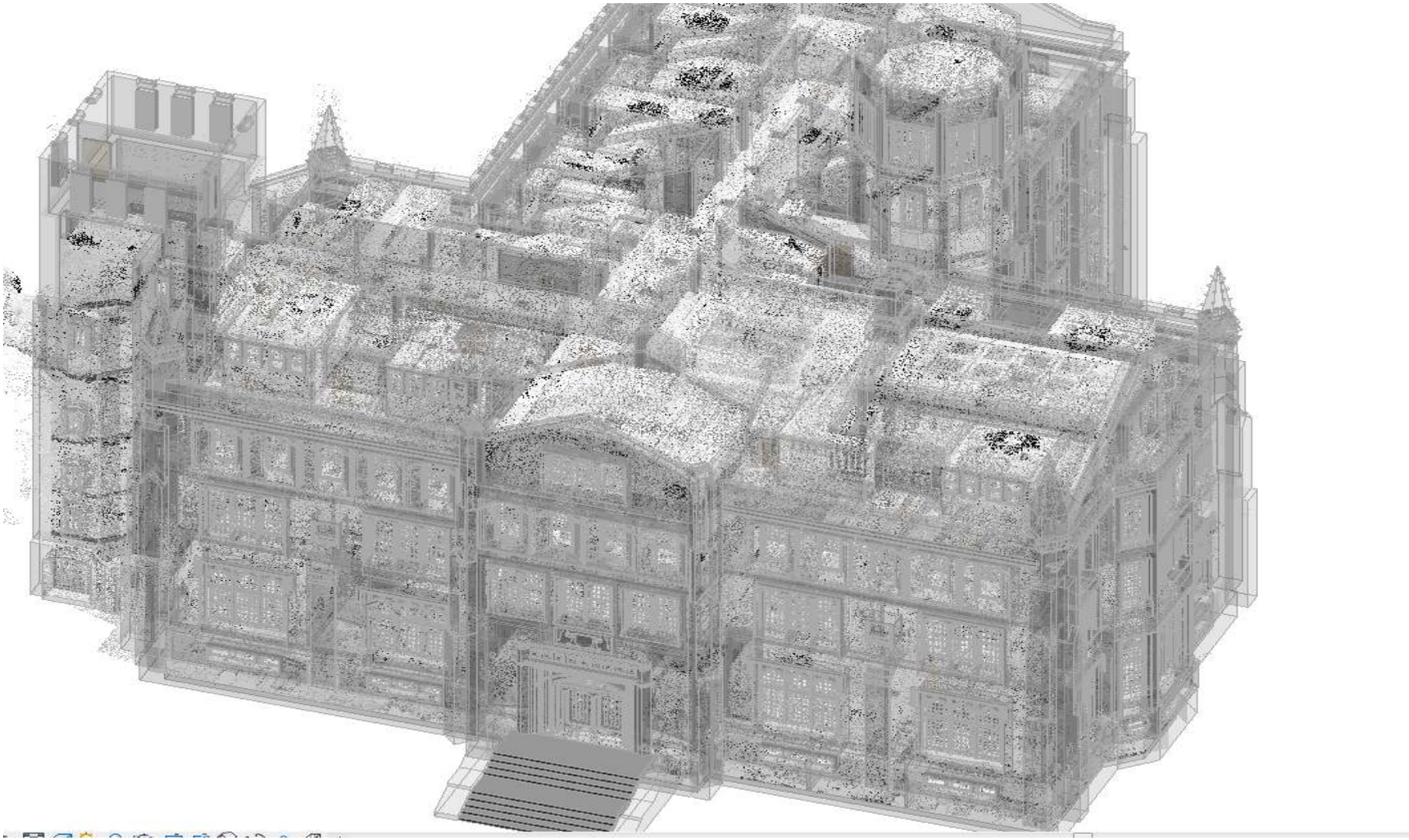

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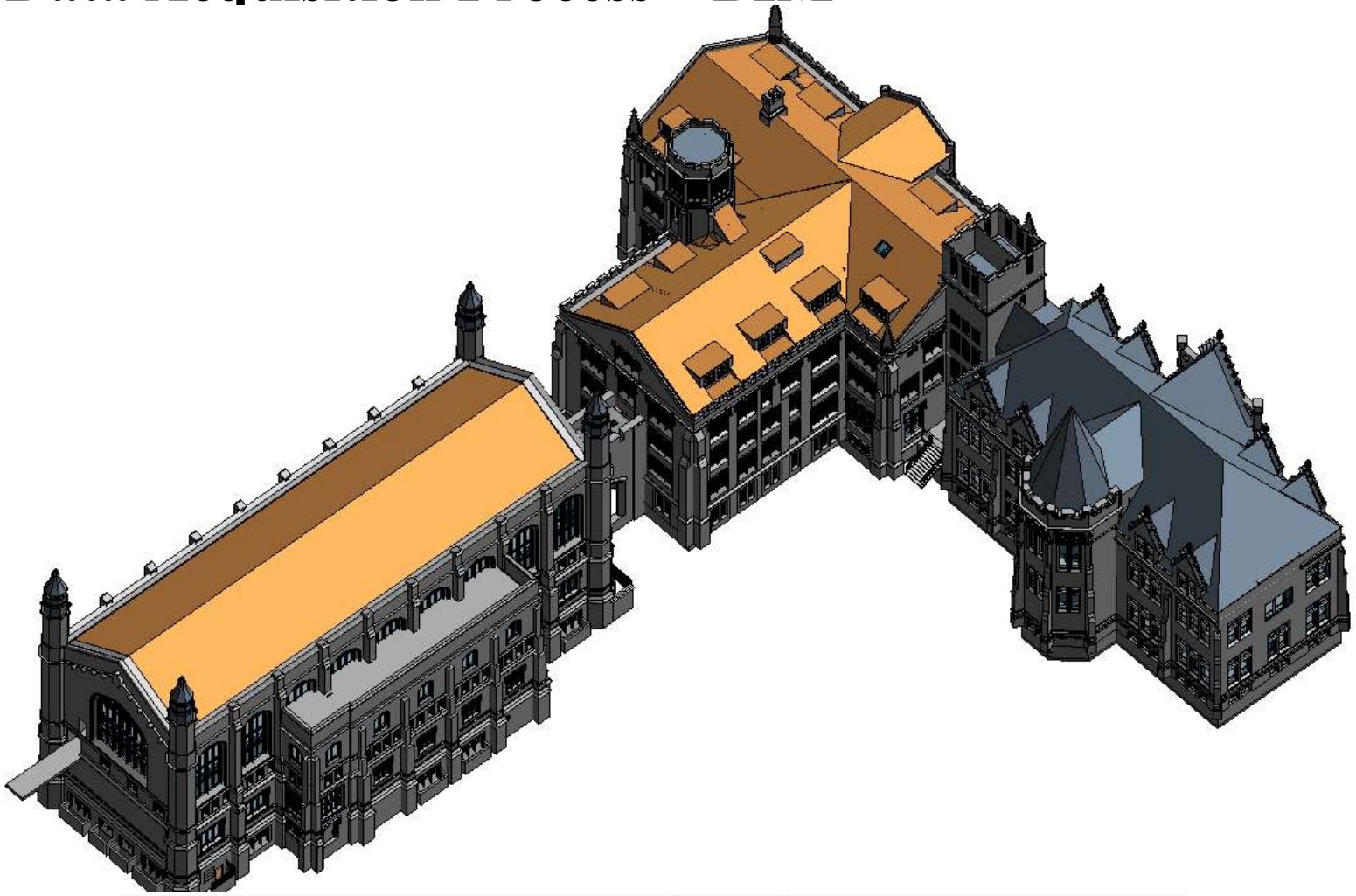
- **Data Acquisition Process – BIM**



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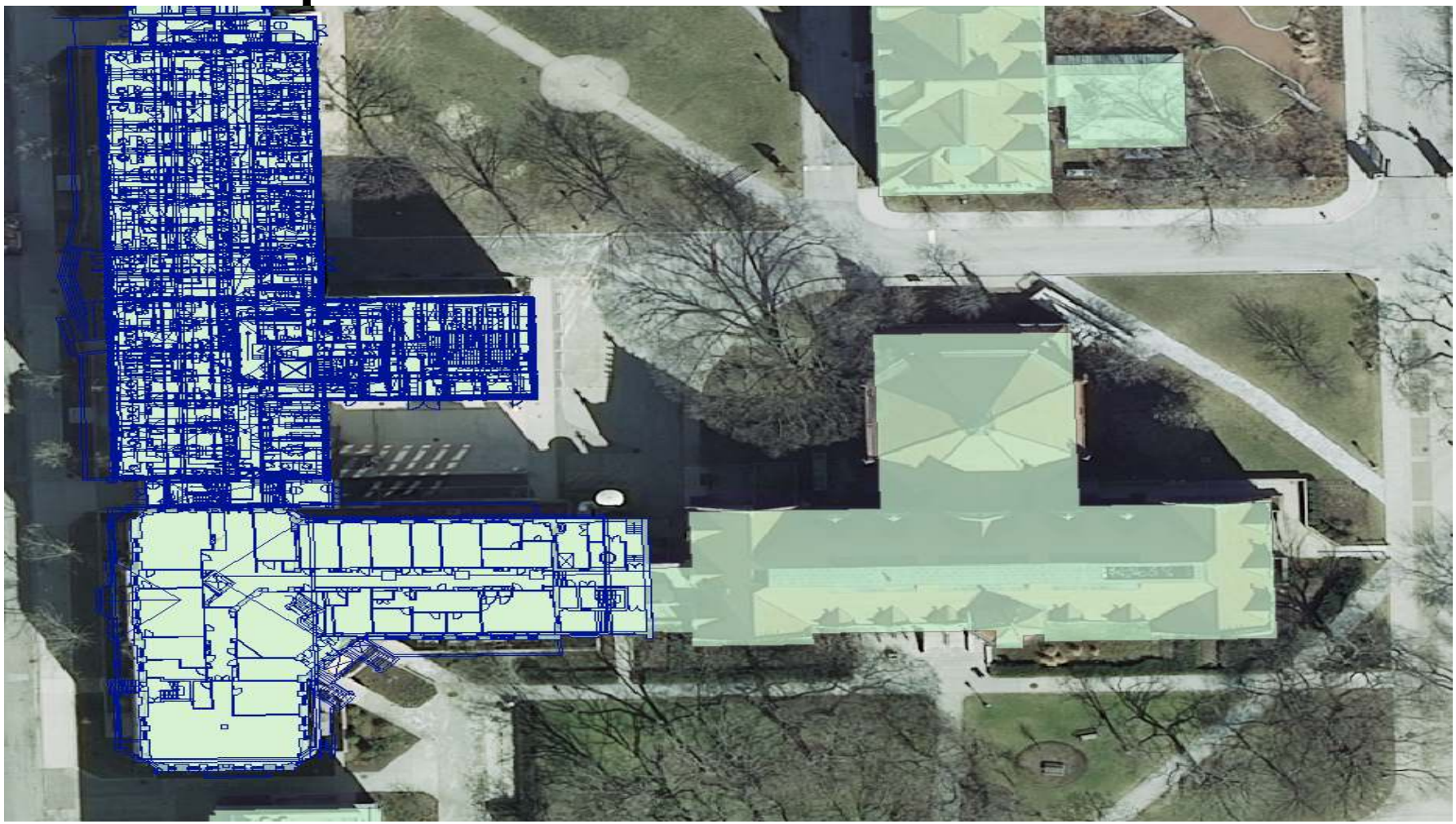
- **Data Acquisition Process – GIS**



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- **Geodatabase Import – CAD drawings:**
  - ✓ **CAD Drawings are the same used in SIMS**
  - ✓ **No Georeferencing required**
  - ✓ **Select Feature Classes by CAD layers**
  - ✓ **Add attributes for Feature-ID, Elevation data**

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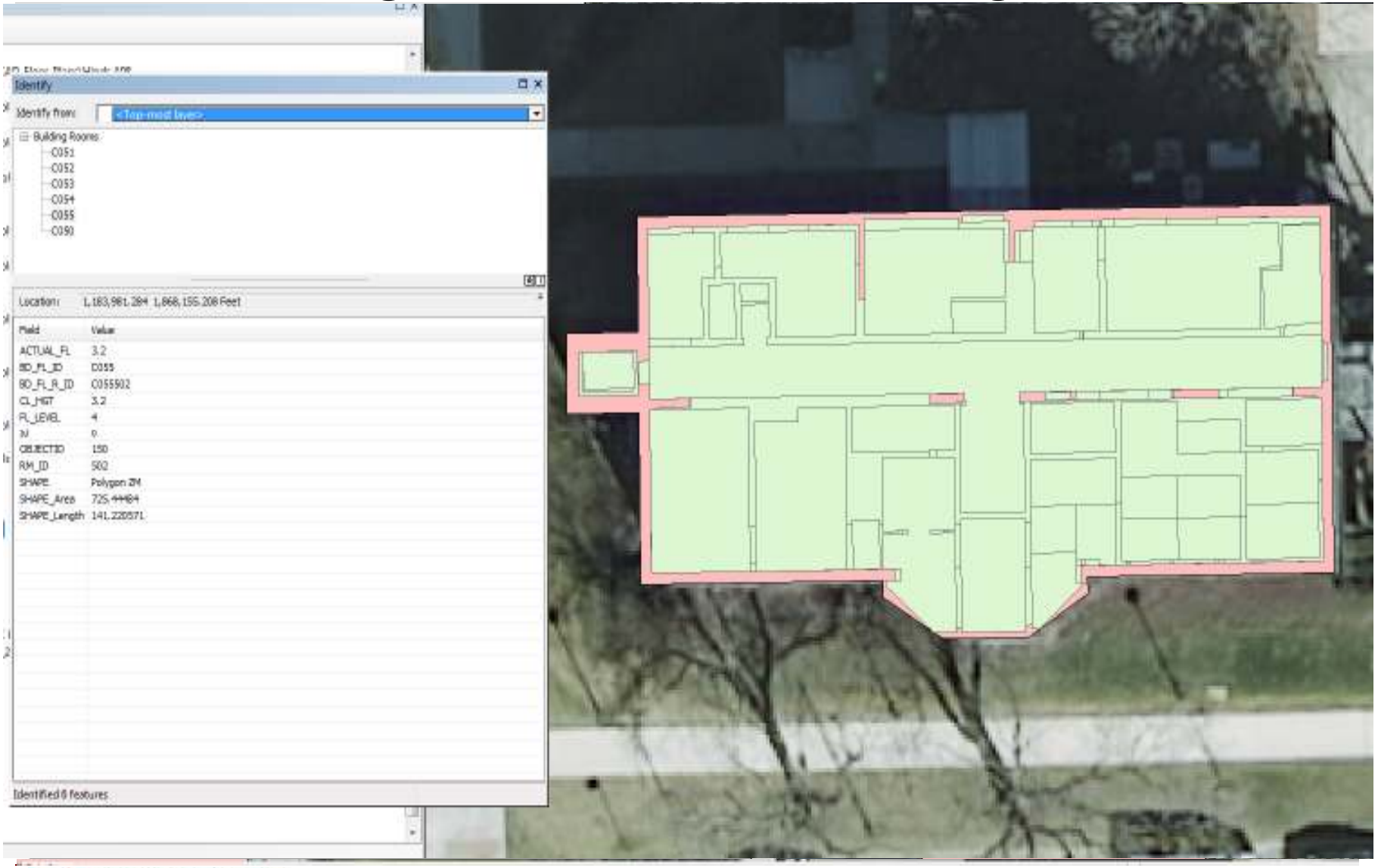

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- **Develop a Point Cloud Repository/Viewer:**
  - ✓ **FARO SCENE Viewer**
    - **Viewer set for use by low end computers**
    - **Ability to find and view clouds easily**
    - **Sharing Point Clouds with Collaborators**
      - Acquire assets not included in the BIM models
      - Help verify survey data or project specifications

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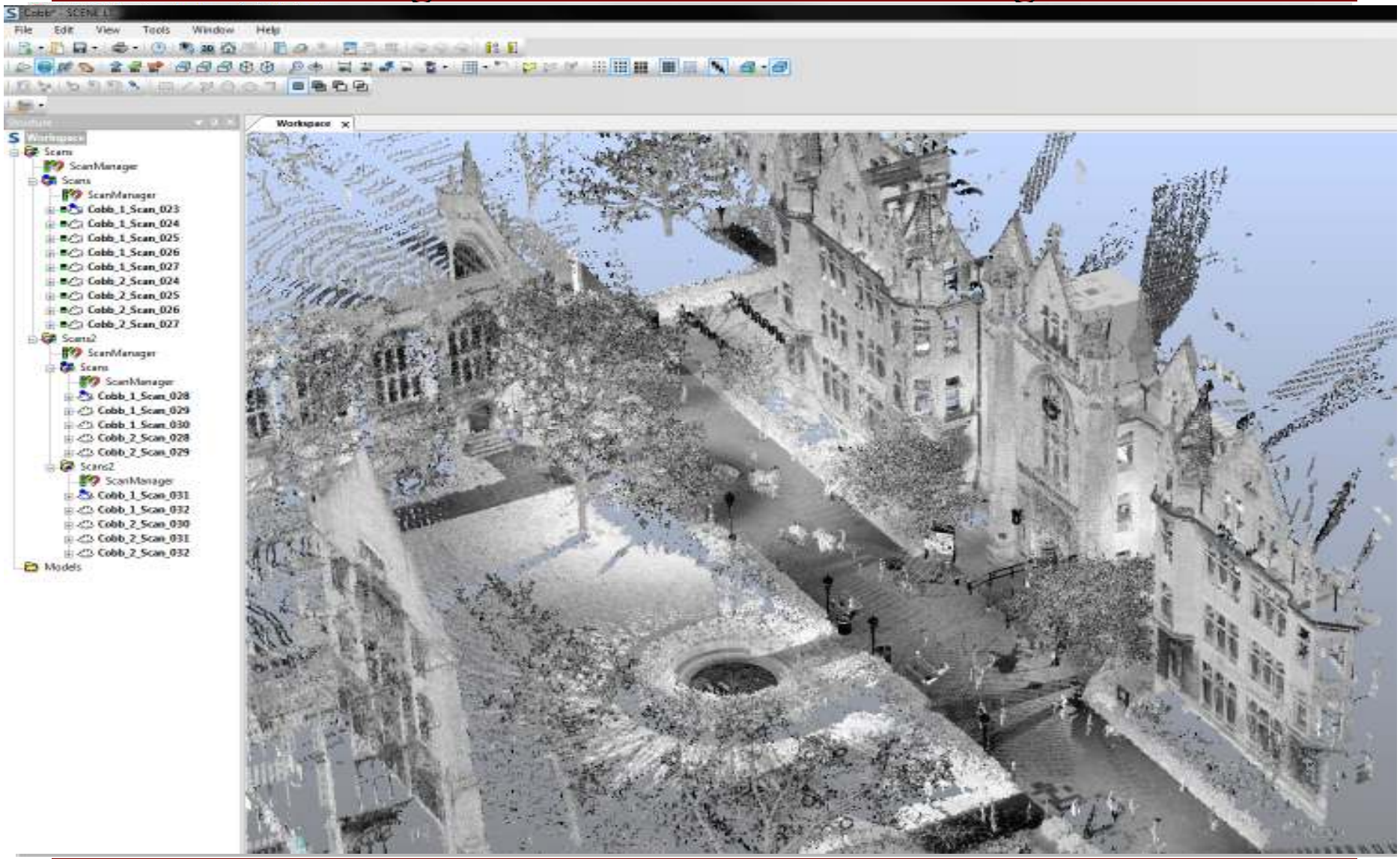

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- **Euclideon Unlimited Detail (UD) technology**
  - ✓ **View Point Clouds at FULL resolution**
  - ✓ **UD plug-in within Applications, Web**
  - ✓ **Provide materials/textures in Virtual Campus**

Currently Testing Euclideon UD technology with existing Point Cloud data

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- **Lessons Learned – LiDAR Acquisition**
  - **Devil in the details – specify that the point clouds must be in State Plane Coordinates!**
  - **LiDAR is an Affordable method to get high quality building plans – that can also support CAD/GIS based applications**
  - **Establish strong QA/QC procedures: still a learning curve from LiDAR vendors on SDI**

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- **Lessons Learned – Spatial Data Collection**
  - **BIM Standards: BIM System of Record – new projects. Clouds/Architectural Models**
  - **Utilize Clouds for Visualization – no textures**
  - **Management of Clouds as Links with BIM Models**

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