BURNS McDONNELL

3D DOCUMENTATION
“WITH THE SPEED OF LIGHT”

IDEA2015
Inspiring the Next Generation
Boston, MA | June 28 – July 1

Existing Facility Models / Drawings

- Projects struggle with the accuracy of the existing as-built documentation. Any projects with existing structures, equipment, piping and etc. that have critical connection or penetration locations require accurate documentation. Almost all existing structures requiring engineering changes were designed before 3D CAD modeling.
- How accurate the information or if any exists is always a concern.

LiDAR “Light + Radar” (3D laser scanning)

- A 3D Scanner provides an accurate measurement of the distance from an object’s surface to the scanner position. The scan of the object’s surface comprises many thousands of individual points that are mapped in a three-dimensional XYZ coordinate system.

- The resultant scan is called a “point cloud.”

Benefits

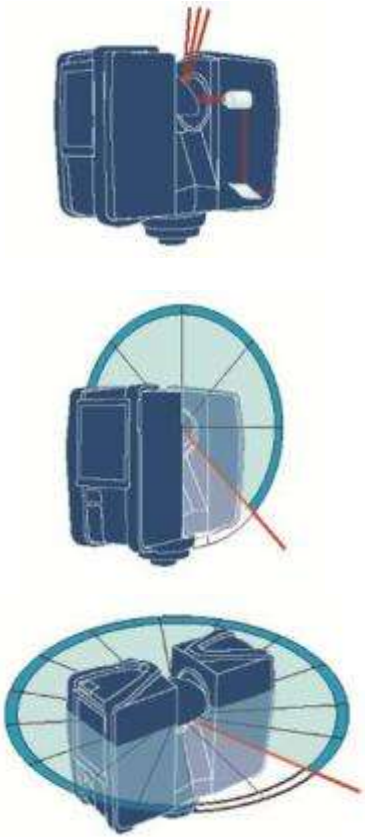
- Capture data quickly and safely with immense detail and accuracy
  - Non intrusive
  - Hazardous or complex objects
- Improves project planning and design
  - Reduces site visits and on-site time
  - Fit the new design around existing objects
    - Reduces design rework
    - Enables off-site fabrication
- Continuous management of asset and Building Information Management (BIM) data
  - Keep records accurate - combine future scans to existing
  - Aids communication & collaboration between architects, engineers, constructors and owners

HD Stationary Scanner

- Faro Focus 3D
  - Indoor/Outdoor
  - Type 1 Laser (eye safe)
  - Accurate to within +/- 2mm
  - Range
    - X330 = 330m
    - X130 = 130m
  - Full Color

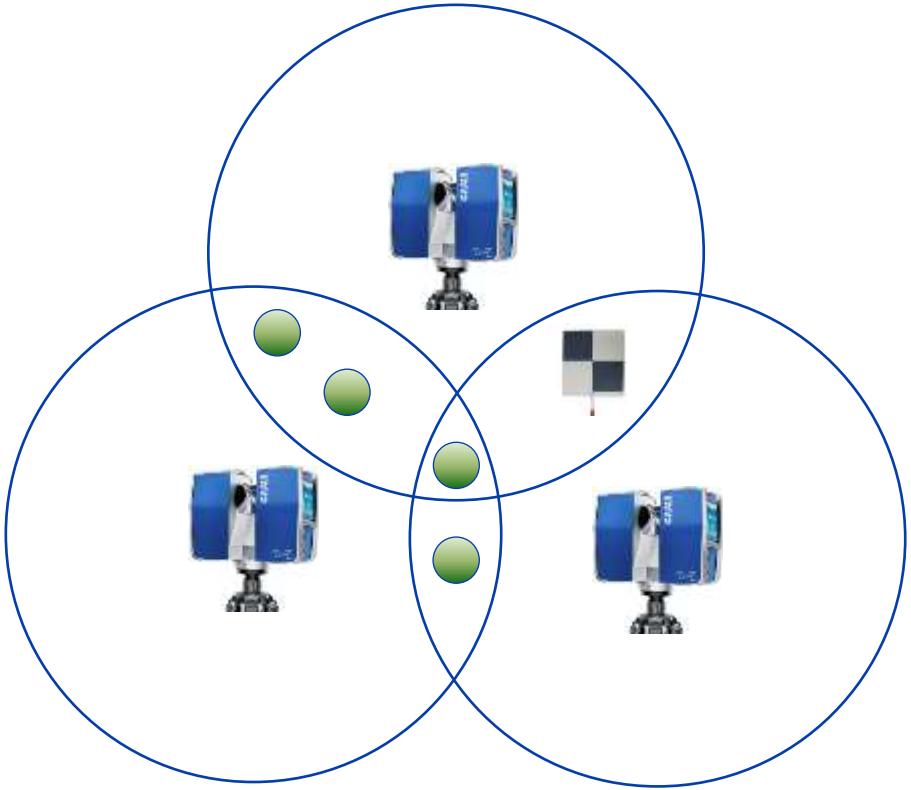
How’s It Works

- Distance - The laser scanner uses a laser beam, which is reflected back to the scanner by an object. The distance is measured in millimeter accuracy by the phase shift between the ending and receiving beam.
- Vertical Angle - The mirror deflects the laser beam in a vertical direction onto the same object. The angle is encoded simultaneously with the distance measurement.
- Horizontal Rotation - The laser scanner revolves 360° horizontally. The horizontal angle is encoded simultaneously with the distance measurement.



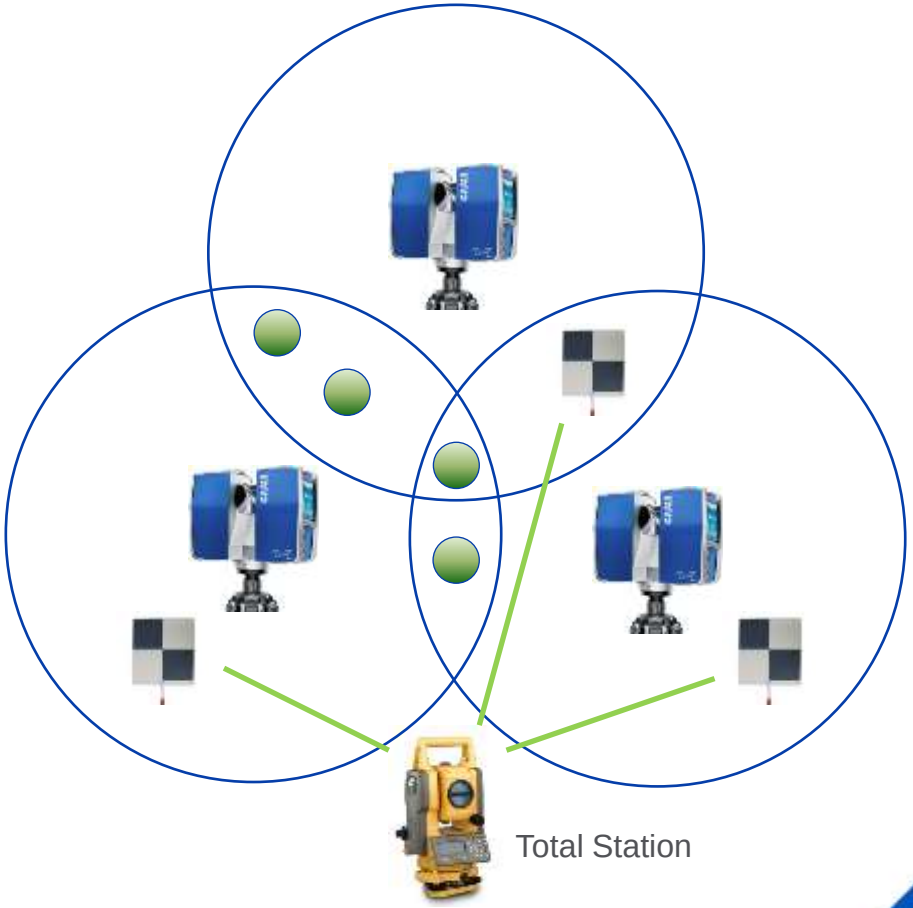
Data Collection

- Registration Targets
  - Spheres and/or Checkerboards
  - Minimum 3 shared targets
- 15 Minutes per scan
  - 10 Scan Time
  - 5 Move Scanner & Targets



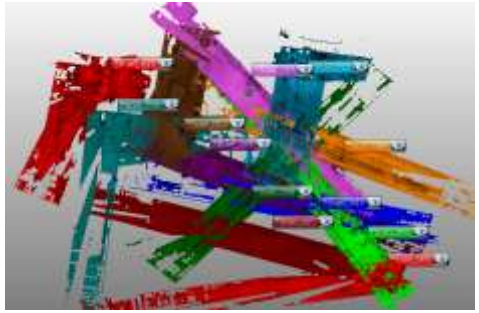
Data Collection

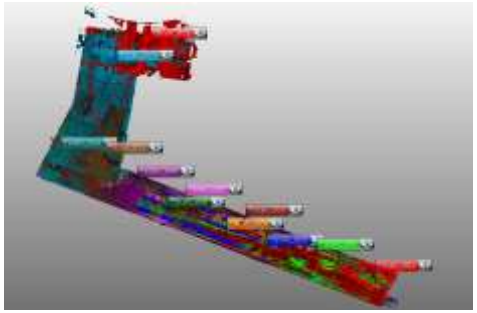
- Registration Targets
  - Spheres and/or Checkerboards
  - Minimum 3 shared targets
- 15 Minutes per scan
  - 10 Scan Time
  - 5 Move Scanner & Targets
- Setting Control (optional)

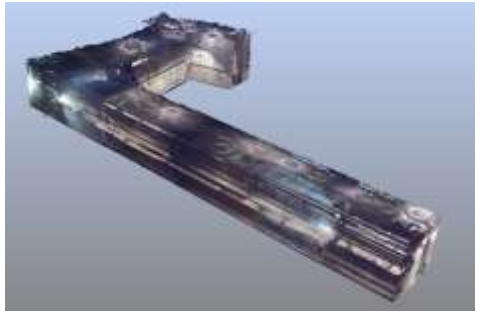


Processing / Registration / Exporting

- Faro Scene
- Autodesk ReCap
- LFM Server
- Export
  - Unified Volumes
  - 3D Design Applications
    - AutoCAD/Plant3D
    - MicroStation
    - PDS/SmartPlant
    - Revit & More







Viewing

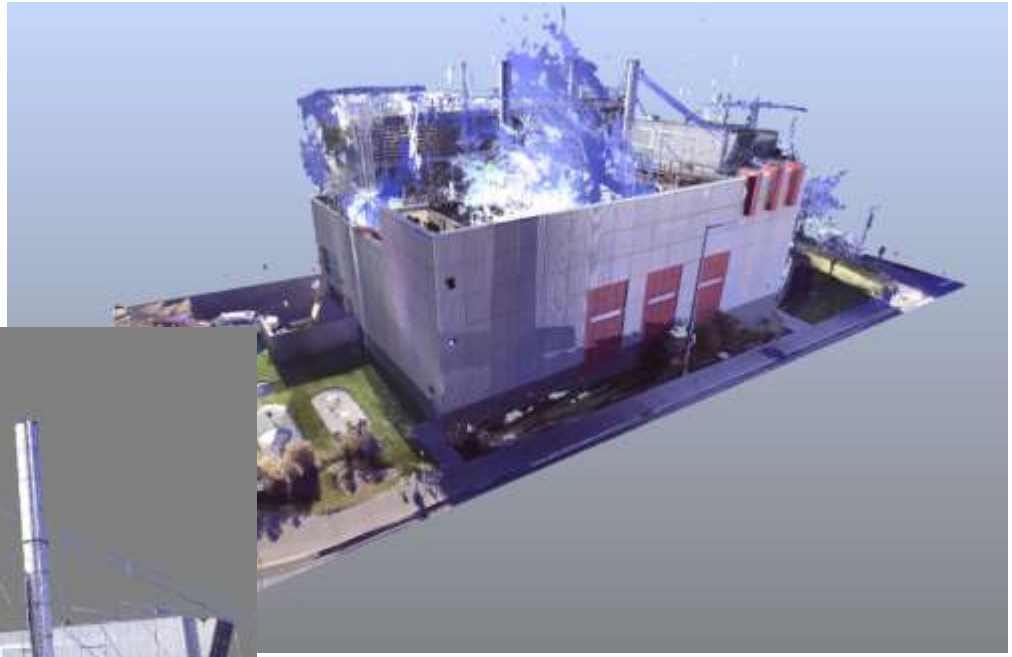
- Faro
  - Scene Light (free)
  - Scene WebShare
- Autodesk
  - ReCap (free)
  - ReCap 360
- LFM Viewer

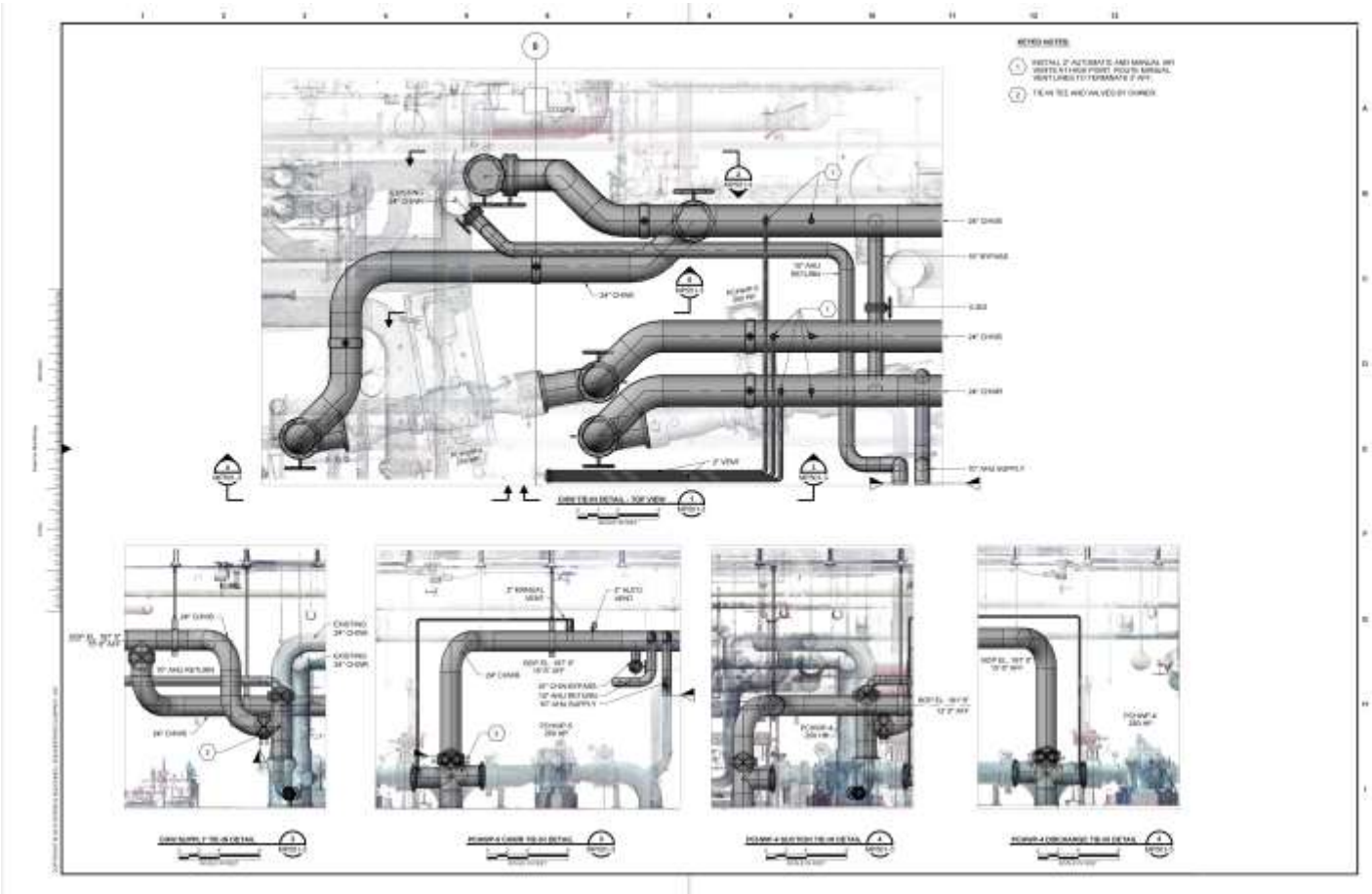
Design Review

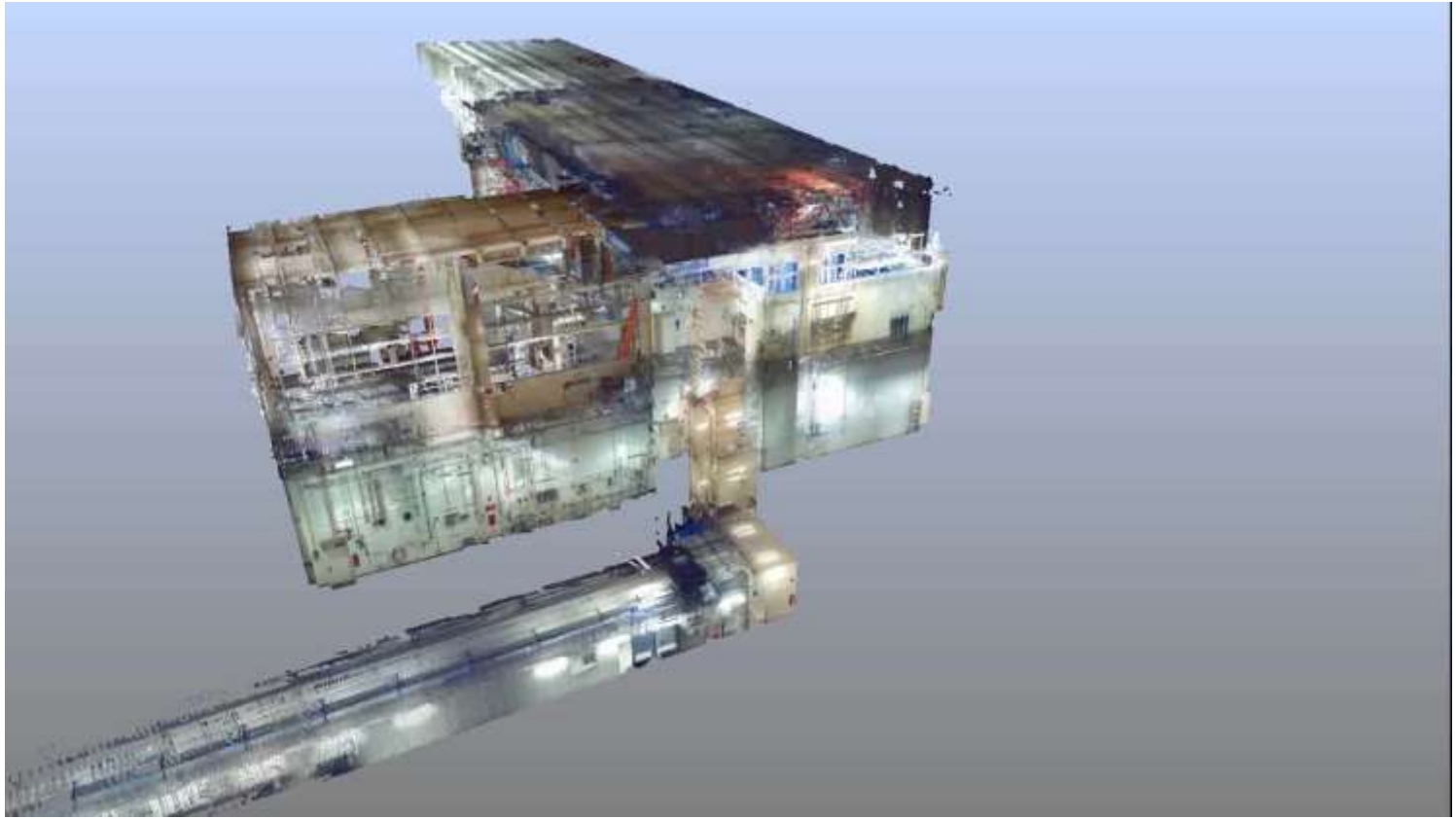
- Navisworks
  - Navigation
  - Collaboration
  - Sectioning
  - Measuring
  - Interference Detection
- Bentley Navigator
- Intergraph SmartPlant

- Navisworks
  - Point Cloud (.rcs)
  - Revit Model
  - Plant3D Model

- Faro Scene View







Questions?

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