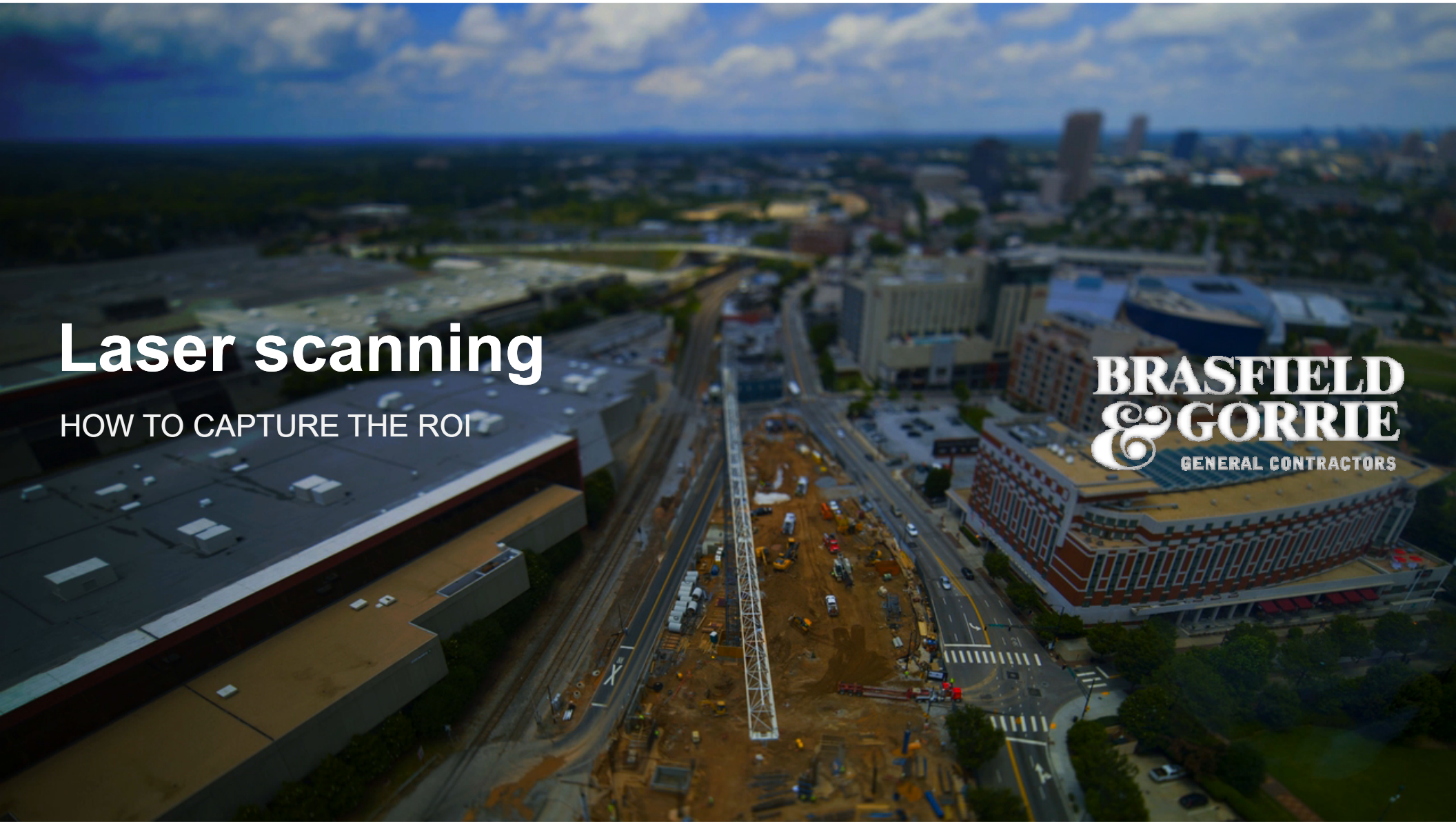


Laser scanning

HOW TO CAPTURE THE ROI

Laser Scanning: How to Capture the ROI

Scott Cloud
Regional Director of VDC
Brasfield & Gorrie

Mitch Carroll
VDC Coordinator
Brasfield & Gorrie

INTRODUCTION

Class Summary

Laser scanning has become a very prevalent topic in the architecture, engineering, and construction industry over the last several years. While the software and hardware has dramatically improved over the years, offsetting or justifying the costs can be a challenge. Rather the project is driven by schedule or cost constraints. What have been the challenges involved in overcoming these hurdles and recouping the benefits that scanning has to offer? This class will take a transparent look at the purchase and use of Brasfield & Gorrie, LLC's, first laser scanner. We will explore the additional challenges as well as the metrics used to prove value. This class is geared toward those considering the purchase of, or who have just recently purchased, their first scanner or who want to learn more about the technology

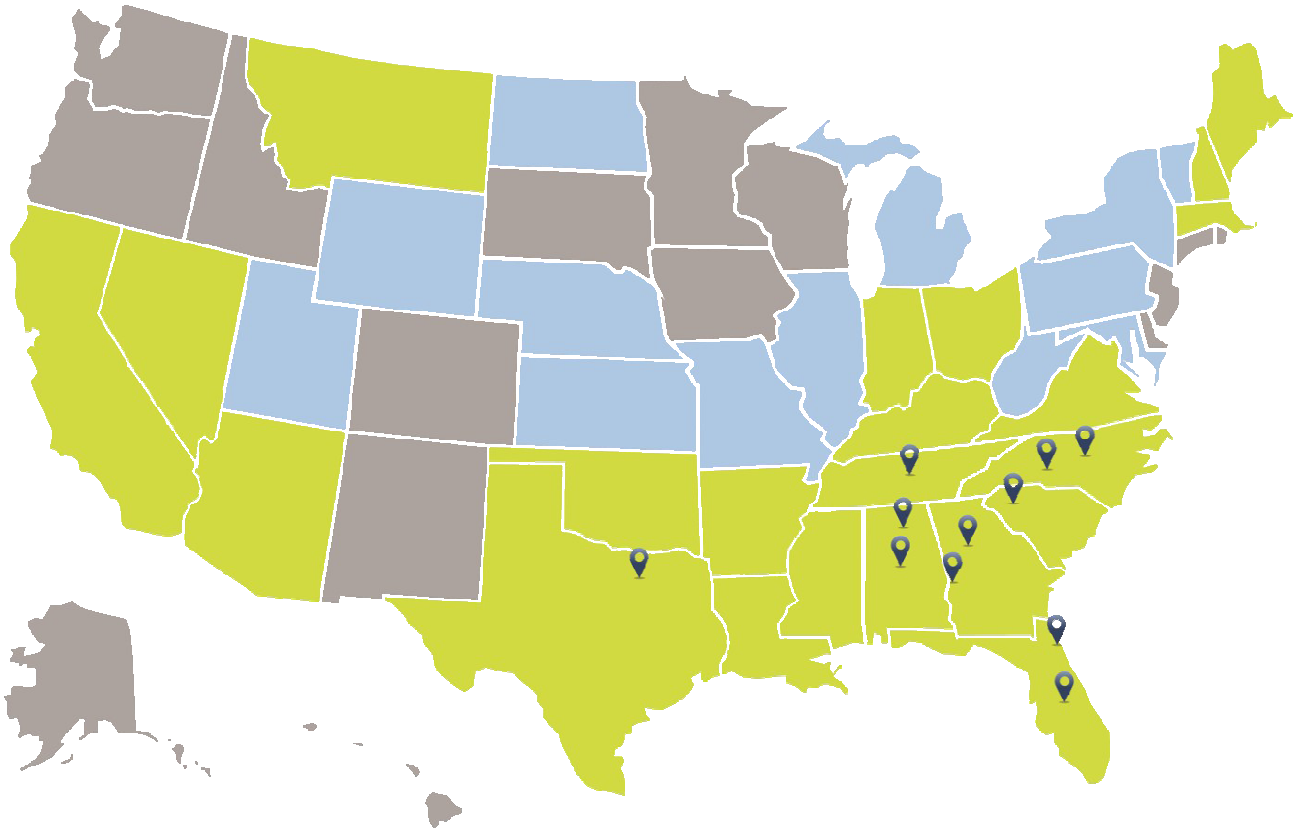
OUTLINE

Class Summary

- What is Laser Scanning?
- Potential Applications
- Justifying Cost
- Tracking ROI
- Lessons Learned


BRASFIELD
& GORRIE
GENERAL CONTRACTORS

WHERE WE WORK



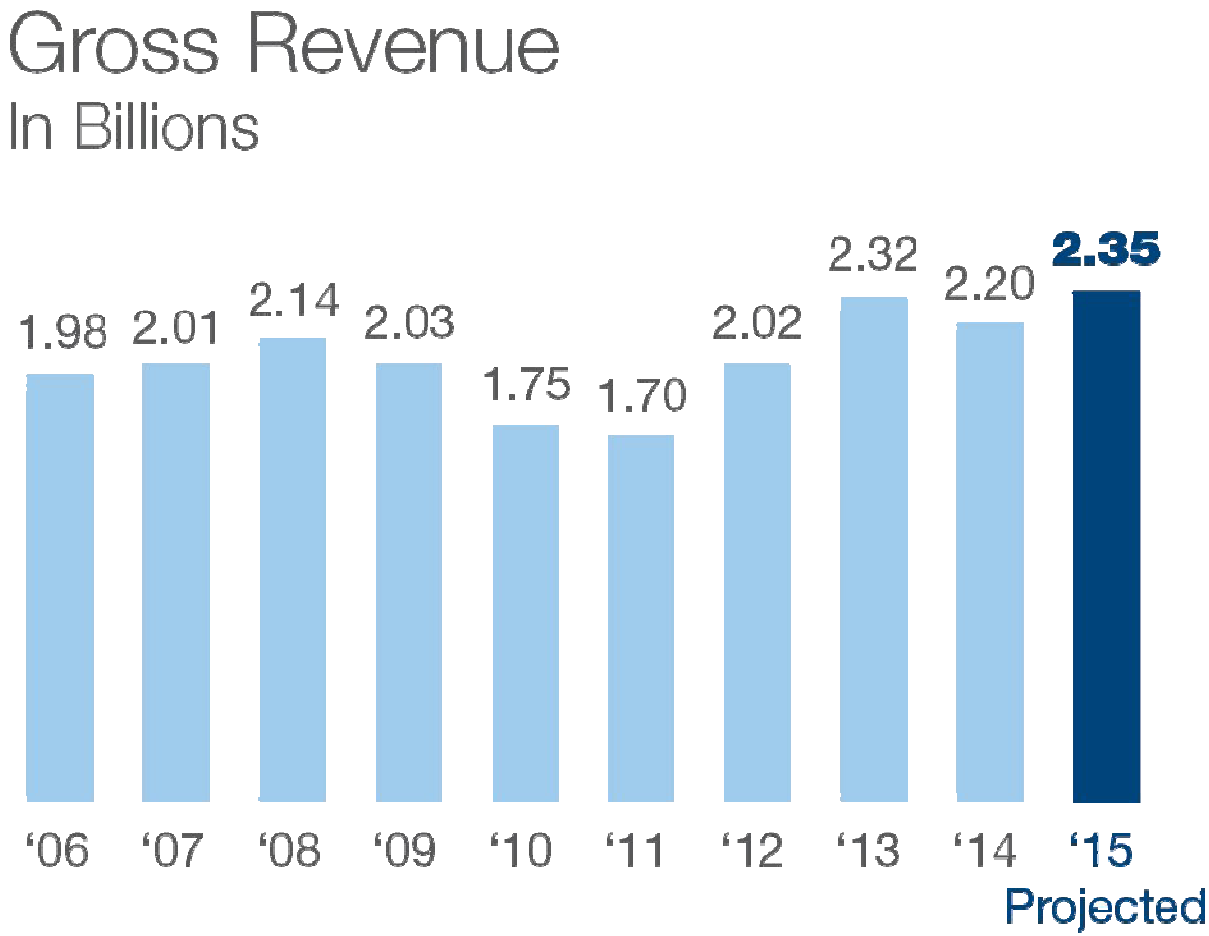
STATES

- CURRENT WORK
- PERFORMED WORK

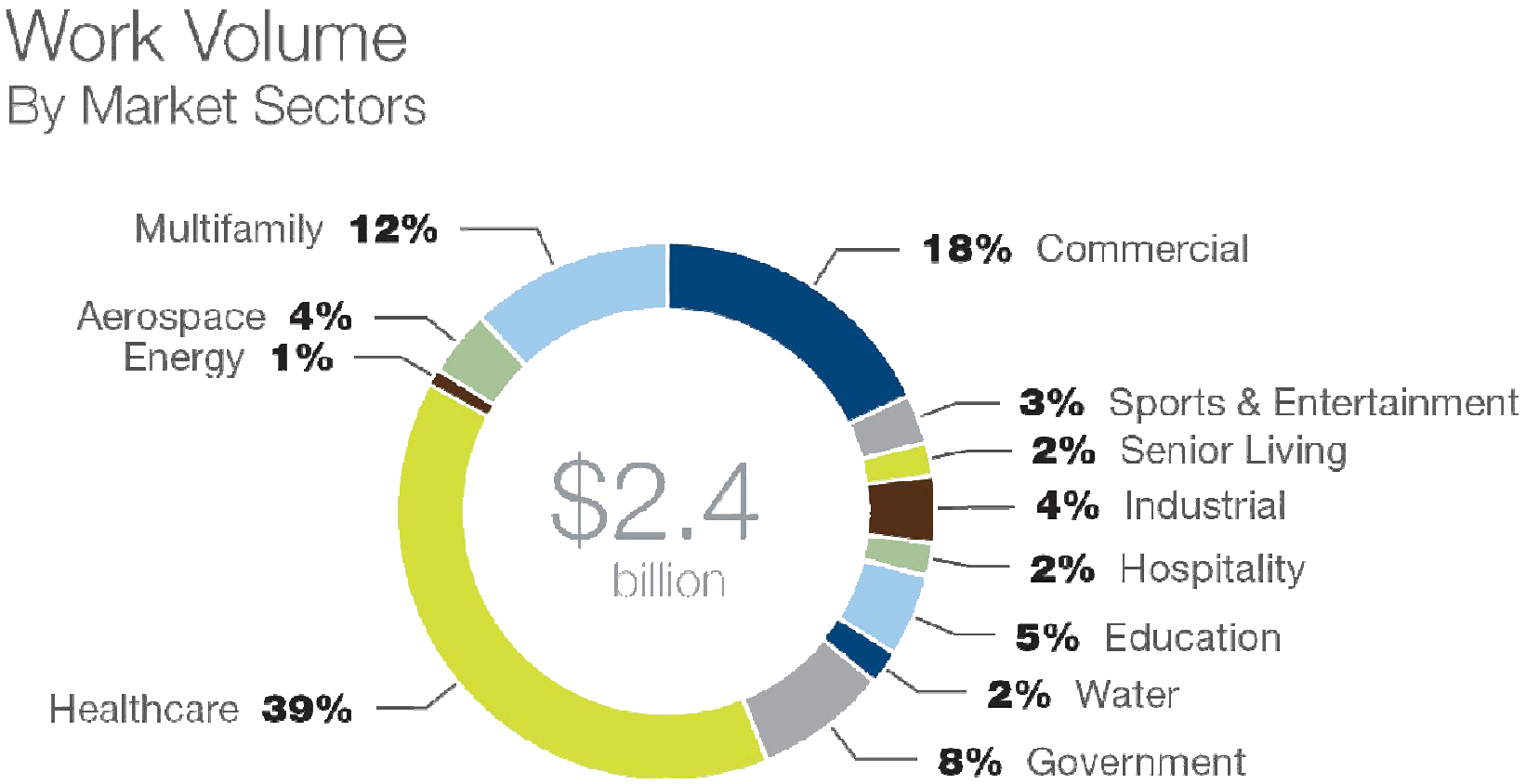
OFFICES

ATLANTA
BIRMINGHAM
CHARLOTTE
COLUMBUS
DALLAS
GREENVILLE
HUNTSVILLE
JACKSONVILLE
NASHVILLE
ORLANDO
RALEIGH

GROSS REVENUES



WORK MIX BY TYPE



RECENT AWARDS & RANKINGS

ENGINEERING NEWS-RECORD (NATIONAL)

- No. 27 in The Top 400 Contractors
- No. 4 in Auto Plants
- No. 4 in Health Care
- No. 5 in Green Contractors in Manufacturing & Industrial
- No. 10 in Aerospace
- No. 11 in Manufacturing
- No. 13 in Hotels, Motels & Convention Centers
- No. 13 in General Building
- No. 13 in Religious and Cultural
- No. 13 in Sports
- No. 15 in Wastewater Treatment Plants

MODERN HEALTHCARE

- No. 3 in Top Healthcare General Contractors in the Nation

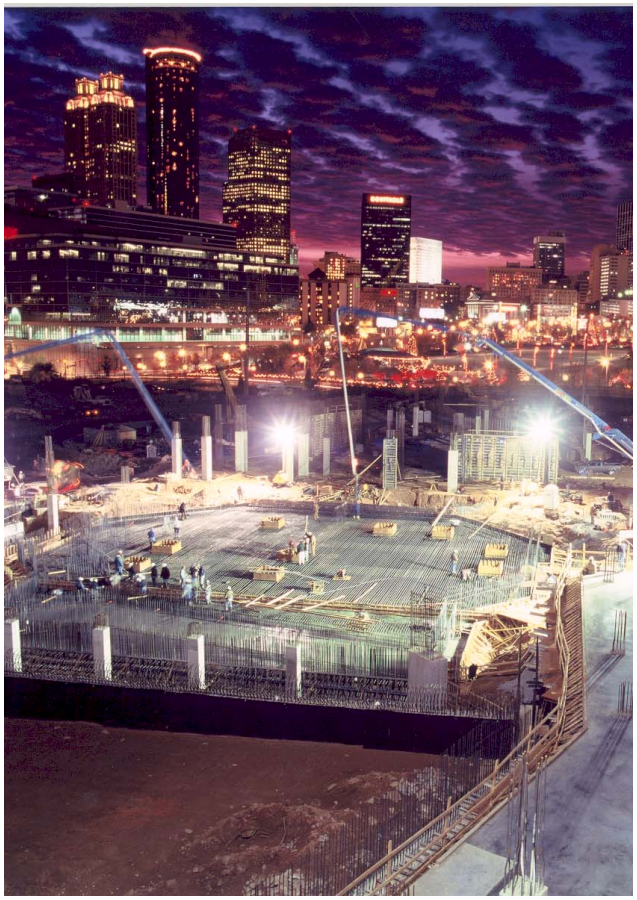
ENGINEERING NEWS-RECORD SOUTHEAST

- No. 1 in Top Contractors
- No. 1 in General Building
- No. 1 in Georgia Contractors
- No. 1 in Government
- No. 1 in Green
- No. 1 in Health Care
- No. 1 in Hard-Bid
- No. 1 in New Construction
- No. 1 in Private

TRUE GENERAL CONTRACTOR

- 274 Superintendents
- 144 Field Engineers
- 115 Foreman
- 1640+ Field Employees
- 4,000+ Equipment Fleet

5M CUBIC YARDS OF CONCRETE POURED SINCE 2003



What is laser scanning?

What is Laser Scanning?

History Timeline

1960
Beginning

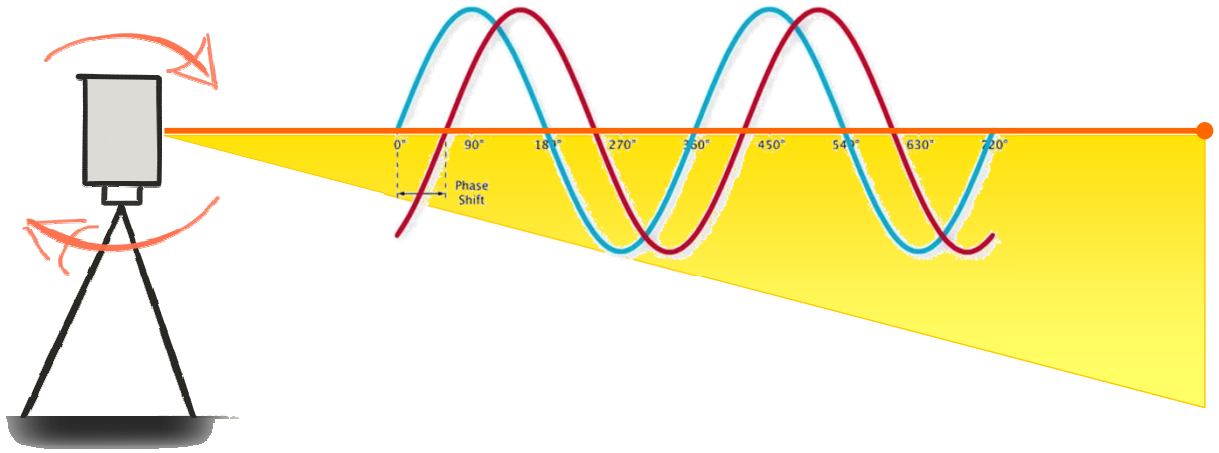
Technology Advanced
1985

1990
Manufacturing Began

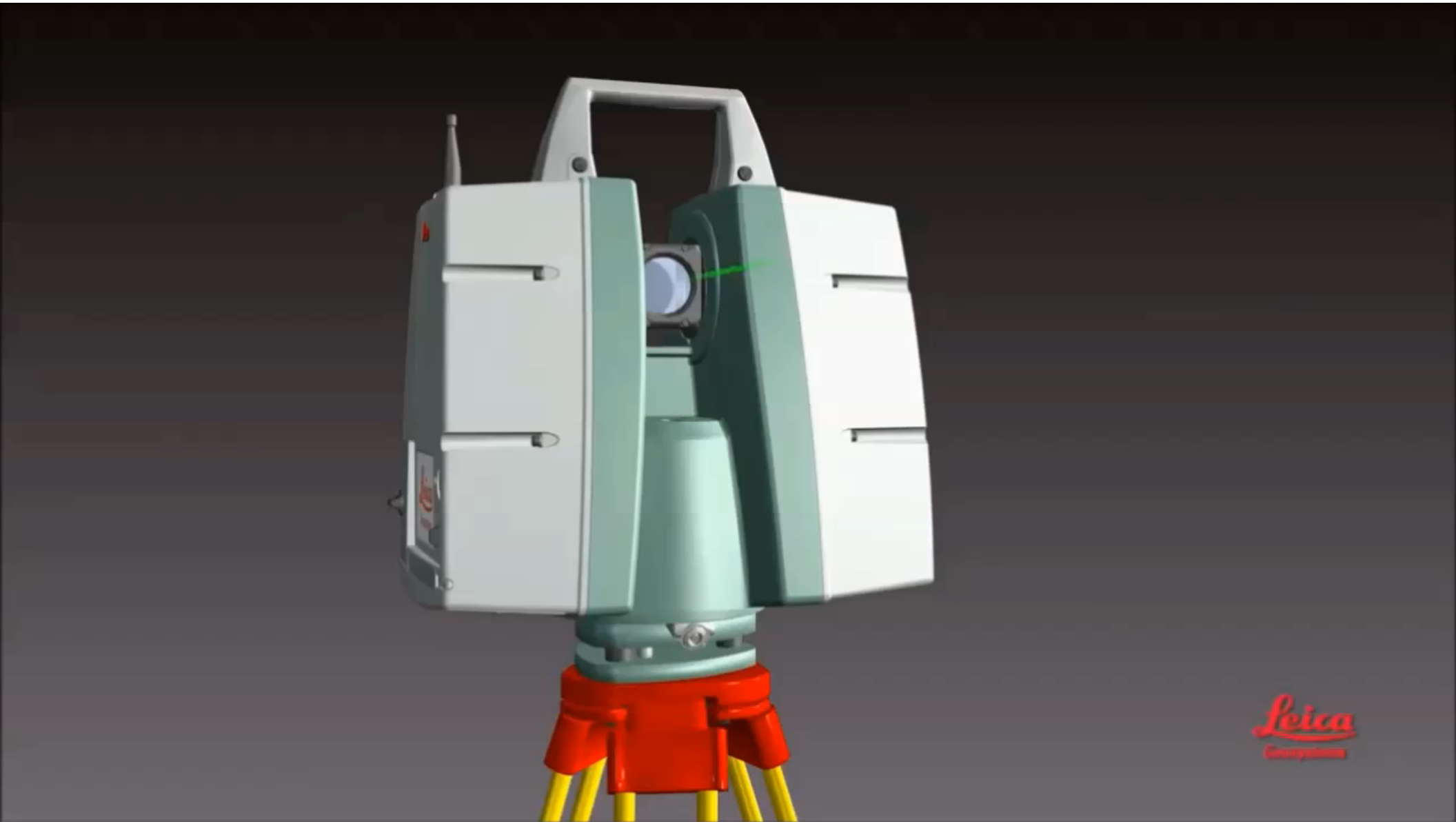
2015

What is Laser Scanning?

How it Works



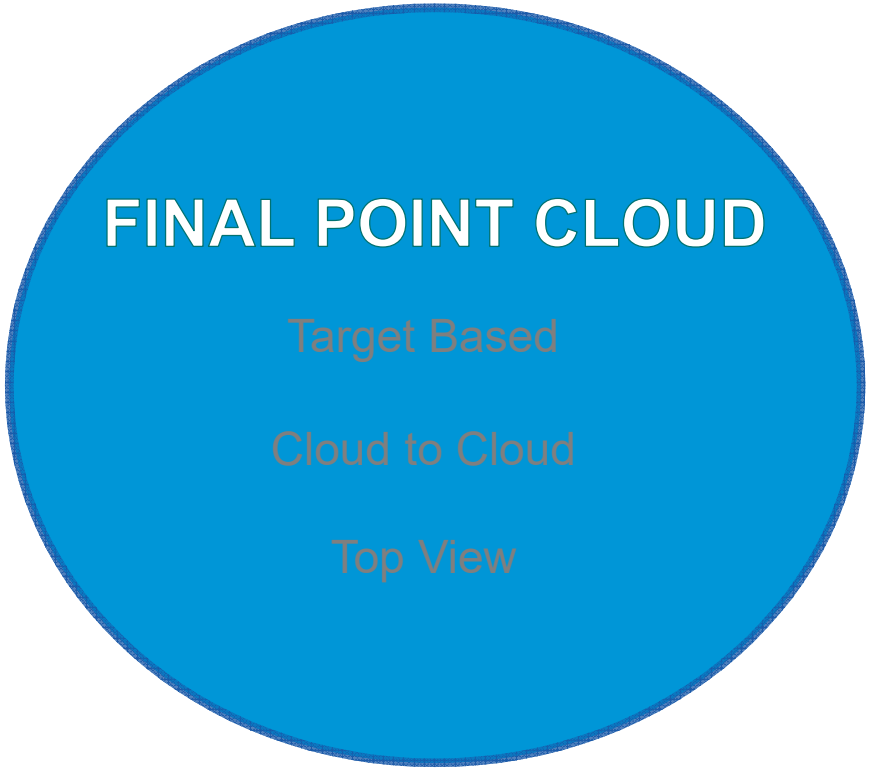
1. Time of Flight
2. Phase Shift
3. Triangulation


Leica

What is Laser Scanning?

How it Works

- Registration : The process of combining all point clouds into one.



What does it create?

WHAT DOES LASER SCANNING CREATE?

Standard Outputs

Point Cloud

- Model Files
- Pts
- Fls
- Xml
- Rcp/Rcs
- Etc…

Mapping View

- Scanner Views
- Can be hosted via web or locally
- Mapping (google maps of scan)

WHAT DOES LASER SCANNING CREATE?

Point Cloud

Point Cloud

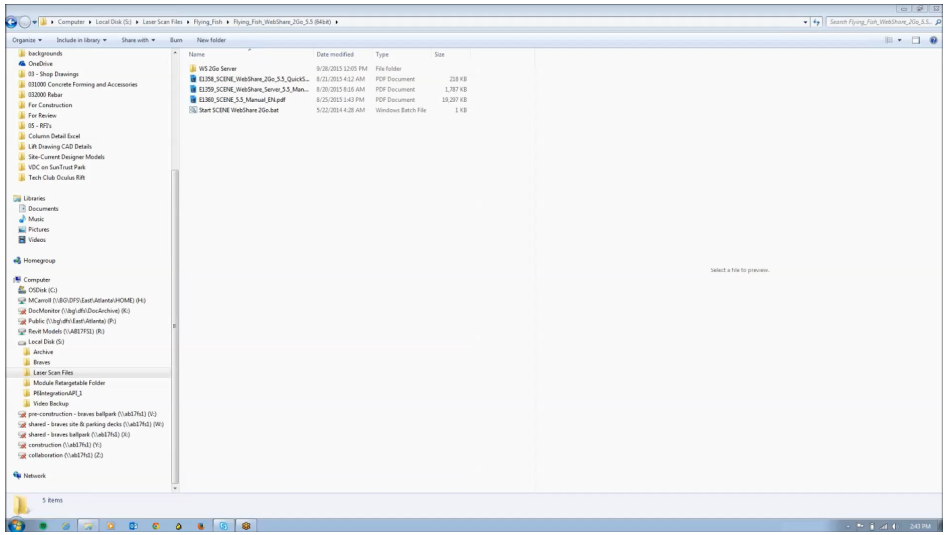
It is a mass of points showing a representation of each point the scanner collects. A pointcloud is the end product from the scanner, which is then analyzed, altered, and purged to create a clear reality capture of an object or area. This can then be used for multiple purposes from site analysis to 3d printing.

WHAT DOES LASER SCANNING CREATE?

Mapping

Mapping View

A 2D representation of a scan project that has been created to show the full scope of a scan job. It first shows a map view of where each scan took place. Then allows a closer look into each scanning position. Once being placed in each position, the scanner will allow you to take measurements, along with many other features, while in the 360 view created by the scanner.



Why is there a need?

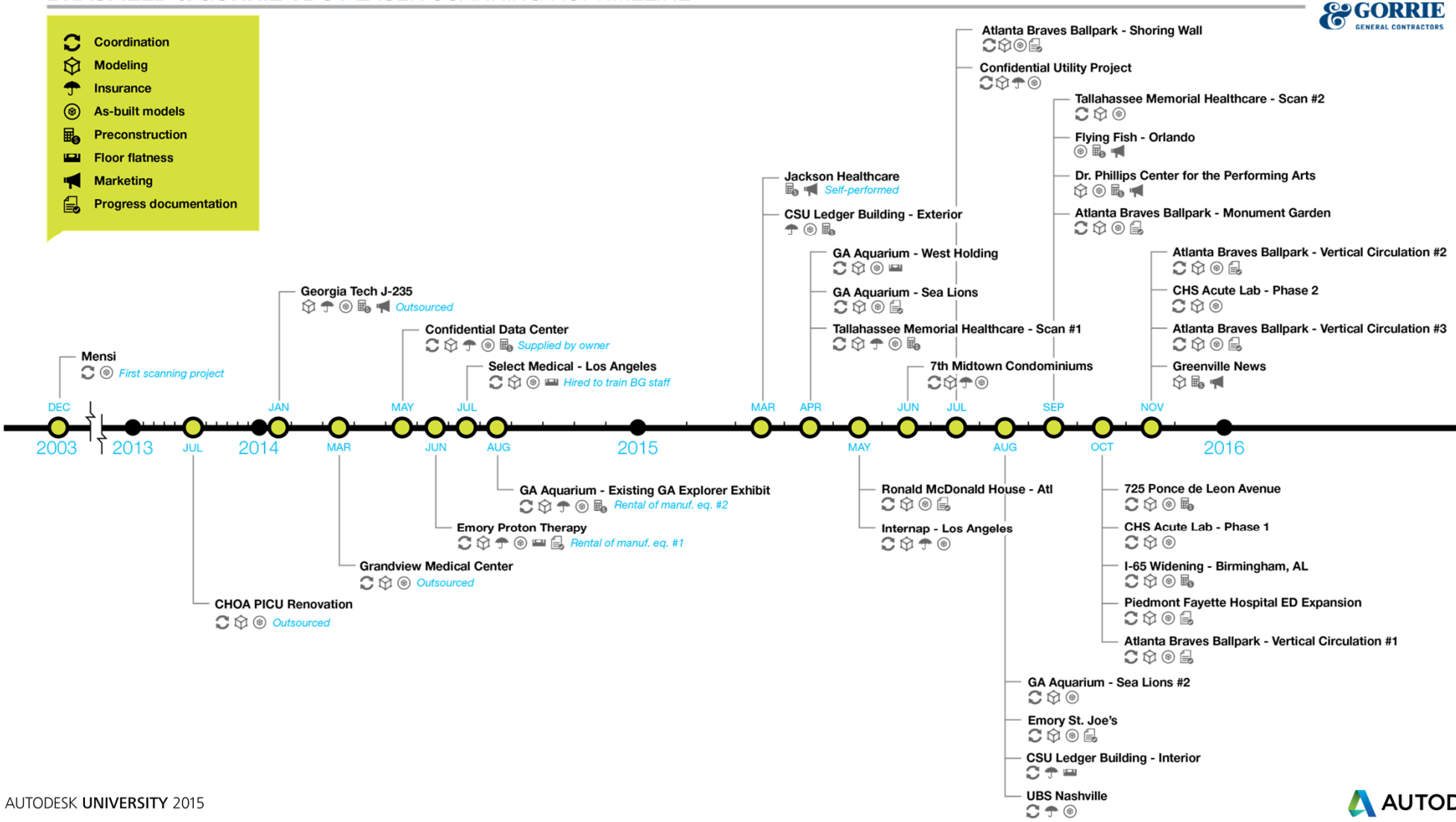
What are the applications?

Potential Applications
Application

- As-Builts
- Preconstruction
- MEP Coordination
- Design Validation
- Early Site Analysis
- Insurance / Record Keeping
- Progress documentation
- Enclosed spaces capturing
- Eliminating high risk safety items
- Virtual site access
- Quality control / Assurance
- Floor flatness
- Marketing

BRASFIELD & GORRIE VDC / LASER SCANNING ROI TIMELINE

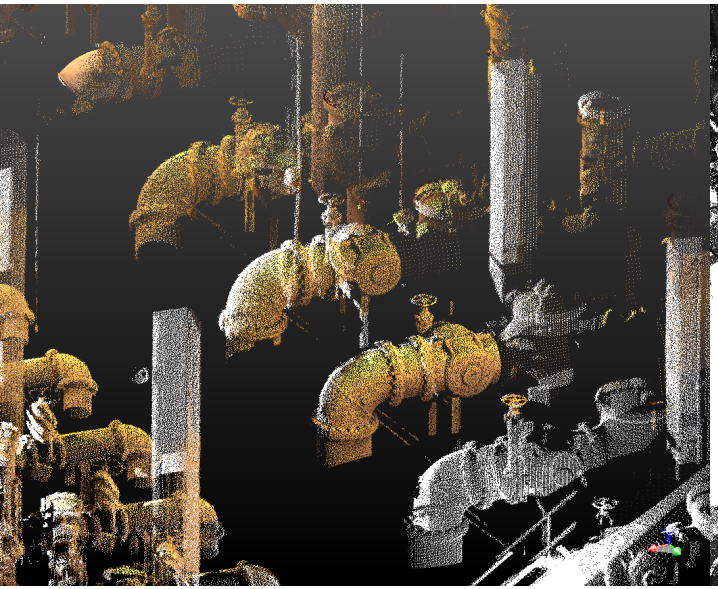
BRASFIELD & GORRIE GENERAL CONTRACTORS

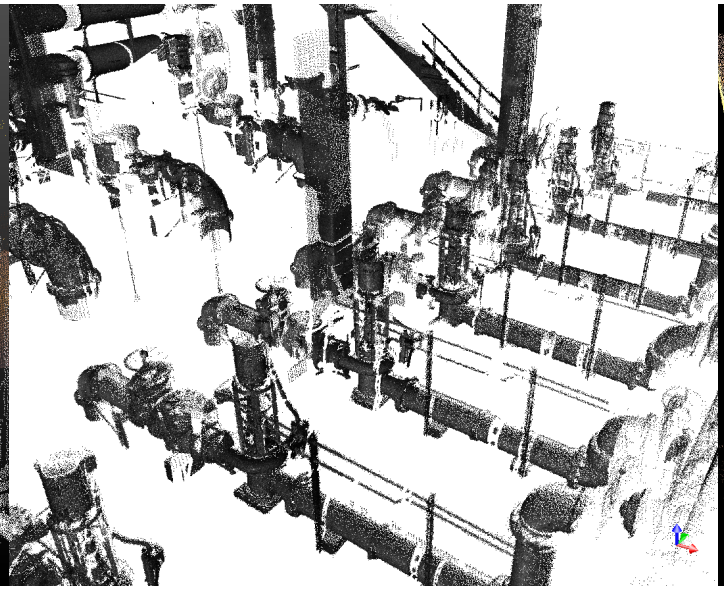


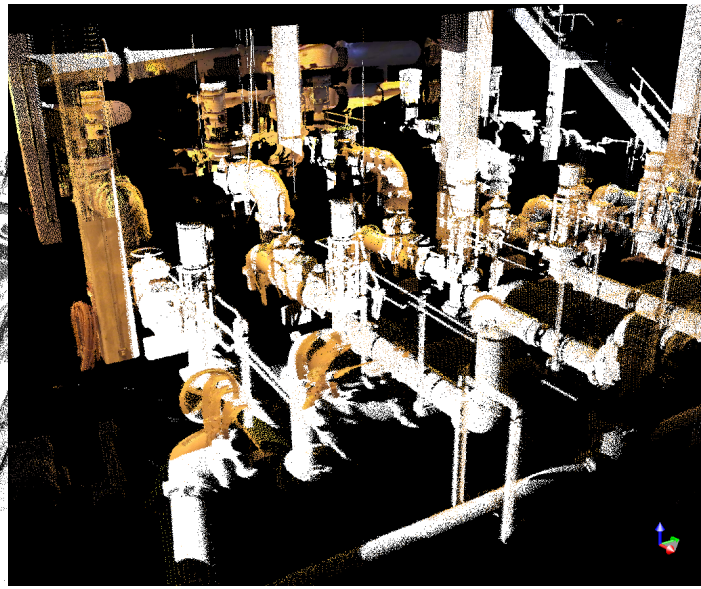
AUTODESK.

What are the Applications
Early R&D

MENSI - 2003

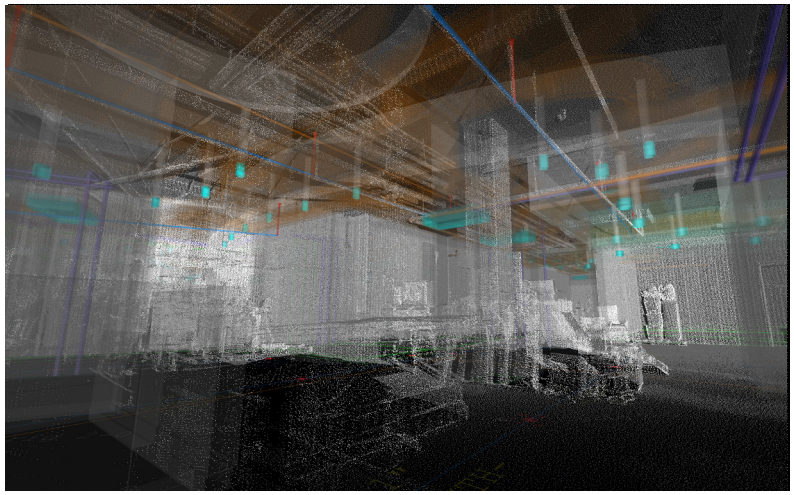


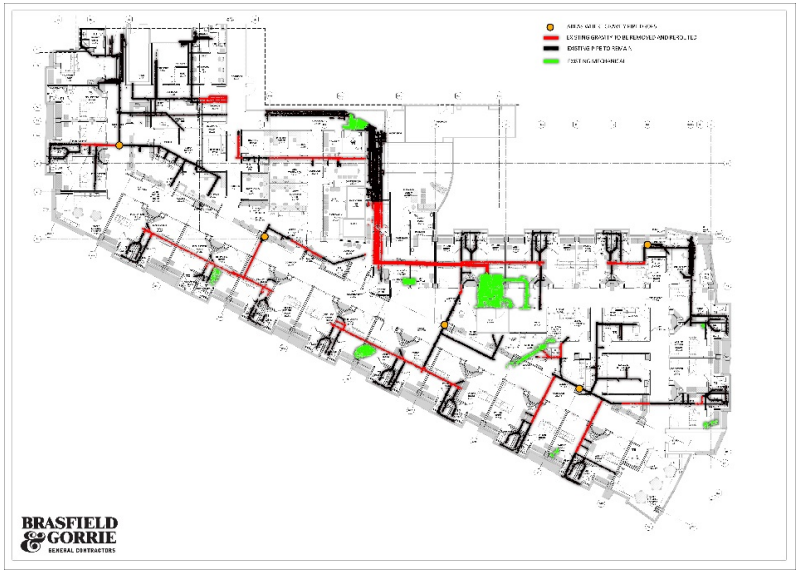




What are the Applications
As-Built Conditions

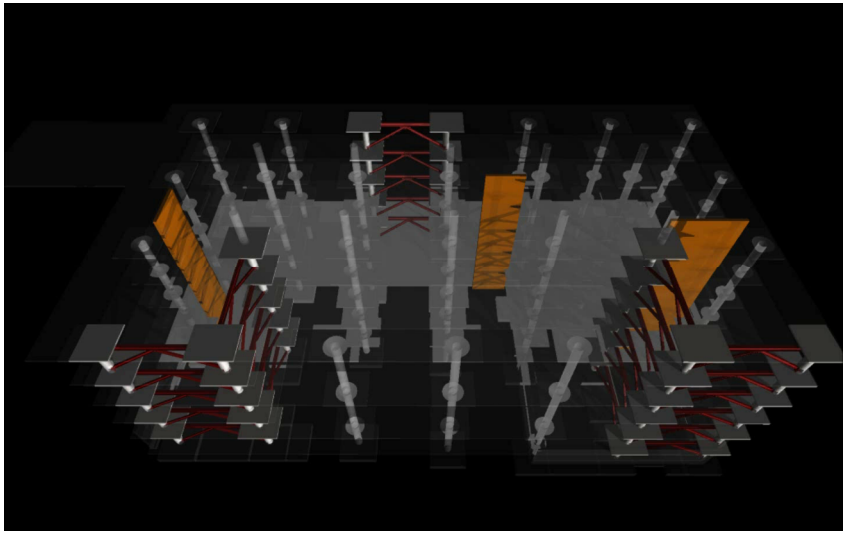
CHOA - 2013





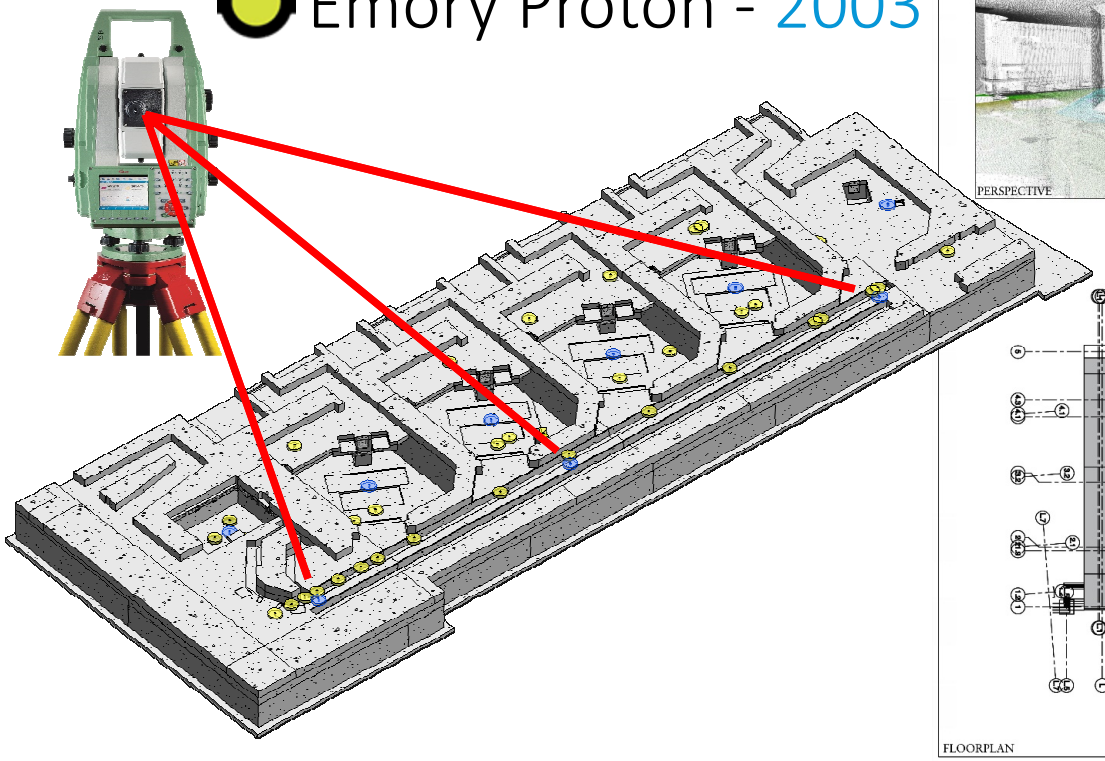
What are the Applications
Preconstruction

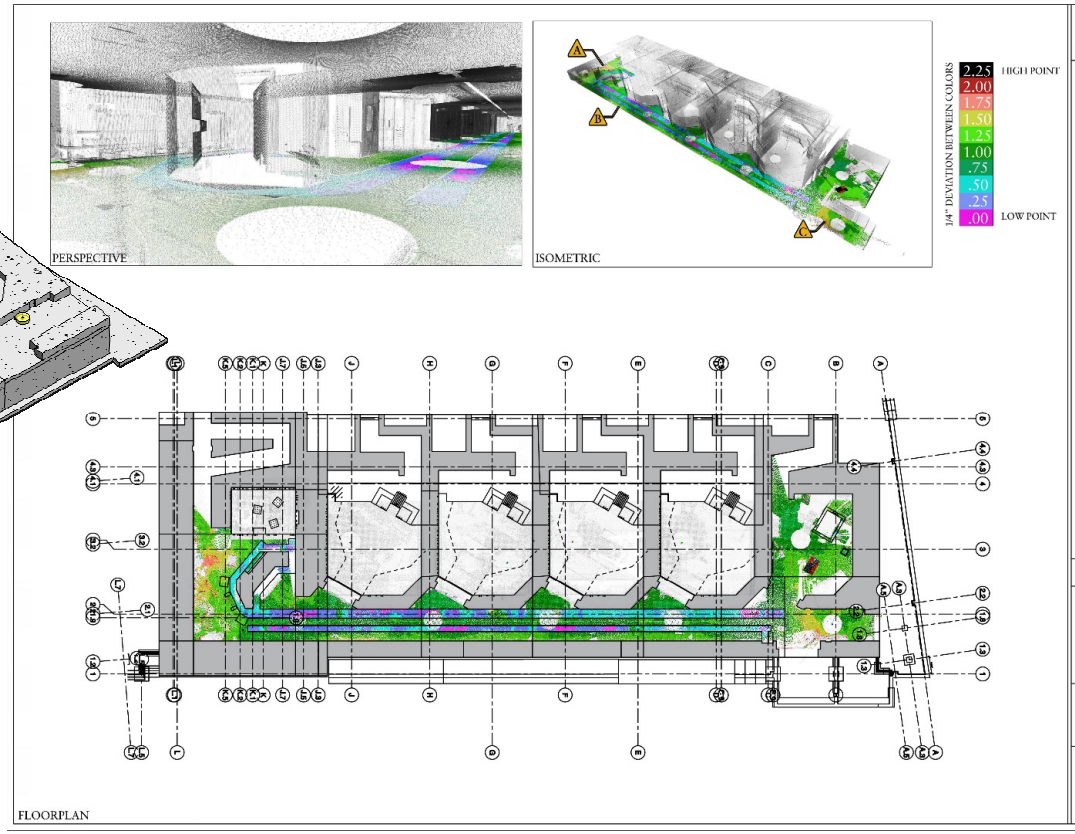
Georgia Tech - 2003



What are the Applications
Quality Control

- Emory Proton - 2003



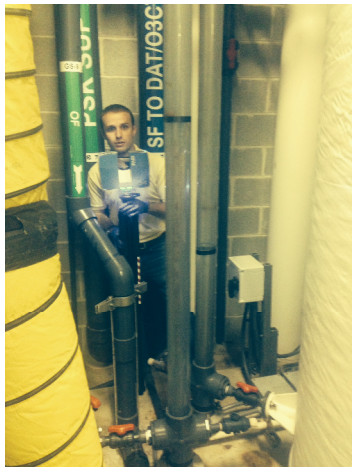


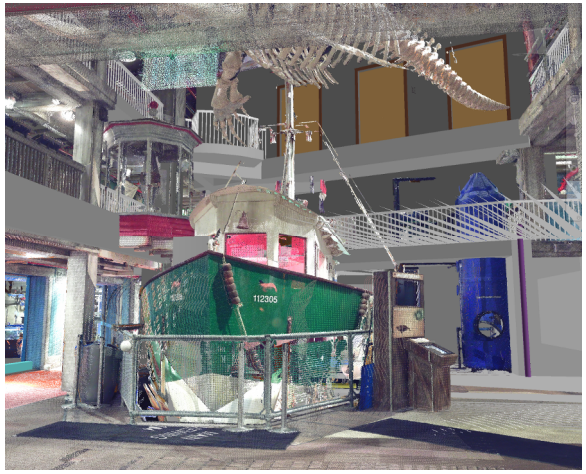
What are the Applications
MEP Coordination

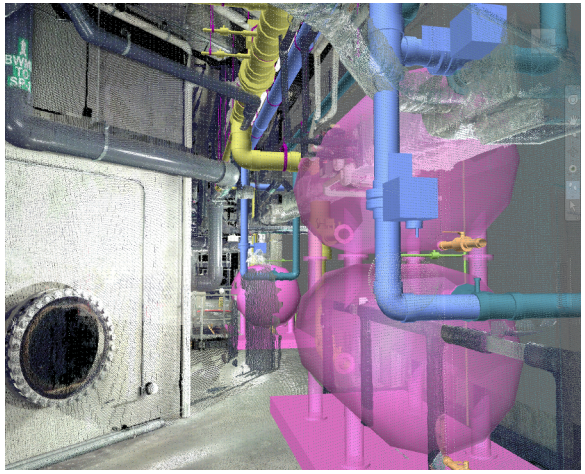
SELECT MEDICAL - 2015

What are the Applications
Design Validation

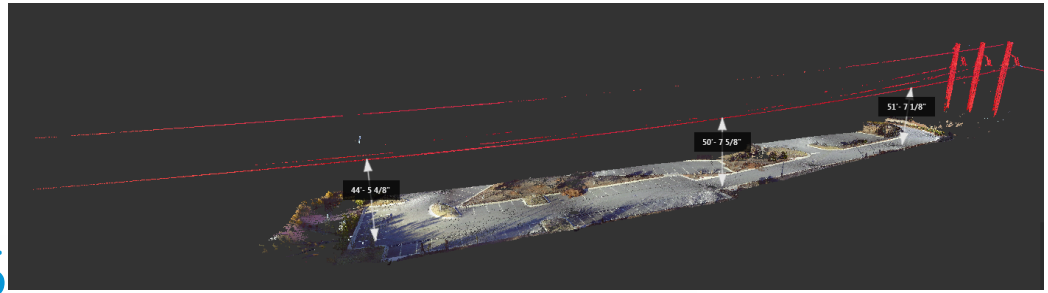
GA AQUARIUM - 2015



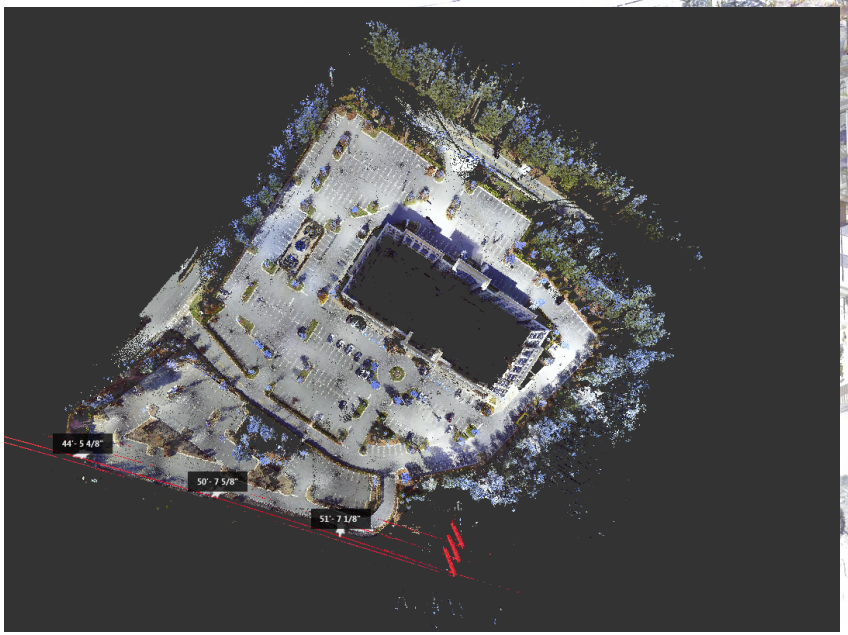


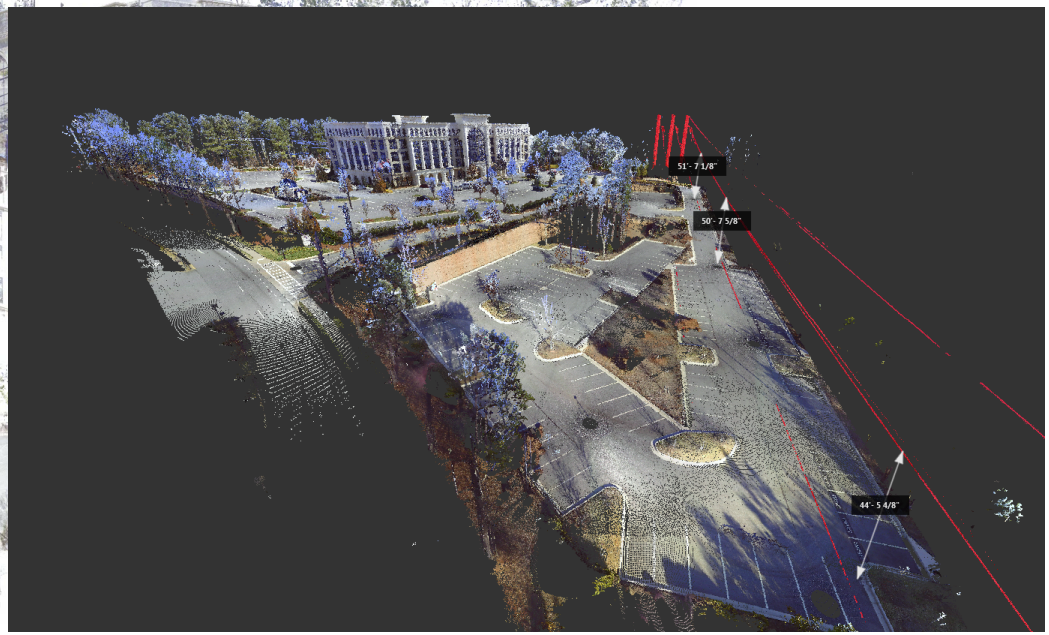


What are the Applications
Early Site Analysis



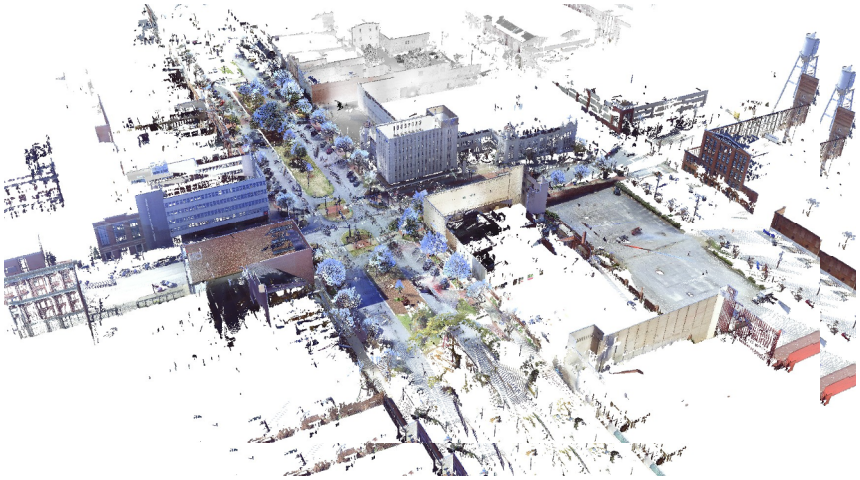
JACKSON HEALTH - 2015

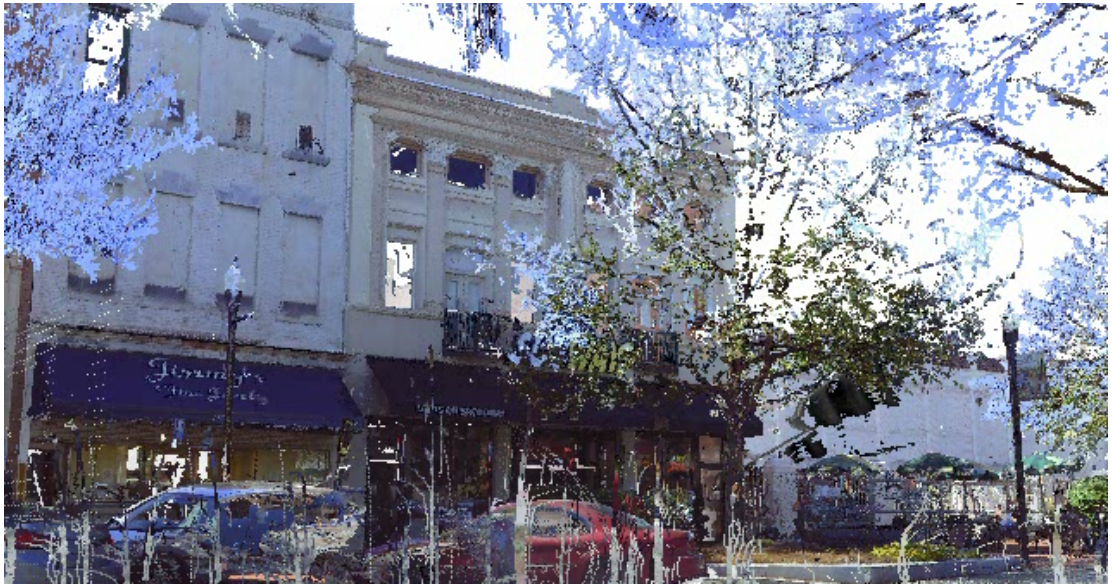




What are the Applications

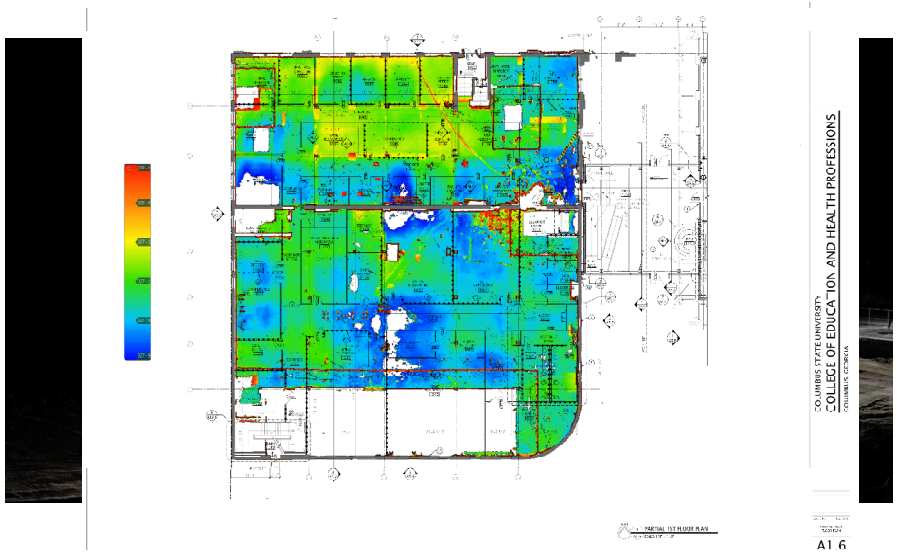
Insurance / Record Keeping

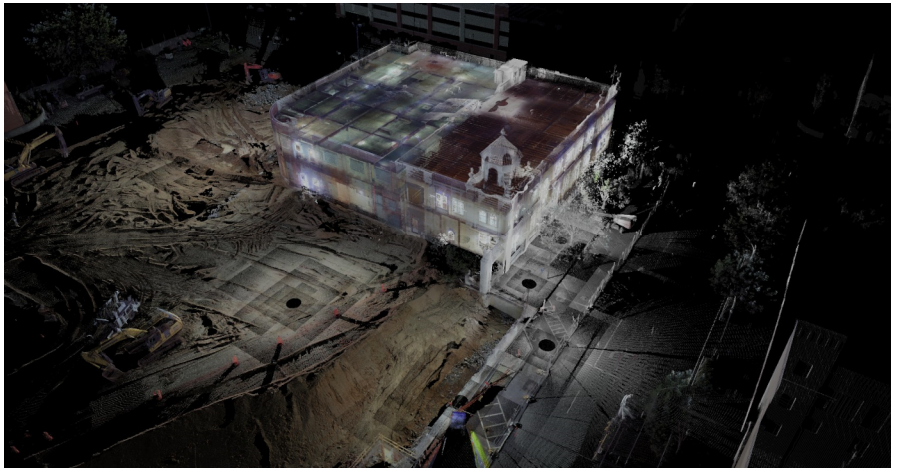




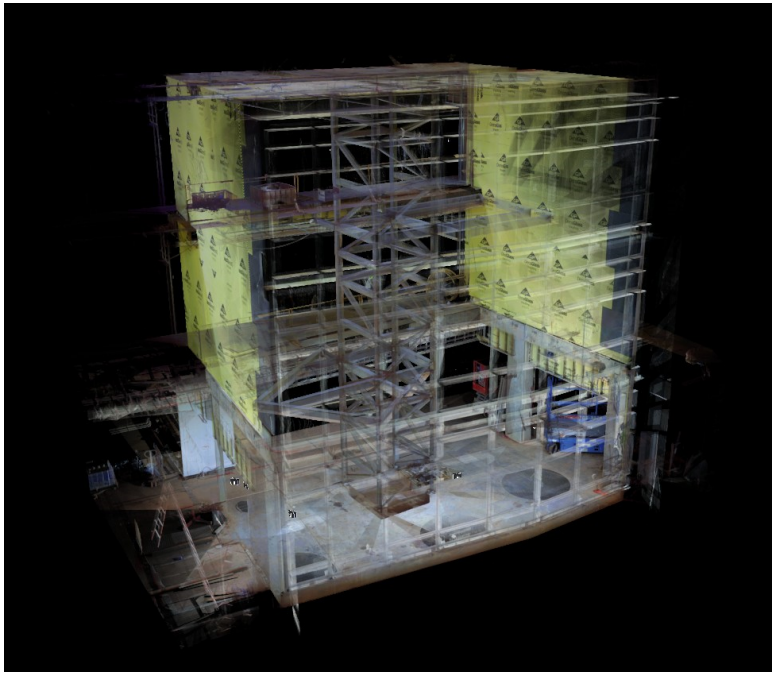
What are the Applications

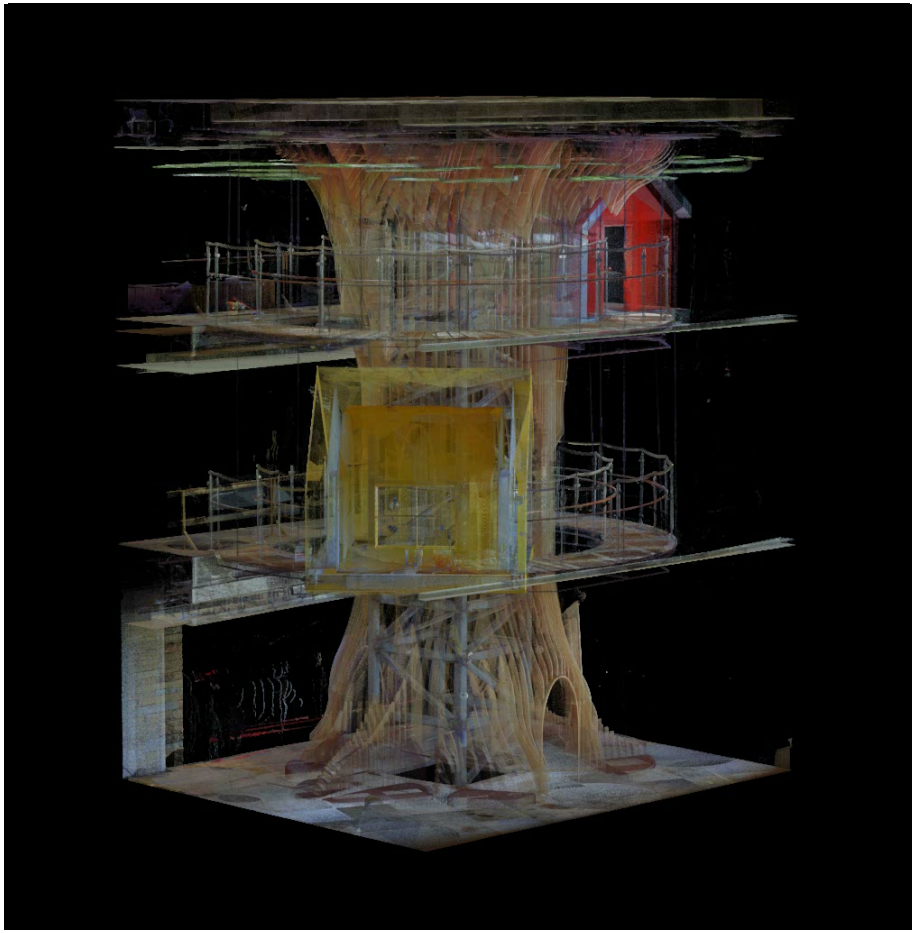
Safety / Remote Access





What are the Applications
Progress Documentation





Justifying the cost

Justifying Cost
How do you pay for it?

1

STEP 1 – QUESTIONS WE ASKED OURSELVES

- How do we intend to use laser scanning?
- How does the upcoming demand look?
- What cost items are there outside of the scanner?
- How do we market scanning internally?
- Do we want to provide service externally?
- What additional risk are we taking on?

Justifying Cost
How do you pay for it?

2

STEP 2 - EVALUATE THE MARKET & MANUFACTURERS

- Pros/Cons
- Cost
- ROI for each unit
- Hands on testing

Justifying Cost
How do you pay for it?

3

STEP 3 – DEVELOP A CHARGE MODEL

- Scanners initial purchase
- Forecasted growth for additional scanners / hardware / etc.
- Project Work / Project Demand
- Assign costs to bill to jobs
- Compare costs with 3rd parties and market

Justifying Cost
How do you pay for it?

STEP 4 – DEVELOP A PLAN TO IMPLEMENT ON EACH PROJECT

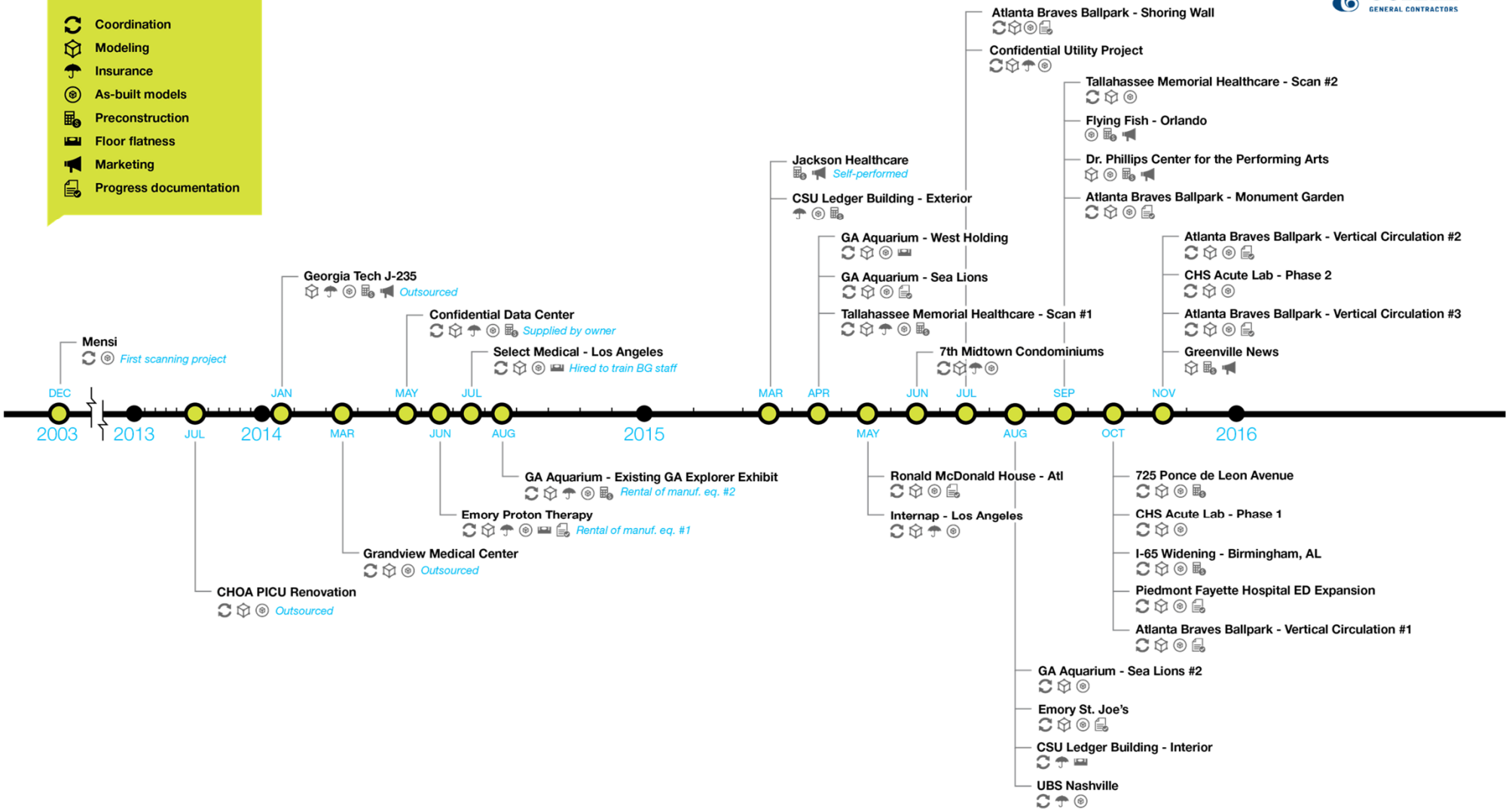
- Who is doing the work?
- How is this paid for?
- What are we offering?
- What are our limitations?
- Where is additional support needed to use the scan?

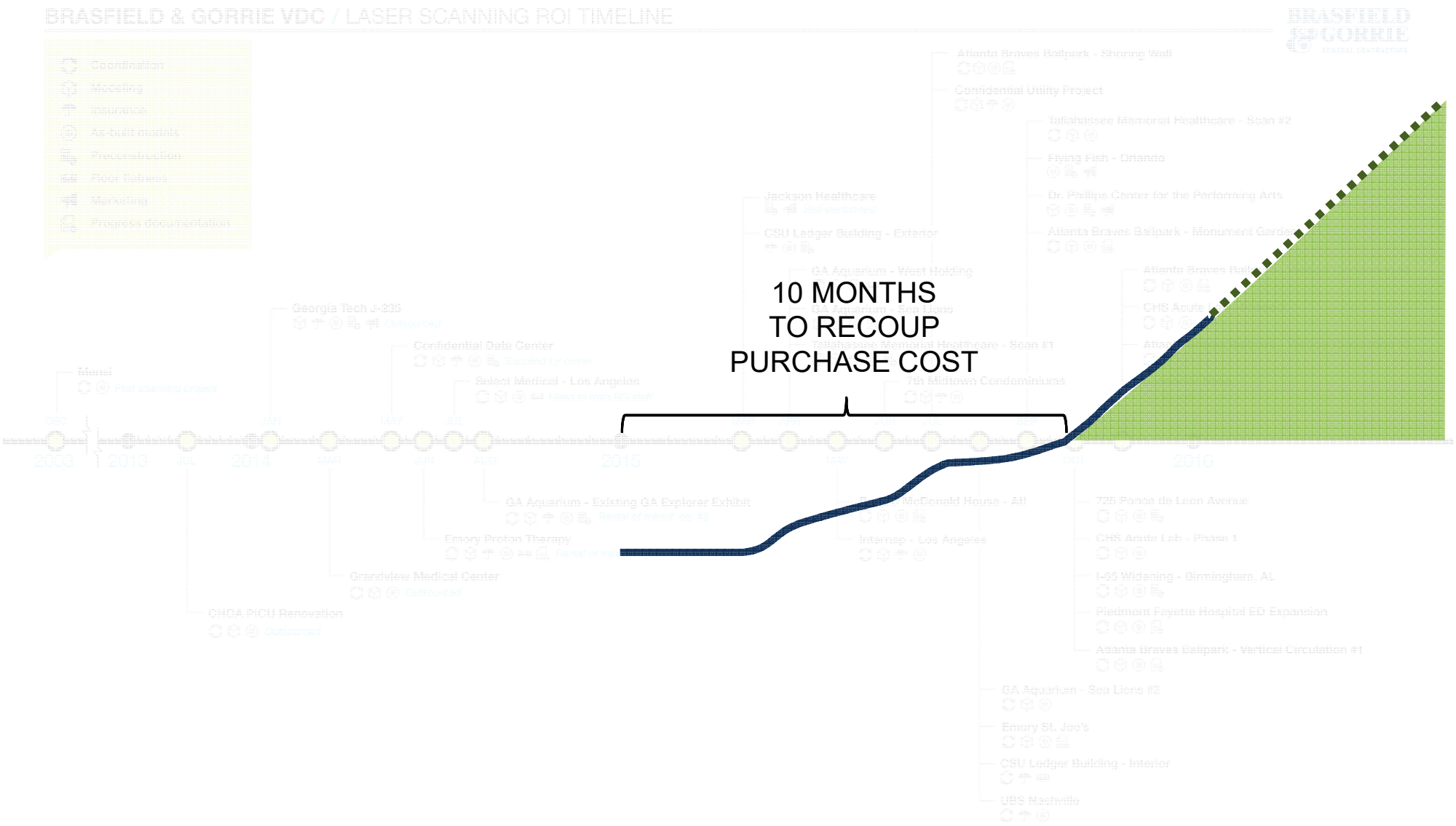
Tracking ROI

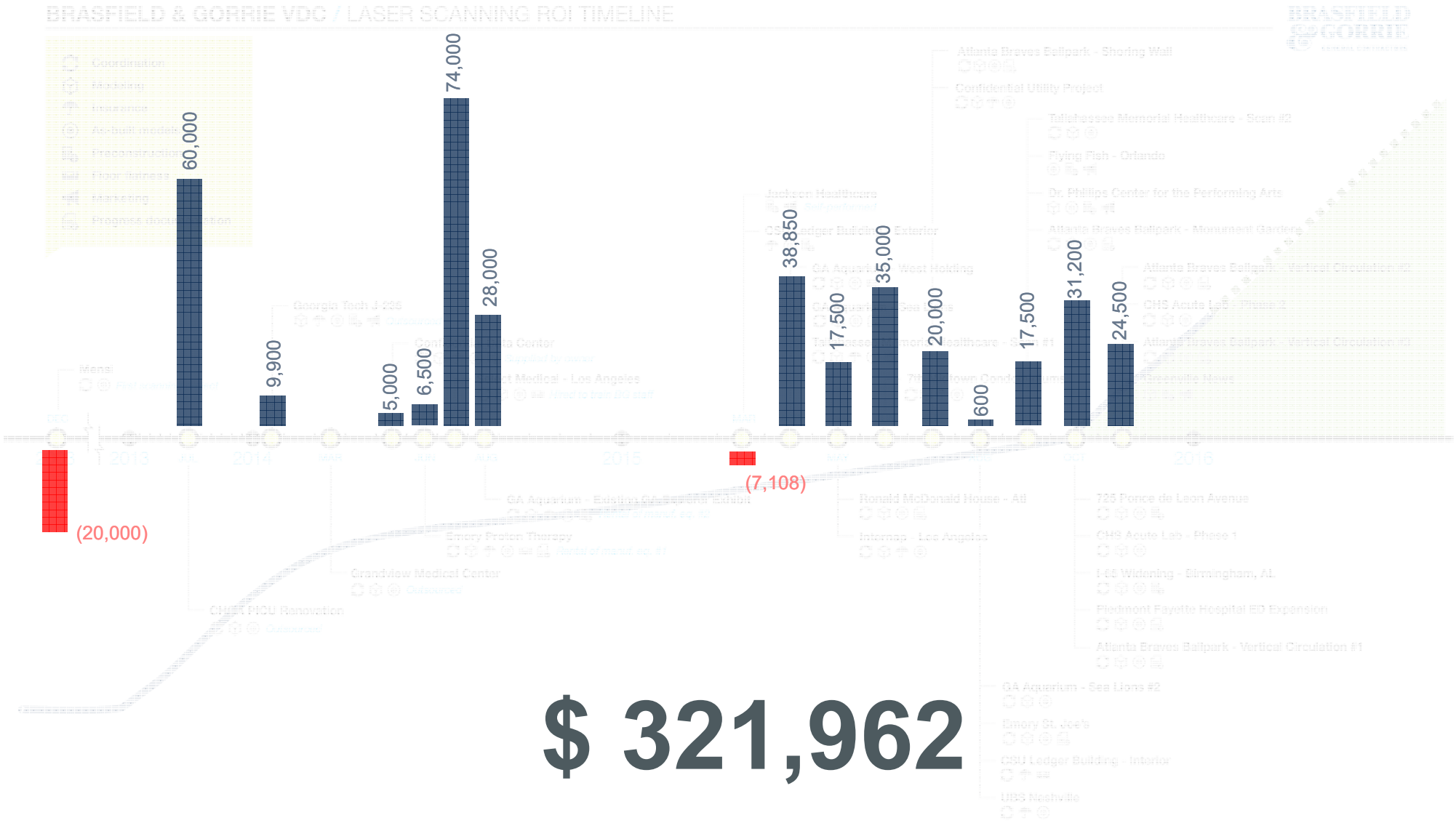
BRASFIELD & GORRIE VDC / LASER SCANNING ROI TIMELINE

BRASFIELD & GORRIE GENERAL CONTRACTORS

- Coordination
- Modeling
- Insurance
- As-built models
- Preconstruction
- Floor flatness
- Marketing
- Progress documentation




BRASFIELD & GORRIE VDC / LASER SCANNING ROI TIMELINE
10 MONTHS
TO RECOUP
PURCHASE COST
2013
2014
2015
2016


BRASFIELD & GORRIE VDC / LASER SCANNING ROI TIMELINE
60,000
9,900
5,000
6,500
74,000
28,000
38,850
17,500
35,000
20,000
600
17,500
31,200
24,500
(20,000)
(7,108)
2013
2014
2015
2016

$ 321,962

Lessons Learned

- Target vs No targets
- TSA / Traveling with your scanners
- Scanning in high traffic areas
- Sharing files
- Weather limitations
- Reflections / Surface limitations
- Curiosity of bystanders
- Hardware Limitations
- Be prepared to be surprised
- Backup Batteries
- Customers understanding deliverables
- Target placement (size vs distance)
- Aligning Scans to Control Coordinates
- Evaluate Scans (Color Lies)
- Scan Resolution / Quality vs Distance / Density

Questions

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