AUTODESK UNIVERSITY 2014

Reality Capture Dramatic Return on Investment

Mike Whaley – TURIS Systems
Chad Zuberbuhler – TURIS Systems

RC4974 Reality Capture Dramatic Return on Investment

Learning Objectives

At the end of this class, you will be able to:

- Understand the applications of laser scanning and reality capture.
- Comprehend the various applications of reality capture in design, construction, and post construction.
- Learn a process for reality capture implementation.
- Understanding the value your business gains from an investment in reality capture.

About the Speaker

Mike Whaley mwhaley@turissystems.com
Mike is the President of TURIS Systems, with 25 years in the architectural industry, and 8 years in the construction industry. He has spent the last 3 years helping to guide TURIS on Exploration to Development to Implementation of BIM for every aspect of our industry.

Chad Zuberbuhler czuberbuhler@turissystems.com
Chad brings over ten years of A/E and Revit experience to the team. His primary involvement has been in the architectural environment with a focus on Science and Technology projects and his BIM innovation has brought him to the front of our industry.

The History of Scanning

The first 3D scanning technology was created in the early 1960's. The early scanners used lights, cameras and projectors to perform the scanning task. Due to limitations of the equipment it often took a lot of time and effort to scan objects accurately during this time. After 1985 the original scanners were replaced with scanners that could use white light, lasers and shadowing to capture a given surface. A 3D laser scanner works by first projecting laser light onto the object or surface, then detecting the reflected light off the object. Based on where the light fall in relation to each other, the scanner calculates their positions and creates data points. These data points help a computer recreate the points into a 3D object visually. 3D laser scanning is used in a variety of fields and academic research. It has benefited clothing and product design, the automotive industry and medical science. Laser scanning can also be used to record built and natural structures, especially in places that people may not be able to access due to safety hazards.

Pre-Construction Case Study #1

Pabst Brewing, Building 29 Bottling Facility

Project Architect; HGA Architects Milwaukee, WI

Project Objective:

The objective of this project was to document the existing conditions of a19th century beer bottling facility. The point cloud and Revit models were then used by the design team to start their rehab and renovation efforts.

Process:

Faro Focus 120 Scanner
Autodesk ReCap
Autodesk Revit
70 exterior scans
180 interior scans
237,000gsf

Advantages:

The Architect was able to use the scan data to accurately replicate the existing conditions of the building. This not only saved the design team time on the front end but also provided them with accurate detail information of the brick to be replicated in the new design.

ROI Case Study #1

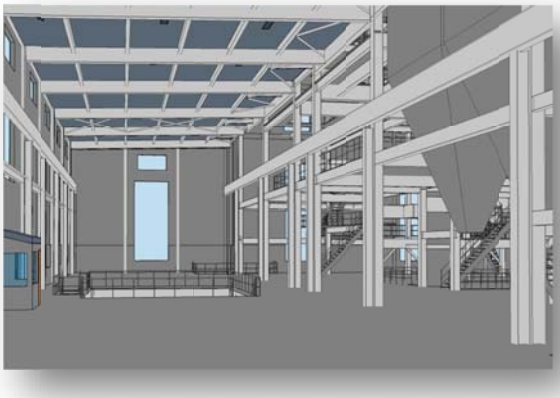
Cost Savings

Scan Cost:		$12,500
Estimated Cost of Field measurement:		$48,000
	Savings:	**$35,500**

Time Savings

Scan & Register	9 man days
Estimated Field measurement	60 man days

Pre-Construction Case Study #2



Building: Beloit Powerhouse

Project Architect; Studio Gang Architects

Project Objective:

The objective for this project was to document the complex structural system and elevated catwalks of the Alliant Energy/WPL Blackhawk Generating Station to be converted into a new activity and recreation center for Beloit College.

Process:

Faro Focus 120 Scanner
Autodesk ReCap
Autodesk Revit
0 exterior scans
277 interior scans
68,000gsf

Advantages:

The scan data and model allowed the architect to start their design around accurate existing information. The scan data allowed the architect to design around accurate steel sizes and locations.

ROI Case Study #2

Cost Savings

Scan Cost:		$15,500
Estimated Cost of Field measurement:		$40,000
	Savings:	**$24,500**

Time Savings	
Scan & Register	11 man days
Estimated Field measurement	40 man days

Pre-Construction Case Study #3

Lucky Building, Madison WI

Project Architect; Brownhouse Design

Project Objective:

The objective of this project was to document the existing structure, fire protection piping, and pitch pipe for a new ceiling installation.

Process:

Faro Focus 120 Scanner
Autodesk ReCap
Autodesk Revit
15 interior scans
5,000gsf

Advantages:

The Architect was able to use the point cloud as existing conditions; an existing model was not needed. The architect modeled their design around the point cloud. This saved time on the field coordination and the upfront Revit modeling.

ROI Case Study #3

Cost Savings

Scan Cost:		$2,500
Estimated Cost of Field measurement:		$4,000
	Savings:	**$1,500**

Time Savings

Scan & Register	1 man days
Estimated Field measurement	5 man days

Pre-Construction Case Study Summary

Case Study #1

Scan Cost:	$12,500
Estimated Cost of Field measurement:	$48,000
Savings:	$35,500
Percent savings:	74%

Case Study #2

Scan Cost:	$15,500
Estimated Cost of Field measurement:	$40,000
Savings:	$24,500
Percent savings:	61%

Cost Saving #3

Scan Cost:	$ 2,500
Estimated Cost of Field measurement:	$ 4,000
Savings:	$ 1,500
Percent savings:	38%

On average we have seen an average of 58% savings for laser scanning compared to the contractor field verification.

Construction Case Study #1

Project Objective;

Document existing utilities and space for the change out of assembly line equipment.

Process:

75 interior scans
8,000 gsf

Advantages:

The owner used the point cloud data to layout new equipment and test utility hook-ups for the changeover of assembly line equipment.

ROI of Construction Case Study #1

Cost Savings

Scan Cost:		$ 7,500
Estimated Cost of Field measurement:		$16,000
	Savings:	**$ 8,500**

Time Savings

Scan & Register	3 man days
Estimated Field measurement	20 man days

Construction Case Study #2

Building: Lucky Building Madison, WI

Project Objective:

Interior renovation of an existing assemble space. Primary focus was to accommodate an undulating ceiling system with existing fire protection and drain piping.

Process:

15 interior scans
5,000 gsf

Advantages:

Architect was able to model new elements around the point cloud which was used as existing conditions. This prevented the need to survey existing conditions and eliminated the need for in-the-field coordination with existing piping during install.

Construction Case Study #3

Field Documentation

Project Objective:

Scan project areas during construction for coordination purposes.

Process:

Concrete Deck Scanning and sleeve coordination

Advantages:

The goal of field documentation is to document as-built conditions, enhance coordination, and avoid risks that may occur during construction.

Cost Savings

No additional costs for x-raying of decks to add sleeves.
No additional costs due to sleeves being in the wrong location.
No additional costs for unnecessary demolition of walls or floors to tie into electrical conduit.
Risk Avoidance.

Post Construction Case Study #1

Building: Associated Bank Madison, WI

Project Objective:

Newly installed ceiling panels need to be replaced due to the product delaminating.

Process:

15 interior scans
5,000 gsf

Advantages:

Contractor was able to pre-cut and prep new ceiling panels offsite thus reducing the disruption on business day to day operations.

ROI on Post Construction Case Study #1

Cost Savings

Scan Cost:		$2,500
Estimated Cost of Field measurement:		$4,000
	Savings:	**$1,500***

Time Savings

Scan & Register	1 man days
Estimated Field measurement	5 man days

*Did not require lifts or ladders which would have disrupted business and was done during business hours not requiring overtime pay.