AGC
THE CONSTRUCTION ASSOCIATION

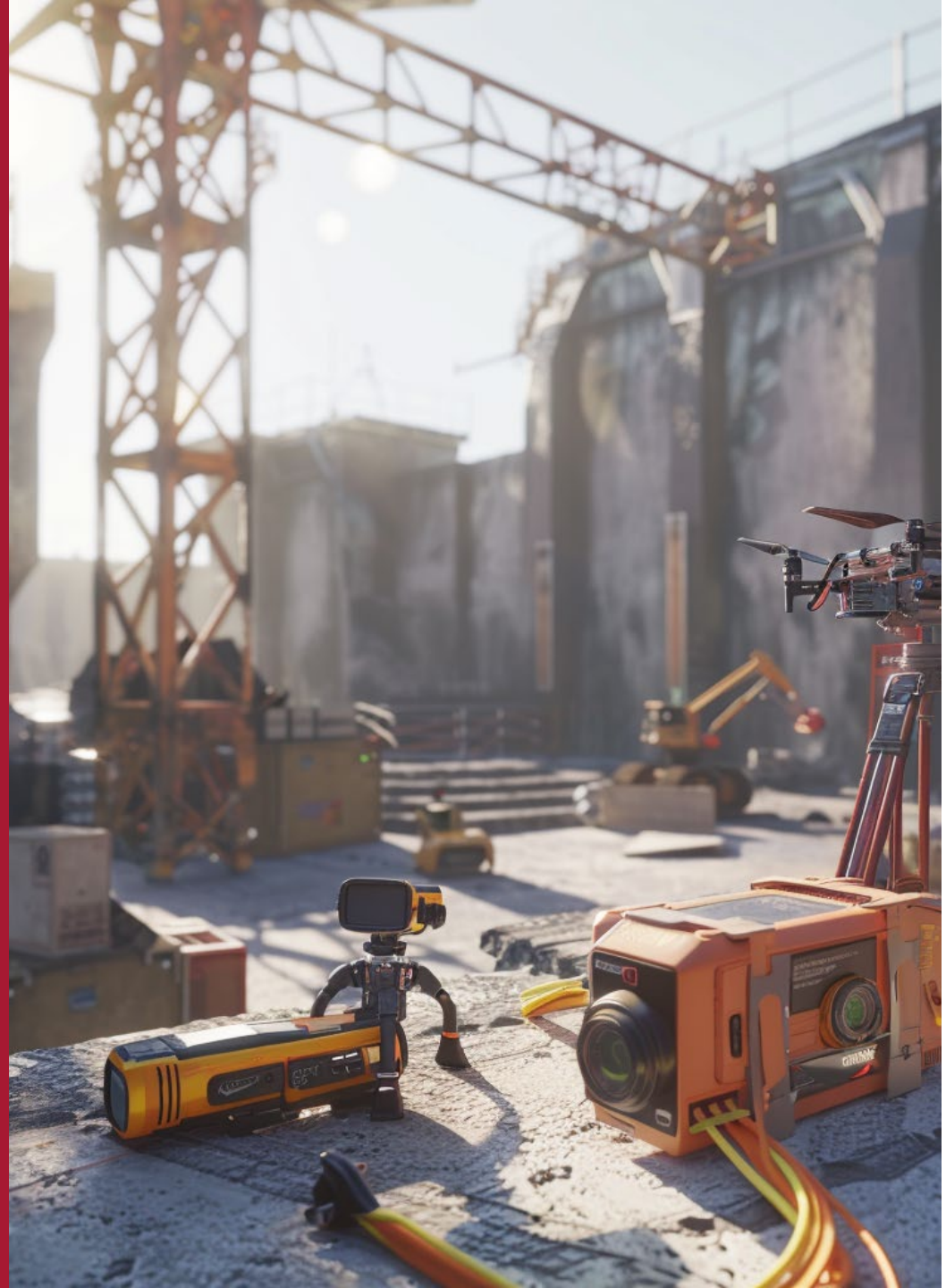
ELEVATE

INTEGRATING REALITY CAPTURE AND DIGITAL TWINS FOR ENHANCED CONSTRUCTION MANAGEMENT

Daniel Kagan

Reality Capture | Quality Manager

#AGCTECH24



AGENDA

1 - Introduction

2 - Industry Challenges

3 - The Pilot “Pilot”

4 - Results and Lessons Learned

5 - Future Directions and Innovations

6 - Q & A

INTRODUCTION

ABOUT ME

Lawrence Technological University

SMU Cox School of Business

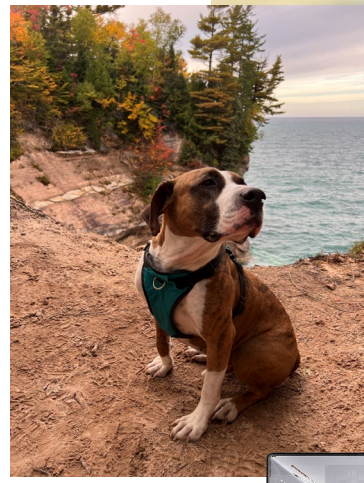
10M+ SF
Total area laser scanned

100+ hours
Time spent flying drones

3 years
Industry Experience

NAVVIS

Rogers-O'Brien CONSTRUCTION



THE REALITY CAPTURE TEAM

“CAPTURE TODAY’S REALITY TO ENABLE TOMORROW’S BUILDER”

Daniel Kagan

Reality Capture | Quality Manager

Trevor Owen

Reality Capture | Regional Manager

Eloisa Fernandez

Reality Capture | Project Manager

TEXAS' PREMIER BUILDER

14
sectors

5
years in business

75%
of work from repeat clients

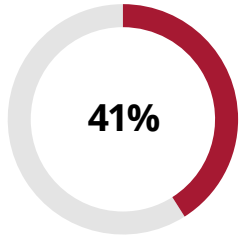
5
offices throughout Texas

800+
million in annual revenue

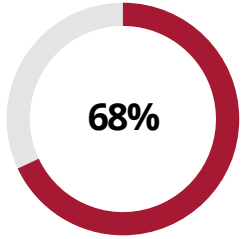
4

WHAT ARE SOME KNOWN CHALLENGES WE ALL FACE?

Source: McKinsey, May 2023



Construction prices have increased 40.7% since February 2020



68% of construction firms are struggling to fill open positions

Source: Deloitte, November 2023

Key Takeaway	We want to drive effective, timely decision making, based on data

WE EXPERIENCE SIMILAR CHALLENGES IN REALITY CAPTURE

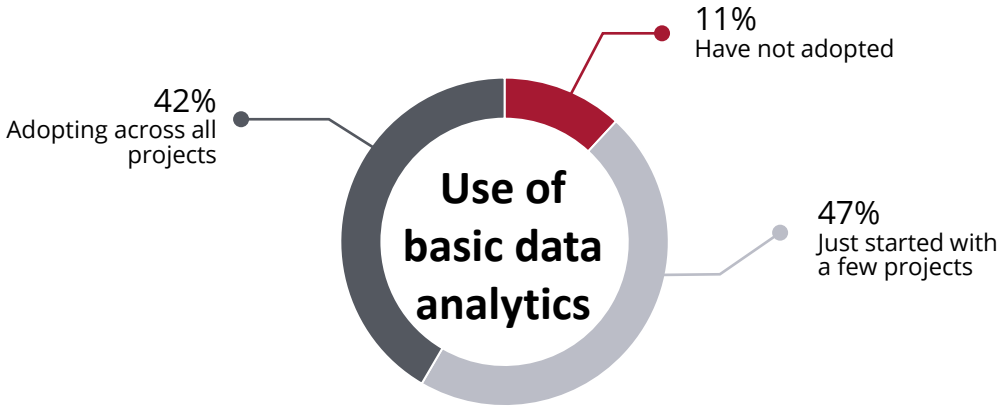
We need people to collect data

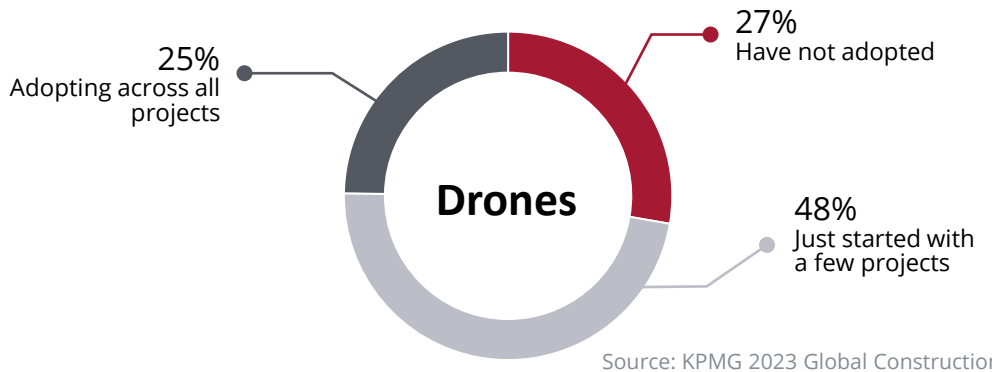
Software and Hardware is costly

Inconsistent data capturing

Slow adoption of using Reality Capture on projects

AEC is known for being slow to digitize and innovate



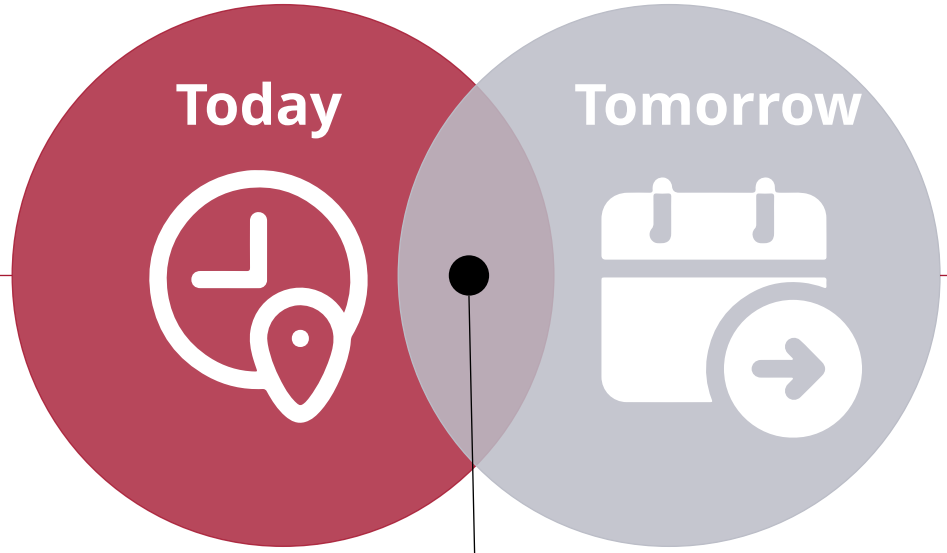


Source: KPMG 2023 Global Construction Survey of nearly 300 firms

HOW DO WE ESTABLISH CONSISTENT COLLECTION?

Where are we today?

- Collect observational data
- SME’s everywhere
- Known for innovation
- Investments in Drones and 360 Cameras
- Building up internal awarness and education

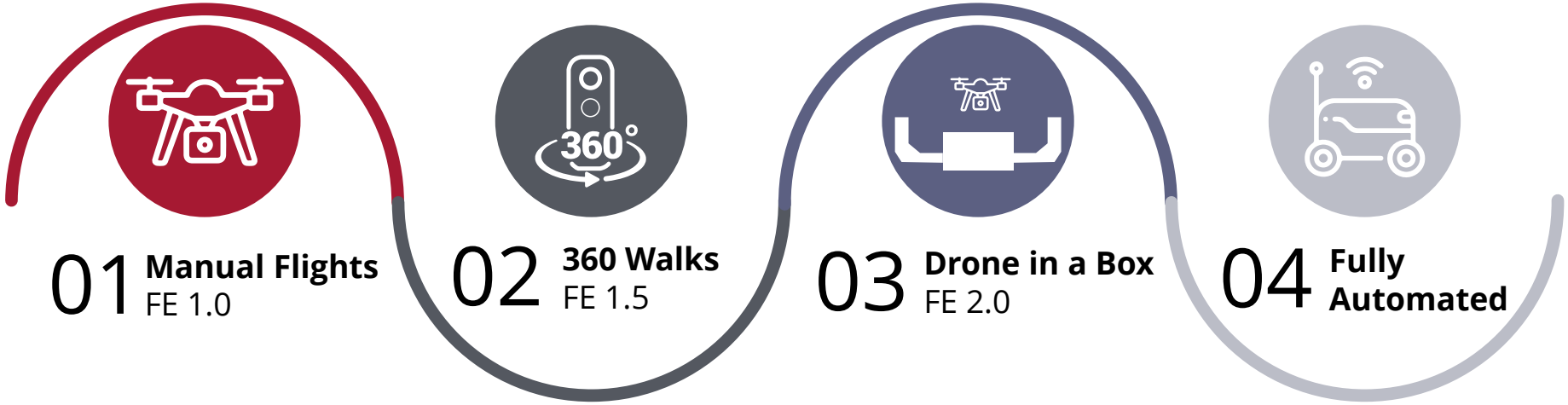


Drone Pilot “Pilot”

Where do we want to be tomorrow?

- Standardization
- Data-driven decision making without data silos
- Faster decisions
- Seamless integration with Field Engineering
- Enabling our Operations team to do more with data

WHAT DOES OUR JOURNEY LOOK LIKE AT RO?



01 **Manual Flights**
FE 1.0

02 **360 Walks**
FE 1.5

03 **Drone in a Box**
FE 2.0

04 **Fully Automated**

48%

Almost half of contractors still primarily use manual methods to track performance

Source: Dodge Data & Analytics, 2023

9%

Only 9% use devices that automatically track/record site data

Source: Dodge Data & Analytics, 2023

UNPACKING THE PILOT “PILOT”

Standardization
Standardize data capture procedures

Consistency
Purpose: Ensure consistent, high-quality data capture of construction projects

Reliability
Improve data accuracy and reliability

Implementation
Launched across all projects in the DFW area

Communication
Training for the field engineering team along with baseline metrics and KPIs

Scale
Future plans: Scaling across the state of Texas

TOOLS AND TECHNOLOGIES

Hardware

38 Drones

10 360 Cameras

Software

monday.com

PROCORE

AirHub Portal

Aerial (UAS) Progress Photos Checklist

Overview

Ensure smooth progress photo capture using drones: Review project details, check weather conditions, verify drone equipment, follow safety protocols, plan an efficient flight path, capture photos at designated waypoints, and compile a comprehensive progress report for stakeholders.

PRE-FLIGHT PREPARATION:

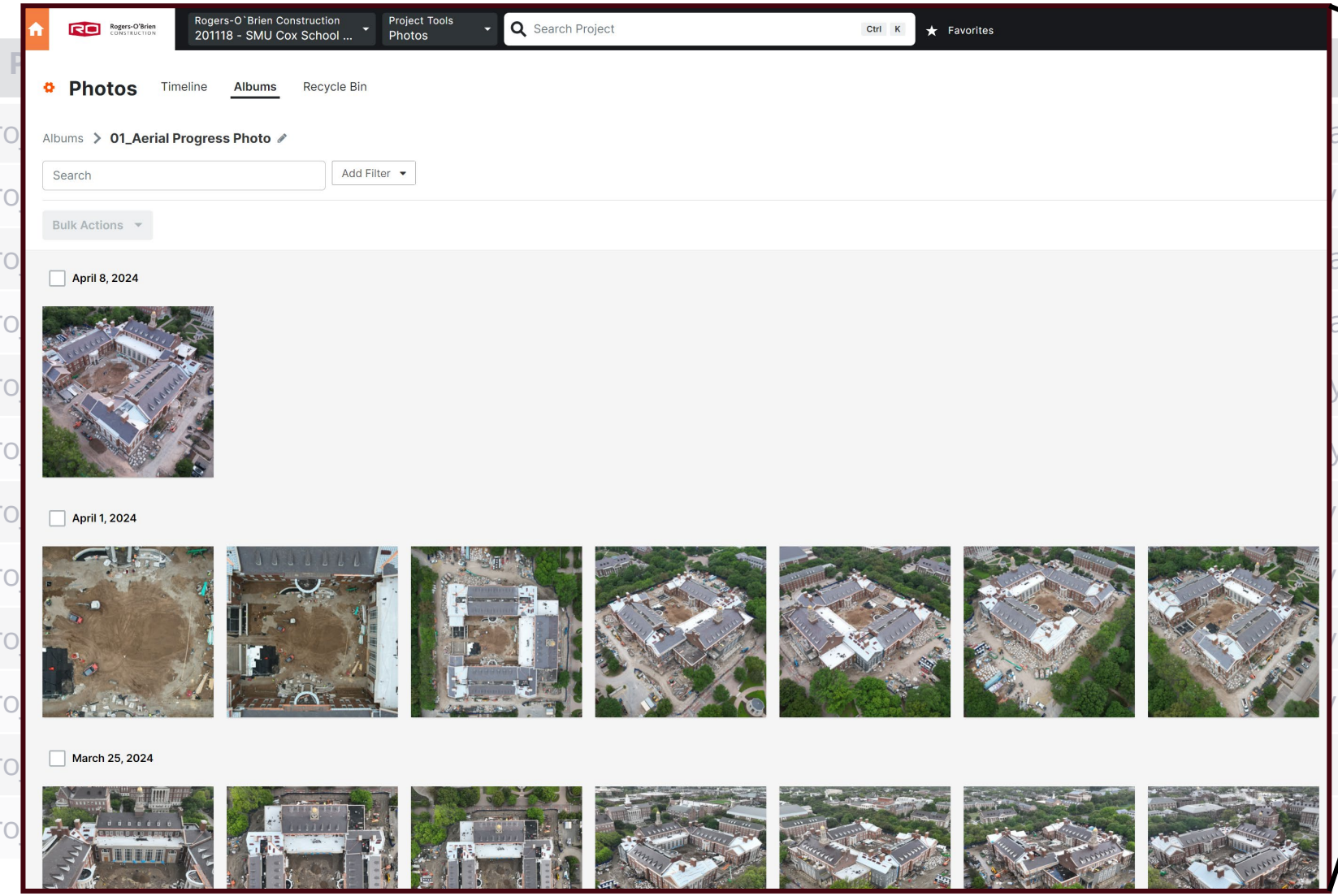
1. **Check Equipment:**
   - Make sure that the drone batteries are fully charged prior to arriving on jobsite or pre-flight
   - Confirm that the camera is work correctly, wipe the lens using a clean microfiber wipe
   - Inspect the propellers and other parts for damage

2. **Verify RO Site Specific Flight Requirements:**
   - Check with on-site superintendent for any project conditions to be aware of (as needed)
   - Notify on-site point of contact of upcoming flight (if needed)

HOW DO WE EFFECTIVELY COMMUNICATE WITH STAKEHOLDERS?

Project	LAANC	Construction Status	QA/QC Status	Capture Person	Day	Time	Aerial Photos
Project 1	Yes	In Progress	Passing QC	Mark	Wednesday	Afternoon	01_Aerial Progress Photo
Project 2	No	In Progress	Passing QC	James	Tuesday	Afternoon	01_Aerial Progress Photo
Project 3	No	In Progress	Field Testing	Mark	Wednesday	Morning	01_Aerial Progress Photo
Project 4	No	In Progress	Passing QC	Mark	Wednesday	Morning	01_Aerial Progress Photo
Project 5	Yes	In Progress	Passing QC	Mark	Thursday	Morning	01_Aerial Progress Photo
Project 6	No	In Progress	Passing QC	Mark	Thursday	Morning	01_Aerial Progress Photo
Project 7	Yes	In Progress	Passing QC	Mark	Monday	Morning	01_Aerial Progress Photo
Project 8	Yes	In Progress	Passing QC	Mark	Monday	Morning	01_Aerial Progress Photo
Project 9	Yes	In Progress	Not Started	James	Tuesday	Morning	01_Aerial Progress Photo
Project 10	Yes	In Progress	Passing QC	James	Monday	Afternoon	01_Aerial Progress Photo
Project 11	No	Upcoming	Not Started				01_Aerial Progress Photo
Project 12	Yes	Opportunity	Not Started				

WHAT DOES DATA AGGREGATION LOOK LIKE?



Time	Aerial Photos
Afternoon	01_Aerial Progress Photo
Afternoon	01_Aerial Progress Photo
Morning	01_Aerial Progress Photo
Morning	01_Aerial Progress Photo
Morning	01_Aerial Progress Photo
Morning	01_Aerial Progress Photo
Morning	01_Aerial Progress Photo
Morning	01_Aerial Progress Photo
Morning	01_Aerial Progress Photo
Afternoon	01_Aerial Progress Photo
	01_Aerial Progress Photo

HOW ARE WE PROJECT MANAGING OUR DEMAND?

Project		2023				2024				2025				
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Project 1	May 16, ‘22 – Aug 1, ‘24														
Project 2	Dec 5, ‘22 – Jul 31, ’24														
Project 3	Dec 6, ‘22 – Aug 13, ‘24														
Project 4	Jun 1, ‘23 – Sep 2, ‘24														
Project 5	Jun 26, ‘23 – Aug 1, ‘24														
Project 6	Jul 24, ‘23 – Jun 11, ’24														
Project 7	Nov 22, ‘23 – Jul 2, ’25														
Project 8	Dec 15, ‘23 – Nov 15, ’24														
Project 9	Mar 3, ‘24 – Jul 31, ’25														
Project 10	Apr 1, ‘24 – Apr 16, ’27														
Project 11	Aug 13, ‘24 – Sep 10, ’26														


cosm
cosm
RO
HKS

CASE STUDY - COSM








Feb 9, 2024 (Top)

- Three of the same corner
- Too zoomed in overall site image

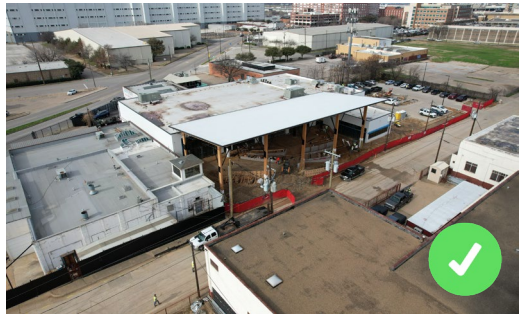
July 9, 2024 (Bottom)

- All four corners
- Complete site image

LAANC	Construction S...	QA/QC Status
Yes	In Progress	QC In Progress
No	In Progress	Passing QC
No	In Progress	Passing QC
No	In Progress	Field Testing
Yes	In Progress	Passing QC
No	In Progress	Passing QC

CASE STUDY – UPPERROOM CHURCH








Feb 8, 2024 (Top)

- All four corners
- Complete top-down

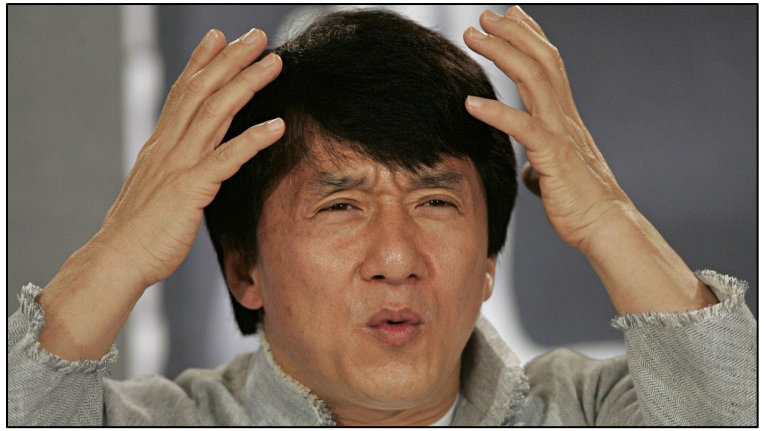
April 17, 2024 (Bottom)

- All four corners
- Complete top-down
- Extra shot per team’s request

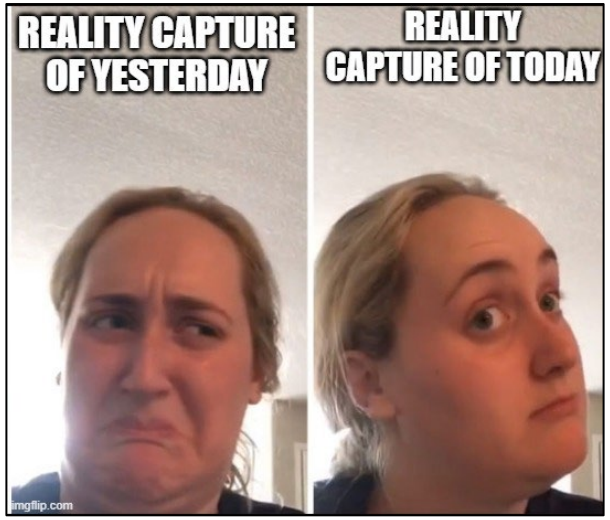
LAANC	Construction S...	QA/QC Status
Yes	In Progress	QC In Progress
No	In Progress	Passing QC
No	In Progress	Passing QC
No	In Progress	Field Testing
Yes	In Progress	Passing QC
No	In Progress	Passing QC

OVERVIEW OF STATE OF REALITY CAPTURE

1. Where Were We?



2. Where Are We Today?

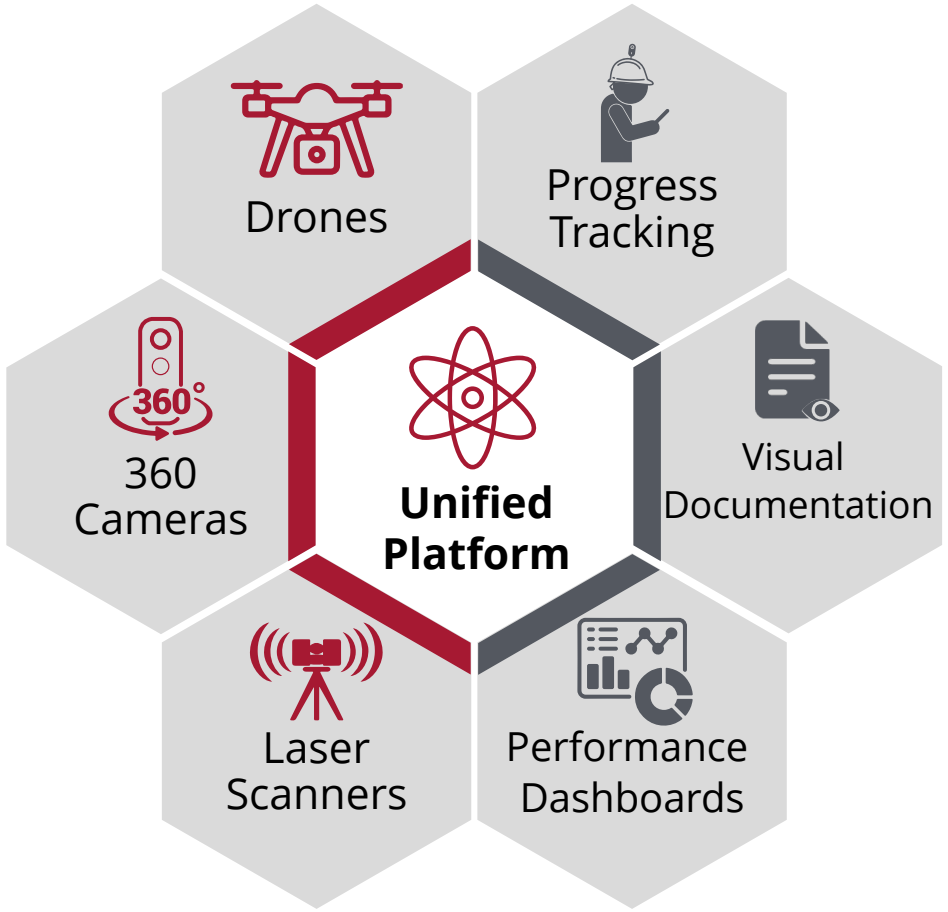


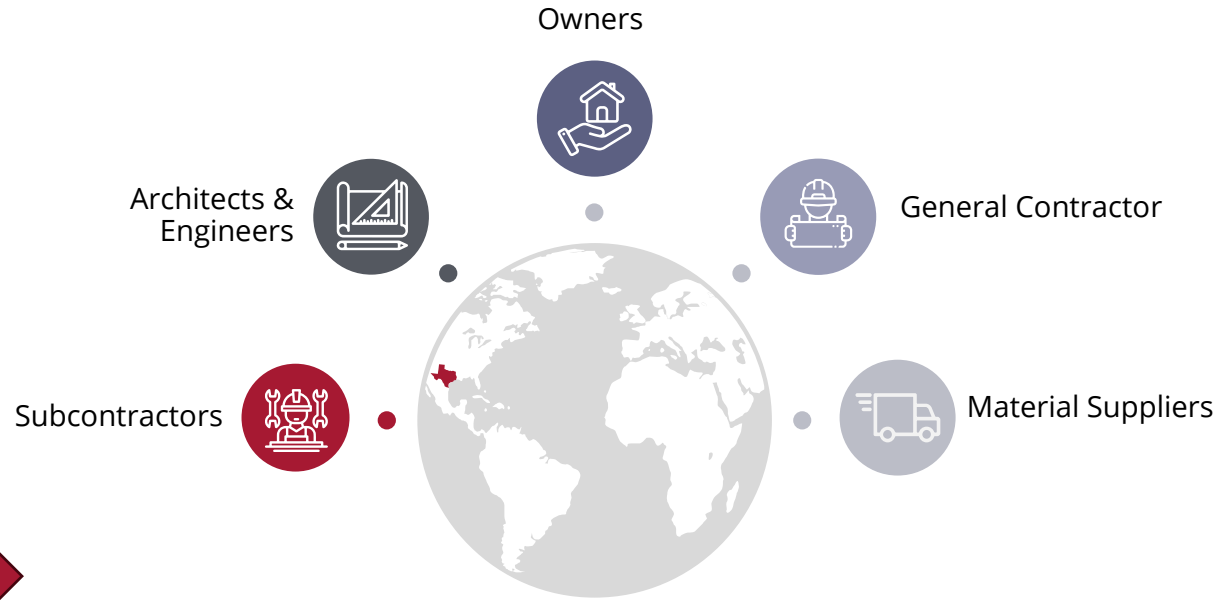
3. Where Are We Going?

REMOTE JOBSITE MONITORING “ROCC”

Visual Data Sources

Outputs





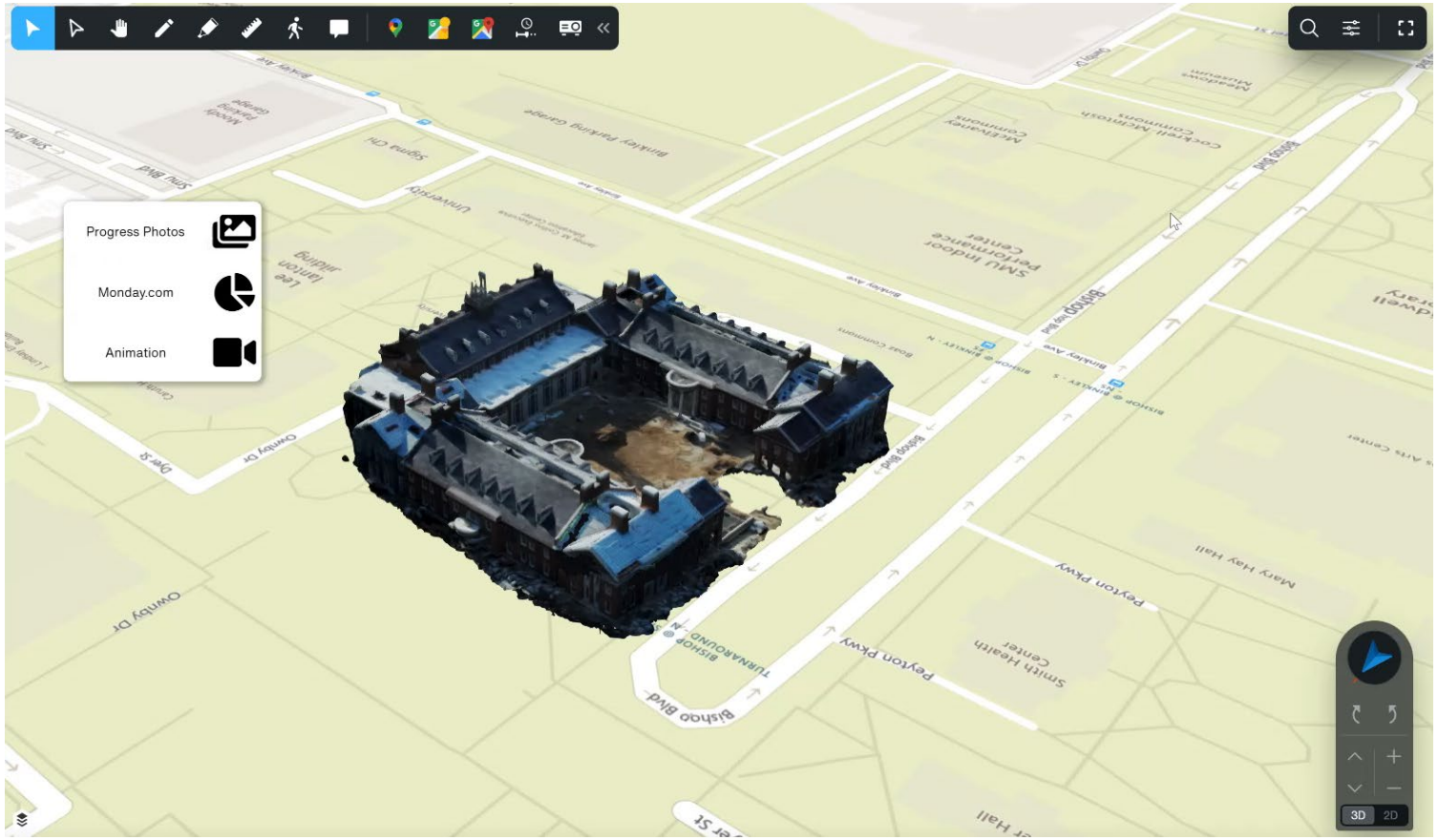
Field Director

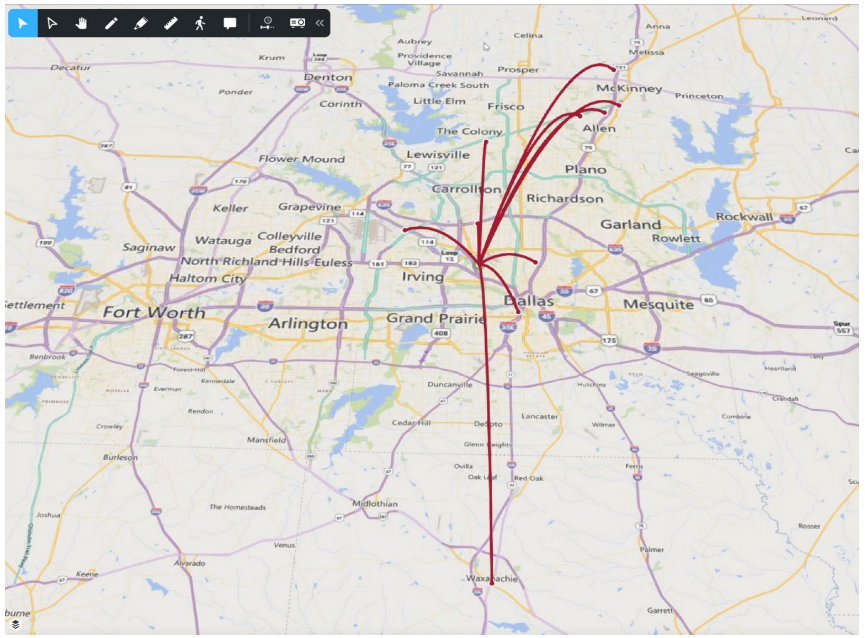
Project Director

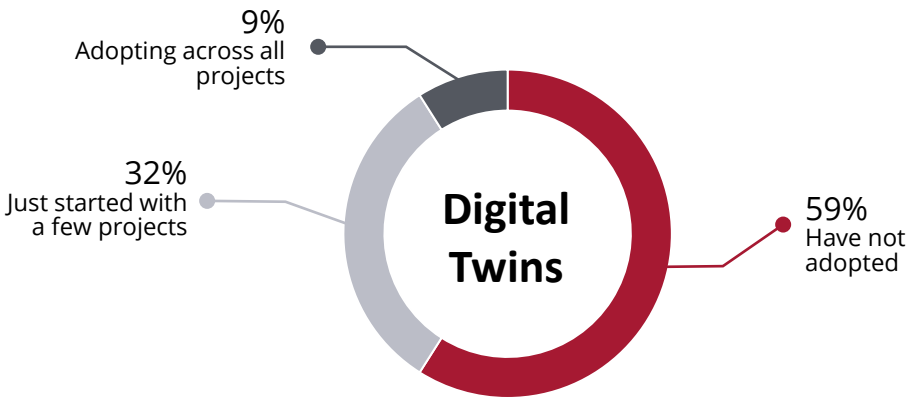
Support

Reality Capture, VDC, Quality Managers

FUTURE DIRECTIONS







Source: KPMG 2023 Global Construction Survey

Thank You!

Questions?

SCAN ME