



# 5 Things You Need to Know About Drones In Construction

*Presented by*  
Grant Hagen, Virtual Design & Construction Manager



*Sponsored by*

**PROCORE**<sup>®</sup>

# Today's Presenter



## Grant Hagen, VDC Manager, The Beck Group

Grant Hagen leads technology implementation through research and development for Beck's unmanned aerial system (UAS or drones) initiative. Coming from construction field operations, Hagen acts as the filter for software/hardware research from the industry to Beck's project teams, including implementing UAS platforms to become more efficient, effective and safer in their operations. Leading this effort at an integrated company, Hagen has the opportunity to impact both industries of design and construction, where UAS have helped both disciplines revolutionize their workflows with this emerging technology.

# Agenda

- + About The Beck Group
- + Background at Beck and drones
- + 5 things you need to know
- + Q+A

## Poll Question 1

What is your experience with/knowledge of using drones in your current company?

- None
- Getting curious
- Actively testing
- Currently implementing

## Poll Question 2

What are your company's biggest hurdles to start using this technology?

- Knowledge of what they can do
- Legal and risk concerns
- Financial investment
- Internal approval
- FAA/Regulations

# WE ARE

DESIGNERS  
BUILDERS  
SUSTAINABILITY EXPERTS  
TECHNOLOGY EXPERTS

- 1912 FOUNDED AS CENTRAL CONTRACTING CO.
- 1924 HEADQUARTERS MOVES TO DALLAS
- 1939 ATLANTA OFFICE
- 1946 HENRY C. BECK COMPANY
- 1975 SAN ANTONIO OFFICE
- 1981 HCB CONTRACTORS
- 1992 MEXICO OFFICE & TAMPA OFFICE
- 1998 DENVER OFFICE
- 1999 MERGED WITH URBAN ARCHITECTURE**
- 1999 THE BECK GROUP
- 1999 AUSTIN OFFICE
- 2002 FORT WORTH OFFICE

ATLANTA

AUSTIN

DALLAS

DENVER

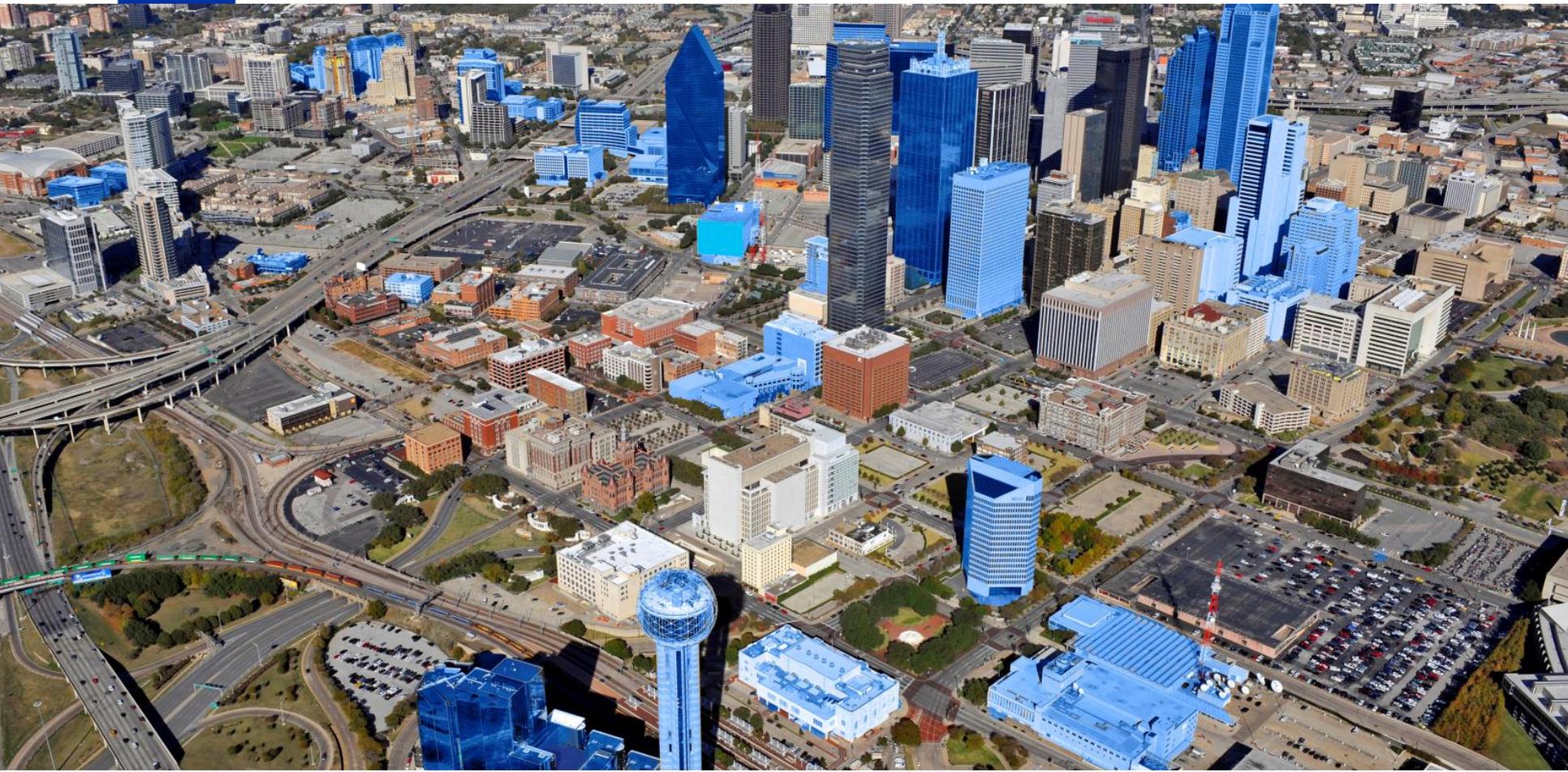
FORT WORTH

TAMPA

& MEXICO CITY



BECK

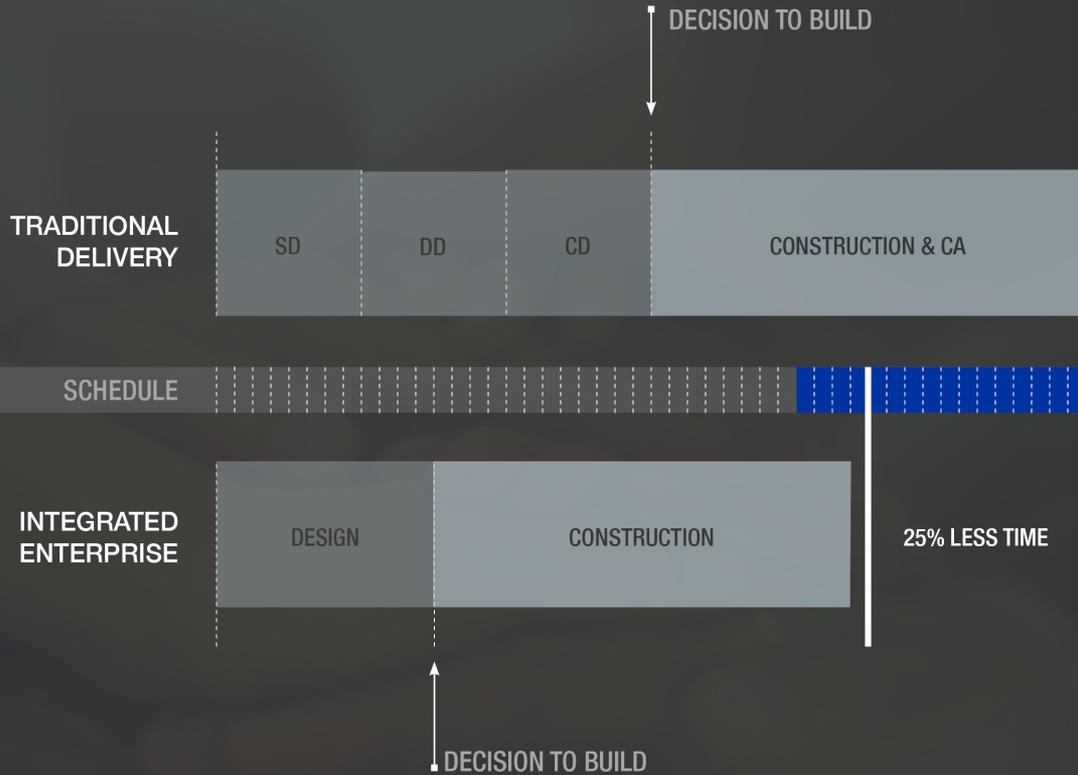


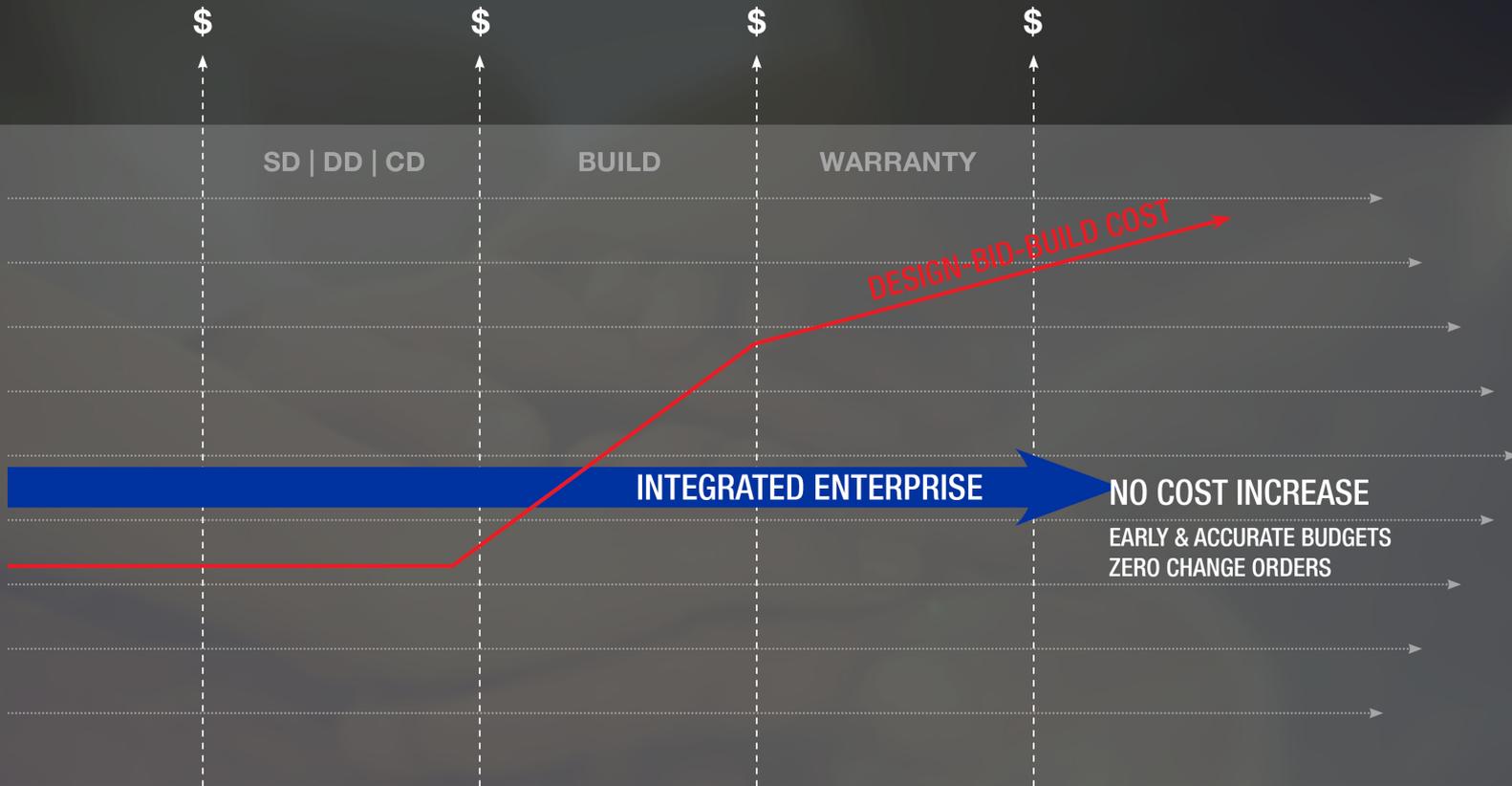
**INTEGRITY** is doing the right thing when no one is looking and behaving with uncompromising honesty.

**CARING** is showing concern, empathy and compassion for others, ourselves, and our environment.

**INTEGRATION** is working unselfishly toward common goals across disciplines, teams, departments and regions.

**INNOVATION** is never being too comfortable with the status quo by developing new ideas and applying those solutions that differentiate us in valuable ways.





**2014**  
**MILESTONES**

- First project utilized on for roof inspection
- Proof of concept validated

**2016**  
**MILESTONES**

- FAA approved 333 **July 2016**
- Full project testing begins **August 2016**

**2018**  
**OBJECTIVES**

- “Services” now available from the warehouse
- Implement “tier” services for project teams to utilize

2014

2015

2016

2017

2018

**2015**  
**MILESTONES**

- 333 exception applied for **October 2016**
- Tested on (3) pilot projects for workflows

**2017**  
**MILESTONES**

- Full year of budget and project capture
- (10) projects utilizing
- First project part 107 pilot certified **June 2017**

- Train project staff for site data capture workflows
- Develop services solutions for regional offices
- Build relationships with DSPs (Drone Service Providers) for non-project team site capture

## Aerial Operations by the numbers since 2014 ...

<b>4</b> States flown in	<b>75+</b> Projects captured drone data
<b>4</b> Countries flown in	<b>10K</b> Acres of sites mapped
<b>8</b> Part 107 certified pilots	<b>11K</b> Hours of recorded flight time
<b>8</b> Units in company fleet	<b>125K+</b> Media files captured and stored

# What Are the 5 Things You Need to Know?

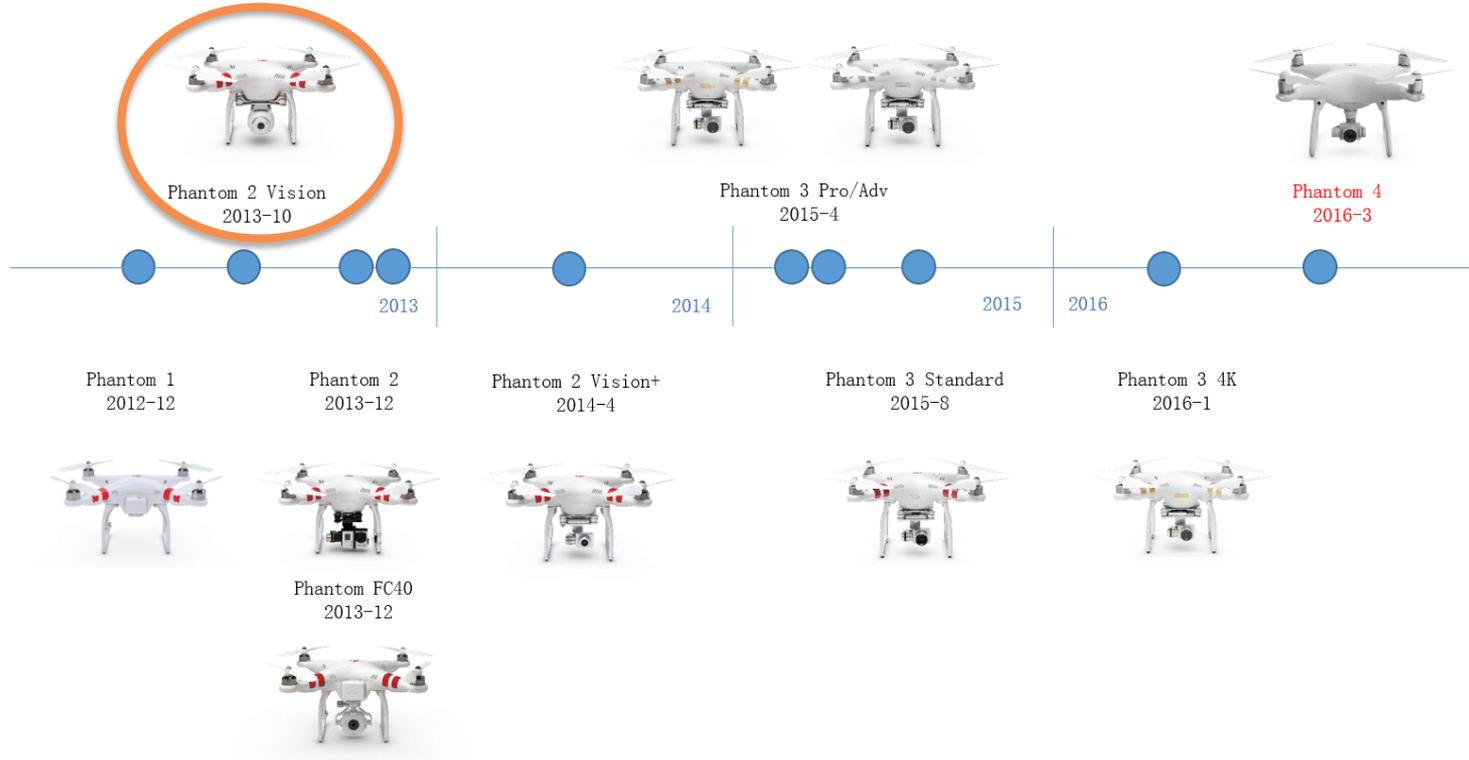
1

They have been around for a while



1

# They Have Been Around for a While



# What Are the 5 Things You Need to Know?

- 1 They have been around for a while 
- 2 There are regulations you need to consider 

## 2

# Regulations You Need To Consider



- Establishes a remote pilot in command position
- Must pass initial aeronautical knowledge test or an initial training course if hold a pilot certificate
- Must be vetted by TSA
- Must be 16 years old
- Must comply with registration requirements
- Reporting obligations (10 days if serious injury, loss of consciousness or property damage of \$500)

- UAS, including any payload, must **weigh less than 55 pounds**
- UAS must be operated at an altitude of no more than **400 feet AGL**
- UAS must be operated within the unaided, **visual line of sight (VLOS) of the operator at all times**
- May use **visual observer (VO)** but **not required**
- Operations in Class B, C, D and E airspace **are allowed with the required ATC permission**
- **Daylight-only operations**, or civil twilight (30 minutes before official sunrise to 30 minutes after official sunset, local time)

[https://www.faa.gov/uas/media/Part\\_107\\_Summary.pdf](https://www.faa.gov/uas/media/Part_107_Summary.pdf)

# What Are the 5 Things You Need to Know?

- 1 They have been around for a while 
- 2 There are regulations you need to consider 
- 3 They are both safe and smart  

3

## They Are Both Safe and Smart





# What Are the 5 Things You Need to Know?

- 1 They have been around for a while 
- 2 There are regulations you need to consider 
- 3 They are both safe and smart  
- 4 They provide immediate value 

4

# They Provide Immediate Value



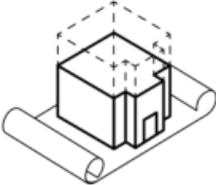
INSPECTIONS



SITE SAFETY



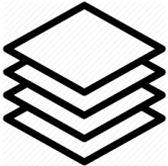
MARKETING



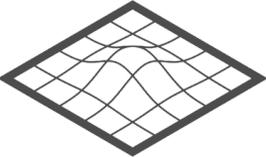
SITE COORDINATION



SITE MEASUREMENTS



PLAN OVERLAY



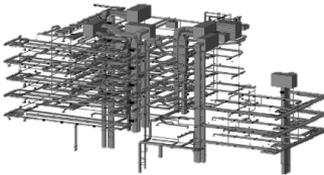
MAPPING



SUBCONTRACTOR COORDINATION



PAY APPLICATION VERIFICATION



MEP COORDINATION



SCHEDULE VERIFICATION



EARTHWORK QUALITY CONTROL

	Man Lift Rental	DJI Phantom 4
Costs	\$1,550*/week	\$1,500 ✓
Fuel/Operating costs	~\$100 to \$300	\$0 ✓
Training required	Certification	Minimal ✓
Avg time to complete one building inspection	8-10 MH	1-2 MH ✓
Camera Quality	14MP	14MP
Site restrictions/ Limitations	Landscaping	None ✓
Height restrictions	135 foot boom**	400 feet ✓
Line of site restriction	Boom and camera zoom	None ✓
Ability to reinvestigate areas of concern	No	Yes ✓



- My Projects
- Map Tools
- Search
- Demo: Mobile Tower
- Demo: Old Building Inspection
- Demo: Quarry Survey
- Legacy West
- Old Parkland
- Upload data
- Inspections - 14 Apr 2015
  - Copper Dome Inspection
  - Measurements
  - Screenshots
- Saint Leo
- UTD School of Management



Copper Dome Inspection

Inspection View Source Photos







Height: 13.68 ft  
Fill: -1.45 yd<sup>3</sup>  
Cut: 566.08 yd<sup>3</sup>  
Total: 564.64 yd<sup>3</sup>



100

30 ft

@ 32.7390213, -97.3685948

# What Are the 5 Things You Need to Know?

- 1 They have been around for a while 
- 2 There are regulations you need to consider 
- 3 They are both safe and smart  
- 4 They provide immediate value 
- 5 They are here to stay 

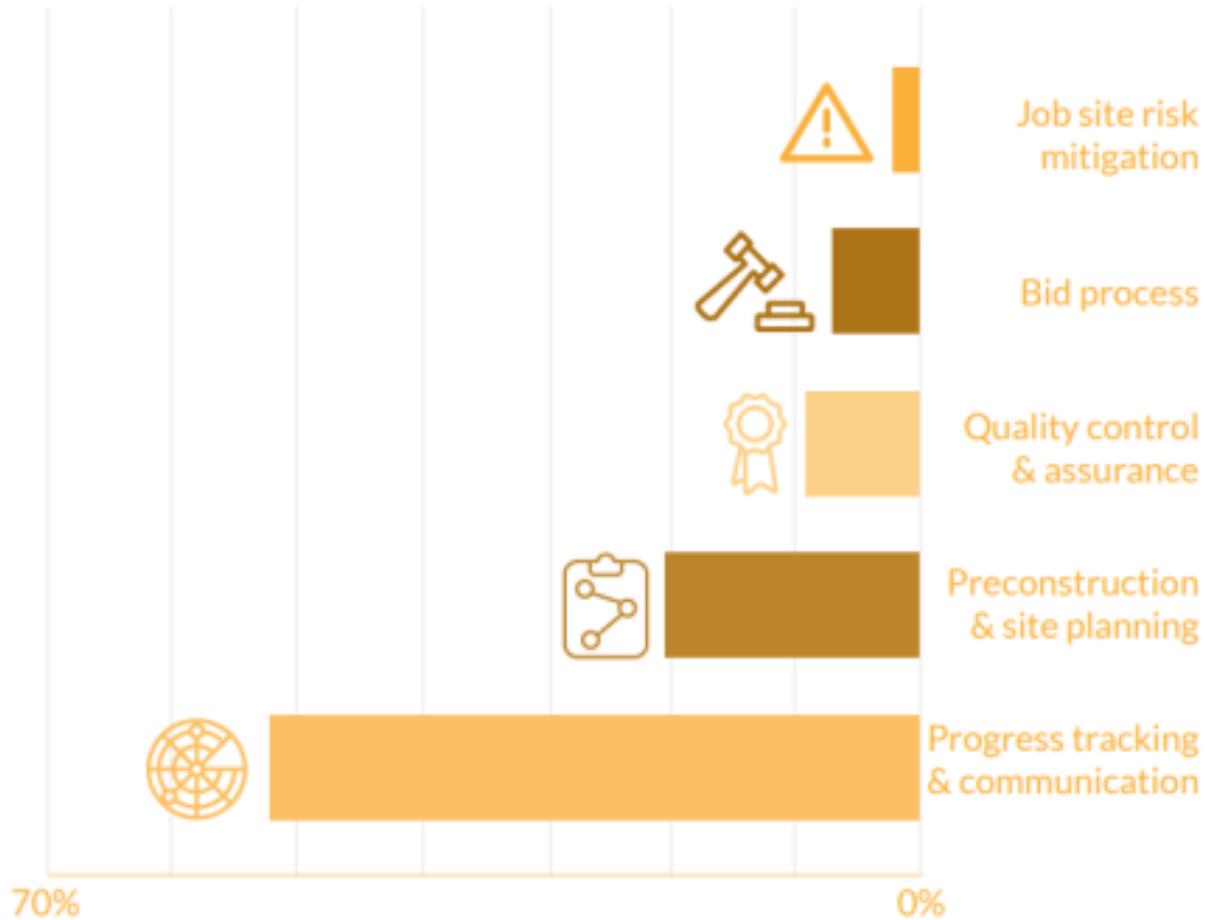
5

# They Are Here to Stay

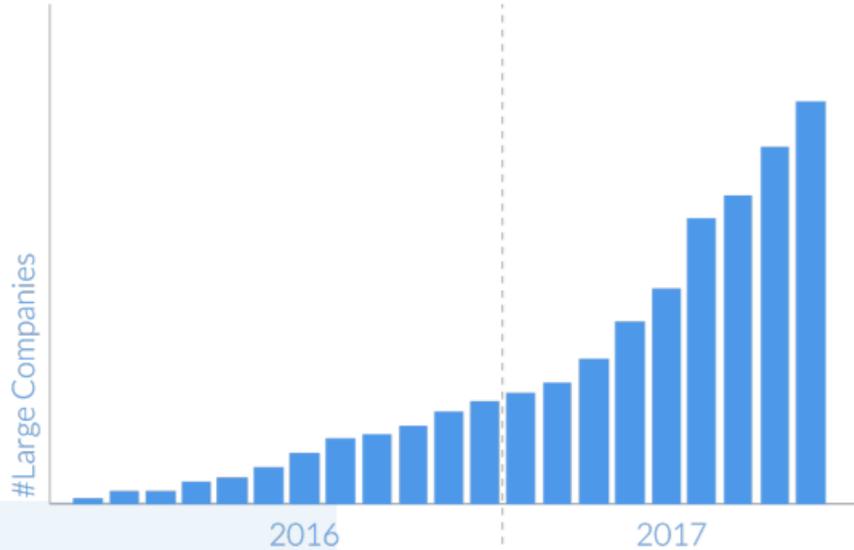
## Growth in Industry Adoption (YoY)

While dozens of industries use drones, the fastest growing commercial adopters of aerial data come from the construction, agriculture, and mining industries.



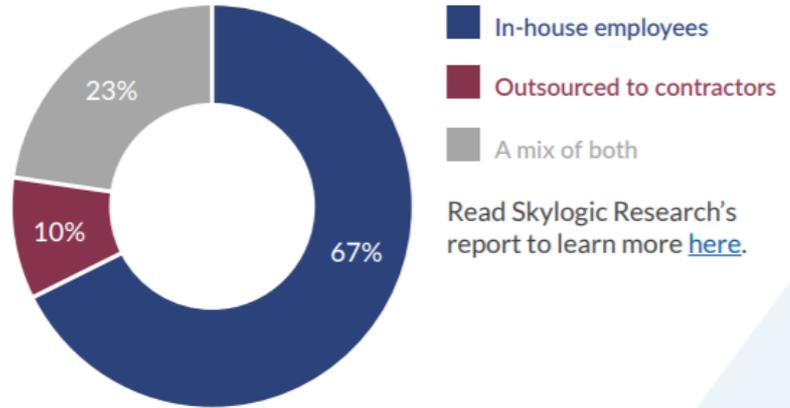


## Enterprise Adoption



Enterprise adoption of DroneDeploy skyrocketed in 2017.

## Contract vs. In-house Drone Program



Source: Skylogic Research

Read Skylogic Research's report to learn more [here](#).

### **Poll Question 3**

What was one key takeaway you had today?

# What are the 5 Things You Need to Know

- 1 They have **been around** for a while 
- 2 There are **regulations** you need to consider 
- 3 They are both **safe and smart**  
- 4 They provide **immediate value** 
- 5 They are **here to stay** 



# QUESTIONS?

Have a question for today's presenter?  
Type it into the chat feature!



# THANK YOU FOR ATTENDING!

Please visit [constructionbusinessowner.com](https://www.constructionbusinessowner.com) in the coming days to access a recording of the webinar or download a copy of the presentation.



## CONTACT US



[granthagen@beckgroup.com](mailto:granthagen@beckgroup.com)



[briana.sanchez@procore.com](mailto:briana.sanchez@procore.com)