How to Decide Whether Your Business Should Start Using UAVs

UAS Mapping Palm Springs
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Aerotas enables mappers to use drones

Aerotas helps surveyors use drones.

We focus on providing value with drones today, not in some vague future.

This forces us to tackle real challenges head on.

There is a huge range of UAV technology

Basic	Professional	Advanced	Bleeding Edge
Photography	Photogrammetry	Thermal	Lidar
Video	Autopilot	Multispectral	Beyond Line of Sight
Practice Flying	3D Modeling	RTK Integration	Obstacle Avoidance

$1,000 ➔ $100,000+

Drones produce a variety of outputs

Photos & Videos

- Real estate

- Construction site monitoring

Orthophotos / 2D Maps

- Backdrop to line drawing

- Site awareness
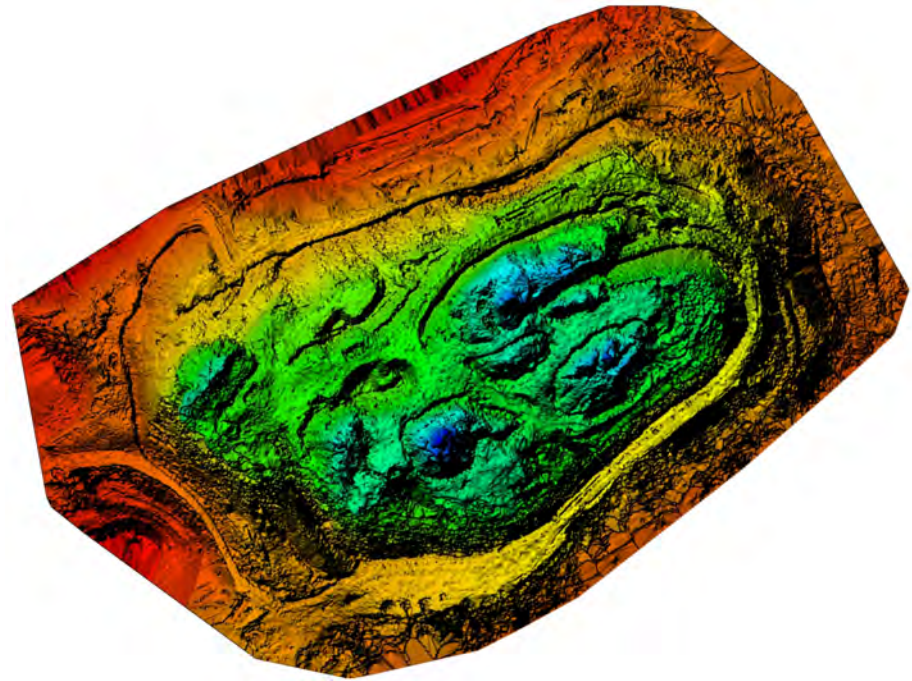
- 2D planimetrics

Point Clouds / 3D Models / DEM

- Topographic / contour mapping

- Digital 3D modeling

- 3D planimetrics

What data do you need?

- Aerial photos for marketing

- Orthophoto backing for existing project work

- 2D planimetric linework

- 3D measurements & topography data

- Stockpile volumetrics

Know your needs before buy!

What kind of accuracy do you need?
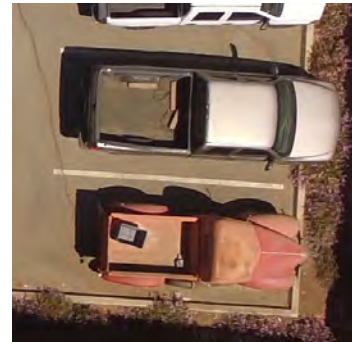
Resolution vs. Accuracy

Resolution: pixel density

Accuracy: ability to measure based on photos

Relative vs. Absolute Accuracy

Absolute: measured to Global Datum

Relative: measuring distance between two points

In UAV photogrammetry, accuracy is usually 2-3x resolution
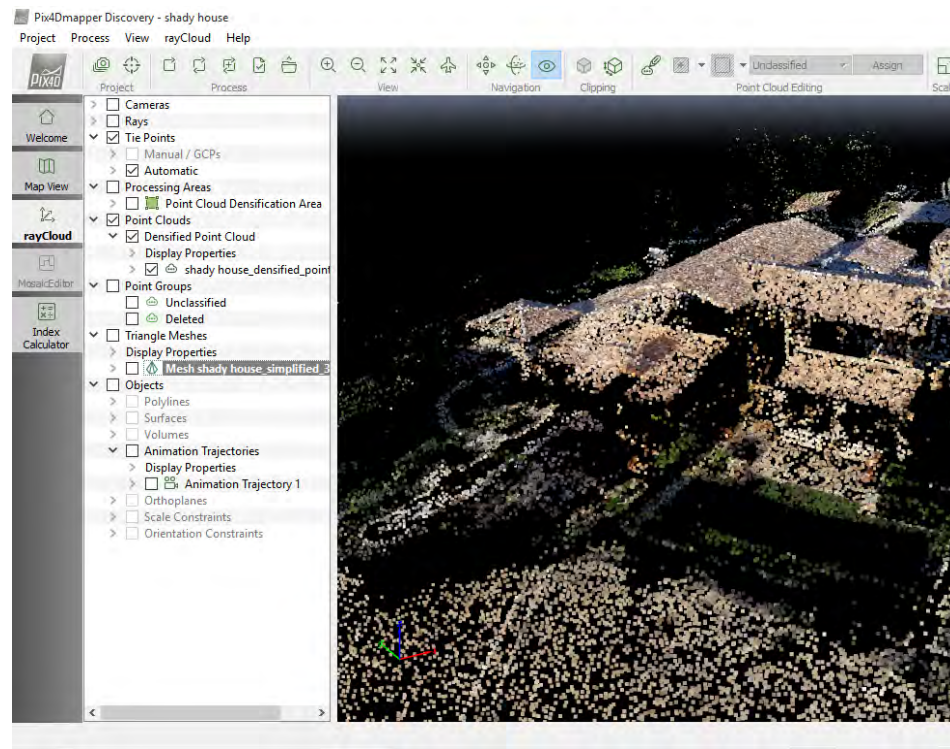

0.06'/ pixel

0.08' / pixel

0.16'/ pixel

0.50' / pixel

How much 3D experience do you have?

- Its easy to spend more on processing than on a drone system

- Point clouds can easily exceed 2GB and 10,000,000 points

- Specialized hardware

- Expensive software to extract value

Going from no 3D experience to full point cloud exploitation in one step is hard!

Are your client sites appropriate?

- Visual line of sight

- Max altitude 400'

- Effective max of ~75 acres per flight

These are legal restrictions -- the
technology is capable of much more

Is there ground cover on the site?

Photogrammetry

Can only map what you can see

Poor plant / tree penetration

Lidar

Good foliage penetration

Much heavier and more expensive

What other legal restrictions apply?

Operating near airports

Operations over people

Controlled Airspace All | None

Class B Airspace
Class C Airspace
Class D Airspace
Class E Airspace

Caution

Temporary Flight Restrictions
Wildfires
Prohibited Special Use Airspace
Restricted Special Use Airspace
National Parks
NOAA Marine Protection Areas

What are realistic goals?

Drones are Good for
High accuracy maps
Automated flights
Accurate property records
Sites up to a few hundred acres

Drones are Bad for
Extremely high accuracy (0.01')
Navigating obstacles
Seeing through ground cover
Very large sites (1,000 acres)

What does this cost?

	Basic	Pro	Advanced	Bleeding Edge
Output	Photos & Videos	2D Maps + 3D Models	Multispectral + 3D Models	High Accuracy 3D Point Clouds
Accuracy	+/- 10'	+/- 0.1'	+/- 0.1'	+/- 0.03'
Tools	RGB Camera	Photogrammetry	Onboard RTK	Lidar
Cost	<$5,000	~$10,000	~$30,000	>$100,000

What can drones do in the future?

Larger areas

Flights over people

Higher accuracy

Better data processing

Start Simple

Get your FAA licenses

Build operational expertise

Create value early, then grow

Aerotas

Questions?