

DroneDeploy's 2017 Drone Buyer's Guide

The Ultimate Guide to Choosing a Mapping Drone for Your Business

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01 Preparing for Takeoff: Introduction

Many businesses are considering the purchase of drones in 2017. With commercial drone legislation being introduced around the world, it's quickly becoming possible for today's companies to integrate these powerful tools into their existing workflows.

Drones allow businesses to make sense of the physical world by capturing aerial data to generate accurate maps and 3D models of their surroundings. By analyzing drone maps and models, companies are enabling faster, more informed decisions that increase efficiency, improve safety, and drive ROI. With benefits like these, it's no surprise that drone use is on the rise across industries including construction, agriculture, surveying, mining, and more.

Businesses just getting started with drones often ask us what drone they should buy. While there is no simple answer, we can help you better understand what you should consider before making a purchase. This guide will help you navigate the different options available in the market and decide which drone model is the right choice for your business.

We realize that investing in new technology can be daunting for a company of any size. That's why we've made this guide—to help ease the selection process and ensure your team is set up with the right drone for your needs. Continue reading to learn about the various drone models, imaging options, and cameras available.

Happy Flying,

The DroneDeploy Team



02 Getting Started: What's To Come

DroneDeploy makes powerful software to help you capture aerial imagery, process maps and 3D models, and interpret your drone data. We've worked with hundreds of businesses around the world, and understand the challenges you face when choosing a drone. Whether you're brand new to the world of drones, or an experienced pilot, this guide is for you. With a wide range of drone manufacturers and models to choose from, it can be difficult to determine which drone is the right choice for your commercial mapping and 3D modeling needs.

We'll walk you through the basics of drones and their applications in the workplace. You'll learn about the benefits drone mapping can offer your business, read side-by-side comparisons of some of the most popular drones for mapping, and get insight into the types of cameras available.

This guide is divided into sections to help you consider the most important factors when choosing your drone:

Aerial Insights: Benefits of Drone Mapping for Businesses

- From 2D mapping to 3D models, aerial imagery can provide better insights and allow you to make faster decisions. If you're new to the world of drones, read this section to better understand the transformational power of drones and the many ways you can incorporate them into your business. There are many benefits drones can provide your business—many of which you may not know.

Choosing the Right Drone for the Job: Multi-Rotor vs. Fixed Wing

- Fixed wing or multi-rotor? Read this section to learn about the types of drone models and review advantages and disadvantages of each. It's important to understand the differences and which model will best support your commercial use case.

Getting to Know Your Drone: Introduction to Commercial Drone Hardware

- Rotors, propellers, and gimbals, oh my! Read this section to learn more about the components that make up the average fixed wing and rotary drones. Understanding the hardware components is a necessary first step to making a smart purchasing decision. Here you can review diagrams and educate yourself on the latest drone hardware.

Eyes in the Sky: Understanding Imaging and Cameras

- Equipped with the right camera, drones are able to capture imagery across the light spectrum from visible light to heat signatures. In order to capture the right data to support your use case you may need to purchase additional sensors or camera components. Read this section to understand the options—and why they're used—and make sure you purchase the right camera for the job at hand.

Drone vs. Drone: Hardware Comparison

- Even if you understand all the hardware and accessories it's time consuming to review product specifications. We've done the work for you. Read this section to review our side-by-side comparisons of the top drones in the industry. We've collected the technical specifications, pros and cons of each model, and provided you with industry recommendations to best meet your needs.



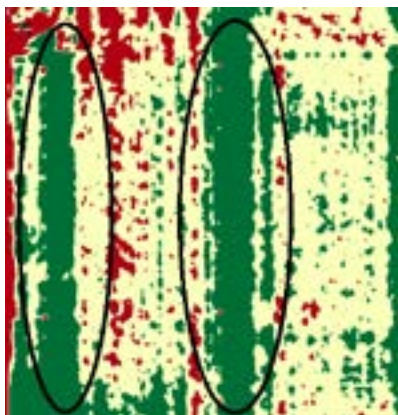
03 Aerial Insights: Benefits of Drone Mapping for Businesses

Commercial drone use is surging around the world. Goldman Sachs forecasts the commercial drone market will reach \$13 billion by 2020 as thousands of drones take to the skies. The number of businesses set to adopt drone technology will only increase over the next few years. The industry is becoming too large to ignore. So how will you stay ahead of the competition?

Companies both large and small are not only integrating commercial drones into day-to-day workflows, but relying on the data drones provide. While adoption has grown universally, there are some clear trailblazers who have arisen in the last year. These industries are particularly ripe for drone integration as they see significant time and cost savings over traditional data capture methods. Here's a look at just a few of the major industries that are leading in adoption rates and reaping the benefits

Agriculture

Farmers and agronomists are lowering costs and maximizing crop yields with drone mapping. Whether compiling plant counts, assessing crop damage, detecting parasites and fungi, or planning drainage and irrigation repair, drones can play a vital role in precision agriculture efforts to ensure better decisions are made throughout the growing season.



Drone Mapping Helps Catch a Major Aphid Infestation

A sugar beet grower in Idaho uses DroneDeploy to detect pests, prevent lost revenue.

[Read the Case Study](#)



Construction

Project managers and virtual design coordinators can save valuable time and eliminate risk through the use of drone maps and 3D models on job sites. Whether keeping construction projects on track with sharable maps, comparing BIM models, inspecting job sites for safety, or measuring stockpiles, drones and software improve communications and make construction a more efficient and safer industry to work in.



Drones Keep Construction of Manufacturing Plant on Track

Drone mapping is a cost-effective management solution for 550,000 square-foot project.

[Read the Case Study](#)



Surveying

Surveyors use drones to save time and lower costs when plotting and planning sites. That's why they are quickly becoming an integral part of the surveyor's toolkit. Paired with powerful software from DroneDeploy, drones can produce survey-grade maps and accurate 3D models in hours, rather than days. This allows survey teams to do the same job in less time, all while reducing costs.

Surveying the Great Sand Dunes

Wohnrade civil engineers integrates DroneDeploy with industry software for high-level deliverables.

[Read the Case Study](#)



Inspection

Building and insurance inspectors are flying drones to inspect sites and infrastructure more efficiently, and in a safer manner. By using drones, building inspectors can identify issues on roofs, building exteriors, cell phone and water towers without the need to spend hours walking or climbing a site. This also prevents businesses from sending contractors into unsafe conditions unless it's absolutely necessary. For insurance inspectors, drones similarly provide a streamlined way to inspect claims quickly and assess damage to property, homes, and commercial real estate.



Increasing Jobsite Safety with Drones

Drone mapping improves inspections and identifies hazards on industrial worksites.

[Read the Case Study](#)



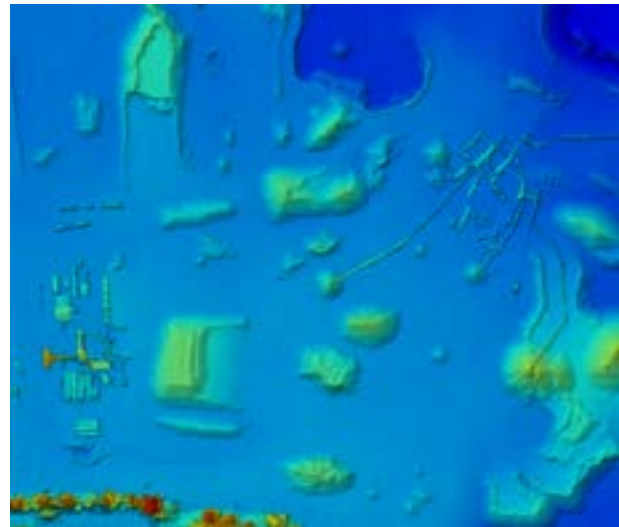
Mining

The mining and aggregates industry use drones for a wide range of workflows ranging from site survey and inspection, to equipment tracking, and even fragmentation analysis. Drones make it possible to quickly capture aerial data that can be put to work to lower costs, streamline operations, meet compliance regulations, and ensure site safety.

Drone-based Volume Measurement Delivers Big Time-Savings to Mining

Drones are safer, faster, and about half the cost as compared to traditional ground-based volumetrics.

[Read the Case Study](#)



These are just some of the most common industries using drones on a weekly basis to power operations in the field. The sky is truly the limit when it comes to the growing applications of commercial drones. To learn more about how DroneDeploy can put your drone to work, visit www.dronedeploy.com.

04 Choosing the Right Drone for the Job: Multi-Rotor vs. Fixed Wing Aircraft

When choosing a drone, one of the first questions you should ask yourself is whether you need a multi-rotor or fixed wing aircraft. They each have advantages and disadvantages that make them better suited for some uses over others, so it's important to understand the key differences between both types.



Multi-Rotor Aircraft

Multi-rotor aircraft are the most commonly used drone models for making maps and models on the DroneDeploy platform. They are made of a central body and multiple rotors that power propellers to take flight and maneuver the aircraft. These usually have four rotors (quadcopter), but can have as many six or eight (hexacopter and octocopter). Once in the air, multi-rotor drones use fixed-pitch propeller blades to control the vehicle motion by varying the relative speed of each rotor to change the thrust and torque produced, allowing a unique range of movement. This presents some advantages when used for commercial mapping.



GREATER MANEUVERABILITY

Unlike fixed wings, multi-rotor aircraft can perform vertical takeoffs and landings. This means that they require less space to take flight, can hover mid-flight, and maneuver above and around objects for easy inspection, mapping, and modeling. This also makes them ideal for area mapping due to the number of flight legs often required to get sufficient overlap to make a quality map.



LOWER PRICE

In the current market, multi-rotor vehicles come with a lower price tag than their fixed wing counterparts. There is of course a wide price range, but you can purchase a professional quadcopter for as low as \$1,500, whereas a professional fixed wing drone of similar quality can easily be 5-7x as much.



MORE COMPACT

Multi-rotor vehicles don't require the surface area or wingspan that fixed wing aircraft do because they use propellers to maneuver. They are easier to break down, fold up, and pack away into smaller cases—making them convenient to transport. Even the larger hexacopters and octocopters fold down to a portable size.



EASE-OF-USE

Multi-rotor aircraft are easier to fly for both humans and autopilots. Quick to maneuver, and capable of making movements in any direction, copters have a shorter learning curve for beginners taking flight for the first time.



HIGHER PAYLOAD CAPACITY

Multi-rotor vehicles generally support more weight due to their design. However, this means that you will need a larger, more expensive drone if you intend to carry significant payloads such as large DSLR or other camera rigs.



SHORTER RANGE

One limitation of multi-rotor craft is the flight range on a single battery. Most multi-rotor drones can fly for about 30 minutes in ideal conditions before returning home for battery replacement. You can offset this downside by purchasing additional batteries.



LESS STABLE IN THE WIND

The aerodynamics of multi-rotor aircraft leaves them more vulnerable to wind. This means that for use cases where high winds are expected, you may have to purchase a heavier, more stable and more expensive multi-rotor vehicle.



Fixed Wing Aircraft

Fixed wing drones are designed like more traditional types of aircraft—which look like an airplane. They are made of a central body that has two wings and a single propeller. Once in the air, the two wings generate lift that compensates for its weight — allowing the aircraft to remain in flight. While this type of aircraft is less common in drone mapping outside of the agriculture, oil, and gas industries, they present some advantages.



SIGNIFICANT RANGE

Fixed wing aircraft can fly for a longer period of time on a single battery cycle than a multi-rotor. This makes them ideal for mapping very large or linear areas because they do not have to fly home for a battery replacement as often during a single mission. Though, as technology improves the gap is closing.



GREATER STABILITY

The airframe design of fixed wing aircraft give them greater stability in high winds over multi-rotor aircraft. This is important for flying in environments where higher winds are expected or frequent.



SAFER RECOVERY FROM MOTOR POWER LOSS

If the aircraft loses power for any reason, in theory it is able to glide down to safety — giving the aircraft a better chance of surviving a fall.



LINEAR FLIGHT ADVANTAGE

Fixed wing aircraft are ideal for long-distance flights, such as pipeline inspections. However, this capability is currently limited to line-of-sight (LOS) regulatory requirements in the US and other countries where LOS regulations have been put into place.



LARGER LANDING/TAKEOFF ZONE REQUIRED

Fixed wing aircraft require a larger take off and landing zone for flight, which can make them ill-suited for some use cases. This can also lead to more time required for setup and takeoff.



HIGHER PRICE

In the current state of the market, fixed wing aircraft tend to cost more than their multi-rotor counterparts. While this could change in the future, it can impact overall ROI.



CHALLENGING TO FLY

Fixed wing aircraft are harder to fly, both for humans and for autopilots, especially in an evolving sense-and-avoid landscape.



LESS COMPACT

The range advantage of fixed wing aircraft comes directly from a larger lifting surface, meaning they are harder to pack away, and often require assembly.



LESS EFFICIENT FOR AREA MAPPING

Fixed wing aircraft are not as well suited for area mapping. This is because many turns are needed to fly a grid pattern and get sufficient overlap of a target area. This sort of maneuvering is better suited for multi-rotor drones.

Summary Comparison



Maneuverability	✓	✗
Price	✓	✗
Size / Portability	✓	✗
Ease-of-use	✓	✗
Range	✗	✓
Stability	✗	✓
Payload Capacity	✓	✗
Safer Recovery from Motor Power Loss	✗	✓
Takeoff / Landing Area Required	✓	✗
Efficiency for Area Mapping	✓	✗

05 Getting to Know Your Drone:

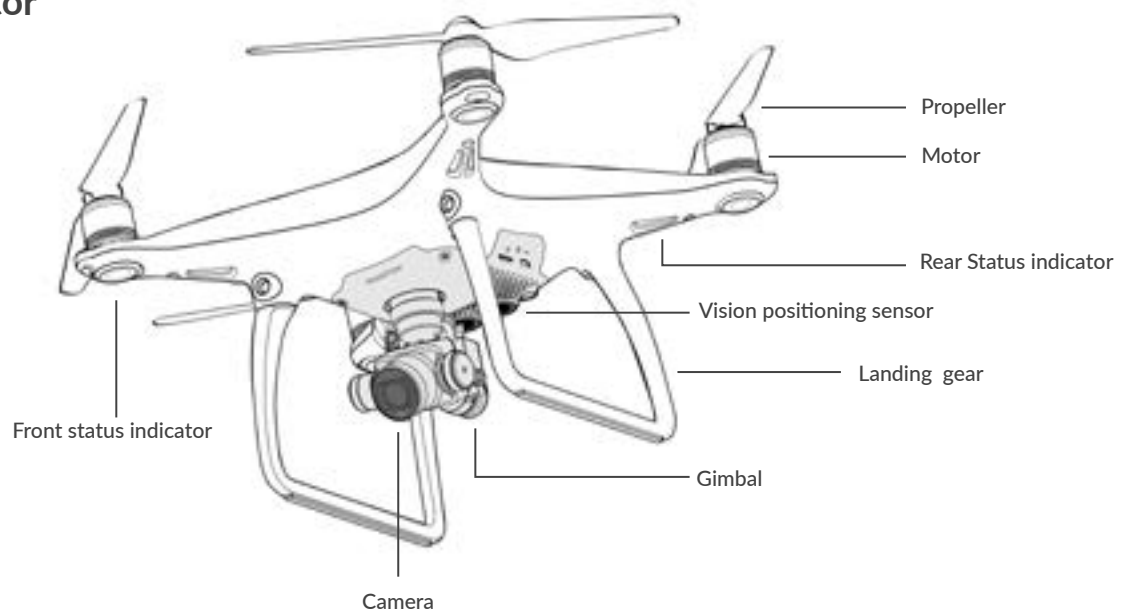
Introduction to Commercial Drone Hardware

Before you begin the purchasing process, it helps to have an understanding of the various components that make up a drone. While not all drones are manufactured the same way, drone models have key components that allow them to operate. We address many of these components in future sections, so read on to ensure you have a grasp on their purpose and benefits to commercial drone mapping.

To help you better understand the hardware, we've put together these diagrams that outline the main components you should keep in mind when choosing the right drone for your business.

In this section, we'll walk you through the hardware components that make up both multi-rotor and fixed wing drones, and help you understand their roles in the operation of the vehicle. Let's get started.

Multi-Rotor



PROPELLER

The propeller is used by the rotor to generate thrust while in flight.

LANDING GEAR

The landing gear widens the stance of the drone to increase stability during takeoffs and landings.

MOTOR

The motor powers the propellers to generate aerial lift of the drone during flight.

DIRECTION LED

These LEDs allow the user to understand the orientation of the drone in low-light conditions.

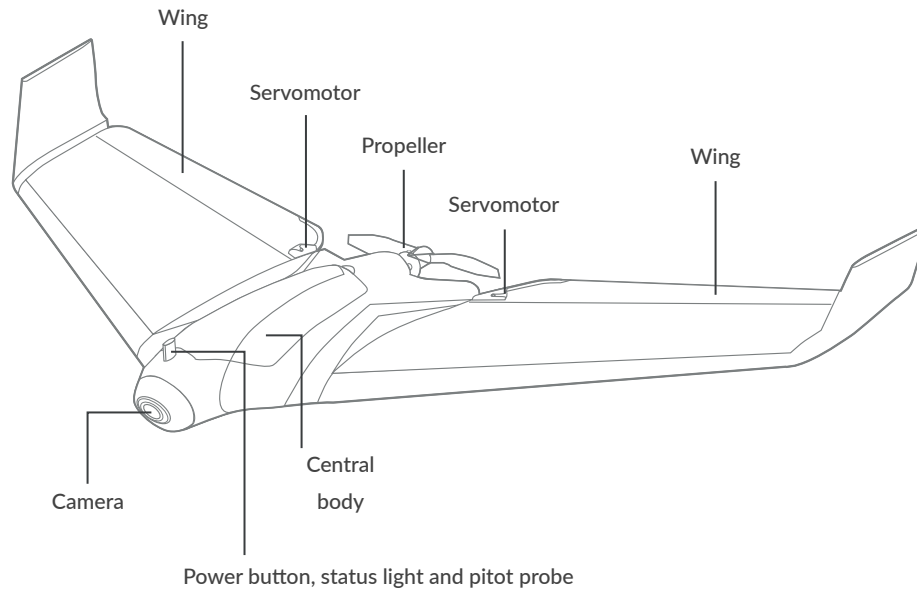
CAMERA & GIMBAL

The camera captures high-resolution video and still image data of the mapping subject. The gimbal stabilizes the camera and keeps it level during flight.

VISION POSITIONING SENSOR

Tracks the drone's position and altitude above ground.

Fixed Wing



WINGS

The wings of the drone produce lift while in flight. They are often detachable for transport, storage and replacement.

CENTRAL BODY

The central body houses the main electronics of the drone including the communication hardware and batteries.

PROPELLER

The propeller is used to generate thrust while the drone is in flight.

CAMERA

The camera is used to capture high-resolution photos to generate maps and 3D models.

PILOT PROBE

The pilot probe is a sensor used to detect data such as airspeed, wind speed, and altitude of the drone.

STATUS LIGHT (LED)

The status light is a colored LED that displays the current state of the drone.

SERVOMOTOR

The servomotor ensures precision control of the wings during flight.

POWER BUTTON

The power button is used to turn the drone on and off.

06 Eyes in the Sky: Understanding Imaging and Cameras

Drones make it possible to capture various types of imagery across the light spectrum. In order to capture the right data you may need to purchase additional sensors, cameras, or hardware components.

In this section, we'll walk through the various types of imagery you're able to capture using a drone, and help you understand the types of cameras you may want to purchase to meet your business needs. Let's get started.

Imaging

Using cameras and sensors attached to a drone, you can capture different types of light across the electromagnetic spectrum. From visible light, to thermal infrared imagery, it's important to understand the different types of imagery and their industry uses. While construction or surveying users may only require a standard camera, an agriculture user may require a near infrared (NIR) camera to evaluate crop health. The illustration below explains where the different types of imagery fall on the electromagnetic spectrum.

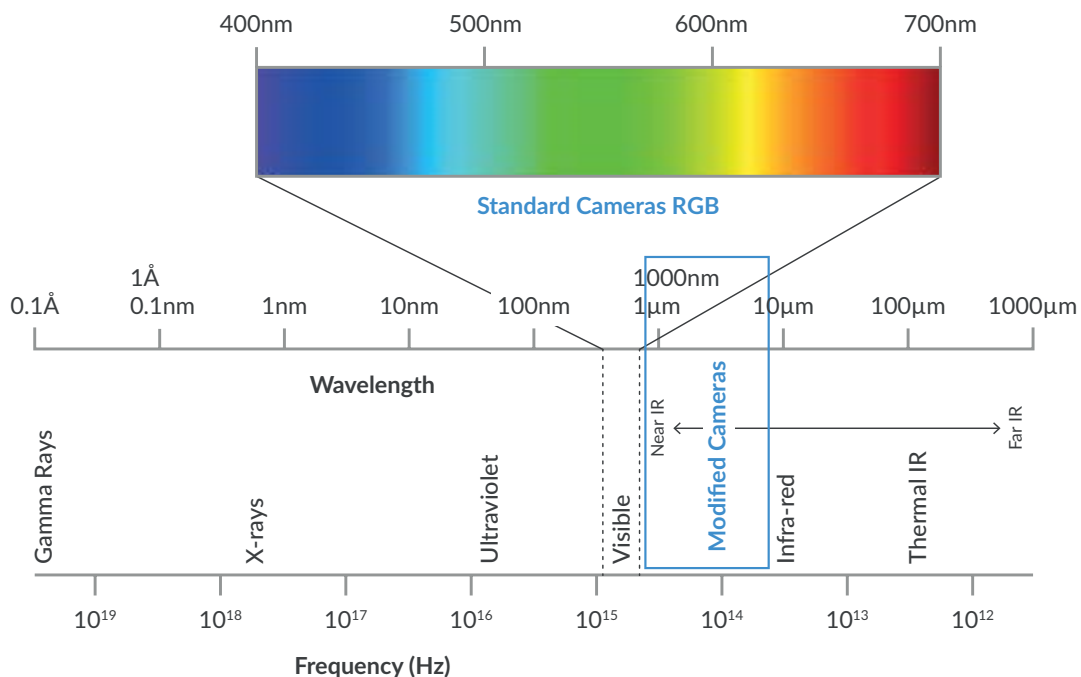


Fig. Difference in wavelength capture between standard and modified cameras

Source: By Victor Blacus (SVG version of File:Electromagnetic-Spectrum.png) CC BY-SA 3.0 via Wikimedia Commons.



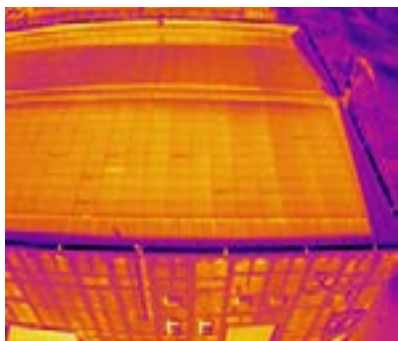
Visible Spectrum (RGB)

This is the most common type of imagery captured. RGB images are generally used in surveying, mapping and GIS missions where a high-definition surface model or 3D point cloud are required. This type of image is produced using the digital camera sensor that comes with most drones available on the market today, and is the color spectrum people are most used to viewing in standard photographs.



Near Infrared (NIR)

NIR imagery is most frequently used in precision agriculture in order to calculate plant vegetation health. NIR has the highest level of reflectance of the light bands. NIR-capable cameras make it possible to identify the reflectance of light from vegetation, which strongly correlates with the level of chlorophyll present in the plant. Plants with more chlorophyll reflect a higher amount of NIR light than unhealthy plants, making it possible to identify plants in poor health.



Thermal

Thermal imagery is used across a variety of industries and use cases ranging from agriculture, to construction, to inspection, and surveying. This type of imagery detects heat signatures from the environment to identify the range of temperature present in an image. This can help identify “hot spots” in images in order to inspect roofs, roadways, and even identify wet spots from irrigation in crop fields.

Cameras

Cameras make it possible to capture imagery across the electromagnetic spectrum. Now that you have an understanding of the various types of imagery at your disposal, let's discuss the different cameras that make it possible to capture image data. Most drone models come with a camera off the shelf, but you may need to invest in additional camera accessories to support your business use case. Let's explore the different types of cameras on the market.

RGB

RGB — or standard — cameras capture Red, Green, and Blue light. This is the camera type that comes stock with most drone models. These are multipurpose photo and video cameras that can be used to make high-definition 2D orthomosaic maps as well as 3D models for any industry. Additionally, they can be paired with plant health algorithms such as the Visible Atmospherically Resistant Index (VARI) to assess plant health and crop stress in precision agriculture use cases.



When considering the right RGB camera for mapping we recommend the following best practices:

Buy the highest quality camera you can afford

- Higher quality camera sensors produce higher resolution photos with greater pixel density, which means you get more accurate maps. What exactly does resolution have to do with map accuracy? Put simply, increasing the resolution of an image decreases its ground sampling distance (GSD), or in other words, it reduces the space between individual pixels in an image. Because drone mapping software like DroneDeploy processes maps by taking a series of individual images and matching the common points between them, the more common points that can be matched, the higher the accuracy of the map. An image with a more pixels contains more information, which means there is a greater probability of matching common points. We recommend purchasing a drone with a 12.3-megapixel camera or higher for drone mapping projects.

Buy a camera with a mechanical shutter

- Many out-of-the-box drone cameras use a rolling shutter. This means that the camera records each frame line-by-line from top to bottom. When taking videos or photographs, this helps reduce motion blur. However, it can also sometimes cause what's known as "rolling shutter effect," where surfaces in a photograph appear warped because the camera-object relation changed before the full image was recorded. An image that is warped in this way makes it difficult for drone mapping software to match points on a map, which negatively affects the map's accuracy. Purchasing a drone camera with a mechanical shutter helps solve this problem, because the sensor records all of the lines of the frame nearly simultaneously, rather than line-by-line.



Learn more about producing accurate drone maps with RGB cameras in our [recent blog post](#).

Near Infrared (NIR) Cameras

There are two main types of NIR cameras: Modified RGB cameras for Near Infrared and Multispectral Cameras. These cameras are generally used in precision agriculture to determine crop variability using plant health algorithms such as the Normalized Difference Vegetation Index (NDVI). They tend to be more expensive than RGB models because they are able to capture additional bands of light, but there are a wide variety of options available on the market to choose from. Let's take a closer look.



Fig. An example of an RGB camera modified for near infrared available from Maxmax.

RGB Cameras Modified for Near Infrared (NIR)

Modified cameras are fitted with a filter to capture some combination of Near Infrared, Red, Green, and Blue light depending on the model.

Multispectral

Multispectral cameras capture Red, Green, and Near Infrared light.

RGB cameras modified with NIR filters and multispectral cameras deliver high performance and accurate (absolute) NDVI imagery, but they require substantially higher investment than standard RGB cameras. Quality NIR-capable cameras can cost anywhere from \$1,200 on the lower end, to \$7,000 on the high end.



Fig. An example of a multispectral camera available from Slanrange.

When considering the right modified RGB or Multispectral camera for mapping we recommend the following best practices:

- While many aftermarket camera conversions for DJI cameras are available, image quality is inconsistent across manufacturers, meaning some may lead to poor map quality ([see our documentation for a full explanation](#)). We recommend getting quality control samples and a warranty from your hardware vendor prior to any purchase.

Learn more about using modified RGB and Multispectral cameras in our [online guide](#) to identifying crop variability with drones.

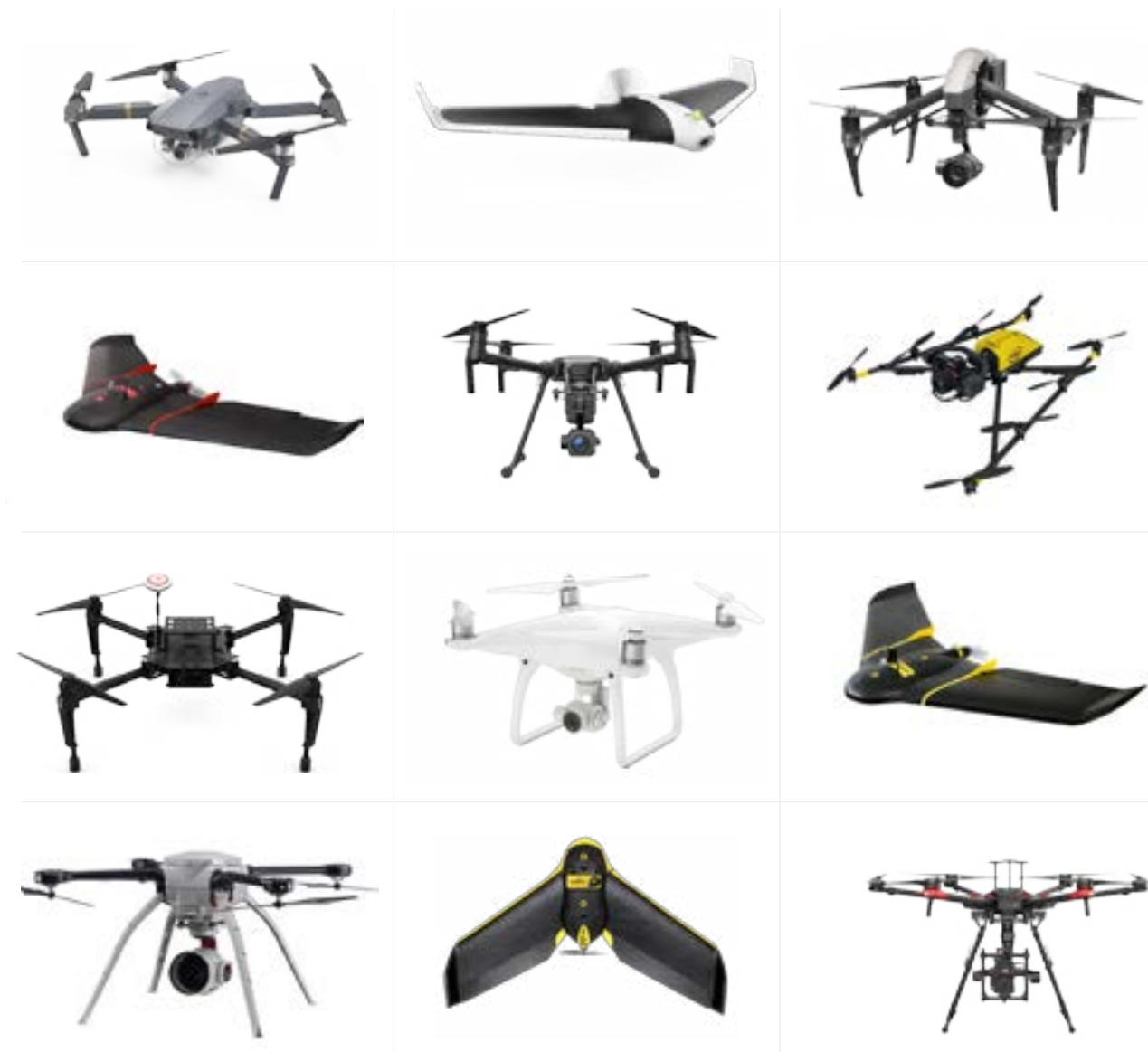


Fig. An example of a thermal camera available from Flir.

Thermal

Thermal, or thermographic cameras, usually detect radiation in the long-infrared range of the electromagnetic spectrum and produce images of that radiation, called thermograms. These cameras are most commonly used in inspection across industries ranging from construction to transportation, to public safety.

07 Drone vs. Drone: Hardware Comparison



Industry Recommendation Key



Agriculture



Construction



Surveying



Oil/Gas



Mining



Forestry

Rotary Drones

DJI Mavic Pro



ADVANTAGES

- Compact and lightweight design
- Waypoint navigation support
- 4K camera with image stabilization for high-definition images
- High ROI for the price range

DISADVANTAGES

- Not very stable in winds higher than 7-10 MPH
- Electronic shutter on built-in RGB camera

INDUSTRIES/USE CASES: Agriculture and Construction

TYPE OF DRONE: Multi-rotor

MANUFACTURER: DJI

PRICE: \$999

CAMERA TYPE/SENSOR: 12.3 MP camera, 1/2.3" (CMOS) sensor, electronic shutter

WEIGHT: 1.62 lbs

MAX FLIGHT TIME: 27 mins

MAX SPEED: 40 mph

BATTERY TYPE: LiPo, 3830 mAh capacity

OPERATING RANGE: 7000 meters

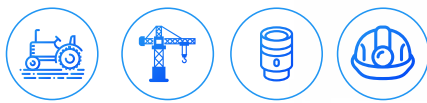
OBSTACLE AWARENESS: Yes

WIND RESISTANCE: No

WATER RESISTANCE: No

Rotary Drones

DJI Phantom 4 Pro



ADVANTAGES

- 20 MP, 1" sensor camera with mechanical shutter
- Lightweight, portable design
- Dual navigation systems with waypoint support
- 5-directional obstacle avoidance
- Precision hover system
- High ROI for the price

DISADVANTAGES

- Does not support interchangeable cameras

INDUSTRY RECOMMENDATION: Agriculture, Construction, and Mining

TYPE OF DRONE: Multi-rotor

MANUFACTURER: DJI

PRICE: \$1,499

CAMERA TYPE/SENSOR: 20 MP camera, 1" (CMOS) sensor, mechanical shutter

WEIGHT: 3.06 lbs

MAX FLIGHT TIME: 30 mins

MAX SPEED: 45 mph

BATTERY TYPE: LiPo, 5870 mAh capacity

OPERATING RANGE: 4.3 miles

OBSTACLE AWARENESS: Yes, 5-directional

WIND RESISTANCE: Yes, 22 MPH

Rotary Drones

DJI Phantom 4



ADVANTAGES

- Portable, lightweight design
- Front-facing obstacle avoidance system
- Waypoint navigation support
- Precision hover system

DISADVANTAGES

- Does not support multiple cameras
- Electronic shutter in built-in RGB camera

INDUSTRIES/USE CASES: Construction, agriculture, and mining

TYPE OF DRONE: Multi-rotor

MANUFACTURER: DJI

PRICE: \$900

CAMERA TYPE/SENSOR: 12.4 MP camera, 1/2.3" (CMOS) sensor, electronic shutter

WEIGHT: 3.04 lbs

MAX FLIGHT TIME: 28 mins

MAX SPEED: 44 mph

BATTERY TYPE: LiPo, 5350 mAh capacity

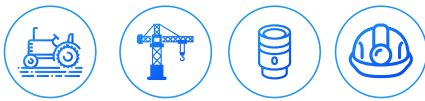
OBSTACLE AWARENESS: Yes, front-facing

WIND RESISTANCE: Yes, 22 MPH

WATER RESISTANCE: No

Rotary Drones

DJI Inspire 1



ADVANTAGES

- Supports multiple cameras, including thermal cameras
- Dual positioning navigation system
- More stable in winds than DJI consumer models
- 3-directional obstacle avoidance system

DISADVANTAGES

- No camera included in purchasing price—reducing ROI
- Longer setup time

INDUSTRIES/USE CASES: Construction, agriculture, surveying, and mining

TYPE OF DRONE: Multi-rotor

MANUFACTURER: DJI

PRICE: \$1,999

CAMERA TYPE/SENSOR: 12.4 MP camera, 6.17 x 4.55 mm CMOS sensor, electronic shutter

WEIGHT: 7.58 lbs

MAX FLIGHT TIME: 27 mins

MAX SPEED: 58 mph

BATTERY TYPE: LiPo, 4280 mAh capacity

OPERATING RANGE: 4.3 miles

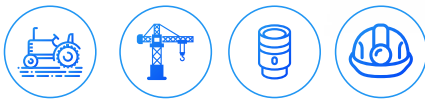
OBSTACLE AWARENESS: Yes, 3-directional

WIND RESISTANCE: Yes, 22 MPH

WATER RESISTANCE: No

Rotary Drones

DJI Inspire 2



ADVANTAGES

- Supports multiple cameras, including thermal cameras
- Front-facing obstacle avoidance system, terrain sensors, upward-facing infrared sensor
- More stable in winds than smaller DJI models

DISADVANTAGES

- No camera included in purchasing price—reducing ROI
- Longer set up time

INDUSTRIES/USE CASES: Agriculture, construction, surveying, and mining

TYPE OF DRONE: Multi-rotor

MANUFACTURER: DJI

PRICE: \$2,999

CAMERA TYPE/SENSOR: No camera included

WEIGHT: 7.58 lbs

MAX FLIGHT TIME: 27 mins

MAX SPEED: 58 mph

BATTERY TYPE: LiPo, 4280 mAh capacity

OPERATING RANGE: 4.3 miles

OBSTACLE AWARENESS: Yes, 4-directional

WIND RESISTANCE: Yes

WATER RESISTANCE: No

Rotary Drones

DJI Matrice 100



ADVANTAGES

- Supports multiple cameras, including thermal cameras
- Supports RTK GPS for increased real-time positioning and flight planning
- Expansion bays for additional accessories such as cameras and sensors

DISADVANTAGES

- Designed for developers—not ready for off the shelf for industry use
- No camera included in purchasing price—reducing ROI
- Longer set up time

INDUSTRIES/USE CASES: Construction and surveying

TYPE OF DRONE: Multi-rotor

MANUFACTURER: DJI

PRICE: \$3,299

CAMERA TYPE/SENSOR: Camera not included

WEIGHT: 5.2 lbs

MAX FLIGHT TIME: 40 mins

MAX SPEED: 49 mph

BATTERY TYPE: LiPo, 4500 mAh capacity

OPERATING RANGE: 4.3 miles

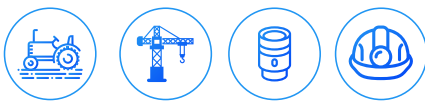
OBSTACLE AWARENESS: No

WIND RESISTANCE: Yes, 22 MPH

WATER RESISTANCE: No

Rotary Drones

DJI M200/210



ADVANTAGES

- Designed for enterprise use
- Supports RTK GPS for increased real-time positioning and flight planning
- Supports multiple cameras and sensors, includes universal ports
- Rugged IP 43 rating blocks dust and water
- Holds payload of up to 5lbs

DISADVANTAGES

- No camera included in purchasing price—reducing ROI
- Higher price tag
- Longer set-up time

INDUSTRIES/USE CASES: Construction, agriculture, surveying, and mining

TYPE OF DRONE: Multi-rotor

MANUFACTURER: DJI

PRICE: Not listed - contact DJI

CAMERA TYPE/SENSOR: Camera not included

WEIGHT: 1.62 lbs

MAX FLIGHT TIME: 38 mins (w/o payload)

MAX SPEED: 51 mph

BATTERY TYPE: LiPo, 7660 mAh capacity

OPERATING RANGE: 4.3 miles

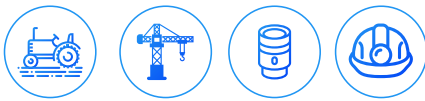
OBSTACLE AWARENESS: Yes

WIND RESISTANCE: Yes, 10 m/s

WATER RESISTANCE: Yes

Rotary Drones

DJI M600 Pro



ADVANTAGES

- Supports RTK GPS for increased real-time positioning and flight planning
- Supports multiple cameras, including thermal cameras
- Holds payload of up to 5.5lbs

DISADVANTAGES

- No camera included in purchasing price—reducing ROI
- Larger design, less portable
- Higher price tag
- Longer set-up time

INDUSTRIES/USE CASES: Construction, agriculture, surveying, and mining

TYPE OF DRONE: Multi-rotor

MANUFACTURER: DJI

PRICE: \$4,999

CAMERA TYPE/SENSOR: Camera not included

WEIGHT: 22 lbs

MAX FLIGHT TIME: 38 mins (w/o payload)

MAX SPEED: 40 mph

BATTERY TYPE: LiPo, 4500 mAh capacity

OPERATING RANGE: 4.3 miles

OBSTACLE AWARENESS: No

WIND RESISTANCE: Yes, 18 MPH

WATER RESISTANCE: No

Rotary Drones

Aeryon SkyRanger



ADVANTAGES

- Compact, folding design for transport
- Designed for use in defense, public safety, energy and fixed infrastructure
- Supports multiple cameras, including 20 MP sensor with mechanical shutter
- Stabilized, dual-streaming optical and infrared cameras capable of zoom
- Built-in support for radiometric temperature data
- High wind and weather resistance—ruggedized, weather-sealed

DISADVANTAGES

- Higher price than other drones in this guide

INDUSTRIES/USE CASES: Defense, public safety, energy and fixed infrastructure

TYPE OF DRONE: Multi-rotor

MANUFACTURER: Aeryon

PRICE: Not listed - contact Aeryon

CAMERA TYPE/SENSOR: Various, 20 MP, mechanical shutter

WEIGHT: 5.3 lbs

MAX FLIGHT TIME: 50 mins

MAX SPEED: Not listed

BATTERY TYPE: Lithium Polymer

OPERATING RANGE: 6 miles

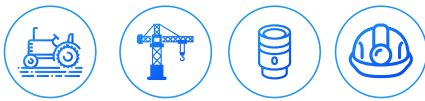
OBSTACLE AWARENESS: No

WIND RESISTANCE: Yes, up to 55 MPH

WATER RESISTANCE: Yes

Rotary Drones

Intel Falcon 8



ADVANTAGES

- Compatible with multiple cameras, including thermal cameras and DSLMs
- Waypoint navigation support
- Triple redundant Inertial Measurement Unit

DISADVANTAGES

- High price tag
- Servo motor gimbal
- Longer set-up time
- Larger design, less portable

INDUSTRIES/USE CASES: Construction, surveying, agriculture and mining

TYPE OF DRONE: Multi-rotor

MANUFACTURER: Intel

PRICE: \$17,495

CAMERA TYPE/SENSOR/: Camera not included

WEIGHT: 6.17 lbs

MAX FLIGHT TIME: 26 mins

MAX SPEED: 40 MPH

BATTERY TYPE: LiPo, 6250 mAh capacity

OPERATING RANGE: 0.6 miles

OBSTACLE AWARENESS: Yes

WIND RESISTANCE: Yes, 26.8 MPH

WATER RESISTANCE: No

Fixed Wing Drones

SenseFly eBee



ADVANTAGES

- Lightweight, simple design – less chance of mechanical failure
- Long flight time—designed for larger, or linear flight plans covering several hundred acres

DISADVANTAGES

- No obstacle awareness system
- High price tag
- Longer set-up time, requires assembly each time

INDUSTRIES/USE CASES: Agriculture, oil & gas, and forestry

TYPE OF DRONE: Fixed wing

MANUFACTURER: SenseFly

PRICE: \$9,999

CAMERA TYPE/SENSOR: 18.2 MP, mechanical shutter

WEIGHT: 1.61 lbs

MAX FLIGHT TIME: 50 mins

MAX SPEED: 56 mph

BATTERY TYPE: LiPo, 2150 mAh capacity

OPERATING RANGE: 1.86 miles

OBSTACLE AWARENESS: No

WIND RESISTANCE: Yes, 45 MPH

WATER RESISTANCE: No

Fixed Wing Drones

SenseFly eBee RTK



ADVANTAGES

- Lightweight, simple design – less chance of mechanical failure
- Built-in RTK GPS system for increased real-time positioning and flight planning
- Long flight time—designed for larger, or linear flight plans covering several hundred acres

DISADVANTAGES

- No obstacle awareness system
- High price tag
- Longer set-up time, requires assembly each time

INDUSTRIES/USE CASES: Agriculture, oil & gas, surveying, and forestry

TYPE OF DRONE: Fixed wing

MANUFACTURER: SenseFly

PRICE: \$25,000

CAMERA TYPE/SENSOR: 18.2 MP camera, 1/2.3" (CMOS) sensor, mechanical shutter

WEIGHT: 1.61 lbs

MAX FLIGHT TIME: 40 mins

MAX SPEED: 56 mph

BATTERY TYPE: LiPo, 2150 mAh capacity

OPERATING RANGE: 1.86 miles

OBSTACLE AWARENESS: No

WIND RESISTANCE: Yes, 45 MPH

WATER RESISTANCE: No

Fixed Wing Drones

SenseFly eBee Plus



ADVANTAGES

- Lightweight, simple design – less chance of mechanical failure
- Built-in RTK/PPK GPS system for increased real-time positioning and flight planning
- Extended flight time—designed for larger, or linear flight plans covering several hundred acres
- 20 MP, 1" sensor camera with mechanical shutter

DISADVANTAGES

- No obstacle awareness system
- High price tag
- Longer set-up time, requires assembly each time

INDUSTRIES/USE CASES: Agriculture, oil & gas, surveying, and forestry

TYPE OF DRONE: Fixed wing

MANUFACTURER: SenseFly

PRICE: \$26,990

CAMERA TYPE/SENSOR/: 20 MP camera, 1" (CMOS) sensor, mechanical shutter

WEIGHT: 2.4 lbs

MAX FLIGHT TIME: 59 mins

MAX SPEED: 40 mph

BATTERY TYPE: LiPo, 2150 mAh capacity

OPERATING RANGE: 1.86 miles

OBSTACLE AWARENESS: No

WIND RESISTANCE: Yes, 45 MPH

WATER RESISTANCE: No

Fixed Wing Drones

SenseFly eBee SQ



ADVANTAGES

- Lightweight, simple design — less chance of mechanical failure
- Built-in multispectral sensor for agriculture use
- Extended flight time—designed for larger, agriculture flight plans covering several hundred acres of crops

DISADVANTAGES

- No obstacle awareness system
- High price tag
- Longer set-up time, requires assembly each time
- Not a multi-use drone, designed specifically for agriculture use

INDUSTRIES/USE CASES: Agriculture

TYPE OF DRONE: Fixed wing

MANUFACTURER: SenseFly

PRICE: \$10,490

CAMERA TYPE/SENSOR: Multispectral camera, Parrot Sequoia

WEIGHT: 2.42 lbs

MAX FLIGHT TIME: 55 mins

MAX SPEED: 68 mph

BATTERY TYPE: LiPo, 2150 mAh capacity

OPERATING RANGE: 1.86 miles

OBSTACLE AWARENESS: No

WIND RESISTANCE: Yes, 28 MPH

WATER RESISTANCE: No

08 Taking it to the Skies: Conclusion

Ultimately, you'll need to decide which drone is best for your business needs. We've given you the information and tools to make an informed decision when you choose your next drone for mapping. Before you take the next step and make a purchasing decision, we have some final thoughts to share.

Choose a Drone That Supports Your Use Case

Consider your industry use case, average flying conditions (e.g. high winds), and mapping subject before you buy. If you plan to map smaller areas, make 3D models of structures, or conduct site inspections that require maneuvering up and around buildings, then a multi-rotor drone model is the right choice. If you are mapping larger areas (hundreds or thousands of acres at a time) or flying long, linear flight plans such as pipelines or roadways, you may want to consider a fixed wing drone.

Keep Your Budget in Mind

You'll also want to keep your budget in mind. In the current market, there is a significant price gap between multi-rotor and fixed wing drone models. If you're looking to get a greater ROI, an affordable, multi-use quadcopter model is your best bet. However, you may need a fixed-wing to meet the specific demands of your business use case—it all depends.

Newer is Usually Better

When it comes to purchasing business technology solutions, buying the latest product usually results in a smoother experience and greater feature set. Drones are no different. Choosing the latest drone model over its predecessor is a smarter investment for your business. Not only will they have improved hardware, but software solutions will also work more effectively with the latest integrations and support. While some older models are solid products, we recommend you invest in the newer model for a longer shelf life and better experience. You don't want buyer's remorse, or to be faced with an early upgrade down the line.

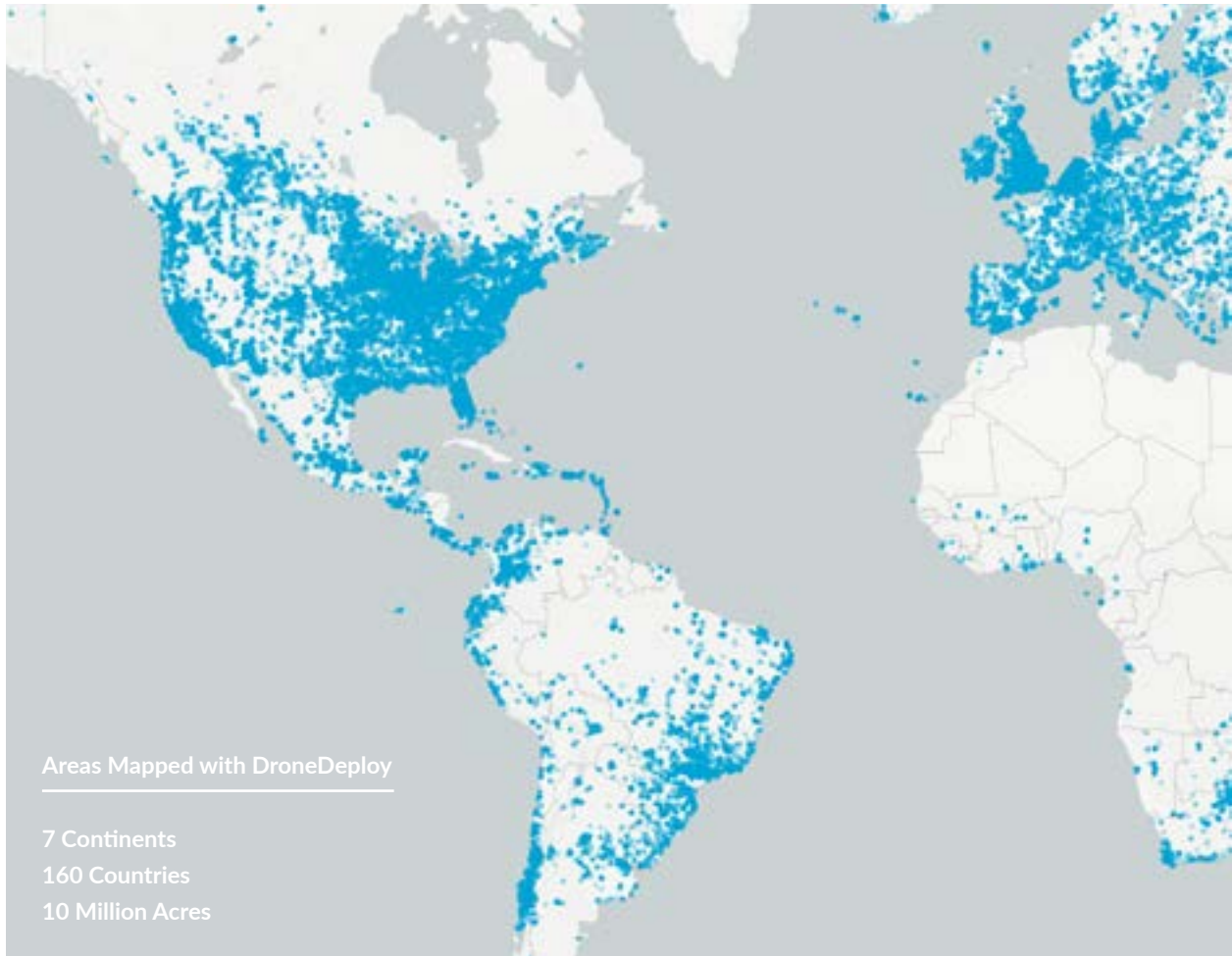
Remain Flexible

There is no one-size fits all drone solution that will suit every use case. In fact, more than 20% of pilots on the DroneDeploy platform fly multiple drones. This number is increasing every year as companies expand the use of drones for commercial applications. So, you should remain flexible. Your businesses may need to invest in more than one drone model to accomplish all of its goals. If your budget doesn't allow for several drones, pick a model that is multi-use and has wide range of applications.

Where to Learn More

With all of this in mind, you're prepared to choose the right mapping drone for your business. We hope you found this guide helpful and informative. If you still have questions, we encourage you to check out our [blog](#), [support documentation](#), and [online resources](#) for additional information about deploying drones at your company. Happy Flying!

The DroneDeploy Team



About DroneDeploy

DroneDeploy is the leading cloud software platform for commercial drones, and is making the power of aerial data accessible and productive for everyone.

Trusted by leading brands globally, DroneDeploy is transforming the way businesses leverage drones and aerial data across industries, including agriculture, construction, mining, inspection and surveying. Simple by design, DroneDeploy enables professional-grade imagery and analysis, 3D modeling and more from any drone on any device.

DroneDeploy is located in the heart of San Francisco. To learn more visit us online and join the conversation on Twitter.

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