



www.2cofly.com

DRONES

IN CONSTRUCTION



MISSION

Deliver business efficiencies using drones

INTRO

When drones were first adopted in the construction/engineering industry, it was primarily used as a tool for providing quick aerial photos & videos that served as useful data for basic visual inspection and progress tracking. This in and of itself was such a huge benefit to companies because they were able to see things from a whole new perspective. But, thanks to the advancement in both hardware and software over the decade, drones grew beyond just providing “nice to have” data; they’ve become an indispensable “tool” capable of bringing efficiencies in all stages of construction.

With major players such as *McCarthy*, *Brasfield & Gorrie* and many other

engineering and construction firms adopting drones in their workflow in the U.S., it is not a question of whether drone technology “works” anymore. It’s been proven for years, streamlining the construction process, saving costs, providing richer data and providing a safer alternative to collecting valuable data in the field.



OUR COMPANY

2cofly is one of Guam’s first and only drone service providers (DSP) utilizing drones and various sUAS technologies to bring business efficiencies and solutions, specifically to the construction industry. Our vision is to change the way business is done here by integrating drone technology to our clients’ business operations. By utilizing these technologies, our goal is to save our clients time and money, provide useful & actionable data, and mitigate safety hazards on job sites with a better and more efficient way to collect field data.

The logo for 2cofly, featuring the word "2cofly" in a white, stylized font with a yellow and orange flame-like graphic above the "2".



RESPONSIBILITY in the SKIES



Drones are classified as aircrafts and participating in the National Airspace System (NAS) comes with it great responsibilities. From managing our crew and equipment to the drone operations itself, we take great measures for safety and responsibility and ensure that the rules and regulations set by the FAA and any local laws are followed.

2cofly's remote pilots are Part 107 certified and have passed the newly published recurrency test online. We have flown in the most restricted places including the Guam International Airport and the Air Traffic Control Tower. To date, we have had a 100% approval rate for obtaining COAs and have 30+ approved COAs on island including a blanket area approval on PGUM Class D airspace, a blanket area approval of the entire Guam International Airport, and more.

We believe that participating in the NAS with our drones for commercial purposes is a true privilege. We continue to learn from each and every drone operation to make safety always a number one priority.

Our pilots are FAASafetyTeam (FAAST) representatives in Guam.





DRONES IN CONSTRUCTION

A E R I A L I M A G E R Y

One of the most simplest, but highly useful way drones are used in construction is to produce aerial imagery of a construction site. Aerial imagery is used for a multitude of reasons, including:

- remote visual inspection
- progress tracking
- inventory management/tracking
- updating stakeholders who are off-island
- surveillance of the site
- marketing material

Compared to taking photos on the land, drone imagery can give a better perspective of the site from above and can capture much more acreage in less time. It can easily capture areas that aren't normally accessible by foot or car. It can capture rooftops, tall structures and can even zoom in to the most important detail.





DRONES IN CONSTRUCTION

ORTHOPHOTO

An orthomosaic map (also referred to as just orthophoto) is a 2D representation of an area that is corrected from the effects of terrain relief or camera tilt/angle to produce a unified scaled map. This is created by taking hundreds, if not thousands of overlapping photos that are stitched together.

Orthophotos are great for operational planning, updating all stakeholders, making linear measurements, spotting potential hazards, displaying the entire operation and great for even large-format printing to showcase the development in your office.

By georeferencing the map with ground control points, they can be used as a map layer in GIS where you can overlay contours or even conduct as-built vs. as-design to spot for any deviations in the progress.

They serve as a great form of record-keeping/documentation to go back to or to settle disputes on whether a work was done or not on a certain day. It also gives you the most up-to-date visualization of the site, rather than looking at a year or more old low-res Google Earth representation.



Orthophoto overlaid onto Google Earth



Compared to satellite imagery, which is taken at hundreds of thousands of feet high, orthomosaics are taken at just ~200ft above ground. There is a clear difference in resolution as a result. Because you can zoom in without losing resolution, you can measure objects in the map to a high level of accuracy and know exactly what you're looking at/measuring. Here is an example of a 100-acre site. We zoomed in all the way to the 40-foot container and measured it using our software. The accuracy is within 1.3 centimeter!

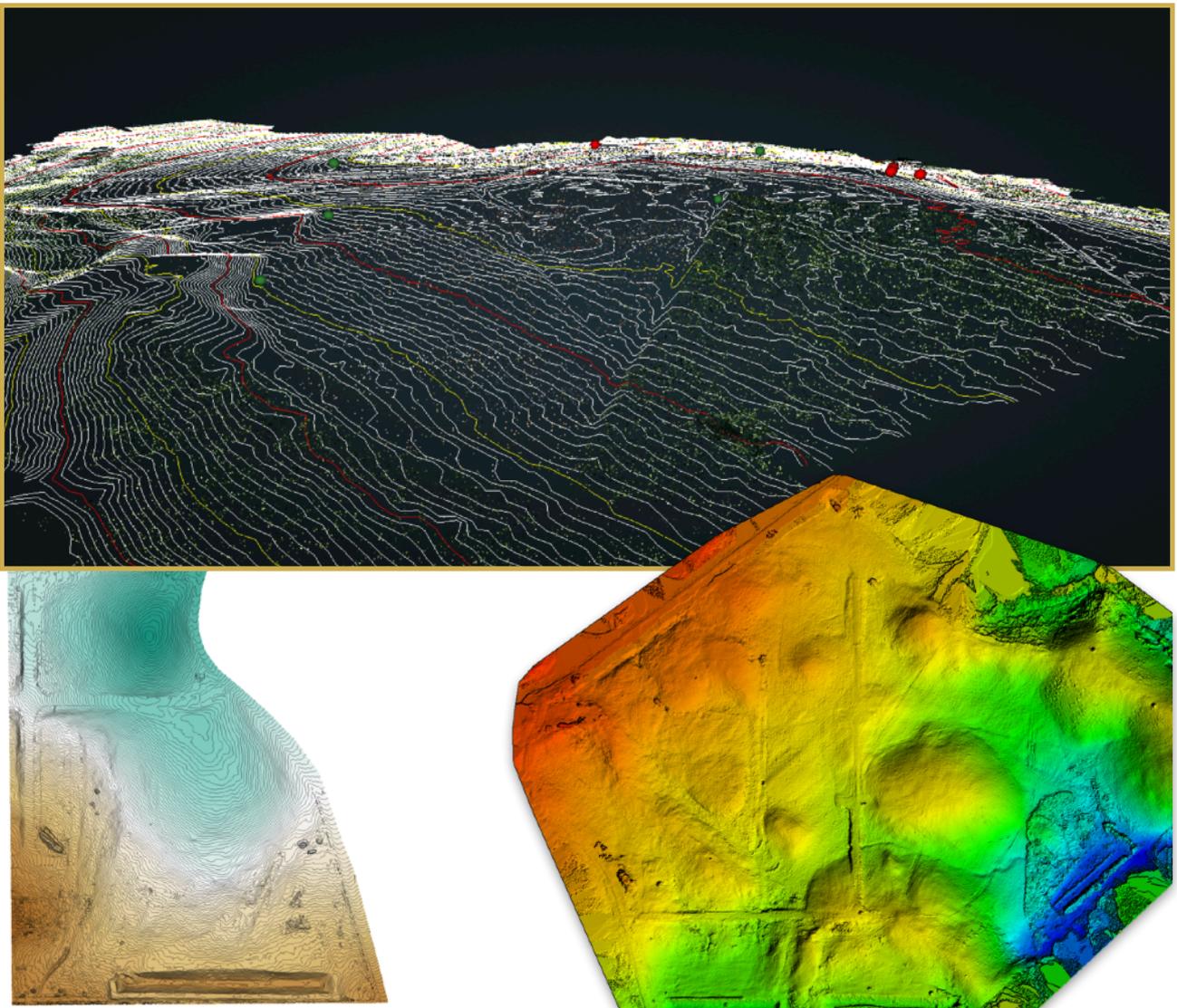


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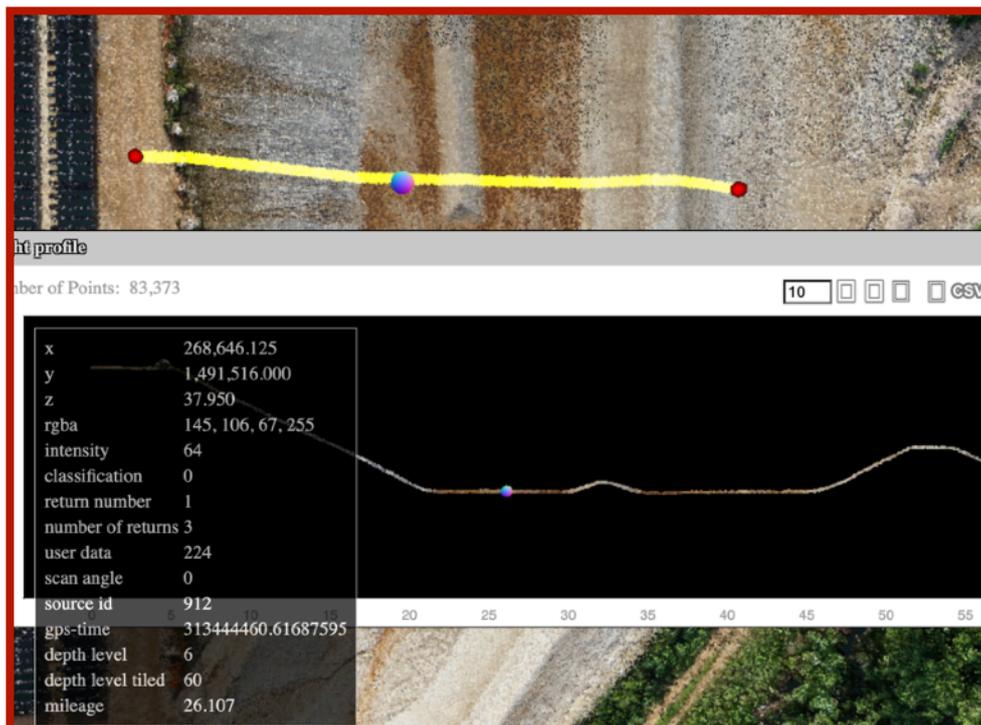
3D Point Cloud

Producing an elevation model or bare earth model can pose a challenge to surveyors and developers, and can take weeks or even months depending on the terrain. Having to plot points every X amount of feet throughout the entire land can be a challenge, especially in dense vegetation. Using aerial photogrammetry or LiDAR, drones can output highly accurate 3D point clouds within just days. From these point clouds, we can produce digital elevation models and 1' contours. With our LiDAR sensor, we can create a DEM even through dense vegetation!

Other ways we can utilize these 3D point cloud data is to measure stockpiles to get cut, fill, and volume data and create a 3D textured model. Engineers can use the raw 3D point clouds for other engineering purposes as well.



One great benefit we provide our clients with our LiDAR deliverables is our cloud system. Our clients get access to our online platform where they can not only view the 3D point cloud data and other deliverables like the contours online, but they can also do analysis. The many tools at their disposal includes an interactive 3D viewer, measuring tools, annotation tool, stockpile analysis tool and visualizing tools. And because it's all in the cloud, stakeholders who need to view no longer need to download software on their computer! They can simply view on their computer or laptop as long as there is an internet connection.



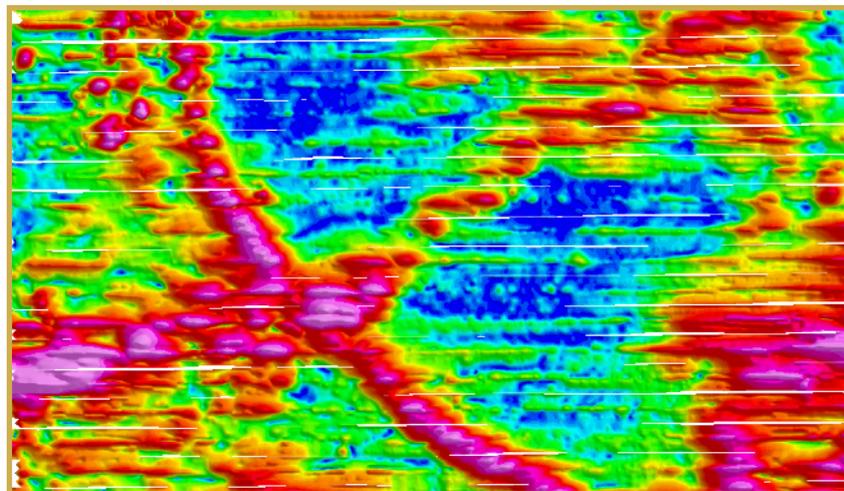


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A E R O M A G N E T I C S C A N

The newest line of service we provide using drones is a digital geophysical survey to detect for ferrous anomalies underground using an aerial magnetometer. This is to detect for any underground or buried metal objects including things like metal pipes and UXOs.

Compared with the traditional method, this technology brings all the great benefit of utilizing a drone - automation, speed and efficiency. Instead of having a field crew going out to the field and exposing them to safety risks, we can program our drone to collect the data instead. The respective specialists can then utilize the data collected from the drone and make their professional analysis.



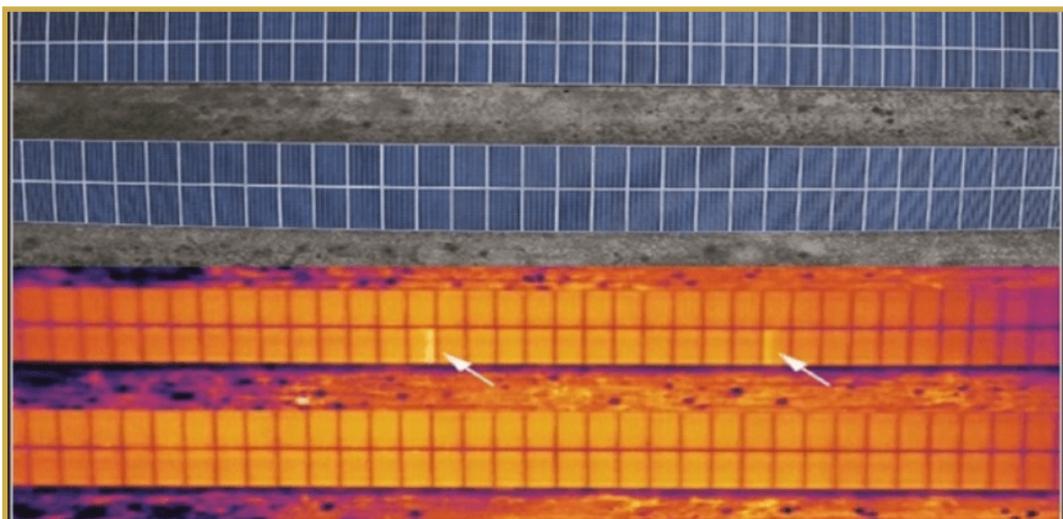
(Click) -> [Watch how software automates this process of field data collection](#)



DRONES IN CONSTRUCTION

THERMAL SCAN

Thermal drone-based sensing enables us to measure the relative surface temperature of objects. In construction, this can be used to view sources of energy inefficiencies or leaks during facility management assessment and documentation. Using drone-based thermal scanning, this can save a lot of cost in roof inspection and other infrastructure inspections. You can get data of irregular installation, spot water under roof membranes, external electrical issues, failed windows and more. These sensors can also spot for inefficiencies in solar panels such as cracks, detect faulty connectors, etc. Furthermore, collecting thermal data with a drone will be much faster than collecting via traditional methods. Thermal sensors can also be used as a surveillance tool during the night.





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THE FUTURE, NOW

2cofly is committed to integrating drones and UAS technology into Guam's construction industry and partnering with construction companies to achieve this goal. We are the leading drone service provider in our region and we continue to strive to grow this new and emerging industry in and outside of the field.

We are committed to investing in new sensors as technology advances to provide more and better service to our construction partners. Our ultimate goal is to grow and integrate drones beyond the construction industry to other industries in Guam that drones can benefit.

Have any questions? Request a meeting online or in person:

Dong Won Lee, *Director of Drone Operations*

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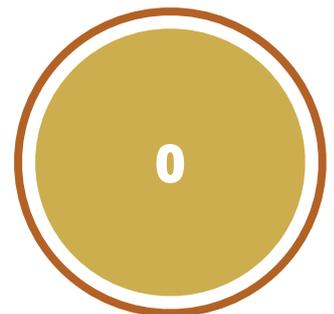
Commercial
Operations



Island-wide
COAs



Feet flown
with drones



Crashes
or accidents