



How are Survey & Mapping Professionals Using Drones in 2017?

By Jeremiah Karpowicz

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THE SIGNIFICANCE OF THE NEW rules for non-hobbyist drone operations, aka [Part 107 of the Federal Aviation Regulations](#), is monumental. Among countless other implications, Part 107 has opened the door to using drones on routine surveys, and many professional surveyors are now looking to use the tool to make short work of things like topographic and volume surveys on fairly open job sites. The new ruling has opened up the technology for surveyors to provide them with the flexibility to work with their clients to find often unexpected value in this new source of data.

As a brief example of this flexibility, the provision of Part 107 that allows flying to any altitude so long as the drone remains within 400 feet of a structure (and remains in Class G airspace) has removed the need to obtain waivers for structural inspection such as towers. This is a huge relaxation of a previously stifling requirement.

Even with those rules relaxed, some have questioned whether regulation represented the true barrier around adoption though, since economic factors often present far greater concerns for organizations that are looking at the technology. Lewis Graham, President and Chief Technical Officer of GeoCue Corporation, agreed that questions around value and ROI have and continue to take priority.

“I would agree that economics are the primary reason for relatively slow adoption of small site surveying using drones,” said Graham. “There are some projects where a drone is the best available tool. Mine site volumetrics is a good example. For other projects such as construction surveying, service providers need to see where drones will save them expense or speed up the solutions. In most cases, the answer will be a positive one, but to make this discovery requires a financial and training investment.”

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“With proper training, there is no doubt that a drone survey crew can safely acquire hundreds of acres of quality 3D data in a matter of hours. Properly planning the survey with the addition of drone flights, adopting new software workflows to digitize features, and integrating drone data with traditional survey methods are the biggest sources of uncertainty for those new to the technology.”

What that investment looks like for operators and organizations varies depending on how a drone might be able to be utilized on a given project and beyond, and regulation itself plays a role in such logistics. Under Part 107, becoming “legal” is relatively simple and inexpensive, which will compel many to explore the possibilities for the first time. Some are testing the waters with low-cost systems and are preparing to extend these efforts into serious mapping.

Many surveyors have different expectations around these details though, and issues related to adoption, complete drone solutions and changes to the technology and the industry itself complicates the matter. All of these factors will influence how surveyors responsibly, safely, and profitably take to the sky.

Making Sense of How Drones Can Impact a Survey Project

UNDER PART 107, a number of people in the industry have seen the adoption rate of the technology increase, which is already driving demand. Many are excited about the features that various sensors are able to provide, but being able to build and leverage success with the technology is an ongoing issue, since many are anxious to build on the potential of the technology, rather than results they’ve seen and created for themselves.

“The fact is that everyone and their brother wants to fly at night and BVLOS,” Hogan said. John Perry is CEO at Altavian, whose company is manufacturing drones designed to be rugged and precise surveying instruments. He’s seen the challenges that many have encountered when it comes to fully utilizing drone technology, and understands what has and needs to change in terms of the approach operators and stakeholders have to embrace.

“With proper training, there is no doubt that a drone survey crew can safely acquire hundreds of acres of quality 3D data in a matter of hours,” said Perry. “In my mind, the barrier to surveyors is learning how to produce survey products with drone-acquired data. Properly planning the survey with the addition of drone flights, adopting new software workflows to digitize features, and integrating drone data with traditional survey methods are the biggest sources of uncertainty for those new to the technology.”



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“It’s clear with the implementation of Part 107 that professionals now have a different perspective on building a program internally, or partnering with a service provider. However, companies still need to conduct internal audits and ask themselves, ‘do I have the expertise, budget and time to undertake a program, or am I better served by partnering with a service provider?’”

That sort of proper planning ties into the implementation of an entire program for an organization, and under Part 107, creating an entire UAV program is entirely feasible for larger organizations that are cognizant of regulations and risk. Many companies are now looking at internalizing at least part of a UAV operation because they believe they can handle those logistics after observing drone flights over their sites. Whether or not that outlook actually lines up with reality is an issue Dave Henderson, Topcon’s Director of Geospatial Sales, has encountered firsthand.

“It’s clear with the implementation of Part 107 that professionals now have a different perspective on building a program internally, or partnering with a service provider,” said Henderson. “The simplified changes under 107 provide a pathway to pursue a UAV program. However, companies still need to conduct internal audits and ask themselves, ‘do I have the expertise, budget and time to undertake a program, or am I better served by partnering with a service provider?’ If companies don’t ask those questions and come up with honest answers, they’re going to end up in major trouble.”

Part 107 has created tremendous opportunity for survey professionals, and much of that is related to gains to efficiency and safety that the tools provide. Determining how to best create and leverage those gains is a question that needs to be worked through in specific detail, and those answers will vary.

Creating Complete Solutions

REGARDLESS OF WHETHER AN OPERATOR is in-house or not, larger companies such as multi-location mining companies are looking for UAV systems that are relatively simple to use yet will scale out to meet most of their mapping needs. Most realize from a past technology deployment that buying pieces of a drone solution and doing their own integration carries a lot of risk. When things go wrong, they do not have a single vendor they can hold accountable. A complete drone solution simplifies everything, but the expectations around what that sort of solution actually looks like vary.



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“The desire for a drone and system with an “easy” button that will allow stakeholders to press a button and get an answer from a drone is pervasive. Many of the challenges in this space are related to the proper application of the technology, and a complete drone solution with that “easy” button will solve many of those problems.”

“I think everyone has a different idea of what a ‘complete drone solution’ actually is,” said Henderson. “Some just want to push a button and get an answer. Others want an easy way to send a drone up to collect data, process it and give it back to the user. The thing is, even if you’re doing that for volumes, you’ve got work to do. You’ve got to pick out your piles. Someone still needs to look at that data no matter what. Someone has to determine what they want to extract out of it and do a quality control on it to make sure it’s what they’re looking for. There’s no software or machine that’s going to do that today.”

The desire for a drone and system with an “easy” button that will allow stakeholders to press a button and get an answer from a drone is pervasive. Many of the challenges in this space are related to the proper application of the technology, and a complete drone solution with that “easy” button will solve many of those problems. As Henderson notes though, that’s really not a practical application of the technology, which above all else is a tool like any other that a surveyor can use if and when appropriate.

Many of the issues in this regard are around setting the proper expectations. Complete solutions might need to split out from what we could instead call “turn-key solutions”, which keep users from having to assemble a hardware/software package, but allow them to determine how UAVs can and should be utilized in the best manner. Regardless of what these drone solutions are called or how they’re assembled, putting in the work associated with discovering the value they can deliver remains essential.

“The drone industry has moved quickly to build drones that are both capable and convenient on the job,” said Perry. “Most surveyors are genuinely surprised with the ease of use of the latest drones, which I would compare to the complexity of a modern total station. Of course, not all drones are alike so we suggest you shop around and compare not only the ease of use, but also the quality and simplicity of the data production. The biggest challenge the drone industry faces to complete the solution for surveyors is to ensure surveyors are equipped to utilize the data effectively in production scenarios.”

Creating Complete Solutions

THE DRONE INDUSTRY AS A WHOLE is an early-stage technology, which means opportunities are being created, leveraged and expanded upon in countless different ways at a break-neck speed. Much of that ties into changes and developments to drone technology itself, which surveyor professionals are already planning to leverage in new and powerful manners.

“I’m looking forward to seeing things change in a positive way with direct geo-positioning,” Graham said. “The accuracy that can be achieved with drone mapping is highly correlated with the accuracy of the estimates of the drone location when each image is acquired. Low cost dual band differential GNSS will be coming to prosumer drones within the next year or so. This will dramatically improve their application to mapping.”

Graham also mentioned potential changes to energy management that will allow flight times to be extended. There is a big industry focus on extending flight times while simultaneously improving payloads, all of which will dramatically impact the sort of efficiency that operators have found with these tools.

Additionally, many companies are realizing that serious mapping can be achieved with low cost drones. The problem in the past has been the relatively poor quality of the still frame images, but these sorts of technical problems get sorted out incredibly quickly. It wasn’t that long ago that fly-aways presented a real challenge, but today, it’s a non-issue for many professionals.

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Advancements and changes to the technology go hand-in-hand with shake-outs that will undoubtedly happen throughout the industry, as operators and organizations work to actually realize the potential of drones that until now had all been on paper. People on every side of the industry are going to be asked some tough questions this year, and the answers to those questions will surprise stakeholders and the industry as a whole.

Tempting as it is to speculate around exactly what kind of transformations might come from such developments, concentrating on issues that are far closer to the hearts and minds of survey professionals is what most are focused on for 2017.

“If the surveying and mapping profession can maintain its safety record for drone operations, it will continue to lead the commercial adoption of this technology,” Perry concluded. ■



About the Author:

Jeremiah Karpowicz is the Executive Editor for Commercial UAV News. He has created articles, videos, newsletters, ebooks and plenty more for various communities as a contributor and editor. He is also the author of a number of industry specific reports that feature exclusive insights and information around how drones are being used in various markets. You can read all of those reports [here](#).

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Commercial UAV Expo is a conference and exhibition exclusively focused on the commercial drone market. Launched to great success in the US in 2015, the organizers are bringing their winning formula to Brussels with a European-centric event.

In the conference program, UAV industry experts share key insights into the issues large enterprise asset owners face when implementing UAS, including systems selection and integration; developing enterprise workflows, guidelines and policies; data management and integration; and legal, safety and regulatory considerations. Plenary sessions and panels cover topics of interest to all end-users regardless of industry while breakout sessions focus on UAV technology, applications and opportunities in the vertical markets listed above.

The international Exhibition includes airframe manufacturers, component suppliers, software suppliers and service companies.

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