SURVEYING *and* MAPPING:

THE RIGHT TOOLS FOR THE JOB

There are many UAS platforms on the market, but they're not all well suited for every application. Some surveying and mapping applications require more advanced solutions, and while that may mean a more significant investment up front, companies and clients will save time and money in the long run.

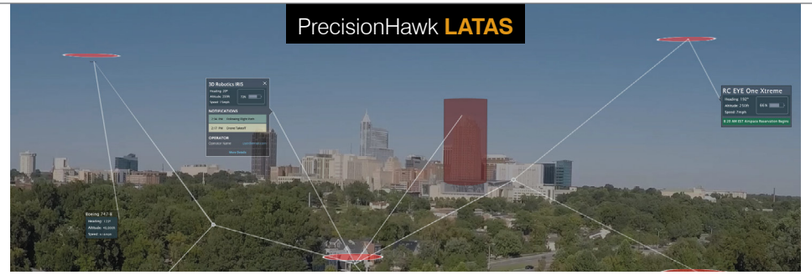
by Renee Knight

As the unmanned sector evolves and more manufacturers enter the market place, buyers have an increasing array of hardware and software options to consider at various price points.

For professionals looking for an unmanned aircraft system (UAS) to fly surveying and mapping missions, it might seem like a cheaper, more basic system is a good place to start. Recreational and entry-level systems, however, may not have the capabilities needed for these types of applications—even though some manufacturers claim they do. Choosing carefully, keeping clearly in mind the desired results and how those results will be used can save drone operators, and their clients, time and money, experts told *Inside Unmanned Systems*.

"There're many factors that come into play," said Michael Singer, founder and CEO of DroneView Technologies, which provides aerial data acquisition and data processing for surveyors and civil engineers. "Understanding the project parameters will help to dictate what the right tool is that solves for that end result. And that's an important thing because there's lots of press that we've all read that you can go on

WEB EXCLUSIVE Microdrones recently merged with Avyon, a Canadian-based solution provider and alliance partner, and expanded operations into the U.S. For more on this, read *High-end German Drone Manufacturer Expands to U.S.* at *insideunmannedsystems.com.*



LEFT: Flight planning before the senseFly eBee performs a mission at a mine

RIGHT: PrecisionHawk's Low Altitude Tracking and Avoidance System (LATAS) provides flight planning, tracking and avoidance using real-time flight data transmission based on existing world-wide cellular networks.

ABOVE: A UAS pilot flies Topcon's Falcon 8.

Firms offering advanced surveying and mapping platforms

Aeryon Labs
Delair-Tech
microdrones
PrecisionHawk
senseFly
Topcon
Trimble

Photos courtesy of senseFly, PrecisionHawk, microdrones and Topcon

"YOU DON'T WANT TO USE A UAV THAT WAS DESIGNED TO BE A TOY or something to play with. You have to use professional equipment to get a good quality product at the end."

George Southard of GSKS Associates, a geospatial business consulting firm

flies two 25-minute flights for each mission. The data enables Briggs to regularly monitor the change at various time intervals and see how the morphology of the beach is evolving.

"The UX5 is different than traditional drones. It's a fixed wing product, that allows us to cover a much greater area at a much higher speed than we could with a quadcopter based design," Gammack-Clark said. "We can cover our study area in a practical timeframe in a practical number of missions."

Some higher-end systems can handle even longer missions.

"One of the big differentiators (between entry-level and more advanced systems) is the flight time," said Matt Bethel, director of technology at the survey firm Merrick and Company. "The lower end systems have shorter flight times and a much higher frequency of launch and recovery, more opportunities for issues with that, whereas the higher-end systems will fly many more times longer than the lower-end systems—sometimes up to an hour and a half."

Integrated or Al la Carte?

Professional UAS are designed and engineered to work as one system, said Mike Hogan, business development director for microdrones. That is the biggest difference, he said, between platforms like the md4-1000 and the soon-to-be released md4-3000 and more basic models. Microdrones and other professional systems aren't made of a motor from one manufacturer, an autopilot from another and a frame from another. Everything is built to work together for better performance and a smoother workflow.

Among the components that make a system a good choice for survey and mapping are the stability of the platform, the stability and quality of the camera, the flight planning software and, the data processing, said David Snyder, applied geospatial expert for Trimble.

"All components have to work well together," he said. "The UAS market is still relatively new, and there have been a huge number of people who were fairly good at remote control aircraft, so they tried to find a way to make money with their hobby. Putting cameras on the aircraft and taking video was one of the first things done. When it comes to producing maps with these images, a lot of the builders of these systems don't have the history or knowledge of what makes a good aerial imaging platform."

Singer pointed out that the integrated solu-

SUCCESSFUL DAM INSPECTION

Last year, **microdrones** worked with a client to complete a **DAM INSPECTION.** The inspection was necessary to plan for future engineering work but the dam was difficult to get to, microdones' Business Development Director Mike Hogan said.

The team at microdrones flew the **MD4-1000** over the dam 11 times from different angles and was able to generate the accurate data required for the engineering work as well as a 3D model of a majority of the dam—without anybody putting themselves at risk traveling to the dam by boat, Hogan said.

The company also worked with **APPLANIX** to **INTEGRATE A DIRECT GEO-REFERENCING CAPABILITY** on the md4-1000.

"We were able to configure two different payloads in support of that application," Hogan said. "Not a lot of multi-rotors have that precision mapping and the ability to swap payloads. And in this case we were operating about four meters above the water. Not every system could handle the flight conditions we had."

UTILITY INSPECTION

Systems like the microdrones md4-1000 can be used for a variety of applications, including inspections. **RAECON INDUSTRIES BEGAN USING microdrones ABOUT THREE YEARS AGO TO PROVIDE UTILITY INSPECTION SERVICES.** They did a lot of research before investing in a UAS, pilot Ben Van Lare said, and decided on the md4-1000 because it was a safe, high-quality system that could provide the data their clients needed. Consumer grade systems just aren't equipped for this type of application, he said, and can cause interference and other issues during these types of inspections.

Many clients see the value UAS can bring to utility inspection, but are still nervous about the process, Van Lare said. If Van Lare and his team came in with a $2,000 drone to inspect their equipment, they wouldn't be happy and probably wouldn't agree to it. Clients feel more confident in the service knowing Raecon has invested in a high-quality, proven platform.

"It makes us more legit," Van Lare said. It shows we understand the importance of maintaining their site and making sure no accidents occur. Sending a drone 10 feet away from a 50,000 voltage tower can be quite daunting to utility companies. They want to make sure the company providing the service knows what they're doing and isn't going to damage their utility line for a buck."

And the point isn't to just provide clients with expensive photos, Van Lare said. The end product is geo located thermal imagery that shows them if they have a damaged asset. If they inspect 100 miles of power line, they can show the client there's a damaged asset at mile 52.

"We give the end user additional views and additional data that can help them maintain their asset," he said. "Anyone can provide photos. It's how you assess and deliver them. We geolocate them and provide them in a map platform, where they can click and see exactly where their structures are on the map."

DELAIR-TECH also uses the **DT18 TO PERFORM POWER LINE INSPECTIONS,** said Benjamin Benharrosh, the firm's co-founder and sales and marketing director, and the system's endurance makes it well suited for this type of application. **THE UAS DETECTS SPATIAL ENCROACHMENT.** Once the images are collected, they're processed and a map is delivered to the utility company.

"We create a report with pictures of the anomaly, the GPS coordinates and how close the tree is to a power line," Benharrosh said. "From the flight to acquiring the data to delivering the data, it's all automated."

Photos courtesy of (Top) Raecon Industries and (Bottom) Delair-Tech