Desert drones

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Carrying out drone surveys in the hot desert environments of the Middle East presents both logistical and legal challenges. As demand for such surveys is increasing, Philip Angell offers his insights

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There are a number of regulatory approvals needed to operate commercial unmanned aerial vehicles (UAVs) or drones in the United Arab Emirates (UAE). With each Emirate having its own civil aviation authority under the federal regulator, it can be quite a challenge to obtain the correct ones. Having said that, the process is always evolving, and is now a lot more efficient than it used to be.

My company, VPS , received its unmanned operator approval from the UAE?s General Civil Aviation Authority in 2016. We operate in all 7 Emirates, and carry out projects for high-profile international engineering, survey and consulting firms, as well as governmental bodies such as its waste management division.

Most of our work focuses on producing accurate maps and digital outputs such as true orthomosaics, digital terrain models, contours and 3D models. We use senseFly?s eBee fixed-wing drones mainly, in conjunction with Pix4D and Global Mapper products for processing, but we are always bringing new technology in to improve our products and services. We are also finding that demand for ?reality capture? ? which combines aerial data with terrestrial data such as photos or laser scanning ? is increasing, especially with the huge infrastructure design and development projects found in the UAE.

A notable recent project involved combining UAV survey data with conventional topographic methods and ground-penetrating radar to map a subsurface network of utilities accurately. UAV surveys cover large areas very quickly, so we can survey a 6 sq. km site, such as this project, in a few hours.

The largest area we have surveyed was 40 sq. km in Abu Dhabi. The project resulted in 20,000 images and 2TB of data. The survey was carried out in August when temperatures were approaching 50?C and the humidity was nearly 100%.

As a result of these conditions, we had to operate between 6.00am and 10:30am, before temperatures became too intolerable for humans and machines. We completed this eBee Real Time Kinematic (RTK) project in 4 days, making 85 flights with just a small remedial infill to image on day 5.

Harsh climates play havoc with sensitive electronics, so it?s always a fine balance between getting more data and shortening the lifespan of the equipment due to humidity, dust, hard landings and excessive wear and tear.

Case study: Fujairah city survey

VPS was invited to quote for an aerial, full-city survey using our fleet of senseFly eBee RTK survey-grade drones. We were also asked to advise the client on the most efficient methodology in terms of cost and time. Consideration had to be taken on the proximity to Fujairah Airport and its aviation operations and also the tall buildings in the city.

The project consisted of a precise aerial survey of 22 sq. km of Fujairah city?s urban area for a proposed stormwater drainage project. Project timing was estimated at 3 days, but it was completed in 2.

Accuracy

We set 5cm as the ground sampling distance (GSD), and achieved an accuracy of 4cm for horizontal and 5cm for vertical. This GSD was sufficient for such a large survey area.

Results

We produced a series of highly accurate 2D orthomosaics, 3D point clouds, contours, 3D models, digital terrain models and digital surface models for the client.

Looking forward

There will be a lot more automation to fieldwork in future. Following the launch of our website , we at VPS are working on a drone planning portal that will allow clients to prepare their surveys online and apply for the required regulatory flight permits for each mission. We will then dispatch an operator to fly the mission, with all the client?s data being processed, delivered and available for their approval automatically.

Of course, you will always need a qualified human to oversee the process. I like to deliver the data in person and to see the client start to think about their project while looking at the results.

Philip Angell MRICS is Managing director of VPS

Further information

- Related competencies include Legal/regulatory compliance , Mapping , Remote sensing and photogrammetry , Surveying land and sea
- This feature is taken from the RICS Land Journal (April/May 2018)
- Related categories: Infrastructure ; Land use and construction