

Dispelling aerial surveying myths

RAY COX, A DIRECTOR AT LANDAIR SURVEYS, EXPLAINS WHY USING BOTH MANNED AIRCRAFT AND DRONES FOR SURVEYING CAN IMPROVE PRODUCTIVITY.

The history of the rivalry between iconic car manufacturers Holden and Ford goes back more than 100 years in Australia.

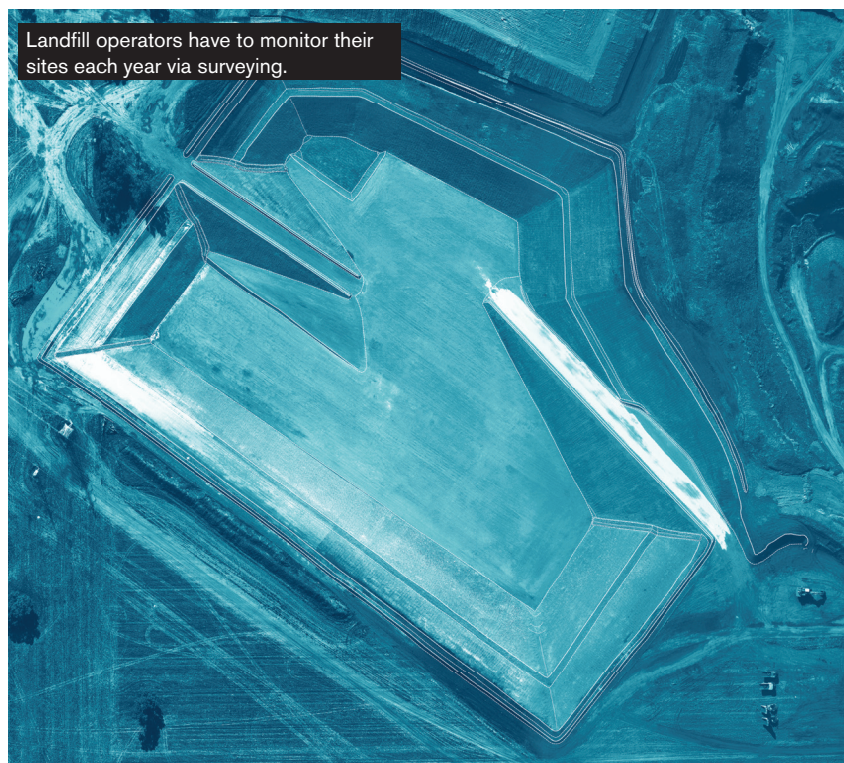
Ford launched to the Australian market in 1904. However, it wasn't until Tarrant Motor & Engineering Co signed up as the first Australian agents of the Model T in 1909 that sales in Australia really started to take off, according to Museums Victoria Collections. Holden escalated its presence from 1924, when it became the exclusive supplier of American car manufacturer General Motors.

Decades later, the rivalry is ever-present on Australian race tracks as fans boast their associations through colourful merchandise. The culturally recognised rivalry has led to the popular belief that fans will align themselves with only one of the two leading brands.

Unfortunately, the choice between drone and manned aircraft surveys has become polarising in the same way, according to Ray Cox, a director at the surveying company Landair Surveys. Landair Surveys believes that utilising either drone or manned aircraft surveys should be based on the survey task, not a blanket choice of one over the other.

“At a recent waste expo, I was surprised to learn that many coming to our booth had the belief that it was a case of only choosing either drone or manned aircraft surveys,” Ray says.

By not being restricted to one type of



aerial service, the company argues that landfill operators can choose the best option that fits the task, and improve productivity as a result.

Each year, landfill operators have to monitor their sites for environmentally responsible waste volumes and compaction, landfill cells and other valuable data. Ray believes drones now play a significant role in landfill surveying, with landfills previously relying solely upon manned aircrafts for aerial flyovers. However, it does pay to know the similarities and the differences between the two aerial platforms.

“Landair Surveys believes it should be a case of choosing the best aerial technology for each task based on a combination of factors including survey requirements, budget, timeframe, accuracy desired, site access, safety, and legislative requirements,” Ray says.

He adds that a failure to investigate technology fit-for-purpose has led to some landfill operators using potentially illegal methods of aerial surveying.

“I recently had a conversation with one of our key landfill clients.

“The client mentioned that a tradesman working on his site offered to undertake the next annual airspace flyover using drone technology for a fraction of the price of the usual manned aircraft flyover,” Ray says.

“As a hobbyist, he had undertaken some basic research on how drones can be used on landfill sites and offered to use his hobby drone equipped with an approximate positioning system and GoPro camera to map the site.”

Ray notes that if he did undertake the survey he could have been guilty of breaking laws set by the Federal Government’s independent statutory authority, the Civil Aviation Safety Authority, including flying within an airport approach path.

“There are strict rules relating to flying drones for commercial gain and care needs to be taken”, Ray says.

Ray says the client would have also disregarded the EPA guidelines for landfill surveying, as well as best-practice surveying principles ensuring accuracy.

In Victoria, for example, the Environmental Protection Authority states in Publication 1323.3 that landfill operators must conduct an independent annual survey using a licenced surveyor. These must be submitted to the EPA at the end of each financial year along with a performance statement. This data is then used to determine royalties/levies due, so it pays to get it right.

DATA DELIVERABLES

Ray emphasises that the data deliverables for both drone and manned aircraft surveys are the same.

He notes

manned aircraft survey cameras have evolved to match the outputs offered by modern drone technology. Landair Surveys uses both platforms to provide clients orthophotographs, digital terrain models, point clouds, contours and extracted stringlines.

“As the data deliverables are like for

like, it comes down to a combination of accuracy required and budget available in determining whether the drone or manned aircraft service works best,” he says.

ACCURACY

Ray says the overall accuracy of a data set can be difficult to ascertain, as it’s often not discernible looking at both platform’s data sets at a surface level. It’s only as you investigate positional accuracy within each data set that comparisons can be made. Essentially, data accuracy for aerial surveying focuses on three key principles: camera accuracy, flight stability and the number and quality of Ground Control Points (GCPs).

With regards to camera accuracy, manned aircraft cameras are advantageous, Ray says. These cameras have all known distortions calibrated and removed from the data set. Drone cameras are not calibrated and all camera errors are dispersed throughout the data.

Flight stability is also an advantage when it comes to manned aircrafts. The aircraft’s movement is compensated through the use of a high-end gyroscope.

“A few multi-rotor drones are equipped with low-end gyroscopes, but most drones have no way of stabilising images in even basic windy conditions. As such, drone image errors are again distributed throughout the data set,” Ray says.

GCPs are essential to achieve the survey accuracy required by most landfill survey tasks and to generate data without them is extremely unwise.

“More GCPs mean better accuracy, even with the most accurate drones. Generally, manned aircraft surveys with their larger format imagery use less GCPs, than what would be required for a drone survey of the equivalent area.”

Ray also emphasises that image resolution and number of pixels do not

indicate data accuracy, another common myth surfacing in the industry.

“A common mistake is to use Ground Sampling Distance (GSD) as a measure of accuracy. GSD is simply the distance between two consecutive pixel centres measured on the ground. A 2cm GSD doesn’t mean accuracy to 2cm,” he explains.

“The only way to confirm accuracy is to check points derived from the data set against independently surveyed points that have not been previously used as control points in processing the data.”

COST

Ray says in his experience, cost is the other key determinant in landfill operators choosing an aerial service. He says the benefit of using drones is their quick mobilisation available, as well as the ability to target specific areas within a site.

This generally leads to a lower up-front cost base per survey, Ray notes, compared to manned aircraft surveys that have a higher initial mobilisation cost to get up in the air.

However, there can be significant hidden costs associated with drone surveys, so it pays to check.

“By having both aerial platforms available, you can tailor the technology to your task,” Ray says.

Some of Landair’s clients prefer the accuracy of manned aircraft cameras and will fly all their sites on the same day, spreading one mobilisation cost across all sites. Other clients use drones for individual landfill cell mapping and manned aircraft for whole-of-site mapping.

“Generally, if accuracy is a secondary issue, it is more economical to use drones for small area mapping of less than 30 hectares and manned aircrafts for large area mapping.

“The key is finding the balance between accuracy and cost and selecting the right aerial service accordingly.” ■