



# Winging it

## unmanned aerial vehicles take land surveying to new levels

**Paudie Barry, managing director, Baseline Surveys Ltd, explains how military drones have been adapted to civilian use and can now offer unprecedented efficiencies in land surveying**

.....

Unmanned aerial vehicles (UAVs), otherwise known as drones, have been put to extensive use for military purposes over the last 10 years. Today, this technology has been adapted for civilian use. Drones can now be used for aerial mapping and there are a multitude of mapping and inspection drones, under 20kgs, on the market. However, they basically can be classified in two categories: fixed wing and rotary wing. A fixed wing drone needs a large area for take off and landing, but is far more efficient at flying so it can survey far greater areas and is much more suitable for surveying areas of over three acres. The rotary wing, or multicopter drone needs a minimum of 3m<sup>2</sup> for a safe take-off and landing and is far more suitable for working in confined or urban areas. Highly effective in surveying intricately detailed sites of up to 10 acres, it can also carry out aerial structural inspections and low altitude oblique photography (as the operator can control the camera's field of view).

**Data accuracy and applications**  
Both types of drones are capable of

producing very accurate planimetric and height data throughout a five-acre site. The orthophotography produced can be georeferenced to ITM or ING75, with a pixel size of only 1.5cm. This means that drone aerial photogrammetry is as accurate as land surveying, but the data, because it is photographic, is far richer, more complete and much cheaper to produce than traditional aerial or ground surveying. Drone aerial photogrammetry is extremely useful for land registration, boundary issues, topographical surveying, road/roof/structural condition surveys, volumetric analysis, planning enforcement issues, corridor mapping, coastal erosion mapping, construction spatial management, environmental monitoring, search and rescue etc. And that's only with a pocket grade camera. The list of capabilities expands dramatically when you add an infra-red or near infra-red sensor. With thermal imaging cameras, drones can detect and pinpoint heat loss through roofs, vegetative diseases and malnutrition in trees and crops, pollution plumes in rivers and streams, structural defects in bridges and assist in search and rescue missions – all at a fraction of the existing price for such services. If you have a possible application for this technology, further information can be found on <http://uav.ie/lecture.html>, where you'll find a video of an Engineers Ireland CPD lecture delivered in January 2013 on this topic.

### Baseline's UAV service

As an ESRI silver partner, Baseline Surveys Ltd currently offers a drone aerial photogrammetry GIS data capture service and claims to produce the world's most accurate aerial photogrammetry with a maximum RMSE of only 5cm over a 5-acre study area.

.....

**Paudie Barry is a committee member of Unmanned Vehicle Systems International. Paudie has a degree in civil engineering from CIT, a higher diploma in Geographic Information Systems and is the managing director of Baseline Surveys Ltd, a leading company in digital mapping since 1990. Paudie has specific expertise in Property Registration Authority Ireland's Geographic Information System. He currently provides mapping consultancy services to the Dept of Agriculture, Food and the Marine and is a guest seminar speaker on the masters course for remote sensing in UCC's geography department.**