

Case Study

Customer:
Quantum Survey Management

Project:
Factory roof survey

Solution:
senseFly albris rotary drone



3D modelling with rotary drone technology

Quantum Survey Management talk us through how they've been using senseFly's albris to add value to their business by generating high accuracy 3D aerial imagery for integration with laser scan data.

The demand for more sophisticated deliverables, often in the form of 3D models, is on the increase and whilst many survey practices have successfully met this need with the adoption of 3D laser scanning, businesses can further differentiate themselves by 'adding value' to their offering through data integration.

However, whilst laser scanning is a useful methodology for capturing data from the ground, it is less relevant for jobs such as roof top inspections (which would require users to work at height and/or hire in mobile access platforms) above bridges (restricted field of view) and for inspection work (lack of detail in inaccessible areas).

The challenge therefore is for surveyors to deliver a comparable level of accuracy in these less accessible areas without compromising either their efficiency or their capacity to provide clients with value for money. One solution is to integrate 3D laser scans with aerial imagery collected by a rotary rather than fixed wing drone.

Rotary drones are extremely effective at capturing high-resolution mm per pixel aerial imagery (as opposed to a fixed wing's cm per pixel) and are also highly manoeuvrable thanks to the combined thrust of the rotors and are therefore especially suitable for small area mapping and inspection projects as opposed to the agricultural, environmental and mining type larger scale projects more suitable for fixed wing drones.

The trend for rotary drones in the UK is showing a slow but steady increase, something reinforced by recent KOREC sales of senseFly's albris, an intelligent mapping and inspection drone, for use in applications such as building inspections and condition surveys. One of these customers is Quantum Survey Management (QSM), a multidisciplinary building consultancy offering a range of building surveying, project management, design and aerial surveying services nationwide.

A large proportion of QSM's work is within the insurance sector dealing with major loss claims such as fire, flood, storm and explosion, many of which entail surveys of complex and dangerous buildings. Under the guidance of founder and technical operations director John Cusack, the company's drone capability has recently been expanded to include a KOREC supplied senseFly albris. The purpose of this acquisition was threefold - to provide both a safe and efficient way to carry out building inspections for diagnostic

"We required the ability to capture high-res imagery, thermal imagery and video - the albris delivers."

John Cusack,
QSM

purposes, to carry out rapid capture of data on complex or dangerous sites and to reduce survey times to hours and days as opposed to days and weeks. Captured data would then be used for measurement, analysis and 3D modelling through packages such as Revit, Trimble SketchUp and user friendly web browser applications.

After extensive research, John Cusack selected the albris primarily for its ability to switch between capturing video, still and thermal imagery during the same flight, all without the need to land to change cameras. Additionally, the advanced situational awareness of the albris, delivered through proximity sensors, allows for it to be operated close to structures and surfaces in order to achieve sub-millimetre image resolutions without the movement issues sometimes caused by zooming from afar. The sensor head of the senseFly albris also particularly lends itself to inspection work because it allows the



▲ senseFly albris



▲ Safe take-off from a restricted area

camera to be rotated through 180 degrees – not only can surveyors fly over and look down on areas of interest such as a roof, but also fly under structures such as bridges and look up. These features are especially relevant for QSM's insurance work with dangerous buildings.

Roof survey integrating albris UAV data with scan data

QSM was recently approached by a client tasked by a third party to produce a 3D laser scan, internal and external, of a factory in the north of England. On completion, this laser scan would be used to provide 3D drawings for redevelopment work. However, with no safe access to the top of the building, the client contacted QSM to undertake a drone survey of the roof with a view to using the captured aerial imagery to produce a .LAS point cloud to 10mm GSD (ground sampling distance) tied to their existing survey grid. The two data sets would then be combined into an overall 3D point cloud model.

Mission Planning

Mission planning for the project was undertaken pre site with senseFly's eMotion software which offers live streaming video feedback, full control of what imagery the albris captures, access to sensor and flight data and full flight planning functionality. This included a target GSD of 8mm comprising a high level flight at 50m, a low level flight at 30m and a POI (point of interest) flight to capture building elevations to enable cross checking with existing scan data.

Once on site, a network of seven ground control points was established and these control points tied into their existing survey network. The mission was flown autonomously throughout, producing a total of 300 pictures.

Overcoming typical site challenges

The site and conditions presented a number of challenges:

Proximity of neighbouring properties – regulations dictate a minimum of 50m separation distance from neighbouring properties and in this incidence, the site was bordered by residential properties. The main 38MP camera of the albris enabled QSM to fly high enough at the boundaries of the site to maintain separation and yet still capture the level of detail required.

Windy weather – the original mission planning had anticipated 3 flights, however rotary drones are more susceptible to wind resistance than fixed wing drones and on the day of the flight, the breeze was stronger than forecast. Therefore battery endurance (up to 22 minutes) was slightly reduced and a fourth flight required. However, this presented few problems in the field because the battery was easily swapped and the eMotion flight planning software allowed for the mission to be resumed post battery change.

Restricted take off area – the site was a busy working factory and the intended take-off area had become a construction site for a car park extension and therefore a revised take-off location was required. Thanks to the small take-off and landing area of the albris, all that was required was for a small area in a delivery yard to be cordoned off and through careful management of on-site staff, the mission was completed safely.



Processing and deliverables

Processing was undertaken using Pix4Dmapper Pro following initial data management within eMotion flight planning and control software. QSM's client provided the 3D GCP (ground control point)

data post visit and this allowed the model to be calibrated to their local survey grid referenced to OSBG36.

The primary deliverable was a .LAS point cloud file which was then integrated into their existing laser scan data of the elevations and internal areas to produce a full 3D cloud of the site. The final output to the end client was a full set of 3D drawings of the site. Whilst the point cloud data was the primary output required, QSM's ability to produce a high resolution orthomosaic of the site from the original dataset was an added bonus.

John Cusack reports that the job was delivered on time and to the specification required and that he was able to do this without the need to hire in expensive mobile access platforms which would have compromised the running of the site. He concludes, "KOREC has been most helpful with both our acquisition of the technology, ongoing training and support and with regular visits to our offices to review progress and ensure we have all the assistance we require. We have several larger scale projects in the pipeline that will provide further validation of the albris as a tool for the rapid and safe capture of building and infrastructure data."

FIXED-WING OR ROTARY?		
		
Projects	Mapping	Small area mapping & inspection
Applications	Land surveying (rural), agriculture, GIS, mining, environmental mgt, construction, humanitarian	Inspection, real estate, surveying (urban), construction, emergency response, law enforcement
Cruising speed	High	Low
Coverage	Large	Small
Ground resolution	cm/inch per pixel	mm per pixel
Take-off/landing area	Large	Very small
Flight times & wind resistance	High	Low

More: waypoint.sensefly.com/buy-fixed-wing-drone-or-rotary

Contact us:

Please do get in touch for further information on any of the products or services mentioned in this case study, a demonstration, support or just a chat about your requirements.

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