



Case Study 3: Drone Roof Survey for GCA Consulting and AG Group

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1. Introduction

This case study outlines a drone roof survey carried out for GCA Consulting, a structural engineering firm, working on behalf of AG Group, a developer and construction company. The project involved a property in a poor and potentially dangerous condition, surrounded by a road and a police station, limiting the use of traditional access methods like mobile elevating work platforms (MEWPs). The use of drone technology proved to be the ideal solution for this challenging environment, providing a safe, efficient, and comprehensive roof survey.



2. Project Background

The property was part of a redevelopment project managed by AG Group, and GCA Consulting was tasked with assessing the structural integrity of the buildings and the roof. Due to the deteriorated state of the property, it was unsafe for personnel to enter the building or access the roof using conventional methods.

Additionally, the location of the building, surrounded by a public road and adjacent to a police station, presented logistical challenges that ruled out the use of traditional equipment like scaffolding or MEWPs. The safety concerns, combined with the need for a detailed inspection, made a drone survey the most practical and efficient option.

3. Objectives

The main objectives of the drone roof survey were as follows:

- **Safe Access:** Carry out a detailed inspection of the roof without risking the safety of surveyors or damaging the building.



- **Detailed Survey:** Capture high-resolution images and 4K video footage of the roof, chimneys, and surrounding structure to assess the extent of damage and identify areas requiring repair.
- **Comprehensive Analysis:** Provide GCA Consulting with the data needed to make informed recommendations regarding the structural integrity of the roof.
- **Cost Efficiency:** Avoid the need for costly and time-consuming traditional access methods, while still delivering high-quality results.
- **Real-Time Monitoring:** Allow real-time monitoring of the survey, enabling adjustments to be made as needed during the process.



4. Challenges

The project presented several challenges:

- **Unsafe Building Conditions:** The building's poor condition made it too dangerous to access via conventional means. Roof access using ladders or scaffolding was not an option due to the risk of collapse or further damage to the structure.
- **Restricted Location:** The property was surrounded by a public road and a police station, which limited the use of MEWPs or cranes. Any equipment that might obstruct the road or interfere with the police station's operations was ruled out.
- **Weather and Environmental Factors:** As with any drone survey, the operation was subject to weather conditions. Wind, rain, and other environmental factors could affect the quality of the data collected, making it essential to plan the survey for a day with optimal weather.

5. Solution: Drone Roof Survey

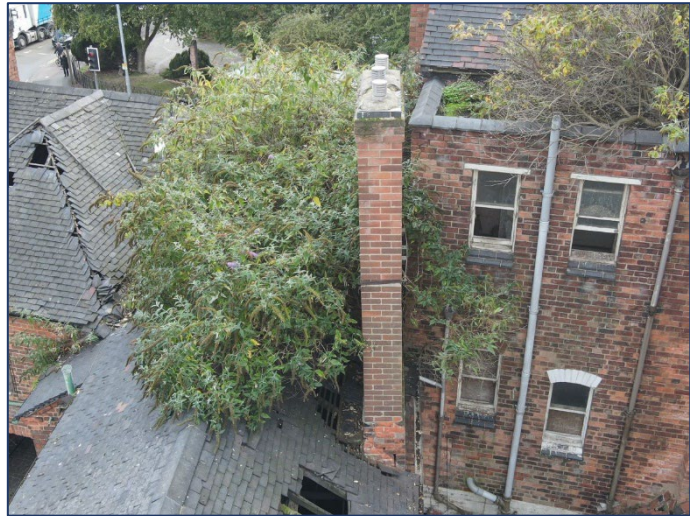
Given the challenges, a drone roof survey was selected as the ideal solution. The drone was equipped with a high-resolution camera and thermal imaging technology, allowing for a comprehensive visual analysis of the roof.

The drone was operated by a licensed and experienced drone operator, ensuring both safety and precision during the survey.



Key Features of the Drone Roof Survey:

- **High-Resolution Imaging:** The drone captured high-quality images and 4K video footage, allowing GCA Consulting to closely examine the condition of the roof and surrounding structures.
- **Real-Time Data Monitoring:** The drone transmitted live footage to the survey team on the ground, allowing for real-time adjustments to be made during the survey.
- **Non-Invasive Inspection:** The drone survey was completely non-invasive, ensuring that no additional damage was caused to the already fragile structure.



6. Execution

The drone roof survey was executed over the course of one day, with the following steps involved:

1. **Pre-Survey Planning:** The team conducted a site visit to assess the surrounding area and identify any potential obstacles, such as overhead power lines or nearby buildings. A flight plan was developed to ensure that the drone could access all areas of the roof without endangering nearby structures or road users.
2. **Survey Execution:** The drone was deployed to capture high-resolution images and video footage of the roof. Multiple passes were made to ensure that every angle of the roof, including hard-to-reach areas around chimneys and ridges, was covered.
3. **Data Analysis:** Once the survey was complete, the data was analysed by both the drone operator and GCA Consulting's structural engineers. The high-resolution images and thermal data provided a clear picture of the roof's condition, highlighting areas where repairs were needed.
4. **Reporting:** A detailed report was prepared for AG Group, outlining the findings of the survey and providing recommendations for necessary repairs. This report included both visual and thermal images, along with a summary of the key issues identified during the survey.

7. Results



The drone roof survey provided the following key results:

- **Comprehensive Roof Inspection:** The survey successfully captured high-resolution images and video footage of the entire roof, including areas that would have been difficult or impossible to access using traditional methods.
- **Identification of Key Issues:** The drone identified several issues with the roof, including cracked tiles, displaced roofing materials, and areas where water ingress had caused structural damage. The thermal imaging data revealed significant heat loss in certain sections of the roof, indicating potential insulation issues.
- **Informed Decision-Making:** The detailed report provided AG Group and GCA Consulting with the information they needed to make informed decisions regarding repairs. The data helped prioritize the areas of the roof that required immediate attention, ensuring that repairs could be carried out efficiently and cost-effectively.
- **Cost and Time Savings:** The drone survey was completed in a fraction of the time it would have taken using traditional methods, saving both time and money. The use of a drone also eliminated the need for scaffolding or MEWPs, further reducing costs.



8. Benefits of Using Drone Technology for Roof Surveys

This case study highlights several key benefits of using drone technology for roof surveys, particularly in challenging environments:

- **Safety:** The drone survey allowed for a comprehensive roof inspection without the need for personnel to access the roof physically, reducing the risk of accidents or injuries.
- **Cost-Effectiveness:** By eliminating the need for scaffolding or MEWPs, the drone survey was far more cost-effective than traditional methods. Additionally, the detailed data collected by the drone allowed for targeted repairs, further reducing costs.
- **High-Quality Data:** The high-resolution images and thermal data provided by the drone gave GCA Consulting and AG Group a clear and detailed understanding of the roof's condition. This level of detail would have been difficult to achieve using traditional inspection methods.
- **Efficiency:** The drone survey was completed quickly, minimizing disruption to the surrounding area and allowing for faster decision-making.



- **Adaptability:** The drone's ability to access hard-to-reach areas made it ideal for inspecting complex roof structures, such as those with chimneys or ridges.



9. Conclusion

The drone roof survey conducted for GCA Consulting and AG Group demonstrated the significant advantages of using drone technology for roof inspections, particularly in challenging environments where traditional methods may be unsafe or impractical. The survey provided high-quality data that enabled informed decision-making, while also offering significant cost and time savings. As drone technology continues to advance, it is likely to play an increasingly important role in the construction and property maintenance industries, providing a safer, more efficient, and more cost-effective solution for roof inspections.

10. Review and feedback

As a structural engineer, I was highly impressed by the precision and efficiency of the drone roof survey conducted by Ricky. The high-resolution images and 4K video provided critical insights into the roof's condition without needing physical access, which was crucial for this deteriorated structure. The itemised PDF report was very detailed and most importantly the survey saved time and costs while offering accurate, actionable data that allowed me to make informed recommendations. I would highly recommend this method for complex roof inspections.

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