



## Project Summary

### Organization

Skand Pty. Ltd.

### Solution

Reality Modeling

### Location

Victoria, Australia

### Project Objectives

- To provide integrated drone imagery into an asset lifecycle platform for unbiased analysis.
- To deliver a superior quality model and defect mapping for better asset maintenance.

### Products Used

ContextCapture

## Fast Facts

- Skand was tasked with conducting an urban capture of RMIT's Brunswick campus.
- Skand used its web application, supported by ContextCapture, to integrate drone imagery and analysis into an ISO-certified asset lifecycle program.
- ContextCapture allowed Skand to project thermal defects, such as thermal signatures and water leaks, onto a high-resolution 3D model.

## ROI

- ContextCapture allowed building envelope inspection to occur nearly four times faster than with previously used photogrammetry engines.
- Skand delivered an inspection report and 3D campus model within seven days at AUD 80,000, significantly less than the AUD 150,000 budget.
- Skand expects the AI analysis time to be reduced to 72 hours from data acquisition to report.

# Skand Delivers Integrated 3D Model and Asset Lifecycle Program for a University Campus

ContextCapture Sped-up the Project Four Times Faster, Saving AUD 70,000

## Integrating Drone Data and Analysis into Asset Lifecycle Program

Skand Pty. Ltd., a Melbourne-based start-up, was tasked with conducting an urban capture of the Royal Melbourne Institute of Technology's (RMIT) Brunswick campus. The Australian public research university wanted to integrate drone data capturing and analysis into its award-winning 40-year asset lifecycle program, which is ISO certified. The university's portfolio includes 74.4 hectares of land and many historical buildings. Managing these physical assets is a core business activity and integral to extending their life. To better manage the assets, RMIT wanted to create a digital version of its Brunswick campus, updating the previously 2D orthophoto representation. The AUD 150,000 project area covers 6.5 hectares and six buildings of various sizes and building material types, which would all be incorporated into the RMIT asset lifecycle program.

Founded in 2018 with less than 10 employees, Skand specializes in building envelope solutions for its clients. The project team wanted to provide RMIT with a platform to integrate drone imagery into their asset lifecycle program, as well as to deliver a superior quality of model and defect mapping for better asset maintenance planning. Skand needed to conduct an unbiased analysis of the site that included layers of categorization and integrated with an ISO-compliant asset management system.

## Overcoming Location and Access Challenges

The main challenge on this project was site access. Australia has many regulations on having drones in the air among people and infrastructure, which only allowed for a short window of time that Skand could use the drones at the university. Additionally, many of the buildings were near roads, and the drones could not pass over a road. As a result, Skand needed to develop a different method of capturing data.

Other challenges came from the people who needed to access the platform. The platform had to be homogenous so that everyone accessing the data was viewing the same information, regardless of their location. It also needed to

allow for easy collaboration between users, allowing people to work together to add extra layers of information to the models. Finally, the project team members have varying levels of experience; some team members are recent high school graduates while others have years of experience working on these kinds of projects. The centralized cloud-based viewing platform needed to be intuitive and easy enough to navigate for people of all experience levels.

## Creating 3D Images from 2D Data

Skand used a Phantom 4 Pro drone to capture imagery of the project site, conducting three passes with the drone. Each pass would be closer to the asset until it was as low as legally possible. Skand then used its web application, supported by ContextCapture, to integrate the drone imagery and analysis into the ISO-certified asset lifecycle program. This web application is specifically designed for asset owners and asset managers, meeting and exceeding RMIT's building envelope inspection project brief. Skand chose Bentley as the support for this platform because of its technical knowledge, active support team, and scalability of working with cloud services.



Skand projects AI-identified defects onto the ContextCapture reality mesh including forms of corrosion and building material degradation.

*“Skand & Bentley partnership enables productivity & efficiency in the asset management workflow. Using Skand’s cutting edge machine learning technology & adopting a proactive approach will reduce OPEX compared to traditional inspection methods.”*

*– Yossi Kahlon,  
CEO, Skand*

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ContextCapture allowed the Skand solution to take in aerial- and land-based 2D images and turn them into meaningful data sets mapped in a 3D reality mesh. This mesh is then published online, detailing condition and priority for any required action or intervention. Each asset receives a risk category number of one through three. One means that the asset needs immediate review because it is dangerous, two means that it needs to be looked at in the next few months, and three means that it is a risk. Users can now make informed decisions about maintenance plans inside an intuitive, user-friendly platform.

**Detecting Asset Defects for Better Maintenance**

ContextCapture also allowed Skand to use thermal imagery to detect thermal signatures of mechanical-electrical assets as well as water leaks in roof insulation methods. The machine learning layer ran analysis over the drone-captured images to determine whether the image set is of sufficient quality to be processed. Once it is deemed a good quality, ContextCapture rapidly processed the images to stitch the 2D images together into a 3D surface.

Using artificial intelligence (AI), Skand can identify and categorize defects when analyzing the 2D images and then project these defects onto the 3D reality mesh. ContextCapture helped the project team create 16 categories of defects on both the roofs and facades, including cracks, moss, algae, rust, and other forms of corrosion and building material degradation. Skand’s web application displays the ContextCapture 3D reality mesh with the detected defects mapped out, creating an inspection and condition report powered by Power BI.

The conventional process of building asset inspection, condition, and maintenance reports for building envelopes would have previously taken several weeks to months to organize, execute, and complete. This former process required contracting costly specialists to complete manual rope inspections. It also entailed scaffolding, costing hundreds of thousands of dollars while putting people at risk. By combining ContextCapture with Power BI reporting into one location, Skand created a cost-effective integration of drone imagery and analysis into RMIT’s asset lifecycle program. ContextCapture

accurately mapped out defects, offering dramatic reductions in maintenance activities, overheads, and costs.

**Saving Time and Cost for Current and Future Projects**

By using drones and ContextCapture for this project, Skand realized significant time and cost savings. Spreading over 6.5 hectares, the Brunswick campus’ building envelope inspection would normally have taken at least a month. However, this project’s drone imagery capture took three and a half days and the processing time for the model only took two days, allowing the project to occur nearly four times quicker than with the photogrammetry engine previously used on similar projects. Skand delivered an inspection report with a 3D campus model into the web platform within seven days at a cost of AUD 80,000, which was AUD 70,000 less than the estimated budget.

This time savings will continue after this initial project. Skand expects the AI analysis time to be reduced to 72 hours from data acquisition to report by recycling images that failed initial processing with another round of supervised machine learning and testing the solution algorithms. This platform offers RMIT potential savings of millions of Australian dollars on future inspections and asset maintenance while also helping extend the life of its buildings and assets.

**Developing a Successful Method**

Moving forward, RMIT plans to use this method of gathering and analyzing data for its other assets. RMIT can increase the return on its investments on the 131 buildings across its three campuses and property portfolio. The cost savings can be put toward the campus’ education, society, and environment.

Skand will also continue to use this method for its future projects. The most important reason is because of safety, as roof and façade inspections no longer require colleagues to leave the ground. This method is also faster because works can be automatically carried out on computers, and it is 60% cheaper than traditional inspection methods. The analysis is consistent across regions, making it more accurate. ContextCapture’s quality of outputs and accuracy of mapping defects was far greater when compared to previous outputs modeled in different photogrammetry engines.