



NEWSLETTER



GEOTECHNICAL
CONSULTANTS INC.

Advanced Drone Imaging Enhances Risk Management for Building Owners, Contractors and Architects

July 2023

Nothing replaces skilled engineers and experienced technicians, but advanced drone imagery can improve the data that informs their work.

The technological advances of GCI's newest drone captures advanced resolution and detail that helps make human work safer, more efficient and more accurate. Combined with the ability to image or reach areas not previously accessible, the result is a sizeable leap forward in terms of the info available for risk management and decision making.

Here are four examples of common building construction and maintenance practices where drone imaging keeps workers safer while delivering faster results with greater detail—plus some fun facts about our Skydio X2 drone.

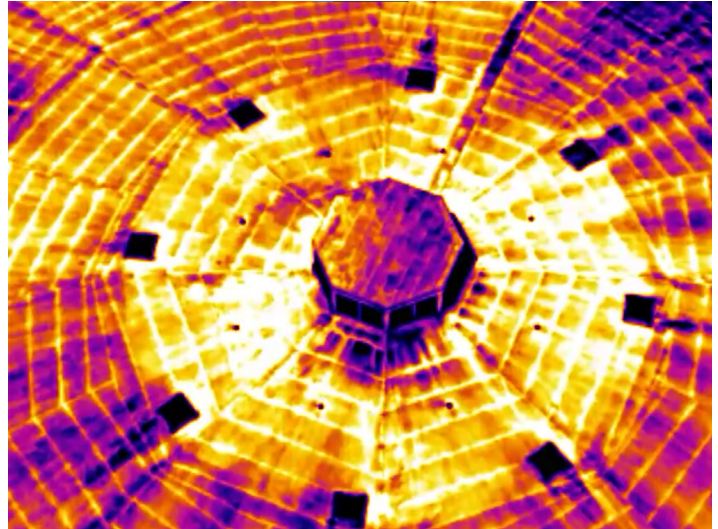
1 Thermal imaging detects loss of heated or cooled air, adding previously unavailable insights to roof inspections.

Roof inspections are typically completed twice annually. An inspection team can easily spend two days walking a warehouse roof section by section or many days using lifts to reach pitched roofs to visually inspect the surface.

Despite that effort, even an experienced technician cannot see heat transfer that a drone can detect with thermal imaging photography in a fraction of the time.

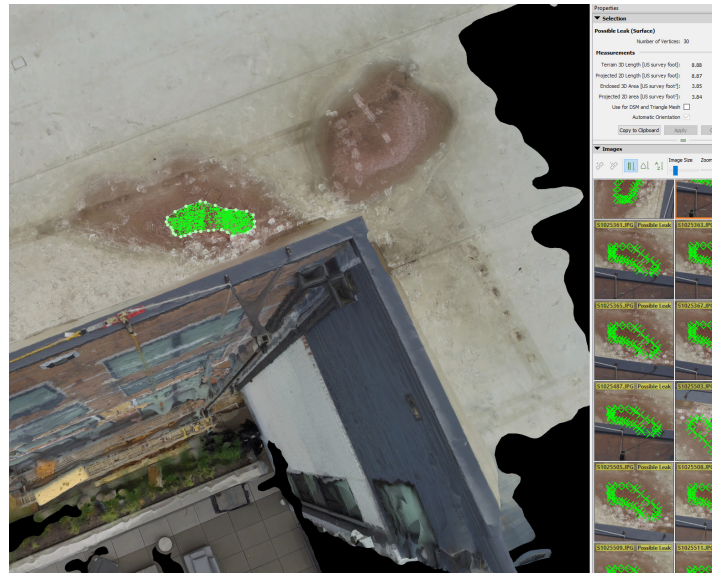
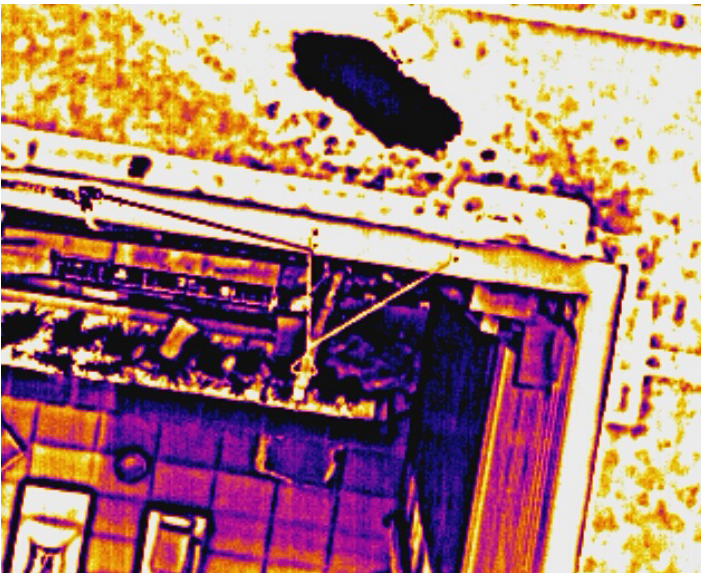


- **Heated or cooled air loss where insulation may be compromised or missing** is revealed with the use of thermal imaging cameras captured by drone.



Roof image (left) taken by drone with a digital camera and (right) taken with infrared thermal imaging camera. The white/light yellow colors indicate warmer temperatures, and the black/purple areas indicate cooler temperatures. The vents on the sides of the central structure are cooling the structure (as they are designed to do). The skylights dotted around the central structure are also cooler than the surrounding dome material.

- **Water flow and moisture retention patterns** that indicate possible water intrusion concerns can be detected or confirmed with drone imaging.



Roof image on left was taken by drone with infrared thermal imaging camera and indicates possible water intrusion. Image on right is a 3D model of the building, which allows for an estimation of the size of the damaged area.

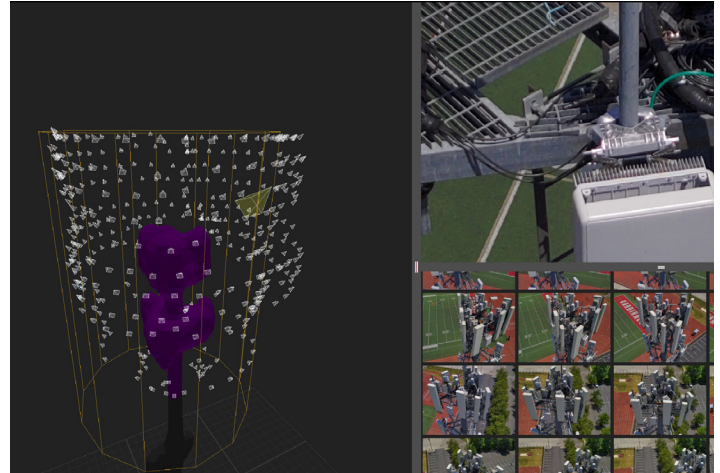
Why it matters: The bigger the roof, the higher the risk that a costly issue will be missed with only a visual inspection.



2 Creating a “digital twin” means inspections can be completed without putting technicians at risk.

The Skydio drone’s numerous cameras are AI-directed to capture imagery and software stitches it into an actual 3D digital asset—a high-resolution, interactive version of a physical structure.

This technology is especially useful for inspections of cell towers, electrical transmission towers, and even entire buildings during or after construction when conducting in-person visual inspections are perilous to the inspector or in inaccessible locations.



The 3D digital twin allows for high-resolution observation of inaccessible physical structures.

3 Drone imaging supports construction observation and BEC inspections for difficult-to-access places.



Imaging by drone to support construction observation minimizes technicians' time in precarious situations.

Once construction starts going vertical, accessibility to materials, assemblies and completed work needing observation or inspection can become challenging, time consuming and more costly.

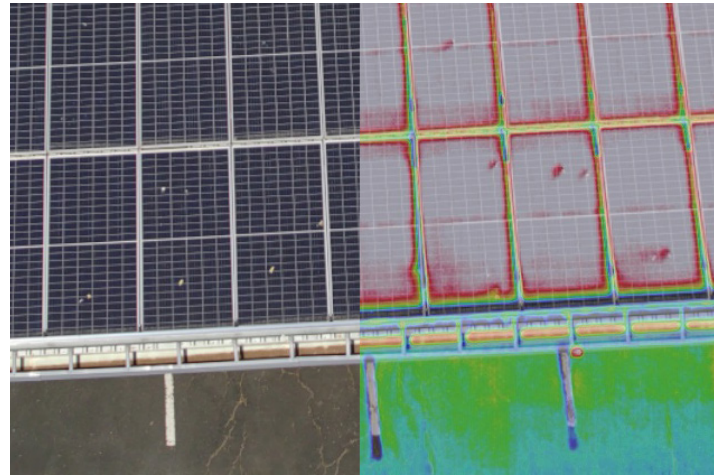
- **Imaging by drone improves jobsite safety and efficiency.** Technicians’ time in precarious jobsite situations is minimized, construction work can proceed on schedule, and high quality imagery is captured by the drone’s high resolution cameras.
- **Coverage of hard-to-access building surfaces** is provided by the autonomous Skydio X2 drone. It’s onboard sensors enable the drone to fly in GPS-denied or poor GPS areas such as around tall buildings that require repeat inspections.



4 Solar panel hot spots are easily pinpointed.

Hot spots on rooftop solar panels indicate potential problem areas and increased fire risk.

Thermal imaging via drone captures the entire solar array and individual panels in high-resolution detail, revealing troublesome hot spots which could be missed by an inspector using a handheld thermal camera.



Darker red areas on the thermal image (right, captured via drone) indicate hotter areas within the solar panel array.

Fun Features and Advantages of GCI's Newest Drone

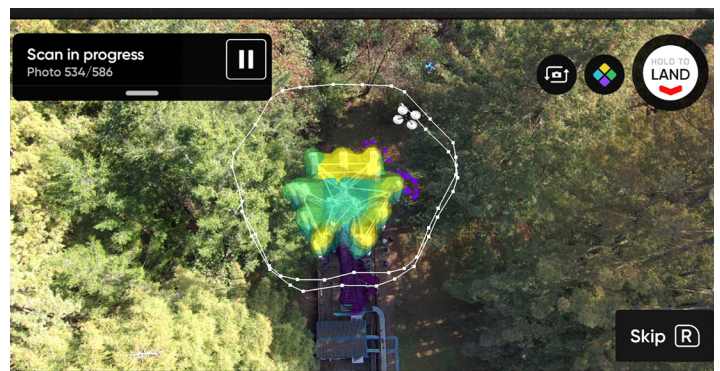


It's about the size of a shoebox.

The Skydio X2 is small but mighty! It's equipped with multiple 4K color and 320p thermal cameras, meaning the resolution and detail is approximately four times greater than earlier models.

It can fly itself.

The licensed drone pilot pinpoints the structure to image and the parameters, then the drone's AI-driven autonomous flight technology determines its route within the defined polygon.





Skydio X2 Features and Advantages (continued)

It can fly inside buildings and under structures that block GPS access.

Skydio's 360-degree obstacle avoidance technology tells the drone where it is relative to objects, so it doesn't need GPS to fly. That means it can fly inside buildings and under bridges where other drones lose navigation signals.



It can safely and legally fly at night.

Cooler nighttime temperatures often provide the temperature differential necessary to capture thermal imagery for the investigation of existing buildings, so nighttime flight is essential. Nighttime inspections are made possible with the built-in visible and infrared (IR) strobe lights that adhere to FAA regulations.

Electrical interference from natural and manmade EMF doesn't impede performance.

Unlike drones that rely on older technology, Skydio X2 can create a 3D digital twin of buildings and structures such as electrical substations, transmission towers, cell towers and other infrastructure assets despite the presence of electrical interference.



It's NDAA compliant.

The Skydio X2 is designed and assembled in America and all data is maintained and processed within the U.S. in compliance with National Defense Authorization Act (NDAA) regulations.



Developers, contractors, building owners, property managers, inspectors and design professionals all benefit from the advanced capabilities of AI-driven drone imaging.

To discuss applications for your construction project or assessment of existing structures, contact:

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