

CUSTOMER SUCCESS STORY:

Sundt Construction switches from DJI to Skydio to generate 3D models faster, better, and safer.



90%

reduction in workers
inspection time

50%

reduction in pilot training
requirements

Executive Summary

Sundt Construction is one of the largest 100% employee-owned general contractors in the US. The firm specializes in transportation, industrial, commercial building, concrete, and renewable energy work. Sundt started building out their drone operations for mapping in 2013. Since then, they've expanded their drone program to 40+ aircraft and 30 pilots, and they run over 100 mapping missions per year.

While Sundt initially began their drone mapping operations with the DJI Phantom 2.0, they have been searching for solutions to the challenges of manual drone flight, including the high crash risk and demanding pilot training requirements. Additionally, they have found 3D modeling with manual drones to be highly inefficient, and other current methods of 3D modeling, like ground-based cameras, are time-consuming and dangerous for workers.

After adopting Skydio in 2020, Sundt projects a full phase-out of DJI drones by the end of 2021. Sundt uses the Skydio 2 with the Autonomy Enterprise Foundation and 3D Scan add-on software packages. As Early Access Program participants, they have been among the first drone operators to implement Skydio 3D Scan.

Skydio's superior obstacle avoidance and ease of use means Sundt can train their pilots in half the time, while increase their confidence in flight. Skydio 3D Scan is helping make many of Sundt's operations, from BIM coordination to progress tracking, faster, safer, and more efficient. Sundt estimates that by using 3D Scan, they will be able to save over \$400 per inspection due to labor, equipment, and downtime savings, not to mention the reducing worker injury and death, which is priceless.

Challenges

Although Sundt has built a world-class team of pilots, the shortcomings of manual drones continue to present challenges that prevent their program from reaching its full potential. From legacy ground-based methods, to manual drones, to manual-drone based scripting software, the methods available to Sundt pilots today leave much to be desired.

HEADQUARTERS

Tempe, AZ

INDUSTRY

Construction, General Contractor

CHALLENGE

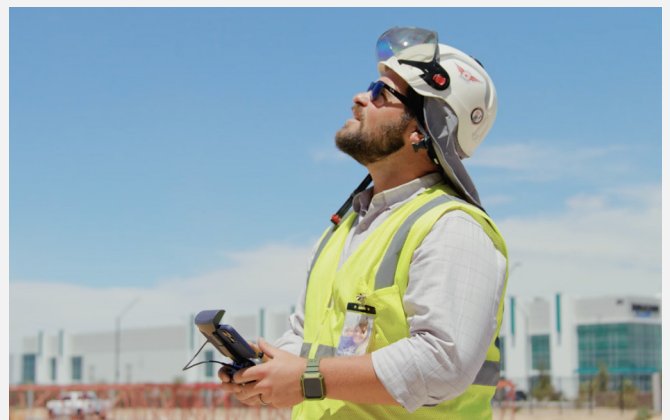
Current 3D modeling methods are inefficient and can be dangerous for workers. Additionally, manual drones have limited applications on obstacle-rich, unpredictable construction environments.

SOLUTION

Sundt plans to replace all 30+ manual drones in their fleet with Skydio 2s equipped with 3D Scan for inspection of dangerous areas, projecting a full phase-out of manual aircraft by the end of 2021

RESULTS

- Able to generate high-quality as-built assessments for the team using 3D Scan to use for high-frequency progress tracking
- Improved worker safety by using Skydio 3D Scan to create 3D models
- Reduced pilot training requirements by 50%
- Reduced time to inspect by 90%



Dean Miller, Virtual Design in Construction Engineer at Sundt, uses Skydio drones with 3D Scan to provide 3D models to project teams.

3D modeling using ground-based inspection is time-consuming, expensive, and dangerous.

For industrial clients, Sundt inspects many high-pressure, high-temperature industrial systems. For example, [this model](#) is of a crystallizer water cooling tower, which cools superheated water from over 1000 degrees Fahrenheit down to around 200 degrees. These systems need to be inspected monthly to ensure that they are fully functional and operating safely. One method that Sundt uses to inspect these systems is ground-based inspection, where field teams get up close to the superheated structure and use very expensive 3D modeling equipment. During three to four hours, the teams are exposed to hazardous conditions, since they must be within 20 feet of the structure to operate the modeling equipment. The risks to worker safety can include scalding hot steam or equipment failures. Also, for the duration of the inspection, the systems themselves must be shut down, which can result in hundreds of thousands of dollars in lost downtime costs for the client. Eliminating time spent scanning in these environments can save lives and money for project teams.

“With ground-based inspection, it takes the field team something like 2-3 weeks to work their way through the job site. With Skydios we could do that in a couple of days.”

- DEAN MILLER, VIRTUAL CONSTRUCTION ENGINEER

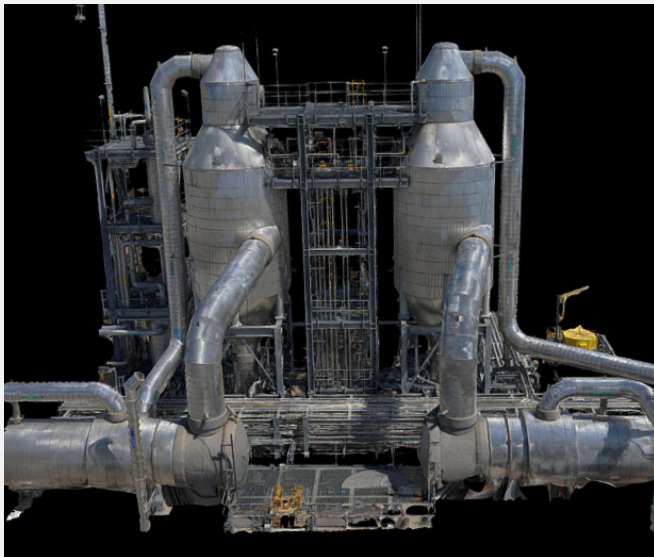
Expensive hardware requirements with high risk of drone crashes.

As an early adopter of drones on construction sites, Sundt ran into the same problem all manual drone

pilots encounter at some point. On obstacle-rich, unpredictable job sites, even expert pilots run the risk of crashing into any number of structures, from tower cranes to buildings to heavy machinery. When these crashes happen, they can damage both the job site and the drone hardware, requiring expensive repairs and downtime. On top of that, a drone crash usually requires an incident report to management or the Federal Aviation Administration (FAA) and substantial research and time spent analyzing why the crash happened, placing additional scrutiny on the company's drone program. At the end of the day, executives, job sites, and virtual construction engineers all have to spend time, money, and downtime dealing with the fallout from a drone incident.

Existing manual drone modeling methods are inefficient.

To prevent workers from having to go into dangerous areas for inspections, Sundt has tried to use manual drones to create 3D models. A small team of heavily-trained pilots would fly the drone around the structure, manually operating the joysticks and taking overlapping photos of assets to generate a 3D model. However, despite the heavy investment in pilot training, multiple challenges remained. Because manual drones cannot fly in GPS-denied or high-electromagnetic interference environments, they cannot capture indoor or overhung angles, or generate up-close scans of metallic structures, common to job sites. Manual drones are also prone to crash-proneing in environments with high reflectivity, shadows, windows, and hard-to-reach corners that could affect the quality of the final 3D model. While working hard to keep their aircraft from crashing, these pilots also needed to focus on taking photos with approximately 80% overlap, so that reconstruction software could turn them into a 3D model - without any tools to indicate in real-time which areas of the scene have already been photographed. On top of that, the pilot has to wait until the post-processing of the model is complete to confirm that the model has full coverage and the correct overlap, rather than being able to confirm this in the field. Up to 10% of the time, the model is insufficient and the pilot ends up needing to re-fly.



After only one hour of training, Virtual Design in Construction Engineer Dean Miller was able to fly his Skydio and create this highly detailed 3D model of a crystallizer water cooling tower, a high-pressure high-temperature industrial system at an upcoming semiconductor facility in Chandler, Arizona. The flight took 30 minutes and around 200 photos.

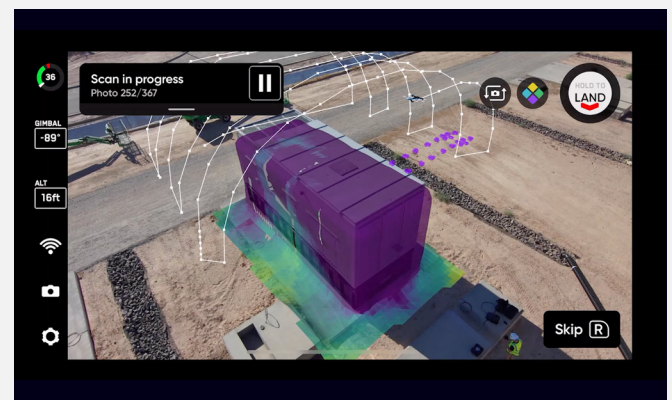
“Sundt is using 3D Scan to create incredibly detailed and highly accurate models. We are using them to replace traditional means of 3D modeling with either manual drones or ground-based inspection, which are highly user-intensive and have high failure rates”

- DEAN MILLER, VIRTUAL CONSTRUCTION ENGINEER

Solution: Artificial Intelligence & Automation

Today, Sundt Construction maximizes their operations with Skydio Autonomy, which provides 360° Obstacle Avoidance, reliable GPS-denied operations, and elevated workflow automation. As Dean Miller stated at Skydio’s recent [3D Scan Launch Event](#), Sundt plans to fully phase out its manual drones by the end of 2021.

With the Skydio 2, Sundt can fly with confidence through areas of construction sites that they would never dream of mapping with a manual drone. The ease of flying a Skydio lessens the burden on master pilots to avoid crashing, so they can focus on performing high quality inspections and reports. From BIM coordination to progress tracking, 3D Scan will make the process of capturing 3D models easier than ever before, reducing the amount of time inspectors and team members need to spend in the field. With the high-fidelity model output, Sundt will be able to deliver more accurate, higher quality models to their clients and in-house teams.



3D Scan uses groundbreaking autonomy to plan bespoke waypoints for any scene an operator needs to model.

Results:

Streamlining the entire job cycle.

3D Scan helps coordinate Building Information Management (BIM) as work is getting done among various subcontractors, perform regular as-built assessments for project managers, and provide proof of delivery at the conclusion of a project.

BIM Coordination. During the initial planning phase of a new build, there is significant coordination needed between various stakeholders and subcontractors, from plumbing and electrical to heating, ventilation, and air conditioning (HVAC) and architects. Each of these stakeholders submits 3D models that depict where they are planning to build, and Sundt puts the models together to identify conflicts in the plans. This type of Building Information Management (BIM) coordination is incredibly important in the planning process to mitigate any potential issues that could cause expensive rework. With 3D Scan, as-built models can be more accurate and generated more frequently, helping teams to stay on schedule and within budget.

Progress Tracking. Once the build gets underway, Sundt must regularly track the progress of the construction and report back to the client for billing purposes. Before, this reporting would consist of someone on foot taking cell phone photos of the site, leaving ample room for competing interpretations of the job status. With 3D Scan, the team can quickly and easily fly Skydios through the site to create high quality 3D models of the job site progress. Since construction firms charge their clients based on build progress, more accurate models can impact the bottom line..

Visual Proof of Delivery. At the end of a project during close out, Sundt can use 3D Scan to create a model of the completed job site and have visual proof of the equipment status at the time of delivery. This allows Sundt to provide a greater level of accountability than simplistic ground-based photographs are able to.

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- DEAN MILLER, VIRTUAL CONSTRUCTION ENGINEER

Improved worker safety by using Skydio drones.

The typical methods for scanning and inspecting these high-pressure, high-temperature systems require workers to climb onto the platforms of the structures, exposing them to hazardous situations. With Skydio drones, pilots can scan the structure from a safe distance with full confidence that the Skydio will avoid crashing, and get full photo coverage of the structure. By adopting Skydio drones, Sundt has protected its workforce without compromising on job quality.

“At Sundt we inspect high-pressure, high-temperature systems. When you use a drone for these inspections, you’re not reducing an injury, you’re reducing a death. A drone is around \$1,000, but a human life is priceless.”

- DEAN MILLER, VIRTUAL CONSTRUCTION ENGINEER

Reduced time to inspect by 90%.

3D Scan's autonomous workflows maximize its efficiency when scanning, meaning an inspection that would typically require 2 people and 4 hours could be completed in 30 minutes by a single inspector. The result is a 90% reduction in labor costs per inspection, allowing Sundt to perform nearly 10x as many inspections in the same amount of time. A job site that would normally take 2-3 weeks to scan with a field team on the ground can be covered in a few days by a Skydio, or even faster with a team of Skydios. Further, these inspections do not necessarily require a job site to shut down, helping projects stay on schedule and at high quality levels.

"The autonomy of 3D Scan is incredible. The fact that the drone itself is able to create that reality capture and then determine its own flight path around the object you've put in the boundary reduces an enormous amount of time. The accuracy and detail is really impressive."

- DEAN MILLER, VIRTUAL CONSTRUCTION ENGINEER

Reduced pilot training requirements by 50%.

After adopting Skydio drones into their fleet, Sundt noticed a substantial reduction in the amount of time it took to train new drone pilots. Skydio's ease of use and seamless user experience allows operators to perform jobs after half of the training required to fly manual drones safely. Beyond that, Skydio's breakthrough obstacle avoidance gives pilots the confidence they need to execute complex mapping missions on obstacle-ridden job sites without worrying about

crashing. As the Sundt fleet continues to grow and perform more frequent inspections, enabling new pilots to achieve results quickly is critical to realizing the full potential of the drone program.



Sundt uses Skydio drones to inspect areas that would otherwise require workers to climb ladders and face the risk of falling.

"We are training pilots in half the time because it takes little to no time for the pilot to learn how to operate the drone properly. The drone is so easy for you to just pick up and just start flying. Anybody of any skill level, whether you've flown any sort of drone before, you can pick up a Skydio and be in the air in 5 minutes."

- DEAN MILLER, VIRTUAL CONSTRUCTION ENGINEER



SKYDIO IS THE WORLD-LEADER IN AUTONOMOUS FLIGHT TECHNOLOGY

Skydio is the leading U.S. drone manufacturer and world leader in autonomous flight technology. Skydio leverages breakthrough AI technology to create the world's most intelligent flying machines for consumers, enterprises, defense and civilian agencies. Founded in 2014, Skydio built a world class R&D team with leading experts in AI, robotics, cameras, and electric vehicles from top companies, research labs, and universities. Headquartered in Redwood City, CA, Skydio designs, assembles, and supports its products in the U.S. to offer higher standards of supply chain and manufacturing security. Skydio is trusted by leading enterprises across a wide range of industry sectors and is backed by top investors and strategic partners including Andreessen Horowitz, IVP, Playground, Next47, Levitate Capital, NTT DOCOMO, NVIDIA.