DRONES IN CONSTRUCTION

BEST PRACTICES FROM SKYWARD & SKYCATCH

Skyward®
A Verizon company

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SKYCATCH

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From surveying and 3D modeling to structural inspections and job site monitoring, sophisticated construction companies are turning to drones to save time, improve safety, and acquire data they've never had access to before.

Currently, the construction industry holds some of the most diverse and creative use cases for drones. But launching drone ops at a major construction enterprise involves much more than simply investing in a few aircraft, sensors, and software.

Setting up a highly professional, low-risk drone operation within a construction company requires serious consideration and advance planning:

- **Which aircraft will you invest in?**
- **Will you outsource drone services, hire experts, or train existing personnel to fly safely and process data?**
- **How will you meet regulatory requirements in your jurisdiction?**
- **Is your operating process efficient? Will it scale as you grow and add more use cases?**
- **How will you maximize your investment?**
- **Do you already have the foundational elements of an aviation process (such as general operating manual & operational checklists), or will you need to create them?**

Skyward & Skycatch understand construction companies

Even though our names are similar, Skycatch and Skyward aren't affiliated, but we both make complementary software that hundreds of companies in many industries, including construction and infrastructure, use to run their operations.

Skyward's ops management platform connects all the people, projects, and equipment involved in a company's drone program into one efficient workflow. Skycatch provides software solutions that allow companies to efficiently capture, process, and analyze drone data.

Between the two of us, we have seen what works and what doesn't for construction companies using drones.

Every construction company is different and the industry is changing quickly. But, based on our own experiences as commercial UAV operators as well as helping construction companies in numerous jurisdictions, companies with successful operations have certain traits in common:

1. They understand regulatory requirements
2. They use the right drones and software for the job
3. They have insurance
4. They have efficient processes that enable them to scale as they grow
5. They put safety first
6. They plan and log flights
7. They employ or contract with pilots and provide ongoing training

1. Know the Regulations & Get the Necessary Authorizations

Your country's airspace regulations provide the essential rules for your commercial drone operation. Many countries have regulations specific to commercial drones.

Regardless of which countries you operate in, there are airspace regulations and it is every project manager's, ops director's, and pilot's responsibility to understand and follow them. This is for good reason: Every airspace rule is based on safety, which has made airspace one of the most regulated and safest spaces accessible to humans.

Just as in many other industries (banking, transportation, telecommunications), commercial drone operators in most countries need authorization from a regulator in order to do business.

Those in Canada need a Special Flight Rules Operating Certificate from Transport Canada.

In the U.S., companies don't need to apply for permission to use drones, but they do need to know and comply with Part 107, the federal regulations that govern commercial drone use (download our guide to navigating Part 107 here). One of the most important regulations spelled out by Part 107 is that anyone operating a drone must obtain an operator's certificate from the FAA.

Operating within the law is essential for any legitimate enterprise. Every airspace regulation is focused on safety, and your drone operation should be too.

It's your responsibility to know the regulations of every country you do business in and operate safely.

KEEP IN MIND :
Your province/state, county, and city may have additional regulations for UAVs.

Does your business operate in the United States?

DOWNLOAD

Navigating Part 107: What You Need to Know About Doing Business with Drones in the U.S.

Skyward was the biggest factor in getting our drone program approved. Our corporate attorneys loved the thoroughness of the software and the ability to document pilots. All of our information is on the web and contained in one database, so all of our district teams, our legal team, and the safety team can access this information whenever they need to. At Hensel Phelps, we really pride ourselves on safety. Skyward gives us a way to document everything, know that our machines are properly maintained, and have that extra layer of safety.

Richard Lopez

Virtual Design & Construction Operations Manager, Hensel Phelps

2. Choose the Right Drone for the Job

The purpose and the payload—often the combination of a camera, lens, and sensors—should determine the aircraft that you use. If you have one core use case in mind, say job site monitoring, it's worth thinking ahead and planning for all the other ways that drone data can add to a construction enterprise: flashy marketing videos, 3D models, site surveys, and inspections. That way, you'll be able to maximize your investment once your operation is ready to broaden its reach within your company.

KEEP IN MIND :
Drones aren't always the best way to get the job done. Sometimes, helicopters and planes are the most appropriate choice. In other cases, a custom drone can be manufactured to purpose.

In general:

- **Rotorcraft** carry heavier payloads and tend to be used for limited geographical areas.
- **Fixed-wing aircraft** tend to be used for projects that require higher altitude or surveying large areas.

It's important to invest in the best aircraft for the job. But for a construction enterprise, the equipment and software you'll need to access and make sense of the data captured by the drone is far more important. For example, many of our customers in the construction, industrial inspection, and surveying industries rely on applications that allow you to automate drone flights, generate high-quality maps, and create elevation maps and 3D models.

Ongoing maintenance

Every UAV requires ongoing maintenance. This includes physical maintenance such as blade replacements and routine service inspections, as well as firmware updates. Batteries also require periodic checks and firmware updates. Your operations management software should make it easy for you to schedule and manage ongoing maintenance.

Before investing in aircraft, use these criteria to evaluate your options:

- ☐ **Job-specific applications**
  - ☐ How will you be using UAVs?
  - ☐ What jobs will you be performing?
  - ☐ What data will be collected?
  - ☐ What software will you need to collect it?
- ☐ **Time and distance**
  - ☐ How far do you need your UAVs to fly and for how long?
- ☐ **Payload capacity**
  - ☐ How much weight will your UAVs need to carry?
- ☐ **Cost**
  - ☐ How much can you afford to spend on your fleet? Remember to factor in costs of hiring and training pilots.
- ☐ **Business requirements**
  - ☐ What level of ongoing support would you like a UAV manufacturer to provide?
  - ☐ Does the manufacturer use validated airspace data?
  - ☐ Do you need to automate your flights for mapping?
  - ☐ Does the ground control station integrate with your operations management systems? Or will you have to reenter flight data?

3. Protect Assets & Mitigate Risks

When it comes to drone safety, the construction industry is at an advantage: You're already hyperfocused on preventing accidents, you wouldn't dream of starting a project without insurance, and personal protective equipment is required by everyone who enters the job site. If you outsource some or all of your drone operations, make sure to partner with a service provider that has experience working on construction sites and understands typical safety protocols.

How to Create a Low-Risk Drone Workflow

Like commercial construction, aviation prioritizes safety above all else. From routine maintenance, to incident reporting, to emergency protocols, to day-to-day flights, aviation depends on checklists to reduce variables and ensure that every process is standardized.

PRO TIP:

A general operating manual and operational checklists are the foundation of every successful UAS program.

The general operating manual and checklists reduce human error in order to create safe, efficient procedures. They also provide evidence to insurers and customers that an operation is safe and trustworthy.

Checklists and manuals aren't aren't unique to Skyward, but they are something the most sophisticated operations have in common.

Elements of a corporate UAS workflow:

- **General operating manual**
  This is a company's central guide to UAV operations. It provides a glossary of every function, piece of equipment, and term; explains roles, responsibilities, and safety protocols; provides policies for pilot training and equipment maintenance; and gives step-by-step instructions to create predictable, safe, standard results time after time.

Fly Over People

Generally speaking, it's best to avoid flying over people, and in some cases it's expressly against the law. In the United States, Part 107 forbids overflying people; however, businesses can apply for a waiver that allows it if they can prove that their ops are just as safe as if they weren't flying over people at all.

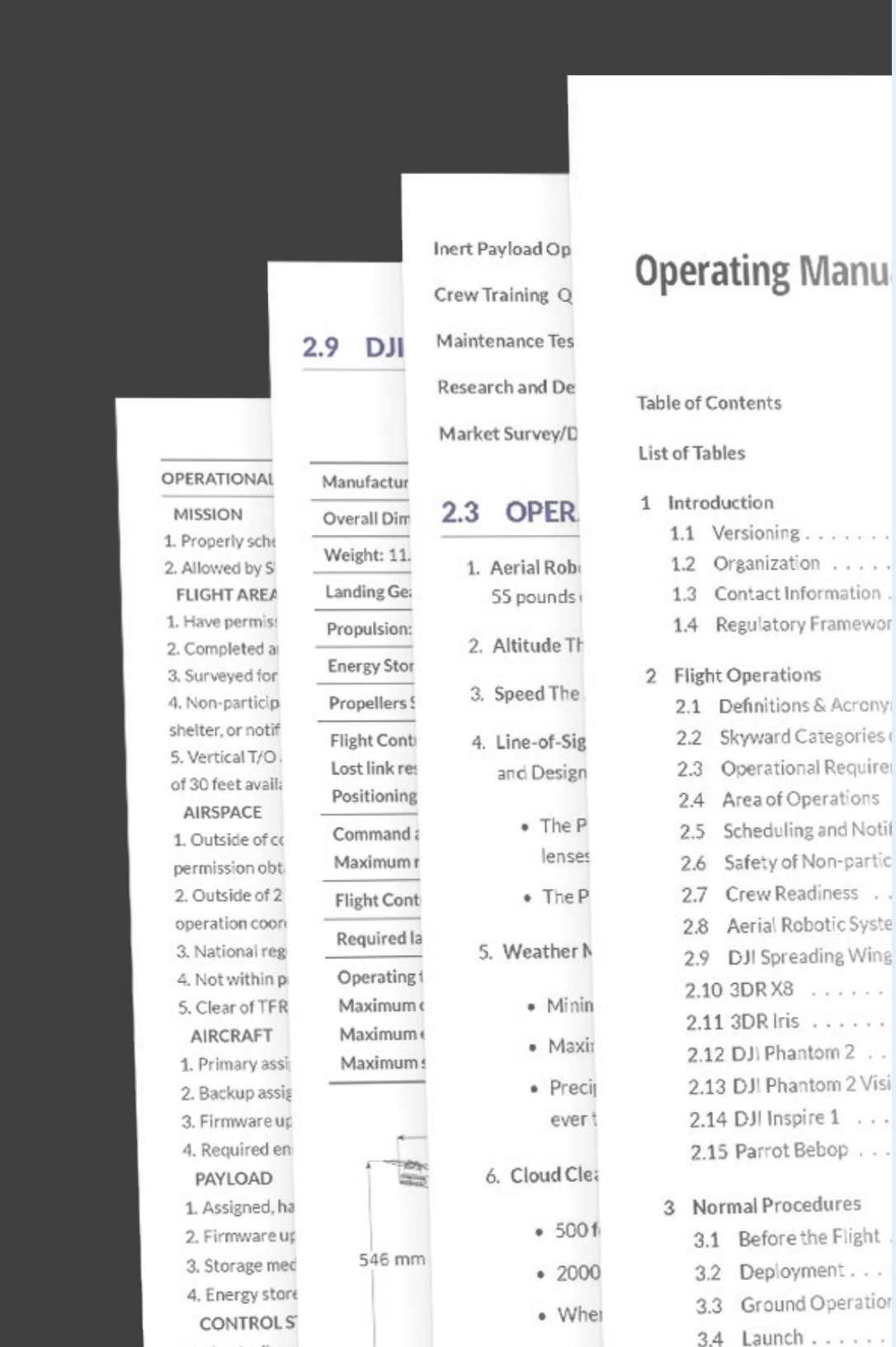
On a construction site, whether you overfly people or just near them, make sure to conduct a safety briefing for crew members who are on the job site, and block traffic so that bystanders or un-briefed personnel won't wander into the flight zone.

- **Operations checklists**
  Just as in traditional aviation, a UAS flight crew uses checklists for every step of an operation to ensure that all of the processes spelled out in the general operating manual are being carried out. Usually there are several:
  - » *Operational checklist:* used by the operations director, dispatcher, or lead pilot to schedule operations
  - » *Flight crew checklists:* used by the field crew to ensure that proper processes are carried out preflight, prior to launch, and postflight.
  - » *Equipment control checklist:* used whenever you add new equipment to your fleet or aircraft are taken into the field

- **An up-to-date drone airspace map**: The only way to ensure that flight crews and project managers know airspace regulations and where they can fly safely. An expertly validated digital airspace map, such as Skyward, shows where a pilot is clear to fly and where special permission may be needed. People without aviation experience are often surprised to learn that temporary flight restrictions can happen anywhere for a variety of different reasons.

- **A single system to organize and record it all**
  Even very small UAS operations need to keep track of aircraft maintenance, pilot assignments, and paperwork. They also need to plan operations and keep good records for billing and audits. A well-designed platform mitigates risks and protects assets, as well as enabling optimal efficiency. Skyward combines an interactive airspace map with these and other operations management features.

At Skyward, we've developed our own general operating manual and checklists for our commercial operations, based on our decades of combined experience in aviation and business operations. Since then, dozens of our customers have used these materials to create their own low-risk, standardized operations across numerous flight



Aviation Runs on Checklists

For more than a century, aviation has run on checklists, including preflight, in-flight, postflight, and emergency checklists. Checklists remove variables and lower risks by ensuring that complex processes and procedures are carried out the same way every time.

At Skyward, we've developed our own General Operating Manual and Operational Checklists in collaboration with aviators, UAV experts, regulators, and insurance providers.

Learn more about how Skyward can support your operations.

crews. This means that companies aren't starting from scratch. And if a drone evangelist is in the process of achieving buy-in from the C-suite and risk managers, presenting these materials up front is an excellent way to show that safety and compliance are top of mind. Working with compliance managers and lawyers, companies can customize our materials by adding additional terms to the operating manual and steps to the checklists. For example, if your company requires every flight crew to take a five-minute break upon the completion of a flight, you can add that to the checklist. And, if a company operates in multiple airspace jurisdictions, the general operating manual and checklists can be customized to reflect different rules as well.

UAV Insurance

UAV insurance covers physical damage of drones and liability arising from the operation of drones. Certain regulators, such as Transport Canada, require all commercial UAV operators to carry liability insurance at the minimum.

Even if your airspace regulator doesn't require UAV insurance, it's likely that your legal department, safety managers, or customers will.

UAV insurance enables you to:

- **Operate professionally**
- **Safeguard your investment & your assets**
- **Protect against liability**
- **Meet investor/shareholder requirements**
- **Mitigate risks**
- **Provide the best service to your clients or customers**

The amount of coverage that you need depends on your business, your customers, and your assets.

Currently, insurance providers are insuring commercial drone companies for up to $500 million in liability and up to $10 million in hull damage.

UAV insurers offer the highest coverage to the most professional operations. Businesses that can't prove consistent, safe, well-tested operating procedures, policies, and controls aren't eligible for as much coverage.

An insurance company determines your rates—and the amount of coverage you can purchase—by a number of factors, including:

- **The processes & systems you use to manage your drones & pilots**
- **Operating procedures & standards**
- **Documented training**
- **Preflight & safety checklists**
- **Proof of maintenance**

Companies that provide proof of process via checklists and a system of record, including flight logs, will qualify for more coverage at better rates.

TIP:
When looking for drone insurance, make sure your provider offers a broad range of coverage so that you can purchase just what you need now and can add more as you grow.

Before you apply for insurance, see the steps you can take to qualify for more coverage at better rates.

Download our checklist:

4. Set Your Process (& Keep Refining It)

If your construction company is a major enterprise, you may already have business processes that can be applied to your UAV operations.

Regardless, the importance of having an efficient, scalable process can't be overstated.

We've all experienced the frustration, poor service, and lack of professionalism that happens when a business doesn't have a good process—the electrician shows up late or not at all, somebody else's food arrives at your table, your package gets shipped to Omaha instead of Houston, your Internet connection is spotty at best.

When we conduct commercial flights at Skyward, we follow a five-phase process.

REMEMBER:
The best processes increase efficiency, lower costs, mitigate risks, enable good customer service, empower your crew to do their best work without wasting time, and scale to meet increasing demand.

1 Job engagement

Understand job requirements. This is all about asking the right questions and communicating well. Taking the time to understand your customer's or colleague's expectations at the outset will save you time and money and enable you to provide the best service—even if it means declining the job or outsourcing it to somebody else. Your customer is anyone requesting UAV services, including a colleague within your company.

- ☐ What is the final product that your customer expects?
- ☐ When does your customer expect it?
- ☐ What is your customer's budget for the job?

Then, analyze the customer's requirements. Are you able to meet them?

- ☐ Is the job legal?
- ☐ Using a validated drone airspace map, check to see whether the job is within controlled or restricted airspace where you may need special permission to fly.
- ☐ Do you have the aircraft and skills to perform the job?
- ☐ Do you have the permits, licenses, and insurance needed to perform the job?
- ☐ Do you and your crew have the time? Are your schedules full?
- ☐ Is the budget reasonable? Or would you lose money if you were to undertake it?
- ☐ Is there a more cost-effective way of achieving the same result?

If you have the time, availability, crew, aircraft, insurance, permission, and expertise to undertake the job, you're read to start planning.

2 Operations planning

Once you have a clear understanding of your customer's expectations and you've determined that you have the time and resources to complete the job, it's time to plan. More than any other, this step will ensure that your crew operates as efficiently as possible.

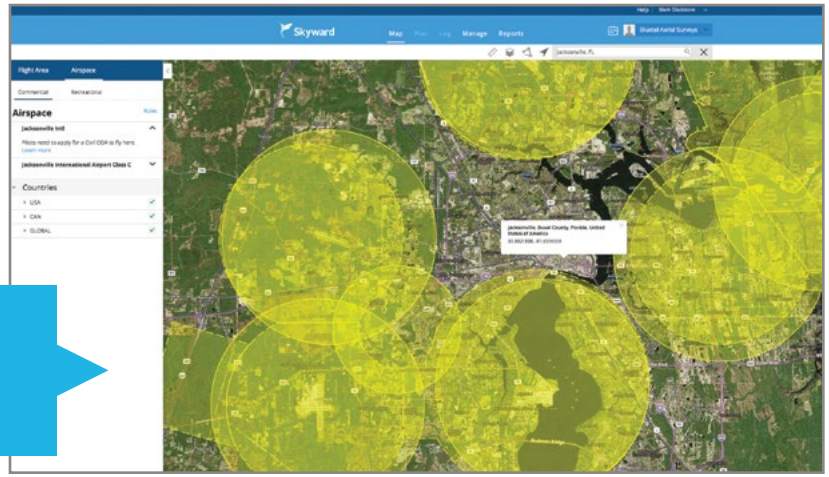
Evaluate airspace

Using a validated drone airspace map, take a look at the location of the job. During the job engagement phase, you determined the type of airspace in which you'll need to fly to complete the job.

For example, if the job is in the United States within controlled airspace (depicted by the yellow circles in the Skyward Airspace Map), you'll need to apply for a waiver from the Federal Aviation Administration's website. But if the job is in an airport coordination zone in Canada, you may be able to fly there under the terms of your Special Flight Rules Operating Certificate (SFOC).

If the job requires that you fly over private property, you may need to get permission from landowners before flying. This is always a good idea, but check your operating license or certificate for specifics.

If your job requires special permission from a regulator or landowner, this will affect your scheduling.



The Skyward Airspace Map simplifies airspace regulations so UAV pilots can quickly see where they're clear to fly and where they may need special permission.

Why the Skyward Airspace Map Is Different

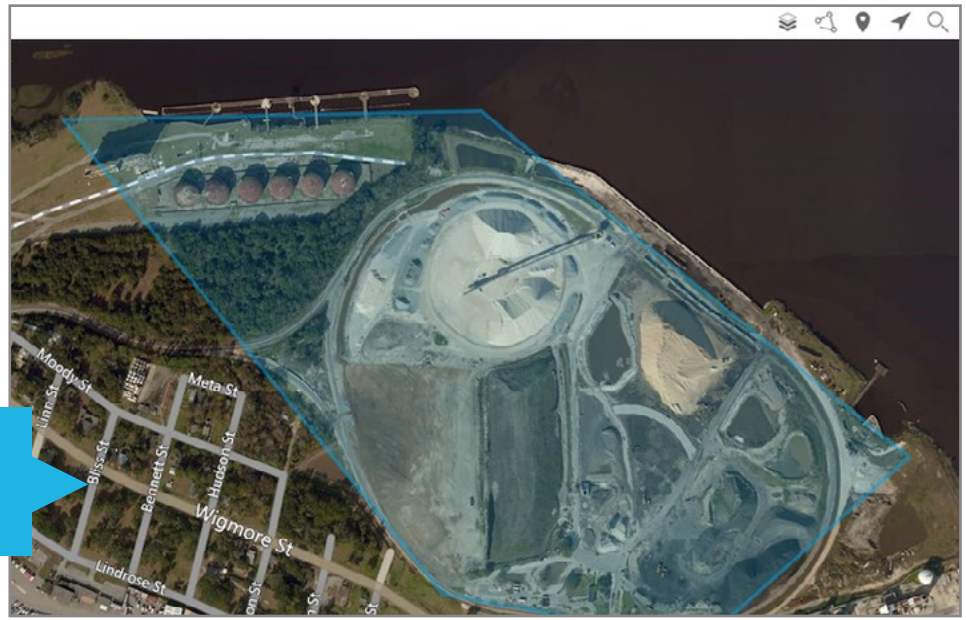
At Skyward, we believe that safety is #1 for all aircraft, including UAVs. That's why our team of airspace analysts inspects every piece of airspace data we receive from regulators. This allows us to correct errors and alert the regulator so that they can be corrected.

Then, we simplify the airspace to make it relevant and easy to understand for commercial drone operators.

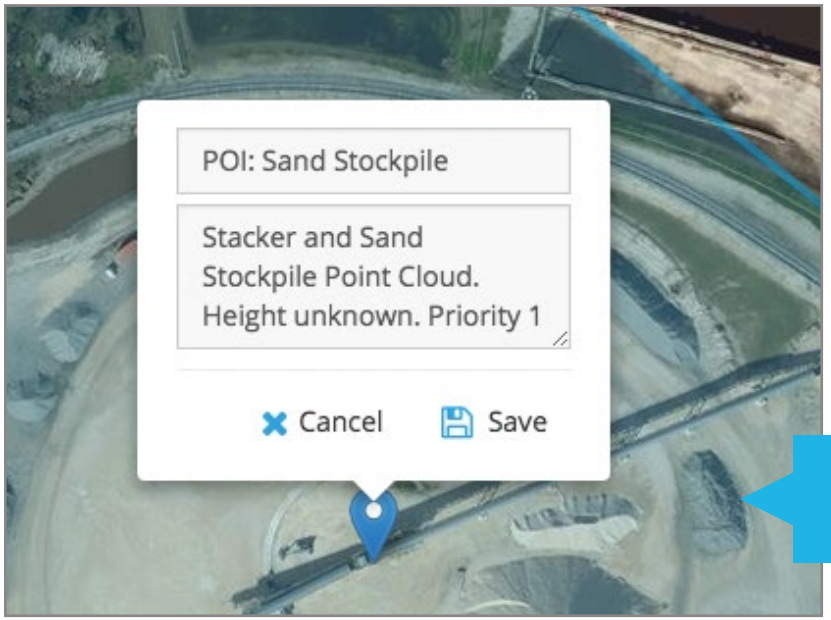
Safe airspace benefits all of us.

Create a flight area

Depending on the scope of the flight job, your flight area may be large (eg, surveying a tract for a new development) or highly constrained (eg, a roof inspection). Regardless, the area should encompass your crew's rally point and takeoff and landing areas.



The Skyward Airspace Map allows you to create and share flight areas with crews, whether internal or outsourced, so they can see exactly where they need to go.



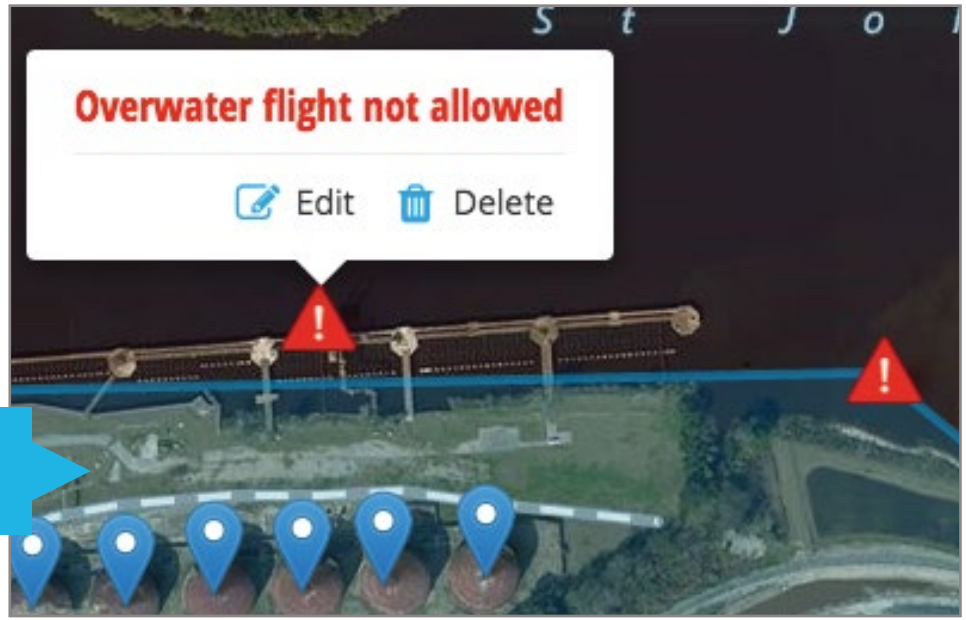
Mark points of interest

Your crew needs to know exactly what's expected of them, including rally points, potential takeoff areas, where they need to fly, when, and the type of data they need to collect. Mark points of interest and record these details so your crew can see everything in advance and avoid guesswork once they're in the field.

Points of interest marked on the Skyward Airspace Map

Mark hazards

Show your crew potential hazard areas, such as powerlines, roads, high-traffic pedestrian areas that may need to be blocked off, or structures that are higher than your permit allows you to fly.



Points of interest and hazards marked within a flight area on the Skyward Airspace Map

Coordinate with your field crew and schedule the job

Share the flight plan with your crew and make sure that everything makes sense to them. Check your field crew's availability, and remember to factor in extra time if you need to obtain special permission from a regulator or landowner.

Share your finished flight plan with your crew and other stakeholders.

Other scheduling considerations:

- ☐ Make sure your UAVs and batteries are available and airworthy.
- ☐ Make sure that your available pilot-in-command has been trained to fly the UAV scheduled for the job.
- ☐ Do you have enough batteries for the planned flight duration?
- ☐ Do you need to block off public access?
- ☐ Does your client require that you have an escort or supervision?
- ☐ Depending on the time of year and weather in your area, you may need to add a buffer to your schedule to account for weather-related delays.

Confirm with your customer

Send your customer screenshots of your flight plan and confirm that all the details have been accounted for.

3 Execution

On the day of the flight, check your validated drone airspace map again. Temporary flight restrictions can happen at any time—for example, if there is a forest fire or public emergency, or if the president comes to town.

There may be a way to work with regulators even in the event of a temporary flight restriction, but don't settle for verbal approval—insist on getting it in writing.

Also, take a look at the weather. If it's raining, snowing, foggy, or very cold, you may have to reschedule for another day.

Once on-site:

- ☐ Check the weather, including temperature and windspeed.
- ☐ Conduct a safety briefing if anyone other than your flight crew is in the area.
- ☐ Are there structures that are higher than you are allowed to fly?

DOWNLOAD THE SKYCATCH APP

The easy-to-use drone mission planning app for DJI aircraft lets you plan repeatable missions, track data collection, and upload for cloud data processing.

Download

- ☐ Begin your preflight checklist.
- ☐ Block off pedestrian or vehicular traffic to keep nonparticipants out of the area.
- ☐ Conduct your flight with an automated flight app such as Skycatch Commander.

4 Close Out

As soon as the crew finishes the job, they should log the flight. In general, flight logging involves two types of data, which should be reflected in your system of record: 1. what the human beings did and 2. what the aircraft did.

All aviators log flights in order to maintain pilot credentials, track training requirements, and be prepared for regulatory audits—airspace authorities routinely review pilot logbooks.

For all pilots, flight hours are the major benchmark of professionalism and credibility and they can only be tracked by logging flights.

Training programs and maintenance requirements also need the support of flight logging data.

You'll also need to know how long an aircraft has been flown in order to schedule routine maintenance.

In terms of your business, UAVs represent a major investment. But they only provide return value if they're being used. Logging flights will show you whether you're maximizing your investment.

Flight logging is essential for:

- ☐ Meeting regulatory requirements
- ☐ Determining whether the aircraft is due for maintenance
- ☐ Keeping a record of unexpected incidents, such as collisions
- ☐ Tracking pilot hours
- ☐ Maintaining training schedules
- ☐ Promoting a pilot to pilot-in-command
- ☐ Tracking how many craft were used
- ☐ Recording the time and resources required for the job (which will help you determine your ROI)

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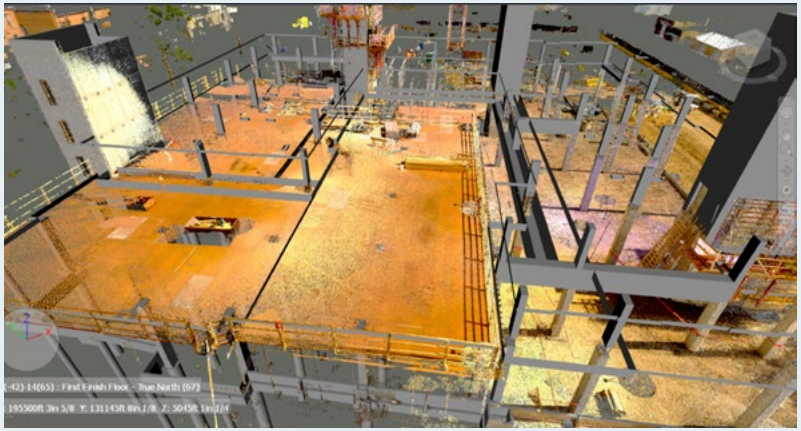
There are 5 awesome ways you can bring drone data into construction workflows with the Skycatch Direct Export Feature.



Point Cloud + 3D Model
courtesy Hensel Phelps

Learn How

5 Delivery

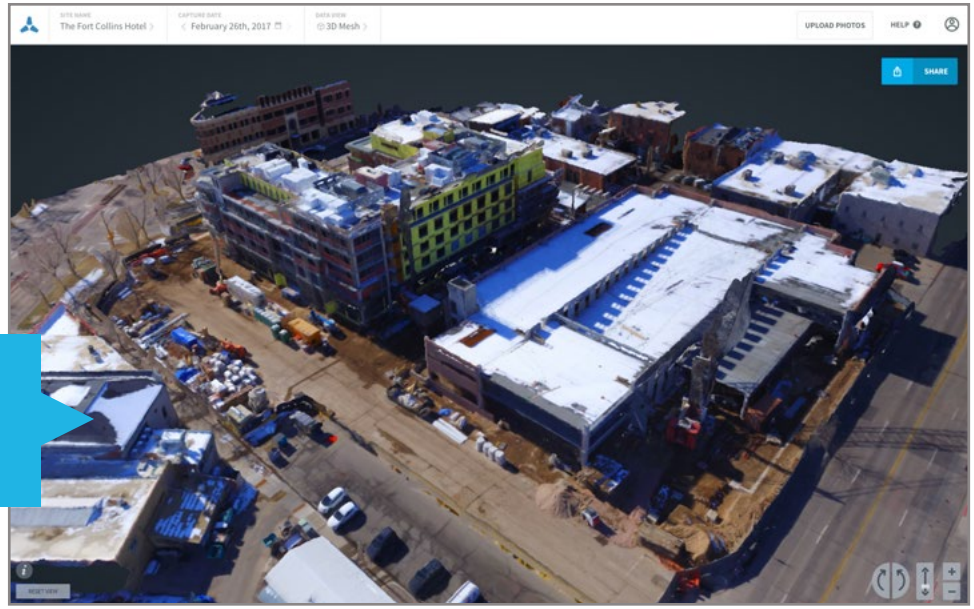
For satisfied customers, this is the most important part.

UAVs have an enormous capacity to quickly and efficiently capture data, but when it comes to serving your customers, it's how you provide the data that matters.

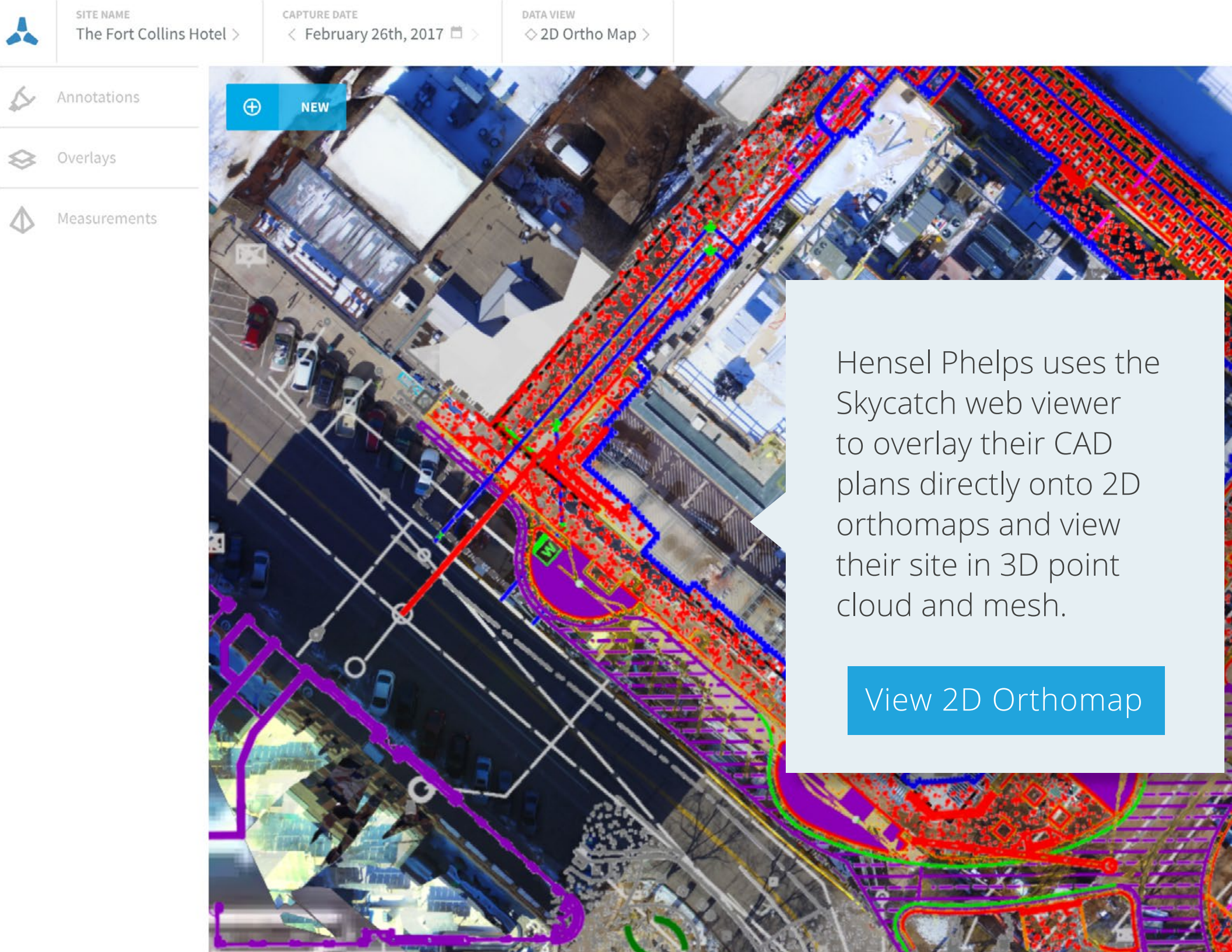
This may involve mapping or video editing software. Depending on the type of service you provide, you may also be expected to interpret raw data so your customer can easily make use of it.

If you're a major corporation, you probably already have the systems in place to handle that type of logistical challenge. If you're a small business, you may need to invest in image processing or data analysis systems in order to use the information you gather.

Skycatch sharing features makes it easy to share and embed your maps and models. Share securely between users in the web viewer or share public links for easy access.



View 3D Mesh


SITE NAME
The Fort Collins Hotel
CAPTURE DATE
February 26th, 2017
DATA VIEW
2D Ortho Map
Annotations
Overlays
Measurements
NEW
Hensel Phelps uses the Skycatch web viewer to overlay their CAD plans directly onto 2D orthomaps and view their site in 3D point cloud and mesh.
View 2D Orthomap

5. Lower Risk & Increase Efficiency with Operations Management Software

So far, we've talked about regulatory and insurance requirements, as well as business processes, including managing aircraft and pilots. These are essential for running a commercial drone operation, but they can easily take time away from your revenue-generating activities (ie, the time you spend flying and providing for your customers).

That's why UAV ops management software is key for running a streamlined, safe, and scalable business.

Drone management software enables companies to manage the specific information and airspace data they need to meet business, insurance, and regulatory requirements.

UAVs aren't so different from other business operations. It would be surprising in this day and age for a controller or accountant to manage a company's financial accounts with a paper ledger, a pencil, and an old-fashioned calculator. It would take too long, there's too much room for error, and there's no way to share it in real time with remote employees or managers.

It would also raise the eyebrows of auditors, who might wonder what that company was trying trying to hide.

Instead, modern businesses use transparent accounting systems to automate tasks, track performance, share records, and report back to investors, shareholders, and the government.

Managing drones is no different. As companies hire multiple pilots and build fleets of unmanned aircraft, they will begin to feel the pain of cumbersome, archaic systems that don't scale.

Best-in-class software ensures safe, scalable, efficient commercial drone operations. It gives business leaders the intelligence and processes to do business across the world, and it gives regulators and insurers the quality assurance and metrics they require.

Look for these features:

- ☐ **a validated airspace map** sourced from official regulatory bodies so you know where it's safe to fly or where you may need special permission.
- ☐ **flight planning and logging capabilities** to meet regulatory requirements, log flight hours, and operate efficiently.
- ☐ **a digital system of record** to manage pilots, training, maintenance, battery performance, flight hours, and organize key documents like pilot licenses, regulatory approvals, proof of insurance, and operating checklists, associated with specific flight records.

The more complex your operation becomes, the more you'll depend on software to ensure that your fleet is well maintained, that your pilots are trained, and that you're operating efficiently.

Spreadsheets and paper logbooks may work for a while, if you have a few flights per month and you only have one pilot and a few aircraft. But adding just one more pilot can quickly create an administrative challenge.

6. Always Know Where it's Safe to Fly

Earlier, we talked about the importance of understanding your country's airspace regulations. This is about so much more than "compliance." For any company, following regulations is part of doing business, and the UAV industry is no different. But it's also about something much more important: safety.

All airspace regulations have one goal: keeping the airspace safe. For more than 100 years, airspace has been highly regulated, which is why air travel is so safe, even in highly congested areas.

Now that UAVs are allowing so many more pilots to access the skies, it's never been more important for every pilot to understand airspace and how to avoid other aircraft.

And there's no way to do that without a reliable, trustworthy, validated airspace map that shows airspace for commercial drone pilots.

In some jurisdictions, such as the United States, there are different rules for recreational and commercial pilots.

What to Look for in a Drone Airspace Map

Third-party validation
Consider this a requirement. The airspace data provided by regulators to mapmakers isn't always

correct. An extra level of scrutiny is the difference between accurate information about a temporary flight restriction and potentially flying into the middle of an emergency.

At Skyward, our aviation experts **validate the airspace data we receive from regulators**. And it updates every 5 minutes.

Easy to understand
While professional aviators are used to VFR sectionals, it's important that everyone on your team is able to understand your drone airspace map, especially in the field. You need to be able to easily see and understand different categories of airspace as they apply to UAVs.

For example, at Skyward, our map displays information about the airspace from the surface to 500 feet above ground level because this is the airspace that is most relevant to commercial drone operators today.

Allows for collaboration
As your company's drone operations scale up, you'll have more managers, pilots, subject matter experts, and other stakeholders who will need to check airspace, review flight areas and job specs, and share it among teams. An interactive, collaborative map will allow you to save time, fly safely, and ensure that everyone is on the same page.

REMEMBER:

In the sky, safety is everyone's responsibility.

Airspace categories for UAVs

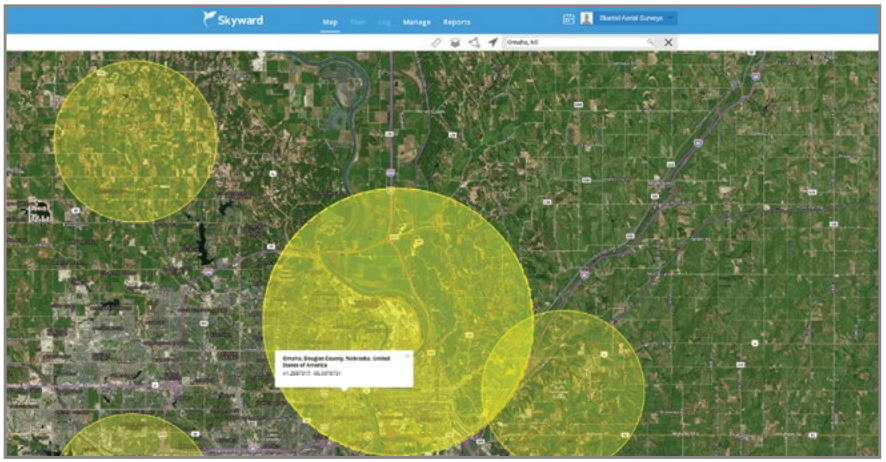
If you're a licensed pilot, you have a sophisticated understanding of airspace categories and regulations. But even if you're a director of operations, foreman, videographer, or surveyor, a basic understanding of airspace will help you plan and execute safe flights.

Clear to Fly

If your flight job area is not within **controlled or restricted airspace** (shown as colored shapes in the Skyward map), and it meets the operating conditions specified by your commercial flight authorization, you likely won't need to plan for special airspace coordination requirements.

Follow your national civil aviation authority's notification requirements. For example, in the U.S., operators using a blanket Certificate of Authorization or Waiver (COA) need to request a Notice to Airmen (NOTAM) at least 24 hours (but not more than 72 hours) before the flight.

Next, check for local or national regulations that could apply to your flight job if, for example, it's

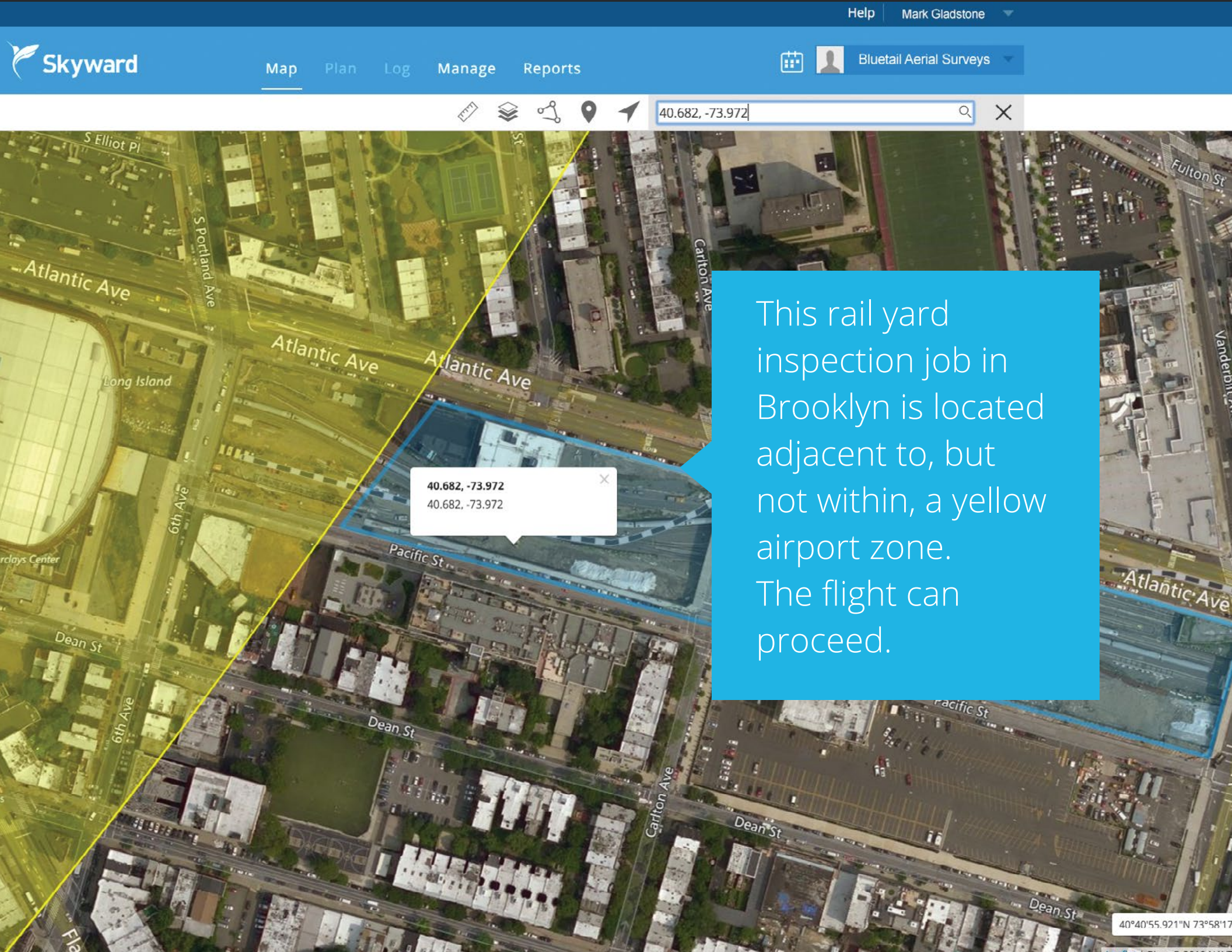


in a sensitive security or environmental area. The airspace may appear clear, but that doesn't guarantee that you are allowed to fly to or from the ground beneath it.

It's best practice to get permission from landowners before flying over private property. This may be a requirement for you; check your regulatory authorization.

BEST PRACTICE:

Remember to always check the map for temporary flight restrictions just before your flight.


Help
Mark Gladstone
Skyward
Map
Plan
Log
Manage
Reports
Bluetail Aerial Surveys
40.682, -73.972
S Elliot Pl
S Portland Ave
Atlantic Ave
Atlantic Ave
Atlantic Ave
Long Island
6th Ave
Pacific St
Dean St
6th Ave
Dean St
Carlton Ave
Dean St
Dean St
Carlton Ave
Fulton St
Atlantic Ave
Pacific St
40.682, -73.972
40.682, -73.972
This rail yard inspection job in Brooklyn is located adjacent to, but not within, a yellow airport zone. The flight can proceed.
40°40'55.921"N 73°58'17

Areas Around Airports

For obvious reasons, areas around airports require special care and attention. In some jurisdictions, you can request special permission to conduct a commercial operation within an airport coordination zone; in others, you may already be allowed to operate under the terms of your regulatory authorization.

In Canada, airport zones typically extend 5 NM (9 KM) from an airport. If you fly in Canada, be sure to check your SFOC—you may be required to file a NOTAM to fly within 5 NM of an airport.

In other jurisdictions, special permission may be required to operate within certain distances of aerodromes.

In the U.S., commercial UAV operations within specified distances of airports and certain heliports listed in the FAA Airfield Facility Directory require special coordination.

In the U.S., operators are allowed to fly in Class B, C, D, and E airspace with permission and as long as there are no flight restrictions.

Restricted Airspace

In any jurisdiction, there are likely to be at least several categories of airspace in which commercial UAV flights are allowed only under exceptional circumstances. These can include:

- ☐ temporary flight restrictions
- ☐ permanent restricted and prohibited areas and other special-use airspace
- ☐ flight restriction zones
- ☐ special flight rules areas

UAV operations are generally prohibited in all of these areas except in special cases. For example, UAV flights over a military base may be restricted to everyone except those who work there.

7. Hire an Experienced Flight Crew (& Provide Ongoing Training)

Different countries have different rules for commercial drone operators. In the United States, commercial drone operators must have a pilot's license. Wherever you operate, be sure to follow the regulations of the countries you're operating in.

Beyond the legalities, professional pilots may offer an advantage to companies flying commercial drones. They have deep knowledge of airspace, safety, and other types of aircraft. They may be less likely to make assumptions or cut corners. This is their area of expertise, after all.

Drone pilots will supplement, not replace, your field crew, and in most cases it probably won't make sense to transform your existing field crew into professional drone pilots (unless that is already their area of expertise). You wouldn't hire pilots to conduct wildlife surveys, build 3-D models, or produce real estate videos, so it probably doesn't make sense to hire non-experts to fly your drones.

We plan and log our flights with Skyward and then mission plan, capture images, and process with Skycatch. Between these two solutions we've found everything we need for our UAS operations.

Kevin Grover
Stantec

See how Kevin Grover and other construction pros use Skycatch data on their sites.

Watch Now

8. Upgrade Your Drone Photos to Data

Now that you're ready to fly, you're ready to capture images. Taking photos and video with your drone will get you some nice marketing content, but the real value is in data. Photogrammetry is the process of stitching together photos to create a variety of data outputs. Cloud-based software, such as Skycatch, automates the process of collecting photos at the optimals overlap and flight path and processing those photos so you don't have to waste your own time, server space, and computing power processing your photos manually.

These are some of the different outputs you can get automatically generated and use online or export to software you already use, like Autodesk to ArcGIS.

TIF

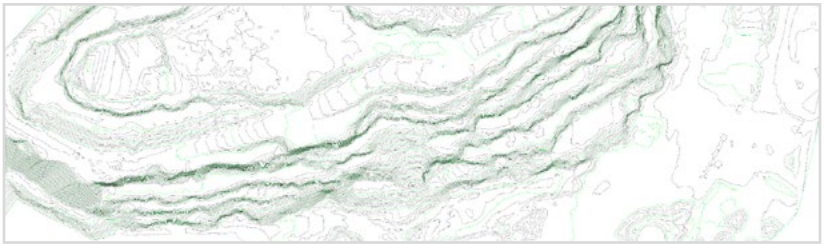
High resolution 2D maps, ideal for enlarged prints for logistics, planning, and asset tracking.

PDF

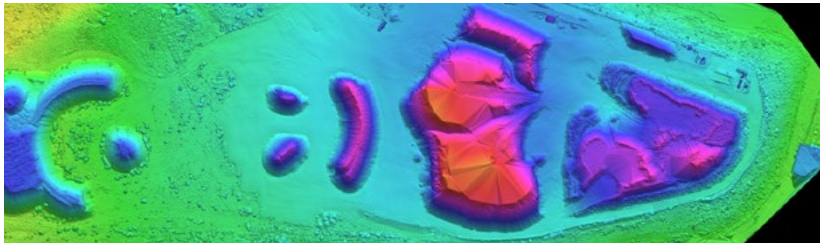
Export a specific area of your site that can include markup, measurements, and CAD file overlays.

LAS
Use point clouds to get a sense of the 3D context of your site in the most raw form (most real).

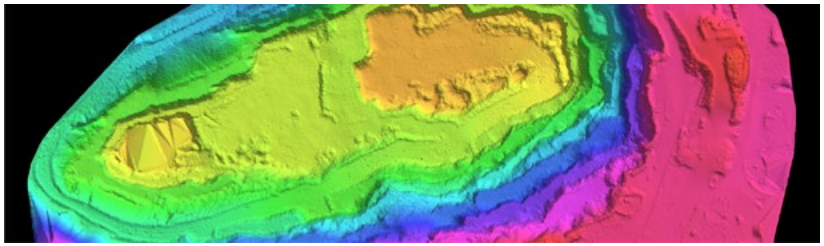
OBJ
Show team members and clients stunning surface detail and texture in the photorealistic 3D model.



Contour Map
See elevations for your site and import the files into your other tools.



DSM
Use a Digital Surface Model to visualize elevation and terrain in a 2D file.



DTM
Object and vegetation removal for easy terrain analysis, automated by computer vision.

Download Sample Data

The Beck Group have used Skycatch to reduce rework costs by 25%.

"The sooner we discover variance from the plan, the easier those variances are to correct. This is why quick turnaround on the drone imagery has made such a large improvement on our project schedule."

Shella Chainaranont

Senior Project Engineer, The Beck Group

Read More

Make drones indispensable to your construction company

Manage Your UAV Business

Schedule crew members, create efficient workflows, & track business metrics.

Digital System of Record

Store and organize licenses, insurance policies, & regulatory paperwork.

Try Skyward for free

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Automate flight planning and cloud-processing

Make Your Drone Data Actionable

Generate maps and 3D models you can measure, overlay, and share

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