

The Pocket Guide to Winter Drone Surveying

For those in Northern Hemisphere, winter is now in full effect. This means if your worksite is located at a high northern latitude, operating your drone on routine surveys can be complicated by frigid temperatures and severe weather conditions. So, what's the best way to fly in winter weather?

Propeller customers run the gamut when it comes to locations and outdoor conditions. After flying on sites in every kind of weather, we wanted to put down our tips on how to best fly in the winter season to get the best data you can.

For winter weather, there are four main concerns to address.



Terrain conditions for photogrammetry

After flying a drone to capture site data and images, you process that data with a photogrammetry platform like Propeller. The [Propeller Platform](#) uses [photogrammetry](#) to stitch drone photos and ground control data together to render a 3D site survey.

Winter snowfall presents a unique hurdle for photogrammetry. Photogrammetry works on the principle of capturing different features from multiple angles to reconstruct that feature in 3D. To be able to identify those features, you need to be able to tell one photo apart from

another.

Fresh, untouched snowfall on a site makes it extremely difficult for the computer to identify different features. Basically, an all-white surface without any marks is bad news for [photogrammetric drone surveying](#). The good news is that tire marks from trucks and equipment on site helps enormously.

So before you start to fly after it snows, make sure that there's enough breaks and gaps in the blanket of snow to be able to identify one part of the site from another.

And when it comes to ground control, it can be hard to place [AeroPoints all around](#) a snow-covered site. With [Propeller PPK](#), you only need one GCP for 1/10ft accuracy.

Battery management

The first thing that colder weather affects during flight is your battery. Low temperatures reduce its efficacy and shorten its charge faster than normal. This means that you might need to keep more spares than you usually do. If you're working in especially frigid conditions, it might be worth investing in a battery warmer.

Cold temps reduce chemical activity in lithium polymer batteries, a typical battery type for drones. (The [Phantom 4 Pro](#) and [Phantom 4 RTK](#) both run on this kind.) This reduction can make the battery unstable, sometimes resulting in loss of power and your drone falling from the sky with little warning.

To prevent this, keep your batteries warm, keep a close eye on your charge, and plan to do more swaps than typical. Also, don't leave your drone or its batteries outside when they aren't in use. We've had some customers accidentally leave their drone case—batteries and all—out on their tailgates after setting up their drone. This is an easy thing to forget, but it means unnecessarily exposing your equipment to low temperatures for extended periods of time. Remember: keep it in the cab.

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Drone performance and operation

On top of the reduced battery life you get with low temps, winter weather can also mean high winds, snow, or fog. Before we get into the specifics of drone operation in winter weather, you should first check that your craft is suitable for winter surveying because not all are.



While this doesn't mean that sort of drone *can't* fly in winter conditions, it does increase the possible risk of accidents. A winter-friendly drone should be able to handle cold temperatures and high humidity. It should also be equipped with high-vis lights on the body of the craft, so you can spot it in the sky even with reduced visibility.

It is worth noting that flying in fog is not a good idea, even if it seems the lesser of these weather phenomena. Fog can trigger the drone's obstacle avoidance sensors, making it think there's something in front of it and stopping the flight mid-mission.

As you know from your [Part 107](#) training, if you're US-based, or your [ARN](#) registration, if you're out of Australia, weather conditions greatly affect your drone's flight and operation.

Reduced visibility, shorter days, and weather

Low visibility

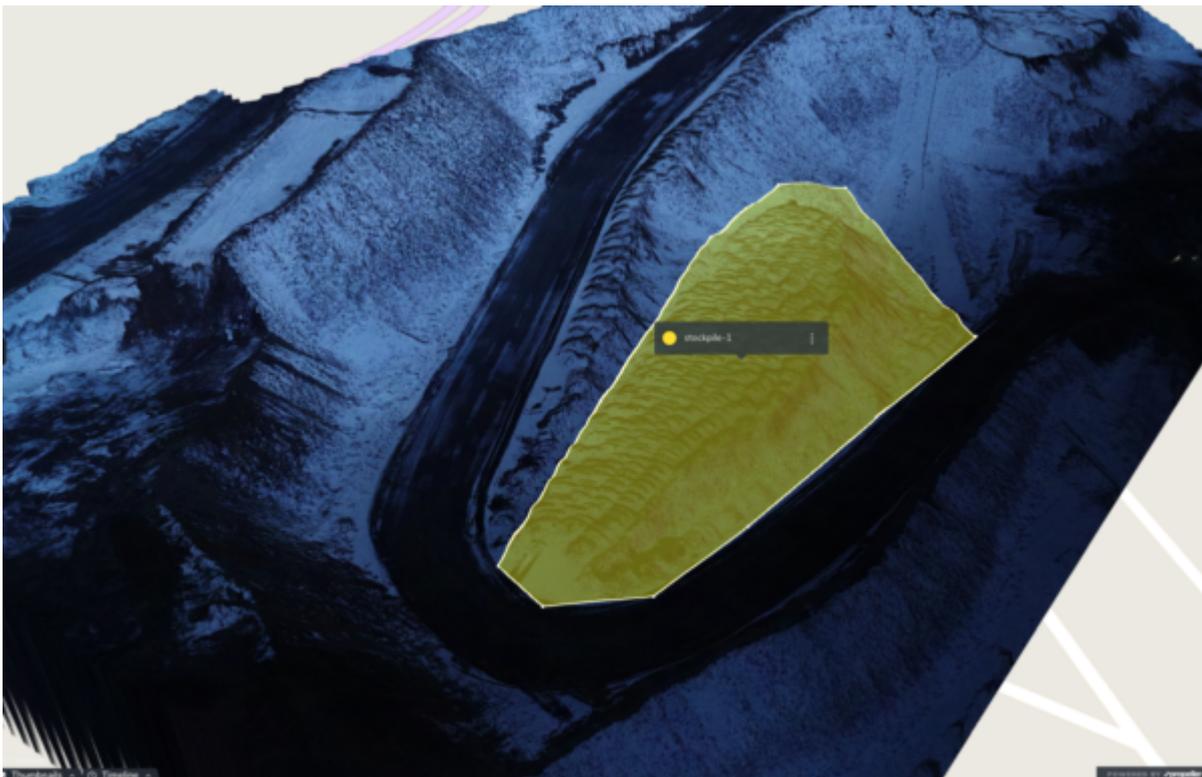
First and foremost are changes in visibility due to winter weather. While you should not be flying in extreme weather conditions, we know that your operations don't shut down at the first sight of snow. You still need to be able to survey if you have a spate of bad weather.

Seasonal changes in daylight

Second, depending on your latitude your regular working hours might extend into complete darkness.

Recall that FAA regulations prohibit the flight of drones after sunset, so plan your surveys to occur during daylight hours—whenever those may be for your area. This could mean doing things much earlier than your normal routine.

Beyond the regulatory aspects, dim light isn't great for photogrammetry and clean visuals. Photogrammetry platforms like Propeller will still work accurately, but all your photos comprising that 3D survey will show up darker than expected, as below.



Keep yourself warm

Lastly, don't forget about yourself. As the drone operator you too have to be out in the

elements for the duration of the flight. Dress accordingly and be sure that you're in a safe place on site while surveying.

Weather watching and navigation

Unlike in more temperate months, winter means you need to keep a much closer eye on the weather forecast whenever you're going to be surveying with a drone. Weather can change at a moment's notice, so check the forecast diligently and schedule your surveys around good conditions as best as possible.

When flying in winter conditions remember: Don't fly in heavy snowfall, hail, strong winds, rain, or fog, as these interfere with line-of-sight visibility and thus operation.

Overall, you want to ensure a safe flight no matter what the weather dishes out that day. So remember to dress warm, watch the forecast, monitor battery performance, and check all your equipment.

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