

Winter Flight Operations

Cold weather operations require more than just a "call, start and launch"

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AOPA 447409

One look tells the entire story—low ceilings, snow, blowing snow, reports of icing—there's no question about it, winter is here. And winter flying is much like the weather, a study in shades of gray rather than the clear-cut, black and white questions and answers of flying in other seasons of the year.

But, what are the real problems of winter flying? Pilots can find many a check list of things to do and not to do, but just how does all of the information so freely passed along fit real flying?

Good, safe, cold weather flying starts long before heading for the airport.

Let's talk about our mental attitude and about thinking ahead as we work through a typical winter flight scenario that this writer is all too familiar with: a four-leg flight from Oklahoma City to Alexandria, Minn., to Minneapolis, to

St. Louis and back to Oklahoma City.

A typical winter situation exists through much of the upper midwest at 4:30 a.m. CST when the first call for weather is made to flight service. An arctic cold front is roaring through the Dakotas spreading snow, high winds and generally miserable conditions through the midlands.

Since we're expecting winter weather, our preflight briefing technique is a little different. In addition to the normal information needed about the synoptic situation, terminal forecasts and en route observations, we're also looking for pilot reports about tops, icing and other operational tidbits.

We'll take a careful look at the general airport situation along the route of flight as well as the situation at Alexandria. Are all runways open? Is all of the

nav gear up and running? What are the snow and braking conditions? Frankly, what we're looking for here is an overview of what will happen if the weather gets substantially worse as we head north and we have to land at some other airport along the way.

Light freezing drizzle has developed in the OKC area, so we'll call the FBO and have them open the hangar doors, but leave the aircraft inside—there's absolutely no point in having the bird pick up a load of ice sitting on the ramp while we're loading up.

Once we've arrived at the hangar we'll make another call, to the FSS for updated pilot reports and to see if the morning upper air sounding has been made. If it has, we can see if there's an inversion in the local area, which will allow us to launch in the fine drizzle that



PHOTOGRAPHY BY ROGER ROZELLE

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is falling out of warmer air above.

The FSS briefer says an airliner just off Will Rogers World Airport has reported on top at 5,000 feet, and the morning sounding shows a pocket of warm air trapped aloft between 4,500 feet and 8,500 feet. So, we'll file IFR for 6,000 feet, planning to be in the clear, which will give us an opportunity to dump the ice we may pick up on the climbout.

We'll pull the airplane out of the hangar just before takeoff, fire up and be on the way before the freezing mist can coat the aircraft.

Taxiing to the active is done gingerly, since ice may well be glazing the pavement. Also, we turn on the pitot-static heat to prevent ice accumulation.

Off we go with departure instructions to, "fly runway heading 4,000 feet, radar vectors direction Pioneer VOR."

Everyone may have a separate technique for dealing with a climb through icing. I like to climb at the best rate speed as quickly as possible, taking care to note where the clouds start, the loca-

tion of the freezing level, and where I'm finally on top. One brief aside, please pass along pilot reports to departure control, radio or flight watch stations since first-hand information is the best tool a pilot can have to deal with a dynamic winter weather situation.

Once en route it's a good practice to keep up-to-date on how the weather is actually developing and to confirm that the upper winds are substantially as forecast.

En route, listen to Flight Watch (122.0 MHz). However, don't call flight watch stations for routine weather information. Frequencies in many sections of the country are being abused by pilots calling for route forecasts and asking for other routine data that should be handled by normal FSS air-to-ground frequencies. All too often flight watch communicators aren't telling pilots to contact an FSS.

A constant listening watch on 122.0 MHz can serve to keep you up-to-date without requiring you to ask a lot of questions.

During a regular check with an FSS about the weather in the Alexandria area we discover the "Alex" weather is 600 overcast and one mile in snow, blowing snow and fog—just like the

forecast unfortunately—so a quick review of the fuel situation is in order. Has the fuel burn been as planned, and do we have enough fuel to backtrack to an airport we know we can make, in the event the Alexandria weather goes below minimums?

This is a key point in most winter situations. Since winter weather tends to be widespread, a prudent pilot will keep enough fuel in reserve to retreat as far as necessary to reach satisfactory conditions. This is not the time to file phantom alternates, which may be as bad as the intended destination.

The surface temperature in Alexandria is -15°F so I don't anticipate any icing problems on the descent. A VOR approach is anticipated which calls for 600-1 weather.

Inbound from the approach fix, we make a last check of the Alexandria weather—600-1 on the button, so it's going to be a tight approach.

The quartering headwind across the snow-packed runway will present some unique operational problems. Since braking action has been reported poor-to-nil by a pickup truck in the last hour's surface observation, we're going to be concerned about getting down quickly, and will probably need all the



available runway to allow the aircraft to slow on its own. We won't depend on the brakes.

Tracking the centerline of the approach requires a substantial amount of crab, so we remember the airport isn't just going to crop up under the nose—we look for it out of the correct window!

The airport is in sight, and we commit to a landing. Full flaps, ample power and good technique are required if we are to get the bird down on the end of that slick runway in a fair crosswind.

Over the runway we come back on the power to put the aircraft down solidly on all three points. Now that we're down and rolling, it's in the can. Right? Wrong—dead wrong!

The runway is just like a mirror and the wind is going to make the airplane weathercock sharply if something isn't done quickly. We use all available aerodynamic control to keep the centerline nailed down since nosewheel steering and braking are almost useless at any speed other than a crawl.

Once the aircraft is slowed enough to taxi safely, we head for the ramp, taxiing slowly and we *don't use the brakes*. If you fly a twin, differential power is a handy tool for directional control, and turboprop operators can put "Beta"

reverse pitch to good use here.

When we roll slowly up to the parking spot, we pull the mixture killing the engine to allow the aircraft to roll to a halt at the gate. If the brakes are necessary, we'll use them easily, "feeling" for some effectiveness.

After getting all of the passengers headed for the terminal, it's time to think about securing the airplane. (Let's keep the -15° weather in mind and do a couple of things.)

1. If a hangar is available, we will have the airplane put inside for the duration of the stay. By the time you figure the cost of a tiedown and preheat it's just about as cheap to hangar the bird, and protection from the cold will make the next startup a lot easier on batteries, engines, starters, gyros and pilots.

2. If the airplane can't be hangared, be sure to reposition trim controls to appropriate takeoff positions, shut down everything, deplane, and DON'T lock the door. (In case you've never had the opportunity to break a semifrozen key off in a solidly frozen lock, save yourself the effort.)

Business completed, it's time to leave again, so how do we handle it?

1. If the aircraft has been inside, tell the FBO when to expect your departure, and ask him not to roll the aircraft out any sooner than he has to.

2. Bad news—the aircraft has been out and cold-soaked for three days. So, here's the drill—arrange for preheat at least 30 minutes ahead of your planned engine start, and have somebody who knows what they are doing set it up. More than one airplane has been lost to a fire caused by sloppy preheat techniques. When departure time comes be ready, start the engine as quickly as the preheat equipment is moved and taxi out as carefully as you taxied in.

3. Even more bad news. The aircraft has not only been outside and cold-soaked, but the preheater is being used to heat the FBO's ice-fishing shack. You're going to have to start with a battery cart or jumper cables. Now that's going to be a tall order, but it can be done. First, pull the engine through by hand through several complete turns to break up the semisolid oil packing the engine's bearings. Then strictly follow your manufacturer's cold weather starting procedures.

If you have the misfortune to get a false start and ice the spark plugs, the party's over until you either pull and defrost the plugs or go out to the lake and get the preheater out of the FBO's fishing shack, and even that may not solve the problem.

One note of caution in any nonpre-

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Things to Keep in Mind

PREFLIGHT

- Carefully check the overall weather situation and airport conditions.
- Don't expose the aircraft to the weather any more than necessary during preflight and loading.
- Review and follow airframe and powerplant manufacturers' recommendations for cold weather operation.
- Preflight carefully, and look for frozen material in control hinges, flap tracks and gear wells.
- Thoroughly preheat the engine if possible. (See "Preheating for Winter Starts," Jan. *Pilot*.)
- After engine start, avoid quick throttle movements until the engine oil is properly heated and flows smoothly.
- Be sure to exercise the prop governors according to manufacturer's instructions. Cold, stiff oil must be purged from the governors prior to flight.
- Use pitot and static heat, if available, on the ground to avoid an accumulation of snow and slush in pitot or static ports.

IN FLIGHT

- Give the slipstream time to blow excess slush, mud and water off the gear structure and out of gear wells before retracting the gear, or recycle the gear. Follow the manufacturer's recommendations.
- Don't accept premature descent instructions from ATC into zones of potential icing, and have a plan in the event ice is encountered on the descent.
- Use proper techniques during takeoffs and landing rollouts to maintain directional control on slick runways. Assume that the runway will be slippery.

GROUND OPERATIONS

- Taxi carefully, since braking and steering effectiveness will be sharply diminished.
- Walk and climb carefully around and on the aircraft.
- Clear the windshield and windows before attempting ground operations. Attempting to taxi with restricted visibility is dangerous.
- Clear away snow and ice from wings and horizontal stabilizer.

heated start: keep an eye on oil pressure, and don't jockey the throttle sharply until things have warmed up enough to get the oil moving freely. If the oil cooler is blocked with frozen oil, a big surge of pressure will sure move the oil out of the cooler, and right into the cowl through a hole in the cooler. So, take it easy, allow the engine to warm up to minimum operating temperatures before doing the runup.

Now the next leg of our flight will be easy, since all we've got to deal with is snow until we're in the Minneapolis area.

However, the Minneapolis airport has one of the primary runways closed for sweeping. We can either make a crosswind landing or drone around somewhere until they've got the runway open. We choose the scenic tour. Crosswind landings that are a snap on dry runways aren't worth the trouble on icy ones if they can be avoided.

Ground operations at a busy airport are even more confusing with a bunch of snowblowers and trucks charging around the ramp. Take your time. That's just what the guys in the big silver birds are doing.

Our routine IFR trip to St. Louis starts to come unglued somewhere southeast of Sioux City as icing crops up ahead. Some of the calls to flight watch have gone up a few octaves.

Careful altitude hunting, listening to center and flight watch and keeping calm will go a long way toward not allowing en route icing to ruin your day.

In many cases icing can be avoided, but once you're in it there's nothing to do but hunt quickly for a way out.

If it's clear above, don't wait around to ask for a higher altitude. *Do it now while you can still climb!* Almost any center controller is going to bend over backward to keep a minor problem like ice from becoming an accident, but you've got to ask for help if you're going to get it.

If the rate of accumulation is fairly slow, the best thing to do may be to proceed with caution. Keep your options open, and be ready to beat a quick retreat if things get worse.

There are some things you can do to make your single or light twin less susceptible to dangerous ice accumulation. Keep the airframe clean, and keep the props carefully dressed to avoid ice-catching nicks and rough spots. One other trick is to use a commercially available anti-ice agent to provide some protection against ice accumulation on brief climbs and descents, but this isn't a sure-fire way to beat the situation.

As we get closer to the St. Louis area we start hearing people really yelling

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about ice accumulation on departure from the St. Louis Airport, but we've managed to find an area between layers where we're not picking up any of the frosty stuff.

Now we have the opportunity to really get in trouble by descending into the ice, trying to comply with a routine ATC crossing altitude restriction, since we've been told to "cross 25 north of the St. Louis VORTAC at 6,000."

Well, 6,000 feet is right in the heart of the icing and I for one don't want to get down there any sooner than I have to. So, what's the solution? Let's ask the friendly ATC man for a favor.

"Roger, St. Louis Approach, Skylane 7393Y would prefer to remain at 8,000 out of the icing as long as possible and descend our discretion to cross the marker at 2,500 if possible."

That may sound like a strange request, but if the controller can work it out, he will realize that quick descent to approach altitude will minimize the time we're going to be exposed to icing conditions. Now this isn't the world's





most popular procedure with some folks for some good reasons, but if you are familiar with the aircraft you are flying this isn't overly difficult.

We're on the ground in St. Louis. Blowing snow completely restricts visibility from the tower, so the operator is going to separate his ground "IFR" traffic by procedure just as the rest of the ATC system uses intersections and crossing altitudes to keep inflight traffic separated. So, be sure to stick strictly to the directions given about holding short of intersections and making requested position reports.

Our departure from St. Louis will require us to taxi a long way over a lot of slush and snow-covered taxiways. The ice and slush tossed into the gear wells and into the brakes can cause us some problems if we don't take a few precautions.

For instance, it's vitally important to run a careful control movement and freedom check prior to any departure from this type of surface. The slush can freeze in control hinges. Also, don't forget to use whatever anti-ice equipment is available.

Okay, we've made it to the runup pad, we have found the brakes won't hold the aircraft for a runup. Now

what? That's simple, we'll use a procedure that requires just a little practice—the rolling runup.

Roll onto the active and, if runway length is not a problem, throttle the aircraft up to the preflight rpm settings, cycle the props together, check the mags, then power up and go.

Now that we're in flight our problems with slush under the aircraft are still around. If we just go ahead and pull the gear up and forget about it, we may get home and find we're not able to get the gear down. So, just leave it down a little longer than you normally would. Another suggestion is that the gear be cycled after departure.

After a short stay in St. Louis we're headed back toward Oklahoma City where the weather is clearing after a monster snow. As we're taxiing back to the hangar at Wiley Post Airport we pull into a T-hangar taxiway and sharply brake and turn to avoid a pile of snow pushed up by cleanup operations.

In sum, winter flying isn't difficult, but it does pose some unique operational problems that require a proper "mind set" about winter flying techniques. Think winter flying safety, and winter flying can be some of the most beautiful, satisfying aviating around. □