**Tim:** 0:05

Welcome, everyone to the Civil Aviation Safety Authority podcast series. This series explores a whole variety of air safety-related topics, with hints and tips helpful for our everyday flying. I'm Tim Penney and joining me is Lea Vesic as your host.

**Lea:** 0:23

You will hear interesting stories from our industry, including pilots and aviation experts, aviators such as yourself involved in different areas of aviation who are willing to share their stories and experiences so we can all learn from each other.

**Tim:** 0:37

And whether we fly three times a week or three times a year, that doesn't really matter, there's always something we can learn to ensure optimal safety. For more information on a wide range of safety issues, visit our website www.casa.gov.au/pilots.

The most talked-about topic everywhere, especially for pilots is weather and forecasting. So, how do other pilots get on top of interpreting those weather forecasts? And what do you do when the weather turns? When and how do you make those important weather-related decisions? This is what we'll be exploring today. And we're joined today by two aviators, Lea Vesic who is a commercially rated pilot, who mostly flies around the countryside for fun and Michael Paech, a forecaster at the Bureau of Meteorology in Brisbane.

They both have insights about aviation concerning the weather, and takeaways to help you stay safe on your next flight. So, first of all, let's hear Lea's story.

**Lea:** 1:40

It was a cool, calm and cloudy winter's day in Adelaide. But probably in hindsight, not the kind of day you wake up to and decide that VFR flying is on the table. Nevertheless, the conditions were docile, there was a horizon and above all, the requirements were legal. The cloud base hung low, relatively low at 4000 feet, but not too low to impede some basic training area of solo flying, which was really only a stone's throw from the airfield.

I was scheduled to top up my remaining command hours to meet the minimum requirements for my private pilot's license. It was literally the day that had been in the making for almost a decade. I was anxious, but eager,I only had about 1.2 hours left to log, my single engine trainer, the one that I had accumulated all my hours in and the one that I was very familiar and comfortable with flying.

So, I patiently greeted my instructor to confirm my interpretations of the weather, the airspace, we ran through the threat and error management, and of course, the NOTAM information. There was definitely an urgency there building. It was essentially the last box ticking exercise to complete before I received my wings literally and metaphorically and don't we all love that feeling?

**Tim:** 3:03

So Leah, you were there with your instructor, how did they feel about the weather? Did they give you any warnings leading up to the flight?

**Lea:** 3:11

My instructor looked out to the West and dutifully assessed the conditions outside that was written on the area forecast. It was pretty much as expected, a chance of increasing showers of rain and a thunderstorm in the afternoon. But it was only mid-morning, so my instructor signed me out with the following stipulations: the weather is safe, but it can become marginal very quickly in this environment.

He repeated, I want you to decide early on if you don't have adequate visibility once you get to the outbound VFR point, and he reiterated that if I couldn't see to the end of the training area, he expected I'd be back in the circuit immediately. At this point, I guess my enthusiasm to get in the aircraft really clouded any looming concerns of a change in the weather.

I definitely heard what my instructor had said, but I had a determination to complete the flight, rain, hail or shine as they say. I completed the preflight checks and I closed and latched the door and started the engine and taxied to the holding point for my departure.

As I crossed the VFR waypoint, I changed to area frequency and noticed mist descending off the clouds in the distance, I still could see past the training area, all my dials were in the green as I began conducting air work and tracked towards the far end of the training field. But what was interesting was I was surprised to see aircraft heading inbound to my left. I thought to myself it's only mid-morning with most aircraft out on navigation flights, surely they're not back already.

**Tim:** 4:41

And Lea, did this bring up any red flags for you at the time?

**Lea:** 4:44

At the time, no. And it probably was something I should have considered. I continued to track further west. I just proceeded with my flight and I calculated that with the 1.2 hours flight remaining I'd still need to keep tracking at least to the edge of the flight training area. It was interesting, I kept seeing aircraft, I noticed the second aircraft and then a third passed by my left, only this time, I noticed a wall of dark clouds over the coastline on the horizon.

This was certainly something I wasn't expecting. My instructor's voice echoed in my ears, and I realized now was the time to turn back to the airfield. The cloud base had started to lower and naturally my adrenaline started to take over and the initial fear had really started to set in, I should be nowhere near a cloud base, particularly as pilots know the likelihood of surviving an IMC incident.

I really felt adrenaline take over and panic set in. But of course, with your training, you learn to settle those fears and really focus on the task at hand. So, it wasn't really time to philosophize as I returned to my ingrained procedures.

**Tim:** 5:53

It's really interesting to hear you say that, that even though you felt that panic, you were still able to remain calm. So, tell us how did you stay calm in that moment?

**Lea:** 6:06

Pilots know that part of our training, a really significant part is our procedures and our standard operating procedures and going back to what you're taught and following those, obviously there's room for deviation when required, but knowing that once you've got the skills at hand, you're trained for these incidents and more. So, going back to that and realizing that this is where your training really kicks in, and you need to trust your instincts.

**Tim:** 6:31

Okay, Lea. So, what happened next?

**Lea:** 6:33

So, while tracking back to the inbound VFR waypoint, my nerves were tempered, I knew the focus was on getting back to that inbound point and simply making my call to tower and joining a downwind circuit, as I had done hundreds of times before. The only problem now was that to slot into the conga line of inbound aircraft that had passed to my left, there was a lot of traffic going on, and there was a lot of chatter on the radio.

I made a few hasty calls to allow for separation, I knew that it was time for me to change the frequency over to the ATIS, to get the weather for the airport, I turned down the volume on my comms one system to basically a negligible sound to get maximum clarity of the ATIS on comms two, I briefly looked down to jot down the details on my kneeboard.

And I became distracted by the sudden loud and alerting beep from the TCAS warning system. And as pilots know, that's often an alarming sound to hear, knowing that there is an aircraft somewhere in close proximity. Every pilot knows when you hear the TCAS warning, it definitely sparks a bit of intrigue, you definitely start to think, "Oh, okay, that's probably not something I expected..."

You know that you don't want an aircraft to be that close to you at any given time. But I kept my cool and I focused on approaching the control zone and making my inbound call, it wasn't entirely impossible that there was an aircraft within that distance. It was a busy VFR inbound point. But I knew that as soon as I was identified by the tower, the separation would be a joint burden to bear anyway.

And with reducing visibility, it became apparent that I was beginning to lose visual reference down to a kilometre or two - that started to get me worried. Nevertheless, I kept making my calls. But this time, there was no response. “It's okay”, I thought, "There's a lot of traffic around, the tower's busy, they'll get to me eventually..." Again, that wasn't totally out of the norm. I made my call again, but no response. So, I approached the boundary zone, I made yet another call. Once again there was no response. Now I was convinced my radio had failed.

**Tim:** 8:40

And so what was going through your mind at this point in time?

**Lea:** 8:44

I began to troubleshoot. Firstly, unplugging and plugging in the headset. Surely that's what it was. The TCAS had continued to beep in the background, which was a continual reminder that I was in a very uncomfortable situation. And now with virtually no horizon, I started to feel the heat. Finally, I could hear the air traffic control loudly bellowing over comms one.

And that's when I realized that I had been transmitting, but I could just not hear their response because the volume was turned down too low when I was listening to the ATIS. Thankfully, ATC had cleared the local airspace to allow me to join downwind. So, I made a quick descent through the thick mist to the safety of the circuit height. And now I could finally take a deep breath.

**Tim:** 9:26

And at that point did you know or did you think that you were safe?

**Lea:** 9:30

Yeah, once I was in the circuit area, it's a very familiar zone and I went back to my operating procedures and just followed the circuit procedure, as I had done dozens and dozens of times. It didn't take long though for my instructor to be alerted to the event. After all, I was clearly bellowing my radio calls on the inbound frequency, which happens to play in the school's operations room. So, everyone certainly heard me loud and clear.

As I taxied back I tried to piece together what happened. Lots of things happened so fast, but it became obvious there were a few key things that had contributed to this event. I definitely lost my situational awareness. And my judgment quite literally became clouded by my impatience to just get out to the training area and finish that sortie.

I didn't really take in the warning signs of returning aircraft, and I didn't observe the changing environment, the weather clearly was changing in front of me, and I didn't notice it. I was so committed to achieving the goal, rather than continuing assessing the situation and whether it was worthwhile achieving today.

**Tim:** 10:38

Is that something you think affects a lot of pilots?

**Lea:** 10:41

Absolutely. I think as aviators, decision-making is such a critical part of our flight training, it's so important to understand that it can happen to the best of us where we don't make the decisions that we think we would, we often say that it's easy to judge other pilots by their mistakes, and that we wouldn't get caught in those situations. But pressure often is not just a social pressure, it's often the pressure you put on yourself as well to get the job done and to complete the mission.

**Tim:** 11:09

So Lea, I can imagine when you've set yourself a goal to go flying on a particular day, to achieve a certain thing or to attain a number of hours. Your ego, of course, wants to say, "Yes, I've got to get this thing done." As opposed to the other side of your thinking that says, "No, have I actually stayed safe today?"

**Lea:** 11:32

Absolutely. And I think there's a case of when everything goes right for so many hours and so many flights, you think, "Well, surely this will just be like any other flight." And that's where it's so important to understand that we're flying in a really dynamic environment. And even though the forecasts say one thing, it can be something completely different, or it can change.

**Tim:** 11:54

This is not an unusual scenario. And we will return to talk to Lea about lessons learned, and of course, the wisdom of hindsight. But first, let's unpack one key misconception related to weather conditions and pilot's decision-making.

You'll hear the pilots say, "But the weather turned." However, it may surprise you that accidents are not actually about the weather. It's more about the decisions we make or fail to make before the actual flight. CASA hosts a range of resources and events to support the pilot community. register to attend our free AvSafety seminars to hear about safety issues, talk to us and meet other people in industry. Visit www.casa.gov.au/AvSafety to register. And while you're there, subscribe to the mailing list to stay up to date on changes and information relating to aviation safety resources for all pilots.

Now let's hear from the Bureau of Meteorology's forecaster, Michael Paech as he speaks with Lea and shares some of his insights as a forecaster to provide some useful advice that we can put in our own pocket.

**Lea:** 13:13

In your experience, how important is it for pilots to be able to correctly interpret the weather, particularly in their local area?

**Michael:** 13:22

Particularly the local effects that occur around individual aerodromes are really important for us as forecasters to forecast, particularly for the TAS or the local aerodrome forecasts that we do, we do take into account all those local effects that we're aware of.

But for those pilots who are flying in and out of their local aerodrome, it's really important to know the topography around the area and how that impacts on the local winds, how that impacts on any sort of cloud development, particularly if you're near and around the Great Dividing Range, or in fact, any ranges around Australia, how that impacts on the development of cloud as it orthographically uplifts over ranges, so incredibly important just to know where you live, you know, and the local effects that occur.

**Lea:** 14:12

Many of our pilots fly interstate and potentially across time zones, across the continent. So, how important is it to understand whether in different areas particularly en route as well as not just at takeoff, but also at the destination aerodrome?

**Michael:** 14:27

Yeah, particularly for those long long-range navigation exercises that the pilots are undertaking. You can move between different air masses and get significantly different weather as you move through different air masses. If you're thinking in the southern states as you're moving through frontal systems, you've got significantly different weather on either side of a front.

For us in the north, you know, you're moving from almost like a mid-latitude meteorology in the south up to tropical meteorology in the north and we get quite different weather patterns and weather effects, depending on where you are in Australia. So, I guess it's incredibly important to be aware of the large-scale or the synoptic features that are occurring around your flight, as well as the local effects as you get closer to your destination.

**Lea:** 15:19

And it's probably worth noting that a few years ago, the Bureau of Meteorology actually changed some of the forecasting over to the graphical area forecasting to help pilots better understand the weather.

**Michael:** 15:32

Look, that's correct. We moved from the area forecast, the ARFORs, into the GAFs, the Graphical Forecast. And that was after a lot of consultation with various industry to move that way. And look, that's in line with what ICAO requires from us as an organization as well to make sure that our forecasts, in a graphical sense, fit in and subscribe to their requirements on an international level.

When you're looking at those graphical area forecasts, the GAFs, you're looking at a broad scale area and the areas we look at and the areas that we forecast give an idea: is it safe to fly here? Or where is it safe to fly visually? Or where is it that I need to be under instrument flight rules? So, we will give quite a broad forecast over that area just to give pilots, "Okay, this is where I'm safe to fly and this is where it's going to be really a no-go zone if I'm flying VFR."

**Lea:** 16:34

As pilots, we obviously get a crash course in meteorology training and nothing like what meteorologists do in their training. So, in that regard, what are some of the more common weather misinterpretations or things that pilots incorrectly assume when interpreting weather?

**Michael:** 16:56

Look, it's a good question. It's probably, if I'm thinking about what are the misinterpretations that occur with our forecasts, I guess one of the big ones is that you know that weather is mobile, it's not going to stay static, if you're looking at frontal systems or air masses, they move. So, while we have a point in time forecast on a GAF or also on a TAF, recognize that those conditions will change over time, the frontal systems, you know, move from west to east, you know?

And so we're going to see some low clouds move along with those systems. In the north, you're going to get thunderstorms at all times of the day or night, and they will change or modify the environment around them. And so it's going to evolve over time. So, particularly, I mean, the low cloud is the big one that a lot of general aviation pilots and those trying to fly VFR get into trouble with.

So, if you're flying into a low cloud, you know it's going to be moving. So, you know that, well, just pushing on into low cloud is never a good idea because you can't be sure you're going to come out at the other end, you know, so you are going into breaking those visual flight rules that you can and can't do.

But just be aware generally of those movements of weather systems, the storms and the low clouds and the rain, all those other aviation hazards that we deal with, they are mostly on the move.

**Lea:** 18:22

And that's a great point when we talk about VFR into IMC conditions and how deadly that can be for some pilots, it's so important to understand that the weather can change and what you plan for in the event that that does happen. How important is it to understand that changing behaviour, and particularly when you think about leading into poorer conditions, we often hear of stories where the weather's gone, turned poorly and that's where pilots get themselves into trouble.

**Michael:** 18:56

There is a telephone number down the bottom left-hand side of each of those, each of those GAFs, which will connect you with the forecaster who has written that GAF, who's writing the TAS in that area, and is also looking at that whether the entire shift, so they can give you the most up to date information about those weather hazards that cause the most impact.

For example, with low clouds, we may have low clouds over a large area of a GAF. And in a quick call to the forecaster we can just refunnel, well, this is where we're seeing it now. This is where the most likely place for the low cloud may be, might be looking at critical locations, we can give you the current observations that we're seeing there and the likely progression of those observations over time.

**Tim:** 19:43

So, what are the key lessons Lea learned from her experience?

**Lea:** 19:48

Why is pilot's debriefing such an integral part of our flying journey, we do it all the time, whether it's with our instructors or with ourselves, but sometimes I think we overlook the important lessons we can take from it. It's really important when you land after a challenging flight, that you take note of what went right and what went wrong, and what would you do differently.

But it's really about acting to eliminate the hazard. So, thinking big picture strategic, what is the weather that I expect to see and if it's not that, what am I going to do about it? And what are my decision points?

We often talk about escape options, knowing your decision point to turn back or where you can find good weather within your aircraft's range and endurance capability. And also understanding those pressures, whether it's external pressures to get a passenger to their destination, or your own internal pressure to complete the flight, I think in my flight, I had moved my decision point a few times.

And that's probably something I would not do again, once you've made a decision point, you've made it in the clarity on the ground with all the information in hand, if you start to change that in flight, sometimes you can actually make the situation worse.

Of course you assess as you go along. But picking up cues like all the aircraft going back inbound, that should have been a sign to me that maybe the weather up ahead wasn't as good and my decision point should actually be as planned to turn around.

**Tim:** 21:17

So, Lea, how can pilots ensure that they've taken what they've learned from previous flights and implement that in their next flight?

**Lea:** 21:27

Everyone's got different learning styles and how they retain information. For me, I'm a very visual learner, and I do a lot of writing. So, I have a debrief folder and a file that I just make a note of what were the weather conditions, if you can print off a copy of the weather and stick it in there with some notes in a folder or book, you have references to what the weather forecast was that day and what you actually saw, as we all know, it's better to be on the ground wishing you're up there than being up there wishing you were on the ground.

**Tim:** 21:57

So, let's hear some final thoughts from Michael Paech.

**Michael:** 22:00

The forecasts themselves as pilots will be aware, you're required to download that whether from NAIPS, from the air services site and you can get all of those informations for the day of your flight from NAIPS. We also have it on the Bureau of Meteorology website as well. It's part of airmanship, isn't it? To get the weather in the first case and to keep a good scan going while you're flying, can I see the low cloud ahead? Can I see storms forming? Can I see showers in different areas and then scanning for the development of those weather elements as they go along.

**Tim:** 22:44

If you want to learn more about how you can stay up to date on the topics we've discussed today, then check out the information and resources we have by going to the link in the description. Thank you to our guests for sharing their wisdom, stories and insights. We look forward to having you join us for our next episode. My name is Tim and this is CASA's AvSafety podcast.