

BRISBANE VALLEY FLYER

FEBRUARY - 2017



Watts Bridge Memorial Airfield, Cressbrook-Caboonbah Road, Toogoolawah, Q'ld 4313.



The Lockyer valley after rain.

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Reading the Wind. Part 1 – Horizontal wind currents

By Rob Knight

In the last issue of the Flyer we looked at air in vertical motion. In this issue we examine air in horizontal motion – the air movement we normally call wind. Wind is just air changing its geographic location and pilots need to know both the direction from which the wind is coming and its speed.

Let's look at estimating the wind from a weathermap.

Although certainly not perfect, it's a very good way to get a good grip on the wind.

Around the globe, there are considerable variations in atmospheric pressure as seen on any TV or printed weathermap. These are displayed in the shape of the isobaric patterns where the lines that join points of equal barometric air pressure form concentric circles. Such a group of circles will have either an L in the centre to denote a low pressure area, or an H for a high pressure one. Air flow around these pressure system will tend to flow around their centres, in the Southern Hemisphere always clockwise around a low and anti-clockwise around a high. This gives rise to their common names – cyclones or cyclonic systems for lows and anti-cyclones or anti-cyclonic systems for highs and the wind (at about 2000 feet AGL) follows quite closely the line of the isobars. Another point to note at this time is that the spacing between the isobars is a good guide to the wind speed. The closer the isobars are together, the stronger will be the wind and vice versa.

If a pilot observes the direction the isobars lie in the area in which his/her airfield is located, the isobaric pattern gives a very powerful approximation of the wind direction.

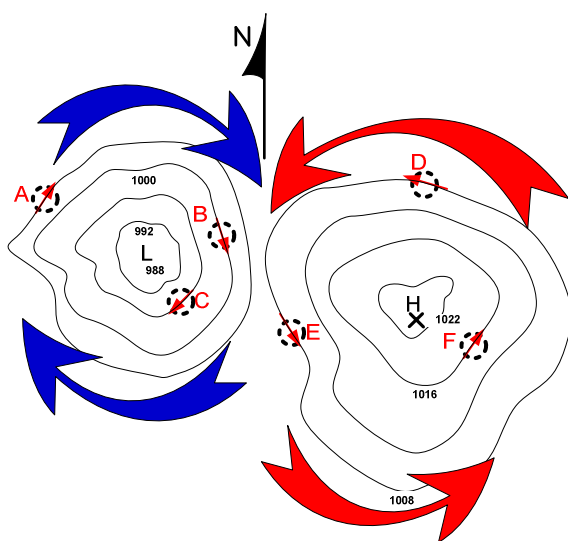


Fig. 2. Isobars indicate the general wind direction and speed. Note this is representational only.

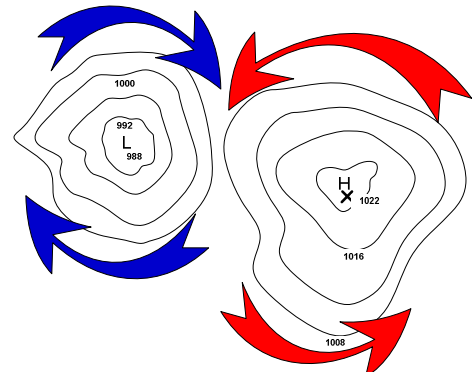


Fig. 1. An isobaric pattern showing a high and a low. The circular lines are the isobars themselves and are drawn in 4 mb (or hPa (hectopascal)). The clockwise wind flow around the low is shown in BLUE and the anti-clockwise flow about a high in RED. Note – this is a schematic representation only – NOT TO ANY SCALE

that the closer the isobars are together, the stronger the wind, the pilot can get an idea of the potential wind strength.

Fig. 2 on the left shows the same isobaric pattern as above but now airfields have been placed on it. The isobars show the wind direction at around 2000 feet above those airfields. Airfield A is on the edge of a low and is experiencing a south westerly wind, about 220° True. Airfield B, still within the low has a north westerly blowing (around 350° True while C is experiencing a north easterly around 050° True. Airfield D, in the clutches of the high, has a south easterly wind from about 100° True. You can estimate the winds for Airfields E and F. See my guesses later in this article.

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Unless the isobaric charts are completed to scale and the appropriate wind gauge for that scale is available, we can only read the wind speed in general terms. From Fig. 2, the strongest wind speed would be at Airfield A in the low which has the closest isobar lines adjacent to it. The lightest winds could be expected at any of the three airfields under the high. All have wider isobar spacings.

But this, as stated, relates to the wind at about 2000 feet AGL. What about the surface wind? At the surface, the wind blows slightly inwards into a low and slightly outwards under a high and in both cases at a slighty reduces speed. The actual angle change is dependant on the nature of the surface but 10° would be a good average. Thus, my guess at the the surface wind direction at Airfield **A** would be $220 + 10 = 230^\circ$ True. I have added the 10 degrees because the surface wind will veer when compared to the 2000 ft wind. The surface wind at Airfield **D**, under the high, will be experiencing a slight outward flow from the centre of the high compared to the 2000 ft wind above. I gestimate the surface wind here to be around $100 + 10 = 110^\circ$ True.

But what about reading the wind without a chart? What clues exist in the environment to aid a pilot's interpretation of his local atmosphere?

We can't see the wind, either on the ground or in the air, but we can see its effects. On the ground at most airfields at least one windsock provides wind indications and reading windsock indications is an essential part of a pilot's training. However, this is not the only indicator available: we can feel the wind on our faces and body and so it's direction and, an impression of its speed can easily be ascertained.

Both on the ground and when airbourne, we can see the direction in which dust or smoke is blowing and these are good indicators because they each relate directly to the wind direction and speed when taxiing, taking off, and landing. Smoke is particularly good as it also indicates changes in direction and speed as it ascends, so indicating both wind direction and wind speed changes at varying heights AGL. This is helpful when joining and approaching.



Smoke drift indicates wind direction and the smoke's appearance and ascent path may indicate wind speed



Drifting smoke indicating wind direction. As the smoke is seen ascending at a shallow angle, the wind speed causing this must be brisk.

Smoke is just as useful when viewed from aloft as it indicates the same air movements as when viewed from the ground. Viewing the image on the left, the smoke is not rising at the steep angle one could expect and this factor is interpretable as being caused by a brisk wind speed. The lighter the wind strength, the steeper or more vertical will be the smoke's angle of ascent. This image also indicates a fairly constant wind direction as height increases – there are no substantial direction changes in the smoke's path as it ascends.

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The wind also has other visual indicators. As it passes across trees and crops it presents a clearly visible “mexican wave” as it progresses. Whilst giving a good indication of wind direction, it also lets the viewer gain an appreciation of wind speed and gustiness from just watching the wave motion.

The effects of wind blowing across water are also important sources of wind data for pilots. Just like crops etc, wind causes waves on the water surface and the ruffles can be easily seen, even from a considerable height if the body of water body is expansive.



In the left image above, dark lines can clearly be seen ruffling across the water. These are local gusts giving a good indication of the local wind conditions. The right image has darkened patches rather than lines. These are called “cats paws” and are the visible result of wind tumbling down the steep terrain and forming downdrafts that impact onto the water. Whilst good for sailing perhaps, wise pilots would avoid operations in these areas at low levels. Should such indications be adjacent to an approach path, the discerning pilot who notices such effects, would be alert for downdrafts and wind gradients.

On smaller bodies of water, dams and lakes etc, with no adjacent tall obstacles, the blowing wind ruffles the water on the downwind side of the body while the upwind shore is mirror smooth. Known as the wind shadow effect, this visual clue is also a good guide to the wind strength. The greater the proportion of ruffled water, the greater the the wind speed. This visual clue is evident even in relatively light winds and is commonly used by Ag pilots when the windsock is at the top of a sloping strip and there is a dam near the touchdown point.



A wind shadow on the edge of a small lake. In this case the wind is blowing from bottom right of the image to top left.

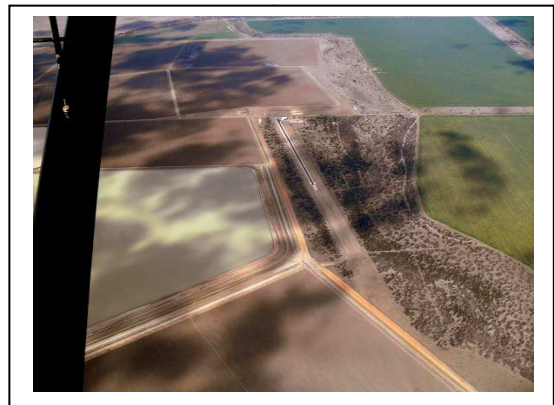
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When subject to stronger winds, the water surface takes on a different appearance. Straighter streaks or lines appear, called wind lanes, that are caused by the rising wind flow. Unlike the ruffles which lie across the wind as discussed previously, these run parallel

with the direction. Variations in the lines will indicate gusts and major disruptions in the lanes are likely to be caused by squalls. In such cases the wind is often strong enough to pick up water from the surface as spray and dampen surfaces downwind.

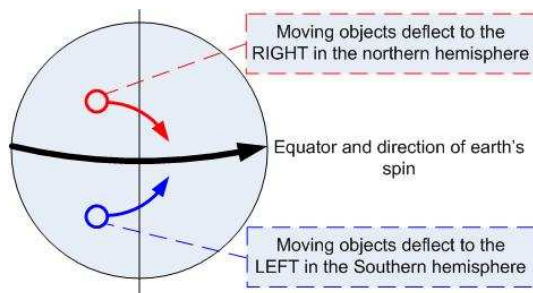
But the wind also affects another item of consequence to pilots – the clouds. It's no good looking at a cloud to ascertain it's movement, but a pilot can see the wind flow in the cloud's shadow moving across the landscape. In light winds, sometimes the movement can be a little difficult to ascertain but careful persistence will pay off. The image on the right shows a cropduster strip with cloud shadows drifting across it. When viewed as movement over the landscape, the shadows indicated a wind from top right to bottom left.



This was, of course, the wind at the height of the cloud and not at ground level. In this case the wind indicated by the lonely windsock at the end of the runway was about 120° removed from the direction indicated by cloud shadow movement which graphically illustrates the importance of ascertaining the surface wind for landing. Cloud shadows are great for confirming the forecast wind at altitude but are not always ideal for planning an approach in a forced landing. Also note that clouds at two levels can give conflicting wind indications and care must be exercised if this is an important factor.

These are all local variations and environmental occurrences that the pilot can physically see. There is another factor to consider in serious discussions on wind directions and wind flows over the landscape that is not as obvious. I refer to Coriolus force.

Where other factors have either no influence or a lesser influence, the wind direction will change if the wind speed changes. A force called Coriolus force will cause any object moving in the free



Coriolus force as it acts on the earth's surface. A change in wind speed will cause a change in wind direction. The faster it moves the more it deflects.

atmosphere in the southern hemisphere to deflect to the left. The magnitude of the force is proportional to the object speed so any increase in wind speed will see the wind change anticlockwise (or back). A decrease in speed will see it swing to the right (or veer). Thus, as an example, if a wind blowing from 360° increases its speed it will swing and might blow from, say, 350°. If the wind speed diminishes, instead of 360°, it might blow from 010°.

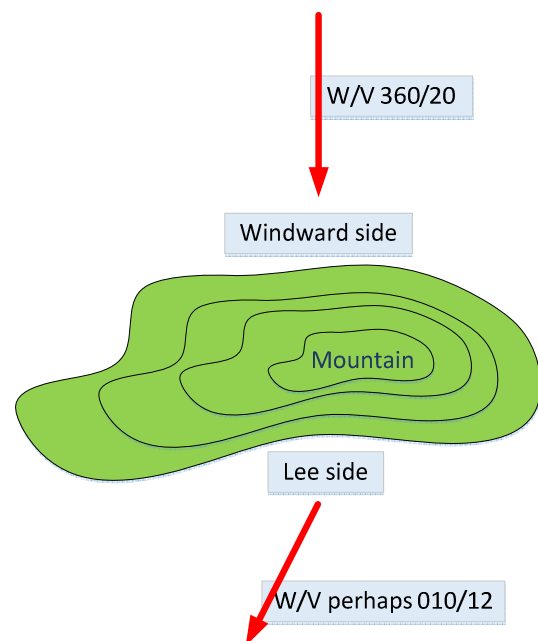
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We can't see this force, nor can we feel it but it certainly exists and a wind speed change for any reason is likely to change the wind direction. In view of this, it is simple to see the reason why the wind velocity usually changes at dusk as night falls. With the setting of the sun thermal activity reduces or even ceases. With no thermal activity providing mixing in the lower layers of the atmosphere, the faster flowing wind aloft is not brought down from aloft to energise the surface wind so it is slowed by friction with the earth's surface. As the surface wind speed reduces, as stated above, Coriolis will cause the wind to swing to the right - it will veer. In the morning, the wind usually increases in speed as the sun starts the thermal up again and the surface wind will back - swing left - and these two phenomena cause the normal surface wind diurnal variation.

In view of Coriolis Force, if any ground obstacle or terrain factor slows the wind speed, there is likely to be a resulting change in wind direction with the speed change. See the image on the right for a simplified but graphic illustration.

Coriolis force is most significant at the poles and doesn't exist at the equator so its magnitude is latitude influenced. In Southeast Queensland we are in a region where its effects are reduced but nevertheless, Coriolis can cause significant wind changes at times when there seems to be no rational cause for a wind change.

Wind direction and speed is a factor in all stages of flight. From taxi and take-off, through the climb, cruise and descent then through the approach, landing and further taxi, wind is a factor that influences an aircraft and its crew at every stage of every flight



My estimation for the winds for Airfields E and F are: E = 330° and F = 195°.

Happy flying

AC-43.13 Maintenance Manual

For those that might be interested in a searchable, on-line version, of AC-43.13, copy the link below into your browser.

<http://content.aviation-safety-bureau.com/allmembers/ac-43-13-1b/ac-43-13-1b.php>

Is this guy the world's worst pilot?

New Zealand Herald, 9:45 AM Tuesday Dec 13, 2016



Despite performing a number of dangerous manoeuvres, 'Captain Zero's' colleague says he wasn't fired. Photo / Getty Images

A pilot has dished the dirt on a former colleague who almost flew into the White House and dodged "UFOs" in the sky but somehow managed to avoid losing his job.

Former pilot Ron Wagner recently responded to a question on Quora asking what it took for a pilot to be fired.

Wagner answered the question by describing his former co-worker's horrifying list of midair misdemeanours - and said none of them cost the maverick pilot his job.

He said the US-based captain with a now-defunct airline, who Wagner dubbed "Captain Zero", first earned his bad reputation while he was a first officer.

In an early incident, while flying a Boeing 727 at full speed at 35,000 feet and during a full meal service, Captain Zero "quietly, and with no warning, reached up and dropped the landing gear".

"This vastly exceeded the speed limits on the gear and gear doors. And the sudden deceleration made a mess of the meal service in back. You can imagine it also terrified the passengers," Wagner said.

"When asked why, he said, 'I was just sitting there wondering what would happen if I did it'."

Wagner said the airline grounded Captain Zero with the intention of firing him, but Washington-based pilot union Air Line Pilots Association (ALPA) intervened and got him reinstated.

He was made captain, and from there, his mid-flight antics got even more bizarre.

A few years later, Captain Zero was hand-flying another Boeing 727 when he suddenly "pulled the thing over about 120 degrees" and performed a series of totally inappropriate fighter pilot evasive manoeuvre.

"You can imagine the horror this caused in the cabin. Flight attendants were hurt, passengers peed themselves," he said.

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"He [Captain Zero] claimed a flying saucer came straight at them and if he hadn't made those manoeuvres, they'd have crashed into it."

"The airline grounded him immediately, but ALPA again rescued him, this time after a series of psychological tests. And he thought himself a hero who should be exalted for his bravery and skills in saving those lives."

Wagner said similarly strange incidents followed over time and all the while, Captain Zero grew more convinced of his skill and bravery as a pilot.

But his colleagues grew especially concerned when Captain Zero was at Washington DC's Ronald Reagan Washington National Airport and lined up for takeoff on Runway 36, which pointed almost directly at the White House.



Captain Zero made his colleagues nervous as they prepared for takeoff at Washington DC, on a runway that directly faced the White House.

"Departure procedures, of course, call for an immediate left turn to fly northeast up the Potomac River. But for the first mile or so, you and your fast-moving jet are pointed directly at The White House," Wagner explained.

"One day, awaiting takeoff clearance at the south end of Runway 36, Captain Zero very casually stated that he wondered what it would be like if, after takeoff, they just flew straight ahead and dived into the White House.

"Then, just as casually, he took off and made a normal climb. The other two pilots were, well, I don't know, but I can say that horrified was a monstrous understatement."

"This was the guy who one day wondered what it would be like if he lowered the landing gear at cruise speed, which he did, just to find out. Reminds me of Johnny Cash in Folsom Prison Blues: 'I shot a man just to watch him die!'"

Wagner said the incident happened before September 11, 2001, which may explain why Captain Zero was allowed to fly again.

Captain Zero eventually did lose his job, but not for the reason you would expect.

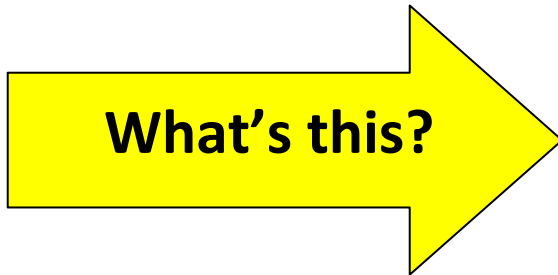
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"Fortunately this airline soon went bankrupt and we all dispersed and the world was safe from Captain Zero," Wagner said.

FLY-INS Looming

Feb 11	Murgon	Angelfield Breakfast Fly-In
Feb 12	Watts Bridge	Watts for Breakfast
Feb 18	Dunwich	Straddie Fly-in and Grand Breakfast
Mar 12	Clifton	Annual Clifton Breakfast, BBQ

Mystery Aircraft (February Issue)



Mystery Aircraft (Last Issue)



This mystery aircraft is the Watkinson Dingbat, a single seat homebuilt manufactured in the UK in 1938. Still the only example in the world, it was still on the civil aircraft register in 2010. Congratulations to Mal McKenzie for identifying this unique little aircraft,

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Keeping up with the Play (Test yourself – how good are you, really?)

1. An aeroplane is tightly held in the clutches of a wing drop stall. The pilot takes the stick forward to unstall. This action will (select the most correct answer):
 - A. Unstall the stalled wing.
 - B. Unstall the stalled wing and reduce the asymmetric drag caused by the dropping wing.
 - C. Unstall the aircraft and allow the pilot to commence a climb.
 - D. All of the above.

2. A pilot flies from A to B on a true track of 180° covering 2° of latitude in doing so. A tailwind has been forecast. The local magnetic variation is 14°W and aircraft compass deviation 2°W. If the TAS has been 95 knots, and the flight time from A to B is 60 minutes, what groundspeed has been experienced?
 - A. 95 kts.
 - B. 120 knots.
 - C. 86 kts
 - D. 132 knots.

3. A pilot/owner fits new, larger sized tyres to his nose-wheel equipped aeroplane. The additional weight is recorded in the aircraft's logbook and the payload change is noted. Is a new weight and balance calculation required to be done and entered into the aircraft's logbook?
 - A. Yes, it must be done as the empty weight has changed.
 - B. No, it is not required.
 - C. Yes, but only if the Centre of Gravity position of the empty A/C changes.
 - D. Yes, but only if the empty A/C Centre of Gravity position is outside its specified limits.

4. Two aeroplanes are on final approach, each intending to land. The second one shall not cross the runway threshold until the first aeroplane has:
 - A. Landed.
 - B. Landed and is rolling along the runway.
 - C. Landed and taxied clear of the runway.
 - D. Landed, taxied clear of the runway and advised clear of the runway by radio on the required CTAF frequency.

5. Whilst in a climb and experiencing a tailwind wind gradient, which of the following is likely?
 - A. Decreasing groundspeed and increasing IAS.
 - B. Increasing IAS and decreasing rate of climb.
 - C. Increasing groundspeed and increasing rate of climb.
 - D. Increasing groundspeed and decreasing angle of climb.

ANSWERS: 1. B, 2. B, 3. A, 4. C, 5. D

If you have any problems with these questions, call me(in the evening) and let's discuss it! Ed.

--ooOoo--

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