BRISBANE VALLEY FLYER

May 2025

BRISBANE VALLEY SPORT AVIATION CLUB INC

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

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A Review of the Hawker Hurricane. *See page 6.*

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Our website - **bvsac.com.au**

Greetings Members,

April has come and gone, and I hope you all had a safe and enjoyable Easter break.

We also had the honour of attending the ANZAC Day gathering at Watts, where Ian laid a wreath on behalf of BVSAC—thank you, Ian.

A quick reminder about our upcoming visit to the Caloundra Air Museum on 17 May. We need confirmed numbers to finalise arrangements. If we can get 12 or more attendees, we'll receive a guided tour and gain access to areas normally closed to the public. If you're planning to come along, please let us know by the next meeting.

Our next meeting is on 4 May—we'd love to see you there!

Best wishes

Peter Ratcliffe
President BVSAC

Don't be Dis-Gusted

By Rob Knight

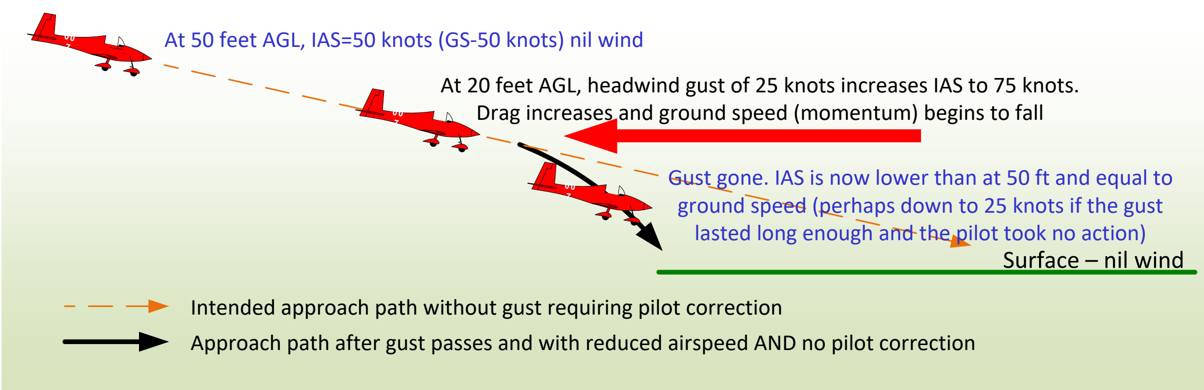
What do you do when you get dis-gusted? Does gusty wind changes stuff-up your approaches? Let's have a look at what chaos gusts can cause to your approach and airspeed when you are trying to slide down your perfect approach path.

Once again, it's good old Sir Isaac Newton and his laws of motion that are at fault. Similar to the issues with wind gradients, gusts cause changes to an aeroplane's IAS that a pilot must either remedy continuously until the landing occurs, or the pilot must abort the approach and carry out a go-around. It's a case of the aeroplane having inertia and not being able to change its momentum in an instant. As also happens in the case of wind gradients, a change in wind speed will reflect in the aeroplane's airspeed after being factored by the aeroplane mass and its state of motion.

The fundamental cause of the issues lies in the transience of gusts; they appear and disappear so quickly. This is a good thing otherwise a good gust of headwind could see an aeroplane ultimately robbed of its entire airspeed after the gust passes, potentially the aeroplane could be left with no airspeed whatsoever.

Let's look at this in the simplest scenario. An aeroplane is on approach at 50 knots in a dead calm (nil wind condition). The ground speed is steady at 50 knots to match the airspeed when a sudden 25 knot gust of headwind strikes the aeroplane's nose. Accepting that a 600 kg aeroplane could be generating 480 kg of lift as it descends on its approach, and if we assume it has a lift/drag ratio of 10:1, it will be suffering 48 kg of drag. Remembering that aerodynamic drag rises as the square of the airspeed change, a 25-knot gust is half the value of the current speed and will therefore double the drag. So, with no input from the pilot, the aeroplane's drag increases from 48 kg to 96 kg. The pilot may notice a tightening of the shoulder straps as the ASI needle swings up the dial and the increasing drag causes the aeroplane's momentum to diminish as the groundspeed falls.

In other words, the effect of the wind gust is to temporarily raise the airspeed which, in turn, temporarily increases the drag. The increased drag will then reduce the newly risen airspeed and with this reduction will come a reduction in the groundspeed. If the gust lasts long enough, the ground speed can be reduced by the full strength of the gust – in this case by 25 knots – to (60-25=) 35 knots. This could easily leave the aeroplane below its stall speed.



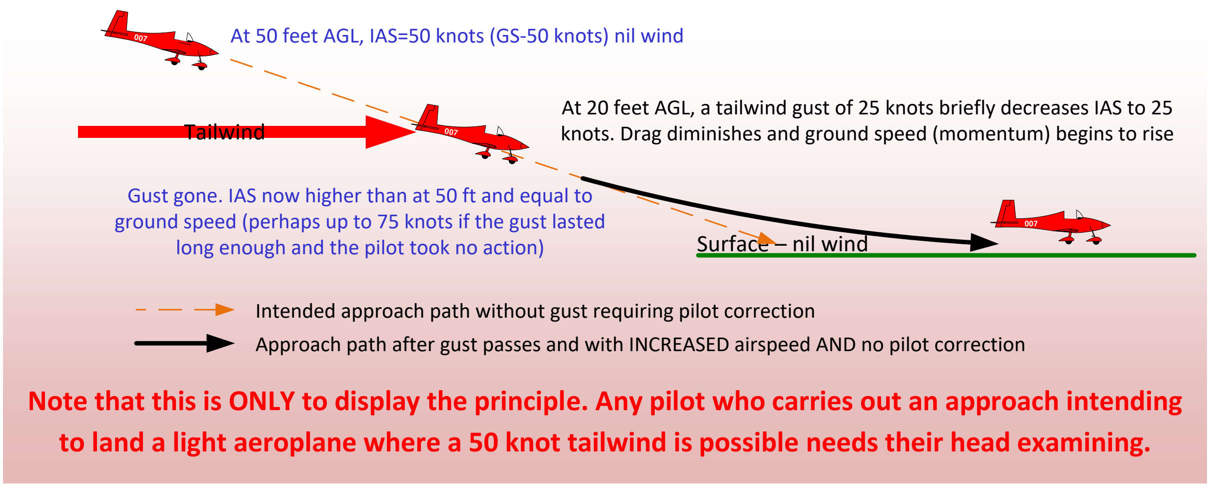
However, it is seldom that gusts just appear in times of calm air and, unlike squalls, gusts rarely last long enough for their full strength to take effect. But even half gust strength can cause anxiety as they drive the ASI needle around the dial and magically take away the ground speed and lead an unwary pilot into a short landing, short of the field, that is.

A crosswind will reduce the effect of gusts. A quick look at the crosswind table factors shows that an increasing angle between the aeroplane's heading and the wind direction provides a reducing headwind component and so a reducing effect on the groundspeed. With less headwind component the airspeed rise is less so, in turn drag rise is less and less ground speed and thus momentum is lost.

° off	Headwind	Crosswind
0	1.0	0.00
10	0.98	0.17
20	0.94	0.34
30	0.87	0.5
40	0.77	0.64
45	0.71	0.71
50	0.64	0.77
60	0.5	0.87
70	0.34	0.94
80	0.17	0.98
90	0.00	1.0

As the table on the right depicts, a wind blowing at 60° to the aircraft's nose will provide a headwind component of only half (0.5) of the wind speed value. Thus a 20 -not wind blowing at 60° to the nose will only provide a 10-knot headwind effect. However, this is only a partial relief to the pilot as the crosswind component quickly makes for directional and even geographic challenges.

A tail wind condition will have the reverse effect. A gust "up the tail" whilst on finals will see a temporary fall in airspeed because gusts will temporarily reduce the effective IAS and thus reduce the drag. The reduction in drag will cause the groundspeed to increase as the aeroplane's mass overcomes its inertia and, when the gust passes, the IAS will reflect this increased speed on the ASI reading. To look at this process closely, the tail wind gust reduces the drag so, when the aeroplane overcomes its inertia, it will accelerate and increase its ground speed. When the gust has gone, the aircraft is left holding a higher groundspeed which then reflects in a higher airspeed.



Unless the pilot does something about it as soon as the gust passes and the airspeed rises past the desired value, it can cause considerable difficulty containing the runway distance required at most airfields. Considering tailwind gusts encountered during and after landing, as aerodynamic drag assists with braking after landing, any reduction in drag caused by a tailwind component or condition will make more work for the braking system to land in the same length.

So, what can/should a pilot do about gusts when they occur on approach and landing? Conventionally, in light aircraft, pilots control airspeed with attitude (elevator) and approach angle with power (throttle) and this is no exception. With a headwind condition, first the airspeed rises as the gust hits the aeroplane, and then, after the gust passes, the airspeed begins to fall. During the span of these occurrences the pilot should be adjusting the attitude to maintain airspeed and simultaneously adjusting the throttle to maintain the desired approach path. These corrections, if done at the beginning of the change, are seldom substantial control movements and over-control is easily achieved. The secret is in keeping the aeroplane doing what is required, not having to return it from a substantial deviation in either airspeed or approach angle. If substantial changes appear necessary it would be wise to go around and make another approach. I don't recall any aircraft accident occurring because it went around.

Exactly the same process needs to be followed with a tailwind gust except the airspeed first falls and then rises – the opposite of the headwind condition. The pilot's response is the same – to control airspeed with attitude (elevator) and the approach angle with the throttle (power). Remember, though, tailwind approaches by choice are likely to carry legal implications should an accident occur; current aviation law encourage take-off and landing operations on most aeroplanes only into wind.

Headwind gusts on take-off are also an issue. Imagine that you are charging down the runway almost ready to lift off. Suddenly a headwind gust adds 20 knots onto your airspeed. Your aeroplane leaps into the air and all looks good until the gust passes when the aeroplane may have insufficient speed to remain airborne. It hangs on the prop as it stalls and settles onto the ground again. If the stall occurs high enough and the pilot exercises insufficient pitch control, a wing drop stall is easily possible.

Tailwind gusts on take-off may reduce the IAS at any point including just on lift-off, Sure, when the gust has passed, the airspeed will be returned to the same value (or even a little higher), but until that happens a loss of lift and potential stall are both possible. "Take-off with a tailwind", now sounds a bit like a Mother-in-Law's advice, doesn't it!

Another factor to consider is the frequency of the gusts. A single gust may be easy to handle but a series of gusts can hammer the ultimate speed reduction to very uncomfortable levels unless quickly countered by the pilot. Also bear in mind that a gusting wind that is also swinging in direction varies its effect and the closer to being a direct headwind the more severe will be that effect.

So what can a pilot do to avoid the hazards of wind gusts? One is to approach with a little extra airspeed when the windsock is flicking like a horses tail, and the other to simply be alert and fly the aeroplane. If the hand holding the stick adjusts the attitude to control the airspeed, and the hand holding the throttle adjusts the power to correct the changing approach path, the effects of gusts should be controlled. However, the bottom line remains (as always) - if the pilot is in any way concerned, then a go-around will resolve all the issues: go back and start the procedure from the beginning.

Pilots should ensure that their piloting skills are always up to scratch. For this reason, a few circuits with the local CFI when the wind is having a hissy-fit is always a good investment.

As an almost after-thought – why would anyone other than a pilot carrying out an emergency flight, air ambulance perhaps, be going flying in such severe conditions.

Remember the definition of a superior pilot – "One who uses their superior airmanship to avoid conditions that will cause him/her to demonstrate their superior flying abilities".

Happy flying

A Hurricane of the Harry Hawker Kind

Rob Knight

Nicknamed "Hurri" by its pilots, the Hawker Hurricane was a British single-seater monoplane fighter aircraft designed by Chief Designer Sydney Camm at Hawker Aircraft in the early 1930's. It saw exemplary service in World War II and accounted for over 60% of the air victories in the Battle of Britain.

The Hawker Hurricane

Considered by many to be inferior to the ubiquitous Supermarine Spitfire, it was, in reality, not so. Instead, it had had its own character and its own advantages as a fighter aircraft, as its success rate in victories above indicates clearly. Designed earlier than the Spitfire, the Hurricane used fabric covering on its wings and trail surfaces and had a larger frontal area than it's later Supermarine sister. This led to a generally slightly lower performance over all, but allowed it to carry more damage from enemy action and survive, than the Spitfire. In combination, the two designs made a formidable team and were ultimately responsible, along with the tenacity and courage of the RAF pilots, for the ultimate defeat of the Luftwaffe in the Battle of Britain in 1940.

The fabric covered fuselage and pilot's foot step for entering the cockpit.

Notably, it was significantly cheaper to produce than the Spitfire, taking 10,300 man-hours per airframe to produce, compared to 15,200 for the Spitfire, which had many parts formed by hand.

The Hurricane Mk.1 entered RAF service in 1937. Powered by a Rolls Royce engine, the 'Hurri' was considerably faster than the then current RAF fighter aircraft (Hawker Furies and Gloster Gladiators), being capable of level flight speeds up to 295 knots. Also, compared to other existing fighters, it had superior range and better armed with up to four machine guns and two 20mm cannons, depending on its mark, the Hurricane design combined streamlined aerodynamics, strength, and agility making it one of the more successful fighter planes in history.

The Hurricane was typically delivered to the RAF equipped for both day and night operations so was provided with navigation lights, Harley landing lights, a set of the complete blind-flying equipment for the times, and two-way radios. As this was a top-of-the -range new fighter, and mostly secret, much of its specific performance data was intentionally concealed from the general public. However, its construction and design were advanced for the times and the simple steel tube structure that supported the engine was fitted with easily detachable cowling panels to permit simple and quick access to most of the engine's areas for maintenance. Installed underneath the fuselage, the liquid-cooled radiator had a aft rectangular opening covered by a hinged flap to allow the pilot to control the cooling level to remain inside normal operating temperature ranges.

The first production version, supplied between 1937 and 1939, had fabric-covered wings and a wooden, two-bladed, fixed-pitch propeller. These propellers were quickly upgraded to three bladed two -pitch propeller to improve take-off performance and reduce distances required. The power came from a 1,030 hp Rolls-Royce Merlin Mk.II, the sting in its nose came from eight .303in (7.7mm) Browning machine guns fitted into the wings and firing clear of the propeller arc.

Mechanics servicing the engine of a Hurricane I of 501 Squadron, at No. 1 Repair Centre, Reims, Champagne, in France, in 1940. Note the four gun-ports in the leading edge of each wing

As a low-winged aircraft, cockpit visibility was better than any biplane, and Sydney Camm had deliberately located the pilot high up to maximise it. He had provided a fully enclosed cockpit, still a new innovation in fighter aircraft, with only the Gloster Gladiator, the RAFs last biplane fighter, introduced to the RAF in 1936, being similarly equipped. Also aiding forward visibility was the far more streamlined nose shape provided by the use of the Merlin engine, compared to the blunt radial powering the Gladiator the Merlin blanked out much less of the sky ahead and downwards. It really was a gamechanger for the soon-to-be battling pilots.

Also showing its advanced pedigree was the Hurricane's retractable undercarriage. Entering RAF service just the year before, in 1937, the Avro Anson was the fastest aircraft in RAF 's fleet, no RAF fighter could touch it for level flight speed. This included the Gladiator which makes it easy to see why the Gladiator was quickly despatched to outreaching theatres of war leaving Hurricanes and Spitfires to fight on the home front.

Flying the Hurricane was easy by the standards of the day. The Merlin starting procedure was simple - preset the throttle and mixture, select the magneto switches to ON, and press both the Booster Coil and Starter buttons. Then just watch and feel that big shovel-bladed propeller slowly start to jerkily turn before blurring into a vibrating rumbling and a cloud of oil smoke. And then being rewarded with the smooth seismic grumble of an idling Merlin.

Hurricane Mk.IIa, cockpit. Note left rudder applied.

Taxiing the Hurricane was painless once one becomes familiar with the pneumatic lever-differential braking system. A bicycle brake lever on the top of the spade grip routes air to the brakes, and rudder pedal movement determines the amount of differential braking – a very British system.

The Hurricane sits placidly upon its wide landing gear; the C of G[1] position holding the tail firmly planted behind. Ground handling was easy, with none of the nose-over anxiety that was always

[1] *C of G – Centre of Gravity.*

present during the taxi and run-up in the Spitfire. The engine temperatures quickly stabilize, allowing an unhurried run through the take-off checklist. Now Ready to roll?

The canopy was fully open for normal take-offs to facilitate a hasty exit in the event of an engine failure and roll-over. As the rumbling becomes a roar, airflow trying to negotiate the edges of the steep blunt windscreen was torn to turbulent tatters. The wind and buffeting in the cockpit was atrocious! Too often, a new pilot would not secure maps, checklists and test cards sets, which would whirl around the cockpit, combining with any loose ends of the parachute and harness straps to beat upon the hapless pilot's face. Needless to say, after one experience, everything was securely stowed for take-off.

One wisely opens the throttle slowly on any powerful piston engined aircraft so the brain was ready to see nose swing and direct the feet appropriately to counter the propeller's directional wanderlust. The Hurricane's rudder was generous in size, and being awash in Merlin-motivated airflow, easily enables the pilot to track the centreline during take-off. However, a hint of right aileron was still good medicine against propeller torque.

Upon opening the throttle, the first of the Hurricane's personality traits asserts itself. It was loud! Perhaps it's the fabric skin or that the pilot sits quite far forward, but it's loud even by Merlin standards. There was sufficient propeller ground clearance that normal take-offs may be done from the two-point attitude (tail up) and it's nice to see where the nose was pointing but, try that in a Spitfire and the propeller tips will likely be squared by the runway.

When the Hurricane was ready to fly, let it! The VLE[2] is a mere 104 knots, requiring the adoption of quite a high nose attitude to get the wheels retracting before exceeding the limit. This was a busy period. Immediately after lift-off the pilot must squeeze the brake lever to stop the main wheels rotating before changing hands on the spade grip to reach the U/C position control, a unique H-shaped lever mounted on the lower right cockpit sidewall which, confusingly, controls both flaps and undercarriage. To raise the U/C, the pilot must change hands on the stick and grab the lever. Then move it upwards on the inboard side to raise the undercarriage.

An issue with the Hurricane was a tendency for throttle creep and pilots had to also ensure that full throttle was maintained. If the throttle had crept, he had to quickly change hands, again, on the spade grip stick to jab the throttle back to climb power (+4 lbs of boost), then re-set the propeller to 2650 RPM as necessary for the climb.

When manoeuvring, the Hurricane's controls were heavy, but not unpleasantly so. Rudder coordination was always required, a characteristic of its design vintage. Attitude trim was vague and trimming the aeroplane could not generally be satisfactorily done so the pilot couldn't really take his hands off the stick. This issue was due, at least in part, to substantial friction in the mechanical control system. In this regard, comparisons were inevitable. Wartime propaganda told that, while the Spitfire was more agile, the Hurricane was a more "stable gun platform". This was never the case. In terms of defined stability, the Spitfire won by a small margin on all counts. Nevertheless, the issue was never so severe that it negated the aircraft's abilities as a fighter aircraft.

Flying the Hurricane was hot work, even at high altitudes. The engine oil and coolant radiators were mounted in the "bathtub" structure beneath the fuselage, and exposed plumbing systems for both

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[2] VLE - M*aximum airspeed with under carriage extended.*

oil and radiator ran along the sides of the cockpit. For this reason, Hurricanes were often flown on patrols with the canopy cracked open, to be closed when action began.

As with all approaches to land, airspeed was critical. In the Hurricane, it was not just the maintaining of the required approach airspeed that was critical, but, as mentioned above, the V_{LE} and also the V_{FE} speeds were uncomfortably close to the approach speed. As both the undercarriage and flap extension sequences were both quite slow actions, caution and control was necessary to ensure the aircraft remained within its airspeed limitations. Of further concern, was the huge trim change as the flaps were lowered, requiring a further division of the pilot's attention. It was normal for the aircraft to run out of aft elevator trim on approach.

Elevator effectiveness was poor in the 3-point attitude and most pilots left a trickle of power through the flare to soften touchdowns. However, the rudder was adequate for directional control and, with the wide-stance, inward retracting undercarriage, provided directional stability and a good response to allow adequate tracking through the roll-out. There was even enough download on the tail to allow some use of brakes.

Over the period of WWII, the Hurricane was developed through several versions ranging from interceptor-fighter, bomber-interceptors, fighter-bomber, and ground support aircraft. Versions were developed for the Royal Navy and known as Sea Hurricanes which had modifications including an arrester hook for operation from ships. Some were converted as catapult-launched convoy escorts. By the end of production in July 1944, 14,487 units had been completed in Britain and Canada, with others built in Belgium and Yugoslavia

The type served with distinction in France, in the retreat from Dunkirk, and was an important asset in the middle-east, a part of the Desert Airforce in North Africa, where it suffered heavy casualties against the Me 109s. As a result of the losses, the Hurricane role was changed to that of ground attack (or fighter-bomber) where its thick wings, giving it excellent manoeuvrability, and its ability to take groundfire, allowed the type to excel in its new role. Here it was fitted with 4 20mm canon and a 500lb (230kg) bomb.

Faith, Hope, and Charity, the famous Gloster Gladiators that provided the amazing defence of Malta, were replaced with, initially, four Hurricanes. These were later assisted by a further 12 aircraft and two Blackburn Skuas, all forming the Island's defence until the German squadrons attacking the Island were transferred to Russia at the start of Hitler's Russian campaign.

Hurricane V7476 sent to Australia in May 1941, arriving in August, was the only Hurricane based in Australia during the Second World War. The tropicalised Vokes air filter, which was fitted to many types operating in the Pacific, is visible under the nose.

Hurricanes also went to Russia, 2952 being actually delivered. This number made it the most numerous aircraft in the then Russian Army-Airforce. However, the Russian pilots were not enamoured by their free-supplied aircraft as they felt the Hurricane's performance was poor compared to their opposing German aircraft. However, the exceedingly high kill-rate achieved by the Russian pilots flying their free Hurricane's belie this belief entirely.

The Hurricane also fought the Japanese. Replacing Brewster Buffaloes which were inferior to the Japanese attacking fighters, Hurricanes put up a spirited though ill-fated defence of Singapore. Re-directed to Singapore from the Middle East as a stop-gap measure, these machines had been fitted with special air filters and extra machine guns, the combined weight of which reduced their performance to below par and they were unable to hold their own against the Zeros.

Specifications Hurricane (general):

Crew: One

Length: 32 ft 3 in (9.83 m)

Wingspan: 40 ft 0 in (12.19 m)

Height: 13 ft 1.5 in (4.001 m)

Wing area: 257.5 sq ft (23.92 m^2)

Aerofoil: root: Clark YH (19%); tip: Clark YH (12.2%)

Empty weight: 5,745 lb (2,606 kg)

Gross weight: 7,670 lb (3,479 kg)

Max take-off weight: 8,710 lb (3,951 kg)

Powerplant: 1 × Rolls-Royce Merlin XX V-12 liquid-cooled piston engine, 1,185 hp at 21,000 ft.

Propellers: 3-bladed

Performance:

Maximum speed: 340 mph (550 km/h, 300 kn) at 21,000 ft

Range: 600 mi (970 km, 520 nm)

Service ceiling: 36,000 ft (11,000 m)

Rate of climb: 2,780 ft/min (14.1 m/s)

Wing loading: 29.8 lb/sq ft (145 kg/m2)

Wing loading: 29.8 lb/sq ft (145 kg/m2)

Armament:

Initially, 8 X machine guns, later 4 × 20 mm (0.79 in) Hispano Mk II cannon.

Bombs: 2 × 250 or 500 lb (110 or 230 kg) bombs.

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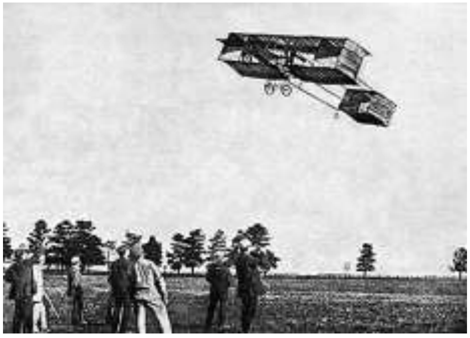
The First Powered Flight in Australia

By Rob Knight

In 1910, Harry Houdini was the first man to fly in Australia.

In 1909, Houdini, fascinated with aviation, purchased a French Voisin biplane for $5000, along with its full-time mechanic, Antonio Brassac. Being built specifically for him, the Voisin weighed 1,350 pounds, with Houdini aboard. With its 8 foot “pusher” propeller behind the pilot, the Voisin resembled an enlarged powered version of the English Bristol box kites. He learned to fly in Hamburg, in Germany, and after first crashing it, he made his first successful flight in Hamburg, on November 26 in 1909.

Then Houdini’s dream of being the first to fly across Australia surfaced, and he shipped the aircraft to Melbourne where he set up his projected attempt to be the hero. At first, for almost a month, the attempts at flight were thwarted due to wind conditions and when the wind conditions improved, Houdini's initial attempts to take off were unsuccessful due to mechanical issues with the aircraft’s controls. Although some disagree with the exact date, finally, early on the morning of March 18, 1910, Houdini succeeded in making three flights, then becoming the first person to fly over Australian soil.



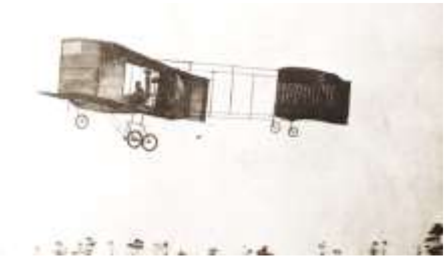
In flight over Australia on March 18, 1910.

The last of these flights was the longest and involved him covering a distance of two miles and achieving a height of 100 feet in 3 ½ minutes. When interviewed after this flight, Houdini said, "When I went up for the first time, I thought for a minute that I was in a tree, then I knew I was flying. The funny thing was that as soon as I was aloft, all the tension and strain left me. As soon as I was up all my muscles relaxed, and I sat back, feeling a sense of ease. Freedom and exhilaration, that's what it is."

On March 21, 1910, Houdini flew a much longer flight, covering over three and a half miles, before a crowd of about 100-120 spectators. In doing this, he completed a flight of about six miles in 7 minutes, 31 seconds.

Houdini's flight on the 18th of March in his Voisin was witnessed by magic and aviation enthusiasts, newspaper reporters and representatives of the Australian Aerial League, and was certified and acknowledged as the first controlled powered flight in Australia. In addition, Houdini was the first aviator to have documented the event(s) on film.

Ending his Australia tour, Houdini shipped the Voisin into storage in England. Although he announced he would use it to fly from city to city during his next Music Hall tour, Houdini never flew again.



Harry Houdini, airborne in Australia.

That storage place is the last known detail of this aircraft. It was later removed and lost to known records so its ultimate demise is unknown.

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The Essence of Physically Piloting an Aeroplane

By Rob Knight

What are the basic manipulative skills necessary to fly an aeroplane, really?

I have received vacant looks of total disbelief when I have been talking to non-pilots about how easy flying an aeroplane really is. When I mention that, in reality, there are only four essential manoeuvres a competent pilot must maintain mastery of, I have been immediately found guilty of a gross simplification. However, there is no salesmanship involved. I am speaking the truth: my statement is absolutely factual.

The four manoeuvres are (in no particular order)

- Straight and level
- Turning,
- Climbing, and
- Descending

Think about it – a take-off is accelerating whilst keeping the aeroplane straight (with the ridder). Then, after the wheels leave the ground, the climb is established. Turns may or may not be required whilst climbing. On reaching the desired altitude, a pilot levels off and flies straight and level and unbanked, unless changing direction either laterally or vertically. Then, lastly, the pilot descends to the surface to land, until the flare on the surface when the aeroplane, again flies straight and level as the airspeed dissipates until the aeroplane lands on its wheels. If only we could find it as simple as that.

Let's take a walk through the difficulties that our human natures visit upon us as we move through these four exercises.

THE STRAIGHT AND LEVEL EXERCISE.

Often this exercise is the second lesson taught during initial flight training. It is so early in the syllabus because it provides student practice in using the three flight controls that were illustrated in the first lesson – effects of controls this developing the knowledge the student retains of the basic control about the three axes and practice in manipulating the aeroplane's flight path.

The straight and level flight lesson is aimed at beginning the handling skills of the pilot to divide his/her concentration to allow two limbs to work in a coordinated fashion. The hand, on stick or yoke, controls roll and pitch, while the feet on the rudder pedals controls yaw. It is virtually inevitable that the trainee's brain will never previously have been required to carry out such an exercise unless they have mastered the ability to pat the top of their head whilst simultaneously rubbing their tummy.

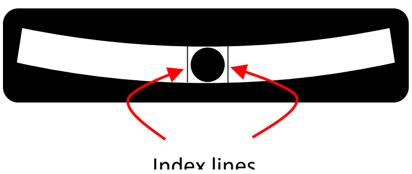
Instead, as humans using their limbs to control machines or vehicles, the trainee's skills have been developed around using their hands to control all yaw which is how we control motor vehicles, and, to further compound the confusion, it's their foot that has been controlling the engine power and thus their speed. Now, the student is required to maintain the vertical nose position with pressing or squeezing back on the stick or yoke with one hand, and that same hand keeping the wings level, whilst their other hand controls the engine. Their feet must now stop any yaw and control their aeroplane's straightness against a vague indistinct point of the horizon. This must be the greatest sea-change that has ever been devised!

As an examiner, I have checked logbooks post flight-test to seek answers to questions raised during the test, and sometimes seen just a single 20-minute entry logged as the straight and level training exercise and not another entry in the entire book. It's an impossibility for any trainee to gain the necessary proficiency in such a short time. Some instructors have argued that further training occurred but was unrecorded, being carried out during subsequent lessons. But the performance of the candidate at flight test attested that this whole process was ineffectual as the candidate simply couldn't fly in a straight line. Generally, the attitude holding is OK, but in regard to directional control, a constant swooping or swerving either side of the desired track line was as close as they could get. They had not developed the inherent habit required of pilots of noting a reference point on the horizon and keeping their nose on that point with the rudder using their feet.

This, over the years, has been so frequent that there is no longer any mystery as to why the candidate lacks the necessary skills. The straight and level lesson was either not taught properly in the first instant, or the student developed subsequent bad habits and sloppy ways that were never picked up during subsequent BFR flights. Virtually every pilot trainee drives a car and they will carry the steering habits from the motor vehicle across to aeroplanes unless their instructor has the wit and the knowledge to prevent it. That's just human nature for you!

Some senior instructors have argued that the technique I write of above is tantamount to insisting that pilots "pick up a wing" with aileron". Rubbish – I never mentioned any wings – just the nose remaining on a selected point ahead, on the horizon ahead. The flaw in their argument is that, if a pilot uses rudder to prevent yaw, or stops any yaw away from that selected point, the wings will remain level without pilot input. If the aeroplane rolls uncommanded, the pilot has not kept straight with the rudder, and the ensuing yaw has rolled the aeroplane because of the further effects of yaw. Yaw promoting roll is taught in the Further Effects of Controls part of the lesson so it should already be known that, if the wings aren't level, it's too late - the pilot never noticed the yaw and stopped it in the first place. Now he/she has two problems to fix – the aeroplane is no longer flying in the desired direction AND the wings aren't level so the directional change is increasing. The pilot must now deliberately turn back, using opposite bank, and roll out when the nose is again on the selected point. What a silly situation, when merely using very small rudder applications to keep the nose on the selected point would have seen the wings remain level and the aeroplane maintain its straight path across the earth's surface. However, people's human nature mixed with old habits make this issue very commonplace indeed. Are you a victim?

TURNING



This is usually the third lesson in sequence in the ab-initio instructor's toolbox. Often logged as "medium turns", initially level turns are covered, and then turns whilst climbing and descending. A bank angle of about 15˚ is desired and the ball within about its diameter outside the index lines is acceptable without comment at this early stage: attempts at balancing the adverse yaw is more important than success at this early stage. After experience is gained, a smooth entry and exit are desired and any imbalance created during the entry or exit from the turn should be seen and immediately corrected.

In the turn, at flight test level the ball should not have more than half its diameter consistently outside the index lines.

Also, after the initial medium turns lesson, additional training in turning will include climbing turns, descending turns, stalling in a turn, and recovery from unusual attitudes including spiral dives. These all use the basic techniques covered in the very first lesson, but the physical sensations experienced will vary greatly. If advanced training is undertaken, emergency (maximum rate) turns are likely to be included. In such cases, the aeroplane will be turned at its maximum achievable bank angle which will require full throttle to offset the drag because the angle of attack must be very close to the critical angle immediately prior to the onset of the aerodynamic stall.

So, from an examiner's perspective, what goes wrong with such a simple turn exercise?

A number of things, actually, and some are potentially quite hazardous. Lookout often falls victim to casual familiarity, as does the actual precise use of the controls during the turn

The loss of precise control inputs are often clearly reflected in a pilot's failure to maintain a desired bank angle. He/she becomes so engrossed in fighting with altitude control because of the under or over bank they are too tied-up to see the cause of the issue and resolve it without assistance.

The standard BLAC patter for a turn is as follows:

ENTRY:

LOOKOUT – in the direction of turn – above, around and below.
ROLL IN - with aileron, balancing with rudder.
STOP - the roll by removing aileron (and rudder) at the required bank angle.
ADD – back stick pressure sufficient to maintain height (or airspeed) and power if airspeed decays.

IN THE TURN: (Do Not Re-Trim whilst banked)

LOOKOUT.
BANK ANGLE CONSTANT – use aileron, balancing with rudder.
BALL - in the middle – if not in so – step on it.
MAINTAIN HEIGHT/AIRSPEED – Adjust backpressure (this the angle of attack) GENTLY.
CHECK EXIT POINT REQUIRED and anticipate necessary action.
REPEAT process until exit point is anticipated.

EXIT:

ROLL OUT - with aileron, balancing with rudder.
STOP - the roll out by removing aileron (and rudder) at the wings-level attitude.
RELEASE BACK STICK PRESSURE - and allow the nose attitude to resume the normal level flight attitude or attitude for desired climb/descent as required.
LOOKOUT – around, above and below.

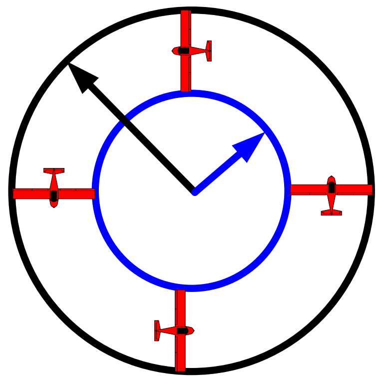
Now to the issues that examiners see in candidates.

There is a tendency, unless removed by the teaching instructor, for students to fail to maintain a constant bank angle. There are two reasons for this:

1. To not remove sufficient aileron to stop the roll in so bank increases in the turn, and,

2. Falling victim to the natural tendency for aeroplanes to overbank because of the airspeed differential between the wing tips during turns. *Whilst turning, the inner wing travels a shorter arc than the outer wing tip so it covers a shorter distance in the same time. Thus, the airspeed on the outer wing will be higher and so provide more lift, causing a continued roll into the turn. This will require some out-of-turn aileron (with appropriate rudder to balance) to be maintained to keep the bank constant during the turn.*

   Note that the amount of out-of-turn aileron (and rudder to balance) needed to maintain a constant bank varies according to whether the aeroplane is level, climbing, or descending.



*The **black arc** is longer than the **blue arc**, so the wings travel at differing airspeeds creating roll into the turn*

Often, when doing remedial training to correct this habit, the success is very rapid and provides joy to both sides of the cockpit. With very little effort, the instructor sees a change of great magnitude in the student's turning skills, and in the recipient, a beaming smile indicates he/she has been touched with a magic wand, and seemingly impossible to attain accuracy in turns has suddenly become achievable. A classic win-win situation.

With the accuracy attainable immediately by maintaining a constant bank angle, airspeed and/or altitude control also become far easier. For any given weight and angle of bank there is ONLY ONE back-pressure to make an accurate turn. Without a constant angle of bank, the required stick back-pressure force cannot be constant so accuracy in maintaining turn parameters cannot be constant.

<u>CLIMBING</u>

There are few issues relating to climbing that require any substantial re-education. The few that do relate more to sloppy flying habits than a lack of pilot understanding or training.

Airspeed control is probably the worst issue, and this is frequently the result of a failure to trim correctly during cruise climbs (lazy habits). The second would be maintaining an adequate lookout ahead because so much of the view ahead is obscured by the nose. This is most important in low aspect ratio winged aircraft, such as Piper PA28's, especially older models with the squared, short wings, and others such as the Zenair low-winged varieties. Such aircraft do require "S" turns in a sustained climb to ensure the area ahead is adequately scanned to ensure no unsuspected or unsuspecting air-traffic lies ahead.

Perhaps of lesser importance is the issue of keeping the balance ball centred (no slip or skid) in the climb. At all times the propeller is turning, the resulting slipstream is impacting more on one side of the keel surface than the other so creates a "out of balance" situation. Propellers turning clockwise from the cockpit create a force pressing the tail right and so the nose left. This will, in turn, create the requirement for a pilot to hold a touch of right rudder in the climb to remain in balanced flight. Powerful engines create the need for a rudder trim device to hold this without pilot input, but most light aeroplanes are without this facility. As "P" factor is a force that adds to the slipstream effect, it is most noticeable in the climb especially when at high power settings and the airspeed is below cruise speed.

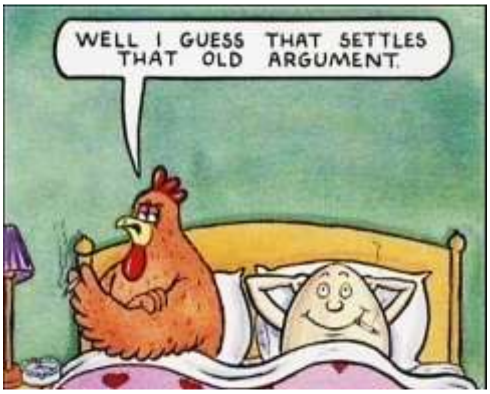
DESCENDING

The greatest issues I have seen with issues in the descent relate to the accuracy of airspeed retention whilst in a glide doing engine-out forced landing exercises. For best glide performance, the aeroplane must be operated at its airspeed to achieve its best lift to drag ratio, Given by the manufacturer as a TAS value, unless the aircraft being operated is something like a WW2 fighter, use the TAS value as an IAS on your airspeed indicator and maintain that speed. This will give the best still-air glide range. However, I have observed pilots initially set an accurate airspeed as required, then forget to trim, and as soon as they are distracted by other duties during such an exercise, the airspeed changes and glide performance decays. This has resulted in a dreaded FAIL when other flaws are factored into the level of displayed performance.

The other demonstrated issue with the descent is, once again, alas, LOOKOUT! Especially dangerous when pilots make straight-in approaches, and their over-all workload is higher. They are maintaining a higher speed than the normal approach speed value, and still need to complete their required checklists, so their lookout ceases. For me, this is another, albeit small, issue that I have using printed checklists in single engined VFR ops aircraft. It's better to keep eyes and heads OUT of the cockpit than give further cause and reasons to keep them IN.

That pretty-well sums up a practical examiners view of required pilot performance. Flying isn't hard, but it requires a definite set of unique skills that are different to apparent logic and almost anything else a human can do that's not in some way, related to the air. Any failure on the pilot's part to maintain these skills makes him/her a danger to themselves and to all others in the air including their own passengers

Happy Flying.



Fly-Ins Looming

WHERE	EVENT	WHEN
Murgon (Angelfield) (YMRG)	Burnett Flyers Breakfast Fly-in	**Find Next Planned EVENT AT** **http://www.burnettflyers.org/?p=508**

Socializing: Club Trip to the Caboolture Air Museum

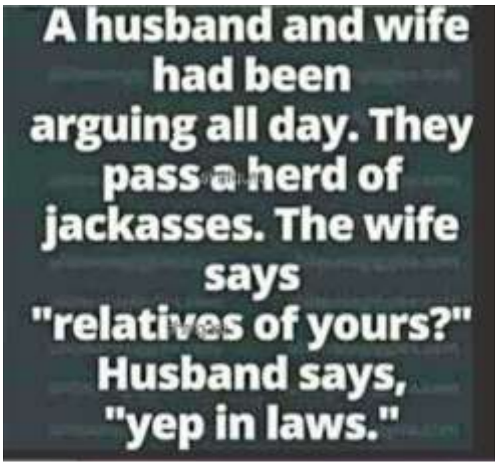
At the Club meeting in March, the BVSAC members and friends were invited to visit the Caloundra Air Museum.

The museum visit is planned for Saturday morning the 17th of May, and the cost of admission will be $25.00 per person. If the BVSAC can get 12 or more people to attend, the museum will provide a private tour. This will allow visits to some places and some aircraft that the public cannot normally access.

After the tour, the BVSAC members and friends will likely go to a local venue (EG: RSL) for an informal lunch. All members and friends will be welcome to come along to lunch as well.

Please RSVP with your names and numbers so we can arrange the booking and make the arrangements.

Peter Ratcliffe, Secretary BVSAC



The Days of Our Lives (From a Flying Instructor's perspective).

By Rob Knight

As the CFI, you are responsible for the actions of your members insofar as ensuring that their training and aircraft operations are all above reproach. This extends the gamut from more junior instructors down through CPLS, PPLs and students.

When I worked for Waitemata Aero Club I followed one club trip down the North Island on a social visit to the New Plymouth Aero Club. I arrived at New Plymouth about an hour behind our aircraft and was pleased to see them all tied down in an orderly fashion, neatly in a line with their picket ropes with no slack. I decided to compliment the junior instructor who had been the organiser for the group. Although the early evening weather was pleasant, a 15 to 20 knot northerly was forecast to come through at around 0400 so the pickets were a necessary precaution.

As I walked away, aircraft from another organisation were still landing and their first arrivals were shutting down at their allotted parking spaces. One of these was their Cherokee 6 and I saw the door open and 7 people stream out. The last out was a junior instructor, John, with whom I had had words at a recent RNZAC flying competition when his candidate for a competition was marked fourth so was out of the race. His over-loud protests of parochialism had been unpleasant and just plainly rude until an adjudicator silenced him. I stopped to watch as I knew there was difficulty with picket pins being driven where they were as there were stones under the surface. I also knew that he had a short fuse.

One of his passengers retrieved a rolled-up pack from the rear, opened it and shook out a pile of picket pins, short chains, a hammer and some coils of cord. They crawled under the wing and, beneath the tie-down loop they began hammering in a steel pin. After several hits with the hammer, it stopped moving and began to bend. The hammer-holder selected another pin, a slightly different place, and bent that one too.

After many attempts they gave up and John sent the passenger in to register their arrival. He walked around the aircraft looking at the ground and, after several more probes with a straightened pin, climbed into the aircraft, released the brakes, and pulled the aircraft forward about a foot (300mm). He tied a cord to each tie-down loop and pulled the loose ends in under the aircraft, each length of cord lying just behind each mainwheel tire. He then pushed the aircraft backwards until the tires sat over the ropes, climbed back into the cockpit and parked the brakes.

He gathered up the picket pins, chains and the rest of the cord and put them back into the bag and srowed the roll in the forward locker. He walked away into the Clubrooms. His aircraft was now securely tied down by its mass.

Several years later John applied for a position that I was advertising and complained because I didn't offer him an interview. He didn't know what I knew!

They walk among us………

WTF - The World's Worst Aircraft – the Caproni Noviplano of 1921

By Rob Knight

Count Gianni Caproni, builder of some fine aircraft, chose for some reason to build a giant flying boat with no fewer than nine wings and eight engines. With this, or an even bigger version, he hoped to fly over 100 passengers across the Atlantic. Amidst all the struts and wings, the absence of any tail surfaces could easily be overlooked. Reportedly making a short hop without incident, the official first flight was less successful. Rising to about 18m above Lake Maggiore, the Ca.60 suddenly nosed down and dived into the water. Some said that testing had shown the need for a lot of lead ballast and that this had shifted in flight. Test pilot Semprini crawled out of the wreck unscathed. Later a mysterious fire destroyed the remains and ended the Count's transatlantic dream.

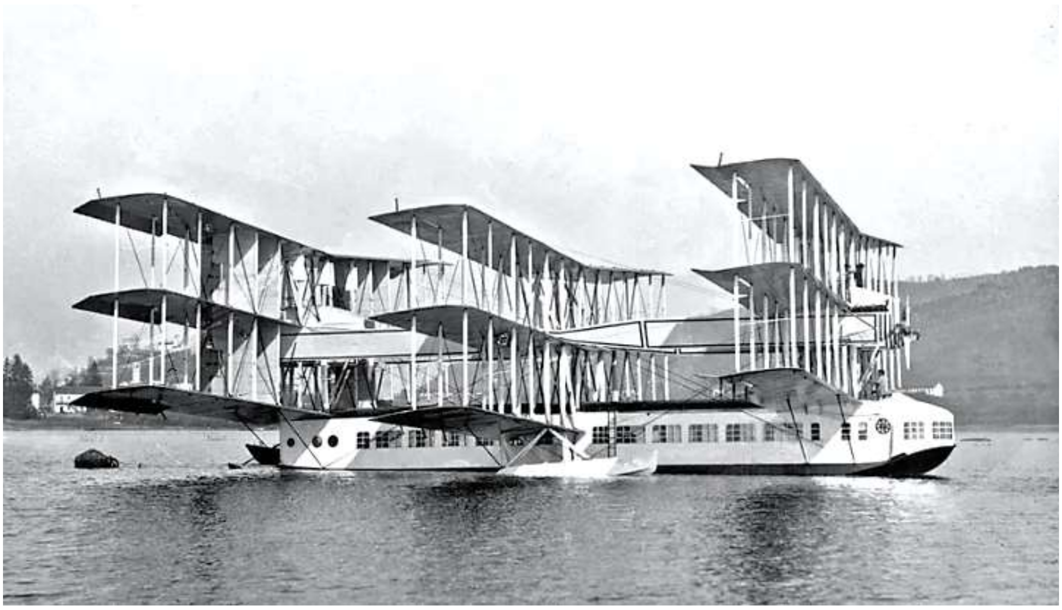
FACTS AND FIGURES

- The Ca.60 had twice the wing area of a B-52 bomber. The equal size wings would have nearly equal loading, making it longitudinally unstable. Supposedly differential use of front and rear ailerons would have controlled pitch.
- The eight Liberty engines were arranged with three pulling and pushing on the front wing and three pushing and one pulling at the back. The centre engines had four-bladed propellers.
- The pilot had an open cockpit, but the passengers in the cabin had more windows glazing than any airliner before or since.

SPECIFICATIONS:

Crew	8 persons.
Engines:	8 Liberty piston engines of 400 hp.
Cruise speed:	(Estimated) 60 knots.
Wing span	30 metres.
Length:	23.47 metres
Height:	9.24 metres.
Weight:	24993 kg

Note - Noviplano means nine wings. This aircraft is the world's only example of a triple triplane



The Caproni CA-60 Noviplano before its crash.

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

1. When flying in equilibrium, in level flight, an application of left rudder will….

   A. Force the nose to yaw right, and the aircraft to tend to roll right
   B. Force the tail to move to the left and the aircraft to tend to roll left.
   C. Force the nose to yaw left and the aircraft to tend to roll right.
   D. Force the tail to move to the right and the aircraft to tend to roll left.

1. What effects will climbing downwind have on an aeroplane's rate of climb and rate and angle of climb compared to when climbing into wind? (Ignore potential gradient effects)
   A. The rate of climb will remain the same, the angle of climb will reduce.
   B. The rate of climb will remain the same, the angle of climb will increase.
   C. The rate of climb will increase, the angle of climb will decrease.
   D. The rate of climb will decrease, the angle of climb will increase.

2. If cumulus cloud is forming, the area of sky in proximity to the forming cloud is likely to be.
   A. Neutrally stable.
   B. Unstable.
   C. Stable.

3. The centre of pressure (that position on the wing chord where all the lift forces may be considered to act) moves in flight in an unstalled aeroplane
   A. Forward with decreasing angles of attack.
   B. Aft with increasing angles of attack.
   C. Forward with increasing angles of attack.
   D. Aft with decreasing angles of attack

4. From trimmed, straight and level flight at a constant airspeed, why do most light aeroplanes pitch nose-down when the throttle is closed in flight?
   A. The centre of pressure moves aft along the chord line.
   B. The airspeed reduces and lift is lost.
   C. Slipstream is lost over the tailplane/elevator surfaces and the nose pitches down.
   D. The power of the thrust/drag couple reduces as thrust diminished and the unchanged lift/weight couple forces the nose to pitch down.

See answers and explanations overleaf.

If you have any problems with these questions, see notes below, or call me (in the evening) and let's discuss them. Rob Knight: 0400 89 3632 (International +61 4 0089 3632), or email me at kni.rob@hotmail.com.

1. D is correct.

When flying in equilibrium, in level flight, an application of left rudder will force the tail to move to the right yawing the aircraft about its centre of Gravity so its nose moves LEFT. The yawing motion, changing the relative airspeed on the wings, raises the airspeed about the right wing causing the right wing to rise. Therefore, the application of left rudder will cause the aircraft to yaw left and subsequently roll left, the roll being the further effect of yaw.

2. B is correct.

The wind direction has no influence over the rate of climb (as there is no wind gradient involved) so the rate of climb will remain the same. However, the tailwind will increase the groundspeed so the aircraft will have a shallower angle of climb

3. A is correct.

The centre of pressure moves forward along the aerofoil chord line as the angle of attack increases (which is an unstable morion) until the critical angle if the aerofoil s reached. At the stall, the centre of pressure moves rapidly rearward (which is a stable condition).

4. C is correct.

The centre of pressure moves forward along the chord line, on an unstalled wing, as the angle of attack is increased. At the stall the centre of pressure moves rapidly rearward leading to the classic nose pitch down as the stall breaks.

5. D is correct.

The thrust/drag couple reduces as thrust diminished and the lift/weight couple force the nose to pitch down. This occurs because the lost thrust means the power of the thrust drag couple to hold the nose up is reduced and is overpowered by the unchanged power of the lift/weight couple.

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Aircraft Books, Parts, and Tools etc.

Contact Rob on mobile – 0400 89 3632

Books

Title	Condition	Price
PPL Navigation, by Trevor Thom	Good condition	**$15.00**
PPL Basic Aircraft Technical Knowledge, by Trevor Thom	Excellent	**$15.00**
Manual of Aviation Meteorology, by the BOM	Excellent	**$15.00**
Human Factors in Flight, by Frank Hawkins	Excellent	**$15.00**
Aviation Medicine and Other Bhuman Factors, by Dr Ross L. Ewing	Excellent	**$15.00**

Aircraft Magnetic Compass (Selling on behalf)

Item		Price
Magnetic compass: Top panel mount, needs topping up with baby oil.		**$45.00**

Propeller Parts

Item	Condition	Price
Propeller spacers, Assorted depths, all to fit Rotax 912 UL/ULS propeller flanges	Excellent	**$100.00 each**
Spinner and propeller backing plate to suit a Kiev, 3 blade propeller, on a Rotax 912 engine flange.	Excellent	**100.00**

For all items, Contact me - on mobile – 0400 89 3632

Or email me at:

kni.rob@hotmail.com

Aircraft for Sale

Kitset - Build it Yourself

Reduced Price

$1,480.00 neg

DESCRIPTION

All of the major components needed to build your own aircraft similar to a Thruster, Cricket or MW5.

- Basic plans are included, also
- Hard to obtain 4" x 3" box section, 2 @ 4.5 metres long.
- Wing spar & lift strut material - 6 tubes of 28 dia. x 2 wall.
- 20 fibreglass ribs plus the moulds,
- 16 spar webs plus the moulds,
- 2 fibreglass flat sheets for the leading edges - 4 metres long x 1.1 metres wide.
- A ballistic parachute,
- A 4-point harness,
- Set fibreglass wheel pants, and
- More.

Box sections and tubes

Support parts – Harness etc.

A very comprehensive kit of materials

Ribs, tubes, spats, etc

Colin Thorpe. Tel: LL **(07) 3200 1442**,

Or Mob: 0419 758 125

Aircraft Grade Bolts for Sale

Aircraft AN Bolts - $500

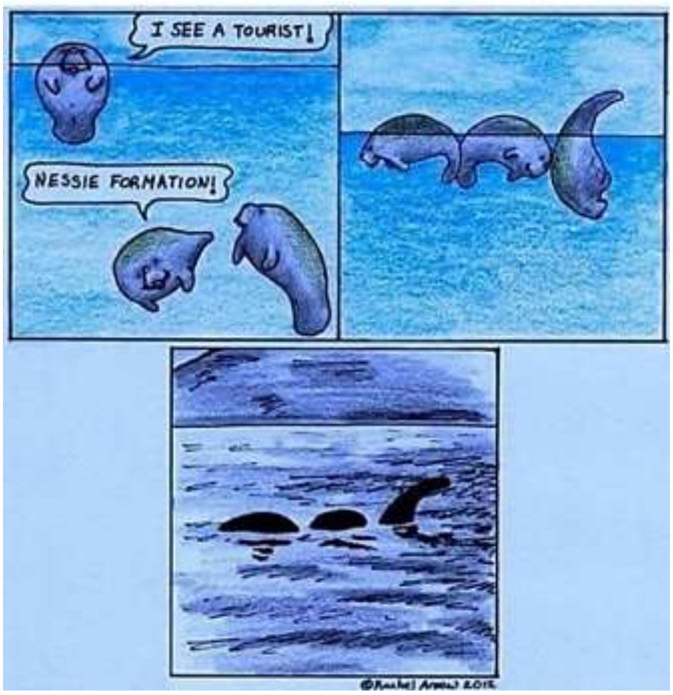
AN3, AN4 & AN5 bolts, all bagged
- 500 bolts in total.

Today's cost – approximately **$5,500**

A list can be supplied if required

Contact Colin Thorpe –

0419 758 125



Sky Dart Single Seat Ultralight for Sale.

$4,500.00 NEG

A single seat, ultralight, Taildragger. Built in 1987, this aircraft has had a single owner for the past 18 years, and is only now I am regretfully releasing it again for sale. I also have a Teenie II and am building another ultralight so I need the space.

The landed Sky Dart III rolling through at YFRH Forest Hill

TTIS airframe is 311 hours, and the engine, TTIS 312 – is just 1 hour more. Up-to-date logbooks available. 2 X 20 litres tank capacity. To be sold with new annuals completed.

Landed at McMaster Field after my flight back from Cooma just West of Canberra. In the cockpit with me is GeeBee, my dog

It is easy to fly (for a taildragger), and a great way to accumulate cheap flying hours.

Call me to view, Bob Hyam, Telephone mobile 0418 786 496 or Landline – 07 5426 8983, or Email: bobhyam@gmail.com

Single Seat T84 Thruster, disassembled and ready for rebuild.

I have a T84 single seat Thruster project in my hanger at Watts bridge.

The fuselage is on its undercarriage, the wing assemblies are folded up and the skins are with them.

Included is a fully rebuilt Rotax 503 dual ignition engine and propeller.

And, most importantly – the aircraft logbook!

Asking price $5000.00

Contact John Innes on **0417 643 610**

Jodel D9 (Bébé) for Sale

Registered 28-3503 (formerly VH-IVB)
With great reluctance I'm parting with the little Jodel as I'm simply not able to fly it often enough due to living overseas and the need to finish my Auster restoration.

Completed in 1964 by LAME Vic Bartinetti at Tumut this Jodel has around 700 hours total time on the airframe and about 300 hours on a-new-at-installation VW 1680cc Hapi conversion engine. It will be sold with a new propeller (currently in build) and current maintenance release. Currently the aircraft resides at YGYM (Gympie). Note that specific hours will be available when I return to Australia early in the New Year and can access the logbooks.

I have much history with the plane, having it bought it for the first time in 1979, then sold it, then bought it back in 2015. Email me and I will fill your inbox with stories.

I'm asking $8,000, which would include the new propeller but no radio.

Contact me by email only at kerryskyring@gmail.com

S

2000 Parker Teenie Two for sale

NEW PRICE$9,500

- ✓ TTIS 70 hours airframe.
- ✓ Engine: 1835 cc Volkswagen with dual ignition and dual spark plugs, Slick mag, and 12-volt electronic ignition.
- ✓ Built by original L.A.M.E. owner.
- ✓ Price includes weatherproof storage/transport trailer so no hangarage is required.

I purchased the aircraft in 2020 intending to enter Recreational flying, but due to work and study commitments, it never eventuated.

The aircraft last flew in 2017. I start the engine every three months and have serviced it yearly. It really needs to go to someone who can enjoy her.

Contact me, Jared Tucker, at jaredtucker1998@gmail.com,

or call me on **0450 233 263**.

See you next month