BRISBANE VALLEY FLYER

October - 2021

www.bvsac.com.au

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Cessna O-2 Skymaster. See page 17.

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Front cover image:
Cessna O-2 Skymaster. Used as Forward Air Controller platform during Vietnam war

From the Club

Hello all,

Here we are with another month gone. At least we are getting into some warmer weather and are not in lock down like our southern neighbours.

Our last monthly was well attended and the BBQ after.

The BVSAC has been informed the Air Show is to be postponed, once again. This time until July next year. The club has been thanked by the Air show committee for the help that the club had done to assist with the current preparations.

Please note that the October BVSAC meeting is to be our AGM, so it would be good to see as many of our members as possible in attendance.

Peter Ratcliffe
President BVSAC

Is Your Airspeed Indicator Telling the Truth

By Rob Knight

There is a popular adage that pilots always need any two of *airspeed, altitude, or brains*, to fly safely and, having watched thousands of people flying, sometimes in MY aeroplanes, I have found this to be totally factual. However, and obviously, the safety of the airspeed and altitude factors will only remain if these instruments are telling the truth! What if one of them, or worse, both of them, are acting like politicians? That could leave us right in the effluent without gumboots. Perhaps we should ensure we know more about how these instruments work, and how to assess their potential issues and errors.

In this piece, the first of a planned trilogy on the operating and workings of the basic flight instruments, we'll look at the airspeed indicator, the primary instrument when taking off, approaching to land, and when operating at low level.

Please notE that I am reflecting solely on analogue instruments. You know – the old fashioned, steam driven dials that seem to be so out of date, yet are fitted to about 96.973% of all aircraft. Glass cockpit instrumentation is another topic completely, and I am not looking at how, when, or why the detail presentations are arrived at or errors corrected on electronic screens.

The analogue airspeed indicator (ASI) is a very simple mechanical device: but it doesn't really indicate airspeed. It's a comparative pressure indicator instead. What it really indicates is the pressure of the air striking the front of the aircraft but the background scale the ASI needle indicates against is marked as appropriate in speed graduations, inevitably, in western world aircraft, in knots. It is not designed to indicate the true, actual, or real, speed of the aircraft through the air mass.

Since an ASI cannot know the density of the air it is operating in, their design is calibrated to assume the ISA (International Standard Atmosphere) atmospheric density when indicating airspeed thus the airspeeds indicated will vary, in cases, markedly, from the true airspeed (TAS), the relative velocity between the aircraft and the surrounding air mass.

The airspeed indicator (ASI) really reads impact air pressure against the front of the aircraft caused by its movement through the air. The reading here shows no pressure against the aircraft so its airspeed is zero

An aircraft's IAS is usually presented in knots, typically abbreviated KIAS (knots - Indicated Air Speed) as opposed to KTAS (knots – True Airspeed), which is often more relevant to navigation than general flight in light aircraft.

The IAS is vitally important for the pilot because it is the indicated speeds which are specified in aircraft flight manuals for such important performance values as critical operating airspeeds, e.g., take-off airspeeds, stall airspeeds, climb airspeeds, descent/glide airspeeds, maximum flap extension and maximum manoeuvring airspeeds, as well as the oh-so-critical never exceed airspeeds.

Simply put, at typical aircraft operating speeds, the aircraft's aerodynamic structure will respond to dynamic pressure alone, and the aircraft will perform the same every time the same dynamic pressure is experienced. Since it is this same dynamic pressure that drives the airspeed indicator, an aircraft will always, for example, stall at the Flight Manual stated IAS for any given configuration, regardless of air density, height, or true airspeed factors.

Furthermore, the IAS is specified in some regulations, and used in air traffic control clearances when directing pilots, since the airspeed indicator displays that speed (by definition) and it is the pilot's primary airspeed reference when operating below transonic or supersonic airspeeds.

So how does our lil' ol' ASI work to give us this all so important airspeed indication? Firstly, here's a couple of important pressure definitions that we need to understand – static pressure and dynamic pressure.

> **Static pressure** is the pressure exerted by a fluid at rest. If we go outside on a calm day, although we can't feel it, we are experiencing the static pressure of the atmosphere around us. The QNH is the calculated static pressure reading of the atmosphere at sea level. As this pressure is caused by the weight of the atmosphere above, the static pressure will diminish as altitude is gained.

> **Dynamic Pressure** is the pressure of a fluid that results from its motion. If, whilst standing outside, a wind is blowing and you feel it exerting a force on you, you are feeling the dynamic pressure exerted by that wind flow.

> An aircraft "feels" a similar pressure as it moves through the air, and it is this pressure that the ASI needle is actually indicating.

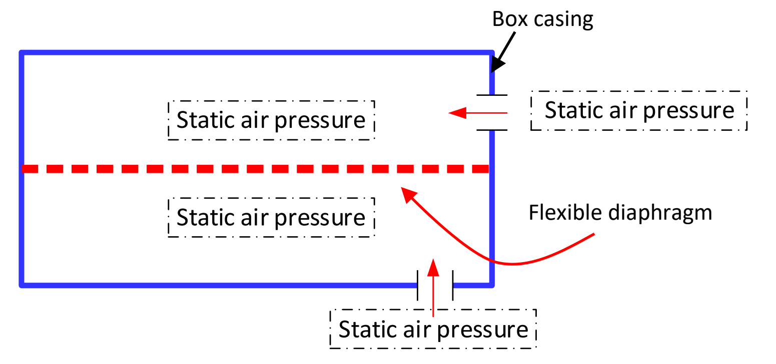

Fig 1. Diaphragm exposed solely to static air pressure

So how does an ASI take these two different pressure values and use them to provide us with our oh-so-necessary airspeed indications?

I begin my explanation with a simplistic sketch to provide an idealized concept of the workings of this instrument.

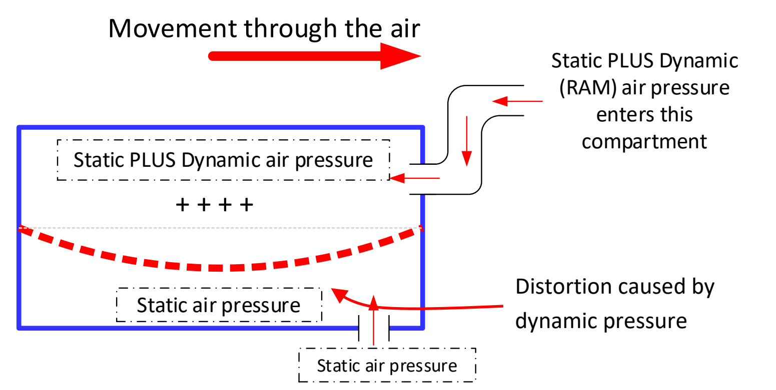

Fig 2. Diaphragm exposed to static and dynamic pressure on one side and just static pressure on the other. The indirect result is an airspeed indication.

See Fig 1. Take an airtight box that is divided into two independent compartments by a flexible diaphragm. Drill a hole in one end of each compartment to allow air to enter. Because each compartment is exposed to the same atmosphere conditions, they will have the same static pressure exerted against the diaphragm and it will not have its shape distorted. The box in Fig 2 has been modified to be moved through the air in the direction indicated by the red arrow. Now, while both compartments still experience static air pressure, the upper one (as drawn) also experiences DYNAMIC (RAM) PRESSURE caused by the case being moved through the air as air is forced through the vent into that compartment. The pressure differential between the two compartments that now exists will cause the flexible diaphragm to distort and extend into the lower chamber. The degree of distortion is proportional to the pressure differential which in turn represents the magnitude of the RAM pressure value - **the speed through the air -** causing the diaphragm distortion. If the magnitude of the diaphragm distortion can be captured and displayed, an indication of the airspeed will result. The greatest difficulty is, perhaps, accurately engineering the diaphragm distortion to a needle representation with accuracy. However, it is achievable, but the actual instrument mechanics are quite different to what I have presented to display its concept.

Fig 3 is a sketch of an airspeed indicator, cutaway to display its workings. In this sketch you can see the ram air entering the pitot tube and flowing through to the metal capsule, the actual component used instead of my flexible diaphragm. The diaphragm in the sketch is a sealed metal capsule that is able to expand or contract laterally. Note that the static air line from the static vent opens into the case of the instrument and not the diaphragm. The case contains air at static pressure whilst the diaphragm contains air at a total pressure of the static pressure value PLUS the RAM pressure value. Obviously, the greater the dynamic pressure, the greater will be the expansion of the diaphragm, the greater will be the movement transmitted to the needle, and the higher the needle will read against the scale. Simple, eh!

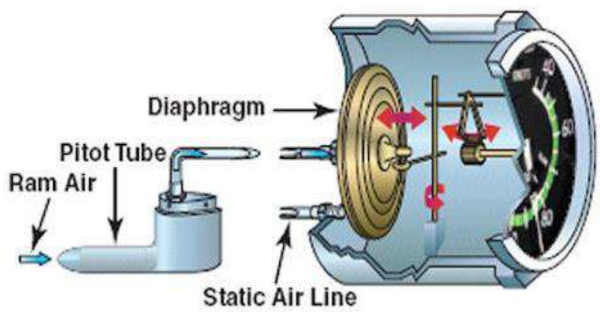

Fig 3. Cutaway sketch of an ASI

The mechanisms that transmit the diaphragm movement differ between manufacturers. However, they are all delicate, and constructed from excellent materials to provide good and long service.

If they're that simple, what can go wrong with an airspeed indicator?

Generally, very little, they are mechanically reliable and usually provide long service without mechanical failure. Failures of the ASI that do occur, almost inevitably relate to the air pressure supply sources, either static or dynamic. Thus, a good working knowledge of both the pressure sources and supply systems is a must for any competent pilot.

Firstly, errors come in two types – total failure (where the instrument fails to read) and a partial failure (where the instrument reads but the reading is incorrect). Of the two, the former is the best type of failure because the failure can be instantly recognised and appropriate action taken by the pilot for operational safety. However, where the instrument appears to function normally, but the readout is flawed, is another matter altogether, A short landing requiring a specific low approach speed with an ASI that is over-reading is like sleepwalking in the bull paddock.

To get a clearer picture, let's look at each pressure source individually.

The dynamic (RAM) pressure system (pitot tube and supply line).
On many aircraft the pitot is just a tube that points forward, directly into (parallel to) the relative airflow in the aeroplane's the level flight attitude. Usually mounted outboard to minimize flow disturbances caused by the fuselage, pitot tubes are open at the front to allow air to enter and the rear of the tube is attached to a length of small diameter hose that is attached at its other end to the ASI case on the instrument panel and supplies both static and dynamic air pressures to the interior of the diaphragm. Thus, the inside of the diaphragm is always exposed to static pressure and, when the aircraft is moving forward, to the dynamic pressure caused by the movement as well. As the diaphragm is expandable, the ram air pressure expands the diaphragm and the degree of expansion is transferred to the ASI needle which is read against the airspeed scale.

The static pressure system (vent and supply line).
The static vent is usually a disc on the side of the aircraft fuselage with a tiny hole in the centre.

Blocked pitot tube or line

A pitot tube that is blocked will trap the airspeed indicated at the time of blockage. A pitot that is blocked on the ground, before take-off, such as from mud wasp activity, or, perhaps, frost ice, will cause the airspeed indicator to register zero airspeed on and after take-off. However, as the aeroplane climbs, the static pressure will decrease naturally with increasing altitude and a disparity will occur between the ambient static pressure on the outside of the diaphragm, and the trapped old static pressure that is locked inside it. This will cause the ASI to begin reading albeit indicating a very low airspeed indication.

If the blockage occurs in cruise flight, as from either damage from a bird-strike/hail/airframe icing etc., the ASI will maintain the reading it held at the time of blockage. However, a climb will instigate a disparity and the instrument will over-read the factual IAS[1]. When the aircraft descends, the reverse will occur, and the ASI will under-read and the aircraft will have a higher airspeed than the ASI indicates.

If the pitot system is sophisticated and has a drain to allow condensate or precipitation to be eliminated, and the drain is also blocked, the above will continue to hold true. However, if the drain is unblocked, then the indicator readings will vary depending on the location of the drains and the various impacting dynamic pressures to which it is exposed.

Blocked static vent or line

A static system that is blocked on the ground, before flight, will cause no alerting indications until the aircraft rolls on its take-off, at which time it will fail to indicate the rising airspeed. If the take-off can be aborted, this would usually be the wisest decision the pilot can make at that time.

If the static vent (or line) blocks in flight, the ASI will under-read in the climb and OVER-READ in the descent. This means that the pilot will have a lower IAS on approach than the ASI is indicating if they set their aeroplane up at the usual airspeed indication. Competent pilots, ones that check and set their airspeeds by attitude, can revert to using their aircraft's nose attitude to set the appropriate

[1] IAS = Indicated airspeed – the reading on the face of the airspeed indicator.

airspeed, and use the aeroplane trim/control feel to confirm their impressions. Note that some GA aircraft, with unpressurized cabins, have an alternative static source available, one that can be selected from within the cockpit.

In simple aeroplanes, such as ultralight aircraft, there may not be any static vent or static pressure system at all. The static vent might just be the static vent port at the rear of the instrument. This will be open to cabin pressure but at low airspeeds, this may well equate to an absolutely adequate and accurate static pressure source.

It's timely to note that the pressures we are discussing, the static pressure and the dynamic/pitot pressure, are very low in relative values. The airspeed indicator, and the other atmospheric-pressure driven flight instruments, is designed to be sensitive to these very low-pressure values to operate and is therefore very delicate. Should you be examining an ASI, don't take a deep breath and blow into either orifice in the rear of the instrument, or into either the static vent or the pitot tube on the aircraft. Such an act will almost inevitably see you, wallet in hand, purchasing a replacement instrument.

Airspeed Indicator Serviceability Checking Requirements

Details for airspeed indicator checks for recreational aircraft operating under VFR, but not operating in controlled airspace, are listed in the RA-Aus technical Manual in Section 12.4, Instrument and Transponder Check. *(TECHNICAL MANUAL ISSUE 4.1 - MARCH 2021 © RAAus Ltd)*

2 AIRCRAFT OPERATING ONLY OUTSIDE CONTROLLED AIRSPACE (OCTA) – CLASS G

2.2 Airspeed indicators must be checked every 2 years against a manometer or against a GPS using test runs in opposite directions; and airspeed indications shall not vary by +/- 5kts; and

Regarding ASI serviceability checks, Section 2.1 above means that every aircraft is required to be ASI checked within every two-year period, and the results inserted in the maintenance logbook.

Next month I'll be looking at the workings of the altimeter, and will include an appropriate section of its characteristics, issues, and errors.

For further reading, see https://en.wikipedia.org/wiki/Pitot-static_system

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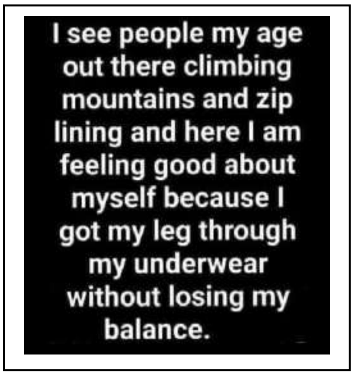

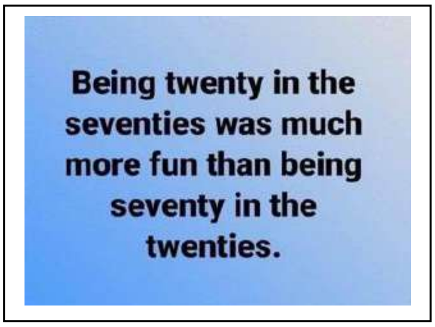

The One and Only Ray Stits

An Early Homebuilt Designer

By David Gustafson

Unless your EAA membership number is below 100,000, you may not have heard of Ray Stits. However, few people outside of the Poberezny family had as much influence on the early homebuilt aircraft movement as Ray Stits. Today, at the age of 90, he's still going strong as a pilot, mentor, and founding member of EAA Chapter One at historic Flabob Airport. Ray has had a sterling career as an aircraft designer, aircraft mechanic and creator of the Stits Process, known today as Polyfiber. Between 1948 and 1965, he designed and built 15 airplanes. Except for the first two designs, he test-flew them all. The reason for not flying the first two relates to the nature of the aircraft: they were the world's smallest monoplane and then the world's smallest biplane. Ray was too big/heavy to fit into them. They captured world attention, generated considerably revenue on the airshow circuit and resulted in a whole lot of requests for plans.

The incentive to build "Junior", the monoplane, came from a discussion about the world's smallest airplane. Someone mentioned Steve Wittman's little racer with a 13' span and Ray queried whether or not he could fly something with a 10'10" wingspan. One of the participants in that conversation said it wouldn't be possible and that was all it took. Ray started building. He'd actually been thinking about it for a long time and proceeded with a 40hp engine from an Aeronca. That got changed to a 65 hp Continental. The plane was a handful and after the third crash on the fifth test flight, Ray shortened the wings to 8'10" and attached tip gates to generate more lift and better aileron control. He found a new pilot, Bob Starr, a former P-51 pilot. In 1950, Junior was a big hit in airshows. He began thinking about a larger sport plane that would be easy to build and fly, but he got side-tracked with another design: his quest to create the world's smallest biplane.

In May of 1952, he introduced the Stits Sky Baby, a biplane with a 7'2" wingspan. Once again, he drew tremendous response from newspapers, magazines and the newsreel companies. And once again he got busy on the airshow circuit…but not for long. After one season, and 25 hours of flying time, the Sky Baby was given to the Smithsonian Institute. In 1963 it was sent to the Experimental Aircraft Association's Museum, where it remains on long term loan. Junior wound up on a scrap heap after an off-airport landing. Requests were pouring in for plans for both of his midget aircraft, but Ray knew most people couldn't handle the complexities of construction or the flying limitations of the two designs. Not being one to pass up an opportunity, however, he designed, built and test flew the Stits Playboy. It was a single seat, low wing, strut braced, aerobatic airframe that was designed to fly with 85 hp to 160hp engines

Ray and his Sky-Baby

Capitalizing on his fame for the miniature, Ray began selling plans. Realizing that a lot of builders were having problems securing aircraft grade materials, he started stocking and selling materials. He was into his second decade as an aircraft mechanic when the homebuilt movement began to take off and he slowly transitioned into an early version of Aircraft Spruce & Specialty.

His original Playboy has been rebuilt and now resides in the EAA museum. One of the Playboy builders eventually sold his project to a young aviator who quickly rebuilt the wing, getting rid of the struts and converting it from a fabric covered wooden frame to an aluminium wing. Once finished, it was called the RV-1. The rebuilder was Dick Van Grunsven and his first airplane has been rebuilt and will be donated to the EAA museum this summer.

By 1951, after living in Michigan and Arizona, Ray had moved to Flabob Airport in Riverside, California. He recalled the day he brought the "Junior" over to that airport. "In those days, anything you built yourself made you a kook. You're a strange guy if you built airplanes. A lot of people told me: 'You're crazy doing that'". In 1953, Ray got a letter from a man named Poberezny. The letter sat in an office at the airport for six weeks before someone finally delivered it to Ray. Paul Poberezny had heard of Ray's work with home-builts and had written to invite him to join a new organization he'd founded called the Experimental Aircraft Association.

Ray liked the concept and suggested to Paul that he be allowed to establish a Chapter of the EAA at Flabob. A couple months later, EAA had amended their bylaws to allow for Chapters and Ray was authorized to set up the first one. He got a dozen friends together and founded Chapter One. It's still very active and leads all the other chapters in the number of Young Eagles they fly annually. Today there are over 700 active EAA Chapters. Ray went on designing new airplanes. Today the designs look dated, like the cars from the Golden Age of Automobiles (1948 – 1959). Aside from the first two designs, there weren't any concepts that could be labelled radical or futuristic (we'd have to wait for Burt Rutan for that kind of design stream). However, they were all solid designs that offset their kind of plain-Jane styling with functional simplicity and they were on the market at a time when it was still possible to build a complete airplane (including prop and engine) for less than a thousand dollars.

The list of Ray's designs includes:

1. Stits Junior, world's smallest monoplane, 8'10" span, 1948
2. Stits Sky Baby, world's smallest biplane, 7'2" span, 1952
3. Stits SA-3A, single place, 1952
4. Stits-Besler Executive, folding wing, 1954
5. Stits Playboy, two place, 1954
6. Stits Flut-R-Bug, SA-5A, 1955
7. Stits Flut-R-Bug, SA-5B, 1955
8. Stits Flut-R-Bug, SA-6A, two place, tandem, 1955
9. Stits Flut-R-Bug, SA-6B, two place, tandem, 1955
10. Stits Flut-R-Bug, SA-6C, two place, side by side, 1956
11. Stits Skycoupe, SA-7A, two place, 1956
12. Stits Skeeto, 265-pound ultralight, 1957
13. Stits Skycoupe, SA-7B, two place, 1957
14. Stits Skycoupe, SA-9A, two place, Type Certified, 1957-6
15. Stits Playmate, 2/3 place, folding wing, 1963-65

It reached the point where people were really wondering what Ray was going to bring to EAA's annual convention in Rockford next. He was a prolific designer and builder. In the 1960s Ray began to realize that the business of designing home-builts and selling plans was very time consuming and not terribly lucrative. Around 1961, Ray went out to the back of his shop to dispose of some scrap aircraft covering that had been removed from an airplane. Disposal in those days was done with a match. But when he bent over to torch the nitric dope covered fabric, the stuff blew up in his face. The flammability of the covering got him thinking and he began a course of study that made him a chemist, leading over several years to the creation of a new covering material and a form of paint that was fire-resistant. Stits Polyfiber was born and it became such a hit in the homebuilt and restoration communities that Ray stopped selling all other forms of aircraft materials and by 1969, he removed all of his aircraft plans from the market. He spent the next couple of decades selling fabric and paint of his own creation. Ray is retired now and Jon Goldenbaum runs Polyfiber, which is still based on the famous "Stits Process".

Ray Stits had a big influence in making Flabob Airport a major force in the homebuilt aircraft movement. Ray and the airport attracted other figureheads like Lou Stolp of Starduster fame, Ed Marquart, who designed the Marquart Charger, and Bill Turner, who created Repeat Aircraft which built three of the four fabulous replica racers owned by Tom Wathen. There was a time when Flabob Airport and EAA Chapter One was one of the busiest places in the world for aircraft construction projects.

A while back Ray offered some advice to people thinking about designing a new homebuilt: “Get a lot of ideas, do a lot of testing, don’t get involved with partners, don’t promise something you might not be able to deliver, don’t extend yourself beyond your own financial means.”

Ray Stits went on to become recognized as a Master Mechanic and recently became one of a handful of people who has also earned the title of Master Pilot. He still flies an LSA and stays involved with events going on at Flabob Airport. His latest gesture was an offer to install a 12,000-gallon fuel tank on the airport’s fuel farm so that Flabob can become the first airport in the state of California to offer mogas to homebuilders and those who own a certificated aircraft with the proper STC. He’s also involved in working with students at the Flabob Airport Preparatory Academy who are rebuilding a Stits Skycoupe.

Ray Stits made a far-reaching and inspirational contribution to the early days of the homebuilt aircraft movement in this country. His influence on the EAA Chapter Network and the early designers and builders of home-builts was profound and deserves to be reviewed. Like Paul Poberezny, Ray Stits was a real pioneer.

Google Ray Stits Aircraft, then click on “images” and see the great array of his designs. Note the reflections of them in modern light and ultra-light manufactured aeroplanes. (Ed)

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- Don’t be worried about your smartphone or TV spying on you. Your vacuum cleaner has been collecting dirt on you for years.
- If you can’t think of a word, just say, “I forgot the English word for it.” That way people will think you’re bilingual instead of an idiot.
- I’m at a place in my life where errands are starting to count as going out.
- I’m getting tired of being part of a major historical event.
- I don’t always go the extra mile, but when I do it’s because I missed my exit.
- At what point can we just start using 2020 as profanity? As in: “That’s a load of 2020.” or “What in the 2020.” or “abso-2020-lutely.
- My goal for 2020 was to lose 20 pounds. Only have 34 to go.
- Ate salad for dinner. Mostly croutons and tomatoes. Really just one big round crouton covered with tomato sauce, and cheese. FINE, it was a pizza.... OK, I ate a pizza! Are you happy now?
- I just did a week's worth of cardio after walking into a spider web.
- I don't mean to brag, but I finished my 14-day diet food supply in 3 hours and 20 minutes.
- A recent study has found women who carry a little extra weight live longer than men who mention it.
- Kids today don't know how easy they have it. When I was young, I had to walk 9 feet through shag pile carpet to change the TV channel.

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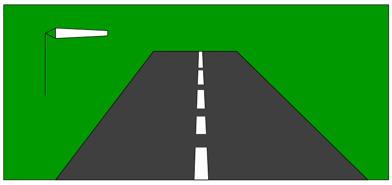
When the Wind Blows Sideways -
You have a Crosswind

By Rob Knight

An aircraft flight manual is the first source of crosswind operating advice. Note that the statement, “Maximum demonstrated crosswind component” is neither a legal nor a physical limitation on the aeroplane: it is advisory ONLY. However, unless you are very, very current, with several logbooks attached to your history, you would be wise to consider your piloting competence very carefully before operating an aeroplane outside this value.

Any discussion on crosswind operations must separate the flight into three parts – the take-off, the approach, and the landing. These are three quite separate exercises with only limited commonality. Obviously, the greater the strength of the crosswind value, the more critical will be the application of the appropriate technique so let’s see what the over-all picture shows.



Firstly – what is a crosswind? Technically, a crosswind exists when the tail of the windsock is not pointing in your direction, and parallel to the runway you are using to take-off or landing. The more the windsock is pointing across your path, the greater is the crosswind angle, and the more the windsock is stretched out, the greater is the wind strength the sock is indicating. Thus, a windsock that is horizontal, with the tail showing it is angled 90° to you path, will indicate your worst-case scenario. However, for the sake of this discussion, let’s assume that we are experiencing a 10 knot crosswind 90° from our left.

Before we can do a crosswind landing, we must first take-off. If your take-off is unsuccessful, then there’s little point if discussing crosswind landings yet. So, we’ll start the discussion with take-offs, when the wind is not pointing straight down the runway.

The crosswind take-off has a number of issue that need expanding. The primary issue is that of directional control, i.e., of keeping the nose pointing down the same runway that you start your take-off on. No pilot can sign a contract with his/her aeroplane to remain straight on take-off without pilot instigated control intervention, so a quick look at why the aeroplane wants to wander is necessary.

There are four factors causing wander from the straight and narrow of the centre line.

1:- The crosswind, trying to weathercock the aeroplane and yaw it into wind throughout the take-off roll, and then to drift the aeroplane as the wings begin lifting and reducing traction between the wheels and the surface.

2: The pilot proficiency factor. (Is the pilot really as good as they think they are?)

3: The aircraft and the aerodynamic forces acting on it.

4: The surface, the factor where roughness/slipperiness, grass-length, and lateral slope are considerations. However, as we are not depicting strip operations, let’s assume that the runway is smooth, even-length, grass (or bitumen), and has no lateral slope.

The crosswind. Make a paper aeroplane and place it on the table in front of you facing, left to right. Blow briskly across it and it will turn towards you (yaw into wind), and skid across the table away from you (drift). Every aeroplane that operates with the wind blowing across it will suffer the forces that created these two effects to some extent or other. Pilots must be aware of these forces and potential results, and use the aeroplane's controls to counter them.

Pilot proficiency is a serious issue. Recently my writings have been expounding on the problems that some pilots have with keeping straight with the rudder. Too many apply inappropriate aileron as I have been discussing in recent past issues of this very magazine. As the rudder and aileron require very specific operation in all three stages of crosswind operations, ensure that you have no bad habits that could become liabilities in this exercise. The rudder controls the direction in which you are travelling, the ailerons are there to provide wings level, or roll control. There are NO EXCEPTIONS unless you are flying an Ercoupe, in which case this discussion if not intended for you!

The aerodynamic forces acting on your aeroplane ALWAYS create some tendency to swing on take-off as was taught to you in your first briefings on the take-off exercise. A discussion on these forces is necessary here because they not only create control issues, but they will increase or reduce the effect of the crosswind you are encountering during your take-off. Essentially, for all non-pusher configured aeroplanes, with a single engine, turning the propeller clockwise when viewed from the pilot's seat, the forces will combine to swing (yaw) the aeroplane's nose towards the left on the take-off roll. To counter this, the pilot must use sufficient right rudder to maintain the direction of aeroplane movement along the runway centre-line. When the wind blows across the direction of travel on your take-off roll, it will induce a natural weathercocking tendency which will also cause the nose to swing and try to point into it. If the cross wind is from your left, the weathercocking force will be added to the aeroplane's normal swing tendencies. In such a case, the crosswind will increase the need for MORE rudder application to control direction of travel during the take-off roll.

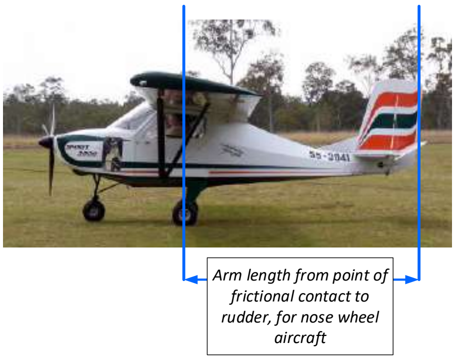
If the crosswind is blowing FROM the viewer towards the aeroplane, the aeroplane will weathercock and its nose will tend to swing to its left (into wind and towards the viewer) unless corrected by the pilot. In addition to the other aerodynamic forces being countered, this effect is common to both nosewheel and tailwheel configurations.

Conversely, in such an aeroplane, a right crosswind is easier to control because the natural nose-swing to the left will provide some countering force and less rudder need be applied to keep straight.

For tractor configured aircraft with engines rotating their propellers anticlockwise from the pilot's seat, all the above is reversed. For pusher configurations, an additional factor exists, the distance from the propeller to the vertical fin, important because this determines which part of the helical path of the slipstream flow will strike the rudder/keel surface and provide the yaw force. . Each example of this configuration must be viewed on a stand-alone basis when considering slipstream effect and yaw it creates.

The pilot carrying out a crosswind take-off has two primary issues to deal with. Firstly, and as always, they must keep the aeroplane straight. However, now they have added issues of the crosswind creating weathercocking and drift effects. Secondly, the pilot must ensure that the windward wing doesn't rise and cause a premature lift-off because, with a crosswind, the wings do not have equal air conditions so will not generate equal lift. The air is clear as it approaches the windward wing, but is heavily disturbed by the fuselage and nose before it gets to the down-wind wing which, then, and in turn, provides less lift. This will create a natural tendency for the aeroplane to roll towards the down-wind wing, and once begun, such roll can be super-difficult to stop.

Considering the weathercocking effect, nosewheel aeroplanes have a slight advantage in that the point of frictional contact with the runway (the main wheels) is further aft than can be on a tailwheel configured aeroplane, which reduces the length of the arm that is causing the weathercocking effect. See the image on the right. The tailwheel version has a longer arm between the point of frictional contact and the rudder when compared to the nosewheel aircraft. This makes the nosewheel configured aeroplane less sensitive to the weathercocking effects of the cross wind. Also, a nosewheel commonly has greater steering authority than a tailwheel, which often operates through springs or rubber rings. This factor further reduces (slightly) the sensitivity of the nose wheel fitted aeroplanes to weathercocking. However, though, in either case, a serious weathercock will likely see the aeroplane yawing wildly into the wind and at the same time rolling outwards from the turn, towards the downwind wing . The centrifugal force resulting from the direction change as the aeroplane swerves into wind, raises the load on the outer wheel which will "dig in", tightening the turn further and dragging the downwind wing along the ground. The aeroplane could even roll completely over and further ruin the pilot's day. This is not an ego building exercise for the pilot!



Same aeroplane type – ALA GR-912.
Top: Tailwheel version,
Lower: Nosewheel version.

The premature lift-off is also hazardous. If the aeroplane becomes airborne and begins drifting, should it sink back and touch the surface, the lateral movement can "trip" the aeroplane, and see it go belly up – literally! It is very important that the aeroplane leaves the ground cleanly and there is no tendency to settle back again. The classic technique for such a clean take-off is to use no flap and to rotate later so the nosewheel is on the ground for longer to aid directional control. It also allows the aeroplane, whilst still on the runway, to accelerate to an airspeed a little in excess of the normal lift-off value. When it has been achieved, the pilot can lift the aeroplane off the ground and make a coordinate turn into wind, and the airspeed is sufficient to maintain flight and for the aeroplane begin to climb away along the runway centre line. For tailwheel aeroplanes, the same technique applies – nil flap, and leave it on the ground a little longer. Lift it off clean, and at a speed sufficient to instigate an immediate, albeit slow, climb away to safety. In both configurations, when clear of the ground, establish the required climb-out airspeed and fly away as normal, tracking along the extended centre line to counter drift.

The common piloting technique for a successful crosswind take -off is to begin the take-off with the aileron fully applied into wind. Then, as the airspeed rises and the ailerons take effect, to reduce the into-wind aileron just sufficient to maintain a positive download on the windward wing to prevent it rising. This can seldom be done with the rudder as most light aeroplanes have the rudder and nose or tail wheel system linked. However, it is very relevant to note that early control intervention to counter the wind effects is vital as, if the aeroplane gets away, there may be insufficient control authority to regain command even though there was, initially, sufficient control available to avoid the problem. The pilot HAS to be in command and in control at ALL times. Timidity has no place in piloting, least of all in the middle of a crosswind take-off or landing.

The crosswind landing is the same but entirely different. The pilot MUST be in control: beginning an approach carrying an “unsure” state of mind is the first step towards a mishap. Also, there is more than one technique that is recognised as an appropriate crosswind landing approach.

In a far-off land, in an ancient time (in the 1960’s), when I was taught crosswind approach and landing techniques, there was only one way to make the approach – by crabbing (or tracking) down the final approach path extended centre line to allow for the drift. At the flare, the rudder was applied to yaw the nose until it lined-up with the runway centre line and the aeroplane was landed on the windward wheel. Nowadays, there is an alternative. Called the “wing-down” approach, it allows the aeroplane’s nose to remain aligned down the centre line whilst the windward is held down to create slip which, when correctly manipulated, will match exactly the drift. With this method, there is no yaw required at the flare because the aeroplane is always aligned with the runway and its centre line.

I have advised my students ad nauseum that good landings usually follow good approaches, and here I go again. When they (or any other pilots for that matter, ask which method I recommend, I always advise that they use the method with which they feel the most competent. For myself, having taught both methods, and used both methods, I prefer the crab approach because the aeroplane will fly in the same fashion it usually does, and this is the one that I use when flying privately.

Crab approaches are just like any other flight where drift exists. There is a reference point towards which we fly a descent, wings level, with the nose just a little to windward of it. At the flare apply sufficient down-wind-side rudder to align the nose with the direction of travel down the centre line and continue to raise the nose in the float. Simultaneously, apply aileron to lower the windward main wheel (still keeping straight with rudder) and land on that wheel first, allowing the other main wheel to settle quickly afterwards. Then allow the nose to settle because its contact with the runway gives instant improved directional control to keep straight as the speed reduces. Apply into wind aileron, increasing the input until full aileron is applied as the speed diminishes.

Some suggest that one should land on both wheels simultaneously instead of the windward wheel first. However, the experience level of most amateur pilots is insufficient to master this and it is better for both the pilot’s ego and the continued longevity of the aeroplane to use the simpler method and land on the windward wheel. This is because the light wing-loaded aeroplanes are far more unpredictable under these conditions even skilled pilots can have difficulty.

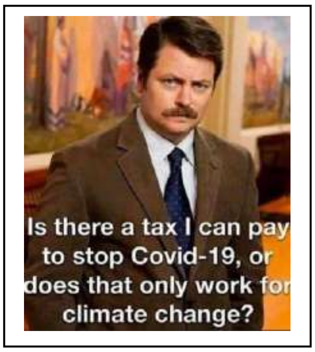
The wing-down approach requires the pilot to apply downwind rudder to hold the nose on the runway (to keep straight) whilst into wind aileron is held and maintained to keep that wing down to provide slip and prevent drifting. Thus, the aeroplane has crossed controls to provide slip into wind at the same rate that it is drifting downwind. In this configuration the aeroplane is experiencing more drag than when the controls are not crossed on a normal approach, and therefore the lift/drag ratio is lost out the window. This results in higher power being required to maintain the “normal” approach angle at the given airspeed, and a changed nose attitude for that airspeed may also be necessary. A good question now arises – when is adding further challenges to an already challenging situation good airmanship? However, if it works for you……….. .

The landing, after the wing-down approach, can be achieved in one of two ways. Either, as I described earlier, land on the windward wheel, or “kick” the aeroplane straight just before ground contact so the aeroplane settles onto both main wheels simultaneously. This is not an easy judgment in a lightly wing-loaded aeroplane so be prepared to action a very quick go-around if it looks to be turning to custard. Hint: If you are looking up at the grass or the bitumen, you have left it too late.

Rule of thumb 

You can consider the crosswind component of a wind blowing at 30°, to be 50% of the wind speed, and blowing at 60°, to be 100% wind speed.

------ ooOOoo ------



I saw an ad for burial plots. I thought to myself, “that’s the last thing I need.”

Come fly with me:
life as a Forward Air Controller in Vietnam
By Dale Hill (Colonel (Ret))

I served as a Forward Air Controller (FAC) in Southeast Asia, flying the North American Rockwell OV-10 Bronco from Thailand as well as from bases in South Vietnam. I flew 165 missions over North and South Vietnam, Laos, and Cambodia. Join me now on one of those missions.

During the Vietnam War, FACs flew day and night at low altitudes, and in every sort of weather. Operating from Jeeps, FACs also deployed in support of ground forces.


Not all Forward Air Controllers were in the air.

We directed air strikes flown by US and Allied warplanes in support of embattled ground units, searched for targets, interdicted enemy lines of communication, and coordinated rescue operations for downed airmen. We also struck targets by directing artillery strikes and naval gunfire. We were the eyes, ears, and voices above the battlefield providing a vital link between troops in the field, the various command and control agencies, and US and Allied warplanes.

A few "Fast FACs" flew F-100 Super Sabres and F-4 Phantoms. The more numerous "Slow FACs" flew slow, propeller-driven aircraft, as their low-speed manoeuvrability and endurance were ideal for locating and maintaining visual contact with targets across the battlefield.


The Cessna O-1 Bird Dog (background), and the Cessna O-2 Skymaster (foreground): not your typical warbirds.

Some Slow FACs flew T-6 Texans or T-28 Trojans, but most flew either Broncos, O-1 Bird Dogs, or O-2 Skymasters. Both O-1s and O-2s were off-the-shelf Cessna aircraft modified for the FAC mission. The OV-10 was developed specifically for counter-insurgency combat, but its primary mission was the FAC role.

With a target identified, FACs had to describe both it and its location to attacking aircraft. This was referred to as "marking the target." A valuable tool in marking targets was our forward-firing rockets armed with white phosphorous warheads (hence their name Willie Petes). Upon detonation, Willie Petes created a distinctive white plume of smoke and, using that smoke as a reference, we 'talked the eyes' of attacking pilots onto the target. To make our job easier, and the mission quicker, we endeavoured to get our "smokes" as close as possible to the target. Hitting the target was considered the perfect pass and, when you pulled it off, you could simply direct the attacking aircraft to, "Hit my smoke!"

For FACs to mark targets and for the fighters to deliver their ordnance, we had to finesse our respective airplanes through aerobatic-like manoeuvres in order to get the nose of the airplane pointed at the target. We called this rolling-in, because it oftentimes required rolling the airplane nearly inverted while pulling the nose toward the target. Once pointed at the target, you would fine-tune your flight path to align the aiming reticule (called the "pipper") onto the target.

Winds, dive and bank angles, g-loading and airspeed all played a part in final placement of the pipper. Maximizing your chances of hitting the target required having your aircraft perfectly coordinated before firing/releasing your ordnance. Clouds, sun angles, and especially potential gunfire from the enemy were other factors that came into play while manoeuvring to get the pipper in the right place at the right time. As you might imagine, extreme manoeuvres were often required.

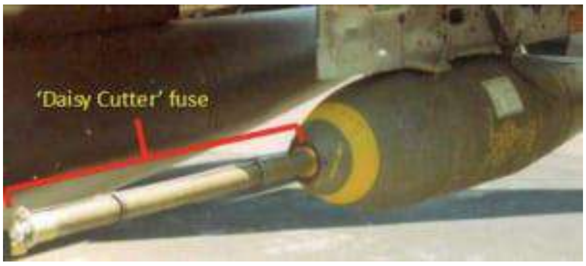
Now, climb into my back seat to experience such a time on a mission to find and interdict enemy forces and/or supplies in eastern Cambodia. I was conducting visual reconnaissance near the Vietnamese border over some very dense, triple-canopy jungle rising over 100 ft above the terrain below me. Through a small break in the jungle, I spotted a wooden bridge, approximately 50 ft long, spanning a river. It was only possible to spot it when either directly overhead or else looking upstream to the north or downstream to the south.

In an area where there were no signs of civilization, I thought, "Who would be using this bridge?" Through my binoculars, I could see vehicle mud tracks on the bridge and assessed it was likely being used to supply the North Vietnamese. Referencing my map, I plotted the bridge's coordinates and reported them to the Airborne Battlefield Command and Control Center, callsign "Cricket." Cricket quickly called back validating the target and clearing me to strike it. They also informed me fighter aircraft were already headed my way.

Within minutes, a flight of two Air Force F-4s checked in on my radio frequency. They were already headed in my general location and we used a radio direction-finding procedure, known as a "DF steer," to give them a more precise heading to my location. Soon thereafter, my Radar Homing and Warning scope lit up indicating they had "locked me up" with their air-to-air radar. That's when the adrenalin started to flow; in a few moments, they would be in my area and under my control!

As they neared, the flight lead passed me their "line-up," including the weapons they were carrying and their "play time" (how long they could stay with me). They were both carrying six Mark-82 General Purpose bombs (500 lbs apiece), which were perfect for this target. However, their play-time was short—they had only enough gas to make a single pass.

Unfortunately, the flight lead also informed me their bombs were fitted with "daisy cutters," an extended fuse designed to ensure the bomb detonated on contact (even with foliage) rather than going deep into the earth before going off. Earning their name because they would cut down everything above ground level, they are not the preferred fusing when striking a hard target like bridges or bunkers. I thought they might just blow the dust off the bridge, but it was the hand I was dealt, so I briefed them on the target and that it would only be visible using either a north or south run-in.



Not the right fusing, but sometimes it's all you have.

I was orbiting the bridge at roughly 6,000 ft AGL in a counter-clockwise direction when the flight lead radioed, he might have me in sight. So, I started rocking my wings and turned on my smoke generator, which produced a smoke trail from my aircraft and highlighted me against the jungle below.

When I spotted the F-4s several miles west and some 10-12,000 ft above me, I radioed "Lead, I've got a tally on you."

The flight lead immediately, replied, "I've got you smokin' and rockin' FAC, if you can mark the bridge now, I can roll-in behind you."

I had just passed the downstream view of the bridge but, because of the fighter's low fuel state, I had to roll-in now. So, I radioed, "FAC's in to mark!" as I instinctively went full throttle, pulled the nose up, and rolled right, away from the bridge. With about 30 degrees of turn completed and with my aircraft nearly 60 degrees nose high, I stopped at about 45 degrees of bank and continued to pull my nose to the horizon. Inverted, I sliced through the horizon with my right wing about 30-45 degrees low and maintained back-pressure. Still inverted and nearing 45 degrees nose low, I tilted my head back and picked up the target through the top of my canopy. I was now on my back heading south toward the bridge, so I levelled my wings with the horizon and continued pulling back pressure until I was once again right side up, but still diving earthward.

As I approached about 30 degrees nose low, I released a little back pressure on the stick to slow the pipper's movement across the ground. When the pipper reached the bridge, I stopped its movement by unloading to about a half-G and fired a Willie Pete. I immediately pulled out of the dive and, as soon as my nose was above the horizon, I rolled 80-90 degrees left to see where my smoke would hit. When the plume of smoke blossomed dead center on the bridge. I smiled and radioed, "Lead, HIT MY SMOKE!"

To get bombs on the target, the FAC first has to get smoke on the target.

Lead immediately responded, "One's in hot from the south, FAC in sight." The "…in sight" call was important as it meant we were deconflicted during an especially perilous time.

I saw him as well and replied, "You're cleared hot," meaning he was cleared to drop his bombs.

I watched him dive down, release his bombs, and then climb away. The bridge was quickly enveloped by a geyser of mud and water flung high into the air. There wasn't much smoke from the impact of lead's bombs, which worried me that they had landed in the river – 'washing' rather than 'blowing' the dust off the bridge. As the water and mud fell back to the earth and the little smoke present had cleared, it became apparent lead's bombs had landed under the bridge and the Daisy Cutters had worked as advertised; several trusses were blown out and the bridge had partially collapsed.

Meanwhile, #2 had circled around to the north and he radioed, "Two's in hot from the north, FAC in sight."

I answered, "You're cleared hot, aim where lead hit!" I watched #2 dive down, release his bombs, and climb away. His bombs exploded in the same place lead had struck. As soon as the bridge was again visible, I saw it had completely collapsed with parts of it being swept away in the current.

The F-4s were already heading homeward when lead asked, "FAC, you got our BDA?" (bomb damage assessment report).

Their BDA included the time on and off the target, the target coordinates, and ended with, "Bridge destroyed."

Lead responded, "Copy," then added, "Hey, FAC, can I ask a favour?"

I replied, "Shoot."

He said, "I'd like to see that marking pass again."

Laughing, I answered, "I'll see what I can do next time."

The rest of the mission was routine—hours of utter boredom interspersed with moments of sheer terror. However, the best part of the mission—seeing my Willie Pete strike that bridge dead-center following my aerobatics to put it there—sticks with me today.

------ ooOOoo ------

- Senility has been a smooth transition for me.
- Remember back when we were kids and every time it was above 30° outside they closed school? Yeah, Me neither.
- I may not be that funny or athletic or good looking or smart or talented. I forgot where I was going with this.
- I love approaching 80, I learn something new every day and forget 5 other things.
- A thief broke into my house last night. He started searching for money so I got up and searched with him.
- I think I'll just put an "Out of Order" sticker on my forehead and call it a day.
- Just remember, once you're over the hill you begin to pick up speed.
- Having plans sounds like a good idea until you have to put on clothes and leave the house.
- It's weird being the same age as old people.
- When I was a kid I wanted to be older… this is not what I expected.
- Life is like a helicopter. I don't know how to operate a helicopter.
- It's probably my age that tricks people into thinking I'm an adult.
- Marriage Counsellor: Your wife says you never buy her flowers. Is that true? Me: To be honest, I never knew she sold flowers.
- Never sing in the shower! Singing leads to dancing, dancing leads to slipping, and slipping leads to paramedics seeing you naked. So, remember…Don't sing!
- I see people about my age mountain climbing; I feel good getting my leg through my underwear without losing my balance.
- So, if a cow doesn't produce milk, is it a milk dud or an udder failure?
- **Coronacoaster:** noun; the ups and downs of a pandemic. One day you're loving your bubble, doing work outs, baking banana bread and going for long walks and the next you're crying, drinking gin for breakfast and missing people you don't even like.
- I'm at that age where my mind still thinks I'm 29, my humour suggests I'm 12, while my body mostly keeps asking if I'm sure I'm not dead yet.
- You don't realize how old you are until you sit on the floor and then try to get back up.
- **We all get heavier as we get older, because there's a lot more information in our heads. That's my story and I'm sticking to it.**

------ ooOOoo ------

FLY-INS Looming

10 October 2021	Murgon (Angelfield) (ALA)	Burnett Flyers Breakfast Fly-in

Invitation

An invitation is extended to pilots in the South East Queensland area to affiliate with a group promoting Fly-Outs (as opposed to Fly-Ins which are promoted by the hosts) to country community areas to assist in fostering business in such areas. Note that all qualified pilots are welcome, regardless of experience, and there is no current intention to limit the potential destinations that could be entertained under this scheme

Such trips would include day trips to outlying places (within adequate range, of course) for lunches, or, for destinations further afield, overnight stays which would require accommodation. Advertising and planning for overnight trips would be made prior to departure so no-one need sleep under their wings unless it is by choice.

Planning has begun for a day trip to Boonah for a picnic lunch under your wing, or a visit to Boonah's highly recommended Dugandan Pub, about 1700 metres down the road towards Boonah town. Negotiations are underway seeking access to a courtesy car to assist with transport as the walk down there might be OK, but, after one of their lunches, the walk back might be taxing.

A date for this trip is pending and will be advised by email to all interested parties.

To be advised of the date, interested parties should contact:

Geoff Norwood on 0411 436 327, or Rob Knight on 0400 89 3632, or email Rob at kni.rob@bigpond.com

The A25 Airspeed Oxford

As provided on the **RAAF** Museum, Point Cook

Designed for all aspects of aircrew training, the prototype Oxford first flew in 1937, and was the military version of the Airspeed Envoy. The latter aircraft had tragic memories for Australians, for it was while flying an Envoy that Charles Ulm (an honorary RAAF Flight Lieutenant) disappeared between Oakland and Honolulu during his 1934 Pacific flight attempt.

Airspeed Oxford, designated with the pre-fix A2 in Australia.

On the outbreak of World War II, Oxfords were selected as trainers for the Empire Air Training Scheme (EATS), and a total of 8,751 Oxfords served in Britain, Australia, Canada, New Zealand, Rhodesia and the Middle East.

In Australia, the prefix A25 was allocated for RAAF use but, as was the case with the Fairey Battles, the imported Oxfords retained their RAF serials. Altogether 391 Oxfords were shipped to Australia and the first aircraft, P6878, was received on 28 October 1940 and the last, LW999, on 20 March 1944. These aircraft included the Mk I with an Armstrong Whitworth dorsal turret, and the Mk II which had the turret removed and was employed mainly for pilot and navigation training.

Known to trainees as the "Ox Box", the Oxfords were used at EATS schools for instruction in flying, navigation, gunnery, radio and bombing. In addition, Mk II versions operated with Nos 1, 2 and 5 Communication Units.

In the years after World War II, Oxfords remained with the RAAF as trainers and communication aircraft until they were finally withdrawn from service in 1953. Together with the Avro Anson, the Airspeed Oxford was responsible for all initial multi-engined training in the RAAF for over a decade.

Technical Data: Airspeed Oxford Mk III:

Description:	Three-seat advanced trainer, wooden structure, plywood covered.
Power Plant:	Two 370 hp Armstrong Siddeley Cheetah X.
Dimensions:	Span 16.25 m (53 ft 4 in); length 10.51 m (34 ft 6 in); height 3.38 m (11 ft 1 in).
Weights:	Empty 2440 kg (5380 lb); loaded 3447 kg (7600 lb).
Performance:	Max speed 302 km/h (163 kt); Cruising speed 249 km/h (135 kt); initial climb 292 m (960 ft)/min; service ceiling 19,500 ft (5943 m); Range 1445 km (780 nm).

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

1. Excluding wind effects, for an aeroplane flown without slip or skid, which of the following is likely to provide the greatest ascent distance over the shortest linear distance?
   A. Vy.
   B. Vy -5 knots.
   C. Vx -5 knots.
   D. Vx.

2. Excluding wind effects, the angle of glide in an aeroplane is dependent on which of the following?
   A. Aeroplane weight.
   B. Flying at the best L/D ratio.
   C. Flying at the lowest possible safe airspeed.
   D. Descending at the lowest sink rate on the VSI.

3. What causes loading when turning an aeroplane?
   A. Centrifugal force.
   B. The acceleration experienced whilst turning.
   C. The increase in apparent weight?
   D. A and C are both correct.

4. An aeroplane is in a steady, straight-line glide. Its stall speed compared to that in straight and level flight will be ?
   A. Higher than the Vs in straight and level flight.
   B. The same as the Vs in straight and level flight.
   C. Lower than the Vs in straight and level flight.
   D. It depends on the angle of attack in the glide.

5. Which of the following most correctly defines an isogonal?
   A. A line on a chart linking all point of latitude on the same meridian.
   B. A line on a chart linking all points of the same longitude on the same parallel.
   C. A line on a chart linking all points of the same magnetic deviation.
   D. A line on a chart linking points of the same magnetic variation.

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 +64 400 89 3632), or email me at kni.rob@bigpond.com.

1. D is correct. The ratio of height ascended over horizontal distance travelled is the definition of the *angle of climb*. To get the best available angle of climb, the pilot should set the attitude that provides the best speed for the angle of climb which is Vx.
   See: https://severevfr.com/aerodynamics/best-rate-of-climb-vs-best-angle-of-climb/

2. B is correct. Gliding at the speed that conforms to the best lift/drag ratio will provide the best glide angle.
   See: https://www.faa.gov/news/safety_briefing/2018/media/SE_Topic_18-05.pdf

3. B is correct. Loading in a turn is the result of the acceleration the aeroplane experiences when turning. Centrifugal force is merely the reaction to centripetal force, the increase in apparent weight is the loading itself so cannot constitute an answer. Option B is the ONLY correct answer to this question.

4. C is correct. In a glide, the aeroplane's weight is supported by a combination of both the lift from the wings AND the aerodynamic drag. Therefore, the amount of lift the wings are required to provide is reduced. When the lift required is reduced, the stall speed is reduced. If the weight is increased, the Vs increases, and vice versa.

5. D is correct. An isogonal is a line on a chart linking points of the same magnetic variation.

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Aircraft Books, Parts, and Tools etc.

Parts and Tools

Item	Condition	Price
VDO Volt Readout instrument	Brand New	**$70.00**
Altimeter. Simple – single hand	As new	**$50.00**
Oil Pressure indicator, (gauge and sender)	New – still in box	**$80.00**
Flight bag. 3 section (2 x zips and 1 x locking flap)	**SOLD**	

Tow Bars

Tailwheel tow bars. Now only one available	Good condition	**$50.00 EA**

Headsets

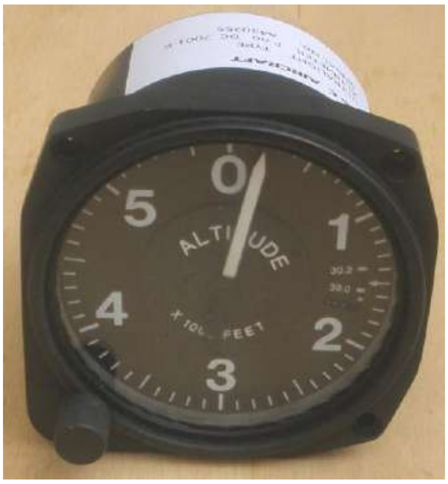
AvCom headset. Functions perfectly	**SOLD**

Propeller Parts

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**

Contact Rob Knight via either kni.rob@bigpond.com, or **0400 89 3632**.

Altimeter for Sale



This simple altimeter I purchased at Oshkosh is now surplus to my requirements and I am seeking a new home for it.

Its face is absolutely clear, it has never been used, and the subscale is provided in "HG.

It is in as-new condition and certificated. For a copy of the certificate, and/or further details, contact

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

Mob: **0419 758 125**

$120.00

Aircraft for Sale

¾ scale replica Spitfire

$55,000 neg

This aircraft is airworthy, flown regularly, and always hangared. Registered 19-1993, it is powered by a 6-cylinder Jabiru engine (number 33a-23) with 300 hours TTIS. The airframe has logged a mere 320 hours TTIS. This delightful aircraft has recently been fitted with new mounting rubber, a new alternator and regulator, a new fuel pump, and jack stands

It handles superbly and is available for immediate collection or delivery by arrangement.

Kept at Kentville in the Lockyer Valley, interested parties should contact either:

Kev Walters on Tel. **0488540011** or

William Watson on Tel., **0447 186 336**

Aircraft for Sale

$ Make Me an Offer$

Cobham Cobra

An opportunity to buy a unique aircraft.

I now have a Foxbat, and can't to afford to keep 2 aircraft. The Cobra was advertised for about a year in Sport Pilot, with many enquiries, but no resulting sale. Rather than continuing to spend on hangarage and advertising I decided to de-register it, remove the wings, and trailer it home to my shed. I don't intend to ever fly it again so, make me an offer. It provides very cheap and enjoyable flying.

It is a one-off design, a single seater with a fully enclosed cockpit. It has a 24-foot wing-span, and is powered by a VW engine that provides sporty performance and superb handling. The airframe has logged 653 hours and the engine 553 since installation. It is easy to start, but requires hand-propping.

To see it in action, go to
https://www.youtube.com/watch?v=V5Qx4csNw_A&list=PLpBv2A6hk66Tg9DiCsjEtt4o4o8ygcTju&index=1&t=22s

It cruises at around 80 knots at 11-12 litres/hr. The tanks hold 48 litres so it has a very reasonable range. For my approaches I use 50 knots on my initial approach down to 40 knots on short final. You will want a fair bit of tailwheel time.

For further details contact Tony Meggs on (02) 66891009 or tonymeggs@fastmail.fm

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Slipstream Genesis for Sale **$14,000.00**

Imported and built 2001. Two seats side by side, powered by 80 hp 912UL Rotax, driving a Warp Drive 3 bladed prop. Cruise 70-75 knots. Empty weight 304kg, MTOW 544 kg, Payload 240 kg. Fuel tanks hold 78 litres. With fuel burn averaging 16 litres/hr, still air endurance (nil reserve) is theoretically 5 hours, or 350 nm. Aircraft always hangared. It has been set up for stock control/ mustering or photography, and is not fitted with doors. Registered until 13 October 2021, currently flying, and ready to fly away.

Total Hours Airframe: 144.6. Current, up-to-date, logbook.

Total Hours Engine: 1673.9. Annuals/100 hourly inspection done 01/09/20. Sprag clutch replaced January 2020, gearbox overhauled January 2020.Just undergone ignition system overhaul. One CDI Ignition unit replaced PLUS brand-new spare unit included in sale. Easy aircraft to maintain - everything is in the open. Comes with spare main undercarriage legs, spare main wheel, and nosewheel with other assorted spare parts included.

Fabric good, seats are good, interior is tidy. Fitted with XCOM radio/intercom. Basic VFR panel with appropriate engine instruments, and compass.

An article on this aircraft was published in Sport Pilot, June 2019 issue. See front cover and pilot report within.

Must sell: two aeroplanes are one too many. Quick sale - Fly it away for $14,000.

Contact **Rob Knight tel. 0400 89 3632**, **or email** kni.rob@bigpond.com for details and POH.

Aircraft Engine for Sale

Aircraft Hangarage Available

The 10 Commandments for Safe Flying

1. Those who inspecteth not their aircraft shall not become men of old or renown.
2. Be knowing of thine attack angle lest the devil's stall appear.
3. Let discretion govern thy movement near the ground, for vast is the hell of destruction.
4. Blessed are those who strive and retain their standards, for without standards they shall surely perish.
5. Thou shalt maintain thine airspeed lest the ground rise and smite thee.
6. Thou shall not make trial of thy centre of gravity lest the devil appear and take thee.
7. Thy confidence must not exceed thine ability, for broad is the path to destruction.
8. He that approacheth with the wind behind, shall surely make restitution.
9. He who runneth out of fuel shall meet with thorns and see his children's children cursed.
10. Observe thou this parable, lest on the morrow thy friends come to mourn thee.

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