BRISBANE VALLEY FLYER

August 2025

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

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The Lockheed L-133 Starjet. See page 11.

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Contents

- Brisbane Valley Flyer -

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

Hello All,

Prior to the start of last month's meeting, we held a working bee at the clubhouse. The working bee and the meeting were very well attended, with 18 members taking part. This great turnout helped us complete the tasks quickly and efficiently.

We managed to get the ceiling of the new room framed, so we're now ready to install the plasterboard linings. Having so many members on hand made a big difference—some were measuring, others cutting and installing, and even those simply passing fixings along helped keep the workflow smooth and fast.

Other members took care of cleaning the bathroom and the front patio area, which had become quite dirty with spider webs and bird droppings.
All in all, we managed to complete all the planned tasks. A big "well done" goes out to everyone who attended!

Additionally, last weekend, seven members helped at the airfield working bee. Our members cleaned the gable markers and assisted with reinstating some of the street posts.
Again, thanks to the good turnout, the jobs were completed quickly.

A huge thank you to everyone who has helped over the past month. There are too many of you to name individually, but your efforts are greatly appreciated!

Best wishes
Ian Ratcliffe
Treasurer BVSAC

WANTED

New Flyer Editor

After producing 138 issues of the BVSAC Flyer, over nearly 13 years, I am planning to hang up my keyboard and dictionaries, and move on to other things.

After a catastrophic haemorrhage behind my right eye about 2 years ago (a type 2 diabetic issue), my vision has deteriorated considerably. Whilst I still meet the medical requirements for an RA-Aus pilot certificate, I have logged too many near misses in my now 63-year run as a pilot to feel adequate and safe enough to carry passengers, or to even operate as a solo P in C. But now, with my close-up vision deteoriation, even writing is becoming more difficult so I need to take a step back and ease the pressure on my remaining close-up sight.

With this in mind, I am tendering my not-yet-dated resignation as the editor/compiler of the said Flyer, and the BVSAC is seeking a replacement. And I need a replacement sooner rather than later.

If you want to try your hand as the new scribe for the Flyer, please contact me, Rob Knight, or the BVSAC committee. Contact details for both are printed on/in every issue of the Flyer.

Rob Knight

Surprised – Don't be, be Aware Instead!

By Rob Knight

When a person is surprised, like any other animal, their reactions may not always be considered, appropriate, or desirable. In fact, an ill guided, inappropriate reflex action can cause exactly the result the surprised party is attempting to avoid.

An unusual attitude is not necessarily a departure from normal flight (i.e. a stall/spin) but it does include abnormal attitudes and gross over/under airspeed conditions. Avoidance is paramount, and recognition no less so, and each is as important as recovery, if not more so. Effective monitoring by a pilot of his/her flight path cannot be over emphasized.

How to give a precise definition of an unusual attitude, however, is a little more difficult. As it is a pilot thing, modified and amended by experience, it is individualised by each pilot. However, there are some general clues that can assist as the term applies to light aircraft types.

For general operations engaged in by light aircraft pilots who don't indulge in aerobatics, any pitch angle exceeding 30˚ nose up or down is likely to be very unusual, and any bank-angle exceeding about 50˚ would be likewise. Generally, maximum rate turns are part of the training syllabus for CPL so PPLs and recreationally trained pilots are not exposed to 60˚ bank angles: steep turns generally don't exceed 45˚ of bank angle. Perhaps, in training for spiral dive recovery, training at higher angles of bank might be experienced, but these are emergency recovery techniques being taught so all the pilot is trained for is to get out of them – they are to be recovered from so ease of mind while experiencing them, is not a planned outcome for the exercise.

The causes of unusual attitudes are varied. Obviously, they can be pilot-induced using the normal controls in the usual manner but this is a very rare cause. Untrained pilots will, instead, use those very controls to avoid unusual attitudes. However, mis-use of controls is another matter entirely as virtually everyone that ever sat in the left seat during stall training has either applied the wrong rudder and aided (or added to) the yaw at the stall, or, post stall onset, tried to lift a sagging wing with aileron. Both these actions can set in motion interesting and unusual attitudes for the training pilot, sometimes even for a newly qualified instructor. Let's call this cause, "misuse of controls".

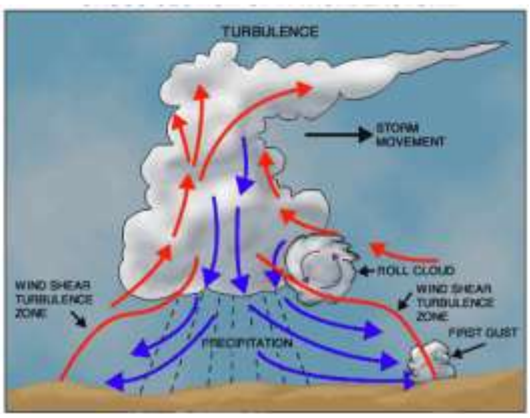
Perhaps the most prevalent cause of changing one's horizon perspective unexpectedly is atmospheric turbulence. While most pilots seem to assume that all turbulence is from vertical movements in the air, this is not actually correct: there are horizontal and circular movements as well. Remember that air is a fluid and is capable of movement in any direction.

There are three causes of atmospheric turbulence: thermal, mechanical, and wake turbulence, this last one being caused by a heavier aircraft ahead (not necessarily directly so).

THERMAL TURBULENCE.

Most pilots expect thermal turbulence to cause up and down movements in columns of air, and this is generally the case, resulting in mostly some bumpiness. The reason thermal activity is not always vertical is that winds aloft may cause a slant in the column of rising or descending air.

Varying air temperatures, including temperatures changing with altitude, also promote Cbs and thunderstorms as illustrated on the next page. Inside, and in the proximity of, Cbs, vertical updrafts frequently exceed 100 knots. These are often inside the cloud, in the IMC parts, but can also exist outside the cloud, along the leading edge of the cloud, in areas of clear air particularly ahead of the storm's direction of movement. In the roll-cloud region, air movement can be either vertical or, in keeping with the name, in a very tight and aircraft-breakingly, severe rolling motion. Obviously, then, flying in the proximity of a Cb can quickly change your perspective and put your aeroplane into interestingly different attitudes without warning, leaving you, the pilot, to sort things out quickly and concisely, and all without over-stressing your airframe. If you have passengers aboard, you are also likely to need to clean them and the aircraft up as well, and leave them thinking you're a pretty s#*t pilot.



Mechanical turbulence is identical to thermal turbulence described above, except its cause is wind blowing across rough terrain or buildings and trees adjacent to runways. Here the air can ascend or descend at severe rates, or roll as in the roll cloud ahead of the Cb above. Whilst on short final it's not funny to be rolled severely when you are concentrating on make a greaser landing – it can ruin your day. Always be prepared for turbulence on every approach as it can upset your descent path dramatically, and be the result from either wind issues or high temperatures, or worse – both being present at the time. Here, the ability to recover from an unusual attitude quickly and precisely is a decided advantage.

WAKE TURBULENCE

Boats leave a visible wake behind them. While all flying aeroplanes also leave wakes, these, too, can be visible when the atmospheric moisture conditions are right. We can always dodge or otherwise avoid something that we can see, but if we can't see it – well that's another matter. However, aeroplanes, and helicopters for that matter, always leave a wake, visible or otherwise and even if we can't see it. we know that it will always be there.

Aeroplanes leave two horizontal, inward revolving corkscrews in the air, making a net downdraft behind the aircraft

Aircraft parting clouds with its wing tip vortices

Behind each wingtip, aeroplanes leave a twisting vortex of moving air, each vortex flowing inwards, from the tip towards the wing root and leaving a net downdraft behind the aircraft as shown in the image to the right. This is a serious issue and has caused fatal crashes, even lighter aircraft breaking up in flight when entering such a vortex behind a large heavy aircraft operating at a high angle of attack. These vortices don't remain stationary. They drift with the wind currents, sink at rates varying between 300 and 500 feet per minute and also move sideways, laterally if you like, at about two to three knots. You can get caught by a large aeroplane ahead of you if you fail to exercise care and get into the wrong place at the wrong time. You can be confident that entering such a wake will surely let you see some unusual attitudes. Close to the ground, experienced when following close to another aircraft, the sudden and severe onset and magnitude of the wake vortices are deadly. Following a Cessna 207 on approach in a Victa 100, I have been rolled almost inverted at about 200 feet AGL so don't imagine that this is only a heavy aircraft issue.

The last cause of a sudden and severe unusual attitude control misuse. While I accept that no pilot in their right mind will deliberately misuse their controls, it is a factor in many fatal accidents around the world. The cause is that a surprised pilot, especially when alarmed as well, often make control applications that, under other circumstances, they would not.

Imagine experiencing a wake turbulence issue at 200 feet when the aeroplane is rolled beyond 90˚. The lesser experienced are inclined to pull the stick back which, at that altitude, is unhealthy to say the least. There is insufficient vertical room to complete the 180-degree pull out, and an accident is inevitable.

Another scenario that I have presented before in my writings relates to an inadvertent stall when a pilot misuses their controls on approach. Remember that crossing your controls can induce a savage wing drop and, because it's so unexpected, a pilot may attempt to stop the roll with applied aileron and, instead, deepen the stall state. Approach issues are best resolved by a go around, not an attempt to hurry the aircraft's descent with steep S turns or such.

With all this detail on the potential causes of entering a surprise unusual attitude, If we encounter one, what's the best thing to do?

Fifty-eight years ago this year, I was taught by Wimpy Baker, a recovery method that has served me all these years. It has served both me and the students who have entered unusual attitudes whilst I have been instructing very well, and I assume it is still serving those still flying.

It requires early recognition of the issue, and contains just three simple steps. The method works in both VMC and IMC.

Step 1. GENTLY put the ball in the middle with careful and accurate rudder inputs. Then

Step 2. GENTLY begin to roll back to wings level with aileron, and

Step 3. GENTLY, if the nose is low (or falling), apply stick/yoke back pressure UNTIL the nose attitude correction begins, and hold until the noise is in the desired attitude, or gently press forward if the nose is high until the attitude correction begins, and hold still until the desired attitude is attained.

Under control, gently return to the state of flight originally had, OR a new one if you desire – climb, descent, or level flight.

Note that, in IMC, instruments must be read and details utilised in lieu of a visual horizon for attitude and roll but don't try this at home – get some dual.

For most light aircraft pilots, the example I mentioned above where I was with a student and we got caught in wake turbulence, is a classic. I was sitting there, fat, dumb, and happy, watching the student make quite a good approach for runway 25 at Ardmore. We had been given ATC instructions to make No 2 to a Cessna 207 charter flight arriving from Waiheke Island. It was joining close right base and my student was well positioned, about 100 feet above the flight path of the Cessna and some 500 metres behind and slightly to the left of its track as it was making for the bitumen runway whereas we were heading for runway 25 grass.. The wind was almost calm, just a slight drift from our port and the day was still warm although the sun was not far from setting. At about 250 feet AGL, the Victa, without warning, suddenly rolled about 80˚ to the right which certainly startled both of us, but particularly the student as she was a fairly new circuit student. I snatched the controls, pushed forward to stop diving into the ground, and continued the roll to the right back to wings level. The aircraft, whilst rolling has inertia in that roll and it would have taken longer to stop the roll and use left aileron and rudder to roll back, to the left, against the direction of the snap.

So how did we get caught? As I mentioned earlier, the wake spreads horizontally, and sinks behind the aircraft that caused it. On that day, at that time, we had a drift from the left which held the vortex from the 207s port wing on our track so it didn't drift. Also, there were road works on the bitumen road right at the end of the runway, and the hot tar and the remains of the day's heat had conspired to create an updraft that raised the wake above the Cessna's flight path to wait for us.

So simple - but it could so easily have been a disaster. To this day I am more aware of the terrain and textures on the ground on my short final flight path. Particularly when making No 2 to an aeroplane ahead.

Happy flying

The Percival Provost

By Rob Knight

In the late 1940s, the Royal Air Force (RAF) were using the DHC-1 Chipmunks for ab-initio training and leaving the pilots trained in these to the Percival Prentice for advanced exercises. However, the RAF found the Prentice cumbersome and not as effective in its training role as they desired, creating excessive cost blow-outs for pilot replacement training. As a result, they issued an Air Ministry Specification detailing the attributes they were seeking in a replacement.

A Provost T.1., cleverly designed to lead the way into jet fighters for the RAF.

This document called for a single-engined basic trainer aircraft to meet Operational Requirement 257, seeking a replacement aircraft that would introduce more direct supervision and observation of student pilots by instructors in order to reduce the course attrition rate when late-stage trainees were washed-out[1] in the latter stages of their training. On 11 September 1948, this specification was issued, attracting widespread interest, ultimately resulting in proposals from some 30 companies, including the Percival Aircraft Company. Their proposal was to be called the Percival P56 Provost, and its designer was the Polish-born aeronautical engineer, Henry Millicer. This same Henry Millicer later emigrated to Australia, where he later designed the award-winning Victa Airtourer light aircraft.

After reviewing the numerous submissions, the Air Ministry selected just a pair of designs, the said *Percival P.56*, and the Handley Page H.P.R. 2, which looked remarkably similar to the Percival entry. The Air Ministry issued contracts to both companies for the construction of prototypes and, on the 13 January 1950, Percival began preparation to manufacture two prototypes, both powered by an Armstrong Siddeley Cheetah engine. However, fearing the engine would prove to be inadequate power-wise, the company decided to construct a third prototype, at its own expense, powered by a more powerful Alvis Leonides Mk 25 radial engine.

P56 ProvoseT.1., restored in New Zealand as ZK-SGN. (photo by Colin Hunter)

On 24 February 1950, an Armstrong Siddeley Cheetah-powered prototype undertook its maiden flight. Manufacturing continued on both the remaining Chetah powered version and the more powerful Leonides model and months later, the Provost prototypes were moved to RAF Boscombe Down for an extensive evaluation. Here the aircraft were flown head-to-head with the rival H.P.R. 2 so an in-depth evaluation could be made. Feedback reports from the trials were largely favourable, especially of its handling characteristics which were deemed eminently suited to the RAF requirements, with only minor refinements being suggested.

[1] *Washed-out (as in pilot training) – dumped from a training course, usually military.*

Ultimately, the Leonides-powered version of the P.56 was selected for production, justifying the financial outlay for the private venture version by Percival. Designated the Provost T.1; on 29 May 1951, an initial order for 200 aircraft was placed.

A total of 461 aircraft had reportedly been completed when production of the type was terminated in 1961. However, the design philosophy was so successful that it did not die with that termination, it was merely re-formed into design of the jet-powered derivative, the Jet Provost, which ultimately succeeded the piston-engined Provost as the principal training platform of the RAF.

In essence, the production Provost, designate a T.1., was a two-seat, all metal aeroplane fitted with tail-wheel undercarriage, the tailwheel being fully castering. It was developed to provide training better-suited to the increasing complexity of the operational aircraft that were then being brought into RAF service. The pilot seats were positioned side-by-side so the instructor sat beside the student, improving training by allowing mutual close observation, and for flight exercises to be more effectively demonstrated. The design provided for a third observer's seat, but this was later omitted following little use. The cockpit was considered to be relatively bulky amongst its contemporary rivals, a feature that did not heavily impinge upon the aircraft's overall performance. The type was designed to be easily maintained; where possible, components were intentionally interchangeable, and easy access for servicing was available through the generous provision of access hatches in the fuselage.

The Alvis Leonides 25 engine was rated at 550 hp which meant that the Provost was roughly twice as powerful as the preceding Percival Prentice. Engine operation was smooth across various speeds and produced relatively low noise levels from within the cockpit. While the Provost had a roll rate and handling comparable to the best fighters upon entering service, a definite plus for its operation as a trainer for these more advanced aircraft, it was also known for its rapid rate of climb, a function of its more powerful engine. Its performance level has been contrasted to that of aerobatic aircraft, which strongly appealed to some instructor-pilots, although it was deemed to be somewhat excessive for general flying purposes. According to aviation periodical Flight International, the stall characteristics of the Provost were relatively gentle, it also had excellent spin and spin recovery characteristics.

The T.1. The RAF cross-over trainer – from piston to jets.

The self-centring stick was relatively light and sensitive during flight. A spin could be easily and deliberately induced by pulling hard back on the stick and applying full rudder in the direction of the desired spin. Recovery was entirely conventional and achieved by a combination of taking the stick forwards sufficient to unstall, and applying full out-of-spin rudder. Aileron rolls through 360 degrees could be achieved with full aileron deflection in a mere four seconds. Both the ailerons and elevators, relatively light compared with contemporary peers; were well-harmonised. Landing the Provost was also relatively easy, being aided by a high level of external visibility for the pilot, a low tendency to float during the hold-of. It also had excellent side-slip capabilities.

The three-piece canopy was designed for good crashworthiness. It also had attachments to facilitate instrument flying training in daylight using removable and extendible amber screens. These screens, when used with pilot-worn blue-tinted goggles, prevented the student seeing outside the cockpit, while the instructor, without goggles, could see clearly through the amber panels.

In keeping with other RAF aircraft, the Provost was also equipped with then-modern very high frequency (VHF) radio aids, which enabled pilots to conduct landings through cloud cover using a Ground Controlled Approach; this greatly improving pilot training for cloudy conditions and for night navigation.

In regard to cockpit layout, the controls were grouped together as appropriate, the majority being set on the central console positioned between the two seats. According to author David Ogilvy, the complexity of the cockpit was a deliberate design choice; contrary to earlier trainer aircraft, which were typically simplified so students would find them easy to fly, the Provost intentionally exposed beginners to an advanced environment more representative of the varied tasks of more advanced aircraft operations.


The Provost T.1., panel and cockpit layout

The first batch of operational aircraft were delivered in 1953 to the Central Flying School (CFS) at RAF South Cerney. The CFS carried out intensive flight trials prior to instructor training commencing as the Provost was a vastly different and more capable training aircraft than the Prentice it was replacing. Provost-trained students could now proceed directly on to the De Havilland Vampire without further schooling.

The aircraft served with the RAF until the early 1960s, when it was replaced by the newer and even more capable Jet Provost. While a few piston engined Provosts continued in service throughout the 1960s, the last example being retired during 1969. Several retired airframes were renumbered with maintenance serials and used for training of airframe and engine tradesmen. At least five Percival Provost have survived as civilian aircraft

Over its period of operation, so successful was the Provost design that export orders were placed. The first order, from Southern Rhodesia, was for 4 T.1s, and was placed in May 1953. These were designated as T.51 aircraft. Later, the Royal Rhodesian Air Force ordered 12 armed trainers, designated T.52, which were delivered in 1955. In January 1954, the Irish Air Corps ordered four T.51 aircraft and in 1960, a further order for 6, armed, T.53 variants. Then, in 1954, the Burmese Air Force ordered 12, armed, T.53 variants. They eventually operated a total of 40 of these aircraft. In May 1957, the newly formed Sudan Air Force ordered four T.53, armed variants; however, two of these were lost in accidents shortly after delivery. In 1959. They purchased a further T53s as well as five 2nd hand former RAF Provosts.

Former RAF provosts were purchased by the Royal Air Force of Oman. These were modified to become armed T.52 variants. In 1955, the Royal Iraqi Air Force ordered 15 Provost T.53s, with the first delivered in May 1955. The final export customer was the Royal Malaysian Air Force, which obtained 24 T.51 trainers between 1961 and 1968.

So successful was this type in a cost-effective, multi-role capability, that, in 1968, Rhodesia obtained further aircraft using a convoluted route to circumvent an arms embargo existent against that country at that time.

General characteristics of the T.1.

Crew:	2		Wing area:	19.9 m^2
Length:	8.69 m		Empty weight:	15.2 kg
Wingspan:	10.67 m		MTOW:	1995 kg
Height:	3.66 m		Engine:	1 × Alvis Leonides 126, 9-cylinder air-cooled radial piston engine, 550 hp
Wing Loading:	101 kg.m^2		Propeller	3-bladed, CSU

Performance

Max Speed:	170 kts		Service ceiling:	25,000 ft
Range:	560 nm		Rate of Climb	2,200 fpm
Endurance:	4 hours		Time to altitude	3 minutes 16 seconds to 10,000 ft

Armament:

Guns (T52 & T53):	2 × 7.62mm machine guns
Bombs (T52 & T53):	230 kg (500 lb) bombs or rockets

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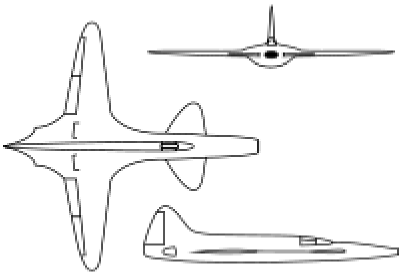
What Might Have Been – The Lockheed L-133 Starjet

By Rob Knight

In 1939, the Lockheed Aviation Company was the first United States company to start work on a jet-powered aircraft. Even though the United States at that time had no jet engine, they were fully aware of Frank Whittle's research and development activities in England and Lockheed was already working on an axial-flow L-1000 turbojet engine of their own design. By 1940 preliminary work on a company-financed jet fighter design had been started which progressed to several different versions on the drawing board. Obviously, the powerplant of choice for the jet fighter project when it was finalised was the L-1000 turbojet. The aircraft design knows as the Lockheed Model L-133-02-01 was in the pipeline.



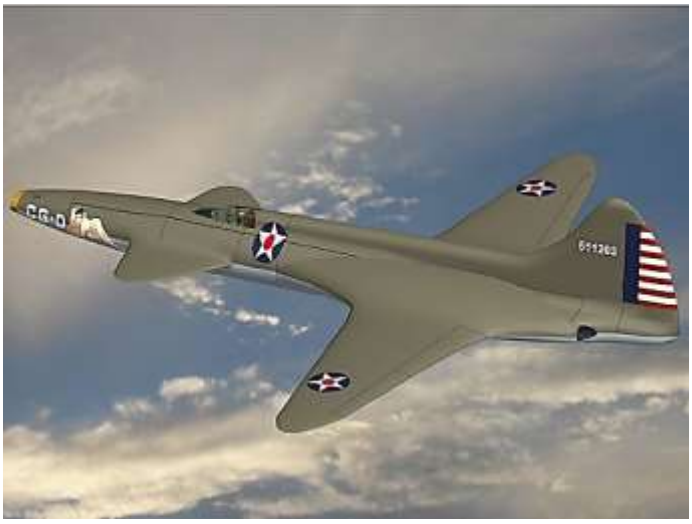
Profile of the Lockheed Model L-133-02-01.

On 30 March 1942, Lockheed formally submitted the L-133-02-01 to the USAAF for consideration. Powered by two L-1000 turbojets and featuring a futuristic-appearing canard design with slotted flaps to enhance lift, the single-seat fighter was expected to have a top speed of 612 mph (985 km/h) in level flight, but a range of only 310 miles (500 km)

The L-133 had a main wing shape that was essentially identical to the outer wing sections of the Lockheed P-38 Lightning. In many respects the L-133 was far ahead of its time, with futuristic features including:

- canard layout;
- blended wing-body planform; and,
- two engines in a very low-drag integral fuselage location.

But turbulence struck! The USAAF hierarchy decided the L-133 concept was too advanced for the technology of the time and refused to pursue the project. Instead, they set their sights lower, onto firmer ground theoretically, and Lockheed used the experience gathered with the L-133 design to better the development of their replacement design which became the USAAF's first operational jet fighter, the P-80 Shooting Star.



Was the Lockheed L-133 Starjet a lost opportunity?

Although entering combat service after the war had ended, the P-80 was considerably lower tech than the L-133. Because the USAAF didn't allow the L-133 to progress, the advanced engines intended for the L-133 suffered retarded development. That left the most expedient engine choice for the P-80 being the Allison J33, based on British centrifugal compressor designs. Instead of the sophisticated, advanced, futuristic aircraft that might have been, the USAAF had only the P-80, a cheap-to-build, single-engine aircraft, with a conventional wing and tailplane design, not using the blended wing-body and canard layout of the L-133 with all the advantages they would have provided.

Design Specifications of the L-133-02-01:

General characteristics:

Crew:	1		Wing area:	30.194 m²
Length:	14.73 m		Engines:	2 × Lockheed L-1000 axial-flow turbojets, 5,100 lbf (23 kN) thrust each
Wing span:	14.22 m			

Performance:

Maximum speed:	543 knots

Armament:

Cannon:	4 × 20mm nose-mounted cannon

The Lockheed L-133 Starjet.

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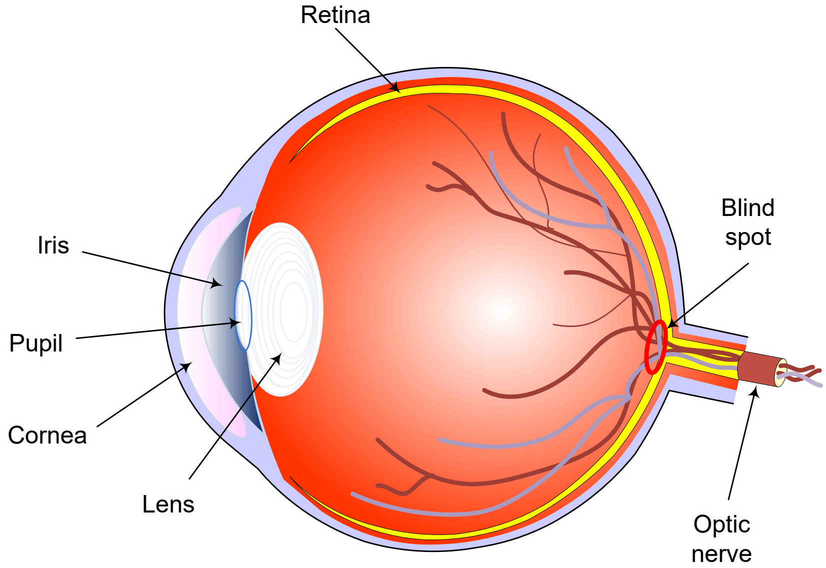
The Eyes have IT. Or do They?

By Rob Knight

When operating any aircraft, in VFC or IMC, it's all about eyes. That's eyes to see and be seen, and eyes to interpret and make use of the instrument presentations and indications. We simply can't do without them.

Some would argue that the VISUAL bit generally refers to the visual horizon, After all the Wright brothers had no instruments, but for every flight we must use our visual acumen so see and avoid other aircraft. Thus, we are completely dependent on our MK-1 eyeballs to see and avoid others.

The Basic Parts of the Eye.



The Basic Eye

NO PILOT IS EXEMPT FROM A MID-AIR COLLISION

Limitations of the Eye.
Eyes provide 80% of a human's information intake. In flight, pilots depend on their eyes to gather the basic data necessary for flying such as direction, airspeed, altitude, and air traffic in the vicinity.

Physical Eye Limitations:
Eyes, themselves, have physical limitations. These limitations include:

- Poor performance through tiredness or strain,
- Poor function in dusty conditions,
- High sensitivity to injury and to failing badly, possibly completely, if foreign bodies or lashes enter them.

Light Limitations:
Eyes use reflected light to function so anything that influences reflected light will affect eyes. Things that will influence reflected light include:

- Blind Spots (be aware of them),
- Atmospheric conditions (smoke/haze, precipitation, cloud),
- Glare (use sunglasses with clean lenses),
- Windscreen cleanliness (keep windscreen clean),
- Lighting (keep light inside the cockpit low),
- Windshield distortion and damage.

The sun is an issue worth special consideration. Glare from the sun can severely limit vision, especially when looking towards it. When landing, the sun can appear with surprising suddenness, and if it is ahead, it can result in a substantial loss of vision at a time when it is particularly important to be able to see clearly.

It is also noteworthy that haze makes objects indistinct by reducing contrast and this lower contrast makes objects seem further away than they really are. In other words, hazy objects may be closer than they appear.

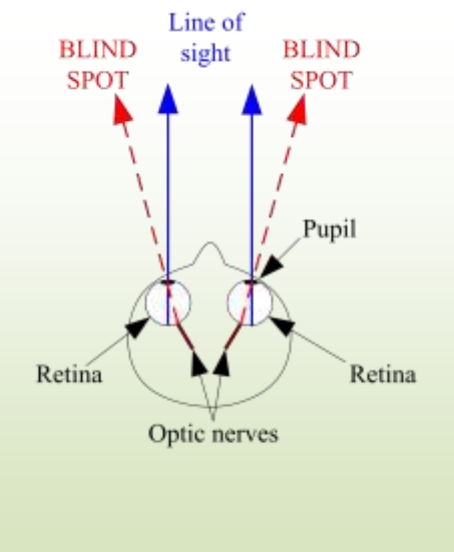
Blind Spots:
Eyes have blind spots, areas where they provide no vision.

A small portion of the visual field of each eye around the optic nerve head within the retina has no light receptors and therefore, there is no image detection in this area. The blind spot of the right eye is to the right of the centre of vision and vice versa in the left eye. With both eyes open, the blind spots are not noticed because the visual fields of the two eyes overlap. Indeed, even with one eye closed, the blind spot can be difficult to detect because the brain ignores the missing portion of the image.

To see a 'blind spot (if that is possible) view the image below at arm's length, with the CROSS in front of your RIGHT eye. Block your left eye and, whilst focussing carefully on the cross but noticing the dot with the side of your eye, move closer to the image and the dot will disappear. It really is still there but you can't see it because it is in your right eye blind spot.

Try the exercise with your left eye, too. Just put the spot in front of the centre of vision of your left eye, adjust the eye-image distance, and see the cross disappear in the side of your left eye. Go ahead - try it.

If a pilot has vision impaired in one eye as can be caused by short term local reflections and/or glare, these blind spots are very relevant and can be hazardous indeed.



Blind Spots

Time to Focus Limitation:

It takes time for eyes to focus, up to two (2) seconds in some circumstances for healthy eyes to adjust to a new focal length. Considering that it takes around 10 seconds to avoid a mid-air collision, two seconds is a long time – about 20% of what time might be available.

Another focusing problem arises when there is nothing specific to focus on. This is common where there is no visible or distinct horizon. In such cases the pilot experiences empty-field myopia (staring but seeing nothing).

Field of Vision:

Another eye problem is that they have only a narrow field of vision. This is the size of the area around a focused point in which the eye can discern other objects - there is no wide-angle lens for eyes.

To catch the eye, an object is best to have motion or contrast and for aircraft in flight both these tend to be lacking. At a distance, an aircraft on a collision course appears to be motionless and it is small (initially anyway) and often has little contrast with the background. Obviously, as other aircraft are hard to see, pilots need to ensure their lookout is maximised in all respects.

Aviation Environment:

Some atmospheric properties hinder good lookout. In bright conditions, glare makes it hard to see anything clearly outside and also makes scanning uncomfortable. Haze, fog/smog, precipitation and dust, all reduce the ability of eyes to see what needs to be seen.

Scanning.

Because sight is affected by so many factors, the best way to SEE and avoid collisions is for a pilot to learn how to use his/her eyes efficiently. This means understanding limitations of eyes and using appropriate scanning patterns.

Visual Scanning Techniques:

Effective scanning is vital in avoiding collisions throughout an entire flight. Even when taxiing, pilots have been known to taxi into other aircraft, drains, fences and hangars because they had their heads in the cockpit and were not looking out and scanning.

How to Scan:

There is no 'one-size-fits-all' in scanning techniques. The most important thing is for all pilots to develop a scan method that's comfortable and works for them. Good scanning requires a pilot to know how and where to concentrate his/her eyes during a scan. For example, it is obviously critical, especially in the traffic pattern, to always look out before a turn, and ensure the path is clear. A good scan before a turn whilst in the circuit should also check for traffic making a non-standard entry into the circuit as well. During the climb, if the nose obscures the flightpath ahead, good pilots make gentle clearing turns to ensure that no traffic lies hidden under the cowling. Neither do good pilots forget to scan around their approach path when on finals, as well as watching their aiming point of the runway.

In normal flight, a good scan pattern encompasses an area at least 60 degrees left and right of your flight path and 10 degrees above and below it. This will provide a better chance of seeing a potential collision threat and of having time to avoid it. In terms of time spent scanning, remember that the chance of spotting collision threats increases with the time spent looking outside. Effective scanning is achieved through short regular and spaced eye movements that bring successive areas of the sky into the central visual field.

To increase scan effectiveness, a pilot should shift their gaze and refocus at regular intervals.

Remember that:

- Eyes need several seconds to refocus when switching views between items in the cockpit and distant objects.
- Good scanning needs constant attention sharing with other piloting tasks. Note, though, that good scanning is easily degraded by boredom, illness, fatigue, preoccupation, and/or anxiety.

The average time needed for an outside scan is accepted as being 18-20 seconds and for an instrument panel scan, 3 seconds.

Collision Avoidance Checklist.

Collision avoidance involves more than just a proper scanning technique. A pilot might be the most conscientious scanner known to man but still be an integral part of a mid-air collision if other factors are neglected in the see-and-avoid technique.

A good Collision Avoidance Checklist will include the following items:

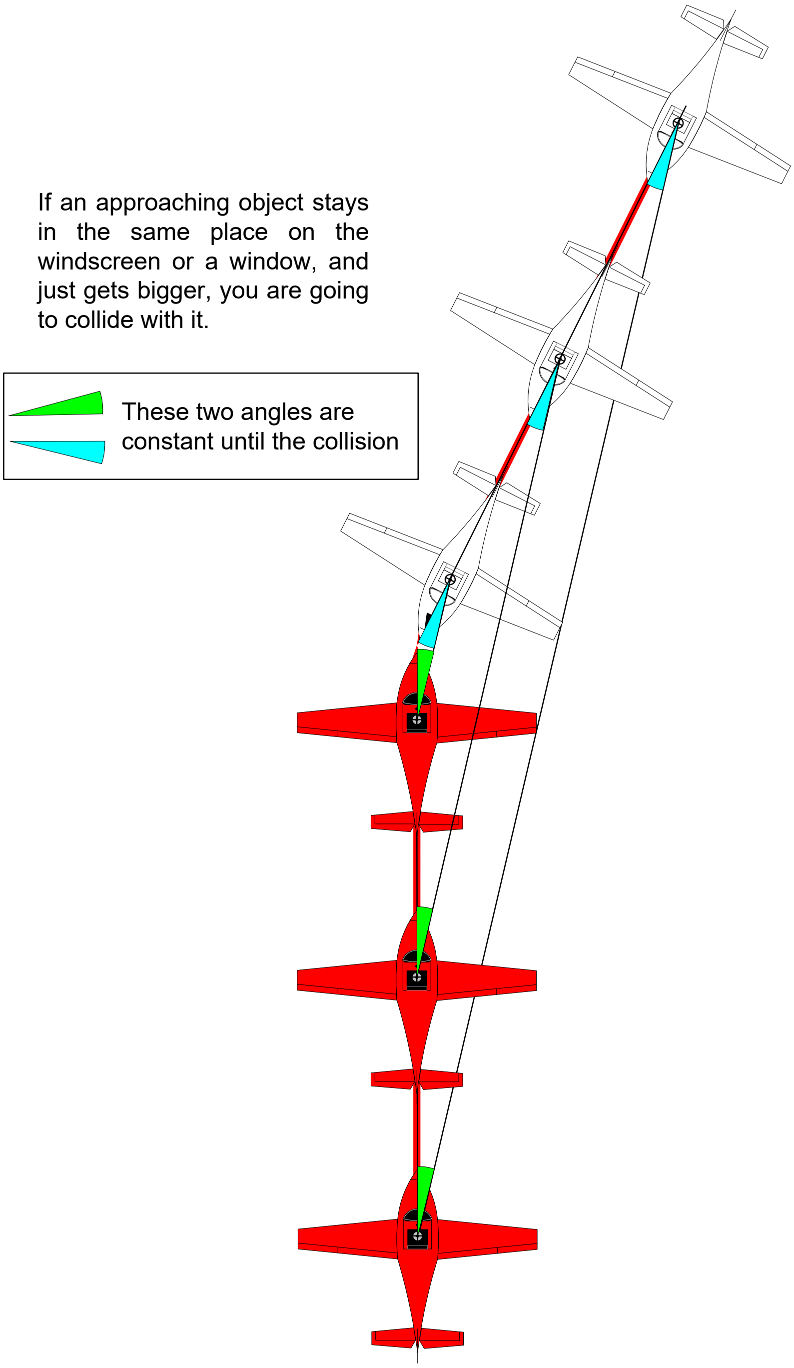
1. Plan ahead - remove cockpit clutter, store charts and navigation logs etc.
2. Carry appropriate sun glasses – keep lenses clean.
3. Clean windows before flight.
4. Adhere to procedures - Follow correct regulations and procedures; such as correct flight levels and proper pattern practices so you can more easily be seen and identified by other air traffic.
5. Avoid crowded airspace.
6. Compensate for blind spots - Know specifically where your aircraft blind spots are.
7. Equip to be seen - Aircraft lights can aid in avoiding collision. In high traffic density, strobe lights are often the first indication another pilot has received your presence.
8. Talk and listen - Use your eyes as well as your ears in flight. Make use of the information you gather from the radio. When a pilot reports his/her position on the CTAF they are also reporting it to you.
9. Use all available eyes - If flying with a passenger, encourage them to advise you of any aircraft they see.
10. Maintain a good scan - This is the most important part of the checklist.

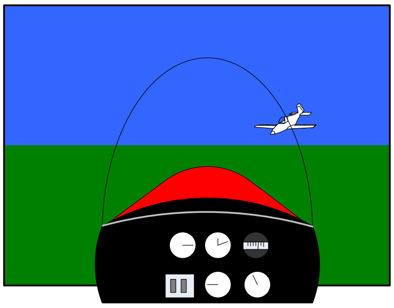
How to tell if an aircraft is on a collision course.

An object that will collide with an aircraft will remain in the same position in its windscreen or window and will simply grow larger. When confronted with such a situation, a pilot must change his aircraft's flight path so the other aircraft moves across the his/her vision.

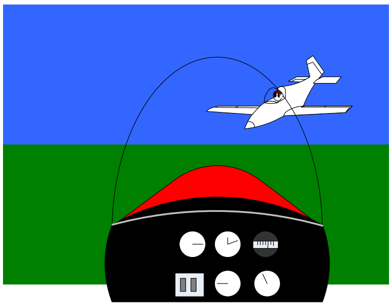
The steps to take for collision avoidance are:

1. He/she must see the approaching object
2. He/she must recognise that it is not moving across the screen or window.
3. He/she must change his/her aircraft's flight path





Someone should do something



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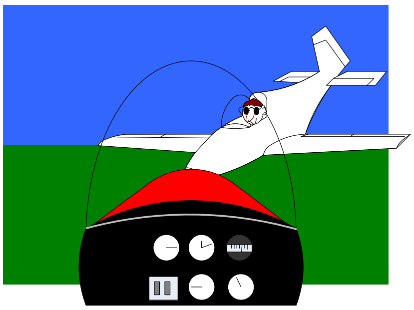
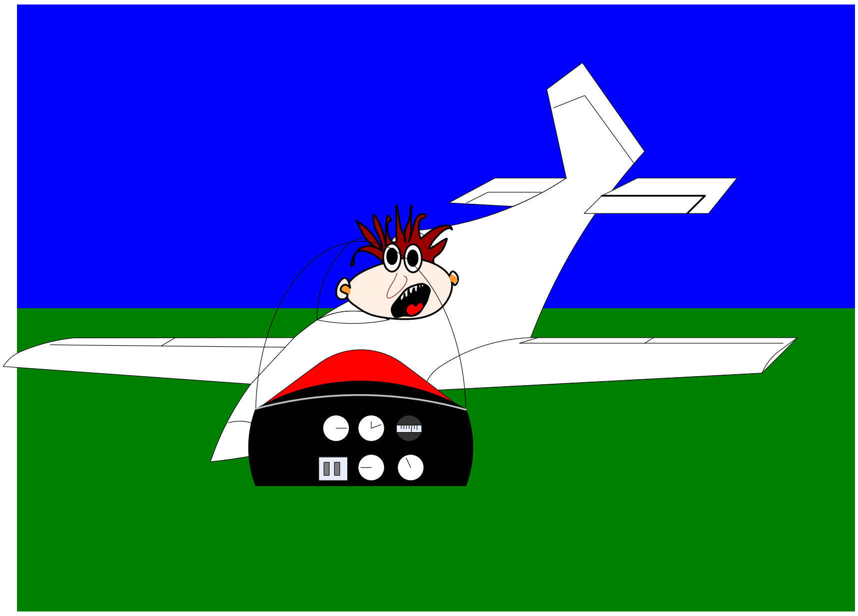


Do something

TOO

LATE



Happy Flying

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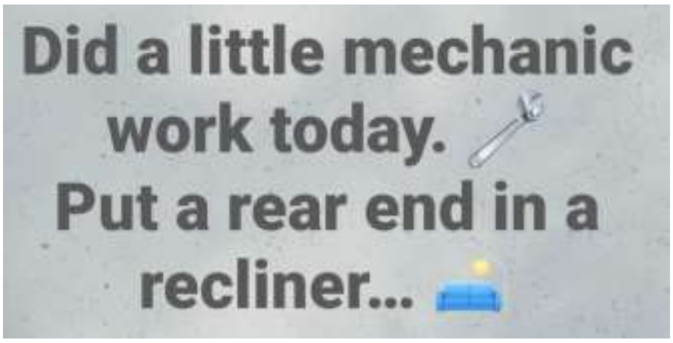
Fly-Ins Looming

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



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WTF - The World's Worst Aircraft – The Ryan X-13 Vertijet - 1955

By Rob Knight

In the 1950s, the US Navy senior brass held the now debunked view that within the decade, all US Navy fighter aircraft would be VTOL. This lasted until such hard-earned lessons as the Ryan Vertijet provided, when their views returned to the conventional deck runways.

An X-13 in profile.

The Vertijet was a tiny delta-winged aircraft with a total wing span of a mere 7.13 metres. Powered by a Rolls-Royce RA.28-49 Avon turbojet engine, it reaches a maximum speed of merely 419 knots, well below expectations. However, it's lack of speed was not the ultimate cause of it's being discontinued – it landed backwards. The X-13 used a unique, one-off, landing method where it involved a purpose-built trailer, a hook, and a striped pole. As the deck of the trailer was horizontal, and the X-13 sat upon it with the nose in a vertical attitude, the pilot had to make his vertical approach in reverse, without being able to see the landing spot.

An X-13 landing.

A second aircraft was built and with this one, the feasibility of vertical take-offs and landings was confirmed. A number of flights involving a vertical take-off followed by an acceleration and level flight sequence were achieved before returning to a vertical attitude and tail-first landings were successfully carried out. To aid the pilot during the landing phase, the seat tilted 45 degrees to ease the pilot during landing.

These flights were solely to examine such operations, and the planes never carried more than about 12 minutes of fuel on any flight. The tests were deemed successful and it was determined that such operations were possible on aircraft that had a substantial differential between thrust available and their weight.

AN X-13 on it's trailer after landing.

On one demonstration for the Pentagon, The X-13 got airborne from its trailer deck, wobbled across the Potomac then destroyed a flower garden with its jet blast before being caught by and landing in a net. Although this did impress the senior officers attending, considerations regarding its poor payload and short operational range led to the cessation of further funding and the aircraft were consigned to history as an interesting possibility but not really practical.

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

1. From the following options select the recognised required conditions for radiation fog to form in Australia?
   A. No wind and no cloud cover.
   B. Breeze 2 to 8 knots and no cloud cover.
   C. A breeze of at least 3 knots, a southerly, and no more than 3 oktas of cloud cover.
   D. At least 8 knots of wind and no cloud cover

2. Control about which aeroplane axis has the greatest general priority for a pilot?
   A. Normal (or vertical or YAW) axis.
   B. Lateral (or pitching) axis.
   C. Longitudinal (or rolling) axis

3. Upon which of the following does an aeroplane's rate of climb (Vy) depend?
   A. Surplus lift.
   B. Surplus thrust.
   C. Surplus horsepower.
   D. Surplus airspeed.

4. Which of the following will minimise an aeroplane's adverse yaw?
   A. Frise ailerons.
   B. Differential ailerons.
   C. Correctly applied rudder.
   D. All of the above.

5. The propeller on a single-engined aeroplane's nose turns anticlockwise from the cockpit. Which rudder is the pilot most likely need to hold during the climb to offset the slipstream effect?
   A. Either left or right rudder.
   B. No rudder.
   C. Left rudder
   D. Right rudder.

If you have any problems with these questions, call me (in the evenings on 0400 89 3632) and let's discuss it. Ed.

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.

ANSWERS

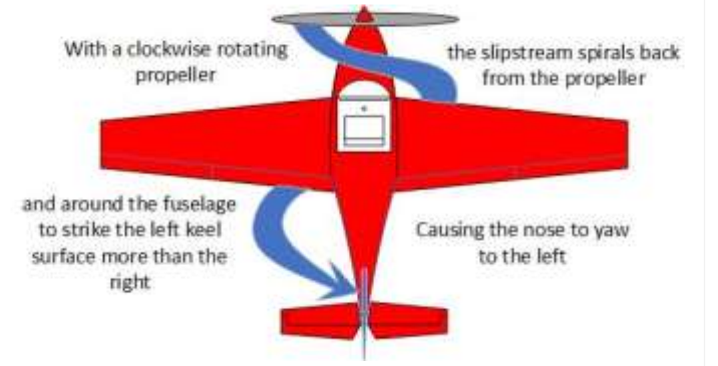
1. B is correct.
   Option A is likely to provide a frost.
   C is nonsense.
   D is likely to form low cloud.

2. A is correct.
   Whilst control about all three axes is obviously mandatory, for an aeroplane in flight any lack of control, or hesitation in controlling yaw will quickly cause an uncommanded roll, which, in turn, will cause an uncommanded pitch nose down.
   For a tail-wheeled aircraft on the ground, the centre of gravity is located behind the main wheels, which will make the aeroplane directionally unstable and any lack of absolute yaw control will result in a loss of directional control.

3. C is correct.
   An aeroplane's rate of climb depends surplus horsepower, i.e., that horsepower available above and beyond that necessary to equal aerodynamic drag.
   See: https://www.flightliteracy.com/aircraft-performance-climb-performance/

4. D is correct.
   Adverse yaw is created when aileron is applied, but the force causing adverse yaw is minimised by the design features of frise ailerons and differential ailerons. However, when rudder is correctly applied to counter it when aileron is applied any/all residual adverse yaw is eliminated. Thus options A, B, and C are all correct
   See: https://www.youtube.com/watch?v=D9clof2O6Mc

5. C is correct.
   As the sketch to the right displays, a clockwise rotating propeller will apply a force to the left side of the aircraft fin and keel surfaces pushing the tail right so the nose will yaw left with high power & low airspeed. Conversely, an anticlockwise rotating propeller will cause yaw to the right so left rudder will be required to counter it.



Slipstream effect with a clockwise rotating propeller.

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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 human 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 Grade Bolts for Sale

<u>**Aircraft AN Bolts - $500**</u>

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

Morgan Cheeta Aircraft for Sale

- Registered 19-1502 and paid up until July 2025.
- Power Plant: Jabiru 2200 with the cold start kit & 1.2kw starter motor.
- Propeller: Sensenich 68" ground adjustable.
- Icom radio, 2 headsets, Sigtronics intercom.
- Flight Instruments: Airspeed indicator, altimeter, vertical speed indicator, slip/skid indicator.
- Strobe lights.
- Fat beach tyres & Matco. Brakes.
- 93 litre fuel tank.
- Leather seats.
- 100 Knots cruise.
- TTIS – 32.0 hours engine & airframe.

NEW PRICE - $36,000

Contact Colin Thorpe
Ph. 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.

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

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

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**

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. maybe