BRISBANE VALLEY FLYER

AUGUST- 2020

BRISBANE VALLEY SPORT AVIATION CLUB INC

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www.bvsac.org.au

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At dawn readiness, patiently awaiting its pilot, a Spitfire sits at a secret SEQ airfield

From the Club

Message from BVSAC President

Hello everyone,

Here are a couple of photos of the first meeting back after the lock down. We had 11 members that attended the meeting with the lunch after. All went well with the meeting. There was not much to discuss as we have not been active for the last few months.

We are on again next month so hope to see more members.

Peter Ratcliffe

NOTICE:

Membership fees are now due.

The Drag Curve – WHAT – Drag acts in a straight line, doesn't it?

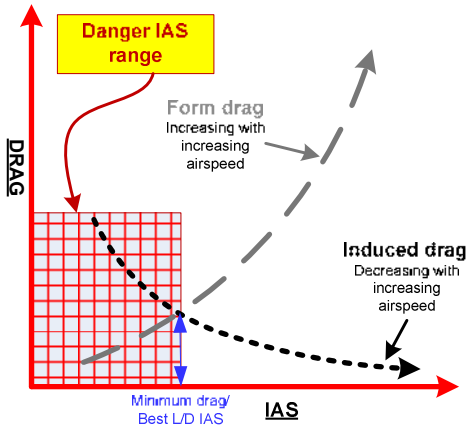
By Rob Knight

So what?

You're on short final, descending towards your selected flare point. The trees before the threshold are getting closer and you see as their tops start to climb up your screen that you are beginning to undershoot. It's clear that your present approach path will now see you arriving short of the runway. The runway is short but you need to slow the descent so you add power and raise the nose a fraction to prevent a rise in airspeed.

Not always the best move. You see that you are still sinking too quickly to clear the tree tops. Your airspeed is a tad low and you add more power until you have full power applied, but you are still sinking too quickly and still can't clear the trees you ease the stick back a tiny fraction to help but it only increases the sink rate and your angle of descent. Welcome to what's commonly known as the back side of the drag (or power) curve. It's a place guaranteed to make you very unhappy so it's worth an overview of the basic that got you into this mess so you can avoid it. Let's look over the nitty-gritty relationship between drag and power.

Remember that there are two main types of drag. Form drag is the drag created by the airframe's resistance to motion through the air, whilst induced drag is a downside of producing the lift that we need and is at its greatest when we are slow, and holding a high angle of attack. Looking at the drag curve on the right, while there is always form drag whilst there's relative motion, it's the induced drag that's the real enemy. And it is worthy to note the red IAS danger zone that precedes the best L/D IAS in the image in the right. Flying at airspeeds within the red zone indicated makes an aeroplane more susceptible to drag curve issues

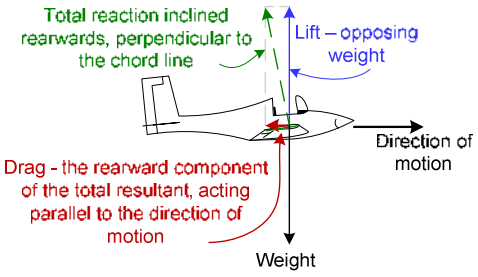


The individual drag curves – Form drag increasing with increasing IAS, and Induced Drag decreasing with increasing IAS.

As stated above, induced drag is a side-effect of producing lift, and induced drag is greatest at high angles of attack. High angles of attack are usually encountered at low airspeeds. To understand how induced drag affects our aircraft note in Figs 1 & 2 that it is the total reaction of the forces generated by the airflow that provides both the Lift (the vertical component of the total reaction) and the induced drag that extends rearwards – the horizontal part (or vector) of the total reaction. See Figs 1 and 2.

At low airspeeds, the angle of attack is highest so it will follow that the slower you fly, the more you'll suffer from induced drag. Go try it. Grab an instructor and try slow flight at minimum controllable airspeed. Play with it and you'll find that there comes a point when you haven't got enough power to maintain height and the only way back is to lower the nose to pick up some speed. This'll give you a good introduction as to your aeroplane's behaviour with lots of induced drag.

As we said previously, the lift needed to support the aircraft weight is the vertical component of that rearwardly inclined total reaction, while the induced drag is the measure of that rearward inclination of that same total reaction. Drag acts parallel to the direction of motion of the aircraft and the relative airflow is exactly opposite in direction to that direction of motion.



With this in mind, the two sketches below depict the components of lift and induced drag at two differing angles of approach. The attitude is maintained as constant so the only change to the lift and drag values is the angle of attack change caused by the steepening approach angle.

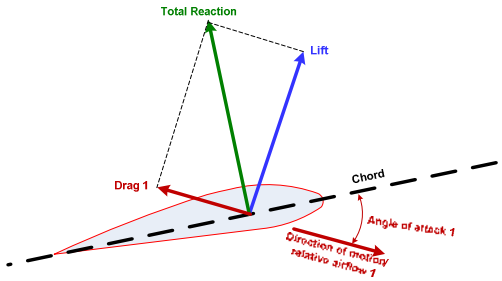


Fig-1. Note the length of the Drag 1 line and its angle.

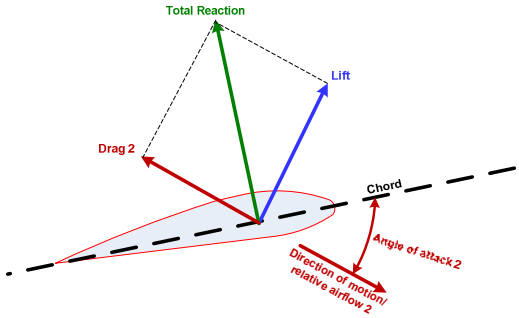


Fig-2. Note the length of the Drag 2 line and its angle. Compare this line with the Drag 1 line in Fig 1.

The change in direction of motion depicted in Fig 2 is the cause of the increased induced drag indicated by the length of the drag line. Now the important question remains what force opposes drag? Basic principles of flight theory immediately screams **POWER**.

And quite rightly so, Power does, indeed, oppose drag. But think about this for a minute! What if the drag is greater than the power available? What if applying full throttle and denting the firewall WILL NOT BE ENOUGH TO STOP THE DESCENT, regardless of how much noise your engine can make? Getting into this situation when low on finals is a bit like tumbling off a waterfall in a kayak. Once you're over the edge you can't get back. When low on finals, the only measure a pilot can take to prevent such a catastrophe it is not to paddle too close to the edge of the water fall. In other words, don't set up a situation you can't escape from.

Obviously this "*behind the drag curve*" issue can be avoided if more power is available than can be gathered through the engine and prop system. The clue is Height. Height is a source of energy. Known as potential energy, height can be exchanged for speed by simply diving to gather that oh-so-necessary speed.

And therein lies the answer. If you are in a position to dive to regain airspeed, the induced drag will diminish and there is no issue to combat. With that little more speed the aircraft's descent profile is again controlled and the aeroplane's appropriate flight path may be re-established by the pilot.

BUT, be warned. This recovery from an uncontrolled undershoot can ONLY be achieved if sufficient height is to hand.

If it happens toooo low, when you get toooo slow, you have paddled off the waterfall and are no longer in control of your fate.

But wait. There's more. The environment can also put you firmly in the same place under certain circumstances. Encountering a phenomena know as a wing gradient (aka wind shear), can see your aeroplane robbed of airspeed with no change in attitude. The effect is that the aeroplane steepens it's approach angle which, in turn, increases its angle of attack. Again, the induced drag value will grow and, if it exceeds the power available, you are back over the waterfall. It's for this reason your instructor demanded you maintain a constant appraisal of your airspeed on approach when you were circuit training. Even with a constant attitude and power, a wind gradient can set you up for a bloody nose short of the runway if you haven't the height to restore the airspeed by diving.

If, at a low level on approach, you find that you are applying full power to arrest an excessively steep approach angle, and if you manage to break out of the drag curve issue, my advice is to go around. Trying to land after an approach requiring full throttle to achieve your desired approach angle can be very trying and may set you up for another, quite unrelated disaster.

After the go-around, on your next approach, use a higher speed – maybe 55 knots instead of 50, or even 65 knots instead of 55, to give you a speed edge. Otherwise, fly to another field and return when the wind either changes direction or reduces its speed/gust value.

The drag curve's biggest lessons shout to pilots flying too low on final. Use all the available vertical guidance available when approaching the runway. Fly at the correct airspeed and in an appropriate approach configuration. Watch your planned touchdown spot carefully for any movement. If it is moving toward you, you're getting high; if it's moving away from you, you're undershooting and you'll land short of that spot. That magical spot that is moving neither away from you nor towards you is the place where this approach will deposit you onto the ground. It's your flare point.

From the above can easily be seen the ease with which a pilot can stuff-up a short landing approach. A low airspeed, taken too far, might see the landing shorter than was ever either anticipated or planned. The SHORT might even ultimately refer to being short of the runway.

Any unsuspecting pilot may inadvertently enter a state of being behind the drag curve whilst attempting any landing, although especially a short one. Attentiveness and awareness is the next defence. Don't be unsuspecting. All landings require care and attention, but short landings or cross wind landings, especially for those less experienced, have added items to consider and thus it's easy to become distracted from prime issues. Take care, on ALL approaches, but more so when suffering added attentions diversions.

For those able to access past issues of the Flyer, see issue 40 which I published in June 2016. There is a briefing that I provided on wind gradient and wind shear at that time.

In addition to that, in Flyer Issue 84, to be published in September 2020, I will provide a further revisional piece on recognising wind gradient/wind shear and remove any mysteries associated with it.

Happy Flying

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~~Easter~~ July Fly-In at Biddaddaba

By Rob Knight

Doug and Mon McIlwraith's AAK Hornet back-tracking on 15 at Biddaddaba

Easter was cancelled by arrangement with Covid-19 and thus the planned Easter Fly-in to Biddaddaba had to be abandoned. With the easing of the social distancing, numbers at a gathering, and travel restrictions, it was decided to re-schedule the event over the period 2 to 6 July. At the same time, a weather request was placed seeking assurances from the ether that the period would be free of strong winds and precipitation a of a wet nature., The Gods must have heard because the conditions were near perfect for any fly-in over the selected period

Most of the camping visitors (me included) arrived on Thursday, and the area adjacent to the creek was soon festooned by a cartel of colourful caravans, camper trailers, and converted busses. Although there was some flying activity, most people were too busy setting up their camps to participate.

In the evening, around 1900 hours, the fire box in the social area was ablaze with 500 mm plus diameter tree trunks and limbs and the guitars were being tuned. The resident band, I understand called "The Blowflies", provides excellent entertainment most evenings at these fly-ins and proved to be up to their usual good standard at this one. Ably led by Jeff Thompson and Allan Walker on Guitars, and Kev Walters on his single stringed Bass, the music flowed almost as smoothly as the reds, whites, and beer and soon everyone was in full song. By 2200, most had slipped away into the arms of Morpheus.

The firebox - a great attraction on a cold evening

The following morning was foggy as I suspect were more than a few heads. The dawn was beautiful and clear; but before the sun was fully up the fog wisps had thickened into a soft blanket of low

visibility. Breakfast was the first item on the day's agenda and the smoke from pig stoves soon thickened the mist and gave it more substance. Not everyone's pig performed on cue, though. Kev Walters tried to blow his up in frustration because it simply wouldn't fire up in spite of his best efforts.

In spite of all the non-smoking warnings, some pilots just can't resist.

Lifting fog brought all breakfasts to an abrupt end and soon we had the usual cacophany of Jabiru and Rotax engines competing for first place in the noise stakes. The rising roar as the waiting aircraft took off in turn would have stirred the soul of the most spiritless pilot.

Over the next several days the activities generally followed those set on the day depicted above. Jeff and Marilyn Thompson (Fos and Mrs Fos) enjoyed their GR Lightwing and Gary Hawkins was very active in his immaculate Raven.

"Grummo's" Taildragger Jab

Doug McIlwraith in his beautiful Brumby 600

Various other aircraft visited including John Grummitt in his tail dragger Jab. Doug and Mon McIlwraith's aircraft were very active over the period, the Monlas and Hornet flew daily.

Col Thorpe's well presented Morgan Cheetah did some more test flying towards its requirements for acceptance in the fold for general use. After the first flight, where a rise in oil temperature was noticed, the spinner was re-attached and the recalcitrant temp was restored to normal and no other issues were recognized. Only a few more hours and this aircraft, too, will be joining the rest of us. Colin has been working on building his dream machine for 10 years and soon his work will be realized in the currency of self-satisfaction. Powered by an 80 hp Jabiru, it flies comfortably at 105 knots so will be a great cross-country machine

Colin's new Cheetah, with spinner attached

Another visitor was the well known personage of Robin Austin in his Sonex. Robin is reportedly something of a perfectionist in all the aircraft that he has built and this latest example certainly supports that view. The workmanship clearly shows the care and effort that he puts into these productions and results in the excellent speeds he gets from his efforts. Powered by a 100 hp Rotax 912ULS, he reportedly achieves 150 knots in cruise. This is assisted by the in-flight adjustable prop he has fitted

Over the weekend, Doug and Mon McIlwraith's aircraft remained active, the Monlas and Hornet flying daily.

The AAK Hornet on short finals

The Monlas in flight. It's just as nice to fly as it looks

Also being driven around during the weekend was Mon's restored to better-than-showroom-condition 1929 Chevrolet, Complete with period horn and wooden spoked wheels, it looked as if it had appeared through a time warp

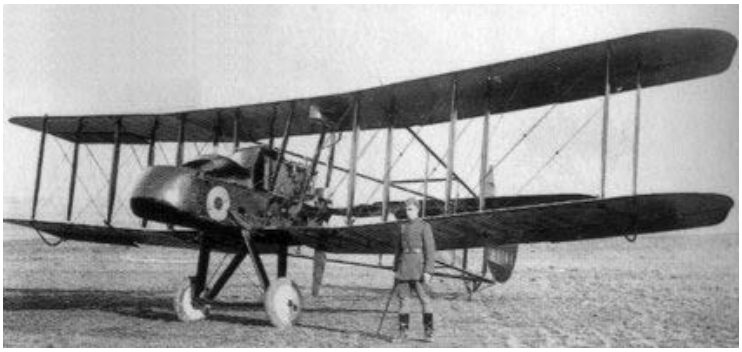
Mon's Show Room Chev

Thanks Doug and Mon: another great weekend!

Flying the FE.2b

Looking at early aircraft designs, and the history of the failures, had had me wondering what they were really like to fly. Research has told me that it has been recorded that in 1910, a crash resulted in 72% of flights. Whilst this sounds horrendous, and a great many lives were lost and injuries sustained, these aircraft were flying so slowly and had such large expanses of wood and fabric in their airframes that the impacts were relatively gentle. Most tragedies were caused by being crushed by the engine or speared by part of the timber frame. By the start of WW1, things had improved a little but were still not yet as we know aviation

The Fe2b began its production life near the end of 1915 arriving on the Western Front in January 1916 as a front line fighter.



The FE.2B (Image from Wikipedia), the development of a design originating in 1910 with the F.E.2 design. This one not fitted with the two machine guns, one facing forward, the other aft, in the front cockpit.

At this point in the war Aircraft were being designed as fighters from their inception rather than fitting an existing design with guns.FE stands for "Farman Experimental", the RAF's designation for Pusher configurations at the time. For a short period, it was an effective fighter, for this was the age of the pusher. Prior to the advent of the interrupter gear allied Pusher types ruled the sky; types like the FE2b, DH2 and the Vickers Gun Bus. Deadly formations of Fee's could wreak havoc on enemy aircraft, heavily armed and armoured, they were dangerous from nearly every angle.

German ace Max Immelmann was killed during a fight with an FE2b on June 18th 1916. Although Manfred von Richthofen's first victory was an Fe2b, he was later shot down suffering a severe head injury during an attack on a formation of Fe2d's July 6, 1917. The Fee quickly became obsolete to more manoeuvrable faster aircraft. It was withdrawn from frontline daylight duties in early 1917, however its stable design and large payload made it perfect for bombing missions and Fe2's carried out the night bombing role until the end of the war as well as Home Defence and anti Zeppelin patrol. I would imagine by the end of the war a Zeppelin was the only craft an FE2b could overtake! Other roles the Fee was well suited for were photography missions, night search duties and night bombing missions. Photographing enemy trenches and gun emplacements may have been the reason for the Fee's heavy steel armour plating mounted beneath the cockpits on the bottom of the nacelle, after all, flying 200 feet above the enemy at 70 MPH (60 knots) would leave the pilot and observer open to all sorts of enemy gun fire from below. A fixed camera was mounted to the side of the aircraft for these missions. Night operations in general are often forgotten as were the Zeppelin attacks on London. The Fee's sturdy undercarriage was well suited to harsh night landings, the slow speed and good forward visibility were also in its favour and its slow speed didn't matter much under cover of darkness.

16 litre, 160 HP Beardmore engine weighing 279 kg. (Wikipedia)

The first production aircraft were fitted with 120 Hp Beardmore engines, later versions were fitted with 160 HP Beardmore engines as well as 12 cylinder air cooled RAF5a engines similar to those found in RE8's. The most

powerful version was the Rolls Royce Eagle powered Fe2d of 250 HP, many of these later aircraft did away with the complicated Oleo type landing gear in favour of the simpler lighter "Vee" type landing gear which allowed a single 230 lb (104 kg) bomb to be carried beneath the nacelle. The maximum bomb load for the Fe2b was 350lbs (160 kg approx.). Fully loaded with bombs the Fee's speed was between 60 and 70 MPH (52 to 61 knots) - it would take ten minutes to reach 3,000 feet.

With a span of nearly 50 feet (47 feet, nine inches) and an all up maximum weight of 3,307 lbs (1500 kg), this is a very big fighter. The upper centre section alone is nearly sixteen feet wide. The horizontal stabilizer is the size of a wing itself. All this size comes with a price, the drag it creates only allows the Fee a normal cruise speed of 70-75 MPH (about 60 to 65 knots).

As you approach this aircraft you become aware of its size and presence, it is like no other first World War aircraft, It's unique, and its departure from conventional designs are so overwhelming, it almost looks comical. With its extensive areas of wooden frames it was inevitable it would become colloquially know as, "The Crate".

PREFLIGHT

The Preflight was no easy task with the F.E.2b. You can almost walk under the lower wings which makes looking at the aileron cables and landing gear an easy task, but forget about looking at any pulleys or hinges on the top wing or centre section without a ladder. The RAF oleo landing gear is a web of tubes, joints, universal ends and bracing wires that mount a pair of 750mm diameter main wheels and on some, a tiny nose wheel to prevent "nose overs".
This type of undercarriage is not often seen on first World War fighters and is difficult to construct due entirely to the large number of machined steel parts and close tolerances required to make it work properly. The high undercarriage was an asset for the Fee when operated at night since a forced landing almost always meant a crash. Many a crewmember was thrown clear of the wreckage unless the Fee hit a building or tree and in this case injuries were more likely fatal as the heavy engine crushed the occupants. Simply check for fluid leaks on the oleo gear, make sure the complex fairings are attached and intact, and then make sure the wind driven air pump under the nacelle is serviced with a few squirts of fresh oil. This tiny air pump is what pressurizes the main fuel tank forcing fuel uphill to the engine.

The next areas to check are the fragile outriggers or tailbooms. These four main structural members support the massive horizontal stabilizer and rudder and the tiniest of vertical stabilizers. The outriggers are intricate routed hollow pieces of spruce, laminated together, wrapped with linen cord at regular intervals and joined to the wing centre sections with metal fittings. These fragile timber members are easily damaged by enemy fire or even by debris thrown about by the propeller - still a hazard today. Never ever lift the tail by the outriggers unless your hands are next to one of the many vertical struts. These four outriggers support a large effective rudder that pivots on its forward spar. At the aft end of the aircraft almost all of the critical components are easily accessible and exposed for inspection. The tailskid bungees are out in the open and so are all of the attach fittings, and bolts.

Obviously, most of this aeroplane is exposed in some way, even the engine hangs half out of the airframe and the engine requires special, attention during a preflight. Having ascertained that the airframe is safe for another flight we must carry out some routine servicing of the engine as instructed by the manufacturer.

1. Top up the radiator with “Rain water” as the Beardmore manual recommends,
2. Screw in each brass “greaser” at least one turn to force lubricant to critical moving parts like the valve rockers, magneto drive and water pump.
3. Lubricate all other exposed moving engine parts with a squirt from an oil can prior to each flight. This airplane creates a full time job for someone to grease, oil, fill, clean, tighten and wipe!
4. Check the engine mounts. These two wooden rails are all that support the massive 600 lb engine a well as the 90 lb radiator.

“The engine is a work of art in itself, a sturdy cast aluminium crankcase sprouting six very large copper jacketed cylinders.”

With over 1000 cubic inches to feed, it eats fuel at a rate of 13 imperial gallons (60 Litres) per hour at full throttle, which provides just 1300 RPM at the prop. Normal cruise is at a mere 1250 RPM. Recommended time between overhauls is 300 Hrs and the factory recommends sending it back to them for ALL overhauls! An external “Lubricator” (which has a capacity internally to supply the engine for 30 Minutes) and a reserve oil tank is fitted, filled with “Vacuum BB “ or Castor oil and consequently the engine has a very distinctive castor oil smell when running.

The oil sump is made up of six compartments each allowing an individual connecting rod to “scoop” up a bit of oil on each revolution. These sumps have a combined capacity of 5 pints. Because of this system, the Beardmore manual warns the pilot not to exceed 14 degrees of pitch for extended periods (we wouldn’t want all of our oil to slosh to the back of the engine leaving the front conrods high and dry). The lubricator provides pressure oil to the engines main crankshaft bearings and to the cylinder walls via external lines.

Built by the Beardmore Aero Engine Co. in Glasgow Scotland, the engine is essentially an upgraded copy of an Austro Daimler engine. Its design has another unusual feature, **Desaxe cylinders**. This means that the cylinders themselves are offset from centre line of crankshaft. (A Desaxe engine means one in which each cylinder is not positioned with its exact centre (the bore axis), directly above the centreline of the crankshaft. Instead, the cylinder is offset slightly. If the offset is in the direction of rotation, it has the effect of increasing the leverage applied to the crankshaft during the "power" stroke, and reducing thrust wasted against the cylinder wall.)

Well constructed cable pulleys

There are miles of control cable to look over, hundreds of split pins and castle nuts to check and almost every bit of it exposed, albeit some parts nearly thirteen feet in the air! One little oddity is the way in which many of the cable pulleys are hidden or enclosed, these intricate works of art house an aluminium pulley , ball bearings and a phenolic cable guide, each pulley housing resembles donut sized “UFO”. Even the 26 hand carved streamlined wooden struts must be checked for structural integrity. The structure of the airplane varies from massive rugged steel fittings to delicate wooden components all braced by cable and streamlined wire. At the aft end near the tailskid the wooden vertical struts seem to be overly wide and perhaps this was done to increase directional stability. Bulbous and blunt at the front, it is open and flimsy at the rear.

CLIMB ON BOARD

Once you have decided that you want to take control of this beast and wrestle it into the air you have to somehow climb on top of, and get into, the cockpit. Duck under the front brace wire and the aileron control cable, put one foot on the big main tire and reach up to grab something solid, Place the other foot on the step hanging below the nacelle and move your right foot from the tire to the wing root. Nearly there, just place one foot on the tiny metal step next to the front cockpit and then the other over the cockpit side onto the seat and you're in! The cavernous size of the cockpit and lack of wind protection makes you aware there is nothing snug about these two cockpits. The crew positions are stepped so that the pilot can see over the observer/gunner, the front observers cockpit is very open and empty giving the gunner ample room to work.

Getting into an F.E.2B was no easy task. See the nose wheel to prevent nose-overs on landing)

A No.4 Mark IV gun mount in front cockpit – swivelling pillar on a universal joint and spring clips , dispersed around front of nacelle to allow the front gun to be positioned in a number of places. The rear gun fitted to the "scotch express" was a nonstandard pillar mount fitted with a Mk II Lewis gun . Both guns are fitted with Mk II deflector bags to catch the spent rounds before they fly through and damage the pusher propeller. Looking more like furniture than the inside of a war machine the front cockpit is fitted with a curving cupboard that holds spare Lewis magazines. Two sliding wooden doors allow access to the rear of the instrument panel and the compass. No seat is provided for the observer, just a pair of eyebolts to fasten a safety harness. In comparison, most aircraft of the day were pretty tight. The diminutive Nieuport fits like a glove, even the SE5 wraps around you and keeps you out of the elements. Once seated in the pilot's seat, a unique control column with a brass triangular grip and integrated thumb-operated throttle is revealed. Trying to operate the controls on the ground is a chore, the weight of the elevators makes the control column heavy and awkward and the control stick mounted throttle seems a bit out of place. I'm already wondering what to do with my left hand.

The first impression is that the metal seat looks cold, and all the controls are all within easy reach. Then you try to work your feet onto the rudder bar and the straps meant to keep your boots in place, to find the aileron cables rub the back of your feet and ankles while the rudder cables trap your shoes between the rudder bar itself and the cables. There are levers for spark advance, radiator shutter, mixture control, switches for the magnetos and the booster magneto and of course the valves for the air system and fuel system. The hand air pump is located within reach of your left hand and is about to get a workout. In order to transfer fuel to the gravity "service" tank located under the upper wing, you must first select "hand pump" on the air system and then "Service to main tank" on the fuel system. This transfer can only be done on the ground and prior to flight, as no provision is made in this position to send fuel to the engine. It takes a long time to transfer 8 imperial gallons of fuel to the top of this aircraft - long enough for your left hand to warrant a rest for the duration of the flight! It's alarming to sit in such a large aircraft and not be able to see most of it. There is no way to peer around the cockpit shell to see the engine, no way to tell if you are leaking fluids or worse yet, if you are on fire! Even the tiny wind driven air pump is mounted below the fuselage out of sight. No way

An F.E.2B panel

to check its operation prior to take off or during flight, hence the procedure to take off on the gravity feed service tank.

READY FOR TAKEOFF

The engine is relatively easy to start, in fact sometimes it starts itself. After your engineer climbs up onto the wing root and carefully balances there while priming each of the six brass primer cups from a squirt can of raw fuel, he needs to clamber back to ground level and pull the engine through a few blades before the prime evaporates away. A call for "all switches off" signals the engineer that it is relatively safe to rotate the four bladed prop. Then, a call of "ready" from the engineer signals the pilot to make his last checks of all the cockpit controls and to ensure everything is in the proper position.

1. Fuel selector "Main tank to carb,"
2. Air selector "Hand Pump",
3. Air pressure at 2.5 PSI,
4. Check service tank is full by looking at the glass sight gauge built into the side of the tank,
5. Position the spark advance to "retard"

Now, to try a start, the pilot calls "Clear," and selects "2" on the mag switch which allows the engine to run on both magnetos. He then selects "On" on the booster magneto switch. All this time the engineer is trapped in a maze of bracing wires and struts trying to remain clear of the soon to be rotating knives called a prop. If we are lucky the engine will come to life with just a spin of the booster mag, otherwise the engineer has to earn his keep and actually hand swing this very big, very awkward engine. Once started, air pressure must be maintained with the hand pump and the RPM kept below 800 RPM until the water temp reaches 60 Celsius. Then the spark advancer lever can be moved to "Advance" whilst checking for an increased smoothness in the engine's beat. Before setting off it is a good idea to have your engineer look over the engine while it is running, as this aircraft is a pusher, there is no way of detecting oil, water or fuel leaks.

A run up to check the engine operation is performed with chocks in place and the engine brought up to its maximum static RPM of 1100. Each magneto is checked and of course the idle speed is also checked. Unlike modern aircraft, this is to check not the minimum idle RPM, but to ensure that the RPM doesn't exceed the maximum. If the idle is greater than 600 RPM the airplane will have an excessive ground roll and may even "float" using excessive runway, maybe even more than is available in some cases. No brakes on this machine, so we want to double check that idle speed before we put 3,000 lbs of wood, steel, fabric and wire into motion.

Replica F.E.2B at Hood Aerodrome, at Masterton, New Zealand

Taxiing is fairly easy with good visibility forward and a steerable tailskid, just bear in mind there is a great deal of momentum with this ship and it doesn't change direction or stop quickly, in fact it doesn't do anything quickly. Check the wind direction, line up into the wind and switch to "Service tank to carb" make sure the air pressure is built up in the main tank just in case and go. Here's where everything seems to revert to slow motion.

Even when the throttle is advanced the engine only increases in speed to 1120 RPM, the aeroplane starts to roll and simply levitates into the air. A combination of huge wing area (nearly 500 Sq Ft) and an airfoil with a slight undercamber and tall Oleo gear, doesn't give the Fee much of an attitude change as it lifts off. Lift off takes place just as the airspeed indicator comes alive at 40 MPH (34 knots) and the speed increases easily to the best rate of climb speed of 55-60 MPH. (48 to 52 knots)

which will give an unimpressive 300 feet per minute. About 2.5 minutes later, having attained a safe altitude of 750 feet AGL, you can safely switch the air selector to “mechanical pump” and check to see the air pressure is being maintained by the wind driven pump at 2.5 PSI. Now it is safe to switch to “Main fuel tank to carb”.

Climb-out to the desired altitude is slow but steady as you become aware of the lack of prop wash and the stability of this big kite. Turns in either direction are smooth and coordinated, movement in any regime is easily carried out and you never lose faith in the controllability of this monster. The elevators are not as heavy as they were on the ground and the ailerons have plenty of authority. The rudder leaves a little bit to be desired but is sufficient. In contrast to the Fee, the Sopwith Camel with about the same horsepower (160 HP Gnome rotary) climbs like a rocket, swaps ends in a blink of the eye and can easily exceed 100 MPH. The performance difference is due mainly to the camel being half the fee’s size and a third of the weight! In the comparison of these machines, one can easily see how fast technology advanced during wartime.

Throttle back to 1250 RPM, the best “normal” (cruise) speed and level out, this should give 70 -75 MPH (60 to 65 knots) and a smooth ride. The wind noise isn’t as apparent as it is in most open cockpit airplanes owing mostly to the pusher configuration. The view is extraordinary and the feel is unusually comfortable; you soon forget about the cables trapping your feet, the awkward throttle and even that you have no idea what’s going on behind you, I guess “ignorance is bliss”.

There isn’t much more to report on the flying characteristics; it flies like it looks - big, heavy slow and stable. I did find it odd that the entire throttle range seems to be about 250 RPM; I use 1300 for take off and the first part of the climb, reduce to 1250 to keep the temperature down and for cruise, then reduce to 1050 to descend. The stick mounted throttle doesn’t get used too much and it is very handy right where it is when you are trying to maneouvre this heavy machine, it definitely takes two hands on the stick to throw this fighter about. Diving is an experience, point the nose down and you would expect all this weight to carry you to the ground at an alarming rate, not so, there is so much drag that there is hardly any acceleration until you input an excessive amount of forward stick. Even then the Fee doesn’t go much faster, it’s a chore to reach our never exceed speed of 110 MPH and even then the machine is steady and very predictable.

The view from this vantage point is stunning, however in combat conditions it is easy to see why the Fee was utilized best in defensive formations, it is very vulnerable from the rear. In fact even to the side the pilots view is obscured by the high cockpit sides extending above your shoulders and head. A few steep turns in either direction show no unusual characteristics, in fact the machine feels very strong and purposeful, it doesn’t get knocked about by the wind or have a serious gust response like the very light Sopwith Triplane. If you care to muscle the Fee around the sky it will oblige but it has its limits, speed bleeds away fairly rapidly, water temperature builds during the climb and it is very tiring. On a calm evening it could be likened to flying your lazy boy recliner around the valley except for that awful engine noise as the big Beardmore thumps along only a few feet behind your head.

This “sparrow strainer” is a marvellous machine. While it wouldn’t be my choice for a fighter, it certainly is a joy to fly. Many reports from servicemen regarded this machine as rugged, reliable and purposeful and it certainly filled many roles. It takes a while to get used to the lack of aeroplane in front of you, but you quickly begin to rely on the relatively calm breeze blowing in your face. Surprisingly that seventy mile an hour wind is more comfort than nuisance, it’s much more bearable than the usual prop wash from a typical tractor configuration. This constant breeze becomes a great indicator of your attitude, just one more surprise the Fee has to offer.

To further explore the performance envelope, a few stalls are in order. It doesn’t seem to matter how the fee is configured, it stops flying with a very gentle drop of the nose and if you really push it,

a wing will drop. Recovery only takes a slight amount of forward of that triangular stick and you can fly away again to claw your way back up to where you started.

The only bad characteristic seems to be the lethargic rate of climb and a terrible buffeting when you retard the throttle. While exploring stalls and descents I came upon something I wasn't exactly expecting. The rotating prop disc creates severe turbulence that passes over the tail section which can be felt throughout the aircraft. The easiest way to avoid this condition is to simply keep the power up to a "zero thrust" RPM which seems to be about 1000 RPM for this engine and prop combination, anything below this RPM and you will feel it in the control stick, rudder bar and of course, the seat of your pants.

The best part of F.E.2B is the ability to have someone up front for the flight. Designed to accommodate a gunner or observer in the spacious front cockpit big enough to allow him to move about unhindered, the space is open and free from any obstruction including a seat. Sitting up front today is a pleasure however; ninety years ago this would be much different, we could imagine the gunner up front and how little protection he had, no place to sit, low cockpit sides that didn't have much support and of course the danger of being crushed by that big engine in the event of a crash. For takeoff and during most of the flight I would expect the gunner to sit and face rearwards and keep a lookout for enemy aircraft or the condition of his own machine since the pilot cannot see anything to the rear. Once ready to engage the enemy the typical position would be crouching to operate the forward facing Lewis gun or standing to fire the rearward facing gun which could be used to fire backwards over the wing. The gunner must have made spectacular gyrations to make his machine guns effective.

The gunner's position. Note that his cockpit depth is only ankle deep. No seatbelt, either!

At first I had no idea why there would be straps inside of a jacket and my inexperienced gunner obviously had no idea what he was in for on that first flight! As we climbed for altitude my observer attempted to stand and reach for the rear facing gun - in an instant he inflated like a balloon, funny at first but then the thought of him being pulled over the low sides of the front cockpit became very real. The cockpit only comes to just below your knee so you are more standing on the plane than in it. The RFC leather coats of the day had straps inside that wrapped around the wearers legs to keep their coat from blowing open in the wind and possibly being dragged out of/off the aeroplane in flight. Being so exposed, even the gunner's gloves were a cross between gloves and mittens; they had a small fur lined mitten part that folded over the fingers to add even more warmth when you didn't need fingers free for firing a gun. Flying any open cockpit airplane in the dead of winter wouldn't be much fun, I think people often forget the war was fought even in the winter and sometimes at altitudes of ten thousand feet or more, the bone chilling temperatures must have been excruciating.

The pilot and gunner crew certainly had to work as a team. The pilot relied on the gunner to keep a lookout behind and the gunner relied on the pilot to help position the airplane to allow a shot to be taken. I was also amazed at how much influence on the airplane the gunner has, in level flight he can almost steer the airplane with his body position. You also notice how teamwork would be paramount for Fee crews, if the pilot wasn't cognizant of the gunner's position and what he was trying to do, the pilot could easily throw the gunner around the front cockpit recklessly while maneouvring haphazardly.

Time to land

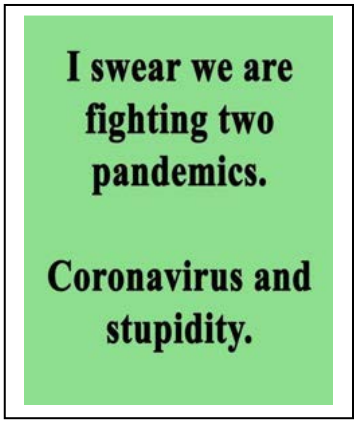
Simply head back towards the field and drop the nose a few degrees, throttle back to 1050 RPM and wait. The airspeed only builds to 80-85 MPH (about 70 to 75 knots) and the noise increases a bit. Check the T's and P's, well... the only temperature is water temp, and the only pressure to check is air pressure, if the water is cooling down you will have to close the cooling shutter by moving the appropriate lever aft. Consult the checklist once more and switch to "Service tank to carb" and prepare for a normal overhead rejoin.

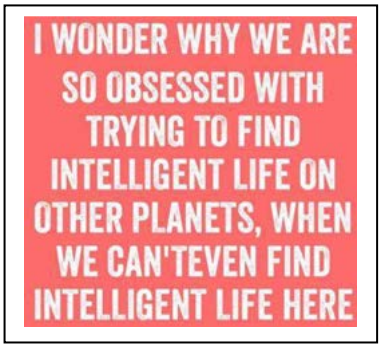
Replica F.E.2B at Hood Aerodrome, at Masterton, New Zealand. This is the on;y F.E.2B flying anywhere in the world and has an original Beardmore engine powering it

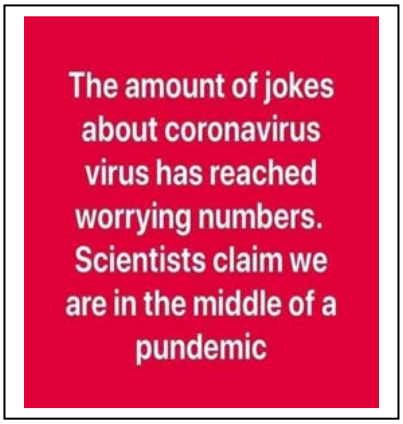
Once in the pattern to land some planning is required. It's a big machine and has a lot of momentum and very little climb performance, all serious inhibiting factors when considering a go around. Turn downwind, the speed should be about 60 MPH (about 50 knots) reducing to around 55 MPH (48 knots) as you turn onto base, Then the speed should gradually be reduced to 50 MPH (43 knots) over the fence to give a touchdown speed of about 45 (about 40 knots). The undercarriage will make any landing short of a crash feel good. As you taxi back to dispersal, think about flying this machine with a full bomb load and at night, in all kinds of weather, with men firing machine guns and rifles at you, all trying to kill you.

It's no wonder men were given medals for their service, but I still think they were worth more than their medals

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





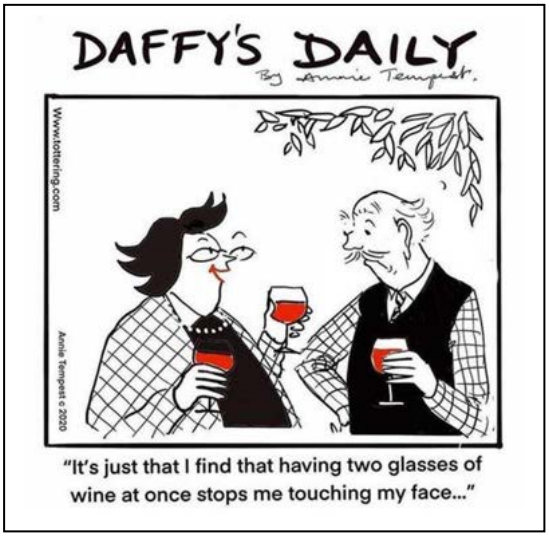


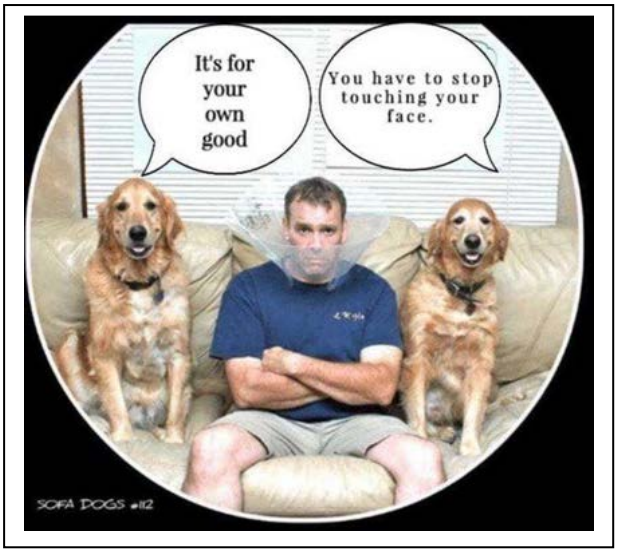
Harry's Joke:

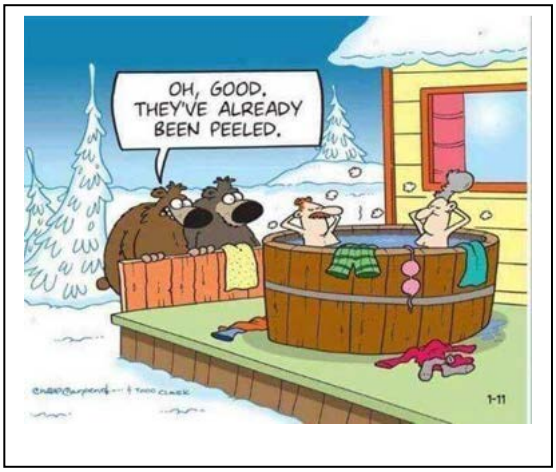
I purchased a map of the world recently and, after giving my wife a dart, asked her to throw it telling her that I'd take her on a two week holiday at whatever place the dart landed. She asked me how serious I was, and stood there, dart in hand, until I promised on my heart, the bible and other things sacred to marriages that I would, indeed, take to the dart's location as soon as this pandemic is over.

It turns out that we're spending two weeks behind the fridge.

Harry



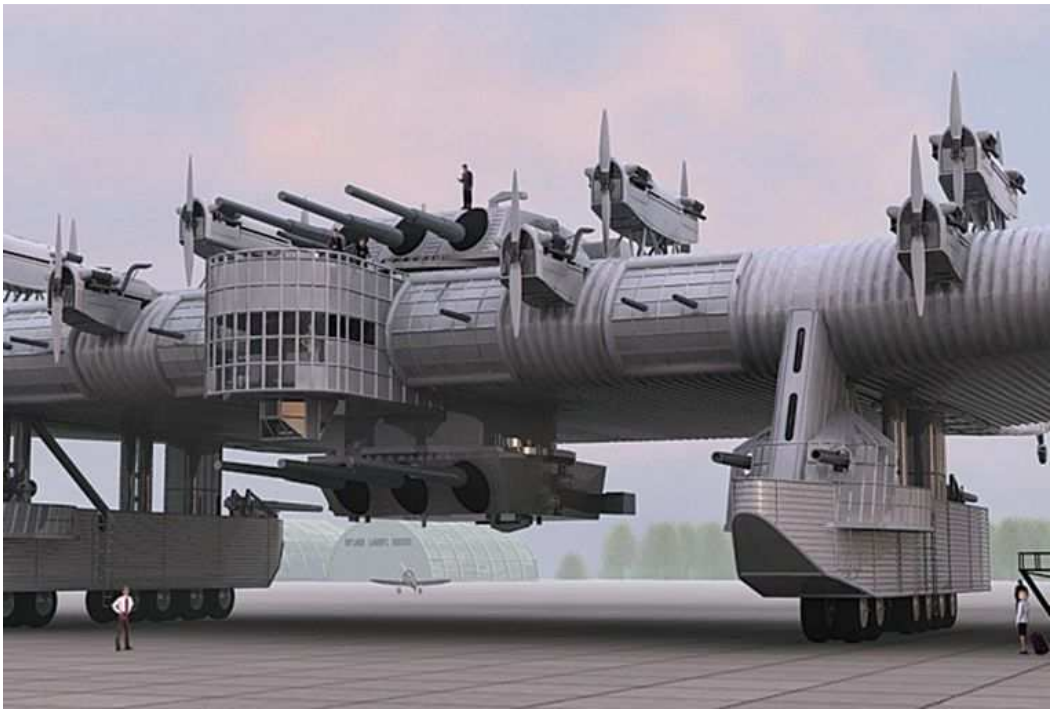




FLY-INS Looming

All awaiting current social distancing rules to be rescinded.

What the Hell is THAT - – Kalinin K7



The **Kalinin K-7** (Russian: Калинин К-7; Ukrainian: Калінін К-7) was a heavy experimental aircraft designed and tested in the Soviet Union in the early 1930s. It was of unusual configuration, with twin booms and large underwing pods housing fixed landing gear and machine gun turrets. In the passenger version, seats were arranged inside the 2.3-meter thick (7 ft 7 in) wings. The airframe was welded from *KhMA* chrome-molybdenum steel. The original design called for six engines in the wing leading edge, but when the projected loaded weight was exceeded, two more engines were added to the trailing edges of the wing, one right and one left of the central passenger pod

The very brief first flight showed instability and serious vibration caused by the airframe resonating with the engine frequency. The solution to this was thought to be to shorten and strengthen the tail booms, little being known then about the natural frequencies of structures and their response to vibration. The aircraft completed seven test flights before a crash due to structural failure of one of the tail booms on 21 November 1933.

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

1. A pilot flying in Class G airspace at 3800 feet AMSL and 3500 feet AGL sees a cloud ahead at the same height. What is the minimum horizontal distance he requires to pass that cloud?
   A. Remain clear of cloud and in sight of ground or water.
   B. 1 km.
   C. 1.5 km.
   D. 2 km.

2. Considering the pilot flying in question 1 above, what minimum flight visibility must he maintain to remain within VMC minimums?
   A. Remain clear of cloud and in sight of ground or water.
   B. 1.5 km.
   C. 5 km.
   D. 8 km.

3. A pilot with an expired BFR is at the field to renew his BFR and needs to taxi his aeroplane across the maneuvering area to refuel. May he carry out this taxi exercise?
   A. Yes.
   B. Yes but ONLY with the approval of the instructor carrying out the BFR.
   C. Yes, but only when specifically authorized by CASA and the terms of that authorization are complied with.
   D. No.
   E. C and D are both correct

4. A pilot making a broadcast transmission at a non towered (non controlled) aerodrome or in Class E or Class G airspace MUST BEGIN that transmission ,and END that transmission, with which of the following
   A. The name of the specific location followed by the word TRAFFIC.
   B. The aircraft type and registration callsign.
   C. The name of the location.
   D. The aircraft registration.

5. Two aeroplanes are approaching each other head on and there is a danger of their colliding. One is climbing, the other descending. Who is required to give way?
   A. The one at the HIGHER LEVEL.
   B. The one at the LOWER LEVEL.
   C. The one with the other on its LEFT.
   D. The one with the other on its RIGHT.
   E. They must each give way by turning to their RIGHT

See answers overleaf

Answers: 1, C, 2, C, 3, E, 4, A, 5, E.

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.

1. C is correct.
   A is only correct when flying within 1000 feet of the ground
   See VFRG, Non-Controlled Airspace

2. C is correct..
   See VFRG, Non-Controlled Airspace

3. E is correct
   Aircraft not to be taxied except by pilot (CAR 229)
   An aircraft shall not be taxied anywhere on an aerodrome by a person other than a licensed pilot whose license is endorsed for the particular type of aircraft concerned or a person approved by CASA in accordance with the terms and conditions of that approval.
   See VFRG and/or CAR 229

4. A is correct
   It is a legal requirement for a pilot to begin and end a broadcast transmission at a non-towered (non controlled) aerodrome or in Class E or Class G airspace with the location of the place AND the word TRAFFIC. E.g., to begin, "Watts Bridge Traffic, this is ……..", and end that transmission with the words, "Watts Bridge Traffic".
   See VFRG Radio Transmission Format

5. E is correct. Regardless of climb, descent, or any other activity, two aeroplanes potentially colliding head on must each turn to THEIR RIGHT.
   See VFRG, Right of Way

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Aircraft Parts and Tools

Item	Condition	Price
VDO Volt Readout instrument	Brand New	**$70.00**
Skystrobe Strobe light for Ultralight	NEW – IN BOX	**SOLD**
Altimeter – non-sensitive with subscale in "Hg.	Brand new	**$50.00**
Pipe bender (for 6, 8, & 10 mm tube)	Used but as new	**SOLD**
Torque Wrench, 3/8 drive ToolPro	Near new	**$60-.00**

Headsets

AvCom headset. Functions perfectly	Excellent	**$150.00**

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

Vehicles for Sale

Ute-back Trailer

The rear end of a Ford Courier ute, covered with a Courier fibreglass canopy. Very robust, good tyres, complete with spare - on Land Rover hubs and wheels.

Tows very well: Excellent condition.

For quick sale - $2100.00 ono

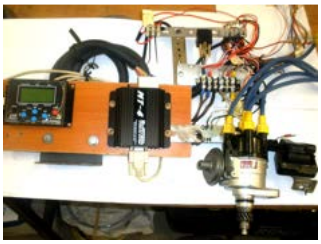
Contact Rob Knight - **0400 89 3632**

Closing Down Sale (All Ex Forest Hill Airfield)

Item		Sale Price
Rover Rancher ride-on mower Superb - runs great and is complete with manual and new battery.		**$650.00 ono**
Painter's drop sheets - Supplied by Aldi, 3.6 X 1.5 M Never used. Contact Rob Knight – **0400 89 3632**		**$25.00 the lot** **Or** **$10.00 Each.**
Push mower, single stoke, very limited use. Not ideal for a septuagenarian hence sale. Complete with catcher. Contact Rob Knight **0400 89 3632**		**$40.00**
Makita four stroke. Starts easily, runs well. Comes with catcher and mulching frame. Needs blades sharpened. Contact Rob Knight **0400 89 3632**		**$120.00 ono**
Digital timer/hour meter. Acts and accumulates on operating vibration Contact Rob Knight 0400 89 3632		**$12.00**
Chain saw, 25cc Ozito. Short blade, automatic blade oiling. Very good condition. Once very useful, now very surplus to requirements. Complete with fuel bottle fuel can, and oil. Contact Rob Knight **0400 89 3632**		**$70.00**

Petrol Ryobi Weed Wacker. Runs well Contact Rob Knight **0400 89 3632**		**$100.00 ono**
Generator Power King 5 KVA Contact Ray Jones **0431 569 477**		**$450.00 ono**

Aircraft Parts For Sale

Item		Sale Price
Suzuki s G16 motor, modified to lay over at 55 degrees to fit inside aircraft cowling. Includes overhauled, balanced, painted motor, new injector carby, starter, alternator, fuel pump, distributor, coil, stainless steel exhaust, and SPG-3 gearbox. Contact Colin Thorpe **0419 758125**		**Reduced Price** ~~**$5700.00**~~ **Now** **$5400-**
Microtech Engine Management System Manage all engine parameters Data log in 3d Control timing, fuel, air-fuel ratios Set idle & wide open throttle rpm Monitor system voltages Paid $1300. Contact Colin Thorpe **0419 758125**		**Reduced Price** ~~**$750.00**~~ **Now** **$680**
Pioneer Ballistic parachute. Includes explosive charge. For details and more illustrations - contact Colin Thorpe **0419 758125**		**Reduced Price** ~~**850.00**~~ **Now** **$780**

Bullit ballistic parachute - Spring loaded. For details and more illustrations Contact Colin Thorpe **0419 758125**		**Reduced Price** ~~**$280.00**~~ **Now** **$250**
3 Blade black Ivo prop. Ground adjustable, Dia. 1500mm Contact Colin Thorpe **0419 758 125**		**Reduced Price** ~~**$450.00**~~ **Now** **$430**
3 Blade blue Ivo prop. Ground adjustable, Dia. 1540mm Contact Colin Thorpe **0419 758 125**		**$300.00** **Now** **$280**
NEW - Cummins finished aluminium spinner, polished with shaped cut-outs Suit 3 blade prop, Dia. 243mm x 300mm high 101.4mm pcd mounting holes Contact Colin Thorpe **0419 758 125**		**Reduced Price** ~~**$480.00**~~ **Now** **$420**
USED - Fibreglass spinner to suit 3 blade prop Dia. 215mm x 290mm high, 101.4mm pcd mounting hole. Contact Colin Thorpe **0419 758 125**		**$80.00** **Now** **$70**
Koger folding canopy sunshade Contact Colin Thorpe **0419 758 125**		**$170.00** **Now** **$160**

K&N cone air filters, washable Brand new. 42 mm (1.65”) mouth. Two of. Contact Rob Knight **0400 89 3632**		**$15.00 each or** **$20.00 for both**
PROPELLER FOR SALE Prince P-Tip Carbon Fibre 74” x 42” propeller (6134P74AT42LK) – SAE 1 bolt pattern. Call Nick – **0435 992 136**. *Note – only the propeller is for sale in the image.*		**$1850 ONO**

Aircraft for sale

¾ scale replica Spitfire

$60,000

Powered by a 6 cylinder engine, this delightful aircraft has good performance and low hours. Available for immediate delivery.

It comes with a low flight time, excellent handling qualities, superb charisma, a brand new mechanical fuel pump and two jack stands.

For details contact Bill Watson. Tel., **0447 186 336**