

BRISBANE VALLEY FLYER

SEPTEMBER 2012



Watts Bridge
Memorial Airfield,
Silverleaves Road
via Toogoolawah,
Qld

www.wattsbridge.com.au

www.qva.org.au

Bruce Clarke's Sopwith Pup





Bruce Clarke's Sopwith Pup

Long time BVSAC member, Bruce Clarke is originally from England. He has worked in aviation all his life. After completing an apprenticeship in aircraft construction techniques, he started work with DeHavilland in 1961. It wasn't long before he got itchy feet, however, and migrated to Australia in 1963. Since then he has worked for many aircraft construction and maintenance companies throughout Australasia, including Hawker DeHavilland in Sydney. He retired in 2004 and eventually bought an Air Chalet block at Watts Bridge Memorial Airfield where he now has his hangar and residence.

Bruce's first project after retirement was an AcroSport single seat aerobatic biplane, which he still owns. However, he has always had a keen interest in early aircraft designs, particularly World War 1 planes, so about two years ago he decided to build himself a full size Sopwith Pup. He chose the Pup because he had often read about this plane being the most delightful aircraft of its era to fly. Said to be a "pilot's aeroplane", it was extremely popular with everyone who flew it.



There was a kit available from "Airdrome Aeroplanes" and, although it was advertised as being faithful to the original Pup dimensions, it used modern materials. Just to be sure that he had authentic measurements, though, Bruce ordered a complete set of plans from Jim Kiger. Kiger's plans were on five large sheets, but each individual drawing was an exact reproduction taken from the original 90 pages of drawings done by the Sopwith design office all those years ago.

The fuselage and wing frames are mostly constructed of gusseted aluminium components, each member riveted or bolted to the next. Bruce made other design concessions to modernity for the sake of safety, including disc brakes,

push/pull tubes instead of cables, and a steerable tail wheel instead of a skid. Also, as La Rhône 80hp rotary engines are hard to come by these days, Bruce decided to convert a VW motor for aeronautical use with a 2:1 reduction drive and parallel coil ignition. This 2275cc motor puts out 110 hp, considerably more than the original, so the aircraft should have performance to match its authentic appearance. The 84" x 48" Culver propeller is made from American hard maple.

Bruce Clarke's Sopwith Pup (continued)

There are already at least two of these replicas flying in the USA, and so far no major problems. Bruce expects to have his Pup in the air in three months. He still has to do the rigging, the weight and balance, and the tuning of the engine.



I continue to be amazed at the quality of aircraft building work done by BVSAC members. Very well done, Bruce Clarke!

When the tail wags the dog

In many ways, RA-Aus appears to be in good shape. Our operations team of Zane Tully and Jill Bailey seem a capable pair. Over the last few months I have had cause to query two or three matters with Jill, and I found her very helpful (and patient). More than that, Zane and Jill have shown themselves quite willing to engage in an open discussion on controversial topics like GPS navigation, something which really impresses me. The new technical team are no doubt getting on with the job as well. I spoke with Dean Tomkins when he was acting Tech Manager before Adam Finn arrived and liked him straightaway. The Natfly organisers continue to do a great job and, most amazing of all, we now have a magazine that is a completely open forum for ideas and dissent, giving voice to everyone from our most conservative die-hards to obstreperous ragbags like me. Whoever chose Brian Bigg and Kreisha Ballantyne for our editors did very well.

In other ways, however, RA-Aus appears to be flying through turbulent times. For instance, there are members publicly expressing dissatisfaction with the performance of the CEO, and this actually resulted in legal action being initiated against one of them (using RA-Aus money to pay for the lawyer). As well, the RA-Aus Board is behaving like a house divided with several resignations of late. One of those not long resigned Board members, who has been a vocal critic of the way the Board is functioning, is now trying to change the RA-Aus constitution at the coming AGM in September. Additionally, there is a report from a recently concluded coronial enquiry into a fatal RA-Aus accident near Lismore in northern NSW that has potentially serious ramifications for the way we fly and maintain our aircraft. A scan of the report is available at: http://www.coroners.lawlink.nsw.gov.au/agdbasev7wr/assets/coroners/m40160114/123_hainaut_okeefe.pdf

On August 14th, I was sent a copy of a document which brought many of these difficult matters into sharp focus. It was entitled "Tizzard_Tully_Draft_Recmnd_to_Police_prosecutor_120516.pdf". This title seems to indicate that the document was written in relation to the Lismore inquest by Steve Tizzard and Zane Tully. Now, as I have just said, that inquest has potential operational ramifications for RA-Aus and it is perfectly reasonable that our operational staff would be involved in making recommendations in respect of it. The Tizzard/Tully (apparently) document in fact lists eighteen recommendations and most of these are of an operational nature. However, at least five of the recommendations are of a distinctly political nature and they are as follows:

Remove the Board from the initial disciplinary process – current system unworkable

Any appeals to be reviewed by Management and not the Board

Board members to have potential relevance and nominations reviewed by CASA

A board of 13 is unworkable and needs to be reduced - 3 short at the moment

Currently 7 out of 10 board members are CFIs, who should be excluded from voting on related policy issues

Of these five points, the recommendation that CASA vet RA-Aus Board members is definitely the most startling. I wrote to Zane Tully the day I received the document asking him to confirm ownership and invited him to expand on his views in the pages of the Brisbane Valley Flyer. Then, three days later, I wrote to Steve Tizzard, also asking for confirmation and making a similar offer to pass on his views to the readership. To this date, neither man has confirmed the document to be theirs; however, nor have they denied it.

After asking around, I was told by Board members that the President of the Board, Steve Runciman, became aware of the issue of this document, may have even approved it, yet did not notify the other board members about its existence. So I wrote to Steve on 19th August asking him for confirmation, also offering to publish anything he wanted to say in support of his actions. To date, I have not received any response from him either.

It is hard to avoid a view of two diametrically opposed groups of people battling it out for control over the direction of RA-Aus. On one hand it appears that there are those working from within to advance a top-down administrative model very much under the direct influence of CASA. On the other hand, there are those who are doing their best to preserve the bottom-up, grass roots style of decision making model that is unmistakably our heritage.

Both sides probably think God is on their side and that the world of RA-Aus will be all the better if they get their way. Basically, it is a political matter, and those from a military or CASA background probably have less understanding of grass roots participation than the rest of us, (except of course when it comes to telling those grass roots what to do).

Perhaps there is a case to be made for disciplinary matters not being in the hands of the RA-Aus Board. Many board members run aviation businesses and, while they can always exempt themselves from cases close to home, ex-board members have told me that the fear of payback at some later date is possibly a limiting factor on the ability of the Board to make fair decisions. However, whatever the merits of this and the other recommendations, a line of protocol in terms of both the spirit and probably the letter of the association's rules was crossed when those policy recommendations were submitted by Management without the knowledge of the Board (meaning not just the President of the Board).

On 22nd September, the RA-Aus Annual General Meeting is being held at Heck Field in South East Queensland. At this meeting, former RA-Aus Treasurer, Don Ramsay, will be proposing four constitutional amendments. These amendments are aimed at strengthening member control of our association. It will be a time for all members of RA-AUS to stand up and be counted. Remember that this association is an association of its members. It is *your* association. The articles of this association state that *you* elect *your* representatives to represent *you* on the Board. So *you* need to make up *your* minds about whether you want this arrangement to continue into the future. If you want your rights as members to be taken away from you, then simply do nothing. Otherwise, make sure you attend the meeting or, if unable to attend, fill out your proxy, put it in the envelope provided and mail it!

Comment from SQ Board member John McKeown

Hi Arthur. Thank you for your email. Yes, I am aware of this document and I can state it is genuine. This has been confirmed by both the President and the investigating police officer. To the best of my knowledge, the President of the Board was not aware of the document beforehand, but you would need to ask him this question. My view of the lead up events are as follows:

*The President was told of the document and given a copy by one of our members at the inquiry. Some two weeks later I was asked by a Northern NSW member what action the Board had taken on the matter. I told this person I had no knowledge of the document. Subsequently, I was then sent a copy. I sent an email asking the President about a document given to the court by our staff. The President denied knowledge of any document given to the court by our staff. I then sent the Board a copy and I was perhaps a little harsh in stating that the staff sending a **policy document** to the court without Board approval was a sacking offence. An email was received from the police assisting the enquiry confirming that the policy document came from Zane Tully. The police said it was a draft version and they did not pass it on to His Honour as they would only pass on recommendations the staff could deliver on (or words to that effect). My personal view is the policeman knew that the document was way outside staff authority. The President later stated that his original denial of knowledge was correct as no policy document from the staff was actually given to the court.*

Arthur, my issue on this matter is that this is another instance of staff acting on their own without Board approval. Even if the points raised in the document were all excellent policy, my objection would still occur. As your representative, my view is that the staff must never write a policy document and send it off to a third party without full Board approval.

John McKeown

Strict Liability: what does it mean?

I have to thank BVSAC member Bill Oates for bringing my attention to point number 5 in the Tizzard/Tully document:

A clearer indication that breaches of the regulations are of strict liability

What exactly is strict liability? I found (most of) this on the Web:

Strict Liability is a legal doctrine referring to absolute legal responsibility for an injury that can be imposed on the "wrongdoer" without proof of fault. What is unique about Strict Liability is that a person does not have to be found careless, at-fault, or negligent for something that happened and/or caused harm to another. In short, it means that in certain types of cases, you can be held liable or responsible for something even if you did nothing wrong. For instance, Strict Liability is sometimes seen in dog bite cases. With dog bites, the owner of the dog can be found responsible or liable even if it was the first ever biting behaviour of that dog and even if the bite was provoked by the bitten person and the dog was restrained in a yard or home that the bitten person had to illegally enter before getting bitten.

To further illustrate this type of legal doctrine, suppose a person is killed after being run over by a car. Normally, if there is intent (i.e., the car was purposely driven into that person), the offence is murder and this category of offence attracts the greatest penalty. If there is only negligence (eg., careless driving), then the offence becomes one of homicide, and this category of offence normally incurs a substantially reduced penalty when compared to murder. If there is neither intent nor negligence, then there is usually no charge to answer at all. However, if strict liability were to be applied, then even if the deceased had jumped out in front of your car as you were driving, completely sober, with all possible care on a public road in a perfectly roadworthy car, the offence you would be charged with would carry the same penalty as cold-blooded murder and the only defence you would have would be to somehow prove that you hadn't been driving the car.

Bill referred me to a report by the ACT Standing Committee on Legal Affairs, which is currently investigating Strict Liability legislation (<http://www.parliament.act.gov.au/downloads/reports/07StrictLiability.pdf>). To quote just one small sentence from that 128 page report: "One of the Scrutiny Committee's frequently expressed concerns is that such offences have the potential to erode certain human rights, particularly the presumption of innocence and the right to a fair trial."

Coronial recommendation for regular L2 inspections

Ian Walker, a long time RA-Aus member and Drifter pilot from the Boonah Tigers, wrote to the Flyer in connection with the Lismore inquest. One of the most concerning recommendations in the Coroner's report was for all RA-Aus aircraft to undergo inspections by L2 qualified inspectors "at regular intervals to be determined by CASA and/or RA-Aus". It is hard to see validity in the reasoning behind this recommendation considering that the pilot involved in the accident was found to have been doing unapproved aerobatic manoeuvres and thereby overstressing the airframe.

It doesn't surprise me, Arthur, but it's a problem for our general freedom from bureaucracy, especially with some in the hierarchy of RA-Aus actively seeking more power. I suspect that one of the reasons the AUF originally began was to escape from the suffocating presence of its CASA predecessor (then the Department of Aviation, formerly Dept of Transport, and before that DCA, as I recall) and their over regulation of General Aviation, which as a result has now almost died out. Back then, people just wanted to make their own little inventions fly in whatever shape or style - a little like reinventing the wheel.

Unfortunately, when there is a fatal accident, the legal profession gets involved, and the usual result is more regulation. While this accident with the loss of life is extremely regrettable, it was probably inevitable, given the absolute refusal of the pilot to take notice of anyone else, however experienced. I suspect that he would have flown even if his certificate had been suspended (as per the recommendation of the Coroner). The reference to maintenance and to Level 2 LAME checks is also worrying. It's just more regulation in the name of safety. This is one of the things that helped cause the decline of GA though cost factors. As far as maintenance related accidents are concerned, the main problems have always come from engine failures, and I believe that it is an indictment of our training methods that so many accidents arise there from.

Anyway, all that any of us can do is to try to limit the fallout where possible and continue to fly safely and sensibly as do the vast majority of pilots. There are cowboys in every walk of life, and when they behave as this guy did they just give the regulators (and those who would like to be rulers) an excuse to erode more of our freedoms. If he'd killed himself in a traffic accident nobody would have taken much notice, but obviously pilots need to be saved from themselves. Funny how so often those who want to rule us have no real idea of what it's all about.

This is just my opinion. I'm not having a go at the Coroner. He would have accepted the advice of people in positions of authority in our own organization who would like to broaden that authority (as per the proposals on the dot point list from Steve Tizzard & the RAA Ops Manager recently brought to our attention). Of course, I thoroughly disagree with that advice. The idea of effectively reversing the onus of proof in the case of accusations of misbehaviour should not be accepted in any form - the accused should be presumed innocent until proven guilty! Regards, Ian.

Well said, Ian. I couldn't agree more. (More RA-Aus politics next page – sorry about that!)

Big price reduction: You may remember this neat, blue and white, Jabiru LSA from last month's Flyer. It was built in 1998 by LAME 2 Rob Dawson from Yeppoon, and has been owned, maintained and flown by him ever since. Rob is only selling because he is getting too old for the sport. He realises the market is not strong at the moment, so has reduced the price of this little beauty from \$38,000 to just \$30,000. The plane has 625 hours TT, but the solid-lifter motor has just 162 hours TT. You can contact Rob on 07 4939 8431 or email him: rda6587@bigpond.com



Ian Baker: RA-Aus persona non grata?

Ian Baker runs the Recreational Flying Website. It is a registered business and he also sells pilot gear, but no one who knows Ian believes for a moment that he is doing it for the sake of a profit. Love him or hate him, Ian is idealistically motivated to the nth degree and, over the years, has created more than his share of controversy in RA-Aus circles. It was former Board member Ian who got CEO Steve Tizzard agitated enough to have him initiate legal action through Slater and Gordon, (very much at the expense of RA-Aus funds it should be added).

Ian started flying about eight years ago and began his forum style website in 2004 (originally called ultralight.net.au). Two years ago, he began a more personal battle with a severe illness, but just lately has been given a given a clean bill of health. It was an extreme ordeal however, and, even though he didn't actually need to, Ian stopped flying and did not renew his RA-Aus membership. Now recovered, he is taking steps to take up his hobby again, but finds that the RA-Aus hierarchy have other ideas. After making his application, Ian received a letter from RA-Aus Board President, Steve Runciman, saying that his membership was not going to be automatically renewed because of allegations that he had brought the name of RA-Aus into disrepute. Ian has now taken legal advice himself and believes the RA-Aus administration hasn't got a legal leg to stand on, by-law twelve notwithstanding.



Ian with his son, Lachlan

I had only spoken to Ian occasionally until just recently when I had opportunity to talk to him for an extended period over the phone. I have to say that I like Ian. Actually, I will go further and say that I admire him. Of course, I have never suffered the wrath of his Recreation Flying forum, however I may never be in that position either because I do not hold a paid position in the Association and my performance in terms of my value for money is no one's business but my own. Most of what I read on Ian's website is to do with the broader policy and direction of the Association anyway.

There is no doubt about it. Ian is a brilliant organizer, a pedantic idealist, a totally obstreperous ragbag (a kindred spirit perhaps), and a whole many other things as well. But he is the kind of person that helps facilitate a truer course for an organization to follow. Successful companies ignore their complaining customers at their peril because papering over the cracks with legal obfuscation will only get you so far. Personally, I think the world needs more people like Ian Baker.

I might add that during our conversation I did attempt to accuse Ian of hypocrisy in that the Rotec Aerosport company was banned from his website for a while (they have just been re-instated, actually). Ian said that in the history of the site there have only ever been two parties banned from his forum pages and this was only because they couldn't contain their enthusiasm to advertise their products there. Knowing what great stuff Rotec make and how absolutely passionate Technical Director, Paul Chernikeeff, is about promoting it, I can readily believe that.

This arrived tonight, just as the Flyer was going on line!

From: "Peter Gilmour" <peter@gilmour.name> Subject: Unconscionable Conduct Date: 27 Aug 2012 4:25pm AEST

I am writing to express my deep concern with the decision to refuse/defer Ian Baker's ("IB") RA-Aus membership application. This decision, which appears to have been initiated by Steve Runciman ("SR") and Steve Tizzard ("ST") acting in concert, is both repugnant and immature and appears to be a clumsy attempt to punish free speech. Further, it is poor and unusual behaviour which itself brings RA-Aus into disrepute and the supporters and perpetrators of this behaviour should offer their resignations.

Given that RA-Aus is the only body through which IB can fly recreational aircraft of the type he prefers, it is misguided to think that the delegated authority from CASA allows the RA-Aus Board and CEO to prevent someone from flying because they directed criticism at the organisation and/or its administration. I know I can write letters of complaint about CASA and its administration without fear of my GA licence being revoked.

I urge you to act immediately and encourage your fellow Board members to overturn this decision by circular resolution and grant IB membership. Should IB's membership not be granted by COB 30 August 2012, I will lodge a formal complaint with CASA, which will not only describe this clearly unconscionable conduct but will urge their intervention to conduct a formal review of RA-Aus administration, Board structure, Constitution and By-laws to ensure RA-Aus acts within the spirit of its delegated authority.

Note that I am not representing or acting for IB but am taking steps to ensure that this sort of grave injustice never happens again. Also note that there are other avenues to pursue to correct this injustice which will be done in parallel with the CASA complaint and, as you are aware, my background equips me with the skills needed to ensure a just outcome.

Regards,

Peter Gilmour

Now, another (happier) letter from Tinsel Town (this time about Kevin's CX4)

Good afternoon Arthur, I live in "sunny" Canberra and have been reading the BV Flyer with much interest. Keep up the good work. It gives me something to dream about when it is -6 degrees in the morning. I own a beautiful Aeronca Champ based at Goulburn, but am thinking of something a bit faster and love the look of the CX4. I was wondering if Kevin Osborne would mind a call or email to discuss the aircraft and build complexities with me. Regards, Ian McArthur.

From Captain (now retired) Bob Wyllie in Vanuatu

Hi, Arthur. Sorry, but I should have replied like years ago! To answer your three questions: Firstly, yes, I have bought a SeaRey kit and am about to start the building process. Secondly, the Cessna 172 has been a drama getting engineers, etc, but I hope to do a test flight next week. The farm we bought that I was going to build an airstrip on has ended up in court with traditional owners, dubious land agents and other low lives, so the strip is on hold and may never eventuate. I gave up flying the 737 last year and am hoping to have more fun in the LSA area. I will write a small story and send a photo or two shortly. Actually, I am rather disappointed with the way aviation is going and I see so much unhappiness in commercial and GA. The LSA, RAA type of flying certainly seem to be where everyone is having fun, and your group is certainly one of those! I really appreciate getting the Flyer every month. There is a good chance of my having my SeaRey in your neck of the woods in a few years time, so I must formally join your group and give my support. Trust all is well with you and I will write again shortly. Regards, Bob Wyllie.

And from Kirk Sutton in the UK

Not a lot is new, Arthur. I've been very busy with work. I have overhauled one of the UK microlights I own and got it back up to scratch. Then the Olympics came and grounded us for the entire summer! All flights in the southeast quarter of the UK are under military control and require approved flight plans and transponders. A half hour flight to another field and back to get a cup of tea and bacon roll takes several hours of planning (flight plans need to be in 2 hours before flight AND still need approval), so I have given up flying for the summer. The new wings for the Sapphire and the new engine are coming along. One D cell is complete and the components for the rest are all in hand, but, in the meantime, I have decided to modify another UK microlight to take a large fuel injected two-stroke. The paperwork and design justifications are killing me! Other than that it's all forward for a trip home in October this year (first time in 4 years), and I hope to get around and see most of those I have not seen for a while. Cheers, Kirk.

Now let's hear from Deep in the Heart of Texas (and I don't mean Texas, Queensland)

G'day to you all. Could a couple of us Texaicans be added to the distribution list of your newsletter?

That mail came at the beginning of the month. Bill Hughes and Don Pellegrenod, who live near Fort Worth in the state of Texas, USA are both now on our mailing list. I asked Bill for some background information:

G'day, Arthur. Thanks for adding us. I will let Don respond to you for his information. He owns a really rare Fairchild aircraft. Actually, I think it is one of a kind. Also, his wife flew around the world in a twin replicating the Earhart plan a number of years ago. I have a strip on my home place 35 miles south of Fort Worth, Texas. Several planes currently reside in my care until they need a new caretaker and a new home. They are a 1966 Cessna 172 (I've had it some 26 years), a 1952 Chipmunk (WP904), and three others in the process of restoration. These projects are a 1946 Cessna 120, a 1945 Ercoupe 415C, (serial #180) and a 1956 Piper Tri-Pacer with the tail dragger conversion (still in the box). I thought I would get on to them when I retired, but somehow it didn't happen. Too many other things, I suppose, like cows and ranching, seem to demand my time. Here is a photo of my ex-Royal Navy Chipmunk. Regards, Bill.



And, while we are on the American theme, this is the most interesting aeroplane story I've heard for a long while. Just follow this link: <http://www.freedomfiles.org/war/pentagon.htm> and watch the video at the top of the blog.

For Sale!! The plane of the decade!!
BVSAC member Ken Edwards is
willing to part with his multi award
winning Courier for basically what
it cost him to build. Ken wants to
start a new project, this time a
Super Cub. If you have ever wanted
to own an aircraft that is as near to
flying perfection as it ever possibly
could be, then look no further.

Rans S-7S Courier: First flown
 November 2010; TTIS 175 Hrs; Rotax
 912 ULS 100 HP engine; colour white.



PolyFiber covering system with Aerothane paint finish; Air Master AP332 constant speed propeller with three Warp Drive, nickel edge, capped blades; Whelan combination wing tip strobe/nav lights; moulded acrylic windshield, with all other transparencies acrylic as well; 800 x 6 Main wheels with an 8" Matco tail wheel; Electronics International FP-5L Fuel flow computer; SA3-00B Gascolator and Golan cleanable engine fuel filter; custom-made dash board and extended fibreglass glare shield; aircraft grade wiring throughout;

Garmin Avionics, complete with SL-40 VHF, GTX327 Transponder, 296 Colour GPS, 2 place intercom with rear seat transmit isolation; electric trim with rear seat isolation; rear instruments (roof mounted ASI, Alt & skid ball); GME MT410G beacon; UMA aircraft instrumentation; plumbed and wired for aux 2 hour fuel system with Andair fuel valve, quick disconnect fuel and electrical fittings (40 litre Turtle Pac additional to sale); glare shield lighting for panel; custom made seats and fully formed cushions; plus a removable rear control stick.

This aircraft has been built by an experienced LAME/Commercial pilot (a repeat offender home builder). It has many small modifications that enhance its looks and performance, such as hinged main leg fairings, interior trim, panel layout, engraved placards and markings, remote mounted oil press s/w, powder-coated fuselage frame and epoxy primed components prior to assembly.



Based at Kooralbyn, SE Qld, 19-7222 has won back to back 2011 and 2012 Natfly "Best Fabric" and "Concourse d'Elegance" Awards. It would undoubtedly be the best example of a Rans product currently in Australia by far!

The plane is priced far below the cost of an RTF Courier ex-USA. It is here now, fully registered and loaded with extras. A delight to fly hands-off (yes, the editor has flown it and can confirm that to be absolutely correct). It cruises at between 90 and 95 knots, burning a maximum of 20 litres per hour (with 68 litre tankage). This is a very reluctant sale but Ken has to make way for his next project. Any inspections are most welcome. Full builder's log and photos available for inspection.

\$100,000 AUD Contact: Ken Edwards on 0438178869, or, alternatively: kenedwardss7@yahoo.com

GPS Accuracy

In July's Sport Pilot, RA-Aus Operations Officer, Zane Tully wrote a very informative article about recent changes to CAO 95.55, noting that the AIP (ENR 1.1 section 19.2) stipulates a margin of error of up to 4nm (5000ft and above) in regard to fixing position in the vicinity of restricted airspace. As Zane (this time with Jill) goes on to say in August SP Pilot Talk, common sense dictates a healthy buffer next to CTA boundaries as well as knowing from which reference point the distance is being measured. However, such margins of error may reflect the inexactness of visual fixes rather than those from GPS receivers, because the inaccuracies of modern GPS systems are measured in metres, not nautical miles.

The diagrams in this article and much of the information are taken from: <http://www.kowoma.de/en/gps/errors.htm>; <http://www.colorado.edu/geography/gcraft/notes/gps/gps.html>; http://earthmeasurement.com/GPS_accuracy.html; <http://www8.garmin.com/aboutGPS/>; <http://www8.garmin.com/aboutGPS/>; <http://www.vmrgradstone.org.au/gps%20accuracy.html>; <http://www.maps-gps-info.com/gps-accuracy.html>; as well as other internet sources.

The system

Twenty-four satellites orbit the earth about 12,000 miles up. They make complete orbits in less than 24 hours, travelling at speeds of about 7,000 miles an hour. They are powered by solar energy, with backup batteries onboard in the event of a solar eclipse. Small rockets on each satellite keep them flying in the correct path. The first launch was in 1978 but all 24 were not flying until 1994. Each satellite has a life of about 10 years, so they are constantly being replaced. Each weighs approximately 900 kilograms and is about 5 metres across with solar panels deployed.



Each satellite transmits at less than 50 watts, putting out two radio signals, designated L1 and L2. Civilian GPS uses the L1 frequency of 1575.42 MHz in the UHF band. The signals travel in straight lines, through clouds, glass and plastic but won't pass through most solid objects such as buildings and mountains. Each signal encodes three different types of information: a pseudorandom code, ephemeris data and almanac data. The pseudorandom code identifies the satellite. Ephemeris data contains important information about the status of the satellite (healthy or unhealthy), current date and time. The almanac data tells the receiver where each satellite should be at any time throughout the day.

Different Geodetic Datums

Latitude and longitude values can be based on different geodetic systems or datums, the most common being WGS 84, a global datum used by all GPS equipment. Other datums are chosen by national cartographical organisations for representing their region on printed maps. Therefore, the latitude and longitude on a map may not be the same as on a GPS receiver. Coordinates from maps can be translated into those based on GPS datums, but it should be noted that the differences between national mapping datums and GPS datums do not seem to be of critical importance for normal visual navigational purposes. For example, to convert from ETRF89 (GPS) to the Irish Grid, you only have to add 49 metres to the east, and subtract 23.4 metres from the north.

The WGS84 Datum

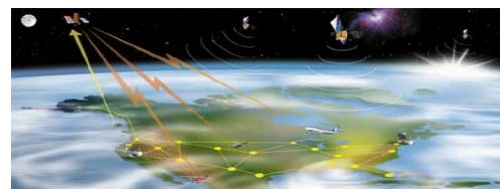
World Geodetic System 1984 is a global geodetic datum maintained by the U.S. National Mapping & Imaging Agency (NMIA). It is the datum to which all GPS positioning information is referred. Prior to January 1987, the system in use was WGS72.

WGS84 uses over 1500 geodetic stations around the world. WGS84 is an earth-fixed Cartesian coordinate system with its origin at the earth's centre of mass (the geocentre). The geocentre is the physical point about which GPS satellites orbit, and it is therefore preferable to any local geodetic datum. Its "z-axis" is aligned parallel to the direction of the Conventional Terrestrial Pole (CTP) for polar motion. Its "x-axis" is the intersection of the WGS84 Reference Meridian Plane with the plane of the CTP Equator. Its "y-axis" completes a right-handed, earth-centred, earth-fixed (ECEF) orthogonal coordinate system, measured in the plane of the CTP Equator, 90 degrees east of the x-axis.

The WGS84 ellipsoid is defined by the length of its semi-major axis, the degree of ellipsoidal flattening at the poles, and both the angular velocity and gravitational constant of the Earth. Since 1994 (particularly), GPS datums have also been taking into account movements of the Earth's tectonic plates (continental drift).

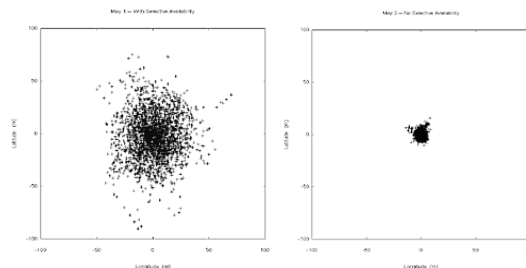
Wide Area Augmentation System (WAAS)

WAAS is a satellite-based augmentation system to support aircraft navigation in North America. It is not operational in Australia. WAAS uses a number of (about 25 or so) ground referencing stations to increase satellite accuracy. Before WAAS, GPS aviation systems could not provide horizontal and vertical navigation for approach operations for all users at all locations.



Selective Availability (SA)

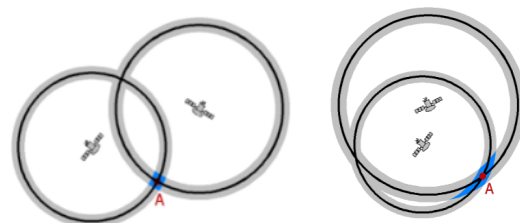
Selective availability was an artificial falsification of signal for civil GPS receivers (50 to 150 metres over a period of several hours). The ostensible reason was safety, particularly in relation to US national security. On May 2nd, 2000, it was turned off. Determination of heights (particularly) improved with the deactivation of SA. The graphs (right) illustrate the difference in lateral accuracy between SA on (left) and SA off (right).



Satellite geometry

Satellite geometry refers to the position of satellites in relation to each other from the viewpoint of the receiver. Poor geometry is when the available satellites are only in one corner of the sky. The more acute the intersection lines between satellite beams, the worse the positioning information. Errors can increase by up to 150 metres compared to when satellites are well distributed over the whole sky and intersection lines are close to 90 degrees. The following two dimensional diagrams compare good geometry (left diagram) with poor geometry (right diagram):

Thinking in three dimensions it is easy to realise that satellites directly overhead are not as good as satellites closer to the horizon. Satellite geometry is also affected by the vehicle's structure (airframe?) and by proximity to high buildings. Some signals may be blocked off. The larger the blind spot, the less accurate the fix. Most GPS receivers not only indicate the number of satellites they are tuning into but also their position. Satellite geometry error also depends to some extent on the latitude of the receiver and is greater closer to the poles.

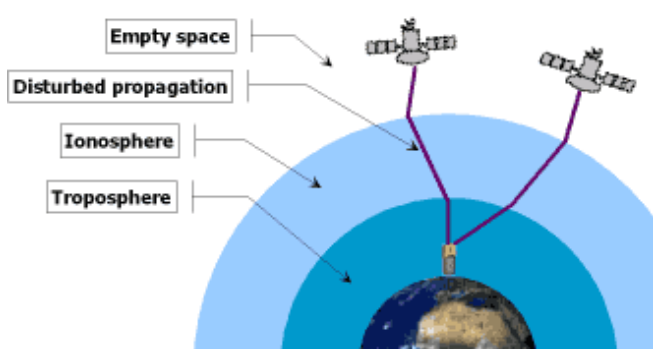
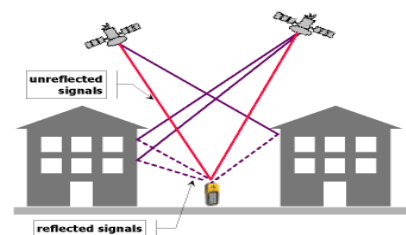


Satellite Orbits

Although satellites are positioned in very precise orbits, slight shifts are possible due to gravitation forces. Both the Sun and the Moon have weak influences on satellite orbits. Orbit parameters are monitored and regularly adjusted so that this kind of position error is usually not more than about two metres.

Multipath effect

This happens when satellite signals are reflected by nearby objects. It is the same effect that caused ghost images on analogue television receivers when the reflected signal took more time to reach the receiver than the direct signal. With GPS, the multipath error typically lies in the range of a few metres and, for obvious reasons, is not a significant factor with aircraft flying well above ground structures.

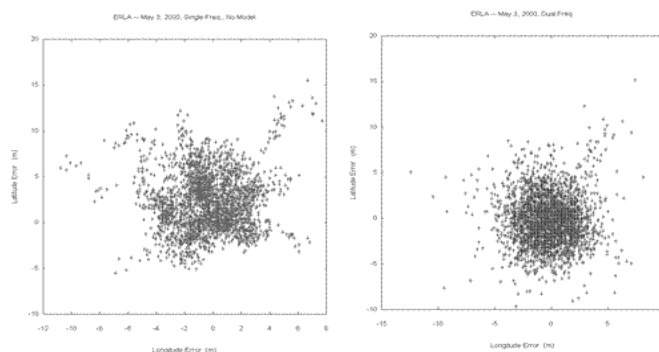


Atmospheric effects

Another source of inaccuracy is the effect of the troposphere and ionosphere on the speed of the GPS signals. In outer space, radio waves travel at the speed of light; however, in the ionosphere (at a height of 80 to 400 km above the surface) a large number of electrons and positive charged ions are formed by the ionizing force of the Sun (this effect is stronger towards the poles) and these charged particles refract the satellite signals back and forth, resulting in an elongated runtime. These errors are mostly corrected using algorithms within the receiver (typical variations of velocity for low and high frequencies are well known for standard conditions). However, civil receivers are

usually not capable of correcting unforeseen runtime changes, for example those caused by strong solar winds.

These two graphs (right) visualize the ionospheric error. The left data were collected using a receiver without ionospheric correction, the right data were collected using a receiver with ionospheric correction.



The troposphere also extends the runtime of GPS signals; however, this time the effect is caused by fluctuations in water vapour. Tropospheric error is smaller than Ionospheric error, but cannot be eliminated by calculation. It can only be approximated to about a half of a metre.

WAAS and EGNOS (the European equivalent ground referenced augmentation system) have the capability to set up atmospheric condition (correction) maps over different regions, enhancing accuracy considerably.

Clock inaccuracies and rounding errors

Despite synchronization of the receiver clock with satellite time during position determination, remaining inaccuracies still lead to errors of about two metres. Rounding and calculation receiver errors are approximately one metre.

Relativistic effects

Relativity has an influence on the proper functioning of the GPS system. Time must be accurate to 20 or 30 nanoseconds to ensure the necessary accuracy. Therefore, the fast movement of the satellites themselves (nearly 12,000 km/h) needs to be considered because clocks run faster at that speed than the clocks on the Earth's surface. Even more significant (about six times more, actually) is that Satellite clocks run faster due to there being less gravity 20,000 kilometres above the surface. The total time shift equals about 38 milliseconds per day translating into a total error of approximately 10 kilometres per day. To compensate for this shift, satellite clocks are set to run more slowly than receiver clocks.

The relativistic effect of the rotation of the Earth (and also of high speed aircraft moving across the surface of the Earth) is not normally considered for GPS position determinations. It is complicated to calculate as it depends on the direction of the movement and the effect is very small anyway.

Receiver Errors

Most modern receivers produce a precision of better than .3 metre. The limited precision of earlier designs of receiver software, which relied on 8 bit microprocessors, contributed more significantly to this type of error. With ranges to the satellites of over 20 million metres, a precision of $1:10E10$ or better was required. Modern microprocessors now provide such precision along with the co-requisite calculation speeds. The net result is that receivers should contribute less than .5 metre error in bias and less than .2 metre in noise.

Total Error

Approximate GPS system errors are summarized in the following table:

Incorrect Geodetic Datum Selection	Can be more than 100 metres
Selective Availability Error	No longer an issue (but used to be between 50 and 150 metres)
Satellite Geometry Error	Up to 150 metres (but not usually an issue for aircraft flying clear of topography)
Satellite Orbit Error	Not more than 2 metres
Multipath Effect Error	Up to 1 metre (but not an issue for aircraft except very near the ground)
Atmospheric Error (Ionosphere)	2 – 5 metres, but mostly corrected for (some sources say 1 – 2 metres)
Atmospheric Error (Troposphere)	Up to .5 metre (some sources say up to 1 metre)
Clock Inaccuracies & rounding error	Up to 1 metre (some sources say up to 2 metres)
Relativistic Errors (Satellite)	Compensated for with differential receiver and satellite clocks
Receiver Errors	Up to .5 metre (using modern equipment)

Summary

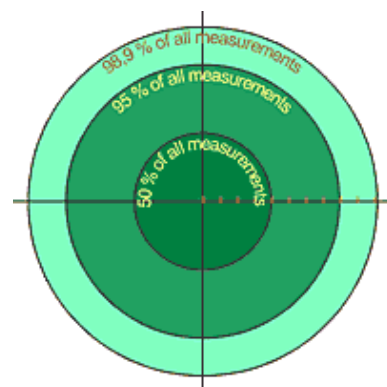
Disregarding errors due to incorrect datum selection (and other human errors), prior to the deactivation of SA, typical system error was in the range of 100 metres. Since the deactivation of SA, and not taking into account WAAS and EGNOS augmentation, horizontal accuracy within 15 metres can be expected. The Garmin website makes the following statement in regard to all of its current GPS receivers:

Today's GPS receivers are extremely accurate, thanks to their parallel multi-channel design. Garmin's 12 parallel channel receivers are quick to lock onto satellites when first turned on and they maintain strong locks, even in dense foliage or urban settings with tall buildings. Certain atmospheric factors and other sources of error can affect the accuracy of GPS receivers. Garmin® GPS receivers are accurate to within 15 metres on average.

Accuracy Values for Garmin Receivers (<http://www.kowoma.de/en/gps/accuracy.htm>)

The declaration of accuracy for Garmin GPS receivers often leads to confusion. What does it mean if the receiver states an accuracy of 4 metres? This, in fact, refers to the so-called 50% CEP (Circular Error Probable), which means that 50% of all measurements are within a radius of 4 metres. The implication, of course, is that 50% of all measured positions are outside this radius. However, 95% of all measured positions are within a circle of twice this radius, and 98.9% of all positions are within a circle of 2.55 the radius. In the given example (i.e., CEP = 4 metres), therefore, nearly all positions will lie within 10 metres of the indicated position.

Note: The Brisbane Valley Flyer is not endorsing Garmin equipment here, though one day it might, when they add Lake Wivenhoe, that huge Lake, seven times the capacity of Sydney harbour, not far west of Brisbane, built in 1976, to their aeronautical maps!



TSO'd GPS Equipment

Zane and Jill also raised the issue of TSO'd equipment. A Technical Standard Order (TSO) is a minimum performance standard issued by the United States Federal Aviation Administration (FAA) for specified materials, parts, processes, and appliances used on civil aircraft. A question that comes immediately to mind is how much such a standard applies to the reliability of equipment and how much to its performance. For example, with light aircraft engines, reliability is obviously the relevant criterion. A certified engine can be virtually identical to a non-certified one, the certified one, however, having been operated for more bench testing hours prior to sale. With GPS receivers, though, specific (up-market) TSO'd equipment does not seem to be usually available in non-TSO'd versions. Also, TSO criteria for GPS receivers ranges from visual navigation to Category 1 precision approach (WAAS augmented), with the equipment TSO'd to the more demanding criteria costing progressively more (a lot more actually) to purchase.

However, for the intent and purposes of RA-Aus aviators, especially when not flying in close proximity of restricted airspace, the performance of non-TSO'd GPS equipment would seem to be more than adequate, and the question of system reliability can be satisfactorily addressed through system redundancy (i.e., duplicated GPS systems with independent power supplies). The idea that these devices somehow distract pilots from the 'big picture' may not be a reasonable one. No one is suggesting that flight planning should be done solely on the basis of GPS, however GPS track keeping, in addition to the computational advantages conferred by these systems not only increases situational awareness via the presentation of concise, accurate information, it also frees up consciousness for other piloting tasks. To quote from FAA library resource, "GPS Approach Minima – How Low Can You Go?" (July 2006, first sentence, second paragraph), by Martin Heller (FAA Safety Team):

GPS vastly improves situational awareness for both visual and instrument flight rule (VFR and IFR) flying, reducing circuitous travel and airspace incursions. (http://www.faasafety.gov/gslac/alc/libview_normal.aspx?id=9082).

2012 Watts Bridge Gathering of Eagles

The airfield was in its usual excellent condition and so was the weather. However, some of us found the cross wind near the threshold of Runway 12 just a little tricky. Attendance was a little down on last year, but still respectable. The BVSAC clubhouse was very busy. A good time was had by all. An extraordinary number of photographers lined the main strip to get their favourite shots of passing aircraft. Digital photography is such a popular hobby these days, and what better subjects to photograph than aircraft.



2012 Watts Bridge Gathering of Eagles (continued)



IF IT FLIES, IT'S
WELCOME AT
WATTS BRIDGE!



What's new with Deb and Ralph on the Burnett?

Remember Deb and Ralph, former BVSAC members who moved to the South Burnett. Deb recently wrote to Mal McKenzie bringing him up to date on their efforts to start a new flying club there. She sent photos as well, which show some work being done on their clubhouse building. They are calling themselves the Burnett Fliers. Good on them!

Hello, Mal. The airfield is at Angelfield outside Murgon. It is an old airfield established in the 1930s by the Angel family. The Burnett Fliers is a new flying club based at Angelfield. Last Sunday (12th August), a lot of work was done to improve the facilities and put new markers and signs on the runway. The clubhouse building is an old one once used by a now defunct model aero club. There is also a hangar on the field. One of the photos is Bert marking out the strip. Don is the big guy who donated all the wood in a couple of the photos. Don and Nic also cut up a big slab for a bar, which they used for a makeshift bench to saw up the boards. Nic and I got one of the toilets sorted out and usable if we need to go. It has been all cleaned and sanitized. Nic donated \$30 with which she bought some cleaning products for the building and toilet. Nic also bought a carton of beer and they went down well with a few of the members. It was a really good social working bee. Everybody in our club is easy to get along with. Regards, Deb.

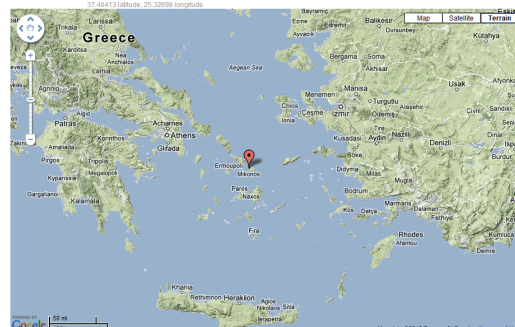


John McKeown is taking a break from rebuilding his flooded house

Hi Arthur. ... We are stern tied to the small boat section in the new marina on the island of Mykonos ... (Windy Mykonos)...The wind is pumping. (30 to 40 knots at times), but we are snug here. We had a friendly sail boat race over with our French friends from Tinos.... In racing mode we needed the full genoa ... and slowly passed them ... beat them into Mykonos. When we rounded up to furl the sail we were hit by a very violent katabatic wind coming off the hills and the sail tore from top to bottom along the UV protection strip. I should have reefed earlier the sail was very old ... stitched up 3 times in the last two years, ... a brand new genoa on board.

As you can see, John's very descriptive and well written travelogue is the next best thing to actually being there yourself (and so much cheaper).

John Spot: This is John McKeown checking in with my current location using SPOT tracker. All is OK
37.45413 latitude, 25.35598 longitude



Planes and partners: going for a spin with Mike

Three weeks ago, my (far) better half, Marie-Laure, accepted the invitation of a ride in Air Force One (the BVSAC President's plane), and the experience went down well. The Smith family Jabiru 230 is a very nicely presented and stylish aircraft indeed. Marie-Laure was especially impressed with the leather seats, particularly with the fact that there were two of them (this being a 100% improvement on a Sapphire). Indeed, since that day, the acquisition of an aircraft with two seats has been a recurring topic of conversation between us.



Peter Freeman once said that it's simply not possible to have too many aircraft, so, who knows, one day it just might happen.

Actually, what impressed Marie-Laure the most was Mike saying that he rarely went flying without his very capable co-pilot Priscilla, in whose

absence, he ruefully admitted he isn't able to operate his new, all bells and whistles, Garmin GPS. To Marie-Laure, the idea that men are basically useless without their wives at their sides is intuitively correct, this knowledge being hard won from twenty-eight years of firsthand experience.

I was lucky enough to also be taken for a ride with Mike and quickly found the Jab 230 to fly even better than it looks. We motored out over the southern stretches of Moreton Bay, north along the western shore of Straddie, almost as far north as Coochiemudlo Island. The air was calm and conditions clear. The only other aircraft we saw was a Tiger Moth doing aerobatics to the south of the field. We both had an excellent day. Many thanks, Mike.

Steve Donald's Savannah cargo pod

Savannahs carry a lot of stuff already, but Steve wanted to store a couple of 20 litre fuel containers and a matching folding trolley. So he designed and built a cargo pod for his plane. As can be seen, it's a very neat job indeed, but that's what we've come to expect from Steve. The modification will be put to good use in a day or two as the BVSAC expedition to the Birdsville race meeting gets underway. At this stage, there are just three aircraft making the pilgrimage. Apart from Steve and Lesley (affectionately known as the "Minister for War and Finance"), there is Ken Hulse and Jim Holden in the new Nynja and myself in the Sapphire (no wonder I am interested in aircraft recovery trailers!). We will be travelling via Roma and Charleville on the way out and returning via Thargomindah and St George on the way home. One stop of interest will be the famous "Dig Tree" site on Cooper Creek near Innamincka, where the ill-fated Burke and Wills expedition failed to dig up their supplies due to the tree not being re-marked.



Upcoming Aviation Events not to be missed!

Queensland Recreational Aircraft Assoc incorporating
Warwick Aero Club invites you to

'Wings Over Warwick'

War Birds, Recreational & General Aviation

From 8.00am, Saturday
8th September 2012



GA, Experimental, Recreational (anything that flies) is invited to attend our annual Fly-In at Warwick (YWCK) the Rose and Rodeo City

Food and drinks available from 8.00am to 2.00pm

- Trial Introductory Flights in a Jabiru Aircraft
- Bike, car and model aircraft displays
- Additional Information: 0402705877 or 0427377603
- Email for information: qraaql@gmail.com
- Details at: www.qraa.info

Royal Flying Doctor Service is the charity to benefit

ANYONE INTERESTED IN AIRCRAFT IS WELCOME

(Aerodrome is 12km North of Warwick, turn off the back road to Allora)

AUSFLY 2012

Australia's private & sport aviators together under the one sky

Join Australia's recreational and sport aviators for this history-making, first ever aviation event in this country that unifies our vibrant and diverse aviation organisations for a spectacular weekend of airborne action!

Activities:

- Warbirds
- Homebuilts
- Vintage aircraft
- Ultralights
- Aerobatic displays
- Gliders
- Hang Gliders
- Helicopters
- Skydivers
- Gyros
- Model Aircraft
- Joy Flights
- Ground exhibitors

Narromine Airport
13th-16th September 2012
www.ausfly.com.au

NORRA-AUS MONTO FLY-IN

29TH SEPTEMBER-1ST OCTOBER 2012

Activities:

- Presentations
- Workshops
- Musical Entertainment
- Raffles
- Vintage Aircrafts
- Food Vendors
- Bundaberg Rescue Helicopter
- RFDS
- Angel Flight
- TIF'S
- Caravan Club
- Agricultural machinery Stalls

Event Manager Myles Breitkreutz 0418 198 016
All enquires please email admin@raa.asn.au

Light Aircraft I.C.P.

Australian Government Civil Aviation Safety Authority

Other Fly-in Events

August 31st – September 1st

Birdsville, QLD

[Birdsville Races](#)

September 2nd

Wagga Wagga, NSW

[Wagga City Aero Club monthly BBQ Lunch](#)

September 7th – 8th

Bedourie, QLD

[Bedourie Races](#)

September 15th

Coffs Harbour, NSW

[Coffs Harbour Airshow](#)

September 29th – 30th

Willowbank airfield (YWIN), QLD

['The Few' Spitfire fly in Willowbank](#)

Sep 29th – Oct 1st

Yarrawonga, VIC

[AYA Grumman Light Aircraft Fly In Yarrawonga](#)

BRISBANE VALLEY SPORT AVIATION CLUB Inc

MINUTES OF THE August 4th 2012 GENERAL MEETING

MEETING LOCATION: Watts Bridge Memorial Airfield
MEETING DATE: 4th August 2012
MEETING OPENED: 10:30AM

MEMBERS PRESENT: 14

APOLOGIES: Arthur Marcel, Mary Clarke, Ron Dunn, Kerry Burrows, Scott Meredith, Peter Ratcliffe, David Ratcliffe, Neil Bowden, Bryan Schollum

VISITORS: 0

NEW MEMBERS: 0

MINUTES: July meeting of the BVSAC Inc
Proposed: Mal McKenzie Seconded: Peter Freeman Acceptance motion carried.

PRESIDENT'S REPORT: The President thanked Mal McKenzie and Bryan Schollum for building the picnic tables for the meeting rooms. Thanks also to Richard Faint for organizing the Poker Run. Shame it was called off due to weather, but everyone who attended had a great time.

SECRETARY'S REPORT: The Secretary tabled the Correspondence Register for the month.
Informed the members BVSAC is now a part of the WBMA group insurance scheme underwritten by Allianz. Thanks in particular to Cheryl Brown from WBMA BOM for organizing the insurance scheme.

TREASURER'S REPORT: Bank Account Balance is \$11,279.99
Membership Fee's have not been paid by 25 members as yet.
Detailed expenses for the club meeting room's improvements.

WBMA REPORT: WBMA President was reported that the airfield is still very wet in many areas.
Commented on deep ruts on some of the taxiways.
Mentioned that a flying school proposal for the airfield is under negotiation.
Mentioned that the Gathering of Eagles is planned for August 25th

BUSINESS ARISING: Nil

GENERAL BUSINESS: Mal McKenzie led discussion on a proposed Fun Fly event for disadvantaged children with a proposed date of Sunday 4th November. Points covered included.
Insurance, Liability, Blue Card requirements, Scope and Intent of the event, Activities, Joy Flights, other Attractions, Fuel Cost reimbursement, etc.
BVSAC: Drink Stall
QVAG: BBQ

NEXT MEETING: 3rd September at the Terminal Building, Archerfield Aerodrome at 8:00PM.
This will also be the AGM provided the club's financial statements have been audited.

MEETING CLOSED: There being no further business, the meeting was declared closed at 11:15AM
A BBQ lunch was held after the meeting.

**Next meeting: 7.30pm, Monday September 3rd at the
Archerfield Terminal Building (supper to follow).**

**PRESIDENT: Mike Smith 0418 735 785 TREASURER: Ian Ratcliffe
0418728238**

SECRETARY: Richard Faint 0412317754 Email richard@auav.org

NEWSLETTER EDITOR: Arthur Marcel Email a.marcel@optusnet.com.au