



The newsletter of the Sport Aircraft Association (Auckland Chapter) Inc

# Sport Aviator

October 2011



## In This Issue:

- Alan Moselen - Air Safety Investigator
- FLAIR Aviation Expo 2011
- Member Profile – Warren Sly

[www.saaauckland.org.nz](http://www.saaauckland.org.nz)

# Committee 2012

## Executive Committee Members

**President:** **Cyril Wright**  
09 372 9329  
aircam@ihug.co.nz

**Vice President:** **Evan Wheeler**  
09 238 6081  
evan.allround@xtra.co.nz

**Secretary:** **Paul Blackmore**  
09 910 0119  
paulblackmore@gmail.com

**Treasurer:** **Bruce Turner**  
09 889 0780  
bruce@hta.co.nz

## Committee Members

<b>Don Wilkinson</b> 09 576 5009 bdwilkinson@xtra.co.nz	<b>Norm Bartlett</b> 09 528 0108 bartnz@xtra.co.nz
<b>Peter Armstrong</b> 09 576 3676 peter@reivernet.com	<b>Gavin Magill</b> 09 298 7174 gavin.magill@gmail.com
<b>David Campbell-Morrison</b> 09 817 4782 dcm@xtra.co.nz	

## Operational Positions

<b>Safety Officer:</b> Norm Bartlett 09-528 0108 bartnz@xtra.co.nz	<b>Technical Library:</b> Sandy Wilson 09 536 4018 wilsonnz@xtra.co.nz
<b>Newsletter Editor:</b> Gavin Magill 027 291 0525 gavin.magill@gmail.com	<b>Tool Library:</b> Manfred Scherbius 09-375 8392 manfred.scherbius@bluescopesteel.com
<b>Airspace Users Group:</b> Steve Chilcott 09 625 5273 s.chilcott@slingshot.co.nz	<b>Catering Officer:</b> Chris Groves

## **Technical Mentors:**

Wood & Fabric	Mike Tunnicliffe	09-237 8173
Composite	Phil Richards	09 826 4150
Metal Skin	Kevin Paulsen	09 296 5125

## **Front Page**

Giovani Nustrini's Falcomposite Furio displays its beautiful lines with an impressive low pass at Flair 2011.

# Contents

- 2 Committee 2012
- 3 Presidents Report
- 4 From the Editor
- 5 Last Meeting Minutes
- 6 Chapter News
- 10 Chapter Project & Aircraft Lists
- 11 Alan Moselen Safety Investigator
- 13 FLAIR Aviation Expo 2011
- 15 A Bit of a Laugh
- 17 In The News & On The Web
- 19 Tips, Techniques & Technologies
- 22 Member Profile - Warren Sly
- 25 Upcoming Events

## Next Meeting

**WHEN:** Thursday 27<sup>th</sup> Oct 2011 -7:15pm

**WHERE:** Auckland Society of Model Engineers Club Rooms  
Peterson Road, Panmure Basin  
Mt Wellington

**SPEAKER:** Cyril Wright

**SUBJECT:** Oshkosh 2011 & Aircam Flight Training

Our chapter president Cyril Wright will be presenting his impressions of EAA Air Venture (Oshkosh) 2011 and his experiences with training on the Aircam.



Hi All

Well I went flying this week on Thursday. Times like that I really enjoy the stress of being self employed.

I was sent the below photo of the Worlds biggest airplane, the Russian Antonov 225. When I see planes like this I really wonder about how they can fly. The cost of keeping them in the air must be huge. Are these planes harder to fly than smaller ones?

Thanks to all the ones that helped at **Te Kowhai** fly-in.

I have been wondering if there was a way of encouraging younger men or woman to join up with our group. Or is it like myself that I had to get the kids out of the nest before I can indulge my passion for flying.

I hope all of you have been able to get up in the air now the weather is stabilizing and the days are getting longer.

See you all this Thursday

Have fun  
Cyril





Phew, another month down and here we are at the end of October already. Summer and the promise of plenty of flying and building has me really looking forward to the end of this year and the start of next.

This past month has been a busy one with quite a bit happening in the world of aviation. By far the

biggest event of the past month was the **FLAIR Aviation Expo** held at Te Kowhai from Thursday October 13<sup>th</sup> through Saturday 14<sup>th</sup>.

I managed to get down to Te Kowhai on both the Friday and Saturday of the three day event and although the weather was less than cooperative and the number of visitors a lot less than the event deserved, the event itself was nevertheless excellent and worth attending.

There were numerous seminars presented by some well known industry visionaries both from New Zealand and overseas. This included **John McGinnis** from the United States who pitched his radical composite, box tail aircraft design called the Synergy.



The Synergy Aircraft

I found this seminar particularly interesting as I have been following the progress of the Synergy design on the web. The aircraft was entered in the recent NASA Cafe Green Flight Challenge and was favoured to win but unfortunately did not make it to the design flyoff mainly due to the new engine being unavailable in time.

Another of the interesting speakers was **Glenn Martin** of Martin Jet Pack fame.

Glenn Martin gave an interesting and humorous talk on the background, development and current state of the jet pack design (really a ducted fan).

Glenn came across as a very down to earth and interesting speaker who has spent the past thirty odd years perfecting his design.



The Martin Jetpack

From a home builders perspective there were workshops held each day on composites, welding, metal working and aircraft painting. These offered the opportunity to see introductory lessons on each of these areas of aircraft construction and ask questions of the presenters and were well worth attending.

As well as the workshops and seminars there were also displays by current NZ aviation businesses where you could preview products and services and discuss business with the company representatives. Many of the products sold by these businesses were also being displayed in the air each day. The PAC 750XL, Calidus Gyroplane and Falcomposites Furio all made great displays twice a day which provided a great backdrop to the rest of the event. I have included a more detailed article in the body of the newsletter with more photo's and details.

During the past month I also made a visit to the new MOTAT Aviation Display hall and I was going to include a bit of a write up in the newsletter but it was starting to get a tad long so I have decided to hold this over till next month. If you have not already been to visit this facility I can highly recommend a look as it is well worth it.

In the rest of the newsletter this month you will find the usual array of updates from chapter members although these were somewhat light on the ground this month (hint, hint).

Also included this month is a write up of the presentation by last month's guest speaker, CAA Air Safety Investigator **Alan Moselen**. Alan presented a very interesting précis of his role, how he goes about performing crash investigations, a summary of some recent accidents he has attended and a review of recent trends in light aircraft accidents.

Alan's presentation, whilst a sobering reminder to all those present, was well received and members took the opportunity to ask many questions of Alan both during and after his talk.



Alan Moselen

I hope you enjoy this month's edition. Please remember that this is your newsletter so the more input you can give me the more I can include.

Happy flying and/or building.

Cheers  
Gavin

**SPORT AIRCRAFT ASSOCIATION  
(AUCKLAND CHAPTER) INC.**

**MINUTES OF THE MEETING  
29TH SEPTEMBER 2011**

**Venue**

The Society of Model Engineers Clubrooms  
Peterson Rd, Panmure.

The meeting commenced at 1745 hrs.

There were 21 members present.

**Welcome**

Chapter President Cyril Wright opened the meeting.

**Visitors**

Visitors were Peter Hall a friend of Cyril's and Ian Williams an early AACA member.

**Apologies**

Graeme Weck, Brian Wigley, Alistair McLachlan, Peter Herrick, Paul Blackmore

**New Members**

Tom Goddard and Gary Briggs were formally welcomed as members.

**General Business**

Chris Wade advised that Chapter Treasurer Bruce Turner had been ill and also had just shifted into his new house. Bruce hoped to attend to the chapters affairs over the next two weeks. To expedite the payment of subscriptions and reduce Bruce's workload Gavin Magill offered to send out a chapter e mail with details on how to pay.

The subject of reporters for the Chapter News in Sport Flying was again discussed. Bob Keith was of the opinion that this was best served by active flying members at Ardmore and North Shore taking on this role. Gavin Magill stated he could cover the Ardmore area. There were no members at the meeting willing to take on the North Shore area.

The SAA was offered the opportunity to provide a display at no cost at the FLAIR 2011 Aviation Showcase at Te Kowhai airfield from the 13th to the 15th of October. It was suggested that the Auckland Chapter take on this role as the Waikato Thames Valley Chapter is involved with the Raglan Fly In. This was agreed to. Even Wheeler is to organize a display for the Friday and Saturday only. Discussion regarding usage of the Chapter trestle tables for the display indicated they should be in the container at Graeme Weck's factory.

Neville Hay advised that he was organizing a black tie dinner for 300 people in the new MOTAT hanger as part of the Walsh 100 year's celebration. Any members interested in attending should contact him directly.

There being no further business the formal meeting closed at 8.00 PM

**Guest Speaker**

Even Wheeler introduced Guest Speaker Alan Moeslen. Alan's career in aviation started with eight years in the RNZAF as a fitter followed by twenty six years with Air NZ. The last 12 years have been with CAA as a Safety Investigator.

His talk was about the Accident Investigation process, liaising with the police serious crash unit, the media and local authorities, and dealing with OSH requirements. The talk included specific aircraft accidents some of which involved Sport and Microlight aircraft. Evan thanked Alan on behalf of those present for a very interesting talk.

## STOP THE PRESSES!!! From Alan Coubray

I was quite literally just about to send this month's newsletter out when this email arrived in my inbox. I think members would want to see this so I have reworked Alan's news into the newsletter.

Hi Gavin,

A bit late for your newsletter. I flew my RV 12 for the first time on 23<sup>rd</sup> October. Ops normal as expected.

25 hrs of test flying to do. Prop hub has a service bulletin issued by Sensinich and has to be returned for replacement. So test flying on hold for the time being. ZK YRV is the 140th RV12 to take to the sky and the first in NZ.

Cheers

Alan Coubray

## New Member Gary Briggs

Gary Briggs has recently joined the Chapter and sent the following by way of introduction.



I started my apprenticeship as an aircraft engineer at South African Airways in 1989 where I had the privilege of rebuilding a Harvard and maintaining a Junkers JU 52, besides the standard apprenticeship training.

I went on to pick up quite a few ratings as a LAME on Boeing B747, 737 and Airbus A320, A340 where I did a lot of traveling as a traveling LAME in Africa and Europe.

I now work for Air New Zealand as a Line Maintenance Engineer where I have managed to get most of my ratings back and on the NZ register.

I have also helped build and maintain a couple of homebuilt aircraft for friends.

I have just started building Sonex #1351 and received my tail kit last week. My plan is to scratch build most of the aircraft.

I had a PPL in SA which I will have to renew here in NZ sometime.

Regards Gary

## New Member Tom Goddard

Tom Goddard has also joined the Chapter recently and sent the following introduction.



My interest in aviation started at a very young age, having grown up in war-time England. I lived very close to a fighter air base in the south east of England and many planes were about from as early as I can remember. This was the start of a life-long fascination with aviation. I did not, however, learn to fly until after I had emigrated to South Africa, where I joined a flying club on the east coast near Durban. I bought into a syndicate with four other chaps who owned a Taylor Craft. This enabled me to accumulate the 200 hours necessary for a commercial licence relatively inexpensively. Having hacked through the exams, and armed with a brand new licence, I obtained a job doing crop dusting that enabled me to build up my flying experience quite quickly.

I graduated to flying light aeroplane charter, and flew extensively in Africa, often in Kenya, Tanzania and Uganda. A few years later I qualified as an airline transport pilot and managed to secure a job in the mining industry flying larger aircraft. This was particularly interesting to me from an aviation point of view, as they were operating Douglas DC-3's and DC-4's. Later I was fortunate enough to get to fly some other earlier interesting types, including a DC-6, Vickers Viscount and Bristol Britannia.

After that I flew for various airlines for about 15 years, starting with regional types such as the Fokker F-27 and British Aerospace HS-748. I then graduated to jets: Boeing 707, Douglas DC-9 and Fokker F-28. During this period of my career, I worked in North and South America and extensively in the Middle East. For the final ten years of my career I was involved in contract work. This was probably the most interesting time of all as it involved extended periods in Afghanistan, Iraq, Iran and Libya.

I would love to still be doing it, but age caught up with me. Didn't bother me in the least, but it became more difficult to convince the employers!

# 7 Chapter News Continued

## Peter Armstrong - Armed and Dangerous

Peter Armstrong found this picture on the web recently. (He's maybe having delusions of being a fighter pilot. - Ed ☺ )  
[Seen] at a very recent air display in France. Do you think I need to add the bits under the wings to mine!!!! Cheers Peter



## Norm Bartlett - RWC Host Extraordinaire

Norm has been taking the role of being a good host to RWC visitors to new heights (bad pun intended- Ed.☺).

[I] took a quick snap from the CT4 while taking an Aussie Rugby fan around Auckland. He enjoyed the flight but the game that night was not as good. However he did invite me for a ride in his jet ranger over Sydney. A quick Google later and I found out he is a mining and property magnate. I got him interested in homebuilt aircraft and he tells me he is thinking of getting an RV 6/7. Cheaper than a new Cessna Citation.



# 8 Chapter News Continued

## Bob Keith Thorp T18 ZK-EDF

Gavin, I received a phone call from Tony Woodroffe at Ardmore last Wednesday telling me that he had seen a white T18 fly past. I could not recall any in NZ that were that colour so phoned Chapter member Wayne Cunningham suspecting that it might be Greg McNicolls old aircraft EDF. This proved to be correct.

The aircraft is based at Whenuapai and is owned by Kevin Foster who is Wayne's cousin. EDF was the first T18 built in NZ and was voted Grand Champion at our National Fly In. Here is a photo of EDF in the new paint scheme. The Kiwi decal was added to the tail after the first photo was taken. Older members might recall Greg had a tiger decal in that location. Rob Keith





# 9 Chapter News Continued

## Gavin Magill Sonex JQP at FLAIR 2011

While attending the FLAIR aviation expo last weekend I bumped into Noel Bayley as he was preparing his Jodel D18 ZK-JAC for display.

In speaking with Noel about Sonex JQP, he asked if the Sonex was to be displayed at FLAIR. I said nothing had been arranged but I would be happy to put JQP on display if required. To cut a long story short I ended up pulling JQP out of the hanger and taxiing to the display line alongside the other sport aircraft on display. I also spent a very enjoyable couple of hours answering questions from and speaking with a number of folks at the event.

The photo below is of JQP on the display line.



In other news JQP passed her Microlight Annual Condition Inspection this past Saturday. Dave Readman performed the inspection and picked up on a couple of minor things which were able to be corrected on the spot.

Following the issue of the Condition Sticker both Sandy Wilson and I took JQP up for some currency circuits. We were also checking out the new 5" tail wheel we have fitted. This worked a treat. It was especially noticeable at last weeks FLAIR event as the ground was very wet in places and the tail wheel did not dig in at all.



JQP's new 5" tail wheel.

## Peter Armstrong Dyn Aero PSA at FLAIR 2011

Also spotted at FLAIR 2011 was Peter Armstrong taking his DynAero MCR-4S out for a spin during its flight testing phase.



## Gordon Sanders Email and SAANZ Web Site

SAANZ are in the midst of transferring the hosting of their web site, along with both the SAANZ and Auckland Chapter email systems to a new hosting company, Dunedin based Core Developments. They come highly recommended by AOPA and potentially offer significant advantages for web hosting in their availability for carrying out revamp/rewrite work coupled with ready availability to promptly address any problems that occur.

It is hoped that this change will also overcome the on-going problems experienced with numerous emails to members who use Xtra as their ISP (Internet Service Provider) being deflected into spam folders rather than delivered. Great difficulty has been experienced with this problem with Xtra and the previous host (Orcon) each happy to put the problem in the other company's court, but not talk creatively to the other to get it solved.

If you want to email the Chapter while the system is still down a limited back-up is in place courtesy of Gavin Magill. Compose your email and send it to Gavin <gavin.magill@gmail.com> with a request to forward. An email will be broadcast when the situation returns to normal. Thanks for your patience.

# 10 Chapter Project & Aircraft Lists

## Chapter Projects

Make/Model	Rego	Member	Status
Auster J5F	BDY	Les Wilson	Restoring
Bede BD5	ZIP	David Rose	Building
Cessna 150L		Craig Thomas	Repairing
DeHavilland DH-83C	AQB	John Eaton	Restoring
Europa XS Tri-gear	ROB	Rob Waters	Building
Fisher R80 Tiger Moth	CCC	Jon Farmer	Rebuild
Jack Thompson 1		Kevin Moir	Building
Lancair 235		Rod Sullivan	Building
Menestrel HN-700		Stephen Chilcott	Building
Osprey 2 Amphibian	XRT	Richard Thompson	Restoring
Pietenpol Aircamper		Mike Tunnicliffe	Building
Pitts S1-SS	MPH	Stuart Mackereth	Building
Rand KR-2	CCK	Walter Reinauer	Repairing
Rand KR2S		Gavin Magill	Building
Rearwin Sportster(37)	ALX	Tony Payne	Rebuild
Rutan Long Ez		Wayne Cunningham	Building
Sonex Tri Gear	PDB	Paul Blackmore	Building
Taylor Monoplane		Kevin Moir	Building
Titan T51 Mustang		Gary Mitchell	Building
Titan T51 Mustang	FDL	Warren Sly	Building
Van's RV-4		David Grove-Hills	Building
Van's RV-6		Ian Chapman	Building
Van's RV-12	YRV	Alan Coubray	Building
Waix		Bruce Turner & Chris Wade	Building

## Chapter Projects Other

Make/Model	Rego	Member	Status
Nexus Mustang	NEX	Stuart Wards	Plans
Rand KR2S		Karl Pudney	Plans
Pazmany PL2		Frank Ciochetto	Stored
Helicycle		Allan Cameron	Unknown
Murphy Rebel		Eric Breetvelt	Unknown
Safari Helicopter		Dick Ussher	Unknown
Witman W-10	RET	Cliff Bellingham	Active
ATEC Zephyr 2000S	ZFR	Kevin Hartley	Arrived

## Chapter Aircraft

Make/Model	Rego	Member
Aerosport Kahu Gyroplane	RCP	Chris Wade
Aircam	SUN	Cyril Wright
Airtrainer CT4 (Syndicate)	DGY	Norm Bartlett
Avid	PCM	Graham Smith
Bolkow Junior BO 208	CJF	Keith Trillo
Brantley B2B	INK	Nick Koreneff
Cessna 172	DKH	David Horton
Cessna 172D	CCI	Graeme Weck
Cessna C182	WKK	Brian Wigley
CFM Shadow C2	FSG	John Granger
Corby Starlet	TOY	David & Don Wilkinson
Corby Starlet CJI	TNT	Alfred Hirzel
CRICRI Cricket MC15	LBW	Neville Hay
Druiene Turbulent D31	CFY	Kevin Paulsen
DynAero MCR 4S	PSA	Peter Armstrong
Europa XS	EPA	Gavin Lee
Falco F8L	TBD	Giovani Nustrini
Falco F8L	SMR	George Richards
Falcomposite Furio LN27RG	LLG	Giovani Nustrini
Fisher Dakota Hawk	SOL	Gary Mitchell
Grumman AA-IC Lynx	EFV	Brian Wigley
Grumman Cheetah AA-5A	ERJ	Chris Watkins
Isaacs Fury II	JHR	Rex Carswell
Jabiru J200	CHW	Chris Watkins
Jodel D18	OWL	Mike Tunnicliffe
Jodel D18	SCJ	Stephen Chilcott
Lancair 360	MHS	Norm Bartlett
Micro Aviation Bantam B20	XIE	Bob Syron
Mike Whitaker MW6S	MWS	Grant Sandiford
Morgan Aero Works Cheetah	CCB	Jon Farmer
Murphy Rebel	DKZ	David Horton
Murphy Rebel	WEM	Evan Wheeler
Murphy Rebel	WEC	Graeme Weck
Petrel Amphibian	JAQ	John Eaton
Piel Super Emerald	FMM	Peter Nicholson
Piper Cherokee Archer I	DQX	Leo Johns
Piper PA38 112 Tomahawk	VBM	John Eaton
Piper Pacer PA-22/20	PAT	David Wilkinson
Pitts S12	PTS	John Eaton
Pitts	MPM	Paul McGruer
Ragwing Special	MIK	Bob Syron
Rans S6ES Coyote II	TNA	John Struthers
Rans Sacota S10	CLT	Craig Thomas
Safari Helicopter	IJE	John Eaton
Sequoia Falco F8L	TBD	Giovani Nustrini
Socata Tobago TB10	JIE	Stuart Wards
Sonex (Syndicate)	JQP	Paul B, Sandy W, Bruce T, Chris W, Gavin M
Taylor Coot A	JST	Alistair McLachlan
Taylor Monoplane	CRS	David Grove-Hills
Thorp S-18T	MBY	Mike Boyles
Titan T51 Mustang	WSV	Peter Walton
TL2000 Carbonsting	PLR	Phil Richards
Ultravia Super Pelican	JDI	Jon Farmer
Vans RV-7A	MIS	Dave Cogan
Van's RV-6	PRV	Kevin Paulsen
Zenair CH 601 B	ZXZ	David Rose
Zenair CH601	JFN	Peter Herrick

If Chapter members are aware of any changes to or aircraft missing from the lists on this page please forward an update email to the editor at [gavin.magill@gmail.com](mailto:gavin.magill@gmail.com)

# 11 Alan Moselen - Air Safety Investigator

At the September Chapter meeting CAA Air Safety Investigator Alan Moselen presented a very interesting précis of his role, how he goes about performing crash investigations, a summary of some recent accidents he has attended and a review of recent trends in light aircraft accidents. Below is a summary of his presentation.

Evan Wheeler introduced Alan Moselen with a review of his background in aviation. Alan spent some 8 years in the RNZAF as an aircraft fitter, followed by 26 years with Air New Zealand flying DC8, DC10 and Boeing 747 aircraft accumulating in excess of ten



thousand hours on these types. For the last 12 years he has been with the New Zealand Civil Aviation Authority working as a Safety Investigator and he is currently the president of the New Zealand Society of Air Safety Investigators. He holds a New Zealand Commercial Pilots licence with Instrument and Multiengine ratings.

Alan began his talk by describing how investigating light aircraft accidents in NZ is quite different from investigating large commercial aircraft accidents mainly due to the fact that there are significantly less tools and resources available to investigators. As a result, investigators must rely heavily on eye witness accounts where these are available and must make use of any and all resources they can to determine the cause of accidents.

Alan demonstrated this reliance by using the example of the investigation he helped conduct into the crash of the Fouga CM170 Magister jet trainer, ZK-FGA which crashed into the Firth of Thames off Kaiaraua on the 19<sup>th</sup> of March 2004. A link to the official accident report can be found on the CAA website at the following link. [http://www.caa.govt.nz/safety\\_info/fatal\\_accident\\_reports.htm](http://www.caa.govt.nz/safety_info/fatal_accident_reports.htm) (Report number 04/940)



Fouga CM170 Magister ZK-FGA

Alan described how this particular accident posed many problems for the investigation team in that the aircraft impacted a tidal estuary in very muddy conditions and as such the wreckage had to be recovered quickly in order to not lose vital evidence from the crash scene due to tidal movement. In the end a barge with a screen filter fitted was used to recover the wreckage which was then moved to a hangar at Hobsonville Air base where it was inspected. Alan described how he also interviewed numerous witnesses to the accident (including a current serving RNZAF pilot) and used a large printed scale relief map obtained from the local council to get accurate directional information from each witness.

The result of the investigation was that it was found the pilot had performed an unauthorized aerobatic manoeuvre (a reverse half Cuban eight), close to the ground during which the aircraft was inadvertently flown into cloud. Once in the cloud the pilot lost situational awareness and control of the aircraft resulting in the aircraft entering a spin that was probably not recoverable given the altitude. The aircraft subsequently impacted the surface of the estuary in a near vertical dive killing both the pilot and the passenger.

Alan described how the New Zealand Police are officially in control of all fatal aircraft accident scenes and that the Accident Investigation team only take over once the police have finished.

He noted that occasionally the emergency services who are first responders to the scene can cause the accident investigation team problems by destroying or contaminating the accident scene. He said that fortunately incidents where this happens have been slowly reducing as emergency services in the country have been educated on the importance of maintaining the integrity of the accident scene at aircraft accidents.

Alan explained how the lead investigator will always perform a formal briefing before the investigation begins and how everyone who attends the scene must now undertake a blood borne pathogen training course before they are allowed onto the accident scene.

Alan mentioned that all Safety Investigators are trained in still photography and will also usually take video footage of the scene. Alan said he always takes a grey bedsheet with him to use as a backdrop to photo's to give contrast to the images he takes. Without this photos of wreckage, especially in bush scenes, can be difficult to interpret due to inconsistent lighting conditions often found in New Zealand bush.

He went on to describe how when interviewing witnesses it is important to speak with them as soon as possible after the accident because as much as 30% of recalled facts can be lost in the days following an accident. He said all investigators are now witness trained and allow witnesses to just speak without interrupting them in order to get the witnesses short term memory working. He said they also make it very clear to witnesses up front that they do not have to sign a witness statement as the investigation team are there are to determine the cause of the accident and not to apportion blame.

Alan next spoke about a number of other accidents that he had attended including that of Wayne Mathews' Thorp S18 ZK-WMT. As Wayne was the Vice President of the Auckland chapter at the time of his accident, Alan's comments were of particular interest to members. He described how the cause of Wayne's accident was still undetermined as both aircraft and pilot were in good functioning order before the aircraft departed from controlled flight and as a result investigators have not been able to determine a cause.

[http://www.caa.govt.nz/safety\\_info/fatal\\_accident\\_reports.htm](http://www.caa.govt.nz/safety_info/fatal_accident_reports.htm)  
(Report number 08/1753)



ZK-WMT Crash Scene

Alan described that even though Wayne's aircraft had burnt after the crash, investigators were still able to gather a significant amount of information from the cockpit area including engine and throttle settings, carb heat setting and that the left rudder position and distortion indicated Wayne had been attempting to recover the aircraft prior to impact. He also noted that even though one of the aircraft's aileron balance weights had been found nearly 400 meters from the crash scene, this was eventually excluded as the cause of the accident when it was determined that it had been propelled away from the crash scene when it caught on a nearby building just before impact.

Moving on from this accident, Alan then spoke about the accident involving the Smythe Model S Sidewinder ZK-DYY.

[http://www.caa.govt.nz/safety\\_info/fatal\\_accident\\_reports.htm](http://www.caa.govt.nz/safety_info/fatal_accident_reports.htm)  
(Report number 06/4354)

This accident, he said, was a clear example of how a distracted pilot had not performed a thorough pre-flight which then led directly to a fatal accident. The aircraft took off from the beach beside Kaipara harbour with the speed brake extended and this then contributed to a subsequent stall and crash of the aircraft into the harbour. A witness photographed the takeoff and climb out which clearly showed the speedbrake extended.



Alan also described how the pilot had been taking pain medication and that this along with potential confusion caused by the precautionary beach landing made the previous day after the pilot became lost, also likely contributed to the pilot's distraction.

The balance of Alan's presentation looked at various accidents in other Sport Aircraft categories including gliders and gyrocopters. Alan described how the CAA had been worked closely with the gliding community in recent years to significantly reduce the number of incidents that were occurring in this type of aircraft. Alan showed a video taken by the passenger of a motor glider which had crashed in the Southern Alps during a cross country flight in which both the pilot and passenger were killed. Alan indicated that the pilot had pushed the limits of the aircraft and his skills whilst competing in the extended cross country race and had subsequently made a poor decision which resulted in the pilot being caught in a situation from which he could not recover.

In wrapping up his presentation Alan emphasised that distraction issues are becoming a significant cause of accidents in light sport aircraft. Pilots are spending more time monitoring cockpit instruments and not flying the plane which is leading directly to accidents. He warned that sport pilots should not rely on or fly to GPS units as these are only navigation aids and should not be relied upon as a primary flight instruments. Alan wrapped up his talk with a lively question and answer session where he answered members' questions.

During October Max Clear's Te Kowhai air strip west of Hamilton played host to the FLAIR Aviation Industry Expo. This event was arranged in conjunction with the REAL New Zealand Showcase business programme which was developed by the NZ Government to showcase the country during the Rugby World Cup. The Aviation Industry Cluster with support from AIA and Aviation NZ aviation industry put the FLAIR event together to demonstrate some of the hardware their companies are producing and also to present seminars from local and overseas industry leaders and offer a series of educational workshops for the homebuilding community.

I was fortunate enough to be able to attend for two out of the three days and managed to get to a number of the workshops and attend some of the seminars.

### Workshops

From a homebuilders perspective the workshops provided an excellent opportunity to get an introduction to the skills necessary to work with the materials most modern homebuilt aircraft are made of. The Composites workshops were presented by Drew Collet of Composite Thinking and his clear and helpful advice on matters of safety and materials handling were very informative and useful. The workshop on aircraft metal working was presented by Owen Wilson from the Nelson Marlborough Institute of Technology. With his extensive RNZAF background and his own personal interest in the BD-5 kit which he is building, the workshop was again very well presented and extremely helpful to the homebuilders. Other workshops included one on aircraft painting systems and another on tig welding of which I only managed to catch the end of the aircraft painting presentation.

### Seminars

On the seminar front, the FLAIR organisers had lined up an excellent array of speakers from New Zealand and overseas.

Speakers included John McGinnis from the United States who pitched his radical composite, box tail aircraft design called the Synergy. The Synergy design is being presented as the long overdue next step required to bring GA back into the realms of being affordable and relevant to today's aviation market. The presentation was at pains to point how little progress has been



John McGinnis

made in the GA market in the last 50 years and compared telephones and cars from the mid 1950's to their modern equivalents as compared to the example of a Cessna 182 which has basically not changed since 1956. The Synergy aircraft, if it lives up to its billing, promises to radically change the way aircraft designs utilise aerodynamics and active drag reduction using well known and proven techniques in a smart way.



The Synergy Aircraft

The Synergy design was entered in the recent NASA Cafe Green Flight Challenge and was favoured to win but sadly did not make it to the design flyoff mainly due to the new engine being unavailable in time. This competition required entrants to produce an aircraft capable of 200 miles per (US) gallon of fuel equivalent, could fly for over 200 miles range and was capable of a minimum of 100 miles per hour. The company is continuing to push ahead with the design and John McGinnis indicated that they were intending to produce a homebuilt kit version of the Synergy.

Another of the interesting speakers was Glenn Martin of Martin Jet Pack fame. Glenn Martin gave an interesting and humorous talk on the background, development and current state of the jet pack design (really a ducted fan). Glenn has spent the past thirty odd years perfecting his design. Most folks in New Zealand are probably familiar with the Martin Jet Pack and a



Glenn Martin

bit of its history. Glenn explained where development of the Jet Pack was currently at and where his company are trying to take it.

He explained that originally it had been intended to produce the Jet Pack with purely manual flight controls however with persuasion and input electronics from the US military the Jetpack has been converted to a fly by wire control which means anyone can learn to fly it in

# 14 FLAIR Aviation Expo 2011 Continued

under an hour as the electronics keep the pack stable and the 'pilot' just decided where to go.



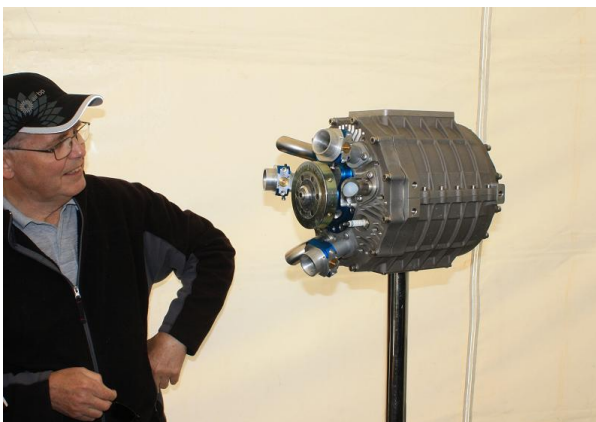
The Martin Jet Pack on display.

At the moment Martin Aviation are extending the flight envelop of the Jet Pack to meet the requirements of the US military and also making sure the software can handle higher winds in flight. They are also looking to integrate a ballistic recovery chute into the design so the avoidance curve for the pack can be reduced to the smallest possible footprint. Glenn explained that originally they were just trying to get the avoidance curve the same as the Robinson R22 helicopter but with the BRS and fly by wire systems it looks likely that the avoidance curve will be only a small fraction of the size of the R22.

## Industry Displays

As well as the workshops and seminars there were also displays by current NZ aviation businesses where you could preview products and services and discuss business with the company representatives.

One of the technologies on display was the Duke Engine from Duke Engineering who are based in Drury, South of Auckland.



The smaller Duke Engine capable of 120hp.

This engine is an axial motion, internal combustion engine which because of its design significantly reduces the size and weight of the engine as well as increasing the power density.

If you are interested in seeing how this concept works I strongly recommend you visit the Duke Engines

website (<http://www.dukeengines.com/>) to check it out. In speaking with the guys on the stand it was clear the development of the engine had reached a point where the company now needs to partner with a significant manufacturing company to enable the development to continue. Duke Engineering does not have the facilities to manufacture the engines themselves and the engines they have built to date are engineering prototypes only. Hopefully this technology will find a backer as the technology has potential.



The larger Duke Engine in cutaway.

## Air Displays

And as well as the seminars, workshops and industry displays there were also regular air displays each day.



PAC 750XL rotates on a max performance takeoff.

The PAC 750XL, Calidus Gyroplane and Falcomposites Furio all made great displays twice a day which provided a great backdrop to the rest of the event. Also on the Sunday the RNZAF Red Checkers aerobatics team arrived and gave one of their signature displays.

## Conclusion

About the only thing to really detract from the FLAIR event was the weather. Heavy showers went through each morning causing the ground to become very muddy in places. (Gumboots were the footwear de-jour.) Also the number of attendee's was not great and this will make it difficult to justify running a similar event in the future. That said it was still a very well run and extremely interesting couple of days. One would hope that if at all possible a similar event can be staged again in a couple of years time.

This story came through my email in box during the month. It's a bit lengthy so grab a cuppa and enjoy.

## Fwd: Australian Cattle Station Pilots

G'day Mate,

I am writing to you because I need your help to get me bloody pilot's license back. You keep telling me you got all the right contacts. Well now's your chance to make something happen for me because, mate, I'm bloody desperate. But first, I'd better tell you what happened during my last flight review with the CAA Examiner.

On the phone, Ron (that's the CAA d\*#"head), seemed a reasonable sort of a bloke. He politely reminded me of the need to do a flight review every two years. He even offered to drive out, have a look over my property and let me operate from my own strip. Naturally I agreed to that.

Anyway, Ron turned up last Wednesday. First up, he said he was a bit surprised to see the plane on a small strip outside my homestead, because the "ALA" (Authorized Landing Area), is about a mile away. I explained that because this strip was so close to the homestead, it was more convenient than the "ALA," and despite the power lines crossing about midway down the strip, it's really not a problem to land and take-off, because at the halfway point down the strip you're usually still on the ground.

For some reason Ron, seemed nervous. So, although I had done the pre-flight inspection only four days earlier, I decided to do it all over again. Because the prick was watching me carefully, I walked around the plane three times instead of my usual two.

My effort was rewarded because the colour finally returned to Ron's cheeks. In fact, they went a bright red. In view of Ron's obviously better mood, I told him I was going to combine the test flight with some farm work, as I had to deliver three "poddy calves" from the home paddock to the main herd. After a bit of a chase I finally caught the calves and threw them into the back of the ol' Cessna 172. We climbed aboard but Ron, started getting onto me about weight and balance calculations and all that crap. Of course I knew that sort of thing was a waste of time because calves, like to move around a bit particularly when they see themselves 500-feet off the ground! So, it's bloody pointless trying to secure them as you know. However, I did tell Ron that he shouldn't worry as I always keep the trim wheel set on neutral to ensure we remain pretty stable at all stages throughout the flight.

Anyway, I started the engine and cleverly minimized the warm-up time by tramping hard on the brakes and gunning her to 2,500 RPM. I then discovered that Ron has very acute hearing, even though he was wearing a bloody headset. Through all that noise he detected a metallic rattle and demanded I account for it. Actually it

began about a month ago and was caused by a screwdriver that fell down a hole in the floor and lodged in the fuel selector mechanism. The selector can't be moved now, but it doesn't matter because it's jammed on "All tanks," so I suppose that's Okay.

However, as Ron was obviously a nit-picker, I blamed the noise on vibration from a stainless steel thermos flask which I keep in a beaut little possie between the windshield and the magnetic compass. My explanation seemed to relax Ron, because he slumped back in the seat and kept looking up at the cockpit roof. I released the brakes to taxi out, but unfortunately the plane gave a leap and spun to the right. "Hell" I thought, "not the starboard wheel chock again."

The bump jolted Ron back to full alertness. He looked around just in time to see a rock thrown by the prop-wash disappear completely through the windscreen of his brand new Commodore. "Now I'm really in trouble," I thought...

While Ron was busy ranting about his car, I ignored his requirement that we taxi to the "ALA," and instead took off under the power lines. Ron didn't say a word, at least not until the engine started coughing right at the lift off point, and then he bloody screamed his head off. "Oh God! Oh God! Oh God!"

"Now take it easy Ron," I told him firmly. "That often happens on take-off and there is a good reason for it." I explained patiently that I usually run the plane on standard MOGAS, but one day I accidentally put in a gallon or two of kerosene. To compensate for the low octane of the kerosene, I siphoned in a few gallons of super MOGAS and shook the wings up and down a few times to mix it up. Since then, the engine has been coughing a bit but in general it works just fine, if you know how to coax it properly.

Anyway, at this stage Ron seemed to lose all interest in my test flight. He pulled out some rosary beads, closed his eyes and became lost in prayer (I didn't think anyone was a Catholic these days). I selected some nice music on the HF radio to help him relax. Meanwhile, I climbed to my normal cruising altitude of 10,500-feet. I don't normally put in a flight plan or get the weather because, as you know getting FAX access out here is a friggin' joke and the weather is always "8/8 blue" anyway. But since I had that near miss with a Saab 340, I might have to change me thinking on that.

Anyhow, on leveling out, I noticed some wild camels heading into my improved pasture. I hate bloody camels, and always carry a loaded 303, clipped inside the door of the Cessna just in case I see any of the bastards.

We were too high to hit them, but as a matter of principle, I decided to have a go through the open window. Mate, when I pulled the bloody rifle out, the effect on Ron, was friggin' electric. As I fired the first shot his neck lengthened by about six inches and his eyes bulged like a rabbit with myxo. He really looked as if he had been jabbed with an electric cattle prod on full power. In fact, Ron's reaction was so distracting that I lost concentration for a second and the next shot went straight through the port tyre. Ron was a bit upset about the shooting (probably one of those pinko animal lovers I guess) so I decided not to tell him about our little problem with the tyre.

Shortly afterwards I located the main herd and decided to do my fighter pilot trick. Ron had gone back to praying when, in one smooth sequence, I pulled on full flaps, cut the power and started a sideslip from 10,500-feet down to 500-feet at 130, knots indicated (the last time I looked anyway) and the little needle rushed up to the red area on me ASI. What a buzz, mate! About half way through the descent I looked back in the cabin to see the calves gracefully suspended in mid air and mooing like crazy. I was going to comment to Ron on this unusual sight, but he looked a bit green and had rolled himself into the fetal position and was screamin' his freakin' head off. Mate, talk about being in a bloody zoo. You should've been there, it was so bloody funny!

At about 500-feet I leveled out, but for some reason we kept sinking. When we reached 50-feet, I applied full power but nothin' happened. No noise no nothin'. Then, luckily, I heard me instructor's voice in me head saying "carb heat, carb heat." So I pulled carb heat on and that helped quite a lot, with the engine finally regaining full power. Whew, that was really close, let me tell you!

Then mate, you'll never guess what happened next! As luck would have it, at that height we flew into a massive dust cloud caused by the cattle and suddenly went I.F. bloody R, mate. BJ, you would have been really proud of me as I didn't panic once, not once, but I did make a mental note to consider an instrument rating as soon as me gyro is repaired (something I've been meaning to do for a while now). Suddenly Ron's elongated neck and bulging eyes reappeared. His Mouth opened wide, very wide, but no sound emerged. "Take it easy," I told him, "we'll be out of this in a minute." Sure enough, about a minute later we emerged, still straight and level and still at 50-feet.

Admittedly I was surprised to notice that we were upside down, and I kept thinking to myself, "I hope Ron didn't notice that I had forgotten to set the QNH when we were taxiing." This minor tribulation forced me to fly to a nearby valley in which I had to do a half roll to get upright again.

By now the main herd had divided into two groups leaving a narrow strip between them. "Ah!" I thought, "there's an omen. We'll land right there." Knowing that

the tyre problem demanded a slow approach, I flew a couple of steep turns with full flap. Soon the stall warning horn was blaring so loud in me ear that I cut it's circuit breaker to shut it up, but by then I knew we were slow enough anyway. I turned steeply onto a 75-foot final and put her down with a real thud. Strangely enough, I had always thought you could only ground loop in a tail dragger but, as usual, I was proved wrong again!

Halfway through our third loop, Ron at last recovered his sense of humor. Talk about laugh. I've never seen the likes of it. He couldn't stop. We finally rolled to a halt and I released the calves, who bolted out of the aircraft like there was no tomorrow.

I then began picking clumps of dry grass. Between gut wrenching fits of laughter, Ron asked what I was doing. I explained that we had to stuff the port tyre with grass so we could fly back to the homestead. It was then that Ron, really lost the plot and started running away from the aircraft. Can you believe it? The last time I saw him he was off into the distance, arms flailing in the air and still shrieking with laughter. I later heard that he had been confined to a psychiatric institution - poor bugger!

Anyhow mate, that's enough about Ron. The problem is I got this letter from CASA withdrawing, as they put it, my privileges to fly; until I have undergone a complete pilot training course again and undertaken another flight proficiency test.

Now I admit that I made a mistake in taxiing over the wheel chock and not setting the QNH using strip elevation, but I can't see what else I did that was a so bloody bad that they have to withdraw me flamin' license. Can you?

Ralph H. Bell  
Mud Creek Station



## New British Airways Commercial Gavin Magill

British Airways released a new advertising campaign during the month and I picked this up through <http://airpigz.com/> website. This is a great ad and there is a raft of supporting video's on Youtube to watch as well. Well worth a look.



[http://www.youtube.com/watch?v=a4JdQi60an0&feature=player\\_embedded](http://www.youtube.com/watch?v=a4JdQi60an0&feature=player_embedded)

[http://www.youtube.com/watch?v=RUQJiFARd80&feature=player\\_embedded](http://www.youtube.com/watch?v=RUQJiFARd80&feature=player_embedded)

[http://www.youtube.com/watch?v=x\\_G4MV\\_DG2Q&feature=player\\_embedded](http://www.youtube.com/watch?v=x_G4MV_DG2Q&feature=player_embedded)

<http://www.youtube.com/watch?v=chjN5SerNeQ&NR=1>

<http://www.youtube.com/watch?v=7fY-Pu-C6PA&feature=relmfu>

## Owl in Flight Robin Hickman

For aviation buffs check out Bernoulli's Theorem at work. The curvature on the wing is amazing, the last few seconds impressive. Click on link below. Owl coming right at the camera. Hypnotic little piece of film. I thought my eyes would cross. The last two or three seconds are amazing, watching the feathers ruffle and the wings swell. Interesting to watch the corrections in the flight path as the bird comes in

<http://www.dogwork.com/owfo8/>



## Rare Mk1 Spitfire Takes Flight Peter Armstrong

A rare Spitfire Mark I takes to the skies once more – Telegraph.

This is magic - enjoy.

Peter

<http://www.telegraph.co.uk/motoring/goodwood-revival/8753919/A-rare-Spitfire-Mark-I-takes-to-the-skies-once-more.html>



## Smoke On Gavin Magill

This great Youtube video turned up on the Airpigz.com website a couple of weeks ago. Having a bit of an interest in all things Sonex I was of course interested. However it is not just a good video of a Sonex but also a great video full stop. I recommend opening it up to full screen and increasing it to the maximum screen definition your modem will handle.

If you don't already have <http://airpigz.com/> as a bookmark on your web browser can I strongly suggest you add it. This web blog is updated every day or so with some of the most amazing links you will find on the web. I show just a fraction of the links so it is well worth taking the trouble to check out this site each day if you have time. Enjoy

[http://www.youtube.com/watch?feature=player\\_embedded&v=vKeEW0zOFik](http://www.youtube.com/watch?feature=player_embedded&v=vKeEW0zOFik)



## Ski Flying Peter Armstrong

Peter Armstrong also found this really cool video of ski-flying in Switzerland. Like the wingsuit flying he found a couple of issues ago it is also very cool.

<http://www.collegehumor.com/video/6337154/ski-flying-in-switzerland>



## Update on Reno Crash Bob Keith

Bob Keith had the following email forwarded to him recently.

“Subject: RENO AIR RACES MAY FLY AGAIN!

Good News for the future of air racing.

Our new crew member, Matt Jackson, is not only a race pilot, aircraft business owner and aircraft owner (he also takes care of Tom Cruises P-51) but he is also the VP of the Unlimited Racing Class and head of the Safety Committee.

We had a long talk about the Reno crash on the way to Mojave today. Matt believes the cause of the crash was due to The Galloping Ghost having a CG too close to the aft limit which resulted in pitch instability.

There are instructions on the P-51 regarding no combat missions with the aft fuel tank full resulting in an aft CG problem. Instructions specify to empty the aft fuel tank first in flight.

During qualifying Matt watched Galloping Ghost from inside the cockpit of Furius and could not believe how much trouble Leeward was having in keeping the Ghost in a stable pattern around the course.

Since Leeward lives in Florida and the Galloping Ghost was modified for racing in Calif., when Leeward picked up the Ghost for the Reno races at the last minute, a complete flight test program had not been done based on available information.

There is a video of the entire last lap of the Ghost before the crash which Matt showed me. As Leeward was coming around pylon #8 at about 480 mph after passing Rare Bear, he hit turbulence which pitched his left wing down, Leeward corrected with hard right rudder and aileron. Just as the aircraft was straightening out, he hit a second mountain of turbulence which caused the tail to 'dig in' resulting in a 10+ G climb rendering Leeward unconscious instantly and resulted in the tail wheel falling out. (broken tail wheel support structure was found on the course). As the Ghost shot upward the LH aileron trim tab broke loose. This can be heard on the tape, so the trim tab did not cause the accident.

Since the Ghost was racing at 480 mph with full right rudder and the stick full right, this is where everything stayed when Leeward blacked out. Cockpit camera film that was salvaged from the wreck shows Leeward slumped over to the right in the cockpit. As a result, the Ghost climbed up and to the right, rolled over on her back and then headed for the box seats. Most in the box seats never saw it coming because it came in from behind them.

Matt has had long conversations with the NTSB who call the accident a 'fluke'. They are not going to recommend canceling future races. He has also talked to the insurance companies covering the races for Reno and they also say they are not going to cancel their coverage of future races. Now we wait for the FAA to make a decision.

Ironically, Matt bought box seats tickets for his good friends who stayed with him for a few days before the races. They were the husband and wife who were killed." JR

# 19 Tips, Techniques & Technology

The following is from an article off the Vans website and came to me via the KRNet mail list. It is well worth a read and you can find this article plus a follow up article at the following link. [http://vansaircraft.com/pdf/hp\\_limits.pdf](http://vansaircraft.com/pdf/hp_limits.pdf)

## FLYING HIGH AND FAST

ANOTHER REASON WHY MORE POWER IS NOT ALWAYS A GOOD THING

KEN KRUEGER

While talking with potential RV-10 builders (although the concepts are the same for any airplane), the subject of turbocharged and/or turbine engine installation occasionally comes up. And why not? The idea of maintaining power at high altitudes is very appealing. With the gain in true airspeed inherent in high altitudes and the additional power, you could go very fast, very economically. While turbines are probably not a realistic choice for an RV-10, turbochargers seem easy enough. They've been used on enough airplanes and cars to become a familiar part of our mechanical world. The concept of turbo-normalizing is even more attractive. In this case, the turbo merely replaces the air density lost through increasing altitude, so, while the engine can maintain

Density Altitude	TAS if indicator reads 230 mph
0	230
4000	244.1
8000	259.4
12000	276.3
16000	294.8
20000	315.1
24000	337.6

*If you can hold Indicated Airspeed constant, True Airspeed will increase dramatically with altitude.*

rated power as it climbs, it is never asked to produce more power at low altitudes. The pilot gets the best of both – no extra strain on the engine down low, and more power up high.

Why isn't every piston airplane turbo-normalized? This is a good place to remember Robert Heinlein's wonderful acronym: TANSTAAFL. There Ain't No Such Thing As A Free Lunch. As attractive as it appears at first, there are several mechanical arguments against turbocharging airplanes. One of the biggest is heat. If the engine is making full rated power, it must eject a certain amount of heat to stay with operating limits. This is exacerbated by the fact that compressing air makes it hotter. This is manageable if the airplane is in the lower atmosphere where there is plenty of cooling air, but if the engine is operating in very thin high-altitude air, there is a lot less mass to absorb heat. Soon cylinder head temperatures are beyond limits and oil is cooking. But these are mechanical details and people can devise mechanical solutions. They may be heavy, complicated and expensive, but they work.

No, the real problem is not mechanical. The real danger is exceeding the Never Exceed Speed, noted as  $V_{ne}$ .

Many pilots assume that operating at high altitude (greater than 12,500 ft, say), even with the increased power supplied by a turbocharger, will not be a problem if the mechanical problems are solved. Sure, they can go faster, but not so much faster that they exceed the limitations marked in living color on the airspeed indicator. How, they ask with apparently perfect logic, can the airplane be exceeding  $V_{ne}$  if the needle is in the green arc?

Because the airspeed indicator is The Gauge That Lies. Despite its name, an airspeed indicator does not measure speed. It measures "q" – dynamic pressure caused by packing air molecules into a tube. Now, several limiting speeds like stall speed (bottom of the green and white arcs), gust loads (top of the green arc), and maneuvering speed (blue line) are also functions of q, so they may be read directly off the dial. In these cases, the logic is true.

This logic is NOT true for the very important red line at the top of the yellow arc. Here's why:

Consider an aircraft flying in smooth air at cruise speed. The aircraft structure is then slightly disturbed (such as by turbulence). In response, the aircraft structure will oscillate with amplitude decreasing until the oscillation stops altogether. This dynamically stable response is due to damping acting on the system, either from the aircraft structure and/or air. If the cruise speed is incrementally increased there will be a particular speed at which the amplitude of structural oscillation will remain constant. The speed at which constant amplitude oscillation can be first maintained is defined as the "critical flutter speed", or more generi-

### TURBO-NORMALIZED ENGINE DEVELOPING 75% POWER TO 24,000'

Density Altitude	TAS	IAS	Flutter Margin TAS	Flutter Margin IAS
0	187.3	187.3	42.7	42.7
4000	194.9	183.7	35.1	46.3
8000	203	180	27	50
12000	211.7	176.3	18.3	53.7
16000	221	172.4	9	57.6
20000	231	168.6	-1	61.4
24000	242	164.9	-12	65.1

*If you installed a turbo-normalized engine that could maintain 75% of 260 hp (195 hp) up to 24,000 feet, the flutter margins will go negative at 20,000...even though the airspeed indicator will show an indicated airspeed well below the red line.*

# 20 Tips, Techniques & Technology Continued

**TURBO-NORMALIZED ENGINE DEVELOPING 260 HP TO 24,000'**

Density Altitude	TAS	IAS	Flutter Margin TAS	Flutter Margin-IAS
0	206.2	206.2	23.8	23.8
4000	214.5	202.1	15.5	27.9
8000	223.4	198.1	6.6	31.9
12000	232.9	193.9	-2.9	36.1
16000	243.2	189.8	-13.2	40.2
20000	254.3	185.6	-24.3	44.4
24000	266.3	181.4	-36.3	48.6

*With an 260 hp engine capable of maintaining rated power up to 24,000 feet, the flutter margin goes negative somewhere below 12,000'.*

cally "flutter speed". Flutter is almost a pretty word. You'd associate it with butterflies and silk handkerchiefs. But in the engineering sense, it can be highly destructive. Once flutter has started, the amplitude may quickly become so large that a structure will disintegrate, literally shaken to pieces.

Remember, as the airplane climbs, there are fewer air molecules and less air pressure, so the needle on The Gauge That Lies reads a lower speed, even though the airplane is actually going just as fast. That's why True airspeed is faster than Indicated. But flutter does *not* depend on Indicated Air Speed/dynamic pressure. It is directly related to True Air Speed — the velocity of the air passing by the airframe. The *velocity* of the excitation force is the prime concern, not the magnitude. It is very possible to exceed this critical "flutter speed" without encountering flutter if there is no initial disturbance. But if the critical flutter speed *is* exceeded and then a disturbance *is* encountered, the aircraft structure will begin to oscillate in response to the velocity of the passing air. This is not a typical resonance, where either increasing or decreasing the speed will move the aircraft away from the critical frequency and the vibration will stop on its own. Going faster merely pumps more energy into the system, increasing the amplitude of the flutter. Go faster, flutter harder. Only going slower and lowering the velocity of the air over the airframe will solve the problem.

You've probably seen film of the collapse of the Tacoma Narrows Bridge. Built before the aerodynamics of bridges was fully understood, this bridge could probably have withstood the dynamic pressures of a hurricane. But one day, the wind speed was just right — about 42 mph — to match the natural flutter frequency of the bridge. The bridge started moving, undulating more and more until the whole structure collapsed. There's still hundreds of tons of concrete and twisted steel out there at the bottom of the bay. The slow writhing of the bridge makes good video, but when flutter occurs in an airplane, destructive failure can be reached at a speed that human

senses would detect as a sudden explosion, rather than a vibration. There is no warning, no time to react, certainly no time to slow down.

RVs are designed presuming the installation of naturally aspirated engines (and pilots). Van's flutter analysis is conservative, but not so conservative as to allow for the true airspeeds that might occur using an engine that can develop 75% of rated power up to altitudes of 20,000 feet or more. The projected performance of a turbo-normalized RV-10

is listed in the tables.

Interestingly, airplanes without engines — let alone engines with turbochargers — can encounter the same dangers. Sailplanes often fly at quite high altitudes. Those long, long wings tend to be flexible structures which makes them, potentially, quite susceptible to flutter. Sailplanes may not have engines, but they certainly have the equivalent of a lot of power in the Earth's gravity. They also have very little drag. The combination means that they can accelerate very quickly indeed. A sailplane pilot

PIPISTREL SINUS	
Density Altitude	V <sub>NE</sub> (KIAS)
0	122
3300	116
6500	111
10000	105
13000	100
16500	95
19700	90
23000	85
26300	80

who points the nose down at altitude could find himself in a grave situation very quickly. It is not uncommon to see charts in sailplane cockpits correlating the V<sub>ne</sub> to indicated airspeed. Here's one we saw at SunNFun on the panel of a Pipistrel Sinus motorglider:

As you can see from our charts and Pipistrel's, the margin of safety narrows with altitude, and actually goes negative in some cases. A negative margin of safety

is not considered desirable by passengers or insurance companies. Pilots, too, although they are superior beings with greater intellectual capacity, should be concerned. Superior intellect hits the earth just as hard, although it tends to be more surprised when it happens.

If you must hurtle through Mother Nature's atmosphere at a speed higher than the V<sub>ne</sub> of the RV-10, it would be best if you found another airplane to do it in. Preferably one designed for the job.

# 21 Tips, Techniques & Technology Continued

## Pitot Status Adjustment Bob Keith

The following article was sent in by Bob Keith and Bob was at pains to point out that he has not had the opportunity to verify whether the method described in this article works or not. He asked that anyone considering using this approach must first get appropriate advice from a qualified avionics or instrument technician.

Prior to flying your Sport or Microlight aircraft you should check all your instruments for any errors. The chapter can help here as it does have some equipment which will assist you in checking your temperature instruments. The altimeter in particular however needs to be checked by an approved person and while they are doing that you can get them to check the integrity of your pitot/static system (no leaks) and also check the ASI. The ASI check will not however tell you if you have any pitot/static position error. You are only going to find this out when you fly your aircraft.

In the case of my T18 checking the ASI was a work in progress. Initial flight testing gave stall figures of 58kts clean and 53kts with full flap which were quite a bit higher than that published for T18's with the Sunderland wing. I had half expected this as it had fuselage mounted static points and a pitot probe under the left wing.

To give you some background on the reason for my configuration the T18 plans did not have any information on Pitot static systems other than the original drawing of a pitot/static probe mounted on top of the Fin and this was known to have gross error close to the stall, looked ugly and as I had never seen that system used on any T18's at Oshkosh I decided to place the probe under the left wing. I did not want one protruding forward of the wing as they are more easily damaged.

I purchased a second-hand blade type as used on the Piper Cherokee minus the heating element. (I figured I would not be flying IFR so would not require that.) Location was the next consideration and I read up on this. First consideration was it had to be far enough out on the wing to be unaffected by the prop wash. Depth below the wing was determined by the manufacturer (It worked fine for Piper so should be OK on my aircraft) The next consideration was how far back to place it. My main consideration regarding this was I did not want any hole in the spar web so the plumbing had to run either in front or behind the spar. I placed it just behind the spar as there was more depth and I was able to loop the alloy tubing so that I could unbolt the probe, lower it and disconnect the tubing easily. My next problem was created by the wing folding action. It needed to have flexible hose at the junction between the folding outer wing section and the inner wing as I did not want to have to disconnect these lines each time I folded the wings as I could end up with leakage.

After some deliberation I decided that there was insufficient room for hoses for both pitot and static so I blanked the static port off at the probe and just ran the pitot line through to the fuselage. Even with just the one flexible hose I was not that happy as I could not see the lie of the hose with the wing unfolded so I elected to cut the upper wing skin back and extend the gap cover back to the near the TE. That enabled me to inspect the flexible hose and check it was not chaffing or twisted.

My next consideration was the placement of the static ports which was largely hit and miss. Every T18 owner that used this system had a slightly different location so I ended up with an average of all of them.

This brings me to the point of this article. It is possible to correct for pitot and static error. The following information comes from a book by Vaughan Askue called Flight Testing Homebuilt Aircraft

What is suggested in the case of separate fuselage mounted static ports is to make up small dams of metal about .1 inch high and place them close to the static ports either in front, behind or above or below. Placing the dam in front of the port will normally increase the IAS across the whole range. Place the dam behind them will decrease IAS. Rotating the dams about the port enables you to bias the IAS either up or down. You need to fix them temporarily at first as its very much a trial and error process. If you are using a combined pitot static probe the static source can be biased by placing a tubular sleeve on the static tube. Placing this tubular collar either in front or behind the ports will have the same effect.

Vaughan states that low speed errors are normally due to probe misalignment and often cured by angling the probe down a little more. Broad band errors are indicative of a poor static system.

I can't vouch for the effectiveness of these fixes but they sound reasonable.

In the case of the fuselage static ports I could see the idea has some merit as I for one would be loath to have to reposition them on the fuselage sides as the new position might be worse than the first. Ideally it would be better to use a combined pitot static probe and avoid fuselage static ports unless their location is marked on the plans.

What is needed BEFORE we attempt to modify the system as suggested above is to find out what ASI errors we have right throughout the speed range. Our SAA flight test program document (form AIRTESTt-FW) does not deal with ASI errors but the recommended companion document FAA Advisory Circular 90-89A (Amateur-Built Aircraft and Ultralight Flight Testing Handbook) (Ref page 43) does explain how to go about checking your ASI. Both documents can be downloaded from the SAA web site. The book by Vaughan Askue uses a two way timed speed course for checking the ASI but this method does require little or no wind to be accurate.

Probably the easiest way to check out your ASI is using a GPS and while searching on the internet I came up with several sites that explained how to do this. I am not qualified to comment on the usefulness of any of them so perhaps another member might like to provide an article on this which could then lead on to another article on how to accurately mark the white green yellow bands on your ASI.

Rob Keith

This month's member profile is of Warren Sly. Warren is the immediate past President of the Auckland SAA Chapter and is currently constructing a T51 Mustang in his home workshop in Huapai.



Warren Sly

#### Airforce Years

Warren says he has always had a passion for aircraft for as long as he can remember. He joined the Airforce in 1966 as an aircraft fitter and did his recruit course in Wigram. During this time he became good friends with another recruit who was from Walter Peak Station in the South Island and had access to and could fly a Piper Cub. With the encouragement of his mate he joined the local Canturbury Flying Club and began learning to fly in the club Piper Cub.

At the completion of his recruit course, Warren was posted to Hobsonville for his basic engineering course. He recalls often walking over to the 3 Squadron hangar virtually every evening to scrounge rides in any Iroquois flights that would be going each evening. Occasionally he would even get to fly left seat if the pilot was going up by himself.

On completion of his basic engineering course he was posted to Woodbourne to complete his basic trade training course. He recalls that the day he sat his trade qualification exam he also sat his PPL flight test. Fortunately he passed both tests but he says looking back he has no idea how he managed to do this. He recalls he was a nervous wreck that day.

Following completion of his trade qual's, Warren was posted to 14 Squadron at Ohakea which was then

flying Canberra bombers. While at Ohakea he also joined the Aviation Sports Club and spent time flying the club aircraft. He recalls that the club owned was a Piper Tri-Pacer which he says was great for spot landing competitions as when you pulled the throttle it dropped like a stone onto whatever spot it was sitting above. It was also fitted with large tires and these absorbed much of the landing shock during such landings. He says it was hardly fair on the competition really.

Warren then returned to Woodbourne to complete his senior trade training following which he was posted to Whenuapai where he worked on P3 Orion's and Hercules aircraft. He was eventually promoted to Corporal and posted to Ohakea where he joined 75 Squadron which had just become operational with the A4 Skyhawk. Warren says he was probably one of the most fortunate groundies on the squadron in that he got to fly in the Skyhawk a number of times. This culminated with a two week period where the rest of the squadron was away in Singapore while he remained back at Ohakea for some reason (he can't recall why, possibly to have tonsils removed.). The squadron CO, Fred Kinvig, had also remained back at Ohakea and knowing of Warren's interest in flying, was trying to convince Warren to remuster to aircrew. Fred said to Warren that he wanted to fly as often as he could while the squadron were overseas and Warren was to have a TA-4K ready on the flight line every day by 10am and Warren was to be kitted up to go flying each day so Fred could assess his flying skills in the Skyhawk.



RNZAF TA-4K Skyhawk

As Warren describes it, this was an opportunity of a life time and not one to be passed up. [Best understatement I've heard for a while- Ed]. The flights consisted of aerobatics flights and navex flights around the country and Warren was given control of the

T-Bird basically from wheels up till immediately prior to touch down when Fred would take back control. Of all the flights Warren recalls the most memorable as a long navex up to North Cape and a return flight back down 90 mile beach at about 200 feet. At the southern end of 90 mile beach there are a series of large sand dunes divided by large valleys. Warren says Fred flew the T-bird down these valleys below the tops of the dunes, weaving from one valley to the next.

He also recalls that he was fortunate enough to also get to go supersonic in a Skyhawk. As part of each new pilot's introduction to the A4 they were required to do a Mach run. Warren recalls when he went for his ride, the pilot took the TA-4K up to its maximum ceiling where it was barely hanging in the air above stall and just a slight touch on the controls caused it to drop the wing and nose causing the aircraft to rapidly dive and accelerate through to Mach 1.2. He recalls it being a bit of a non event really with no buffeting caused by the aircraft going supersonic.

Despite all the flying, Fred Kinvig was unable to convince Warren to remuster to aircrew and after his 8 years were up Warren left the Airforce and departed overseas with his wife Jeweline on an OE.

#### Post Airforce Career

Warren and Jeweline arrived in the UK after travelling around Europe and ended up staying for five years. Warren says he was keen to get into the Hydraulic engineering industry and when Jeweline spotted a job being advertised for a Hydraulic Applications Engineer at GEC, Warren applied. He managed to secure a role as a Hydraulic Engineering Draughtsman after finding he was not sufficiently qualified for the engineer role during the interview. However after working in the draughting role for a few months Warren was called to the CEO's office and offered the original position he had applied for. Warren explained to the company CEO that he did not have the qualifications for the position but the CEO said that didn't matter and if Warren wanted the job it was his. Warren accepted and spent the next five years working for GEC.

He recalls his biggest challenge during his time at GEC was as the Chief Commissioning Officer in charge of commissioning a Replenishment At Sea (RAS) system that GEC was developing for the Royal Navy. He recalls meeting with many high ranking officers and officials during this time and feeling somewhat overwhelmed by it all and thinking that at any moment he would be caught out as just this simple aircraft technician from Palmerston North. He found the best approach was to just lay his cards on the table and be honest about his experience and people generally accepted this and let him get on with it.

After 5 years in the UK, Jeweline and Warren decided to return to NZ. By now they had two children and returned to live in Palmerston North. Warren started a Hydraulic Engineering business which did well but Warren began to have health issues at about this time. He was eventually diagnosed with Rheumatoid Arthritis and his doctor recommended Warren sell up the business and learn to adapt to living with the disease. Warren sold the business and moved to Napier with his family. He says after a period of convalescence he eventually found a cure for the disease and after four years was finally free of the pain. In the meantime he had set up another rural engineering business in Napier and this was doing quite well until the era of Rogernomics arrived. Warren eventually sold out of this business and after being offered a role as a design engineer for a crane on a super yacht being built in Auckland he relocated to Auckland with his family just as the stock market crashed in 87.

Fortunately Warren had been accumulating skills using a CAD design package on his MacIntosh computer and when it broke down he took it into a local computer shop where they asked him what he was using the machine for. On showing them they promptly offered him a job selling CAD software for the business. Warren duly accepted and found himself selling software to a boutique market of engineering companies who were looking to do their own CAD design work.

He has subsequently spent the last 25 years working in the computer industry with the only change being

that he has moved on from selling CAD software to selling Desktop Publishing software during this time.

#### Previous Homebuilt Projects

While in the airforce Warren purchased a set of plans for a BD5 and subsequently began work on constructing airframe components. At the time however there were a number of unresolved issues with the BD-5 design and also issues around the reliability of the Hirth engine. As a result, when he left the airforce in 1974 Warren decided to sell the BD-5 plans and the components he had already made to a friend. At that time Warren was a member of the original AACA organisation.

#### Choosing the T51

After his OE and the return to NZ and following the various moves around NZ, Warren finally found time to once again start looking at buying or building an aircraft. He says he was originally tempted to just buy a 172 as he had done plenty of hours in this type. However after attending an airshow at Omaka about five years ago he happened to see the T51 that Ivan Campbell had on display. He thought that the design had potential as it looked good and flew well however he was not that fussed with the Rotax engine offered at the time. A short while later, a guy in Canada re-engined the Titan with a Suzuki Vitara V6 engine and for Warren this completed the tri-fecta of what he was looking for in an aircraft. It not only looked good and flew well, it now also sounded great as well. Warren purchased his kit about four years ago and has been working steadily through the build since then.

He says his build progress has been somewhat slow because being an engineer he has applied his knowledge to the Titan design and made a number of modifications where he has found the design either lacking or where he has wanted to make the T-51 more authentic looking. His undercarriage uplock mechanism, overcentre preloaded lock pistons and hydraulic actuated inner undercarriage doors have proven to be popular with other T51 kit builders and he is now providing kits for these mods to T-51 builders around the world.

Warren has also replaced the overlapping joint system used by

Titan for the skin to a butt jointed system and made his own wing fillet fairing to replace the stock fish plates.

He has also designed a new engine mount for the Vitara Engine as he found the Titan design has what he believes is a serious design flaw in that one of the weld joints is a working joint and will probably fail.



The Titan designed engine mount.

His new mount design is in the process of being tested by a Christchurch engineering firm to ensure his calculations are correct.



Warren holds a mockup of his new mount design. The diagonal will be a turnbuckle

The Vitara engine has also received attention from a friend who builds race engines. He gave the engine heads a full work over and Warren's engine now produces 170hp at 5200rpm as compared to the 150hp at 5600rpm the standard engine makes.

When asked what he would do differently if he had the chance to start over, Warren says he would probably have bought two kits, one to keep and one to sell. He says he could work out all the bugs and issues with the first, sell that and then build the second exactly how he wanted it.

Asked what he has enjoyed most about the build process, he says it has been meeting like minded people from all over the world. He says he spends many evenings Skyping with other T51 builders around the world and really enjoys the camaraderie and friendship of this group of people.

**Future Plans**

As for the future, Warren wants to get the T-51 finished by the end of the coming summer season and then just enjoy getting to fly it. He is working

about 2 days per week on the project to try and accomplish this timeline. He would also perhaps like to build another aircraft in the future, possibly composite and he would focus on

building for efficiency next time. And ever the engineer, he is also looking at a design for an electronic constant speed propellor unit which could have wider market potential.



Warren and his baby.



The wing fillet made on an English Wheel.



T-51 Utility Bay. Hydraulic manifold left, accumulator right , auto pilot rear.



Warren's inboard undercarriage door design



The T-51Empennage. The rudder will be fabric covered.



## Chapter Events

2011

**Oct 27 Chapter Monthly Meeting**  
 Title: Oshkosh 2011  
 Speaker: Cyril Wright  
 Chapter President, Cyril Wright will present a talk on his trip to Oshkosh, Aircam training etc.

**Nov 24 Chapter Monthly Meeting**  
 Title: TBA  
 Speaker: TBA  
 Guest speaker(s) being arranged for a presentation on advances in digital photography. Understanding the hype and evaluating your next camera purchase. Learn before you buy. (Not a sales pitch).

## Aviation Calendar

2011

## Every Dargaville Aero Club

**Sat** The place is buzzing every Sat, wet or fine, windy or calm, and the \$10 lunch at 12.30 is good value. Club is on the web at [www.goflying.co.nz/index.html](http://www.goflying.co.nz/index.html). If going as a group please have the courtesy to ring in advance so the cook expects you. Contact Murray on 027-478 4308 or the club house on 09-439 8024.

**Nov 11 Walshe Centennial Dinner**  
 MOTAT, Auckland.  
 1845 hrs at the new Aviation Display Hall MOTAT. A once-in-a-lifetime event will bring together the full spectrum of NZ Aviation community to recognise and celebrate the pioneering achievements of Leo and Vivian Walsh.  
 Tickets \$120 per head all inclusive. Contact Nev 521 7077 or [ann-nev@xtra.co.nz](mailto:ann-nev@xtra.co.nz) for more info.

**Nov 12-13 13<sup>th</sup> Black Sands Fly-In**  
 Raglan Airfield, Raglan  
 See article in the September issue for more detail. Also the SAANZ web site at [www.saa.org.nz](http://www.saa.org.nz) when it returns to operation. Contact is Bruce Cooke on 021-112 2364.

**Nov 12 Remembrance Day WW1 Airshow**  
 Hood Aerodrome, Masterton  
 1.00 to 6.00 p.m. More info at <http://thevintageaviator.co.nz/node>.

**Dec 4 NZ Warbirds Open Day**  
 Ardmore Aerodrome, Ardmore  
 Pearl Harbour Commemoration.

2012

**Jan 21 Joveux Noel WW1 Airshow**  
 Hood Aerodrome, Masterton  
 3.00pm to 8.00pm. More info at <http://thevintageaviator.co.nz/node>.

**Jan 26-30 SportAvex 2012 & Tauranga City Airshow**  
 Tauranga Airport, Tauranga  
 Relocated accommodation and facilities, aircraft parking etc.

## Tentative Schedule:

Thu 26<sup>th</sup> Arrivals  
 Fri 27<sup>th</sup> Seminars & Flying  
 Sat 28<sup>th</sup> Seminars & Flying  
 Sun 29<sup>th</sup> Airshow  
 Mon 30<sup>th</sup> Fly Home

A fly-out to Whitianga is being planned for Saturday. More info nearer the date.

**Mar 4-5 Warbirds Over Whitianga**  
 Whitianga Airfield, Whitianga  
 T51 2012 fly-in, Mercury Bay Aero Club. Light lunch, evening BBQ. Camp on the field or stay at local motels. Evening social with guest speaker John Williams, CEO of Titan Aircraft. Rain date 11-12 March. All welcome.

**Apr 06-08 Warbirds Over Wanaka International Airshow**  
 Wanaka Airfield, Wanaka  
 This airshow goes from strength to strength. A special event this year will be a low-level flypast by 40 privately owned jets following the end of the Hong Kong to Christchurch Silver Fern Air Race. Also open in time for WOW will be the new Warbirds and Wheels visitor attraction, which will include an ex RNZAF Skyhawk. Much more info at [www.warbirdsoverwanaka.com](http://www.warbirdsoverwanaka.com)

**Apr 28 ANZAC WW1 Airshow**  
 Hood Aerodrome, Masterton  
 12.00pm to 5.00pm. More info at <http://thevintageaviator.co.nz/node>.

If Chapter members are aware of any other events that could be of interest to others please pass the details on to Gordon Sanders at his email address - [gordon@sanders.gen.nz](mailto:gordon@sanders.gen.nz)